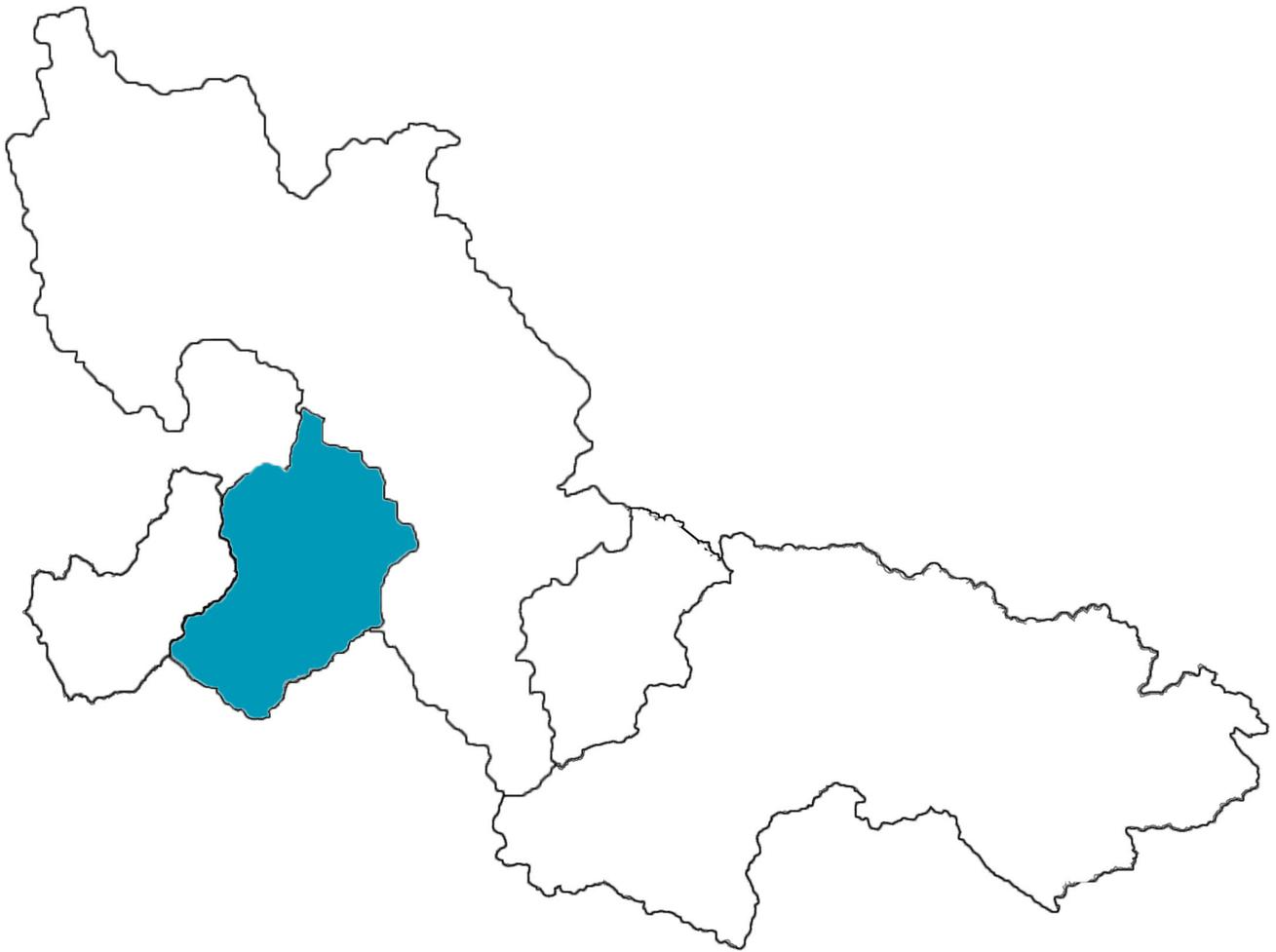


# Section 5.1

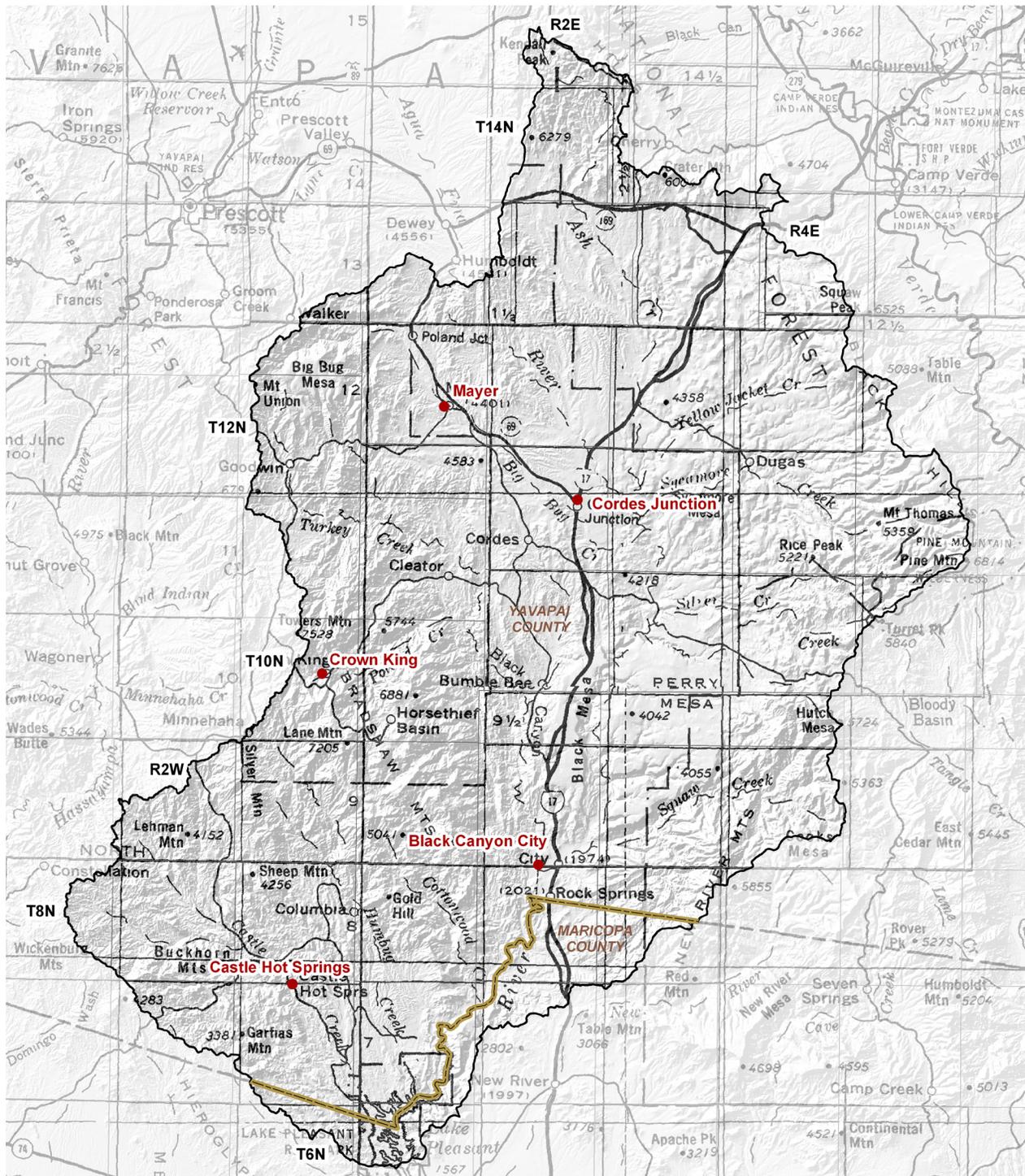
## Agua Fria Basin



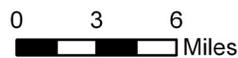
### 5.1.1 Geography of the Agua Fria Basin

The Agua Fria Basin, located in the west central part of the planning area is 1,263 square miles in area. Geographic features and principal communities are shown on Figure 5.1-1. The basin is characterized by mid-elevation mountain ranges and mesas. Vegetation types include Arizona upland Sonoran desertscrub, semidesert grassland, interior chaparral, montane conifer forests and Great Basin conifer woodland (see Figure 5.0-10). Riparian vegetation is found along the Agua Fria River including mixed broadleaf and cottonwood/willow.

- Principal geographic features shown on Figure 5.1-1 are:
  - Agua Fria River running north to south through the center of the basin
  - Numerous creeks that flow into the Agua Fria River including Castle Creek, Humbug Creek, Cottonwood Creek, Black Canyon Creek, Squaw Creek, Turkey Creek, Silver Creek, Sycamore Creek, Yellow Jacket Creek and Ash Creek
  - Horsethief Basin southeast of Crown King
  - Black Mesa along Interstate 17 west of Perry Mesa
  - Big Bug Mesa on the western basin boundary northwest of Mayer
  - Buckhorn Mountains in the southwestern and the New River Mountains in the southeastern portions of the basin
  - Bradshaw Mountains west of Interstate 17, which contain the highest point in the basin, Mt. Union at 7,528 feet
  - The lowest point in the basin is about 3,700 feet along the Agua Fria River



Base Map: USGS 1:500,000, 1981



**Figure 5.1-1**  
**Agua Fria Basin**  
**Geographic Features**

COUNTY   
City, Town or Place 

### 5.1.2 Land Ownership in the Agua Fria Basin

Land ownership, including the percentage of ownership by category, for the Agua Fria Basin is shown in Figure 5.1-2. Principal features of land ownership in this basin are the diversity of land ownership types and the large contiguous parcels of forest service lands. A description of land ownership data sources and methods is found in Volume 1, Appendix A. More detailed information on protected areas is found in Section 5.0.4. Land ownership categories are discussed below in the order from largest to smallest percentage in the basin.

#### **National Forest**

- 46.7% of the land is federally owned and managed by the United States Forest Service (USFS).
- Forest lands in the basin are part of the Prescott and Tonto National Forests.
- The basin contains two wilderness areas, the 25,536-acre Castle Creek Wilderness and the 20,100-acre Pine Mountain Wilderness. Both areas are in the Prescott National Forest. (see Figure 5.0-13)
- There are numerous small private in-holdings in the Prescott National Forest.
- National forest land is located in the northern, eastern and western portions of the basin, divided by Interstate 17 and other land uses in the central part of the basin.
- Land uses include recreation, grazing and timber production.

#### **U.S. Bureau of Land Management (BLM)**

- 28.8% of the land is federally owned and managed by the Hassayampa Field Office BLM.
- Most BLM lands are interspersed with private and state trust lands in the southern and central portions of the basin.
- BLM lands include 71,000 acres of the Agua Fria National Monument.
- Primary land uses are recreation and grazing.

#### **State Trust Land**

- 14.7% of the land in this basin is held in trust for the public schools and four other beneficiaries under the State Trust Land system.
- State land is interspersed with private and BLM lands and is found in the southern and north-central portions of the basin.
- Primary land use is grazing.

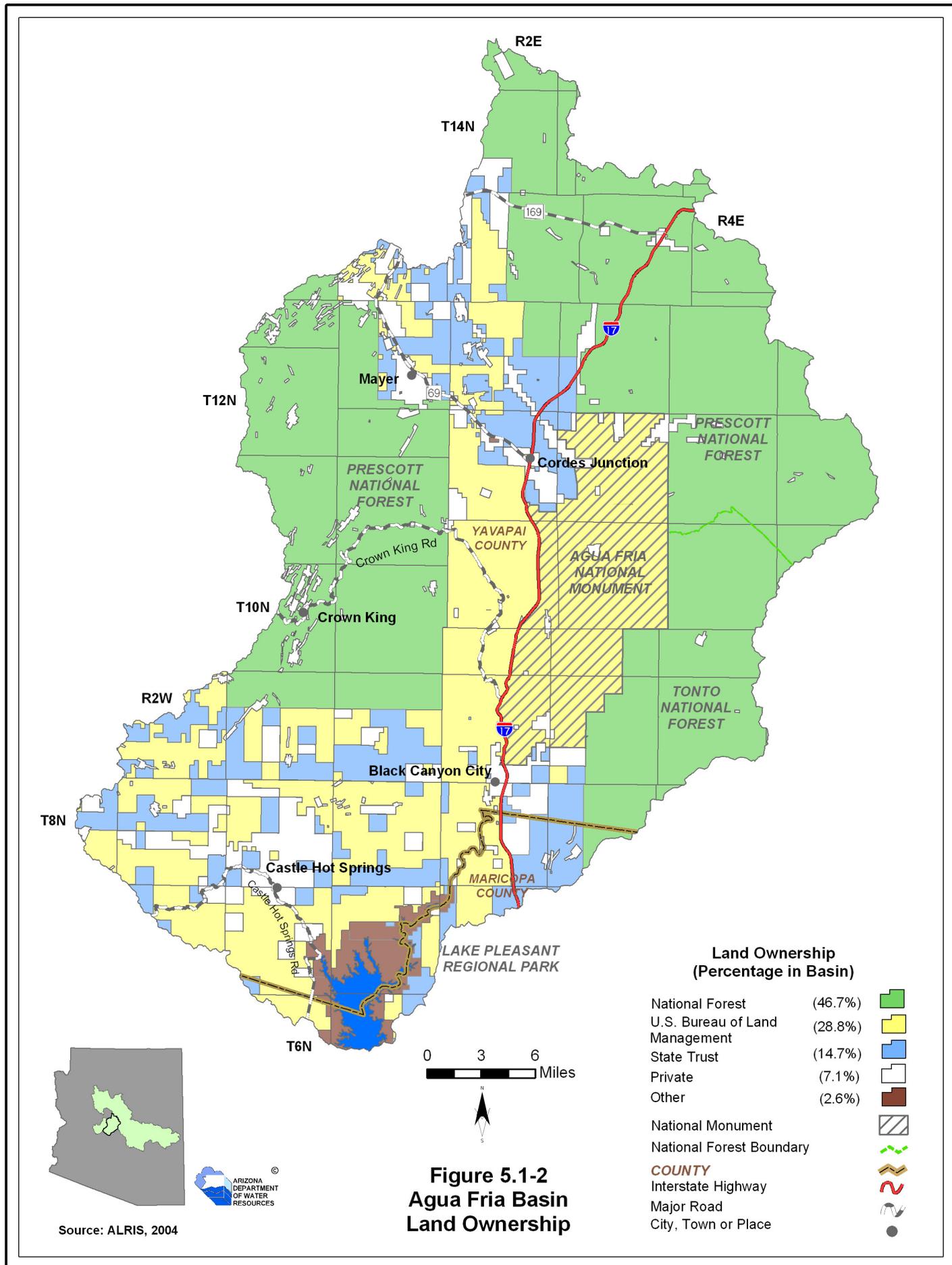
#### **Private**

- 7.1% of the land is private.
- Private land is found throughout the basin with the majority of the private land interspersed with state trust, national forest and BLM lands.
- The largest contiguous area of private lands is in the vicinity of Castle Hot Springs.
- Land uses include domestic, commercial and ranching.

#### **Other (Game and Fish, County and Bureau of Reclamation Lands)**

- 2.6% of the land is owned and managed by two counties.

- The largest portion of “other” land is owned and managed by Maricopa County as the Lake Pleasant Regional Park, located at the southernmost tip of the basin.
- A small portion of land northwest of Cordes Junction is owned by Yavapai County, its use is unknown.
- Primary land use at the Lake Pleasant Regional Park is recreation.



### 5.1.3 Climate of the Agua Fria Basin

Climate data from NOAA/NWS Co-op Network stations are compiled in Table 5.1-1 and the locations are shown on Figure 5.1-3. Figure 5.1-3 also shows precipitation contour data from the Spatial Climate Analysis Service (SCAS) at Oregon State University. The Agua Fria Basin does not contain Evaporation Pan, AZMET or SNOTEL/Snowcourse stations. More detailed information on climate in the planning area is found in Section 5.0.3. A description of the climate data sources and methods is found in Volume 1, Appendix A.

#### NOAA/NWS Co-op Network

- Refer to Table 5.1-1A
- There are three NOAA/NWS Co-op network climate stations in the basin. The average monthly maximum temperature occurs in July at all stations and ranges between 72.6°F at Crown King and 88.8°F at Castle Hot Springs. The average monthly minimum temperature occurs in January and ranges between 53.2°F at Castle Hot Springs and 37.4°F at Crown King.
- Highest average seasonal rainfall occurs in the winter (January – March) at two of the three stations. For the period of record used, the highest annual rainfall is 28.41 inches at Crown King and the lowest is 15.47 inches at Castle Hot Springs.

#### SCAS Precipitation Data

- See Figure 5.1-3
- Additional precipitation data shows rainfall as high as 32 inches near Crown King and as low as 10 inches at the southernmost tip of the basin.

**Table 5.1-1 Climate Data for the Agua Fria Basin**

**A. NOAA/NWS Co-op Network:**

Station Name	Elevation (in feet)	Period of Record Used for Averages	Average Temperature Range (in F)		Average Total Precipitation (in inches)				
			Max/Month	Min/Month	Winter	Spring	Summer	Fall	Annual
Castle Hot Springs	1,990	1971 - 2000	88.8/Jul	53.2/Jan	6.23	1.03	4.52	3.69	15.47
Cordes	3,770	1971 - 2000	80.1/Jul	45.3/Jan	5.29	1.31	5.87	3.74	16.21
Crown King	5,920	1971 - 2000	72.6/Jul	37.4/Jan	11.39	2.13	8.62	6.27	28.41

Source: WRCC, 2005

**B. Evaporation Pan:**

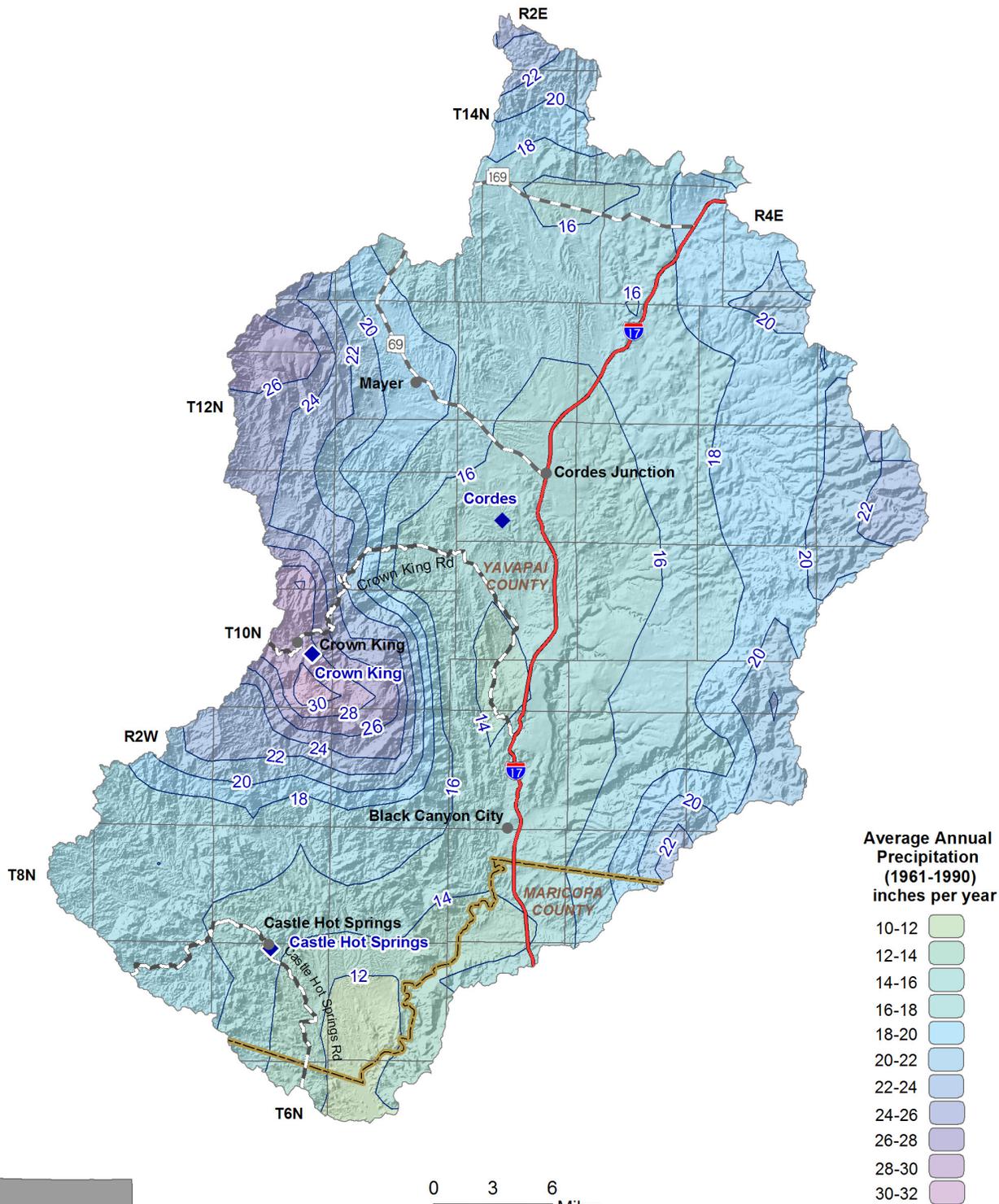
Station Name	Elevation (in feet)	Period of Record Used for Averages	Avg. Annual Evap (in inches)
None			

**C. AZMET:**

Station Name	Elevation (in feet)	Period of Record	Average Annual Reference Evapotranspiration, in inches (Number of years to calculate averages)
None			

**D. SNOTEL/Snowcourse:**

Station Name	Elevation (in feet)	Period of Record	Average Snowpack, at Beginning of the Month, as Inches Snow Water Content (Number of measurements to calculate average)					
			Jan.	Feb.	March	April	May	June
None								



**Average Annual Precipitation (1961-1990) inches per year**

10-12	Lightest Green
12-14	Light Green
14-16	Medium-Light Green
16-18	Light Blue-Green
18-20	Light Blue
20-22	Medium-Light Blue
22-24	Medium Blue
24-26	Dark Blue
26-28	Dark Blue-Purple
28-30	Dark Purple
30-32	Lightest Purple

**Meteorological Stations**

- NOAA/NWS ◆
- Precipitation Contour —|— 12
- COUNTY —
- Interstate Highway —
- Major Road —
- City, Town or Place ●

0 3 6 Miles

ARIZONA DEPARTMENT OF WATER RESOURCES

Precipitation Data Source: Oregon State University, 1998

**Figure 5.1-3**  
**Agua Fria Basin**  
**Meteorological Stations**  
**and Annual Precipitation**

## 5.1.4 Surface Water Conditions in the Agua Fria Basin

Streamflow data, including average seasonal flow, average annual flow and other information is shown in Table 5.1-2. Flood ALERT equipment in the basin is shown in Table 5.1-3. Reservoir and stockpond data, including maximum storage or maximum surface area, are shown in Table 5.1-4. The location of streamflow gages identified by USGS number, flood ALERT equipment and USGS runoff contours are shown on Figure 5.1-5. Descriptions of stream, reservoir and stockpond data sources and methods are found in Volume 1, Appendix A.

### Streamflow Data

- Refer to Table 5.1-2.
- Data from seven stations located at five watercourses are shown in the table and on Figure 5.1-5.
- The average seasonal flow at most stations is highest in the winter (January-March) and lowest is in the spring (April-June).
- The largest annual flow recorded in the basin is 360,541 acre-feet in 1992 at the Agua Fria near Rock Spring station and the lowest is 12 acre-feet in 1989 at Cottonwood Creek near Waddell Dam. For a hydrograph showing average annual streamflow from 1940 to 2007 on the Agua Fria near Mayer see Figure 5.1-4.

### Flood ALERT Equipment

- Refer to Table 5.1-3.
- As of October 2005 there were 14 stations in the basin.

### Reservoirs and Stockponds

- Refer to Table 5.1-4.
- The basin contains one large reservoir with a maximum capacity of 1,108,600 acre-feet. Lake Pleasant, created by the New Waddell Dam, is used for flood control, hydroelectric power generation, recreation and water supply purposes.
- Surface water is stored or could be stored in four small reservoirs in the basin.
- There are 527 registered stockponds in this basin.

### Runoff Contour

- Refer to Figure 5.1-5.
- Average annual runoff is one inch per year, or 53.3 acre-feet per square mile, in most of the basin and increases to two inches per year, or 106.6 acre-feet per square mile, in the northeast portion of the basin.

**Figure 5.1-4 Annual Flows (acre-feet) at Agua Fria River near Mayer, water years 1940-2008 (Station #9512500)**

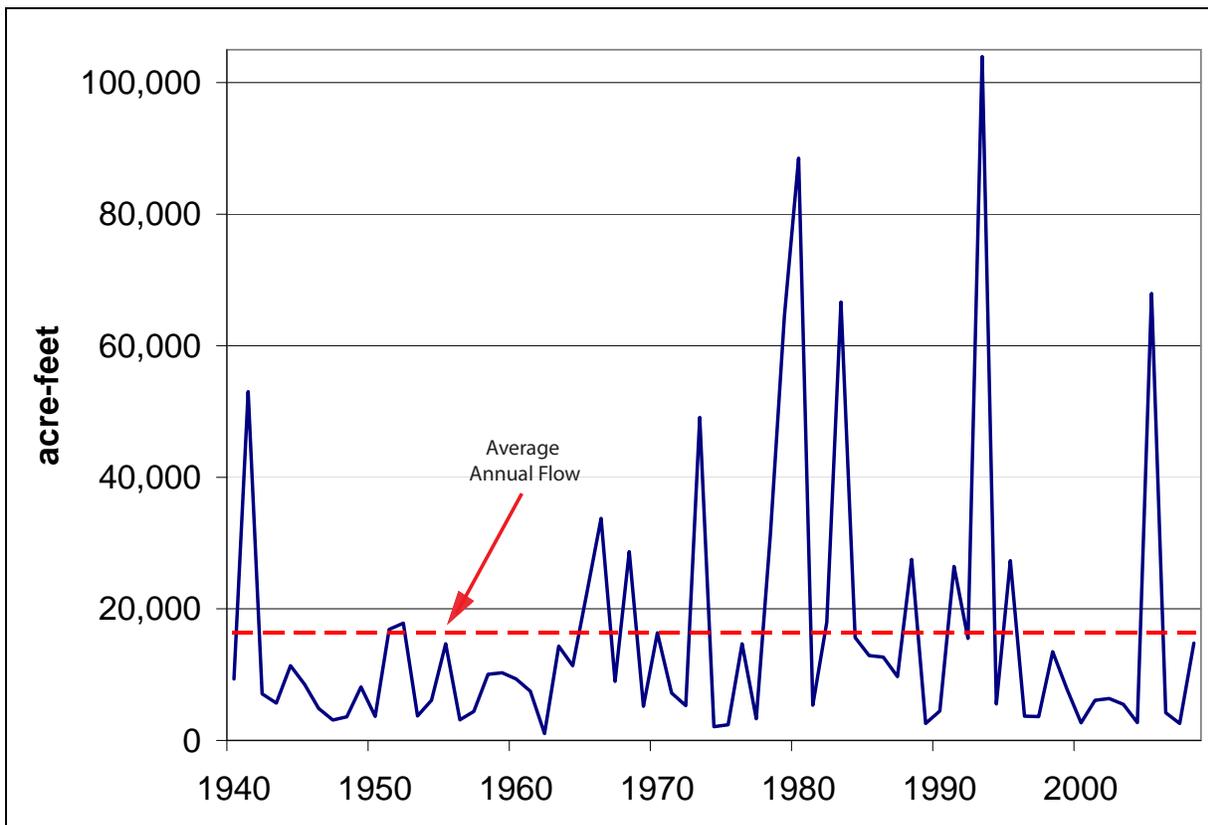


Table 5.1-2 Streamflow Data for the Agua Fria Basin

Station Number	USGS Station Name	Drainage Area (in mi <sup>2</sup> )	Gage Elevation (in feet)	Period of Record	Average Seasonal Flow (% of annual flow)				Annual Flow/Year (in acre-feet)				Years of Annual Flow Record
					Winter	Spring	Summer	Fall	Minimum	Median	Mean	Maximum	
9512450	Agua Fria River near Humboldt	NA	4,400	1/2000-current (real-time)	19	9	40	32	1,332 (2003)	1,354	2,013	3,352 (2002)	3
9512500	Agua Fria River near Mayer	585	3,434	1/1940-current (real-time)	52	9	22	17	976 (1962)	9,197	16,327	103,555 (1993)	63
9512600	Turkey Creek near Cleator	89	3,140	10/1979 - 9/1990 (discontinued)	68	10	9	12	239 (1981)	4,164	8,154	33,882 (1980)	12
9512800	Agua Fria River near Rock Springs	1,111	1,800	1/1970-current (real-time)	75	7	7	11	1,528 (1975)	19,692	57,664	360,541 (1992)	31
9512830	Boulder Creek near Rock Springs	38	1,890	5/1983-9/1993 (discontinued)	80	9	3	9	14 (1989)	701	1,186	3,869 (1992)	9
9512860	Humbug Creek near Castle Hot Springs	60	1,790	5/1983-9/1994 (discontinued)	81	7	5	7	333 (1989)	1,948	5,334	34,896 (1993)	10
9512970	Cottonwood Creek near Waddell Dam	9	1,660	4/1983-3/1993 (discontinued)	82	1	13	4	12 (1989)	94	252	1,166 (1992)	9

Source: USGS (NWIS) 2005 & 2008

**Notes:**

Statistics based on Calendar Year  
 Annual Flow statistics based on monthly values  
 Summation of Average Annual Flows may not equal 100 due to rounding  
 Period of record may not equal Years of Record used for annual Flow/Year statistics due to only using years with a 12 month record  
 In Period of Record, current equals November 2008  
 Seasonal and annual flow data used for the statistics was retrieved in 2005

**Table 5.1-3 Flood ALERT Equipment in the Agua Fria Basin**

Station ID	Station Name	Station Type	Install Date	Responsibility
3755	Brooklyn Peak	Precipitation	8/3/2005	Yavapai County FCD
3780	Black Canyon City	Repeater/Weather Station	8/1/2005	Yavapai County FCD
5335	Minnehaha	Precipitation	6/16/1981	Maricopa County FCD
5660	Lake Pleasant North	Weather Station	NA	Maricopa County FCD
5670	Garfias Mountain	Precipitation	8/14/1981	Maricopa County FCD
5685	Columbia Hill	Precipitation	7/1/1981	Maricopa County FCD
5700	Horsethief Basin	Weather Station	11/24/1986	Maricopa County FCD
5715	Crown King	Precipitation	10/18/1982	Maricopa County FCD
5730	Sunset Point	Precipitation	7/1/1981	Maricopa County FCD
5745	Horseshoe Ranch	Precipitation	5/1/1981	Maricopa County FCD
5760	Horner Mtn. Ranch	Precipitation	4/1/1981	Maricopa County FCD
5775	Arizona Hunt Club	Precipitation	4/1/1981	Maricopa County FCD
5790	I-17 @ 169	Precipitation	11/11/1987	Maricopa County FCD
5805	Dewey	Precipitation	11/1/1981	Maricopa County FCD

Source: ADWR 2005b

**Notes:**

FCD = Flood Control District

NA = Data not currently available to ADWR

**Table 5.1-4 Reservoirs and Stockponds in the Agua Fria Basin**

**A. Large Reservoirs (500 acre-feet capacity and greater)**

MAP KEY	RESERVOIR/LAKE NAME (Name of dam, if different)	OWNER/OPERATOR	MAXIMUM STORAGE (AF)	USE <sup>1</sup>	JURISDICTION
1	Lake Pleasant (New Waddell Dam) <sup>2</sup>	Bureau of Reclamation	1,108,600	C,H,R,S	Federal

**B: Other Large Reservoirs (50 acre surface area or greater)**

MAP KEY	RESERVOIR/LAKE NAME (Name of dam, if different)	OWNER/OPERATOR	MAXIMUM SURFACE AREA (acres)	USE	JURISDICTION
None identified by ADWR at this time					

Source: Compilation of databases from ADWR & others

**C. Small Reservoirs (greater than 15 acre-feet and less than 500 acre-feet capacity)**

Total Number: 2

Total maximum storage : 63

**D. Other Small Reservoirs (between 5 and 50 acres surface area)<sup>3</sup>**

Total Number: 2

Total surface area: 13

**E. Stockponds (up to 15 acre-feet capacity)**

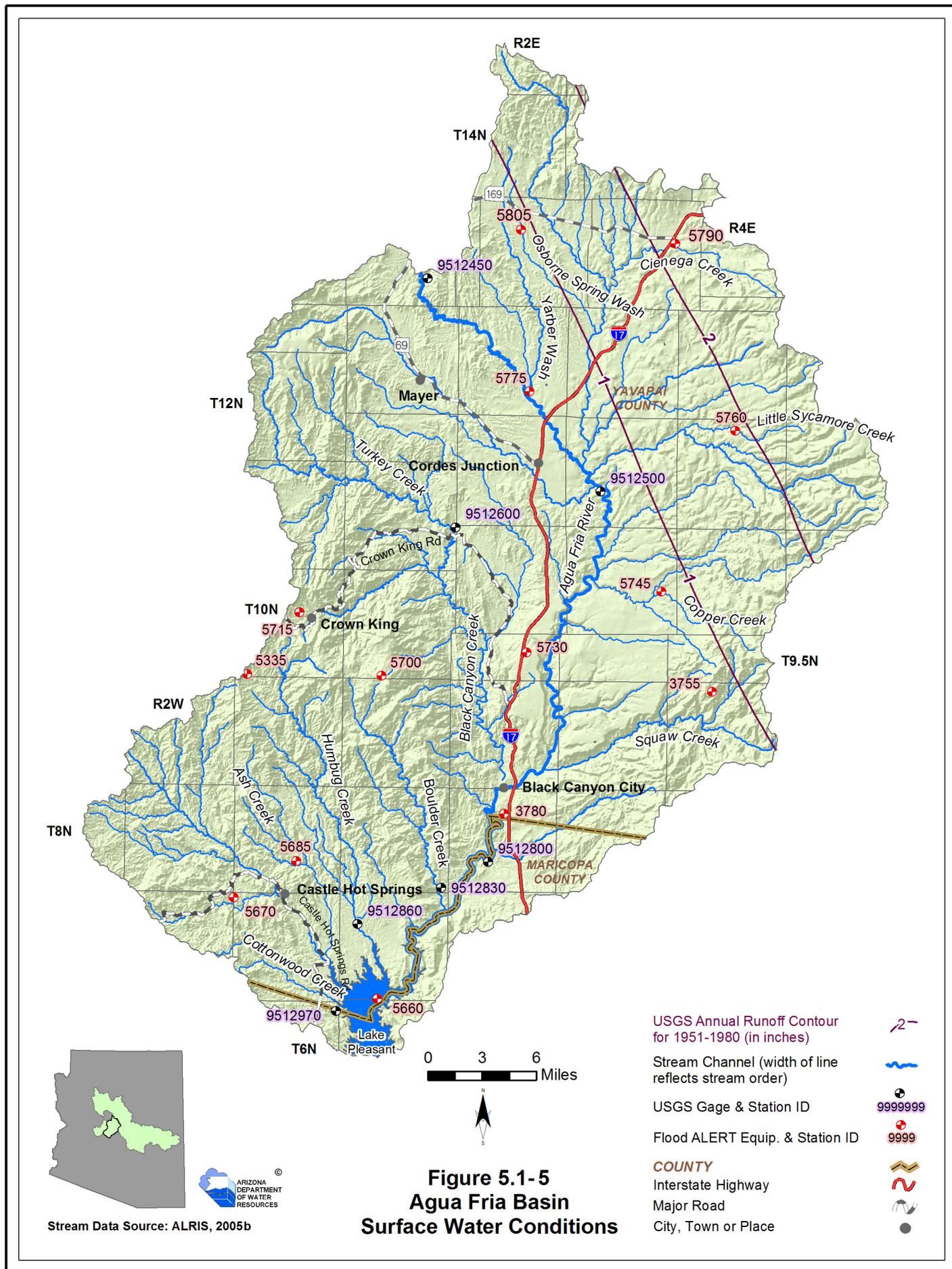
Total number: 527 (from water right filings)

**Notes:**

<sup>1</sup>C=Flood Control; H=hydroelectric; R=recreation; S=water supply

<sup>2</sup>Dam is on the boundary for the Phoenix AMA but lake storage is in the Agua Fria Basin

<sup>3</sup>Capacity data is not available to ADWR



### 5.1.5 Perennial/Intermittent Streams and Major Springs in the Agua Fria Basin

Major and minor springs with discharge rates and date of measurement, and the total number of springs in the basin are shown in Table 5.1-5. The locations of major springs and perennial and intermittent streams are shown on Figure 5.1-6. Descriptions of data sources and methods for intermittent and perennial reaches and springs are found in Volume 1, Appendix A.

- Perennial streams in this basin include the Agua Fria River, Ash Creek, Sycamore Creek, Indian Creek, Silver Creek, a small reach of Humbug Creek, Yellow Jacket Creek and Grapevine Creek. Most perennial streams are in the northern portion of the basin.
- A number of intermittent streams are located throughout the basin.
- There are five major springs with a measured discharge of 10 gallons per minute (gpm) or greater at any time. The largest discharge rate is 340 gpm at Castle spring.
- Springs with measured discharge of 1 to 10 gpm are not mapped but coordinates are given in Table 5.1-5B. There are 14 minor springs identified in this basin.
- Listed discharge rates may not be indicative of current conditions. All of the measurements were taken during or prior to 1993.
- The total number of springs, regardless of discharge, identified by the USGS varies from 294 to 297, depending on the database reference.

**Table 5.1-5 Springs in the Agua Fria Basin**

**A. Major Springs (10 gpm or greater):**

Map Key	Name	Location		Discharge (in gpm) <sup>1</sup>	Date Discharge Measured
		Latitude	Longitude		
1	Castle	335908	1122134	340	During or prior to 1982
2	Nelson Place	341913	1114946	96	6/5/1981
3	Bee House	341846	1114945	50	12/13/1980
4	Brown	342302	1120049	40	8/31/1978
5	Willow	342119	1115343	14	10/23/1980

**B. Minor Springs (1 to 10 gpm):**

Name	Location		Discharge (in gpm) <sup>1</sup>	Date Discharge Measured
	Latitude	Longitude		
Coyote	341800	1120248	6	9/16/1993
Larry Canyon <sup>2</sup>	340821	1120331	6	Not available
Unnamed	342905	1126121	5	10/20/1978
Sombero Canyon	341753	1115945	5	9/9/1993
Sheep	341800	1120220	3	9/1993
Alkali	335933	1122212	3	6/22/1979
Charlie's	342002	1120230	3	9/28/1993
Government <sup>2</sup>	342742	1120146	2	9/5/1978
Silver Creek	341515	1120146	2	8/1993
Badger	341356	1120633	2	4/9/1998
Unnamed	335558	1122126	1	8/9/1979
Unnamed	342857	1121704	1	10/20/1978
Unnamed	335559	1122124	1	8/9/1979
Little	342108	1120524	1	9/1985

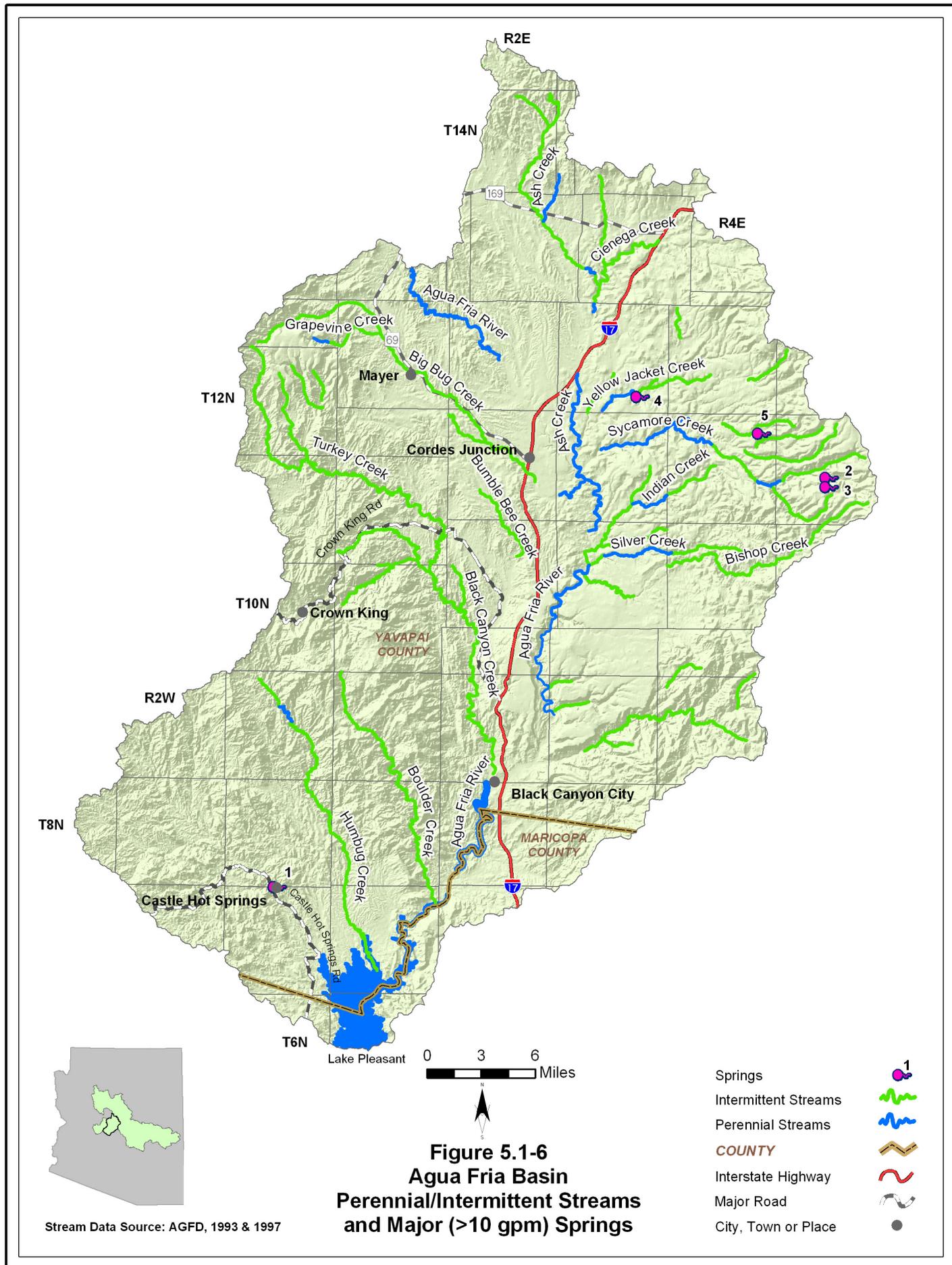
Source: Compilation of databases from ADWR & others

**C. Total number of springs, regardless of discharge, identified by USGS (see ALRIS, 2005a and USGS, 2006a): 294 to 297**

**Notes:**

<sup>1</sup>Most recent measurement identified by ADWR

<sup>2</sup>Spring is not displayed on current USGS topo maps



### 5.1.6 Groundwater Conditions of the Agua Fria Basin

Major aquifers, well yields, estimated natural recharge, estimated water in storage, number of index wells and date of last water-level sweep are shown in Table 5.1-6. Figure 5.1-7 shows aquifer flow direction and water-level change between 1990-1991 and 2003-2004. Figure 5.1-8 contains hydrographs for selected wells shown on Figure 5.1-7. Figure 5.1-9 shows well yields in four yield categories. A description of aquifer data sources and methods as well as well data sources and methods, including water-level changes and well yields are found in Volume 1, Appendix A.

#### Major Aquifers

- Refer to Table 5.1-6 and Figure 5.1-7.
- Major aquifers in the basin include basin fill and sedimentary rock (conglomerate).
- Flow direction in the northern portion of the basin is generally from the north to the south from the basin boundaries toward the center of the basin.

#### Well Yields

- Refer to Table 5.1-6 and Figure 5.1-9.
- As shown on Figure 5.1-9 well yields in this basin range from less than 100 gpm to 2,000 gpm at several locations.
- One source of well yield information, based on 49 reported wells, indicates that the median well yield in this basin is 300 gpm.
- Well yields vary throughout the basin, with a cluster of less than 100 gpm yields in the vicinity of Mayer.

#### Natural Recharge

- Refer to Table 5.1-6.
- The estimate of natural recharge for this basin is 9,000 acre-feet per year (AFA).

#### Water in Storage

- Refer to Table 5.1-6.
- Storage estimates for this basin range from 620,000 acre-feet to a depth of 1,200 feet to 3.5 million acre-feet to an unknown depth.

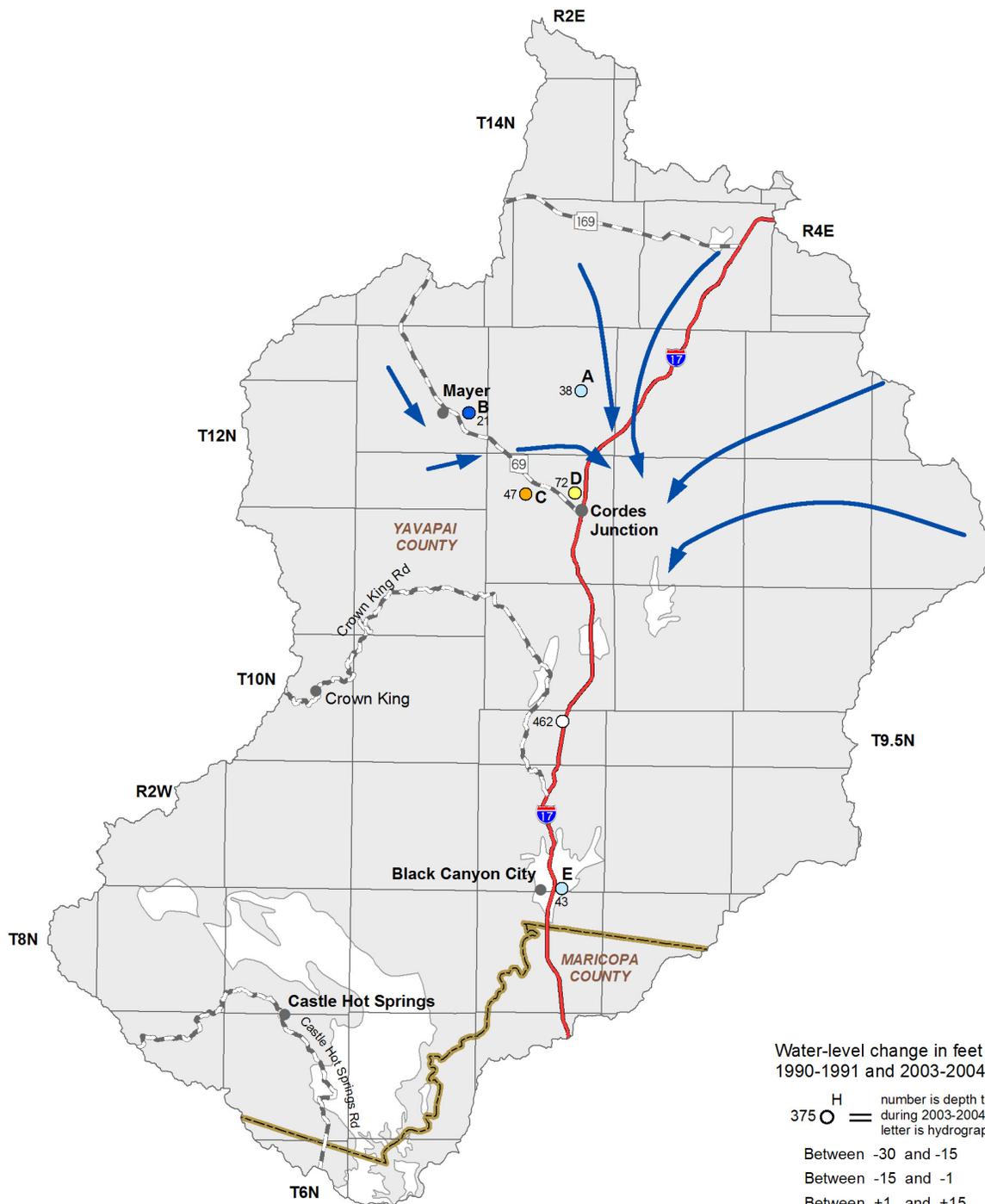
#### Water Level

- Refer to Figure 5.1-7. Water levels are shown for wells measured in 2003-2004.
- The Department annually measures seven index wells in this basin. Hydrographs for five of these wells are shown in Figure 5.1-8.
- There is one ADWR automated groundwater level monitoring device in this basin as of May 2009.
- The deepest recorded water level in 2003-04 is 462 feet near Interstate 17 north of Black Canyon City and the shallowest is 21 feet east of Mayer.

**Table 5.1-6 Groundwater Data for the Agua Fria Basin**

<b>Basin Area, in square miles:</b>	1,263	
<b>Major Aquifer(s):</b>	<b>Name and/or Geologic Units</b>	
	Basin Fill	
	Sedimentary Rock (Conglomerate)	
<b>Well Yields, in gal/min:</b>	Range 210-625 (2 wells measured)	Measured by ADWR (GWSI) and/or USGS
	Range 5-1,500 Median 300 (49 wells reported)	Reported on registration forms for large (>10-inch) diameter wells (Wells55)
	Range 30-300	ADWR (1990)
	Range 0-500	Anning and Duet (1994)
<b>Estimated Natural Recharge, in acre-feet/year:</b>	9,000	Freethy and Anderson (1986)
<b>Estimated Water in Currently in Storage, in acre-feet:</b>	620,000 (to 1,200 ft) - 3,500,000 (depth N/A)	ADWR (1990 and 1994b)
	3,000,000 <sup>1</sup> (to 1,200 ft)	Freethy and Anderson (1986)
<b>Current Number of Index Wells:</b>	7	
<b>Date of Last Water-level Sweep:</b>	2008 (207 wells measured)	

<sup>1</sup> Predevelopment Estimate  
N/A not available



Water-level change in feet between 1990-1991 and 2003-2004

H number is depth to water in feet during 2003-2004; letter is hydrograph

- Between -30 and -15 ●
- Between -15 and -1 ●
- Between +1 and +15 ●
- Between +15 and +30 ●
- Change Data Not Available ○

Generalized Flow Direction ➔

Consolidated Crystalline & Sedimentary Rocks

Unconsolidated Sediments

COUNTY —

Interstate Highway —

Major Road —

City, Town or Place ●

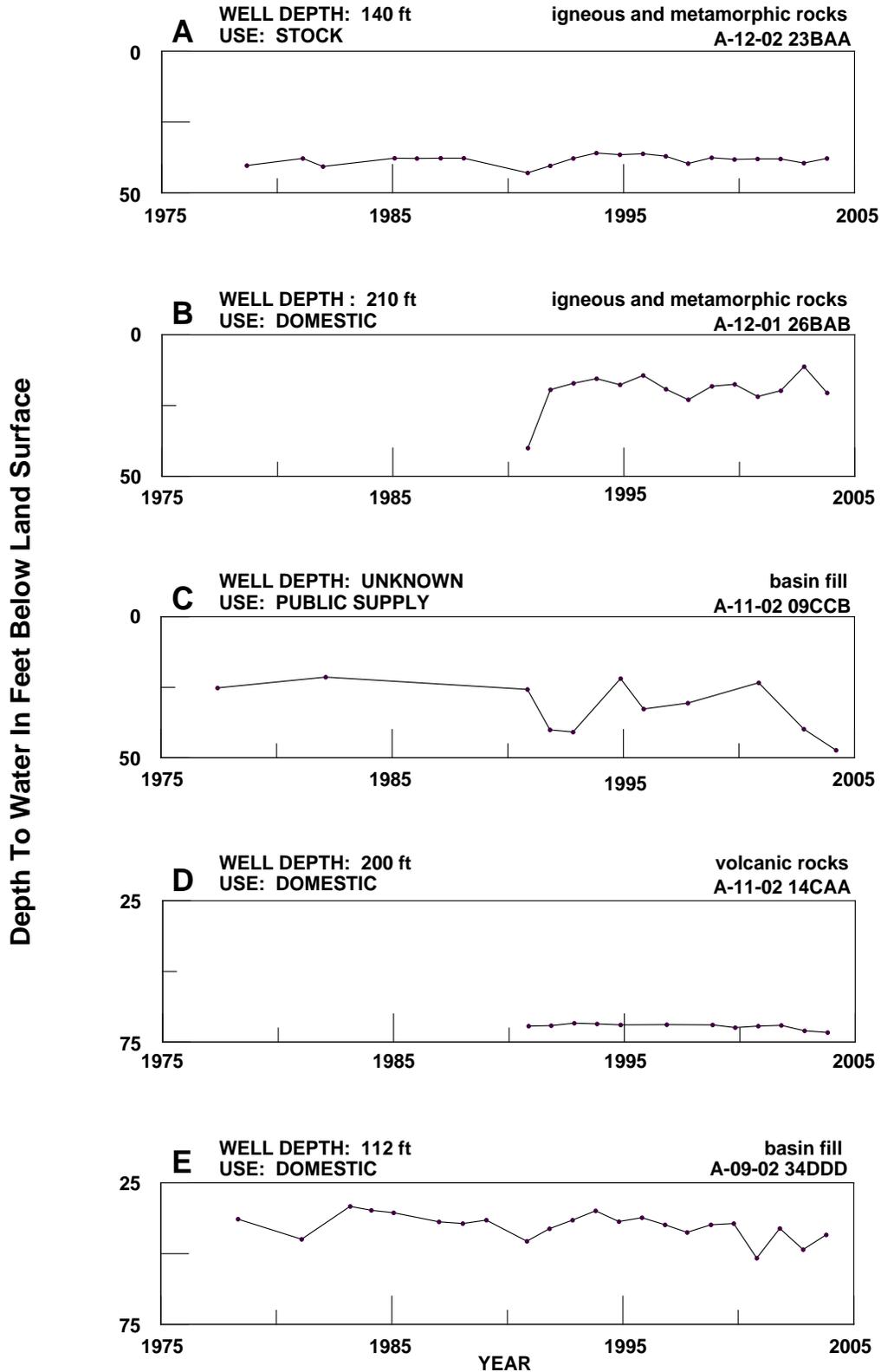
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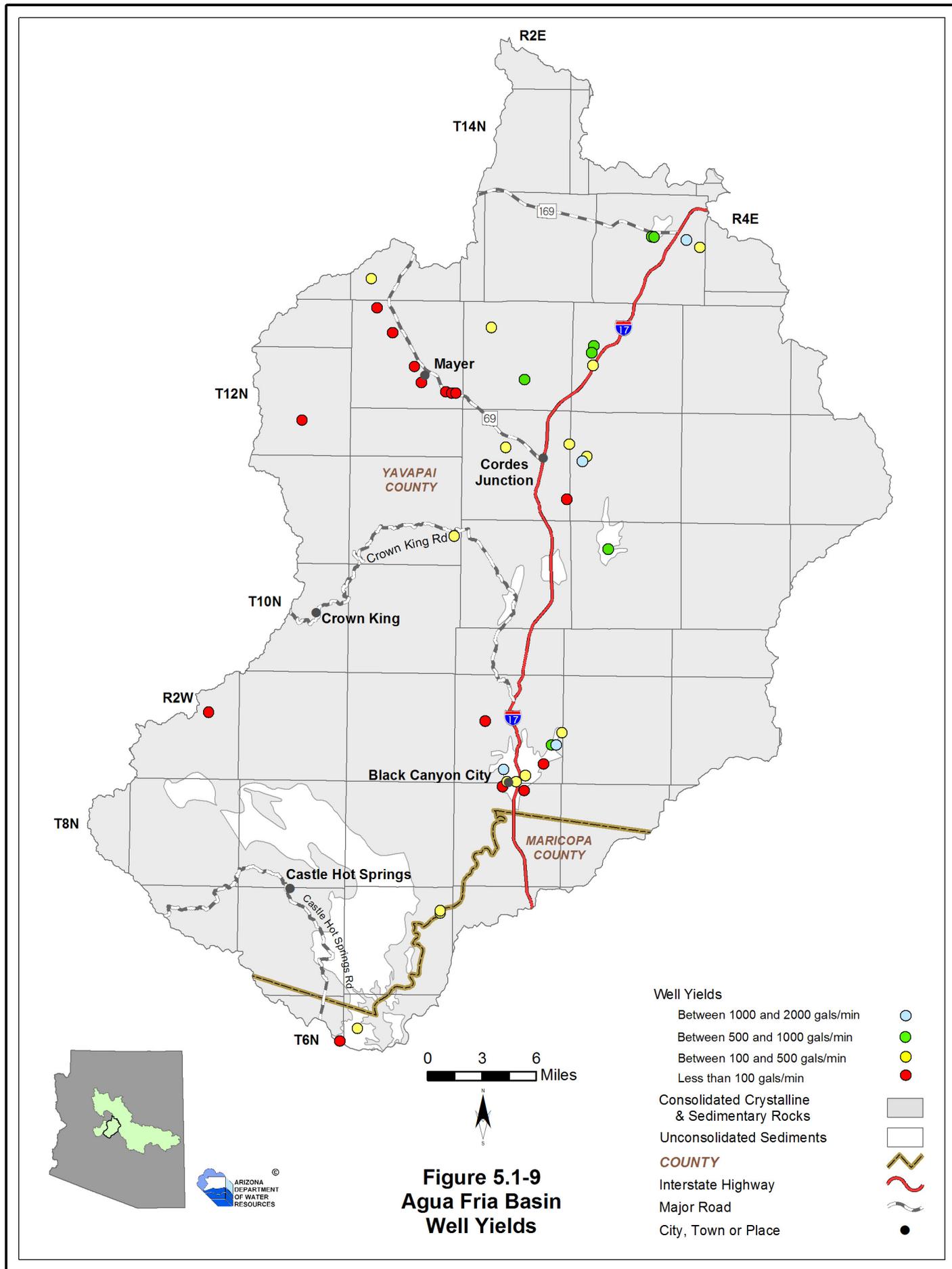


**Figure 5.1-7**  
**Agua Fria Basin**  
**Groundwater Conditions**



**Figure 5.1-8**  
**Agua Fria Basin**  
**Hydrographs Showing Depth to Water in Selected Wells**





**Figure 5.1-9**  
**Agua Fria Basin**  
**Well Yields**

### 5.1.7 Water Quality of the Agua Fria Basin

Wells, springs and mine sites with parameter concentrations that have equaled or exceeded drinking water standard(s), including location and parameter(s) are shown in Table 5.1-7A. Impaired lakes and streams with site type, name, length of impaired reach, area of impaired lake, designated use standard and parameter(s) exceeded is shown in Table 5.1-7B. Figure 5.1-10 shows the location of water quality occurrences keyed to Table 5.1.7. A description of water quality data sources and methods is found in Volume 1, Appendix A. Not all parameters were measured at all sites; selective sampling for particular constituents is common.

#### **Well, Mine or Spring sites that have equaled or exceeded drinking water standards (DWS)**

- Refer to Table 5.1-7A.
- Forty-nine well and spring sites have parameter concentrations that have equaled or exceeded drinking water standards
- The drinking water standard most frequently equaled or exceeded in the sites measured was arsenic. Other standards equaled or exceeded include cadmium, fluoride and radionuclides.

#### **Lakes and Streams with impaired waters**

- Refer to Table 5.1-7B.
- Water quality standards for cadmium, copper, lead and zinc were equaled or exceeded in a 21 mile reach of Turkey Creek from an unnamed tributary to Poland Creek.
- Turkey Creek is part of the ADEQ water quality improvement effort called the Total Maximum Daily Load (TMDL) program. The TMDL report has been completed and the United States Forest Service has completed remediation of the Golden Belt and Golden Turkey mines, which caused the contamination.

**Table 5.1-7 Water Quality Exceedences in the Agua Fria Basin<sup>1</sup>**

**A. Wells, Springs and Mines**

Map Key	Site Type	Site Location			Parameter(s) Concentration has Equaled or Exceeded Drinking Water Standard (DWS) <sup>2</sup>
		Township	Range	Section	
1	Spring	14 North	2 East	23	As
2	Spring	14 North	2 East	32	As
3	Spring	13 North	1 East	28	As
4	Well	13 North	2 East	12	As
5	Well	13 North	2 East	14	As
6	Spring	13 North	2 East	24	As
7	Well	13 North	2 East	33	As
8	Well	13 North	3 East	9	As
9	Well	13 North	3 East	14	As
10	Well	12 North	1 East	9	As
11	Well	12 North	1 East	26	As
12	Well	12 North	1 East	29	As
13	Well	12 North	1 East	36	As
14	Spring	12 North	2 East	17	As
15	Spring	12 North	3 East	35	As
16	Well	11 North	2 East	31	As
17	Well	9.5 North	2 East	26	As
18	Well	9.5 North	2 East	21	As
19	Well	9 North	2 East	27	F
20	Well	9 North	2 East	27	F
21	Well	9 North	2 East	27	As
22	Well	9 North	2 East	28	F
23	Well	9 North	2 East	28	F
24	Well	9 North	2 East	28	F
25	Well	9 North	2 East	28	As, F
26	Well	9 North	2 East	33	As
27	Well	9 North	2 East	34	As
28	Well	9 North	2 East	35	As
29	Well	9 North	2 East	35	As
30	Well	9 North	2 East	35	As
31	Well	9 North	2 East	35	As
32	Well	8 North	2 East	2	Rad
33	Well	8 North	2 East	4	As
34	Well	10 North	1 West	14	As
35	Well	10 North	1 West	15	Cd
36	Well	10 North	1 West	15	Cd
37	Well	10 North	1 West	15	Cd
38	Well	9 North	2 West	25	As
39	Well	8 North	1 West	4	As
40	Spring	8 North	1 West	14	As
41	Spring	8 North	1 West	25	As
42	Spring	8 North	1 West	33	As, F
43	Spring	8 North	1 West	33	F
44	Well	8 North	1 West	33	As, F
45	Spring	8 North	2 West	27	As
46	Well	8 North	3 West	13	As, Rad
47	Well	7 North	1 West	4	F
48	Spring	7 North	1 West	22	F
49	Spring	7 North	1 West	22	F

Source: Compilation of databases from ADWR & others

**Table 5.1-7 Water Quality Exceedences in the Agua Fria Basin (Cont)<sup>1</sup>**

**B. Lakes and Streams**

Map Key	Site Type	Site Name	Length of Impaired Stream Reach (in miles)	Area of Impaired Lake (in acres)	Designated Use Standard <sup>3</sup>	Parameter(s) Exceeding Use Standard <sup>2</sup>
a	Stream	Turkey Creek - unnamed tributary to Poland Creek	21	NA	A&W	Cd, Cu, Pb, Zn

Source: ADEQ 2005d

**Notes:**

<sup>1</sup> Water quality samples collected between 1978 and 2003.

<sup>2</sup>As = Arsenic

Cd = Cadmium

Cu = Copper

F= Fluoride

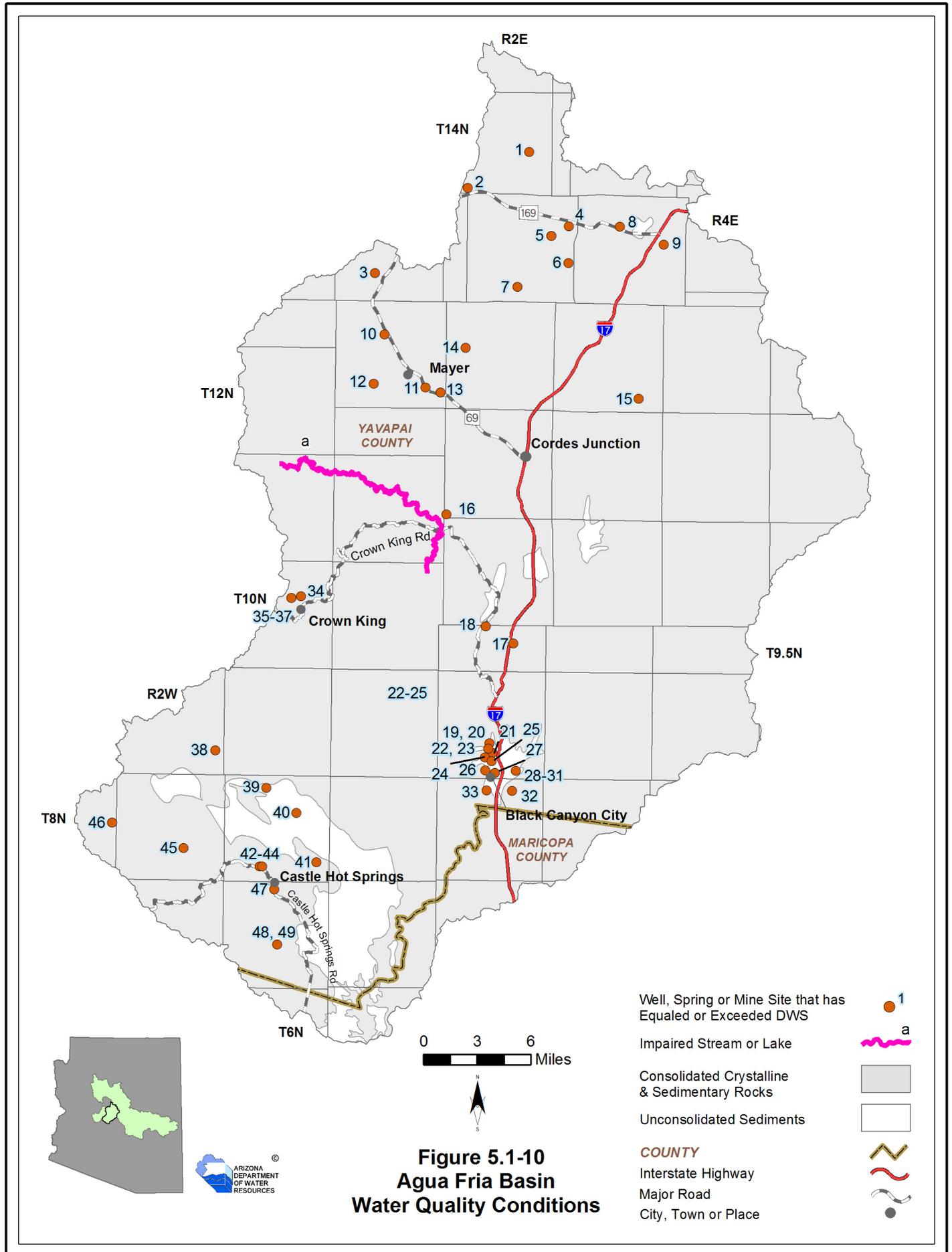
Pb = Lead

Rad = One or more of the following radionuclides - Gross Alpha, Gross Beta, Radium, and Uranium

Zn = Zinc

<sup>3</sup>A&W = Aquatic and Wildlife

NA = Not applicable



### 5.1.8 Cultural Water Demand in the Agua Fria Basin

Cultural water demand data including population, number of wells and the average well pumpage and surface water diversions by the municipal, industrial and agricultural sectors are shown in Table 5.1-8. Effluent generation including facility ownership, location, population served and not served, volume treated, disposal method and treatment level is shown in Table 5.1-9. Figure 5.1-11 shows the location of demand centers. A description of cultural water demand data sources and methods is found in Volume 1, Appendix A. More detailed information on cultural water demand is found in Section 5.0.7.

#### Cultural Water Demand

- Refer to Table 5.1-8 and Figure 5.1-11.
- Population in this basin increased from 2,839 people in 1980 to 8,210 in 2000.
- There are no reported surface water diversions in this basin. Groundwater use has increased since 1971, with an average of 2,000 AFA from 1971-1975 and an average of 3,300 AFA during 2001-2005. The highest average annual groundwater use, 5,000 AFA, occurred during 1981-1985.
- Municipal groundwater demand increased from an average of 1,100 AFA in 1991-1995 to an average of 1,800 AFA in 2001-2005.
- Agricultural demand has increased slightly from an average of 1,300 AFA in 1991-1995 to an average of 1,500 AFA in 2001-2005.
- Most municipal demand is found in the vicinity of Black Canyon City, Cordes Junction and Mayer.
- There are numerous small agricultural demand areas north and east of Cordes Junction.
- The basin contains two small mines or quarries; one northwest of Mayer and the other northeast of Castle Hot Springs. Water demands are unknown for these quarries.
- As of 2005 there were 1,776 registered wells with a pumping capacity of less than or equal to 35 gpm and 310 wells with a pumping capacity of more than 35 gpm.

#### Effluent Generation

- Refer to Table 5.1-9.
- There are four identified wastewater treatment facilities in this basin.
- Information on population served, effluent generation and disposal was available for two facilities. These facilities serve over 300 people and generate 27 acre-feet of effluent per year.

Table 5.1-8. Cultural Water Demand in the Agua Fria Basin<sup>1</sup>

Year	Estimated and Projected Population	Number of Registered Water Supply Wells Drilled		Average Annual Demand (in acre-feet)						Data Source
				Well Pumpage			Surface-Water Diversions			
				Q ≤ 35 gpm	Q > 35 gpm	Municipal	Industrial	Agricultural	Municipal	
1971										
1972										
1973						2,000			NR	
1974										
1975										
1976		718 <sup>2</sup>	143 <sup>2</sup>							
1977										
1978						3,000			NR	
1979										
1980	2,839									
1981	3,086									
1982	3,334									
1983	3,581	183	52			5,000			NR	
1984	3,829									
1985	4,076									
1986	4,323									
1987	4,571									
1988	4,818	140	38			4,000			NR	
1989	5,066									
1990	5,313									
1991	5,603									
1992	5,892									
1993	6,182	142	30	1,100	NR	1,300			NR	
1994	6,472									
1995	6,762									
1996	7,051									
1997	7,341									
1998	7,631	256	20	1,500	NR	1,300			NR	
1999	7,920									
2000	8,210									
2001	8,646									
2002	9,082									
2003	9,517	337	27	1,800	NR	1,500			NR	
2004	9,953									
2005	10,389									
2010	12,568									
2020	16,104									
2030	19,135									
<b>TOTAL WELLS:</b>		<b>1,776</b>	<b>310</b>							

**Notes:**

NR - Not reported

<sup>1</sup> Does not include evaporation losses from stockponds and reservoirs.

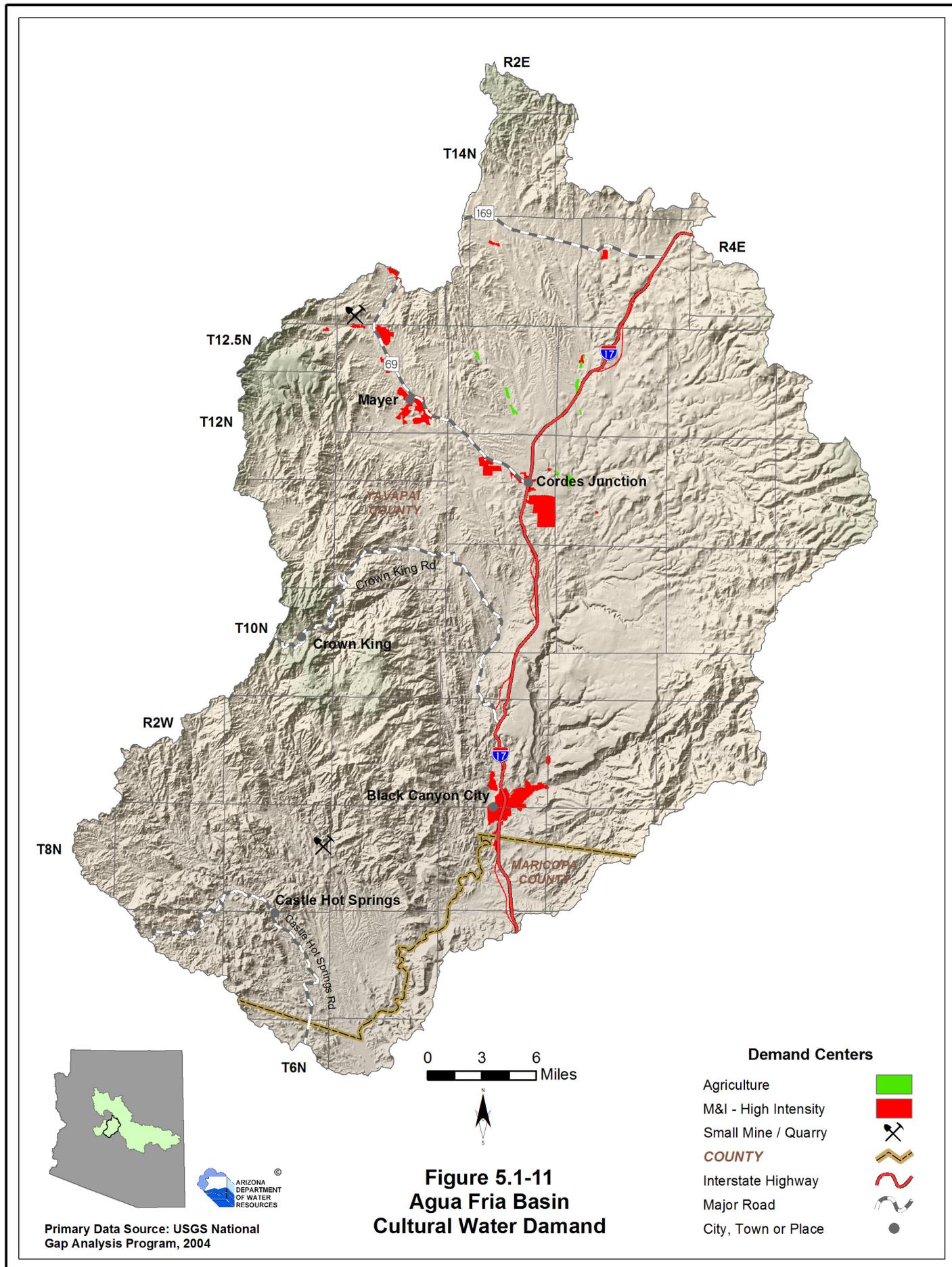
<sup>2</sup> Includes all wells through 1980.

Table 5.1-9 Effluent Generation in the Agua Fria Basin

Facility Name	Ownership	City/Location Served	Population Served	Volume Treated/Generated (acre-feet/year)	Disposal Method						Current Treatment Level	Population Not Served	Year of Record
					Water-course	Evaporation Pond	Irrigation	Wildlife Area	Golf Course/Turf/Landscape	Discharge to Another Facility			
Arcosanti WWTF	Private	Arcosanti	273	22					NA			610	2001
Bensch Ranch	Private	Mayer	19	2	X							NA	2007
Crown King Work Center	Prescott NF	Site Facilities							NA				
Kings Ranch Unit II	Private	Black Canyon City	30	3	Agua Fria							NA	2006
<b>Totals</b>			<b>322</b>	<b>27</b>									

Sources: Compilation of databases from ADWR & others

**Notes:**  
 Year of Record is for the volume of effluent treated/generated  
 NA: Data not currently available to ADWR  
 WWTF: Wastewater Treatment Facility



### 5.1.9 Water Adequacy Determinations in the Agua Fria Basin

Water adequacy determination information including the subdivision name, location, number of lots, adequacy determination, reason for the inadequacy determination, date of determination and subdivision water provider are shown in Table 5.1-10A and B for analysis of adequate water supply. Figure 5.1-12 shows the locations of subdivisions keyed to the Table. A description of the Water Adequacy Program is found in Volume 1, Appendix C. Adequacy determination data sources and methods are found in Volume 1, Appendix A.

- All subdivisions receiving an adequacy determination are in Yavapai County. Fifteen water adequacy determinations have been made in this basin through December 2008. Of the 1,177 lots in fourteen subdivisions for which lot information is available, 973 lots in nine subdivisions, or 83% of lots, were determined to be adequate.
- All inadequacy determinations were because the applicant chose not to submit the necessary information, and/or the available hydrologic data was insufficient to make a determination. One inadequate determination also stated the existing supply was unreliable or physically unavailable or groundwater exceeds the depth-to-water criteria.
- One Analysis of Adequate Water Supply application for 50 lots has been approved for this basin.

Table 5.1-10. Adequacy Determinations in the Agua Fria Basin<sup>1</sup>

A. Water Adequacy Reports

Map Key	Subdivision Name	County	Location		No. of Lots	ADWR File No. <sup>2</sup>	ADWR Adequacy Determination	Reason(s) for Inadequacy Determination <sup>3</sup>	Date of Determination	Water Provider at the Time of Application
			Township	Range Section						
1	Bensch Ranch Estates	Yavapai	11 North	2 East 6	411	53-400479	Adequate		2/26/2001	Bradshaw Mountain View Water Company
2	Black Canyon Estates	Yavapai	8 North	2 East 3, 4	142	53-500335	Adequate		1/26/1976	Trail's End Water Service
3	Black Canyon Estates #2	Yavapai	8 North	2 East 3, 4, 9	142	53-500336	Adequate		8/20/1984	Trail's End Water Service
4	Bradshaw Overlook	Yavapai	11 North	2 East 5, 8	23	53-500352	Adequate		1/22/1990	Bradshaw Mountain View Water Company
5	Cordes Lakes	Yavapai	11 North	2 East 23, 24, 25, 26	101	53-500508	Inadequate	A1	5/16/1986	Cordes Lakes Water Company
6	Cordes Lakes #8	Yavapai	11 North	2 East 24	7	53-500509	Inadequate	A1	6/19/1986	Cordes Lakes Water Company
8	Kings Ranch Units	Yavapai	8 North	2 East 4, 9	NA	53-500841	Adequate		1/26/1976	Trail's End Water Service
9	Mayer Estates	Yavapai	12 North	1 East 27	163	53-500940	Adequate		1/7/1976	Mayer Water Company
10	Oak Hills	Yavapai	12 North	1 East 35	18	53-501068	Adequate		7/14/1994	Mayer Domestic Water Imp District
11	Quail Hollow #1	Yavapai	12 North	1 East 22	50	53-501237	Adequate		4/19/1990	Mayer Water Company
12	Rancho Vista Estates LLC	Yavapai	12 North	1 East 3, 4	58	53-501276	Inadequate	A1, A2	2/22/1995	Dry Lot Subdivision
13	Spring Valley #3	Yavapai	11 North	2 East 8	18	53-501445	Inadequate	A1	2/20/1981	Bradshaw Mountain View Water Company
14	Spring Valley #4	Yavapai	11 North	2 East 8	5	53-501446	Inadequate	A1	9/16/1985	Bradshaw Mountain View Water Company
15	Sunrise Estates	Yavapai	12 North	1 East 2	15	53-400244	Inadequate	A1	2/17/2000	Mayer Domestic Water Improvement District
16	Westridge	Yavapai	8 North	2 East 4	24	53-501672	Adequate		9/17/1987	Black Canyon City Water Association

B. Analysis of Adequate Water Supply

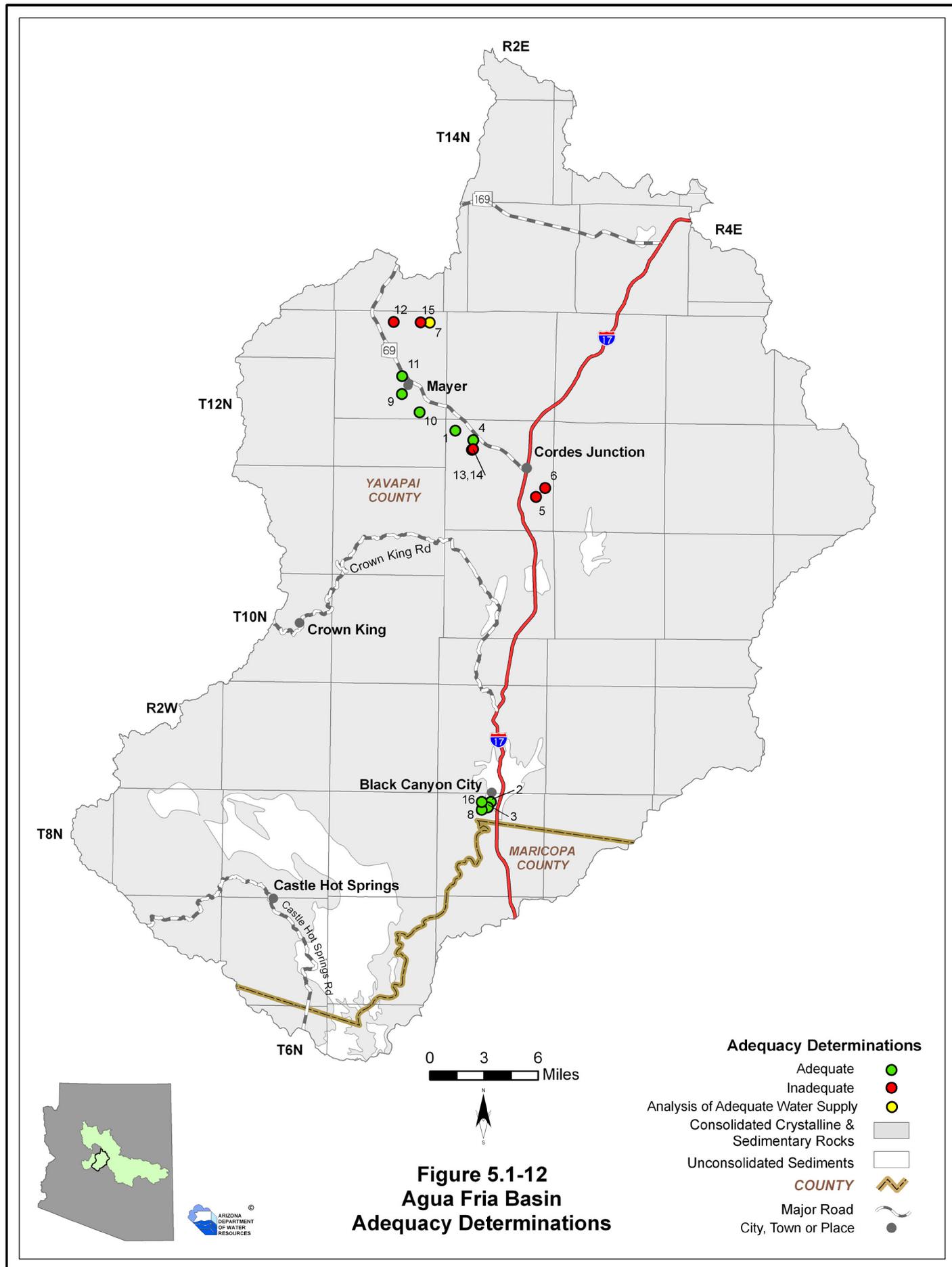
Map Key	Subdivision Name	County	Location		No. of Lots	ADWR File No. <sup>2</sup>	Date of Determination	Water Provider at the Time of Application
			Township	Range Section				
7	Hidden Valley Ranch	Yavapai	12 North	1 East 1, 2	50	43-401625	1/3/2006	NA

Source: ADWR 2008a

Notes:

- <sup>1</sup>Each determination of the adequacy of water supplies available to a subdivision is based on the information available to ADWR and the standards of review and policies in effect at the time the determination was made. In some cases, ADWR might make a different determination if a similar application were submitted today, based on the hydrologic data and other information currently available, as well as current rules and policies.
- <sup>2</sup> Prior to February 1995, ADWR did not assign file numbers to applications for adequacy. Between 1995-2006 all applications for adequacy were given a file number with a 22 prefix. In 2006 a 53 prefix was assigned to all water adequacy reports and applications regardless of their issue date.
- <sup>3</sup> A. Physical/Continuous
  - 1) Insufficient Data (applicant chose not to submit necessary information, and/or available hydrologic data insufficient to make determination)
  - 2) Insufficient Supply (existing water supply unreliable or physically unavailable; for groundwater, depth-to-water exceeds criteria)
  - 3) Insufficient Infrastructure (distribution system is insufficient to meet demands or applicant proposed water hauling)
- B. Legal (applicant failed to demonstrate a legal right to use the water or failed to demonstrate the provider's legal authority to serve the subdivision)
- C. Water Quality
- D. Unable to locate records

NA=Information not available to ADWR



# Agua Fria Basin

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