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Watershed Delineation

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- ✓ Delineating watershed boundaries. All watershed delineation means is that you're drawing lines on a map to identify a watershed's boundaries.
- ✓ These are typically drawn on topographic maps using information from contour lines.
- ✓ Contour lines are lines of equal elevation, so any point along a given contour line is the same elevation.



Here's how you can delineate a watershed:

STEP 1:

Use a topographic map(s) to locate the river, lake, stream, wetland, or other waterbodies of interest. (the example, West Branch of Big River, in Figure 1.)

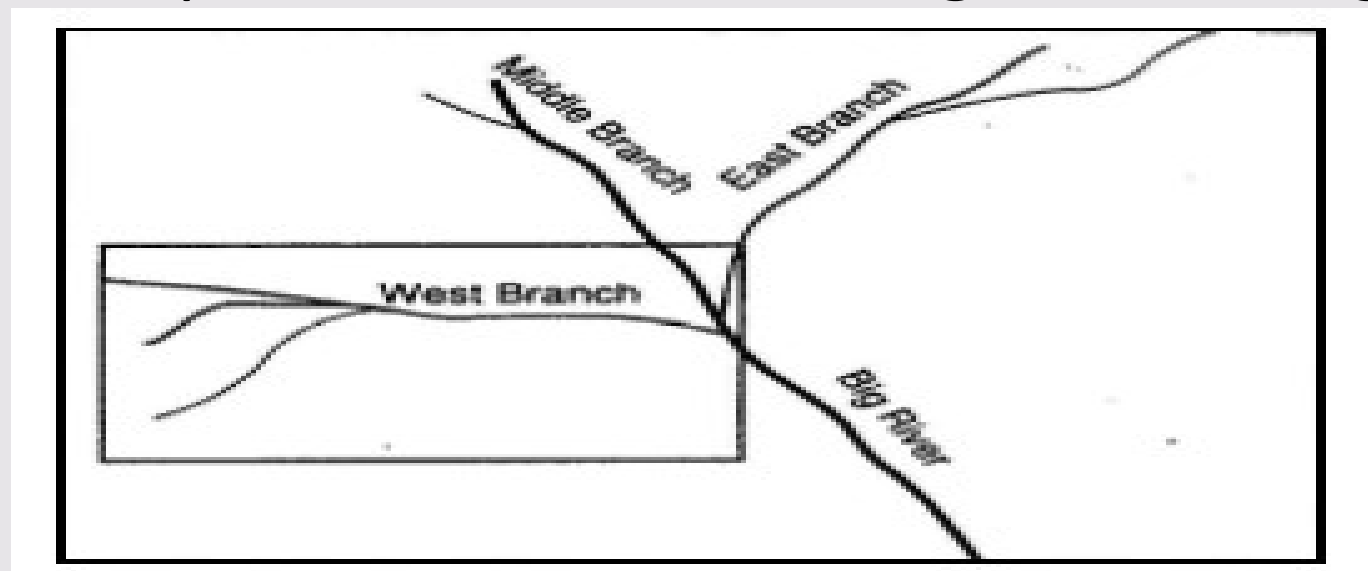
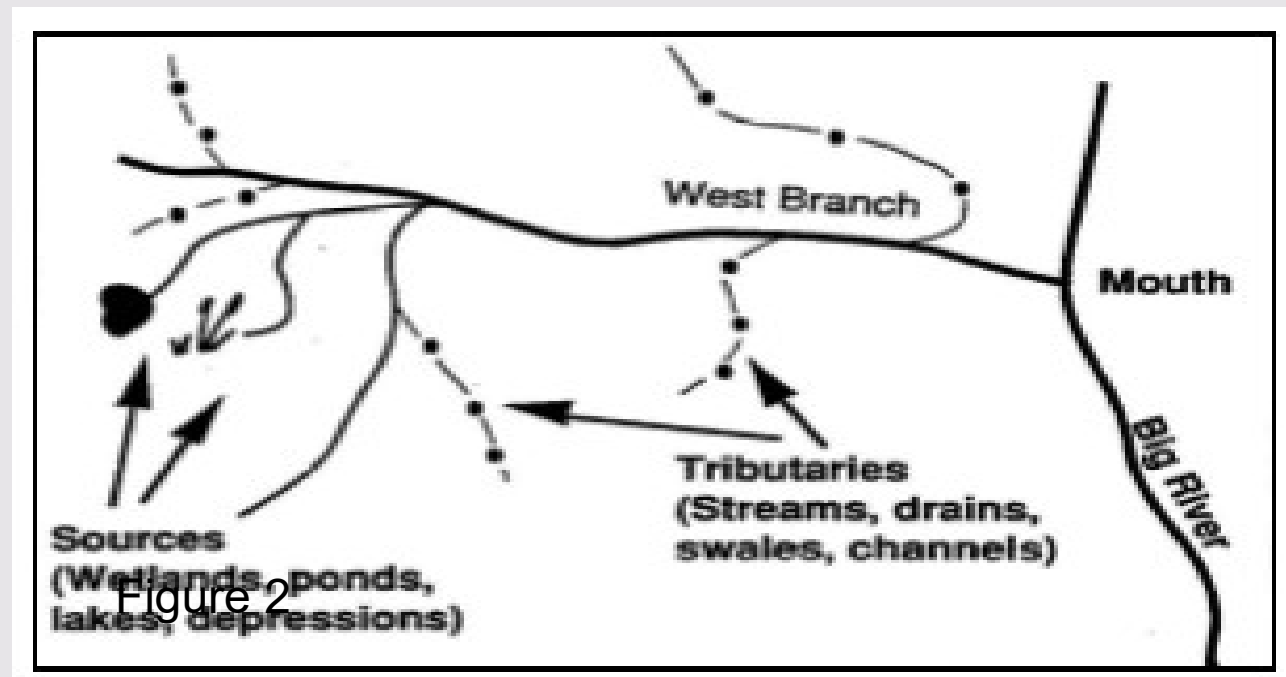


Figure 1 : West Branch of Big River



Step2:

Trace the watercourse from its source to its mouth, including the tributaries (figure 2). this step determines the gene beginning and ending boundaries





STEP 3:

Examine the brown lines on the topographic map that are not the watercourse. These are referred to as contour lines. Contour lines connect all points of equal elevation above or below a known reference elevation.

- The dark brown contour lines (thick lines) will have a number associated with them, indicating the elevation.
- The light brown contour lines (thin lines) are usually mapped at 10 (or 20) foot intervals, and the dark brown (thick) lines are usually mapped at 50 (or 100) foot intervals. Be sure to check the map's legend for information on these intervals.
- To determine the final elevation of your location, simply add or subtract the appropriate contour interval for every light brown (thin) line, or the appropriate interval for every dark brown (thick) line. Figure 3 shows a point (X) at an elevation of 70 feet above mean sea level



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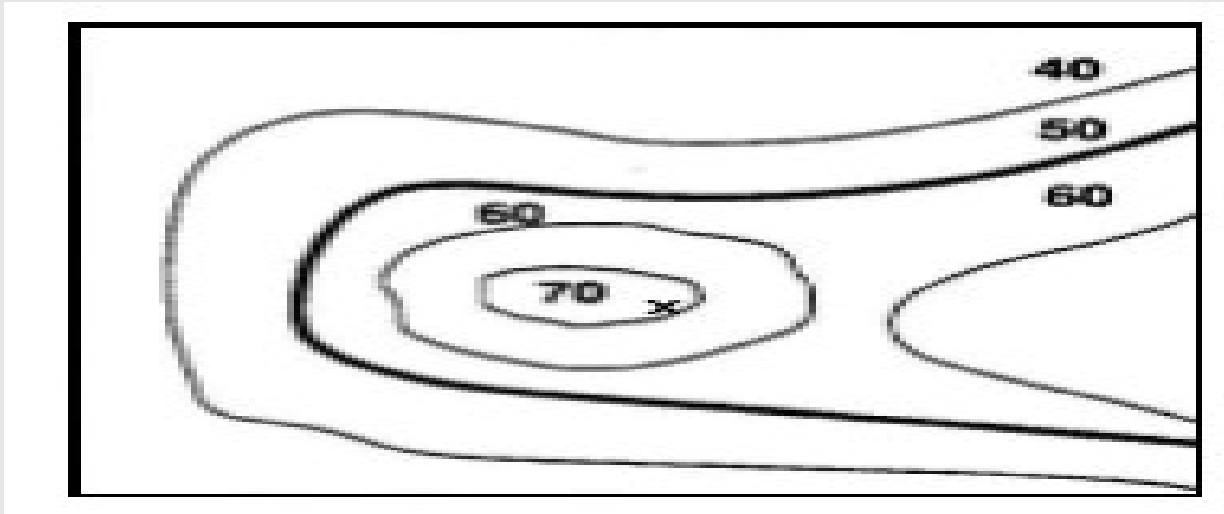


Figure 3: Contour lines and an example point (X) at an elevation 70 feet above sea level.



STEP 4:

Contour lines spaced far apart indicate that the landscape is more level and gently sloping (i.e., they are flat areas). Contour lines spaced very close together indicate dramatic changes (rise or fall) in elevation over a short distance (i.e., they are steep areas) (Figure 4).

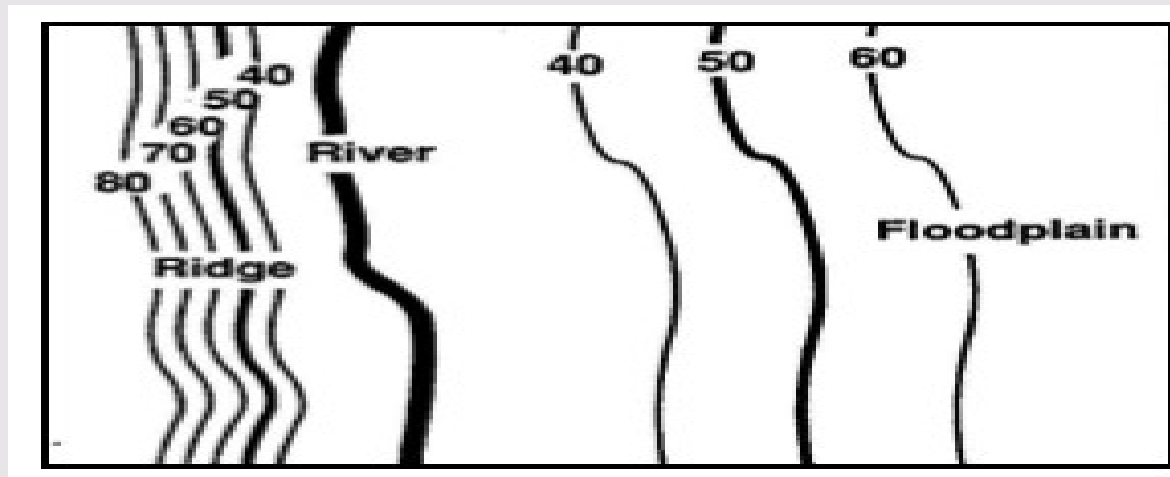


Figure 4: Floodplains and ridges



STEP 5:

Check the slope of the landscape by locating two adjacent contour lines and determine their respective elevations. The slope is calculated as the change in elevation, along a straight line, divided by the distance between the endpoints of that line.

- A depressed area (valley, ravine, swale) is represented by a series of contour lines “pointing” towards the highest elevation (Figure 5).
- A higher area (ridge, hill) is represented by a series of contour lines “pointing” towards the lowest elevation (Figure -6)

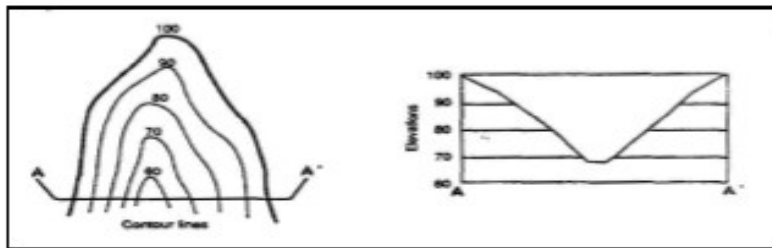


Figure 5: Valley

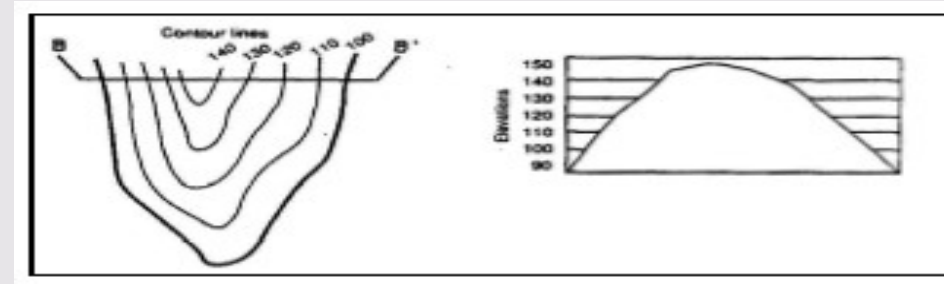


Figure 6: Ridge

STEP 6: Determine the direction of drainage in the area surrounding a waterbody by drawing arrows perpendicular to a series of contour lines that decrease in elevation. Stormwater runoff follows the path of least resistance as it travels downslope. The “path of least resistance” is the shortest distance between contours, hence a perpendicular route (Figure 7).

Mark the break points surrounding the waterbody. The “break points” are the highest elevations where half of the runoff from the area drains towards one body of water, and the other half would drain towards another body of water (Figure 8)

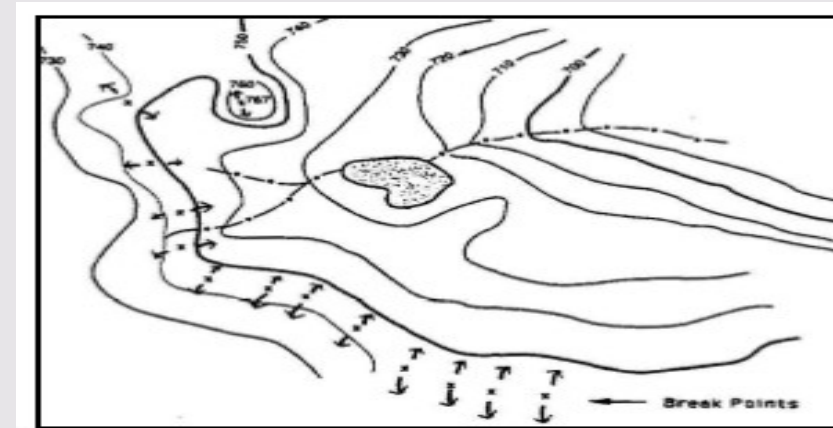


Figure 7: Direction of drainage



STEP 8: IDENTIFY BREAK POINTS

Connect the break points with a line following the highest elevations in the area. The completed line represents the watershed boundary (Figures 8 and 9).

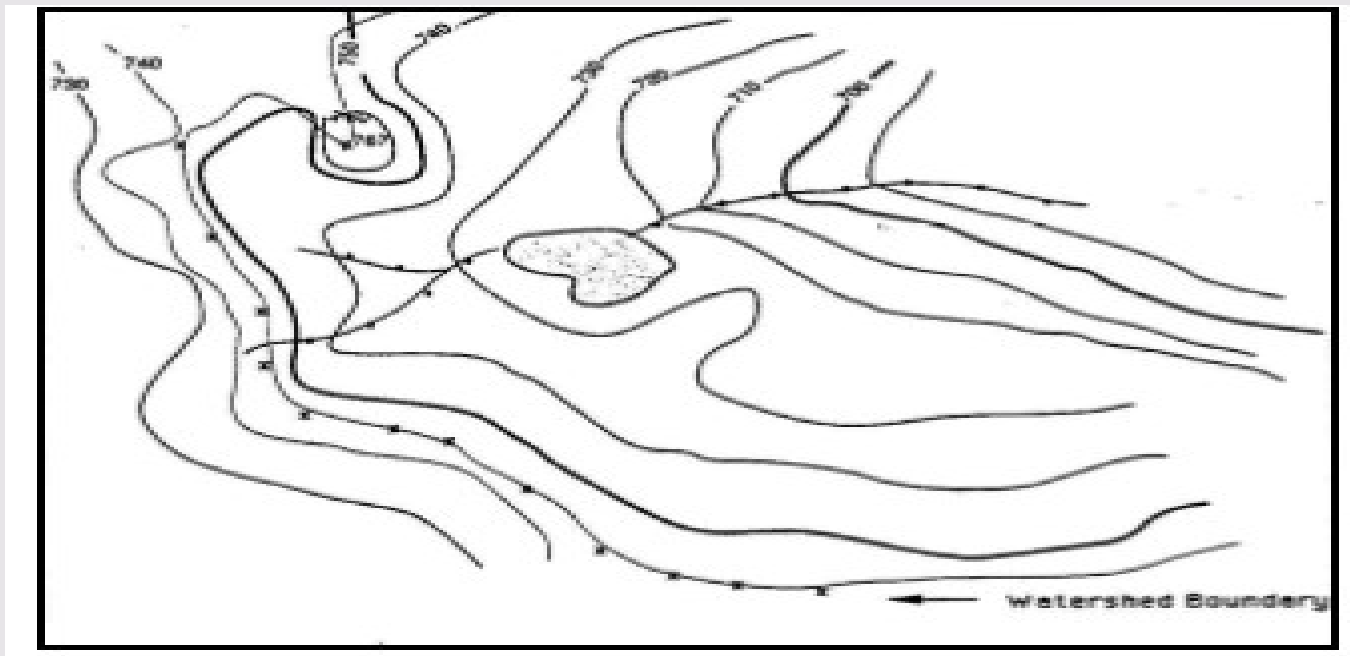


Figure 8: Watershed Boundary

STEP 9: Once you've outlined the watershed boundary on your map, imagine a drop of rain falling on the surface of the map. Imagine the water flowing down the slopes as it crosses contour lines at right angles.

Follow its path to the nearest stream that flows to the water body you are studying. Imagine this water drop starting from different points on the watershed boundaries to verify if the boundaries are correct.

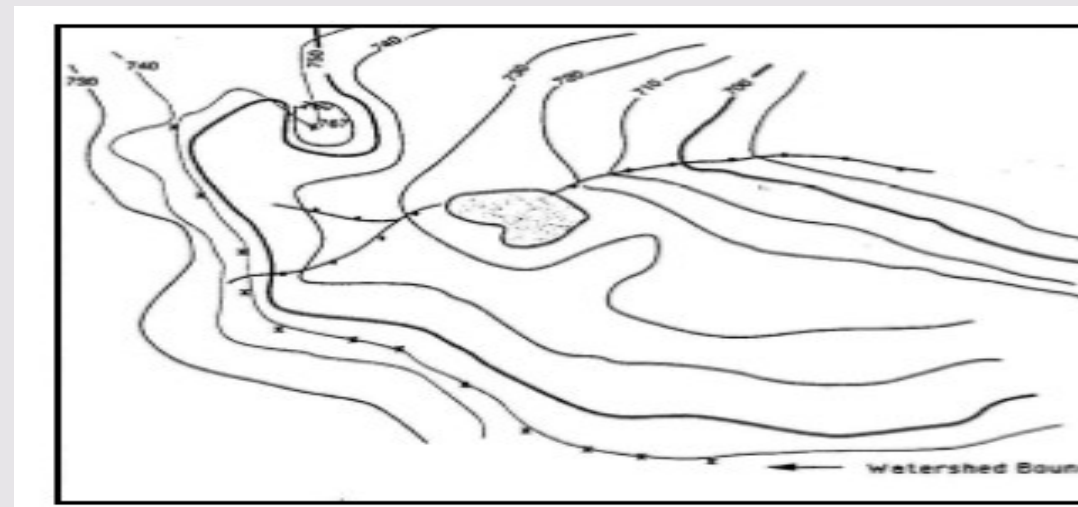


Figure 8: Watershed Boundary



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STEP 10: Watersheds sometimes have what are termed subwatersheds within them. Rivers, large streams, lakes, and wetland watersheds often have more than one subwatershed (usually smaller tributary watersheds) within them.

Generally, the larger the waterbody you are examining, the more subwatersheds you will find. Your watershed map can be further divided into smaller sections or subwatersheds if it helps organize your study better.

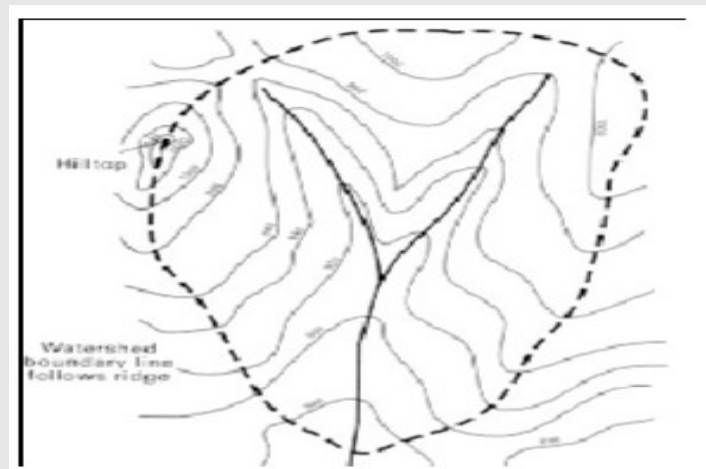


Figure 9: Idealized Watershed Boundary