

# **IMPACTS OF GAS WELL\* DRILLING ON AQUATIC RESOURCES**

**\*PARTICULARLY MARCELLUS  
SHALE**

(but don't forget mine drainage)

DON'T FORGET  
WE'RE STILL PAYING FOR AMD



# MY MARCELLUS SHALE EDUCATION BEGAN OCT. 2008

- ARMY CORPS OF ENGINEERS
- PA DEP

MONONGAHELA RIVER TDS LEVELS

12

**WATER QUALITY  
FORUMS**

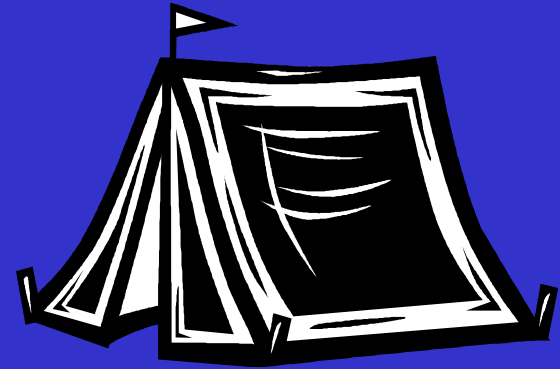
UPPER MON RIVER  
ASSOCIATION

# What's the Problem?

mine drainage



Monongahela River Basin



gas wells



# Stream Impacts

- Water quantity
- Water quality



- Erosion
- Fish passage

# Water Quantity

- Stream withdrawals:
  - When and where are withdrawals allowed?
- Who decides?
- How much?



# Water Treatment

- What's in it?
- How and where is it treated?





# HOW MUCH WATER?

- Coal bed methane  
40,000 – 80,000 gallons
- Marcellus Shale  
1 – 6 M gallons  
1 – 10 frac @ 1 M gallons

**LOTS OF IT !**

A white water tanker truck is parked on a gravel area next to a river. Two large hoses, one green and one brown, are connected to the truck and lead into the water. Two people are standing near the hoses. The background is filled with lush green trees and a blue sky. A concrete curb is visible in the foreground.

**GOOD WATER:  
IS THERE ENOUGH ?**

NOT ENOUGH



FILLING UP



**BAD WATER: WHERE DOES IT GO?**

**MANIFEST TRACKING ?**

# SLUDGE DISPOSAL ?



STORAGE CAPACITY ?



# TANKER TRUCK TRAFFIC

- 1 TRUCK = 4,500 GALLONS
- 1 MS WELL = 1 MILLION GALLONS
- 220 TRUCKS = 440 TRIPS



# WATER WITHDRAWAL SOURCES

CORPS OF ENGINEERS RESERVOIRS

OHIO RIVER

KANAWHA RIVER

MONONGAHELA RIVER

NEW RIVER?

SEASONALITY



# WATER QUALITY

A photograph of a stream with a large log in the foreground. The water is a deep reddish-brown color, suggesting sediment or organic matter. The background shows a wooded area with trees and brush.

**WE ARE ALL CONCERNED:  
SHOULD WE BE?**

# Really, where does it go?

- In a pit or 500 gallon tanks (temporary)
- Underground Injection
- Land disposal
- Treatment plants
- In a stream (no!)

**RECYCLE ? Yes !!**



# WV DNR OFFICE OF LANDS AND STREAMS

- **STREAM ACTIVITY PERMIT**
- **LICENSE AND RIGHT OF ENTRY**
  - CULVERT INSTALLATION
  - FORD WORK
  - WATER INTAKE SYSTEM (NOT QUANTITY)
  - SPAWNING SEASON WAIVER
  - PIPELINE CROSSING
- **APPROVED BY DISTRICT FISHERY  
BIOLOGIST**

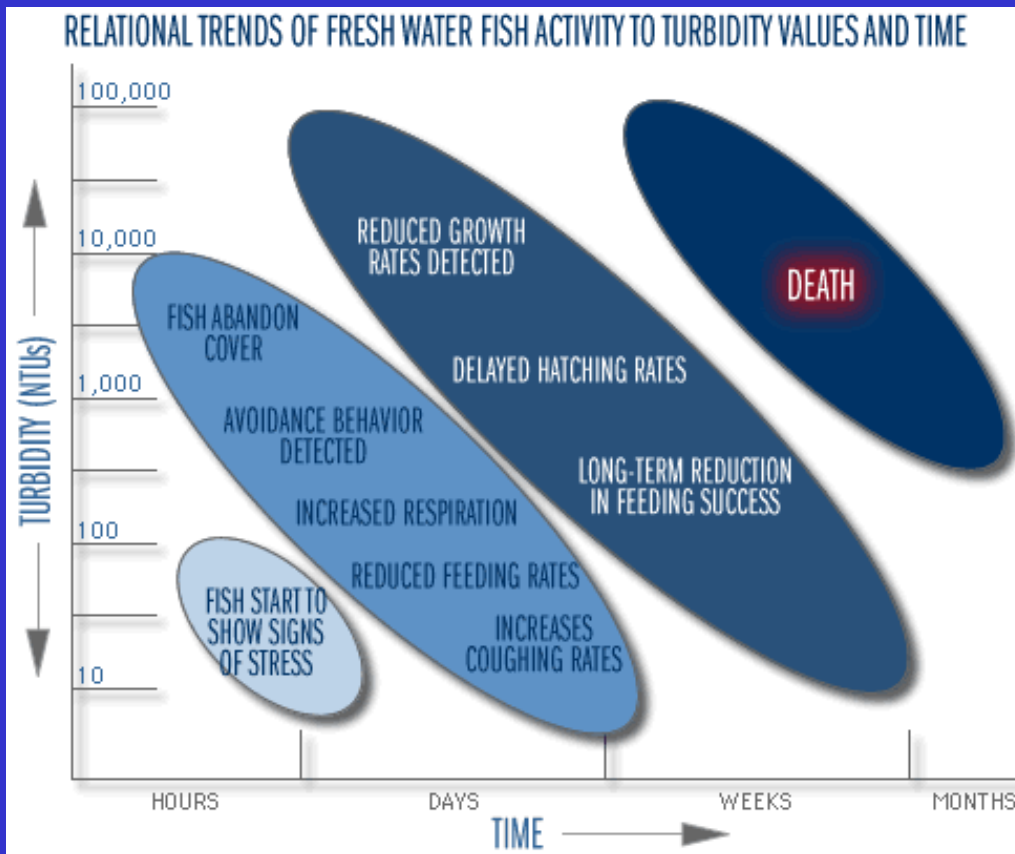
# Erosion

- Fish Reproduction and Growth
- Fishing success



# Erosion

- Fish Reproduction and Growth





**MAINTENANCE ?**



POOR CONSTRUCTION



**2 WEEKS AGO**



**ROUTINE MAINTENANCE?**



**PIT**



**TOO CLOSE TO STREAM**





**PIT**



WV DEP  
EROSION and SEDIMENT  
CONTROL MANUAL

# Fish Passage

- Fish movement
- Isolates populations





# TRANSMISSION LINES







ONE YEAR LATER



**A GOOD JOB  
BECAUSE...**

STREAM  
CROSSING  
#





**NO SILT !**

# AVOID A PROBLEM SO WE DO NOT HAVE TO REPAIR THE DAMAGES (or live with them)

- MINING



AMD: TDS

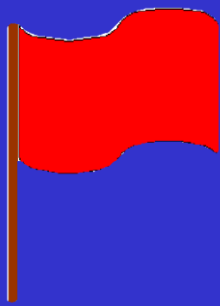
- GAS WELLS



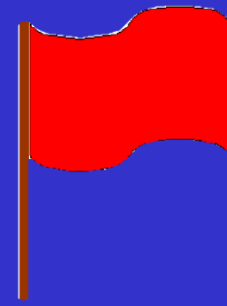
13,000-17,000 WELLS  
NEXT 20 YEARS

To meet our energy needs without negative environmental impacts, regulatory agencies, industry, and public need to work together.





# RED FLAGS



- Mon River TDS levels high
- Drinking water impaired
- Golden algae
- Dunkard Creek fish and mussel kill

How much evidence do we need before we take preventive action?



search ID: rj00628

Gas well impacts

WV Streams

THE TIP OF THE ICEBERG

**WE DON'T NEED MORE  
STUDIES**

**STUDY=DELAY=INACTION**

**EMERGENCY RULES ?**

**THE HORSE IS OUT OF  
THE BARN !**



# What's the Problem?



mine drainage

West Virginia  
waters



Other  
Users?



gas wells

THE TENT IS TOO SMALL!

Have we wrung out the last drop?



**PRETTY CLOSE!**

# Drill and mine all you want; just do no harm

- Decisions are market driven, often by situations in other states or countries, or by accountants and managers far removed from the on-the-ground impacts of their decisions
- Profit is adequate to avoid environmental damages up-front

# WILL THEY BE CONCERNED ABOUT OUR WATER IN WV?



ATLAS  
ENERGY/  
RELIANCE  
\$1.7 B



CHESAPEAKE/  
STATOIL  
\$3.3 B



ANDARKO/  
MITSUI  
\$1.4 B



# WHAT'S THAT ?

GUIDANCE TOOL ?

BMPs ?

EROSION CONTROL MANUAL ?

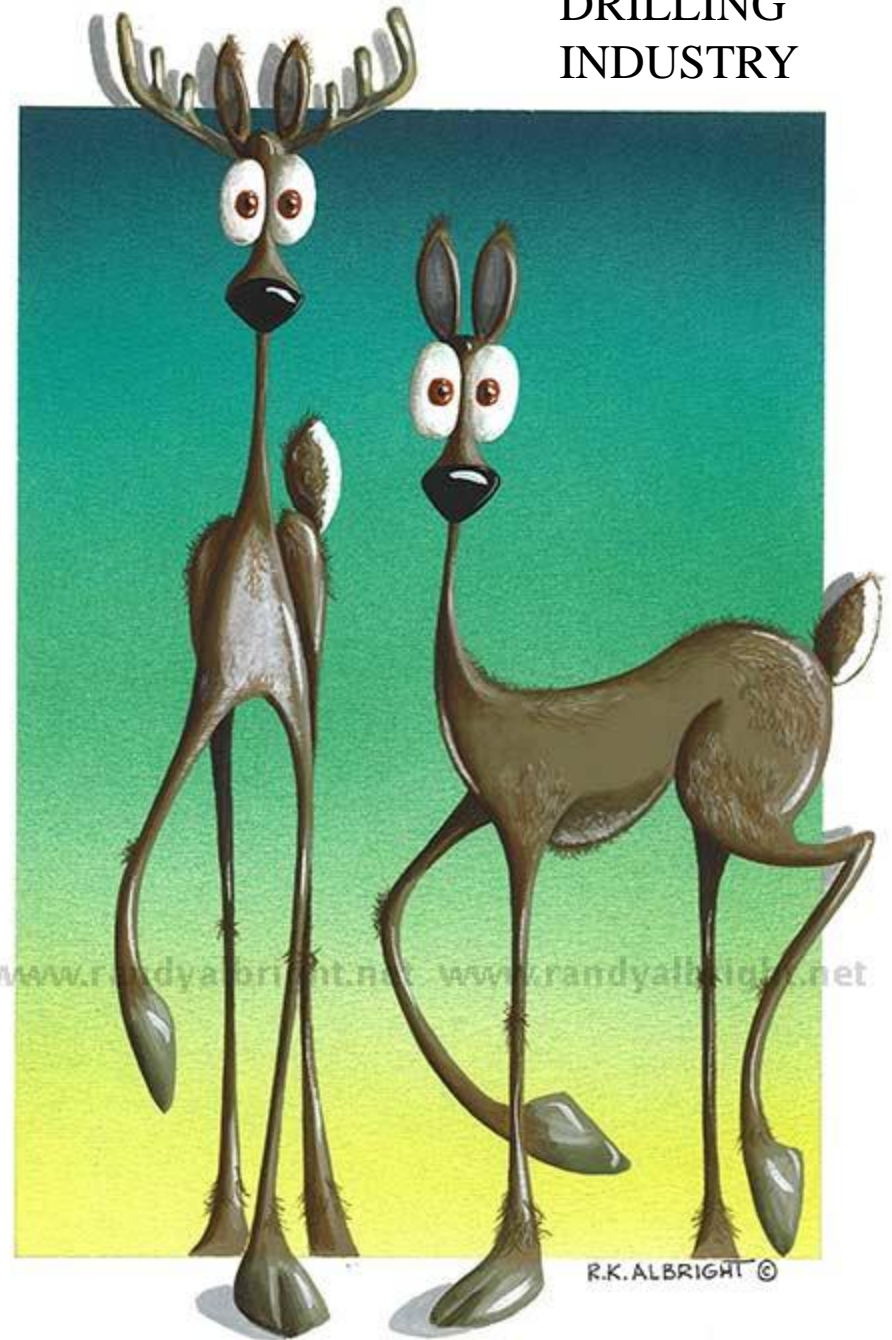
WV PERMITS ?

PAY ITEM vs. INCIDENTAL ITEM

SUBCONTRACTOR COORDINATION

Hey Dorothy:  
West Virginia is not Kansas  
(or Oklahoma, or Texas)

DRILLING  
INDUSTRY



GUIDANCE IS :



WE NEED MORE TEETH!



ENFORCEABLE REGULATIONS



# SOLUTIONS

ENFORCEABLE REGULATIONS  
(CAN'T RELY ON BMPs OR GUIDANCE)

ADEQUATE ENFORCEMENT and  
MONITORING STAFF

DO THE ARITHMETIC !

# HOW MUCH IS A RELIABLE SOURCE OF WATER WORTH?

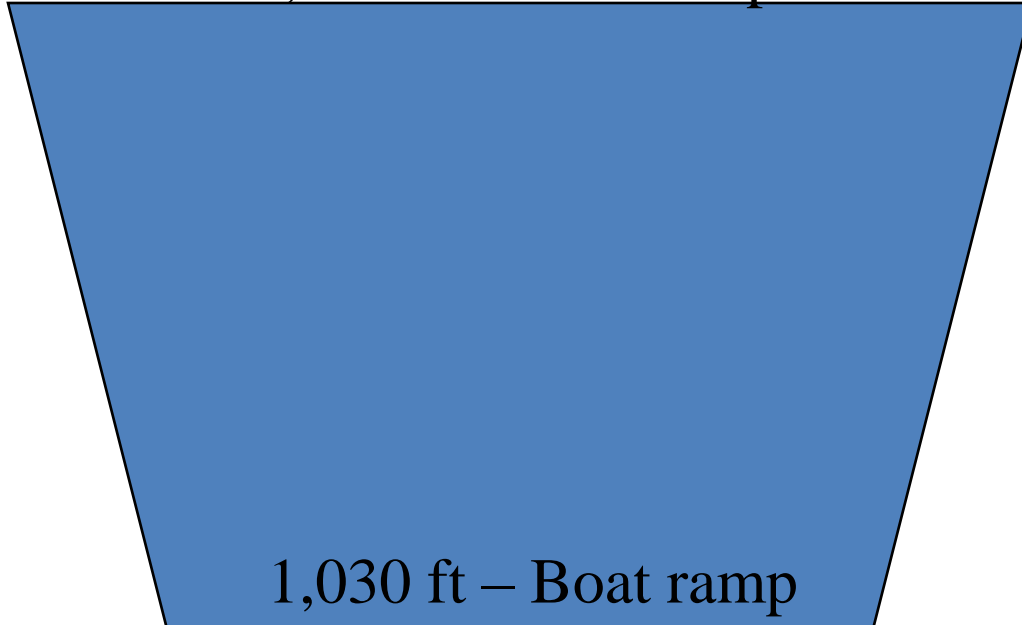
- TO THE PUBLIC
- TO INDUSTRY

# CORPS OF ENGINEERS: WHAT IS THEIR ROLE?

Stonewall Jackson & Tygart lakes

1. Flood control
2. Low flow augmentation for navigation
3. Water quality
4. Dilute Three Forks Creek
5. Recreation

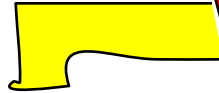
1,094 ft – Summer pool



**TYGART  
LAKE**

1,030 ft – Boat ramp

1,010 ft – Winter pool



Tygart River  
to Mon River

# Will we have to make a choice?

- Tap water



- Bottled water



or

**YES:** unless we manage our waters better.

# IS THIS A CHOICE?





**THE END?**









