

Using a 2D Model to Teach How and Why Watersheds Flood



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Grid_Flow_Surf_2019

Export: NetLogo

model speed

ticks: 0

Setup

Go

Step

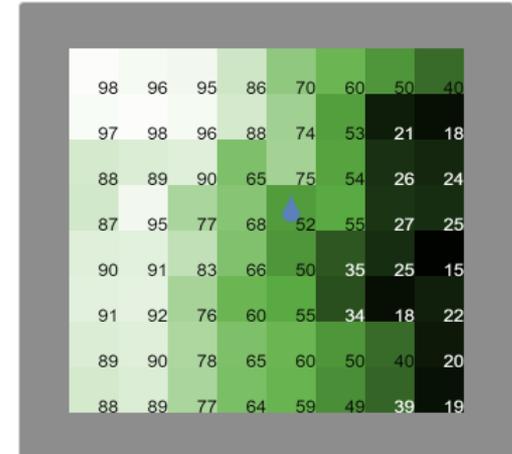
Place-water-randomly?

num-drops 1

Record-pathways?

Leave-pathways?

Diagonal-longer?



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Floorlandia – Grid of Elevations

	A	B	C	D	E	F	G	H	I	J
1										
2		98	96	95	86	70	60	50	40	
3		97	98	96	88	74	53	21	18	
4		88	89	90	65	75	54	26	24	
5		87	95	77	68	52	55	27	25	
6		90	91	83	66	50	35	25	15	
7		91	92	76	60	55	34	18	22	
8		89	90	78	65	60	50	40	20	
9		88	89	77	64	59	49	39	19	
10										

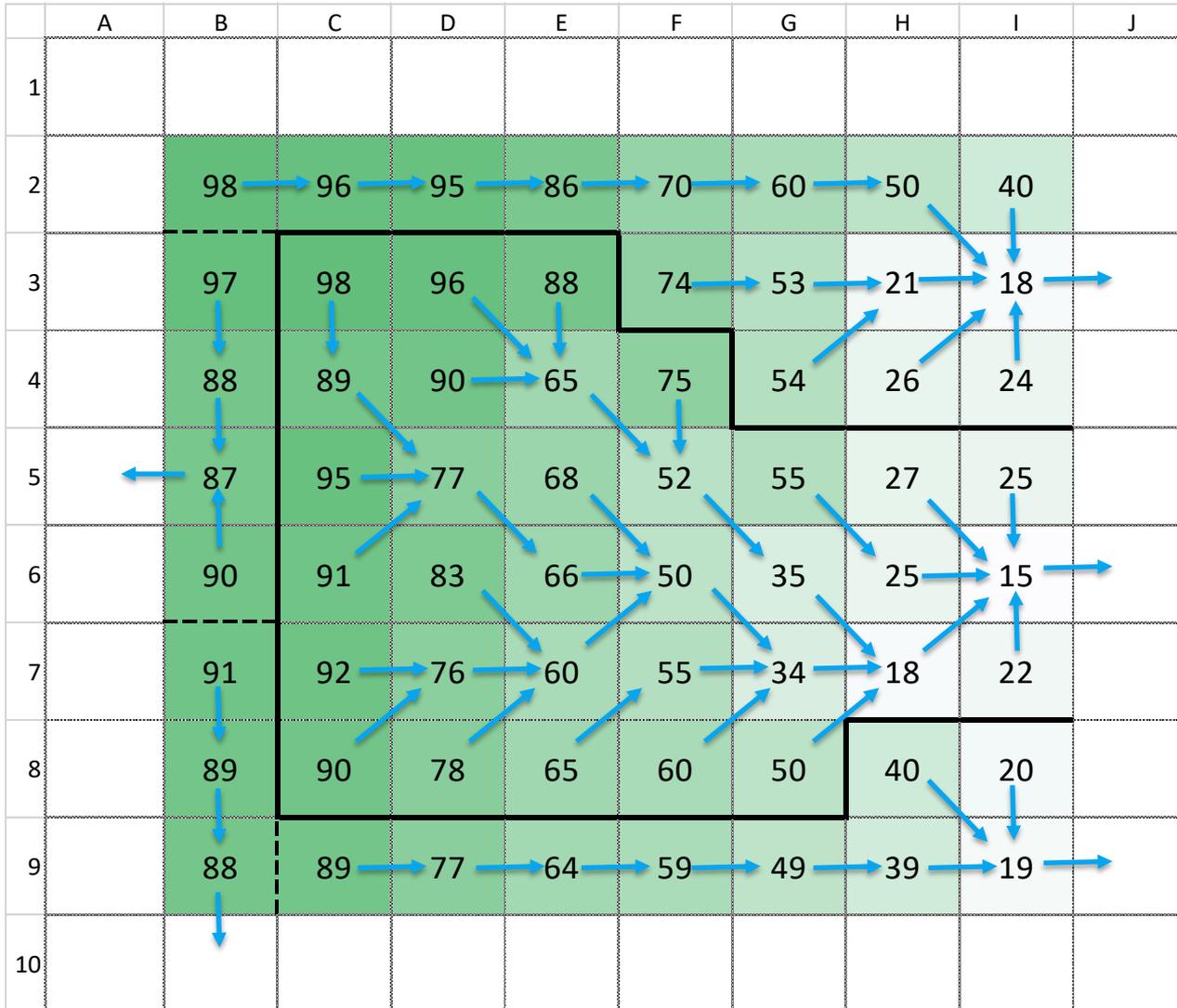
Your assignment:

1. Figure out 'lay of the land' – high & low areas
2. Trace path of a water droplet falling on a hi cell
3. Trace paths of droplets falling on all cells 😊

Reflection questions:

1. What rules did you use to govern water flow?
2. Can you identify watershed boundaries in the grid?
3. If you measured the number of water droplets leaving the watershed(s) in the grid with each time step following a simulated rain of one drop per grid, what would the graph look like?

Floorlandia – Grid of Elevations



Reflection questions:

1. What rules did you use to govern water flow?

- Lowest point
- One 'move' per time step
- Diagonals, boundaries

2. Can you identify watershed boundaries in the grid?

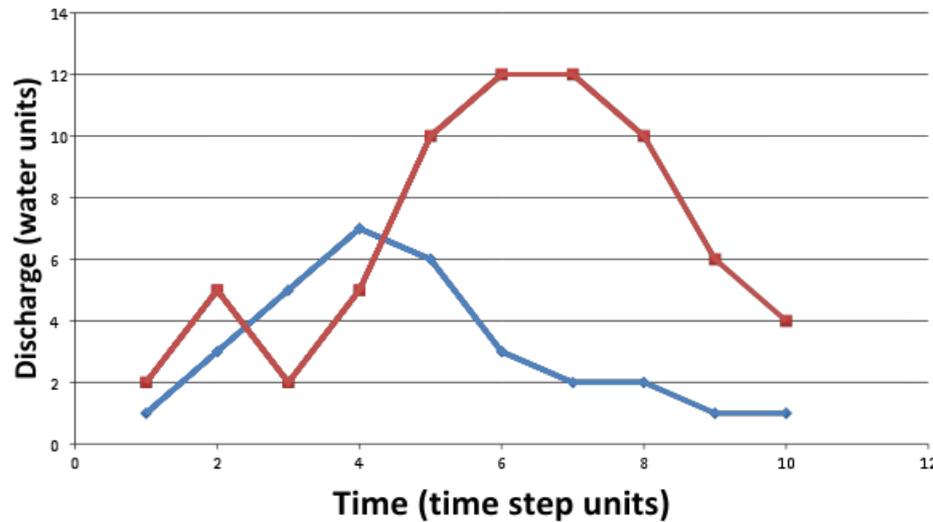
- 5 watersheds!

3. If you measured the number of water droplets leaving the watershed(s) in the grid with each time step following a simulated rain of one drop per grid, what would the graph look like?

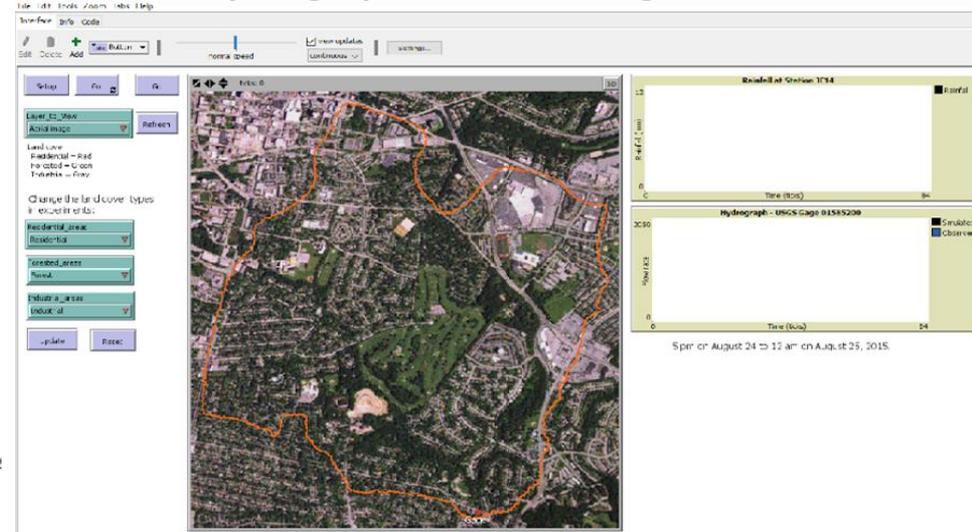
- Simple hydrograph

Comp Hydro Baltimore – modeling runoff and hydrographs

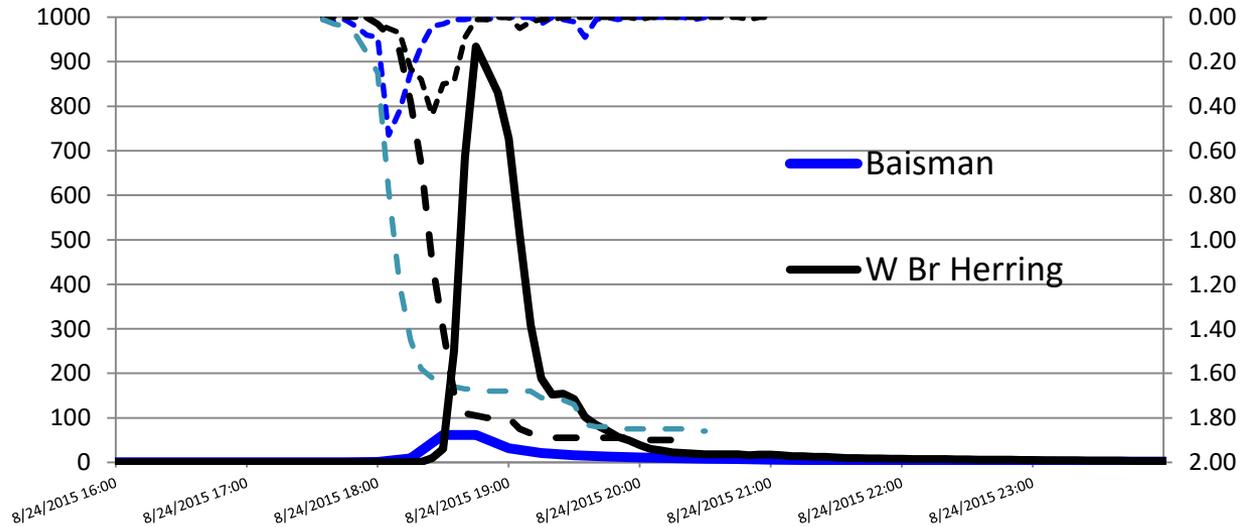
Hydrographs from Floorlandia Watersheds



Hydrographs from NetLogo Model



Hydrographs and Hyetographs after a Storm in Two Watersheds



Please Use Comp Hydro!

- Full curriculum – Baltimore Ecosystem Study Curriculum and Resources page:
<https://baltimoreecosystemstudy.org/bes-curriculum-and-resources/>
- Lesson 3 – Topography and Watersheds
<https://baltimoreecosystemstudy.org/wp-content/uploads/2020/05/CompHydro-Baltimore-Lesson-3-Final.pdf>
- Contact us
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