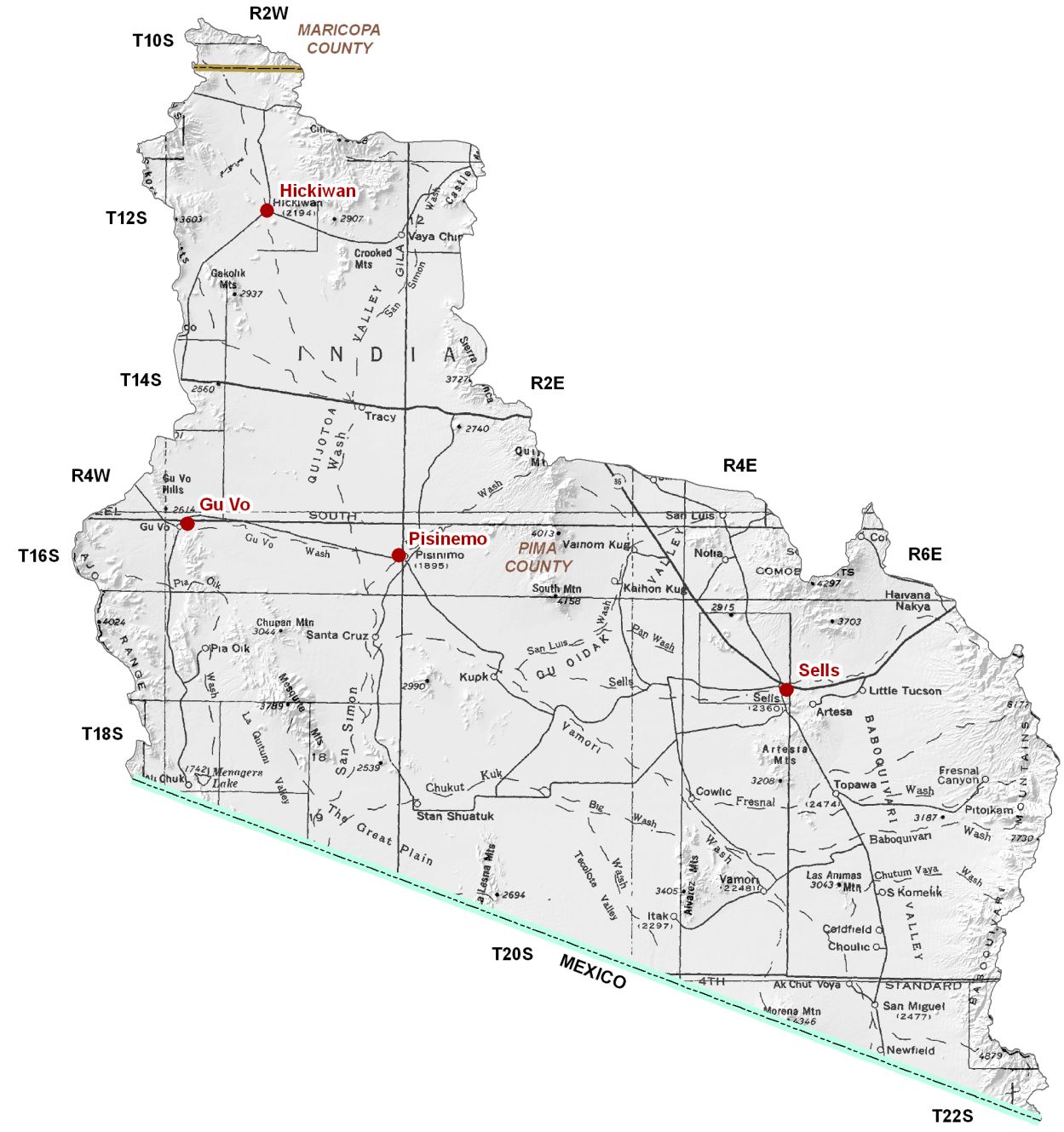
Section 7.8
San Simon Wash Basin

7.8.1 Geography of the San Simon Wash Basin

The San Simon Wash Basin, located in the southeastern part of the planning area is 2,284 square miles in area. Geographic features and principal communities are shown on Figure 7.8-1. The basin is characterized by plains and valleys bordered by mountain ranges including the highest elevation mountain range in the planning area. Vegetation types include Lower Colorado River Valley and Arizona Uplands Sonoran desertscrub, semi desert grassland and madrean evergreen woodland along the eastern basin boundary. (See Figure 7.0-7)

- Principal geographic features shown on Figure 7.8-1 are:
    - Basin communities of Gu Vo, Hickiwan, Pisinemo and Sells
    - San Simon Wash running north-south through the center of the basin
    - Valleys and plains including the Quijotoa Valley in the northern portion of the basin, the Gu Oidak Valley in the center of the basin and the Baboquivari Valley in the southeastern portion of the basin
    - Mountain ranges including the Ajo Range on the southwestern basin boundary and the Baboquivari Mountains on the southeastern basin boundary
    - The highest point in the basin at 7,730 feet in the Baboquivari Mountains
    - The lowest point at about 1,650 feet where San Simon Wash enters Mexico



0 3 6 Miles

International Boundary
COUNTY
City, Town or Place

Base Map: USGS 1:500,000, 1981

Figure 7.8-1
San Simon Wash Basin
Geographic Features

7.8.2 Land Ownership in the San Simon Wash Basin

Land ownership, including the percentage of ownership by category, for the San Simon Wash Basin is shown in Figure 7.8-2. The principal feature of land ownership in this basin is the large proportion of tribal lands. A description of land ownership data sources and methods is found in Volume 1, Section 1.3.8. Land ownership categories are discussed below in the order of largest to smallest percentage in the basin.

Indian Reservation

- 99.2% under tribal ownership as the Tohono O'odham Indian Reservation.
- Land uses include domestic, commercial, grazing and farming.

Private

- 0.3% of the land is private.
- Small parcels of private land are found in the southern portion of the basin and in the vicinity of Sells.
- Land uses include domestic, commercial and grazing.

U.S. Bureau of Land Management

- 0.2% of the land is federally owned and managed by the Lower Sonoran Field Office of the U.S. Bureau of Land Management.
- Primary land use is grazing.

State Trust Land

- 0.2% of the land is held in trust for the public schools under the State Trust Land system.
- Primary land use is grazing.

National Park Service

- 0.1% of the land is federally owned and managed by the National Park Service as the Organ Pipe Cactus National Monument.
- Land uses include resource conservation and recreation.

Source: ALRIS, 2004

0 3 6
Miles

Land Ownership (Percentage in Basin)

Indian Reservation	(99.2%)
Private	(0.3%)
U.S. Bureau of Land Management	(0.2%)
State Trust	(0.2%)
National Park Service	(0.1%)

International Boundary
COUNTY
Major Road
City, Town or Place

Figure 7.8-2
San Simon Wash Basin
Land Ownership

7.8.3 Climate of the San Simon Wash Basin

Climate data from NOAA/NWS Co-op Network stations are complied in Table 7.8-1 and the locations are shown on Figure 7.8-3. Figure 7.8-3 also shows precipitation contour data from the Spatial Climate Analysis Service (SCAS) at Oregon State University. The San Simon Wash Basin does not contain Evaporation Pan, AZMET or SNOTEL/ Snowcourse stations. A description of the climate data sources and methods is found in Volume 1, Section 1.3.3.

NOAA/NWS Co-op Network

- Refer to Table 7.8-1A
- There is one NOAA/NWS Co-op Network station in the basin, Sells, with an average high of 86.4°F and an average low of 51.2°F.
- Highest average seasonal rainfall, 6.66 inches, occurs in the summer season (July-September) when 55% of the annual average precipitation occurs.

SCAS Precipitation Data

- See Figure 7.8-3
- Additional precipitation data shows average annual rainfall as high as 32 inches along the eastern basin boundary in the Baboquivari Mountains and as low as eight inches along the border with Mexico and west and south of Hickiwan.

Table 7.8-1 Climate Data for the San Simon Wash Basin

A. NOAA/NWS Co-op Network:

Station Name	Elevation (in feet)	Period of Record Used for Averages	Average Temperature Range (in F)		Average Precipitation (in inches)				
			Max/Month	Min/Month	Winter	Spring	Summer	Fall	Annual
Sells	2380	1948 - 2004[1]	86.4/Jul	51.2/Jan	1.46	0.65	6.66	3.31	12.07

Source: WRCC, 2005
Notes:
[1]Average temperature data from period of record shown; average precipitation data from 1971 - 2000

B. Evaporation Pan:

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

Source: WRCC, 2005

C. AZMET:

Station Name	Elevation (in feet)	Period of Record Used for Averages	Average Annual Reference Evaportranspiration, in inches (*Number of years to calculate averages*)
None			

Source: Arizona Meteorological Network, 2005

D. SNOTEL/Snowcourse:

Station Name	Elevation (in feet)	Period of Record Used for Averages	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								

Source: NRCS, 2005

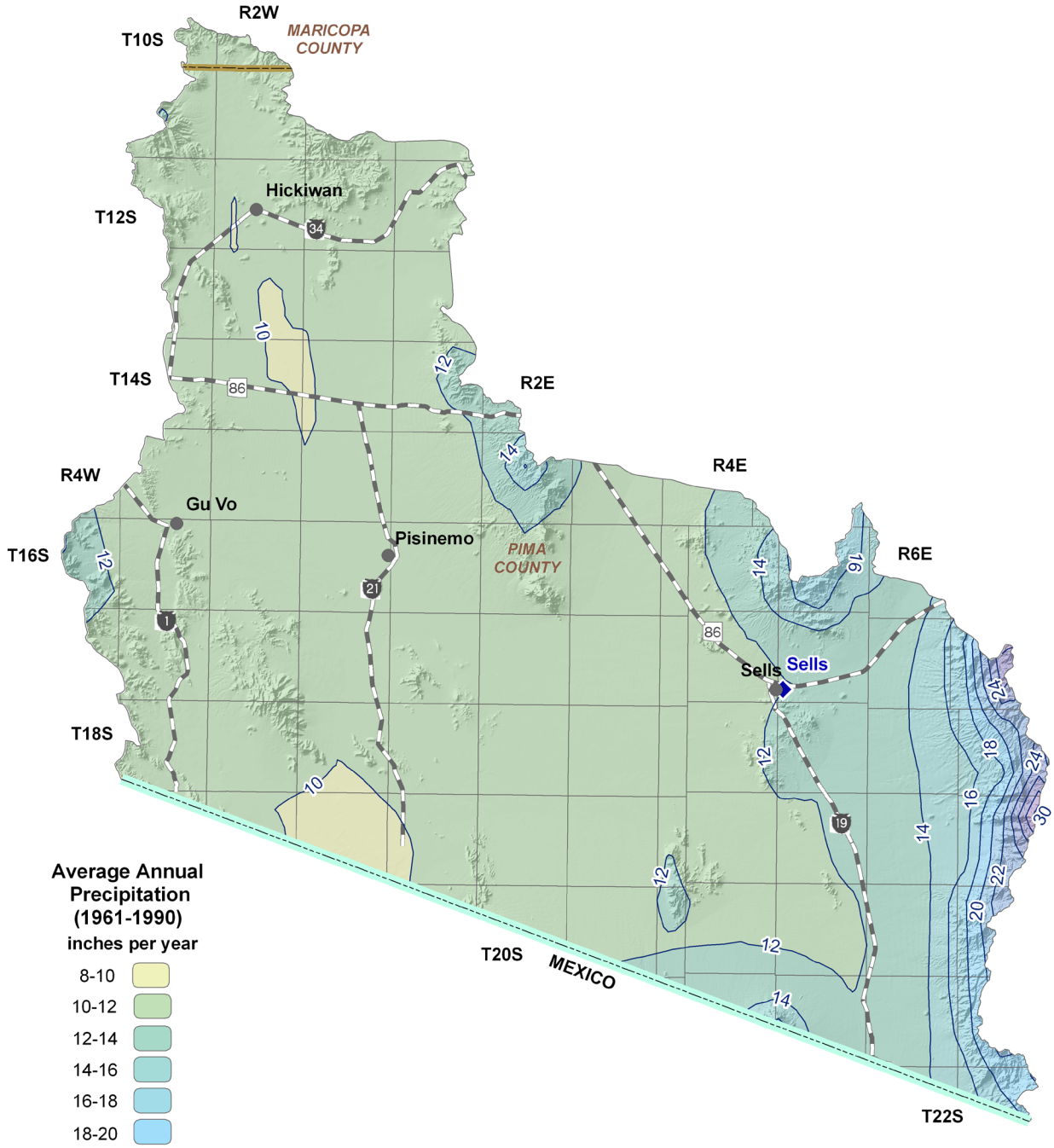


Figure 7.8-4
San Simon Wash Basin
Meteorological Stations
and Annual Precipitation

7.8.4 Surface Water Conditions in the San Simon Wash Basin

Streamflow data, including average seasonal flow, average annual flow and other information are shown in Table 7.8-2. Reservoir and stockpond data, including maximum storage or maximum surface area, are shown in Table 7.8-4. The location of streamflow gages identified by USGS number, USGS runoff contours and large reservoirs are shown on Figure 7.8-4. There are no flood ALERT stations in this basin. A description of stream data sources and methods is found in Volume 1, Section 1.3.16. A description of reservoir data sources and methods is found in Volume 1, Section 1.3.11. A description of stockpond data sources and methods is found in Volume 1, Section 1.3.15.

Streamflow Data

- Refer to Table 7.8-2.
- Data from three stations located at two watercourses are shown in the table and on Figure 7.8-4.
- Average seasonal flow at all three stations is highest in the summer season (July-September). All three stations report zero average seasonal flow in the spring season (April-June).
- The largest annual flow recorded in the basin is 39,684 acre-feet in 1983 at the Vamori Wash at Kom Vo station. This station reports a mean annual flow of 6,625 acre-feet.

Reservoirs and Stockponds

- Refer to Table 7.8-4.
- The basin contains one large reservoir, Menegers Lake, with a maximum storage of 15,000 acre-feet. This reservoir is used for irrigation.
- Surface water is stored or could be stored in 12 small reservoirs.
- There are three registered stockponds in this basin.

Runoff Contour

- Refer to Figure 7.8-4.
- Average annual runoff is highest, 0.5 inches per year or 26.67 acre-feet per square mile, in the eastern portion of the basin around Sells and decreases to 0.1 inches, or five acre-feet per square mile, in the southwest corner of the basin.

Table 7.8-2 Streamflow Data for the San Simon Wash Basin

Station Number	USGS Station Name	Drainage Area (in mi^2)	Mean Basin Elevation (in feet)	Period of Record	Average Seasonal Flow (% of annual flow)				Annual Flow/Year (in acre-feet)				Years of Record
					Winter	Spring	Summer	Fall	Minimum	Median	Mean	Maximum	
9535100	San Simon Wash near Pisinimo	569	2,250	2/1972-2003	12	0	70	17	94 (1980)	1,340	2,372	11,007 (1976)	30
9535295	Vamori Wash at International Boundary near Sells	NA	NA	7/1995-4/2001 (discontinued)	10	0	72	17	4,452 (1996)	8,905	8,274	11,801 (1998)	5
9535300	Vamori Wash at Kom Vo	1,250	2,699	2/1972-2003	11	0	57	32	941 (1973)	4,334	6,625	39,684 (1983)	28

Sources: USGS NWIS, USGS 1998 and USGS 2003.

Notes:
NA = Not available
Statistics based on Calendar Year
Annual Flow statistics based on monthly values
Annual Flow/Year statistics were only completed for those gages that had at least 3 years of 12 month records.
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

Table 7.8-3 Flood ALERT Equipment in the San Simon Wash Basin

Station ID	Station Name	Station Type	Install Date	Responsibility
None				

Table 7.8-4 Reservoirs and Stockponds in the San Simon Wash 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[1]	JURISDICTION
1	Menegers Lake	Tohono O'odham	15,000	I	Tribal

Source: US Army Corps of Engineers 2005

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					

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

Total number: 0
Total maximum storage: 0 acre-feet

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

Total number: 12
Total surface area: 144 acres

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

Total number: 3

Notes:
[1]I = Irrigation

Stream Data Source: ALRIS, 2005

0 3 6 Miles

USGS Annual Runoff Contour for 1951-1980 (in inches) 2
Large Reservoir 1
Stream Channel (width of line reflects stream order)
USGS Gage and Station ID 9999999
International Boundary
COUNTY
Major Road
City, Town or Place

Figure 7.8-4
San Simon Wash Basin
Surface Water Conditions

7.8.5 Perennial/Intermittent Streams and Major Springs in the San Simon Wash Basin

The total number of springs in the basin are shown in Table 7.8-5. There are no perennial or intermittent streams and no major or minor springs in the San Simon Wash Basin. A description of data sources and methods for intermittent and perennial reaches is found in Volume 1, Section 1.3.16. A description of spring data sources and methods is found in Volume 1, Section 1.3.14.

- The total number of springs, regardless of discharge, identified by the USGS varies from 11 to 17, depending on the database reference.

Table 7.8-5 Springs in the San Simon Wash Basin

A. Major Springs (10 gpm or greater):

Map Key	Name	Location		Discharge (in gpm)	Date Discharge Measured
		Latitude	Longitude		
None identified by ADWR at this time					

B. Minor Springs (1 to 10 gpm):

Name	Location		Discharge (in gpm)	Date Discharge Measured
	Latitude	Longitude		
None identified by ADWR at this time				

C. Total number of springs, regardless of discharge, identified by USGS (see ALRIS, 2005 and USGS, 2006): 11 - 17

7.8.6 Groundwater Conditions of the San Simon Wash Basin

Major aquifers, well yields, estimated water in storage, number of index wells and date of last water-level sweep are shown in Table 7.8-6. Figure 7.8-5 shows aquifer flow direction, data on water-level change between 1990-1991 and 2003-2004 was not available for this basin. Figure 7.8-6 shows well yields in two yield categories. A description of aquifer data sources and methods is found in Volume 1, Section 1.3.2. A description of well data sources and methods, including water-level changes and well yields, is found in Volume 1, Section 1.3.19.

Major Aquifers

- Refer to Table 7.8-6 and Figure 7.8-5
- The major aquifer in this basin is basin fill.
- Groundwater flow is generally from east and north to south.

Well Yields

- Refer to Table 7.8-6 and Figure 7.8-6
- Well yield data are only available for two wells located in the vicinity of the international boundary.

Natural Recharge

- Refer to Table 7.8-6
- The estimate of natural recharge is 11,000 acre-feet per year.

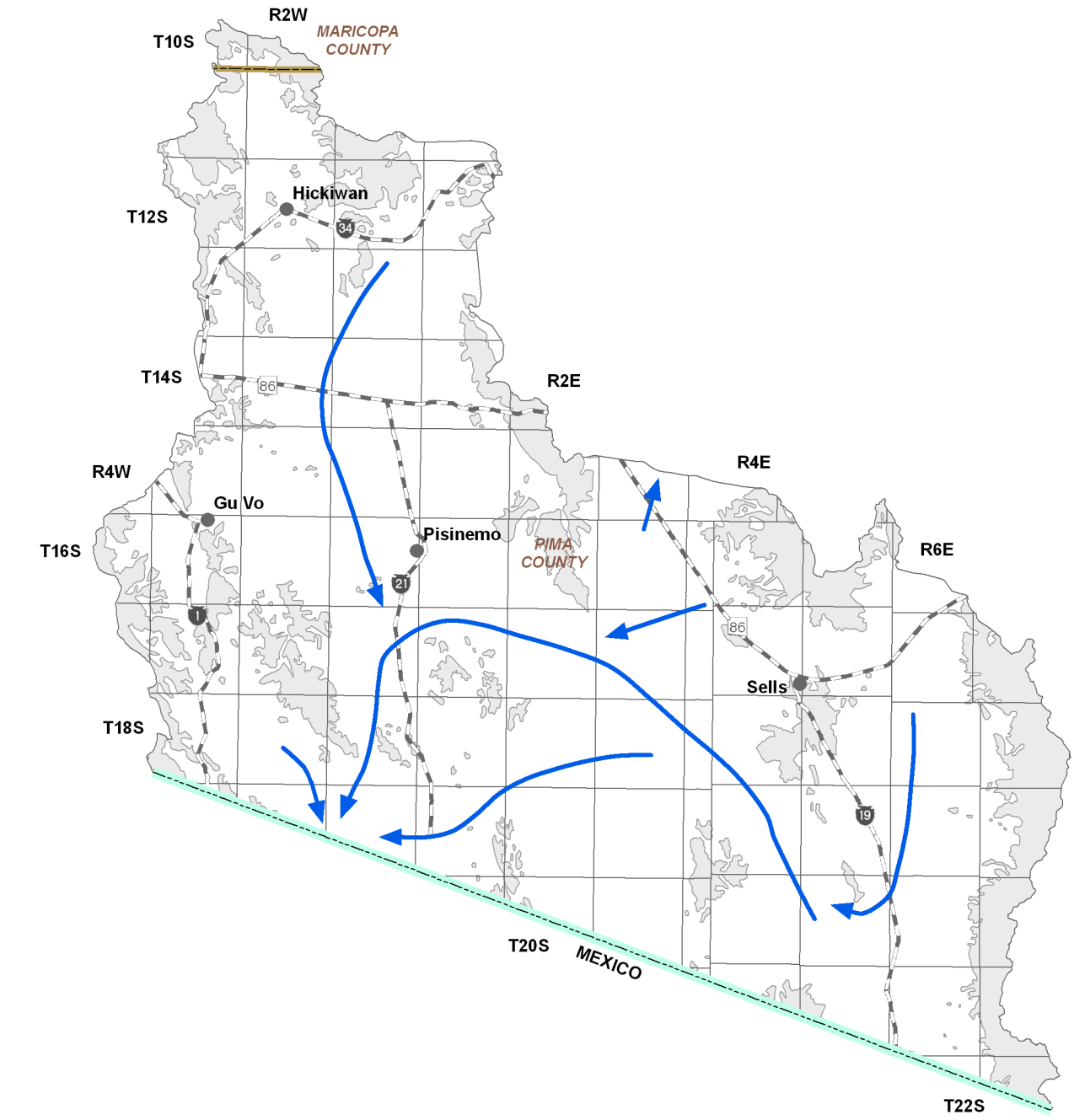
Water in Storage

- Refer to Table 7.8-6
- There are three estimates of water in storage ranging from 6.7 million acre-feet to 45 million acre-feet, both to a depth of 1,200 feet.

Table 7.8-6 Groundwater Data for the San Simon Wash Basin

Basin Area, in square miles:	2,284	
Major Aquifer(s):	**Name and/or Geologic Units**	
	Basin Fill	
Well Yields, in gal/min:	2,000 (1 well measured)	Measured by ADWR and/or USGS
	34 (1 well reported)	Reported on registration forms for large (> 10-inch) diameter wells
	Range 50-3,000	ADWR (1994)
	Range 0-2,500	USGS (1994)
Estimated Natural Recharge, in acre-feet/year:	11,000	Freethey and Anderson (1986)
Estimated Water Currently in Storage, in acre-feet:	6,700,000 (to 1,200 ft)	ADWR (1990)
	21,000,000[1] (to 1,200 ft)	Freethey and Anderson (1986)
	45,000,000 (to 1,200 ft)	Arizona Water Commission (1975)
Current Number of Index Wells:	0	
Date of Last Water-level Sweep:	1979 (148 wells measured)	

[1]Predevelopment Estimate



0 3 6
Miles

Generalized Flow Direction
Consolidated Crystalline & Sedimentary Rocks
Unconsolidated Sediments
International Boundary
COUNTY
Major Road
City, Town or Place

Figure 7.8-5
San Simon Wash Basin
Groundwater Conditions

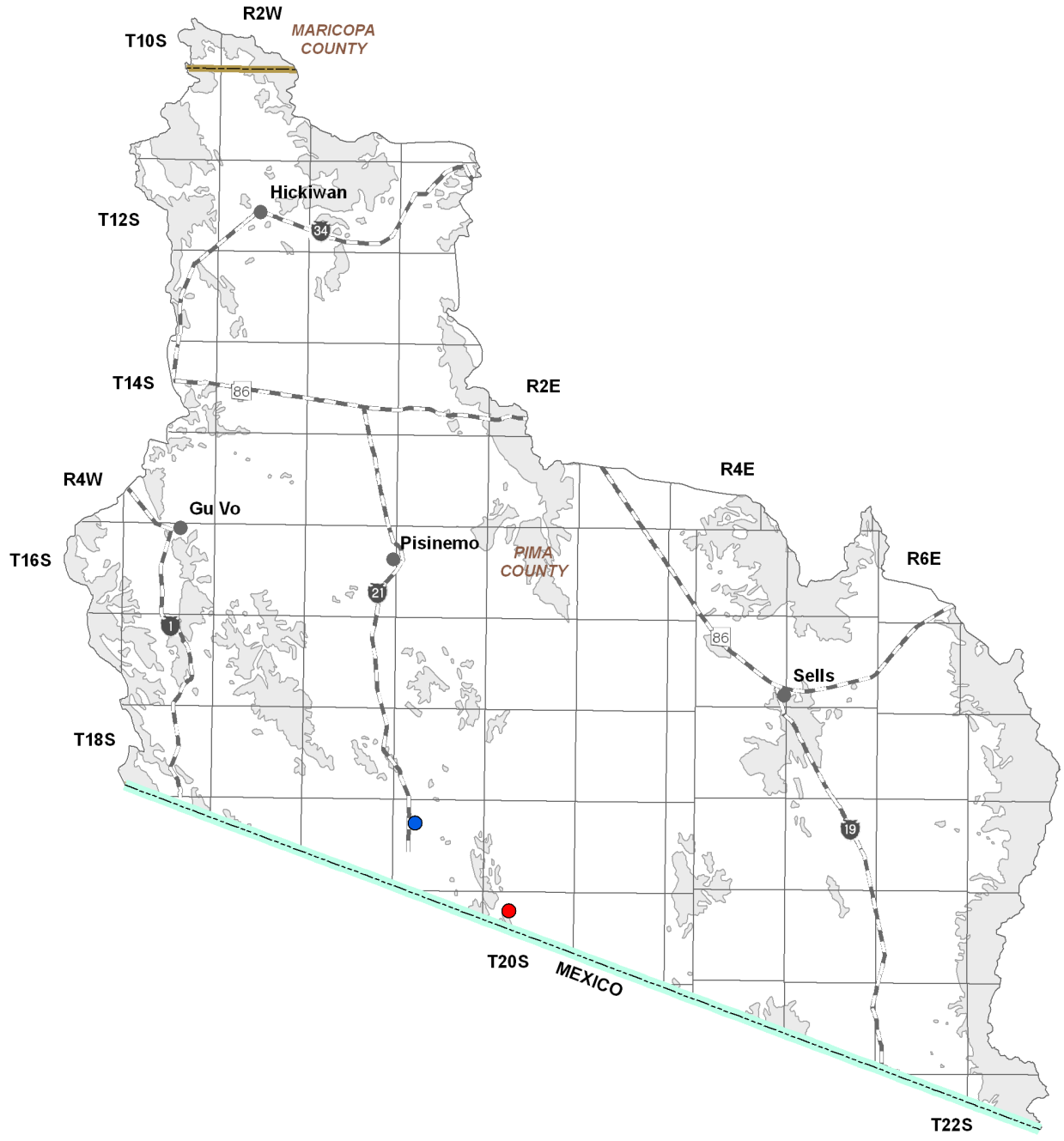


Figure 7.8-6
San Simon Wash Basin
Well Yields

7.8.7 Water Quality of the San Simon Wash 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 7.8-7A. There are no impaired lakes or streams in this basin. Figure 7.8-7 shows the location of water quality occurrences keyed to Table 7.8-7. A description of water quality data sources and methods is found in Volume 1, Section 1.3.18. Not all parameters were measured at all sites; selective sampling for particular constituents is common.

Wells, Springs and Mine Sites

- Refer to Table 7.8-7A.
- Fifty-three wells have parameter concentrations that have equaled or exceeded drinking water standards.
- The parameter for arsenic was equaled or exceeded in eighty-one percent of the wells.
- Other parameters equaled or exceeded include chromium, fluoride, mercury, lead, nitrate and total dissolved solids.

Table 7.8-7 Water Quality Exceedences in the San Simon Wash 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	Well	12 North	1 West	25	Cd
2	Well	14 North	1 West	20	As, Pb
3	Well	15 South	1 West	15	As, Pb, NO3
4	Well	16 South	1 West	10	As, Pb
5	Well	17 South	1 West	11	As, Hg
6	Well	17 South	1 West	11	As, Pb
7	Well	17 South	3 West	35	F
8	Well	17 South	3 West	36	As, F
9	Well	18 South	1 West	35	As, F
10	Well	18 South	3 West	34	As
11	Well	19 South	1 West	14	As, F
12	Well	19 South	1 West	28	As, F
13	Well	19 South	1 West	36	As, F
14	Well	19 South	2 West	3	TDS
15	Well	15 South	4 East	34	As
16	Well	15 South	4 East	36	As
17	Well	16 South	1 East	18	As
18	Well	16 South	1 East	18	As
19	Well	16 South	1 East	18	As, F
20	Well	16 South	2 East	15	As
21	Well	16 South	3 East	10	As
22	Well	17 South	1 East	3	As
23	Well	17 South	2 East	33	As, Pb
24	Well	17 South	3 East	24	As
25	Well	17 South	4 East	30	As
26	Well	17 South	5 East	20	As
27	Well	17 South	6 East	8	Hg
28	Well	18 South	5 East	5	As
29	Well	18 South	5 East	7	As
30	Well	18 South	7 East	29	As
31	Well	19 South	1 East	5	F
32	Well	19 South	1 East	7	As, F, Pb
33	Well	19 South	1 East	7	F
34	Well	19 South	1 East	8	As, F
35	Well	19 South	1 East	8	As, F
36	Well	19 South	1 East	8	F
37	Well	19 South	1 East	8	F
38	Well	19 South	1 East	8	F
39	Well	19 South	1 East	11	As
40	Well	19 South	1 East	17	As, F
41	Well	19 South	1 East	18	As, F
42	Well	19 South	1 East	18	F
43	Well	19 South	1 East	28	As, F
44	Well	19 South	2 East	22	As
45	Well	19 South	3 East	29	As
46	Well	19 South	3.5 East	1	As
47	Well	19 South	5 East	3	As

Table 7.8-7 Water Quality Exceedences in the San Simon Wash Basin con't[1]

Map Key	Site Type	Site Location			Parameter(s) Concentration has Equaled or Exceeded Drinking Water Standard (DWS)[2]
		Township	Range	Section	
48	Well	20 South	2 East	2	As
49	Well	20 South	3 East	2	As, F
50	Well	20 South	4 East	2	As
51	Well	20 South	5 East	24	As
52	Well	20 South	7 East	32	As
53	Well	21 South	7 East	7	As

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	Parameter(s) Exceeding Use Standard
None identified by ADWR at this time						

Notes:

[1] Water quality samples collected between 1977 and 1980.

[2] As = Arsenic
Cr = Chromium
F = Fluoride
Hg = Mercury
Pb = Lead
NO3 = Nitrate/ Nitrite
TDS = Total Dissolved Solids

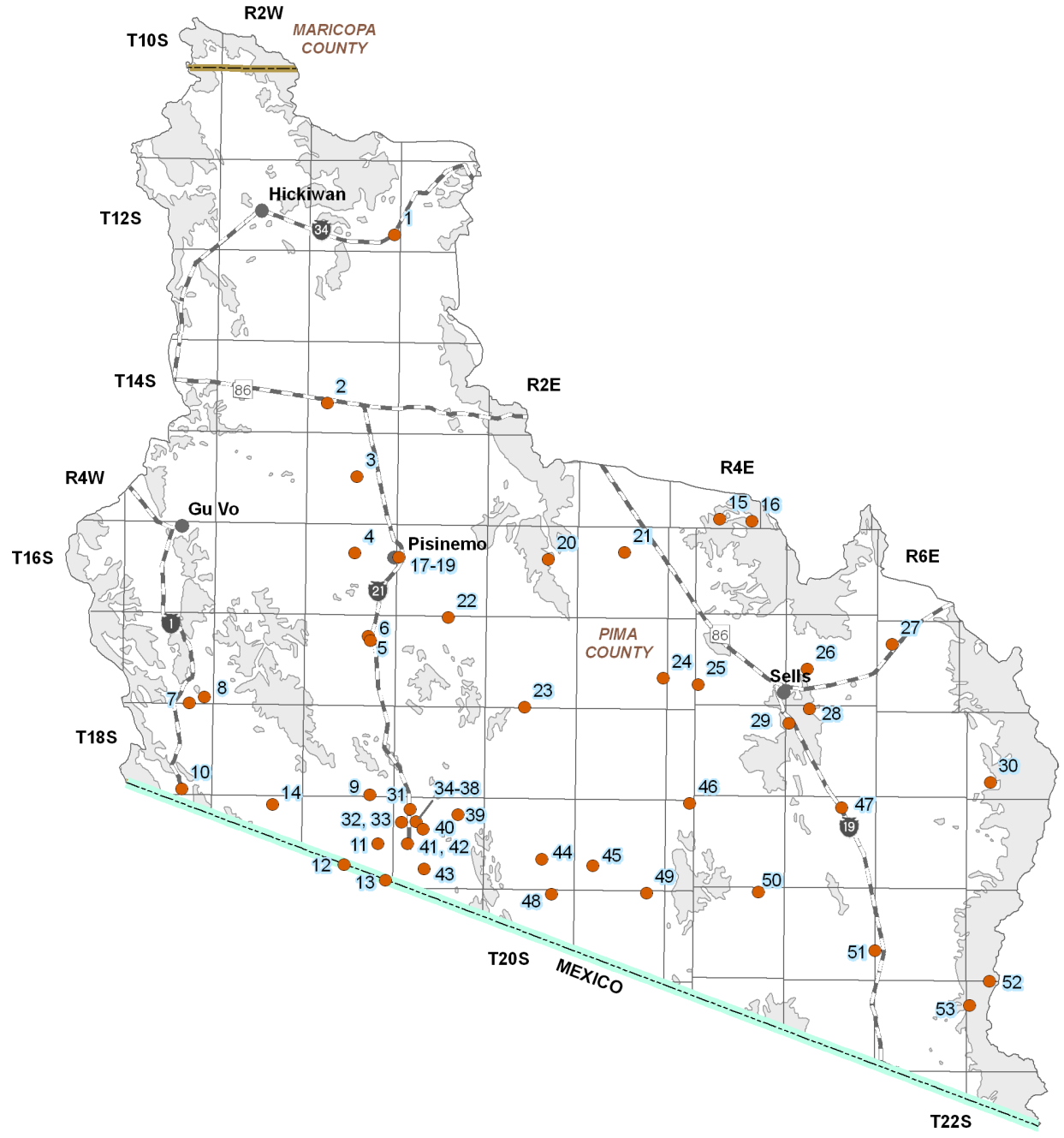


Figure 7.8-7
San Simon Wash Basin
Water Quality Conditions

7.8.8 Cultural Water Demands in the San Simon Wash 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 7.8-8. Effluent generation including facility ownership, location, population served and not served, volume treated, disposal method and treatment level is shown in Table 7.8-9. Figure 7.8-8 shows the location of demand centers. A description of cultural water demand data sources and methods is found in Volume 1, Section 1.3.5. More detailed information on cultural water demands is found in Section 7.0.7.

Cultural Water Demands

- Refer to Table 7.8-8 and Figure 7.8-8.
- Population in this basin increased from 4,852 in 1980 to 5,833 in 2000 and is projected to increase through 2050.
- Most cultural water demand is for irrigation south of Pisinemo.
- Agricultural groundwater demand remained relatively constant from 1991to 2003.
- Municipal groundwater demand is about 1,000 acre-feet per year and increased 5% from 1991 to 2003.
- There are no surface water diversions in this basin.
- As of 2003 there were seven registered wells with a pumping capacity of less than or equal to 35 gallons per minute and no wells with a pumping capacity of more than 35 gallons per minute.
- Tribes are not required to register wells with the Department; therefore, Table 7.8-8 does not reflect all of the wells in the basin.

Effluent Generation

- Refer to Table 7.8-9.
- There are two wastewater treatment facilities in this basin.
- These facilities serve over 4,600 people and generate over 420 acre-feet of effluent per year.
- Both facilities discharge to evaporation ponds.

Table 7.8-8 Cultural Water Demands in the San Simon Wash Basin[1]

Year	Recent (Census) and Projected (DES) 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	Irrigation	Municipal	Industrial	Irrigation	
1971		6[2]	0[2]	3,000			NR			ADWR (1994)
1972										
1973										
1974										
1975										
1976				4,000			NR			
1977										
1978										
1979										
1980	4,852									
1981	4,979	0	0	6,000			NR			
1982	5,106									
1983	5,234									
1984	5,361									
1985	5,488									
1986	5,615	0	0	7,000			NR			
1987	5,742									
1988	5,870									
1989	5,997									
1990	6,124									
1991	6,095	0	0	900	NR	4,000	NR			USGS (2005)
1992	6,066									
1993	6,037									
1994	6,008									
1995	5,978									
1996	5,949	1	0	950	NR	3,800	NR			
1997	5,920									
1998	5,891									
1999	5,862									
2000	5,833									
2001	5,891	0	0	1,000	NR	4,000	NR			
2002	5,950									
2003	6,010									
2010	6,443									
2020	7,117									
2030	7,862									
2040	8,685									
2050	9,593									
	WELL TOTALS	**7**	**0**							

[1] Does not include evaporation losses from stockponds and reservoirs.
[2] Includes all wells through 1980.
NR - Not reported

Table 7.8-9 Effluent Generation in the San Simon Wash Basin

Facility Name	Ownership	City/Location Served	Population Served	Volume Treated/Generated (acre-feet)	Disposal Method							Current Treatment Level	Population Not Served	Year of Record
					Water-course	Evaporation Pond	Irrigation	Golf Course	Wildlife Area	Discharged to Another Facility	Infiltration Basins			
Santa Lucia Sewer System	Tohono O'odham Nation	Santa Lucia	810	90		X						Secondary	NA	2000
Sells WWTF	Tohono O'odham Nation	Sells	3,858	336		X						Secondary	NA	2001

NA: Data not currently available to ADWR
WWTF: Waste Water Treatment Facility

Figure 7.8-8
San Simon Wash Basin
Cultural Water Demand

7.8.9 Water Adequacy Determinations in the San Simon Wash Basin

No water adequacy applications for the San Simon Wash Basin were filed with the Department as of May 2005. A description of the Water Adequacy Program is found in Volume 1, Appendix A. Adequacy determination data sources and methods are found in Volume 1, Section 1.3.1.

Table 7.8-10 Adequacy Determinations in the San Simon Wash Basin

Map Key	Subdivision Name	County	Location			No. of Lots	ADWR File No.	ADWR Adequacy Determination	Reason(s) for Inadequacy Determination	Date of Determination	Water Provider at the Time of Application
			Township	Range	Section						
None identified by ADWR at this time											

San Simon Wash Basin
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A

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