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Travis L. Thompson, ISB #6168
Sarah W. Higer, ISB #8012
BARKER ROSHOLT & SIMPSON LLP
163 Second Avenue West
P.O. Box 63
Twin Falls, Idaho 83303
Telephone: (208) 733-0700
Facsimile: (208) 735-2444

*Attorneys for A&B Irrigation District, Burley
Irrigation District, Milner Irrigation District,
North Side Canal Company, and Twin Falls Canal
Company*

W. Kent Fletcher, ISB #2248, Department of Water Resources
FLETCHER LAW OFFICE Eastern Region
P.O. Box 248
Burley, Idaho 83318
Telephone: (208) 678-3250
Facsimile: (208) 878-2548

*Attorneys for American Falls Reservoir
District #2 and Minidoka Irrigation District*

BEFORE THE DEPARTMENT OF WATER RESOURCES

OF THE STATE OF IDAHO

IN THE MATTER OF	)	THE SURFACE WATER COALITION'S
APPLICATION FOR	)	DISCLOSURE OF EXPERT REPORT AND
TRANSFER NOS. 84488 AND	)	DECLARATION OF DAN TEMPLE
84490 IN THE NAME OF LCSC	)	
ENTERPRISES LLC	)	
	)	
	)	
	)	
	)	

TO: The Hearing Office of the Department and all parties and attorneys of record:

PLEASE TAKE NOTICE A&B IRRIGATION DISTRICT, BURLEY IRRIGATION DISTRICT, MILNER IRRIGATION DISTRICT, NORTH SIDE CANAL COMPANY, TWIN FALLS CANAL COMPANY, AMERICAN FALLS RESERVOIR DISTRICT #2, AND MINIDOKA IRRIGATION DISTRICT (hereinafter "Protestants" "Surface Water Coalition" or "SWC"), by and through their attorneys of record, BARKER ROSHOLT & SIMPSON LLP, and FLETCHER LAW OFFICE, hereby submits its expert report and supporting information pursuant to the Scheduling Order.

THE SURFACE WATER COALITION'S DISCLOSURE OF EXPERT REPORT AND
DECLARATION OF DAN TEMPLE

DATED this 16th day of July, 2021.

FLETCHER LAW OFFICE


_____ for
W. Kent Fletcher

*Attorneys for American Falls Reservoir
District #2 & Minidoka Irrigation District*

BARKER ROSHOLT & SIMPSON LLP



Travis L. Thompson
Sarah W. Higer

*Attorneys for A&B Irrigation District, Burley
Irrigation District, Milner Irrigation District,
North Side Canal Company, and Twin Falls
Canal Company*



EXPERT REPORT ON LCSC TRANSFER APPLICATIONS NOS. 84488 AND 84490

Prepared for:
The Surface Water Coalition

July 16, 2021

1604FLE01-21

The technical material in this report was prepared by or under the supervision and direction of the undersigned, whose seal as a Professional Geologist is affixed below.



The following members of the LRE Water staff contributed to the preparation of this report.

David Colvin, PG - Principal-in-Charge
Jacob Bauer, PG – Senior Project Hydrogeologist
GIS Analyst, Tucker Fullmer

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SECTION 1: TRANSFER APPLICATION SUMMARIES

On October 13, 2020, LCSC Enterprises, LLC (LCSC) submitted transfer applications No. 84488¹ and No. 84490² to the Idaho Department of Water Resources (IDWR). This LRE Water expert report is in support of the Surface Water Coalition's protest of these applications.

The transfer applications were prepared by JCH Engineering and Consulting, PLLC (JCH), as a representative of LCSC. Combined, the two applications propose to move 1290 acre feet annually (AFA) from Bingham County to Power County.

1.1.1 Transfer Application No. 84488

Transfer application No. 84488 consists of a point of diversion (POD) change, POD addition, place of use (POU) change and update to a combined POU. The transfer application is for 0.46 cubic feet per second (CFS) or 186.4 acre-feet per annum (AFA). The Eastern Snake Plain Aquifer (ESPA) groundwater rights included in the application are transferring from part of Right No. 35-14041 (0.46 CFS/ 186.4 AF) and transferring to existing Rights No. 35-7740 (3.66 CFS/ 1,160.0 AFA) and 35-2824 (0.16 CFS/32.7 AFA). Existing POD/water measurement information system (WMIS) identification numbers include 600779 and 600735. The transfer to POU includes a total of 345.6 acres in sections 13, 18, 19, and 24 of Township 09S and Range 28E. The application proposes to cease irrigation of 46.6 acres at the existing 35-14041 POU to offset the increased use of water at the POU for 35-2824 and 35-7740. Water Right No. 35-14041 is under a 2007-2021 Conservation Reserve Program (CRP) contract. **Table 1** summarizes water rights included in this application.

¹ <https://idwr.idaho.gov/apps/ExtSearch/RelatedDocsTransfers.asp?TransferNumber=84488>

² <https://idwr.idaho.gov/apps/ExtSearch/RelatedDocsTransfers.asp?TransferNumber=84490>

Table 1 – Irrigation Groundwater Rights Included in Transfer Application No. 84488

Water Right No.	Priority Date	Use Period	Total Diversion Rate (CFS) / Volume (AFA)	Transfer Diversion Rate (CFS) / Volume (AFA)	POU Acreage and Location
35-14041	10/16/1974	04/01-11/01	3.18 / 1290	Transfer FROM: 0.46 / 186.4	322.5 total acres in T01S R32E, S12 Transfer 46.6 acres FROM
35-2824	8/28/1961	04/01-11/01	0.16 / 32.7	TO POD update under existing water right	Add 9 acres TO T09S, R 28E, S13
35-7740	8/15/1977	04/01-11/01	3.660 / 1160.0	TO POD update under existing water right under existing water right	Add 290 acres TO T09S, R28E, S13&14 and T09S, R29E, S18&19

1.1.2 Transfer Application No. 84490

Transfer Application No. 84490 includes a POD and POU change for a portion of irrigation groundwater right No. 35-14041. The POD change is for 2.72 CFS / 1,103.6 AFA transferred from an existing well in Section 12 of Township 01S, Range 32E to two new wells in Sections 19 and 20 of Township 09S, Range 29E. The application proposes a POU transfer of 275.9 acres from Section 12 in Township 01S, Range 32E to Sections 17, 18, 19, and 20 of Township 09S, Range 29E. Water Right No. 35-14041 is in a 2007-2021 CRP contract.

Table 2 summarizes water rights information for Transfer Application No 84490.

Table 2 – Irrigation Groundwater Rights Included in Transfer Application No. 84490

Water Right No.	Priority Date	Use Period	Total Diversion Rate (CFS) / Volume (AFA)	Transfer Diversion Rate (CFS) / Volume (AFA)	POU Acreage and Location
35-14041	10/16/1974	04/01-11/01	3.18 / 1290	Transfer 2.72 / 1,103.6 FROM	322.5 total acres in T01S R32E, S12
New	NA	NA	NA	Transfer 2.72/1,103.6 TO new POD	Transfer 275.9 acres TO T09S 29E, S17, 18, 19, & 20

SECTION 2: LCSC TRANSFER ANALYSIS RESULTS

IDWR has produced an Eastern Snake Plain Aquifer (ESPA) modeling tool for the analysis of impacts due to proposed groundwater transfers. The modeling intent is to allow applicants to evaluate potential transfers and ensure that they meet the criteria of Idaho Code §42-222, including the requirement which states that water right transfers must not injure other water rights. Statewide transfer policy and procedures are further detailed in IDWR's "Transfer Memo 24" (Peppersack 2009). Water right transfers within the ESPA have additional tools and procedures. The ESPA Model Transfer Spreadsheet (ETRAN) calculates the impacts of a transfer and a complementary Mitigation Analysis Spreadsheet evaluates the need for mitigation of a transfer's increased depletive impacts to springs or river reaches (IDWR 2016). The current release of ETRAN is version 3.3, which utilizes response functions from version 2.1 of the Enhanced Snake Plain Aquifer Model or ESPAM (IDWR 2013). The Mitigation Analysis Spreadsheet compares the ETRAN calculated impacts to the criteria that, when exceeded, require transfer mitigation.

Table 3 – Transfer Mitigation Requirement Criteria (IDWR 2015)

Steady State Analysis	Transient State Analysis
1. Is the total increase in volume greater than 10% of the historical depletion volume? 2. Is the total increase in volume greater than 2 acre-feet/trimester? 3. Does the depletion in this reach make up more than 10% of the total depletion to the river?	1. Is the total increase in volume greater than 10% of the historical depletion volume? 2. Is the total increase in volume greater than 2 acre-feet/trimester?
If the answer to all three questions is YES, then mitigation is required for this reach.	If the answer to both questions is YES, then mitigation is required for this reach.

The LCSC transfer applications propose to move water rights from PODs/POUs in Bingham County over 50 miles to the southwest with PODs/POUs in Power County (Figure 1). The current POD is over 16 miles from the river and the new PODs are approximately 1/2 mile or less from the river. JCH proposes to combine the near Blackfoot to Neeley and Neeley to Minidoka reaches of the Snake River for the purposes of transfer impact analysis and claim that increased depletions in the Neeley to Minidoka reach of the river are offset by the increased reach gains of the Near Blackfoot to Neeley reach.

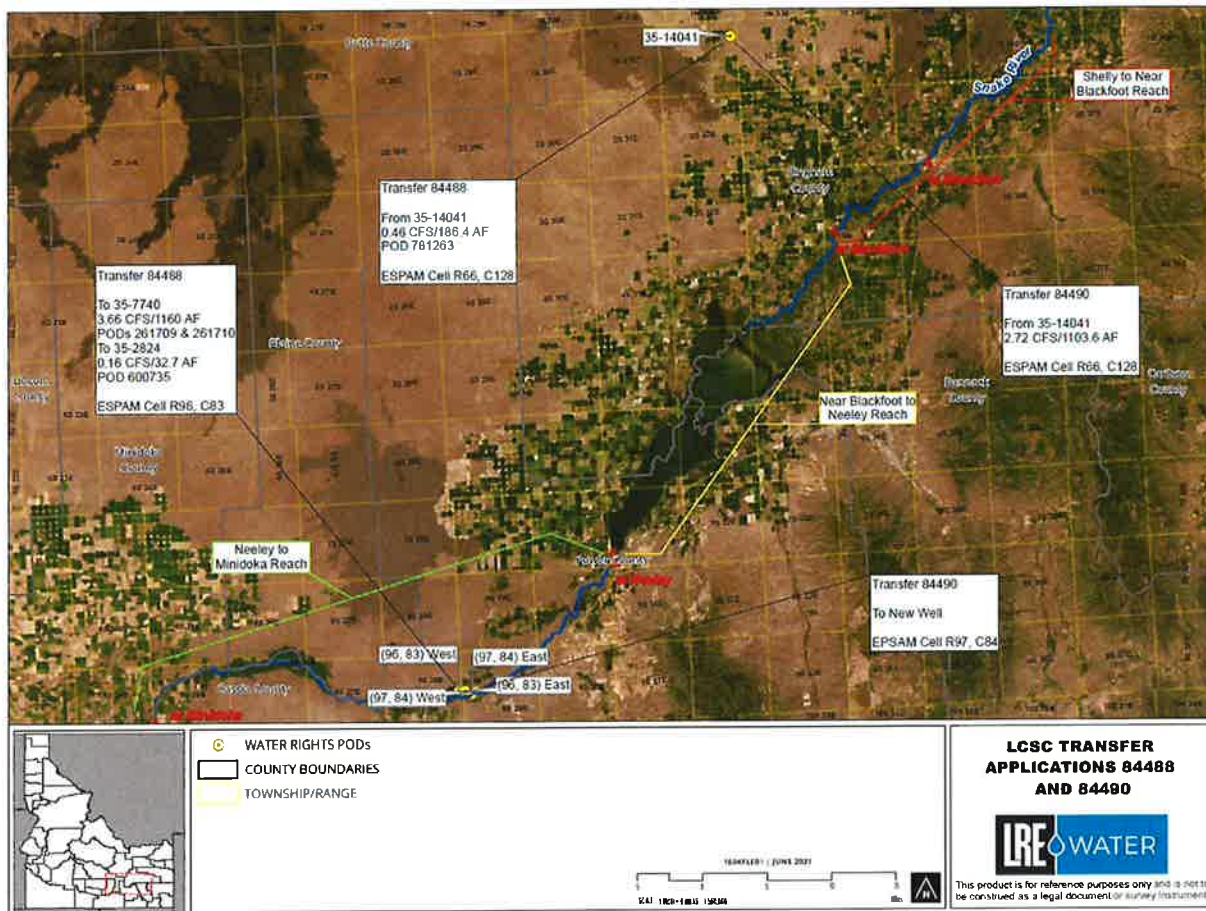


Figure 1 – Map of LCSC Transfers

JCH utilized ETRAN 3.2, an outdated version of the tool, to evaluate the impacts of the proposed transfers.

In the transfer applications, JCH states:

“ESPA impact evaluations using the IDWR Transfer Spreadsheet are attached showing that the increased depletions in the Neeley to Minidoka reach of the river are mitigated by the increased reach gains of the Near Blackfoot to Neeley reach accumulating in the American Falls Reservoir.”

To summarize their modeling analysis of the transfers, JCH provides screenshots of the ETRAN 3.2 input and an output graph modified to include the results of the non-standard combined reach impacts.

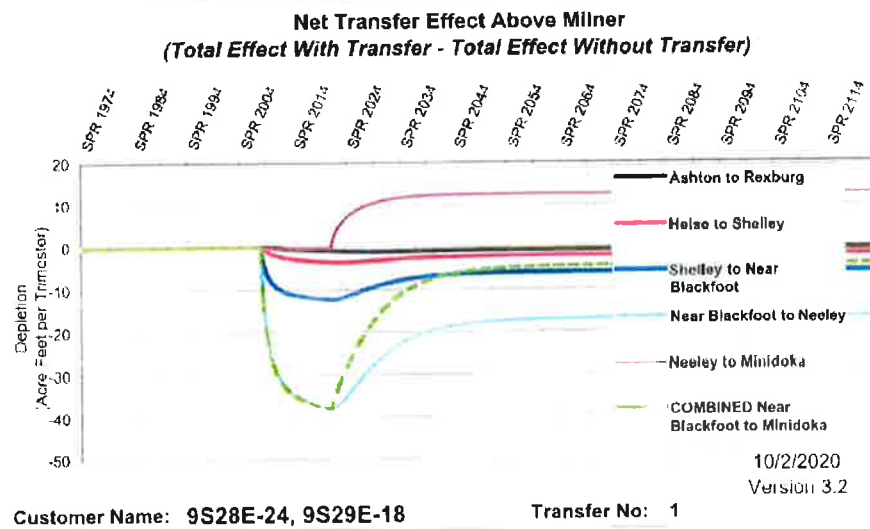


Figure 2 – JCH Modified ETRAN 3.2 Output for Transfer Application No. 84488

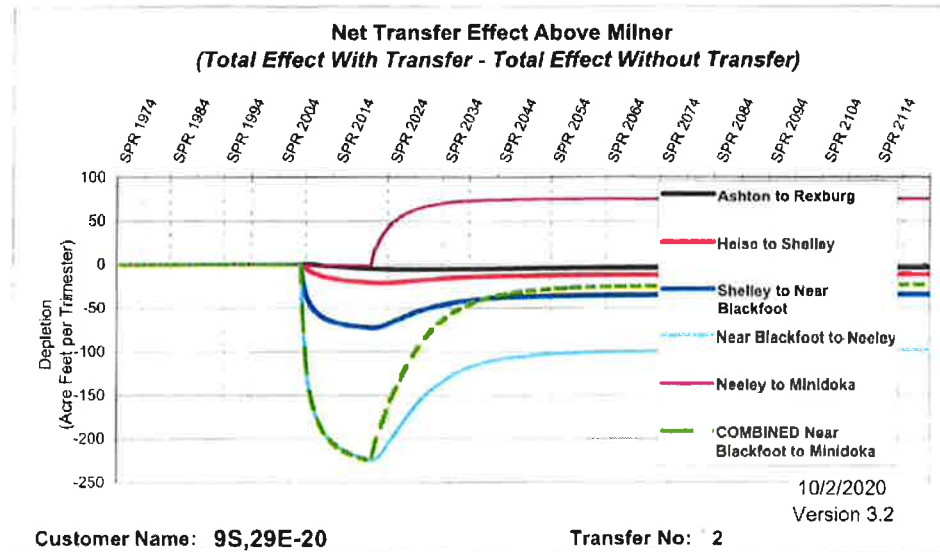


Figure 3 – JCH Modified ETRAN 3.2 Output for Transfer Application No. 84490

Figure 2 and Figure 3 show that the transfer depletion impacts for both applications exceed the transient analysis criteria for the Neeley to Minidoka reach. For both transfer applications, the depletive impacts on this reach are greater than 2 AF/trimester and greater than 10% of the pre-transfer depletion.

No steady state ETRAN results were provided in the applications. Furthermore, the Mitigation Analysis Spreadsheet results prescribed in the ETRAN modeling guidance (IDWR 2016) are not included in the transfer applications.

SECTION 3: LRE TRANSFER ANALYSIS RESULTS

LRE Water has evaluated the LCSC transfer applications using IDWR prescribed methodology and tools. We are also providing additional transfer analysis to elaborate on the nature of the depletive effects of the applications.

3.1 ETRAN AND MITIGATION ANALYSIS SPREADSHEET RESULTS

The ETRAN inputs included in the LCSC transfer applications match the transfer details except for the period of use associated with the water rights (April 1 through November 1). We repeated the LCSC analysis using the identical inputs. These results show that mitigation is required even when analyzed using IDWR'S prescribed methodology and procedures.

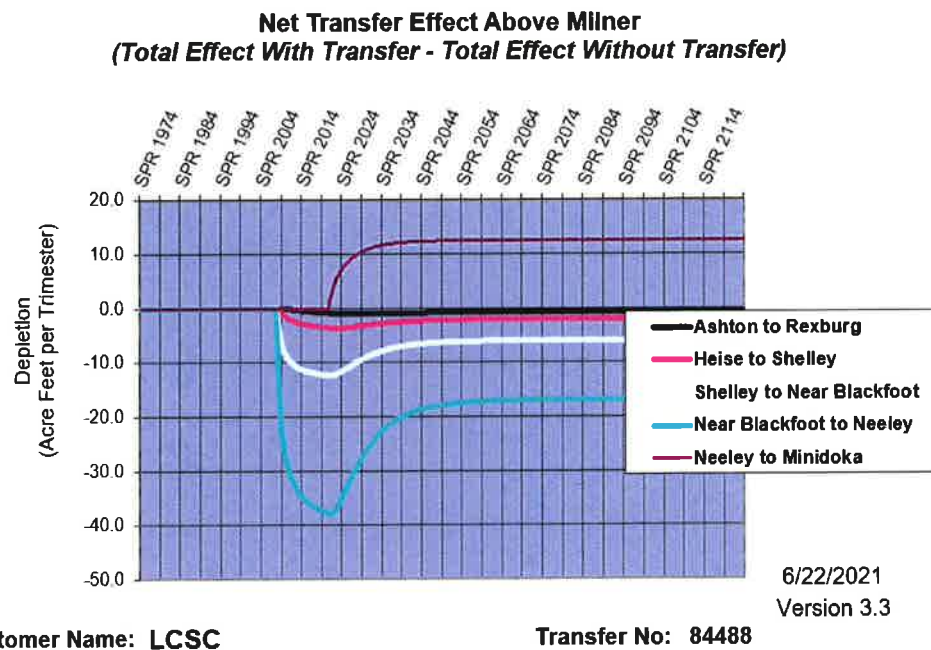


Figure 4 – LRE Analysis: ETRAN 3.3 Modeled Impacts of Transfer No. 84488 using ETRAN Version 3.3

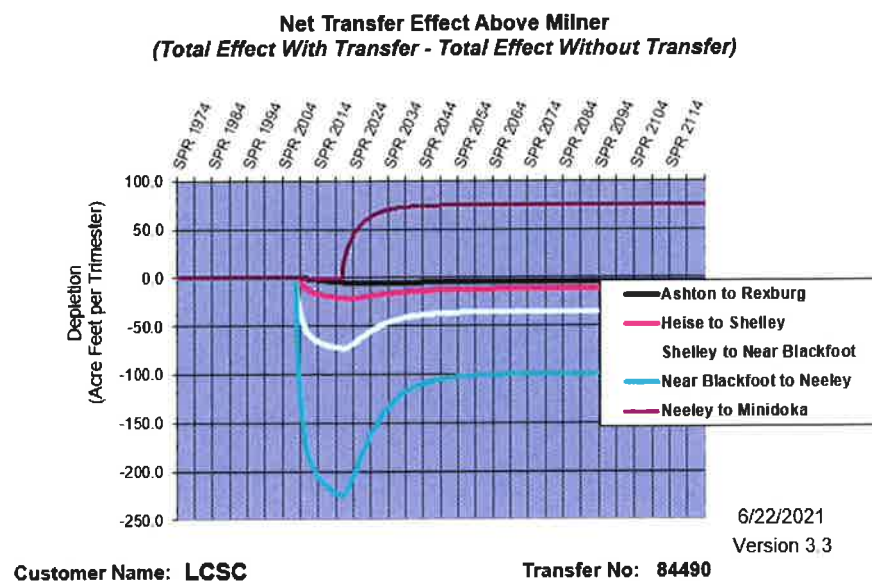


Figure 5 – LRE Analysis: ETRAN 3.3 Modeled Impacts of Transfer No. 84490 using ETRAN Version 3.3

Figure 4 and Figure 5 confirm the applicant's modeled impacts and show that the graphed transfer depletive impacts for both applications exceed the transient analysis criteria for the Neeley to Minidoka reach.

Following the transfer modeling analysis procedures, LRE Water also evaluated the need for transfer mitigation.

Table 4 – LRE Analysis: Mitigation Analysis Tool Results for Transfer No. 84488

Impact by Reach (AF/Trimester)												
	Ashton to Rexburg	Heise to Shelley	Shelley to Nr Bckft	Nr Bckft To Neeley	Neeley to Minidoka	Dev. Wbl To Buhl	Buhl to Kspr	Kspr	Kspr to Malad	Malad	Malad to Bancroft	
	1.44	4.33	13.17	40.26	0.24	0.76	0.87	0.38	0.24	0.22	0.01	
	0.81	2.41	7.26	23.53	12.74	4.44	5.00	2.22	1.40	1.28	0.08	
	1.44	4.33	13.17	40.26	0.24	0.76	0.87	0.38	0.24	0.22	0.01	
	0.81	2.41	7.26	23.53	12.74	4.44	5.00	2.22	1.40	1.28	0.08	
Steady State Analysis	Mitigation Check 1 - >10% of Historical:	-43.5%	-44.4%	-44.9%	-41.6%	5221.7%	483.2%	477.5%	477.5%	477.4%	477.3%	477.2%
	Mitigation Check 2: > 2 AF/T:	-0.6	-1.9	-5.9	-16.7	12.5	3.7	4.1	1.8	1.2	1.1	0.1
	Mitigation Check 3 - >10% of Total:	1.3%	3.9%	11.9%	38.5%	20.8%	7.3%	8.2%	3.6%	2.3%	2.1%	0.1%
	Mitigation Required?:	NO	NO	NO	NO	YES	NO	NO	NO	NO	NO	NO
	Mitigation Vol. Req'd (ac-ft):	-0.6	-1.9	-5.9	-16.7	12.5	3.7	4.1	1.8	1.2	1.1	0.1
Transient State Analysis	Mitigation Check 1 - >10% of Historical:	-43.5%	-44.4%	-44.9%	-41.6%	5221.7%	483.2%	477.5%	477.5%	477.4%	477.3%	477.2%
	Mitigation Check 2: > 2.01 AF/T:	-0.6	-1.9	-5.9	-16.7	12.5	3.7	4.1	1.8	1.2	1.1	0.1
	Mitigation Required?:	NO	NO	NO	NO	YES	YES	YES	NO	NO	NO	NO
	Mitigation Vol. Req'd (ac-ft):	-0.6	-1.9	-5.9	-16.7	12.5	3.7	4.1	1.8	1.2	1.1	0.1

Table 5 – LRE Analysis: Mitigation Analysis Tool Results for Transfer No. 84490

Impact by Reach (AF/Trimester)												
	Ashton to Rexburg	Heise to Shelley	Shelley to Nr Bckft	Nr Bckft To Neeley	Neeley to Minidoka	Dev. Wbl Buhl	To Kspr	Kspr	Kspr to Malad	Malad	Malad to Bancro	
	8.52	25.64	78.02	238.49	1.42	4.51	5.13	2.28	1.44	1.31	0.08	
	4.82	14.29	43.15	139.93	76.38	25.82	29.07	12.91	8.14	7.45	0.46	
	8.52	25.64	78.02	238.49	1.42	4.51	5.13	2.28	1.44	1.31	0.08	
	4.82	14.29	43.15	139.93	76.38	25.82	29.07	12.91	8.14	7.45	0.46	
Steady State Analysis	Mitigation Check 1 - >10% of Historical:	-43.4%	-44.3%	-44.7%	-41.3%	5287.6%	472.5%	467.0%	466.9%	466.9%	466.8%	466.7%
	Mitigation Check 2: > 2 AF/T:	-3.7	-11.4	-34.9	-98.6	75.0	21.3	23.9	10.6	6.7	6.1	0.4
	Mitigation Check 3 - >10% of Total:	1.3%	3.9%	11.9%	38.6%	21.1%	7.1%	8.0%	3.6%	2.2%	2.1%	0.1%
	Mitigation Required?:	NO	NO	NO	NO	YES	NO	NO	NO	NO	NO	NO
	Mitigation Vol. Req'd (ac-ft)	-3.7	-11.4	-34.9	-98.6	75.0	21.3	23.9	10.6	6.7	6.1	0.4
Transient State Analysis	Mitigation Check 1 - >10% of Historical:	-43.4%	-44.3%	-44.7%	-41.3%	5287.6%	472.5%	467.0%	466.9%	466.9%	466.8%	466.7%
	Mitigation Check 2: > 2.01 AF/T:	-3.7	-11.4	-34.9	-98.6	75.0	21.3	23.9	10.6	6.7	6.1	0.4
	Mitigation Required?:	NO	NO	NO	NO	YES	YES	YES	YES	YES	YES	NO
	Mitigation Vol. Req'd (ac-ft)	-3.7	-11.4	-34.9	-98.6	75.0	21.3	23.9	10.6	6.7	6.1	0.4

Table 4 and Table 5 are the tabulated reach impact outputs from the Mitigation Analysis Spreadsheet. Highlighted cells in the output tables show where the depletive impacts exceed the steady state and transient mitigation criteria.

Using LCSC's input information with IDWR transfer analysis methodology and tools, LRE Water determined that transfer application No. 84488 and No. 84490 require mitigation of the Neeley to Minidoka reach because the depletive impacts exceed the steady state and transient mitigation criteria. Both applications also require mitigation of several spring reaches that exceed the transient mitigation criteria. Based upon the applications and information supplied to date in this case, LRE Water is not aware of any proposed mitigation that is being offered by the Applicant LCSC.

3.2 CUMULATIVE IMPACTS TRANSFER COMPARISON

While evaluating the details of the LCSC transfer applications it is helpful to compare them to other transfer applications that have been approved historically.

IDWR has recently updated their analysis of the cumulative effects of transfers on springs and river reaches (Sukow 2021). Their updated “Cumulative Transfer Memo” included several conclusions relevant to the LCSC transfer applications. IDWR concluded that cumulative impacts of 551 transfers approved after 2011 had quantifiable, but relatively small, impacts on river reaches above Milner, with some reaches showing a net gain while others showed a net loss. IDWR estimates that all 551 of the historically approved transfers result in a decrease of 318 AFY (0.4 CFS) in the Neeley to Minidoka reach. By comparison, the LCSC transfer applications require 262.5 AFY of mitigation to the Neeley to Minidoka reach, or over 80% of the total net depletive impacts from 551 historical transfers.

The estimated depletion rate of the LCSC transfer applications illustrates how they deviate from approved transfers evaluated in the IDWR cumulative transfer impacts analysis. Another unique (and important) aspect of these transfer applications is the distance between the historical and new PODs. The LCSC transfers propose to move the associated water rights over 50 miles. In their cumulative transfer impacts memorandum, IDWR states:

Most transfers involve relatively small amounts of water (Figure 5) or move points of diversion a relatively short distance (Figure 6). Figure 7 shows the cumulative volume of water transferred by the average distance between TO and FROM wells. (Sukow 2021)

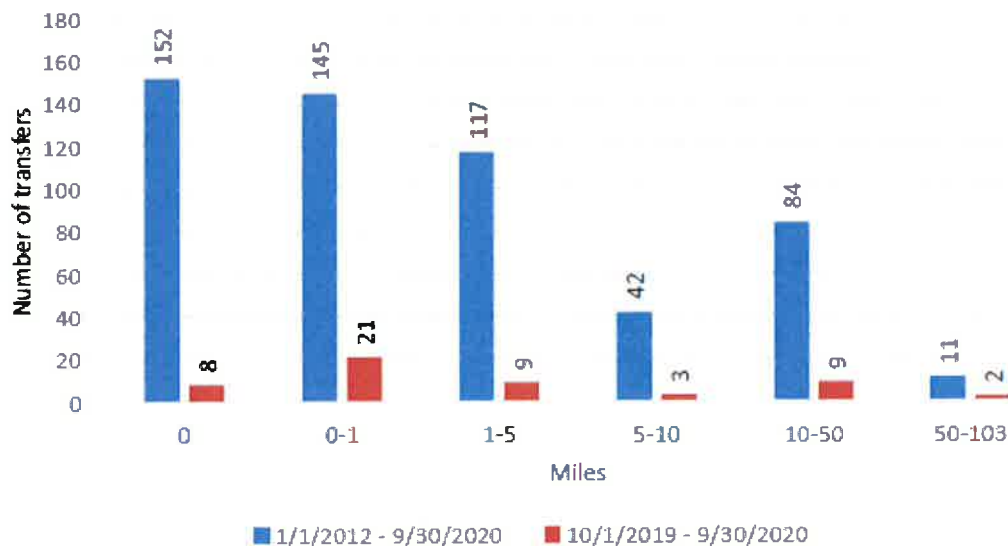


Figure 6 – Average Distance Between FROM and To Wells (Sukow 2021)

The LCSC transfer applications fall into the largest distance category plotted on Figure 6 (50-103 miles). At least 98% of the transfers IDWR evaluated in the cumulative impacts analysis were a shorter distance than the distance proposed by transfer application Nos. 84488 and 84490. At least 83% of the historical transfers were less than one-fifth of the distance of the LCSC applications.

3.3 PERCHED AQUIFER WELL IMPACTS

The location of existing and new wells LCSC is proposing to move the water rights to are in an area of the ESPA where there is a perched shallow aquifer overlying the deeper regional aquifer. Any wells completed in the perched shallow aquifer will have a better connection to the river than deeper wells, and will result in relatively faster depletions of a higher rate.

Logs for existing wells in the area of the proposed new wells report shallow aquifer materials separated from a deeper aquifer by clay materials. Figure 8 shows a lithologic log for Well ID 352874 located in Section 18 of Township 9S, Range 29E. Although the depth and thickness of the clay materials vary locally, Figure 8 is generally representative of the perched aquifer conditions.

Form 2467
73

STATE OF IDAHO
DEPARTMENT OF WATER RESOURCES

Location Corrected by IDWR To:
T09S R29E Sec. 18 SE3W

WELL DRILLER'S REPORT

By: mciscall 2012-05-09

Stamp: 30 days after the completion or abandonment of the well

1. WELL OWNER
Name: Leon Duffin
Address: Aberdeen, Ida 83212
Owner's Permit No.:

2. NATURE OF WORK
☒ New well ☐ Deepened ☐ Replacement
☐ Abandoned (describe method of abandoning)

3. PROPOSED USE
☐ Domestic ☒ Irrigation ☐ Test ☐ Municipal
☐ Industrial ☐ Stock ☐ Waste Disposal or Injection
☐ Other (specify type)

4. METHOD DRILLED
☐ Rotary ☐ Air ☐ Hydraulic ☐ Reverse rotary
☒ Cable ☐ Aug ☐ Other

5. WELL CONSTRUCTION
Casing schedule: ☒ Steel ☐ Concrete ☐ Other
Thickness: 250 inches Diameter: 16 inches From: 0 feet To: 250 feet
Was a packer or seal used? ☒ Yes ☐ No
Perforated? ☐ Yes ☒ No
How perforated? ☐ Factory ☐ Knife ☐ Torch
Size of perforation: _____ inches by _____ inches
Number _____ From _____ To _____
perforations _____ feet _____ feet
perforations _____ feet _____ feet
perforations _____ feet _____ feet
Well screen installed? ☐ Yes ☒ No
Manufacturer's name _____
Type _____ Model No. _____
Diameter _____ Slot size _____ Set from _____ feet to _____ feet
Diameter _____ Slot size _____ Set from _____ feet to _____ feet
Gravel packed? ☐ Yes ☐ No ☐ Size of gravel _____
Placed from _____ feet to _____ feet
Surface seal depth: 24 feet Material used in seal: ☐ Cement grout ☐ Pudding clay ☐ Well cuttings
Sealing procedure used: ☐ Slurry pit ☐ Temp. surface casing ☐ Overbore to seal depth
Method of joining casing: ☐ Threaded ☐ Welded ☐ Solvent Weld
Describe access port: 2" pipe

6. LOCATION OF WELL
Sketch map location must agree with written location: 4/
Subdivision Name _____
Lot No. _____ Block No. _____
County: Bingham
NW 1/4 NW 1/4 Sec. 19, T. 9, S. 29, E. 30

7. WATER LEVEL
Static water level: 8.5 feet below land surface
Flowing? ☐ Yes ☒ No G.P.M. flow _____
Artesian closed-in pressure _____ p.s.i.
Controlled by: ☐ Valve ☐ Cap ☐ Plug
Temperature _____ °F. Quality _____

8. WELL TEST DATA
☐ Pump ☐ Bailor ☐ Air ☒ Other
Discharge G.P.M. _____ Pumping _____

9. LITHOLOGIC LOG

Hole Diam.	Depth From	Depth To	Material	Water Yes/No
16	0	3'	Top Soil	
	3'	5'	Gray sandy clay & Rock	
	5'	10'	Black lava Boulders	
	10'	15'	Broken Black lava	
	15'	25'	Black lava gravel & clay	
	25'	40'	Gravel	
	40'	70'	Brown sandy clay & gravel	
	70'	110'	Yellow clay & red gravel	
	110'	125'	White Silty Clay	
	125'	200'	Beaver clay	
	200'	245'	Yellowish brown clay & gravel	
	245'	295'	Black lava Boulders	
	295'	345'	Brownish lava	
	345'	385'	Black lava	
	385'	410'	Multicolored lava	
	410'	425'	Red lava & clay	
	425'	445'	Multicolored lava	
	445'	475'	Red & Black lava	
	475'	505'	Red & Black lava & clay	
	505'	525'	Red lava & white clay	
	525'	545'	Red lava & white clay	
	545'	565'	Multicolored lava & clay	
	565'	585'	White & Black clay	
	585'	605'	Black lava	
	605'	625'	Multicolored lava	
	625'	645'	Gray lava	
	645'	665'	Sharp gray lava (No Cuttings)	
	665'	685'	Red lava	
	685'	705'	Multicolored lava	
	705'	725'	Reddish Rock with layers of gravel	
	725'	745'	Red clay & Red lava & gravel	
	745'	765'	Gravel	

10. Work started: 10-11-78 finished: 1-18-79

11. DRILLERS CERTIFICATION
I/We certify that all minimum well construction standards were complied with at the time the rig was removed.
Firm Name: Paul Vollmer & Son Firm No. 67
Address: Box B
Aberdeen, Ida Date: 3-12-79
Signed by IFirm Official: Harry Vollmer
and
(Operator) Jim Taylor

USE ADDITIONAL SHEETS IF NECESSARY - FORWARD THE WHITE COPY TO THE DEPARTMENT

Figure 7 – Well Log for Well ID 352874 Showing Perched Aquifer Materials Above 40 FT BGS

The Figure 8 lithologic log shows various clay deposits from approximately 40 to 210 FT BGS. These clays create a two-aquifer system locally by acting as a perching layer for shallower aquifer materials above, and a confining layer for aquifer materials below. The lithologic log also indicates that water was encountered from 10-40 FT BGS, and then again from 245 FT BGS to the total drilling depth of 535 FT BGS.

The vast majority of the transfer pumping (2.73 CFS) is proposed to be pumped from new wells cased to 39 feet (Harris 2021), producing water out of the perched aquifer in the area. Pumping from such wells in the shallow perched aquifer will cause relatively faster, higher magnitude depletions.

3.4 TRANSFER APPLICATION GLOVER ANALYSES

Transfer Nos. 84488 and 84490 would move the point of diversion, which is currently located 16.0 miles (84,666 FT) from the Snake River to four wells located downstream from the current diversion point. According to communication with the applicant, the new diversion points will either be four wells that average approximately 1800 FT away from the river ("Configuration A"), or two existing wells averaging 1800 FT away from the river and two wells approximately 180 FT from the river ("Configuration B") (Harris 2021).

ESPAM 2.1 has model limitations that make it inappropriate for analysis of the LCSC transfer applications. ESPAM 2.1 issues include calibration, near river grid discretization, storativity, transmissivity at the FROM well, riverbed conductance at the TO wells, and layering. Because ETRAN (versions 3.2 and 3.1) utilizes ESPAM 2.1 response functions, it is also inappropriate for evaluation of these transfer applications. LRE Water has prepared an analysis of the LCSC transfers that represents a more appropriate analysis of the LCSC transfer application impacts.

The purpose of this analysis is to determine whether: 1) there is a substantive difference in the temporal pattern of stream depletion due to groundwater pumping when comparing Configuration A to Configuration B, and 2) to estimate whether the depletive effects on the river pre-and post-transfer will be substantially different. This analysis focuses on the timing aspects of depletion at the closest river location caused by pumping from the transfers in isolation. Other aspects such as the depletion by reach are considered elsewhere in this report.

3.4.1 Calculation of Pumping Effects and Stream Depletions

The transfers propose to move approximately 1,290 AFA of pumping that originally occurred approximately 16.0 miles from the Snake River to four wells located substantially closer to the river (Configurations A and B). Table 6 presents information on these configurations. The two existing wells at the transfer-to location are located in the ESPAM

model row 96, column 83, and under both Configurations, will have 186.4 AFA of pumping. The potential new wells are located in ESPAM model cell row 97 and column 84 and will have 1103.6 AFA of pumping. Both of the cells where transfer-to wells are located contain the Snake River itself in the ESPAM 2.1 model. Table 6 presents the well distances for the two proposed configurations from the Snake River as well as the pumping. Aquifer width values are based on the approximate width of the aquifer between the ESPAM Version 2.1 model and the Snake River.

Table 6 - Well Distances, aquifer width values, Transmissivity and Storage Values, (i.e. "Glover Parameters")

Configu ration	Well Locations	T (gpd/ft)	Sy (-)	Distance to River (ft)	Aquifer Width (ft)	Spring and Summer Trimester Pumping
A	Two Existing Wells in cell 96, 83	6,939,764	0.05	1,800	323,350	186.4 AFA or 23.3 AF per month for 8 months of pumping
	Two New Wells in Cell 97, 84	8,194,071	0.05	180	323,350	1,103 AFA or 137.875 AF per month for 8 months
B	Two Existing Wells in cell 96, 83	6,939,764	0.05	1,800	323,350	186.4 AFA or 23.3 AF per month for 8 months of pumping
	Two New Wells in Cell 97, 84	8,194,071	0.05	1,800	323,350	1,103 AFA or 137.875 AF per month for 8 months

Groundwater modeling is generally an appropriate tool for simulating stream depletion timing from wells far from the river, and is the most appropriate tool for conducting analyses where wells (transfer "from" and transfer "to" wells) are located more than a few grid cells from the river. Unfortunately, the grid size resolution of ESPAM 2.1 is insufficient to evaluate stream depletion timing from wells located very close to the river, such as the wells involved in the proposed LCSC transfers. The fact that the new proposed well locations are all located within the same grid cell, and that this grid cell contains the river poses particular difficulty for model simulation and unless revised, ESPAM 2.1 cannot properly account for the timing from the proposed new well locations.

ESPAM Model version 2.1 does not have the spatial resolution necessary to accurately estimate timing effects from this transfer. Other analysis methods other than ESPAM/ETRAN can be used to appropriately evaluate these transfers. Increasing the resolution of the ESPAM model near the Snake River, methods used to downscale the

model, or local models may provide acceptable methods to estimate timing effects from the proposed transfer.

As an additional approach to depletion timing evaluation that does not have grid-resolution challenges, we estimated transient effects from the proposed change using the Glover (1954) equation (or “Glover method”). The Glover method is an analytical expression for estimating stream depletion timing from pumping wells. The Glover equation expresses the total rate of streamflow depletion as a function of time according to the following equation (notation from Barlow and Leake, 2012):

$$Q_s = Q_w * \text{erfc}(z) \text{ where } z = \sqrt{d^2 S / (4 T t)} \text{ and:}$$

Q_s=rate of stream depletion

Q_w= well pumping rate

d= the distance to the stream

S = the storage coefficient, which is equal to specific yield in water table aquifers

T = the Transmissivity of the aquifer

t= the time being evaluated.

This equation calculates stream depletion within an idealized infinite, isotropic, and homogenous aquifer of constant transmissivity with a fully penetrating stream. The Glover method may be modified to calculate pumping effects of wells in an idealized isotropic, homogenous aquifer of constant transmissivity of limited extent parallel to the river using image well theory. Such an analysis is sometimes referred to as a “bounded” aquifer analysis, and this type of analysis is applicable to aquifers of limited width located adjacent to rivers, such as the Eastern Snake Plain Aquifer.

Two key elements of stream depletion timing analyses are shown by proportional relationships between the parameters. The first is that the time it takes for well pumping to affect the stream is proportional to the T/S ratio, or the “Hydraulic Diffusivity” of the aquifer. Increases in T result in quicker stream depletion, and decreases in Storage result in quicker stream depletion. The second relationship is that closer distances to the river result in quicker pumping effects, and further distances result in slower pumping effects.

Based on the relationship between distance and stream depletion timing, transferring water from a location over 16 miles from the river to new locations where the wells are less than a half-mile from the river will result in a substantially different depletion timing pattern at the river.

3.4.2 Transfer Configuration Comparison

LRE considered the timing effects from the two proposed well location configurations shown in Table 6. LRE conducted this timing analysis using the Glover method and implemented through the Integrated Decision Support Systems Alluvial Water Accounting System or IDS-AWAS (CSU-IDS 2003). In this analysis we consider the effect of pumping the wells in a cyclical fashion over the spring and summer trimesters, with no pumping during the winter. We refer to this condition as “Oscillatory Steady-State” where pumping is cycled on and off. An even more accurate method would be to include actual monthly pumping amounts to match the irrigation demand schedule, but this analysis is sufficient for the intended purpose. Table 1 shows all of the input parameters to the Glover Equation used in this analysis (distance from river: x , aquifer width: w , and the T and S parameters). We derived the T and S values from the cells containing the wells in the ESPAM 2.1 model. Table 7 and Figure 8 present the results of this analysis including the pumping inputs, and simulated stream depletions from both well configurations.

Table 7 - Pre- and Post-transfer Pumping Effects

Oscillatory Steady-State Month	Pumping Input (AF/month)	Glover - Configuration A (AF/month)	Glover - Configuration B (AF/month)	ETRAN – Existing Well Locations (AF/month)	ETRAN - New well Locations ¹
Apr	161.25	158.72	151.06	110.0	106.3
May	161.25	160.4	157.93	110.0	106.3
Jun	161.25	160.65	158.97	110.0	106.3
Jul	161.25	160.76	159.47	110.0	106.3
Aug	161.25	160.84	159.75	119.6	107.7
Sep	161.25	160.88	159.95	119.6	107.7
Oct	161.25	160.91	160.08	119.6	107.7
Nov	161.25	160.94	160.19	119.6	107.7
Dec	0.00	2.79	11.54	91.9	103.9
Jan	0.00	1.07	4.48	91.9	103.9
Feb	0.00	0.79	3.29	91.9	103.9
Mar	0.00	0.65	2.7	91.9	103.9

Notes:

1: ESPAM 2.1 does not have sufficient spatial resolution to distinguish between the two well configurations.

For the purposes of this report, it was not necessary to conduct a detailed investigation of why the ETRAN results for the existing wells appear to show quicker stream depletion impacts on the river than the new well locations. However, this is not supported by the current understanding of the aquifer and supports the need for model improvements, such as the improvements made to ESPAM version 2.1 to create ESPAM 2.2.

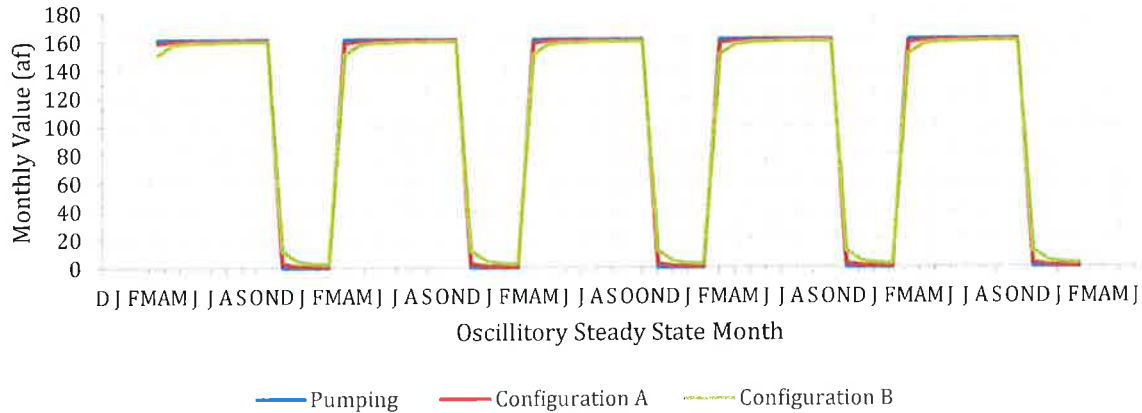


Figure 8 – Glover Analysis Depletion Estimates Comparing Configurations A and B

As shown on Figure 8, the two configurations result in depletive effects at the river that are very similar to the pumping inputs. This is a result of the very short time it takes for the wells to affect the river. Furthermore, the two configurations result in similar effects on the river, which is a function of the high Hydraulic Diffusivity of the aquifer, resulting in fast propagation of pumping effects to the river.

Because of the similarity of depletion estimates, we chose to use Configuration A for comparison to the FROM wells and for different versions of ESPAM. Figure 9 shows the Glover method depletion estimates for the TO and FROM wells using parameters derived from ESPAM 2.1. The TO well depletion estimates are nearly indistinguishable from the pumping pattern. The FROM well depletion estimates show a lagged timing of impacts at the river.

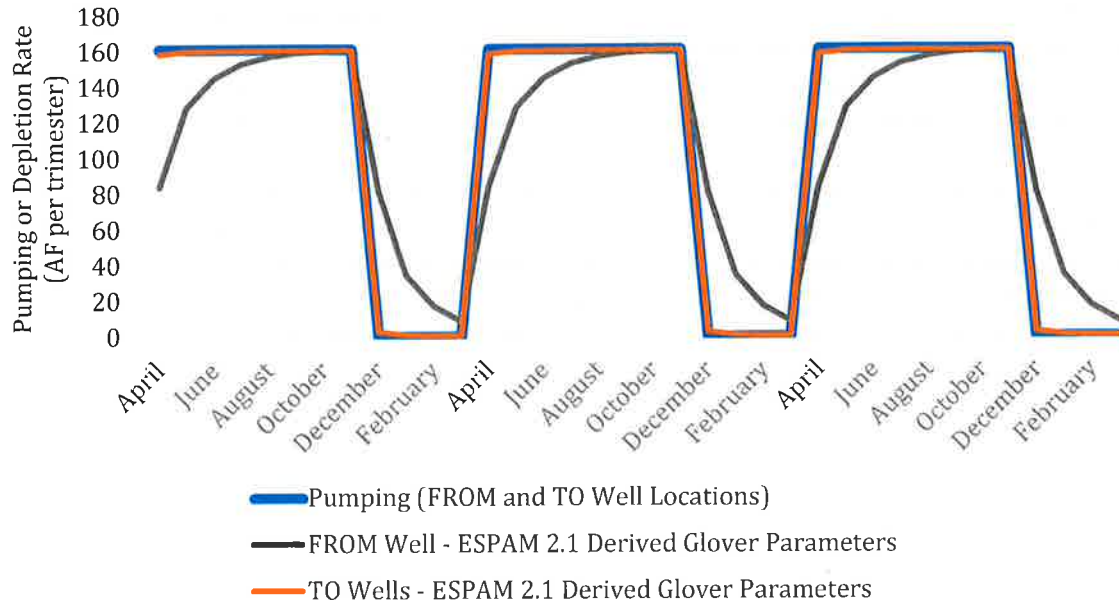


Figure 9 –FROM and TO Well Glover Method Depletion Estimates with ESPAM 2.1 Derived Parameters

An even more accurate depletion estimate comes from using the Glover method with inputs derived from ESPAM 2.2. As shown in Figure 10, the TO wells depletion estimate is again virtually indistinguishable from the pumping pattern. The FROM well depletion pattern shows a lagged timing that results in year-round depletions.

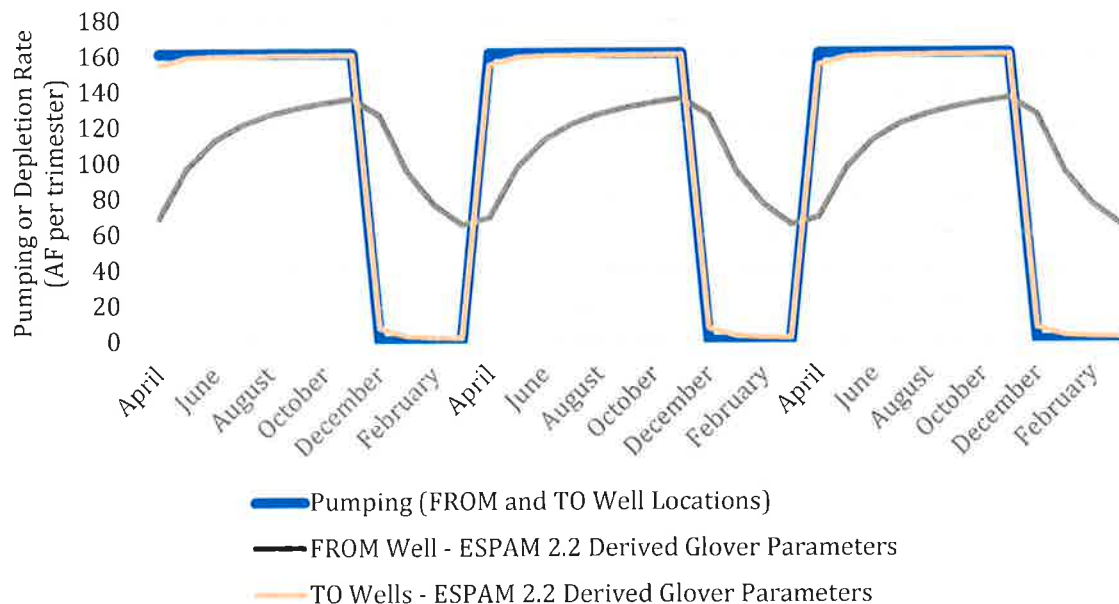


Figure 10 – FROM and TO Well Glover Method Depletion Estimates with ESPAM 2.2 Derived Parameters

SECTION 4: CONCLUSIONS AND SUMMARY OF OPINIONS

4.1 CONCLUSIONS

The LCSC transfer applications Nos. 84488 and 84490 propose to move water rights over 50 miles downstream, drastically changing the location of depletive impacts on the Snake River and associated water rights. The applications propose to move the POD from a well over 16 miles away from the river to shallow/perched well locations less than half of a mile from the river. Moving the PODs to locations so much closer to the river will significantly change the timing and magnitude of depletive impacts.

Even though the inputs and methodology are flawed, the LCSC transfer analysis results using the ETRAN 3.2 tool indicate that mitigation is necessary. The inputs and analysis methodology are flawed because LCSC did not use the associated water rights periods of use and the analysis methodology relies on ESPAM 2.1. LRE Water developed a more accurate analysis using the Glover method with parameters derived from ESPAM 2.2. This method is more appropriate and can be used to show significant depletion impacts as a result of the proposed transfers.

4.2 SUMMARY OF OPINIONS

Below is a numbered list summarizing my detailed opinions regarding LCSC transfer application Nos. 84488 and 84490. I based my opinions on the currently available information and reserve the right to change my opinions should new information become available.

1. The two transfer applications propose to move water rights over 50 miles from Bingham County to Power County from wells over 15 miles away from the river to wells approximately $\frac{1}{4}$ mile or less from the river.
2. The applicant proposes to combine the near Blackfoot to Neeley and Neeley to Minidoka reaches of the Snake River for the purposes of transfer impact analysis and claim that increased depletions in the Neeley to Minidoka reach of the river are offset by the increased reach gains of the Near Blackfoot to Neeley reach. This approach is inconsistent with IDWR transfer analysis procedures, will deplete water rights in the Neeley to Minidoka reach, and will generally decrease the water available to fulfill water rights downstream of Neeley.
3. While preparing the transfer applications on behalf of LCSC, JCH utilized ETRAN 3.2, an outdated version of the IDWR transfer evaluation tool, to evaluate the impacts of the proposed transfers.
4. The only transfer analysis results JCH provided in the applications were screenshots of the ETRAN 3.2 output graphs modified to include the transient results of the non-standard combined reach impacts.
5. The transfer analysis results included show that the transfer depletion impacts for both applications exceed the transient analysis criteria for the Neeley to Minidoka reach. For both transfer applications, the depletive impacts on this reach are greater than 2 AF/trimester and greater than 10% of the pre-transfer depletion.
6. The ETRAN inputs included in the LCSC transfer applications match the transfer details except for the period of use associated with the water rights (April 1 through November 1). We repeated the LCSC analysis using the exact same inputs to show that mitigation is required even when analyzed using IDWR-prescribed methodology and procedures.
7. The application materials were incomplete, did not follow standard transfer analysis procedures and were missing information prescribed in IDWR's ESPA transfer evaluation guidelines (IDWR 2016). The most critical missing information

are the results of steady state and transient transfer impact analysis and the results of the IDWR Mitigation Analysis Spreadsheet.

8. Using LCSC's input information with IDWR transfer analysis methodology and tools, LRE Water determined that transfer application No. 84488 and No. 84490 require mitigation of the Neeley to Minidoka reach because the depletive impacts exceed the steady state and transient mitigation criteria. Both applications also require mitigation of several spring reaches that exceed the transient mitigation criteria.
9. When compared to transfers IDWR evaluated in their Cumulative Transfer Impacts memorandum (Sukow 2021), the LCSC transfer applications are estimated to deplete the Neeley to Minidoka reach by 262.5 AFY, or over 80% of the total net depletive impacts from a comprehensive analysis of 551 historically approved transfers.
10. The LCSC transfer applications propose to transfer water a much greater distance than most of the historically approved transfers. At least 98% of the transfers IDWR evaluated in the cumulative impacts analysis were a shorter distance than the distance proposed by transfer application Nos. 84488 and 84490. At least 83% of the historical transfers were less than one-fifth the distance of the LCSC applications.
11. As proposed by LCSC, pumping transferred water rights from wells in the shallow perched aquifer will cause relatively faster, higher magnitude depletions than the depletions from this historical well.
12. The resolution of the ESPAM 2.1 is insufficient to evaluate stream depletion timing from wells located very close to the river, such as the wells involved in the proposed transfers. The fact that the new proposed well locations are all located within the same grid cell, and that this grid cell contains the river, poses particular difficulty for model simulation and unless some revisions are made, ESPAM 2.1 cannot properly account for the timing from the proposed new well locations.
13. ESPAM Model version 2.1 does not have the spatial resolution necessary to accurately estimate timing effects from this transfer. Other analysis methods other than ESPAM/ETRAN can be used to appropriately evaluate these transfers. Increasing the resolution of the ESPAM model near the Snake River, methods used to downscale the model, or local models may provide acceptable methods to estimate timing effects from the proposed transfer.

14. ESPAM 2.1 has model limitations that make it inappropriate for analysis of the LCSC transfer applications. ESPAM 2.1 issues include calibration, near river grid discretization, storativity, transmissivity at the FROM well, riverbed conductance at the TO wells, and layering. Because ETRAN (versions 3.2 and 3.1) utilizes ESPAM response functions, it is also inappropriate for evaluation of these transfer applications.
15. Based on the relationship between distance and stream depletion timing, transferring water from a location over 16 miles from the river to new locations where the wells are less than a half-mile from the river will result in a substantially different depletion timing pattern at the river.
The two configurations for wells at the transfer-to locations result in pumping effects at the river that are very similar to the pumping inputs. This is a result of the very short time it takes for the wells to affect the river. Furthermore, the two configurations result in similar effects on the river, which is a function of the high Hydraulic Diffusivity of the aquifer, resulting in fast propagation of pumping effects to the river.
16. The LCSC transfer applications Nos. 84488 and 84490 propose to move water rights over 50 miles downstream, drastically changing the location of depletive impacts on the Snake River and associated water rights. The applications propose to move the POD from a well over 16 miles away from the river to shallow/perched well locations less than half of a mile from the river. Moving the PODs to locations so much closer to the river will significantly change the timing and magnitude of depletive impacts.
17. Even though the inputs and methodology are flawed, the LCSC transfer analysis results using the ETRAN 3.2 tool indicate that mitigation is necessary. The inputs and analysis methodology are flawed because LCSC did not use the associated water rights periods of use and the analysis methodology relies on ESPAM 2.1. LRE Water developed a more accurate analysis using the Glover method with parameters derived from ESPAM 2.2. This method is more appropriate and can be used to show significant depletion impacts as a result of the proposed transfers.

SECTION 5: REFERENCES

- Barlow, P.M., and Leake, S.A., 2012, Streamflow depletion by wells—Understanding and managing the effects of groundwater pumping on streamflow: U.S. Geological Survey Circular 1376, 84 p. (Also available at <https://pubs.usgs.gov/circ/1376/>).
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<http://www.ids.colostate.edu/projects.php?project=awas&breadcrumb=IDS+AWAS+-+Alluvial+Water+Accounting+System>.
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- IDWR. 2013. "Enhanced Snake Plain Aquifer Model Version 2.1, Final Report."
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- Peppersack, J. 2009. *Transfer Processing Policies and Procedures*. Administrator's Memorandum, IDWR.
- Sukow, J. 2021. *Cumulative review of ESPA transfers between 2012 and 2020*. IDWR.

Appendix A - Curriculum Vitae for David C. Colvin



PROFESSIONAL SUMMARY

Dave is a Principal Hydrogeologist and Senior Project Manager with over 24 years of experience in groundwater hydrology, water resources, and environmental sciences. He supervises teams of diverse subject matter experts and provides technical leadership to solve today's water resource challenges. Dave serves as the LRE Groundwater Team Leader responsible for managing staff, resources, projects and schedules for a group of hydrogeologists across the West, Midwest and Texas. His technical expertise subject areas include water supply development, groundwater governance & management, surface water/groundwater interaction, riverbank filtration (RBF), soil aquifer treatment (SAT), managed aquifer recharge (MAR), aquifer storage and recovery (ASR), aquifer characterization, groundwater modeling, and subsidence caused by groundwater pumping. He conducts and supervises hydrogeologic investigations involving project management, aquifer testing, 3-D geologic modeling, groundwater flow/transport modeling, uncertainty analysis, hydrogeophysics, water rights, expert testimony, environmental geology, and regulatory support.

EDUCATION

M.S. Environmental Science and
Engineering, Colorado School of
Mines, 2002

B.S. Geology, Syracuse University
1996

PROFESSIONAL REGISTRATION

Professional Geoscientist
Arizona RG#68926
Idaho #PGL-1453
Texas #11440
Wyoming #PG-3602
Kansas #958

Project Management Professional
(PMP) #1749472

EXPERIENCE

2010–Present: **LRE Water**, Denver

PROFESSIONAL ACTIVITIES

AWRA Colorado
2017/2018 Past President
Water Education Colorado
2012 Water Leaders Program
National Groundwater Association
MAR Working Group Member
Colorado Groundwater Association

FEATURED PROGRAM & PROJECT EXPERIENCE

Surface Water Coalition, Idaho (2019-ongoing): Technical representative providing litigation support related to water management of the Eastern Snake Plain Aquifer. Provides protection of surface water flows and water rights from negative impacts due to groundwater pumping. Serves on the Eastern Snake Hydrologic Modeling Committee supporting MODFLOW modeling activities related to complex surface water/groundwater management and water rights administration. Also serves as the SWC representative on two technical working groups overseeing the implementation of a water rights injury mitigation agreement between the SWC and Idaho Ground Water Appropriators overseeing monitoring and implementation of over 240,000 acre feet of recharge annually.

Salt River Project - Gila River Basin Adjudication, Arizona Superior Court Case W1-103, San Pedro Basin, AZ (2018-ongoing): Hydrogeologist providing groundwater analysis and modeling supporting adjudication of water rights in the San Pedro Basin. Tasks include oversight of groundwater modeling, calibration and uncertainty analysis, and trial/litigation support. Provides protection of surface water flows, riparian habitat, and water rights from negative impacts due to groundwater pumping.

City of Aurora – Box Elder Basin Managed Aquifer Recharge (MAR) Feasibility Investigation; Adams County, CO (2018-ongoing): Project Manager and lead hydrogeologist investigating the feasibility of recharging and storing water in the Box Elder alluvial aquifer at the Aurora Center for Renewable Energy (ACRE). Tasks included hydrogeophysical surveys, exploratory drilling/test pits, and infiltration testing. The project identified recharge as a viable option for innovative storage opportunities and has moved into a pilot test planning phase. Current services include recharge source water characterization, water rights and permitting planning, water quality evaluation, groundwater modeling, and pilot system design.

Town of Erie – Water Supply Planning Support (2018-ongoing): Lead hydrogeologist and Project Manager providing groundwater support related to water supply planning. Services include aquifer characterization, water quality studies, horizontal directionally drilled well field design, ASR feasibility analysis, and water rights. Prepared Colorado Water Conservation Board and Division of Local Affairs grant applications to obtain project funding. The project will provide a 3,000 GPM expansion of the Town's water supplies.

City of Northglenn – ASR Feasibility Evaluation and Pilot Test Planning (2020 – ongoing): Lead hydrogeologist and Project Manager for feasibility investigation and pilot test system design services. Support includes feasibility data analysis, water quality evaluation, DWR and EPA UIC permitting, ASR system design and pilot test planning.

Salt River Project – Big Chino Cooperative Agreement #1 Groundwater Modeling and Field Data Collection Oversight; Prescott, AZ (2017-ongoing): Technical Advisor providing oversight of groundwater modeling activities and hydrogeologic field investigation supporting a cooperative agreement between stakeholders evaluating the impacts of groundwater development on critical springs in the Upper Verde River watershed.

City of Aurora – Horizontal Well Pilot Project; Weld County, CO (2019-2020): Project Manager for feasibility evaluation and planning of a pilot facility to test horizontal well options for the City's Prairie Waters System. Investigation targeted increasing yield while maximizing riverbank filtration water quality improvements. Investigation included hydrogeophysical surveys, exploratory drilling, aquifer testing, and groundwater modeling. Results included design of horizontal wells that maintain the existing system water quality while providing adaptable system operations that can increase yield during drought demands. Currently the Lead Hydrogeologist providing design phase services.

Town of Castle Rock – Groundwater Support; Douglas County, CO (2015-ongoing): Project Manager providing comprehensive groundwater support. Projects have included:

- *Denver Basin Well Drilling, Testing, and Aquifer Storage and Recovery (ASR)* – Support includes Denver Basin ASR planning/permitting, bidding services, contractor management, construction oversight, well/pump design, aquifer testing, and groundwater regulatory support.
- *Alluvial Well Field Expansion and Rehabilitation* – Project Manager for two projects aimed at improving yields in well fields affected by biofouling and performance issues. Oversaw construction and testing of six horizontal directional drilled (HDD) wells installed to increase yield, performance, and sustainability.

City of Aurora – Prairie Waters North Campus Master Plan; Adams and Weld Counties, CO (2017-2019): Lead hydrogeologist providing master planning services for approximately 20 MGD expansion of the Prairie Waters Project – North Campus over the next 20 years. Facility expansion included riverbank filtration well field, pipelines, and storage reservoirs. Led facilities operational planning, supported water resource planning, gap analysis, and capital improvements planning.

City of Greeley – ASR Feasibility Evaluation (2019-ongoing): Senior Technical Advisor for a project evaluating the feasibility of new and existing ASR projects in multiple bedrock aquifers. Includes evaluation of water quality, aquifer characteristics, well construction/testing, project planning, and regulatory support, including negotiating an EPA UIC Rule Authorization in less than two months.

Eagle River Water and Sanitation District and Upper Eagle Regional Water Authority – Groundwater Support; Eagle County, CO (2010-2019): Project Manager and lead Hydrogeologist for alluvial well field groundwater support. Projects have included:

- *GWUDI Evaluation* – Regulatory support, groundwater modeling and operational monitoring of alluvial well fields in support of CDPHE GWUDI evaluation
- *Lake Creek Well Field Planning* – Services included groundwater modeling, well drilling, aquifer testing, source water quality characterization, regulatory support for Eagle County 1041, CDPHE, and DWR permitting
- *Well field maintenance and rehabilitation support* – well rehabilitation in response to well issues including pump issues, casing holes, and water quality contamination

Dominion Water and Sanitation District – Groundwater Support; Douglas County, CO (2015-ongoing): Denver Basin groundwater supply planning services including water rights evaluation, water quality assessment, well field yield estimation and project planning. Technical support included documentation for County hearings, interactions with local water agencies, and groundwater sale transactions.

Denver Water – Aquifer Storage and Recovery (ASR) Pilot Project, City and County of Denver, CO (2016-2018): Groundwater technical and project management for ASR feasibility investigation. Provided Denver Basin aquifer characterization including exploratory borehole drilling, hydrogeophysical investigation (Nuclear Magnetic Resonance and conventional methods), and 3-D geologic modeling.

Colorado Water Conservation Board - HB16-1256 South Platte Storage Study; CO (2018): Lead hydrogeologist providing evaluation of underground water storage options for the Lower South Platte alluvial aquifer. Provided alluvial storage site evaluation, conceptual design, cost estimates, and comparison to surface storage options.

City of Steamboat Springs – Infiltration Gallery System Expansion; Routt County, CO (2018-ongoing): Project Manager for feasibility evaluation of alluvial groundwater supply expansion alternatives. Expansion options being considered include vertical and horizontal well options. Tasks included exploratory drilling, aquifer testing, groundwater modeling and conceptual expansion system design. Modeling was performed to optimize well siting to maximize yield, maintain water quality, and to minimize pipeline costs.

City of Aurora and Town of Castle Rock – Lost Creek Underground Storage Pilot Project; Lost Creek Designated Basin, CO (2017-2018): Project Manager for aquifer characterization and evaluation of recharge potential for underground water storage pilot project. Obtained grant funding and facilitated multiple stakeholder project planning and implementation. The project identified important field investigation methods and results for storage related aquifer characteristics previously overlooked in desktop studies.

Texas Water Development Board – Statewide Subsidence Risk Evaluation (2018): Technical advisor for risk evaluation of subsidence due to groundwater pumping in all Texas major and minor aquifers. The project used well lithology data with model predicted water level declines to create a statewide risk map and prioritized table. Recommended follow up actions for identified areas of risk. The project provided important subsidence risk information for statewide planning and local user considerations.

Village at Taos Ski Valley – Spring Water Supply Expansion; Taos County, NM (2018-ongoing): Senior Technical Advisor providing groundwater evaluation into the management, protection and expansion of spring water supplies.

City of Phoenix – ASR Tracer Test Design; Maricopa County, AZ (2017): Provided MT3D groundwater modeling to assist in aquifer characterization, travel time estimates, and the design of an ASR tracer injection test for feasibility. The testing was in support of the Northeast Phoenix Reclaimed Water Recharge and Recovery Study. The system is intended to create a potable water resource through Indirect Potable Reuse (IPR), provide additional non-potable supplies, and to mitigate land subsidence issues.

Groundwater Relief – Kutupalong Refugee Camp Groundwater Supplies; Cox's Bazaar, Bangladesh (2019): Volunteer hydrogeologist providing well testing and water quality support to field geologists. The project is developing emergency water supplies for nearly 1 million Rohingya refugees who have fled religious persecution in Myanmar.

City of San Angelo – Riverbank Filtration Feasibility Evaluation; Tom Green County, TX (2018): Provided feasibility evaluation, preliminary siting, design and costs for a potential riverbank filtration (RBF) well field near the Concho River. This information was used to evaluate RBF as an alternative for expansion of the City's water supply.

Tarrant Regional Water District – Cedar Creek Wetlands; Kaufman County, TX (2013): Project manager and lead Hydrogeologist for riverbank filtration feasibility investigation along the Trinity River. Project tasks include geotechnical, hydrogeologic, and surface geophysical surveys, groundwater modeling, and design, construction and testing of riverbank filtration pilot test sites.

Rangen, Inc. – Water Rights Support; Gooding County, ID (2010-2016): Expert witness providing testimony and trial support for a water rights hearing (IDWR Case No. CM-DC-2011-004) involving springs and complex surface

water/groundwater interaction of the Eastern Snake Plain Aquifer. Represented a fish hatchery reliant on spring flow that was being impacted by groundwater pumping. Served on the Eastern Snake Plain Hydrologic Modeling Committee supporting MODFLOW modeling activities in the Eastern Snake Plain of Idaho.

Overturf, McGath, and Hull, P.C. – Stewart No. 1 Ditch Company; Pitkin County, CO (2017): Expert witness support including expert and rebuttal reports, depositions, and settlement negotiations for a civil case involving alleged roadway water damage from ditch operations.

Fredrickson Law Offices – In-Play Golf; Weld County, CO (2017): Expert witness providing expert and rebuttal reports, depositions, and trial support for a civil case involving alleged water damages from golf course irrigation.

Boulder Valley School District – Douglass Elementary Non-Tributary Well Support; Boulder County, CO (2018): Project Manager for a non-tributary well application in the Boulder Complex Area of the Denver Basin Aquifers. Provided aquifer characterization and regulatory support leading to a non-tributary determination and permit approval.

Boulder County Parks and Recreation – Kenosha Ponds Groundwater Evaluation; Boulder County, CO (2016): Expert witness providing hydrogeology water rights support for a Boulder County Parks and Recreation augmentation pond. Technical support included expert report writing and trial exhibit preparation for the hydrologic characterization of a recharge pond between two streams where the pond bottom was below the water table.

City of Burkburnett, Texas – Alluvial Well Field Evaluation; Wichita County, TX (2016): Project Manager and groundwater lead for evaluation of underperforming well fields near the Red River. Wells ranged from 3-50 years old with a variety of issues causing low yields. Project tasks included well operational data integration, analysis, and development of alternatives to improve well yields.

Penrose Water District – Arkansas River Alluvial Well Field; Fremont County, CO (2016): Groundwater technical management for planning, design, and construction of an alluvial well field for diversion of Arkansas River water rights. Tasks included aquifer characterization, water rights support, groundwater modeling, contractor management, well drilling, construction and testing.

Salt River Project – New River Agua Fria Underground Storage Project; Phoenix, AZ (2013): Project involved optimization and in-channel expansion design for an existing recharge facility. Support included evaluation of operational data and adaptation of an existing MODFLOW model for operational optimization and feasibility testing.

City of San Marcos, Texas – Well Performance Investigation and Replacement Plan; Hays County, TX (2015): Project Manager and groundwater lead for investigation into reduced yield problems for a well in the Edwards Aquifer. Well construction and operational data were analyzed to test viability of rehabilitation or equipment replacement. Provided ultimate solution of siting a replacement well in a more productive aquifer area.

Oakwood Homes – Neighborhood Scale Dewatering Systems and Water Rights; CO (2016): Project Manager and groundwater lead for planning, design, and permitting of neighborhood scale dewatering systems. Managed project work including groundwater modeling, system design, data analysis, contractor coordination, DWR and CDPHE permitting, and water rights evaluations.

Winkler Services – Well Field Siting and Design; Wink County, Texas (2017): Technical advisor for well field siting in the Pecos Valley Alluvium and Upper Dockum Aquifer. Support included project planning, aquifer characterization, and geologic modeling.

Donala Water and Sanitation District – Reuse Evaluation; El Paso County, CO (2015): Preliminary feasibility investigation into riverbank filtration alternatives for indirect potable reuse. Evaluated hydrogeologic conditions for permitting, cost, and performance feasibility considerations.

Confidential Client; Groundwater Supply and Subsidence Analysis; AZ (2011): Development of regional MODFLOW models used to estimate well field yield and land subsidence due to groundwater pumping in Arizona. Work included statewide study of subsidence-related empirical relationships and prediction methods, aquifer characterization, 3-D geologic and groundwater flow modeling, automated model calibration and predictive uncertainty analysis using PEST, and numerical MODFLOW subsidence modeling.

City of Scottsbluff – Well Field Uranium Investigation and Monitoring; Scotts Bluff County, NE (2016): Technical advisor for a project aimed at reducing uranium concentrations in an alluvial groundwater supply. Provided aquifer characterization and uranium monitoring data analysis.

Confidential Client - Oilfield Produced Water Infiltration Modeling, San Louis Obispo County, CA (2010): Lead Hydrogeologist for the development of an engineering design MODFLOW-SURFACT model with the goal of infiltrating 13 acre-feet of water per day into the subsurface of a 200 acre alluvial site. Performed model calibration using PEST software in a parallel processing environment utilized 50 geologic conceptualizations for stochastic predictions of system performance.

CDPHE – Summitville Superfund Site; Summitville, CO (2008): Provided support for abandoned mine hydrology and geochemistry, field sampling, monitoring and mine facility inspection, and database support. The project goal was to monitor and minimize mine waste impacts on the Alamosa River.

Various Mines – Groundwater Modeling and Analysis; Basin and Range Province; NV (2010): Provided MODFLOW modeling and water balance studies in support of mine water management and regulatory reporting. Analyses included point flow surface water modeling to evaluate stream gain/loss; detailed water balance quantifications; well inventories and pumping estimates; groundwater underflow assessments.

Aurora Prairie Waters Project – North Campus; Weld County, CO (2008): Supported City of Aurora's Prairie Waters project near the South Platte River, CO. Acted as team liaison for multi-consultant, multi-disciplinary project team. Field investigation and construction tasks included field oversight of drilling, well construction, pump/motor installation, aquifer testing, system start up testing, well field yield optimization, and geotechnical investigations. Support also included the design, construction, and operation of alluvial recharge and riverbank filtration pilot test facilities. Developed and implemented pilot test procedures, including tracer studies to assess flow paths, travel times, and stream/aquifer interaction. *MODFLOW modeling support for the Prairie Waters Project included development of regional groundwater model for Colorado Division 1 case 2006CW104. Performed parallel processing model calibration using UCODE. Prepared expert and rebuttal reports, exhibits and materials used in settlement negotiations.*

Miron Construction - Laramie-Fox Hills Well; Hudson, Colorado (2008): Assisted in design and field engineering for the construction and testing of a 960-foot deep, large capacity, municipal/industrial, Laramie-Fox Hills water supply well at the Hudson Correctional Facility.

Perini/US Army Corps of Engineers – Groundwater System Design and Optimization; Baghdad, Iraq (2007): MODFLOW modeling support for the U.S. Agency for International Development in Baghdad, Iraq. Developed a numerical groundwater model for the optimization of water supply well locations and pumping operations. Main objectives were to maximize well yields while minimizing differential land subsidence across newly constructed East End Barracks.

Colorado Haiti Project (Volunteer Position); Petit Trou de Nippes, Haiti (2013): Technical advisor for aquifer development, management, and protection in a rural, developing area of Haiti.

Water For People Groundwater Management Project (Volunteer Position); San Pedro Sula, Honduras (2008): Technical advisor for development of a scope of work for a participatory groundwater management plan aimed at restoring and protecting an over utilized alluvial aquifer in a developing region.

ASARCO - California Gulch Superfund Site; Leadville, Colorado (2000-2005): Conducted environmental sampling for the Kids First Program to identify and address sources of lead exposure for children in residential areas. Provided statistical analysis and reporting for evaluation of program effectiveness. Designed sampling plan and performed soil sampling and analysis to delineate extent of metals contamination at the Arkansas Valley Smelter Operable Unit. Provided technical support for hydrogeological and geochemical characterization of the Apache Tailings site; and implemented the surface water and groundwater performance monitoring program to assess the effectiveness of the remedial action. Conducted synoptic surface water flow measurement and water quality sampling.

Asarco - Omaha Lead Site, Omaha, Nebraska (2003): Assisted in the development of program to identify sources of lead exposure for children in residential areas.

Mine Waste and Tailings Pile Sites, Various Locations (2000-2004): Performed hydrologic evaluation of remedial alternatives for repository evaluation using Hydrologic Evaluation of Landfill Performance (HELP) model.

Industrial Groundwater Contamination Sites, Various Locations (2000-2005): Performed groundwater modeling to assist design of groundwater extraction remediation wells using MODFLOW modeling code.

EPA - Vasquez Boulevard and Interstate 70 Superfund Site, Denver, Colorado (2002): Designed, directed, and performed environmental sampling for project intended to identify sources of lead and arsenic exposure for children in residential areas.

Hertz Rent-a-Car - Former Underground Storage Tank, Colorado Springs, Colorado (2002): Project Hydrogeologist and technical lead for the characterization, monitoring, and remediation of hydrocarbon contaminated soils and groundwater at a former underground storage tank site. Performed quarterly monitoring and reporting; developed and implemented an in-situ chemical oxidation remediation program.

R&R Super Service - Former Underground Storage Tank, Arvada, Colorado (2002): Project Manager and technical lead for the characterization and remediation of soils and groundwater contaminated by petroleum hydrocarbons at a former service station. Responsibilities included client and regulatory interaction; site characterization activities to delineate the nature and extent of contamination in soil and groundwater; modeling of vapor and mass extraction rates using VENT2D; respirometry testing to quantify biodegradation rates in vadose zone soils; startup testing; operating, maintaining, and monitoring of an air sparge/soil vapor extraction system.

City and County of Denver - Former Stapleton International Airport Remediation; Denver, Colorado (2000): Served as a hydrogeologist conducting field investigations to define nature and extent of hydrocarbon contamination and to determine remediation. Field tasks included lithologic logging with a hollow-stem auger and direct-push drilling rigs; soil, groundwater, and soil vapor testing, remediation system construction/operation/maintenance, data evaluation and reporting.

National Park Service – Mt. Rainier National Park, Longmire, Washington (1996-1997): Biologist and crew leader for aquatic ecosystem studies in Mt. Rainier National Park. Conducted field surveys in sub-alpine wetland monitoring. Performed aquatic field sampling, wetland classification, biological species identification, and aquatic laboratory analyses.

PRESENTATIONS & PUBLICATIONS

Colvin, Dave, 2020. "Moving from Conflict to Collaboration: The Role of MAR in Mitigating Groundwater Pumping Impacts to Surface Water" 17th Biennial Symposium on Managed Aquifer Recharge. Tempe, AZ.

Colvin, Dave, 2020. "*Drawing the Line in the Sand between Underground Water Storage and Augmentation Recharge*." American Water Resources Association – Colorado Chapter & Colorado Groundwater Association Joint Annual Symposium. Denver, CO

Colvin, Dave, 2019. "*Demonstrating Dominion and Control – Moving from Black Magic to Understandable Science*." American Groundwater Trust Annual Colorado Groundwater Conference. Denver, CO.

Colvin, Dave, 2019. "*Now We Know What We Don't Know: An ASR Regulatory Update*". Colorado Groundwater Association September Meeting. Denver, CO.

Colvin, Dave, 2019. "*The Evolution of Colorado Underground Water Storage Administration*". American Water Resource Association / Colorado Groundwater Association 2019 Joint Annual Symposium. Denver, CO.

Colvin, Dave, 2018. "*Technical Considerations for ASR Planning in Colorado's Front Range*". American Groundwater Trust Annual Colorado Groundwater Conference. Denver, CO.

Colvin, Dave, 2018. "*ASR Panel Discussion: The Revolution of Subsurface Water Storage*". American Water Works Association ACE18 Conference. Las Vegas, Nevada.

Colvin, Dave, and Keester, Michael, 2017. "*Applying Web-Based Information Management Tools to Increase Efficiency and Expand Opportunities for Groundwater Conservation Districts*". Texas Association of Groundwater Districts Groundwater Summit. San Marcos, TX.

Colvin, Dave, and Pence, Rachel, 2017. "*Using NMR and Hydrogeophysics to Evaluate ASR Feasibility in the Denver Basin*". 2017 NGWA Conference on Hydrogeophysics and Deep Groundwater, Denver, CO. (<https://ngwa.confex.com/ngwa/hdg2017/webprogram/Paper11286.html>)

Colvin, Dave, and Justus, Heather, 2016. "*Benefits of Directionally Drilled Alluvial Well Lateral Arms in the Town of Castle Rock*". 2016 RMSAWWA/RMWEA Joint Annual Conference, Keystone, CO.

Colvin, Dave, and Furnans, Jordan, 2016. "*Can/Should Texas learn from Colorado? A primer on groundwater-surface water interactions and regulation methods*". 2016 Texas Water Conservation Association Spring meeting, Woodlands, TX. (<http://www.slideshare.net/TWCA/twca-annual-convention-canshould-texas-learn-from-colorado-jordan-furnans-and-dave-colvin>)

Colvin, Dave, 2015. "*Methods for Confident Model Predictions and Integration*". Colorado Water Congress 2015 Annual Conference; DARCA Workshop Series, "The Next Step: Modeling Colorado's Water Plan", Denver, CO.

Colvin, Dave, 2014. "*Groundwater Challenges and Solutions for Colorado Watersheds*." 2014 Colorado Sustaining Watersheds Conference, Avon, CO.

Colvin, Dave and Loopesko, William, 2014. "*Advantages of Alluvial Aquifer Storage Alternatives for Managing Hydrologic Extremes and Future Water Supply Risks*." 2014 Upper Colorado River Basin Water Forum, Grand Junction, CO.

Colvin, Dave, 2014. "*Groundwater Solutions for Indirect Potable Reuse*." 2014 Rocky Mountain Water Reuse Workshop, Golden, CO.

Colvin, Dave, Bauer, Jacob, and Noack, Tim, 2013. "*Effective Tools and Project Planning for Riverbank Filtration Feasibility Investigation*" Poster session at 2014 Texas Water, Dallas, TX. (http://s3.amazonaws.com/eventmobile-assets/events/txwater14/documents/person/1366969/201404_RBF_Feasibility_Poster_Final.pdf)

Colvin, Dave, and Bauer, Jacob, 2013. "Cost Effective Feasibility Investigation of Natural Subsurface Reuse Treatment Systems." Poster session at the 2013 National Water Reuse Symposium, Denver, CO.

Colvin, Dave, and Neupauer, Roseanna, 2013. "Riverbank Filtration Feasibility Modeling." MODFLOW and More 2013. Integrated Groundwater Modeling Center. Golden, CO.

Colvin, David C., 2012. "Comparison of One and Three Dimensional MODFLOW Subsidence Results." 2012 Groundwater Summit, National Groundwater Association, Westerville, OH.

Colvin, David C., 2012. "One Dimensional MODFLOW Modeling of Land Subsidence Due to Fluid withdrawal." GSA 2012 Cordilleran Section Meeting, Vol. 44, No. 3. Geological Society of America. Boulder, CO.

EXPERT TESTIMONY

Dave has provided expert testimony in trial or depositions in the following cases:

Idaho Surface Water Coalition; Idaho Department of Water Resources Docket No. AA-GWMA-2016-001, Order Designating the Eastern Snake Plain Aquifer Groundwater Management Area, February 2020

Stewart No. 1 Ditch Company; Pitkin County Case No: 2014CV30084, Pitkin County Board of County Commissioners v. Brothers, et. al., September, 2015.

In-Play Golf, Inc; Weld County Case 12CV727, Helen Hawkins et. al. v. Vista Ridge Development Corporation et. al., August, 2015.

Rangen, Inc.; In the Matter of Application for Water Rights Permit No., 36-17011, February, 2015.

Rangen, Inc.; Idaho Department of Water Resources Case No. CM-DC-2011-004, Distribution of Water To Water Right Nos. 36-02551 and 36-07694, May, 2013.

EXPERT REPORTS

Dave has performed groundwater analysis, provided assistance in settlement negotiations, and authored or contributed to reports in the following cases.

Idaho Surface Water Coalition; Idaho Department of Water Resources Docket No. AA-GWMA-2016-001, Order Designating the Eastern Snake Plain Aquifer Groundwater Management Area, February 2020

Salt River Project; AZ Big Chino Cooperative Agreement #1, Evaluation of Big Chino Water Ranch impacts on Upper Verde Springs discharge, 2016 - ongoing.

Salt River Project; AZ Gila River Adjudication Contested Case No. W1-103, Groundwater adjudication and subflow depletion evaluation, 2017 – ongoing.

In-Play Golf, Inc; Weld County Case 12CV727, Helen Hawkins et. al. v. Vista Ridge Development Corporation et. al., August, 2015.

Stewart No. 1 Ditch Company; Pitkin County Case No: 2014CV30084, Pitkin County Board of County Commissioners v. Brothers, et. al., September, 2015.



Rangen, Inc.; In the Matter of Application for Permit No., 36-17011, February, 2015.

Rangen, Inc.; Idaho Department of Water Resources Case No. CM-DC-2011-004, Distribution of Water To Water Right Nos. 36-02551 and 36-07694, May, 2013.

Boulder County Parks and Open Space; CO Division 1 Case No. 2010CW320, Change of Use and Plan for Augmentation for Kenosha Ponds Open Space, 2013.

City of Aurora; CO Division 1 Case No. 2006CW104, Aurora's Prairie Waters Project, 2007.

Travis L. Thompson, ISB #6168
 Sarah W. Higer, ISB #8012
BARKER ROSHOLT & SIMPSON LLP
 163 Second Avenue West
 P.O. Box 63
 Twin Falls, Idaho 83303-0063
 Telephone: (208) 733-0700
 Email: tlh@idahowaters.com
swh@idahowaters.com

W. Kent Fletcher, ISB #2248
FLETCHER LAW OFFICE
 P.O. Box 248
 Burley, Idaho 83318
 Telephone: (208) 678-3250
 Email: wkf@pmt.org

*Attorneys for American Falls Reservoir
 District #2 and Minidoka Irrigation District*

*Attorneys for A&B Irrigation District, Burley
 Irrigation District, Milner Irrigation District,
 North Side Canal Company, and Twin Falls Canal
 Company*

**BEFORE THE DEPARTMENT OF WATER RESOURCES
 OF THE STATE OF IDAHO**

IN THE MATTER OF	)	
APPLICATION FOR TRANSFER	)	
NOS. 84488 AND 84490 IN THE	)	DECLARATION OF DAN TEMPLE
NAME OF LCSC ENTERPRISES	)	
LLC	)	
	)	
	)	
_____	)	

I, Dan Temple, hereby declare and state as follows:

1. I am over the age of 18 and have knowledge of the attached documents pertinent to this matter, and make this declaration based upon personal knowledge and experience. I live at 175 W. 750 Lane N., Rupert Idaho 83350.

2. I recently retired from the general manager position at the A&B Irrigation District ("District"). I held that position from 1997-2021. I worked for the District for over 40 years, including in the electrical mechanical division and as a foreman.

3. As part of my duties with the District I became familiar with well drilling techniques, well deepening projects, reviewing and interpreting well logs, and groundwater supplies in the region. I am also familiar with all aspects of well construction, including casing, and how water enters a well and is available for pumping.

4. The A&B irrigation project was initiated by the United States Bureau of Reclamation (Reclamation) as the North Side Pumping Division of the Minidoka Project within Jerome and Minidoka Counties. A&B operates two divisions within the irrigation project, Units A and B. Landowners within Unit A receive surface water from a pumping plant ("Plant #1") on the Snake River. The water is pumped to a main canal and then distributed by various laterals and pipelines. Landowners within Unit B primarily receive groundwater from 180 wells. Certain lands in Unit B, approximately 3,500 acres, can receive surface water through conversion projects and the development of Plant #2. Together, approximately 650 landowners within the two units irrigate approximately 82,000 acres.

5. The District holds decreed surface water rights to the Snake River and groundwater rights to the Eastern Snake Plain Aquifer (ESPA). The District also holds storage water rights in American Falls Reservoir (46,826 acre-feet) and Palisades Reservoir (90,800 acre-feet).

7. Given my experience in the construction and deepening of groundwater wells and familiarity with the area's groundwater supplies, I was requested by the Surface Water Coalition to review the proposed transfers in this proceeding filed by LCSC.

8. I reviewed the following documents in preparing this declaration.

- a. Application for Transfer No. 84488;
- b. Application for Transfer No. 84490;

c. USGS / IDWR Monitoring Well Information & Data (Ex. A), and information supplied by LCSC's counsel Rob Harris related to existing irrigation wells;

d. Google Earth surface elevation information; and

e. Map of Proposed Wells; (Ex. B)

9. The water right subject to the proposed transfers, 35-14041, currently authorizes pumping from a well in Bingham County located northwest of Blackfoot, Idaho.

10. Transfer No. 84488 proposes to move the location of a part of water right 35-14041 and pump water from existing irrigation wells located in Section 24, Township 9S Range 28E and Section 18, Township 9S, Range 29E, Power County, Idaho.

11. Transfer No. 84490 proposes to move the location of the balance of water right 35-14041 and add two new groundwater wells adjacent to the Snake River in Sections 19 and 20, Township 9South, Range 29East, Power County, Idaho.

12. Based on my review of available information, including a review of Google Earth, the ground surface elevation for the two new proposed wells under Transfer No. 84490 is approximately 4,205 ft (Sec. 19) and 4,203 ft (Sec. 20). Evaluating area ground water levels from other monitoring wells I would expect the static water level at this location to be approximately eight (8) to ten (10) feet below the ground surface elevation.

13. Given the close proximity to the Snake River it is likely that groundwater at the proposed wells is influenced by surface water levels in the Snake River and the operation of Lake Walcott.

14. Even if these wells are constructed with casing down to 39 feet as required by IDWR, it is my opinion that pumping water at these locations would have an immediate impact on the Snake River.

15. In addition, casing the well does not ensure that water adjacent to the casing cannot enter the well. Water in the aquifer outside the casing can enter the well by surrounding pressure to push water back up into the well to the static level of the water located outside the well.

I declare under penalty of perjury under the laws of the State of Idaho that the foregoing is true and correct.

DATED this 16th day of July, 2021.


Dan Temple

CERTIFICATE OF SERVICE

I certify that on July 16, 2021, I served true and correct copies of the foregoing
Declaration of Dan Temple upon the following by the method indicated:

James Cefalo
Idaho Department of Water Resources
900 North Skyline Drive, Suite A
Idaho Falls, Idaho 83402-1718
james.cefalo@idwr.idaho.gov

☒ U.S. Mail, Postage Prepaid
☐ Hand Delivery
☐ Overnight Mail
☐ Facsimile
☒ Email

Robert L. Harris
Holden, Kidwell, Hahn & Crapo,
PLLC
P.O. Box 50130
Idaho Falls, Idaho 83405
rharris@holdenlegal.com

☐ U.S. Mail, Postage Prepaid
☐ Hand Delivery
☐ Overnight Mail
☐ Facsimile
☒ Email

LCSC Enterprises LLC
433 Las Colinas Blvd. E., Ste. 1290
Irving Texas 75039-5058
jasoncivil@alumni.nd.edu

☐ U.S. Mail, Postage Prepaid
☐ Hand Delivery
☐ Overnight Mail
☐ Facsimile
☒ Email

Scott Pugrud
Idaho Power Company
P.O. Box 70
Boise, Idaho 83707
SPugrud2@idahopower.com

☐ U.S. Mail, Postage Prepaid
☐ Hand Delivery
☐ Overnight Mail
☐ Facsimile
☒ Email

John K. Simpson
Barker Rosholt & Simpson LLP
1010 Jefferson, Suite 102
P.O. Box 2139
Boise, Idaho 83701-2139
jks@idahowaters.com

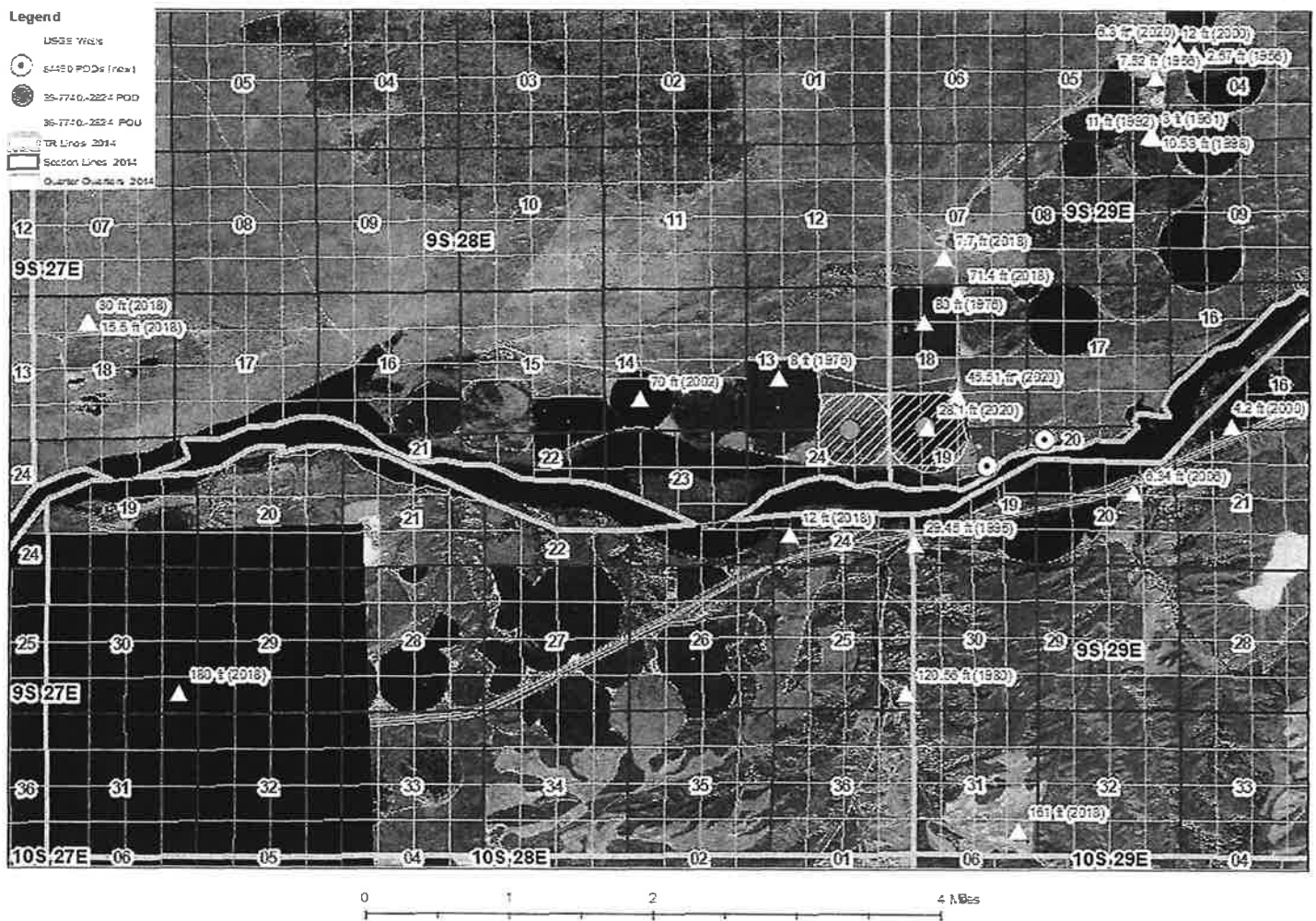
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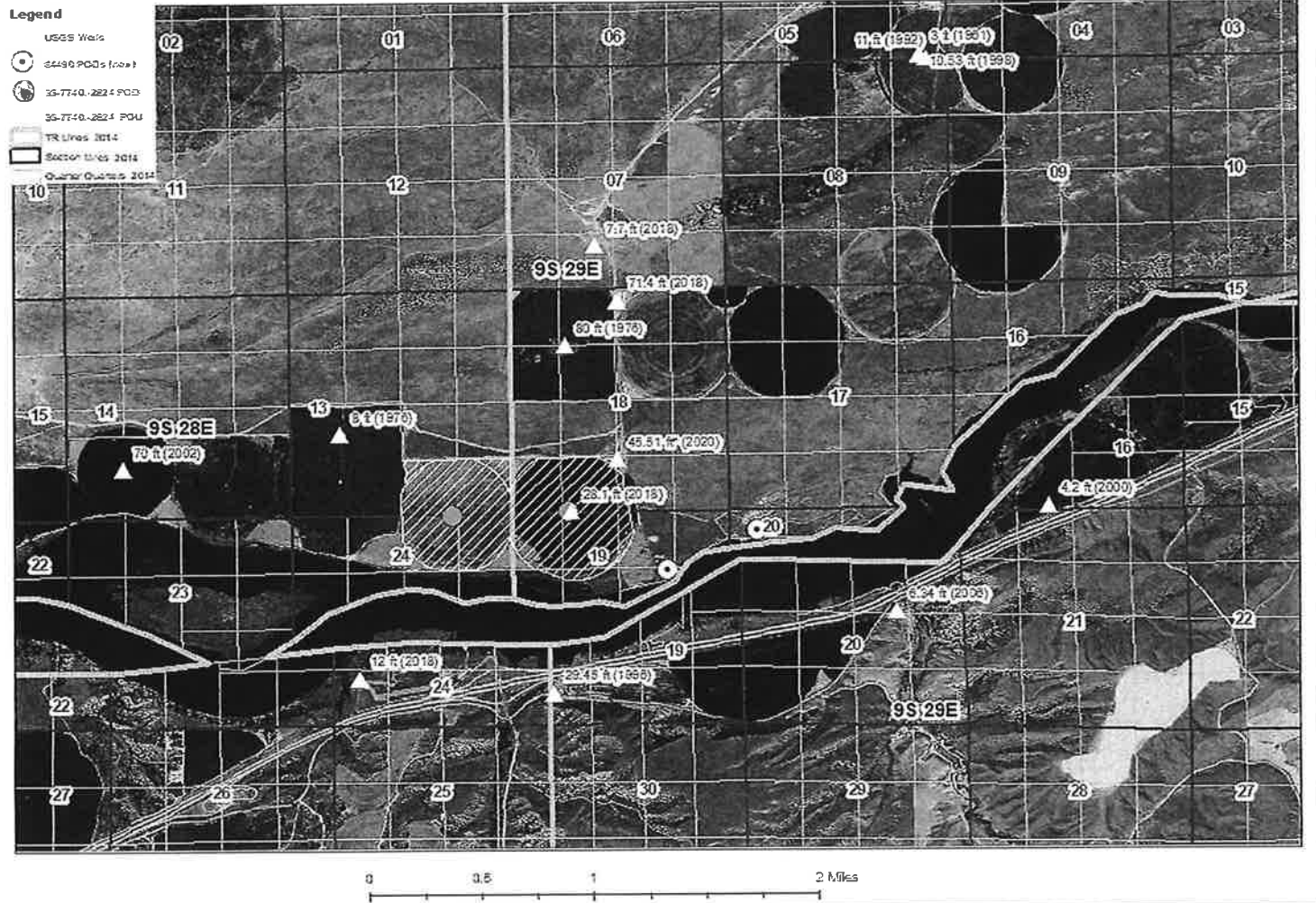
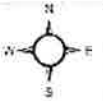
Sarah W. Higer

Exhibit A

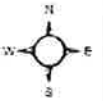
LCSC WATER RIGHTS



LCSC WATER RIGHTS

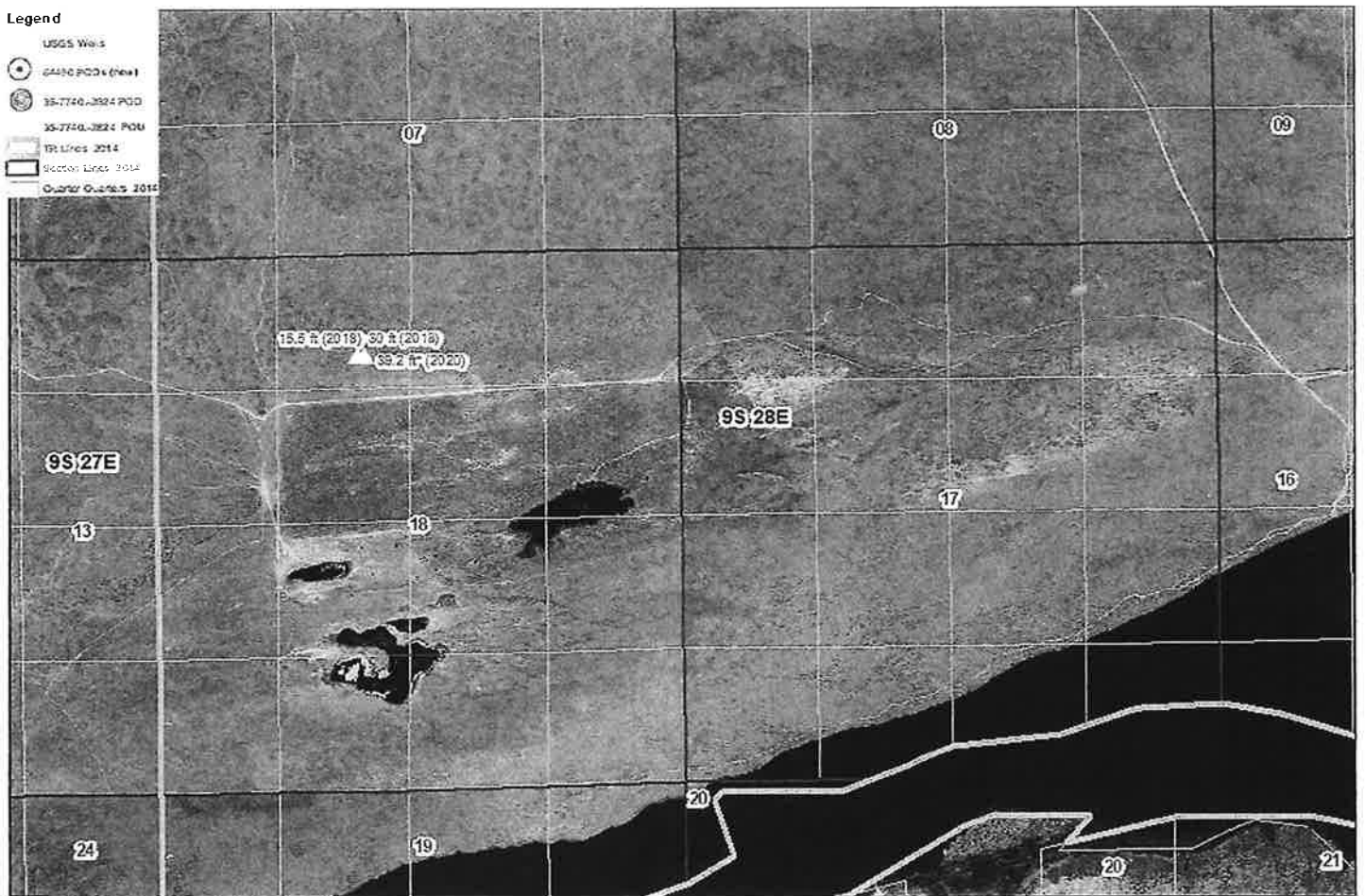


LCSC WATER RIGHTS

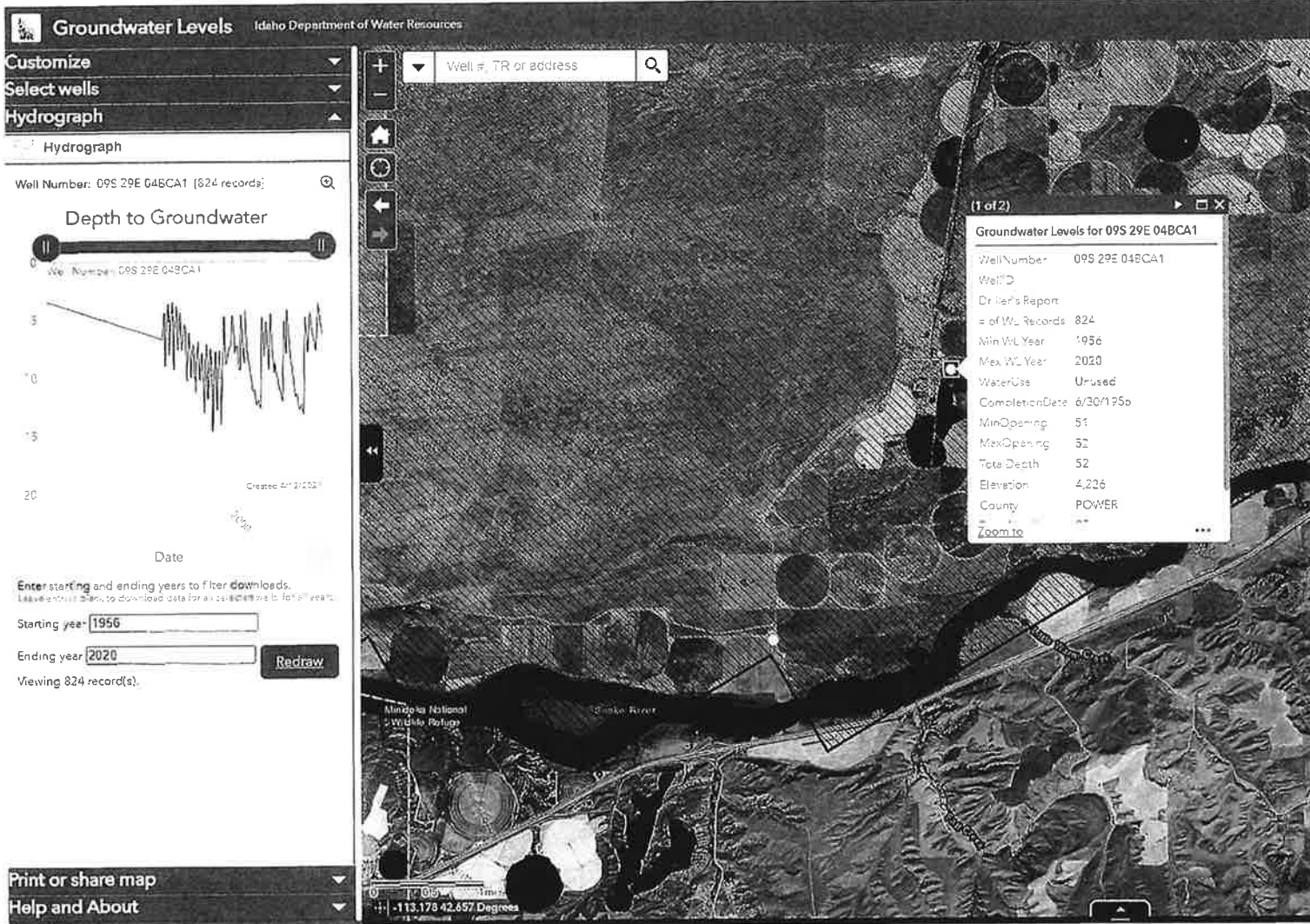


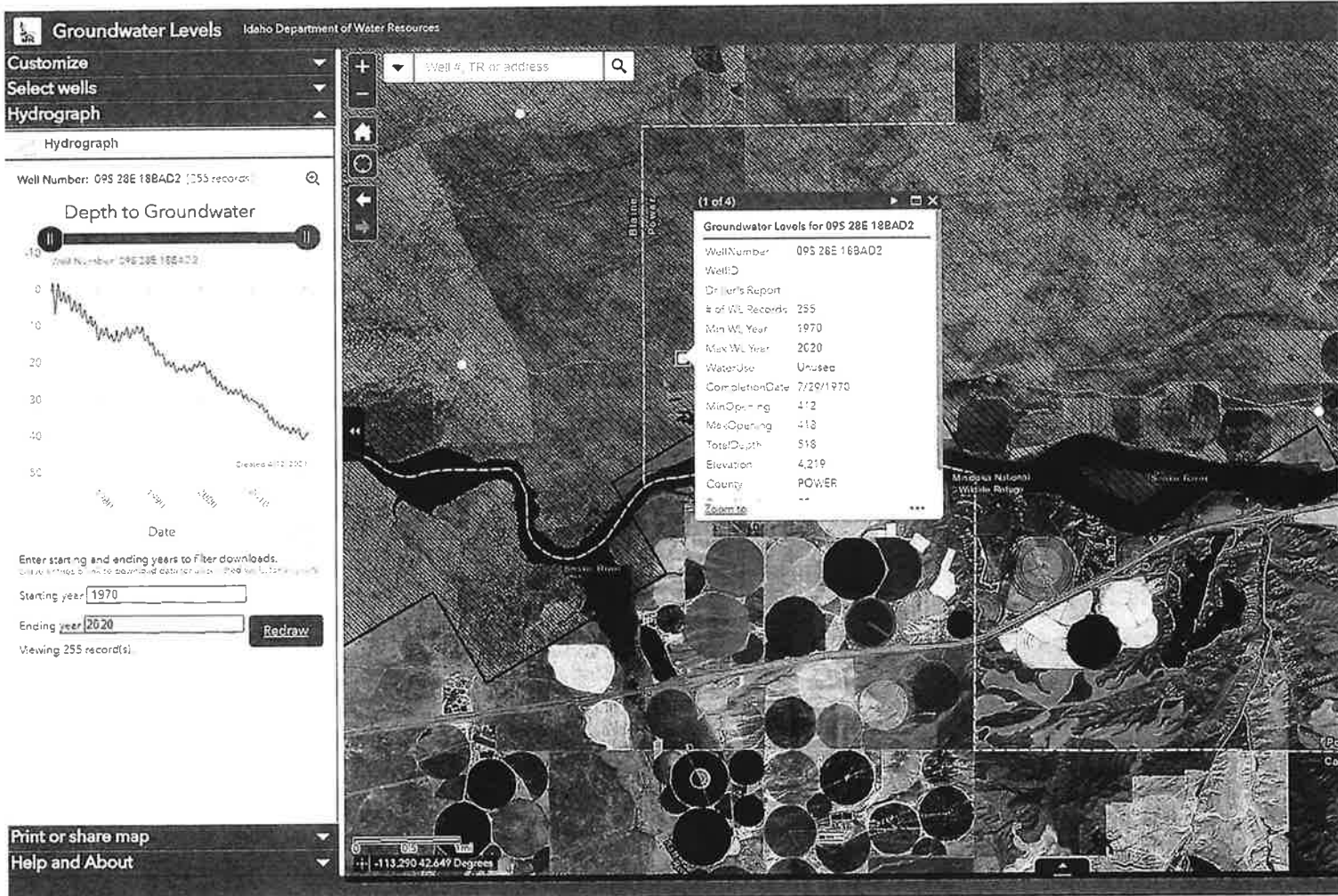
Legend

- USGS Well
- 64550 POG (new)
- 35-7740-3824 POG
- 35-7740-3824 POG
- TR Lines 2014
- Section Lines 2014
- Quarter Quads 2014



0 0.25 0.5 1 Miles







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National Water Information System: Web Interface

[USGS Water Resources](#)

Data Category:
Groundwater

Geographic Area:
Idaho

[GO](#)

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* IMPORTANT: [Next Generation Station Page](#)

Search Results -- 8 sites found

Site name contains string = 09s 28e

Minimum number of levels = 1

[Save file of selected sites](#) to local disk for future upload

USGS 423620113070201 09S 28E 25DDA1

Power County, Idaho

Hydrologic Unit Code 17040209

Latitude 42°36'19.68", Longitude 113°07'04.99" NAD83

Land-surface elevation 4,389.24 feet above NAVD88

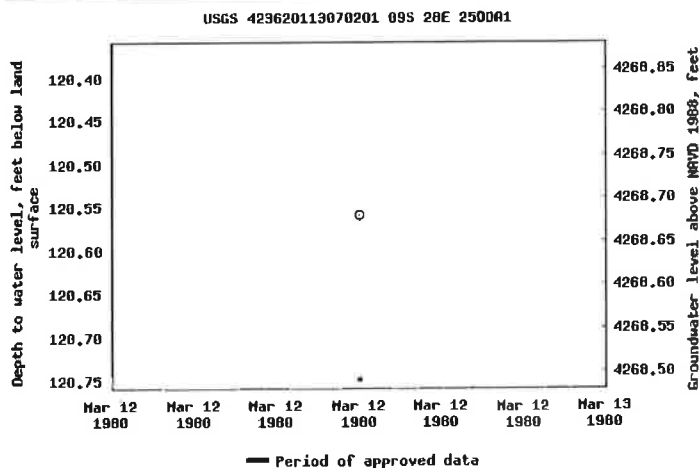
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Cassia County, Idaho

Hydrologic Unit Code 17040210

Latitude 42°36'21.68", Longitude 113°13'02.00" NAD83

Land-surface elevation 4,373.67 feet above NAVD88

The depth of the well is 242 feet below land surface.

The depth of the hole is 242 feet below land surface.

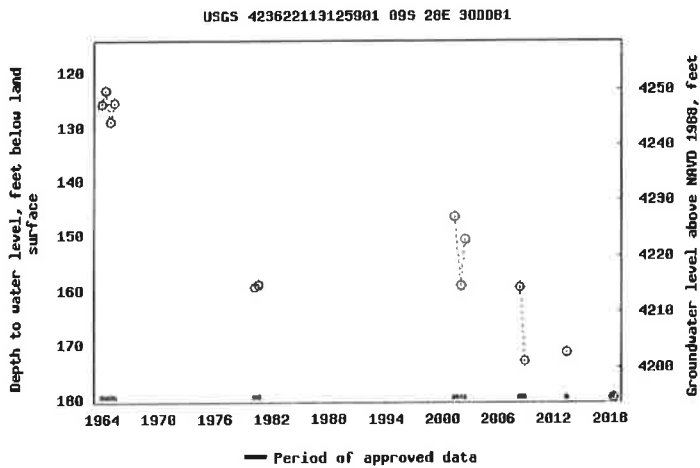
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USGS 423716113075601 09S 28E 24CCA1

Power County, Idaho

Hydrologic Unit Code 17040209

Latitude 42°37'17.68", Longitude 113°08'00.99" NAD83

Land-surface elevation 4,223.22 feet above NAVD88

The depth of the well is 24.5 feet below land surface.

The depth of the hole is 24.5 feet below land surface.

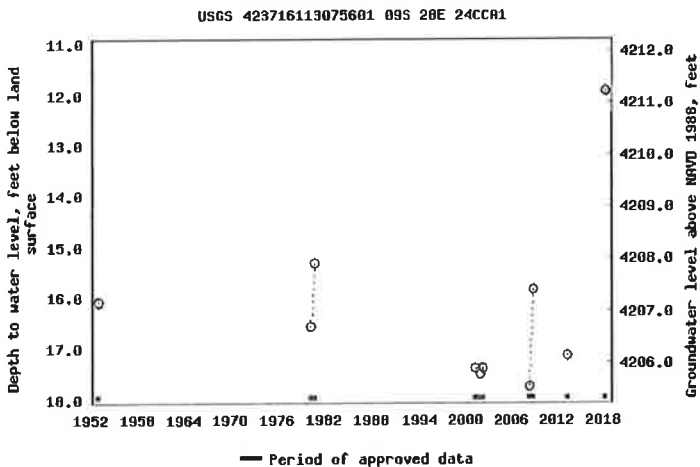
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USGS 423807113091501 09S 28E 14CDBB1

Power County, Idaho

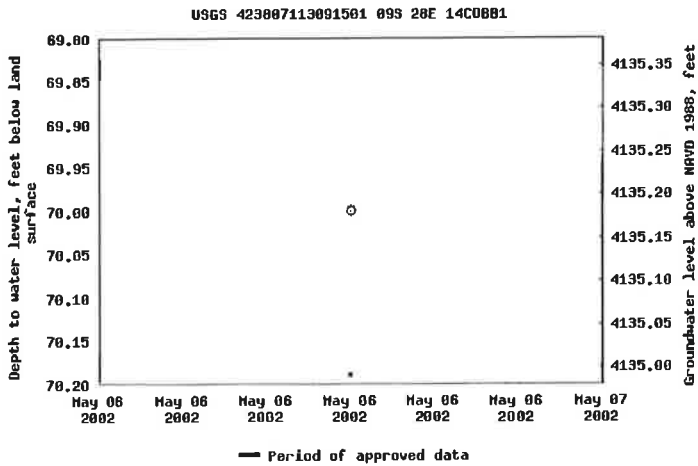
Hydrologic Unit Code 17040209

Latitude 42°38'07.20", Longitude 113°09'14.60" NAD83

Land-surface elevation 4,205.18 feet above NAVD88

The depth of the well is 888 feet below land surface.
The depth of the hole is 888 feet below land surface.

Output formats

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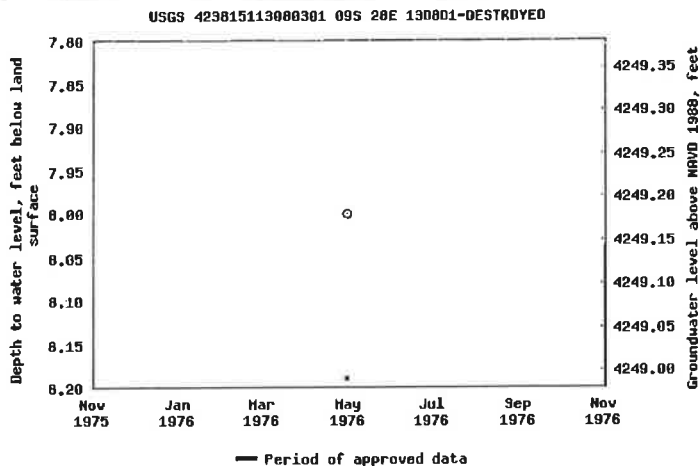
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Power County, Idaho
Hydrologic Unit Code 17040209
Latitude 42°38'14.68", Longitude 113°08'06.00" NAD83
Land-surface elevation 4,257.18 feet above NAVD88
The depth of the well is 70 feet below land surface.
The depth of the hole is 70 feet below land surface.

Output formats

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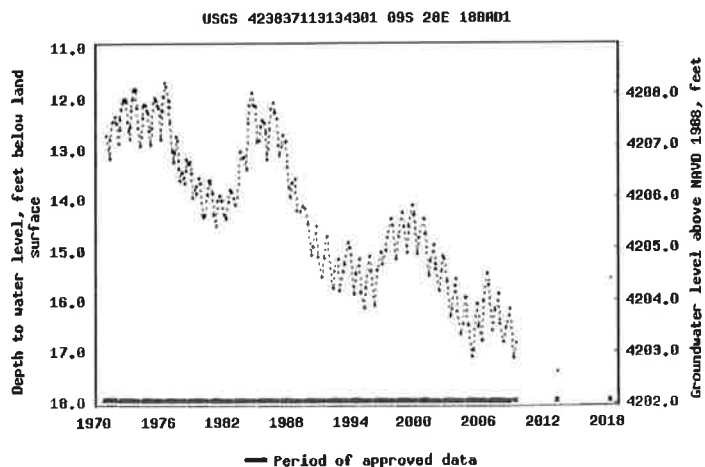
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Power County, Idaho
Hydrologic Unit Code 17040209

Latitude 42°38'36.68", Longitude 113°13'45.00" NAD83
 Land-surface elevation 4,219.96 feet above NAVD88
 The depth of the well is 150 feet below land surface.
 The depth of the hole is 150 feet below land surface.

Output formats

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Tab-separated data
Graph of data
Reselect period



Breaks in the plot represent a gap of at least one year between field measurements.

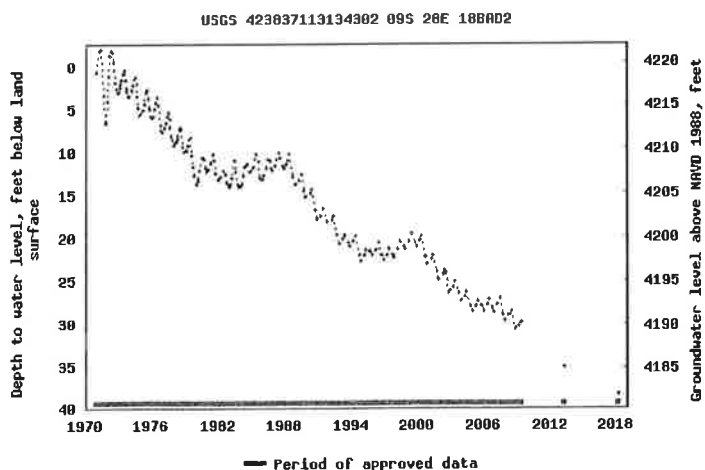
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Power County, Idaho
 Hydrologic Unit Code 17040209
 Latitude 42°38'36.68", Longitude 113°13'45.00" NAD83
 Land-surface elevation 4,219.96 feet above NAVD88
 The depth of the well is 505 feet below land surface.
 The depth of the hole is 518 feet below land surface.

Output formats

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Graph of data
Reselect period



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USGS 423837113134303 09S 28E 188AD3

Power County, Idaho
Hydrologic Unit Code 17040209
Latitude 42°38'36.68", Longitude 113°13'46.00" NAD83
Land-surface elevation 4,219.96 feet above NAVD88
The depth of the well is 1,013.70 feet below land surface.
The depth of the hole is 1,013.70 feet below land surface.

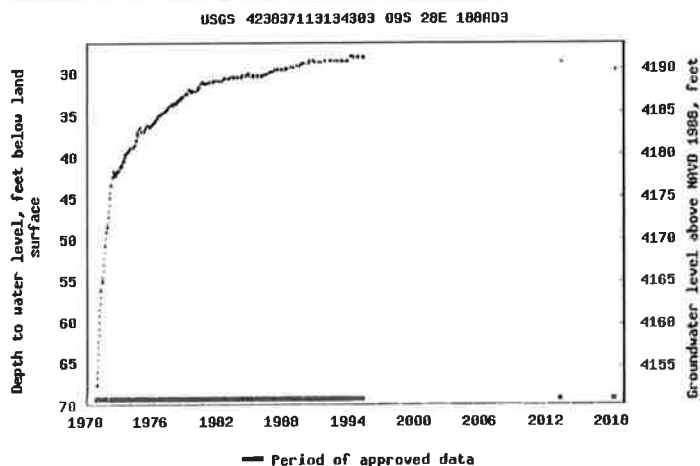
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Title: Groundwater for Idaho: Water Levels

URL: <https://nwis.waterdata.usgs.gov/id/nwis/gwlevels?>

USA.gov

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9.4 3.2 nadww01



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Search Results -- 16 sites found

Site name contains string = 09s 29e

Minimum number of levels = 1

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USGS 423527113060701 09S 29E 31DDB1

Power County, Idaho

Hydrologic Unit Code 17040209

Latitude 42°35'29.69", Longitude 113°06'09.99" NAD83

Land-surface elevation 4,503.28 feet above NAVD88

The depth of the well is 175 feet below land surface.

The depth of the hole is 175 feet below land surface.

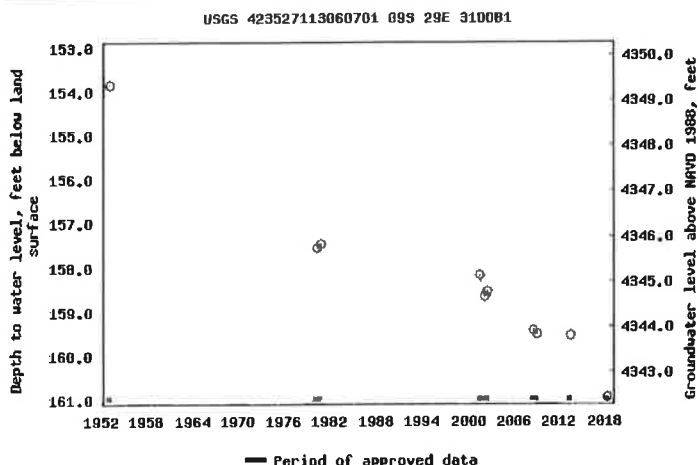
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USGS 423713113053401 09S 29E 20ACD1

Power County, Idaho

Hydrologic Unit Code 17040209

Latitude 42°37'31.70", Longitude 113°05'11.50" NAD83

Land-surface elevation 4,233.22 feet above NAVD88

The depth of the well is 40 feet below land surface.

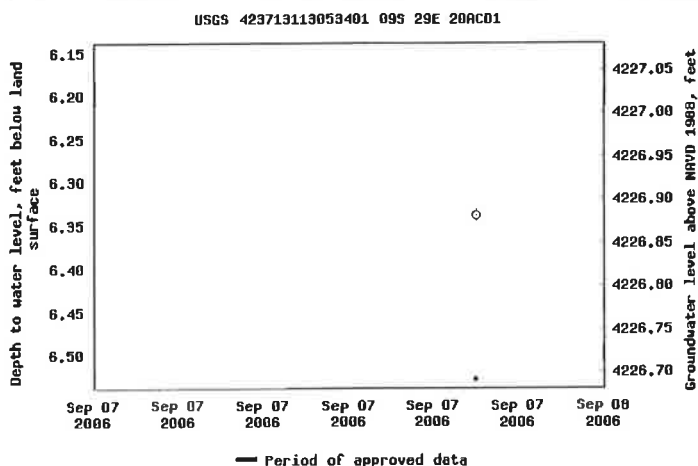
Output formats

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USGS 423714113065701 09S 29E 19CCA1

Power County, Idaho

Hydrologic Unit Code 17040209

Latitude 42°37'13.68", Longitude 113°06'59.99" NAD83

Land-surface elevation 4,230.21 feet above NAVD88

The depth of the well is 90 feet below land surface.

The depth of the hole is 90 feet below land surface.

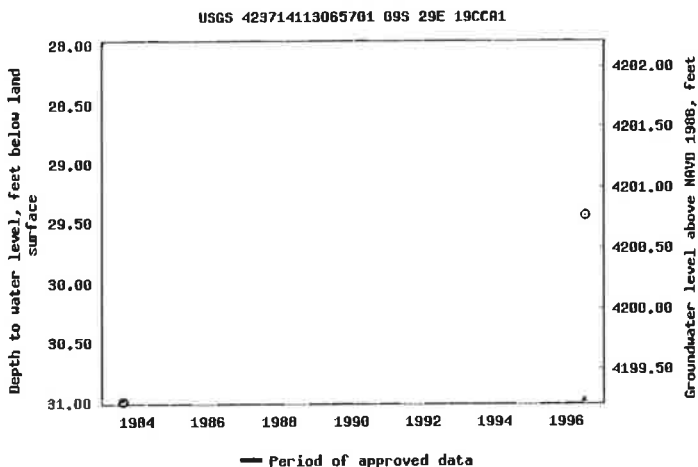
Output formats

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USGS 423755113065001 09S 29E 19BAB1

Power County, Idaho

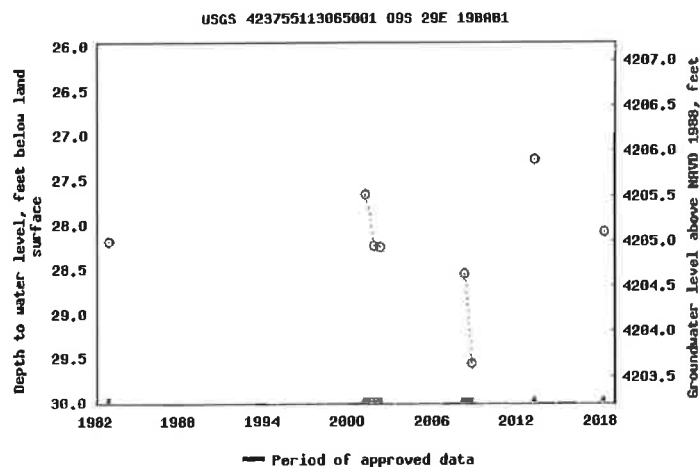
Hydrologic Unit Code 17040209

Latitude 42°37'56.00", Longitude 113°06'53.60" NAD83

Land-surface elevation 4,233.19 feet above NAVD88
The depth of the well is 535 feet below land surface.
The depth of the hole is 535 feet below land surface.

Output formats

Table of data
Tab-separated data
Graph of data
Reselect period



Breaks in the plot represent a gap of at least one year between field measurements.

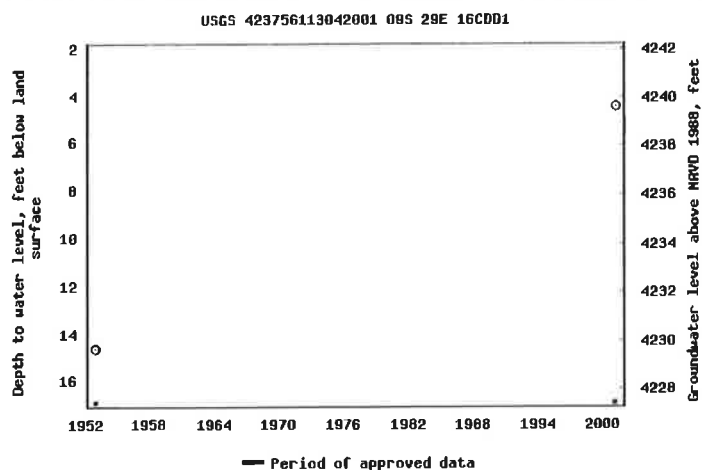
[Download a presentation-quality graph](#)

USGS 423756113042001 09S 29E 16CDD1

Power County, Idaho
Hydrologic Unit Code 17040209
Latitude 42°37'55.69", Longitude 113°04'22.99" NAD83
Land-surface elevation 4,244.23 feet above NAVD88
The depth of the well is 52 feet below land surface.
The depth of the hole is 60 feet below land surface.

Output formats

Table of data
Tab-separated data
Graph of data
Reselect period



Breaks in the plot represent a gap of at least one year between field measurements.

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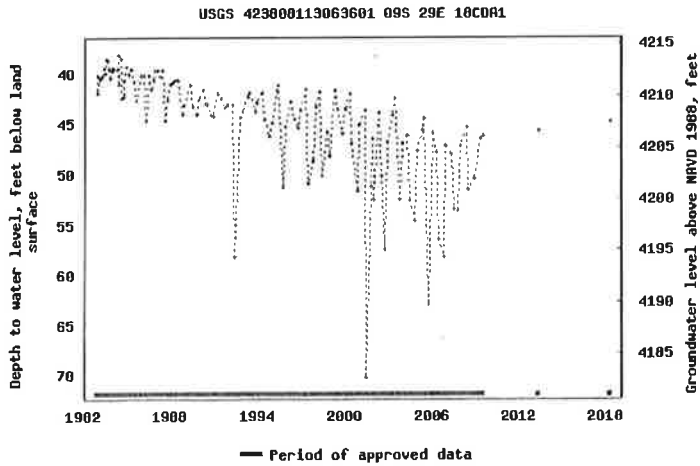
USGS 423808113063601 09S 29E 18CDA1

Power County, Idaho

Hydrologic Unit Code 17040209
 Latitude 42°38'07.90", Longitude 113°06'39.00" NAD83
 Land-surface elevation 4,252.52 feet above NAVD88
 The depth of the well is 250 feet below land surface.
 The depth of the hole is 250 feet below land surface.

Output formats

Table of data
Tab-separated data
Graph of data
Reselect period



Breaks in the plot represent a gap of at least one year between field measurements.

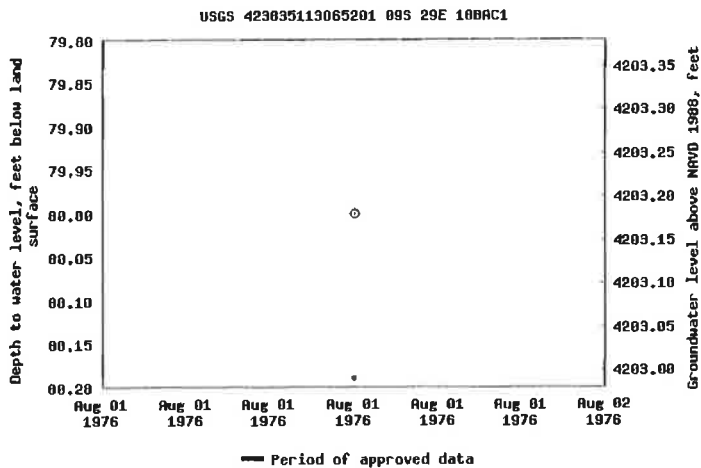
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USGS 423835113065201 09S 29E 18BAC1

Power County, Idaho
 Hydrologic Unit Code 17040209
 Latitude 42°38'34.69", Longitude 113°06'55.00" NAD83
 Land-surface elevation 4,283.18 feet above NAVD88
 The depth of the well is 420 feet below land surface.
 The depth of the hole is 420 feet below land surface.

Output formats

Table of data
Tab-separated data
Graph of data
Reselect period



Breaks in the plot represent a gap of at least one year between field measurements.

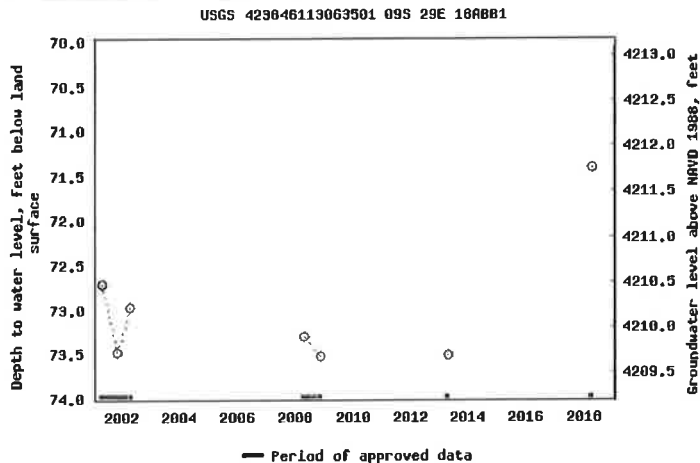
[Download a presentation-quality graph](#)

USGS 423846113063501 09S 29E 18ABB1

Power County, Idaho
 Hydrologic Unit Code 17040209
 Latitude 42°38'45.00", Longitude 113°06'38.30" NAD83
 Land-surface elevation 4,283.18 feet above NAVD88

Output formats

Table of data
Tab-separated data
Graph of data
Reselect period



Breaks in the plot represent a gap of at least one year between field measurements.

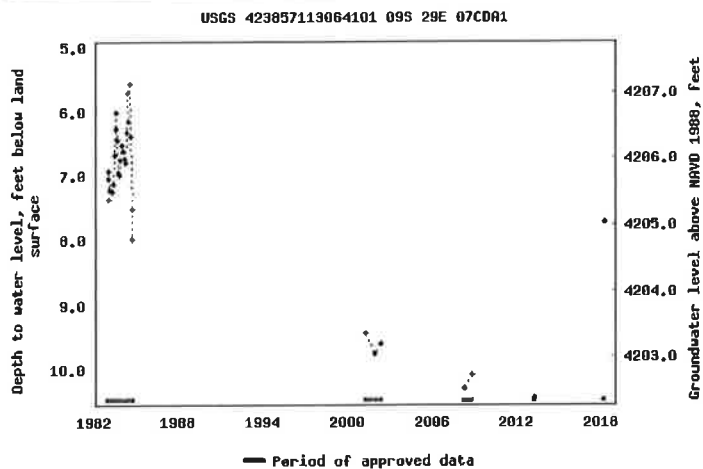
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USGS 423857113064101 09S 29E 07CDA1

Power County, Idaho
 Hydrologic Unit Code 17040209
 Latitude 42°38'57.90", Longitude 113°06'45.10" NAD83
 Land-surface elevation 4,212.76 feet above NAVD88
 The depth of the well is 141 feet below land surface.
 The depth of the hole is 148 feet below land surface.

Output formats

Table of data
Tab-separated data
Graph of data
Reselect period



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USGS 423941113045701 09S 29E 05DDD1-DESTROYED

Power County, Idaho
 Hydrologic Unit Code 17040209
 Latitude 42°39'40.69", Longitude 113°04'59.99" NAD83
 Land-surface elevation 4,243.20 feet above NAVD88
 The depth of the well is 74 feet below land surface.
 The depth of the hole is 74 feet below land surface.
 This well is completed in the Snake River Group (110SKRV) local aquifer.

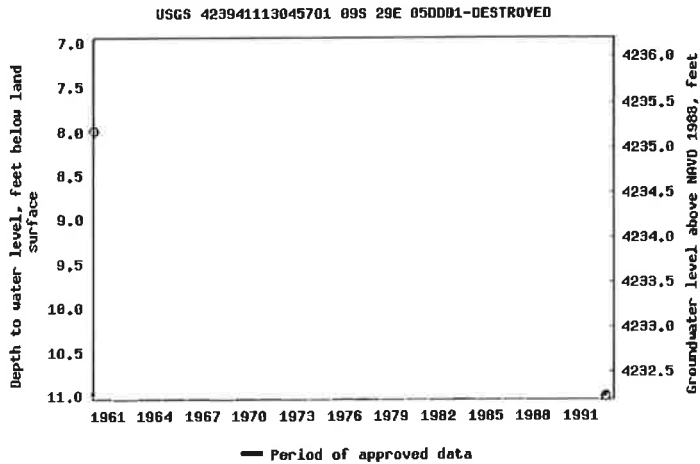
Output formats

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USGS 423941113045702 09S 29E 05DDD3

Power County, Idaho
 Hydrologic Unit Code 17040209
 Latitude 42°39'41.10", Longitude 113°05'02.10" NAD83
 Land-surface elevation 4,243.20 feet above NAVD88
 The depth of the well is 100 feet below land surface.
 The depth of the hole is 100 feet below land surface.
 This well is completed in the Snake River Plain basaltic-rock aquifers (N600SKRVPV) national aquifer.
 This well is completed in the Snake River Group (110SKRV) local aquifer.

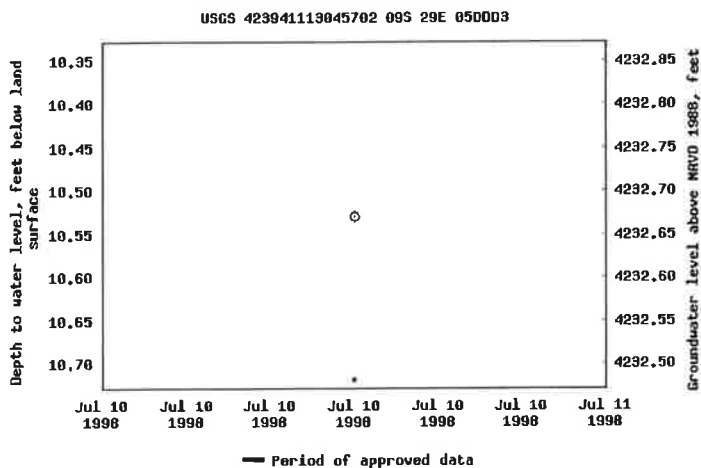
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USGS 423942113045901 09S 29E 05DDD2

Power County, Idaho

Hydrologic Unit Code 17040209

Latitude 42°39'41.69", Longitude 113°05'02.00" NAD83

Land-surface elevation 4,243.20 feet above NAVD88

The depth of the well is 84.0 feet below land surface.

The depth of the hole is 84.0 feet below land surface.

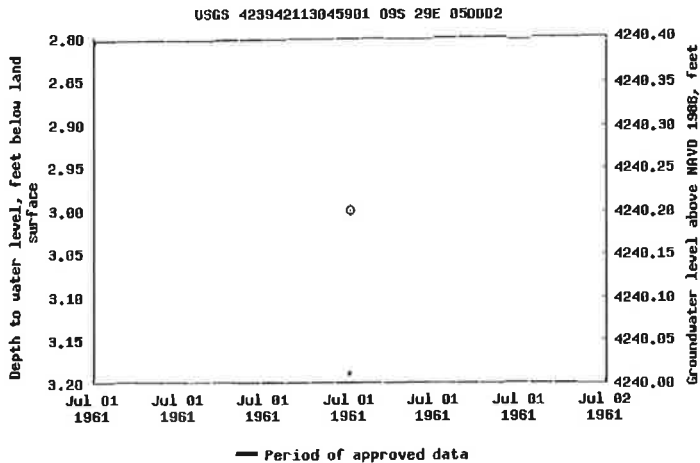
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USGS 424003113045601 09S 29E 05DAA1

Power County, Idaho

Hydrologic Unit Code 17040209

Latitude 42°40'02.69", Longitude 113°04'59.00" NAD83

Land-surface elevation 4,233.98 feet above NAVD88

The depth of the well is 50.0 feet below land surface.

The depth of the hole is 50.0 feet below land surface.

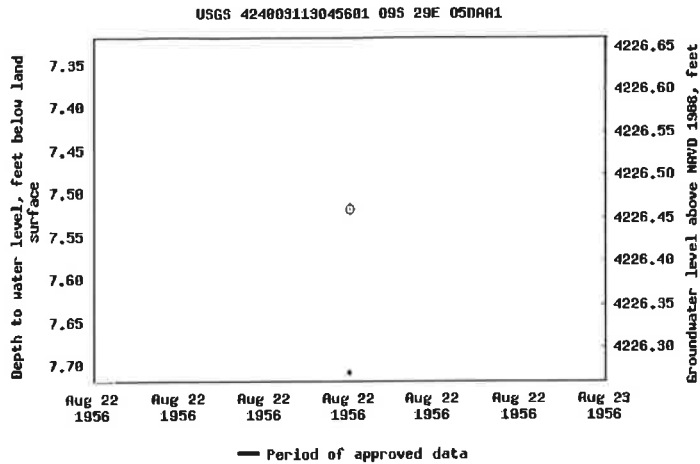
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USGS 424012113043701 09S 29E 04BCA2

Power County, Idaho

Hydrologic Unit Code 17040209

Latitude 42°40'11.69", Longitude 113°04'40.00" NAD83

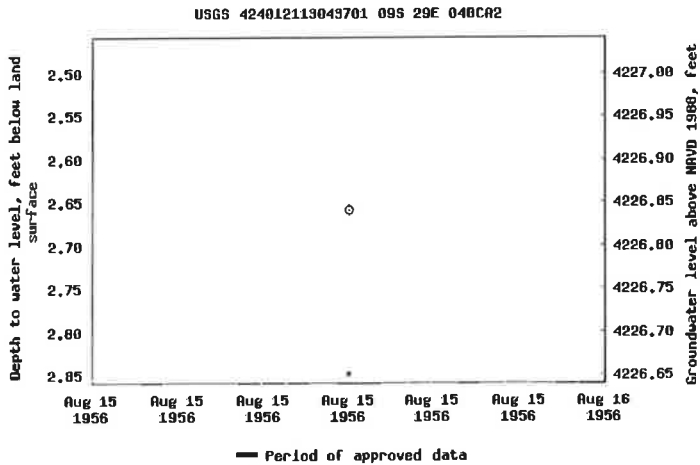
Land-surface elevation 4,229.50 feet above NAVD88

The depth of the well is 100 feet below land surface.

The depth of the hole is 100 feet below land surface.

Output formats

Table of data
Tab-separated data
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Reselect period



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USGS 424013113043801 09S 29E 04BCA1

Power County, Idaho

Hydrologic Unit Code 17040209

Latitude 42°40'13.09", Longitude 113°04'47.30" NAD83

Land-surface elevation 4,229.87 feet above NAVD88

The depth of the well is 52.56 feet below land surface.

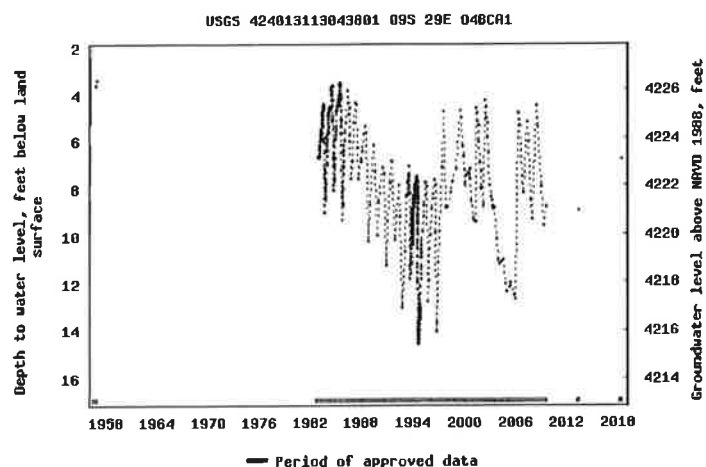
The depth of the hole is 52.56 feet below land surface.

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USGS 424013113044901 09S 29E 04BCB1

Power County, Idaho

Hydrologic Unit Code 17040209

Latitude 42°40'12.69", Longitude 113°04'52.00" NAD83

Land-surface elevation 4,247.21 feet above NAVD88

The depth of the well is 20.0 feet below land surface.

The depth of the hole is 20.0 feet below land surface.

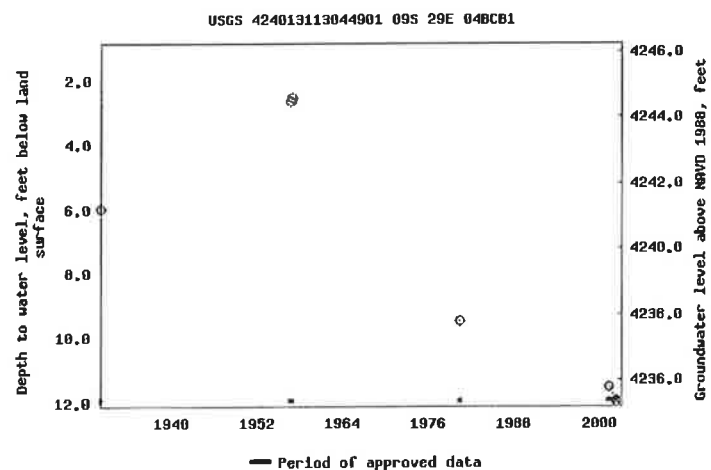
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URL: <https://nwis.waterdata.usgs.gov/Id/nwis/gwlevels?>



Page Contact Information: [Idaho Water Data Maintainer](#)

Page Last Modified: 2021-04-02 16:55:20 EDT

12.78 6.03 nadww01

WELL DRILLER'S REPORT

State law requires that this report be filed with the Director, Department of Water Resources within 30 days after the completion or abandonment of the well.

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USE ADDITIONAL SHEETS IF NECESSARY FORWARD THE WHITE COPY TO THE DEPARTMENT

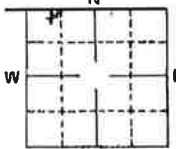
STATE OF IDAHO
DEPARTMENT OF WATER RESOURCES
WELL DRILLER'S REPORT

Location Corrected by IDWR To:

T09S R29E Sec. 18 SESW

By: mciscell 2012-05-09

State requires that this report be filed with the Director, Department of Water Resources, within 30 days after the completion or abandonment of the well.

1. WELL OWNER Name <u>Ken Duffin</u> Address <u>Aberdeen, Ida 83210</u> Owner's Permit No. _____		7. WATER LEVEL Static water level <u>6</u> feet below land surface. Flowing? ☐ Yes ☒ No G.P.M. flow _____ Artesian closed-in pressure _____ p.s.i. Controlled by: ☐ Valve ☐ Cap ☐ Plug Temperature _____ OF. Quality _____																																																																																																																																																																						
2. NATURE OF WORK ☒ New well ☐ Deepened ☐ Replacement ☐ Abandoned (describe method of abandoning) _____		8. WELL TEST DATA ☐ Pump ☐ Baller ☐ Air ☒ Other <u>1980</u>																																																																																																																																																																						
3. PROPOSED USE ☐ Domestic ☒ Irrigation ☐ Test ☐ Municipal ☐ Industrial ☐ Stock ☐ Waste Disposal or Injection ☐ Other _____ (specify type)		9. LITHOLOGIC LOG <table border="1"><thead><tr><th>Hole Diam.</th><th>Depth From</th><th>To</th><th>Material</th><th>Water Yes No</th></tr></thead><tbody><tr><td>14"</td><td>0'</td><td>3'</td><td>Top Soil</td><td></td></tr><tr><td></td><td>3'</td><td>5'</td><td>Gray sandy clay & Rock</td><td></td></tr><tr><td></td><td>5'</td><td>10'</td><td>Black lava Balders</td><td></td></tr><tr><td></td><td>10'</td><td>15'</td><td>Broken Black Lava</td><td></td></tr><tr><td></td><td>15'</td><td>35'</td><td>Black lava Gravel & Gray Clay</td><td></td></tr><tr><td></td><td>35'</td><td>40'</td><td>Gravel</td><td></td></tr><tr><td></td><td>40'</td><td>70'</td><td>Brown Sandy Clay & Gravel</td><td></td></tr><tr><td></td><td>70'</td><td>110'</td><td>Yellow Clay & Red Gravel</td><td></td></tr><tr><td></td><td>110'</td><td>173'</td><td>White Silt & Clay</td><td></td></tr><tr><td></td><td>173'</td><td>240'</td><td>Brown Clay</td><td></td></tr><tr><td></td><td>240'</td><td>245'</td><td>Yellow & Brown Clay & Gravel</td><td></td></tr><tr><td></td><td>245'</td><td>275'</td><td>Black lava Broken</td><td></td></tr><tr><td></td><td>275'</td><td>295'</td><td>Brownish Lava</td><td></td></tr><tr><td></td><td>295'</td><td>305'</td><td>Black Lava</td><td></td></tr><tr><td></td><td>305'</td><td>310'</td><td>Multicolored Lava</td><td></td></tr><tr><td></td><td>310'</td><td>312'</td><td>Red Lava & Clay</td><td></td></tr><tr><td></td><td>312'</td><td>315'</td><td>Multicolored Lava</td><td></td></tr><tr><td></td><td>315'</td><td>320'</td><td>Red & Black Lava</td><td></td></tr><tr><td></td><td>320'</td><td>385'</td><td>Red & Black Lava & Clay</td><td></td></tr><tr><td></td><td>385'</td><td>387'</td><td>Red & White Clay</td><td></td></tr><tr><td></td><td>387'</td><td>400'</td><td>Red lava White Sap Stone</td><td></td></tr><tr><td></td><td>400'</td><td>450'</td><td>Multicolored Lava & Red Clay</td><td></td></tr><tr><td></td><td>450'</td><td>455'</td><td>White & Black Clay</td><td></td></tr><tr><td></td><td>455'</td><td>465'</td><td>Black Lava</td><td></td></tr><tr><td></td><td>465'</td><td>470'</td><td>Multicolored Lava</td><td></td></tr><tr><td></td><td>470'</td><td>500'</td><td>Gray Lava</td><td></td></tr><tr><td></td><td>500'</td><td>515'</td><td>Sharp Gray Lava (No Cuttings)</td><td></td></tr><tr><td></td><td>515'</td><td>530'</td><td>Red Lava</td><td></td></tr><tr><td></td><td>530'</td><td>535'</td><td>Multicolored Lava</td><td></td></tr><tr><td></td><td>535'</td><td>590'</td><td>Reddish Rock with heavy iron pyrites</td><td></td></tr><tr><td></td><td>590'</td><td>530'</td><td>Red Clay & Lava & Crystals</td><td></td></tr><tr><td></td><td>530'</td><td>535'</td><td>End of hole</td><td></td></tr></tbody></table>		Hole Diam.	Depth From	To	Material	Water Yes No	14"	0'	3'	Top Soil			3'	5'	Gray sandy clay & Rock			5'	10'	Black lava Balders			10'	15'	Broken Black Lava			15'	35'	Black lava Gravel & Gray Clay			35'	40'	Gravel			40'	70'	Brown Sandy Clay & Gravel			70'	110'	Yellow Clay & Red Gravel			110'	173'	White Silt & Clay			173'	240'	Brown Clay			240'	245'	Yellow & Brown Clay & Gravel			245'	275'	Black lava Broken			275'	295'	Brownish Lava			295'	305'	Black Lava			305'	310'	Multicolored Lava			310'	312'	Red Lava & Clay			312'	315'	Multicolored Lava			315'	320'	Red & Black Lava			320'	385'	Red & Black Lava & Clay			385'	387'	Red & White Clay			387'	400'	Red lava White Sap Stone			400'	450'	Multicolored Lava & Red Clay			450'	455'	White & Black Clay			455'	465'	Black Lava			465'	470'	Multicolored Lava			470'	500'	Gray Lava			500'	515'	Sharp Gray Lava (No Cuttings)			515'	530'	Red Lava			530'	535'	Multicolored Lava			535'	590'	Reddish Rock with heavy iron pyrites			590'	530'	Red Clay & Lava & Crystals			530'	535'	End of hole	
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STATE OF IDAHO
DEPARTMENT OF WATER RESOURCES
WELL DRILLER'S REPORTState law requires that this report be filed with the Director, Department of
within 30 days after the completion or abandonment of the well

Location Corrected by IDWR To:

T09S R29E Sec. 18 NWSWSE

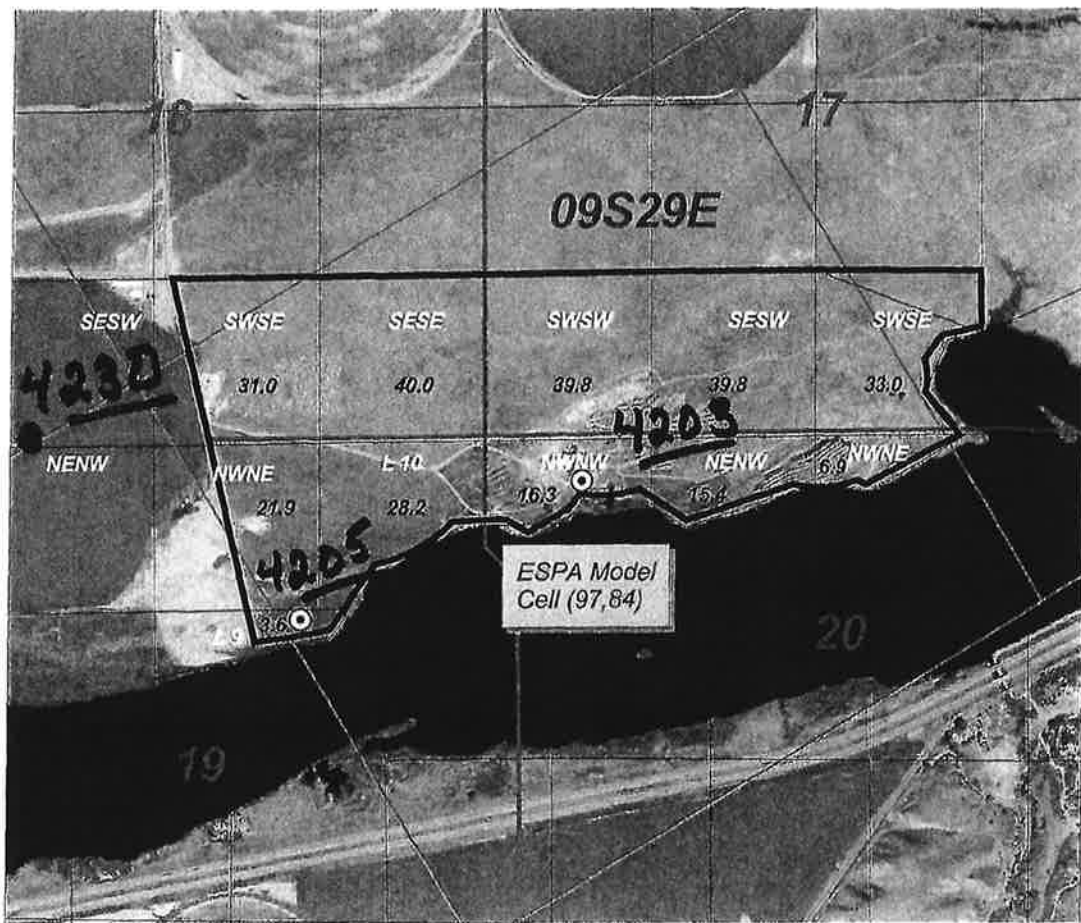
By: mciscell 2012-08-28

1. WELL OWNER Name <u>Vern Duffin</u> Address <u>Aberdeen, Ida 83210</u> Owner's Permit No. _____	7. WATER LEVEL Static water level <u>85'</u> feet below land surface. Flowing? ☐ Yes ☒ No G.P.M. flow _____ Artesian closed-in pressure _____ p.s.i. Controlled by: ☐ Valve ☐ Cap ☐ Plug Temperature _____ °F. Quality _____																																																										
2. NATURE OF WORK ☒ New well ☐ Deepened ☐ Replacement ☐ Abandoned (describe method of abandoning) _____	8. WELL TEST DATA <u>Good</u> ☐ Pump ☐ Bailer ☐ Air ☐ Other _____ <table border="1"><thead><tr><th>Discharge G.P.M.</th><th>Pumping Level</th><th>Hours Pumped</th></tr></thead><tbody><tr><td> </td><td> </td><td> </td></tr><tr><td> </td><td> </td><td> </td></tr><tr><td> </td><td> </td><td> </td></tr></tbody></table>	Discharge G.P.M.	Pumping Level	Hours Pumped																																																							
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USE ADDITIONAL SHEETS IF NECESSARY - FORWARD THE WHITE COPY TO THE DEPARTMENT

Exhibit B

River elevation 4195
 Google Earth elevations —



JCH - 10/8/2020

NAIP 2019 IR Aerial Photo

0.25 0 0.25 0.5 Miles

⊙ New Well

□ New Place of Use: 275.9 ac.

▭ Township & Range

▭ Sections

▭ Power County 40's

▭ ESPA Model Grid



Attachment #7a



**Barker Rosholt
& Simpson LLP**

Boise

1010 W. Jefferson St. Suite 102
Boise, Idaho 83702
p. 208.336.0700
f. 208.344.6034

Attorneys

Albert P. Barker
John K. Simpson
Travis L. Thompson
Scott A. Magnuson
of counsel
Sarah W. Higer
Michael A. Short

John A. Rosholt
(1937-2019)

Sarah W. Higer

EMAIL: swh@idahowaters.com
PHONE: 208.336.0700
WEB: idahowaters.com

RECEIVED

July 16, 2021

JUL 19 2021

Idaho Department of Water Resources
900 North Skyline Drive, Suite A
Idaho Falls, Idaho 83402-1718

Department of Water Resources
Eastern Region

Re: *Application for Transfer Nos. 84488 and 84490 in the Name of LCSC Enterprises LLC*

Dear Clerk:

Enclosed for filing, please find one original and one copy each of *The Surface Water Coalition's Disclosure of Expert Report and Declaration of Dan Temple* and *Notice of Service of Surface Water Coalition's Responses to LCSC Enterprises LLC First Set of Interrogatories* in the above referenced matter. Please return the copies with your file stamp in the enclosed postage prepaid envelope.

Please contact our office if you have any questions. Thank you for your assistance.

Very truly yours,

BARKER ROSHOLT & SIMPSON LLP


Laura E. Lowrey, Assistant to
Sarah W. Higer

/lcl
Enclosures