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RECLAMATION

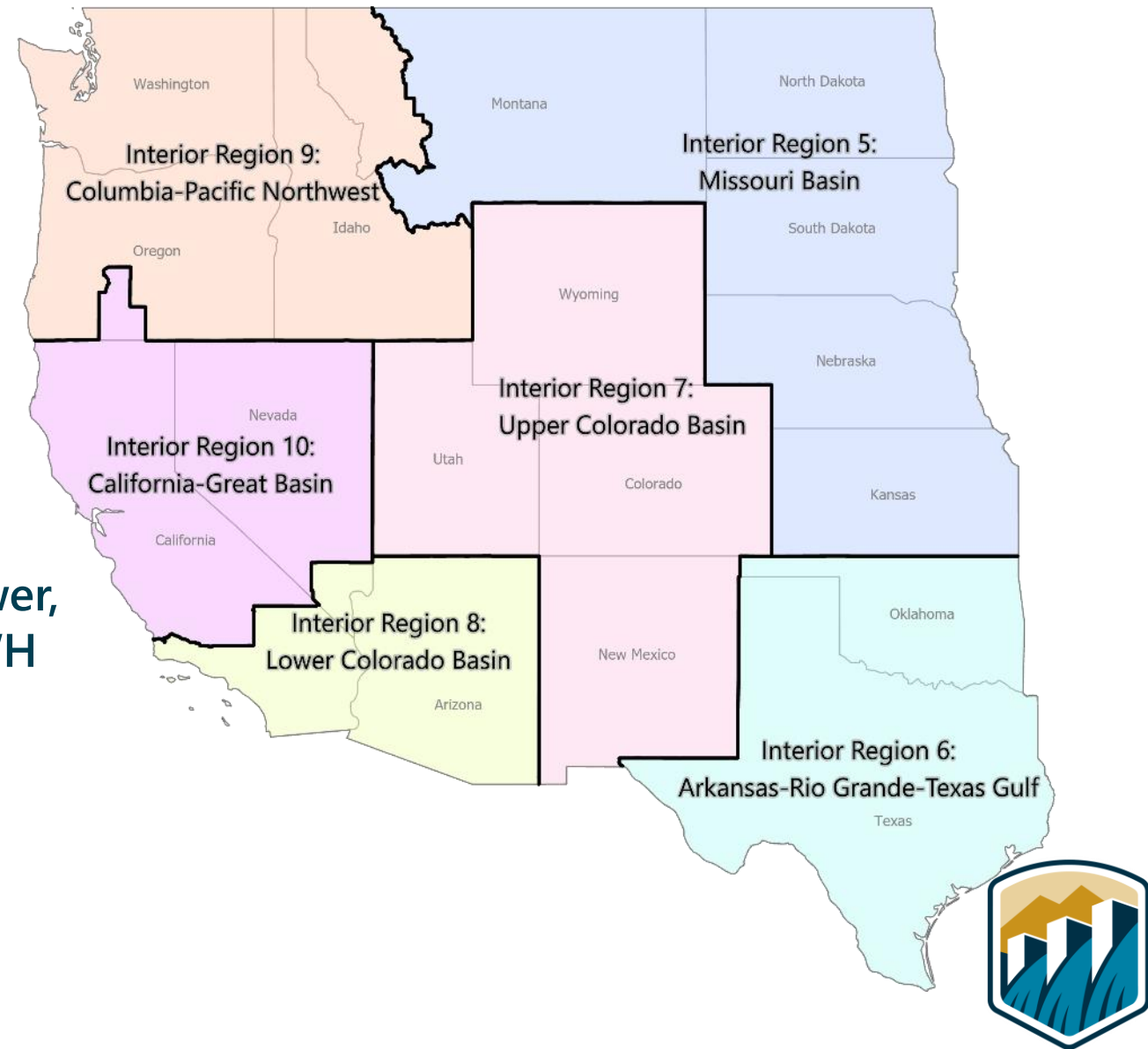
Water Supply Projects in an Arid Zone of the Southwestern United States

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U.S. Bureau of Reclamation

- U.S. Department of the Interior agency
- Established in 1902 in the 17 western United States
- Largest wholesaler of water in U.S., providing water to over 40 million people
- Provides water to irrigate 10 million acres of farmland, producing 60% of the nation's vegetables
- Second largest producer of hydroelectric power, with 58 powerplants producing 40 billion KWH
- Over 600 dams and reservoirs
- Includes Hoover, Davis, and Parker dams and infrastructure for water delivery on the lower Colorado River



Phoenix Metro Area

- “The Valley of the Sun”
- Climate – June-September average high temperatures $\sim 40^{\circ}\text{C}$
- Precipitation – 20.4 cm/yr
- Population – 4.9 million (2019)
- Rapid growth
 - Third largest growth in US (2010-2019)
- Per capita water use – 680 L/day
- Water usage
 - Agricultural, M&I, and Tribal



Phoenix Water Supply

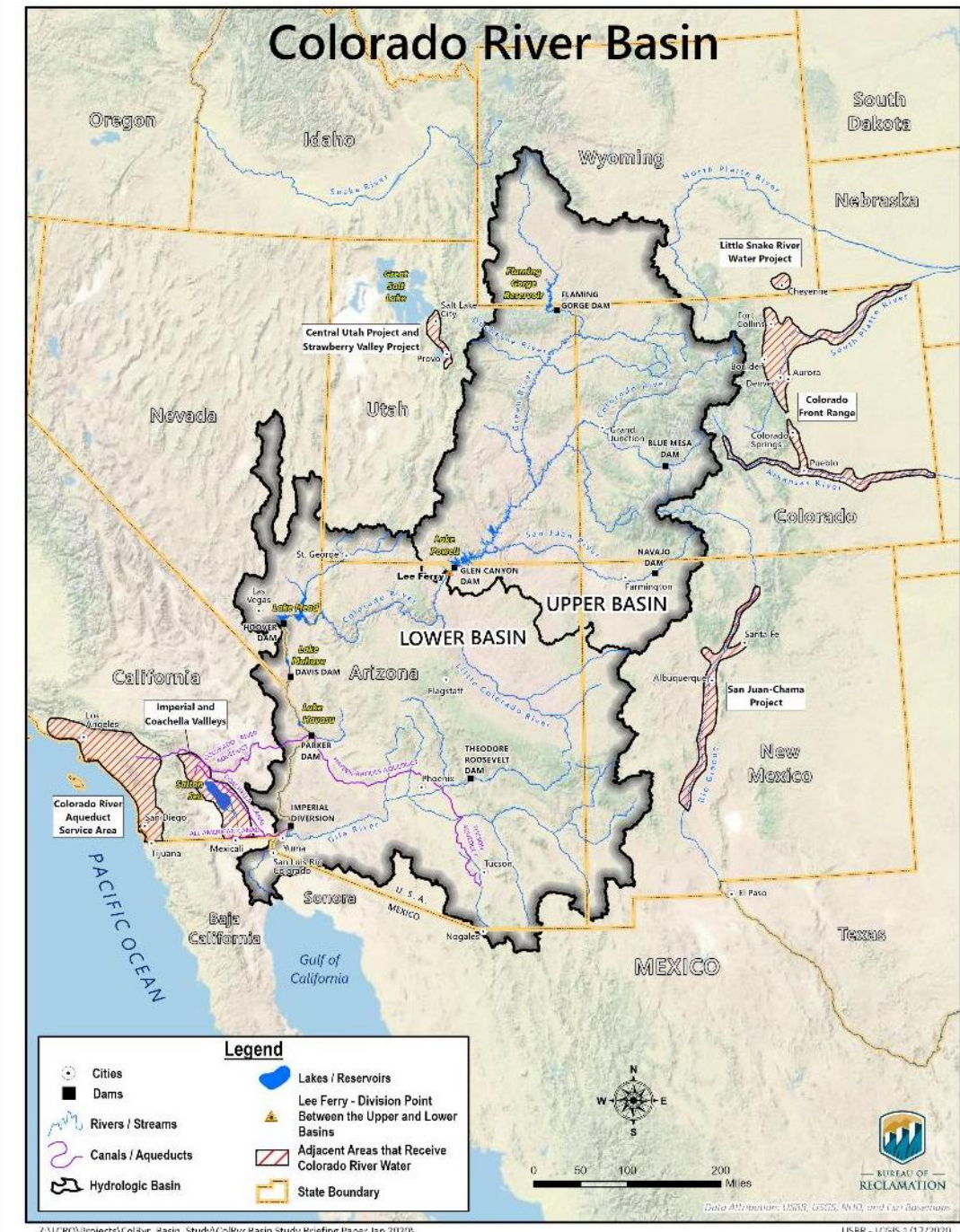


- Colorado River Basin
 - Watershed - Colorado, Wyoming, and Utah
- Salt River Project
 - Watershed - Northern and Eastern Arizona
- Phoenix Area Groundwater
- Variety of Water Sources
 - Increase reliability
- Distribution/Delivery Systems
 - Federal, state, and local ownership



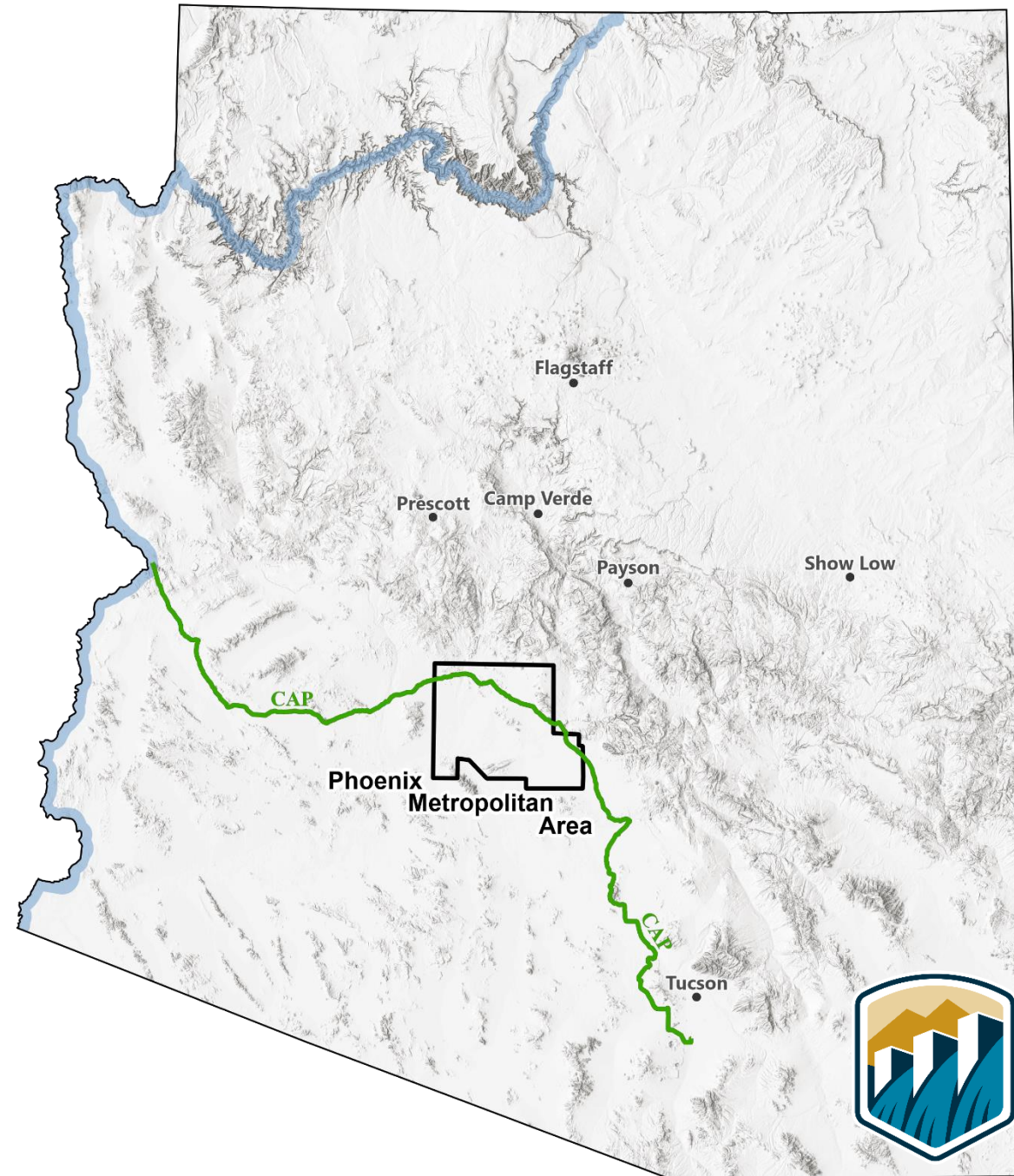
Colorado River Basin

- 20.35 bcm/year of allocations
 - 9.25 bcm to the Lower Basin States including Arizona
- Approximately 19.7 bcm average annual “natural flow”
 - Inflows are highly variable year-to-year
 - Current 22-year drought is among the driest periods of last 1,200 years
- 74 bcm of storage (approximately four times the annual average inflow)
- Colorado River water taken off river by Central Arizona Project for use in Central Arizona



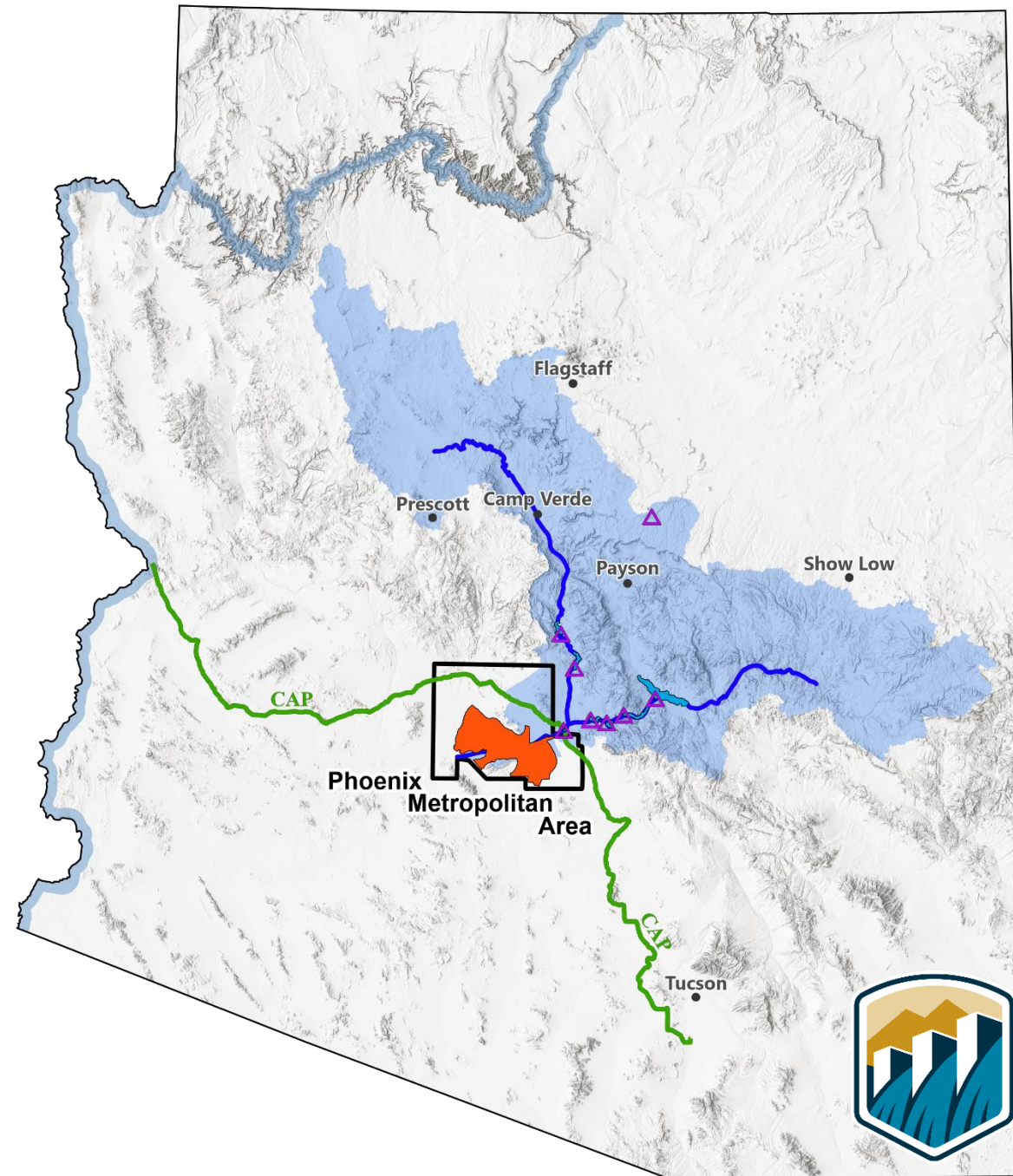
Central Arizona Project

- Delivers Colorado River Water to federal, state, and local distribution systems
- Tribal, Agricultural, Municipal & Industrial uses
- 1.8 bcm/year
- 540 km length
- 915 m rise
- 14 pumping plants



Salt River Project

- Service Area - Phoenix metropolitan area
- Watershed mountains of northern and eastern Arizona
- 7 dams – Storage 2.8 bcm
- 270 groundwater wells
- 1,930 km of canals
- Conjunctively operated
- Deliveries 990 mcm year



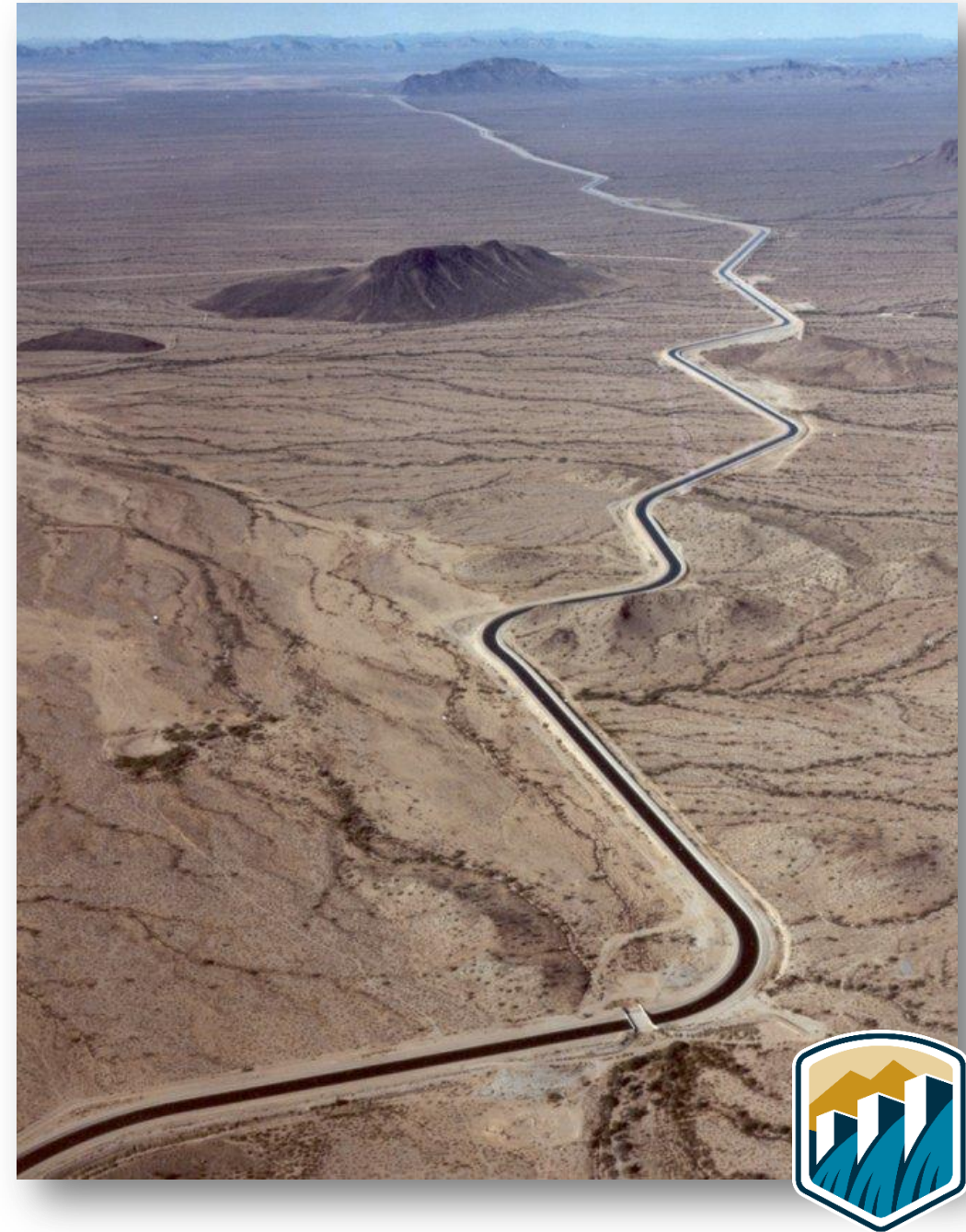
Phoenix Groundwater Supplies

- Regulated under 1980 Groundwater Management Act
- Established Active Management Areas
 - In areas of high groundwater overdraft
- Limits new groundwater pumping
- Incentivizes storage of water underground
 - Credits that are marketable and extractable



Water Supply Reliability

- Diverse Source Supplies
 - Upper Colorado River Basin/Arizona
 - Surface Water/Groundwater
- Groundwater storage incentivized
- Large storage volumes
 - Colorado River/SRP reduce impacts of drought
- Systems interconnections increase flexibility – CAP → SRP
- Water leases/exchanges
- Shortage sharing



Evolving Water Management

- Continuing drought
 - Colorado water delivery reductions
 - 2022 Arizona – 632 mcm reduction
 - Shortage sharing agreements
- New intersystem connections
- Wheeling of non-project water
- Canal capability projects
- Storage studies
 - Restore lost capacity/create new capacity
- Transfers of mainstem Colorado River rights to central Arizona
- Watershed Restoration



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