DECISION-MAKING UNDER DURESS - PRIORITIZING MANAGEMENT ACTIVITIES TO PRESERVE THE INTEGRITY OF FRESH WATERS, PROMOTE HUMAN HEALTH, AND PROTECT WATER SUPPLIES

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Globally, local resource managers and policy-makers are tasked to address environmental and human-health concerns associated with aging and obsolete water infrastructure using limited financial resources. Though many issues associated with aging and obsolete water infrastructure can have large economic and ecological impacts, failing wastewater treatment infrastructure (WWTI) presents a globally pervasive threat to the integrity of freshwater ecosystems. Nevertheless, there is limited information describing how waste streams vary in their pollutant load or explaining the heterogeneous effects of waste on ecosystem structure and function through space and time. Consequently, as more aging wastewater systems degrade, local resource managers and policy makers are forced to develop watershed management strategies to deal with increasing effluent discharge (e.g., leaky pipes, failing septic tanks, and obsolete wastewater treatment systems) without the information needed to understand how their decisions will influence local ecological processes or the structural and functional integrity of downstream habitats. Here, we will present ideas generated by a new collaboration between Athens-Clarke County, the UGA, the Environmental Protection Agency, and the Army Corps of Engineers to address this challenge. We propose to generate a greater understanding of the dynamic feedbacks between WWTI management decisions and the socio-ecological condition of fresh waters by addressing three objectives. Initially, the proposed work will elucidate how environmental, regulatory, and social information has informed infrastructure and environmental management decisions made by local officials. We propose to create a set of possible WWTI management scenarios under variable governance conditions and predict how and when reactive (e.g., reaction to infrastructure failure) and proactive (e.g., enhanced operational procedures) management decisions will influence in the biophysical system. Furthermore, we aim to study interactions among WWTI, variations in wastewater streams, and the biological response of aquatic systems.

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