Robert V Hopper III, PE, PMP
CDM Smith
North Carolina, United States

The Ecological Engineer for Water Resources Resilience… in Raleigh

The World Bank among other international and national organizations are calling for innovative and nature-based solutions to provide water infrastructure resilience in the face of climate change, habitat loss, and expanding population. As an aspiring ecological engineer, I seek green infrastructure solutions that are multifunctional, cost effective, and more than a drop-in-the-bucket. Having implemented urban stream stabilization, BMP retrofits, green stormwater infrastructure, and lake restoration I know the costs are high and the benefits can be limited on watershed scales. Observing the effects of beaver ponds in urban catchments, with the transformation of otherwise narrow confined channels into expansive riparian wetlands, impressed upon me the exceeding value and potential for ecosystem services.

Beaver restoration and mimicry are occurring in the west to rehydrate dry lands, support salmon recovery, and even control wildfires. Proven “low tech, process-based restoration” methods can be employed across North America where retention of sediment and nutrients in headwaters would serve to reduce nutrients in rivers and provide flood attenuation and drought moderation. In the Chesapeake Bay watershed, stream restoration is currently the most popular BMP for obtaining credits towards meeting the bay TMDL. Imagine implementing stream restoration on watershed scales without the heavy machinery and associated costs, sequestering sediment loads, and creating wetland habitat across the riparian zone. Afforded space and acceptance, and sometimes requiring flow levelers and post line assists, beaver can continue their comeback from near extirpation in this country and be recognized, supported, and mimicked as the quintessential ecological engineer for water resource resilience.

Beaver have recolonized the southeastern US, and at least in one city initial steps are transpiring toward

positive consideration, space, and support to let them build beneficial wetland systems in and around urban spaces providing much needed ecosystem services. Testing of the first BDA in Raleigh was conducted by a geologist interested in supporting beaver in their floodplain building endeavors then the first beaver deceiver in Raleigh was installed last year with the help of a local youth group. To naturally protect the City's water supply watershed, the Tar River Land Conservancy is acquiring land in the Beaver Dam Lake - Smith Creek area with a complex of more than a dozen beaver dams. On their own beaver are damming natural channel design projects in Raleigh whether designers and regulators like it or not.