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April 03, 2018

Indian Wells Valley Stream Monitoring Report

February 04, 2018-March 09, 2018 - Field Activities and Data Interpretation

Conclusions and Recommendations

Sand Canyon

1. Flow on March 09, 2018 was 0.25 feet (staff gage) above the crests of the of the 2-ft. contracted weir structure which amounts to approximately 0.79 cubic feet per second (cfs), or 1.57 Acre Feet/day (AF/day).
2. Sand Canyon Stream is flowing downstream of the road crossing below the stream station and upstream of the station at the old Los Angeles Aqueduct.
3. Downloaded data from digital stream recording device.
4. Retrieved paper chart from recorder. Paper chart recorder functioned properly February 04, 2018 through February 14, 2018. The paper recorder failed due to a dead battery. The digital recorder failed to record data during this period. Digital recorder and paper recorder were removed and replaced with a paper recorder with a newer clock that uses 6 batteries versus one on the old paper recorder.
5. Total flow for the period of February 04, 2018 through March 09, 2018 amounted to approximately 45 acre-feet (AF). Cumulative flow since January 01, 2017 is approximately 86 AF.
6. Data from the digital data recorders (transducers) has not been delivered to me, this data needs to be analyzed and incorporated into the historic data set.
7. Kern County Water Agency has provided the paper chart data for the stream recorders. Missing years from the Sand Summary (attached) are being updated.

Grapevine Canyon

1. Flow on March 09, 2018 was 0.41 feet (staff gage) above the crests of the of the 90-degree V Notch weir and .06 ft. above the 2-ft. contracted weir structures which amounts to approximately 0.34 cfs, or 0.74 AF/day (the top of the contracted weir is .35 feet above the invert of the V Notch weir).
8. Total flow for the period February 04, 2018 through March 09, 2018 is approximately 22 AF. Cumulative flow since January 01, 2017 is approximately 32 AF.
2. The Stream channel is dry below the old LA Aqueduct.
3. This station uses a mechanical clock that must be wound at least once per month. The property owner has agreed to keep the mechanical clock wound. It is recommended that this recording

unit be re-fitted with an electronic clock like the one at Sand Canyon. Battery life is typically one year.

4. Data from the digital data recorders (transducers) has not been delivered to me, this data needs to be analyzed and incorporated into this report.
5. Kern County Water Agency has provided the paper chart data for the stream recorders. Missing years from the Sand Summary (attached) are being updated.

Data Interpretation and Analysis

Sand Canyon, 24-inch/ Standard Sharp Contracted Rectangular Weir

Location: (Lat. 35.775978 Long. -117.907538 Elev. 2869 ft. above mean sea level (amsl) [Google Earth])

Monthly Flows 2017

Stream flow for January 2017 is 167 AF (estimated 01/23/17-01/30/17)

Stream flow for February 2017 is 1,001 AF (estimated 02/1/17-02/28/17)

Stream flow for March 2017 is 271 AF.

Stream flow for April 2017 is 144 AF.

Stream flow for May 2017 is 66 AF.

Stream flow for June 2017 is 27 AF

Stream flow for July 2017 is 6 AF

Stream flow for August 2017 is 0.17 AF

Stream flow for September 2017 is 0.00 AF

Stream flow for October 2017 is 0.00 AF

Stream flow for November 2017 is 0.00 AF

Stream flow for December 2017 is 0.74 AF (12/31/17)

Total flow for 2017 01/23/17 to 12/31/17) is 1,683 AF.

Monthly Flows 2018

Stream flow for January 2018 is 37 AF

Stream flow for February 2018 is 36 AF

Stream flow for March 2018 is 14 AF (03/01/18-03/09/18)

Discussion:

Note: Stream recording stations do not record flow. The stations record the height of the water above a horizontal crest(H) of known length (L). In the case of Sand Canyon, the weir was set up to handle low flows across a weir of 2 feet in length and also higher flows across a length of 12 feet in length. The height value is averaged over a 24-hour period and entered into a spreadsheet that calculates the flow for each 24-hour day (midnight to midnight). Additionally, peak flows are recorded as these can be useful in watershed studies. The formula for calculating flow for a "Standard Sharp Contracted Rectangular Weir" is:

$$Q=3.33 H^{3/2}(L-0.2H)$$

Where:

Q=flow in cubic feet per second (cfs), and

H=gage height in feet.

L=weir length in feet.

(Water Resources Manual; US Dept. of the Interior, 1984)

Note: The spreadsheet formula for the Sand Canyon Recording Station is designed to compensate for when the water level (H) exceeds 1.0 ft. (at the staff gage) at which time the flow is both through the 2-ft. weir and through the 12-ft. weir.

Grapevine Canyon, Standard 90° Contracted V-Notch Weir

Location: (Lat. 35.733084 Long. -117.916723 Elev. 3174 ft. amsl [Google Earth])

The Standard Sharp Contracted Rectangular Weir for this recording station was modified due to concerns about the owner's bridge to which it is attached.

Stream flow for January 2017 is 0 AF.

Stream flow for February 2017 (2/18/17-2/28/17) is 67 AF.

Stream flow for March 2017 is 160 AF.

Stream flow for April 2017 is 131 AF.

Stream flow for May 2017 is 81 AF. (revised)

Stream flow for June 2017 is 53 AF

Stream flow for July 2017 is 25 AF

Stream flow for August 2017 is 14 AF

Stream flow for September 2017 is 12 AF

Stream flow for October 2017 is 8 AF

Stream flow for November 2017 is 5 AF

Stream flow for December 2017 is 7.2 AF (12/31/17)

Total flow for year 2017 (2/18/17-12/31/17) is 563 AF.

Monthly Flows 2018

Stream flow for January 2018 is 9 AF

Stream flow for February 2018 is 16 AF

Stream flow for March 2018 is 6 AF (03/1/18-03/09/18)

Discussion:

Note: The Grapevine Canyon recording station consists of two separate weirs across two 2-ft. diameter culverts within a concrete bridge across the creek. A V-Notch weir occupies the southern culvert and a Standard Sharp Contracted Rectangular Weir occupies the northern culvert.

Stream recording stations do not record flow. The stations record the height of the water between the apex of the V notch weir and the surface of the water.

The height value is averaged over a 24-hour period and entered into a spreadsheet that calculates the flow for each 24-hour day (midnight to midnight). The formula for calculating flow for a "Standard 90° Contracted V-Notch Weir" is:

$$Q=2.49 H^{2.48}$$

Where:

Q=flow in cubic feet per second (cfs), and

H=gage height in feet.

(Water Resources Manual; US Dept. of the Interior, 1984)

The formula for calculating flow for a "Standard Sharp Contracted Rectangular Weir" is:

$$Q=3.33 H^{3/2}(L-0.2H)$$

Where:

Q=flow in cubic feet per second (cfs), and

H=gage height in feet.

L=weir length in feet.

(Water Resources Manual; US Dept. of the Interior, 1984)

Attachments

Sand Canyon Creek Flow Summary

Sand Canyon Daily Flow Chart 2018

Sand Canyon Creek Cumulative Volume Chart 2018

Sand Canyon Creek Cumulative Volume Chart All Years

Grapevine Canyon Creek Flow Summary

Grapevine Canyon Daily Flow Chart 2018

Grapevine Canyon Creek Cumulative Volume Chart 2018

Grapevine Canyon Creek Cumulative Volume Chart All Years

SAND CANYON CREEK STREAM GAUGE
MONTHLY FLOW SUMMARY

	1999		2000		2001	
	YEAR TO DATE CUMULATIVE VOLUME (acre-feet)	MONTHLY TOTAL VOLUME (acre-feet)	YEAR TO DATE CUMULATIVE VOLUME (acre-feet)	MONTHLY TOTAL VOLUME (acre-feet)	YEAR TO DATE CUMULATIVE VOLUME (acre-feet)	MONTHLY TOTAL VOLUME (acre-feet)
JANUARY	no data	no data	17.14	17.14	4.74	4.74
FEBRUARY	no data	no data	67.93	50.79	21.96	17.21
MARCH**	16.92	16.92	135.97	68.04	78.82	56.87
APRIL	104.60	87.69	157.53	43.17	121.46	42.63
MAY	156.62	52.01	179.14	24.16	138.29	16.83
JUNE	179.10	22.48	209.91	6.60	145.19	6.89
JULY	187.99	8.89	212.45	2.55	148.46	3.27
AUGUST	190.12	2.13	212.86	0.41	148.88	0.43
SEPTEMBER	190.12	0.00	213.02	0.16	148.88	0.00
OCTOBER	191.12	1.00	213.06	0.04	148.88	0.00
NOVEMBER	194.21	3.08	214.48	1.36	148.89	0.00
DECEMBER	200.09	5.88	216.68	2.20	150.42	1.42
NOTE:						
** GAUGING						
STATION						
OPERATIONAL						
MARCH 26, 1999						

SAND CANYON CREEK STREAM GAUGE
MONTHLY FLOW SUMMARY

	2002		2003		2004		2005	
	YEAR TO DATE CUMULATIVE VOLUME (acre-feet)	MONTHLY TOTAL VOLUME (acre-feet)	YEAR TO DATE CUMULATIVE VOLUME (acre-feet)	MONTHLY TOTAL VOLUME (acre-feet)	YEAR TO DATE CUMULATIVE VOLUME (acre-feet)	MONTHLY TOTAL VOLUME (acre-feet)	YEAR TO DATE CUMULATIVE VOLUME (acre-feet)	MONTHLY TOTAL VOLUME (acre-feet)
JANUARY	4.53	4.53	5.38	5.38	95.70	95.70	923.83	923.83
FEBRUARY	9.12	4.58	12.56	7.18	97.15	1.45	2027.40	1103.58
MARCH**	13.90	4.79	49.05	36.49	100.06	2.91	3168.28	1140.87
APRIL	19.86	5.96	81.70	32.65	100.18	0.12	3430.68	262.40
MAY	31.29	11.43	108.95	27.25	100.18	0.00	3595.47	164.79
JUNE	32.07	0.78	122.85	13.90	100.18	0.00	3652.01	56.55
JULY	32.07	0.00	131.04	8.18	100.18	0.00	3672.15	20.13
AUGUST	32.07	0.00	132.46	1.42	100.18	0.00	3677.87	5.72
SEPTEMBER	32.07	0.00	132.46	0.00	100.18	0.00	3682.49	4.62
OCTOBER	47.74	15.67	132.46	0.00	100.18	0.00	3689.84	7.35
NOVEMBER	64.02	16.28	155.79	23.33	100.18	0.00	3719.76	29.92
DECEMBER	68.69	4.67	329.04	173.26	102.28	2.10	3783.32	63.56
NOTE:								
** GAUGING								
STATION								
OPERATIONAL								
MARCH 26, 1999								

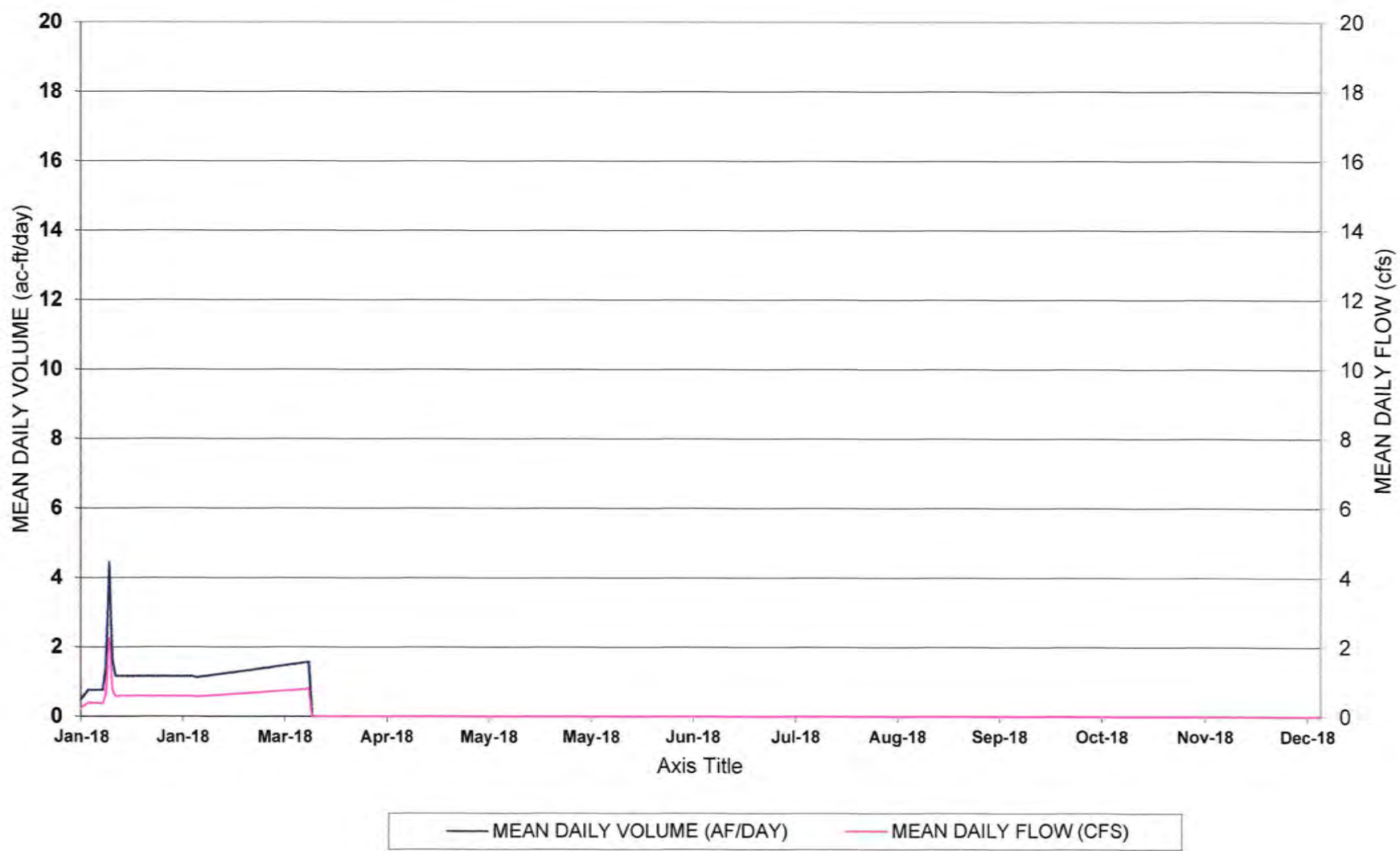
SAND CANYON CREEK STREAM GAUGE
MONTHLY FLOW SUMMARY

	2006		2007		2011		2012		2017	
	YEAR TO DATE CUMULATIVE VOLUME (acre-feet)	MONTHLY TOTAL VOLUME (acre-feet)	YEAR TO DATE CUMULATIVE VOLUME (acre-feet)	MONTHLY TOTAL VOLUME (acre-feet)	YEAR TO DATE CUMULATIVE VOLUME (acre-feet)	MONTHLY TOTAL VOLUME (acre-feet)	YEAR TO DATE CUMULATIVE VOLUME (acre-feet)	MONTHLY TOTAL VOLUME (acre-feet)	YEAR TO DATE CUMULATIVE VOLUME (acre-feet)	MONTHLY TOTAL VOLUME (acre-feet)
JANUARY	126.07	126.07	17.17	17.17	0.00	0.00	59.06	59.06	166.99	166.99
FEBRUARY	218.37	92.30	62.49	45.32	0.00	0.00	132.48	73.42	1168.05	1001.06
MARCH**	342.45	124.08	116.21	53.72	0.00	0.00	219.16	86.68	1438.51	270.46
APRIL	471.31	128.86	151.44	35.23	0.00	0.00	270.67	51.52	1582.40	143.89
MAY	544.94	73.63	164.59	13.15	40.49	40.49	285.54	14.86	1648.32	65.92
JUNE	569.60	24.66	168.75	4.16	98.35	57.85	285.54	0.00	1675.72	27.39
JULY	570.26	0.66	168.76	0.01	119.80	21.45	285.54	0.00	1681.97	6.25
AUGUST	570.40	0.14	168.76	0.00	121.31	1.52	285.54	0.00	1682.14	0.17
SEPTEMBER	571.00	0.60	168.76	0.00	122.28	0.97	285.54	0.00	1682.14	0.00
OCTOBER	571.01	0.01	168.76	0.00	126.05	3.77	285.54	0.00	1682.14	0.00
NOVEMBER	574.99	3.98	168.76	0.00	145.07	19.02	285.54	0.00	1682.14	0.00
DECEMBER	585.07	10.08	171.37	2.60	184.35	39.28	285.54	0.00	1682.88	0.74
NOTE:										
** GAUGING										
STATION										
OPERATIONAL										
MARCH 26, 1999										

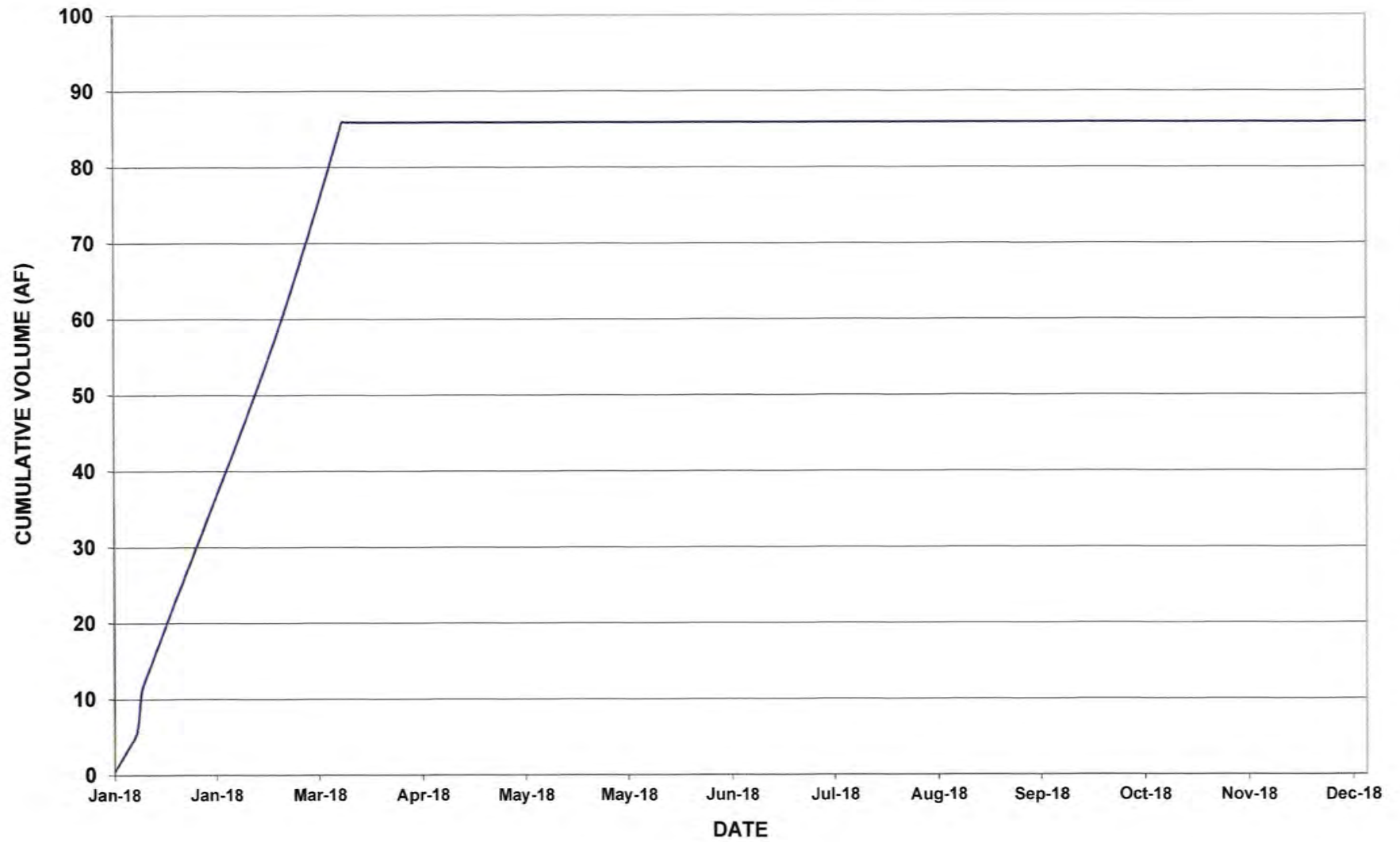
SAND CANYON CREEK STREAM GAUGE
MONTHLY FLOW SUMMARY

	2018	
	YEAR TO DATE CUMULATIVE VOLUME (acre-feet)	MONTHLY TOTAL VOLUME (acre-feet)
JANUARY	36.65	36.65
FEBRUARY	72.26	35.61
MARCH**	85.91	13.64
APRIL	85.91	0.00
MAY	85.91	0.00
JUNE	85.91	0.00
JULY	85.91	0.00
AUGUST	85.91	0.00
SEPTEMBER	85.91	0.00
OCTOBER	85.91	0.00
NOVEMBER	85.91	0.00
DECEMBER	85.91	0.00
NOTE:		
** GAUGING STATION OPERATIONAL MARCH 26, 1999		

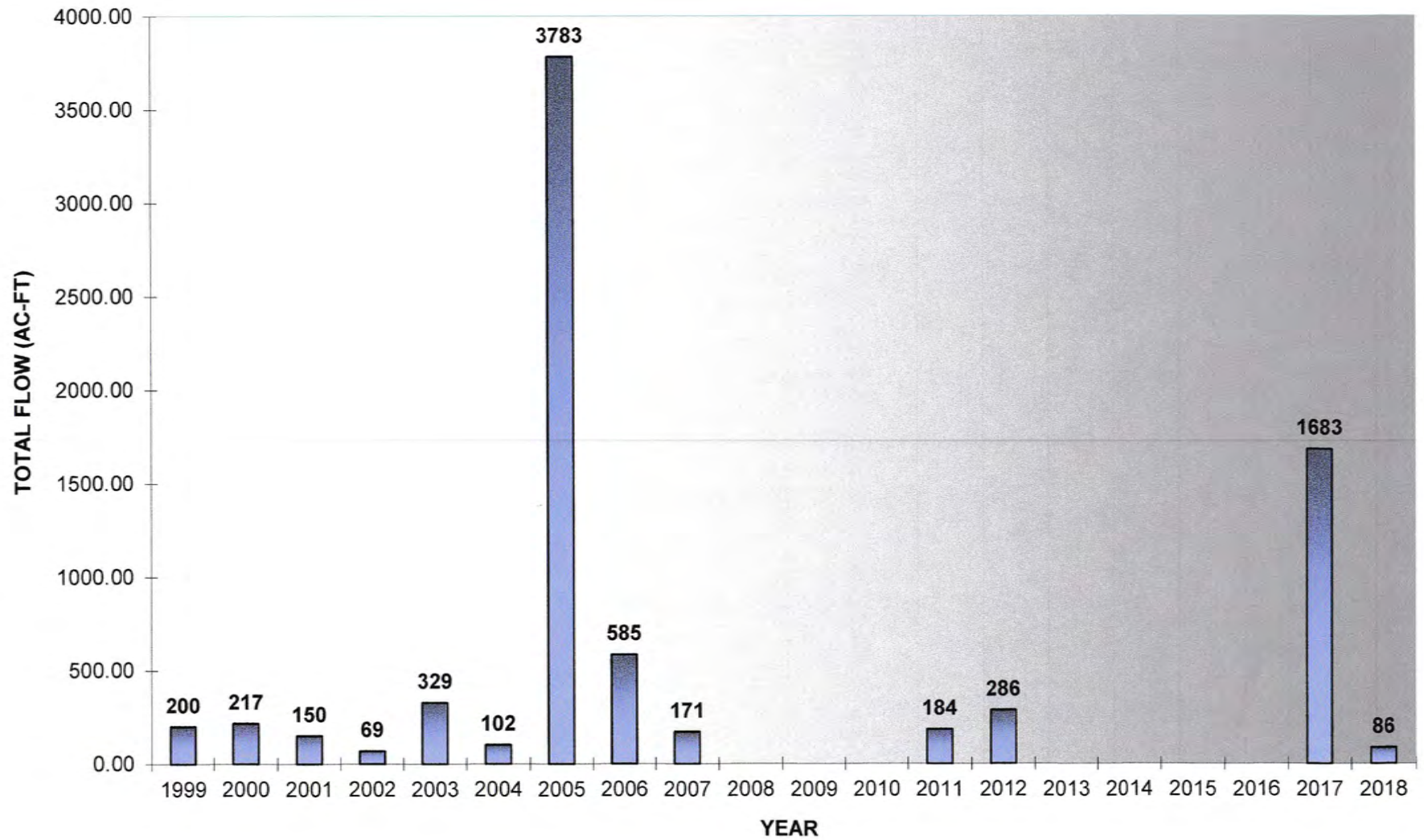
SAND CANYON STREAM GAGE
JAN.1-DEC.31, 2018



SAND CANYON STREAM GAGE CUMULATIVE VOLUME (AF) JAN. 1-DEC. 31, 2017



IWV-SAND CANYON-CUMULATIVE YEARLY VOLUME (1999-2018)



GRAPEVINE CREEK STREAM GAUGE
MONTHLY FLOW SUMMARY

	1997		1998		1999	
	YEAR TO DATE CUMULATIVE VOLUME (acre-feet)	MONTHLY TOTAL VOLUME (acre-feet)	YEAR TO DATE CUMULATIVE VOLUME (acre-feet)	MONTHLY TOTAL VOLUME (acre-feet)	YEAR TO DATE CUMULATIVE VOLUME (acre-feet)	MONTHLY TOTAL VOLUME * (acre-feet)
JANUARY	**	**	4.92	4.92	66.84	66.84
FEBRUARY	**	**	220.03	215.11	136.79	69.95
MARCH	**	**	500.19	280.17	215.42	78.64
APRIL	**	**	839.24	339.04	280.16	64.74
MAY	12.11	12.11	1773.50	934.27	334.83	54.66
JUNE	24.49	12.38	1975.38	201.88	364.31	29.49
JULY	29.98	5.49	2055.26	79.88	375.19	10.88
AUGUST	32.41	2.42	2096.58	41.32	382.73	7.54
SEPTEMBER	34.83	2.42	2132.00	35.43	387.74	5.01
OCTOBER	39.70	4.87	2171.87	39.87	390.25	2.51
NOVEMBER	44.46	4.76	2216.30	44.43	393.40	3.15
DECEMBER	49.38	4.92	2274.54	58.24	393.59	3.93
NOTES:						
** GAUGING STATION OPERATIONAL MAY 09, 1997						

GRAPEVINE CREEK STREAM GAUGE
MONTHLY FLOW SUMMARY

	2000		2001		2002		2003	
	YEAR TO DATE CUMULATIVE VOLUME (acre-feet)	MONTHLY TOTAL VOLUME * (acre-feet)	YEAR TO DATE CUMULATIVE VOLUME (acre-feet)	MONTHLY TOTAL VOLUME * (acre-feet)	YEAR TO DATE CUMULATIVE VOLUME (acre-feet)	MONTHLY TOTAL VOLUME * (acre-feet)	YEAR TO DATE CUMULATIVE VOLUME (acre-feet)	MONTHLY TOTAL VOLUME * (acre-feet)
JANUARY	3.27	3.27	2.35	2.35	2.83	2.83	1.29	1.29
FEBRUARY	7.17	3.89	4.72	2.37	4.68	1.85	2.36	1.07
MARCH	17.35	10.19	6.46	1.73	8.47	3.79	2.83	0.47
APRIL	40.09	22.74	8.79	2.33	9.94	1.47	3.23	0.40
MAY	61.88	21.79	12.01	3.23	11.80	1.86	5.54	2.31
JUNE	73.13	11.25	17.75	5.73	13.20	1.40	8.71	3.17
JULY	80.46	7.33	24.34	6.60	14.25	1.05	10.95	2.24
AUGUST	84.45	4.00	29.80	5.46	14.98	0.73	12.52	1.57
SEPTEMBER	87.18	2.72	33.81	4.01	15.31	0.33	13.13	0.61
OCTOBER	89.72	2.54	36.37	2.55	15.85	0.54	13.52	0.39
NOVEMBER	92.46	2.74	39.57	3.20	17.23	1.38	14.81	1.29
DECEMBER	94.95	2.57	42.75	3.27	18.83	1.60	16.32	1.51
NOTES:								
** GAUGING STATION OPERATIONAL MAY 09, 1997								

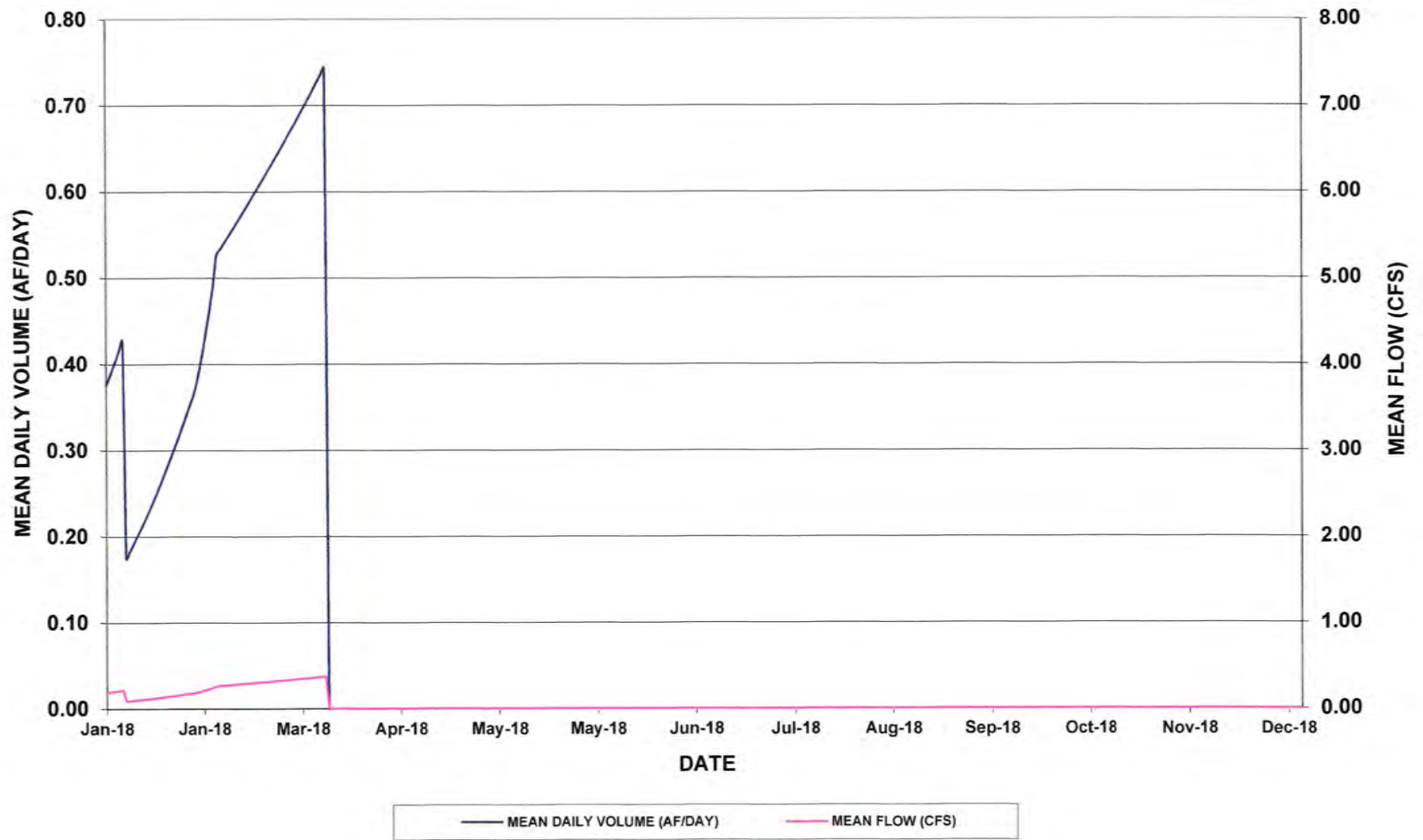
GRAPEVINE CREEK STREAM GAUGE
MONTHLY FLOW SUMMARY

	2004		2005		2006		2007	
	YEAR TO DATE CUMULATIVE VOLUME (acre-feet)	MONTHLY TOTAL VOLUME * (acre-feet)	YEAR TO DATE CUMULATIVE VOLUME (acre-feet)	MONTHLY TOTAL VOLUME * (acre-feet)	YEAR TO DATE CUMULATIVE VOLUME (acre-feet)	MONTHLY TOTAL VOLUME * (acre-feet)	YEAR TO DATE CUMULATIVE VOLUME (acre-feet)	MONTHLY TOTAL VOLUME * (acre-feet)
JANUARY	1.34	1.34	0.45	0.45	49.89	49.89	0.72	0.72
FEBRUARY	3.22	1.88	172.27	171.82	65.53	15.64	0.72	0
MARCH	3.67	0.45	491.44	319.17	72.92	7.39	8.52	7.8
APRIL	3.77	0.10	773.72	282.28	112.31	39.39	14.42	5.9
MAY	3.94	0.17	1000.57	226.85	167.65	55.34	17.63	3.21
JUNE	3.94	0.00	1078.49	77.92	187.89	20.24	21.62	3.99
JULY	3.94	0.00	1102.19	23.70	193.07	5.18	24.94	3.31
AUGUST	3.94	0.00	1110.32	8.13	193.17	0.10	27.84	2.91
SEPTEMBER	3.94	0.00	1112.51	2.19	193.17	0.00	29.70	1.86
OCTOBER	3.94	0.00	1118.14	5.63	193.17	0.00	32.21	2.51
NOVEMBER	3.94	0.00	1123.50	5.36	193.17	0.00	33.89	1.68
DECEMBER	4.04	0.10	1159.82	36.32	193.43	0.26	34.77	0.88
NOTES:								
** GAUGING STATION OPERATIONAL MAY 09, 1997								

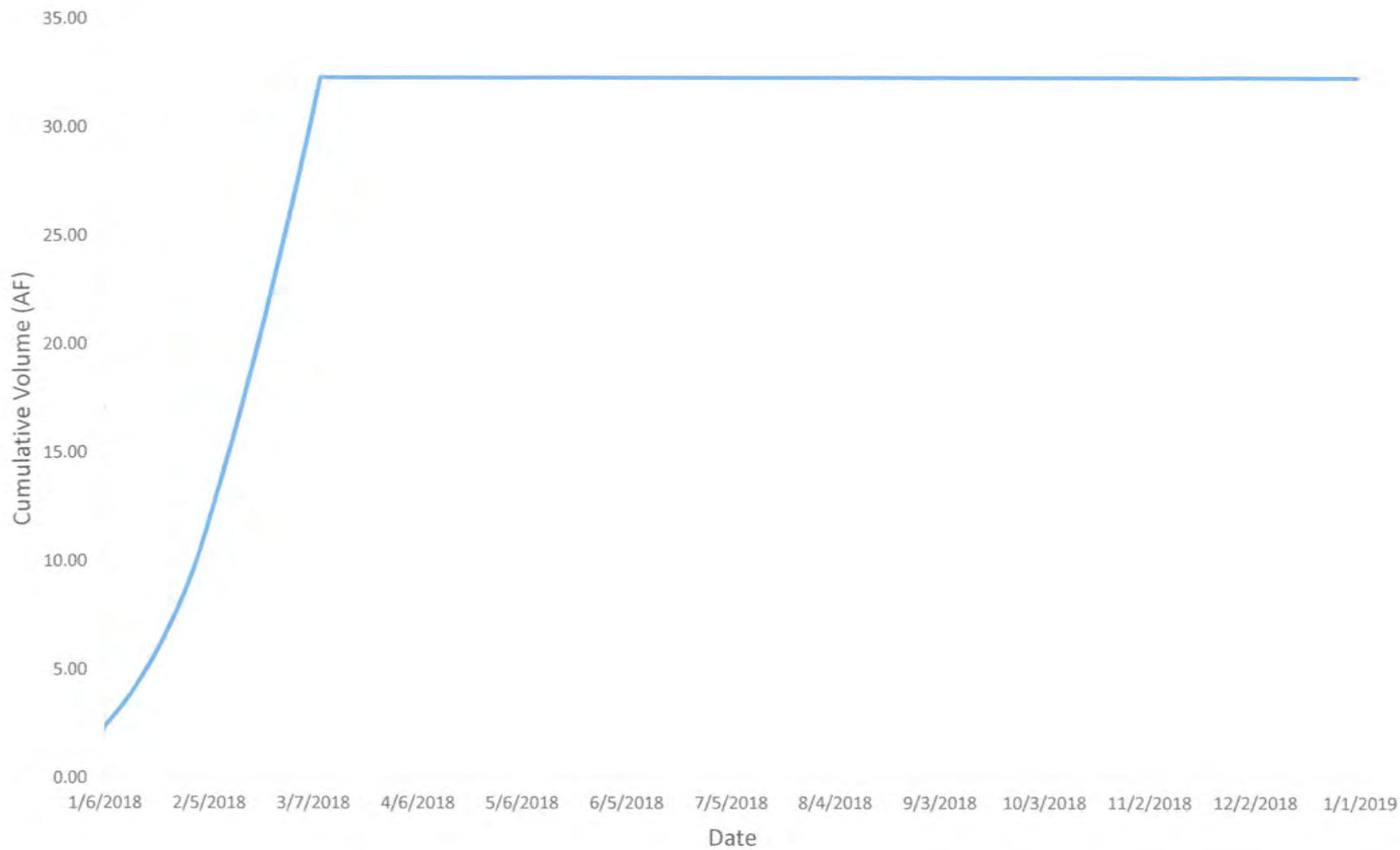
GRAPEVINE CREEK STREAM GAUGE
MONTHLY FLOW SUMMARY

	2012		2017		2018	
	YEAR TO DATE CUMULATIVE VOLUME (acre-feet)	MONTHLY TOTAL VOLUME * (acre-feet)	YEAR TO DATE CUMULATIVE VOLUME (acre-feet)	MONTHLY TOTAL VOLUME * (acre-feet)	YEAR TO DATE CUMULATIVE VOLUME (acre-feet)	MONTHLY TOTAL VOLUME * (acre-feet)
JANUARY	0.00	0.00	0.00	0.00	9.42	9.42
FEBRUARY	0.00	0.00	67.45	67.45	25.85	16.42
MARCH	0.00	0.00	227.19	159.73	32.28	6.44
APRIL	21.84	21.84	358.56	131.37	32.28	0.00
MAY	41.69	19.85	439.41	80.85	32.28	0.00
JUNE	56.32	14.62	492.47	53.06	32.28	0.00
JULY	67.44	11.12	517.59	25.13	32.28	0.00
AUGUST	67.44	0.00	531.09	13.49	32.28	0.00
SEPTEMBER	72.61	5.17	542.96	11.88	32.28	0.00
OCTOBER	77.46	4.84	551.37	8.40	32.28	0.00
NOVEMBER	89.87	12.41	556.11	4.74	32.28	0.00
DECEMBER	89.87	0.00	563.32	7.21	32.28	0.00
NOTES:						
** GAUGING STATION OPERATIONAL MAY 09, 1997						

GRAPEVINE CANYON STREAM GAGE
JAN.1-DEC.31, 2018



IWV GRAPEVINE CANYON STREAM GAGE
CUMULATIVE VOLUME (AF)
JAN. 1- DEC. 31, 2018



IWV-Grapevine- Yearly Cumulative Volume
1997-2018

