Imported Water Committee

Report on Colorado River Evaporation Loss

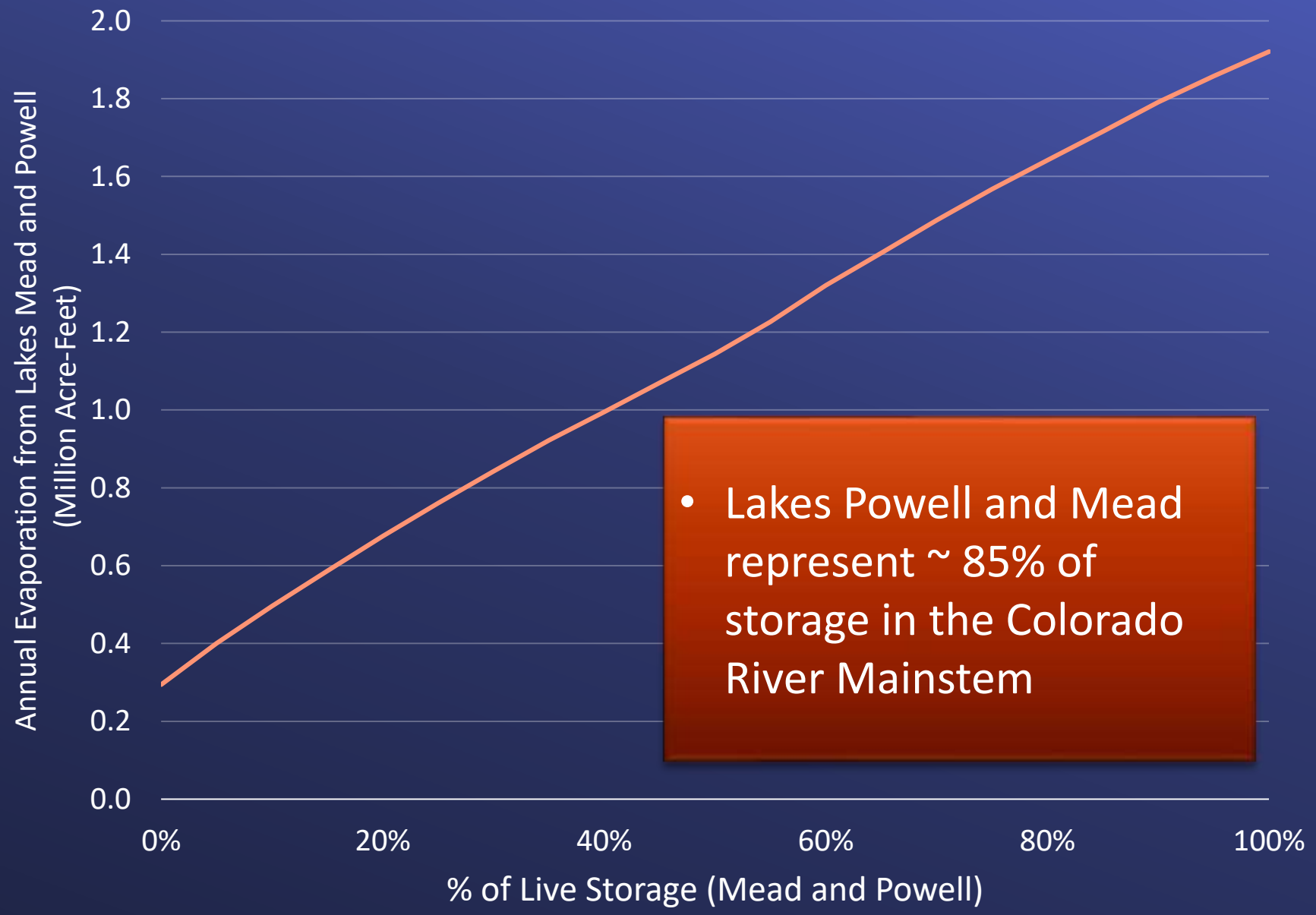
Item 6a

December 12, 2022

Colorado River is Highly Regulated

Total storage capacity in the Colorado River system is ~4 times the average annual flow of the river

Significant Colorado River System Storage Comes with Evaporation Losses



Upper and Lower Colorado River Basins Address Evaporation in Different Ways

- Net reservoir evaporation is charged to Upper Basin as a whole.
  - Has not impacted allocations to date.

- Reservoir evaporation is not charged to state allocations.
- Evaporation losses influence shortage declarations.

Lower Basin Evaporation in the News

Four things to know about the lower Colorado River basin

Western Slope water officials tour sites integral to lower basin consumption

News FOLLOW NEWS | Nov 24, 2022

Evaporation loss not accounted for in lower basin

"We are asking for (the lower basin) to be treated the same way we are so the system and the playing field is even," Mueller said. "Once we are on an even playing table, then we can address the way we work in the future, but it's really hard to do that when the rules they play by down here enable so much more water use than what we have in the upper basin."

SOUTHERN NEVADA WATER AUTHORITY®

New analysis wants to pinpoint the water lost to evaporation on the Lower Colorado River

KUNC | By Luke Runyon
Published October 27, 2022 at 2:00 AM MDT

SUMMARY OF ASSESSMENTS BY STATE / MX

State	afy
AZ	401,018
CA	771,486
NV	17,570
MX	352,926
TOTAL	**1,543,000**

SUMMARY OF WATER USER ASSESSMENTS

Reach	State	Major Water Users	afy
1	NV	LVVWD/SNWA - SNWP	15,514
3	AZ	Central Arizona Water Conservation District	190,474
3	CA	The Metropolitan Water District of Southern California	110,464
4	AZ	AZ Colorado River Indian Reservation	45,378
4	AZ	Wellton-Mohawk I.D.D.	51,654
4	AZ	Yuma County Water Users' Association	47,611
4	AZ	Yuma Mesa I.D.D.	28,657
4	CA	Coachella Valley Water District	70,074
4	CA	Imperial Irrigation District	509,508
4	CA	Palo Verde Irrigation District	71,335
5	MX	Mexico	352,926
		Subtotal	*1,493,596*
Reach	**State**	**Remaining Water Users**	**afy**
All	AZ	Other Users in AZ	37,243
All	CA	Other Users in CA	10,105
All	NV	Other Users in NV	2,056
		Subtotal	*49,404*
		TOTAL	1,543,000

Variance in Water Accounting Rules Between Basins

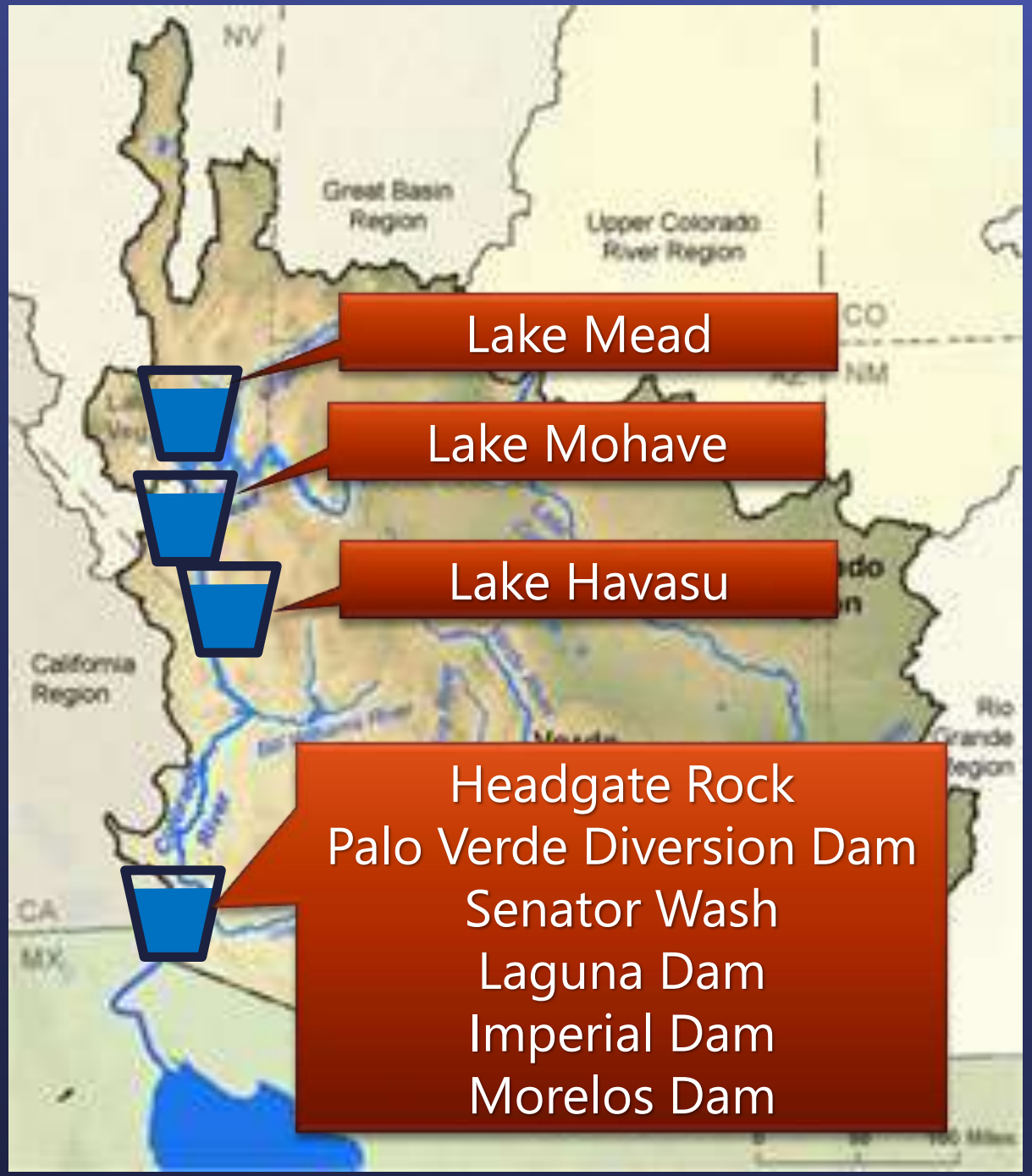
	Calculating Consumptive Use	Source of Accounted Water
	Human-Made Depletions	Tributary & Mainstem
	Diversion – Return Flow	Mainstem Only

What if the Lower Basin Treated Losses Similarly to the Upper Basin?

Governing Principles of Hypothetical Analysis:

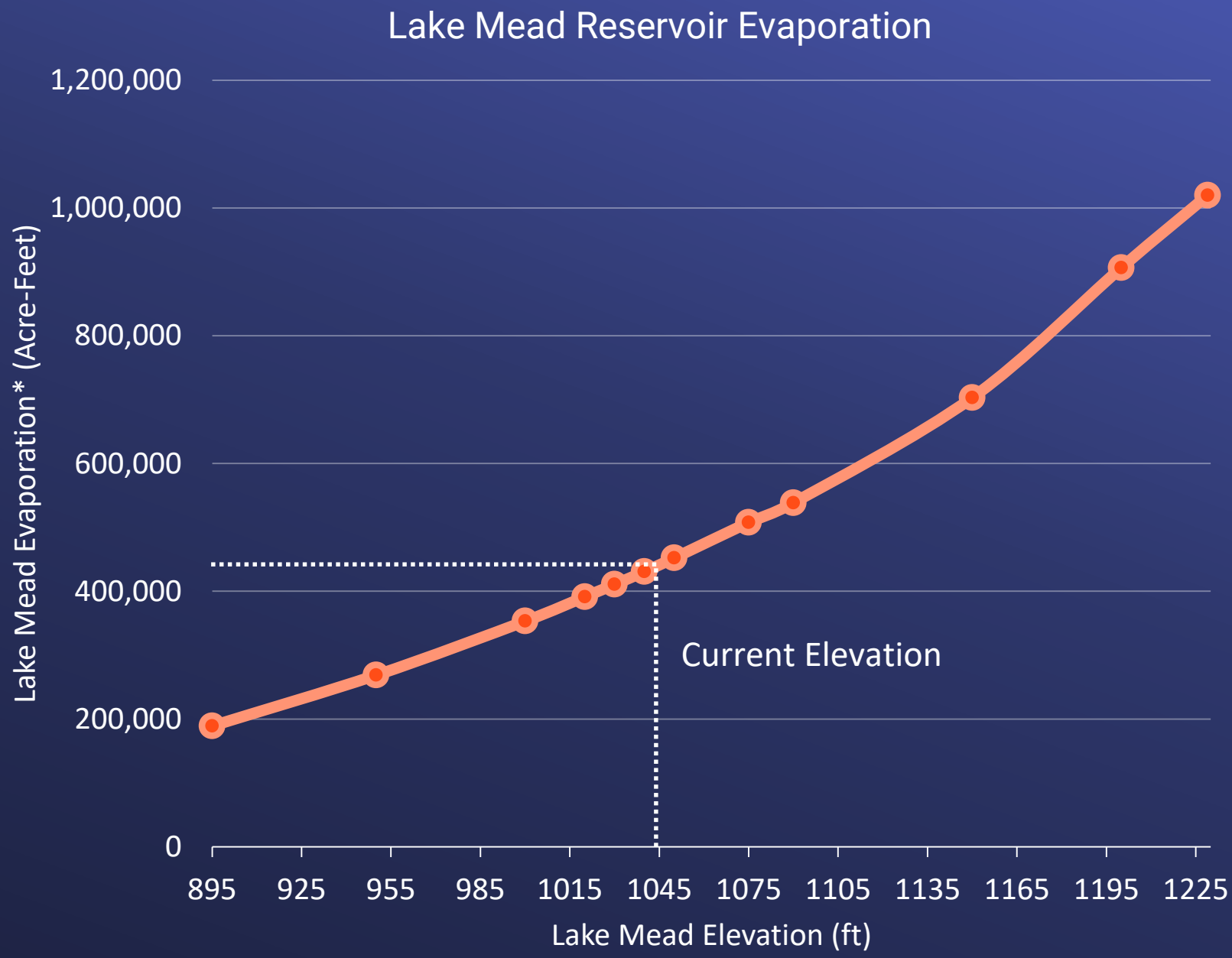
- Human-made Depletion
- Mainstem + Tributary

Lower Colorado River Basin Mainstem Reservoirs

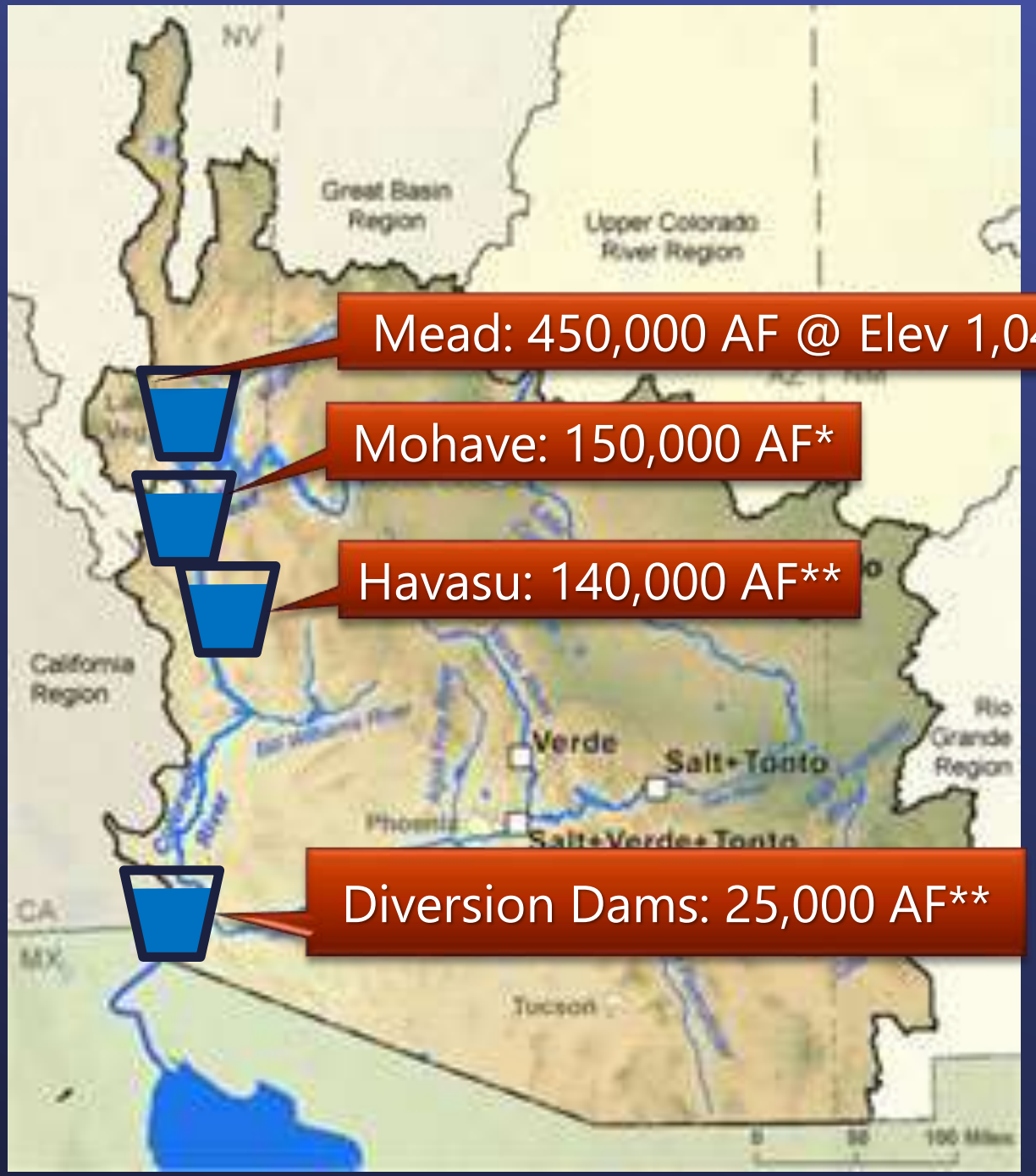


Lake Mead Evaporation* Varies based on Lake Elevation

*Gross Evaporation



Current Lower Basin Mainstem Reservoir Evaporation

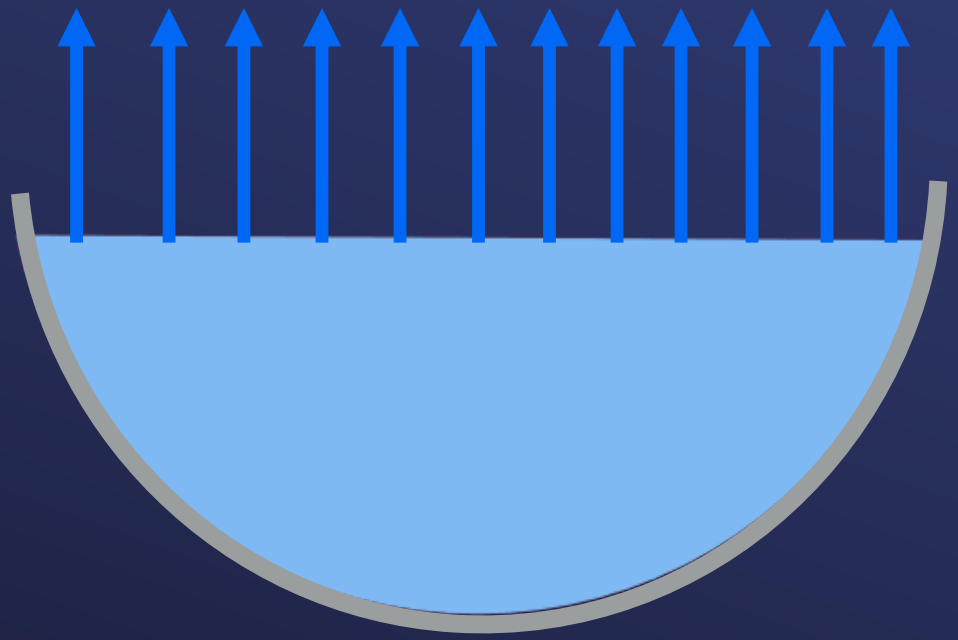


Davis Dam Fun Facts:

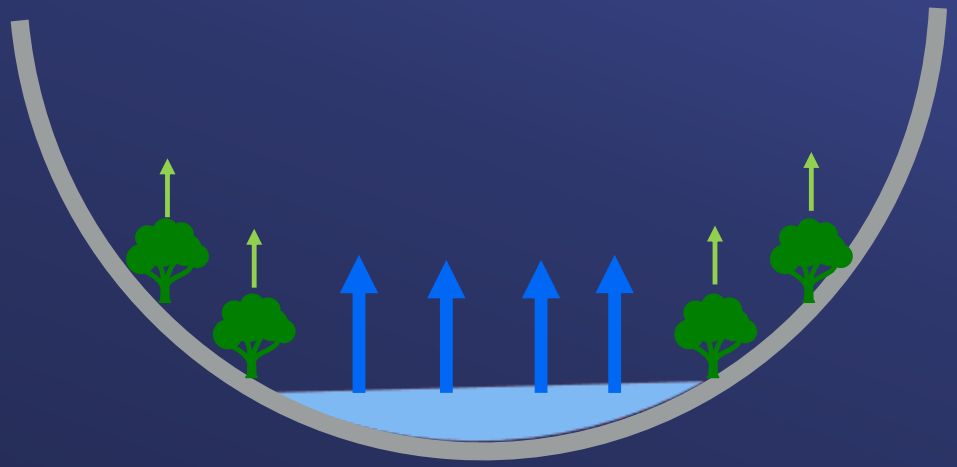
- 1944 Mexican Treaty, Section 12(b), Obligated the United States to build Davis Dam.
- A part of the capacity of Lake Mohave would be to regulate Mexican Treaty Deliveries of Colorado River Water.

Sources:
*2022 Report on Implementation Effects of New Evaporation Coefficient for Lake Mead and Lake Mohave
**CU&L 2001-2005 Average

Human-Made Depletions Looks at Difference between With and Without Reservoir Conditions



With Reservoir Condition



Without Reservoir Condition

Upper Basin Considers Both Tributary and Mainstem Use when Assessing Mainstem Reservoir Losses

Tributary & Mainstem

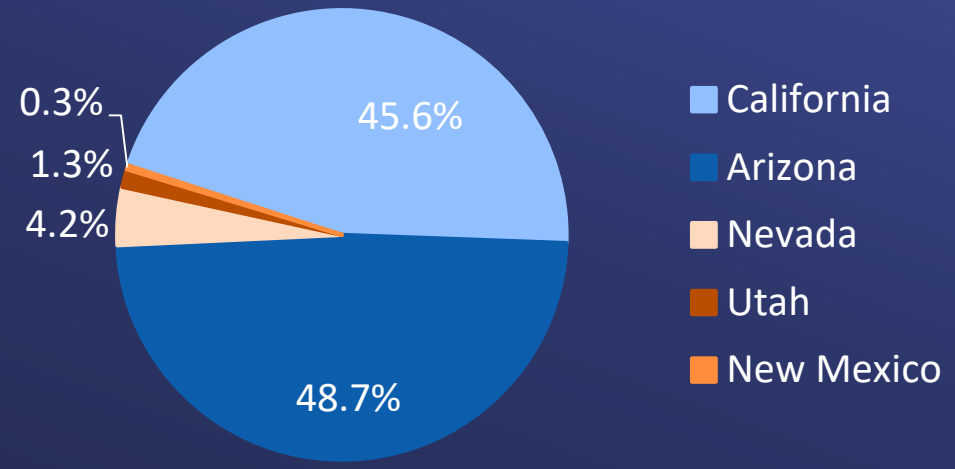
Tributary & Mainstem

Lower Basin Tributary Use is Significant

- All actions within the Colorado River Basin borders impact the Colorado River
- Impacts both Upper Division and Lower Basins

*CU&L 2001-2005 Average

Proportion of Lower Colorado River Basin Use by State



	California	Arizona	Nevada	Utah	New Mexico	Lower Basin States Total
Basic Apportionment	4,400,000	2,800,000	300,000	0	0	7,500,000
Tributary Use	0	1,900,000	102,000	124,000	28,000	2,154,000
Total	**4,400,000**	**4,700,000**	**402,000**	**124,000**	**28,000**	**9,654,000**

Hypothetical: Calculating Lower Basin Net Reservoir Evaporation Using Upper Basin Approach

	Net Evaporation	Upper Division States	California	Arizona	Nevada	Utah	New Mexico
Lake Mead	350,000	-	159,500	170,400	14,600	4,500	1,000
Lake Mohave*	117,000	58,500	27,089	28,936	2,475	0	0
Lake Havasu	109,000	-	49,700	53,100	4,500	1,400	300
Diversion Dam	19,000	-	8,700	9,300	800	200	100
Total	**595,000**	**58,500**	**244,989**	**261,736**	**22,375**	**6,100**	**1,400**

- Gross reservoir evaporation converted to net evaporation. Assumed ratio of Lake Powell gross to net evaporation.
- Reservoir evaporation assigned to states, proportional to use of water from the Lower Basin
- *Lake Mohave net evaporation split between basins, then assigned to Lower Division states proportional to use of water from Lower Basin.

Conclusions

- Evaporation losses are accounted and applied differently between the Upper and Lower Basin
- If there was a collective desire to voluntarily change how evaporation losses are applied, there are many potential approaches
- Aligning accounting and application methodologies is one potential approach
- Methodology has a significant impact in outcome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