

Flooding in Massachusetts

Between March 13 and March 16 of 2010 it rained about 10 inches in many of our towns in Massachusetts. During that time, rivers rose 5 to 6 feet.

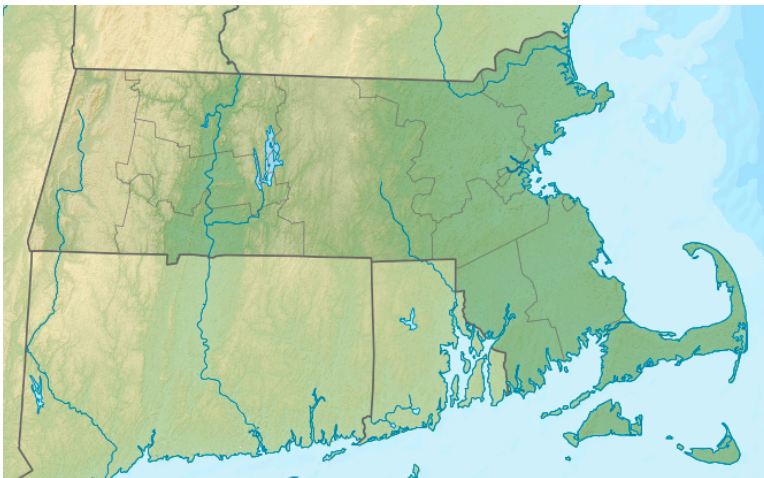
1. How could 10 inches of rain make a river rise 5 feet?

Here's one idea. It's probably too simple. Maybe the rainwater will seek the lowest level of elevation and flow towards our waterways that have smaller surface area and cause the volume of water to have to fit into a deeper region.

2. Using this table, what percentage of Massachusetts is water?

Total square miles of MA	Land in square miles in MA	Water in square miles in MA	% Water
10,555	7,840	2,715	

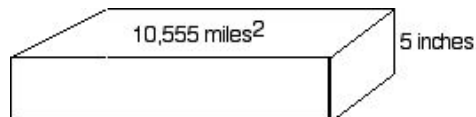
http://www.netstate.com/states/geography/ma_geography.htm



*Relief map of
Massachusetts*

Massachusetts is 190 miles long and 50 miles wide at its most distant points.

3. If you imagine Massachusetts as a large rectangular prism with a top surface area of 10,555 square miles and it rains 5 inches, what is the volume of rain that is created in cubic miles?

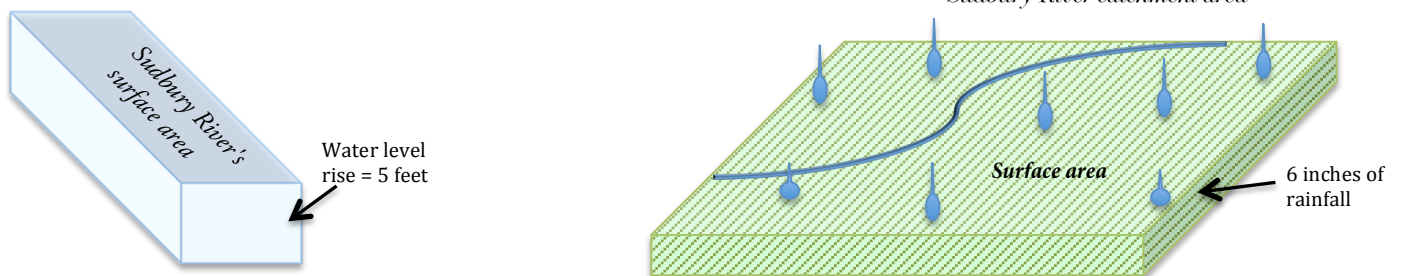


4. If that rain has to now fit into a rectangular prism with top surface area of 2,715 square miles, how deep will this rectangular prism have to be to hold your calculated volume of water?

5. If rain falling on Massachusetts's land and water areas seep through the ground and run towards its waterways, how much depth would a 1" rainfall cause our waterways to rise?

The amount that a river would raise after rainfall is not as simple as that. Also all of the rivers in Massachusetts don't rise the same amount. Melting snow, the ability of the ground to absorb the rain (frozen or saturated ground), and elevation differences are just some of the conditions that make predicting flooding complex.

6. If 6 inches of rain caused the Sudbury River to rise 5 feet, what percent of the Sudbury's catchment size area is the Sudbury River's surface area?



7. The Sudbury River finally rose more than 13 feet. We had about 13 inches of rain in those 3 weeks. How can you explain that?