FROM URBAN CANAL TO NATURAL STREAM: UTILIZING STREAM RESTORATION CONCEPTS TO IMPROVE WATER QUALITY, HABITAT, AND RESILIENCE

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Urban drainage canal systems and channelized streams throughout Florida have altered natural hydrology and are susceptible to dramatic responses to rainfall events, excessive erosion and sedimentation, increased pollutant loads, and reduced habitat integrity as a result of poorly drained, surface runoff-dominated urban landscapes and channels with insufficient floodplains.

Restoring channels to include natural floodplains, meanders, pools, riffles, and improved riparian zones dissipates energy associated with severe weather events to prevent erosion and downstream sedimentation, which also reduces maintenance needs and costs. Natural channel stream restoration also provides additional storage volume to abate flooding, provides multiple nutrient reduction mechanisms, improves terrestrial and aquatic habitat, and offers a wide array of community benefits.

Floodplain and channel dimensions required to sustain a natural stream are determined by watershed characteristics such as soil types, drainage areas, and elevation gradients. To restore an urban channel back to a naturally functioning stream, the area available for use in the project must be able to accommodate the natural channel dimensions, and the valley slope must provide sufficient energy gradient to support a stable stream that neither incises nor aggrades the channel.

Because of the requirements necessary, natural channel stream restoration is not feasible for all canals, and other channel restoration techniques are sometimes required. In this stream restoration feasibility project, a canal in Pinellas County, FL was evaluated to assess if the site met requirements to implement natural channel stream restoration. The stream restoration concept design was compared to two other channel restoration alternatives using two-dimensional hydraulic/hydrologic modeling software to assess shear stresses during several discharge scenarios. The modeling results showed that natural channel stream restoration provides the greatest reduction in shear stresses, especially during extreme flow events. The project will also assess performance efficiency of stream restoration as a BMP to obtain water quality credit.

PRESENTER BIO: Megan Long works on a variety of stream restoration, water quality, and hydrology projects at Wood, where she builds on her water resources, ecohydrology, and sustainability background acquired through research and studies at University of South Florida (Master of Science) and University of Wisconsin-Madison (B.S. Civil Engineering).