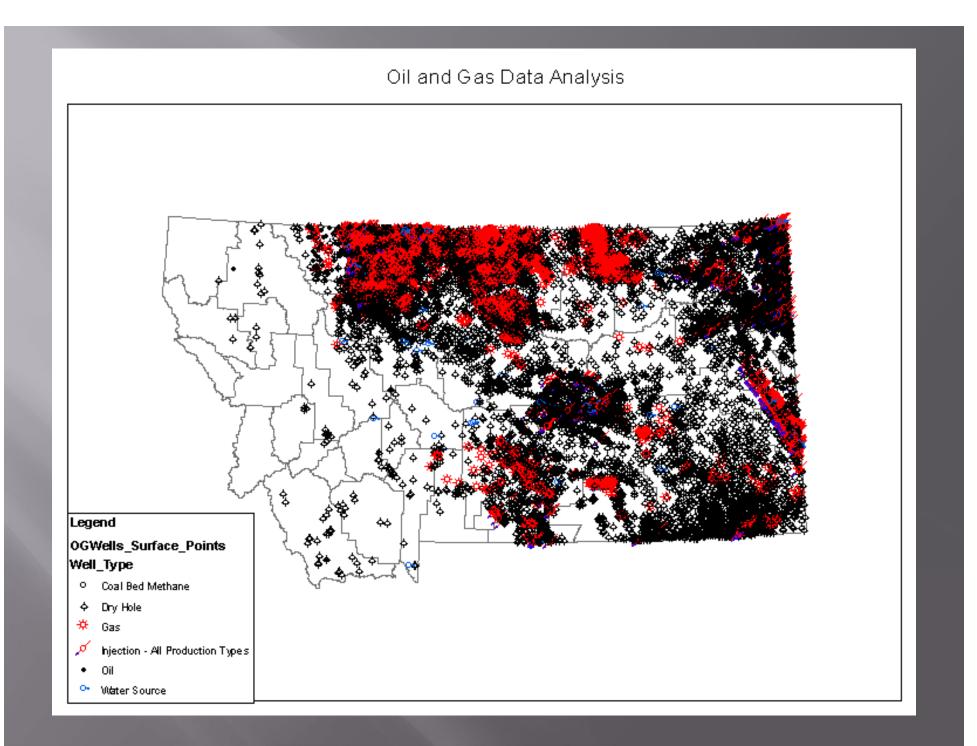


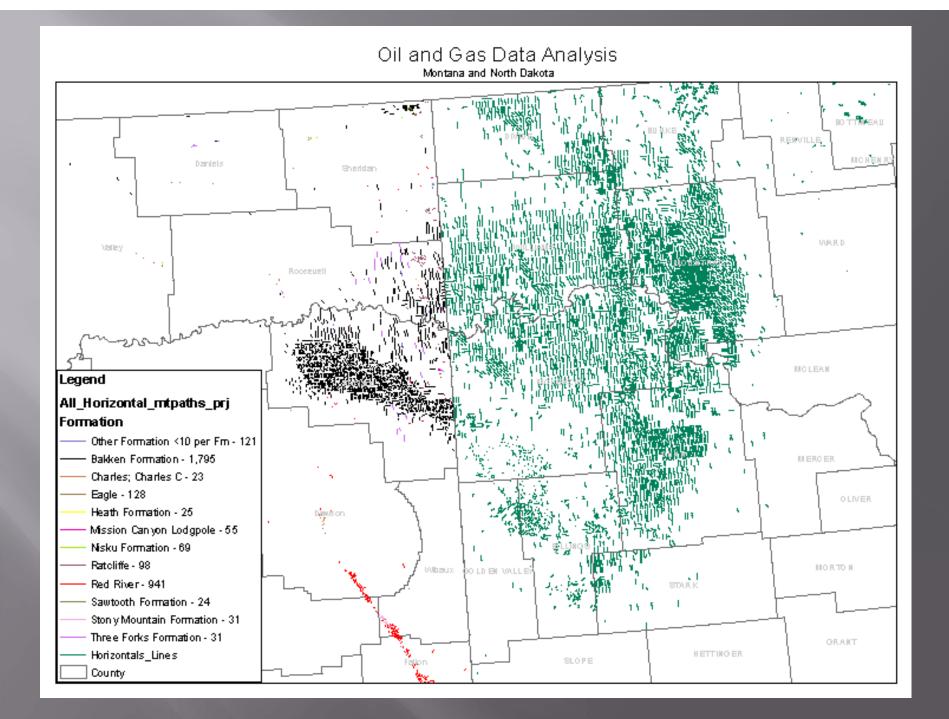
DEQ'S ROLE IN THE BAKKEN

STEVE KILBREATH, MDEQ DATA FROM BOGC & NDIC

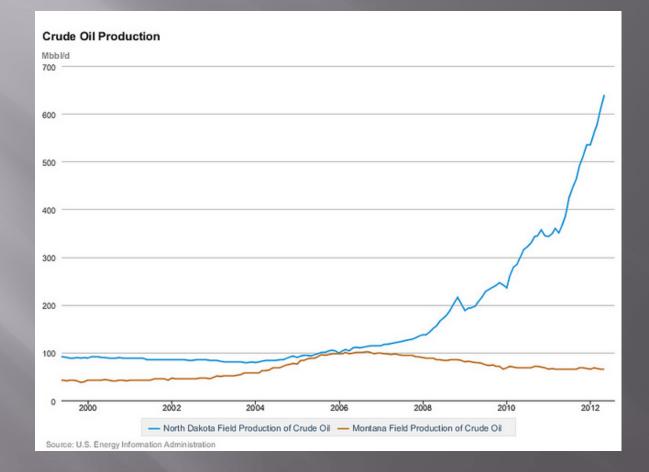


Oil and Gas Data Analysis 2 + 2Legend All_Horizontal_mtpaths_prj Formation - Other Formation <10 per Fm - 121 Bakken Formation - 1,795 Charles; Charles C - 23 Eagle - 128 Heath Formation - 25 Mission Canyon Lodgpole - 55 Nisku Formation - 69 Ratcliffe - 98 Red River - 941 Sawtooth Formation - 24 Ston y Mountain Formation - 31 Three Forks Formation - 31

INTERESTING DIFFERENCES MONTANA VS NORTH DAKOTA



Montana vs North Dakota Daily Production



Rigs and Production

March 2013 Production

- Montana 2,466,969 barrels
- North Dakota 24,272,461 barrels
- March Rig Count
- Montana 11
- North Dakota 184

Completions - Horizontal

- Montana 181 for all of 2012
- North Dakota 142 for March 2013

DEQ Related Issues

Permitting and Compliance Gravel mining Subdivision Stuff – Temporary Work Force Wastewater, Wastewater, Wastewater Zombies Air registry permits Solid Waste Discharge permits – produced water Sewage Pumpers Water Quality Issues Enforcement

Gravel Mining



2012 – Eastern Montana
86 Issued
36 pending
5 withdrawn
75% in Eastern MT
2 staff 1 week/month



Temporary Work Force Housing

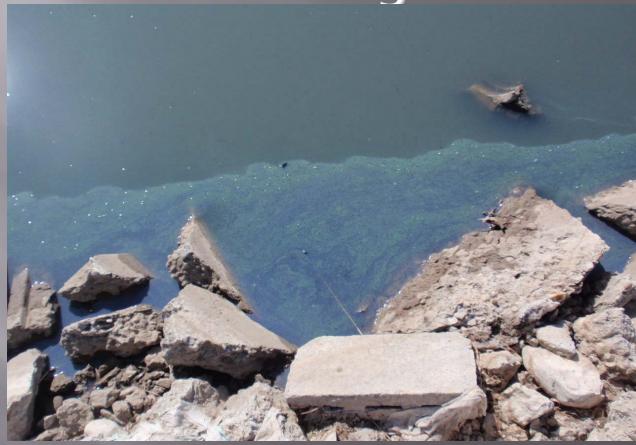
RV Parks vs Work Camps



76-4 MCA – Subdivision 75-6 MCA – Public Water 1 engineer 2-3 days/month



Community Challenges



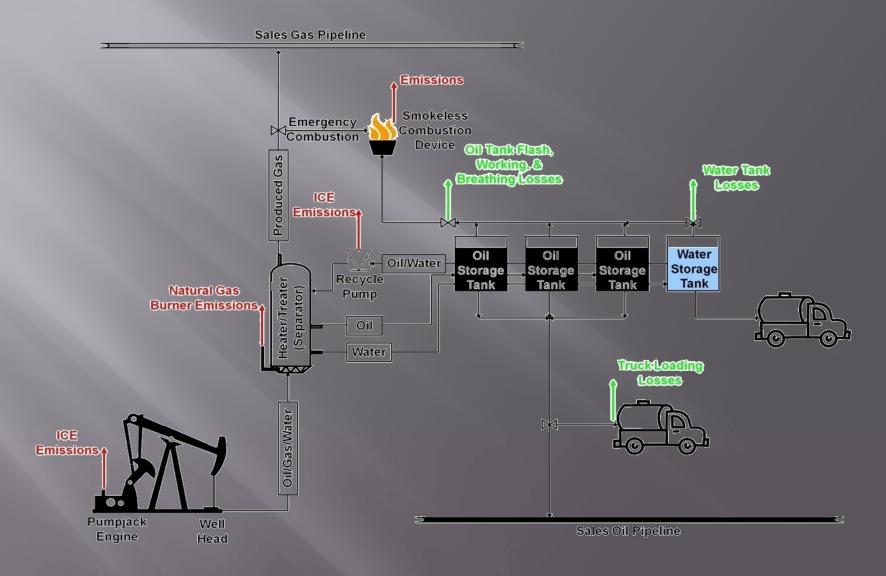
RV's and Blue water ?

Permitting Challenges

• Example of a zombie system: this development was approved and occupied in the early 1980s, then vacated and returned to agricultural land, and is now being occupied again. How does this fit our regulations?



Air Registry



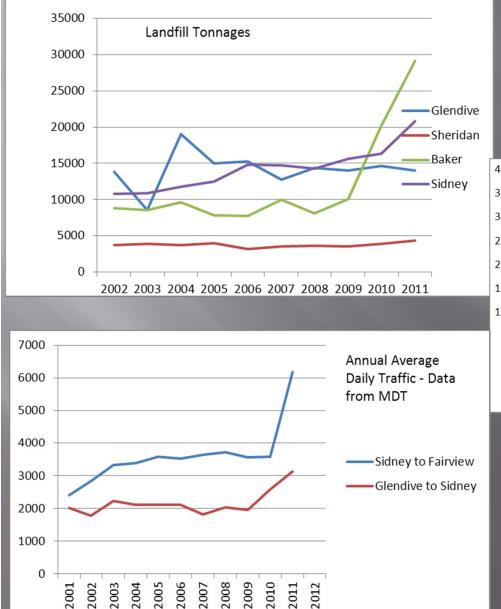
Solid Waste

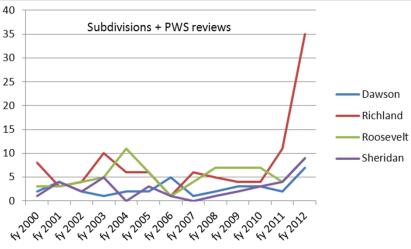


UIC sites/ produced water

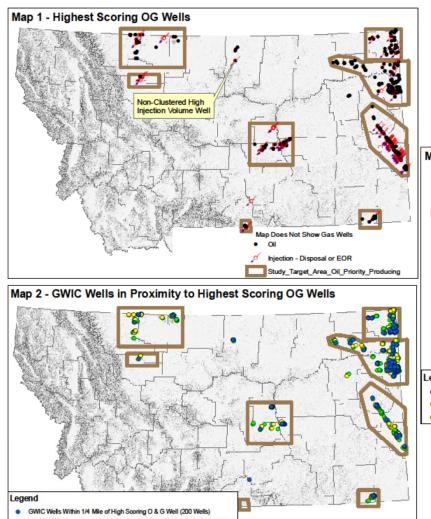
TENORM & Filter Socks Specialty Sites – cuttings, mud, etc

Impact timing for Montana





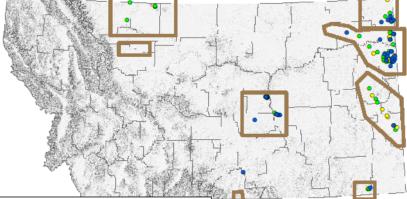
DEQ Baseline Monitoring



DEQ GW WQ Sampling For Potential Impacts From O & G Production

Draft Site Selection Results May 01, 2013

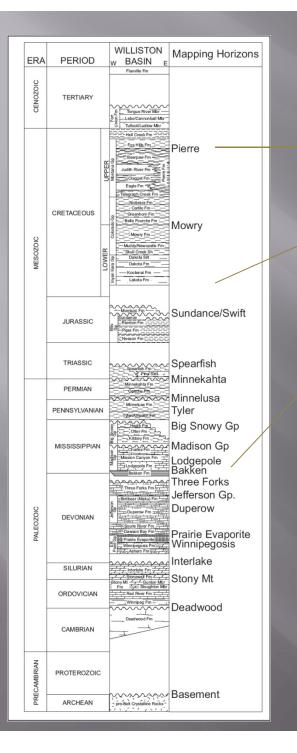
Map 3 - High Scoring GWIC Wells in Proximity to Highest Scoring OG Wells



Legend

- GWIC Wells 1/4 Mile GT 65 WW Pts (62 Candidate Wells)
- GWIC Wells 1/4 & 1/2 Mile GT 70 WW Pts (54 Candidate Wells)
- GWIC Wells 1/2 & 1 Mile GT 50 WW pts (62 Candidate Wells)

- GWIC Wells Between 1/4 & 1/2 Mile of High Scoring O & G Well (405 Wells)
- GWIC Wells Between 1/2 & 1 Mile of High Scoring O & G Well (1,170 Wells)



Water thoughts

Bottom of Fresh Water 1,500' Dakota/Lakota – Injection Zone 5,000' Bakken – Three Forks 10,000 feet

O&G Water Cycle

Fresh water for drill mud 500,000 gallons Fresh water for frack 2-3,000,000 gallons(100,000 gal/stage) Fresh water is enough to irrigate 4-5 acres of Kentucky Blue grass Flow back and produced Mt wells in $2012 = \frac{1}{2}$ " in Canyon ferry Mt+ND wells in 2012 = 7" in Canyon Ferry