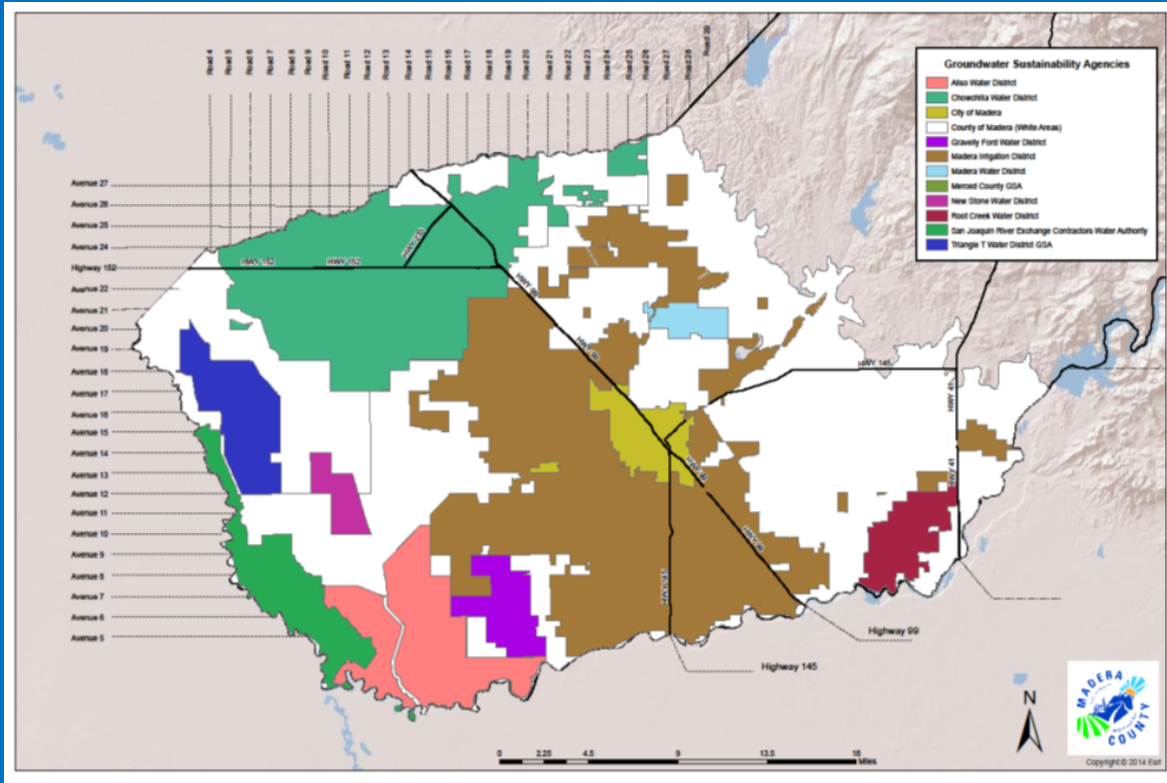


Madera County GSA details for each subbasin



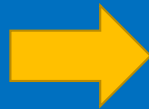
- In Chowchilla Subbasin:
 - Total Area = 42,500
 - Irrigated = 35,000
- In Madera Subbasin:
 - Total Area = 178,000
 - Irrigated = 85,000

Problem: Current use exceeds sustainable 'Native Groundwater'

County GSA in Chowchilla Subbasin

Current Use
82,000 af/yr

Native GW
21,000 af/yr



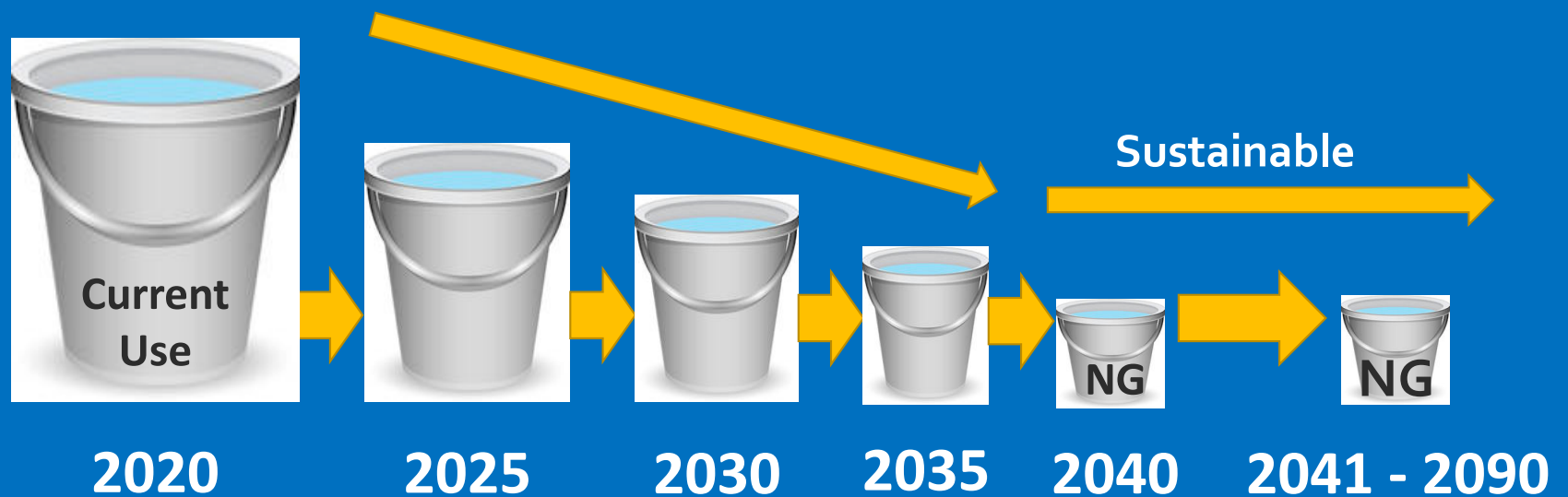
County GSA in Madera Subbasin

Current Use
190,000 af/yr

Native GW
90,000 af/yr



Reduction in the total County GSA groundwater pumping in each subbasin from 'current' to 'NG' will occur by 2040



County GSA is also modeling sustainability with projects, not just demand reduction

- New surface water into Madera County GSAs
 - Recharge during non-irrigation
 - Irrigate with surface water
- New surface supplies need:
 - A secured water source(s):
 - Conveyance agreement(s) (Reclamation/MID/CWD)
 - New diversion/deliver infrastructure
 - Funding

Madera Subbasin

Chowchilla Subbasin

Type	Max Rate and frequency	Estimated Avg. Annual Benefit
(Values in acre-feet)		
Recharge along Bypass	30,000 - 40,000 35% of years	10,000 to 15,000
Recharge in east area	20,000 15%-30% of years	5,000 to 7,000
Irrigate with surface water in east area	3,000 – 10,000 60%-70% of years	3,000 to 5,000
Demand reduction	Steady-annual decrease in consumption to 2040	Increase ~5,000/yr (additive) to ~90,000/yr

Type	Max Rate and frequency	Estimated Avg. Annual Benefit
(Values in acre-feet)		
Recharge along Bypass	70,000 - 80,000 35% of years	20,000 to 25,000
Recharge in east area	8,000 15%-30% of years	1,000 to 2,000
Irrigate with surface water in east area	1,500 – 4,000 60%-70% of years	1,000 to 2,000
Demand reduction	Steady-annual decrease in consumption to 2040	Increase ~1,400/yr (additive) to ~28,000/yr

County GSA allocation considerations

- DWR cares about the subbasin as a whole
 - GSP needs to show reduction at the subbasin level
 - How it is actually reduced is a County GSA-managed policy that must consider County economics, grower economics, drinking water needs, water rights, equity, and implementability
- County GSA recognizes landowners need to understand change at a parcel-level
 - These details likely not shown in the GSP – only described generally to show intent of GSA
- Other GSAs in subbasin need to agree with County GSA plan – since our actions impact groundwater levels throughout the basin

Additional scenarios have been created using Madera Subbasin as an example...

- Transition from ~ 190,000 af/yr to ~ 90,000 af/yr
 - Assumes no projects to supplement groundwater (worst case)
- Does not attempt to resolve question about distribution of 'NG', options:
 - NG is allocated to all lands in GSA area and a market is established
 - NG is allocated only to irrigated lands (with or without a market)
 - Some blend involving 'reserves,' markets, and allocations
- For any scenario, the GSA anticipates a fee structure tied to use:

0.01 ft/ac – 0.5 ft/ac = \$

0.51 ft/ac – 1.0 ft/ac = \$\$

1.01 ft/ac – 1.5 ft/ac = \$\$\$

1.51 ft/ac – 2.0 ft/ac = \$\$\$\$

**Example
Only!!!**

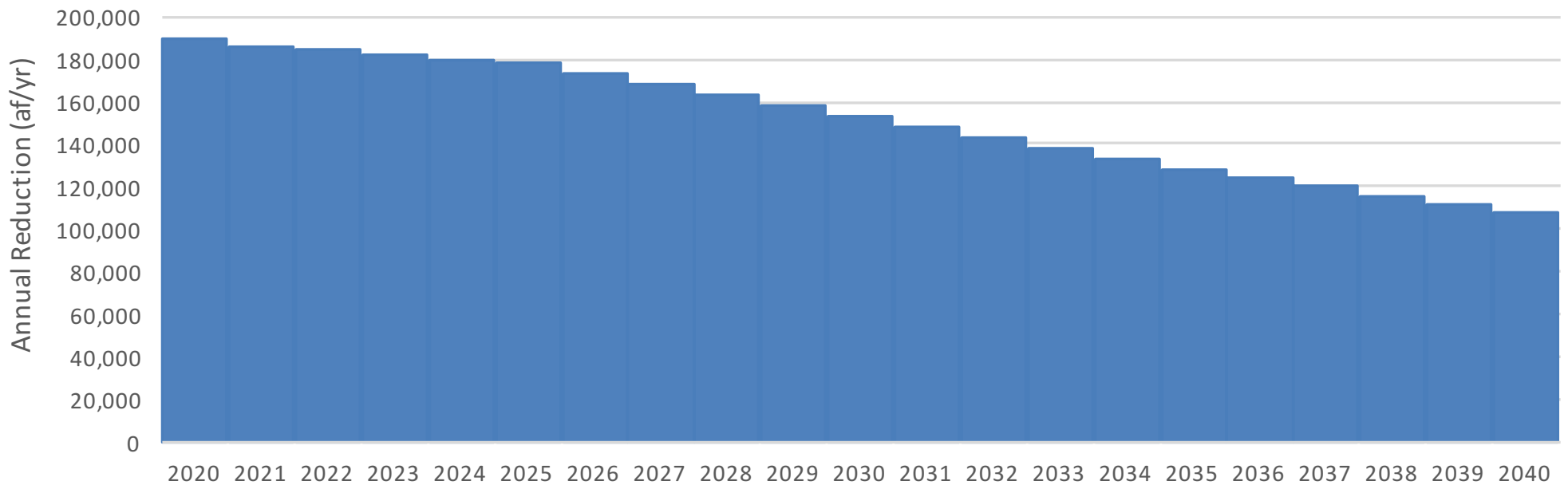
Scenario 4a

Equal share of ETAW to all irrigated lands

- Assumes 2% per year reduction for first 5 years: ~ 3,600 af/yr starting at 190,000 af
- Assumes 4.25% reduction for remaining 15 years: ~ 5,500 af/yr
- Starts at ETAW of ~ 2.25 ft/ac
- Includes a 'Flexibility Pool' administered by County GSA

Example of anticipated affect on pumping quantities

Anticipated Annual Pumping in Madera County GSA
w/in Madera Subbasin without any 'projects' (af/yr)



Example of County GSA allocation and 'Flexibility Pool' operation

- Step 1: Early January, County offers quantity for parcel based on per-acre ETAW value (reduces each year)
- Step 2: Owner chooses (mid-February??):
 - a) take entire quantity offered
 - b) take less than offered, with remainder returning to pool
 - c) take less than offered, with remainder assigned to co-owned parcel
- Step 3: County offers 'Flexibility Pool' water (mid-March??)
- Step 4: Owner requests water from pool, if needed (by April 1??)
 - Same fee structure
 - May require pro-ration if requests exceed available pool
- Step 5: County assess use the following spring and send fees

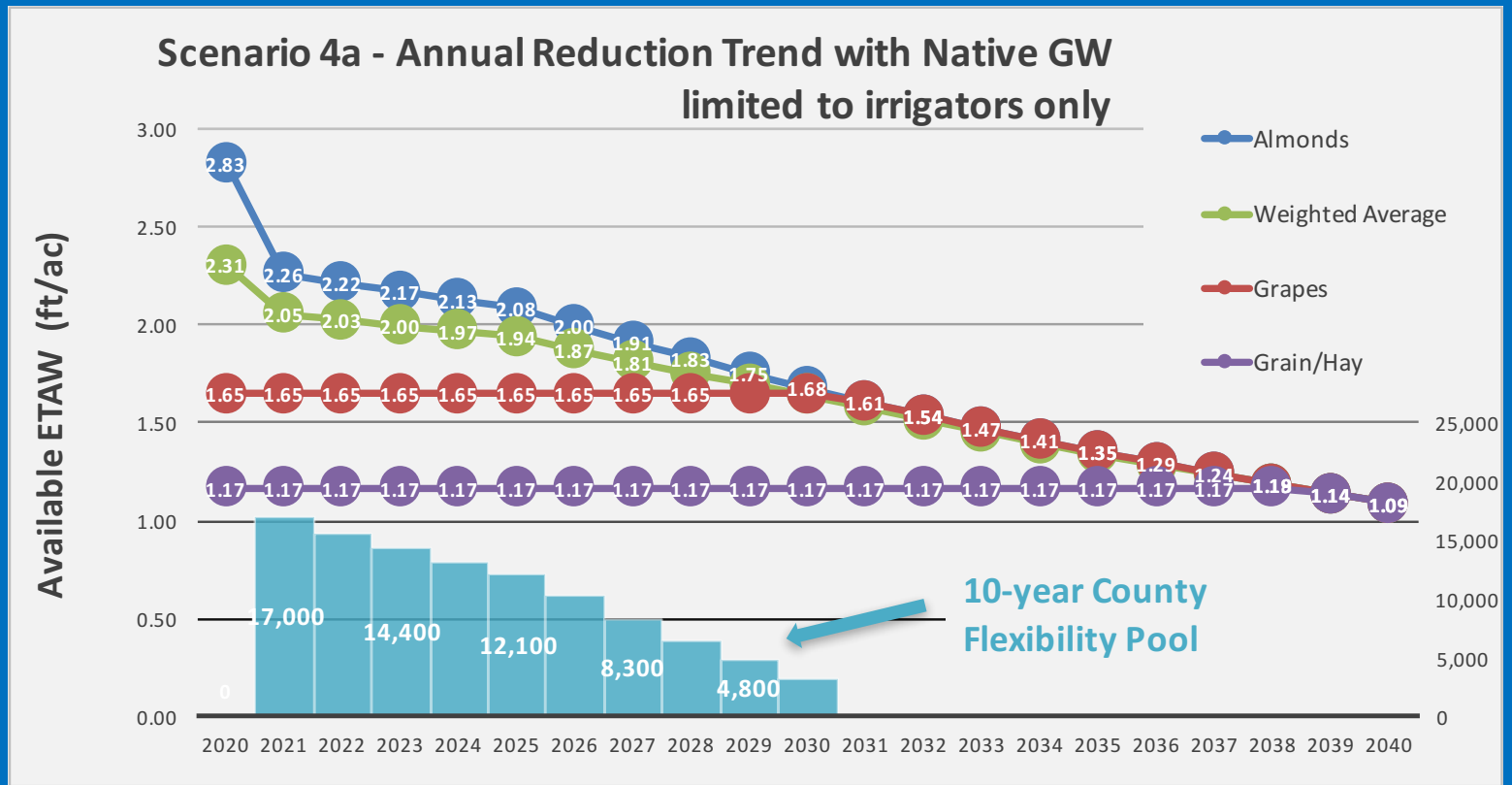
County Flexibility Pool considerations

- Benefits
 - Not tied to crop type
 - Provides grower flexibility to manage
 - Easier County GSA administration
 - Mitigates for perceived disparity in allocation for higher water-use crops
 - Allows flexibility for how the County GSA manages transitional reduction
- Challenges
 - Significant administrative tracking and cost
 - Potential for disagreement on 'submitted' information between County and owner

Scenario 4a

Equal share of ETAW to all irrigated lands

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Scenario 4a: Example

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Year 1				Per acre ETAW Allocation		Parcel Operation						
Parcel Size acres	Crop	Crop Acres	Ideal ETAW	NG ft/ac	ESG Add ft/ac	Total Avail ac-ft	Total Ask ac-ft	To Pool ac-ft	Short ac-ft	Req't From Pool (ac-ft)	Rec'v from Pool (ac-ft)	Short after call on Pool (ac-ft)
120	Almonds	110	2.83	0.5	1.75	270	311	0	41	41	41	0
330	Grapes	310	1.65	0.5	1.75	743	512	231	0	0	0	0
185	Hay/Grain	180	1.2	0.5	1.75	416	216	200	0	0	0	0
545	Almonds	515	2.83	0.5	1.75	1,226	1,457	0	231	231	231	0
Total into County Pool (not requested) =								431				
Total Short =									273			
Total from County Pool =										273		
County Pool Remainder =										159		

Year 5				Per acre ETAW Allocation		Parcel Operation						
Parcel Size acres	Crop	Crop Acres	Ideal ETAW	NG ft/ac	ESG Add ft/ac	Total Avail ac-ft	Total Ask ac-ft	To Pool ac-ft	Short ac-ft	Req't From Pool (ac-ft)	Rec'v from Pool (ac-ft)	Short after call on Pool (ac-ft)
120	Almonds	110	2.83	0.5	1.58	250	311	0	62	62	55	-7
330	Grapes	310	1.65	0.5	1.58	686	512	175	0	0	0	0
185	Hay/Grain	180	1.2	0.5	1.58	385	216	169	0	0	0	0
545	Almonds	515	2.83	0.5	1.58	1,134	1,457	0	324	324	289	-35
Total into County Pool (not requested) =								344				
Total Short =									386			
Total from County Pool =										344		
County Pool Remainder =										0		

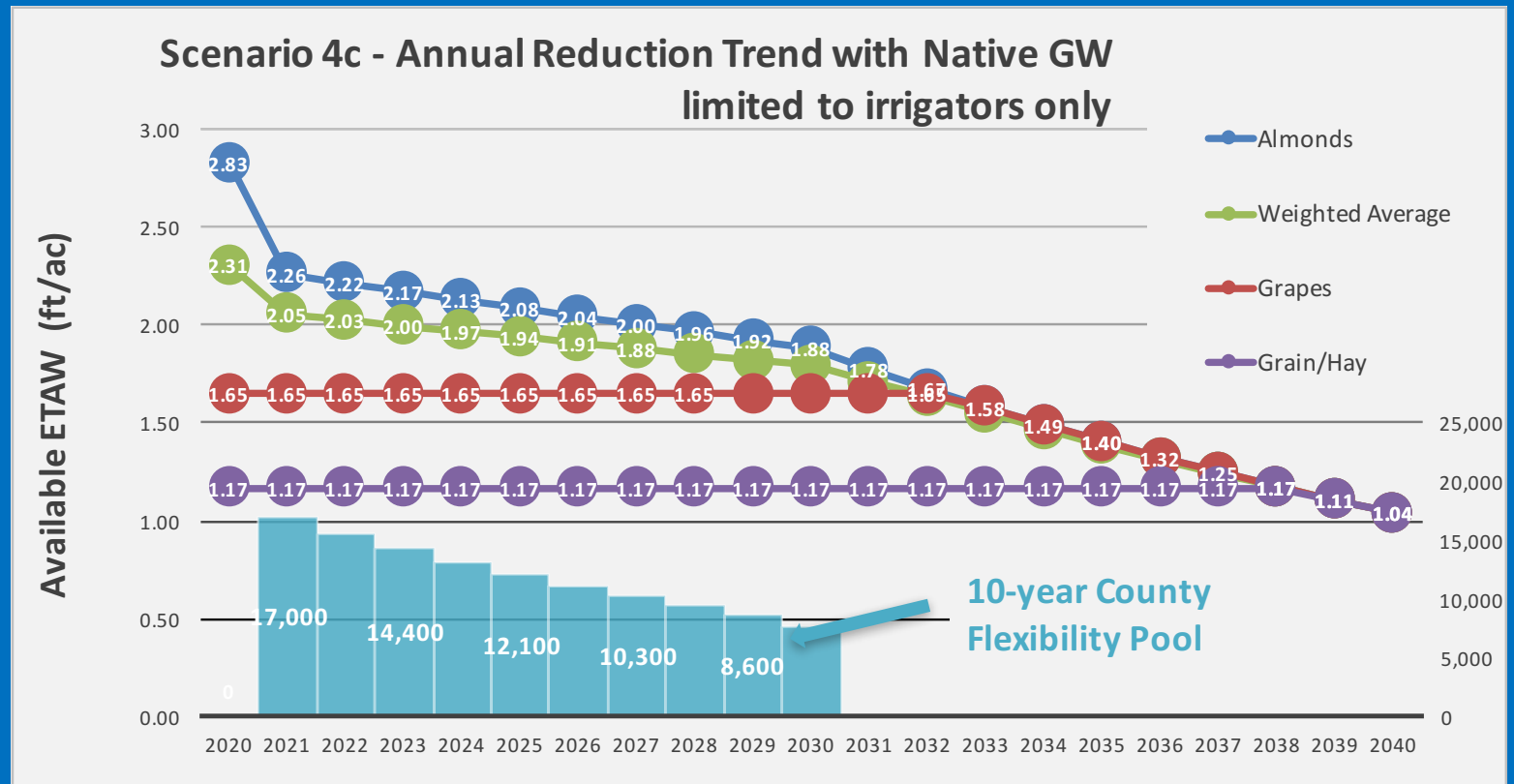
Scenario 4c – same as 4a, but slower reduction

- Assumes 2% per year for first 10 years: ~ 3,600 af/yr starting at 190,000 af
- Assumes 5.75% for remaining 10 years: ~ 6,400 af/yr
- Starts at ETAW of ~ 2.25 ft/ac
- Includes a 'Flexibility Pool' administered by County GSA

Scenario 4c

Equal share of ETAW to all irrigated lands

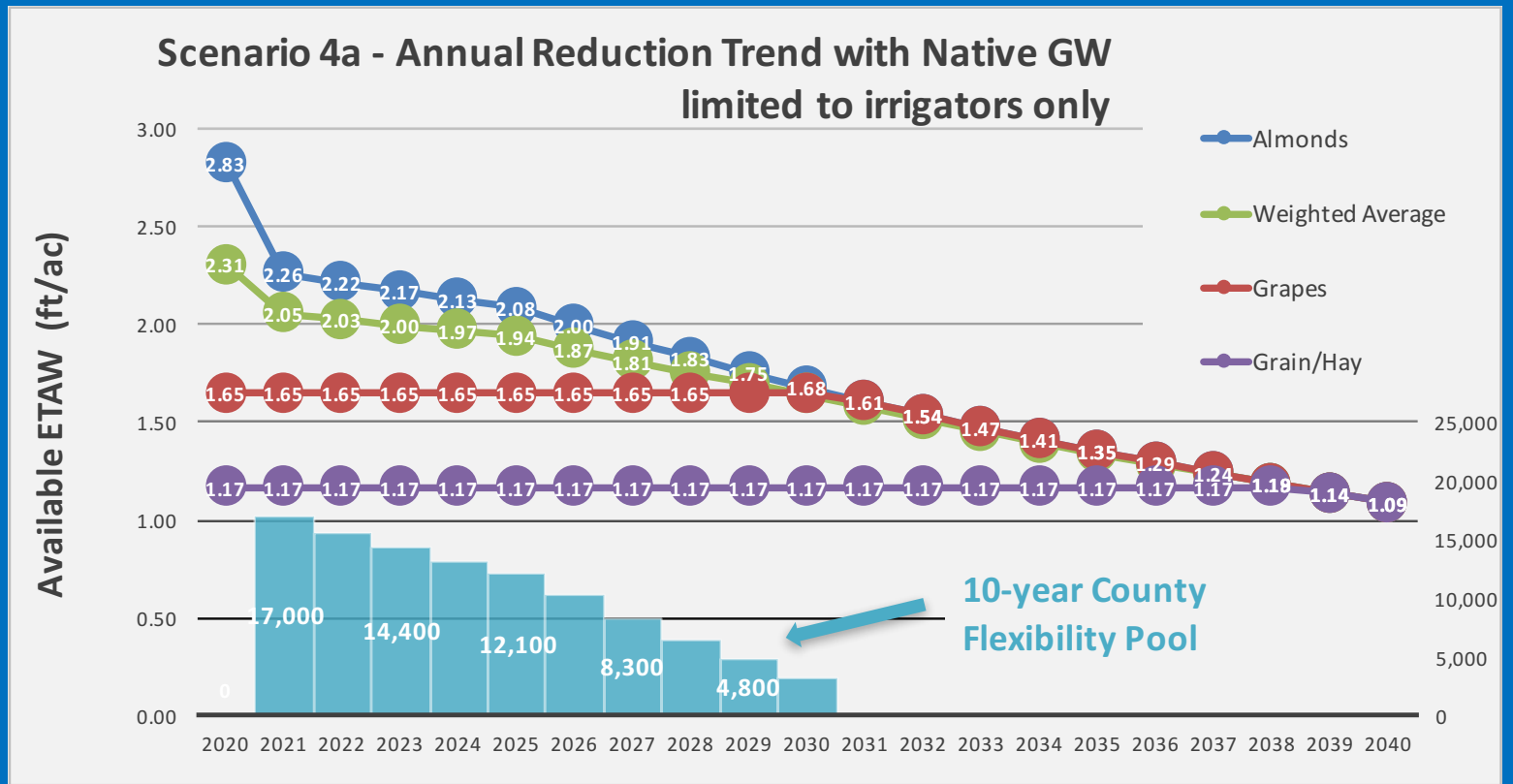
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Scenario 4a

Equal share of ETAW to all irrigated lands

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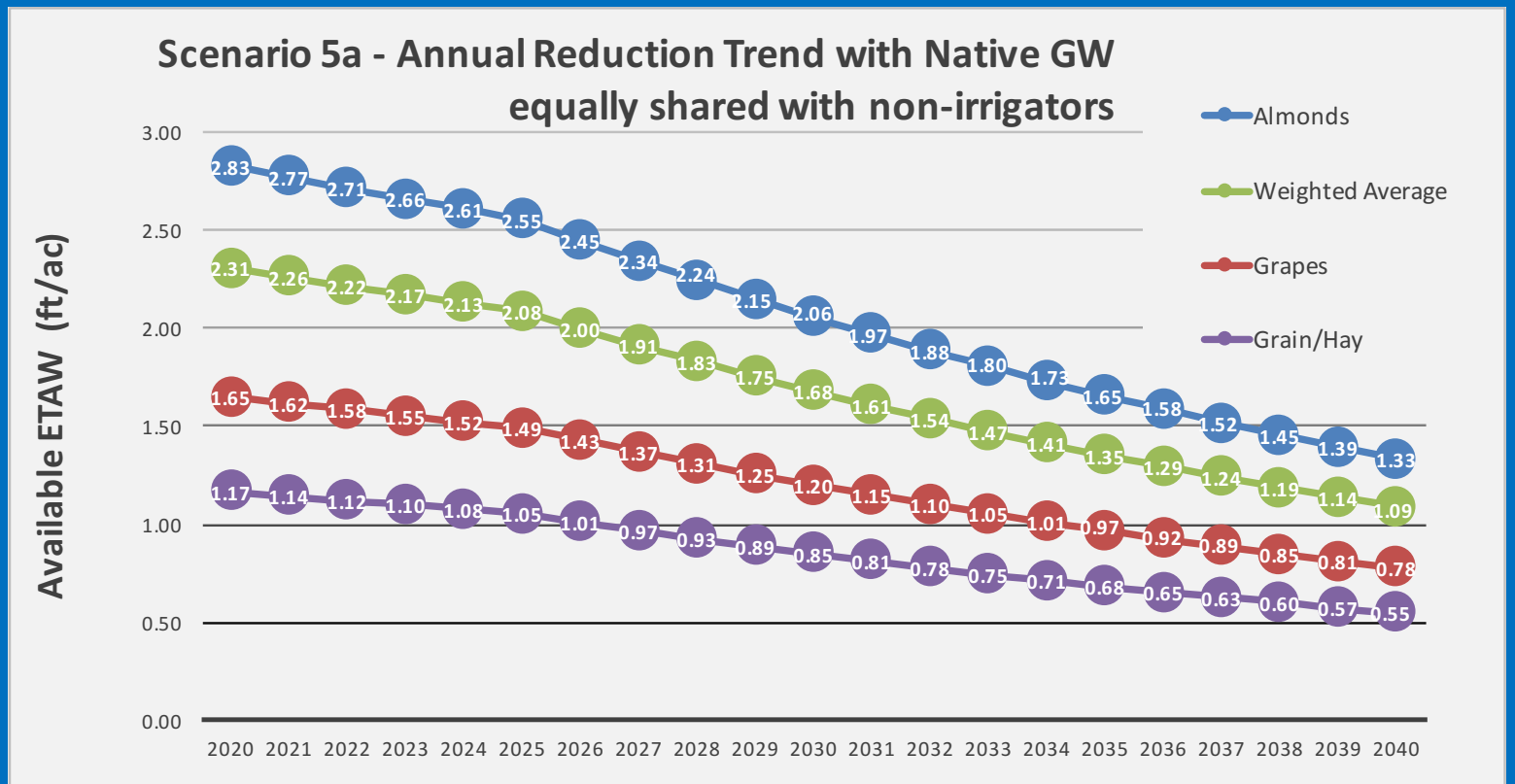


Scenario 5a: ETAW to irrigated lands based on crop type

- Assumes 2% per year for first 5 years: ~ 3,600 af/yr starting at 190,000 af
- Assumes 4.25% for remaining 15 years: ~ 5,500 af/yr
- Starts at ETAW of ~ 2.25 ft/ac
- No 'Flexibility Pool'
- Challenges:
 - What is baseline year(s) to define crop type?
 - Does change in crop change allocation?
 - Expensive to manage (outsource), requiring additional admin fees

Scenario 5a: ETAW to irrigated lands based on crop type

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Potential simplified approach

- Focus only on tiered fee structure
 - Fees adjust related to reduction goals, with last increment(s) of pumping increasingly more expensive
- Provides grower flexibility to manage
- Easiest County GSA administration

DISCUSSION