

*Inspiring wonder, understanding and connection to the natural world through playful, outdoor, scientific inquiry*



**Kestrel**  
EDUCATIONAL  
ADVENTURES



**2021  
Annual  
Report**



## From the Founder -

When I was a student in middle and high school science classes, a lab class meant that we could follow a prescribed course of hands-on procedures to observe a phenomenon in action; perhaps mixing chemicals, or dissection. "Projects" tended to be posters on which we summarized information we had read, or models of known entities, such as atoms or solar systems. But science is an exploration of the unknown, the generation of new knowledge, the pursuit of mysteries, not the repetition of knowns. For scientists who work in the natural world; this requires long term, patient observation of natural phenomena. How can K-12 science education grow to incorporate the work of truly being young scientists?



One essential ingredient here is time. Time to become rooted in a place, in a question, in the process. Time to mess up and change course, and time to reflect. Can this kind of time be available as a regular component of a science program at school? I truly hope so.

We at Kestrel have been shifting over the past couple of years towards more emphasis on scientific process, patiently rooted in the natural world. What we want to see is our students generating questions, then being allowed the luxury to collect information to help them answer their questions, realize they're not quite the right questions, and try again. We'd like to see students finding data that does not support their initial ideas, and then wrestling with the reasons, and trying to find even more information. It's hard to accomplish while juggling school schedules, but I argue it's essential, not just during out of school time, but during in-school, core academic science programs. I think we've all seen over the past two years that there is widespread confusion about how scientific process works when new information is being learned. Not only understanding, but generating this process, I argue, should be an essential piece of the academic curriculum for all K-12 grades. The challenges are many; finding long enough periods to allow for proper reflection, excessive testing, and teacher preparation.

The rooted in the natural world piece is just as essential, and just as challenging to execute. It requires, of course, access to outdoor spaces, proper outdoor gear, and willingness and patience to find the information you're looking for, so much less speedily than web searches. Checking the temperature and chemistry of the same river week after week, having enough time at the field site to sketch the lay of the land, gather water samples, and not only find but analyze the values found, is a big ask. Giving students the luxury to not only do all this, but also, at some point, to sit with their backs against a tree for minutes on end, just observing the flow of the river and taking it all in, is the ideal. Time, in project based learning, is everything. Rushing does not work.

I am encouraged that, increasingly over the past few years, we are finding schools and teachers willing to partner with us for projects that are all of the above. Over the past year, we conducted a yearlong analysis of the chemistry and life of the Ipswich River with high schoolers, and conducted three separate month-long units with middle schoolers, one for observing animal behavior, and two for engineering solutions to assist wildlife living in developed areas. In all these projects, students were asked not to conduct perfect research, but instead to explain their data and their mistakes, where they wished they had taken water samples from, how they wished they had installed trail cameras, or how they had messed up the camera settings, and how they would re-design their research if given even more time. They also explained not only what they did learn from their research, but also, what they were not able to determine, and why. It's difficult to comprehend the nature of scientific process without having opportunities for all this reflection and re-design. All of this occurred during a pandemic, sometimes virtually and sometimes in person, but always with direct observation of the natural world involved. I am determined to help schools make projects like this a staple of science learning.

Jessica Kagle, Founder and Program Director

# Featured Programs

This year's programs were funded by the New England Biolabs Foundation, New England Biolabs Corporate Donation Committee, Institution for Savings Charitable Foundation, Manchester Essex Conservation Trust, and the Beverly Cultural Council, a local agency which is supported by the Mass Cultural Council, a state agency.



## ***Bentley School Tideline Explorers, K - 1***



All the Kindergarten and first graders from the Bentley School in Salem had a two part coastline adventure with our instructors in the spring of 2021. Each class walked from their school to Dead Horse Beach, where instructors had set up a tidal study. We used a seine net to capture fascinating creatures including shrimp and baby sculpin and pipefish, and submerged barnacle-covered rocks into tanks of water to watch the barnacles open up and feed. The students walked the mud flats learning to roll rocks to find and catch crabs and snails and amphipods.

For each animal we discovered along the coastline, we observed it and tried to figure out what behaviors it had to protect it from predators and rising tides. We then played a new game the instructors had invented called "Tide Stage" in which everyone acted out each animal we had observed, at high tide, and then acted out its low tide behaviors. After our beach adventure, the

students worked in groups to make giant maps of Dead Horse Beach, showing where each animal had been found. Some of the students had not held small ocean creatures before, and showed their wiggly excitement. A highlight was working with the students to place survey flags at the tideline, then watch how the tide changed the shoreline as it came in or receded. We almost lost a few of our flags, but we got the point across! This program enabled young students to connect their science studies about animal habitats and behaviors to a dynamic place only a short walk from their school.



## ***Ipswich High School River Study***



The Ipswich High School Earth and Space Science class studied the Ipswich River with our instructors, meeting throughout the fall and spring to analyze water quality, catch and identify invertebrates found in the water, and figure out how all these moving parts impacted the river and its surroundings. Students took on specialist roles, running chemical water quality tests, gathering water samples from the river, testing salinity, or identifying species.

Their resulting website is a snapshot of the river that flows through the students' hometown. A favorite moment was when, on the last day of the spring, when learning about the pollution tolerance of various insects, a tiny mayfly emerged from the river and landed, drying its wings on one of our nets. By the end of the year, students showed the ability to make inferences about the possible causes of each of our findings, and how different measures of water quality might connect to one another.





## **Homeschool Wildlife Tracking and Nature Awareness**

A group of delightfully present and curious homeschoolers from ages 11-13 joined us for a three part tracking and nature awareness class on the grounds of the Patton Homestead. We began with games for improving our observation of small things hiding in the woods. A favorite was hiding diminishingly small toy animals in woodland crevices, and attempting to find them by scanning the forest from the trail. We then moved on to learning to recognize different animal tracks, and practicing moving like various animals. Our astute students soon found deer and raccoon footprints in the muddy field. Finally, we worked on learning to recognize the signs and trails of animals in the forest, noticing small disturbances. Many of our students enjoyed drawing and writing about their observations. Some of our favorite finds were discoveries of rare frogs, many owl pellets, painted turtles crossing the field, and signs of otters.



## **Beverly Children's Learning Center (BCLC) Bird Studies**



Our six week partnership with BCLC this spring involved preschoolers up through 5th graders in an in-depth program we called *How to be a Wild Bird*. Working with the children in small groups by age level, we moved from observation and awareness of birds to learning about specific species and their food needs and behavior. We did most of our learning through games, such as acting out various bird behaviors and playing at migration using landmarks. We also searched for small critters that insect eating birds might eat, built nests out of sticks we found, and learned to imitate bird calls using the Merlin app. We highlighted a different common bird each week, and most weeks, we were able to find our featured bird in real life, observe, and maybe even call to the birds. Towards the end of our BCLC spring adventures, we used everything we had learned to mix custom blends of seeds to attract particular birds and to make and hang bird feeders. Conversing with song sparrows and grackles became a routine weekly activity.



## ***Kestrel Summer Adventures: Survival Rockport***

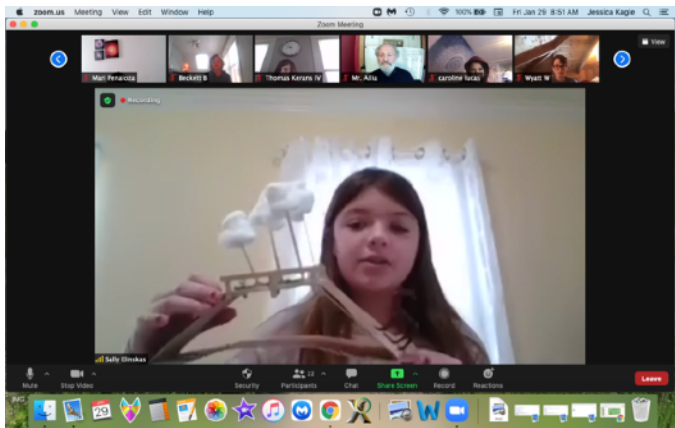


This summer's Survival Rockport camp was so highly enrolled that we had to add extra instructors. We found a new favorite basecamp spot within the Rockport woods, forever after dubbed "Toad Cliffs." Toad Cliffs is our favorite spot because it contains a wide variety of habitats, rich wildlife, and, of course, cliffs for exploring. We had an elaborate theme and story for each week, and campers adventured as characters in the story.

On week one, we searched for the Evergreen Wizard and spent much of the week interpreting chalk clues we found around the cliffs, and used these clues to learn to make everlasting fire. On another week, we ventured into a new land alongside our animal allies, to find some missing people. Every week, we built shelters and fires and carefully snuck up on wildlife to observe it undisturbed. Campers worked towards stamps in their Forestbook skills trackers, elevating their levels on their favorite skills over time. They learned to carve wooden tools and small sculptures, build shelters that actually kept them dry during a downpour, and make embercloths that can hold a spark to be ignited later. They sculpted clay animals, built and tested miniature rafts, and navigated their own paths through the woods with compasses. Their installed trail cameras captured coyotes and raccoons walking through our campsite, much to everyone's delight. At the end of each week, our campers compiled their experiences, animal findings, and a hearty dash of wild imagination, to create and act out endings to the story of the week.



## Rockport Middle School Designing for Wildlife



Collaborating closely with the engineering teacher, Kestrel instructors developed a month-long project tasking middle schoolers with generating solutions to problems faced by wildlife. Beginning with a slideshow highlighting some issues faced by local animals, including road crossings, introduced predators, loss of special types of habitats, and storm drain perils, we then moved into brainstorming solutions as a group. We discussed the dangers of deer and raccoons crossing busy roads, snakes being washed into storm drains, and turtle nests being dug up by cats and raccoons.

Students were then given packets of fun craft materials and time to sketch and then build a model of an innovative engineering design to help an animal. Each student choose a local species to help, and a specific problem spot on Cape Ann where their engineering design should be installed. Students presented their ideas and models to an audience at the end of the month. This project was conducted twice over the fall-winter of 2020-2021. Due to pandemic restrictions, our involvement was entirely virtual.

**This program was generously funded by the Institution for Savings Charitable Foundation. Thank you!**



## Our New Home at the Patton Homestead

In August, we began a full move into the Patton Homestead in South Hamilton, with weekly onsite programs beginning soon after moving in. The Patton Homestead is a dream location for Kestrel, with our office that can serve as a small classroom, a fire pit, kayak /canoe storage and ramp, and 24 acres of fields, ponds, forest, and riverfront on the Ipswich River. From our office, we can walk to Vineyard Hill Reservation and Bradley Palmer State Park, giving us access to thousands of acres of open space with trails. Our new headquarters is an ideal home from which we can explore the land and the river, and the wildlife presence and diversity has been enchanting to our staff and students alike.





# Kestrel Staff

Our Kestrel staff are experienced, knowledgeable professional educators and naturalists who each bring extensive experience to the team. They understand child development, how to support learning, and the complexities of the natural world. This allows them to use a flexible teaching model based on paying attention to students and how they are learning and responding. Staff at all levels contribute original ideas, knowledge, and suggestions to help guide the organization. We plan together, work together, and connect with the natural world together.



## **Jessica Kagle, Program Director**

Jessica has a lifelong passion for playing in the woods and observing wildlife, and holds a master's degree from Harvard Graduate School of Education. She has over 20 years of experience as a professional naturalist and educator, and a great love for the wildlife and lands of New England, especially amphibians and wild canines, and beech-hemlock forests. Jessica is also a former K-8 science teacher with classroom teaching experience in both public and independent schools. Jessica teaches through challenging her students to figure out answers to their questions, building and making things, and by encouraging everyone to be silly, adventurous, and muddy. She loves nothing more than educating people through relationships with wildlife. Jessica can often be found bicycling around New England, swimming in the ocean, or standing out in the rain watching frogs and salamanders.



## **Mark Losavio, Instructor**

Hailing from Kentucky, Mark has a BS in Marine Science from the University of South Carolina and an MS in Marine Biology from Northeastern University. He has worked with Northeastern University's Marine Science Center, including their Three Seas Program, and is an avid SCUBA diver. Mark's research has led him all over the world, and he loves traveling to new ocean wonders! He has been communicating marine science to people of all ages for almost 10 years and has a special soft spot for crustaceans. Mark is also a big fan of exploration, from hiking Panamanian volcanoes to sailing the Long Island Sound. He loves taking kids right outside their classrooms to see what kind of weird creatures they can discover. This year was Mark's first Massachusetts winter!





### **Spencer Taft, Instructor**

Spencer holds a Bachelor's degree in Biology from Brandeis University with a minor in environmental studies. He grew up combing the beaches and tide pools of Gloucester for critters and never stopped. He's been teaching in the natural history sphere over the summer for 5 years, and working with children since high school. Spencer was Kestrel's first full time college intern, staffing the Get Outside Center for a full summer and providing original games and activities to drop in visitors. He joined as a spring program instructor this year. When he's not out rolling logs for bugs, he's often playing strategy games, carving magic wands or perfecting his coffee brewing. His favorite part of teaching is building connections with the next generation of scientists.



### **Austin Gammons, Instructor**

Originally from Virginia, Austin is now transferring to Salem State University to complete his BA in art education. Before Kestrel, Austin held many roles in areas of youth education, such as camp directing, backpacking facilitation, and Montessori education. Austin found his correlation between art and nature early and used these skills in his field studies while exploring countries such as Ireland, Spain, and the U.K. His attraction to expedition and travel has led him to the world of education and to the desire to share the love of nature with today's youth.



### **Curtis Sarkin, Instructor**

Curtis has a BA in Writing in Natural History and Cultural Perspectives from UMass Amherst. Before working for Kestrel, he taught hands-on marine science, conducted whale and turtle research, and explored the rainforests and reefs of Central America and Australia. Curtis has been educating the public about local wildlife for over fifteen years and enjoys nothing more than when children ask him challenging and thought-provoking nature questions. He has been flipping over rocks in search of invertebrates since he could first walk, and enjoys fish keeping, fossil collecting, wildlife humor, and science fiction.



### **Molly Sidell, Instructor**

Molly was born exploring the wilds of Cape Ann and gardening above granite. Most of her childhood education consisted of slipping in tidepools, gazing in vernal ponds, and searching for animal friends in the woods. She grew up gardening with passion for living off the land and continues to develop skills in food foraging and bushcraft. Holding a BA in Theatre and Fine Arts, Molly is passionate about seeing wildness in our backyards and loves inviting kids into imaginative interaction with their environment and encouraging them to fully see, smell, and taste a place!

# Goals and Accomplishments

## *Strategic Plan 2018-2021*

### Program Goals:

- Remove barriers to participation - Kestrel strives to be inclusive and to serve the needs of all in our service area.
- Build partnerships with Beverly-area organizations to broaden nature connection offerings, strengthen community, and advocate for experiential learning during and outside of the school-day.
- Increase and Deepen Long Term Partnerships with Schools, by including students and school staff in planning and implementation.

### Accomplishments

- Restored in - person programming by September, while maintaining virtual offerings throughout the fall and winter as needed.
- Provided free programs for all school partners and afterschool site partners throughout the spring, to accommodate schools struggling to recover from the pandemic.
- Facilitated three one month -long project based learning workshops for Rockport Middle School, co-designing and co-teaching the units with the science and engineering teachers.
- Built a yearlong partnership with Ipswich High School to study the quality and living things in the Ipswich River.
- Worked closely with Beverly Children's Learning Center to integrate study of the birds around the center into preschool and school age programming.





# Students and Schools

## Beverly

Beverly Children's Learning Center  
Cove Elementary School  
Ayers Ryalside School

## Gloucester

Gloucester High School

## Manchester/Essex

Essex Elementary School  
Manchester Memorial School

## Rockport

Rockport Middle School

## Salem

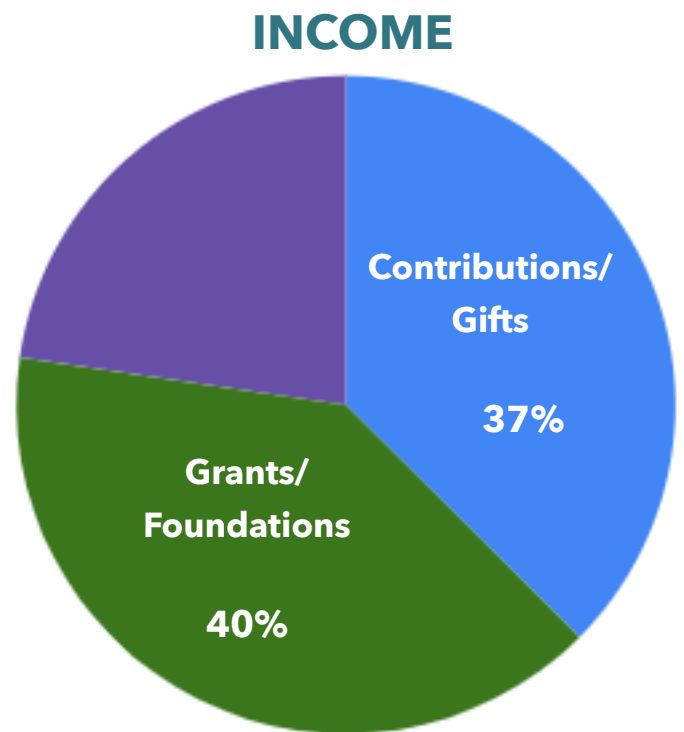
Bentley Elementary School  
Bates Elementary School



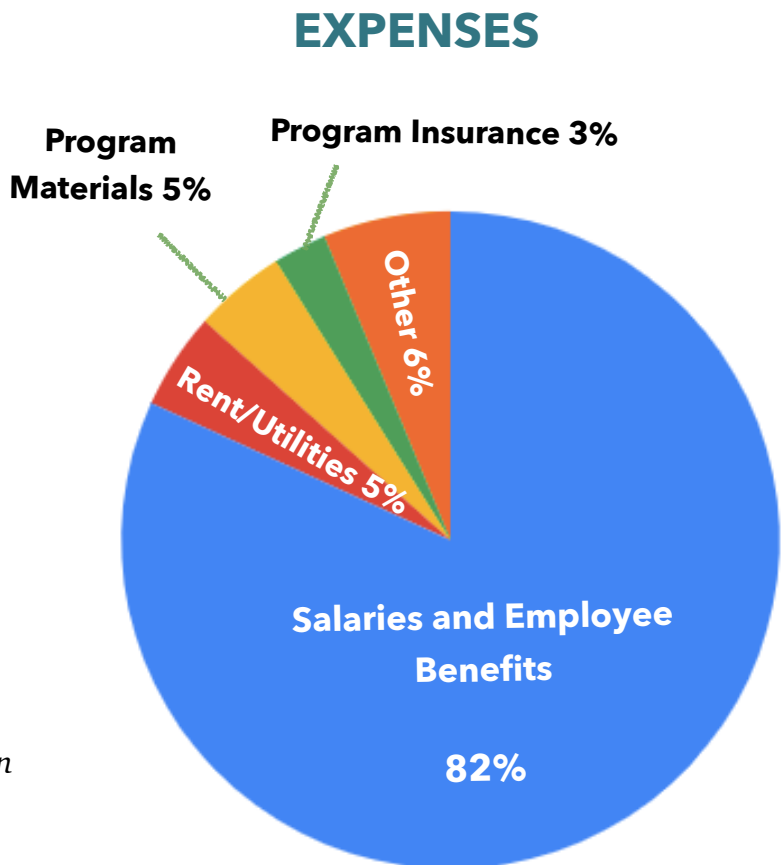
# Financials

9/1/20 - 8/31/21

Income	
Contributions and Gifts	\$26,290
Grants and Foundations	\$27,985
Earned Revenue	\$15,928
<b>TOTAL INCOME</b>	<b>\$70,203</b>



Expenses	
Salaries, employee benefits, payroll expenses	\$60,697
Rent, Utilities and Maintenance	\$3,529
Program and Office Materials	\$3,353
Program Insurance	\$1,945
Other	\$4,650
<b>TOTAL EXPENSES</b>	<b>\$74,174</b>
<b>Net for the year</b>	<b>-\$3,971*</b>



*\*Note: This net deficit reflects grant income from the previous fiscal year that was spent on programs this fiscal year.*



# FY21 Supporters

*We couldn't do our work without the generous people, businesses and foundations that support us.*

**Thank you for helping us keep science wild and curious!**

**\$2,000 +**

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### Volunteers and In-kind Donations:

Thank you Torey Adler, Meg Arnio, Michelle Boucher, Tracy Bowen, Jeff and Jo-Anne Crawford, Benjamin Flemer, Emily Flaherty and Salem Sound Coastwatch, Rick Roth and the Cape Ann Vernal Pond Team, Essex County Greenbelt Association, Zach and Melissa Herron, Mara Goldberg, Arthur and McKenna Kagle, Beth and Andy Knox, Sophie Mazowita and Kim Cabrera, Mark Maitland, Cecilia Mullings, Jennifer Santerre, and many others, who provided advice, support, and inspiration this fiscal year.

