Index-velocity Quick Sheet

Stage-area Rating Tips

- A stage-area rating is one of two ratings needed for computing discharge records using the index velocity method. The stage-area rating is used obtain a rated area for a given stage at the streamgaging station. It should be developed based on data collected at a fixed cross-section in the stream (also referred to as the standard cross-section).
- The standard cross-section should be located such that periodic surveys can readily be made to check for changes in channel geometry and therefore the stage-area rating.
- Several different instruments may be used for surveying the standard cross-section, including
  - Level and Stadia Rod
  - Depth soundings with a tag-line
  - Echo sounder with a surveying package like HyPack
  - Acoustic Doppler Current Profiler (ADCP)
- ADCPs are convenient for surveying channel depths. Keep in mind they were not designed as echo sounders and are difficult to calibrate
  - Use a tagline if possible, to provide transects that are approximately perpendicular to the flow
  - Make the ADCP transect straight across the channel
- Calibrated echo sounders used in conjunction with differential GPS and hydroagraphic surveying software such as HyPack are useful for obtaining accurate channel geometry.
- Important considerations include the following:
  - The cross-section must be referenced to stage / gage datum
  - Make sure that the survey extends past the maximum expected stage
  - Periodically check for channel changes – even upstream or downstream of the standard cross section.
- When computing mean channel velocity (V) for a discharge measurement for development or checking of an index velocity rating, ALWAYS compute V using the area from the stage-area rating.
- The USGS has developed a useful tool for developing stage-area ratings called AreaComp. This Windows program allows users to:
  - Import ADCP transect ASCII files (you must generate those using WinRiver)
  - Import comma delimited files
  - Enter cross sections interactively
  - Generate stage-area tables for entry in to the USGS NWIS