Produced Water Reuse Opportunities and Challenges in the San Juan and Animas Watersheds

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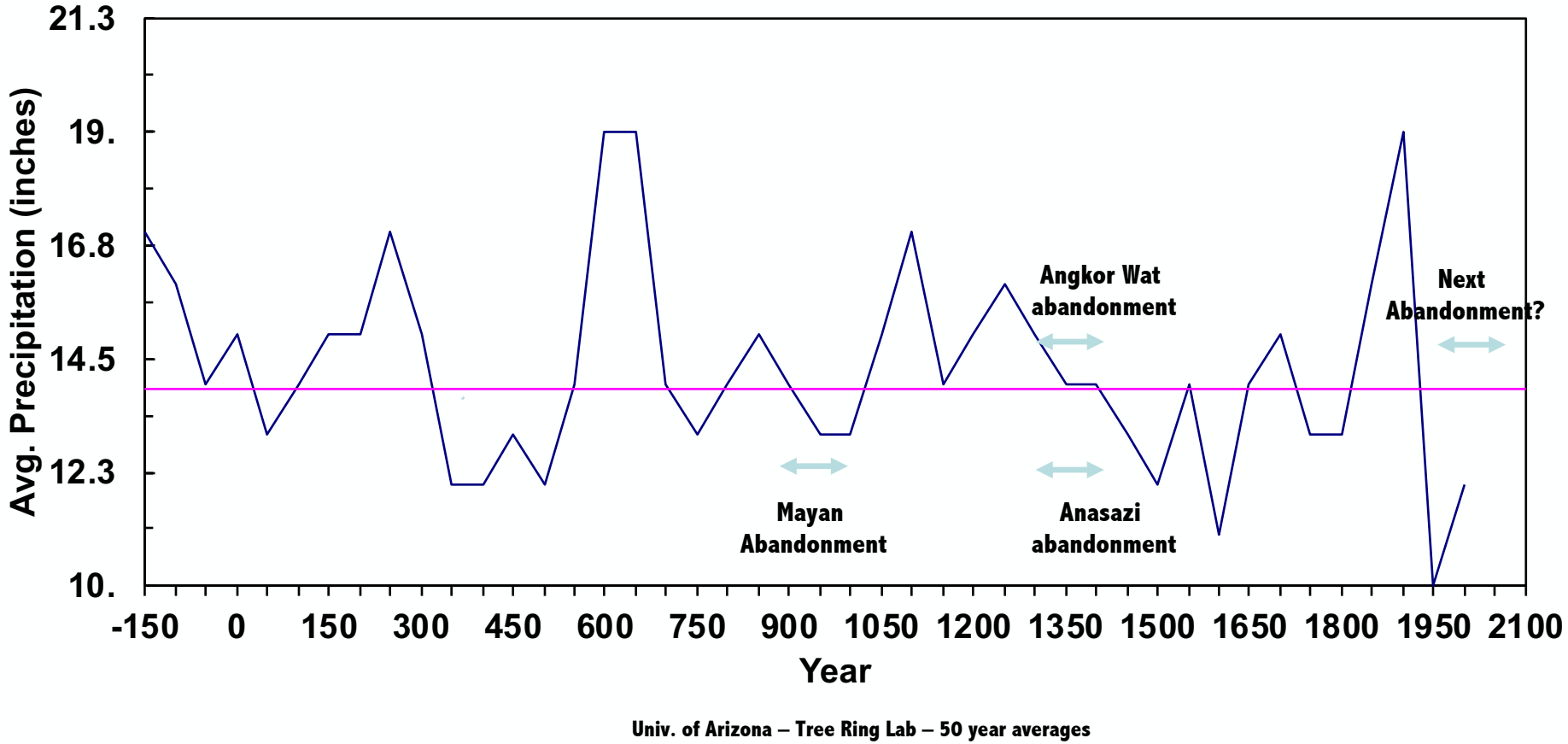
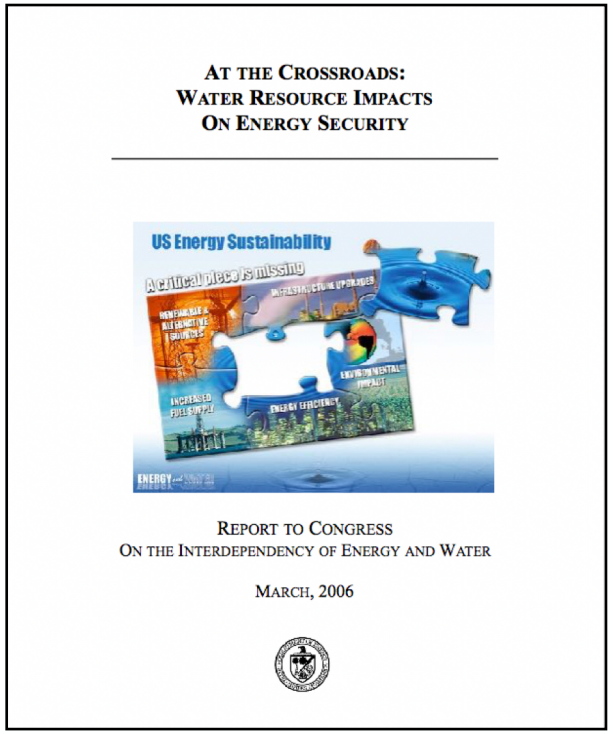
Southwest Climate History from Tree Ring Data



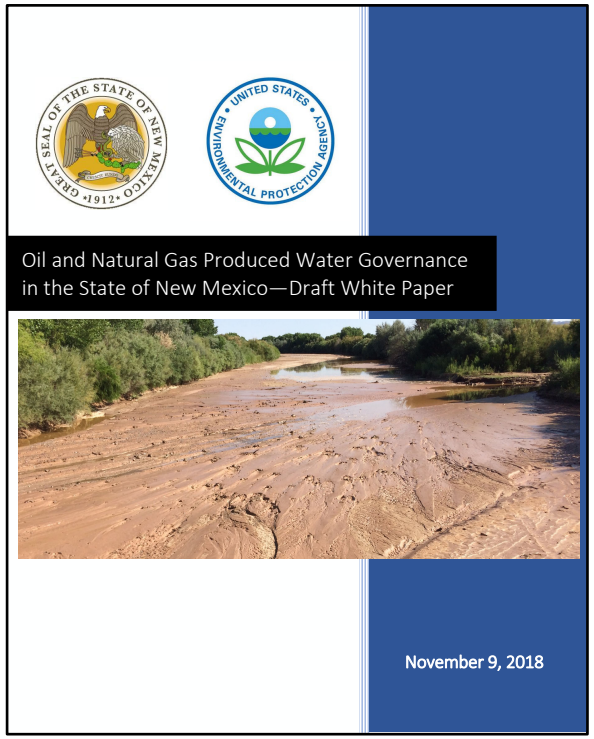
Univ. of Arizona – Tree Ring Lab – 50 year averages

The southern U.S. and the mid-latitudes are in the 130th year of a 300 year arid cycle - not a drought

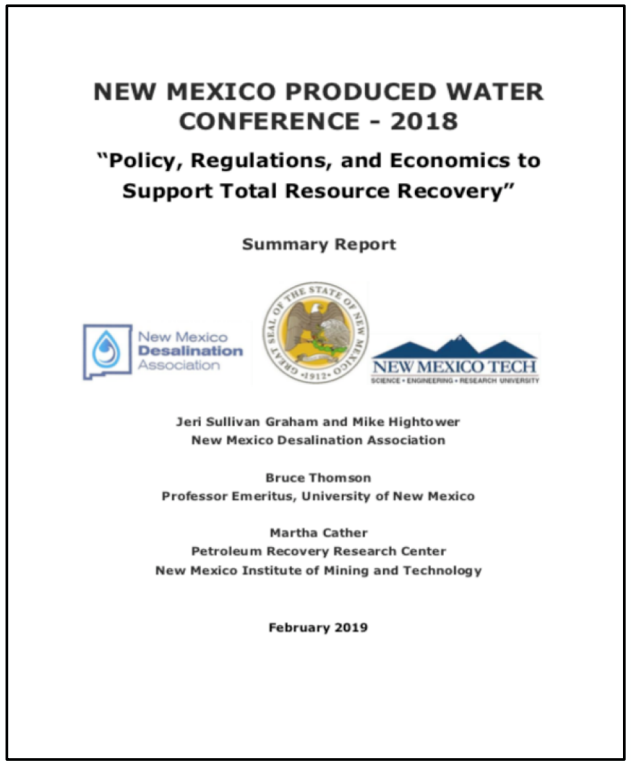
Recent New Mexico Efforts on Produced Water Treatment and Reuse



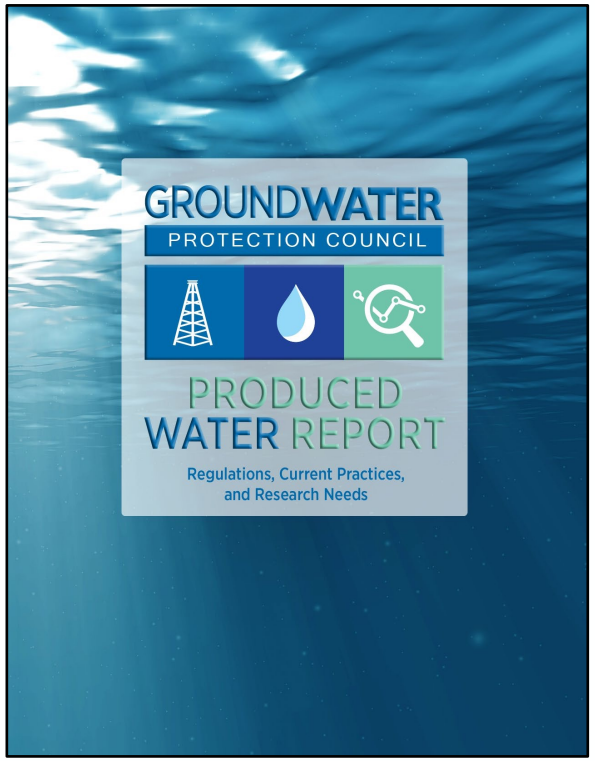
Sandia, Los Alamos, DOE
2004-15



NMED, OSE, EPA 2017-18



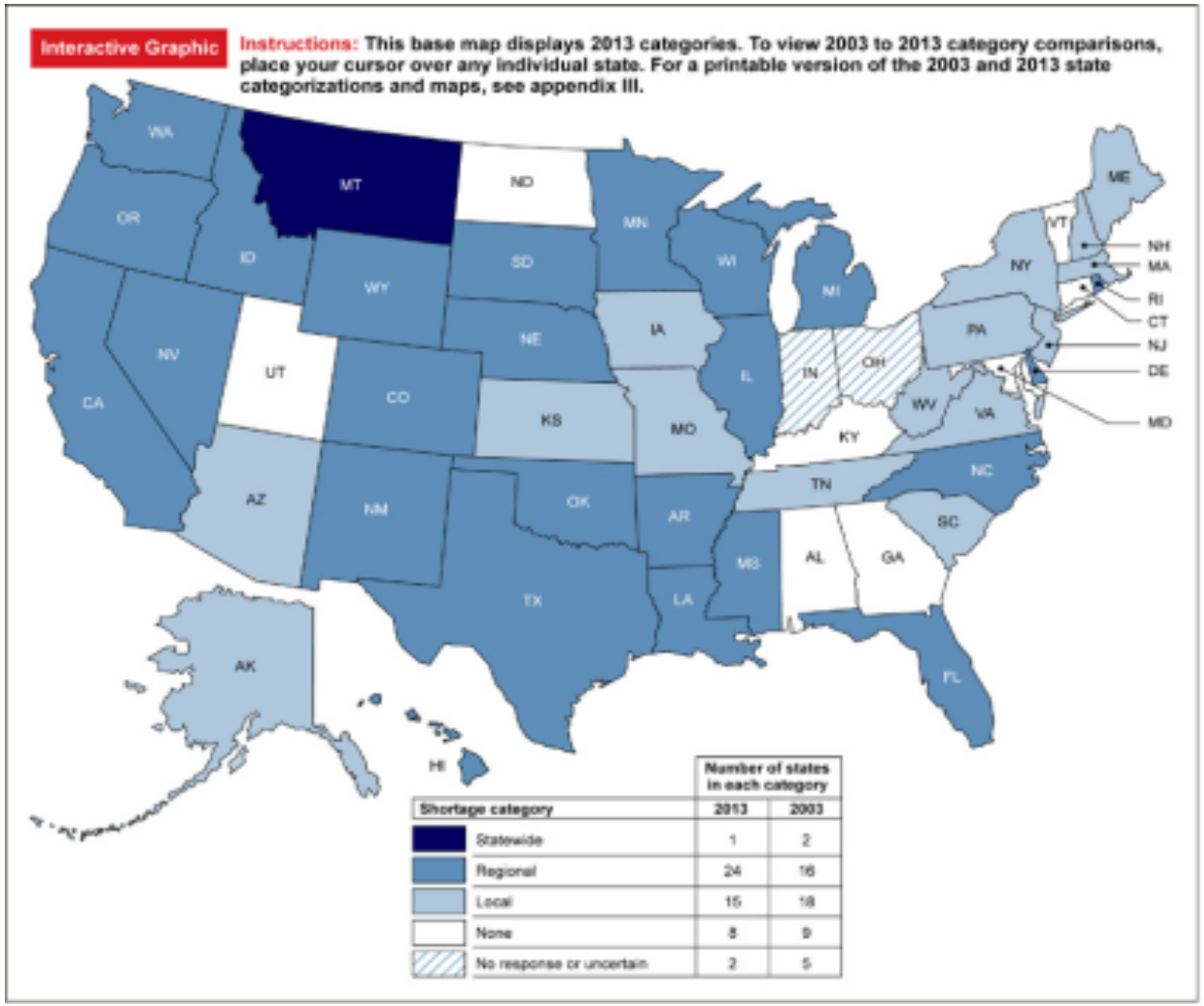
NMED, OSE, EMNRD
2017-19



EMNRD 2016-19

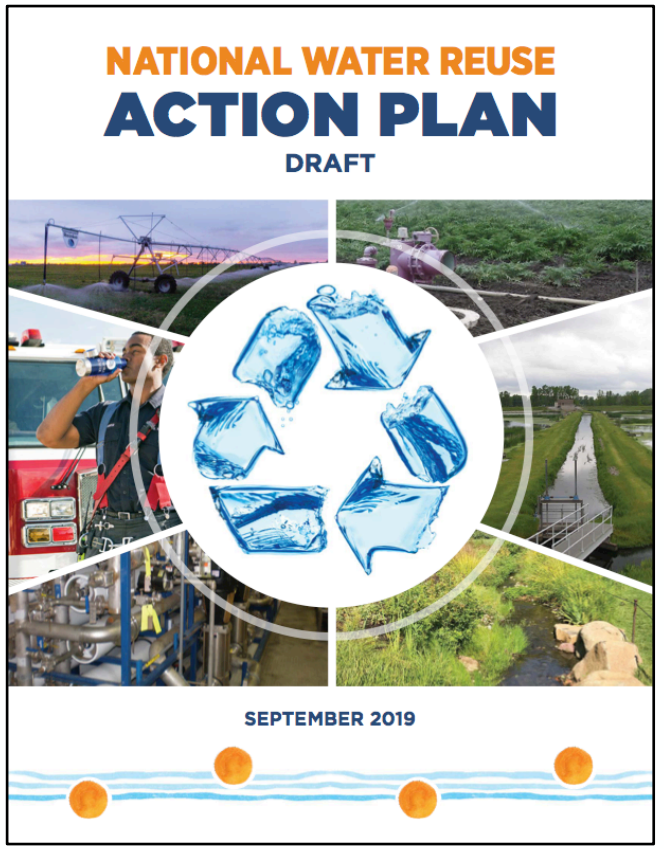
Growing National Interest in Using Non-traditional Water Resources

GAO 2003 and 2013



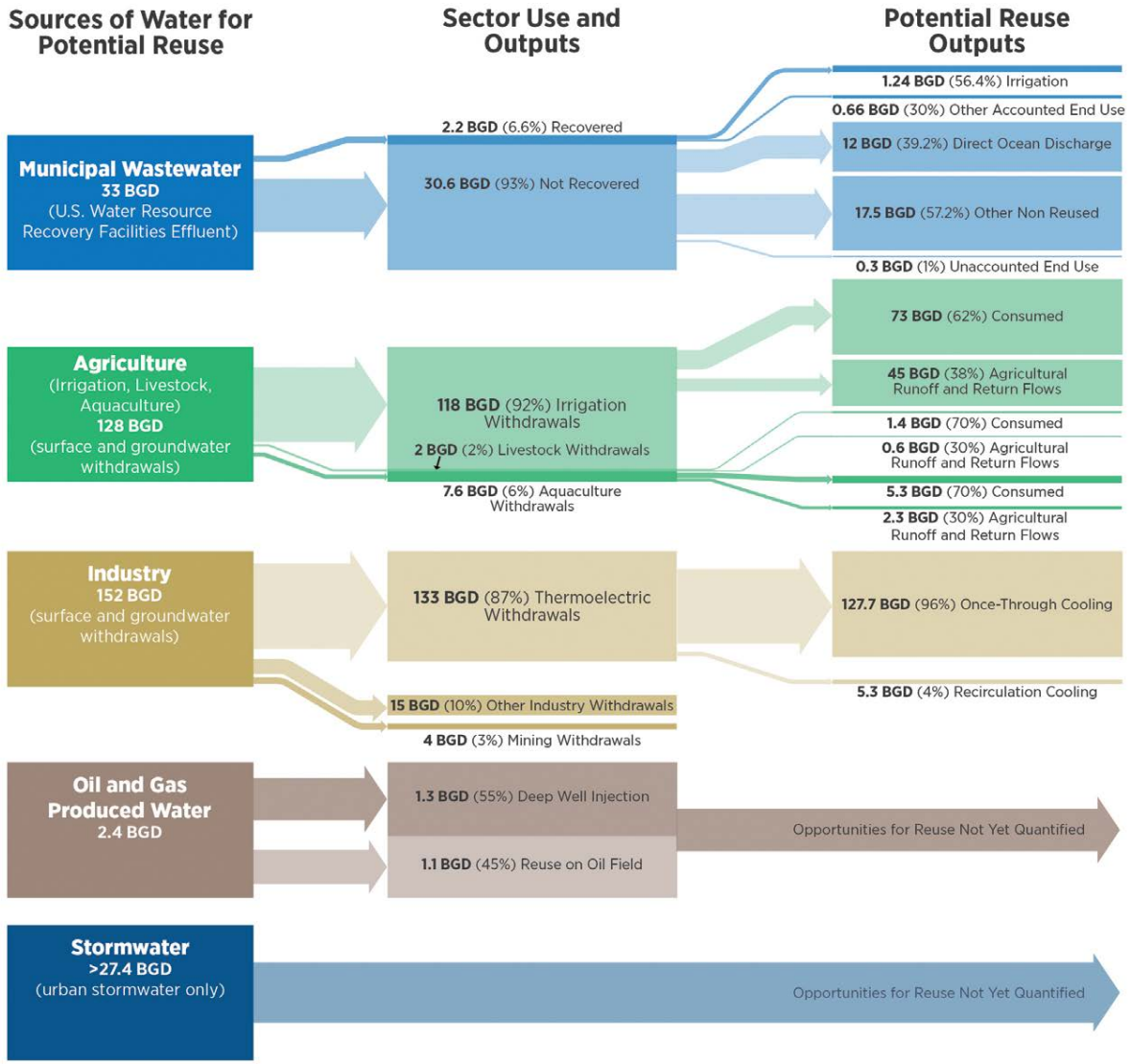
Sources: GAO analysis of state water managers' responses to GAO survey; Map Resources (map).

EPA 2019



Sources of Waters and Potential Reuse Outputs

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



NM 2019 Produced Water Act, HB 546

- Through the Act, statutory and regulatory authority for the reuse of produced water was modified:
  - Reuse inside oil and gas sector remains under the Oil Conservation Division (OCD) of the NM EMNRD,
  - **Reuse outside the oil and gas sector, was designated to the NM Environment Department (NMED).**
- The Act encourages produced water reuse outside oil and gas to:
  - enhance fresh water sustainability,
  - reduce or eliminate fresh water use in the oil and gas sector,
  - support new economic development opportunities,
  - maintain public and environmental health and safety.

This regulatory transition is an emerging trend in the oil and gas sector – OK and TX

NM Produced Water Consortium Roles

- The Consortium was formed in an MOU between the NMED and NMSU to:
  - Coordinate a collaborative research, development, and evaluation program for produced water reuse outside the oil and gas sector,
  - include state and federal health and resource management agencies, academia, industry, and NGOs and their technical experts.
- Will fill science and technology gaps to accelerate innovative technology cost and performance testing to:
  - address fit-for-purpose treatment for various applications - industrial, road construction, agriculture, rangeland, municipal, aquifer storage, surface supplies.
- Make sure treatment requirements are protective of public, environmental, ecological, and watershed health and safety.

Consortium Organization

Modeled after DOE Innovative Treatment Remediation Demonstration Program and EPA Environmental Technology Verification (ETV) Program

Common Water Quality Requirements for Various Applications

Produced Water Quality (ppm) TDS	Application	Common Water Quality Requirements (ppm) TDS	Typical Treatment Process
Conventional 10K to 50K 50%<35K 50%>35K	Drinking	500-600	Chemical/membrane/thermal
	Aquifer Storage & Recovery	300-5,000	Chemical/membrane/thermal
	Agriculture and livestock	Class 1 <700, <60% Na, B<0.5 Class 2 2000, 60-75% Na, B<2.0 Class 3 >2000, 75% Na, B~2	Chemical/membrane/thermal
Unconv. 60K to 300K 25%<100K	Rangeland	4,000 – 10,000	Chemical/membrane/thermal
	Surface Flow	600-2000	Chemical/membrane/thermal
	Mineral Recovery	>100K (no discharge)	Chemical/thermal
	Road Constr.	Up to 100,000	Chemical/membrane/thermal

Current Consortium Efforts and Future Schedule

- Consortium technical kickoff meeting was January 2020.
- Currently conducting produced water risk, treatment, sampling, data management, and toxicology evaluations, analyses, and assessments.
- Collecting letters of interest from technology, midstream, and producers on potential projects and opportunities.
- Pilot–testing efforts and evaluations will begin in October 2020, when guidance from NMED on pilot-testing, performance testing and sampling, and risk assessment and toxicology testing requirements are finalized.
- The Consortium charter is through 2022, so interested parties, groups, or agencies are encouraged to participate and it is not too late to join.

https://nmpwrc.nmsu.edu