

Memorandum

To: Gary Spackman, Interim IDWR Director
From:  for Tim Luke, Water Distribution Section Manager
CC: Phil Rassier, Chris Bromley, Jeff Peppersack, Allan Wylie, Cindy Yenter, Sean Vincent
Date: January 11, 2010
Re: Determination of Shortfall Calculations Requested by the District Court in the Snake River Farm Delivery Call Regarding Ground Water Districts' 2009 Second Plan of Action

Attached to this memo are three memos from Allan Wylie that document reach gain benefits to the Buhl to Thousand Springs reach resulting from mitigation activities implemented by the North Snake and Magic Valley Ground Water Districts during 2009. The three mitigation activities include conversion projects (existing conversions and new conversions), CREP, and recharge. The reach gains were determined using the Eastern Snake Plain Aquifer Model (ESPAM) version 1.1. Allan Wylie's memos provide sufficient detail regarding how the reach gain computations were determined. The North Side Canal Company (NSCC) reported surface water delivery data for both new and existing conversion projects to Water District 130 watermaster Cindy Yenter. Cindy analyzed ground water use data for conversion wells provided by the ground water districts to determine any excess surface water deliveries. NSCC also reported post season recharge data to the Department.

Model results showing benefits to the Buhl to Thousand Springs reach from 2009 mitigation activities are as follows:

Existing Conversions*	New Conversions*	CREP	Recharge	Total Provided	Total Required	Shortfall
3.19	2.38	0.48	3.00	9.05	12.23	3.18

*Includes credit for transmission loss and excess head gate deliveries

The current projected shortfall of 3.18 cfs to the reach equates to a shortage of 0.22 cfs directly to Clear Springs. This shortfall to Clear Springs is higher than the 0.17 cfs shortfall projected in the Department's Amended Curtailment Order of August 7, 2009. On August 24, 2009, Judge Melanson stayed the Department's Amended Curtailment order "contingent upon the Districts providing security in their 'Second Plan of Action'."

Some comments regarding the attached memos and data:

- Allan Wylie's Conversion Post Audit memo details credit for transmission loss and excess head gate deliveries (credited as deep percolation throughout the NSCC service area within the Buhl-Thousand Springs trim line).
- Certain ground water use data from existing conversion project wells were not provided by the ground water districts to the Department until December 30, 2009 despite several requests from the watermaster that were made earlier in the Fall of

2009. The last minute data were provided upon request made by the Department on December 29, 2009. The Department did include the last minute data in its conversion projects analysis. No penalty or loss of credit was assigned for late submittal of the data.

- Regarding the 2009 new conversion project deliveries shown in Table 1 of Allan Wylie's 2009 Conversion Post Audit memo:
 - a) No credit was given for the Van Dyk conversion well because NSCC did not report delivery of any of the ground water districts' 2009 storage water. The watermaster reports that Van Dyk used its own NSCC shares for the surface water conversion pond and pump constructed by the ground water districts. The Van Dyk well was used during June and several days in July before the pond and pump were constructed or installed. The well was used well after the June 1 conversion project deadline established by agreement between the ground water districts and Clear Springs Foods, and approved by the Department in an earlier 2009 order.
 - b) Well Nos. 100468, 100472 and 100473, owned by Box Canyon, were replaced by surface water deliveries to two ponds that provided water to lands under the three wells. The watermaster combined the authorized water right acres under the three wells and surface water deliveries for the lands under the rights for analysis purposes since it was impossible to know how much surface water went to the different acres under the authorized rights.

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: 6 January 2010
To: Tim Luke
From: Allan Wylie AW
cc: Sean Vincent, Rick Raymondi
Subject: 2009 Conversion Post Audit for Snake River Farm

This memo summarizes the results of the post audit for the new conversions and old conversion portion of IGWA's mitigation for Snake River Farm. The post audit involves an analysis by Water District 130 Water Master Cindy Yenter to determine the total amount of water (surface and ground water) delivered to each formerly ground water irrigated field in the conversion program and a modeling analysis in which the steady-state benefit to the target reach is computed. This memo summarizes the benefits of the 2009 mitigation by IGWA.

Each irrigation well is associated with a farmed field and identified with a WMIS point of diversion (pod) number in Table 1. A total of seven pods are included in this analysis for the new conversions. Allowable deliveries are capped at four af/acre. Table 1 shows the results of the analysis by Water Master Cindy Yenter. The total volume of mitigation water delivered for the new conversions was 3,472.2 af

Table 1. New conversion 2009 deliveries.

WMIS pod	NAME	Acres	Max Allowed AF	2009 GW Diversion AF	2009 Final SW Delivery AF 11/04/09	2009 Conversion Credit AF	2009 Excess Credit AF
100468	Box Canyon	124	496	29.0	607.6	492.7	114.9
100472	Box Canyon	139	556	19.0	607.6	492.7	114.9
100473	Box Canyon	139	556	82.0	607.6	492.7	114.9
100537	Box Canyon	148	592	31.0	549.8	545.7	4.1
100539	Box Canyon	148	592	41.0	549.8	545.7	4.1
100540	Box Canyon	148	592	67.0	549.8	545.7	4.1
100826	Van Dyk	74	296		0	0	0
	total af/y		3680		3472.2	3115.2	369.5

Using the information provided by Cindy, I identified the ESPAM version 1.1 model-cell that each conversion well lies within. A conversion credit was applied to the model cell corresponding to each well. Note that no credit was given to the last well in Table 1 because delivery records do not show that any mitigation water was delivered to that field.

Figure 1 shows the location of the seven new conversion wells in Table 1 and the associated conversion credit in cubic feet per day. All new conversion wells are within the Buhl-Thousand Spgs trim line associated with ESPAM version 1.1. The benefit to the target reach from the 3115.2 af conversion credit was then modeled, and the results show that the benefit to the Buhl-Thousand Spgs reach from the Snake River Farm new conversion wells is 2.0 cfs.



Figure 1. New conversion wells.

IDWR policy allows a credit of 30% for transmission loss through the North Side system to the delivery location. During the 2009 irrigation season, 3,472.2 af of mitigation water was delivered via the North Side Canal, so 1,041.7 af of transmission loss is due as credit. Figure 2 shows the assumed route for the water delivered to the new conversion wells. Transmission loss was assumed to occur evenly along the route from Milner to the new conversion wells. The entire delivery route is within the Buhl-Thousand Spgs trim line. The modeled steady-stat benefit to the Buhl-Thousand Spgs reach from transmission loss for the new conversion wells was determined to be 0.29 cfs.

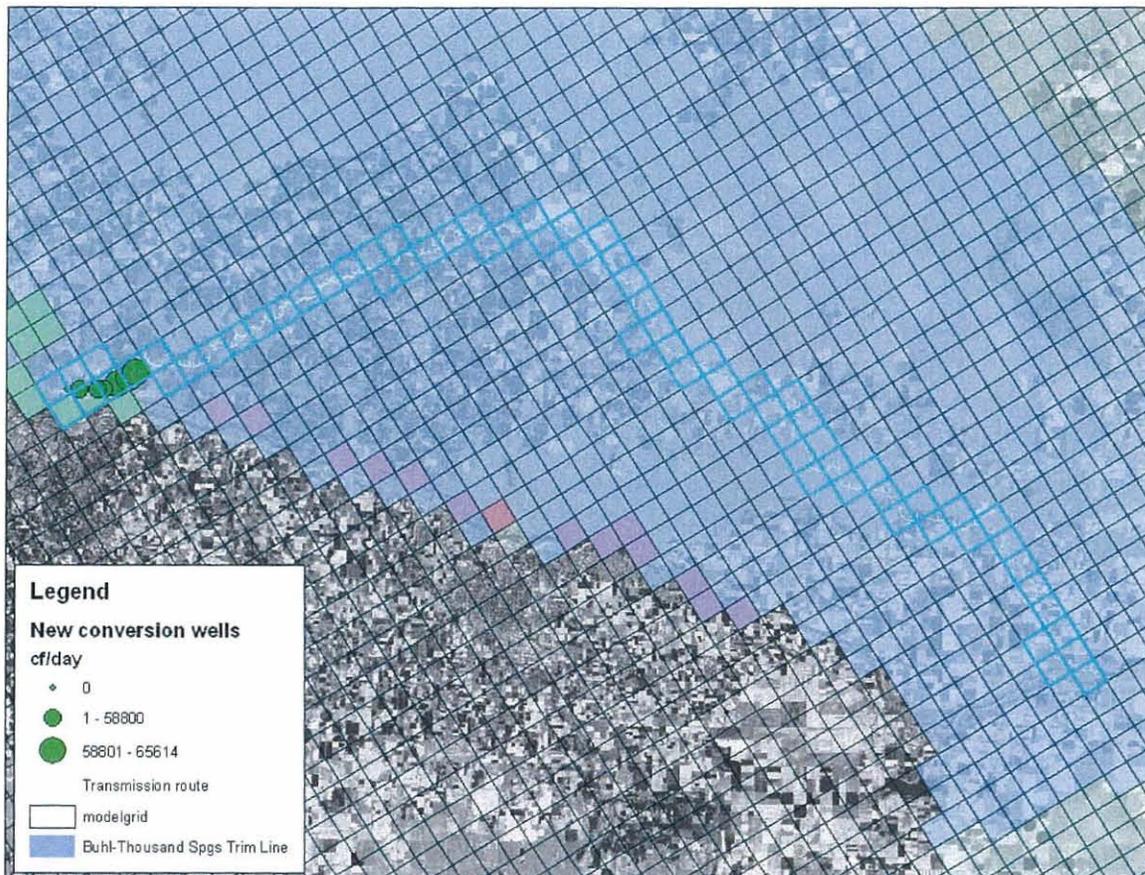


Figure 2. Presumed transmission path for new conversion wells.

All surface water delivered above the 4 af/acre limit was spread evenly across the surface water irrigated lands within the North Side Canal Co service area and then clipped to the Buhl-Thousand Spgs trim line. This was accomplished by selecting all surface water irrigated lands within the North Side Canal Co service area as identified during calibration of ESPAM 1.1, then selecting all model cells whose center overlies surface water irrigated lands, and then applying the total volume of water in the '2009 Excess Credit' column in Table 1.

Figure 3 shows the model cells overlying surface water irrigated lands within the Buhl-Thousand Spgs trim line. Table 1 shows an excess credit of 369.5 af. About 27.0 af are lost by removing surface water irrigated lands outside of the Buhl-Thousand Spgs trim line. The total credit to the Buhl-Thousand Spgs reach from the excess credit is 0.085 cfs.

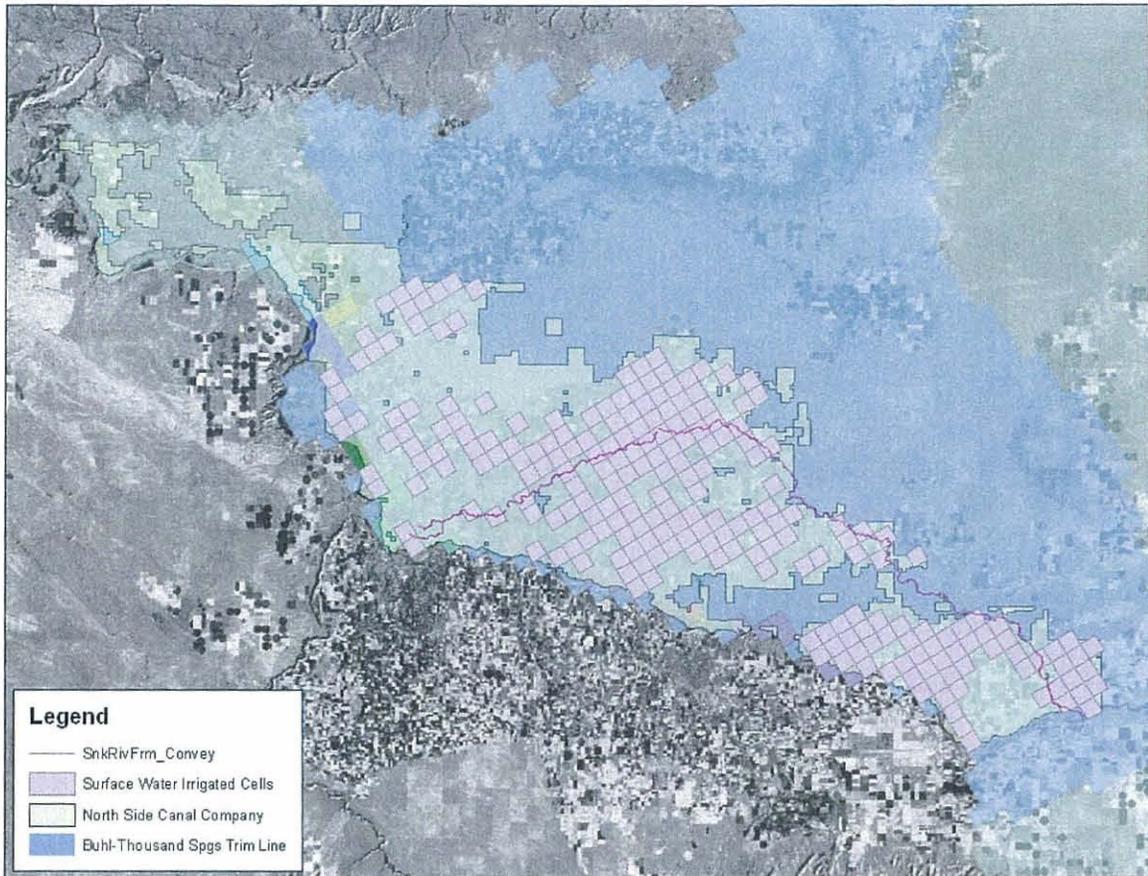


Figure 3. Model cells in the North Side Canal Co service area overlying surface water irrigated lands within the Buhl-Thousand Spgs trim line.

The conversion post audit (not including the new conversions in Table 1) by Water District 130 Water Master Cindy Yenter is presented in Table 2. A total of 57 pods are included in this analysis, 25 received mitigation water in 2009. Figure 4 shows the location of the 57 wells in Table 2 and the associated conversion credit in cubic feet per day. All 25 wells that received mitigation water are within the Buhl-Thousand Spgs trim line associated with ESPAM version 1.1. The total volume for the ongoing conversion mitigation water delivered was 9,493.7 af. As before, the total allowable deliveries are capped at four af/acre. The steady-state benefit to the target reach was then modeled, and the results show that the benefit to the Buhl-Thousand Spgs reach from the ongoing conversions 2.2 cfs.

Table 2. Ongoing North Snake conversions (modified from Cindy Yenter).

WMIS POD #	Owner	Maximum Allowed AF	2009 Final SW Delivery, AF 11/04/09	2009 GW Diversion AF	2009 Conversion Credit AF	2009 Excess Credit AF
100535	Anderson, Kenneth C.	345.00	0.0		0.0	0.0
100624	Benedictine Monks of Idaho Inc.	512.00	315.4	0.4	315.4	0.0
100138	Bettencourt, Luis	96.25	0.0		0.0	0.0
100476	Bettencourt, Luis	96.25	0.0		0.0	0.0
100477	Bettencourt, Luis	96.25	0.0		0.0	0.0
100478	Bettencourt, Luis	96.25	0.0		0.0	0.0
100181	Bettencourt, Luis (Bolich place)	1147.00	1340.8	26.0	880.5	460.3
100183	Bettencourt, Luis (Bolich place)	1147.00	1340.8	629.0	880.5	460.3
700035	Big Sky Dairy, Russ Visser	150.00	120.5	496.0	120.5	0.0
100829	Boer 2+, Miller Farms	573.00	0.0		0.0	0.0
100830	Boer 2+, Miller Farms	573.00	0.0		0.0	0.0
100831	Boer 2+, Miller Farms	573.00	0.0		0.0	0.0
100521	Boer, Adrian (Davis place - M)	936.00	0.0		0.0	0.0
100514	Boer, Adrian (Davis place - N)	316.00	0.0		0.0	0.0
100523	Boer, Adrian (Davis place - S)	602.00	0.0		0.0	0.0
100465	Box Canyon (Hubbard)	0.00	0.0		0.0	0.0
100536	Box Canyon (Strickland)	98.00	0.0		0.0	0.0
100497	Brandsma Dairy	336.00	0.0		0.0	0.0
101067	Claar, Ron	389.00	371.5	0.0	371.5	0.0
100582	De Kruyf Dairy	400.00	339.6	0.0	339.6	0.0
100524	Dewit, Neil & Melinda	346.00	0.0		0.0	0.0
100554	Dewit, Neil & Melinda	192.00	0.0		0.0	0.0
100509	Dimond, Gary B. & Ruth P.	0.00	0.0		0.0	0.0
100644	Henry Farms	0.00	0.0		0.0	0.0
100891	Henry Farms	798.00	618.9	0.0	618.9	0.0
100480	Hirai, Jack J. or Kunie	180.00	0.0		0.0	0.0
101090	Huettig Brothers	578.00	563.5	9.7	563.5	0.0
100081	Hults, Kay (Harms place)	146.00	92.8	668.0	92.8	0.0
100561	Johnson, Jr., Elmer & Judy McReits LLC (formerly Beukers)	554.00	0.0		0.0	0.0
101134	Beukers)	0.00	0.0		0.0	0.0
100827	Meyers, Robert	178.00	0.0		0.0	0.0
100542	Niagara - Boer Canyonside	125.71	84.4	429.5	84.4	0.0
100543	Niagara - Boer Canyonside	125.71	84.4	35.0	84.4	0.0
100544	Niagara - Boer Canyonside	125.71	84.4	249.0	84.4	0.0
100545	Niagara - Boer Canyonside	125.71	84.4	154.7	84.4	0.0
100546	Niagara - Boer Canyonside	125.71	84.4	283.6	84.4	0.0
100549	Niagara - Boer Canyonside	125.71	84.4	422.0	84.4	0.0
100550	Niagara - Boer Canyonside	125.71	84.4	351.0	84.4	0.0
700036	Ravenscroft, Bryan	250.00	176.1	0.0	176.1	0.0

100159	Richard Trail Trust	244.00	21.8	263.0	21.8	0.0
100160	Richard Trail Trust	185.00	0.0	345.0	0.0	0.0
100161	Richard Trail Trust	185.00	0.0	307.0	0.0	0.0
100894	Roth, James	461.00	342.7	0.0	342.7	0.0
100127	Ruby, Kenneth E.	316.00	51.6	0.0	51.6	0.0
700054	Sawtooth Sheep Co. Inc.	1000.00	1120.7	0.0	1120.7	0.0
100072	Smith, Ronnie D.	0.00	0.0		0.0	0.0
100074	Smith, Ronnie D. (Hess)	0.00	0.0		0.0	0.0
100589	Ted Miller Dairy	365.00	0.0		0.0	0.0
100845	U-U Ranch (Ledbetter)	471.00	715.7	161.0	715.7	0.0
100847	U-U Ranch (Ledbetter)	471.00	715.7	290.0	715.7	0.0
100073	Vader, Orval E. (R Smith)	0.00	0.0		0.0	0.0
100071	Veenstra, Frank	276.00	0.0		0.0	0.0
100070	Veenstra, Frank (Beck place)	276.00	0.0		0.0	0.0
100078	Veenstra, Frank/V & L Dairy	0.00	599.1	627.0	581.0	18.1
100064	Larry	0.00	0.0		0.0	0.0
100512	Wert, Loren	0.00	0.0		0.0	0.0
100528	Wert, Wayne K.	346.00	55.5	276.0	55.5	0.0
Total af/y			9493.7		8555.0	938.7

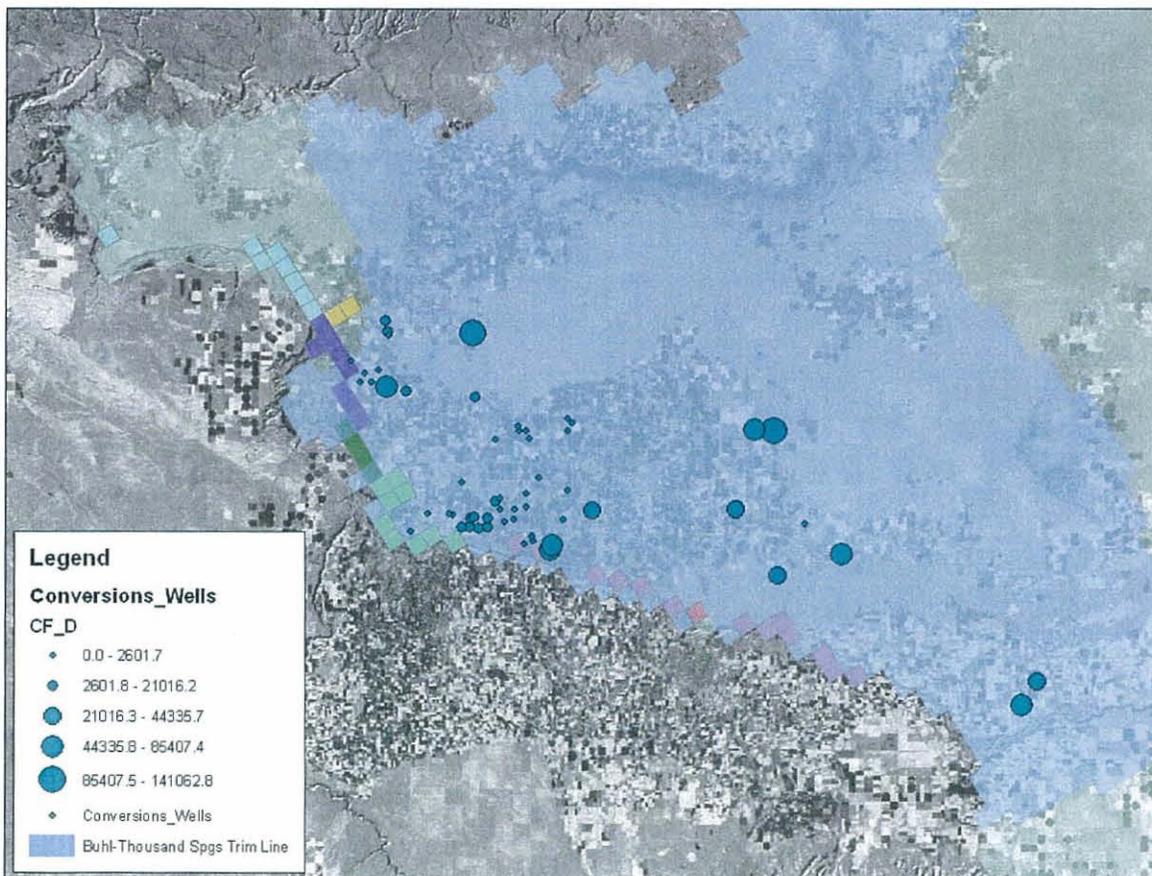


Figure 4. Location of ongoing conversions wells.

IDWR policy allows a credit of 30% for transmission loss through the North Side system to the delivery location. During the 2009 irrigation season, 9,493.7 af of mitigation water was delivered via the North Side Canal system, so 2,848.1 af of transmission loss is due as credit. Figure 3 shows the assumed delivery route for the ongoing conversion water. Transmission loss was assumed to occur evenly along the route from Milner to the ongoing conversion wells. The entire delivery route is within the Buhl-Thousand Spgs trim line. The modeled steady-state benefit to the Buhl-Thousand Spgs reach from transmission loss for the ongoing conversions was determined to be 0.77 cfs.

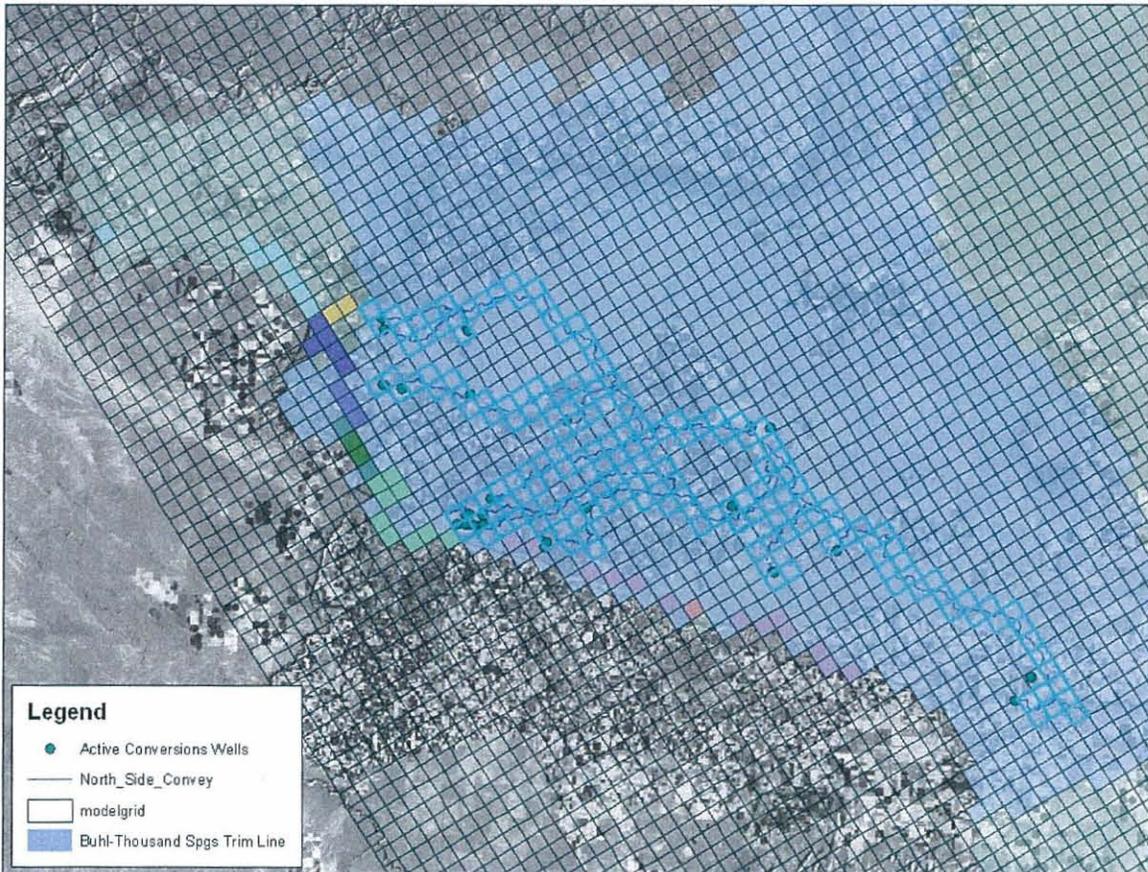


Figure 5. Presumed delivery route for 2009 ongoing conversion water.

All surface water delivered above the 4 af/acre limit was spread evenly across the surface water irrigated lands within the North Side Canal Co service area and then clipped to the Buhl-Thousand Spgs trim line. This was accomplished by selecting all surface water irrigated lands within the North Side Canal Co service area as identified during calibration of ESPAM 1.1, then selecting all model cells whose center overlies surface water irrigated lands, and then applying the total volume of water in the '2009 Excess Credit' column in Table 2. Figure 3 shows the model cells overlying surface water irrigated lands within the Buhl-Thousand Spgs trim line. Table 2 has an excess credit of 938.7 af. About 126.4 af are lost by removing surface water irrigated lands outside of the Buh-Thousand Spgs trim line. The total credit to the Buhl-Thousand Spgs reach from the excess credit is 0.22 cfs.

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: 6 January, 2010

To: Tim Luke

From: Allan Wylie *AW*

cc: Sean Vincent, Rick Raymondi

Subject: North Side Canal Co 2009 Recharge Post Audit

This memo summarizes my analysis of the 2009 post season recharge by IGWA during which 13,687 af of water were recharged between October 22 and about November 17 along selected canals and laterals primarily to benefit Snake River Farm. The 2009 post season recharge was a collaborative effort with Idaho Ground Water Association (IGWA) and Idaho Dairy Association (IDA) providing the water, Idaho Department of Water Resources (IDWR) personnel collecting measurements at three locations along the Main Canal, and North Side Canal Co. (NSCC) personnel collecting measurements at weirs or rated sections normally used by the ditch riders to monitor water distribution during the irrigation season. Figure 1 is a map showing the canals and laterals used during this effort.

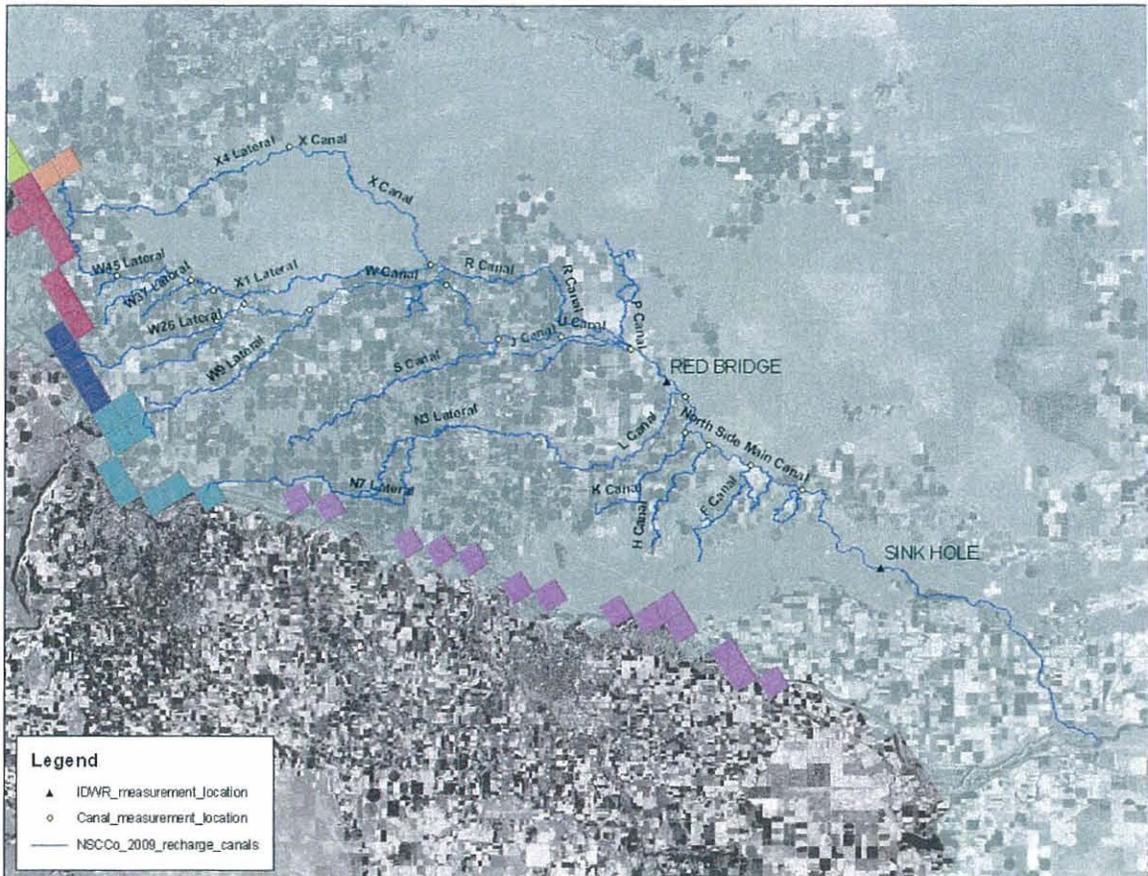


Figure 1. Location of canals and laterals used during the 2009 post season recharge on North Side Canal.

The flow measurements collected by NSCC and IDWR at numerous locations were input into the ESPA model. Figure 2 shows the gauging stations and the computed seepage per model cell between stations. The flow measurements collected during the recharge effort can be used to compute seepage between each upstream and downstream station by differencing the two stations. The total seepage between the two stations was then divided by the number of model cells intersected along the canal path between the two stations and added to the cells.

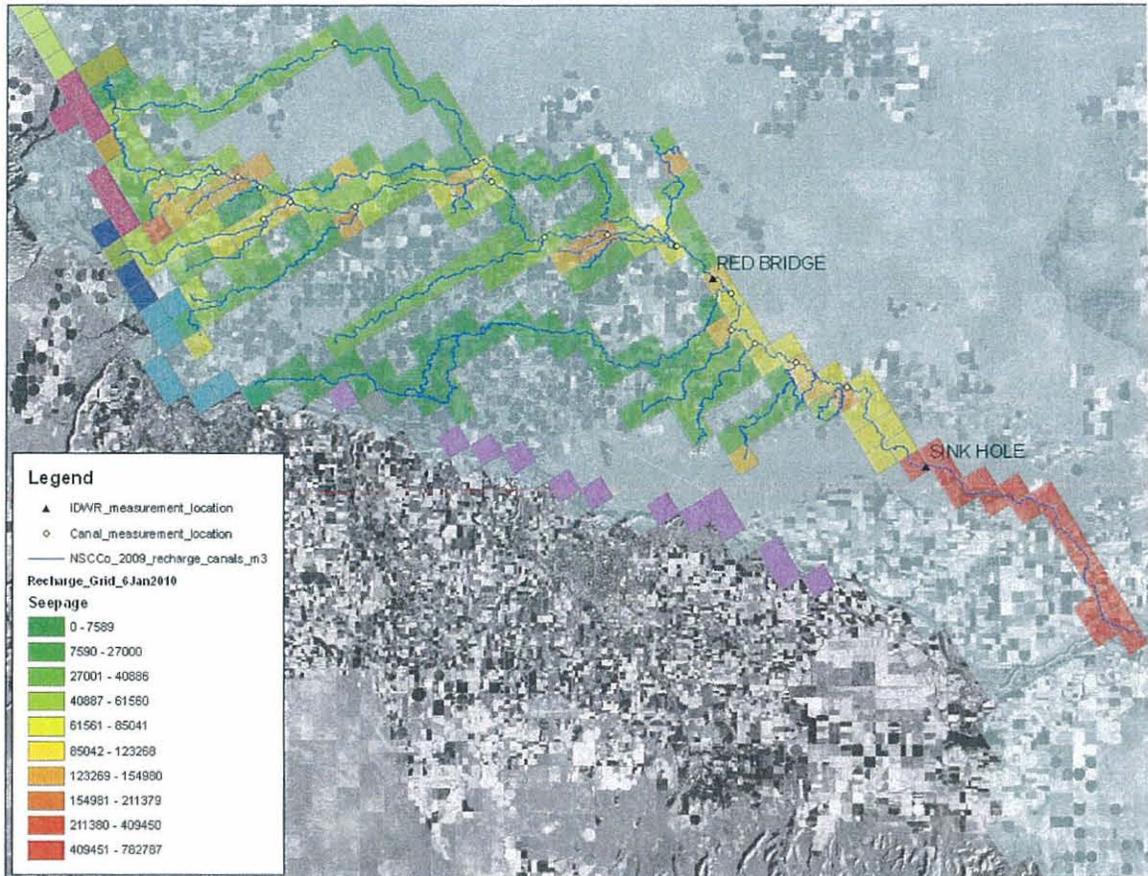


Figure 2. Computed seepage along the canals and laterals used during the 2009 post season recharge.

Once seepage from the canal system is assigned to model cells, the model can be used to predict the impact of recharge to the modeled river and spring reaches. The computed steady state benefit to the Buhl-Thousand Spgs reach is 3.0 cfs. Figure 3 shows that nearly all of the canals and laterals used for recharge are within the Buhl-Thousand Spgs trim line. After removing the cells not within the Buhl-Thousand Spgs trim line, the benefit remains at 3.0 cfs.

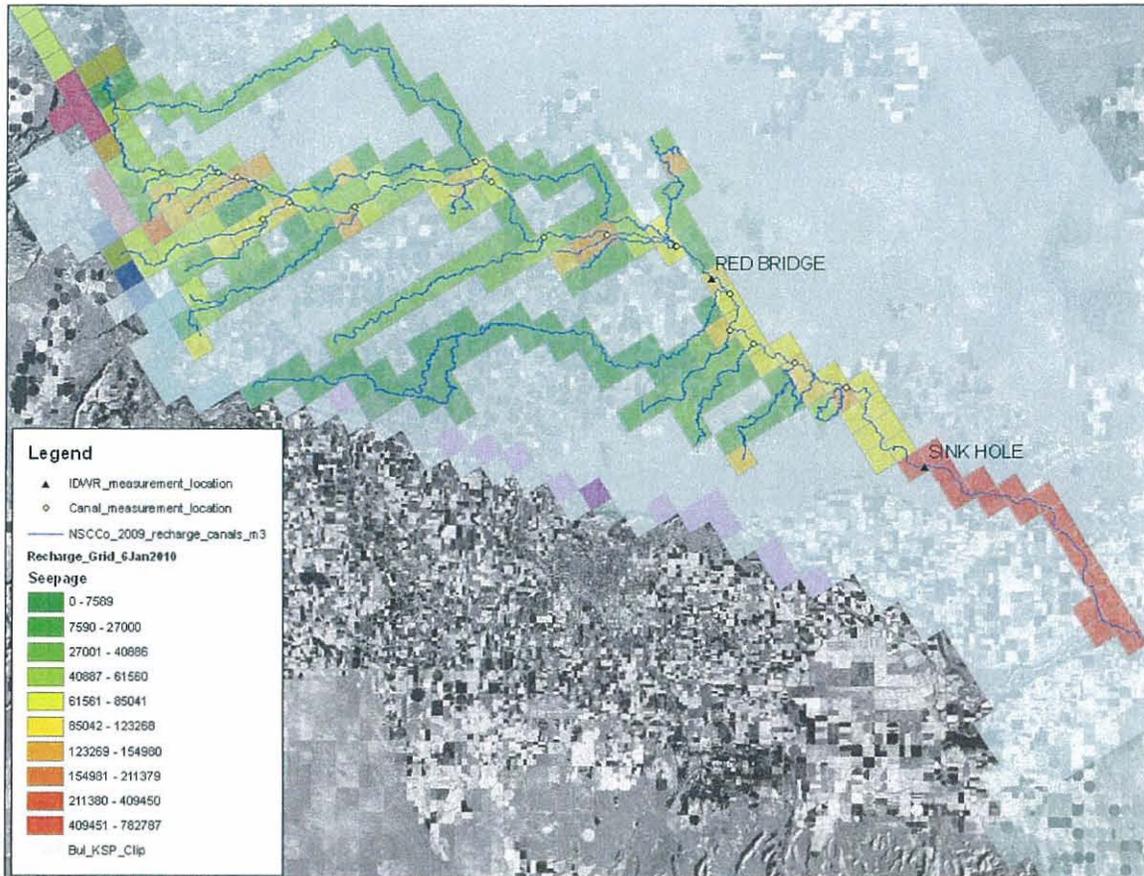


Figure 3. Buhl-Thousand Spgs trim line superimposed on the computed seepage.

MEMO

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

Date: 18 December 2009
To: Tim Luke
From: Allan Wylie AW
cc: Sean Vincent
Subject: 2009 CREP Post Audit

This memo summarizes the results of the post audit for the CREP portion of IGWA's mitigation for Snake River Farm. The CREP post audit involves field visits by Idaho Soil Conservation Commission, updates to our CREP shape file to account for movement into and out of the CREP program, and a record of whether or not a particular field received irrigation to help establish or maintain a cover crop.

Using the updated shapes, I extracted average evapotranspiration less average precipitation (average for the last five years in ESPAM1.1). To compute what crop consumptive use would have been had the lands not been in CREP, 1/3 of an acre foot was subtracted from fields that are allowed to irrigate to either establish or maintain a cover crop. The resulting 'non-depletion' was then assigned to the appropriate model cells.

These model cells were then trimmed using the area of common ground water and the trim-line for the calling reach, in this case the Buhl to Thousand Springs reach, before using the model to simulate the benefit of these non-depletions. Model cells not within both the trim line and the area of common ground water were discarded. Figure 1 shows the area of common ground water, the Buhl to Thousand Springs trim line, and irrigated and not irrigated CREP lands within the model area.

There were a total of 1,279 CREP acres within the Buhl to Thousand Springs trim line during the summer of 2009. 1,073 not receiving irrigation and 206 receiving 1/3 acf of irrigation. The total benefit to the Buhl to Thousand Springs is 0.48 cfs.

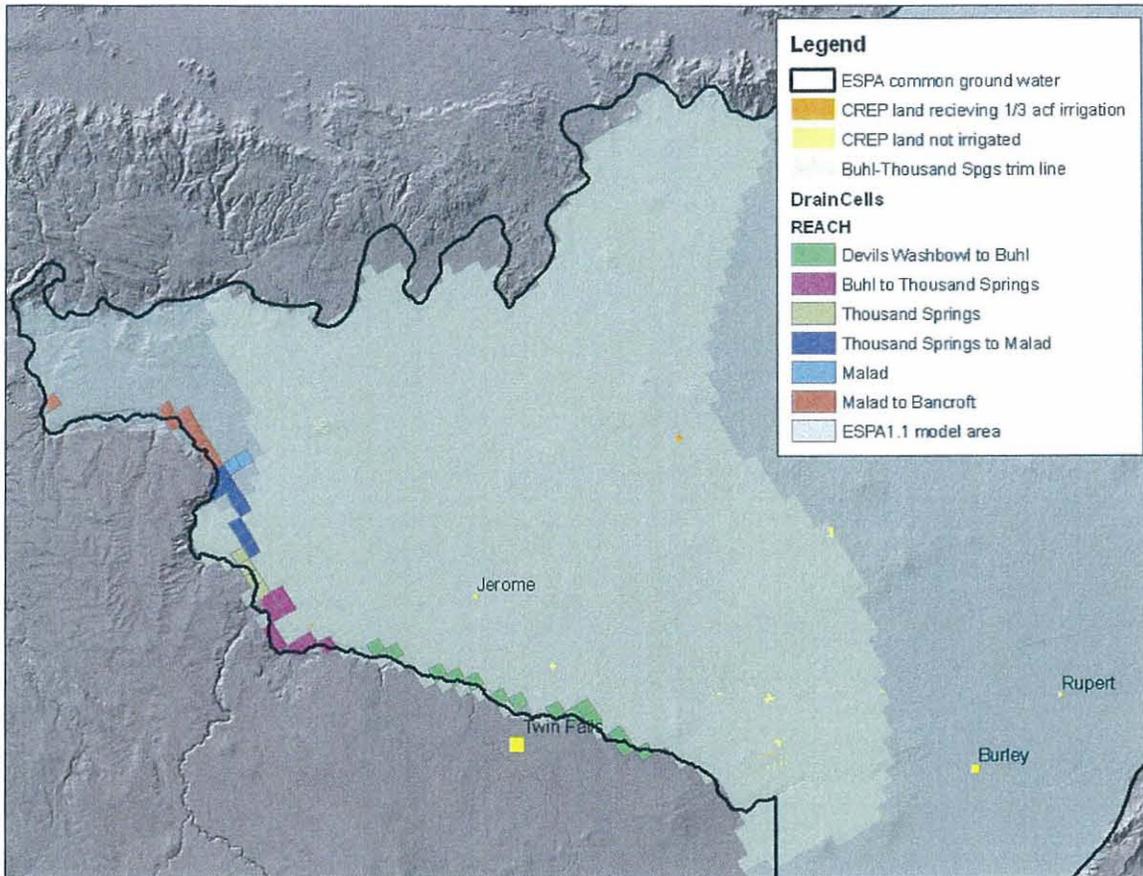


Figure 1. 2009 CREP acres within the Buhl to Thousand Springs trim-line.