

# Water District 02 (Milner to Murphy)

## 2016 Annual Report

*(Submitted by R Whitney, Watermaster)*

### BACKGROUND

Water District 02 (WD02) was created by order of the Director of the Idaho Department of Water Resources (IDWR) in May of 2012. WD02 includes Snake River diversions from Milner Dam to the Murphy gage station below Swan Falls Dam. Figure A1 in the Appendix shows the distribution of measured diversions and geographic extent of WD02.

WD02 was created to monitor and administer diversion of water within the district and to measure, record, and report consumptive water use diversions. These actions are necessary to ensure that diversions do not exceed authorized water right limits, allow the watermaster to quantify water delivery under valid water rights, and to help protect the applicable minimum stream flow(s) at the Murphy gage station<sup>1</sup>. The IDWR measurement order issued on August 26, 2013, required water users to install and maintain approved measuring devices on all diversions for irrigation uses > 5 acres and non-irrigation uses with diversion rates > 0.24 cfs.

Anticipated expenses associated with watermaster time and travel collecting measurement data were of concern to the Advisory Committee because of the size of the district and because many of the diversions are geographically remote. In an effort to reduce the district's operational expenses the WD02 Steering Committee and subsequent Advisory Committee proposed the installation and use of radio telemetry equipment and dataloggers on diversions ≥ 500 acres and the installation of dataloggers on diversions ≥ 100 acres but < 500 acres.

Water users also expressed some concern about the cost of measuring devices. The Idaho Water Resource Board (IWRB) and IDWR applied for and secured two Bureau of Reclamation (BOR) WaterSMART grants to help offset the cost of installing measuring devices and associated telemetry equipment within WD02. Under both grants, BOR contributed a total of \$304,833 toward the installation of measuring devices and related equipment. These grants provided financial assistance to 67% of WD02 water users.

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<sup>1</sup> The current official Murphy Gaging Station, as provided by The Swan Falls agreement and the *Partial Decrees*, is located on the Snake River, 4.2 miles downstream from the Swan Falls Power Plant on right bank, at river mile 453.5 and at coordinates 43° 17' 31" N, 116° 25' 12" W.

Watermaster efforts prior to 2017 were primarily focused on the following:

- 1) Inventory of all regulated diversions to ensure installation of approved measuring devices were consistent with the measurement order;
- 2) Providing project management and assisting with installation and operation of the radio telemetry network;
- 3) Reporting to the BOR on the WaterSMART grant(s) for Phase I and Phase II, ensuring the associated deadlines under the grants were met; and
- 4) Meeting the Federal Communications Commission (FCC) deadlines associated with the radio communication licenses issued to WD02.

## **MEASUREMENT AND TELEMETRY NETWORK OVERVIEW**

Accurate water measurement enables the watermaster to determine that diversions are within the applicable water right limits, provides documentation of water use, and allows the watermaster to assess based on the amount of water delivered.

At the end of the 2016 irrigation season, there were 116 inventoried diversions equipped with approved measuring devices (52 of these are equipped with radio telemetry). The remaining diversions have approved measuring devices (4 of these are equipped with a datalogger).

The number of measured diversions increased by 40% in 2016, but the watermaster concluded that the measurement data collected for 2016 was not complete or reliable enough to use for 2017 assessment purposes. Acquisition of complete and accurate measurement data will be a focus for the 2017 season.

In 2016, all diversions equipped with telemetry recorded diversion data, and 80% of those transmitted data via radio. Telemetry data is automatically transferred into the Aquarius software that IDWR uses to process hydrologic data. Figure 1 is an example of an average daily rate hydrograph and Figure 2 is an example of a volume calculation report from Aquarius.

## DIVERSION DATA

A summary of 2016 data from measured diversions is presented in Tables 1 thru 4. To evaluate accuracy, measurement data was reviewed by IDWR staff and the watermaster. The 2016 cumulative total of both measured and estimated diversions within WD02 was approximately 478,287 acre-feet during the 2016 irrigation season. The water use data including estimations of use within WD02 have been categorized based on the reliability or completeness of the collected data. The most comprehensive measurement data is presented in Table 1 and shows complete measurement data for the season. As noted thereafter, Tables 2 thru 4 show diversion volumes that include estimated values with varying degrees of actual measurement data. The diversion names in bold have dataloggers that recorded diversion rate data which is shown in Table 5.

Historic annual volumes for King Hill Irrigation District and other major diversions measured by the UGSS and IDWR staff within WD02 are also reported in Figure A2 (King Hill), Table A1 (USGS, 2016) and Figure A3, in the Appendix.

### TABLES 1-4 Summary of annual volumes for diversions in WD02

**Table 1: Complete Measured Irrigation Season.**

Totals represent measured volumes for a full irrigation season. Diversions bolded have rate data presented in Table 5.

DIVERSION NAMES	2016 ACRE-FEET	2016 24 HR CFS
Anderson	634.31	319.79
<b>Black Mesa Farms</b>	2,104.43	1,060.97
<b>Bledsoe</b>	1,598.37	805.83
<b>Boltz</b>	1,162.83	586.25
Brown	346.99	174.94

<b>TABLE 1 (CONTINUED)</b> <b>DIVERSION NAMES</b>	<b>2016</b> <b>ACRE-FEET</b>	<b>2016</b> <b>24 HR CFS</b>
Bruneau Dunes	545.41	274.97
CJ Strike Pasture (IPCo)	84.47	42.59
<b>Clover Hollow</b>	9,834.67	4,958.24
Colyer Herefords	1,362.45	686.89
Dale Hooley - VFD	472.18	238.05
<b>Dale Van Es</b>	9,200.08	4,638.31
<b>Deruyter</b>	5,048.24	2,545.12
Edgewater Ranch	1,215.97	613.04
<b>Flying H Browns Creek</b>	3,741.37	1,886.25
Freeburg	988.14	498.18
Gibs	91.72	46.24
Gingrich Substation	101.73	51.29
Glerum	208.68	105.21
<b>Grand View Irrigation District</b>	67,995.77	34,280.70
<b>Grand View Mutual</b>	36,366.10	18,334.31
Green	147.27	74.25
<b>Grindstone Butte</b>	27,916.43	14,074.33
Half Moon	502.66	253.42

<b>TABLE 1 (CONTINUED)</b> <b>DIVERSION NAMES</b>	<b>2016</b> <b>ACRE-FEET</b>	<b>2016</b> <b>24 HR CFS</b>
Hall	104.82	52.85
Hisel	1,099.30	554.22
Howarth	639.23	322.27
IDFG Duck Pond	1,077.72	543.34
<b>Indian Cove Irrigation District</b>	5,777.41	2,912.74
Jeffrey	94.09	47.44
Joy Jones	1,513.86	763.23
Kitsos	614.07	309.59
Knox	157.70	79.51
Landis New Pump	1,681.00	847.49
Little Valley Elk	290.31	146.36
<b>Little Valley Mutual</b>	12,079.35	6,089.92
<b>Murphy Flats</b>	8,930.07	4,502.18
Nettleton	481.82	242.91
<b>Owyhee Farms Black Sands</b>	3,488.03	1,758.52
<b>Owyhee Farms Cottonwood</b>	4,209.93	2,122.48
<b>Owyhee Farms Cove Arm</b>	1,455.39	733.75
<b>Owyhee Farms Snake River</b>	803.00	404.84

<b>TABLE 1 (CONTINUED)</b> <b>DIVERSION NAMES</b>	<b>2016</b> <b>ACRE-FEET</b>	<b>2016</b> <b>24 HR CFS</b>
Pearson-Osprey	469.68	236.79
<b>Quey Johns</b>	1,386.89	699.21
River Valley Farms	325.04	163.87
Rockin S Ranch	667.53	336.54
<b>Sailor Creek</b>	9,358.50	4,718.17
<b>Salmon Falls Land and Livestock</b>	6,694.89	3,375.29
SeeSee 1	255.52	128.82
SeeSee 2	86.58	43.65
<b>Simplot 2</b>	3,884.80	1,958.56
<b>Simplot 3</b>	2,054.87	1,035.98
<b>Simplot 4</b>	5,633.09	2,839.97
<b>Simplot 9</b>	3,903.24	1,967.85
<b>Simplot- Big Foot Bar 1</b>	354.55	178.75
<b>Simplot- Big Foot Bar 2</b>	1,074.00	541.47
<b>Simplot- Big Foot Bar 3</b>	506.00	255.10
<b>Simplot Jacks Creek</b>	2,802.44	1,412.88
<b>Snake River Irrigation District</b>	65,297.90	32,920.54
<b>South Elmore</b>	29,000.63	14,620.94

<b>Table 1 (continued)</b> <b>Diversion Names</b>	2016 acre-feet	2016 24 hr cfs
SV Ranch 1	468.13	236.01
SV Ranch 3	730.09	368.08
Three Island State Park	89.34	45.04
Tingstrom	62.95	31.74
Treatment Plant Diversion	176.24	88.85
<b>Triple C</b>	3,413.99	1,721.19
<b>UBS Indian Hills</b>	5,025.81	2,533.81
<b>Upper Grand View Mutual</b>	4,745.19	2,392.33
Uptmor	256.60	129.37
<b>War Eagle</b>	883.86	445.61
Wolfe Bros Pump 2	110.17	55.54
Wootan	0.00	0.00
Yarbrough	37.45	18.88

**Table 2: Some Estimations or >75% Measured Irrigation Season.**

Totals represent data with estimations, or at least 75% of the irrigation season measured.  
 Diversions bolded have rate data presented in Table 5.

<b>DIVERSION NAMES</b>	<b>2016 ACRE-FEET</b>	<b>2016 24 HR CFS</b>
U.S. Ecology Idaho Inc.	50.66	25.54
Bliss Park (IPCo)	21.74	10.96
CJ Strike North Park (IPCo)	23.00	11.60
CJ Strike Scout Park (IPCo)	28.00	14.12
CJ Strike Village (IPCo)	28.00	14.12
Flopet	258.61	130.38
<b>King Hill Irrigation - Black Mesa</b>	28,705.89	14,472.34
<b>King Hill Irrigation - Glenns Ferry</b>	21,999.77	11,091.39
<b>King Hill Irrigation - King Hill</b>	7,551.93	3,807.38
<b>King Hill Irrigation - Wiley</b>	7,911.91	3,988.86
Parkinson	130.50	65.79
Potucek	404.00	203.68
Rattlesnake Diversion	406.48	204.93
Rivendale	186.24	93.89
Swan Falls Park (IPCo)	28.73	14.48
Thomas	383.34	193.26
Upper Salmon Village (IPCo)	14.11	7.11



**Table 3: Late Install or 50% - 74% Measured Irrigation Season.**

Totals represent data for 50% - 74% of the irrigation season measured due to late install or issues with the measuring device. Diversions bolded have rate data presented in Table 5.

<b>DIVERSION NAMES</b>	<b>2016 ACRE-FEET</b>	<b>2016 24 HR CFS</b>
Billingsley Bay Farms	26.90	13.56
<b>Blanksma Chalk Flats</b>	2,660.00	1,341.06
Hagerman Wings	6.15	3.10
<b>West Indian Cove</b>	2,343.77	1,181.63

**Table 4: Late Install or <50% Measured Irrigation Season.**

Totals represent data for less than 50% of the irrigation season measured due to late install or issues with the measuring device. Diversions bolded have rate data presented in Table 5.

<b>DIVERSION NAMES</b>	<b>2016 ACRE-FEET</b>	<b>2016 24 HR CFS</b>
Ayarra 1	0.00	0.00
<b>Blanksma Dunes</b>	<b>2,517.05</b>	1,268.99
<b>Bybee Lateral</b>	13,791.50	6,953.11
Chattin Flats	0.00	0.00
Dale Hooley	982.17	495.17
<b>Eagle Cove</b>	1,510.61	761.59
Hoodco	160.95	81.14

<b>TABLE 4 (CONTINUED)</b> <b>DIVERSION NAMES</b>	<b>2016</b> <b>ACRE-FEET</b>	<b>2016</b> <b>24 HR CFS</b>
Hooley Farm	6.19	3.12
Johnson	62.25	31.38
King Hill and Young	90.00	45.37
Martell	53.39	0.00
Mellum	42.57	21.46
Pearson	292.41	147.42
<b>Robert Meyers</b>	592.17	298.55
<b>Roger Young</b>	4,662.00	2,350.39
<b>Schiermeier</b>	<b>3,934.70</b>	1,983.72
Sundberg	113.57	57.26
SV Ranch 2	3,355.48	1,691.70
TR Investments	28.40	14.32
<b>UBS Slick Ranch</b>	<b>2,436.40</b>	1,228.33
Vader	0.01	0.01
Wolfe Bros Pump 1	0.00	0.00

**Table 5. Average Monthly Diversion Rates.**

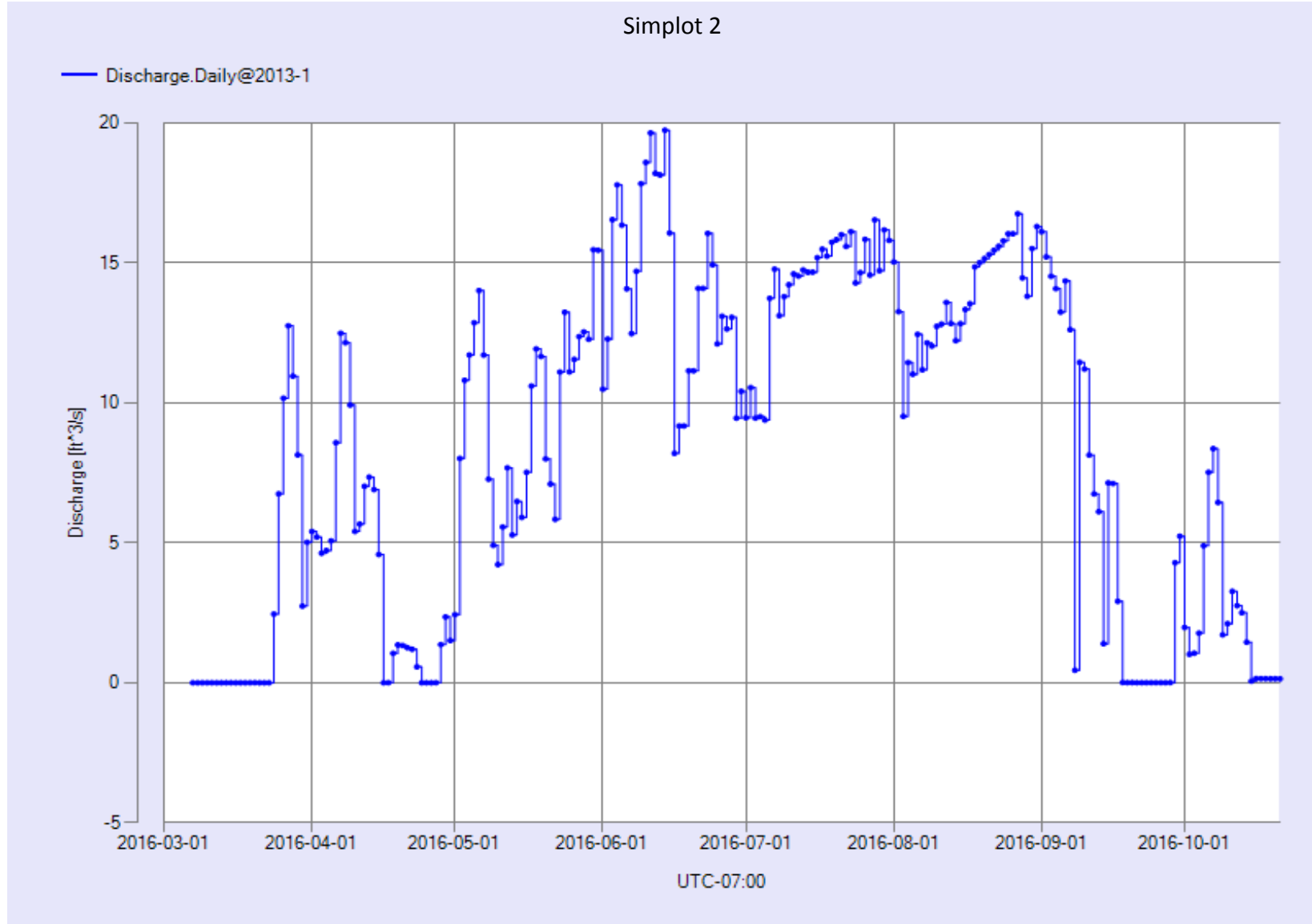
Totals represent average monthly diversion rates for the 2016 irrigation season, maximum measured rate, and allowable diversion rate for WD02. Data provisional and subject to change.

DIVERSION NAMES	AVERAGE RATE (CFS)									MAXIMUM MEASURED RATE (CFS)
	MAR	APR	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	
<b>Murphy Flats</b>	21.05	22.76	26.28	34.81	35.75	17.19	10.6	0	0	<b>46.03</b>
<b>Dale Van Es</b>	N/A	N/A	27.41	30.09	30.02	30.01	30.01	26.53	20.35	<b>30.1</b>
<b>War Eagle</b>	4.63	1.79	1.93	3.11	3.55	3.07	1.57	0.59	0	<b>4.91</b>
<b>Boltz</b>	N/A	4.54	4.7	4.52	4.68	4.26	4.47	0	0	<b>5.28</b>
<b>Big Foot Bar 1</b>	N/A	1.93	2.19	2.26	N/A	N/A	N/A	N/A	N/A	<b>3.29</b>
<b>Big Foot Bar 2</b>	4.7	4.93	8.23	6.77	3.37	2.21	2.34	0.93	0	<b>11.55</b>
<b>Big Foot Bar 3</b>	N/A	N/A	1.91	2.16	1.94	2.16	0.6	0	0	<b>2.9</b>
<b>Upper Grand View Mutual</b>	7.59	13.12	20.1	27.33	27.99	27.51	24.95	23.91	0	<b>27.99</b>
<b>Simplot 9</b>	N/A	9.78	7.52	14.68	14.52	10.59	5.65	6.42	0	<b>19.55</b>
<b>Grand View Mutual</b>	48.54	64.72	81.04	87.77	96.53	98.22	80.28	51.24	0	<b>114.3</b>
<b>Grand View Irrigation District</b>	83.43	157.2	161.9	166.9	166.9	163.26	153.0	141.3	0	<b>171.01</b>
<b>Snake River Irrigation District</b>	190.3	183.5	173.7	171.7	177.9	179.7	132.4	98.11	0	<b>200.26</b>

TABLE 5 (CONTINUED) DIVERSION NAMES	AVERAGE RATE (CFS)									MAXIMUM MEASURED RATE (CFS)
	MAR	APR	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	
<b>Simplot 4</b>	10.62	12.58	8.09	16.42	17.9	21.12	13.62	23.83	2.27	<b>28.66</b>
<b>Bybee Lateral</b>	N/A	21.1	21.1	106.7	112.8	102.44	59.92	40.33	0	<b>257.2</b>
<b>Simplot 2</b>	7.37	7.79	9.57	14.57	14.16	13.36	8.91	1.64	0	<b>19.74</b>
<b>Little Valley Mutual</b>	12.63	29.39	26.42	41.36	42.42	38.58	17	10.37	0.9	<b>58.34</b>
<b>Schiermeier</b>	N/A	29.15	10.86	8.54	17.69	16.61	13.89	6.99	0	<b>36.08</b>
<b>Simplot 3</b>	N/A	2.29	4.28	8.53	8.7	7.09	2.76	2.56	0	<b>10.03</b>
<b>Simplot Jacks Creek</b>	N/A	N/A	N/A	N/A	6.96	7.3	5.36	2.9	0	<b>9.77</b>
<b>Owyhee Farms Cottonwood</b>	N/A	N/A	4.89	5.95	6.84	6.50	4.89	0.00	0.00	<b>7.94</b>
<b>Owyhee Farms Black Sands</b>	N/A	6.67	10.43	11.52	10.03	8.39	6.2	5.07	0	<b>13.07</b>
<b>Owyhee Farms Snake River</b>	N/A	1.38	2.38	1.89	1.45	1.63	1.27	2.14	1.05	<b>4.8</b>
<b>Owyhee Farms Cove Arm</b>	N/A	N/A	5.79	7.6	7.09	4.31	0.37	0	0	<b>8.96</b>
<b>Rudy Gingerich</b>	N/A	N/A	N/A	N/A	N/A	3.54	6.9	2.65	0	<b>13.83</b>
<b>Robert Meyers</b>	N/A	N/A	N/A	N/A	36.93	27.05	21.94	0	0	<b>39.2</b>

TABLE 5 (CONTINUED) DIVERSION NAMES	AVERAGE RATE (CFS)									MAXIMUM MEASURED RATE (CFS)
	MAR	APR	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	
Roger Young	N/A	N/A	N/A	N/A	14.47	14.54	11.42	11.17	0	17.77
Triple C	1.31	2.39	5.27	15.16	13.77	14.83	8.23	4.07	0	19.49
South Elmore	N/A	8.75	16.87	28.13	41.66	106.78	39.28	10.51	10.4	124.73
Clover Hollow	N/A	7.08	12.76	18.83	18.95	29.26	8.61	2.97	0	44.18
Quey Johns	N/A	N/A	N/A	N/A	N/A	N/A	2.76	1.97	0	4.12
Eagle Cove	N/A	N/A	N/A	N/A	17.27	3.93	4.12	3.44	0	30.02
Blanksma Dunes	N/A	N/A	N/A	N/A	18.27	21.11	17.61	10.9	0	23.42
West Indian Cove	N/A	N/A	N/A	N/A	N/A	N/A	3.18	3.24	0	4.7
Indian Cove Irrigation District	N/A	13.15	14.05	13.37	0	26.21	15.53	24.87	0	28.54
Flying H Browns Creek	N/A	2.03	5.78	13.4	0	18.85	5.44	0	0	26.28
UBS Indian Hills	N/A	N/A	7.96	5.76	4.37	4.54	1.93	2.4	0	9.38
Blanksma Chalk Flats	N/A	N/A	N/A	N/A	N/A	N/A	1.72	0.66	0	1.99
Bledsoe	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0

TABLE 5 (CONTINUED) DIVERSION NAMES	AVERAGE RATE (CFS)									MAXIMUM MEASURED RATE (CFS)
	MAR	APR	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	
Deruyter	N/A	N/A	N/A	N/A	N/A	N/A	10.99	13.61	1.1	15.48
UBS Slick Ranch	N/A	N/A	8.02	12.91	10.99	7.76	6.18	4.9	0	14.98
Grindstone Butte	N/A	N/A	64.25	142.2	139.2	115.04	53.49	31.27	34.9	176.55
Sailor Creek	N/A	N/A	17.11	37.32	36.2	29.92	19.27	14.73	17.2	46.38
King Hill Irrigation - Glenns Ferry	N/A	135	69.84	11.79	122.3	120.85	66.36	59.37	0	161.73
King Hill Irrigation - King Hill	N/A	31.51	12.44	4.07	0	0	0	0	0	33.48
Black Mesa Farms	N/A	6.14	10.55	16.09	14.15	0	0	0	0	21.09
King Hill Irrigation - Black Mesa	N/A	16.94	43.31	43.1	0	0	19.43	2.67	0	54.76
King Hill Irrigation - Wiley	N/A	37.32	21.5	21.3	26.56	24.94	14.2	9.1	0	38.17
Salmon Falls Land and Livestock	N/A	7.35	13.34	25.7	22.9	21.66	15.47	8.6	0	28.85



**Figure 1: Average Daily Rate hydrograph for Simplot 2 as calculated in the Aquarius Time-Series Software.**

## Daily Mean by Year

Annual Volume - Average Daily Report (cfs) to Total Volume (AF)

Identifier: Discharge.Daily@2013-1

Location: Simplot 2

Units: ft<sup>3</sup>/s

Filter: None

Year: 2016	Aggr: 7.329					Min: 0.000		Max: 19.743		Total (Acre-ft): 3583.260		
Day	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	* UN	* UN	* UN	5.405 UN	2.438 UN	10.491 UN	9.472 UN	15.038 UN	16.117 UN	1.976 UN	0.151 UN	* UN
2	* UN	* UN	* UN	5.209 UN	8.019 UN	12.282 UN	10.549 UN	13.262 UN	15.218 UN	1.020 UN	0.000 UN	* UN
3	* UN	* UN	* UN	4.631 UN	10.808 UN	16.548 UN	9.459 UN	9.520 UN	14.527 UN	1.059 UN	0.000 UN	* UN
4	* UN	* UN	* UN	4.725 UN	11.713 UN	17.792 UN	9.510 UN	11.445 UN	14.083 UN	1.776 UN	0.000 UN	* UN
5	* UN	* UN	* UN	5.073 UN	12.863 UN	16.354 UN	9.388 UN	11.025 UN	13.246 UN	4.901 UN	0.000 UN	* UN
6	* UN	* UN	* UN	8.580 UN	14.015 UN	14.077 UN	13.737 UN	12.453 UN	14.360 UN	7.523 UN	0.000 UN	* UN
7	* UN	* UN	0.000 UN	12.490 UN	11.709 UN	12.476 UN	14.780 UN	11.186 UN	12.619 UN	8.365 UN	0.000 UN	* UN
8	* UN	* UN	0.000 UN	12.152 UN	7.276 UN	14.704 UN	13.119 UN	12.146 UN	0.451 UN	6.445 UN	* UN	* UN
9	* UN	* UN	0.000 UN	9.925 UN	4.913 UN	17.833 UN	13.797 UN	12.032 UN	11.450 UN	1.716 UN	* UN	* UN
10	* UN	* UN	0.000 UN	5.411 UN	4.227 UN	18.596 UN	14.225 UN	12.735 UN	11.209 UN	2.114 UN	* UN	* UN
11	* UN	* UN	0.000 UN	5.672 UN	5.569 UN	19.649 UN	14.611 UN	12.819 UN	8.140 UN	3.271 UN	* UN	* UN
12	* UN	* UN	0.000 UN	7.023 UN	7.684 UN	18.203 UN	14.533 UN	13.594 UN	6.750 UN	2.757 UN	* UN	* UN
13	* UN	* UN	0.000 UN	7.352 UN	5.283 UN	18.144 UN	14.753 UN	12.836 UN	6.116 UN	2.505 UN	* UN	* UN
14	* UN	* UN	0.000 UN	6.907 UN	6.480 UN	19.743 UN	14.666 UN	12.224 UN	1.398 UN	1.451 UN	* UN	* UN
15	* UN	* UN	0.000 UN	4.586 UN	5.910 UN	16.070 UN	14.673 UN	12.832 UN	7.143 UN	0.000 UN	* UN	* UN
16	* UN	* UN	0.000 UN	0.000 UN	7.525 UN	8.200 UN	15.192 UN	13.341 UN	7.121 UN	0.152 UN	* UN	* UN
17	* UN	* UN	0.000 UN	0.000 UN	10.606 UN	0.000 UN	15.495 UN	13.549 UN	2.912 UN	0.152 UN	* UN	* UN
18	* UN	* UN	0.000 UN	1.056 UN	11.933 UN	0.000 UN	15.244 UN	14.860 UN	0.000 UN	0.151 UN	* UN	* UN
19	* UN	* UN	0.000 UN	1.356 UN	11.661 UN	0.000 UN	15.742 UN	0.000 UN	0.000 UN	0.147 UN	* UN	* UN
20	* UN	* UN	0.000 UN	1.331 UN	7.999 UN	0.000 UN	15.835 UN	0.000 UN	0.000 UN	0.148 UN	* UN	* UN
21	* UN	* UN	0.000 UN	1.254 UN	7.104 UN	0.000 UN	16.009 UN	0.000 UN	0.000 UN	0.149 UN	* UN	* UN
22	* UN	* UN	0.000 UN	1.199 UN	5.842 UN	0.000 UN	15.593 UN	0.000 UN	0.000 UN	0.151 UN	* UN	* UN
23	* UN	* UN	0.000 UN	0.572 UN	11.108 UN	16.058 UN	16.122 UN	0.000 UN	0.000 UN	0.151 UN	* UN	* UN
24	* UN	* UN	2.456 UN	0.000 UN	13.240 UN	14.934 UN	14.286 UN	0.000 UN	0.000 UN	0.149 UN	* UN	* UN
25	* UN	* UN	6.755 UN	0.000 UN	11.111 UN	12.112 UN	14.658 UN	0.000 UN	0.000 UN	0.152 UN	* UN	* UN
26	* UN	* UN	10.171 UN	0.000 UN	11.560 UN	13.098 UN	15.846 UN	16.045 UN	0.000 UN	0.153 UN	* UN	* UN
27	* UN	* UN	12.755 UN	0.000 UN	12.371 UN	12.643 UN	14.570 UN	16.761 UN	0.000 UN	0.153 UN	* UN	* UN
28	* UN	* UN	10.958 UN	1.366 UN	12.540 UN	13.062 UN	16.543 UN	14.467 UN	0.000 UN	0.150 UN	* UN	* UN
29	* UN	* UN	8.141 UN	2.355 UN	12.276 UN	9.458 UN	14.726 UN	13.811 UN	4.293 UN	0.152 UN	* UN	* UN
30	* UN		2.740 UN	1.510 UN	15.476 UN	10.416 UN	16.184 UN	15.514 UN	5.239 UN	0.150 UN	* UN	* UN
31	* UN		5.024 UN		15.459 UN		15.809 UN	16.305 UN		0.152 UN		* UN
Aggr	*	*	2.360	3.905	9.572	11.765	14.165	10.316	5.746	1.590	0.020	*
Min	*	*	0.000	0.000	2.438	0.000	9.388	0.000	0.000	0.000	0.000	*
Max	*	*	12.755	12.490	15.476	19.743	16.543	16.761	16.117	8.365	0.151	*
Total	*	*	117.027	232.343	588.534	700.052	870.995	634.312	341.939	97.759	0.299	*

Date Processed: November 23, 2016 11:33

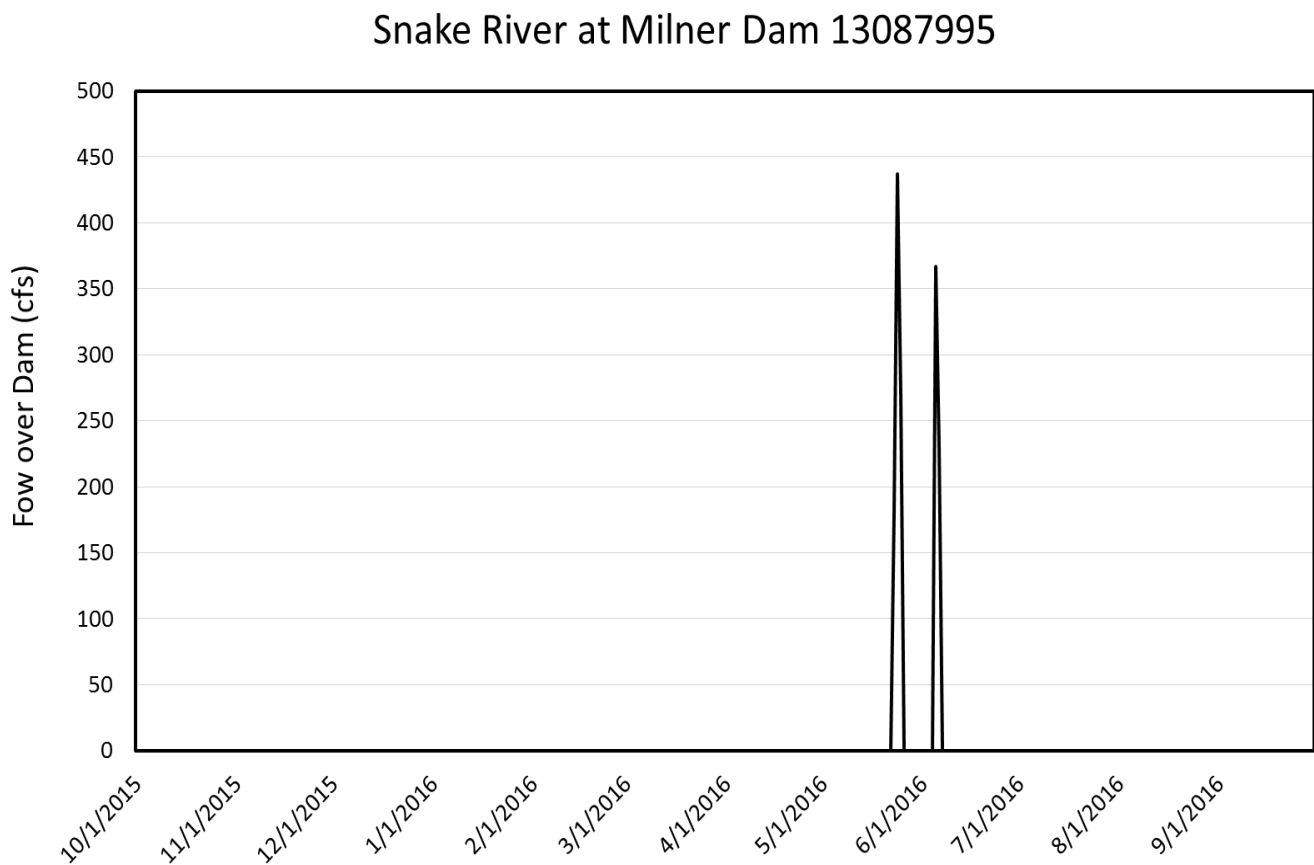


Figure 2: Volume Calculation Report Created in the Aquarius Time-Series Software from Average Daily Rates



## MINIMUM STREAM FLOWS

Two releases were made over the Milner Dam, one in late May with a peak of 437 cfs and one in early June with a peak of 367 cfs (Figure 3). Unadjusted Average Daily Flows (UADF) on the Snake River at the Murphy Gaging station were provided by Idaho Power (Idaho Power, 2016) as flow data for water year 2016 was unavailable through the USGS surface water data for Idaho (USGS, 2016). Adjusted average daily flows (AADF) were calculated using the reservoir-stage method to compensate for fluctuations caused by hydropower operations of Idaho Power. A three-day moving average of the AADF was calculated and is reported in Figure 4 in accordance to the Final Order issued October 27<sup>th</sup>, 2014. (DWR, 2014).



**Figure 3. Releases from Milner Dam for Water year 2016 at USGS gage station 13087995.**

## Snake River near Murphy 13172500

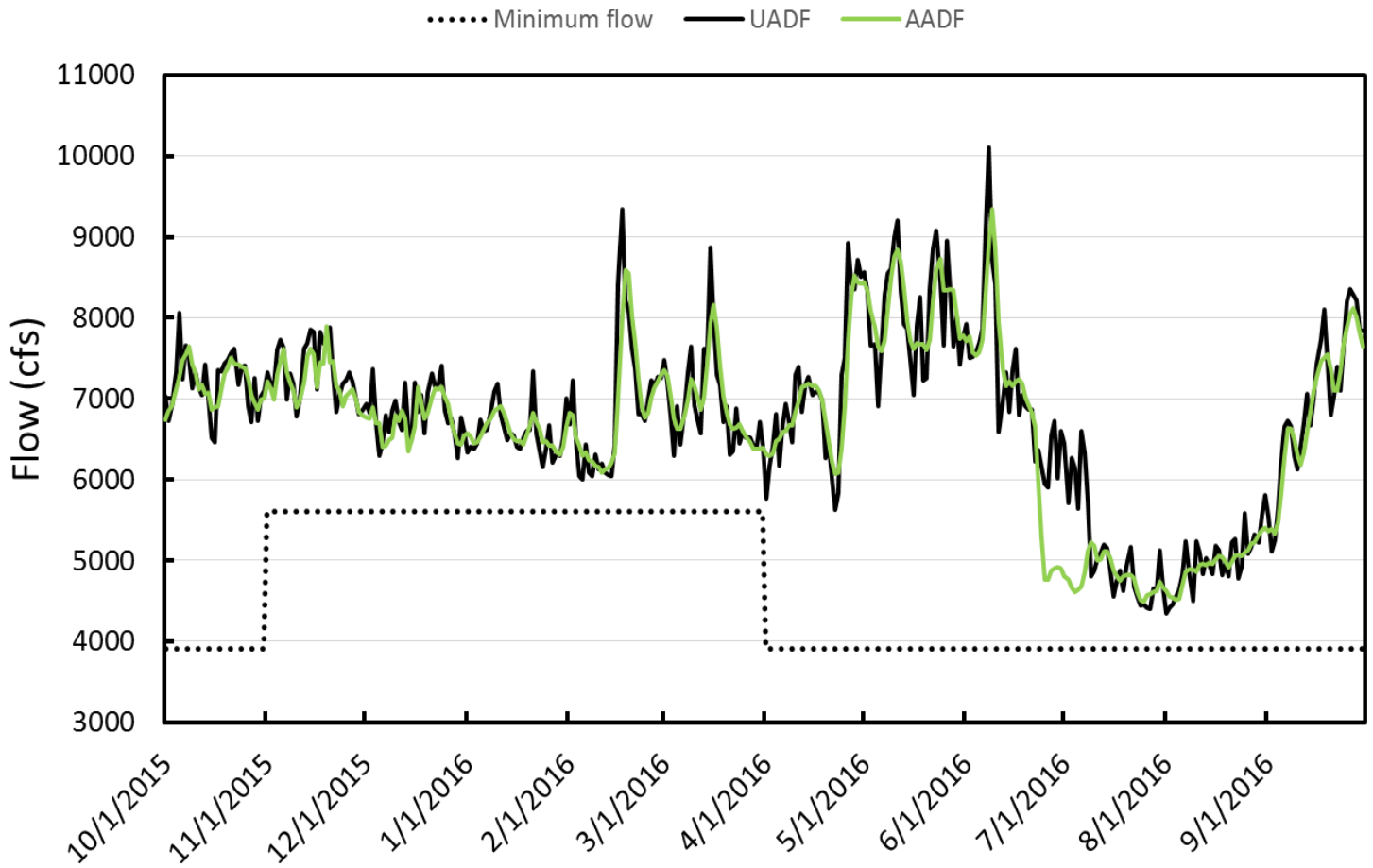


Figure 4. Unadjusted Average Daily Flow (UADF), 3 day average of Adjusted Average Daily Flow (AADF) and Minimum Stream Flow for Water year 2016 at Murphy Gaging station.

## CLIMATE PARAMETERS WATER YEAR 2016

Average daily temperatures in Grand View, Idaho ranged from a low of 6.4 °F on 1/1/2016 to a high of 83°F on 6/29/16 (Figure 5). Actual temperatures in a day may be lower or higher than the average daily values but the average temperatures show a general trend for the water year.

Total precipitation for water year 2016 was 6.31 inches in Grand View, Idaho (Figure 6) and this value is almost 8% above the 22 year average (1993-2015) represented by the open diamond in Figure 8.

Precipitation and temperature data were measured and recorded at the GDVI AgriMet station (USBOR, 2016).

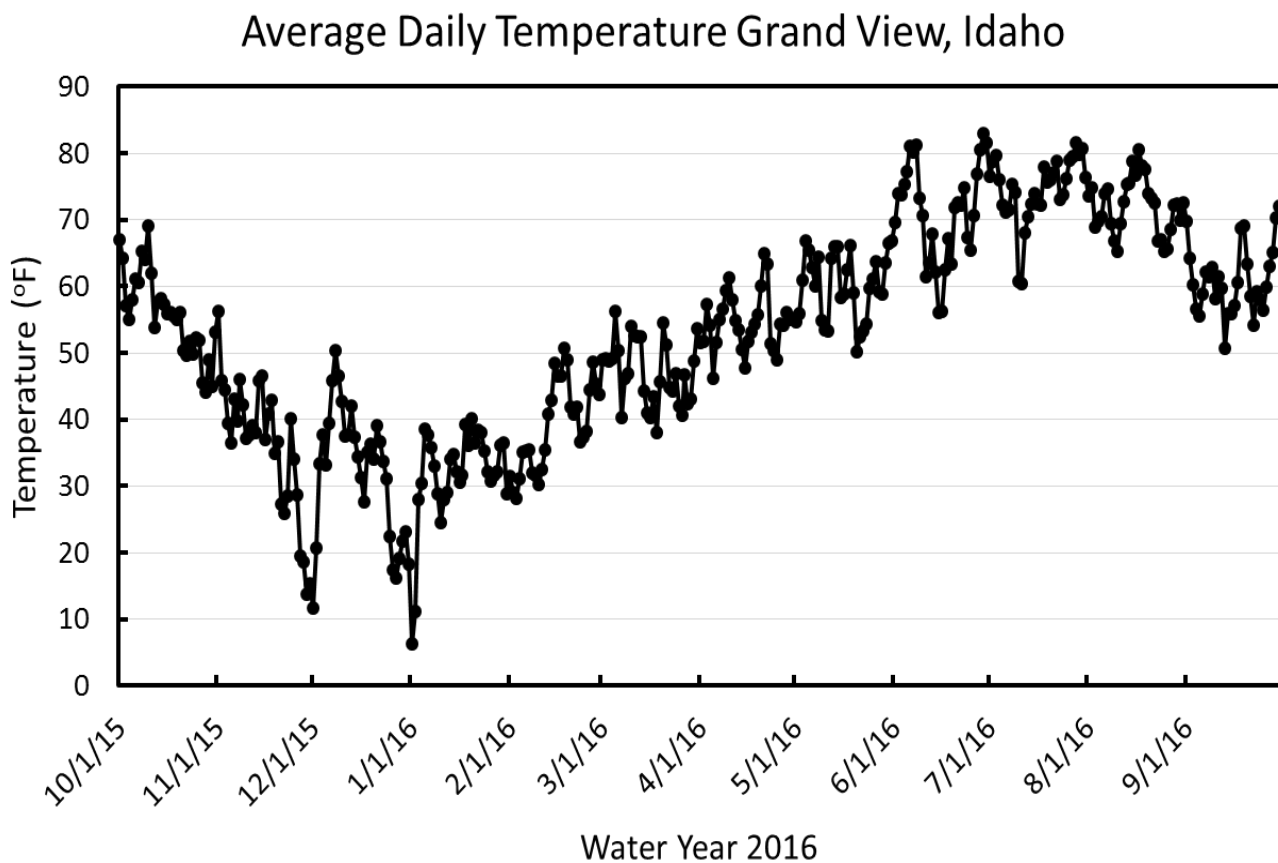
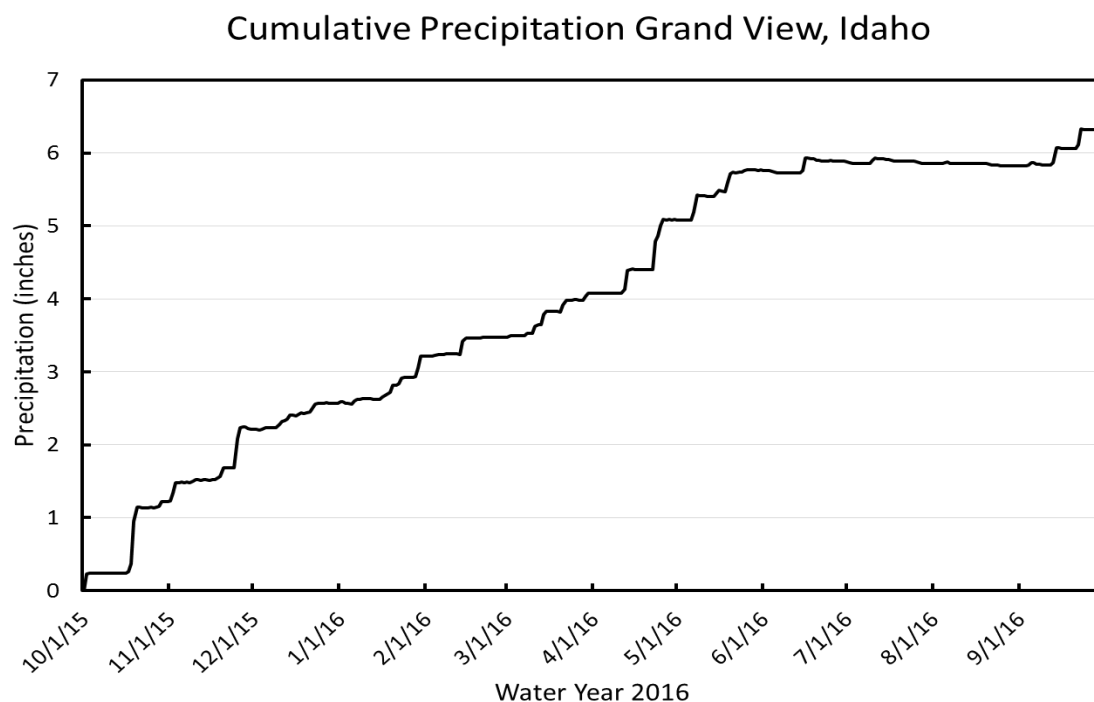
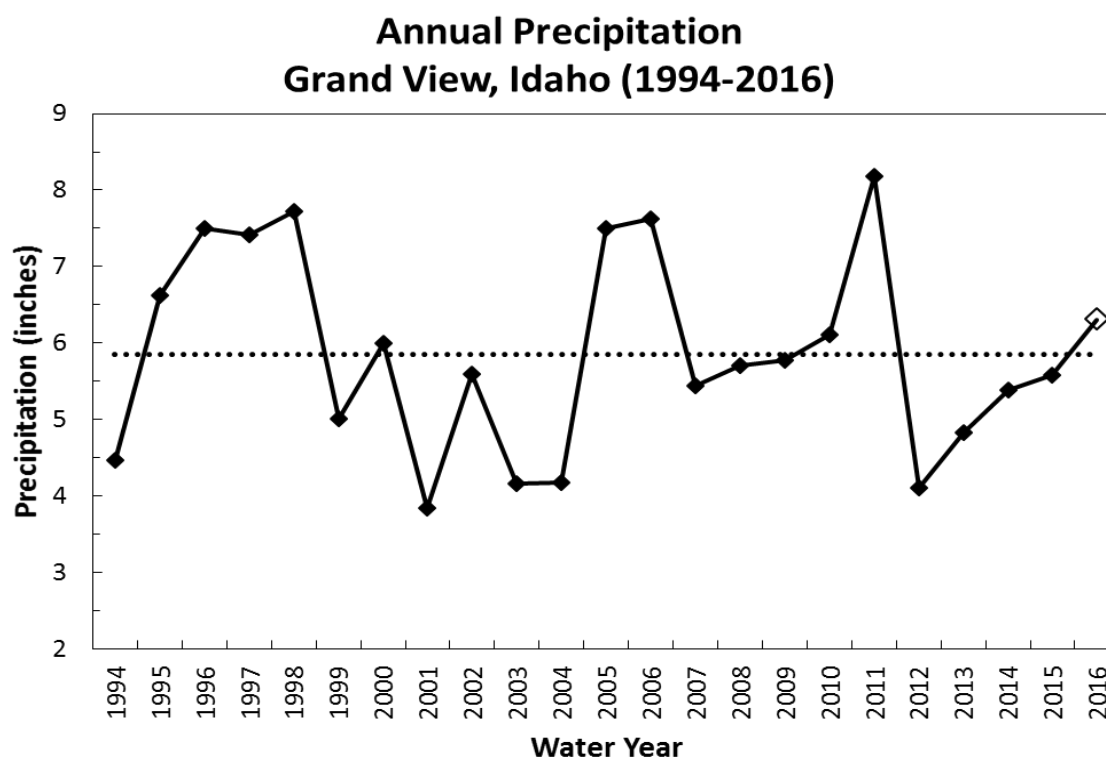


Figure 5. Average Daily Temperature for Grand View, ID in WY 2016. Data from <http://www.usbr.gov/pn/agrimet/webagdayread.html> Station GDVI.



**Figure 6. Cumulative Precipitation for Grand View, ID in WY 2016.** Data from <http://www.usbr.gov/pn/agrimet/webagdayread.html> Station ID GDVI Accessed 11/30/2016.



**Figure 7. Annual precipitation for Grand View, Idaho from 1993-2016.** Data from <http://www.usbr.gov/pn/agrimet/webagdayread.html> Station ID GDVI Accessed 11/30/2016.

## REFERENCES

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U.S. Geological Survey, 2016, National Water Information System data available on the World Wide Web (USGS Water Data for the Nation), accessed [12/28/16], at URL [<http://waterdata.usgs.gov/nwis/>].

## APPENDIX

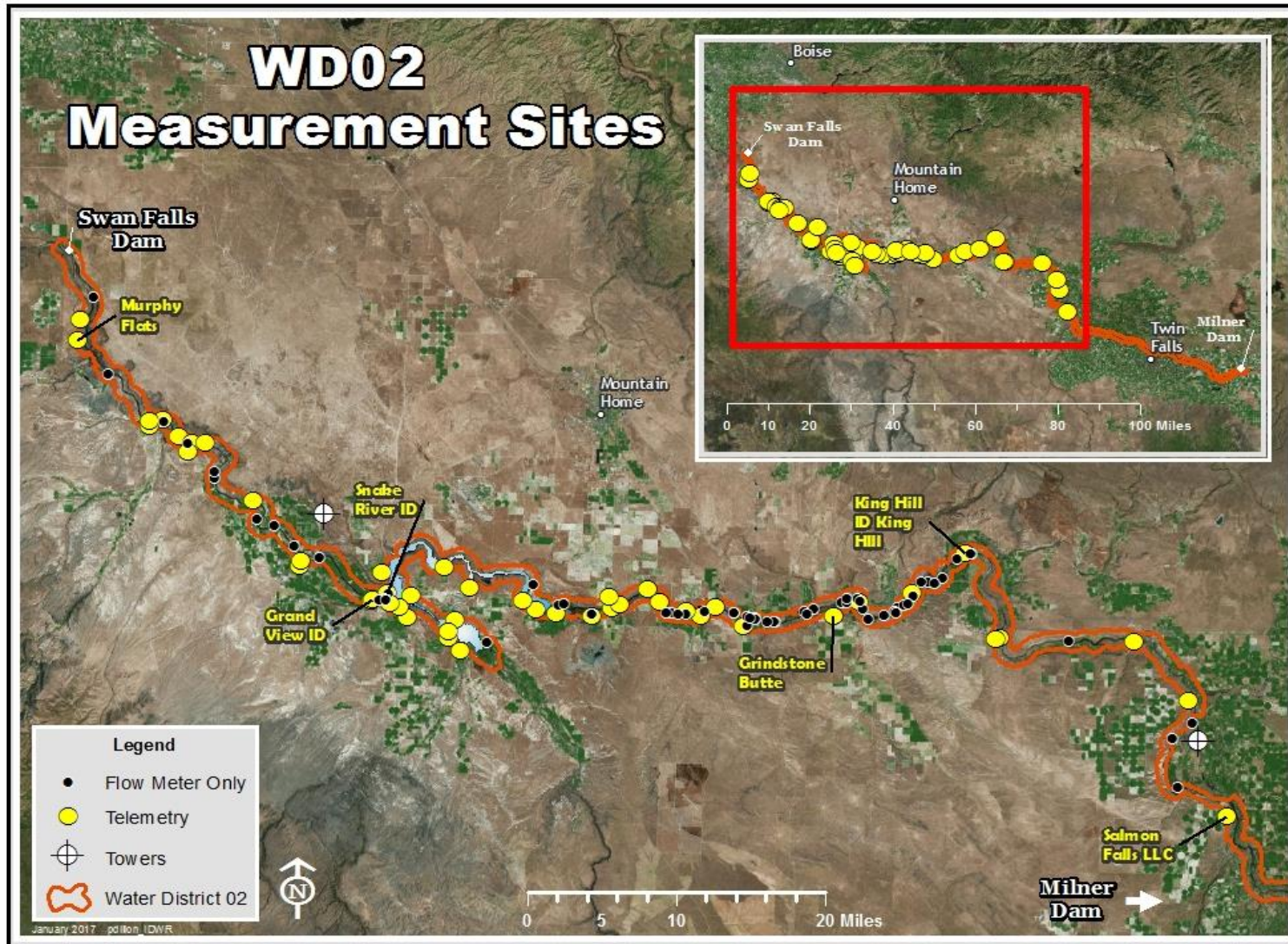
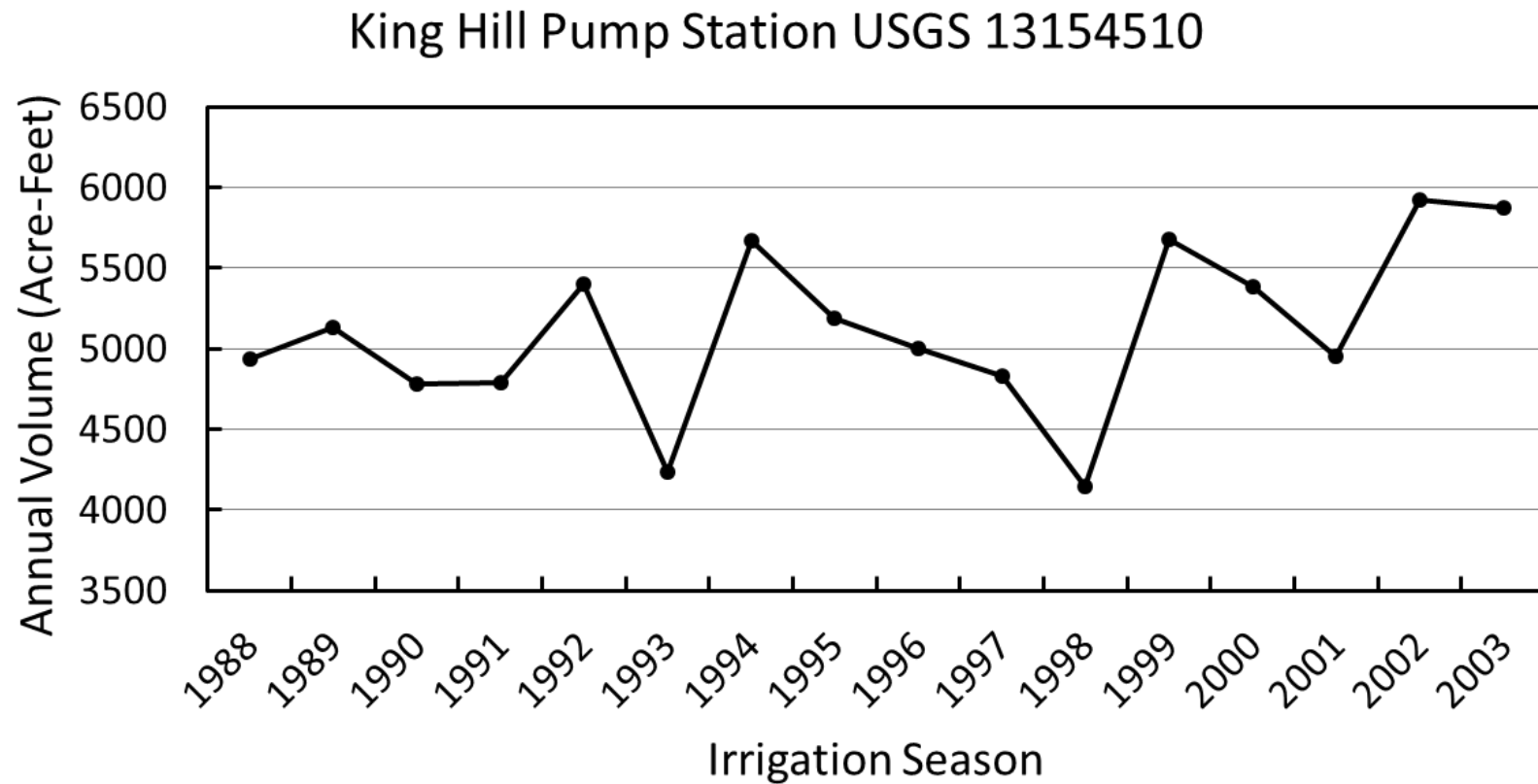


Figure A1. Map of Water District 02 boundaries and measurement sites.



**Figure A2. Historical annual volume for King Hill Irrigation District Pump Station, USGS historical site 11354510. This location coincides with the current WD02 measured diversion, named King Hill-King Hill**



## Historic Measured Diversions (2002-2014)

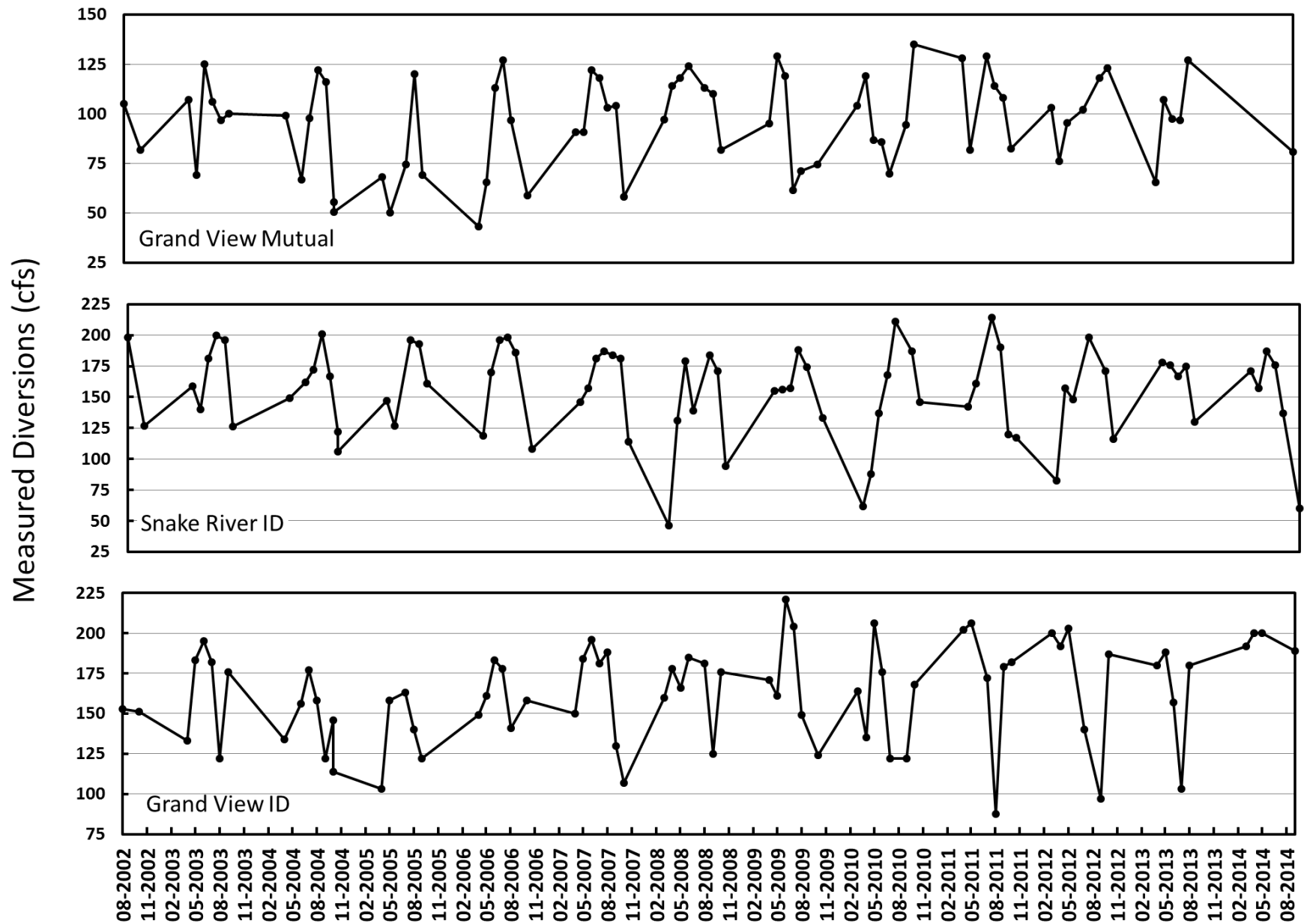


Figure A3. Measured diversions by IDWR staff between irrigation seasons 2002-2014.



**Table A1. Historic USGS Diversion Data for WD02, average monthly rates (cfs)**

<b>Diversion Date</b>	<b>Simplot 2</b>	<b>Simplot 3</b>	<b>Simplot 4</b>	<b>Flying H</b>	<b>Clover Hollow</b>	<b>South Elmore</b>	<b>Lower Indian Cove</b>	<b>Upper Indian Cove</b>	<b>West Indian Cove</b>
04/1985	N/A	N/A	N/A	N/A	N/A	13.3	N/A	N/A	N/A
05/1985	N/A	N/A	N/A	N/A	N/A	58.9	N/A	N/A	N/A
06/1985	N/A	N/A	N/A	N/A	N/A	89.2	N/A	N/A	N/A
07/1985	N/A	N/A	N/A	N/A	N/A	96.6	N/A	N/A	N/A
08/1985	N/A	N/A	N/A	N/A	N/A	58.5	N/A	N/A	N/A
09/1985	N/A	N/A	N/A	N/A	N/A	12.5	N/A	N/A	N/A
10/1985	N/A	N/A	N/A	N/A	N/A	4.56	N/A	N/A	N/A
04/1986	N/A	N/A	N/A	N/A	N/A	N/A	5.33	4.3	N/A
05/1986	N/A	N/A	N/A	N/A	24.1	40.3	15.2	17.3	N/A
06/1986	N/A	N/A	N/A	N/A	35.8	71.8	13.1	14.8	N/A
07/1986	N/A	N/A	N/A	N/A	38.7	84.4	15.5	14.8	N/A
08/1986	N/A	N/A	N/A	N/A	33.1	64.2	15.7	13.2	N/A
09/1986	N/A	N/A	N/A	N/A	19.5	27.9	2.61	2.55	N/A
10/1986	N/A	N/A	N/A	N/A	0.123	2.83	N/A	N/A	N/A
04/1987	N/A	N/A	15.8	N/A	16.4	25	10	7.63	6.88
05/1987	N/A	N/A	19.9	N/A	30.4	64.1	16.2	14.1	14.4
06/1987	N/A	N/A	23.4	N/A	33.4	82.3	14	13.3	10.5

<b>Table A1 (cont.) Diversion Date</b>	<b>Simplot 2</b>	<b>Simplot 3</b>	<b>Simplot 4</b>	<b>Flying H</b>	<b>Clover Hollow</b>	<b>South Elmore</b>	<b>Lower Indian Cove</b>	<b>Upper Indian Cove</b>	<b>West Indian Cove</b>
07/1987	N/A	N/A	26.7	N/A	33.1	75.1	15.5	11.5	14.7
08/1987	N/A	N/A	20.8	N/A	35.5	64.4	17.3	15.5	14.4
09/1987	N/A	N/A	24.1	N/A	23.8	47	7.8	4.34	9.41
10/1987	N/A	N/A	N/A	N/A	6.32	14.4	N/A	N/A	3.06
03/1988	N/A	N/A	N/A	N/A	1.16	N/A	N/A	N/A	N/A
04/1988	24.8	N/A	N/A	N/A	20.8	N/A	15.6	12	N/A
05/1988	26.6	N/A	18.8	8.56	30.9	48	17.6	15.9	12.4
06/1988	33.5	N/A	25.1	12	38.5	73.8	17.2	16.2	15.5
07/1988	33.7	N/A	26.8	11.3	35.1	71.4	19.8	15.9	17
08/1988	28.3	N/A	21.6	10.1	32.1	59.3	18.6	17.1	11.7
09/1988	29.2	N/A	15.5	5.52	21.7	35.6	4.57	3.27	10.4
10/1988	1.22	0.216	4.62	1.27	4.24	12.3	0	0	3.29
04/1989	N/A	5.03	N/A	N/A	10.4	N/A	4.03	3.1	5.85
05/1989	24	8.97	23.4	11.2	30.4	N/A	18	14	9.02
06/1989	33.2	13.1	24.4	N/A	41.4	N/A	17.1	16.7	12.9
07/1989	25.4	11.2	16.6	12.5	38.5	69.3	19.5	16	14.8
08/1989	25.3	9.63	21	9.94	30.2	47.6	16.9	14.2	9.76
09/1989	0	7.36	0	3.04	18.8	36.1	12.6	8.17	9.25

<b>Table A1 (cont.) Diversion Date</b>	<b>Simplot 2</b>	<b>Simplot 3</b>	<b>Simplot 4</b>	<b>Flying H</b>	<b>Clover Hollow</b>	<b>South Elmore</b>	<b>Lower Indian Cove</b>	<b>Upper Indian Cove</b>	<b>West Indian Cove</b>
10/1989	N/A	0.5	N/A	2.02	10.7	N/A	0.894	0.797	2.67
03/1990	1	N/A	0.119	N/A	0.184	0.968	N/A	N/A	0.31
04/1990	30.4	N/A	18.6	4.05	17.6	31.7	9.29	10.8	9.12
05/1990	20.5	N/A	13.2	9.75	27.2	38.3	17.8	16.3	11.3
06/1990	27.6	4.94	21.1	15.8	31.9	55.5	14.3	12.4	9.91
07/1990	33.6	9.57	22.5	15.7	44.6	71.3	17.7	13	11.8
08/1990	32.2	12	20.8	9.46	35.5	59.3	17.5	16.3	10.5
09/1990	N/A	7.89	22.4	7.79	24.4	N/A	14.2	14	9.97
10/1990	N/A	1.34	2.49	1.68	6.45	N/A	0.777	1.77	2.23
11/1990	N/A	N/A	0	N/A	N/A	N/A	N/A	N/A	N/A
04/1991	N/A	6.64	15.2	5.28	N/A	N/A	N/A	N/A	N/A
05/1991	N/A	8.3	14.4	4.49	10.4	12.6	N/A	N/A	N/A
06/1991	N/A	8.33	23.5	7.72	24.5	37.2	N/A	N/A	N/A
07/1991	30.9	10.3	23.8	11.4	39	N/A	N/A	N/A	N/A
08/1991	32.8	10.7	25.3	11.4	35.2	51.6	N/A	N/A	N/A
09/1991	19.1	6.03	21	7.52	18	25.7	N/A	N/A	N/A
10/1991	0	1.06	N/A	3.04	6.91	8.45	N/A	N/A	N/A

<b>Table A1 (cont.) Diversion Date</b>	<b>Simplot 2</b>	<b>Simplot 3</b>	<b>Simplot 4</b>	<b>Flying H</b>	<b>Clover Hollow</b>	<b>South Elmore</b>	<b>Lower Indian Cove</b>	<b>Upper Indian Cove</b>	<b>West Indian Cove</b>
04/1992	35	9.4	20.6	6.53	11.9	33.7	N/A	N/A	N/A
05/1992	26.4	8.92	22.4	13.5	26.5	53.6	N/A	N/A	N/A
06/1992	33.3	10.1	23.2	13.7	29.1	62.5	N/A	N/A	N/A
07/1992	24.7	10.2	19.5	10.1	31.1	43.3	N/A	N/A	N/A
08/1992	31.3	9.15	24.6	10.7	32.9	53.3	N/A	N/A	N/A
09/1992	24.6	9.07	20.3	9.05	25	39	N/A	N/A	N/A
10/1992	0	0	5.47	4.97	4.46	9.76	N/A	N/A	N/A
04/1993	9.69	N/A	5.06	0	6.15	6.3	N/A	N/A	N/A
05/1993	21.6	6.96	18.7	7.68	21.9	34.3	N/A	N/A	N/A
06/1993	13.7	5.65	14.6	7.4	37.8	45.4	N/A	N/A	N/A
07/1993	35.8	9.74	21.1	11	29.9	N/A	N/A	N/A	N/A
08/1993	27.7	7.77	21.8	11.2	20.5	45.2	N/A	N/A	N/A
09/1993	5.21	8.32	19.1	6.73	3.05	36.7	N/A	N/A	N/A
10/1993	N/A	N/A	8.17	1.06	N/A	13.4	N/A	N/A	N/A
04/1994	5.45	4.7	13.9	8.24	17.5	30.4	N/A	N/A	N/A
05/1994	8.43	8.69	18.2	7.87	25.4	33.9	N/A	N/A	N/A
06/1994	N/A	N/A	22.7	17.8	42.1	66.3	N/A	N/A	N/A

<b>Table A1 (cont.) Diversion Date</b>	<b>Simplot 2</b>	<b>Simplot 3</b>	<b>Simplot 4</b>	<b>Flying H</b>	<b>Clover Hollow</b>	<b>South Elmore</b>	<b>Lower Indian Cove</b>	<b>Upper Indian Cove</b>	<b>West Indian Cove</b>
07/1994	15.2	10.1	24.8	17.5	41.6	N/A	N/A	N/A	N/A
08/1994	12.9	9.12	22.7	13.5	38.7	61.2	N/A	N/A	N/A
09/1994	14.5	5.75	22.2	9.83	24.6	39.9	N/A	N/A	N/A
10/1994	1.72	N/A	1.48	1.35	N/A	11.7	N/A	N/A	N/A
04/1995	9.61	N/A	12.8	8.44	22.3	32.5	N/A	N/A	N/A
05/1995	5.12	N/A	8.11	6.24	13.9	21.7	N/A	N/A	N/A
06/1995	14.4	N/A	18.2	13.4	35.7	N/A	N/A	N/A	N/A
07/1995	15	N/A	19.6	15.5	42.4	N/A	N/A	N/A	N/A
08/1995	15.1	N/A	20.9	0.165	39.1	58.2	N/A	N/A	N/A
09/1995	14.7	N/A	18	N/A	32.7	38.1	N/A	N/A	N/A
10/1995	1.86	N/A	1	N/A	3.67	11.4	N/A	N/A	N/A
04/1996	5.46	N/A	10.9	N/A	15.8	29.7	N/A	N/A	N/A
05/1996	8.14	N/A	13.3	N/A	N/A	39.1	N/A	N/A	N/A
06/1996	15.2	N/A	21.5	N/A	47.5	N/A	N/A	N/A	N/A
07/1996	16	N/A	17.8	12.1	38.7	81	N/A	N/A	N/A
08/1996	0.032	N/A	19.9	11.8	37.8	74	N/A	N/A	N/A
09/1996	N/A	N/A	18	8.22	27.2	44.5	N/A	N/A	N/A
10/1996	N/A	N/A	2.94	1.48	4.13	14.5	N/A	N/A	N/A

<b>Table A1 (cont.) Diversion Date</b>	<b>Simplot 2</b>	<b>Simplot 3</b>	<b>Simplot 4</b>	<b>Flying H</b>	<b>Clover Hollow</b>	<b>South Elmore</b>	<b>Lower Indian Cove</b>	<b>Upper Indian Cove</b>	<b>West Indian Cove</b>
11/1996	N/A	N/A	N/A	1.56	N/A	N/A	N/A	N/A	N/A
04/1997	N/A	N/A	11.1	5.52	24.9	31.8	N/A	N/A	N/A
05/1997	N/A	N/A	17.5	8.59	29.5	57.3	N/A	N/A	N/A
06/1997	N/A	N/A	16.5	15.6	39.7	68.2	N/A	N/A	N/A
07/1997	N/A	N/A	18.7	14.9	37.1	71.9	N/A	N/A	N/A
08/1997	N/A	N/A	23.7	11	37.2	63.3	N/A	N/A	N/A
09/1997	N/A	N/A	19	7.98	26.8	41.8	N/A	N/A	N/A
10/1997	N/A	N/A	7.57	N/A	N/A	15.2	N/A	N/A	N/A
03/1998	N/A	N/A	0.2	N/A	N/A	N/A	N/A	N/A	N/A
04/1998	N/A	N/A	10.6	N/A	N/A	24.3	N/A	N/A	N/A
05/1998	N/A	N/A	14.9	N/A	N/A	31.9	N/A	N/A	N/A
06/1998	N/A	N/A	14.5	N/A	N/A	57.9	N/A	N/A	N/A
07/1998	N/A	N/A	20.5	N/A	N/A	70.4	N/A	N/A	N/A
08/1998	N/A	N/A	22.4	N/A	N/A	75.8	N/A	N/A	N/A
09/1998	N/A	N/A	19.3	N/A	N/A	55.2	N/A	N/A	N/A
10/1998	N/A	N/A	8.19	N/A	N/A	18	N/A	N/A	N/A
04/1999	N/A	N/A	N/A	N/A	N/A	33.4	N/A	N/A	N/A
05/1999	N/A	N/A	N/A	N/A	N/A	58.4	N/A	N/A	N/A

<b>Table A1 (cont.) Diversion Date</b>	<b>Simplot 2</b>	<b>Simplot 3</b>	<b>Simplot 4</b>	<b>Flying H</b>	<b>Clover Hollow</b>	<b>South Elmore</b>	<b>Lower Indian Cove</b>	<b>Upper Indian Cove</b>	<b>West Indian Cove</b>
<b>06/1999</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>94</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>
<b>07/1999</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>96.9</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>
<b>08/1999</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>83.6</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>
<b>09/1999</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>71.7</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>
<b>10/1999</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>19.4</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>