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TEAM NAME

Field Methods for Geography 747

Field Measurement of Stream Discharge

If there is sufficient flow in the creek we will measure the discharge by the following procedure. Pin the end of the measuring tape above the water's edge on the left bank. (The *left bank* is conventionally defined as on your left as you look downstream.) Stretch the tape across the channel tight enough that sagging of the tape will not introduce a measurement error. Use the equal width interval method with a spacing to get 10 readings. In Table 1, record the *station* (horizontal position) from the tape, calculate *width* as change in station from the previous station (or from the channel edge for the first reading), and *depth* to the bottom as measured with the wading rod.

Table 1. Channel cross-section dimensions and discharge measurement using current meter.

Staff gage reading: In__________ Out ________ Time In: _______ Time Out: _________

Station (cm)											
Width (cm)											
Depth (cm)											
Area (cm^2)											
Velocity (cm/s)											
Discharge (cm^3/s)											

Distance from Left Bank (m)

Current Meter Measurements

Use the current meter and wading rod for measuring velocity at 0.6 depth. Make sure the current meter is reading in m/s (if it says ft/s you need to change the settings or convert your readings). Repeat velocity measurements for the same channel segments as above and enter results on Table 1. Work in teams of three with one person operating the current meter and taking notes, while another person wades the channel with the wading rod and velocity sensor. Position the sensor in the water, read the depth from the rod, position the sensor at 0.6 depth, wait for readings to stabilize, then tell note-taker to record station, depth, and velocity in cm, cm, and cm/s, respectively. Calculate width, area, and discharge as you did with the float exercise and sum up areas and discharges.

Measuring Channel Dimensions

After you have completed the discharge measurement, plot the flow depths as a function of distance from the banks on the chart below to make a *channel cross-section. This* will facilitate the visualization of top widths, mean depths, and cross-section areas. Plot the station and depth data on Figure 1 to show the channel cross section. Assume a horizontal water surface. Note that distances, depths, and later velocities may be in different units so you should convert as you enter values on Table 1.

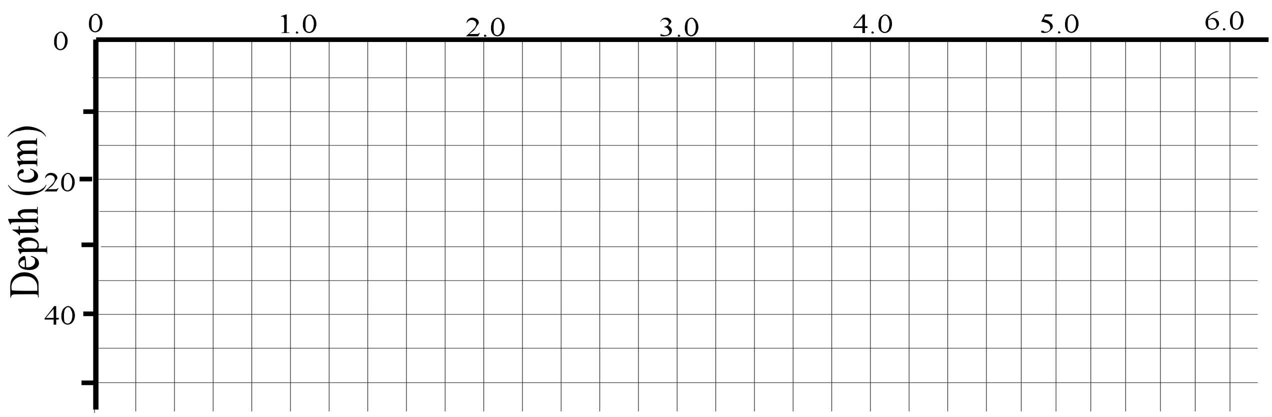

Figure 1 - Channel cross-section plot.

Calculate these values after filling out Table 1.
Discharges in Table 1 are given in cm^3/s. Calculate total discharge by summing the discharges over each channel subsection:

Total discharge = ___________________ cm^3/s. Convert cm^3/s to liters per second (L/s) [divide cm^3/s by 1000]: Total discharge = ___________________ L/s.

Total area = ___________________ cm^2. To convert cm^2 to m^2, divide cm^2 by 10,000:

Total area = ___________________ m^2.

Calculate mean cross-section velocity as total discharge divided by total area:

Mean velocity = ___________________ m/s.

Repeat the Q measurement nearby using floats. Take at least four measurements across the channel cross section and record the values in Table 2.

Table 2. Channel cross-section dimensions and discharge measurement using floats.

Staff gage reading: In___________ Out _________ Time In: _______ Time Out: _________

Station (cm)							
Width (cm)							
Depth (cm)							
Area (cm^2)							
Velocity (cm/s)							
Discharge (cm^3/s)							

Distance from Left Bank (m)

Total discharge (floats) = ___________________ cm^3/s. Convert cm^3/s to liters per second (L/s) [divide cm^3/s by 1000]: Total discharge = ___________________ L/s.

Total area = ___________________ cm^2. To convert cm^2 to m^2, divide cm^2 by 10,000:

Total area = ___________________ m^2.

Calculate mean cross-section velocity as total discharge divided by total area:

Mean velocity = ___________________ m/s.