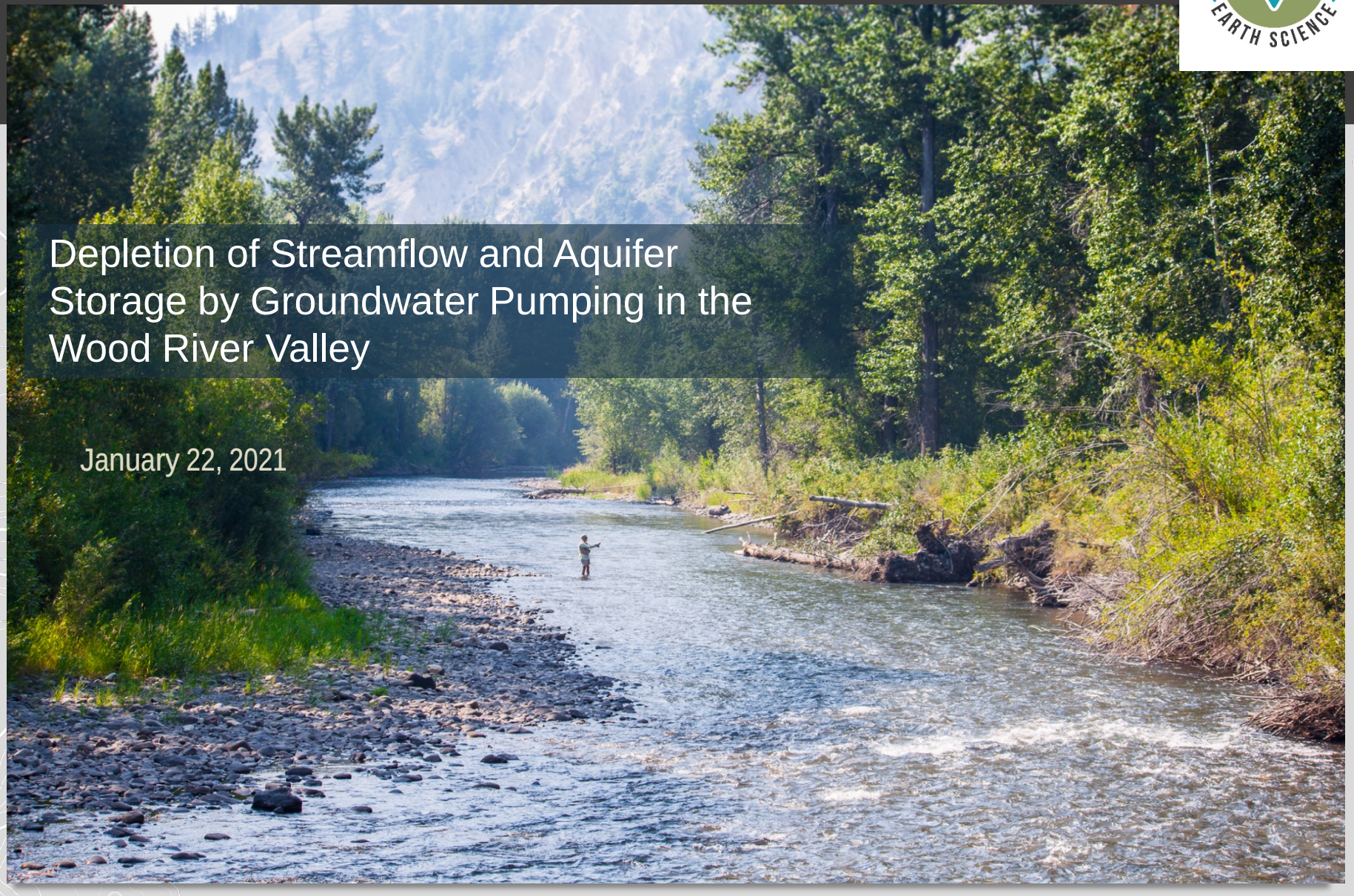
Big Wood River Ground Water Management Area Advisory Committee

January 22, 2021 Meeting Materials

1) Depletion of Streamflow and Aquifer Storage by Groundwater Pumping in the Wood river Valley (PowerPoint Presentation by Eric Miller, Yellowstone Earth Science)
2) BWRGWMA Ground Water Use from Wells with Supplemental Ground Water Right Conditions 2016-2020 (Table prepared by Tim Luke, IDWR)
3) GWRGWMA Supplemental Use Graphs (Tim Luke, IDWR)
4) BWRGWMA Ground Water Use from Wells with Supplemental Ground Water Right Conditions 2016-2020, Including Supplemental Ground Water Rights with Acres and Volume Limits (Table prepared by Tim Luke, IDWR)



Depletion of Streamflow and Aquifer Storage by Groundwater Pumping in the Wood River Valley

January 22, 2021

Objectives

- Objective 1 – Definitions & Framework
- Objective 2 - Expanding Temporal Limits
- Objective 3 – Evaluating Aquifer Stability
- Objective 4 - Updated Impact Estimates

Objective 1: Definitions & Framework

Definitions

- CM Rules – Conjunctive Management Rules
- Impact – the hydrologic effects of groundwater pumping on the natural system (e.g., aquifers, streams, lakes etc.)
- Injury – the material effects of groundwater pumping on individual or collective water rights generally viewed within the context of the conjunctive management rules (i.e., material injury)
- Quasi-Injury – the effects of groundwater pumping on individual or collective water rights holder which as less than “system” impacts but may not reach the standard of full “material injury” under the CM Rules

Definitions (cont.)

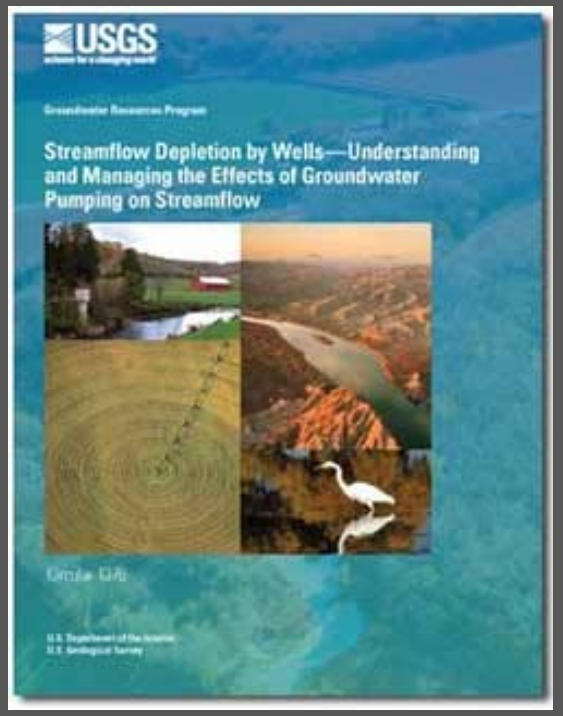
- Recent Period – the time period from the on-set of the current system equilibrium condition (i.e., mid 1980s) to the present. This time period includes the calibration period for the current Wood River groundwater model.

- Long-Term Period – the time period from the onset of groundwater pumping (circa 1905) and the end of the natural equilibrium condition until the present.

Suggested Reading

- **Streamflow Depletion by Wells—Understanding and Managing the Effects of Groundwater Pumping on Streamflow**
- **By Paul M. Barlow and Stanley A. Leake**

- **USGS Circular 1376**



Zero-Sum Game

- "Groundwater discharge is a critical part of flow in most streams – and the more we pump below ground, the more we deplete water flowing down the stream…When viewed over the long-term, it is one big zero-sum game." (Marcia K McNutt, USGS Director 2010-2013)

- Zero-Sum Game – an economic theory and mathematical representation of a situation in which each participant's gain/loss is exactly balanced out by the gain/loss of other participants.

Prior Appropriation Doctrine, Drought and Climate Change

- It is taken to be axiomatic that Idaho's Prior Appropriation Doctrine is fundamentally designed for and is used to, allocate water during times of variable scarcity. Idaho law does not identify, categorize, distinguish or exempt specific causes of water scarcity, the notion that climate changes can somehow alter the Priority Doctrine and change the analysis of the impact of groundwater pumping on the water supply is not supported by law.

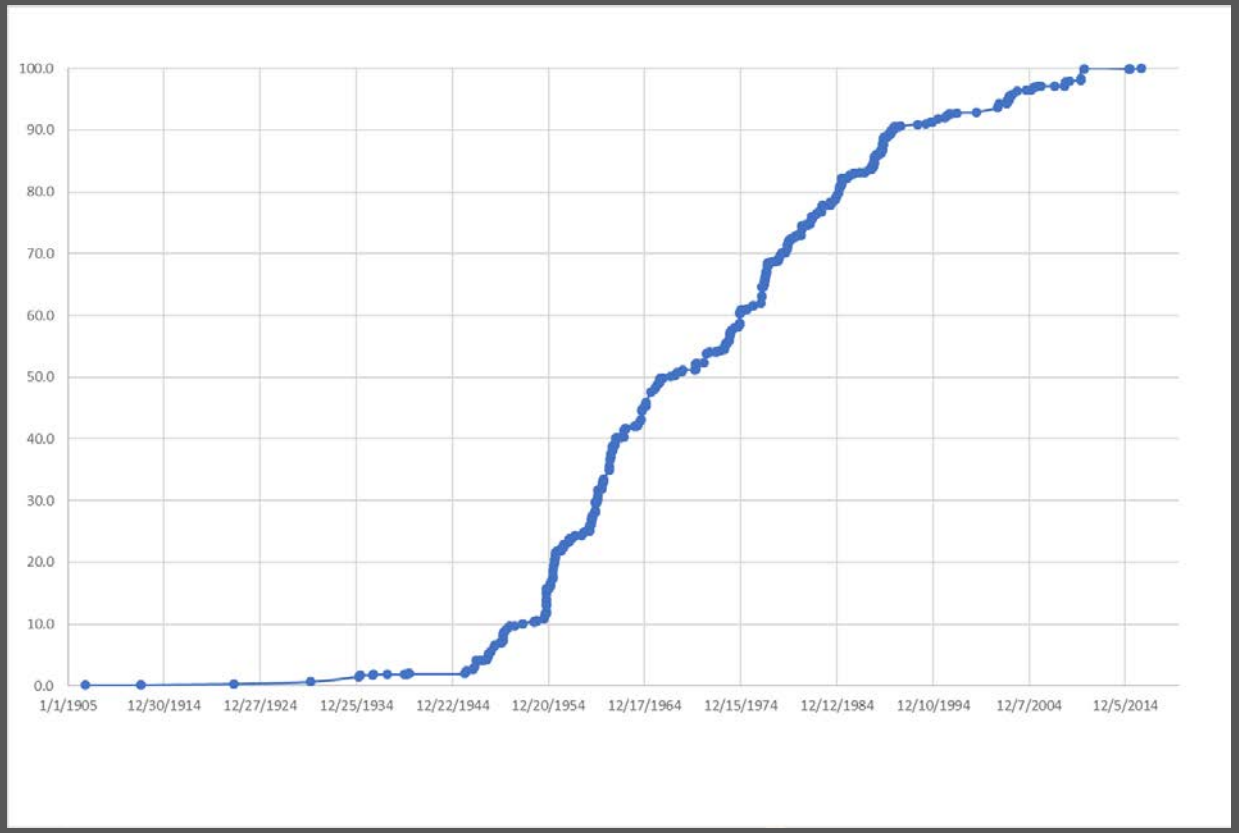
Prior Appropriation Doctrine, Drought and Climate Change

- "The prior appropriation doctrine is comprised of two bedrock principles—that the first appropriator in time is the first in right and that water must be placed to a beneficial use. Article XV, section 3 of the Idaho Constitution provides that "[t]he right to divert and appropriate the unappropriated waters of any natural stream to beneficial uses, shall never be denied.... Priority of appropriation shall give the better right as between those using the water...." These two doctrines encouraged settlers to divert surface water from its natural course and put it to beneficial use, thus leading to the development of Idaho's arid landscape. This Court long ago held that prior appropriation also governs interests in groundwater."

(In the Matter of DISTRIBUTION OF WATER TO VARIOUS WATER RIGHTS HELD BY OR FOR the BENEFIT OF A & B IRRIGATION DISTRICT, 155 Idaho 640, 315 P.3d 828 (2013))"

Objective 2: Expanding Temporal Limits

Development of Wood River Valley Groundwater Pumping



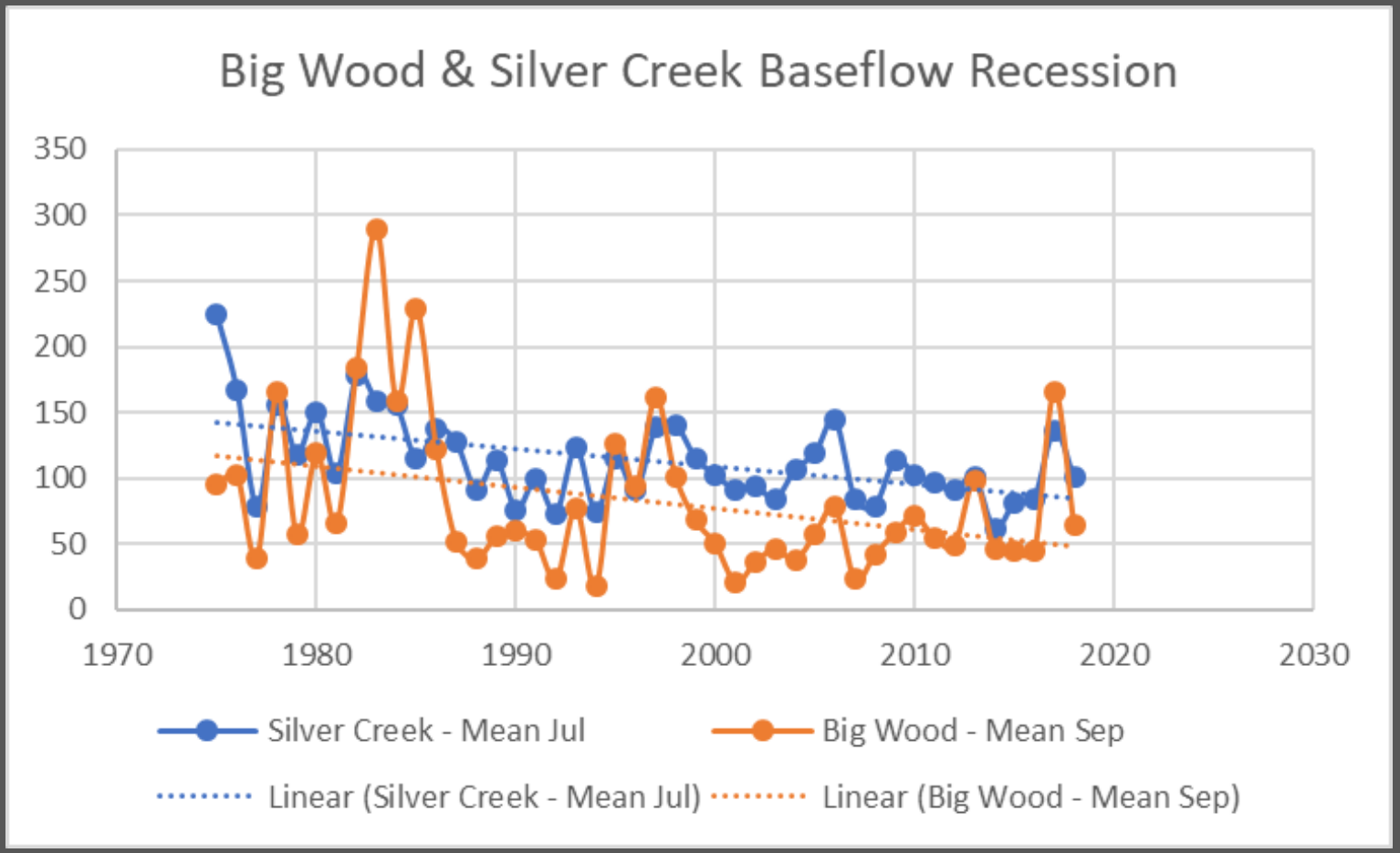
Objective 3: Evaluating Aquifer Depletion

Multiple Water Resource Studies

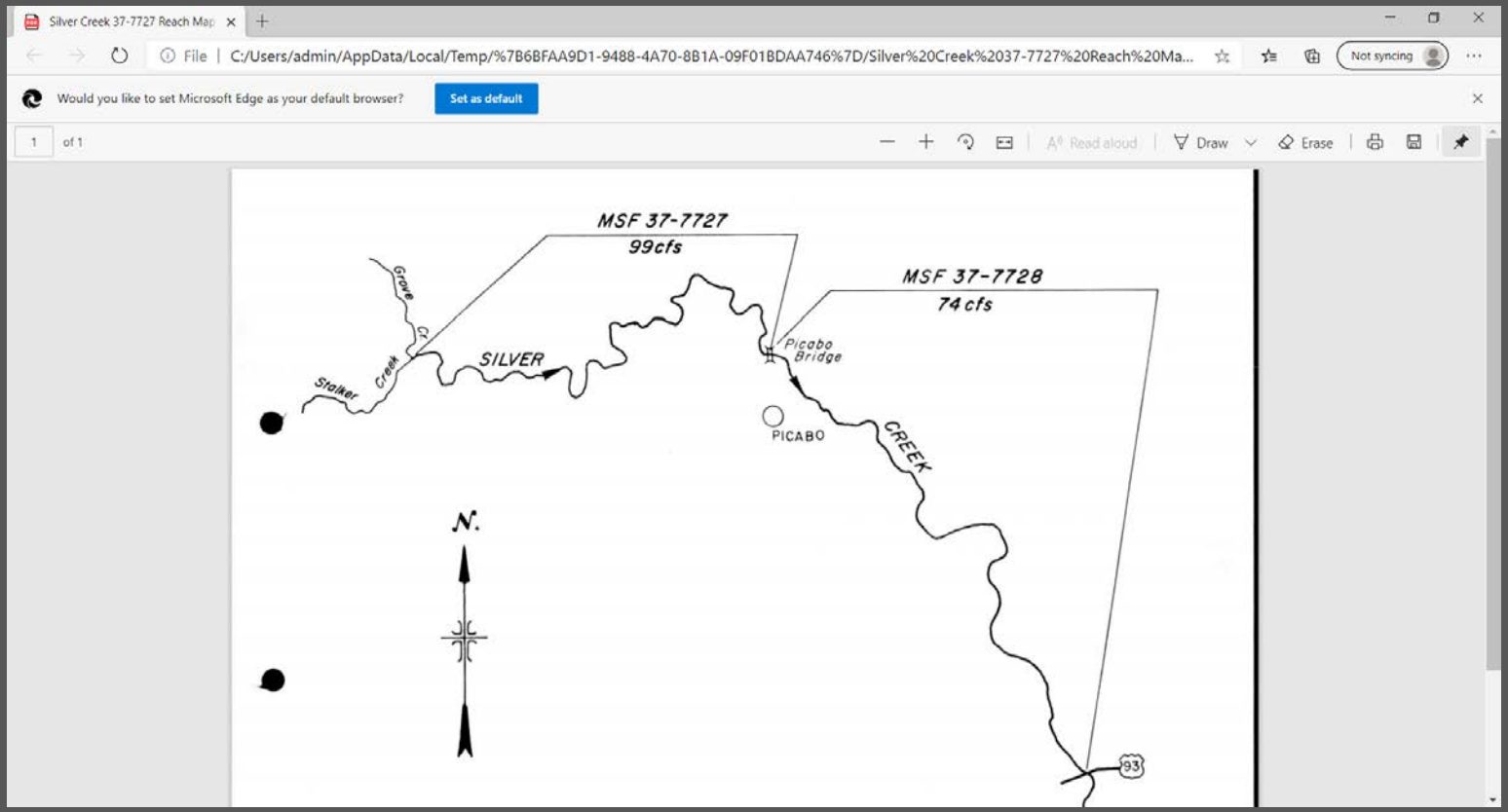
- “The decreasing trends in the Big Wood River near Bellevue since the 1940s, and in Silver Creek since 1975, indicate declining ground-water levels.”

- (Water-Resource Trends and Comparisons Between Partial Development and October 2006 Hydrologic Conditions, Wood River Valley, South-Central Idaho, Skinner et al., 2007)

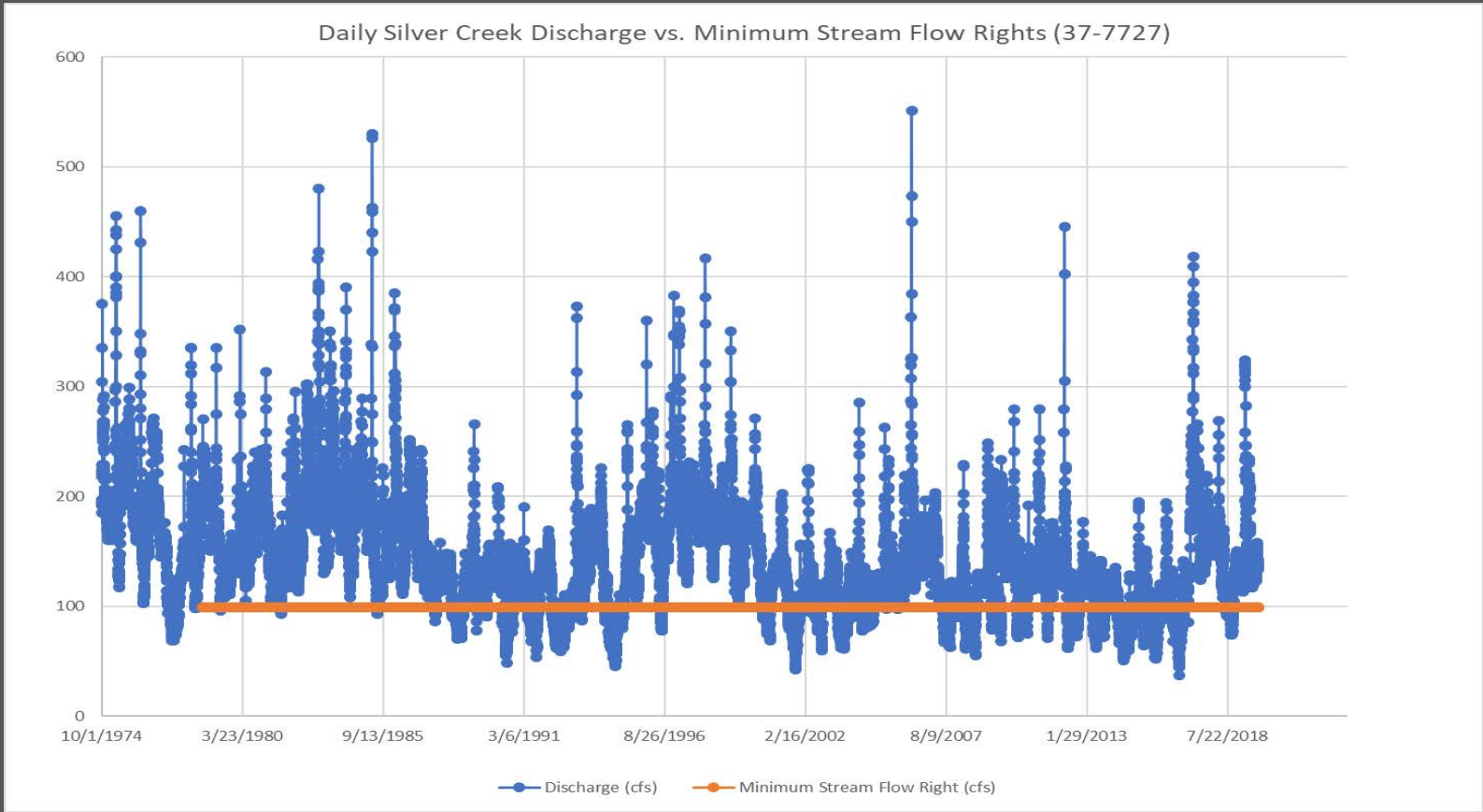
Baseflow Recession Analysis Since 1974



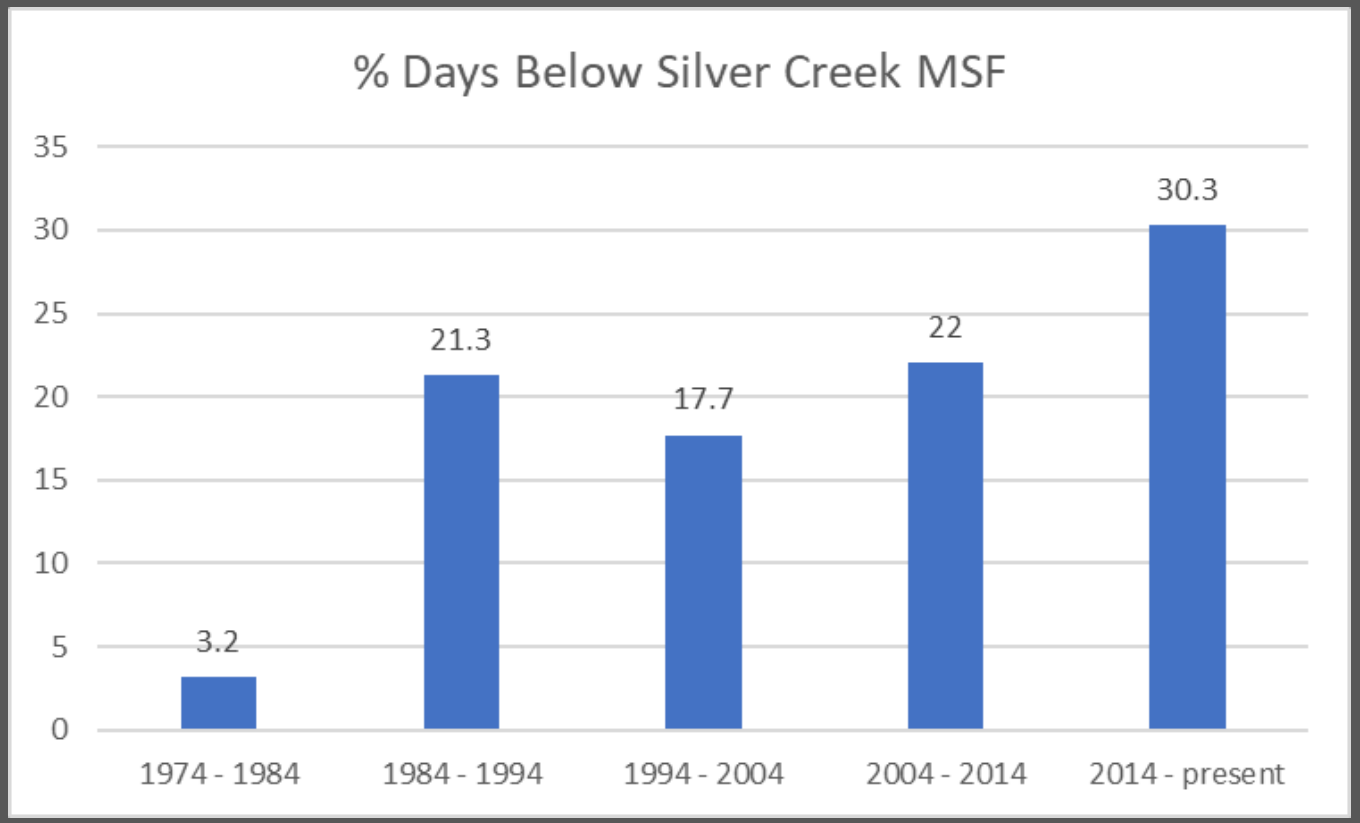
WR #37-7727 Reach Location



Silver Creek Trends vs. Minimum Stream Flow Right (37-7727)



Frequency Analysis – Silver Creek Minimum Stream Flows



Trends in Aquifer Levels

- Published reports and preliminary data suggest continued decreases in aquifer levels since 1974.

Objective 4: Updated Impact/Injury Estimates

Estimated Consumptive Use from Groundwater Pumping

- Galena & South Valley Total Withdrawals
  - 2018 – 46,638 ac-ft
  - 2019 – 40,694 ac-ft
  - 2020 – 46,800 ac-ft (estimated)
  - Three-Year Average ~ 44,700 ac-ft
- Camas Prairie Total Withdrawals
  - 2018 – 11,940 ac-ft
  - 2019 – 9,775 ac-ft
  - 2020 – 12,500 ac-ft (estimated)
  - Three-Year Average ~ 11,400 ac-ft
- Return Flows (RF) Estimated at 10% – irrigation water that returns to aquifer or surface stream.
- 2020 Estimated Consumptive Use (CU) ~ 50,500 ac-ft

Three-Year Impacts to Surface Water from One-Year Pumping

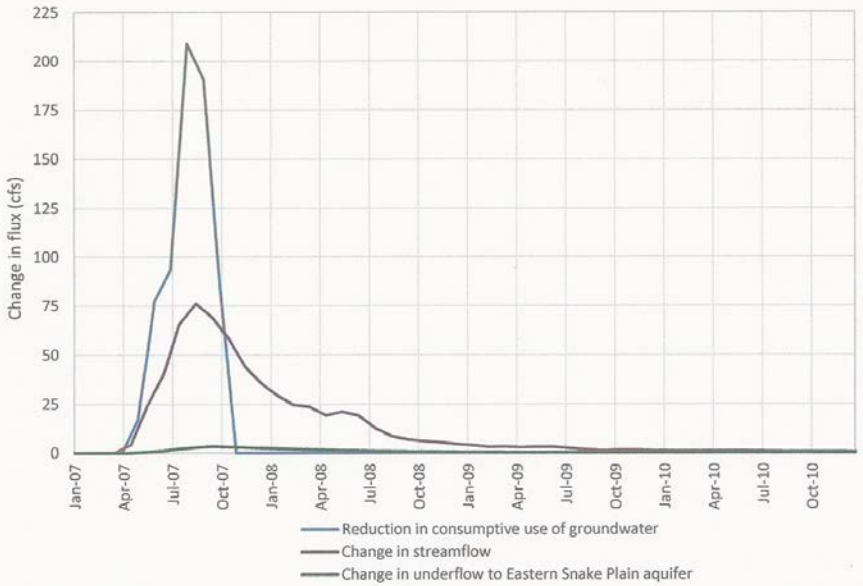


Figure 9. Hydrologic responses to simulated curtailment of non-exempt groundwater irrigation (2007)

Estimated 2020 Hydrologic System Impacts

MONTH	SILVER CREEK IMPACTS		BIG WOOD RIVER IMPACTS		CAMAS PRAIRE IMPACTS	
	(AC-FT)	(CFS)	(AC-FT)	(CFS)	(AC-FT)	(CFS)
Jan	1,114	18.12	944	15.35	855	13.24
Feb	837	**15.07**	706	**12.71**	**855**	**13.24**
Mar	791	12.87	876	14.24	855	13.24
Apr	819	**13.76**	776	**13.05**	**855**	**13.24**
May	1,578	25.66	1,578	25.66	855	13.24
Jun	1,975	**33.20**	2,049	**34.43**	**855**	**13.24**
Jul	3,175	51.64	2,376	38.50	855	13.24
Aug	3,282	**53.37**	2,686	**43.68**	**855**	**13.24**
Sep	2,921	49.09	2,247	37.76	855	13.24
Oct	2,536	**41.25**	2,015	**32.78**	**855**	**13.24**
Nov	1,853	31.14	1,558	26.17	855	13.24
Dec	1,552	**25.24**	1,300	**21.15**	**855**	**13.24**
Total	**22,434 (AC-FT)**		**19,102 (AC-FT)**		**10,260 (AC-FT)**	
Total Irrigation Season	**13,750 (AC-FT)**		**11,703 (AC-FT)**		**5,558 (AC-FT)**	
Total Non-Irrigation Season	**8,684 (AC-FT)**		**7,398 (AC-FT)**		**4,702 (AC-FT)**	

Modeled Impacts for Big Wood River below Heart Rock Ranch

MONTH	BELOW HEART ROCK RANCH IMPACTS (AC-FT)
Jan	330
Feb	**247**
Mar	306
Apr	**272**
May	552
Jun	**717**
Jul	828
Aug	**940**
Sep	786
Oct	**705**
Nov	545
Dec	**455**
Total	**6,686**
Total Irrigation Season	**4,096**
Total Non-Irrigation Season	**2,589**

Estimated 2020 Quasi-Injury Estimates

IMPACT TYPE	SILVER CREEK IMPACTS (AC-FT/Y)	BIG WOOD RIVER IMPACTS (AC-FT/Y)	CAMAS PRAIRE IMPACTS (AC-FT/Y)
General Irrigation Season	**13,750**	**761[1]**	**5,558**
General Non-Irrigation Season	**0**	**7,398**	**4,702**
Stockwater	**30**	**0**	**0**
Below HRR Irrigation Season	**0**	**4,095[2]**	**0**
Sub-Totals	**13,780 Ac-ft/y**	**12,254 Ac-ft/y**	**10,260 Ac-ft/y**
Totals	**36,294**		

Note 1: represents 10% of impacts during the irrigation Above Heart Rock Ranch (HRR) to account for surface water diversions in the triangle junior to Magic's Impoundment Rights.

Note 2: represents impacts during the irrigation season on the Big Wood River Below HRR from April 1 – September 30

Conclusions

- From a System's perspective GW Pumping is one big zero-sum game.
- Current modeling and impact/injury estimates do not address the full system or material injury that has occurred from the beginning of groundwater pumping. Groundwater mining, and associated impact/injury that may have occurred prior to 1995 has not yet been quantified.
- Published reports and preliminary analysis suggest that groundwater depletion may still be occurring.
- Current System Impacts are Approximately 50,500 ac-ft/yr and have likely resulted in the system in a Depleted Equilibrium relative to systems conditions Circa 1905.
- Current "Quasi-Injury" is estimated to be approximately 36,300 ac-ft/y
- At present, Advisory Committees efforts under the framework of a "Ground Water Management Plan" are considered the best means through which individual injuries can be indirectly addressed by focusing on efforts to "protect the people of the state from depletion of groundwater resources" as required under the Ground Water Act (Idaho Code 42-231).

Basin 33 Water Users v. IDWR – November 6, 2020 (Wildman)

- The court found that:

- “the Director’s duty to manage ground water under the [Groundwater] Act does not cease when an adjudication is completed or when a delivery is resolved…When a call is addressed through mitigation or some other monetary agreement, as opposed to curtailment, the continued depletion of the underlying resource is not addressed…When that occurs, the Director’s express duty under the [Ground Water] Act…remains unfilled” (Basin 33 Water Users v. IDWR, November 6, 2020, Wildman)

Ground Water Act

- At present, Advisory Committees efforts under the framework of a “Ground Water Management Plan” are considered the best means through which individual injuries can be indirectly addressed by focusing on efforts to “protect the people of the state from depletion of groundwater resources” as required under the Ground Water Act (Idaho Code 42-231).

Questions & Discussion

BWRGWMA Ground Water Use from Wells with Supplemental Ground Water Right Conditions (2016 - 2020)

WMIS No.*	Meas Option	2016 Vol (AF)	2017 Vol (AF)	2018 Vol (AF)	2019 Vol (AF)	2020 Vol (AF)	Comment
1000704	Unused (6)						Unused
1000716	Flowmeter (1)	730.18	672.26	456.31	412.87	339.84	
1000722	Flowmeter (1)	6.31	6.15	7.40	6.31	7.40	
1000770	Flowmeter (1)						No data; 1.8 acre irrigation right w/domestic
1000774	Flowmeter (1)						No data; 2 acre irrigation right w/domestic
1000786	Unused (6)						Unused
1000788	Flowmeter (1)	0.00	130.87	174.96	48.80	679.06	
1000789	Unused (6)						Unused
1000793	Flowmeter (1)	128.44	207.65	81.64	121.47	35.40	
1000795	Flowmeter (1)	68.47	36.54	54.89	107.74	115.12	
1000800	Flowmeter (1)						No data; 5.3 acre right
1000801	Flowmeter (1)	152.18	113.20	129.61	69.52	172.10	
1000810	Flowmeter (1)	75.35	97.40	122.24	153.48	108.29	
1000813	Flowmeter (1)	88.47	0.00	153.08	0.00	307.98	
1000815	Flowmeter (1)						No data exists, notes say hour meter could be used and flow calibration scheduled for 2016. No flow calibration has been made
1000819	Timeclock (7)	522.39	88.08	506.25	259.02	658.96	
1000826	Flowmeter (1)	142.37	131.30	131.30	145.42	3386.19	
1000841	Flowmeter (1)	928.77	746.55	845.90	472.05	863.58	
1000882	Flowmeter (1)	0.00	0.00	0.00	0.00	0.00	Meter installed, zero usage 2017-2020; only 200 to 300 gals use 2016 & 2017; 1.8 acre irrig right
1000884	Flowmeter (8)	177.00	139.00	94.00	90.00	178.00	
1000891	Flowmeter (1)	18.04	5.99	3.14	1.91	7.51	
1000892	Flowmeter (1)	12.37	14.11	13.64	12.33	15.44	
1000893	Flowmeter (1)	3.78	3.54	3.21	3.12	3.41	
1000894	Flowmeter (1)						No data; well does not exist per watermaster
1000895	Flowmeter (1)	14.00	14.00	14.00	14.00	14.00	
1000896	Flowmeter (1)	186.06	154.44	125.33	140.90	279.16	
1000903	Unused (6)						Unused
1000911	Flowmeter (1)	0.00	0.00	0.00	0.00	173.62	
1000983	Flowmeter (1)	5.24	6.33	6.47	6.64	7.29	
1001008	Flowmeter (1)	3.44	6.12	4.83	4.37	6.18	

* WMIS No: Water Measurement Information System well ID number

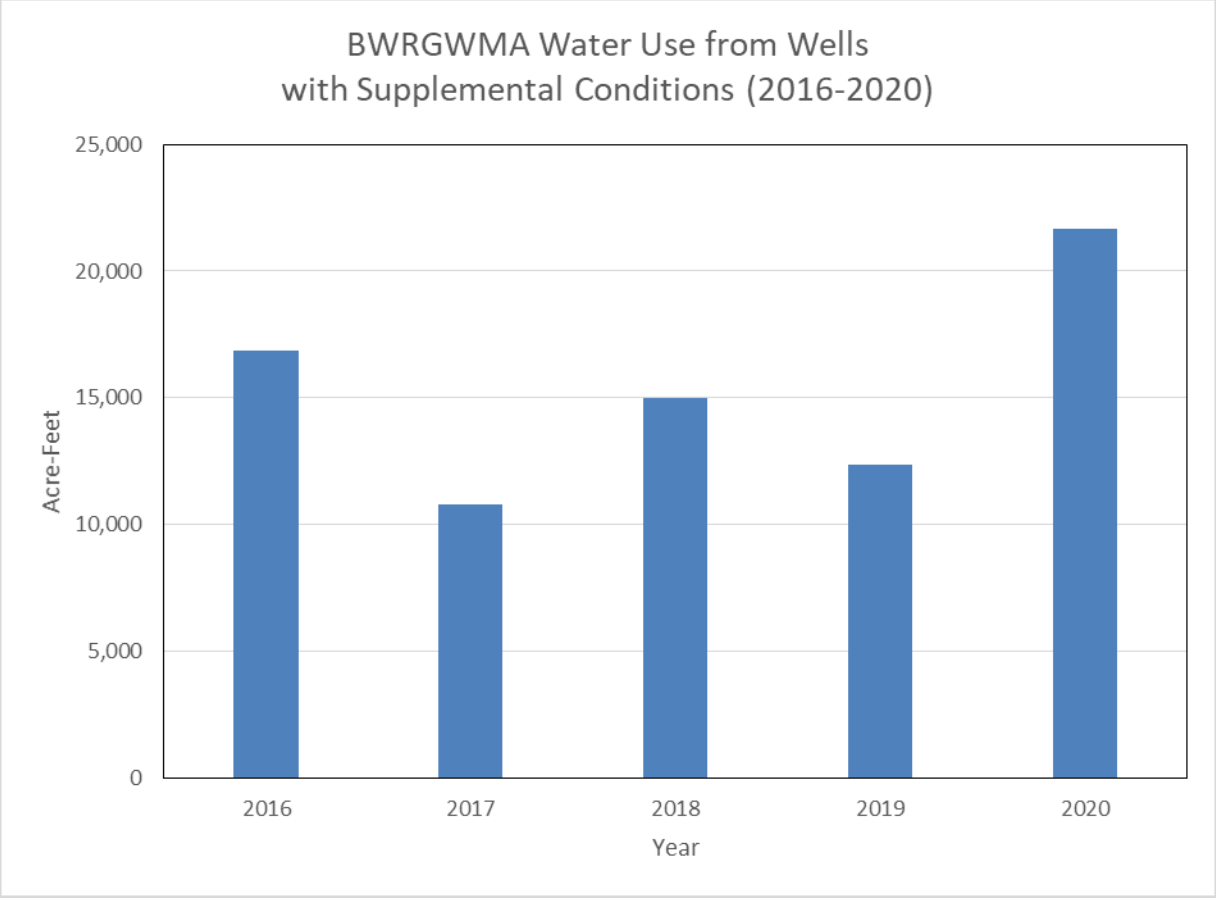
WMIS No.*	Meas Option	2016 Vol (AF)	2017 Vol (AF)	2018 Vol (AF)	2019 Vol (AF)	2020 Vol (AF)	Comment
1001017	Flowmeter (1)	126.96	56.94	17.08	40.63	94.83	
1001018	Flowmeter (1)	714.52	433.79	729.92	564.57	650.00	
1001022	Flowmeter (1)	6.97	2.93	2.80	13.19	12.60	
1001039	Flowmeter (1)			4.60	4.35	4.31	
1001040	Unused (6)						Unused
1001041	Flowmeter (1)	22.88	46.35	23.70	20.21	28.55	
1001051	Flowmeter (1)	98.51	85.00	85.00	85.00	53.81	
1001052	Flowmeter (1)	87.70	73.61	82.67	83.77	95.32	
1001053	Flowmeter (1)	141.64	12.18	167.18	607.02	631.44	
1001074	Flowmeter (1)	78.18	138.96	107.83	108.12	123.66	
1001083	Flowmeter (1)	17.56	17.86	13.75	15.18	19.17	
1001084	Timeclock (7)	287.67	86.09	194.43	279.87	295.77	
1001089	Flowmeter (1)	732.13	710.98	644.96	864.78	749.64	
1001093	Flowmeter (1)	313.40	346.92	274.52	284.53	365.25	
1001103	Flowmeter (1)	213.52	96.80	528.86	801.97	595.77	
1001104	Flowmeter (1)	0.00	0.00	7.09	0.00		Dead battery October 2019,user said no use 2019; dead battery 2020, 2020 use uncertain
1001116	Flowmeter (1)	222.05	57.26	102.25	420.03	200.00	
1001117	Flowmeter (1)	249.55	1.47	559.47	546.80	503.66	
1001120	Timeclock (7)	65.59	43.30	174.05	180.22	431.75	
1001121	Timeclock (7)	243.20	0.00	548.32	319.40	872.94	
1001127	Flowmeter (1)	0.00	0.00	0.00	0.00	136.44	
1001131	Unused (6)						Unused
1001132	Unused (6)						Unused
1001134	Flowmeter (1)	529.22	519.94	415.63	563.46	650.09	
1001137	Timeclock (7)	218.45	0.05	239.60	95.82	366.62	
1001140	Flowmeter (1)						Use measured at other well
1001141	Flowmeter (1)		31.35	52.34	65.94	188.16	
1001142	Flowmeter (1)						Use measured at other well
1001143	Flowmeter (1)						Use measured at other well
1001152	Flowmeter (1)	231.61	0.00	230.06	122.64	296.69	2016-17 volumes used Timeclock
1001153	Unused (6)						Unused

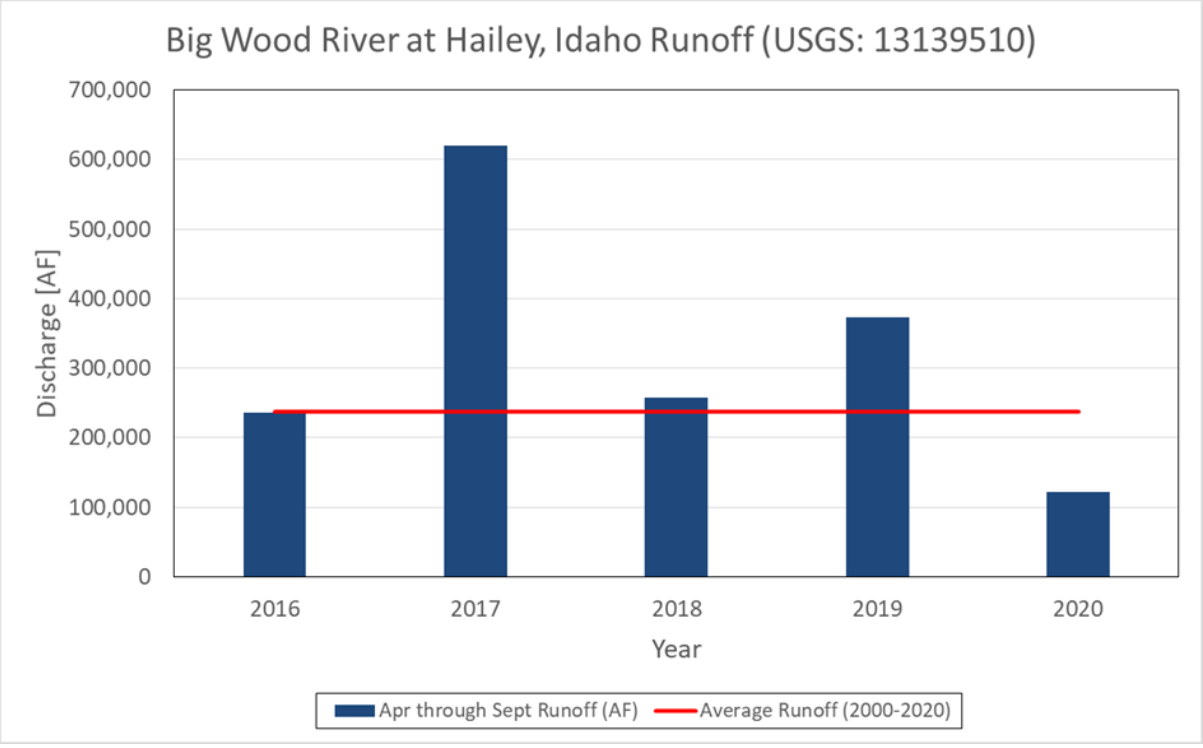
* WMIS No: Water Measurement Information System well ID number

WMIS No.*	Meas Option	2016 Vol (AF)	2017 Vol (AF)	2018 Vol (AF)	2019 Vol (AF)	2020 Vol (AF)	Comment
1001154	PCC (2)	249.91	121.14	180.60	163.92	218.68	
1001155	Unused (6)						Unused
1001156	PCC (2)	16.19	0.01	7.32	0.01	10.62	
1001161	Timeclock (7)	0.00	0.00	0.00	0.00	0.00	Watermaster confirmed zero pumpage 2016-2020
1001162	Flowmeter (1)	461.45	0.34	243.00	195.63	69.81	
1001195	Flowmeter (1)	313.07	582.23	17.99	0.00	327.49	
1001196	Flowmeter (1)	5.62	18.78	41.88	0.00	65.44	
1001198	Flowmeter (8)	879.29	1260.59	1239.02	800.00	155.38	
1001205	Unused (6)						Unused
1001206	Unused (6)						Unused
1001210	Timeclock (7)	70.95	44.61	24.00	11.09	70.02	
1001211	Flowmeter (1)	63.00	69.00	173.00	17.00	70.00	
1001212	Flowmeter (1)	1023.00	448.00	304.00	0.00	0.00	
1001214	Flowmeter (1)	610.41	815.46	766.66	96.63	0.00	
1001217	Timeclock (7)	329.82	0.00	372.59	275.25	393.99	
1001218	Timeclock (7)	772.84	163.57	746.87	439.00	834.07	
1001223	Flowmeter (1)	266.89	55.55	215.77	46.07	147.26	
1001228	Flowmeter (1)	11.79	9.41	13.03	9.08	10.83	
1001229	Flowmeter (1)	47.45	0.06	45.83	0.06	43.21	
1001240	Flowmeter (1)	213.79	250.00	116.02	26.33	273.64	
1001243	Flowmeter (1)	76.11	0.00	0.00	0.00	37.35	
1001244	Flowmeter (1)					253.42	Meter condensation 2019; no data entered 2014 - 2018
1001248	Flowmeter (1)	493.27	0.00	606.14	597.53	500.00	
1001250	Flowmeter (1)	86.90	85.00	2.50	0.00	0.00	
1001252	Flowmeter (1)	129.95	120.00	165.63	100.60	171.21	
1001256	Flowmeter (1)	0.65	3.32	2.76	0.35	2.59	
1001270	Flowmeter (1)	2.22	0.00	3.08	1.68	3.59	
1001276	Flowmeter (1)	6.74	6.02	3.41	0.38	8.78	
1001277	Flowmeter (1)	10.03	13.45	10.93	0.23	19.87	
1001318	Flowmeter (1)	112.35					No data after 2017; meter issues, will follow up for compliance
1001319	Flowmeter (1)						No data; meter issues, will follow up for compliance
1001324	Flowmeter (1)				4.52	2.75	

* WMIS No: Water Measurement Information System well ID number

WMIS No.*	Meas Option	2016 Vol (AF)	2017 Vol (AF)	2018 Vol (AF)	2019 Vol (AF)	2020 Vol (AF)	Comment
1001325	Flowmeter (1)	10.33	11.88	12.35	14.07	15.27	
1001333	Flowmeter (1)	551.07	498.67	546.77	570.83	621.52	
1001335	PCC (2)						No data; PCC option w/no PCC meas. Wateramster reports 3 attempts made to find flow without success, plumbing of outlet works needs to be changed
1001543	Flowmeter (1)		87.32	10.93	104.39	42.72	
1001544	Flowmeter (1)						No data; does well exist?
1001558	Timeclock (7)	541.53	77.60	93.05	35.50	200.41	
1001559	Flowmeter (1)	280	0	0	0	456.70	Old WD 37 well with manual on/off readings 2016 to 2019 and flow based on portable meter calibration from 2016
1001560	Timeclock (7)	0.00	0.00	304.67	0.00	364.45	
1001585	Flowmeter (1)						Well does not exist at this location. Diversion is reported at 1000716
1001586	Flowmeter (1)				55.94	50.00	
1001681	Timeclock (7)	835.74	19.84	0.00	0.00	837.00	
1001685	Flowmeter (1)						No data; 1.3 acre irrigation right w/domestic use
1001695	Flowmeter (1)	540	669	566	610.00	229	Old WD 37 well with flows measured manually through 2 flumes.
1001701	Flowmeter (1)				0.00	438.00	
1001831	Flowmeter (1)						No data; 6.8 acre irrigation right
1003803	Flowmeter (1)						No data; 1 acre irrigation right, well added 12/2019
1003806	Flowmeter (1)						No data; 1 acre irrigation right, well added 12/2019
1003807	Flowmeter (1)						No data; 0.6 acre irrigation right; well added 12/2019
1003808	Flowmeter (1)						No data; 0.9 acre irrigation right, well added 12/2019
1003809	Flowmeter (1)						No data; 0.6 acre irrigation right; well added 12/2019
1003810	Flowmeter (1)						No data; 0.8 acre irrigation right; well added 12/2019
1003811	Flowmeter (1)						No data; 0.8 acre irrigation right; well added 12/2019
1003812	Flowmeter (1)						No data; 0.8 acre irrigation right; well added 12/2019
1003813	Flowmeter (1)						No data; 0.8 acre irrigation right; well added 12/2019
1003814	Flowmeter (1)						No data; 0.9 acre irrigation right, well added 12/2019
		16,877	**10,766**	**14,970**	**12,334**	**21,670**	


BWRGWMA Water Use from Wells
with Supplemental Conditions (2016-2020)
25,000
20,000
15,000
10,000
5,000
0
Acre-Feet
2016
2017
2018
2019
2020
Year


Big Wood River at Hailey, Idaho Runoff (USGS: 13139510)
700,000
600,000
500,000
400,000
300,000
200,000
100,000
0
Discharge [AF]
2016
2017
2018
2019
2020
Year
Apr through Sept Runoff (AF)
Average Runoff (2000-2020)

BWRGWMA Ground Water Use from Wells with Supplemental Ground Water Right Conditions (2016 - 2020)
Includes Supplemental Ground Water Rights with Acres and Volume Limits
Sorted by Owner Name (not displayed)

WMIS Number	Meas Option	Water Right No.	Water Rt. Total Acres	Water Rt. Acre LImit	Water Rt. Volume (AF)	2016 Vol (AF)	2017 Vol (AF)	2018 Vol (AF)	2019 Vol (AF)	2020 Vol (AF)
1000903	Unused (6)	37-7319	504.7	219.7	395.3					
1001205	Unused (6)	37-7319	504.7	219.7	395.3					
1001206	Unused (6)	37-7319	504.7	219.7	395.3					
1000774	Flowmeter (1)	37-8364	2		0					
1001681	Timeclock (7)	37-22777	158.9		556.2	835.74	19.84	0.00	0.00	837.00
1001041	Flowmeter (1)	37-2557V	10		35	22.88	46.35	23.70	20.21	28.55
1001217	Timeclock (7)	37-4109			2380.2	329.82	0.00	372.59	275.25	393.99
1001218	Timeclock (7)	37-2556A			1874.3	772.84	163.57	746.87	439.00	834.07
1001083	Flowmeter (1)	37-2732	90.2		339.5	17.56	17.86	13.75	15.18	19.17
1001084	Timeclock (7)	37-2732	90.2		339.5	287.67	86.09	194.43	279.87	295.77
1000819	Timeclock (7)	37-20737	20	2.2	7.8	522.39	88.08	506.25	259.02	658.96
1000819	Timeclock (7)	37-2559B	20	13.3	46.6	522.39	88.08	506.25	259.02	658.96
1001089	Flowmeter (1)	37-23055	21.5		75.3	732.13	710.98	644.96	864.78	749.64
1001104	Flowmeter (1)	37-2630	380	289	1011.5	0.00	0.00	7.09	0.00	
1000789	Unused (6)	37-7312C	28.2		98.7					
1001210	Timeclock (7)	37-23090	1291.6	359.1	1256.8	70.95	44.61	24.00	11.09	70.02
1001210	Timeclock (7)	37-23091	1291.6	385.2	1455.2	70.95	44.61	24.00	11.09	70.02
1001210	Timeclock (7)	37-23092	1291.6	444.6	1333.8	70.95	44.61	24.00	11.09	70.02
1001210	Timeclock (7)	37-23093	1291.6	174.6	611.1	70.95	44.61	24.00	11.09	70.02
1001211	Flowmeter (1)	37-23090	1291.6	359.1	1256.8	63.00	69.00	173.00	17.00	70.00
1001211	Flowmeter (1)	37-23091	1291.6	385.2	1455.2	63.00	69.00	173.00	17.00	70.00
1001211	Flowmeter (1)	37-23092	1291.6	444.6	1333.8	63.00	69.00	173.00	17.00	70.00
1001211	Flowmeter (1)	37-23093	1291.6	174.6	611.1	63.00	69.00	173.00	17.00	70.00
1001212	Flowmeter (1)	37-23090	1291.6	359.1	1256.8	1023.00	448.00	304.00	0.00	0.00
1001212	Flowmeter (1)	37-23091	1291.6	385.2	1455.2	1023.00	448.00	304.00	0.00	0.00
1001212	Flowmeter (1)	37-23092	1291.6	444.6	1333.8	1023.00	448.00	304.00	0.00	0.00
1001212	Flowmeter (1)	37-23093	1291.6	174.6	611.1	1023.00	448.00	304.00	0.00	0.00
1000891	Flowmeter (1)	37-21253	34.4	7	24.5	18.04	5.99	3.14	1.91	7.51
1000892	Flowmeter (1)	37-21253	34.4	7	24.5	12.37	14.11	13.64	12.33	15.44
1000895	Flowmeter (1)	37-21269	5		17.5	14.00	14.00	14.00	14.00	14.00

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BWRGWMA Ground Water Use from Wells with Supplemental Ground Water Right Conditions (2016 - 2020)
Includes Supplemental Ground Water Rights with Acres and Volume Limits
Sorted by Owner Name (not displayed)

WMIS Number	Meas Option	Water Right No.	Water Rt. Total Acres	Water Rt. Acre LImit	Water Rt. Volume (AF)	2016 Vol (AF)	2017 Vol (AF)	2018 Vol (AF)	2019 Vol (AF)	2020 Vol (AF)
1000810	Flowmeter (1)	37-20619	12		36	75.35	97.40	122.24	153.48	108.29
1001244	Flowmeter (1)	37-20621	12		42					253.42
1001093	Flowmeter (1)	37-4433	143		500.5	313.40	346.92	274.52	284.53	365.25
1001335	PCC (2)	37-8219	864	300	0					
1000983	Flowmeter (1)	37-21500	2.5		7.5	5.24	6.33	6.47	6.64	7.29
1001277	Flowmeter (1)	37-21666	5		17.5	10.03	13.45	10.93	0.23	19.87
1000722	Flowmeter (1)	37-8538	6		0	6.31	6.15	7.40	6.31	7.40
1003807	Flowmeter (1)	37-23164	0.6		2.1					
1001152	Flowmeter (1)	37-7609	17.2		420	231.61	0.00	230.06	122.64	296.69
1001161	Timeclock (7)	37-2725	23		70	0.00	0.00	0.00	0.00	0.00
1000882	Flowmeter (1)	37-20809	1.8		0	0.00	0.00	0.00	0.00	0.00
1003812	Flowmeter (1)	37-23169	0.8		2.8					
1001223	Flowmeter (1)	37-11329	714.9	143	500.5	266.89	55.55	215.77	46.07	147.26
1001543	Flowmeter (1)	37-11329	714.9	143	500.5		87.32	10.93	104.39	42.72
1001544	Flowmeter (1)	37-11329	714.9	143	500.5					
1000800	Flowmeter (1)	37-20397	5.3		18.6					
1003814	Flowmeter (1)	37-23171	0.9		3.2					
1001022	Flowmeter (1)	37-7775G	20		70	6.97	2.93	2.80	13.19	12.60
1003809	Flowmeter (1)	37-23166	0.9		3.2					
1000884	Flowmeter (8)	37-14289	164.5	14.5	50.8	177.00	139.00	94.00	90.00	178.00
1000884	Flowmeter (8)	37-2614	164.5	150	450	177.00	139.00	94.00	90.00	178.00
1001695	Flowmeter (1)	37-14289	164.5	14.5	50.8	540.00	669.00	566.00	610.00	229.00
1001695	Flowmeter (1)	37-2614	164.5	150	450	540.00	669.00	566.00	610.00	229.00
1000788	Flowmeter (1)	37-2713	675.5	596	2086	0.00	130.87	174.96	48.80	679.06
1000788	Flowmeter (1)	37-7356	675.5	596	1057.8	0.00	130.87	174.96	48.80	679.06
1000793	Flowmeter (1)	37-2713	675.5	596	2086	128.44	207.65	81.64	121.47	35.40
1000793	Flowmeter (1)	37-7356	675.5	596	1057.8	128.44	207.65	81.64	121.47	35.40
1000795	Flowmeter (1)	37-2713	675.5	596	2086	68.47	36.54	54.89	107.74	115.12
1000795	Flowmeter (1)	37-7356	675.5	596	1057.8	68.47	36.54	54.89	107.74	115.12
1001017	Flowmeter (1)	37-2713	675.5	596	2086	126.96	56.94	17.08	40.63	94.83

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BWRGWMA Ground Water Use from Wells with Supplemental Ground Water Right Conditions (2016 - 2020)
Includes Supplemental Ground Water Rights with Acres and Volume Limits
Sorted by Owner Name (not displayed)

WMIS Number	Meas Option	Water Right No.	Water Rt. Total Acres	Water Rt. Acre LImit	Water Rt. Volume (AF)	2016 Vol (AF)	2017 Vol (AF)	2018 Vol (AF)	2019 Vol (AF)	2020 Vol (AF)
1001017	Flowmeter (1)	37-7356	675.5	596	1057.8	126.96	56.94	17.08	40.63	94.83
1001229	Flowmeter (1)	37-7745C	40.5	40.5	142	47.45	0.06	45.83	0.06	43.21
1001131	Unused (6)	37-7799	136		410.4					
1001132	Unused (6)	37-7799	136		410.4					
1001243	Flowmeter (1)	37-21808	36	36	126	76.11	0.00	0.00	0.00	37.35
1003810	Flowmeter (1)	37-23167	0.8		2.8					
1001586	Flowmeter (1)	37-11932	549.3	254	96.5				55.94	50.00
1001586	Flowmeter (1)	37-2573	549.3	240	562				55.94	50.00
1001701	Flowmeter (1)	37-7014	549.3	445	1335				0.00	438.00
1000786	Unused (6)	37-7775D	20		70					
1001256	Flowmeter (1)	37-21511	5		17.5	0.65	3.32	2.76	0.35	2.59
1003808	Flowmeter (1)	37-23165	0.9		3.2					
1003806	Flowmeter (1)	37-23163	1	0.8	2.8					
1000716	Flowmeter (1)	37-2627C	39.3		183.6	730.18	672.26	456.31	412.87	339.84
1000716	Flowmeter (1)	37-2632	97		402.5	730.18	672.26	456.31	412.87	339.84
1000716	Flowmeter (1)	37-8854	22		103.4	730.18	672.26	456.31	412.87	339.84
1001318	Flowmeter (1)	37-2627C	39.3		183.6	112.35				
1001318	Flowmeter (1)	37-2632	97		402.5	112.35				
1001318	Flowmeter (1)	37-8854	22		103.4	112.35				
1001319	Flowmeter (1)	37-2627C	39.3		183.6					
1001319	Flowmeter (1)	37-2632	97		402.5					
1001319	Flowmeter (1)	37-8854	22		103.4					
1001585	Flowmeter (1)	37-2627C	39.3		183.6					
1001585	Flowmeter (1)	37-2632	97		402.5					
1001585	Flowmeter (1)	37-8854	22		103.4					
1001052	Flowmeter (1)	37-2705B	39		136.5	87.70	73.61	82.67	83.77	95.32
1000815	Flowmeter (1)	37-8441A	71		0					
1000815	Flowmeter (1)	37-8441B	177		0					
1003811	Flowmeter (1)	37-23168	0.8		2.8					
1001195	Flowmeter (1)	37-22749	34.8		252	313.07	582.23	17.99	0.00	327.49

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BWRGWMA Ground Water Use from Wells with Supplemental Ground Water Right Conditions (2016 - 2020)
Includes Supplemental Ground Water Rights with Acres and Volume Limits
Sorted by Owner Name (not displayed)

WMIS Number	Meas Option	Water Right No.	Water Rt. Total Acres	Water Rt. Acre LImit	Water Rt. Volume (AF)	2016 Vol (AF)	2017 Vol (AF)	2018 Vol (AF)	2019 Vol (AF)	2020 Vol (AF)
1001196	Flowmeter (1)	37-22749	34.8		252	5.62	18.78	41.88	0.00	65.44
1001198	Flowmeter (8)	37-2492	122.5	116.1	414.8	879.29	1260.59	1239.02	800.00	155.38
1001214	Flowmeter (1)	37-22050	369.4	120.9	542.5	610.41	815.46	766.66	96.63	0.00
1001053	Flowmeter (1)	37-22361	2		6	141.64	12.18	167.18	607.02	631.44
1001228	Flowmeter (1)	37-20398	4.6		16.1	11.79	9.41	13.03	9.08	10.83
1001140	Flowmeter (1)	37-12089	507.6	192.6	565.7					
1001140	Flowmeter (1)	37-7002	507.6	62	217					
1001140	Flowmeter (1)	37-7309	507.6	253	899.5					
1001141	Flowmeter (1)	37-12089	507.6	192.6	565.7		31.35	52.34	65.94	188.16
1001141	Flowmeter (1)	37-7002	507.6	62	217		31.35	52.34	65.94	188.16
1001141	Flowmeter (1)	37-7309	507.6	253	899.5		31.35	52.34	65.94	188.16
1001142	Flowmeter (1)	37-12089	507.6	192.6	565.7					
1001142	Flowmeter (1)	37-7002	507.6	62	217					
1001142	Flowmeter (1)	37-7309	507.6	253	899.5					
1001143	Flowmeter (1)	37-12089	507.6	192.6	565.7					
1001143	Flowmeter (1)	37-7002	507.6	62	217					
1001143	Flowmeter (1)	37-7309	507.6	253	899.5					
1001040	Unused (6)	37-2557T	5		17.5					
1001156	PCC (2)	37-2664B	19		60	16.19	0.01	7.32	0.01	10.62
1001325	Flowmeter (1)	37-21251	19.6	11	38.5	10.33	11.88	12.35	14.07	15.27
1001074	Flowmeter (1)	37-7584	134	117	351	78.18	138.96	107.83	108.12	123.66
1001333	Flowmeter (1)	37-2629	138.9	124.9	437.5	551.07	498.67	546.77	570.83	621.52
1000801	Flowmeter (1)	37-11430	591	181	633.5	152.18	113.20	129.61	69.52	172.10
1000801	Flowmeter (1)	37-2658	591	351	1228.5	152.18	113.20	129.61	69.52	172.10
1000801	Flowmeter (1)	37-4421B	591	138	190	152.18	113.20	129.61	69.52	172.10
1000801	Flowmeter (1)	37-7651	591	120	420	152.18	113.20	129.61	69.52	172.10
1000841	Flowmeter (1)	37-11430	591	181	633.5	928.77	746.55	845.90	472.05	863.58
1000841	Flowmeter (1)	37-2658	591	351	1228.5	928.77	746.55	845.90	472.05	863.58
1000841	Flowmeter (1)	37-4421B	591	138	190	928.77	746.55	845.90	472.05	863.58
1000841	Flowmeter (1)	37-7651	591	120	420	928.77	746.55	845.90	472.05	863.58

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BWRGWMA Ground Water Use from Wells with Supplemental Ground Water Right Conditions (2016 - 2020)
Includes Supplemental Ground Water Rights with Acres and Volume Limits
Sorted by Owner Name (not displayed)

WMIS Number	Meas Option	Water Right No.	Water Rt. Total Acres	Water Rt. Acre LImit	Water Rt. Volume (AF)	2016 Vol (AF)	2017 Vol (AF)	2018 Vol (AF)	2019 Vol (AF)	2020 Vol (AF)
1001018	Flowmeter (1)	37-11430	591	181	633.5	714.52	433.79	729.92	564.57	650.00
1001018	Flowmeter (1)	37-2658	591	351	1228.5	714.52	433.79	729.92	564.57	650.00
1001018	Flowmeter (1)	37-4421B	591	138	190	714.52	433.79	729.92	564.57	650.00
1001018	Flowmeter (1)	37-7651	591	120	420	714.52	433.79	729.92	564.57	650.00
1001195	Flowmeter (1)	37-11387	140.9	109.2	252	313.07	582.23	17.99	0.00	327.49
1001196	Flowmeter (1)	37-11387	140.9	109.2	252	5.62	18.78	41.88	0.00	65.44
1001324	Flowmeter (1)	37-21228	4		14				4.52	2.75
1001558	Timeclock (7)	37-11911	3037.4	340	1190	541.53	77.60	93.05	35.50	200.41
1001558	Timeclock (7)	37-11914	3037.4	967	257	541.53	77.60	93.05	35.50	200.41
1001558	Timeclock (7)	37-2627A	3037.4	2496.3	3865.7	541.53	77.60	93.05	35.50	200.41
1001559	Flowmeter (1)	37-11911	3037.4	340	1190	280.00	0.00	0.00	0.00	456.70
1001559	Flowmeter (1)	37-11914	3037.4	967	257	280.00	0.00	0.00	0.00	456.70
1001559	Flowmeter (1)	37-2627A	3037.4	2496.3	3865.7	280.00	0.00	0.00	0.00	456.70
1001560	Timeclock (7)	37-11911	3037.4	340	1190	0.00	0.00	304.67	0.00	364.45
1001560	Timeclock (7)	37-11914	3037.4	967	257	0.00	0.00	304.67	0.00	364.45
1001560	Timeclock (7)	37-2627A	3037.4	2496.3	3865.7	0.00	0.00	304.67	0.00	364.45
1003813	Flowmeter (1)	37-23170	0.8		2.8					
1001053	Flowmeter (1)	37-22360	126.3		378.9	141.64	12.18	167.18	607.02	631.44
1001053	Flowmeter (1)	37-22692	2.1		4.4	141.64	12.18	167.18	607.02	631.44
1001053	Flowmeter (1)	37-22693	2.1		4.6	141.64	12.18	167.18	607.02	631.44
1001053	Flowmeter (1)	37-22695	2		4.3	141.64	12.18	167.18	607.02	631.44
1001053	Flowmeter (1)	37-22696	2.1		4.5	141.64	12.18	167.18	607.02	631.44
1001053	Flowmeter (1)	37-22694	2		14.3	141.64	12.18	167.18	607.02	631.44
1000911	Flowmeter (1)	37-21227	49	35	122.5	0.00	0.00	0.00	0.00	173.62
1000896	Flowmeter (1)	37-21268	60		210	186.06	154.44	125.33	140.90	279.16
1000896	Flowmeter (1)	37-22498	73	73	255.5	186.06	154.44	125.33	140.90	279.16
1000896	Flowmeter (1)	37-22638	30.5		93.1	186.06	154.44	125.33	140.90	279.16
1000770	Flowmeter (1)	37-7846	1.3	0.08	4					
1001685	Flowmeter (1)	37-7846	1.3	0.08	4					
1003803	Flowmeter (1)	37-23162	1	0.8	2.8					

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BWRGWMA Ground Water Use from Wells with Supplemental Ground Water Right Conditions (2016 - 2020)
Includes Supplemental Ground Water Rights with Acres and Volume Limits
Sorted by Owner Name (not displayed)

WMIS Number	Meas Option	Water Right No.	Water Rt. Total Acres	Water Rt. Acre LImit	Water Rt. Volume (AF)	2016 Vol (AF)	2017 Vol (AF)	2018 Vol (AF)	2019 Vol (AF)	2020 Vol (AF)
1000704	Unused (6)	37-8655	2.5		0					
1001134	Flowmeter (1)	37-2682	198	172	516	529.22	519.94	415.63	563.46	650.09
1001137	Timeclock (7)	37-22016	277	47	164.5	218.45	0.05	239.60	95.82	366.62
1001137	Timeclock (7)	37-2554	277	160	560	218.45	0.05	239.60	95.82	366.62
1001137	Timeclock (7)	37-4114	277	70	245	218.45	0.05	239.60	95.82	366.62
1000896	Flowmeter (1)	37-22499	0	4.9	17	186.06	154.44	125.33	140.90	279.16
1000826	Flowmeter (1)	37-22586	400		1200	142.37	131.30	131.30	145.42	3386.19
1001089	Flowmeter (1)	37-8117	77		0	732.13	710.98	644.96	864.78	749.64
1001089	Flowmeter (1)	37-8196	152		532	732.13	710.98	644.96	864.78	749.64
1001104	Flowmeter (1)	37-22737	380	6	18	0.00	0.00	7.09	0.00	
1001104	Flowmeter (1)	37-22739	380	6.7	21	0.00	0.00	7.09	0.00	
1001104	Flowmeter (1)	37-22741	380	1	3	0.00	0.00	7.09	0.00	
1001120	Timeclock (7)	37-22738	295.3	295.3	885	65.59	43.30	174.05	180.22	431.75
1001120	Timeclock (7)	37-22740	78	78	234	65.59	43.30	174.05	180.22	431.75
1001120	Timeclock (7)	37-2656	152	151	453	65.59	43.30	174.05	180.22	431.75
1001120	Timeclock (7)	37-7645	158		474	65.59	43.30	174.05	180.22	431.75
1001121	Timeclock (7)	37-22738	295.3	295.3	885	243.20	0.00	548.32	319.40	872.94
1001121	Timeclock (7)	37-22740	78	78	234	243.20	0.00	548.32	319.40	872.94
1001121	Timeclock (7)	37-2656	152	151	453	243.20	0.00	548.32	319.40	872.94
1001121	Timeclock (7)	37-7645	158		474	243.20	0.00	548.32	319.40	872.94
1001240	Flowmeter (1)	37-2681	521.1	231	693	213.79	250.00	116.02	26.33	273.64
1001248	Flowmeter (1)	37-2576	521.1	240	840	493.27	0.00	606.14	597.53	500.00
1001701	Flowmeter (1)	37-2649A	397	212	742				0.00	438.00
1001701	Flowmeter (1)	37-2649B	397	160	560				0.00	438.00
1001701	Flowmeter (1)	37-7644	139.5		0				0.00	438.00
1001039	Flowmeter (1)	37-2557P	10		35			4.60	4.35	4.31
1001250	Flowmeter (1)	37-22250	253	34	119	86.90	85.00	2.50	0.00	0.00
1001252	Flowmeter (1)	37-22251	253	91	318.5	129.95	120.00	165.63	100.60	171.21
1001051	Flowmeter (1)	37-20494	55.9		167.7	98.51	85.00	85.00	85.00	53.81
1001270	Flowmeter (1)	37-22243	6.1	6.1	21	2.22	0.00	3.08	1.68	3.59

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1001103	Flowmeter (1)	37-2568	3437	154	539	213.52	96.80	528.86	801.97	595.77
1001116	Flowmeter (1)	37-20635	3437	806.5	2419.5	222.05	57.26	102.25	420.03	200.00
1001116	Flowmeter (1)	37-20637	3437	79.1	238.3	222.05	57.26	102.25	420.03	200.00
1001116	Flowmeter (1)	37-20639	3437	79.1	287	222.05	57.26	102.25	420.03	200.00
1001116	Flowmeter (1)	37-2502	3437	268	938	222.05	57.26	102.25	420.03	200.00
1001116	Flowmeter (1)	37-804	3437	91.2	319.2	222.05	57.26	102.25	420.03	200.00
1001117	Flowmeter (1)	37-20635	3437	806.5	2419.5	249.55	1.47	559.47	546.80	503.66
1001117	Flowmeter (1)	37-20637	3437	79.1	238.3	249.55	1.47	559.47	546.80	503.66
1001117	Flowmeter (1)	37-20639	3437	79.1	287	249.55	1.47	559.47	546.80	503.66
1001117	Flowmeter (1)	37-2502	3437	268	938	249.55	1.47	559.47	546.80	503.66
1001117	Flowmeter (1)	37-804	3437	91.2	319.2	249.55	1.47	559.47	546.80	503.66
1001127	Flowmeter (1)	37-804	3437	91.2	319.2	0.00	0.00	0.00	0.00	136.44
1001162	Flowmeter (1)	37-2502	3437	268	938	461.45	0.34	243.00	195.63	69.81
1001008	Flowmeter (1)	37-7178B	2		6	3.44	6.12	4.83	4.37	6.18
1001154	PCC (2)	37-8536	108		0	249.91	121.14	180.60	163.92	218.68
1001155	Unused (6)	37-8536	108		0					
1001276	Flowmeter (1)	37-21667	5		17.5	6.74	6.02	3.41	0.38	8.78
1000813	Flowmeter (1)	37-21509	8.2		28.7	88.47	0.00	153.08	0.00	307.98
1001831	Flowmeter (1)	37-22244	6.8	6.1	21					
1000893	Flowmeter (1)	37-21255	35.3	11.2	40.6	3.78	3.54	3.21	3.12	3.41
1000894	Flowmeter (1)	37-21255	35.3	11.2	40.6					
1001153	Unused (6)	37-8137	13		47.1					

Note: List is limited to ground water rights with supplemental conditions only.
Some wells may include additional ground water rights without supplemental conditions.