United States Department of the Interior
U.S. Geological Survey
5522 Research Park Drive
Baltimore, MD 21228
443-498-5500

Maryland-Delaware-D.C. Water Science Center
Seminar Series

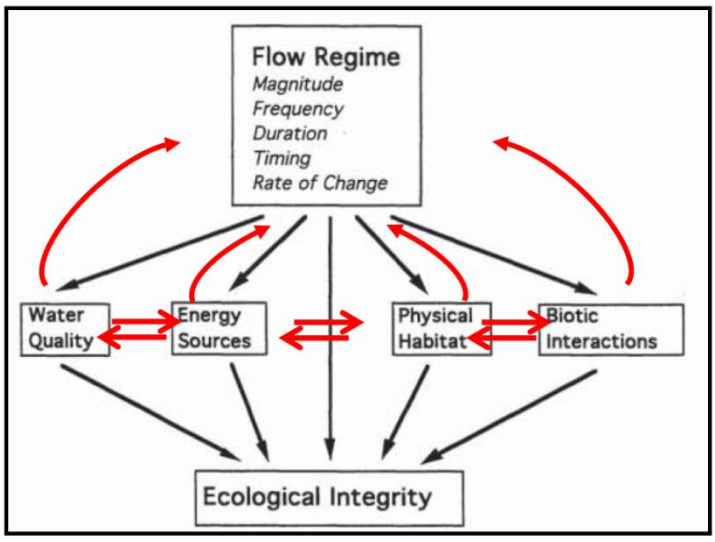
Tuesday, January 22, 2013
11:00 – 12:00

The Natural Flow Regime and its Role in Function and Sustainability of Rivers and Wetlands

Jud Harvey, Hydroecology of Flowing Waters Team Lead
USGS National Research Program, Reston, Virginia

Fluvial and geomorphic processes interact with biological communities to substantially influence the fate of aquatic ecosystems. Understanding the physical-biological interactions is important for predicting future trajectories of ecosystems affected by land use and climate change, and for developing and prioritizing sound management practices. Hydroecologists are often concerned with off-channel "storage areas" of aquatic systems, which provide nursery areas for organisms, hot spots for biogeochemical reactions that remove contaminants, and balanced levels of stream metabolism that support healthy, resilient food webs.

To understand the dynamic role of flow, researchers are increasingly developing study designs that explicitly address natural floods and/or altered flow regimes. Examples from across the country illustrate effects of climate change on natural attenuation of contaminants, role of floodplains in removing nitrogen from large river systems, and potential effectiveness of management practices that either adjust the flows (e.g. Everglades) or adjust the geomorphic template that conduct the flows (e.g. urban streams). Within this framework we seek to identify not only the "hot spots" for storage and biogeochemical transformations in aquatic systems, but also the "hot moments" associated with flow variation and its relation to geomorphic, sediment, and solute dynamics. From the perspective of ecosystem services, desirable outcomes include enhancement of processes that remove contaminants and excessive levels of nutrients from flowing waters, as well as hydrogeomorphic processes that contribute to high-value, self-sustaining aquatic ecosystems that support healthy food webs and are resilient to floods and droughts.



"*Natural Flow Regime*" (Poff et al., 1997) with red arrows added to illustrate effects of nonlinear interactions between fluvial, geomorphic, and biological processes that shape aquatic ecosystems and determine how they respond to drivers such as land-use and climate change.

For more information, contact Jud Harvey-Phone: 703-648-5876, Email: jwharvey@usgs.gov, website: http://water.usgs.gov/nrp/jharvey/site/index.html

Presentation also available remotely via Webex: https://usgs.webex.com/ 703-648-4848 37126#

For directions to the USGS MD-DE-DC WSC: http://md.water.usgs.gov/directions/baltimore.html.