

P6. Mapping the Lower Bear River Cross Section

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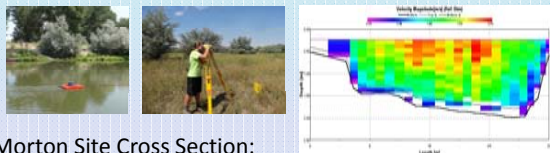
Abstract

The purpose of this cross section data study is to map the geometry of different points along the Lower Bear River, compare the data from 2012 to 2013, and identify how the changes in the river cross section correlate with seasonal variation of river flow. We obtained data by setting up three monitoring sites along the River, and measuring cross section data using an Acoustic Doppler Current Profiler (ADCP) as well as surveying equipment. We measured river bank, water surface, and adjacent riparian land elevation. After obtaining the data, we then digitally converted and organized it into formats that allowed for it to be graphically represented on a basic x y plane where the x axis represents distance away from the benchmark point and y represents elevation with reference to the benchmark point. Changes in the river bed, banks, and river water depth were inferred visually on the graphs, and similarly quantitative correlations between year to year measurements were observed in the organized numerical data. The findings from this work illustrate changes in the river cross section.

Objectives

1. Observe differences in the Confluence and Cub River cross sections from November 2012 to August 2013.
2. Quantitatively relate river wetted perimeter to river stage.
3. Determine if the Cub River cross section changed significantly since May 2013 to see why we could not find our pressure transducer in August 2013.

Methods



Morton Site Cross Section:

- We used ADCP depth readings and rod measurements with reference to the benchmark to obtain water depth at particular intervals along the channel cross section.
- We digitized the recorded data, converted the depth readings to appropriate elevation readings, and then plotted the data on a graph in Excel

Cross Section Comparison:

- We plotted the ADCP transect depth data in the WinRiver program
- Exported data to obtain depth and "distance made good" measurements to plot on a graph.

Site Locations



Figure 1: Field study sites. Measurements were taken from November 2012 to August 2013 at the Morton, Cub, and Confluence locations.

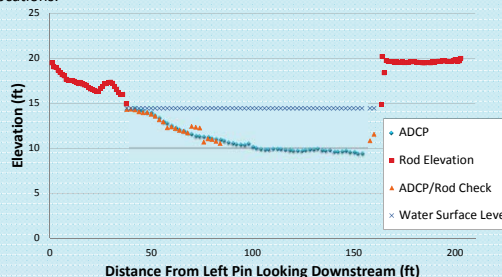


Figure 2: Morton site cross section looking downstream

Results

- Visually represent the Morton Site Cross Section (Figure 2)
- Visually infer where the river had changed (Figures 3 and 4)
- See correlations between the perimeter-stage data (Figure 5)
- Bear Cub Confluence did not show significant differences in average perimeter with relation to stage (Figure 5), supported by visual representation of Bear Cub Confluence (Figure 4)
- Cub River showed differences in perimeter-stage, the perimeter decreased from May 2013-August 2013 while the stage increased (Figure 5) eliciting that there had been a change in the river cross section which is roughly discernable in the visual representation (Figure 3)
- Cub River cross section did change between May 2013 and August 2013

Results

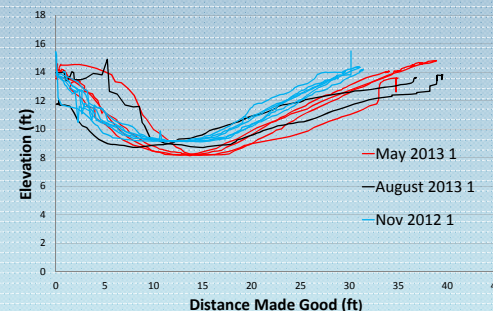


Figure 3: Cub River Site Cross Section. Each line represents a transect.

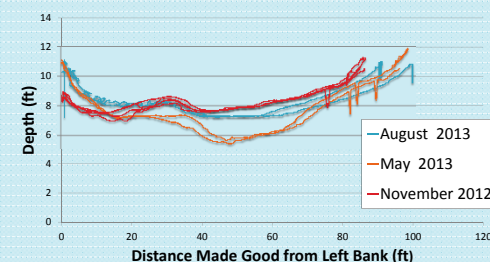


Figure 4: Bear Cub Confluence Site Cross Section. Each line represents a transect.

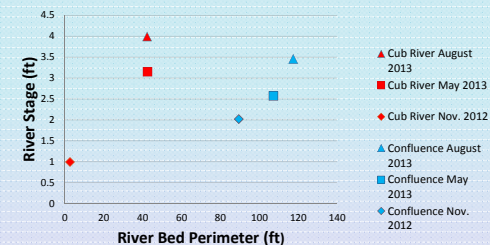


Figure 5: Perimeter-Stage Relationship at the Cub River and the Confluence

Next Steps

- We will note the distance from pins and distance from banks with reference to the constant benchmark point when taking ADCP measurements.
- Find a relation between river cross section and river mass balance to see how cross section changes effect river flow.
- Obtain more transect data over time to improve cross section comparisons.