



National Wildlife Federation®

CAMPUS
ecology®

Northampton Community College

Bethlehem, Pennsylvania

Water

SCHOOL

Northampton Community College Main Campus (public; 2-year). 15,000 students. Bethlehem, Pennsylvania.

ABSTRACT

The focus of this project is using biofiltration to clean the runoff from parking lots, resulting in a potable filtrate that can be used to water the on-campus community garden. In Spring 2011, research into bioswales was conducted in conjunction with the Civil and Environmental Engineering department at Lafayette College. Over the summer, students from Northampton Community College and Lafayette College designed and built a 9'x9' bioswale. The swale is 5 feet deep. At the bottom, a 40-mil impervious PVC liner provides sealed temporary containment for the filtered runoff. Several layers of geotextile cushion the liner from a layer of storm tank units, which create a 9'x9'x1.5' reservoir. A 3-foot-deep layer of engineered soil mix serves as the backbone of the system, filtering out harmful heavy metals such as copper and lead. The finishing touch on the swale is an 8-inch layer of mulch, which traps and filters hydrocarbons like gasoline and motor oil. Next to the swale, a 7-foot sump was dug to install a water pump. An outlet pipe drains the reservoir into the sump, from where the water can be pumped up to an above-ground cistern at the community garden. As of August 4, 2011, the bioswale has been built and the majority of the plumbing has been installed. The next step is installing the sump pump and the solar panel that will power it. To date, the project has cost approximately \$3,500, and the estimated cost for finishing is approximately \$500 more.

GOALS AND OUTCOMES

Goals

This project began with three main goals in mind:

- 1) Trap harmful pollutants and prevent them from entering the local watershed.
Assays were performed on parking lot runoff samples, testing for grease, lead, copper, and coliform bacteria. Upon completion of the swale, the filtered water will be assayed, and the results compared to the unfiltered runoff.
- 2) Provide a clean source of water for Northampton Community College's community garden.
The assays of the filtrate (see above) will be used to determine the purity of the water.
- 3) Maintain a habitat for native wildlife
Native, water-tolerant plants will be planted in the swale. The plants will be chosen based on filtration properties (plants that absorb heavy metals through their root systems). These plants will also attract native birds and insects, contributing to biodiversity on campus.

The goals for the next 2-3 years are to continue lab testing to determine the life of the system and the eventual purchase of a heavier-duty pump, depending on how the community garden project grows in the coming years.

Accomplishments and Outcomes

At this stage, we are on track to meeting our goals. The system is filtering the parking lot runoff, and trapping pollutants, keeping them from entering the watershed. Within a few weeks, it will be providing clean water to the community garden, automatically. Though the plants have not yet been installed, the swale is still frequented by many birds and insects, providing a native habitat.

Challenges and Responses

The major challenge of this project was coordinating resources. Since the project required a host of construction and plumbing materials, the process of sourcing all the materials from various suppliers, going through the school's red tape to make all the purchases, and coordinating delivery time and manpower in a way that makes efficient use of everyone's time were a major concern.

The original goal of the project was to modify the existing retention basins behind the parking lot, transforming it into a bioswale. Upon further investigation, we discovered that the permitting process for modifying an existing storm water management system takes around 2 years and costs several thousand dollars. This was a major hang-up for us, until we realized that the current retention basin overflows every time there is a storm, spilling runoff into the low-lying area of a field behind the parking lot. This is the location we chose for the swale.

Another challenge to the project has been flooding. Since the bioswale is built in a low-lying area, every major rain event results in flooding. Fortunately, a local plumber stopped by one day while walking his dog and offered his support. Over the last month, he's volunteered dozens of hours and his equipment to help pump out the system so we could continue working on it.

If this project were repeated, I would recommend having the pumping system ready to be installed immediately after the swale is finished, to avoid flooding.

Campus Climate Action: Your School's Carbon Footprint

While the main focus of the project is reducing pollution, the project does also reduce carbon emissions. The native plants will absorb carbon dioxide, and the use of a solar-powered pump eliminates the need for carbon-powered electricity.

Commentary and Reflection

There were a few points in this project where we feared we'd bitten off more than we could chew. As a student, I'm used to being told what to do: write a speech; study for an exam; go on a field trip. This project was a new frontier, not only for me, but for all the students and faculty involved. When questions came up, it was up to me to answer them. Being in a leadership position on a project like this, using new technology, can be very stressful. The flipside, of course, is that meeting the challenges and answering the questions leaves you with a distinct sense of pride and confidence. The bioswale we created benefits the environment, but it also has left an indelible mark on our character – a gift that keeps on giving.

ENGAGEMENT AND SUPPORT

Leaders and Supporters

This project was inspired by a friend of mine, a fellow student named Victoria Bastidas. Never have I met anyone with more passion for the environment.

The faculty advisor for the research portion of the project is Professor Karen Klein (biology). Her kind support and generous sharing of office space was of great assistance to me in researching bioswales.

Most of the funds used for the project were raised by the Good Growers, a Northampton Community College student organization that built and maintains the community garden.

Also instrumental in the project was the East 40 Committee, a committee of faculty, staff and students that planned the community garden and are in charge of steering its future.

Professor Kelly Allen, who serves as the East 40 coordinator, overseeing all community garden activities, has been a great motivator and mentor throughout this process.

Funding and Resources

The estimated total cost for the bioswale project is approximately \$4,000. Of that, \$1,000 was generously provided by NWF through the Campus Ecology program. The rest of the funding came from the Good Growers club, who tirelessly ran bake sales, raffles, and other events to raise money for this project and the construction of the community garden. Special thanks is also owed to the Outdoors Club, Ski Club, and Phi Theta Kappa Honors Society for generous financial contributions. Lafayette College Environmental Engineering students Chris Geary and Don Harris poured hours of time into research, lab testing and construction of the swale.

Good Growers Lucas Rappa, Sam Couchara and Steve Adams generously volunteered their time and manpower to help in the construction of the swale.

Roy Armbruster, a local plumber who happened upon us while walking his dogs, volunteered his time, energy and equipment to help make this project a success.

Education and Community Outreach

The bioswale has been mentioned in a Northampton Community College newsletter article.

Many of NCC's neighbors walk through the area of campus where the bioswale was built. During construction, we engaged as many people as possible, explaining the system and its benefits to the environment and garden. Responses were general

National Wildlife Federation's Campus Ecology Program

The Campus Ecology program was a big help to my project. The funding was a huge help, since the materials for this project ended up being quite costly. The Young Leaders Assembly gave me an opportunity to network with other young professionals in the field and share information, which has been invaluable.

CONTACT INFORMATION

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MORE ABOUT YOUR SCHOOL

Campus Sustainability History

Though Northampton Community College does not yet have a sustainability office, our school has made great strides toward greening our campus and reducing our carbon footprint. The Environmental Task Force (ETF), a student organization, designed a website where students can coordinate carpooling based on where they live and what time their classes are. The ETF is also currently working with NCC's cafeteria to start composting food scraps. Composting is already in place at NCC's Culinary Arts school, and scraps are brought to compost tumblers at the community garden.

The East 40 Committee and Good Growers club designed and built a community garden at NCC this spring. The garden will be used to teach credit and non-credit classes, and community plots will be available next year on a first-come, first-serve basis.