DETERMINING VOLUME SENSITIVE WATERS IN BEAUFORT COUNTY, SC TIDAL CREEKS

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Non-point source pollution from stormwater runoff associated with large-scale land use changes threatens the integrity of ecologically and economically valuable estuarine ecosystems. Beaufort County, SC implemented volume-based stormwater regulations on the rationale that if volume discharge is controlled, contaminant loading will also be controlled. The County seeks to identify which of their tidal creeks and rivers and what portions of these waters are most sensitive to stormwater runoff. Through an ongoing collaborative process with county officials and concerned citizens, four watersheds of critical interest were instrumented with rain gauges and salinity sensor arrays to monitor the movement of freshwater down these systems from volume "sensitive" headwaters to volume "insensitive" downstream waters. The change in salinity was measured as the primary indicator of the volume of stormwater entering the estuarine ecosystem. Runoff analyses were complicated somewhat by significant tidal exchanges that alter estuarine salinities twice daily. Thirteen and twenty-five hour filters were applied to the salinity time series to isolate the stormwater impacts from tidal effects. Watersheds and sub-watersheds were ranked with regard to their relative stormwater volume sensitivity by comparing several salinity response parameters derived from the time series data. Stormwater runoff is also being modeled with the Stormwater Runoff Modeling System (SWARM) to estimate the expected runoff based on watershed area, land cover, soils, and slope. If the empirical and modeling approaches correlate well, SWARM will be used to model stormwater volume sensitivity in additional estuarine watersheds, as well as to project impacts of climate change and engineered stormwater retrofits on tidal creeks. This information will permit Beaufort County to focus policy and stormwater management actions on those portions of tidal creeks that are most sensitive to stormwater inputs.

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