

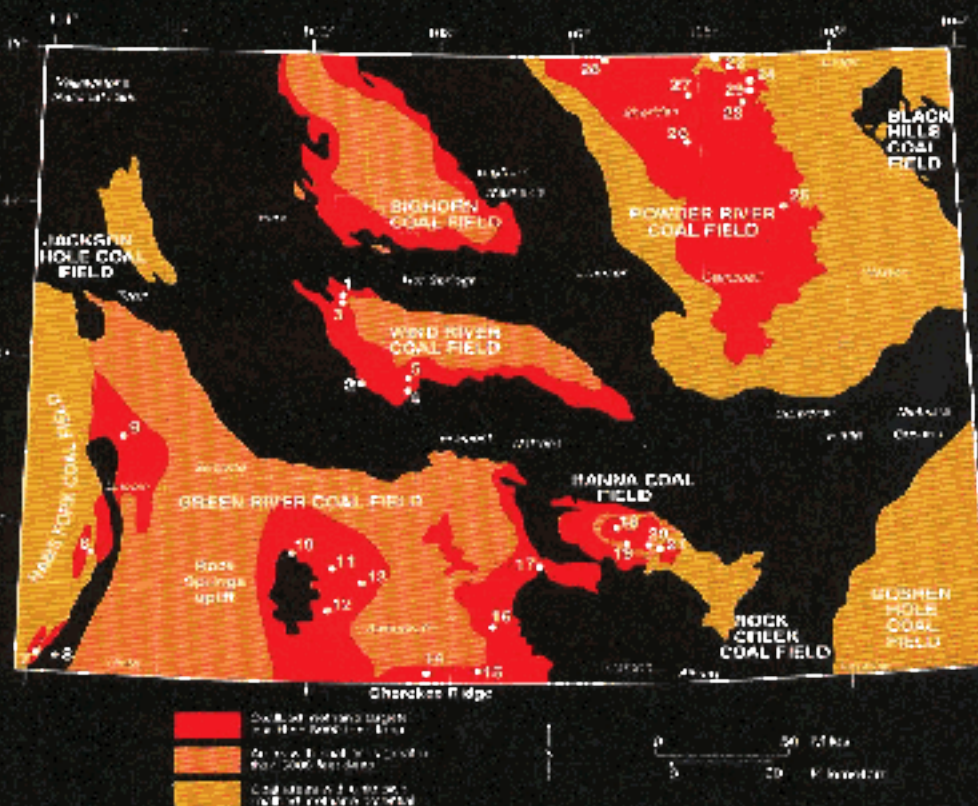
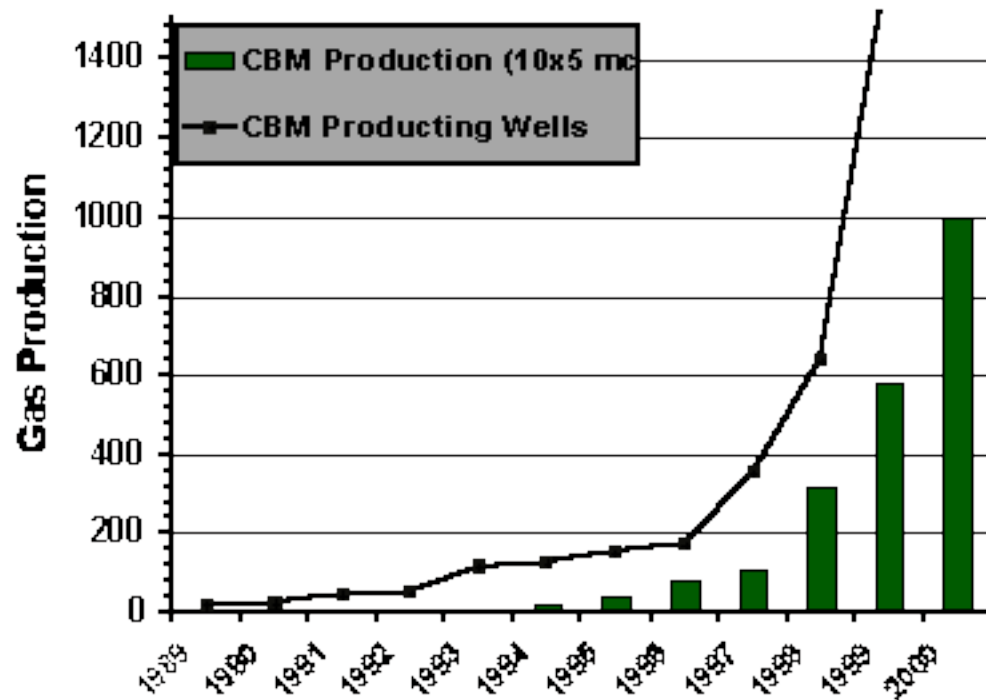
Holistic Coal Bed Methane Research Project

**& Apache Corporation
Columbia University
Stanford University
University of Wyoming**

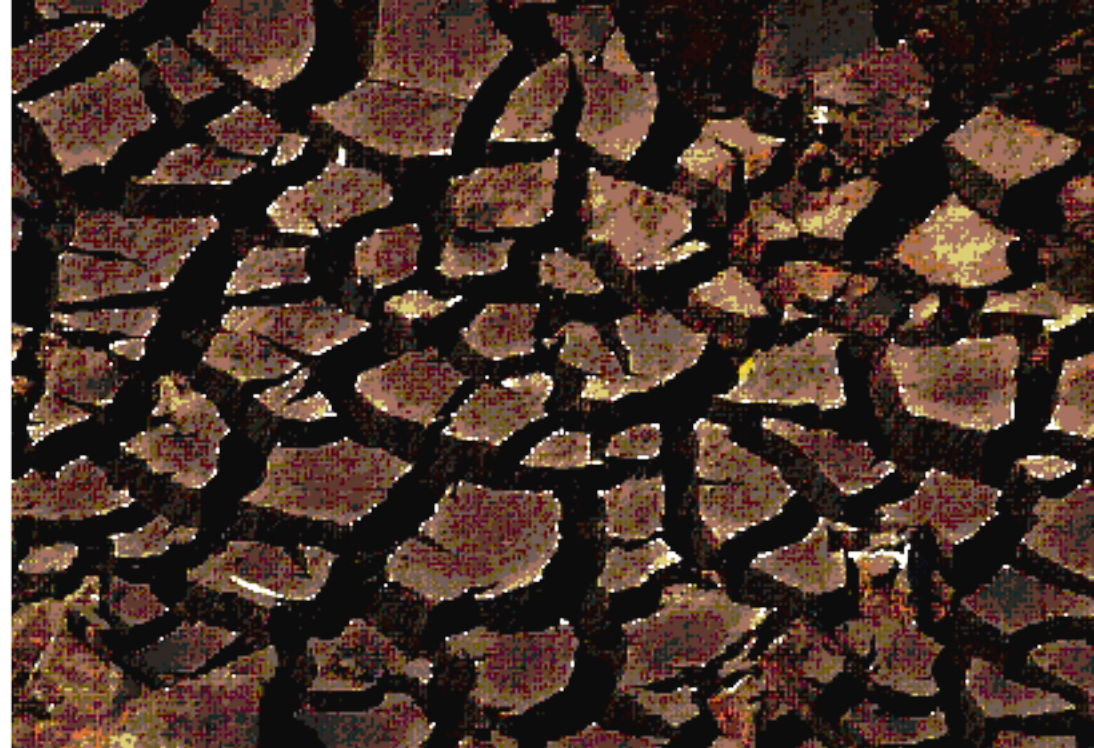


Coal Bed Methane is critical to the Energy future of the United States and Wyoming is at the heart of the Opportunity

BUT there may be a DOWNSIDE that will affect Wyoming's Future water supply

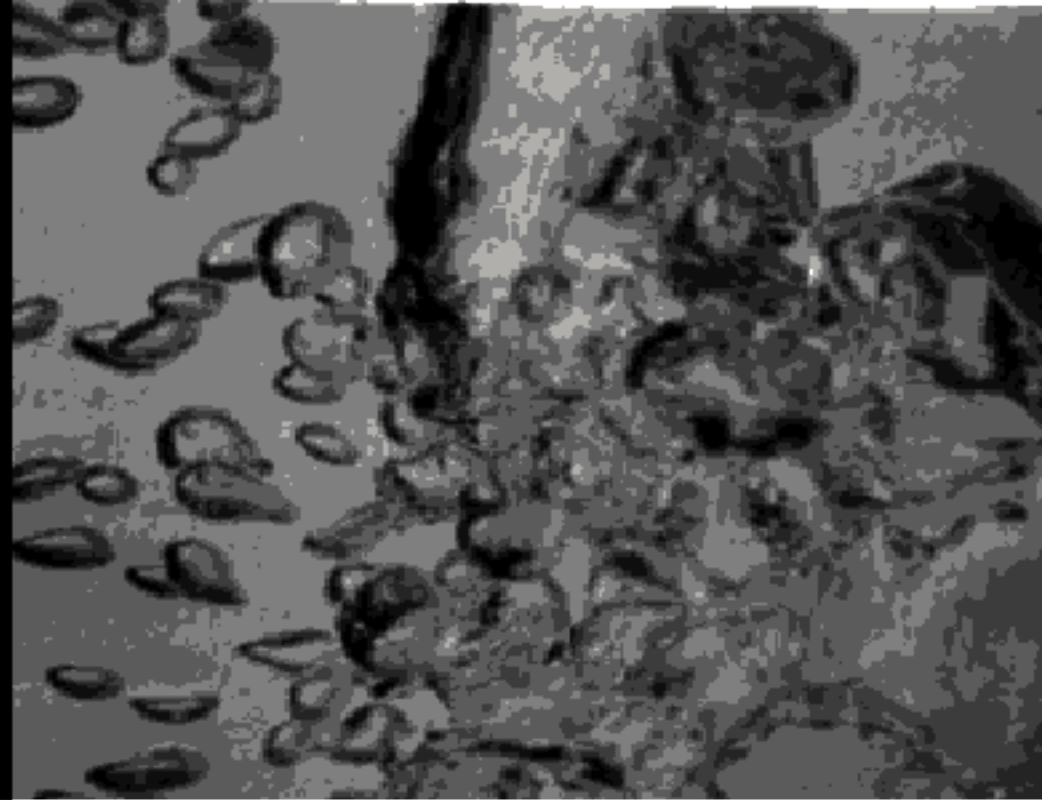


A massive volume of fresh water is produced along with the Gas -- at what cost to the Aquifer and to the drinking water of future generations?



Ucross Foundation is teaming with world class scientists from Columbia University, Stanford University and the University of Wyoming to attempt to produce better answers.

**We are proposing a Holistic
CBM Research Project about
how to more effectively
produce the gas needed to
power and heat America while
at the same time doing no
damage to the Aquifer**



**Our Scientific Method is to
combine the measurement
and monitoring of water
chemistry with the imaging
of changes in the aquifer and
experiments in how to better
manage the water/gas flux!**

Mitigating the environmental effects of water chemistry so that economic benefits in a dry state can be enjoyed:



Such as Membrane Filtration experiments to determine how to make the sodium rich water useful for irrigation.

Can the Aquifer be seismically imaged and monitored in real-time so that damage can be averted?

Can near-wellbore drainage be improved with modern Frac-Packing techniques?

Can the local Acquirer model be fit into a regional water management model for the whole Powder River Basin?

Can the Coal Seams be degassed without de-watering? Say with CO₂ mitigating global warming as well?

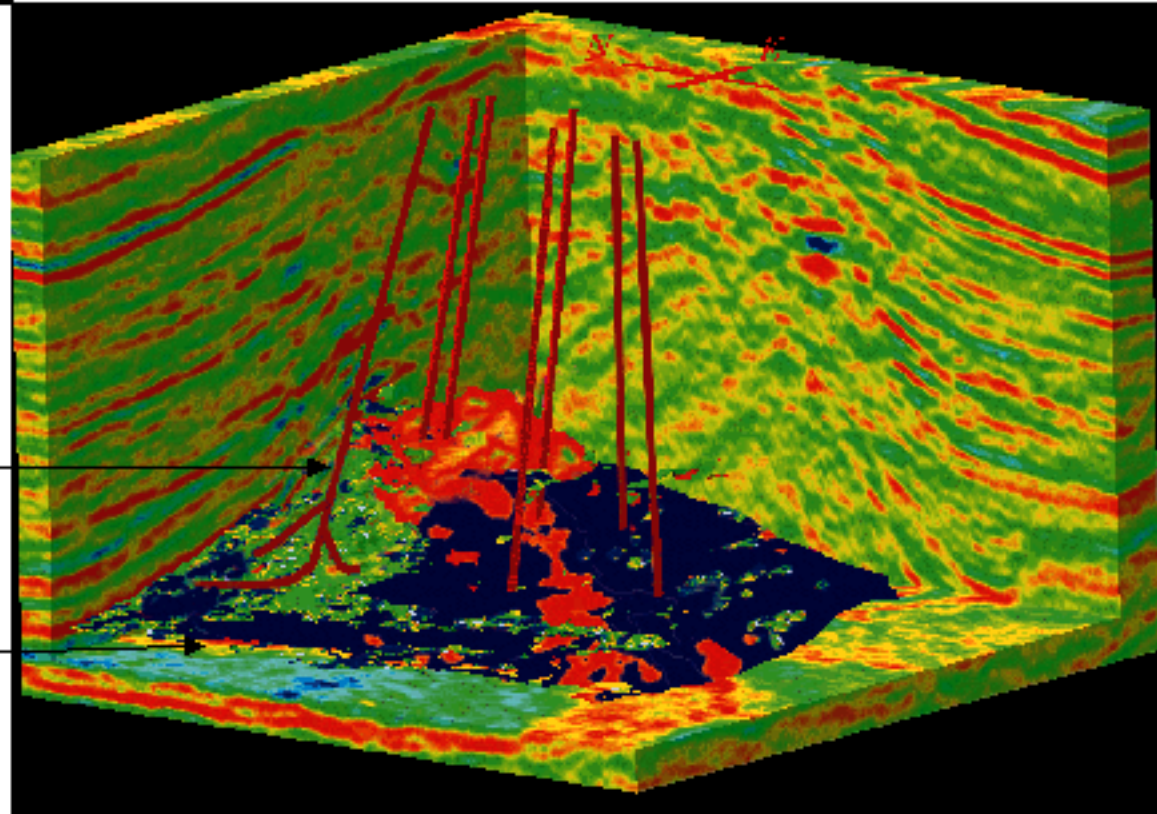
**Can gas be produced with
minimized water
production using modern
well placement and
drainage techniques?**

**Experiments with Dendritic
Drainage of untapped gas
using multi-lateral horizontal
well technologies**

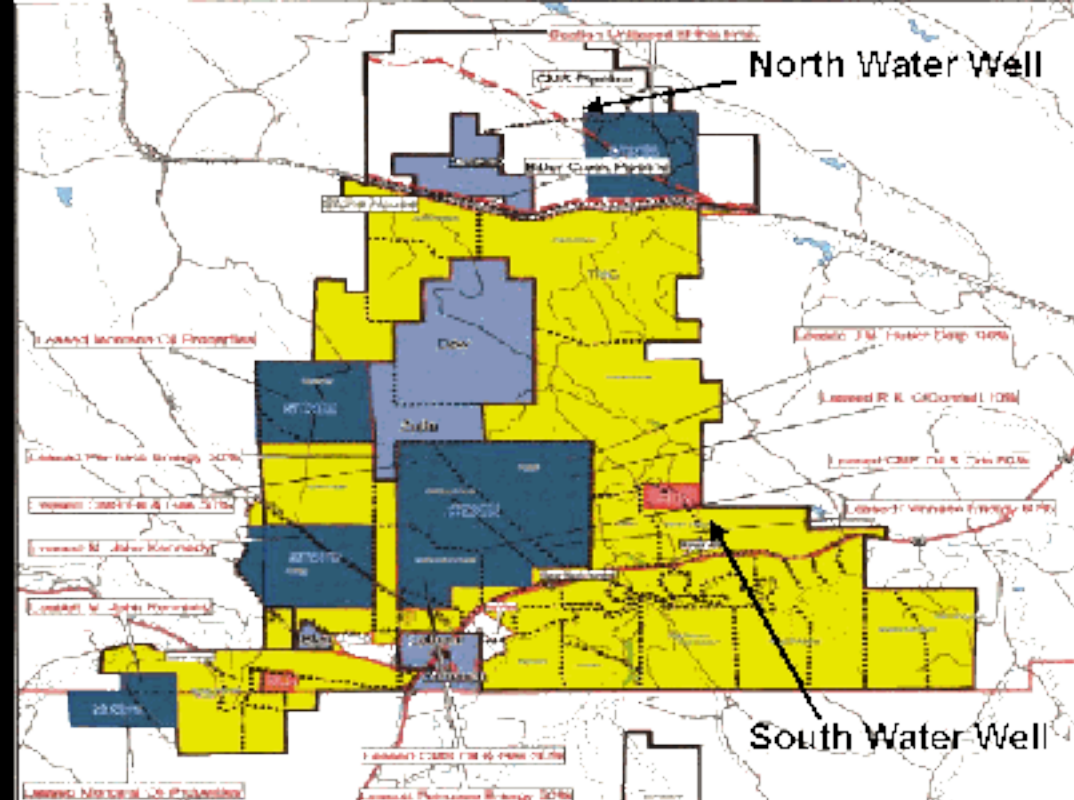
Surface →

Gas production from
pressure drawdown
over extended drainage
area →

Coal Seam



**The Ucross Ranch is about to
enjoy (suffer?) an extensive
Coal Bed Methane
Production Program
beginning in 2001**



**The Plan: Core, Log
and sample fluids so
that measurements of
chemistry and physical
properties can better
define the problem in
year one.**



**The Plan: Integrate
across environmental
and economic silos to
arrive at a better
Holistic CBM
production
methodology in the
second year.**

