Hydrology:

Head (water-level) - A Schlumberger Micro-Diver (DI601) pressure transducer was deployed in a manually installed stream gauge to record surface water head, and Schlumberger Baro (DI500) pressure transducers were deployed in three manually installed shallow piezometers to record subsurface head levels at ~35 cm depth; calculations accounted for the contribution of air pressure recorded by an additional Schlumberger Baro. Two of the piezometers were deployed at the main monitoring/sampling sites: in the center of the stream channel, and in the west-flanking wetland sufficiently close to the channel such that inundated conditions persisted throughout the summer. To assess variability within Second Creek, the third piezometer was deployed between the first two locations in the channel near its west bank.

Temperature - Vertical temperature probes collocated with the piezometers measured porewater temperature at 0, 5, 10, 15, 20, and 30 cm depths below the sediment-water interface. The temperature probes were constructed using wooden dowels, housed thermistors potted at the dowel surface in waterproof epoxy, and were connected to an open-source “ALog” data-logger (an intermediary version between that presented in Wickert [2014] and Wickert et al. [2018].

Flux - Time series data of temperature profile and hyporheic zone head gradients in the center channel, west wetland, and west channel were incorporated in the heat-transport inverse model 1DTempPro [Voytek et al., 2014] to estimate the time series of hyporheic flux at each location. For parameters required by 1DTempPro model, we used sediment porosity of 0.51 previously measured by Myrbo et al. [2017], thermal conductivity of 0.56 W/m/C, and saturated heat capacity of 2.44 × 10 6 J/m^3/C estimated assuming 80% sediment organic matter and 20% siliciclastic material in the approach by Farouki [1986], and heat dispersivity of 0.1 m assigned based on typical solute dispersivity for the tens of centimeters spatial scale considered here [Zheng and Bennett, 2002].

Water chemistry:

On June 14 and August 15, 2016, we sampled porewater at 1.56 cm depth intervals from 1.56 cm above the sediment-water interface to about 40-50 cm depth below the interface using passive porewater equilibrators (“peepers”) following the method described in Ng et al. [2017]. In June, duplicate peepers were deployed in the channel and wetland monitoring/sampling locations. In August, duplicate peepers were deployed again in the channel; intended peeper deployment in the wetland in August was later found to be mislocated in channel sediments and failed to capture actual wetland conditions. For all peeper samples, pH was analyzed in the field using a Thermo Scientific Orion STAR A329. Fe^2+ was quantified in the field using the phenanthroline method [Eaton et al., 2005]. Methane samples were collected and analyzed using the same methods described in [Ng et al., 2017]. For select peeper samples, we acidified cation samples of about 12 mL volume with one drop of 6N HCl before analysis using a Thermo Scientific iCAP 6500 dual view ICP-OES (for Al, Ba, Ca, Fe, K, Li, Mg, Mn, Na, P, Si, and Sr) at University of Minnesota, Twin Cities; anion samples were analyzed using a Thermo Dionex ICS 5000+ ion chromatography system (for F−, Cl− ,NO3− ,Br− , and SO4^2− ) at University of Minnesota, Twin Cities.

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