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 fracs @ 1 M gallons

LOTS OF IT!
GOOD WATER: IS THERE ENOUGH?
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

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

![RELATIONAL TRENDS OF FRESH WATER FISH ACTIVITY TO TURBIDITY VALUES AND TIME](image_url)

- Fish abandon cover
- Avoidance behavior detected
- Reduced feeding rates
- Increases coughing rates
- Long-term reduction in feeding success
- Reduced growth rates detected
- Delayed hatching rates
- Fish start to show signs of stress
- Death

![Fish in river](image_url)
MAINTENANCE ?
POOR CONSTRUCTION
ROUTINE MAINTENANCE?
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...
Avoid a problem so we do not have to repair the damages (or live with them)

- Mining
- Gas Wells

AMD; TDS

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?
Gas well impacts

I'd slow down if I were you.

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

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)
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
TYGART LAKE

1,094 ft – Summer pool

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

YES: unless we manage our waters better.
IS THIS A CHOICE?