Can Produced Water from Energy Production Offset Water Scarcity in the Southwest? (Part 1)

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Across the American Southwest, water scarcity and oil and gas development increasingly overlap in the same geography. Texas and New Mexico sit atop some of the nation's most productive hydrocarbon basins, especially the Permian Basin, while also facing recurring drought, rapid population growth, industrial demand, and ongoing concern over freshwater availability.

In the Southwest, produced water has shifted from a water-management challenge to a potential supplemental water resource. Producers have not attempted to alleviate water shortages solely through regulatory compliance; many have also invested in water recycling systems, water-sharing arrangements, expanded pipeline networks, and basin-scale planning intended to reduce freshwater withdrawals from underground aquifers and improve operational efficiency.

In the Permian Basin in particular, recycling water produced from oil and gas drilling for use in completion activities has become an increasingly important part of water-management strategy, reflecting both economic incentives and growing emphasis on conservation of limited freshwater supplies.

This shift is not merely conceptual. Produced water is already the largest waste-management stream associated with oil and gas production, and the volumes are substantial in major producing basins. At the same time, regulators, researchers, and operators are exploring whether at least some produced water can be treated, reused, or mined for valuable constituents such as lithium and other critical minerals.

The federal government has signaled support for reuse and recycling where legally and technically feasible, while state governments in the Southwest, particularly Texas and New Mexico, have become central forums for policy development, pilot projects, and litigation over ownership and reuse.

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Complicating these efforts, the composition of produced water varies from basin to basin and even between wells within the same basin. Depending on the formation and production history, produced water may contain high salinity, residual hydrocarbons, heavy metals, naturally occurring radioactive materials, and chemical additives from drilling and stimulation operations. Those characteristics make treatment expensive, energy-intensive, and highly site-specific.

As a result, the question of what to do with produced water sits at the intersection of water scarcity, environmental protection, energy economics, property rights, and emerging technology.

For the Southwest, and especially Texas, the question is no longer whether produced water has value. It is whether these substantial volumes of fluid can be transformed into a practical asset while satisfying regulatory, technical, and stakeholder-confidence requirements.

What Is Produced Water?

Produced water is a byproduct of oil and gas production and consists of fluids that return to the surface as a result of drilling activity, generally including naturally occurring formation water, injected water, and chemicals used in drilling, completion, production, or maintenance operations.

In hydraulically fractured wells, some returned fluid may also be characterized as flowback water. In practice, however, these streams are often managed together as part of the broader produced-water management challenge.

Produced water is chemically complex and highly variable. Its composition depends on reservoir geology, field age, extraction methods, and operational inputs. Produced water may contain dissolved and dispersed hydrocarbons, salts, suspended solids, heavy metals, radionuclides, bacteria, dissolved gases, and residual treatment chemicals.

Salinity can range from relatively low levels in some western fields to concentrations far above seawater in formations such as the Marcellus and Bakken, and much of the produced water in the

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Permian Basin is highly saline and operationally difficult to treat.

The sheer volume of produced water generated by oil and gas operations is one reason it has become such a significant policy issue. A 2023 review in *Water* reported that the oil and gas industry generates roughly 250 million barrels of produced water per day globally, making it the industry's principal byproduct stream by volume.

In the United States, produced water generation has risen alongside the growth of unconventional oil and gas production, and Texas consistently ranks among the leading producer states by volume, with the Permian Basin and Texas oilfields generating more produced water than all other U.S. oilfields combined. According to reports from Texas A&M, Texas and Permian Basin oilfields generate between 22 million and 33 million barrels — or approximately 1 billion gallons — of produced water daily.

The Permian Basin is especially important in any water-management discussion. Data from the Department of Energy's Office of Fossil Energy and Carbon Management shows that the Permian Basin accounts for roughly half of U.S. oil production and an outsized share of produced water generation, producing more water than all other U.S. shale plays combined.

That juxtaposition makes clear why Texas, and particularly the Permian Basin, dominate discussions surrounding saltwater disposal capacity, water recycling, and beneficial reuse.

Produced water has historically been treated as an oil-and-gas management byproduct rather than conventional groundwater or a ready substitute for municipal supply. But because it is generated in such immense volumes in water-stressed regions, it has become increasingly difficult to view solely as a disposal issue.

Ground Zero for Discussion: The Arid Southwest

The case for treating produced water as a strategic resource is strongest in the water-scarce Southwest. The region faces overlapping pressures from drought, rising temperatures, population growth, agricultural demand, industrial expansion, and ecological stress.

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A 2025 U.S. Geological Survey National Water Availability Assessment found that nearly 30 million people live in areas where available surface-water supplies are limited relative to water use. Corpus Christi is currently on pace to exhaust its water reserves before 2028.

In the Southwest, aridity is structural rather than episodic, and the pressure to address water scarcity is significant. State leaders and industry participants have increasingly looked at produced water as a possible "new water" source because traditional freshwater supplies are under strain and many of the most productive oil basins are located in arid parts of West Texas.

Texas policymakers are actively examining whether oilfield wastewater could help address looming water shortages, although the treatment and energy requirements remain substantial.

At the same time, oil and gas extraction itself is water-intensive, despite producers' efforts to reduce freshwater consumption. Hydraulic fracturing in major shale basins requires significant water volumes, often in semi-arid areas where water resources are already constrained.

Produced water therefore occupies a dual role in Southwest water policy: it is both a consequence of water-intensive energy production and a possible partial offset to freshwater demand if it can be safely reused.

This dual role is especially visible in the Permian Basin, which produces extraordinary volumes of water well beyond what can currently be reused in completion activities alone. Even where operators have significantly increased recycling for hydraulic fracturing, substantial volumes still require transport, treatment, or underground injection.

In the Southwest, then, the appeal of produced water is relatively straightforward: it is one of the few massive water streams already being brought to the surface in places where freshwater is scarce. The challenge is that converting it into usable water requires overcoming significant technical, legal, and economic barriers.

Key Takeaway

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Produced water is no longer viewed solely as an operational byproduct. In the Southwest, it has become part of a broader conversation surrounding water security, infrastructure, environmental management, and resource development.

Still, significant questions remain unresolved. Treatment costs, infrastructure requirements, environmental concerns, and public confidence continue to complicate broader reuse efforts.

The next article in this series examines the legal framework governing produced water, including ownership disputes, regulatory authority, and evolving reuse policy in Texas and New Mexico. If you have questions about or comments on this article, please contact the authors or any attorney with FBT Gibbons' Oil, Gas and Minerals team.

Produced Water Series

- **Part 1 — Can Produced Water from Energy Production Offset Water Scarcity in the Southwest?**
- **Part 2 — The Legal Framework for Produced Water: Ownership, Rights, and Regulations**
- **Part 3 — Reuse in Practice: Produced Water Disposal, Recycling, Treatment, and Commercial Hurdles**

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