

Velocity effects of transverse in-stream structures in channel bends

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Abstract. River systems commonly exist in dynamic, meandering equilibrium with channel bend propagation laterally and longitudinally along the valley bottom. Channel bends present hydraulic conditions that are varied from that of a straight reach, including secondary and tertiary currents and a shift of conveyance from the channel center to the outer bank. While morphologically benign, hydraulics and migration of meanders associated with channel bends can present problems to navigation and encroach upon valuable property holdings. To counter such issues, transverse in-stream structures placed along the outer edge of the channel bank to reconfigure the stream velocity and protect the bank from erosion are commonly implemented. A scaled laboratory model of channel bends was constructed and hydraulic data were collected with and without in-stream structures. The effects of the structures on reconfiguring velocity trends are quantified and analyzed. It was shown that transverse in-stream structures redirect the velocity from the outer-bank and bring the core of high flow velocity back to the channel center.