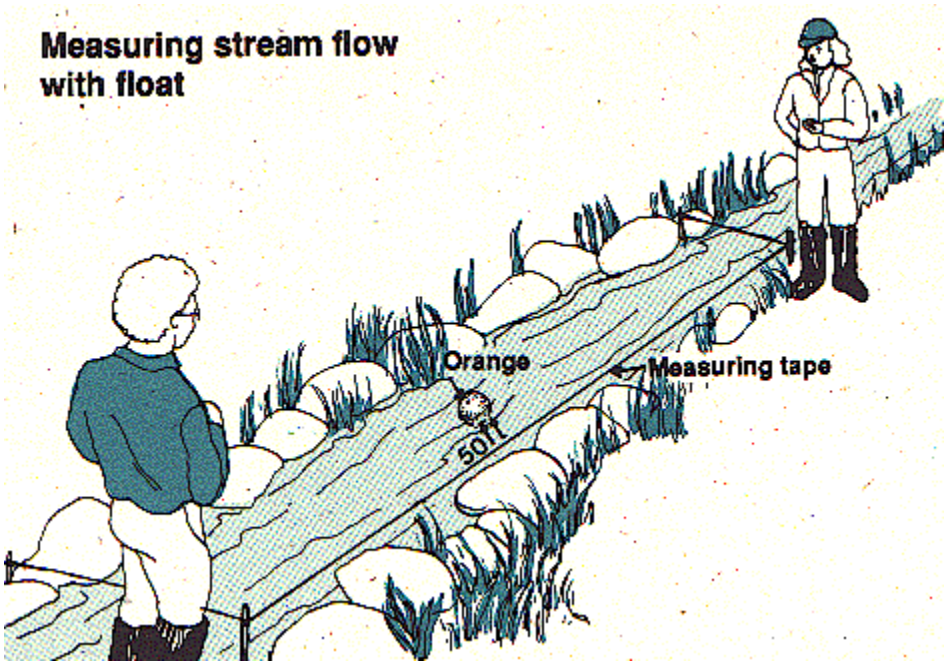
A Citizen's Guide to Understanding and Monitoring Lakes and Streams

Chapter 5 - Getting a Handle on Hydrology

Measuring Stream Flow with a Simple Float

If a flow meter is not available or a rough estimate is adequate, you can measure flow by using a float. The float can be any buoyant object, such as an orange or a partially filled plastic water bottle. It needs to be heavy enough so that about an inch of it is below the water line. (Don't use glass or any material that may cause problems if you can't retrieve the float after the measurement.)



Measure off at least 50 feet along the bank of a straight section of stream. If possible, string a rope across each end of the 50-foot length.

1. Estimate the cross-sectional area of the stream at one of these ends by using the total stream width and the average depth. (Calculate the average depth from depths measured at 1- to 2-foot intervals.)

   Total width (ft) x Average depth (ft) = area (ft^2)

2. Release the float at the upstream site. Using a stopwatch, record the time it takes to reach the downstream tape. (If the float moves too fast for an accurate measurement, measure off 75 or 100 feet instead of 50). Repeat the measurement two more times for a total of three measurements.
3. Calculate the velocity as distance traveled divided by the average amount of time it took the float to travel the distance. If the distance roped off is 50 feet and the orange took an average of 100 seconds to get there, the velocity is 0.5 ft/sec.

$\frac{50 \text{ ft}}{100 \text{ sec}} = 0.5 \text{ ft/sec}$

4. Correct for the surface versus mid-depth velocity by multiplying the surface velocity by 0.85.

   0.5 x 0.85 = 0.43 ft/sec

5. Calculate the discharge in cubic feet per second (cfs) by multiplying velocity (ft/sec) by the cross-sectional area (ft^2) of the stream.

0.43 ft/sec x 10.73 ft^2 = 4.62 cfs