The COMMUNITY Foundation for Greater New Haven
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QUINNIPIAC RIVER FUND FINAL REPORT- 2018

Please complete and submit completed form via e-mail to dcanning@cfgnh.org at The Community Foundation for Greater New Haven by March 29, 2019 (or as otherwise stated on the terms of grant).

Date: 6/28/2019

Group/Organization Name: Connecticut Audubon Society

Address: 314 Unquowa Road

City, State, & Zip: Fairfield, CT 06824
Telephone #: 203-259-0416

Project Name: Meriden Middle Schools Bioswale and Native Garden Installation Project

Grant Number: 20180210

Name & title of person completing this form: Kate Reamer, Director Center at Glastonbury

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Please respond to the following statements:

1. List the specific objectives/outcomes of the project and tell how they were met during the grant period. Also, provide an update on any special conditions of the grant (if applicable).

    1. Install bioswale/native gardens at the two Meriden middle schools, Lincoln Middle School and Washington Middle School. Excess surface storm water is an issue at all Meriden school yards, and students stand to participate in and witness real environmental change with the implementation of these projects. When complete, an outdoor learning space will occupy every Meriden elementary and middle school yard

In the fall of 2018, CAS staff worked with the staffs at Lincoln Middle School and Washington Middle School to identify a site at each school yard that would provide the best location for the bioswale/native garden. Lincoln Middle School chose a spot right next to a main road with a natural depression/swale. This specific site is prone to flooding in large rain events, runoff water comes sheeting across Centennial Avenue from the large Stop & Shop parking lot across the street. By choosing to place a garden in this location, the parking lot and road runoff with all of the contaminates, will be absorbed and filtered by the native plants the students installed before making its way to Sodom Brook.

The location of the garden at Washington Middle School is behind the school, at the top of a steep hill that leads down towards the athletic fields. There is a small building directly adjacent to the garden, with a downspout leading into the garden. This location will allow runoff from the main school yard to slow and filter before running down the hill, helping to prevent erosion and improve water quality for the Harbor Brook, a tributary to the Quinnipiac River.

In the spring of 2019, CAS staff worked with the 6th grade teachers and students to successfully install each of these gardens. At Lincoln Middle School an approximately 400 square foot area was prepped and 200 students planted 114 native plants including cardinal flower, bee balm, goldenrod, and milkweed.

Across town at Washington Middle School approximately 350 square feet was planted with about 60 plants by 150 students. The fencing already present at this site provided a good opportunity to add native honeysuckle to the above mentioned plants in the garden to further mitigate the run off and erosion down the steep embankment.

Each sixth grade student at both Washington and Lincoln Middle School had the opportunity to plant native butterfly milkweed seeds to take back to their home to help create more natural areas in Meriden. Many students were very excited about the prospect of attracting native pollinators to their yards to help increase the biodiversity of the area.

2. All sixth grade students will complete class work prior to bioswale/native garden installation as part of their regular science curriculum. All CAS-provided classroom material meets NGSS standards, Math Common Core Content Standards, and Connecticut Language Arts Common Core Standards. CAS will work with each school individually to refine the curriculum for their individual classroom needs.

CAS staff worked with the STEM Coordinator at each of the two middle schools to develop a curriculum syllabus to be used during the school year as well as corresponding journals and

handouts to be used by the students ("Taking Action" handout attached as an example). CAS staff provided professional development at each of the two middle schools to orient the staff to the curriculum, journals, and handouts and to personalize the lessons to the particular school. The staff then used these tools throughout the school year to prepare the students for the garden installation in the spring. This curriculum will stay with the schools and can be modified to meet the needs of the individual school's garden for many years to come.

3. Students and teachers will begin to gather quantitative and qualitative data from the newly installed bioswales/native gardens as part of the citizen science aspect of this project. Items such as soil quality, water quality, and biodiversity observations will be recorded and discussed with their teachers and CAS, just like professional scientists. Although outside the grant period, once installed, these installations will become a permanent feature in the school landscape, contributing to school-wide science learning for the future. For years to come, all middle school students at Meriden's middle schools will have the opportunity to study the effects of the bioswale/native garden as part of their science curriculum.

With the curriculum developed by CAS staff and given to the STEM teachers at Washington and Lincoln middle schools to use as a guide, the 6th grade students are able record and analyze any changes that occur to the soil quality, water quality and biodiversity as a result of the creation of their school yard gardens. In addition to the in-class lessons, each school received 3 different journals for the students to use for study. "Ecosystem Monitoring – Abiotic Components" will guide the students through soil studies and microhabitat studies looking at wind, sunlight and noise. The "Ecosystem Monitoring – Biodiversity" journals will collect data comparing plant and insect species in the rain garden versus the school yard. The third journal, "Ecosystem Monitoring- Water Quality of Harbor/Sodom Brook" looks at all aspects of stream quality including temperature, turbidity, litter, bio-indicator species, and wildlife present in the area. Stream monitoring kits provided to each school will greatly help in collecting data over the years to determine the health of the Sodom and Harbor Brooks. The master copies of the journals, along with the in class lessons and handouts, will stay with the teachers and can be re-created (allowing for edits when necessary) for use with students year after year. In several years, there is the potential to have collected a good amount of data to show the positive impact these rain gardens have had on the Quinnipiac River Watershed.

2. Please share your successes, challenges and any lessons learned through the implementation of your project. Were there any unintended consequences or lessons learned that may affect how you operate your program moving forward?

The biggest success of this project was the installation of two gardens in excellent locations to mitigate storm water runoff and improve the water quality of the Sodom and Harbor Brooks, tributaries to the Quinnipiac River. Students learned what a rain gardens purpose is and why it is important to use native plants in our gardens. The teachers at both middle schools valued the experience and expressed to us that the hands on experience of having the students actually help plant the garden was one of the best experiences they and their students have had. A teacher from Lincoln Middle School said "hands down the BEST activity I have ever been involved with in my career. Every student had an active part in creating the garden. The kids are still buzzing about it today. They are all very proud of their hard work, which will be here for years to come." At Washington Middle School, the teachers commented that "this program provided our inner city students with an opportunity to understand nature on a very personal level" and agreed that this project "encouraged inquiry and critical thinking, enhanced students' interest in science and nature, and addressed content standards and met grade-level expectations". The students took pride in the work they did to create not only a beautiful space in their schoolyard, but one that will help their local watershed and improve their community. Additionally, with the location of the Lincoln Middle School garden being so prominent on a main road, the interpretive sign next to the garden will help educate all Meriden residents who walk by and see this space.

One challenge we faced was the timing of the project. Being in New England, the best time to plant a garden is in the spring and unfortunately this year was a very late, wet, cold spring which pushed our planting to the end of May, not giving much time once the garden was established for the students to complete follow up studies on the area this school year. However, because these are permanent installations, the follow up studies will happen year after year. Going forward with future rain garden installations we will take this timing issue into consideration when developing the curriculum and timeline for the project.

Additionally, we found that the material cost for the plants, soil, and mulch was lower than anticipated, leaving us with $1,489 of the award unspent. CAS can either use those funds to purchase supplies to use for this project in the future or return the funds to the foundation.

3. What are the opportunities and needs of your organization as it continues to move forward with its work to positively impact the Quinnipiac River?

After successfully installing rain gardens over the past few years in all of the middle school and elementary schools in the city of Meriden, we hope to continue improving the water quality of the Quinnipiac River by working in other communities within the watershed through additional garden installations as well as our general conservation and education programs.

Also, please include a photo or image that can be uploaded along with your report to The Quinnipiac River Fund website.

Images of completed rain gardens attached in email.