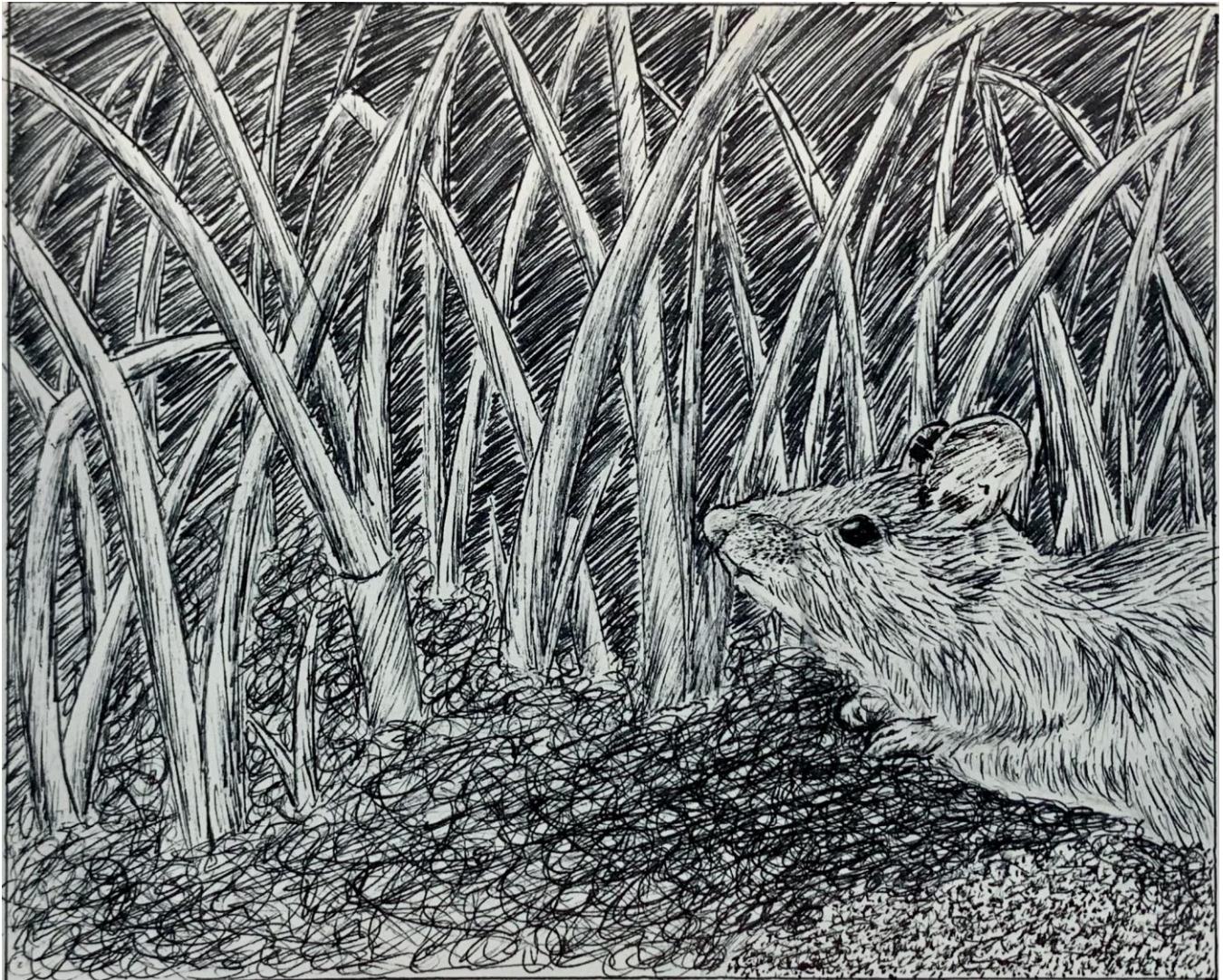




SPRING 2023 NEWSLETTER



Morning in the Fields by Melissa Wong

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A Message from the Program Coordinator

I always enjoy seeing the first signs of spring- the daffodils peaking their way out of the dark ground, hearing the first spring peepers, noticing the rusty red color of a deer’s summer coat after it molted, and observing the regrowth of the wildflower meadows filled with birdsong.

As we approach the last few weeks before school lets out, we are preparing to go full steam ahead with Nature Initiative projects! Spring brought some new experiences for us such as learning about Native American culture and creating clay pinch pots, starting a new Ailanthus removal project on Youngs Island, learning the workings of a regenerative farm, and attending a specialized salt marsh planting project in Connecticut.

It’s always a joy to watch our students come together whether we are pulling garlic mustard, planting vegetables, doing a cleanup, crafting wood projects, or working in a restoration area. I always admire the way everyone contributes to the team whether they’ve known each other for 5 years or 5 minutes.

As always, thank you to the students and for the support of our parents/guardians who continue to make our program a success!

The garden is planted, the sheep are shorn and we are ready for a fun summer! Looking forward to seeing you out there!

Enjoy the sunshine,

Kayla



Our first Eastern box turtle spotted this season at Avalon right outside the veggie garden!



Tonito Valderrama giving a presentation on zoomorphic pinch pots

Avalon Spring Newsletter
By Deia Colosi



Deia is a Nature Initiative participant who enjoys drawing and painting. She has been involved in art classes from a very young age!

Alumni Spotlight

Ever wonder what happens after students graduate out of our programs? We connected with some of our alumni from Avalon's youth programs to see where they are now! Meet them below!



Major/Area of Study: Environmental Science & Engineering, with a minor in Spanish

Favorite hobby: I love to write poetry! I've recently been trying to carry a notebook with me wherever I go so that I can always capture inspiration when it comes.

How did our programs at Avalon inspire you? I have always been interested in sustainability and conservation, but my involvement in Avalon youth programs allowed my love for environmental science to grow and flourish. Now, I am pursuing a career in that field.

I still think back fondly to the Outdoor Leadership Program where I learned orienteering and how to paddleboard. Every time I lead friends to places using a map, I trace that back to what I learned at Avalon. I remember the experience of staying in Zealand Falls Hut in the White Mountains and having to reduce the waste that I produced because every piece of trash had to be carried out on someone's back. Ever since, I have essentially stopped using napkins and I try to reduce waste wherever I can.

Maya Peña-Lobel

Completed the Outdoor Leadership and Environmental Program in 2017 (now called Natural Connections), completed the Western Exploration for Young Environmental Stewards Program (now called Yellowstone Immersion) in 2018 and participated in S.T.A.T.E. from 2016-2019 (now Nature Initiative).

Maya just completed her junior year at Harvard University.

I also learned wilderness first aid, but fortunately I have not had to use that training too often!

I also frequently think back to my experiences through STATE. I participated in a variety of events helping to collect data for researchers, facilitating educational programs, or providing service to local environmental nonprofits. I am currently in an Ecosystem Restoration class, and I have been able to draw upon my learned experience from volunteering with horseshoe crab tagging, Long Island Native Plant Initiative seedling planting, invasive species pulls, and more to apply this knowledge towards creating plans for endangered species counting, native plant revegetation, and invasive species monitoring.

Favorite experiences, stories, or Avalon

memories: Going to Yellowstone through the Avalon program six years ago remains, to this day, one of the best experiences of my life. The amount of knowledge that I learned, beauty that I saw, and fun that I had in one week has been unparalleled. Yellowstone has a way of coming back to me while I'm at college whether it be hotspot geology for geothermal power in my energy

Maya Peña-Lobel
(cont'd.)

resources class, or predator-prey models of the Yellowstone grey wolf reintroduction in my differential equations class, or nature photography in my art extracurriculars. But I also gained immeasurable value beyond the scholastic setting. The awe that I felt, the serenity that I was immersed in, and the ineffability of the landscape I was surrounded by on my Yellowstone trip has left an incredible impact on me.



Advice you would give to a high school student:

High school should be a time when you explore new opportunities to figure out what you like and who you are. Don't do things because you think you are *supposed to* or because someone told you that it will look good on a transcript. Instead, try to find things that you really enjoy and are passionate learning about! What makes you excited? What could you talk about or do for hours? What makes you feel most comfortable as yourself?

Career goals/future plans: I will be in San Francisco doing an internship this summer! After college, I would like to try environmental consulting (ESG). I am also considering getting a Master's degree or certification in engineering and then pursuing engineering consulting.



Gianna Leippert

Participated in the S.T.A.T.E. Program (now called Nature Initiative) from 2017-2019
Worked at Avalon as a Part-Time Seasonal Program Assistant during the summer of 2019

Gianna graduated this May from SUNY ESF with a Bachelor's of Science Degree in Environmental Health with a minor in Chemistry.

Favorite hobby: Like many Nature Initiative participants, my favorite pastime is exploring nature with my dog! This summer, I'm looking forward to returning to Long Island for a few months to revisit some of its unique habitats that I've been missing here in Syracuse.

How did our programs at Avalon inspire you?

In high school, I wanted to attend ESF for wildlife science, so Avalon's programs were an obvious choice for me. While my current research interests are far from my initial vision, I still think my experiences at Avalon were an important part of my early environmental education, because it taught me some of the fundamentals of any scientific career.

Favorite experiences, stories, or Avalon memories:

I worked on the early stages of the white-tailed deer immunocontraception project, which was my first real involvement in scientific research. It was a great introduction to the research process in environmental science, and I'm grateful to have had the opportunity to do this before taking on my own projects at the university level.

Your typical day: I attend the SUNY College of Environmental Science and Forestry (ESF) in Syracuse, New York. I also work and do research part time. My jobs have all involved water treatment, and my research focuses on the remediation of polluted soils.

Major/Area of Study: For my undergraduate degree, I studied Environmental Health, a somewhat uncommon degree that is similar to an environmental science degree, but has a heavier emphasis on human health. That means I took classes like epidemiology and toxicology in addition to typical environmental science courses like ecology and chemistry.

For my upcoming graduate studies, I will be earning my M.S. in Environmental Chemistry, which is a field that looks at the environmental fate of pollutants when they enter the environment. The chemical may stay inert, or it may undergo several reactions and become something entirely different! It is a fascinating area of research with lots of potential.

Gianna Leippert (*cont'd.*)



Gianna placing a trail camera for field surveys of deer in 2018

Advice you would give to a high school student:

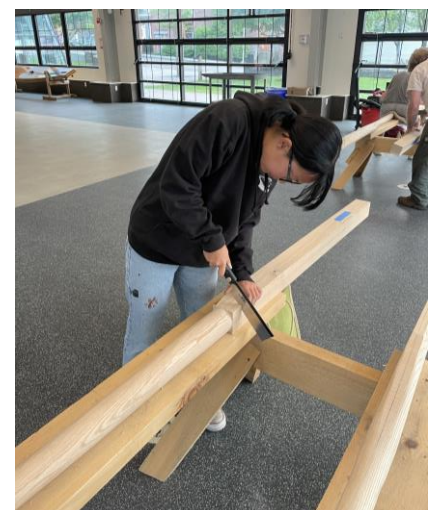
Try new things, even if you're sure you won't like them! I always thought I hated chemistry since taking it in high school, but here I am going for a graduate degree in chemistry. There are so many fields within the environmental science umbrella that are scarcely known and understudied, and it takes the curiosity of students like yourselves to tackle them!

Career goals/future plans:

I've found out that there's a lot I can do with my degree. So far, I've worked with non-profit organizations, private companies, and various levels of government. I am not sure yet which direction I'll go after school, but I'm hoping I can work in the field of environmental remediation!

About the Artist Melissa Wong

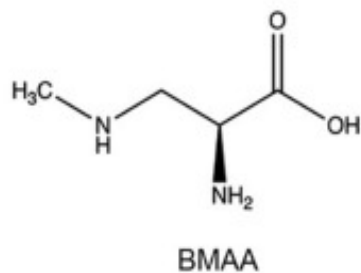
Melissa is a Nature Initiative participant who has been drawing for as long as she can remember but started taking it seriously in 5th grade. She enjoys drawing still life's, wildlife and people. Her favorite mediums to use are pen and charcoal. Her cover drawing "Morning in the Fields" was done in all ballpoint pen!



Understanding oxidative stress and excitotoxicity by BMAA using *Nematostella vectensis*

By Nadia Matthew

The frequency and duration of harmful blue-green algal blooms (HABs) have significantly increased. Run-off from agricultural wastes and industrial effluents fertilize these blooms by loading aquatic systems with excess nutrients like phosphorus and nitrogen. With over 60% of the global population and over 50% of the national population living in coastal areas where these blooms persist, HABs pose a great threat to human health. Cyanobacteria may inhabit these blooms and produce toxins, such as the non-proteinogenic amino acid beta-Methylamino-L-alanine (BMAA). This toxin biomagnifies up trophic levels, leading to neurological diseases like Amyotrophic Lateral Sclerosis (ALS). In my study, I use the Cnidarian *Nematostella vectensis*, a starlet sea anemone, as a model organism to understand the effects of BMAA exposure. After exposing polyps to 0-10 μM BMAA for a week, I found little to no noticeable morphological effect at low doses. However, the 10 μM dose killed polyps after two days. I also measured peristaltic rates as an indication of the polyp's metabolic health. Average peristaltic rates increased with greater BMAA concentrations and prolonged exposure. Then, I determined oxidative stress levels using the fluorescent probe 2-7 dichlorofluorescein diacetate. Polyps were exposed to 0-10 μM BMAA.

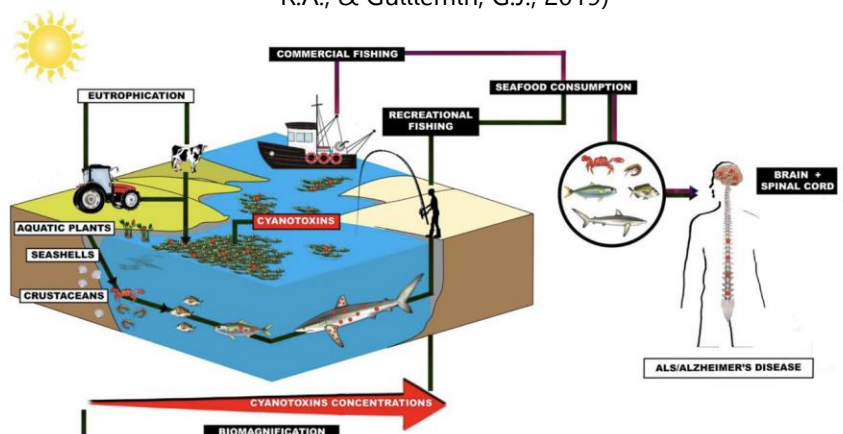


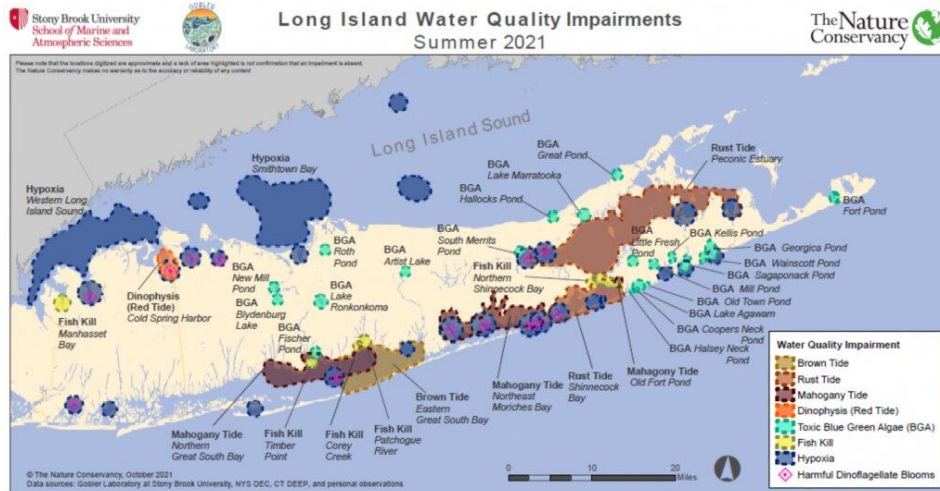
Chemical structure of BMAA
(Han, N., Bullwinkle, T.J., et. al, 2019)

The polyps exhibited changes in ROS (reactive oxygen species) production that were highly significant in relation to concentration and time: as the dose increased, so did oxidative stress levels. After seeing increased ROS levels, I wondered whether antioxidants could mitigate these effects. My mortality experiments revealed the 1 μM BMAA polyps had high mortality by day 9; however, polyps exposed to BMAA with antioxidants did not have significantly lower mortality rates.

As HABs frequency increases, more people are exposed to BMAA. And with about 90% of ALS having sporadic origins, environmental toxins like BMAA become a potential agent in some of these cases. BMAA is already being linked to cases of neurodegenerative disease across the world: the Chamorro people who ingest BMAA-containing seeds, Gulf War Veterans exposed to cyanobacterial crusts, and New Brunswick, Canada residents experiencing neuro-dysfunction. Perhaps by answering such questions about ALS' origins, we can find effective treatments for this devastating disease.

Eutrophication's role in the development of harmful algal blooms and the threat of cyanotoxins. (Dunlop, R.A., & Guillemain, G.J., 2019)





Algal blooms and water quality throughout Long Island. (Christopher J. Gobler, Ph.D., School of Marine and Atmospheric Sciences at Stony Brook University)

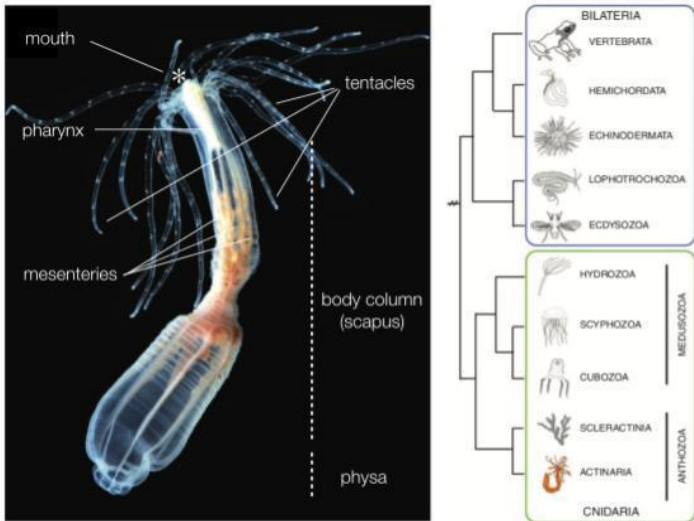


Figure 2: The structure of *Nematostella vectensis* is shown along with a phylogenetic tree depicting the sister relationship of cnidarians and bilaterians. (Layden, M.J., et al., 2016)

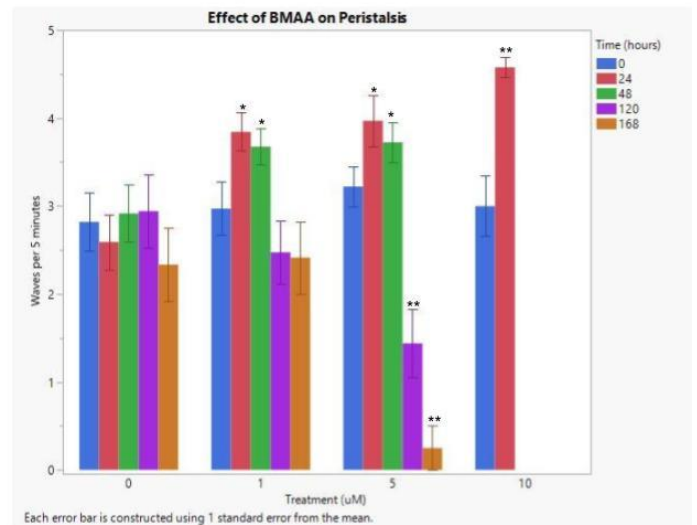


Figure 5: Peristaltic rates of the polyps after being exposed to BMAA after 24 hours, 48 hours, 120 hours, and 168 hours of exposure. * = P values < .005; ** = P values < .0001 (Made by author)

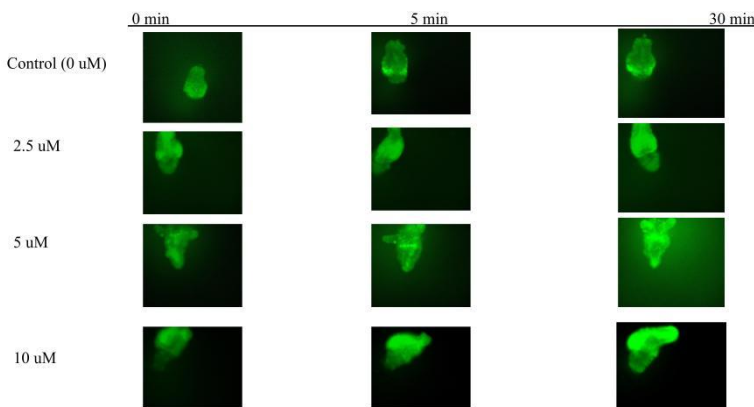


Figure 6: *Nematostella vectensis* polyps treated with 0, 2.5, 5, or 10 uM BMAA over 30 minutes and stained with the fluorescent probe 2-7 dichlorofluorescein diacetate. (Made by author)

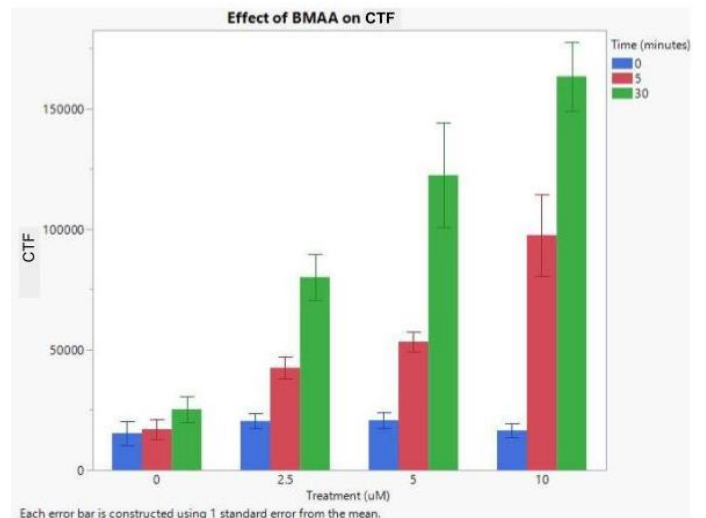


Figure 7: CTF levels of the polyps after exposure to 0uM, 2.5uM, 5uM, and 10uM BMAA at 0 min, 5 min, and 30 min after exposure. (Made by author)

Tales of Feathered Friends

Bird Nest Box Camera

By Kayla Serina

This spring, I took on another fun endeavor – we purchased a Green Backyard wireless bird box camera to mount on the inside roof of an Eastern Bluebird box. Once I figured out how to connect it to the network and get it all installed, I anxiously waited for visitors. If any birds come to the box, the camera gets motion triggered and sends the videos straight to my phone. After about a week, I finally got my first visitor! A male tree swallow kept checking out the inside of the box, flying in and out a few times a day. Not long after, he started bringing pieces of reeds in from the cut meadow. In my research, I learned that the male will claim a nest cavity at which point they will display and call out to court females. However, once a pair is established the female will do a majority of the nest building. I was so excited to see the male returning to the box each day and heard his calls while defending the cavity from other intruders. Males get quite competitive with other tree swallows over territory. I went out to the garden one afternoon and noticed a pair of swallows perched on the roof together and I was ready to soon watch nest building take place.

That was until.... the house wren! A male house wren started flying in and out of the nest box multiple times a day. At one point I even had footage of the house wren inside the box while a larger shadow appeared from the perching area- I heard chatter from the tree swallow. Male house wrens will actually start to make several nests to attract a female who then visits each cavity and decides which one to pick. Wrens can be quite aggressive and often bully larger birds resulting in their nest failure. Between our wren and then a paper wasp, I haven't seen the tree swallows since. Hopefully we'll have better luck next year, but it was quite a show to see!

Click on the icons below to watch our bird camera videos!



Video #1: Male tree swallow



Video #2: Male house wren

A pair of tree swallows perched on top of a bird box (Female on left; male on right).

Upcoming Projects:

- Horseshoe Crab Tagging: 6/1 from 9:45 PM-11:30 PM @ West Meadow Beach
- LI Maker Faire: 6/3 from 9:30 AM-3:30 PM @ Port Jefferson Village Center
- Horseshoe Crab Tagging Pt II: 6/16 from 10:30 PM-12:30 AM @ West Meadow Beach
- Terrapin Monitoring: 6/17 from 8:15 AM-10:30 AM @ West Meadow Beach
- Arcadia Day: 6/19 from 2:00 PM-4:00 PM @ Avalon Barn
- CEED Summer Solstice Festival: 6/24 from 11:00 AM-3:00 PM @ The Washington Lodge
- Native Habitat Garden: 6/25 from 10:00 AM-12:00 PM @ Sweetbriar Nature Center



Spring Break Farm Experience

By Kayla Serina

On a cool, overcast morning in the first week of April, we welcomed 11 student volunteers to Birdsfoot Farm. Birdsfoot is a small farm spanning 43 acres located next to the forest sanctuary area of the preserve. They use regenerative practices to celebrate the interconnectedness between natural ecosystems and conservation agriculture.

Our farm experience was two days long for 2 hours each day. On our first day we split into two groups- one group met with Bill O'Hern, a local beekeeper who is currently managing hives at the farm, while the other group helped rotate chickens on pasture. Halfway through, the groups switched. There was a wealth of knowledge to learn about farming!

Bill shared his expertise on how his beekeeping journey started, the equipment needed to start a hive, how to collect honey and the roles of bees in the hive. We learned about the queen bee, drones and the worker bees. Did you now that one honeybee only produces 1 teaspoon of honey in its lifetime? It is challenging to produce enough honey to sell at the farmers market every week, you need a LOT of bees! We even had the opportunity to try some honey and pollen, yum!

The other group went with Annalee, Lauren and Ryan who all work on the farm 6 days a week. Volunteers were shown how to move a flock of chickens from one area of the farm to another. Flexible panels of electric fencing get rolled up (after it is turned off of course) and carried to the next area while farm staff attached the closed chicken coop to the back of a tractor and took the chickens for a ride! Students helped get the chickens set up in their new area by reconnecting the electric fence, making sure food and water was moved and opening up the coop to let the chickens back out on pasture.

Rotational grazing allows the animals to follow their natural behavior patterns while giving them plenty of nutrition. In turn, the animals help to improve soil health.

The same volunteers returned the next morning, which was a bit sunnier. Tasks this day included rotating sheep and goats as one large group. We walked out to the fields and half the group picked up the electric fence and moved sheep with Ryan and Annalee. For the sheep, students set up a second area of fencing next to the original one and then they opened one side of the fence to allow the sheep to run into the new section. The sheep enthusiastically ran right over and we closed them in. Next up were the goats- the other half of the group set up a second fence for them and then Annalee and Ryan helped push the goats over to the new area. The goats were a little more complicated to move because they eat woody shrubs and bramble so we needed to set up the fencing around a hedge row of trees. Once they were settled and everyone was moved, we watched for a few minutes and proceeded to our final activity.

For our last activity of the farm experience, students had the opportunity to learn how to do health assessments on baby goats. Students worked in pairs to give each goat a body condition score based on criteria by looking at their spine, ribs, and hips. By evaluating the amount of fat on each animal we can ensure they are getting the proper nutrient levels in their diet and fat content fluctuates based on time of year. Each group chose a score for the animal they were working on and when Ryan and Annalee went over the results, the students were spot on!

Overall, it was a fun way to learn about the day-to-day operations of a small-scale farm and we can't wait to do more programs there in the future!





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