



South Dakota State University
Department of Sociology & Rural Studies

Risks to Communities from Shale Gas Development

National Research Council

Workshop on Risks from Shale Gas Development

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By:

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Agenda

1. The Blessing and “Curse” of Natural Resources

2. Four Risks to Communities

- Industrialization**
- Corrosion**
- Contamination**
- Disruption**

3. Four Gaps in the Knowledge

Agenda

Very little knowledge of community effects of shale energy in particular

Agenda

Very little knowledge of community effects of shale energy in particular

Much more knowledge of:

- **Other types of energy development**
- **Environmental Contamination and Change**
- **Technological Disaster**

The Blessing of Natural Resources

- **Jobs, Jobs, Jobs**
 - Well paying!
 - Plentiful!
 - Often not many other options in Rural America.



Photo: Brian Hall

The Blessing of Natural Resources

Opportunity for:

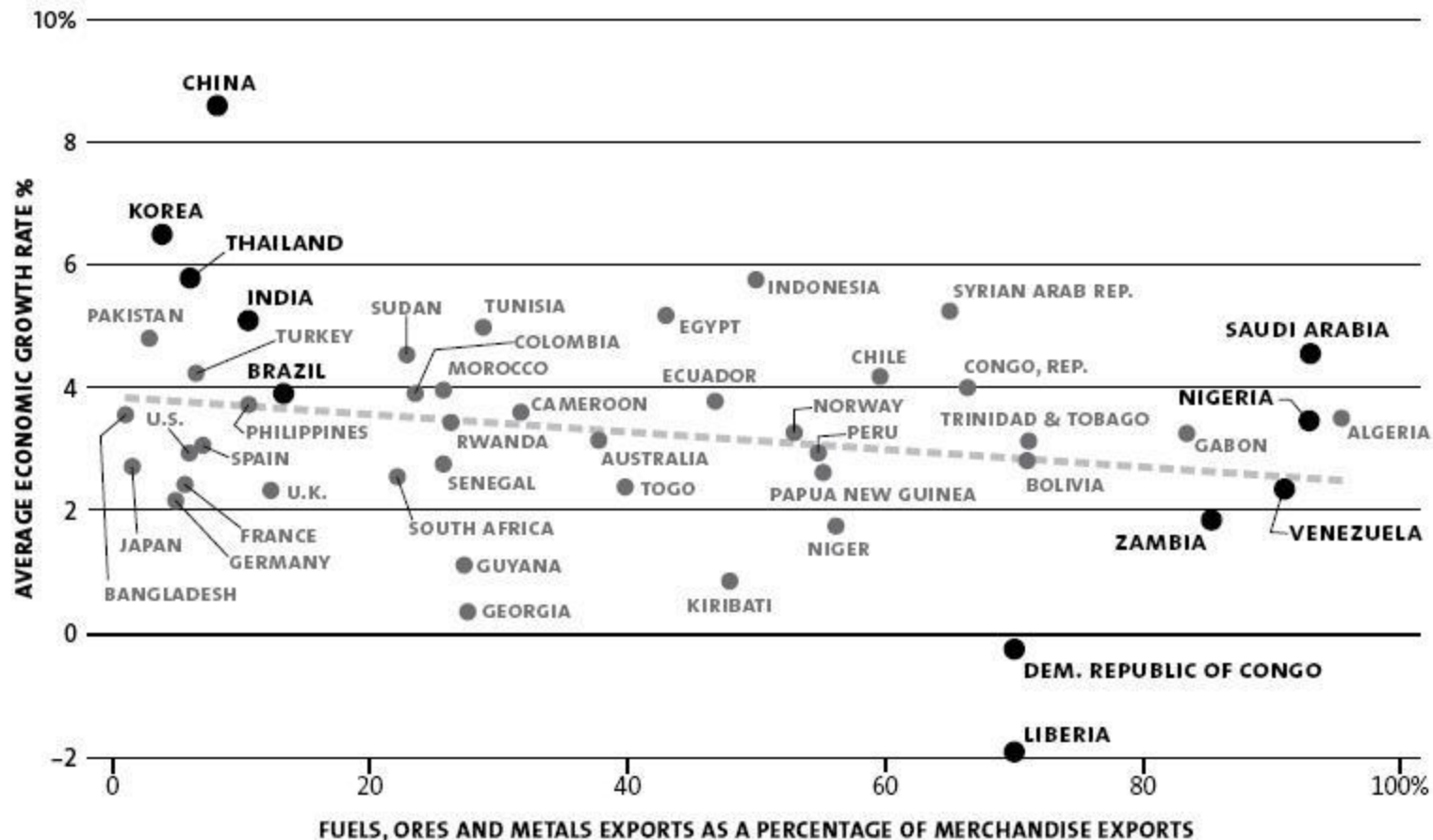
- **Taxes, Revenues,**
 - **Income, Royalties**
 - **Population Growth**
 - **Local Investment**
-
- **Amid long-time struggles, especially in the Rural US**

The “Curse” of Natural Resources

- Blessings are relatively short-term, volatile, unpredictable
- Mounting costs over the long-term:
 - volatility, instability, and de-diversification
 - high unemployment, poverty, inequality, crime, low educational attainment, corruption

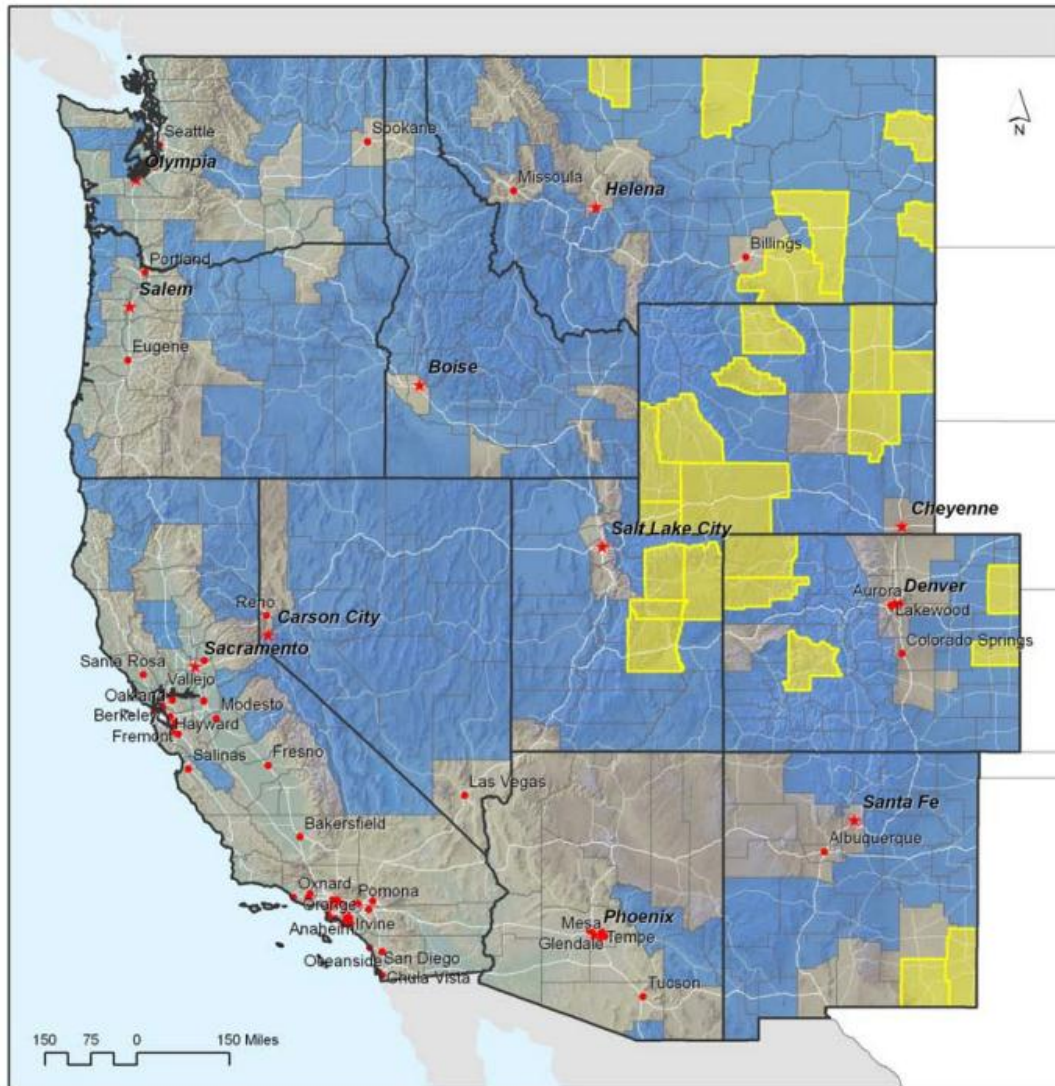
The “Curse” of Natural Resources

MINERAL EXPORTS AND GROWTH, 1970–2008



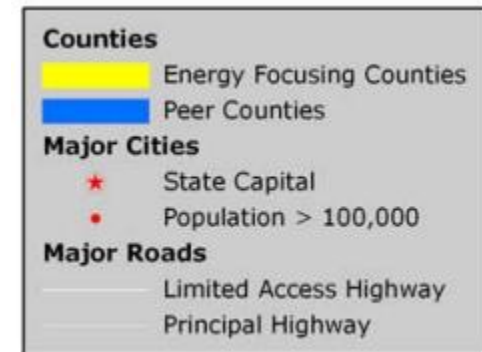
SOURCE: World Development Indicators, World Bank

Headwaters Economics Study (2009)



Fossil Fuel Extraction as a County
Economic Development Strategy
Are Energy-focusing Counties
Benefiting? (2009)

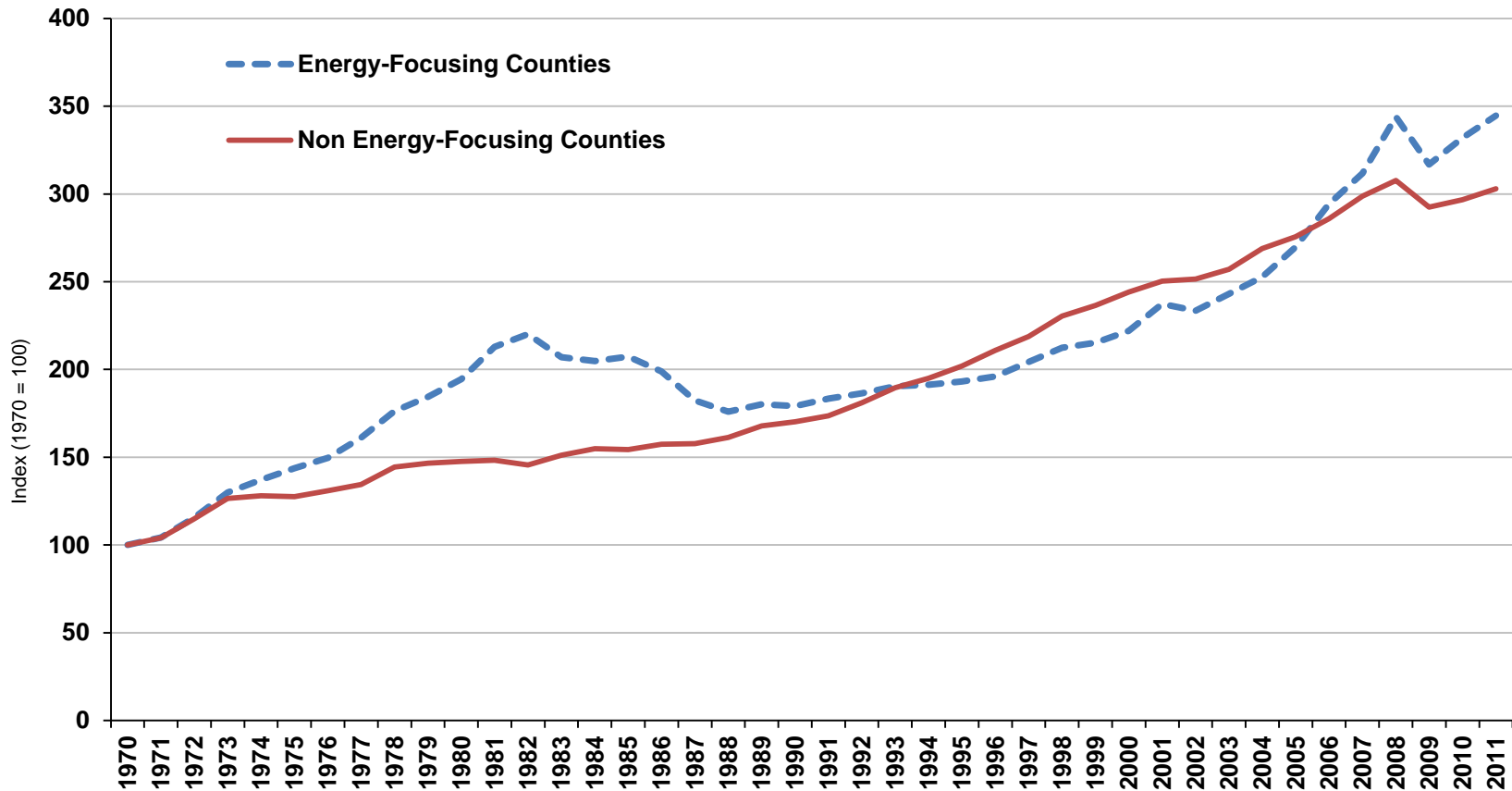
<http://headwaterseconomics.org/energy/western/fossil-fuel-extraction/>



Data Sources: US Census County Business Patterns 2005, US Bureau of Economic Analysis Regional Economic Information System 2005, US Geological Survey
World Mercator Projection
Map Date: 8/7/2008

Headwaters Economics Study (2009)

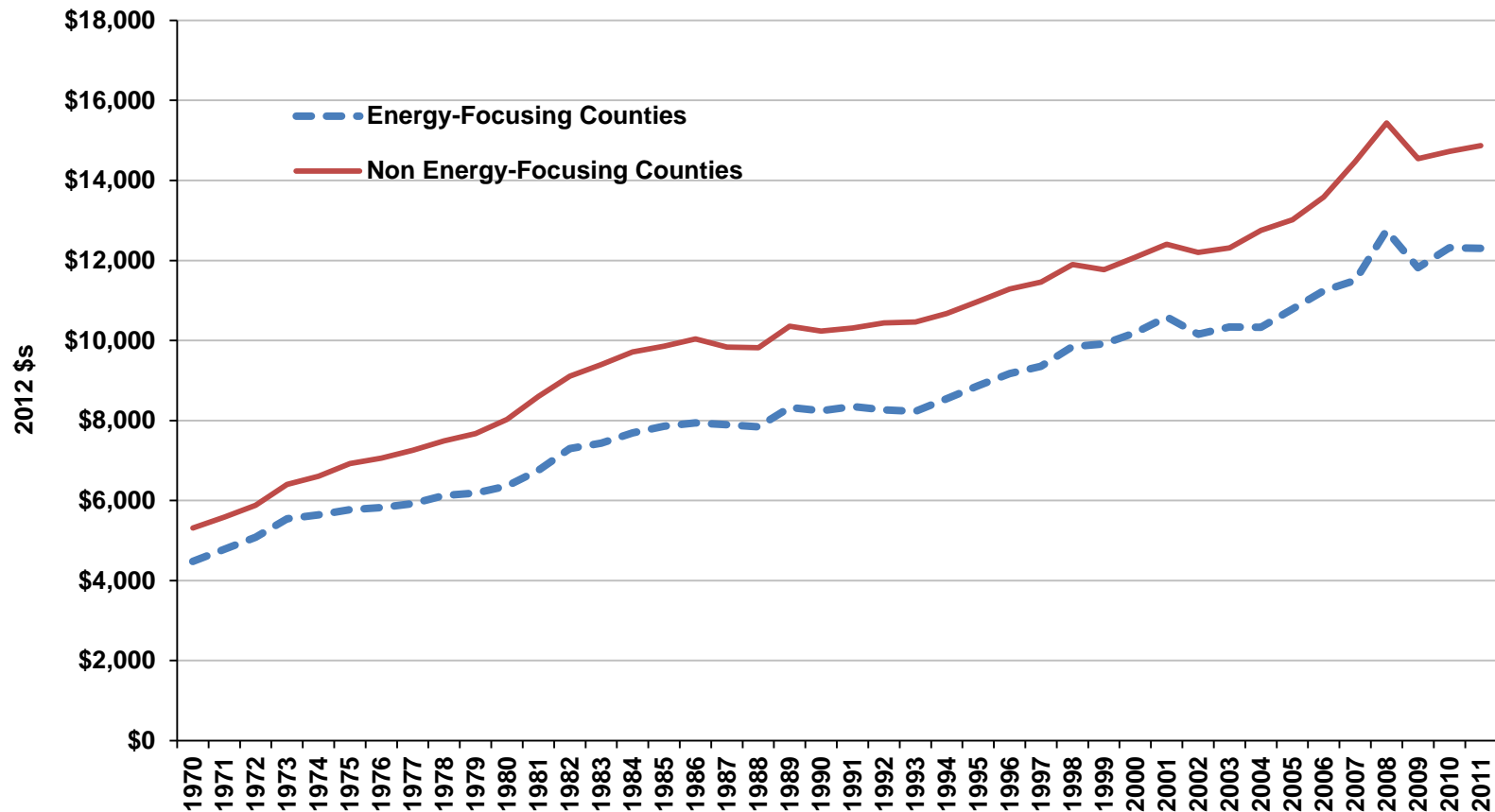
Change in Total Personal Income, Energy-focusing (EF) Counties versus Peer Counties in the West, Indexed, 1970–2011



Fossil Fuel Extraction as a County Economic Development Strategy Are Energy-focusing Counties Benefiting? (2009) <http://headwaterseconomics.org/energy/western/fossil-fuel-extraction/>

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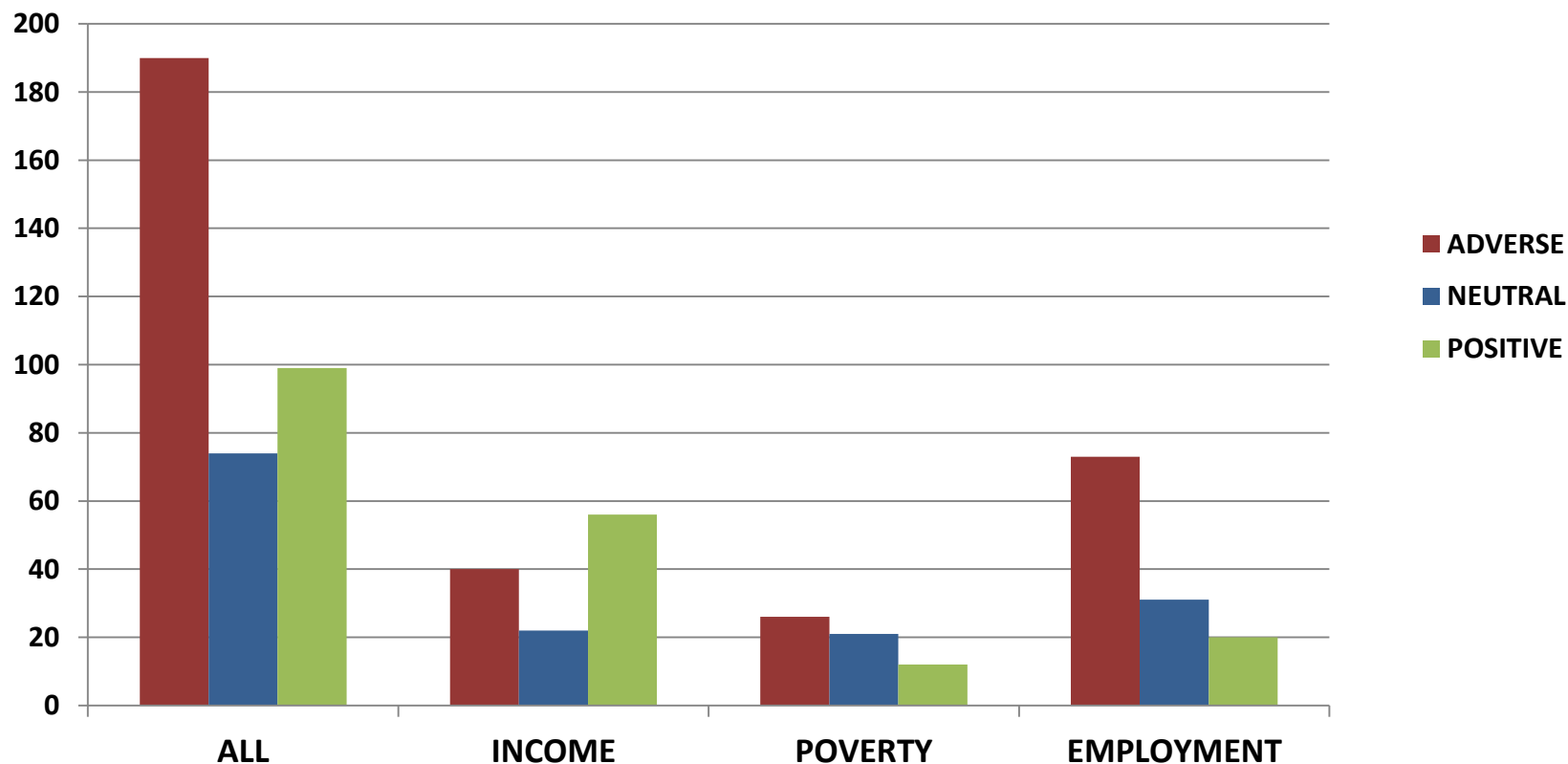
Change in Per Capita Non-Labor Income, Energy Focusing Counties Compared to Peers, 1970-2011



Fossil Fuel Extraction as a County Economic Development Strategy Are Energy-focusing Counties Benefiting? (2009) <http://headwaterseconomics.org/energy/western/fossil-fuel-extraction/>

Freudenberg and Wilson (2002)

**Meta-Analysis of Resource Dependent Community Research
-- Types of Economic Impacts Reported in 369 Studies--
(Freudenberg and Wilson, 2002)**

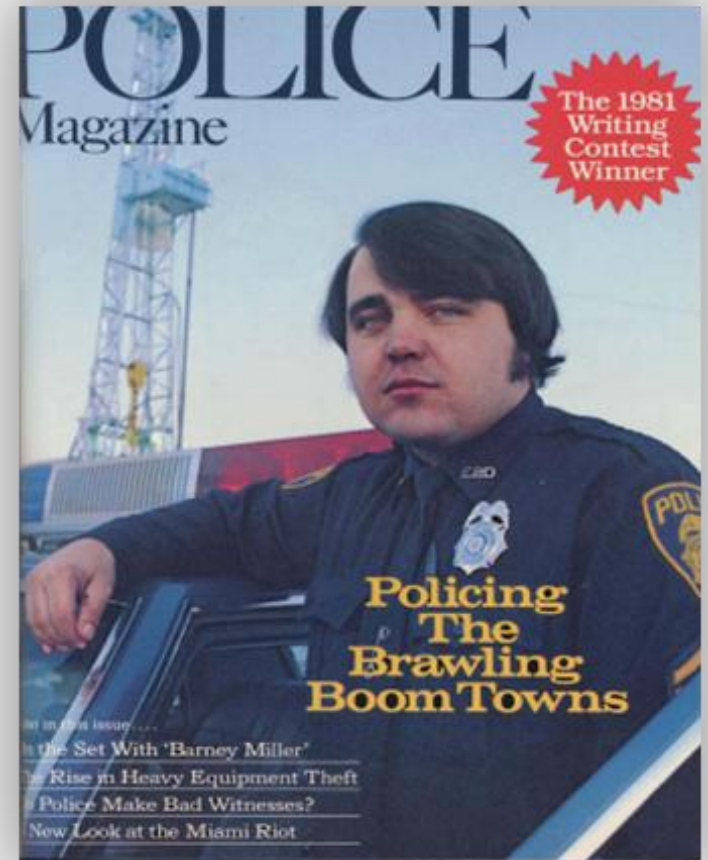


Risks to Communities

- **Rapid Industrialization**
- Uneven Cost and Benefits
 - “Corrosive Communities”
- “Contaminated Communities”
- Social-psychological Stress

Risks to Communities: Rapid Industrialization

- **Rapid Growth**
- **Strained Municipal Services**
- **Poor Quality of Life**
- **Out-migration of residents**
- **Overbuilt and Unplanned Construction**



Police Magazine, 1981

Current Boomtowns



- **Sidney, MT**
- **Williston, ND**
- **Dickinson, ND**
- **Pinedale, WY**
- **Eagle Ford, TX**
- **Montrose, PA**
- **Towanda, PA**

annual growth rates:
(~12-17%)

Photo: Joe Riss

Current Boomtowns



**Results have varied,
depending on:**

- **population density,**
- **pace/scale of
development**
- **mitigation funds
available**

Photo: Joe Riss

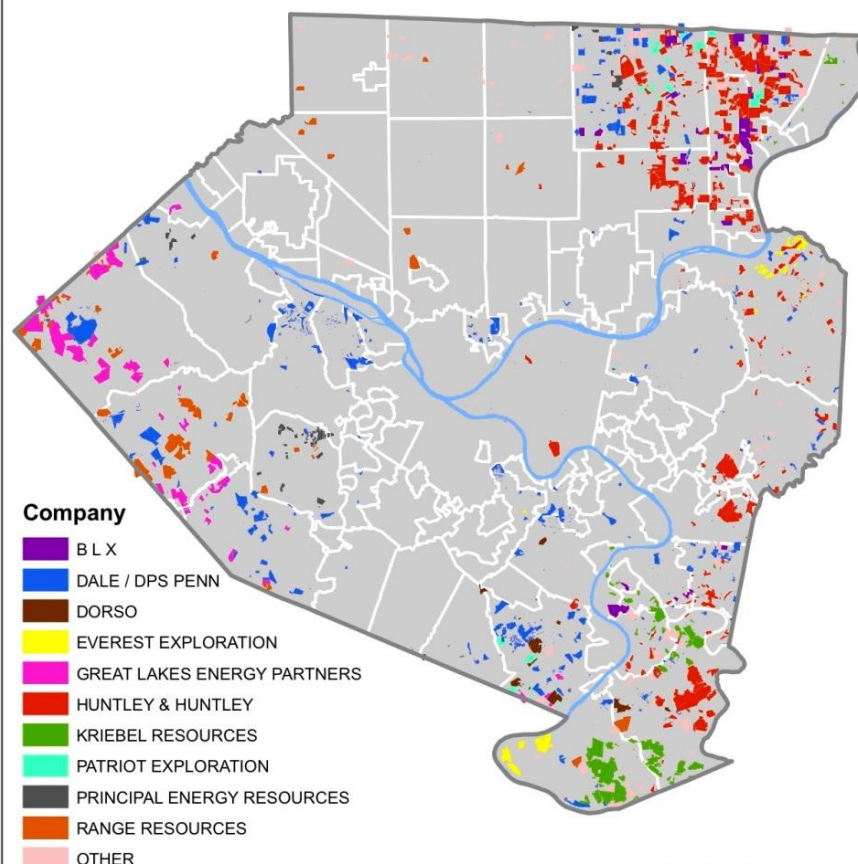
Risks to Communities

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Risk to Communities: Unequal cost and benefit

- **Leasing and Royalties are not uniform**
- **Non-landowners not eligible**
- **Landowner benefits will vary**

Oil and Gas Leasing Activity by Parcel and Company, Allegheny County, 2003 - 2010*



* January - May 2010

Source: Allegheny County Department of Real Estate
University Center for Social and Urban Research
University of Pittsburgh

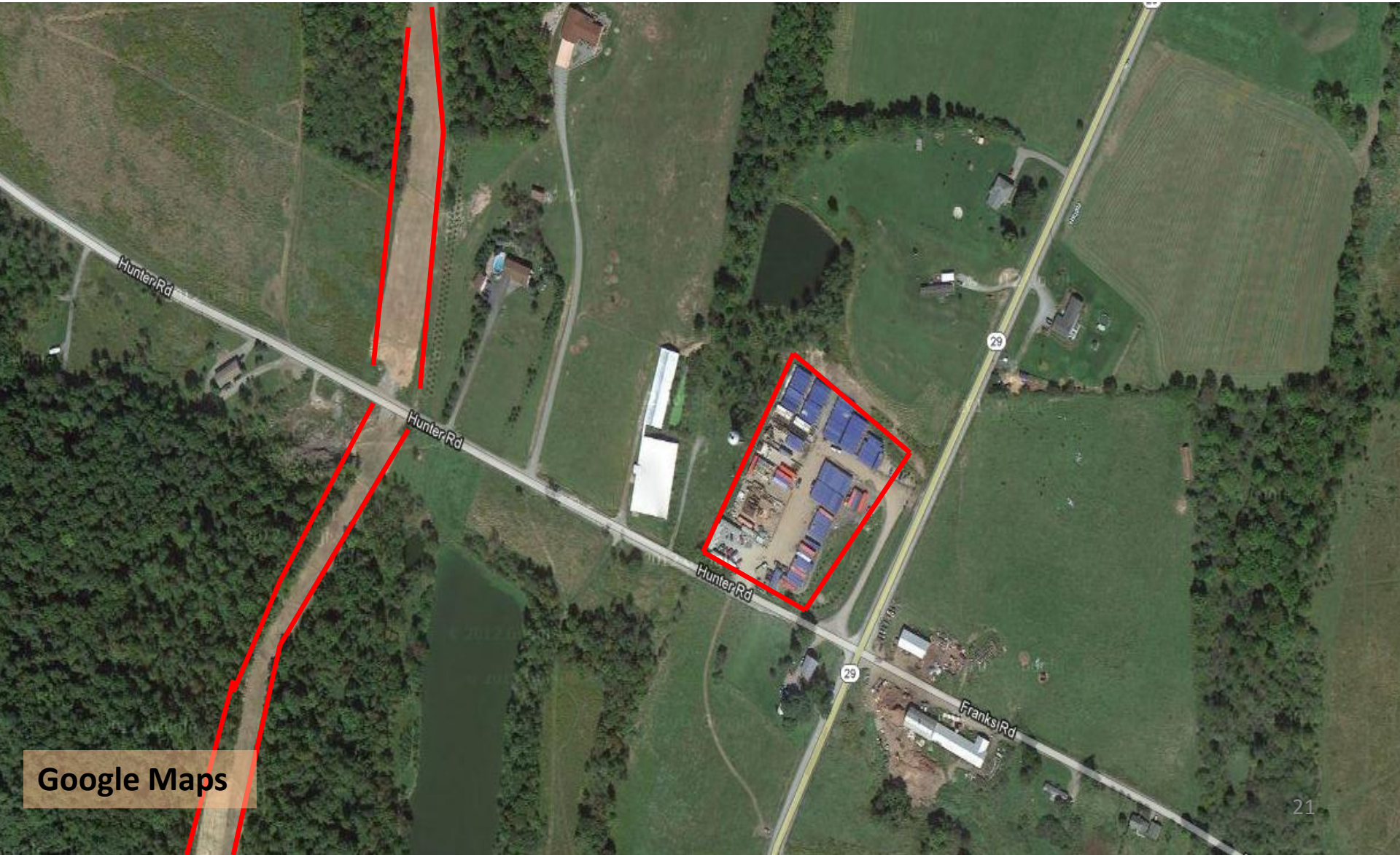
Risk to Communities: Unequal cost and benefit



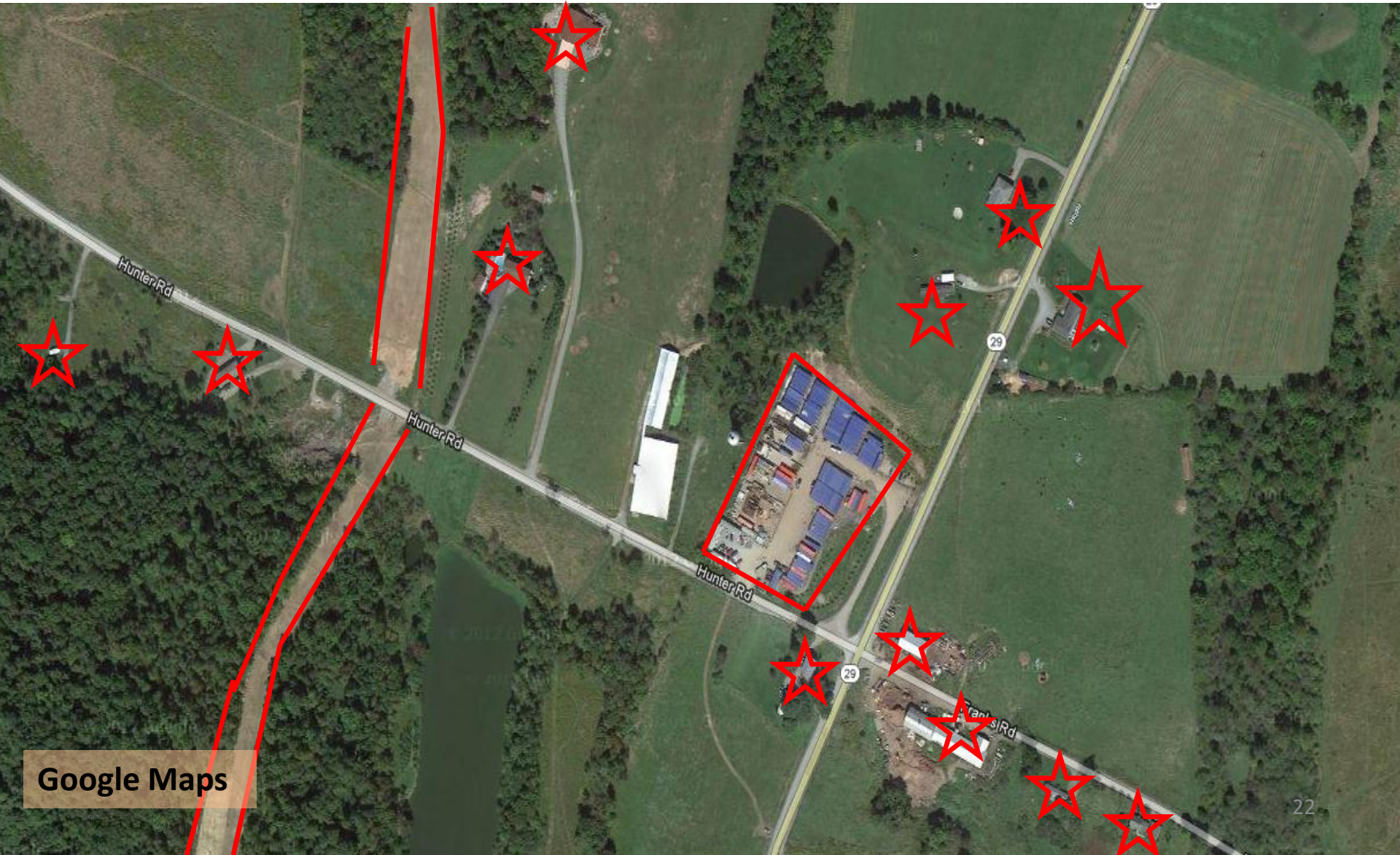
Risk to Communities: Unequal cost and benefit



Risk to Communities: Unequal cost and benefit

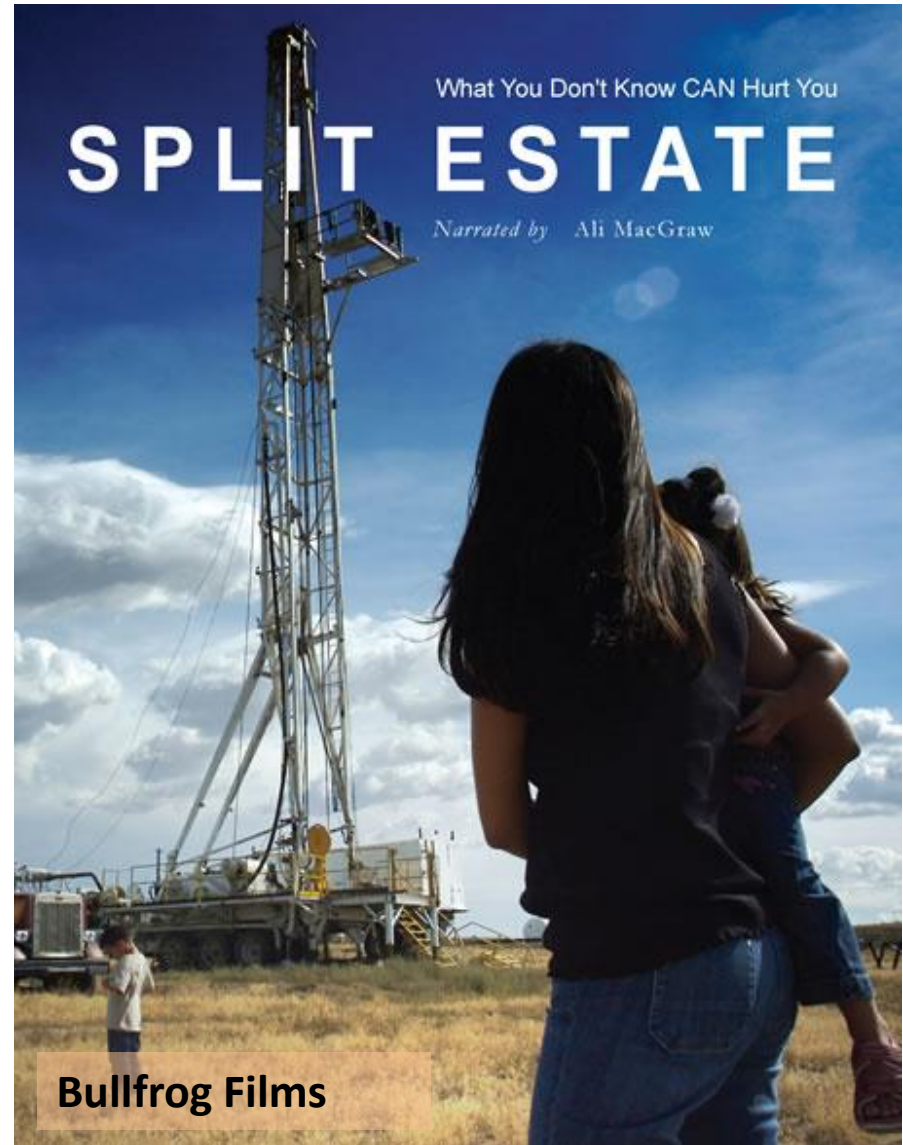


Risk to Communities: Unequal cost and benefit



Risk to Communities: Unequal cost and benefit

- **Split-Estate**
- **What is the impact of a growing amount of land without mineral rights?**
- **How money is obtained and spent will Impact communities**



Risk to Communities: “Corrosive Communities”

Shaleshock.org



Risk to Communities: “Corrosive Communities”

- **Corrosive Communities** (Freudenberg and Jones 1991)
 - Fierce Community Conflict
 - Winners and Losers
 - Distrust
 - Confusion and Uncertainty
 - Litigation
 - Blame over faults
 - Distaste over benefits

Risk to Communities: “Corrosive Communities”

Community conflict worse than the environmental problem itself:

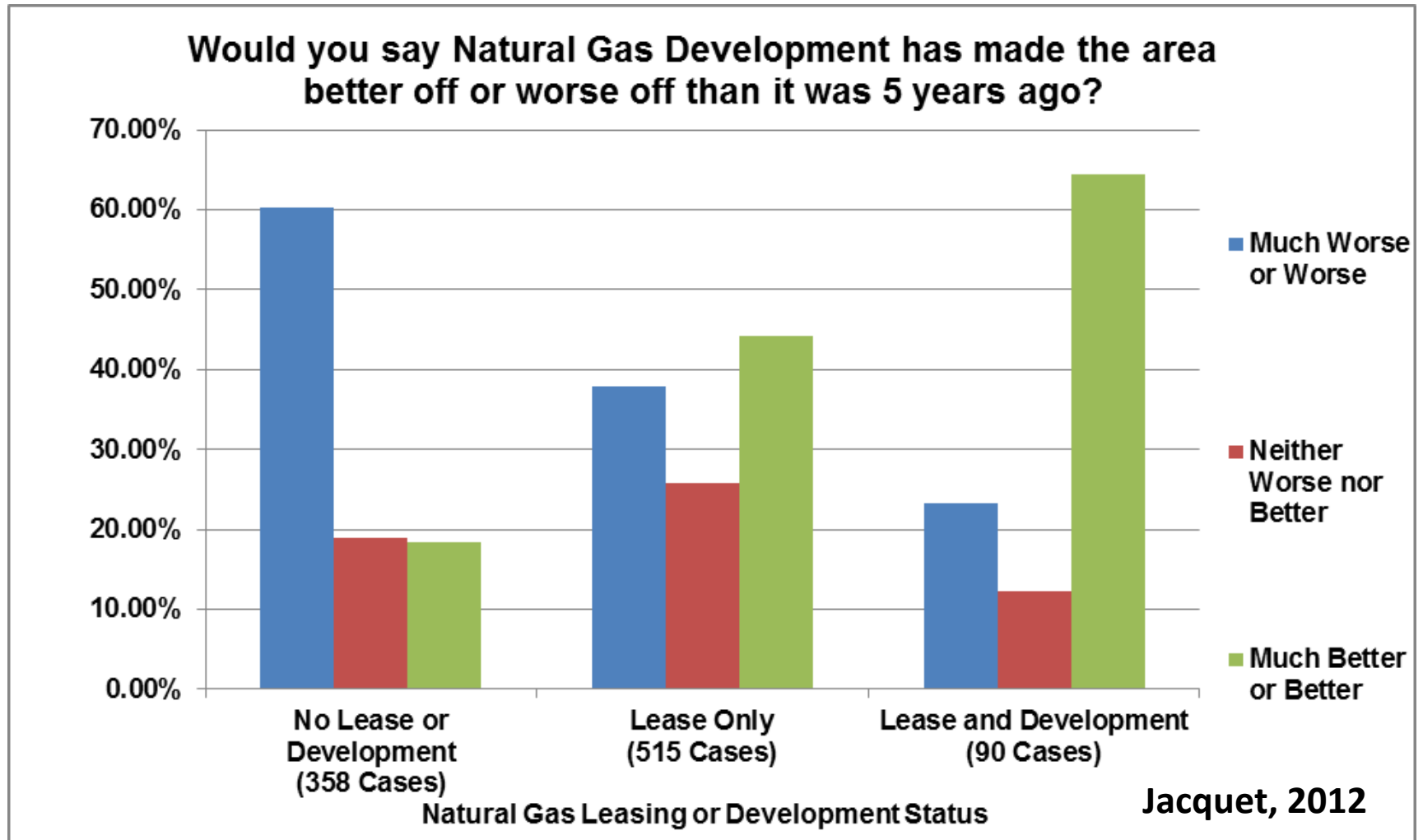
- Hampered decision-making, community capacity**
- Broken communication and social structures**
- Impossible to obtain scientific “facts”**
- Disinvestment, outmigration**

Risk to Communities: “Corrosive Communities”

Distribution of Costs and Benefits can influence:

- **Attitudes on Acceptability**
- **Perceptions of Impact and Risk**
- **Perceptions of Harm**
- **Perceptions of Trust and Fairness**

Risk to Communities: “Corrosive Communities”



Risk to Communities: “Corrosive Communities”

Multiple Regression Analysis of Variables Explaining Attitude Scale Towards Existing Natural Gas Development (Jacquet, 2012)

| Independent Variables | B | Std. Error | Beta |
|---|--------|------------|---------|
| (Constant) | 25.673 | .288 | |
| Gas Lease (dummy) | 1.978 | .282 | .188** |
| Gas Well (dummy) | 3.554 | .503 | .188** |
| Distance to Well | -.008 | .257 | -.001 |
| Environmental Attitudes | -.459 | .022 | -.520** |
| Gas Industry Employment (self) | 2.658 | .538 | .125** |
| Gas Industry Employment (friends and relatives) | .045 | .143 | .008 |
| Gender (1= male; 2=female) | -.682 | .282 | -.059* |
| Education | -.316 | .010 | -.071** |
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R = .655; *R Squared* = .429;
Adjusted R Squared = .424

Significance (2-tailed): * *p* < .05; ***p* < .01;

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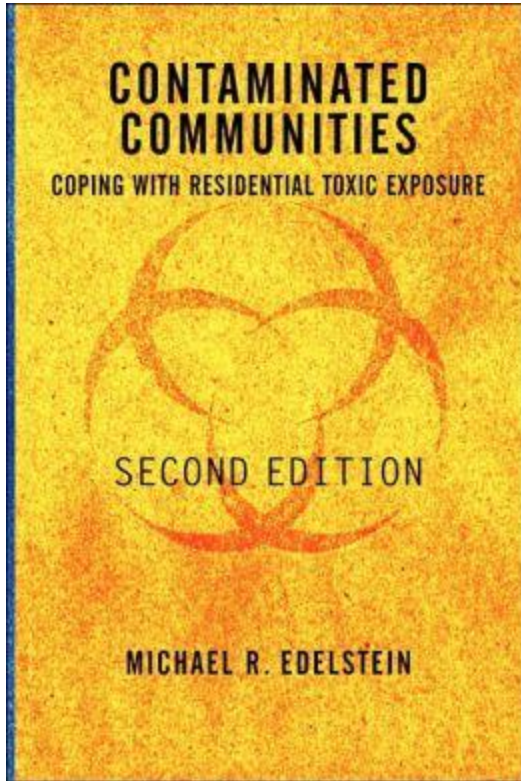
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- Social-psychological Stress

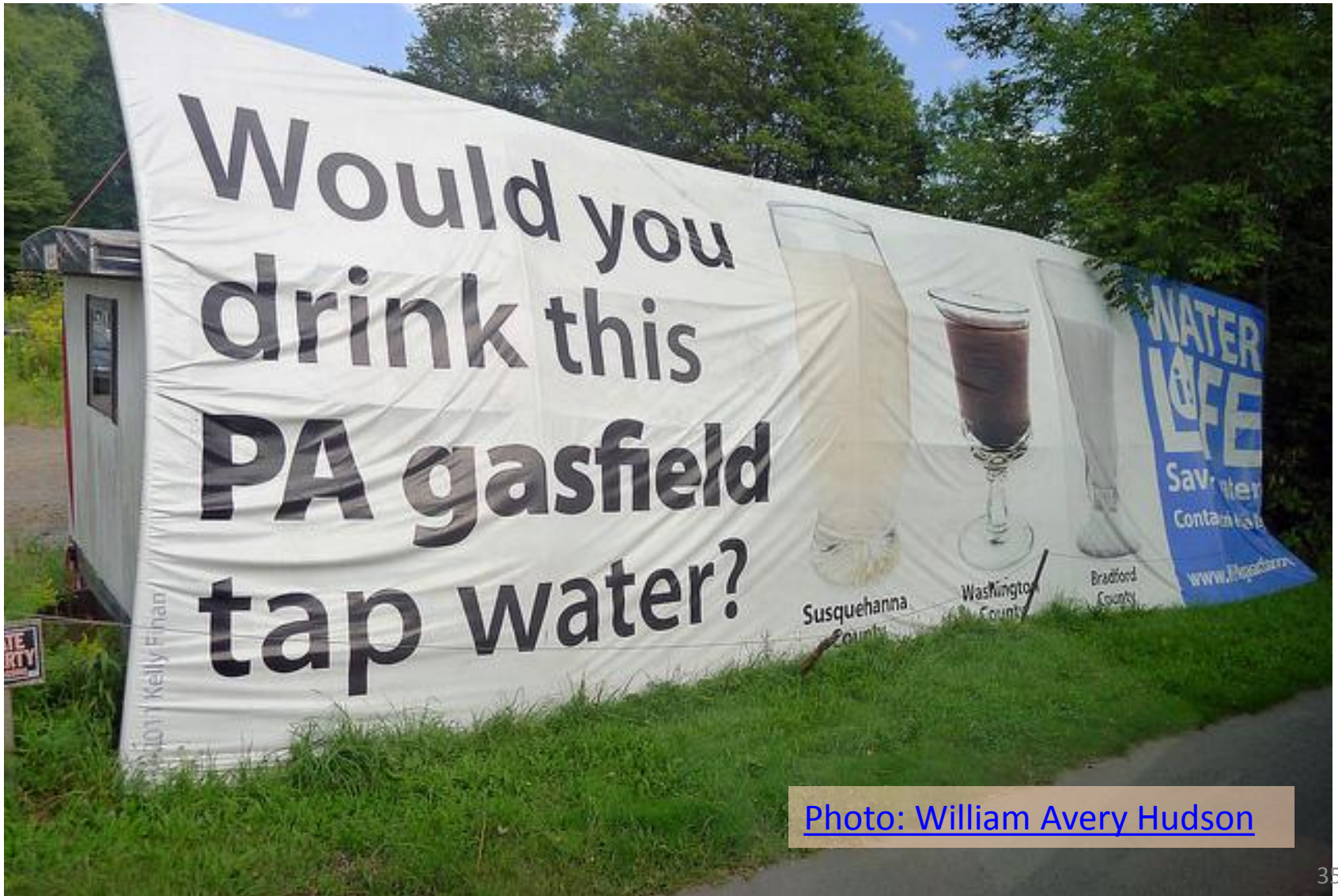
Risk to Communities: “Contaminated” Communities



Edelstein, 1988/2003

- **“Life-Scape Change”**
- **Community no longer a “Psychological Refuge”**
- **Stigmatized as Contaminated**
- **Little or no relation to actual levels of contamination or health impacts**

Risk to Communities: “Contaminated” Communities



[Photo: William Avery Hudson](#)

Risk to Communities: “Contaminated” Communities

**3 Mile Island
Disaster:**

**\$2.4 Billion in
Property Damages**
(Sovacool, 2008)

**No health problems
reported from
radiation.**

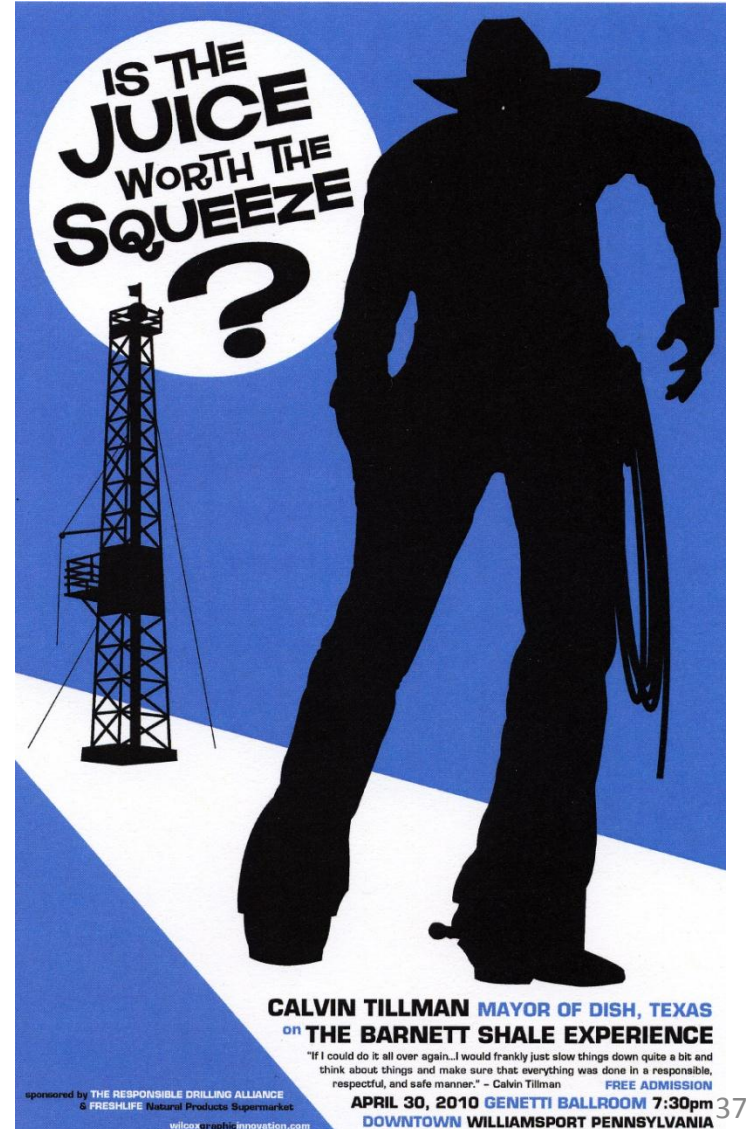


Photo: National Archives

Risk to Communities: “Contaminated” Communities

Contemporary Examples:

- Dimock, PA
- Dish, TX
- Pinedale, WY
- Pavilion, WY



Risks to Communities

- Rapid Industrialization
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 - “Corrosive Communities”
- “Contaminated Communities”
- **Social-psychological Stress**

Risk to Communities: “Social-Psychological Disruption”

–Place-based identities are powerful

- My community defines “who I am”

- What kind of place is this?

 - Farming Town, place with clean water, a place to raise children, etc.

- What is my role in the community?

 - Leader, pioneer, farmer, organizer

- Who are my friends? Social circle?

Risk to Communities: “Social-Psychological Disruption”

- **Social-Psychological Disruption:**
 - Stress
 - Mental Health
 - Physical Health
- **Weisz (1979)** Gillette, Wyoming
 - average of 308 on the Holmes and Rhae SRRS (>300 = “major life stress”)
 - 49% of stressed experienced physical illness; 9% of non-stressed

Risk to Communities: “Social-Psychological Disruption”

- **Witter, et al. (2010); Kassoover & McKeown (1981)**
 - **“Stress” of impending change is among greatest health impact of gas drilling**
- **Arata et al. (2000), Plankais, et al. (1993)**
 - **Alaskan communities surrounding the Exxon Valdez shown clinical signs of Posttraumatic Stress Disorder**

Risk to Communities: Conclusions

- Broad-Based
- Multi-media
- Long-term, longitudinal
- Equitable Cost and Benefit key variable across all risks
- Perception = Reality

Knowledge Gaps:

- **Community Capture of Wealth**
- Health outcomes and Social-psychological disruption
- long-term investment and sustainability
- Long-term development picture for Shale Gas Industry

Knowledge Gaps: Community Capture of Wealth

We Know:

How *income* circulates, is invested, turned into jobs and vice versa (i.e. I/O modeling).

Knowledge Gaps: Community Capture of Wealth

We Know:

How *income* circulates, is invested, turned into jobs and vice versa (i.e. I/O modeling).

We Don't know:

Amount of *wealth* generated, if/how wealth is captured in rural areas, where it is transferred upon death, how it can create sustainable communities

Knowledge Gaps: Community Capture of Wealth

- **In Pennsylvania:**
 - **\$193.38 billion changing hands by 2015**
 - **\$1.17 trillion transferred in by 2055**
(Center for Rural Pennsylvania, 2008)
- **5% of \$1.17T = \$58,500,000,000**

Knowledge Gaps:

- Community Capture of Wealth
- Health outcomes and Social-psychological disruption**
- long-term investment and sustainability
- Long-term development picture for Shale Gas Industry

Knowledge Gaps: Health and Social-psychological disruption

We Know:

**Stress is multi-dimensional, important health factor, effects morbidity and mortality.
Community change creates stress.**

Knowledge Gaps: Health and Social-psychological disruption

We Know:

**Stress is multi-dimensional, important health factor, effects morbidity and mortality.
Community change creates stress.**

We Don't Know:

Magnitude of community, environmental, place *change* or *threat of change* on stress, health, conflict, economic development,

Knowledge Gaps:

- Community Capture of Wealth
- Health outcomes and Social-psychological disruption
- long-term investment and sustainability**
- Long-term development picture for Shale Gas Industry

Knowledge Gaps: long-term investment and sustainability

We Know the effects of:

- **Volatile economic/population/employment trends**
- **Economic De-diversification**
- **Overbuilding**

Knowledge Gaps: long-term investment and sustainability

We Know the effects of:

- Volatile economic/population/employment trends
- Economic De-diversification
- Overbuilding

Don't Know the Long term effects from:

- Corrosive Communities (conflict, distrust, etc.)
- In-equality (split estate and land development?)
- Stigmatized Communities
- Social-psychological Disruption

Dis-investment?

Out-migration?

Lack of amenity-led in-migrants?

Knowledge Gaps: long-term investment and sustainability

To what extent can real or perceived contamination be recovered from?



[Art and Photo: tonkydesigns.com](http://tonkydesigns.com)

Knowledge Gaps:

- Community Capture of Wealth
- Health outcomes and Social-psychological disruption
- long-term investment and sustainability
- Long-term development picture for Shale Gas Industry**

Knowledge Gaps: Long-term development picture

We Know:

Shale oil and gas will be here for a long time, and will continue to be developed.

Knowledge Gaps: Long-term development picture

We Know:

Shale oil and gas will be here for a long time, and will continue to be developed.

We Don't Know:

Where? When? How Often? Factors driving drilling? Should we expect multiple booms and multiple busts? Hold by production?

How can communities plan in this environment?

Knowledge Gaps: Conclusions

Need Targeted Funding

Plan for Long-term Longitudinal Analysis

Revisit previous studies and cases

Assist Communities with Mitigation and Planning

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