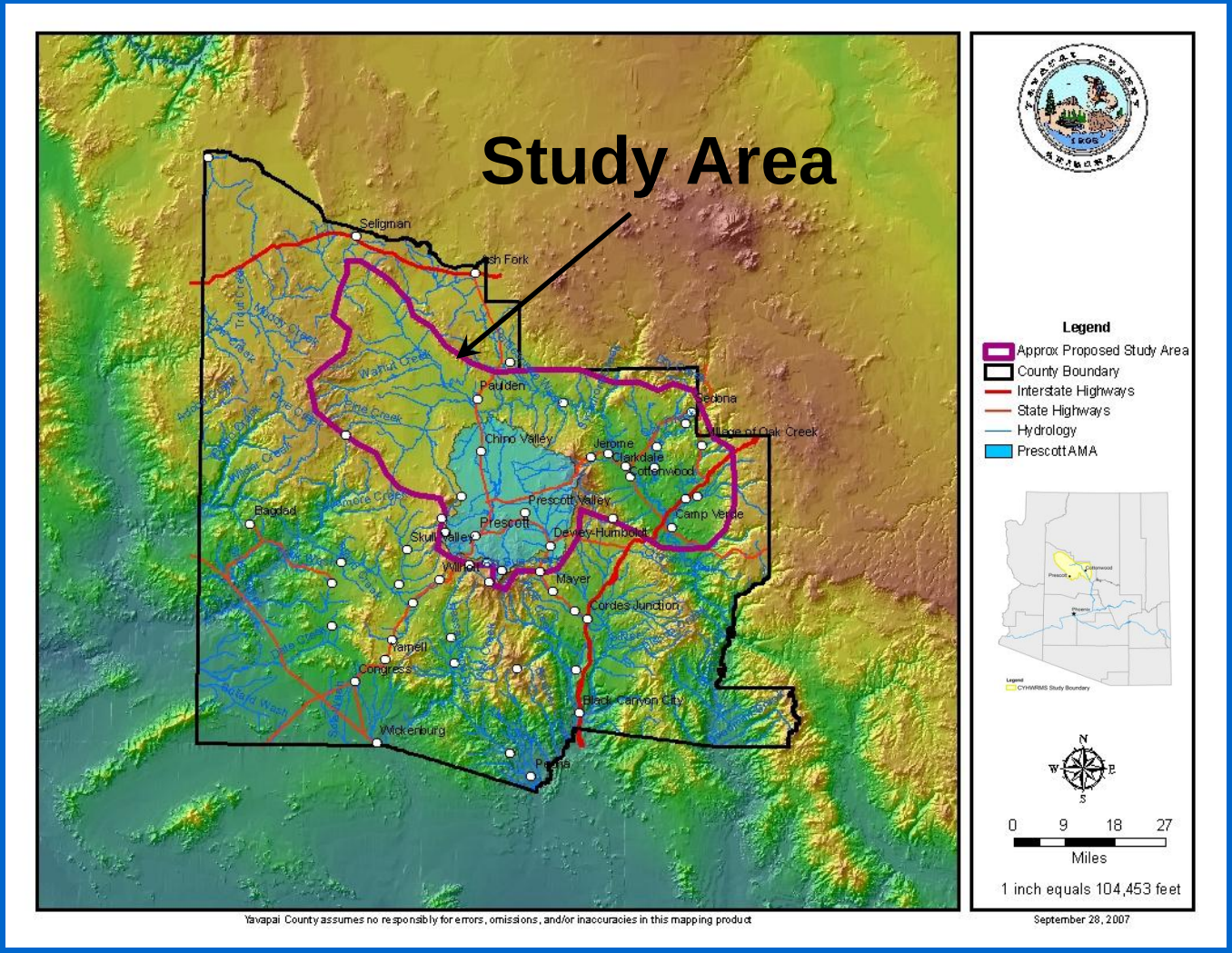
Central Yavapai Highlands Water Resource Management Study CYHWRMS

US Bureau of Reclamation
Arizona Department of Water Resources
Yavapai County Water Advisory Committee

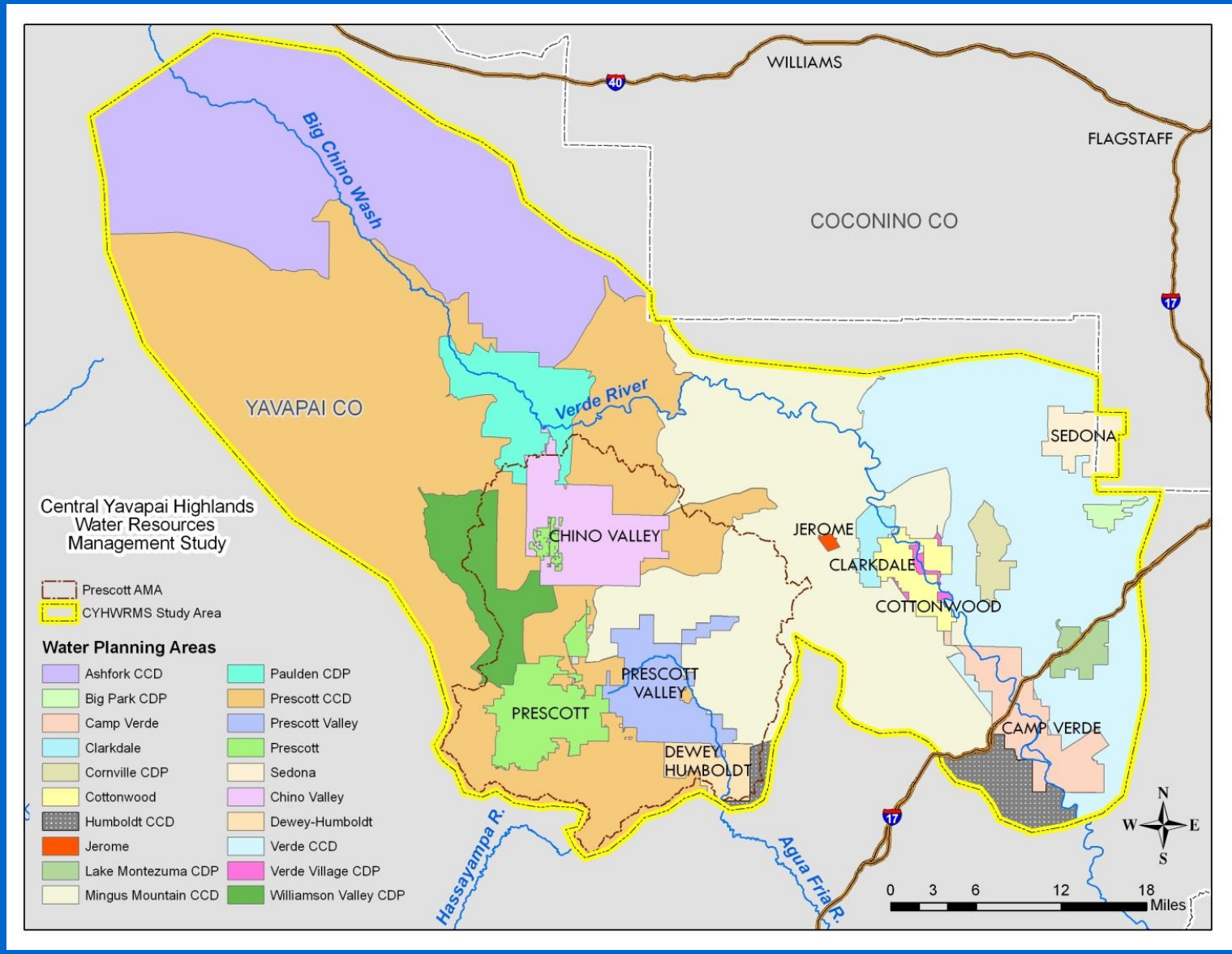
September 18, 2013 WAC meeting

CYHWRMS – Study Location – Yavapai County



- **Study Area includes areas with high potential growth and increased water demands: Big Chino, PrAMA, and Verde Valley**

CYHWRMS - Study Area



- **STUDY AREA: Big Chino, PrAMA, and Verde Valley; High Potential Growth Areas; With increased water demands**

Do we have unmet demands in 2050?

Yes

- **Unmet 2050 demand for the entire study area = about 50,000 acre feet**
- **(best expressed as a range: 45,000-80,000 acre feet depending on calculation method)**
- **If the study area is broken down into groundwater sub-basins**

	Verde Valley	PrAMA (Little Chino and Upper Agua Fria)	Big Chino
Status Quo	-11,886	-31,677	-2,909
Water Budget 1	-25,658	-54,182	-201
Water Budget 2	-21,898	-41,085	3,119

Are there alternatives to meet the 2050 unmet demands?

YES

CYHWRMS Alternatives Considered

Water Supply	Alternative	Alternative Description
Groundwater	1	Local Groundwater Development within the WPA (Inside and outside PRAMA)
	2	Regional Groundwater Development – Big Chino Pipelines (PRAMA and Verde Valley)
	3	Regional Groundwater Development Outside Study Area - Bill Williams Sub-basin and Big Sandy Sub-basin
Effluent	4	Conversion of Existing Systems - Urban
	5	Conversion of Existing Systems - Rural
	6	Additional Effluent from Increased Population
Flood Water	7	Capture and Store Unappropriated Verde River or tributary water
Storm Water	8	Rainwater Harvesting – Aquifer Storage
Conservation	9	Implement Conservation (e.g. low flow toilets, turf restrictions, educational programs, etc.)
Surface Water	10	Alamo Lake
	11	Colorado River via (a) Alamo Lake, (b) Diamond Creek, (c) Lake Mead, (d) Lake Havasu, (e) Lake Mohave, and (f) Lake Powell
Other	12	Weather Modification – Cloud Seeding
	13	Watershed Management

CYHWRMS - Appraisal Level Water Resource Study
General Review

A logically constructed, comprehensive assessment of alternatives to meet future unmet water resource demands in the area of study. Assess regional solution for future water needs.

Assesses available information to address three basic questions

1. **Are there unmet future demands?**
2. **If so, what are the alternatives to meet the demand?**
3. **Is there potential for Federal involvement for meeting the demands? (next step would be "Feasibility")**

Then Ask: Do communities want to pursue any alternative(s)?

CYHWRMS - Study Phases

- **Phase 1 (Demand Analysis) defines problem (amount and location of unmet demands) (completed)**

- **Phase 2 (Water Resource Inventory) identifies potential sources of water to satisfy unmet demands in the Study Planning Areas. (completed)**

- **Phase 3 (Alternative Development and Evaluation) will identify, describe and analyze various potential alternatives to meet the future unmet demands identified in Phase 1 (using the Phase 2 water sources). (completed – in review)**

- **Phase 4 (Assemble Final Report) – In preparation**

CYHWRMS – Phase I Demand Analysis

- Define Study Area and Water Planning Areas
- Develop list of water providers

  Water Demand (evaluated for each Water Provider)
- Present Population
- Future Population
- Present Water Demands
- Present Water Resources (source and amount)
- Future Demands
- Calculate difference between present and future

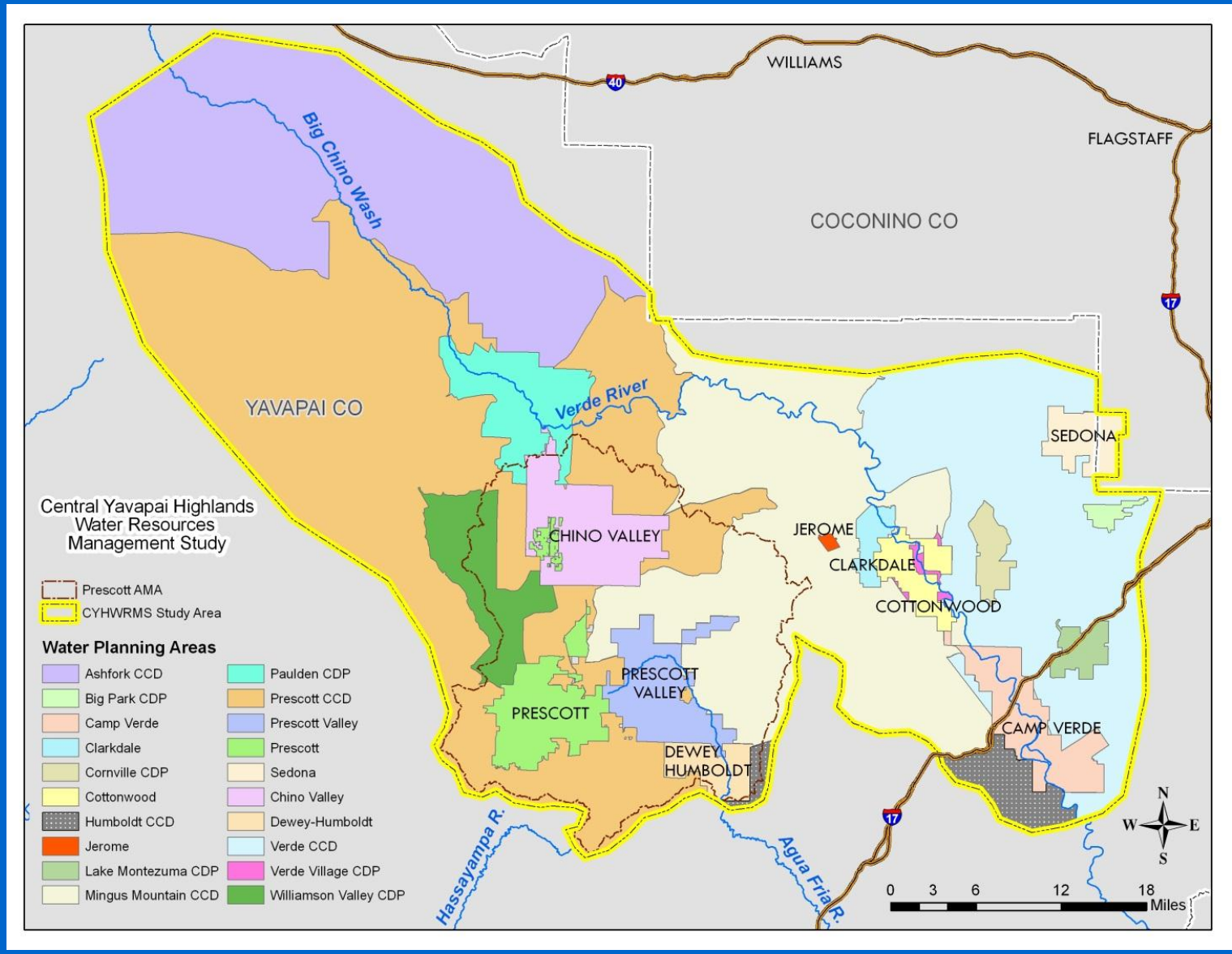
Questions:

Are there demands that will be unmet in 2050?

Where?

How much?

CYHWRMS - Study Area



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How did the TWG get to these figures?

Main Document - Demand Analysis Table

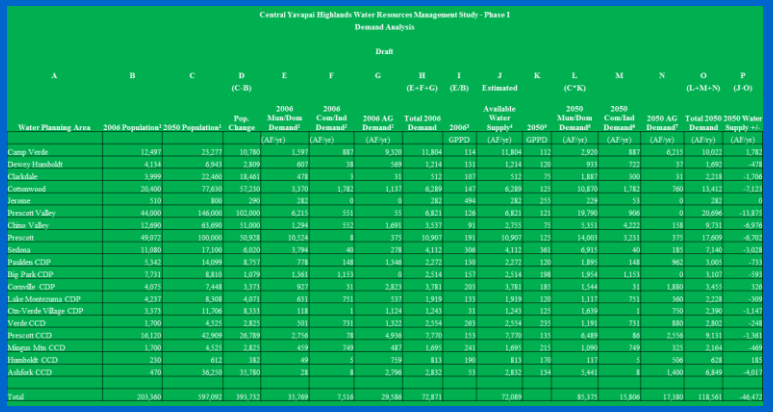
Central Yavapai Highlands Water Resources Management Study - Phase I
Demand Analysis

Draft

A	B	C	D (C-B)	E	F	G	H (E+F+G)	I (E/B)	J Estimated	K	L (C*K)	M	N	O (L+M+N)	P (J-O)
Water Planning Area	2006 Population[1]	2050 Population[1]	Pop. Change	2006 Mun/Dom Demand[2]	2006 Com/Ind Demand[2]	2006 AG Demand[2]	Total 2006 Demand	2006[3]	Available Water Supply[4]	2050[5]	2050 Mun/Dom Demand[5]	2050 Com/Ind Demand[6]	2050 AG Demand[7]	Total 2050 Demand	2050 Water Supply +/-
				(AF/yr)	(AF/yr)	(AF/yr)		GPPD	(AF/yr)	GPPD	(AF/yr)	(AF/yr)	(AF/yr)	(AF/ry)	(AF/yr)
Camp Verde	12,497	23,277	10,780	1,597	887	9,320	11,804	114	11,804	112	2,920	887	6,215	10,022	1,782
Dewey Humboldt	4,134	6,943	2,809	607	38	569	1,214	131	1,214	120	933	722	37	1,692	-478
Clarkdale	3,999	22,460	18,461	478	3	31	512	107	512	75	1,887	300	31	2,218	-1,706
Cottonwood	20,400	77,630	57,230	3,370	1,782	1,137	6,289	147	6,289	125	10,870	1,782	760	13,412	-7,123
Jerome	510	800	290	282	0	0	282	494	282	255	229	53	0	282	-23
Prescott Valley	44,000	146,000	102,000	6,215	551	55	6,821	126	6,821	121	19,790	906	0	20,696	-13,875
Chino Valley	12,690	63,690	51,000	1,294	552	1,691	3,537	91	2,755	75	5,351	4,222	158	9,731	-6,976
Prescott	49,072	100,000	50,928	10,524	8	375	10,907	191	10,907	125	14,003	3,231	375	17,609	-6,702
Sedona	11,080	17,100	6,020	3,794	40	278	4,112	306	4,112	361	6,915	40	185	7,140	-3,028
Paulden CDP	5,342	14,099	8,757	778	148	1,346	2,272	130	2,272	120	1,895	148	962	3,005	-733
Big Park CDP	7,731	8,810	1,079	1,361	1,153	0	2,514	157	2,514	198	1,954	1,153	0	3,107	-593
Cornville CDP	4,075	7,448	3,373	927	31	2,823	3,781	203	3,781	185	1,544	31	1,880	3,455	326
Lake Montezuma CDP	4,237	8,308	4,071	631	751	537	1,919	133	1,919	120	1,117	751	360	2,228	-309
Ctn-Verde Village CDP	3,373	11,706	8,333	118	1	1,124	1,243	31	1,243	125	1,639	1	750	2,390	-1,147
Verde CCD	1,700	4,525	2,825	501	731	1,322	2,554	263	2,554	235	1,191	731	880	2,802	-248
Prescott CCD	16,120	42,909	26,789	2,756	78	4,936	7,770	153	7,770	135	6,489	86	2,556	9,131	-1,361
Mingus Mtn CCD	1,700	4,525	2,825	459	749	487	1,695	241	1,695	215	1,090	749	325	2,164	-469
Humboldt CCD	230	612	382	49	5	759	813	190	813	170	117	5	506	628	185
Ashfork CCD	470	36,250	35,780	28	8	2,796	2,832	53	2,832	134	5,441	8	1,400	6,849	-4,017
Total	203,360	597,092	393,732	35,769	7,516	29,586	72,871		72,089		85,375	15,806	17,380	118,561	-46,472

Demand Analysis Table Columns

- Water Planning Area (also see map)
- 2006 Population
- 2050 Population (cities and towns input)
- Population Change
- 2006 Municipal/Domestic Demand (includes commercial demands met by providers)
- 2006 Commercial/Industrial Demand (by private wells)
- 2006 Agricultural Demand
- Total 2006 Demand
- GPPD (2006)
- Estimated Available Water Supply
- GPPD (2050)(cities & towns input)
- 2050 Municipal/Domestic Demand
- 2050 Commercial/Industrial Demand
- 2050 Agricultural Demand
- Total 2050 Demand
- 2050 Water Supply (Difference between 2050 and 2006)



Central Yavapai Highlands Water Resources Management Study - Phase I
Demand Analysis
Draft

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Total	203,360	597,092	393,732	35,369	7,516	29,586	72,871		72,089		85,375	15,806	17,180	118,561	-46,472

Demand Analysis – Total 2050 Demand (column 0)

- Total of 2050 Demands (add columns L, M, N)

- Total year 2050 Study Area Demand = 118,561 AF/yr

(Total 2006 = 72,880 AF/yr)

Water Planning Area	Total 2050 Demand (AF/ry)
Camp Verde	10,022
Dewey Humboldt	1,692
Clarkdale	2,218
Cottonwood	13,412
Jerome	282
Prescott Valley	20,696
Chino Valley	9,731
Prescott	17,609
Sedona	7,140
Paulden CDP	3,005
Big Park CDP	3,107
Cornville CDP	3,455
Lake Montezuma CDP	2,228
Ctn-Verde Village CDP	2,390
Verde CCD	2,802
Prescott CCD	9,131
Mingus Mtn CCD	2,164
Humboldt CCD	628
Ashfork CCD	6,849
Total	118,561

Bottom Line (column P):
2050 Water Supply +/-

- **Phase 1 has identified unmet future demands.**
- **The unmet demands are detailed the Demand Analysis Table (with several supporting documents).**
- **They are expressed as a range based on a range of approaches used in the phase 1 analysis (a "status quo" and a "water balance" approach).**
- **The total, overall study area unmet 2050 demands range from about 46,000 AF/yr (status quo method) to about 80,000 AF/yr (water budget method 1).**

Water Planning Area	2050 Water Supply +/- (AF/yr)
Camp Verde	1,782
Dewey Humboldt	-478
Clarkdale	-1,706
Cottonwood	-7,123
Jerome	-23
Prescott Valley	-13,875
Chino Valley	-6,976
Prescott	-6,702
Sedona	-3,028
Paulden CDP	-733
Big Park CDP	-593
Cornville CDP	326
Lake Montezuma CDP	-309
Ctn-Verde Village CDP	-1,147
Verde CCD	-248
Prescott CCD	-1,361
Mingus Mtn CCD	-469
Humboldt CCD	185
Ashfork CCD	-4,017
Total	-46,472

CYHWRMS: Demand Analysis – Estimated Supplies and Demands, using components from existing water budgets

SUB-BASIN "Water Balance 1" APPROACH -

Verde Valley Sub-basin:
Inflow (167,000) – Outflow (baseflow out 144,100) = 22,900 AF available
22,900 – 48,558 (2050 Demand) = -25,658 (unmet 2050 demand)

Little Chino/Upper Agua Fria (PrAMA):
Inflow Natural Recharge (8,070) – Outflow (4,850) = 3,220 AF available
3,220 – 57,402 (2050 Demand) = -54,182 (unmet 2050 demand)

Big Chino Sub-basin:
Inflow (30,300) – Outflow (17,900 baseflow out) = 12,400 AF available
12,400 – 12,601 (2050 Demand) = -201 (unmet 2050 demand)

Bottom Line Need by WPA

- This table represents the amount of additional supplies each planning area needs to find to satisfy 2050 demands.
- Understand assumptions built in to Phase 1 table (such as GPPD, conservation and agricultural transfers, etc)
- Phase 2 assesses where there may be water to use in alternatives to meet those needs

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Clarkdale	-1,706
Cottonwood	-7,123
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CYHWRMS Phase 2
Water Resource Inventory

- Purpose: locate and describe water resources that could be included in various portfolio(s) to meet future unmet demands
- Consider possibilities both within the Study Area and outside of the Study Area
- Consider both quantity and quality
- Consider several types of water (surface, ground, effluent, reservoirs, impaired waters, demand management, waste water, flood, and others)
- Findings represent appraisal level analysis based on available information and input from the Technical Working Group.

Phase 2 - Table 1: Water Resource Availability within Study Area

	Big Chino Sub-Basin	Little Chino and Upper Agua Fria Sub-Basin (Prescott AMA)	Verde Valley Sub-Basin
Surface Water	No	No	No
Groundwater	Yes	Yes	Yes
Wastewater			
Septic	Yes	Yes	Yes
Mine Drainage	No	No	No
Brackish/Saline	No	No	No
Flood Water	Yes	Yes	Yes
Storm Water	Yes	Yes	Yes
Effluent	Yes	Yes	Yes

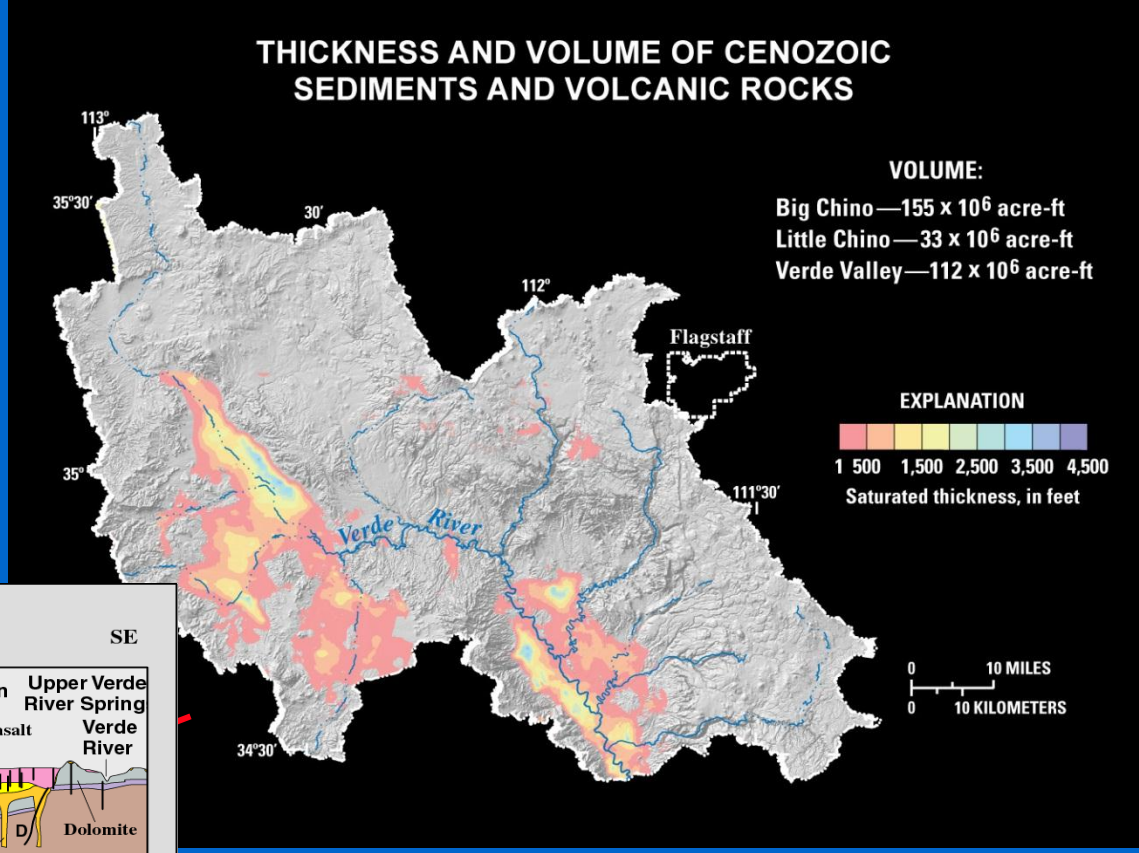
Within Study Area

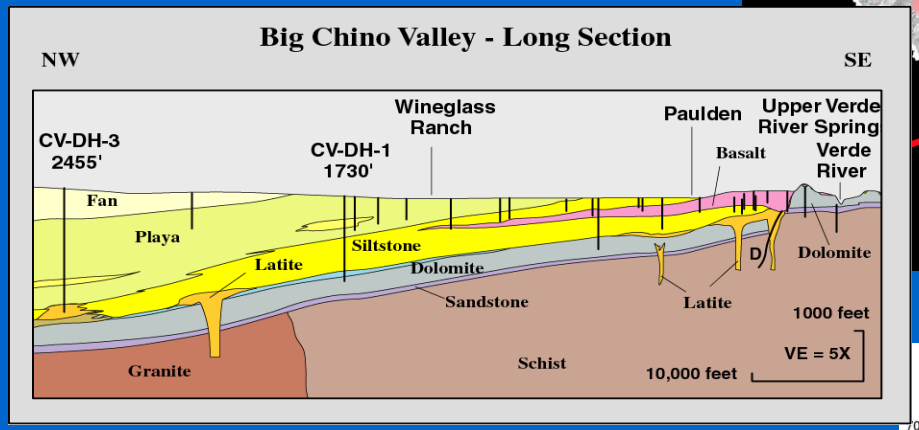
- **Surface Water: Rivers and Streams**
- **The analysis of Statements of Claimant (SOCs) and surface water filings in the Verde and Agua Fria Watersheds concludes that existing claims for surface water far exceed available supply. Therefore, with the exception of major flood events (see Flood water section); new sources of surface water are not available within the study area to meet new water demands.**

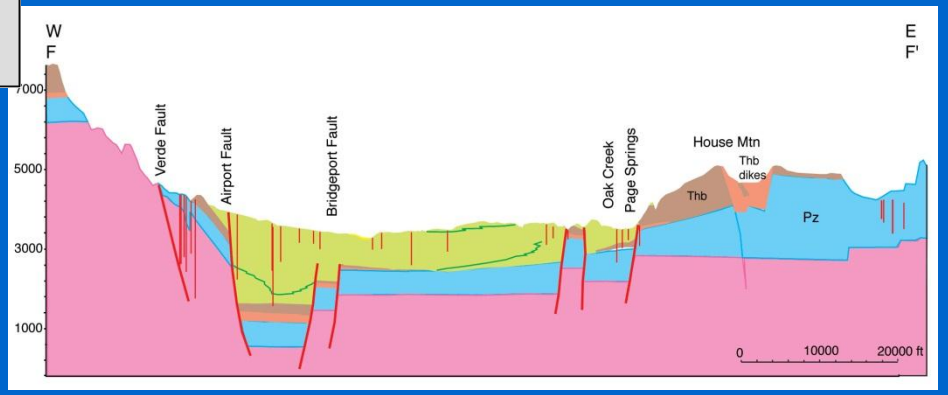
Sierra Club; USFS

Within Study Area

- **Ground Water**:
- Basin Fill Aquifers
- Paleozoic Aquifers







Within Study Area

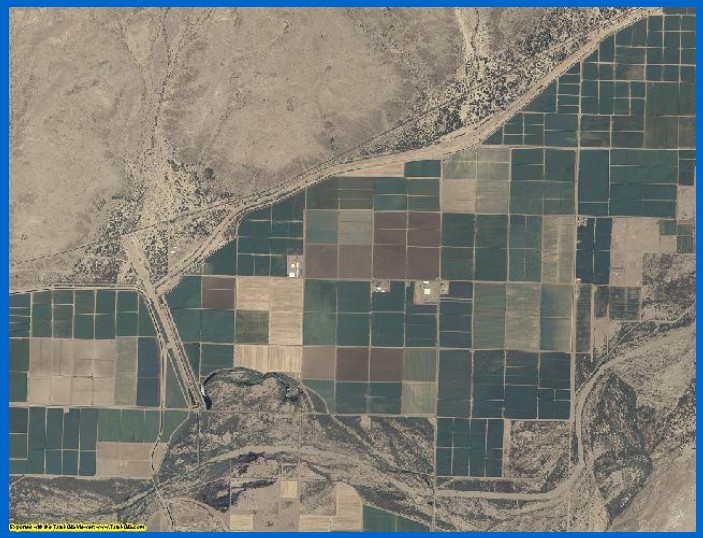
- **Flood water is generated in tributaries in each of the sub-basins and is available to be developed as an additional supply in the study area. Water supply developed from the collection and storage of un-appropriated flood water is dependent on high flow events and will be relatively unreliable. Additionally, this supply will likely be quite expensive and may have many issues associated with location of diversion and potential exchanges on the Verde River.**

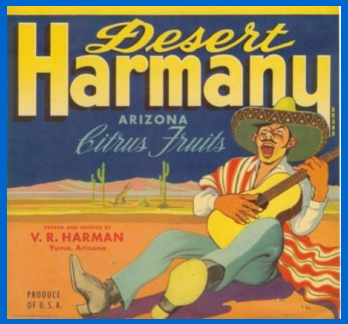



Within Study Area

- **Storm water may have the potential to produce large volumes of surface runoff within any given developed community and, potentially, on a larger landscape scale, however, information relating to storm water runoff volumes is limited.**

Phase 2- Table 2: Surface Water Resource Availability Outside the Study Area





River Basin	Surface Water
Agua Fria	No
Colorado	Yes
Little Colorado	No
Salt	No
Middle Gila	No
Bill Williams	Yes
Verde	No

Phase 2- Table 3: Water Resource Availability Outside the Study Area

Groundwater Basins	Groundwater	Wastewater	Flood Water	Storm Water	Effluent
Coconino Plateau	Yes	No	No	No	No
Little Colorado Plateau	Yes	No	No	No	No
Agua Fria	Yes	No	No	No	No
Salt River	Yes	No	No	No	No
Tonto Creek	Yes	No	No	No	No
Upper Hassayampa	Yes	No	No	No	No
Verde River	Yes	No	No	No	No
Phoenix AMA	Yes	No	No	No	No
Prescott AMA	Yes	No	No	No	No
Big Sandy	Yes	No	Yes	No	No
Bill Williams	Yes	No	Yes	No	No
Peach Springs	Yes	No	No	No	No
Shivwits Plateau	Yes	No	No	No	No

Phase 3 - Alternatives

- **Phase 3 (Alternative Development and Evaluation) Identifies, describe and analyze various potential alternatives to meet the future unmet demands identified in Phase 1 (using the Phase 2 water sources). Ways to tie the available resources to the identified needs**

- **Question: Is there at least one alternative that can meet the unmet demands? (Yes, but alternatives only meet a portion of the deficit – potential combinations)**

- **Question: Is there a Federal Interest in the identified alternatives? (yes)**

- **Question: Do communities (WAC) want to pursue any alternative(s)?**

Phase 3 Process

- List and Describe Alternatives
- Describe Environmental issues associated with Alternatives (document/maps)
- Describe Legal and Institutional issues associated with the Alternatives (document)
- Calculate potential water volume associated with each alternative
- Prepare appraisal level costs (tables/documentation) (to serve as relative comparison of alternatives – not absolute costs)
- Consider Viability (Four tests of Viability)

Are there alternatives to meet the 2050 unmet demands?

YES

CYHWRMS Alternatives Considered (13)

Water Supply	Alternative	Alternative Description
Groundwater	1	Local Groundwater Development within the WPA (Inside and outside PRAMA)
	2	Regional Groundwater Development – Big Chino Pipelines (PRAMA and Verde Valley)
	3	Regional Groundwater Development Outside Study Area - Bill Williams Sub-basin and Big Sandy Sub-basin
Effluent	4	Conversion of Existing Systems - Urban
	5	Conversion of Existing Systems - Rural
	6	Additional Effluent from Increased Population
Flood Water	7	Capture and Store Unappropriated Verde River or tributary water
Storm Water	8	Rainwater Harvesting – Aquifer Storage
Conservation	9	Implement Conservation (e.g. low flow toilets, turf restrictions, educational programs, etc.)
Surface Water	10	Alamo Lake
	11	Colorado River via (a) Alamo Lake, (b) Diamond Creek, (c) Lake Mead, (d) Lake Havasu, (e) Lake Mohave, and (f) Lake Powell
Other	12	Weather Modification – Cloud Seeding
	13	Watershed Management

Each alternative has a written description…

- **Alts. 10 & 11- Surface Water in Alamo Lake and Colorado River water via Alamo Lake, Diamond Creek, Lake Mead, Lake Havasu, Lake Mohave and Lake Powell**
-
- **Description**
- **This alternative proposes use of surface water obtained from outside of the study area in the volume of 42,379 AF/yr. Alternative 10 proposes delivery of water from Alamo Lake via pipeline. The variations of Alternative 11 propose delivery of water from the Colorado River via pipelines from several different locations: Alamo Lake, Diamond Creek, Lake Mead, Lake Havasu, Lake Mohave and Lake Powell.**
-
- **The WPAs considered in this alternative are those that show a 2050 water supply deficit with the exception of Jerome and rural WPAs that are primarily served from private domestic wells. The following WPAs were not included within this alternative: Jerome, Verde CCD, Prescott CCD, Mingus Mountain CCD, Humboldt CCD and Ashfork CCD.**

Alt. #8 Rainwater Harvesting-Aquifer Storage

Description

This alternative evaluates a variety of rainwater harvesting methods to capture rainwater that would normally be lost to evaporation and transpiration. The methods evaluated in this alternative are considered large-scale, or macro-rainwater harvesting methods, that capture storm water and re-direct a portion of the rainwater to recharge facilities. It assumes that the water gathered via rainwater harvesting efforts is water that would not be considered appropriable as surface water. Under current state law there is no provision that would recognize this distinction. For each alternative, the rainwater that is harvested is gathered at numerous smaller locations (lots) and then transmitted to another location for recharge and recovery.

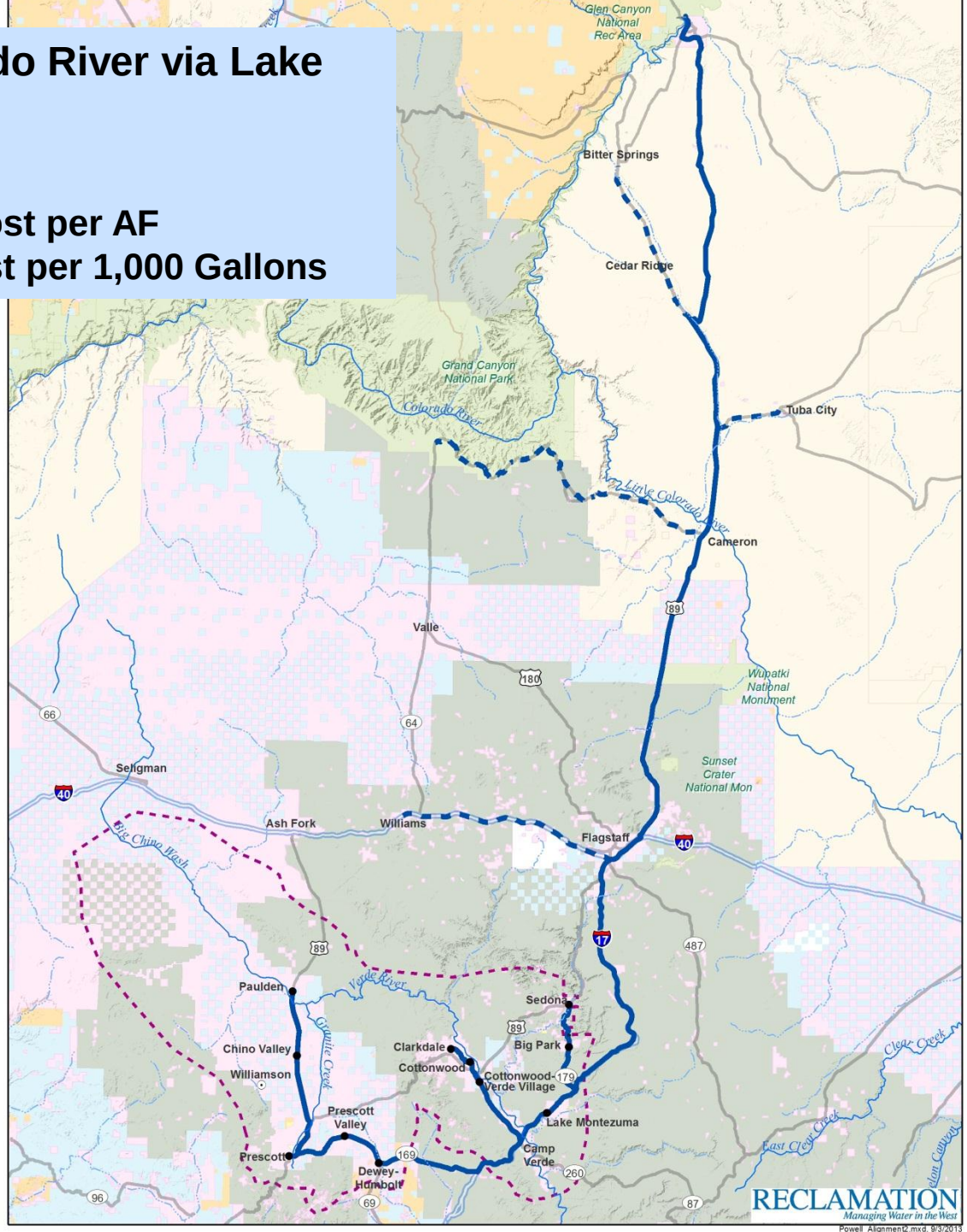
There were two general categories of rainwater harvesting considered in this alternative. The first is harvesting from developed areas such as existing residential and commercial properties. The second is harvesting from undeveloped areas that have land surfaces modified via compaction to increase runoff from storm events (scenario 10, open space lots of 2.0 acres).

In this alternative, there were 10 water harvesting scenarios developed for specific lots that differ by lot location, lot size, the amount of development on the lot (pervious versus impervious versus pervious made impervious land surfaces), existing infrastructure and proposed infrastructure improvements. For each scenario, the horizontal land surface, nature of the land surface, and rainfall records were used to estimate the annual volume of rainwater that could be harvested based on a collective 12 lot sample wherein the lots were physically linked through lateral and collector infrastructure improvements. There was no attempt to evaluate impacts to downstream water right holders.

The WPAs evaluated in this alternative are Prescott Valley, Chino Valley, Prescott and Prescott CCD. However, this alternative is applicable to all WPAs.

Alt. #11 Colorado River via Lake Powell

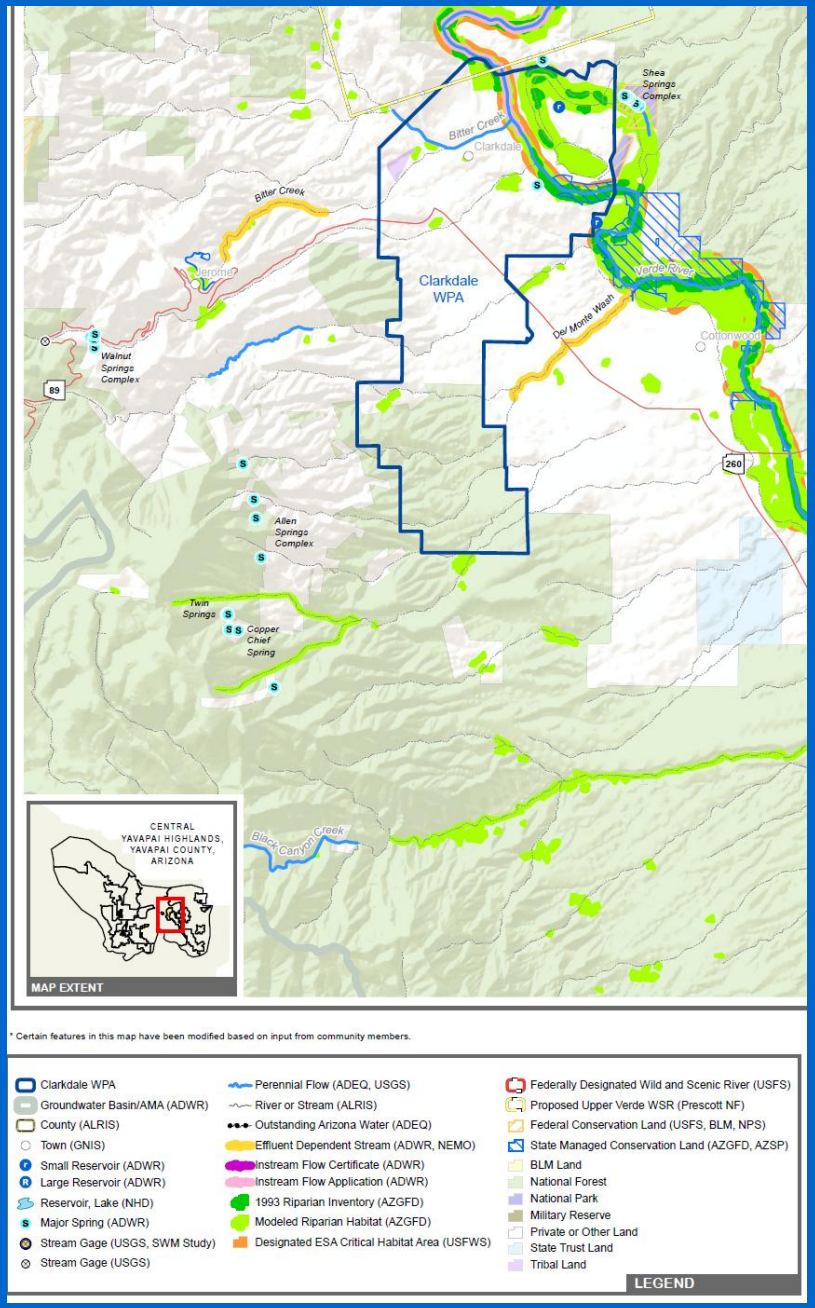
42,379 AF/yr.
$1,605 Annual Cost per AF
$4.92 Annual Cost per 1,000 Gallons



Alternative Evaluations

- <u>Environmental</u>: potential environmental issues associated with each alternative were discussed and documented.

- <u>Legal & Institutional</u>: intent to develop and document potential significant issues or obstacles relative to Federal, sate or local regulations.



CYHWRMS Alternatives Evaluated for costs and volumes (10)

Water Supply	Alternative	Alternative Description
Groundwater	1	Local Groundwater Development within the WPA (Inside and outside PRAMA)
	2	Regional Groundwater Development – Big Chino Pipelines (PRAMA and Verde Valley)
	3	Regional Groundwater Development Outside Study Area - Bill Williams Sub-basin and Big Sandy Sub-basin
Effluent	4	Conversion of Existing Systems - Urban
	5	Conversion of Existing Systems - Rural
	6	Additional Effluent from Increased Population
Flood Water	7	Capture and Store Unappropriated Verde River or tributary water
Storm Water	8	Rainwater Harvesting – Aquifer Storage
~~**Conservation**~~	~~9~~	~~Implement Conservation (e.g. low flow toilets, turf restrictions, educational programs, etc.)~~
Surface Water	10	Alamo Lake
	11	Colorado River via (a) Alamo Lake, (b) Diamond Creek, (c) Lake Mead, (d) Lake Havasu, (e) Lake Mohave, and (f) Lake Powell
~~**Other**~~	~~12~~	~~Weather Modification – Cloud Seeding~~
	~~13~~	~~Watershed Management~~

Note: Conservation and Watershed Management are important components of water management. However, not evaluated for costs and volumes in CYHWRMS (“facilities, pipes and pumps”) – they are discussed in the study documentation.

Viability Testing

- **Each alternative is screened based on four evaluation criteria: completeness, effectiveness, efficiency, and acceptability.**

- **Minimum standards are established to assess viability for four criteria to determine if an alternative is worthy of further consideration.**

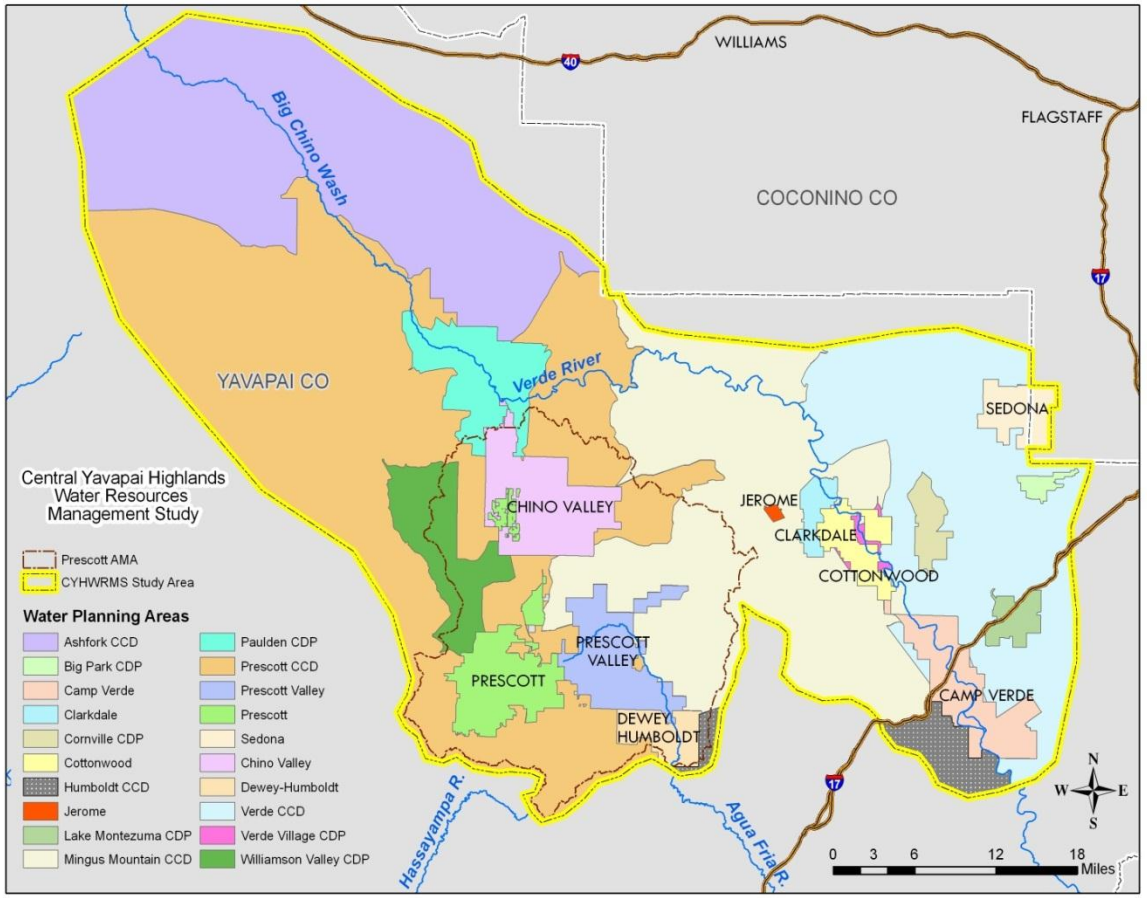
- **The standards are subjective and each alternative is measured relative to other proposed alternatives.**

- **As long as an alternative exceeds the minimum standard for each criterion it qualifies for further consideration and comparison with other alternatives.**

Viability: 8 alternatives are considered viable

Viability	Alternative
Viable	Alt. 1 Local Groundwater Development within the WPA (Outside the PRAMA)
Not Viable	~~Alt. 1 Local Groundwater Development within the WPA (Inside the PRAMA)~~
Viable	Alt. 2 Regional Groundwater Development Big Chino Pipelines (PRAMA)
Viable	Alt. 2 Regional Groundwater Development Big Chino Pipelines (Verde)
Viable	Alt. 3 Regional Groundwater Development Outside Study Area (Bill Williams & Big Sandy Sub-basins)
Viable	Alt. 4 Conversion of Existing Septic Systems (Urban)
Not Viable	~~Alt. 5 Conversion of Existing Septic Systems (Rural)~~
Viable	Alt. 6 New Effluent From New Population
Viable	Alt. 7 Capture and Store Unappropriated Verde River
Viable	Alt. 8 Rainwater Harvesting-Aquifer Storage
Viable	Alt. 10 & 11 Surface Water in Alamo Lake and Colorado River Water via Alamo Lake, Diamond Creek, lake Mead, lake Havasu, lake Mohave and Lake Powell

Analysis done by Technical Working Group



WPA #	Water Planning Area	WPA #	Water Planning Area
1	Camp Verde	11	Cornville CDP
2	Chino Valley	12	Ctn-Verde Villages CDP
3	Clarkdale	13	Lake Montezuma CDP
4	Cottonwood	14	Paulden CDP
5	Dewey Humboldt	15	Williamson CDP
6	Jerome	16	Ashfork CCD
7	Prescott	17	Humboldt CCD
8	Prescott Valley	18	Mingus Mtn CCD
9	Sedona	19	Prescott CCD
10	Big Park CDP	20	Verde CCD

Are there alternatives to meet the 2050 unmet demands?

YES

CYHWRMS Alternatives Considered (13)

Water Supply	Alternative	Alternative Description
Groundwater	1	Local Groundwater Development within the WPA (Inside and outside PRAMA)
	2	Regional Groundwater Development – Big Chino Pipelines (PRAMA and Verde Valley)
	3	Regional Groundwater Development Outside Study Area - Bill Williams Sub-basin and Big Sandy Sub-basin
Effluent	4	Conversion of Existing Systems - Urban
	5	Conversion of Existing Systems - Rural
	6	Additional Effluent from Increased Population
Flood Water	7	Capture and Store Unappropriated Verde River or tributary water
Storm Water	8	Rainwater Harvesting – Aquifer Storage
Conservation	*9*	*Implement Conservation (e.g. low flow toilets, turf restrictions, educational programs, etc.)*
Surface Water	10	Alamo Lake
	11	Colorado River via (a) Alamo Lake, (b) Diamond Creek, (c) Lake Mead, (d) Lake Havasu, (e) Lake Mohave, and (f) Lake Powell
Other	*12*	*Weather Modification – Cloud Seeding*
	13	*Watershed Management*

Water Supply	Alternative #	Alternative	Planning Area
Inside the Study Area			
Groundwater	1	Local Groundwater Development	1-20
	2	Regional Groundwater Development	(3,4)(2,7,8)(2)(7,8)
Waste Water (Septic Only)	3	Conversion of Existing Systems (Urban)	1,2,3,4,5,6,7,8,9,10,11,13, 14,15
	4	*Conversion of Existing Systems (Rural)*	1-20
Flood Water	5	Capture and Store Verde (or Trib) Flood Water	Water Providers Only 1-20
Storm Water	6	Macro Rainwater Harvesting	By Sub-Basin 1-20
Effluent	7	Existing Unused Effluent and/or Capacity	1,2,3,4,5,6,7,8,9,10,11,13, 14,15
	8	New Effluent from Septic (See 3/4 above)	1-20
	9	New Effluent from new population	1-20
Conservation	10	*Implement Conservation (i.e. Rainwater Harvesting, educational programs, etc.)*	1-20
Outside the Study Area			
Surface Water	11	Alamo Lake	1-20
	12	Colorado River (via (a)Alamo Lake, (b)Lake Powell, (c)Diamond Creek, (d)Lake Mead, (e)Lake Havasu, (f)Lake Mohave)	1-20
Ground Water	13	(a)Big Sandy, (b)Bill Williams (Santa Maria Creek), (c) Bill Williams (Burro Creek), (d)Agua Fria	1-20
Other	14	*Weather Modification*	1-20

WPA #	Water Planning Area	WPA #	Water Planni
1	Camp Verde	11	Cornville CDP
2	Chino Valley	12	Ctn-Verde Villa CDP
3	Clarkdale	13	Lake Montezu
4	Cottonwood	14	Paulden CDP
5	Dewey Humboldt	15	Williamson CD
6	Jerome	16	Ashfork CCD
7	Prescott	17	Humboldt CCD
8	Prescott Valley	18	Mingus Mtn C
9	Sedona	19	Prescott CCD
10	Big Park CDP	20	Verde CCD

Planning Roadmap