



# Produced Water Management

*Radioactive and Hazardous Materials Committee*  
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*November 5, 2019*





# Presentation Overview

- Produced Water Overview
- Regulation of Produced Water and the Produced Water Act (HB 546)
- NMED's Plan for Produced Water Act Implementation

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# Produced Water Overview

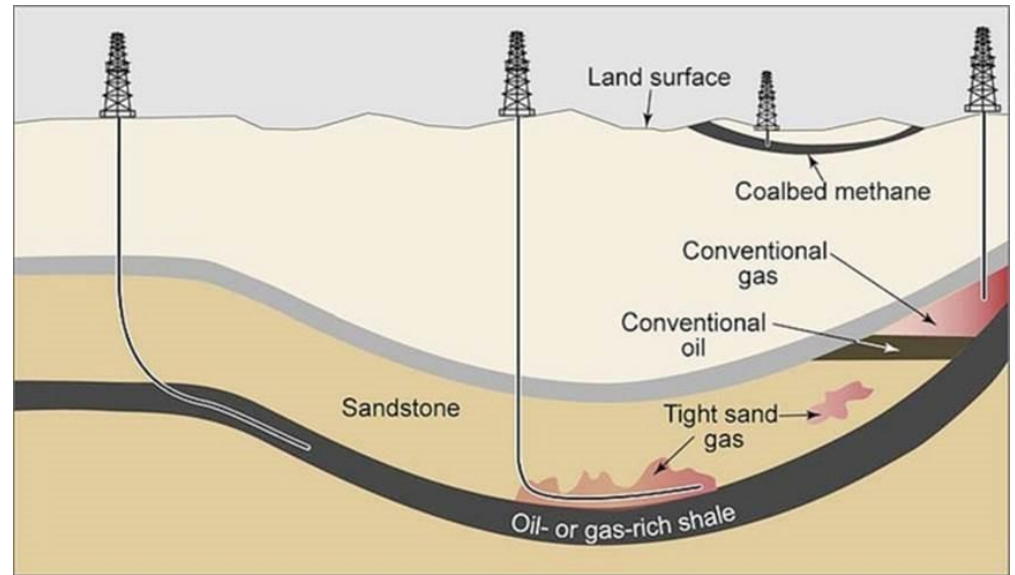


# Produced Water Overview: What is it?



Photos: [OilandGas360.com](http://OilandGas360.com)

Graphic: Adapted from Society of Petroleum Engineers, "The hydraulic fracture water cycle."



Sources: U.S. Energy Information Administration and U.S. Geological Survey.

New Mexico law defines produced water as “fluid that is an incidental byproduct from drilling for or production of oil and gas.”



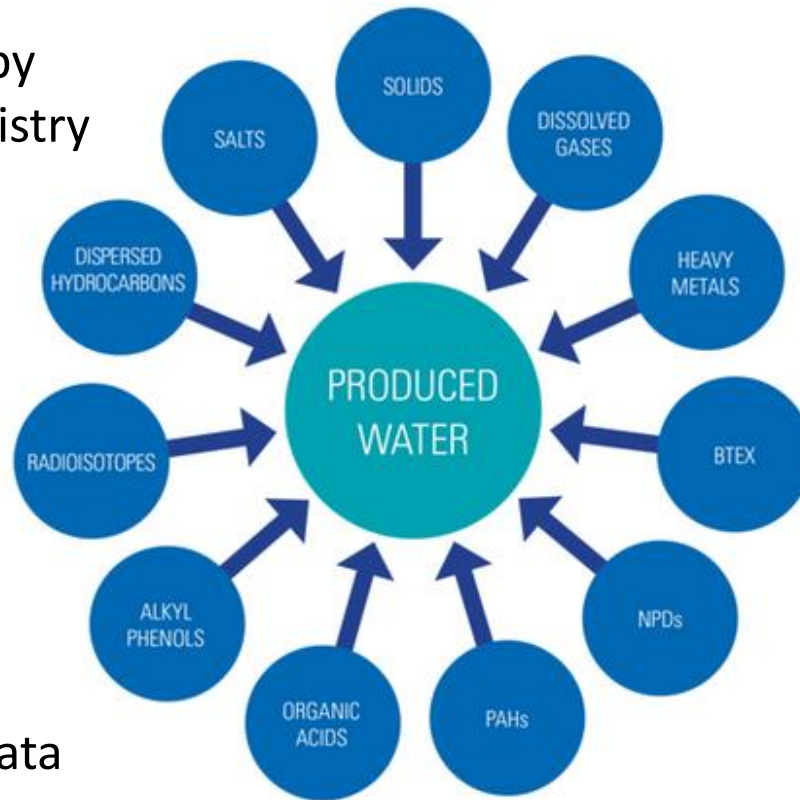
# Produced Water Overview: What's in it?

State law requires companies to disclose chemicals in frac water by filing with FracFocus registry (<https://fracfocus.org/>).



Constituents depend on geology and age of well.

U.S. Geological Survey data are available at: <http://energy.cr.usgs.gov/prov/prodwat/>.



Graphic: [www.waterteconline.com](http://www.waterteconline.com)

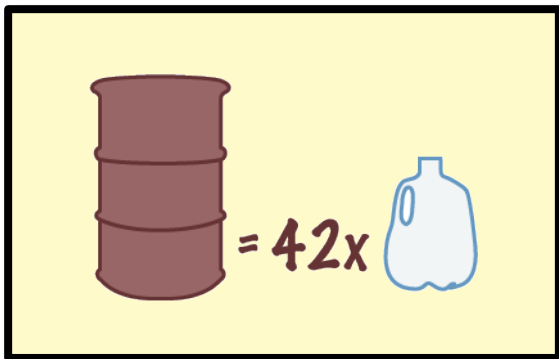
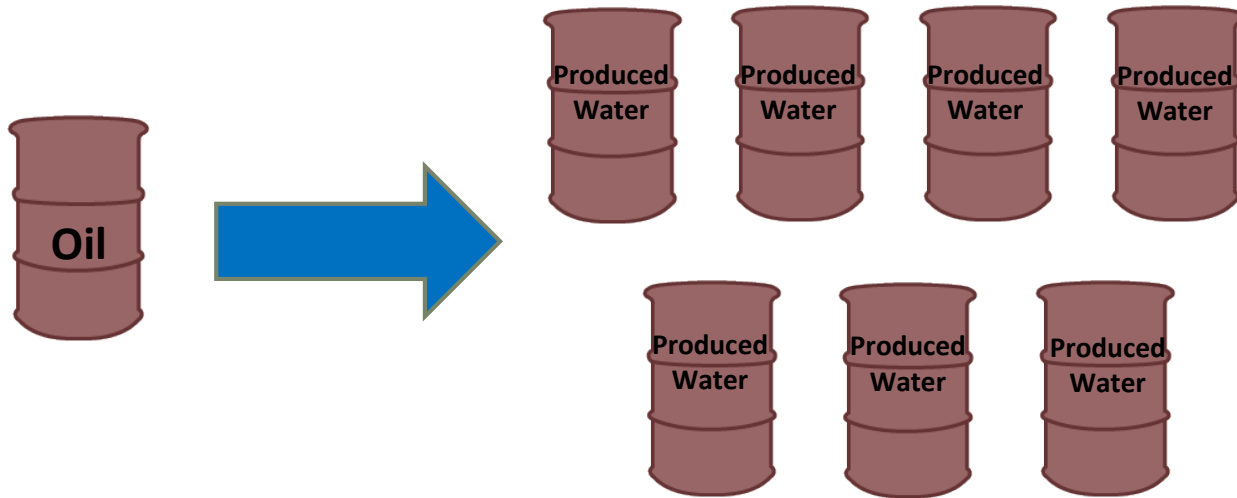
## Common Constituents

- *Salts*
- *Oil residues*
- *Sand/mud*
- *Metals*
- *Carbon-based compounds such as solvents, surfactants, acids, and waxes*
- *Naturally occurring radioactive materials*
- *Bacteria*



# Produced Water Overview: How much is generated?

For every barrel of oil produced, four to seven barrels of produced water are generated:





# Produced Water Overview: How much is generated?

- In 2018, industry in New Mexico generated 248 million barrels (10 billion gallons) of oil along with produced water totaling:
  - ▣ One billion barrels (or 42 billion gallons) in southeast corner of the state.
  - ▣ Twenty-two million barrels (or 946 million gallons) in the northwest corner of the state.



*Photo: Albuquerque Journal*



*Photo: Carlsbad Current-Argus*

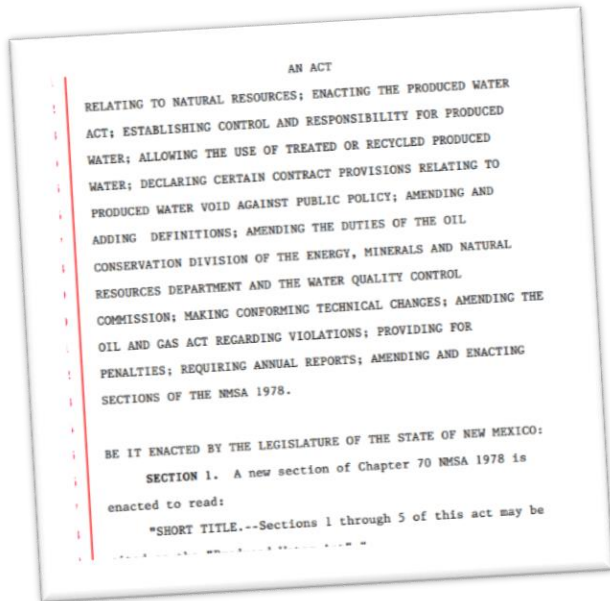
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# Regulation of Produced Water and the Produced Water Act (HB 546)





# Key Provisions of the Produced Water Act



- ❑ Eliminates legal vulnerabilities to New Mexico's surface/ground waters that existed prior to July 1, 2019, through:
  - ❑ Affirmative state permitting requirements;
  - ❑ Affirmative requirements for financial assurance; and
  - ❑ Clarified liability for spills.
- ❑ Removes obstacles to recycling of produced water.
- ❑ Gives EMNRD much-needed penalty authority.
- ❑ Explicitly requires that any use of produced water outside the oil and gas industry be regulated by NMED.
- ❑ Requires that the New Mexico Water Quality Control Commission (WQCC) adopt regulations for the discharge, handling, transport, storage, and recycling or treatment of produced water or byproduct thereof outside the oilfield.
- ❑ Does not specify what these regulations shall be or what the WQCC determines protective of water quality.



# Key Provisions of the Produced Water Act

- Since HB 546 was passed, the State can now:
  - ▣ Address the significant gaps in liability and penalty authority
  - ▣ Develop comprehensive information regarding toxicity of fracking chemicals
  - ▣ Issue penalties for violations of EMNRD Oil Conservation Division regulations (as of January 1, 2020)



# Priorities for Produced Water Management

- ❑ Minimize fresh water usage and increase recycling by industry for increased climate change resiliency
- ❑ Reduce reliance on salt water injection wells for disposal
- ❑ Address leaks from impoundments, pipeline ruptures, and illegal dumping
- ❑ Better protect groundwater and surface water resources
- ❑ Better protect against human and wildlife exposure to contaminants
- ❑ Advance aggressive renewable energy targets through extraction of materials like lithium – used in batteries and solar panels – from produced water

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## NMED's Plan for Produced Water Act Implementation



# Produced Water Act Implementation

- ✗ NMED is not currently authorizing the discharge of *treated* produced water for any purpose, including:
  - ✗ Surface waters
  - ✗ Drinking water and aquifer storage
  - ✗ Livestock watering
  - ✗ Irrigation for any crops, including food crops
  - ✗ Dust or ice control on roads
  - ✗ Construction
- ✗ NMED will **never** authorize *untreated* produced water to be used outside of oil and gas for any purpose

- ✓ NMED is preparing to implement HB 546
- ✓ NMED is partnering with research and academic institutions to fill critical science and technology gaps related to the safe treatment and use of produced water
- ✓ NMED is engaging the public to talk about the Produced Water Act and developing informative resources on the topic



# Produced Water Act Implementation



Photo: Licensed under [CC BY-NC](#).

- Phase 1
  - ▣ Public meetings
  - ▣ Tribal engagement
  - ▣ Collaboration with technical experts to fill science and technology gaps
  
- Phase 2 (after public meetings and informed by research findings)
  - ▣ Propose draft regulations for formal rulemaking before the Water Quality Control Commission (WQCC), including public notice and comment period and opportunity for tribal consultation



# Produced Water Act Implementation

- Near-term path forward:
  - ▣ Develop and issue rules that prohibit untreated produced water use(s) outside of the oil and gas industry (e.g., road spreading) given there is no safe use for untreated produced water uses outside of the oil and natural gas industry.
  - ▣ Develop and issue rules that require operators to analyze and disclose the chemical constituents in produced water intended for use outside of the oil and natural gas industry.
  
- Long-term path forward:
  - ▣ Over time and as the science dictates, develop rules for the “discharge, handling, transport, storage, and recycling or treatment of produced water or byproduct thereof outside the oilfield” (excerpt from HB 546).



# Produced Water Act Implementation

Examples of NMED's research questions related to filling the science and technology gaps:

- What contaminants are in the produced water generated in NM?
- How can the produced water be treated to be safe?
- What changes are needed to our state water quality standards to protect water resources and human health?





# Produced Water Act Implementation

A screenshot of the website for the New Mexico Produced Water Research Consortium (NM-PWRC). The browser address bar shows "https://nmpwrc.nmsu.edu". The website header includes the New Mexico State University logo and the slogan "BE BOLD. Shape the Future. New Mexico State University". A navigation menu contains links for Home, About Us, Membership, Sponsorship, Research, and News. The main content area features a large image of a scientist in a lab coat and safety glasses working with laboratory equipment. Overlaid on this image is the title "New Mexico Produced Water Research Consortium". Below the image, there is a section titled "Advancing Scientific and Technological Solutions in Treatment and Reuse of Produced Water" with two paragraphs of text. To the right of this section is a "Quick Facts" box containing a bulleted list of key information.

← → ↻ https://nmpwrc.nmsu.edu

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## New Mexico Produced Water Research Consortium

### Advancing Scientific and Technological Solutions in Treatment and Reuse of Produced Water

The New Mexico Produced Water Research Consortium (NM-PWRC) is a collaboration between the New Mexico Environment Department (NMED) and New Mexico State University (NMSU). Through this consortium, New Mexico will continue to lead the country in advancing scientific and technological solutions related to the treatment and reuse of produced water generated by the oil and gas industry.

The consortium will develop a framework to fill scientific and technical knowledge gaps necessary to establish regulations and policies for the treatment of produced water. Such regulations and policies must be protective of public health and the environment while encouraging the oil and natural gas industry to rely less on fresh water and more on reuse of produced water. "The multidisciplinary research approach that we are proposing is specifically needed to fill existing data gaps to inform policy decisions," said NMSU Chancellor Dan Arvizu. "NMSU is excited to be at the very forefront of research in this area."

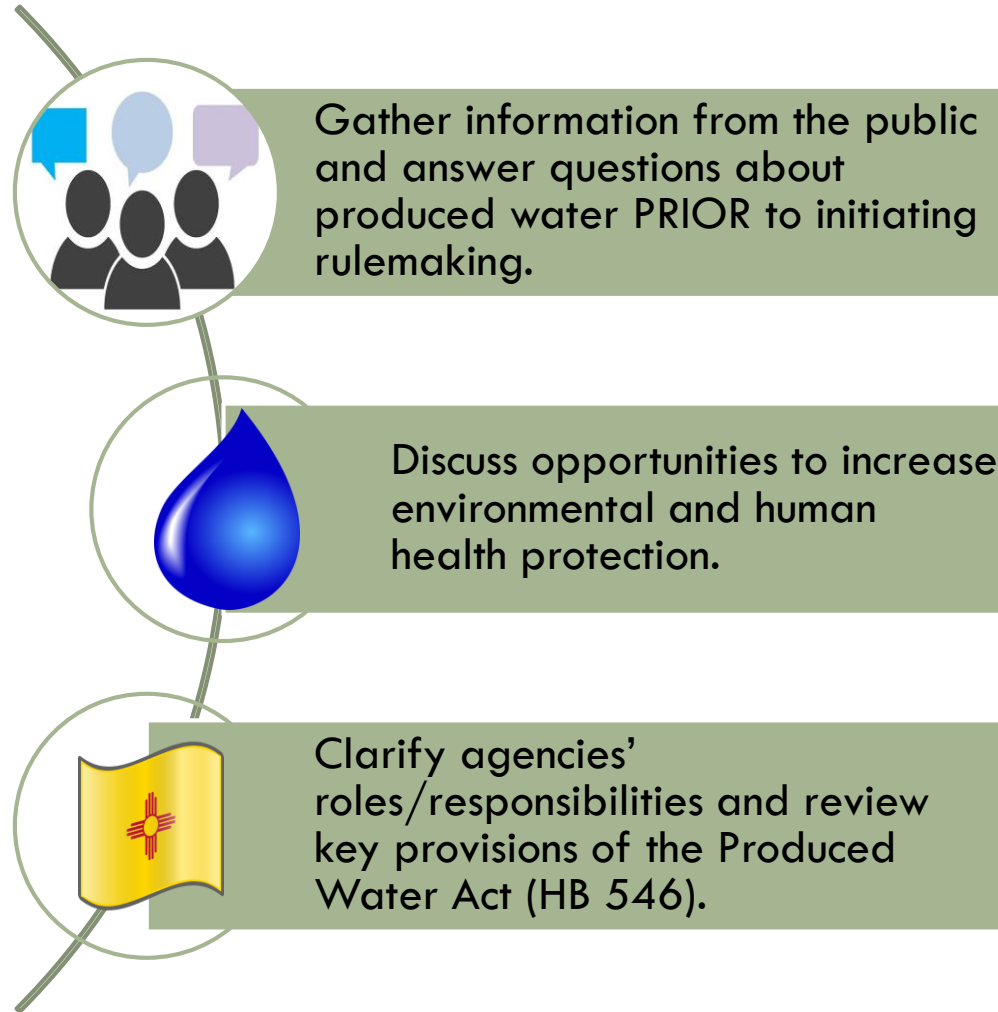
#### Quick Facts

- In 2018, over 42 billion gallons of produced water were created in New Mexico's Permian Basin.
- House Bill 546, includes the Produced Water Act, and went into effect July 1, 2019.
- New Mexico Environment Department (NMED) and New Mexico State University (NMSU) entered into a memorandum of understanding on

Details available at <https://nmpwrc.nmsu.edu/>.



# Produced Water Public Meetings



Public meeting schedule	
Oct. 15	National Hispanic Cultural Center Bank of America Theatre Albuquerque, NM
Oct. 30	St. Francis Auditorium Santa Fe, NM
Nov. 14	Pecos River Village Conf. Center Carousel House Carlsbad, NM
Nov. 19	San Juan College Little Theatre Farmington, NM
Nov. 25	New Mexico Farm & Ranch Heritage Museum Ventana Room Las Cruces, NM



# Beyond the Public Meetings

- NMED's targeted engagement with governments of 23 tribes/pueblos/nations
  - Letters to tribal leaders in September 2019
  - Discussions about produced water during face-to-face meetings with tribal leaders
  - Participation in upcoming meetings with tribal environmental directors
  
- Briefing for legislators on Produced Water Act implementation
  - Dec. 3, 2019, 11 a.m. to 12:30 p.m. at NMED's Albuquerque office
  - Join in person or by phone
  - Contact [Rebecca.roose@state.nm.us](mailto:Rebecca.roose@state.nm.us) for more information



# State Agency Contacts

NMED contacts for treatment of produced water for off oil field use:

- ❑ Rebecca Roose, Water Protection Division Director, [Rebecca.Roose@state.nm.us](mailto:Rebecca.Roose@state.nm.us)
- ❑ Annie Maxfield, Assistant General Counsel, [Annie.Maxfield@state.nm.us](mailto:Annie.Maxfield@state.nm.us)

EMNRD contacts for management of produced water within the oil field:

- ❑ Adrienne Sandoval, Oil Conservation Division Director, [Adrienne.Sandoval@state.nm.us](mailto:Adrienne.Sandoval@state.nm.us)
- ❑ Bill Brancard, General Counsel, [Bill.Brancard@state.nm.us](mailto:Bill.Brancard@state.nm.us)

OSE contacts for water rights issues related to produced water management:

- ❑ John Romero, Water Resource Allocation Program Director, [John.Romero2@state.nm.us](mailto:John.Romero2@state.nm.us)
- ❑ Owen Kellum, Administrative Litigation Unit Attorney, [Owen.Kellum@state.nm.us](mailto:Owen.Kellum@state.nm.us)