

# **NEW WATER FOR NEW MEXICO: THE ECONOMIC DEVELOPMENT CONNECTION**

**R. Keith Julian**

**Earth/Environment Scientist and**

**New Mexico Desalination Association Board Member**

# **NEW MEXICO'S ECONOMIC BASELINE**

- **NM Gross Domestic Product (GDP) in 2021: \$95.1 billion**
- **NM Annual GDP Growth Rate (2010-2020): 0.3%**
- **U.S. Annual GDP Growth Rate (2010-2020): 2.9%**
- **NM Annual Population Growth Rate (2010-2020): 0.2%**
- **U.S. Annual Population Growth Rate (2010-2020): 0.6%**
- **NM GDP Per Capita (2021): \$44,858**
- **U.S. GDP Per Capita (2021): \$61,280**
- **NM Economic Ranking in US (2021 GDP per capita): 38<sup>th</sup> out of 50**

# ECONOMIC SECTOR CONTRIBUTIONS TO NM GDP

- **Government services and enterprises: \$21.1 billion (22 % of total GDP)**
- **Finance, insurance, real estate: \$13.5 billion (14%)**
- **Professional and business services: \$11.5 billion (13%)**
- **Mining, minerals, and oil/gas production: \$10.9 billion (12%)**
- **Wholesale and retail sales/trade: \$9.5 billion (10%)**
- **Manufacturing and industrial R&D: \$4.7 billion (5%)**
- **Construction: \$3.1 billion (4%)**
- **Transportation and warehousing: \$2.5 billion (3%)**
- **Utilities/power generation and transmission: \$1.7 billion (2%)**
- **Agriculture (irrigated crops, dairy, livestock)\*: \$1.3 billion (1.4%)**

**\*denotes sector with greatest demand for water**

# NM'S WATER DEMAND BY ECONOMIC SECTOR

- Irrigated Agriculture and Croplands (76%)
- Public Water/Municipal Supply Systems (9%)
- Evaporation from Surface Water Supply (8%)
- Mining and Oil/Gas Activities (3%)
- Electric Power Generation (2%)
- Commercial and Transportation Activities (2%)
- Livestock and Dairy Operations (1%)
- Private Domestic Water Supply (<1%)
- Manufacturing and Industrial Activities (<1%)
- NM Total Average Annual Demand: ~3.15 million acre feet

# **POSSIBLE OR LIKELY FUTURE NON-ECONOMIC DEMANDS FOR NM WATER**

- **Pueblo and Tribal Prior-rights Claims**
- **Adjudication of Over-appropriated Existing NM Water Rights**
- **Inter-state and International Claims and Revised Settlements**
- **Expansion of NM's Strategic Water Reserve**
- **Newly-mandated Environmental Conservation Claims or Critical Habitat Projects**
- **Expanded Demographic Demand (population growth, increased per capita consumption, rejection of conservation mandates, etc.)**
- **Decreased Water Supply Resulting From Climate Change**
- **Total Potential Decrease From Non-economic Demands: ~1 million-10 million acre-feet**

# **NM'S EXISTING WATER STATUS ( SUPPLY VS DEMAND )**

- **Estimated Average Annual Conventional Water Supply: ~3.0 million acre-feet**
- **Estimated Average Annual Conventional Water Demand: ~3.15 million acre-feet**
- **Approximate Average Annual Water Deficit: ~150,000 acre-feet**
- **Average Annual Conventional Water Demand Per Capita: ~1.5 acre-feet**
- **Potential Total Non-economic Demand: 1-10 million acre-feet (0.3-3.0 x existing supply)**
- **Significant Imbalance Between Sector Water Demand and Contribution to NM's GDP**  
**(e.g., irrigated agriculture/livestock/processing produces ~2% of GDP but uses ~79% of water supply; manufacturing/industrial uses <1% of water but produces ~5% of GDP)**
- **Existing Water Rights Value in New Mexico: ~\$1000 to \$30,000 per acre-foot**
- **Estimated "Unconventional" Water Supply: 2-3 billion acre-feet**
- **Potential Future Economic Value of Unconventional Water: ???**

# **POTENTIAL UNCONVENTIONAL SOURCES OF “NEW WATER” FOR ECONOMIC DEVELOPMENT**

- **Desalination of Brackish Groundwater**
- **Municipal and Industrial Water Reuse**
- **Utilization of Produced Water from Oil/Gas Extraction**
- **More Efficient Agricultural Applications and Runoff Reuse**
- **Widespread Fallowing of Irrigated Cropland**
- **Prevention or Reduced Evaporation of Surface Water Supplies**
- **Increased Conservation of Existing Supply**
- **Total Potential Unconventional Water Available: ~2-3 billion acre-feet**

# **WATER-DEPENDENT NEW AND EXPANDED ECONOMIC DEVELOPMENT OPPORTUNITIES**

- **Energy Production**—creation of “hydrogen hubs”, pumped-storage hydroelectric power generation/storage, HDR geothermal systems, carbon-sequestration
- **Agriculture**—increased production of high value crops (e.g., fruits/vegetables, cannabis), less dependence on water-intensive crops (e.g., hay and alfalfa), greater use of range-grazed livestock
- **Mining and Extraction**—in-situ mineral extraction (e.g., lithium, uranium, and rare earth mineral production), brine concentrate mineral recovery
- **Manufacturing**—fertilizer, cement, renewable energy components, next-generation micro-chips, metal and plastic recycling, chemicals, batteries
- **Transportation Applications**—“clean corridor” road and rail networks, carbon-free aviation fuels, interstate water-export pipelines, helium-processing
- **Expanded Tourism Opportunities**—outdoor recreation, esp. water sports



# **NEW WATER: WHAT DETERMINES WHICH, WHERE, AND HOW MUCH?**

- **Free-market Forces (“supply and demand’ solution)**
- **Adjudication By Existing/Revised “Water Law” (legal solution)**
- **Federal or State Legislative-based Allocations (political solution)**
- **New Technologies and Resource Economies (technical solution)**
- **Likely to be a combination of “all the above”**

**Or, if no action is taken:**

- **Ongoing climate change and “status quo” non-solutions will result in future economic decline and lower economic status for NM**

# **SUMMARY: THE UGLY, THE BAD, AND THE GOOD (FOR NM'S ECONOMIC DEVELOPMENT)**

- **The Ugly News:** There is likely to be significant increased future demand on New Mexico's existing water supply, mostly from non-economic sources
- **The Bad News:** New Mexico's economy will not grow without new water; in fact it will likely decline as a result of decreasing existing supply and increasing non-economic demand
- **The Good News:** There are ample potential new sources and unconventional supplies of water available in New Mexico, but they have to be pursued and developed--beginning now and in the near future

# QUESTIONS AND/OR COMMENTS



# **DATA SOURCES FOR BASELINE AND PROJECTED USES OF “NEW WATER”**

- **Bureau of Economic Analysis, U.S. Department of Commerce**
- **New Mexico Department of Economic Development**
- **New Mexico Department of Energy, Minerals, and Natural Resources**
- **New Mexico Environment Department**
- **New Mexico Office of the State Engineer**
- **New Mexico Produced Water Research Consortium**
- **New Mexico Water Resources Research Institute**
- **“NM Water Use By Categories, 2015” NMOSE**
- **“NM’s Strategic Economic Plan—Empower and Collaborate, 2021”**
- **“Draft NM 50-year Water Plan, 2022”**