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Department of Water Resources
Eastern Region

August 19, 2015

James Cefalo
Idaho Department Of Water Resources
Eastern Region
900 North Skyline Drive, Suite A
Idaho Falls, Idaho 83402-1718

Jason C. Helms, P.E.

JCH Engineering & Consulting
6755 N. Albert Lane
Idaho Falls, ID 83401
(208) 308-2109
jasoncivil@alumni.nd.edu

Re: Revised Narrative in Support of Transfer 29-7006 in the name of Idaho Water Company, LLC

Dear James,

Please find attached a revised narrative in support of pending water right transfers associated with existing water right 29-7006 which were submitted in March of this year. These transfers were advertised in April and no protests were received, however, IDWR has withheld approval due to increased concerns. After meeting with Jeff Peppersack in Boise, who provided a copy of a staff memo prepared in July, I have performed additional study and revised the model analysis as described in the attached revised narrative. For easy reference I have also included a copy of the review memo prepared by Jennifer Sukow of IDWR with comments provided by John Welhan of the Idaho Geological Survey which forms the primary basis for the revisions.

As always, if you have any questions or would find any GIS information shown helpful in finalizing the processing of these transfers please let me know at your earliest convenience.

Thanks,



Jason C. Helms, P.E.

cc: Del Kohtz (Idaho Water Company, LLC)
Michael C. Creamer (Givens-Pursley)

Attachments

- Revised Narrative in Support of Transfer (Dated 08/18/2015)
- Hydrology staff review of application for transfer 79844 (w/ Welhan comments)

MEMO

State of Idaho

Department of Water Resources

322 E Front Street, P.O. Box 83720, Boise, Idaho 83720-0098

Phone: (208) 287-4800 Fax: (208) 287-6700

Date: July 10, 2015
To: Jeff Peppersack, P.E., Water Allocation Bureau Chief
Cc: Sean Vincent, P.G., Hydrology Section Manager
From: Jennifer Sukow, P.E., P.G., Hydrology Section
Subject: Hydrology staff review of application for transfer 79844

This memorandum summarizes hydrology staff review of application for transfer 79844, which requests to transfer a portion of groundwater right 29-7006 from the Marsh Valley near Arimo, Idaho approximately 50 miles northwest to Pleasant Valley near Aberdeen, Idaho. The current points of diversion (PODs) and place of use (POU) for water right 29-7006 are located outside of the Eastern Snake Plain Aquifer (ESPA) area of common groundwater supply (Figure 1) and are not located within a groundwater district or an active water district. The proposed transfer would move the POD and POU to a location within the ESPA area of common groundwater supply, the Aberdeen-American Falls Ground Water District, and Water District 120. Water right 29-7006 has a priority date of 1/10/1968.

The Marsh Valley aquifer is not directly connected to the ESPA, but groundwater discharge to Marsh Creek may be conveyed to the ESPA boundary as surface flow via the Portneuf River. The Portneuf River does not have significant interaction with groundwater between Inkom and Batiste Road. At Batiste Road (coincident with ESPA model cell 1095119), the Portneuf River becomes hydraulically connected to the ESPA and begins to gain significant flow from groundwater. If the Portneuf River carries additional water in the connected reach downstream of Batiste Road, the stage in the river will be higher, and the river will gain less water from the Eastern Snake Plain aquifer. However, water discharged from the Marsh Valley aquifer to Marsh Creek is natural flow available for diversion by numerous surface water users on Marsh Creek and the Portneuf River (Figure 1). During the irrigation season, groundwater discharged to Marsh Creek may be diverted for consumptive use and may not reach the Portneuf River at Batiste Road.

Ground water underflow through the Portneuf Gap (below Inkom) in near-normal water years is of the order of 4.5 cfs (Welhan, 2006, IGS Staff Report), compared to the Portneuf's historic median flow of 69 cfs. Hence, a small but significant proportion of water discharges from the upper basin as underflow within the fluvial gravels of the Portneuf Gap (additional underflow likely connects the upper and lower basin via fractures and faults in bedrock of the Portneuf Range). Within the Inkom-Portneuf Gap reach, therefore, significant surface water-ground water interaction is expected, and the Marsh Valley aquifer is most certainly directly connected to the ESPA.

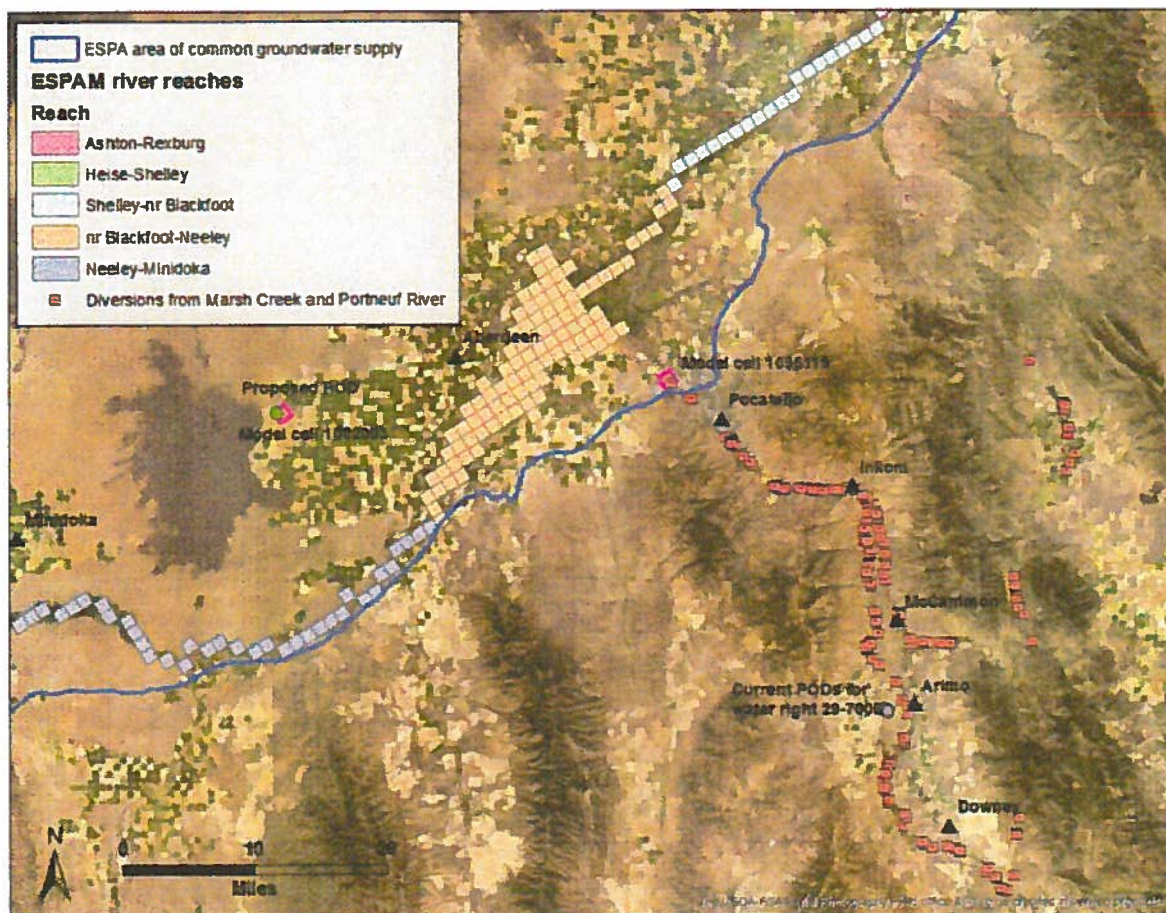


Figure 1. Location of current and proposed points of diversion.

JCH Engineering & Consulting, PLLC (JCH) submitted a “Narrative in Support of Transfer 29-7006”, which discusses the local and regional hydrology and presents the results of an “ESPA Impact Analysis” performed using the ESPA groundwater rights transfer spreadsheet version ETRAN3.1. JCH computed a time lag of approximately 4 years between pumping at the current water right POD and impact to the ESPA at model cell 1095119, which is coincident with the Portneuf River at Batiste Road. The time lag was estimated by calculating the groundwater travel time between the POD and Marsh Creek, and adding the time required for surface water to flow down Marsh Creek and the Portneuf River. Staff notes that impacts of pumping on hydraulic head propagate through the aquifer more quickly than the particle travel time calculated by JCH. While JCH has overestimated the time lag, the time lag does not have a significant effect on the results of the transfer spreadsheet analysis for this transfer. JCH’s transfer spreadsheet analysis predicts that, if groundwater discharged to Marsh Creek is conveyed to the ESPA boundary, the impact of the proposed transfer on surface water flow in the

Snake River would not exceed the thresholds set forth in "Transfer Processing Memo No. 24", dated December 21, 2009.

In my opinion, the most significant issue with JCH's analysis is the assumption that additional groundwater discharge to Marsh Creek resulting from cessation of pumping at the current POD will travel as surface flow down Marsh Creek and the Portneuf River without being diverted for consumptive use. If groundwater discharged to Marsh Creek as a result of non-pumping at the current POD is diverted from Marsh Creek or the Portneuf River upstream of ESPA model cell 1095119, then the inputs to JCH's transfer spreadsheet analysis are not valid. More conservative stance, but not unreasonable

JCH also assumes any additional groundwater discharge to Marsh Creek will "recharge" the ESPA in model cell 1095119. While any additional flow in the Portneuf River at Batiste will result in reduced groundwater discharge to the Portneuf River and/or American Falls Reservoir, the location of the impacts to the ESPA is uncertain.

Hydrology staff identifies the following concerns regarding proposed transfer 79844.

1. Groundwater discharged to Marsh Creek is natural flow subject to diversion from Marsh Creek or the Portneuf River. If groundwater discharge to Marsh Creek resulting from non-pumping at the current POD is diverted upstream of Batiste Road, the transfer spreadsheet analysis submitted by the applicant is invalid. Agreed
2. Even if additional groundwater discharge to Marsh Creek is conveyed to the Portneuf River at Batiste Road, the location of impacts to the ESPA is uncertain. Agreed. Simulating all of the impact in model cell 1095119 may not be appropriate.

Revised Narrative in Support of Transfers #79844, 79906, 79907

Evaluation of tributary aquifer source to ESPA transient impacts

Prepared by: Jason C. Helms, P.E.

Date: August 18, 2015

Transfer Applicant: Idaho Water Company, LLC

Water Right: 29-7006 Priority: 1/10/1968 Source:

Existing POD: Twp. 10S, RNG. 36E, Sec. 14

Existing ESPA Model Cell: 102,121 (First active cell nearest Portneuf Gap)

Transfer #79844: 1.47 cfs, 576.2 afa, 200 ac

POD1: Twp. 6S, RNG. 29E, Sec. 20

ESPA Model Cell: 82,93

Transfer #79906: 0.87cfs, 342.9afa, 119ac

POD2: Twp. 4S, RNG. 31E, Sec. 31

ESPA Model Cell: 79,108

Transfer #79907: 0.19cfs, 74.9afa, 26ac

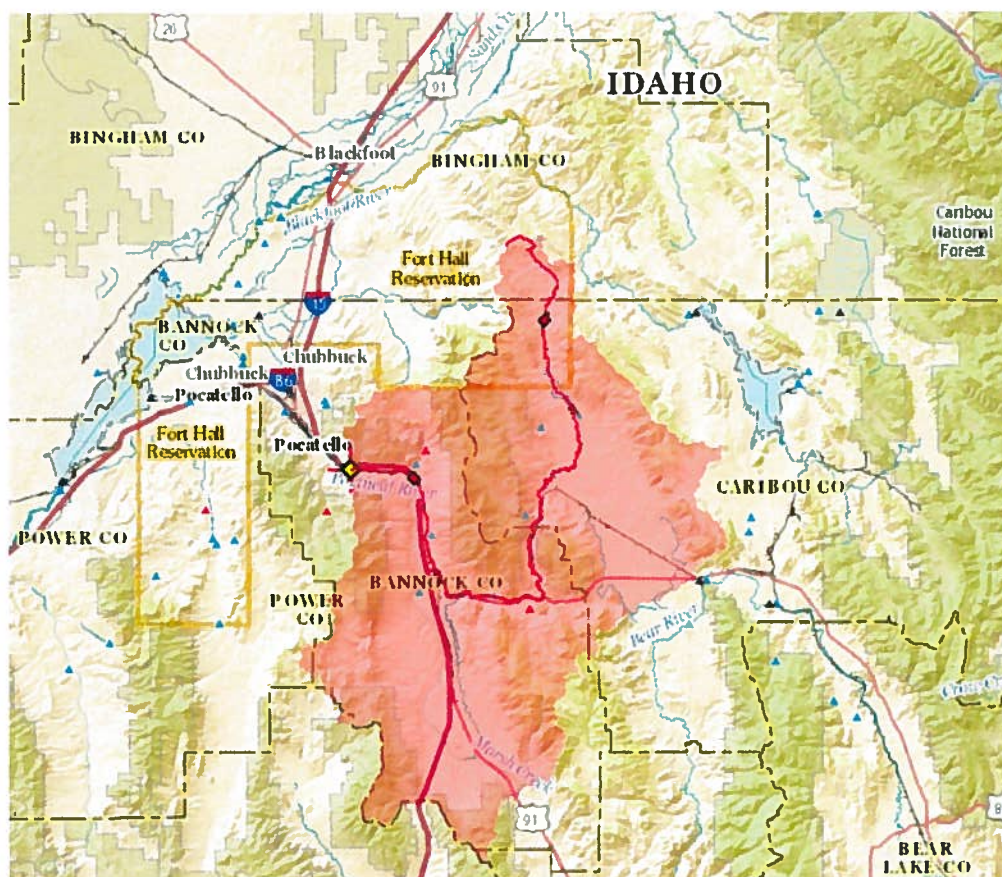
POD3: Twp. 4S, RNG. 33E, Sec. 18

ESPA Model Cell: 82,120

These three transfers seek to change the point of diversion and place of use for portions of existing water right 29-7006 from two existing wells completed within the Marsh Valley tributary aquifer to existing wells approximately 30 miles to the northwest completed within the Eastern Snake River Plain Aquifer (ESPA). The current point of diversion lies within the Marsh Valley aquifer which is connected through the Portneuf Gap to the Portneuf Valley Aquifer (PVA) which is connected to the ESPA.

This narrative revises previous estimates of the transient hydraulic impacts within the connected aquifer systems associated with the parent water right being dried up within the Marsh Valley aquifer outside the active ESPA model to incorporate additional understanding of the hydraulic connectivity between the Marsh Valley aquifer, the Lower Portneuf Valley Aquifer (LPVA) and the EPSA.

Increased concern from IDWR indicated the model grid cell identified previously by IDWR related to approved transfer #79001 may not actually be appropriate (Sukow, 2015) although according to John Welhan of the Idaho Geological Survey, the Marsh Valley aquifer is certainly connected to the ESPA so the methodology continues to appear appropriate with a change utilizing the first active ESPA model cell instead.



Portneuf Gap Drainage Area

Water chemistry similarity in the river and aquifer both above and below the Portneuf Gap makes an accurate analysis of the separation of flows difficult (Meehan, 2005). While existing data is not conclusive¹, existing drainage basin hydrogeologic and water budget evaluations support the conclusion that a significant portion of the

¹ USGS Streamstats indicates basin size exceeds valid range for low flow and peak flow calculations and is also slightly below the minimum stream slope per mile introducing unknown error in flows, however, still useful for comparative purposes. Refer to **Exhibit 4** for details.

precipitation recharged to the aquifer in the upper basin, including the Marsh Valley aquifer, does not manifest as surface water at or above the Portneuf-Pocatello gage but rather circulates deeper into the ESPA, perhaps bypassing the LPVA to some extent. In other words, once precipitation in the upper basin percolates into the aquifer, the fate of a majority of this recharge likely is to become tributary underflow to the ESPA. This hypothesis is supported through evaluation of expected annual flows utilizing the USGS StreamStats regression equations which are attached as Exhibit 4. Current understanding, as incorporated into the ESPAM 2.0 ground water flow model, attributes 5.4×10^9 gal/year² of underflow from the Portneuf basin to the ESPA but the contribution may in fact be much higher.³ To better account for this relationship, IDWR intends to incorporate the Portneuf River basin into the ESPA ground water flow model at some point in the future.⁴ ESPAM 2.0 places the closest active model cell approximately 5 miles south of the Portneuf Gap and this cell has been used to develop this revised hydrologic analysis supporting these transfers.

In light of this current state of understanding and accounting for tributary contributions to the ESPA, the non-diversion of ground water from the Marsh Valley aquifer as currently authorized by water right 29-7006 will directly benefit the ESPA through the connected aquifer and surface water systems.⁵

Attached **Exhibit 1** shows the relative location of the current active ESPA model grid with respect to the proposed and existing water right point of diversion. Attached

² Relying on Welhan, J. 2006. Water Balance and Pumping Capacity of the Lower Portneuf River Valley Aquifer, Bannock County, Idaho; Idaho Geological Survey Staff Report 06-5.

³ Discrepancies between expected and actual streamflow values further support this conclusion. According to the recorded flows at the Pocatello gage, the average annual observed flow for the current period of record is 268 cfs while the USGS Streamstats regression equations expect an average flow of 577 cfs - a 309 cfs loss in expected annual tributary system drainage of which most exists above the Portneuf Gap. A similar result is reached when applying the Streamstats regression equations to the Marsh Creek gage and slightly above the Portneuf @ Topaz gage locations indicating expected average annual flows of 131 cfs and 239 cfs respectively resulting in an apparent loss of 102 cfs ($131 + 239 - 268 = 102$) even neglecting any additional inflow from the 332 square miles of excluded drainage between the gages.

⁴ ESPAM Improvements (Allan Wylie IDWR: ESHMC Presentation March 17, 2015)

⁵ IDWR plans to update the ESPA ground water model to include the Portneuf River as attached to the ESPA and such work is considered a high priority however, work has not yet begun on this update. (E-mail communication from Allan Wylie: August 5, 2015)

Exhibit 2 shows the local ground water contours at the existing diversion location based on information gleaned from available well driller's logs.

The reported ground water levels coordinated with USGS 24k topography indicates the ground water table is significantly higher than the nearby surface water flow of Marsh Creek and the ground water moves toward the stream and from there down the valley to the north. Published studies indicate this gaining reach character extends toward Inkom where it becomes seasonally perched.

Several large diversion rate pumping tests have been completed historically in the vicinity of the existing well serving water right 29-7006 and an average of the aquifer conductivity was calculated based on unsteady and unconfined flow conditions associated with those tests. The attached **Exhibit 3** showing the calculated ground water travel time to the river bed also shows the well driller pumping test details utilized in determination of the modeled aquifer characteristics. Based on the calculated average hydraulic conductivity, apparent water table slope and perpendicular distance to Marsh Creek the ground water travel time into the Marsh Creek bed aquifer is estimated on the order of 1400 days (3.85 years) between the historical diversion location and equilibrium with the streambed.

According to published studies, the hydraulic conductivity in the Portneuf Gap area stream bed is estimated (likely within an order of magnitude) at 10,000 ft per day (Welhan, 2006) resulting in an additional travel time of 2,660 days (7.28 years) for the tributary flow to move down the Marsh Creek and Inkom valley and through the Portneuf gap along an approximately 29 mile path to the first active ESPA model grid cell (102,121). According to this simplified analysis, the time lag of historical impacts to tributary impacts within the active ESPA model is 11 years corresponding to 33 model trimesters.

The calculated time lag associated with the historical impacts of the existing water right within the Marsh Valley Aquifer were incorporated into the ESPA Transfer Spreadsheet analysis by adding an 11 year delay for the start of pumping as well as the initiation of CRP and water supply bank protected non-use. This delay appears conservative as previous studies have found a strong correlation between 5-10 year average basin precipitation variation and LPVA aquifer water levels (Welhan, 1996). According to the results of the time-lagged IDWR Transfer Spreadsheet analysis (**Attachment #5**), the impacts associated with the transfers including the potential

overlap resulting from the tributary time lag has no significant effects to the ESPA model river reaches and could be extended to as much as 16 years without adverse consequences. This is directly related to the extended period of protected non-use which has allowed the historical impacts of pumping to stabilize and has been benefiting the ESPA for many years as shown by the strong dip in impacts of more than 200 acre-ft per trimester within the Near Blackfoot to Neeley reach prior to the transfer.

According to the results of the Transfer Spreadsheet analysis, credits continue in the Shelley to Near Blackfoot and Near Blackfoot to Neeley reaches which are the only reaches of the Snake River comprising more than 10% of the total impacts of the transfers so the transfers should be approvable without mitigation.

List of Attachments:

- Exhibit 1: (Map) Transfer 79984, 79906, 79907 Locations
- Exhibit 2: (Map) 29-7006 Local Hydrology
- Exhibit 3: (Table) Calculated Ground Water Travel Time & well logs
- Exhibit 4: (Tables) StreamStats Results
- Attachment #5a: (Tables) ESPA Impact Analysis - Summary
- Attachment #5b: (Tables) ESPA Impact Analysis - Data Entry
- Attachment #5c: (Charts) ESPA Impact Analysis - Results Above Milner
- Attachment #5d: (Charts) ESPA Impact Analysis - Results Below Milner

References:

Sukow, J., 2015. Hydrology staff review of application for transfer 79844. Idaho Department of Water Resources Memo.

Welhan, J., 2006. Water Balance and Pumping Capacity of the Lower Portneuf River Valley Aquifer, Bannock County, Idaho; Idaho Geological Survey Staff Report 06-5.

U.S. Department of the Interior | U.S. Geological Survey. Page Contact Information: GS-W_Streamstats@usgs.gov. (URL: <http://streamstats.usgs.gov/>)

Welhan, J., 2006. Water Balance and Pumping Capacity of the Lower Portneuf River Valley Aquifer, Bannock County, Idaho; Idaho Geological Survey Staff Report 06-5.

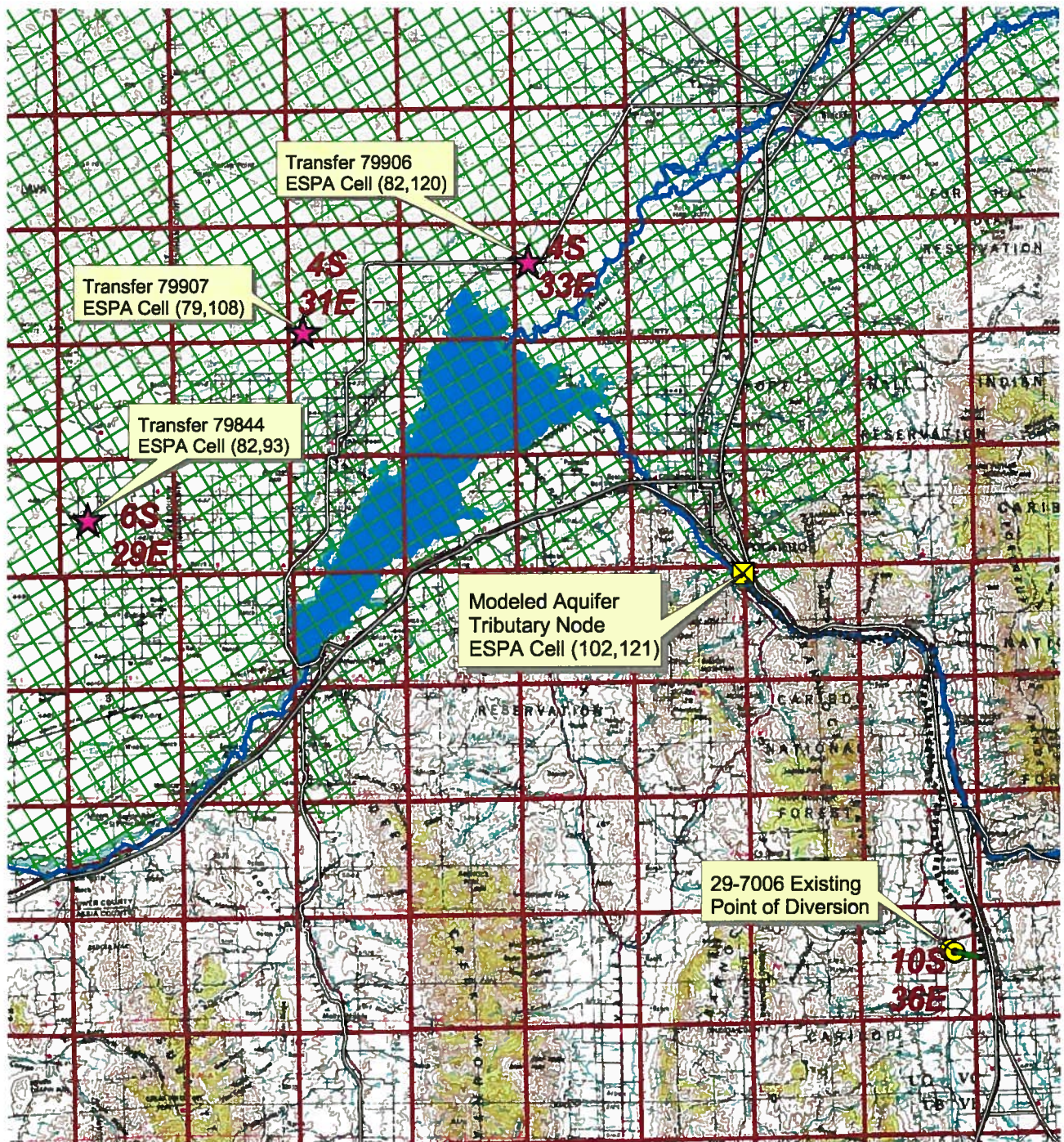
Meehan, C.W., 2005. Geochemistry of the Southern Pocatello Aquifer and its Implications for Aquifer Recharge and Contamination Potential. Masters Thesis: Idaho State University.

Welhan, J., 2001. Ground-Water Interactions Near the Highway Pond Gravel Pit, Pocatello, Idaho; Idaho Geological Survey Staff Report 01-3.

Welhan, J.; Meehan, C.; Reid, T., 1996. The Lower Portneuf River Valley Aquifer: A Geologic/Hydrologic Model and its Implications for Wellhead Protection Strategies.

Welhan, J.; Meehan, C., 1994. Hydrogeology of the Pocatello Aquifer: Implications for Wellhead Protection Strategies.

Norvitch, R.F.; Larson, A.L., 1970. Water Information Bulletin No. 16: A Reconnaissance of the Water Resources in the Portneuf River Basin, Idaho.



JCH - 8/18/2015

USGS Topographic Map

5 0 5 10 15 20 25 Miles

- Township & Range
- ~ Major Rivers
- ESPA Model Grid

- ~ Initial Ground Water Flow Path
- ~ Marsh Creek - Portneuf Gap Flow Path
- Existing Well 29-7006
- ★ Proposed Transfer Points of Diversion



Exhibit 1

Transfer 79984, 79906, 79907 Locations

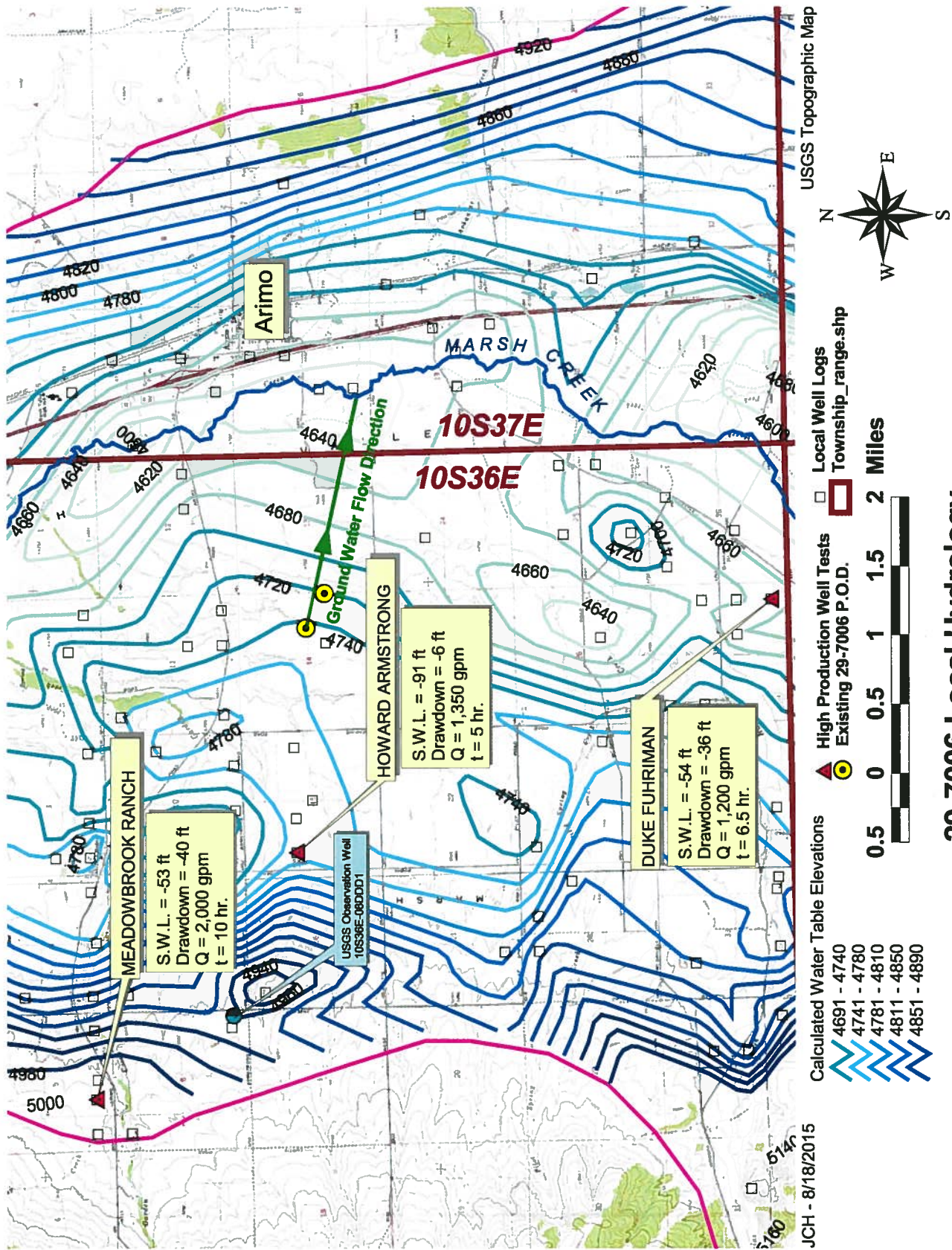


Exhibit 2

Ground Water Travel Time Determination

Aquifer properties from local well tests

	Test Diversion Rate [gpm]	Test Duration [hr]	Initial Water Level [ft]	Final Water Level [ft]	Drawdown [ft]	Aquifer Thickness [ft]	Well Diameter [ft]
Duke Fuhriman	1200	6.5	54	90	36	74	1.33
Meadowbrook Ranch	2000	10	53	93	40	125	1.33
Howard Armstrong	1350	5	91	97	6	139	1.00

	r [ft]	S []	T [ft ² /day]	t [days]	u = r ² S/(4Tt)	W(u)	Estimated K* [ft/day]
Duke Fuhriman	0.67	0.20	5,368	0.27	1.53E-05	10.51	73
Meadowbrook Ranch	0.67	0.20	4,024	0.42	6.09E-06	11.43	32
Howard Armstrong	0.50	0.20	44,610	0.21	1.34E-06	12.94	321

$$*K = Q \cdot W(u) / (4\pi \cdot (h_0 - h))$$

1) Existing Well Location to Marsh Creek Basin

Average Hydraulic Conductivity (K): 142 ft/day

Water Table Elevation @ Well: 4,723 ft USGS 24k
 Water Table Elevation @ Marsh Creek: 4,640 ft USGS 24k
 $\Delta h = 83$ ft
 $\Delta l = 9,100$ ft
 Darcy Velocity $v = -K(\Delta h/\Delta l) = 1.3$ ft/day
 Porosity: 0.2
 Interstitial Fluid Velocity (V): 6.5 ft/day
Travel Time: 1,406 days T_1
 3.85 years

2) Marsh Creek Basin through Portneuf Gap

Estimated Hydraulic Conductivity (K): 10,000 ft/day *Order of magnitude per Welhan, Meehan*

Water Table Elevation @ Marsh Creek: 4,640 ft USGS 24k
 Water Table Elevation @ Portneuf-ESPA: 4,460 ft Pocatello Riverside Golf Course Well
 $\Delta h = 180$ ft
 $\Delta l = 154,634$ ft
 Darcy Velocity $v = -K(\Delta h/\Delta l) = 11.6$ ft/day
 Porosity: 0.2
 Interstitial Fluid Velocity (V): 58.2 ft/day
Travel Time: 2,656.9 days T_2
 7.28 years

Total Travel Time (Existing well to active ESPA model cell 102,121)

4063.2 days $T_1 + T_2$
11.13 years

Exhibit 4

StreamStats: Portneuf @ Pocatello Gage

Date: Wed July 22, 2015 10:45:30 PM GMT-6

NAD 1983 Latitude: 42.8724 (42 52 21)

NAD 1983 Longitude: -112.4682 (-112 28 06)

Label	Value	Units	Definition
DRNAREA	1260.13	mi ²	Area that drains to a point on a stream
RELIEF	4850	feet	Maximum - minimum elevation
ELEVMAX	9290	feet	Maximum basin elevation
MINBELEV	4440	feet	Minimum basin elevation
ELEV	5840	feet	Mean Basin Elevation
FOREST	13	percent	Percentage of area covered by forest
PRECIP	17.4	inches	Mean Annual Precipitation
BSLDEM10M	21	percent	Mean basin slope computed from 10 m DEM
SLOP30_10M	29	percent	Percent area with slopes greater than 30 percent from 10-meter NED
NFSL30_10M	9	percent	Percent area with north-facing slopes greater than 30 percent from 10-meter NED
CSL1085LFP	11.2	feet per mi	Change in elevation divided by length between points 10 and 85 percent of
SLOP30_30M	24.1	percent	Percent area with slopes greater than 30 percent from 30-meter DEM.
BSLDEM30M	19.2	percent	Mean basin slope computed from 30 m DEM
CSL10_85	17	feet per mi	Change in elevation divided by length between points 10 and 85 percent of
NFSL30_30M	8	percent	Percent area with north-facing slopes greater than 30 percent from 30-meter NED
AG_OF_DA	23	percent	Agricultural Land in Percentage of Drainage Area (Idaho Logistic Regression)
DV_OF_DA	0.6	percent	Developed Land in Percentage of Drainage Area (Idaho Logistic Regression)
LAKEAREA	0.25	percent	Percentage of Lakes and Ponds
SLOP50	5.07	percent	Slopes Greater Than 50 Percent as percent of drainage area
VOLCANIC	23.1	percent	Percent of drainage area as surficial volcanic rocks as defined in SIR 2006-
IMPNLCD01	0.48	percent	Percentage of impervious area determined from NLCD 2001 impervious
LC01DEV	3.03	percent	Percentage of land-use from NLCD 2001 classes 21-24

Flow Statistics Ungaged Site Report

Date: Wed July 22, 2015 11:11:39 PM GMT-6

Site Location: Idaho

NAD 1983 Latitude: 42.8724 (42 52 21)

NAD 1983 Longitude: -112.4682 (-112 28 06)

Drainage Area: 1260.13 mi²

Peak-Flow Basin Characteristics			
100% Peak Flow Region 7B (1260 mi ²)			
Value	Regression Equation		Parameter
	Min	Max	
1260 (above max value 431.4)	2.1	431.4	Drainage Area (square miles)

Warning: Some parameters are outside the suggested range. Estimates will be extrapolations with unknown errors.

Low-Flow Basin Characteristics			
100% Low Flow Region 7 (1260 mi ²)			
Value	Regression Equation		Parameter
	Min	Max	
1260 (above max value 535.3)	7.4	535.3	Drainage Area (square miles)
17 (below min value 18.4)	18.4	372.8	Stream Slope 10 and 85 Method (feet per mi)
13	0	38.9	Percent Forest (percent)
5840	2984.4	7603	Mean Basin Elevation (feet)
24.1	0	55.2	Slopes gt 30pct from 30m DEM (percent)
19.2	1.7	35.3	Mean Basin Slope from 30m DEM (percent)
17.4	8.2	29.1	Mean Annual Precipitation (inches)
5.07	0.189	28.5	Slopes Greater Than 50 Percent (percent)

Warning: Some parameters are outside the suggested range. Estimates will be extrapolations with unknown errors.

Zero-Flow Probability Basin Characteristics			
100% Low Flow Region 7 Prob Zero Flow (1260 mi2)			
Value	Regression Equation		Parameter
	Min	Max	
1260 (above max value 535.5)	7.4	535.5	Drainage Area (square miles)
19.2	10.1	35.3	Mean Basin Slope from 30m DEM (percent)

Warning: Some parameters are outside the suggested range. Estimates will be extrapolations with unknown errors.

Monthly and Annual Basin Characteristics			
100% Low Flow Region 7 (1260 mi2)			
Value	Regression Equation		Parameter
	Min	Max	
1260 (above max value 535.3)	7.4	535.3	Drainage Area (square miles)
17 (below min value 18.4)	18.4	372.8	Stream Slope 10 and 85 Method (feet per mi)
13	0	38.9	Percent Forest (percent)
5840	2984.4	7603	Mean Basin Elevation (feet)
24.1	0	55.2	Slopes gt 30pct from 30m DEM (percent)
19.2	1.7	35.3	Mean Basin Slope from 30m DEM (percent)
17.4	8.2	29.1	Mean Annual Precipitation (inches)
5.07	0.189	28.5	Slopes Greater Than 50 Percent (percent)

Warning: Some parameters are outside the suggested range. Estimates will be extrapolations with unknown errors.

Peak-Flow Statistics						
Statistic	Value	Unit	Prediction Error	Equivalent years of record	90-Percent	
					Min	Max
PK1 5	592	ft3/s				
PK2	800	ft3/s				
PK2 33	907	ft3/s				
PK5	1470	ft3/s				
PK10	2050	ft3/s				
PK25	2970	ft3/s				
PK50	3780	ft3/s				
PK100	4690	ft3/s				
PK200	5760	ft3/s				
PK500	7430	ft3/s				

<http://id.water.usgs.gov/PDF/wri024170/index.html>

Berenbrock_ Charles_ 2002_ Estimating the Magnitude of Peak Flows at Selected Recurrence Intervals for Streams in Idaho: U.S. Geological Survey Water-Resources Investigations Report 02-4170_ 59 p.

Low-Flow Statistics						
Statistic	Value	Unit	Prediction Error	Equivalent years of record	90-Percent	
					Min	Max
M1D10Y	6.56	ft3/s				
M7D10Y	8.23	ft3/s				
M7D2Y	17.5	ft3/s				
M30D5Y	12.9	ft3/s				

<http://idaho.usgs.gov/PDF/wri014093/index.html>

Hortness_ J.E._ and Berenbrock_ Charles_ 2001_ Estimating Monthly and Annual Streamflow Statistics at Ungaged Sites in Idaho: U.S. Geological Survey Water-Resources Investigations Report 01-4093_ 36 p.

Zero-Flow Probability Statistics						
Statistic	Value	Unit	Prediction Error	Equivalent years of record	90-Percent	
					Min	Max
PROB 1DAY	3.28E-08	dim				
PROB 7DAY	1.28E-07	dim				
PROB 30DAY	7.16E-09	dim				

<http://idaho.usgs.gov/PDF/wri014093/index.html>

Hortness_ J.E._ and Berenbrock_ Charles_ 2001_ Estimating Monthly and Annual Streamflow Statistics at Ungaged Sites in Idaho: U.S. Geological Survey Water-Resources Investigations Report 01-4093_ 36 p.

Monthly and Annual Statistics						
Statistic	Value	Unit	Prediction Error (percent)	Equivalent years of record	90-Percent Prediction Interval	
					Min	Max
QA	577	ft ³ /s				
JAND20	359	ft ³ /s				
JAND50	133	ft ³ /s				
JAND80	74.7	ft ³ /s				
FEBD20	546	ft ³ /s				
FEBD50	261	ft ³ /s				
FEBD80	123	ft ³ /s				
MARD20	915	ft ³ /s				
MARD50	404	ft ³ /s				
MARD80	174	ft ³ /s				
APRD20	1800	ft ³ /s				
APRD50	1080	ft ³ /s				
APRD80	552	ft ³ /s				
MAYD20	1340	ft ³ /s				
MAYD50	865	ft ³ /s				
MAYD80	380	ft ³ /s				
JUND20	854	ft ³ /s				
JUND50	486	ft ³ /s				
JUND80	214	ft ³ /s				
JULD20	299	ft ³ /s				
JULD50	122	ft ³ /s				
JULD80	48.5	ft ³ /s				
AUGD20	106	ft ³ /s				
AUGD50	57.6	ft ³ /s				
AUGD80	24.7	ft ³ /s				
SEPD20	85.2	ft ³ /s				
SEPD50	46	ft ³ /s				
SEPD80	22.8	ft ³ /s				
OCTD20	122	ft ³ /s				
OCTD50	62.8	ft ³ /s				
OCTD80	32.4	ft ³ /s				
NOVD20	147	ft ³ /s				
NOVD50	93.9	ft ³ /s				
NOVD80	56.1	ft ³ /s				
DECD20	146	ft ³ /s				
DECD50	98.9	ft ³ /s				
DECD80	64.1	ft ³ /s				

<http://pubs.usgs.gov/wri/2001/4093/report.pdf>

Hortness_ J.E._ and Berenbrock_ Charles_ 2001_ Estimating Monthly and Annual Streamflow Statistics at Ungaged Sites in Idaho: U.S. Geological Survey Water-Resources Investigations Report 01-4093_ 36 p.

StreamStats: Marsh Creek Gage @ McCammon

Date: Tues Aug 11, 2015 3:34:04 AM GMT-6
 NAD 1983 Latitude: 42.6294 (42 37 46)
 NAD 1983 Longitude: -112.2254 (-112 13 32)

Label	Value	Units	Definition
DRNAREA	353.55	square miles	Area that drains to a point on a stream
RELIEF	0	feet	Maximum - minimum elevation
ELEVMAX	4790	feet	Maximum basin elevation
MINBELEV	4790	feet	Minimum basin elevation
ELEV	5600	feet	Mean Basin Elevation
FOREST	9	percent	Percentage of area covered by forest
PRECIP	14.3	inches	Mean Annual Precipitation
BSLDEM10M	19	percent	Mean basin slope computed from 10 m DEM
SLOP30_10M	25	percent	Percent area with slopes greater than 30 percent from 10-meter NED
NFSL30_10M	8	percent	Percent area with north-facing slopes greater than 30 percent from 10-meter
CSL1085LFP	11.1	feet per mi	Change in elevation divided by length between points 10 and 85 percent of
SLOP30_30M	20.4	percent	Percent area with slopes greater than 30 percent from 30-meter DEM.
BSLDEM30M	17.3	percent	Mean basin slope computed from 30 m DEM
CSL10_85	16.8	feet per mi	Change in elevation divided by length between points 10 and 85 percent of
NFSL30_30M	7	percent	Percent area with north-facing slopes greater than 30 percent from 30-meter
AG_OF_DA	100	percent	Agricultural Land in Percentage of Drainage Area (Idaho Logistic Regression
DV_OF_DA	0	percent	Developed Land in Percentage of Drainage Area (Idaho Logistic Regression
LAKEAREA	0	percent	Percentage of Lakes and Ponds
SLOP50	0	percent	Slopes Greater Than 50 Percent as percent of drainage area
VOLCANIC	0	percent	Percent of drainage area as surficial volcanic rocks as defined in SIR 2006-
IMPNLCD01	0	percent	Percentage of impervious area determined from NLCD 2001 impervious
LC01DEV	0	percent	Percentage of land-use from NLCD 2001 classes 21-24

Flow Statistics Ungaged Site Report

Date: Tues Aug 11, 2015 3:39:38 AM GMT-6
 Site Location: Idaho
 NAD 1983 Latitude: 42.6294 (42 37 46)
 NAD 1983 Longitude: -112.2254 (-112 13 32)
 Drainage Area: 353.55 mi2

Peak-Flow Basin Characteristics			
100% Peak Flow Region 7B (354 mi2)			
Value	Regression Equation		Parameter
	Min	Max	
354	2.1	431.4	Drainage Area (square miles)

Low-Flow Basin Characteristics			
100% Low Flow Region 7 (354 mi2)			
Value	Regression Equation		Parameter
	Min	Max	
354	7.4	535.3	Drainage Area (square miles)
16.8 (below min value 18.4)	18.4	372.8	Stream Slope 10 and 85 Method (feet per mi)
9	0	38.9	Percent Forest (percent)
5600	2984.4	7603	Mean Basin Elevation (feet)
20.4	0	55.2	Slopes gt 30pct from 30m DEM (percent)
17.3	1.7	35.3	Mean Basin Slope from 30m DEM (percent)
14.3	8.2	29.1	Mean Annual Precipitation (inches)
4.77	0.189	28.5	Slopes Greater Than 50 Percent (percent)

Warning: Some parameters are outside the suggested range. Estimates will be extrapolations with unknown errors.

Zero-Flow Probability Basin Characteristics			
100% Low Flow Region 7 Prob Zero Flow (354 mi2)			
Value	Regression Equation Valid Range		Parameter
	Min	Max	
354	7.4	535.5	Drainage Area (square miles)
17.3	10.1	35.3	Mean Basin Slope from 30m DEM (percent)

Monthly and Annual Basin Characteristics			
100% Low Flow Region 7 (354 mi2)			
Value	Regression Equation Valid Range		Parameter
	Min	Max	
354	7.4	535.3	Drainage Area (square miles)
16.8 (below min value 18.4)	18.4	372.8	Stream Slope 10 and 85 Method (feet per mi)
9	0	38.9	Percent Forest (percent)
5600	2984.4	7603	Mean Basin Elevation (feet)
20.4	0	55.2	Slopes gt 30pct from 30m DEM (percent)
17.3	1.7	35.3	Mean Basin Slope from 30m DEM (percent)
14.3	8.2	29.1	Mean Annual Precipitation (inches)
4.77	0.189	28.5	Slopes Greater Than 50 Percent (percent)

Warning: Some parameters are outside the suggested range. Estimates will be extrapolations with unknown errors.

Peak-Flow Statistics						
Statistic	Value	Unit	Prediction Error (percent)	Equivalent years of record	90-Percent Prediction Interval	
					Min	Max
PK1 5	274	ft3/s	130		48.6	1540
PK2	368	ft3/s	110		76.2	1780
PK2 33	416	ft3/s	100		92	1880
PK5	666	ft3/s	81		187	2370
PK10	919	ft3/s	69		301	2810
PK25	1310	ft3/s	60		487	3520
PK50	1650	ft3/s	56		646	4200
PK100	2020	ft3/s	54		806	5080
PK200	2450	ft3/s	55		965	6230
PK500	3110	ft3/s	58		1160	8340

<http://id.water.usgs.gov/PDF/wri024170/index.html>

Berenbrock_ Charles_ 2002_ Estimating the Magnitude of Peak Flows at Selected Recurrence Intervals for Streams in Idaho: U.S. Geological Survey Water-Resources Investigations Report 02-4170_ 59 p.

Low-Flow Statistics						
Statistic	Value	Unit	Prediction Error (percent)	Equivalent years of record	90-Percent Prediction Interval	
					Min	Max
M1D10Y	2.87	ft3/s				
M7D10Y	3.54	ft3/s				
M7D2Y	7.09	ft3/s				
M30D5Y	5.42	ft3/s				

<http://idaho.usgs.gov/PDF/wri014093/index.html>

Hortness_ J.E._ and Berenbrock_ Charles_ 2001_ Estimating Monthly and Annual Streamflow Statistics at Ungaged Sites in Idaho: U.S. Geological Survey Water-Resources Investigations Report 01-4093_ 36 p.

Zero-Flow Probability Statistics						
Statistic	Value	Unit	Prediction Error (percent)	Equivalent years of record	90-Percent Prediction Interval	
					Min	Max
PROB 1DAY	0.0169	dim				
PROB 7DAY	0.0173	dim				
PROB 30DAY	0.00675	dim				

<http://idaho.usgs.gov/PDF/wri014093/index.html>

Hortness_ J.E._ and Berenbrock_ Charles_ 2001_ Estimating Monthly and Annual Streamflow Statistics at Ungaged Sites in Idaho: U.S. Geological Survey Water-Resources Investigations Report 01-4093_ 36 p.

Monthly and Annual Statistics						
Statistic	Value	Unit	Prediction Error (percent)	Equivalent years of record	90-Percent Prediction Interval	
					Min	Max
QA	131	ft ³ /s				
JAND20	288	ft ³ /s				
JAND50	112	ft ³ /s				
JAND80	63.7	ft ³ /s				
FEBD20	457	ft ³ /s				
FEBD50	217	ft ³ /s				
FEBD80	104	ft ³ /s				
MARD20	213	ft ³ /s				
MARD50	95.7	ft ³ /s				
MARD80	45.8	ft ³ /s				
APRD20	1370	ft ³ /s				
APRD50	776	ft ³ /s				
APRD80	390	ft ³ /s				
MAYD20	690	ft ³ /s				
MAYD50	434	ft ³ /s				
MAYD80	202	ft ³ /s				
JUND20	467	ft ³ /s				
JUND50	270	ft ³ /s				
JUND80	132	ft ³ /s				
JULD20	200	ft ³ /s				
JULD50	89.8	ft ³ /s				
JULD80	39.9	ft ³ /s				
AUGD20	86.8	ft ³ /s				
AUGD50	48.3	ft ³ /s				
AUGD80	21.4	ft ³ /s				
SEPD20	72	ft ³ /s				
SEPD50	39.4	ft ³ /s				
SEPD80	19.7	ft ³ /s				
OCTD20	102	ft ³ /s				
OCTD50	53.5	ft ³ /s				
OCTD80	28.3	ft ³ /s				
NOVD20	122	ft ³ /s				
NOVD50	78.8	ft ³ /s				
NOVD80	48.1	ft ³ /s				
DECD20	121	ft ³ /s				
DECD50	83.1	ft ³ /s				
DECD80	54.8	ft ³ /s				

<http://pubs.usgs.gov/wri/2001/4093/report.pdf>

Hortness_ J.E._ and Berenbrock_ Charles_ 2001_ Estimating Monthly and Annual Streamflow Statistics at Ungaged Sites in Idaho: U.S. Geological Survey Water-Resources Investigations Report 01-4093_ 36 p.

StreamStats: Portneuf @ Topaz Gage

Date: Tues Aug 11, 2015 4:05:49 AM GMT-6

NAD 1983 Latitude: 42.6229 (42 37 22)

NAD 1983 Longitude: -112.0806 (-112 04 51)

Label	Value	Units	Definition
DRNAREA	574.77	square miles	Area that drains to a point on a stream
RELIEF	4330	feet	Maximum - minimum elevation
ELEVMAX	9260	feet	Maximum basin elevation
MINBELEV	4930	feet	Minimum basin elevation
ELEV	6060	feet	Mean Basin Elevation
FOREST	15	percent	Percentage of area covered by forest
PRECIP	18.3	inches	Mean Annual Precipitation
BSLDEM10M	18	percent	Mean basin slope computed from 10 m DEM
SLOP30_10M	22	percent	Percent area with slopes greater than 30 percent from 10-meter NED
NFSL30_10M	7	percent	Percent area with north-facing slopes greater than 30 percent from 10-meter
CSL1085LFP	10.7	feet per mi	Change in elevation divided by length between points 10 and 85 percent of
SLOP30_30M	17.6	percent	Percent area with slopes greater than 30 percent from 30-meter DEM.
BSLDEM30M	16.4	percent	Mean basin slope computed from 30 m DEM
CSL10_85	16.5	feet per mi	Change in elevation divided by length between points 10 and 85 percent of
NFSL30_30M	6	percent	Percent area with north-facing slopes greater than 30 percent from 30-meter
AG_OF_DA	27.9	percent	Agricultural Land in Percentage of Drainage Area (Idaho Logistic Regression)
DV_OF_DA	0.0898	percent	Developed Land in Percentage of Drainage Area (Idaho Logistic Regression)
LAKEAREA	0.44	percent	Percentage of Lakes and Ponds
SLOP50	2.82	percent	Slopes Greater Than 50 Percent as percent of drainage area
VOLCANIC	26.4	percent	Percent of drainage area as surficial volcanic rocks as defined in SIR 2006-
IMPNLCD01	0.16	percent	Percentage of impervious area determined from NLCD 2001 impervious
LC01DEV	1.78	percent	Percentage of land-use from NLCD 2001 classes 21-24

Flow Statistics Ungaged Site Report

Date: Tues Aug 11, 2015 4:11:47 AM GMT-6

Site Location: Idaho

NAD 1983 Latitude: 42.6229 (42 37 22)

NAD 1983 Longitude: -112.0806 (-112 04 51)

Drainage Area: 574.77 mi2

Peak-Flow Basin Characteristics			
100% Peak Flow Region 7B (575 mi2)			
Value	Regression Equation		Parameter
	Min	Max	
575 (above max value 431.4)	2.1	431.4	Drainage Area (square miles)

Warning: Some parameters are outside the suggested range. Estimates will be extrapolations with unknown errors.

Low-Flow Basin Characteristics			
100% Low Flow Region 7 (575 mi2)			
Value	Regression Equation Valid Range		Parameter
	Min	Max	
575 (above max value 535.3)	7.4	535.3	Drainage Area (square miles)
16.5 (below min value 18.4)	18.4	372.8	Stream Slope 10 and 85 Method (feet per mi)
15	0	38.9	Percent Forest (percent)
6060	2984.4	7603	Mean Basin Elevation (feet)
17.6	0	55.2	Slopes gt 30pct from 30m DEM (percent)
16.4	1.7	35.3	Mean Basin Slope from 30m DEM (percent)
18.3	8.2	29.1	Mean Annual Precipitation (inches)
2.82	0.189	28.5	Slopes Greater Than 50 Percent (percent)

Warning: Some parameters are outside the suggested range. Estimates will be extrapolations with unknown errors.

Zero-Flow Probability Basin Characteristics			
100% Low Flow Region 7 Prob Zero Flow (575 mi2)			
Value	Regression Equation Valid Range		Parameter
	Min	Max	
575 (above max value 535.5)	7.4	535.5	Drainage Area (square miles)
16.4	10.1	35.3	Mean Basin Slope from 30m DEM (percent)

Warning: Some parameters are outside the suggested range. Estimates will be extrapolations with unknown errors.

Monthly and Annual Basin Characteristics			
100% Low Flow Region 7 (575 mi2)			
Value	Regression Equation Valid Range		Parameter
	Min	Max	
575 (above max value 535.3)	7.4	535.3	Drainage Area (square miles)
16.5 (below min value 18.4)	18.4	372.8	Stream Slope 10 and 85 Method (feet per mi)
15	0	38.9	Percent Forest (percent)
6060	2984.4	7603	Mean Basin Elevation (feet)
17.6	0	55.2	Slopes gt 30pct from 30m DEM (percent)
16.4	1.7	35.3	Mean Basin Slope from 30m DEM (percent)
18.3	8.2	29.1	Mean Annual Precipitation (inches)
2.82	0.189	28.5	Slopes Greater Than 50 Percent (percent)

Warning: Some parameters are outside the suggested range. Estimates will be extrapolations with unknown errors.

Peak-Flow Statistics						
Statistic	Value	Unit	Prediction Error (percent)	Equivalent years of record	90-Percent Prediction Interval	
					Min	Max
PK1 5	368	ft3/s				
PK2	495	ft3/s				
PK2 33	560	ft3/s				
PK5	901	ft3/s				
PK10	1250	ft3/s				
PK25	1790	ft3/s				
PK50	2260	ft3/s				
PK100	2790	ft3/s				
PK200	3400	ft3/s				
PK500	4340	ft3/s				

<http://id.water.usgs.gov/PDF/wri024170/index.html>

Berenbrock, Charles, 2002, Estimating the Magnitude of Peak Flows at Selected Recurrence Intervals for Streams in Idaho: U.S. Geological Survey Water-Resources Investigations Report 02-4170, 59 p.

Low-Flow Statistics						
Statistic	Value	Unit	Prediction Error (percent)	Equivalent years of record	90-Percent Prediction Interval	
					Min	Max
M1D10Y	2.61	ft3/s				
M7D10Y	3.28	ft3/s				
M7D2Y	7.1	ft3/s				
M30D5Y	5.22	ft3/s				

<http://idaho.usgs.gov/PDF/wri014093/index.html>

Hortness, J.E., and Berenbrock, Charles, 2001, Estimating Monthly and Annual Streamflow Statistics at Ungaged Sites in Idaho: U.S. Geological Survey Water-Resources Investigations Report 01-4093, 36 p.

Zero-Flow Probability Statistics						
Statistic	Value	Unit	Prediction Error (percent)	Equivalent years of record	90-Percent Prediction Interval	
					Min	Max
PROB 1DAY	0.00126	dim				
PROB 7DAY	0.00181	dim				
PROB 30DAY	0.000477	dim				

<http://idaho.usgs.gov/PDF/wri014093/index.html>

Hortness_ J.E._ and Berenbrock_ Charles_ 2001_ Estimating Monthly and Annual Streamflow Statistics at Ungaged Sites in Idaho: U.S. Geological Survey Water-Resources Investigations Report 01-4093_ 36 p.

Monthly and Annual Statistics						
Statistic	Value	Unit	Prediction Error (percent)	Equivalent years of record	90-Percent Prediction Interval	
					Min	Max
QA	239	ft ³ /s				
JAND20	264	ft ³ /s				
JAND50	123	ft ³ /s				
JAND80	76.4	ft ³ /s				
FEBD20	367	ft ³ /s				
FEBD50	198	ft ³ /s				
FEBD80	113	ft ³ /s				
MARD20	295	ft ³ /s				
MARD50	145	ft ³ /s				
MARD80	76.5	ft ³ /s				
APRD20	1650	ft ³ /s				
APRD50	958	ft ³ /s				
APRD80	470	ft ³ /s				
MAYD20	1720	ft ³ /s				
MAYD50	1130	ft ³ /s				
MAYD80	487	ft ³ /s				
JUND20	1090	ft ³ /s				
JUND50	619	ft ³ /s				
JUND80	264	ft ³ /s				
JULD20	361	ft ³ /s				
JULD50	143	ft ³ /s				
JULD80	54.5	ft ³ /s				
AUGD20	121	ft ³ /s				
AUGD50	64.6	ft ³ /s				
AUGD80	27.1	ft ³ /s				
SEPD20	95.4	ft ³ /s				
SEPD50	51.1	ft ³ /s				
SEPD80	25	ft ³ /s				
OCTD20	137	ft ³ /s				
OCTD50	69.9	ft ³ /s				
OCTD80	35.4	ft ³ /s				
NOVD20	166	ft ³ /s				
NOVD50	106	ft ³ /s				
NOVD80	62.3	ft ³ /s				
DECD20	164	ft ³ /s				
DECD50	111	ft ³ /s				
DECD80	71.2	ft ³ /s				

<http://pubs.usgs.gov/wri/2001/4093/report.pdf>

Hortness_ J.E._ and Berenbrock_ Charles_ 2001_ Estimating Monthly and Annual Streamflow Statistics at Ungaged Sites in Idaho: U.S. Geological Survey Water-Resources Investigations Report 01-4093_ 36 p.

Attachment #5:

ESPA Ground Water Rights Transfer Spreadsheet Data Summary

TRANSFER NO: 79844, 79906, 79907
TRANSFER NAME: Idaho Water Company (3)

PREPARED BY: Jason C. Heims, P.E.
DATE: 8/10/2015
Transfer Tool Version: Version 3.1

WATER RIGHTS INVOLVED:

Group 1 Transfer Rights		Group 2 Additional Mitigation Rights	
Right No.	Priority Date	Right No.	Priority Date
29-7006	1/10/1968		

HISTORIC BENEFICIAL USE:

Trans/Mit. Rights (group no.)	Acres to Dry Up (ac)	Beneficial Use (afa/yr)	Total (af/yr)
#79844	200	576.2	576.23
#79906	119	342.9	342.86
#79907	26	74.9	74.91
Total:	345	994.0	994.00

MODEL CELL LOCATIONS:

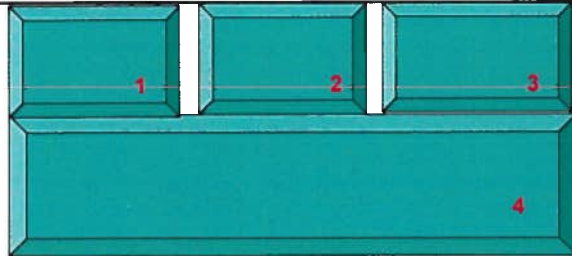
	TO WELL	FROM1 WELL	FROM2 WELL	FROM3 WELL
ROW	82	102	82	79
COLUMN	93	121	120	108

	Start Date		End Date		Water Use		Acres Authorized (acres)	Notes
	Season	Year	Season	Year	Annual (af/yr)	Trimester (af/trimester)		
TO Well (Projected Use)	Winter	1967	Winter	2014	0.0	0.0	0.0	No use prior to transfer
	Spring	2015	Winter	2117	576.2	192.1	200.0	Transfer 79844 use begins spring, 2015
FROM1 Well (With Transfer)	Winter	1967	Winter	1967	0.0	0.0	0.0	No use before priority date of water right
	Spring	1968	Winter	1978	0.0	0.0	0.0	Lag start of use to account for tributary effects
	Spring	1979	Winter	1997	994.0	331.3	345.0	ESPA depletions begin on priority date + 11 yr lag
	Spring	1998	Winter	2008	994.0	331.3	345.0	Enters CRP however 11 yr lag for tributary effects
	Spring	2009	Winter	2014	0.0	0.0	0.0	Credits from CRP non-use begin to accrue
	Spring	2015	Winter	2117	0.0	0.0	0.0	Non-use credits continue with approval of transfer
FROM1 Well (Without Transfer)	Winter	1967	Winter	1967	0.0	0.0	0.0	No use before priority date of water right
	Spring	1968	Winter	1978	0.0	0.0	0.0	Lag start of use to account for tributary effects
	Spring	1979	Winter	1997	994.0	331.3	345.0	ESPA depletions begin on priority date + 4 year lag
	Spring	1998	Winter	2008	994.0	331.3	345.0	Enters CRP however 11 yr lag for tributary effects
	Spring	2009	Winter	2014	994.0	331.3	345.0	Baseline authorized impacts continue without
	Spring	2015	Winter	2117	994.0	331.3	345.0	Authorized depletions continue without transfer
FROM2 Well (With Transfer)	Winter	1967	Winter	2014	0.0	0.0	0.0	No use prior to transfer
	Spring	2015	Winter	2117	342.9	114.3	119.0	Transfer 79906 use begins spring, 2015
FROM2 Well (Without Transfer)	Winter	1967	Winter	2014	0	0.0	0.0	No use prior to transfer
	Spring	2015	Winter	2117	0	0.0	0.0	No use without transfer
FROM3 Well (With Transfer)	Winter	1967	Winter	2014	0.0	0.0	0.0	No use prior to transfer
	Spring	2015	Winter	2117	74.9	25.0	26.0	Transfer 79907 use begins spring, 2015
FROM3 Well (Without Transfer)	Winter	1967	Winter	2014	0	0.0	0.0	No use prior to transfer
	Spring	2015	Winter	2117	0	0.0	0.0	No use without transfer

ENHANCED GROUND-WATER RIGHTS TRANSFER

UNIVERSITY OF IDAHO - IDAHO WATER RESOURCES RESEARCH INSTITUTE | IDAHO DEPARTMENT OF AGRICULTURE

Cells this color are set up for user entries



ENTER STARTING DATE FOR

SIMULATION. THEN PUSH

"UPDATE DATES" BUTTON

YEAR

1968

SEASON

SPRING

TRANSFER NO:

79844, 79906, 79907

TRANSFER NAME:

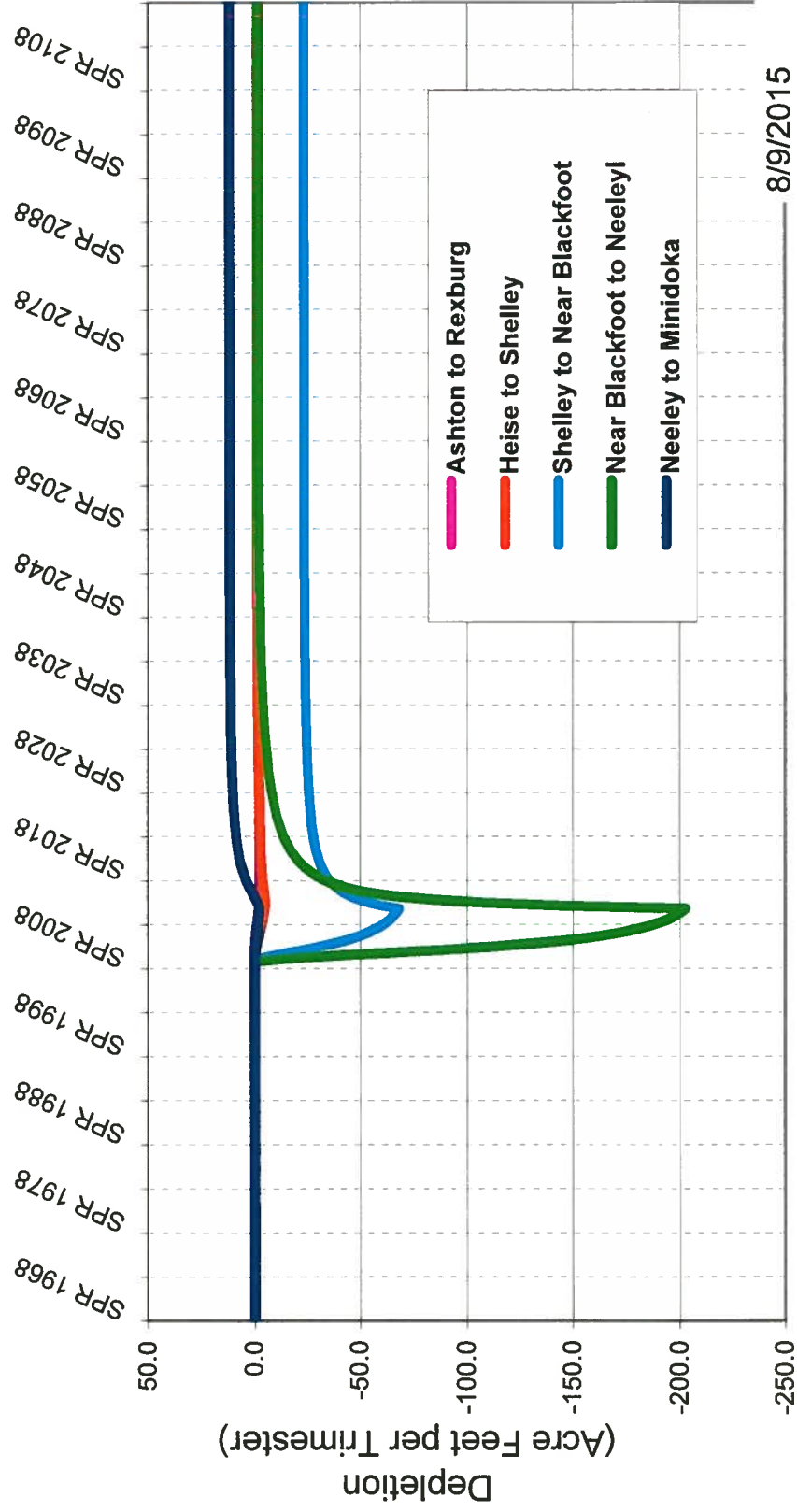
Idaho Water Company (3)

ENTER CELL LOCATIONS:

	'TO' CELL	'FROM1' CELL	'FROM2' CELL	'FROM3' CELL			
ROW	82	102	82	79	Transfer 79844	1/10/1968	576.2
COLUMN	93	121	120	108	Transfer 79906	1/10/1968	74.9
					Transfer 79907	1/10/1968	342.9

		Transfer 79844	Tributary Inflow	Transfer 79906	Transfer 79907	Total		994.0
TRIMESTER OF ACTIVITY	TO WELL	FROM1 WELL		FROM2 WELL		FROM3 WELL		
	Projected Use AF/TRIMESTER	With Transfer AF/TRIMESTER	Without Transfer AF/TRIMESTER	With Transfer AF/TRIMESTER	Without Transfer AF/TRIMESTER	With Transfer AF/TRIMESTER	Without Transfer AF/TRIMESTER	
SPR 1968	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SUM 1968	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
WIN 1968	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SPR 1969	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		ESPA depletions begin on priority date + 11 years associated with revised tributary lag						
SPR 1978	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SUM 1978	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
WIN 1978	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SPR 1979	0.00	331.33	331.33	0.00	0.00	0.00	0.00	0.00
SUM 1979	0.00	331.33	331.33	0.00	0.00	0.00	0.00	0.00
WIN 1979	0.00	331.33	331.33	0.00	0.00	0.00	0.00	0.00
SPR 1980	0.00	331.33	331.33	0.00	0.00	0.00	0.00	0.00
SPR 1996	0.00	331.33	331.33	0.00	0.00	0.00	0.00	0.00
SUM 1996	0.00	331.33	331.33	0.00	0.00	0.00	0.00	0.00
WIN 1996	0.00	331.33	331.33	0.00	0.00	0.00	0.00	0.00
SPR 1997	0.00	331.33	331.33	0.00	0.00	0.00	0.00	0.00
SUM 1997	0.00	331.33	331.33	0.00	0.00	0.00	0.00	0.00
WIN 1997	0.00	331.33	331.33	0.00	0.00	0.00	0.00	0.00
SPR 1998	0.00	331.33	331.33	0.00	0.00	0.00	0.00	0.00
SUM 1998	0.00	331.33	331.33	0.00	0.00	0.00	0.00	0.00
WIN 1998	0.00	331.33	331.33	0.00	0.00	0.00	0.00	0.00
SPR 1999	0.00	331.33	331.33	0.00	0.00	0.00	0.00	0.00
		Land entered CRP 10-1-1997 + 11 years associated with revised tributary lag						
SPR 2008	0.00	331.33	331.33	0.00	0.00	0.00	0.00	0.00
SUM 2008	0.00	331.33	331.33	0.00	0.00	0.00	0.00	0.00
WIN 2008	0.00	331.33	331.33	0.00	0.00	0.00	0.00	0.00
SPR 2009	0.00	0.00	331.33	0.00	0.00	0.00	0.00	0.00
SUM 2009	0.00	0.00	331.33	0.00	0.00	0.00	0.00	0.00
WIN 2009	0.00	0.00	331.33	0.00	0.00	0.00	0.00	0.00
SPR 2010	0.00	0.00	331.33	0.00	0.00	0.00	0.00	0.00
SUM 2010	0.00	0.00	331.33	0.00	0.00	0.00	0.00	0.00
WIN 2010	0.00	0.00	331.33	0.00	0.00	0.00	0.00	0.00
SPR 2011	0.00	0.00	331.33	0.00	0.00	0.00	0.00	0.00
SUM 2011	0.00	0.00	331.33	0.00	0.00	0.00	0.00	0.00
WIN 2011	0.00	0.00	331.33	0.00	0.00	0.00	0.00	0.00
SPR 2012	0.00	0.00	331.33	0.00	0.00	0.00	0.00	0.00
SUM 2012	0.00	0.00	331.33	0.00	0.00	0.00	0.00	0.00
WIN 2012	0.00	0.00	331.33	0.00	0.00	0.00	0.00	0.00
SPR 2013	0.00	0.00	331.33	0.00	0.00	0.00	0.00	0.00
SUM 2013	0.00	0.00	331.33	0.00	0.00	0.00	0.00	0.00
WIN 2013	0.00	0.00	331.33	0.00	0.00	0.00	0.00	0.00
SPR 2014	0.00	0.00	331.33	0.00	0.00	0.00	0.00	0.00
SUM 2014	0.00	0.00	331.33	0.00	0.00	0.00	0.00	0.00
WIN 2014	0.00	0.00	331.33	0.00	0.00	0.00	0.00	0.00
SPR 2015	192.07	0.00	331.33	24.97	0.00	114.30	0.00	0.00
SUM 2015	192.07	0.00	331.33	24.97	0.00	114.30	0.00	0.00
WIN 2015	192.07	0.00	331.33	24.97	0.00	114.30	0.00	0.00
SPR 2016	192.07	0.00	331.33	24.97	0.00	114.30	0.00	0.00
WIN 2116	192.07	0.00	331.33	24.97	0.00	114.30	0.00	0.00
SPR 2117	192.07	0.00	331.33	24.97	0.00	114.30	0.00	0.00
SUM 2117	192.07	0.00	331.33	24.97	0.00	114.30	0.00	0.00
WIN 2117	192.07	0.00	331.33	24.97	0.00	114.30	0.00	0.00

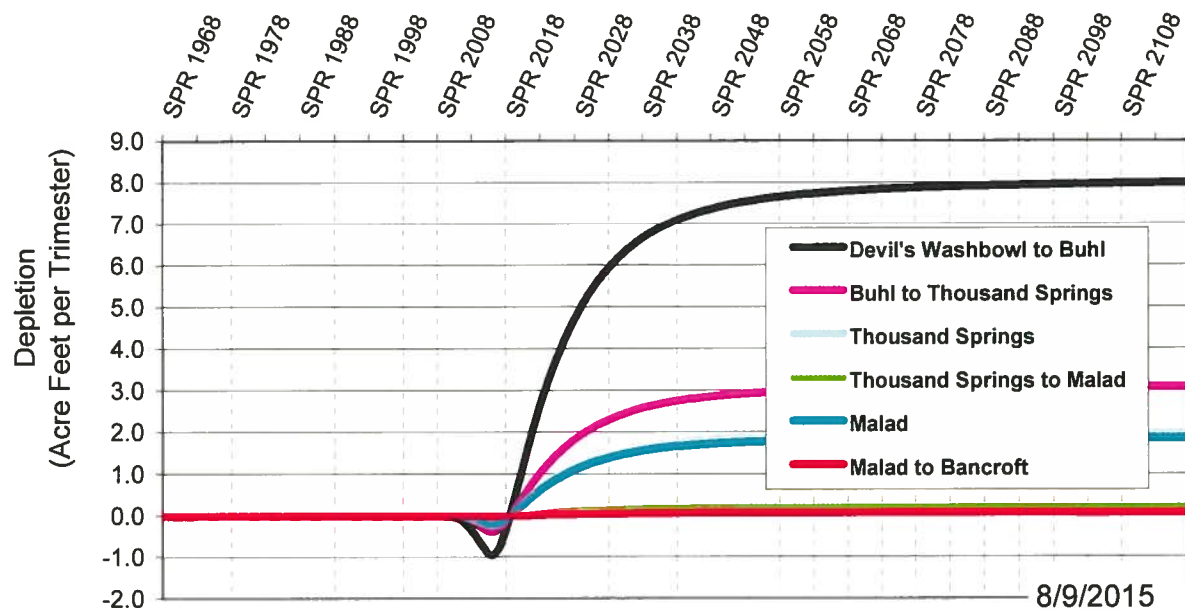
Net Transfer Effect Above Milner (Total Effect With Transfer - Total Effect Without Transfer)



Customer Name: Idaho Water Company (3)

Transfer No: 79844, 79906, 79907

Net Transfer Effect Below Milner *(Total Effect With Transfer - Total Effect Without Transfer)*



8/9/2015
Version 3.1

Customer Name: Idaho Water Company (3)

Transfer No: 79844, 79906, 79907