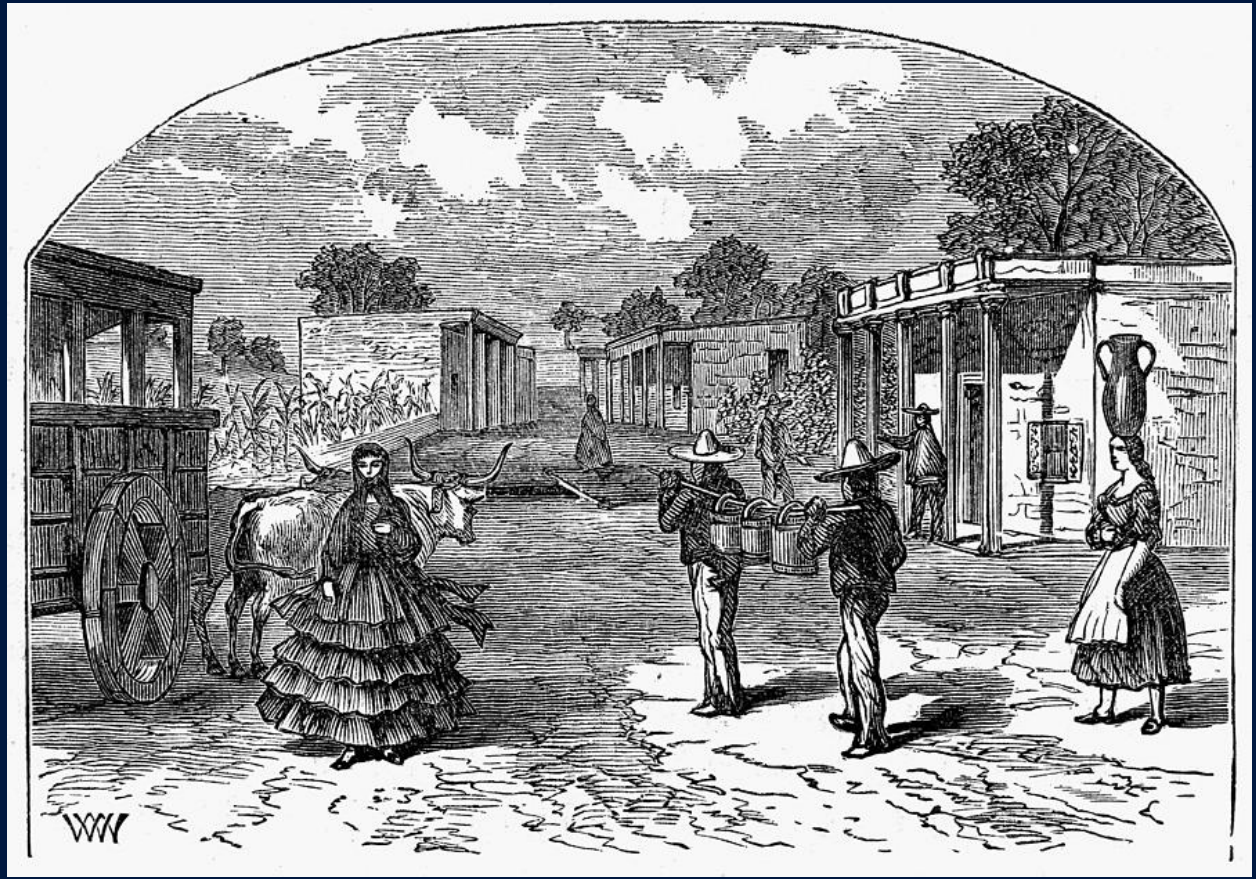
El Paso Water Yesterday, Today, and Tomorrow

2022 Texas Groundwater Summit

August 30th, 2022

Scott Reinert P.E., P.G.


GREETINGS
from
EL PASO
TEXAS
7



El Paso 1860's

Water was drawn from hand dug shallow wells or from the *Rio Grande*.

Freight Teams arriving in El Paso from Chihuahua, Mexico
1881

El Paso 1880's

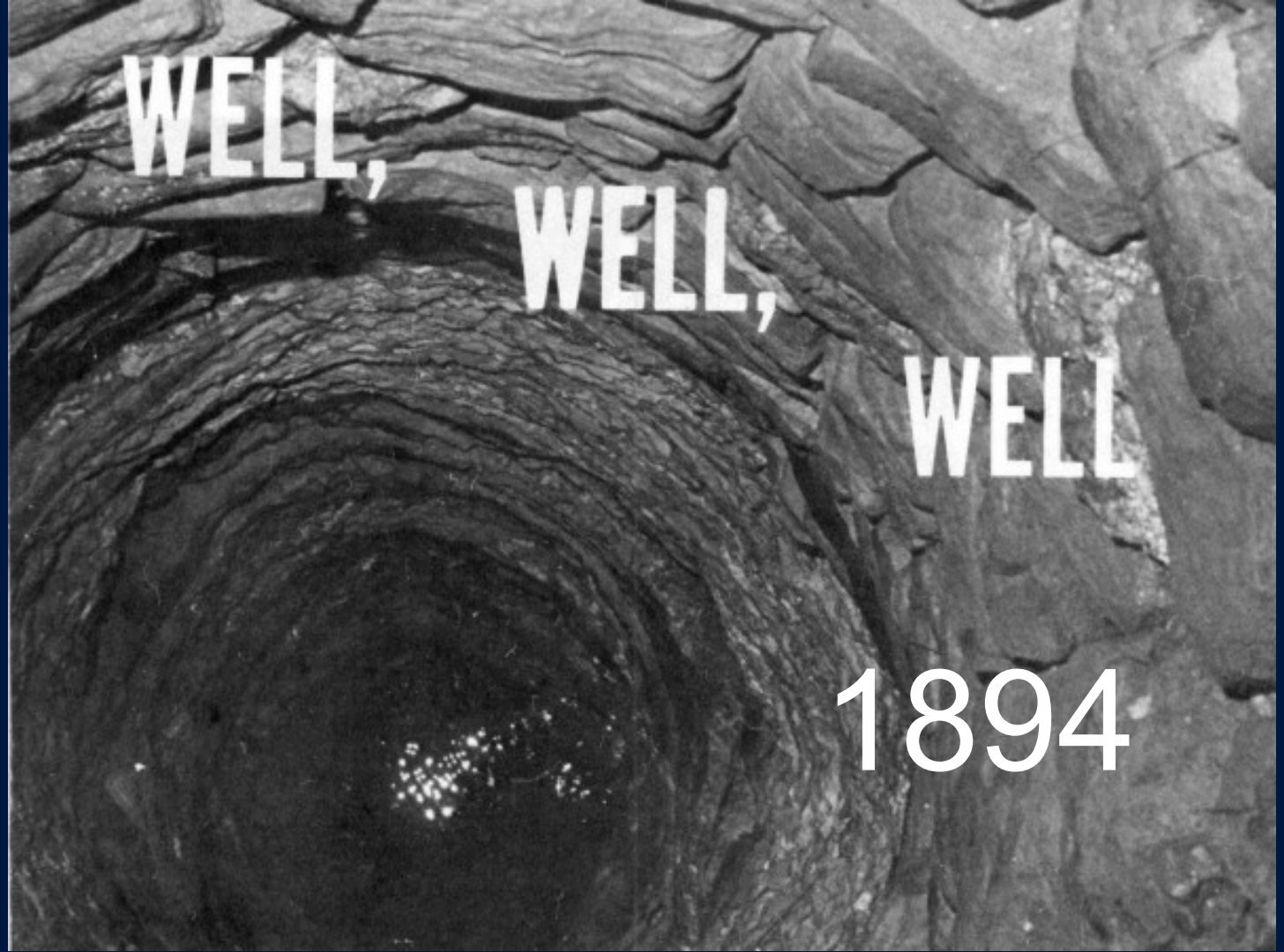
Population 800

Sylvester Watts receives franchise from El Paso to sell and distribute water.

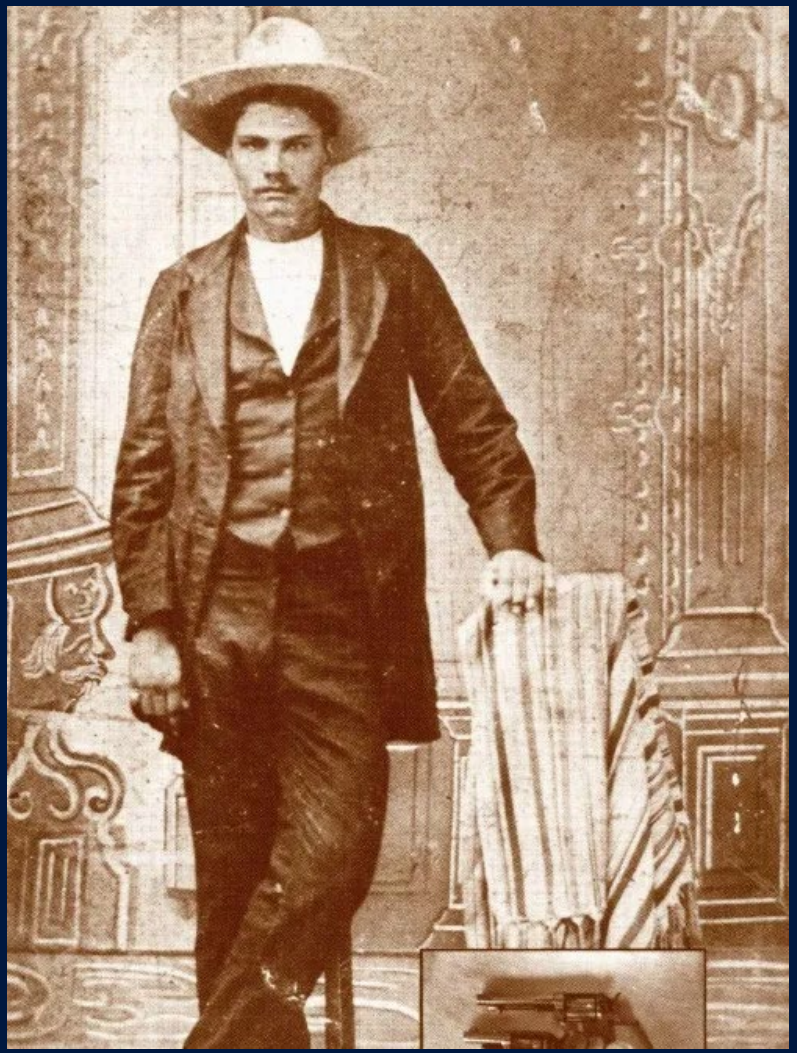
Pumps were steam powered. Watts laid the earliest water mains.

El Paso 1890's

El Paso still very much part of the wild west. Group photo of mounted lawmen. Sylvester Watts' water distribution has issues with lack of water pressure, sand in the water, and general water quality. Watts would lose his franchise in 1903.


WELL,
WELL,
WELL
1894


Watts' Well
BIRD'S EYE VIEW OF
EL PASO
EL PASO COUNTY TEX.
1885



John Wesley Hardin
(1853-1895)

1910

Looking to the northeast towards the Franklin Mountains from downtown El Paso.

Water was produced by 27 wells at the Mesa wellfield located on what is the northeast corner of today's Fred Wilson Avenue and Railroad Drive.

*photo mislabeled

Water Wagons

"Fifteen to twenty wagons serviced the town daily during 1900-1910. All who could afford it purchased their drinking water."
-Leon Metz, El Paso Chronicles

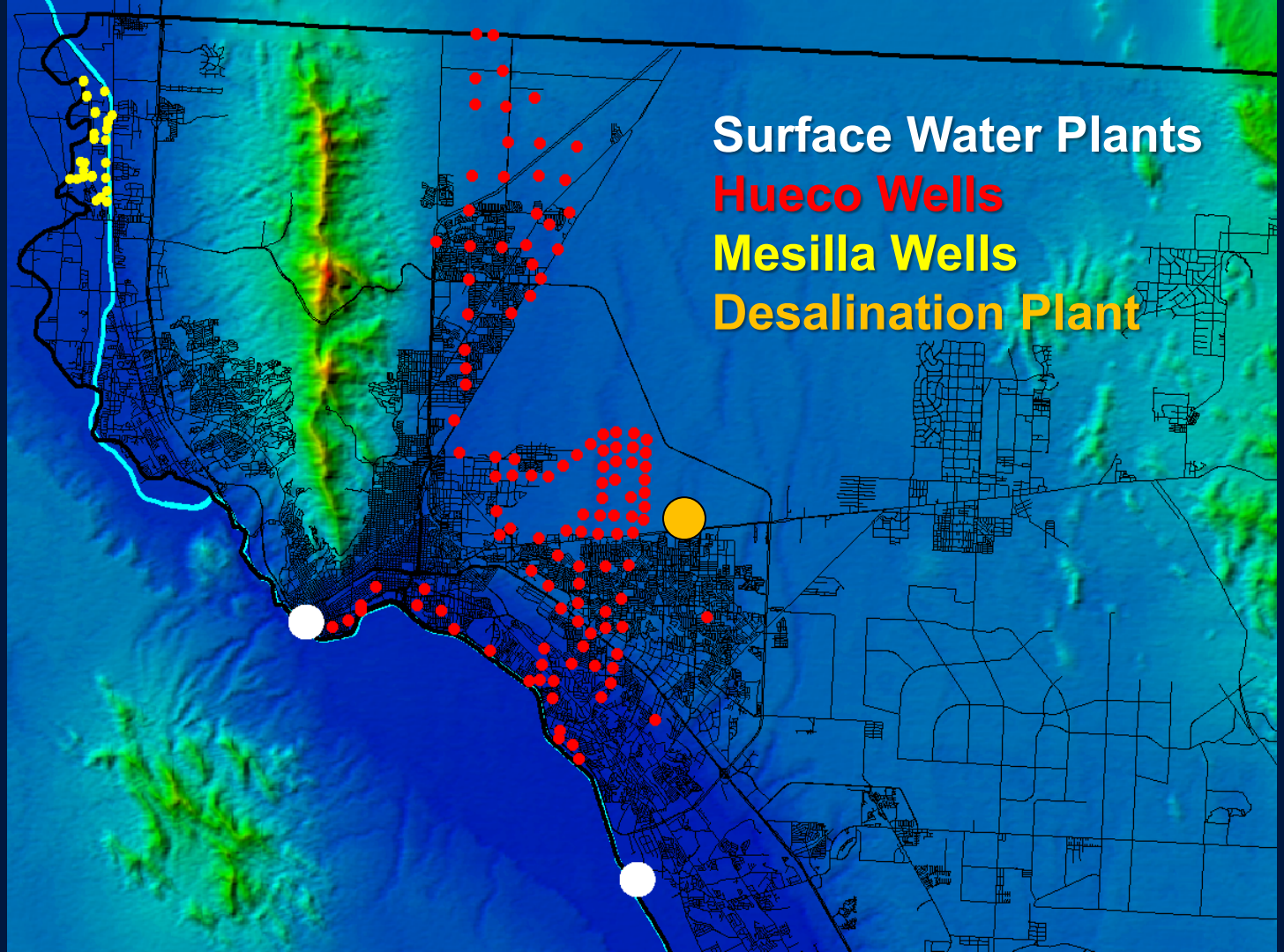
The Fall of the Berlin Wall
November 9, 1989

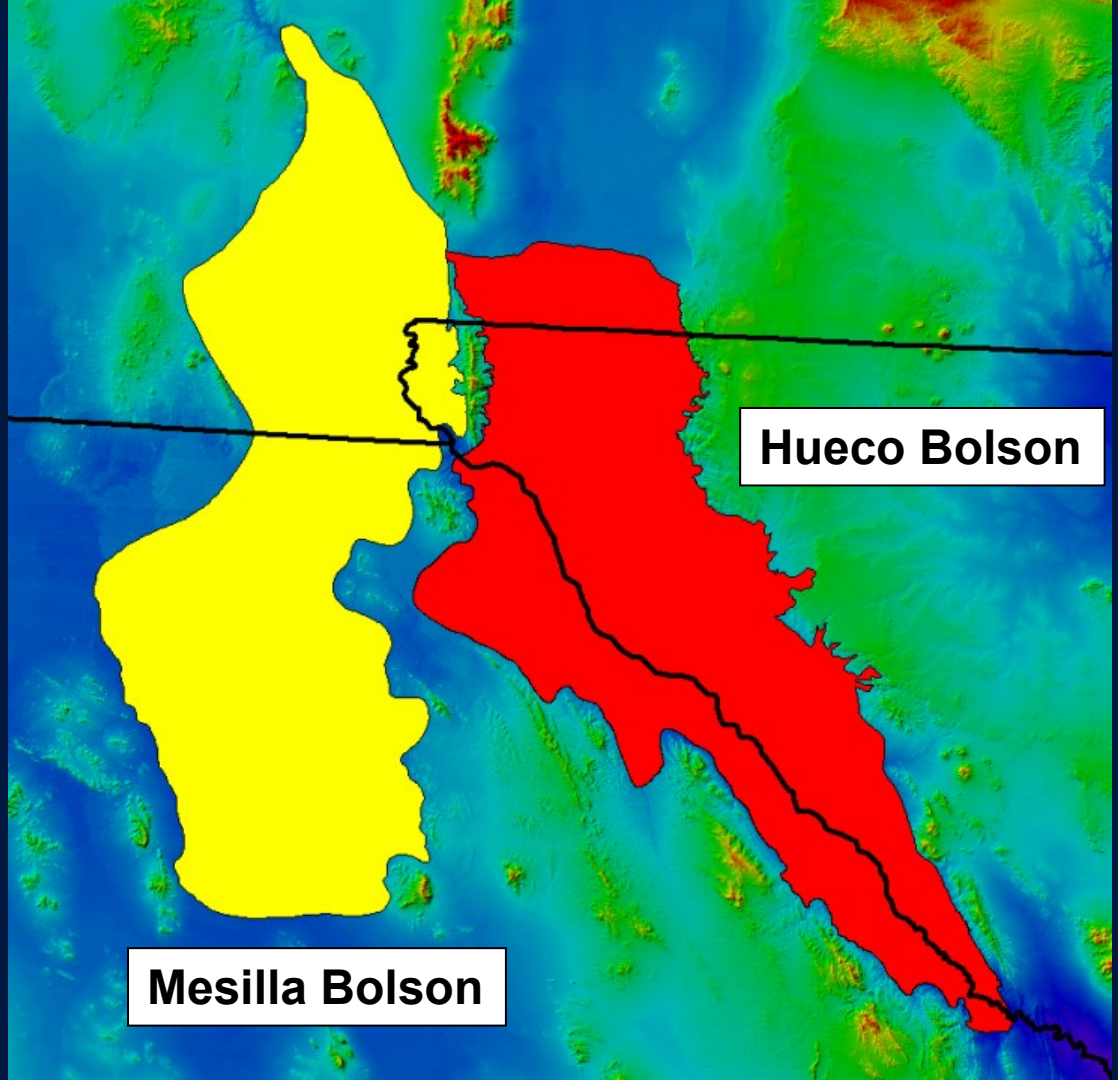
Marilyn Monroe
1926-1962

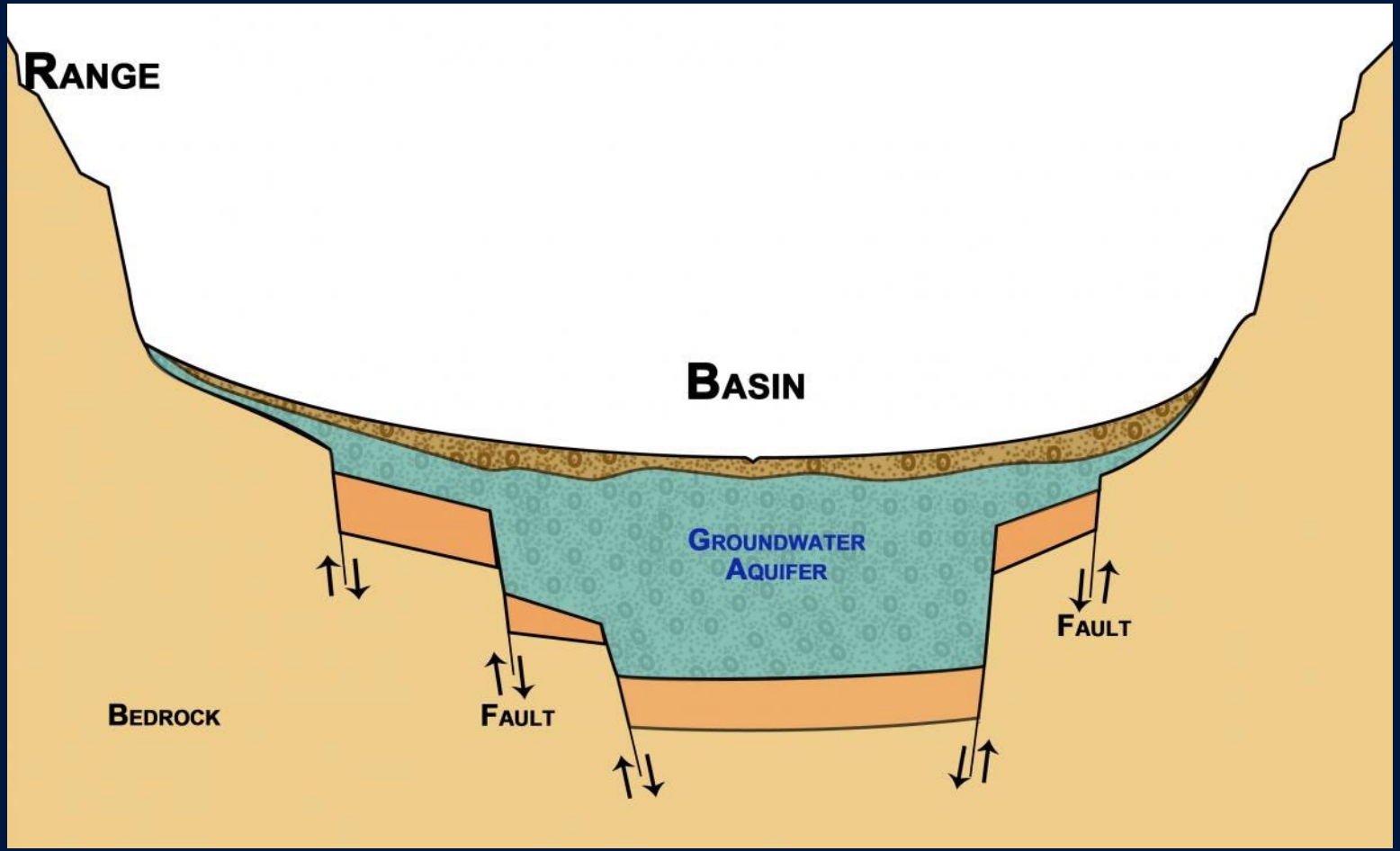
First Airplane Flight
December 17, 1903

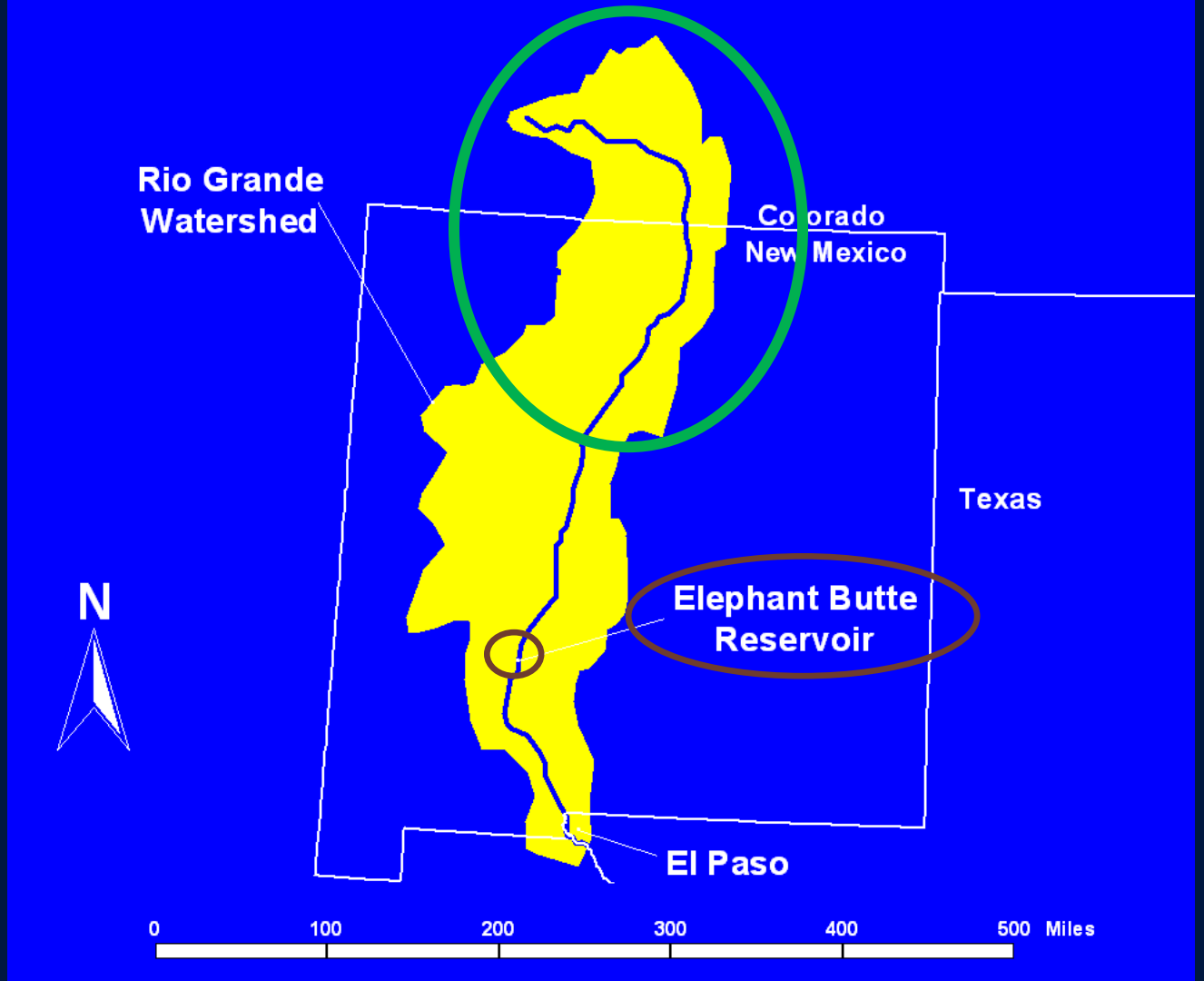
Franklin D. Roosevelt
1933-1945

World War I
1914-1918

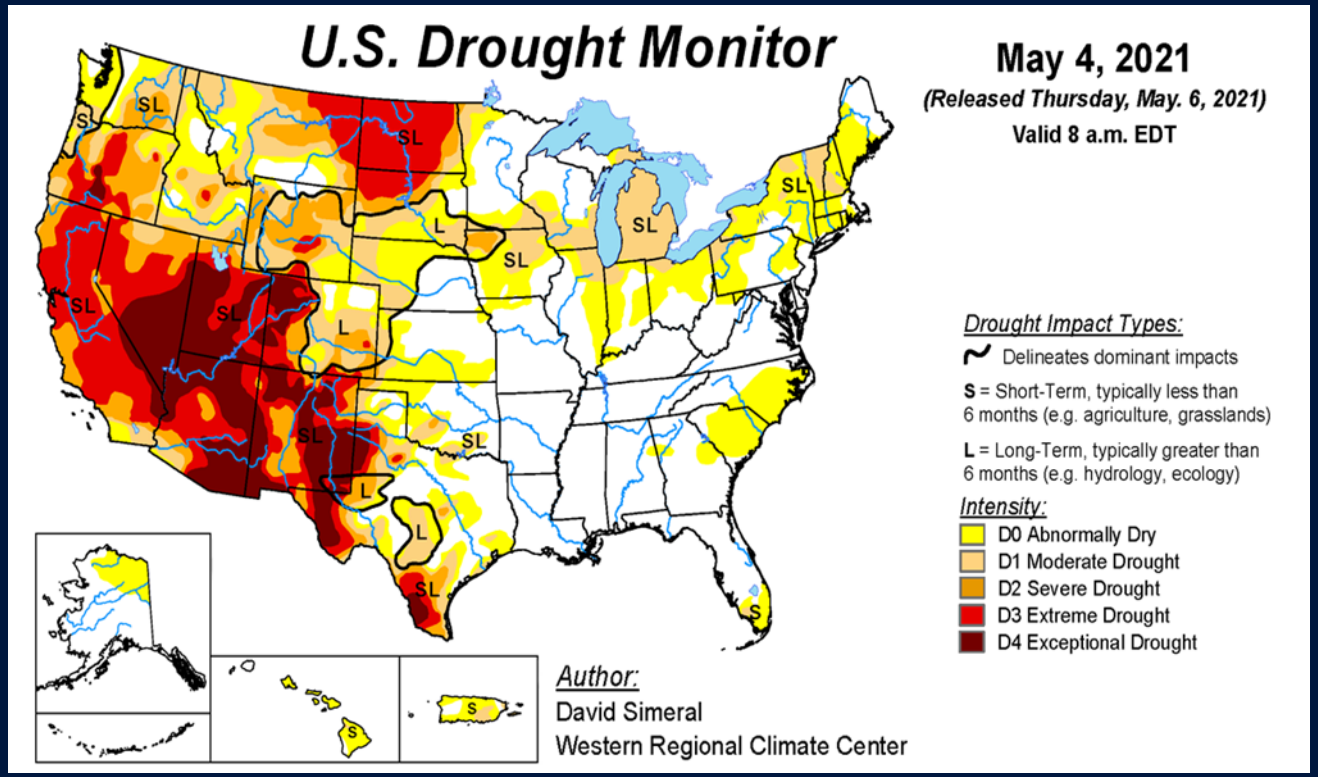

Surface Water Plants
Hueco Wells
Mesilla Wells
Desalination Plant


Hueco Bolson
Mesilla Bolson


RANGE
BASIN
GROUNDWATER
AQUIFER
FAULT
FAULT
BEDROCK

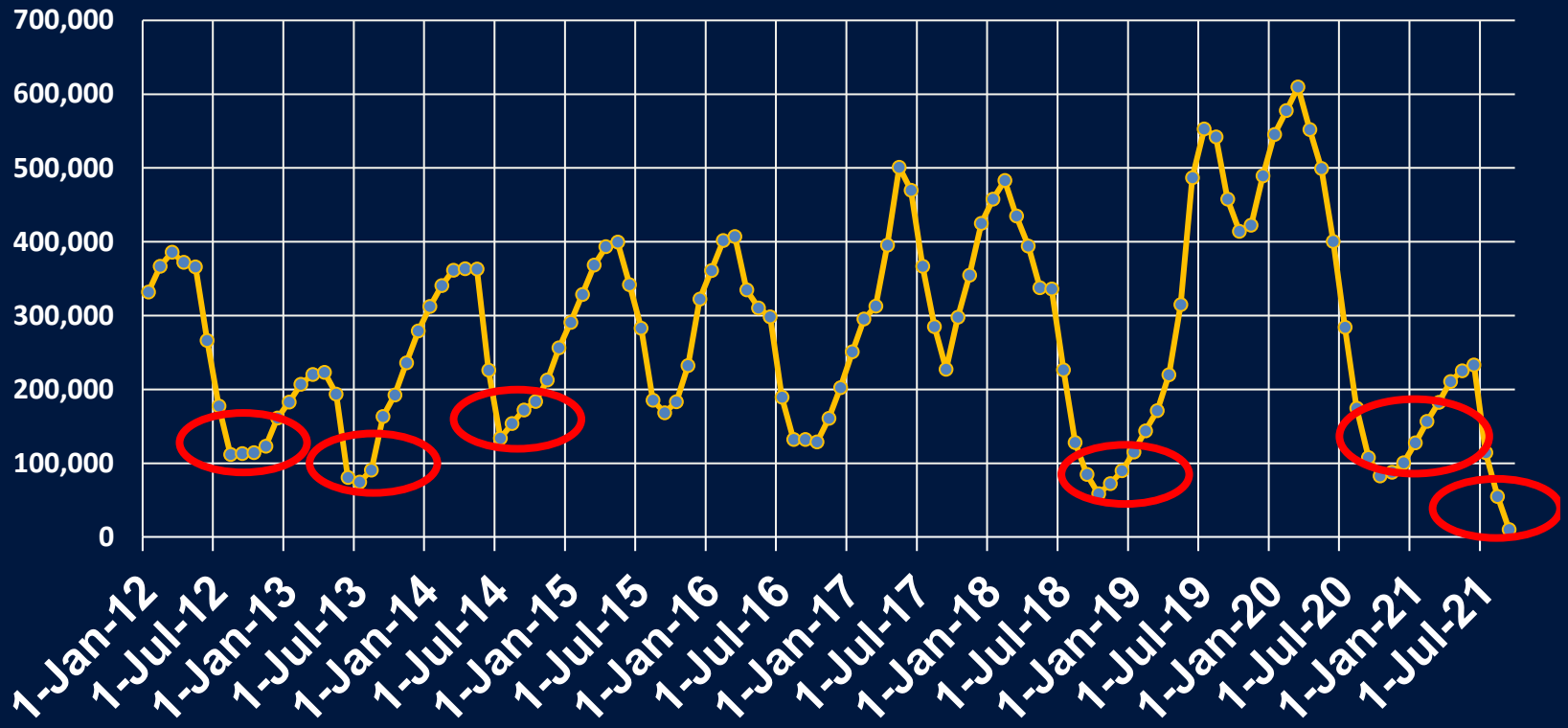

Rio Grande
Watershed
Colorado
New Mexico
Texas
N
Elephant Butte
Reservoir
El Paso
0
100
200
300
400
500 Miles


DROUGHT

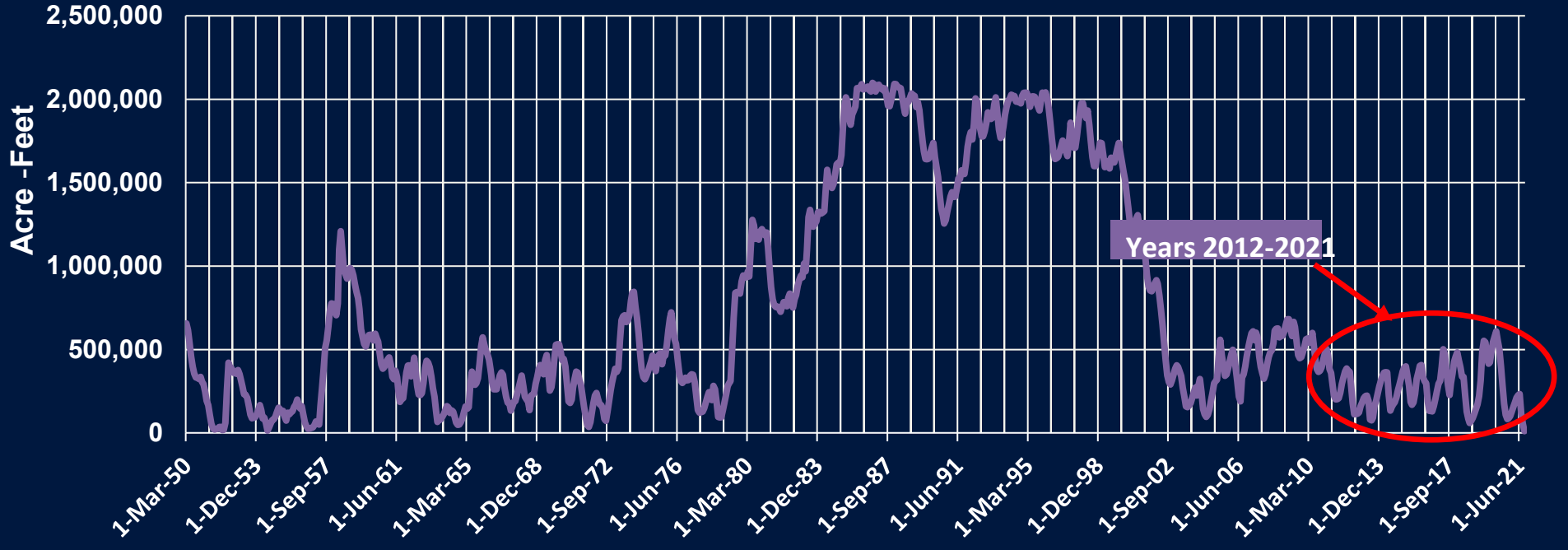

U.S. Drought Monitor
May 4, 2021
(Released Thursday, May. 6, 2021)
Valid 8 a.m. EDT
Drought Impact Types:
Delineates dominant impacts
S = Short-Term, typically less than 6 months (e.g. agriculture, grasslands)
L = Long-Term, typically greater than 6 months (e.g. hydrology, ecology)
Intensity:
D0 Abnormally Dry
D1 Moderate Drought
D2 Severe Drought
D3 Extreme Drought
D4 Exceptional Drought
Author:
David Simeral
Western Regional Climate Center

Current Reservoir Condition

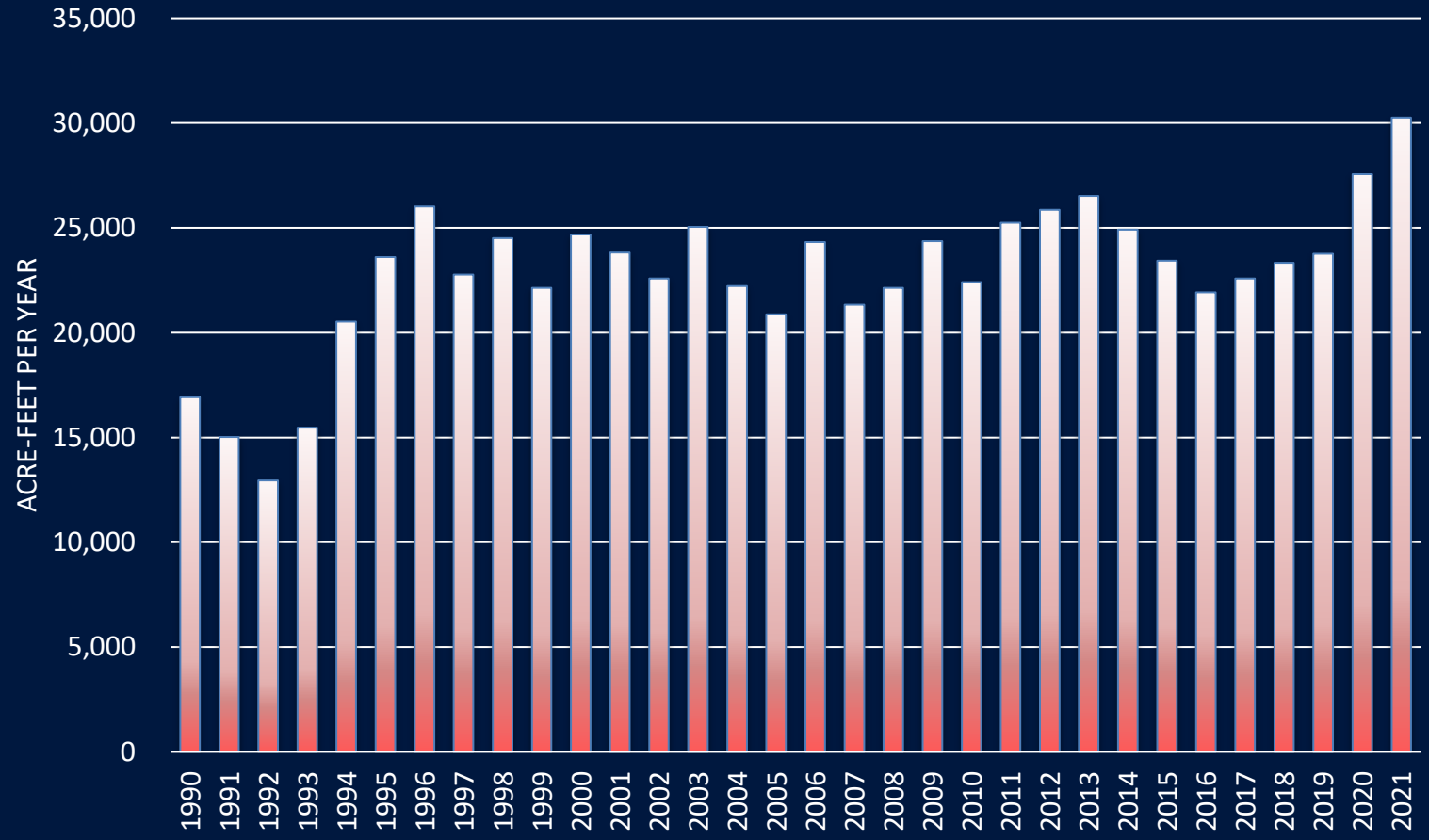
Elephant Reservoir Volumes (Acre-Feet) 2012-2021



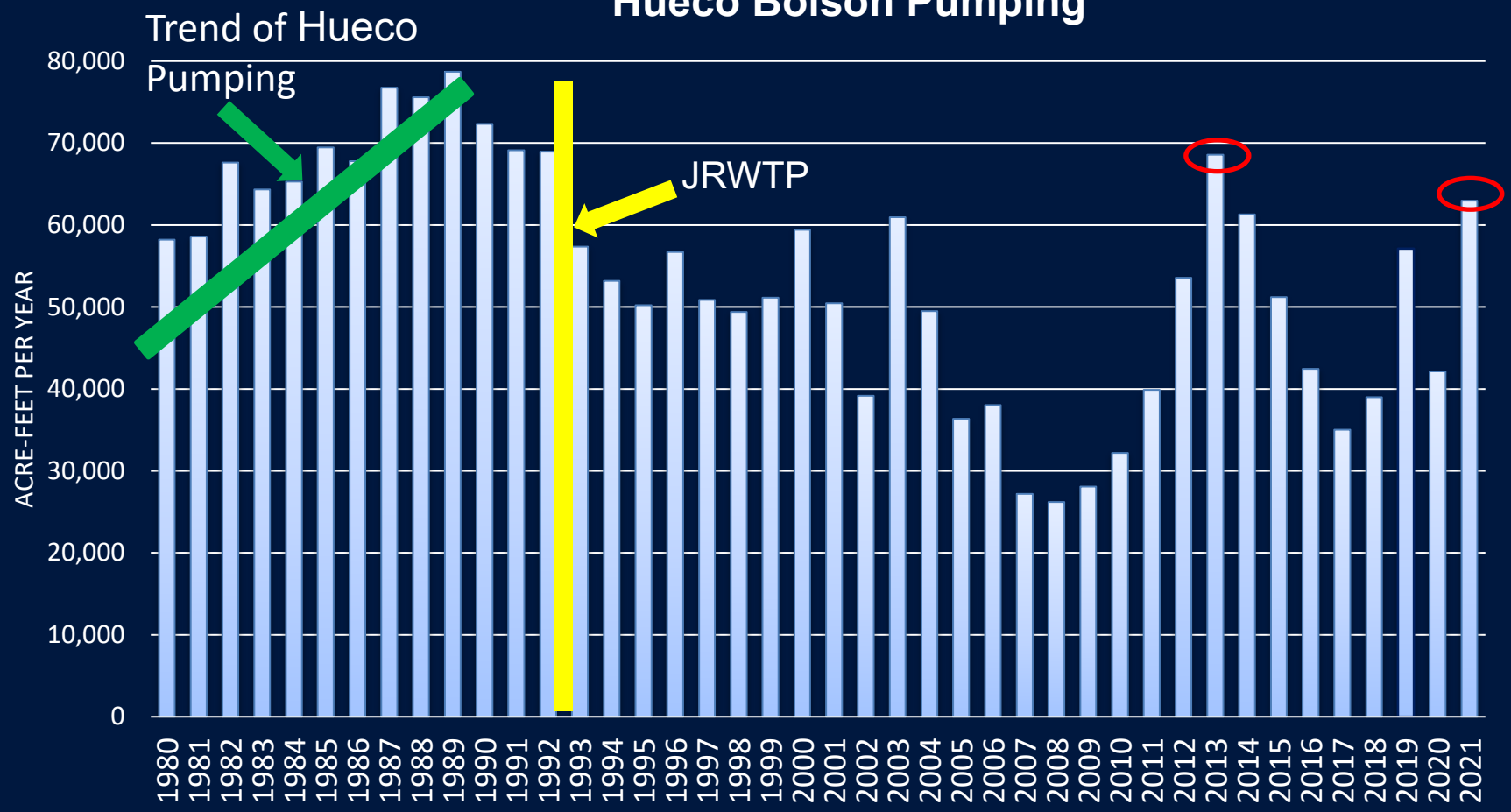
Elephant Butte Reservoir-Annual Volumes 1950-2021



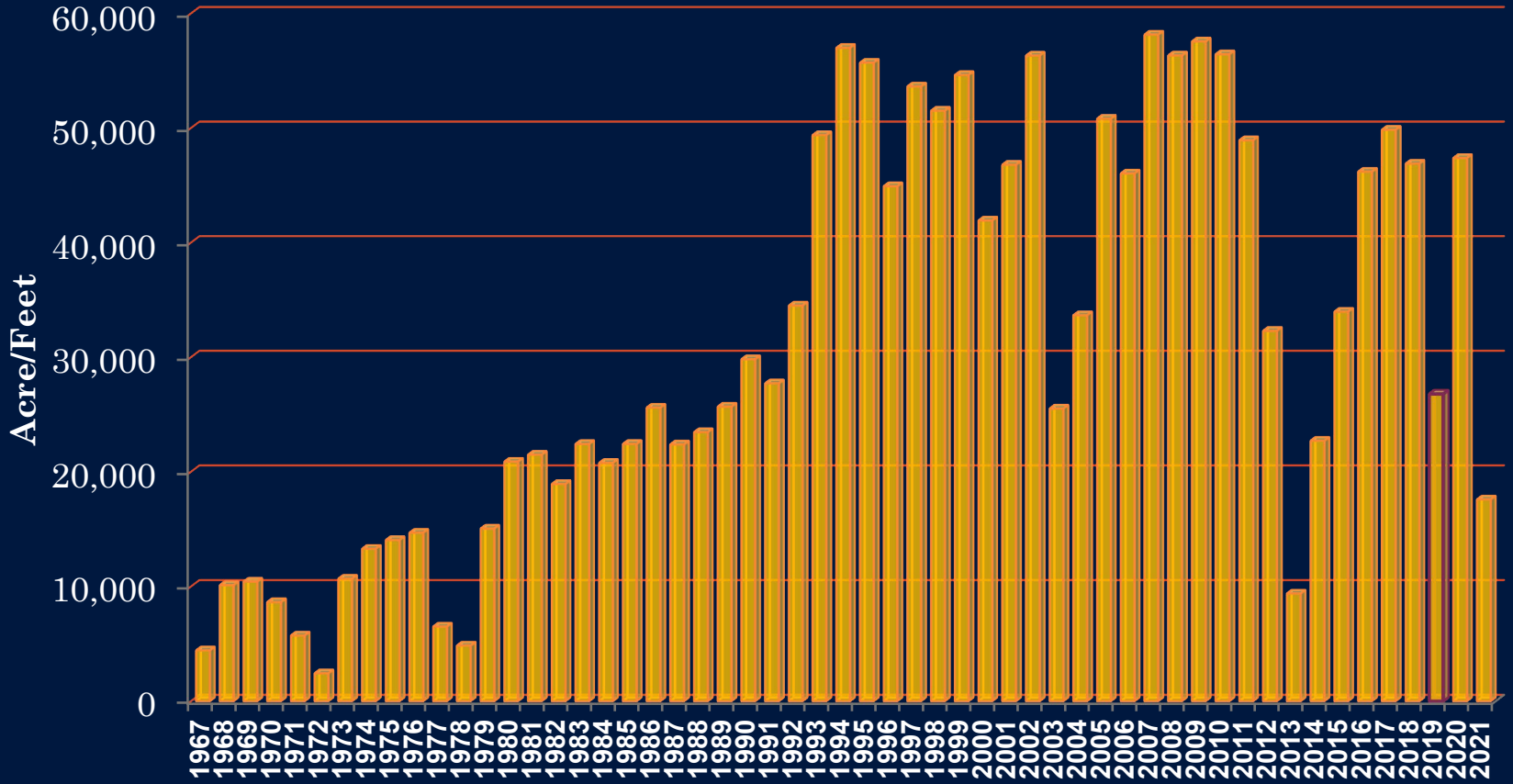
Mesilla Bolson Pumping



Hueco Bolson Pumping



Rio Grande Diversions



Drought Relief Projects

Drill Wells

Equip Wells

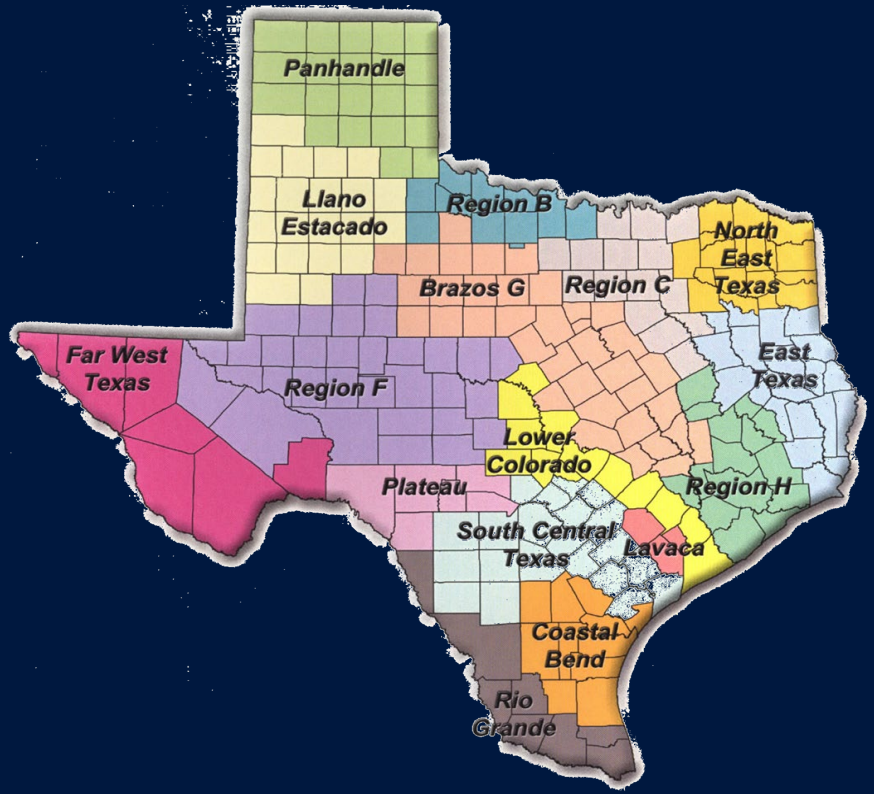
Furnish and Install Well Pumps

Optimize Lower Valley Reverse Osmosis

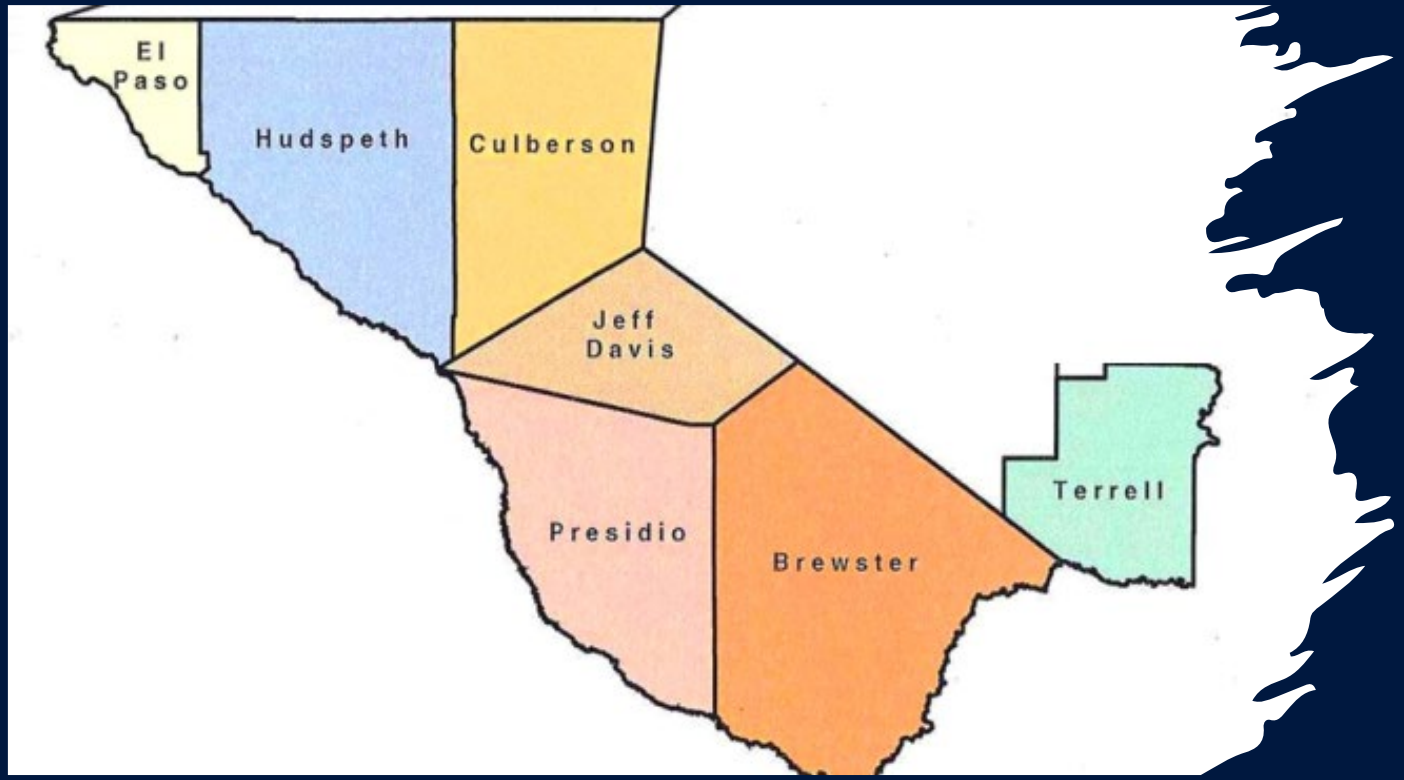
Pumping Systems-Well and Pump Rehab


TEXAS WATER DEVELOPMENT BOARD

Regional Water Planning Areas of Texas



Region E


El Paso
Hudspeth
Culberson
Jeff Davis
Presidio
Brewster
Terrell

Regional Water Planning Trifecta

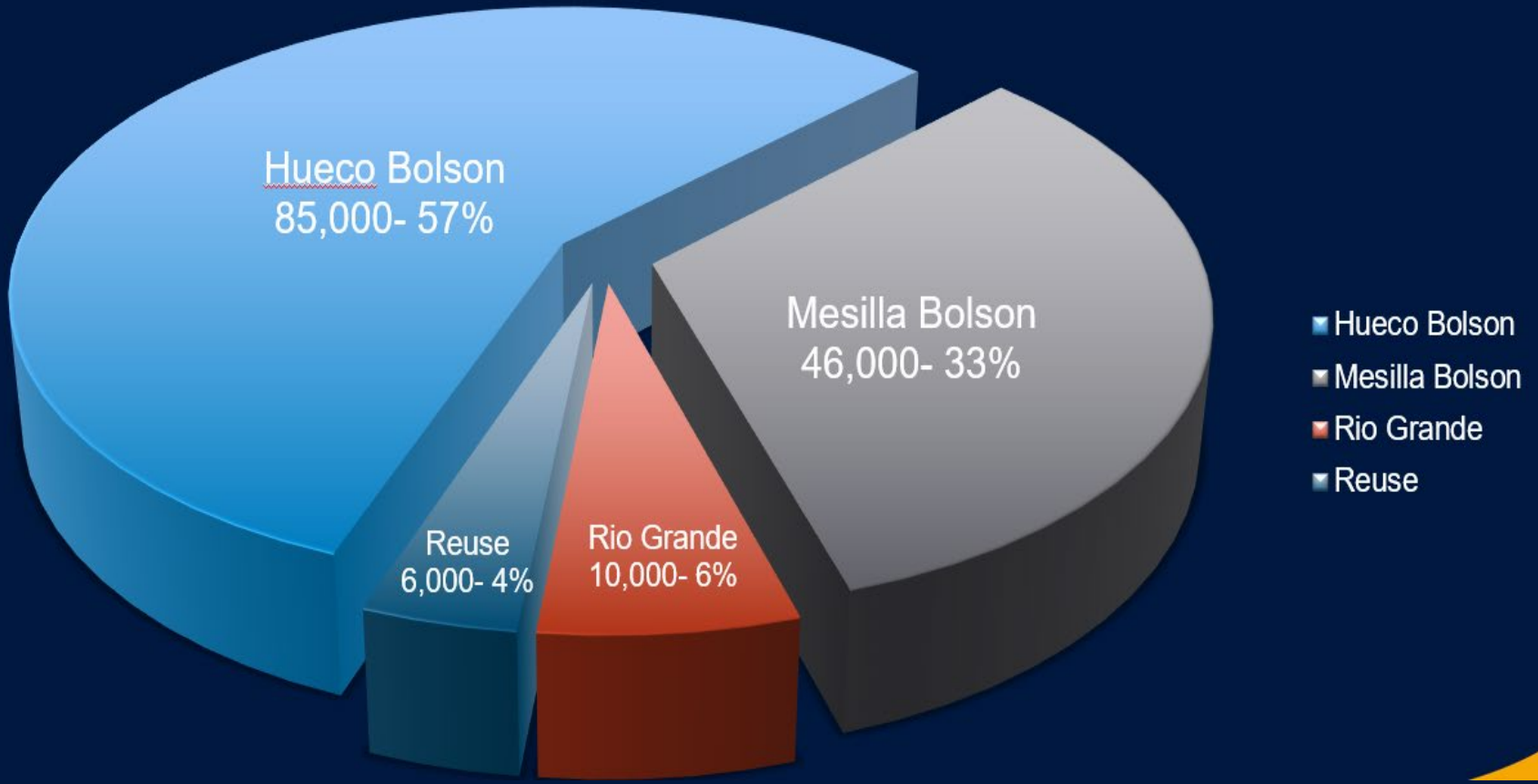
Population

- EP Water will see a 63% increase in population during the next 50 years

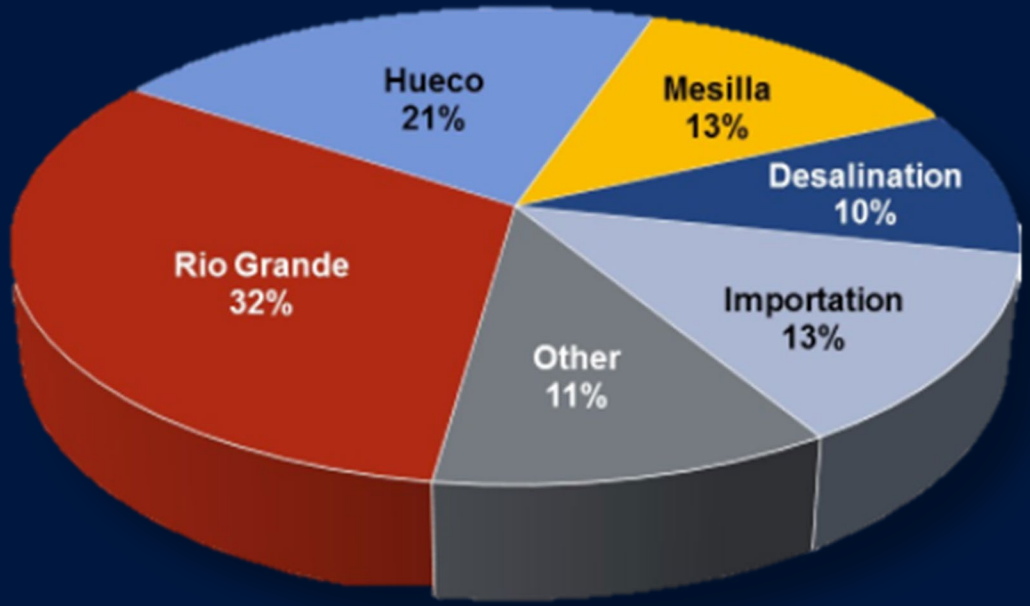
Projected Population Served by El Paso Water

	Historical 2013	2020	2030	2040	2050	2060	2070
Projected Population Served by El Paso Water	787,208	831,386	938,493	1,038,018	1,136,713	1,230,215	1,318,182

Existing Supplies (AF/YR)



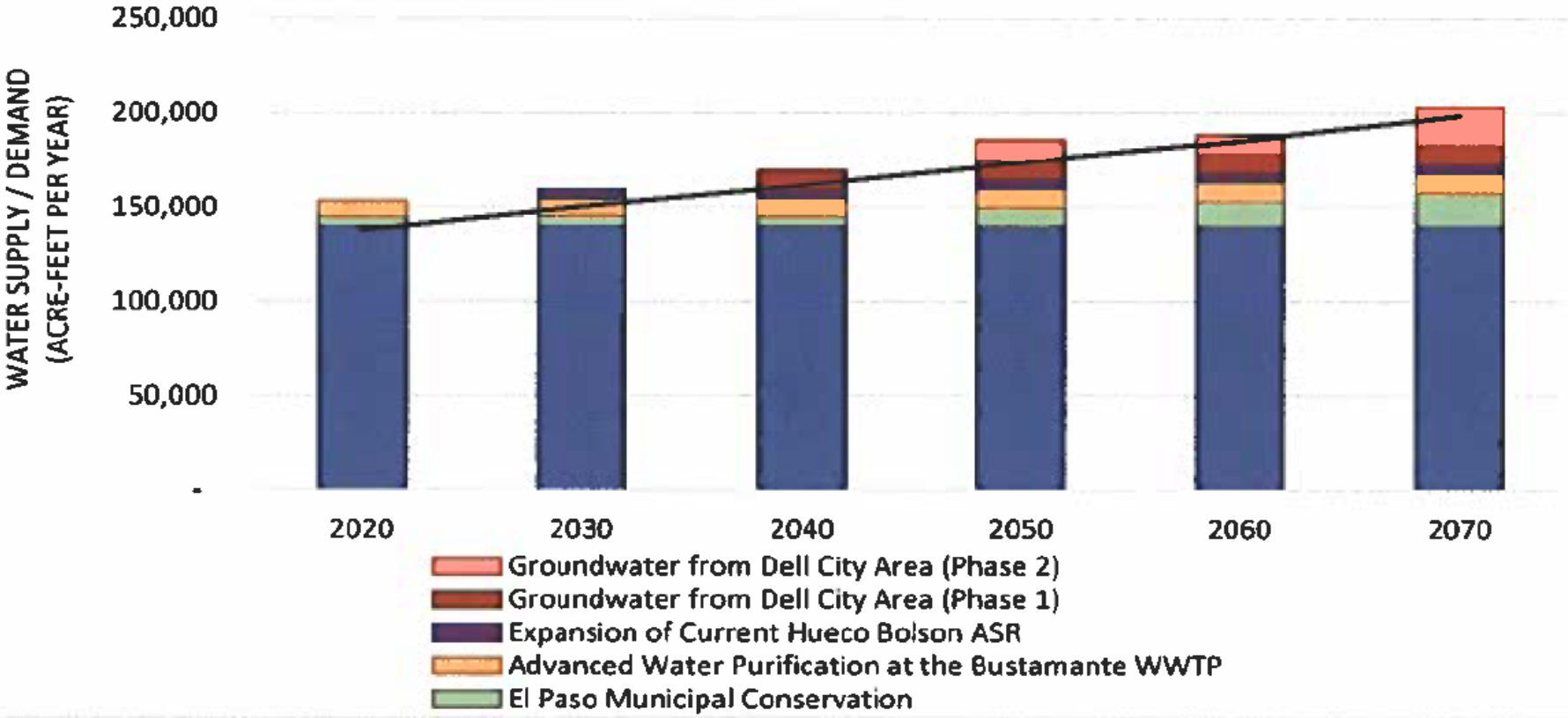
Projected Breakdown of Water Supply Sources in 2070



El Paso 50 Year Plan

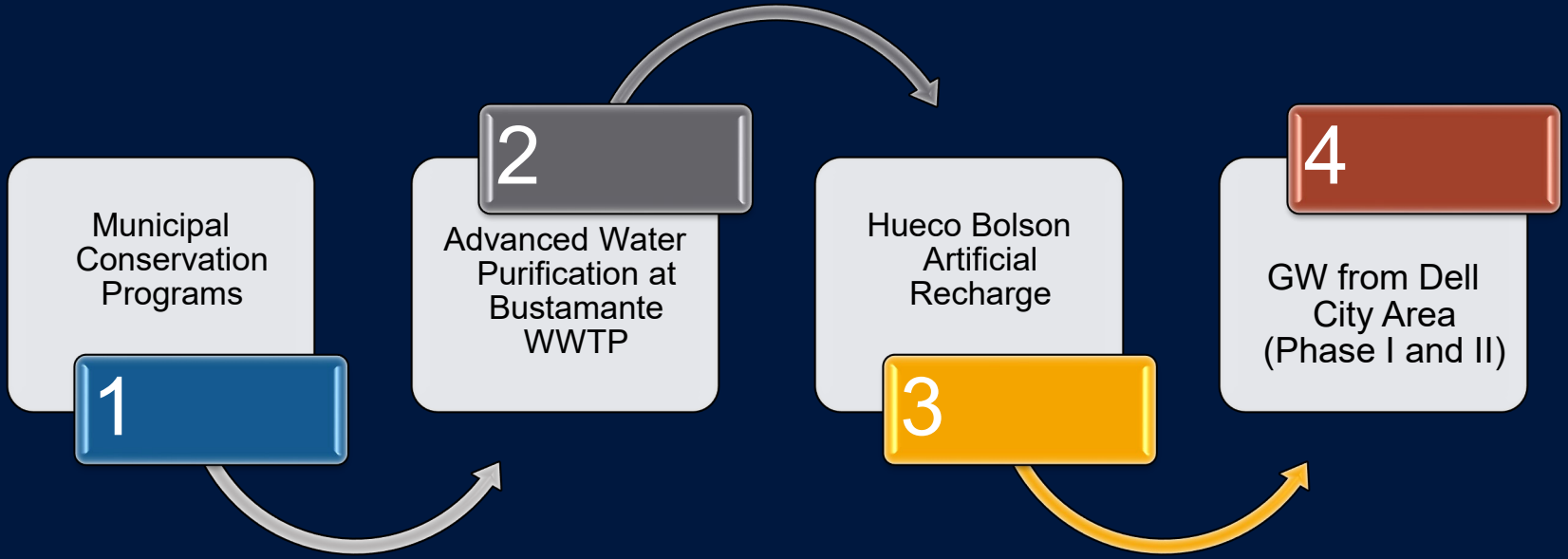
- Four strategies are recommended that are designed to meet future water demands for the growing population

- Generate approximately 53,420 AF/YR by the year 2070



Recommended Water Management Strategies to Meet EPW Projected Water

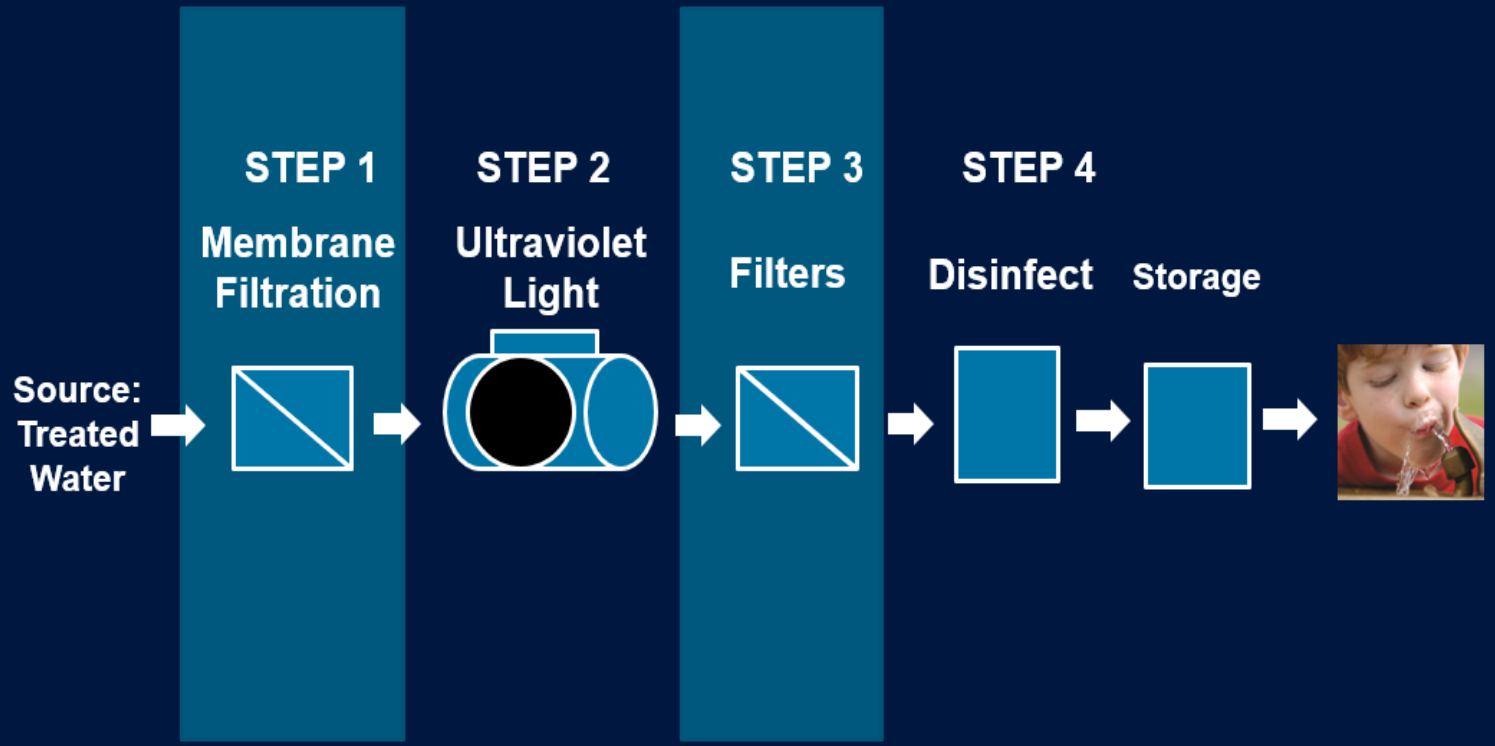
EPW Recommended Water Management Strategies



Advanced Water Purification at Bustamante WWTP

- Additional conventional WWT at Bustamante to include an advanced treatment facility

- Wastewater effluent produced from plant would undergo 4 additional treatment for purification into potable supply.


STEP 1
Membrane Filtration
STEP 2
Ultraviolet Light
STEP 3
Filters
STEP 4
Disinfect
Storage
Source: Treated Water

Hueco Bolson Artificial Recharge


DELL CITY
A GROWING COMMUNITY
GRAPES
"THE VALLEY OF HIDDEN WATERS"
CATTLE
CHILE PEPPERS
DTC
DELL TELEPHONE.COM
www.delltelephone.com
915-964-2352

GW from Del City Area (Phase I)

- In 2003 and 2004, EP purchased 8,833 acres of land (Diablo Farms) overlying the Capitan Reef Aquifer

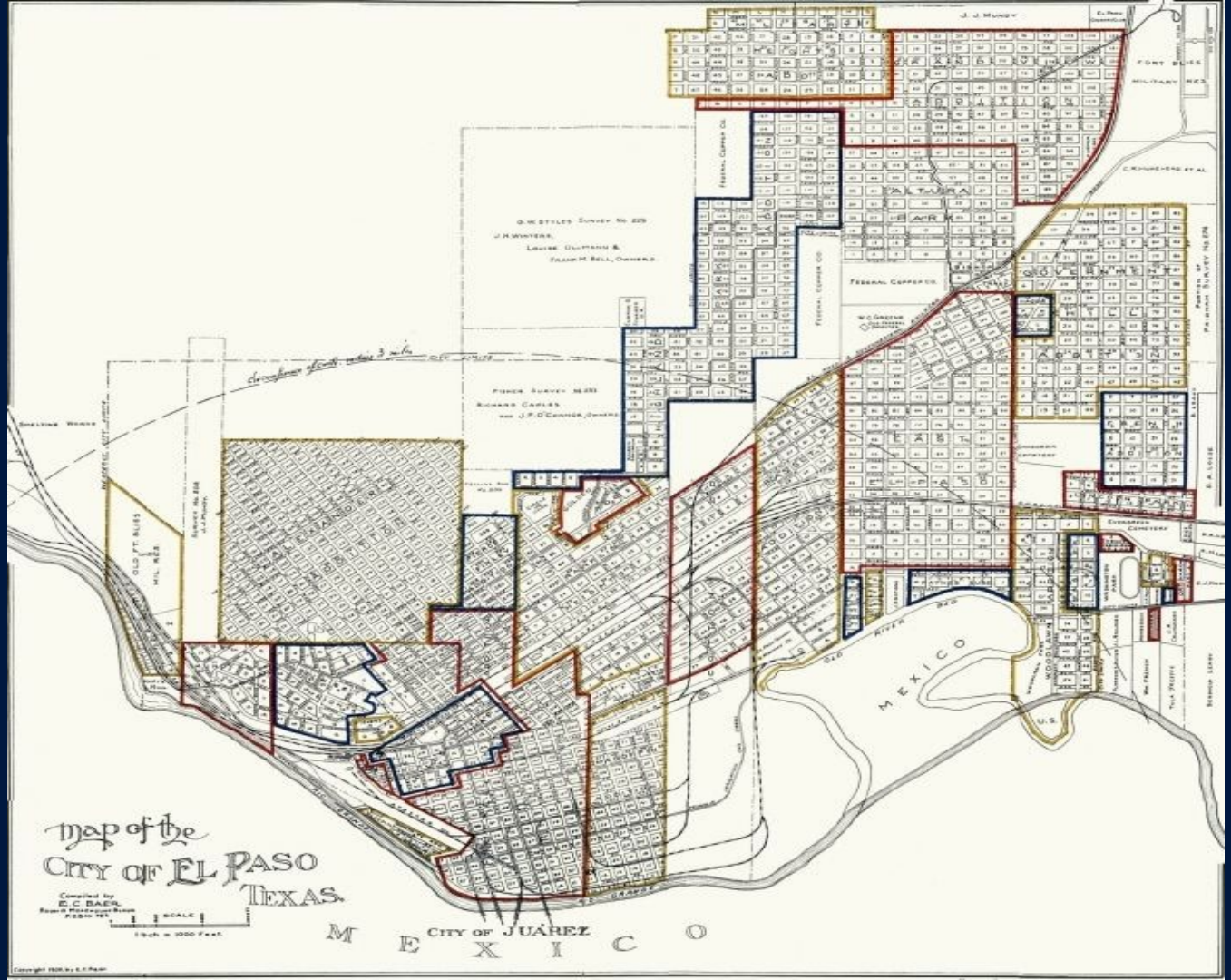
- Proposed strategy calls for importation of up to 10,000 AF/YR from six new wells and pipeline beginning in 2040

GW from Del City Area (Phase II)

- EPW purchased 70,388 acres of land in Dell City overlying the Bone Spring-Victorio Peak aquifer
- Importation of 10,000 AF/YR proposed in 2050
- TDS range from 1,810 to 3,900 mg/l→ desalination is required before used for municipal purposes

Alternate Water Management Strategies

- AWP at Haskell Street WRP
- Agricultural Drain Water
- Expansion of Canutillo Well Field
- Lower Valley Reverse Osmosis
- Expansion of KBH
- Expansion of Jonathan Rogers WTP
- Riverside Regulating Reservoir
- Surface Water treatment at Upper Valley WTP
- AWP at the Fred Hervey WRP



El Paso *circa* 1930

Population 104,421

Wells are the sole source of El Paso water.

1910 to 1940 per capita consumption was around 19 gallons a day.

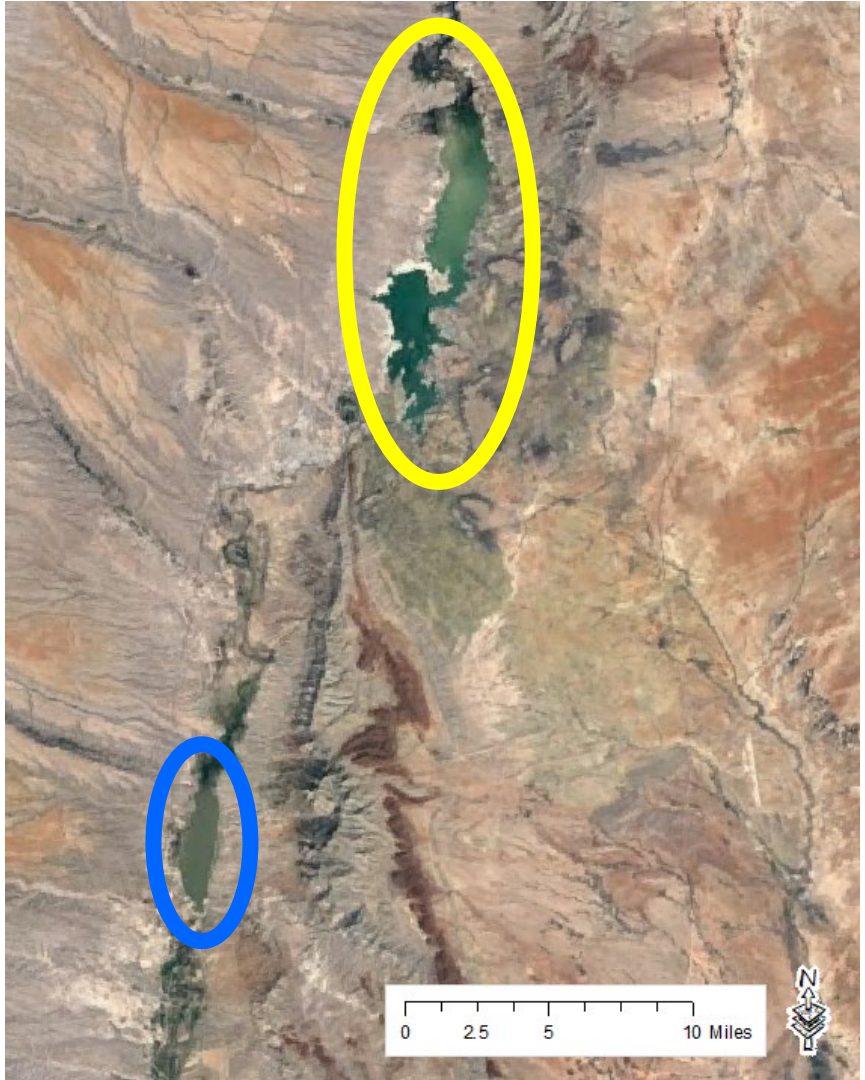
1908 El Paso is a growing city.

The 1910 census will show a population of 39,279.

Pancho Villa
(1878-1923)

Circa 1910
Animal power and steam
used by City Water Department


FRED MARTINEZ
E. McCUAN
E. DUCHENE
JOE PAZ
DICK DESMOND
R. MELENDEZ
WM. SKENE
JUAN CARO
D. MESA
CITY WATER WORKS
MARCH, 1936.



Elephant Butte Reservoir

Elephant Butte Dam and Reservoir constructed between 1912 and 1916. Reservoir began filling in 1915 while the dam was under construction. After on-again/ off-again planning the Elephant Butte Dam hydro-electric generating plant was completed in 1940. The reservoir's maximum storage is 1,960,900 acre-feet.

Caballo Reservoir

Caballo Dam and Reservoir constructed between 1936 and 1938 to impound flow from the Elephant Butte Dam hydro-electric generating plant during winter (non-irrigation) season. Dam provides flow for summer irrigation. Reservoir provides storage of *Rio Grande* water to meet treaty obligations with Mexico. The reservoir's maximum storage is 343,990 acre-feet.

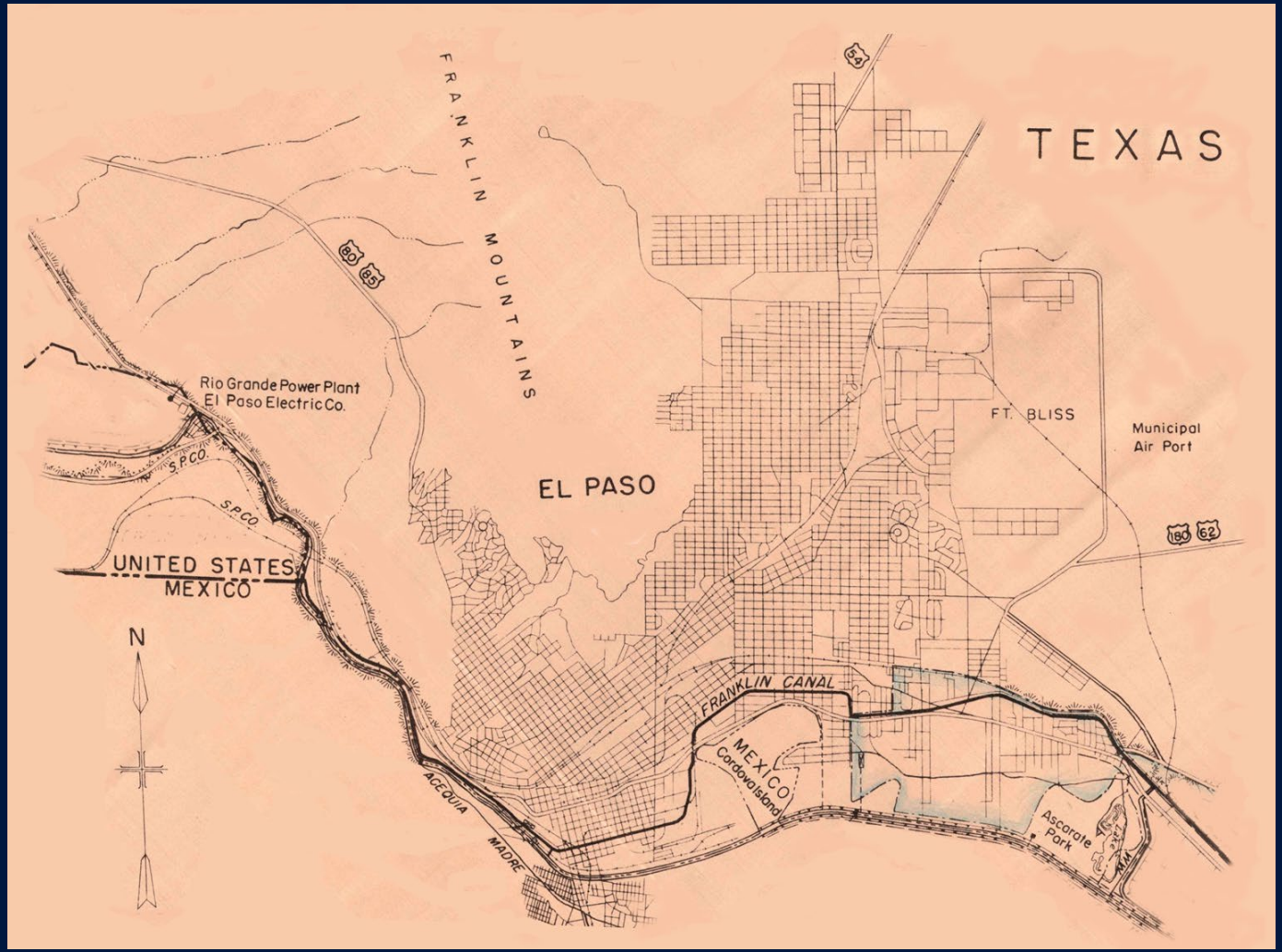
Well Drilling

El Paso 1900's

The International Water Company takes over the Watts' franchise in 1903.

International Water Company shifts production from the Watt's wells at the river to the Mesa well field.

In 1910 the International Water Company fails and its assets are acquired by El Paso.



El Paso *circa* 1940

Population 96,910

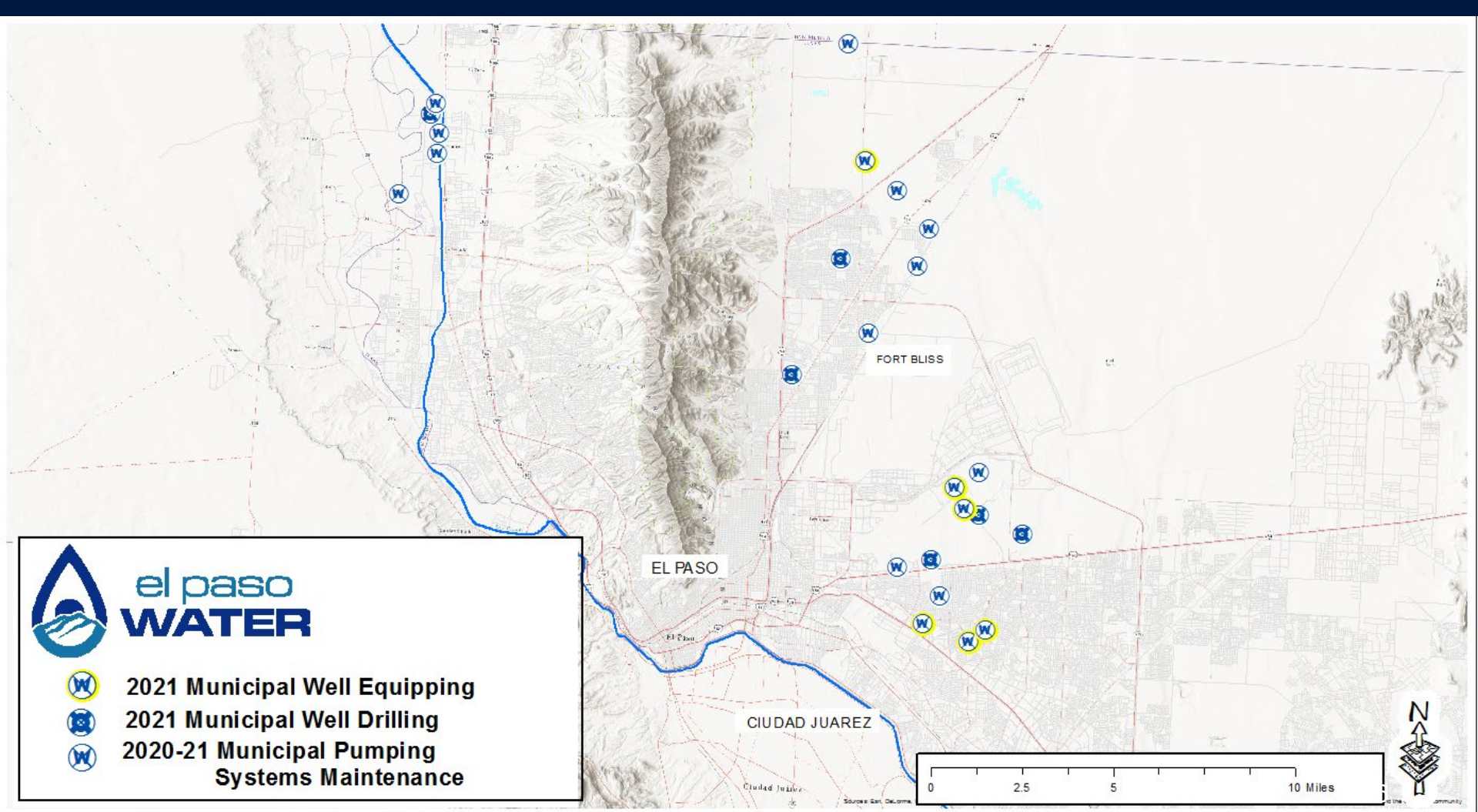
Wells and surface water treatment plant supply El Paso.

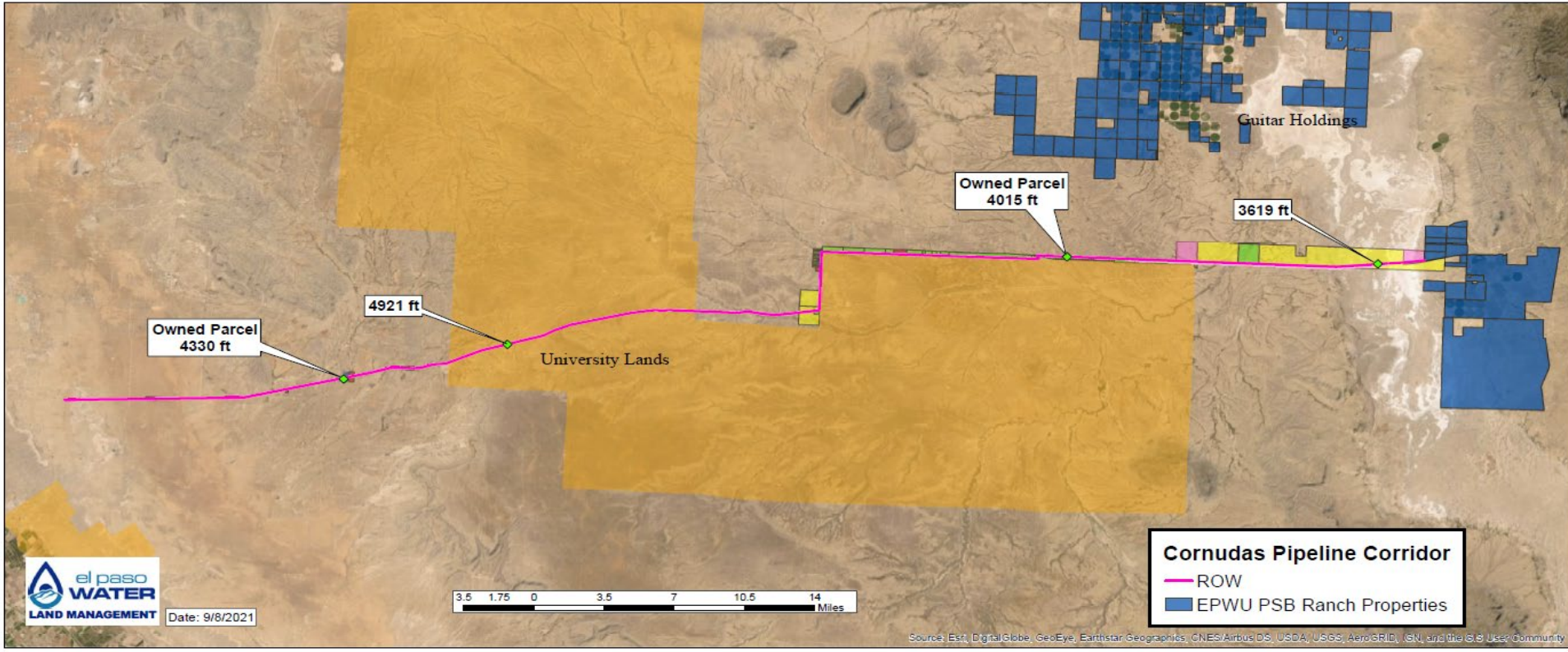
1940 to 1950 per capita consumption climbs to 39 gallons a day.

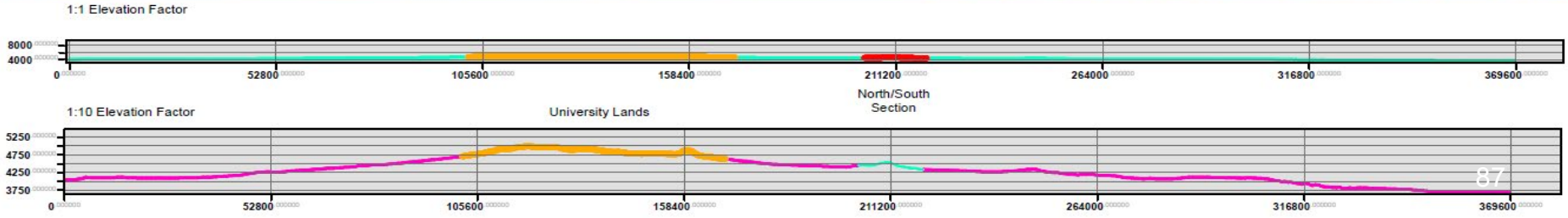
1950 Population 130,485

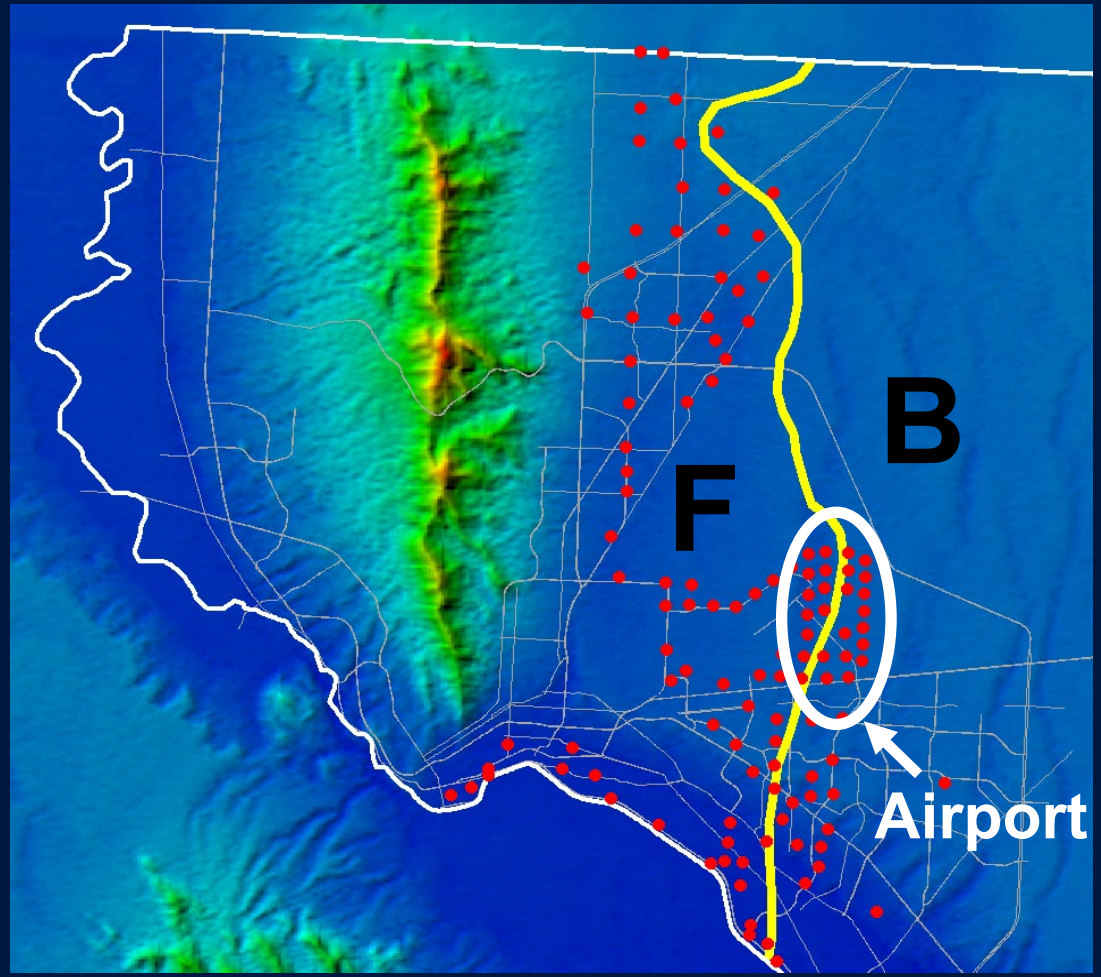
1950 to 1960 per capita consumption climbed to 176 gallons a day.

1960 Population 279,000


el paso
WATER
2021 Municipal Well Equipping
2021 Municipal Well Drilling
2020-21 Municipal Pumping
Systems Maintenance
FORT BLISS
EL PASO
CIUDAD JUAREZ
0
2.5
5
10 Miles
N


Guitar Holdings
Owned Parcel
4015 ft
3619 ft
4921 ft
Owned Parcel
4330 ft
University Lands
3.5 1.75 0 3.5 7 10.5 14
Miles
el paso
WATER
LAND MANAGEMENT
Date: 9/8/2021
Cornudas Pipeline Corridor
ROW
EPWU PSB Ranch Properties
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community


1:1 Elevation Factor
8000
4000
0
52800
105600
158400
211200
264000
316800
369600
North/South
Section
1:10 Elevation Factor
University Lands
5250
4750
4250
3750
0
52800
105600
158400
211200
264000
316800
369600


B
F
Airport Area

Benefits of a Desalination Plant

- Reserves fresh water in Hueco Bolson for drought periods
- Prevents brackish water from encroaching on fresh water wells
- Increases fresh water production for El Paso by 25%

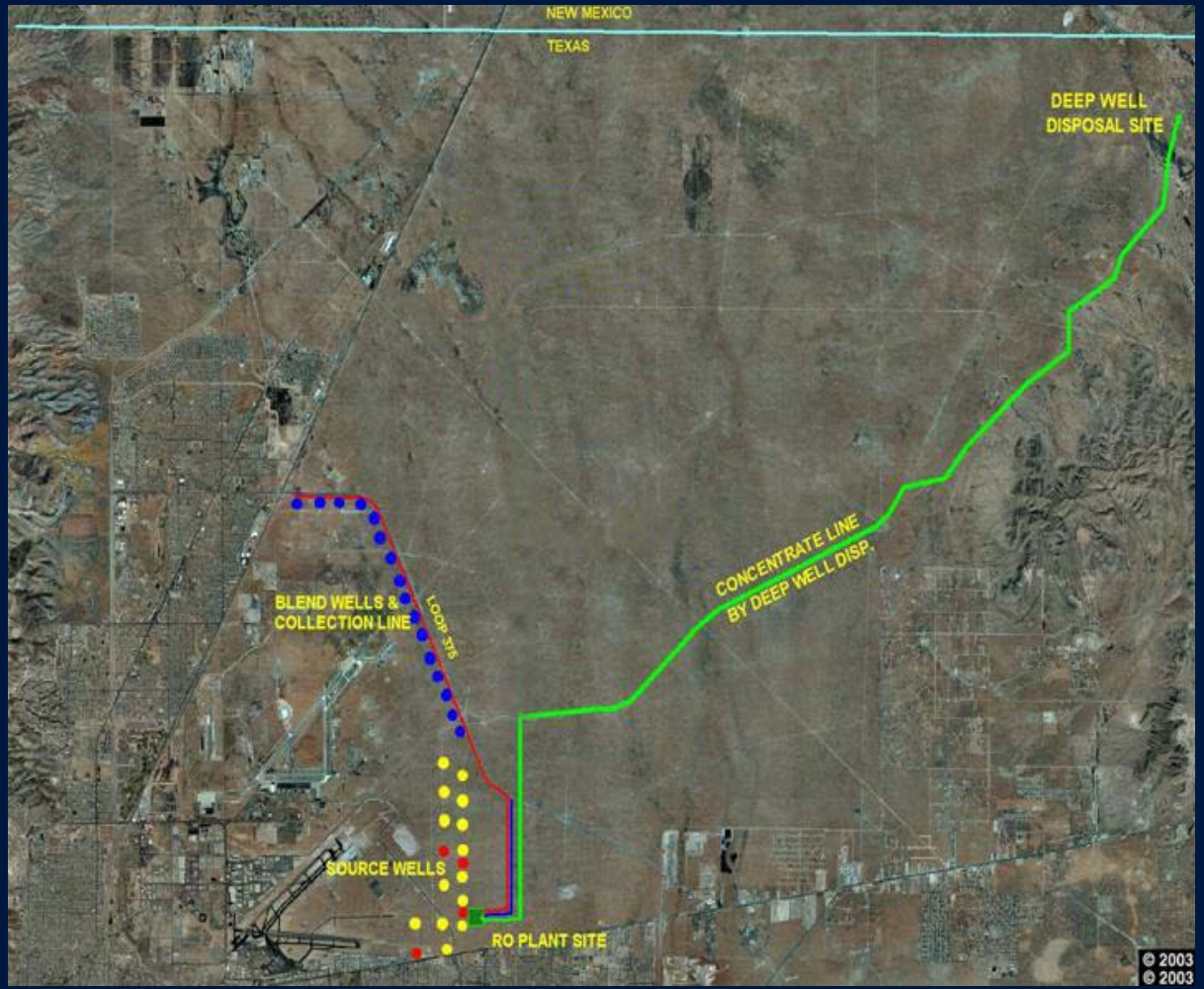
Desalination Plant Details

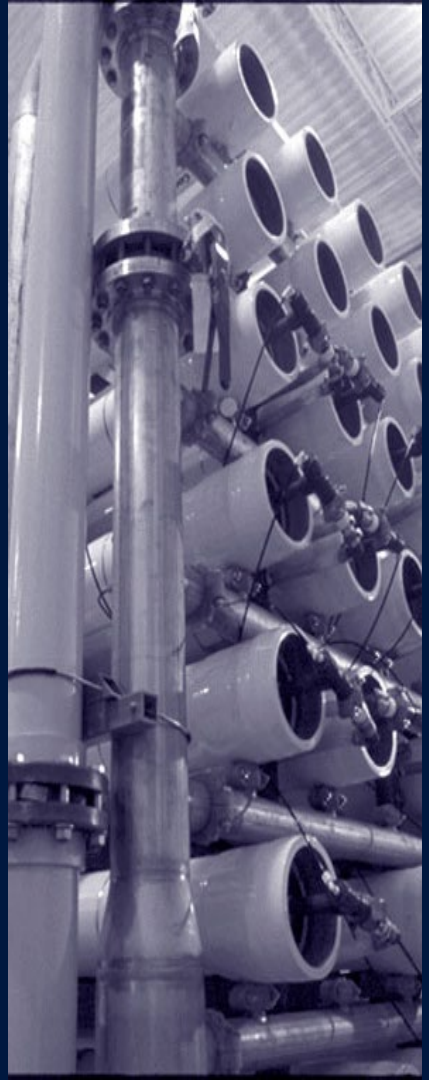
- Up to 27.5 MGD capacity
- Utilizes 5 reverse osmosis skids
- Year round usually runs at 1-2 skids
- Operated at full capacity for the first time in May 2012

Kay Bailey Hutchison Desalination Plant

Opened in 2007 to deal with:

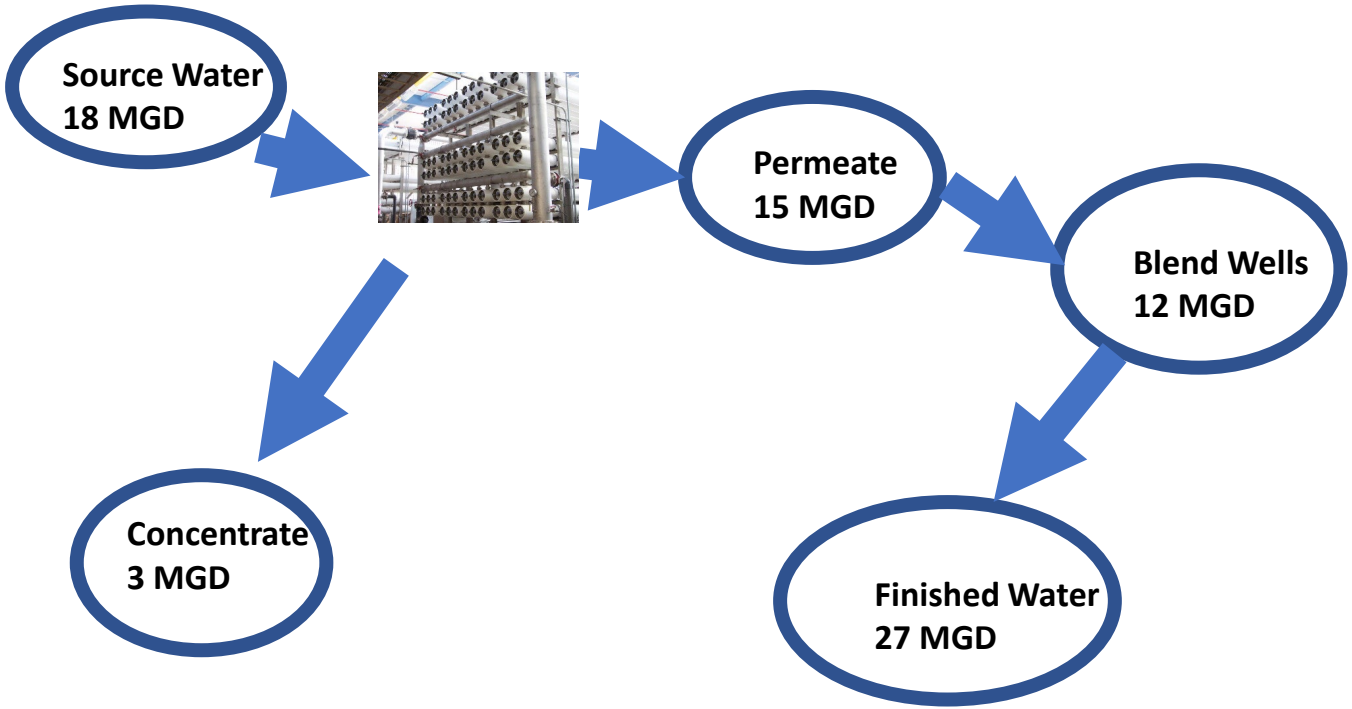
- Drought
- Emergency situations
- Growth
- Brackish water intrusion


NEW MEXICO
TEXAS
DEEP WELL
DISPOSAL SITE
CONCENTRATE LINE
BY DEEP WELL DISP.
BLEND WELLS &
COLLECTION LINE
LOOP STS
SOURCE WELLS
RO PLANT SITE
© 2003
© 2003

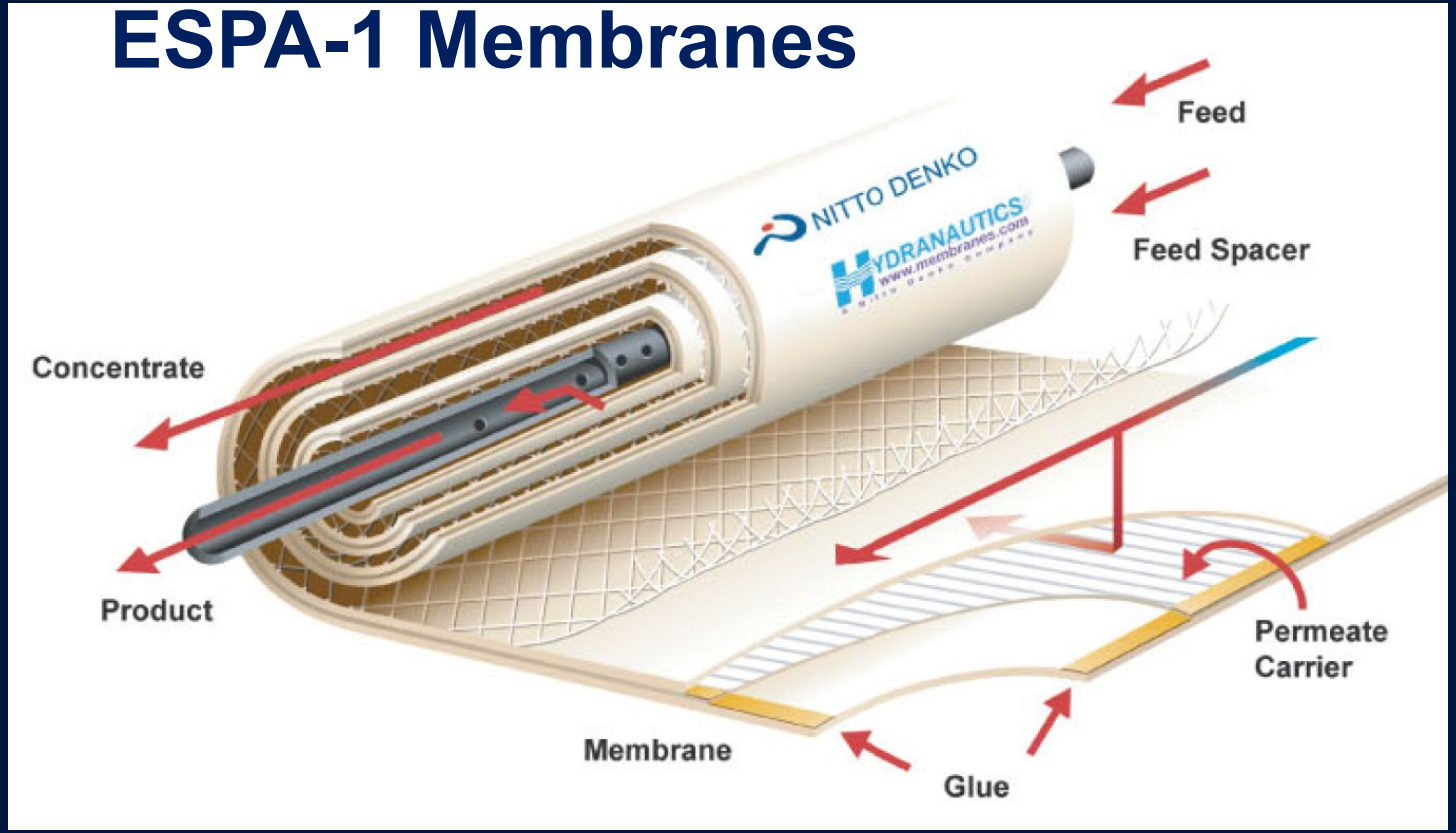


Desalting 101

- Source Water – 18 MGD
- Permeate-15 MGD
- Concentrate – 3 MGD
- Blend Water -12.5 MGD
- Finished Water – 27.5 MGD

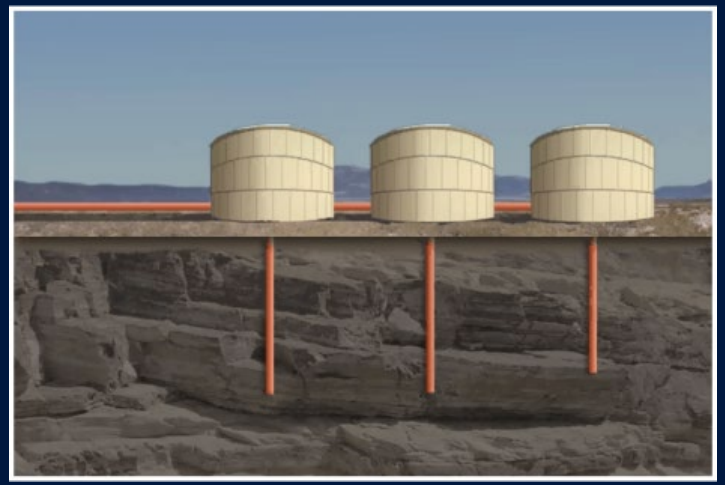

Source Water
18 MGD
Permeate
15 MGD
Blend Wells
12 MGD
Concentrate
3 MGD
Finished Water
27 MGD

ESPA-1 Membranes



Remote Concentrate Disposal Area

- Less costly and less environmental impact than evaporation ponds
- 3 injection wells
- Concentrate pipeline (22 mi)



Dam Names

- [x] Engle Dam
- [x] Engel Dam
- [x] B.M. Hall Dam
- [x] Woodrow Wilson Dam
- [x] Elephant Butte Dam