



# Produced Water Management in New Mexico

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*Updated Nov. 14, 2019*



# Produced Water Meeting

## Meeting Objectives



Gather information from the public and answer questions about produced water prior to initiating rulemaking.



Discuss opportunities to increase environmental and human health protection.



Clarify agencies' roles/responsibilities and review key provisions of the Produced Water Act (HB 546).

**Find this presentation at:**

<https://www.env.nm.gov/new-mexico-produced-water/public-meeting-materials/>



# Meeting Overview

- **6:00 – 6:45 p.m. Presentation**
  - Produced Water Overview
  - Regulation of Produced Water and the Produced Water Act (HB 546)
  - NMED's Plan for Produced Water Act Implementation
  - Transition to Q&A and Public Input

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



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  - ▣ Audience questions about the presentation, including state agency activities related to produced water management.
  
- **7:30 – 8:30 p.m. Public Input**
  - ▣ Please sign-up to make a public statement.
  - ▣ All speakers will have up to 2 minutes to make remarks.
  - ▣ Written input can be shared tonight (drop box) and by email to [pw.environment@state.nm.us](mailto:pw.environment@state.nm.us).





# 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

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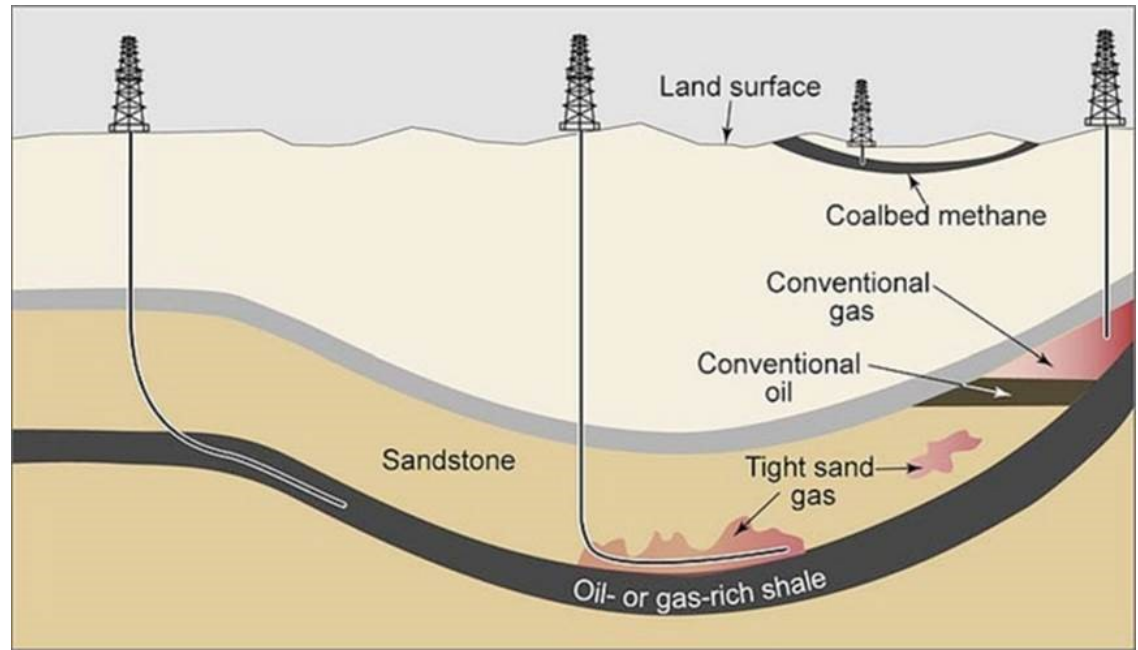
# Produced Water Overview



# Produced Water Overview: What is it?

Legally, produced water is defined as “fluid that is an incidental byproduct from drilling for or production of oil and gas.”

Technically, produced water is a combination of *flowback water* (water used to drill the well) and *formation water* (naturally-occurring ancient sea water recovered along with the oil and gas).

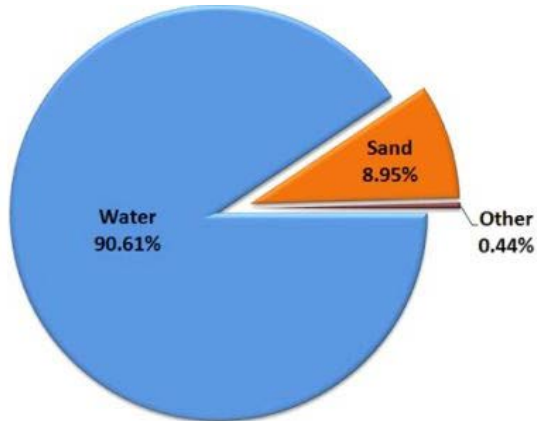


Sources: U.S. Energy Information Administration and U.S. Geological Survey.

*Flowback water* is typically a small component of the total amount of produced water generated over the life of a well.



# Produced Water Overview: What's in it?



Typical water mixture used to drill and produce a well

Graphic adapted from:

<http://www.oil-gasportal.com/water-treatment-in-unconventional-gas-production-2/>



State law requires companies to disclose chemicals used in hydraulic fracturing 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/>.

## Common Constituents in Produced Water

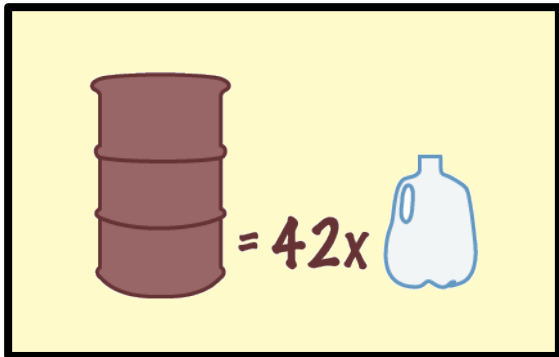
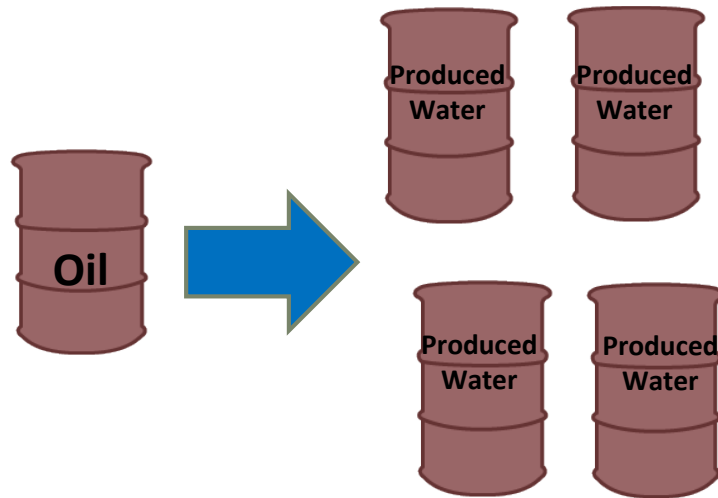
- *Salts*
- *Oil residues*
- *Sand/mud*
- *Metals*
- *Naturally occurring radioactive materials (NORM)*
- *Bacteria*
- *Carbon-based compounds such as solvents, surfactants, acids, and waxes*
- *Biocides*





# Produced Water Overview: How much is generated?

For every barrel of oil produced, four 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*

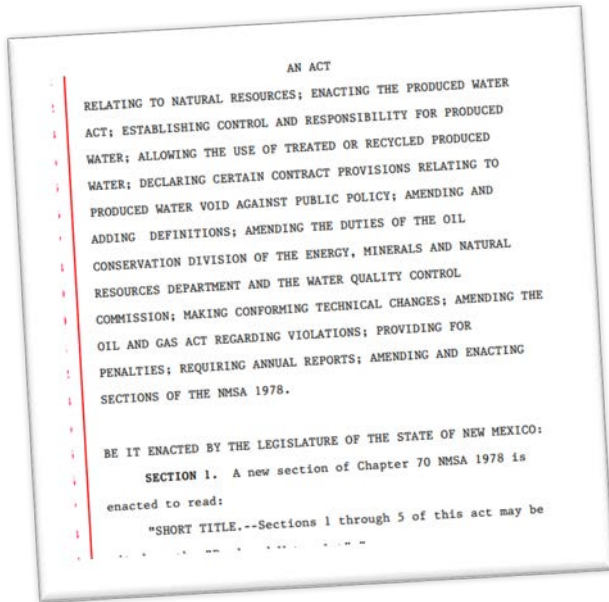


*Photo: Carlsbad Current-Argus*

# 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

NMED's path for produced water regulations:

- ❑ Develop rules that prohibit untreated produced water use(s) outside of the oil and gas industry (e.g., road spreading).
- ❑ Develop rules that require companies to analyze and disclose the chemical constituents in produced water intended for treatment and use outside of the oil and natural gas industry.
- ❑ 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 the URL https://nmpwrc.nmsu.edu. The website header includes the New Mexico State University logo and the slogan "BE BOLD. Shape the Future." along with navigation 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 looking at a piece of equipment, with the title "New Mexico Produced Water Research Consortium" overlaid. Below the image is a section titled "Advancing Scientific and Technological Solutions in Treatment and Reuse of Produced Water" with two paragraphs of text. To the right is a "Quick Facts" box containing three bullet points.

← → ↻ 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/>.



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## Transition to Q&A and Public Input



# 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)



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Thank you for engaging with us!

More information available at

<https://www.env.nm.gov/new-mexico-produced-water/>.

## Appendix for Q&A Session

To maximize time during Public Meetings for audience participation, the following slides are not part of the NMED/EMNRD/OSE presentation but may be displayed during the Question and Answer Session if applicable.



# Frequently Asked Questions

**Q:** What is the Environment Department's responsibility for produced water management?

**A:** House Bill 546, aka the Produced Water Act, requires NMED to draft regulations to present before the Water Quality Control Commission (WQCC) that address the discharge, handling, transport, storage, and recycling or treatment of produced water or byproduct thereof outside the oilfield.

In adopting regulations, the Water Quality Act requires the WQCC to consider:

- Character and degree of injury to or interference with health, welfare, environment and property;
- Public interest, including the social and economic value of the sources of water contaminants;
- Technical practicability and economic reasonableness of reducing or eliminating water contaminants from the sources involved and previous experience with equipment and methods available to control the water contaminants involved;
- Successive uses, including domestic, commercial, industrial, pastoral, agricultural, wildlife and recreational uses;
- Feasibility of a user or a subsequent user treating the water before a subsequent use;
- Property rights and accustomed uses; and
- Federal water quality requirements.

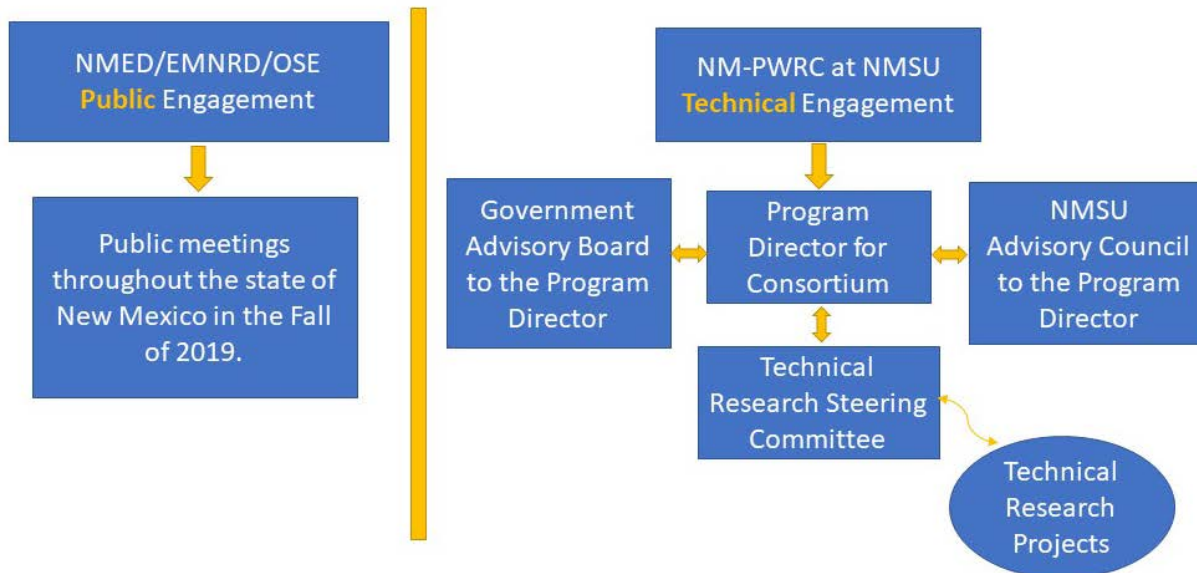


# Frequently Asked Questions

Q: How is NMED involved with the Produced Water Research Consortium?

A: New Mexico State University is managing the Consortium. NMED will be involved as a member of the Government Advisory Board (see diagram below) and in other activities related to implementation of the [NMED-NMSU Memorandum of Understanding](#).

## Produced Water Engagement







# Frequently Asked Questions

Q: What treatment is needed for use of produced water outside the oil and gas field?

A: The level of treatment necessary to protect human health and the environment depends upon the intended end use of the treated water. “Fit for purpose” research to support future regulations will address the range of factors that vary based on the end use. Learn more about “fit for purpose” research in the Ground Water Protection Council’s 2019 *Produced Water Report*, available at <http://www.gwpc.org/producedwater>.



# Frequently Asked Questions

Q: Where do oil and gas companies get fresh water?

A: They buy or lease water needed for their operations. Fresh water comes from either surface waters or groundwater, e.g., the Pecos River and Ogallala Aquifer.

Q: Are NM aquifers suffering a strain due to Oil and Gas Productions?

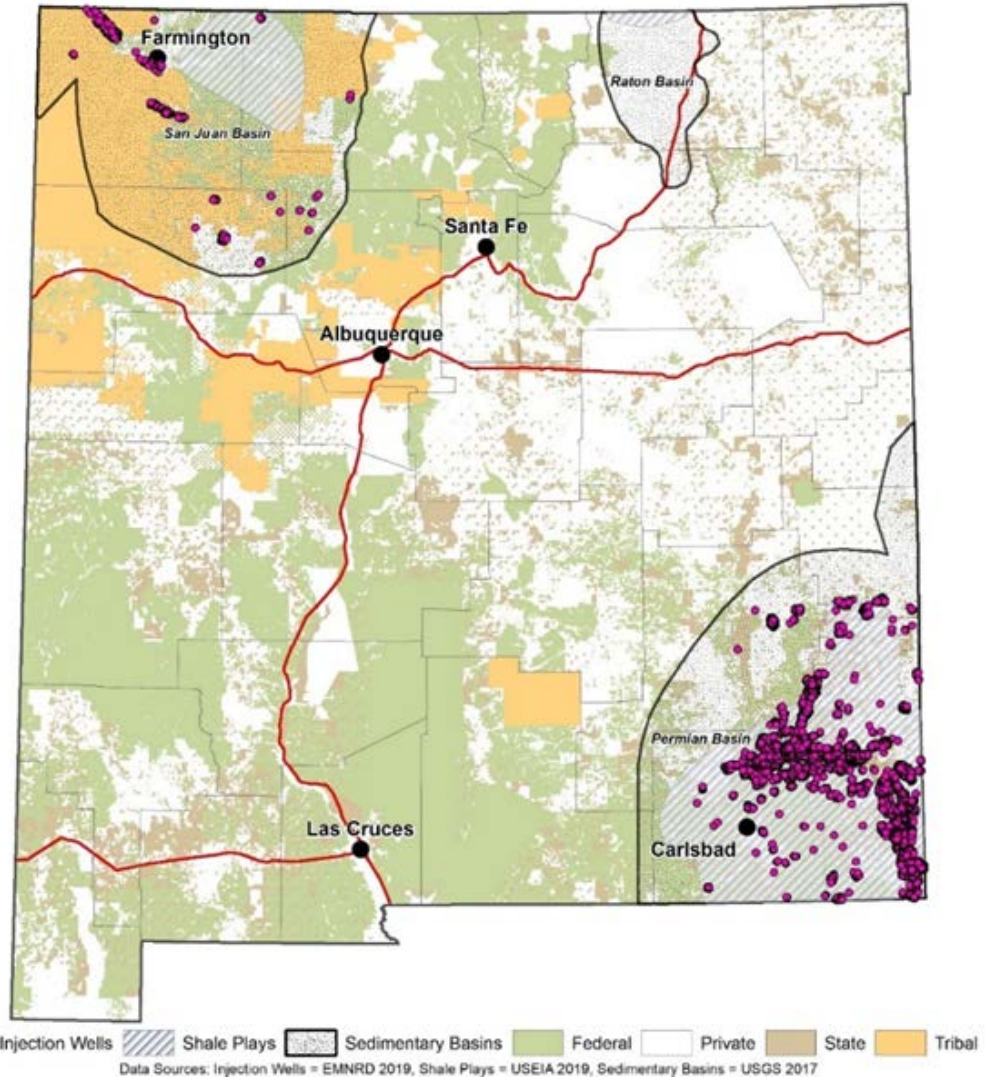
A: Yes, and the State is examining ways to encourage producers to use other sources before fresh water, including through implementation of HB 546, the Produced Water Act.



# Frequently Asked Questions

Q: Where is produced water generated?

A: In New Mexico, oil and gas production activity is in the Permian Basin in the southeast corner of the State, and the San Juan Basin in the northwest corner.





# Frequently Asked Questions

Q: How many acre-feet/gallons/barrels of water does it take to frack one well?

A: Depending on a number of factors, including the location of the well, up to 31 acre-feet/10 million gallons/240,509 barrels of water may be needed. The 2019 Bureau of Land Management New Mexico Water Support Document reports an average of 27 acre-feet/8.8 million gallons of slick water (water with a TDS > 50,000 ppm) used per mile of lateral wellbore.

<https://www.blm.gov/programs/energy-and-minerals/oil-and-gas/about/new-mexico>

Q: Is all the water used for fracking fresh water?

A: No, current practices employed in New Mexico use a combination of slick water and recycled produced water in addition to or in place of fresh water.



# Frequently Asked Questions

Q: What is the role of the Energy, Minerals and Natural Resources Department (EMNRD) in produced water management?

A: Under the Oil and Gas Act, the Oil Conservation Division within EMNRD regulates the handling and disposal of produced water within the oil and gas industry in New Mexico. This includes underground injection control (UIC) wells for produced water disposal, reuse through enhanced recovery operations and recycling and reuse in oil and gas drilling operations. EMNRD anticipates minor changes to existing rules to comply with HB 546.



# Frequently Asked Questions

Q: What is the role of the Office of the State Engineer (OSE) in produced water management?

A: HB 546 and existing regulations confirm no OSE permit is required to use produced water. The use of produced water is considered “disposition by use,” not a “beneficial use” for establishing and maintaining a water right. The OSE will work with NMED as they draft regulations that address the discharge, handling, transport, storage, and recycling or treatment of produced water outside of oil and gas industry uses. As the NMED develops rules, the OSE will examine which statutes and regulations might need to be changed to facilitate those NMED-permitted uses in the future. The OSE will work with our sibling agencies to reduce the use of freshwater resources for oil and gas production and reduce the amount of produced water being injected in disposal wells.





# Frequently Asked Questions

Q: What is the Office of the State Engineer (OSE) doing to change the trend of water use for oil and gas production activities?

A: In 2018, the OSE rescinded the policy of issuing multiple 72-12-1.3 permits (mineral exploration). Since then there has been an approximate 70% reduction in the issuance of these permits.

The OSE is currently reviewing the following actions to further reduce the use of freshwater resources for oil and gas activities:

- ❑ Approval of water lease permits for less time than requested based on situation
- ❑ Require oil and gas applicants to demonstrate need for fresh water vs saline/other water

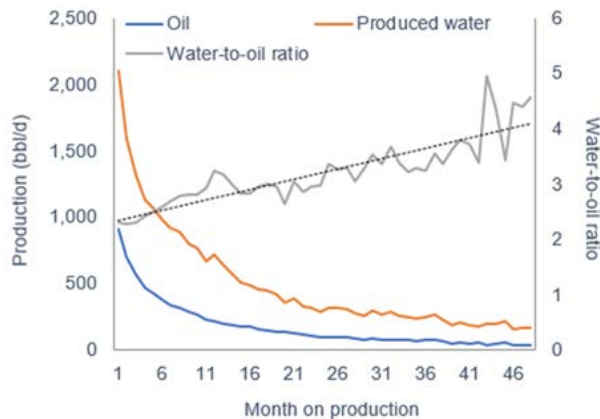


# Frequently Asked Questions

Q: How does the relative percentage of formation water to flowback water in produced water typically change over the life of a well?

A: As a well ages, the produced water becomes predominantly formation water.

Delaware Wolfcamp oil and produced water curves



Data represents average values for NM Delaware Wolfcamp wells drilled since 2014. Source: Wood Mackenzie

