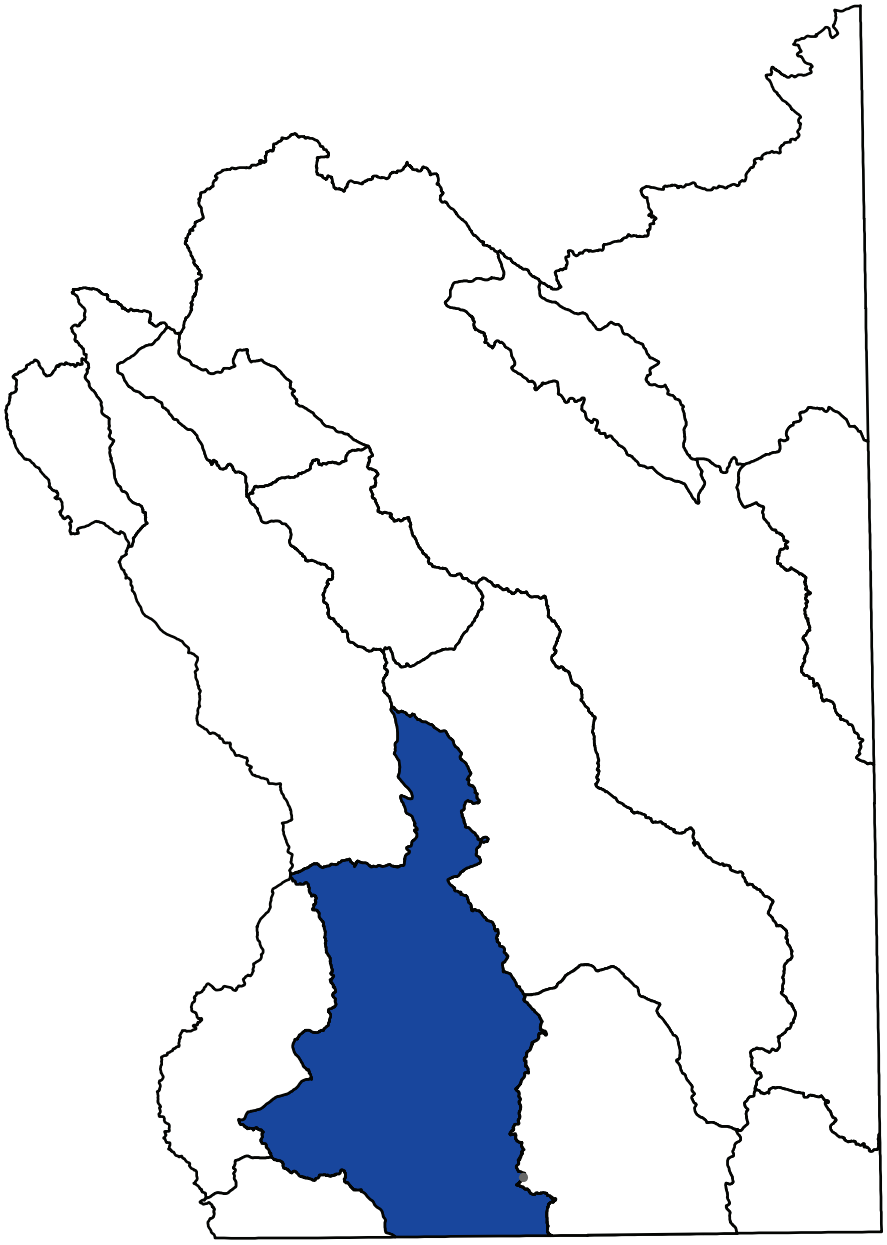
Section 3.13
Upper San Pedro Basin



3.13.1 Geography of the Upper San Pedro Basin

The Upper San Pedro Basin is a medium-size, 1,825 square mile basin in the southwestern portion of the planning area. Geographic features and principal communities are shown on Figure 3.13-1. The basin is characterized by a large valley flanked by a series of mountain ranges. Vegetation is primarily semi-desert grassland and Chihuahuan desertscrub with smaller areas of madrean evergreen woodland, plains and Great Basin desertscrub and Rocky Mountain and montane conifer forest. (see Figure 3.0-10) Riparian vegetation includes cottonwood/ willow, mesquite and tamarisk along the San Pedro River and conifer oak and mixed broadleaf along Gardner, Ramsey and Miller Canyons.

- Principal geographic features shown on Figure 3.13-1 are:
    - San Pedro River, which flows north through the San Pedro Valley east of Sierra Vista and Benson
    - Babocomari River north of Sierra Vista
    - Garden and Ramsey Canyons southwest of Sierra Vista
    - Tres Alamos Wash northeast of Benson
    - Greenbrush Draw north of the Mexico border in the vicinity of Naco
    - Huachuca Mountains southwest of Sierra Vista
    - Whetstone Mountains southwest of Whetstone
    - Canelo Hills on the southwestern boundary
    - Mule Mountains west of Bisbee
    - Dragoon Mountains along the eastern boundary of the basin east of Tombstone
    - Galiuro Mountains on the northeastern boundary of the basin
    - The highest point in the basin, 9,466 feet, at T23S, R20E in the Huachuca Mountains
    - The lowest point at approximately 3,000 feet where the San Pedro River exits the basin.

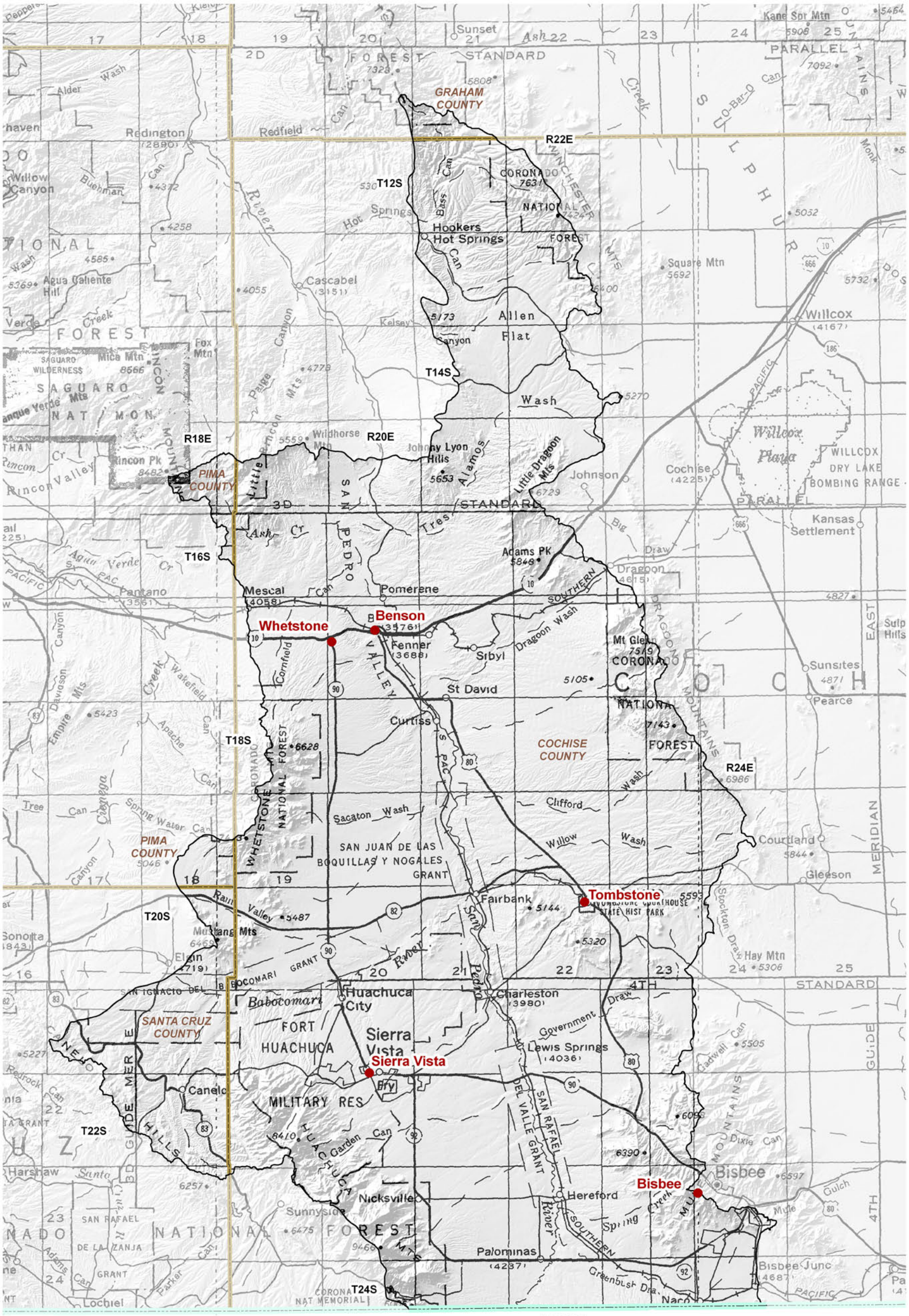


Figure 3.13-1
Upper San Pedro Basin
Geographic Features

3.13.2 Land Ownership in the Upper San Pedro Basin

Land ownership, including the percentage of ownership in each category, is shown for the Upper San Pedro Basin in Figure 3.13-2. Principal features of the land ownership in this basin are the relatively large amounts of state owned lands and private lands as well as the Fort Huachuca Military Base. More detailed information on National Parks, Monuments, Riparian, Conservation, Wildlife and Wilderness Areas is found in Section 3.0.3. A description of land ownership data sources and methods is found in Volume 1, Appendix A. Land ownership categories are discussed below in the order of percentage from largest to smallest in the basin.

State Trust

- 39.1% of land in this basin is held in trust for public schools and five other beneficiaries under the State Trust Land system.
- State owned land is fragmented in most of the basin, however, large contiguous parcels exist north of Interstate 10 and north of Highway 82 and east of Highway 90.
- Primary land use is grazing.

Private

- 33.3% of land is private.
- Much of the private land is interspersed with state owned land and, to a lesser extent, Bureau of Land Management lands.
- Contiguous private lands exist south of Sierra Vista, north of Fort Huachuca, southeast of Benson and in the vicinity of Benson.
- Primary land uses are domestic, commercial, industrial and farming.

National Forest

- 11.6% of land is federally owned and managed by the United States Forest Service (USFS).
- All forest lands, although not contiguous, are in the Coronado National Forest in four ranger districts: the Safford Ranger District at the northern tip of the basin; the Santa Catalina Ranger District north of Interstate 10 adjacent to Saguaro National Park; the Douglas Ranger District south of Interstate 10 on the eastern basin boundary; and the Sierra Vista Ranger District in the southern part of the basin adjacent to Fort Huachuca and south of Interstate 10 on the western basin boundary.
- Portions of the Miller Peak Wilderness area and the Rincon Mountain Wilderness area. (see Figure 3.0-13)
- Primary land uses are grazing, recreation and timber production.

U.S. Bureau of Land Management (BLM)

- 8.9% of land is federally owned and managed by the Safford Field Office of the Bureau of Land Management.
- The majority of the BLM land in this basin is within the San Pedro Riparian National Conservation Area.
- A portion of the Las Cienegas National Conservation Area.
- A portion of the Redfield Canyon Wilderness. (see Figure 3.0-13)

- Primary land uses are recreation and grazing.

U.S. Military

- 6.8% of land is federally owned and managed by the U.S. Military
- All military lands are within Fort Huachuca.
- Fort Huachuca was established during the Indian Wars in 1877 and has existed as a military outpost, with varied missions, since that time.
- Primary land use is military activities.

National Park Service (NPS)

- 0.3% of land is federally owned and managed by the National Park Service.
- All park lands are within the Coronado National Memorial and Saguaro National Park in the northwest portion of the basin.
- Primary land use is recreation.

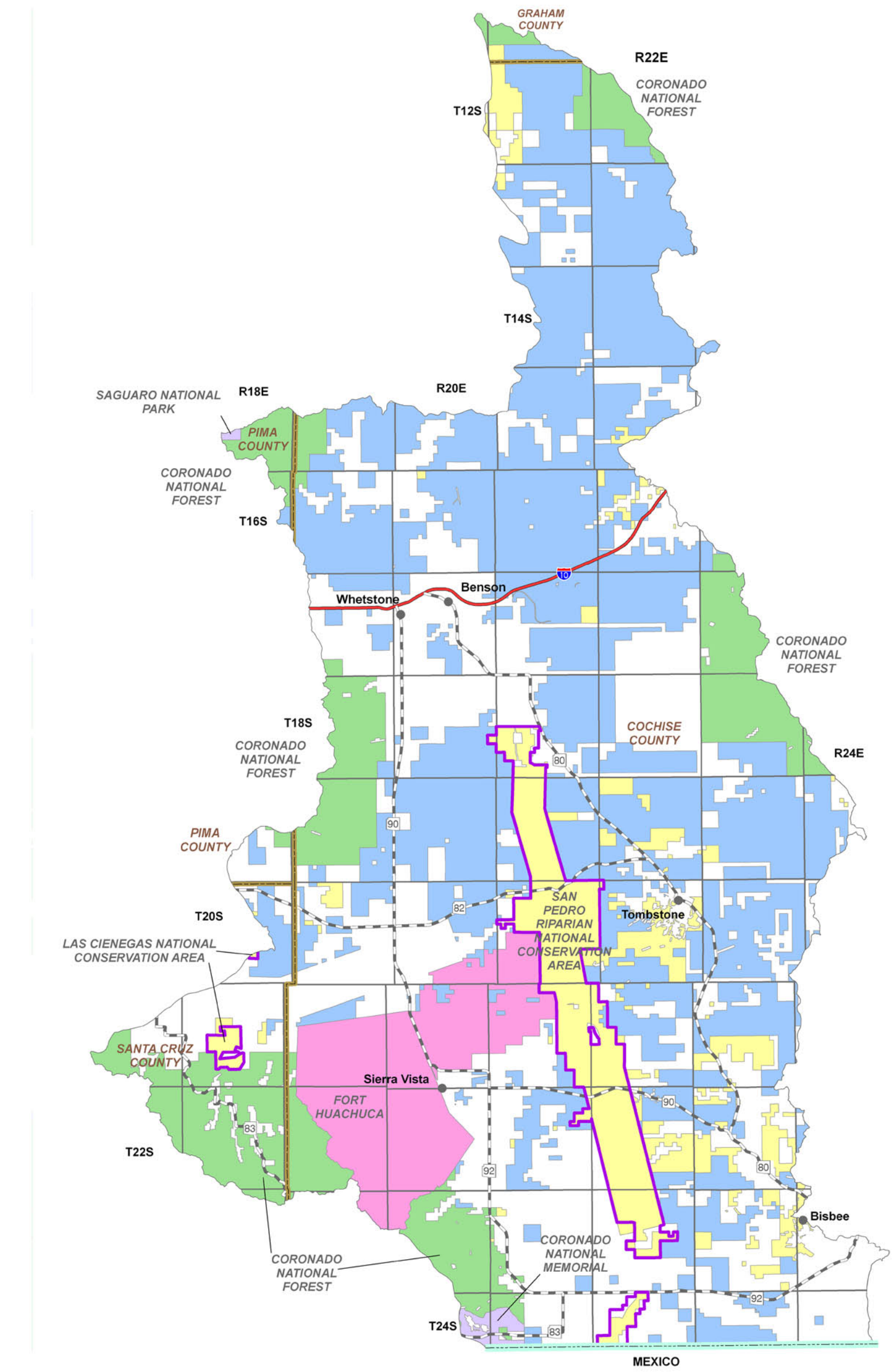


Figure 3.13-2
Upper San Pedro Basin
Land Ownership

3.13.3 Climate of the Upper San Pedro Basin

Climate data from NOAA/NWS Coop Network stations is complied in Table 3.13-1 and the locations are shown on Figure 3.13-3. Figure 3.13-3 also shows precipitation contour data from the Spatial Climate Analysis Service (SCAS) at Oregon State University. The Upper San Pedro Basin does not contain Evaporation Pan, AZMET and SNOTEL/Snowcourse stations. More detailed information on climate is found in Section 3.0.4. A description of the climate data sources and methods is found in Volume 1, Appendix A.

NOAA/NWS Coop Network

- Refer to Table 3.13-1A
- There are seven NOAA/NWS Coop network climate stations in the basin. The average monthly maximum temperature occurs in July at all stations and ranges between 74.6°F at Canelo 1 NW to 81.0°F at Benson. The average monthly minimum temperature occurs in December or January and ranges between 43.3°F at Canelo 1 NW to 47.8°F at Tombstone.
- Highest average seasonal rainfall occurs in the summer (July – September). For the period of record used, the highest annual rainfall is 21.18 inches at Coronado N.M. and 12.34 inches at Benson.

SCAS Precipitation Data

- See Figure 3.13-3
- Additional precipitation data shows rainfall as high as 38 inches at the Huachuca Mountains south of Sierra Vista and as low as 12 inches in the vicinity of Tombstone.

Table 3.13-1 Climate Data for the Upper San Pedro 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
Apache Powder Co.	3,690	1971-2000	80.3/Jul	45.5/Dec	2.16	1.01	8.38	2.66	14.21
Benson	3,670	1894-1975[1]	81.0/Jul	45.9/Jan	1.23	0.74	8.01	2.37	12.34
Bisbee 2	5,020	1961-1997[1]	77.6/Jul	46.6/Jan	2.74	1.22	8.39	3.10	15.44
Canelo 1 NW	5,010	1971-2000	74.6/Jul	43.3/Jan	3.68	1.32	9.17	3.87	18.04
Coronado N.M.	5,240	1971-2000	75.4/Jul	45.3/Jan	4.71	1.41	10.02	5.04	21.18
Fort Huachuca	4,670	1900-1981[1]	77.3/Jul	46.3/Jan	2.44	1.13	7.89	2.91	14.35
Tombstone	4,610	1971-2000	79.9/Jul	47.8/Jan	2.48	1.13	7.43	3.06	14.10

Source: WRCC, 2005

Notes:
[1]Average temperature for period of record shown; average precipitation from 1971-2000

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 Evaportranspiration, 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								

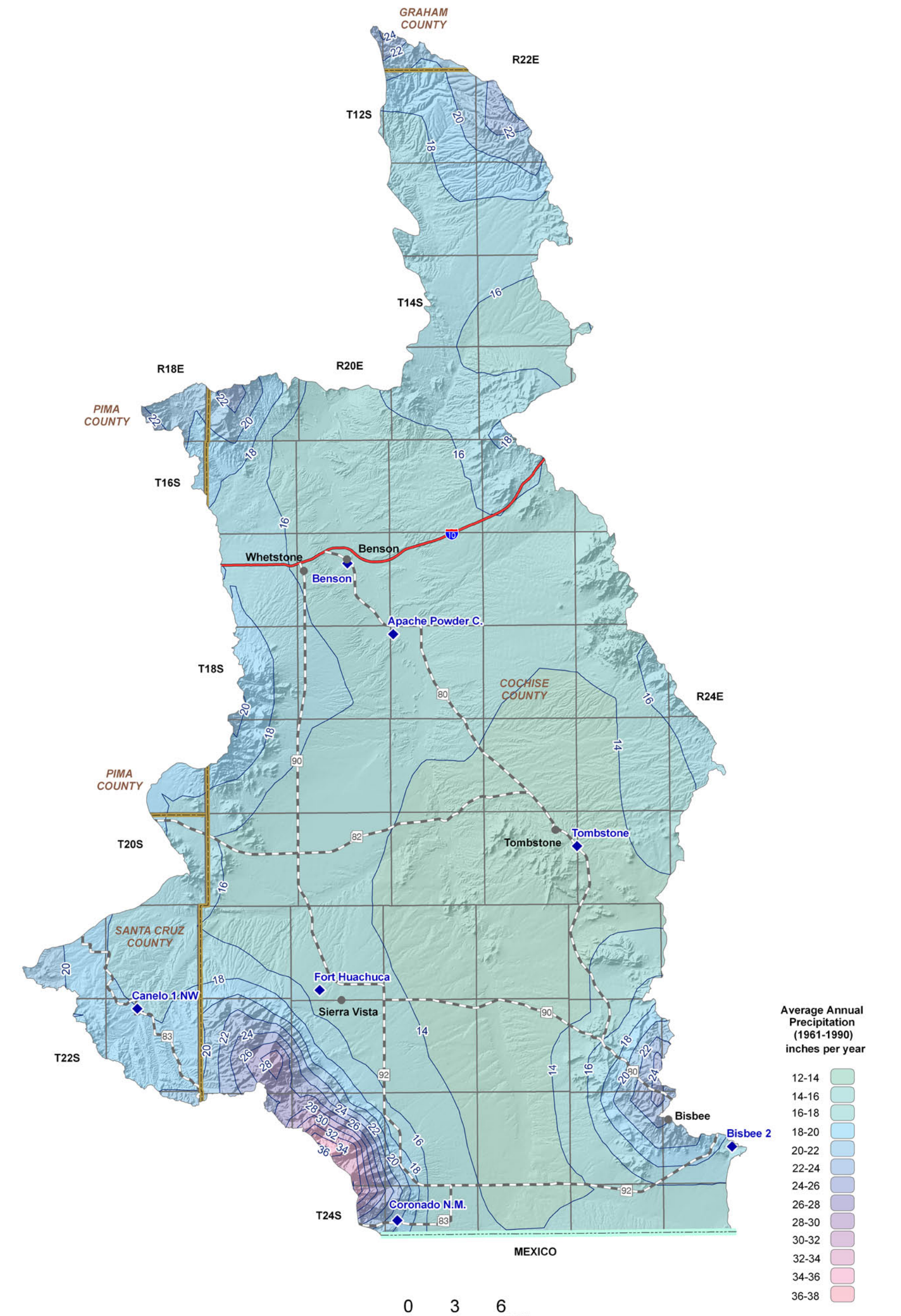


Figure 3.13-3
Upper San Pedro Basin
Meteorological Stations and
Annual Precipitation

3.13.4 Surface Water Conditions in the Upper San Pedro Basin

Streamflow data, including average seasonal flow, average annual flow and other information is shown in Table 3.13-2. This basin does not contain Flood ALERT equipment. Reservoir and stockpond data, including maximum storage or maximum surface area, are shown in Table 3.13-3. The location of streamflow gages identified by USGS number, USGS runoff contours and large reservoirs are shown on Figure 3.13-5. Descriptions of stream, reservoir and stockpond data sources and methods are found in Volume 1, Appendix A.

Streamflow Data

- Refer to Table 3.13-2.
- Data from 13 stations on seven watercourses are shown on the table and on Figure 3.13-5. Three stations have been discontinued and 10 are real-time stations.
- The average seasonal for the majority of the stations is highest in the Summer (July-September) and lowest in Spring (April-June).
- Maximum annual flow was 102,107 acre-feet in 1984 at the San Pedro River near Tombstone and minimum annual flow was 0 acre-feet at Greenbush Draw near Palominas in 2001. The oldest operating gage is the San Pedro River at the Charleston, a hydrograph of this gage is found in Figure 3.13-4.

Reservoirs and Stockponds

- Refer to Table 3.13-3.
- Surface water is stored or could be stored in four small reservoirs in the basin.
- There are an estimated 974 stockponds in this basin.

Runoff Contour

- Refer to Figure 3.13-5.
- Average annual runoff is 0.5 inches, or 26.65 acre-feet per square mile, in this basin.

Figure 3.13-4 Annual Flows (in acre-feet) at San Pedro River at Charleston (Station # 9471000) Water Years 1905-2007

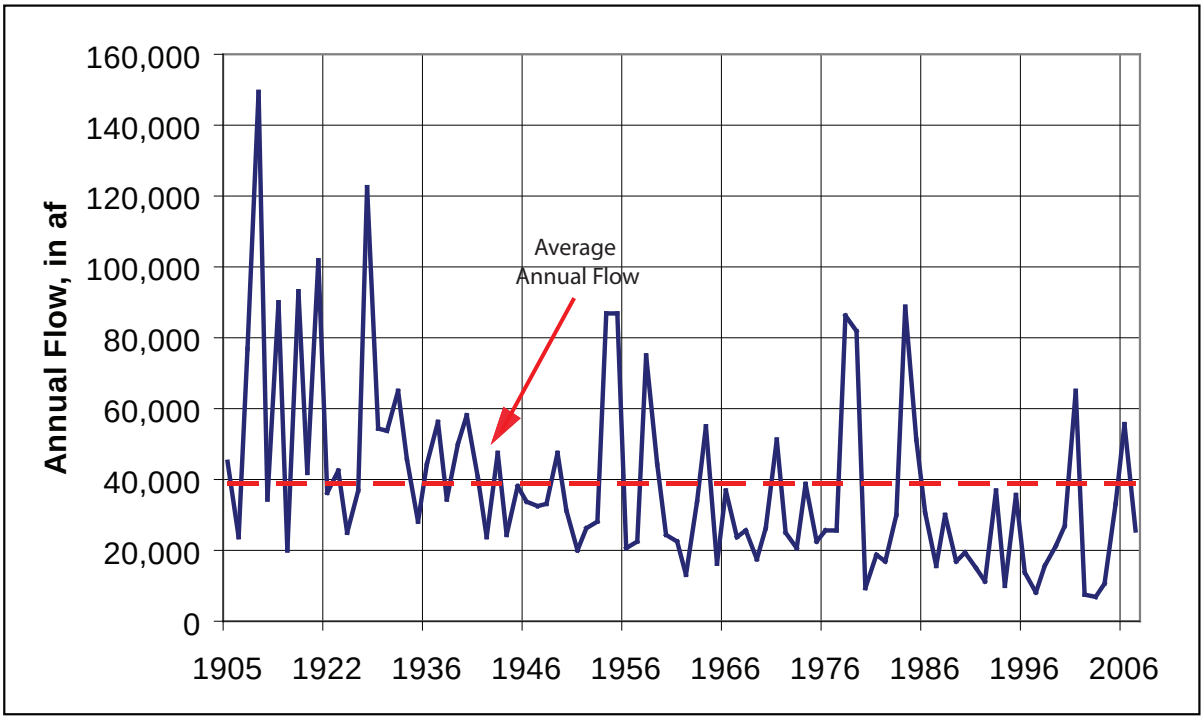


Table 3.13-2 Streamflow Data for Upper San Pedro Basin

Station Number	USGS Station Name	Drainage Area (in mi^2)	Gage Elevation (in feet)	Period of Record	Average Seasonal Flow (% of annual flow)				Annual Flow (in acre-feet/year)				Years of Annual Flow Record
					Winter	Spring	Summer	Fall	Minimum	Median	Mean	Maximum	
9470500	San Pedro River near Palominas	737	4,188	5/1930-current (real time)	10	2	70	17	4,403 (1962)	16,659	22,873	65,464 (2000)	44
9470520	Greenbush Draw near Palominas	NA	4,280	6/2000-9/2004 (discontinued)	0	11	35	54	0 (2001)	76	76	152 (2003)	3
9470700	Banning Creek near Bisbee	NA	4,767	2/2001-current (real time)	No statistics run, less than 3 years of data								2
9470750	Ramsey Canyon near Sierra Vista	NA	5,525	5/2000-current (real time)	10	8	9	73	24 (2003)	43	145	369 (2001)	3
9470800	Garden Canyon near Fort Huachuca	8	5,400	10/1959-current (real time)	39	11	35	15	71 (1997)	1,043	990	2,086 (1995)	11
9471000	San Pedro River at Charleston	1,234	3,954	3/1904-current (real time)	14	5	65	16	6,778 (2002)	33,203	38,636	152,798 (1914)	84
9471300	Huachuca Canyon near Fort Huachuca	3	NA	10/1961-9/1964 (discontinued)	No statistics run, less than 3 years of data								2
9471310	Huachuca Canyon near Fort Huachuca	NA	5,600	10/2000-current (real time)	11	7	9	73	7 (2002)	62	88	195 (2001)	3
9471380	Upper Babocomari River near Huachuca City	NA	5,500	7/2000-current (real tme)	16	9	28	47	1,433 (2003)	2,331	2,669	4,243 (2003)	3
9471400	Babocomari River near Tombstone	NA	3,980	3/2000-current (real time)	25	8	24	43	862 (2003)	1,028	1,028	1195 (2001)	3
9471500	San Pedro River at Fairbanks	1,672	NA	10/1926-9/1928 (discontinued)	No statistics run, less than 3 years of data								1
9471550	San Pedro River near Tombstone	1,740	3,780	4/1967-current (real time)	19	4	49	28	7,314 (2002)	29,654	36,950	102,107 (1984)	24
9471800	San Pedro River near Benson	2,490	3,310	3/1966-current (real time)	5	1	87	8	8,618 (1973)	28,966	23,447	44,463 (1971)	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 Year 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 retreived in 2005
NA=Not available

Table 3.13-3 Reservoirs and Stockponds in the Upper San Pedro 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	JURISDICTION
None identified by ADWR at this time					

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: 247 acre-feet

D. Other Small Reservoirs (between 5 and 50 acres surface area)[1]

Total number: 2
Total surface area: 13 acres

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

Total number: 974 (from water right filings)

Notes:
[1]Capacity data not available to ADWR

0 6 12 Miles

USGS Annual Runoff Contour for 1951-1980 (in inches)

Stream Channel (width of line reflects stream order)

Stream Gages

USGS Gage and Station ID

COUNTY

International Boundary

Interstate Highway

Major Road

City, Town or Place

Stream Data Source: ALRIS, 2005

Figure 3.13-5
Upper San Pedro Basin
Surface Water Conditions

3.13.5 Perennial/Intermittent Streams and Major Springs in the Upper San Pedro 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 3.13-4. The locations of major springs as well as perennial and intermittent streams are shown on Figure 3.13-6. Descriptions of data sources and methods for intermittent and perennial reaches and springs are found in Volume 1, Appendix A.

- There are numerous perennial stream reaches in this basin. Most perennial streams are in the southern portion of the basin.
- A number of intermittent stream reaches are located throughout most of the basin.
- The San Pedro River through most of this basin is intermittent with a perennial reach in the southern portion of the basin.
- There are 12 major springs with a measured discharge of 10 gallons per minute (gpm) or greater at any time. The largest discharge rate is 1,164 gpm at Garden Canyon.
- Springs with measured discharge of 1 to 10 gpm are not mapped but coordinates are given in Table 3.13-4. There are four minor springs identified in this basin.
- Listed discharge rates may not be indicative of current conditions. Most of the measurements were taken prior to 1982. Two major spring measurements post-date 1982.
- The total number of springs identified by the USGS varies from 79 to 91, depending on the database reference.

Table 3.13-4 Springs in the Upper San Pedro Basin

A. Major Springs (10 gpm or greater):

Map Key	Name	Location		Discharge (in gpm)[1]	Date Discharge Measured
		Latitude	Longitude		
1	Garden Canyon No. 1	312807	1102132	134	2/11/1963
2	Huachuca Canyon	313103	1102318	108[3]	1958-1963
3	Unnamed[2]	313044	1102327	100	4/3/1941
4	Miller Canyon[2]	312516	1101554	97[3]	1973-1977
5	Garden Canyon No. 2	312728	1102155	76	1/8/1963
6	Lewis North	313456	1100819	45	6/30/2005
7	Hooker's Hot	322018	1101421	40	During or prior to 1982
8	Murray	313425	1101023	26	6/30/2005
9	Spring No. 3A[2]	313028	1102441	10	4/19/1960
10	Tree Root[2]	313029	1102442	10	4/19/1960
11	Spring No. 1	313102	1102315	10	4/3/1941
12	Unnamed (multiple)	322050	1101422	10	During or prior to 1982

B. Minor Springs (1 to 10 gpm):

Name	Location		Discharge (in gpm)[1]	Date Discharge Measured
	Latitude	Longitude		
Unnamed[2]	330436	1095904	7	During or prior to 1982
Kiper	320309	1102340	5	5/17/1951
Kino	313340	1102631	4	3/30/1960
Unnamed	320316	1102233	2	10/12/1950

Source: Compilation of databases from ADWR & others

C. Total number of springs, regardless of discharge, identified by USGS (see ALRIS, 2005a and USGS, 2006a): 79 to 91

Notes:
[1]Most recent measurement identified by ADWR
[2]Spring not displayed on current USGS topo map
[3]Average discharge

Stream Data Source: AGFD, 1993 &1997
Brown and Carmony, 1981

Figure 3.13-5
Upper San Pedro Basin
Perennial/Intermittent Streams
and Major (>10 gpm) Springs

3.13.6 Groundwater Conditions of the Upper San Pedro 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 3.13-5. Figure 3.13-7 shows aquifer flow direction and water-level change between 1990-1991 and 2003-2004. Figure 3.13-8 contains hydrographs for selected wells shown on Figure 3.13-7. Figure 3.13-9 shows well yields in five 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 3.13-5 and Figure 3.13-7.
- The major aquifers in the basin are basin fill, consisting of younger basin fill, older basin fill and basal conglomerate, and recent stream alluvium.
- The basin fill is the principal aquifer although the stream alluvium is also utilized.
- Artesian conditions exist primarily in the vicinity of Benson.
- Flow direction is generally from south to north.

Well Yields

- Refer to Table 3.13-5 and Figure 3.13-9.
- As shown on Figure 3.13-9 well yields in this basin range from less than 100 gallons per minute (gpm) to more than 2,000 gpm.
- One source of well yield information, based on 353 reported wells, indicates that the median well yield in this basin is 600 gpm.

Natural Recharge

- Refer to Table 3.13-5.
- The principal sources of recharge for this basin are mountain-front recharge and streambed infiltration.
- The estimate of natural recharge in this basin is 35,750 acre-feet per year.

Recharge Sites

- Refer Figure 3.13-7.
- There are two recharge facilities in this basin. Both facilities recharge effluent. For more information see Section 3.0.6

Water in Storage

- Refer to Table 3.13-5.
- Storage estimates for this basin range from 19.8 million acre-feet to 59 million acre-feet to a depth of 1,200 feet.

Water Level

- Refer to Figure 3.13-7. Water levels are shown for wells measured in 2003-2004.
- The Department annually measures 59 index wells in this basin. Hydrographs for 15 index wells and five other wells are shown in Figure 3.1-7. Index well hydrographs are: A-C, E-I, K-M,P,Q, S and T.

- Deep water levels are found in the vicinity of Sierra Vista with water levels as deep as 585 feet measured in 2003-2004. Shallow water levels are found near the Mexico border in the vicinity of Highway 92 with levels as shallow as 10 feet in 2003-2004.

Table 3.13-5 Groundwater Data for the Upper San Pedro Basin

Basin Area, in square miles:	1,825	
Major Aquifer(s):	**Name and/or Geologic Units**	
	Recent Stream Alluvium	
	Basin Fill	
Well Yields, in gal/min:	Range 14 - 981 Median 335 (39 wells measured)	Measured by ADWR and/or USGS
	Range 3 - 3,800 Median 600 (353 wells reported)	Reported on registration forms for large (> 10-inch) diameter wells
	Range 100 - 2,800	ADWR (1994b)
	Range 0 - 2,500	Anning and Duet (1994)
Estimated Natural Recharge, in acre-feet/year:	35,750	ADWR (2005f)
Estimated Water Currently in Storage, in acre-feet:	21,000,000 - 59,000,000 (to 1,200 ft/not given)	ADWR (1990 and 1994b)
	35,000,000[1] (to 1,200 ft)	Freethey and Anderson (1986)
	48,000,000 (to 1,200 ft)	Arizona Water Commission (1975)
	19,800,000 - 26,100,000 (to 1,200 ft)	ADWR (2005f)
Current Number of Index Wells:	59	
Date of Last Water-level Sweep:	2001 (736 wells measured)	

[1]Predevelopment Estimate

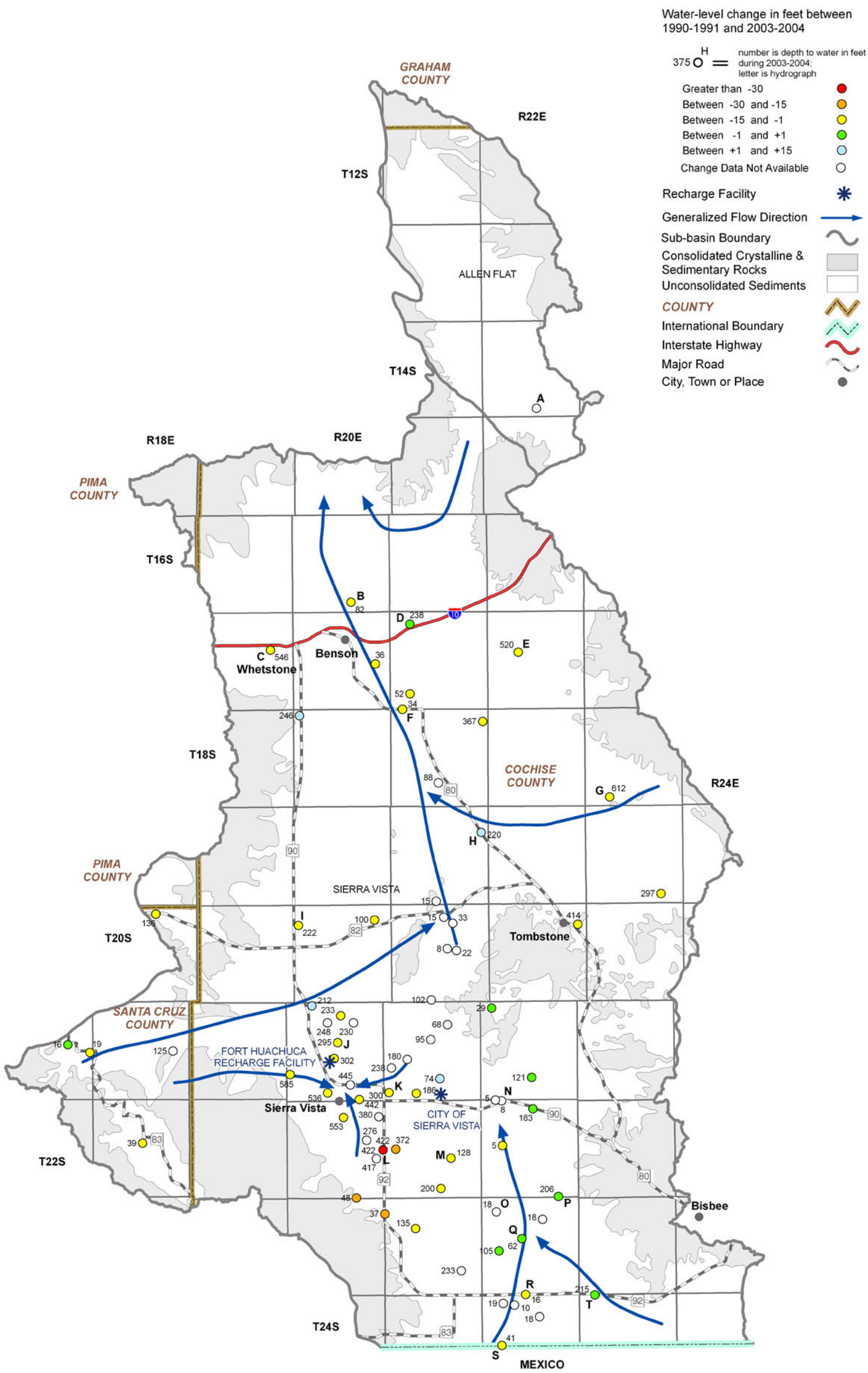


Figure 3.13-7
Upper San Pedro Basin
Groundwater Conditions

Figure 3.13-8
Upper San Pedro Basin
Hydrographs Showing Depth to Water in Selected Wells

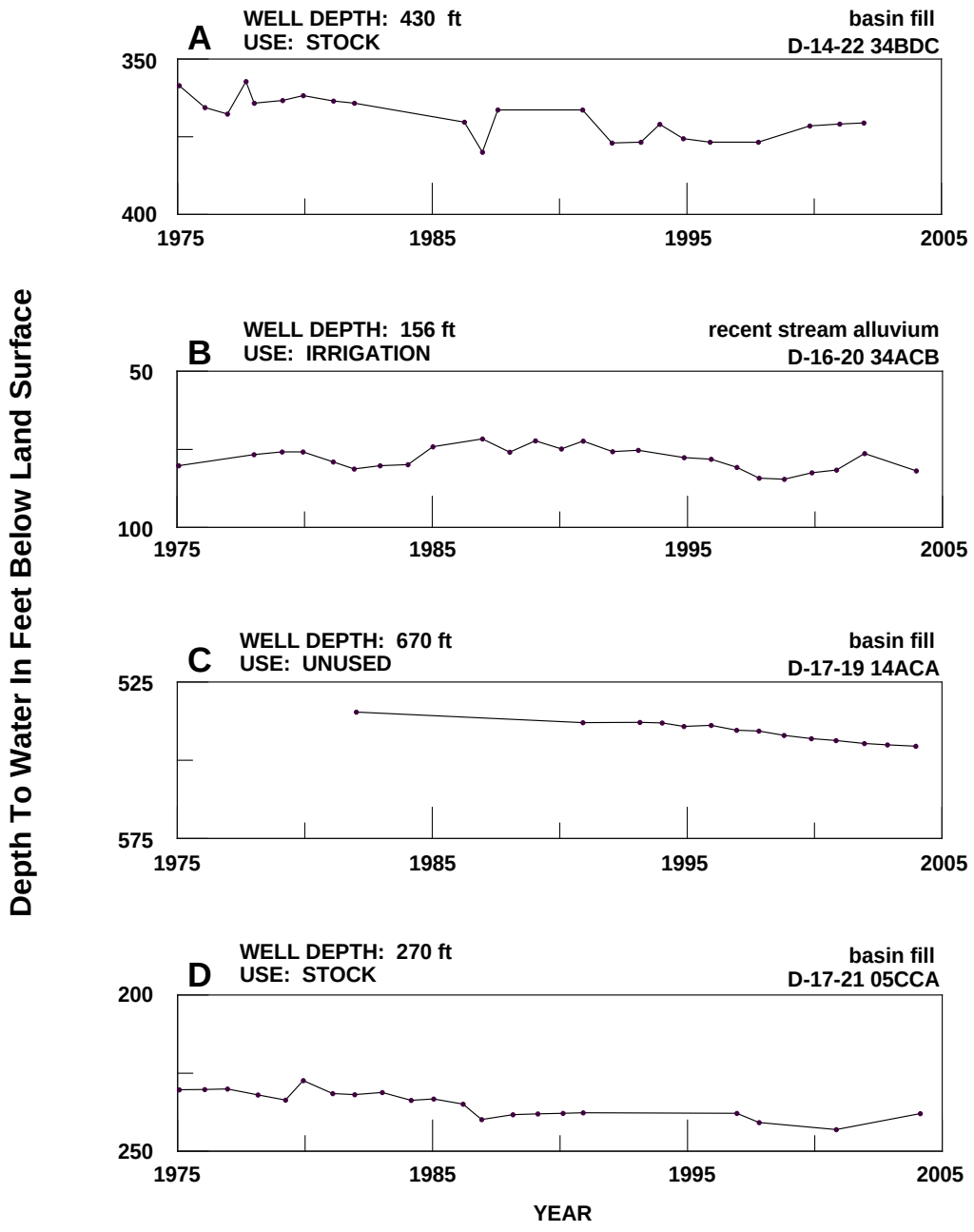


Figure 3.13-8 (Cont)
Upper San Pedro Basin
Hydrographs Showing Depth to Water in Selected Wells

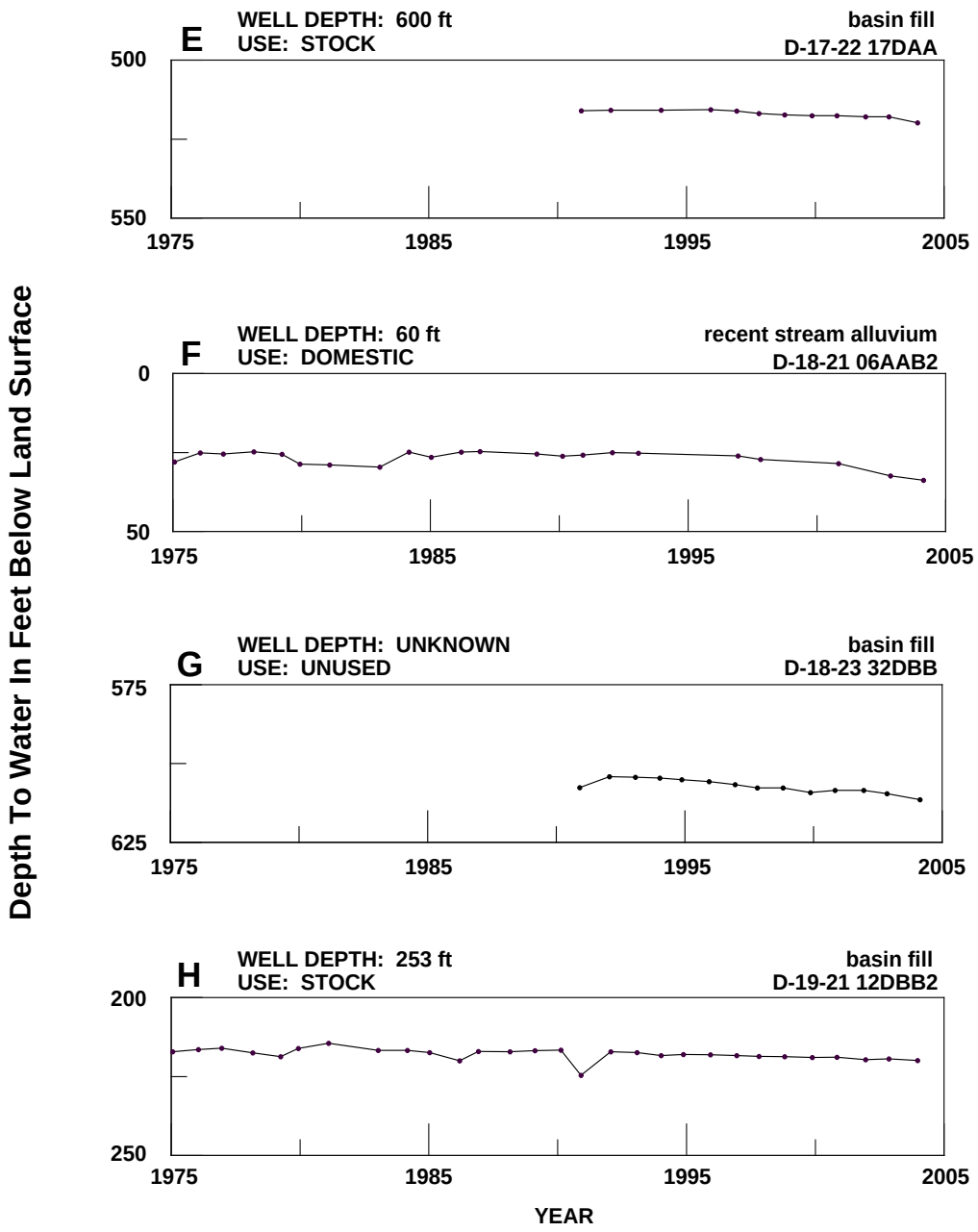


Figure 3.13-8 (Cont.)
Upper San Pedro Basin
Hydrographs Showing Depth to Water in Selected Wells

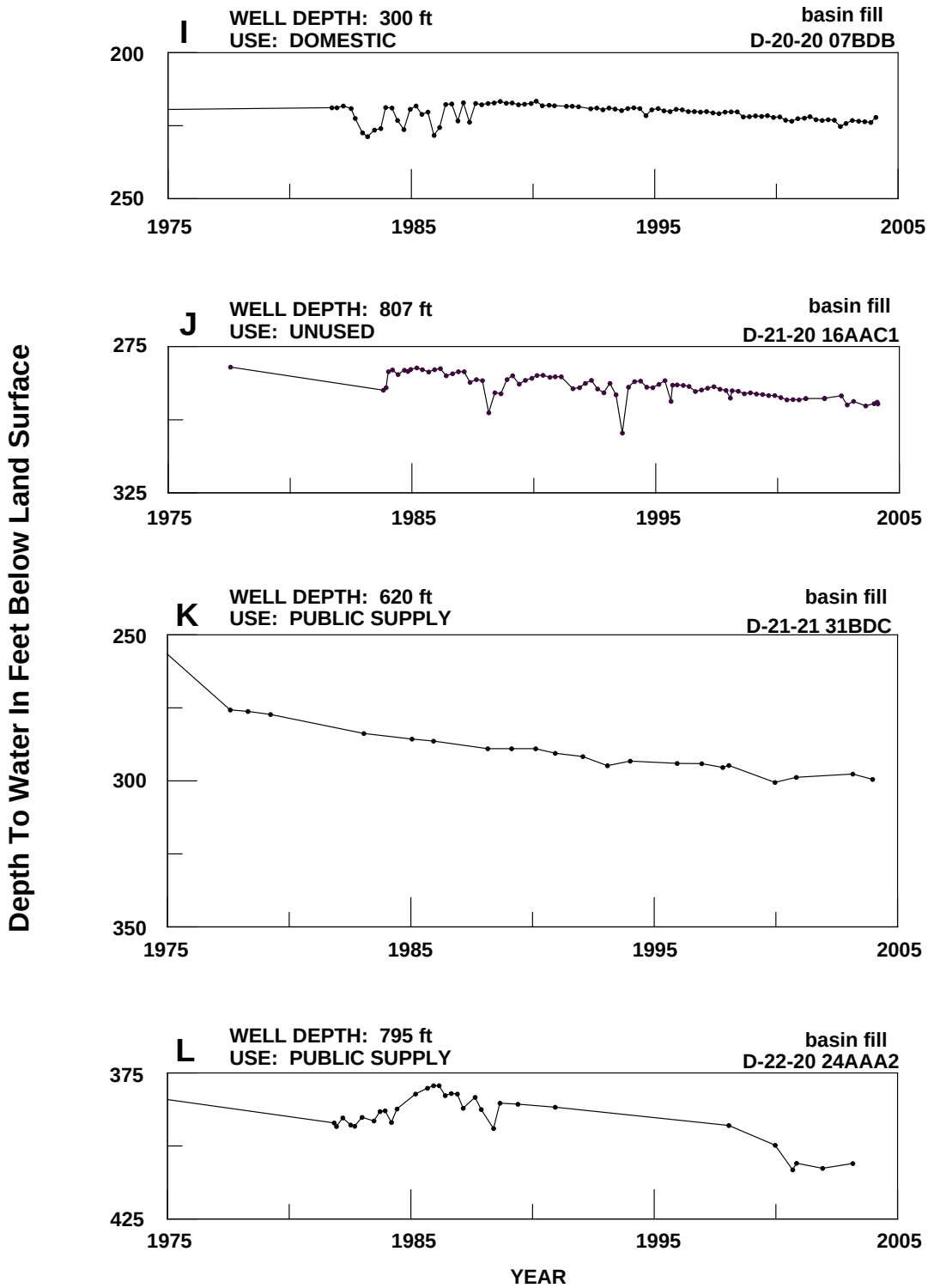
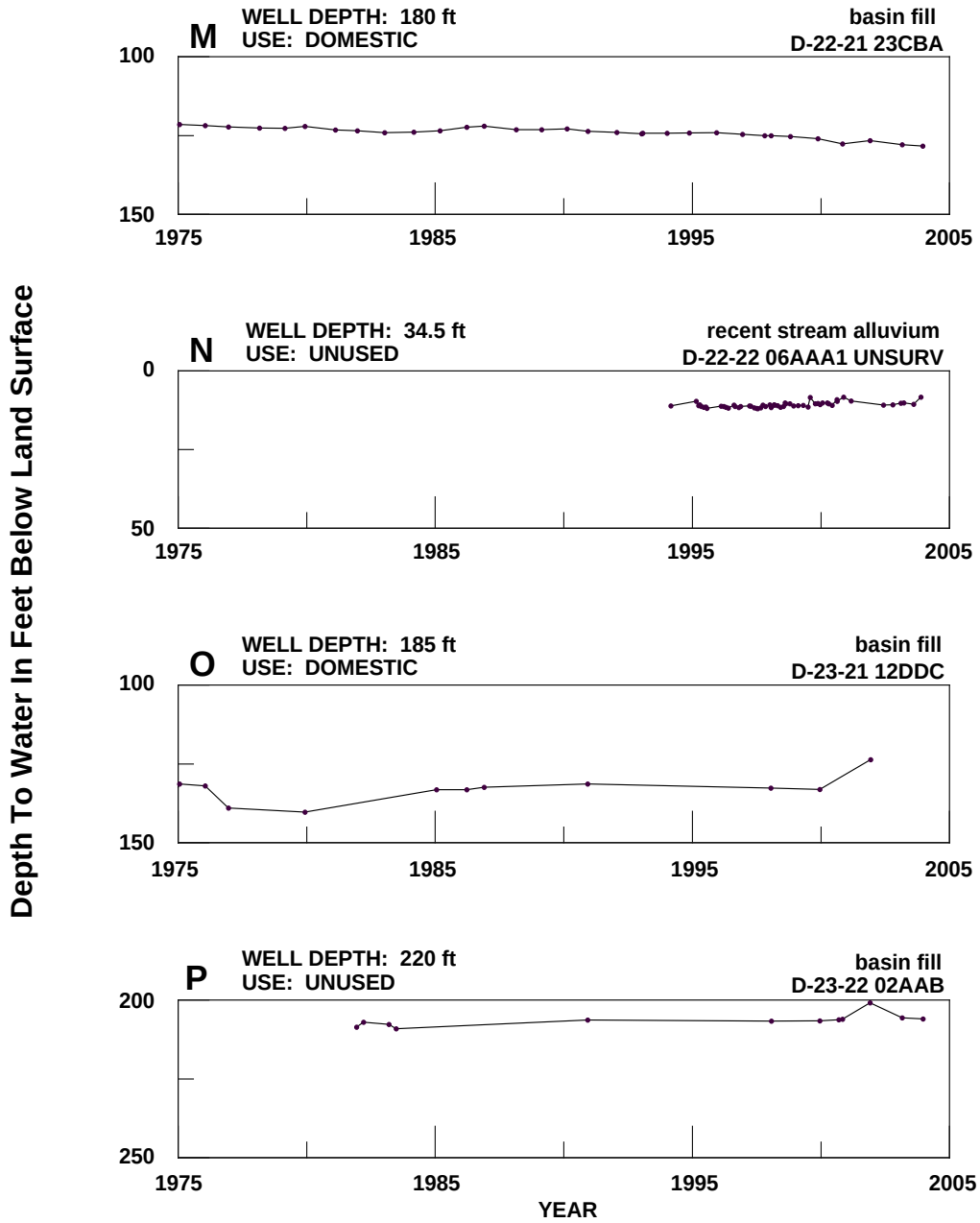
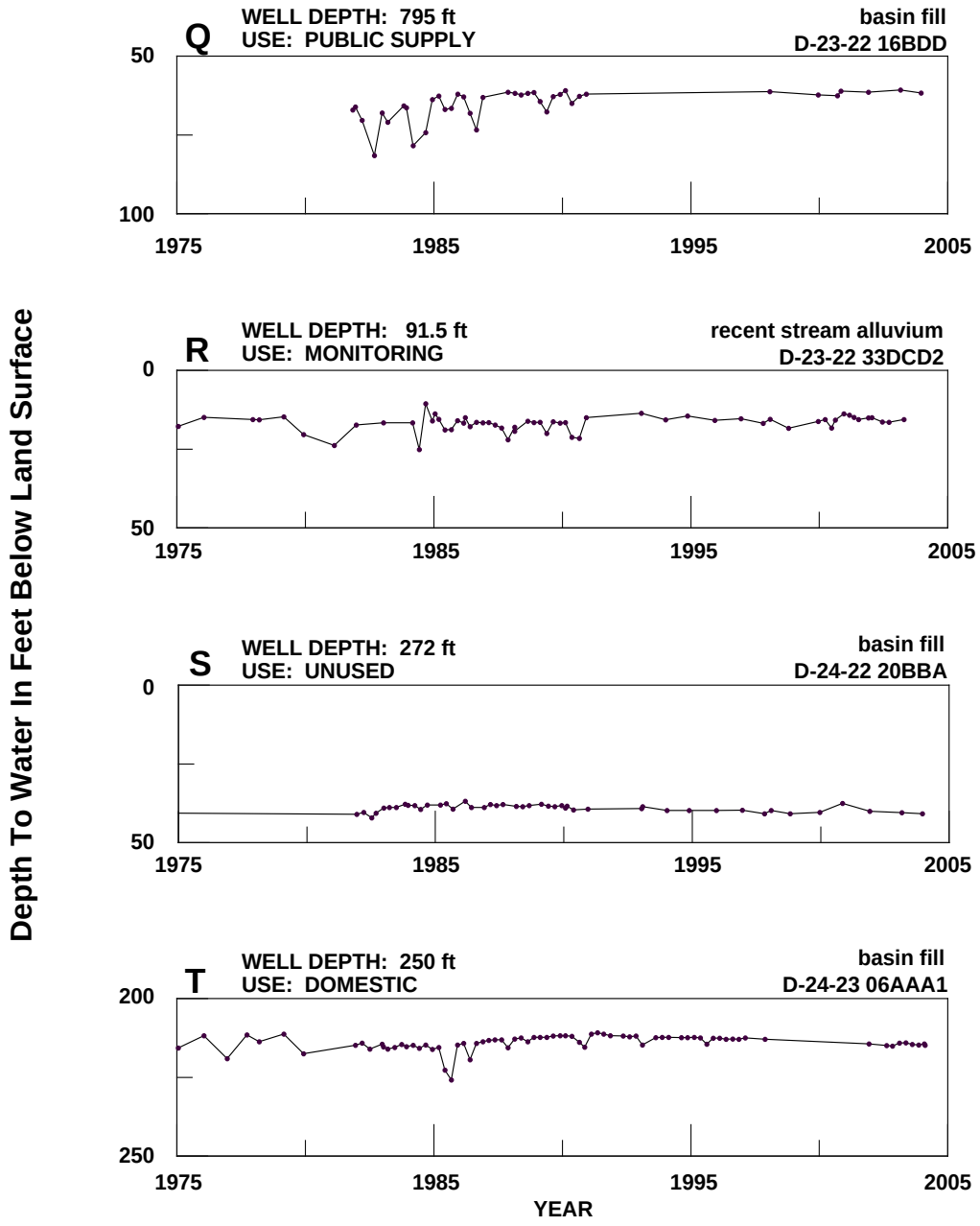


Figure 3.13-8 (Cont)
Upper San Pedro Basin
Hydrographs Showing Depth to Water in Selected Wells



In Hydrograph N UNSURV indicates there is no land survey for the area the well is in, and the coordinates are projected based on latitude and longitude.

Figure 3.13-8 (Cont)
Upper San Pedro Basin
Hydrographs Showing Depth to Water in Selected Wells



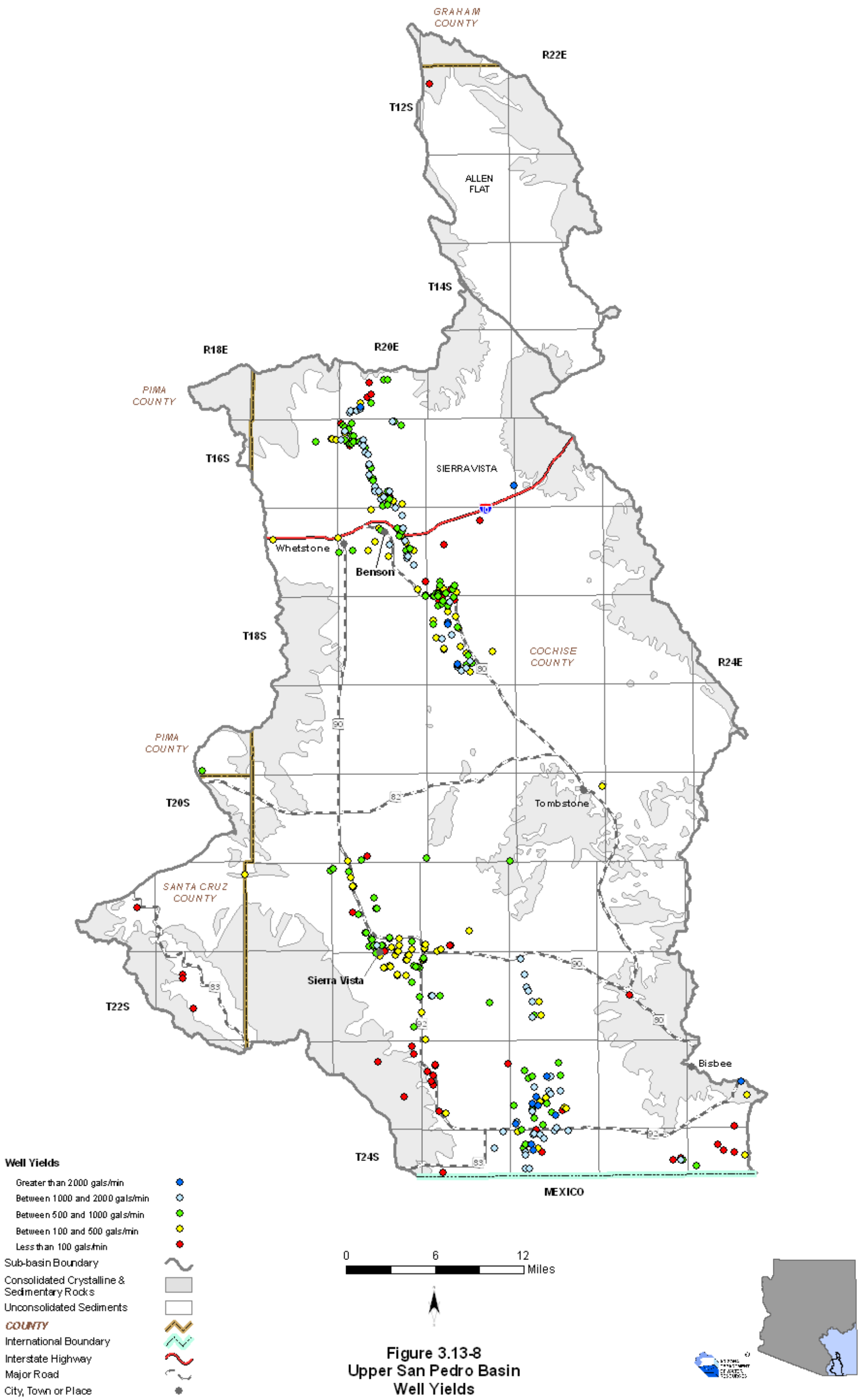


Figure 3.13-8
Upper San Pedro Basin
Well Yields

3.13.7 Water Quality of the Upper San Pedro Basin

Sites with parameter concentrations that have equaled or exceeded drinking water standard(s) (DWS), including location and parameter(s) are shown in Table 3.13-6A. Impaired lakes and streams with site type, name, length of impaired stream reach, area of impaired lake, designated use standard and parameter(s) exceeded is shown in Table 3.13-6B. Figure 3.13-10 shows the location of exceedences and impairment keyed to Table 3.13-6. All community water systems are regulated under the Safe Drinking Water Act and treat water supplies to meet drinking water standards. Not all parameters were measured at all sites; selective sampling for particular constituents is common. A description of water quality data sources and methods is found in Volume 1, Appendix A.

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

- Refer to Table 3.13-6A.
- Sixty-seven sites have parameter concentrations that have equaled or exceeded DWS.
- Frequently equaled or exceeded parameters include arsenic and fluoride. Almost all of these sites are in the vicinity of Patagonia.
- Other parameters commonly equaled or exceeded in the sites measured in this basin were cadmium, lead, nitrates, beryllium, mercury and total dissolved solids.

Lakes and Streams with impaired waters

- Refer to Table 3.13-6B.
- Water quality standards were exceeded in three reaches of the San Pedro River.
- The parameter exceeded was different for each reach; E. coli, nitrates and copper.
- Two of the three impaired stream reaches, San Pedro River from the Mexican border to Charleston and from Babocomari to Dragoon Wash, are part of the ADEQ water quality improvement effort called the Total Maximum Daily Load (TMDL) program. Sampling to create a TMDL report is ongoing.

Effluent Dependent Reaches

- See Figure 3.13-10
- There is one effluent dependent reach, Walnut Gulch, in the vicinity of Tombstone.

Table 3.13-6 Water Quality Exceedences in the Upper San Pedro Basin[1]

A. Wells, Springs and Mines

Map Key	Site Type	Site Location			Parameter(s) Concentration has Equaled or Exceeded Drinking Water Standard (DWS)[2]
		Township	Range	Section	
1	Spring	13 South	21 East	6	As
2	Well	13 South	21 East	6	As
3	Well	13 South	21 East	6	As
4	Well	13 South	22 East	33	As, Cd, Pb
5	Well	15 South	20 East	31	As, F
6	Well	16 South	20 East	34	As
7	Well	16 South	20 East	34	As
8	Well	16 South	22 East	15	F
9	Well	17 South	20 East	2	TDS
10	Well	17 South	20 East	4	As
11	Well	17 South	20 East	9	As
12	Well	17 South	20 East	9	As
13	Well	17 South	20 East	11	As, F
14	Well	17 South	20 East	11	F
15	Well	17 South	20 East	13	F
16	Well	17 South	20 East	15	As
17	Well	17 South	20 East	16	As
18	Well	17 South	20 East	16	As
19	Well	17 South	20 East	17	As
20	Well	17 South	20 East	22	As, F
21	Well	17 South	20 East	22	As
22	Well	17 South	20 East	22	As, F
23	Well	17 South	20 East	23	F
24	Well	17 South	20 East	36	NO3
25	Well	17 South	20 East	36	F
26	Well	17 South	20 East	36	As
27	Well	17 South	21 East	20	F
28	Well	17 South	21 East	29	F
29	Well	17 South	21 East	31	As, F
30	Well	17 South	21 East	31	NO3
31	Well	18 South	19 East	2	F
32	Well	18 South	20 East	1	As
33	Well	18 South	21 East	6	As, F
34	Well	18 South	21 East	7	As, Be, F
35	Well	18 South	21 East	7	As, Be, F
36	Well	18 South	21 East	7	As, Be, F
37	Well	18 South	21 East	7	F
38	Well	18 South	21 East	8	F
39	Well	18 South	21 East	9	As
40	Well	18 South	21 East	10	As, F
41	Well	18 South	21 East	10	As, F
42	Well	18 South	21 East	16	F
43	Well	18 South	21 East	17	F
44	Well	18 South	21 East	21	F
45	Well	18 South	21 East	28	As
46	Well	18 South	23 East	32	F
47	Well	19 South	21 East	36	As
48	Well	19 South	22 East	27	As

Table 3.13-6 Water Quality Exceedences in the Upper San Pedro Basin (Cont)[1]

A. Wells, Springs and Mines

Map Key	Site Type	Site Location			Parameter(s) Concentration has Equaled or Exceeded Drinking Water Standard (DWS)[2]
		Township	Range	Section	
49	Well	19 South	22 East	27	As
50	Well	19 South	22 East	27	As
51	Well	20 South	19 East	24	Pb
52	Well	20 South	20 East	6	Hg
53	Well	20 South	20 East	7	Hg
54	Well	20 South	22 East	1	As
55	Well	20 South	22 East	1	As
56	Well	20 South	22 East	11	As, NO3
57	Well	21 South	20 East	16	Pb
58	Well	21 South	20 East	22	Pb
59	Well	21 South	21 East	33	NO3
60	Spring	22 South	19 East	14	Pb
61	Well	22 South	20 East	12	Cd
62	Well	23 South	21 East	7	Cd
63	Well	23 South	21 East	7	Cd
64	Well	23 South	21 East	18	Cd
65	Well	23 South	21 East	18	Cd
66	Well	23 South	22 East	33	Pb
67	Well	24 South	24 East	4	TDS

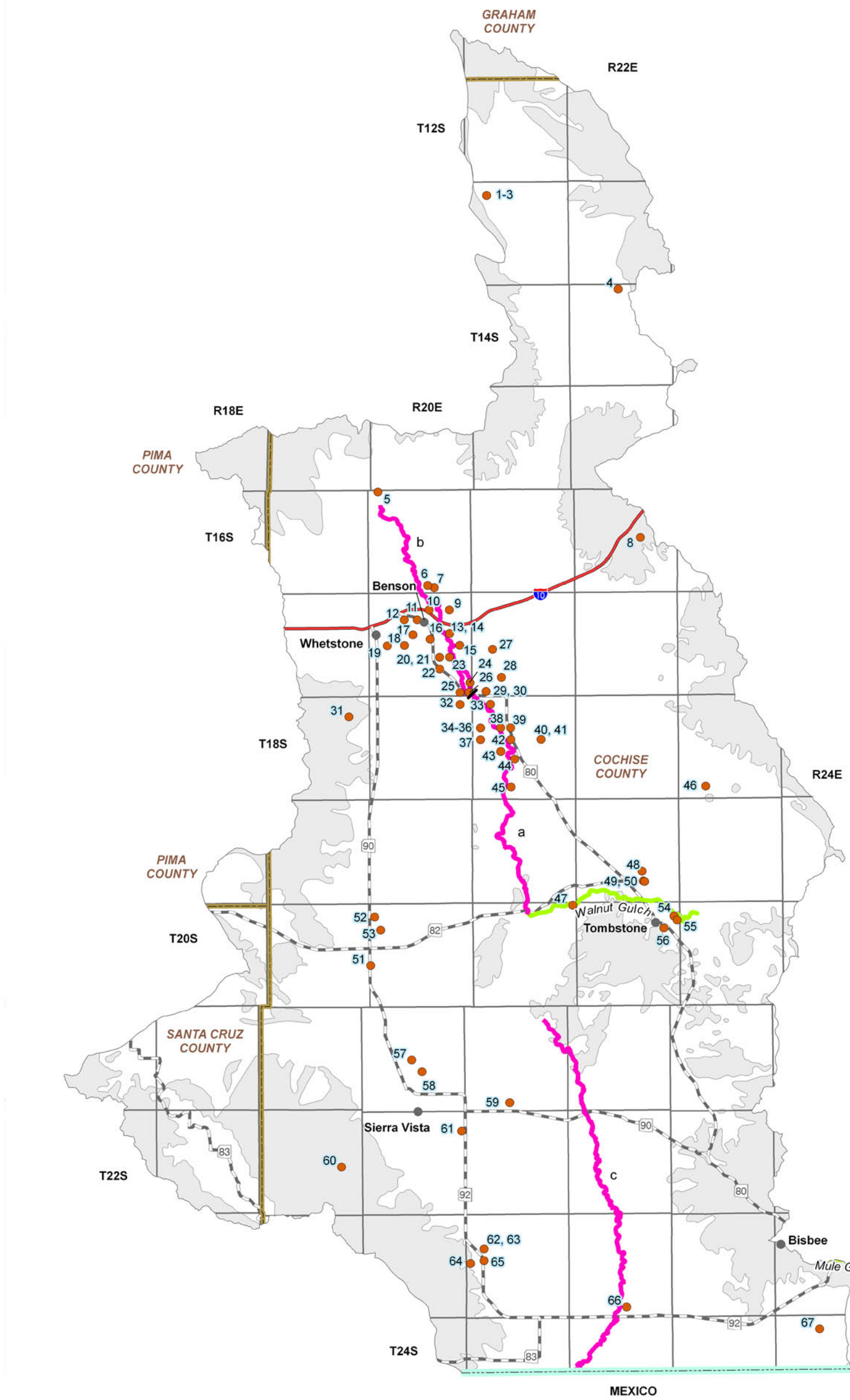
Source: Compilation of databases from ADWR & others

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[3]	Parameter(s) Exceeding Use Standard[2]
a	Stream	San Pedro River (Babocomari Creek to Dragoon Wash)	9	NA	FBC	E. coli
b	Stream	San Pedro River (Dragoon Wash to Tres Alamos Wash)	16	NA	A&W	NO3
c	Stream	San Pedro River (Mexico border to Charleston)	28	NA	A&W	Cu

Source: ADEQ 2005e

Notes:
Because of map scale, feature locations may appear different than the location indicated on the table
NR = Information not available to ADWR
NA = Not applicable
[1] Water quality samples collected between 1977 and 2004.
[2] As = Arsenic
Be = Beryllium
Cd = Cadmium
Cu = Copper
F= Fluoride
Pb = Lead
Hg = Mercury
NO3 = Nitrate
TDS = Total Dissolved Solids
[3] A&W = Aquatic and Wildlife
FBC = Full Body Contact



0 6 12 Miles

Well, Spring or Mine Site that has Equaled or Exceeded DWS
Effluent Dependent Reach
Impaired Stream or Lake
Consolidated Crystalline & Sedimentary Rocks
Unconsolidated Sediments

COUNTY
International Boundary
Interstate Highway
Major Road
City, Town or Place

Figure 3.13-10
Upper San Pedro Basin
Water Quality Conditions

3.13.8 Cultural Water Demands in the Upper San Pedro 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 3.13-7. Effluent generation including facility ownership, location, population served and not served, volume treated, disposal method and treatment level is shown on Table 3.13-8. Figure 3.13-10 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 demands is found in Section 3.0.7.

Cultural Water Demands

- Refer to Table 3.13-7 and Figure 3.13-11.
- Population has increased by about 1,200 residents a year from 1980 to 2000.
- This basin includes the largest population as well as the fastest growing population in the planning area.
- Total groundwater use increased from 1971 to 1985 and has remained relatively constant since 1986, with an average of 29,100 acre-feet pumped per year in the period from 2001-2005.
- Total current surface water diversions are estimated to be comparable to historic diversion volumes with approximately 4,500 acre-feet per year diverted in the period from 1991 – 2005. However, actual diversions have not been consistently reported.
- Over 90% of the surface water diversions are for agriculture, however, over 75% of the agricultural water supply is groundwater.
- The majority of agricultural lands are in the vicinity of Benson.
- Most high intensity municipal and industrial demand is found near the population centers of Sierra Vista, Benson, Tombstone and Bisbee/San Jose.
- Municipal demand constitutes over half of the total groundwater use in the period from 1996-2005.
- There is one large inactive mine, the Copper Queen, in the vicinity of Bisbee, and at least two small sand and gravel pits in the vicinity of Sierra Vista. All industrial water supply is groundwater.
- As of 2005 there were 5,021 registered wells with a pumping capacity of less than or equal to 35 gallons per minute and 1,106 wells with a pumping capacity of more than 35 gallons per minute.

Effluent Generation

- Refer to Table 3.13-8.
- There are nine wastewater treatment facilities in the basin.
- Eight of these facilities serve communities and one is used for industrial purposes.
- The three Bisbee wastewater facilities were recently consolidated into one new facility at San Jose. This new treatment facility has the capacity to treat 0.81 million gallons of wastewater per day.
- Over 42,000 people are served by these facilities.
- More than 5,000 acre-feet of effluent per year are generated in this basin.
- Two facilities discharged wastewater for irrigation in 2002 or 2003 but recent treatment

facility consolidations in Bisbee will affect disposal methods.

- Two facilities discharge wastewater for golf course irrigation.
- Discharge from two facilities recharges the aquifer. Both are designed for the purpose of groundwater recharge. The Sierra Vista facility is permitted by the Department as an Underground Storage Facility and the Fort Huachuca Facility is not.

Table 3.13-7 Cultural Water Demands in the Upper San Pedro Basin[1]

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	Industrial	Agricultural	
1971		1,785[2]	653[2]	40,500			4,500			ADWR (1994a) ADWR (2005a)
1972										
1973										
1974										
1975										
1976				53,500			4,500			
1977										
1978										
1979										
1980	50,999									
1981	52,215	474	130	55,500			4,500			
1982	53,431									
1983	54,647									
1984	55,863									
1985	57,079									
1986	58,295	501	77	35,500			4,500			
1987	59,511									
1988	60,727									
1989	61,943									
1990	63,159									
1991	64,645	592	95	15,600	1,600	16,500	<300	NR	4,300	USGS (2007) ADWR (2005a) ADWR (2008b) ADWR (2008c)
1992	66,130									
1993	67,615									
1994	69,101									
1995	70,586									
1996	72,071	765	76	17,400	1,600	15,000	<300	NR	4,300	
1997	73,557									
1998	75,042									
1999	76,528									
2000	78,013									
2001	79,945	904	75	17,300	1,900	9,900	<300	NR	4,300	
2002	81,876									
2003	83,808									
2004	85,739									
2005	87,671									
2010	97,329									
2020	113,044									
2030	125,700									
WELL TOTALS:		**5,021**	**1,106**							

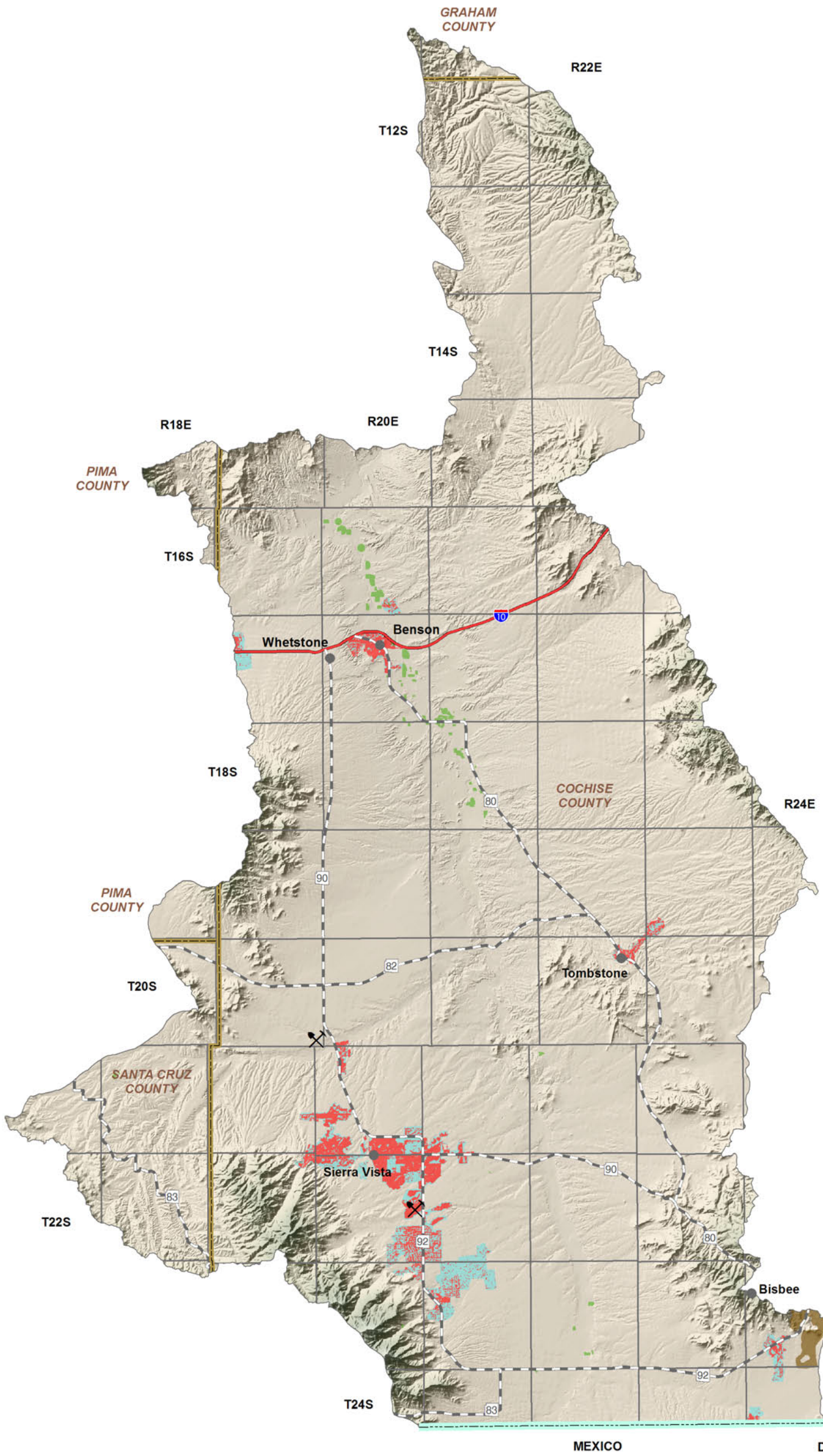
Notes:
NR = Not reported.
[1] Does not include evaporation losses from stockponds and reservoirs, or effluent.
[2] Includes all wells through June 1980.

Table 3.13-8 Effluent Generation in the Upper San Pedro 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	Golf Course/Turf Irrigation	Wildlife Area	Industrial Use	Discharge to Another Facility	Infiltration Basins			
Apache Nitrogen Products	Private	Industrial Facility	NA	NA					X				NA		
Benson WWTF	Town of Benson	Benson	3,505	560		X		San Pedro					Adv.Trt.I	1,206	2003
Fort Huachuca WWTP	US Army	Ft.Huachuca	8,414[1]	1,053				Mountain View				X	Adv.Tr.II	NA	2003
Huachuca City	City of Huachuca City	Huachuca City	600	150		X							Secondary	80	2000
Naco WWTF	Naco SD	Naco	846	83		X							Secondary	NA	2000
San Jose WWTF[2]	City of Bisbee	Bisbee	4,900	438	Greenbush Draw	X	X	Turquoise Valley[3]					Secondary	1,190	2002
Sierra Vista WWTP	City of Sierra Vista	Sierra Vista	36,000	2,800					X			X	Secondary	4,800	2002
Southland Sanitation	Private	Sierra Vista	NA	34		X	X						NA		2003
Tombstone WWTP	City of Tombstone	Tombstone	1,465	112	Walnut Gulch								Secondary	NA	2002
Total			**55,730**	**5,230**											

Source: 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
WWTP: Wastewater Treatment Plant
SD: Sanitation District
Adv Tr I: Advanced treatment level I
Adv. Tr. II: Advanced treatment level II
[1]Population varies due to temporary residents
[2]Consolidation of the city's 3 WWTF's in 2006
[3]Sometime in 2009, approximately 100 AF will be delivered for irrigation



Demand Centers

- Agriculture
- M&I - High Intensity
- M&I - Low Intensity
- Large Mine
- Small Mine\Quarry
- COUNTY
- International Boundary
- Interstate Highway
- Major Road
- City, Town or Place

0 6 12 Miles

Primary Data Source: USGS National Gap Analysis Program, 2004

Figure 3.13-11
Upper San Pedro Basin
Cultural Water Demand

3.13.9 Water Adequacy Determinations in the Upper San Pedro 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 3.13-9A and B for water reports and analysis of adequate water supply. Designated water provider information is shown in Table 3.13-9C with date of application, date the designation was issued and projected or annual estimated demand. Figure 3.13-12 shows the locations of subdivisions and designated providers 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 lots receiving an adequacy determination are in Cochise County. Two hundred and two water adequacy determinations have been made through December 2008. Of the 24,923 lots in 201 subdivisions for which lot information is available 18,218 lots, or 73%, were determined to be adequate.
- In 1984, the Department began issuing determinations of inadequate water supply in the Sierra Vista Sub-basin in the Upper San Pedro River Watershed due to lack of legal availability. At that time, the Gila River adjudication drew into question whether water withdrawn from certain wells would be considered groundwater or surface water. In 1993, the Department reexamined its position and determined that legal availability is based on the current legal right to use the water, and not on an adjudication determination that has yet to be made. Therefore, since 1993, the Department has not issued determinations that water supplies are inadequate in the Sierra Vista Sub-basin solely for lack of legal availability related to the possible future decisions in the Gila River adjudication
- Other reasons for an inadequacy determination were because the applicant chose not to submit necessary information and/or available hydrologic data was insufficient to make a determination and water quality.
- Eight analyses of adequate water supply, for a total of 7,220 lots, have been issued in this basin.
- There are two designated water providers, Bachman Springs Utility Company and City of Benson. Total projected or annual estimated demand for the two providers is 14,686 acre-feet.

Table 3.13-9 Adequacy Determinations in the Upper San Pedro Basin[1]

A. Water Adequacy Reports

Map Key	Subdivision Name	County	Location			No. of Lots	ADWR File No.[2]	ADWR Adequacy Determination	Reason(s) for Inadequacy Determination[3]	Date of Determination	Water Provider at the Time of Application
			Township	Range	Section						
1	Bella Sonoma	Cochise	21 South	20 East	35	45	53-401926	Adequate		8/3/2006	Bella Vista Water Company
3	Buena Loma #112	Cochise	22 South	21 East	7	7	53-500364	Inadequate	B	2/7/1985	Pueblo Del Sol Water Company
4	Buena Vista Ranchettes	Cochise	17 South	19 East	5	20	53-500368	Inadequate	B	7/16/1987	Dry Lot Subdivision
5	Campstone	Cochise	22 South	21 East	5	84	53-402082	Adequate		9/11/2006	Bella Vista Water Company
6	Campstone	Cochise	21 South	20 East	5, 6, 8	900	53-500388	Inadequate	B	8/17/1987	Town of Huachuca City
7	Campus Drive Business Park	Cochise	21 South	21 East	31	18	53-400029	Adequate		3/10/1999	Bella Vista Water Company
8	Canyon De Flores , Phase II	Cochise	22 South	20 East	23, 24	355	53-400908	Adequate		6/2/2003	Pueblo del Sol Water Company
9	Canyon De Flores Phase 1 - C	Cochise	22 South	20 East	24	69	53-400597	Adequate		9/27/2001	Pueblo del Sol Water Company
10	Canyon De Flores Phase ID	Cochise	22 South	20 East	24	64	53-400659	Adequate		1/16/2002	Pueblo del Sol Water Company
11	Canyon de Flores Phase E	Cochise	22 South	20 East	24	52	53-400686	Adequate		5/8/2002	Pueblo del Sol Water Company
12	Canyon de Flores Phase 1F	Cochise	22 South	20 East	24	61	53-400842	Adequate		11/2/2002	Pueblo Del Sol Water Company
13	Carmel	Cochise	21 South	21 East	31	54	53-500398	Inadequate	B	3/3/1987	Bella Vista Water Company
14	Casa Antigua Condominiums	Cochise	22 South	20 East	12	152	53-402097	Adequate		9/21/2006	Arizona Water Company - Sierra Vista
15	Casitas Place #2	Cochise	22 South	21 East	6	40	53-500421	Inadequate	B	6/24/1985	Bella Vista Water Company
16	Casitas Place Condominiums	Cochise	22 South	21 East	6	40	53-500422	Adequate		5/26/1983	Southwest Water Company
17	Chaparral Village North	Cochise	22 South	21 East	5	549	53-400847	Adequate		12/5/2002	Bella Vista Water Company
18	Charleston Village	Cochise	21 South	21 East	29	185	53-500448	Adequate		11/3/1993	Bella Vista Water Company
19	Cimmaron Place	Cochise	21 South	20 East	35	47	53-401496	Adequate		12/6/2004	Bella Vista Water Company
20	Circle G at Ramsey Ranch	Cochise	23 South	21 East	6	437	53-500459	Adequate		2/24/1995	East Slope Water Company
21	Circle S Ranches	Cochise	23 South	21 East	17	36	53-500460	Inadequate	B	12/12/1989	Horseshoe Ranch Water Company
22	Cochise Commercial Center	Cochise	22 South	21 East	7	15	53-500476	Inadequate	B	3/21/1986	Pueblo Del Sol Water Company
23	Cochise Terrace	Cochise	17 South	20 East	18	308	53-300410	Adequate		1/20/1998	City of Benson
24	Cochise Vista	Cochise	20 South	20 East	31	45	53-500478	Adequate		6/25/1973	Town of Huachuca City
25	Cochise Vista Condominiums	Cochise	22 South	21 East	7	17	53-500479	Adequate		8/11/1983	Pueblo Del Sol Water Company
26	Compass Point	Cochise	23 South	22 East	19	30	53-400685	Adequate		4/2/2002	Dry Lot Subdivision
27	Copper Pointe Estates	Cochise	22 South	20 East	12	52	53-400729	Adequate		10/22/2002	Arizona Water Company
28	Copper Sky Estates	Cochise	22 South	20 East	11, 12	180	53-400744	Adequate		7/15/2002	Arizona Water Company - Sierra Vista
29	Corona del Sol	Cochise	22 South	21 East	7	9	53-500510	Inadequate	B	12/17/1984	Pueblo Del Sol Water Company
30	Coronado Estates	Cochise	20 South	20 East	18, 19	7	53-500511	Inadequate	B	3/20/1989	Cochise Water Company

Table 3.13-9 Adequacy Determinations in the Upper San Pedro Basin[1] (Cont)

A. Water Adequacy Reports

Map Key	Subdivision Name	County	Location			No. of Lots	ADWR File No.[2]	ADWR Adequacy Determination	Reason(s) for Inadequacy Determination[3]	Date of Determination	Water Provider at the Time of Application
			Township	Range	Section						
31	Cottonwoods of San Pedro, The	Cochise	23 South	22 East	16	90	53-500520	Inadequate	A1,B	2/1/1994	Dry Lot Subdivision
32	Coventry Estates	Cochise	21 South	20 East	34	20	53-500200	Adequate		11/4/1983	Bella Vista Water Company
33	Covey Run	Cochise	23 South	21 East	21	26	53-401507	Adequate		11/14/2005	Dry Lot Subdivision
34	Crestview	Cochise	23 South	24 East	29	54	53-500540	Inadequate	A1	6/8/1993	AWC-Bisbee system
35	Crossroads Commerce Center 2001	Cochise	21 South	21 East	31	19	53-400501	Adequate		5/8/2001	Bella Vista Water Company
36	Deer Ridge Estates	Cochise	23 South	21 East	27	20	53-300294	Adequate		5/7/1997	Dry Lot Subdivision
37	Desert Mist Commerce Center	Cochise	22 South	21 East	5	52	53-500572	Inadequate	B	3/9/1989	Bella Vista Water Company
38	Desert Shadows #2A	Cochise	22 South	21 East	5	51	53-500580	Inadequate	B	1/7/1993	Bella Vista Water Company
39	Desert Shadows #2B	Cochise	22 South	21 East	5	33	53-500581	Inadequate	B	3/15/1994	Bella Vista Water Company
40	Eagle Ridge #1	Cochise	22 South	20 East	24	59	53-500595	Inadequate	B	10/14/1986	Pueblo Del Sol Water Company
41	Eagle Ridge #2	Cochise	22 South	20 East	24	155	53-500596	Inadequate	B	7/9/1987	Pueblo Del Sol Water Company
42	El Rancho Estates	Cochise	23 South	24 East	29	39	53-501727	Inadequate	A1	7/10/1989	Arizona Water Company
43	Executive Acres	Cochise	23 South	20 East	1	26	53-500627	Inadequate	A1	5/2/1985	Dry Lot Subdivision
44	Fairway Villas	Cochise	22 South	20 East	13	35	53-500637	Inadequate	B	4/13/1993	Pueblo Del Sol Water Company
45	Foothills Ranch	Cochise	23 South	21 East	7	49	53-500665	Inadequate	B	10/28/1992	Nicksville Water Company
46	Foothills Ranch, #4,5,6	Cochise	23 South	21 East	18	53	53-500666	Adequate		1/31/1995	Bella Vista Water Company
47	Gatewood	Cochise	21 South	20 East	35	75	53-401533	Adequate		11/5/2004	Bella Vista Water Company
48	Golden Acres Commercial #1	Cochise	22 South	21 East	19	9	53-500709	Adequate		7/22/1976	Southland Utilities Company
49	Golden Acres Mobile Home Park #2	Cochise	22 South	21 East	17	27	53-500710	Adequate		7/21/1981	Southland Utilities Company
50	Golden Acres Mobile Home Park #3	Cochise	22 South	21 East	19	278	53-500711	Adequate		6/17/1974	Southland Utilities Company
51	Golden Meadows #3	Cochise	22 South	21 East	30	8	53-500719	Adequate		8/9/1979	Southland Utilities Company
52	Golden Vistas	Cochise	22 South	21 East	30	59	53-300049	Adequate		3/29/1996	Southland Utilities Company
53	Golden Vistas, Phases 2 & 3	Cochise	22 South	21 East	29	120	53-400319	Adequate		4/14/2000	Southland Utilities Company
54	Grandeur Carmel	Cochise	21 South	21 East	31	54	53-500724	Adequate		10/26/1993	Bella Vista Water Company
55	Greenbriar Estates, Lots 1-32	Cochise	22 South	20 East	13	32	53-300274	Adequate		4/11/1997	Pueblo Del Sol Water Company
56	Greenways, The	Cochise	22 South	20 East	13	21	53-500763	Adequate		11/23/1981	Pueblo Del Sol Water Company
57	Heritage Park	Cochise	17 South	20 East	4	89	53-500783	Inadequate	A1,B	7/31/1984	Konen Water Company
58	Highland Park Estates	Cochise	22 South	20 East	20	110	53-400710	Adequate		5/14/2002	Arizona Water Company
59	Hobby Horse Ranch	Cochise	22 South	21 East	23, 26	35	53-300035	Adequate		7/20/1995	Dry Lot Subdivision
60	Hodgins Acres	Cochise	20 South	20 East	7	129	53-500795	Inadequate	B	7/17/1990	Whetstone Water Improvement District

Table 3.13-9 Adequacy Determinations in the Upper San Pedro Basin[1] (Cont)

A. Water Adequacy Reports

Map Key	Subdivision Name	County	Location			No. of Lots	ADWR File No.[2]	ADWR Adequacy Determination	Reason(s) for Inadequacy Determination[3]	Date of Determination	Water Provider at the Time of Application
			Township	Range	Section						
61	Holiday at Pueblo Del Sol	Cochise	22 South	21 East	19	191	53-401627	Adequate		6/7/2005	Pueblo Del Sol Water Company
62	Horseshoe Ranch Mobile Home Estates	Cochise	23 South	21 East	17	68	53-500805	Inadequate	B	10/23/1989	Horseshoe Ranch Water Company
63	Huachuca Commercial Center	Cochise	20 South	21 East	31	NA	NA	Inadequate	D	8/17/1987	Town of Huachuca City
64	Huachuca Commercial Center B	Cochise	20 South	21 East	5, 6	47	53-500806	Inadequate	D	8/17/1987	Town of Huachuca City
65	Huachuca Mountain Estates	Cochise	22 South	20 East	10	370	53-500807	Adequate		8/22/1975	Arizona Water Company
66	Huachuca Mountain Village,A&B	Cochise	22 South	20 East	25	208	53-500808	Adequate		5/25/1977	Pueblo Del Sol Water Company
67	Huachuca Terrace	Cochise	23 South	24 East	29	9	53-500809	Inadequate	A1	6/13/1987	AWC-Bisbee system
68	Ironhorse Village	Cochise	17 South	20 East	16	48	53-300394	Adequate		12/15/1997	City of Benson
69	Kinjockity Ranch	Cochise	23 South	21 East	32, 33, 34	281	53-401824	Adequate		10/7/2005	Bella Vista Water Company
70	La Marquesa	Cochise	23 South	21 East	21	103	53-700214	Adequate		8/10/2007	Bella Vista Water Company
71	La Pradera Estates	Cochise	23 South	21 East	21	26	53-402012	Adequate		7/6/2006	Dry Lot Subdivision
72	La Terraza Phase B	Cochise	22 South	20 East	24	33	53-400712	Adequate		8/7/2002	Pueblo Del Sol Water Company
73	La Terraza, Phase C	Cochise	22 South	20 East	23	28	53-401003	Adequate		9/17/2003	Pueblo Del Sol Water Company
74	Legends at Valiente I	Cochise	21 South	20 East	35	104	53-401337	Adequate		7/7/2004	Bella Vista Water Company
75	Legends at Valiente II	Cochise	21 South	20 East	35	100	53-401583	Adequate		2/4/2005	Bella Vista Water Company
76	Linda Vista	Cochise	23 South	21 East	8	76	53-500908	Adequate		2/27/1996	Nicksville Water Company
77	Loma Catarina	Cochise	17 South	20 East	15	20	53-500910	Adequate		11/4/1974	City of Benson
78	London Square #2	Cochise	21 South	20 East	34	42	53-500913	Adequate		8/19/1994	Bella Vista Water Company
80	Los Ranchos Subdivision	Cochise	23 South	21 East	25, 26	70	53-400238	Adequate		2/15/2000	Dry Lot Subdivision
81	McCormick Place	Cochise	22 South	21 East	6	4	53-500941	Adequate		9/13/1983	Southwest Water Company
82	Meadows, The	Cochise	22 South	20 East	3	406	53-500946	Adequate		6/12/1974	Southwest Water Company
83	Mesa Mountain Northeast	Cochise	21 South	21 East	33	20	53-500967	Inadequate	B	11/4/1991	Arizona Water Company
84	Mesa Verde Estates	Cochise	22 South	21 East	5	66	53-401257	Adequate		1/25/2005	Bella Vista Water Company
85	Mesa Verde/Mountain View	Cochise	22 South	21 East	5	127	53-500970	Adequate		3/15/1994	Bella Vista Water Company
86	Miracle Valley	Cochise	23 South	22 East	31	23	53-300271	Inadequate	C	6/3/1997	Miracle Valley Water Company
87	Mission Coronado Estates	Cochise	22 South	21 East	19	97	53-500988	Adequate		10/23/1979	Southland Utilities Company
88	Mission Hills Estates	Cochise	22 South	21 East	7	129	53-500990	Inadequate	B	4/13/1993	Pueblo Del Sol Water Company
89	Mission Shadows	Cochise	22 South	20 East	13	71	53-500991	Inadequate	B	3/6/1987	Pueblo Del Sol Water Company
90	Montebello	Cochise	21 South	21 East	31	39	53-501008	Adequate		6/23/1981	Bella Vista Water Company
91	Mountain Ridge	Cochise	22 South	20 East	24	364	53-501021	Inadequate	B	4/13/1993	Pueblo Del Sol Water Company

Table 3.13-9 Adequacy Determinations in the Upper San Pedro Basin[1] (Cont)

A. Water Adequacy Reports

Map Key	Subdivision Name	County	Location			No. of Lots	ADWR File No.[2]	ADWR Adequacy Determination	Reason(s) for Inadequacy Determination[3]	Date of Determination	Water Provider at the Time of Application
			Township	Range	Section						
92	Mountain Shadows	Cochise	22 South	20 East	24, 25	244	53-501022	Inadequate	B	2/12/1986	Pueblo Del Sol Water Company
93	Mountain Shadows #A	Cochise	22 South	20 East	25	82	53-501024	Adequate		7/9/1987	Pueblo Del Sol Water Company
94	Mountain Shadows "F", 1-40	Cochise	22 South	20 East	25, 26	40	53-300253	Adequate		2/19/1997	Pueblo Del Sol Water Company
95	Mountain View Terrace	Cochise	22 South	20 East	13, 24	169	53-501036	Inadequate	D	8/12/1987	Pueblo Del Sol Water Company
96	Mustang Heights	Cochise	20 South	19 East	14	33	53-501044	Adequate		5/31/1974	Mustang Water Company
97	Northpark	Cochise	21 South	20 East	35	59	53-501057	Inadequate	A1	7/30/1992	Bella Vista Water Company
98	Oakmont Subdivision	Cochise	22 South	20 East	12	87	53-500083	Adequate		8/27/2007	Arizona Water Company - Sierra Vista
99	Oasis Condominiums	Cochise	22 South	21 East	6	184	53-501069	Inadequate	B	5/23/1985	Southwest Water Company
100	Ocotillo Terrace Subdivision, 1-22	Cochise	21 South	20 East	35	22	53-300422	Adequate		5/27/1998	Bella Vista Water Company
101	Ocotillo Villas	Cochise	21 South	20 East	35	28	53-300023	Adequate		6/28/1995	Bella Vista Water Company
102	Park Place Townhouses	Cochise	23 South	24 East	29	36	53-501112	Inadequate	B	7/17/1985	AWC-Bisbee system
103	Patton Subdivision	Cochise	21 South	20 East	8	10	53-501127	Adequate		7/3/1979	Town of Huachuca City
105	Pueblo Las Brisas	Cochise	21 South	20 East	35	16	53-401946	Adequate		4/27/2006	Bella Vista Water Company
106	Pueblo del Sol	Cochise	22 South	21 East	7	127	53-501215	Adequate		6/24/1974	Southwest Water Company
107	Pueblo del Sol #5,6	Cochise	22 South	21 East	7	48	53-501217	Adequate		10/15/1974	Southwest Water Company
108	Pueblo del Sol #7	Cochise	22 South	21 East	5, 6	112	53-501218	Adequate		3/12/1976	Southwest Water Company
109	Pueblo del Sol #8	Cochise	22 South	21 East	6, 7	115	53-501219	Adequate		6/21/1977	Pueblo del Sol Water Company
110	Pueblo del Sol Tract 109	Cochise	22 South	21 East	6, 7	124	53-501220	Adequate		4/18/1980	Southwest Water Company
111	Pueblo del Sol Tract 110	Cochise	22 South	21 East	5, 6, 7	178	53-501221	Adequate		4/23/1982	Southwest Water Company
112	Pueblo del Sol Tract 111	Cochise	22 South	20 East	13	278	53-501222	Adequate		9/8/1981	Pueblo Del Sol Water Company
113	Pueblo del Sol Tract 112	Cochise	22 South	21 East	7	538	53-501223	Adequate		10/15/1982	Pueblo Del Sol Water Company
114	Pueblo del Sol Tract 113	Cochise	22 South	21 East	7	6	53-501224	Adequate		10/15/1982	Pueblo Del Sol Water Company
115	Pueblo del Sol Tract 115	Cochise	22 South	21 East	7	360	53-501225	Inadequate	B	11/30/1984	Pueblo Del Sol Water Company
116	Pueblo del Sol Co. Club Estate	Cochise	22 South	20 East	13	1165	53-501226	Adequate		10/23/1974	Pueblo Del Sol Water Company
117	Quail Hills	Cochise	21 South	20 East	5, 8	50	53-501233	Adequate		3/22/1978	Town of Huachuca City
118	Quail Hollow	Cochise	21 South	20 East	35	149	53-501235	Adequate		12/30/1982	Bella Vista Water Company
119	Quail Hollow #2	Cochise	21 South	20 East	29	5	53-501236	Adequate		12/8/1993	Bella Vista Water Company
120	Radine Ridge	Cochise	17 South	20 East	15	66	53-501243	Adequate		10/1/1992	City of Benson
121	Ranchitos Los Alamos #2	Cochise	17 South	20 East	4	64	53-501251	Adequate		1/2/1980	K-7 Development, Inc.

Table 3.13-9 Adequacy Determinations in the Upper San Pedro Basin[1] (Cont)

A. Water Adequacy Reports

Map Key	Subdivision Name	County	Location			No. of Lots	ADWR File No.[2]	ADWR Adequacy Determination	Reason(s) for Inadequacy Determination[3]	Date of Determination	Water Provider at the Time of Application
			Township	Range	Section						
122	Rancho Arizona Subdivision	Cochise	23 South	22 East	29	48	53-401225	Adequate		12/1/2004	Dry Lot Subdivision
123	Ranchos Carmela Estates	Cochise	21 South	20 East	25	44	53-501277	Adequate		10/23/1979	Bella Vista Water Company
124	Ranchos Carmella #3,4	Cochise	21 South	20 East	25	68	53-501279	Adequate		11/3/1993	Bella Vista Water Company
125	Reflections at Valiente	Cochise	21 South	20 East	35	146	53-401584	Adequate		2/4/2005	Bella Vista Water Company
126	Remington Park East	Cochise	22 South	20 East	11, 12	107	53-400757	Adequate		7/12/2002	Arizona Water Company - Sierra Vista
127	Rincon View Subdivision, Lots 1-59	Cochise	17 South	19 East	5, 8	59	53-400865	Adequate		1/24/2003	Mescal Lakes Water Systems Inc
128	Rio Corte Estates	Cochise	23 South	22 East	17	22	53-700351	Adequate		7/13/2007	Dry lot Subdivision
129	Rio Mesa	Cochise	22 South	21 East	5	139	53-700216	Adequate		8/10/2007	Bella Vista Water Company
130	San Pedro Estates	Cochise	16 South	20 East	35	36	43-401638	Adequate		5/6/2005	Pomerene Domestic Water Improvement District
133	San Pedro Terrace	Cochise	23 South	22 East	7	11	53-300117	Adequate		6/25/1996	San Pedro Terrace Homeowners Assoc.
134	Sandalwood	Cochise	22 South	20 East	2	36	53-501367	Inadequate	B	3/31/1988	Bella Vista Water Company
135	Seminole Winds	Cochise	21 South	20 East	8	93	53-501384	Adequate		4/29/1994	Town of Huachuca City
136	Si Tengo	Cochise	17 South	20 East	15	6	53-501392	Adequate		12/3/1980	City of Benson
137	Sierra Bonita Estates	Cochise	23 South	24 East	28	174	53-501395	Adequate		6/15/1979	AWC-Bisbee system
138	Sierra Bonita Estates B	Cochise	23 South	24 East	28	50	53-400326	Inadequate	A1	4/24/2000	AWC-Bisbee system
139	Sierra Bonita Ranches	Cochise	22 South	21 East	11	30	53-400937	Inadequate	C	11/3/2003	Arizona Water Company
140	Sierra Carmichael Condos	Cochise	21 South	20 East	34	120	53-501396	Inadequate	B	3/24/1986	Southwest Water Company
141	Sierra Charles Condominiums	Cochise	21 South	20 East	34	120	53-501397	Adequate		3/24/1986	Bella Vista Water Company
142	Sierra Court	Cochise	21 South	20 East	34	8	53-501398	Adequate		5/9/1994	Bella Vista Water Company
143	Sierra Grande	Cochise	24 South	21 East	14	2400	53-501401	Adequate		7/18/1973	Unformed Company by Developer
144	Sierra Shadows	Cochise	17 South	20 East	15	6	53-300563	Adequate		12/8/1998	City of Benson
145	Sierra Springs	Cochise	22 South	21 East	6	70	53-501402	Adequate		1/19/1995	Bella Vista Water Company
146	Sierra Tacoma Condos	Cochise	21 South	20 East	34	76	53-501403	Inadequate	B	3/24/1986	Bella Vista Water Company
147	Sierra Vista Estates #2	Cochise	22 South	21 East	31	4	53-501405	Inadequate	B	9/13/1989	East Slope Water Company
148	Sierra Vista Industrial Park	Cochise	21 South	20 East	31	34	53-501406	Adequate		6/15/1979	Bella Vista Water Company
149	Silverado	Cochise	22 South	20 East	11	90	53-401876	Adequate		11/18/2005	Arizona Water Company - Sierra Vista
150	Skov Estates Subdivision	Cochise	17 South	20 East	26	85	43-700528	Adequate		7/22/2008	Undetermined
152	Somerset	Cochise	22 South	20 East	1	16	53-501434	Inadequate	B	4/15/1988	Arizona Water Company
153	Sonora Verde Estates	Cochise	16 South	20 East	35	43	53-501440	Inadequate	B	12/1/1987	Pomerene Domestic Water Improvement District

Table 3.13-9 Adequacy Determinations in the Upper San Pedro Basin[1] (Cont)

A. Water Adequacy Reports

Map Key	Subdivision Name	County	Location			No. of Lots	ADWR File No.[2]	ADWR Adequacy Determination	Reason(s) for Inadequacy Determination[3]	Date of Determination	Water Provider at the Time of Application
			Township	Range	Section						
154	St. David Countryside Estates, 1 28	Cochise	17 South	21 East	32	28	53-501448	Adequate		4/2/1997	Saint David Water Association
155	St. David Townsite	Cochise	18 South	21 East	16	32	53-501449	Inadequate	B	2/24/1989	Stratman Water Company
156	Strathan Addition	Cochise	18 South	21 East	9	21	53-501460	Adequate		4/1/1975	Saint David Water Association
157	Sulger City (9/1974)	Cochise	20 South	20 East	6	13	53-501471	Adequate		9/26/1974	Sulger Water Company
158	Sulger City (1976)	Cochise	20 South	20 East	6	10	53-501467	Adequate		1/14/1976	Watermill Water Company
159	Sulger City (1982) Lots 19-32	Cochise	20 South	20 East	6	14	53-501468	Adequate		10/14/1982	Windmil Water Company
160	Sulger City (1993) Lots 1-33	Cochise	20 South	20 East	6	33	53-501469	Adequate		8/30/1993	Dry Lot Subdivision
161	Sulger City Lots	Cochise	20 South	20 East	6	30	53-501472	Adequate		7/24/1980	Dry Lot Subdivision
162	Sulger City No. 2	Cochise	20 South	20 East	6	21	53-300306	Adequate		6/24/1997	Sulger Water Company
163	Summit Heights	Cochise	22 South	20 East	11	187	53-401877	Adequate		3/14/2006	Arizona Water Company - Sierra Vista
164	Summit, The/Sierra Vista	Cochise	22 South	20 East	11, 12	1499	53-501476	Inadequate	D	11/2/1984	Arizona Water Company - Sierra Vista
165	The Estates at Willow Springs, Lots 1-110 & Tracts A-O	Cochise	19 South	22 East	28, 29	110	53-402015	Inadequate	A1	9/11/2007	Lucky Hills Water Co.
166	The Oaks	Cochise	23 South	21 East	20, 29	113	53-700419	Inadequate	A1	11/8/2007	Bella Vista Water Company
167	The Ranch	Cochise	21 South	21 East	30	226	53-400537	Adequate		7/20/2001	Bella Vista Water Company
168	The Ranch at Tombstone	Cochise	21 South	22 East	9, 10, 11	516	43-700559	Adequate		9/25/2008	NA
169	Tierra Del Sol Estates	Cochise	23 South	22 East	17	8	53-400207	Adequate		12/8/1999	Dry Lot Subdivision
170	Tierra de Las Flores	Cochise	23 South	24 East	33	142	53-501545	Inadequate	A1	4/21/1989	AWC-Bisbee system
171	Tombstone Territorial Estates	Cochise	20 South	22 East	1	419	53-501562	Adequate		7/26/1973	City of Tombstone
172	Tombstone Territory Estates #1	Cochise	20 South	22 East	1	19	53-501563	Adequate		4/24/1989	City of Tombstone
173	Tombstone Villas	Cochise	20 South	22 East	2	114	53-501564	Inadequate	A1	2/25/1986	City of Tombstone
174	Town & Country Estates	Cochise	22 South	20 East	11	80	53-501568	Adequate		7/18/1973	Arizona Water Company
175	Town & Country Estates #3,4	Cochise	22 South	20 East	11	90	53-501569	Adequate		3/18/1975	Arizona Water Company
176	Town & Country Estates 5,11,12	Cochise	22 South	20 East	10, 11	183	53-501573	Adequate		10/26/1976	Arizona Water Company
177	Town & Country Estates #6	Cochise	22 South	20 East	11	99	53-501570	Adequate		6/21/1977	Arizona Water Company
178	Town & Country Estates #7	Cochise	22 South	20 East	11	87	53-501571	Adequate		2/21/1978	Arizona Water Company
179	Town & Country Estates #8	Cochise	22 South	20 East	11	52	53-501572	Adequate		8/4/1976	Arizona Water Company
180	Townsite of Naco	Cochise	24 South	24 East	18, 19	443	53-501575	Inadequate	A1	1/28/1985	Naco Water Company
181	Tract 114, Lots 1-35	Cochise	22 South	20 East	13	35	53-501576	Adequate		8/23/1994	Pueblo Del Sol Water Company
182	Tract 117, Lots 1-67	Cochise	22 South	20 East	13	67	53-501577	Adequate		4/13/1994	Pueblo Del Sol Water Company
183	Trinity Terrace, Lots 1-17	Cochise	18 South	21 East	16, 17	17	53-300503	Adequate		8/5/1998	Dry Lot Subdivision
184	Villa La Casa	Cochise	22 South	21 East	7	4	53-501627	Inadequate	B	6/21/1985	Pueblo Del Sol Water Company
185	Villa del Rio #1	Cochise	22 South	20 East	3	20	53-501620	Adequate		11/12/1975	Southwest Water Company

Table 3.13-9 Adequacy Determinations in the Upper San Pedro Basin[1] (Cont)

A. Water Adequacy Reports

Map Key	Subdivision Name	County	Location			No. of Lots	ADWR File No.[2]	ADWR Adequacy Determination	Reason(s) for Inadequacy Determination[3]	Date of Determination	Water Provider at the Time of Application
			Township	Range	Section						
186	Villa del Rio #2	Cochise	22 South	20 East	3	68	53-501622	Adequate		12/14/1976	Southwest Water Company
187	Village Green	Cochise	22 South	20 East	1	141	53-501633	Inadequate	B	11/13/1984	Arizona Water Company - Sierra Vista
188	Village Park	Cochise	22 South	20 East	18	40	53-501635	Adequate		3/12/1976	Arizona Water Company - Sierra Vista
189	Village, The	Cochise	22 South	20 East	2	162	53-501636	Adequate		1/26/1976	Cochise Enterprises, Inc.
190	Villas San Luis	Cochise	21 South	20 East	34	28	53-501638	Adequate		2/9/1994	Bella Vista Water Company
191	Villas de San Andreas	Cochise	21 South	20 East	35	79	53-501637	Adequate		6/21/1977	Bella Vista Water Company
192	Vista Village #2	Cochise	21 South	20 East	35	67	53-501657	Adequate		7/27/1973	Bella Vista Water Company
193	Vista Village #3	Cochise	21 South	20 East	35	73	53-501658	Adequate		9/16/1976	Bella Vista Water Company
194	Vista Village #5	Cochise	21 South	20 East	35	122	53-501659	Adequate		9/29/1977	Bella Vista Water Company
195	Vista Village #6	Cochise	21 South	20 East	35	105	53-501660	Adequate		5/2/1979	Bella Vista Water Company
196	Vista del Oro	Cochise	23 South	21 East	20	44	53-300285	Adequate		5/22/1997	Bella Vista Water Company
198	Vistaview Estates	Cochise	22 South	21 East	5	356	53-400050	Adequate		4/20/1999	Bella Vista Water Company
200	Walnut Valley Ranch	Cochise	19 South	22 East	32	43	53-700361	Adequate		7/11/2007	Lucky Hills Water Co.
201	Whetstone Hills	Cochise	20 South	20 East	7	38	53-300377	Adequate		11/10/1997	Whetstone Water Improvement District
202	Whetstone Mesa Estates #5 (1995)	Cochise	20 South	20 East	7	15	53-300040	Adequate		7/24/1995	Whetstone Water Improvement District
203	White Wing	Cochise	22 South	20 East	35	114	53-501681	Adequate		2/5/1980	Antelope Run Water Company
204	Wild Horse	Cochise	23 South	21 East	29	77	53-300076	Adequate		1/4/1996	Bella Vista Water Company
205	Wild Horse #2	Cochise	23 South	21 East	28	79	53-300152	Adequate		6/12/1996	Bella Vista Water Company
206	Windmere Subdivision	Cochise	22 South	20 East	2	65	53-501694	Adequate		10/4/1978	Bella Vista Water Company
207	Windsong	Cochise	22 South	20 East	1	158	53-501695	Adequate		10/3/1978	Arizona Water Company - Sierra Vista
208	Winterhaven Country Club Estates	Cochise	22 South	20 East	14	438	53-300166	Adequate		11/4/1996	Pueblo Del Sol Water Company
209	Winterhaven, Phases 2E, 3,4A and 5	Cochise	22 South	20 East	14	438	53-401002	Adequate		9/17/2003	Pueblo Del Sol Water Company
210	Y-Lightning Subdividion	Cochise	23 South	21 East	4	30	53-401852	Adequate		11/14/2005	Dry Lot Subdivision

Table 3.13-9 Adequacy Determinations in the Upper San Pedro Basin[1] (Cont)

B. Analysis of Adequate Water Supply

Map Key	Subdivision Name	County	Location			No. of Lots	ADWR File No.[2]	Date of Determination	Water Provider at the Time of Application
			Township	Range	Section				
2	Benson Farms Estates	Cochise	16 South	20 East	33	208	43-700443	7/28/2008	Undetermined
79	Los Ranchitos Estates	Cochise	17 South	20 East	4	43	43-700442	7/28/2008	Undetermined
104	Pomerene River Estates	Cochise	16 South	20 East	21, 28	637	43-700411	12/4/2007	NA
131	San Pedro Partners Master Planned Community	Cochise	17 South	19 East	13	850	43-401730	7/13/2005	NA
132	San Pedro Partners Master-Planned Community	Cochise	17 South	19 East	13	225	43-402189	7/3/2007	City of Benson
151	Smith Ranch	Cochise	17 South	19 East	14, 15, 22, 23, 26, 27	4859	43-401628	12/12/2005	Smith Ranch Water Co.
197	Vistaview Estates	Cochise	22 South	21 East	4	356	43-300190	10/28/1996	NA
199	Walnut Valley Ranch	Cochise	19 South	22 East	32	42	43-402021	5/18/2006	Lucky Hills Water Co.

C. Designated Adequate Water Supply

Map Key	Water Provider Name	County	Designation No.	Projected or Annual Estimated Demand	Date Application Received	Date Application Issued	Year of Projected or Annual Demand
a	Bachman Springs Utility Company	Cochise	40-401893.0000	1,212.62	10/4/2005	6/5/2006	2014
b	City of Benson	Cochise	41-401803.0001	13,474	4/19/2007	6/14/2008	2021

Source: ADWR 2008a

Notes:

[1]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.

[2] 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.

[3] 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 unavaible;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= Data not currently available to ADWR

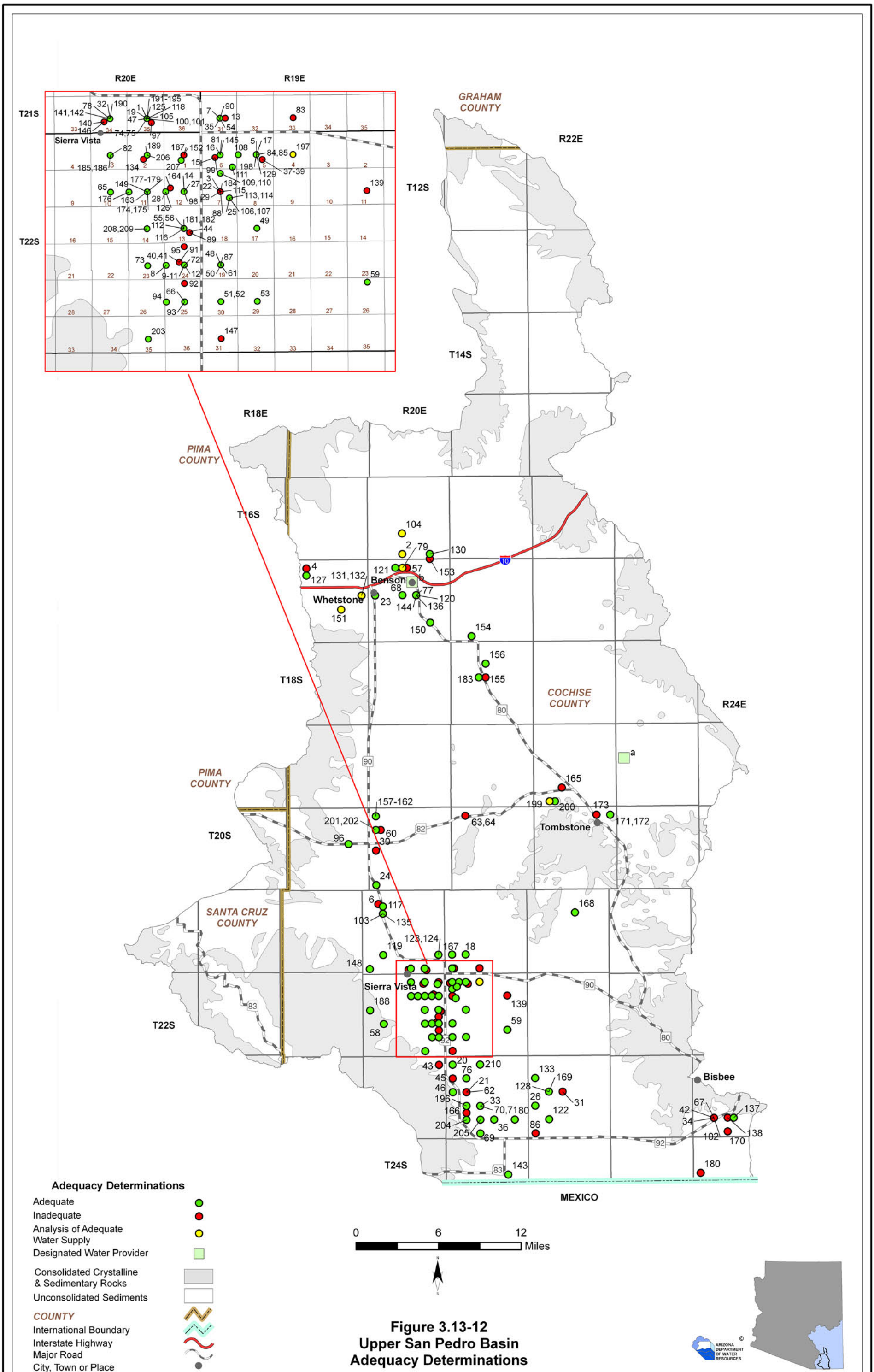


Figure 3.13-12
Upper San Pedro Basin
Adequacy Determinations

Upper San Pedro Basin
References and Supplemental Reading

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A

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