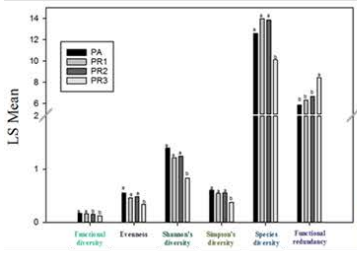
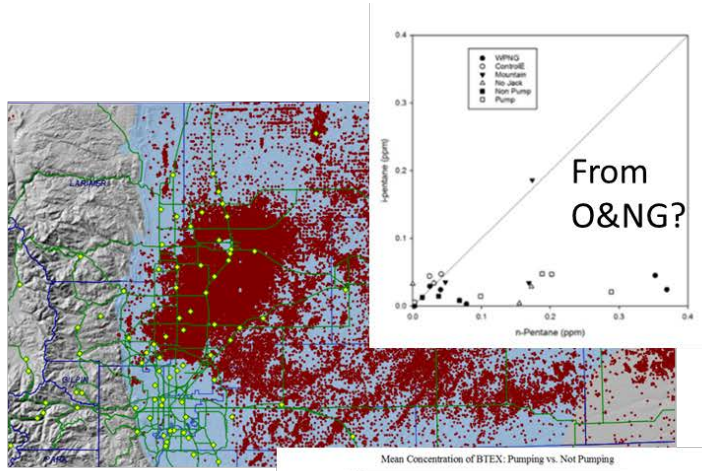
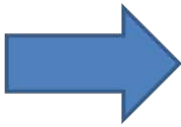
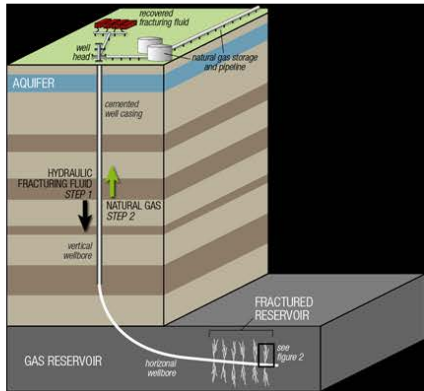


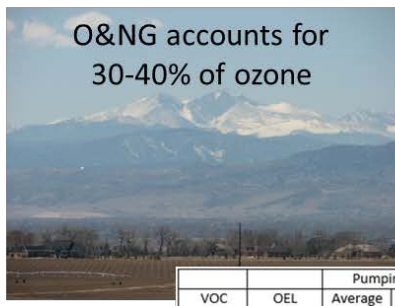
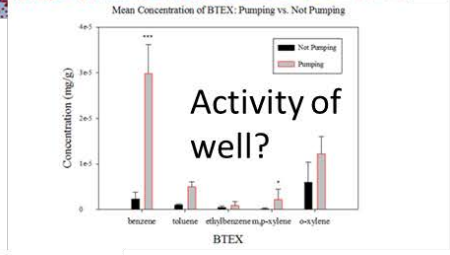
Tour de Frack Handout

What is the story?

Oil and natural gas account for 78% of Colorado's energy (making up 5% of the US total), the number of producing natural gas wells in Colorado has more than doubled over the last seven years (currently 54,369; 23,301 in Weld County), and production of O&NG in Colorado is expected to increase during the next few decades. The potential impacts of fracking well sites on the quality of air and footprint on the land have been documented, but data are needed to understand their magnitude, and their spatial and temporal extent. The goal of this research in the Pawnee National Grasslands was to quantify VOC emissions from O&NG production sites and the reclamation of wells following abandonment to determine if levels meet regulatory standards.

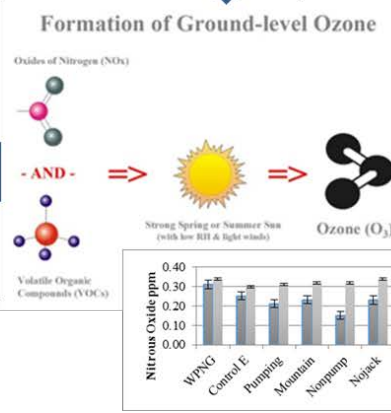


Can we reclaim?



Health Risk?

VOC	OEL TWA PEL	Pumping Sites		Nojack Sites	
		Average	Maximum	Average	Maximum
Acrolein	0.1 ppm	0.08	0.54	0.27	0.69
Benzene	1 ppm	0.16	1.26	0.27	1.31



Take-Home Messages

1. Well sites have fugitive emissions.
2. Fugitive emissions are affected by well activity.
3. The temporal footprint is long, but not permanent.
4. The spatial footprint may not be very wide (or is it?), but point source data are clear and a health hazard.