



BROCKWAY
ENGINEERING
P.L.L.C.

Hydraulics

Hydrology

Water Resources

RECEIVED

JUN 05 2017

Department of Water Resources
Eastern Region

May 31, 2017

Regional Manager
Idaho Department of Water Resources
900 N. Skyline Drive, Suite A
Idaho Falls, ID 83402-1718

Re: Sam's Hollow Water Company – 2016 Annual Report
Project No. 370-04-2001

Dear Regional Manager:

Enclosed please find the 2016 annual report required by the approved mitigation plan for Sam's Hollow Water Company in Bear Lake. If you have any questions or need additional information, please do not hesitate to contact me.

Cordially,

Greg Sullivan, M.S., Engineer

Cc: Sam's Hollow Water Company
Enc: Sam's Hollow Water Company-3 Final Reports
Idaho Department of Water Resources-1 Final Report

CHARLES E.
BROCKWAY,
PH.D., P.E.

CHARLES G.
BROCKWAY,
PH.D., P.E.

2016 NORTH
WASHINGTON
STREET • SUITE 4

TWIN FALLS,
IDAHO 83301

208•736•8543

FAX: 736•8506

Project No. 370-01-1999

2016 Annual Report on Water Use and Mitigation for the Sam's Hollow Water Company

Prepared for:

**Sam's Hollow Water Company
Bear Lake, Idaho**

May 31, 2017

For information concerning this report, contact
Greg W. Sullivan, M.S., Engineer
Charles G. Brockway, Ph.D., P.E.



CHARLES E. BROCKWAY, Ph.D., P.E.
CHARLES G. BROCKWAY, Ph.D., P.E.
ERICK POWELL, Ph.D., P.E.

2016 NORTH WASHINGTON, SUITE 4
TWIN FALLS, IDAHO 83301

RECEIVED
JUN 05 2017

Department of Water Resources
Eastern Region

Project No. 370-01-1999

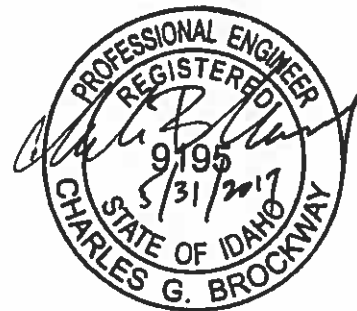
2016 Annual Report on Water Use and Mitigation for the Sam's Hollow Water Company

Prepared for:

Sam's Hollow Water Company
Bear Lake, Idaho

May 31, 2017

For information concerning this report, contact
Greg W. Sullivan, M.S., Engineer
Charles G. Brockway, Ph.D., P.E.



CHARLES E. BROCKWAY, PH.D., P.E.
CHARLES G. BROCKWAY, PH.D., P.E.
ERICK POWELL, PH.D., P.E.

2016 NORTH WASHINGTON, SUITE 4
TWIN FALLS, IDAHO 83301

2016 Annual Report on Water Use and Mitigation Sam's Hollow Water Company

Brockway Engineering, PLLC
May 31, 2017

Introduction

The Water Management and Operations Plan for Mitigation (the "Plan") dated June 19, 2006 for Sam's Hollow Water Company requires an annual report of water use on residences and facilities in use during the year. The reporting requirements are outlined in the Plan, which was submitted to the Idaho Department of Water Resources. The Plan requires the submittal of the number and type of facilities (residences, commercial, and other) utilizing ground water during the year, the estimated depletion to Bear Lake resulting from the occupancy of the facilities, irrigated acres taken out of production within the project, and the volume of mitigation water returned to Bear Lake through the mitigation facilities.

The mitigation facilities consist of a conveyance channel which delivers water from the end of the irrigation system to a pipeline which conveys water to Bear Lake from Fish Haven Creek. Water delivered through the irrigation system and mitigation pipeline is measured through a flow meter before it returns to Bear Lake.

Sam's Hollow Water Company has shares in Fish Haven Water Users for delivery through three ditches from Fish Haven Creek to the project. Deliveries into the ditches are measured through calibrated flumes. During 2016, deliveries through Ditch No. 3, the lower ditch, were the source of water for mitigation. A portion of the flow through Ditch No. 3 was delivered into a pond and thence through the flow meter and into Bear Lake.

Project Build-Out History

In 2006 there were no homes or water-using facilities in use on the Project. Project build out varies from year to year but has steadily increased. In 2011, the Club House was constructed in the Project area. Table 1 provides the year and number of residences constructed in the Project, type of wastewater treatment and if construction occurred within the current place of use of irrigation water right.

A total of 5 houses were constructed in 2016. Three homes were constructed and connected to the St. Charles Sewer District. Two homes were built that utilize on-site wastewater treatment. The total number of residential households constructed in the project area is 54. Locations of the residences are shown on the attached map. A total of 12 residential homes and the clubhouse have been constructed inside of the irrigation place of use and qualify for mitigation acres.

Table 1: Residence Units Constructed Information

Residence Units Constructed

Year	On-site Wastewater treatment	St. Charles Wastewater treatment	Condominium	Inside Irrigation Place of Use	Total Residences
2006					0
2007	1				1
2008		9		5	10
2009		4		1	14
2010		3		2	17
2011		6			23
2012	7	8		2	38
2013		2		1	40
2014		7		1	47
2015		2			49
2016	2	3			54
Total	10	44	0	12	54

Irrigated Acres

Mitigation for water use on residential and commercial units requires that irrigated acres formerly supplied with surface water be dried up to compensate for consumptive use depletion of the development. The 2008 annual report documented the fact that 2.05 acres had been removed from irrigation due to construction of roadways (note that other roads were in place prior to the approved mitigation plan and are not accounted for).

The assumed area of house footprints, driveways, and other hardscape areas per residence is 4,000 ft². The assumed area of turf, garden area and landscaping areas per residence is 5,000 ft² for a total displaced area of 9,000 ft² per residence. The approximate area removed from irrigation for the clubhouse, pool area and parking lot is 1.0 acres or 43,560 ft². Based on procedures developed by Dr. Robert Hill and adopted in the Bear River Ground Water Management Plan, the consumptive depletion for grass pasture is 1.18 ac-ft/acre/year.

Table 2 provides the total accumulated mitigation from the construction of structures within the water right place of use from the start of the project until the end of the current reporting year of 2016.

Table 2: Summary of Mitigation Provided by Construction through 2016.

		ft ² /structure	Acres	AFA
Road Ways			2.05	2.42
Homes	12	9000	2.48	2.93
Condos	0	12000	0.00	0.00
Commercial	1	43560	1.00	1.18

Total Removed for Mitigation 5.53 Acres 6.52 AFA

Estimated Project Depletion

The estimated consumptive depletion from residences and other facilities was determined using procedures developed by Dr. Robert Hill and adopted in the Bear River Ground Water Management Plan. For the Sam's Hollow system, the depletion values for potable water and irrigation of residences and commercial facilities were developed and included in the Plan for the project. Table 3 was developed to assist in estimating depletion each year based on the facilities build out. Table 3 shows the annual unit depletion and the number of units on line in 2016. The total estimated depletion from the fifty four (54) units and club house on line in 2016 is 19.02 acre feet.

Table 3. Depletion analysis for Sam's Hollow Water Company in 2016. All depletions are in acre-feet annually.

Entities with On-Site Sewage Disposal

	Unit Depletion	Occupied Units	Total Depletion
Domestic Potable Water - Homesites	0.03	10	0.3
Irrigation - Homesites	0.14	10	1.4

Entities with St. Charles Sewer District Service

	Unit Depletion	Occupied Units	Total Depletion
Domestic Potable Water - Homesites	0.19	44	8.36
Irrigation - Homesites	0.14	44	6.16

Domestic/Irrigating - Condominiums (Per Building = 4 units)	0.5	0	0.00
Irrigation - Condominiums	0.14	0	0.00

Potable Water - Commercial	2.8	1	2.80
-----------------------------------	-----	---	------

All Depletion Values are in Acre-Feet Annually

The annual depletion value is based on a rate of 40.2% occupancy

Total Homesites	54
Total Condominiums	0
Total Commercial Sites	1
Total Depletion	19.02 afa

Water Supply Available for Mitigation

The 140.5 shares in Fish Haven Water Users owned by Sam's Hollow Water Company can be diverted through any of three ditches: the Upper North Ditch, Number 1 Ditch, and Number 3 Ditch. Each ditch has been instrumented with water measuring flumes and flow measurements have been recorded since May 22, 2004. The flumes were installed by the Fish Haven Water Users Company with assistance from Sam's Hollow Water Company and are being monitored by Sam's Hollow Water Company.

During 2016, discharge readings were obtained from June 14, 2016 through October 27, 2016 and are shown on the attached spreadsheet. This log shows that there was approximately 2544.84 acre-feet of irrigation water diverted into Upper North Ramped Flume, Ditch No. 1 and Ditch No. 3 during the irrigation season of 2015, of which 378.95 acre-feet was allotted to Sam's Hollow Water Company.

Correspondence with Brent Skinner on March 12, 2010 indicated that 22.2 acres of previously irrigated land covered by the 140.5 shares in Fish Haven Water Users was dried up in 2009.

There have been 5.74 acres dried up due to construction of roads and buildings in the project irrigated area. The total irrigated acres that have been set aside to date for the project is 27.94 acres.

Mitigation Water Returned to Bear Lake

Water was returned to Bear Lake via the mitigation pipeline and was measured by the flow meter located just east of the Fish Haven Cemetery. The pipeline, conveying water from the retention pond, under the highway, and to Bear Lake is an 8-inch PVC pipe with a Siemens SITRANS FM electromagnetic water meter Type MAG 8000 installed in the pipeline (see attached photograph). The meter has a totalizer and instantaneous discharge readout which reads in gallons and gallons per minute. The meter is maintained by Sam's Hollow staff.

The meter was installed in 2007 to record the mitigation water volume. For the 2016 season, mitigation flow commenced to Bear Lake on September 15, 2016. The mitigation flow turn terminated on October 2, 2016. Table 4 shows the mitigation pipeline flow meter readings.

The total volume returned to Bear Lake during the 2016 irrigation season was 13.67 acre feet.

Table 4. Flow Meter Readings for the Sam's Hollow Mitigation Pipeline.

Date	Reading (gallons)	Volume (acre-feet)
9/15/2016	25011900	76.76
10/2/2016	29465200	90.43

Total Mitigation Volume	4453300	13.67	acre-feet
-------------------------	---------	-------	-----------

The consumptive use reduction appurtenant to the 5.74 acres removed from irrigation provided 6.77 acre feet to mitigate for the project depletion in 2016, which was insufficient to provide the entire mitigation requirement. Therefore, 10.38 acres (12.25 acre feet) of additional irrigated acres beyond those dried up on the residential footprints and roadways will be added to the mitigation acres for the current development build-out.

The additional 10.38 acres of additional irrigated acres to be dried up will come from the 22.2 acres that were dried up in 2009. The remaining total of 11.82 acres of the 22.2 acres is available for future mitigation needs.

At the conclusion of 2016, total cumulative volume of water discharge into Bear Lake is 113.34 acre feet. The cumulative volume required for mitigation from project development is 111.09 acre feet. (See Figure 1)

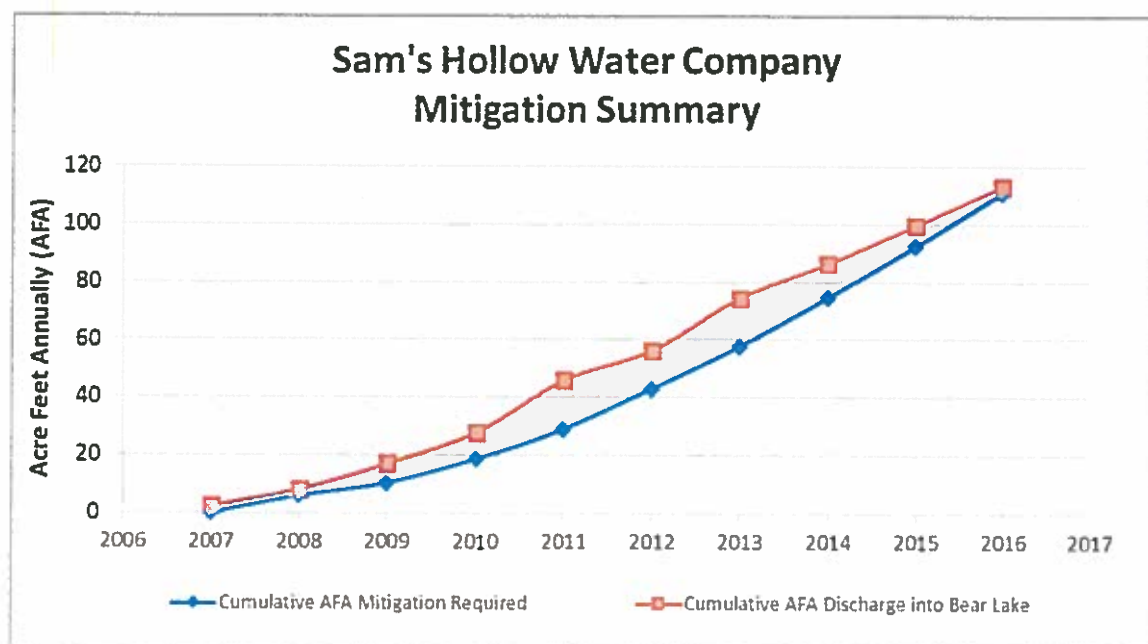


Figure 1: Sam's Hollow Water Company Mitigation Summary

Projection of 2017 Sufficiency of Mitigation Water

It is estimated that the mitigation requirement for 2017, based on a projected build-out, will be 5 additional homes comprised of 4 residential homes outside of the irrigation area and 1 residential home within the water right place of use. Of the 5 additional homes, it is expected that there will be 2 additional residential homes with on-site sewage treatment. The total expected residential units online will be 59 units. The club house will continue to be utilized with no additional conversion of irrigated areas to commercial uses. The calculated depletion for residences and commercial uses under these assumptions will be 20.01 acre feet. It is estimated that the seasonal water availability for Sam's Hollow in 2017 will be adequate to provide mitigation water for the expected number of units on-line in 2017. Based on NRCS SNOTEL data for the Bear River Basin, the peak snow water equivalent was 159% of the average level. Data for the Bear River Basin was obtained May 17, 2017. The runoff for Fish Haven Creek will be considered above average based on the snow pack data, and it is anticipated that water supply will be more than adequate for mitigation needs. Mitigation flow to Bear Lake will need to commence during late summer or early fall.

Regarding the consumptive use balance, the projected 59 units on line in 2017 (13 homes and the club house within the currently irrigated area) will provide a total of 5.74 acres or 6.77 acre-feet of the required 20.01 acre-feet estimated depletion for 2017. Therefore, 12.25 acre-feet must be provided from additional irrigation reduction in the amount of 10.38 acres. The 11.82 acres remaining from the 27.94 acres that have been set aside for this project will be sufficient to mitigate for the proposed additional 2017 project depletion.



Terminus of the Sam's Hollow mitigation pipeline.

Note: Date on photo is incorrect. The correct date is July 2007.



Development that has occurred at Sam's Hollow Water Company

Photo courtesy of *The Reserve* reservebl.com 2015.

The Reserve at Bear Lake



SAM'S HOLLOW WATER COMPANY AVAILABLE IRRIGATION DIVERSIONS

Fish Haven Water Users Association

Water Year 2016 Measurements By The Reserve Staff

Date	Upper North Ramped Flume*				NO. 1 NORTH - Parchal Flume*				No. 3 North 12" Ramped Flume				Sam's Hollow Total afid
	Gage ft	Discharge cfs	Measured afid	Estimated afid	Sam's Hollow 99.5 shares 249.5 in ditch 39.9%	Accum af	Gage ft	Discharge cfs	Measured afid	Estimated afid	Sam's Hollow 21.0 shares 255.4 in ditch 8.2%	Accum af	Total afid
11-May													
12-May													
13-May													
14-May													
15-May													
16-May													
17-May													
18-May													
19-May													
20-May													
21-May													
22-May													
23-May													
24-May													
25-May													
26-May													
27-May													
28-May													
29-May													
30-May													
31-May													
1-Jun													
2-Jun													
3-Jun													
4-Jun													
5-Jun													
6-Jun													
7-Jun													
8-Jun													
9-Jun													
10-Jun													
11-Jun													
12-Jun													
13-Jun													
14-Jun	0	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.52	0.04	0.04	0.00
15-Jun					0.00	0.00				2.39	0.20	0.24	0.00
16-Jun					0.00	0.00				4.78	0.39	0.63	0.00
17-Jun	0	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	7.17	0.59	1.22	0.00
18-Jun					0.00	0.00				7.17	0.59	1.81	0.00
19-Jun					0.00	0.00				7.17	0.59	2.40	0.00
20-Jun					0.00	0.00				7.17	0.59	2.99	0.00
21-Jun					0.00	0.00				7.17	0.59	3.58	0.00
22-Jun					0.00	0.00				7.17	0.59	4.17	0.00
23-Jun					0.00	0.00				7.17	0.59	4.76	0.00
24-Jun					0.50	0.50				5.74	0.47	5.23	0.00
25-Jun					1.01	1.51				4.30	0.35	5.58	0.00
26-Jun					3.79	3.02				2.87	0.24	5.82	0.00
27-Jun					5.05	5.03				1.43	0.12	5.94	0.00
28-Jun	0.48	3.19	6.31	6.31	2.01	7.55	0.46	2.98	5.90	0.00	0.00	5.94	0.00
29-Jun					6.31	10.07				0.00	0.00	5.94	0.00
30-Jun	0.48	3.19	6.31	6.31	2.52	12.58	0.46	2.98	5.90	0.00	0.00	5.94	0.00
1-Jul					2.52	15.10				0.00	0.00	5.94	0.00
2-Jul					6.31	17.62				0.00	0.00	5.94	0.00
3-Jul					2.52	20.13				0.00	0.00	5.94	0.00
4-Jul					6.31	22.65				0.00	0.00	5.94	0.00
5-Jul	0.48	3.19	6.31	6.31	2.52	25.17	0.46	2.98	5.90	0.00	0.00	5.94	0.00
6-Jul					3.16	28.42				3.59	0.29	6.23	0.00
7-Jul	0	0.00	0.00	0.00	0.00	26.42	0.52	3.62	7.17	7.17	0.59	6.82	0.00
8-Jul					0.00	28.42				7.17	0.59	7.41	0.00
9-Jul					0.00	28.42				7.17	0.59	8.00	0.00
10-Jul					0.00	28.42				7.17	0.59	8.59	0.00
11-Jul					0.00	28.42				7.17	0.59	9.18	0.00
12-Jul	0	0.00	0.00	0.00	0.00	26.42	0.52	3.62	7.17	7.17	0.59	9.77	0.00
13-Jul					0.00	28.42				7.17	0.59	10.36	0.00

13-Jul F:\Projects\Bear Lakes Reserve\Manuals and Plans\2016 Annual Report\Sams Hollow diversions 2016 GWS

4/19/2017

Date	Upper North Ramped Flume*					NO 1 NORTH - Parchal Flume*					No. 3 North 12" Ramped Flume					Total af/d	Sam's Hollow Total af/d			
	Gage ft	Discharge cfs	Measured af/d	Estimated af/d	Sam's Hollow 99.5 shares 249.5 in ditch 39.9%	Accum af	Gage ft	Discharge cfs	Measured af/d	Estimated af/d	Sam's Hollow 210.0 shares 133.8 in ditch 15.9%	Accum af	Gage ft	Discharge cfs	Measured af/d			Estimated af/d	Sam's Hollow 255.4 in ditch 8.2%	Accum af
14-Jul	0	0.00	0.00	0.00	0.00	26.42	0.52	3.62	7.17	7.17	1.07	18.37	0.52	3.62	7.17	7.17	0.59	10.95	14.34	1.66
15-Jul				0.00	0.00	26.42				7.17	1.07	19.44				7.17	0.59	11.54	14.34	1.66
16-Jul				0.00	0.00	26.42				7.17	1.07	20.52				7.17	0.59	12.13	14.34	1.66
17-Jul				0.00	0.00	26.42				7.17	1.07	21.59				7.17	0.59	12.72	14.34	1.66
18-Jul				0.00	0.00	26.42				7.17	1.07	22.66				7.17	0.59	13.31	14.34	1.66
19-Jul	0	0.00	0.00	0.00	0.00	26.42	0.52	3.62	7.17	7.17	1.07	23.73	0.52	3.62	7.17	7.17	0.59	13.90	14.34	1.66
20-Jul				0.66	0.66	27.09				7.17	1.07	24.80				7.17	0.89	14.71	17.06	1.89
21-Jul	0.32	1.68	3.32	3.32	1.32	26.41	0.52	3.62	7.17	7.17	1.07	25.88	0.74	6.37	12.61	12.61	1.04	15.75	21.44	2.77
22-Jul				3.32	1.32	29.73				7.17	1.07	26.95				12.61	1.04	16.78	23.10	3.43
23-Jul				3.32	1.32	31.06				7.17	1.07	28.02				12.61	1.04	17.82	23.10	3.43
24-Jul				3.32	1.32	32.38				7.17	1.07	29.09				12.61	1.04	18.86	23.10	3.43
25-Jul				3.32	1.32	33.70				7.17	1.07	30.17				12.61	1.04	19.90	23.10	3.43
26-Jul	0.32	1.68	3.32	3.32	1.32	35.02	0.52	3.62	7.17	7.17	1.07	31.24	0.74	6.37	12.61	12.61	1.04	20.93	23.10	3.43
27-Jul				3.32	1.32	36.35				0.53	0.98	32.21				19.31	1.59	22.52	29.16	3.89
28-Jul	0.32	1.68	3.32	3.32	1.32	37.67	0.46	2.98	5.90	5.90	0.88	33.10	1.16	13.14	26.01	26.01	2.14	24.66	35.23	4.34
29-Jul				3.32	1.32	38.99				5.90	0.88	33.98				26.01	2.14	26.80	35.23	4.34
30-Jul				3.32	1.32	40.32				5.90	0.88	34.86				26.01	2.14	28.94	35.23	4.34
31-Jul				3.32	1.32	41.64				5.90	0.88	35.74				26.01	2.14	31.07	35.23	4.34
1-Aug				3.32	1.32	42.96				5.90	0.88	36.62				26.01	2.14	33.21	35.23	4.34
2-Aug	0.32	1.68	3.32	3.32	1.32	44.28	0.46	2.98	5.90	5.90	0.88	37.51	1.16	13.14	26.01	26.01	2.14	35.35	35.23	4.34
3-Aug				3.66	1.46	45.74				5.90	0.88	38.39				26.01	2.14	37.49	35.23	4.34
4-Aug	0.36	2.02	4.00	4.00	1.59	47.34	0.46	2.98	5.90	5.90	0.88	39.27	1.16	13.14	26.01	26.01	2.14	39.63	35.57	4.48
5-Aug				4.00	1.59	48.93				5.90	0.88	40.15				26.01	2.14	41.77	35.91	4.61
6-Aug				4.00	1.59	50.52				5.90	0.88	41.03				26.01	2.14	43.91	35.91	4.61
7-Aug				4.00	1.59	52.12				5.90	0.88	41.91				26.01	2.14	46.05	35.91	4.61
8-Aug				4.00	1.59	53.71				5.90	0.88	42.80				26.01	2.14	48.18	35.91	4.61
9-Aug	0.36	2.02	4.00	4.00	1.59	55.30	0.46	2.98	5.90	5.90	0.88	43.68	1.16	13.14	26.01	26.01	2.14	50.32	35.91	4.61
10-Aug				4.00	1.59	56.90				2.95	0.44	44.12				26.01	2.14	52.46	32.96	4.17
11-Aug	0.36	2.02	4.00	4.00	1.59	58.49	0	0.00	0.00	0.00	0.00	44.12	1.16	13.14	26.01	26.01	2.14	54.60	30.01	3.73
12-Aug				3.86	1.54	60.03				0.00	0.00	44.12				22.24	1.83	56.43	26.24	3.42
13-Aug				3.72	1.49	61.52				0.00	0.00	44.12				18.48	1.52	57.95	22.34	3.06
14-Aug				3.59	1.43	62.95				0.00	0.00	44.12				14.71	1.21	59.16	18.43	2.69
15-Aug				3.45	1.38	64.32				0.00	0.00	44.12				10.94	0.90	60.06	14.53	2.33
16-Aug	0.32	1.68	3.32	3.32	1.32	65.65	0	0.00	0.00	0.00	0.00	44.12	0.52	3.62	7.17	7.17	0.59	60.85	10.62	1.97
17-Aug				3.32	1.32	66.97				0.00	0.00	44.12				7.17	0.59	61.24	10.49	1.91
18-Aug	0.32	1.68	3.32	3.32	1.32	68.29	0	0.00	0.00	0.00	0.00	44.12	0.52	3.62	7.17	7.17	0.59	61.83	10.49	1.91
19-Aug				3.45	1.38	69.67				1.18	0.18	44.30				7.17	0.59	62.41	11.67	2.09
20-Aug				3.59	1.43	71.10				2.38	0.35	44.65				7.17	0.59	63.00	12.98	2.32
21-Aug				3.72	1.49	72.59				3.54	0.53	45.18				7.17	0.59	63.59	14.30	2.55
22-Aug				3.86	1.54	74.13				4.72	0.71	45.68				7.17	0.59	64.18	15.61	2.78
23-Aug	0.36	2.02	4.00	4.00	1.59	75.72	0.46	2.98	5.90	5.90	0.88	46.76	0.52	3.62	7.17	7.17	0.59	64.77	16.93	3.01
24-Aug				4.00	1.59	77.31				5.90	0.88	47.65				7.17	0.59	65.36	17.06	3.06
25-Aug	0.36	2.02	4.00	4.00	1.59	78.91	0.46	2.98	5.90	5.90	0.88	48.53	0.52	3.62	7.17	7.17	0.59	65.95	17.06	3.06
26-Aug				4.00	1.59	80.50				6.15	0.92	49.45				7.17	0.59	66.54	17.32	3.10
27-Aug				4.00	1.59	82.09				6.41	0.96	50.41				7.17	0.59	67.13	17.57	3.14
28-Aug				4.00	1.59	83.69				6.66	1.00	51.40				7.17	0.59	67.72	17.83	3.18
29-Aug				4.00	1.59	85.28				6.92	1.03	52.44				7.17	0.59	68.31	18.08	3.22
30-Aug	0.36	2.02	4.00	4.00	1.59	86.87	0.52	3.62	7.17	7.17	1.07	53.51	0.52	3.62	7.17	7.17	0.59	68.90	18.34	3.26
31-Aug				4.00	1.59	88.47				7.17	1.07	54.58				7.17	0.59	69.49	18.34	3.26
1-Sep	0.36	2.02	4.00	4.00	1.59	90.06	0.52	3.62	7.17	7.17	1.07	55.65	0.52	3.62	7.17	7.17	0.59	70.08	18.34	3.26
2-Sep				4.00	1.59	91.66				7.17	1.07	56.72				8.26	0.68	70.76	19.42	3.44
3-Sep				4.00	1.59	93.25				7.17	1.07	57.80				9.35	0.77	71.53	20.51	3.43
4-Sep				4.00	1.59	94.84				7.17	1.07	58.87				10.44	0.86	72.36	21.60	3.52
5-Sep				4.00	1.59	96.44				7.17	1.07	59.94				11.53	0.95	73.33	22.69	3.61
6-Sep	0.36	2.02	4.00	4.00	1.59	98.03	0.52	3.62	7.17	7.17	1.07	61.01	0.74	6.37	12.61	12.61	1.04	74.37	23.78	3.70
7-Sep				4.55	1.81	99.84				7.17	1.07	62.09				12.61	1.04	75.41	23.78	3.70
8-Sep	0.42	2.58	5.10	5.10	2.03	101.88	0.52	3.62	7.17	7.17	1.07	63.16	0.74	6.37	12.61	12.61	1.04	76.44	24.33	3.92
9-Sep				5.10	2.03	103.91				6.40	0.96	64.11				12.61	1.04	77.48	24.33	4.03
10-Sep				5.10	2.03	105.95				5.63	0.84	64.96				12.61	1.04	78.52	23.55	3.91
11-Sep				5.10	2.03	107.98				4.86	0.73	65.68				12.61	1.04	79.55	22.58	3.80
12-Sep	0.42	2.58	5.10	5.10	2.03	110.02	0.32	1.68	3.32	3.32	0.61	66.29	0.74	6.37	12.61	12.61	1.04	80.59	21.81	3.68
13-Sep				5.10	2.03	112.05				3.32	0.50	66.79				12.61	1.04	81.63	21.03	3.57
14-Sep				5.10	2.03	114.09				3.32	0.50	67.29				12.61	1.04	82.67	21.03	3.57
15-Sep	0.42	2.58	5.10	5.10	2.03	116.12	0.32	1.68	3.32	3.32	0.50	68.28	0.74	6.37	12.61	12.61	1.04	83.70	21.03	3.57
16-Sep				5.10	2.03	118.16				3.32	0.50	68.77				15.29	1.26	84.96	23.71	3.79
17-Sep				5.10	2.03	120.19				3.32	0.50	69.27				17.97	1.48	86.44	26.39	4.01
18-Sep				5.10	2.03	122.23				3.32	0.50	69.77				20.65	1.70	88.14	29.07	4.23
19-Sep				5.10	2.03	124.28				3.32	0.50	69.77				23.33	1.92	90.05	31.75	4.45
20-Sep	0.42	2.58	5.10	5.10	2.03	126.30	0.32	1.68	3.32	3.32	0.50	70.26	1.16	13.14	26.01	26.01	2.14	92.19	34.43	4.67
F:\Projects\Bear Lakes Reserve\Manuals and Plans\2016 Annual Report\Sams Hollow diversions 2016 GWS																				
4/19/2017																				

Date	Upper North Ramped Flume*					NO 1 NORTH - Parchal Flume*					No. 3 North 12" Ramped Flume					Total af/d	Sam's Hollow Total af/d	
	Gage ft	Discharge cfs	Measured af/d	Estimated af/d	Sam's Hollow 99.5 shares 249.5 in ditch 39.9%	Accum af	Gage ft	Discharge cfs	Measured af/d	Estimated af/d	Sam's Hollow 20.0 shares 133.8 in ditch 15.0%	Accum af	Gage ft	Discharge cfs	Measured af/d	Estimated af/d	Sam's Hollow 21.0 shares 255.4 in ditch 8.2%	Accum af
21-Sep	0.42	2.56	5.10	5.10	2.03	128.33	0.32	1.68	3.32	3.32	0.50	70.78	1.16	13.14	26.01	26.01	2.14	94.33
22-Sep			5.10	5.10	2.03	130.37			3.32	3.32	0.50	71.25			26.01	26.01	2.14	96.47
23-Sep			4.88	4.88	1.95	132.31			3.83	3.83	0.57	71.83			26.01	26.01	2.14	98.61
24-Sep			4.66	4.66	1.86	134.17			4.35	4.35	0.65	72.48			26.01	26.01	2.14	100.75
25-Sep			4.44	4.44	1.77	135.94			4.87	4.87	0.73	73.21			26.01	26.01	2.14	102.89
26-Sep			4.22	4.22	1.68	137.62			5.38	5.38	0.80	74.01			26.01	26.01	2.14	105.03
27-Sep	0.36	2.02	4.00	4.00	1.59	139.22	0.46	2.98	5.90	5.90	0.88	74.89	1.16	13.14	26.01	26.01	2.14	107.16
28-Sep			4.00	4.00	1.59	140.81			5.90	5.90	0.88	75.77			26.01	26.01	2.14	109.30
29-Sep	0.36	2.02	4.00	4.00	1.59	142.40	0.46	2.98	5.90	5.90	0.88	76.66	0.48	3.19	6.31	6.31	0.52	109.01
30-Sep			4.00	4.00	1.59	144.00			5.90	5.90	0.88	77.54			6.31	6.31	0.52	109.53
1-Oct			4.00	4.00	1.59	145.59			5.90	5.90	0.88	78.42			6.31	6.31	0.52	110.05
2-Oct			4.00	4.00	1.59	147.18			5.90	5.90	0.88	79.30			6.31	6.31	0.52	110.57
3-Oct			4.00	4.00	1.59	148.78			5.90	5.90	0.88	80.18			6.31	6.31	0.52	111.09
4-Oct	0.36	2.02	4.00	4.00	1.59	150.37	0.46	2.98	5.90	5.90	0.88	81.08	0.48	3.19	6.31	6.31	0.52	111.61
5-Oct			4.00	4.00	1.59	151.97			5.90	5.90	0.88	81.95			6.31	6.31	0.52	112.12
6-Oct	0.36	2.02	4.00	4.00	1.59	153.56	0.46	2.98	5.90	5.90	0.88	82.83	0.48	3.19	6.31	6.31	0.52	112.64
7-Oct			4.00	4.00	1.59	155.15			5.90	5.90	0.88	83.71			6.31	6.31	0.52	113.16
8-Oct			4.00	4.00	1.59	156.75			5.90	5.90	0.88	84.59			6.31	6.31	0.52	113.68
9-Oct			4.00	4.00	1.59	158.34			5.90	5.90	0.88	85.47			6.31	6.31	0.52	114.20
10-Oct			4.00	4.00	1.59	159.93			5.90	5.90	0.88	86.35			6.31	6.31	0.52	114.72
11-Oct	0.36	2.02	4.00	4.00	1.59	161.53	0.46	2.98	5.90	5.90	0.88	87.24	0.48	3.19	6.31	6.31	0.52	115.24
12-Oct			4.00	4.00	1.59	163.12			5.90	5.90	0.88	88.12			6.31	6.31	0.52	115.76
13-Oct	0	0.00	0.00	0.00	0.00	163.32	0.46	2.98	5.90	5.90	0.88	89.00	0.52	3.82	7.17	7.17	0.59	116.38
14-Oct			0.00	0.00	0.00	163.32			4.72	4.72	0.71	89.71			7.17	7.17	0.59	116.97
15-Oct			0.00	0.00	0.00	163.32			3.54	3.54	0.53	90.23			7.17	7.17	0.59	117.56
16-Oct			0.00	0.00	0.00	163.32			2.36	2.36	0.35	90.59			7.17	7.17	0.59	118.15
17-Oct			0.00	0.00	0.00	163.32			1.18	1.18	0.18	90.76			7.17	7.17	0.59	118.74
18-Oct	0	0.00	0.00	0.00	0.00	163.32	0	0.00	0.00	0.00	0.00	90.76	0.52	3.82	7.17	7.17	0.59	119.33
19-Oct			0.00	0.00	0.00	163.32			0.00	0.00	0.00	90.76			7.17	7.17	0.59	119.88
20-Oct	0	0.00	0.00	0.00	0.00	163.32	0	0.00	0.00	0.00	0.00	90.76	0.48	3.19	6.31	6.31	0.52	120.40
21-Oct			0.00	0.00	0.00	163.32			0.00	0.00	0.00	90.76			6.31	6.31	0.52	120.93
22-Oct			0.00	0.00	0.00	163.32			0.00	0.00	0.00	90.76			6.31	6.31	0.52	121.48
23-Oct			0.00	0.00	0.00	163.32			0.00	0.00	0.00	90.76			6.31	6.31	0.52	122.04
24-Oct			0.00	0.00	0.00	163.32			0.00	0.00	0.00	90.76			6.31	6.31	0.52	122.62
25-Oct	0	0.00	0.00	0.00	0.00	163.32	0	0.00	0.00	0.00	0.00	90.76	0.52	3.82	7.17	7.17	0.59	123.21
26-Oct			0.00	0.00	0.00	163.32			0.00	0.00	0.00	90.76			7.17	7.17	0.59	123.80
27-Oct			0.00	0.00	0.00	163.32			0.00	0.00	0.00	90.76	0.52	3.82	7.17	7.17	0.59	124.39
28-Oct	0	0.00	0.00	0.00	0.00	163.32	0	0.00	0.00	0.00	0.00	90.76			7.17	7.17	0.59	124.98
29-Oct			0.00	0.00	0.00	163.32			0.00	0.00	0.00	90.76			7.17	7.17	0.59	125.57
30-Oct			0.00	0.00	0.00	163.32			0.00	0.00	0.00	90.76			7.17	7.17	0.59	126.16
31-Oct			0.00	0.00	0.00	163.32			0.00	0.00	0.00	90.76			7.17	7.17	0.59	126.75
1-Nov			0.00	0.00	0.00	163.32			0.00	0.00	0.00	90.76			7.17	7.17	0.59	127.34
2-Nov			0.00	0.00	0.00	163.32			0.00	0.00	0.00	90.76			7.17	7.17	0.59	127.93
3-Nov			0.00	0.00	0.00	163.32			0.00	0.00	0.00	90.76			7.17	7.17	0.59	128.52
4-Nov			0.00	0.00	0.00	163.32			0.00	0.00	0.00	90.76			7.17	7.17	0.59	129.11
5-Nov			0.00	0.00	0.00	163.32			0.00	0.00	0.00	90.76			7.17	7.17	0.59	129.70
6-Nov			0.00	0.00	0.00	163.32			0.00	0.00	0.00	90.76			7.17	7.17	0.59	130.29
7-Nov			0.00	0.00	0.00	163.32			0.00	0.00	0.00	90.76			7.17	7.17	0.59	130.88
8-Nov			0.00	0.00	0.00	163.32			0.00	0.00	0.00	90.76			7.17	7.17	0.59	131.47
9-Nov			0.00	0.00	0.00	163.32			0.00	0.00	0.00	90.76			7.17	7.17	0.59	132.06
10-Nov	0	0.00	0.00	0.00	0.00	163.32	0	0.00	0.00	0.00	0.00	90.76	0	0.00	0.00	0.00	0.00	132.65
			0.00	0.00	0.00	163.32			0.00	0.00	0.00	90.76			0.00	0.00	0.00	133.24
			0.00	0.00	0.00	163.32			0.00	0.00	0.00	90.76			0.00	0.00	0.00	133.83
			0.00	0.00	0.00	163.32			0.00	0.00	0.00	90.76			0.00	0.00	0.00	134.42
			0.00	0.00	0.00	163.32			0.00	0.00	0.00	90.76			0.00	0.00	0.00	135.01
			0.00	0.00	0.00	163.32			0.00	0.00	0.00	90.76			0.00	0.00	0.00	135.60
			0.00	0.00	0.00	163.32			0.00	0.00	0.00	90.76			0.00	0.00	0.00	136.19
			0.00	0.00	0.00	163.32			0.00	0.00	0.00	90.76			0.00	0.00	0.00	136.78
			0.00	0.00	0.00	163.32			0.00	0.00	0.00	90.76			0.00	0.00	0.00	137.37
			0.00	0.00	0.00	163.32			0.00	0.00	0.00	90.76			0.00	0.00	0.00	137.96
			0.00	0.00	0.00	163.32			0.00	0.00	0.00	90.76			0.00	0.00	0.00	138.55
			0.00	0.00	0.00	163.32			0.00	0.00	0.00	90.76			0.00	0.00	0.00	139.14
			0.00	0.00	0.00	163.32			0.00	0.00	0.00	90.76			0.00	0.00	0.00	139.73
			0.00	0.00	0.00	163.32			0.00	0.00	0.00	90.76			0.00	0.00	0.00	140.32
			0.00	0.00	0.00	163.32			0.00	0.00	0.00	90.76			0.00	0.00	0.00	140.91
			0.00	0.00	0.00	163.32			0.00	0.00	0.00	90.76			0.00	0.00	0.00	141.50
			0.00	0.00	0.00	163.32			0.00	0.00	0.00	90.76			0.00	0.00	0.00	142.09
			0.00	0.00	0.00	163.32			0.00	0.00	0.00	90.76			0.00	0.00	0.00	142.68
			0.00	0.00	0.00	163.32			0.00	0.00	0.00	90.76			0.00	0.00	0.00	143.27
			0.00	0.00	0.00	163.32			0.00	0.00	0.00	90.76			0.00	0.00	0.00	143.86
			0.00	0.00	0.00	163.32			0.00	0.00	0.00	90.76			0.00	0.00	0.00	144.45
			0.00	0.00	0.00	163.32			0.00	0.00	0.00	90.76			0.00	0.00	0.00	145.04
			0.00	0.00	0.00	163.32			0.00	0.00	0.00	90.76			0.00	0.00	0.00	145.63
			0.00	0.00	0.00	163.32			0.00	0.00	0.00	90.76			0.00	0.00	0.00	146.22
			0.00	0.00	0.00	163.32			0.00	0.00	0.00	90.76			0.00	0.00	0.00	146.81
			0.00	0.00	0.00	163.32			0.00	0.00	0.00	90.76			0.00	0.00	0.00	147.40
			0.00	0.00	0.00	163.32			0.00	0.00	0.00	90.76			0.00	0.00	0.00	147.99
			0.0															

