Campus Compact- Rain Garden

Dr. Joseph Corbin, Cory Allen, Jeffrey Braun, Michael Corcoran, Andreanna Demetriou, Timothy de Redon, Stephen Fournier, Samuel Fuller, Sean Heichlinger, Trevor Nelson, Drew Poirier, Lorreta Rocha, Karth Sivagurunathan, Benjamin Veilleux, Michael Weinstein, Dr. Michele Goldsmith (ENV 101), Dr. Allison Cummings (ENG 120)

Southern New Hampshire University

Abstract

Our undergraduate research project is the planning and installation of a phytoremediating rain garden on the Southern New Hampshire University (SNHU) campus. As part of an EPA grant-funded program (66.951), our group will be responsible for the entire creation process of this rain garden including the planning, development, and installation of the rain garden. This project aims to accomplish three goals, namely, 1) to identify and remediate soil and water pollutants from parking lot runoff on SNHU campus to help with the water quality of the Merrimack River, 2) to increase campus and community awareness of environmental issues and actions that can be taken to help, and 3) to hopefully serve as proof of concept for the future installation of rain gardens at SNHU. The site is in a visible area for all to see and may include a pathway or little park area. All relevant documentation will be created and catalogued by our group.

Introduction

In the United States and many places around the globe, stormwater runoff is one of the main polluters of surface water. When it rains in a naturally covered setting, the stormwater or snow melt has a chance to seep into the ground to get taken up by the roots of plants and trees. Some of the water even makes it deeper than roots and is naturally filtered by the Earth and dispersed into aquifers as clean groundwater (EPA, 2003). When the Earth is covered by pavement and asphalt, or stripped of it's natural plant cover, stormwater does not have the chance to be absorbed by the ground so it builds up as runoff. Stormwater runs rapidly across the impervious surfaces and picks up pollutants that harm the surface water quality similar to that of the neighboring Merrimack River.

Over the course of the 19th and 20th centuries, the Merrimack River was dominated by the mill towns of Lowell, Lawrence, and Manchester which greatly polluted the river with wastes and sewage. In the 1920's, the city of Lowell dumped 12 million gallons of raw sewage into the river every day (Lowell National Historic Park). The Clean Water Act of 1972 forced the cities abutting rivers nationwide to use waste treatment plants before dumping but despite that, Manchester continued to dump raw sewage until 1992 (Lowell National Historic Park). Today, mostly all of the new pollution of Merrimack is from stormwater runoff. Protecting the water quality of the Merrimack is important because the rebounding fish populations and ecosystems and because it is the second largest surface drinking water source in New England serving 300,000 people with 4 water treatment facilities (Lowell National Historic Park).

Today, there are a number ways to protect surface water quality from polluted stormwater runoff. A perfect example of this is a rain garden, which is both cheap and natural. Usually they are built in a ditch or depression area that is then filled with deep rooted native plants and grasses that catch and slow stormwater while allowing it to filter naturally into the ground (Rainscaping). The plants in rain garden also have phytoremediation abilities which means that they filter out pollutants and settle sediment by slowing the flow of water. Rain gardens are also ornamental and can be decorated with aesthetically pleasing plants and landscaping.

Southern New Hampshire University (SNHU) campus is located on the Manchester/Hooksett line on the bank of the Merrimack River. As such our school was given a grant administered by Campus Compact as a part of the Environmental Education Sub-Grant Program sponsored by the Environmental Protection Agency (EPA) to build a rain garden on campus. The project encompasses three different classrooms at SNHU, Dr. Joseph Corbin's Waste class, Dr. Michelle Goldsmith's Environment 101 class, and Dr. Allison Cumming's English Composition class along with Mrs. Say's Third Grade Class at Beech Street School in Manchester. This project aims to give students experience at identifying pollutants and phytoremediation while promoting environmental awareness to the Univerisity's community and the larger community by way of the children at Beech Street School.

The site of the rain garden is located parallel to the Hospitality Building and on the far end of Robert Frost parking lot. This will help control storm water runoff and to stop pollutants from the parking lot and road from reaching the Merrimack River. The significance of the research work is for us to deeply understand and to try to solve the waste problems in our environment, specifically the SNHU environment. We will be studying the runoff water that is entering different areas around SNHU, and we will be focusing on creating a rain garden that will assist in trapping and controlling the chemicals from water runoff. The research will help us to work together to figure out various solutions to problems, learn about different types of phytoremediation plants and various harmful chemicals, and hopefully allow us to complete a well-designed rain garden that will benefit SNHU and potentially other communities in the future.

Method

Our method of analysis will involve both that of experiment and that of literature review. The experimental portion will involve testing of the water in the areas specified for this project. This will determine contaminants or any substances that we wish to remediate. The experimental will involve the testing of soil composition and pollutants in this area to determine if it is suitable for the plants we wish to incorporate into the garden that will benefit the stormwater runoff at SNHU.

Future Plans

Aside from the experience, what we hope to establish is the future "green mind" on and around our campus. The rain garden teaches the classes, as well as the student population, about how the ground beneath their feet can impact a waterway overlooked by most. Through phytoremediation, the rain garden will help the overall quality of the groundwater as well as help inform students at various levels of schooling how being environmentally aware can be beneficial to the community. Collectively we believe that making a small step in the right direction will cause a snowball effect for all to follow in years to come.

CCNH

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

Timeline

1/1/ 2014: Grant awarded and the start of Environmental Protection Agency campus compact project.

1/20/2014: Divided up jobs and identified problems we would face with the rain garden. We also researched plants that phytoremediate and that would be easy yet fun for the kids of Beech Street School to plant.

3/12/2014: Visited and planted "fun" plants with the Third Grade Class at beech Street School.

3/20/2014: the kids from Beech Street School came to visit us on campus where we took them on a tour and then ate lunch with the Third Grade Class.

4/4/2014: We plan on going to Beech Street School to build birdhouses with the kids and then hang them up around the school.

4/21/2014: Today, we are going to plant the our rain gardenin the area we are trying to clean up the stormwater runoff on campus. The kids of Beech street School will be coming to help us plant during the day.

4/21/2014 – 5/2/2014: The rain garden will be maintained and adjustments will be made to ensure the future wellbeing of the rain garden on campus.

5/2/2014- the future: The maintenance crew on campus will maintain the rain garden and keep it functioning as is it should.

References

Rainscaping. "Rain Gardens." Rainscaping.org. Clarity Connect, 2014. Web. 28 Mar. 2014. <http://www.rainscaping.org/index.cfm/fuseaction/home.showpage/pageID/5/>.

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U.S. Department of Interior. Lowell National Historic Park: The Merrimack River. Lowell: U.S. Department of Interior, n.d. National Park Service. National Park Service. Web. 28 Mar. 2014. <http://www.nps.gov/lowe/planyourvisit/upload/River.pdf>.