

New Water

For New Mexico

CONFRONTING THE MEGADROUGHT AND MORE



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**EARTH AND ENVIRONMENTAL SCIENCE EDUCATOR**

## ABOUT ME — R. KEITH JULIAN

- BA in Economics and Natural Sciences from Harvard University
- PhD in Earth and Environmental Science at UCLA
- Educator for over 50 years
- Published over 75 scientific papers
- Consulted for environmental and energy projects around the world
- Serving on the New Mexico Desalination Association Board of Directors



# What Is MegaDrought?

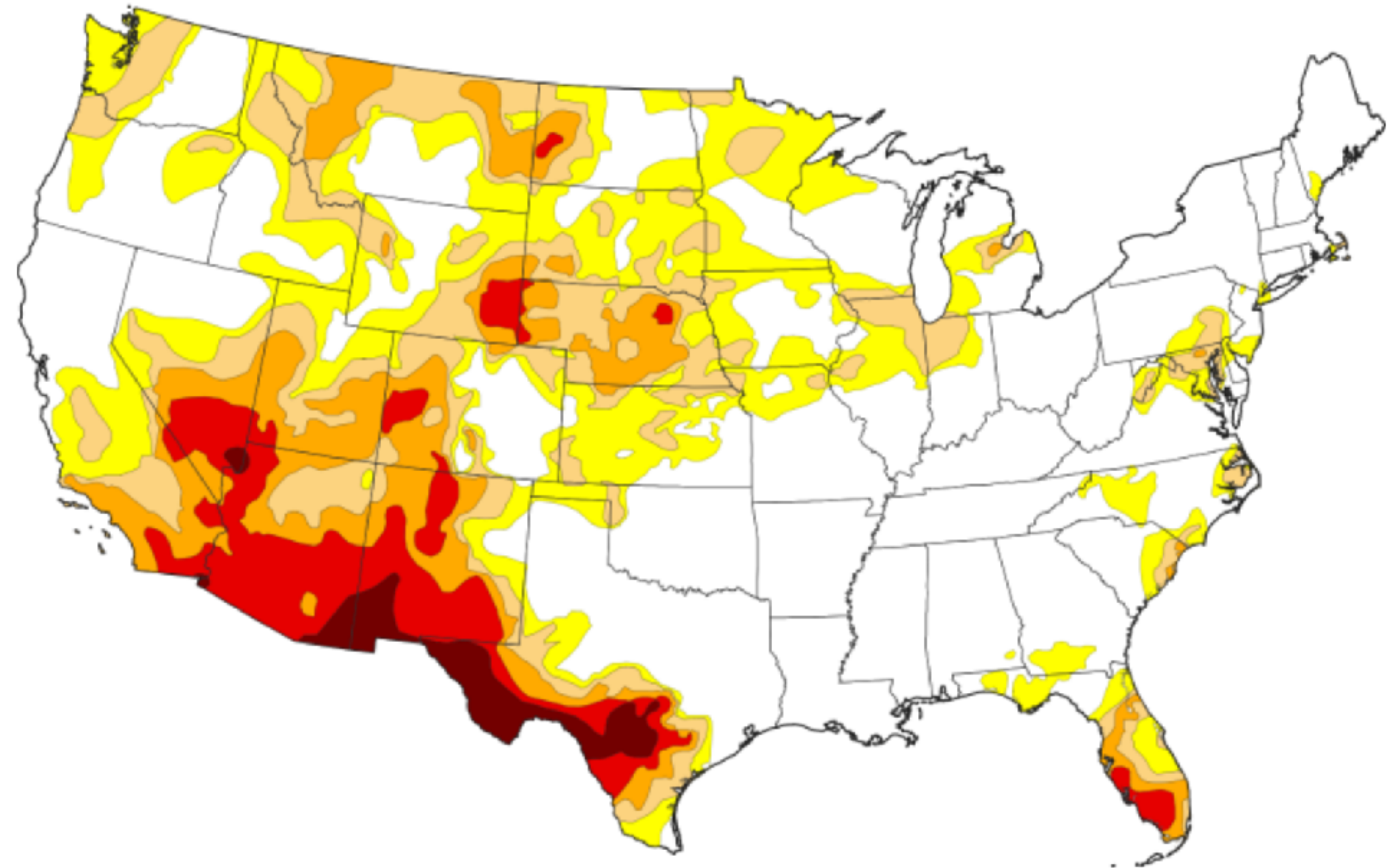
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# How Bad Is It?

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# What Can We Do?

## U.S. Drought Monitor



### U.S. Drought Monitor Categories



Source(s): NDMC, NOAA, USDA  
Updates Weekly: 05/27/25

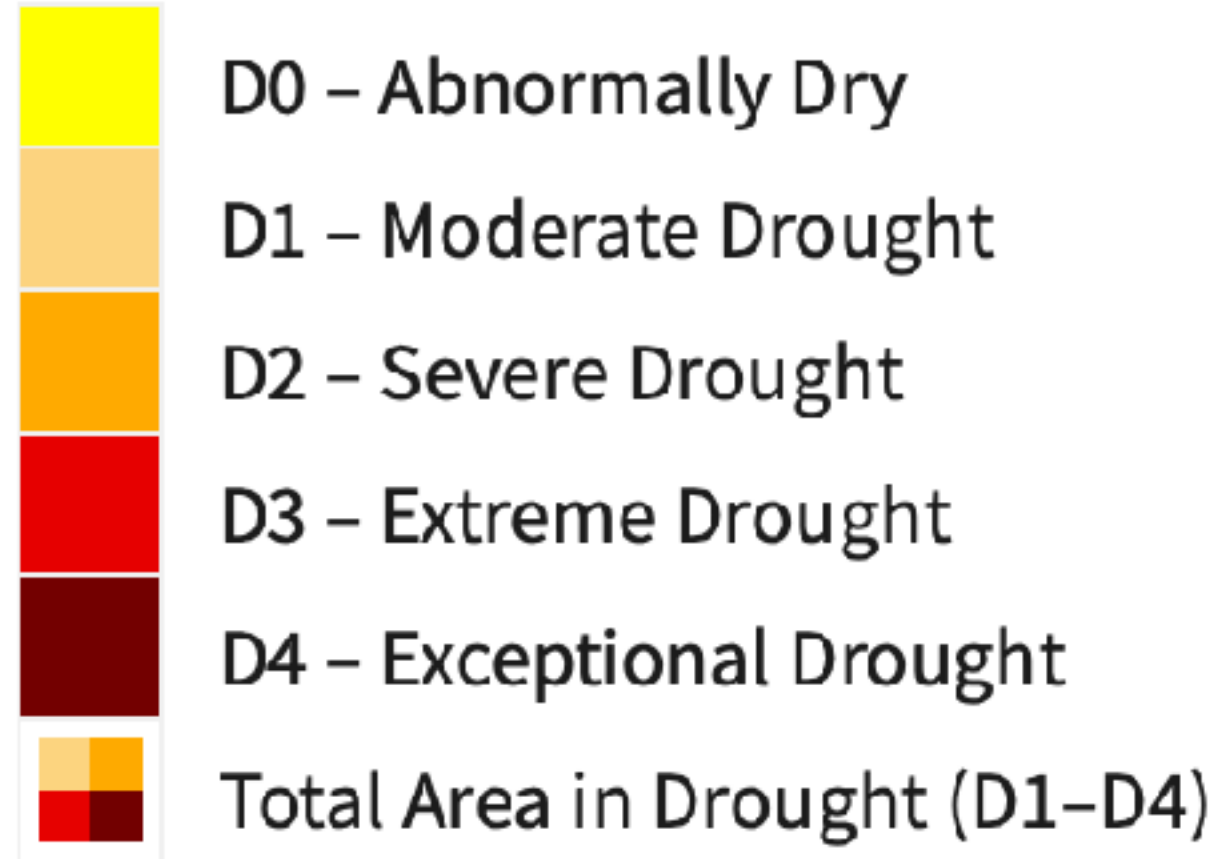
**Drought.gov**





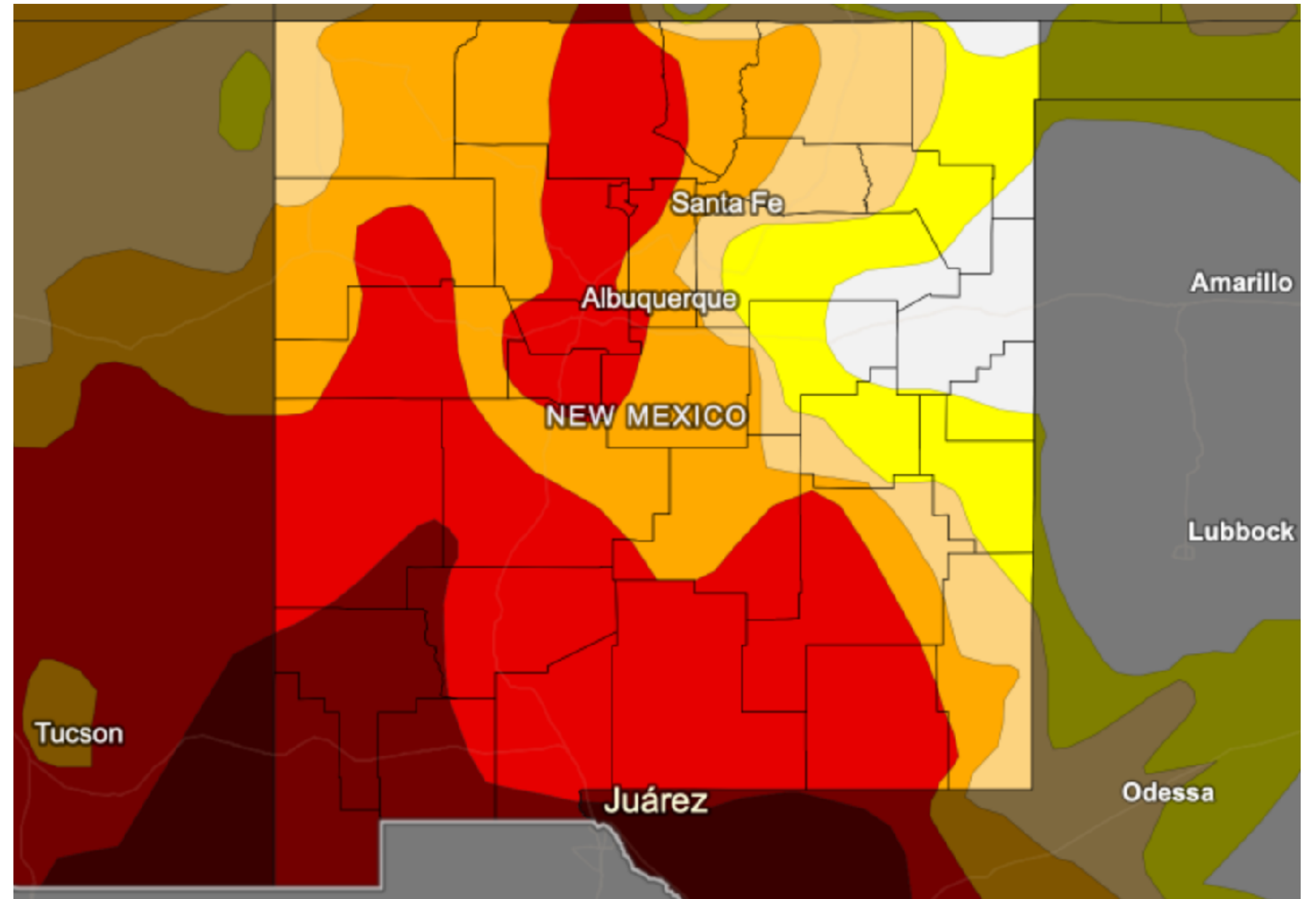
# DROUGHT CONDITIONS IN NEW MEXICO

## Drought & Dryness Categories



## % of NM

<b>10.1%</b>
<b>11.3%</b>
<b>25.3%</b>
<b>38.1%</b>
<b>9.7%</b>
<b>84.3%</b>



**Drought.gov**

Source(s): NDMC, NOAA, USDA  
Updates Weekly: 05/27/25

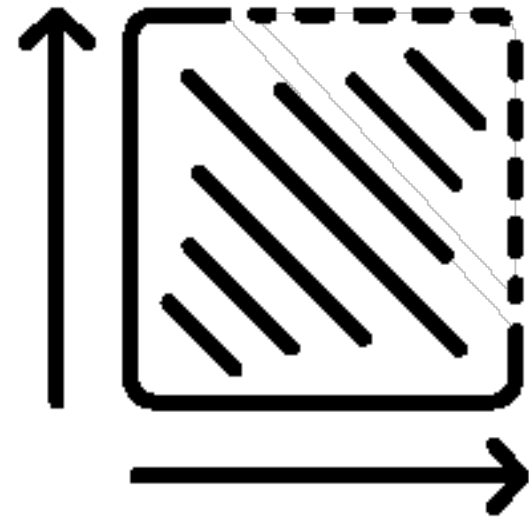
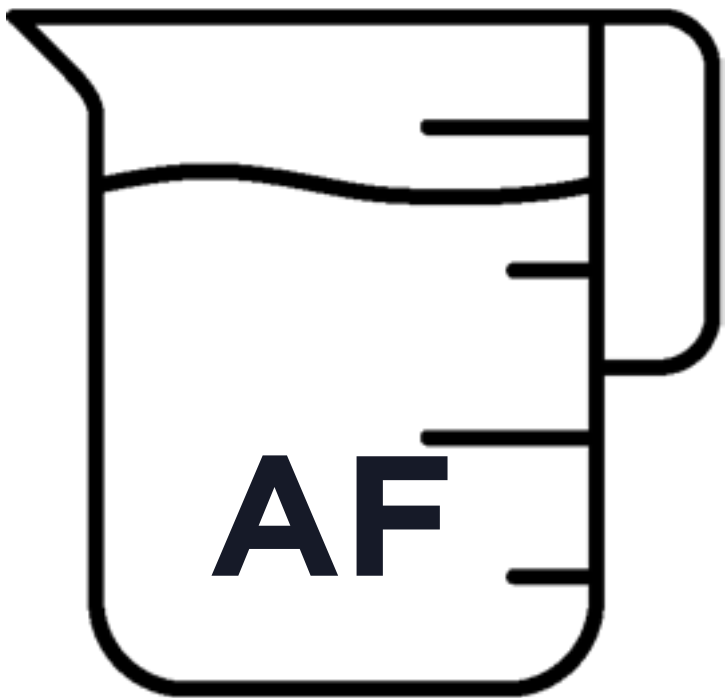
# CONVENTIONAL WATER SOURCES

1. SURFACE WATER

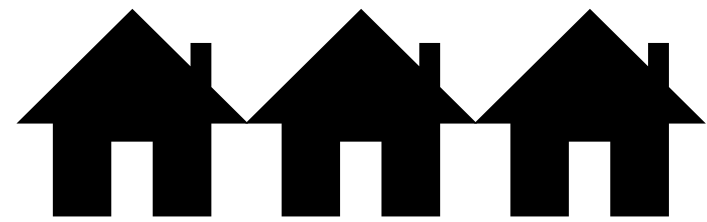
2. GROUNDWATER



# HOW WATER IS MEASURED: ACRE-FOOT (AF)












1 acre filled with 1 foot deep of water  
= **326,000 gallons**



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Annual Water Use/Demand  
for 3 Households

# WATER DEMAND BY ECONOMIC SECTOR IN NM

SECTOR	WATER DEMAND	AF/YEAR
 AGRICULTURE + CROPLAND	75%	2,900,000 AF
 PUBLIC DOMESTIC H <sub>2</sub> O SUPPLY	9%	330,000 AF
 EVAPORATION OF SURFACE WATER STORAGE	8%	270,000 AF
 MINING + OIL/GAS	3%	104,000 AF
 ELECTRIC POWER GENERATION/ EVAPORATIVE COOLING	2%	76,000 AF
 COMMERCIAL + TRANSPORT	2%	70,000 AF
 LIVESTOCK AND DAIRY	1%	37,000 AF
 PRIVATE DOMESTIC H <sub>2</sub> O SUPPLY	<1%	31,000 AF
 MANUFACTURING AND INDUSTRIAL ACTIVITIES	<1%	28,000 AF

**3.85** MILLION AF  
TOTAL ANNUAL AVERAGE  
[2015-2024]

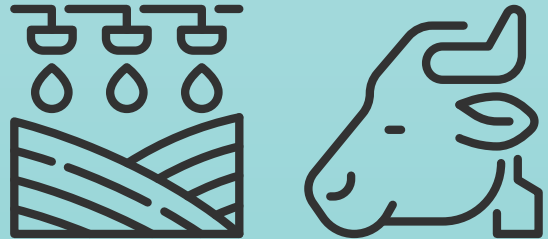
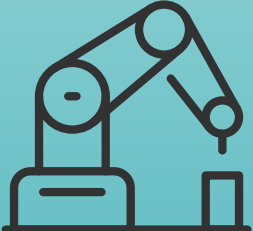

# 2025 NM WATER SUPPLY VS. DEMAND

**3.5 MILLION AF WATER SUPPLY**  
**3.85 MILLION AF WATER DEMAND**

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**– 350,000 AF WATER DEFICIT [ = –10% ]**

# WATER DEMAND VS. GDP CONTRIBUTION

SECTOR	WATER DEMAND	NM GDP
 AGRICULTURE + LIVESTOCK	77%	<2%
 MANUFACTURING	<1%	5%
 MINING + OIL/GAS	2%	13%

# POTENTIAL FUTURE NON-ECONOMIC WATER DEMANDS

- DECREASED WATER SUPPLY RESULTING FROM CLIMATE CHANGE AND PROLONGED DROUGHT
- ADJUDICATION AND REDUCTION OF OVER-APPROPRIATED EXISTING WATER RIGHTS
- PUEBLO AND TRIBAL PRIOR-RIGHTS CLAIMS (“FIRST IN TIME, FIRST IN LINE”)
- REVISION OF INTER-STATE RIVER COMPACTS/SETTLEMENTS (COLORADO, RIO GRANDE, PECOS)
- MANDATED NATURAL RESOURCE WATER CONSERVATION AND CRITICAL HABITAT DESIGNATIONS
- INCREASED DEMOGRAPHIC DEMAND (E.G., POPULATION GROWTH, GREATER PER-CAPITA USE)

## POTENTIAL FUTURE ANNUAL DECREASE

1-10

MILLION AF/YEAR

## POTENTIAL FUTURE NON-ECONOMIC DEMAND

30%–300%

OF CURRENT WATER SUPPLY



**WHAT ARE WE GOING TO DO?!?**

**— GOOD NEWS —**

**NEW MEXICO HAS AMPLE  
UNCONVENTIONAL WATER SOURCES!**

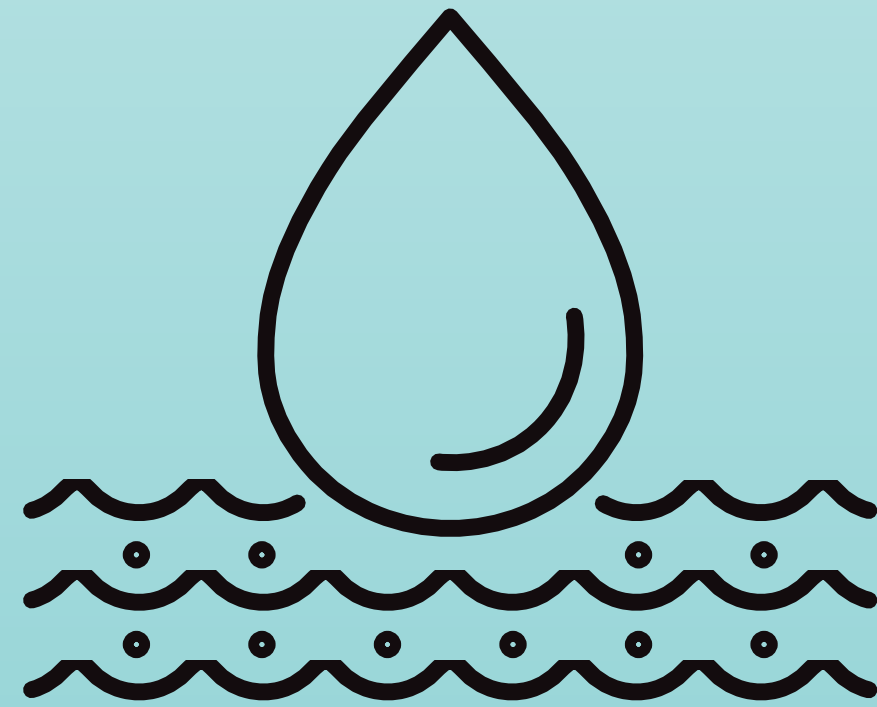
# CONVENTIONAL WATER SOURCES

1. SURFACE WATER

2. GROUNDWATER



# UNCONVENTIONAL WATER SOURCES: NEW WATER

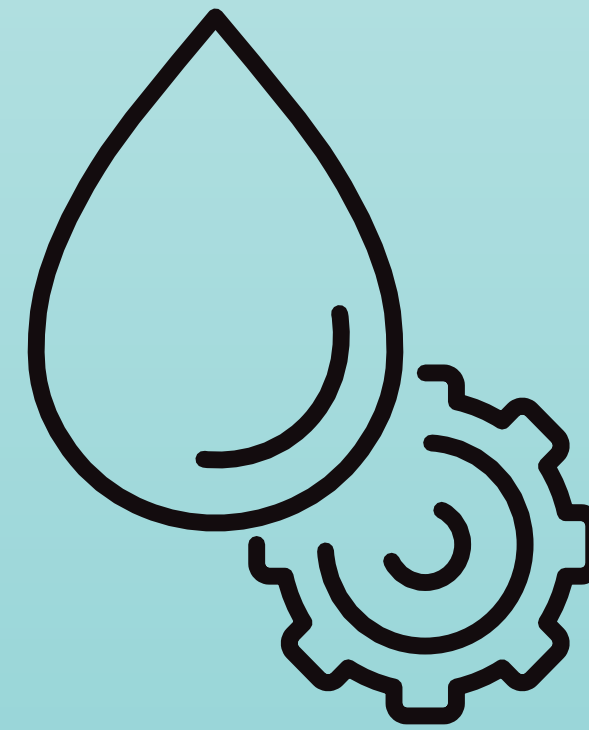


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## BRACKISH WATER

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- DEEP GROUNDWATER
- >2500 FT.
- 1000-10,000 PPM TDS

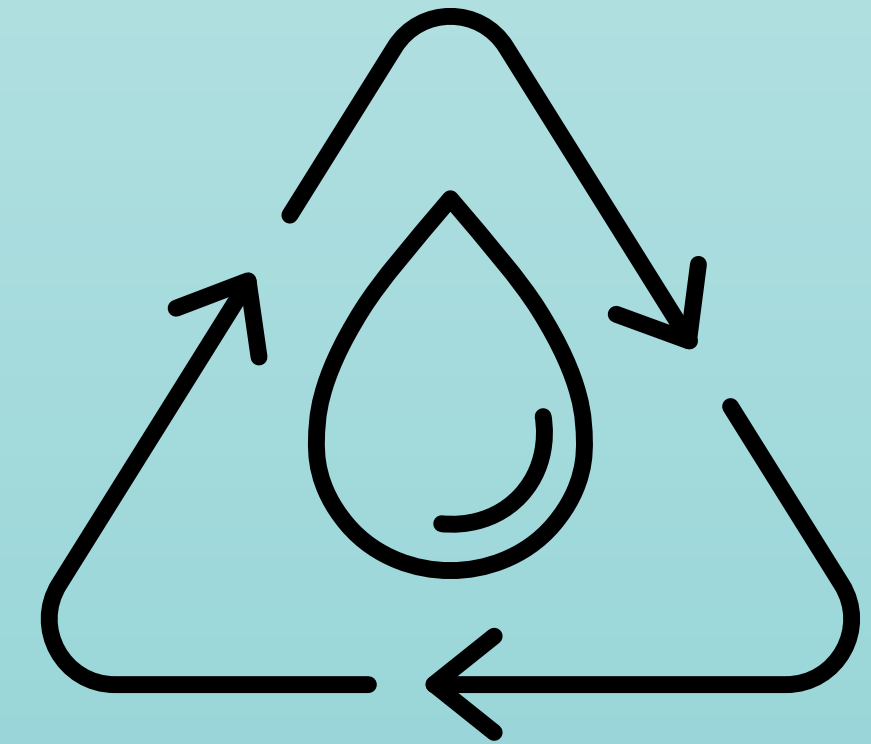


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## PRODUCED WATER

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- BY PRODUCT OF OIL/GAS EXTRACTION
- 1 BARREL OIL : 3-10 BARRELS OF WATER



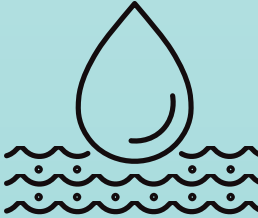
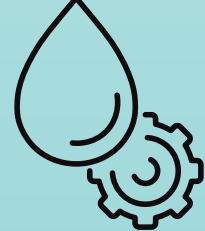

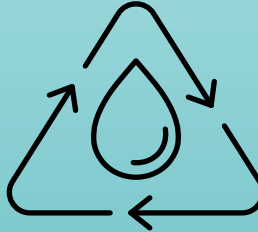
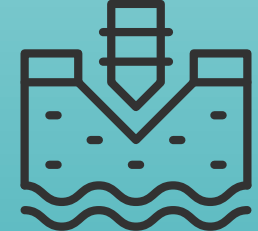
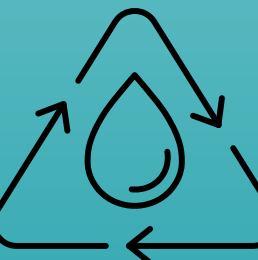

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## RECLAIMED/REUSED WATER

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- TOILET TO TAP
- PURPLE PIPE WATER
- ALREADY IMPLEMENTED

# ADDITIONAL AF/YEAR FROM NEW WATER FOR NM

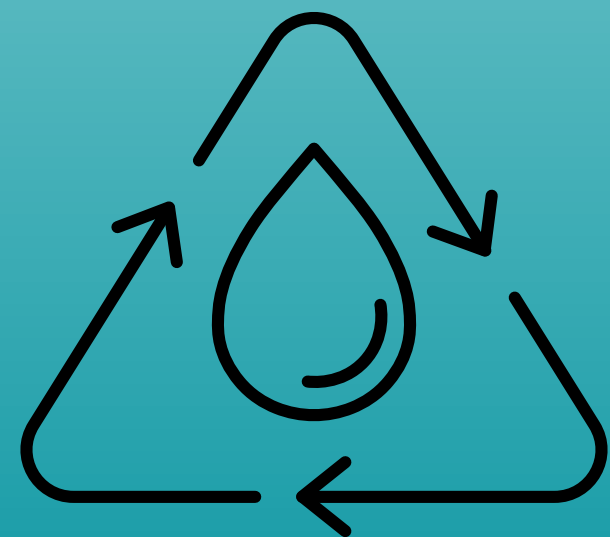
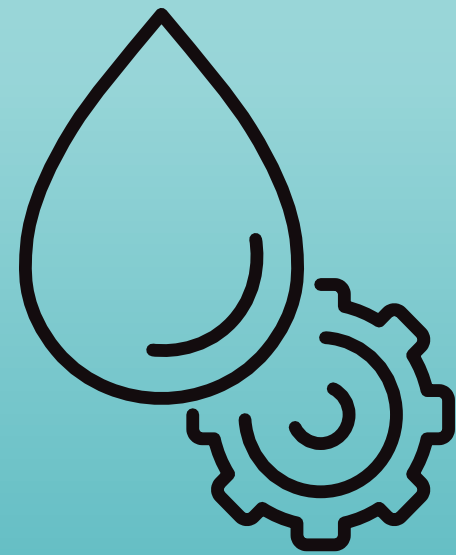
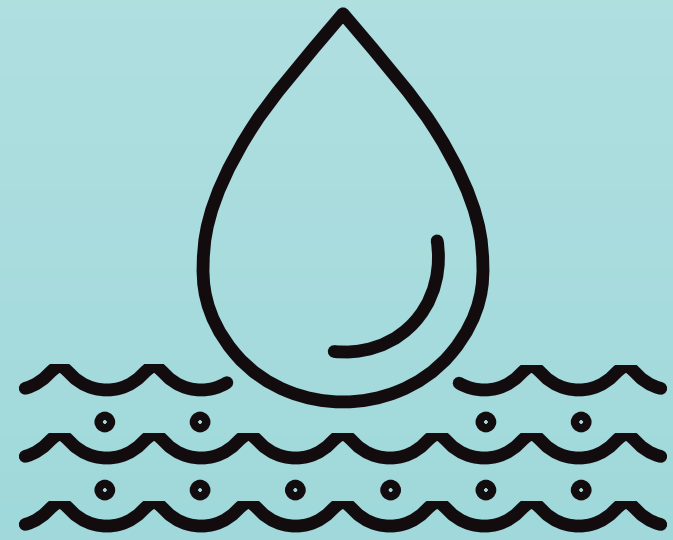
SECTOR	AF/YEAR	PRO/CON
 <b>DESALINATED BRACKISH GROUNDWATER</b>	>3,000,000 AF	GREATEST POTENTIAL SOURCE
 <b>TREATED PRODUCED WATER FROM OIL/GAS EXTRACTION</b>	~300,000 AF	CONTROVERSIAL
 <b>FALLOWING OF LOW-VALUE IRRIGATED CROPLAND</b>	~100,000-500,000 AF	EXPENSIVE
 <b>MUNICIPAL AND INDUSTRIAL WASTEWATER RECLAMATION</b>	~100,000 AF	LIMITED
 <b>REDUCED SURFACE EVAPORATION USING GROUNDWATER STORAGE</b>	~100,000 AF	COSTLY
 <b>MORE EFFICIENT AGRICULTURAL APPLICATIONS AND RUNOFF REUSE</b>	~100,000 AF	FEASIBLE
 <b>CONSERVATION OF EXISTING MUNICIPAL/LANDSCAPE IRRIGATION USES</b>	~50,000 AF	ECONOMICAL

**TOTAL AVAILABLE NEW WATER**

**>4**

**MILLION AF/YEAR**

# UNCONVENTIONAL WATER SOURCES: NEW WATER



**POTENTIAL AVAILABLE  
“NEW WATER”**

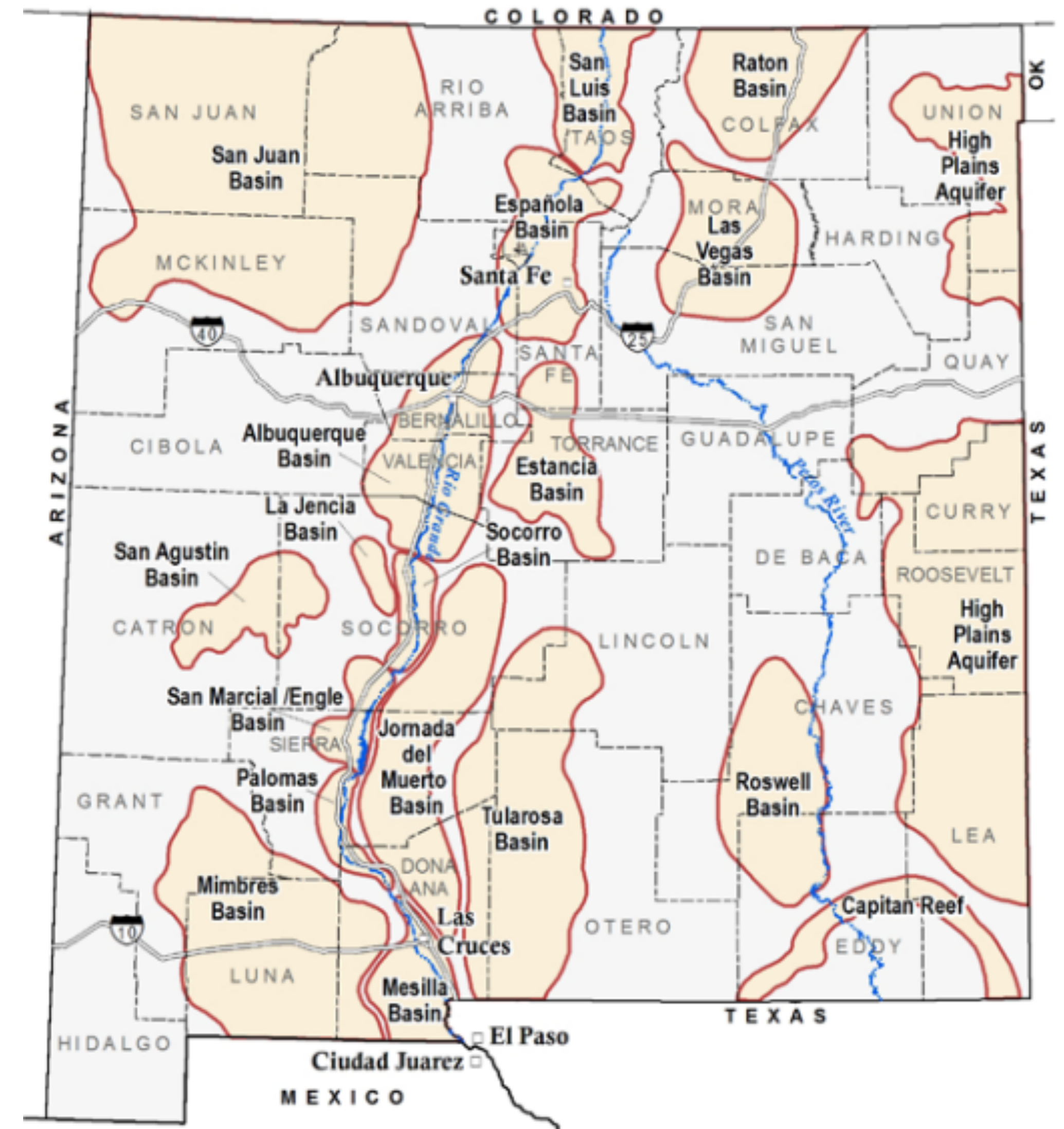
**3-5**  
BILLION AF

**POTENTIAL LONG-TERM  
RESOURCES**

**500-1,500**  
YEAR SUPPLY

# GREATEST POTENTIAL: BRACKISH GROUNDWATER (BG)

- AVAILABLE EXISTING RESOURCE IN MAGNITUDE GREATER THAN ANY OTHER AVAILABLE WATER SOURCE (CONVENTIONAL OR UNCONVENTIONAL)
- STATEWIDE DISTRIBUTION OF 20+ MAJOR BG BASINS AND AQUIFERS
- MOST BG AQUIFERS LOCATED IN OR NEAR HIGH-DEMAND USE AREAS IN NEW MEXICO (I.E., RIO GRANDE CORRIDOR)
- NOW ECONOMICAL AND EASY TO TREAT BG UTILIZING NM'S ABUNDANT RENEWABLE ENERGY SUPPLIES
- MODERN DESALINATION TREATMENT TECHNOLOGIES TRANSFORM BG INTO A WIDE RANGE OF "FIT-FOR-USE" APPLICATIONS—FROM DRINKING WATER TO INDUSTRIAL TO AGRICULTURE
- WATER RIGHTS ADJUDICATION NOT REQUIRED FOR DEEP BG



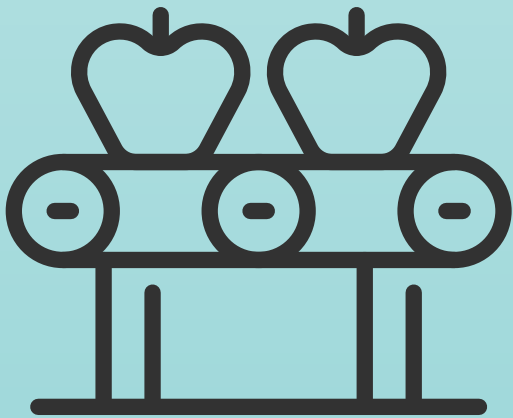
# NEW WATER = NEW ECONOMIC OPPORTUNITIES



**EXPORT SURPLUS NEW WATER**



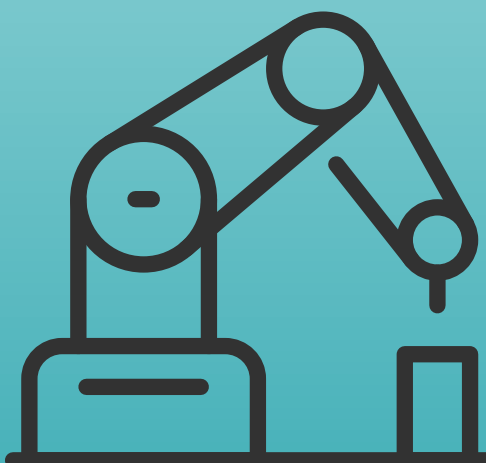
**DATA CENTERS**



**HIGH-VALUE CASH CROPS**



**MINING + MINERALS**



**MANUFACTURING**



**EXPANDED OUTDOOR RECREATIONAL TOURISM**

# CONCLUSION: THE GOOD, THE BAD, AND THE UGLY

## GOOD NEWS

New Mexico has ample  
unconventional water sources!

The conditions are right to verify and develop.

# CONCLUSION: THE GOOD, THE BAD, AND THE UGLY

## **BAD NEWS**

New Mexico economy will decline if we do not address our water issues soon!

# CONCLUSION: THE GOOD, THE BAD, AND THE UGLY

## UGLY NEWS

Time is of the essence!

The future non-economic demand alone is 30%–300% above our available conventional water supply.

We cannot wait!

