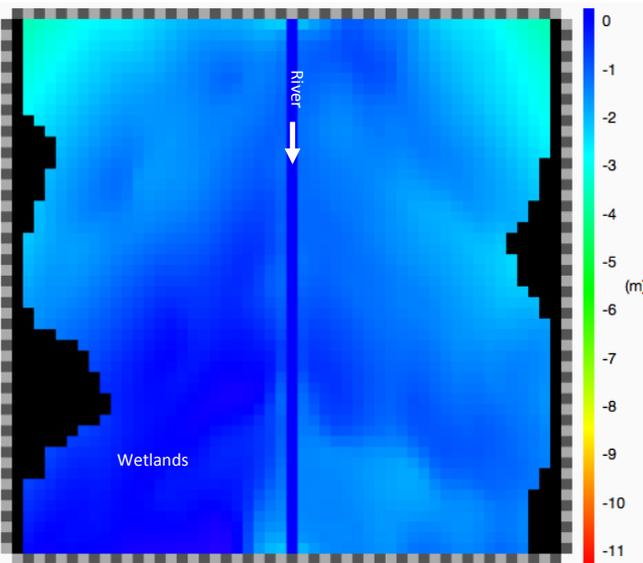
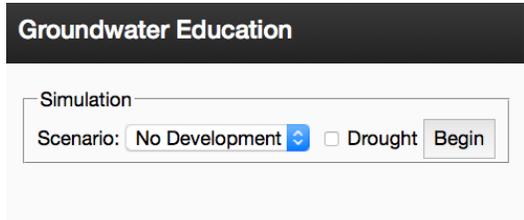


# Quick Start Guide

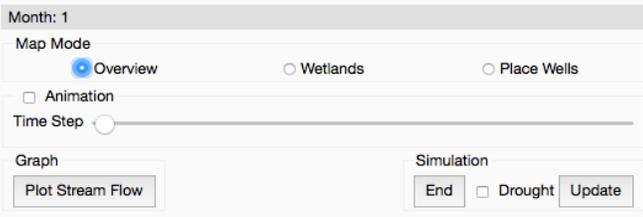
The physical laws governing the flow of groundwater can be represented as equations that can be solved by a computer. This is called a computer model, and it can be used to study how pumping water for urban supply and crop irrigation affects the groundwater table, wetlands, and streamflow.

When you first enter the site, you must choose a scenario to begin your exploration of the water table. You may choose from **No Development**, **City**, or **City and Farm**. The simulation will run the selected scenario without a drought, unless the *Drought* box is checked. Adding a drought to any scenario results in less stream inflow and rainfall.



## The Map

Select the **No Development** scenario. A map will load showing the water table of a region in which no human activity or development has occurred. The map represents a region that is 10 km by 10 km, and measures the water table to a depth of 100 meters. There are 50 rows and 50 columns, each cell measuring 0.2 km by 0.2 km. Each cell on the map is a color that indicates how far beneath the surface the water table is found, as shown by the key on the right side of the map. Cells that are black are not part of the aquifer.



## The River

The blue line down the middle of the map represents a river (surface water). It flows from the top of the map towards the bottom. The river is separated from the groundwater by the permeable riverbed.

## Wetlands

You can observe the changes in the wetland areas over the five years of the simulation by selecting *Wetlands* from the *Map Mode* menu. Cells on the map that are classified as wetlands will be highlighted in bright blue. Select *Overview* to hide the wetland cells.

## Data Bar

Directly under the map is a bar of useful data. When in *Overview* mode, the current month is displayed. The cell position is displayed for each map cell that your mouse hovers over. If a cell is clicked, the Data Bar displays the Elevation and Water Table depth above sea level. Clicking one of the gray or black cells along the edges of the map displays the land elevation and the water table depth for an entire cross-section.

## Animation

By checking the *Animation* box at the bottom of the map, you can observe changes to the water table over a five year period of time. You will see a moving indicator next to *Time Step* marking time over five years. To stop the animation, uncheck *Animation*. You may also click on the indicator circle and use your mouse or arrow keys to step through the animation.

## Place Wells

Add wells to the **No Development** scenario. In *Map Mode*, click *Place Wells*. Two regions of cells on the map will be highlighted. One region is a city, the other is a farm. The city is 6.16 square kilometers in area, and the farm is 3.99 square kilometers.

To place a well, click on a cell in the city or farm region. A circle will indicate the well's location. Remove a well by clicking on it. When you are finished adding wells, click *Update*. The simulation will update to reflect changes in the water table due to the removal of water from the aquifer by the wells.

**City Wells:** Place up to five wells within city limits by clicking on a cell in the highlighted region. Choose a pumping rate for each well between  $-5000$  and  $-15,000 \text{ m}^3/\text{day}$ .

**Farm Wells:** Place up to three wells for the farm by clicking on a cell in the highlighted farm region. The pumping rates for the farm are predetermined since farms only irrigate during the growing season, May through October as shown in the table below.

	May	June	July	August	Sept	Oct
Farm Pumping Rate ( $\text{m}^3/\text{day}$ )	-203.20	-4836.16	-8717.28	-6238.24	-1930.40	-772.16

## Plot Stream Flow

Clicking the *Plot Stream Flow* button displays a graph of the river inflow at the top of the map (north) and the river outflow at the bottom (south). The outflow is displayed without pumping (No Development) and with any wells added.

The yellow vertical line indicates the month while the animation is running.

*Note:* the riverbed is permeable and some exchange of water does occur between the river and aquifer.

