Water-Data Report 2013

09508500 VERDE RIVER BELOW TANGLE CREEK, ABOVE HORSESHOE DAM, AZ

Verde Basin
Lower Verde Subbasin

LOCATION.--Lat 34°04′23″, long 111°42′56″ referenced to North American Datum of 1927, in sec.35, T.9 N., R.6 E., Yavapai County, AZ, Hydrologic Unit 15060203, in Tonto National Forest, on right bank 1.3 mi downstream from Tangle Creek and 9 mi upstream from Horseshoe Dam.(unsurveyed).

DRAINAGE AREA.--5,858 mi^2 of which 364 mi^2 probably is noncontributing, including 357 mi^2 in aubrey valley playa, a closed basin.

SURFACE-WATER RECORDS

PERIOD OF RECORD.--Aug. 1945 to current year.

REVISED RECORDS.--WDR AZ-89-1: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 2,029.0 ft above sea level.

REMARKS.--Records good, except for estimated daily discharges, which are poor.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 145,000 ft^3/s, Jan. 8, 1993, gage height, 23.4 ft, from slope-area measurement of peak flow. Maximum daily discharge, 32,600 ft^3/s, Jan. 28, 2007; Minimum daily discharge, 52 ft^3/s, June 28, 2007.

EXTREMES OUTSIDE PERIOD OF RECORD.--Maximum discharge since at least 1888, 150,000 ft^3/s Feb. 24, 1891, based on comparison with peak discharge at other stations on Verde River.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 17,200 ft^3/s, Jan. 28, gage height, 15.68 ft; minimum daily discharge, 67 ft^3/s, July 4.

09508500 VERDE RIVER BELOW TANGLE CREEK, ABOVE HORSESHOE DAM, AZ—Continued

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2012 TO SEPTEMBER 2013
DAILY MEAN VALUES
[e, estimated]

Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1	126	184	207	257	1,050	357	e232	149	e103	e72	448	937
2	127	182	207	256	810	349	e220	146	e103	70	357	711
3	126	180	216	256	712	336	204	144	e103	70	287	545
4	123	178	216	256	669	360	197	141	e103	67	241	486
5	113	183	225	256	618	456	192	139	106	74	209	448
6	112	188	228	256	573	553	187	138	105	114	184	414
7	118	192	230	256	525	560	182	141	103	110	168	325
8	125	191	229	256	495	825	e183	144	98	105	157	310
9	131	195	230	256	474	2,690	e192	146	e92	103	152	378
10	137	197	233	252	439	1,830	e196	145	87	97	151	832
11	139	203	235	252	416	2,390	e212	143	81	95	136	701
12	161	204	238	251	383	2,380	e220	138	78	90	122	950
13	171	212	241	251	348	2,530	e213	128	77	178	110	928
14	171	215	270	247	323	2,550	e197	125	75	247	105	683
15	181	214	319	239	315	2,060	e187	131	73	211	e103	514
16	182	212	464	236	312	1,540	e182	134	e77	208	107	426
17	180	213	358	236	327	1,250	e178	132	e77	195	109	465
18	175	208	328	232	396	1,040	e173	130	e77	192	e104	390
19	174	212	346	231	431	816	e168	e124	68	204	e104	337
20	171	215	331	228	425	639	162	118	e74	255	107	306
21	172	217	307	226	411	551	162	117	e77	410	115	279
22	174	217	292	223	401	490	162	115	e77	307	120	253
23	174	215	279	223	381	455	156	117	e77	281	118	239
24	175	215	272	220	377	415	154	112	e76	234	126	233
25	175	211	268	219	364	368	153	103	e75	232	145	233
26	174	209	264	404	380	323	148	97	e75	228	172	216
27	174	209	263	4,300	373	300	151	98	e75	348	208	218
28	174	208	263	14,900	364	277	150	105	e75	426	213	198
29	176	211	260	8,020	---	252	147	e103	e75	337	216	201
30	179	213	260	2,810	---	246	149	e103	e75	326	287	208
31	181	---	261	1,580	---	233	---	e102	---	367	1,140	---
Total	4,871	6,103	8,340	38,085	13,092	29,421	5,409	3,908	2,517	6,253	6,321	13,364
Mean	157	203	269	1,229	468	949	180	126	83.9	202	204	445
Max	182	217	464	14,900	1,050	2,690	232	149	106	426	1,140	950
Min	112	178	207	219	312	233	147	97	68	67	103	198
Ac-ft	9,660	12,110	16,540	75,540	25,970	58,360	10,730	7,750	4,990	12,400	12,540	26,510
Cfsm	0.03	0.04	0.05	0.22	0.09	0.17	0.03	0.02	0.02	0.04	0.04	0.08
In.	0.03	0.04	0.06	0.26	0.09	0.20	0.04	0.03	0.02	0.04	0.04	0.09

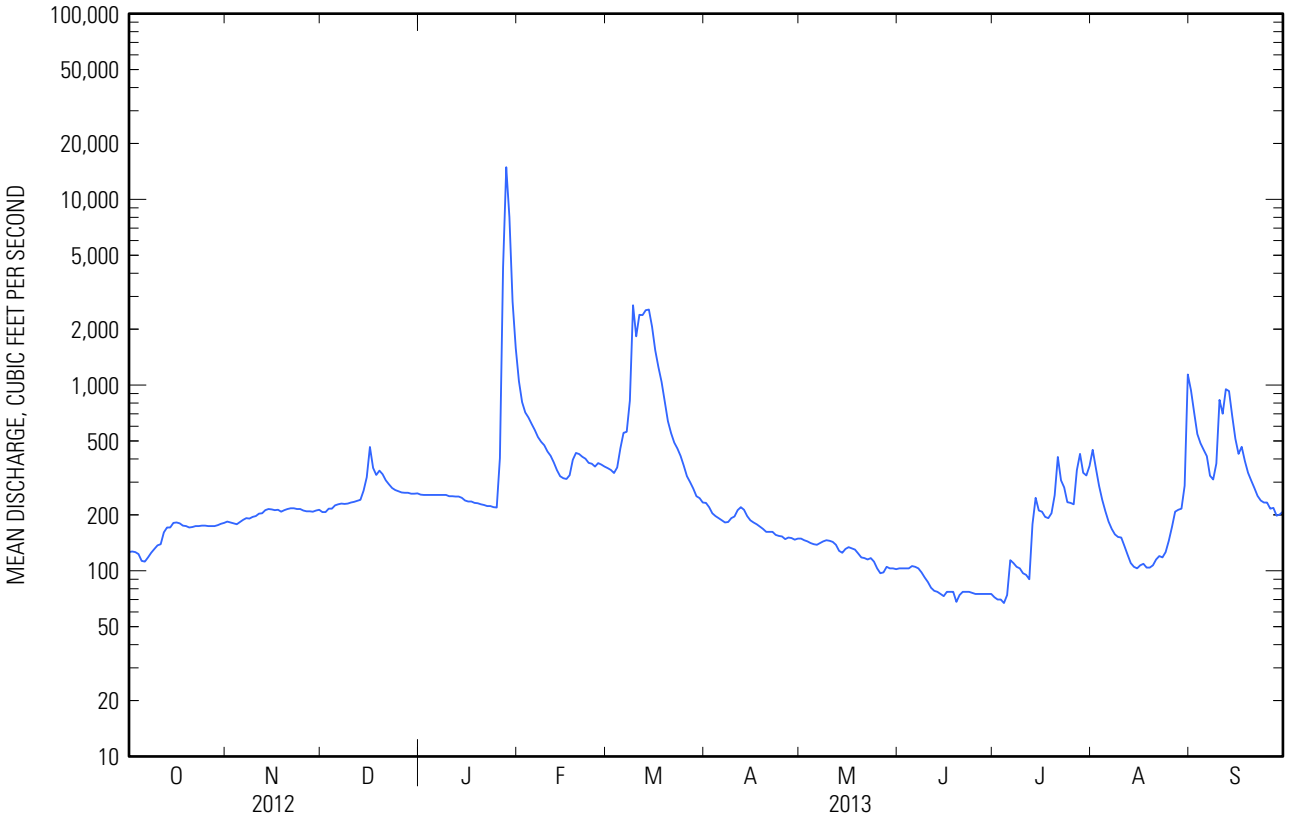
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1986 - 2013, BY WATER YEAR (WY)

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Mean	221	340	504	1,273	1,335	1,328	568	171	116	154	258	255
Max	443	1,256	2,097	12,420	8,501	3,776	2,855	289	206	298	1,114	752
(WY)	(2001)	(2005)	(2005)	(1993)	(1993)	(1991)	(1998)	(1998)	(1992)	(1986)	(1992)	(1999)
Min	129	189	231	228	230	193	162	101	63.3	71.4	72.5	118
(WY)	(2004)	(2008)	(2004)	(2004)	(2002)	(2002)	(2002)	(2004)	(2004)	(2003)	(2002)	(2001)

09508500 VERDE RIVER BELOW TANGLE CREEK, ABOVE HORSESHOE DAM, AZ—Continued

SUMMARY STATISTICS

	Calendar Year 2012		Water Year 2013		Water Years 1986 - 2013	
Annual total	75,818		137,684			
Annual mean	207		377		474	
Highest annual mean					1,609	2005
Lowest annual mean					177	2002
Highest daily mean	1,740	Mar 25	14,900	Jan 28	110,000	Jan 8, 1993
Lowest daily mean	56	Jul 3	67	Jul 4	52	Jun 28, 2007
Annual seven-day minimum	59	Jun 29	72	Jun 29	56	Jul 5, 2004
Annual runoff (ac-ft)	150,400		273,100		343,500	
Annual runoff (cfsm)	0.038		0.069		0.086	
Annual runoff (inches)	0.51		0.93		1.17	
10 percent exceeds	291		533		724	
50 percent exceeds	198		212		223	
90 percent exceeds	76		103		108	



09508500 VERDE RIVER BELOW TANGLE CREEK, ABOVE HORSESHOE DAM, AZ—Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.-- Oct. 1980 to current year.

WATER-QUALITY DATA
WATER YEAR OCTOBER 2012 TO SEPTEMBER 2013

Part 1 of 7

[%, percent; $CaCO_3$, calcium carbonate; MF, membrane filter; N, nitrogen; NTRU, nephelometric turbidity ratio unit; P, phosphorus; col/100 mL, colonies per 100 milliliters; ft^3/s, cubic feet per second; mg/L, milligrams per liter; mm Hg, millimeters of mercury; nm, nanometers; °C, degrees Celsius; µS/cm, microsiemens per centimeter; µg/L, micrograms per liter; <, less than; E, estimated; k, counts outside acceptable range]

Sample date-time	Medium name	Sample type	Barometric pressure, mm Hg (00025)	Temperature, air, °C (00020)	Discharge, instantaneous, ft^3/s (00061)	Dissolved oxygen, water, unfiltered, mg/L (00300)	Dissolved oxygen, water, unfiltered, % saturation (00301)	pH, water, unfiltered, field, standard units (00400)	Specific conductance, water, unfiltered, µS/cm at 25°C (00095)
12-04-2012 1310	Surface water	Regular	716	25.0	213	9.4	96	8.5	643
02-05-2013 1415	Surface water	Regular	712	29.0	625	11.6	113	8.2	464
06-04-2013 1610	Surface water	Regular	706	35.5	102	7.5	99	8.4	729
08-30-2013 1010	Surface water	Regular	712	32.5	231	7.0	94	8.4	655

WATER-QUALITY DATA
WATER YEAR OCTOBER 2012 TO SEPTEMBER 2013

Part 2 of 7

[%, percent; $CaCO_3$, calcium carbonate; MF, membrane filter; N, nitrogen; NTRU, nephelometric turbidity ratio unit; P, phosphorus; col/100 mL, colonies per 100 milliliters; ft^3/s, cubic feet per second; mg/L, milligrams per liter; mm Hg, millimeters of mercury; nm, nanometers; °C, degrees Celsius; µS/cm, microsiemens per centimeter; µg/L, micrograms per liter; <, less than; E, estimated; k, counts outside acceptable range]

Sample date-time	Temperature, water, °C (00010)	Turbidity, water, unfiltered, broad band light source (400-680 nm), detectors at multiple angles including 90 +/- 30 degrees, ratiometric correction, NTRU (63676)	Dissolved solids dried at 180°C, water, filtered, mg/L (70300)	Dissolved solids, water, filtered, sum of constituents, mg/L (70301)	Dissolved solids, water, filtered, tons per acre-foot (70303)	Hardness, water, mg/L as $CaCO_3$ (00900)	Noncarbonate hardness, water, filtered, field, mg/L as $CaCO_3$ (00904)	Suspended solids, water, unfiltered, mg/L (00530)	Calcium, water, filtered, mg/L (00915)
12-04-2012 1310	13.4	E 2.7	393	361	0.53	274	22	< 15	49.8
02-05-2013 1415	11.3	20	293	249	.40	199	22	18	41.6
06-04-2013 1610	25.5	E 10	446	414	.61	287	46	20	49.1
08-30-2013 1010	26.9	29	365	369	.50	271	27	35	52.6

09508500 VERDE RIVER BELOW TANGLE CREEK, ABOVE HORSESHOE DAM, AZ—Continued

WATER-QUALITY DATA
WATER YEAR OCTOBER 2012 TO SEPTEMBER 2013
Part 3 of 7

[%, percent; $CaCO_3$, calcium carbonate; MF, membrane filter; N, nitrogen; NTRU, nephelometric turbidity ratio unit; P, phosphorus; col/100 mL, colonies per 100 milliliters; ft^3/s, cubic feet per second; mg/L, milligrams per liter; mm Hg, millimeters of mercury; nm, nanometers; °C, degrees Celsius; µS/cm, microsiemens per centimeter; µg/L, micrograms per liter; <, less than; E, estimated; k, counts outside acceptable range]

Sample date-time	Calcium, water, unfiltered, recoverable, mg/L (00916)	Magnesium, water, filtered, mg/L (00925)	Magnesium, water, unfiltered, recoverable, mg/L (00927)	Potassium, water, filtered, mg/L (00935)	Sodium adsorption ratio, water, number (00931)	Sodium, water, filtered, mg/L (00930)	Alkalinity, water, filtered, inflection-point, incremental titration method, field, mg/L as $CaCO_3$ (39086)	Bicarbonate, water, filtered, inflection-point, incremental titration method, field, mg/L (00453)	Carbonate, water, filtered, inflection-point incremental titration method, field, mg/L (00452)
12-04-2012 1310	47.9	36.4	35.1	2.49	1.04	39.4	252	299	4.1
02-05-2013 1415	42.6	23.0	22.7	2.07	.71	22.9	176	211	2.2
06-04-2013 1610	50.5	40.0	40.0	3.35	1.28	49.9	242	284	4.9
08-30-2013 1010	49.4	33.9	33.9	3.58	1.00	37.6	244	283	6.6

WATER-QUALITY DATA
WATER YEAR OCTOBER 2012 TO SEPTEMBER 2013
Part 4 of 7

[%, percent; $CaCO_3$, calcium carbonate; MF, membrane filter; N, nitrogen; NTRU, nephelometric turbidity ratio unit; P, phosphorus; col/100 mL, colonies per 100 milliliters; ft^3/s, cubic feet per second; mg/L, milligrams per liter; mm Hg, millimeters of mercury; nm, nanometers; °C, degrees Celsius; µS/cm, microsiemens per centimeter; µg/L, micrograms per liter; <, less than; E, estimated; k, counts outside acceptable range]

Sample date-time	Chloride, water, filtered, mg/L (00940)	Fluoride, water, filtered, mg/L (00950)	Sulfate, water, filtered, mg/L (00945)	Ammonia plus organic nitrogen, water, unfiltered, mg/L as N (00625)	Ammonia, water, filtered, mg/L as N (00608)	Nitrate plus nitrite, water, filtered, mg/L as N (00631)	Organic nitrogen, water, unfiltered, mg/L (00605)	Phosphorus, water, unfiltered, mg/L as P (00665)	Total nitrogen, water, unfiltered, mg/L (00600)
12-04-2012 1310	24.3	0.29	57.0	0.10	< .010	< .040	< .10	< .01	< .14
02-05-2013 1415	16.5	.24	35.7	.26	< .010	.223	< .26	.06	.48
06-04-2013 1610	34.5	.35	91.9	.18	< .010	< .040	< .18	.04	< .22
08-30-2013 1010	24.9	.28	69.7	.23	< .010	.087	< .23	.09	.32

09508500 VERDE RIVER BELOW TANGLE CREEK, ABOVE HORSESHOE DAM, AZ—Continued

WATER-QUALITY DATA
WATER YEAR OCTOBER 2012 TO SEPTEMBER 2013
Part 5 of 7

[%, percent; $CaCO_3$, calcium carbonate; MF, membrane filter; N, nitrogen; NTRU, nephelometric turbidity ratio unit; P, phosphorus; col/100 mL, colonies per 100 milliliters; ft^3/s, cubic feet per second; mg/L, milligrams per liter; mm Hg, millimeters of mercury; nm, nanometers; °C, degrees Celsius; µS/cm, microsiemens per centimeter; µg/L, micrograms per liter; <, less than; E, estimated; k, counts outside acceptable range]

Sample date-time	Escherichia coli, modified m-TEC MF method, water, col/100 mL (90902)	Barium, water, unfiltered, recoverable, µg/L (01007)	Beryllium, water, filtered, µg/L (01010)	Beryllium, water, unfiltered, recoverable, µg/L (01012)	Cadmium, water, filtered, µg/L (01025)	Cadmium, water, unfiltered, µg/L (01027)	Chromium, water, unfiltered, recoverable, µg/L (01034)	Copper, water, filtered, µg/L (01040)	Copper, water, unfiltered, recoverable, µg/L (01042)
12-04-2012 1310	E 4 k	95.6	< .006	< .02	< .016	< .016	< .30	< .80	< .70
02-05-2013 1415	E 2 k	72.4	.008	.06	< .016	.032	1.6	1.6	4.3
06-04-2013 1610	E 3 k	87.6	.010	.05	< .016	< .016	.86	< .80	1.4
08-30-2013 1010	100	108	.008	.10	< .016	.029	2.3	1.2	2.4

WATER-QUALITY DATA
WATER YEAR OCTOBER 2012 TO SEPTEMBER 2013
Part 6 of 7

[%, percent; $CaCO_3$, calcium carbonate; MF, membrane filter; N, nitrogen; NTRU, nephelometric turbidity ratio unit; P, phosphorus; col/100 mL, colonies per 100 milliliters; ft^3/s, cubic feet per second; mg/L, milligrams per liter; mm Hg, millimeters of mercury; nm, nanometers; °C, degrees Celsius; µS/cm, microsiemens per centimeter; µg/L, micrograms per liter; <, less than; E, estimated; k, counts outside acceptable range]

Sample date-time	Lead, water, filtered, µg/L (01049)	Lead, water, unfiltered, recoverable, µg/L (01051)	Manganese, water, unfiltered, recoverable, µg/L (01055)	Mercury, water, filtered, µg/L (71890)	Mercury, water, unfiltered, recoverable, µg/L (71900)	Zinc, water, filtered, µg/L (01090)	Zinc, water, unfiltered, recoverable, µg/L (01092)	Antimony, water, filtered, µg/L (01095)	Antimony, water, unfiltered, µg/L (01097)
12-04-2012 1310	< .025	0.05	9.4	< .005	< .005	< 1.4	< 3.0	0.089	< .18
02-05-2013 1415	.066	.72	37.1	< .005	< .005	5.7	< 15.0	.256	< .18
06-04-2013 1610	< .025	.39	39.1	< .005	< .005	3.8	< 3.0	.113	< .18
08-30-2013 1010	< .025	.74	54.6	< .005	< .005	5.1	4.4	.179	< .18

09508500 VERDE RIVER BELOW TANGLE CREEK, ABOVE HORSESHOE DAM, AZ—Continued

WATER-QUALITY DATA
WATER YEAR OCTOBER 2012 TO SEPTEMBER 2013

Part 7 of 7

[%, percent; $CaCO_3$, calcium carbonate; MF, membrane filter; N, nitrogen; NTRU, nephelometric turbidity ratio unit; P, phosphorus; col/100 mL, colonies per 100 milliliters; ft^3/s, cubic feet per second; mg/L, milligrams per liter; mm Hg, millimeters of mercury; nm, nanometers; °C, degrees Celsius; µS/cm, microsiemens per centimeter; µg/L, micrograms per liter; <, less than; E, estimated; k, counts outside acceptable range]

Sample date-time	Arsenic, water, filtered, µg/L (01000)	Arsenic, water, unfiltered, µg/L (01002)	Boron, water, unfiltered, recoverable, micrograms per liter (01022)	Selenium, water, unfiltered, µg/L (01147)	Suspended sediment concen-tration, mg/L (80154)	Suspended sediment discharge, tons per day (80155)
12-04-2012 1310	19.6	18.7	182	0.678	19	11
02-05-2013 1415	13.0	11.6	127	.657	33	56
06-04-2013 1610	22.2	21.1	194	.731	37	10
08-30-2013 1010	23.4	22.5	200	1.00	58	36