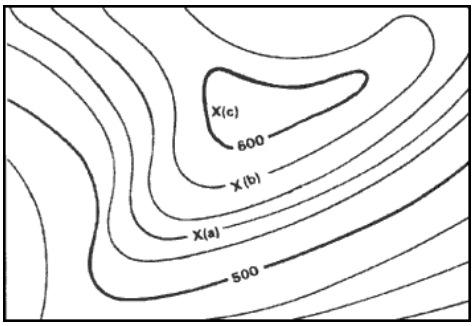
## Interpreting Topographic Maps

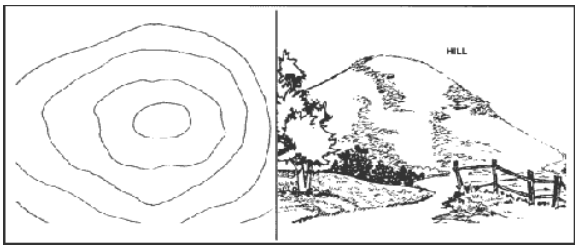
Basic Concepts:

***Contour interval*** is the difference in elevation between two adjacent contours. Typically, the contour interval is given in the map legend, as seen below. Think of it as the vertical distance you would need to climb or descend from one contour to the next.

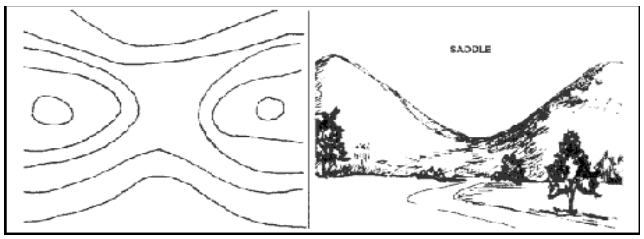

***Contour lines*** represent a ground elevation or vertical distance above a reference point such as sea level. All points along a contour line are the same elevation.




***Hill***. A hill is an area of high ground. From a hilltop, the ground slopes down in all directions. A hill is shown on a map by contour lines forming concentric circles. The inside of the smallest closed circle is the hilltop.

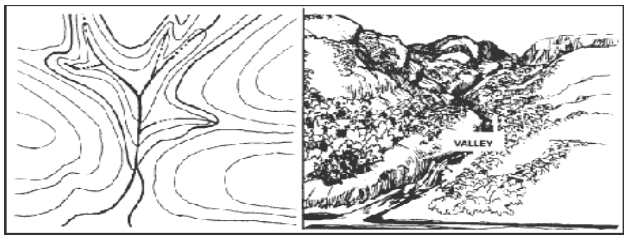



***Saddle***. A saddle is a dip or low point between two areas of higher ground. A saddle is not necessarily the lower ground between two hilltops; it may be simply a dip or break along a level ridge crest. If you are in a saddle, there is high ground in two opposite directions and lower ground in the other two directions. A saddle is normally represented as an hourglass, such as the representation on the left.

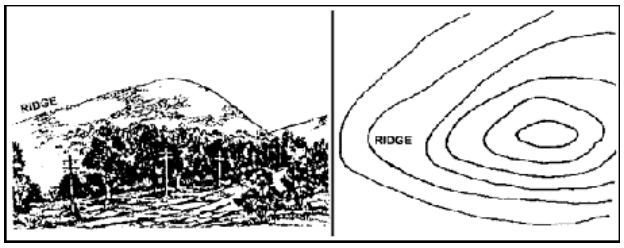


***Valley***. A valley is a stretched-out groove in the land, usually formed by streams or rivers. A valley begins with high ground on three sides, and usually has a course of running water through it. Imagine standing in the valley pictured below; the ground would be higher in three directions and lower in the fourth direction. Depending upon where you are standing and how big the valley is, it might not be obvious that the ground is higher in the third direction, but the stream, river, or runoff will flow from higher to lower ground. The contour lines representing a valley are either V-shaped or U-shaped. The shape enables you to determine the direction water is flowing. Think of the U or V shape as an arrow that points downstream and toward lower ground. (The wider end is on higher ground.) In the topographic map below, you can also see tributaries flowing into a larger stream.




***Ridge***. A ridge is a sloping line of high ground. If you are standing on the centerline of a ridge, you will normally have low ground in three directions and high ground in one direction with varying degrees of slope. (See illustration below.) If you were to cross a ridge at a right angle, you would climb steeply to its crest and then descend steeply to its base. Contour lines forming a ridge tend to be U-shaped or V-shaped. Again, the closed end ("arrow tip") of the contour line points downward away from high ground.





## Delineating a Watershed

The following method is used to outline a watershed on a topographic map, also known as *delineating a watershed*. It involves locating and connecting the high points around a waterbody. The resulting outline represents the *watershed divide,* as it is the high area separating watersheds. The enclosed area is the watershed (Figure E-5). This method can be used to delineate your local watershed.

1. Draw a circle at the water outlet of a body of water or the downstream point of a stream going into a larger body of water (such as a larger stream or lake). In Figure E-4 the circle is drawn on the outlet of a wetland (the hatched area).

2. Put small "X's" at the high points along both sides of the watercourse using the information you learned in this worksheet. Work your way upstream towards the headwaters (beginning of the stream) of the watershed.

3. Starting at the circle that was made in step one, draw a line connecting the "X's" (Figure E-5).
   - The line should cross the contours at right angles (be perpendicular to each contour line).
   - The line connects back to the starting point.

4. This designated area is your watershed.

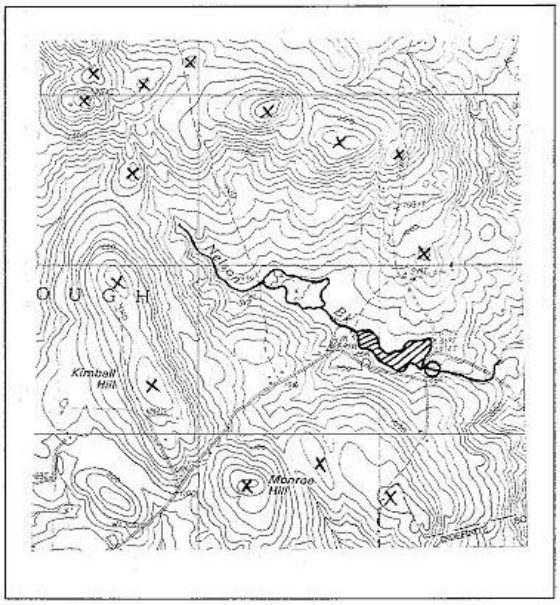



Figure E-4: Delineating a Watershed Boundary - Step 1

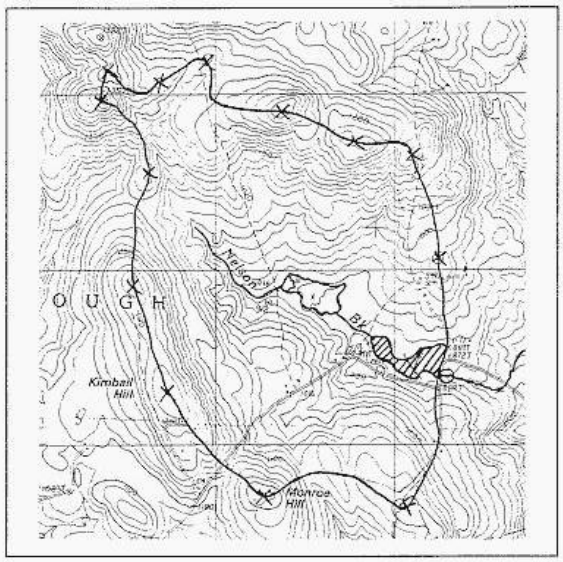



Figure E-5: Delineating a Watershed Boundary - Step 2

The delineation (Figure E-5) appears as a solid line around the watercourse. Rain falling anywhere in this area will either evaporate, infiltrate into the ground, or runoff to the stream and to its downstream point. Different land uses in this area affect the amount of runoff that reaches the stream, the speed at which it reaches the stream, and the amount of pollution it carries.

**Explain why this is true. Give two examples.**

This lesson is adapted from Appendix E of the *Method for the Comparative Evaluation of Nontidal Wetlands in New Hampshire*, 1991. Alan Ammann, PhD and Amanda Lindley Stone. This document and method is commonly called "The New Hampshire Method." For more information on how to read a topographic map, see *How to Read a Topographic Map and Delineate a Watershed*, Natural Resources Conservation Service, United States Department of Agriculture. http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs144p2_014819.pdf