

Coalbed Natural Gas in Montana

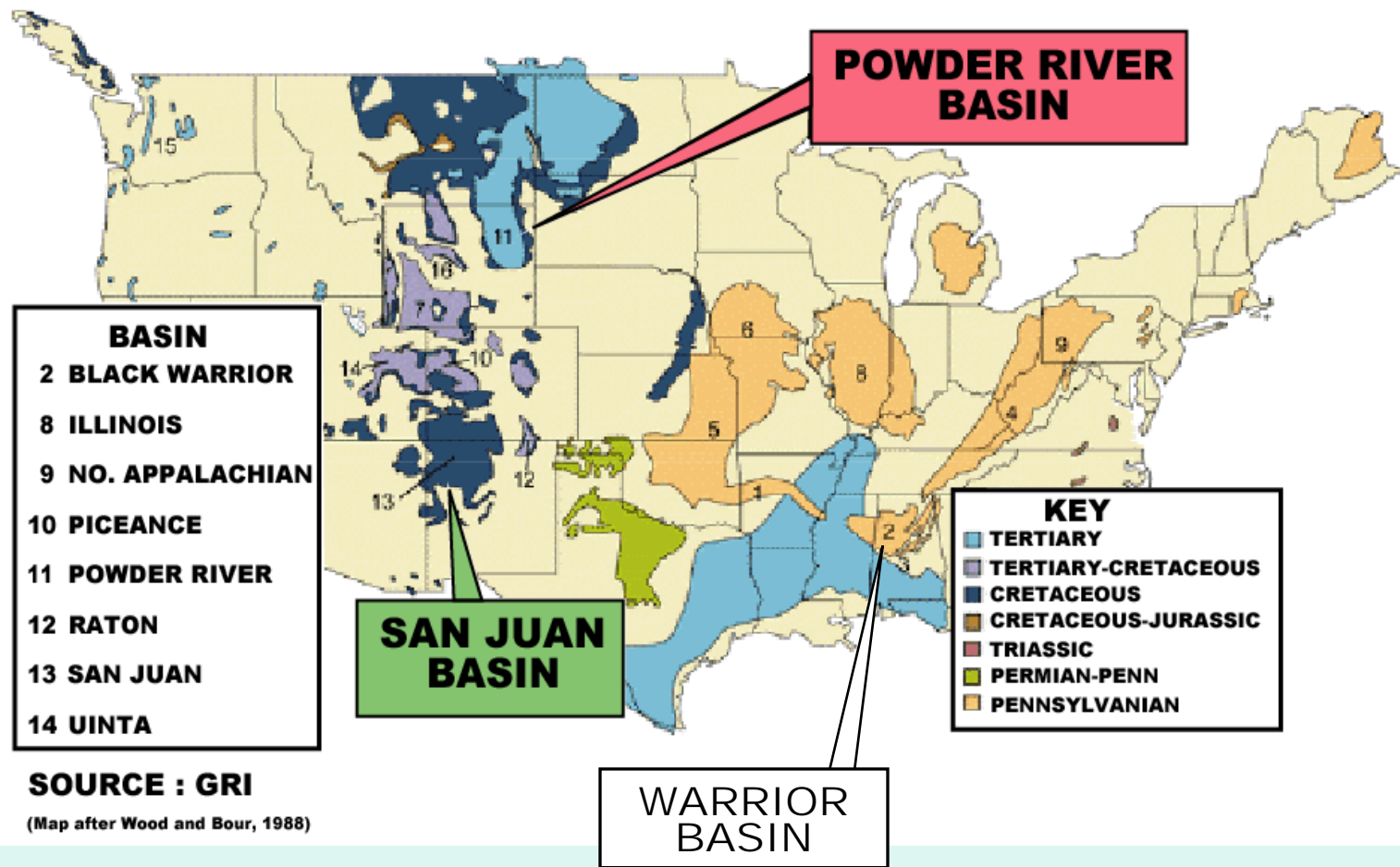
Bruce Williams

Vice President - Operations
Fidelity Exploration & Production Company

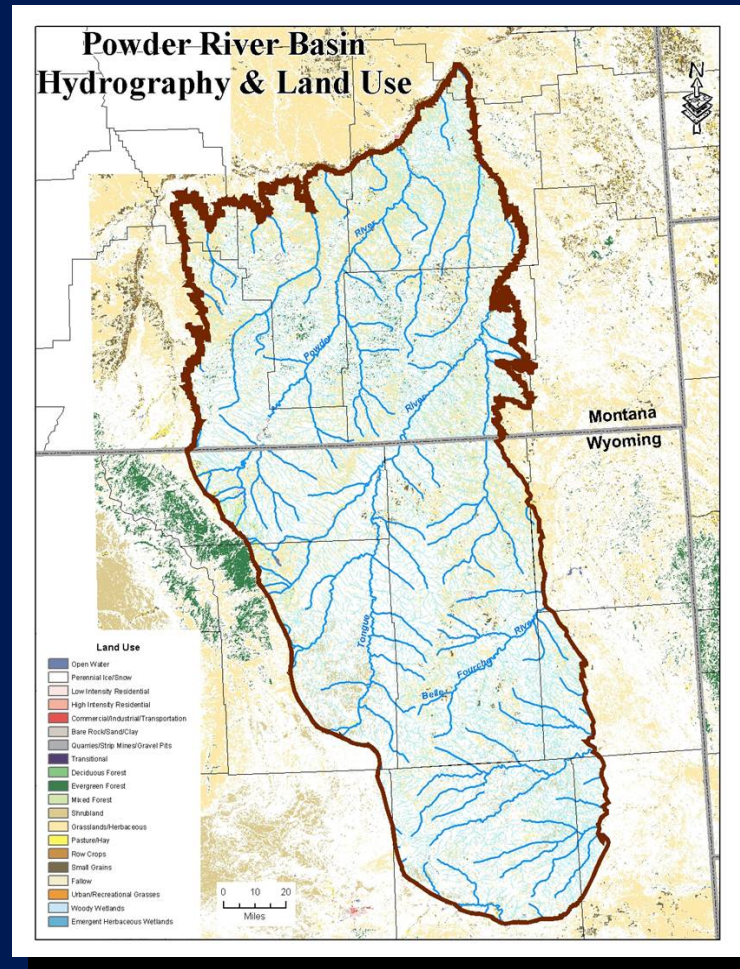
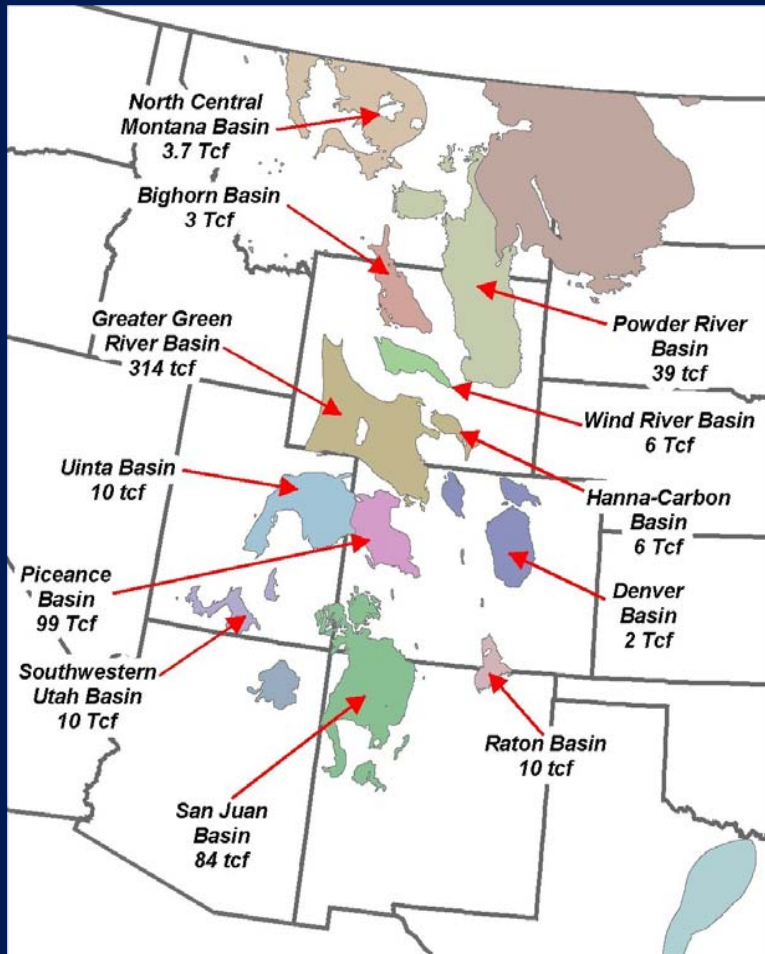


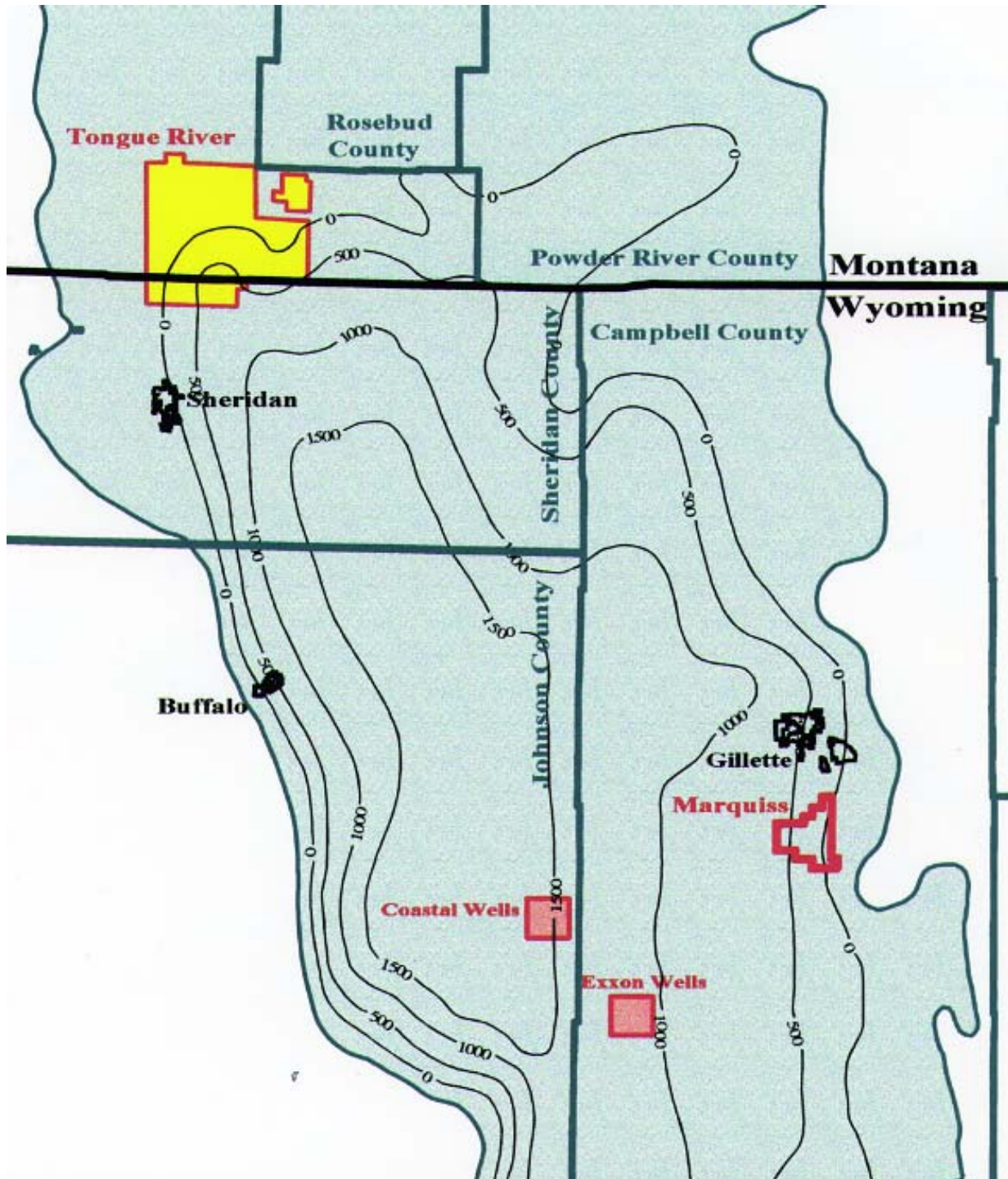
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CBNG in the U.S.



CBNG in the Rockies





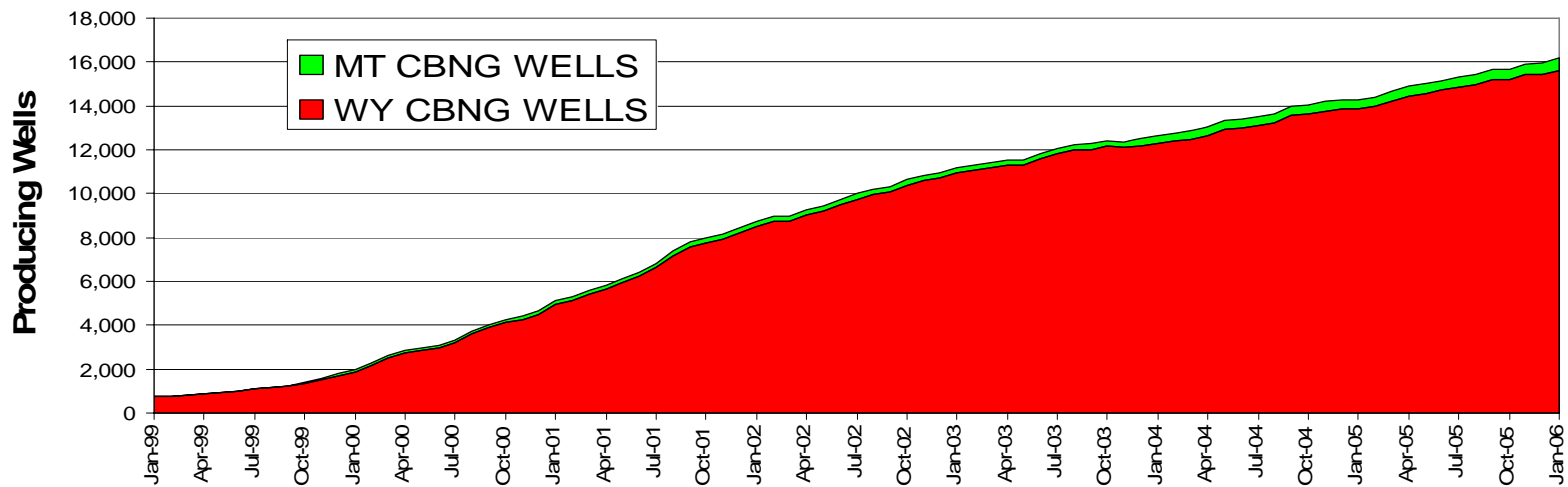
Powder River Basin with Fidelity Tongue River Project



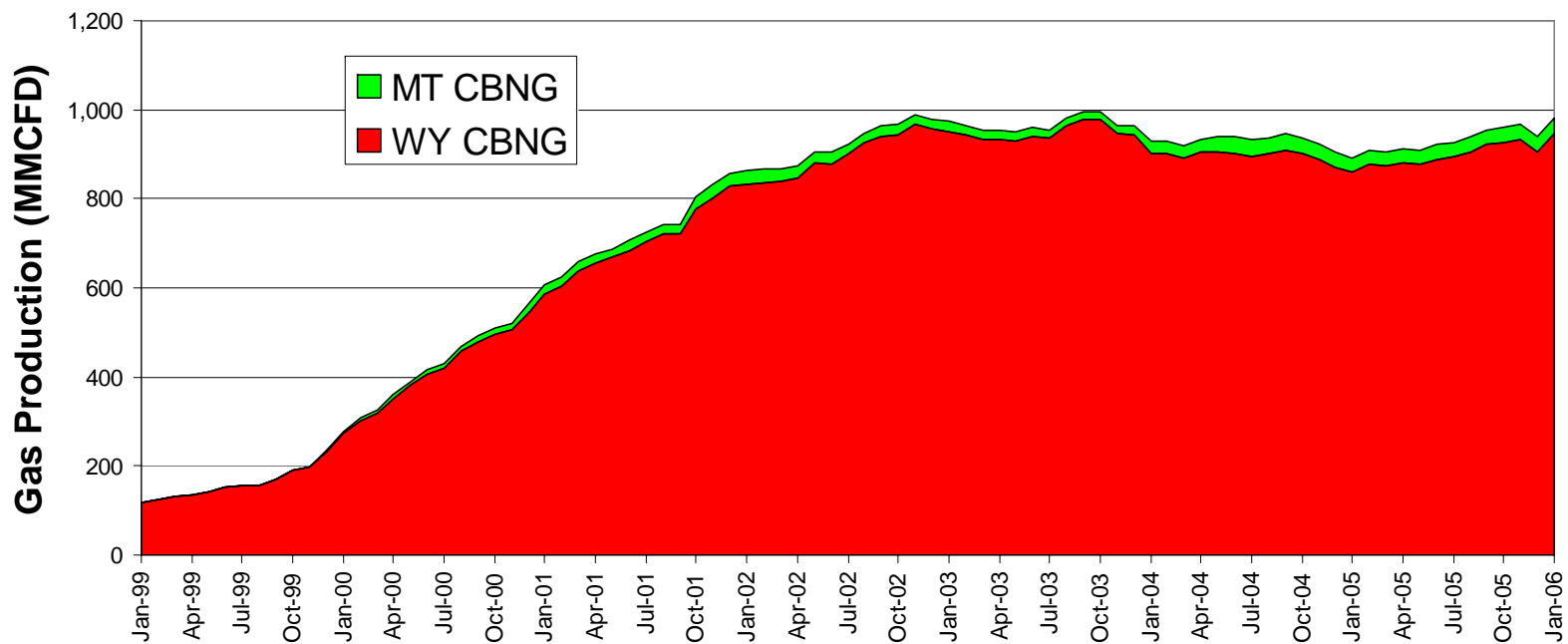
Why does CBNG development work in the PRB?

- Large coal volume
- High natural permeability
- High quality water
- Relatively shallow depth

POWDER RIVER BASIN PRODUCING CBNG WELLS



POWDER RIVER BASIN CBNG PRODUCTION

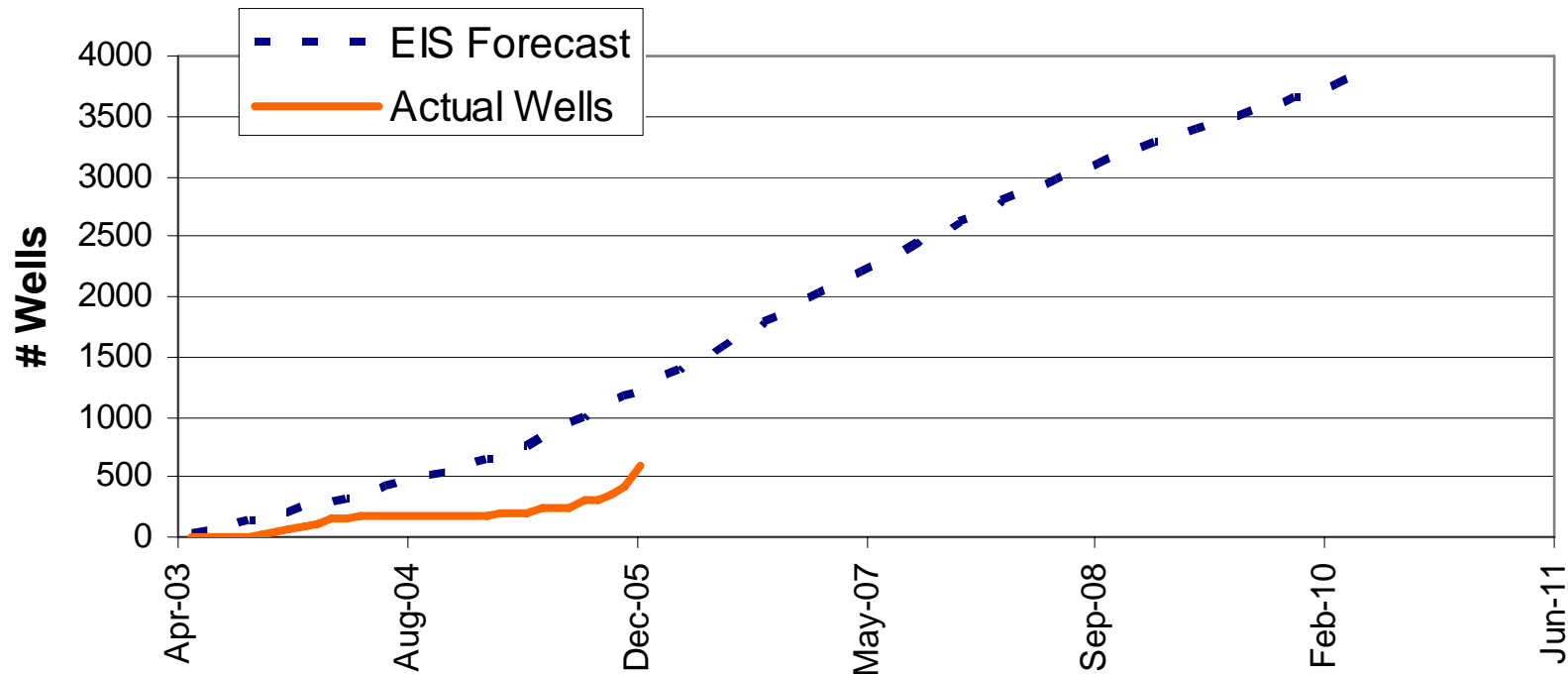


Why is Montana development lagging behind Wyoming?

- **Resource Size**
- **Infrastructure**
- **Regulatory Issues**
- **Litigation**

Where is CBNG in Montana today?

EIS-Forecast Development vs. Actual Producing Wells
Big Horn County



Regulatory/Legal Challenges

- **5 federal lawsuits challenging 2003 EIS**
- **1 state lawsuits challenging 2003 EIS**
- **4 lawsuits (3 state, 1 federal) challenging specific project approval**
- **2 state lawsuits challenging MPDES water discharge permits**
- **2 major rulemakings on state water quality standards**

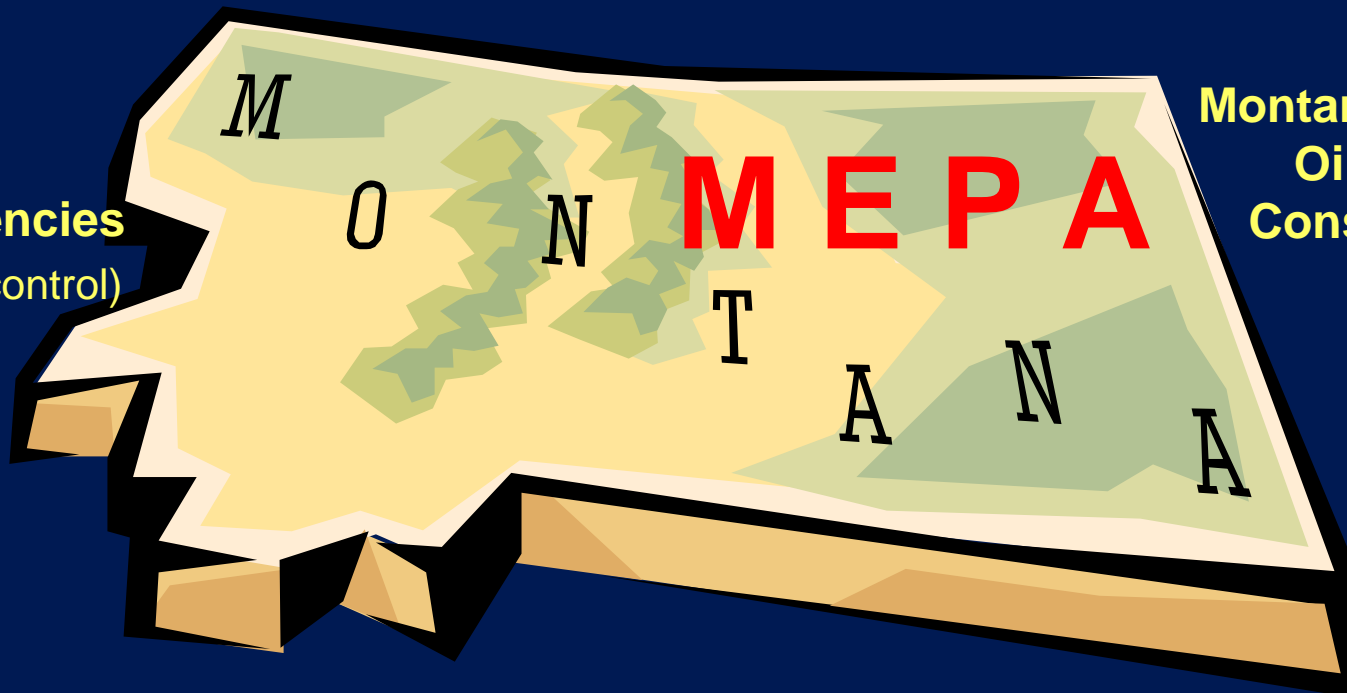
CBNG Regulatory Agencies

Montana Department of
Environmental Quality

Montana
Department of
Natural Resources

Big Horn
Conservation District

County Agencies
(e.g. weed control)



Montana Board of
Oil & Gas
Conservation

U.S. Army Corps of Engineers

Bureau of Land Management

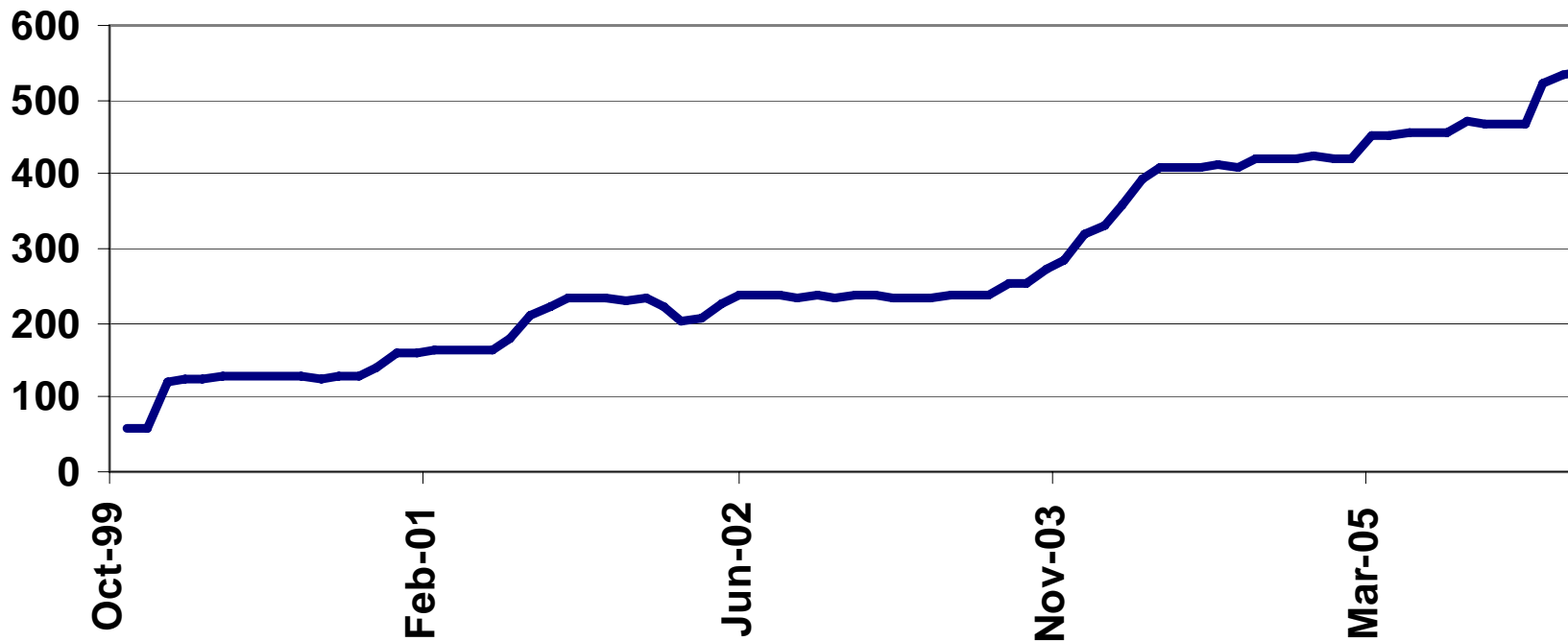

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Fidelity's Tongue River Project

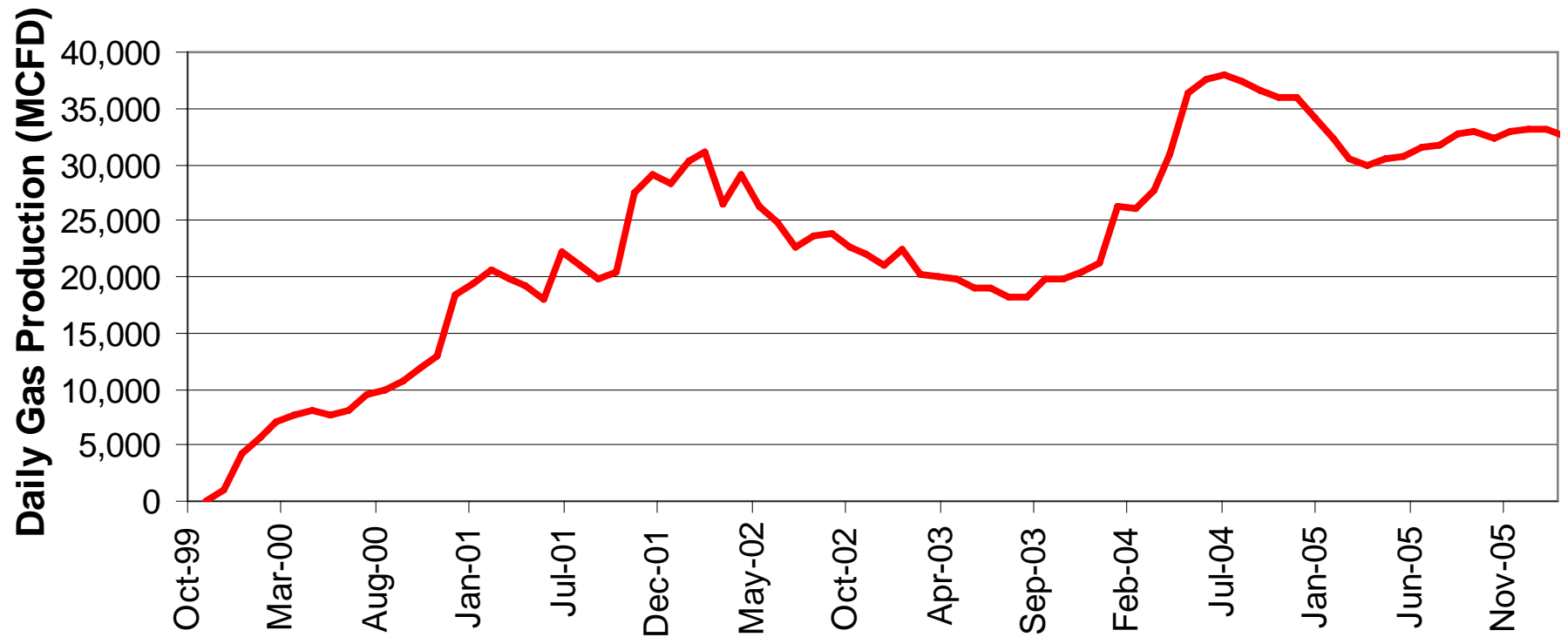
(near Decker, MT)

- Exploration began in 1997
- Pipeline constructed in 1998
- First production in 1999
- CBNG Litigation in 2000
- 535 wells producing approx. 33 MMCFD
- Over \$16.5 million paid in production tax

Fidelity Exploration & Production NUMBER OF PRODUCING CBNG WELLS IN MONTANA



Fidelity Exploration & Production MONTANA CBNG PRODUCTION



Water Quality (DEQ)
&
Water Quantity (DNRC)
Issues

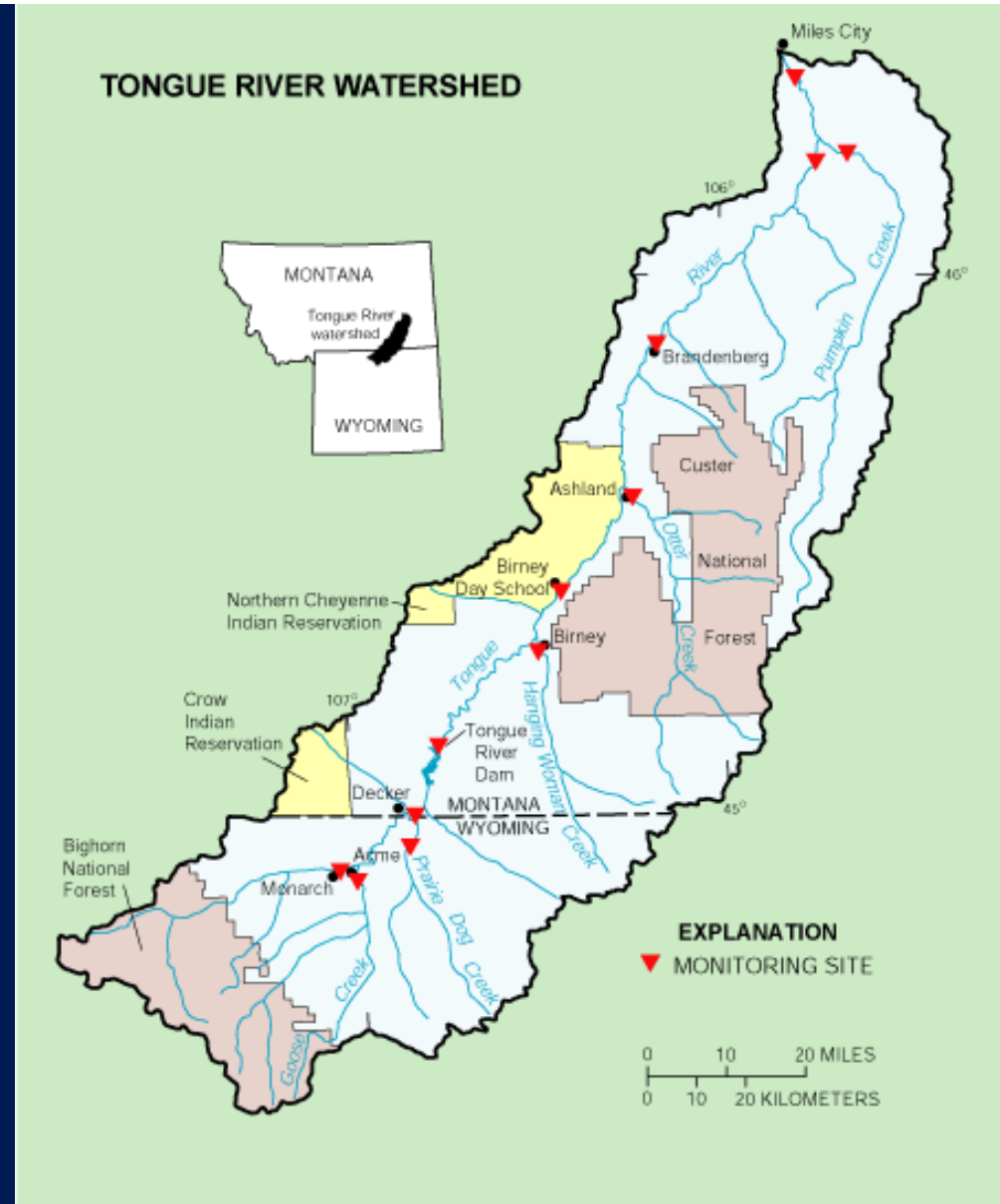
Surface Water Quality Issues

- **Salinity (affects plants)**
 - **Electrical conductivity (EC) or total dissolved solids (TDS)**
- **Sodicity (affects soil)**
 - **Sodium Adsorption Ratio (SAR)**

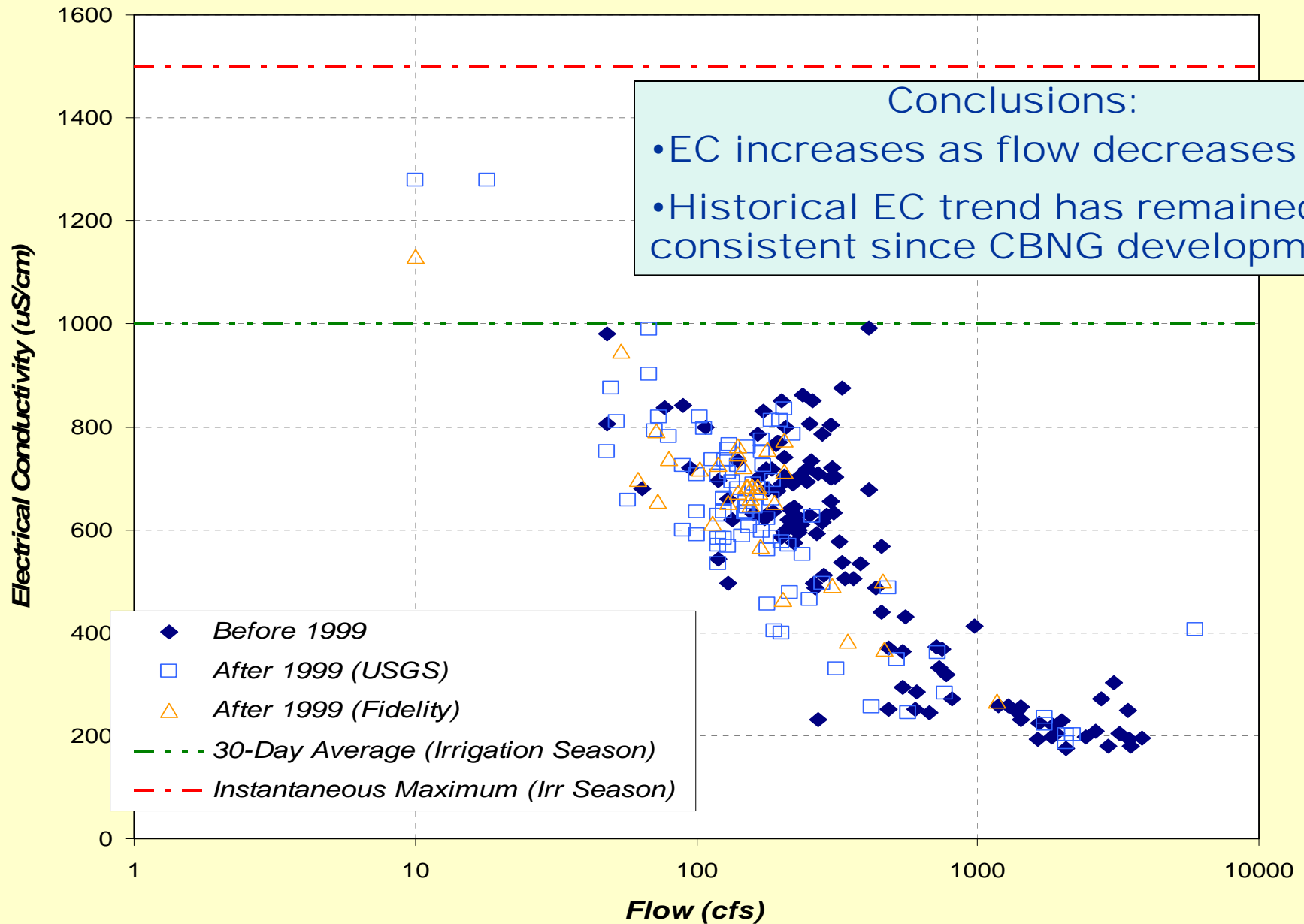
Surface Water Quality Monitoring

- Monitored by US. Geological Survey
- Tongue River water quality today is the same as it was before CBNG development began

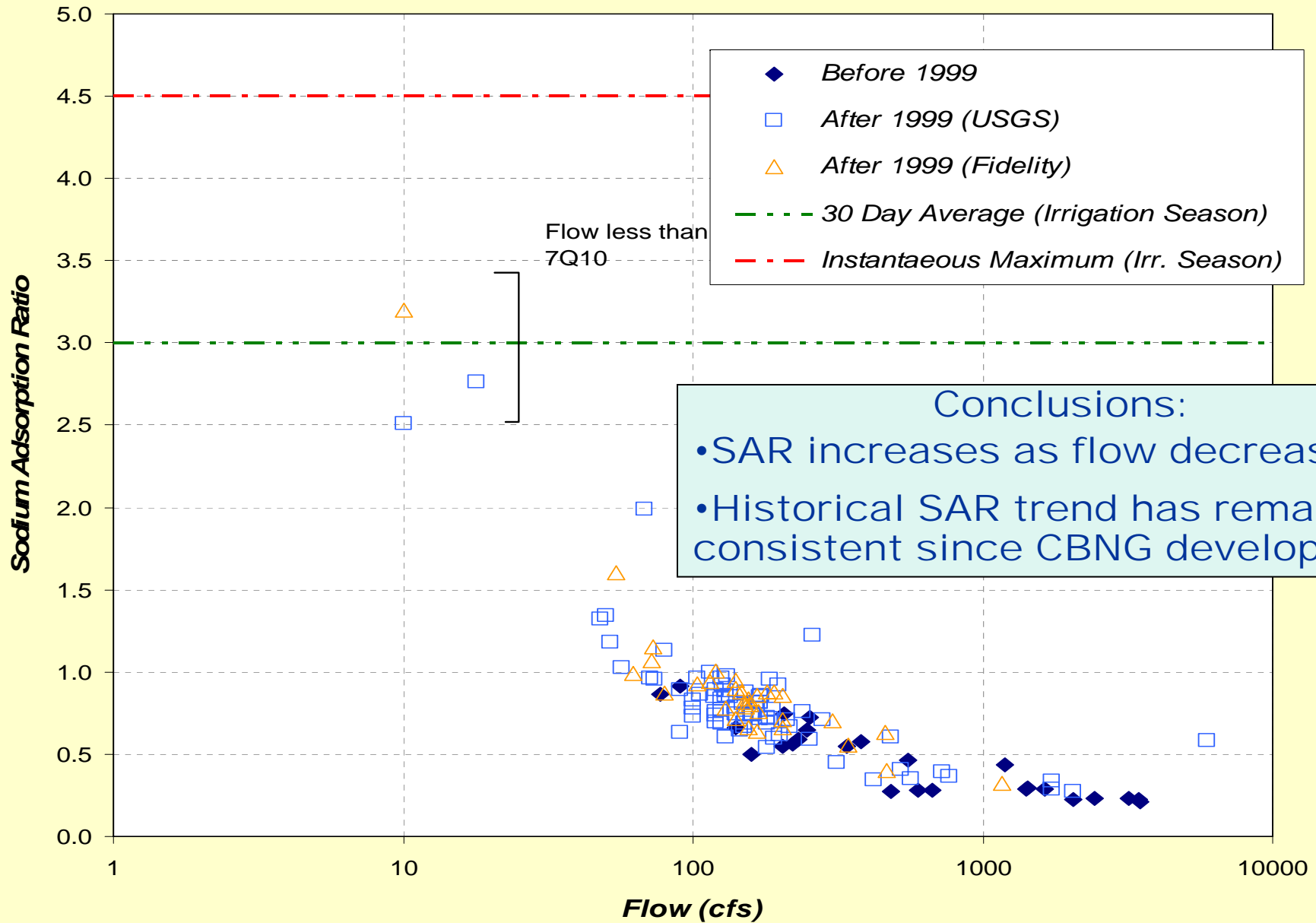
Tongue River Monitoring Stations



Tongue River at Stateline



Tongue River at Stateline



Tongue River Agronomic Monitoring and Protection Program

- Led by 3 independent scientists
- Identification of soil characteristics
- Monitor soil quality and crop yields
- Initially funded by Fidelity Exploration & Production Company

Tongue River AMPP Locations



Source: tongueriverampp.com

BOB McDONALD/Courtesy Staff

Soil & Crop Monitoring Tongue River Agronomic Monitoring and Protection Program (AMPP)

Results to date

- Soils physical and chemical characteristics have not changed
- Differences in crop yields were the result of farming practices, not salinity or sodium

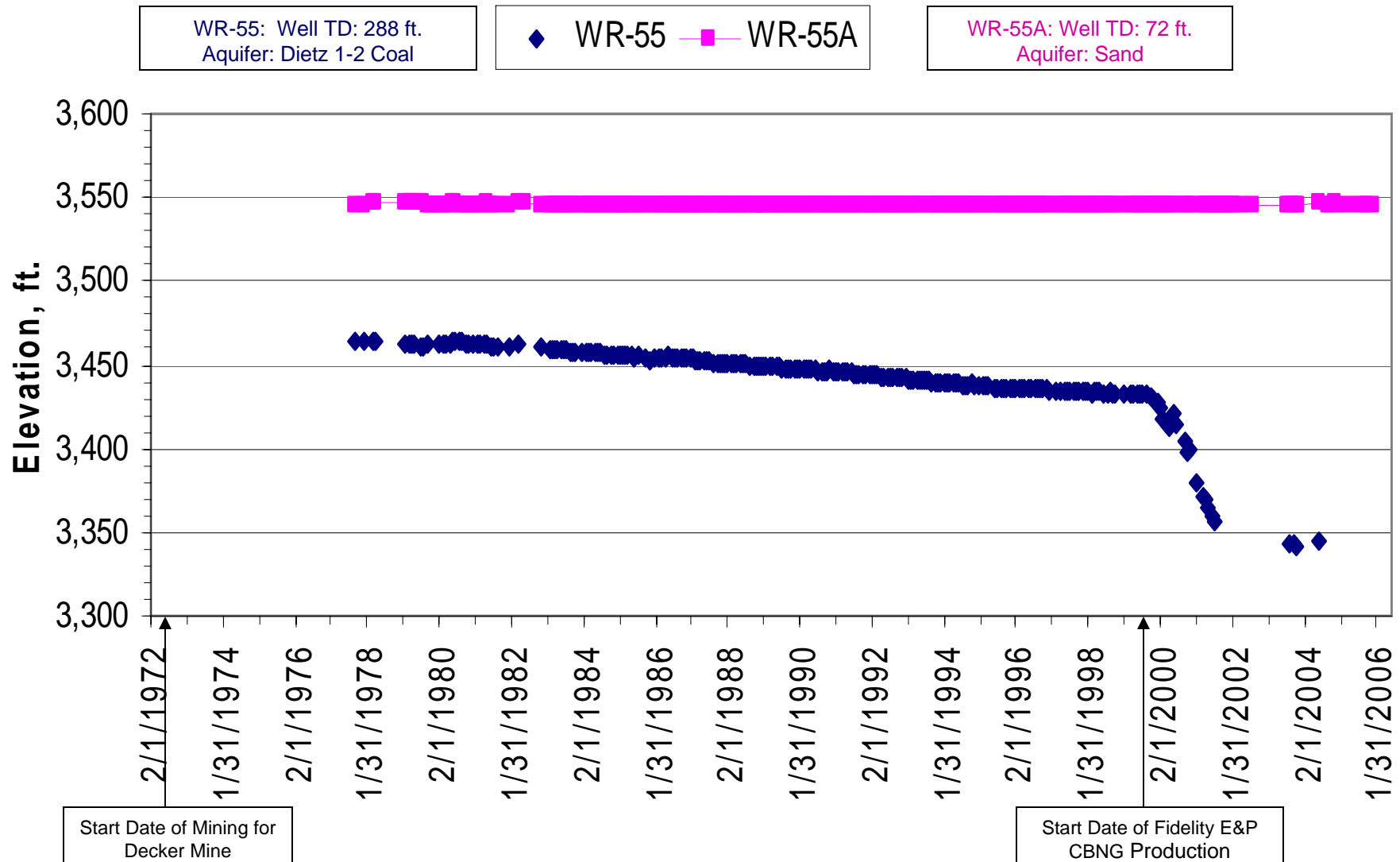
Water Quantity (Aquifer) Issues

- **Aquifers monitored by Montana Bureau of Mines & Geology (MBMG)**
- **Protection of water source by Montana Board of Oil & Gas Conservation and Department of Natural Resources & Conservation**
- **By Montana Statute (MCA 82-11-175) and regulation (MBOGC Order 99-99), appropriated ground water users are offered water well mitigation agreements within 1 mile of active CBNG well**

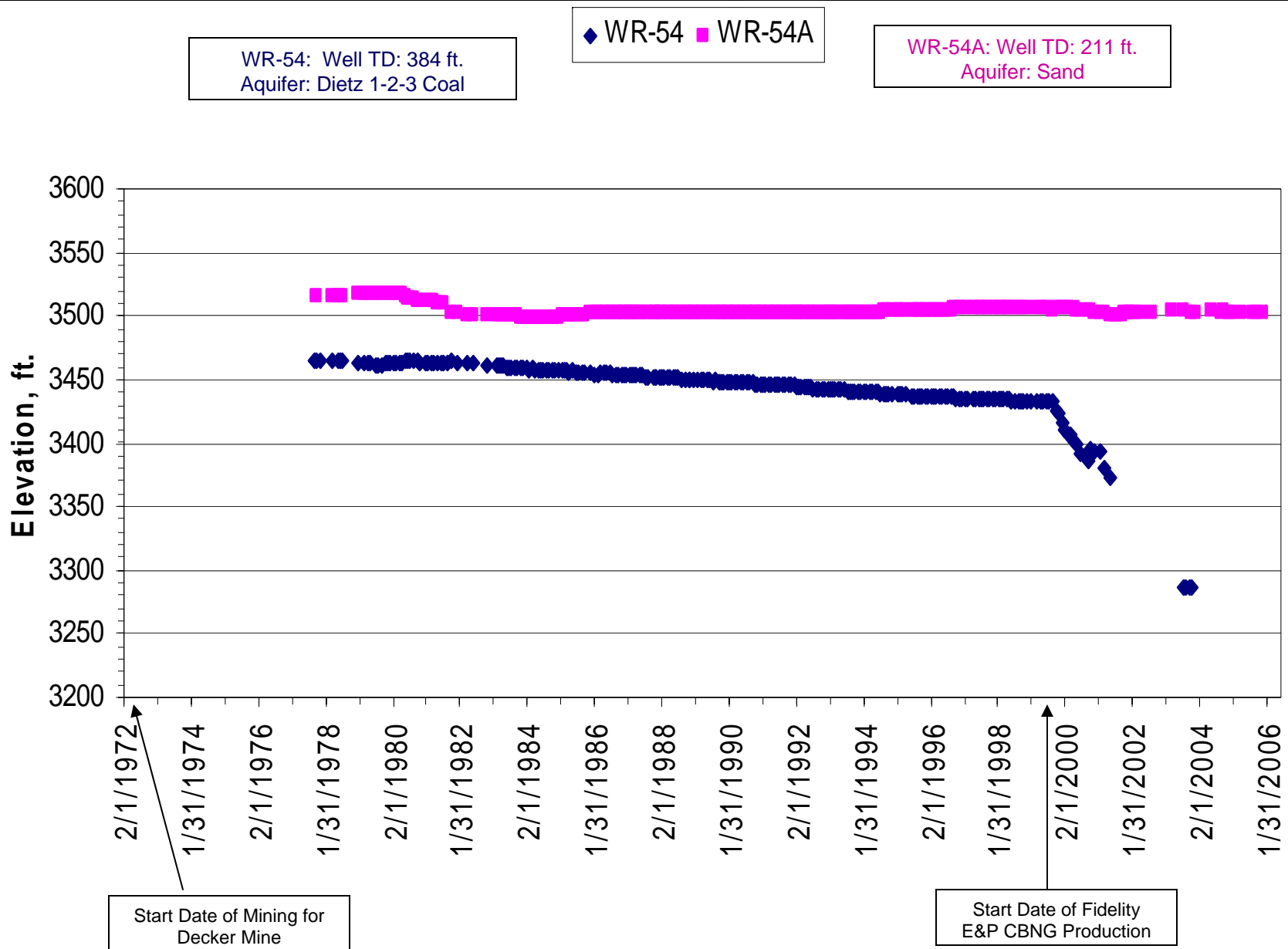
Water Quantity (Aquifer) Findings

- Aquifers being used by local ranchers for domestic & stock water are generally shallower than the coal seams that are being produced
- Coal seams that produce natural gas are “confined aquifers.”
- Confined aquifers are not connected or are poorly connected to near-surface aquifers
- Paired MBMG monitoring wells within the CX Field confirm these facts

Groundwater Level Trends in Paired Shallow Well (WR-55A) and Producing Coal Bed (WR-55).



Groundwater Level Trends in Paired Shallow Well (WR-54A) and Producing Coal Bed (WR-54).



Source: Ground Water Information Center database (2006)



Thank You