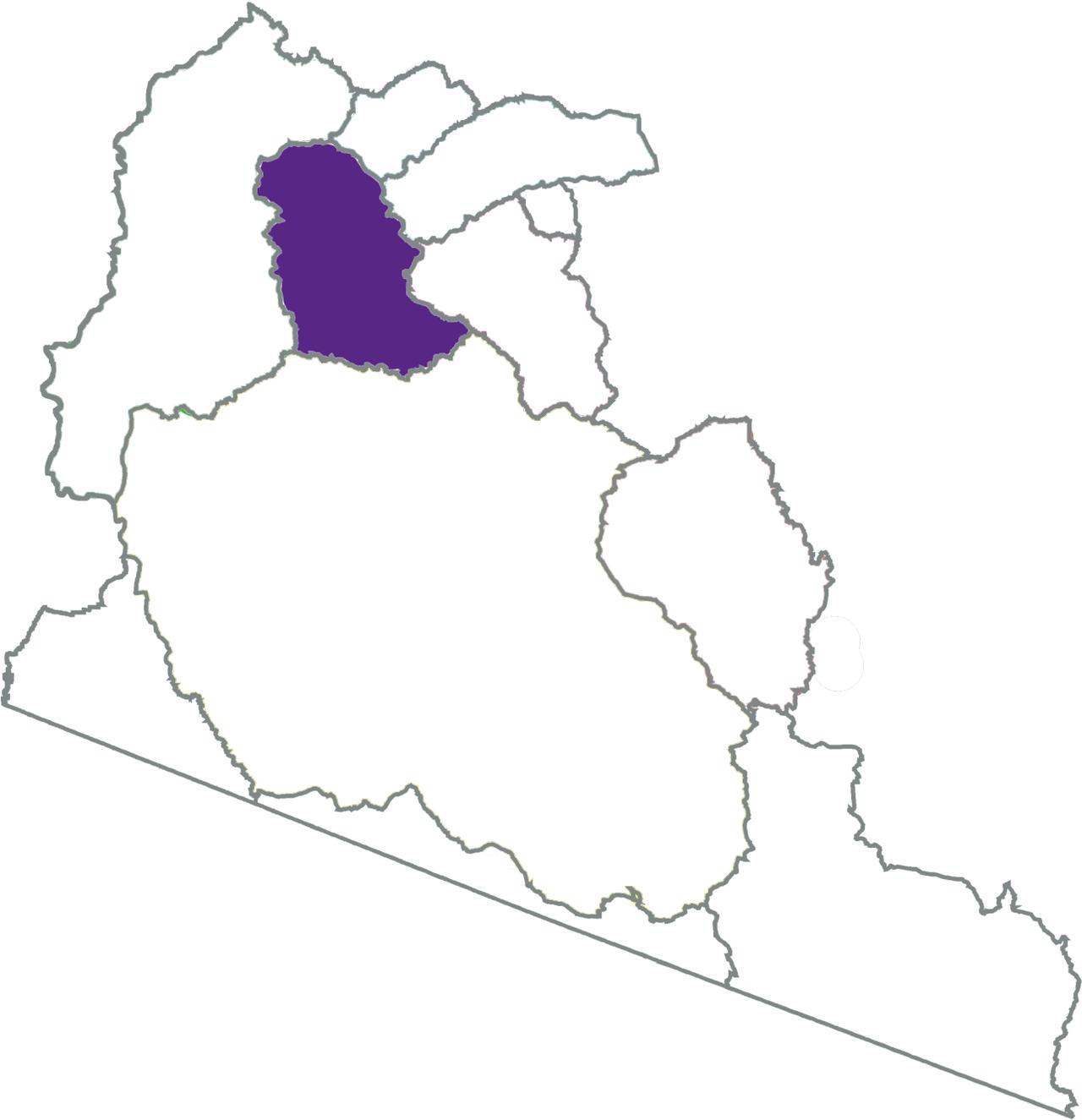


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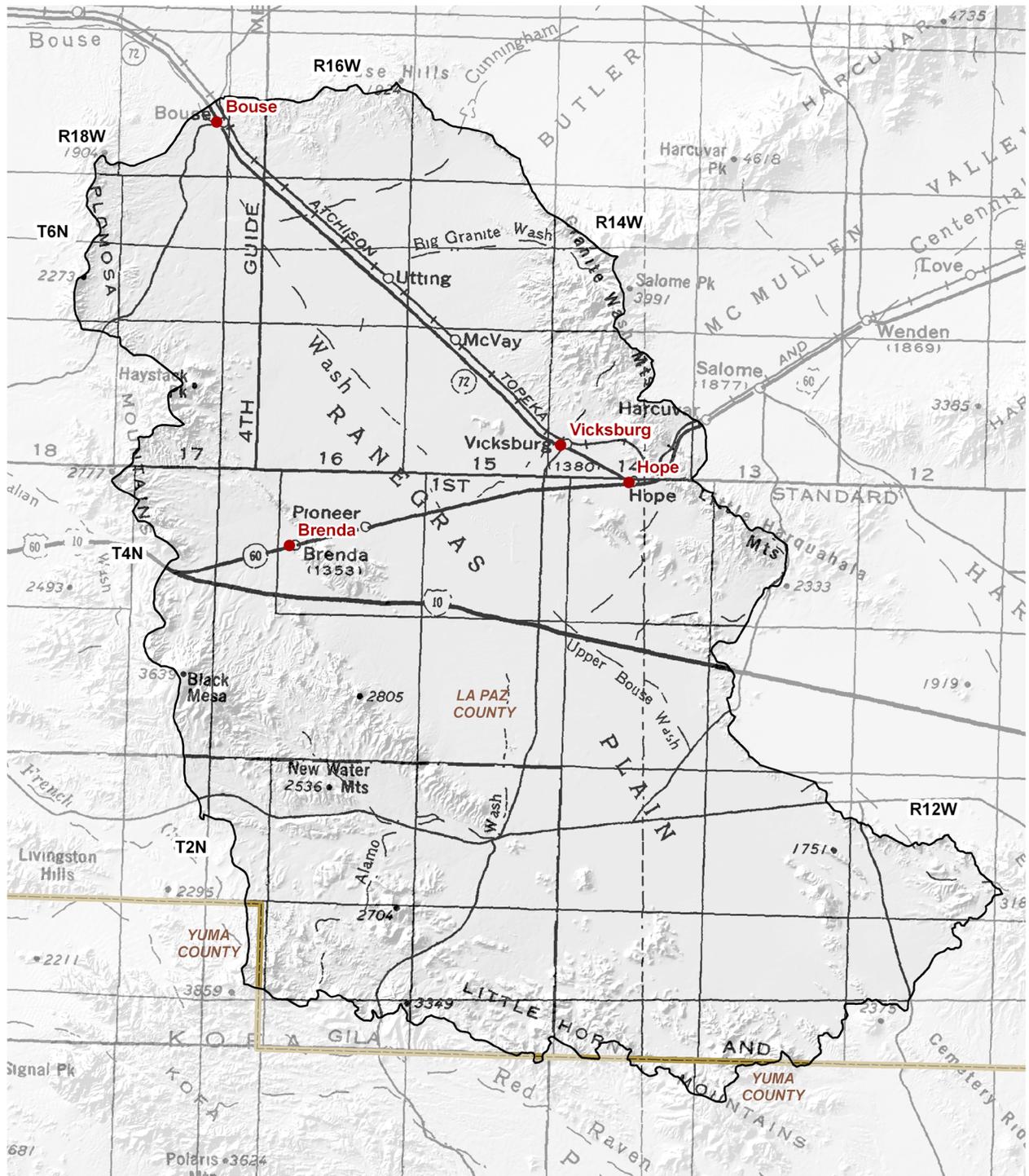
Ranegras Plain Basin



7.7.1 Geography of the Ranegras Plain Basin

The Ranegras Plain Basin, located in the northern part of the planning area is 912 square miles in area. Geographic features and principal communities are shown on Figure 7.7-1. The basin is characterized by a plain bordered by mountain ranges. Vegetation types include Lower Colorado River Valley and Arizona uplands Sonoran desertscrub. (See Figure 7.0-9)

- Principal geographic features shown on Figure 7.7-1 are:
 - Bouse Wash in the northern portion of the basin
 - Ranegras Plain in the center of the basin bordered by the Plomosa, New Water and Little Horn Mountains in the west and the Granite Wash and Little Harquahala Mountains in the east
 - The highest point in the basin at 2,805 feet in the New Water Mountains
 - The lowest point in the basin at 930 feet near the Town of Bouse.



Base Map: USGS 1:500,000, 1981

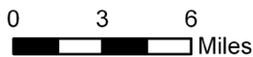


Figure 7.7-1
Ranegras Plain Basin
Geographic Features

COUNTY 
City, Town or Place 

7.7.2 Land Ownership in the Ranegras Plain Basin

Land ownership, including the percentage of ownership by category, for the Ranegras Plain Basin is shown in Figure 7.7-2. The principal feature of land ownership in this basin is the large proportion of U.S. Bureau of Land Management land. 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 7.0.4. Land ownership categories are discussed below in the order of largest to smallest percentage in the basin.

U.S. Bureau of Land Management (BLM)

- 66.3% of the land is federally owned and managed by the Yuma Field Office of the Bureau of Land Management.
- This basin includes the 25,000 acre New Water Mountains Wilderness and 12,000 acres of the 100,000 acre Eagletail Mountains Wilderness. (See Figure 7.0-12)
- Land uses include grazing, resource conservation and recreation.

Wildlife Refuge

- 15.5% of the land is federally owned and managed by the U.S. Fish and Wildlife Service as the Kofa National Wildlife Refuge (NWR).
- Land uses include resource conservation, wildlife protection and recreation.

Private

- 11.1% of the land is private.
- Land uses include domestic, commercial and agriculture.

State Trust Land

- 7.1% of the land is held in trust for the public schools under the State Trust Land system.
- Primary land use is grazing and agriculture.

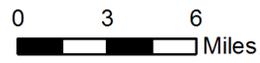
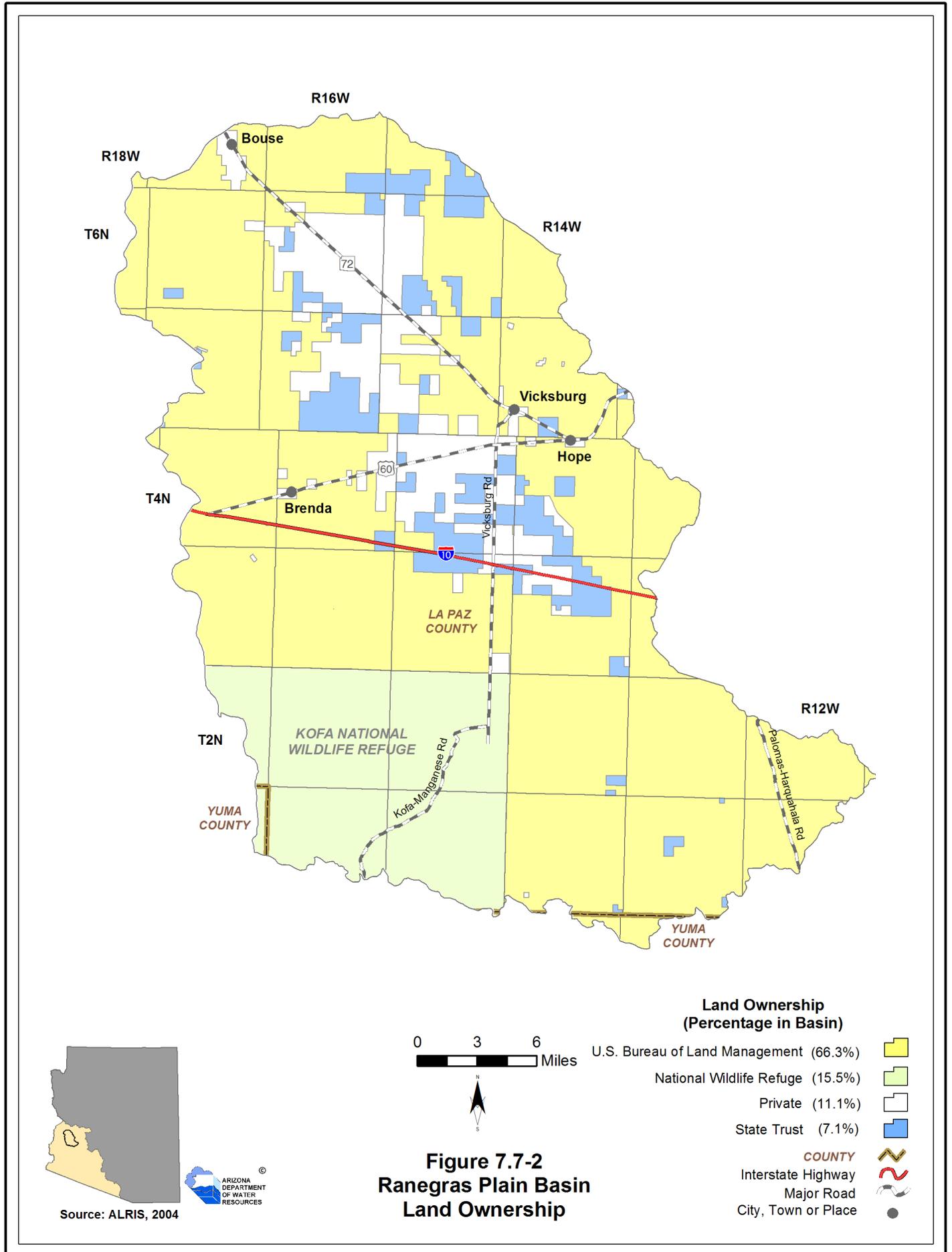


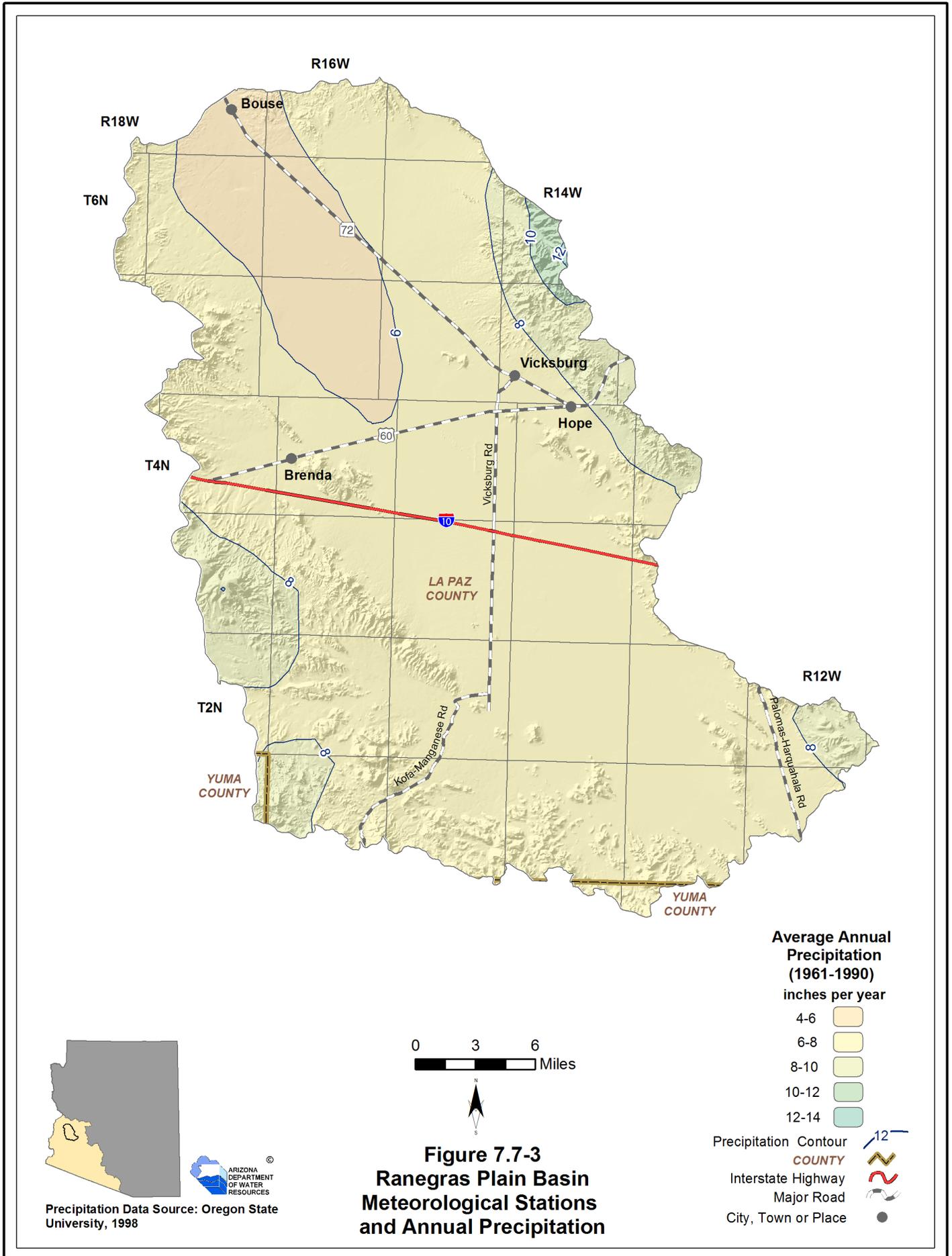
Figure 7.7-2
Ranegras Plain Basin
Land Ownership

7.7.3 Climate of the Ranegras Plain Basin

The Ranegras Plain Basin does not contain NOAA/NWS, Evaporation Pan, AZMET or SNOTEL/Snowcourse stations. Figure 7.7-3 shows precipitation contour data from the Spatial Climate Analysis Service (SCAS) at Oregon State University. More detailed information on climate in the planning area is found in Section 7.0.3. A description of the climate data sources and methods is found in Volume 1, Appendix A.

SCAS Precipitation Data

- See Figure 7.7-3
- Average annual rainfall is as high as 14 inches along the eastern basin boundary north of Vicksburg and as low as four inches in the north central portion of the basin.



7.7.4 Surface Water Conditions in the Ranegas Plain Basin

There are no streamflow data, flood ALERT equipment or USGS runoff contour data available for this basin. Reservoir and stockpond data, including maximum storage or maximum surface area, are shown in Table 7.7-1. Descriptions of stream, reservoir and stockpond data sources and methods are found in Volume 1, Appendix A.

Reservoirs and Stockponds

- Refer to Table 7.7-1.
- There are no large or small reservoirs and 16 registered stockponds in this basin.

Table 7.7-1 Reservoirs and Stockponds in the Ranegas Plain Basin

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

MAP KEY	RESERVOIR/LAKE NAME <i>(Name of dam, if different)</i>	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 <i>(Name of dam, if different)</i>	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: 0

Total maximum storage: 0 acre-feet

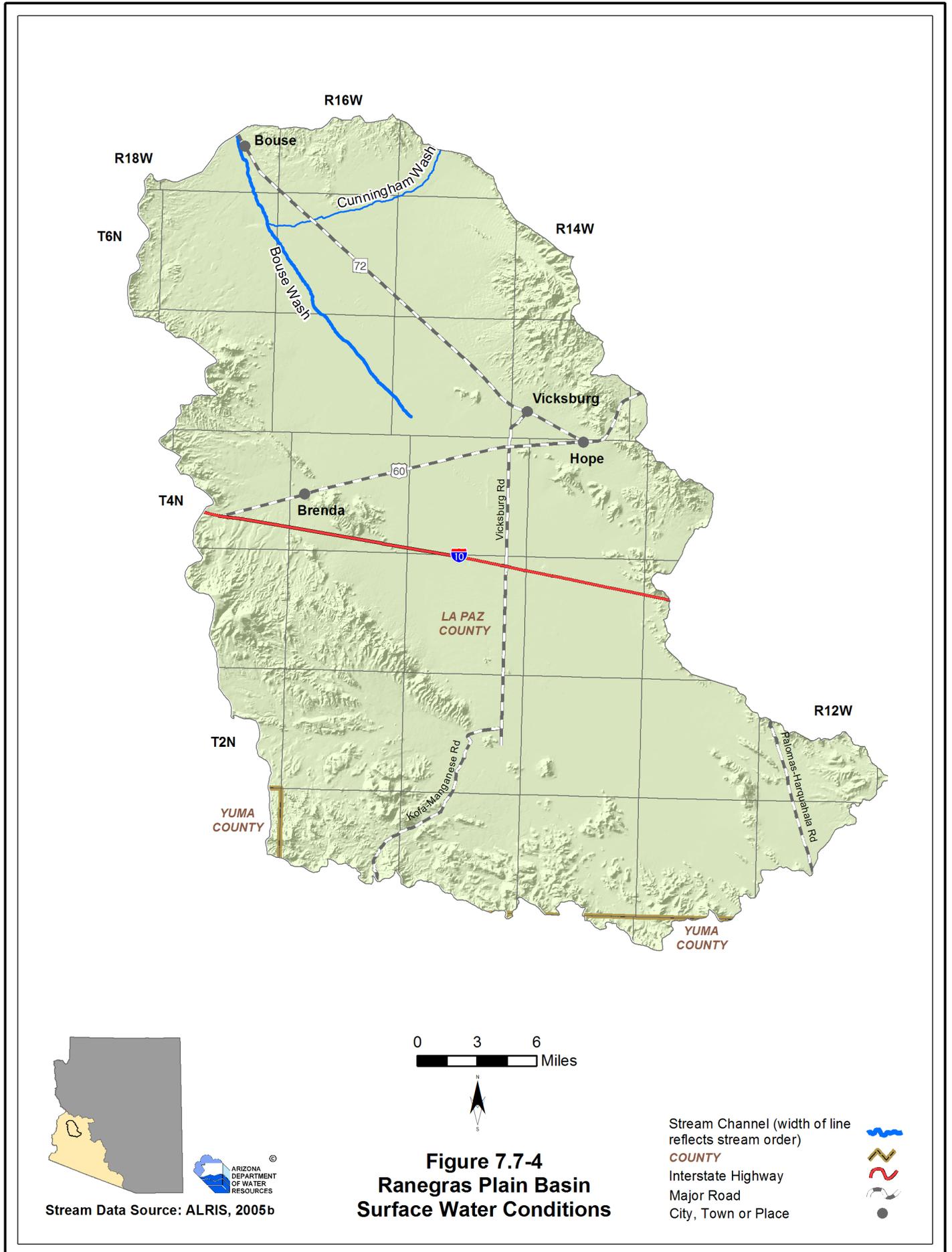
D. Other Small Reservoirs (between 5 and 50 acres surface area)

Total number: 0

Total surface area: 0 acres

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

Total number: 16



7.7.5 Perennial/Intermittent Streams and Major Springs in the Ranegras Plain Basin

The total number of springs in the basin are shown in Table 7.7-2. There are no perennial or intermittent streams and no major or minor springs in the Ranegras Plain Basin. Descriptions of data sources and methods for intermittent and perennial reaches and springs are found in Volume 1, Appendix A.

- The total number of springs, regardless of discharge, identified by the USGS is two.

Table 7.7-2 Springs in the Ranegras Plain 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, 2005a and USGS, 2006a): 2

7.7.6 Groundwater Conditions of the Ranegras Plain Basin

Major aquifers, well yields, estimated water in storage, number of index wells and date of last water-level sweep are shown in Table 7.7-3. Figure 7.7-5 shows aquifer flow direction and water-level change between 1990-1991 and 2003-2004. Figure 7.7-6 contains hydrographs for selected wells shown on Figure 7.7-5. Figure 7.7-7 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 7.7-3 and Figure 7.7-5.
- The major aquifer is basin fill.
- Groundwater flow is generally from south to north, and to a cone of depression caused by irrigation pumping west of Hope.

Well Yields

- Refer to Table 7.7-3 and Figure 7.7-7.
- As shown on Figure 7.7-7, well yields in this basin are generally greater than 1,000 gallons per minute (gpm).
- One source of well yield information, based on 68 reported wells, indicates that the median well yield is 1,150 gpm.

Natural Recharge

- Refer to Table 7.7-3.
- Natural recharge estimates range from less than 1,000 acre-feet per year (AFA) to between 4,550 acre-feet and 6,050 AFA.
- The largest source of natural recharge is infiltration of runoff from the Bouse Wash and its tributaries (ADWR 1994b).

Water in Storage

- Refer to Table 7.7-3.
- Storage estimates for this basin range from 9.0 million acre-feet (maf) to 27 maf to a depth of 1,200 feet.

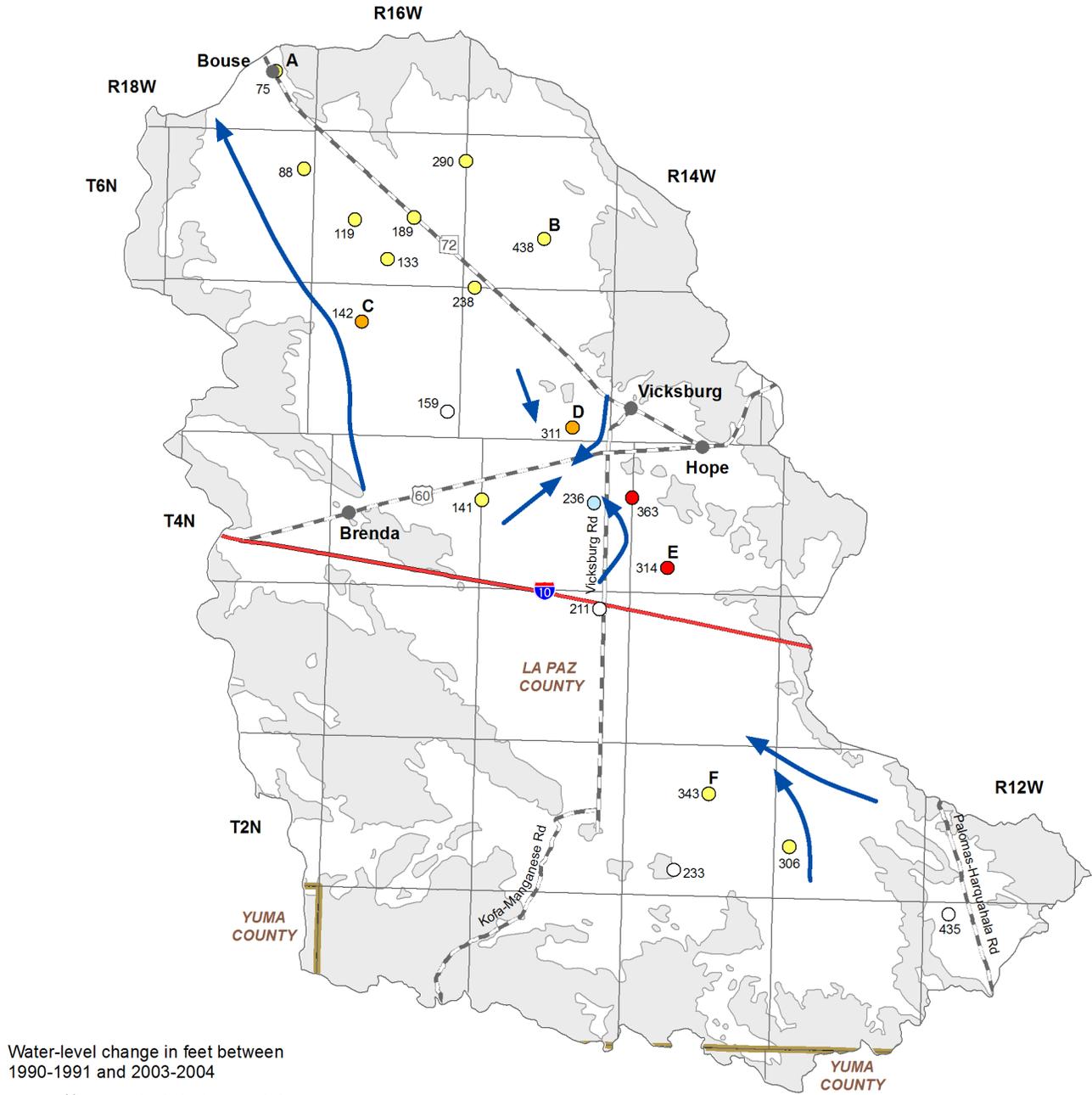
Water Level

- Refer to Figure 7.7-5. Water levels are shown for wells measured in 2003-2004.
- The Department annually measures 19 index wells in this basin. Hydrographs for six index wells are shown on Figure 7.7-6.
- The deepest water level shown on the map is 363 feet south of Vicksburg and the shallowest is 75 feet at Bouse.

Table 7.7-3 Groundwater Data for the Ranegras Plain Basin

Basin Area, in square miles:	912	
Major Aquifer(s):	Name and/or Geologic Units	
	Basin Fill	
Well Yields, in gal/min:	Range 812-3,310 Median 1,993.5 (14 wells measured)	Measured by ADWR (GWSI) and/or USGS
	Range 12-4,000 Median 1,150 (68 wells reported)	Reported on registration forms for large (>10-inch) diameter wells (Wells55)
	Range 85-3,310	ADWR (1994b)
	Range 0-2,500	Anning and Duet (1994)
Estimated Natural Recharge, in acre-feet/year:	5,000	ADWR (1994b)
	5,500	ADWR (1990) (HMS 18)
	<1,000	Freethy and Anderson (1986)
	1,000	Arizona Water Commission (1975)
	4,550 - 6,050	Briggs (1969)
Estimated Water Currently in Storage, in acre-feet:	21,700,000 (to 1,200 ft)	ADWR (1994b)
	9,000,000 ¹ (to 1,200 ft)	Freethy and Anderson (1986)
	27,000,000 (to 1,200 ft)	Arizona Water Commission (1975)
	15,400,000 - 22,200,000	Johnson (1990)
Current Number of Index Wells:	19	
Date of Last Water-level Sweep:	2004 (124 wells measured)	

¹Predevelopment Estimate



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

- Greater than -30
- Between -30 and -15
- Between -15 and -1
- Between +1 and +15
- Change Data Not Available



Generalized Flow Direction



Consolidated Crystalline & Sedimentary Rocks



Unconsolidated Sediments



COUNTY



Interstate Highway



Major Road



City, Town or Place

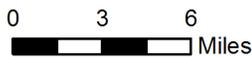


Figure 7.7-5
Ranegras Plain Basin
Groundwater Conditions



Figure 7.7-6
Ranegras Plain Basin
Hydrographs Showing Depth to Water in Selected Wells

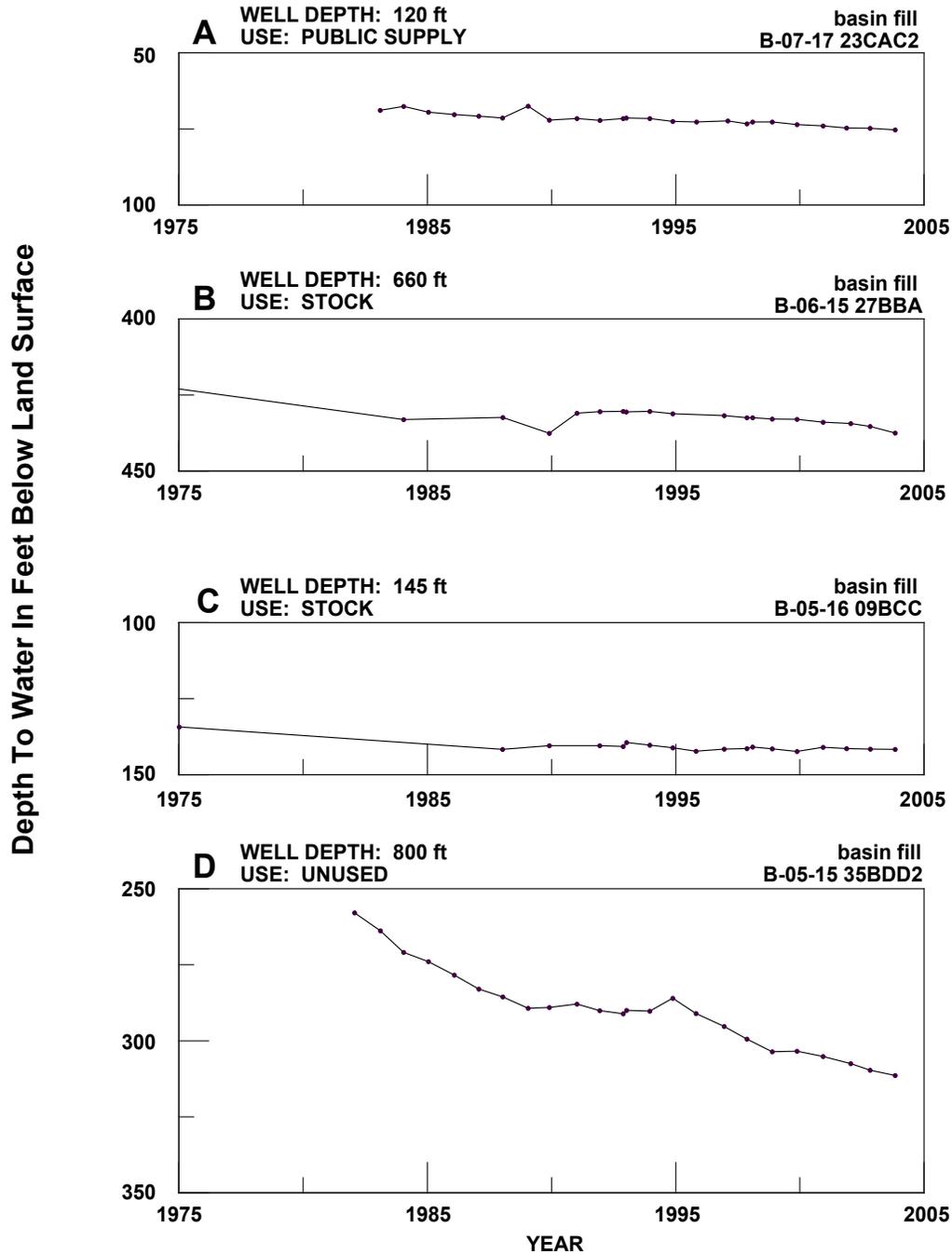
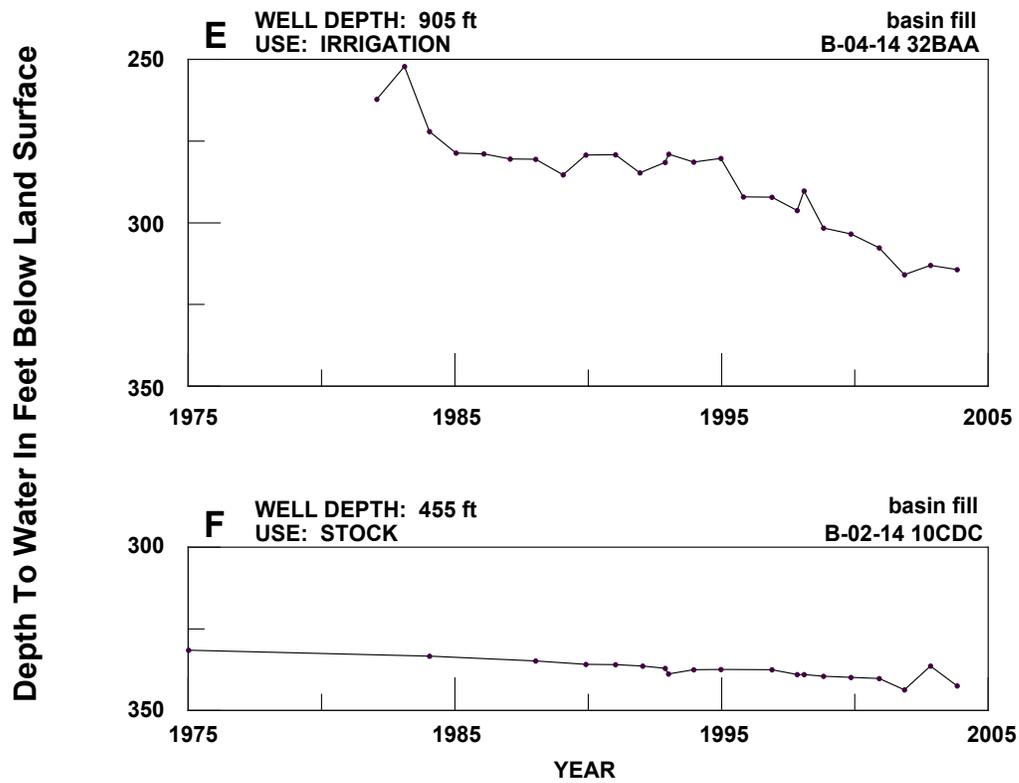
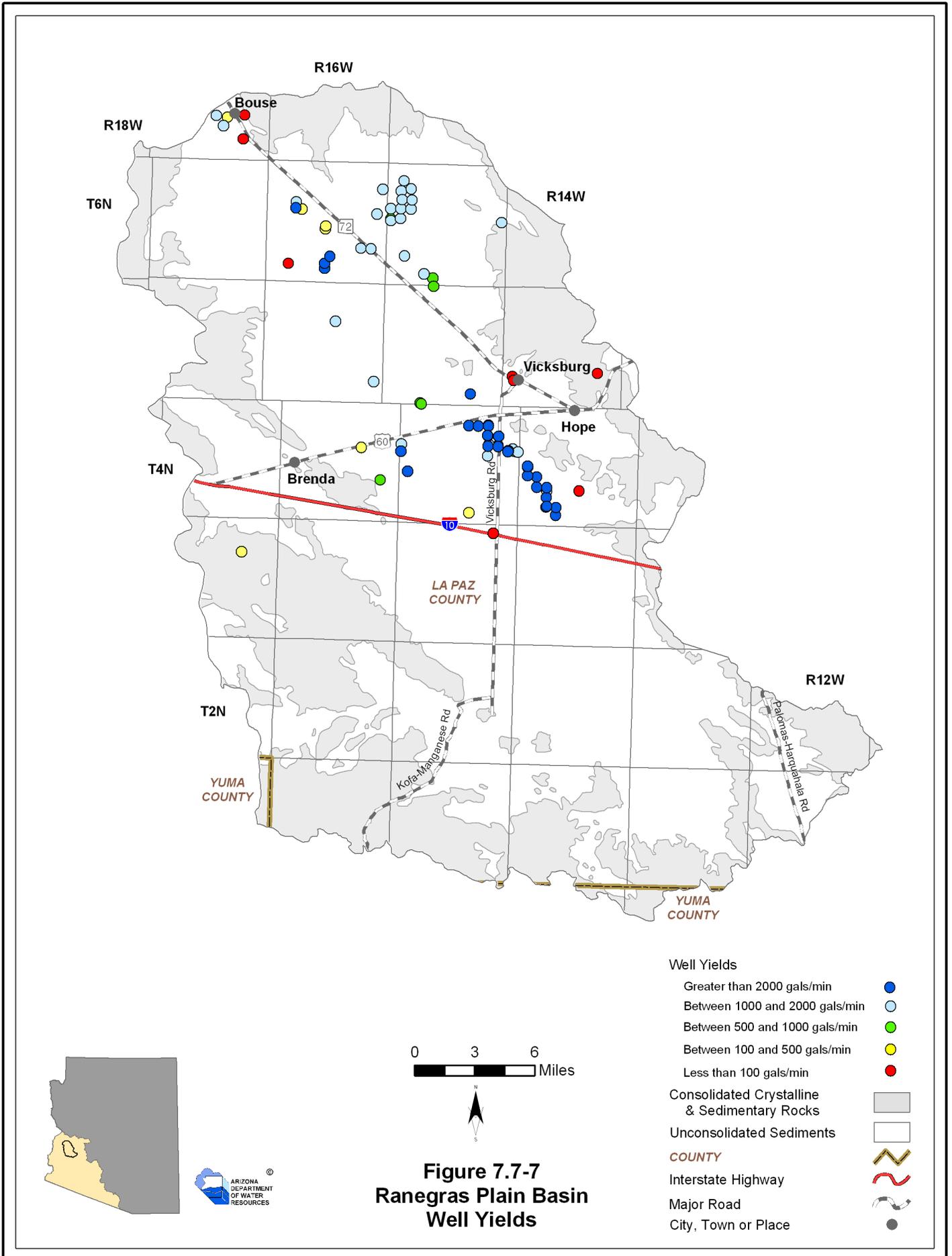


Figure 7.7-6 (cont'd)
Ranegras Plain Basin
Hydrographs Showing Depth to Water in Selected Wells





7.7.7 Water Quality of the Ranegras Plain 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 7.7-4A. There are no impaired lakes or streams in this basin. Figure 7.7-8 shows the location of water quality occurrences keyed to Table 7.7-4. 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 7.7-4A.
- Ninety-one wells have parameter concentrations that have equaled or exceeded drinking water standards.
- The most frequently equaled or exceeded the parameter was fluoride. Other parameters equaled or exceeded include arsenic, barium, chromium, lead, nitrate and total dissolved solids.

Table 7.7-4 Water Quality Exceedences in the Ranegras Plain Basin¹

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	7 North	17 West	22	As, F
2	Well	7 North	17 West	23	As, F
3	Well	7 North	17 West	23	As, F
4	Well	7 North	17 West	23	As, F
5	Well	7 North	17 West	35	As, F
6	Well	6 North	15 West	6	NO3
7	Well	6 North	15 West	6	NO3
8	Well	6 North	15 West	7	NO3, TDS
9	Well	6 North	15 West	8	F
10	Well	6 North	15 West	8	F
11	Well	6 North	15 West	18	F
12	Well	6 North	15 West	18	F
13	Well	6 North	15 West	30	As, F
14	Well	6 North	15 West	30	As, F
15	Well	6 North	15 West	30	As, F
16	Well	6 North	15 West	32	As, F
17	Well	6 North	15 West	33	Pb
18	Well	6 North	15 West	33	As, Pb
19	Well	6 North	16 West	12	F
20	Well	6 North	16 West	15	Cr
21	Well	6 North	16 West	15	Cr, TDS
22	Well	6 North	16 West	16	F
23	Well	6 North	16 West	17	F
24	Well	6 North	16 West	17	As
25	Well	6 North	16 West	17	As, F
26	Well	6 North	16 West	20	F
27	Well	6 North	16 West	22	F
28	Well	6 North	16 West	23	As, NO3, TDS
29	Well	6 North	16 West	23	F
30	Well	6 North	16 West	26	NO3, TDS
31	Well	6 North	16 West	32	As, F
32	Well	6 North	16 West	34	As, F
33	Well	6 North	17 West	12	As, F
34	Well	6 North	17 West	12	Ba
35	Well	6 North	17 West	12	F
36	Well	5 North	15 West	4	As, F
37	Well	5 North	15 West	4	As, F
38	Well	5 North	15 West	6	F, NO3, TDS
39	Well	5 North	15 West	20	As, F
40	Well	5 North	15 West	21	F
41	Well	5 North	15 West	30	As, F, NO3, TDS
42	Well	5 North	16 West	9	As, F, Pb
43	Well	5 North	16 West	10	As, F
44	Well	4 North	14 West	4	As
45	Well	4 North	14 West	19	As, F
46	Well	4 North	14 West	19	As, F, NO3
47	Well	4 North	14 West	19	F
48	Well	4 North	14 West	19	As, F, NO3
49	Well	4 North	14 West	29	As, F
50	Well	4 North	14 West	29	F
51	Well	4 North	14 West	29	F
52	Well	4 North	14 West	30	As, Cr, F
53	Well	4 North	14 West	32	As, Cr, F
54	Well	4 North	14 West	32	As, Cr, F, NO3
55	Well	4 North	14 West	32	F
56	Well	4 North	15 West	8	F, NO3
57	Well	4 North	15 West	8	As
58	Well	4 North	15 West	9	As, NO3

Table 7.7-4 Water Quality Exceedences in the Ranegras Plain 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	
59	Well	4 North	15 West	10	F
60	Well	4 North	15 West	10	F
61	Well	4 North	15 West	11	F
62	Well	4 North	15 West	11	As, Cr, F, NO3
63	Well	4 North	15 West	11	F
64	Well	4 North	15 West	13	As, Cr, F
65	Well	4 North	15 West	13	F
66	Well	4 North	15 West	13	As, F
67	Well	4 North	15 West	13	F
68	Well	4 North	15 West	14	As, F, NO3
69	Well	4 North	15 West	14	As, F, NO3, TDS
70	Well	4 North	15 West	14	As
71	Well	4 North	15 West	18	As
72	Well	4 North	15 West	18	As, F
73	Well	4 North	15 West	23	F
74	Well	4 North	15 West	28	As, NO3
75	Well	4 North	16 West	9	As, F
76	Well	4 North	16 West	13	As
77	Well	4 North	16 West	13	As, F
78	Well	4 North	16 West	13	As
79	Well	4 North	16 West	15	As, F
80	Well	4 North	16 West	18	As
81	Well	4 North	16 West	18	As
82	Well	4 North	16 West	19	As
83	Well	4 North	16 West	19	As
84	Well	3 North	14 West	11	F
85	Well	3 North	15 West	2	As, F, NO3
86	Well	3 North	15 West	2	As, F
87	Well	3 North	15 West	2	As, Cr, F
88	Well	3 North	15 West	23	As, F
89	Well	2 North	13 West	19	As
90	Well	2 North	14 West	10	As
91	Well	2 North	14 West	28	NO3

Source: Compilation of databases from ADWR & others

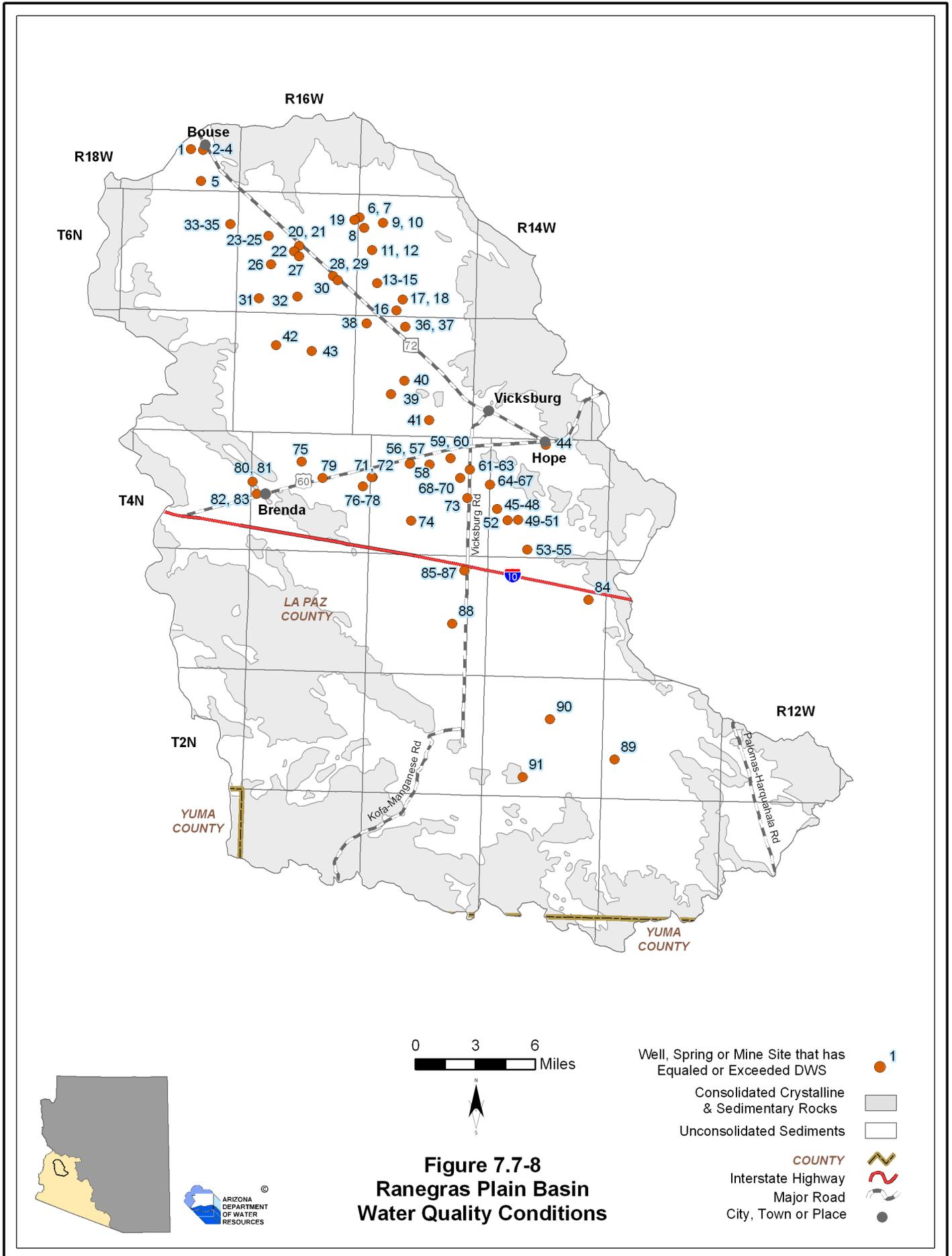
B. Lakes and Streams

Map Key	Site Type	Site Name	Length of Impaired Stream Reach (in miles)	Area of Impaired Lake (in acres)	Designated Use Standard	Parameter(s) Exceeding Use Standard
None identified by ADWR at this time						

Notes:

¹ Water quality samples collected between 1978 and 1991. Listed TDS exceedences indicate "mineralized water" that contains over 3000 milligrams per liter (mg/l) of TDS and would require special well construction procedures (A.A.C. R12-15-812(B)). The secondary drinking water standard for TDS is 500 mg/l.

² As = Arsenic
Ba = Barium
Cr = Chromium
F = Fluoride
Pb = Lead
NO3 = Nitrate
TDS = Total Dissolved Solids



7.7.8 Cultural Water Demands in the Ranegras Plain 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 7.7-5. Figure 7.7-9 shows the location of demand centers. There is no recorded effluent generation in this basin. 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 7.0.7.

Cultural Water Demands

- Refer to Table 7.7-5 and Figure 7.7-9.
- Population in this basin declined from 1,024 in 1980 to 581 in 1990 but is slowly increasing. The 2000 basin population was 905.
- There are no reported surface water diversions in this basin.
- Most cultural water use is for irrigation in the northern half of the basin.
- Groundwater use for agriculture decreased from 1991 to 2005 with 28,800 AFA on average between 2001 and 2005.
- Municipal groundwater demand is relatively small and increased from less than 300 AFA in 1991-1995 to 400 AFA in 2001-2005.
- There was no reported industrial groundwater demand from 1991 to 2005. Another dairy began operating in December 2006.
- As of 2005 there were 522 registered wells with a pumping capacity of less than or equal to 35 gpm and 138 wells with a pumping capacity of more than 35 gpm.

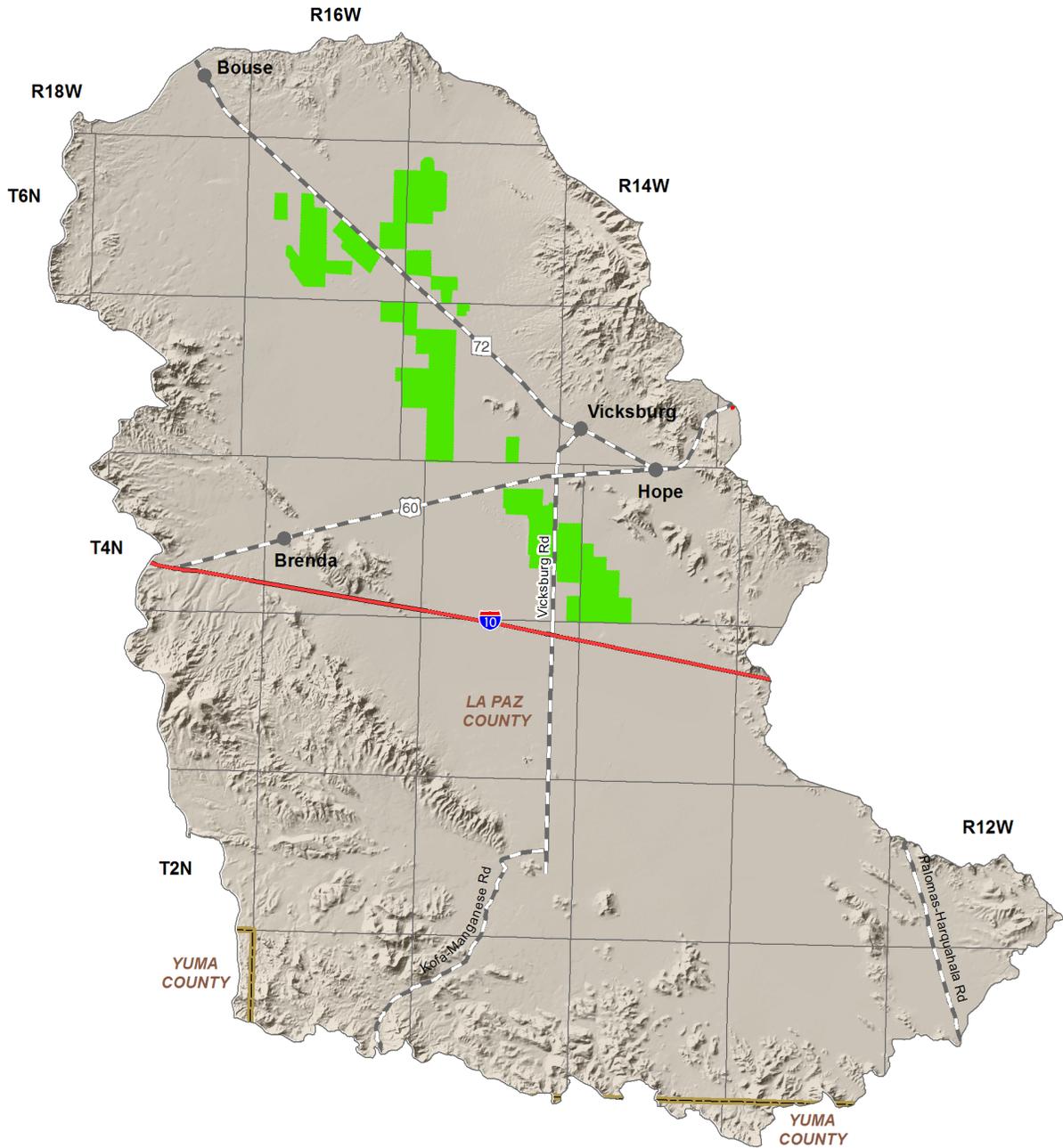
Table 7.7-5 Cultural Water Demand in the Ranegras Plain Basin¹

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		155 ²	91 ²	18,000			NR			ADWR (1994a)
1972				11,000			NR			
1973				35,000			NR			
1974				31,000			NR			
1975				31,000			NR			
1976				31,000			NR			
1977				31,000			NR			
1978		31,000			NR					
1979		31,000			NR					
1980	1,024	43	17	35,000			NR			ADWR (1994a)
1981	980			31,000			NR			
1982	935			31,000			NR			
1983	891			31,000			NR			
1984	847			31,000			NR			
1985	802			31,000			NR			
1986	758			31,000			NR			
1987	714	61	12	31,000			NR			ADWR (1994a)
1988	669			31,000			NR			
1989	625			31,000			NR			
1990	581			31,000			NR			
1991	613			31,000			NR			
1992	646			31,000			NR			
1993	678			31,000			NR			
1994	710	62	3	<300	NR	29,500	NR			USGS (2007)
1995	743			29,500			NR			
1996	775			29,500			NR			
1997	808			29,500			NR			
1998	840			29,500			NR			
1999	873			29,500			NR			
2000	905			29,500			NR			
2001	920	96	5	300	NR	32,000	NR			USGS (2007)
2002	934			32,000			NR			
2003	949			32,000			NR			
2004	963			32,000			NR			
2005	978			32,000			NR			
2010	1,050			32,000			NR			
2020	1,128			32,000			NR			
2030	1,198	32,000			NR					
WELL TOTALS:		522	138							

¹ Does not include evaporation losses from stockpounds and reservoirs.

² Includes all wells through 1980.

NR - Not reported



Primary Data Source: USGS National Gap Analysis Program, 2004

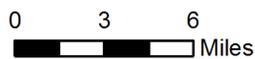


Figure 7.7-9
Raneras Plain Basin
Cultural Water Demand

Demand Centers

- Agriculture
- COUNTY
- Interstate Highway
- Major Road
- City, Town or Place

7.7.9 Water Adequacy Determinations in the Ranegras Plain Basin

Water adequacy determination information including the subdivision name, location, number of lots, adequacy determination, reason for an inadequacy determination, date of determination and subdivision water provider are shown in Table 7.7-6. Figure 7.7-10 shows the general locations of subdivisions (to the section level) 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 La Paz County. Eight water adequacy determinations for 280 lots have been made in this basin through December 2008. Twenty-six lots in one subdivision, or 9% of lots, were determined to be adequate.
- The most common reason for a determination of inadequacy is water quality.

Table 7.7-6 Adequacy Determinations in the Ranegras Plain Basin¹

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	Bucksaw	La Paz	6 North	16 West	17	54	53-700293	Inadequate	A1,C	4/9/2007	Dry Lot Subdivision
2	Desert Rose Acres (Tract No. 0135)	La Paz	6 North	16 West	22	64	53-400809	Inadequate	C	10/22/2002	Dry Lot Subdivision
3	Desert Shadows	La Paz	4 North	16 West	19	26	53-500579	Adequate		1/10/1994	Desert Shadows Water District
4	Eden Park Phase 3	La Paz	4 North	15 West	1	67	53-700557	Inadequate	A1	8/20/2008	Eden Park HOA
5	Eden Park RV Subdivision	La Paz	4 North	15 West	1	16	53-400701	Inadequate	D	5/8/2002	Eden Park HOA
6	Eden Park RV Subdivision Phase 2	La Paz	4 North	15 West	1	12	53-700294	Inadequate	A1	4/12/2007	Eden Park HOA
7	Faybol Subdivision	La Paz	6 North	16 West	34	29	53-300247	Inadequate	A1,C	1/28/1997	Dry Lot Subdivision
8	Sunnyside, Unit 1	La Paz	7 North	17 West	35	12	53-402075	Inadequate	A1	7/26/2006	Undetermined Provider

Source: ADWR 2008a

Notes:

¹Each 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.

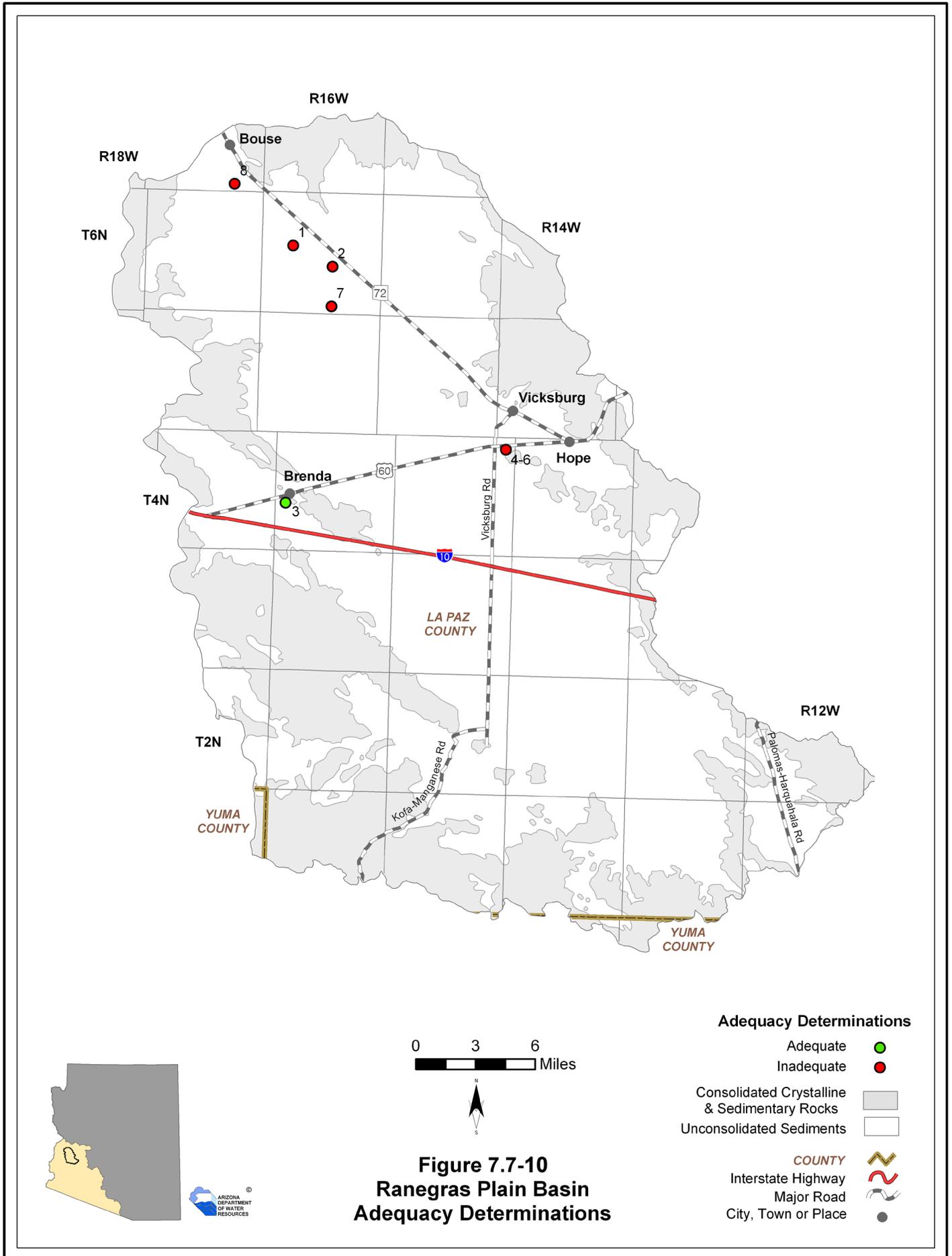
³ A. Physical/Continuous

- 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 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



Ranegras Plain Basin

References and Supplemental Reading

References

A

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