

Does Urban Habitat Restoration Work?

A Tale of 19 Students and 5,148 Insects in a New Haven Harbor Refuge

By Taylor Pauls, Erik Lopez, Kathiana Torres, Sophia Ginnow, Georgia Basso and Corrie Folsom-O'Keefe



Urban Habitat Restoration by the Numbers

- 1 Urban Wildlife Refuge Partnership
- 6 habitat restoration study plots
- 19 Common Ground Green Job Corp Students
- 3 years of monitoring
- 13 pairs of tweezers
- 10 microscopes
- 100+ native species planted
- 5, 148 insects collected and identified



The lab classroom is silent as eight Green Jobs Corps students from Common Ground High School peer under microscopes, sorting and counting insects with a methodical intensity. They pause to jot down a few notes, make a quick sketch of an insect, or flip through the dichotomous key to double check the difference between flies and wasps. Occasionally a triumphant cry rings out from one of the tables, "I've finished counting the Homoptera! 15 different species, 213 individuals." Smiles and encouragement come from the other tables, "Yeh!" "Way to go!" There is a sense of comradery among this crew, with thousands of insects left to identify—we are all in this together.

Now and then an outsider wanders into the lab room. Upon seeing this strangely silent, extremely focused group, who occasionally speak to each other using Latin names—it's too much for them and the silence is broken, "What the heck are you guys doing?"

As part of the New Haven Harbor Urban Wildlife Refuge Partnership, Green Jobs Corps students from Common Ground are working side-by-side with Audubon and USFWS biologists to restore habitat in the city of New Haven. These students took on a multi-year challenge to scientifically document whether urban habitat restoration is working to increase biodiversity. Although it's generally known that habitat restoration increases

biodiversity, there are few studies that actually document this. This study is one of the first of its kind in New Haven.

Over the past three years, the students have collected invertebrate data at two habitat restoration sites in the city. The students hypothesized that by increasing the diversity of native plant species



Author Kathiana Torres works with Common Ground teacher Sharon Brostrom to sort Hymenoptera (bees, wasps, and ants) by their appearance. Photo credit: Joel Tolman, Common Ground

we will also increase invertebrate diversity and abundance and create better habitat for wildlife.

The experiment involved extensive habitat restoration. First, invasive shrubs, herbaceous plants, and cool-season grasses were removed. Then native plants were planted. Mulch was placed around the native plants to stop the spread of invasive weeds. Three ten by ten meter plots were set-up at the two sites—a control plot and two study plots. The percent of native plants, non-native plants, mulch, or bare ground was recorded each year in all study plots. Insects were collected by sweeping the ground with butterfly nets, killed in rubbing alcohol, identified to order using a dichotomous key, and then identified to species based on differences in their appearance.

What we found out.

In analyzing the data, first we saw more vegetation diversity in 2015 than the previous two years in all the plots. Second, the increase in vegetation diversity is helping to increase invertebrate diversity and abundance.

On the next page, we highlight Beaver Pond Plot 3, one of the four study plots. Plot 3 is representative of what we see happening at the other study plots in that both vegetation diversity and insect diversity are increasing as we continue to restore these urban areas.

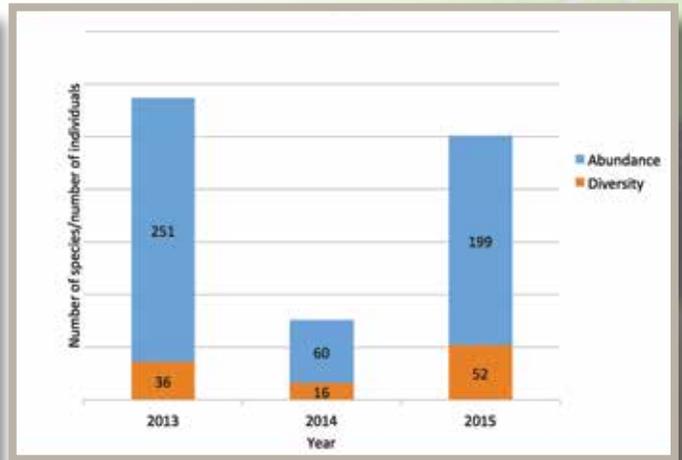
In the summer of 2014, we came up with a hypothesis that after a year ended up being supported. Our hypothesis was that the mulch that spread on Plots 3 and 4 at Beaver Pond reduced a lot of the insects

that were living in that area (*Figure 2*). We brought this information to our Urban Wildlife Refuge Partners and asked them to use less mulch and more native plants. It worked! This year we have more native plant species and the highest diversity of invertebrates of all the study years (*Figures 1 and 2*). The native herbaceous plants increased from 25 % to 56% in plot 3 (*Figure 1*) and 5% to 35% in Plot 4. Invertebrate abundance and diversity tripled at Plot 3 and doubled at Plot 4. Lastly, in the previous years the Beaver Pond control plot resembled a soccer field. The vegetation was very short. In 2015, the control was not mowed and it looked more like a meadow. We suspect that the tall grass increased the invertebrate population. We saw the abundance increase by six times and diversity by three times more than the previous year. Habitat restoration in New Haven is

Figure 1 - A Vegetation Change at Beaver Pond



Figure 2- Invertebrate Abundance and Diversity at Beaver Pond



improving wildlife habitat and also benefiting the students involved in this project.

• **Monitoring is important**

Monitoring alerted us to problems with the habitat restoration (too much mulch, not enough native plants) and allowed us to change our restoration plan mid-course. This was very important to the study. Because it is still early in the study, we recommend monitoring for at least two more years in order to have a 5 year data set. This will also allow us to monitor after the plants have had more chance to grow.

• **Designate low and no mow sites**
Based on the past three years of data

we recommend that the study plots not be mowed at all because mowing can kill the young native plants trying to establish themselves. We also recommend that select areas across the city in parks and other public spaces be designated as low or no mow sites. Mowing certain areas less frequently could not only save the city money but also increase the amount of insects at these sites and the value of the areas for wildlife, particularly species that eat insects like birds, small mammals, and reptiles.

• **Plant a diversity of native species**
Based on the past three years of data we recommend continuing to add and care for a diverse suite of native plants in the study plots. Diversity in plants

and native plants in particular are helping to increase the diversity of insects, including beneficial insects like bees, ants, and wasps. We feel that with continued management including planting and watering native species and removing invasive species, vegetation diversity at the sites will continue to increase and have a positive effect on wildlife diversity.

Why this project has been important to us

This project is important to the Common Ground Green Jobs Corps students. It gives them meaningful summer employment and job skills like being responsible, showing up on time, and planning for the day ahead, while earning income to help support their families. We are learning life skills, discovering career interests, and seeing the results of the hard work and the real outcomes for the environment and our community.

Special thanks to:

The New Haven Urban Wildlife Refuge Partners who work to plant, protect and monitor the habitat restoration sites, especially the Urban Resources Initiative and their partners.

Common Ground students and instructors who have worked on this project- Students: Michael Bruno, Nyasia Mercer, Dimitri Lemonas, Grace Knudsen, Joaquin Davis, Lovell Davis, Sophia Ginnow, Tricia Johnson, Erik Lopez, Taylor Pauls, Kathiana Torres, Meisha Hennesey, Thomas Montez, Thomas Melendez, Eugenio Garcia, Loc Nguyen, Christopher Gonzalez, Anthony Duff, Lisandra Mendosa, and Linnette Mendoza.

Instructors: Joel Tolman, Sarah Tracy-Wanck, Karen Climis, Sharon Brostrom, and David Edgeworth



Butterflies are excellent pollinators.
Photo credit: ©Mel Morales.

Insight from the Authors:

“The coolest part about this project is seeing the results of the work that me and my coworkers did in planting and taking care of the habitat restoration sites. Realizing that the work we did is actually making an impact is really great.”

-Kathiana Torres

“My favorite part of this project was seeing the spiders under the microscope. For the first time ever I was able to see all the little parts of the body. The thing I will remember most about this project is the long hours looking into the scope and having to check carefully to see if the insects were the same or different.”

-Erik Lopez

“I loved looking at the insects under the microscope. It was as if they came alive and we could see all the detail in their body structure. The biggest lesson I will take away from this experience is learning all the orders of insects, like Homoptera, Hemiptera, Diptera, Hymenoptera. Being involved in this project made me even more passionate about working in a scientific field; I really enjoyed collecting and analyzing the data and discussing the results.”

-Taylor Pauls



ABOUT THE AUTHORS

Taylor Pauls (senior), Erik Lopez (junior), Kathiana Torres (senior), and Sophia Ginnow (sophomore, not pictured) are Common Ground students. Corrie Folsom O’Keefe is affiliated with Audubon CT, and Georgia Basso is affiliated with the U.S. Fish and Wildlife Service.

Butterfly nets were used to collect insect at the 10x10m study plots. The insects were bagged and then brought back to the school for identification.