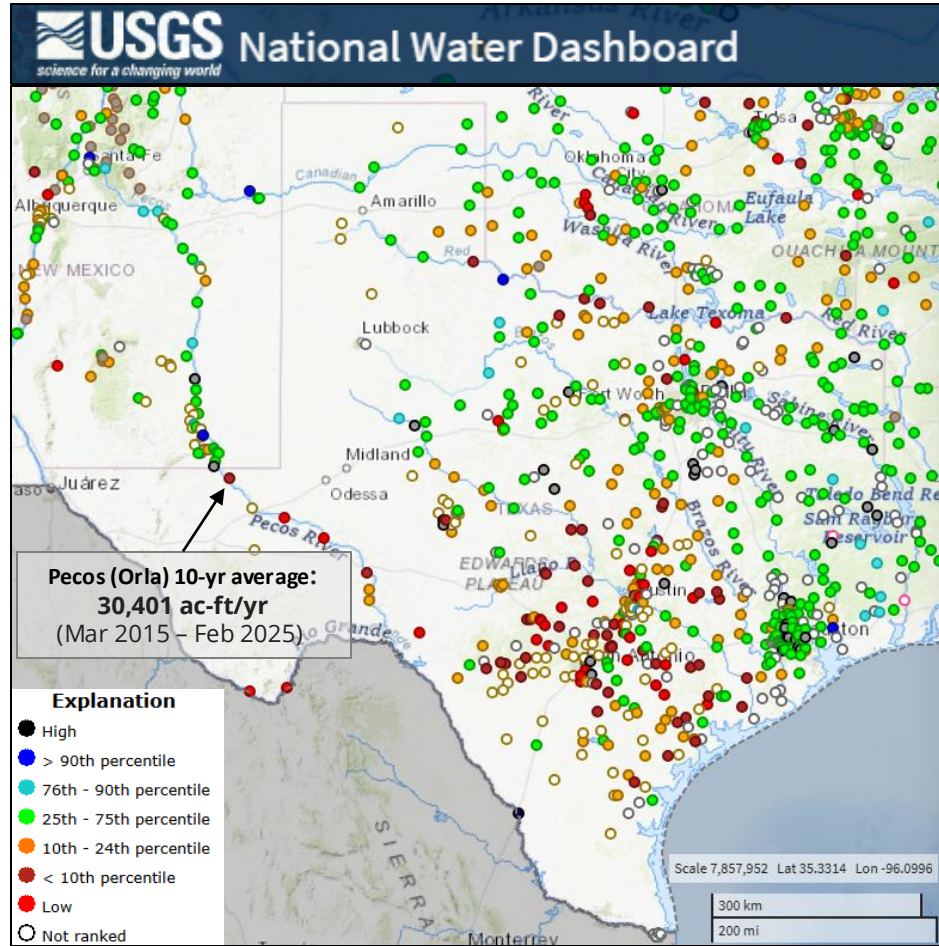


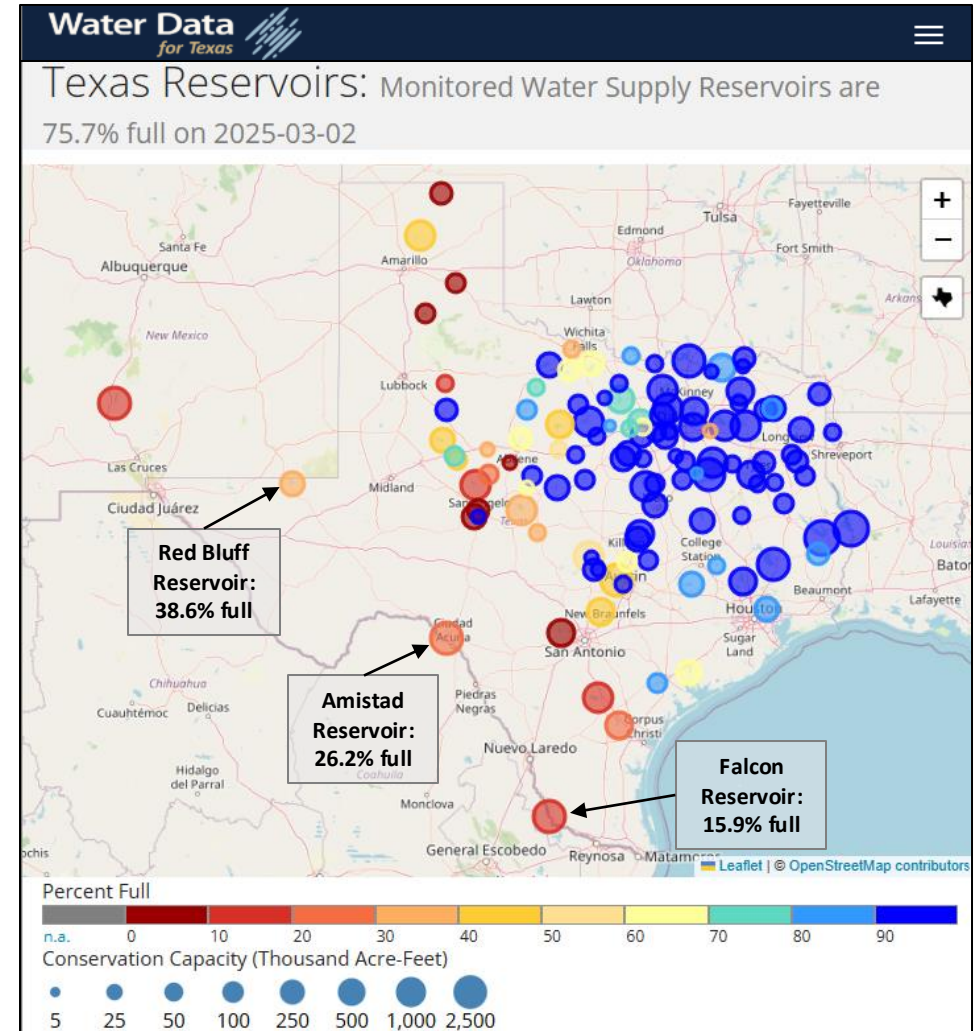
Permian Basin: Desalinated Produced Water

Current applications for TCEQ surface discharge permits:
into or downstream of Red Bluff Reservoir



<https://dashboard.waterdata.usgs.gov/app/nwd/en/>, accessed 2025-MAR-02

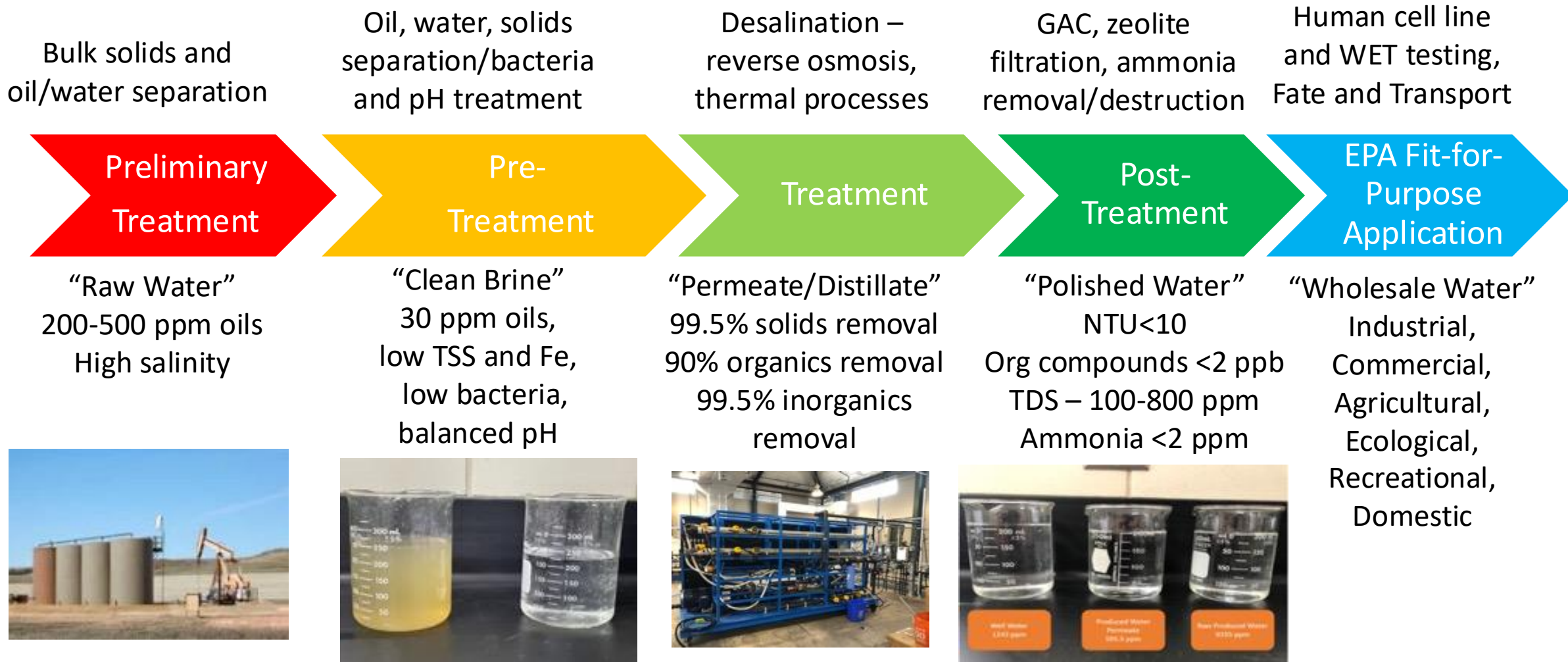
<https://waterdata.usgs.gov/tx/nwis/rt>, accessed 2025-MAR-02



<https://www.waterdatafortexas.org/reservoirs/statewide>, accessed 2025-MAR-02

<https://www.waterdatafortexas.org/reservoirs/individual/red-bluff>, accessed 2025-MAR-02

Produced Water Treatment Train To Reduce Toxicity



Current Regulatory Values vs. Treatment Data Values

(Curated collaborative data by NMPWRC)

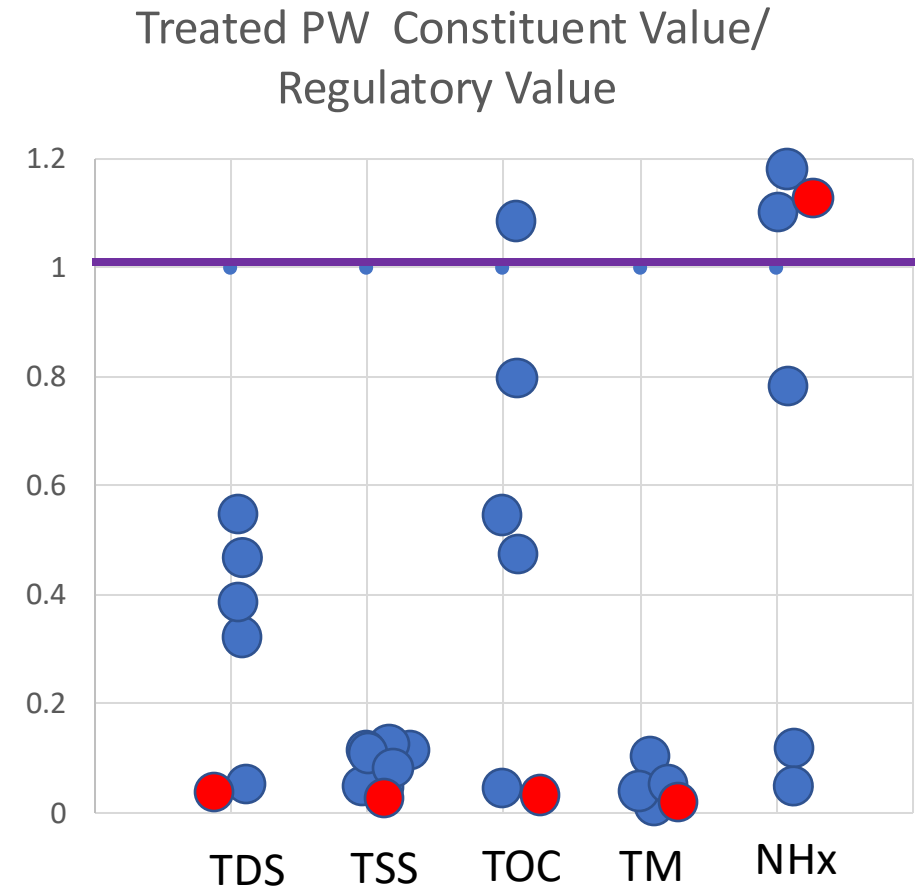
NMPWRC Curated Pilot Data

● Permian Basin (~120,000 ppm TDS)

● San Juan Basin (~20,000 ppm TDS)

Fresh Water Limit of 1,000 ppm TDS

Data suggests post-treatment needed to meet regulatory requirements for organics and ammonia which is helped by using a “Clean Brine”



Produced Water Drivers for Risks and Benefits

- Dirty Dozen

- TDS
- TOC, TPH
- BTEX, Benzene
- NORM
- Total metals
- Alcohols – methanol (replace it)
- Ammonia
- Dioxins
- PCBs
- Acetone/butanone
- Arsenic
- PFAS (ban it)

- Good Dozen – DD of PW

- Metals – Cr, Co, Ti, Ni, Li, Mg, etc.
- Ammonia
- Minerals – barium, strontium
- Chlor/alkali
- Rare earth elements

Suggests need to collect 'select' raw and treated produced water data to:

- Understand treatment needs
- Support techno-economic analysis to optimize treatment trains and concentrate recovery revenue
- Drive real-time treatment monitoring