

# UNDERSTANDING WATER



## Devon supports Oklahoma's 50-year water plan

Oklahoma has a long-term plan to meet the growing demand for water in the state, and Devon Energy supports that plan. The Oklahoma Water Resources Board (OWRB) expects demand for water to grow by 33 percent between 2010 and 2060, which is why the state legislature in 2012 passed the Water for 2060 Act and published the updated Oklahoma Comprehensive Water Plan. The statewide goal is to consume no more fresh water in 2060 than was consumed in 2010.

In support of the plan, Devon is particularly interested in the use of water the OWRB defines as “marginal-quality water,” which can be utilized in Devon’s operations even though it’s not suitable for most other uses. This aligns with Devon’s corporate water principles, which include the use of economically and operationally feasible alternatives to drinking-water supplies. As an Oklahoma-based company with core values that include always doing the right thing and being a good neighbor, Devon is pursuing an Oklahoma water management strategy based on the Oklahoma Comprehensive Water Plan.

### Water Used to Complete a Well

Water is needed to produce oil and natural gas. After an oil or natural gas well is drilled, water is pumped down the wellbore to create fractures in the target-rock formation. This is necessary to stimulate the flow of oil and natural gas. Completing a well in the STACK play of west-central Oklahoma — one of Devon’s core areas — typically requires 300,000 to 500,000 barrels of water. It’s important to note that the oil and natural gas industry — the top contributor to Oklahoma’s tax revenue and gross domestic product — accounted for just 5 percent of the state’s water use in 2013, according to the Oklahoma Water Survey’s most recent estimate. The OWRB expects that percentage to remain at 5 percent in 2060.

### Using Marginal Quality Water

Devon is exploring how to further incorporate marginal-quality water into its STACK operations. The OWRB describes this source as “waters that may be of lower quality and have historically not been widely used for supplying Oklahoma’s water needs.” This includes:

- Treated wastewater effluent
- Stormwater runoff
- Brackish surface and groundwater
- Water with elevated levels of other key constituents
- Oil and gas flowback and produced water

### Brackish surface and groundwater

OWRB and the Water for 2060 Advisory Council acknowledge that not all water is created equal; water quality is distinguished by physical, chemical and biological characteristics. One method of chemical classification is the mass of total dissolved solids (TDS) in water. These naturally occurring solids include minerals, salts or metals. Depending on the concentration, water containing them can pose health risks to humans and livestock, damage soils and crops or cause corrosion or scaling in water fixtures and equipment. Water that exceeds these limits is described as “brackish.” Devon has and will continue to consider brackish water a source for well completions when feasible.

### Flowback and produced water

As a well produces oil and natural gas, water is generally produced along with it. This may include the water used in the hydraulic fracturing operation (flowback water) and water that was already in the underground rock (produced water). Produced water often contains even higher concentrations of TDS, which can make treatment very expensive. With the added cost and liability of collecting, storing and transporting produced water, this supply generally is not desirable for most water users. However, similar to brackish supplies, Devon has and will continue to consider it a primary source for well completions when feasible.

### A History of Conservation

Devon has long been considered an industry leader for its water-conservation efforts. Here are some examples:

- In north Texas, Devon was the first company to recycle flowback and produced water from natural gas wells.
- In West Texas, Devon developed and incorporated a brackish groundwater supply and recycling program into its operations.
- In Canada, Devon uses only brackish water to create the steam required to produce heavy oil.
- In New Mexico, Devon is the largest user of treated produced water, having led the effort to allow such use via a change in state rules.
- Within what is now called the STACK play in west-central Oklahoma, Devon built a pipeline network connecting well sites to a central water reuse facility. This conserved millions of barrels of water during a drought.

Devon is taking lessons learned from these experiences and expanding and improving best practices into all of its operating areas.