



UTAH DEPARTMENT of
ENVIRONMENTAL QUALITY

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Developing a Utah Oil and Gas Emissions Inventory

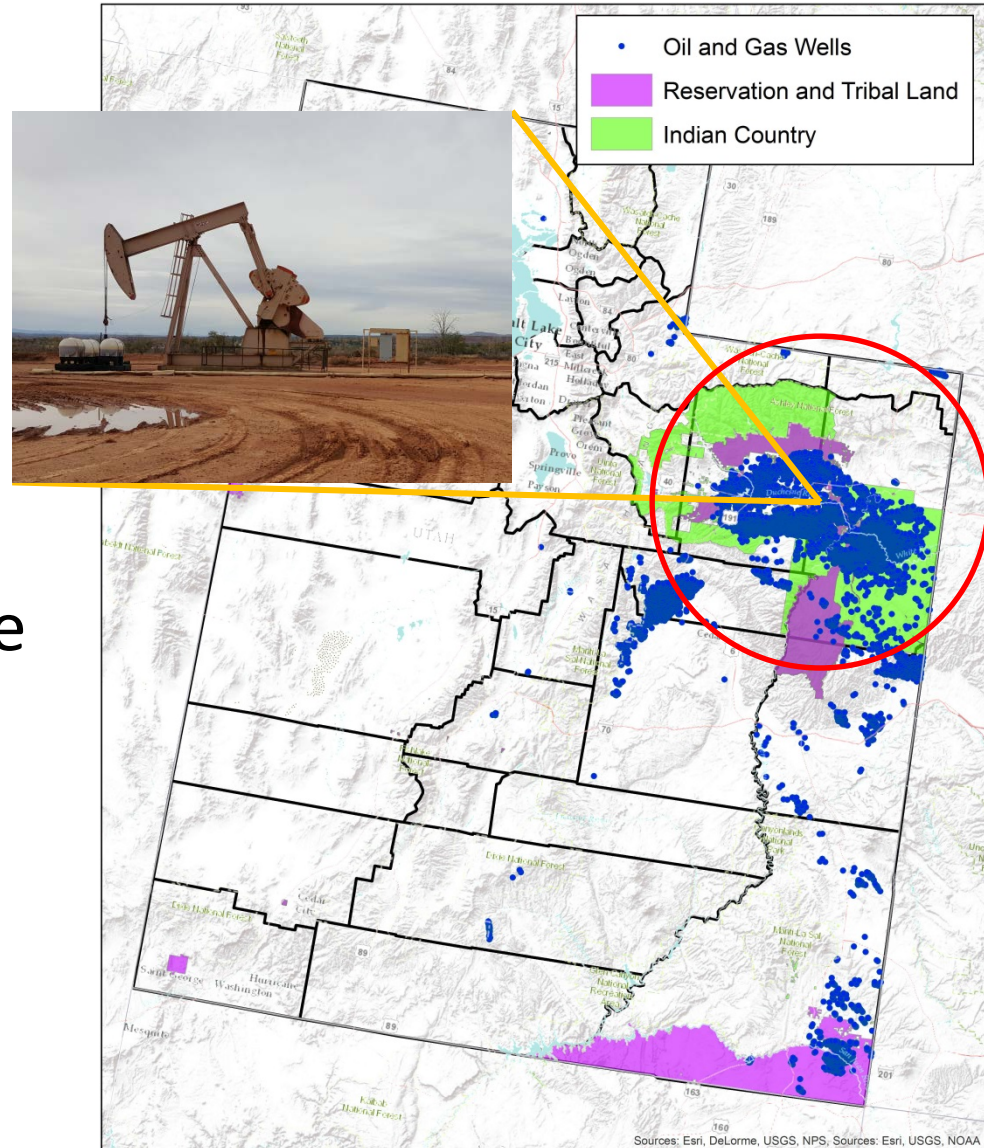
Whitney Oswald

8/17/2017



Oil and Gas Wells in Utah

- >11,000 wells in 2014
- Majority in Uinta Basin (UB)
- Shared Airshed - complex jurisdiction
 - State, Feds (EPA), Tribe
 - \approx 30% State and 70% Tribe and EPA



Uinta Basin Ozone Issues

- High Wintertime Ozone Events
- First noted: 2009-2010 winter season
 - **124ppb** 8-hr average
- Oil and gas industry is the largest contributor of precursors (especially VOC)



Modeling and Planning

- Previously:
 - Inventory = 2006 WRAP Phase III + current oil and gas activity data = 2014 projection
- Continued O₃ exceedances, impending likelihood of a non-attainment designation
- High quality inventory needed for Ozone modeling

Partnership

- Shared Airshed, Split Jurisdiction = COLLABORATION!
- UDAQ + EPA (R8) + Ute Tribe



Stakeholder Process

- Conference Calls
- 4 in-person meetings
- Included: UDAQ, EPA, Ute Tribe, WRAP, BLM, Western Energy Alliance (WEA), major oil and gas operators



Stakeholder Process

- Initial Approach: Stepwise requirement gathering.
 - Problem: topics of agreement in one meeting became topics of disagreement in the next meeting.
 - No conclusive decisions made.



- New Approach: rather than stepwise approach, craft a draft inventory that Air Agencies saw as acceptable, take this inventory to stakeholders for input and review.

Inventory Workbook

- Microsoft Excel based workbook
 - Facility Based
 - Sheet for each equipment type
 - Emissions Factors
 - AP-42, API, Subpart W, Operators provided or manufacturer spec. based
 - $PM_{2.5}$, PM_{10} , SO_x , NO_x , VOC, CO, CH_2O
- Well completions
 - Rice & turbines
 - Separators & heaters
 - Dehydrators
 - Tanks
 - Truck loading
 - Pneumatic controllers
 - Pneumatic pumps
 - Fugitives
 - Composition Data:
 - Raw Gas, Flash gas, S/W/B Gas

Inventory Collection and DB

- 31 workbooks received (represent 96% of 2014 Wells)
- > 8,500 facilities included
- Initial QA/QC → Formal QA/QC → DB Populated → Final QA/QC



Results (NO_x & VOC)

2014 Utah Air Agencies Oil and Gas Emissions Inventory				
Description	NO _x (tons/year)		VOCs (tons/year)	
	Duchesne	Uintah	Duchesne	Uintah
Totals				
County Total (Duchesne & Uintah)	5,668	7,857	10,353	41,286
Combined Total (Duchesne + Uintah)	13,526		51,640	

Not Shown:

- CO
- SO_x
- PM₁₀
- PM_{2.5}
- CH₂O

2014 – Air Agencies EI vs NEI

- NOx is similar
- VOC decreased in Air Agencies 2014 O&G EI

	Air Agencies		NEI		Air Agencies		NEI	
	NOx		NOx		VOC		VOC	
	Duchesne	Uintah	Duchesne	Uintah	Duchesne	Uintah	Duchesne	Uintah
Total	5,669	7,857	7,008	7,408	10,354	41,287	50,913	82,464

2014 NEI = 2006 WRAP Phase III EI projected with 2014 activity data

2014 – Air Agencies EI vs NEI

- Large Decreases in VOC
 - dehydrators
 - pneumatic controllers
 - pneumatic pumps (Duchesne County)
 - Engines
 - oil and condensate tanks
 - truck loading
- Large Increases in VOC
 - fugitive emissions
 - heaters
 - well completions
- Large Decreases in NOx
 - dehydrators
 - well completions
- Large Increases in NOx
 - separators
 - heaters

2014 – Air Agencies EI vs O&G Tool

	NOx (tons/year)		VOCs (tons/year)	
	Duchesne	Uintah	Duchesne	Uintah
NEI	7,008	7,409	51,353	84,827
Air Agencies + WRAP Supplement	5,669	7,858	10,793	43,650
O&G Tool	4,597	4,935	30,362	39,309

2014 – Air Agencies EI vs O&G Tool

- EPA Tool– provides enough detail to prepare national-level inventory on county level basis
- UDAQ for inventory and modeling needs requires much higher spatial resolution
- 2014 UT EI
 - almost point source inventory for area sources
 - equipment specific emissions
 - location information
 - retains high level of spatial resolution

Modifications

- Supplemented with WRAP Inventory Projections
 - Venting and Flaring
- Added Waste Water Facilities (Ponds, Landfarms, Landfills)
 - UDAQ developed method – mass balance approach

Final 2014 Inventory (NO_x & VOC)

Description	NOx (tons/year)		VOCs (tons/year)	
	Duchesne	Uintah	Duchesne	Uintah
All Sources				
County Total (Duchesne & Uintah)	5,669	7,858	34,096	93,808
Combined Total (Duchesne + Uintah)	13,527		127,904	

Thank You!

UDAQ:

- Brock LeBaron
- Patrick Barickman
- Colleen Delaney
- Sheila Vance
- Greg Mortensen
- Todd Wetzel

EPA (R8):

- Chris Dresser
- Cindy Beeler
- Aaron Zull

Ute Tribe:

- Minnie Grant

Additionally:

- WRAP (Tom Moore)
- WEA
- BLM
- Participating Companies

For Further Information about the Utah 2014 Air Agencies Oil and Gas Emissions Inventory
Please Contact:

Whitney Oswald woswald@utah.gov

Greg Mortensen gmortensen@utah.gov