DEFINING ECOHYDROLOGICAL FUNCTION TO SUPPORT LOW IMPACT DEVELOPMENT IN COASTAL SOUTH CAROLINA

Daniel Hitchcock, A.D. Jayakaran, T. H. Epps, J. A. Palazzolo, T. M. Williams, D. M. Amatya[1]

In the face of dual pressures in coastal South Carolina - residential and commercial development, along with potential climate change impacts - stakeholders need clear, accurate, relevant, and easily-accessible information for effective decision-making for watershed management and natural resource protection. To fill this need, we focus on defining ecohydrological criteria for sustainable land and water resource guidance, specifically in upland areas that ultimately drain to tidal creeks. Runoff coefficients and derived curve numbers (CNs) – hydrologic metrics that define rainfall-runoff relationships based on watershed and landscape characteristics - have been calculated for first-order watersheds that have low gradient topography and shallow groundwater. Results have implications for watershed planning and site engineering, including storm water management and design. Forested water budgets, including the seasonal influence of evapotranspiration and infiltration on water table elevation as it drives highly variable streamflow, are being refined with the goal of defining pre-development conditions. These results have the potential to not only inform coastal stormwater discharge target criteria, but also to guide the prioritization of conservation and restoration efforts. Stormwater control measures, specifically engineered wetlands and bioretention systems, are being investigated to determine hydraulic and water quality performance considering influence of shallow groundwater. Results will be integrated into an online mapping tool so that site-specific geospatial data -based information can be available to decision-makers. An assessment of existing resources (green infrastructure) and their benefits - via ecosystem services at various scales - can provide guidance toward resource protection with the goal of creating resilient communities - whether by conservation or restoration efforts, or by better site design during land use change.

[1]Daniel Hitchcock, Associate Professor, Ecological Systems, Clemson - Baruch Institute, Georgetown, SC 29585
A.D. Jayakaran, Associate Professor, Washington State University, Puyallup, WA 98371
T.H. Epps, Student, Clemson - Baruch Institute, Georgetown, SC 29585
J.A. Palazzolo, Student, Clemson - Baruch Institute, Georgetown, SC 29585
Devendra Amatya, Research Hydrologist, USDA Forest Service, Center for Forested Wetlands Research, Cordesville, SC 29434

Citation for proceedings: Stringer, Christina E.; Krauss, Ken W.; Latimer, James S., eds. 2016. Headwaters to estuaries: advances in watershed science and management—Proceedings of the Fifth Interagency Conference on Research in the Watersheds. March 2-5, 2015, North Charleston, South Carolina. e-Gen. Tech. Rep. SRS-211. Asheville, NC: U.S. Department of Agriculture Forest Service, Southern Research Station. 302 p.