

Beaumont Rain and Butterfly Garden

Patrick Goff and Kyla Trahan, Beaumont Middle School, Lexington, Kentucky



Photo Credit: Pennsylvania Department of Conservation and Natural Resources

Abstract

Beaumont Middle School (BMS) wanted to increase the capacity of the current rain garden to better handle the stormwater runoff that was coming from the main section of the parking lot. By increasing the size of the rain garden system through funding from the NOAA Planet Stewards, we were able to increase the capacity to catch, mitigate and filter stormwater runoff from a large impermeable surface, the main section of a parking lot. This project gave students the opportunity to investigate science in a real-world setting.

Introduction

Beaumont Middle School is located in a suburban landscape near the headwaters of the Wolf Run Watershed that does not have well-designed storm water mitigation plans. The school campus is located with a large roofed building (the school) and a large paved parking lot for the faculty and visitors. Currently, BMS has two rain gardens that were built but are not adequate to handle the volume of water that sheds off these two structures. Habitat conservation and restoration was the main focus of this project funded by the NOAA Planet Stewards. By helping mitigate the runoff at Beaumont Middle School, the project is helping Wolf Run become a healthier/stronger stream allowing for a better watershed system. A secondary goal was to build a butterfly garden to help build a habitat for local and migrating butterflies and bees. (Nature Conservancy, 2019)

Project Implementation

The teachers involved in this project had worked previously to install two rain gardens. This has created a new habitat for local wildlife on the school property, apartment complex and other houses in the local community. The established rain gardens are home to various squirrels, rabbits, robins, starlings, sparrows and a multitude of other animals. While working on those rain gardens, it became apparent that the current system was not large enough to adequately handle the runoff from the impermeable parking lots in order to process and filter more stormwater runoff. Another rain garden was needed. (Scubberly, 2021)

Partners in the project included Kyla Trahan and Patrick Goff, BMS teacher representatives, Bruce Hutcheson, President of Friends of Wolf Run, and Nachie Braga, owner of Geomancer Permaculture. Mr. Hutcheson was the community liaison and expert on the local watershed. Nachie was the rain garden expert to help with site selection, plant selection, design and install of the rain gardens. Eight students were actively involved in the project.



Image 7. Bruce Hutcheson, President of Friends of Wolf Run, comes in to talk with our rain garden club about the importance of the rain garden on the Wolf Run watershed. Photo credit: Patrick Goff



Image 8. Nachie, helping explain why our students would want to use native plants in the rain garden system. Photo credit: Patrick Goff

The existing rain gardens, when measured, came to 2500 square feet. The addition added another 980 square feet, bringing the total square footage to 3480 square feet. Students measured the surface of the parking lot, from which rain runoff would be captured, to assist in the calculation of the amount of runoff produced from this surface.

Our club was formed with eight committed sixth and seventh grade students who wanted to see the rain garden be constructed at Beaumont Middle School. We wanted younger students so that they would buy into the program and want to see it maintained through their middle school years. Throughout the year, students would come and go and at one point during the construction and installation, Ms. Trahan and Mr. Goff were both able to have a class they teach be involved as well.



Image 2. The butterfly garden after having been marked off. Photo credit: Patrick Goff

Table 1. Data that was collected by students.

Type of Data	Data Collection Method	Amount
Size of rain garden	Measured size of rain garden	980 square feet
Size of butterfly garden	Measured size of butterfly garden	750 square feet
Size of parking lot	Measured size of parking area	39,000 square feet
Rainfall runoff collection	Calculated amount of runoff from a 1 inch rainfall event	3,248 cubic feet of water
Rainfall volume	Volume of rain garden original	104.11 cubic feet of water could be held
	Volume of rain garden addition	81.6 cubic feet of water could be held
	Rough 80% increase in volume	New Rain Garden Volume total – 185.71 cubic feet can be held

Table 2. Timeline of activities during the 2021-2022 school year.

Month	Activities
September	Students went outside and talked about the 2 existing rain gardens, looked at the various plants, snapped pictures of them and slowly worked through identifying what needed to be kept and what needed to be removed.
October	Student lesson “Fight Flooding and Pollution with...a Garden?” The students built and tested models of a miniature rain garden in a plastic bottle. https://www.sciencebuddies.org/science-fair-projects/project-ideas/EnvSci_p066/environmental-science/rain-garden
November	The students met with Bruce Hutcheson to investigate where BMS fits into the Wolf Run watershed through a map.
December	Students measured the size of the parking lot and rain gardens, 130 feet by 300 feet and our rain gardens measured in at approximately 2500 square feet.
January	Students met with our contractor, Nachie Braga, who would build both gardens, to learn about the history of our area and why rain gardens are important.
February	Mr. Braga brought in a list of possible native plants for our students to pick from and talked about the pros and cons of each family type of plant for the gardens. Students then developed a list of plants that would be used. The students were made aware of the fact that the specific plants picked would be dependent on availability and price. Students were aware of the budget so they could understand the constraints on the project.
April	Mr. Braga came in on spring break to do the heavy equipment work of excavation and ground prep work for the rain garden expansion and butterfly garden install. This was done for work vehicles to not interfere with traffic in the parking lots and to not have to worry about students being near the work sites.
May	Planting was started and finished with the help of volunteers from Mrs. Trahn’s science classes.
Fall	Future work includes mulching the gardens, creating signage for both gardens, and creating public service announcements about the gardens.

The students also calculated the volume of water that the rain gardens could hold before and after the expansion. The difference between these two numbers allowed students to realize how much additional contaminated water could be prevented from flowing straight in the Wolf Run watershed.

Three outcomes were achieved at the conclusion of the project. Overall, we effectively increased our rain garden system by approximately 81.6 square feet. That allowed for an additional 185.71 cubic feet of storm water runoff to be held and absorbed, not allowing it to go into the storm water system.



Image 1. The butterfly garden after being planted. Photo credit: Kyla Trahan



Image 3. The area in our walking track where we wanted the butterfly garden after having been cleared. Photo credit: Kyla Trahan

Outcome #1 – Expansion of Rain Garden

This outcome allowed for an increase in the amount of rainfall that can be captured and diverted from the stormwater system.

Outcome #2 – Creation of Rain Garden Club

This outcome was of great pride for the educators involved because they were able to get 6th grade students to take interest and ownership in rain gardens. The club itself had eight student members but was able to involve about another 35 students in the planting of the materials through class time and school service projects.

Outcome #3 – Water quality improvement for the Wolf Run Watershed

This diversion allows the rainfall that has various pollutants, many from the 50 plus vehicles that park on the parking lot, to be absorbed by the ground prior to entering the Wolf Run watershed.

While the project was able to calculate the amount of runoff from the parking lot and the volume of runoff that the rain gardens could absorb, it did not calculate the rate at which the gardens would absorb the runoff. This additional piece of data will need to be calculated over the Fall and Spring of 2022-2023 school year. This will allow for a better understanding of the amount of water that can be contained within the rain garden. This number will be used to determine future expansion needs of the rain garden.

Conclusion

Long term maintenance of the rain garden and butterfly garden will fall to future students and staff at BMS along with community volunteer members. Our communication was not what had been planned as the timeline of planting was pushed back because of issues obtaining plants and getting money processed through the school district. The current plan is to take the 2022-2023 school year and start publicizing to the school and wider community about the rain gardens and butterfly gardens. The project is also in talks of working with a local elementary school to help them write a grant to Kentucky American Water to install their own rain garden.

There were several lessons learned over the course of the project.

1. Organize meetings better and help guide the students in the process.



Image 4. Nachi Braga, the local environmental consultant, and Kyla Trahan helped plant our rain garden. Photo credit: Patrick Goff



Image 5. The rain garden expansion after having been planted. Photo credit: Patrick Goff



Image 6. Kyla and her students who helped plant the rain garden expansion. Photo credit: Patrick Goff

About the Authors

Patrick Goff is a 23 year veteran science teacher who works at Beaumont Middle School in Lexington, KY. He has his BS in Secondary Ed Earth/Space Science and a Masters in Administration and Supervision along with his National Boards Science/ Early Adolescence. He has helped to oversee the installation and expansion of the rain gardens at our school. Patrick can be reached at patrick.goff@fayette.kyschools.us.

Kyla Trahan is a 19 year veteran teacher with Beaumont Middle School located in Lexington, KY. Kyla teaches 6th grade science, has a Bachelor's Degree in Elementary Education 1-8 with an add on of PreK- K, a Master's Degree in Arts of Elementary Education, and a Rank 1 in Educational Technology. Kyla can be reached at kyla.trahan@fayette.kyschools.us.

2. Get the planting done either in the fall of the school year OR earlier in the spring so one is not fighting the end of the school year. Project completion was delayed due to the need to remove some invasive plant species and put down the mulch.

In conclusion, it was a great learning experience for all parties involved in the installation of a new rain garden and butterfly garden at our school. We have seen the gardens go from being just an idea to being a real-life rain garden and butterfly garden. Our students are excited at the chance to maintain and improve on what we have done so far. We are also excited that we now know that we have been able to make a difference in the downstream water quality from the rain gardens that have been installed, even if it is a small difference, it is still a difference the students are proud of.

References

- The Nature Conservancy. 2019. Planting For Pollinators. <https://www.nature.org/en-us/about-us/where-we-work/united-states/kentucky/stories-in-kentucky/planting-for-pollinators/>
- Scubberly. 2021. Benefits of Rain Garden for 2021. <https://www.raingardennetwork.com/benefits-of-planting-rain-gardens/>

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