

What is fit-for-purpose use?

- Fit-for-purpose use is a general concept with many similar definitions, for example:
 - “Fit-for-purpose water use includes treatment of alternate water sources to appropriate levels to the appropriate quality for the end use (Daigger et al., 2019)”, and
 - “the treatment required to bring water from a particular source to the quality needed, to ensure public health, environmental protection, or specific user needs.” US Environmental Protection Agency (EPA)

What are some of the potential uses of treated produced water?

- The quality of produced water varies greatly across the different oil and gas basins in New Mexico. Therefore, the potential treatment quality and the associated potential application could vary significantly. Several potential uses exist and are being considered by the Consortium, including:

1. road construction;
2. rangeland rehabilitation;
3. agriculture and livestock production;
4. industrial applications;
5. hard rock and solutions mining;
6. mineral extraction;
7. municipal landscaping applications (parks, golf courses); and
8. water supply augmentation.

- Many of these uses do not require water of drinking water quality, but rather much lower quality water. In some applications, such as mineral extraction and solution mining, very low-quality water is often preferred.



What is the benefit of treatment and fit-for-purpose use of produced water?

- It helps to reduce the use of fresh water for industrial and commercial applications that do not really require fresh water,
- This helps conserve New Mexico’s limited fresh water resources for more important applications that require high-quality water, and
- Enables continued or expanded economic development without depleting precious fresh water resources and supplies.

How is human and ecological health and safety being assured for fit-for-purpose uses of treated produced water?

- The Consortium is pursuing five distinct strategies to assess human, animal, and plant and soil exposure and potential risk and toxicity of treated produced water discharges. These include:
 1. Use of state-of-the-science chemical analysis and spectroscopy by the EPA, commercial laboratories, and New Mexico State University (NMSU) for chemical analysis to identify and quantify all constituents in produced water.
 2. Collaborative state-of-the-science Whole Effluent Toxicity (WET) testing in cooperation with the EPA, NMSU, and commercial laboratories.
 3. Human cell line testing in cooperation with the EPA Office of Research and Development on human risk and toxicology to treated produced water discharges.
 4. Fate and transport modeling of treated produced water discharges for various uses.
 5. Plant and soil bioaccumulation and toxicity testing in green houses at NMSU.
- This multi-pronged chemical, toxicological, and human health and safety testing strategy provides overlapping analysis and evaluation of the human and environmental health impacts of produced water treatment and reuse, to improve public confidence in the safety of using treated produced water for various fit-for-purpose uses.

References and More Information

- New Mexico Produced Water Research Consortium website: <https://nmpwrc.nmsu.edu/>
- Basic Information about Water Reuse - EPA: <https://www.epa.gov/waterreuse/basic-information-about-water-reuse>
- Contaminant Fate, Transport and Exposure – EPA: <https://www.epa.gov/emergency-response-research/contaminant-fate-transport-and-exposure>
- Explanation of fit-for-purpose water use (Daigger et al., 2019): <https://www.sciencedirect.com/science/article/pii/S2589915520300109#b0025>
- Basic Information about Water Reuse - EPA: <https://www.epa.gov/waterreuse/basic-information-about-water-reuse>
- Water Reuse Research – EPA: <https://www.epa.gov/water-research/water-reuse-research>

Questions

- Contact the Consortium at: nmpwrc@nmsu.edu