

Using Underground Mine Maps and Developing GIS for Pennsylvania's Mine Subsidence Insurance Program

- ⇒ Joe Taranto
- ⇒ Pennsylvania Dept of Environmental Protection
- ⇒ California District Office

Introduction

- ⇒ Mine Subsidence Insurance Program
- ⇒ GIS Data Layers
- ⇒ Subsidence investigation and how we used GPS, GIS, and mapping in the investigation.
- ⇒ Hill District, Pittsburgh, PA
- ⇒ Internal web-based GIS – “MSIWeb”
- ⇒ Act 155 Municipality Maps

Duties of our Tech Services Unit

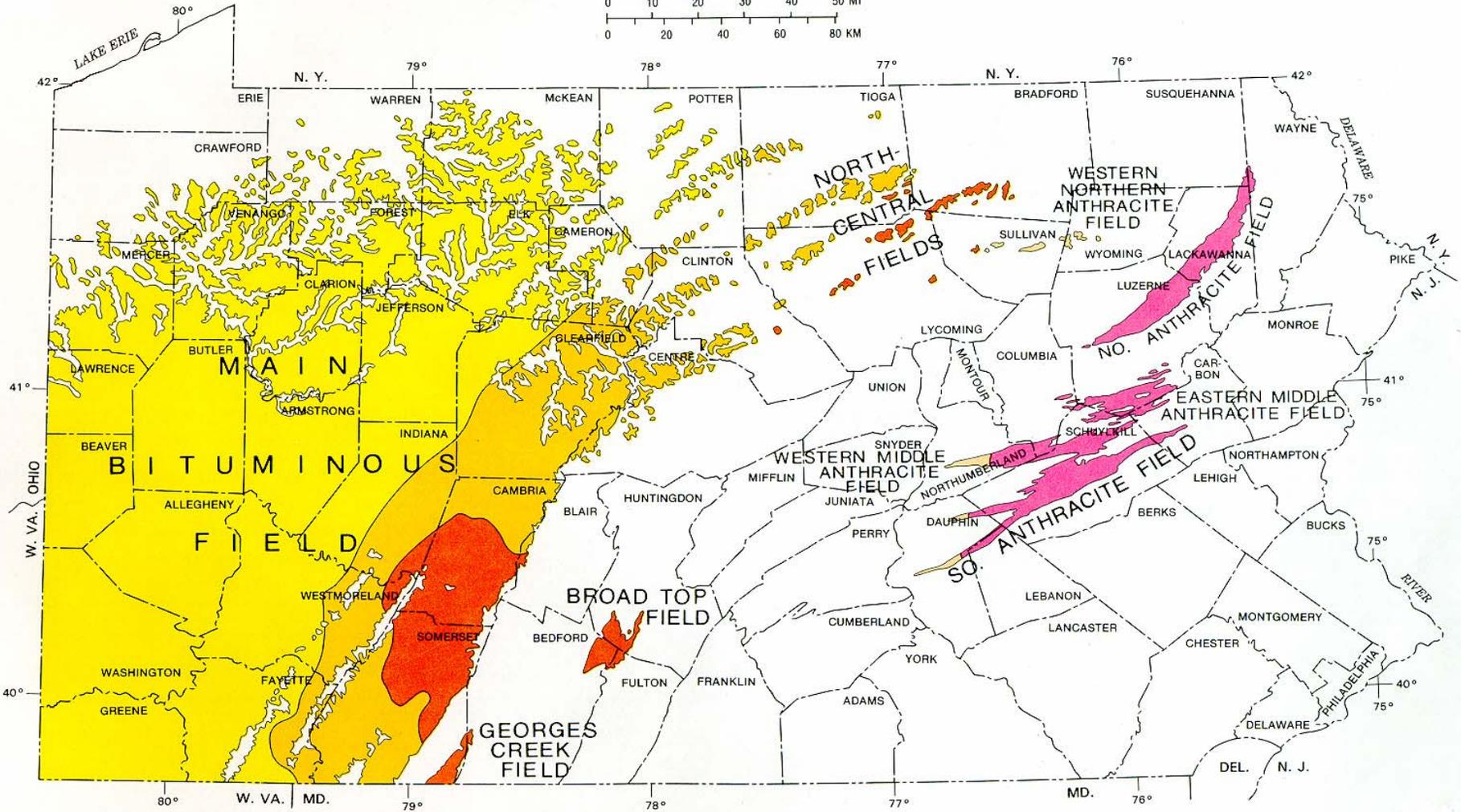
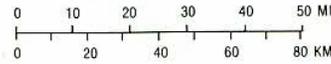
- ⇒ Mine map repository - mine map preservation and sharing of mapping and mining info.
- ⇒ Technical (mapping, GPS, GPS) support of our compliance and permitting staff.
- ⇒ Administer the Mine Subsidence Insurance (MSI) Program.

Pennsylvania Mine Subsidence Insurance Program

- ⇒ Established in 1961, administered by PA DEP.
- ⇒ Covers damage to home due to mine subsidence because most homeowner's insurance policies do not.
- ⇒ It is estimated that over one million homes in Pennsylvania are located above or near abandoned underground mines.

DISTRIBUTION OF PENNSYLVANIA COALS

SCALE 1:2,000,000



EXPLANATION

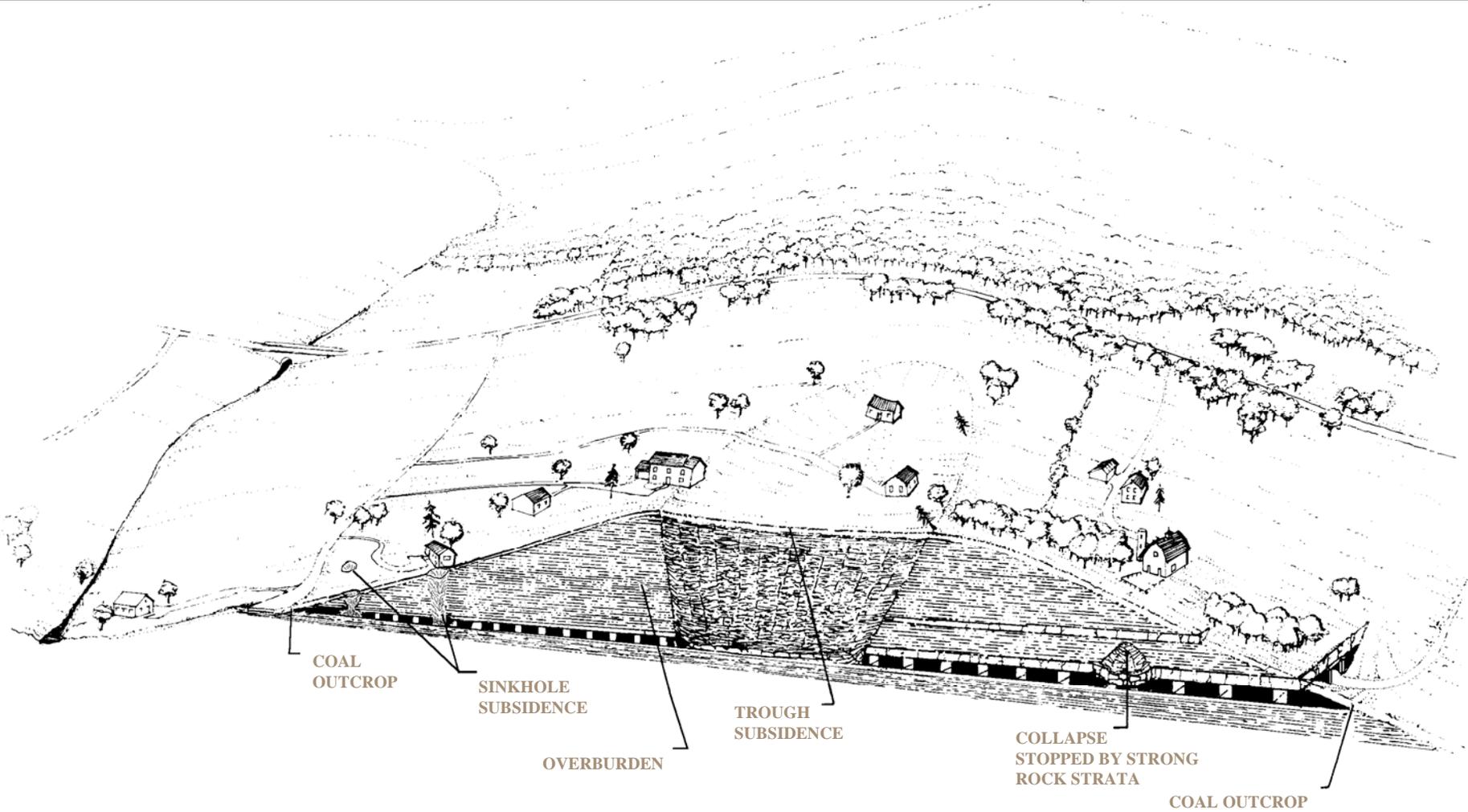
BITUMINOUS FIELDS



ANTHRACITE FIELDS



Mine Subsidence Diagram

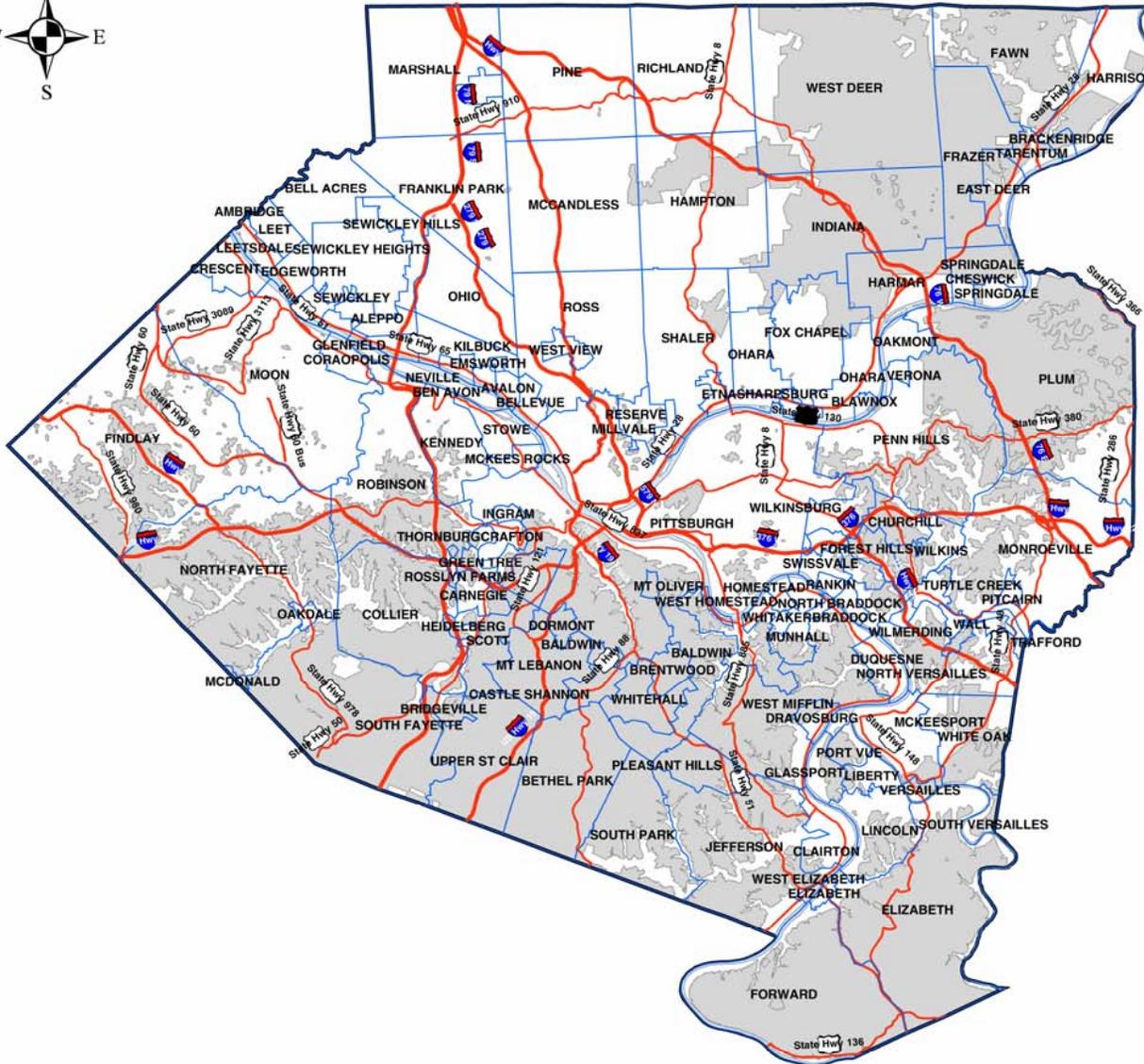








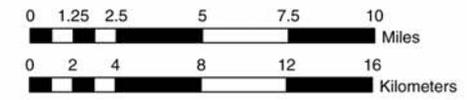
Undermined Areas of Allegheny County



Legend

- Interstate HWY
- US HWY
- State Routes
- Allegheny Co Municipalities
- Undermined Areas

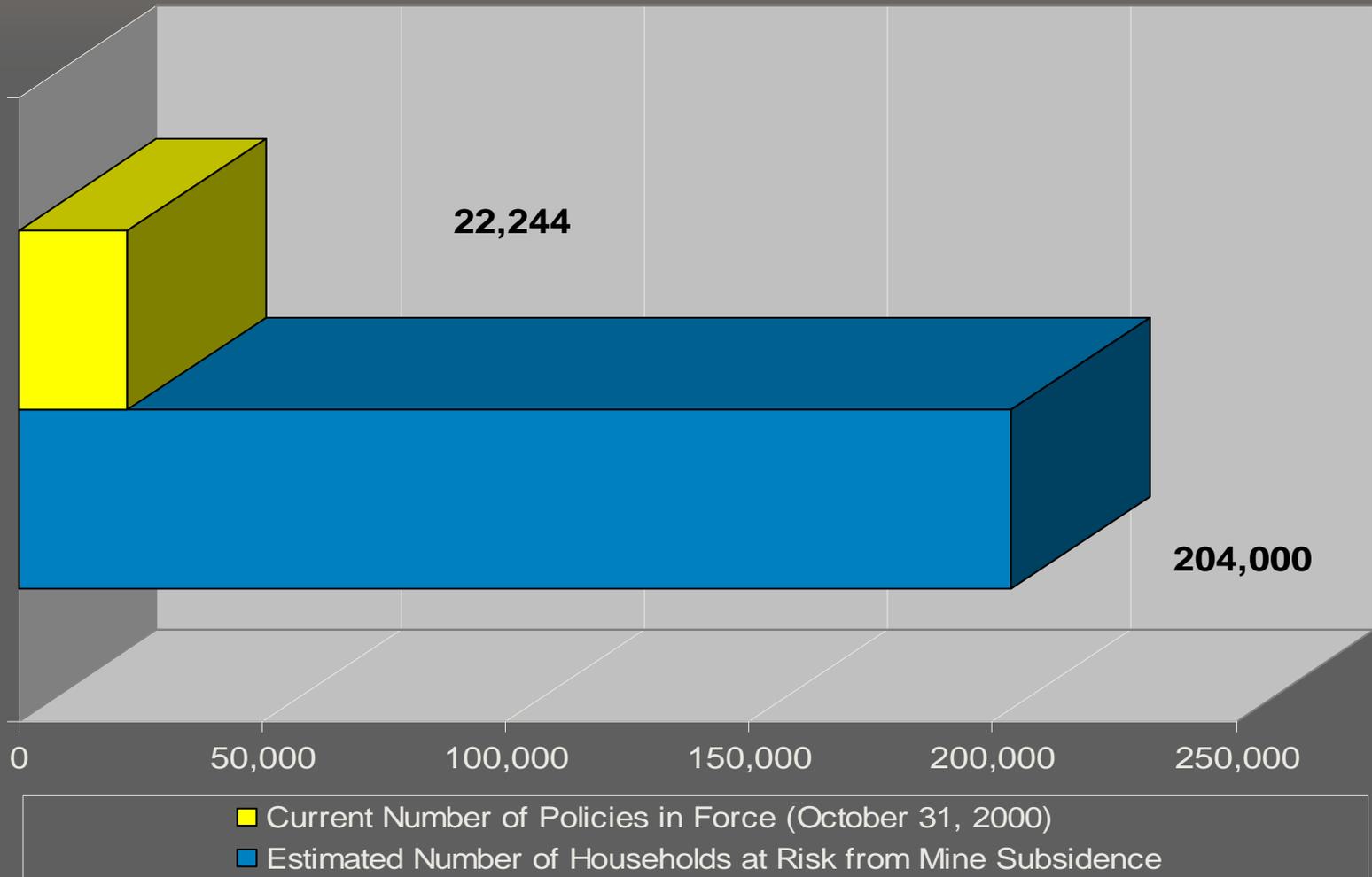
Prepared by:
 Pennsylvania Department of
 Environmental Protection
 California District Office
 Mine Subsidence Section
 Technical Services Unit
 February 2004



This map was prepared using information considered to be the best historical data available. The Department cannot verify the accuracy or completeness of this information.

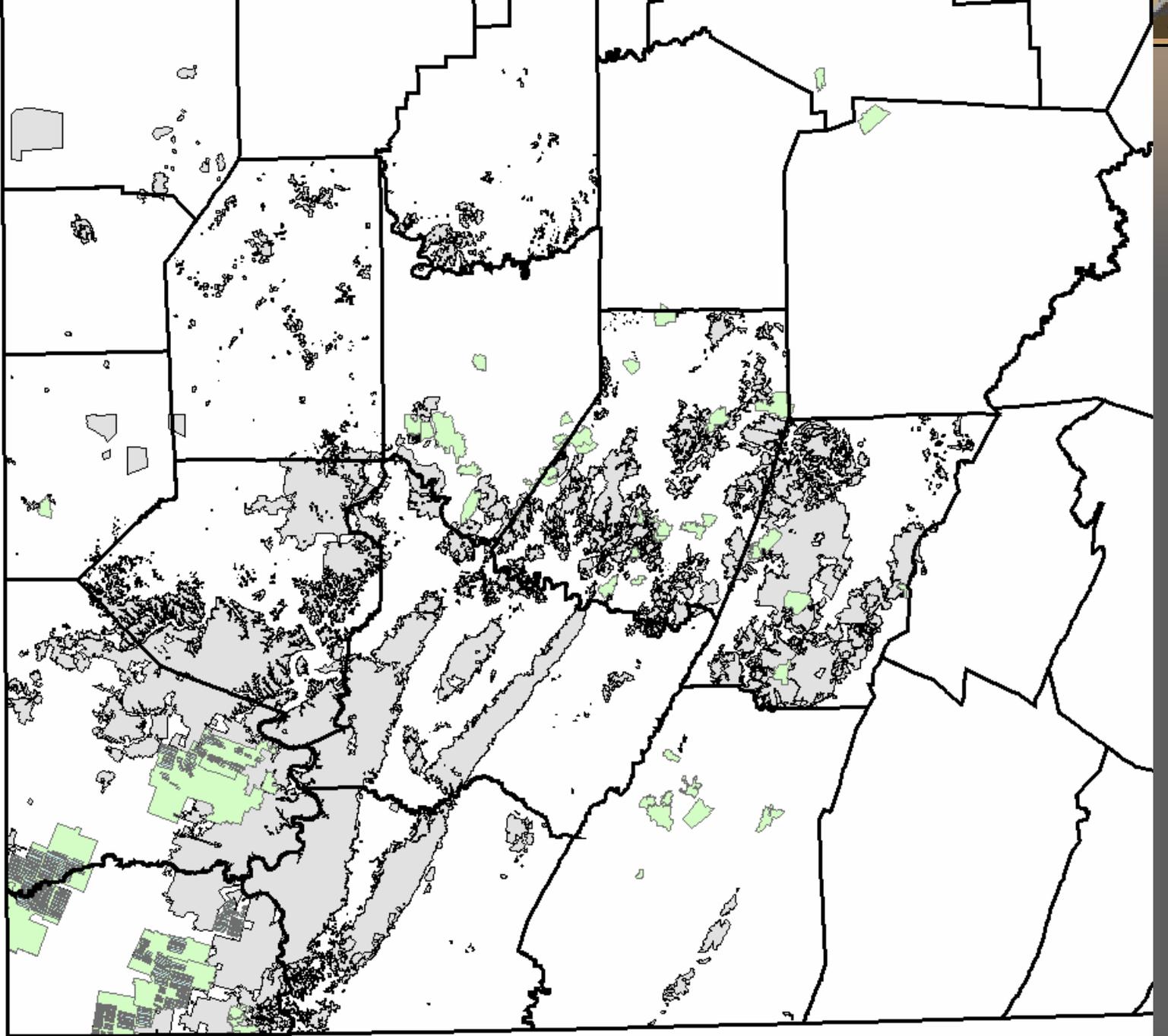


ALLEGHENY COUNTY



GIS Data Layers

- ⇒ "Bituminous Mining"
- ⇒ "Active Mine Permit Boundaries"
- ⇒ "Mine Subsidence Insurance Claims" as well as "BAMR Inquiries" and "OSM Projects"
- ⇒ "Subsidence Events"



- Layers**
- SUBSIDENCE CLAIMS
 - SUBSIDENCE EVENTS
 - MSI CLAIMS
 - STATUS
 - SUPPORTED
 - OPEN
 - DENIED
 - ABANDONED OR WITHDRAWN
 - BAMR INQUIRIES
 - OSM PROJECTS
 - POLITICAL LAYERS
 - COUNTY BOUNDARIES
 - MINOR CIVIL DIVISIONS
 - STREETS
 - MINING LAYERS
 - ACTIVE UNDERGROUND MINES
 - MINED AREAS

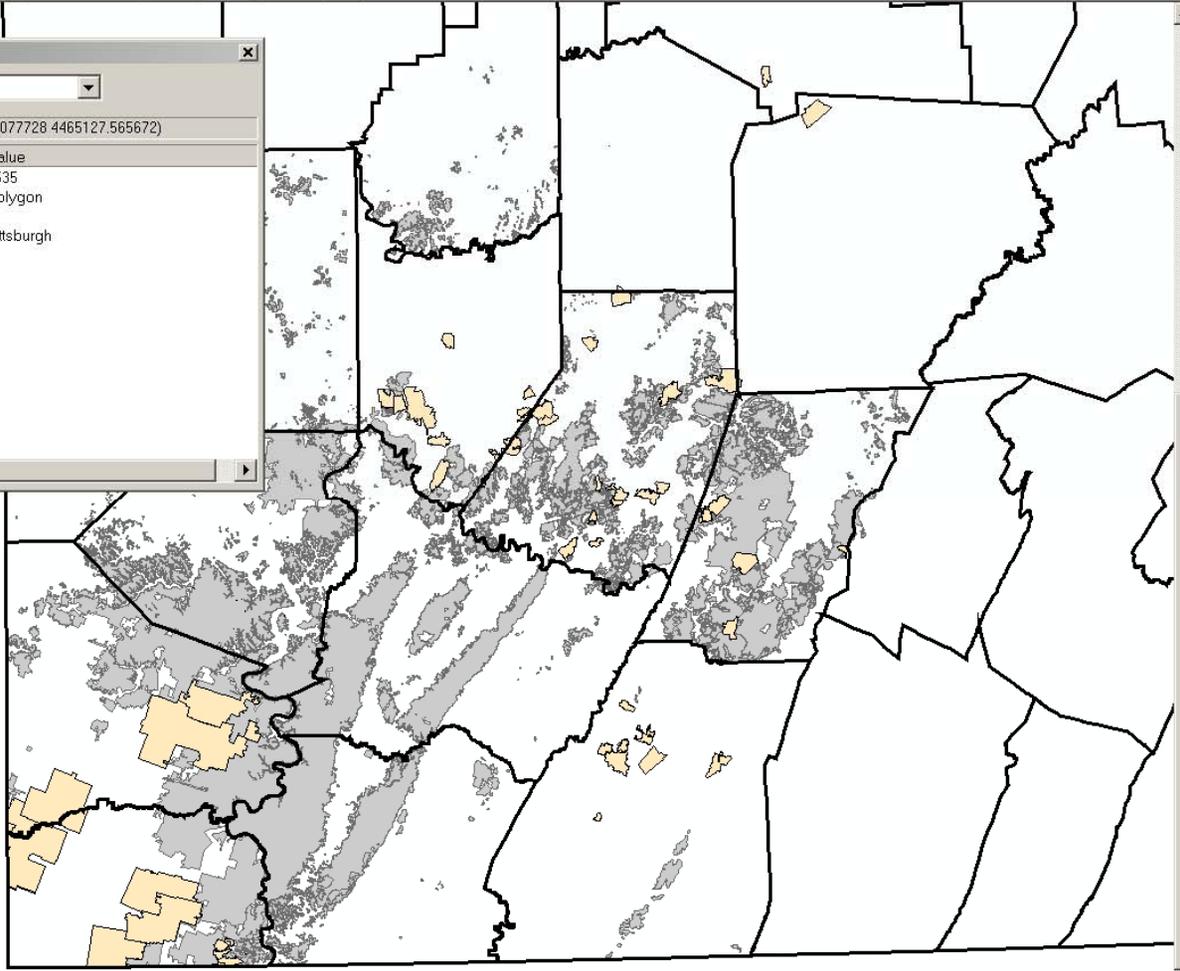
Identify Results

Layers: MINING LAYERS

- MINING LAYERS
 - MINED AREAS
 - pittsburgh

Location: (579741.077728 4465127.565672)

Field	Value
FID	1535
Shape	Polygon
ID	0
COAL_SEAM	pittsburgh



Layers

- SUBSIDENCE CLAIMS
- SUBSIDENCE EVENTS
- MSI CLAIMS
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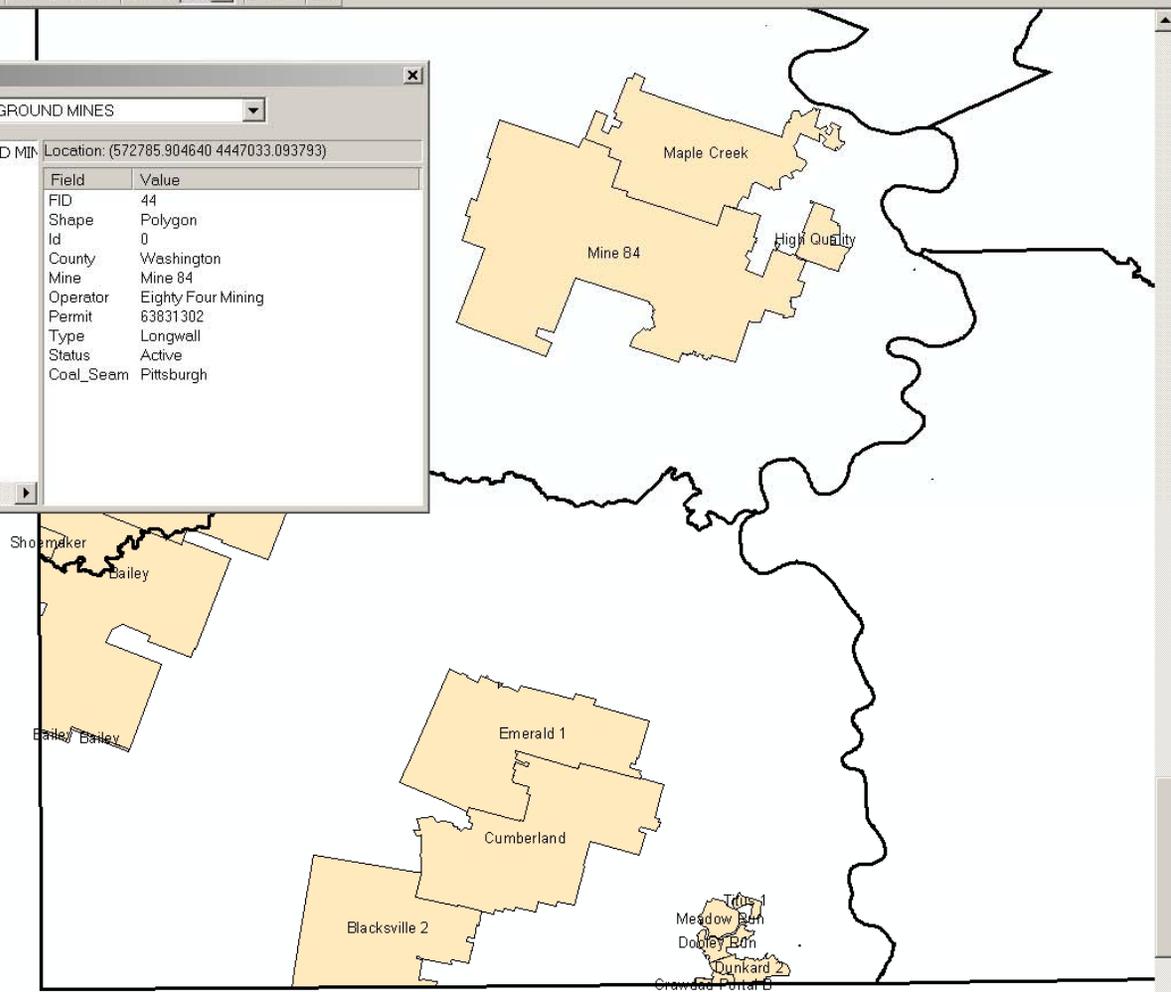
Identify Results

Layers: ACTIVE UNDERGROUND MINES

ACTIVE UNDERGROUND MINES Location: (572785.904640 4447033.093793)

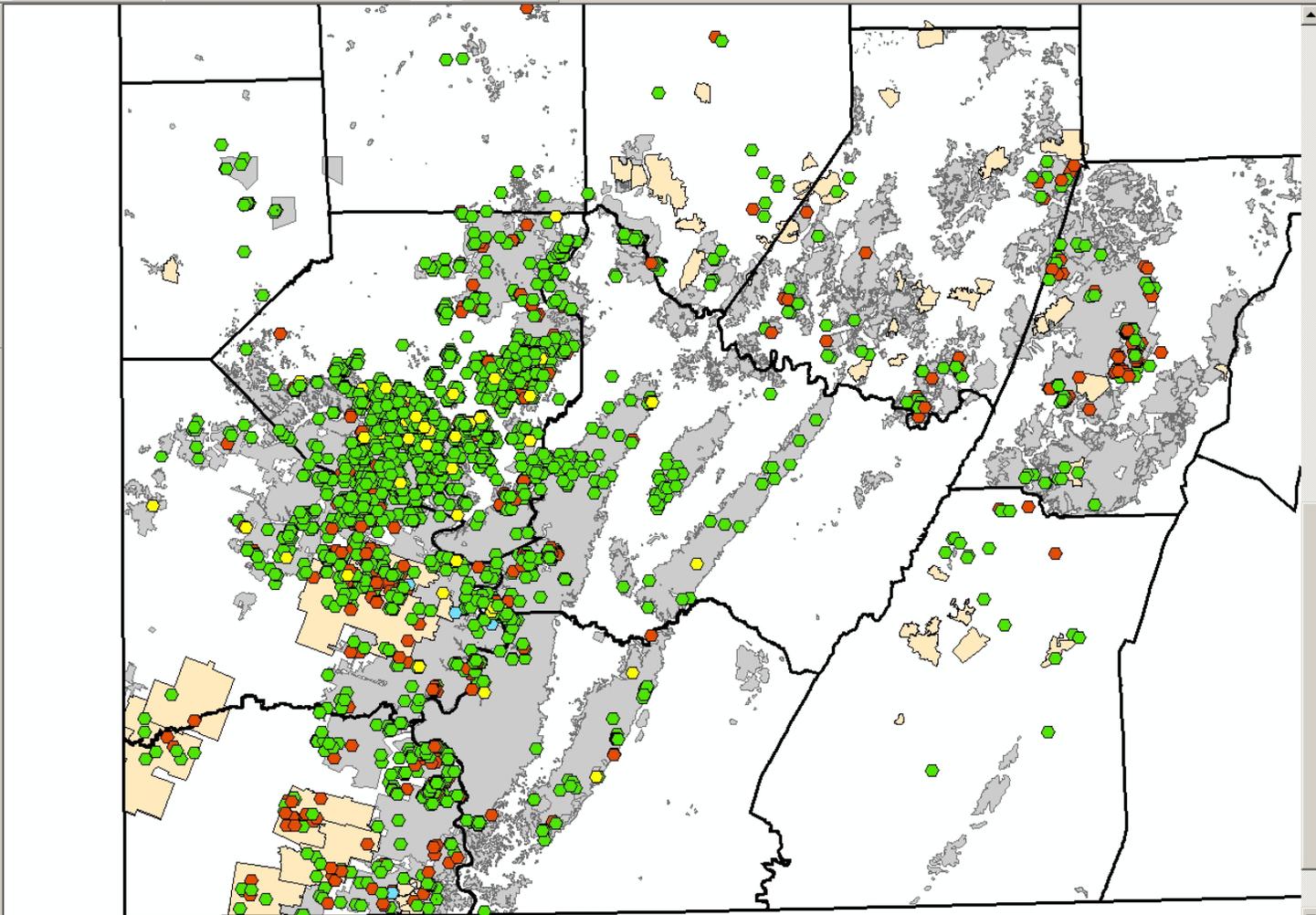
- Washington

Field	Value
FID	44
Shape	Polygon
Id	0
County	Washington
Mine	Mine 84
Operator	Eighty Four Mining
Permit	63831302
Type	Longwall
Status	Active
Coal_Seam	Pittsburgh



Layers

- SUBSIDENCE CLAIMS
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Layers

- SUBSIDENCE CLAIMS
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Identify Results

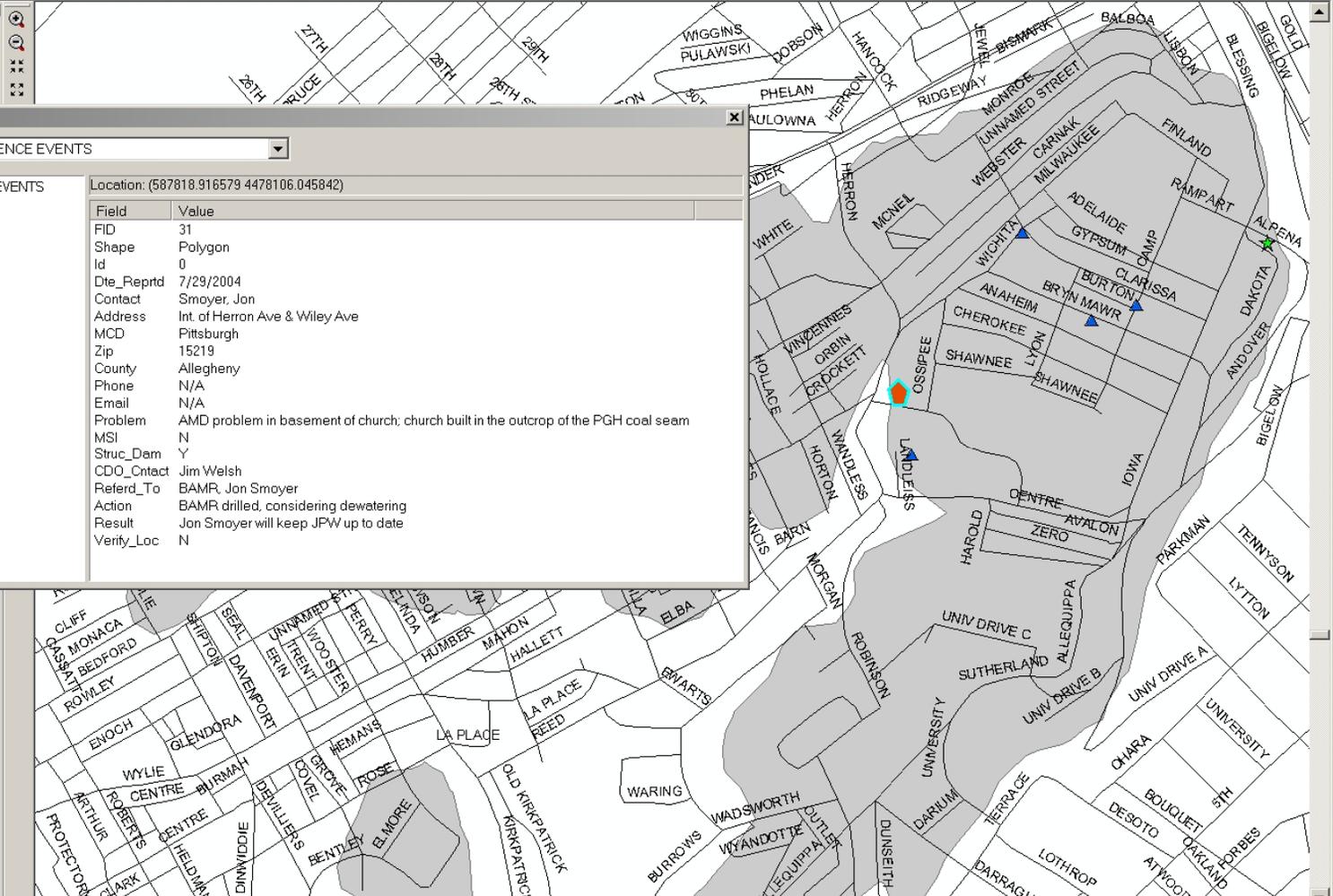
Layers: SUBSIDENCE EVENTS

Location: (587818.916579 4478106.045842)

SUBSIDENCE EVENTS

7/29/2004

Field	Value
FID	31
Shape	Polygon
Id	0
Dte_Reprtd	7/29/2004
Contact	Smoyer, Jon
Address	Int. of Herron Ave & Wiley Ave
MCD	Pittsburgh
Zip	15219
County	Allegheny
Phone	N/A
Email	N/A
Problem	AMD problem in basement of church; church built in the outcrop of the PGH coal seam
MSI	N
Struc_Dam	Y
CDO_Contact	Jim Welsh
Referd_To	BAMR, Jon Smoyer
Action	BAMR drilled, considering dewatering
Result	Jon Smoyer will keep JFW up to date
Verify_Loc	N



South Fayette Twp Subsidence

- ⇒ MSI Damage Claim
- ⇒ Subsidence investigation and how we used GPS and GIS in the investigation.



SEP 21 2004



SEP 21 2004



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Dindak Subsidence





NOV 30 2004



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NOV 30 2004

Hill District, Pittsburgh, PA

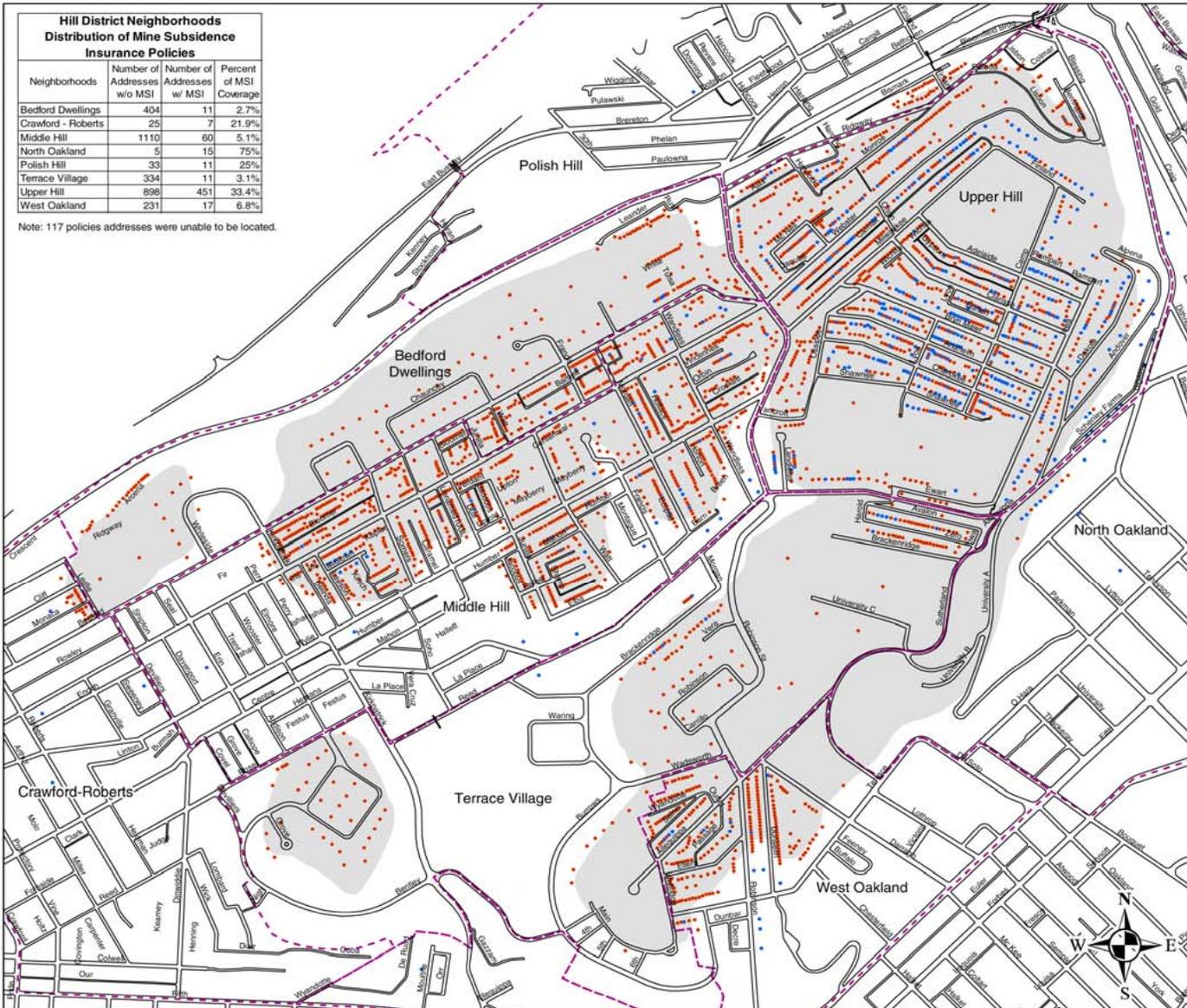
- ⇒ A project was being done by another PA DEP bureau and we were called to inform the public about mining and MSI.
- ⇒ We are using our GIS in several different ways to inform and educate the public.

Abandoned Coal Mining in the Hill District, Pittsburgh, PA

**Hill District Neighborhoods
Distribution of Mine Subsidence
Insurance Policies**

Neighborhoods	Number of Addresses w/o MSI	Number of Addresses w/ MSI	Percent of MSI Coverage
Bedford Dwellings	404	11	2.7%
Crawford - Roberts	25	7	21.9%
Middle Hill	1110	60	5.1%
North Oakland	5	15	75%
Polish Hill	33	11	25%
Terrace Village	334	11	3.1%
Upper Hill	898	451	33.4%
West Oakland	231	17	6.8%

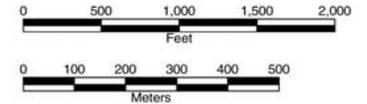
Note: 117 policies addresses were unable to be located.



Legend

- Addresses with Mine Subsidence Insurance
- Addresses without Mine Subsidence Insurance
- Hill District Neighborhoods
- Mined Area

Prepared by:
Pennsylvania Department of Environmental Protection
California District Office
Mine Subsidence Section
Technical Services Unit
October 2004



Map consists of street outlines and neighborhood boundaries overlaid on the approximate mined areas.

The map shows a point location of the addresses with and without Mine Subsidence Insurance.

This map was prepared using information considered to be the best data available.

The Department cannot verify the accuracy or completeness of this information.

City of Pittsburgh



Location Map



Abandoned Coal Mining in the Hill District, Pittsburgh, PA

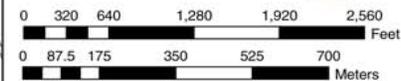


Legend

- Street Outlines
- Hill District Neighborhoods
- Mined Out Areas



Prepared by:
 Pennsylvania Department of
 Environmental Protection
 Mine Subsidence Section
 March 5, 2003



Map consists of street outlines and neighborhood boundaries overlaid on approximate mined out areas.

The above information may be based on maps and plans obtained from various sources.

The Department assumes no responsibility for the accuracy or completeness of this information.

City of Pittsburgh, Allegheny County



MSIWeb

- ⇒ Internal web-based GIS that is used to locate addresses and inform MSI applicants of the mining in the area.
- ⇒ System is also used by our subsidence investigators to locate structure address and review the past claims and events in the area.

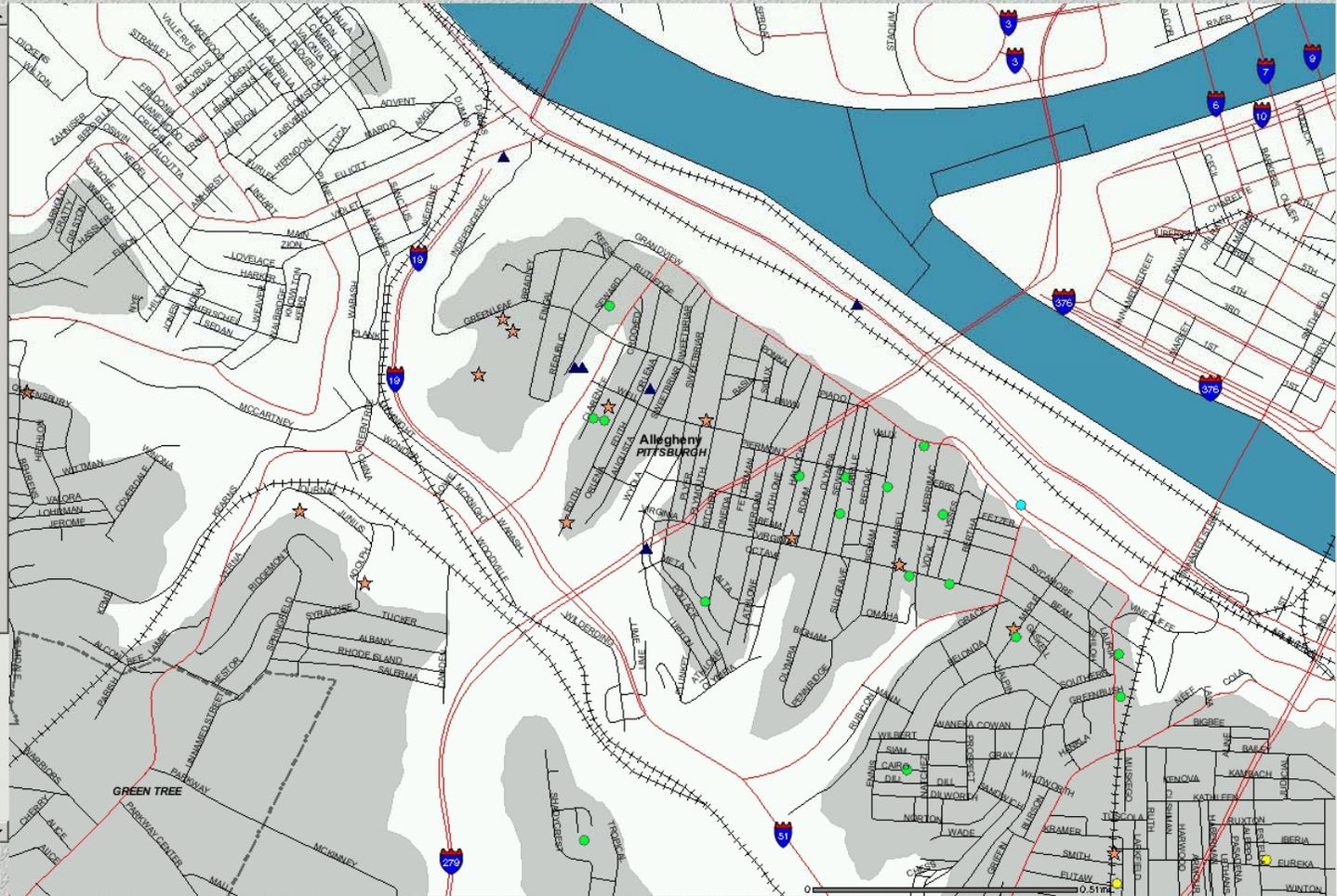


MSIWeb

Active Layer: Subsidence Events



- MSI Layers**
- Political
 - Civil Divisions
 - County Boundary
 - Topo Index
 - Zip Boundary
 - Claims
 - Subsidence Events
 - MSI Claims
 - Supported
 - Open
 - Denied
 - Abandoned
 - Withdrawn
 - BAMR Inquiries
 - OSM Projects
 - Cultural
 - Airports
 - Cemetery
 - Railways
 - Highways
 - Streets
 - Water Resources
 - Minor Streams
 - Water Bodies
 - Mining
 - Active Underground Mine Permit Boundary
 - Active
 - Pending
 - Bituminous Mining
 - Known
 - Suspected
 - Mined Out Areas, Per Other Sources



Refresh Map

Scale 1:

Scale 1: 100000

Current Tool: Zoom In

Go



MSIWeb

Active Layer: Subsidence Events



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Search and Locate - Microsoft Internet Exp...

Street Name: 25 technology drive

Zipcode: 15423

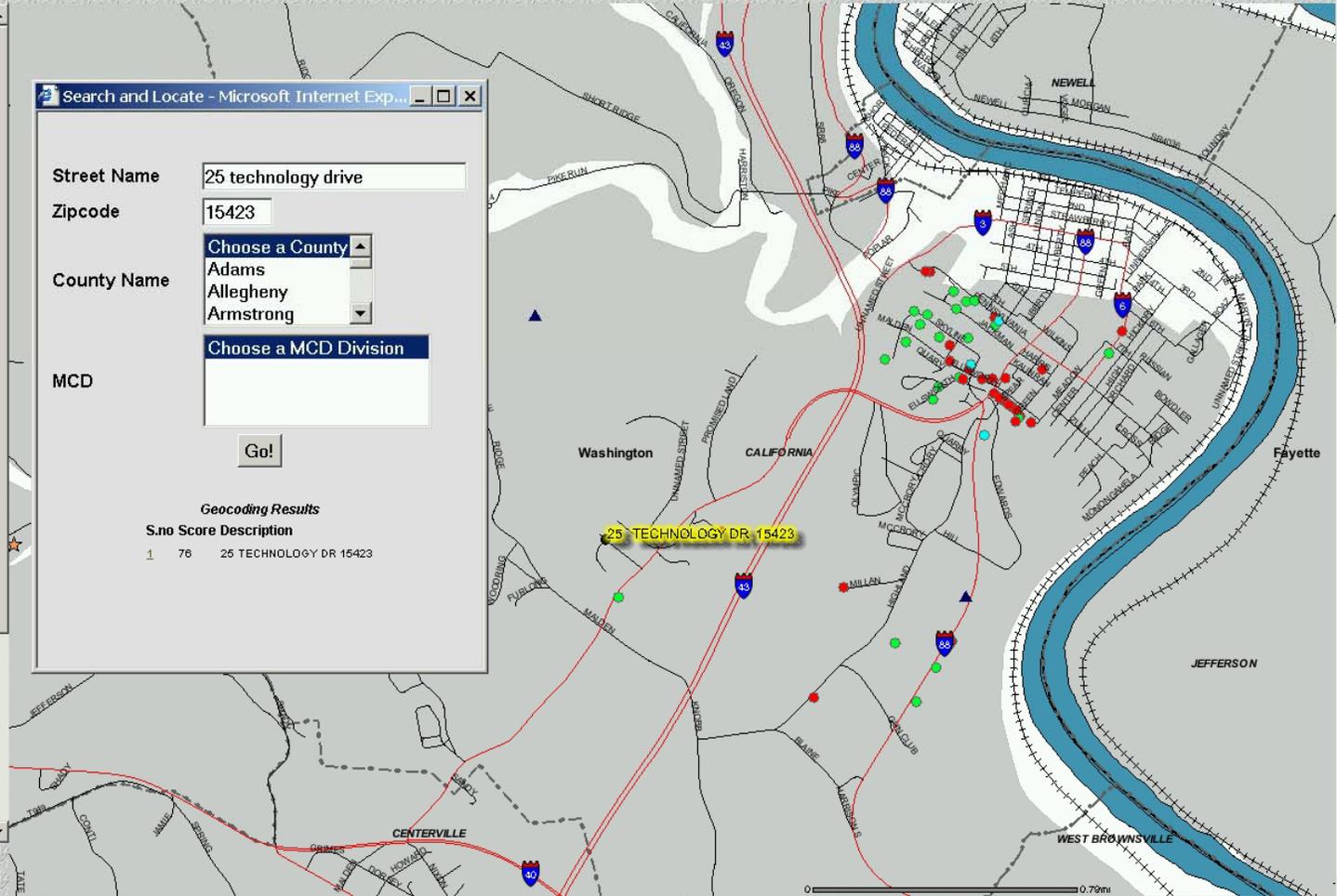
County Name: Adams, Allegheny, Armstrong

MCD: Choose a MCD Division

Go!

Geocoding Results

S.no	Score	Description
1	76	25 TECHNOLOGY DR 15423



Refresh Map

Scale 1:

Scale 1: 20000

Current Tool: Pan

Go

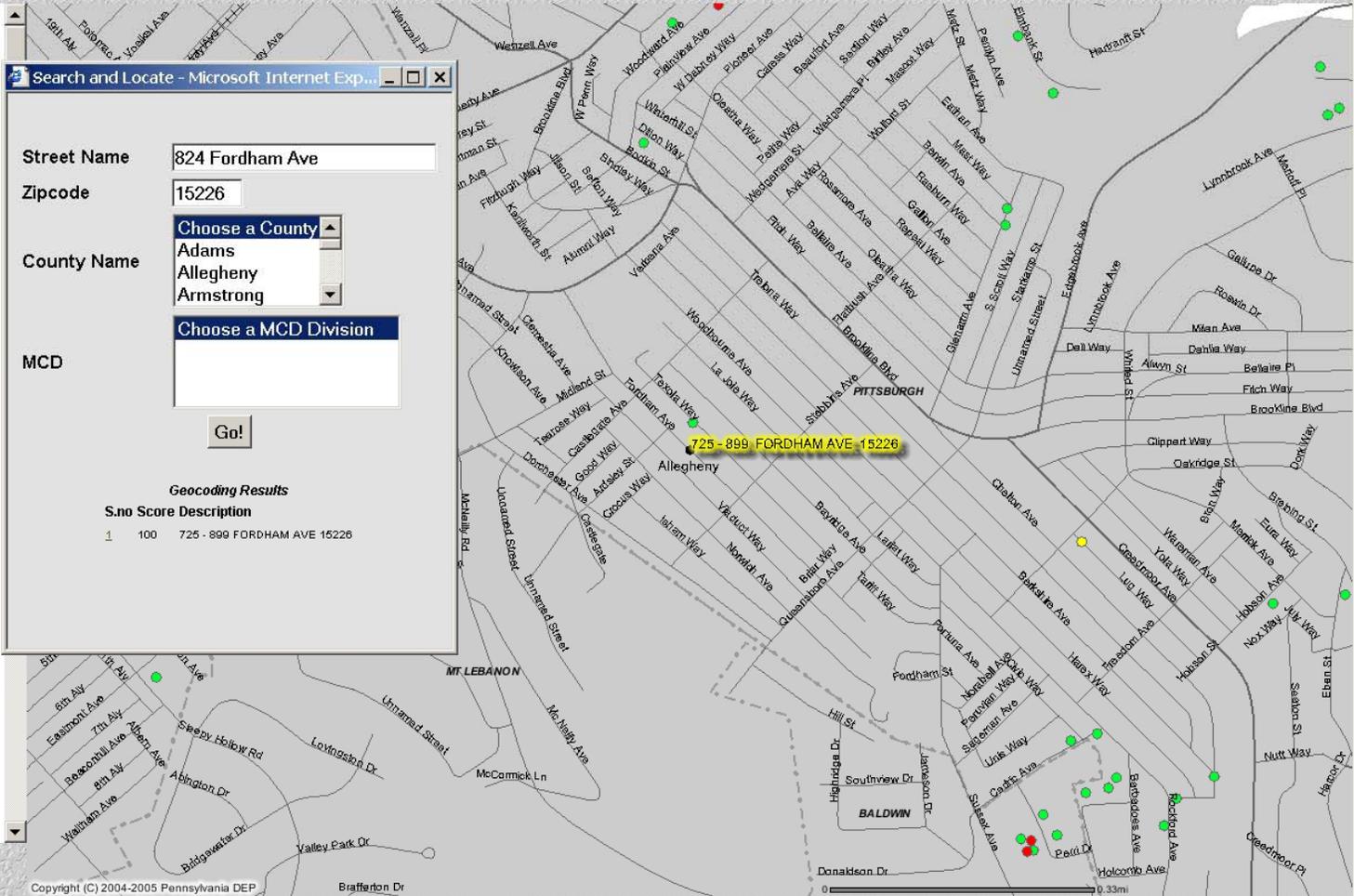


MSIWeb

Active Layer: MSI Claims



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 - Minor Civil Divisions
 - Quad Boundaries
 - Zip Codes
 - Water Resources
 - Major Water Bodies
 - Streams
 - Transportation Networks
 - Active Railroads
 - Airports
 - Interstates
 - US Routes
 - State Routes
 - Major Roads
 - Local Roads



Refresh Map

Scale 1: **Go**

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Scale 1 : 8282

Current Tool : Zoom In



MSIWeb

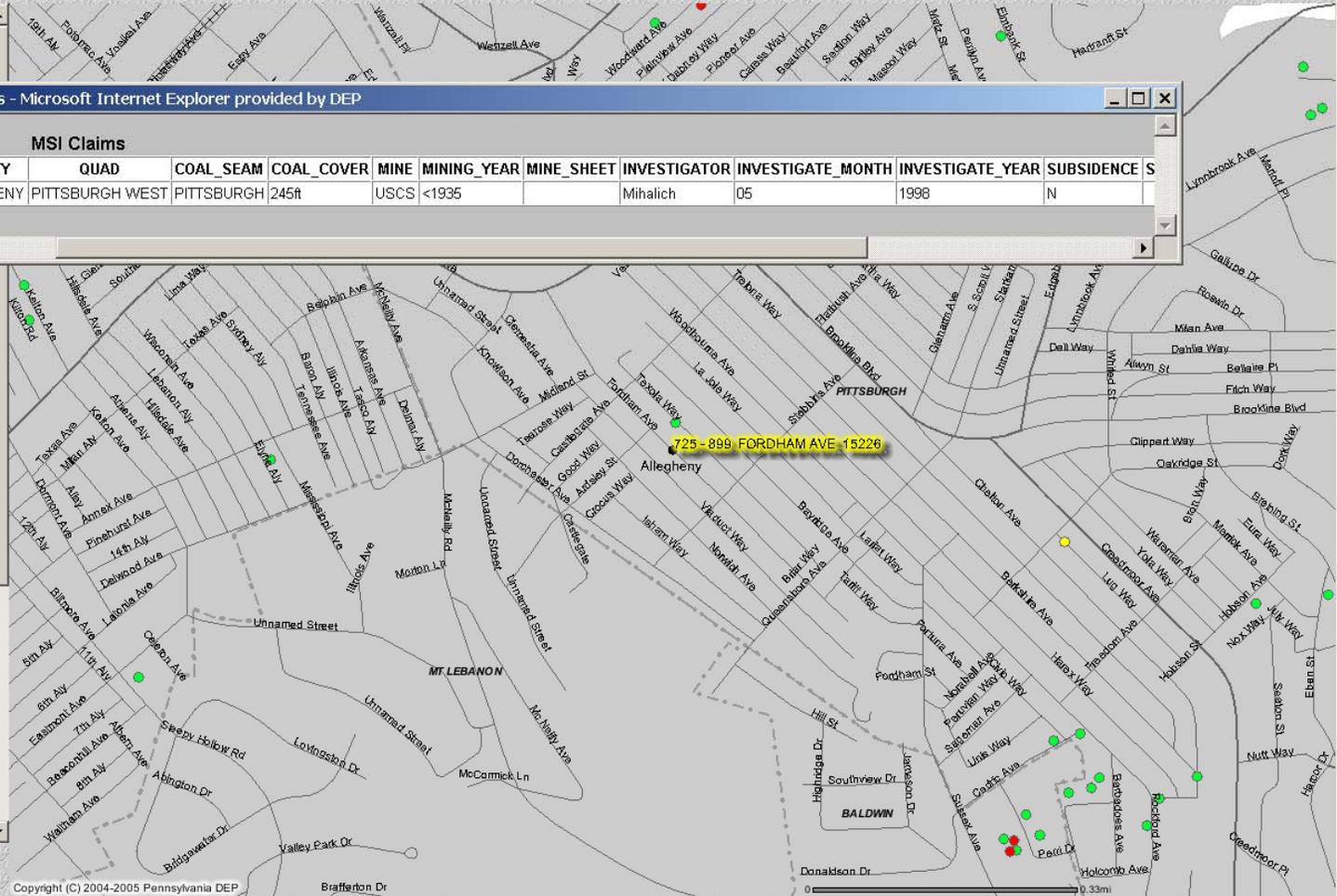
Active Layer: MSI Claims



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 - State Routes
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 - Local Roads

Query/Selection Results - Microsoft Internet Explorer provided by DEP

MSI Claims												
STATUS	MCD	COUNTY	QUAD	COAL_SEAM	COAL_COVER	MINE	MINING_YEAR	MINE_SHEET	INVESTIGATOR	INVESTIGATE_MONTH	INVESTIGATE_YEAR	SUBSIDENCE S
D	Pittsburgh	ALLEGHENY	PITTSBURGH WEST	PITTSBURGH	245ft	USCS	<1935		Mihalich	05	1998	N



Refresh Map

Scale 1: Go

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Scale 1: 8282

Current Tool: Identify

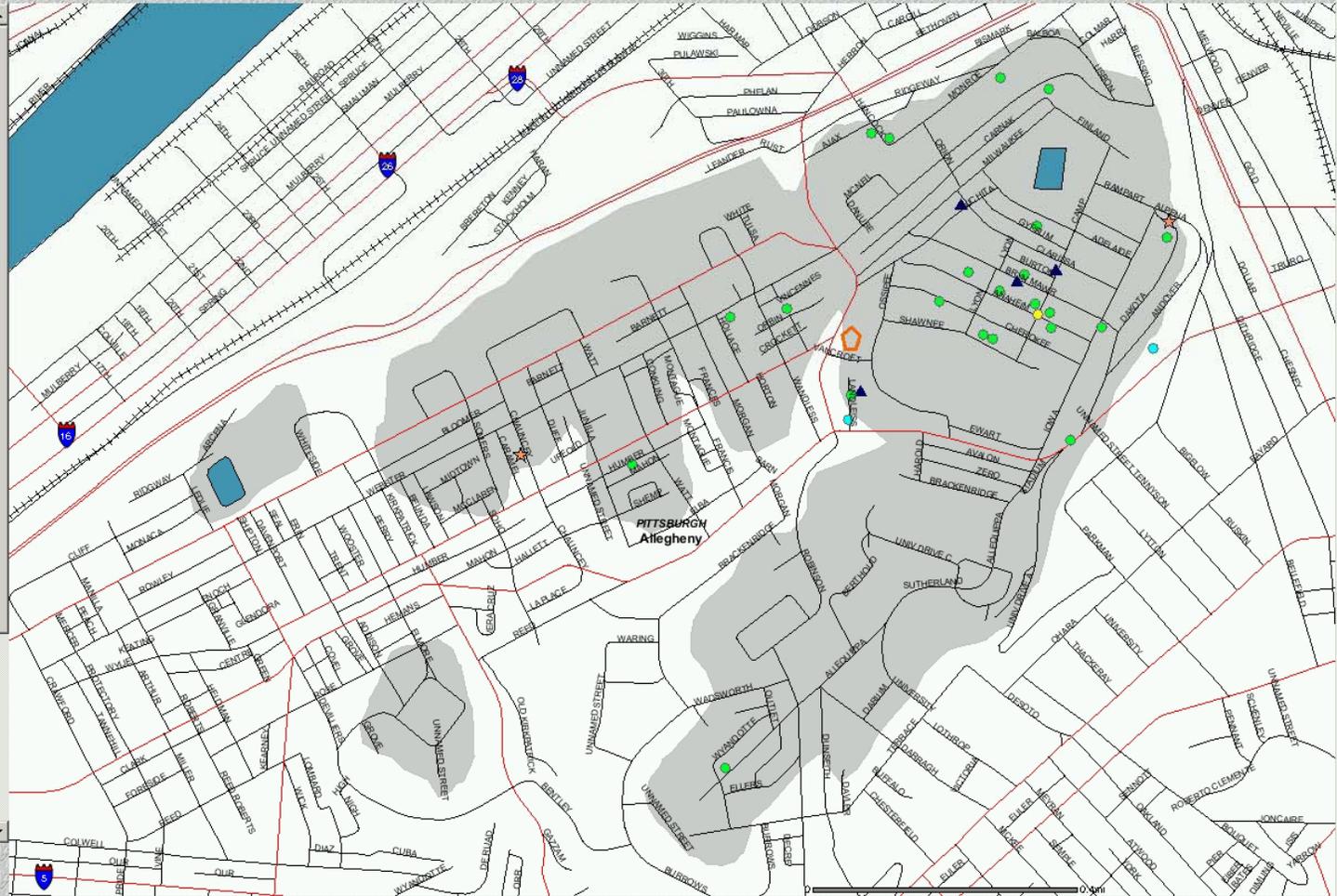


MSIWeb

Active Layer: Subsidence Events



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Refresh Map

Scale 1:

Go

Scale 1: 16294

Current Tool: Zoom In



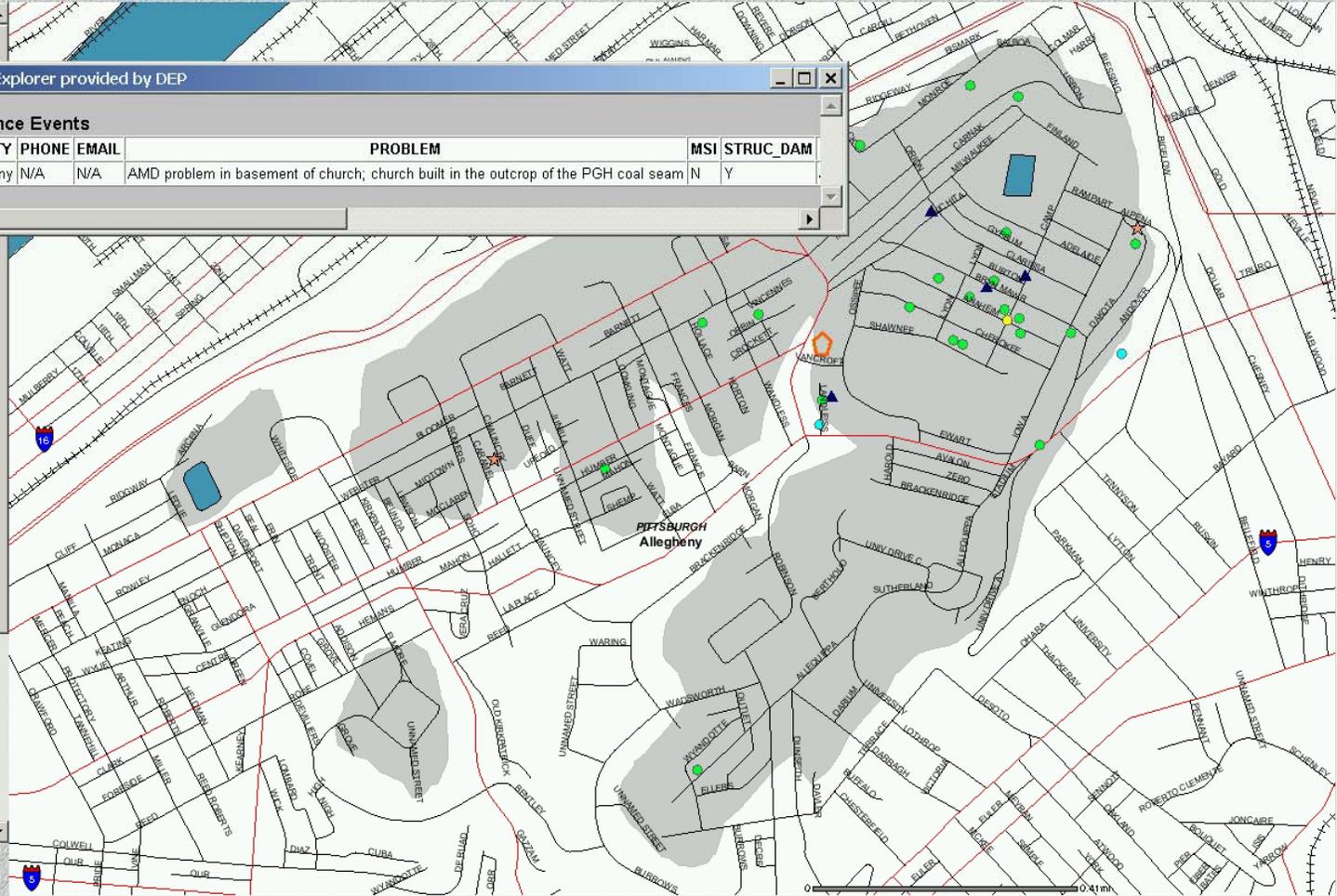
Active Layer: Subsidence Events



MSI Layers

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Subsidence Events								
ADDRESS	MCD	ZIP	COUNTY	PHONE	EMAIL	PROBLEM	MSI	STRUC_DAM
Int. of Herron Ave & Wiley Ave	Pittsburgh	15219	Allegheny	N/A	N/A	AMD problem in basement of church, church built in the outcrop of the PGH coal seam	N	Y



Refresh Map

Scale 1:

Scale 1: 10339

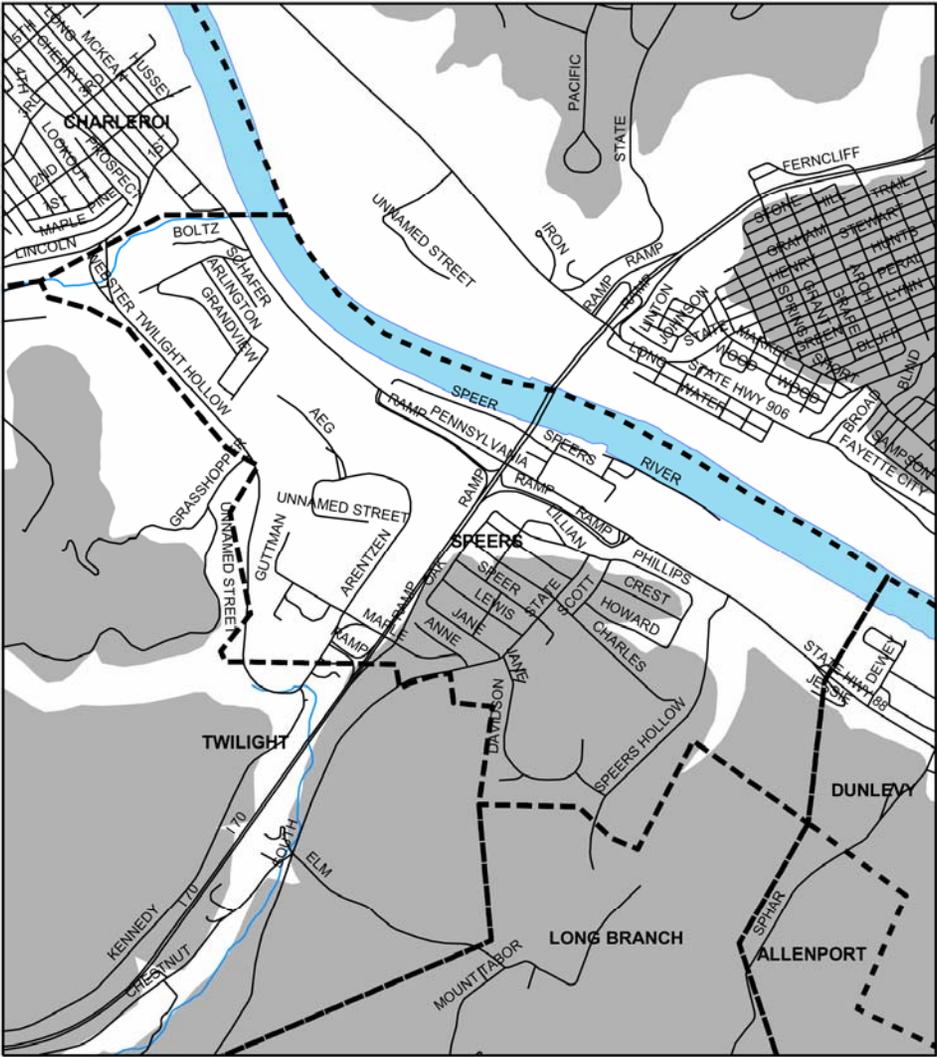
Current Tool: Identify

Go

Act 155 Municipality Maps

- ⇒ A map was made for each municipality where we have record of mining in the ten counties that we have GIS coverage.
- ⇒ These maps are used by insurance agents to sell our MSI.

Speers Boro, Washington County



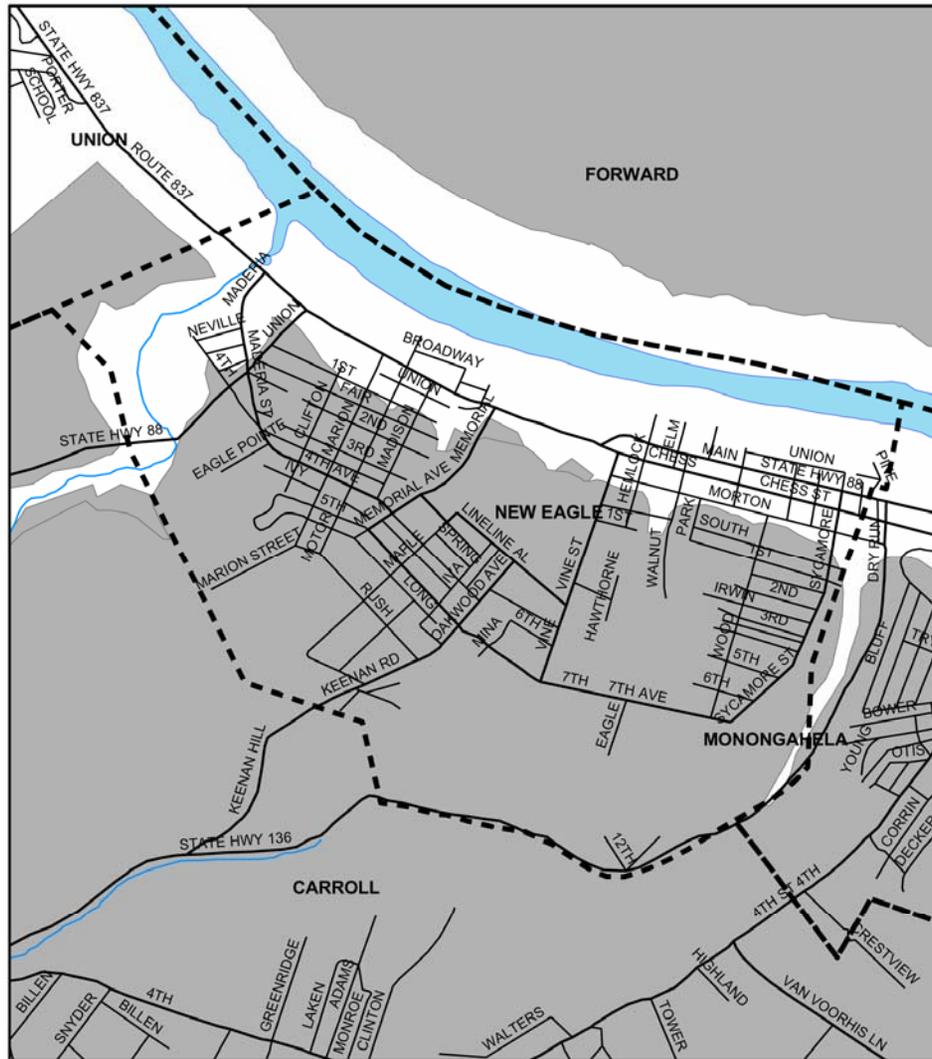
Legend

- Municipality Boundary
- Undermined Area



This map was prepared using information considered to be the best historical data available. The Department cannot verify the accuracy or completeness of this information.

New Eagle Boro, Washington County



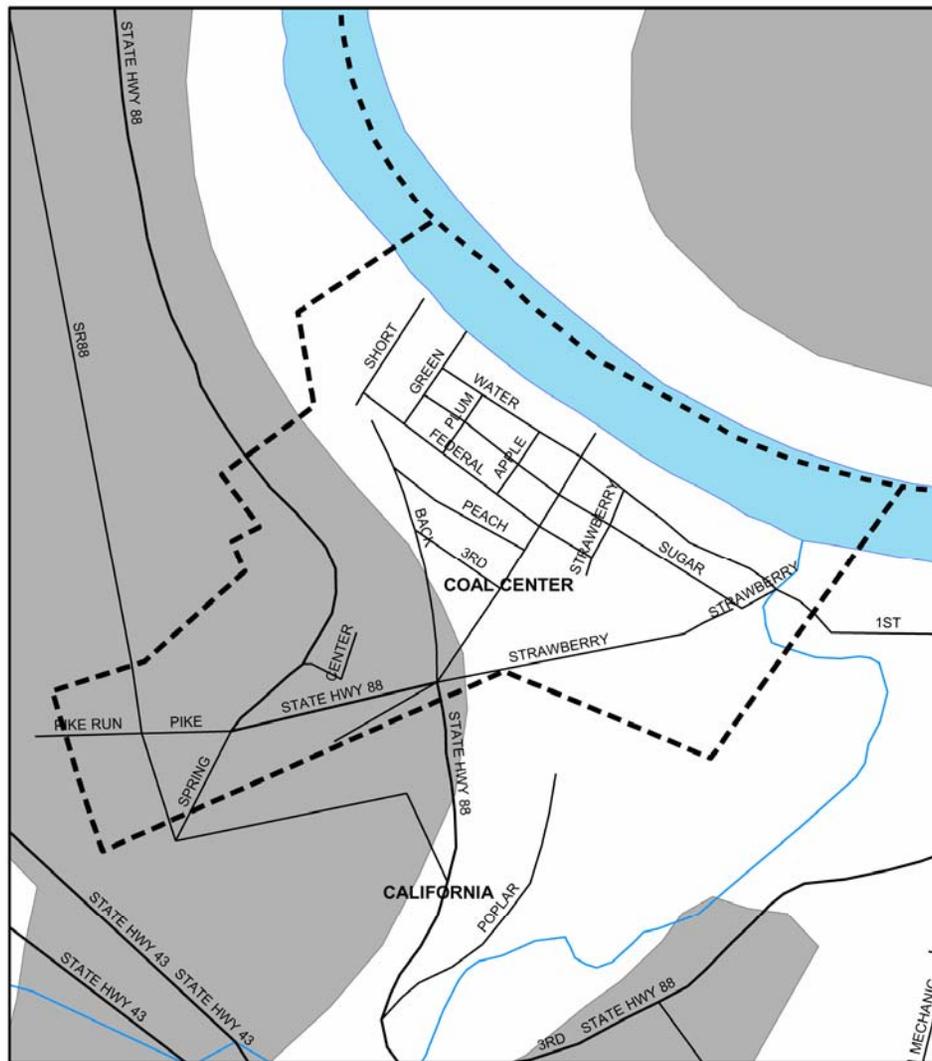
Legend

-  Municipality Boundary
-  Undermined Area



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Coal Center Boro, Washington County

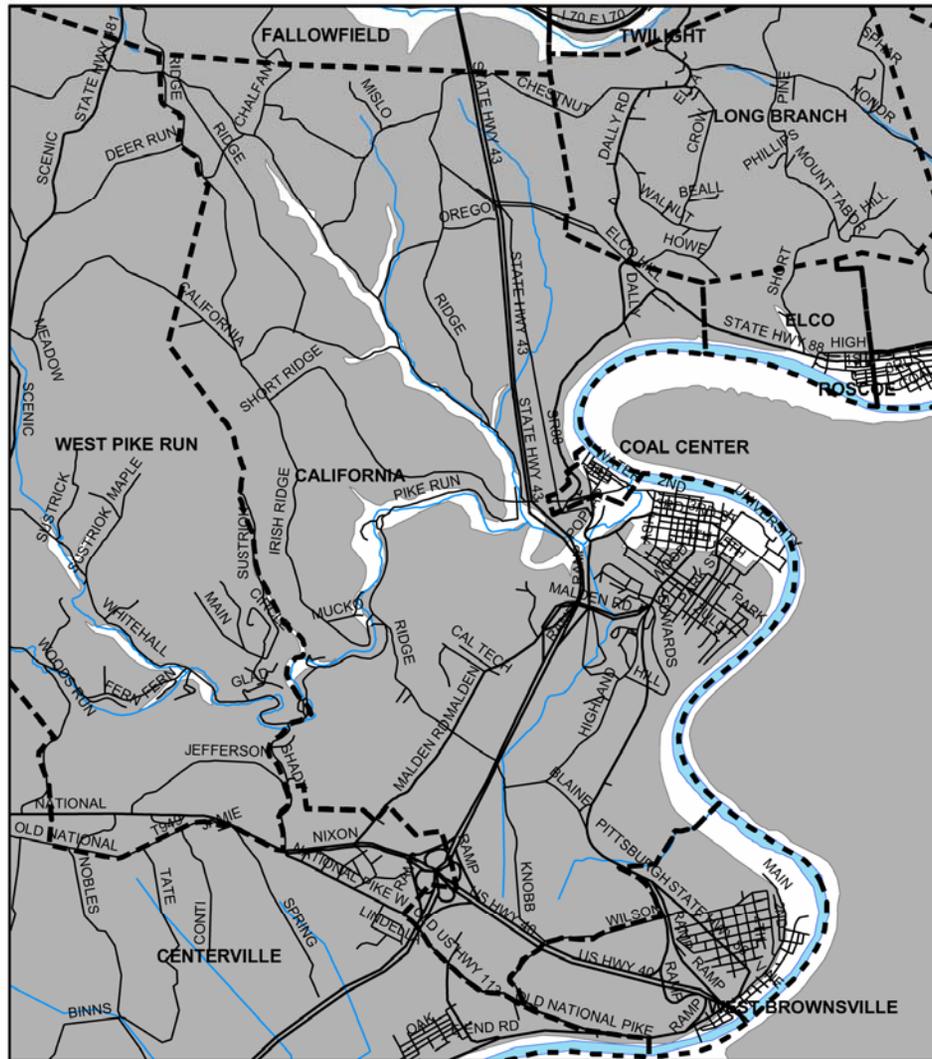


Legend

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-  Undermined Area

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California Boro, Washington County



Legend

- Municipality Boundary
- Undermined Area



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Conclusion

- ⇒ GIS is a valuable tool used to organize and share mine mapping and mining info.
- ⇒ GIS has been very important in the development of the PA Mine Subsidence Insurance Program.
- ⇒ We will continue to further develop our data layers and systems.

Thank you

- ⇒ Joe Taranto
- ⇒ PA DEP
- ⇒ Mine Subsidence Insurance Program

