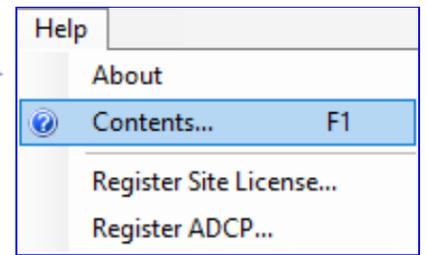


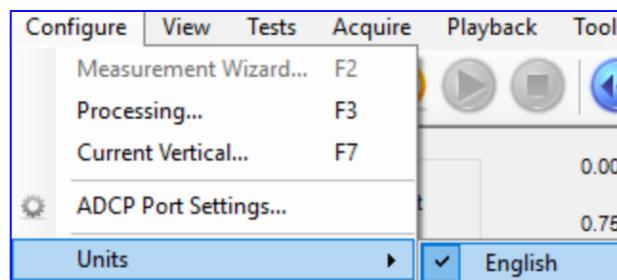
# RDI SXS PRO CHEATSHEET

- This document is set up in two sections: [SETUP](#) and [PROCESSING](#) (select link to jump ahead)
- For additional troubleshooting information, please consult the SxS Pro Users Guide in the Help Menu
- For a Video Index of YouTube videos providing more detailed walkthroughs of midsection measurement procedures, visit the following link: [Link to USGS Midsection Hydrotube Videos](#)

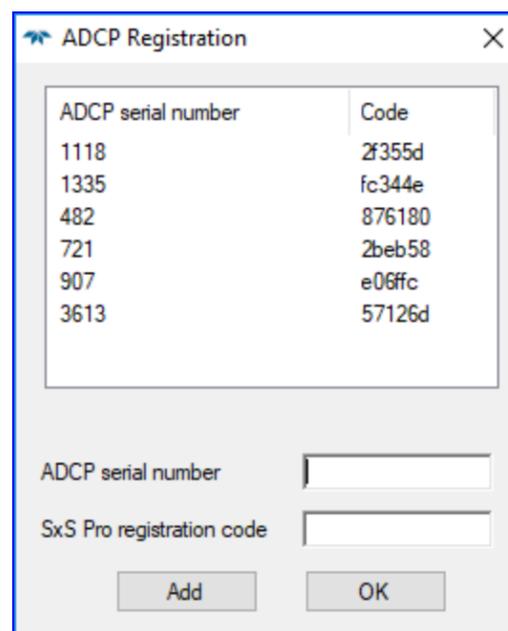
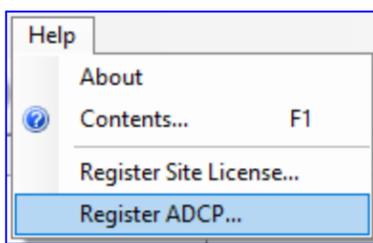


## SETUP

### Set Units to 'English'



### Enter ADCP Registration Code into the SxS Software

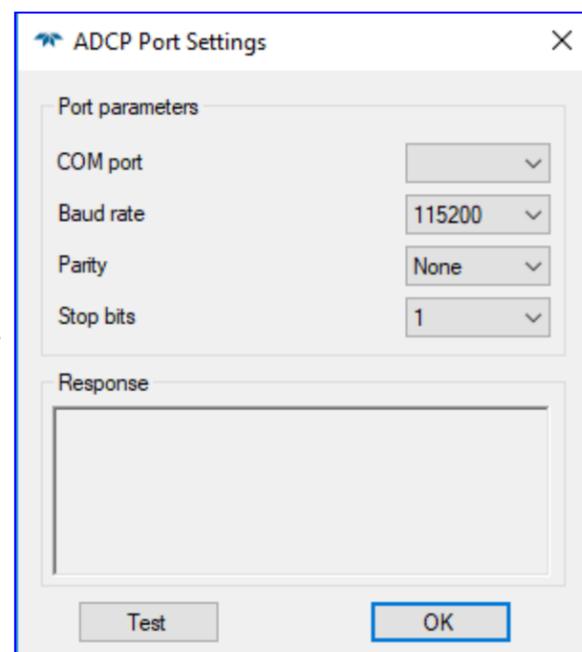
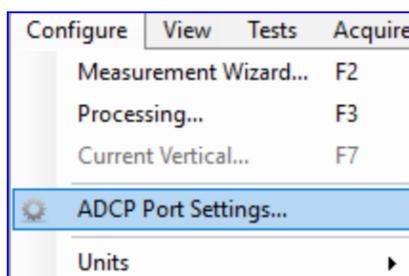


- Enter ADCP Serial Number
- Enter SxS Pro Registration Code\*
- Select 'Add'

*\*Registration Code is provided by TRDI after purchasing SxS upgrade for each ADCP.*

### Set ADCP Communication Port

**\*\*If using RioGrande, perform ADCP test and calibrate compass in WinRiver II prior to connecting in SxS\*\***



- Enter ADCP COM Port
- Enter ADCP Baud Rate
- Keep Parity and Stop Bit settings as shown
- Select 'Test'. ADCP Break Response should populate in window

## Click to Start a New Measurement

(Can go back to wizard via Configure->Measurement Wizard during measurement as long as pinging stopped. This will allow for changing of depth and water speed settings based on changes across cross section)

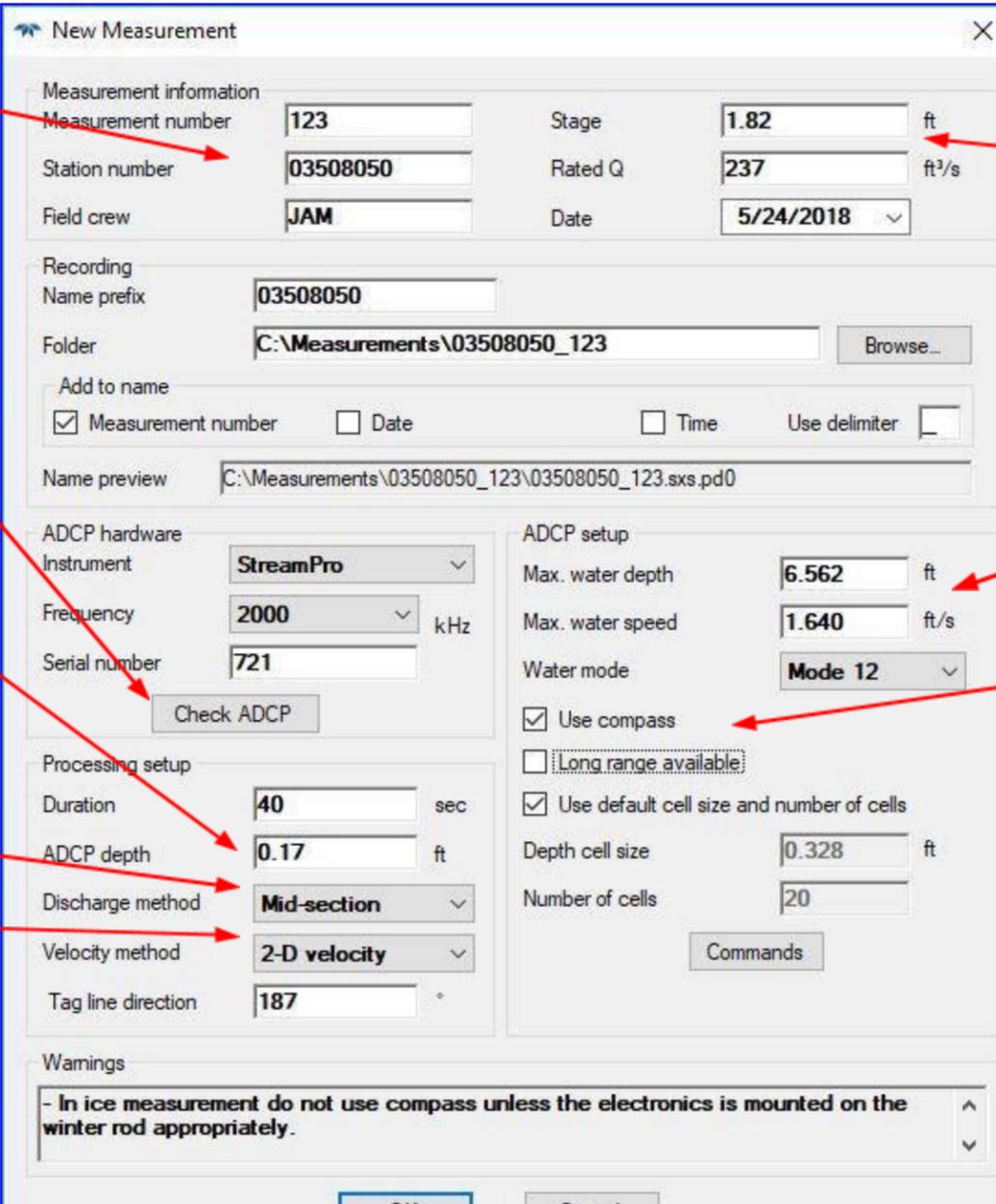
**1**  
Enter Measurement Information

**3**  
Click 'Check ADCP' to find instrument. If first attempt fails, hit 'set port' on pop-up window and select correct COM port.

**4**  
Set ADCP Depth (Draft)

**5**  
Ensure Discharge method is 'Mid-Section'

**6**  
Select appropriate 'Velocity Method'. See below for details on option. **Tagline Azimuth must be entered when using 2-D Velocity Method.**



**2**  
Enter **Stage** and **Rated Q** to calculate % Q in Verticals

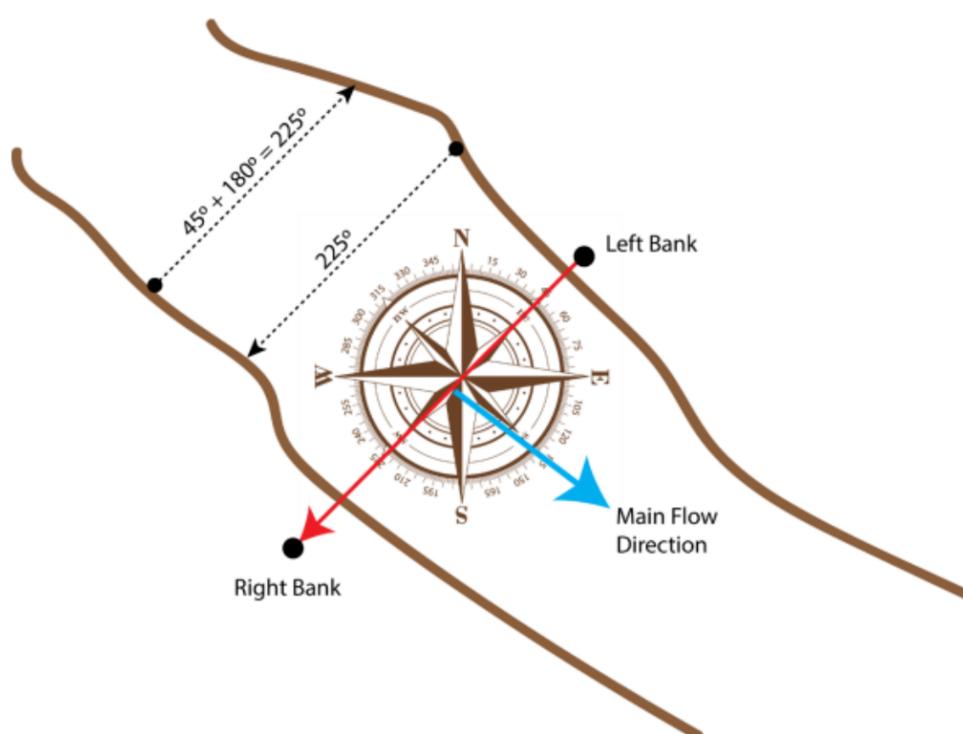
**7**  
Set 'Max water depth' and 'Max Water Speed' settings for RioGrande and Strempro ADCPs. Adjust water mode settings if necessary.

**8**  
**\*STREAMPRO ONLY\***  
Select 'Use compass' to enable ADCP compass. **\*Must check when using 2-D velocity method and unchecked for y-velocity\***  
Select 'Long range available' if enabled on ADCP.

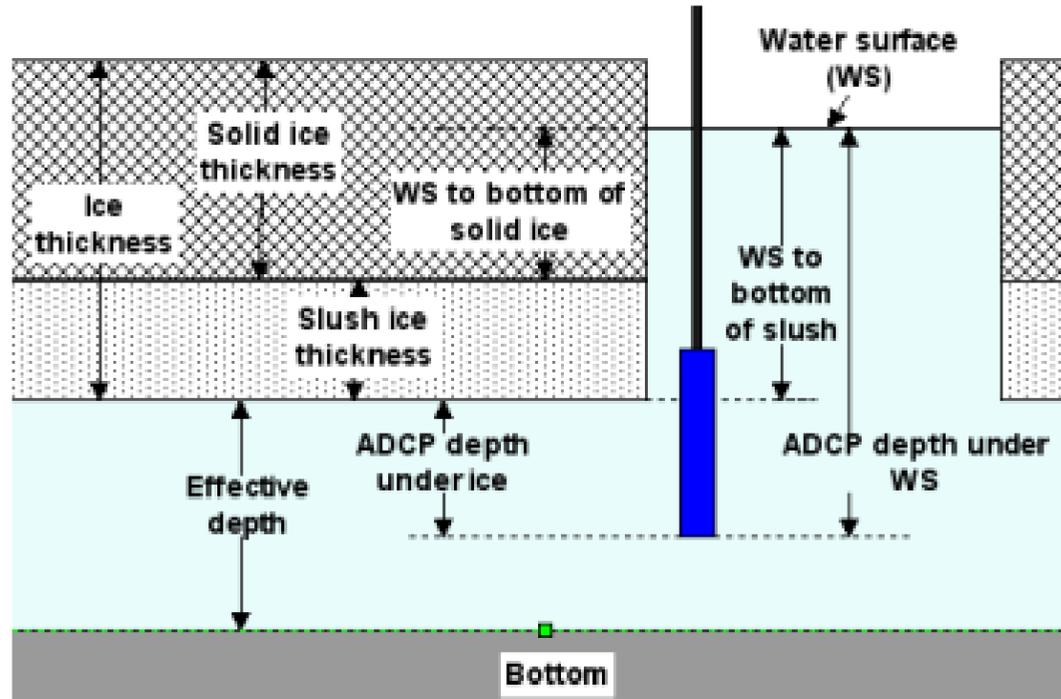
Configuration Wizard can be visited during a measurement to change max depth and velocity between verticals. **Beware of Software Bug** where 'Velocity Method' reverts back to y-velocity when Wizard is re-visited.

### Velocity Method Options

- PREFERRED: Select '**2-D velocity**' method for software to compute flow angle.
  - Must enter tagline (bridge, cableway, etc.) azimuth looking from left to right bank.
  - Beware of magnetic interference with compass bearing. Avoid acquiring bearing standing on bridge.
  - Requires a calibrated ADCP compass.
  - Only enter magnetic variation (in processing window) for tagline azimuths acquired from a map.

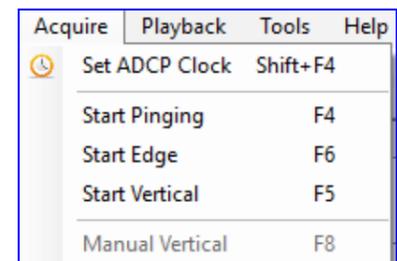
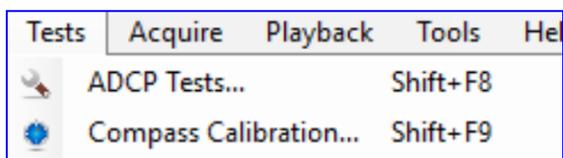


2. Select '**Magnitude**' method to manually enter a flow angle or a flow angle coefficient.
  - Similar to entering flow angle coefficient for current meter measurements.
  - Can also enter flow angle (degrees from perpendicular) .
  - Preferred method if magnetic interference is expected or a valid compass calibration is not possible.
  - Sign of flow angle (+ or -) does not matter.
3. ICE: Select '**y-velocity**' for measurements under Ice.
  - Align beam 3 downstream (perpendicular to 'tagline') or enter 'Beam 3 misalignment' value (The angle between beam 3 and a line perpendicular to cross-section).
  - Sign of misalignment DOES matter for y-velocity method. Looking down on ADCP, beam 3 rotation from line perpendicular to cross section is positive for clockwise rotation and negative for counterclockwise rotation.
  - Must enter 'ADCP depth below ice' or 'ADCP depth below water surface' to calculate discharge.

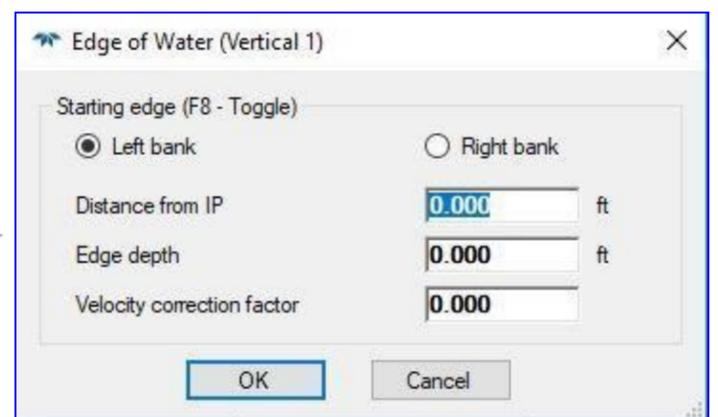
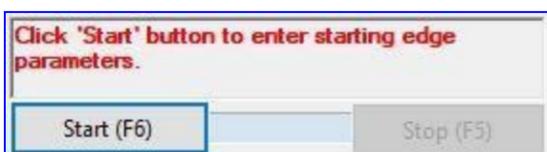


### Perform Pre-Deployment Tests

- Use 'Acquire' menu to '**Set ADCP Clock**' and to '**Start Pinging**' in order to verify temperature stabilization. Document ADCP and verification with 2°C in SVMAQ.
- Use 'Tests' menu to Conduct **ADCP Test** and **Calibrate Compass**.

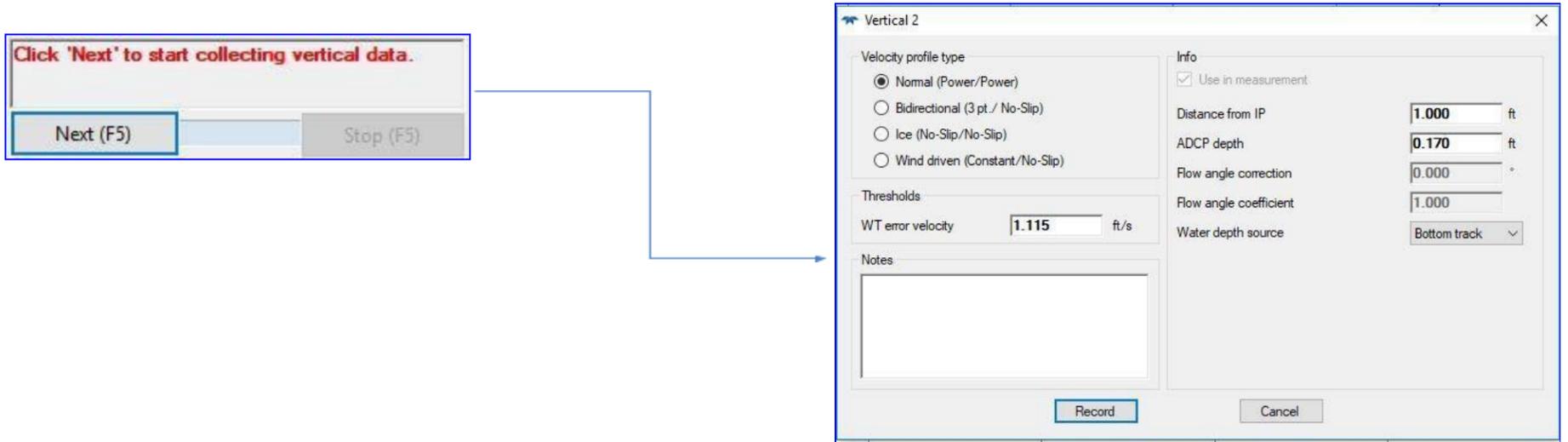


### Select 'Start' or 'F6' to start pinging



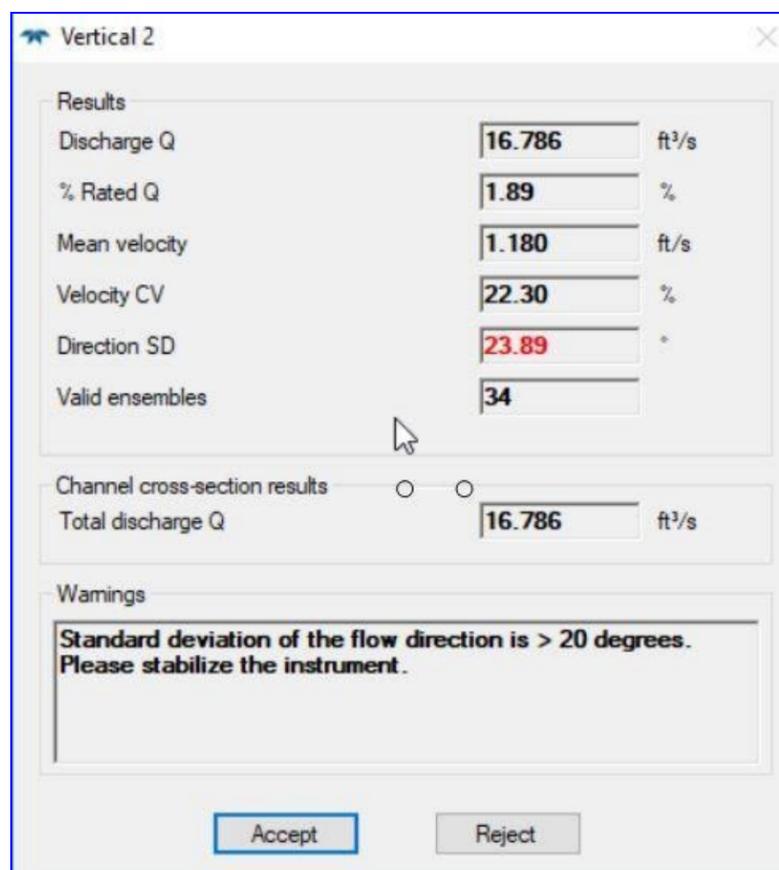
- Distance from IP (Initial Point) is location on tagline at edge of River.
- For Triangular/Sloping Edge (most common) enter an Edge depth of 0.00.
- For Vertical Edge, enter Water Depth at Edge and a Velocity Correction Factor that is applied to the velocity from the next station. For example, if velocity at edge is about half of that of the next station enter 0.5 as the correction factor.

## Select 'Next' or 'F5' to proceed to Next Vertical



- Ensure '**Distance from IP**' is correct and water depth source is 'Bottom Track'.
- If using '**Magnitude**' velocity method, enter *either* the **flow angle** (in degrees from perpendicular to tagline) *or* the **flow angle coefficient** (from current meter note sheet or angle coefficient protractor).
- Ensure  $\geq 30$  good ensembles in each vertical. If not enough, software will prompt to collect for longer period. If still  $< 30$  good ensembles, attempt to change '**Water depth source**' to '**Manual**'. Enter depth from 'good' ensembles or from another source (sounding weight). Make sure to document the source and reason for using manual depth in SVMAQ.
- Profile type can be set to reflect expected site conditions, but should stay constant throughout the measurement.

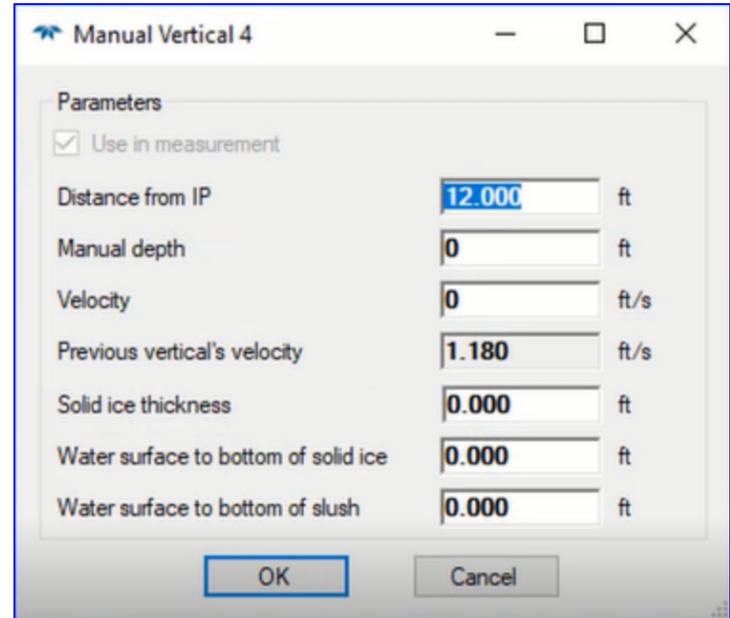
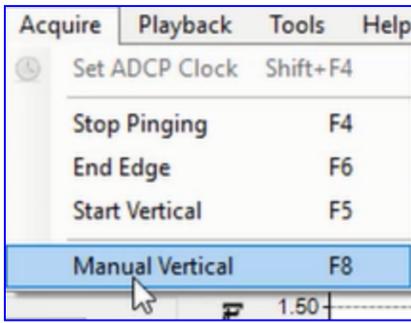
## Review Each Vertical



- Acquire at least 30 good ensembles. If software prompts, consider collecting data for additional time.
- **Velocity CV** (coefficient of variation) should slowly decrease until reaching a stable value. Velocity CV compares velocity values from each ensemble and computes the variation as a percentage.
- '**Direction SD**' may be red if instrument not stable. Common at edges and behind piers. If possible, stabilize boat by shortening rope length or by adding a weight (high velocity) or windsock (low velocity).
- Ensure '**% Rated Q**' less than 5%. If not, shorten the distance between stations or add station.
- Press **Accept** to move to next vertical, or **Reject** to repeat the current vertical.

## Entering a Manual Vertical for Island Edge or Bridge Pier

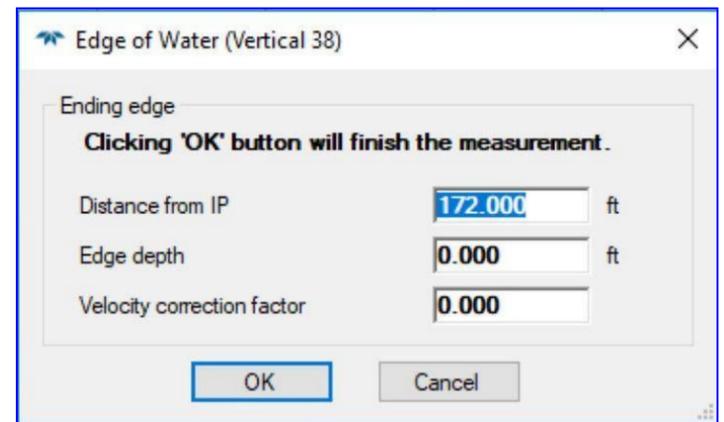
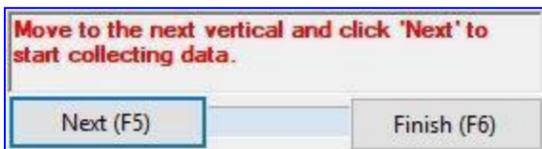
*\*NO option for vertical island edge or vertical bridge pier in SxS Pro Software - Recommendation is to End Edge and make a multi-channel measurement with two SxS measurements\**



Enter zero depth and zero velocity for edge of bridge pier or island edge.

Previous vertical's velocity is available to estimate velocity in extreme or rare cases where velocity data cannot be collected (ie. too shallow), but can be reasonably estimated.

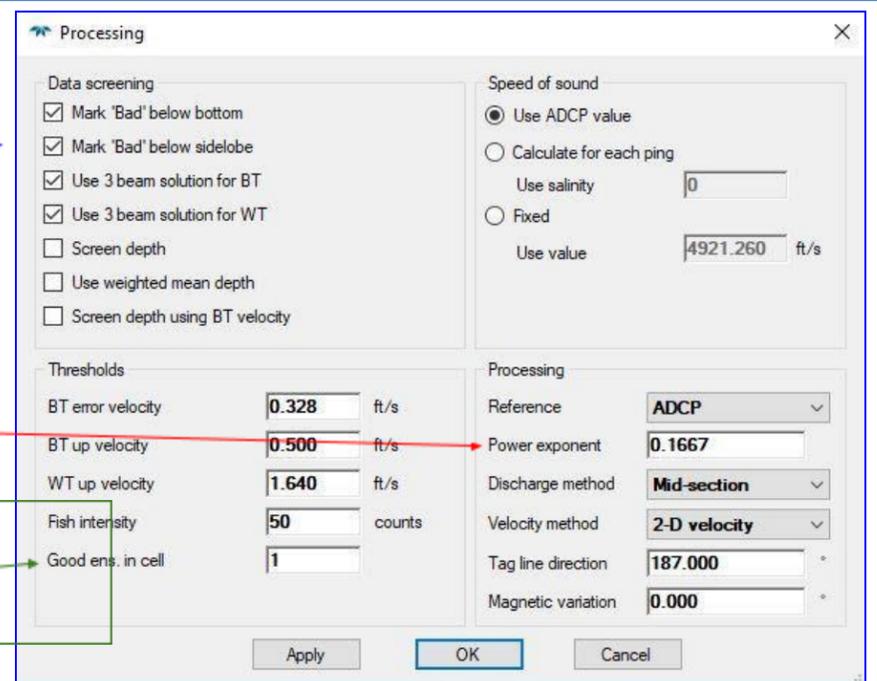
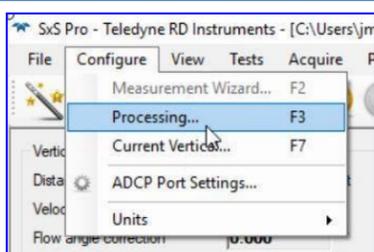
## Select 'Finish' or 'F6' to Enter End Edge Information



- Similar options as Starting Edge. If vertical, enter **Velocity Correction Factor** based on the previous station.
- Ensure all verticals < 5% total discharge before selecting **finish**. Cannot add verticals after this step.

## POST PROCESSING

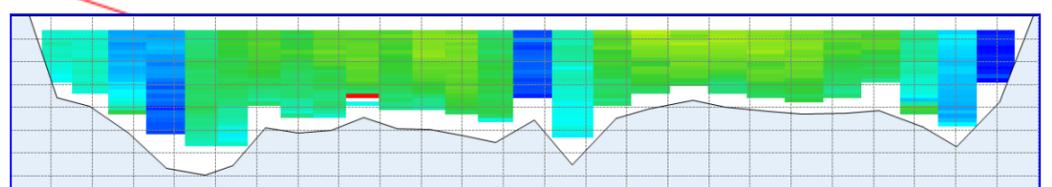
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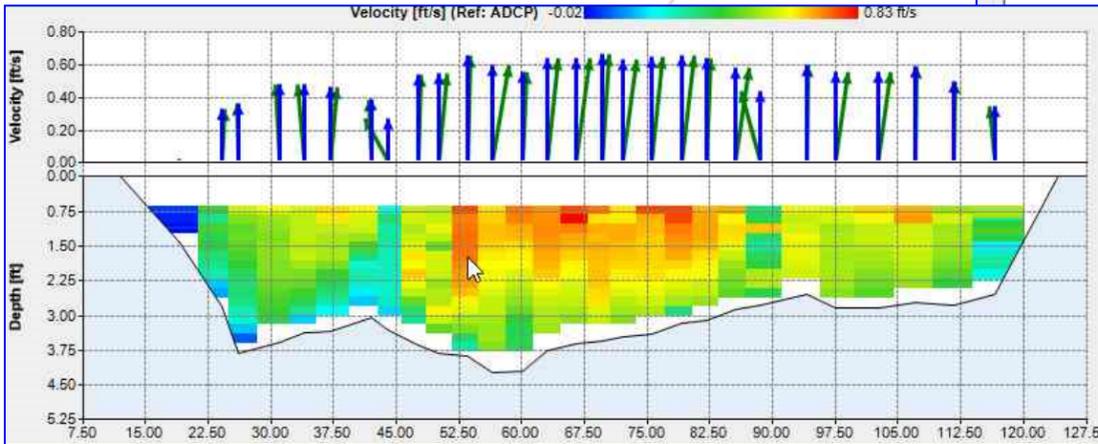
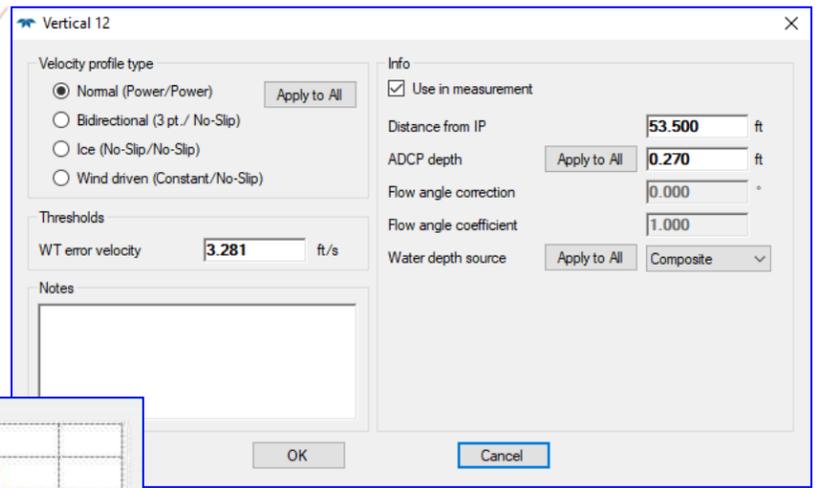
Ensure Processing Settings have not changed from wizard.

Processing Window is where **power exponent** is set for the entire measurement after determining the correct extrapolation (see below).

Increase 'Good Ensembles in cell' to 3 to remove spikes from near river bed. Increase to 5 if necessary to remove near bed spikes. If spikes persist, see USGS Hydrotube Video '[Advanced Review of TRDI SxS Pro Data](#)' for information on evaluating and changing screening thresholds.



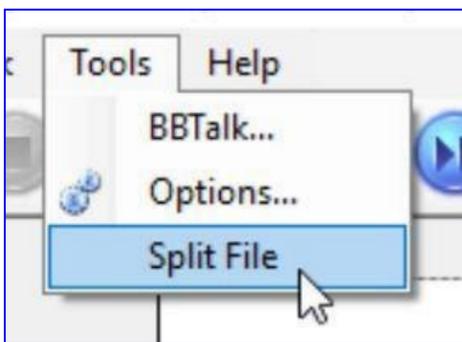
Double Click on a vertical in the velocity contour plot to access the information entered for that vertical. The **Velocity profile type** is adjusted here after proper extrapolation is determined (see below). Can also access by clicking on each vertical on the **'view verticals details/selection'** display mode.



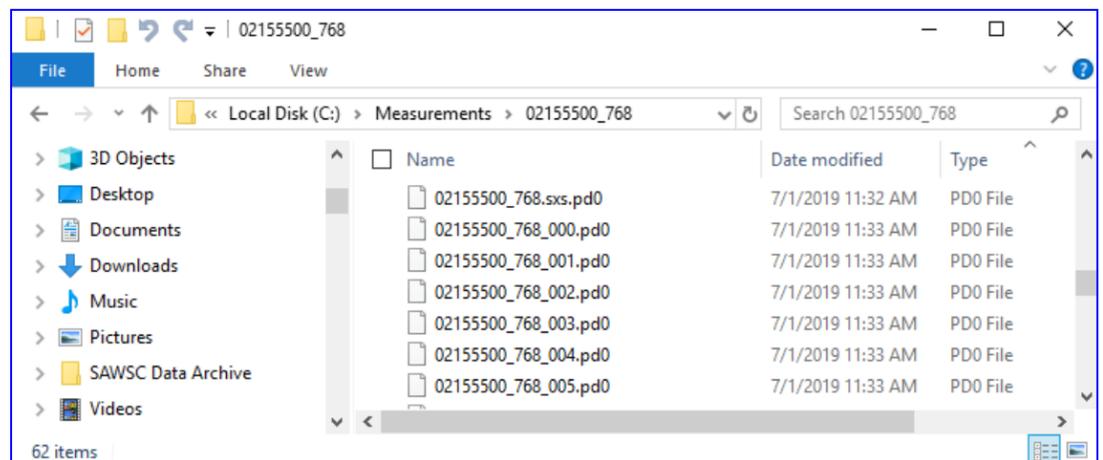
## Extrapolation

*\*Qrev cannot directly process measurements from SxS Pro, but can be used to evaluate the velocity profile extrapolation\**

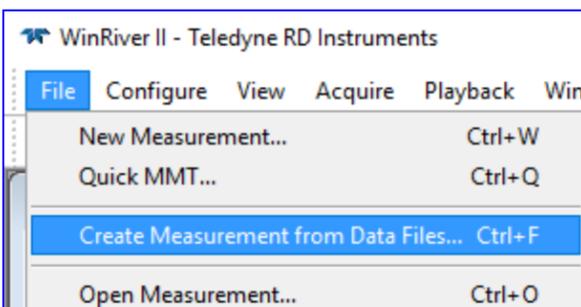
### In SxS Pro



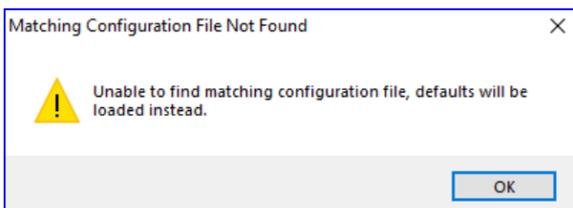
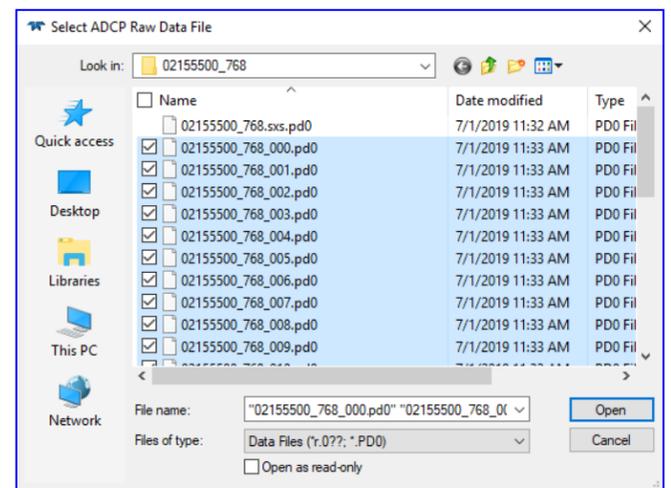
In SxS Pro, Split file to create one .pd0 file for each vertical



### In WinRiver II

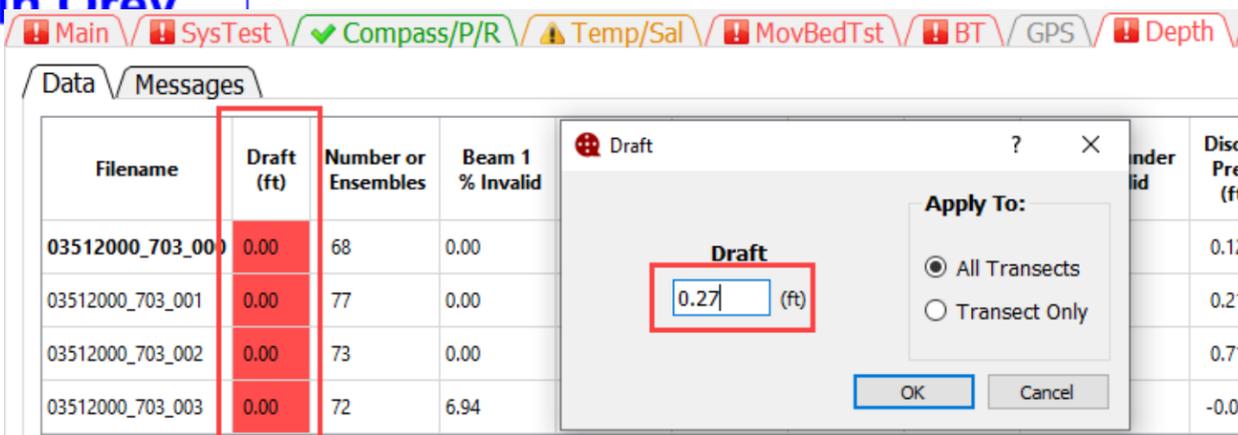


In WinRiver II, create measurement from data files selecting all .pd0 files except the original sxs.pd0



Ignore Errors and save .mmt file with 'extrap' in filename.

### In Qrev



Open extrap.mmt in Qrev

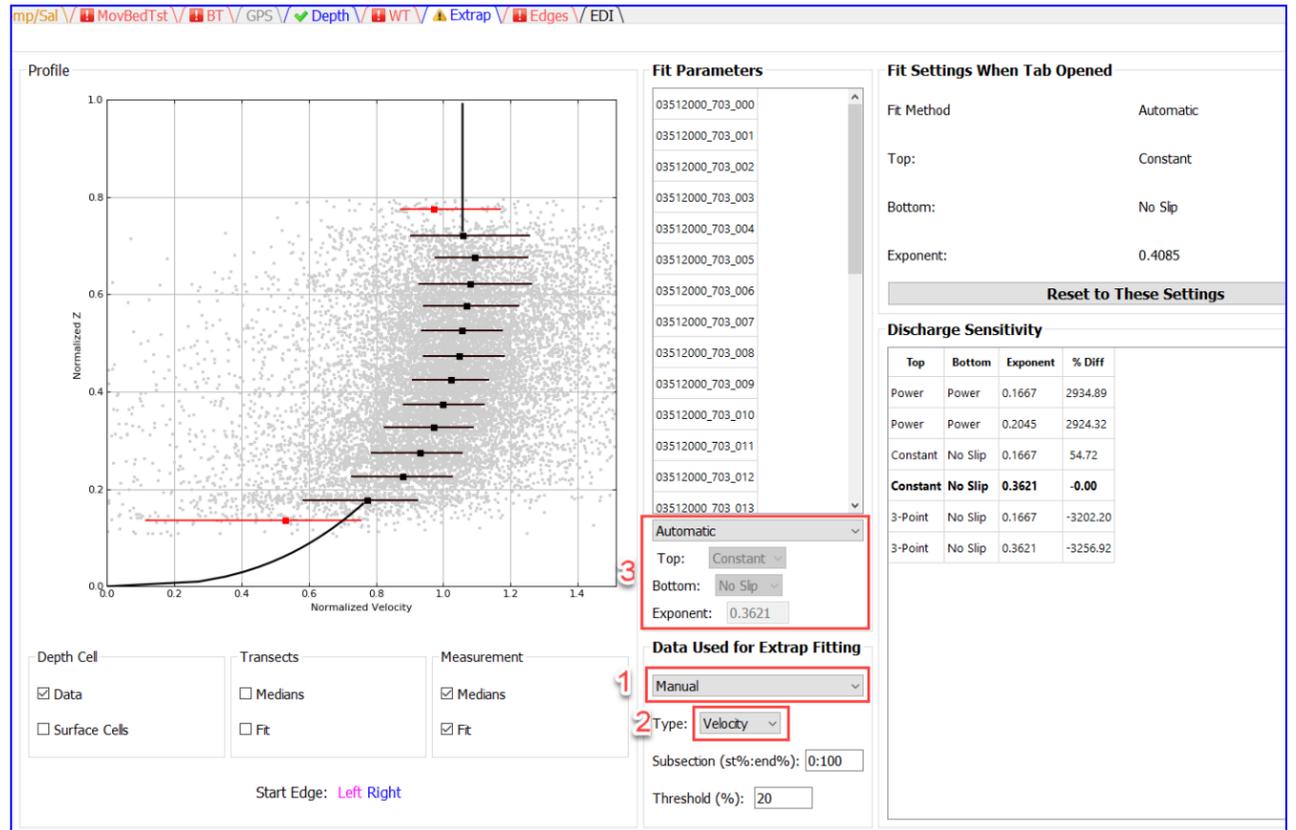
Select **'Depth' Tab**.

Double click on **'Draft (ft.)'** for any transect.

Enter ADCP depth and select **'All Transects'**

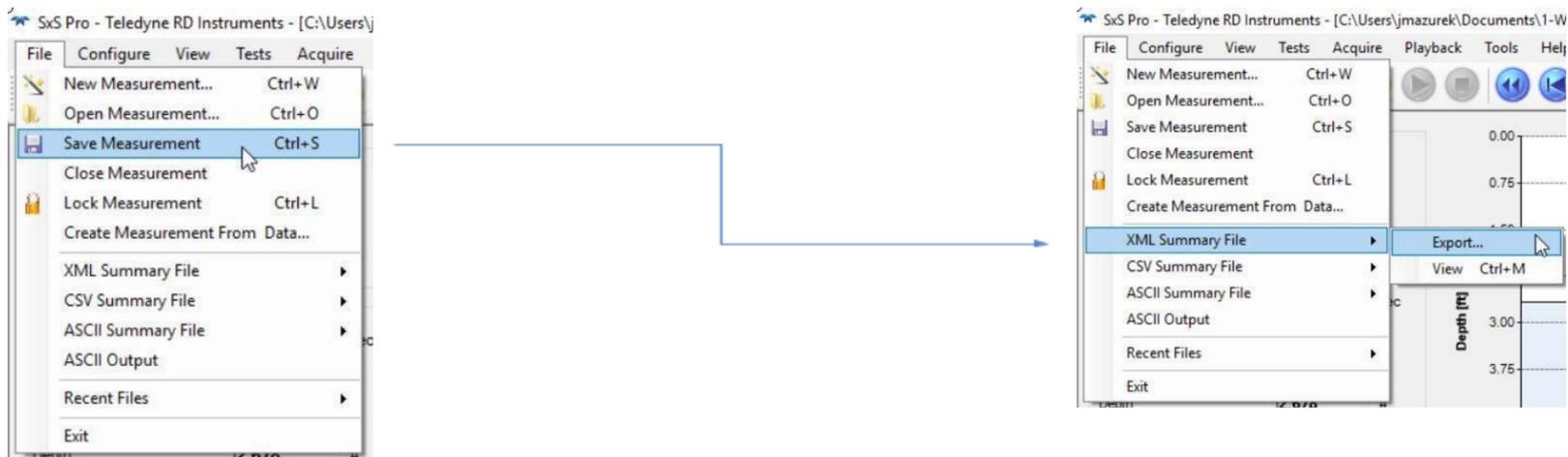
## Extrapolation (continued)

- 1) Change 'Data Type Used' to 'Manual'
- 2) Change 'Data Type' to 'Velocity'
- 3) Evaluate Extrapolation and record Top, Bottom, and Exponent

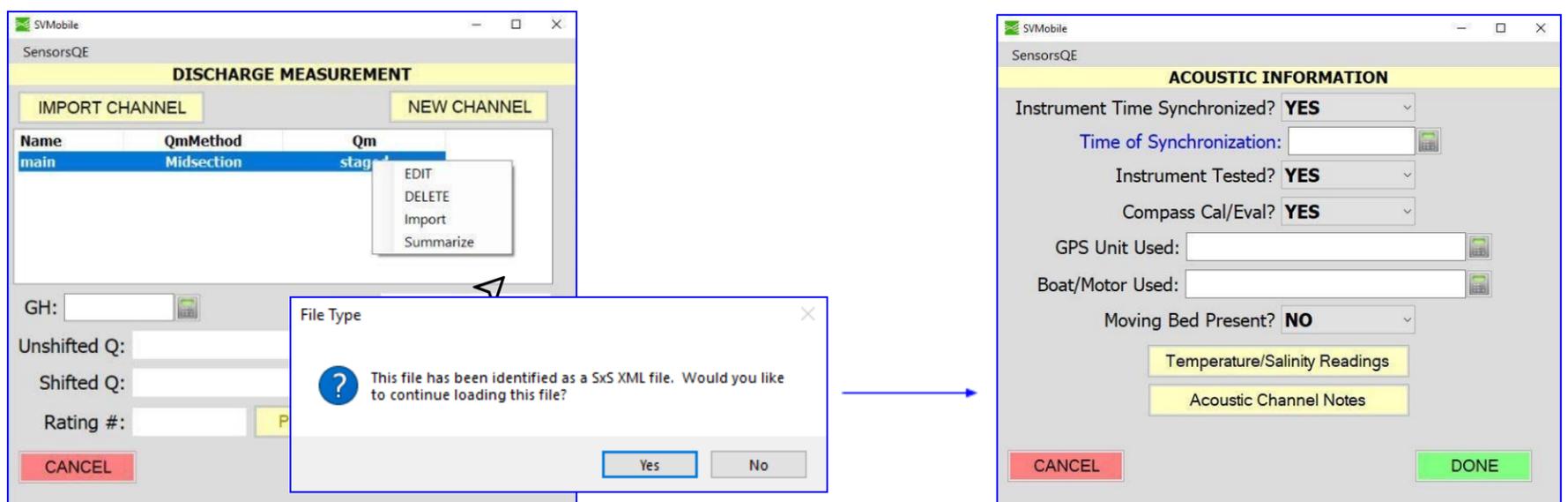


- Based on Qrev, change power exponent in **Configure->Processing** as shown above (in red text) under '**Post Processing**' section above. Close Processing window.
- **Double-click on any vertical** (as shown above in red text in '**Post Processing**'): Change '**Velocity Profile Type**' to Wind Driven if Extrap computes a Constant/No-slip velocity profile and select '**Apply to all**'.
- In cases of extreme upstream flow direction in at least the 3 uppermost bins, **Bidirectional** profile type may be used; However, this option should be rarely used. If used, be sure to document site conditions.
- Save file in Qrev to document the extrapolation used for reviewer. (Reviewer: Check ADCP depth entered, 'Velocity' type selected, and appropriate extrapolation used)

## Save and Export Measurement to .XML



## Import .XML into SVMAQ and Add Any Additional Notes



**\* WARNING: DO NOT load Qrev file into SVMAQ. Only load the XML file exported from SxS Pro Software\***

Please Report any Software Bugs/Issues to: [gs-w\\_hawg\\_all@usgs.gov](mailto:gs-w_hawg_all@usgs.gov)

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