Abigail Kahler, HW3, The Challenge

**Chart, line chart

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Type 1 boundary = specified heads

q = -K dh/dl

* The flow would be constant across the constant head boundaries if it were a homogeneous system. Here, in Figure 1, the low flow in the middle of each boundary corresponds to the lower K in the center of the grid.
* Chart

  Description automatically generated with medium confidenceWith steady state continuous flow, the boundary flow is equally affected by the central low K. Conceptually, flow vectors become shortened as the water ‘backs up’ behind the low K box and slowly return to previous levels as the flow ‘catches up’ on the other side.

Figure 1 Flux through constant head boundaries of 15m (left) and 10m (right)

Figure 2 Head distribution across grid with center low hydraulic conductivity, rotated to align the y-axis with Fig. 1

Diagram

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Comparing the flow profiles (Fig. 3) shows how the effect of an area of low hydraulic conductivity propagates outward and gradually decreases with distance from its center. This should be scalable and help predict the implications of flow through different geologic units. My center flowline had a value of on the right boundary, and I don’t know why. Maybe it had something to do with how I called the array. I manually set it equal to the left boundary because that is the trajectory it was on, but I know that’s bad practice.

Figure 3 Left to right flow along constant head boundaries and through the center of low K

**3**

Total flow in/out calculated by summing flux along constant head boundaries:

K\_eq calculated by total area and total flow in/out under provided K vals: .0039 m3/day

Chart

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A picture containing square

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