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DEPT. OF WATER RESOURCES
EASTERN REGION

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

IN THE MATTER OF APPLICATION
FOR TRANSFER NOS. 84488 AND
84490 IN THE NAME OF LCSC
ENTERPRISES LLC

**DISCLOSURE OF EXPERTS AND NOTICE
OF SERVICE OF
EXPERT REPORTS**

LCSC Enterprises LLC hereby discloses its experts in this matter to be Jason Helms, P.E., of JCH Engineering & Consulting, P.L.L.C., Tony Olenichak of Water District 01, Jennifer Sukow of IDWR, Shelley Keen of IDWR, and Blake Jordan of IDWR.

As required by the *Notice of Hearing and Scheduling Order* in this matter, I hereby certify that on the 16th day of July, 2021, I served a copy of the following expert reports to Hearing Officer James Cefalo and the parties of the above-entitled contested case as indicated by the certificate of service below:

1. Transfer Nos. 84488 and 84490 (Water Right 35-14041) Report.
2. *IDWR's Review of the Cumulative Effects of Water Right Transfers within the Eastern Snake Plain Aquifer (ESPA)* (September 12, 2019).

3. *Cumulative review of ESPA transfers between 2012 and 2020* (updated on April 1, 2020 for transfers approved through September 30, 2020).

Dated this 16th day of July, 2021.



Robert L. Harris
HOLDEN, KIDWELL, HAHN & CRAPO, P.L.L.C.

CERTIFICATE OF SERVICE

I hereby certify that on this 16th day of July, 2021, I served a true and correct copy of the following described pleading or document on the attorneys and/or individuals listed below by the method(s) indicated.

**DOCUMENT SERVED: DISCLOSURE OF EXPERTS AND NOTICE OF SERVICE
OF EXPERT REPORTS**

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Transfer Nos. 84488 and 84490 (Water Right 35-14041) Report

Applicant: LCSC Enterprises LLC

By: Jason C. Helms, PE

General Information

Water right transfer applications 84488 and 84490 submitted by LCSC Enterprises LLC on October 13, 2020 meet Eastern Snake Plain Aquifer (ESPA) transient impact limitations for permanent water right transfers within the ESPA; however, approval of the transfers are held pending resolution of protests asserting negative impacts to existing water rights. The transfer applications seek to change the place of use (POU) and point of diversion (POD) for existing decreed water right 35-14041 which authorizes the legal diversion of 3.18 cfs from the ESPA for irrigation of 322.5 acres not to exceed 1,290 acre-ft per year. The transfers seek to change the POD and POU of water right 35-14041 to existing and new wells also located within the shared ESPA water resource with no increase in diversion rate or volume.

This report discusses the hydraulic modeling details of the water rights proposed for transfer in relation to the analysis of impacts calculated utilizing the Idaho Department of Water Resources (IDWR) ESPA Ground-Water Rights Transfer Spreadsheet (Transfer Spreadsheet). The Transfer Spreadsheet analysis is required to determine if filed transfers within the ESPA fall below acceptable depletions to hydraulically connected reaches of the Snake River to be approvable. Primary sources of information used in preparation of this report are the transfer applications and prior reports referenced at the end of this report in addition to available well driller's logs and ground water data available from IDWR and the United States Geological Survey (USGS).

ESPA Interconnectivity & Specific Mitigating Transfer Conditions

Both the existing and proposed PODs lie within the basalts of the ESPA and an analysis was prepared utilizing the Transfer Spreadsheet. The Transfer Spreadsheet utilizes a calibrated ground water model of the regional aquifer and includes a certain level of complexity recognizing not only the connectedness but also the dis-connectedness of the Snake River and the aquifer system. The diversions are moving from a water table location above the American Falls Reservoir to a location near Lake Walcott below. According to the ESPA ground water model, approximately 64% of the un-diverted volume at the historical place of use is currently being expressed as river reach gains directly into the Near Blackfoot to Neeley reach of the Snake River which is captured within the American Falls Reservoir storage system. At the new POD the impacts in that reach are only 39% with an additional 21% depletion to the Neeley to Minidoka reach resulting in a net benefit in water availability for the major reaches associated with the transfer. CREP non-use of the water rights proposed for transfer has allowed the cone of depression to stabilize at only 5% of steady state conditions mitigating transient impacts and making it possible for the transfer to occur immediately allowing full authorized volume at the expiration of the CREP contracts in September, 2021.

Calculated Snake River Impacts at Existing POD

The major Snake River reach impacts (>10% of the authorized volume) associated with irrigation diversion at the existing POD are the Shelley to Near Blackfoot and the Near Blackfoot to Neeley reaches of the Snake River comprising approximately 21% and 65% of the authorized volume, respectively, near steady state with depletions to all other reaches making up the remaining 14%. The local aquifer in this area is very stable with high transmissivity creating relatively short-term communication between aquifer diversions and river reach impacts. Water right 35-14041 also has a large mitigating factor as it has been enrolled in the CREP program since 2007. The recent non-use has allowed the aquifer to rebound and according to the Transfer Spreadsheet, utilizing version 3.3 of the ESPA Model, the residual impacts are currently only 5% of their maximum authorized volume within the major reaches. Of course, modeling resumption of pumping at the existing POD quickly

reverses the current reach gains which have accrued and approaches 95% of authorized major reach annual impacts within 10 years.

Calculated Impacts of Diversion at new POD

The application seeks to divert a maximum of 3.18 cfs from two new wells that will be built according to standard well construction requirements (including a 39-foot surface sealed casing) and two existing wells as described in the transfers. This should place the pumping burden on the aquifer and reasonably limit river impacts throughout the season. The aquifer in this area is relatively stable, sloping from approximately 4,200 feet in elevation at the proposed PODs down to 4,100 feet in elevation just below Minidoka Dam. This slope is primarily a regional trend that extends northwest across the aquifer below the Great Rift area. Aquifer transmissivities are considered somewhat lower in this area which limits the extent of water table impacts. The water table is approximately 200 feet lower in elevation than at the existing POD, but much shallower relative to land surface which will reduce annual power costs and increase efficient water delivery.

River gains and losses related to riverbed seepage are dependent upon the inundation area of Lake Walcott and the elevation of the regional water table which can cause the Snake River in this area to become variably perched during a single season. Measurements of total Neeley to Minidoka reach losses have varied from a net loss of over 100 cfs at the beginning of the irrigation season to a net reach gain of over 100 cfs in the fall.

The major Snake River reaches associated with the location of the new PODs are the Shelley to Near Blackfoot, Near Blackfoot to Neeley, and Neeley to Minidoka reaches. The Neeley to Minidoka reach represents the downstream end of the upper Snake River-ESPA aquifer connection and becomes perched to the west beyond Minidoka Dam, eventually falling below the aquifer level and later reconnecting in the spring reaches. Calculated ESPA Snake River reach impacts near steady state in the Shelley to Near Blackfoot reach resulting from the proposed transfer are reduced from 21% to only 12% of the diversion volume and the Near Blackfoot to Neeley reach is reduced from 65% to only 39%, while the Neeley to Minidoka reach rises to become a major reach at 21% where it was previously less than 1%. Transient impacts increase moderately quickly reaching 95% of their maximum level within 30 years.

Combined Impacts of Transfer

The increase in impacts to the Neeley to Minidoka reach would normally likely prevent IDWR approval of the transfer, however, physical operation of the American Falls Dam and Reservoir delivers mitigation naturally accruing as reach gains in the Near Blackfoot to Neeley reach resulting from the non-use at the original POD. According to the BOR: "During typical water years, Lake Walcott is maintained close to full to optimize power generation at the Minidoka Dam powerplant. During the summer months, the amount of water released from American Falls Reservoir (which enters Lake Walcott) and from Lake Walcott are set to maintain a fairly constant pool level. There are two canals that divert directly from Lake Walcott. Their headworks are included in the Minidoka Dam superstructure. During the winter months, the reservoir is maintained slightly below full and maintained at a constant level." Because of this BOR river and reservoir operation, the aquifer credits generated in the Near Blackfoot to Neeley reach (-26%) fully expressed as a result of the protected non-use of the water right under the CREP program are delivered as natural flow or physically captured within American Falls Reservoir as storage water which is deliberately released as described above to maintain the river stage elevation at Lake Walcott exactly where the modeled increased impacts resulting from the transfers are calculated to occur.

Impacts Below Milner

Modeled impacts of the transfers show an increase in depletions below Milner at steady state. However, the impacts fall below IDWR thresholds that require mitigation. Further, when analyzed cumulatively with other transfers as IDWR has done, there is an overall net gain to reaches below Milner. IDWR's updated transfer review memo provides that all reaches below Milner show an increase in reach gains, and combined, the overall reach gains below Milner is 0.14 cfs and 105 acre-feet per year.

Conclusion

Relative to these transfers, the timing of historical impacts associated with the protected non-use of the water right (under the CREP program) proposed for transfer combined with the regulatory management of the American Falls and Lake Walcott systems allow combination of the Near Blackfoot to Neeley and Neeley to

Minidoka reaches of the Snake River for determination of acceptable impacts. The combined impacts at every transient time-step of the combined reach impacts demonstrates a net reach gain to the major reaches of the Snake River required by IDWR policy for approval of water right transfers. While the transfers are calculated to result in additional depletions from the hydraulically connected river system in the form of increased impacts in the Neeley to Minidoka reach, the modeled reach gains accruing to the Near Blackfoot to Neeley reach calculated from nonuse of ground water at the originally authorized POD location provides an excess to calculated mitigation requirements for natural flow delivery through American Falls Reservoir into Lake Walcott. This is occurring in-place and in-time while also increasing opportunity for non-consumptive power generation at American Falls Reservoir and simultaneously reducing power consumption (because of a lower pump lift at the proposed wells identified in the transfers) to accomplish the diversion and beneficial use of water under water right 35-14041.

The residual credits associated with the protected non-use of the transferred water right effectively eliminate any typical initial requirement for reduced pumping associated with transient impacts. The transfers seek to transfer an existing water right for beneficial irrigation use within their authorized limitations and such use is in the local public interest is acceptable under IDWR's transfer requirements. An appropriate analysis of impacts to other water users resulting from transfers approved between 2012 and 2020 was performed, reviewed, and accepted that the overall impacts from these prior approved transfers were found to be negligible. In fact, there has been a 0.45 cfs increase in reach gains to the Near Blackfoot to Minidoka Snake River reach. Accordingly, there is no injury to existing water rights both under IDWR's policies and transfer review analyses. The transfers should be approved with standard IDWR conditions related to measurement and reporting.

References:

Lindholm, G.F., 1996, *Summary of the Snake River Plain Regional Aquifer-System Analysis in Idaho and Eastern Oregon* U.S. Geological Survey Professional Paper 1408-A, 68 p., 1 pls.

Whitehead, R.L., 1992, *Geohydrologic framework of the Snake River Plain regional aquifer system, Idaho and eastern Oregon*: U.S. Geological Survey Professional Paper 1408-B, 32 p., 6 pls.

Garabedian, S.P., 1992, *Hydrology and digital simulation of the regional aquifer system, eastern Snake River Plain, Idaho*: U.S. Geological Survey Professional Paper 1408-F, 102 p., 10 pls. (Also available at <http://pubs.usgs.gov/pp/1408f/>.)

Hortness, J.E., Vidmar, Peter, 2005, *Surface-Water/Ground-Water Interaction along Reaches of the Snake River and Henrys Fork, Idaho*: U.S. Geological Survey Scientific Investigations Report 2004-5115, 18p. 3apps.

U.S. Department of the Interior Bureau of Reclamation Pacific Northwest Region Snake River Area Office PN FONSI #19-4: Environmental Assessment (Maintenance and Rehabilitation of Spillway and Dam Structures at American Falls Dam), Minidoka Project, Power County, Idaho May, 2019. <https://www.usbr.gov/pn/programs/ea/Idaho/americanfalls/finalea.pdf>

U.S. Geological Survey, 2013c, *National Water Information System—Web interface*, USGS water data for Idaho: U.S. Geological Survey database, accessed July 2, 2021, at <http://waterdata.usgs.gov/id/nwis/nwis>.

Sukow, Jennifer, *Cumulative review of ESPA transfers between 2012 and 2020* (updated on April 1, 2020 for transfers approved through September 30, 2020).

MEMO

State of Idaho

Department of Water Resources

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

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Date: April 1, 2021
To: Shelley Keen, Water Allocation Bureau Chief
Cc: Sean Vincent, P.G., Hydrology Section Manager
From: Jennifer Sukow, P.E., P.G., Hydrology Section *JS*
Subject: Cumulative review of ESPA transfers between 2012 and 2020

The Idaho Department of Water Resources (IDWR) previously analyzed and documented the cumulative effect of water right transfers involving pumping from the Eastern Snake Plain aquifer (ESPA). The analysis included water right transfers approved between January 1, 2012 and September 30, 2019 (Sukow, 2020)¹. This memorandum presents the results of an updated cumulative review including water right transfers processed between January 1, 2012 and September 30, 2020.

Water Allocation Bureau staff identified 52 transfers approved between October 1, 2019 and September 30, 2020 involving PODs located within the Eastern Snake Plain Aquifer Model Version 2.1 (ESPAM2.1) boundary. For each transfer, Water Allocation Bureau staff assigned “TO” and “FROM” well locations to a model row and column. For transfers involving a well location outside of the active model boundary, the well location was assigned the model row and column of the nearest active model cell. Water Allocation Bureau staff also provided an annual pumping volume for each well. Figure 1 shows the locations of model cells with TO and FROM wells representing the 52 recently approved transfers. Figure 2 shows the cumulative change in annual pumping volume by model cell for the recently approved transfers.

¹ Sukow, J., 2020. *Cumulative review of ESPA transfers between 2012 and 2019*, Idaho Department of Water Resources, memorandum to Shelley Keen dated June 5, 2020, 11 p., <https://idwr.idaho.gov/files/water-rights/20200611-ESPAXferMemo2012-2019.pdf>.

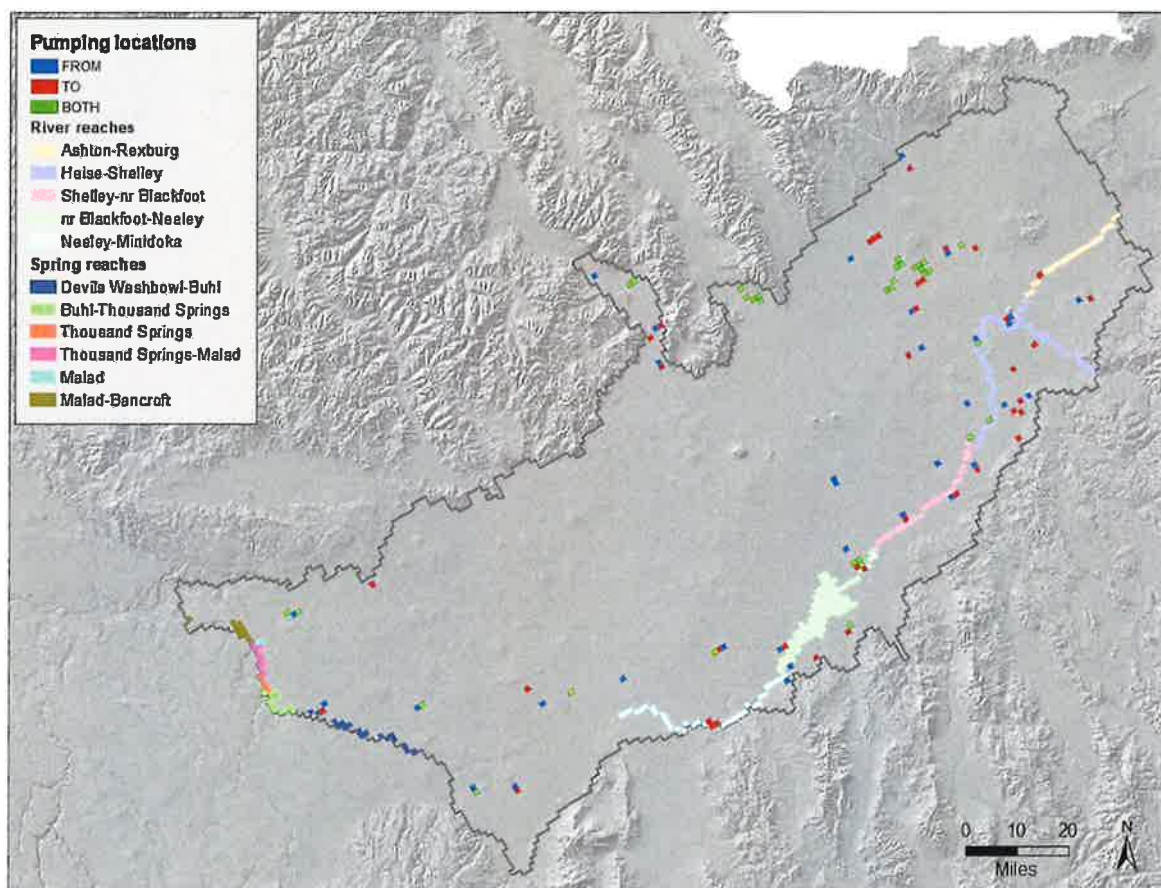


Figure 1. Locations of TO and FROM wells for transfers approved between October 1, 2019 and September 30, 2020

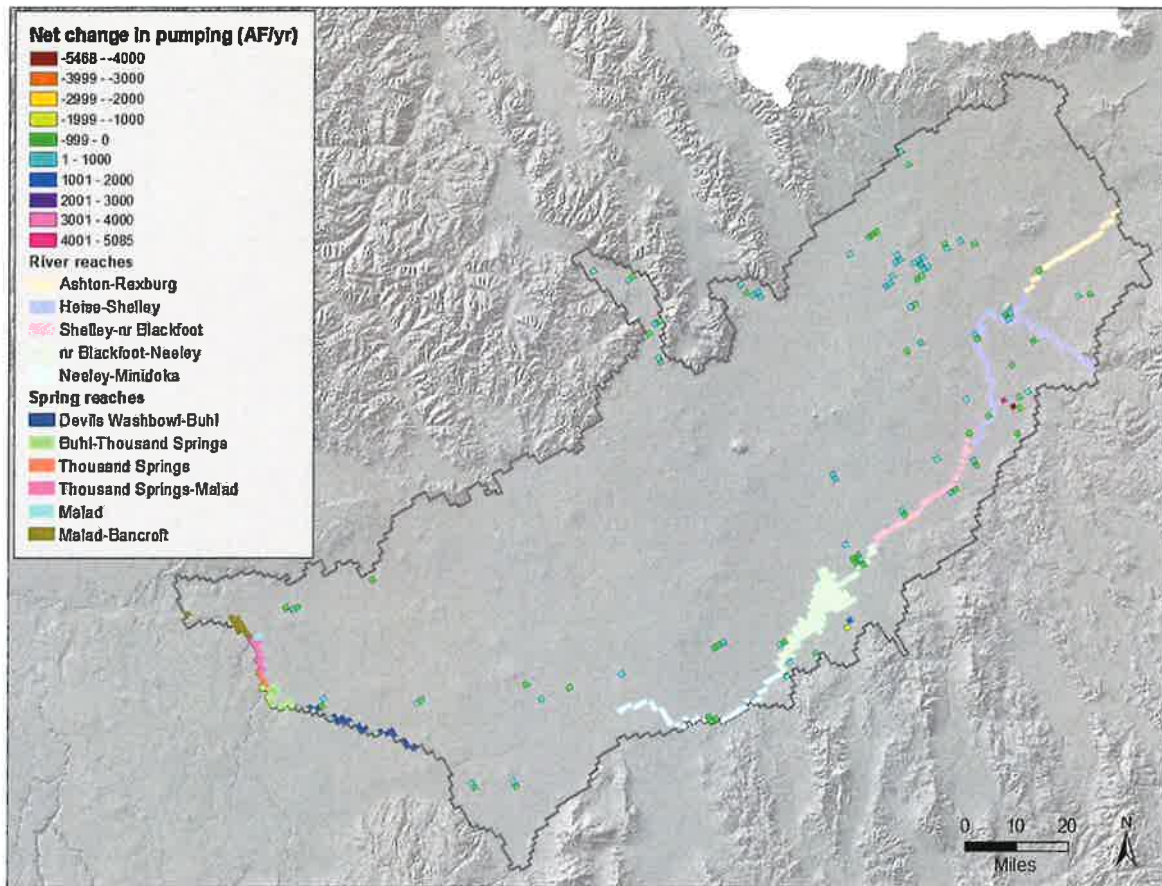


Figure 2. Net change in pumping resulting from transfers approved between October 1, 2019 and September 30, 2020

For the cumulative review, changes in pumping resulting from the recently approved transfers were added to changes in pumping resulting from the 499 transfers analyzed previously in Sukow (2020). The updated analysis includes a total of 551 transfers. Figure 3 shows the locations of model cells with TO and FROM wells representing the transfers approved between January 1, 2012 and September 30, 2020. Figure 4 shows the cumulative change in annual pumping volume by model cell for these transfers.

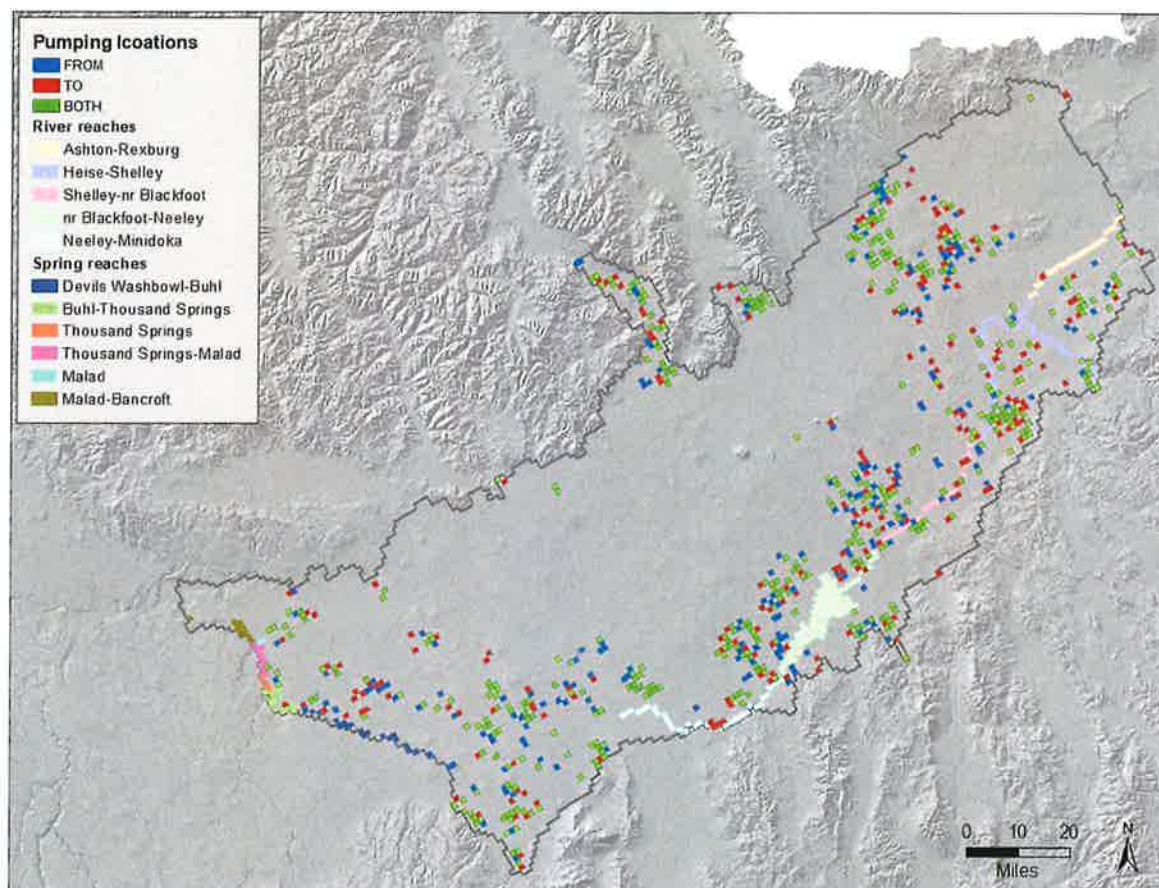


Figure 3. Location of TO and FROM wells for transfers approved between January 1, 2012 and September 30, 2020

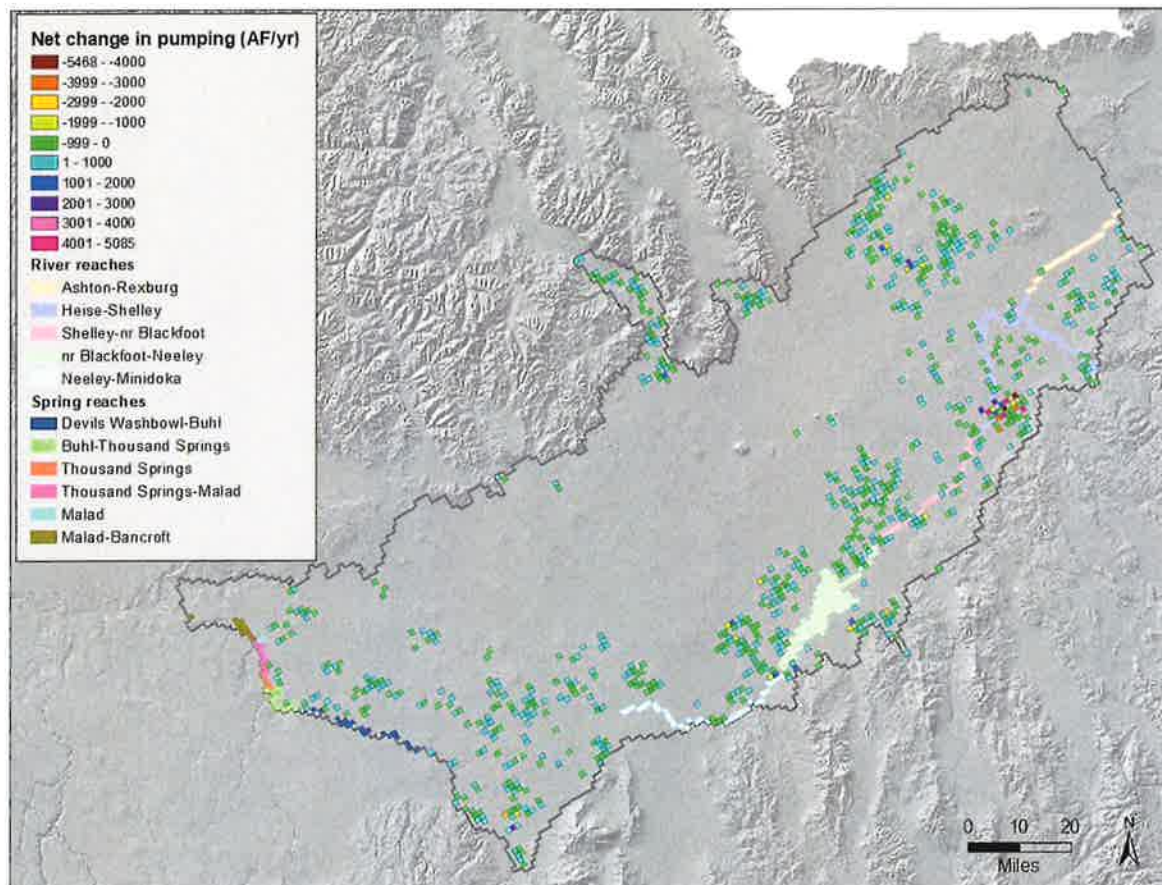


Figure 4. Net change in pumping resulting from transfers approved between January 1, 2012 and September 30, 2020

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

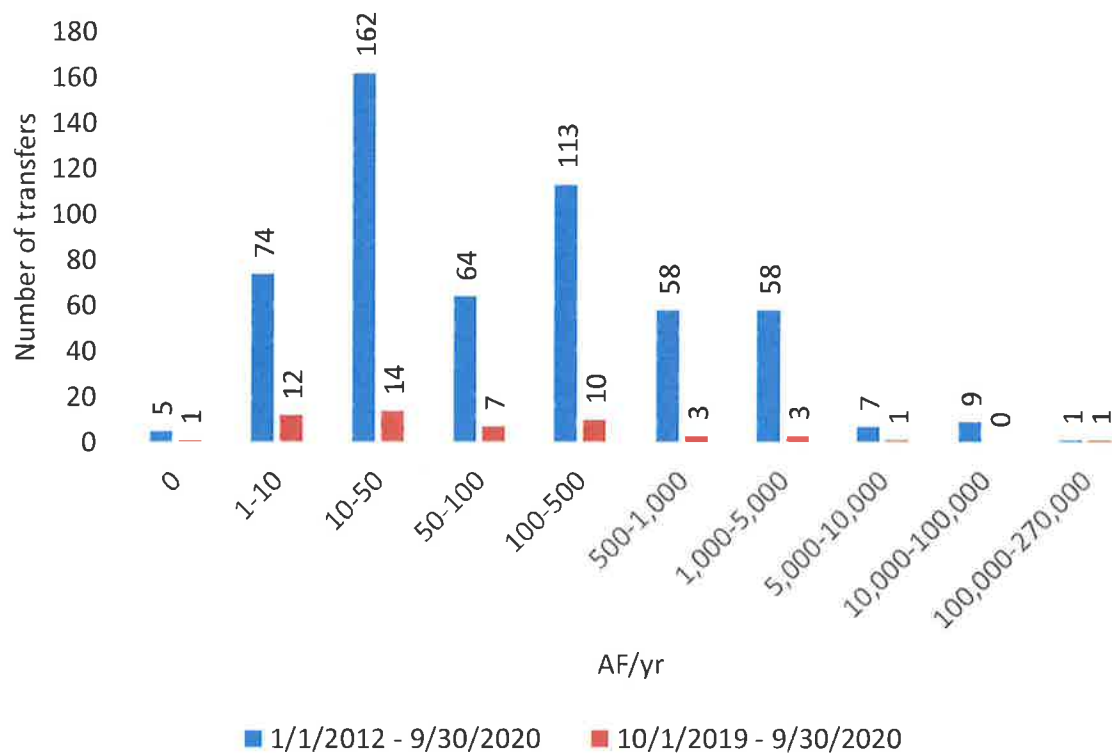


Figure 5. Transfer pumping volume

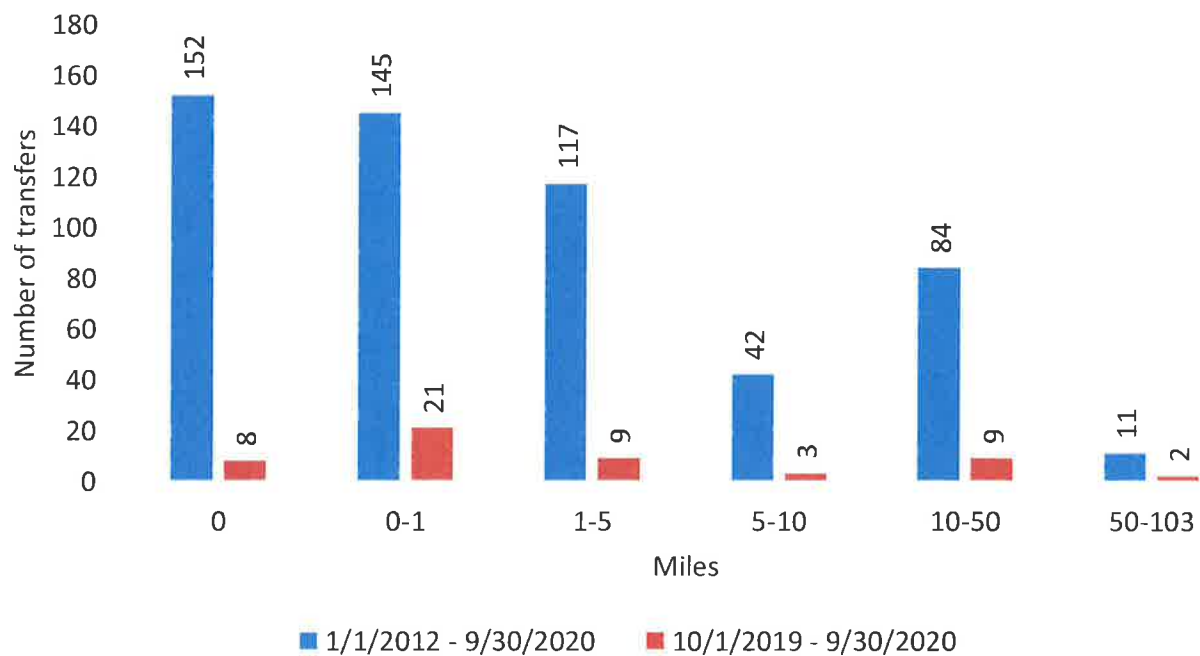


Figure 6. Average distance between TO and FROM wells

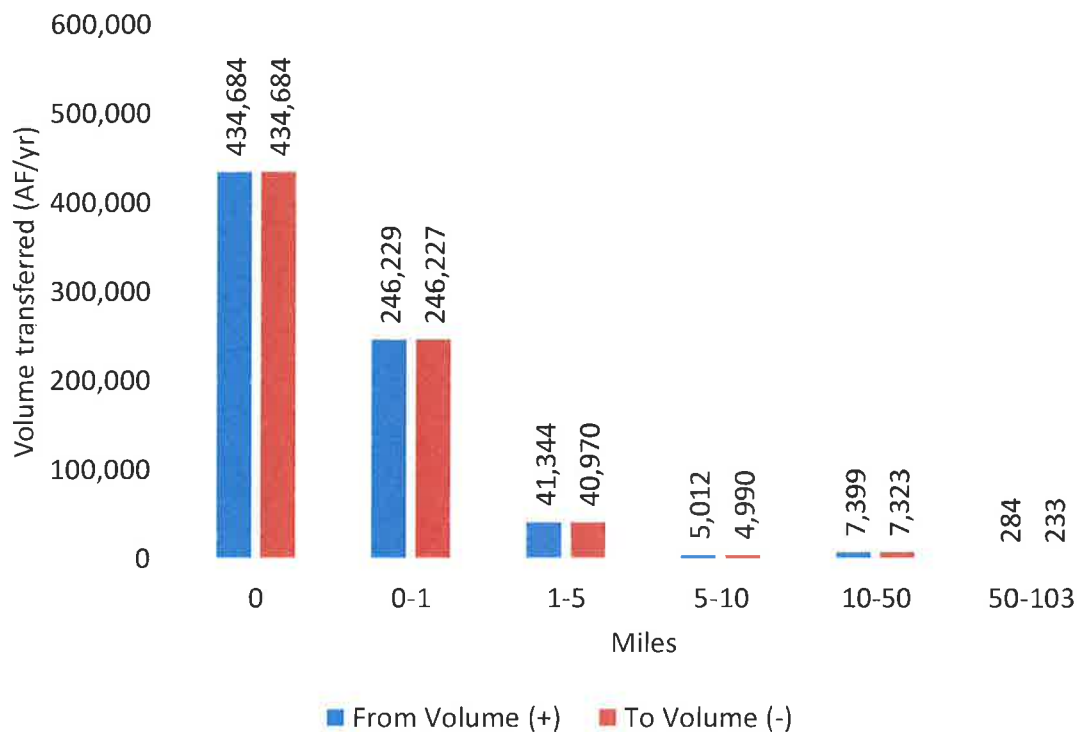


Figure 7. Cumulative volume transferred by distance transferred (1/1/2012 – 9/30/2020)

In October 2020, the Eastern Snake Hydrologic Modeling Committee voted to accept Version 2.2 of the Eastern Snake Plain Aquifer Model (ESPAM2.2) as an improvement to Version 2.1 (ESPAM2.1). IDWR is in the process of finalizing model documentation for ESPAM2.2, and is evaluating how and when to implement ESPAM2.2 in agency programs and processes. For this analysis, both versions of the model (ESPAM2.1 and ESPAM2.2) were used to simulate the cumulative effects of the transfers on steady-state reach gains in eleven reaches of the Snake River (Figure 4). The eleven reaches are equivalent to the reaches represented in the ESPA Model Transfer Spreadsheet (ETRAN), which is commonly used as a tool by transfer applicants and IDWR to analyze the hydrologic impacts of individual transfers. ETRAN simulates the effects of changes in pumping location using the ESPAM2.1 groundwater flow model, but the ETRAN user interface only supports the simulation of a limited number of points of diversion. Because the cumulative analysis requires simulation of a large number of points of diversion, ESPAM2.1 and ESPAM2.2 were used with other pre- and post-processing tools to perform the analyses.

Transfer data provided by Water Allocation Bureau staff were reformatted to create a MODFLOW input file. FROM wells were represented as a positive stress to simulate a decrease in pumping at

these locations. TO wells were represented as a negative stress to simulate an increase in pumping at these locations. The superposition versions of ESPAM2.1 and the proposed ESPAM2.2 were used to simulate the effects of the changes in pumping at steady state. The ESPAM2.1 results are presented in this memorandum. Results from the proposed ESPAM2.2 are provided in Attachment A for comparison with the ESPAM2.1 results.

The cumulative effect of changes in pumping on reach gains in each of the eleven reaches of the Snake River was extracted from the model output. Results are summarized in Table 1. Changes in reach gains resulting from the transfers are very small compared to average reach gains (less than +/- 0.5%). The largest changes are an increase of 949 AF/yr (1.3 cfs) in the near Blackfoot to Neeley reach and a decrease of 318 AF/yr (0.4 cfs) in the Neeley to Minidoka reach.

Table 1. Cumulative effect of transfers approved between January 1, 2012 and September 30, 2020 on reach gains in the Snake River

Reach	Transfer Impact		Average Reach Gain ²		% change in reach gain
	(AF/yr)	(cfs)	(AF/yr)	(cfs)	
Ashton-Rexburg	170	0.24	85,500	118	0.20%
Heise-Shelley	-44	-0.06	-490,500	-677	-0.01%
Shelley-Near Blackfoot	-78	-0.11	-365,100	-504	-0.02%
Subtotal above nr Blackfoot	48	0.07	-1,042,400	-1,063	0.01%
Near Blackfoot-Neeley	949	1.31	1,810,800	2,500	0.05%
Neeley-Minidoka	-318	-0.44	78,800	109	-0.40%
Subtotal nr Blackfoot-Minidoka	631	0.87	1,889,600	2,608	0.03%
Devil's Washbowl -Buhl	-83	-0.11	797,600	1,101	-0.01%
Buhl-Thousand Springs	-74	-0.10			
Thousand Springs	-15	-0.02			
Thousand Springs-Malad	-7	-0.01			
Malad	22	0.03			
Malad-Bancroft	4	0.00			
Subtotal Kimberly-King Hill	-154	-0.21	4,356,800	6,014	0.00%
Total	525	0.72	5,204,000	7,559	0.01%

² Average reach gains were calculated from data compiled for development of ESPAM2.1 for water years 1981 through 2008.

Figure 8 shows the trend in the cumulative effect of transfers approved on or after January 1, 2012 on reaches of the Snake River above Minidoka. For reaches of the Snake River above the near Blackfoot gage, there is not an apparent trend in the cumulative effect of the transfers. For these reaches, the cumulative effect of transfers approved during a given year resulted in increases in reach gains for some years and decreases in reach gains for other years. For the near Blackfoot to Neeley reach, the cumulative effect of the transfers approved during a given year has resulted in a very small increase in reach gains for most years. For the Neeley to Minidoka reach, the cumulative effect of the transfers approved during a given year has resulted in a very small decrease in reach gains for most years. The cumulative effect on the combined near Blackfoot to Minidoka reach has been a very small increase in reach gains for most years.

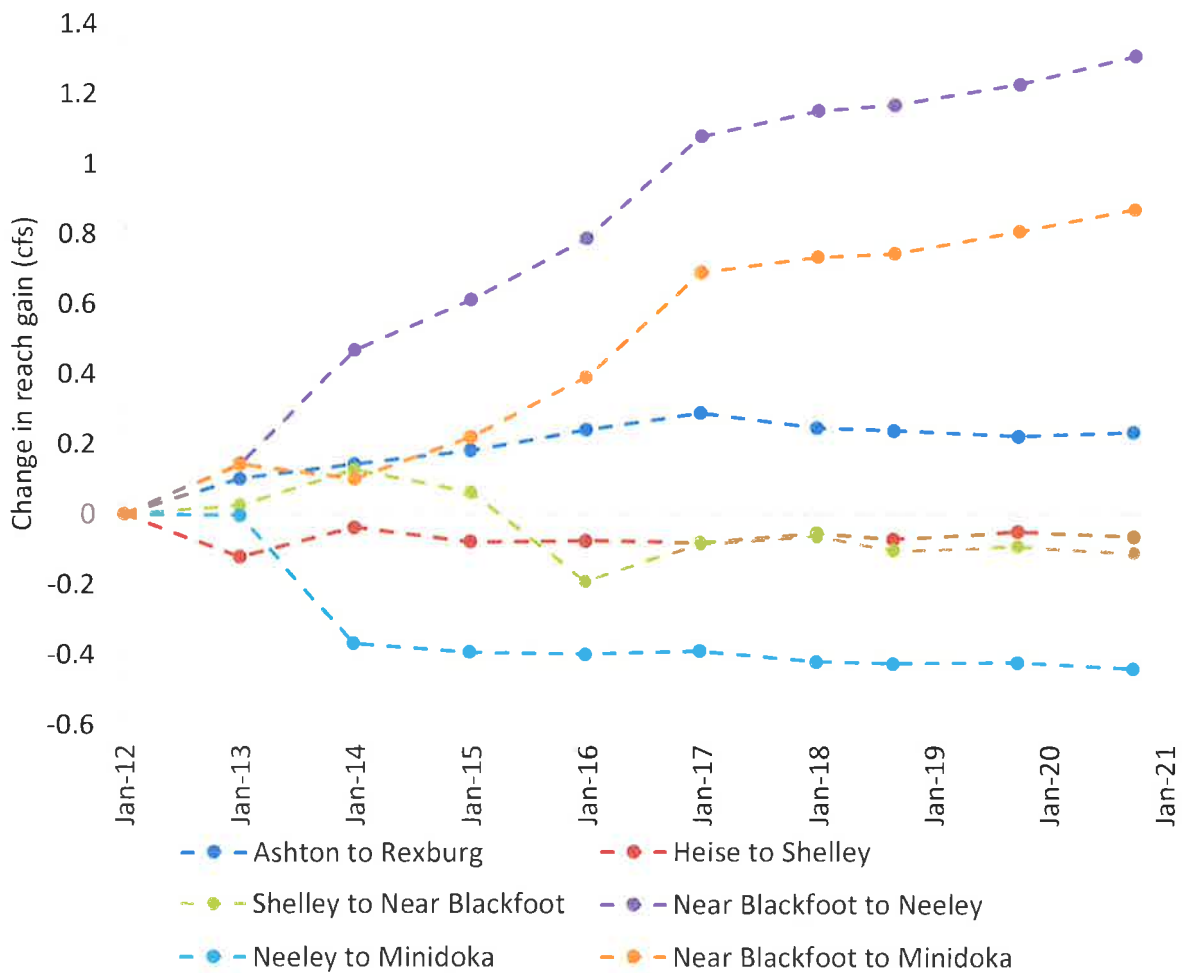


Figure 8. Trend in cumulative effect of transfers approved on or after January 1, 2012 on reaches of the Snake River above Minidoka

Figure 9 shows the trend in the cumulative effect of transfers approved on or after January 1, 2012 on reaches of the Snake River between Kimberly and King Hill. For reaches between Kimberly and King Hill, the cumulative effect of transfers approved during a given year resulted in increases in reach gains for some years and decreases in reach gains for other years. The effect on the Devil's Washbowl to Buhl and Buhl to Thousand Springs reaches has been a very small decrease in reach gains for six of the eight years. The net effect on the Kimberly to King Hill reach has been a very small decrease in reach gains for five of the nine years and a very small increase for four of the nine years.

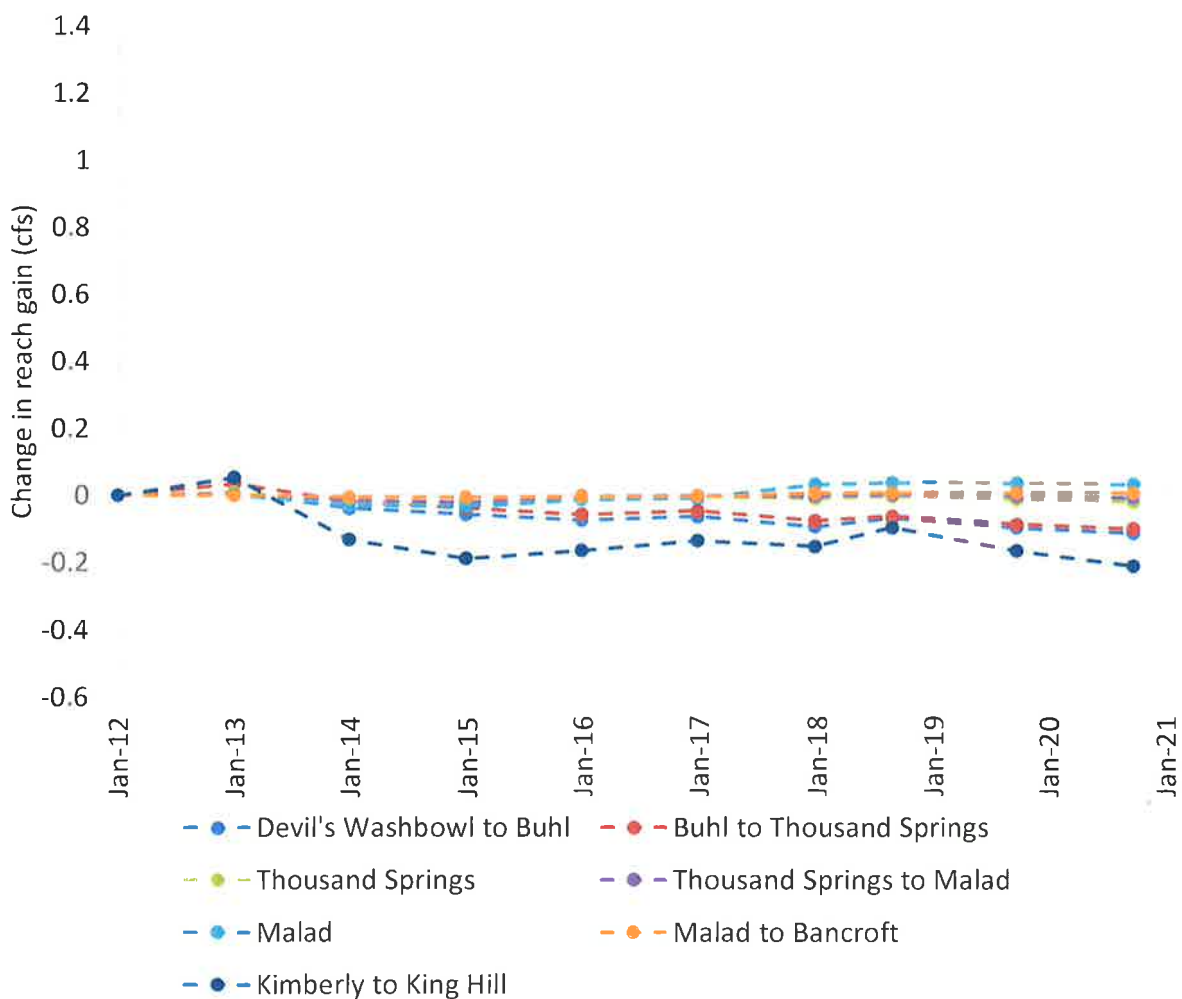


Figure 9. Trend in cumulative effect of transfers approved on or after January 1, 2012 on reaches of the Snake River between Kimberly and King Hill

Of the 551 transfers included in the cumulative analysis, 254 transfers had an average distance of greater than 1.0 mile between the TO and FROM model cell locations. The effects of these 254 transfers were also simulated using the superposition versions of ESPAM2.1 and proposed ESPAM2.2. Results of the ESPAM2.1 simulation are summarized in Table 2. The results are similar to the results of the simulation that included all of the transfers. Changes in reach gains resulting from the transfers are very small compared to average reach gains (less than +/- 0.5%). The largest changes are an increase of 804 AF/yr (1.1 cfs) in the near Blackfoot to Neeley reach and a decrease of 294 AF/yr (0.4 cfs) in the Neeley to Minidoka reach. Results of the proposed ESPAM2.2 simulated are presented in Attachment A.

Table 2. Cumulative effects of transfers with an average distance greater than one mile on reach gains in the Snake River (for transfers approved between January 1, 2012 and September 30, 2020)

Reach	Transfer Impact		Average Reach Gain		% change in reach gain
	(AF/yr)	(cfs)	(AF/yr)	(cfs)	
Ashton-Rexburg	70	0.10	85,500	118	0.08%
Heise-Shelley	-97	-0.13	-490,500	-677	-0.02%
Shelley-Near Blackfoot	159	0.22	-365,100	-504	0.04%
Subtotal above nr Blackfoot	132	0.18	-1,042,400	-1,063	0.02%
Near Blackfoot-Neeley	804	1.11	1,810,800	2,500	0.04%
Neeley-Minidoka	-294	-0.41	78,800	109	-0.37%
Subtotal nr Blackfoot-Minidoka	510	0.70	1,889,600	2,608	0.03%
Devil's Washbowl -Buhl	-69	-0.10	797,600	1,101	-0.01%
Buhl-Thousand Springs	-77	-0.11			
Thousand Springs	-17	-0.02			
Thousand Springs-Malad	-5	-0.01			
Malad	41	0.06			
Malad-Bancroft	9	0.01			
Subtotal Kimberly-King Hill	-119	-0.16	4,356,800	6,014	0.00%
Total	523	0.72	5,204,000	7,559	0.01%

ATTACHMENT A. Simulated effects of ESPA transfers using proposed ESPAM2.2

The cumulative effect of changes in pumping on reach gains in each of the eleven reaches of the Snake River was extracted from the proposed ESPAM2.2 model output. Results are summarized in Table 1. As with ESPAM2.1, changes in reach gains resulting from the transfers are very small compared to average reach gains (less than +/- 1.5%). The largest changes are an increase of 1,617 AF/yr (+2.2 cfs) in the near Blackfoot to Neeley reach and a decrease of 880 AF/yr (-1.2 cfs) in the Neeley to Minidoka reach. For the Kimberly to King Hill reach, proposed ESPAM2.2 simulates a slight increase in reach gain (+0.14 cfs) rather than the slight decrease in reach gain simulated by ESPAM2.1 (-0.21 cfs). Both model predictions are insignificant (0.00%) in comparison to the Kimberly to King Hill reach gain.

Table A-1. Cumulative effect of transfers approved between January 1, 2012 and September 30, 2020 on reach gains in the Snake River

Reach	Transfer Impact		Average Reach Gain ³		% change in reach gain
	(AF/yr)	(cfs)	(AF/yr)	(cfs)	
Ashton-Rexburg	219	0.30	-19,800	-27	1.11%
Heise-Shelley	-334	-0.46	-214,500	-296	-0.16%
Shelley-Near Blackfoot	-202	-0.28	-400,700	-553	-0.05%
Subtotal above nr Blackfoot	-318	-0.44	-634,900	-876	-0.05%
Near Blackfoot-Neeley	1,617	2.23	1,720,800	2,375	0.09%
Neeley-Minidoka	-880	-1.21	71,700	99	-1.23%
Subtotal nr Blackfoot-Minidoka	738	1.02	1,792,500	2,474	0.04%
Devil's Washbowl -Buhl	4	0.01	787,700	1,087	0.00%
Buhl-Thousand Springs	12	0.02			
Thousand Springs	16	0.02			
Thousand Springs-Malad	20	0.03			
Malad	46	0.06			
Malad-Bancroft	7	0.01			
Subtotal Kimberly-King Hill	105	0.14	4,248,500	5,864	0.00%
Total	525	0.72	5,406,100	7,462	0.01%

³ Average reach gains were calculated from data compiled for development of ESPAM2.2 for water years 1981 through 2018.

Figure A-1 shows the trend in the cumulative effect of transfers approved on or after January 1, 2012 on reaches of the Snake River above Minidoka. Results are similar to the ESPAM2.1 predictions. The magnitude of increases and decreases in reach gains is slightly larger with the proposed ESPAM2.2, but the changes are still small relative to average reach gains.

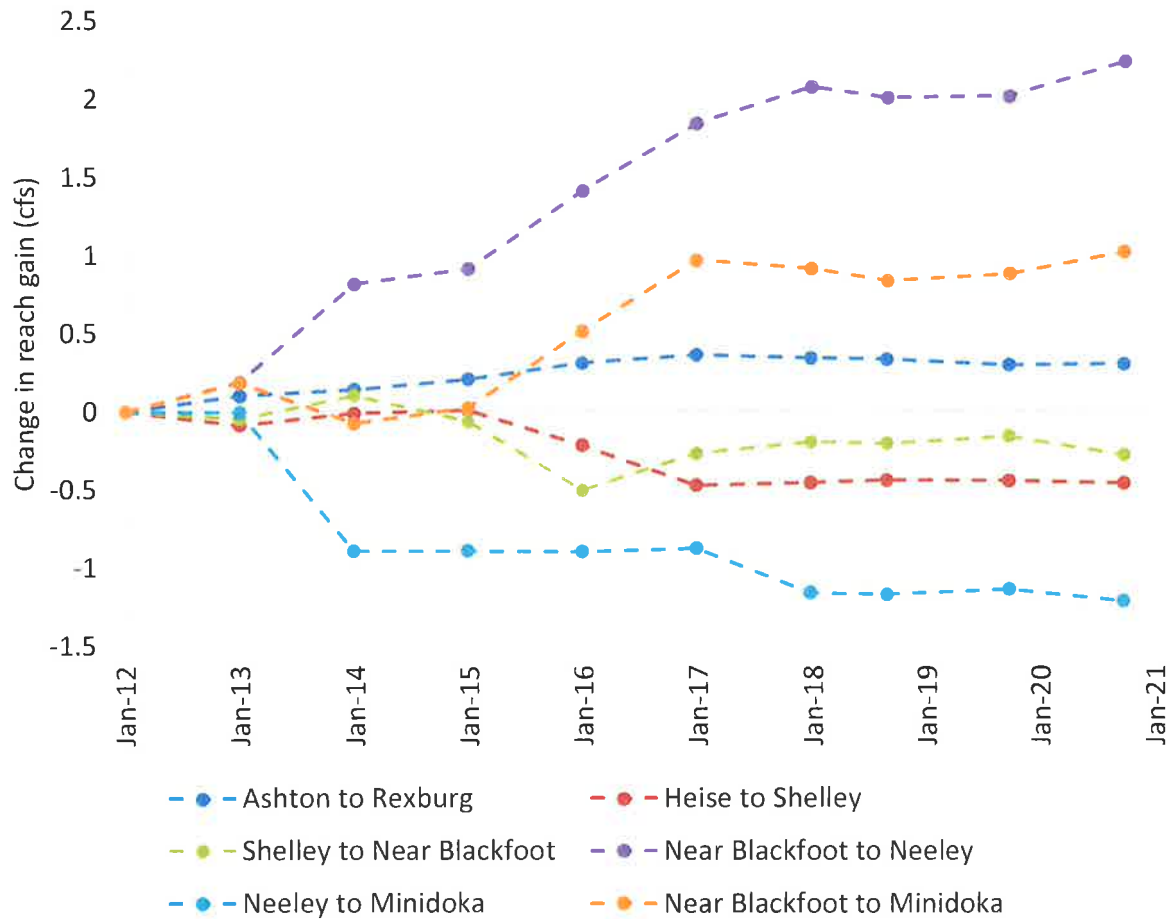


Figure A-1. Trend in cumulative effect of transfers approved on or after January 1, 2012 on reaches of the Snake River above Minidoka

Figure A-2 shows the trend in the cumulative effect of transfers approved on or after January 1, 2012 on reaches of the Snake River between Kimberly and King Hill. The proposed ESPAM2.2 simulates a slight increase in reach gain rather than the slight decrease in reach gain simulated by ESPAM2.1. Predictions by both models are insignificant in comparison to the Kimberly to King Hill reach gain.

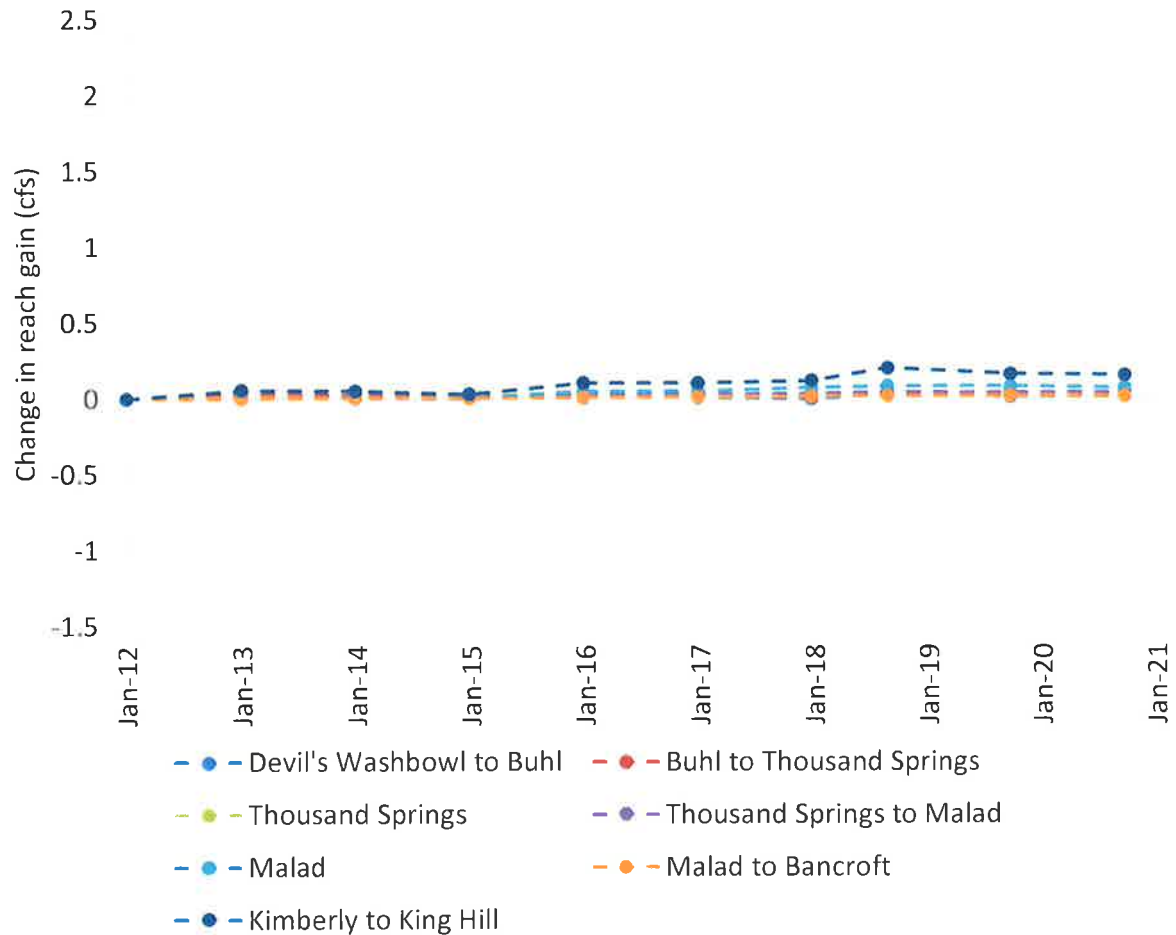


Figure A-2. Trend in cumulative effect of transfers approved on or after January 1, 2012 on reaches of the Snake River between Kimberly and King Hill

Table A-2 summarizes the results of simulating 254 transfers with an average distance of greater than 1.0 mile between the TO and FROM model cell locations. The results are similar to the results of the simulation that included all of the transfers. Changes in reach gains resulting from the transfers are very small compared to average reach gains (+/- 1.0% or less). The largest changes are an increase of 1,039 AF/yr (1.4 cfs) in the near Blackfoot to Neeley reach and a decrease of 714 AF/yr (1.0 cfs) in the Neeley to Minidoka reach. For the Kimberly to King Hill reach, proposed ESPAM2.2 simulates a slight increase in reach gain (+0.09 cfs) rather than the slight decrease in reach gain simulated by ESPAM2.1 (-0.16 cfs). Both model predictions are insignificant (0.00%) in comparison to the Kimberly to King Hill reach gain.

Table A-2. Cumulative effects of transfers with an average distance greater than one mile on reach gains in the Snake River (for transfers approved between January 1, 2012 and September 30, 2020)

Reach	Transfer Impact		Average Reach Gain		% change in reach gain
	(AF/yr)	(cfs)	(AF/yr)	(cfs)	
Ashton-Rexburg	98	0.14	-19,800	-27	0.50%
Heise-Shelley	-17	-0.02	-214,500	-296	-0.01%
Shelley-Near Blackfoot	53	0.07	-400,700	-553	0.01%
Subtotal above nr Blackfoot	135	0.19	-634,900	-876	0.02%
Near Blackfoot-Neeley	1,039	1.43	1,720,800	2,375	0.06%
Neeley-Minidoka	-714	-0.99	71,700	99	-1.00%
Subtotal nr Blackfoot-Minidoka	325	0.45	1,792,500	2,474	0.02%
Devil's Washbowl -Buhl	-8	-0.01	787,700	1,087	0.00%
Buhl-Thousand Springs	6	0.01			
Thousand Springs	10	0.01			
Thousand Springs-Malad	15	0.02			
Malad	36	0.05			
Malad-Bancroft	5	0.01			
Subtotal Kimberly-King Hill	63	0.09	4,248,500	5,864	0.00%
Total	523	0.72	5,406,100	7,462	0.01%