



Update on GOMI Journal: *Learning to Steward the Gulf*

Volume I, No. 3 • Spring 2017
Contents

- Letters from the Editor – John Terry
- Notes from the Naturalist – John Halloran
- Notes from the Field – Melissa Luetje
- Idea Exchange - Lei Lowery
- Idea Exchange - Ali Fields
- Idea Exchange - Kimberly Slathe
- Student Forum – Dominic Noce
- Student Forum - Sarah Brown
- Research Update - Nancy Pau
- Climate Café – Shari Melto
- Book Review – Ellen Link

Letter from the Editor

By John Terry

Dear Reader,

Welcome to Vol. I, Issue 3 of GOMI Journal.

This issue adds new voices to our on-going conversation to inform and inspire stewardship. These voices are special because they bring humanities to a discussion too often limited to scientists and policy makers. I have had many conversations with people who identify GOMI primarily as an environmental or ecological educational supplement. In response, I stress that the GOMI experience is intentionally much richer and deeper than that. It espouses a more holistic approach to knowing and appreciating nature, and thereby a desire to steward it. Think of it: the natural world has always been a source of inspiration to scientists, poets, painters, and philosophers alike.

A growing body of literature points to positive cognitive and health effects for both children and adults when they open themselves to natural world experiences. Walking in the woods, paddling up river, exploring a cave or watching a bee pollinate are but a few of a myriad of flora, fauna, and geological encounters that provide stimuli to all our senses. Thoreau's transcendental spiritual connectedness to nature's magnitude and grandeur is unavailable to us as we hustle and bustle about our daily lives. Its possibility is becoming increasingly unlikely. Yet, this source of inspiration, it seems, is beneficial beyond a mystical encounter. It can move us to works of conservation through political action, art, poetry, science and philosophy and improve our mental and physical well-being. Just a walk in the woods may offer many rewards.

Those engaged in environmental PBE[1], we born-again John Deweyites, believe, as he did, that education "... is the formation of the mind by setting up certain associations or connections of content by means of a subject matter present from without." A little arcane perhaps, we understand, "Certain associations or connections... from without" to mean meaningful experiential connections to the external, in our case, the environment. We also understand that there is a natural proclivity to be drawn to nature, and it provides a powerful tool for teaching. PBE exploits and intensifies this natural proclivity by constructing external experiences that stimulate questioning which often is spontaneous. The process leads to a deeper drink of knowledge.

In this issue, for example, Ali Fields entreats us to encourage our youths to ask the profound question, "Where is the place of beauty in education?" [2] Ali goes on to encourage a profundity and profusion of questioning techniques as the pathway to a good PBE experience. She leads us to ask, "What role may questions, experientially derived from context, have in learning?"

Artist Kim Salathe brings to the conversation the power of art to open us to ways beyond data to understand and communicate the science of stewardship. Beauty helps bond us to our natural world. Senegalese forester Baba Dioum said, "In the end we will conserve only what we love, we will love only what we understand, and we will understand only what we are taught." [3] Intricate

interactions between the sensual and the cognitive produce the strongest learning. For Kim, Earth without art is "Eh!" Sounds right!

Another powerful way to promote stewardship is through civic engagement—an action(s) intended to improve, understand, remedy and/or promote. Civic engagement is the political hand of conservation. Civic engagement also improves students' sense of efficacy and self-esteem. The psychological literature on child and adolescent development is replete with support for this statement.

In his telling of the story of the origins of the Pipe Ceremony, Black Elk, the visionary leader of the Oglala Sioux, completes the circle. His words blend into spiritual vision culture, aesthetics, and ecology as the underpinnings of stewardship. Listen: "It is the story of all life that is holy and good to tell and of us two-leggeds, sharing in it with the four-leggeds and the wings of the air and all green things; for these are children of one mother and their father is one Spirit." [4]

[1] As developed by GOMI this place-based (PBE) approach:

- Promotes learning through rigorous experience rooted in the community and its unique history, environment, culture, economy, literature and art
- Emphasizes civic engagement, the act(s) of doing something concrete and beneficial to improve, understand, remedy and promote

[2] Democracy and Education, John Dewey, Free Press Paperback Edition, Macmillan Publishing Co., Inc. NY1966, p 69

[3] Valenti, JoAnn M.; Tavana, Gaugu (2005). "Report: Continuing Science Education for Environmental Journalists and Science Writers (In Situ With the Experts)". Science Communication. 27 (2): 300–10.

[4] John C. Neihardt, Black Elk Speaks, p. 1, First Bison Book 1988 University of Nebraska Press, Lincoln



John P. Terry, founded the Gulf of Maine Institute in 1999. John was Editor-in-Chief, CYD (Community Youth Development) Journal from Aug. 1994 to Nov. 2002. John has broad teaching and administrative experience at the university level including the Massachusetts Institute of Technology, 1969-1984, University of Massachusetts, Lowell, 1985-1992, and Union College, Schenectady, NY, 1964-1969. John received national recognition in 2006 when selected as Civic Ventures, Lead with Experience Program 2006 Purpose Prize Fellows. He is also a 2008 recipient of the Gulf of Maine Council on the Marine Environment Visionary Award.

Naturalist Notes

By John Halloran

In this equinoctial period, from the Fall Equinox to the Winter Solstice, nature has been very busy for those who observe closely. Let's start with the Harvest Moon, which is the moon that is closest to the Equinox. Northern farmers named this moon for the extra light it provided, allowing them to work later and to bring in their harvest before winter as it hung huge and golden on the horizon.[1] On December 3, it was full and very near perigee, which is when the moon is at its closest point to the Earth. At the same time, we have just enjoyed a period where Mars and Mercury appeared very close to the moon in the southwest sky. Just a pair of binoculars can bring out the valleys of the moon and the redness of Mars while a telescope brings all three celestial bodies to life.

In the Gulf of Maine, we saw some epic movement of the ocean dubbed "KingTides." They are created by the sun and moon lining up together and facing the Earth. Until Isaac Newton showed that the gravitational forces of the moon were varied over the Earth's surface, scientists did not believe that the moon affected the Earth's tides. The word tide comes from the Anglo-Saxon word "tyd," which means seasons.[2]

On the land, plants and animals have been busy as well. Many birds who migrate stayed later than usual due to the warm temperatures and abundant food. As shorter days and falling temperatures take over, trees begin to withdraw chlorophyll from their leaves, unmasking the red and yellow pigments that have been hidden by the green color of working leaves. Deciduous trees drop their leaves, which helps to prevent them from freezing in the winter.

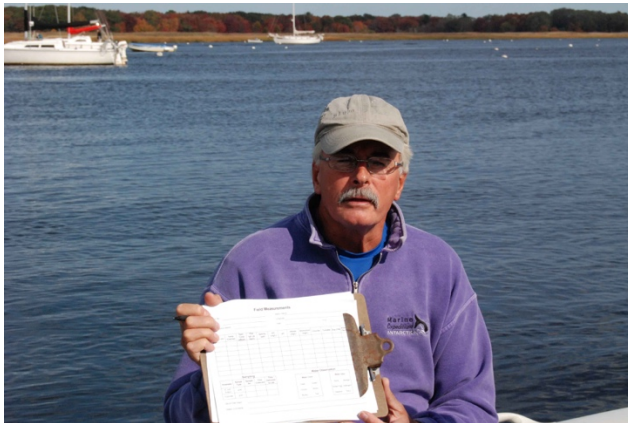
On the forest floor, insects and fungi break down fallen leaves into humus, which becomes compost for the soil, helping it to retain water, nourishing the roots, protecting fallen fruit from rotting due to contact with soil, and helping prevent the growth of competitors, which gives their seeds a better chance in the spring. All of these events are connected and related to each other in some way. The idea of looking at nature in a connected way comes largely from the prodigious writing and work of the German scientist Alexander von Humboldt. Largely forgotten today, he was a joiner, not a splitter, meaning he thought science must be learned from books, tested in the lab, and vigorously pursued and observed in the field. He railed against the narrow range of most scientists pursuing an individual study and not looking for connections to other fields of study or ways of expression of what they learned. He was driven by a sense of wonder, and while agreeing that science must be measured and analyzed, he believed a great part of our response to the natural world should be based on the senses and our emotions.[3]

Humboldt's brother, a diplomat, described him in this way: "Alex's mind was made to connect ideas, to detect chains of things; everything he ever observed fell into place as part of his web of life." [4] His visual depiction of this web, called "Naturgemalde" in his native German, showed nature as a global force connecting species through the lens of climate and location rather than by taxonomic category. His *Essays on the Geography of Plants* looks at the wider context of nature as a holistic interplay of phenomena. It was the world's first ecological book,[5] but it was

left to a disciple of Humboldt, Ernst Haeckel, to combine the Greek word for household "oikos" with "logos" for knowledge to create the discipline of Ecology.[6] Humboldt's web of connections influenced many of the great scientists, writers, poets, and activists of the 19th and 20th centuries. Thomas Jefferson learned the farming practice of crop rotation from Humboldt; George Perkins Marsh used his ideas to reform land use in Vermont; Haeckel's work supported Darwin's work on the origin of species; Henry David Thoreau took Emerson's advice and went to live in the woods; and John Muir took a great journey as Humboldt did and saw nature as magnificent, as if through Humboldt's eyes, with everything big and small woven together. "And if we try to pick anything out by itself, we find it hitched to everything else in the universe." [7] Humboldt had understood the threat to nature; Marsh assembled the evidence into an argument for conservation; while Walt Whitman memorialized Humboldt's greatest work *Kosmos* in his own masterpiece *Leaves of Grass*, Thoreau and Muir saw it differently. They wanted preservation to keep the forests, rivers, and oceans pristine and untrammled or at least not despoiled by humans. This web of connections led to the modern environmental movement. So, Humboldt the man is largely forgotten, but the name Humboldt graces hundreds of rivers, communities, mountains, counties, and even a major current in the Pacific Ocean—a testimony to a humble scientist who was once described as the most famous man in the world after Napoleon.[8]

Sources:

1. Schmitt, Catherine, 2008 *A coastal Companion: A Year in the Gulf of Maine* Tilbury House Publishers, Gardiner , Maine
2. Ibid
3. Wulf, Andrea, 2015 *The Invention of Nature: Alexander Humboldt's New World* Alfred A Knopf, NY
4. Ibid
5. Ibid
6. Ibid
7. Muir, John 1911 *My First Summer in the Sierra*, Houghton Mifflin, Boston and NY
8. Wulf, Andrea, 2015 *The Invention of Nature: Alexander Humboldt's New World* Alfred A Knopf, NY



John Halloran is the Director of Science for GOMI and a member of the GOMI Guide Team. John's interests focus on the ocean environment where he pursues educational adventure travel, research, and recreation by sail, paddle, and scuba. John is the founder and director of Adventure Learning, Newburyport, MA, which has been involved with educational outreach in area schools and recreational programs for teens and adults since 1980. A long-time educator, John was at the forefront of the experiential education

movement in the U.S. for 36 years, he taught natural science in the Newburyport Public Schools.

John has special interest and expertise in teacher training and standards for learning in math and science. His role has included direct teaching, teacher training, program development, grant writing, and developing partnerships with professionals in the field.

Education in the Field

Kennebunk High School Macroinvertebrate Study of the Batson River, Kennebunkport, Maine

By Melissa Luetje M.S., Kennebunk High School Science Teacher



A connection to place, or the outdoors, is essential in environmental science education. How can one learn about the complexity and beauty of the environment without being outside and experiencing the environment first-hand?

Experiential learning is enduring for students as it places science concepts learned in the classroom in an authentic context. Students that participate in "real science" by getting dirty and taking data contribute to a larger body of knowledge that benefits their local and scientific communities. This rich experience can be fostered utilizing

community partners in an ongoing relationship, thereby providing continuity in instruction and programming.

It is difficult to make time and space for experiential, place-based learning opportunities within the constraints of the academic year. After all, a specific curriculum must be taught and assessed, and field trips require time, resources, and context. The high school environmental science curriculum does just this. It is dynamic and allows the delivery of applicable concepts within the framework of units, setting the table for authentic field experience that is vital and underutilized in secondary science education. Place-based learning is "an educational approach that uses all aspects of the local environment and emphasizes hands-on, real-world learning experiences. Research has shown that place-based education has increased student achievement" (Sobel 2004).





Kennebunk and Kennebunkport are part of the coastal community in Maine. Kennebunkport Conservation Land Trust is an active community member of the school district, encouraging the recreational and educational use of its land trust. These lands are home to diverse ecosystems, including freshwater and marine ecosystems. While studying aquatic ecosystems and global climate change, it was easy to create a place-based learning opportunity for environmental science students at Kennebunk High School.

The Batson River is part of Kennebunk's local watershed, traveling through farmland and urban areas and under roadways, eventually emptying into the Gulf of Maine at Gooch's Beach. What a community does directly affects the

water quality of the river and, thus, the Gulf of Maine (GOM). The water quality of rivers is essential to preserving an ecosystem's biodiversity, and human impacts can negatively affect ecosystems. Before entering into this unit of study, students needed to answer the questions: 1) What is a watershed? 2) How can we determine the health of a local river? 3) What are bio-indicators and how can they be used to determine water quality?

This investigation aligns with the Next Generation of Science Standards' (NGSS) specific disciplinary core idea LS2 – Ecosystems, Interactions, Energy, and Dynamics, as well as most crosscutting concepts and all seven scientific and engineering practices. The specific NGSS standards addressed were HS-LS2-2 and HS-LS2-6.



Day 1: Leia Lowery, the Director of Education for the Kennebunkport Conservation Land Trust, was an invited guest speaker. She gave a presentation [1] that outlined the Batson River Watershed, its origins, and its pathway, which eventually empties into the Gulf of Maine at Goose Rocks Beach. The local economy is dependent upon summer tourism. She posed a question: Does an influx in population in the summer have an effect on the Batson River? Students then used their knowledge of aquatic ecosystems and field methodology to help answer the

question. Using an inquiry approach, the students designed an investigation to determine the water quality of the Batson River.



Day 2: Students watched a YouTube video [2] from the University of Wisconsin Cooperative Extension (UWCE) on volunteer macroinvertebrate sampling and were given an article [3] from the Maine Department of Environmental Protection (Maine DEP) on macroinvertebrate sampling in rivers and streams as a reference. Students decided to use a combination of sampling methods based upon the video and article. Students were put into collaborative groups, where they eventually compared the results of two sampling methods: one using D nets as outlined by the UWCE video and the other constructing and using rock bags as modeled by the Maine DEP article. As a class and in small groups,



students discussed possible research questions appropriate for rock bags and D nets. Research questions were developed with guidance and teacher feedback. An example of a research question is as follows: "Does the use of two sampling methods in the same aquatic habitat (riffles) give the same health rating for the Batson River?"

Day 3: Students were given materials [4] to design and construct rock bags based upon their research question.

Day 4: The first field trip to the Batson River was taken in mid-May to place rock bags in their various habitats. Rock bags were left in place for two weeks.

Day 5–7: Students worked collaboratively in their groups to begin work on a scientific paper [5] that would report the results of their research question. Each student was responsible for researching, writing, and peer editing sections of their group's paper. Scientific paper outlines [6] were used as models, and students were encouraged to research exemplars in accessible science journals.

Day 8: The second field trip to the Batson River took place in early June. Rock bags were retrieved, and D-net sampling methods were employed at each habitat using the methodology set forth in the UWCE video. Data was collected, and biotic indices were calculated.

Day 9: Data was analyzed in the classroom, then added to and referenced in appropriate sections of scientific papers.

Days 10–12: Students continued working on collaborating on their scientific papers. PowerPoint presentations [7] were created to



communicate their research question and findings to an authentic audience in lieu of a final exam.



This entry point into fieldwork has been used with another teacher and additional environmental classes this year [8]. The use of a community partner, DEP, and citizen science protocols has given students an authentic learning experience grounded in place-based and inquiry-based science education. Not only were they scientists in the field but they were able to draw valid conclusions from their collected data and share the data with fellow students, KHS faculty and administrators, and the Kennebunkport Conservation Land Trust.

An ecological approach, which is holistic rather than reductionist, gives an entire scope of the ecosystem when solving real-world problems such as the water quality of a local watershed and its broader impacts. These learning opportunities are multi-factorial and include all stakeholders. Utilizing this approach to science education, students participated in contributing to community-based research rather than discussing impassively in a classroom setting. Students learned protocols and used scientific practices. Students then collected data, wrote a scientific paper, and effectively communicated to an invested and authentic audience.

Place-based education is now a standard part of Kennebunk High School's environmental science program. The Kennebunkport Conservation Land Trust will be utilizing student data and conferring with appropriate organizations with regard to testing and monitoring results. A long-term study over several seasons is planned.

Sequence of Instruction, Resources, and Links

1. Introductory Presentation by Leia Lowery, and Lesson 1: Intro to Macroinvertebrate Study
2. University of Wisconsin Cooperative Extension (UWCE) on volunteer macroinvertebrate sampling <https://www.youtube.com/watch?v=In1Fq4l43A>
3. Maine DOE article <http://www.maine.gov/dep/water/monitoring/biomonitoring/sampling/bugs/riversandstreams.htm>
4. Lesson 2: Rock Bag Construction, Lesson 3: Setting out Rock Bags
5. Lesson 5: Writing Batson River Scientific Paper, Lesson 4: Rock Bag Retrieval
6. Student Presentation
7. 2016-17 IB ESS Approach
8. 2016-17 Alternative Education Narrative Sobel, David. "Place-based education." Connecting Classrooms & Communities, The Orion Society, Great Barrington, MA (2004).

Bio & Contact Information

Melissa Luetje, Kennebunk High School, Kennebunk, ME
mluetje@rsu21.net KHS

H: 207-865-5544
C: 207-807-8859

89 Fletcher Street
Kennebunk, ME 04043



A volcanologist wannabe and a high school science teacher in the here and now, Melissa Luetje is dually certified in physical and life sciences. A graduate of the University of Southern Maine with a BA in geology, and an MS in Teaching and Learning, she has taught at Kennebunk High School in Kennebunk, Maine, for 14 years. She has a zeal for experiential learning and extending the opportunity to all levels of students. With three international student service trips, introducing NXT Robotics to self-contained

science students, starting a garden and greenhouse program for alternative education and regular education students, and writing and receiving grants, she is constantly looking for ways for her students to experience, learn, and apply science outside of classroom walls. She is proficient in curriculum design and implementation.

She and her husband live in Freeport; they met in a geomorphology class at USM and honeymooned in Iceland. They plan family vacations with their three daughters around their love of rocks and took their family to Nova Scotia last year for fossil and petrified wood collecting. Summers are spent on the waters of Casco Bay in the Gulf of Maine. Melissa's love for the Gulf of Maine permeates many facets of her life.

A Perfect Pair: Community Conservation and Placed Based Education, Everyone Wins.

By Leia Lowery



This is a time where the country faces many critical issues. The middle class is losing ground[1], our country continues to score low on the PISA[2] regardless of our efforts to standardize education, and we have politicized and created fear around our environmental problems[3] engaging less and less of the future generations. The effects on the environment and education are staggering. This is not to say to lose hope, place based education is a way to find balance in these areas, and even progress. In a small Maine town, a local conservation trust as created programs to help students learn, create community, environmental awareness and an affinity for conservation.

The adoption of Community Conservation[4] at the Kennebunkport Conservation Trust (KCT) seemed like a logical move. After years of garnering the communities support to build its holdings, and effectively conserving over 2200 acres of properties that made Kennebunkport unique, they decided to use their holdings, to help build a stronger community. It was always clear what KCT was saving land from, it was now important to address what the Trust was saving it for. In a world where children were accumulating more and more screen time and less time out of doors, KCT saw the future clearly. If the youth in their community did not connect with their landscape, there would be no future for conservation organizations like the Kennebunkport Conservation Trust, there would be nobody left to care.



Kennebunkport Conservation Trust worked to build a program working with the local elementary school in an effort to create a sense of place for the students of this area. The KCT education programs focused on connecting students with the natural landscape and community members, through experiential learning on their properties. Later realizing that the local high school was in need of enriching experiences, KCT reached out to Kennebunk High School (KHS,) creating a partnership using the conserved lands as an outdoor learning lab for the students of KHS. Connecting KHS students to community members and trust members alike, as well as teaching them about the environment and the rich history of the land around them. KCT's Trust in Education program strives to create deep learning experiences that use conserved land to change lives for the better.



An original partnership with the Alternative Education students of KHS was very successful. The students built the Learning Trail. On this mile-long interpretive trail, they not only learned STEM skills by designing and building bridges and the physical trail itself, but also touched on environmental science and local history as they did the research for the signs that lined the trail. This partnership with students that were not thriving in the traditional school setting sparked curiosity, and a love for the land among the participants. Students involved in the project that were not graduation bound, are now graduated from high school and are gainfully employed. Some still walk and care for the trail, remembering a life changing experience through community conservation and place based learning.

Another successful partnership developed between KCT and the environmental science class at KHS. This class has been studying the health of the Batson River, which runs through the preserve that houses KCT headquarters. The students come out to the Trust and do a macro invertebrate study as well as water quality testing

on the river. KCT talks to the students about the importance of the river because its source is on another one of their preserves and it flows through many KCT properties before emptying out into the Goose Rocks Beach area of the Gulf of Maine. The information that they are collecting will help the Trust monitor any possible non-point source pollution issues as well as monitor the health of the river. It is also a major source of food and habitat for KCT conserved areas. While they are learning the importance of water systems in their books, to actually see the information they are reading about in action, and be a part of actual data collection, creates an excitement and involvement from these students that might not normally be there. Their eagerness is palpable when they discover a macro invertebrate in the very sensitive column, and their concern is intense when they discover pollutants as they did this fall. They can see in real time, the impact of nonpoint source pollution and have a greater understanding of what that means to them and their community.

These are two simple ways that Community Conservation and Placed Based Education are providing meaningful engagement of students. Why does this model work, and why is it so important to the future of both environmental education and conservation efforts? It is a deeper learning approach, it sparks a student's natural curiosity, and it is relevant to, and empowers students in a way that classroom instruction struggles to do.

Finding a way to reach young people by connecting them to the place that they live in is critical in efforts to create more environmental awareness. Creating a tangible understanding of the land these students live on, builds avenues for them to extrapolate that knowledge to a more global understanding of environmental issues facing other people in other areas of our country and around the world. People connect more with what is happening in their backyard, than what is happening across the globe. By getting students out on a local river, studying what is living in it, they learn to care about its welfare, and see that they are inextricably connected to the land and all that lives there.



This kind of experiential learning cashes in on student's natural curiosity. When students are simply fed information they need to know for a test, it becomes rote, or boring. When they are a part of creating the learning experience though, it gives them buy in, and a mutual respect for the project. They see that everyone is learning at the same time. No one person knows what is going to be there, no one person has the answer. As a group, teachers and students, question, test and draw conclusions together. This kind of education keeps students engaged as it puts them in charge of their learning. Instead of being expected to sit and learn by listening to a teacher explain things, these students take charge of their education. They see that questioning, and figuring out the answer are the very essence of learning. It creates a strong motivation to further

their knowledge and gives them those 21st century skills that they will need to pursue future careers.

Real life application of the information that students are learning is key in connecting people and community. In the case of the Learning Trail project and the Batson River project, students felt that the work they were doing was for a greater purpose and would make a difference. It was empowering to know that the work they were doing mattered, and would be used by others, making their education relevant. This gave students confidence and a sense of responsibility to make decisions. Place Based Education in conjunction with Community Conservation connects their lessons to their community, creates the desire to do something for the common good, and rids students of “Ecophobia,” instead empowering them and community members to make a difference.

This teaching strategy gives the students problem solving skills, and real life applications to learning, leading students to more self-awareness, accountability and hopefully, stewardship. If students continue to be in front of a screen, and we continue to ignore them being there, we will lose ground on so many environmental issues that are now coming to a head. This quote from the National Environmental Education Advisory Council in its 2015 report to the US EPA says it all: “The future of Environmental education will depend on its ability to implement effective programs that reach local audiences with culturally appropriate topics while also addressing important environmental problems.”

It will be hard for students to care enough about the environment to study it or care for it if we do not get them on the land and give them first hand experiences that spark their passions, and give them a greater sense of purpose. In the end, Placed Based Education connects students, and gives them a greater connection to their communities and a greater connection to their land. It gives them a sense of ownership and empowers them to think critically and question, current environmental issues. This deeper connection to the land and their environment instills a stronger sense of social responsibilities and creates deeper learning. It has shown to increase academic performance and citizenship. Community Conservation and Placed Based Education may very well be the future of conservation and environmental education.

1. Washington, DC. Pew Research Center “The American Middle Class is Losing Ground” 12/9/2015. <http://www.pewsocialtrends.org/2015/12/09/the-american-middle-class-is-losing-ground/>

2. Organization for Economic Cooperation and Development. “Program for International Student Assessment”. 2001. <https://www.oecd.org/unitedstates/PISA-2012-results-US.pdf>

3. Sobel, David. “Beyond Ecophobia.” Yes! Magazine, 2, Nov. 1998. <http://www.yesmagazine.org/issues/education-for-life/803>

4. Note: to learn more about Community Conservation visit:
<http://www.landtrustalliance.org/topics/community-conservation>



Leia has worked in education for over 20 years. After receiving a master's degree from Virginia Tech, she spent 6 years in the classroom teaching agri-science before moving into teacher training and curriculum development for Virginia Agriculture in the Classroom. She currently serves as the Director of Education for the Kennebunkport Conservation Trust. Leia's commitment to community conservation in her almost seven-year tenure as Director of Education has led to a greater reach in the community and the expansion of the Trust in Education program. Leia is dedicated to creating stronger communities through education and reconnecting people with their natural landscape and local history, in order to instill them with a stronger sense of place and encourage a future of conservationists.

After Reading “Into The Field” by Amanda Giracca (Orion Magazine, May/June 2016)

By Ali Fields

"Humility, an understanding of the world around you, a sense of agency, the ability to form hypotheses based on observations, understanding complexity - these are the qualities educators want all students to have..." Amanda Giracca posits in her recent essay titled "Into The Field" in Orion Magazine. She begins her essay on the road, following a van of students from Prescott College in Arizona toward the cliffs of the Verde River, while explaining that learning by going out of the classroom into the world is what pulls students into real memory forming experiences.

Professor Bob Ellis, who leads this crew, has the stated goal that day of having his students understand why different plants have different types of leaves, some big and broad, some small and waxy. But as a raptor glides overhead, the group stops to notice and to describe what they see, Giracca says she notices that Ellis doesn't tell the students what type of bird it is. He just wants to get the students to be in the habit of noticing. It's not about memorizing names or facts. It's about getting kids out into the field because as an educator, when you create authentic experiences, spontaneous things happen, and that's where real learning can take place. We need to give our students "ample opportunity to develop a sense of wonder or to build a set of skills

that will help them think through the complexities of reality – skills that no textbook-derived information can replace... It's the experience in its purest form that seems to be missing for students."

As I read Giracca's article, I connected to it in a strong way. As an educator myself, I'm constantly trying to get my students out of the classroom. When you bring students out into the world, they wake up. They ask different questions – questions that aren't triggered by workbooks and spelling tests. Professor Ellis, hiking with a group of students in Wyoming's Wind River Mountain range, hiked to the top of a peak after setting up camp. They made it to the top just in time to see the "setting sun send a line of cottonwoods aglow." A light rain fell, making the leaves sparkle. One of the students turned to Ellis and asked, "Bob, what role does beauty have in education?"

When you experience the beauty of nature high on a mountain peak for the first time, you form strong connections with that place. This leads to a love and respect for the place that goes deep. Whether students interview a local fisherman or spend an afternoon each month visiting the same tree at the state park, the connections that they make are not superficial. I think this is the whole point of place-based education. When I've taken my 9 to 12-year-old students to the White Mountains to hike the ridges for a week, when they actually leap from rock to rock, smell the alpine forest, feel the rain whipping against their face, taste tiny mountain cranberries... that is when we're hooked, connected. That is when we care, right? Think about a place that you've visited. You didn't just read about it in a guidebook. When your feet touched the earth, when you talked to people there, I'm sure you felt connected in a different way than when you were planning for that trip. When we've experienced the place, we want to learn more. Every time we hear about that place afterward, our ears perk up. We not only want to learn about our place more, but we want to take care of it. It's become our special place.

Many of my own philosophies on teaching come from my favorite, most meaningful semester of education, a semester with the School for International Training on the South Pacific island of Western Samoa. As I recall, ten American college students are sitting cross-legged in an open air fale (Samoan house), learning how to make traditional art called tapa cloth by pounding and then dyeing it with the inner layers of tree bark. There are vendors sitting on their mats at the market selling passion fruit and papaya, colorful fabrics, and lace. The crowded, rainbow-colored wooden buses are blasting the same song from the boom box over and over. (I learned quickly on those buses to pull a child on my lap, so I didn't have to sit on the lap of some older gentleman when the bus got crowded.) We are wearing white on Sundays as our host families take us to church in the morning, and again in the afternoon, with an outdoor village feast between the two services. The fresh water pools on the edge of the ocean mix with seawater as the tides come in. We respectfully leave when the 16-year-old boy with the fresh, raw tattoo covering much of his body comes to cool off. The delicious mango brought lovingly from the city by my host family's mother is charmed away from me by some eight-year-old child asking for a bit, then walking away with the whole thing. We, unbeknownst, were learning the meaning of place.

In my memory, I compare these delightful and sometimes difficult, always powerful experiences to my other semesters of college which comprised fuzzy thoughts of me sitting at a table or a

desk with a book open, trying to memorize Greek verbs that I no longer remember. I did get an A- in my Ancient Greek course most semesters, and I learned how to write and rewrite Greek words over and over, how to memorize passages for the coming exam. But in terms of deep, meaningful learning, I remember thinking two weeks into my studies in Samoa, "This is what learning can be like? This is so real. It's wonderful!" I had never experienced anything like it and never realized that learning could be so engaging.

It was hard for me to get on a bus the first day we were in the country, but that was our assignment. Get on a bus. Get off in the center of town. Change buses. Go where it takes you, and then get back here. Our Samoan language skills were limited to "hello" and "thank you" at that point, but I did it—we all did. We felt empowered. While we can't take all of the students out of the country, when we take them out of the classroom, perhaps pushing their comfort zone a little, or a lot, the world becomes real, and students become alive when engaged in real, out-of-textbook learning.

This past spring, I was driving a van of eight fifth-graders to a local family farm. This was to be our fifth and final trip of the year. That day, after we had planted strawberry seedlings, helped with the irrigation system, covered an asparagus hill with hay to keep the weeds down, collected eggs, held tiny fluffy chicks, and watched the baby goats wobble on shaky legs, we took turns playing on the raft in the pond which, while attached to a tree on the bank, felt as tippy and unsteady as those newborn kids. So fun! Finally, before leaving, we circled up on the grass in the shade and took turns finishing the prompt, "Before coming to this farm, I had never. . ." Our list went on and on. One reason was none of us wanted the day to end. Each time we'd come to the farm, we pulled into the school driveway late, just as dismissal was starting. On the way back to school that particular day, the students noticed all the political signs that were on people's lawns and started talking about what was happening with the elections. They asked really thoughtful questions and pushed each other's thinking. Taking time away from the classroom gives us an opportunity—and time—to have real conversations triggered by things in the world that make us curious. It is easy, as an educator, to tell when your people are truly engaged.

"Education is a natural process carried out by the child and is not acquired by listening to words but by experiences in the environment." This is a quote by Maria Montessori. At the Montessori public school where I teach 25 upper-elementary students, I am lucky enough to be able to take students out of the classroom on a regular basis. Part of our charter is to learn about the history, culture, and ecology of the Merrimack River Valley, the area where we live. So we go out a lot. We explore the local state park and the Merrimack River. We interview people in town and invite local experts in. The history of our area is rich and deep. I feel grateful to be able to access our community outside of the classroom walls. That said, it can be hard to get out, even in our school. There's the extra time it takes to set up the trips, do the paperwork, and figure out transportation. Sometimes there are costs involved, and we have to figure out how to pay for trips. Then, there's the curriculum-that's-supposed-to-be-taught. Learning by experience certainly takes more time than delivering the information in a lecture or written form. But really, what's the point of education?

Going outside the classroom isn't just a nice break from the routine. It's often the beauty of the natural world and the unassigned learning that drives students to explore their own curiosities

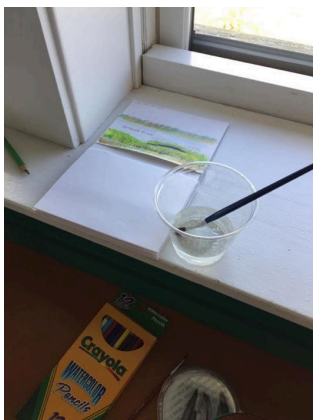
further. It gives students confidence and lights joyous discovery. What's being lost in education today, Giracca says, is the "opportunity to question and grow—to be moved, to be momentarily stunned—or flummoxed—by something you couldn't have anticipated." I would add joy and delight to that list. As more and more of us are speeding through life, attached to our screens and our urgent agendas, one of my great hopes for education is that we can teach our children to look up more often; to look up, to pause, and to notice details of the world around them that they've never wondered about before. It can be wonderful to be flummoxed once in awhile!



Ali Fields teaches in an upper elementary classroom at River Valley Charter School, a Montessori public school in Newburyport, MA. Her love of the outdoors started as a child when she went to summer camp. There she paddled on Squam Lake and hiked in the White Mountains of New Hampshire. She still goes to camp every summer and spends much time outdoors during the rest of the year as well, cross-country skiing, backpacking, canoeing, playing and making fairy houses and, these days, trying to keep up with her seven-year-old twins. Ali spent a year out of the woods and in the wilds of Cambridge earning a Masters in Education from the Ed School at Harvard. Ali and her family recently spent a year on sabbatical working on organic farms in Chile and Denmark. Ali is an avid believer in getting children out into the world.

You can't spell smART without ART!

By Kim Salathé



There is something you should know about me. I love art. I love to look at it, I love to think about it, I love to talk about it, I love to make it, and I love to teach it. But most of all, I LOVE how it helps me learn and communicate! Making art helps me understand the world around me and connects me to it. It always has. It offers me an opportunity to become invested in and to see myself personally in the new concepts and ideas that I must master. Producing art magically causes anything I am tackling cognitively to embed itself in my memory banks in ways that are useful to me and long-lasting. Art is so powerful! There is something else you should know. Art holds the same power for you as it does for me! And it holds the same power and opportunity for our students!

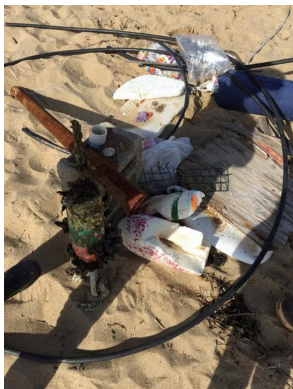
So why not harness and capitalize on this power in our 21st-century classrooms? Why is art always the first thing we cut out of the educational equation during budget and scheduling woes? How is it that educators (the smartest people on this planet!) continually forget about and abandon this magical ingredient while they struggle to empower their students with the creativity they need to excel in the classrooms of today and the boardrooms of tomorrow? It's strange, isn't it?



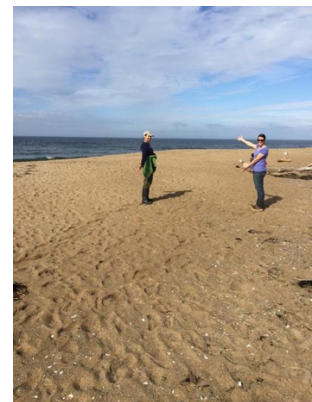
I'm happy to report that the great minds at GOMI are hard at work thinking about all of these questions and more. They have seen through the flawed thinking behind this tragic oversight and have decided to add the magical "A" to their fabulous STEM program to create some STEAM for their teaching partners and, in kind, their students. Recently, at an arts-integrated leadership training conference, John Terry and John Halloran became inspired by the possibilities for



teaching, learning, and presenting that they experienced when art was added into the mix and decided that they wanted to learn more. Having once been a colleague of John Halloran's at the Rupert A. Nock Middle School in Newburyport, MA, I became the lucky art educator asked to help out. John, or, "Hal," as he is known to his colleagues, was looking for some movement to incorporate into the teacher's training day that he would be facilitating in Newburyport on October 21st. After a few conversations and a couple of planning sessions, we were off-and-running with ideas and activities for a great day of art and MWEEs (meaningful watershed educational experiences) at Mass Audubon's Joppa Flats Education Center and the Parker River Wildlife Refuge on Plum Island.



Our day began with an introduction to field journals and an exploration of several different types and styles that could easily be created by students. We demystified sketching in the field by learning some basic drawing tips and techniques, then put these new skills to good use while making observational drawings of the salt marsh in our newly-created sketchbooks. We also learned about mandalas and how they are



drawn and how they can be used as graphic organizers or a nautical instrument such as a compass rose. Next, we were off to our MWEEs. Hal led one that focused on the salt marsh, while Ellen Link (see book review) led one about invasive species, and I led a third, focusing on turning beach refuse into ephemeral art. We finished by presenting our MWEEs to the whole group, focusing on all the different ways that they were hands-on, multidisciplinary, outdoor investigations made up of standards-based activities and assessments that included student actions such as restoration, advocacy, and service learning. It was a truly wonderful day filled with great energy and excitement.

I want to thank GOMI for inviting me to contribute to and participate in this wonderful teacher training day. I learned a great deal from the experience and was truly inspired by the passion of the teachers I met and was able to work with. They know that you can't spell smART without ART. They also know that the eARTh without ART is just "eh." And I know that "eh" is never good enough for GOMI, its teachers, and their students!



Kim Salathé is a passionate art educator with more than two decades of K-12 public school teaching experience in the New Hampshire and Massachusetts school systems. She is also a working artist and award-winning ceramic designer and lives on the Seacoast of New Hampshire with her husband, Paul.

Volunteering for the Osprey Project

By Dominic Noce



Since I was very young, I have been passionate about wildlife. My career objective is to become a wildlife biologist specializing in carnivore behavior and biology. An important carnivore in the coastal Newburyport area is the osprey, a species of hawk with an exclusive diet of fish. Like the bald eagle, the osprey was devastated by DDT pesticide use in the 1970s and is still recovering in most areas.

In the spring of 2015, I began to collaborate with the Essex County Greenbelt Association's Osprey Program. Volunteers construct and install nesting platforms to encourage mated pairs in the area to nest and breed during the summer. We also monitor known nests to observe egg and hatchling activity, some with the help of motion-sensing cameras. Every day during the summer, we travel to the nests and tag fledglings with satellite trackers to study their winter migration to Venezuela and back. I recently attended the first New England Osprey Symposium at which conservation biologists and citizen scientists shared information concerning research, challenges, and strategies.

Volunteering for the Osprey Project is important to me because it makes a positive difference to the wildlife and conservation community. Since ospreys are at the top of the food chain, their recovery indicates that the coastal ecosystem in Newburyport is healthy, providing a habitat for many plants and animals that are required to sustain this bird. Newburyport also benefits from an increase in tourism from birders hoping to catch a glimpse of these amazing predators. Ospreys lead local fishermen to fishing hotspots, assisting fisheries. Most of all, this project helps save a beautiful and fascinating bird from extinction so it can soar gracefully in the skies once again.



Currently, I am a senior at Newburyport High School. I have not yet decided where I will begin my undergraduate education this fall. Wherever it is, I know I will be fulfilling my passion for becoming a wildlife biologist to help reverse the catastrophic population decline of large predators. To support my goal, I participate in wildlife conservation projects and help lead positive environmental change as a member of the Newburyport Gulf of Maine Institute (GOMI) Team. This article is a direct result of my involvement in GOMI's collaboration with the Essex County Greenbelt Association's Osprey Program. I want to thank the Osprey Program for providing me such an exciting opportunity to assist with

its important osprey work and GOMI Journal for the opportunity to share my experiences with its readers.

Effective Dialog

By Sarah Brown

Last summer, I experienced the true impact of an effective dialog. Parts of this were through my role as a camp counselor for fourth and fifth graders. Between canoeing and archery, I started teaching my children about the effects of the little actions we take, such as creating trash and wasting water. The kids and I ended up having powerful conversations about our world. Often, one child would start with a fact they had learned, "There is floating garbage in the ocean that is more than twice the size of Texas." Then others would respond with the myriad of things they knew. It was striking to me how engaged they became with each other's dialog. Our conversations convinced some of the kids to shift from the constant use of plastic cups to carrying a reusable water bottle. I even caught one of my kids pulling plastic cups deep out of a trashcan to put them in the recycling. A small amount of dialog helped these kids to think deeply about their day to day actions.

In addition to educating children this summer, I had the opportunity to intern with Shari Melto (see board of directors page) to work on a dialog about the environment. I helped Ms. Melto facilitate Climate Cafes for high school students at GOMI meetings and at a teacher conference. A Climate Cafe is a discussion-based learning tool designed to mold environmental leaders with exceptional listening abilities. As with the conversations with my camp children, Climate Cafes use dialog to generate change. A Climate Cafe starts with four roles. There is a speaker, a paraphraser, a questioner, and a contributor. A dilemma is presented, and all members have a few minutes to make a mind map. Afterward, one person explains their ideas without interruption. The next person then restates what the first person said in their own words. The third person then asks a question to unravel the idea further. The last person adds a suggestion to the plan. The roles rotate until everyone has had a chance to direct the conversation. In the end, unstructured dialog emerges, yet the tone is maintained of listening and staying receptive to others' thoughts.

At the dinner table and in the classroom, conversations are flipped into debates when a disagreement arises. This often leaves participants feeling bitter and detached. Communicating in a way that focuses on each member and requires their neutral feedback creates higher productivity. I believe that this way of problem-solving will break through disabling disagreements. The roles of Climate Cafes challenge all members to listen and rephrase without criticizing. Climate Cafes are powerful tools that connect people instead of dividing them.

I am also a student at Phillips Exeter. In my day-to-day life during the school year, the Harkness method has pushed my peers and me to discuss issues at the table in ways similar to Climate Cafes. The Harkness method is a teaching style and bases education on the discussion of students. During my freshmen year, it became clear that nothing could be gained from classes unless people welcomed opposing ideas to their own. Whether in math class, thinking through different approaches to a complicated problem, or in religion class, thinking about the morality of euthanasia, we need to listen fully to those around us to learn. There are no assigned roles at the Harkness table, yet I have learned to donate ideas, to listen without immediate refutation, to ask fruitful questions, and to build on others' points. These skills are important for communication, and yet much of the population does not have them: This is where Climate Cafes come in.

We want to spread Climate Cafes to harness the full power of them. I know they would be a great addition to classrooms and office training. As with the kids at my camp and the students at my school, we need to get the rest of the population to start talking. We need to take action together.

When I think about my kids pulling plastic cups out of the trash, high schoolers taking action with the ecological education of others, and my peers listening in the classroom, it helps me to think positively about the future. I know that through effective dialog we can begin where it is most important: in the interactions that drive us to create lasting change.



I am a senior at Phillips Exeter Academy and an advocate for sustainability. From a young age, I went to after school Audubon programs and loved to hike in the woods with my family. I learned about the interconnectedness of our ecosystems and fell in love with nature itself. Later, when I learned the earth as we know it is threatened, I panicked. I am still panicking but now trying to turn these feelings into actions. I know that we need to take dramatic measures, and I know that I can be a part of it. Next year I will be attending Princeton, and I plan to study Civil and Environmental Engineering.

On a Wing and a Prayer: innovative technology helps to shed light on epic wildlife migrations

By Nancy Pau



If someone asked me what I missed the most about my youth, I would say the freedom (and time) to pursue whatever topic piqued my interest. As a scientist, I still get to pursue inquiries and satisfy my curiosities. However, we are often limited to those topics related to our jobs. Every once in a while, an opportunity presents itself to cut across disciplines and combine our passions. Often these opportunities present themselves in the form of daunting challenges, forcing us to think outside the

box, be innovative, and use every tool available to us, or even develop new tools.

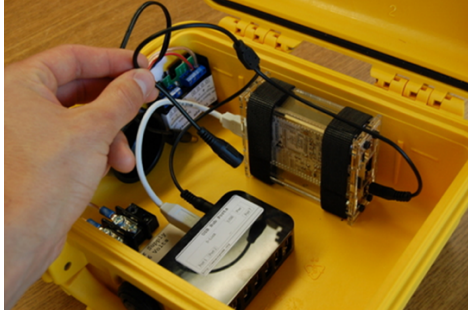
Wildlife is facing some daunting challenges today, with threats such as climate change, large-scale energy development, and disease. In the face of these converging threats, conservationists are realizing that we need to know about the entire life cycle of migratory species. Whereas wildlife research has historically focused on a specific period, such as breeding, scientists are realizing that it is vital to understand the full life cycle of animals in order to design effective conservation measures. Recent research has shown that each life cycle has carry-over effects into others. A bird that doesn't breed successfully on its breeding ground or dies during migration may be led to do so because of events that happened thousands of miles away on the wintering ground and vice versa. Until recently, we have not been able to study animals that move across such long distances such as birds and bats.

In recent years, advances in technology (such as satellite GPS and geolocators) have allowed scientists to track animals across continents, advancing our understanding of their full life cycle needs and allowing us to develop comprehensive conservation strategies that address threats and vulnerabilities throughout their range. However, these technologies were expensive and heavy, allowing only limited application to larger animals. The latest innovation in wildlife tracking, nanotags, have made tracking of the smallest species feasible and affordable on a landscape and population level.



Nanotags are the very light-weight coded telemetry tags developed by Lotek, Inc. In contrast to traditional telemetry tags that broadcast on unique radio frequencies, coded tags emit thousands of unique combinations that can all broadcast on the same frequency, allowing for automated detection by computers 24/7. Dr. Phil Taylor of Acadia University saw the potential for the large-scale collaboration of a monitoring network and has helped to coordinate building and

deployment of over 400 automated detection towers that cover Canada to South America. This expanding, monitoring network allows researchers to ask questions on a flyway scale, knowing that they will be able to track any tagged animals that migrate through the network.



At Parker River National Wildlife Refuge, we've been lucky to be part of the pilot Motus network since 2013. For me, being part of this multi-national, cross-discipline project has been exhilarating, challenging me to dredge up engineering and programming skills that I hadn't used since college. These early years of nanotag research have been as much about testing the technology as it has been about learning about migration and movement of our wildlife species. As we learn about the

potential and limits of this new technology, our research questions and target research species have changed to take advantage of this new research tool. Even still, we have learned quite a bit more about the migratory species that use our refuge. Below, I briefly summarize what we have learned, with some conjectures, and some management implications and next steps.

Shorebirds

Using semipalmated sandpipers as proxies, we have learned that shorebirds are longer-distance fliers than previously thought. Sandpipers have stopover durations of 2-3 weeks at the refuge, with some staying over 1 month. The majority of the tagged birds fly in an easterly or southeasterly direction when leaving Plum Island, and are not detected by towers in Cape Cod and Rhode Island. Combined with resighting and geolocator work on willets, we believe the shorebirds that leave the Great Marsh make the four-day non-stop flight over the ocean (> 2,500 miles) to land in Suriname and French Guiana, and winter in northern Brazil. From our Canadian research partners, we also know that the shorebirds that are tagged in Bay of Fundy, James Bay, and southern breeding grounds like Coats Island (top of Hudson Bay) are mainly making direct flights to South America.

The long over-ocean flight of shorebirds from breeding ground to wintering ground with only a few stopovers stresses the importance of areas that receive large shorebird concentrations during migration, such as the Great Marsh. For the Refuge, this new information highlights the importance of providing an uninterrupted resting and foraging habitat for these tiny birds while they are here. Our preliminary data shows that birds that stay longer tend to make more direct flights (over the ocean), while those that have a shorter stopover fly closer to the coast and stop at other sites. We also learned that shorebirds are relatively mobile and use a variety of habitats during their stay, from beach to salt marsh to impoundments.

Saltmarsh Sparrows

Saltmarsh sparrows are unique in that they spend their entire life in salt marshes and have their entire breeding and wintering range in the eastern U.S. They are also the poster child for sea level rise as they build their nests and raise their young in salt marshes in between monthly flooding tides. In the last decade, the Refuge has been working with partners to learn much about their breeding behavior, population dynamics, and threats such as mercury. With the expanding

nanotag tower network, we finally were able to start investigating the connection between breeding, migratory, and wintering habitats in order to develop better conservation strategies for this highly imperiled species. In 2015, we deployed tags on birds in ME, MA, and RI and were able to track more than 60% of the birds as they migrated along the coast down to Virginia over a 2-month period. An animation of the sparrow's migration can be viewed here:

<http://motus.org/data/demo/saltmarshSparrows2015.html>

This fall, we deployed additional tags on saltmarsh sparrows in Maine, Massachusetts, and Rhode Island to learn more about the timing of migration and migratory routes of this sparrow during their fall migration. We also deployed tags on sparrows in South Carolina this spring to track their northward migration. Having a better understanding of where our sparrows migrate through and winter will allow us to be able to address all threats to their survival, and better understand local population trends that we see in the Great Marsh. This year, we put some tags on birds wintering in South Carolina to track their north-bound migration and deployed additional tags this fall in their breeding grounds.

Bats

Bats are quickly becoming a priority for conservation, due largely to two emergent threats that have dire consequences to their survival. White nose syndrome is an introduced fungus that is having devastating effects on our bat populations, particularly the two most abundant bats in the eastern U.S.: the little brown bat and the northern long-eared bat. Large wind energy development potentially has population-level impacts on migrating bats, particularly along mountain ridges and in coastal areas. These landscape-level questions are expensive and difficult to research, particularly for a group that has received little research funding in the past.

While we have not coordinated a large-scale study for bats as we have for the above species, we were able to work with partners to deploy a few pilot tags and learned a few things. One thing we learned was that bats may be active later in the season than previously believed. By tracking bat movement 24/7, we learned that migratory bats, like red bats, are making migratory movements later than anticipated and that local hibernating bats, like big brown bats, will emerge well into October when the weather is favorable. Working with bats has been challenging as they seem especially apt at removing the nanotags; however, the technology shows promise in being able to track red bats that migrate along the coast. This August and September, red bats and big brown bats were tagged with nanotags, and we look forward to seeing what we learn from the data.



We still have more research to do to confirm some of the hypotheses speculated above. However, this new technology has provided some surprising new data that challenge our scientific understanding of migration. The most exciting part of the nanotag project has been its demonstration that the power of collaboration and human innovation is able to address some

of the most daunting challenges we face in conservation. As a society, we're making advances in technology in leaps and bounds. I am heartened that the next generation of tech-savvy conservationists will take advantages of these technological advances in their stewardship efforts.



Nancy Pau is the wildlife biologist at Parker River National Wildlife Refuge in Newburyport, Massachusetts. Prior to coming to Parker River in 2002, she worked as a land acquisition planner for the US Fish and Wildlife Service's Northeast Region and as an endangered species biologist in Sacramento, CA. Nancy's early career taught her the importance of keeping a landscape perspective in all conservation work. Her biggest challenge at work involves figuring out how to make the

refuge's coastal habitats more resilient to rapid climate change, and how to engage the local community in enhancing that resiliency. Nancy is a mother to two curious boys, ages eight and five. As a parent, Nancy is getting lots of practice developing simple explanations for complicated natural interactions and has gained an appreciation for the role of public engagement in solving many of our conservation challenges.

NOT UP FOR DEBATE

By Shari Melto

No really important issue, certainly not global warming, comes with two neat, opposed sides. So why do we polarize everything and approach it as if it were a fight? What are the implications of runaway debate for thoughtful public discourse? And how can we shift toward collaborative dialogue?

In her book, *The Argument Culture*, Deborah Tannen makes a compelling case that America's addiction to debate is getting in the way of effective problem-solving. "Many problems are actually caused by framing the question as a dichotomy" (p.21), and this approach "limits our imagination when we consider what we can do about situations we would like to understand or change." (p.24)

Even the best of us are easily hooked into futile arguments on both trivial and important issues. As we get angrier and less rational by the minute, we realize that we are caught in a "doom loop." At that moment, however, our goal is not to listen and understand but to win the argument at any cost. We know, down deep, that nothing good can come from the interaction—information will be distorted and trust badly damaged—yet we can't seem to stop ourselves.

The media, especially television, has conditioned us to see even public debate as "entertainment." While it may be entertaining to watch two sportscasters duke it out over last night's game, debate is often downright dangerous when we look to elected officials for informed decision-making. Tannen warns that democracy can get derailed in a polarized debate. "Citizens do not get the information they need to make meaningful use of their right to vote." (p.25)

We're obviously losing ground on global warming by debating every issue. Since we're not likely to find truth in the oversimplified extremes, how can we navigate the complex middle? The best answer may be through dialogue among diverse voices—in Tannen's words, by "exploring, expanding, discussing, investigating, and exchanging ideas ..." (p. 8)

That's what a Climate Cafe is all about.

Tannen, Deborah. *The Argument Culture: Stopping America's War of Words*. (New York: Ballantine Books, 1998).



Shari Melto spent more than 20 years with global consulting firms in the fields of talent management and organization development. She was director of learning & development at McKinsey and director of staffing & recruiting at both Booz and Hewitt. With the support of a MacArthur grant, she partnered with arts boards in Chicago to strengthen their organizations. Shari believes that we have a moral obligation to ensure a healthy, sustainable future for our children and our earth—and working with GOMI provides a unique opportunity to do both.

The Secret Life of Lobsters: How Fishermen and Scientists Are Unraveling the Mysteries of Our Favorite Crustacean

By Ellen Link



My entry into marine science was as a field assistant on a predation study where I was tasked with staking juvenile lobsters to the seafloor. It seemed to be a "no-brainer" that the little guys set out in the open sand would be the first to get eaten, but hypotheses have to be supported by evidence, right? Since then, I have felt I owe a debt to lobsters. I'll service that debt, in part, by encouraging you to learn more about them in *The Secret Life of Lobsters* by Trevor Corson.

The Secret Lives of Lobsters is an engaging best seller that weaves the complex biology of the American lobster (*Homarus americanus*) with the history of the Maine lobster fishery resulting in a book that is both sweeping and specific. A journalist by training, Corson committed to learning about his subject from various viewpoints. He worked as crew on a Maine lobster boat, shadowed scientists in the lab and in the field, and attended lively public meetings. If you are not generally drawn to non-fiction, don't be put off; the reader is drawn onto the slippery deck where a line wraps around the lobster's leg nearly dragging him to a watery death, into the heated debates between scientist and lobstermen over the validity of new data versus generations of on-the-water experience, and under the murky water as scientists search for tiny "superlobsters" that jet through the ocean with claws held out like Superman.



The Secret Lives of Lobsters will equip the reader with knowledge that can be applied to the classroom, conferences or cocktail party conversations. It is bound to instill an appreciation for the mystery of lobster life cycles and the effort involved in sustaining a way of life and a fishery. Corson's work is an exemplar of place-based, project-based learning. The book could be used in a study of Gulf of Maine culture, science and civics providing examples of coastal careers as well as the value of collaboration and persistence. It could be used to enhance a trip to Gulf of Maine Research Institute, WHOI or local wharfs or provide the impetus to do citizen science with The Lobster Conservancy. More important than any specific action that this book might inspire, it serves as a reminder of the importance of gathering information from diverse sources, and of creating common ground in our efforts to protect and manage coastal resources responsibly.



Ellen Link is a science teacher in Newburyport, Massachusetts, who specializes in project-based science and ocean literacy. She holds degrees in resource management, geography, marine affairs, and science education and came to teaching after working in the fields of environmental education and marine resource management. She believes that helping young people connect to nature and gain skills of agency are key to their ability to be stewards of a changing world. She is happiest when tromping around outdoors with children or with her family near, on, or bubbling beneath saltwater.