



Obligation & Enrollment

Ken Seasholes
CAGRD Plan of Operation Workshop
August 21, 2014

Statutory Requirements

A.R.S. § 45-576.02.C.2

- ...the plan shall include the following information for each active management area in which a member land or member service area is located:

A.R.S. § 45-576.02.C.2(b)

- An estimate of the conservation district's current and projected groundwater replenishment obligations...for current members for the twenty calendar years following the submission of the plan and an estimate of the district's projected groundwater replenishment obligations for the one hundred calendar years following the submission of the plan for current members and potential members based on reasonable projections of real property and service areas that could qualify for membership in the ten years following the submission of the plan.



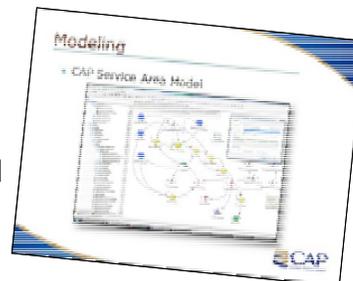
Objective

- Generate an obligation and enrollment forecast that satisfies the ADWR “reasonableness” test
 - Rely on official projections, outside expertise & professional judgment
 - Use “conservative” (middle-high) assumptions



Methodology

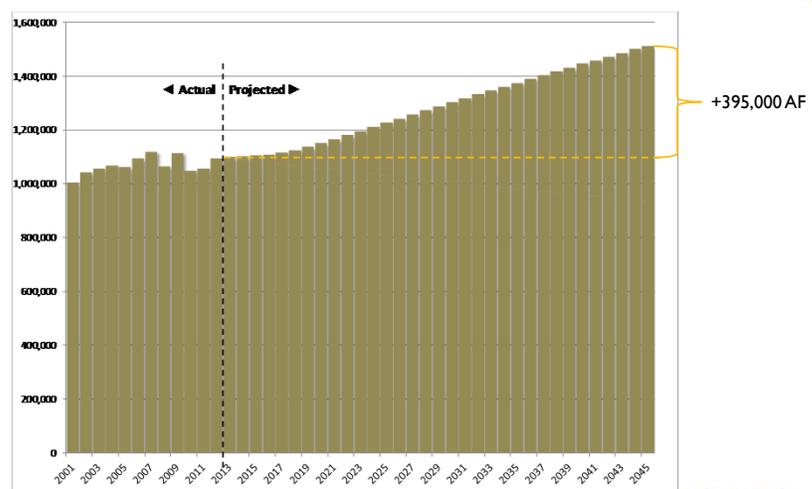
- Develop a model and supporting data that simulates detailed supply & demand conditions in the CAP service area
 1. Project demands
 2. Determine available supplies
 3. Fulfill demands on the basis of legal and physical availability of supplies



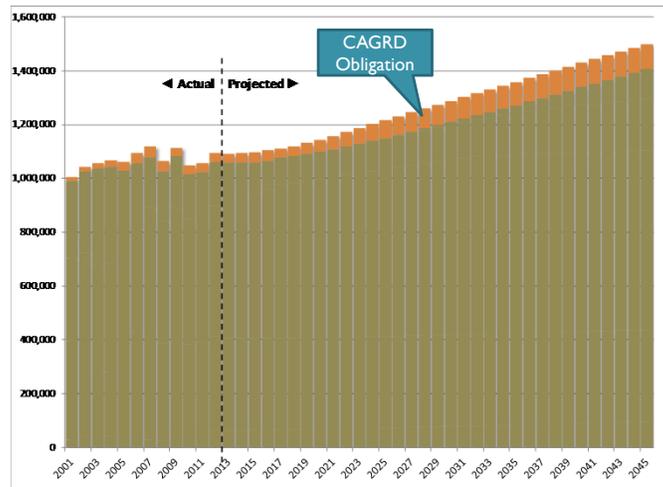
Demand



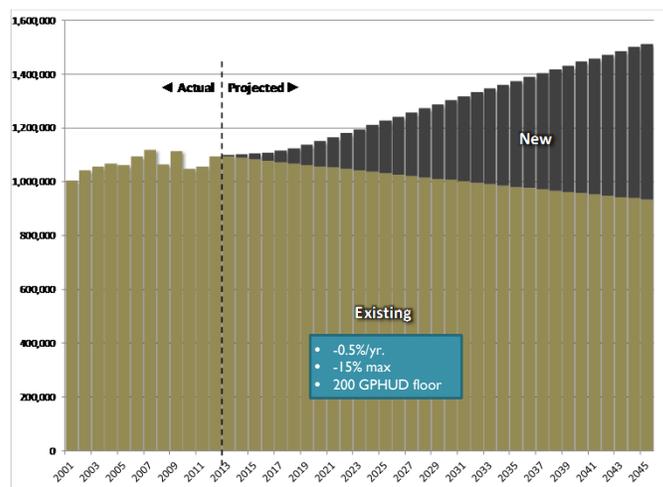
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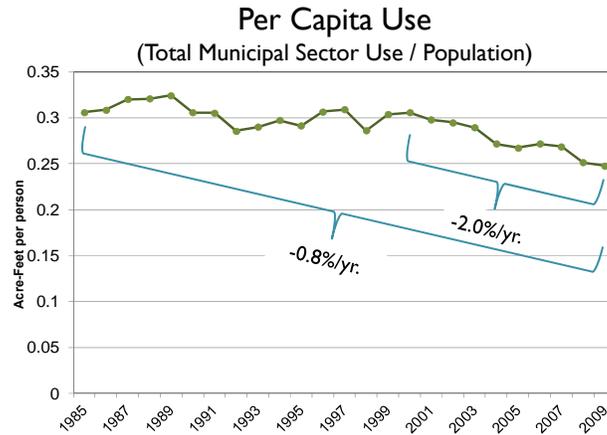
Demand



Demand



Demand: Existing



Demand: New

- Based on projected housing units
 - Allows incorporation of permit and development data
- Methodology relies on three components
 - A projection of new units per year
 - A projection of the location of new units
 - A per unit water demand factor



Housing Units, by Year

- Overall growth rate is tied to official projections from AZ Dept. of Administration
 - Associations of Governments provide sub-county detail
- Actual growth has been lagging, so Plan includes aggressive near-term recovery to catch up



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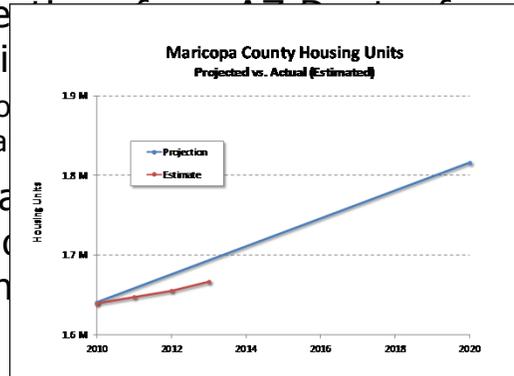
Housing Units, by Year

- Overall growth rate is tied to official projection

Admin

- Associated data

- Actual included catch



sub-county

so Plan recovery to

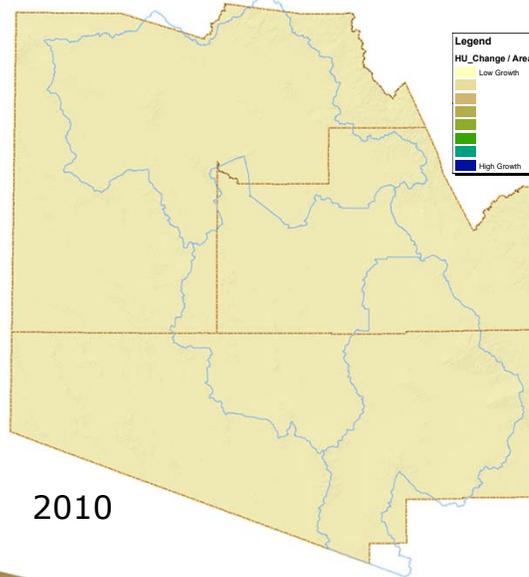


Housing Units, by Location

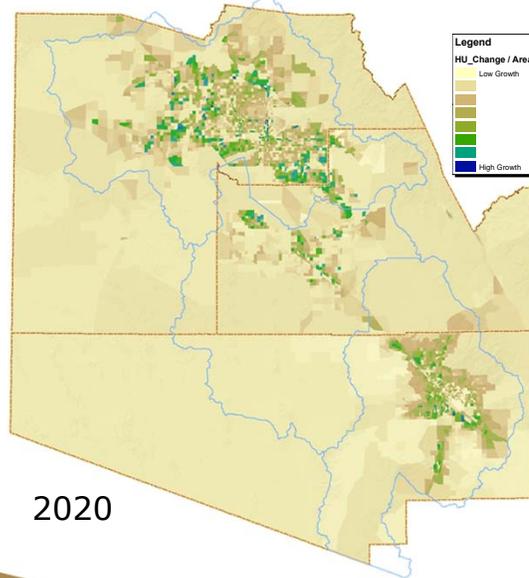
- The location of new housing units is critical for determining both demand and CAGR obligation
- The model requires that the housing unit projection be distributed among water providers
 - Based on Transportation Analysis Zone (TAZ) analyses from MAG, CAG & PAG



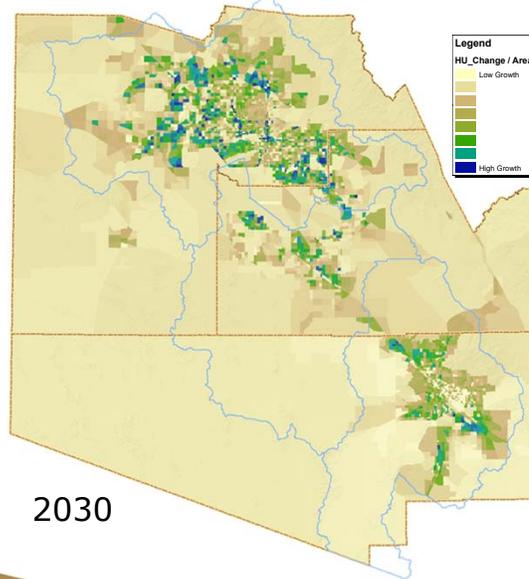
Housing Units, by Location



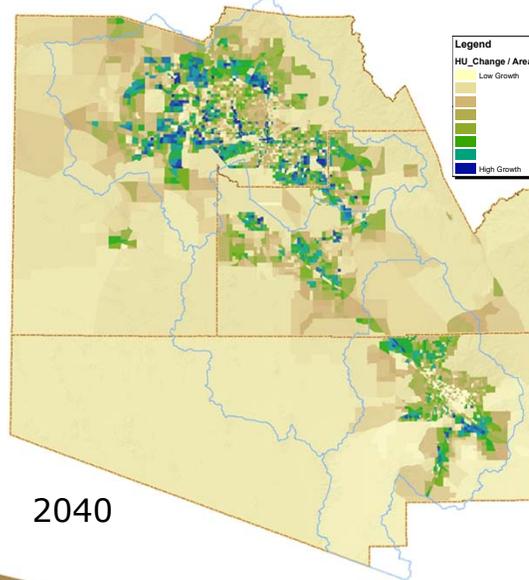
Housing Units, by Location



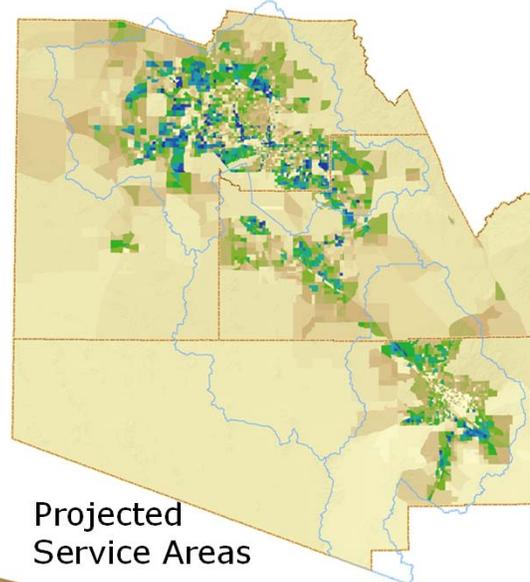
Housing Units, by Location



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Housing Units, by Location

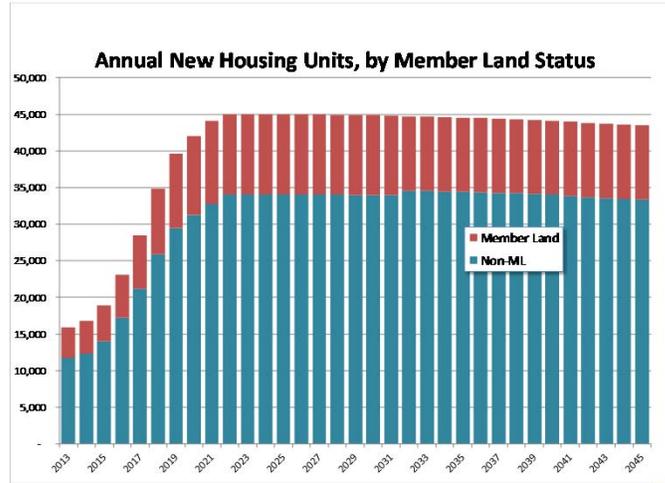


Housing Units, by Location

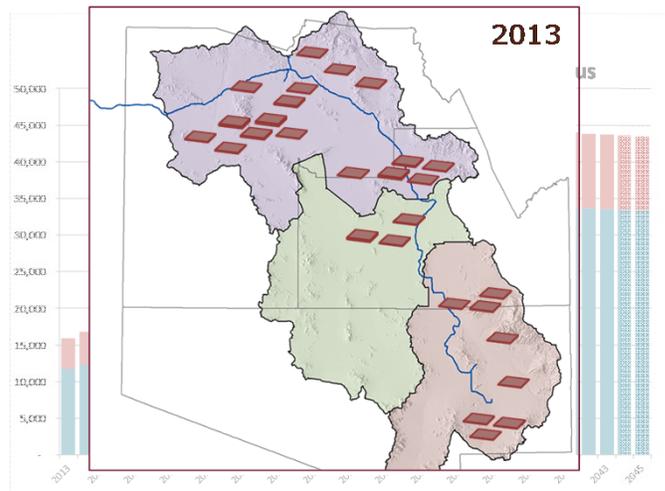
- The geographic analysis produces a housing unit forecast that is unique for each water provider
- For Member Land water providers, the forecast must also account the backlog of current enrollment
 - ~140,000 enrolled but unbuilt lots



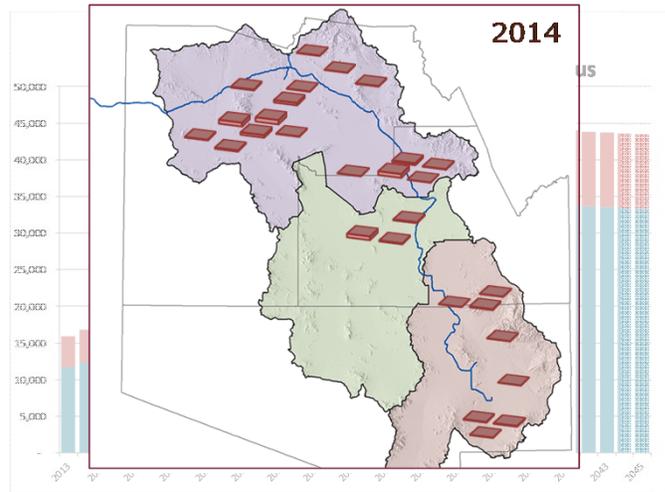
Housing Units, Member Lands



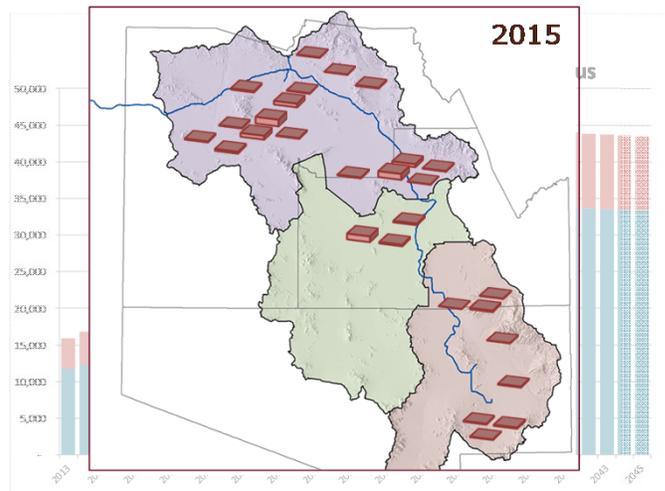
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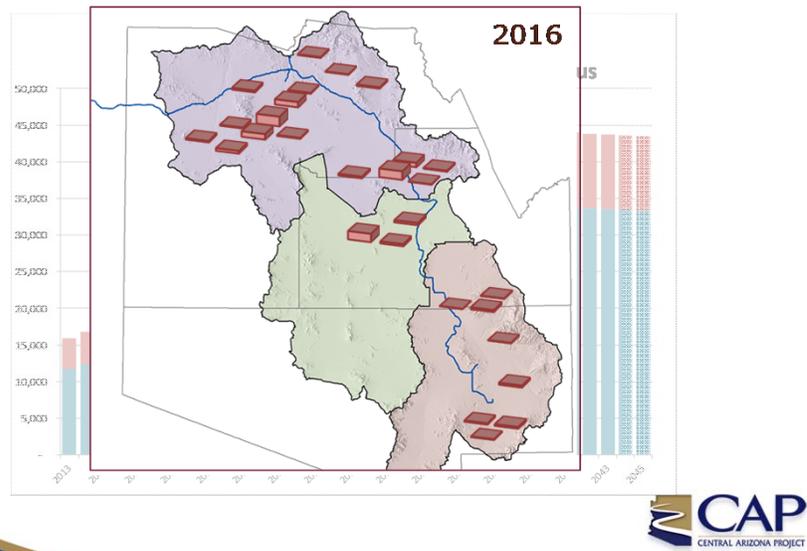
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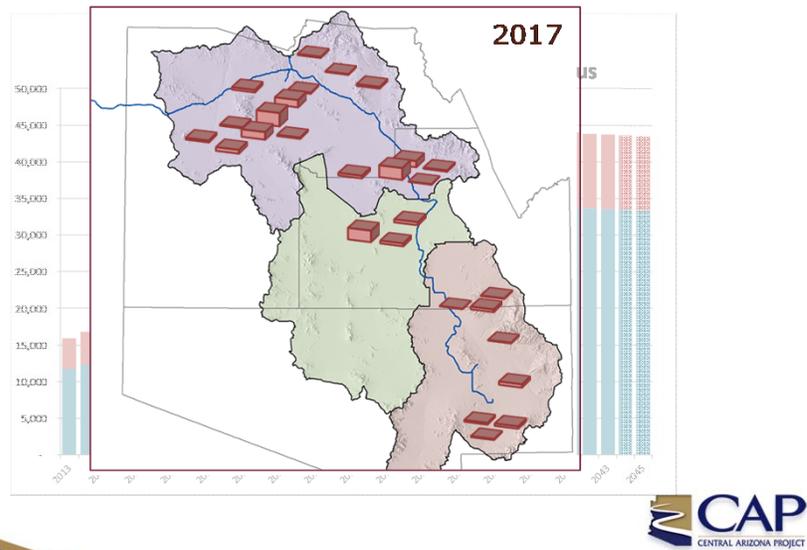
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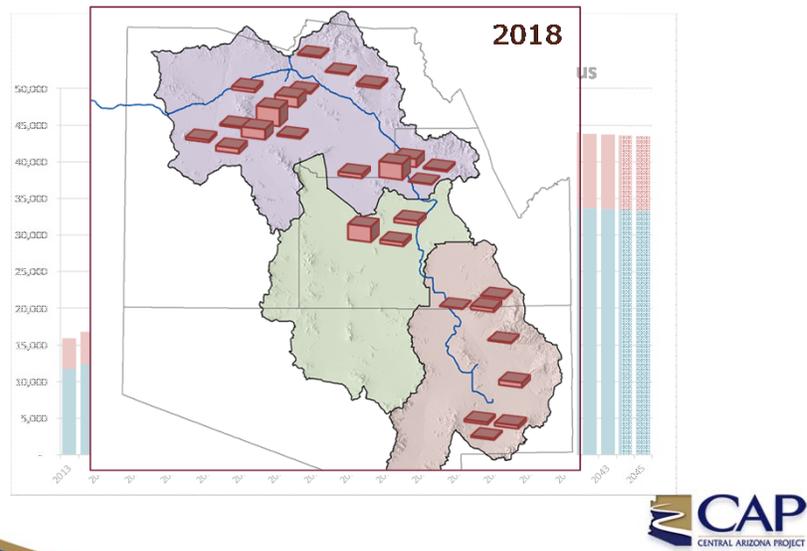
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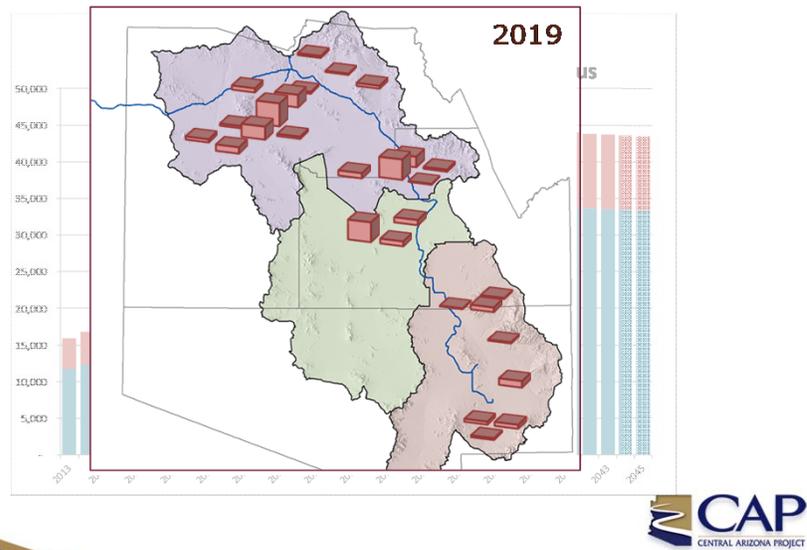
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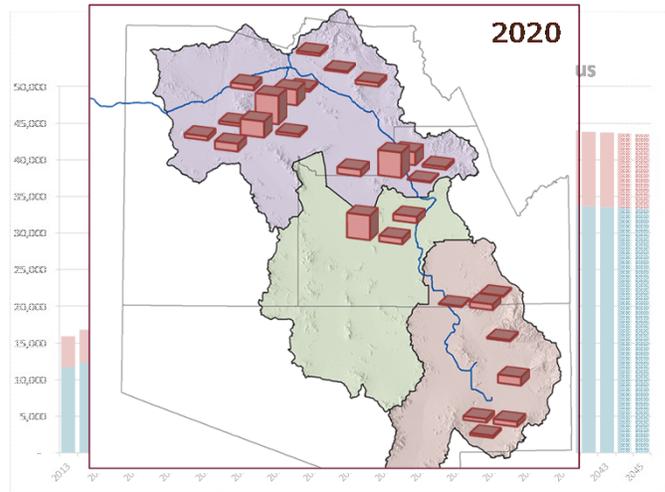
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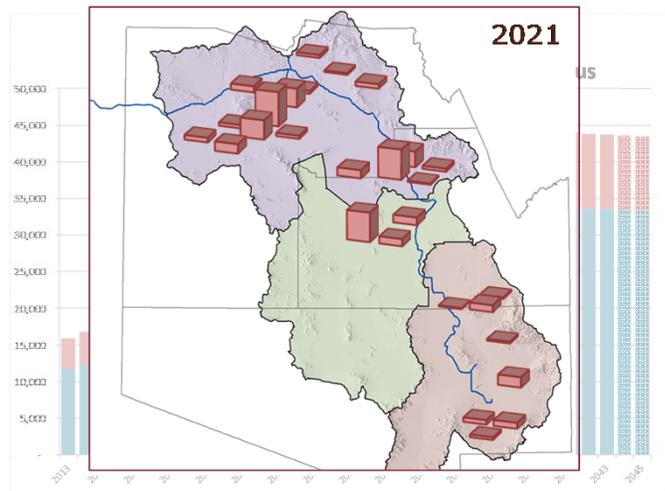
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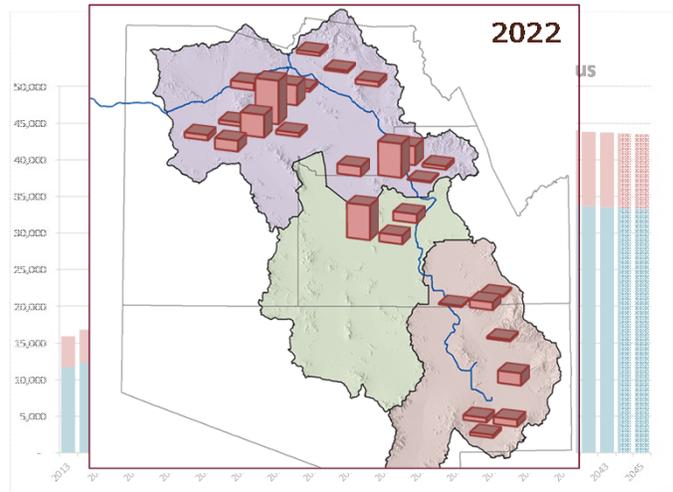
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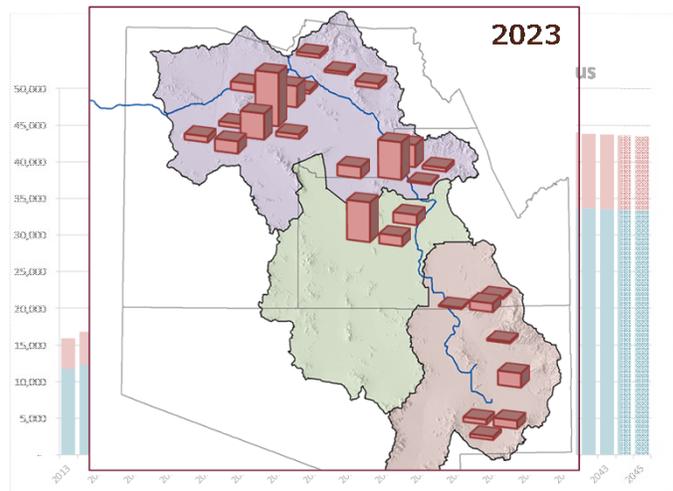
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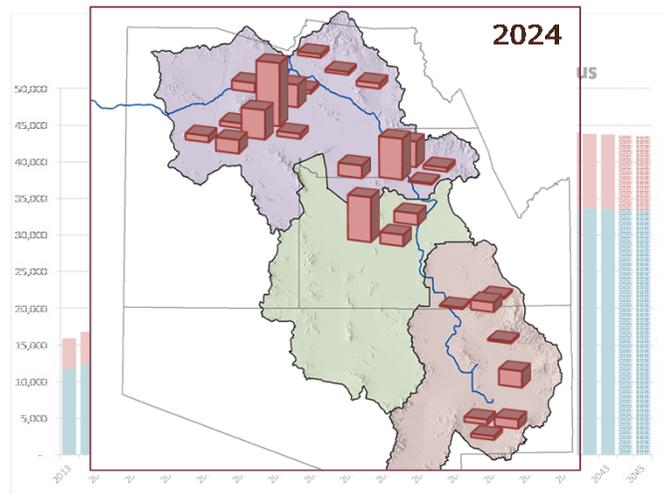
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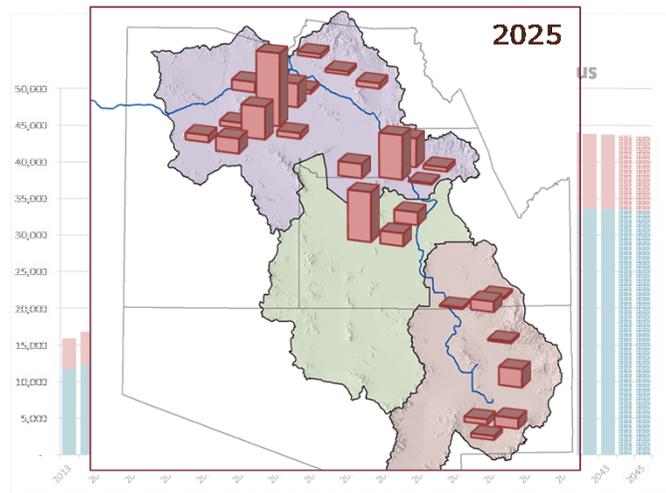
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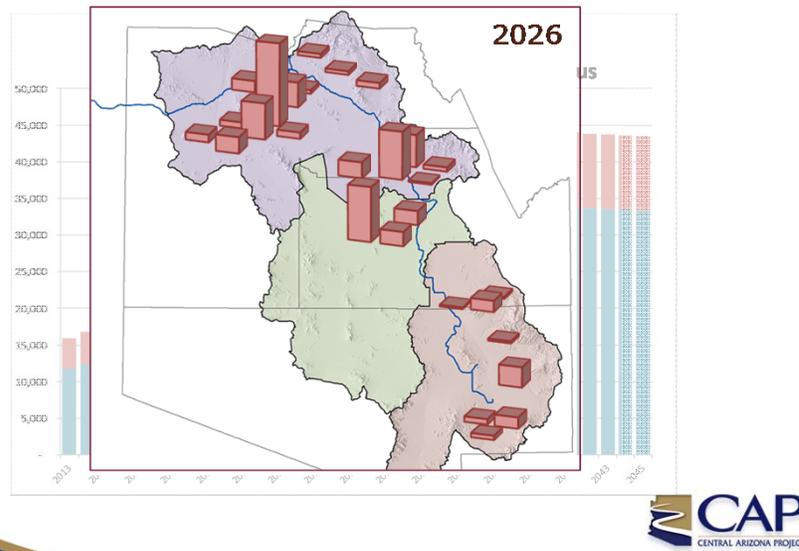
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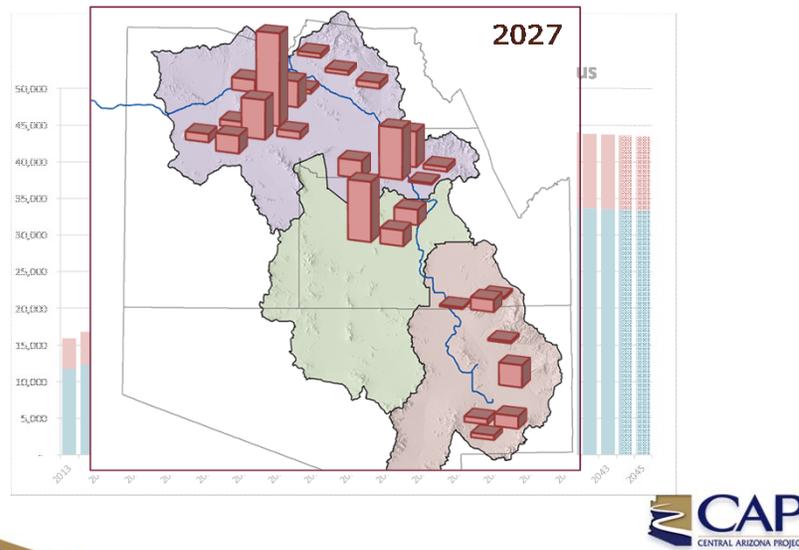
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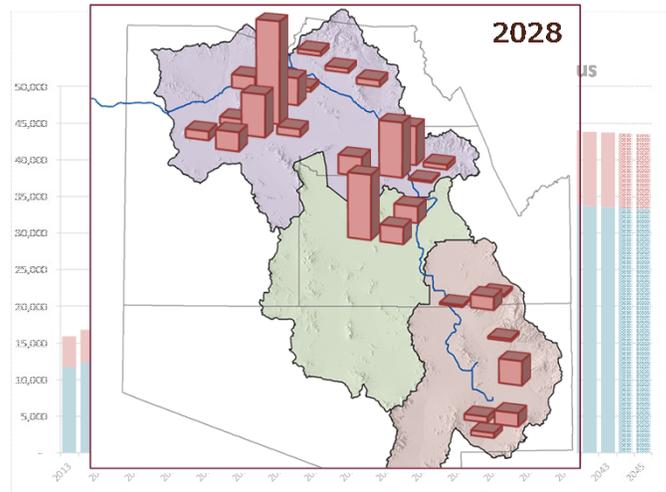
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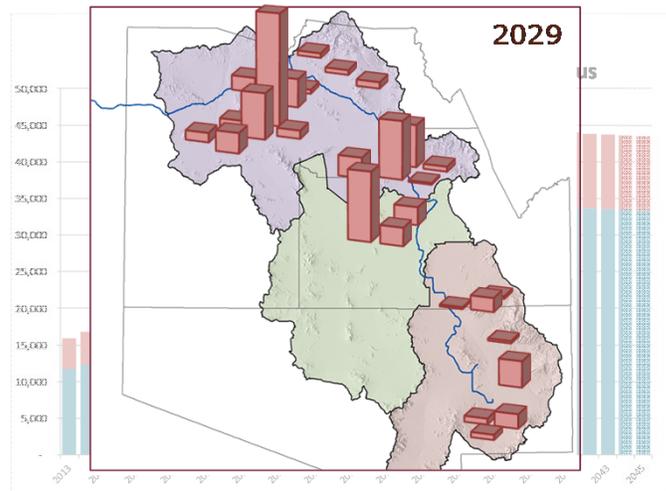
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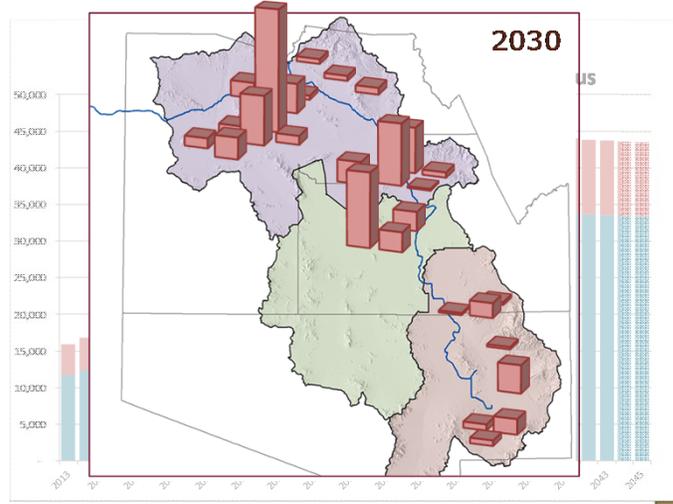
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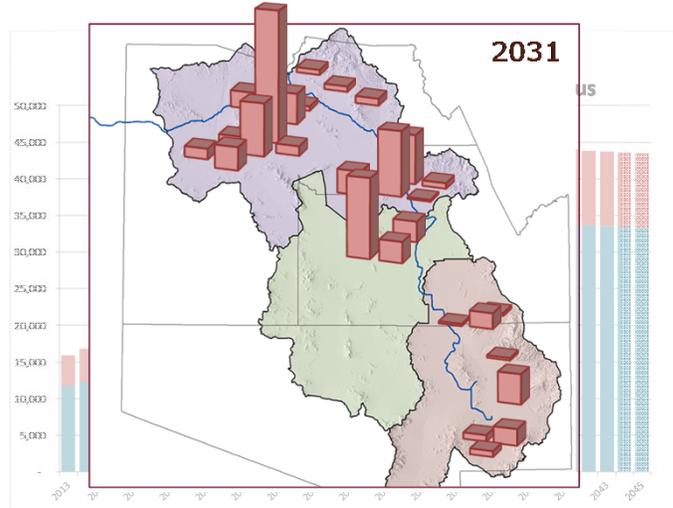
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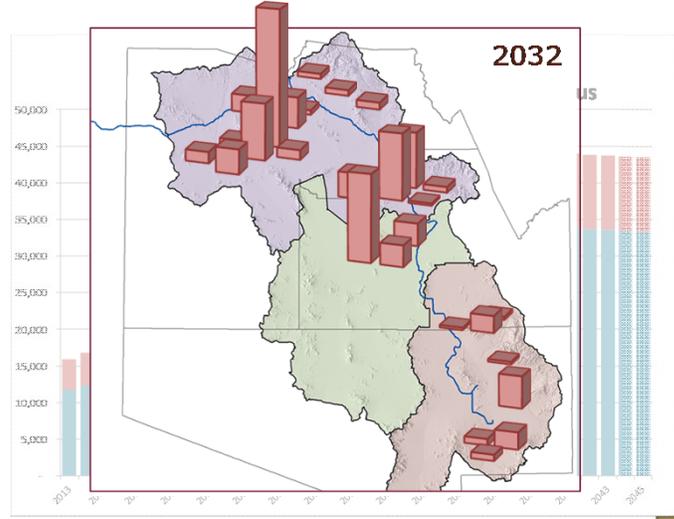
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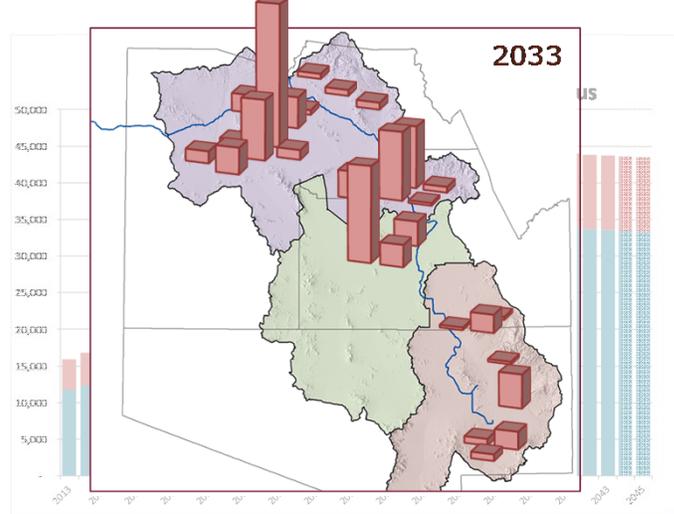
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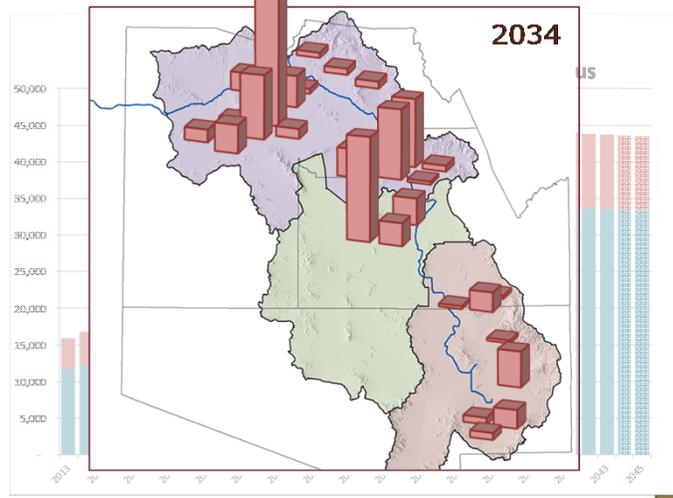
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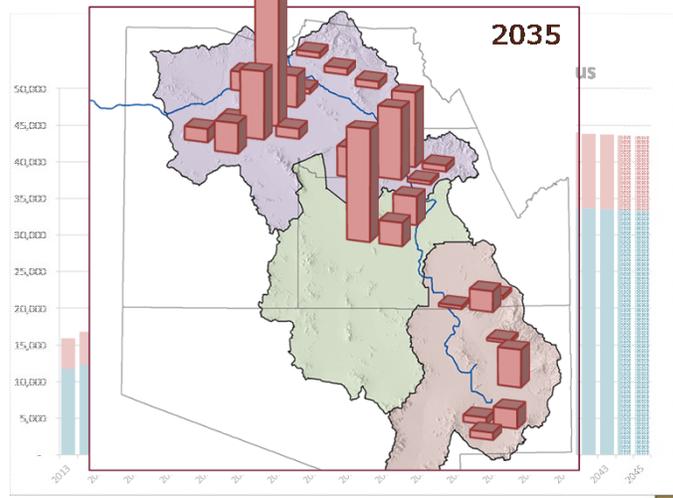
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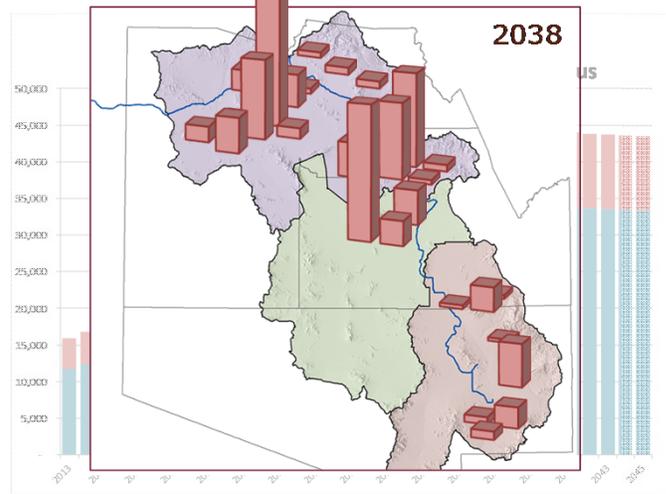
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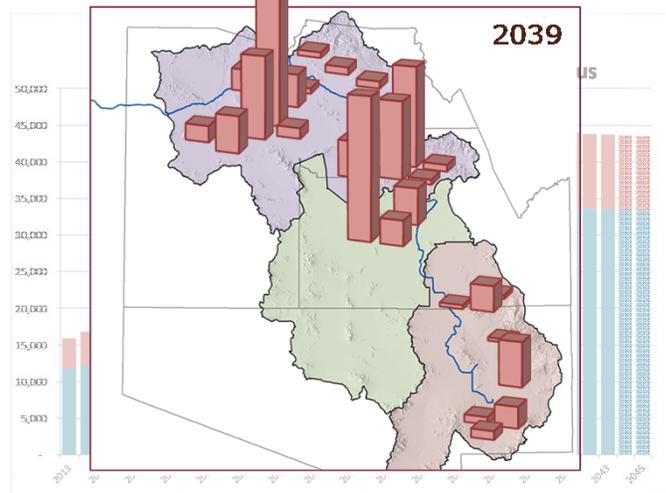
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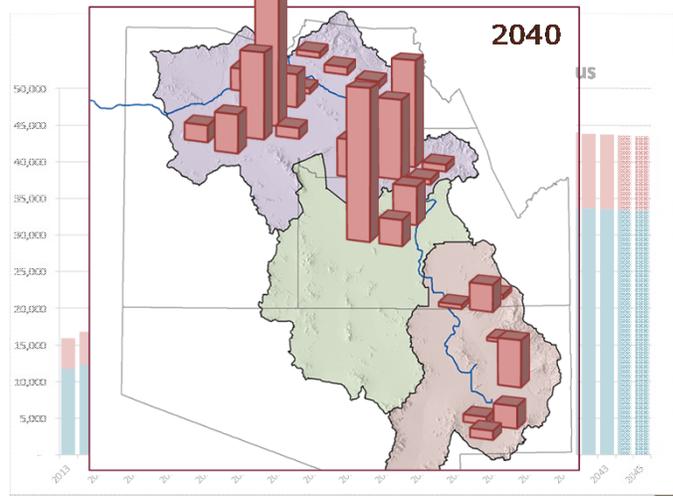
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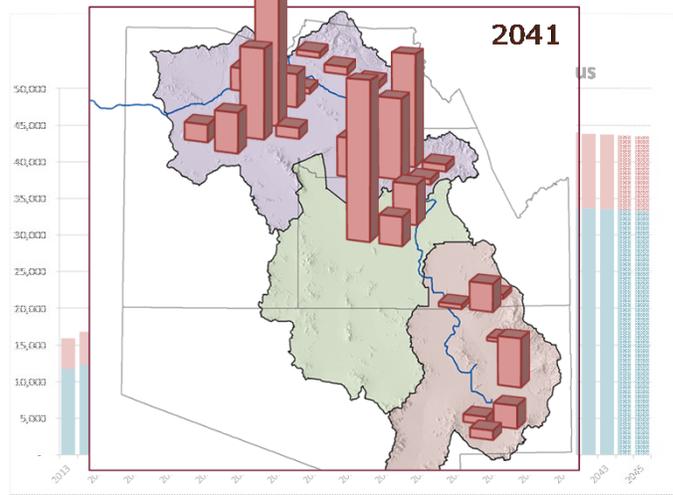
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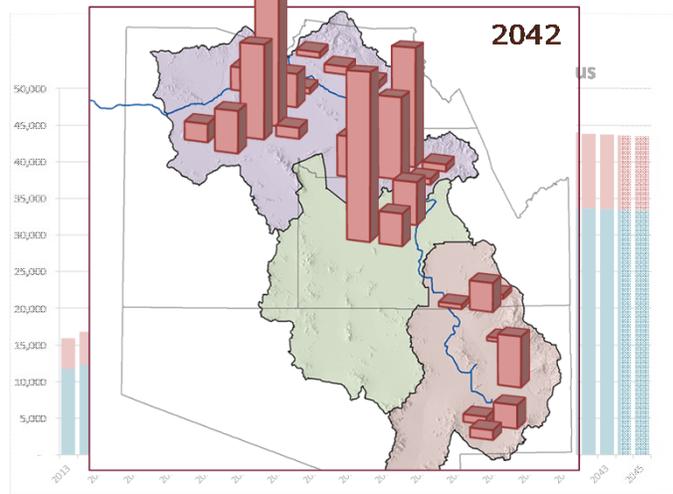
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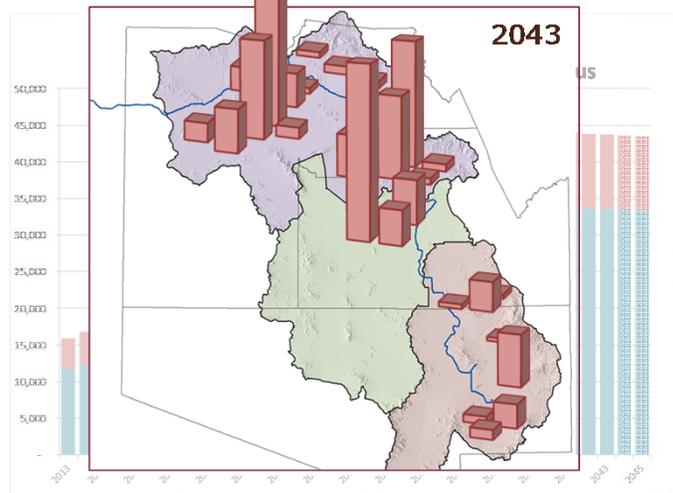
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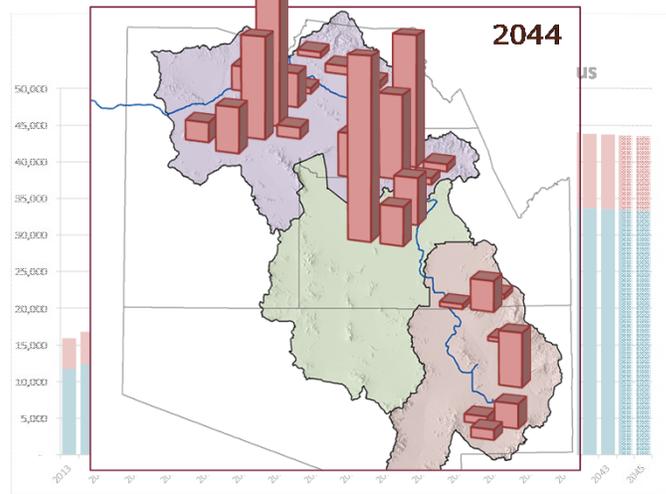
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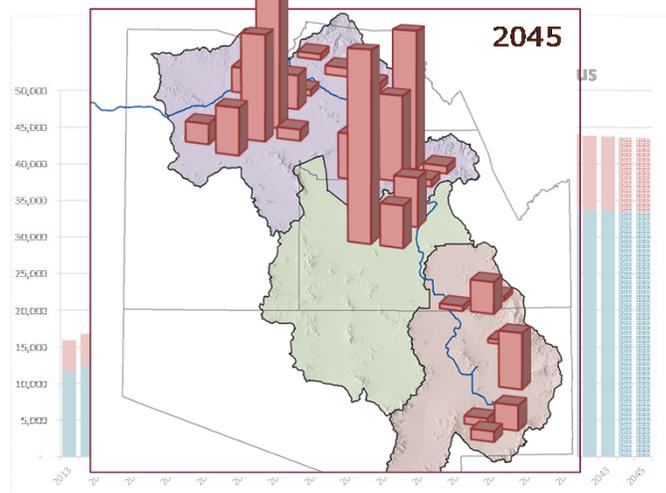
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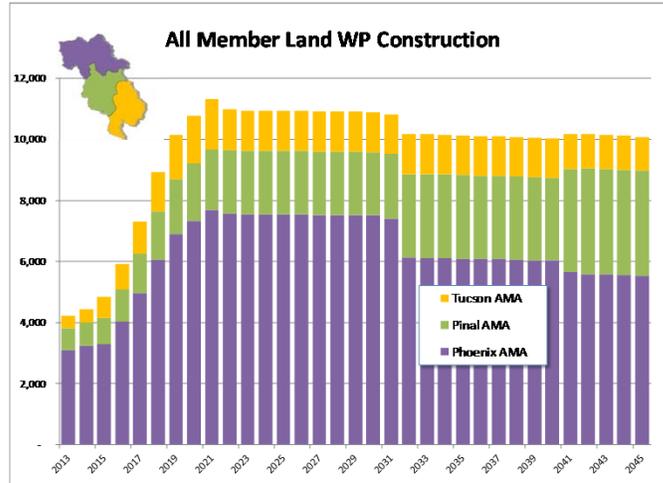
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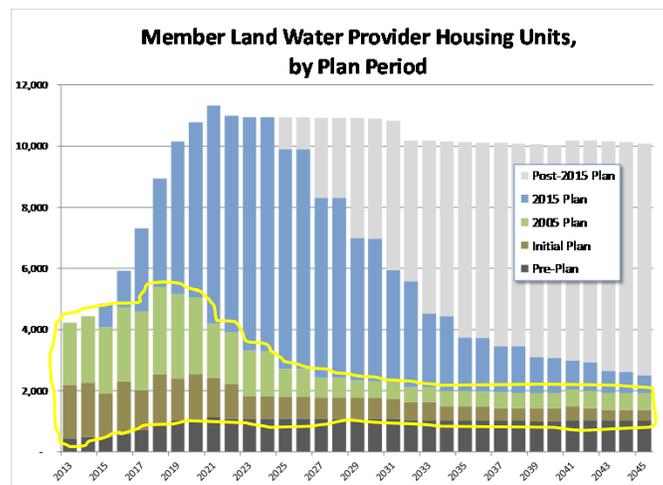
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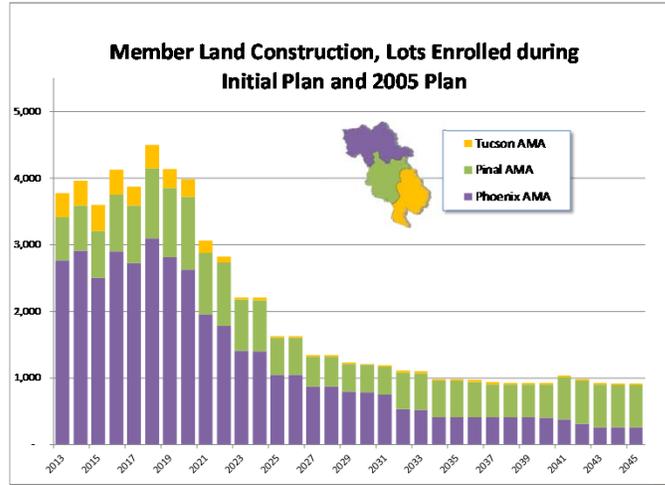
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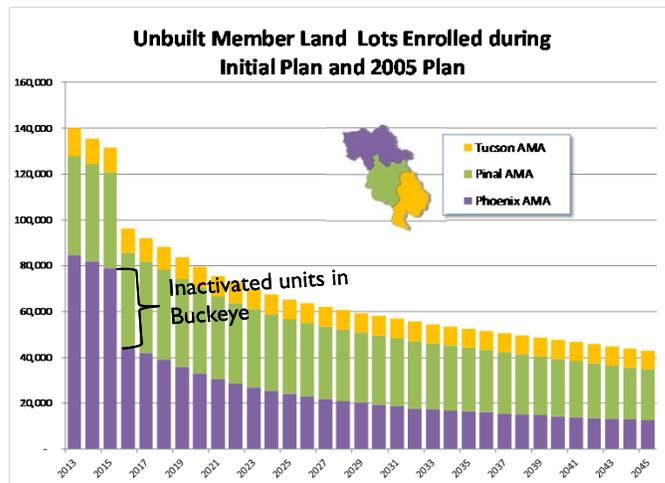
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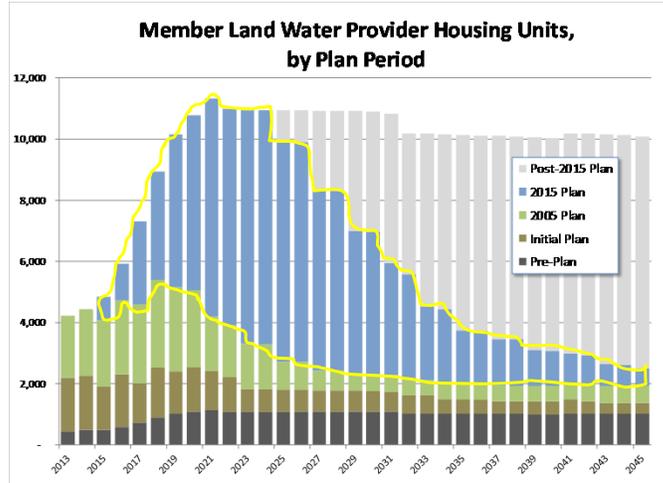
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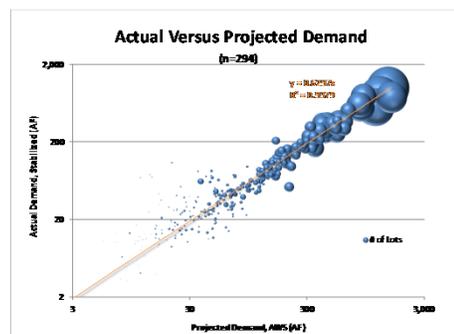
Demand

- The housing unit projections for each provider are converted to demand by multiplying by a water use factor
 - Calculated as:
 - Total Demand/Total Housing Units
 - Calculation includes the demand from the housing unit itself, as well as a fraction of other service area uses (e.g., commercial uses, parks, etc.)
 - A 0.1%/yr. demand reduction factor was applied



Demand: Member Lands

- Separate water use factors were developed for each Member Land, based on analysis of MLs that have “stabilized”

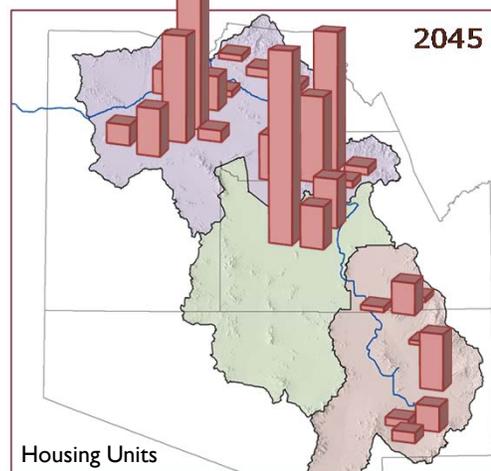


Demand: Member Lands

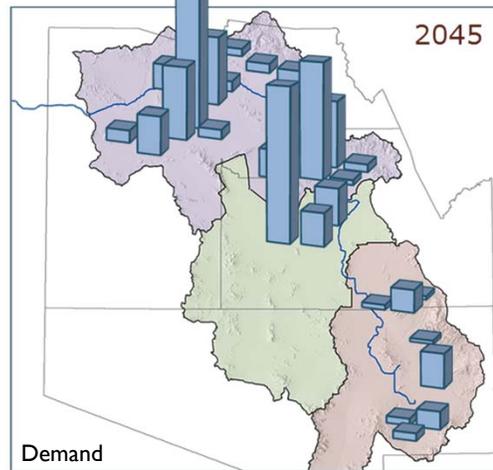
- Separate water use factors were developed for each Member Land, based on analysis of MLs that have "stabilized"
- Those factors are applied to projected housing units that reduce the unbuilt inventory of lots enrolled during the Initial and 2005 Plan



Demand: Member Lands



Demand: Member Lands



Supply



Supply

- The model contains each water provider's portfolio of supplies (i.e., entitlements)
 - Annual supplies (e.g., CAP, surface water, effluent)
 - Volumetric supplies (e.g., LTSCs, GW allowances)
 - Accrual (and debiting) of long-term storage credits is modeled, as is incidental recharge and Pinal renewable GW allowances
 - Leases, exchanges, transfers and reallocations are also be modeled



Supply

Effluent: Based on reported non-potable use, with increasing availability tied to providers' percent housing growth rate

Surface Water: Based on 3-year average delivery volumes as reported to ADWR on Annual Reports (2010 – 2012)

CAP: Based on non-shortage conditions on the CO River. Entitlements based on existing long-term contract volumes, recommended NIA Priority reallocation volumes, and known leases, exchanges and assignments

LTSCs: Based on initial balances from and annual accrual; minimum debit of 1% per year to meet demands

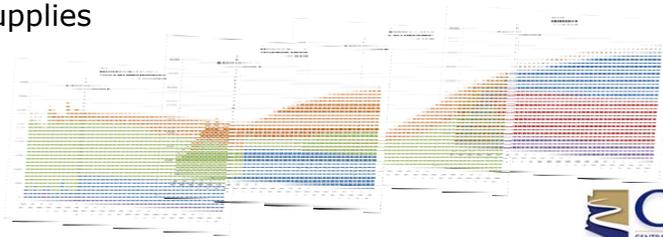
Groundwater Allowances: Default = 5% balance per year when available in Phoenix and Tucson AMA; renewable allowances calculated for providers in Pinal AMA

Exempt Groundwater: Based on remediated groundwater use for designated providers, extended past 2025, and demand from pre-1995 subdivisions, non-subdivisions, and lost and unaccounted water for undesignated providers.

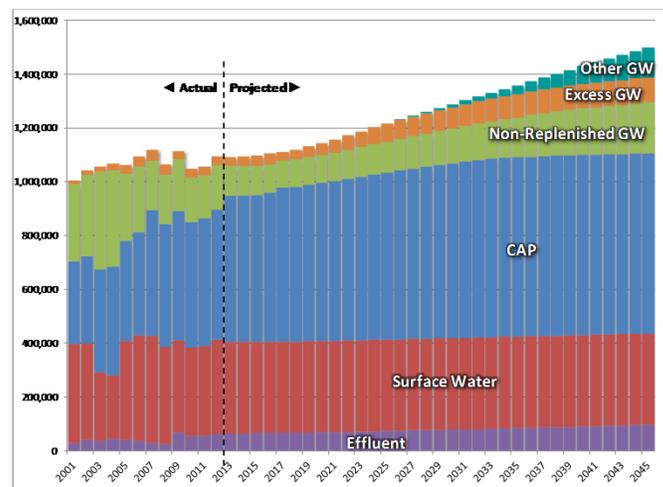


Supply Utilization

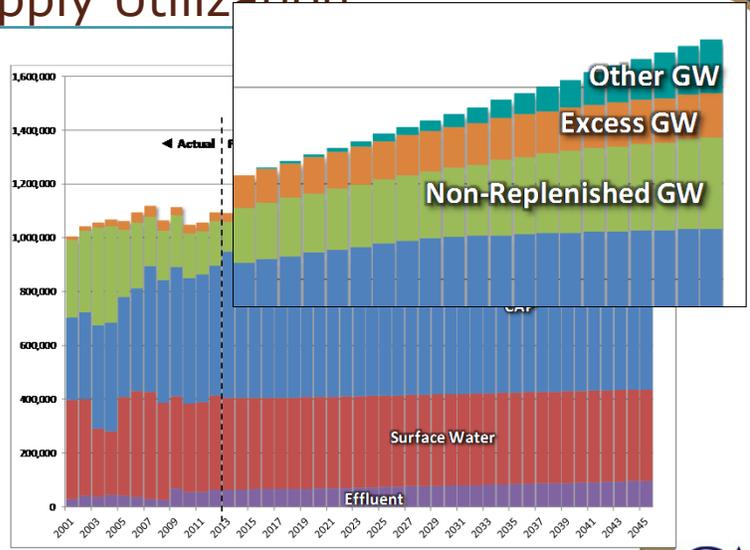
- Supply and demand come together in a “fulfillment” process
 - The demand of each provider is met by stepping through all of the supply types
 - A supply is used based on its availability, the provider’s entitlements, utilization preferences, and how much demand has been met with other supplies



Supply Utilization



Supply Utilization



Replenishment Obligation



Replenishment Obligation: MSAs

- For Member Service Areas, Excess Groundwater, which must be replenished by the CAGRD, is one of the supplies available to fulfill demand
 - The use of that supply comes after consideration of all other supply types, including CAP, surface water, LTSCs, exempt groundwater and the groundwater allowance

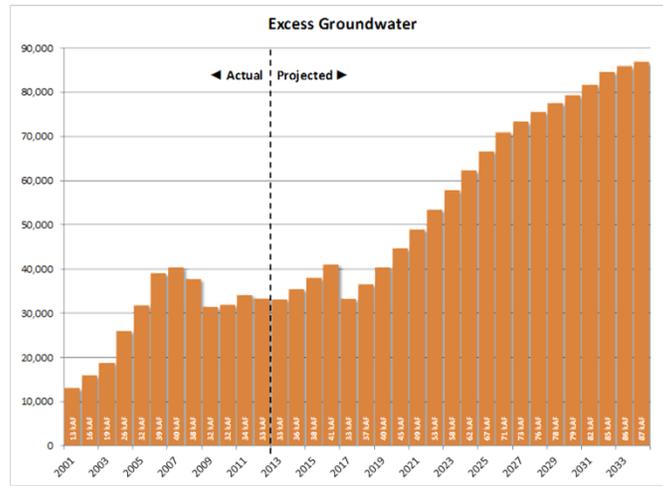


Replenishment Obligation: MLs

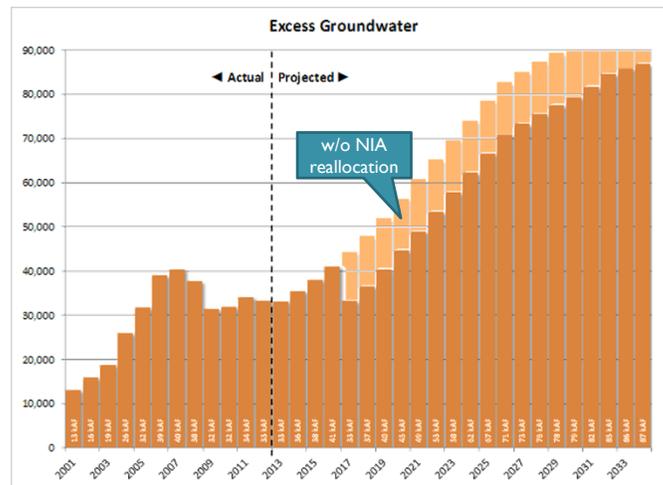
- The demand estimates for Member Lands are converted to obligation by considering;
 - Groundwater reliance of the water provider
 - The provider's reporting percent
 - The ML's groundwater allowance balance
 - When groundwater allowances are exhausted, all groundwater use becomes Excess
 - Special consideration is given to the Pinal AMA's AWS Rules



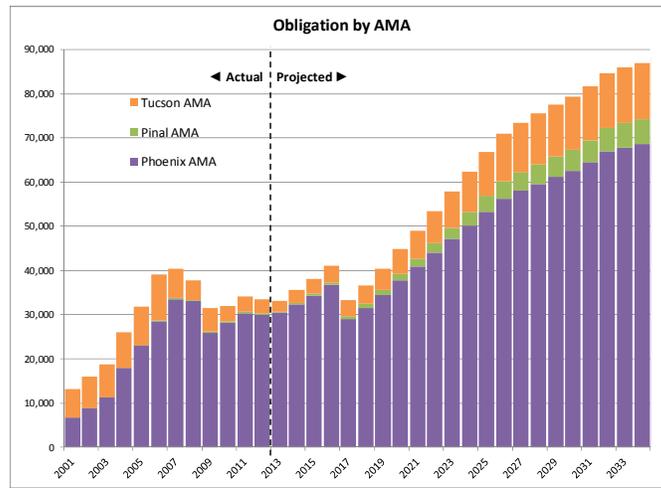
Replenishment Obligation



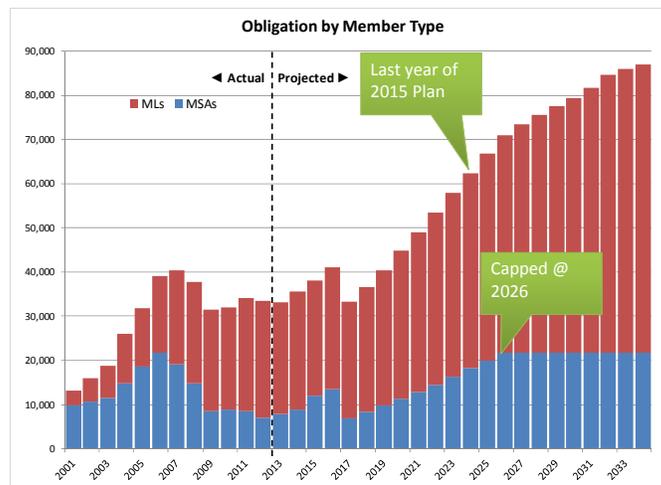
Replenishment Obligation



Replenishment Obligation



Replenishment Obligation



Replenishment Obligation: MSAs

Projected MSA Demand and Obligation, by Active Management Area (acre-feet)

Active Management Area		2015	2020	2025	2030	2034
Phoenix AMA	Demand	126,600	139,400	159,400	179,900	200,000
	Obligation	10,300	7,900	13,000	14,100	14,100
Pinal AMA	Demand	5,600	7,600	10,500	13,400	16,400
	Obligation	400	1,200	2,300	2,500	2,500
Tucson AMA	Demand	143,200	148,300	154,200	159,100	162,800
	Obligation	1,400	2,300	4,600	5,200	5,200
Total	Demand	275,400	295,300	324,100	352,400	379,200
	Obligation	12,100	11,400	19,900	21,800	21,800



Replenishment Obligation: MLs

Projected ML Demand and Obligation, by Active Management Area (acre-feet)

Active Management Area		2015	2020	2025	2030	2034
Phoenix AMA	Demand	116,700	125,500	138,100	150,500	158,800
	Obligation	24,000	29,800	40,300	48,400	54,500
Pinal AMA	Demand	21,300	23,600	27,200	30,800	34,300
	Obligation	100	300	1,300	2,400	3,200
Tucson AMA	Demand	15,100	17,100	19,600	22,000	23,800
	Obligation	1,900	3,300	5,300	6,800	7,500
Total	Demand	153,100	166,200	184,900	203,300	216,900
	Obligation	26,000	33,400	46,900	57,600	65,200



Replenishment Obligation: 20-yr.

Estimated 20-Year Replenishment Obligation for Current Members

Active Management Area	2015	2020	2025	2030	2034
Phoenix AMA	34,500	33,900	40,700	44,200	48,600
Pinal AMA	500	1,300	2,300	2,600	2,600
Tucson AMA	3,900	5,000	7,400	8,200	8,300
Total	38,900	40,100	50,400	55,000	59,400



Replenishment Obligation: 100-yr.

Estimated 100-Year Replenishment Obligation for Current and Future Members

Active Management Area	2015	2020	2025	2030	2034	2114
Phoenix AMA	34,300	37,700	53,300	62,500	68,600	84,200
Pinal AMA	400	1,500	3,500	4,900	5,600	15,500
Tucson AMA	3,300	5,600	9,900	12,000	12,700	13,300
Total	38,000	44,800	66,700	79,400	86,900	113,000

+26 kAF from:

- Post-2034 ML Obligation
- 2015 Plan extra ML enrollment
- Inactivated MLs in Buckeye



Enrollment



Enrollment: MSAs

- The City of Buckeye is expected to convert from a Member Land provider to a Member Service Area in 2015
 - Associated Member Lands are rendered dormant
- Water Utility of Greater Tonopah may also become an MSA



Enrollment: Member Lands

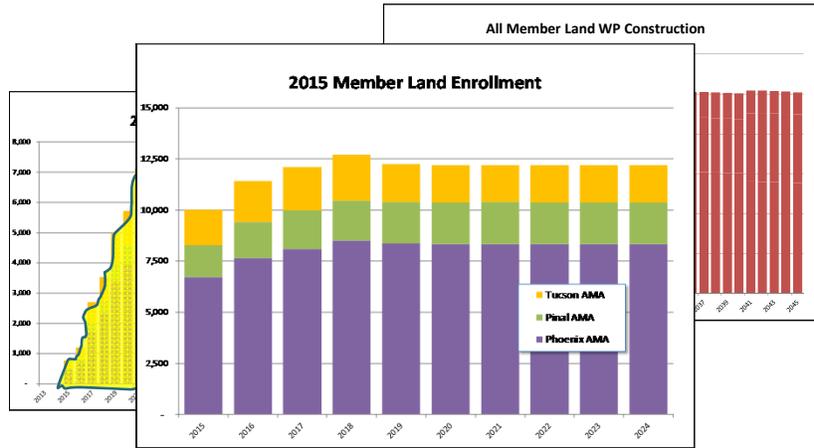
- Enrollment is tied to the construction forecast for 2015 Plan Member Lands
- Construction occurs over decades, but each unit enrolled during the 10-year Plan period
- 2015 Plan construction is summed, then distributed within the 10-year period
- Distribution based on total ML housing forecast



Enrollment: Member Lands



Enrollment: Member Lands



Questions?

