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RECEIVED

Feb 15, 2024

DEPARTMENT OF  
WATER RESOURCES

**STATE OF IDAHO**

**DEPARTMENT OF WATER RESOURCES**

IN THE MATTER OF DISTRIBUTION OF  
WATER TO VARIOUS WATER RIGHTS  
HELD BY OR FOR THE BENEFIT OF  
A&B IRRIGATION DISTRICT,  
AMERICAN FALLS RESERVOIR  
DISTRICT #2, BURLEY IRRIGATION  
DISTRICT, MILNER IRRIGATION  
DISTRICT, MINIDOKA IRRIGATION  
DISTRICT, NORTH SIDE CANAL  
COMPANY, AND TWIN FALLS CANAL  
COMPANY

IN THE MATTER OF IGWA'S  
SETTLEMENT AGREEMENT  
MITIGATION PLAN

Docket No. CM-MP-2016-001

**IGWA'S EXPERT REPORT  
DISCLOSURE**

Idaho Ground Water Appropriators, Inc. ("IGWA"), by and through its counsel of record, submits the following expert reports, in accordance with the Hearing Officer's *Order Authorizing Discovery, Scheduling Order, Order Suspending IDAPA 37.01.01.354, and Notice of Prehearing Conference and Hearing* issued December 29, 2023.

**EXPERT REPORTS**

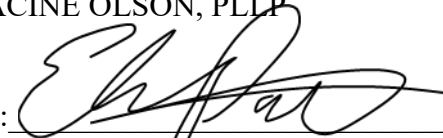
1. **Lynker Technologies Expert Report**, is attached hereto as Exhibit A;
2. **Water Well Consultants Expert Report**, is attached hereto as Exhibit B.

To the extent that other information becomes available, the Director or Department modifies any information presented, or new analysis and information becomes available, said experts reserve the right to modify or expand upon the opinions related to this matter.

RESPECTFULLY SUBMITTED this 15th day of February, 2024.

RACINE OLSON, PLLP

By:

A handwritten signature in black ink, appearing to read 'Elisheva M. Patterson', written over a horizontal line.

Elisheva M. Patterson  
*Attorneys for IGWA*

## CERTIFICATE OF SERVICE

I hereby certify that on this 15th day of February, 2024, I served the foregoing document on the persons below via email at the address shown:

  
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# EXHIBIT A

# EXPERT REPORT

## Hydrology and Groundwater Modeling Evaluation of IGWA's Settlement Agreement Performance, in the Matter of IGWA's 2016 Settlement Agreement Mitigation Plan

Prepared For Racine Olson, PLLP

On behalf of  
Idaho Ground Water Appropriators, Inc.  
February 15, 2024

**Submitted To:**

Idaho Ground Water Appropriators, Inc. (IGWA)  
Attention: T.J. Budge, General Counsel

**Submitted By:**

Lynker  
Sophia C. Sigstedt, Senior Hydrologist, PH-GW  
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## 1 Introduction

This report has been prepared on behalf of Idaho Groundwater Appropriators, Inc. (“IGWA”) in connection with the Surface Water Coalition’s (“SWC”) allegation that certain ground water districts (GWDs) breached a settlement agreement in 2022. The settlement agreement consists of the *Settlement Agreement Dated June 30, 2015, Between Participating Members of the Surface Water Coalition and Participating Members of Idaho Ground Water Appropriators, Inc.* (“2015 Agreement”), as amended by the *Addendum to Settlement Agreement* dated October 19, 2015, the *Second Addendum to Settlement Agreement* dated December 14, 2016, and the *Agreement* dated October 7, 2015, between A&B Irrigation District the Ground Water Districts. These documents are referred to collectively herein as the “Settlement Agreement.”

The Settlement Agreement was submitted to the Idaho Department of Water Resources (“IDWR” or “Department”) as a stipulated mitigation under the Conjunctive Management Rules, and subsequently approved by IDWR pursuant to the *Surface Water Coalition’s and IGWA’s Stipulated Mitigation Plan and Request for Order* filed March 9, 2016, the *Final Order Approving Stipulated Mitigation Plan* issued May 2, 2016, *Surface Water Coalition’s and IGWA’s Stipulated Amended Mitigation Plan and Request for Order* filed February 7, 2017, and the *Final Order Approving Amendment to Stipulated Mitigation Plan* issued May 9, 2017, in IDWR Docket No. CM-MP-2016-001. The Settlement Agreement, together with the orders approving it as a mitigation plan, are referred to herein as the “2016 Mitigation Plan.”

The 2016 Mitigation Plan protects ground water district patrons from curtailment (referred to in the Settlement Agreement as “safe harbor”) under the SWC delivery call. However, safe harbor is provided only if IGWA and the ground water districts abide by the terms of the Settlement Agreement. The paramount obligations are that (1) “Total ground water diversion shall be reduced by 240,000 ac-ft annually,” and (2) “IGWA will supply 50,000 ac-ft of storage water” to the SWC yearly.

IGWA historically understood the 240,000 ac-ft reduction as being an aquifer-wide objective, of which IGWA’s member ground water districts bore the largest share. IGWA’s members represent approximately 80% of all groundwater diversions from the ESPA and tributary basins. Section 3.a.ii of the 2015 Agreement states, in relevant part: “Each Ground Water and Irrigation District with members pumping from the ESPA shall be responsible for reducing their proportionate share of the total annual ground water reduction or in conducting an equivalent private recharge activity.”

From 2016 through 2022, IGWA accounted for groundwater diversions by A&B Irrigation District (“A&B”) and Southwest Irrigation District (“SWID”) in calculating the proportionate diversion reduction obligations of the signatory districts. By this calculation, the obligations of the signatory districts totaled approximately 205,000 acre-feet (the proportionate shares of A&B & SWID totaled approximately 35,000 acre-feet).

To measure compliance with each district’s proportionate share, IGWA compared post-Settlement Agreement diversions against pre-Settlement Agreement diversions. Average groundwater pumping from 2010-2014 served as the “baseline” against which post-Settlement Agreement diversions were compared. The districts utilized averaging, which allowed their members to carry forward excess conservation to offset subsequent deficiencies, and vice versa.

In the spring of 2022, SWC notified IGWA, and later the director of IDWR (“Director”), that certain ground water districts had breached the 2016 Mitigation Plan in 2021. The alleged breach was resolved by a compromise settlement agreement between the parties dated September 7, 2022.

The SWC breach allegation was based on their assertion that diversions by A&B and SWID cannot be considered in calculating the proportionate diversion reduction obligations of the signature districts, and that averaging of groundwater diversions is not allowed to measure compliance with each district’s groundwater conservation obligation. IGWA disputed the SWC’s assertion. Litigation followed, with the Director ruling that diversions by A&B and SWID cannot be considered in calculating the proportionate diversion reduction obligations of the signatory ground water districts, and that averaging is not allowed for the purpose of measuring compliance. The Director’s ruling is currently on appeal.

From 2016-2022, IGWA’s members<sup>1</sup> conserved a total of 2,195,103 acre-feet, or 313,586 acre-feet annually on average, when compared to average pre-Settlement Agreement diversions from 2010-2014. During that period, IGWA’s members had designed their conservation programs to conserve 205,000 acre-feet. Thus, IGWA’s members conserved, on average, 108,586 acre-feet more than they understood was required.

The Director’s ruling that averaging is not allowed disrupts the method IGWA used historically to measure compliance with the Settlement Agreement. It affords no credit for excess conservation, and it affords no opportunity to remedy deficiencies. This has caused IGWA to explore alternative methods of measuring compliance, as the Settlement Agreement does not prescribe any particular method.

In 2010, IDWR approved IGWA’s *Mitigation Plan for Conversions, Dry-Ups, and Recharge* (the “Aquifer Enhancement Plan”) in IDWR Docket No. CM-MP-2009-006. The Aquifer Enhancement Plan authorizes mitigation credit for activities that reduce groundwater withdrawals or add recharge to the ESPA, including conversions of farmland from groundwater to surface water irrigation, fallowing, and managed aquifer recharge. The Eastern Snake Plain Aquifer Model (“ESPAM”) can be used to calculate the effects of such activities on Snake River reach gains that accrue to the SWC.

This report presents the Snake River reach gains that accrued to the SWC from years of excess conservation by IGWA members from 2016-2022, as well as reach deficits that accrued to the SWC in years of deficient conservation during that period, as calculated by ESPAM version 2.2, which is the current version in use by IDWR and represents the “best available science.”

I have relied upon IGWA’s Performance Summary Reports and spreadsheets, and amendments thereto, provided annually to the SWC and IDWR; additional data provided by Jaxon Higgs; my participation since 2012 as a member of the Eastern Snake Hydrologic Modeling Committee (ESHMC) which gives technical support to the Department on the development of the Eastern Snake Plain Aquifer Model (ESPAM); and my professional expertise as a hydrologist and groundwater modeler. To the extent that other information becomes available, the Director or the Department modifies any information presented, or new analysis and information becomes available, I reserve the right to modify or expand upon my opinions related to this case.

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<sup>1</sup> American Falls-Aberdeen GWD, Bingham GWD, Bonneville-Jefferson GWD, Carey GWD, Jefferson-Clark GWD, Madison (Fremont-Madison) & Henry’s Fork GWD, Magic Valley GWD, and North Snake GWD.

## 2 IGWA diversion reduction and recharge activities

Section 3.a.ii of the 2015 Agreement authorizes ground water districts to meet their proportionate share of the 240,000 acre-feet by “ground water reduction or in conducting an equivalent private recharge activity.” Diversion reductions and aquifer recharge are referred to herein collectively as “groundwater conservation.”

Table 1 shows the amount of groundwater conservation in 2022, as reported in IGWA’s Performance Summary Report, whereby the signatory districts were collectively responsible to conserve ~205,000 acre-feet annually, as well as the annual conservation based on the increased diversion reduction obligations assigned by the Director in the Final Order Regarding IGWA’s 2022 Mitigation Plan Compliance issued August 2, 2023 in IDWR Docket No. CM-MP-2016-001, whereby the signatory districts are collectively responsible to conserve 240,000 acre-feet annually. The “IGWA 2022 Mitigation Balance” column and the “IDWR 2022 Mitigation Balance” column reflect the difference between the conservation target actually used by the ground water districts from 2016-2022 (~205,000 acre-feet) versus the increased conservation target (240,000 acre-feet) imposed by the Director in 2023.

2022 Usage Analysis											
all values in acre-ft											
	IGWA Proportioning	[IGWA] Target	IDWR Proportioning	IDWR Target	Baseline	2022 Usage	Diversion Reduction	Accomplished Recharge/Direct Delivery	Total Conservation	[IGWA] 2022 Mitigation Balance	IDWR 2022 Mitigation Balance
American Falls-Aberdeen	14.0%	33,715	16.4%	39,395	283,815	269,322	14,494	23,550	38,043	4,328	-1,352
Bingham	14.6%	35,015	17.0%	40,914	277,011	269,088	7,923	516	8,438	-26,577	-32,476
Bonneville-Jefferson	7.6%	18,264	8.9%	21,341	158,133	151,245	6,888	9,249	16,137	-2,127	-5,204
Carey	0.3%	703	0.3%	821	5,671	1,889	3,782	5	3,787	3,084	2,966
Jefferson-Clark	22.7%	54,373	26.5%	63,533	445,393	408,112	37,281	7,647	44,928	-9,444	-18,605
Henry's Fork <sup>1</sup>	2.2%	5,391	2.6%	6,299	69,979	62,381	7,598	3,000	11,774	6,383	5,475
Madison <sup>2</sup>	0.0%				78,095	76,919	1,176				0
Magic Valley	13.5%	32,462	15.8%	37,931	256,188	218,759	37,429	3,378	40,807	8,345	2,876
North Snake <sup>3</sup>	10.6%	25,474	12.4%	29,765	208,795	174,838	33,957	3,395	37,352	11,878	7,586
A&B <sup>4</sup>	9.0%	21,660	-	-	-	-	-	-	21,660	0	-
Southwest ID <sup>4</sup>	5.4%	12,943	-	-	-	-	-	-	12,943	0	-
<b>Total:</b>	<b>100%</b>	<b>240,000</b>	<b>100%</b>	<b>240,000</b>	<b>1,783,080</b>	<b>1,632,553</b>	<b>150,527</b>	<b>50,739</b>	<b>235,869</b>	<b>-4,131</b>	<b>-38,734</b>

Notes:

(1) Includes mitigation for Freemont- Madison Irrigation District, Madison Ground Water District and WD100. Mitigating by alternative means.

(2) Madison baseline is preliminary estimate, see note on district breakdown.

(3) North Snake GWD baseline includes annual average of 21,305 acre-feet of conversions.

(4) A&B ID and Southwest ID Total Conservation is unknown and assumed to meet target.

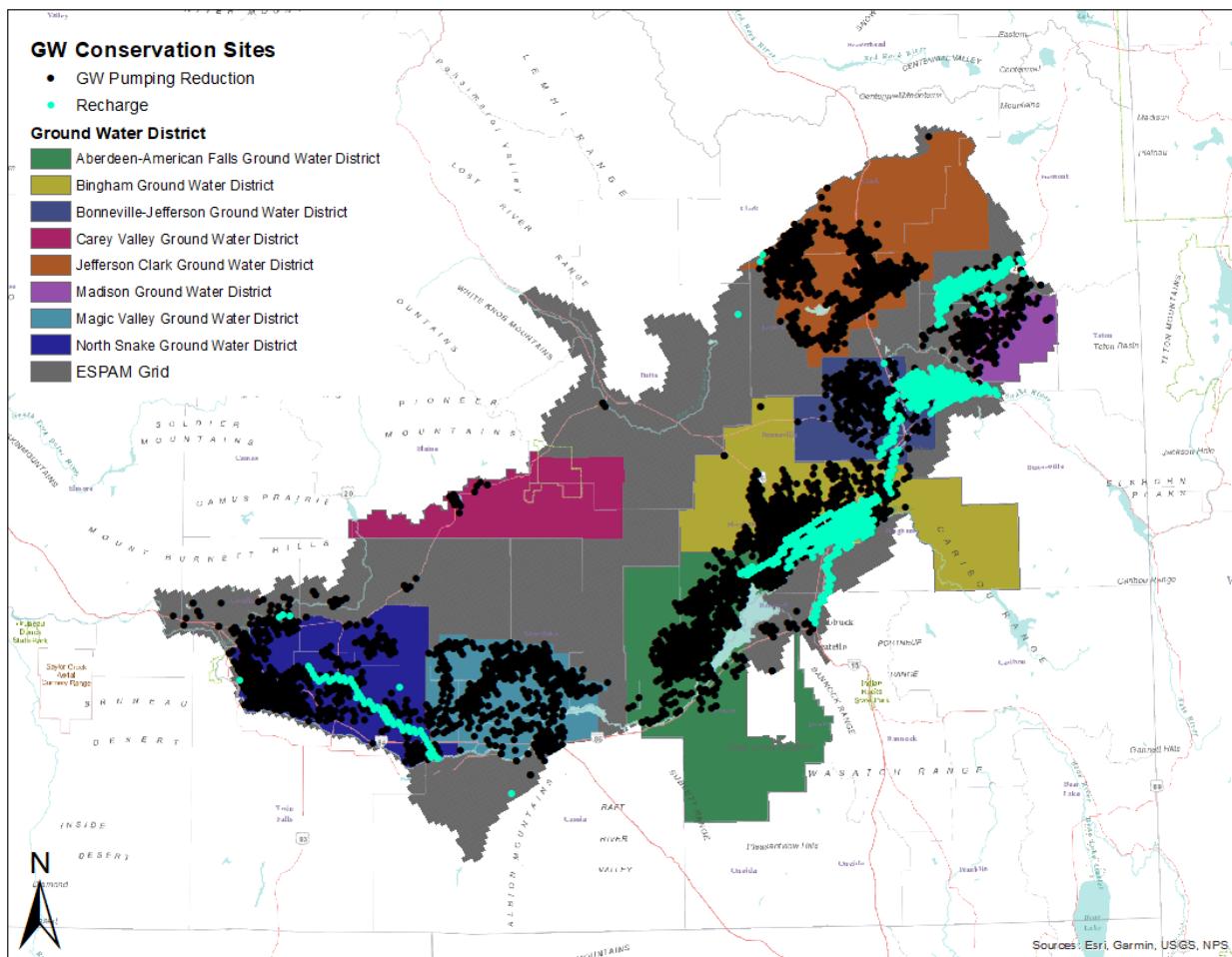
Table 1: IGWA Conservation Summary Based on 2022 Settlement Performance Report and 2023 IDWR Ruling

### 2.1 Modeling Inputs

To calculate the effect on the SWC of groundwater conservation surpluses and deficits from 2016-2022, I used ESPAM to model the effects on the Near Blackfoot to Minidoka reach of the Snake River. Table 2 shows the model inputs for groundwater diversion reductions and managed aquifer recharge from 2016-2022. For the purpose of this report, groundwater conservation data was parsed by ground water district and modeling was performed by individual ground water districts. Groundwater conservation was modeled based on reductions by WMIS location (for groundwater diversion reductions) and aquifer recharge site reported (for managed aquifer recharge). The compilation of diversion reductions and recharge sites as modeled are shown in Figure 1.

IGWA's 2016-2022 Summary Performance Reports submitted annually to the SWC and IDWR contains the diversion and recharge data for each district used in the modeling. Reach gains from diversion reductions and aquifer recharge were calculated based on the ESPAM model response to conservation at the WMIS location or recharge site. For example, recharge conducted at Milepost 31 was assigned to that model cell to calculate the effect on Near Blackfoot to Milner reach gains. All changes in WMIS diversions and reported recharge volumes as reported in the IGWA Summary Settlement Performance Reports for each ground water district were included in the modeling analysis. Annual diversion reductions were applied April through October. For this report, ESPAM 2.2 was used to model the effect on reach gains to the Near Blackfoot to Minidoka reach of the Snake River resulting from groundwater conservation excesses and deficiencies on a district-by-district basis.

Figure 1 IGWA GW Conservation Model Inputs



<b>IGWA Conservation Model Input</b>								
<b>all values in acre-feet</b>								
<b>2015/2016</b>								
	AFA GWD	Bingham	BJ GWD	MV GWD	JC GWD	Madison-HF	NS GWD	Carey
Diversion Reductions	21,836	15,146	2,540	24,112	22,574	26,763	31,228	4,899
ASCC	16,123	13,383	2,325		5,263			
Peoples Canal		3,000						
New Sweden Canal		1,801	2,307		4,078			
Snake River Valley Canal		2,701	2,148		4,187			
FMID West		2,000			7,000			
FMID Egin Lakes		1,801	353		800	3,000		
Jensen Grove		10,000						
GFCC			3,478		6,522			
AFRD/MP 31				5,100				
Birch Creek					343			
New Lavaside Canal		718						
Danskin Canal		184						
Riverside Canal		85						
Watson Canal		182						
Wearyrick Canal		186						
Dewey					4,000			
<b>Total Conservation</b>	<b>37,959</b>	<b>51,185</b>	<b>13,151</b>	<b>29,212</b>	<b>54,767</b>	<b>29,763</b>	<b>31,228</b>	<b>4,899</b>
<b>2017</b>								
	AFA GWD	Bingham	BJ GWD	MV GWD	JC GWD	Madison-HF	NS GWD	Carey
Diversion Reductions	45,224	50,766	21,531	28,872	67,878	30,661	37,836	4,535
ASCC	28,120	20,690	4,891		3,276			
Peoples Canal	811	2,811			862			
New Sweden Canal		17	5,020		5,101			
Snake River Valley Canal	1,847		20,458					
FMID West					27,762	3,000		
Jensen Grove	3,460	1,406			431			
GFCC					10,305			
NSSC					1,597			
AFRD/MP 31				8,000				
Birch Creek					2,322			
Blackfoot Canal	1,405	1,906			431			
Corbett Slough	382							
Burgess			6,464					
Osgood			497					
BMLCC			890					
Sandy Ponds							7,090	
Rudy		1,396						
Harrison		4,447	5,000		6,637			
New Lavaside		1,000						
Progressive			3,596					
North Rigby					154			
Farmers Canal	1,954							
Atchley Pump	454							
Dewey	742							
Fort Hall	1,431							
City of Gooding Site	10,021							
<b>Total Conservation</b>	<b>95,851</b>	<b>84,438</b>	<b>68,346</b>	<b>36,872</b>	<b>126,756</b>	<b>33,661</b>	<b>44,926</b>	<b>4,535</b>

<b>2018</b>								
	AFA GWD	Bingham	BJ GWD	MV GWD	JC GWD	Madison-HF	NS GWD	Carey
Diversion Reductions	10,512	27,661	20,865	39,195	69,555	49,870	38,614	4,284
ASCC	27,847	7,402						
Peoples Canal	3,148	7,717						
Snake River Valley Canal	6,473	1,250	6,500					
FMID West					15,004			
FMID Egin Lakes						7,151		
Jensen Grove	1,574							
AFRD/MP 31				6,100				
Blackfoot Canal	1,574	2,177						
Corbett Slough		241						
Burgess			5,000					
Sandy Ponds							3,822	
Monteview					1,218			
Harrison	7,242							
Dewey	838				879			
Marysville Canal	2,479							
Wilford Canal	1,719							
Cade Carter Pond	823							
City of Gooding Site	2,549							
New Lavaside		1,242						
Watson		113						
Wearyrick		173						
Riverside		185						
<b>Total Conservation</b>	<b>66,778</b>	<b>48,161</b>	<b>32,365</b>	<b>45,295</b>	<b>86,656</b>	<b>57,021</b>	<b>42,436</b>	<b>4,284</b>

<b>2019</b>								
	AFA GWD	Bingham	BJ GWD	MV GWD	JC GWD	Madison-HF	NS GWD	Carey
Diversion Reductions	35,243	44,244	19,030	61,001	52,922	57,537	51,530	4,787
ASCC	28,728	13,243						
Peoples Canal		4,414						
New Sweden Canal			10					
Snake River Valley Canal	1,200	2,207	13,093					
FMID West					4,544	3,000		
AFRD/MP 31				6,500				
Blackfoot Canal		2,207						
Sandy Ponds							4,890	
Monteview					1,451			
Harrison			1,000					
Dewey	2,044				838			
Marysville Canal	2,501							
Clen Atchley Pump	120							
Silkey Ditch	163							
Wilford Canal	2,110							
Cade Carter Pond	2,694							
Teton Bass Pond	724							
Mattson - Craig Canal	2,177							
Fort Hall	585							
<b>Total Conservation</b>	<b>78,289</b>	<b>66,316</b>	<b>33,133</b>	<b>67,501</b>	<b>59,755</b>	<b>60,537</b>	<b>56,420</b>	<b>4,787</b>

2020	AFA GWD	Bingham	BJ GWD	MV GWD	JC GWD	Madison-HF	NS GWD	Carey
Diversions Reductions	13,130	12,830	5,551	28,092	41,244	64,892	30,880	2,308
ASCC	18,840	13,115						
Peoples Canal	6,734	4,687						
New Sweden Canal								
Snake River Valley Canal	3,587	2,497	5,482					
FMID Egin Lakes					25,000	3,000		
AFRD/MP 31				6,634				
Blackfoot Canal	1,550	1,079						
Corbett Slough	480	334						
Sandy Ponds							4,839	
Monteview					1,213			
Hilton Spill	4,177	2,908						
Riverside	129	90						
Danskin	863	601						
Trego	200	140						
Wearyrick	176	122						
Watson	67	46						
Mecham	98	69						
Parsons	304	212						
<b>Total Conservation</b>	<b>50,336</b>	<b>38,729</b>	<b>11,033</b>	<b>34,726</b>	<b>67,457</b>	<b>67,892</b>	<b>35,719</b>	<b>2,308</b>

2022	AFA GWD	Bingham	BJ GWD	MV GWD	JC GWD	Madison-HF	NS GWD	Carey
Diversions Reductions	14,494	7,923	6,888	37,429	37,821	9,900	33,957	3,782
FMID Egin Lakes					4,545	2,200		
Jensen Grove					2,300			
NSSC							1,481	
Sandy Ponds							1,721	
City of Gooding Site	6,802							
Teton Bass Pond	66							
Cade Carter Pond	53							
Parkinson Pond and Cornelsen Pond						800		
Direct Delivery	16,629	516	9,249	3,378	802		192	5
<b>Total Conservation</b>	<b>38,044</b>	<b>8,439</b>	<b>16,137</b>	<b>40,807</b>	<b>45,468</b>	<b>12,900</b>	<b>37,351</b>	<b>3,787</b>

Table 2: IGWA Conservation Model Inputs

## 2.2 Modeling Approach

The purpose of the modeling analysis for this report was to determine benefits to SWC based on reach gains to the near Blackfoot to Minidoka reach of the Snake River that resulted from excess conservation by the IGWA ground water districts from 2016-2022. Excess conservation was determined based on diversion reductions or recharge above the Settlement Agreement conservation target. As detailed in Table 1, the amount of groundwater conservation that districts were required to conserve (“Target Conservation”) each year differs depending on whether it is calculated using the conservation target actually implemented from 2016-2022 (~205,000 acre-feet)(“IGWA’s Conservation Target”) or the increased conservation target imposed by the IDWR in August of 2023 (“IDWR Conservation Target”). The modeling analysis for this report considers excess conservation relative to both sets of groundwater conservation targets.

To determine the “Actual Conservation” Reach Gain volume, a model run was performed for each ground water district which included all conservation activities as actually implemented by IGWA members 2016-2022. Diversion volumes used in this model run are the diversion and recharge volumes contained in the Performance Summary spreadsheets (Table 2). Where spacial and temporal information for a given diversion reduction or recharge activity is available, that information is applied and honored in the model. Some WMIS locations are outside the ESPAM boundary and those volumes are applied to the nearest model cell. Some recharge locations and dates are estimated based on best available data. The total volume of conservation and recharge is consistent with that reported in the Performance Summary spreadsheets.

For comparison, ESPAM was run to simulate the minimum conservation activity required by the 2016 Mitigation Plan under both conservation targets (~205,000 ac-ft and 240,000 ac-ft) from 2016-2022. For each conservation target allocated to each ground water district, a model run was made where the model inputs for the actual conservation activities were modified using a multiplier that resulted in a total district-wide volume equivalent to the conservation target. For example, the North Snake GWD’s actual conservation volumes in 2022 in Table 1 show it performed 33,957 ac-ft of diversion reductions, 1,481 ac-ft of recharge at NSCC, 1,721 ac-ft of recharge at Sandy Ponds, for a groundwater conservation volume of 37,159 ac-ft. The IGWA conservation target only required North Snake GWD to conserve 25,474 ac-ft. To preserve the spacial and temporal components in the model, North Snake GWD’s diversion reduction, recharge at NSCC and Sandy Ponds volumes were modified using a multiplier. Such that under the 205,000 ac-ft model run, North Snake GWD’s inputs into the model were: 23,280 ac-ft of diversion reductions, 1,015 ac-ft of recharge at NSCC, and 1,179 ac-ft of recharge at Sandy Ponds. This process was done to create model inputs for the 205,000 ac-ft minimum conservation target run for all districts. The same method was used for the 240,000 ac-ft minimum conservation target run for all districts, but instead uses IDWR Target Conservation volumes to determine the multiplier and corresponding model input volumes. In 2022, several ground water districts delivered storage water directly to the SWC instead of using it to recharge the ESPA. These volumes were not modeled but were added directly to the reach gain benefits from the model analysis in 2022.

The excess benefits under each set of conservation targets were determined by the difference in near Blackfoot to Minidoka reach gains between the actual IGWA conservation and the target conservation resulting from both the 205,000 and the 240,000 acre-feet allocations.

The model was run for 2016 through 2022; however, no conservation activities were modeled for 2021 because the parties entered into a compromise settlement agreement to resolve their dispute over compliance with the Settlement Agreement that year. Thus, no excess credits or deficits from 2021 were included in the analysis, nor was storage water that IGWA delivered to the SWC under that settlement agreement included in the analysis. ESPAM2.2 was run in superposition mode using a monthly transient version for all model runs.



### 3 Results

#### 3.1 Excess Reach Gain benefits determined based on Actual Conservation Compared to 205K Af Reduction Target, and 240K Af Reduction Target

Table 3 shows the reach gain surplus/deficit to the near Blackfoot to Minidoka reach in 2022 from (1) the volume of groundwater conservation implemented by each ground water district in 2022, and (2) excess groundwater conservation implemented by each district from 2016-2020. Table 3 shows these figures for each ground water district individually as well as a summary of the signatory districts as a whole. Table 3 shows the reach gain surplus/deficit based on both the target conservation figures actually utilized by the ground water districts from 2016-2022 (~205,000 acre-feet), and the increased target conservation figures imposed by the Director in 2022.

For example, IDWR calculated a conservation deficit of 5,204 acre-feet for Bonneville-Jefferson Ground Water District in 2022, using the Director’s increased target conservation figures. However, excess conservation by Bonneville-Jefferson Ground Water District in prior years and direct delivery of 9,249 acre-feet created reach gains in 2022 that more than offset the impact of the conservation deficit that year, resulting in net gain to the reach of 10,362 acre-feet.

As a result of excess groundwater conservation prior to 2022 and direct deliveries in 2022, the mitigation activities of all but one ground water district (Bingham Ground Water District) generated a net positive gain to the Near Blackfoot to Milner Reach in 2022. The net reach gain deficit of Bingham Ground Water District was a modest 2,668 acre-feet based on the conservation target actually implemented in 2022, or 5,001 based on the increased conservation target imposed by IDWR in 2023.

Collectively, the mitigation of the ground water districts produced a net reach gain surplus in 2022 of 37,351 acre-feet or 32,533 acre-feet depending on which conservation target is used, as shown in Table 3.

2016-2022 IGWA Conservation Model Analysis							
all values are in acre-feet (Af)							
<b>Bingham</b>							
	<b>2016 <sup>1</sup></b>	<b>2017</b>	<b>2018</b>	<b>2019</b>	<b>2020</b>	<b>2021</b>	<b>2022 <sup>6</sup></b>
Actual Conservation Volume	51,185	84,437	48,161	66,316	38,728	-	8,439
205,000 AF Conservation Target Surplus/Deficit	16,170	49,422	13,146	31,301	3,713	-	-26,576
205,000 Af Near Blackfoot to Minidoka Reach Gain Surplus/Deficit	2,283	12,131	11,306	13,466	9,677	5,239	-2,668
	<b>2016 <sup>1</sup></b>	<b>2017</b>	<b>2018</b>	<b>2019</b>	<b>2020</b>	<b>2021</b>	<b>2022 <sup>6</sup></b>
Actual Conservation Volume	51,185	84,437	48,161	66,316	38,728	-	8,439
240,000 AF Conservation Target Surplus/Deficit	10,271	43,523	7,247	25,402	-2,186	-	-32,475
240,000 Af Near Blackfoot to Minidoka Reach Gain Surplus/Deficit	1,211	10,036	8,752	10,471	6,400	3,365	-5,001

**American Falls-Aberdeen**

	2016	2017	2018	2019	2020	2021	2022 <sup>6</sup>
Actual Conservation Volume	37,959	95,851	66,779	78,288	50,335	-	38,043
205,000 AF Conservation Target Surplus/Deficit	4,244	62,136	33,064	44,573	16,620	-	4,328
205,000 Af Near Blackfoot to Minidoka Reach Gain Surplus/Deficit	1,079	11,288	14,665	16,338	15,438	8,214	20,105
	2016	2017	2018	2019	2020	2021	2022 <sup>6</sup>
Actual Conservation Volume	37,959	95,851	66,779	78,288	50,335	-	38,043
240,000 AF Conservation Target Surplus/Deficit	-1,436	56,456	27,384	38,893	10,940	-	-1,352
240,000 Af Near Blackfoot to Minidoka Reach Gain Surplus/Deficit	-365	9,253	12,485	14,005	12,385	6,594	20,105

**Bonneville-Jefferson**

	2016 <sup>2</sup>	2017	2018	2019	2020	2021	2022 <sup>6</sup>
Actual Conservation Volume	13,152	68,346	32,365	33,133	11,033	-	16,137
205,000 AF Conservation Target Surplus/Deficit	-5,112	50,082	14,101	14,869	-7,231	-	-2,127
205,000 Af Near Blackfoot to Minidoka Reach Gain Surplus/Deficit	582	1,766	4,680	5,409	5,236	3,371	11,067
	2016 <sup>2</sup>	2017	2018	2019	2020	2021	2022 <sup>6</sup>
Actual Conservation Volume	13,152	68,346	32,365	33,133	11,033	-	16,137
240,000 AF Conservation Target Surplus/Deficit	-8,189	47,005	11,024	11,792	-10,308	-	-5,204
240,000 Af Near Blackfoot to Minidoka Reach Gain Surplus/Deficit	528	1,449	4,157	4,687	4,365	2,474	10,362

**Carey**

	2016	2017	2018	2019	2020	2021	2022
Actual Conservation Volume	4,899	4,535	4,284	4,787	2,308	-	3,782
205,000 AF Conservation Target Surplus/Deficit	4,196	3,832	3,581	4,084	1,605	-	3,079
205,000 Af Near Blackfoot to Minidoka Reach Gain Surplus/Deficit	0	0	0	2	6	13	21
	2016	2017	2018	2019	2020	2021	2022
Actual Conservation Volume	4,899	4,535	4,284	4,787	2,308	-	3,782
240,000 AF Conservation Target Surplus/Deficit	4,078	3,714	3,463	3,966	1,487	-	2,961
240,000 Af Near Blackfoot to Minidoka Reach Gain Surplus/Deficit	0	0	0	2	6	13	21

**Jefferson-Clark**

	2016 <sup>3</sup>	2017	2018	2019	2020	2021	2022 <sup>6</sup>
Actual Conservation Volume	57,624	126,756	86,656	59,755	67,457	-	44,928
205,000 AF Conservation Target Surplus/Deficit	3,251	72,383	32,283	5,382	13,084	-	-9,445
205,000 Af Near Blackfoot to Minidoka Reach Gain Surplus/Deficit	1,253	1,215	1,858	2,178	2,225	2,166	2,600
	2016 <sup>3</sup>	2017	2018	2019	2020	2021	2022 <sup>6</sup>
Actual Conservation Volume	57,624	126,756	86,656	59,755	67,457	42,737	44,928
240,000 AF Conservation Target Surplus/Deficit	-5,909	63,223	23,123	-3,778	3,924	-20,796	-18,605
240,000 Af Near Blackfoot to Minidoka Reach Gain Surplus/Deficit	1,229	943	1,426	1,778	1,593	1,457	1,875

**Henry's Fork-Madison**

	2016	2017	2018	2019	2020	2021	2022
Actual Conservation Volume	29,763	33,661	57,021	60,537	67,892	-	12,900
205,000 AF Conservation Target Surplus/Deficit	24,372	28,270	51,630	55,146	62,501	-	7,509
205,000 Af Near Blackfoot to Minidoka Reach Gain Surplus/Deficit	0	11	74	186	335	503	610
	2016	2017	2018	2019	2020	2021	2022
Actual Conservation Volume	29,763	33,661	57,021	60,537	67,892	-	12,900
240,000 AF Conservation Target Surplus/Deficit	23,464	27,362	50,722	54,238	61,593	-	6,601
240,000 Af Near Blackfoot to Minidoka Reach Gain Surplus/Deficit	0	11	71	179	324	489	594

<b>Magic Valley</b>							
	<b>2016</b>	<b>2017</b>	<b>2018</b>	<b>2019</b>	<b>2020</b>	<b>2021</b>	<b>2022 <sup>6</sup></b>
Actual Conservation Volume	29,212	36,872	45,295	67,501	34,726	-	40,807
205,000 AF Conservation Target Surplus/Deficit	-3,250	4,410	12,833	35,039	2,264	-	8,345
205,000 Af Near Blackfoot to Minidoka Reach Gain Surplus/Deficit	-3	-34	-11	156	613	1,009	4,473
	<b>2016</b>	<b>2017</b>	<b>2018</b>	<b>2019</b>	<b>2020</b>	<b>2021</b>	<b>2022 <sup>6</sup></b>
Actual Conservation Volume	29,212	36,872	45,295	67,501	34,726	-	40,807
240,000 AF Conservation Target Surplus/Deficit	-8,719	-1,059	7,364	29,570	-3,205	-	2,876
240,000 Af Near Blackfoot to Minidoka Reach Gain Surplus/Deficit	-9	-103	-183	-134	194	465	3,904
<b>North Snake</b>							
	<b>2016 <sup>4</sup></b>	<b>2017</b>	<b>2018 <sup>5</sup></b>	<b>2019</b>	<b>2020</b>	<b>2021</b>	<b>2022</b>
Actual Conservation Volume	31,228	44,926	44,029	56,420	35,720	-	37,351
205,000 AF Conservation Target Surplus/Deficit	5,754	19,452	18,555	30,946	10,246	-	11,877
205,000 Af Near Blackfoot to Minidoka Reach Gain Surplus/Deficit	0	8	53	163	332	540	848
	<b>2016 <sup>4</sup></b>	<b>2017</b>	<b>2018 <sup>5</sup></b>	<b>2019</b>	<b>2020</b>	<b>2021</b>	<b>2022</b>
Actual Conservation Volume	31,228	44,926	44,029	56,420	35,720	-	37,351
240,000 AF Conservation Target Surplus/Deficit	1,462	15,160	14,263	26,654	5,954	-	7,585
240,000 Af Near Blackfoot to Minidoka Reach Gain Surplus/Deficit	0	2	25	99	225	389	673
<b>Total IGWA</b>							
	<b>2016</b>	<b>2017</b>	<b>2018</b>	<b>2019</b>	<b>2020</b>	<b>2021</b>	<b>2022</b>
Actual Conservation Volume	255,022	495,384	384,590	426,737	308,199	-	202,387
205,000 AF Conservation Target Surplus/Deficit	49,625	289,987	179,193	221,340	102,802	-	-3,010
205,000 Af Near Blackfoot to Minidoka Reach Gain Surplus/Deficit	5,193	26,385	32,626	37,897	33,863	21,054	37,056
	<b>2016</b>	<b>2017</b>	<b>2018</b>	<b>2019</b>	<b>2020</b>	<b>2021</b>	<b>2022</b>
Actual Conservation Volume	255,022	495,384	384,590	426,737	308,199	-	202,387
240,000 AF Conservation Target Surplus/Deficit	15,022	255,384	144,590	186,737	68,199	-	-37,613
240,000 Af Near Blackfoot to Minidoka Reach Gain Surplus/Deficit	2,595	21,591	26,734	31,088	25,492	15,245	32,533
<sup>1</sup> Bingham GWD 2016 volume includes 7,202 af of Fall 2015 recharge modeled							
<sup>2</sup> Bonneville-Jefferson volume includes 3,412 af of Fall 2015 recharge modeled							
<sup>3</sup> Jefferson Clark 2016 volume reflects sum of mitigation volume from diversion sheet (25,413 af) which is slightly higher than summary table (22,574) and 7,724 af of Fall 2015 recharge modeled							
<sup>4</sup> North Snake GWD volume does not include 2,744 af of Sandy Ponds 2016 recharge not reflected in summary table							
<sup>5</sup> North Snake GWD 2018 volume reflects sum of mitigation volume from diversion sheet (40,207 af) which is slightly higher than summary table (38,614)							
<sup>6</sup> 2022 Direct delivery volumes were not modeled but are included in the "Actual Conservation Volume" and added directly to "Near Blackfoot to Minidoka Reach Gain Surplus/Deficit"							

Table 3: 2016-2022 IGWA Conservation Model Analysis of SWC near Blackfoot to Minidoka Reach Gain Benefits. "Actual Conservation Volume" row displays actual groundwater conservation volumes performed by IGWA signatory district. The "205,000 AF Conservation Target Surplus/Deficit" row displays Actual Conservation Volumes minus IGWA's Conservation Target Volumes. The "205,000 Af Near Blackfoot to Minidoka Reach Gain Surplus/Deficit" row displays the reach gain volume difference between the Actual Conservation run and the 205,000 ac-ft Conservation Target run. The "240,000 AF Conservation Target Surplus/Deficit" row displays Actual Conservation Volumes minus IDWR's Conservation Target Volumes. The "240,000 Af Near Blackfoot to Minidoka Reach Gain Surplus/Deficit" row displays the reach gain volume difference between the Actual Conservation run and the 240,000 ac-ft Conservation Target run.

## 4 Summary of Conclusions

1. IGWA historically understood the 240,000 ac-ft reduction as being an aquifer-wide objective, of which IGWA's member ground water districts bore the largest share (~205,000 acre-feet) which was allocated among IGWA's member ground water districts.
2. To measure compliance with each district's proportionate share, IGWA historically compared average post-Settlement Agreement diversions against average pre-Settlement Agreement diversions. Average groundwater pumping from 2010-2014 served as the "baseline" against which post-Settlement Agreement diversions were compared. The districts utilized averaging, which allowed their members to carry forward excess conservation to offset subsequent deficiencies, and vice versa.
3. The Director's ruling that averaging is not allowed disrupts the method IGWA used historically to measure compliance with the Settlement Agreement.
4. In 2010, IDWR approved IGWA's *Mitigation Plan for Conversions, Dry-Ups, and Recharge* (the "Aquifer Enhancement Plan") in IDWR Docket No. CM-MP-2009-006. The Aquifer Enhancement Plan authorizes mitigation credit for activities that reduce groundwater withdrawals or add recharge to the ESPA, including conversions of farmland from groundwater to surface water irrigation, fallowing, and managed aquifer recharge. The Eastern Snake Plain Aquifer Model ("ESPAM") can be used to calculate the effects of such activities on Snake River reach gains that accrue to the SWC.
5. Excess conservation from IGWA's mitigation activities 2016-2020 above Settlement Agreement target volumes offset deficits from 2022 activities in accounting of SWC benefits to the near Blackfoot to Minidoka reach.
6. From 2016-2022, IGWA's members conserved a total of 2,195,103 acre-feet, or 313,586 acre-feet annually on average, when compared to average pre-Settlement Agreement diversions from 2010-2014. During that period, IGWA's members had designed their conservation programs to conserve 205,000. Thus, IGWA's members conserved, on average, 108,586 acre-feet more than they understood was required.
7. Only Bingham ground water district shows a 2022 deficit in accounting of SWC benefits to the near Blackfoot to Minidoka reach when excess conservation is taken into account using either the 205,000 or 240,000 acre-feet targets.
8. IGWA as a whole does not show a 2022 deficit in accounting of SWC benefits to the near Blackfoot to Minidoka reach gain when excess conservation is taken into account using either the 205,000 or 240,000 acre-feet targets.

## 5 References

*Settlement Agreement Dated June 30, 2015, Between Participating Members of the Surface Water Coalition and Participating Members of Idaho Ground Water Appropriators, Inc. ("2015 Agreement"), as amended by the Addendum to Settlement Agreement dated October 19, 2015, the Second Addendum to Settlement Agreement dated December 14, 2016, and the Agreement dated October 7, 2015, between A&B Irrigation District the Ground Water Districts.*

*Surface Water Coalition's and IGWA's Stipulated Mitigation Plan and Request for Order filed March 9, 2016, the Final Order Approving Stipulated Mitigation Plan issued May 2, 2016, Surface Water Coalition's*

*and IGWA's Stipulated Amended Mitigation Plan and Request for Order* filed February 7, 2017, or the *Final Order Approving Amendment to Stipulated Mitigation Plan* issued May 9, 2017, in IDWR Docket No. CM-MP-2016-001

*IGWA's Mitigation Plan for Conversions, Dry-Ups, and Recharge* (the "Aquifer Enhancement Plan") in IDWR Docket No. CM-MP-2009-006

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# EXHIBIT B



## EXPERT REPORT

**Prepared by:** Jaxon Higgs, Water Well Consultants, Inc.  
**Prepared for:** Idaho Ground Water Appropriators, Inc. (IGWA)  
**Submitted to:** T.J. Budge, General Counsel for IGWA  
**Date:** February 15, 2024  
**Re:** Evaluation of ground water district compliance with the IGWA-SWC Settlement Agreement in 2022 (IDWR Docket No. CM-MP-2016-001)

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### Introduction

This expert report has been prepared at the request of Idaho Ground Water Appropriators, Inc. (IGWA) in connection with the Surface Water Coalition's (SWC) allegation that certain ground water districts breached the *Settlement Agreement Dated June 30, 2015, Between Participating Members of the Surface Water Coalition and Participating Members of Idaho Ground Water Appropriators, Inc.* ("Settlement Agreement") in 2022 by failing to conserve their proportionate share of 240,000 acre-feet under section 3.a of the Settlement Agreement.

In 2016, the Idaho Department of Water Resources (IDWR) approved the Settlement Agreement as a mitigation plan under the Conjunctive Management Rules. The mitigation plan is commonly referred to as the "Settlement Agreement Mitigation Plan" or the "2016 Mitigation Plan." Since the mitigation plan is comprised of the Settlement Agreement and addenda thereto, this report does not distinguish between the Settlement Agreement and the 2016 Mitigation Plan. References in this report to the Settlement Agreement implicitly include the 2016 Mitigation Plan.

The Settlement Agreement protects ground water district patrons from curtailment under the SWC delivery call so long as the district is in compliance with its obligations under the Settlement Agreement. The primary obligation of the ground water districts is to annually conserve their proportionate share of 240,000 acre-feet of groundwater. Groundwater conservation may be accomplished by reducing the amount of groundwater diverted by district patrons, conducting managed aquifer recharge, or a combination of both.

The Settlement Agreement does not prescribe each ground water district's conservation obligation. It states only that each district must conserve a "proportionate share" of 240,000 acre-feet. The Settlement Agreement also does not prescribe how to measure each district's compliance with its proportionate conservation obligation. After the Settlement Agreement was signed in 2015, IGWA retained Water Well Consultants Inc. (WWC) to assist with determining how to calculate each ground water district's proportionate share of 240,000 acre-feet, and how to measure each district's compliance with its proportionate groundwater conservation obligation.

WWC, with the help of Idaho Department of Water Resources (IDWR) staff, collected and analyzed historic groundwater diversion data to aid the ground water districts in making these determinations. The districts agreed to use average groundwater diversions within each district from 2010-2014 for the purpose of calculating each district's proportionate share of 240,000 acre-feet. Diversions from non-IGWA groundwater users, including A&B Irrigation District (A&B) and Southwest Irrigation District (SWID), were taken into account as part of that calculation. From 2016-2022, the ground water districts used this method to define each district's proportionate share of 240,000 acre-feet.

In addition to using average diversions from 2010-2014 to calculate each district's proportionate share of 240,000 acre-feet, the districts decided to measure groundwater conservation by comparing post-Settlement Agreement diversions against pre-Settlement Agreement diversions, using the 2010-2014 average as the pre-Settlement Agreement "baseline." Each ground water district then developed a program to conserve groundwater to meet its obligation. WWC assisted several districts with this process.

Each ground water district that WWC consulted with utilized some form of averaging of post-Settlement Agreement diversions. There were several reasons for this, including: 1) the baseline was derived from average diversions over a five-year period, 2) IGWA and the SWC submitted to IDWR a proposed order authorizing compliance to be measured on a three-year average, 3) many groundwater users rotate between high water use and low water use crops, and 4) averaging enabled ground water district patrons to more effectively manage natural fluctuations in climatic conditions (wet & dry cycles). If a ground water district patron exceeded their diversion allocation in a given year, averaging allowed the patron to make up for the shortfall the following year. Likewise, if a patron conserved excess groundwater in a given year, averaging allowed the patron to utilize the excess the following year.

In 2023, former IDWR Director Spackman ruled that ground water districts (1) are not permitted to account for diversions by A&B and SWID in calculating each district's proportionate share of 240,000 acre-feet, and (2) are not permitted to average post-Settlement Agreement diversions for the purpose of measuring compliance with their respective conservation obligations.

After ruling that diversions by A&B and SWID cannot be considered in calculating each ground water district's share of 240,000 acre-feet, the Director unilaterally assigned new groundwater conservation obligations to the districts by scaling upward, on a pro rata basis, the conservation volumes the districts had agreed to in 2016. The Settlement Agreement does not prescribe the method employed by the Director, and several districts oppose the method because groundwater pumping within each district does not have an equal effect on the water supply of the SWC, and the Director changed how mitigation obligations are calculated in the SWC delivery call by switching to transient-state modeling rather than steady-state modeling. In addition, individual district baseline numbers used to calculate proportionate share had changed since 2016 due to addition or removal of water rights and corrections in usage data. Given these factors, most of the districts reject the pro rata increase of groundwater conservation obligations adopted by the Director. Since the conservation volumes used from 2016-2022 were reached by mutual agreement of the districts, most districts contend that alternative conservation volumes must be reached by mutual agreement. Currently, there is no agreement among the ground water districts nor with the SWC as to each district's proportionate share of 240,000 acre-feet in light of A&B and SWID being removed from the calculation.

In addition, the former Director's elimination of averaging compromised the method the ground water districts had previously used to measure compliance with their conservation obligations. There is congruence in comparing average post-Settlement Agreement diversions against average pre-



Settlement Agreement diversions. By contrast, there is discord in comparing single-year post-Settlement Agreement diversions against average pre-Settlement Agreement diversions.

The ground water districts adopted average diversions over a five-year period (2010-2014) as the baseline in-part because they understood that they would be allowed to average post-Settlement Agreement diversions to measure compliance. The districts believed that comparing average post-Settlement Agreement diversions against average pre-Settlement Agreement diversions was the best method for measuring compliance.

Since averaging is no longer permitted, and in response to the likelihood that groundwater diversion restrictions will be imposed under the ground water management plan currently being developed for the Eastern Snake Plain Aquifer (ESPA) Ground Water Management Area, IGWA asked WWC to evaluate alternative metrics for assessing compliance with groundwater diversion reduction obligations. This report summarizes four alternatives WWC has evaluated to date. These four methods do not comprise the totality of metrics that could be used to assess compliance; rather, they provide a sample of alternative methods that can be used. Now that averaging is no longer permitted, it is likely that ground water districts will adopt one of these alternatives, or a refined version thereof, for the purpose of measuring each district’s compliance with its groundwater conservation obligation.

Attached hereto as **Appendix A** is a Microsoft Excel workbook containing a series of spreadsheets that show each ground water district’s compliance with the Settlement Agreement in 2022, based on the alternative compliance methods discussed below. Total conservation volumes for each method is shown in the following summary table, broken down by district:

**Total 2022 Groundwater Conservation by Baseline Method**

	<b>5-Year Average</b>	<b>3-Year Average</b>	<b>Peak Diversions (2012)</b>	<b>Analog Year</b>	<b>Palmer Drought Regression Calculation</b>
American Falls-					
Aberdeen	39,395	50,387	67,689	54,913	54,067
Bingham	8,438	27,431	41,212	26,084	30,095
Bonneville-Jefferson	16,137	24,104	29,104	24,498	24,267
Carey	3,787	3,787	3,787	3,787	3,787
Jefferson-Clark	44,928	77,697	110,048	82,162	81,541
Henry's Fork	12,900	11,459	16,499	15,905	11,355
Madison					
Magic Valley	40,807	53,770	61,730	47,100	53,733
North Snake	37,352	38,044	38,068	32,178	44,625
<b>Total:</b>	<b>203,745</b>	<b>286,679</b>	<b>368,136</b>	<b>286,628</b>	<b>303,470</b>

Table 1. IGWA conservation by district using various baseline determination methods.

**Former Method: 5-Year Average Baseline**

As discussed above, prior to the decision by former Director Spackman, ground water districts measured compliance by comparing post-Settlement Agreement diversions against average diversions within each district from 2010-2014. Under the method used by the districts from 2016-2022 to measure compliance, the districts collectively conserved a total of 238,348 acre-feet in 2022<sup>1</sup>, as shown in the table below. The table shows three districts with a negative mitigation balance in 2022; however, these districts conserved excess water in prior years. Averaging annual conservation values post-settlement would result in little to no calculated over-use.

After the 2022 irrigation season, the Director increased the conservation obligations of each district, and disallowed averaging. Under the Director’s new method, four ground water districts did not meet their groundwater conservation obligations in 2022, by a total of 56,284 acre-feet, as shown in the following table (full table provided in Appendix A):

2022 Usage Analysis: 5-Year Average Baseline							
all values in acre-ft							
	Target Conservation	Diversions Reduction	Accomplished Recharge/ Direct Delivery	Total Conservation	2022 Mitigation Balance	IDWR Target Conservation	IDWR Mitigation Balance
American Falls-Aberdeen	33,715	14,494	24,902	39,395	5,680	39,395	0
Bingham	35,015	7,923	516	8,438	-26,577	40,914	-32,476
Bonneville-Jefferson	18,264	6,888	9,249	16,137	-2,127	21,341	-5,204
Carey	703	3,782	5	3,787	3,084	821	2,966
Jefferson-Clark	54,373	37,281	7,647	44,928	-9,444	63,533	-18,605
Henry's Fork	5,391	8,724	3,000	12,900	7,509	6,299	6,601
Madison		1,176					
Magic Valley	32,462	37,429	3,378	40,807	8,345	37,931	2,876
North Snake	25,474	33,957	3,395	37,352	11,878	29,765	7,586
A&B	21,660	-	-	21,660	0	-	-
Southwest ID	12,943	-	-	12,943	0	-	-
Total:	<b>240,000</b>	151,654	52,091	238,348	-1,652	240,000	-36,255

Table 2. IGWA conservation using the original five-year average diversions from 2010-2014.

As shown in the above table, the ground water districts as a whole (excluding A&B and SWID) conserved 203,745 acre-feet in 2022.

**Alternate Method #1: 3-Year Average Baseline**

WWC evaluated ground water district compliance in 2022 based on a comparison of single-year diversions in 2022 against average diversions from the three-year period 2012-2014, using the same method of averaging that was used in the 2010-2014 baseline. Under this method, and using the increased conservation obligations imposed by the Director, one district did not meet its mitigation obligation in 2022, by a total of 13,484 acre-feet, as shown in the following table:

<sup>1</sup> Includes recharge accomplished by American Falls-Aberdeen Ground Water District in November 2023 to offset pumping in 2022.

<b>2022 Usage Analysis: 3-Year Average Baseline</b>							
all values in acre-ft							
	<b>Target Conservation</b>	<b>Diversion Reduction</b>	<b>Accomplished Recharge/ Direct Delivery</b>	<b>Total Conservation</b>	<b>2022 Mitigation Balance</b>	<b>IDWR Target Conservation</b>	<b>IDWR Mitigation Balance</b>
American Falls-Aberdeen	33,715	25,485	24,902	50,387	16,671	39,395	10,991
Bingham	35,015	26,915	516	27,431	-7,585	40,914	-13,484
Bonneville-Jefferson	18,264	14,855	9,249	24,104	5,840	21,341	2,763
Carey	703	3,782	5	3,787	3,084	821	2,966
Jefferson-Clark	54,373	70,050	7,647	77,697	23,325	63,533	14,164
Henry's Fork	5,391	5,636	3,000	11,459	6,068	6,299	5,160
Madison		2,823					
Magic Valley	32,462	50,392	3,378	53,770	21,309	37,931	15,840
North Snake	25,474	34,649	3,395	38,044	12,570	29,765	8,278
A&B	21,660	-	-	21,660	0	-	-
Southwest ID	12,943	-	-	12,943	0	-	-
<b>Total:</b>	<b>240,000</b>	<b>234,588</b>	<b>52,091</b>	<b>321,282</b>	<b>81,282</b>	<b>240,000</b>	<b>46,679</b>

Table 3. IGWA conservation using three-year average diversions from 2012-2014 using the same averaging method as the original five-year average.

Under this method, the ground water districts as a whole conserved 286,679 acre-feet in 2022.

#### Alternate Method #2: Peak Diversion Baseline

WWC evaluated ground water district compliance in 2022 based on a comparison of single-year 2022 diversions against peak diversions from the five-year period 2010-2014. Under this method, all districts met their obligations, as shown in the following table:

<b>2022 Usage Analysis: Peak Diversions Baseline (2012)</b>							
all values in acre-ft							
	<b>Target Conservation</b>	<b>Diversion Reduction</b>	<b>Accomplished Recharge/ Direct Delivery</b>	<b>Total Conservation</b>	<b>2022 Mitigation Balance</b>	<b>IDWR Target Conservation</b>	<b>IDWR Mitigation Balance</b>
American Falls-Aberdeen	33,715	42,788	24,902	67,689	33,974	39,395	28,294
Bingham	35,015	40,696	516	41,212	6,196	40,914	297
Bonneville-Jefferson	18,264	19,855	9,249	29,104	10,840	21,341	7,763
Carey	703	3,782	5	3,787	3,084	821	2,966
Jefferson-Clark	54,373	102,401	7,647	110,048	55,675	63,533	46,515
Henry's Fork	5,391	6,809	3,000	16,499	11,108	6,299	10,200
Madison		6,690					0
Magic Valley	32,462	58,352	3,378	61,730	29,268	37,931	23,799
North Snake	25,474	34,673	3,395	38,068	12,594	29,765	8,302
A&B	21,660	-	-	21,660	0	-	-
Southwest ID	12,943	-	-	12,943	0	-	-
<b>Total:</b>	<b>240,000</b>	<b>316,045</b>	<b>52,091</b>	<b>402,740</b>	<b>162,740</b>	<b>240,000</b>	<b>128,136</b>

Table 4. IGWA conservation using IGWA peak diversions during the 2010-2014 original baseline years.

Under this method, the ground water districts as a whole conserved 368,136 acre-feet in 2022.

### Alternate Method #3: PDSI Analog Year

WWC evaluated ground water district compliance in 2022 based on a comparison of single-year 2022 diversions against diversions in the year between 2010-2014 that most closely resembled climatic conditions in 2022. The year that most closely resembles 2022 conditions is referred to by WWC as the “analog year.” The analog year is determined using the Palmer Drought Severity Index (PDSI) published by the National Oceanic and Atmospheric Administration’s National Centers for Environmental Information<sup>2</sup>. The PDSI is a value from +10 (wet) to -10 (dry) calculated using temperature and precipitation data to indicate relative drought conditions over a given time and region. The PDSI reflects current and precedent precipitation and temperature conditions and accounts for regional soil moisture capacity, making it a useful tool for evaluating periods of wet and dry hydrologic conditions as it pertains to agriculture. The PDSI is defined by regional divisions, with the Eastern Snake River Plain located within Idaho divisions 7 and 9. The average PDSI values from April to October each year in Idaho divisions 7 and 9 provide a measure of climatic conditions on the Eastern Snake River Plain and were used to identify an analog year for the 2022 season. The average PDSI for 2022 was -4.20. The year from 1980-2014 with the closest value to the 2022 PDSI is 2013, which had an average PDSI of -4.27, as shown in the following table.

Year	PDI*	2022 Rank	Year	PDI*	2022 Rank	Year	PDI*	2022 Rank
1980	1.9757	31	1995	5.0736	41	2010	0.3486	24
1981	-0.6450	21	1996	3.5300	37	2011	2.9829	34
1982	4.0893	39	1997	4.0636	38	2012	-2.5993	18
1983	6.3114	42	1998	4.1486	40	2013	-4.2793	1
1984	7.4300	43	1999	2.8571	33	2014	-4.2943	2
1985	0.9914	26	2000	-3.2693	10	2015	-3.7193	5
1986	2.5079	32	2001	-5.3957	13	2016	-0.0814	23
1987	-3.4557	7	2002	-3.9886	4	2017	3.2793	35
1988	-5.2336	12	2003	-4.3686	3	2018	-0.9664	20
1989	-0.4693	22	2004	-2.8721	15	2019	0.9229	25
1990	-3.2379	11	2005	1.8293	30	2020	-2.6893	17
1991	-2.9214	14	2006	1.1957	27	2021	-5.1286	9
1992	-6.6779	19	2007	-3.4786	6	2022	-4.2021	0
1993	3.5036	36	2008	-2.7179	16	2023	1.2900	28
1994	-3.2793	8	2009	1.6393	29			

\*Palmer Drought Severity Index average monthly April-Oct from Central Plains & Upper Snake regions, Idaho

Table 5. Palmer Drought Severity Index from 1980 to 2023 with rank based on difference from 2022 value. Original baseline years highlighted.

The PDSI analog year method has the advantage of comparing groundwater diversions during years of comparable climatic conditions. However, it presents one practical complication in that the analog year cannot be identified until after the subject irrigation season, thereby preventing ground water districts

<sup>2</sup> <https://www.ncei.noaa.gov/pub/data/cirs/climdiv/climdiv-pdsidv-v1.0.0-20240105>, data downloaded Jan. 05, 2024.

from assigning fixed diversion limits to their patrons in advance of the irrigation season that will mirror the analog year to be identified after the irrigation season.

WWC’s evaluation of the analog year may be further refined by including additional variables that describe annual irrigation requirement. Regionalization of calculated values would also provide further refinement due to variability in climatic conditions from east to west and north to south in the Eastern Snake River Plain. An equivalent process could be carried out using other potential sources of usage information data pertinent to groundwater irrigated lands.

Based on the PSDI analog year method, as presently developed, one ground water district did not meet its mitigation obligation in 2022, by a total of 14,831 acre-feet, as shown in the following table:

2022 Usage Analysis (PSDI Analog Yr)							
all values in acre-ft							
	Target Conservation	Diversion Reduction	Accomplished Recharge/Direct Delivery	Total Conservation	2022 Mitigation Balance	IDWR Target Conservation	IDWR Mitigation Balance
American Falls-Aberdeen	33,715	30,012	24,902	54,913	21,198	39,395	15,518
Bingham	35,015	25,568	516	26,084	-8,932	40,914	-14,831
Bonneville-Jefferson	18,264	15,250	9,249	24,498	6,235	21,341	3,158
Carey	703	3,782	5	3,787	3,084	821	2,966
Jefferson-Clark	54,373	74,514	7,647	82,162	27,789	63,533	18,629
Henry's Fork	5,391	6,245	3,000	15,905	10,514	6,299	9,606
Madison		6,659					
Magic Valley	32,462	43,722	3,378	47,100	14,638	37,931	9,169
North Snake	25,474	28,784	3,395	32,178	6,705	29,765	2,413
A&B	21,660	-	-	21,660	0	-	-
Southwest ID	12,943	-	-	12,943	0	-	-
Total:	<b>240,000</b>	234,536	52,091	321,231	81,231	240,000	46,628

Table 6. IGWA conservation using the Palmer Drought Severity Index analog year baseline

Using this method, the ground water districts as a whole conserved 286,628 acre-feet in 2022.

**Alternate Method #4: PSDI Regression**

WWC evaluated ground water district compliance in 2022 based on a modification of the PSDI Analog Year method. Instead of using the analog year as the baseline, WWC performed a regression analysis of annual pumping in the years with vetted usage data (2010-2014) plotted against the annual average PSDI value described above. The regression equation was used to calculate a volume that represents what usage would have been without conservation activities. The calculated volume was used as the 2022 baseline.

The PSDI Regression method may be further refined by vetting usage data for years prior to 2010 to be included in the regression calculation.

Based on the PSDI Regression method, as presently developed, one ground water district did not meet its mitigation obligation in 2022, by a total of 10,819 acre-feet, as shown in the following table:

2022 Usage Analysis (PSDI Regression)							
all values in acre-ft							
	Target Conservation	Diversion Reduction	Accomplished Recharge/ Direct Delivery	Total Conservation	2022 Mitigation Balance	IDWR Target Conservation	IDWR Mitigation Balance
American Falls-Aberdeen	33,715	29,165	24,902	54,067	20,351	39,395	14,671
Bingham	35,015	29,580	516	30,095	-4,920	40,914	-10,819
Bonneville-Jefferson	18,264	15,019	9,249	24,267	6,003	21,341	2,927
Carey	703	3,782	5	3,787	3,084	821	2,966
Jefferson-Clark	54,373	73,894	7,647	81,541	27,169	63,533	18,008
Henry's Fork	5,391	5,451	3,000	11,355	5,964	6,299	5,056
Madison		2,904					
Magic Valley	32,462	50,355	3,378	53,733	21,271	37,931	15,802
North Snake	25,474	41,230	3,395	44,625	19,151	29,765	14,860
A&B	21,660	-	-	21,660	0	-	-
Southwest ID	12,943	-	-	12,943	0	-	-
Total:	<b>240,000</b>	251,378	52,091	338,073	98,073	240,000	63,470

Table 7. IGWA conservation using the Palmer Drought Severity Index regression equation calculated baseline.

Under this method, the ground water districts as a whole conserved 303,470 acre-feet in 2022.

### Conclusion

Conservation metrics are not defined in the Settlement Agreement, and WWC aided the ground water districts in determining a method to measure compliance with section 3.a of the Settlement Agreement from 2016-2022. Now that the former Director has rejected the method used from 2016-2022, the ground water districts are evaluating alternative methods of measuring compliance. Each alternative method evaluated by WWC shows the ground water districts conserved considerably more groundwater in 2022 than the Director calculated by comparing year 2022 diversions against the five-year average baseline (2010-2014). The PSDI analog year method and the PSDI regression method more accurately represent single year groundwater conservation because they compare groundwater conservation between years of comparable climatic conditions. Under those methods, the ground water districts collectively conserved more than 240,000 acre-feet, and the lone district that did not meet its conservation obligation exceeded it by 14,831 acre-feet under the PSDI Analog Year method and 10,819 acre-feet under the PSDI Regression method. For reference, total groundwater diversions within the ground water districts is roughly 1,780,000 acre-ft; thus, the foregoing shortfall represents 0.83% of total district groundwater diversions.