

# Aiken Green Roof Project

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Over the past few weeks as part of the Greening of Rubenstein Interns class, Nick Warren, junior environmental sciences major, Jen Diehl, sophomore environmental sciences major, and Ben Galligan, freshman biological sciences major, have been working on developing and implementing a plan to further the research done with the green roof on the Aiken Center. The green roof collects water in eight different treatment watersheds, with two control groups containing a direct drain. There is a watershed with standard soil with standard plants, standard soil with alternative plants, and alternative soil with standard plants. Each treatment is replicated two times. Water flows through these vegetated



watersheds and drains into tipping buckets that collect information on the concentration of many nutrients like phosphorous and nitrogen. We also use the tipping buckets to determine the rate and volume of water that flows through each of the eight watersheds. From these data, we can calculate the flux of the nutrients.

Another important aspect to determine is the total amount of storm water that goes through the watersheds with different green roof treatments. In almost all flat roof buildings, water that goes through the drainage pipes must then be sent to a storm water treatment facility, so the less that goes through the pipes the better. Theoretically, the green roof beds should be absorbing some water and saturating the soil so that the plants can take up the water. Then, through evapotranspiration, the plants will give off water back to the atmosphere instead of into storm water systems. We will be taking data from the last couple years and developing figures to display any statistically significant differences among the discharge of the nutrients and volume of water going into storm water.

In late 2016, the data logger that records the volume of water passing through the eight tipping buckets was stolen out of the cabinet in the Aiken Center lunch room. A new data logger has been ordered and will be reinstalled shortly after spring break. Once that is reinstalled and the tipping buckets have been cleaned and recalibrated, we will be able to start collecting new water quantity and quality data. This is important, because we will be fertilizing the watersheds this spring. The fertilizer that we are using contains nitrogen and phosphorous; both nitrogen and phosphorous are bad for the waterways, and we want to minimize their discharge in storm water draining from the green roof.

On top of the green roof there are many instruments, from a full meteorological station to thermometers and soil moisture probes in the green roof beds. One of the pieces of technology is a live video camera. Because the green roof is only accessible by a ladder that students need permission to access, we thought it would be exciting to link the camera with a live feed to the TV on the second floor of Aiken. This way students could get a better understanding of what our green roof looks like, and what goes on up there. It also would allow students with disabilities that cannot climb ladders to experience the green roof throughout the year.

One final thing that we are hoping to accomplish this semester is to investigate our mystery plant. In the alternative soil watersheds (added biochar) there is a plant that was not originally planted in the roof. We would like to investigate the source and species of this plant that appears to only survive in the biochar soil treatment. We hope to conduct soils tests of all the treatments so that we can understand the differences among treatments in soil characteristics and constituents.