

Protocol 3-A: Determining Stream Slope with Topo Map

Materials:

- Topo map of sampling area
- Field Data Sheet
- 2 people

Method:

Determine the elevation change from the top of the reach to the bottom of the reach. In the example below, it is 10 feet elevation change (1 contour line).

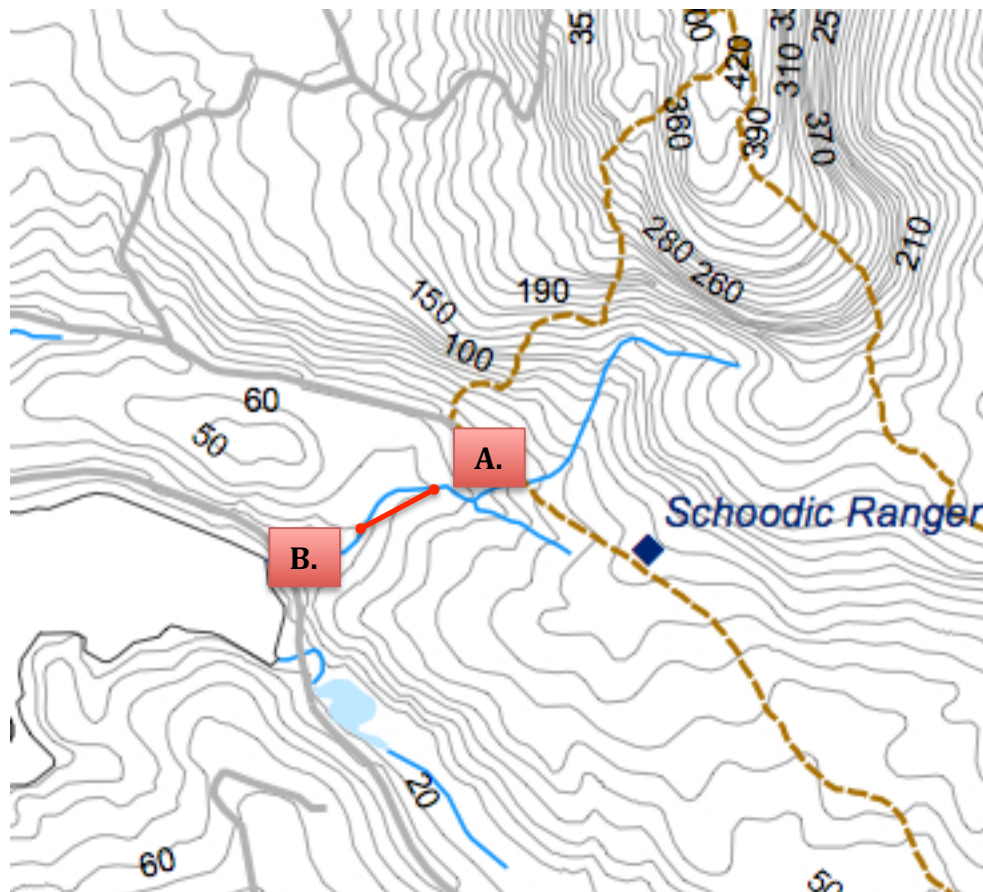
Determine the straight line distance between the two points (top and bottom of reach), A to B.

Use the following equation to determine stream slope:

$$\frac{\text{elevation change (ft)}}{\text{stream distance (ft)}}$$

(note: slope is unitless)

Conversion factor: 1 meter = 3.2808399 feet



Protocol 3-B: Field measuring slope (stream or watershed) or tree height with a clinometer

Materials:

- Field book or field sheets and pencil or waterproof pen
- Clinometer
- Three people

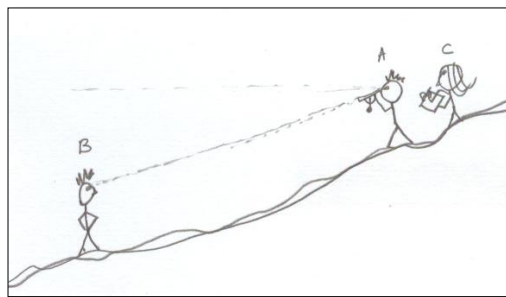
Method:

This procedure requires a clinometer and three people -one with the clinometer (A), one to act as a measurement tool at the other end of the reach (B), and one to record the angle of the slope (C).

Have (A) and (C), stand at the top of the reach, and (B), who should be of approximately the same height as (A), stand at the other end of the reach. Make sure (A) and (B) can see each other.

(A) looks through the clinometer at (B)'s eye.

(C) records the angle of the slope from the clinometer.



Protocol 3-B: Field measuring tree height with a clinometer

Tree Height

Materials:

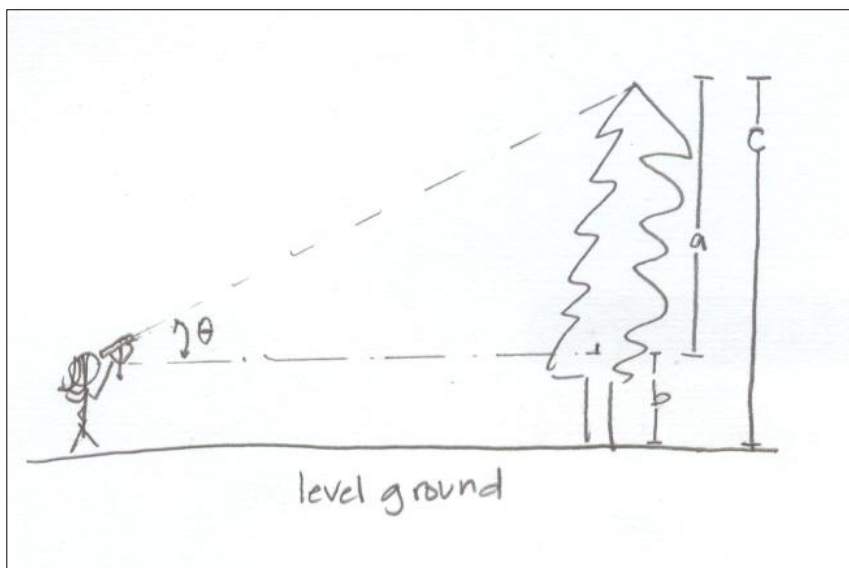
- Field book or field sheets and pencil or waterproof pen
- Clinometer
- 100' tape measure
- Calculator with trig functions
- Two people

Method:

This procedure requires a clinometer, tape measure, calculator and two people (A) and (B).

You will need 3 pieces of information to calculate the tree height:

- i. The angle from (A)'s eye to the top of the tree (θ),
 - ii. The distance to the tree from (A) (d)
 - iii. The height from the ground to (A)'s eye (b)
1. (A), with clinometer, stands on ground level to the tree in question at a distance where she can see the top of the tree, and looks through clinometer to the top of the tree. (B) records the angle (θ).
 2. (B) then uses measuring tape to measure and record distance from (A) to tree (d). (B) also uses the tape measure to measure and record the height from the ground to (A)'s eye (b).
 3. The tree height is calculated, using a calculator with trig functions, with the following calculations:
 $a = d(\tan \theta)$
total tree height (c) = $a + b$
conversion factor: 1 meter = 3.28083300 feet



note: person B is missing from this image.