



Measuring Culvert Stage and Flow -Field Sampling SOP 3 (S-3):

Measuring Culvert Stage

1. Measuring stream stage involves measuring the height of the water moving through the culvert. To do this, you will need to position yourself above the culvert. Before taking your pre-storm sample, you'll need to describe how you'll be taking your measurement.

You might be able to take your yardstick or current rod, lean over the culvert, and with one end of your measuring device on the bottom, read the water level. However, rather than measuring the water height from the "bottom up," it may be easier to measure it from the "top down" - - that is from the top of the culvert down to the surface of the water.

We will need to know which of the above-described methods you will be using. Moreover, if you choose to measure from the "top down", we will need to know from which point at the top of the culvert you are taking your measurements. For example, this could be from the top of a headwall or from the opening of the culvert to the waterline.

It doesn't matter which technique you use, but you must clearly explain the one that you do pick by making a picture of how you are measuring stage on the Culvert Log sheet marked "Stage Measurement geometry." Feel free to write additional notes in the margin and/or add further information on the back of the log sheet. If at any time during the survey, you change the method by which you measure stream stage, be sure to describe this on your log sheet.

2. Once you have selected a measuring method, you are ready to take your stage measurements. On your log sheet, record time of measurement under "Time of Day," and record your stage measurement (with units of inches or centimeters) under "Stream Stage."

Measuring Flow: Marsh-McBirney, Inc. Model 201D Portable Water Current Meter

1. Measure flow immediately after measuring stage.
2. Use the same Culvert Log Sheet.
3. Turn on the current meter.
 - Check the instrument by placing the SCALE switch to the "CAL" position and the TIME CON switch to the "2" position. The reading should stabilize between 9.8 and 10.2 within ten seconds. You should repeat this step periodically, but not necessarily every time you turn it on. If the meter does not calibrate properly, immediately contact the Project Coordinator.
 - Move the SCALE switch to the "M/sec" position.



4. Using the current meter, measure the flow as follows:
 - Point the black sensor head into the middle (i.e., center of the culvert, mid-depth) of the current of water emanating from the pipe. Read the current speed off the meter and record this reading on your log sheet.

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Adapted from the following Instruction Manual.

Marsh-McBirney, Inc. *Instruction Manual Model 201/201D Portable Water Flow Meter.*

Measuring Flow: Marsh-McBirney, Inc. Model 2000 Portable Flow Meter

1. Measure the stream flow immediately after measuring stream stage.
2. Use the same Culvert Log Sheet.
3. Turn on the current meter.
 - If units are not in M/sec, press the ON and OFF keys simultaneously to change units.
4. Using the current meter, measure the flow as follows:
 - Point the black sensor head into the middle (i.e., center of the culvert, mid-depth) of the current of water emanating from the pipe. Read the current speed off the meter and record this reading on your log sheet.

Adapted from the following Instruction Manual.

Marsh-McBirney, Inc. (1990). *Model 2000 Installation and Operations Manual*