Fostering Purpose-Based Education, Collaboration, and Community Connections with a Campus Bioswale, Local Raingardens and Public Greenspace Improvement

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Summary

PI's Sara Baker-Bailey and Suzanne Huminski successfully completed the 3 major grant milestone projects, carried out simultaneously throughout the project year. The first was planning and building Southern CT State University's first curbside bioswale to match the network of green infrastructure throughout New Haven. Most of the grant funds supported this new bioswale and The Urban Resource Initiative (URI), was the contracted non-profit to complete the construction. The second project was to collaborate with multiple local organizations and community members on a variety of green space revitalization projects and embedded service-learning initiatives in local underserved neighborhoods within walking distance of campus, strengthening and expanding partnerships and collaborative capacity as well as progressing with ecological restoration. The third grant-funded project was to successfully produce additional episodes of the podcast "Hidden in Plain Sight," hosted by Dr. Baker Bailey and with a water and nature-based conservation and stewardship theme. All three areas of the grant plan were successfully implemented.

The remainder of the grant funds supported a University Assistant to coordinate and manage community outreach, curriculum connections, event logistics and scheduling, communications, and managing events in the field.

Introduction

As Connecticut's second largest city, New Haven contains a high percentage of impermeable surface, high residential water use, and high population density. These factors contribute to overflow in city sewers, stream bank erosion, poor water quality in streams and rivers, and the direct release of untreated water into Long Island Sound during heavy precipitation. When city sewer flow exceeds capacity for wastewater treatment plants, the city releases excess untreated flow directly into local water bodies like the West River and Long Island Sound. Storm water from SCSU and Newhallville, an underserved neighborhood adjacent to campus, flows in sewers toward downtown areas that regularly experience stormwater overflow, and into Beaver Brook, Beaver Pond, and Wintergreen Brook: tributaries of the West River. The West, the smallest of New Haven's three rivers, has the lowest water quality, and receives the majority of New Haven's storm water flow despite its smaller size.

Second, Newhallville has a lack of high-quality greenspace with permeable surface to recharge groundwater compared to other more affluent neighborhoods in the city. Existing greenspace includes extensive invasive vine and weed infestation, and a shortage of community volunteers to address the infestation with removal. SCSU's campus and the Newhallville neighborhood have, overall, large areas where soil percolation rates are favorable for green

infrastructure expansion and greenspace improvement. This has potential for reducing storm water volume downtown, where chokepoints in sewers create vulnerability to increased flooding.

Third, Newhallville residents and the SCSU campus community can increase their awareness of the vital importance of freshwater resource stewardship and green infrastructure for storm water management, green space access, and human, community, and ecosystem resilience. Even though two streams flow along the border of Southern's campus and there is substantial existing green infrastructure including drywells, a rain garden and a rooftop rain harvester at the Science Building, these place-based learning opportunities are, to a large extent, unnoticed by community members and can be more effectively showcased and utilized for community and educational purposes, and as an asset to scale future green infrastructure on campus, throughout New Haven and regionally through dissemination, education and sharing of best practices.

Fourth, there is need for increasing capacity to divert storm water from sewers via green infrastructure and increased public awareness of stormwater management, like rain garden maintenance, bioswale construction and educational community programs completed during this grant's project year. There is also a need to revitalize the greenspace near Beaver Pond in Newhallville to achieve similar improvements via ground and surface water recharge.

Finally, Southern has need for supporting and expanding place-based, experiential, community-engaged learning opportunities so that students can develop and apply skills and content they learn in academic courses, while creating water stewardship solutions and increasing connection with the surrounding community. Methodologies and established pathways for community collaboration and adaptation to protect present and future freshwater resources are critical for fostering climate and community resilience, especially because unpredictable circumstances like Covid-19, extreme weather events, and during the Fall of 2024, wildfires and drought occur dynamically and with increased frequency.

Objective(s)

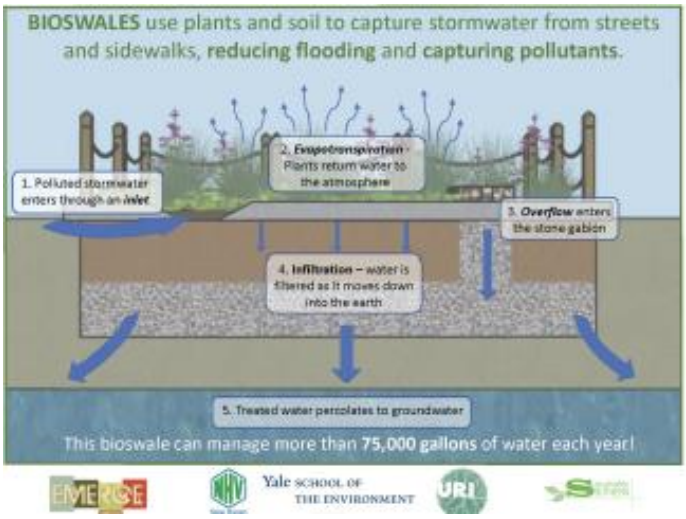
Our three main objectives were to: 1. Plan and build SCSU's first curbside campus bioswale to match those located throughout the city; 2. integrate community awareness of water stewardship, including a podcast series; and 3. expand freshwater stewardship volunteering opportunities, embedded course projects, and local community partnerships for lasting collaboration beyond the funded project year.

Results/Discussion

The New Campus Bioswale:

Most of the grant funds (~$17,000) supported the construction of the first curbside bioswale on Southern CT State University's campus, matching hundreds of bioswales that are located throughout the City of New Haven. The new campus bioswale is 5' x 15', located on Farnham Avenue near Southern's Alumni Relations building and the new net-zero design School of

Business Building. The School of Business building opened in September 2023 and features 100% stormwater diversion, including two drywells on Farnham Avenue. The bioswale, nearby, adds to this stormwater diversion, with capacity to annually divert ~75,000 gallons of stormwater from city sewer infrastructure and Long Island Sound, allowing for filtration, and recharge of groundwater resources. The bioswale includes interpretive signage, native, pollinator and bird friendly shrubs and perennial flowers, and SCSU students maintain the bioswale, keeping it free of leaves and litter so that it can drain properly. The timeline for installing the bioswale shifted from the schedule we proposed, due to availability of the partner organization, Urban Resources Initiative (URI), with whom we contracted services. URI was not available to install the bioswale until Summer, 2024, which proceeded successfully. URI managed planning and permitting with the City of New Haven, as well as all project logistics, installation, and planting, since no students were on campus at the time of construction. Interpretive signage:



Campus and Community Outreach Manager:

The remainder of the grant funding supported a part-time University Assistant for a recent alumnus to gain experience planning and coordinating campus and local community engagement, volunteering, embedded class projects, all associated with local green space and watershed stewardship as it relates to communities, environmental health, and wellbeing. The UA successfully planned and offered multiple community/campus volunteer clean-ups along Beaver Brook, as well as course-embedded projects. PI's Huminski and Baker Bailey offered guidance and support for all events and all events were a team effort.

Campus/ Community Events and Engagement:

Beaver Brook Trail clean-up series: February 2024

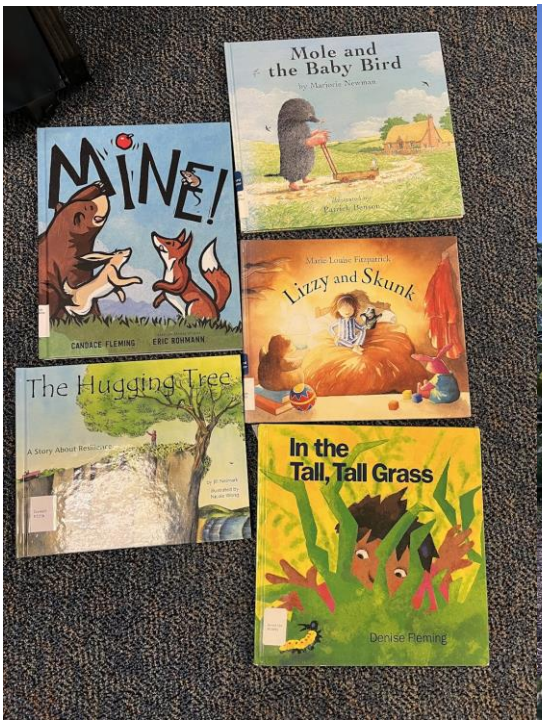
Three winter service days revitalized the Beaver Brook corridor that borders Southern's campus, on Crescent Street near the Fitch Street intersection. Participants, a mixture of local residents, SCSU students and faculty, removed extensive litter and infestations of invasive bittersweet vines, English ivy, Virginia Creeper, and grapevine. Community partners included the West River Watershed Coalition, URI, Southern's GEMS Club, Neighborhood Housing Services, New Haven Bioregional Group, Friends of Beaver Pond Park, and Save the Sound,

Academic engagement:

Throughout the project year, academic engagement included four classes in multiple disciplines (BIO, COM, HON, ENV), who assisted with vine and litter removal at Beaver Pond Park, Cherry Ann Park, the Sherman Forest near Hillhouse High School, vine removal near King Robinson School and Crescent St, and native shrub, perennial flower, and tree plantings

at Beaver Pond Park and Southern's Campus Community Garden. One ENV class toured two neighborhood bioswales and cleared leaves and debris from them. A graduate student in the Environmental Studies Masters program completed a capstone project mapping the campus watershed and featuring green infrastructure for storm water diversion on campus via GIS Story Map. In late April, 2024, 12 students in HON 300 launched canoes in Beaver Pond for a litter clean-up. Most students had never paddled a canoe before, and because of the success of this activity, a Fall 2024 cohort also spent an afternoon canoeing. By getting out onto Beaver Ponds, students were able to gain a better working knowledge of watershed maintenance issues and understand the science behind stormwater management especially as it pertains to the West River and Newhallville.

In May, 2024, HON 300 students and two Early Childhood Education majors (guided by Derek and the PI's) hosted 2 pre-kindergarten classes from the Barack Obama Magnet University School at the SCSU community garden during their learning unit on insects and trees. The Office of SCSU President, Dr. Dwight Smith, and a President's Student Ambassador, assisted. With the event. The 25 "young scholars," along with their 2 teachers and a handful of parent volunteers, spent several hours engaged in activities around the garden. Activity stations included an art project: gluing phragmites to a cutout squirrel (as a tail) and then decorating, environmentally themed short stories, insect and tree yoga, and sunflower planting in the garden.



Required Match:

The required match for the project included faculty time and effort associated with embedded projects in academic classes, managing siting and construction of the bioswale in partnership with a New Haven-based non-profit called the Urban Resources Initiative and the City of New Haven, and creation of a pilot episode of a podcast called *Hidden in Plain Sight,* which focuses on environmental stewardship and opportunities in New Haven.

Communication Outreach

We collaborated with SCSU's Department of Communication, Media, and Screen Studies and its Digital Production Facility to produce two video podcast episodes adding to the Hidden in Plain Sight podcast series. The episodes approximately one-hour in length focused on place-based pedagogy as a way to engage undergraduate students in issues of watershed maintenance and stormwater management.

Episode 1 with SCSU Professor Joe Milone (Department of Recreation, Tourism, and Management) https://youtu.be/1mizCS1D9uU *Episode 2* with Suzie

Huminski (SCSU's Associate Director of Sustainability, Office of STEM Research & Innovation) https://youtu.be/-D9iBmTU-fY

The video podcast studio became available for use in March 2024. Podcast production was supported by Associate Professor Michael Bay and Digital Production Facilities Coordinator Jay Forsyth.

Conclusions

Main "lessons learned" from this grant year have a theme of flexibility and adaptability as necessary for success overall. One significant challenge that arose was scheduling the bioswale construction. Originally, we planned for Fall '23 construction, but URI's busy fall planting season meant a delay until spring, which was pushed to late summer and included delayed replies by URI to coordinate and complete the project before the grant in the absence of the bioswale, prior to its construction, the PI's planned additional community greenspace stewardship events throughout the year. After the grant project year ended, the PI's offered a series of campus tours that included the bioswale. Throughout Fall 2024, they hosted and provided tours to visiting groups from Build Green CT, the Sierra Club, Yale School of the Environment, Common Ground School, and an Ecological Restoration class from the Biology department.

A second "lesson learned" is that the bioswale construction process required additional changes for safety. It originally had one small, low post-and-chain fence as a barrier on the sidewalk side that was set ten inches inside the bioswale, leaving a gap at the sidewalk edge that could have endangered a pedestrian and was hazardous for wheelchairs because of the drop in grade into the bioswale itself. The co-PI's worked with URI to add another taller post and chain barrier, flush at the edge of the sidewalk to protect passing pedestrians. Had this repair not been made, the University would have filled in the bioswale and dismantled it. The matter was resolved smoothly, but there was a delay associated with the repair. Both challenges might have been avoided with improved communication on the part of the contracted services.

A final "takeaway" from this grant year is that a University Assistant fills a critical role for faculty to embed outdoor programming and projects into classes. Faculty need help! We heard repeatedly that assistance with logistics, supplies, facilitating activities, keeping groups intact and productive, and answering questions was so important to their success and learning outcomes. Finally, the PI's underestimated the amount of time needed to implement the grant projects. We exceeded our in-kind time-and-effort significantly, which was, though a lot of fun, important to note for future project planning. Finally, we would like to take the opportunity to thank UCONN and CLEAR for their support of our projects at SCSU and local neighborhoods, and we look forward to future water stewardship efforts and partnerships.