

100-HR-3 Flow and Transport Model

Model Construction and Calibration

SSP&A - September 2021

Model Version 1:

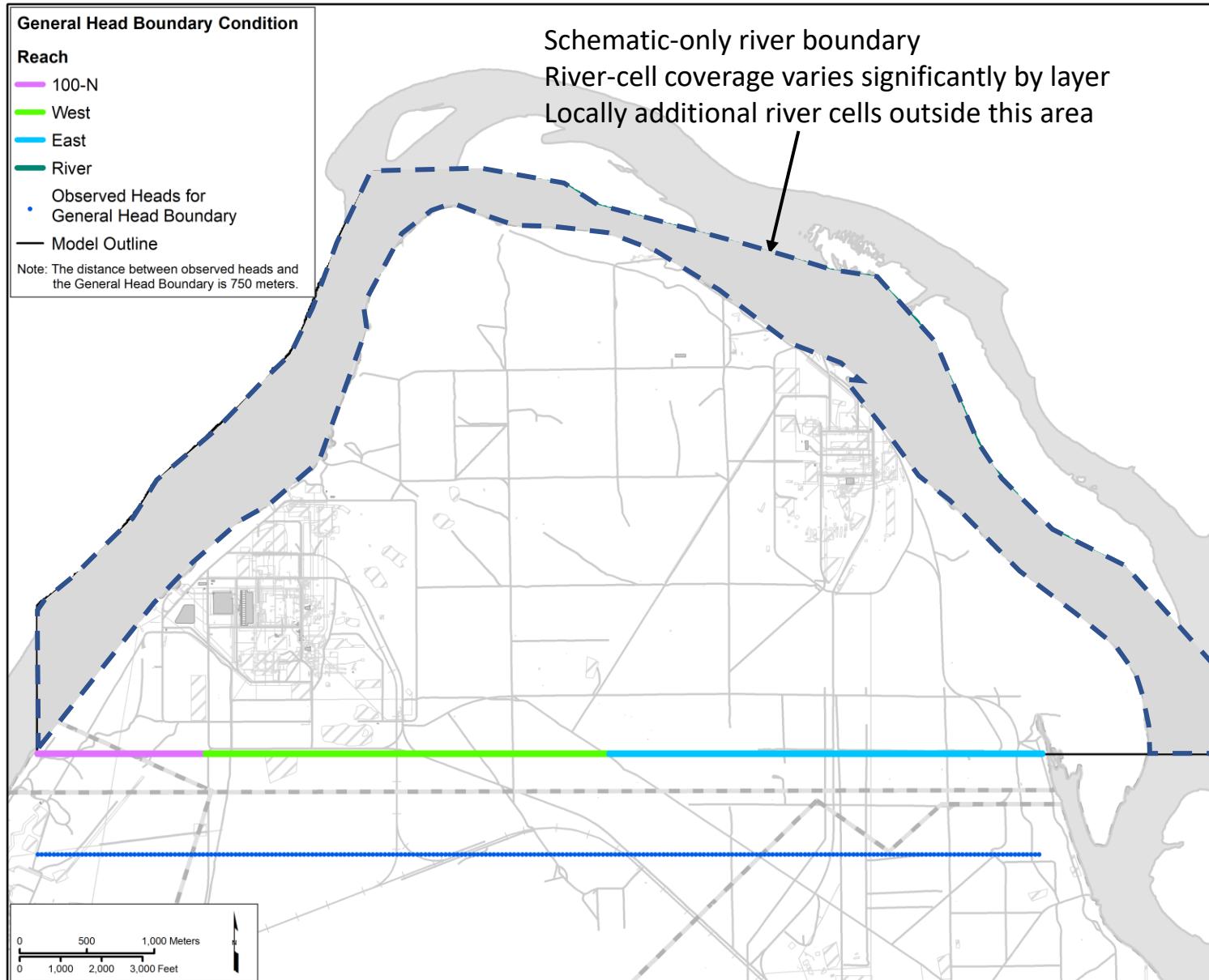
- River BC in Lay 1-6
- Within Actual River: No Flow
- No flow at boundary of Active Model Domain

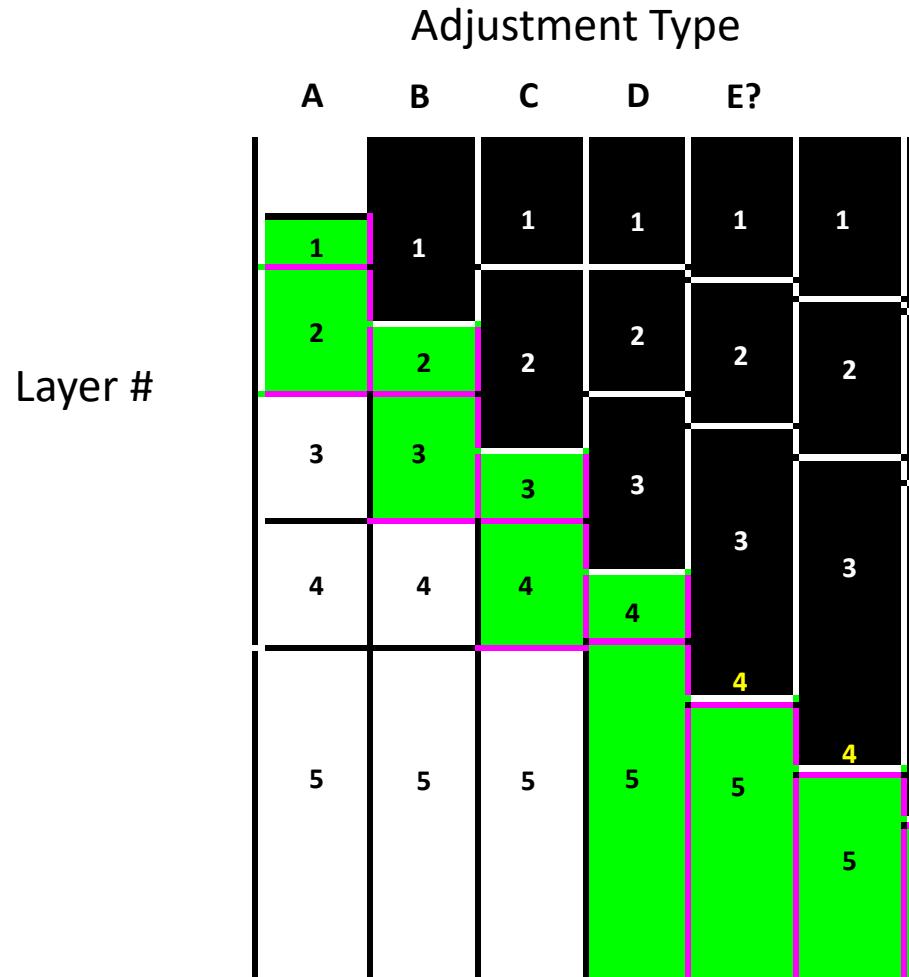
Model Name: RUM_NOFLOW

Model Version 2:

- River BC in Lay 1-6
- GHB at boundary of Active Model Domain in Layer 6

Model Name: RUM_GHB





Initial Layer Set up:

Top of Model = Maximum observed waterlevel (from contour maps)
If no contour (river) use maximum stage

Bottom Lay 1 = $\frac{3}{4}$ of maximum unconfined saturated thickness

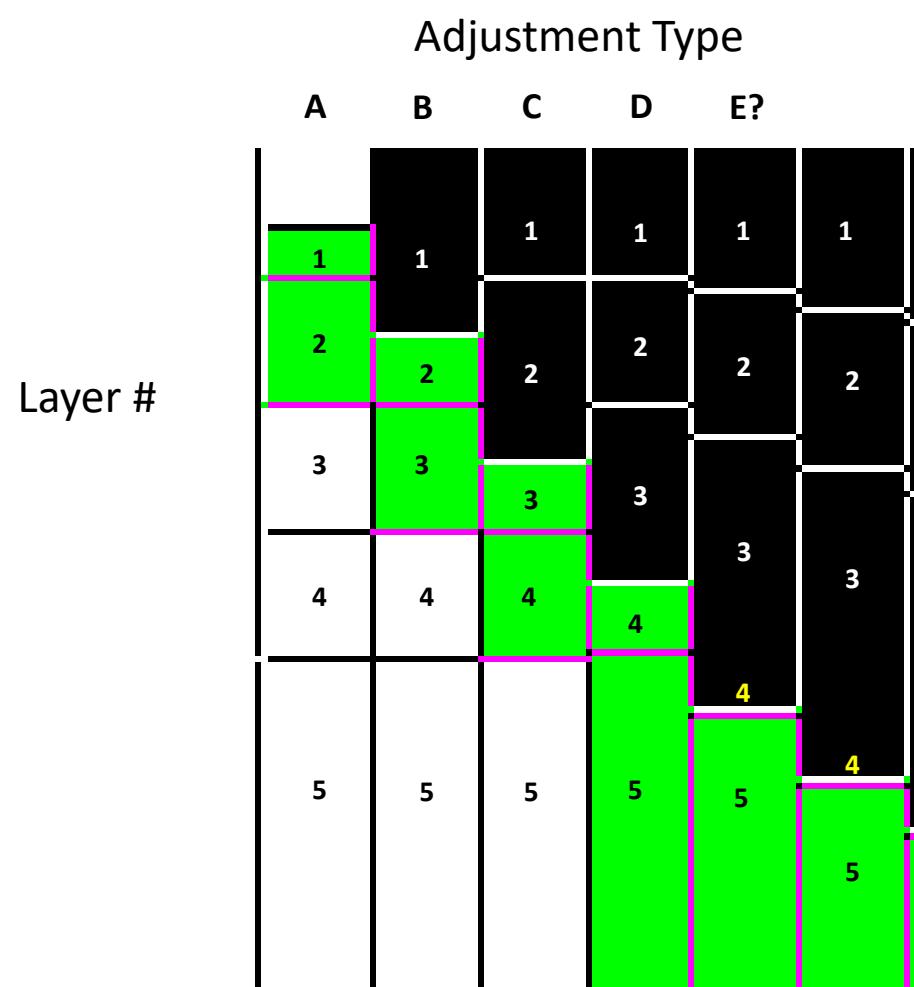
Bottom Lay 2 = $\frac{1}{2}$ of maximum unconfined saturated thickness

Bottom Lay 3 = $\frac{1}{4}$ of maximum unconfined saturated thickness

Bottom Lay 4 = Top of 1st RUM Mud – Bottom of unconfined aquifer

Bottom Lay 5 = Top of 1st RUM Aquifer

Bottom Lay 6 = Top of 2nd RUM Mud



Adjustment Type:

A: If Surface of Hanford is in/above layer 1

B: If Surface of Hanford is in layer 2

C: If Surface of Hanford is in layer 3

D: If Surface of Hanford is in layer 4

E?: If Surface of Hanford does not exist (currently not a type)

Adjustments Made:

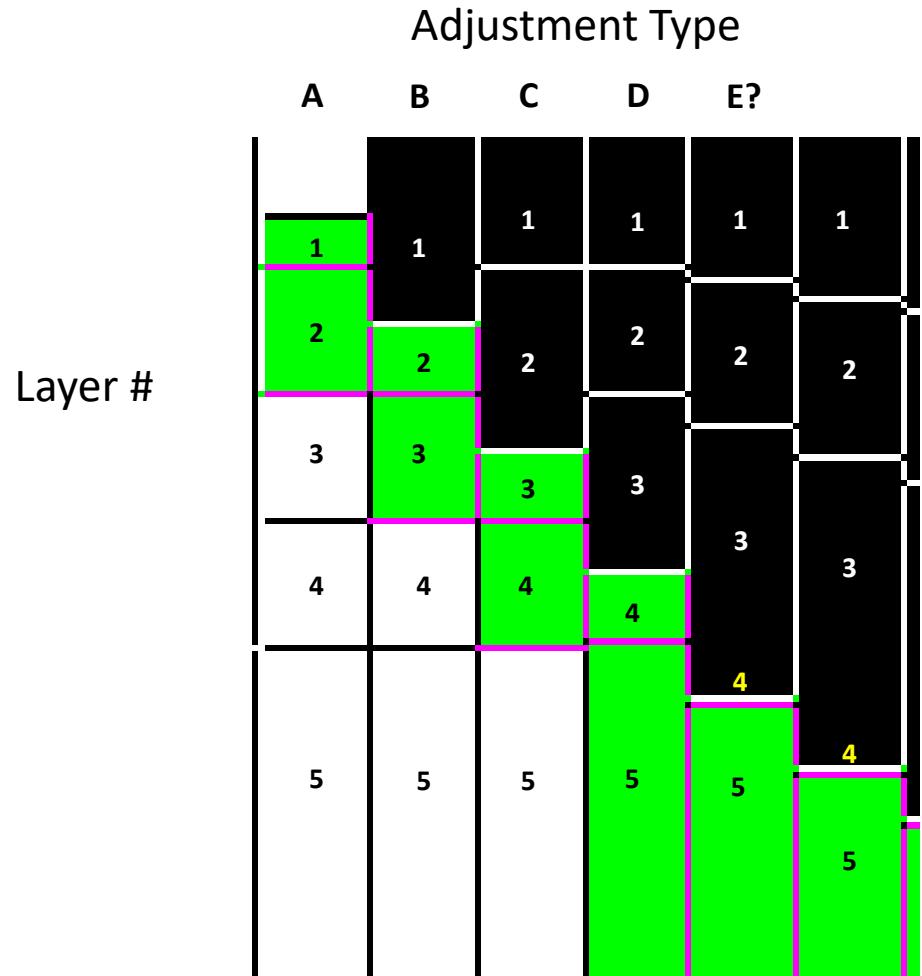
A = Set top of model to Hanford surface

B = Set bottom of Lay 1 to Hanford surface; Layer 1 set to no flow

C = Set bottom of Lay 2 to Hanford surface; Layer 1, 2 set to no flow

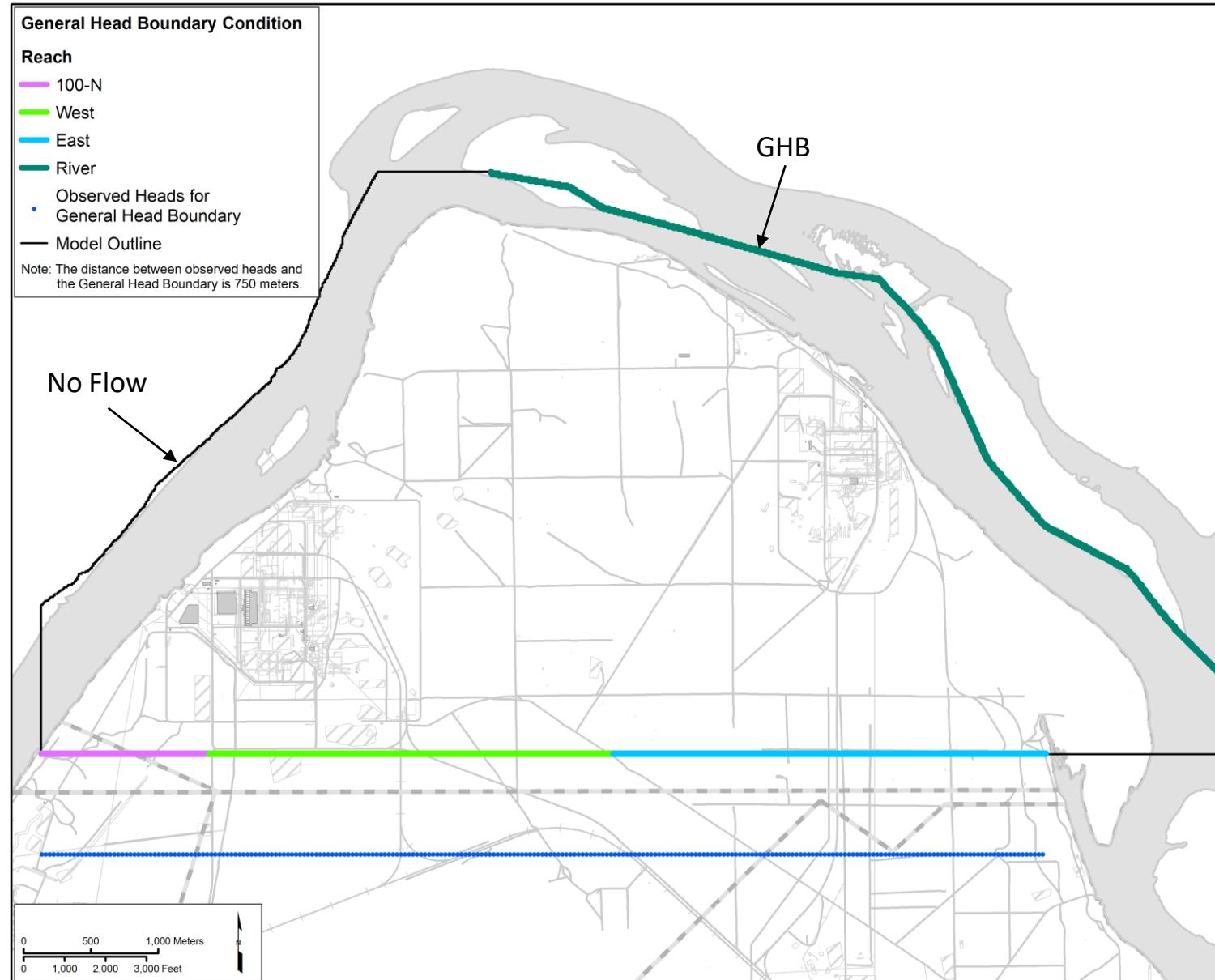
D = Set bottom of Lay 3 to Hanford surface; Layer 1, 2, 3 set to no flow

E? = Layer 1, 2, 3, 4 set to no flow



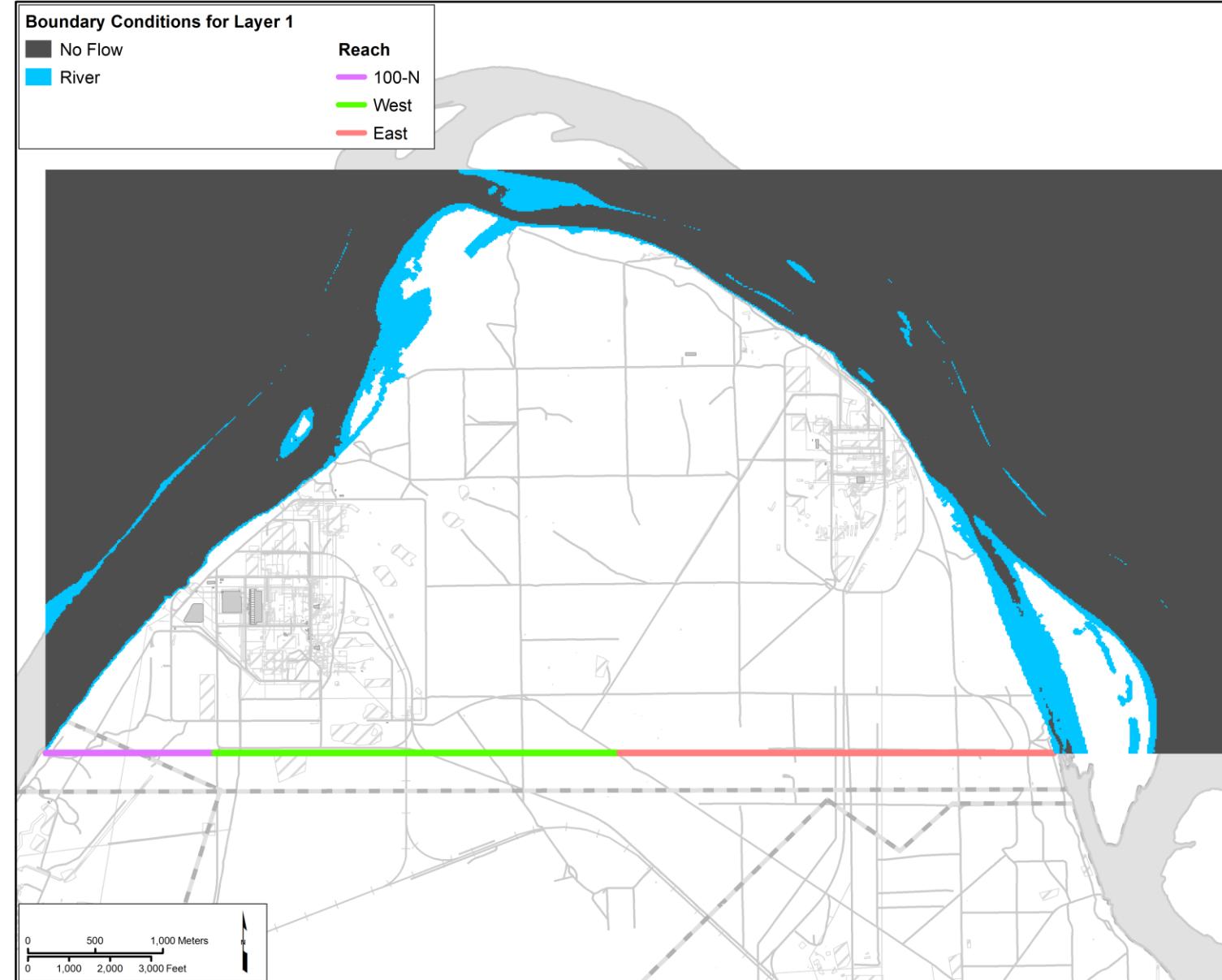
River Cell Check

- 1) The “River Bottom” is calculated for every row/col as the minimum elevation of the Hanford surface from immediately adjacent cells (+/- 1 row/col) including itself
- 2) If the maximum observed water level is greater than the River Bottom the first active layer is set as a river cell
- 3) If the River Bottom is below the bottom of the first active layer, then the River Bottom is set to 1 mm above bottom of that layer and the layer below is also set to a river BC. Repeat until River Bottom is above bottom of layer
- 4) If in any given stress period the river stage drops below the River Bottom then the stage is set to 0.01 mm above the River Bottom and the drain conductance is used

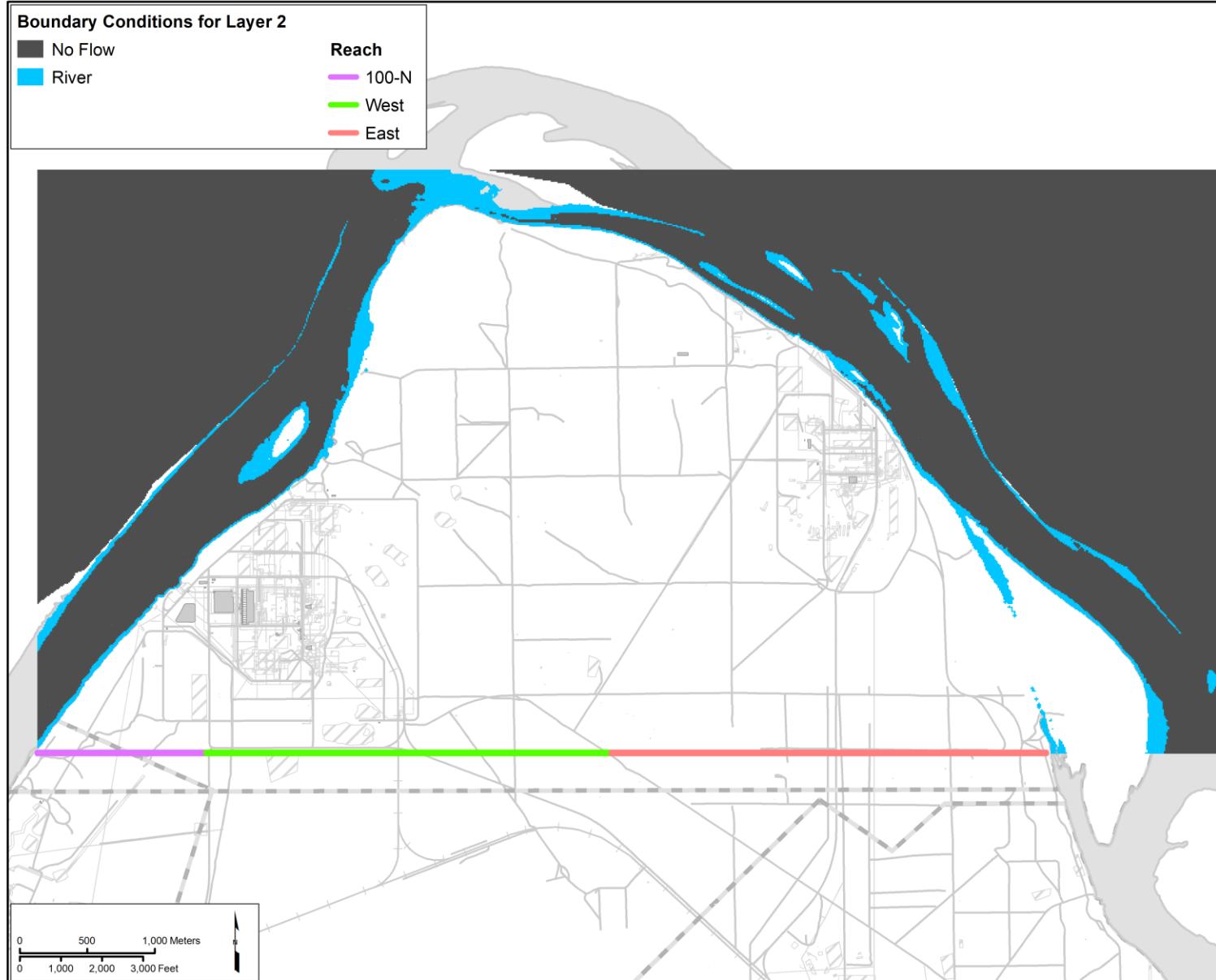


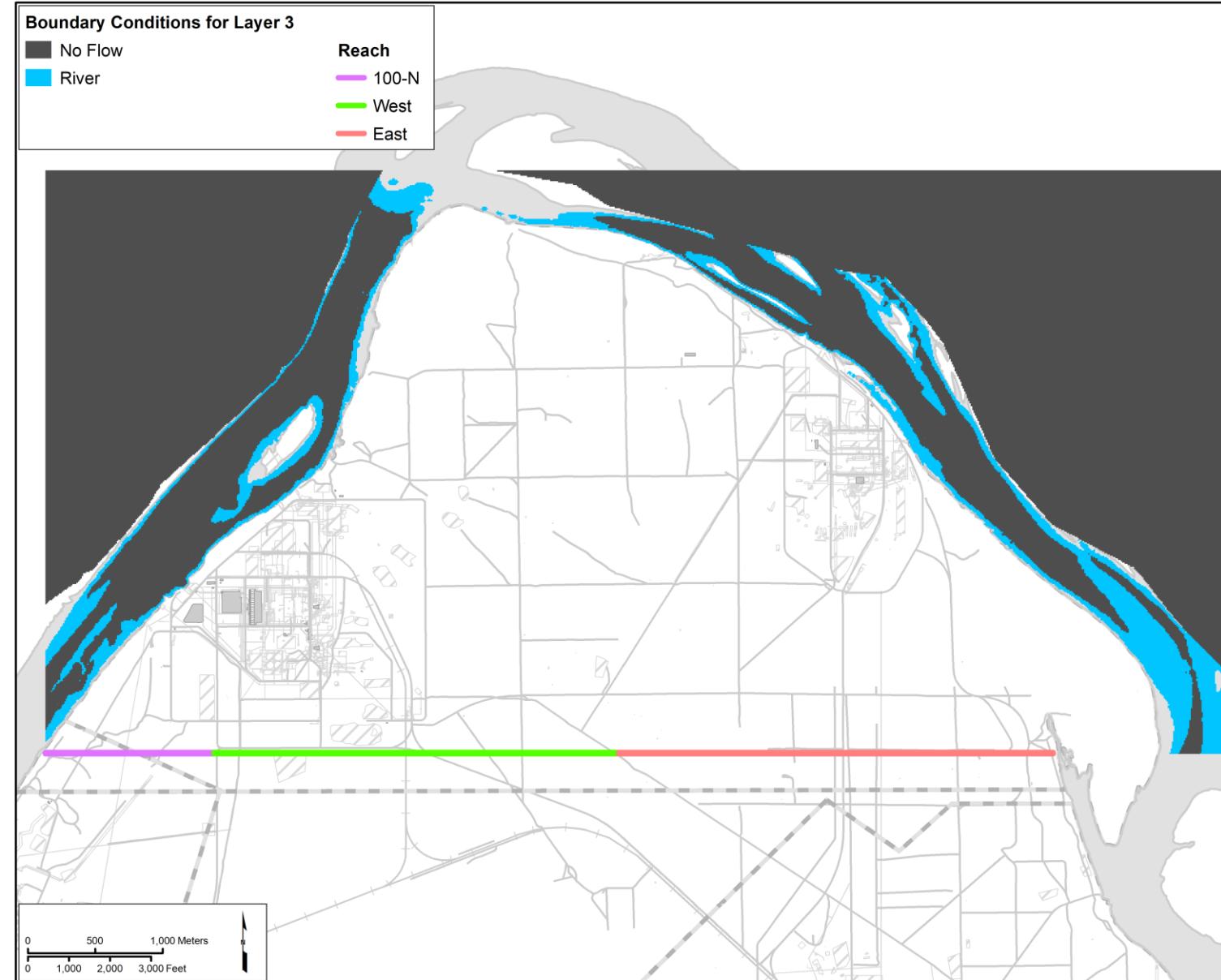
Boundary Conditions

Layer 1

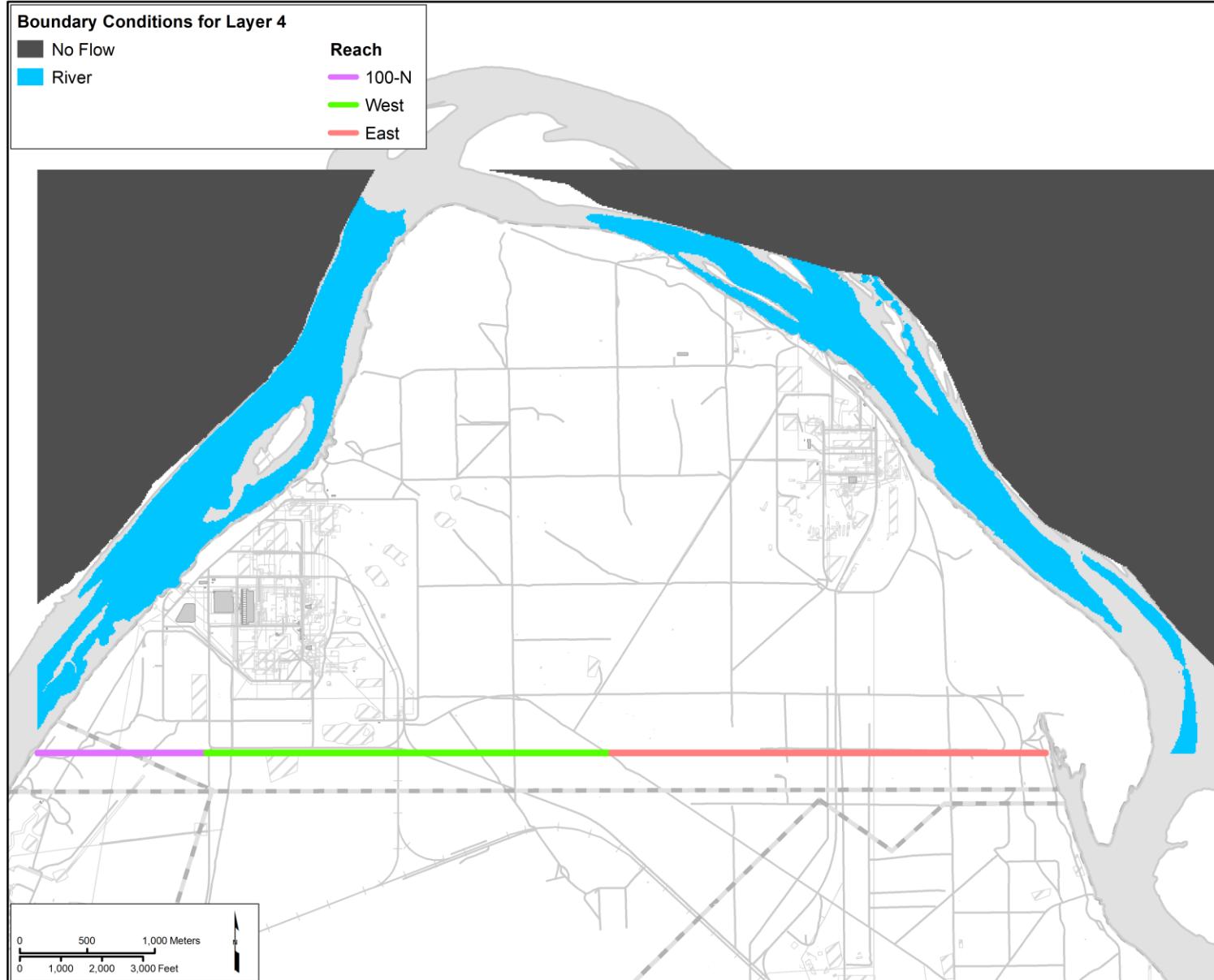


Boundary Conditions | Layer 2

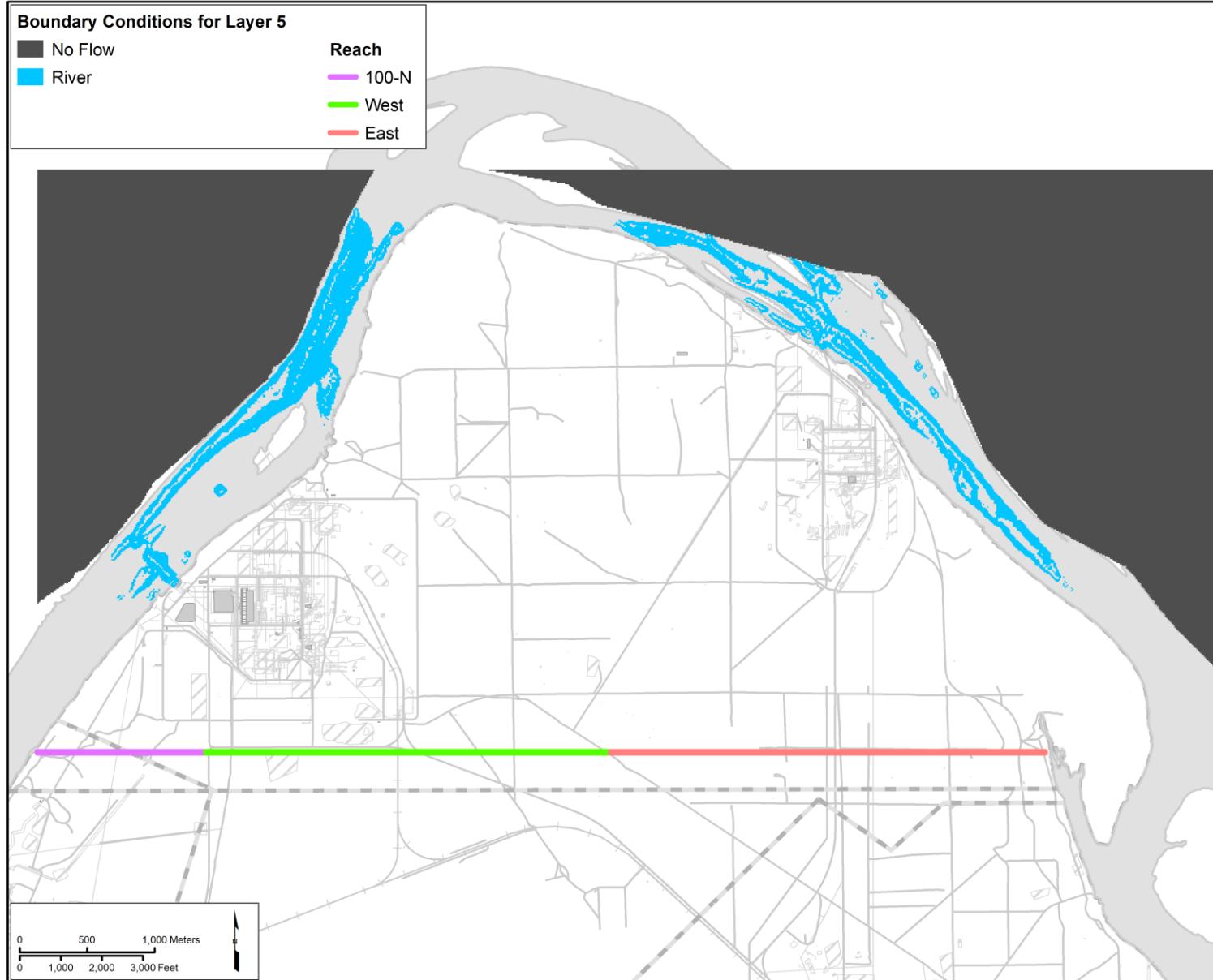


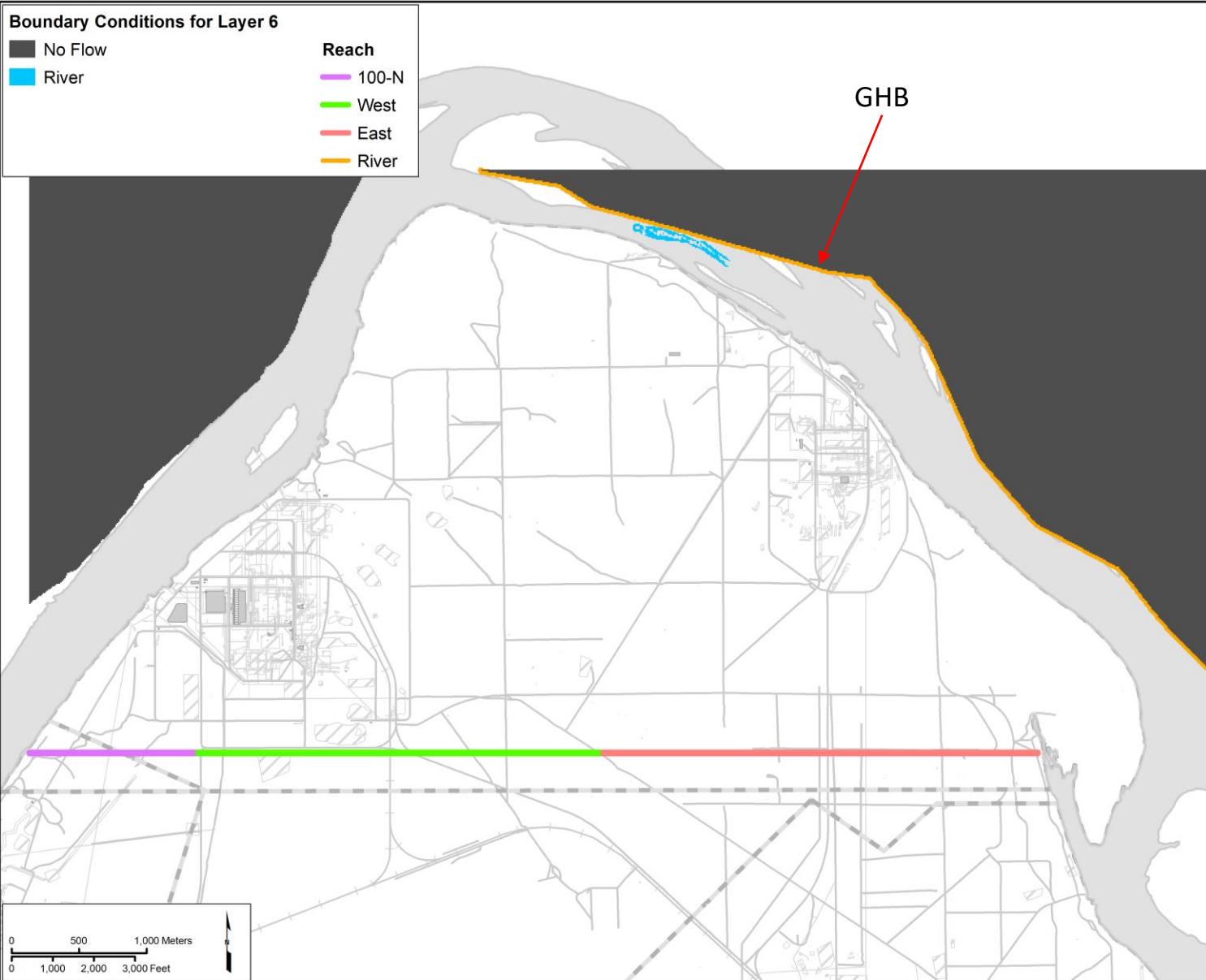


Boundary Conditions | Layer 4



Boundary Conditions | Layer 5

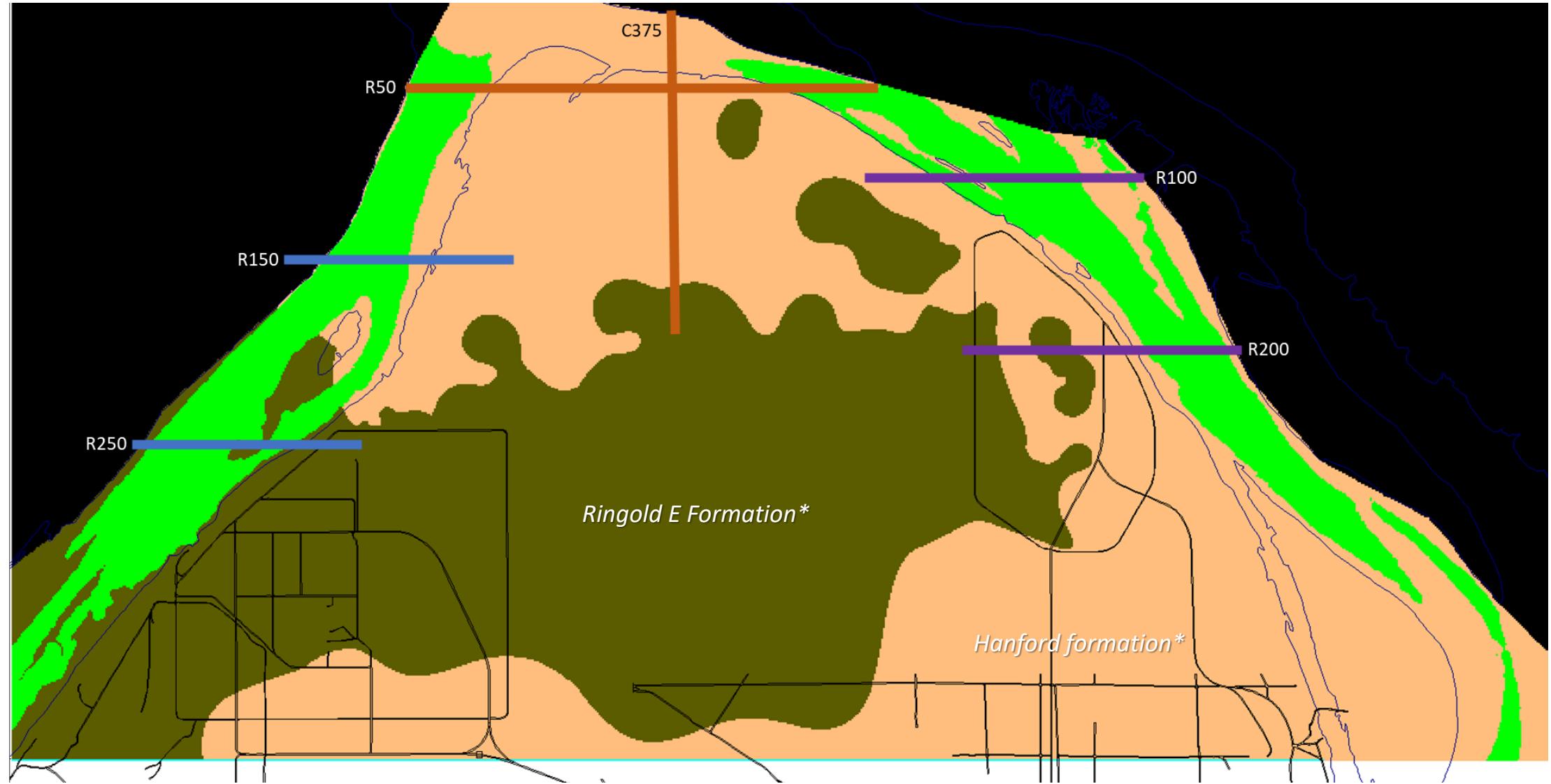




Note:

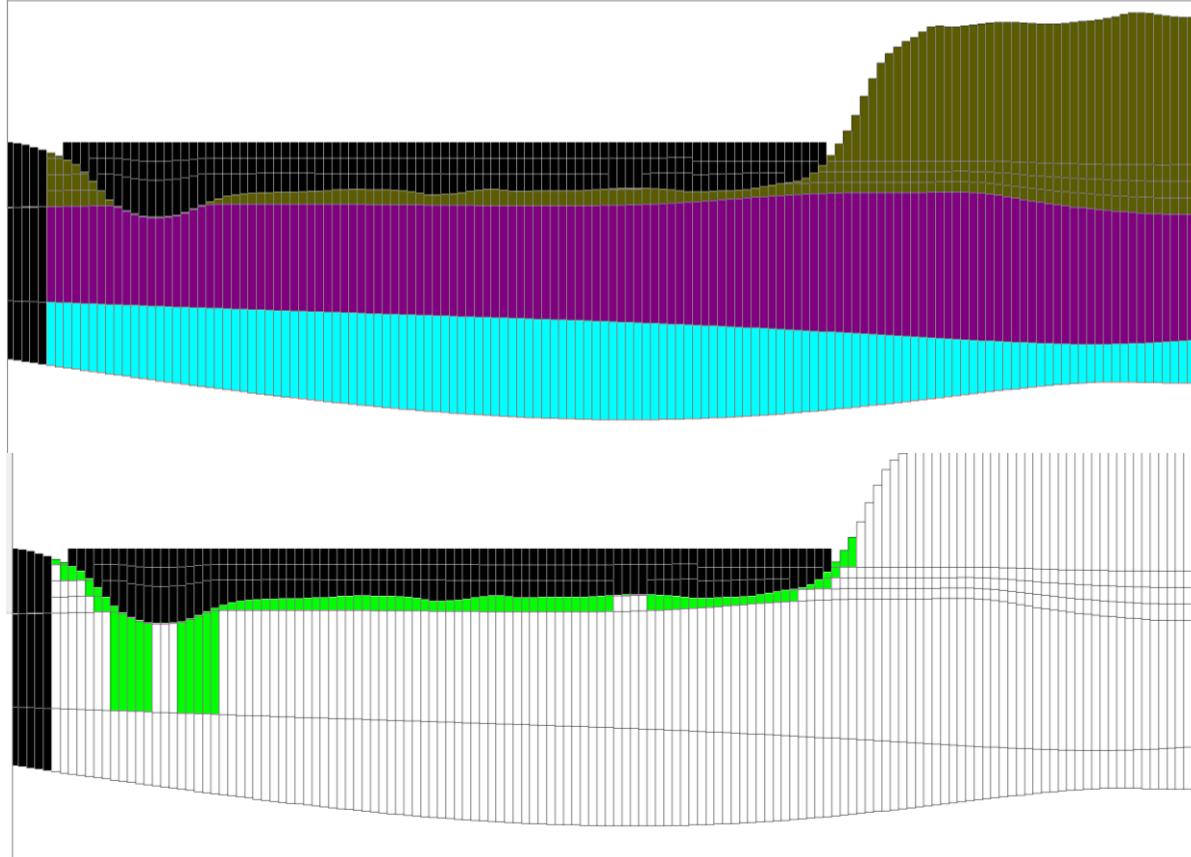
Model Domain Outline:

- No-Flow in Model Version 1
- GHB in Model Version 2

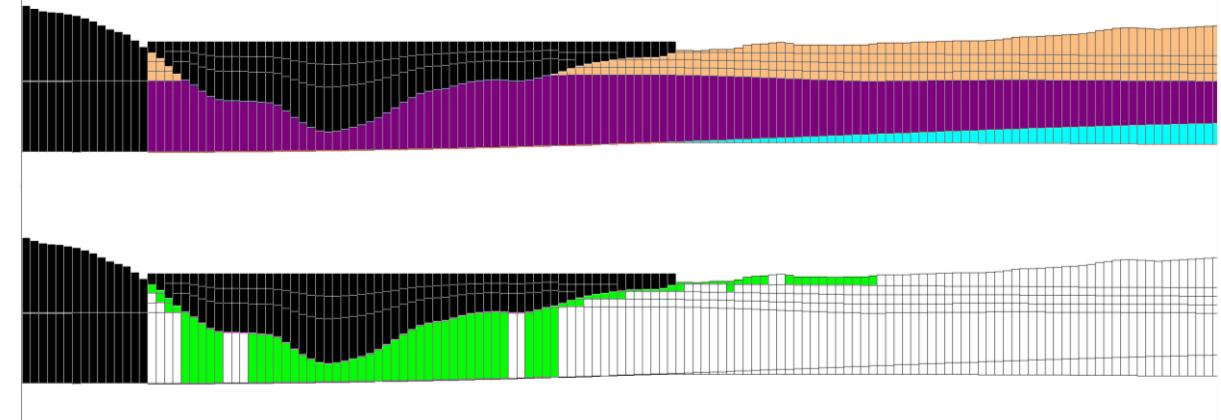


* Hanford and Ringold zones based on GFM delineations

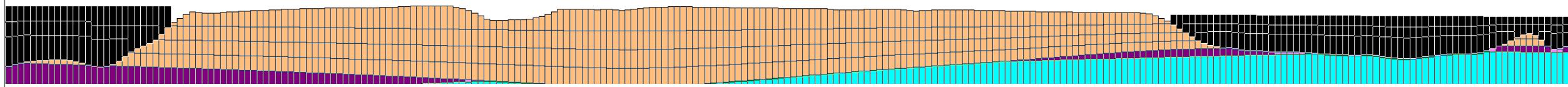
Row 250



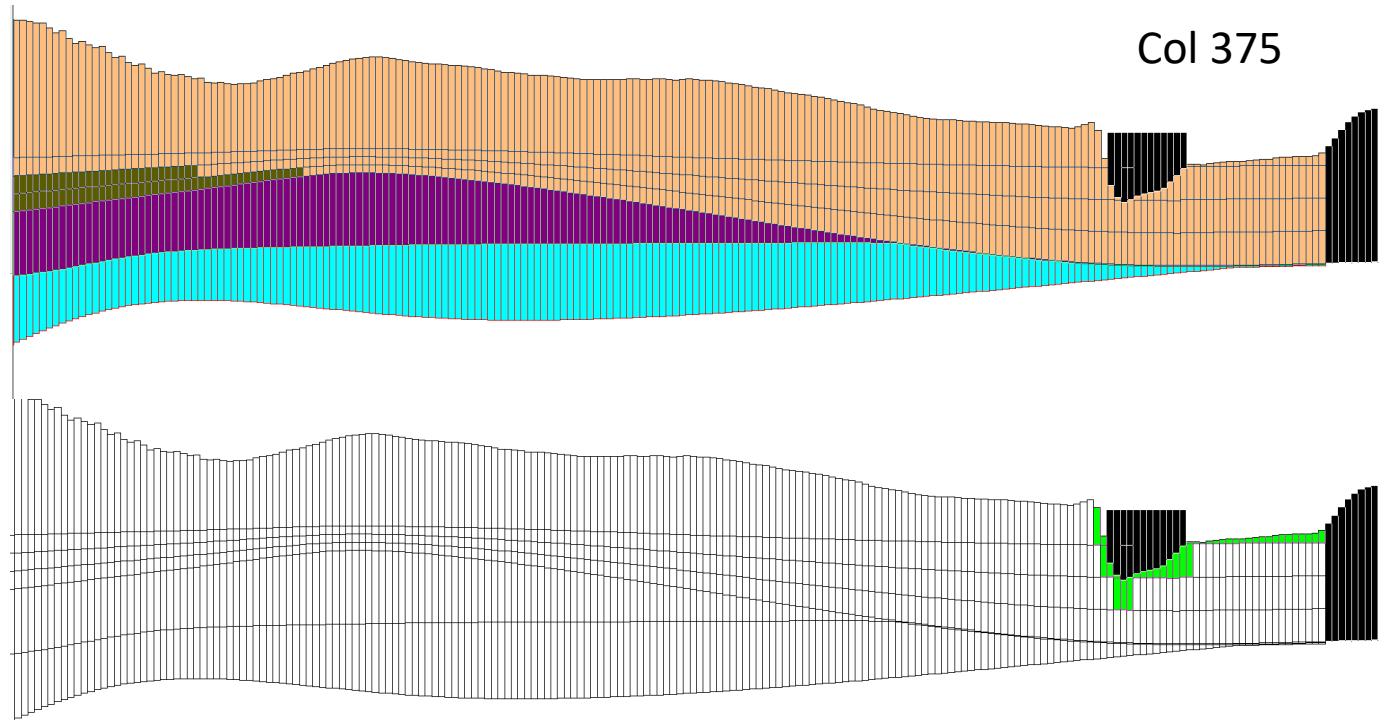
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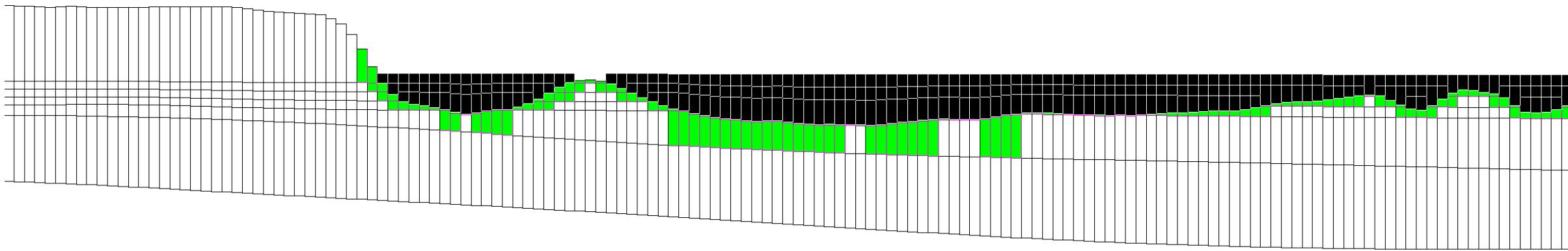
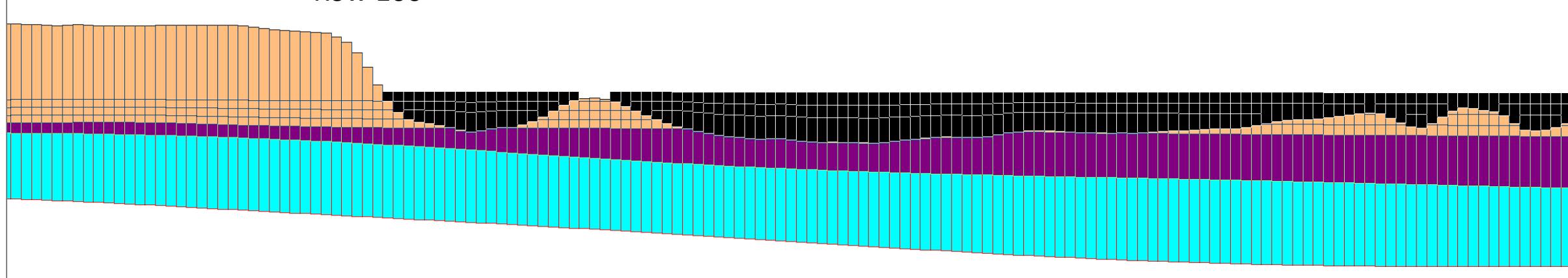
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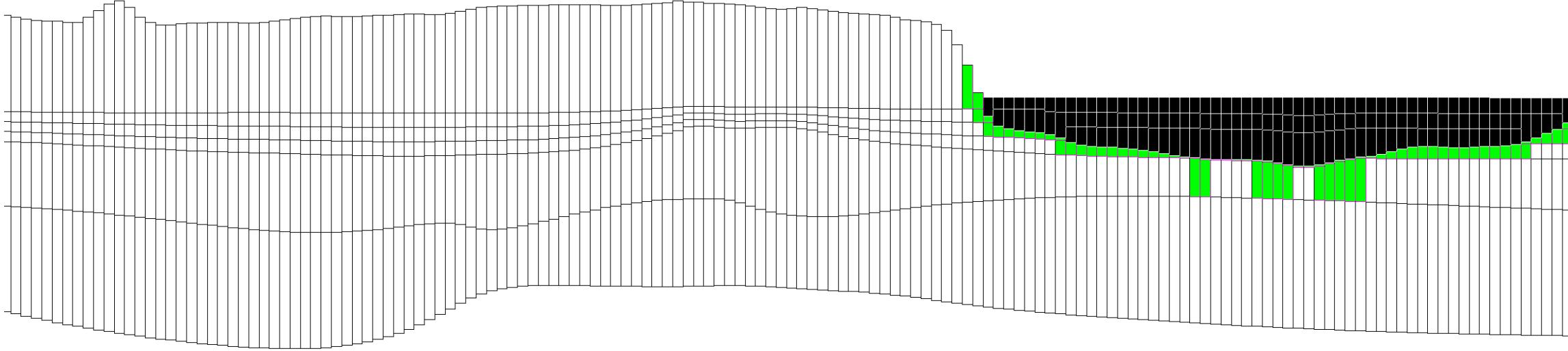
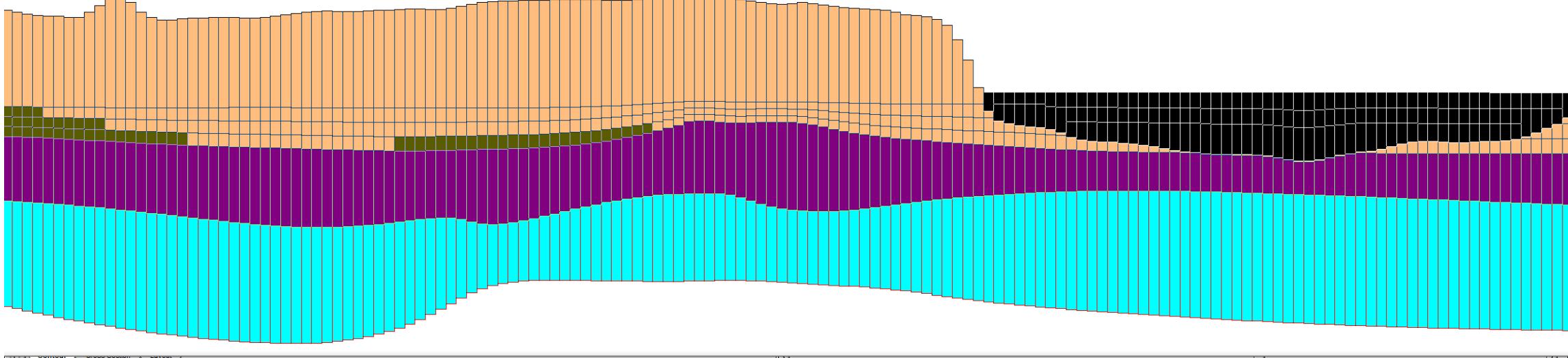
Col 375



Row 100

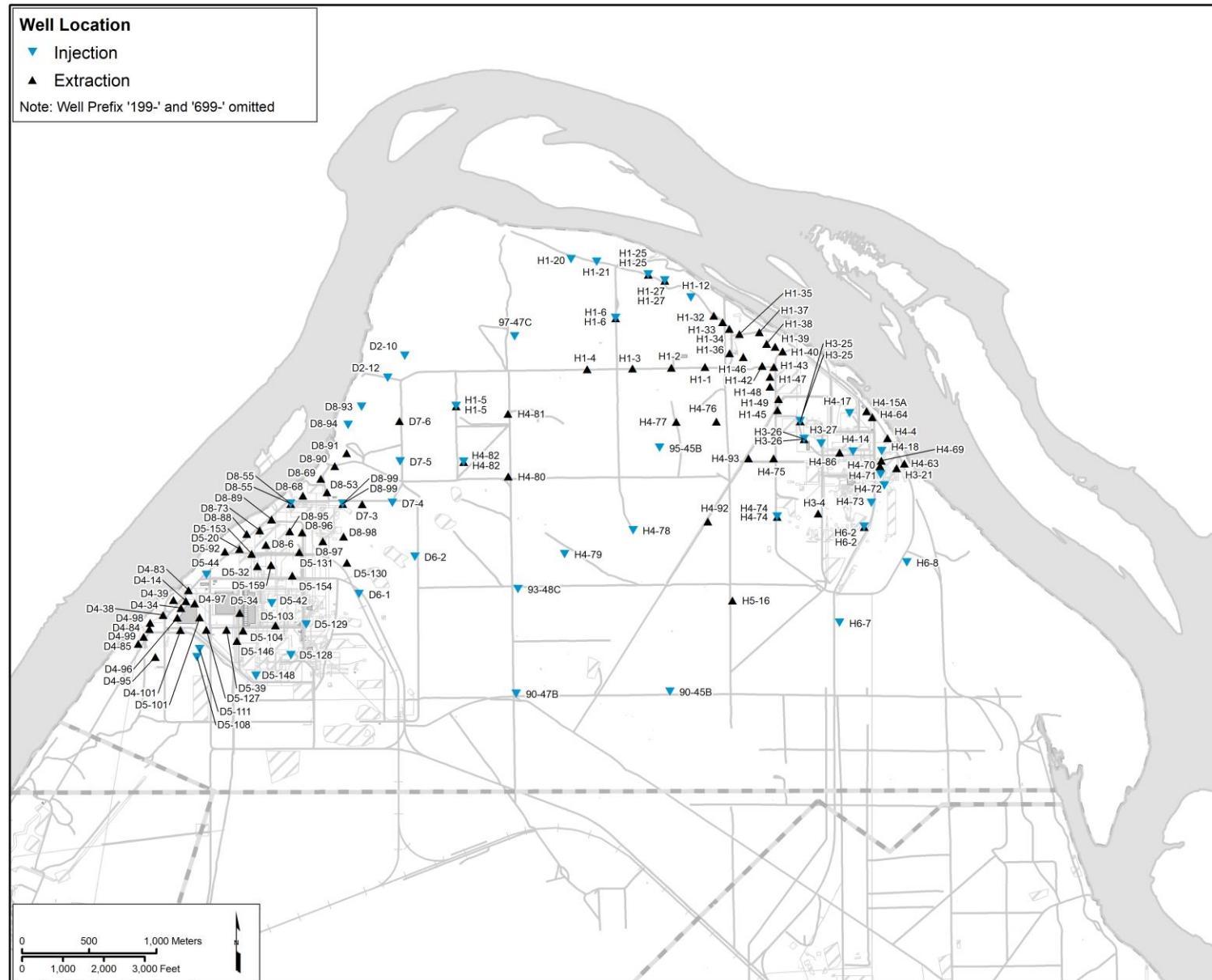


Row 200



Boundary Conditions

P&T Wells – Unconfined Aquifer



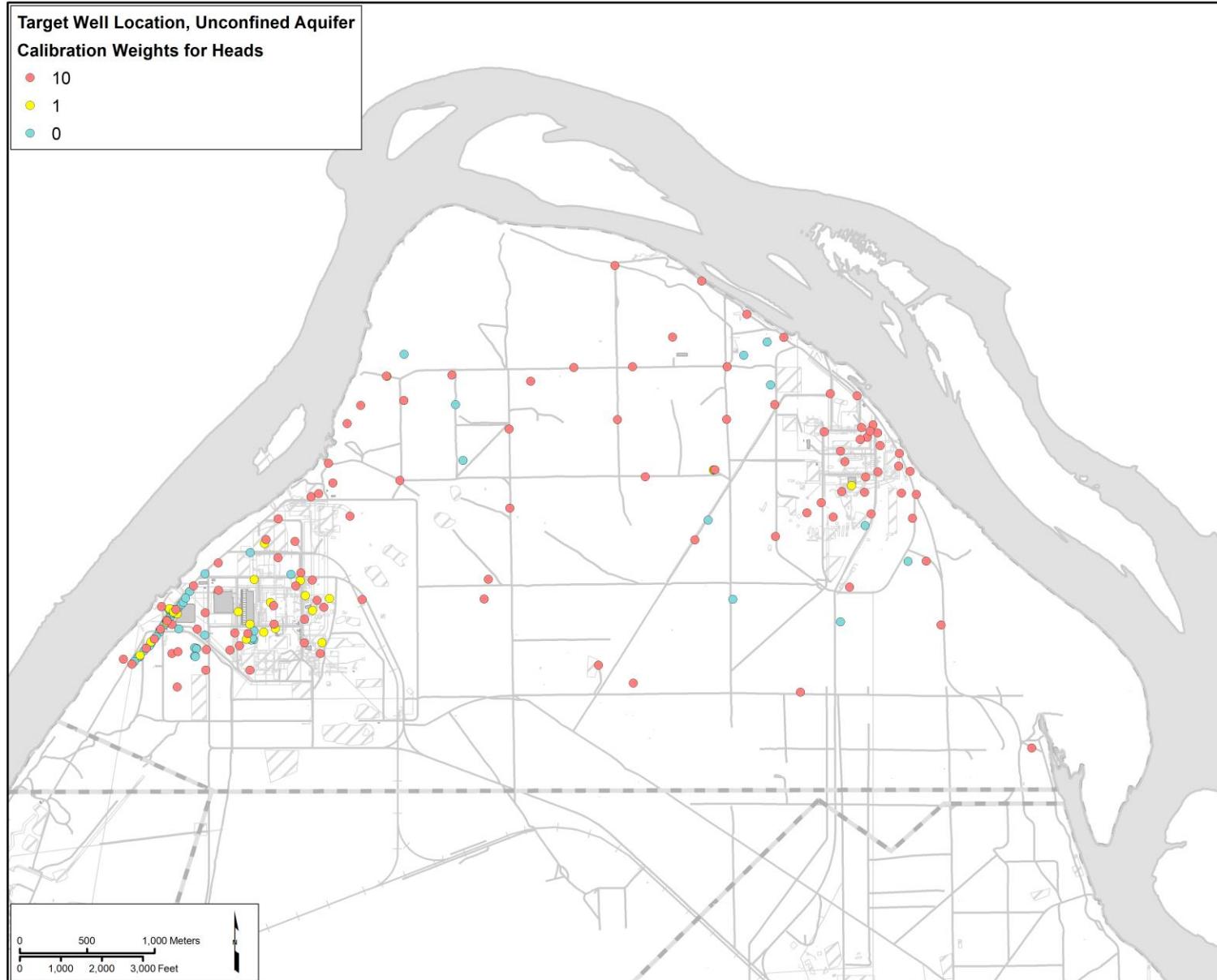
Boundary Conditions

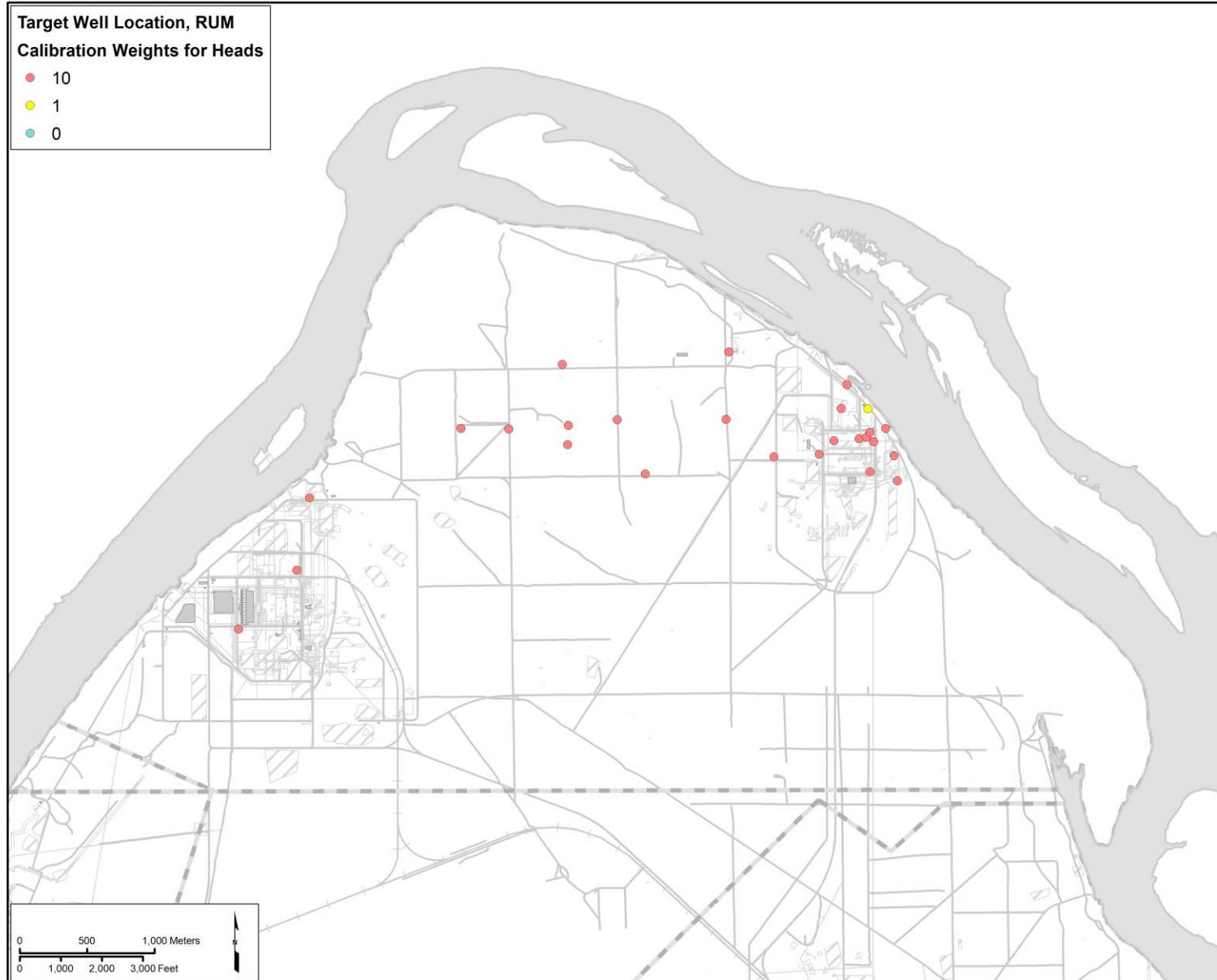
P&T Wells – RUM

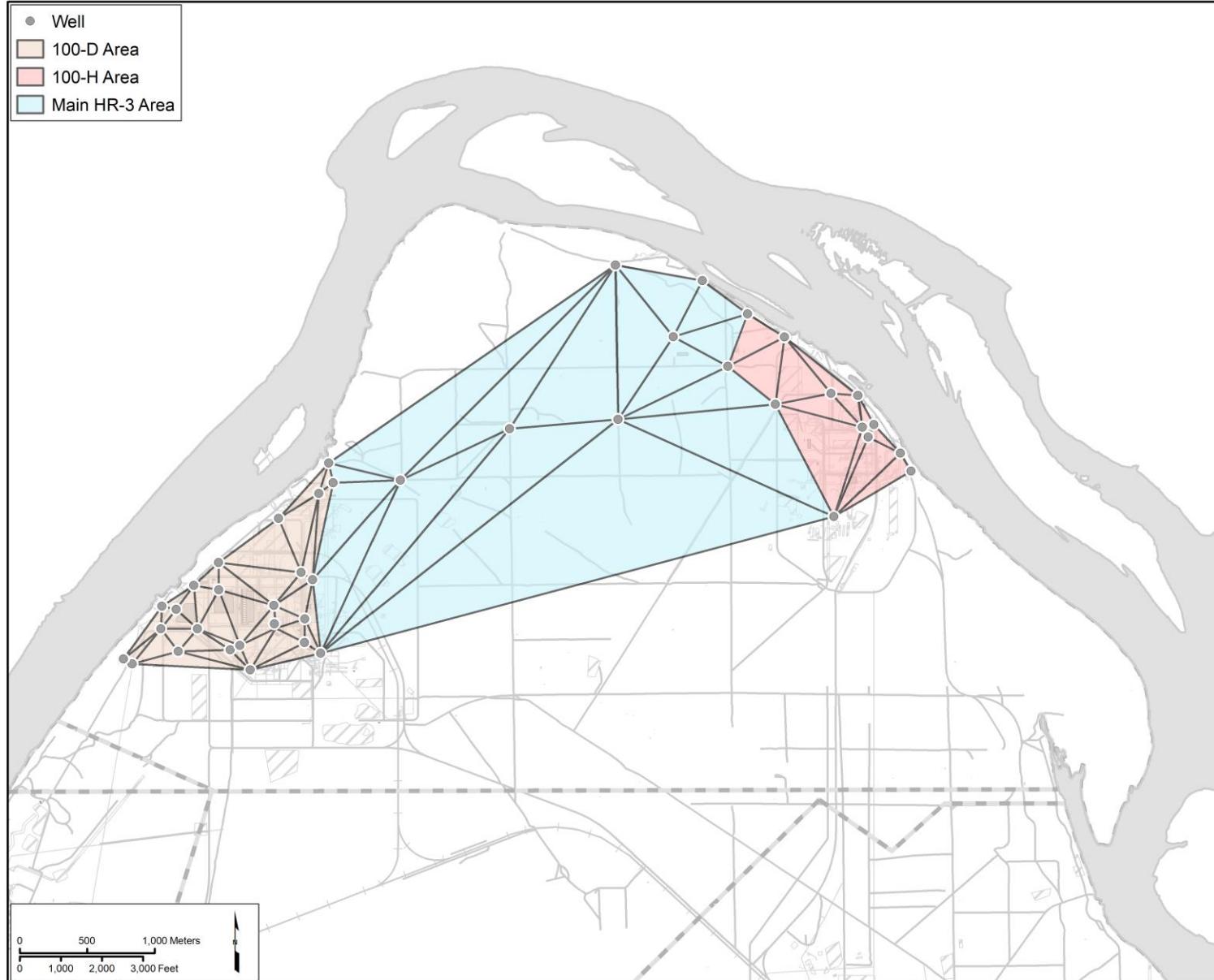
▲ Extraction (RUM)

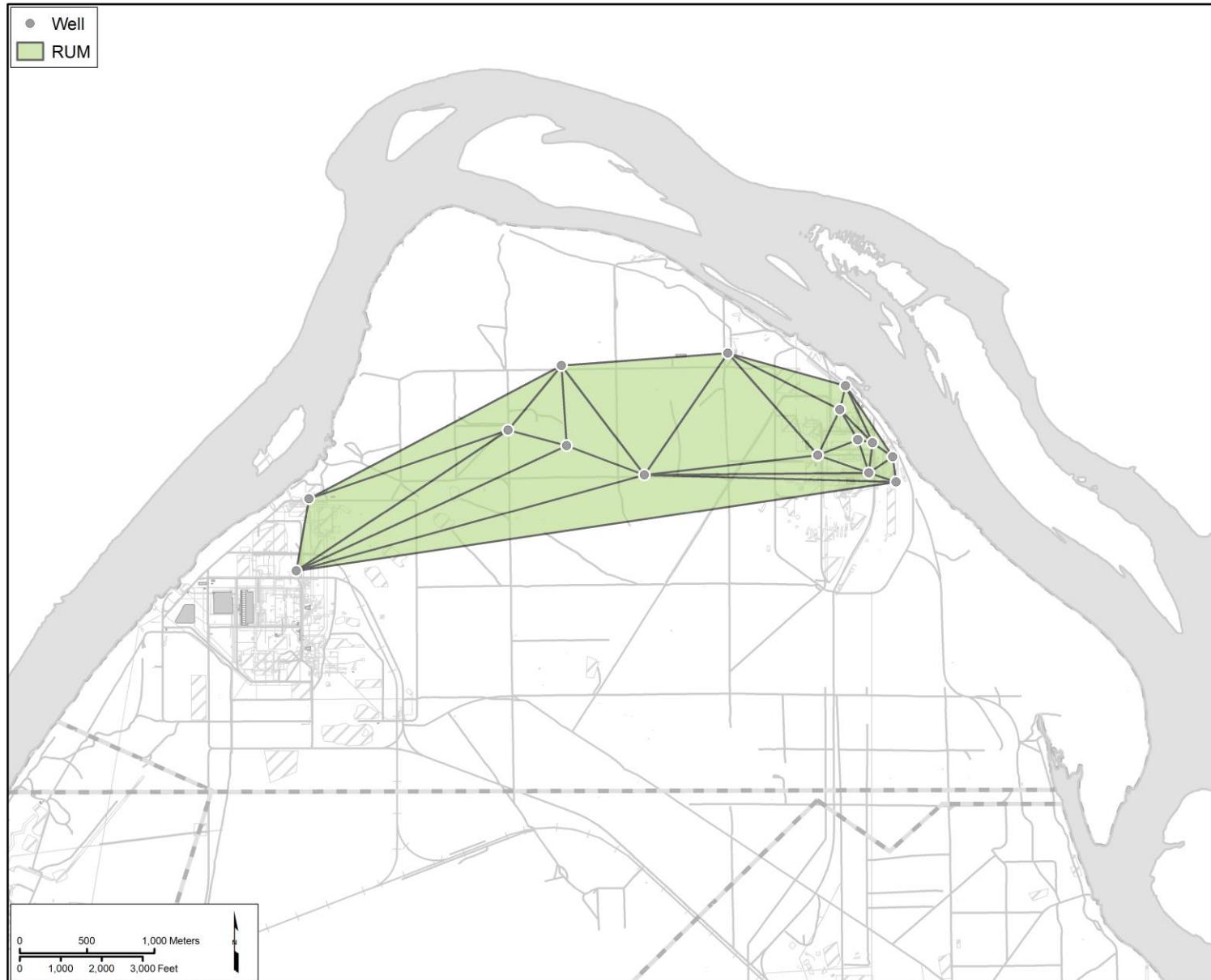
Empty For Wells Prefix Note Note: Well Prefix '199-' and '699-' omitted

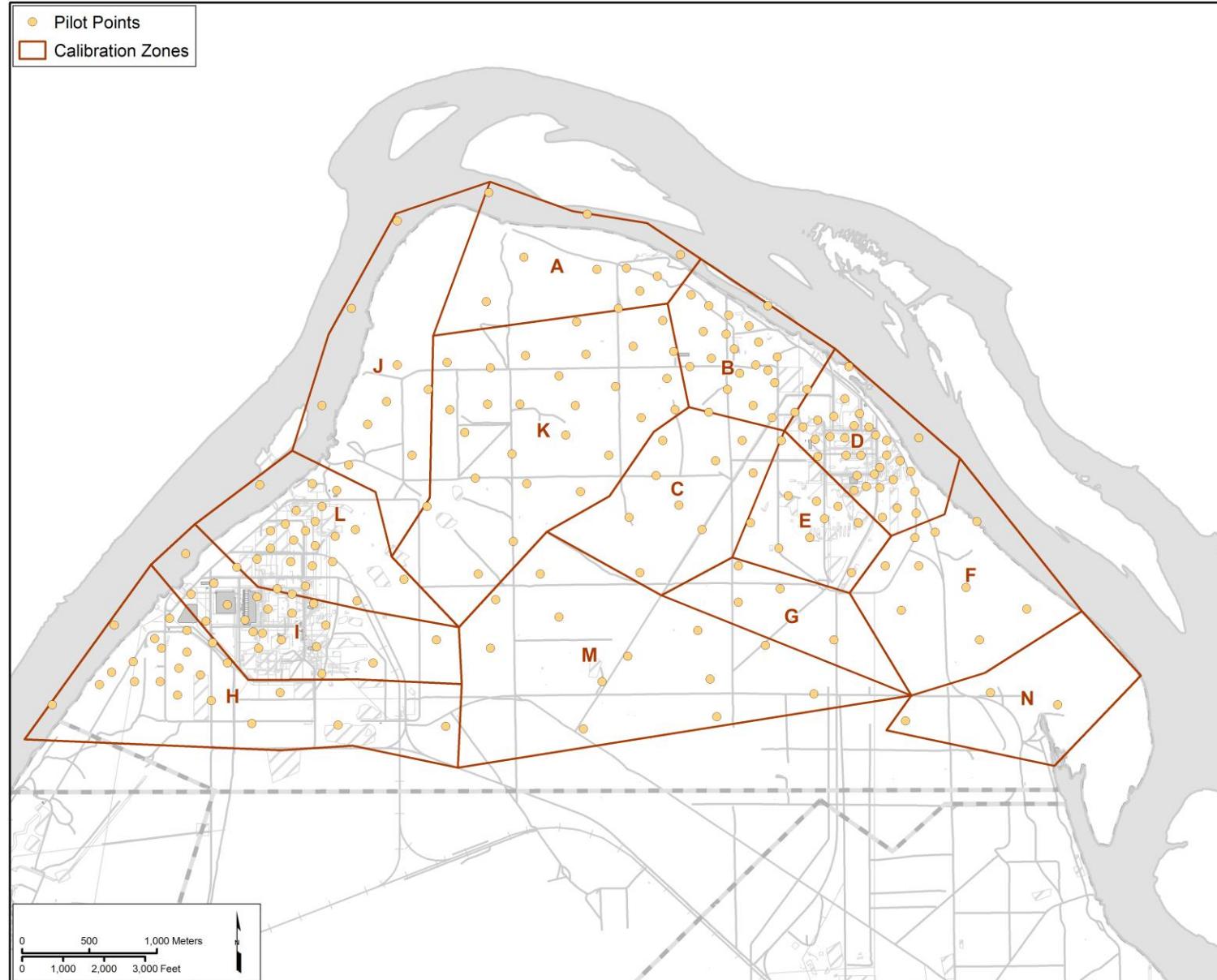


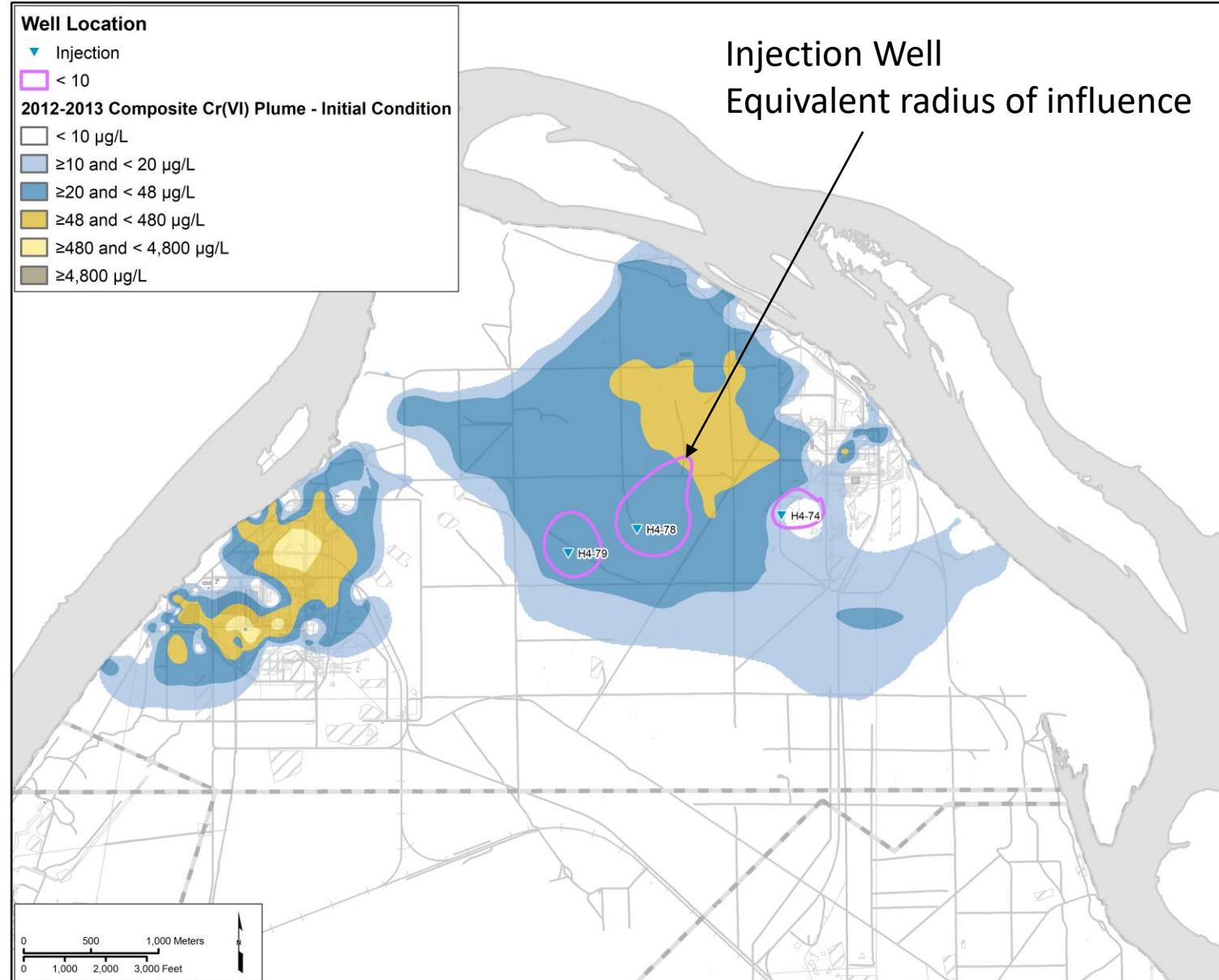


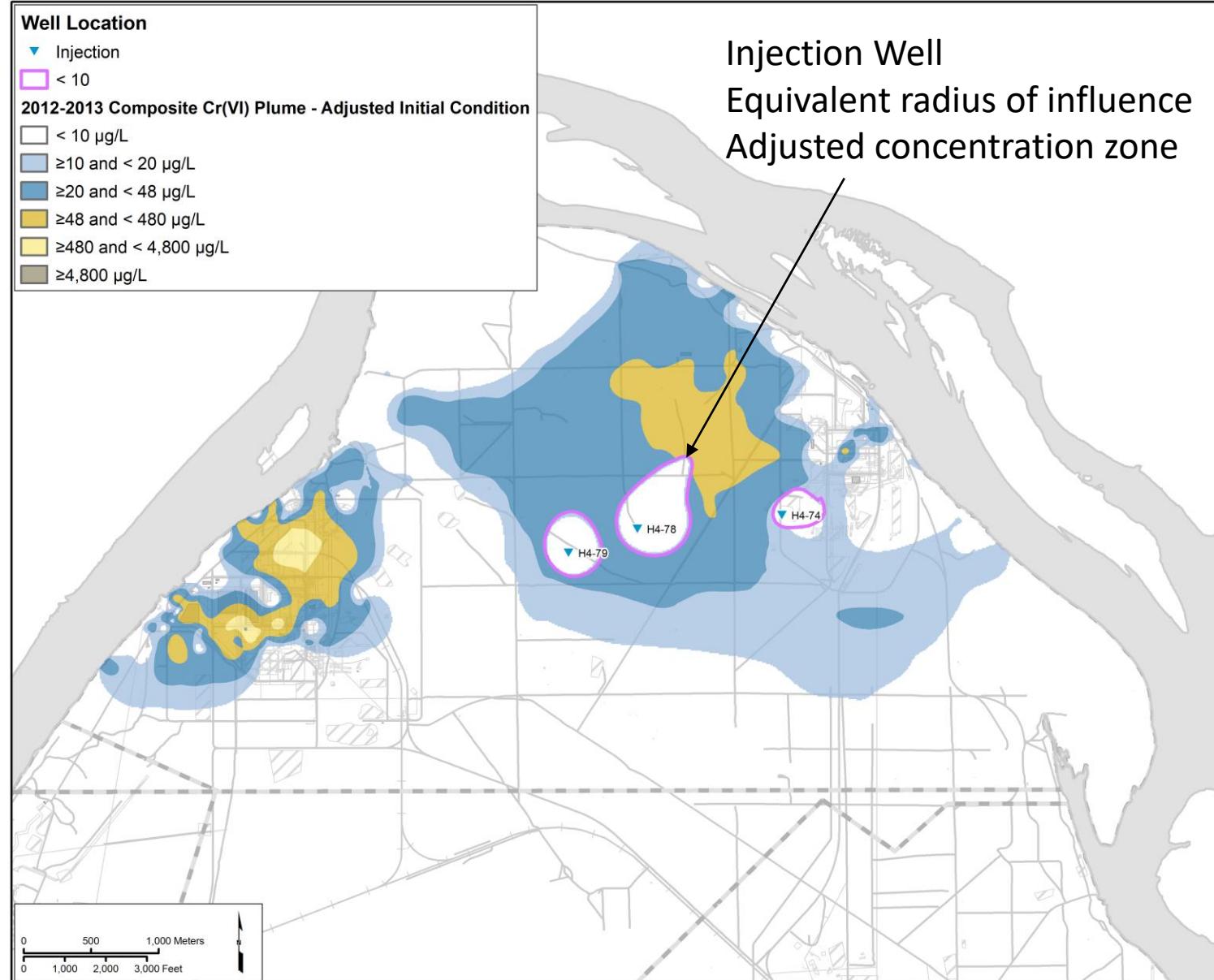


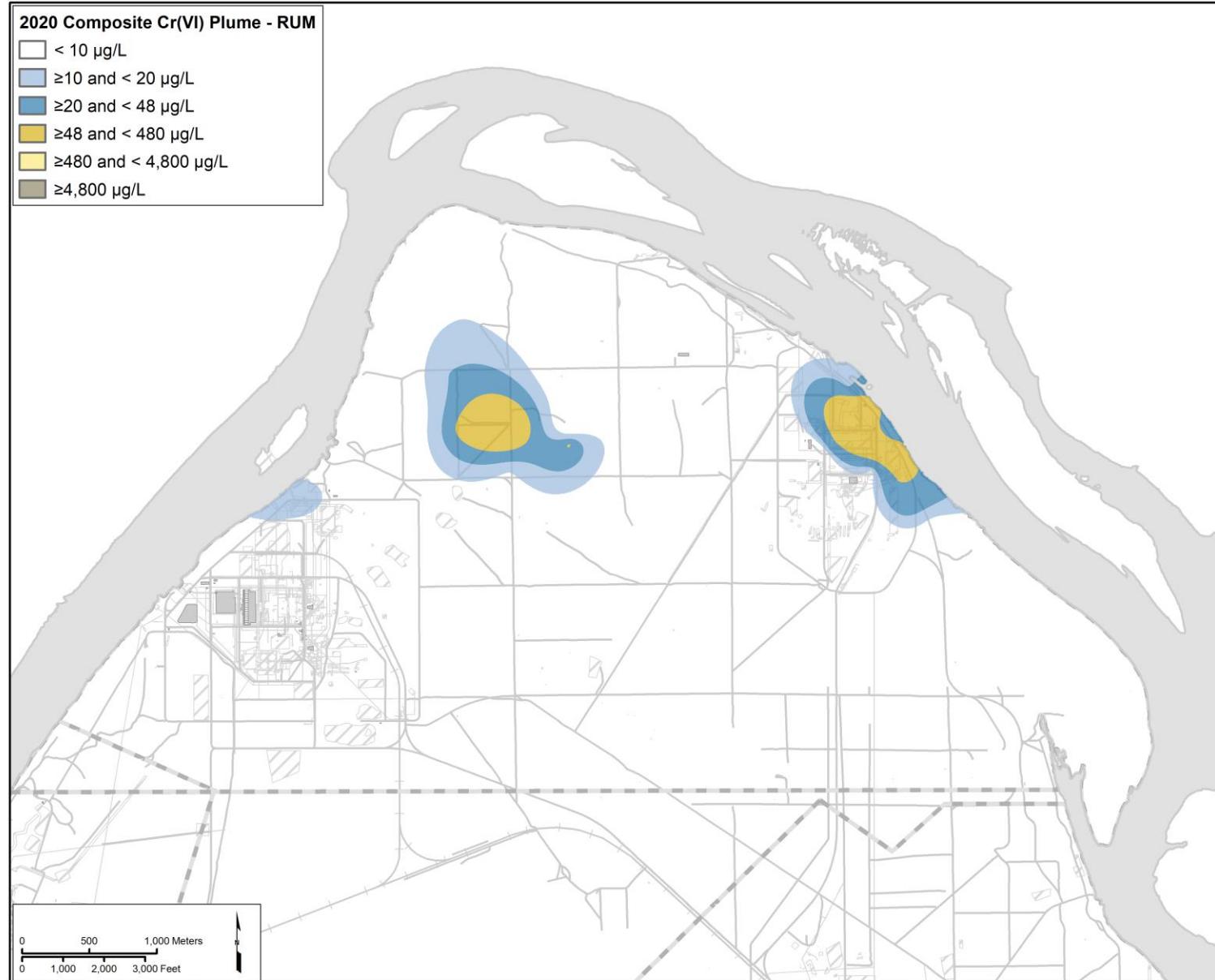






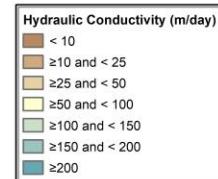
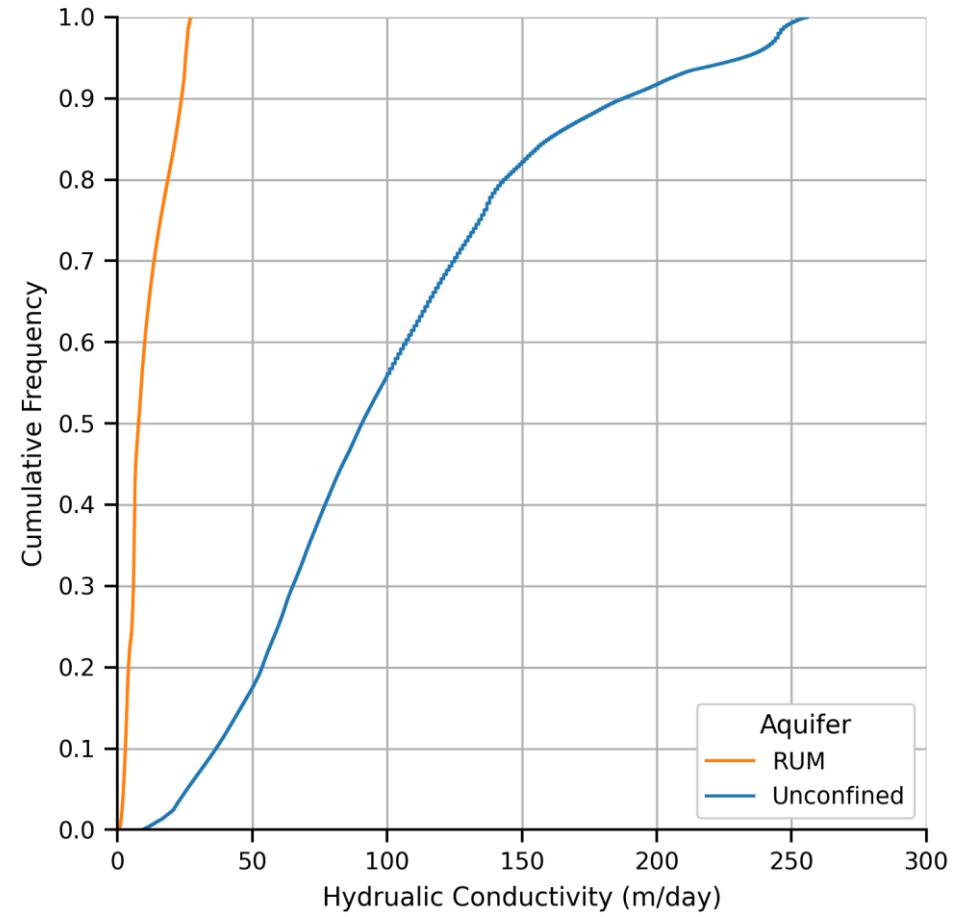




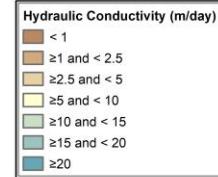
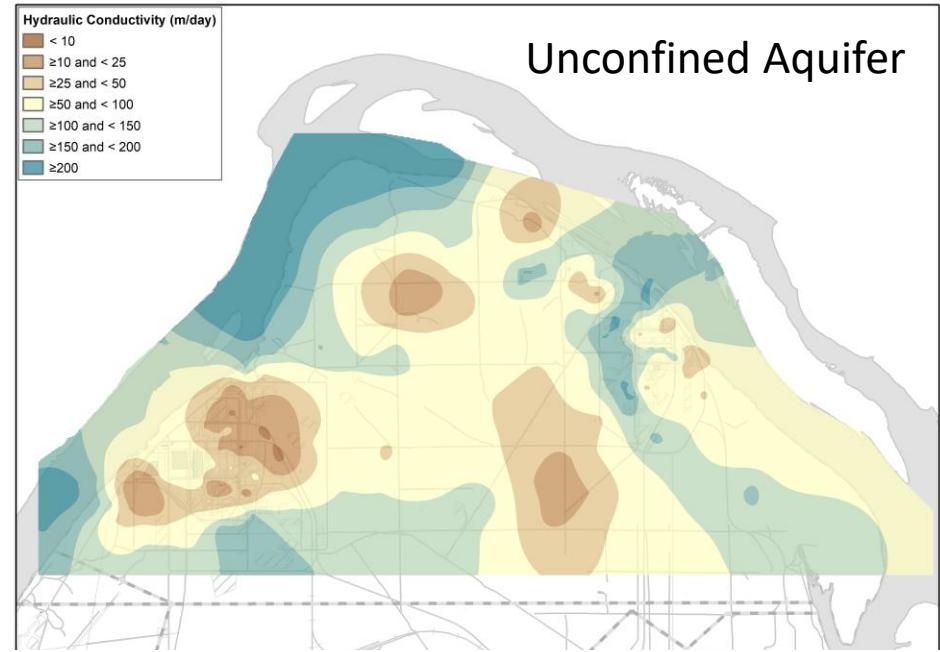


Model Hydraulic Properties

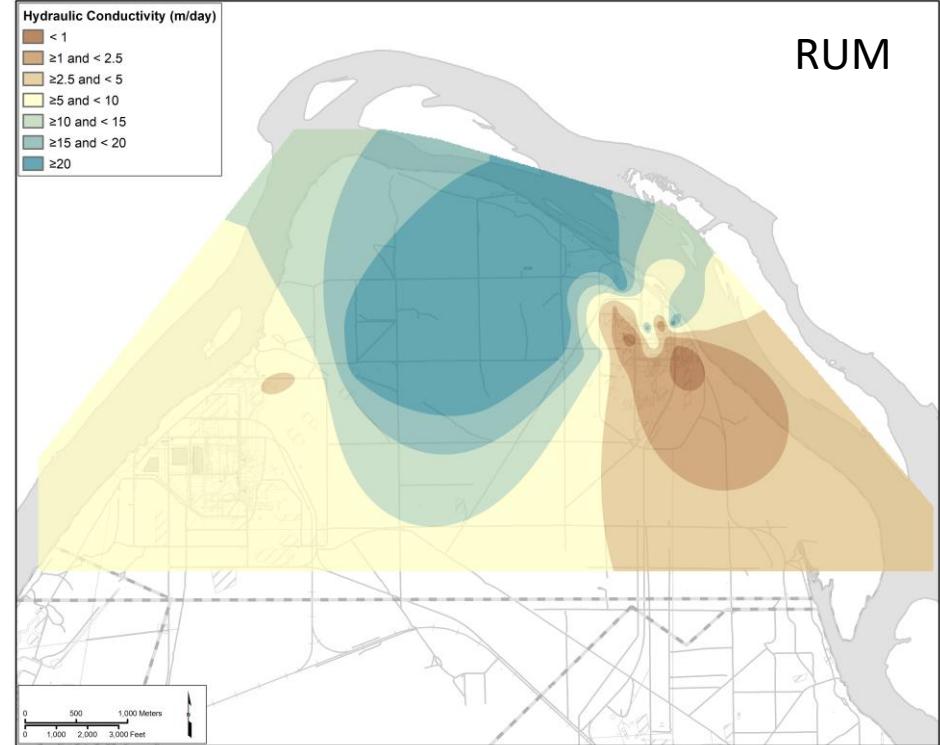
Hydraulic Conductivity

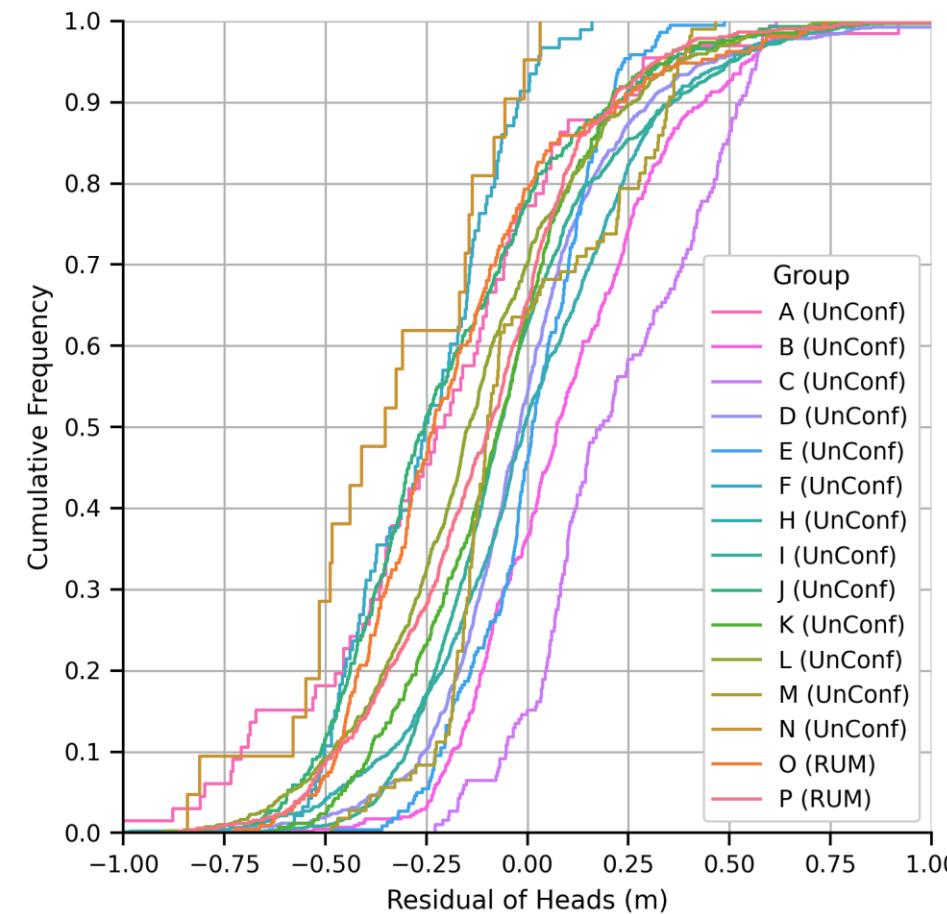


Unconfined Aquifer

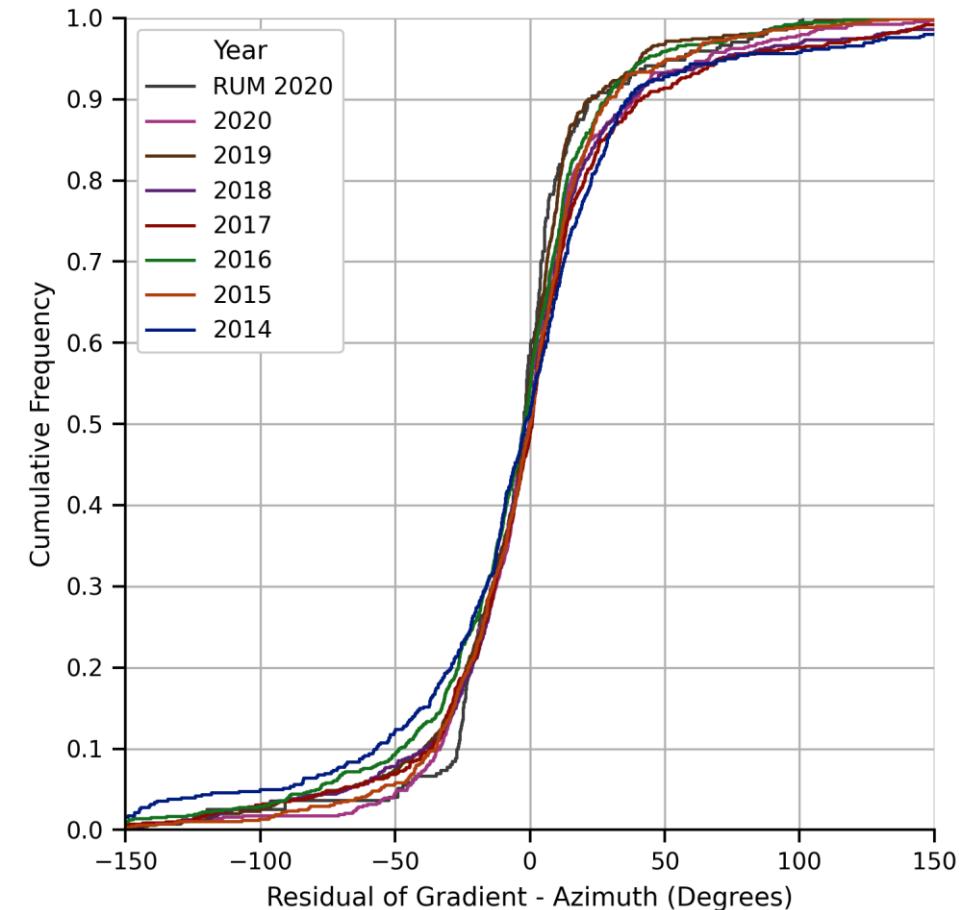
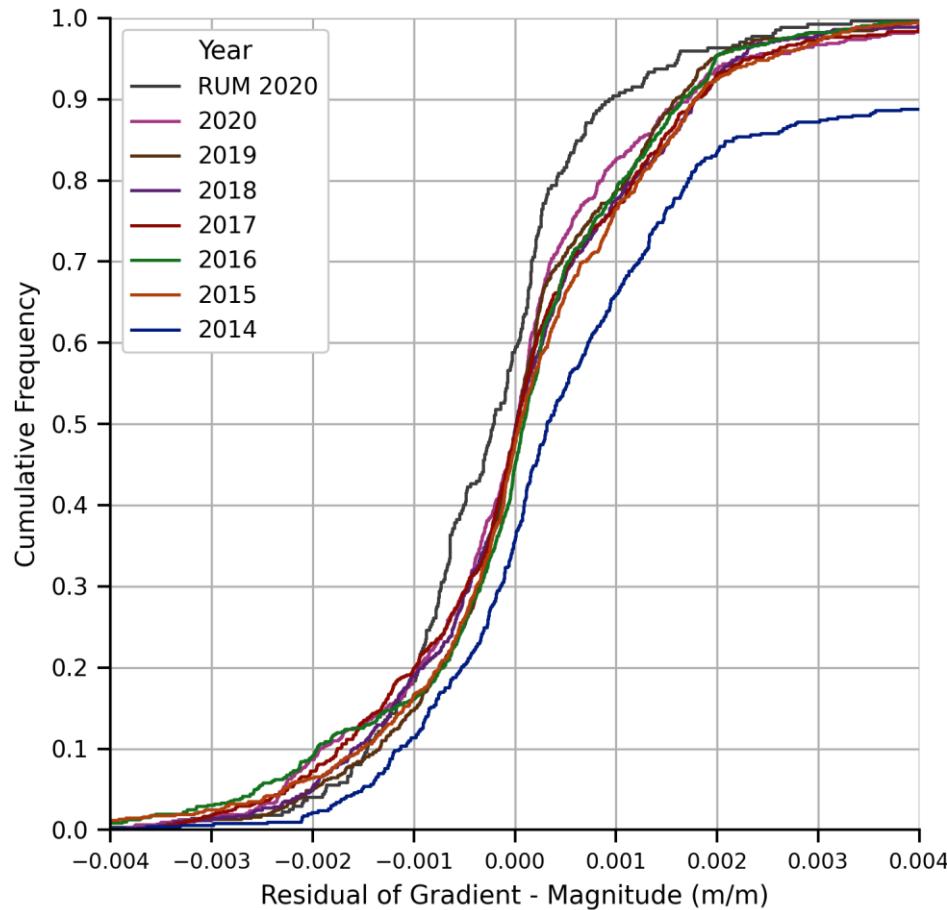


RUM





Hydrograph Files:
RES_RUM_GHB.xlsx



Gradient Files:
Gradient_PlotsYYYY.pdf