Hull-HW-06.md

- Quinn Hull
- HW 6
- Transpired

The Challenge

a. For the initial boundary head values and recharge and ET rates, establish the flow across the boundary versus y-distance along the left (15 m) and right (5 m) boundaries. Plot the equipotentials and flow vectors in plan view and outline (hand draw) the area that would be affected by recharge (i.e. if it were contaminated). Also show a contour plot of the steady state ET flux in plan view.

Figure 5.1.1 *A plot of flow vs y distance along the left and right boundaries where the aquifer is unconfined, flow recharges the agricultural region* `6:10,6:10` *at* `5e^-4 m/d` *, ET occurs over the entire domain at* `5e^-5 m/d` *to an extinction depth of 3 meters, and boundaries are at* `15` *and* `5` *respectively*

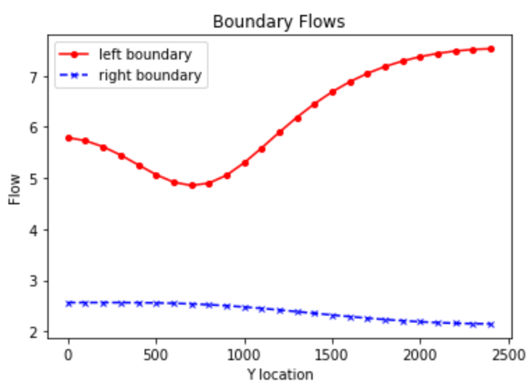


Figure 5.1.2 *A plan view of equipotential lines showing area influenced by recharge from agricultural region*

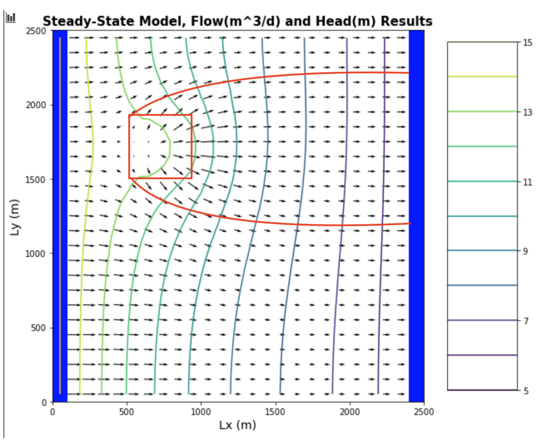
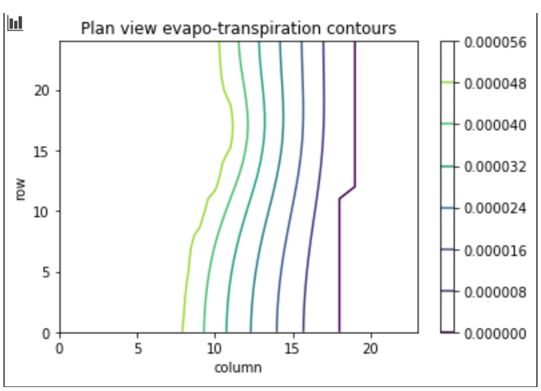


Figure 5.1.3 *A contour plot of the steady state ET flux in plan view*



b. Change the extinction depth. What impacts does this have?

Figure 5.2.1 *A contour plot of the steady state ET flux in plan view given an extinction depth of **10***

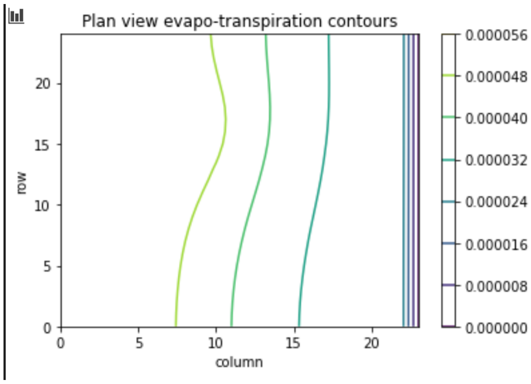
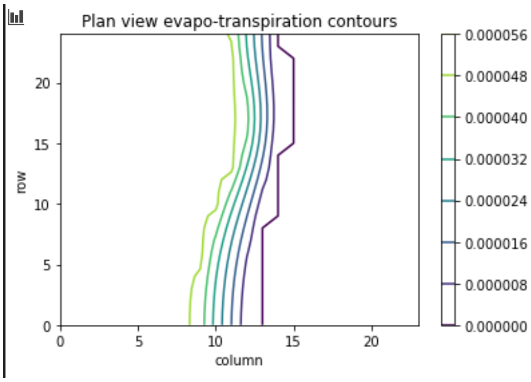


Figure 5.2.2 *A contour plot of the steady state ET flux in plan view given an extinction depth of **1***



c. Explain, conceptually, how MODFLOW is representing ET. How does this compare to your intuitive understanding of ET in the real world?

d. Now start the well pumping, extracting 20 m3/day. How does the well change the zone that is affected by the recharge area? How does it affect the ET map? Write a mass balance for the well - how much water is coming from a boundary? How much is originating as recharge? How do you account for the impact of ET on this mass balance? At steady state, what are the effects of 'capture' by the well?

Figure 5.4.1 *A plan view of equipotential lines showing area influenced by recharge from agricultural region and pumping from the well*