Produced Water Research in New Mexico

NM Produced Water Research Consortium

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Part A: New Mexico Universities Produced Water Synthesis Project
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Rebecca Roose, New Mexico Environment Department
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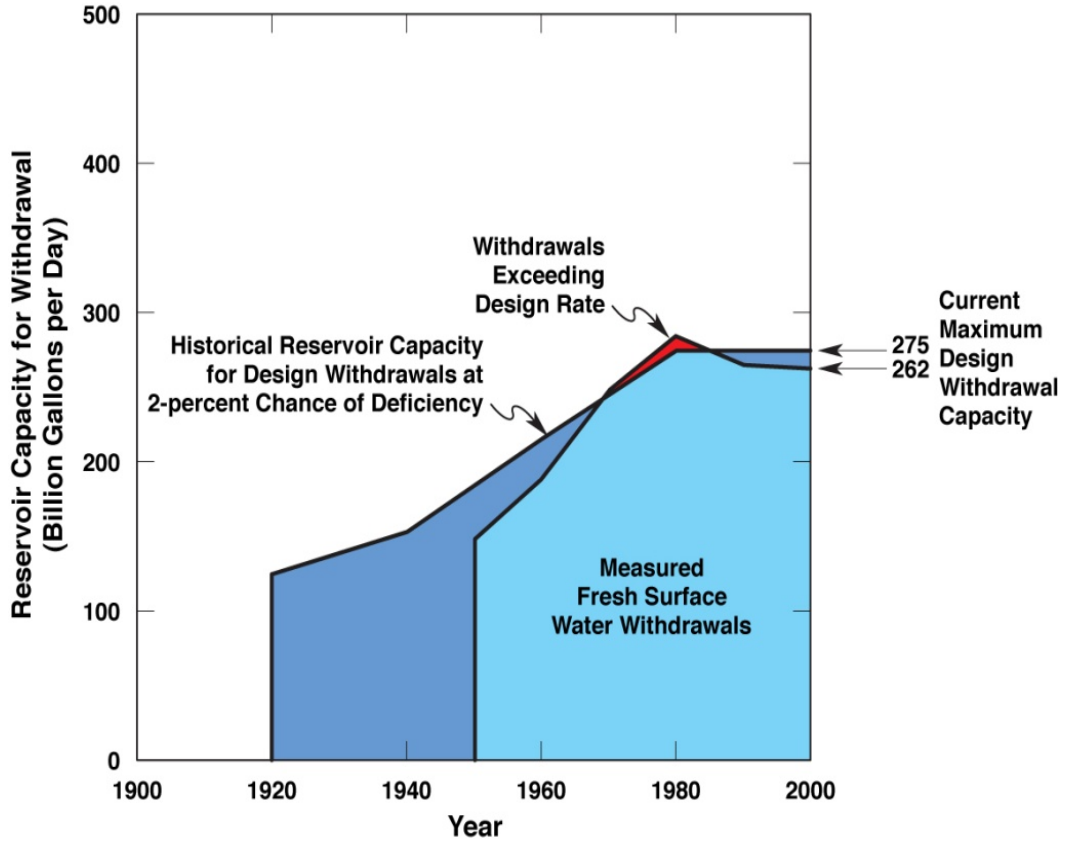
65th Annual New Mexico Water Conference
Virtual Presentation
1:45 PM MST
Thursday, October 29, 2020

https;//nmpwrc.nmsu.edu

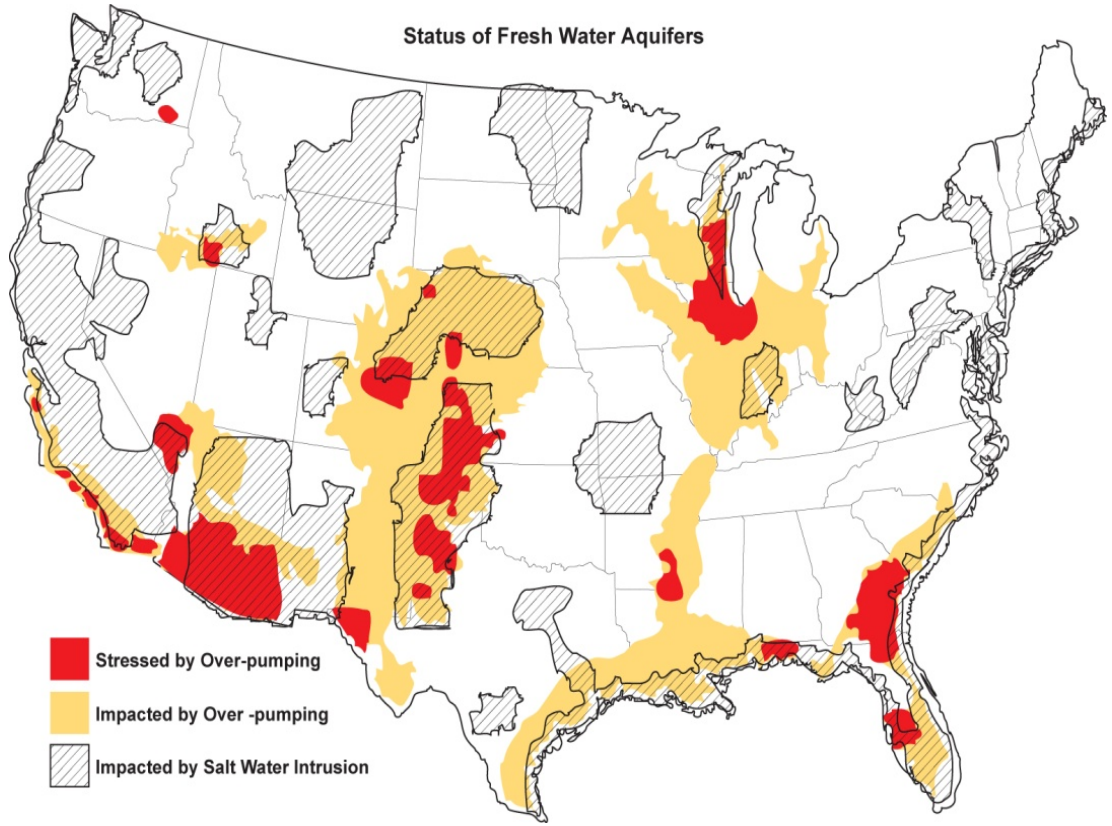
New Mexico Water Resources Research Institute
New Mexico Bureau of Geology and Mineral Resources, New Mexico Tech, Earth Science for the 21st Century
Utton Transboundary Resources Center
Petroleum Recovery Research Center
New Mexico Tech
UNM
NM State University

Water Stress Driving Use of Non-traditional Waters

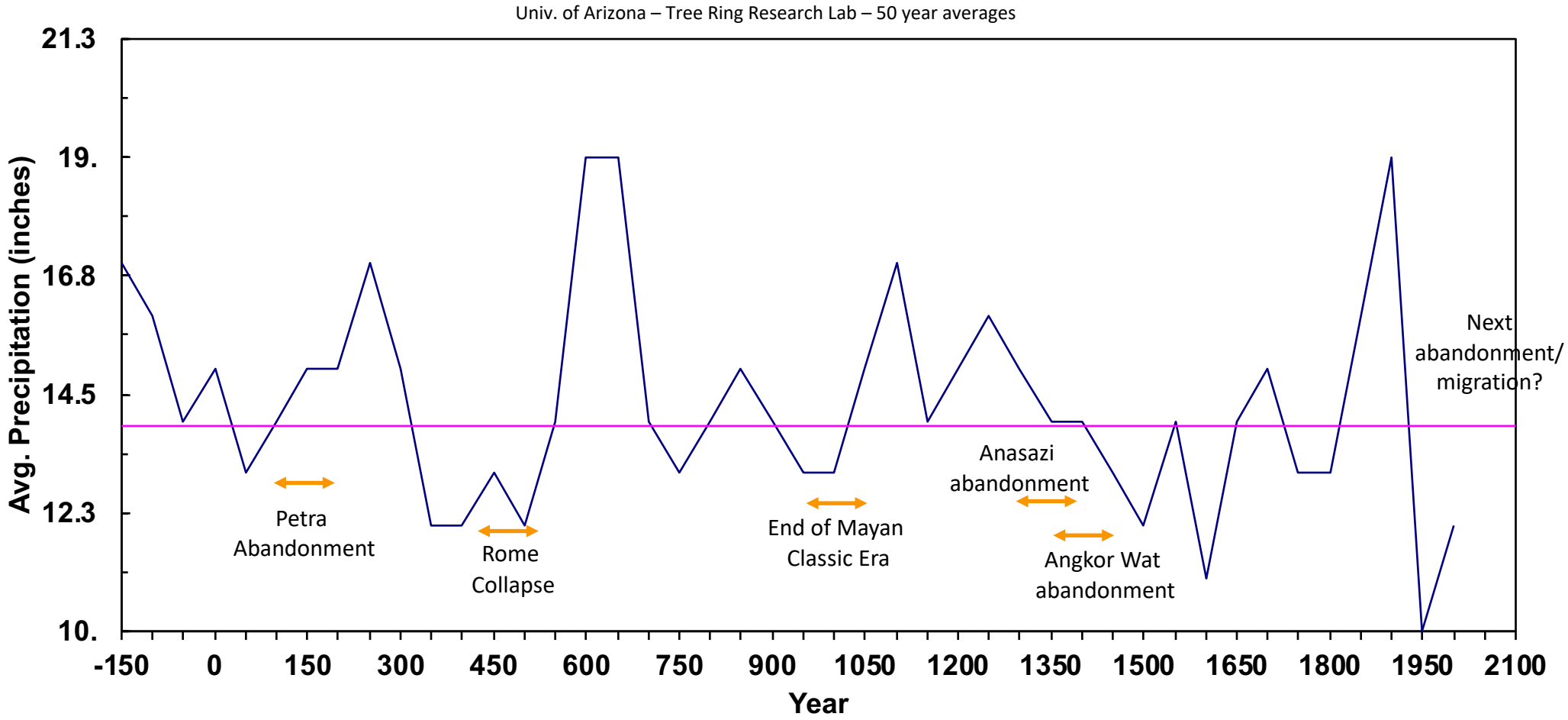


- No new surface water storage capacity since 1980

- All major groundwater aquifers overstressed

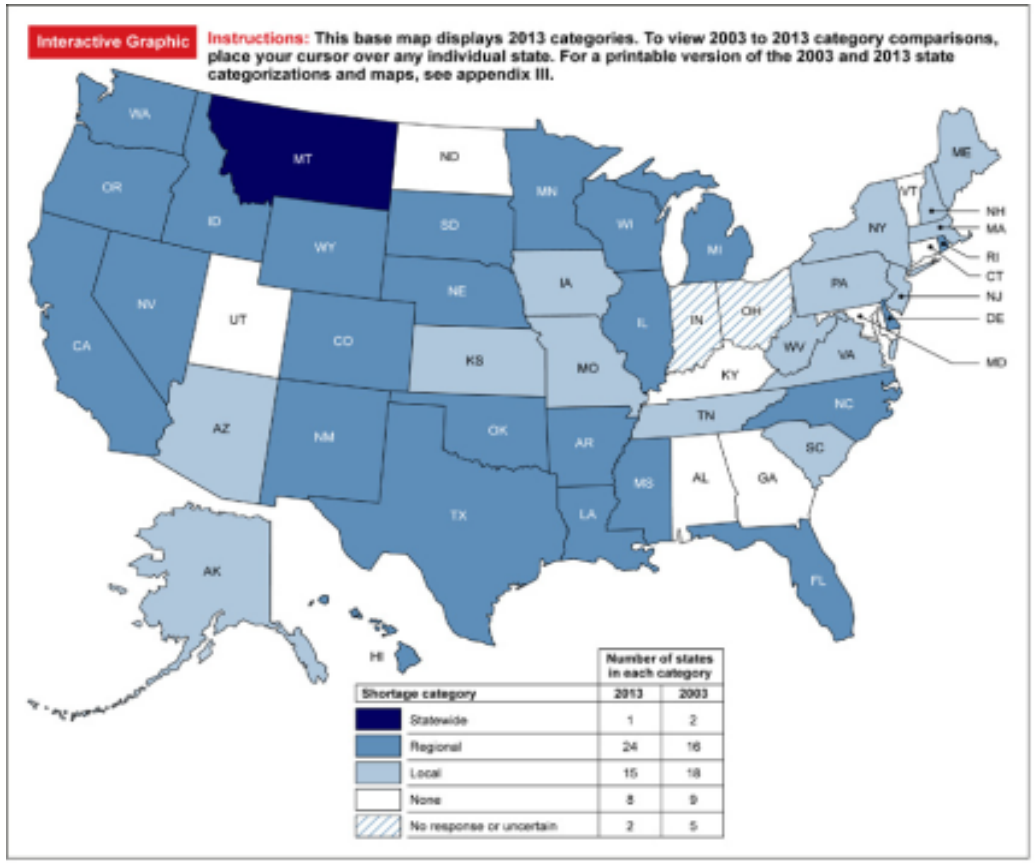


Southwest Climate History Based on Tree Ring Data

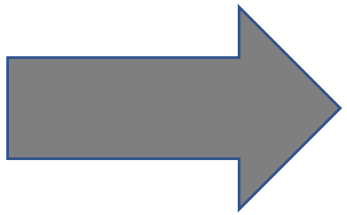


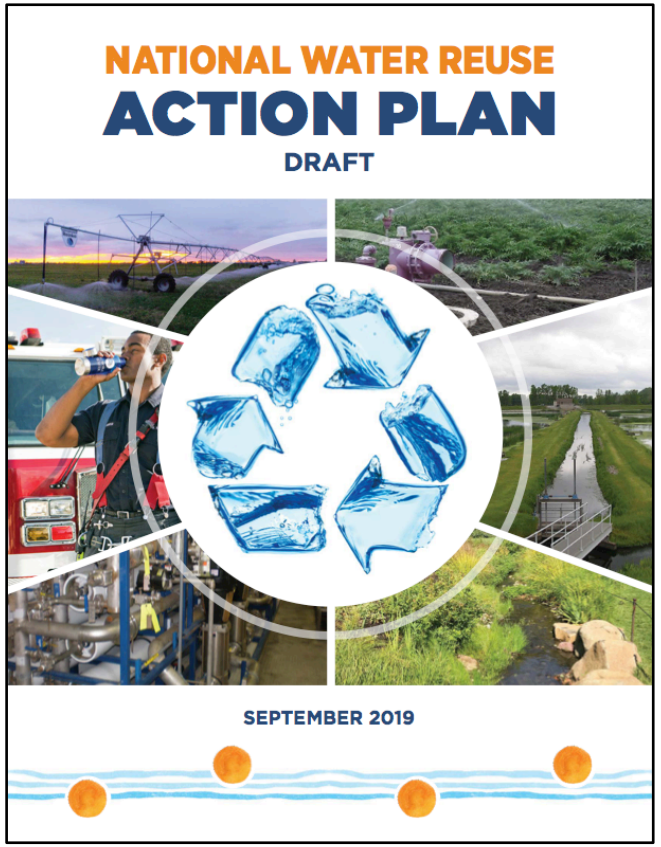
The mid-latitudes are in the 100th year of a 300 year arid period - which in the past have led to significant stress on civilizations

2020 EPA National Water Reuse Action Plan (WRAP)



Sources: GAO analysis of state water managers' responses to GAO survey; Map Resources (map).



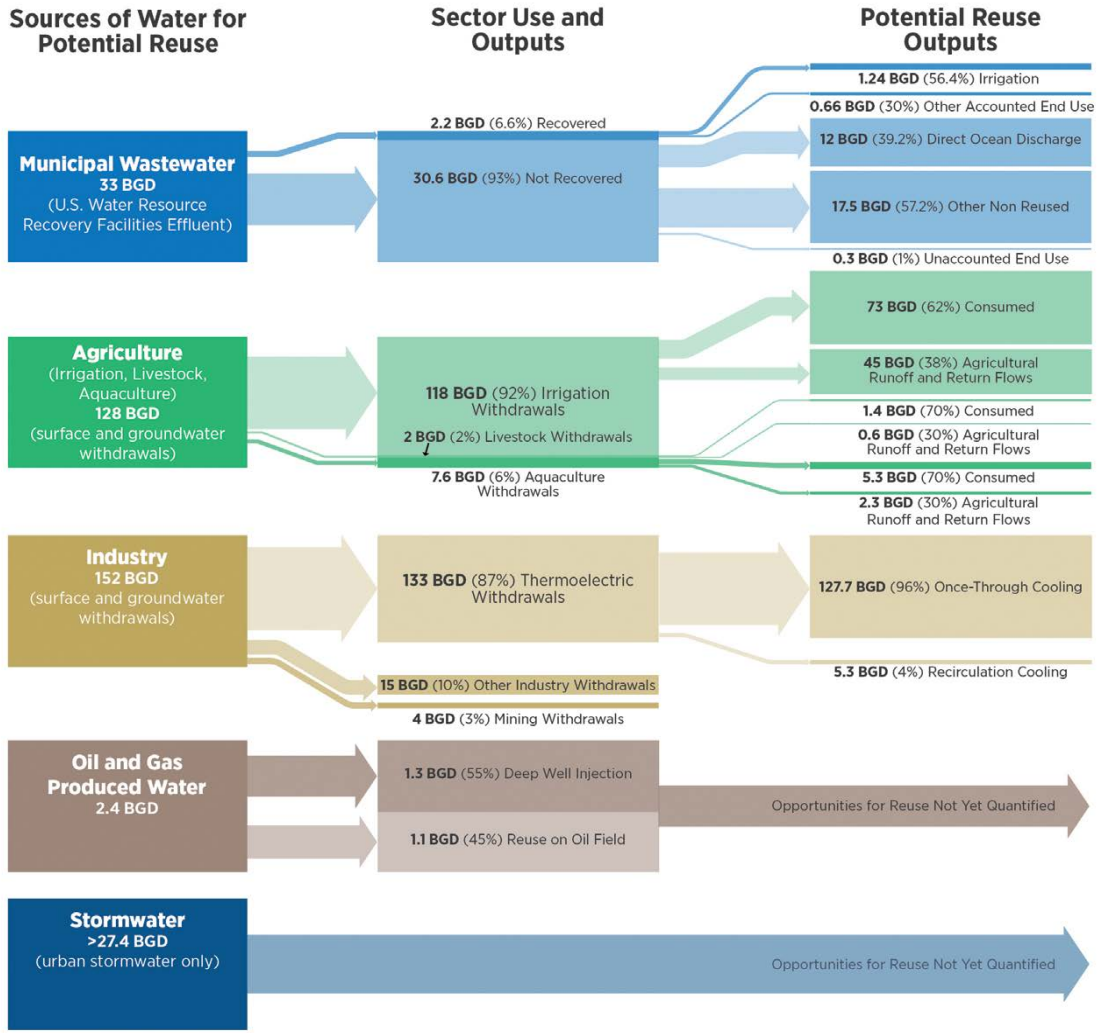


Fresh water stress driving waste water reuse

EPA Priority Waste Water Reuse Sectors

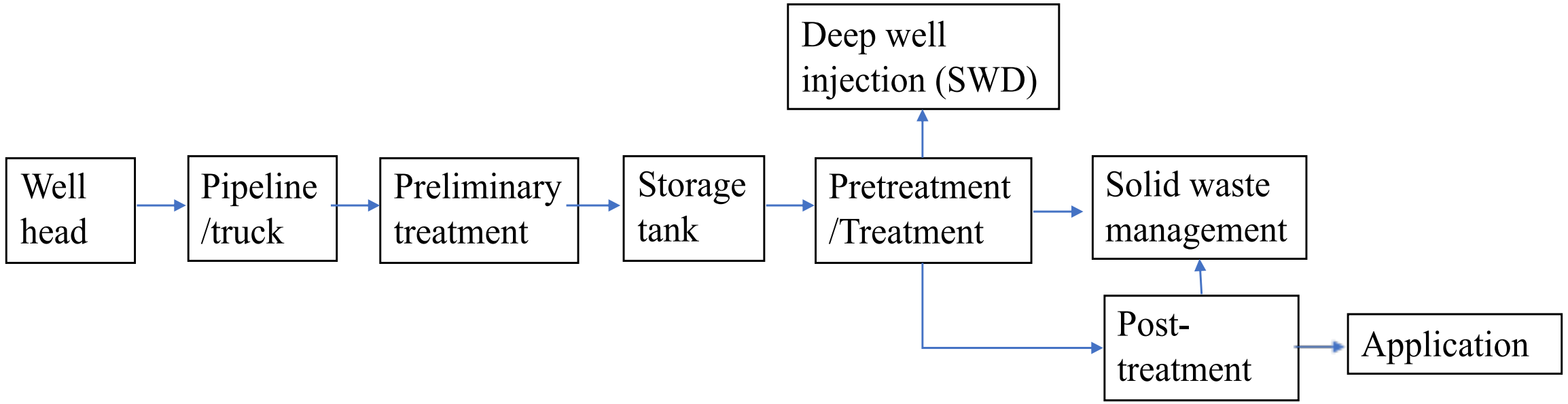
- Clear potential to reclaim more of nation's waste waters
- Sources of water for reuse:
  - 33 BGD - Municipal wastewater
  - 128 BGD - Agriculture
  - 152 BGD - Industry
  - 2.4 BGD - Oil and gas produced water
  - >27.4 BGD – Stormwater

NMPWRC and the GWPC selected by EPA to lead the Produced Water efforts of the National Water Reuse Action Plan



Produced Water Treatment Has Many Benefits

Pre-treatment | Treatment | Post-treatment | Disposal



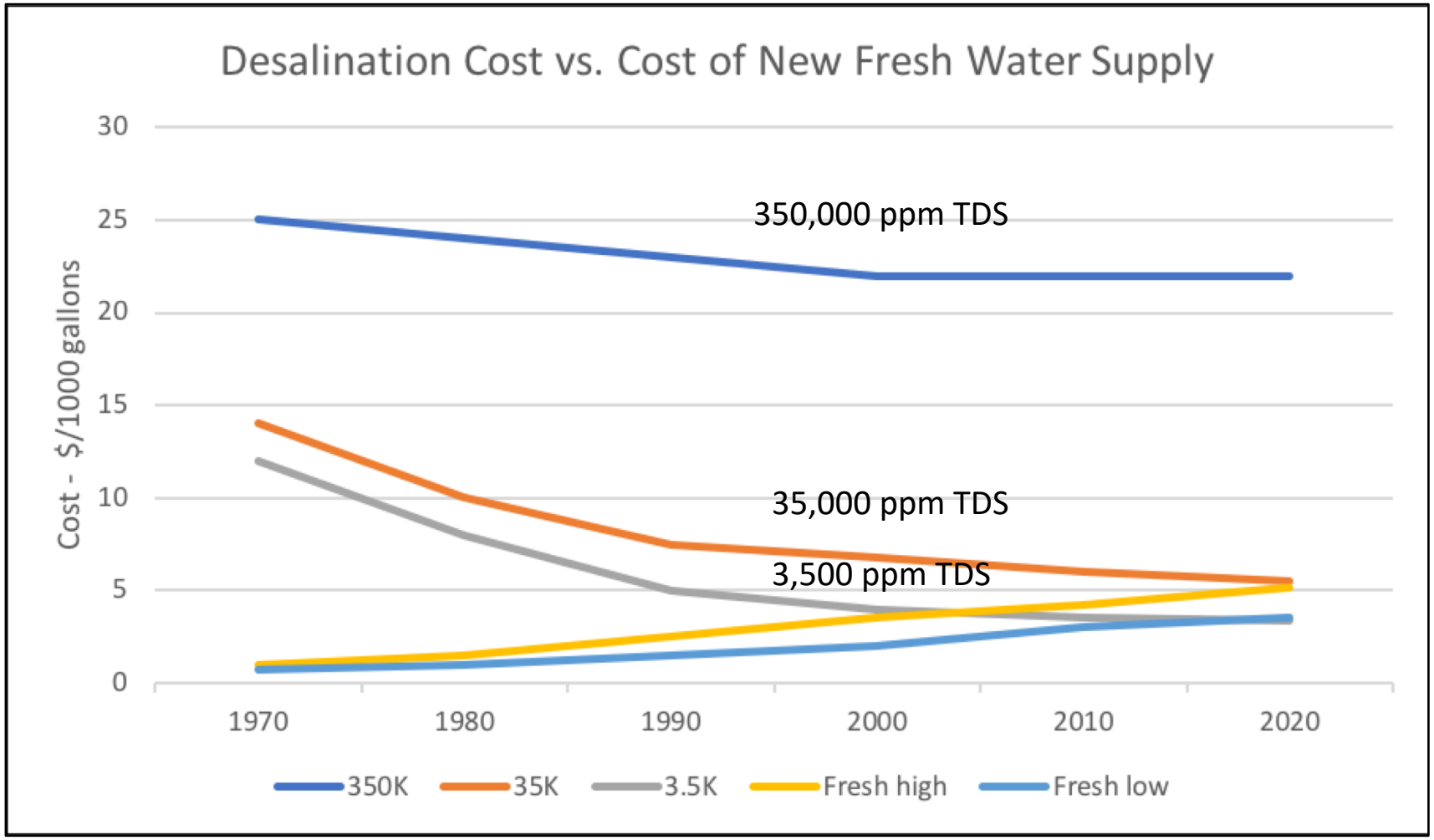
Eliminate fresh water use in drilling and fracking

Water recovery for fit-for-use applications

Mineral recovery

Disposal waste minimization to reduce earthquakes

Changing Desalination and Produced Water Disposal Costs



2000 Permian Basin Avg. Produced Water Disposal costs $2/1000 gal

2020 Permian Basin Avg. Produced Water Disposal costs $20-50/1000 gal

Socio-Economic Benefits of Produced Water Reuse

Element	Value
Oil production value	$6-8 B
Gas production value	$5-7 B
General Fund direct revenues	$2 B
General Fund	$1B
Capital Outlay	$.4-.5 B
Taxes to local government	$.5 B
Percent of Budget from Oil and Gas Revenues	30%

(NM LFC Finance Facts, 2018)

Benefits for state economic development and industrial growth and societal benefits

Cost/Benefit	Range of Values
Price of Oil (WTI)	$55.00
Price of Recycled Water per barrel	$0.50 - $7.00
Marginal Cost of Production & Taxes	$20 - $25
Marginal Cost of Water Disposal per barrel	$0.50 - $2.25
Marginal Cost of Transportation	$0.00 - $9.00
Marginal Cost of Recycling	$1.00 - $16.00
Marginal Private Value of Recycled Water	$0.25 - $1.75
Marginal Social Value of Recycled Water	$0.48 - $51.24

(UNM - Chermak & Patrick, 2018)