CIENEGA CREEK BASIN

References and Suggested Reading

A

Anning, D.W. and N.R. Duet, 1994, Summary of ground-water conditions in Arizona, 1987-90, USGS Open-file Report 94-476.

Arizona Department of Economic Security, 2005, Workforce Informer: Data file, accessed August 2005, http://www.workforce.az.gov.

Arizona Department of Environmental Quality (ADEQ), 2005a, Effluent dependent waters: GIS cover, received December 2005.

_____, 2005b, Impaired lakes and reaches: GIS cover, received January 2006.

_____, 2005c, WWTP and permit files: Miscellaneous working files, received July 2005.

_____, 2004, Water quality exceedences by watershed: Data file, received June 2004.

_____, 2003, Status of Water Quality in Arizona in 2002, Vol. 2.

Arizona Department of Water Resources (ADWR), 2008a, Assured and adequate water supply applications: Project files, ADWR Hydrology Division.

_____, 2008b, Industrial demand outside of the Active Management Areas 1991-2007: Unpublished analysis by ADWR Office of Resource Assessment Planning.

_____, 2005a, Agricultural Surface Water Use Estimates: Unpublished analysis, ADWR Office of Resource Assessment Planning.

_____, 2005b, Automated recorder sites: Data files, ADWR Basic Data Unit.

_____, 2005c, 2004 rural water provider questionnaire: Data files, ADWR Office of Resource Assessment Planning.

_____, 2005d, Flood warning gages: Database, ADWR Office of Water Engineering.

_____, 2005e, Groundwater Site Inventory (GWSI): Database, ADWR Hydrology Division.

_____, 2005f, Wells55: Database.

_____, 2004, Rural Water Resources 2003 Questionnaire Report: Rural water resources study, ADWR Office of Regional Strategic Planning.

_____, 1994a, Arizona Water Resources Assessment, Vol. I, Inventory and Analysis.

_____, 1994b, Arizona Water Resources Assessment, Vol. II, Hydrologic Summary.

_____, 1990, Draft outline of basin profiles for the state water assessment: ADWR Statewide Planning Division, Memorandum to L. Linser, January 16, 1990.

Arizona Game and Fish Department (AGFD), 2005, Arizona Waterways: Data file, received April 2005.

_____, 1997 & 1993, Statewide riparian inventory and mapping project: GIS cover.

Arizona Land Resource Information System (ALRIS), 2005a, Springs: GIS cover, accessed January 2006 at http://www.land.state.az.us/alris/index.html.

_____, 2005b, Streams: GIS cover, accessed 2005 at http://www.land.state.az.us/alris/index.html.

_____, 2004, Land ownership: GIS cover, accessed in 2004 at http://www.land.state.az.us /alris/index.html.

Arizona Water Commission, 1975, Summary, Phase I, Arizona State Water Plan, Inventory of resource and uses.

B

Bureau of Land Management (BLM), 1999, National Monuments: GIS cover.

D

Diroll, M., and D. Marsh, 2006, Status of water quality in Arizona-2004 integrated 305(b) assessment and 303(d) listing report: ADEQ report.

F

Fisk, G.G., D.W, Duet, C.E. Evans, N.K. Angernoth, and S.A Longsworth, 2004, Water Resources Data, Arizona Water Year 2003: USGS Water-Data Report AZ-03-1.

Freethey, G.W. and T.W. Anderson, 1986, Predevelopment hydrologic conditions in the alluvial basins of Arizona and adjacent parts of California and New Mexico: USGS Hydrologic Investigations Atlas-HA664.

G

Gebert, W.A., D.J. Graczyk and W.R. Krug, 1987, Average annual runoff in the United States, 1951-1980: GIS Cover, accessed March 2006 at http://aa179.cr.usgs.gov/metadata/wrdmeta/runoff.htm.

M

Montgomery & Assoc., 1999, Hydrological investigations of groundwater movement and sources of base flow to Sonoita Creek near Patagonia Arizona, Santa Cruz County, Arizona.

Murphy, B.A. and J.D. Hedley, 1984, Map showing groundwater conditions in the Upper Santa Cruz Basin area, Pima, Santa Cruz, Pinal, and Cochise counties Arizona 1982: ADWR Hydrologic Map Series # 11.

O

Oregon State University, Spatial Climate Analysis Service (SCAS), 2006, Average annual precipitation in Arizona for 1961-1990: PRISM GIS cover, accessed in 2006 at www.ocs.orst.edu/prism.

P

Pope, G.L., P.D. Rigas and C.F. Smith, 1998, Statistical summaries of streamflow data and characteristics of drainage basins for selected streamflow-gaging stations in Arizona through water year 1996: USGS Water Resources Investigations Report 98-4225.

T

Tadayon, S., 2004, Water withdrawals for irrigation, municipal, mining, thermoelectric-power, and drainage uses in Arizona outside of the active management areas, 1991-2000: USGS Scientific Investigations Report 2004-5293, 27 pp.

U

United States Geological Survey, 2008, National Water Information System (NWIS) data for Arizona: Accessed October 2008 at http://waterdata.usgs.gov/nwis.

_____, 2007, Water withdrawals for irrigation, municipal, mining, thermoelectric-power, and drainage uses in Arizona outside of the active management areas, 2000-2005: Data file, received November 2007.

_____, 2006a, National Hydrography Dataset: Arizona dataset, accessed at http://nhd.usgs.gov/.

_____, 2006b Springs and spring discharges: Dataset, received November 2004 and January 2006 from USGS office in Tucson, AZ.

_____, 2004, Southwest Regional Gap analysis study- land cover descriptions: Electronic file, accessed January 2005 at http://earth.gis.usu.edu/swgap.

_____, 1981, Geographic digital data for 1:500,000 scale maps: USGS National Mapping Program Data Users Guide.

V

Valencia, R.A., J.A. Wennerlund, R.A. Winstead, S. Woods, L. Rile, E. Swanson and S. Olson, 1993, Arizona riparian inventory and mapping project: Arizona Game and Fish.

W

Wahl, C.R., S.R. Boe, R.A. Wennerlund, R.A. Winstead, L.J. Allison and D.M. Kubly, 1997, Remote sensing mapping of Arizona intermittent stream riparian areas: Arizona Game and Fish Technical Report 112.

Supplemental Reading

Anderson, T.W. and G.W. Freethey, 1995, Simulation of groundwater flow in alluvial basins in south central Arizona and parts of adjacent states: USGS Professional Paper 1406-D.

Arizona Department of Environmental Quality, 2007, TMDL Implementation Plan for Cadmium, Copper, Zinc and Acidity: Alum Gulch, ADEQ OFR 07-03.

_____, 2003, Total Maximum Daily Load For: Upper Harshaw Creek, Sonoita Creek Basin, Santa Cruz River Watershed, Coronado National Forest, near Patagonia, Santa Cruz County, Arizona, ADEQ OFR 07-09.

_____, 2003, Total Maximum Daily Load For: Upper Alum Gulch, Sonoita Creek Basin, Santa Cruz River Watershed, Coronado National Forest near Patagonia, Santa Cruz County, Arizona, ADEQ OFR 07-08.

Arizona Geological Survey, 1996, Refinement of geologic model, lower Cienega basin, Pima County, Arizona: Arizona Water Protection Fund Project 95-016.

Blomgren, N.F., 1999, Water Law and Policy in the Sonoita Creek Basin: University of Arizona, M.S. thesis.

Bota, L., 1997, Modeling of Groundwater Flow and Surface/Groundwater Interaction for Upper Cienega Creek Basin: University of Arizona, M.S. thesis.

Bureau of Reclamation, 1990, Upper Gila water supply analyses and sizing studies: Arizona Projects Office, draft report, April 1990.

Chong-Diaz, D., 1995, Modeling of Stream Aquifer Interaction in Lower Cienega Creek Basin Using a Finite Element Technique: University of Arizona, M.S. thesis.

Ellett, W.J., 1994, Geologic Controls on the Occurrence and Movement of Water in the Lower Cienega Creek Basin: University of Arizona, M.S. thesis.

Fluid Solutions, 2005 Hydrologic Study - Smith Ranch Master Planned Community.
Haley & Aldrich Inc., 2000, Hydrologic Study, Empirita Highlands at the J-6 Ranch, Cochise/Pima County Arizona.

Gangadean, D., 1999, Storm Response of Sonoita Creek Watershed: University of Arizona, M.S. thesis.

Gebler, J. B., 1998, Water quality of selected effluent dependent stream reaches in southern Arizona as indicated by concentrations of periphytic chlorophyll *a* and aquatic invertebrate communities: USGS Water Resources Investigations Report 98-4199, 12 p.

Grahn, H.L., 1995, A Hydrogeochemical Evaluation of the Lower Cienega Creek Sub-Basin, Pima County, Arizona: University of Arizona, M.S. thesis.

Hess, G.S., Zucker, C.L., Karrer, C.A., Kusher, G.F., Radtke, D.B., 1998, Groundwater and streamflow monitoring in the Cienega Creek Nature Preserve, Pima County, Arizona: in Water at the Confluence of Science, Law and Public Policy: Proceedings from the 11th annual Arizona Hydrological Society Symposium, September 1998, Tucson, Arizona, p. 92.

Huth, H.J., 1997, Hydrogeochemical Modeling of Western Mountain Front Recharge, Upper Cienega Creek Sub-Basin, Pima County, Arizona: University of Arizona, M.S. thesis.

Kennard, M., A.E. Johnson and T.W. Perry, 1988, Preliminary Report on the Hydrology of the Cienega Creek Groundwater Basin: Arizona Department of Water Resources Division of Hydrology, Special Studies.

Knight, E.L., 1996, A Water Budget and Land Management Recommendations for Upper Cienega Creek Basin: University of Arizona, M.S. thesis.

Matt, C.E., 1995, Water Resource Administration of Lower Cienega Creek near Tucson: University of Arizona, M. S. thesis.

Megdal, S., K. Mott Lacroix, and A. Schwarz, 2006, Projects to Enhance Arizona's Environment: An Examination of their Functions, Water Requirements and Public Benefits: University of Arizona, Water Resources Research Center.

Morton, E.S., 2001, Arid lands, watersheds, and mining: Sonoita Creek watershed: In Proceedings from the 14th annual Arizona Hydrological Society Symposium, September 2001, Tucson, Arizona, p. 119.

Nature Conservancy, 1999, Hydrogeologic investigation of groundwater movement and sources of base flow to Sonoita Creek and implementation of long term monitoring program: Arizona Water Protection Fund Project 96-0006.

Roudebush, E.M., 1996, The Influence of Bedrock on Perennial Stream flow in the Upper Cienega Creek Basin, Pima County, Arizona: University of Arizona, M.S. thesis

Williams, M.D., 1996, Evapotranspiration in Southeast Arizona Semi-Arid Watersheds: Walnut Gulch and Cienega Creek: University of Arizona, M.S. thesis.

Wittler, R. J., Klawon, J.E., and Collins, K.L., 2004, Upper Gila River fluvial geomorphology study: Bureau of Reclamation final report.

Zucker, C., 2004. Geologic influences on the hydrology of Cienega Creek: in The Value of Water; Proceedings from the 17th annual Arizona Hydrological Society Symposium, September 2004, Tucson Arizona.

FIGURES

Figure 3.0-1	Arizona Planning Areas	2
Figure 3.0-2	Southeastern Arizona Planning Area	3
Figure 3.0-3	Physiographic Regions of Arizona	4
Figure 3.0-4	Geology of the Southeastern Arizona Planning Area	5
Figure 3.0-5	Southeastern Arizona USGS Watersheds	15
Figure 3.0-6	Average monthly precipitation and temperature in the Southeastern Arizona Planning Area, 1930-2002	19
Figure 3.0-7	Average temperature (left) and total precipitation in the Southeastern Arizona Planning Area from 1930-2002	20
Figure 3.0-8	Arizona NOAA climate division 7 (southeastern Arizona; Graham, Greenlee, Cochise, Santa Cruz, and Pima Counties) winter (November-April) precipitation departures from average, 1000-1988, reconstructed from tree rings	21
Figure 3.0-9	Southeastern Arizona Planning Area Biotic Communities and Ecoregions	23
Figure 3.0-10	Southeastern Arizona Planning Area Location of Major Wildfires 2002-2006	26
Figure 3.0-11	Southeastern Arizona Instream Flow Applications	29
Figure 3.0-12	Southeastern Arizona Protected Areas	32
Figure 3.0-13	Water Supplies Utilized in the Southeastern Arizona Planning Area in acre-feet (average annual use 2001-2005)	40
Figure 3.0-13	Southeastern Arizona Planning Area Registered Wells and Surface Water Diversion Points	43
Figure 3.0-15	Southeastern Arizona Planning Area Contamination Sites	50
Figure 3.0-16	Cultural Water Demand by Sector in the Southeastern Arizona Planning Area	51
Figure 3.0-17	Cultural Water Demand by Basin in the Southeastern Arizona Planning Area	52
Figure 3.0-18	Southeastern Arizona Planning Area average annual agricultural demand 2001-2005 by basin, in acre-feet	59
Figure 3.1-3	Aravaipa Canyon Basin Meteorological Stations and Annual Precipitation	87
Figure 3.1-4	Aravaipa Canyon Basin Surface Water Conditions	89
Figure 3.1-5	Aravaipa Canyon Basin Perennial/Intermittent Streams and Major (>10 gpm) Springs	92
Figure 3.1-6	Aravaipa Canyon Basin Groundwater Conditions	95
Figure 3.1-7	Aravaipa Canyon Basin Hydrographs Showing Depth to Water in Selected Wells	96
Figure 3.1-8	Aravaipa Canyon Basin Well Yields	97
Figure 3.1-9	Aravaipa Canyon Basin Water Quality	99
Figure 3.1-10	Aravaipa Canyon Basin Cultural Water Demand	102
Figure 3.2-1	Bonita Creek Basin Geographic Features	111
Figure 3.2-2	Bonita Creek Basin Land Ownership	113

Figure 3.2-3	Bonita Creek Basin Meteorological Stations and Annual Precipitation	115
Figure 3.2-4	Bonita Creek Basin Surface Water Conditions	119
Figure 3.2-5	Bonita Creek Basin Perennial/Intermittent Streams and Major (>10 gpm) Springs	121
Figure 3.2-6	Bonita Creek Basin Groundwater Conditions	124
Figure 3.2-7	Bonita Creek Basin Well Yields	125
Figure 3.2-8	Bonita Creek Basin Cultural Water Demands	129
Figure 3.3-1	Cienega Creek Basin Geographic Features	137
Figure 3.3-2	Cienega Creek Basin Land Ownership	139
Figure 3.3-3	Cienega Creek Basin Meteorological Stations and Annual Precipitation	141
Figure 3.3-4	Cienega Creek Basin Surface Water Conditions	146
Figure 3.3-5	Cienega Creek Basin Perennial/Intermittent Streams and Major (>10gpm) Springs	149
Figure 3.3-6	Cienega Creek Basin Groundwater Conditions	152
Figure 3.3-7	Cienega Creek Basin Hydrographs Showing Depth to Water in Selected Wells	153
Figure 3.3-8	Cienega Creek Basin Well Yields	154
Figure 3.3-9	Cienega Creek Basin Water Quality Conditions	158
Figure 3.3-10	Cienega Creek Basin Cultural Water Demand	162
Figure 3.3-11	Cienega Creek Basin Adequacy Determinations	165
Figure 3.4-1	Donnelly Wash Basin Geographic Features	173
Figure 3.4-2	Donnelly Wash Basin Land Ownership	175
Figure 3.4-3	Donnelly Wash Basin Meteorological Stations and Annual Precipitation	177
Figure 3.4-4	Donnelly Wash Basin Surface Water Conditions	179
Figure 3.4-5	Donnelly Wash Basin Perennial/Intermittent Streams and Major (>10gpm) Springs	181
Figure 3.4-6	Donnelly Wash Basin Groundwater Conditions	184
Figure 3.4-7	Donnelly Wash Basin Hydrographs Showing Depth to Water in Selected Wells	185
Figure 3.4-7	Donnelly Wash Basin Well Yields	186
Figure 3.4-9	Donnelly Wash Basin Water Quality Conditions	188
Figure 3.4-10	Donnelly Wash Basin Adequacy Determinations	192
Figure 3.5-1	Douglas Basin Geographic Features	199
Figure 3.5-2	Douglas Basin Land Ownership	202
Figure 3.5-3	Douglas Basin Meteorological Stations and Annual Precipitation	205
Figure 3.5-4	Douglas Basin Surface Water Conditions	209
Figure 3.5-5	Douglas Basin Perennial/Intermittent Streams and Major (>10gpm) Springs	211
Figure 3.5-6	Douglas Basin Groundwater Conditions	214
Figure 3.5-7	Douglas Basin Hydrographs Showing Depth to Water in Selected Wells	215

Figure 3.5-8	Douglas Basin Well Yields	217
Figure 3.5-9	Douglas Basin Water Quality Conditions	221
Figure 3.5-10	Douglas Basin Cultural Water Demand	225
Figure 3.5-11	Douglas Basin Adequacy Determinations	228
Figure 3.6-1	Dripping Springs Wash Basin Geographic Features	235
Figure 3.6-2	Dripping Springs Wash Basin Land Ownership	237
Figure 3.6-3	Dripping Springs Wash Basin Meteorological Stations and Annual Precipitation	240
Figure 3.6-4	Dripping Springs Wash Basin Surface Water Conditions	244
Figure 3.6-5	Dripping Springs Wash Basin Perennial/Intermittent Streams and Major (>10gpm) Springs	246
Figure 3.6-6	Dripping Springs Wash Basin Groundwater Conditions	249
Figure 3.6-7	Dripping Springs Wash Basin Hydrographs Showing Depth to Water in Selected Wells	250
Figure 3.6-8	Dripping Springs Wash Basin Well Yields	251
Figure 3.6-9	Dripping Springs Wash Basin Cultural Water Demand	255
Figure 3.7-1	Duncan Valley Basin Geographic Features	263
Figure 3.7-2	Duncan Valley Basin Land Ownership	265
Figure 3.7-3	Duncan Valley Basin Meteorological Stations and Annual Precipitation	268
Figure 3.7-4	Duncan Valley Basin Surface Water Conditions	272
Figure 3.7-5	Duncan Valley Basin Perennial/Intermittent Streams and Major (>10gpm) Springs	274
Figure 3.7-6	Duncan Valley Basin Groundwater Conditions	277
Figure 3.7-7	Duncan Valley Basin Hydrographs Showing Depth to Water in Selected Wells	278
Figure 3.7-8	Duncan Valley Basin Well Yields	279
Figure 3.7-9	Duncan Valley Basin Water Quality Conditions	282
Figure 3.7-10	Duncan Valley Basin Cultural Water Demand	286
Figure 3.7-11	Duncan Valley Basin Adequacy Determinations	288
Figure 3.8-1	Lower San Pedro Basin Geographic Features	295
Figure 3.8-2	Lower San Pedro Basin Land Ownership	298
Figure 3.8-3	Lower San Pedro Basin Meteorological Stations and Annual Precipitation	301
Figure 3.8-4	Annual Flows (in acre-feet) at Aravaipa Creek near Mammoth (Station # 9473000) Water Years 1932 - 2007	303
Figure 3.8-5	Lower San Pedro Basin Surface Water Conditions	306
Figure 3.8-6	Lower San Pedro Basin Perennial/Intermittent Streams and Major (>10gpm) Springs	310
Figure 3.8-7	Lower San Pedro Basin Groundwater Conditions	313
Figure 3.8-8	Lower San Pedro Basin Hydrographs Showing Depth to Water in Selected Wells	314
Figure 3.8-9	Lower San Pedro Basin Well Yields	316
Figure 3.8-10	Lower San Pedro Basin Water Quality Conditions	320
Figure 3.8-11	Lower San Pedro Basin Cultural Water Demand	324

Figure 3.8-12	Lower San Pedro Basin Adequacy Determinations	327
Figure 3.9-1	Morenci Basin Geographic Features	337
Figure 3.9-2	Morenci Basin Land Ownership	340
Figure 3.9-3	Morenci Basin Meteorological Stations and Annual Precipitation	343
Figure 3.9-4	Annual Flows (in acre-feet) at San Francisco River at Clifton (Station # 9444500) Water Years 1914-2007	345
Figure 3.9-5	Morenci Basin Surface Water Conditions	349
Figure 3.9-6	Morenci Basin Perennial/Intermittent Streams and Major (>10gpm) Springs	352
Figure 3.9-7	Morenci Basin Groundwater Conditions	355
Figure 3.9-8	Morenci Basin Hydrographs Showing Depth to Water in Selected Wells	356
Figure 3.9-9	Morenci Basin Well Yields	357
Figure 3.9-10	Morenci Basin Water Quality Conditions	360
Figure 3.9-11	Morenci Basin Cultural Water Demand	364
Figure 3.9-12	Morenci Basin Adequacy Determinations	367
Figure 3.10-1	Safford Basin Geographic Features	375
Figure 3.10-2	Safford Basin Land Ownership	378
Figure 3.10-3	Safford Basin Meteorological Stations and Annual Precipitation	381
Figure 3.10-4	Annual Flows (in acre-feet) at Gila River River at Calva (Station # 9466500) Water Years 1930-2007	383
Figure 3.10-5	Safford Basin Surface Water Conditions	388
Figure 3.10-6	Safford Basin Perennial/Intermittent Streams and Major (>10 gpm) Springs	393
Figure 3.10-6	Safford Basin Groundwater Conditions	396
Figure 3.10-8	Safford Basin Hydrographs Showing Depth to Water in Selected Wells	397
Figure 3.10-9	Safford Basin Well Yields	401
Figure 3.10-10	Safford Basin Water Quality Conditions	406
Figure 3.10-11	Safford Basin Cultural Water Demands	411
Figure 3.10-12	Safford Basin Adequacy Determinations	414
Figure 3.12-1	San Rafael Basin Geographic Features	447
Figure 3.12-2	San Rafael Basin Land Ownership	449
Figure 3.12-3	San Rafael Basin Meteorological Stations and Annual Precipitation	452
Figure 3.12-4	San Rafael Basin Surface Water Conditions	456
Figure 3.12-5	San Rafael Basin Perennial/Intermittent Streams and Major (>10gpm) Springs	458
Figure 3.12-6	San Rafael Basin Groundwater Conditions	461
Figure 3.12-7	San Rafael Basin Hydrographs Showing Depth to Water in Selected Wells	462
Figure 3.12-8	San Rafael Basin Well Yields	463
Figure 3.12-9	San Rafael Basin Water Quality Conditions	466

Figure 3.13-1	Upper San Pedro Basin Geographic Features	475
Figure 3.13-2	Upper San Pedro Basin Land Ownership	478
Figure 3.13-3	Upper San Pedro Basin Meteorological Stations and Annual Precipitation	481
Figure 3.13-4	Annual Flows (in acre-feet) at San Pedro River at Charleston (Station # 9471000) Water Years 1905-2007	483
Figure 3.13-5	Upper San Pedro Basin Surface Water Conditions	486
Figure 3.13-6	Upper San Pedro Basin Perennial/Intermittent Streams and Major (>10 gpm) Springs	489
Figure 3.13-7	Upper San Pedro Basin Groundwater Conditions	492
Figure 3.13-8	Upper San Pedro Basin Hydrographs Showing Depth to Water in Selected Wells	493
Figure 3.13-9	Upper San Pedro Basin Well Yields	498
Figure 3.13-10	Upper San Pedro Basin Water Quality Conditions	504
Figure 3.13-11	Upper San Pedro Basin Cultural Water Demands	509
Figure 3.13-12	Upper San Pedro Basin Adequacy Determinations	520
Figure 3.14-1	Willcox Basin Geographic Features	537
Figure 3.14-2	Willcox Basin Land Ownership	540
Figure 3.14-3	Willcox Basin Meteorological Stations and Annual Precipitation	543
Figure 3.14-4	Willcox Basin Surface Water Conditions	547
Figure 3.14-5	Willcox Basin Perennial/Intermittent Streams and Major (>10gpm) Springs	550
Figure 3.14-6	Willcox Basin Groundwater Conditions	553
Figure 3.14-7	Willcox Basin Hydrographs Showing Depth to Water in Selected Wells	554
Figure 3.14-8	Willcox Basin Well Yields	559
Figure 3.14-9	Willcox Basin Water Quality Conditions	563
Figure 3.14-10	Willcox Basin Cultural Water Demand	567
Figure 3.14-11	Willcox Basin Adequacy Determinations	570
Figure C-1	General Stream Adjudications in Arizona	593
Figure C-2	Registered Wells and Surface Water Points of Diversion in Arizona	595

TABLES

Table 3.0-1	Instream flow applications in the Southeastern Arizona Planning Area	27
Table 3.0-2	Listed threatened and endangered species in the Southeastern Arizona Planning Area	30
Table 3.0-3	Wilderness areas in the Southeastern Arizona Planning Area	34
Table 3.0-4	2000 Census population of basins and Indian reservations in the Southeastern Arizona Planning Area	36
Table 3.0-5	Communities in the Southeastern Arizona Planning Area with a 2000 Census population or greater than 1,000	37
Table 3.0-6	Water adequacy determinations in the Southeastern Arizona Planing Area as of 12/2008	39
Table 3.0-7	Count of inventory of surface water right and adjudication filings in the Southeastern Arizona Planning Area	42
Table 3.0-8	Contamination sites in the Southeastern Arizona Planning Area	49
Table 3.0-9	Average annual municipal water demand in the Southeastern Arizona Planning Area (2001-2005) in acre-feet	53
Table 3.0-10	Water providers serving 450 acre-feet or more per year in 2006 in the Southeastern Arizona Planning Area	54
Table 3.0-11	Golf course demand in the Southeastern Arizona Planning Area (c.2008)	58
Table 3.0-12	Agricultural demand in the Southeastern Arizona Planning Area	60
Table 3.0-13	Active irrigation acres, percentage of crops grown and irrigation method in selected basins in the Southeastern Arizona Planning Area, 2007	61
Table 3.0-14	Industrial Demand in the Southeastern Arizona Planning Area	63
Table 3.0-16	Water resource issues ranked by survey respondents in the Southeastern Arizona Planning Area	69
Table 3.1-1	Reservoirs and Stockponds in the Aravaipa Canyon Basin	88
Table 3.1-2	Springs in the Aravaipa Canyon Basin	91
Table 3.1-3	Groundwater Conditions in the Aravaipa Canyon Basin	94
Table 3.1-4	Water Quality Exceedences in the Aravaipa Canyon Basin	98
Table 3.2-1	Streamflow Data for the Bonita Creek Basin	117
Table 3.2-2	Reservoirs and Stockponds in the Bonita Creek Basin	118
Table 3.2-3	Springs in the Bonita Creek Basin	120
Table 3.2-4	Groundwater Data for the Bonita Creek Basin	123
Table 3.3-1	Streamflow Data for the Cienega Creek Basin	143
Table 3.3-2	Flood ALERT Equipment in the Cienega Creek Basin	144
Table 3.3-3	Reservoirs and Stockponds in the Cienega Creek Basin	145
Table 3.3-4	Springs in the Cienega Creek Basin	148
Table 3.3-5	Groundwater Data for the Cienega Creek Basin	151
Table 3.3-6	Water Quality Exceedences in the Cienega Creek Basin	156
Table 3.3-7	Cultural Water Demands in the Cienega Creek Basin	160
Table 3.3-8	Effluent Generation in the Cienega Creek Basin	161
Table 3.3-9	Adequacy Determinations in the Cienega Creek Basin	164

Table 3.4-1	Reservoirs and Stockponds in the Donnelly Wash Basin	178
Table 3.4-2	Springs in the Donnelly Wash Basin	180
Table 3.4-3	Groundwater Data for the Donnelly Wash Basin	183
Table 3.4-4	Water Quality Exceedences for the Donnelly Wash Basin	187
Table 3.4-5	Cultural Water Demand in the Donnelly Wash Basin	190
Table 3.4-6	Adequacy Determinations in the Donnelly Wash Basin	191
Table 3.5-1	Climate Data in the Douglas Basin	204
Table 3.5-2	Streamflow Data in the Douglas Basin	207
Table 3.5-3	Reservoirs and Stockponds in the Douglas Basin	208
Table 3.5-4	Springs in the Douglas Basin	210
Table 3.5-5	Groundwater Data in the Douglas Basin	213
Table 3.5-6	Water Quality Exceedences in the Douglas Basin	219
Table 3.5-7	Cultural Water Demand in the Douglas Basin	223
Table 3.5-8	Effluent Generation in the Douglas Basin	224
Table 3.5-9	Water Adequacy Determinations in the Douglas Basin	227
Table 3.6-1	Climate Data for the Dripping Springs Wash Basin	239
Table 3.6-2	Streamflow Data for the Dripping Springs Wash Basin	242
Table 3.6-3	Flood ALERT Equipment in the Dripping Springs Wash Basin	242
Table 3.6-4	Reservoirs and Stockponds in the Dripping Springs Wash Basin	243
Table 3.6-5	Springs in the Dripping Springs Wash Basin	245
Table 3.6-6	Groundwater Data for the Dripping Springs Wash Basin	248
Table 3.6-7	Cultural Water Demand in the Dripping Springs Wash Basin	254
Table 3.7-1	Climate Data for the Duncan Valley Basin	267
Table 3.7-2	Streamflow Data for the Duncan Valley Basin	270
Table 3.7-3	Flood ALERT Equipment in the Duncan Valley Basin	270
Table 3.7-4	Reservoirs and Stockponds in the Duncan Valley Basin	271
Table 3.7-5	Springs in the Duncan Valley Basin	273
Table 3.7-6	Groundwater Data for the Duncan Valley Basin	276
Table 3.7-7	Water Quality Exceedences in the Duncan Valley Basin	281
Table 3.7-8	Cultural Demand Data for the Duncan Valley Basin	284
Table 3.7-9	Effluent Generation in the Duncan Valley Basin	285
Table 3.7-10	Adequacy Determinations in the Duncan Valley Basin	287
Table 3.8-1	Climate Data for the Lower San Pedro Basin	300
Table 3.8-2	Streamflow Data for the Lower San Pedro Basin	304
Table 3.8-3	Flood ALERT Equipment in the Lower San Pedro Basin	305
Table 3.8-4	Reservoirs and Stockponds in the Lower San Pedro Basin	305
Table 3.8-5	Springs in the Lower San Pedro Basin	308
Table 3.8-6	Groundwater Data for the Lower San Pedro Basin	312
Table 3.8-7	Water Quality Exceedences in the Lower San Pedro Basin	318
Table 3.8-8	Cultural Water Demand in the Lower San Pedro Basin	322
Table 3.8-9	Effluent Generation in the Lower San Pedro Basin	323
Table 3.8-10	Adequacy Determinations in the Lower San Pedro Basin	326
Table 3.9-1	Climate Data for the Morenci Basin	342
Table 3.9-2	Streamflow Data for the Morenci Basin	346
Table 3.9-3	Flood ALERT Equipment in the Morenci Basin	347
Table 3.9-4	Reservoirs and Stockponds in the Morenci Basin	348

Table 3.9-5	Springs in the Morenci Basin	351
Table 3.9-6	Groundwater Data for the Morenci Basin	354
Table 3.9-7	Water Quality Exceedences in the Morenci Basin	359
Table 3.9-8	Cultural Water Demand in the Morenci Basin	362
Table 3.9-9	Effluent Generation in the Morenci Basin	363
Table 3.9-10	Water Adequacy in the Morenci Basin	366
Table 3.10-1	Climate Data for the Safford Basin	380
Table 3.10-2	Streamflow Data for the Safford Basin	384
Table 3.10-3	Flood ALERT Equipment in the Safford Basin	385
Table 3.10-4	Reservoirs and Stock Ponds in the Safford Basin	386
Table 3.10-5	Springs in the Safford Basin	390
Table 3.10-6	Groundwater Data for the Safford Basin	395
Table 3.10-7	Water Quality Exceedences in the Safford Basin	403
Table 3.10-8	Cultural Water Demands in the Safford Basin	408
Table 3.10-9	Effluent Generation in the Safford Basin	409
Table 3.10-10	Adequacy Determinations in the Safford Basin	413
Table 3.12-1	Climate Data for the San Rafael Basin	451
Table 3.12-2	Streamflow Data for the San Rafael Basin	454
Table 3.12-3	Reservoirs and Stockponds in the San Rafael Basin	455
Table 3.12-4	Springs in the San Rafael Basin	457
Table 3.12-5	Groundwater Data for the San Rafael Basin	460
Table 3.12-6	Water Quality Exceedences in the San Rafael Basin	465
Table 3.12-7	Cultural Water Demand in the San Rafael Basin	468
Table 3.13-1	Climate Data for the Upper San Pedro Basin	480
Table 3.13-3	Flood ALERT Equipment in the Upper San Pedro Basin	483
Table 3.13-2	Streamflow Data for the Upper San Pedro Basin	484
Table 3.13-4	Reservoirs and Stock Ponds in the Upper San Pedro Basin	485
Table 3.14-4	Springs in the Upper San Pedro Basin	488
Table 3.13-6	Groundwater Data for the Upper San Pedro Basin	491
Table 3.13-6	Water Quality Exceedences in the Upper San Pedro Basin	500
Table 3.13-7	Cultural Water Demands in the Upper San Pedro Basin	506
Table 3.13-8	Effluent Generation in the Upper San Pedro Basin	507
Table 3.13-9	Adequacy Determinations in the Upper San Pedro Basin	511
Table 3.14-1	Climate Data for the Willcox Basin	542
Table 3.14-2	Streamflow Data for the Willcox Basin	545
Table 3.14-3	Flood ALERT Equipment in the Willcox Basin	545
Table 3.14-4	Reservoirs and Stockponds in the Willcox Basin	546
Table 3.14-5	Springs in the Willcox Basin	549
Table 3.14-6	Groundwater Data for the Willcox Basin	552
Table 3.14-7	Water Quality Exceedences in the Willcox Basin	561
Table 3.14-8	Cultural Demand in the Willcox Basin	565
Table 3.14-9	Effluent Generation in the Willcox Basin	566
Table 3.14-10	Adequacy Determinations in the Willcox Basin	569
Table C-1	Count of Surface Water Rights and Adjudication Filings by Planning Area	596