# Part Two: Rising Tides

The context of this section revolves around simulating rising tides, with the essential restrictions outlined below:

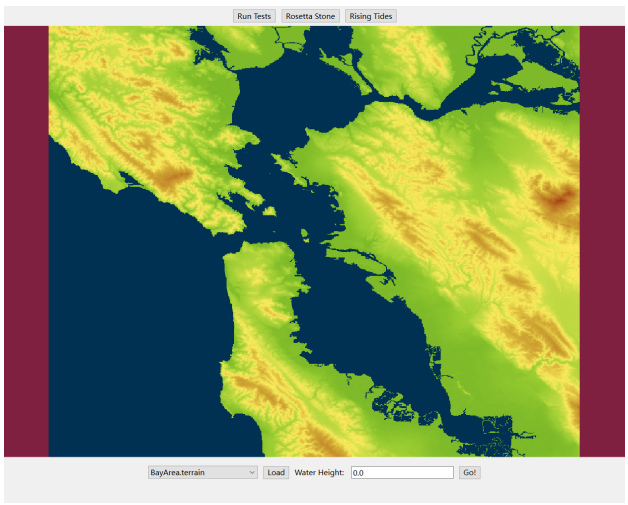
1. Water flow is constrained to four basic directions in two dimensions: up, down, left, and right.
2. Water cannot flow through diagonal gaps in the levee, even though this might occur in reality.
3. Terrain higher than the water level cannot be covered, only terrains with heights less than or equal to the water level.

The primary data structures utilized in this section are Grid and GridLocation, referring to the Stanford Standard Library. Readers can refer to the handbook if they are unfamiliar with these data types. The fundamental algorithm employed in this section is BFS (Breadth-First Search). It loops through terrains located one cell around the current cell and then extends to terrains located two cells around the current cell. The official documentation instructs us to implement this algorithm using a queue. Water sources with heights equal to or lower than the water level should be enqueued because if the terrain height where the water source is located is higher than the water level, the water source will not flow anywhere. After adding the water source under the specified restriction to the queue, we need to verify whether the water flow will cover the four directions around the current cell. To identify whether a cell in one of the four directions will be covered, two conditions must be met:

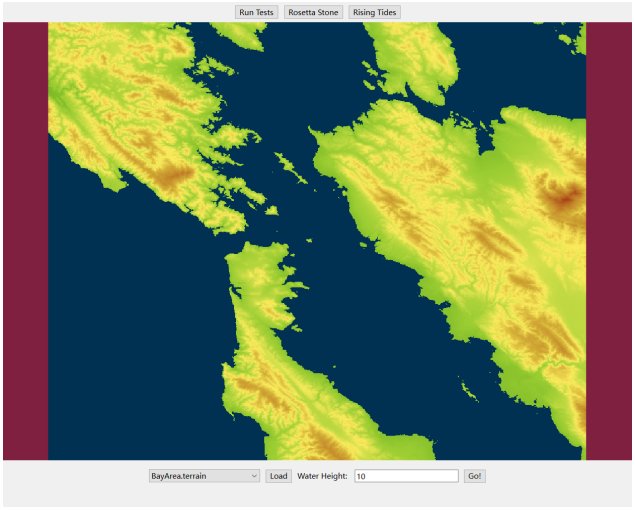
1. The terrain must be within bounds and not yet covered by water.
2. The terrain height must be lower or equal to the water level.

If the terrain meets these qualifications, it will be covered, and we add it to the queue because it can lead to further terrains being covered. During the implementation of this algorithm, attention should be paid to looping through the four directions. My solution involves using offset arrays to reduce redundant code.

I have chosen the Bay Area as the terrain. When the water level is ten meters, all coastlines are submerged.




**Water Height: 0.0**




**Water Height: 10.0**