

MEMO

State of Idaho

Department of Water Resources

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Date: October 6, 2008

To: Aaron Marshall

From: Mike McVay 

cc: Sean Vincent and Rick Raymondi

Subject: Evaluation of The Valley Club mitigation plan.

Introduction

Per your request, I have reviewed the proposed mitigation plan associated with a transfer application for The Valley Club (TVC) golf courses. In particular, the review was to consider the mitigation plan in light of the Big Wood River Ground Water Management Area and the associated management plan. This review has been conducted to answer the following questions:

- 1) Does this mitigation strategy meet requirements set forth in the Big Wood Ground Water Management area?
- 2) Will this transfer impact other wells?
- 3) Will this transfer negatively impact flow in the Big Wood River?
- 4) Does the associated mitigation plan provide relief in terms of volume, location and timing of impacts?

IDWR Review

Big Wood River Ground Water Management Area

The POU for the proposed transfer is located near Hailey, ID. The Valley Club golf courses are within the Big Wood River Ground Water Management Area (BWGWMA) which was designated by Order of the Director on June 28, 1991. The area was designated to address the evidence of connection between ground and surface water within the Camas Creek, Silver Creek, and Upper Big Wood River drainages above Magic Reservoir (Figure 1). According to the State Water Plan, where there is evidence of connection between ground water and surface water, they are to be managed as a single resource (i.e., conjunctively managed). Under the Big Wood GWMA management

plan, new ground water diversions can be allowed if the applicants can demonstrate that there will be no injury or if they can provide acceptable mitigation to senior water right holders (IDWR, 1991).

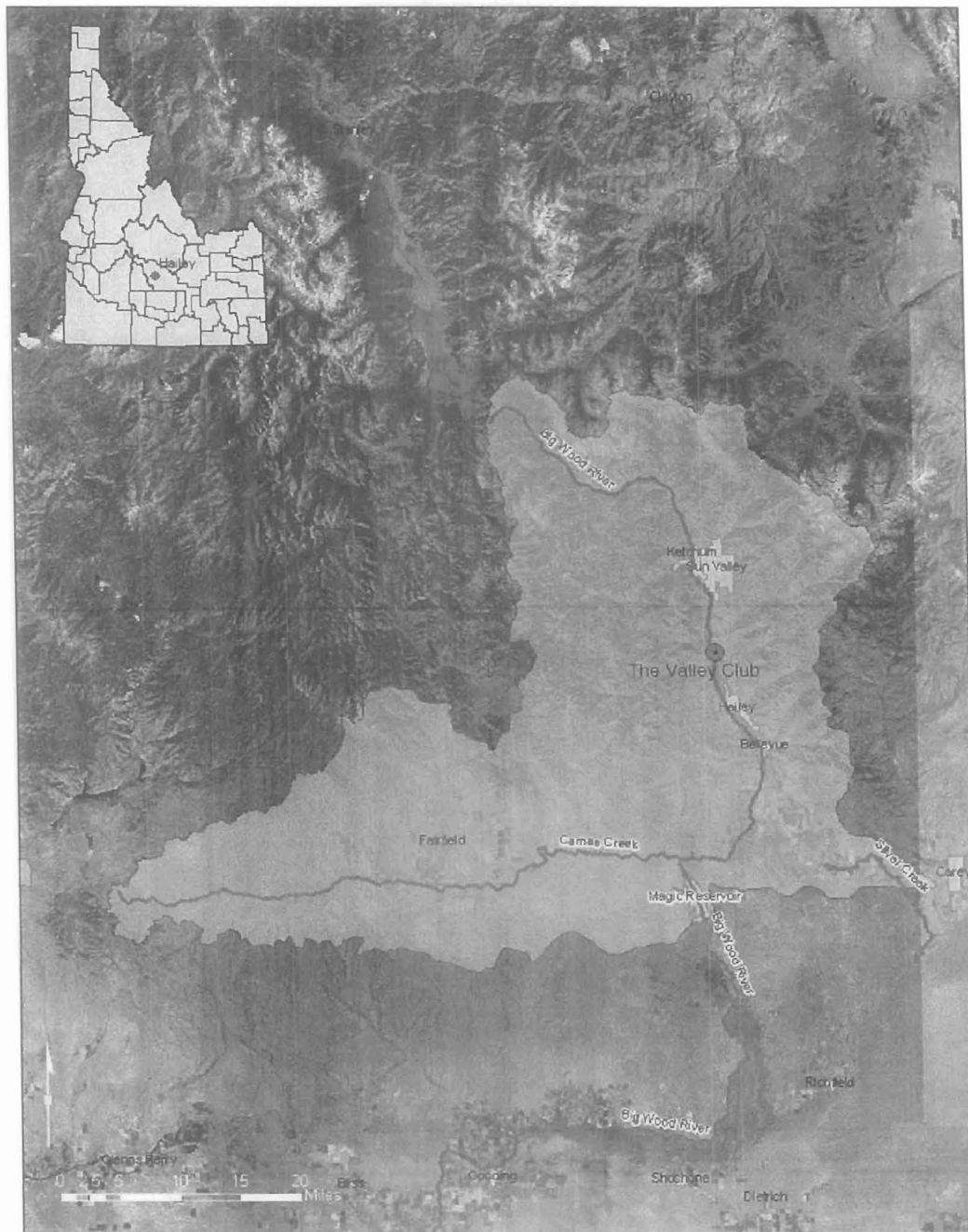


Figure 1. Location of the Valley Club within the Big Wood Ground Water Management Area.

Proposed Transfer and Mitigation Plan

TVC owns and operates two golf courses near Hailey, ID, and anticipates the addition of a third course. The courses are irrigated primarily with surface water, which is augmented with ground water when surface water is not available. These ground water rights are of relatively junior priority, and are potentially subject to curtailment in times of shortage.

Water rights on the Big Wood River have not been managed conjunctively to date; however, the BWGWMA allows for conjunctive management once adjudication has been accomplished in the basin. In anticipation of conjunctive regulation, TVC has submitted a mitigation plan prepared by AMEC Earth and Environmental (AMEC). This proposal is an effort to establish a water rights portfolio and water supply operation that can mitigate any injury attributable to its ground water withdrawals (Brendecke, 2008).

TVC proposes to acquire and transfer 0.806 ft³/sec (cfs) of senior surface water rights from the District Canal to the Hiawatha Canal for use as recharge. This recharge would serve as mitigation for junior ground water pumping that will allow them to continue using ground water that would otherwise be curtailed under conjunctive administration. It has been assumed that these rights are transferrable, and that the transferred volumes and rates listed in the AMEC report are correct.

TVC proposes to acquire and transfer 0.131 cfs (limited to 3.5 acre-feet/year) of junior priority ground water rights to supplement irrigation on the TCV golf courses. This water will be included with the existing TVC ground water rights for which the plan intends to mitigate.

Current Surface Water Availability and Ground Water Use

Surface water availability was estimated from historical monthly diversion from the Hiawatha Canal for 2007. This year was chosen as it is the driest on record from 1990 – 2007. Availability was determined by first allocating monthly diversions among the priorities in the canal, allocating the full amount of water to the most senior right and then to each successively junior right as diversions allowed. Water allocated to each priority was then distributed among users based on relative ownership of that right.

Ground water usage was estimated by subtracting surface water availability from estimated irrigation requirements. Based on these estimates, surface water would be adequate to meet irrigation requirements in all months save for October. Total annual ground water required to meet irrigation needs was estimated to be 16.8 acre-feet (AF) (Brendecke, 2008). Estimated surface water supplies and ground water requirements are summarized in Table 1.

Table 1. Surface Water Availability and Ground Water Use			
Month	Surface Water Availability (acre-feet/month)	Estimated Irrigation Requirements (acre-feet/month)	2007 Ground Water Use (acre-feet/month)
March	0.0	0*	0.0
April	186.3	15.7	0.0
May	337.0	72.2	0.0
June	268.1	118.2	0.0
July	224.1	155.8	0.0
August	184.7	129.0	0.0
September	201.1	74.0	0.0
October	0.0	16.8	16.8
Total	1401.3	581.7	16.8

*Historically TVC has not irrigated in March and irrigation requirements are assumed to be zero.

Proposed Surface Water Transfer

TVC proposes to transfer a portion of what are collectively known as the “South County” water rights from the District Canal near Bellevue to the Hiawatha Canal. The surface water rights would be delivered via the upper Valley Club turnout to infiltration basins where the seepage would be used as mitigation for out-of-priority ground water pumping. This plan is intended to allow the continued use of TVC wells in the event of conjunctive administration for more senior water rights. The water rights to be used as mitigation are listed in Table 2.

Table 2. South County Water Rights Proposed for Mitigation				
Water Right Number	Priority Date	Source	Diversion Rate (cfs)	Existing Use
37-481C	8/1/1882	Big Wood River	3.014	Irrigation
37-577BT	3/24/1883	Big Wood River	2.200	Irrigation
37-482H	8/1/1884	Big Wood River	3.012	Irrigation
37-483C	8/1/1902	Big Wood River	15.086	Irrigation

TVC estimated the divertible water at the District Canal headgate to be 3.4% of the South County diversion rates. This is because 10 acres of the 289 irrigated acres are to be transferred as part of this mitigation plan. Therefore, the District Canal Headgate Divertible Flow values listed in Table 3 are $10/289^{\text{th}}$ of the South County water rights diversion rates. To estimate the divertible water at the Hiawatha Canal headgate, the flow rate and volume were reduced by 30% to account for transmission losses in an effort to avoid injury to other water users. The total water available used for the analysis was estimated from listed water right amounts and records of 2007 priority cuts obtained from the District 37 watermaster. It was assumed that the full water right was divertible when in priority. Table 3 lists the divertible flow rates and volumes for mitigation water.

Table 3. Divertible Yields and Recharge Volumes							
Water Right		37-481C	37-577BT	37-482H	37-483C	Maximum Volume Available in a Dry Year⁵	Minimum Volume in a Dry Year Assuming Water Right No. 37-483C is not Available⁶
District Canal Headgate Divertible Flow¹ (cfs)		0.104	0.076	0.104	0.522		
Priority Date		8/1/1882	3/24/1883	8/1/1884	8/1/1902		
Hiawatha Canal Headgate Divertible Flow² (cfs)		0.073	0.053	0.073	0.365		
Net Diversion Rate Hiawatha Headgate (AF/Day)		0.14	0.11	0.14	0.72		
Date Water Right Cut in 2007³		Aug 17	Jul 10	Jul 2	Jun 22		
Number of Days Water Right Available in 2007⁴		125	87	79	69		
Total Water Available in 2007 Season (AF/Season)		18.10	9.20	11.43	50.01		
Potential Monthly Recharge Volume (AF/Month)	April	2.3	1.7	2.3	11.6	17.9	6.3
	May	4.5	3.3	4.5	22.5	34.7	12.3
	June	4.3	3.2	4.3	15.9	27.8	11.9
	July	4.5	1.1	0.3	0.0	5.8	5.8
	August	2.5	0.0	0.0	0.0	2.5	2.5
Potential Seasonal Recharge Volume (AF/Season)		18.1	9.2	11.4	50.0	88.7	38.7
1) Divertible flow is 10/289 th of total water right listed in Table 2. Only water for 10 of the 289 acres irrigated by the South County Rights is to be transferred for this mitigation plan.							
2) Assumes 30% allowance for reduction in divertible flow rate and volume between present POU and Hiawatha Canal headgate							
3) Based on diversion data provided by the Water Master. This is the driest year in recent memory and provides a conservative estimate on the amount of water available for recharge.							
4) Number of days from the beginning of the irrigation season (April 15) to the cut off date.							
5) Maximum amount of water that would be available for recharge if all water rights are available in a dry year equivalent to 2007.							
6) This provides a more conservative estimate assuming water right no. 37-483C would not be available in a dry year. These were used as recharge rates in the AWAS model.							

Cropping records indicate the South County water rights have historically been used to irrigate 289 acres of alfalfa in rotation with barley or oats. This plan proposes to dry up 10 acres of this property and transfer the rights for use as mitigation on the golf courses. ET estimates for alfalfa by Allen and Robison (2006) suggest that the historic consumptive use on 10 acres of the South County property has been approximately 26 acre-feet per irrigation season.

Mitigation Plan Overview

The mitigation plan is designed to use a transferred portion of the South County surface water as recharge to offset depletions to the Big Wood River caused by pumping of junior priority wells (Valley Club and Peregrine wells). Recharge water would be delivered through existing TVC turnouts on the Hiawatha Canal to the two infiltration basins located approximately 0.2 miles northeast and 0.3 miles southeast of the Valley Club well (Figure 2).



Figure 2. Location of TVC irrigation and recharge features.

The infiltration basins will have a wetted area of 0.6 acres with at least 18 inches of select filter sand, and will be located at least 500 feet away from any existing domestic wells. The estimated infiltration rate is 0.91 acre-feet/day for each basin.

Water will be delivered via Hiawatha Canal. This canal is a reliable delivery system in all but the most extreme low-water conditions, and the infiltration basins are located in the upper end of this system (near the turnout) which minimizes conveyance losses. In the event that water is not available via the canal system, TVC has a contingency plan by which it will reduce irrigation requirements to meet water supply.

TVC currently records the quantities of water diverted from the Hiawatha Canal, the volume of water pumped from wells, and the amount of water applied to its properties. Flow meters will record the volume of flow to the recharge basins as well as tail-water returns to the canal system. TVC plans to recharge the aquifer with mitigation water every year, including years when mitigation for pumping is not required. TVC proposes the implementation of a debit and credit accounting system with IDWR for these mitigation activities.

Mitigation Analysis

Depletions to the Big Wood River due to ground water pumping at TVC were estimated using an image well analysis (see, for example, Freeze and Cherry, 1979). This analysis was executed using a software program called Alluvial Water Accounting System (AWAS). AWAS was also used to estimate water accrual to the Big Wood River from the proposed infiltration ponds.

AMEC Mitigation Analyses

As mentioned above, recharge water availability was estimated using the supply for 2007, a relatively dry year, and by further reducing water availability by removing the most junior South County right (37-483C, Table 3). Using the AWAS software to evaluate the pumping and recharge effects, AMEC used a conservative approach and assumed that all of the pumping came from only one of the wells in each analysis. The net effects of the AMEC analyses are presented in Table 4 below.

Table 4 AMEC Estimated River Impacts From the Irwin Well and the Peregrine Well Evaluated Separately ¹													
Impact to Big Wood River (acre-feet)													Annual Total (acre-feet)
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
<i>Net Impacts Pumping Irwin Well and Recharge via Middle Pond ²</i>													
2007	0	0	0	0	0.14	0.58	1.26	1.86	2.18	0.57	-1.71	-0.07	4.81
2008	0.51	0.68	0.74	0.76	0.89	1.33	1.99	2.57	2.87	1.22	-1.08	0.53	13.01
2009	1.08	1.22	1.25	1.24	1.35	1.76	2.39	2.95	3.22	1.56	-0.76	0.82	18.08
2010	1.35	1.48	1.49	1.46	1.56	1.95	2.57	3.11	3.38	1.7	-0.63	0.95	20.37
2011	1.47	1.59	1.59	1.56	1.64	2.03	2.65	3.18	3.44	1.76	-0.58	1	21.33
2012	1.52	1.63	1.63	1.59	1.68	2.06	2.68	3.21	3.47	1.78	-0.55	1.02	21.72
2013	1.54	1.65	1.64	1.61	1.69	2.08	2.69	3.22	3.48	1.79	-0.55	1.02	21.86
2014	1.54	1.65	1.65	1.62	1.7	2.08	2.69	3.22	3.48	1.8	-0.54	1.03	21.92
2015	1.55	1.66	1.65	1.62	1.7	2.08	2.7	3.23	3.48	1.8	-0.54	1.03	21.96
2016	1.55	1.66	1.65	1.62	1.7	2.08	2.7	3.23	3.48	1.8	-0.54	1.03	21.96
<i>Net Impacts Pumping Peregrine Well and Recharge via Middle Pond ²</i>													
2007	0	0	0	0	0.14	0.58	1.26	1.86	2.18	2.16	1.09	0.52	9.79
2008	0.55	0.59	0.59	0.58	0.7	1.12	1.77	2.35	2.64	2.6	1.5	0.92	15.91
2009	0.92	0.94	0.92	0.9	0.99	1.4	2.03	2.59	2.88	2.82	1.71	1.11	19.21
2010	1.1	1.11	1.08	1.04	1.13	1.53	2.16	2.71	2.98	2.92	1.8	1.2	20.76
2011	1.19	1.19	1.15	1.11	1.19	1.59	2.21	2.76	3.03	2.96	1.84	1.23	21.45
2012	1.22	1.22	1.18	1.14	1.22	1.61	2.23	2.78	3.05	2.98	1.86	1.25	21.74
2013	1.24	1.23	1.2	1.15	1.23	1.62	2.24	2.79	3.06	2.99	1.87	1.26	21.88
2014	1.24	1.24	1.2	1.16	1.24	1.63	2.25	2.79	3.06	2.99	1.87	1.26	21.93
2015	1.25	1.24	1.21	1.16	1.24	1.63	2.25	2.79	3.06	2.99	1.87	1.26	21.95
2016	1.25	1.24	1.21	1.16	1.24	1.63	2.25	2.79	3.06	2.99	1.87	1.26	21.95
¹ River impacts were evaluated independently for the Irwin and Peregrine wells. The Irwin well evaluation assumed the Irwin well provided all needed water supplies whereas the evaluation using the Peregrine wells assumed all water supplies would be pumped from the Peregrine wells.													
² Negative values indicate depletions to the river													

Results of the AWAS analyses run by AMEC indicate that the plan generally mitigates pumping effects on the Big Wood River. Both analyses predict net positive accretions of approximately 22 acre-feet/year (steady-state) to stream flow in the Big Wood River.

Assuming all of the pumping occurs at the Irwin well and that all of the recharge occurs at one infiltration pond, the analysis predicts a small amount of depletion to the Big Wood River during November. Comparing the steady-state depletion (0.54 acre-feet/month) to the average river flow in November (11,130 acre-feet/month), the maximum depletion ratio is 0.01% (USGS, 2007).

Assuming all of the pumping occurs at the Peregrine well and that all of the recharge occurs at one infiltration pond; the analysis predicts no depletion to the Big Wood River.

It is important to remember that these analyses take a conservative water supply scenario and apply the conditions for nine years.

IDWR Mitigation Analyses

During IDWR review of the submitted plan, there appeared to be some discrepancies in recharge basin location data between the AMEC and IDWR estimates. It was therefore decided to run the AWAS program with IDWR inputs to independently verify the mitigation plan behavior. The results of the IDWR analyses are shown in Table 5.

Table 5 IDWR Estimated River Impacts From the Irwin Well and the Peregrine Well Evaluated Separately ¹													
Impact to Big Wood River (acre-feet)													Annual Total (acre- feet)
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
<i>Net Impacts Pumping Irwin Well and Recharge via Middle Pond ²</i>													
2007	0	0	0	0.69	2.84	5.04	5.59	4.69	3.58	2.53	0.91	0.12	25.99
2008	0	-0.06	-0.11	0.54	2.67	4.85	5.39	4.48	3.38	2.33	0.71	-0.06	24.12
2009	-0.17	-0.23	-0.26	0.4	2.54	4.72	5.28	4.38	3.28	2.24	0.63	-0.14	22.67
2010	-0.24	-0.29	-0.32	0.35	2.49	4.68	5.24	4.34	3.25	2.21	0.61	-0.16	22.16
2011	-0.26	-0.31	-0.34	0.33	2.48	4.67	5.23	4.33	3.24	2.2	0.6	-0.17	22
2012	-0.27	-0.31	-0.34	0.33	2.47	4.67	5.23	4.33	3.24	2.2	0.6	-0.17	21.98
2013	-0.27	-0.31	-0.34	0.33	2.47	4.66	5.23	4.33	3.24	2.2	0.6	-0.17	21.97
2014	-0.27	-0.31	-0.34	0.33	2.47	4.66	5.23	4.33	3.24	2.2	0.6	-0.17	21.97
2015	-0.27	-0.31	-0.34	0.33	2.47	4.66	5.23	4.33	3.24	2.2	0.6	-0.17	21.97
2016	-0.27	-0.31	-0.34	0.33	2.47	4.66	5.23	4.33	3.24	2.2	0.6	-0.17	21.97
<i>Net Impacts Pumping Peregrine Well and Recharge via Middle Pond ²</i>													
2007	0	0	0	0.69	2.84	5.04	5.59	4.69	3.58	2.61	1.47	0.58	27.09
2008	0.31	0.19	0.09	0.7	2.79	4.92	5.44	4.5	3.38	2.39	1.24	0.34	26.29
2009	0.08	-0.04	-0.14	0.48	2.57	4.72	5.24	4.32	3.2	2.23	1.08	0.2	23.94
2010	-0.06	-0.17	-0.26	0.36	2.47	4.62	5.15	4.23	3.12	2.15	1.01	0.13	22.75
2011	-0.12	-0.23	-0.31	0.32	2.42	4.58	5.11	4.2	3.09	2.12	0.99	0.11	22.28
2012	-0.14	-0.25	-0.33	0.3	2.4	4.56	5.1	4.18	3.08	2.11	0.97	0.1	22.08
2013	-0.15	-0.26	-0.34	0.29	2.4	4.56	5.09	4.18	3.07	2.1	0.97	0.09	22
2014	-0.16	-0.26	-0.34	0.29	2.4	4.55	5.09	4.17	3.07	2.1	0.97	0.09	21.97
2015	-0.16	-0.26	-0.34	0.29	2.39	4.55	5.09	4.17	3.07	2.1	0.97	0.09	21.96
2016	-0.16	-0.26	-0.34	0.29	2.39	4.55	5.09	4.17	3.07	2.1	0.97	0.09	21.96

¹ River impacts were evaluated independently for the Irwin and Peregrine wells. The Irwin well evaluation assumed the Irwin well provided all needed water supplies whereas the evaluation using the Peregrine wells assumed all water supplies would be pumped from the Peregrine wells.

² Negative values indicate depletions to the river

Although the IDWR analyses indicate depletions to the Big Wood River over more months, the results confirm that the plan generally mitigates TVC pumping effects. Both analyses predict net positive accretions of approximately 22 AF/year (steady-state) to stream flow in the Big Wood River.

Assuming all of the pumping occurs at the Irwin well and that all of the recharge occurs at one infiltration pond; the analysis predicts a small amount of depletion to the Big Wood River during December, January, February and March. Comparing the steady-state depletions to the average river flow in December (9,460 AF/month), January (9,160 AF/month), February (8,980 AF/month) and March (11,130 AF/month), the maximum depletion ratio is 0.004% of flow, and occurs in February (USGS, 2007).

Assuming all of the pumping occurs at the Peregrine well and that all of the recharge occurs at one infiltration pond; the analysis predicts depletions to the Big Wood River during January, February and March. Comparing the depletions to the average river flow in December (9,460 AF/month), January (9,160 AF/month), February (8,980 AF/month) and March (11,130 AF/month), the maximum depletion is 0.003% of flow during the months of January, February and March (USGS, 2007).

As mentioned earlier, the previous analyses considered all withdraws to come from one point and all recharge to occur from one point, both of which are conservative assumptions. To be thorough, IDWR also evaluated the mitigation plan assuming the withdrawals are distributed between both wells and the recharge is distributed between both recharge ponds. Half of the withdrawals and recharge were attributed to each well and each pond, respectively. Results of this analysis are shown in Table 6.

Table 6 IDWR Estimated River Impacts From Both Wells and Both Ponds Evaluated Simultaneously ¹													
Impact to Big Wood River (acre-feet)													Annual Total (acre- feet)
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Net Impacts Pumping Both Wells and Recharge via Both Ponds ²													
2007	0	0	0	0.35	1.56	3	3.68	3.44	2.92	2.27	0.99	0.2	18.41
2008	0.07	0.04	0.02	0.37	1.57	3	3.67	3.43	2.91	2.25	0.97	0.19	18.49
2009	0.05	0.03	0.02	0.36	1.56	3	3.67	3.43	2.91	2.26	0.98	0.2	18.47
2010	0.07	0.04	0.03	0.37	1.58	3.02	3.69	3.45	2.93	2.28	1	0.22	18.68
2011	0.09	0.06	0.05	0.4	1.6	3.04	3.71	3.47	2.95	2.3	1.02	0.24	18.93
2012	0.11	0.08	0.07	0.41	1.62	3.06	3.73	3.49	2.97	2.31	1.04	0.25	19.14
2013	0.12	0.1	0.09	0.43	1.63	3.07	3.74	3.5	2.99	2.33	1.05	0.27	19.32
2014	0.14	0.11	0.1	0.44	1.65	3.08	3.75	3.52	3	2.34	1.06	0.28	19.47
2015	0.15	0.12	0.11	0.45	1.66	3.09	3.76	3.53	3.01	2.35	1.07	0.29	19.59
2016	0.16	0.13	0.12	0.46	1.67	3.1	3.77	3.53	3.02	2.36	1.08	0.3	19.7
¹ River impacts were evaluated simultaneously for the Irwin and Peregrine wells, with each well pumping half of the water. This evaluation also assumed that each recharge pond contributed half of the recharge water													
² Negative values indicate depletions to the river													

Results of this AWAS analysis run by IDWR confirm that the plan mitigates pumping effects on the Big Wood River. This analysis predicts maximum net positive accretions of approximately 20 AF/year to stream flows in the Big Wood River.

Assuming half of the pumping occurs at the Peregrine well and half of the pumping occurs at the Irwin well, and that the recharge occurs equally at each of two infiltration ponds; the analysis predicts no depletion to the Big Wood River.

IDWR Well Impact Analysis

No new wells are proposed, and this plan is intended to mitigate for current withdrawal volumes under future conjunctive administration. This mitigation strategy calls for the addition of recharge water to the aquifer.

Assuming the drought scenario presented by AMEC, TVC would withdraw 16.8 acre-feet of ground water during the month of October. A Theis approximation was used to estimate the impacts to nearby wells as a result of pumping all of this water from one well for one month (Table 7).

Table 7. Time-drawdown calculations using the Theis equation

Aquifer parameters			Radius (ft)	600	1000	1500
T	4845	ft ² /d	Time (days)	Drawdown (ft)	Drawdown (ft)	Drawdown (ft)
S	0.15		1	0.007	0.000	-
B	--		3	0.099	0.009	0.000
Pumping rate			5	0.198	0.037	0.003
Q	24255	ft ³ /d	7	0.281	0.073	0.010
			10	0.383	0.130	0.028
			14	0.489	0.199	0.059
			18	0.573	0.261	0.092
			23	0.658	0.328	0.134
			27	0.715	0.374	0.166
			31	0.765	0.416	0.196
			35	0.809	0.455	0.224
			40	0.859	0.498	0.258
			45	0.903	0.537	0.289

The closest well is approximately 600 feet distant from any TVC production well, and after 31 days of pumping the drawdown in this neighboring well is estimated to be approximately nine inches. However, due to the proximity of the wells to the Big Wood River, a portion of the water withdrawn from the ground will be supplied by the river, further reducing the expected drawdown in nearby wells.

Conclusions

In an effort to evaluate the appropriateness of the TVC mitigation plan, this review has been conducted to answer the following questions:

- 1) Does this mitigation strategy meet requirements set forth in the Big Wood Ground Water Management area?
- 2) Will this transfer impact other wells?
- 3) Will this transfer negatively impact flow in the Big Wood River?
- 4) Does the associated mitigation plan provide relief in terms of volume, location and timing of impacts?

Question 1

Does this mitigation strategy meet requirements set forth in the Big Wood Ground Water Management area?

It appears that that this mitigation strategy meets the requirements set forth in the Big Wood Ground Water Management Area. This plan addresses the surface water-ground water connection in the area, and proposes a plan to mitigate impacts due to junior ground water pumping.

Question 2

Will this transfer impact other wells?

This plan most likely will not negatively impact other wells. A simple Theis approximation for pumping impacts to the nearby wells predicts that if all the groundwater were to be pumped from a single well (for the month of October), the drawdown would be approximately nine inches in the closest well (approximately 600 feet from any TVC pumping well). Due to the proximity of the wells to the Big Wood River, a portion of the water withdrawn from the ground will be supplied by the river, further reducing the expected drawdown in nearby wells.

No new wells are proposed, and this plan is intended to mitigate for current withdrawal volumes under future conjunctive administration. This mitigation strategy calls for the addition of recharge water to the aquifer.

Question 3

Will this transfer negatively impact flow in the Big Wood River?

This plan is not a typical transfer. This plan proposes to transfer senior surface water rights to mitigate for junior ground water rights that are already in place. The plan involves taking water rights with a combined estimated consumptive use of 26 AF/year and using them for recharge. Based on our analysis, this plan appears to increase the net flow in the Big Wood River.

Question 4

Does the associated mitigation plan provide relief in terms of volume, location and timing of impacts?

This plan will mitigate impacts in terms of volume. Analyses indicate that this mitigation strategy will increase flows in the Big Wood River by at least 20 AF/year.

This plan will mitigate impacts in terms of location. The basins are within 2000 feet of the river and in close proximity to the wells (all are located within the same POU), which

implies that depletions and accretions to stream flow will occur in the same general vicinity.

This plan generally mitigates impacts in terms of time. Although some of the analyses indicate stream depletions, the depletions are of relatively small magnitude and are the result of several conservative assumptions. Furthermore, the depletions occur outside of the irrigation season when injury to other users is less likely. Any shortcomings to storage accrual in Magic Reservoir are more than compensated for by the annual additions to river flow the plan provides.

Assuming that the South County water rights are transferrable and that the volumes and rates listed in the AMEC report are correct; this mitigation plan appears to mitigate pumping impacts to the Big Wood River in terms of volume, location and timing.

References

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