SonTek
A YSI Environmental Company

FlowPack Demonstration Guide

INTRODUCTION

This document is a quick guide to help customers get started using SonTek's FlowPack software package. It is a software that provides a method for storing flow, velocity and stage measurements in a single program and easily generating Velocity-Index ratings in a presentation quality format.

FlowPack has the following features and capabilities:

- Simplified measurement storage and data review.
- Storage of multiple sites and ratings.
- Imports data from a wide variety of sources including all SonTek stage and discharge instruments, as well as data from other devices.
- Collates and appends measurements.
- Develops Stage-Area relationships.
- Computes Velocity-Index ratings.
- Outputs analysis results.
- Full multi-language support (*coming soon!*)

What is a Velocity-Index Rating?

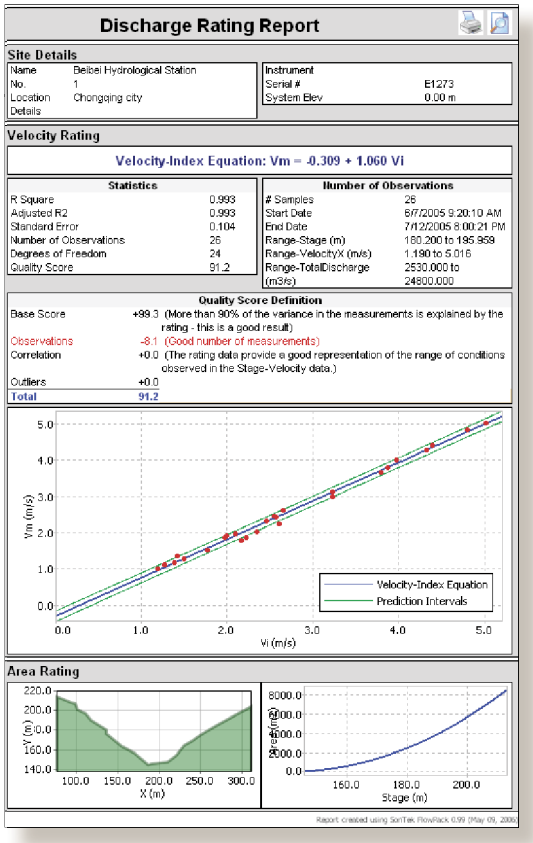
Velocity-Index ratings are developed to provide a relationship between the true mean velocity of a river (which is used to determine the flow) and that measured by an installed current meter (such as an Argonaut-SL or SW) located at the site.

Velocity-Indexing is typically used at sites where the traditional method of relating the stage to the flow (commonly called Stage-Discharge) cannot be used because of complex flow conditions. The quality of a Velocity-Index rating is generally dependent on the number of measurements made and the range of conditions (different stages and velocities) over which these measurements were made.

How to Build a Velocity-Index Rating

The procedure for building a data set of measurements for development of a Velocity-Index rating that is calculated using the FlowPack software is as follows:

1. A current meter is installed at the site and continuous velocity and stage measurements are recorded.
2. Individual measurements are made using a flow measurement device such as a FlowTracker or RiverSurveyor system at the site. This flow data is gathered at different times, stages and flows to provide as wide a range of conditions as possible.
3. Site information and the cross-section geometry are entered into the FlowPack software.
4. The data from the installed current meter are input into the FlowPack software.
5. The data from the flow measurement device is input into the FlowPack software.
6. The FlowPack software matches the flow measurements against simultaneous measurements of stage and velocity from the installed current meter. This builds up a series of records of discharge, stage and measured velocity at different times.
7. The FlowPack software correlates and analyzes this data to automatically determine the best form of the relationship between the velocity measured by the current meter and the mean velocity of the river.
8. A report that graphically displays this relationship is generated.



Sample Discharge Rating Report

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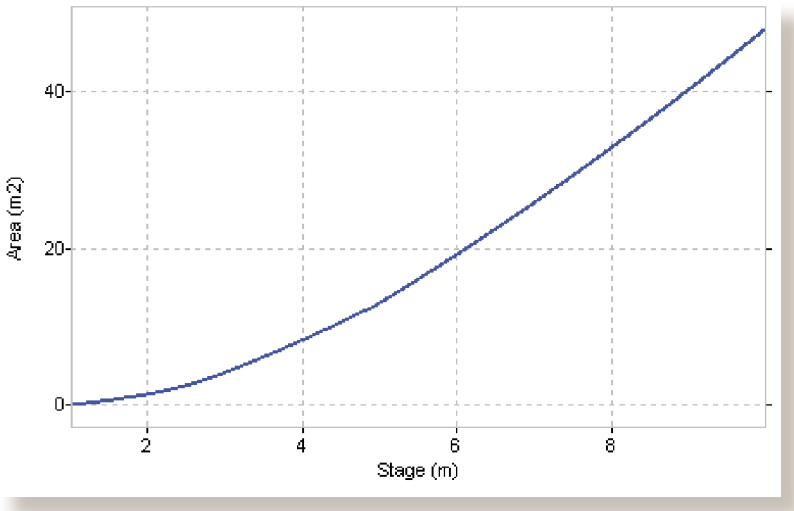
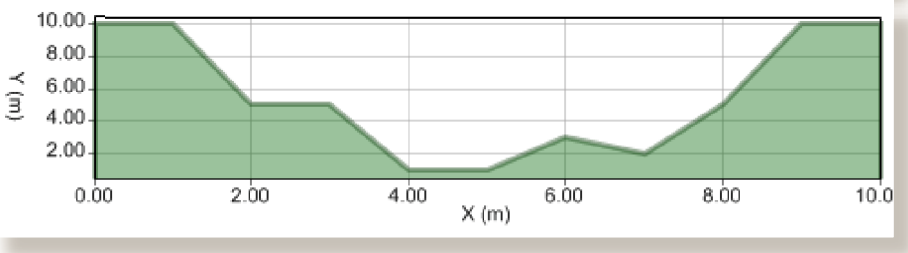
How Does FlowPack Work?

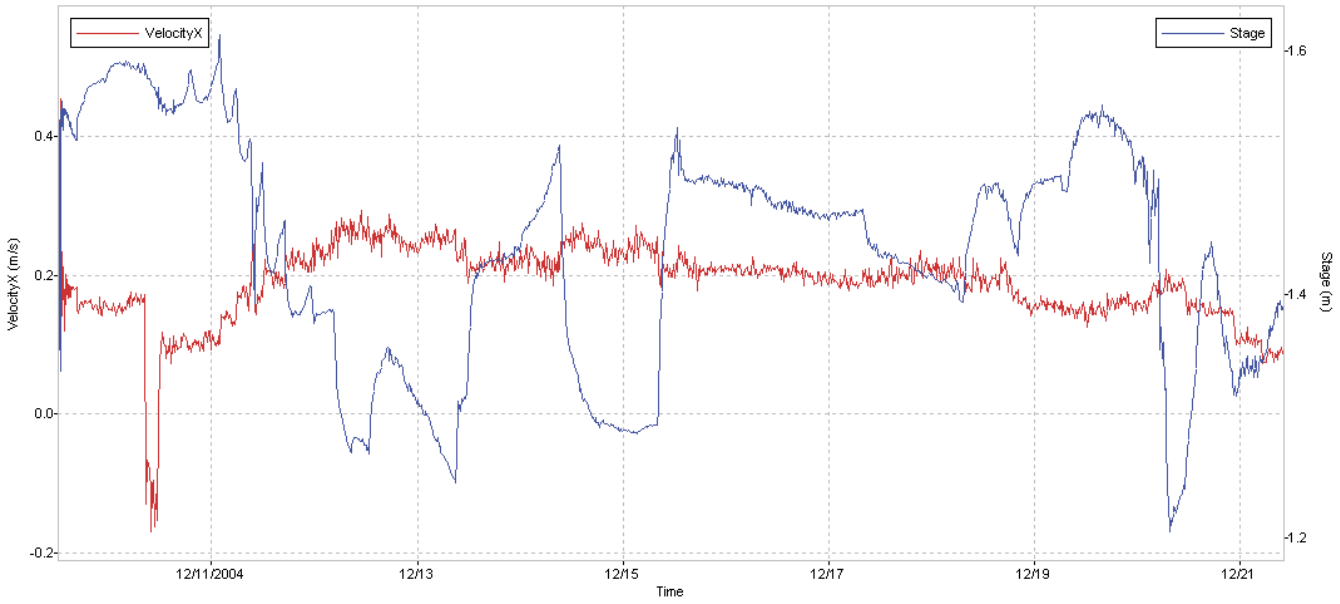
FlowPack first takes the input cross-section geometry and builds a relationship between stage and area for the site, as shown in this example.



The Stage-Area graph (top) has been built using the data from the cross-section (bottom). Using the Stage-Area data, for any given stage, the wetted area may now be determined.



Next, the data from the current meter is loaded. An example data showing changing velocity and stage over time can be seen below.



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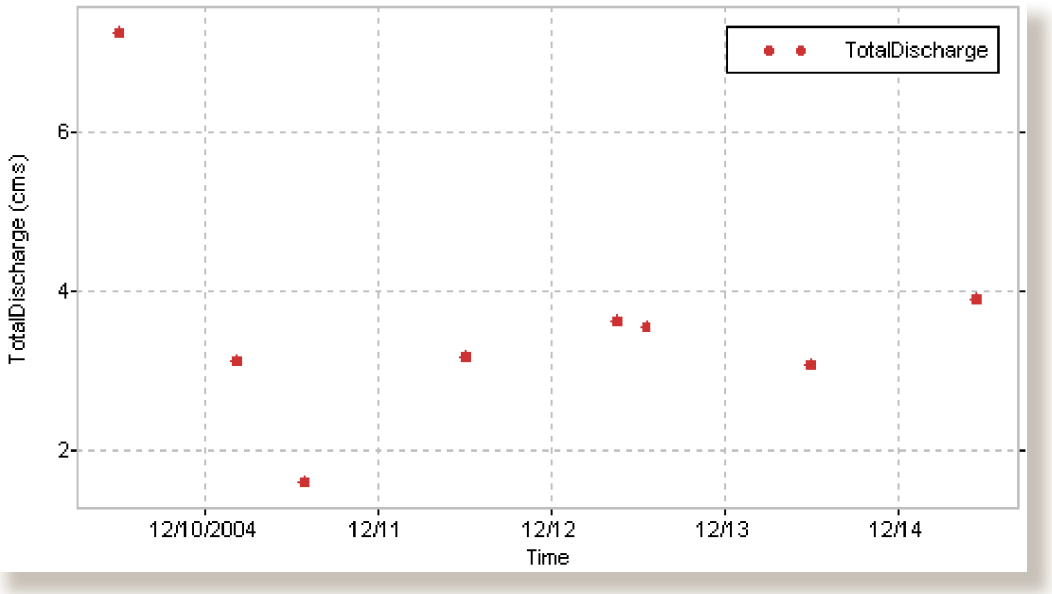
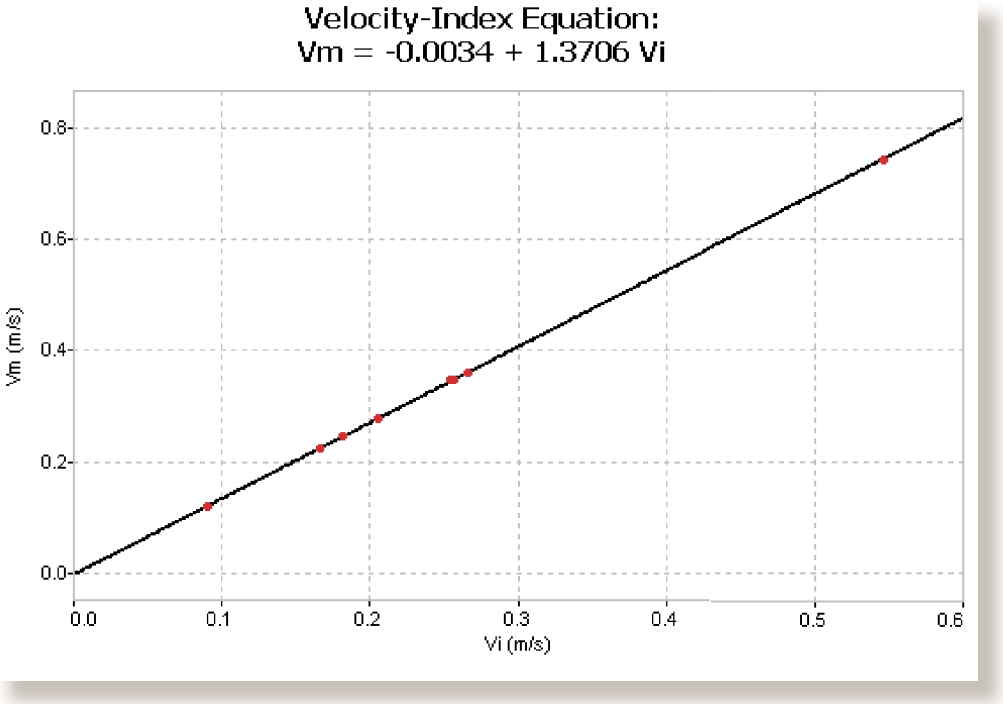
The next step is to load data from the flow measurement device. An example set of these measurements can be seen below.



FlowPack takes each of these measurements, and matching the times for the current meter data and the flow data, builds a table of flow, velocity and stage data.



This Velocity-Index equation can then be loaded into an Argonaut-SL or data logger installed at the site. This permits the output of accurate flow data from the site in real-time