

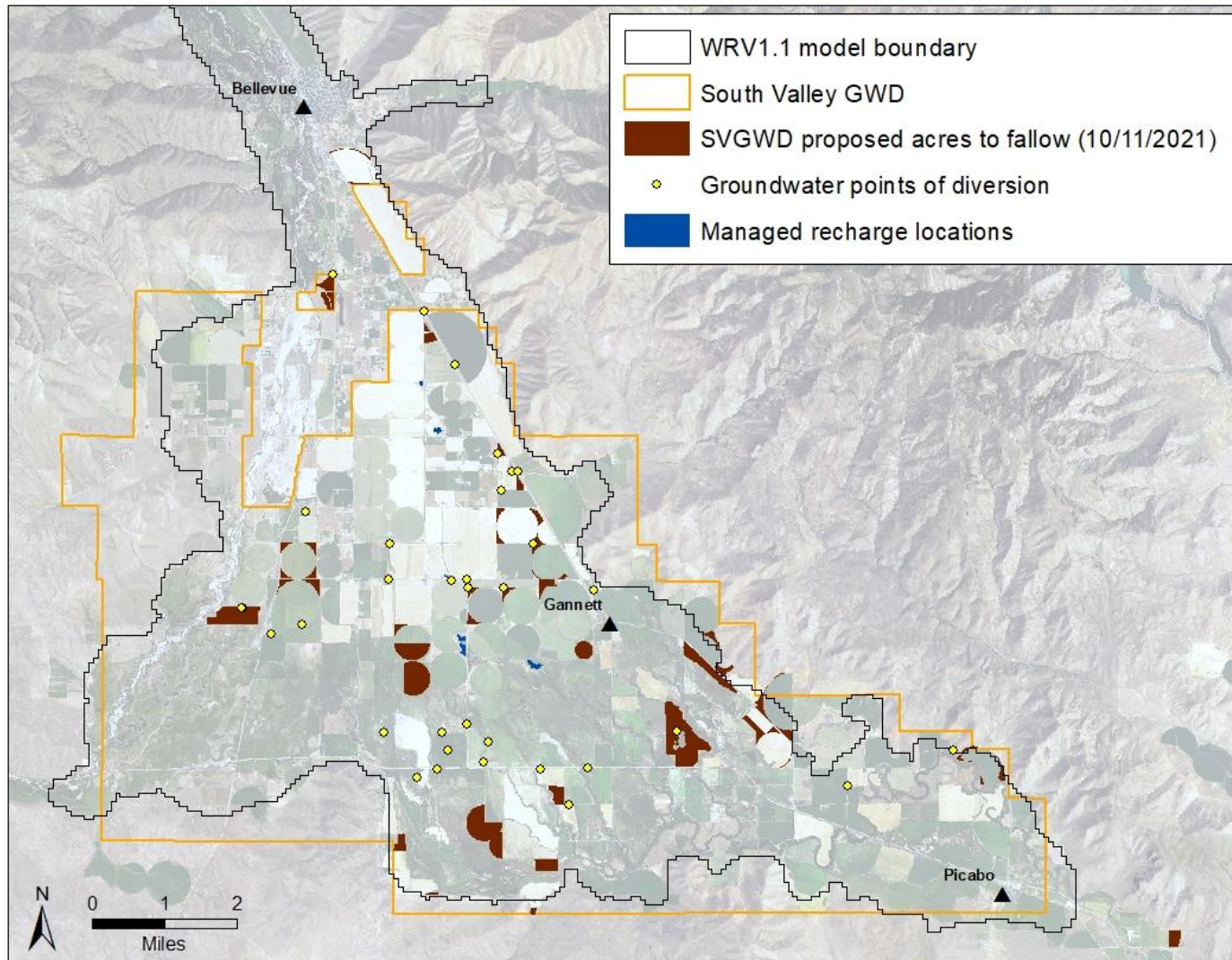
Hydrologic impacts
of proposed
fallowing
conservation
(SVGWD sites,
10/11/2021)

Preliminary results
presented to
BWRGWMA
Advisory
Committee

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IDWR

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Location map



Summary of analysis

- Evaluated impacts of proposed fallowing of 1,092 acres in SVGWD
 - 19 parcels with variety of irrigation water sources
 - 480 acres – Big Wood River with supplemental groundwater
 - 427 acres – Silver Creek with supplemental groundwater
 - 145 acres – Primary groundwater
 - 27 acres – Big Wood and Silver with supplemental groundwater
 - 12 acres – Big Wood River only
 - Reduction of consumptive use by fallowing has a net positive benefit to the hydrologic system equal to the volume of consumptive use reduction, regardless of water source
 - Timing and location of benefit within the system vary with water source and the location of the fallowed land

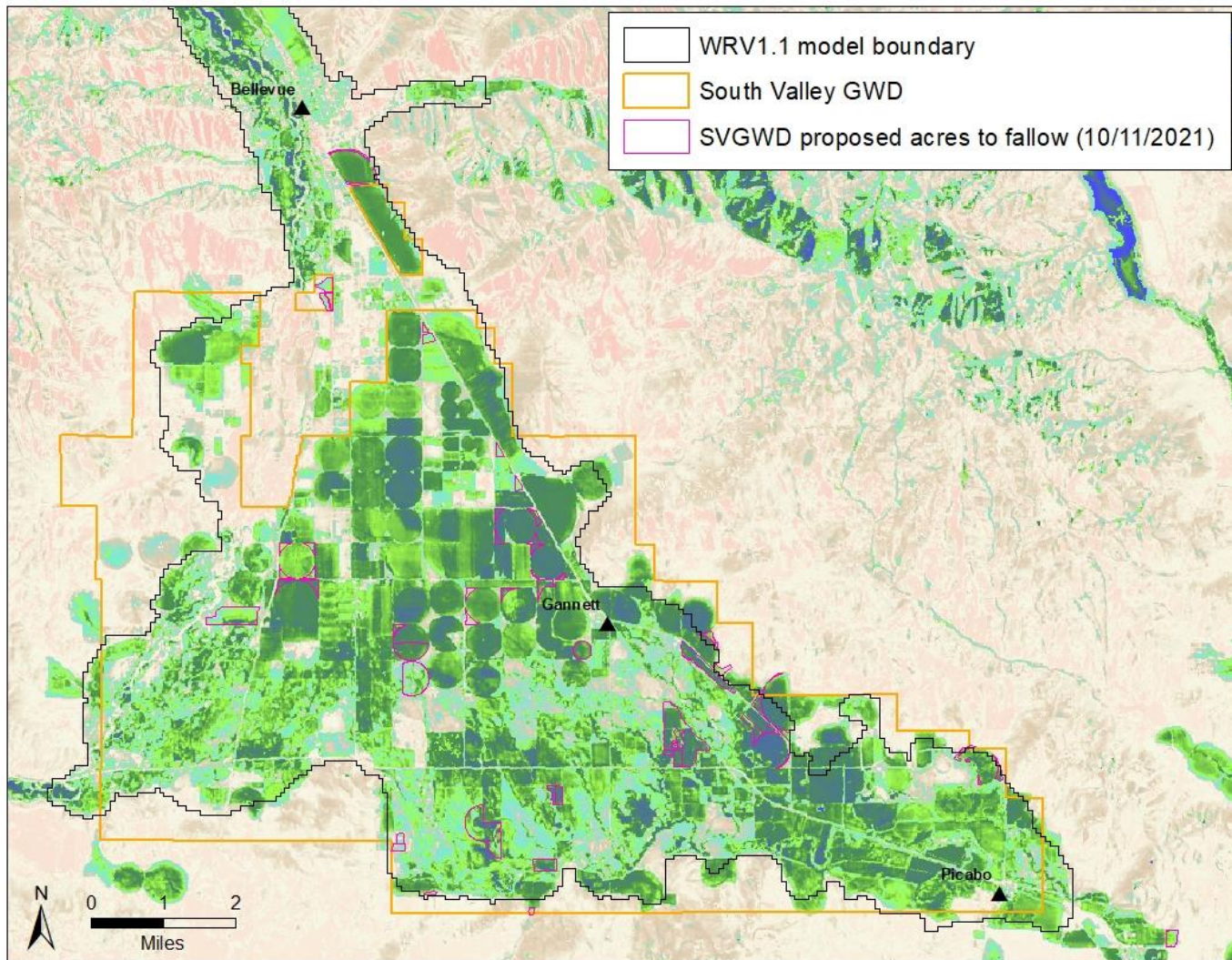
Summary of analysis

- Changes in aquifer stresses were modeled using WRV1.1 to evaluate timing and location of impacts
 - Modeled reduced consumptive use of groundwater and surface water
 - Modeled reduced incidental recharge on fallowed lands
 - Modeled application of saved Big Wood surface water (consumptive use + on-site incidental recharge) to recharge pits (canal seepage modeled as unchanged)
- Quantified reduction of diversions from Silver Creek (consumptive use + on-site incidental recharge) as a direct impact to Silver Creek flow

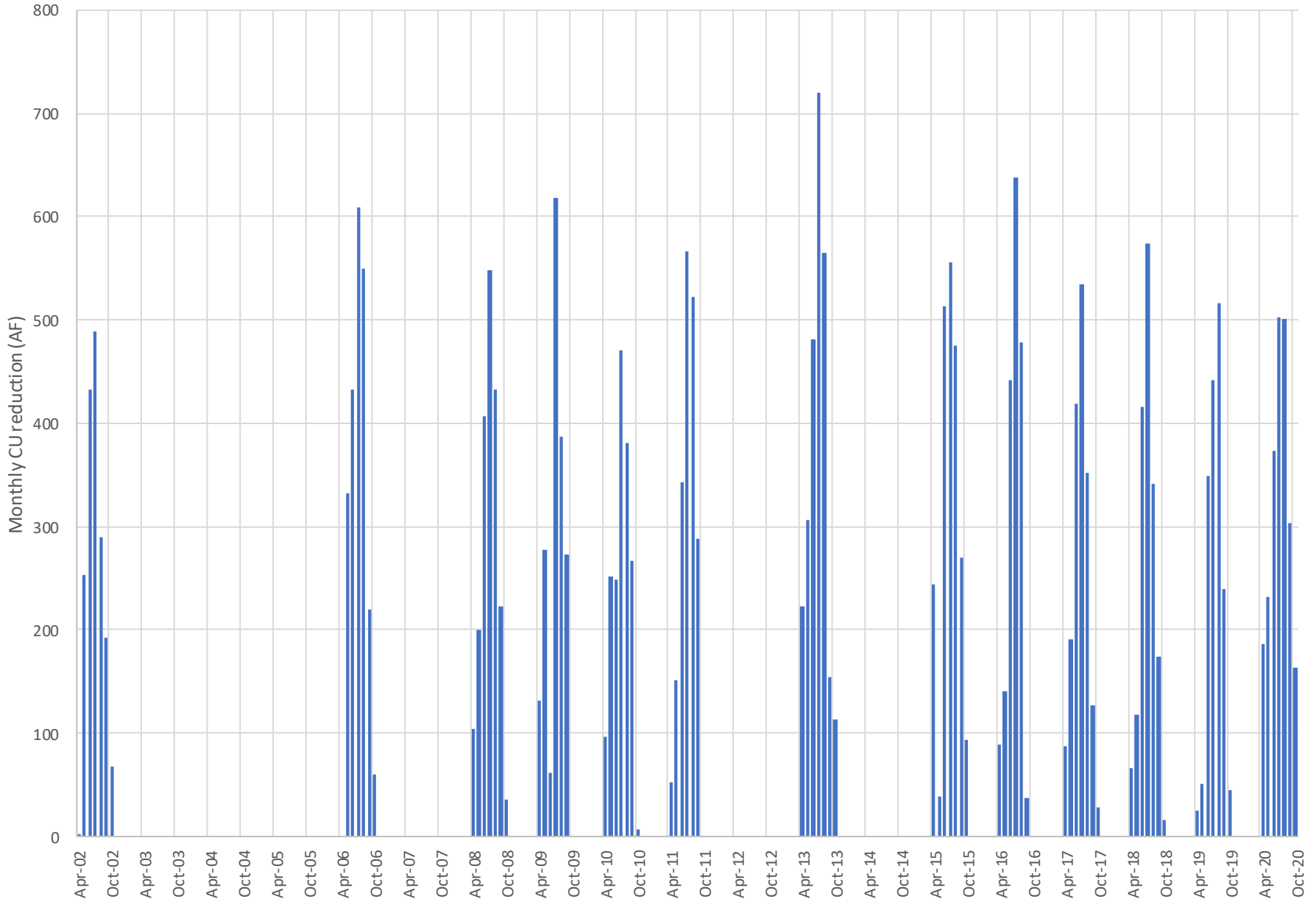
Assumptions

- Monthly consumptive use was calculated using METRIC ET and PRISM precipitation rasters.
- Consumptive use from 2013, 2015, 2016, and 2017 was used to represent the range of consumptive use variation and was applied to years with similar irrigation demand in the 1995-2014 model simulation period.
 - Similar years were selected based on ET Idaho precipitation deficit at Picabo
- Consumptive use reductions were attributed to surface water when in priority.
- Consumptive use reductions were attributed to groundwater when surface water not in priority.
- Percentage of surface water in priority was calculated for 1995-2014 using WRV1.1 priority cut file and surface water right diversion rates.
- WRV1.1 entity efficiency applied to calculate reduction in incidental recharge on fallowed lands
- Reduction in groundwater pumping apportioned evenly between water right PODs for each parcel
- Managed recharge apportioned evenly to model cells representing recharge pits
- Canal seepage assumed to be the same as baseline run

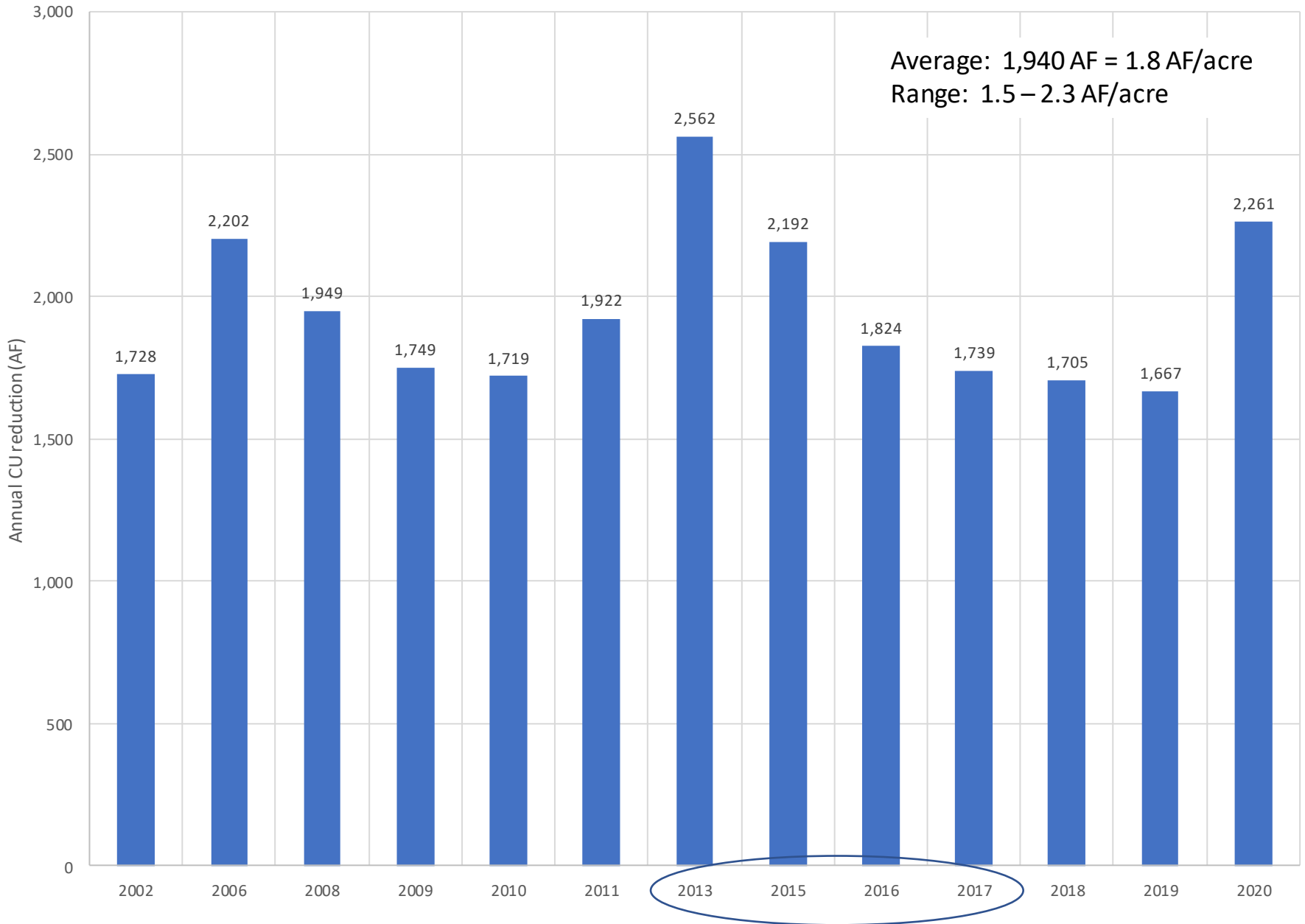
Monthly consumptive use example (July 2013)



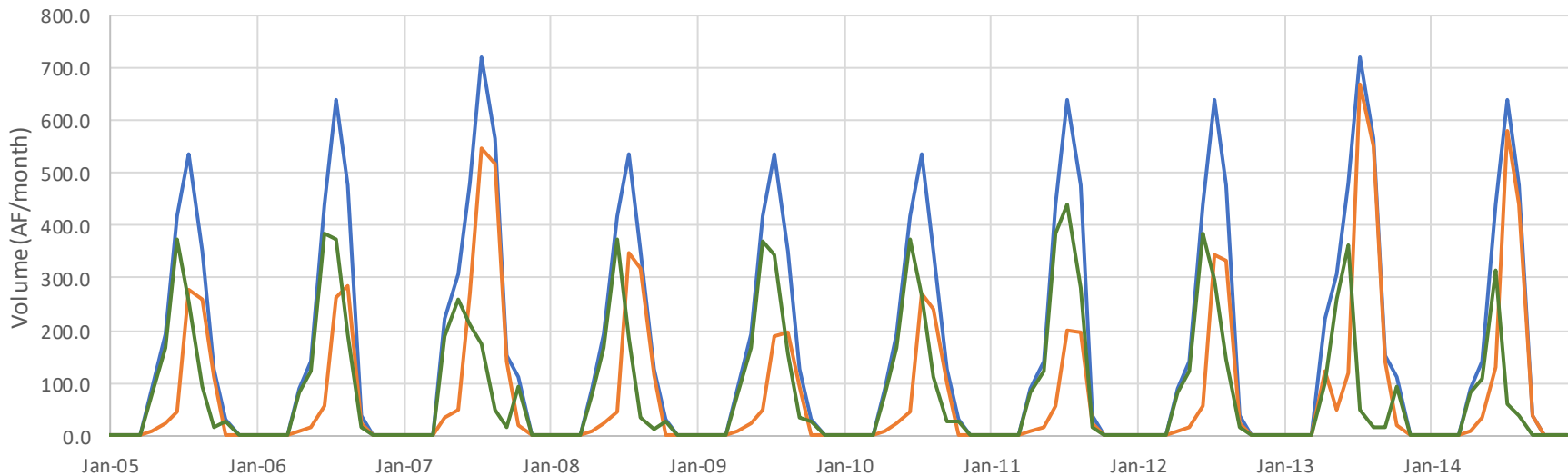
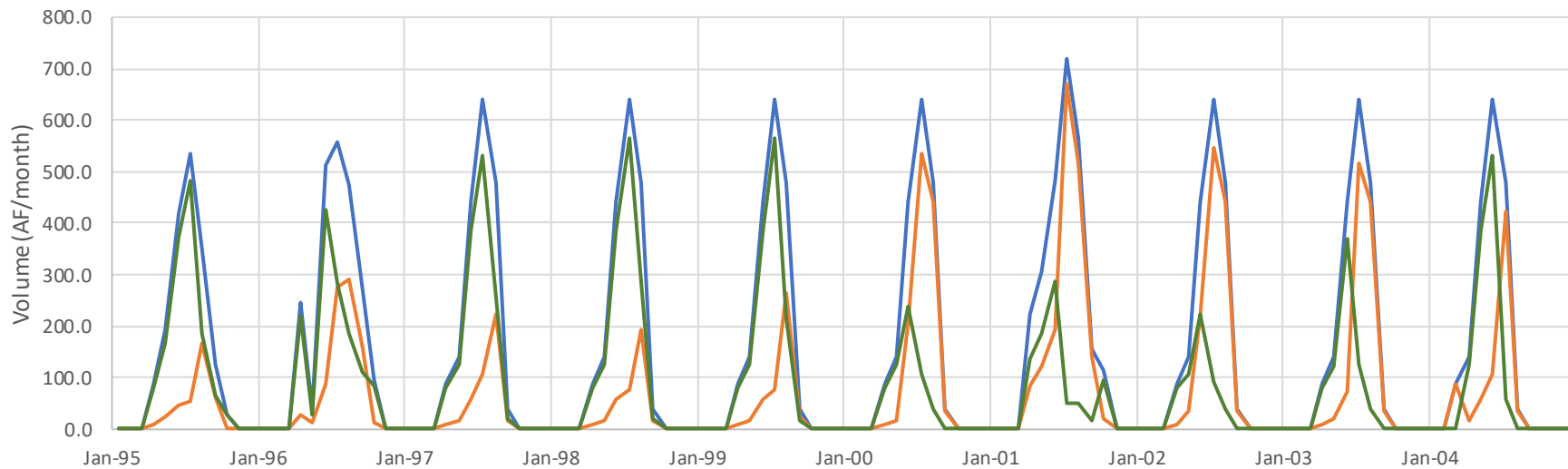
Monthly consumptive use reduction on proposed fallow acres



Irrigation season consumptive use reduction on proposed fallow acres

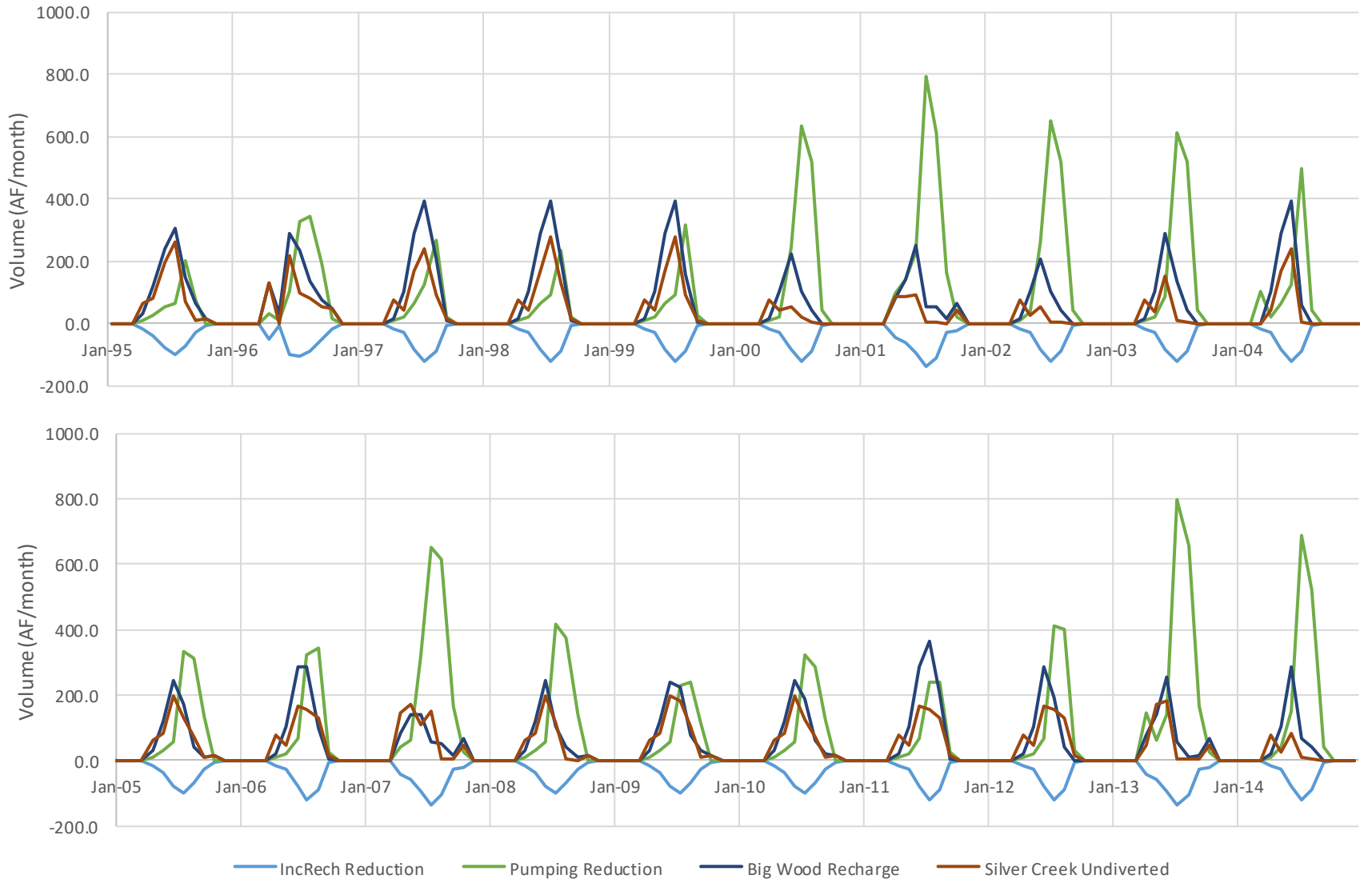


Modeled consumptive use reduction for fallowed acres (10/11/2021 proposal)

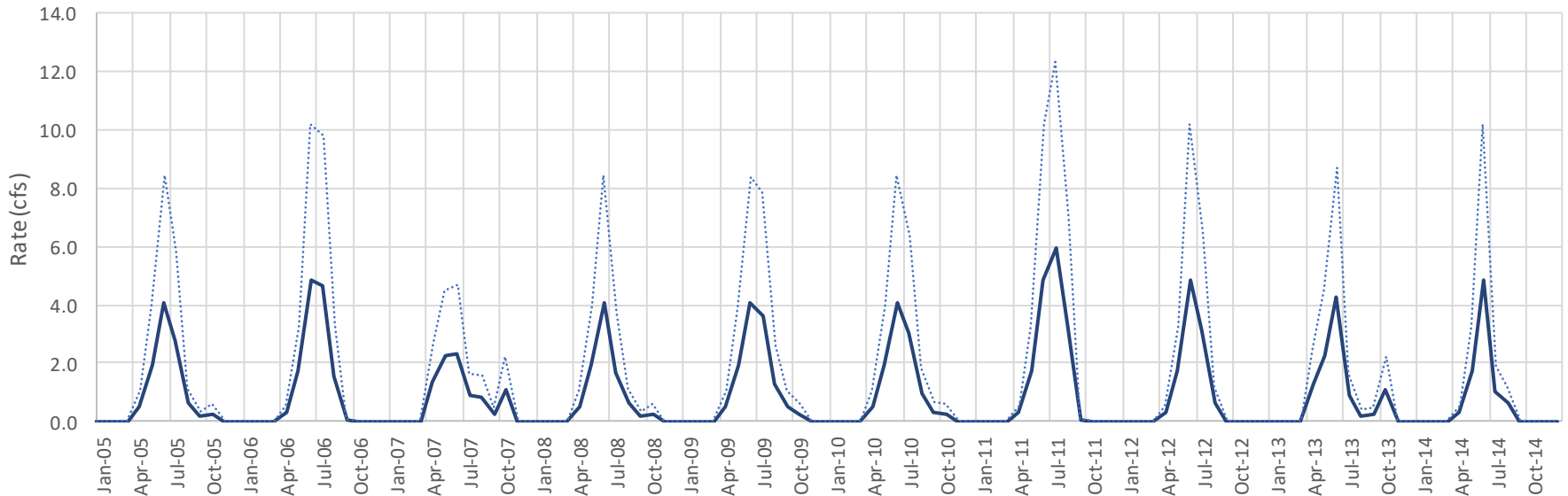
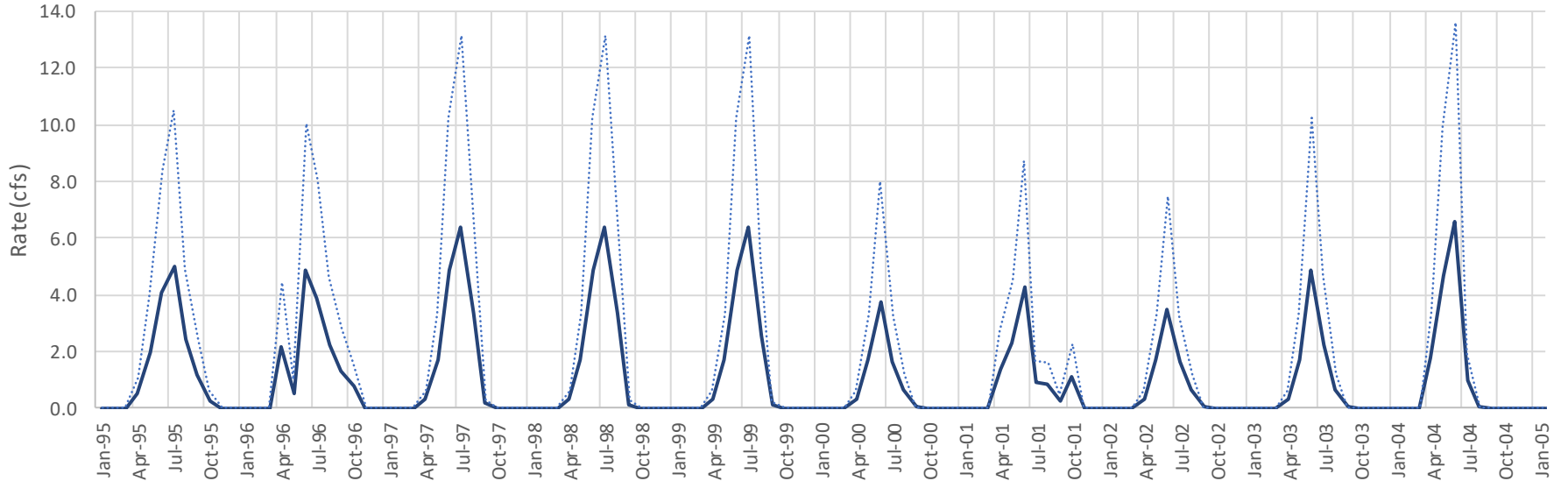


— CU reduction — GWCU reduction — SWCU reduction

Change in aquifer stresses and Silver Creek diversions for fallowed acres (10/11/2021 proposal)

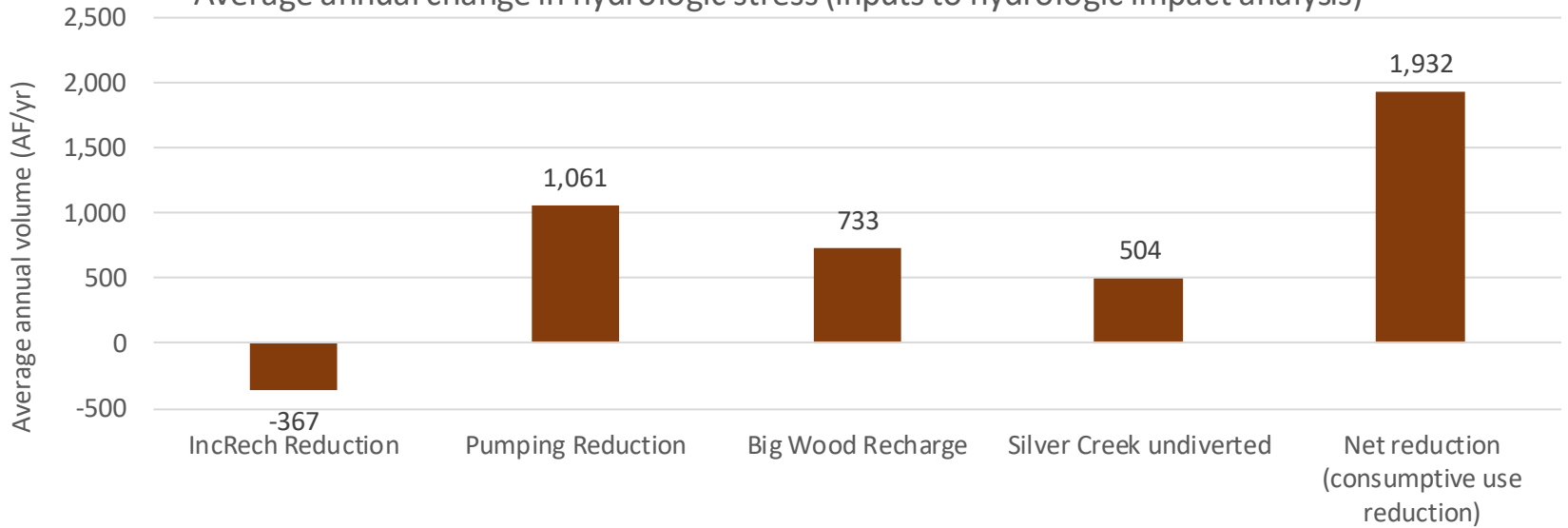


Big Wood managed recharge associated with fallowed acres (10/11/2021 proposal)

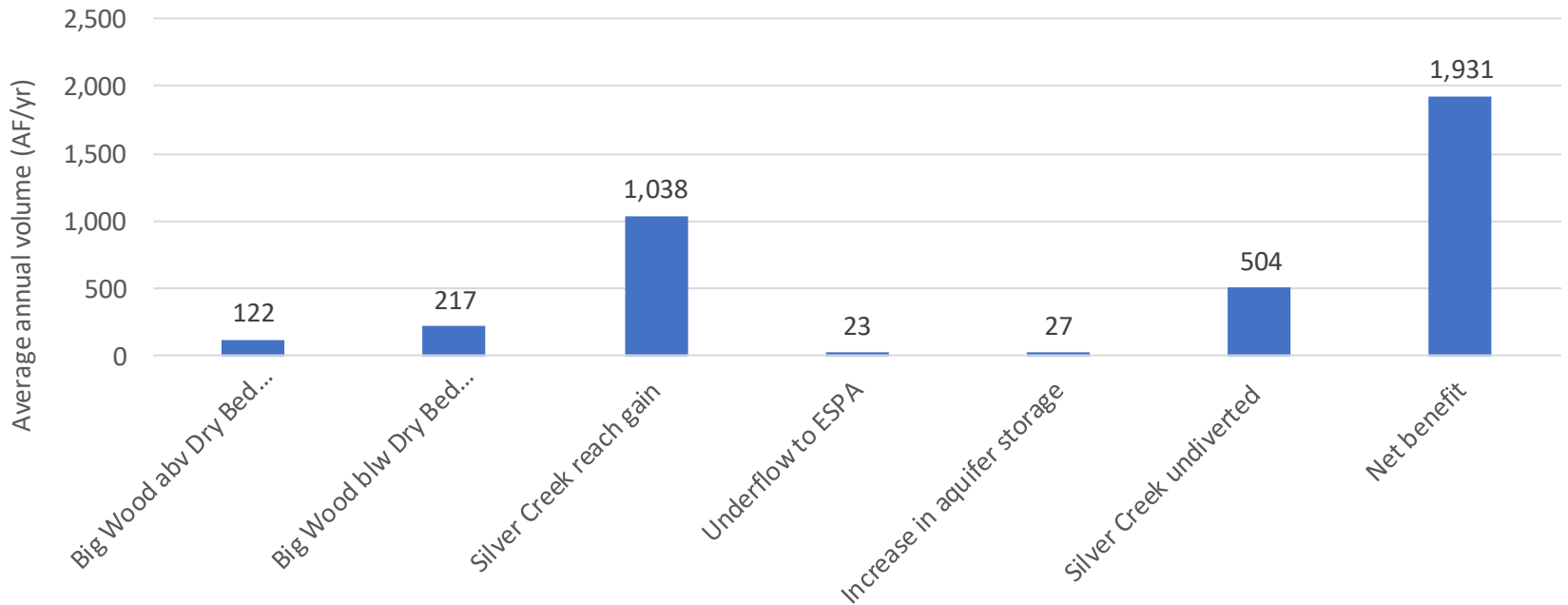


— Big Wood Recharge ····· Diversion (including canal seepage)

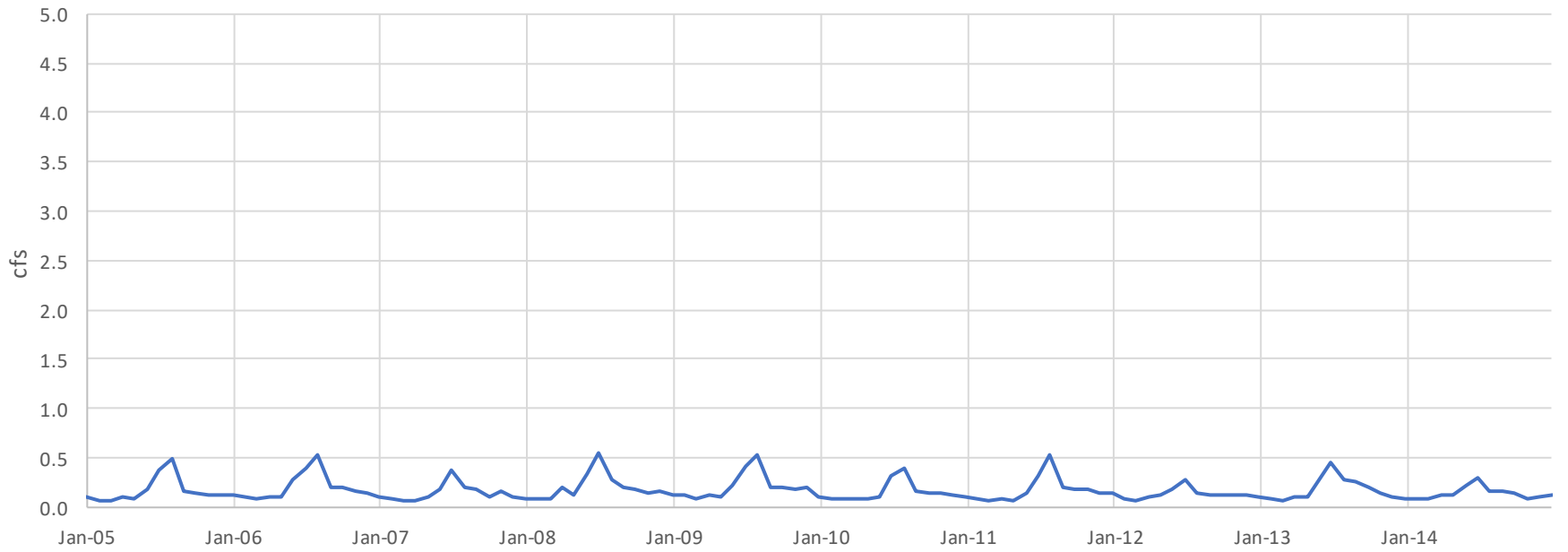
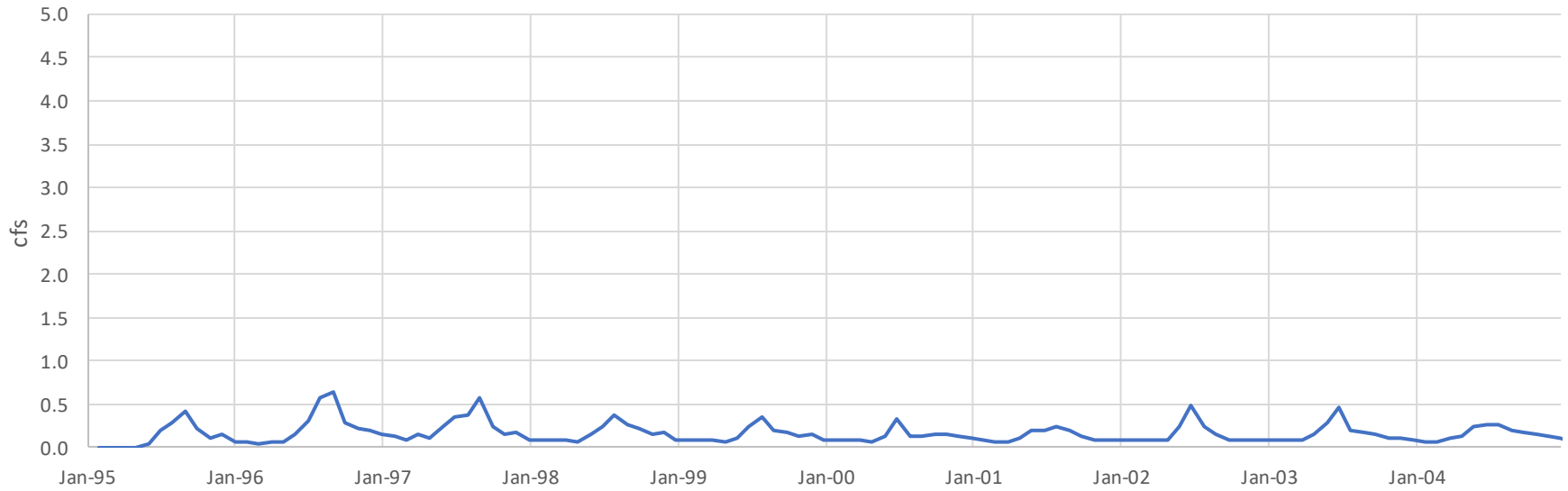
Average annual change in hydrologic stress (inputs to hydrologic impact analysis)



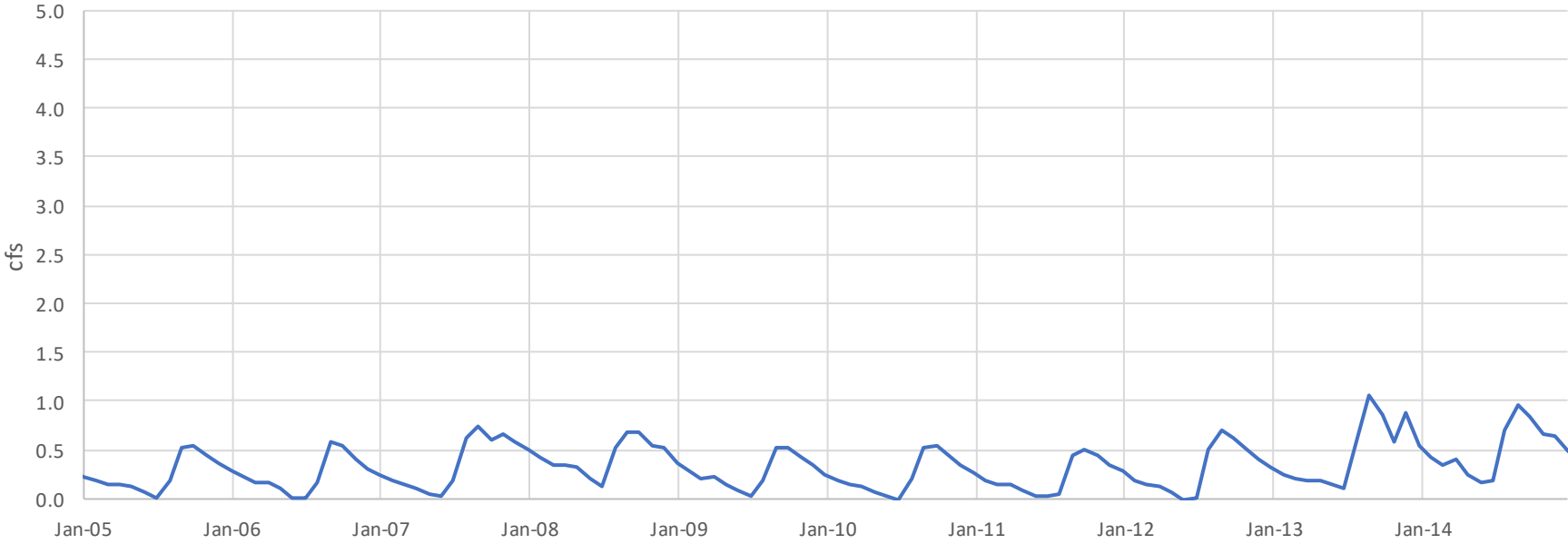
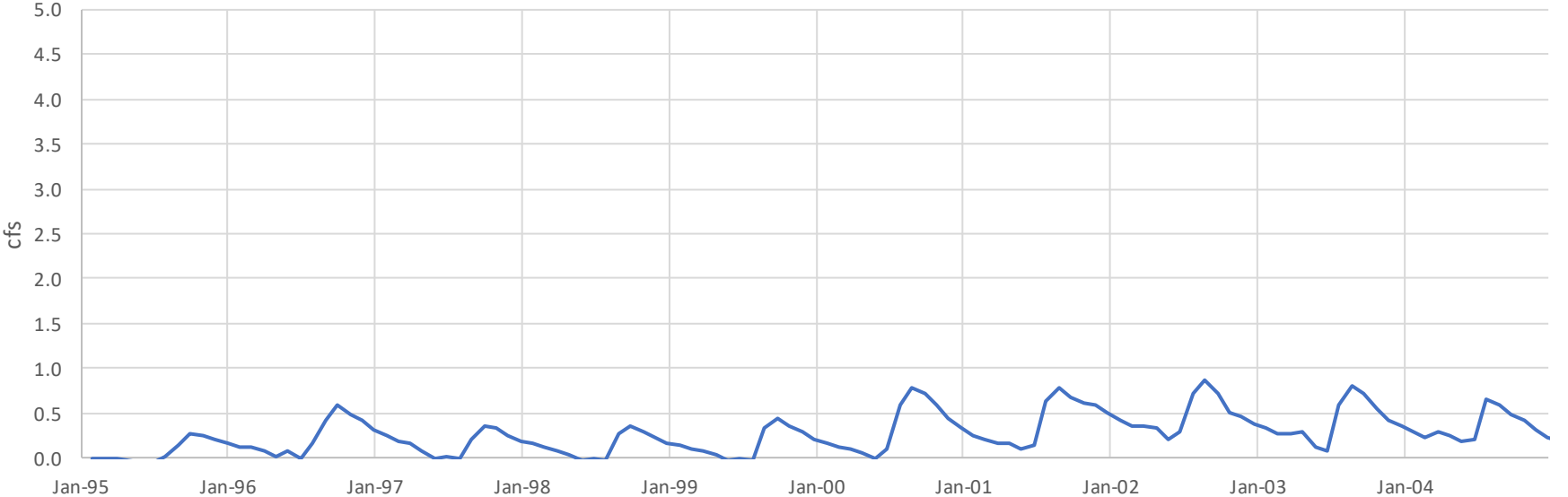
Average annual change in hydrologic response (outputs from hydrologic impact analysis)



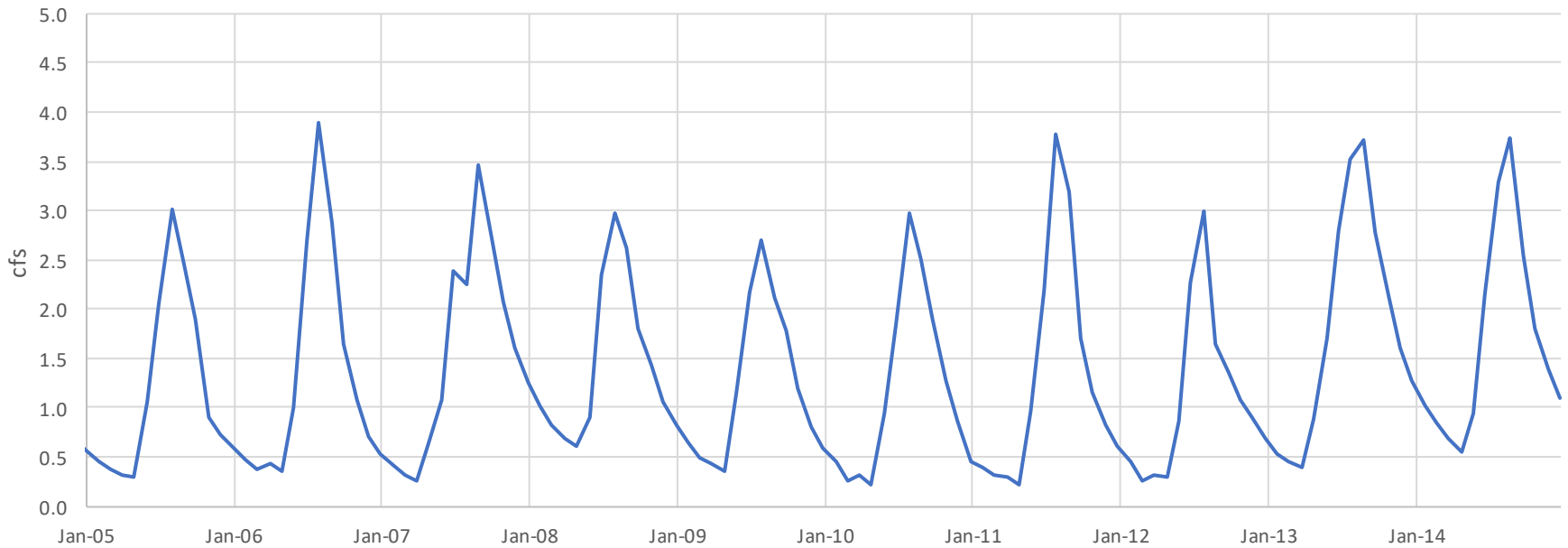
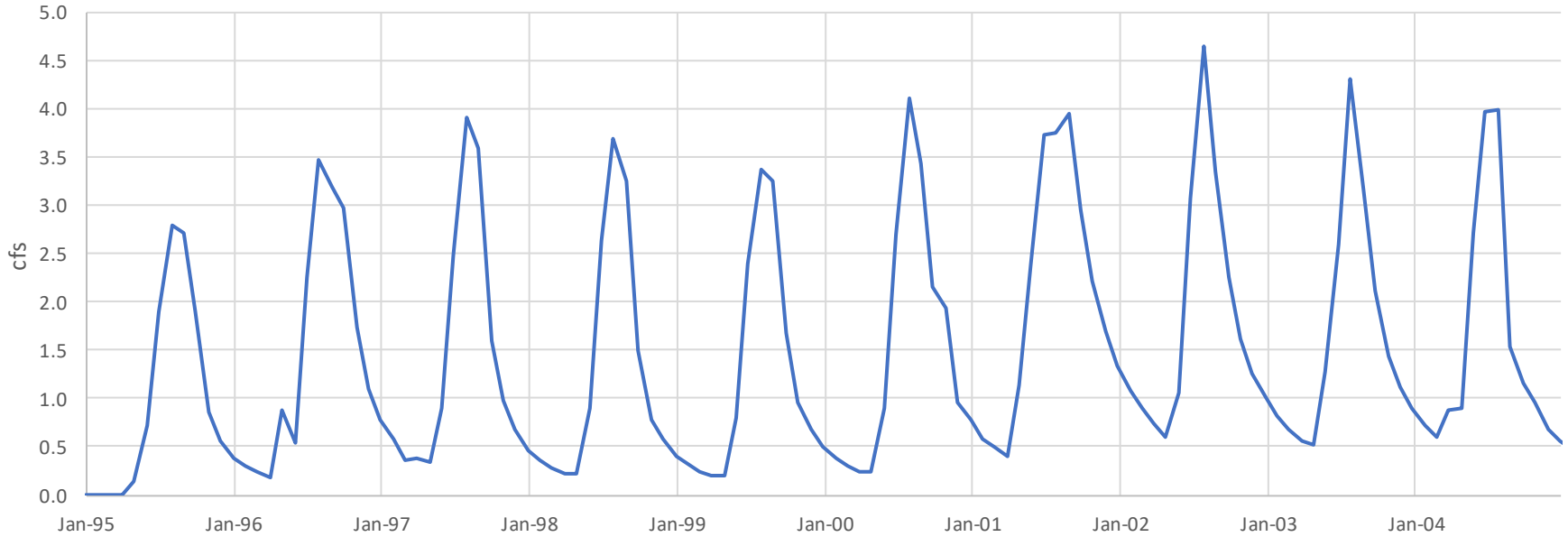
Change in Big Wood abv Dry Bed reach gain



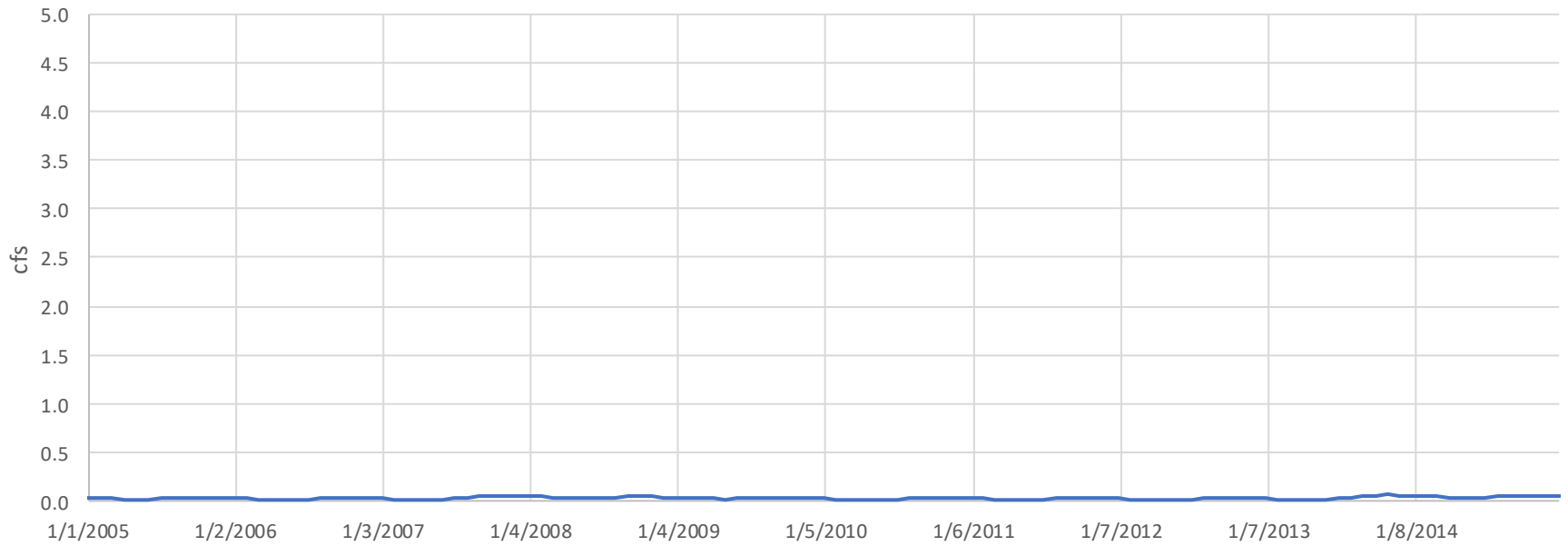
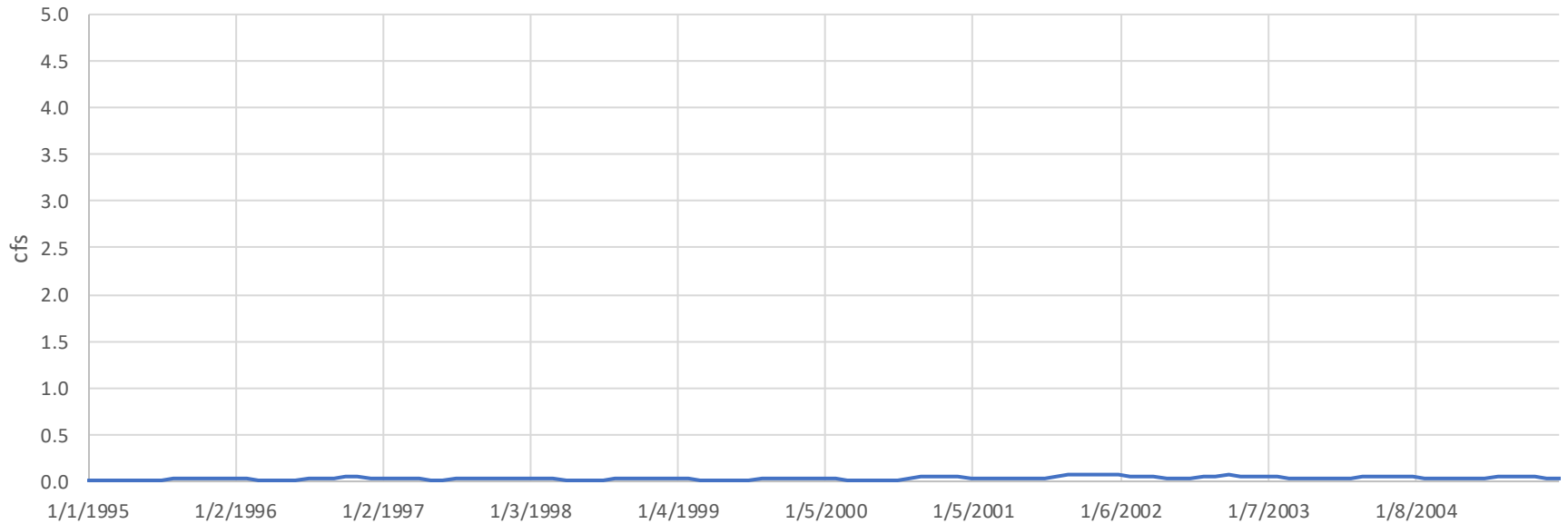
Change in Big Wood blw Dry Bed (including Willow) reach gain



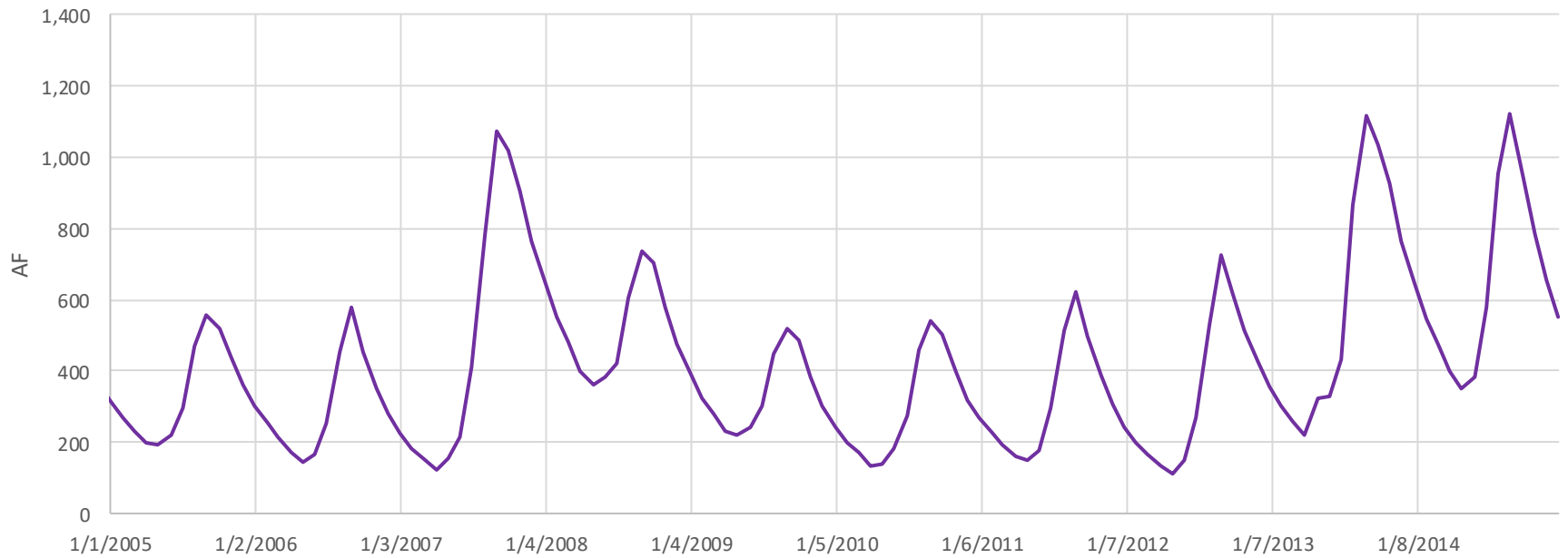
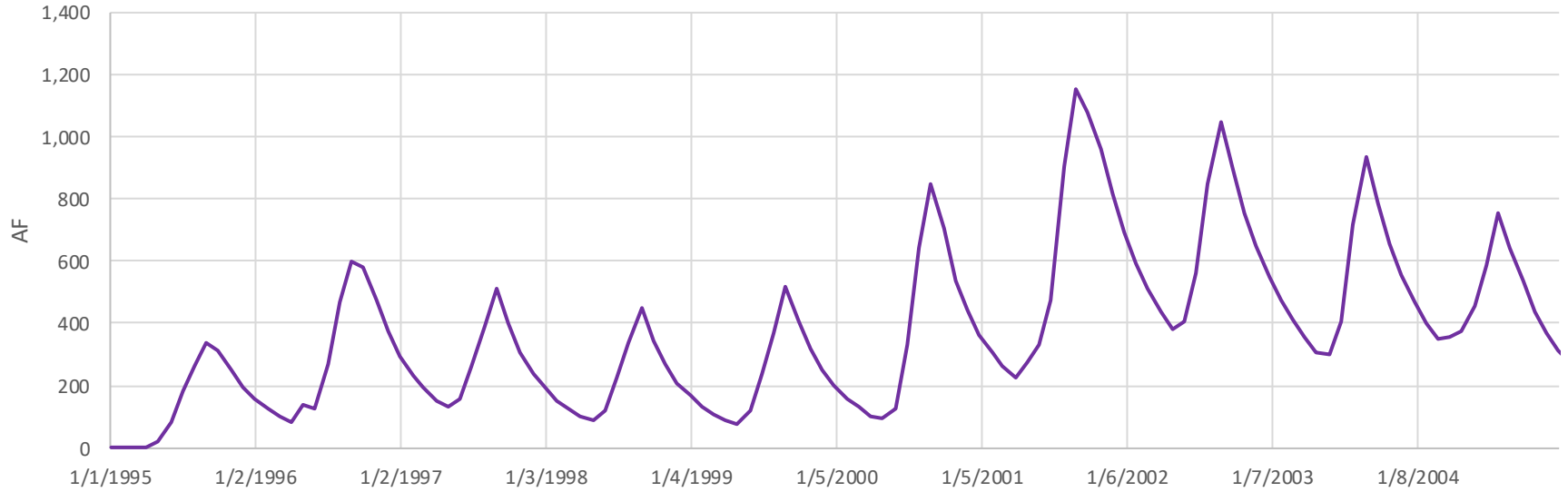
Change in Silver Creek above Sportsman Access reach gain



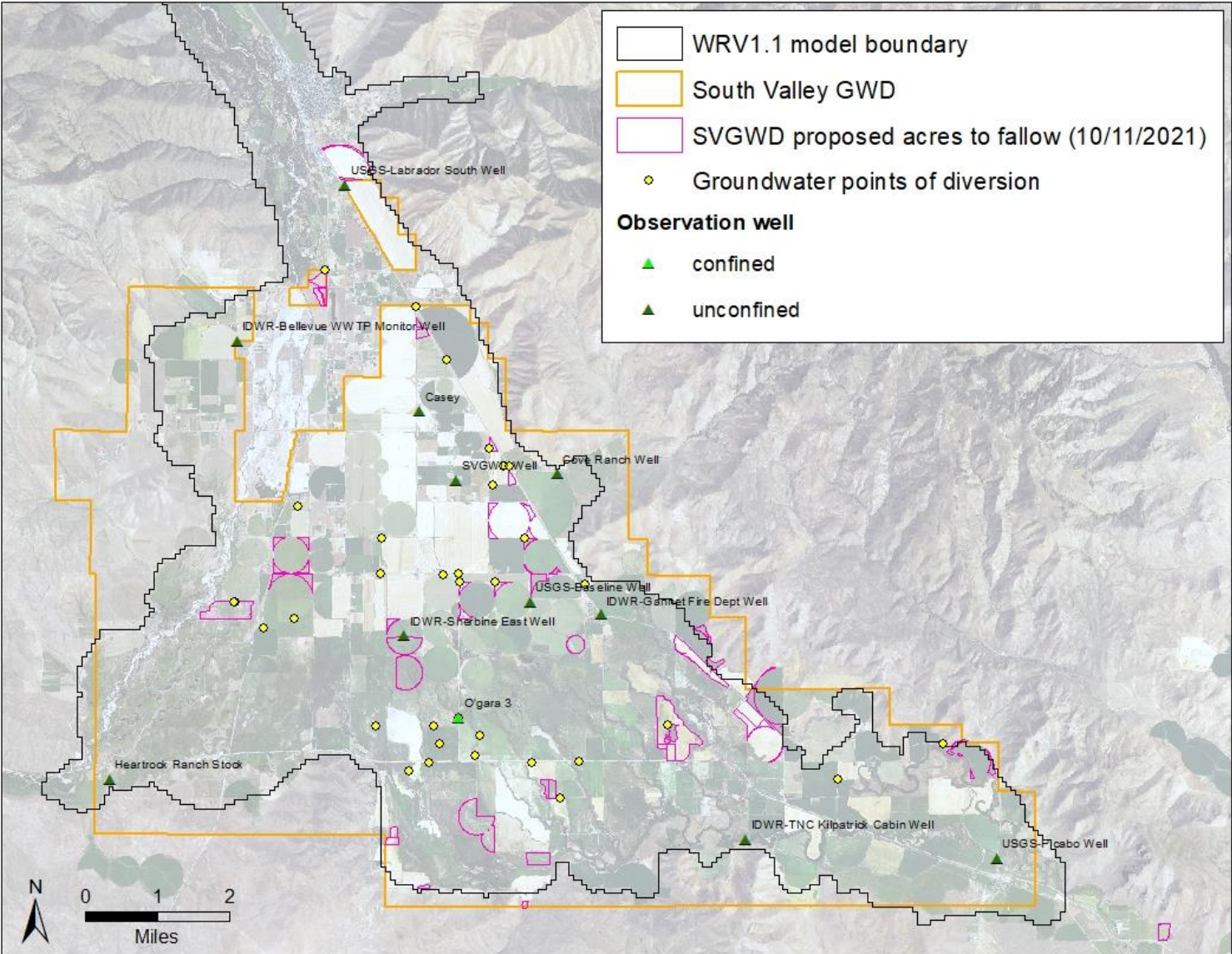
Change in groundwater underflow to ESPA near Picabo



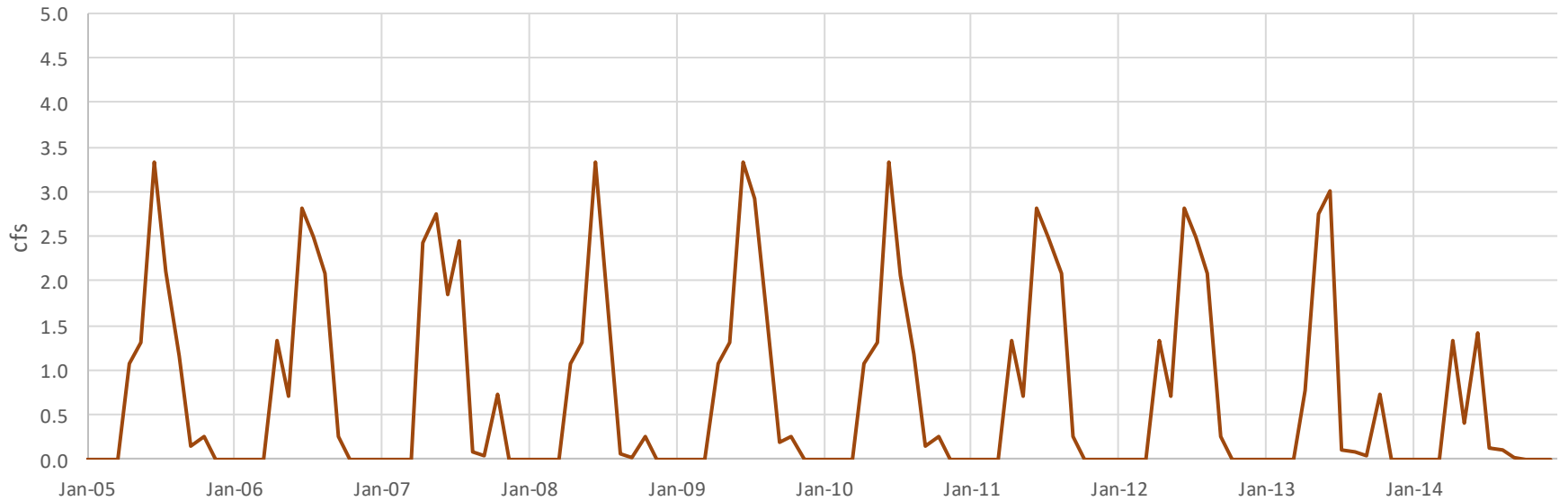
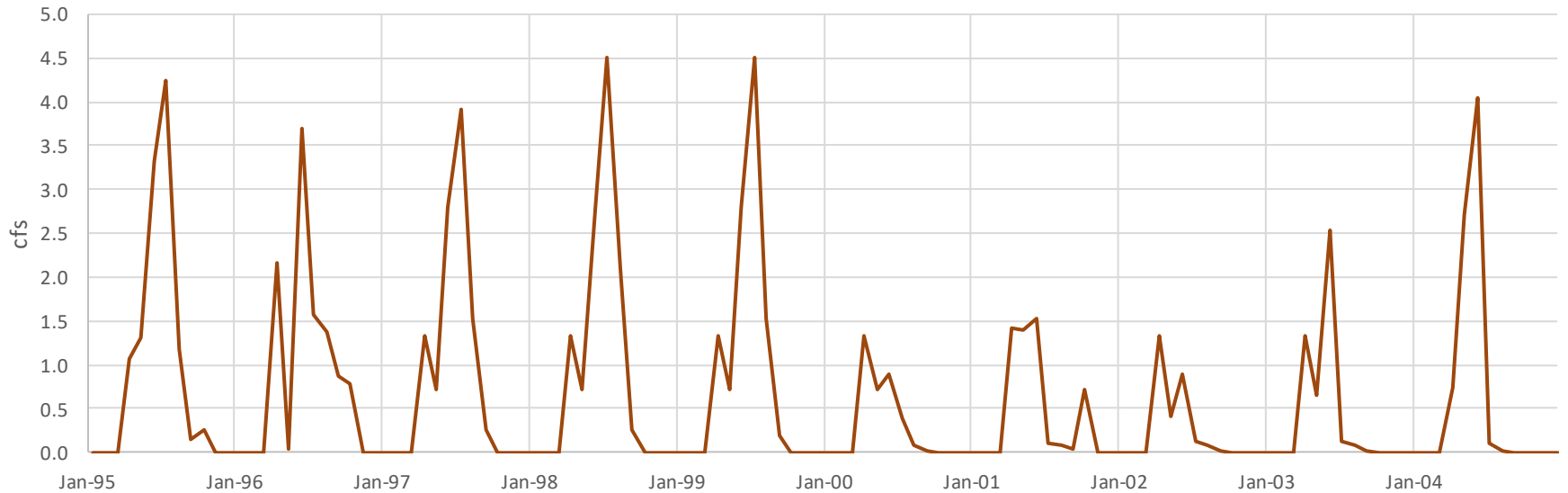
Cumulative change in aquifer storage



Selected observation wells for modeled water level response

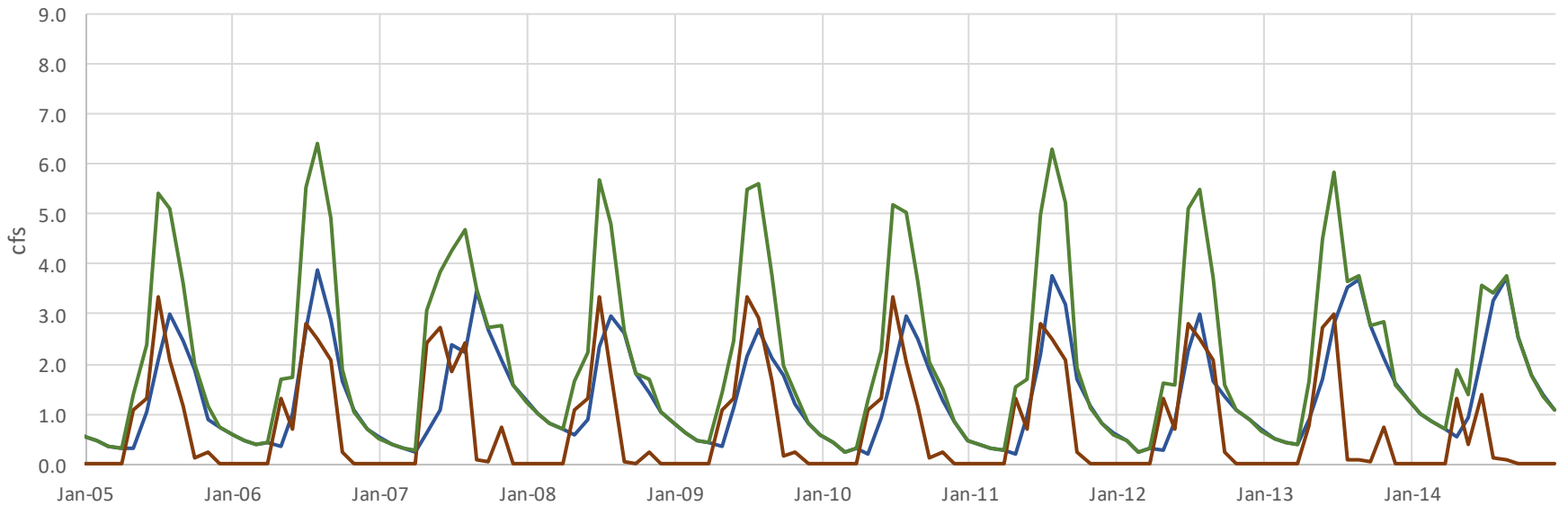
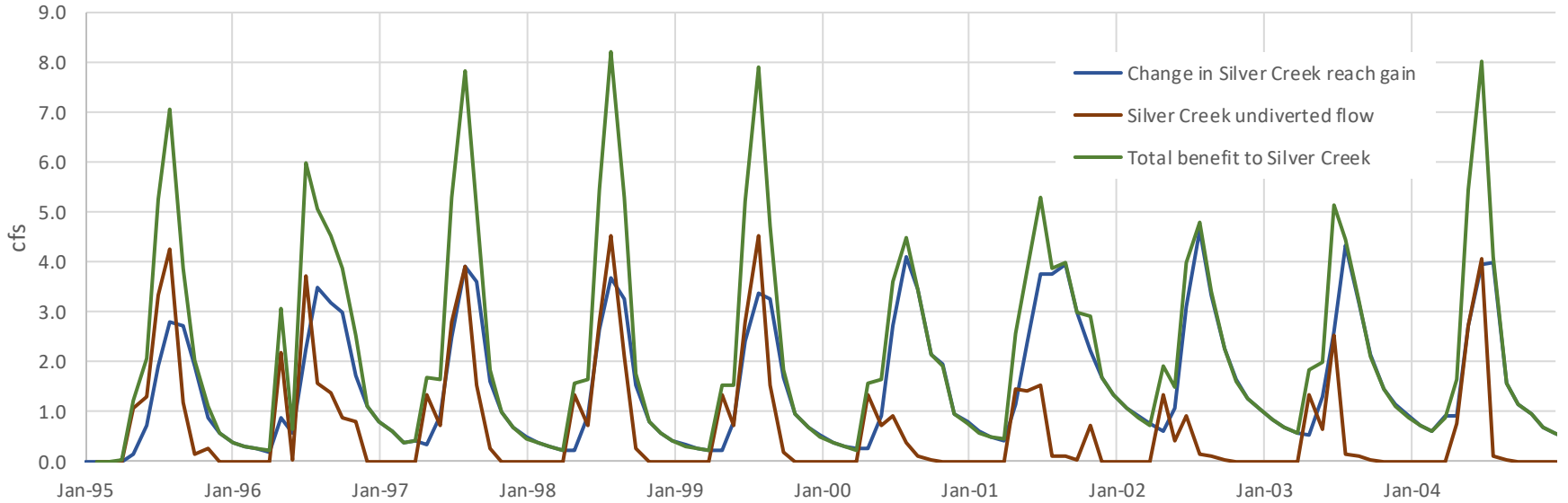


Direct reduction in Silver Creek diversions for fallowed acres (10/11/2021 proposal)

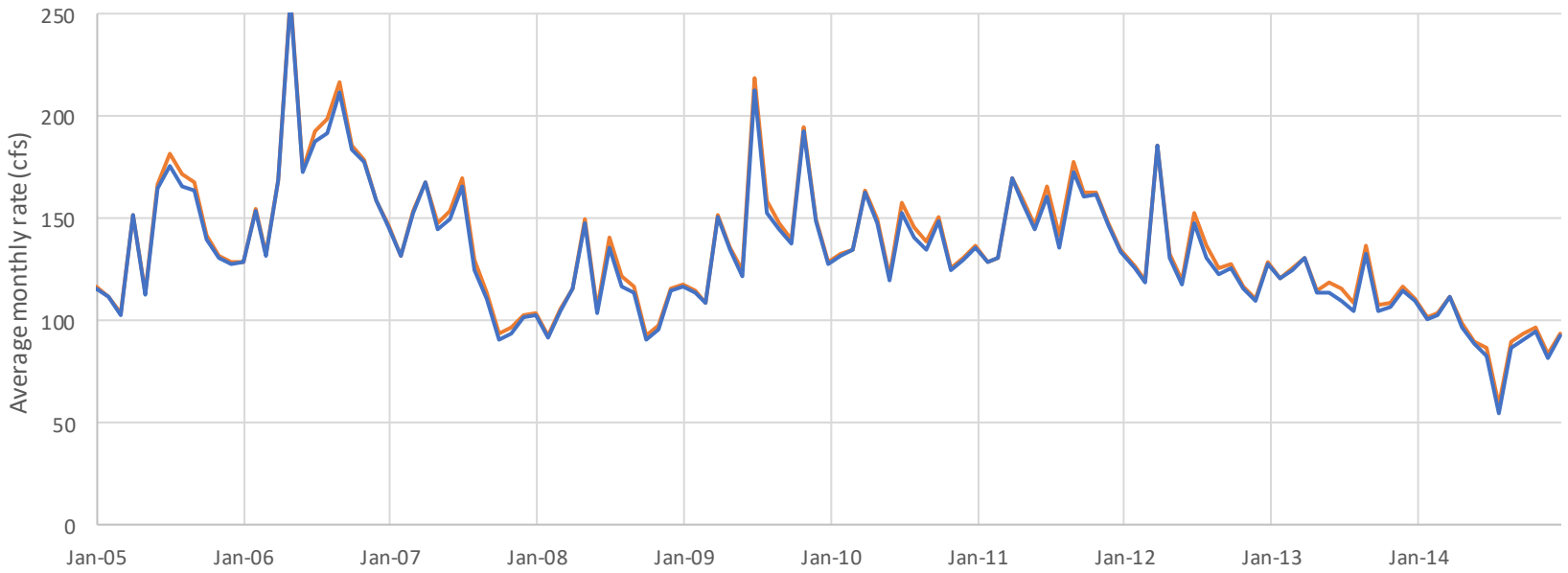
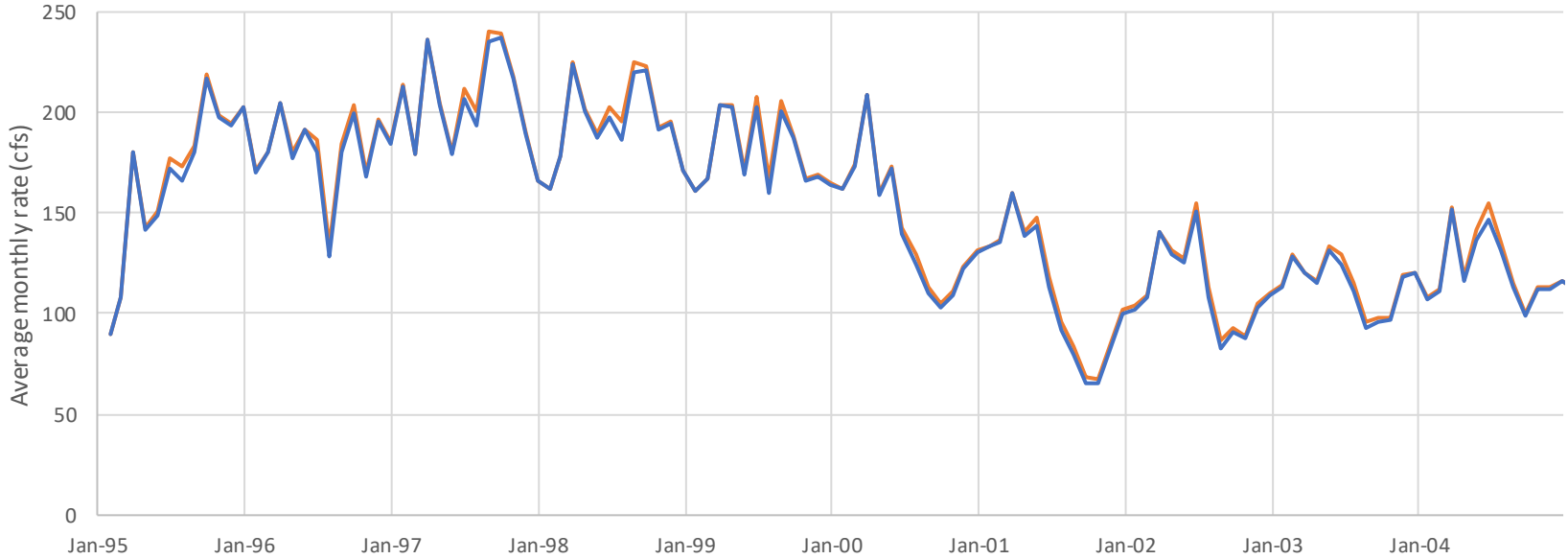


— Silver Creek Undiverted

Change in Silver Creek reach gain and undiverted Silver Creek flow

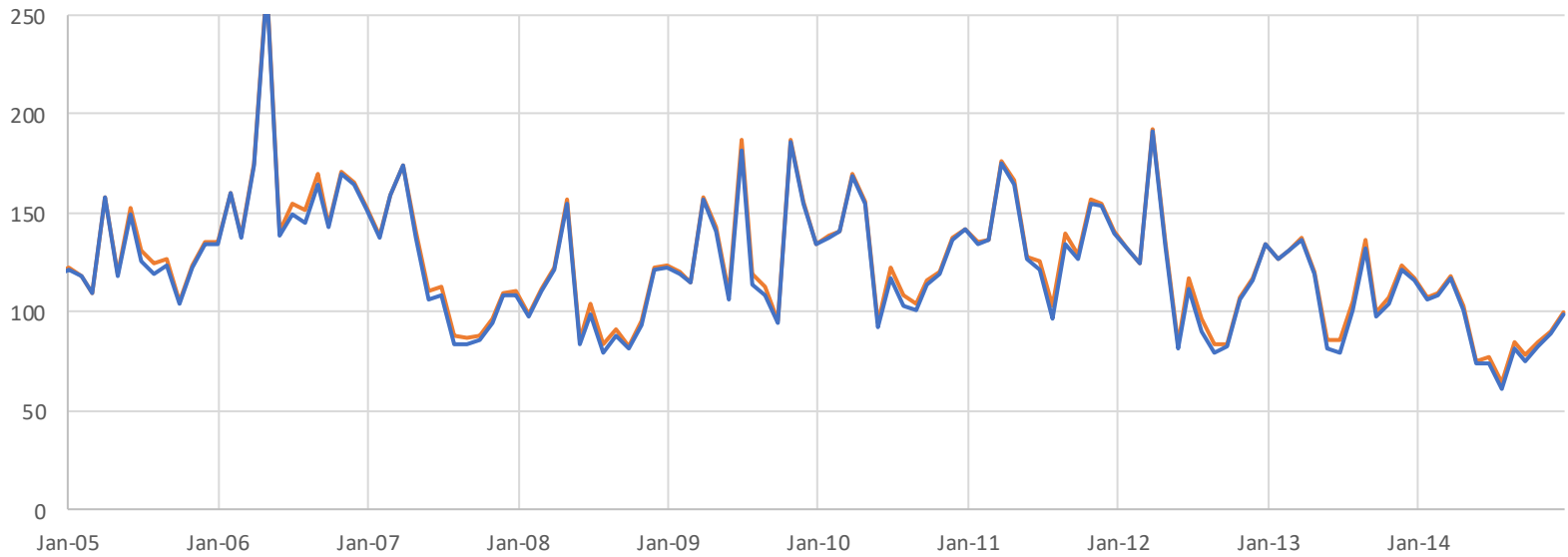
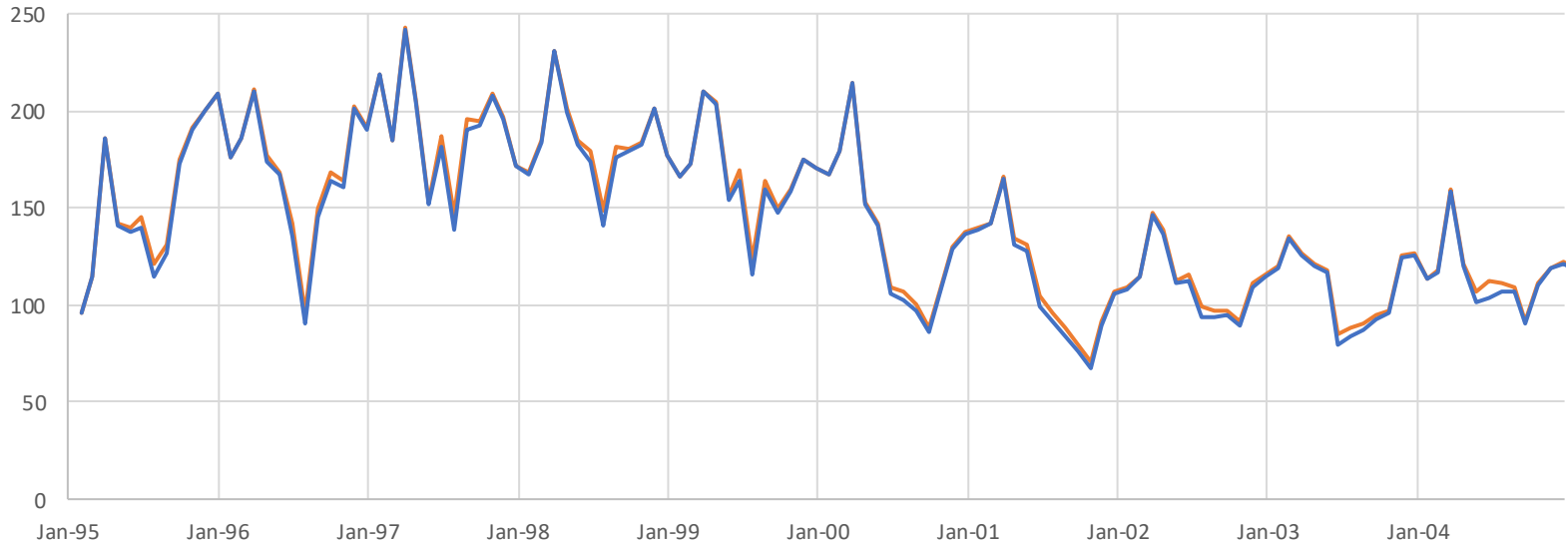


Silver Creek reach gain and predicted response to proposed following



— Silver Creek reach gain plus Silver Creek response and undiverted flow — Silver Creek reach gain

Silver Creek gaged streamflow and predicted response to proposed following



— Silver Creek at Sportsman Access plus Silver Creek response and undiverted flow — Silver Creek at Sportsman Access

Conclusions

Fallowing irrigated land to reduce demand provides a net benefit to the hydrologic system equal to the reduction in consumptive use of irrigation water.

Fallowing of the proposed 1,092 acres is predicted to increase water availability by roughly 3-4 cfs in Silver Creek and 1 cfs in the Big Wood River during August and September of the driest years.

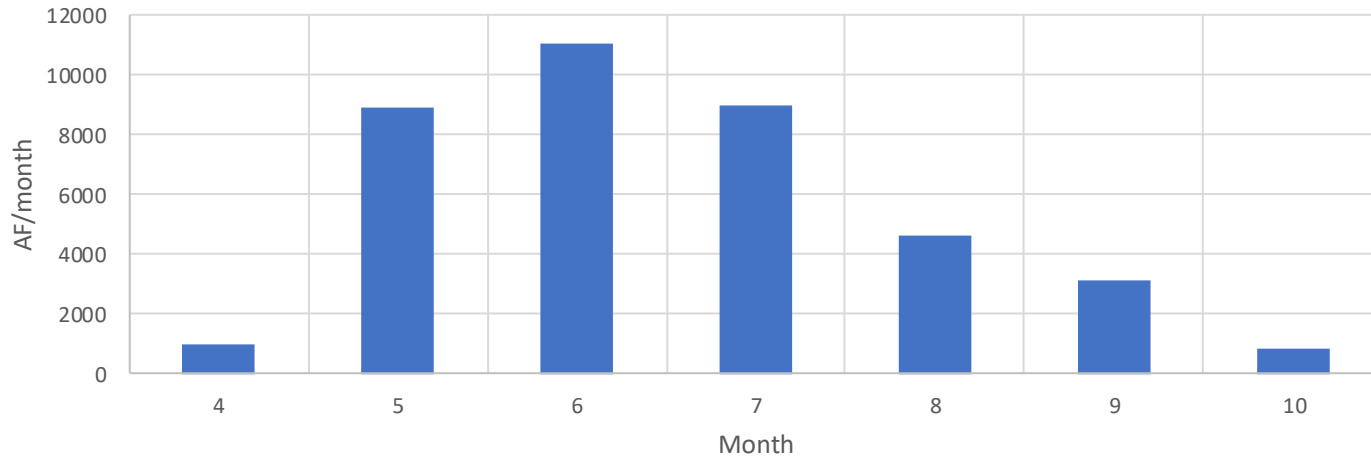
A modest increase in aquifer storage due to fallowing of the proposed acres is retained through the beginning of the next irrigation season.

Significantly increasing the fallowed acreage would be expected to provide significantly larger benefits to the hydrologic system.

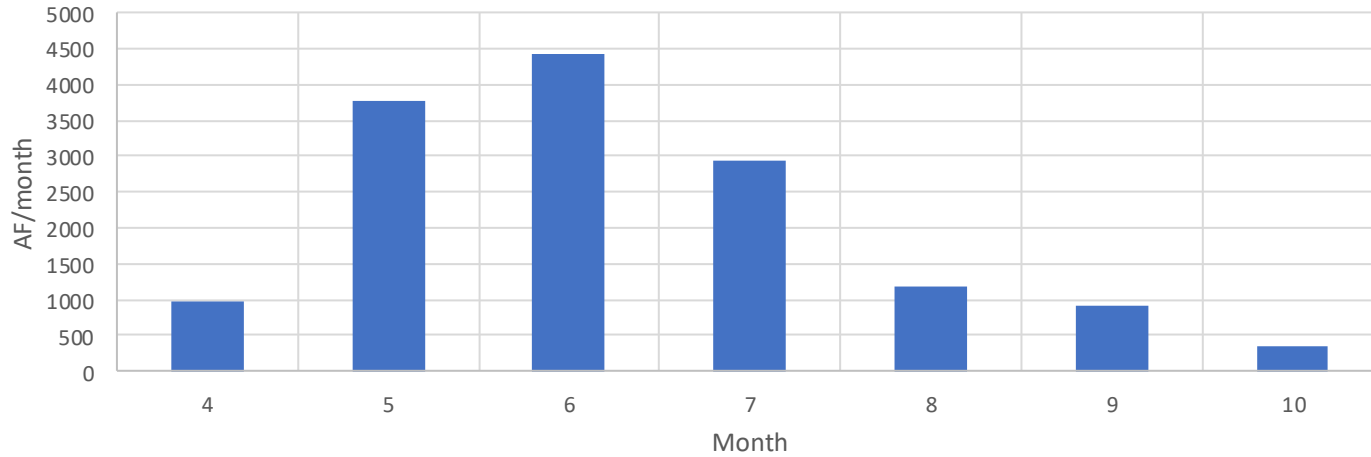
Questions/discussion



Average monthly diversions to District 45 Canal (1995-2015)



Average monthly diversions to Baseline 55C Canal (1995-2015)



District 45 recorded diversions by month

