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Managing Water in the West

Water Resource Management Planning in Arizona

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Water Resources Development Commission
October 10, 2009



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The Bureau of Reclamation *circa 2007*

Our Mission: to manage, develop, and protect water and related resources in an environmentally and economically sound manner in the interest of the American public.



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What do we do?

Reclamation Projects

Planning

Construction

O&M

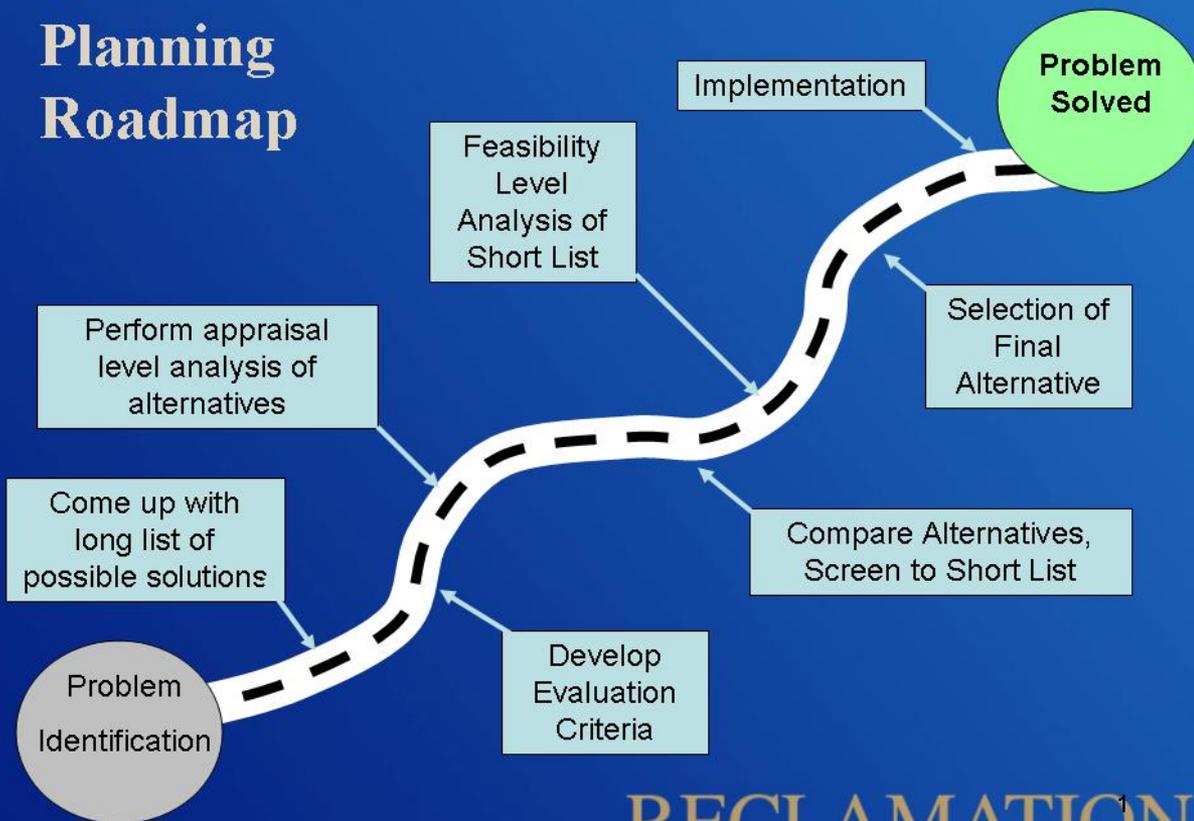


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Planning Roadmap



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Types of Studies

Appraisal

Feasibility

Special Studies



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Appraisal Studies

Answer three key questions:

1. Is there a problem?
2. Is there at least one viable solution to that problem?
3. Is there a Federal Interest?

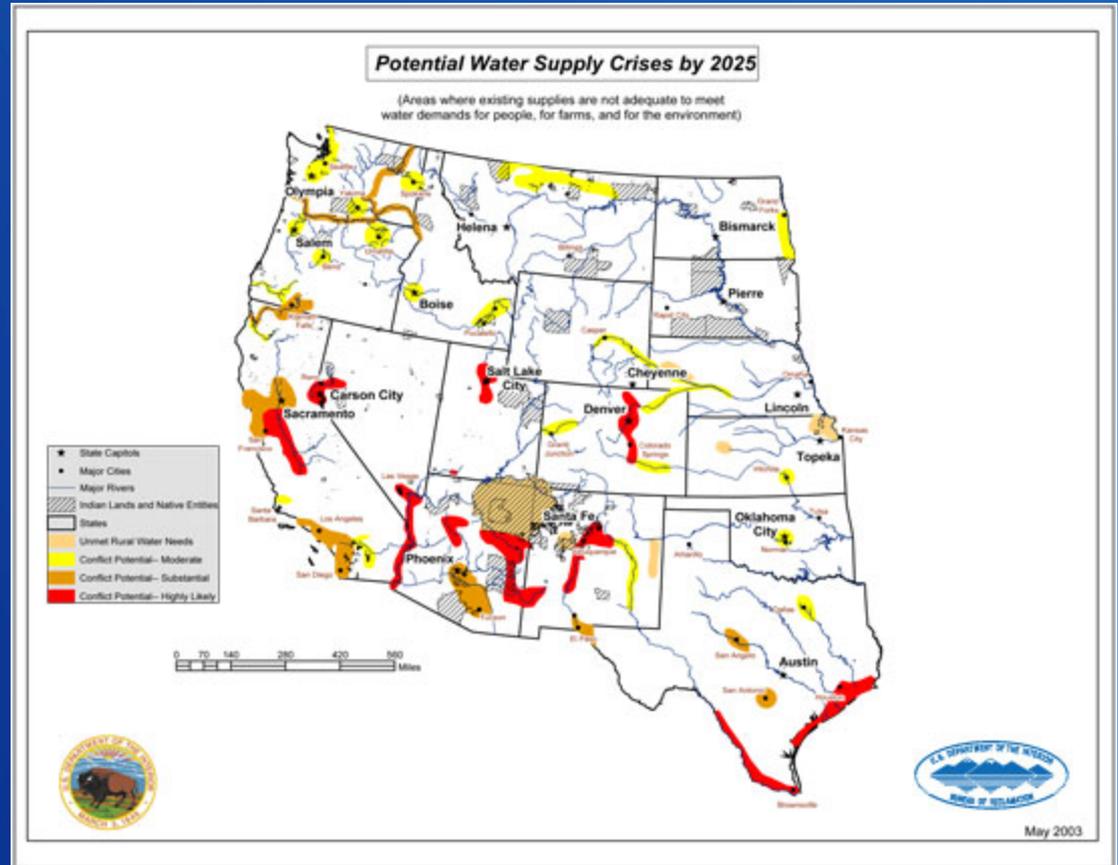


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Conflict Potential
Highly Likely

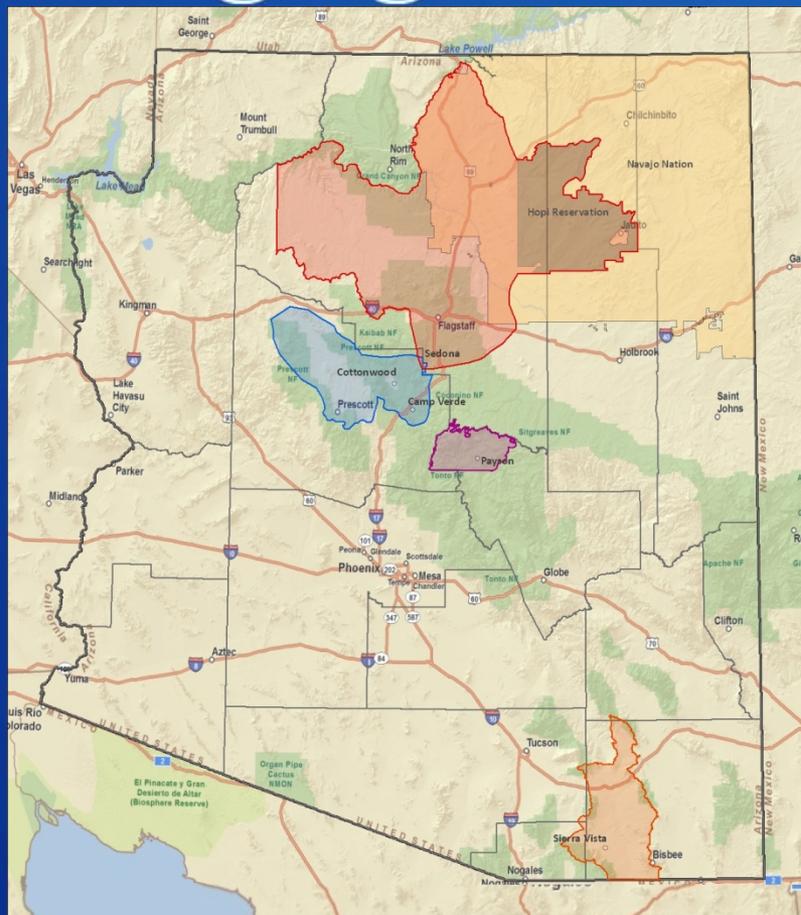


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Appraisal
Studies



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Participating Agencies

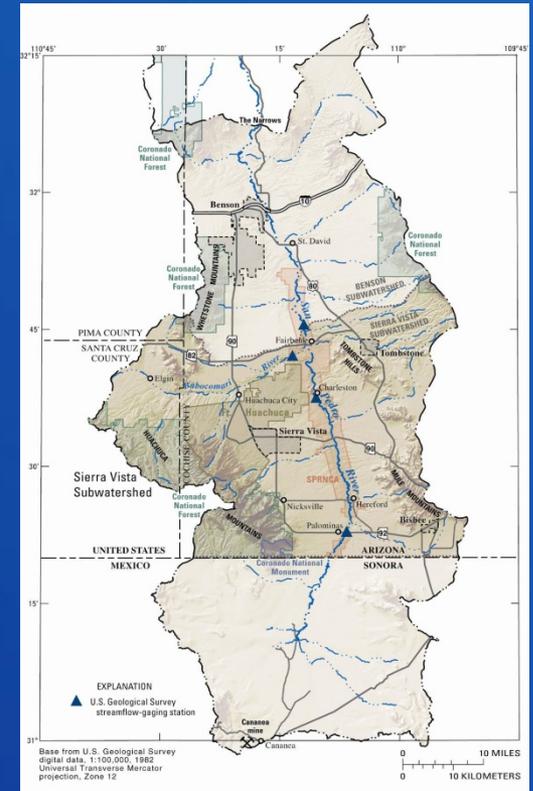
Fort Huachuca
Bureau of Land Management
U.S. Forest Service
National Park Service
U.S. Geological Survey
U.S. Department of Agriculture ARS
U.S. Fish and Wildlife Service
State Land Department
Arizona Department of Environmental Quality
Hereford Natural Resources Conservation District
Cochise County
Sierra Vista
Huachuca City
Bisbee Tombstone
The Nature Conservancy
Audubon Society
Bella Vista Ranches
Arizona Association of Conservation Districts

Upper San Pedro Partnership Sierra Vista Sub-Watershed

Study Partners

Arizona
Department of
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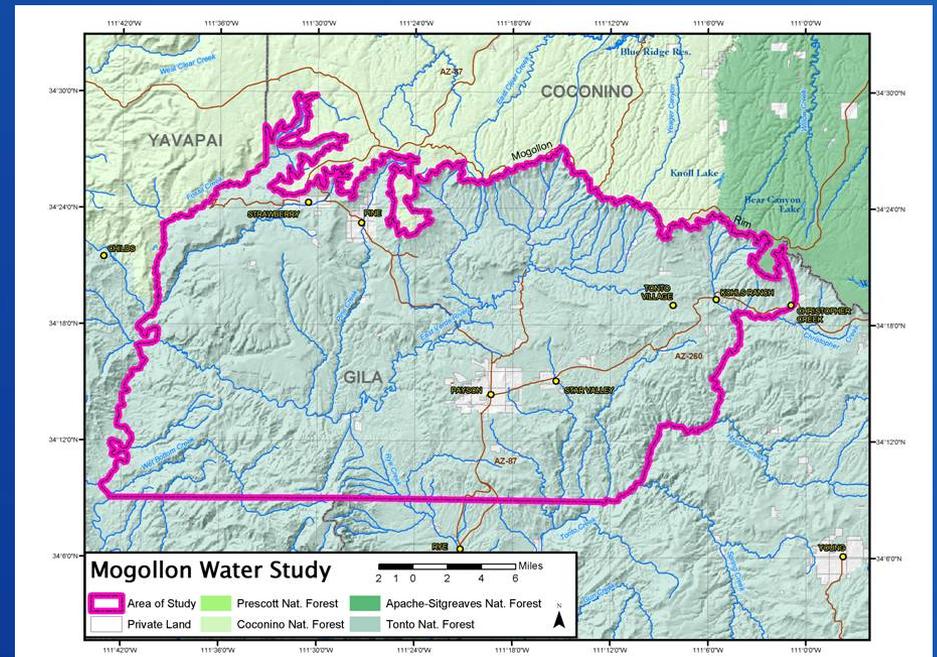
Mogollon Rim Water Resources Management Study

Participating Agencies

Arizona Department of Water Resources
Northern Arizona University
U.S. Forest Service
U.S. Geological Survey
Salt River Project
Tonto Apache Tribe
Town of Star Valley
Brooke Utilities
Pine Strawberry Water Improvement District

Study Partners

Town of Payson
Gila County
Bureau of Reclamation



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North Central Arizona Water Supply Study

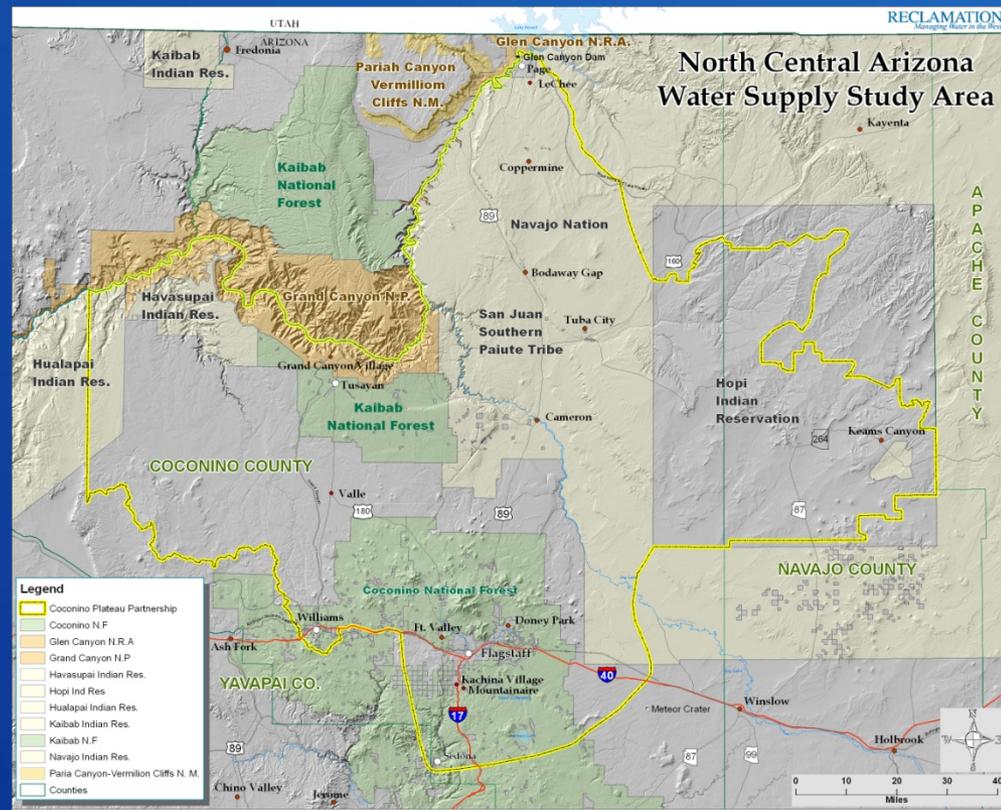
Participating Agencies

Navajo Nation
Hopi Tribe
Havasupai Tribe
Grand Canyon Trust
U.S. Geological Survey
U.S. Fish and Wildlife Service
City of Flagstaff
City of Page
City of Williams
Coconino County

Study Partners

Arizona
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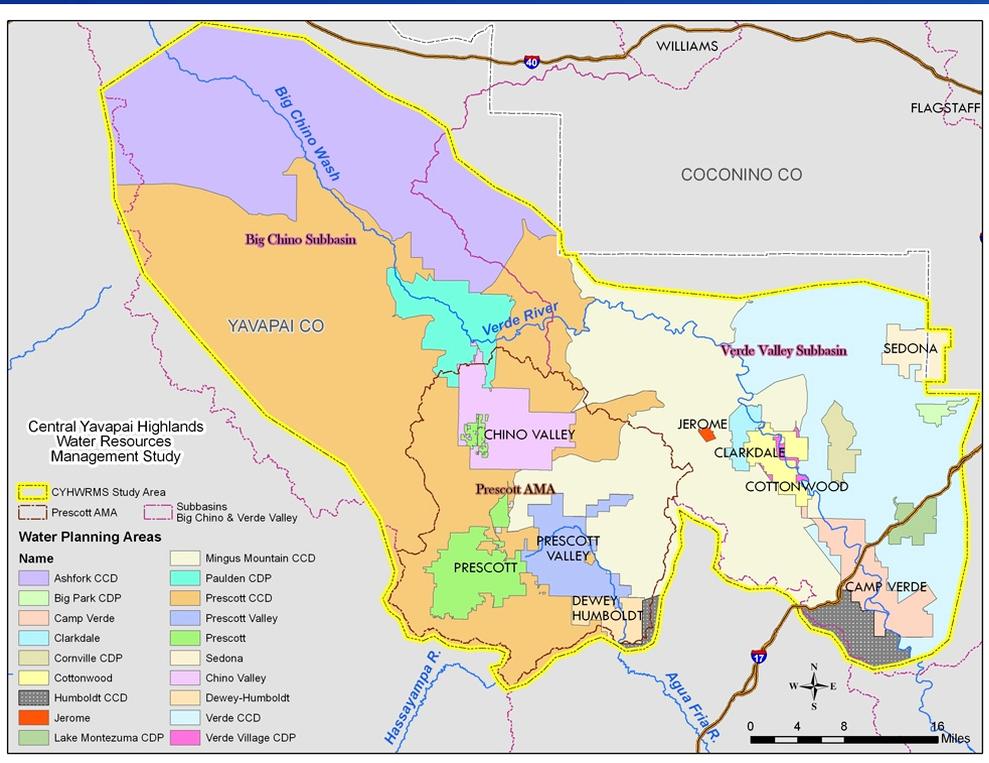


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Central Yavapai Highlands Water Supply Study



Participating Agencies

- Town of Camp Verde
- Town of Clarkdale
- City of Cottonwood
- Town of Jerome
- City of Prescott
- Town of Prescott Valley
- City of Sedona
- Yavapai Apache Nation
- U.S. Geological Survey
- U.S. Fish and Wildlife Service
- Natural Resources Conservation Service
- Verde NRC
- Camp Verde Water System
- AZ Water Company
- Northern Arizona University
- Salt River Project
- The Nature Conservancy

Study Partners

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



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Central Yavapai Highlands Water Resources Management Study **Recommended Plan of Study**

Six Step Process

1. Identify Problems and Opportunities
2. Inventory and Analyze Existing Resources and Forecast Future Conditions
3. Formulate Alternative Plans
4. Evaluate Alternative Plans
5. Compare Alternative Plans
6. Select Recommended Alternative Plan



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Central Yavapai Highlands
Water Resources Management Study
Plan of Study
Phase I

Study Area

- Define Area
- 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

Question: Are there demands that will be unmet in 2050? Where? How much?



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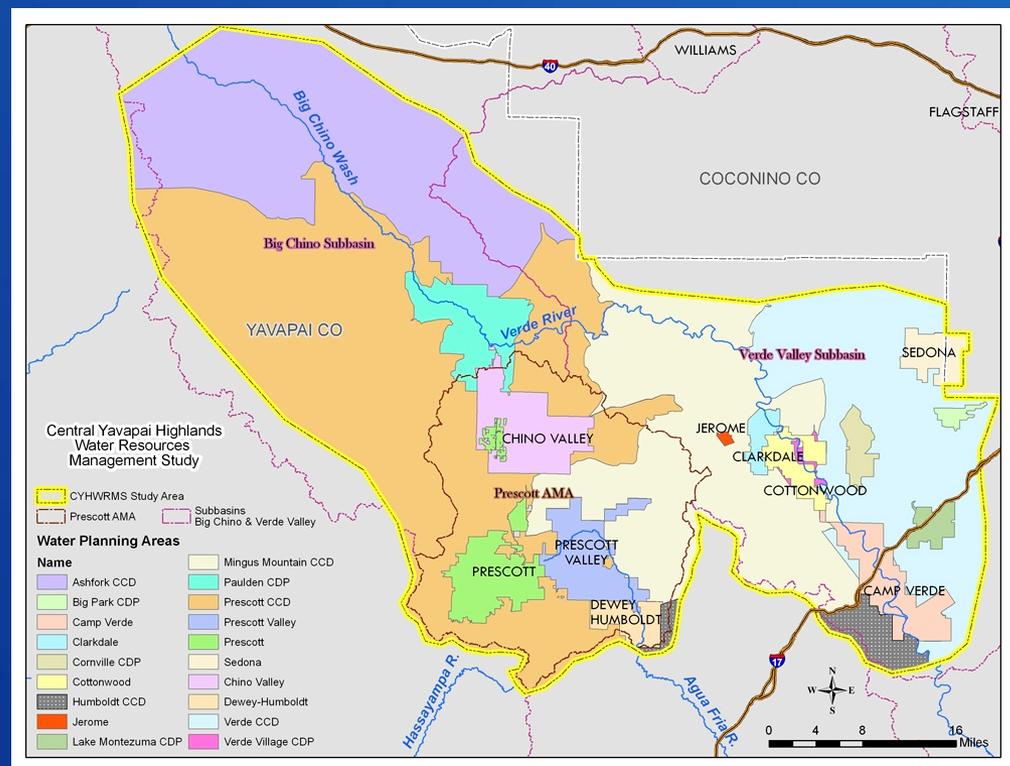
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Central Yavapai Highlands Water Supply Study

Define the Study Area

Water Planning Areas
Groundwater Sub-basins



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Comprehensive Water Provider List

This table is a comprehensive list (draft) of water providers shown in Hoyt's scenario work, YC WAC draft reports in the Verde Valley and Big Chino, ACC records (all entities required to report in Yavapai County), and ADWR records (15+ all entities required to report in Yavapai County and 56 in the D-RMA). At this time, the color coding and unique number is just a grouping mechanism. The comment column shows the type of verification that needs to be done. Corrections and additions will be shown as either a strike-out or in italics.

Uni	Name	Source	Reporting ID#	Water Source	AF in 2005*	AF in 2006*	AF in 2007*	Comment (all comments in red pertain to water)
1	Abra Water Company (7)	YCWAC, Big Chino Subbasin report, Feb 2004 (draft)		GW	179 (p)	no info	no info	
1	Abra Water Co.	Hoyt - Scenario 1 Demand Summary4		GW	no info	164	no info	
1	Abra Water Company, Inc.	ACC - query by Fuente of Yavapai Cnty	W-02678A	GW		164(gp)	176 (gp)	Unable to access 2005 online - call Renee
1	ABRA WC	ADWR CWP - query by Ford of Yavapai Cnty	91-000605.0000	GW	no info	163 (qw)	rec'd	
2	AMERICAN RANCH DWID	ADWR CWP - query by Ford of Yavapai Cnty	91-000684.0000	GW			22.6 (qw)	
3	Antelope Lakes Water Company	ACC - query by Fuente of Yavapai Cnty	W-02740A	GW	187 (qs)	157 (qs)	247 (gp)	
4	APPALOOSA MEADOWS SUBD	ADWR CWP - query by Ford of Yavapai Cnty	91-000680.0000	GW	no info		no info	No AR, the provider is only required to file a SWP due to being in the AMA.
4	APPALOOSA WATER COMPANY	Hoyt - Scenario 1 Demand Summary4		GW	no info	78	no info	
4	Appaloosa Water Company	ACC - query by Fuente of Yavapai Cnty	W-03443A	GW	63 (e)	70 (gp)	93 (gp)	
4	APPALOOSA WATER COMPANY	ADWR RGR 2006 (56 prefix only)	56-003021.0000	GW	63 (qw)	78 (qw)	72 (qw)	
	Arizona Water Company	ACC - query by Fuente of Yavapai Cnty						AWC files one report for all systems, will likely remove this heading and use system names due to subsystems not being contiguous
5	Arizona Water Co. - Rimrock	Hoyt - Scenario 1 Demand Summary4		GW	no info	326	no info	
5	AZ Water Co. Rim Rock	YCWAC Verde Valley Projection, April 2003 (draft)		GW	290 (p)	no info	no info	The report states this is also for River Valley
5	AZ WATER CO-RIMROCK	ADWR CWP - query by Ford of Yavapai Cnty	91-000635.0000	GW	no info	326 (qw)	rec'd	
5	Arizona Water Company - Rimrock	ACC-see Arizona Water Company	W-01445A	GW	322 (gp)	326 (gp)	337 (gp)	
6	Arizona Water Co. - Sedona	YCWAC Verde Valley Projection, April 2003 (draft)		GW	?	no info	no info	
6	AZ Water Co - Sedona, Sedona	YCWAC Verde Valley Projection, April 2003 (draft)		GW	?	no info	no info	
6	Portion	YCWAC Verde Valley Projection, April 2003 (draft)		GW	?	no info	no info	
6	Sedona Wells	Hoyt - Scenario 1 Demand Summary4		GW	no info	1866	no info	Need to verify if this is only AWC

6	Arizona Water Company - Sedona	ACC-see Arizona Water Company	W-01445A	GW	3511 (gp)	3752 (gp)	3829 (gp)	
7	AZ Water Co. River Valley	YCWAC Verde Valley Projection, April 2003 (draft)						a subsystem of AWC. Note YC VV projection report states 290 is for [don't see this on AWC's system list? In CWP's this entity has a new name - Valley Vista
7	AZ WATER CO-RANCHO ROJO	ADWR CWP - query by Ford of Yavapai Cnty						
8	BEAVER CREEK STORE	ADWR CWP - query by Ford of Yavapai Cnty						8 (e)
9	BENT RIVER APARTMENTS	ADWR CWP - query by Ford of Yavapai Cnty						
10	BEVERLY GARDENS TRAILER P	ADWR CWP - query by Ford of Yavapai Cnty						
11	BIG PARK WATER CO	ADWR CWP - query by Ford of Yavapai Cnty	91-000609.0000	GW	no info	880 (qw)	rec'd	
11	Big Park Water Co.	YCWAC Verde Valley Projection, April 2003 (draft)		GW	782 (p)	no info	no info	
11	Big Park Water Company	ACC - query by Fuente of Yavapai Cnty	W-01624A	GW	871 (gp)	880 (gp)	925 (gp)	
11	Big Park Wells	Hoyt - Scenario 1 Demand Summary4		GW	no info	1712	no info	
12	Boynton Canyon	Hoyt - Scenario 1 Demand Summary4		GW	no info	63	no info	
12	Boynton Canyon Enchantment	ACC - query by Fuente of Yavapai Cnty	W-02510A	GW	55 (gp)	63 (gp)	68 (gp)	
12	Boynton Crnyn Enchantment	YCWAC Verde Valley Projection, April 2003 (draft)		GW	111 (p)	no info	no info	
12	Homeowner Association	YCWAC Verde Valley Projection, April 2003 (draft)		GW	111 (p)	no info	no info	
13	BRADSHAW WATER COMPANY INC	ADWR RGR 2006 (56 prefix only)	56-003019.0000	GW	14 (qw)	16 (qw)	16 (qw)	
13	Bradshaw Water Company, Inc.	ACC - query by Fuente of Yavapai Cnty	W-02476A	GW	33 (gp)	2 (gp)	77 (gp)	'34 AF were purchased from ToPV, '36 AF were purchased from ToPV, 6/19/08 it was decided that the demand would be shown with Bradshaw, not with the provider who is supplying the water.
13	BRADSHAW WC, INC.	ADWR CWP - query by Ford of Yavapai Cnty	91-000671.0000	GW	no info		rec'd	No info online - call Melanie
13	Bradshaw Water Company	JMunderloh - email 6/19/08		GW	29	28	30	
14	BUFFALO RUN MHP	ADWR CWP - query by Ford of Yavapai Cnty						
15	CACTUS MOBILE RANCH	ADWR CWP - query by Ford of Yavapai Cnty						2 (qw)
16	Camp Verde Water System	ACC - query by Fuente of Yavapai Cnty	W-01419A	GW	457 (gp)	502 (gp)	533 (gp)	Note CV files use on two sheets showing two systems 13-015 and 13-072.



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Population

Central Yavapai Highlands Water Resources Management Study - Phase I
Population Comparison

Water Planning Area ¹	not WPAs	not WPAs	DES Annual Growth Rate %	WPAs	WPAs	WPAs	WPAs	WPAs	WPAs	Annual Growth Rate %	Pop. Change
	2006 DES Population (not WPAs)	DES 2050 Population (not WPAs)		2006 DES modified for WPAs	2006 Yavapai County Parcel Population ¹	2006 APS Population	2006 Population - Yavapai County Estimates	2006 Assumed Population	2050 Assumed ¹ Population		
Camp Verde	-11,779	22,387	1.5%		-9,826			-11,779	22,387	1.5%	10,608
Dewey Humboldt	-4,134	6,944	1.2%		-4,041			-4,134	6,944	1.2%	2,810
Clarkdale	-3,732	5,146	0.7%	-3,999	-3,568			-3,999	22,460	4.0%	18,461
Cottonwood	-11,201	20,411	1.4%	-20,400	-17,872			-20,400	77,630	3.1%	57,230
Jerome	-330	334	0.0%	-510	-429			-510	800	1.0%	290
Prescott Valley	-35,609	90,620	2.1%	-41,610	-42,182			-41,610	144,000	2.9%	102,390
Chino Valley	-13,235	37,836	2.4%	-12,690	-7,874			-12,690	63,690	3.7%	51,000
Prescott	-42,154	79,588	1.5%	-49,072	-43,418			-49,072	100,000	1.6%	50,928
Sedona	-11,080	15,030	0.7%		-8,270			-11,080	17,100	1.0%	6,020
Paulden CDP	-5,342	14,099	2.2%		-5,890			-5,342	14,099	2.2%	8,757
Big Park CDP	-6,566	12,582	1.5%	-7,731	-7,252			-7,731	8,810	0.3%	1,079
Corville CDP	-4,075	7,448	1.4%		-3,747			-4,075	7,448	1.4%	3,373
Lake Montezuma CDP	-4,237	8,308	1.5%		-4,679			-4,237	8,308	1.5%	4,071
Cin-Verde Village CDP	-12,572	21,506	1.2%	-4,372	-1,928			-4,372	11,707	2.3%	7,335
Verde CCD	-2,239	3,309	0.9%		1,700		-2,239	-1,700	10,000	4.1%	8,300
Prescott CCD	-20,525	26,720	0.6%		16,120		-25,573	-16,120	40,000	2.1%	23,880
Mingus Mtn CCD	-1,687	3,224	1.5%		1,700		-1,687	-1,700	4,500	2.2%	2,800
Humboldt CCD	-1,470	1,470	0.0%		230		-287	-230	2,500	5.6%	2,270
Ashfork CCD	-1,341	2,995	1.8%		470		-500	-470	68,000	12.0%	67,530
Total	-193,308	379,957	1.5%		-140,756			-201,251	630,383	2.6%	429,132

Modifications to 2006 DES populations based on differences between water service area boundaries and city/town boundaries.
Modifications to 2006 DES populations based on input from town/water provider.



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CYHWRMS- Demand Analysis
Water Planning Area
Water Use and Available Supply Summary Table

Water Planning Area	Water User ²	2006 Demand ¹ (AFYR)
Camp Verde	Camp Verde Water System	502
	Lake Verde Water Co.	19
	Verde Lakes Water Corp.	241
	Verde West Irrigation	0
	* Rainbow Acres	0
	Yavapai Apache - Middle Verde System (2005 data)	88
	Yavapai Apache - Casino System (2005 data)	85
	Water Provider Total	935
	Exempt wells (2005-2006)	760
	Agricultural Water Use	9320
**	Nonexempt wells	104
	Yavapai Apache Sand and Rock	100
	United Metro Materials	403
	Superior Materials	280
	PLANNING AREA TOTAL	11902
Dewey-Humboldt	Humboldt Water Co.	83
	Soft Winds MHP	7
	Wilhoit Water Co.	9
	Water Provider Total	99
	Exempt wells (2005-2006)	508
	58-101303.0004 802224 - Bagby	58
	58-101303.0003 802224 - Bagby	28
	58-111928.0002 626917 Cain Verde	28
	58-111927.0000 626311 Jensen	38
	58-104351.0000 610078 Statler	65
	58-102965.0000 623447 Wingfield	37
	58-100544.0002 625770, 802224, 626034 Yavapai Land Holdings, LLC	315
	Total Agricultural Water Use	569
	Nonexempt wells	22
	58-106508.0002 638842 - Yavapai Land Holdings LLC	0
58-106509.0001 638841 - Yavapai Land Holdings LLC	16	
58-110149.0003 625214 - Yavapai Land Holdings LLC	0	
PLANNING AREA TOTAL	1214	
Clarkdale	Town of Clarkdale	405
	* Bent River Apartments	0
	Water Provider Total	405
Exempt wells (2005-2006)	67	

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Planning Area Water Use Summary Table 9-1-09AAWAD.xls

CYHWRMS- Demand Analysis
Water Planning Area
Water Use and Available Supply Summary Table

Planning Area	Water User ²	2006 Demand ¹ (AFYR)
	Agricultural Water Use	31
	Nonexempt wells	3
	PLANNING AREA TOTAL	506
Good	Cottonwood Municipal Water System	3145
	* On the Greens	0
	Water Provider Total	3145
	Exempt wells (2005-2006)	213
	Agricultural Water Use	1137
***	Nonexempt wells	29
	Pine Shadows GC	120
	Verde Santa Fe GC	1313
**	Hanson Aggregates	320
PLANNING AREA TOTAL	6277	
Town of Jerome		
		282
Valley	Prescott Valley Municipal Water System	6169
	Hanely Park	2
	Bradshaw WC (PV water)	2
	Diamond Valley (PV water)	133
	Mingus West (PV water)	0
	Viewpoint SubD (PV water)	0
	Water Provider Total	6306
	Exempt wells (2005-2006)	44
	-101347.0002 617662 Maughan AG Water Use	55
	Nonexempt wells	6
	-108469.0002 530375 - Prescott Country Club GC	449
-111699.0003 631279 - Humboldt USD	0	
-111963.0000 613018 - Fain Land and Cattle Co.	0	
-111966.0001 613018 - Norman W Fain	0	
-115744.0002 613018 - Fain Land and Cattle Co.	0	
Stone Ridge GC (PV Water)	0	
PLANNING AREA TOTAL	6860	
Valley	Appaloosa Water Co.	78
	PacWest Properties	26
	H&R Enterprises	4
	Chino Meadows II Water Co.	211
	* Manneken Apartments	0
	Town of Chino Valley	157

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Planning Area Water Use Summary Table 9-1-09AAWAD.xls

2006 Demands



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Phase I – Results Is there a problem?

Population

Total Present Population – 201,035

Total Future Population – 594,392 (2.5% Annual Growth Rate)

Demand

Total Present Demand – 72,886 AF/yr

Total Future Demand – 117,381 AF/yr

Estimated Available Supply

Status Quo – 72,103 AF/yr

Net Natural Recharge – 38,520 AF/yr

Total Unmet Demand (2050)

Status Quo – 45,279 AF/yr

Net Natural Recharge – 78,861 AF/yr



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Central Yavapai Highlands
Water Resources Management Study
Plan of Study
Phase II

Water Supply Assessment (in addition to present water resources)

- Surface Water
- Ground Water
- Effluent
- Conservation
- Other
- Small surface water reservoir storage and supply mgmt
- Impaired Waters
- Imported/Exported waters
- Indian Water Settlements
- Water Marketing – Sales, leases, exchanges



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Central Yavapai Highlands Water Resources Management Study Plan of Study

Phase III

Alternative Formulation

Alternative Analysis

- Environmental, Economic, Legal and Institutional

Alternative Evaluation

- Completeness, Effectiveness, Efficiency, Acceptability

Question: Is there at least one alternative that can meet the unmet demands?

Question: Is there a Federal Interest in the identified alternatives?



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Central Yavapai Highlands
Water Resources Management Study
Plan of Study

Phase IV

Draft Report Formulation
Draft Report Development
Draft Review and comment
Final Report Development
Review and comment
Publish Final Report



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Feasibility Studies



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Reclamation's Rural Water Program

P.L. 109-451
Rural Water Supply Act of 2006



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FY 2010 Rural Water Supply Program

Bureau of Reclamation
Lower Colorado Region

- 1. Payson Cragin Pipeline Project Feasibility Study**
Reclamation Funding: \$75,000 Total Cost of Study: \$150,000
- 2. Coconino Plateau Water Advisory Council North Central Arizona Water Supply Feasibility Study**
Reclamation Funding: \$500,000 Total Cost of Study: \$TBD
- 3. Navajo Nation - Southwest Navajo Rural Water Project Appraisal Investigation**
Reclamation Funding: \$158,000 Total Cost of Study: \$158,000



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Questions?



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