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Irrigation Trends and Challenges in Arizona and the SW US

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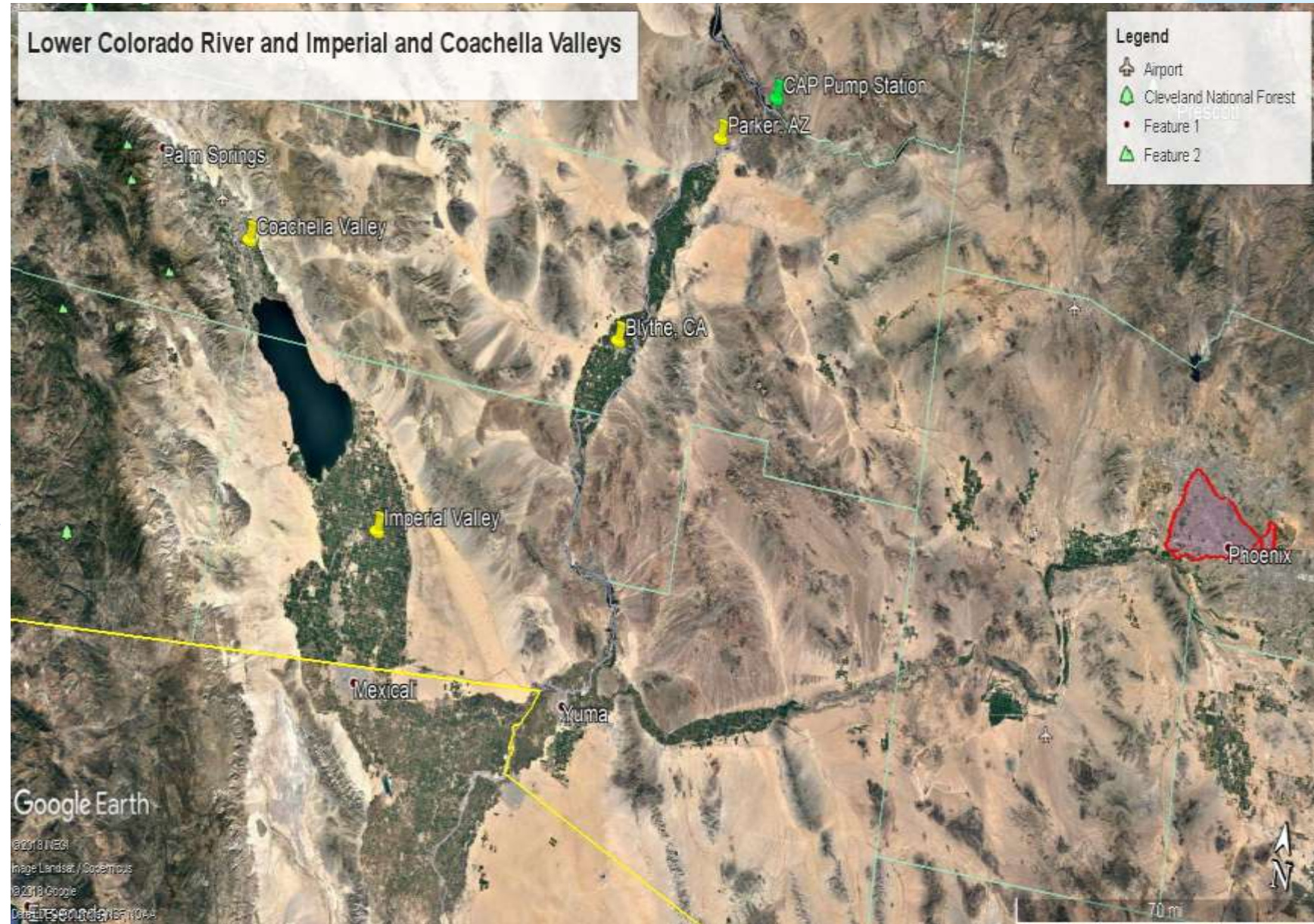
Introduction - Overview

- **Irrigation is an important part of the economy of Southern California and Arizona.**
- **Without irrigation, crop production is virtually impossible in this arid region where annual rainfall ranges from 50-300mm/yr.**
- **With irrigation, however, it is some of the most productive agricultural land in the US.**
- **Arizona's agricultural industry provides more than 88,000 full and part-time jobs in Arizona and contributes more than \$17 billion to the state's economy.**





- **The primary areas of irrigated crop production in Southern California are the Imperial and Coachella Valleys as well as some areas along the Colorado River at Blythe and Bard**
- **In Arizona the primary areas are along the Colorado River and near Yuma and in Central and South Eastern Arizona**

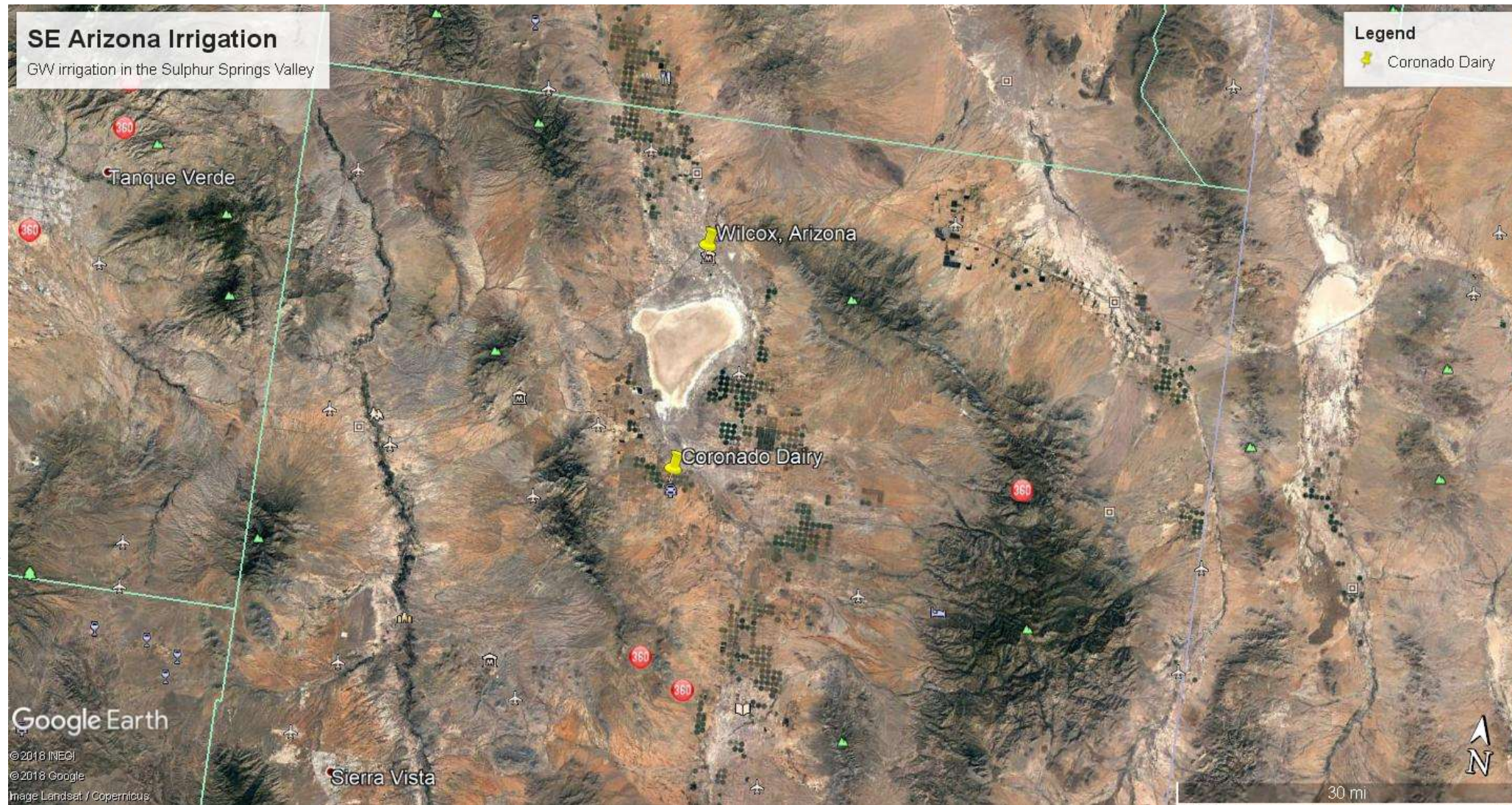




Central Arizona Irrigated Areas from Phoenix towards Tucson



Ground water irrigation in SE Arizona (Sulphur Springs Valley). Coronado Dairy has 198 Center Pivots and irrigates a little over 24,000 acres (~10,000 HA)





Imperial Irrigation District (IID)

- **Area in Imperial Valley between Salton Sea and International Border.**
- **Water source from Colorado River via “All American Canal”**
- **Salton Sea initially formed 1905-1907 when entire Colorado River flowed for two years through the “Alamo Canal”.**
- **Now sustained by drainage water.**
- **Coachella Valley Water District (CVWD) North of Salton Sea, also receives water from All American Canal**





Colorado River Basin

- **Supplies water to SW US.. Arizona, Southern California, Nevada and parts of New Mexico and Mexico.**
- **Also to Colorado, Utah and Wyoming (Upper basin states)**





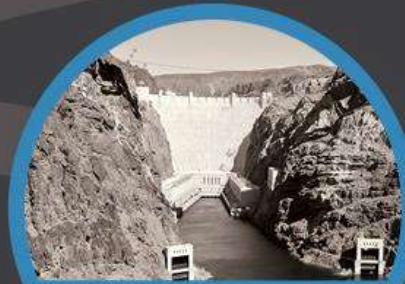
- **Hoover Dam was the first dam on the Colorado River and enabled subsequent development of the river's water resources**
- **Justified to provide water to Los Angeles and the Imperial Valley**
- **Completed in 1936.**

KNOW YOUR WATER

History Walk



CENTRAL ARIZONA PROJECT



1928

Congress authorizes the **Boulder Canyon Project** allotting 4.4 million acre-feet to California, 2.8 million acre-feet to Arizona and 300,000 acre-feet to Nevada.



Colorado River Basin Overview

Colorado River Allocations

1922 Colorado River Compact established Upper and Lower Basin States' allocations

UPPER BASIN STATES - 7.5 MAF

1948 Upper Colorado Basin Compact established the Upper Basin States' apportionment

LOWER BASIN STATES - 7.5 MAF

California – 4.4 MAF

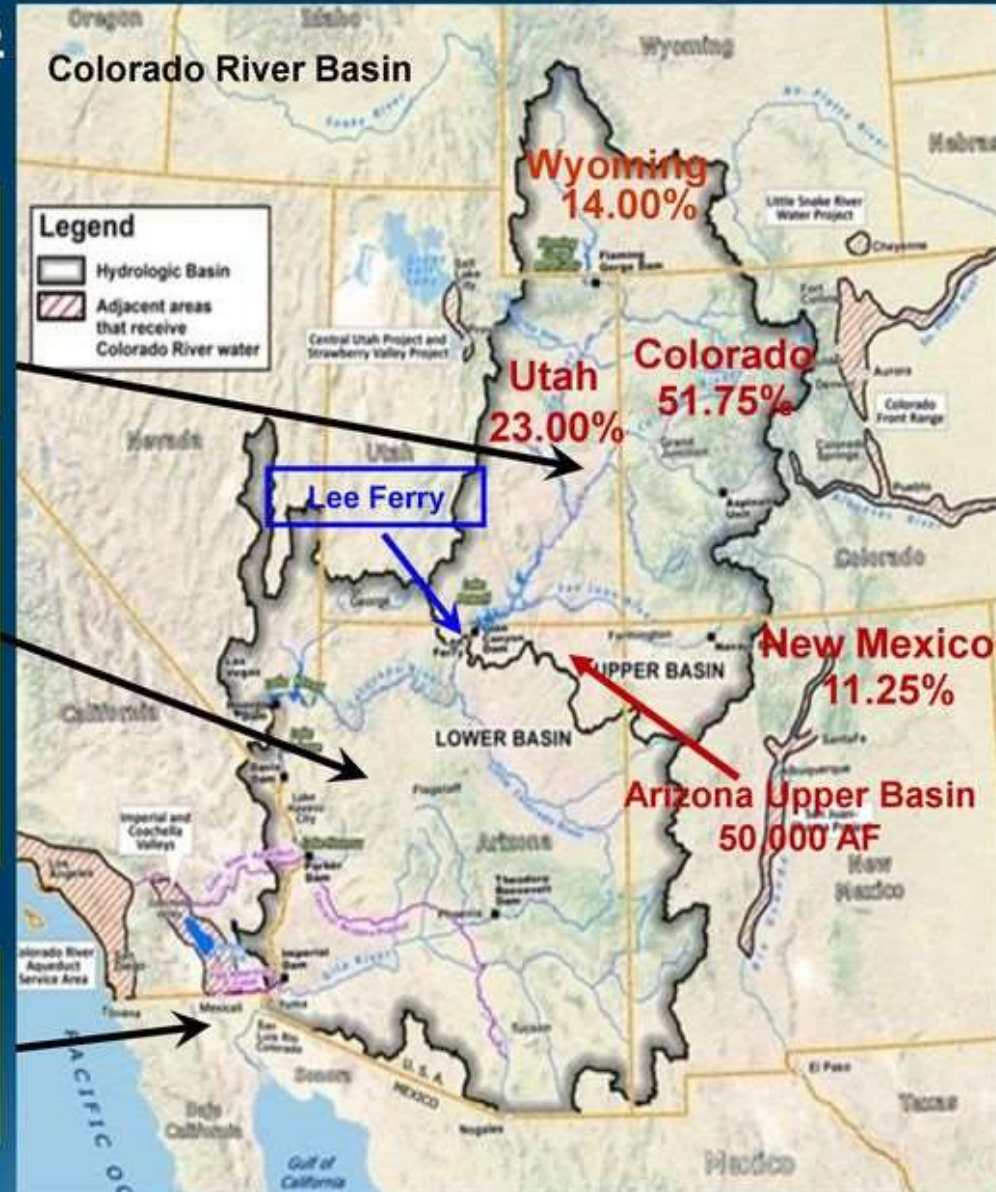
Arizona – 2.8 MAF

Nevada – 0.3 MAF

1928 Boulder Canyon Project Act established the Lower Basin States' apportionment

MEXICO - 1.5 MAF

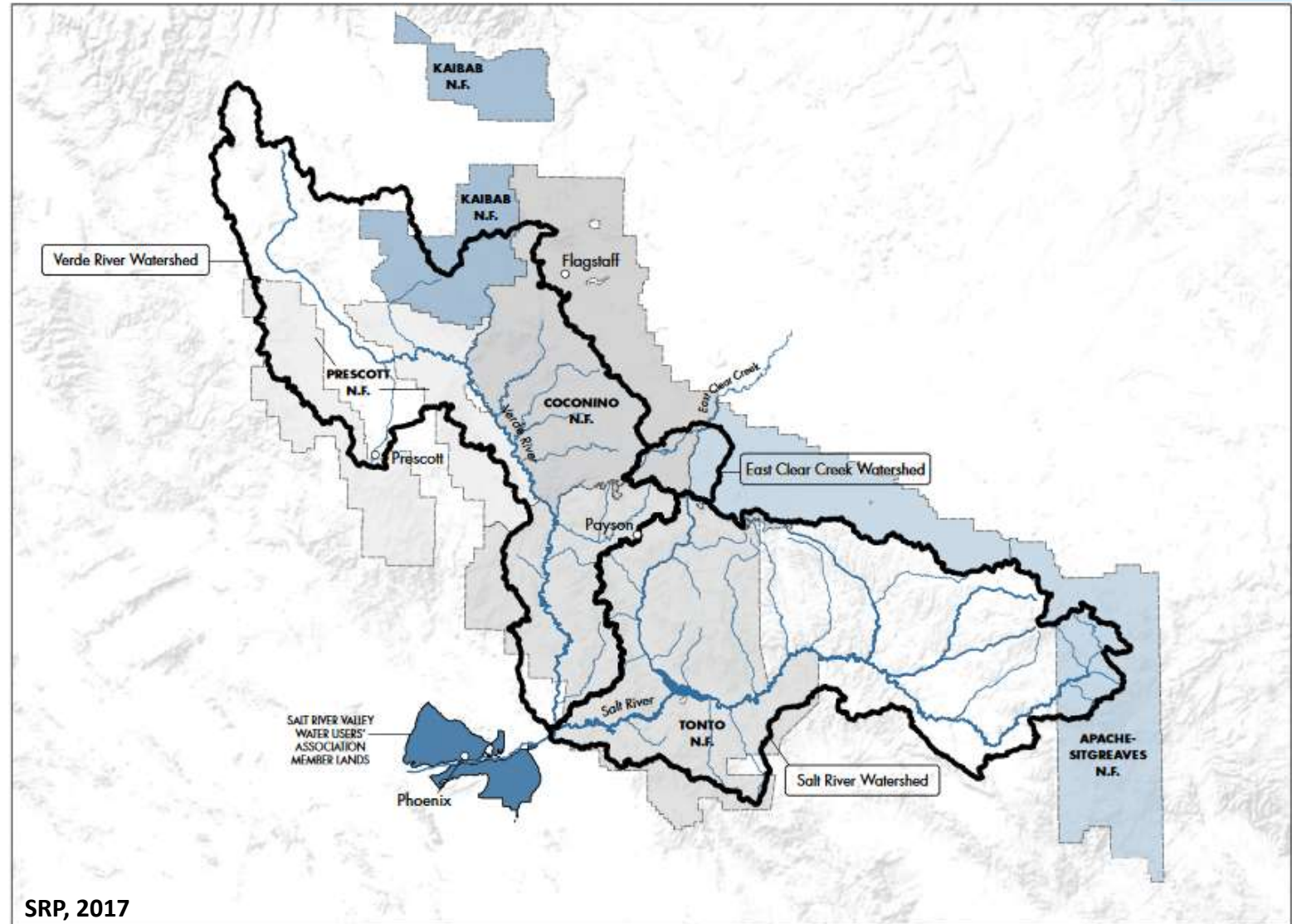
1944 Treaty with Mexico established Mexico's treaty deliveries





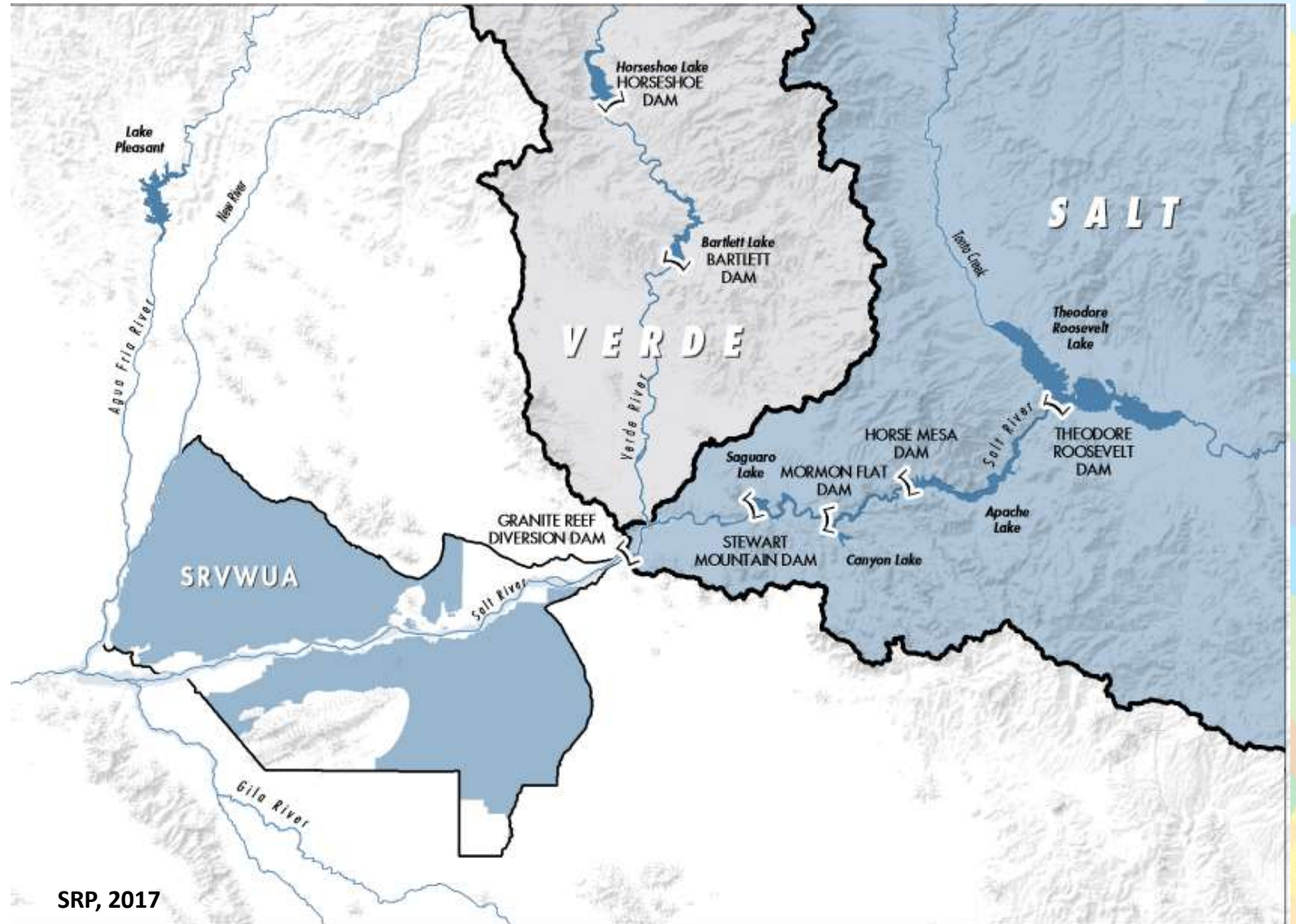
Salt River Project (SRP)

- **Developed to deliver water (and power) to the “Valley of the Sun” (Phoenix area).**
- **Captures water from the Salt and Verde Rivers which converge at Phoenix.**





- **The SRP utilizes seven dams on the Salt and Verde Rivers.**
- **The first was the Theodore Roosevelt Dam completed in 1910.**
- **The Theodore Roosevelt Dam was the first dam built by the US Reclamation Service (Now the US Bureau of Reclamation).**





- **The dam was started in 1905 and completed in 1911.**
- **It is a masonry dam.** (SRP, 2017)





The Central Arizona Project (CAP)

- The 1968 Colorado River Basin Project Act authorized construction of CAP by the U.S. Department of the Interior's Bureau of Reclamation.
- Construction began in Lake Havasu in 1973 and was completed 20 years later south of Tucson at a cost of more than \$4 billion. <https://www.cap-az.com>





**Water enters the system at Mark Wilmer Pumping Plant where six 66,000 horsepower pumps lift water more than 800 vertical feet into the seven-mile long Buckskin Mountain Tunnel.
<https://www.cap-az.com>**



The canal system stretches 336 miles, lifts the water more than 2,900 feet in elevation over the course of the system and includes 14 pumping plants, one hydroelectric pump/generating plant at New Waddell Dam, Lake Pleasant storage reservoir, 39 radial gate structures to control the flow of water and more than 50 turnouts to deliver water.



Irrigation Districts in Arizona

- **There are 65 Irrigation Districts in Arizona**
- **Most are located along the Colorado River or in Central Arizona.**
- **However, the largest is the Salt River Valley Water Users Association which receives its water from the Salt River Project.**

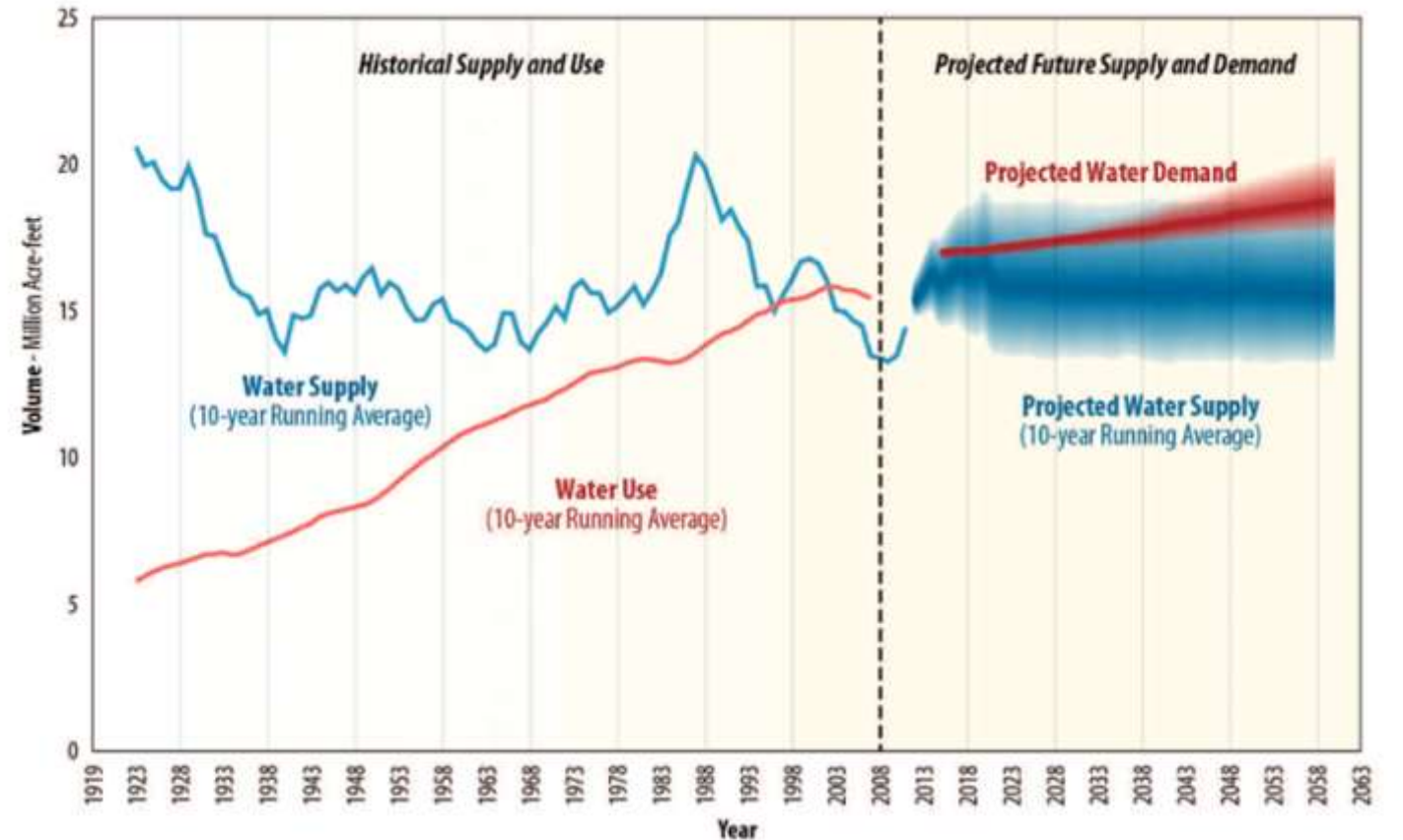




Challenges Facing Irrigation Districts

- **Water Scarcity**

- **Regardless of location, all districts, including those in California are subject to decreasing water availability and increasing demands.**



Water Supply and Demand in Colorado River Basin

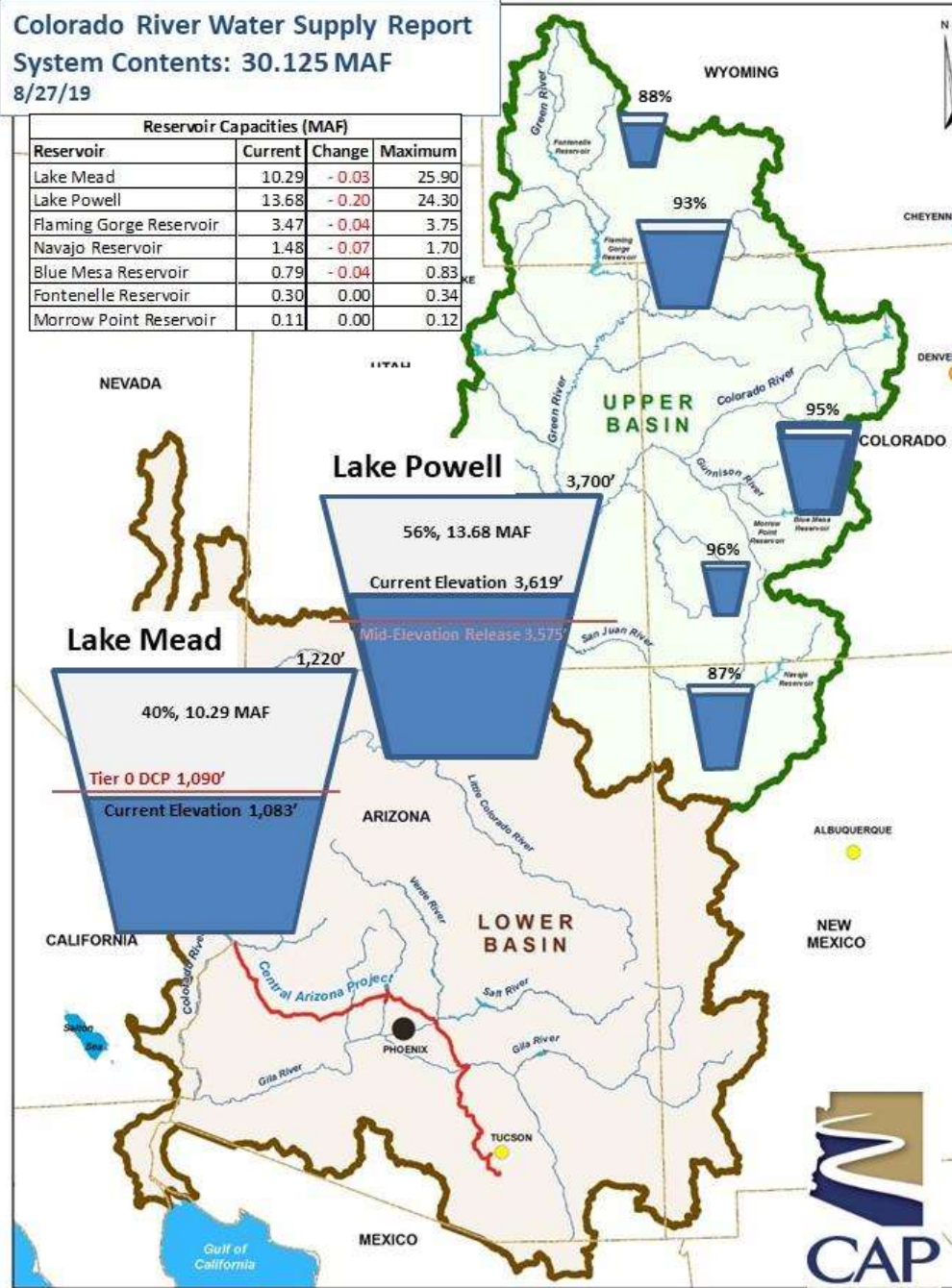
(US Bureau of Reclamation - 2012)



Supply status in Colorado River Basin as of August 27, 2019

Colorado River Water Supply Report
System Contents: 30.125 MAF
8/27/19

Reservoir Capacities (MAF)			
Reservoir	Current	Change	Maximum
Lake Mead	10.29	-0.03	25.90
Lake Powell	13.68	-0.20	24.30
Flaming Gorge Reservoir	3.47	-0.04	3.75
Navajo Reservoir	1.48	-0.07	1.70
Blue Mesa Reservoir	0.79	-0.04	0.83
Fontenelle Reservoir	0.30	0.00	0.34
Morrow Point Reservoir	0.11	0.00	0.12

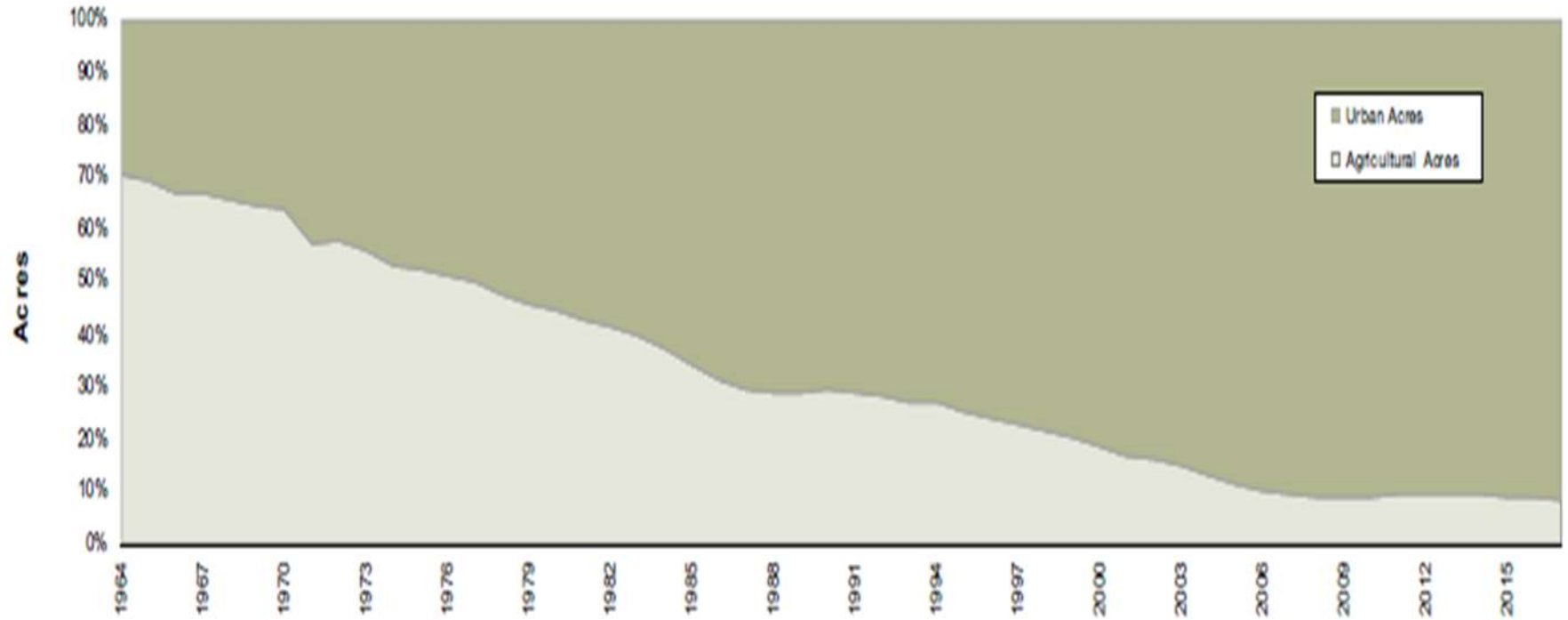




Urbanization

- **Primarily in the Phoenix Metropolitan Area**
- **For example, agricultural acreage in the SRP service area has declined from 70% of the area in 1964 to only 8% in 2017.**
- **Not a big factor along the Colorado River or the Imperial Irrigation District**

Agricultural and Urban Acreage 1964 - 2017



⁽¹⁾ Acreage comparisons are based upon total basic fee acreage only.



Irrigation in Arizona Outside the Districts

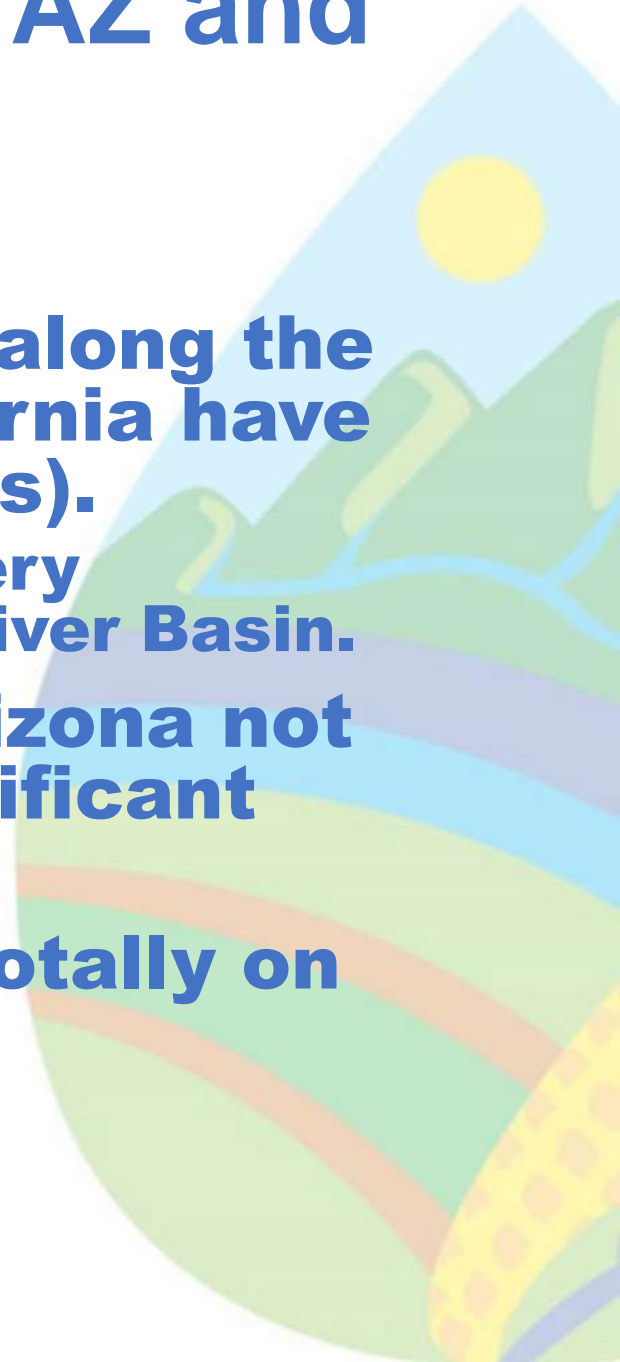
- **Primarily in SE Arizona in the Sulphur Springs Valley**
- **All from groundwater**
- **In that area, groundwater exploitation only weakly regulated**
- **Significant concern that continued exploitation is unsustainable**





What is the Future of Irrigation in AZ and S. California?

- **The Imperial Irrigation District and lands along the Colorado River, both in Arizona and California have superior water rights (dating to late 1800's).**
 - **Thus these areas are relatively safe unless very significant shortages occur in the Colorado River Basin.**
- **However, irrigation districts in Central Arizona not served by the SRP face possibility of significant loss of water in the near future.**
- **Those systems in SE Arizona depending totally on groundwater should be concerned about sustainability.**





Reference

- SRP. 2017. The Story of SRP: Water, Power and Community. Salt River Project. Phoenix, AZ. 211p.



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