

Preliminary analysis of consumptive use reduction within the Wood River Valley aquifer system

Note: This is a preliminary analysis by IDWR staff and has not been thoroughly vetted by other members of the Technical Working Group. This analysis is being provided to the Advisory Committee, at their request, for their consideration of the general approach, but alternative methods of calculation and/or alternative numbers for management plan criteria may be recommended by other members of the Technical Working Group or Advisory Committee. Further, the Advisory Committee is free to completely reject the approach discussed in this analysis.

Description of analysis

1. Historic data from 1995-2014 were compiled for:
 - a. Observed Apr-Sept flow volume (KAF) at the Hailey gage
 - b. Groundwater consumptive use calculated for calibration of the WRV1.1 groundwater flow model (KAF) - exempt domestic and mitigated groundwater uses were deducted from the volume
 - c. Average observed aquifer discharge to Silver Creek (a.k.a. reach gain) for July-Sept of each year¹.
 - d. Average observed aquifer discharge to Willow Creek (a.k.a. reach gain) for July-Sept of each year
 - e. Average observed aquifer discharge to the Big Wood River between Heart Rock Ranch and Stanton Crossing (a.k.a. reach gain) for July-Sept of each year
2. Aquifer discharge to Silver Creek was used as an indicator of aquifer conditions for convenience. Silver Creek is not the only reach of concern. As shown in the analysis of proposed following activities, management actions that benefit the WRV aquifer are also expected to benefit reach gains in Willow Creek and the Big Wood River. The locations of management actions will affect the relative benefits to each reach.
3. Measured streamflow at the Sportsman Access gage does not represent aquifer discharge to Silver Creek because of the effects of diversions and exchange wells located upstream of the gage. Observed July-Sept aquifer discharge to Silver Creek was correlated with average July-Sept streamflow observed at the Sportsman Access gage to provide a general relationship between reach gains from the aquifer and measured streamflow. A reach gain of 119 cfs generally correlates with a July-Sept average streamflow of 99 cfs. A reach gain of 100 cfs generally correlates with a July-Sept average streamflow of 86 cfs.
4. Years when the aquifer discharge to Silver Creek had undesirable (<119 cfs) and very undesirable (<100 cfs) average Apr-Sept reach gains from the aquifer were identified. The ranges of historic Apr-Sept flow volume at the Hailey gage and groundwater consumptive use were evaluated for these years. Undesirable outcomes were generally observed when the Apr-Sept flow volume at the Hailey gage was less than 225 KAF and groundwater consumptive use exceeded 25 KAF. Very

¹ Aquifer discharge to streams (a.k.a. reach gain) is computed by adjusting gaged streamflow to account for recorded diversions and injection of water from exchange wells. Reach gains vary throughout the year. In Silver Creek the lowest average monthly reach gain during July-Sept is often 10 to 20 cfs less than the three-month average.

undesirable outcomes were generally observed when the Apr-Sept flow volume at the Hailey gage was less than 225 KAF and groundwater consumptive use exceeded 35 KAF.

5. Based on this evaluation, it is estimated that an average consumptive use reduction of 11,000 AF in years with a predicted Apr-Sept flow volume at the Hailey gage of less than 225 KAF would reduce the occurrence of undesirable conditions in below average water supply years and minimize the occurrence of very undesirable conditions in extremely dry years.
6. Analysis of the proposed fallowing of 1,100 acres is expected to result in an average consumptive use reduction of 1,940 AF. The additional 9,060 AF of reduction could be met by additional fallowing or other consumptive use reduction projects. Assuming similar consumptive use, an additional 5,100 acres (about 6,200 acres total) would need to be fallowed during years with a predicted flow of less than 225 KAF to reduce consumptive use by 11,000 AF. The source of irrigation water for fallowed acres may be a combination of surface water and groundwater diverted from within the Wood River Valley aquifer system. Big Wood River water formerly diverted to fallowed lands in the Bellevue triangle should be diverted to recharge as described in the SVGWD/GGWD proposal. Water right transfer applications or Water Supply Bank leases and rentals will be required to change water right use from irrigation to ground water recharge.
7. Because of the uncertainty in predicting the volume of reduction needed to avoid undesirable and very undesirable outcomes, this volume could be a starting point for implementation of management plan actions but should be reviewed and potentially adjusted every 3 to 5 years. Metrics for evaluating whether the management plan actions are sufficient will need to be established, and reduction volumes may need to be adjusted to meet selected goals for aquifer water levels, reach gains, and/or streamflow.
8. With the simplified two-tier approach, the intent would be to avoid undesirable outcomes in most years and very undesirable outcomes in more extreme drought years. Other mitigation plan actions can supplement consumptive use reduction to buffer the impacts during years where undesirable outcomes are not avoided.
 - a. Fallowing performed every year would provide some benefit during the following year.
 - b. Delivery of Snake River storage water would provide a supplemental source of water.
 - c. A conservation and infrastructure fund may provide opportunities to improve the efficiency of water delivery and/or application in the lower Big and Little Wood systems.

Potential application as part of a groundwater management plan

Note: This is intended as an example of how this analysis might be applied. The approach, quantities, and dates are for discussion purposes only and are not intended to dictate specific requirements.

- Fallow 1,500 acres every year (current GWD proposal for 2022).
- In years with a March 1 prediction of Apr-Sept flow volume of less than 225 KAF at the Hailey gage, fallow an additional 4,700 acres (or implement equivalent consumptive use reductions of 8,300 AF).
- Implement delivery of Snake River storage water to supplement consumptive use reductions in years with very low water supply and/or very high crop irrigation requirements.

- Establish two levels of goals for aquifer water levels and/or discharge to stream reaches that represent undesirable outcomes to be avoided in below average years and very undesirable outcomes to be avoided in extreme drought years. Evaluate sufficiency of consumptive use reductions every 3 years with respect to established goals and adjust reductions if warranted.

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