



NMPWRC
NEW MEXICO PRODUCED WATER
RESEARCH CONSORTIUM



Produced Water: Update on Research, Technological Advancements, and Data Gaps

2026 WATER AND NATURAL RESOURCES COMMITTEE – ROSWELL, NM

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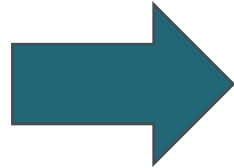
Disclaimer: The New Mexico Produced Water Research Consortium at New Mexico State University is conducting independent, science-based research to evaluate potential environmental and health effects related to the reuse of treated produced water for fit-for-purpose applications. This work is designed to generate objective data under controlled conditions, without promoting or opposing any specific reuse practices. Our goal is to provide clear, reliable information that supports informed decision-making around the safe and responsible use of produced water in New Mexico and beyond.

This presentation includes preliminary research data from the New Mexico Produced Water Research Consortium at New Mexico State University. The information presented is subject to change and has not yet undergone formal quality assurance or quality control (QA/QC) review. Distribution or sharing of this material without prior authorization from New Mexico State University is not permitted.

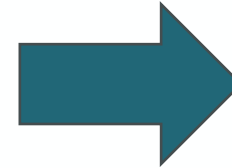
About the New Mexico Produced Water Research Consortium



Conducting science-
based research



Fill key
knowledge gaps

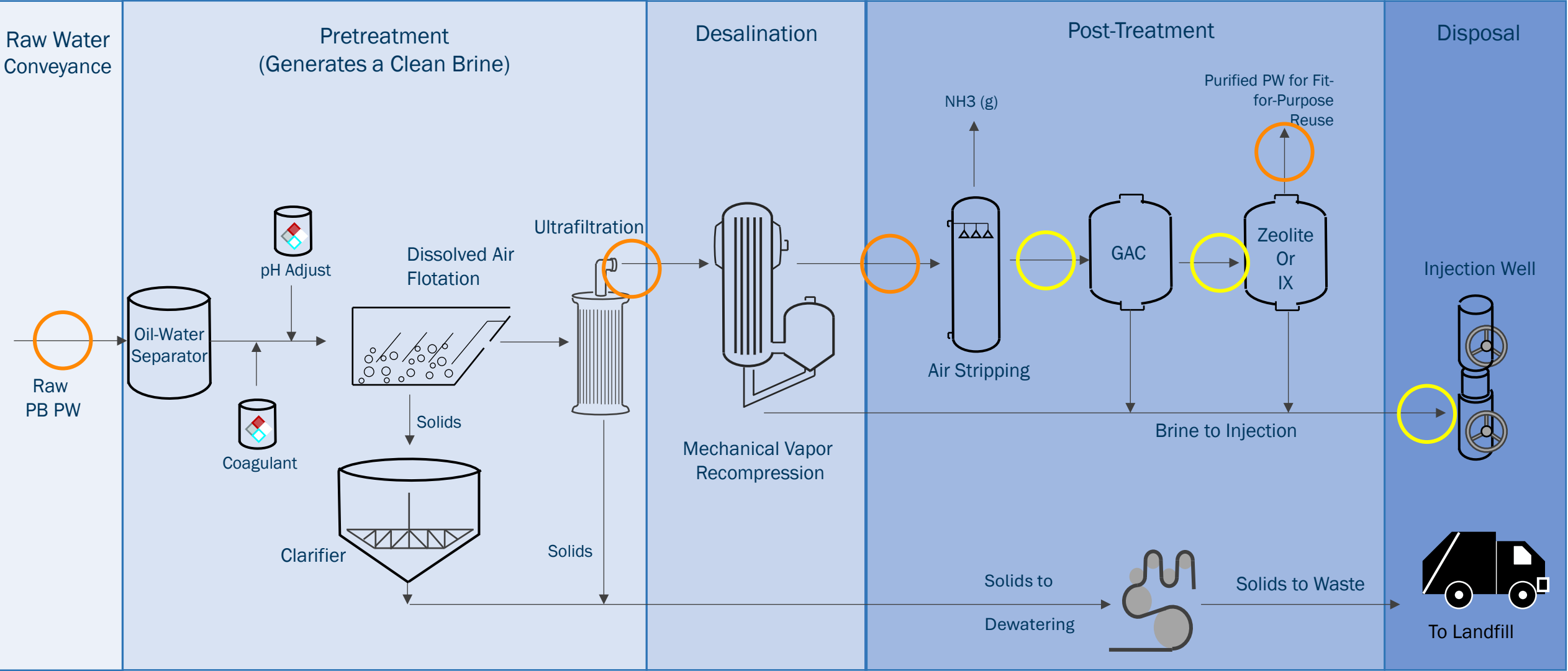


Support
science-based
regulations

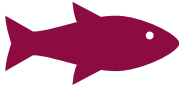
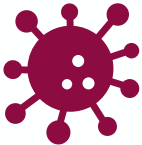
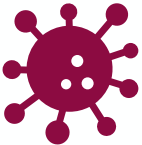
Example of Pilot System and Sampling Event in Permian Basin



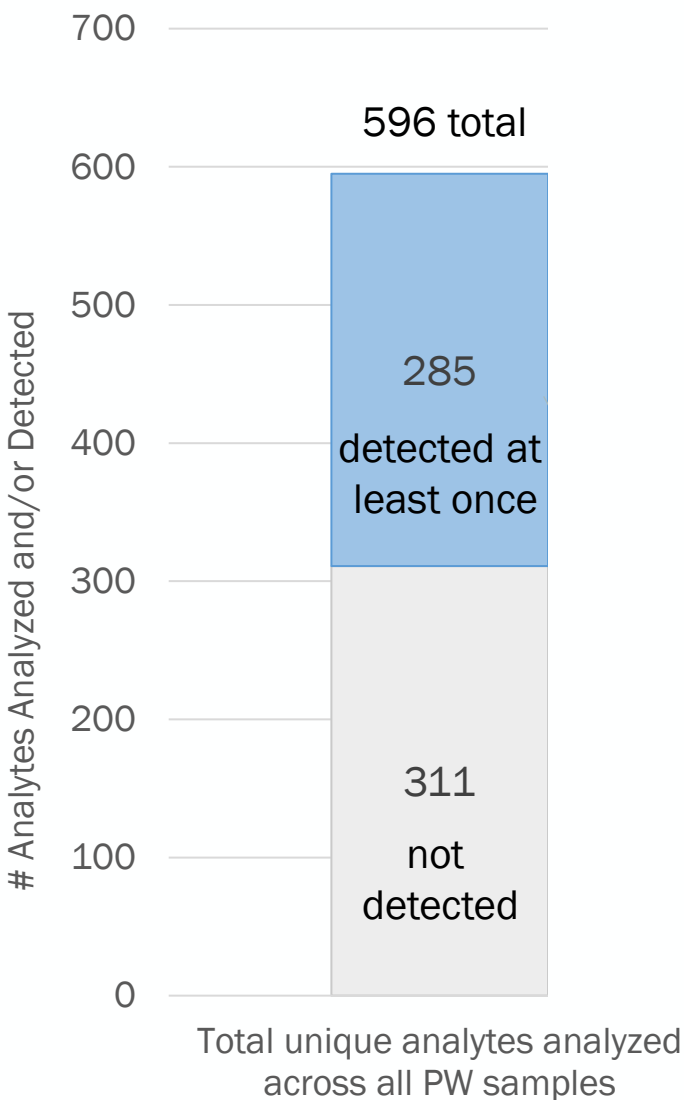
Example of a Produced Water Treatment Train (Permian Basin)



What is the State of the Science on PW Toxicity?

Test (End-Use)	 Raw PW	 Pretreated	 Desalinated	 Post-Treated	[Ref.]
WET (Surface Discharge)	Toxic 	Toxic 	Signif. Reduced Toxicity 	No Toxicity 	[3, 4, 5, 6]
Bioassays (Human Exposure)	Cytotoxic 	Cytotoxic 	Signif. Reduced Cytotoxicity 	No Cytotoxicity 	[6, 7, 8]
Greenhouse (Ag/Irrigation)	[Did not test]	[Did not test]	Minimal Impacts* 	No Adverse Impacts 	[9]

Analytes Detected in Produced Water



BY THE NUMBERS



75 PW samples evaluated



12,300 analytical data points generated

*preliminary and unpublished data



Targeted vs Non-Targeted Analysis

No Toxicity



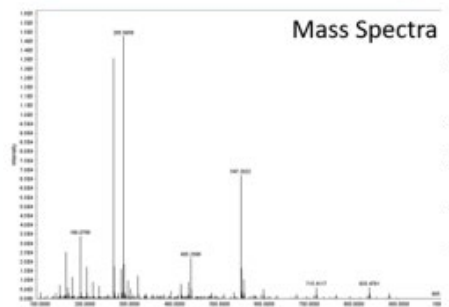
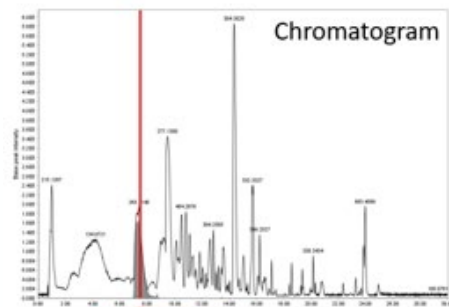
No Cytotoxicity



No Adverse Effects



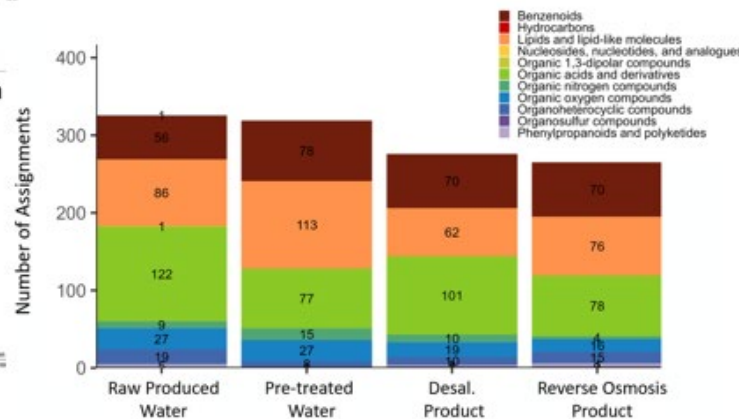
Non-Targeted Analysis



LC system: Separates chemical mixtures

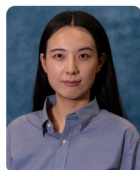
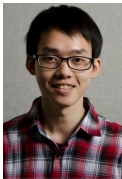


Mass spectrometer: Detects charged molecules and fragments



No Boogeyman (so far)

While There Are Important Research Questions Being Addressed (In the Lab)...

Question	Research Approach	Lead Researchers
Are there any “unknowns” in the raw, treated PW, and bioaccumulations in soil and plants?	In conjunction with targeted analysis, conduct Non-Targeted Analysis to screen for transformation by-products and TICs.	  
What about potential chronic impacts to organisms exposed to tPW over long durations?	Conduct long-term zebrafish toxicity testing (98 day), mouse toxicity (100 days) and reproduction studies, and mosquito studies to probe health and ecological impacts of long-term exposure.	  
Do chemical additives in fracking fluids have an impact on the treated PW?	Use FracFocus data to compare fracking chemical footprints and assess how these additives may influence produced water chemistry, toxicity, and treatment complexity.	  
What is the fate and transport of the (organic) compounds that make it through treatment?	Build off existing fate and transport models to model and predict if compounds pose a risk to human health & environment.	  
What are the economics of Permian Basin PW treatment?	Conduct a technoeconomic analysis and calculate levelized cost of water of a conventional treatment train, w/ focus on understanding where R&D is needed to reduce costs.	   

There Are New Research Questions Emerging

- Science is a process and it is always evolving, but the NMPWRC believes that the science has advanced enough to be used to support cautious regulatory development.
- The next generation of scientific questions - long-term performance at scale, operational reliability, and site-specific reuse applications (land application, wildlife/rangeland restoration, surface discharge, etc.) - cannot be answered through laboratory and greenhouse studies alone.
- New Mexico needs a controlled pathway to generate the science-based evidence required for future decisions. Caution and progress do not have to be mutually exclusive.
- The WATR Alliance petition does not create an unrestricted license to discharge or reuse treated produced water. It proposes a cautious, performance-based framework.

Acknowledgement – Great Collaborations!

- NMPWRC – ALL Members
- NMSU (Students, researchers, faculty, and administrators)
- State of New Mexico (NMED, HED, EDD, OCD, OSE, NMDA, DH...)
- Federal agencies: USEPA, BoR, DOE, USGS
- All Collaborators, TxPWC, CPWC....

Thank You!



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References

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2. NPDES+ List - <https://nmpwrc.nmsu.edu/reference-documents.html>
3. 2025 USGS - <https://agupubs.onlinelibrary.wiley.com/doi/full/10.1029/2024GH001263>
4. 2024 Tarazona a - <https://www.sciencedirect.com/science/article/abs/pii/S2214714424013783?via%3Dihub>
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The “NPDES+” List

- Major product generated in ~2022 by NMPWRC + many stakeholders and members.
- This list of > 430 analytes is critical because it contains a list of compounds that could reasonably found in PW.
- Other entities like have borrowed this list and expanded upon it over the years.
- It serves as the basis for analyses of all waters coming from pilot systems.

Analytical Categories
Metals/Elements
Metals/Elements - speciated
Anions
Wet Chemistry, Other
Radionuclides
Organic - VOC
Organic - VOC - TPH
Organic - SVOC - General
Organic - SVOC - TPH
Organic - SVOC - Explosives
Organic - SVOC - Agent Breakdown Products
Organic - SVOC - Pesticides/Herbicides
Organic - SVOC - PCBs
Organic - SVOC - PAHs
Organic - SVOC - Organic Acids
Organic - SVOC - Dioxins
Toxicity Testing

FY2027 (CY2026) Research Priorities

