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Water Resources

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JUN 14 2019

Department of Water Resources
Eastern Region

June 11, 2019

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

Re: Sam's Hollow Water Company – 2018 Annual Report
Project No. 370-04-2001

Dear Regional Manager:

Enclosed please find the 2018 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 Eastern Region-1 Final Report

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Project No. 370-01-1999

2018 Annual Report on Water Use and Mitigation for the Sam's Hollow Water Company

Prepared for:

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

June 10, 2019

For information concerning this report, contact
Greg W. Sullivan, M.S., Engineer



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2018 Annual Report on Water Use and Mitigation Sam's Hollow Water Company

Brockway Engineering, PLLC
June 10, 2019

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 Water Management and Operation Plan for Mitigation was amended February 10, 2015 by Rocky Mountain Environmental Associates Inc. 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 water deliveries from the end of the irrigation system to Fish Haven Creek and a mitigation pipeline which conveys water to Bear Lake. The 2015 amended Plan changed the method of returning water to Bear Lake by including the option to discharging a portion of irrigation water back into Fish Haven Creek allowing it to flow down the creek into Bear Lake. Water is also delivered to Bear Lake through a mitigation pipeline that collects water at the end of the irrigation system. Water delivered through the irrigation system, the Fish Haven Creek bypass pipe and the mitigation pipeline is to be measured before mitigation water 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 2018, 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 six (6) houses were constructed in 2018. Of the six houses, five were constructed and connected to the Fish Haven Sewer District. One home was built that utilizes on-site wastewater treatment in 2018. The total number of residential households constructed in the project area is 70. Locations of the residences are shown on the attached map. A total of 14 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	Fish Haven Sewer District	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
2017	2	8		1	64
2018	1	5		1	70
Total	13	57	0	14	70

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 2018.

Table 2: Summary of Mitigation Provided by Construction through 2018.

		ft ² /structure	Acres	AFA
Road Ways			2.05	2.42
Homes	14	9000	2.89	3.41
Condos	0	12000	0.00	0.00
Commercial	1	43560	1.00	1.18

Total Removed for Mitigation 5.94 Acres 7.01 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 2018. The total estimated depletion from the seventy (70) units and club house on line in 2018 is 23.82 acre feet.

Table 3. Depletion analysis for Sam's Hollow Water Company in 2018. 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	13	0.39
Irrigation - Homesites	0.14	13	1.82

Entities with St. Charles Sewer District Service

	Unit Depletion	Occupied Units	Total Depletion
Domestic Potable Water - Homesites	0.19	57	10.83
Irrigation - Homesites	0.14	57	7.98

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
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All Depletion Values are in Acre-Feet Annually

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

Total Homesites	70
Total Condominiums	0
Total Commercial Sites	1
Total Depletion	23.82 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 2018, discharge readings were obtained from June 5, 2018 through October 23, 2018 and are shown on the attached spreadsheet. This log shows that there was

approximately 3,111.2 acre-feet of irrigation water diverted into Upper North Ramped Flume, Ditch No. 1 and Ditch No. 3 during the irrigation season of 2018, of which 561.3 acre-feet was allotted to Sam's Hollow Water Company. See Table 4.

Table 4. Discharge readings per month.

Month	Upper North acre feet	No 1 North acre feet	No. 3 North acre feet	Total acre feet
April	NA	NA	NA	NA
May	0.0	0.0	0.0	0.0
June	36.1	31.9	8.5	80.1
July	79.4	32.1	14.6	128.2
August	51.4	18.8	31.6	99.1
September	97.3	32.5	37.3	169.1
October	36.8	32.5	20.4	84.8
November	NA	NA	NA	NA
Total	301.1	147.8	112.4	561.3

As discussed in previous reports, 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 5.94 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 28.14 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 at the end of ditch 1, 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 2018 season, mitigation flow commenced to Bear Lake on September 6, 2018. The mitigation flow turn terminated on November 14, 2018. Table 5 shows the mitigation pipeline flow

meter readings. The volume returned to Bear Lake during the 2018 irrigation season through the mitigation pipelines was 17.31 acre feet.

Table 5. Flow Meter Readings for the Sam's Hollow Mitigation Pipeline.

Date	Reading (gallons)	Volume (acre-feet)
9/6/2018	33330300	102.29
11/14/2018	38970500	119.60

Mitigation Volume	5640200	17.31	acre-feet
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In the amended mitigation plan that was finalized in 2015, the method of returning mitigation water to Bear Lake was modified. Instead of all of the water being delivered to Bear Lake through the meter that was installed in 2007, water will also be measured and delivered into Fish Haven Creek. This mitigation water is to be measured with a ramp flume installed on the end of the bypass pipe. Operation and measuring direction for the bypass pipe and flume designed by McMillen Engineering are included in the amended 2015 mitigation plan.

Water has been delivered annually into Fish Haven Creek since 2015 and is supplying mitigation for the Sam's Hollow Water Company. Table 6 shows the data for water diverted annually into Fish Haven Creek for 2018 that was collected from June 8, 2018 through December 9, 2018. The volume returned to Bear Lake through Fish Haven Creek diversions was 22.30 acre feet. The total volume of water returned to Bear Lake through the mitigation pipeline and the diversions into Fish Haven Creek during 2018 was 39.60 acre feet.

Table 6. Flow Measurements for Fish Haven Creek Bypass Ramped Flume into Fish Haven Creek.

	Volume (acre-feet)
May	0.00
June	4.45
July	2.76
August	2.93
September	2.07
October	4.29
November	4.50
December	1.30
Total Mitigation Volume	22.30

acre-feet

The consumptive use reduction appurtenant to the 5.94 acres removed from irrigation provided 7.01 acre feet to mitigate for the project depletion in 2018, which was insufficient to provide the entire mitigation requirement. Therefore, 14.24 acres (16.81 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 14.24 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 7.96 acres of the 22.2 acres is available for future mitigation needs.

At the conclusion of 2018, total recorded cumulative volume of water discharge into Bear Lake is 164.81 acre feet. The cumulative volume required for mitigation from project development is 156.91 acre feet (See Figure 1).

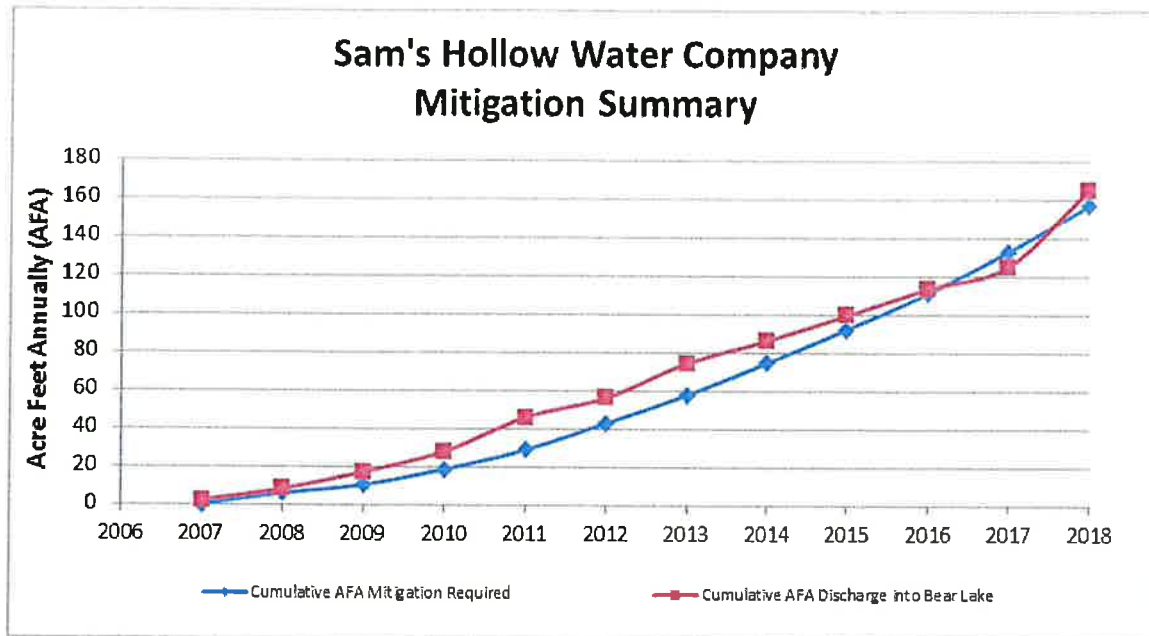


Figure 1: Sam's Hollow Water Company Mitigation Summary

Projection of 2019 Sufficiency of Mitigation Water

For 2019, based on a projected build-out, there will be 7 additional homes comprised of 6 residential homes outside of the irrigation area and 1 residential home within the water right place of use. Of the 7 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 76 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 25.81 acre feet. It is estimated that the seasonal water availability for Sam's Hollow Water Company in 2019 will be adequate to provide mitigation water for the expected number of units on-line in 2019. Based on NRCS SNOTEL data for the Bear River Basin obtained on May 22, 2019, the peak snow water equivalent was 113% of the average level. The runoff for Fish Haven Creek will likely be considered above average based on the snow pack data, and it is anticipated that water supply will be adequate for mitigation needs. Mitigation flow to Bear Lake from Ditch 1 will need to commence during late summer or early fall. Mitigation flow into Fish Haven Creek will continue to be measured and recorded so that it can be included in the total mitigation volume for the Sam's Hollow Water Company.

Regarding the consumptive use balance, the projected 77 units on line in 2019 (15 homes and the club house within the currently irrigated area) will provide a total of 6.15 acres or 7.26 acre-feet of the required 25.82 acre-feet estimated depletion for 2019. Therefore, 18.55 acre-feet must be provided from additional irrigation reduction in the amount of 15.72 acres. The 28.35 acres of previous irrigation retirement will be sufficient to mitigate for the proposed additional 2019 project depletion. There will be 6.48 acres remaining from the previous 28.35 mitigation acres after the expected build out for 2019.



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 as of 2018



Development that has occurred at Sam's Hollow Water Company as of 2018



Development that has occurred at Sam's Hollow Water Company as of 2018



Development that has occurred at Sam's Hollow Water Company as of 2018



SAM'S HOLLOW WATER COMPANY AVAILABLE IRRIGATION DIVERSIONS

Fish Haven Water Users Association

Water Year 2018 Measurements By The Reserve Staff

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		
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	0	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.72	6.10	12.07	12.07	0.99	0.99	12.07	0.99
6-Jun	0	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.72	6.10	12.07	12.07	0.99	1.99	12.07	0.99
7-Jun																				
8-Jun																				
9-Jun																				
10-Jun																				
11-Jun																				
12-Jun	0.32	1.68	3.32	3.32	1.32	3.97	0.65	5.17	10.25	10.25	1.53	4.60	0.72	6.10	12.07	12.07	0.99	6.95	22.92	3.28
13-Jun																				
14-Jun	0.36	2.02	4.00	4.00	1.59	7.02	0.65	5.17	10.25	10.25	1.53	6.13	0	0.00	0.00	6.04	0.50	8.44	19.94	3.49
15-Jun																				
16-Jun																				
17-Jun																				
18-Jun																				
19-Jun	0.36	2.02	4.00	4.00	1.59	13.39	0.65	5.17	10.25	10.25	1.53	13.79	0	0.00	0.00	0.00	0.00	8.44	14.24	3.13
20-Jun																				
21-Jun	0.36	2.02	4.00	4.00	1.59	16.58	0.65	5.17	10.25	10.25	1.53	16.85	0	0.00	0.00	0.00	0.00	8.44	14.24	3.13
22-Jun																				
23-Jun																				
24-Jun																				
25-Jun																				
26-Jun	0.43	2.68	5.30	5.30	2.11	27.70	0.65	5.17	10.25	10.25	1.53	26.04	0	0.00	0.00	0.00	0.00	8.44	15.28	3.54
27-Jun																				
28-Jun	0.43	2.68	5.30	5.30	2.11	31.92	0.65	5.17	10.25	10.25	1.53	29.11	0	0.00	0.00	0.00	0.00	8.44	15.54	3.64
29-Jun																				
30-Jun																				
1-Jul																				
2-Jul																				
3-Jul	0.43	2.68	5.30	5.30	2.11	42.49	0.54	3.85	7.62	7.62	1.14	35.59	0.23	1.00	1.98	1.98	0.16	8.92	14.89	3.41
4-Jul																				
5-Jul	0.48	3.19	6.31	6.31	2.52	47.32	0.54	3.85	7.62	7.62	1.14	36.73	0.23	1.00	1.98	1.98	0.16	9.09	15.40	3.62
6-Jul																				
7-Jul																				
8-Jul																				
9-Jul																				
10-Jul	0.48	3.19	6.31	6.31	2.52	59.90	0.54	3.85	7.62	7.62	1.14	43.56	0.23	1.00	1.98	1.98	0.16	10.06	15.90	3.82
11-Jul																				
12-Jul	0.48	3.19	6.31	6.31	2.52	64.93	0.54	3.85	7.62	7.62	1.14	45.84	0.23	1.00	1.98	1.98	0.16	10.39	15.90	3.82
13-Jul																				
14-Jul																				

Date	Upper North Ramped Flume*						NO 1 NORTH " Parchal Flume"						No. 3 North 12" Ramped Flume						Sam's Hollow	
	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	Total af/d	Total af/d
15-Jul				5.70	2.27	72.00				7.62	1.14	49.25				5.36	0.44	11.43	18.68	3.85
16-Jul				5.50	2.19	74.19				7.62	1.14	50.39				6.49	0.53	11.96	19.60	3.87
17-Jul	0.43	2.68	5.30	5.30	2.11	76.30	0.54	3.85	7.62	7.62	1.14	51.53	0.54	3.85	7.62	7.62	0.63	12.59	20.53	3.88
18-Jul				5.30	2.11	78.42				7.62	1.14	52.67				7.62	0.63	13.22	20.53	3.88
19-Jul	0.43	2.68	5.30	5.30	2.11	80.53	0.54	3.85	7.62	7.62	1.14	53.81	0.54	3.85	7.62	7.62	0.63	13.84	20.53	3.88
20-Jul				5.50	2.19	82.72				7.62	1.14	54.95				7.62	0.63	14.47	20.73	3.96
21-Jul				5.70	2.27	85.00				7.62	1.14	56.09				7.62	0.63	15.09	20.93	4.04
22-Jul				5.91	2.35	87.35				7.62	1.14	57.23				7.62	0.63	15.72	21.14	4.12
23-Jul				6.11	2.44	89.79				7.62	1.14	58.36				7.62	0.63	16.35	21.34	4.20
24-Jul	0.48	3.19	6.31	6.31	2.52	92.30	0.54	3.85	7.62	7.62	1.14	59.50	0.54	3.85	7.62	7.62	0.63	16.97	21.54	4.28
25-Jul				6.31	2.52	94.82				7.62	1.14	60.64				7.62	0.63	17.60	21.54	4.28
26-Jul	0.48	3.19	6.31	6.31	2.52	97.34	0.54	3.85	7.62	7.62	1.14	61.78	0.54	3.85	7.62	7.62	0.63	18.22	21.54	4.28
27-Jul				7.25	2.89	100.23				6.09	0.91	62.69				9.07	0.75	18.97	22.41	4.55
28-Jul				8.19	3.27	103.50				4.57	0.68	63.37				10.52	0.86	19.84	23.28	4.82
29-Jul				9.13	3.64	107.14				3.05	0.46	63.83				11.97	0.98	20.82	24.15	5.08
30-Jul				10.07	4.02	111.16				1.52	0.23	64.06				13.42	1.10	21.92	25.02	5.35
31-Jul	0.68	5.56	11.01	11.01	4.39	115.55	0	0.00	0.00	0.00	0.00	64.06	0.82	7.51	14.88	14.88	1.22	23.15	25.89	5.62
1-Aug				11.01	4.39	119.94				0.00	0.00	64.06				14.88	1.22	24.37	25.89	5.62
2-Aug	0.68	5.56	11.01	11.01	4.39	124.33	0	0.00	0.00	0.00	0.00	64.06	0.82	7.51	14.88	14.88	1.22	25.59	25.89	5.62
3-Aug				11.01	4.39	128.73				0.00	0.00	64.06				14.88	1.22	26.82	25.89	5.62
4-Aug				11.01	4.39	133.12				0.00	0.00	64.06				14.88	1.22	28.04	25.89	5.62
5-Aug				11.01	4.39	137.51				0.00	0.00	64.06				14.88	1.22	29.26	25.89	5.62
6-Aug				11.01	4.39	141.90				0.00	0.00	64.06				14.88	1.22	30.49	25.89	5.62
7-Aug	0.68	5.56	11.01	11.01	4.39	146.30	0	0.00	0.00	0.00	0.00	64.06	0.82	7.51	14.88	14.88	1.22	31.71	25.89	5.62
8-Aug				8.66	3.45	149.75				0.00	0.00	64.06				14.88	1.22	32.93	23.54	4.68
9-Aug	0.48	3.19	6.31	6.31	2.52	152.27	0	0.00	0.00	0.00	0.00	64.06	0.82	7.51	14.88	14.88	1.22	34.15	21.19	3.74
10-Aug				6.31	2.52	154.78				0.00	0.00	64.06				14.42	1.19	35.34	20.74	3.70
11-Aug				6.31	2.52	157.30				0.00	0.00	64.06				13.97	1.15	36.49	20.28	3.67
12-Aug				6.31	2.52	159.82				0.00	0.00	64.06				13.52	1.11	37.60	19.83	3.63
13-Aug				6.31	2.52	162.33				0.00	0.00	64.06				13.07	1.07	38.68	19.38	3.59
14-Aug	0.48	3.19	6.31	6.31	2.52	164.85	0	0.00	0.00	0.00	0.00	64.06	0.74	6.37	12.61	12.61	1.04	39.71	18.93	3.55
15-Aug				3.16	1.26	166.11				3.81	0.57	64.63				12.61	1.04	40.75	19.58	2.86
16-Aug	0	0.00	0.00	0.00	0.00	166.11	0.54	3.85	7.62	7.62	1.14	65.77	0.74	6.37	12.61	12.61	1.04	41.79	20.23	2.18
17-Aug				0.00	0.00	166.11				7.62	1.14	66.91				12.61	1.04	42.82	20.23	2.18
18-Aug				0.00	0.00	166.11				7.62	1.14	68.04				12.61	1.04	43.86	20.23	2.18
19-Aug				0.00	0.00	166.11				7.62	1.14	69.18				12.61	1.04	44.90	20.23	2.18
20-Aug				0.00	0.00	166.11				7.62	1.14	70.32				12.61	1.04	45.94	20.23	2.18
21-Aug	0	0.00	0.00	0.00	0.00	166.11	0.54	3.85	7.62	7.62	1.14	71.46	0.74	6.37	12.61	12.61	1.04	46.97	20.23	2.18
22-Aug				0.00	0.00	166.11				7.62	1.14	72.60				12.61	1.04	48.01	20.23	2.18
23-Aug				0.00	0.00	166.11				7.62	1.14	73.74				12.61	1.04	49.05	20.23	2.18
24-Aug				0.00	0.00	166.11				7.62	1.14	74.88				12.61	1.04	50.08	20.23	2.18
25-Aug				0.00	0.00	166.11				7.62	1.14	76.02				12.61	1.04	51.12	20.23	2.18
26-Aug				0.00	0.00	166.11				7.62	1.14	77.15				12.61	1.04	52.16	20.23	2.18
27-Aug				0.00	0.00	166.11				7.62	1.14	78.29				12.61	1.04	53.20	20.23	2.18
28-Aug	0	0.00	0.00	0.00	0.00	166.11	0.54	3.85	7.62	7.62	1.14	79.43	0.74	6.37	12.61	12.61	1.04	54.23	20.23	2.18
29-Aug				0.00	0.00	166.11				7.62	1.14	80.57				6.31	0.52	54.75	13.92	1.66
30-Aug	0	0.00	0.00	0.00	0.00	166.11	0.54	3.85	7.62	7.62	1.14	81.71	0	0.00	0.00	0.00	0.00	54.75	7.62	1.14
31-Aug				2.20	0.88	166.99				7.62	1.14	82.85				0.00	0.00	54.75	9.82	2.02
1-Sep				4.41	1.76	168.74				7.62	1.14	83.99				0.00	0.00	54.75	12.02	2.90
2-Sep				6.61	2.64	171.38				7.62	1.14	85.13				0.00	0.00	54.75	14.22	3.77
3-Sep				8.81	3.51	174.89				7.62	1.14	86.26				0.00	0.00	54.75	16.43	4.65
4-Sep	0.68	5.56	11.01	11.01	4.39	179.29	0.54	3.85	7.62	7.62	1.14	87.40	0	0.00	0.00	0.00	0.00	54.75	18.63	5.53
5-Sep				11.01	4.39	183.68				6.76	1.01	88.41				0.00	0.00	54.75	17.77	5.40
6-Sep	0.68	5.56	11.01	11.01	4.39	188.07	0.46	2.98	5.90	5.90	0.88	89.29	0	0.00	0.00	0.00	0.00	54.75	16.91	5.27
7-Sep				11.01	4.39	192.46				5.90	0.88	90.18				0.00	0.00	54.75	16.91	5.27
8-Sep				11.01	4.39	196.85				5.90	0.88	91.06				0.00	0.00	54.75	16.91	5.27
9-Sep				11.01	4.39	201.25				5.90	0.88	91.94				0.00	0.00	54.75	16.91	5.27
10-Sep				11.01	4.39	205.64				5.90	0.88	92.82				0.00	0.00	54.75	16.91	5.27
11-Sep	0.68	5.56	11.01	11.01	4.39	210.03	0.46	2.98	5.90	5.90	0.88	93.70	0	0.00	0.00	0.00	0.00	54.75	16.91	5.27
12-Sep				11.01	4.39	214.42				5.90	0.88	94.59				13.01	1.07	55.82	29.92	6.34
13-Sep	0.68	5.56	11.01	11.01	4.39	218.82	0.46	2.98	5.90	5.90	0.88	95.47	1.16	13.14	26.01	26.01	2.14	57.96	42.92	7.41
14-Sep				10.07	4.02	222.83				5.90	0.88	96.35				26.01	2.14	60.10	41.98	7.04
15-Sep				9.13	3.64	226.48				5.90	0.88	97.23				26.01	2.14	62.24	41.04	6.66
16-Sep				8.19	3.27	229.74				5.90	0.88	98.11				26.01	2.14	64.38	40.10	6.29
17-Sep				7.25	2.89	232.64				5.90	0.88	98.99				26.01	2.14	66.51	39.16	5.91
18-Sep	0.48	3.19	6.31	6.31	2.52	235.15	0.46	2.98	5.90	5.90	0.88	99.88	1.16	13.14	26.01	26.01	2.14	68.65	38.22	5.54
19-Sep				6.31	2.52	237.67				5.90	0.88	100.76				26.01	2.14	70.79	38.22	5.54
20-Sep				6.31	2.52	240.19				5.90	0.88	101.64				26.01	2.14	72.93	38.22	5.54
21-Sep	0.48	3.19	6.31	6.31	2.52	242.70	0.46	2.98	5.90	5.90	0.88	102.52	1.16	13.14	26.01	26.01	2.14	75.07	38.22	5.54

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			
22-Sep				6.31	2.52	245.22				6.98	1.04	103.57					26.01	2.14	77.21	39.31	5.70
23-Sep				6.31	2.52	247.74				8.07	1.21	104.77					26.01	2.14	79.35	40.39	5.86
24-Sep				6.31	2.52	250.25				9.16	1.37	106.14					26.01	2.14	81.48	41.48	6.02
25-Sep	0.48	3.19	6.31	6.31	2.52	252.77	0.65	5.17	10.25	10.25	1.53	107.67	1.16	13.14	26.01	26.01	2.14	83.62	42.57	6.19	
26-Sep				6.31	2.52	255.29				10.25	1.53	109.21				22.92	1.88	85.51	39.47	5.93	
27-Sep	0.48	3.19	6.31	6.31	2.52	257.80	0.65	5.17	10.25	10.25	1.53	110.74	0.98	10.01	19.82	19.82	1.63	87.14	36.38	5.68	
28-Sep				5.85	2.33	260.13				10.25	1.53	112.27				19.82	1.63	88.77	35.91	5.49	
29-Sep				5.38	2.15	262.28				10.25	1.53	113.80				19.82	1.63	90.40	35.45	5.31	
30-Sep				4.92	1.96	264.24				10.25	1.53	115.33				19.82	1.63	92.03	34.99	5.12	
1-Oct				4.46	1.78	266.02				10.25	1.53	116.87				19.82	1.63	93.66	34.52	4.94	
2-Oct	0.36	2.02	4.00	4.00	1.59	267.62	0.65	5.17	10.25	10.25	1.53	118.40	0.98	10.01	19.82	19.82	1.63	95.28	34.06	4.76	
3-Oct				4.00	1.59	269.21				8.93	1.34	119.73				19.82	1.63	96.91	32.75	4.56	
4-Oct	0.36	2.02	4.00	4.00	1.59	270.80	0.54	3.85	7.62	7.62	1.14	120.87	0.98	10.01	19.82	19.82	1.63	98.54	31.43	4.36	
5-Oct				4.00	1.59	272.40				7.62	1.14	122.01				17.38	1.43	99.97	28.99	4.16	
6-Oct				4.00	1.59	273.99				7.62	1.14	123.15				14.94	1.23	101.20	26.55	3.96	
7-Oct				4.00	1.59	275.58				7.62	1.14	124.29				12.50	1.03	102.23	24.11	3.76	
8-Oct				4.00	1.59	277.18				7.62	1.14	125.43				10.06	0.83	103.06	21.67	3.56	
9-Oct	0.36	2.02	4.00	4.00	1.59	278.77	0.54	3.85	7.62	7.62	1.14	126.57	0.54	3.85	7.62	7.62	0.63	103.68	19.23	3.36	
10-Oct				4.00	1.59	280.36				8.93	1.34	127.90				7.62	0.63	104.31	20.54	3.56	
11-Oct	0.36	2.02	4.00	4.00	1.59	281.96	0.65	5.17	10.25	10.25	1.53	129.43	0.54	3.85	7.62	7.62	0.63	104.93	21.86	3.75	
12-Oct				4.00	1.59	283.55				10.25	1.53	130.97				7.62	0.63	105.56	21.86	3.75	
13-Oct				4.00	1.59	285.14				10.25	1.53	132.50				7.62	0.63	106.19	21.86	3.75	
14-Oct				4.00	1.59	286.74				10.25	1.53	134.03				7.62	0.63	106.81	21.86	3.75	
15-Oct				4.00	1.59	288.33				10.25	1.53	135.56				7.62	0.63	107.44	21.86	3.75	
16-Oct	0.36	2.02	4.00	4.00	1.59	289.93	0.65	5.17	10.25	10.25	1.53	137.09	0.54	3.85	7.62	7.62	0.63	108.06	21.86	3.75	
17-Oct				4.00	1.59	291.52				10.25	1.53	138.63				7.62	0.63	108.69	21.86	3.75	
18-Oct	0.36	2.02	4.00	4.00	1.59	293.11	0.65	5.17	10.25	10.25	1.53	140.16	0.54	3.85	7.62	7.62	0.63	109.32	21.86	3.75	
19-Oct				4.00	1.59	294.71				10.25	1.53	141.69				7.62	0.63	109.94	21.86	3.75	
20-Oct				4.00	1.59	296.30				10.25	1.53	143.22				7.62	0.63	110.57	21.86	3.75	
21-Oct				4.00	1.59	297.89				10.25	1.53	144.75				7.62	0.63	111.19	21.86	3.75	
22-Oct				4.00	1.59	299.49				10.25	1.53	146.29				7.62	0.63	111.82	21.86	3.75	
23-Oct	0.36	2.02	4.00	4.00	1.59	301.08	0.65	5.17	10.25	10.25	1.53	147.82	0.54	3.85	7.62	7.62	0.63	112.45	21.86	3.75	
24-Oct				0.00	0.00	301.08				0.00	0.00	147.82				0.00	0.00	112.45	0.00	0.00	
25-Oct				0.00	0.00	301.08				0.00	0.00	147.82				0.00	0.00	112.45	0.00	0.00	
26-Oct				0.00	0.00	301.08				0.00	0.00	147.82				0.00	0.00	112.45	0.00	0.00	
27-Oct				0.00	0.00	301.08				0.00	0.00	147.82				0.00	0.00	112.45	0.00	0.00	
28-Oct				0.00	0.00	301.08				0.00	0.00	147.82				0.00	0.00	112.45	0.00	0.00	
29-Oct				0.00	0.00	301.08				0.00	0.00	147.82				0.00	0.00	112.45	0.00	0.00	
30-Oct				0.00	0.00	301.08				0.00	0.00	147.82				0.00	0.00	112.45	0.00	0.00	
31-Oct				0.00	0.00	301.08				0.00	0.00	147.82				0.00	0.00	112.45	0.00	0.00	
1-Nov				0.00	0.00	301.08				0.00	0.00	147.82				0.00	0.00	112.45	0.00	0.00	
2-Nov				0.00	0.00	301.08				0.00	0.00	147.82				0.00	0.00	112.45	0.00	0.00	
3-Nov				0.00	0.00	301.08				0.00	0.00	147.82				0.00	0.00	112.45	0.00	0.00	
4-Nov				0.00	0.00	301.08				0.00	0.00	147.82				0.00	0.00	112.45	0.00	0.00	
5-Nov				0.00	0.00	301.08				0.00	0.00	147.82				0.00	0.00	112.45	0.00	0.00	
6-Nov				0.00	0.00	301.08				0.00	0.00	147.82				0.00	0.00	112.45	0.00	0.00	
7-Nov				0.00	0.00	301.08				0.00	0.00	147.82				0.00	0.00	112.45	0.00	0.00	
8-Nov				0.00	0.00	301.08				0.00	0.00	147.82				0.00	0.00	112.45	0.00	0.00	
9-Nov				0.00	0.00	301.08				0.00	0.00	147.82				0.00	0.00	112.45	0.00	0.00	
10-Nov				0.00	0.00	301.08				0.00	0.00	147.82				0.00	0.00	112.45	0.00	0.00	
11-Nov				0.00	0.00	301.08				0.00	0.00	147.82				0.00	0.00	112.45	0.00	0.00	
May Total				0.00	0.00					0.00	0.00					0.00	0.00	0.00	0.00		
June Total				90.65	36.15					213.58	31.94					103.80	8.53	423.17	80.13		
July Total				199.10	79.40					214.81	32.12					177.73	14.61	602.38	128.24		
August Total				128.98	51.44					125.65	18.79					384.40	31.60	625.17	99.11		
Sept Total				243.88	97.26					217.26	32.49					453.36	37.27	937.00	169.06		
Oct. Total				92.37	36.84					217.24	32.48					248.38	20.42	523.46	84.80		
Annual Total				754.97	301.08					988.54	147.82					1367.68	112.45	3111.2	561.3	afa	

SAM'S HALLOW WATER COMPANY MITIGATION

Water Year 2018

Fish Haven Creek Bypass Ramped Flume

Date	Dailey CFS	Accumulated Acre-Feet	Date	Dailey CFS	Accumulated Acre-Feet	Date	Dailey CFS	Accumulated Acre-Feet	Date	Dailey CFS	Accumulated Acre-Feet	Date	Dailey CFS	Accumulated Acre-Feet
1/1/2018			2/11/2018			3/24/2018			5/4/2018			6/14/2018	6.9	1.42
1/2/2018			2/12/2018			3/25/2018			5/5/2018			6/15/2018	6.8	1.64
1/3/2018			2/13/2018			3/26/2018			5/6/2018			6/16/2018	6.5	1.86
1/4/2018			2/14/2018			3/27/2018			5/7/2018			6/17/2018	9.4	2.16
1/5/2018			2/15/2018			3/28/2018			5/8/2018			6/18/2018	6.4	2.42
1/6/2018			2/16/2018			3/29/2018			5/9/2018			6/19/2018	5.7	2.63
1/7/2018			2/17/2018			3/30/2018			5/10/2018			6/20/2018	5.7	2.82
1/8/2018			2/18/2018			3/31/2018			5/11/2018			6/21/2018	5.4	3.01
1/9/2018			2/19/2018			4/1/2018			5/12/2018			6/22/2018	5.3	3.19
1/10/2018			2/20/2018			4/2/2018			5/13/2018			6/23/2018	5.1	3.36
1/11/2018			2/21/2018			4/3/2018			5/14/2018			6/24/2018	5.1	3.52
1/12/2018			2/22/2018			4/4/2018			5/15/2018			6/25/2018	4.9	3.69
1/13/2018			2/23/2018			4/5/2018			5/16/2018			6/26/2018	4.8	3.84
1/14/2018			2/24/2018			4/6/2018			5/17/2018			6/27/2018	4.6	4.00
1/15/2018			2/25/2018			4/7/2018			5/18/2018			6/28/2018	4.5	4.16
1/16/2018			2/26/2018			4/8/2018			5/19/2018			6/29/2018	4.5	4.31
1/17/2018			2/27/2018			4/9/2018			5/20/2018			6/30/2018	4.4	4.45
1/18/2018			2/28/2018			4/10/2018			5/21/2018			7/1/2018	4.3	4.58
1/19/2018			3/1/2018			4/11/2018			5/22/2018			7/2/2018	3.7	4.71
1/20/2018			3/2/2018			4/12/2018			5/23/2018			7/3/2018	3.5	4.83
1/21/2018			3/3/2018			4/13/2018			5/24/2018			7/4/2018	3.5	4.95
1/22/2018			3/4/2018			4/14/2018			5/25/2018			7/5/2018	3.1	5.06
1/23/2018			3/5/2018			4/15/2018			5/26/2018			7/6/2018	3.2	5.16
1/24/2018			3/6/2018			4/16/2018			5/27/2018			7/7/2018	3.1	5.27
1/25/2018			3/7/2018			4/17/2018			5/28/2018			7/8/2018	3.1	5.37
1/26/2018			3/8/2018			4/18/2018			5/29/2018			7/9/2018	0.3	5.43
1/27/2018			3/9/2018			4/19/2018			5/30/2018			7/10/2018	0.5	5.44
1/28/2018			3/10/2018			4/20/2018			5/31/2018			7/11/2018	0.8	5.47
1/29/2018			3/11/2018			4/21/2018			6/1/2018			7/12/2018	0.6	5.49
1/30/2018			3/12/2018			4/22/2018			6/2/2018			7/13/2018	0.6	5.51
1/31/2018			3/13/2018			4/23/2018			6/3/2018			7/14/2018	0.7	5.53
2/1/2018			3/14/2018			4/24/2018			6/4/2018			7/15/2018	0.6	5.55
2/2/2018			3/15/2018			4/25/2018			6/5/2018			7/16/2018	0.5	5.57
2/3/2018			3/16/2018			4/26/2018			6/6/2018			7/17/2018	0.4	5.59
2/4/2018			3/17/2018			4/27/2018			6/7/2018			7/18/2018	0.3	5.60
2/5/2018			3/18/2018			4/28/2018			6/8/2018	6.3	0.10	7/19/2018	0.2	5.60
2/6/2018			3/19/2018			4/29/2018			6/9/2018	5.6	0.29	7/20/2018	2.5	5.62
2/7/2018			3/20/2018			4/30/2018			6/10/2018	7.7	0.50	7/21/2018	4.2	5.71
2/8/2018			3/21/2018			5/1/2018			6/11/2018	7.9	0.77	7/22/2018	4.0	5.85
2/9/2018			3/22/2018			5/2/2018			6/12/2018	4.7	0.99	7/23/2018	4.1	5.98
2/10/2018			3/23/2018			5/3/2018			6/13/2018	7.4	1.18	7/24/2018	4.0	6.11

SAM'S HALLOW WATER COMPANY MITIGATION

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Fish Haven Creek Bypass Ramped Flume

Date	Dailey CFS	Accumulated Acre-Feet	Date	Dailey CFS	Accumulated Acre-Feet	Date	Dailey CFS	Accumulated Acre-Feet	Date	Dailey CFS	Accumulated Acre-Feet
7/25/2018	4.0	6.25	9/4/2018	2.9	10.53	10/15/2018	4.8	14.40	11/25/2018	4.5	20.25
7/26/2018	3.9	6.37	9/5/2018	1.6	10.60	10/16/2018	4.9	14.55	11/26/2018	4.5	20.40
7/27/2018	5.5	6.51	9/6/2018	1.5	10.65	10/17/2018	4.9	14.71	11/27/2018	4.5	20.54
7/28/2018	5.2	6.69	9/7/2018	1.6	10.70	10/18/2018	1.8	14.84	11/28/2018	4.5	20.69
7/29/2018	5.6	6.86	9/8/2018	1.9	10.75	10/19/2018	1.7	14.90	11/29/2018	4.7	20.84
7/30/2018	5.4	7.03	9/9/2018	1.8	10.81	10/20/2018	2.9	14.96	11/30/2018	4.8	20.99
7/31/2018	4.3	7.20	9/10/2018	1.8	10.87	10/21/2018	3.0	15.06	12/1/2018	4.6	21.14
8/1/2018	4.2	7.35	9/11/2018	1.7	10.93	10/22/2018	3.9	15.17	12/2/2018	4.6	21.29
8/2/2018	3.1	7.48	9/12/2018	2.9	11.01	10/23/2018	6.0	15.31	12/3/2018	4.5	21.44
8/3/2018	4.6	7.58	9/13/2018	3.4	11.12	10/24/2018	5.1	15.48	12/4/2018	4.7	21.62
8/4/2018	2.8	7.70	9/14/2018	2.4	11.23	10/25/2018	5.1	15.65	12/5/2018	4.6	21.77
8/5/2018	2.7	7.80	9/15/2018	0.8	11.30	10/26/2018	4.2	15.79	12/6/2018	4.6	21.92
8/6/2018	2.7	7.88	9/16/2018	0.9	11.33	10/27/2018	4.2	15.93	12/7/2018	4.5	22.07
8/7/2018	2.4	7.97	9/17/2018	1.4	11.37	10/28/2018	4.1	16.07	12/8/2018	4.3	22.21
8/8/2018	2.5	8.05	9/18/2018	1.2	11.42	10/29/2018	4.4	16.20	12/9/2018		
8/9/2018	2.4	8.13	9/19/2018	1.7	11.46	10/30/2018	4.5	16.35	12/10/2018		
8/10/2018	2.6	8.21	9/20/2018	1.7	11.51	10/31/2018	4.5	16.49	12/11/2018		
8/11/2018	2.3	8.29	9/21/2018	1.7	11.57	11/1/2018	4.4	16.64	12/12/2018		
8/12/2018	2.3	8.37	9/22/2018	1.7	11.62	11/2/2018	4.3	16.78	12/13/2018		
8/13/2018	2.4	8.45	9/23/2018	1.6	11.68	11/3/2018	4.8	16.93	12/14/2018		
8/14/2018	2.5	8.53	9/24/2018	1.8	11.74	11/4/2018	4.8	17.08	12/15/2018		
8/15/2018	2.3	8.60	9/25/2018	1.8	11.79	11/5/2018	4.6	17.24	12/16/2018		
8/16/2018	2.3	8.68	9/26/2018	1.9	11.86	11/6/2018	4.7	17.39	12/17/2018		
8/17/2018	2.6	8.77	9/27/2018	1.8	11.92	11/7/2018	4.6	17.54	12/18/2018		
8/18/2018	2.6	8.85	9/28/2018	1.9	11.98	11/8/2018	4.8	17.69	12/19/2018		
8/19/2018	2.3	8.93	9/29/2018	3.6	12.05	11/9/2018	4.8	17.84	12/20/2018		
8/20/2018	2.8	9.01	9/30/2018	5.2	12.20	11/10/2018	4.9	18.00	12/21/2018		
8/21/2018	2.2	9.09	10/1/2018	5.2	12.37	11/11/2018	4.8	18.15	12/22/2018		
8/22/2018	3.2	9.19	10/2/2018	4.1	12.52	11/12/2018	5.0	18.31	12/23/2018		
8/23/2018	2.8	9.29	10/3/2018	4.1	12.68	11/13/2018	4.9	18.46	12/24/2018		
8/24/2018	3.0	9.39	10/4/2018	5.0	12.84	11/14/2018	4.8	18.61	12/25/2018		
8/25/2018	3.2	9.49	10/5/2018	4.7	13.00	11/15/2018	4.7	18.76	12/26/2018		
8/26/2018	3.2	9.60	10/6/2018	4.6	13.16	11/16/2018	4.6	18.91	12/27/2018		
8/27/2018	3.4	9.71	10/7/2018	4.6	13.31	11/17/2018	4.6	19.06	12/28/2018		
8/28/2018	3.5	9.83	10/8/2018	5.3	13.45	11/18/2018	4.7	19.21	12/29/2018		
8/29/2018	3.3	9.93	10/9/2018	2.2	13.57	11/19/2018	4.6	19.36	12/30/2018		
8/30/2018	3.1	10.04	10/10/2018	2.7	13.66	11/20/2018	4.5	19.51	12/31/2018		
8/31/2018	3.0	10.14	10/11/2018	4.4	13.78	11/21/2018	4.5	19.66			
9/1/2018	3.0	10.23	10/12/2018	4.2	13.92	11/22/2018	4.4	19.80			
9/2/2018	3.1	10.33	10/13/2018	5.0	14.07	11/23/2018	4.6	19.95			
9/3/2018	3.1	10.43	10/14/2018	4.9	14.23	11/24/2018	4.4	20.10			