

Index-velocity Quick Sheet

Site Selection and Reconnaissance Tips

- The best sites for index velocity measurements have turbulent (though not excessively turbulent), well-mixed flow. The greater the velocity and channel size, the greater the chance of having a turbulent, well-mixed flow (greater Reynolds Number). Stratified (layered), unmixed flows can cause ray bending and unstable vertical velocity profiles, which may result in unstable index-velocity ratings.
- Select a site so that the index-velocity instrument can measure velocities in a region of the flow that is stable and near to the maximum. Avoid locations where velocity measurements are made near the edges. The zone of maximum velocity (V_{\max}) is the most well-mixed and stable.
 - In many channel V_{\max} zone is below surface 0.05—0.25 times depth
 - The narrower the channel, the deeper V_{\max}
 - V_{\max} occurs at surface in broad, rapid, or shallow streams
 - The sides of a channel have little influence on the interior for streams where the channel width is 5 to 10 times the channel depth
- Research historic records, if available, for the range of stage and range of discharge.
- Determine the bed material type in the stream. Bedrock or concrete channels are best. Sand or silt streambeds may be acceptable, but are subject to shifting. Changes in channel geometry over time may change the stage-area and index-velocity ratings.
- Look for obstructions where your index-velocity instrument will be sampling.
- Assess potential for weed growth. Weeds can block acoustic signals
- Avoid locations close to the upstream or downstream side of a dam or lock. Changes in gate setting can change flow patterns wreaking havoc with your index-velocity ratings. Excessive turbulence and/or entrained air below a dam is also likely to be problematic. Use an ADCP to ascertain reaches downstream or upstream where alterations in flow patterns no longer have a significant effect.
- Consider the following issues: mounting the index velocity meter, power considerations including solar power, protection from vandals, telemetry (for example, GOES transmitters require a clear shot to the satellite).
- Useful reconnaissance tools:
 - Use an ADCP to determine flow patterns, vertical and horizontal velocity profiles
 - Use temperature probes to measure temperature profiles, looking for changes in temperature that could indicate vertically stratified flow
 - Temporarily mounted ADVMs or profilers can be used to collect data for a representative time period (a month or more) to see if the site is suitable
 - Aerial photographs, digital terrain and topographic maps of the area