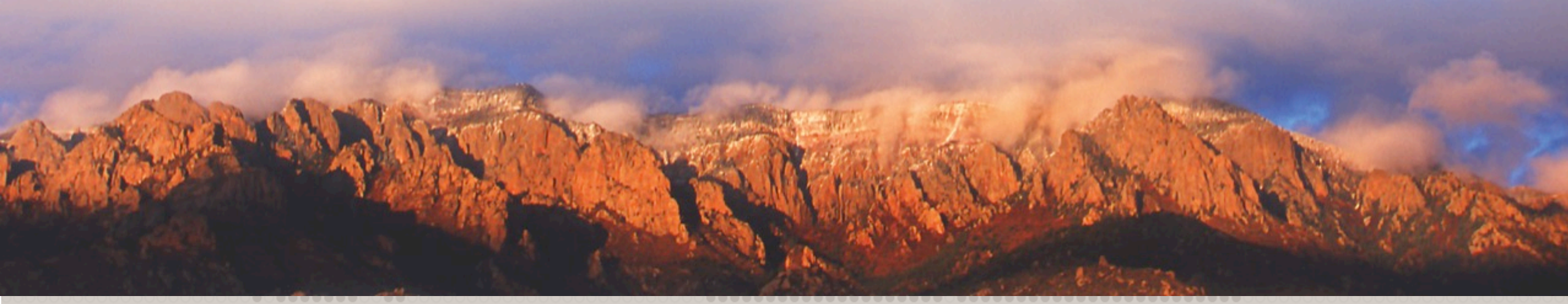

The Role of Desalination in Securing Our Water Future

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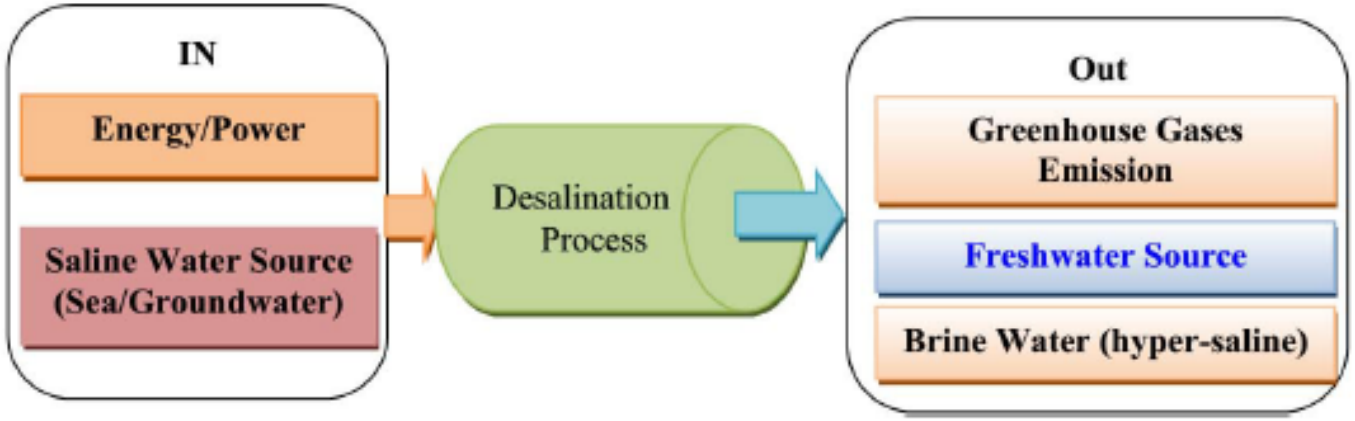
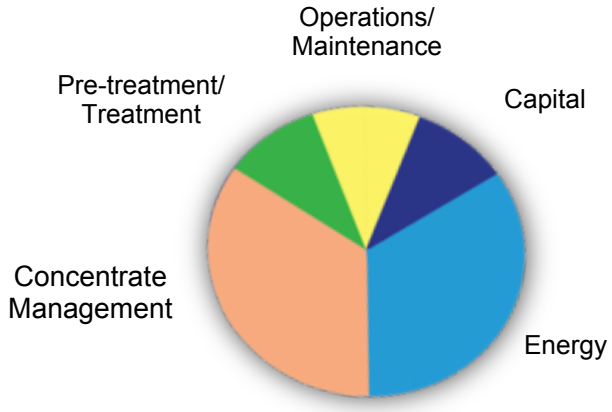
New Mexico Desalination Association

Three Major Myths of Desalination



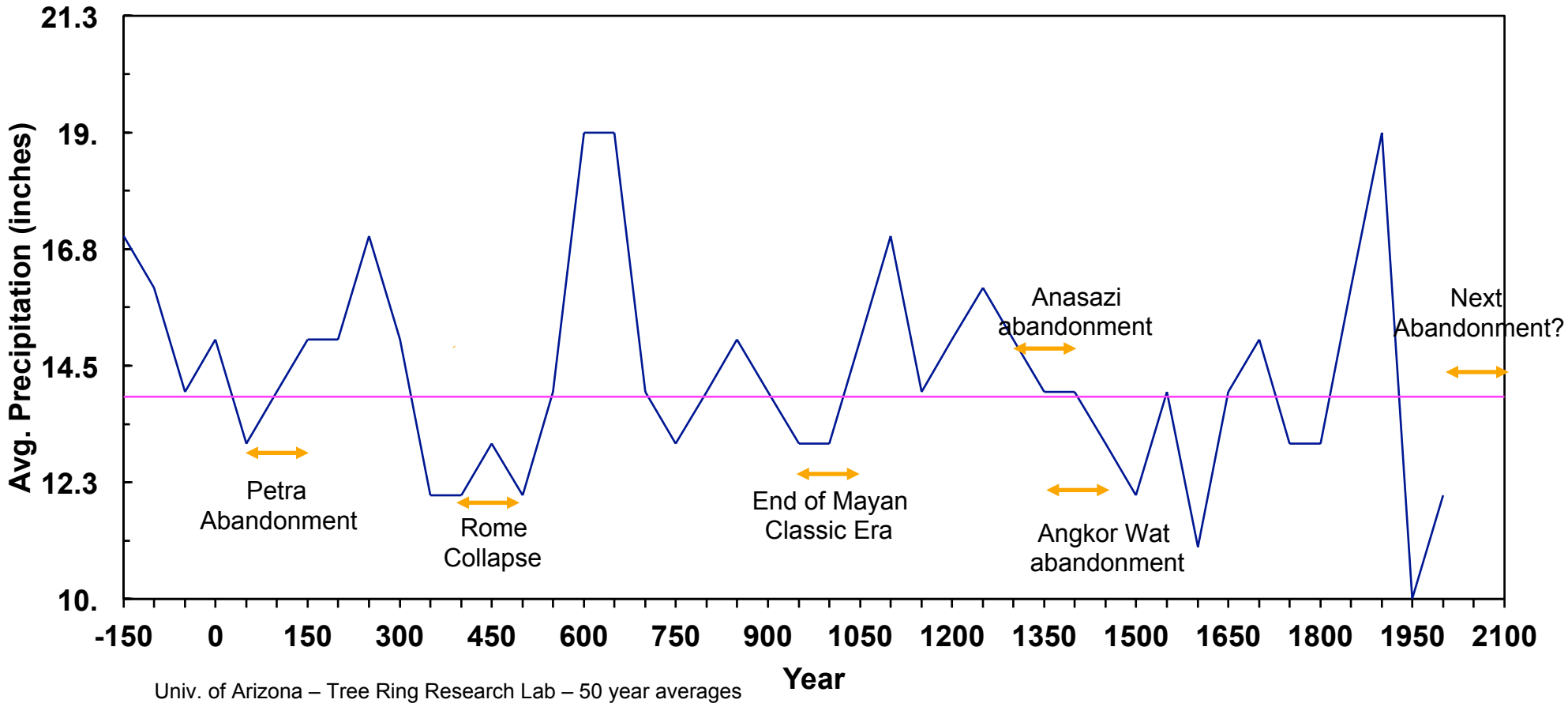
General Desalination Process



General Brackish Water Desalination Costs

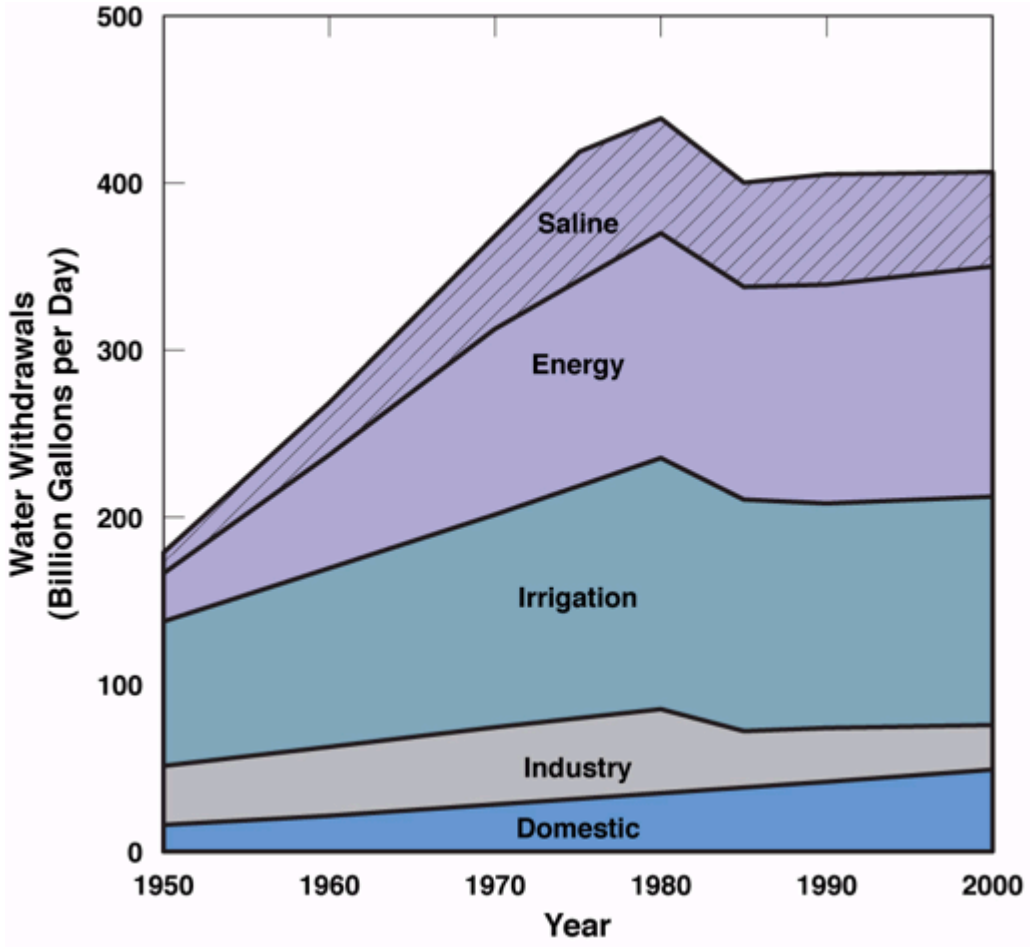
1. **Environmentally unfriendly**
2. **Too costly**
3. **Unsustainable**

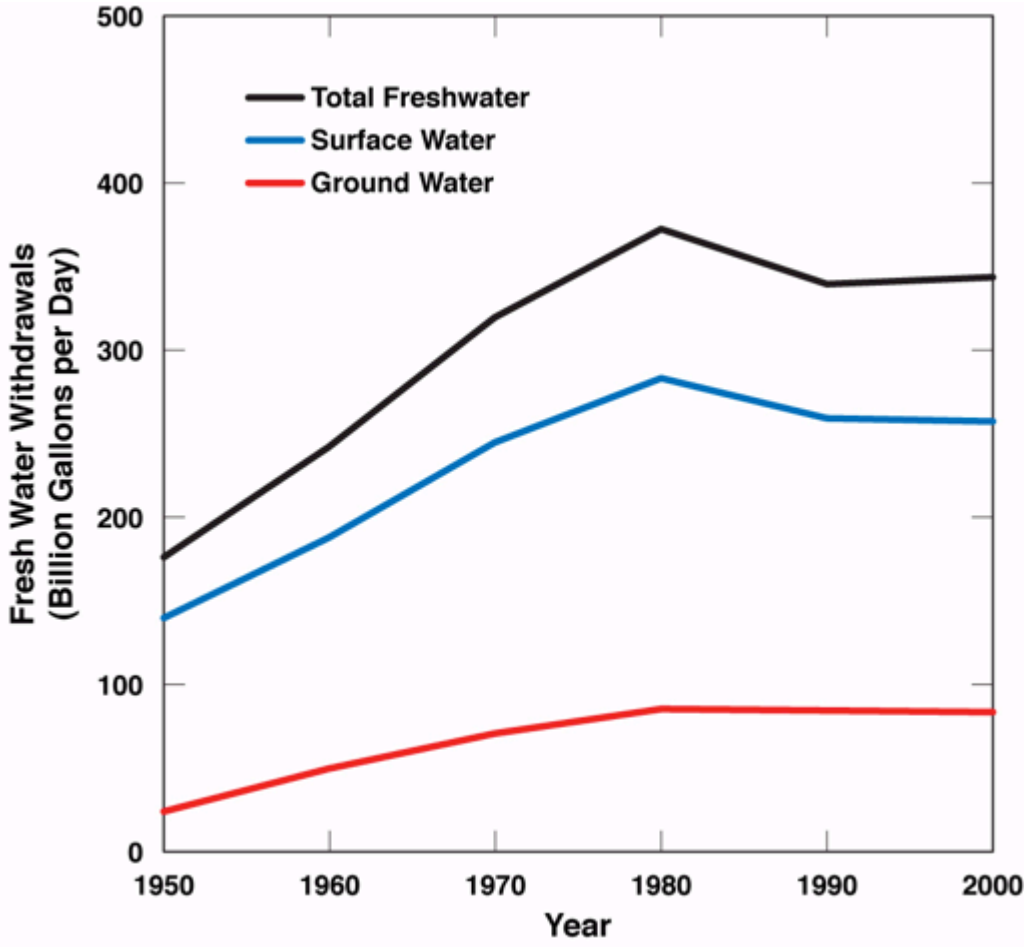
Southwest Climate History Based on Tree Ring Data



The southern U.S. and the mid-latitudes are in the 100th year of a 300 year arid cycle - which in the past has led to significant stress to mid-latitude civilizations

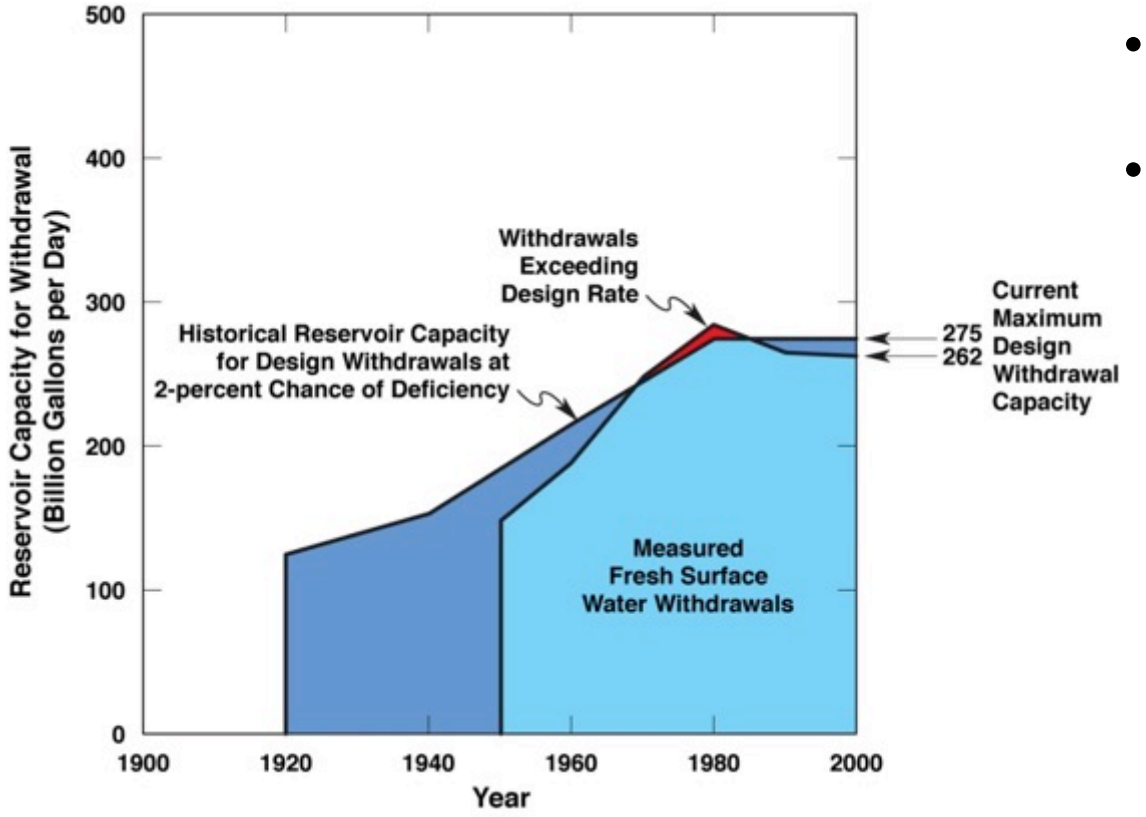
Water Withdrawal Trends in the U.S. by Sector





[USGS, 2004]

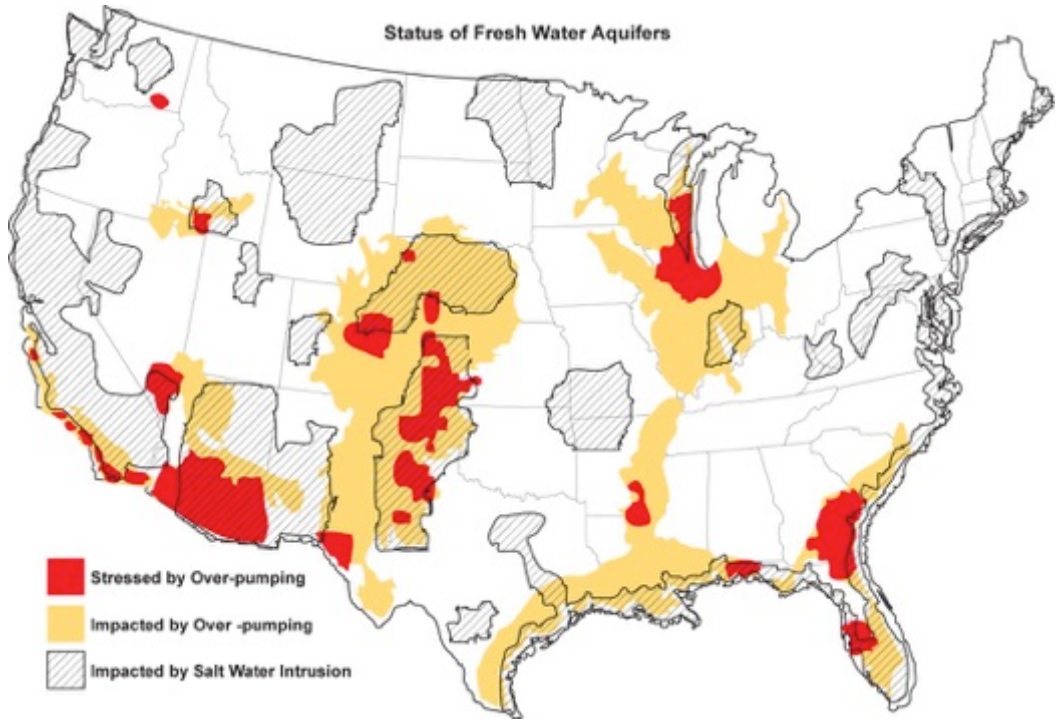
Growing Limitations on Fresh Surface and Ground Water Availability



(Based on USGS WSP-2250 1984 and Alley 2007)

- Many major ground water aquifers seeing reductions in water quality and yield

- Little increase in surface water storage capacity since 1980
- Concerns over climate impacts on surface water supplies

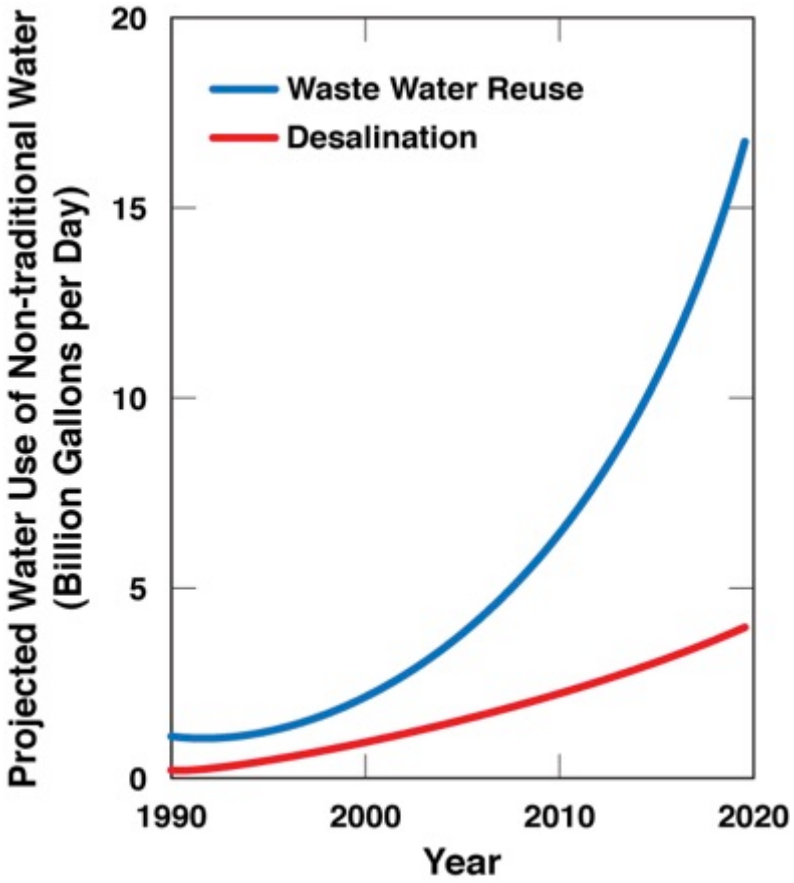


(Shannon 2007)

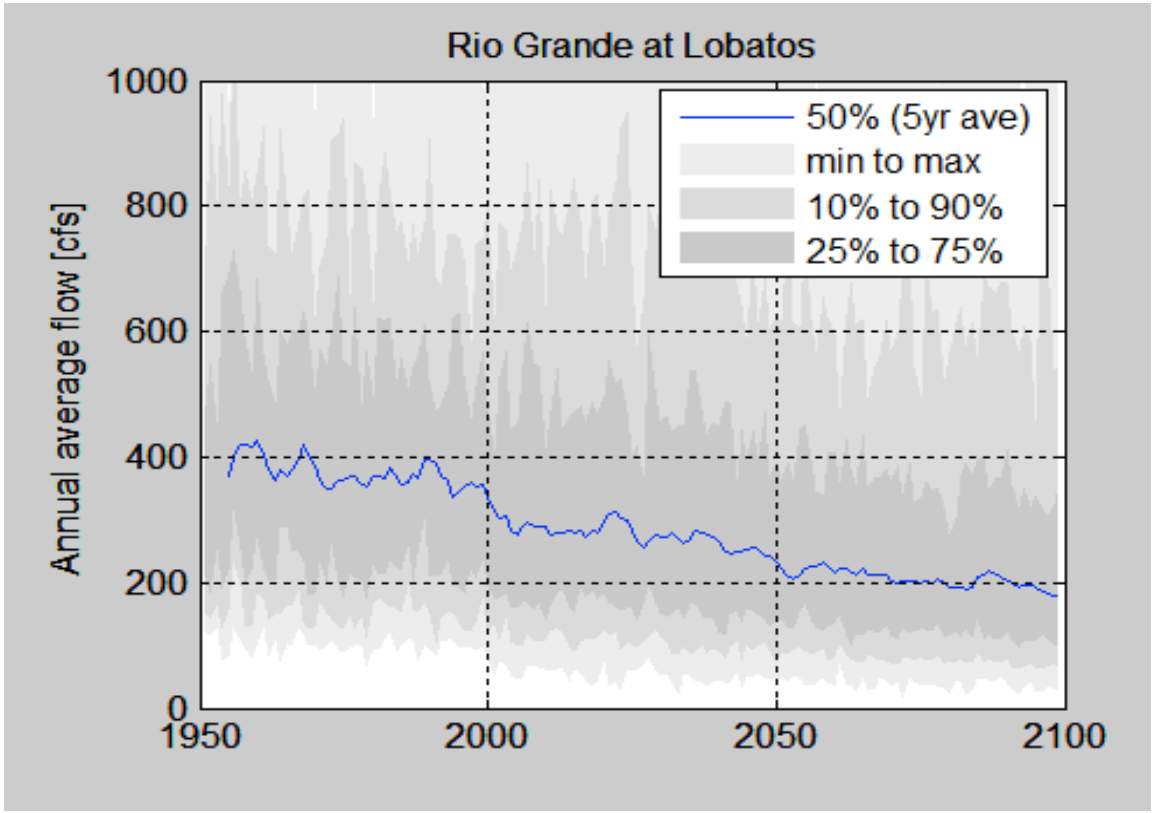
Energy Requirements of Various Water Resource Options

Water Supply Options	Energy Demand (kWhr/kgal)
Fresh Water Importation (100-300 miles)	10-18
Seawater Desalination w/Reverse Osmosis	12-20
Brackish Groundwater Desalination	
Reverse Osmosis Treatment	7-9
Pumping and concentrate management	1-3
Total	8-12
Aquifer Storage and Recovery	
Pre-treatment (as needed)	3-4
Post-treatment (as needed)	3-4
Pumping	2-3
Total	5-11

Growing Need to Use Non-traditional Waters



(Based on Water Reuse 2007, Mickley 2003)



(Based on BOR 2014 with Sandra support)

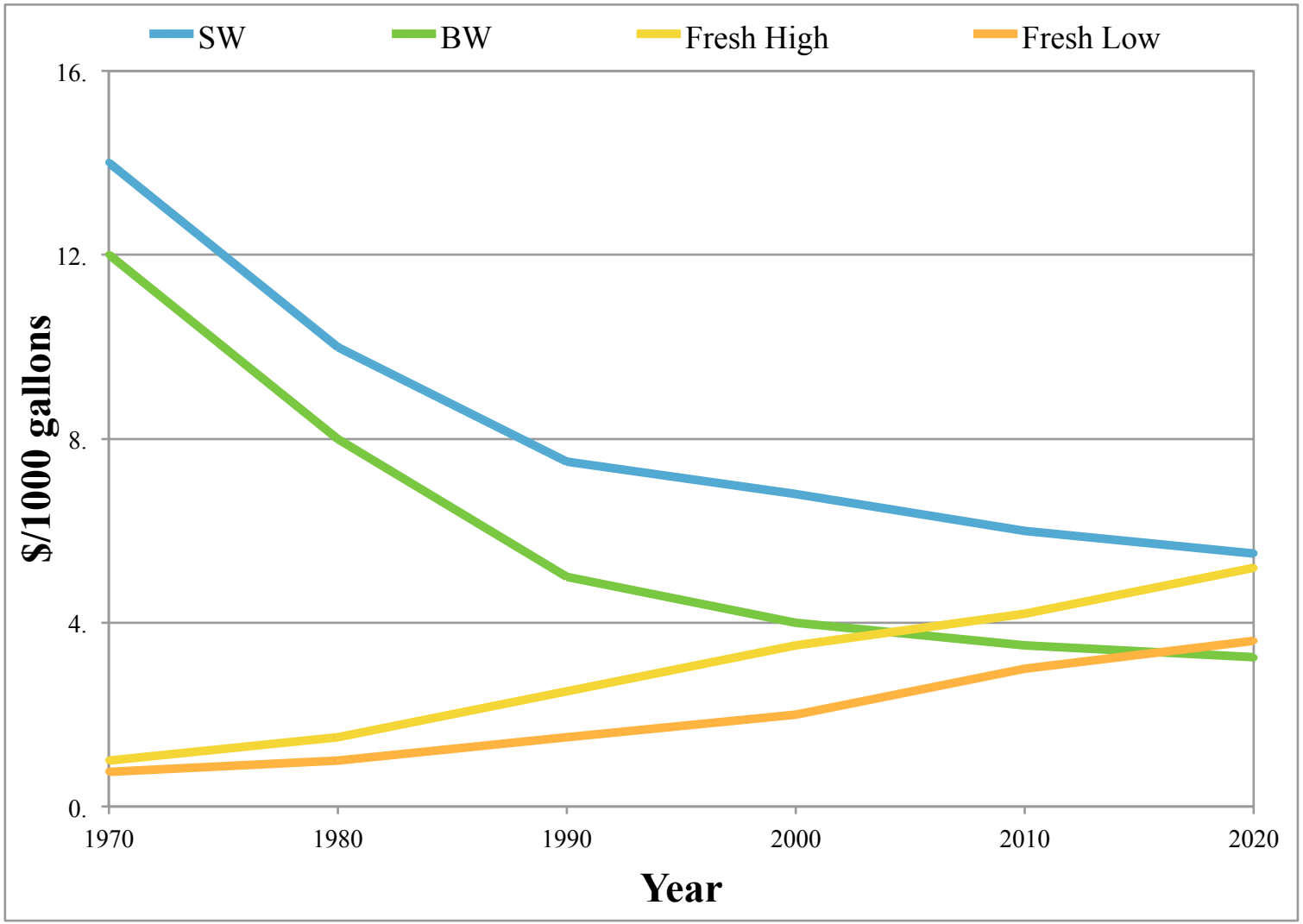
- Desal growing at 10% per year, waste water reuse at 15% per year
- Southwest fresh surface water flow availability reduced by 50% by 2100

Trends in Desalination and Fresh Water Development Costs

SW - Sea Water
- 35,000 ppm TDS

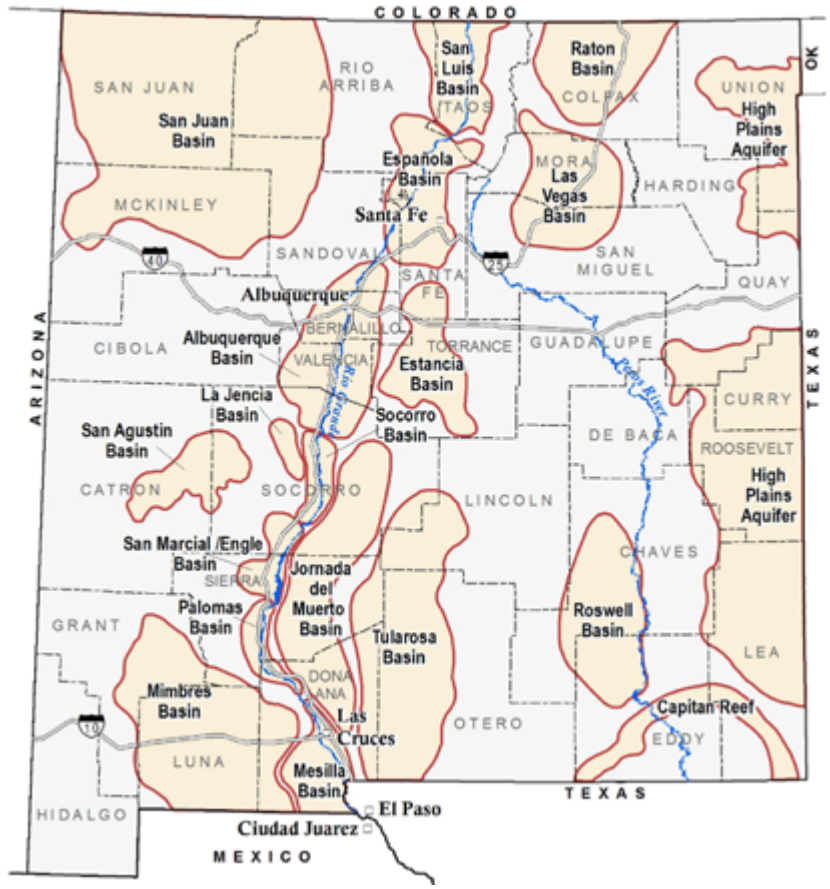
BW - Brackish Water
- 1500 - 6000 ppm TDS

Fresh Water
- 300 - 1000 ppm TDS



New Mexico Brackish Water Resources

- **New Mexico is estimated to have 15 billion acre feet of brackish ground water:**
  - **2 billion acre feet easily and economically treated for municipal use, and 2 billion acre feet for industrial use,**
  - **<u>300 year supply of water in many basins</u>,**
  - **All fresh water basins have zones of brackish water.**
- **Significant brackish and saline produced water generated in Permian and Delaware Basins in SE NM, and San Juan and Raton Basins in NW and NE NM.**
- **Large volumes of surface water and agricultural return flows with elevated salinity levels.**
- **Significant transboundary brackish surface and ground water resources.**



Overview of Fresh and Brackish Water Quality in New Mexico. New Mexico Bureau of Geology and Mineral Resources, OFR-583, New Mexico Tech, Socorro, NM, June 2016.