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FlowTracker Quick Sheet
Discharge Measurements

Office diagnostics (BeamChecks) - prior to each week of use perform a FlowTracker BeamCheck (FlowTracker Technical Manual Section 6.5). The BeamCheck (fig. 1) should be logged to a file and archived. When performing a BeamCheck keep sample volume a minimum of 2 inches from any boundary, including the bottom.

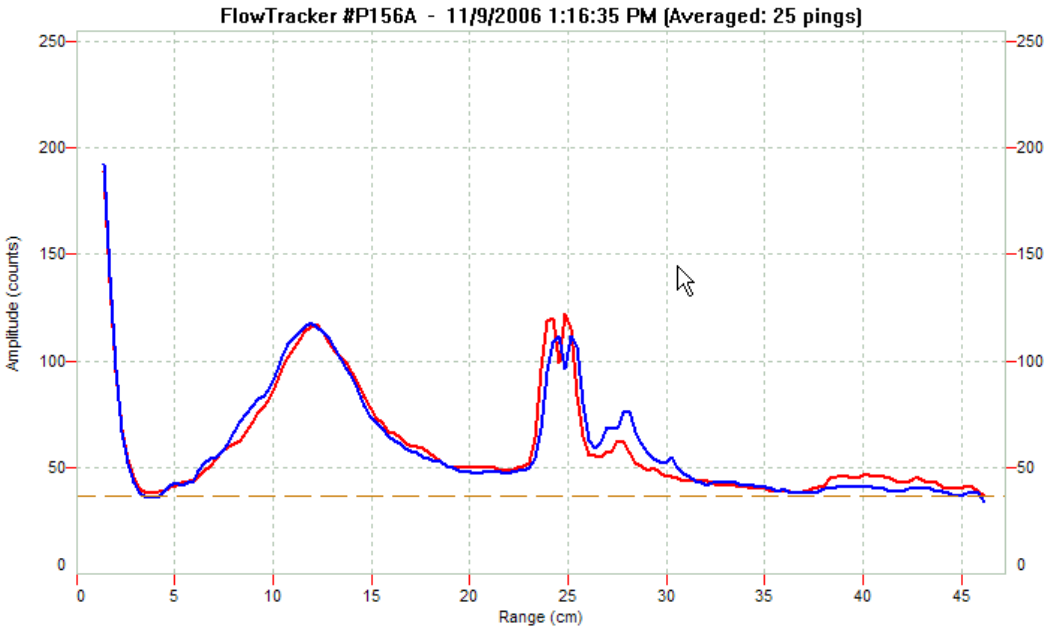

Figure 1. Example output for a good BeamCheck result. Probe held approximately 2 inches from the bottom of a bucket and 10 inches from the far boundary (side of bucket)..

Field diagnostics - prior to starting each measurement, perform FlowTracker field diagnostic procedures (FlowTracker Operation Manual Section 3.3.2). This includes checking: recorder status, temperature, battery capacity, system clock, raw velocity, SNR data and performing the automated QCTest.

Measurement cross section – Selecting a good cross section is very important for any type of discharge measurement. A good cross section is in a straight reach of channel with uniform streamlines and relatively free of slack water, eddies, and turbulence. Most poor FlowTracker measurements are the result of a poor measurement cross section.

Velocity sample time – under normal measurement conditions, each point velocity measurement should be sampled for a minimum of 40 seconds. Under extreme flow conditions, such as rapidly changing stage, a shorter sample time may be used to lessen the time needed to complete the discharge measurement.

Location of velocity observations in each vertical –

- Single-point method (at 0.6 depth)
  - Depths < 1.5 ft
  - Depths > 1.5 ft only when bed conditions prohibit 0.8 depth observation
- 2-pt method (at 0.2 and 0.8 depths)
  - Depths > 1.5 ft
- 3-pt method (at 0.2, 0.6 and 0.8 depths)
  - When a non-standard profile is discovered while using the 2-pt method

Flow angles and sensor alignment - the wading rod should always be held perpendicular to the tagline, so that the pulse generated by the transmitter is parallel to the tagline (fig. 2). Pay close attention to the flow angle reported by the FlowTracker. Large variations in flow angles may be indicative of poor or inconsistent alignment of the wading rod or poor site selection for the measurement. Ideally, the tagline should be set up in the cross section such that flow is perpendicular to the tagline. Because flow is turbulent and unsteady, and the FlowTracker may not be placed exactly perpendicular to the tagline at each vertical, it is not unusual to have small variations in flow directions from vertical to vertical. However, if large fluctuations of flow angles are reported, the discharge measurement should be made at another section with more uniform flow.

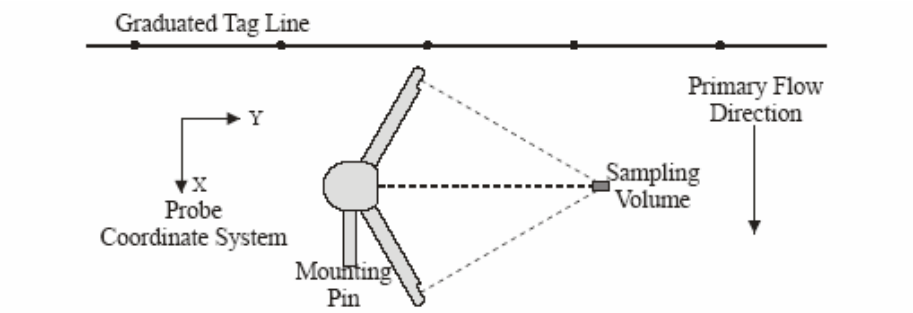

Figure 2. Correct wading rod orientation.

Minimum SNR - monitor the FlowTracker SNR readings during the measurement for SNR readings that are less than 4 dB. The FlowTracker will display a warning at the end of a velocity measurement if the SNR for any beam is less than 4 dB. If the SNR is below 4 dB, try moving to a different measurement section where backscatter may be higher. If a section with an acceptable SNR cannot be located, the FlowTracker should not be used to make a discharge measurement.

Boundaries - avoid measurement sections with abrupt changes in bed topography. These changes can result because of such things as large rocks or cobbles in the measuring section. Abrupt changes in bed topography may cause boundary effects leading to inaccurate velocity measurements. During the measurement, velocities should be monitored for unrealistically low velocities, and also for unusually large SNR values (a solid boundary should cause an increase in the SNR). Be aware of the location of the FlowTracker sample volume when measuring. The sample volume typically is 10 centimeters (about 4 inches) from the center transmitting transducer. Avoid placing the sample volume within 2 inches from any solid boundary (fig. 3).

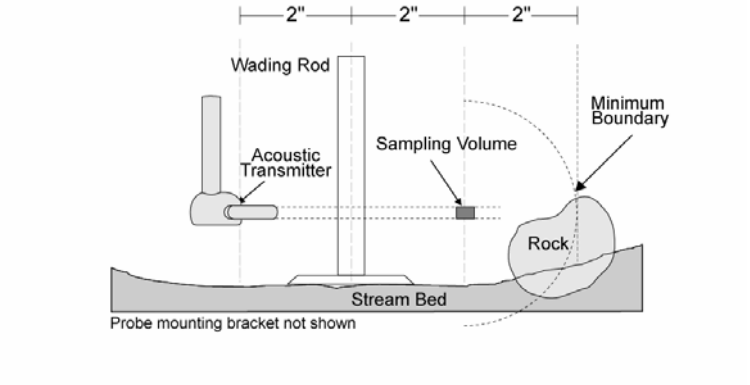

Figure 3. Example of sampling volume placed to close to a boundary.