

Colorado River Shortage: What it Means for Arizona Agriculture

Presentation to the 21st Annual ASFMRA
Spring Ag Forum

February 24, 2017

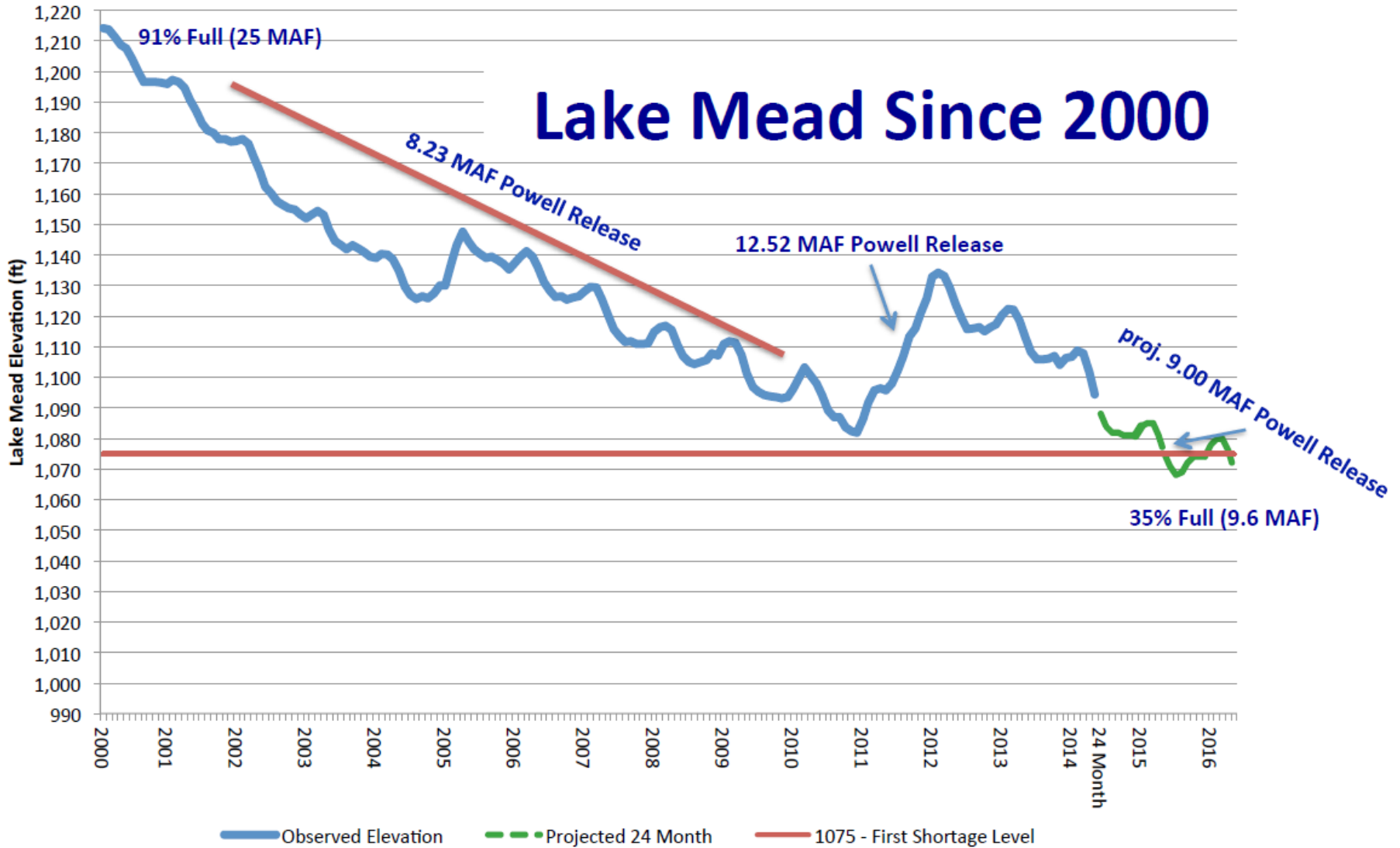
1922 Colorado River Compact

- Upper Basin: 7.5 million AF
 - Colorado: 3.86 MAF
 - Utah: 1.71 MAF
 - Wyoming: 1.04 MAF
 - New Mexico: 0.84 MAF
 - Arizona: 0.05 MAF
- Lower Basin: 7.5 million AF
 - California: 4.40 MAF
 - **Arizona: 2.80 MAF**
 - Nevada: 0.30 MAF



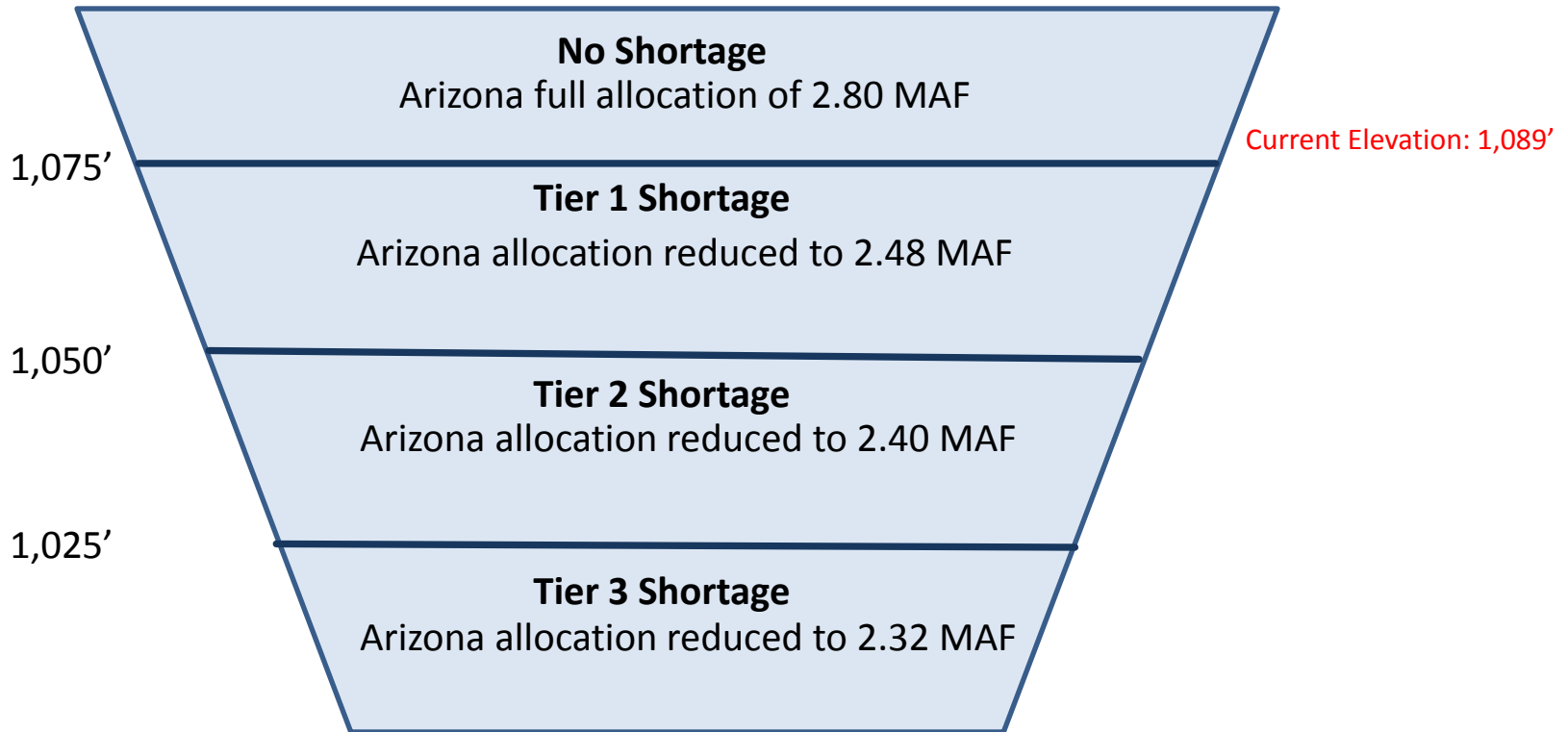
38.2%: 119.29
51.25%: 108.98
61.6%: 99.19

Lake Mead Since 2000

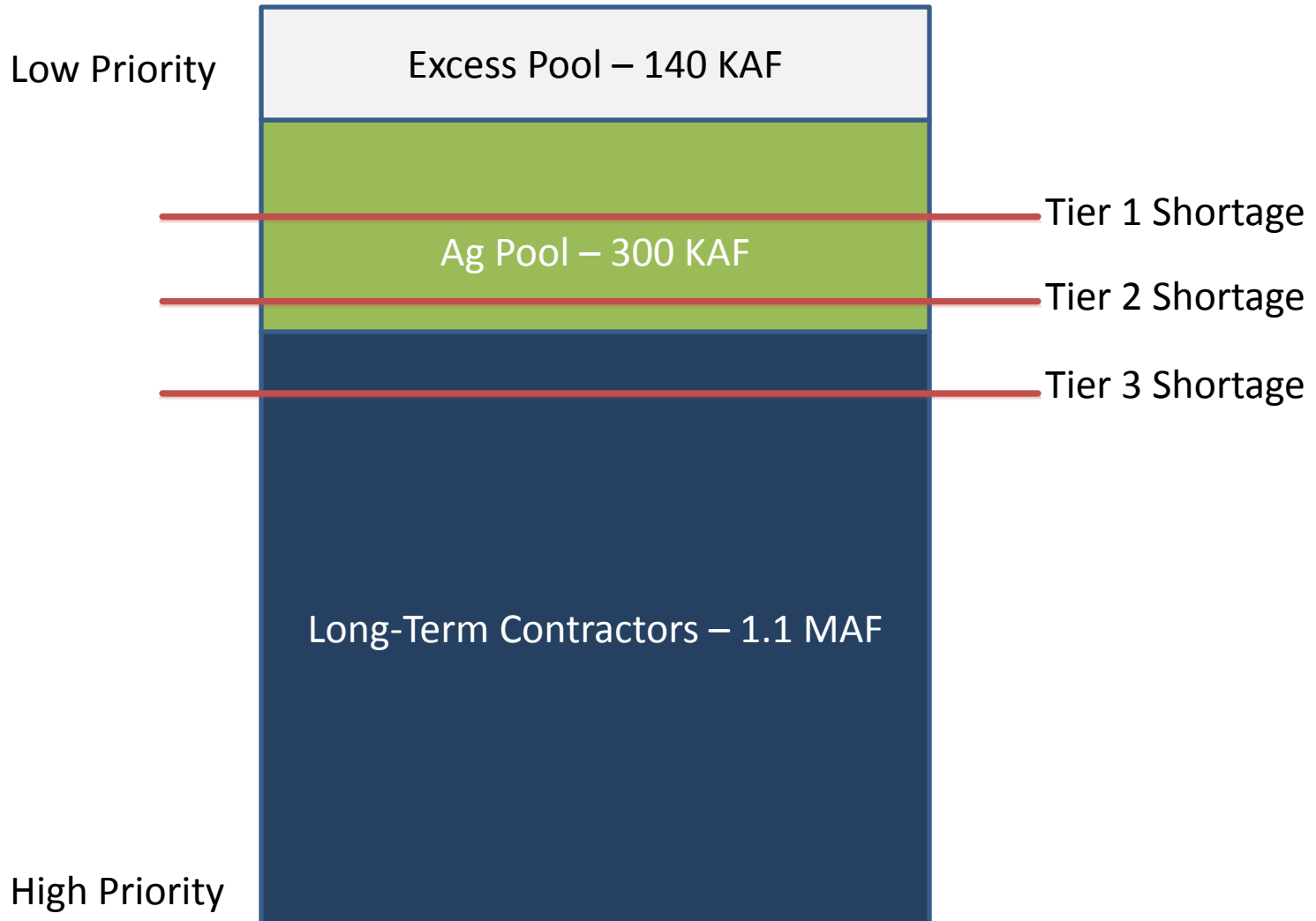


2007 Interim Guidelines for Lower Basin Shortages

Lake Mead Elevation



Shortage Impacts – Central Arizona Project



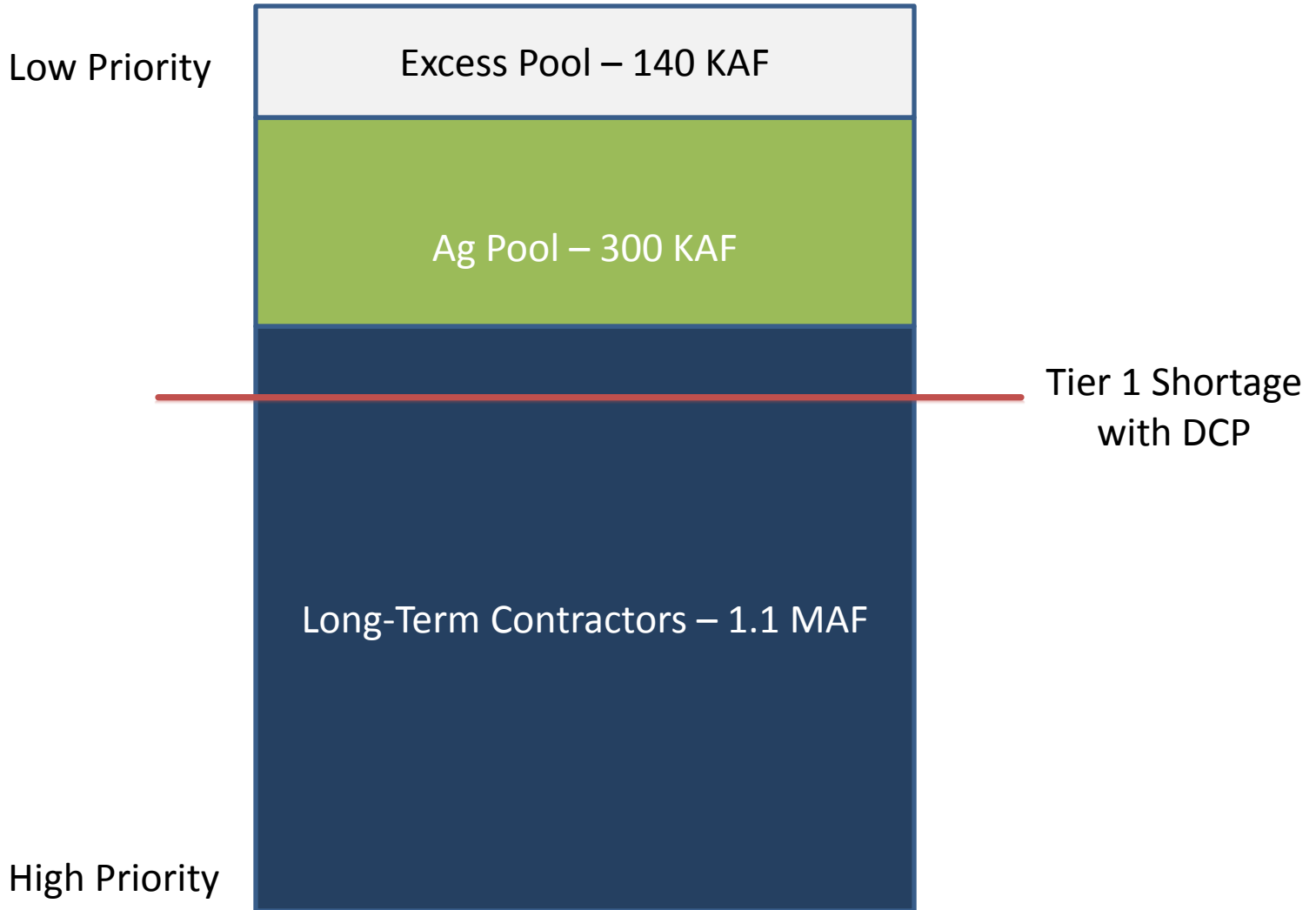
Proposed Drought Contingency Plan (DCP)

- Arizona is proposing to take additional shortage reductions in the near-term to avoid more severe shortages in the future.
- Winners: Higher-priority Colorado River water users.
- Losers: Lower-priority Colorado River water users.

Arizona Shortage Reductions, 2007 Guidelines and DCP

Lake Mead Elevation (ft)	2007 Guidelines (KAF)	DCP (KAF)
1090-1075	0	192
1075-1050	320	512
1050-1045	400	592
1045-1040	400	640
1040-1035	400	640
1035-1030	400	640
1030-1025	400	640
<1025	480	720

Shortage Impacts with DCP – Central Arizona Project



Pilot System Conservation Program (PSCP)

- Announced in 2014.
- \$15 million in funding for voluntary Colorado River water conservation projects that would leave water in Lake Mead to delay shortage.
- Funders: US Bureau of Reclamation, Central Arizona Project, Metropolitan Water District, Southern Nevada Water Authority, Denver Water.
- Proposals solicited for voluntary Colorado River water conservation projects.
- Results: 11 projects funded, conserving 98,000 AF at a cost of \$155 per AF.

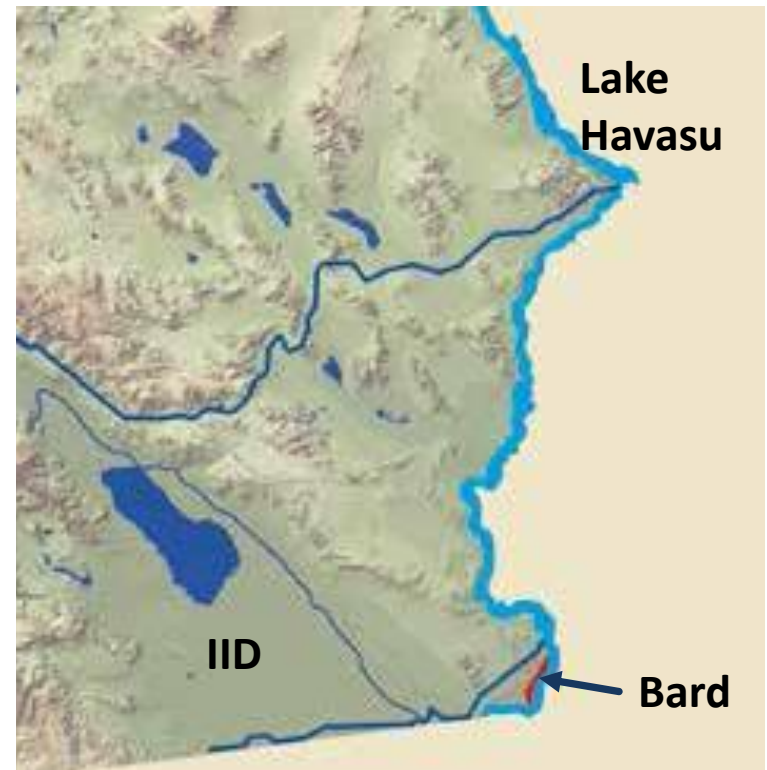
Example System Conservation Projects

- **CAP Ag Pool Users:** Reduced CAP water deliveries to Central Arizona agriculture by 25,265 AF in 2016 in exchange for decreased CAP water delivery charges in future years.
- **Tohono O'odham Nation:** Reduced CAP water deliveries to recharge facilities by 9,817 AF in 2016 at a cost of \$176 per AF.
- **Colorado River Indian Tribes:** Fallowed 1,591 acres of farmland to reduce consumptive use by 8,572 AF at a cost of \$186 per AF.
- **Gila River Indian Community:** Reduced CAP water deliveries to recharge facilities by 10,000 AF in 2016 at a cost of \$176 per AF.

MWD Projects in California

Bard Water District

- 6,400 irrigated acres.
- Cropping pattern: Winter vegetables, summer grains and grasses.
- MWD Program: Voluntary fallowing of up to 2,000 acres from April 1-July 31.
 - Term: 2016-2017.
 - Annual Payment: \$400 per acre.
 - Water Savings: 2 AF per acre.



MWD Projects in California

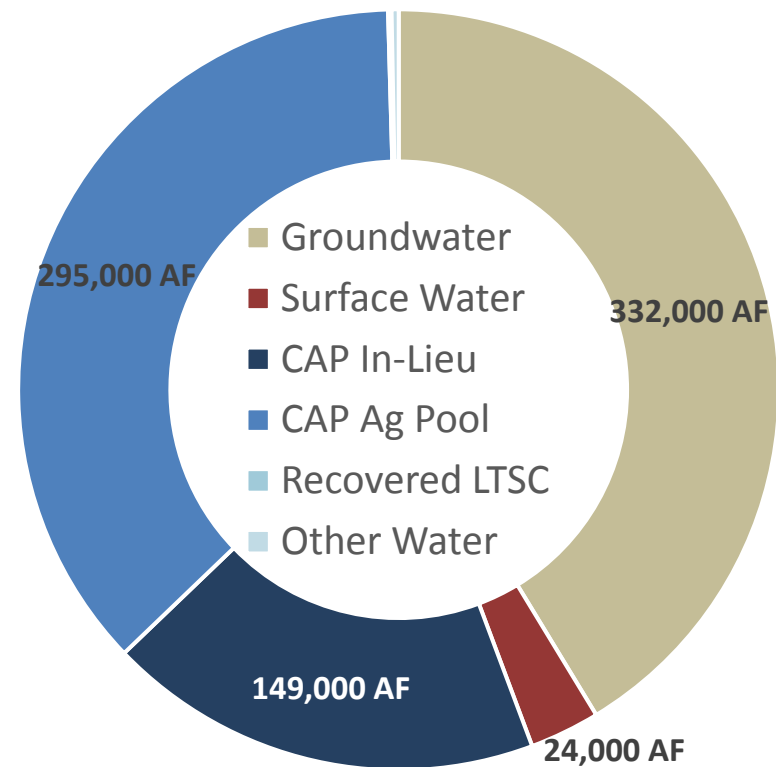
Palo Verde Irrigation District

- MWD owns 21,000 irrigated acres in PVID and has operated a rotational fallowing program in the district since 2004.
- PVID land leased to local growers for \$240-\$250 per acre.
 - Leases expired December 2016.
- New farm leases executed in 2017 provide water conservation incentives:
 - Target consumptive use of 3.5 AF per acre.
 - Tenants consuming less water will receive rent credits of \$37 per AF.
 - Tenants consuming more water will be penalized up to \$187 per AF.

Agricultural Water Use in the Pinal AMA

- Average annual use: 804,000 AF.
- Groundwater: 40%
- CAP Water: 55%
 - 37% Ag Pool
 - 18% In-Lieu
- Includes MSIDD, CAIDD, HIDD, SCIDD from 2011-2015.

Pinal AMA Agricultural Water Use by Source, Annual Average 2011-2015



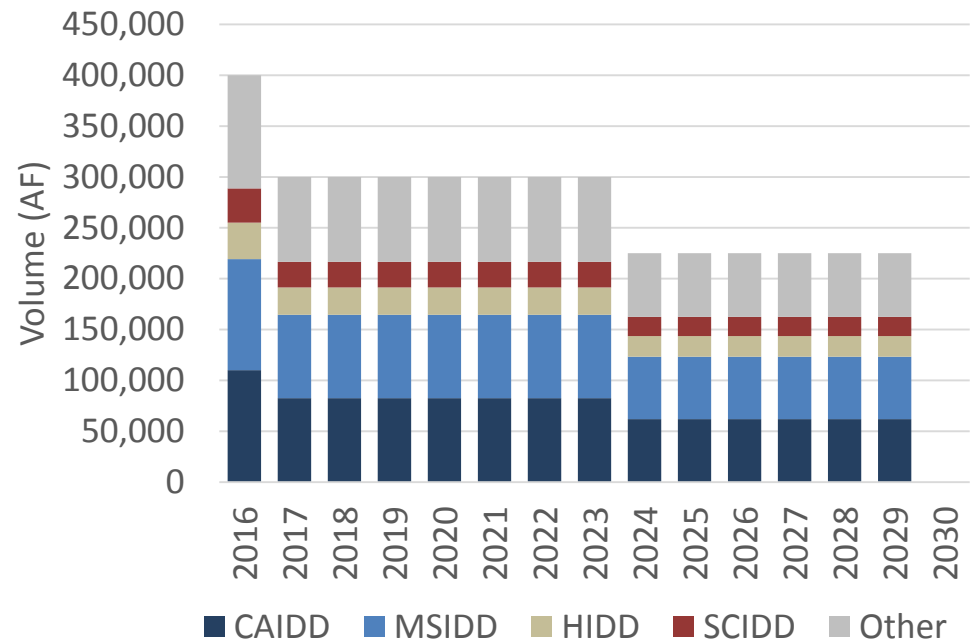
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Threats to Pinal AMA Agricultural Water Supplies

Scheduled CAP Agricultural Settlement Pool Rampdown

- Ag Settlement Pool: Priority access to CAP Excess water granted to former CAP NIA entitlement owners.
- Deliveries subject only to CAP Pumping Energy charges.
 - Currently \$76/AF
- 2017 Pinal AMA Allocations:
 - CAIDD: 82,553 AF
 - MSIDD: 81,887 AF
 - HIDD: 26,924 AF
 - SCIDD: 25,237 AF

Ag Pool Rampdown Schedule, 2016-2030

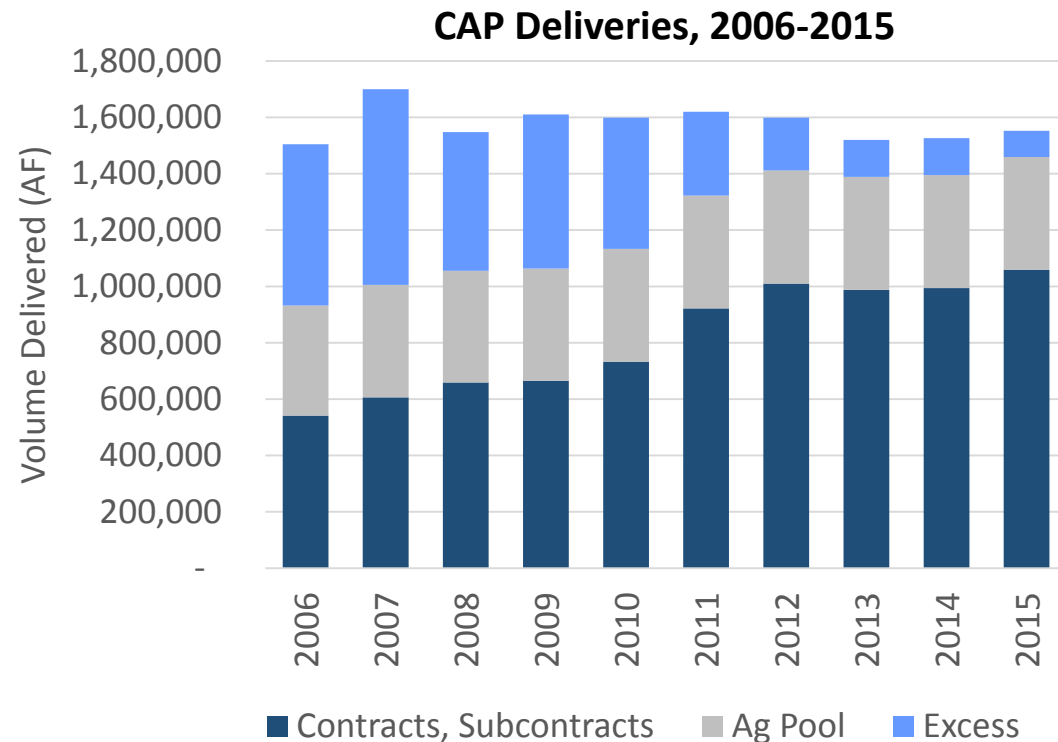


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Threats to Pinal AMA Agricultural Water Supplies

Growth in Use of Long-Term CAP Contracts & Subcontracts

- Increasing use of higher-priority CAP entitlements reduces supply of CAP Excess water, including the Ag Pool and In-Lieu deliveries.
- In 2016, CAP is expecting a significant uptick in M&I subcontract deliveries.



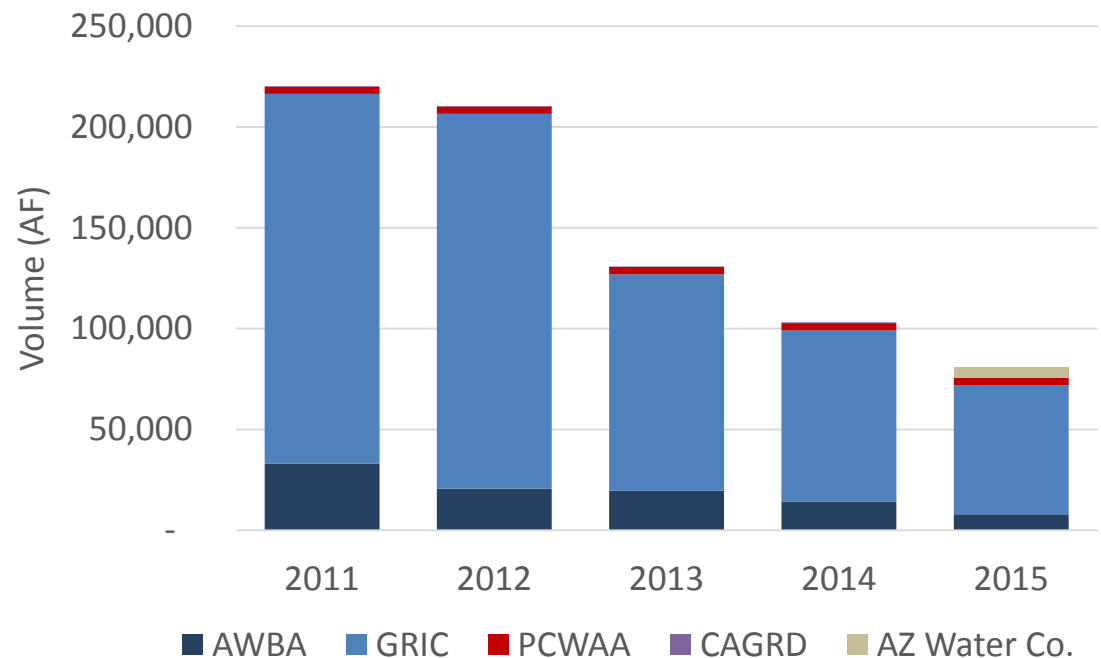
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Threats to Pinal AMA Agricultural Water Supplies

Reductions in CAP In-Lieu Water Deliveries

- As the availability of CAP Excess water decreases, In-Lieu deliveries also decline.
 - AWBA in particular.
- A substantial portion of In-Lieu deliveries has shifted to the Phoenix AMA, e.g GRIC.

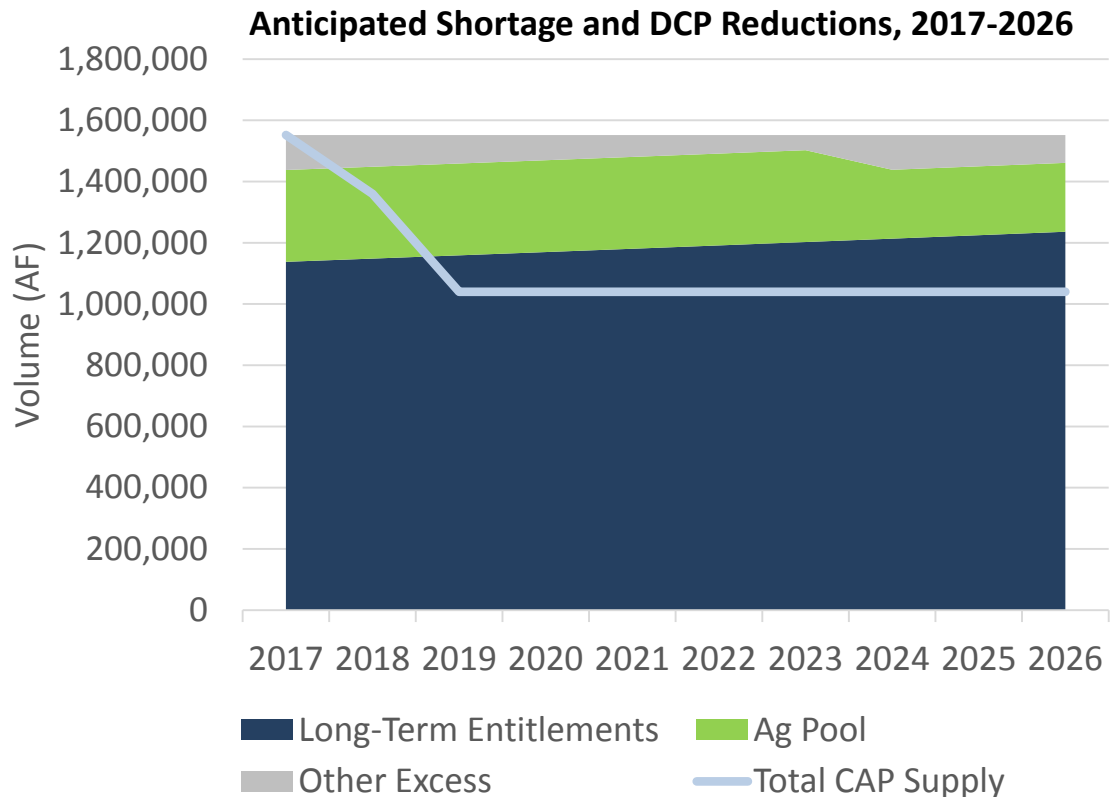
CAP In-Lieu Water Deliveries to Pinal AMA, 2011-2015



Threats to Pinal AMA Agricultural Water Supplies

Shortage Declaration and Proposed Drought Contingency Plan

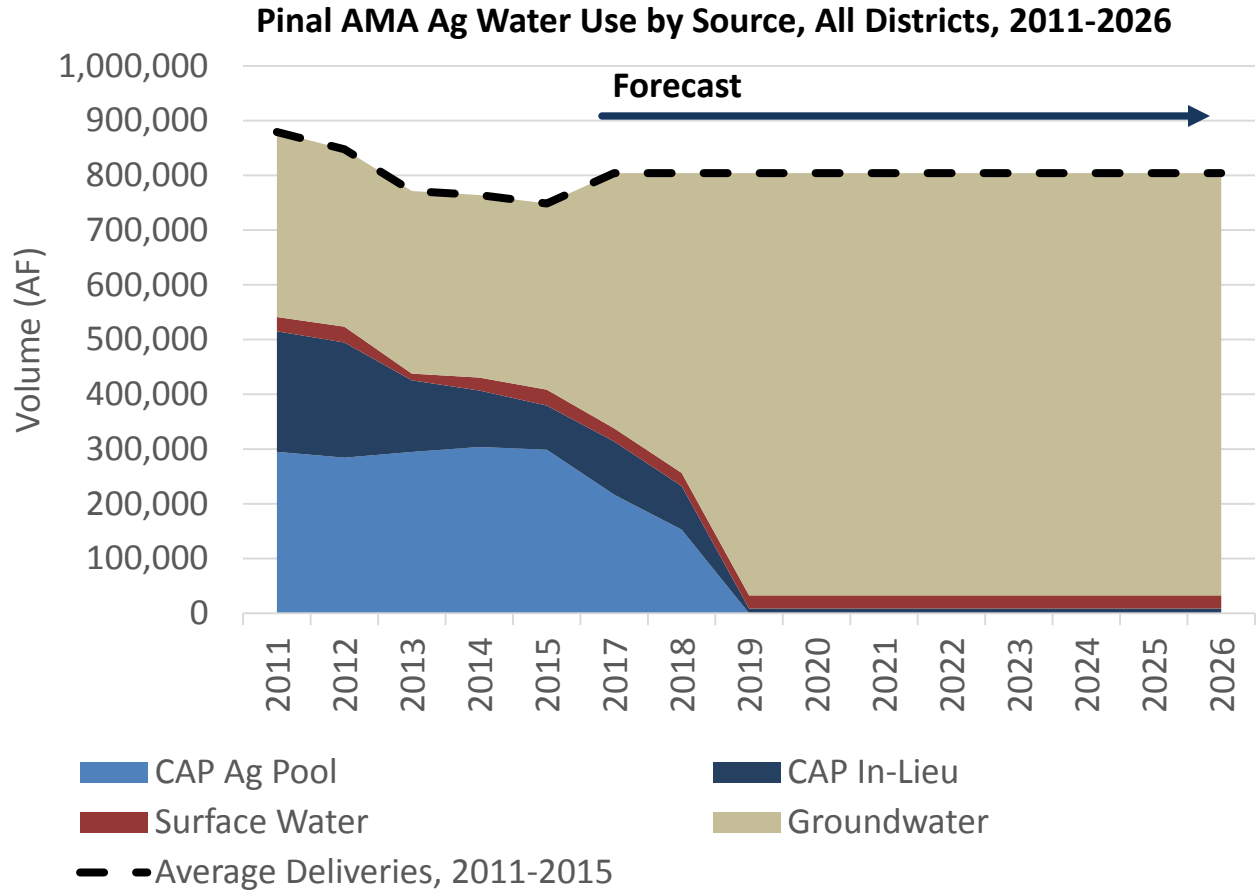
- DCP implementation expected in 2018.
 - Reduction of 192,000 AF in CAP supply.
 - Reduces likelihood of deep shortages.
- Based on the most likely scenario in Reclamation's current forecasting, a Tier 1 shortage is expected in 2019.



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Future Pinal AMA Agricultural Water Use

Based on forecasted CAP water availability, total groundwater pumping by CAIDD, MSIDD, HIDD, and SCIDD will need to increase to 769,000 AF per year by 2019 to maintain historic production levels.



Options for Mitigating CAP Water Supply Reductions

Option No.	Option Name	Option Type
1	Rotational Fallowing	Demand Reduction
2	Deficit & Partial Season Irrigation	Demand Reduction
3a	Crop Conversion – Low Demand	Demand Reduction
3b	Crop Conversion – High Value	Increase Pmt Capacity
4	Irrigation Efficiency – Onfarm	Demand Reduction
5	Modified Water Pricing	Demand Reduction
6	Retirement of Irrigated Land	Demand Reduction
7a	Water Acquisition/Exchange – Reclaimed Water Reuse	Supply Augmentation
7b	Water Acquisition/Exchange – Increased GSF Partner Cost Share	Supply Augmentation
7c	Water Acquisition/Exchange – CAP Water Lease (Tribal)	Supply Augmentation
7d	Water Acquisition/Exchange – Imported Groundwater	Supply Augmentation
7e	Water Acquisition/Exchange – CAP M&I Priority Water Sharing	Supply Augmentation

Key Points

- The impacts of Colorado River shortage on Arizona agriculture vary widely depending on water entitlement type and priority.
- Water shortage risks are becoming a critical issue to address in agricultural land management and investment decisions.
- Colorado River shortage will bring challenges as well as opportunities.
- Growers and landowners should proactively investigate shortage-related opportunities and address risks.
- State and federal policy makers need to fully evaluate the impacts of proposed mitigation measures on agricultural stakeholders.

Thank You

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