

Schmidt Steady State Seepage Calculator

Schmidt, C., Conant Jr, B., Bayer-Raich, M. and Schirmer, M., 2007.
Evaluation and field-scale application of an analytical method to quantify groundwater discharge using mapped streambed temperatures. Journal of Hydrology, 347(3–4): 292-307.

This notebook utilizes steady-state sediment temperature profile to estimate groundwater seepage flux. Users are encouraged to familiarize with the theory beforehand. The only assumed parameters in the steady-state models are volumetric heat capacity of water (pfcf) and thermal conductivity (k) of the saturated porous media. Please look up the worksheet - "Parameter Metadata" for applicable parameter values.

```
In [ ]: from numpy import log
        from scipy.optimize import fsolve

        conductivity = 0.70
        heat_capacity = 4190000
        sed_temp_shallow = 25.36
        sed_temp_mid = 16.11
        sed_temp_const = 12.98
        shallow_mid_dist = 0.45

        expected = 0.0441

In [ ]: qz = -86400 * (conductivity / (heat_capacity * shallow_mid_dist)) * log((sed_temp_mid - sed_temp_

        print(f"Expected: {expected}")
        print(f"Actual: {qz}")

In [ ]:
```