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Closing the water balance using rare flows in a remote, ephemeral outback river

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It is notoriously difficult to accurately capture the full water balance in intermittent river basins; from ephemeral channel flows to infiltration to a shallow aquifer, potential recharge of a deeper regional aquifer, and evapotranspiration. Here, we use a surface water- groundwater model to close gaps in the water balance of a remote, ephemeral river basin in central Australia. Field observations of two flows of different magnitudes were used to parameterize the model, which couples the diffusion-wave approximation for surface flows into a dry channel, the Philips infiltration equation, and MODFLOW for recharge to the regional aquifer and evapotranspiration. The timing of the advancement of the smaller flow was approximately matched using reasonable streambed hydraulic conductivities of 0.1 m/d. The presence of a perched aquifer increased computational demand. Ongoing work to fit both flows will estimate perched aquifer recharge removed by the large trees along the river to better understand contribution of streamflow to regional aquifer recharge.