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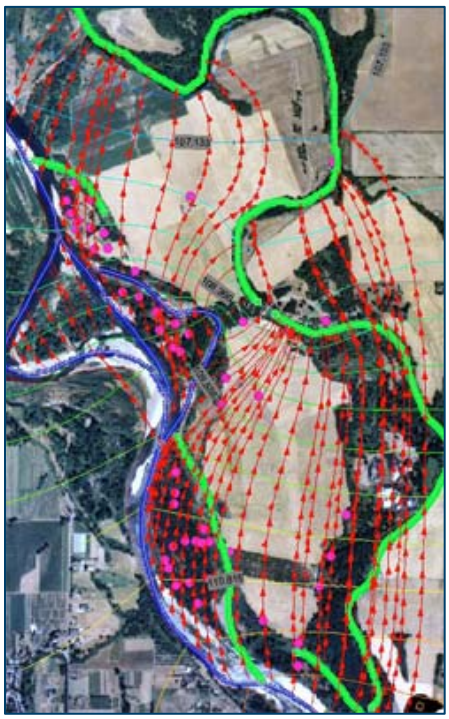
NATIONAL RISK MANAGEMENT RESEARCH LABORATORY
GROUND WATER AND ECOSYSTEMS RESTORATION RESEARCH

Compartmental Analysis of Nutrient Processing in Streams

Background

Previous work under this project focused on developing a screening-level model of nitrate attenuation in streams. The work was based on the premise that stakeholders often are not concerned about nitrate transport and reaction; instead, stakeholders were focused on the total amount of retention or attenuation that a particular hydrologic compartment can produce (Faulkner and Campana 2007). This modeling approach has been brought into a Bayesian framework with potential application for adaptive management of nutrient total maximum daily loads (Faulkner 2008). In a relatively empirical way, these modeling approaches have treated ground water surface water interactions (hyporheic flow) with transient storage in dead zones.



We have done work to develop methods for quantifying the actual hyporheic component (Faulkner, et al. 2005). The hyporheic component is known to be important in the retention of nutrients. Current work under this project is linked to another project examining denitrification potential in the Willamette River floodplain. That work is focused on using numerical ground water flow modeling to develop conceptual models of ground water-surface water interactions in the Willamette River Floodplain, Oregon.

Products

Faulkner, B.R. (2008). "Bayesian Modeling of the Assimilative Capacity Component of Nutrient Total Maximum Daily Loads." *Water Resources Research,* 44: W08415. doi:10.1029/2007WR006638.

Faulkner, B.R. and M.E. Campana. (2007). "Compartmental Model of Nitrate Retention in Streams." *Water Resources Research,* 43: W02406. doi:10.1029/2006WR004920.

Faulkner, B.R., V.A. Murray, and S.R. Hobson. (2005). "Use of Electrical Resistivity Probe for Determination of Hyporheic Flow." In: Proceedings American Water Resources Association 2005 Annual Water Resources Conference, Seattle, Washington, November 7–10. Edited by C. Steward. American Water Resources Association, Middleburg, Virginia, TPS-05-3, CDROM.

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Collaborators

McKenzie River Trust

Tishomingo National Wildlife Refuge

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