Hydrol. Earth Syst. Sci. Discuss., 8, C998–C1000, 2011
www.hydrol-earth-syst-sci-discuss.net/8/C998/2011/

Hydrology and Earth System Sciences Discussions

Interactive comment on "The need for complementary hydraulic analysis in post-restoration monitoring of river restoration projects" *by* T. A. Endreny and M. M. Soulman

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Received and published: 19 April 2011

Endreny and Soulman present results of intensive monitoring of a 1600-m-long channel project on a small (18 km2 watershed) channel in New York state. Although the project is termed "river restoration" throughout the paper, its only stated purpose was to "reduce turbidity entering....a reservoir." This goal was addressed by constructing 60 stone river training (erosion control) structures (an average of 1/27 m), which resulted in four (or 5??–see figure 1)channel avulsions. The authors attribute this response to the small cross-vane arm horizontal angles. Although many of the as-built cross vane geometries departed from design standards, the authors recommend such adverse

channel response be addressed via intensive monitoring and timely hydraulic analyses using computer models and the monitoring data.

Abundant literature (E.G., Brookes and Shields 1996, FISRWG 1998, Shields et al. 2003) provides guidance on stream restoration which was either absent or undocumented in this project.

1. The purpose of a stream restoration/rehabilitation project should be to return the ecosystem to a pre-disturbance trajectory. This implies some analysis and documentation of the "pre-disturbance" ecological condition, and how project components will interact with natural forces to move the system toward that trajectory. In the case of this project, for example, what are past, present and desired downstream turbidity regimes? What types of organisms and habitats are of concern in the project reach? Instead, the monitoring program focuses entirely on channel stability. The implication is that channel stability and restoration project success are directly proportional, and vice versa. This is false (Shields et al. 2003,Florshiem et al. 2008, Rakovan and Renwick 2011).

2. Project planning should include a geomorphic assessment of the watershed system that includes regions beyond the project reach. Only within the context of such an assessment can the real triggers for post-implementation channel behavior be identified. Simply attributing avulsions to certain aspects of structural design misses the more significant point of channel response to upstream sediment inputs, hydrologic perturbations, bed stability, etc. (Shields et al. 2004 and 2006).

3. The project was designed based on characteristics of a reference reach. If the reference reach was appropriately selected, and if the reference reach was stable, why was it necessary to install 60 structures to insure channel stability?

4. What natural channel habitat features were the river training structures designed to emulate?

5. Would the project have produced a better outcome in terms of its stated objective

(reducing downstream turbidity) if the bed and banks had been protected with orthodox erosion controls rather than imposing a "natural channel design"?

6. The intensive monitoring program and complementary hydraulic analysis illustrated by this study are praiseworthy examples of state-of-the-art approaches for physical monitoring of the restored reach. However, such efforts are prohibitively expensive for routine application to all projects. What were the costs for monitoring and analysis and how do they compare to the construction cost?

In conclusion, the Batvia Kill river restoration project suffers from the same syndrome as others produced by the Rosgen school of thought (Simon et al. 2007 and reply to subsequent discussion). Post construction monitoring should have highlighted this shortcoming.

Additional References

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