

N E W M E X I C O



Energy, Minerals and Natural Resources Department

Produced Water Recycling and Use

Water and Natural Resources Committee

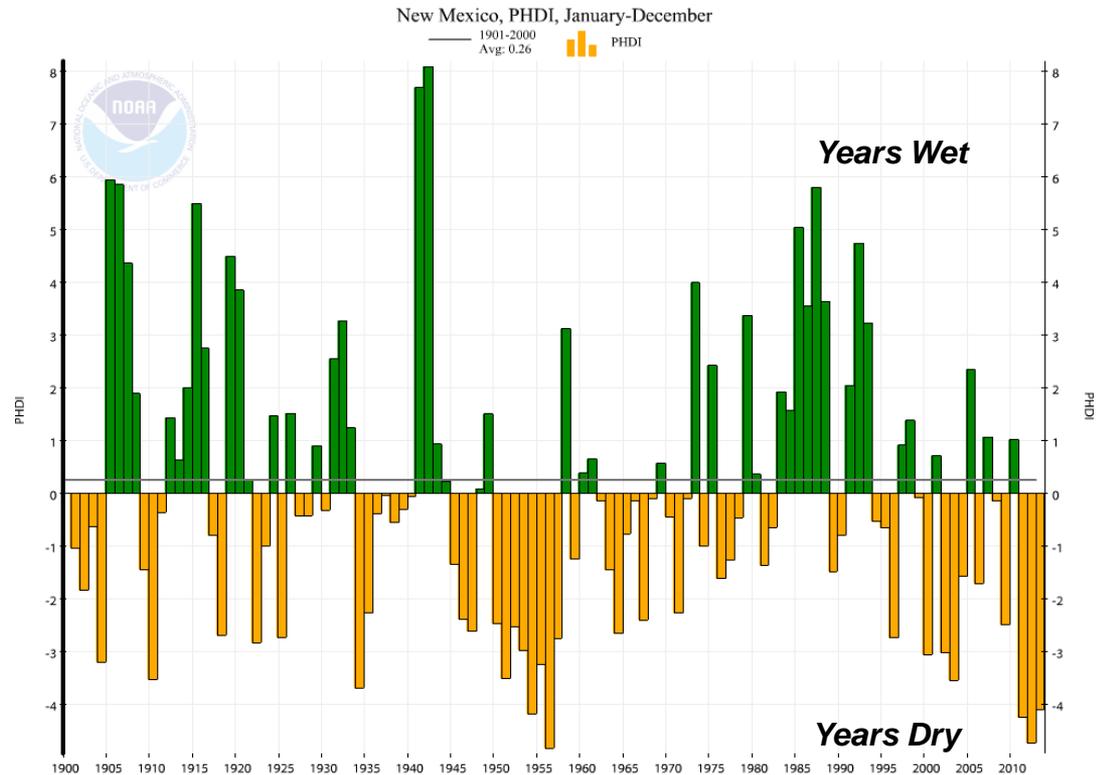
September 4, 2014, Artesia, New Mexico

David Martin, Secretary
New Mexico Energy, Minerals, and Natural Resources

Jeri Sullivan Graham
Los Alamos National Laboratory

Drought and Drought Recurrence in NM

- 66 years dry vs. 47 wet since 1900 (Palmer Hydrological Drought Index)
- Drought recurrence is the norm
- Indicates need for alternative and emergency water supplies



Palmer Hydrological Drought Index for New Mexico, 1900-2013

Source: NCDC-NOAA, accessed 06/30/2014

- Planning is needed for industry and municipalities!

2004 Recommendations...still valid today*

“Water Development Work Group (p. 32)

Developing **new sources of water** will be important to the continued viability of the state. Particularly in times of drought, alternatives to diminished surface water are critical, as are new sources of ground water to offset or avoid excessive depletions. **This new work group will identify ways to develop new sources of water, including treating brackish water reserves and treating wastewater to extend the life of existing water supplies.**

Section C.13 – Identify water-related infrastructure and management and investment needs and opportunities to leverage federal and other funding.

Section C.14 – Promote collaboration with and strategic focusing of the research and development of the state’s national laboratories and research institutions to address the state’s water challenges and to bring to the state demonstration projects in desalination... and other technical approaches to enhancing water supply and management...”

*NM Brackish Groundwater Assessment Program Workshop, January 15, 2004;
New Mexico State Water Plan (2003)

Short-Term and Long-Term Goals (2004)

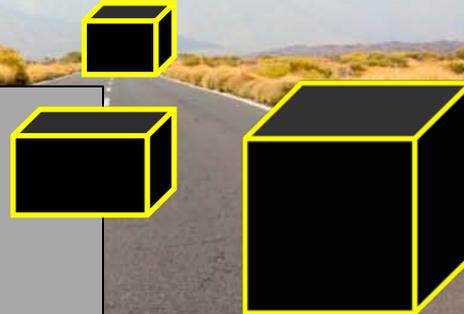
Short Term (6 months to 2 years):

1. Establish a Brackish Water Task Force ...DONE
2. Establish a decision matrix that prioritizes saline aquifers and communities or groups of communities in need of water supply....REQUIRES DATA
3. Compile and review existing data and identify data needs for characterizing and evaluating suitability of potential aquifers....IN PROGRESS
4. Develop a saline aquifer web page...IN PROGRESS
5. Prepare a summary report of saline aquifer resources....REQUIRES DATA

Long Term (2 to 5 years):

1. Collect any additional data needed for proper evaluation of potential aquifers-REQUIRES TIME AND \$\$
2. Develop a hydrogeologic characterization and computer model to support an impact assessment and feasibility study....REQUIRES DATA, TIME, and \$\$
3. Pursue plant design and pilot project(s).. OIL AND GAS INDUSTRY IS EXPLORING METHODS OF TREATMENT AND REUSE IN THE FIELD.

Why is reuse so Challenging?



- Oil and Gas Industry now in the “Water Business” learning curve
- Must have clear knowledge and good analyses
- Market-based requirements for water-is it cheaper than purchasing?
- Must have clear treatment goals
- “Cross-talk” between water treatment/engineering firms and the Oil and Gas industry is evolving
- Service companies are stepping up

Key Challenges to Use of PW

- **Availability**-locations, volumes
- **Costs** to transport and treat
- **Infrastructure**
- **Investment**
- **Risk perception** and use acceptance
 - Industrial Uses-within the oil and gas industry
 - Other Human Uses-irrigation, industry, drinking
- **Environmental sustainability**
 - Handling waste from treatment (concentrate)
 - Non-impingement on fresh water resource
- **Regulations**-for use within and outside of oil and gas industry
- **Partnerships** with Industry and Localities



Industry and State Efforts



Fresh Water Management Team

Development & Management of Water Resources-Company Initiatives

- **Fresh Water Baseline**
- Obtained water analysis for all fresh water wells utilized
- Populating database
- Will monitor fresh water quality and fluid levels on semi-annual basis
- **Corporate-wide Water Management Team**
- Richard Crawford – NM Basins – Water Project Coordinator
- **Develop Water Reclamation “Best Practices” manual**
- **Outreach to Municipal and individual Fresh Water Stakeholders**
- Bench Marking (Permian Basin Water Management Council Member)



New Mexico Energy, Minerals, and Natural Resources Department

- Produced Water Working Group and Steering Committee (Governor’s Drought Task Force)
- Promoting reuse, recycling, and conservation within the industry
- Developing Produced Water Reuse Policies
- Coordination with Stakeholders (Oil and Gas, Municipalities, Regional Entities)

What is needed to reuse PW?

- Infrastructure
 - Pipelines (fixed or flexible)
 - Leak detection and monitoring
 - Lined ponds and larger storage tanks
 - Centralized treatment and handling facilities
- Treatments
 - Widely variable
 - Filtration
 - Pretreatments to remove boron, scale-forming minerals, organics
 - Desalination
 - Various products created
 - Concentrate (brine)
 - Fresh water
 - Other salinities for drilling

Path Forward

- Adapt regulations-EMNRD/OCD
- Build infrastructure-investments by companies
- Exchange information-best practices
 - Within the industry
 - Service companies (e.g., treatment)
 - State and industry
- Measure and understand results, benefits, impacts
 - Oil and Gas Industry
 - State agencies, Localities
 - Universities, National Labs
 - Other Stakeholders

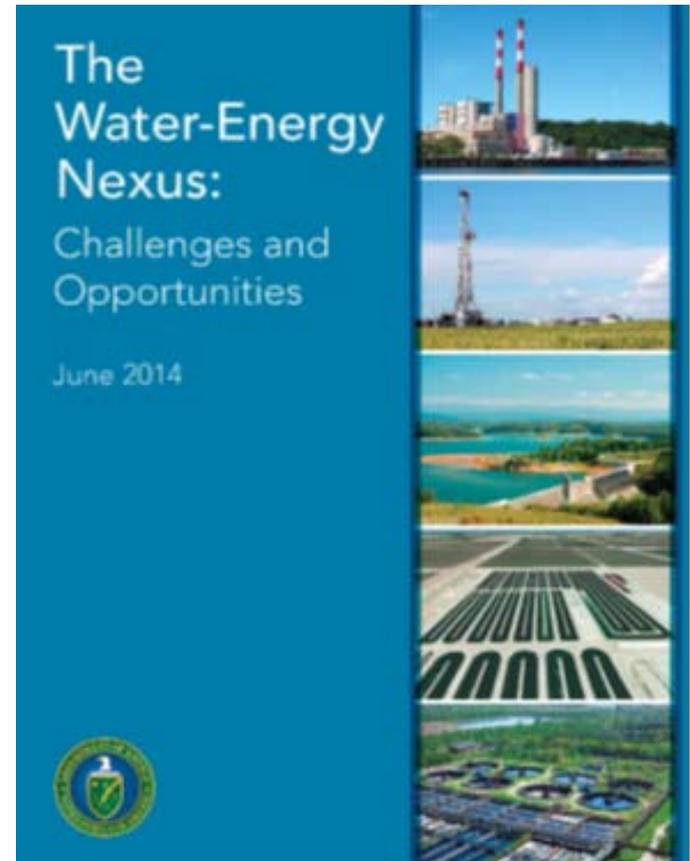
Energy-Water Nexus at DOE

DOE Water Energy Tech Team

Over 20 participants from all major DOE offices have worked for over a year and a half to develop a Water Energy Program Plan

Water Energy Program Plan

- Seven sections, 250 pages, June, 2014
- Very detailed and comprehensive report that includes:
- Landscape for regional and national decision making
- Sections on RD&D needs
- **Water for energy:** generation, exploration
- **Energy for water:** transport, treatment
- Policy issues and considerations
- Stakeholder engagement



"Dramatic Progress in the Water-Energy Nexus Is Required and Attainable"-DOE WETT

Southwest Energy-Water Challenges and Strategy Meeting

- **Motivation:**
 - Water Energy Program Plan and the Water-Energy Tech Team at DOE
 - Big Ideas Summit-Water Energy Nexus
 - One of the six Priority Areas for DOE
- **Focus Areas**
 - Non-traditional water resources
 - Climate and land use interactions and impacts
 - Interface between Natural and Engineered Systems
- **Path Forward**
 - Steering Committee forming
 - Buy-in from represented States
 - Develop management and Science strategies
 - Present plan and opportunities to DOE
- **Organizers**
 - Los Alamos and Sandia National Laboratories
- **Participants**
 - NM Energy Minerals and Natural Resources Department
 - NM Office of the State Engineer
 - Bureau of Reclamation
 - Bureau of Land Management
 - Regional Universities-
 - UNM, NMSU, NMT
 - U of Arizona, TAMU, UNLV, CSM
 - Oil and Gas Industry-NMOGA
 - NM Electric Utility-PNM



**Sandia
National
Laboratories**

