EDF Produced Water & Standards Crosswalk Effort

ECOS Shale Gas Caucus, March 2021

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EDF
ENVIRONMENTAL DEFENSE FUND®
Finding the ways that work

Discharging Oilfield Wastewater Under the Clean Water Act's National Pollutant Discharge Elimination System (NPDES) Program

Basic rule of thumb:

No discharge of wastewater pollutants directly from well sites

40 C.F.R. pt 435(c)

Off-site Options:

Municipal wastewater treatment plants ('conventional' wells only)
40 C.F.R. pt. 435(c)

-or-

Centralized Waste Treatment
40 C.F.R. pt 437

West of 98th Meridian Exception:

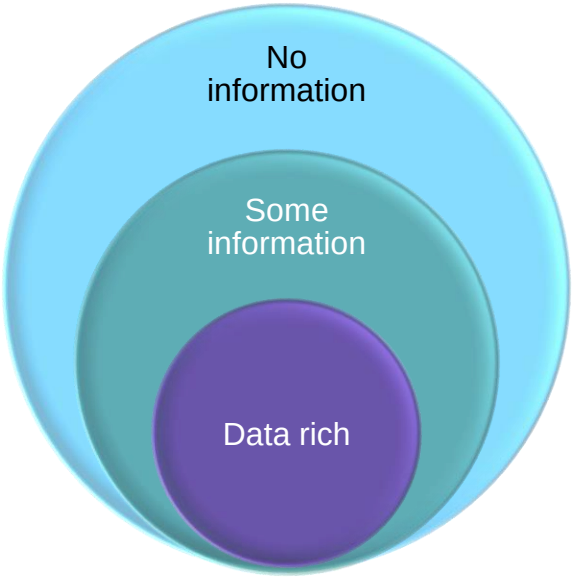
Discharge allowed if **"good enough quality"** for wildlife, livestock, or agriculture **&** put to that use

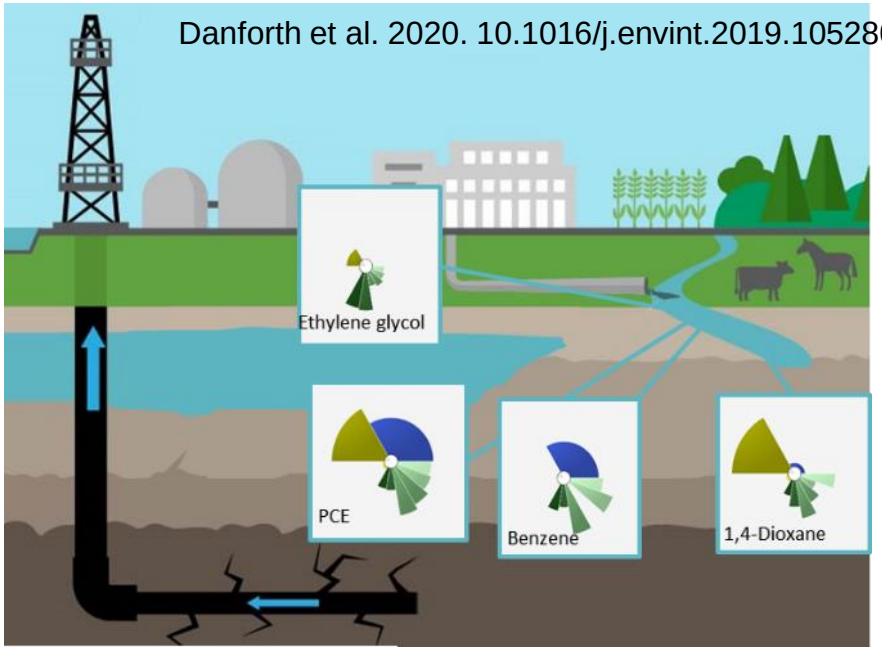
40 C.F.R. pt 435(e)

Permit writers combine baseline federal guidelines *with* state water quality standards to establish specific discharge limits & monitoring requirements

Narrowing the Awareness Gap: A deeper dive on chemicals

Identify data-rich chemicals to understand potential toxicity





Danforth et al. 2020. 10.1016/j.envint.2019.105280

Elena Craft, Environmental Defense Fund

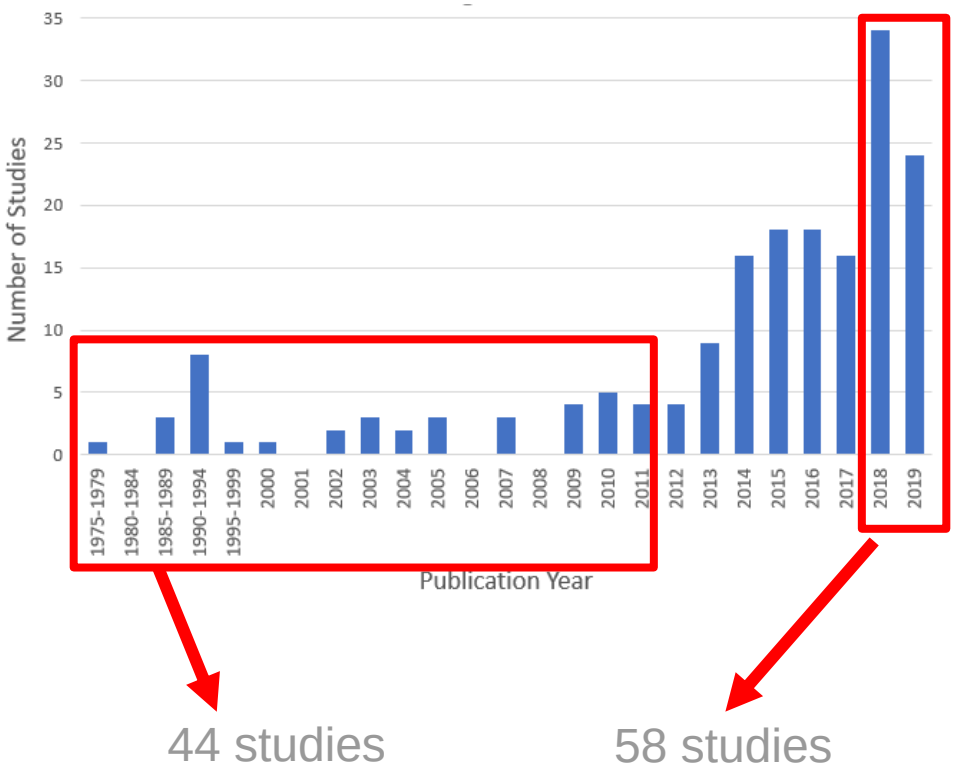
Ivan Rusyn & Weihsueh Chiu TAMU Veterinary Medicine and Biomedical Sciences

Endocrine Disruption Exchange (TEDx): **Carol Kwiatkowski, Kim Schultz, Ashley Bolden**

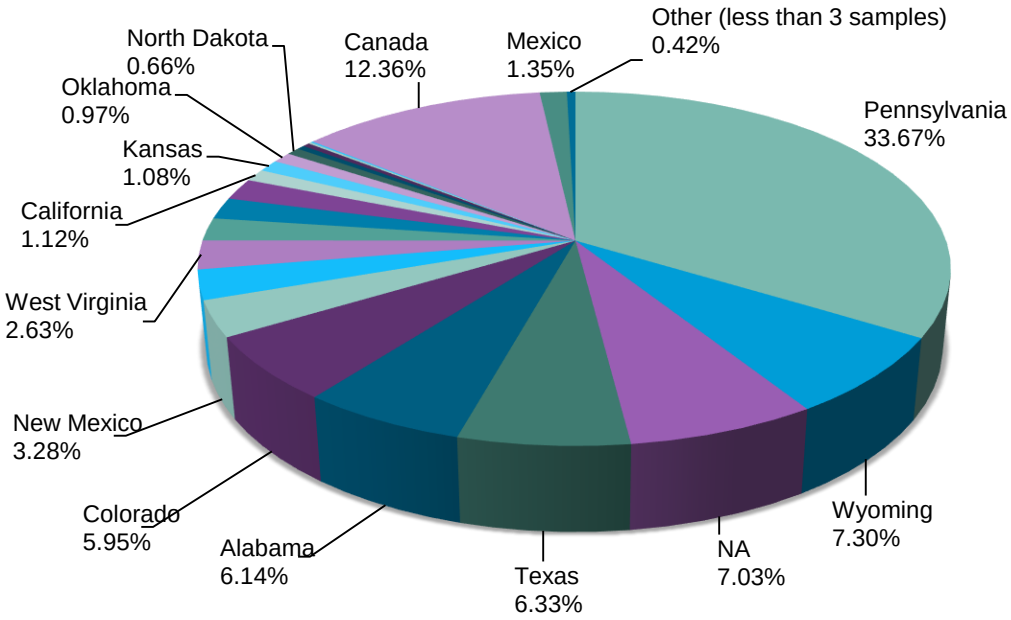
Updated Database

- Updated lit review
  - Updated through 11/12/2019
  - Re-ran search terms:
    - 2544 citations → 181 citations
  - 1358 PW chemicals

181 total citations

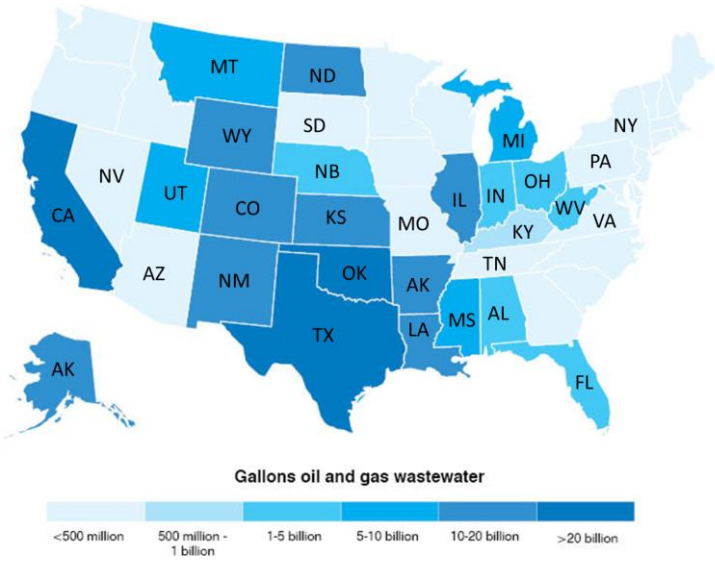


PW sources?



Distribution of studies by state

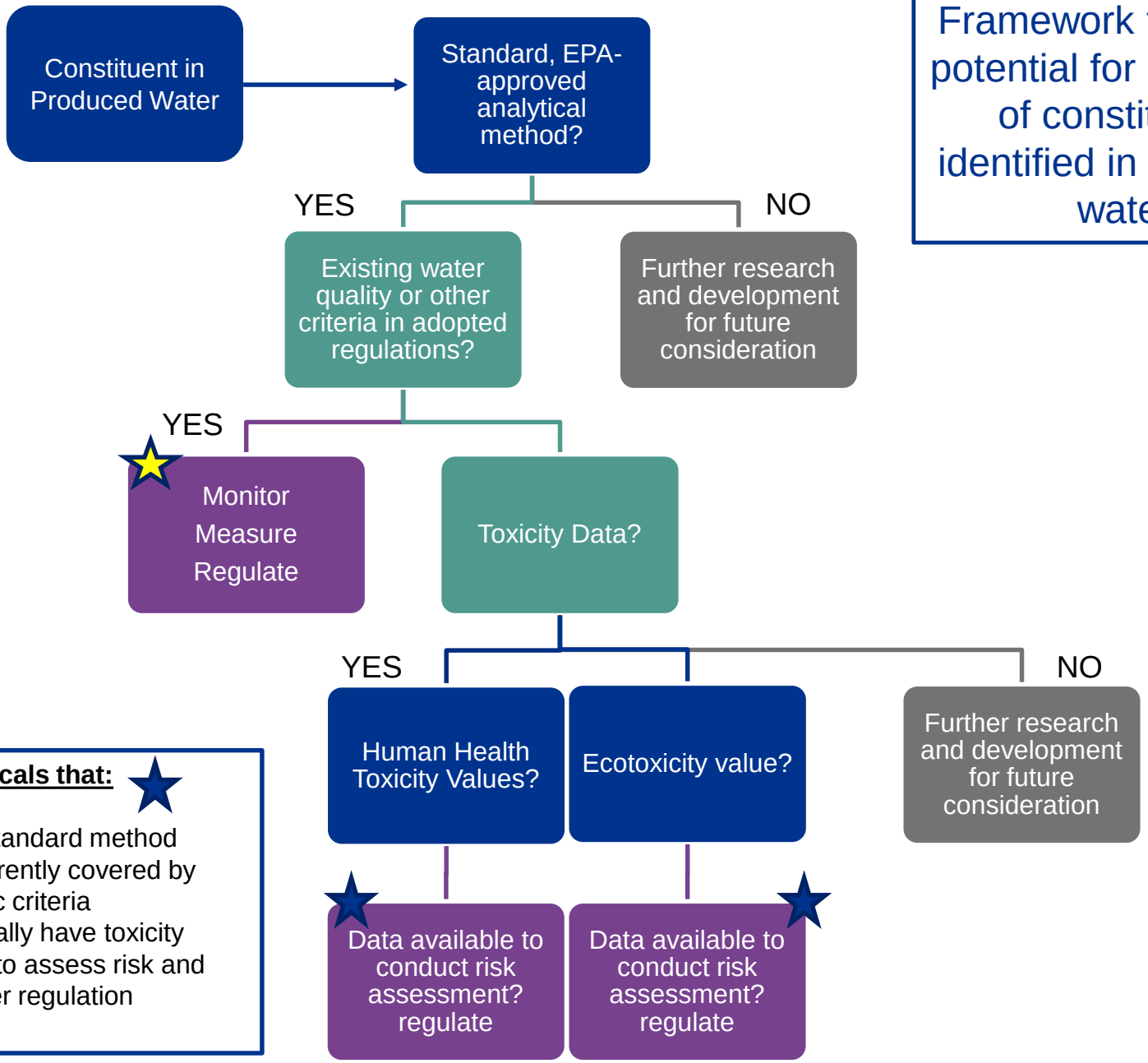
Produced water intensity map developed using data from Veil 2020



Crosswalk Effort

- Permitting new/expanded programs without comprehensive understanding of PW **presents risk**
- Science **must** continue to fill gaps in order to prevent health and environmental harms – time & resources
- **Progress can be made in the interim**. Begin to address gaps where data, tools exist to prioritize near-term action for chems:
  - Have a standard, approved analytical method available;
  - Are not covered by existing numeric criteria;
  - May have toxicity values necessary to assess risk and consider regulatory modifications

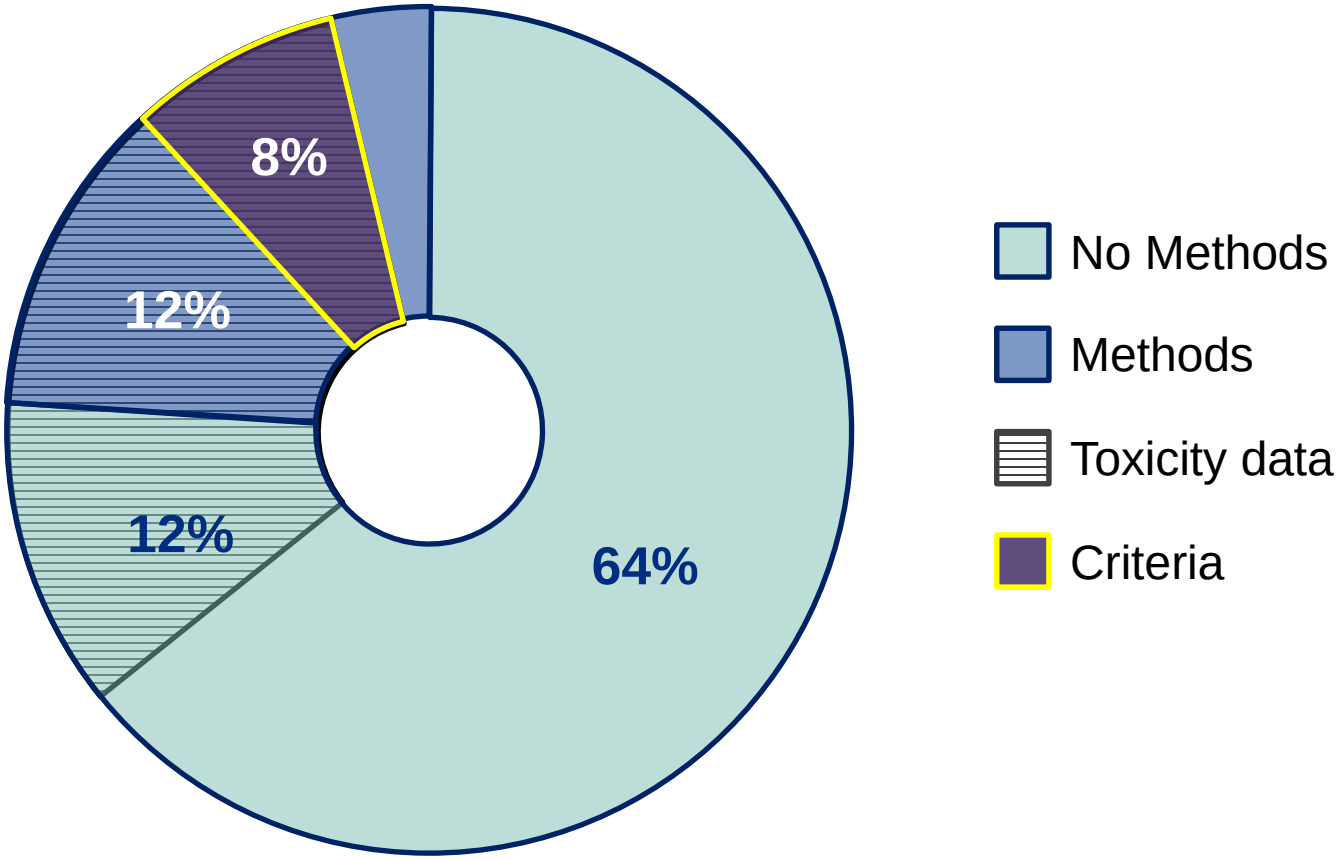
Framework to assess potential for regulation of constituents identified in produced water



PW chemicals that:

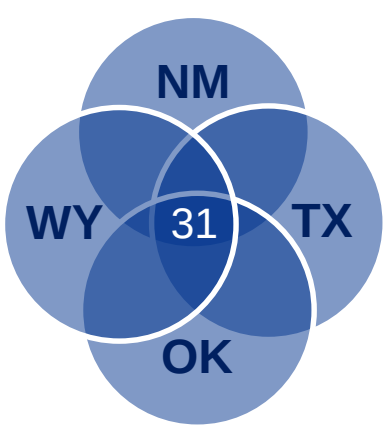
1. Have standard method
2. Not currently covered by numeric criteria
3. Potentially have toxicity values to assess risk and consider regulation

Federal Data Gaps (CWA)



Summary of State Crosswalk (24% of PW chemicals)

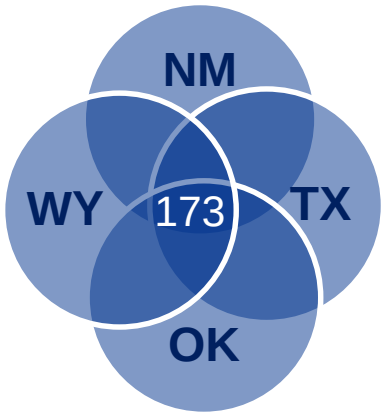
	Fed	NM	OK	TX	WY
Surface WQ	**109**	**88**	**38**	**68**	**89**
• Human Health • Aquatic • CWT • PPL	• 76 • 29 • 27 • 85	• 81 • 26	• 36 • 23	• 59 • 23	• 85 • 27
Toxicity Data	**168**	**193**	**238**	**208**	**186**
• Toxicity Value • Ecotox	• 145 • 154	• 169 • 178	• 214 • 222	• 184 • 192	• 162 • 170



Overlap in chemicals by state for:

Toxicity Data →

← WQ Standards



Takeaways

- Numerous existing state and criteria that could be applied if incorporated into produced water permitting programs
- Significant number of chemicals (~200) that have method and have tox data – but no criteria/standard yet – opportunity
- EPA & States could work together to advance methods and criteria
- 1,000+ known produced water chemicals have no approved method and couldn't be part of this analysis
  - We need more research & it needs to come from right places
- What are we really learning about "how clean is clean" when we judge treatment outcomes based on existing standards?
  - Ex: "meets drinking water standards" = 48 PW chems

Writing Smarter PW Permits - CWA

- Considerations for information gathering in permit application phase
  - Actual – and comprehensive – analysis of influent (produced water)
  - Comprehensive analysis of effluent matched to influent characteristics
    - WET at application, not just in monitoring
  - Disclosure of chemicals used in operations and treatment
    - Necessary but not sufficient to ID chems of concern in PW
  - Demonstration of “beneficial use”
    - Assessment of “good enough quality” tied to specific beneficial uses claimed
    - Demonstration of actual beneficial uses at time of discharge per 40 C.F.R. pt. 435