# E2 River Scientists Study

by the Common School E2 Class of 2008-2009

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The Common School
E2 Class of 2008-2009
Fall 2008


USGS

# Introduction

In the fall of 2008 students in the Elementary II class at The Common School in Amherst, Massachusetts undertook a study of watersheds and rivers. Part of the study was focused on getting to know the Fort River, a nearby river that is the longest undammed tributary of the Connecticut River. In addition to doing site surveys and water quality testing, pairs of students interviewed scientists in the community whose work connects with the Fort River Watershed. The reports of their interviews are included in this booklet. They represent both field and class work that were part of an in-depth study. Our thanks to the many busy professionals who were willing to give up their time to share their expertise and help ignite the students' excitement about this important local resource.

Linda Donnelly,
Head Teacher
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**Dr. Betsy Dumont**
**Chiropterologist**
**University of Massachusetts, Amherst**
**Biology Department**
**by Carly and Emma**

Betsy Dumont is a biologist at the University of Massachusetts who researches bats and their different eating mechanics. Her studies also show how healthy a river system is. Bats mostly either eat fruit or bugs, but some also eat birds, frogs, fish, and some even other bats! She said that around here, bats mostly eat bugs; she also said that aquatic animals eat bugs. This connects bats and aquatic animals, and can help us understand how healthy a river system is. This is

complicated but important. Basically bats and the animals that live in the river are in a mini tug-of –war over bugs. If the bats or the aquatic animals ate all the bugs, it would be hard for the other to live. When rivers are healthy, there are lots of bugs and plenty of both aquatic animals and bats. If you see a lot of bats in an area you know that there are lots of bugs, and probably healthy rivers.

Betsy Dumont always knew she wanted to be: a biologist. What truly inspired her was her sixth grade teacher. The teacher would take her class on trips to explore nature--look under rocks, find insects, play in streams, and just have a lot of fun. That was that; Betsy was on a roll to become a biologist. Once she finished high school, Betsy went to Indiana University. There she studied biology, zoology, anatomy, and anthropology. Soon after she got her M.A. and PhD. Betsy's PhD thesis focused on trying to learn more about what kinds of mammals primates (monkeys, apes and humans) are related to. It was mostly laboratory study. She didn't do fieldwork until after her PhD. Dr. Dumont said if she went through school again, she would take breaks throughout school. For example, she would have liked to take a year off in between her M.A. and PhD to rest and meet other biologists. Still, she fulfilled her dream of being a biologist, and still loves her job today.

Bats are furry mammals that can fly. They have a pair of wings that have thumbs at the end of them, which help them hold and grab onto things. These animals are nocturnal (they sleep during the day and are awake at night.) There are almost 1,000 kinds of bats varying from ones with a one-inch wingspan to ones with a six-foot long wingspan. There is even one called the wrinkle faced bat, because it has a face full of wrinkles. In fact, it's Betsy Dumont's favorite bat.

Betsy Dumont spends most of her time in an office or lab, but enjoys doing field work when she can. When Betsy is in her office she is usually writing grants, teaching or being a curator at the Natural History Collections. In the lab she studies different bat skulls, trying to find out how hard they bite and the stress level on different parts of

their jaws. During fieldwork Betsy uses many different tools to research bats, such as fine nets that bats fly into, bat bags which hang off their belt, head lamps, and boots. Dr. Dumont's favorite project was about four years ago when she went to Mexico to catch and study bats. During the day she got to explore the jungle and during the night she got to experiment with bats. For example, she would catch bats and bring them into her tent, and then she would experiment to find out how bats behaved when they were given different foods. Betsy Dumont loves fieldwork. Although Betsy Dumont rarely gets out to work outside the lab, when she does she is well prepared, because of all the research she does back in her office.

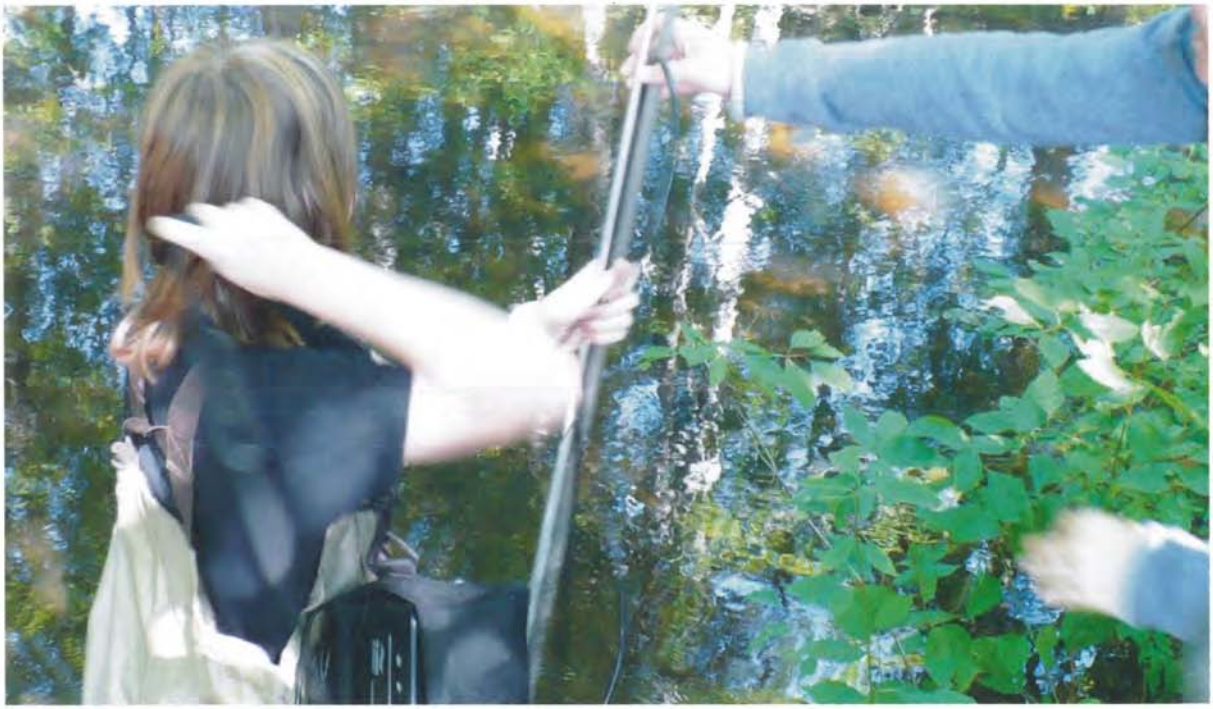
## Dr. Christina Cianfrani
## Hydrologist
## Hampshire College
## by Theo and Courtney

Dr. Christina Cianfrani has been interested in river sciences from a young age. As a child, she had a stream that ran through her backyard that she played in all summer long. She and her brothers and sister would build small dams and throw stones into the water. They also used to catch frogs, fish, and turtles. She has always been interested in how things work, and what's going around her in nature. This made the stream an important place, because it gave her the chance to learn about rivers. She carried that interest with her through high school and college. She

eventually became a hydrologist and is now teaching college students hydrology so they can become river scientists themselves.

Dr. Cianfrani's education helped her prepare for a career as a hydrologist and a teacher. She received her B.S. from the University of Pennsylvania in Philadelphia, where she studied systems engineering and biology. As part of her studies she learned a lot about water--where we get it from, and how to make it safe. She also studied about wastewater treatment. After she graduated from the University of Pennsylvania, she went to Yale, where she got her Master's degree in science. She took advanced science courses in wetland hydrology, chemistry, and plant biology. Then she went to the University of Vermont and studied civil and environmental engineering. There she received her PhD. Dr. Cianfrani's education is broad and varied, and it gave her a lot of early preparation for what she does now in her job.

Dr. Cianfrani has three jobs, all of which she enjoys most of the time. One of her jobs includes taking care of her nine-month old son. Another includes being a Professor at Hampshire College, teaching students about stream ecology and hydrology (the study of how water moves). The third involves working with non-profit organizations. Some of the non-profit organizations Dr. Cianfrani works with include the Nature Conservancy, The Academy of Natural Sciences, and Rushing Rivers Institute. What she likes best about her jobs is getting to work and teach in really awesome places outside, such as Groff Park. What she dislikes most about her jobs is the hot, buggy, and long days of summer because they are really tough. Dr. Cianfrani's jobs all offer her different but enjoyable experiences.



Unlike some professors, Dr. Cianfrani does a lot of work in the field. Dr. Cianfrani takes measurements such as stream width and slope at various sites to collect data. She uses this to help her do measurements of water velocity, depth, and sometimes temperature. Dr. Cianfrani will look at the rocks on the bottom and take notes on how big they are and other things. Her class will sometimes go to take measurements and just play around in the river. The only part she says she doesn't like is having to be in waterproof trousers in hot, buggy weather. So, while some professors may spend all day inside with their class learning arithmetic and all weekend grading papers, this does not apply to Dr. Cianfrani, and she is glad!

## Dr. Keith Nislow
## Research Fisheries Biologist
## U.S. Forest Service
## by Aoife and Bryan

When Dr. Keith Nislow was a boy he lived in New York City until he went to college in New Mexico. Now he lives in Western Massachusetts. As a child he loved to go fishing and diving with his dad. He kept fish, reptiles and amphibians as pets. He was inspired to be a scientist and fisheries biologist by seeing animals in their natural environments and catching animals and keeping them as pets. As he got older his love of animals, science and nature grew.

Even though Dr. Keith Nislow was interested in science, he originally had other plans of what he wanted to do for a career. When he went to college in New Mexico he didn't really want to be a scientist. He would rather be a punk rock star. He was in a punk rock band and was studying television and film. Needless to say being a punk rock star didn't work out. Instead he started to take the turn towards his early interest in aquatic animals. In 1984 he went back to college at the University of New Mexico. There he started to study biological science and his career in science started to take form. From there Dr. Nislow went to Dartmouth College to continue his studies. In 1997 he earned a Ph.D. in biological science from Dartmouth College. He started out trying to be a punk rock star, but Dr. Nislow ended up being a scientist. It's weird how he took such a big leap in his career.

Dr. Nislow works to help fish called salmonids in order to help make a healthier ecosystem. His research is about how a healthy fish represents a healthy aquatic environment and how humans affect fish. He is a biologist; however he would prefer to be called an aquatic ecologist. In his research, he is looking for the diversity of animals and plants in the watershed. He studies fisheries, the study of fish populations and how they are affected by fishing. He recently did a program for the Amherst Regional Middle School and helped lead a class that sampled fish along the Fort River. He enjoys his work and also thinks his research is interesting, however he wished he had more time for himself. He would rather not spend time on paperwork. Besides being a biologist he is the associate editor of the American Fisheries Society, a society where other scientists organize meetings and share their research. He writes scientific papers about his own research and other scientists' research. His future plan for research is spending more time with climate change, which the fish are sensitive to. He believes that this is a major new era of research for him.

Dr. Nislow's future plans are to spend time on how global warming will affect the fish he is studying. The salmon he is studying are sensitive to temperature change and may not be able to spawn if it gets too warm. Also, obstacles such as dams will prevent the fish from returning to the place they were born, so Dr. Nislow wants to remove some dams so the fish can return to the river. He also wants to develop new techniques to determine the effects of fragmentation of the fish population associated with dams and roads. Fragmentation happens when there are a lot of fish in an area that need to cross a certain obstacle such as a dam but only a few fish can cross the dam while the other fish on the other side of the dam cannot. Dr Nislow thinks that this new era of research for him will take a lot of his personal time. If his plans for research are successful, the fish he is studying will be free, happy, and safe from pollution and (high and low) temperature changes.

# Dr. Alan Richmond
# Herpetologist
# University of Massachusetts, Amherst
# Biology Department
# by Brendan and Sam

Alan Richmond is a herpetologist. "Herpo" means to crawl in Greek, so it is not surprising that herpetologists study animals that crawl, such as snakes. Dr. Richmond is especially interested in how reptiles and amphibians came back to Massachusetts after the ice age subsided. One of his theories is that other animals from the same species lived somewhere warmer and returned here. But how did they get here? That is a very good question, and one that Dr. Richmond would like to find the answer to. His favorite animals to study in order are: salamanders and turtles, then snakes, then frogs. He says that all of the creatures he studies are hard to study. This is because not very many people are interested in relatively common animals. Most of the money goes to researching the rarer species because sometimes you can't build where there are rare species. The common species aren't as economically important, so not as many people want to study them. Dr. Richmond thinks that the common species are equally important. For example, people don't know much about the most common snake in Massachusetts, the garter snake. Could the reptile and amphibian population declining? He thinks that is important to know. Now you know why Dr. Alan M. Richmond is so interesting.

Dr. Richmond's interest in learning about amphibians and reptiles led him to work his whole life on them. When Dr. Richmond was a kid, he used to catch snakes, mostly because his mom didn't like them. When he had spare time, he would go outside and look under rocks for other cool amphibians and reptiles. This got him interested in herpetology, the study of

things that crawl. He went to high school in Wilbraham, MA, and studied at the University of Massachusetts. He was a student at UMass for 16 years because he enjoyed school so much. In that time he received a bachelor's degree in zoology, one master's degree in wildlife and fisheries, and another master's degree in biology. Then he earned a PhD in biology. After completing his studies at UMass, he stayed to teach there and continues to study amphibians and reptiles to this day. Now, instead of learning outside, he finds he mostly studies inside.

Alan Richmond works on two different things: teaching and researching. He teaches herpetology to both undergraduate and graduate students at UMass, but mostly he teaches the undergraduates. When he teaches, he can't be outside; he works mostly indoors with books. Dr. Richmond also does research about reptiles and amphibians. He only studies species that live in Massachusetts. The only time that he doesn't work in MA is in the summer when he sometimes goes to different states looking for salamanders and such. He has a lab that has over 200 animals that he uses in his research! He has a permit to keep animals, such as a 15'

long reticulated python. Alan Richmond is finding ways with other scientist of how to make a difference in lives of the amphibians and reptiles of MA.

One of the many animals that Dr. Richmond has in his office is the barred tiger salamander. It is a species of the mole salamander and the state amphibian of Kansas. The barred tiger salamander is one of the largest land salamanders—thirteen inches long, with a head that alone is four inches. The larvae are frequently called mud puppies or river dogs. They can be found almost anywhere from southwestern Canada all the way through the western U.S. and down into Mexico. Surprisingly, they are also found locally here in the Pioneer Valley. This is because tiger salamanders were introduced to Massachusetts when Amherst College students, who were using their larvae for science experiments, dumped them into the Connecticut and Fort Rivers. Unfortunately, this species is often nocturnal so you probably won't find one anytime soon.

**Brad Compton**
**Biologist**
**University of Massachusetts, Amherst**
**Department of Natural Resources Conservation**
**by Olivia and Jennie**

As a kid, Dr. Compton loved science. He wanted to find out as much as he could about it. He wanted to figure out how things worked and how they became the way that they are. He thought of science as a very fun game. As he grew up, he became interested in wood turtles. He was inspired to study them for three reasons. The first reason was that he "just plain liked them." Second, he liked the places they live in , and finally, he enjoyed the challenge of figuring out how to conserve them.

Dr. Compton's work with turtles prepared him for his current job working on conservation projects, including studying turtles. Brad thinks that it's important for kids today to learn science because it gives them the skills they might need for future jobs.

Dr. Compton spends a lot of time studying some of the endangered species of turtles. Wood turtles spend more time than most turtles on land. Their land habitat is being invaded by human development. Many wood turtles die crossing roads that pass through their habitat. When not on land, wood turtles spend a lot of time in rivers. They travel in them, live near them, and in the winter, they slow down their hearts and hibernate in them. Wood turtles live in Canada, near the Great Lakes, in New England and south to Virginia. They find these places plentiful with food. Wood turtles eat many things such as berries and bugs. They have a special way of

catching worms. When they stomp their feet, the worms are put under the impression that it is raining out or that a shrew is chasing them and they come up from the ground. Once up, the turtles can have a nice snack of them. Wood turtles are great animals that need protection, and with the help of Dr. Compton and other scientists, maybe someday

Dr. Compton is working on many different projects, some of which are related to turtles. One of them is the Three Turtles Model. Dr. Compton made this model using software he wrote. This model shows what areas are good habitats for wood turtles to live in, and how over the years, these habitats are being taken away due to housing developments. Dr. Compton also did an experiment in which he taped a piece of string to a wood turtle's shell to help him track the turtle while it is walking. Dr. Compton then sees how far they travel to reach their nests. This experiment helped him learn more about the turtles and how he can save them from becoming extinct. For example, knowing if the turtles need to cross a road on the way to their nests will help him save them. So, through the many projects Dr. Compton is working on, he hopes to find ways to conserve them.

Dr. Compton has no fixed schedule but does many things during the week. He especially enjoys spending time outside observing, and taking notes on wood turtles and their habitat. Though Dr. Compton likes spending time outside, he often finds himself in his office. When he is in his office, he usually talks on the phone with other scientists about his work, or uses the computer for graphing, recording notes, and filing data. Occasionally, Dr. Compton goes to talk to students and help them with projects at the University of Massachusetts, where he works. Though Dr. Compton does not have a fixed schedule, he stays busy and enjoys his week.

## Dr. Elizabeth Farnsworth
## Research Ecologist, Scientific Illustrator
## New England Wildflower Society
## by Indra and Emma Miranda

Dr. Farnsworth has been interested in biology since she was very young. She has always wanted to be outside and discover things about the natural world, especially biology (the study of living things.) Her dad was an engineer and was the person who got her interested in math and science. She also had a couple of great teachers in high school who encouraged her to learn more about nature by doing things like playing with frogs and listening to birds. She went to Brown University, University of Vermont, and Harvard University, where she majored in biology and

environmental science. When she was in college, she especially liked doing experiments in the field. For example, one professor she worked with found a warbler's nest hidden under a bush that nobody in her class including her would ever have seen! That impressed her. It's no surprise that Dr. Farnsworth is still very interested in environmental science and being outside.

Elizabeth Farnsworth has four main jobs right now. First, she is a research ecologist with the New England Wild Flower Society. She also does educational workshops at schools and colleges. As an artist, she is illustrating the Flora of New England. Her drawings will help people identify plants. In addition, Elizabeth is helping to make a plant key for the New England Wild Flower Society to identify many of the common plants found in New England.

There is no such thing as a typical week for Elizabeth. She might visit an undergraduate class at Smith College and walk with them to Mill River. The she might teach a workshop for kids and adults at a library on how to make a nature journal. Next, she might lead a field day at Royalston Falls and then spend a couple of days finishing up drawings. The favorite part of her work is when she discovers something new. For example, at Royalston Falls she found that there is a whole different kind of forest growing with old cherry trees. Her least favorite part of her work is ticks; she got her first case of Lyme disease recently. Also, mosquitoes and black flies are annoying to her. But Elizabeth realizes that there is a purpose for every bug, so she tries to ignore them! She even finds some of them interesting, like the caddisfly. Elizabeth likes having many different jobs so that she can be outside a lot having many different experiences.

As a child and now many years later Dr. Farnsworth also has a love for music. She sang in elementary and high school, and she also played piano. Her first instrument was guitar. She played it all through college, and she still does today. Dr. Farnsworth tends to sing about natural and wild places, which relates to her work as

a scientist. For example, she recorded an old Pete Seeger song about rivers and plays it when giving talks about the river project. Coincidentally, a lot of her biologist friends also like to play music, so she has some people to play with. There is no doubt about it that Dr. Farnsworth has always had many interests and talents an probably always will.

Elizabeth Farnsworth made her own kayak so that she could study aquatic plants and animals. The boat is 16 ½ feet long and weighs 45 pounds. Her maiden voyage in the kayak was from Northfield to Long Island Sound, and it took her one week to complete it. She used an old guide to the Connecticut River when she went. Elizabeth later paddled down the entire Connecticut River. She and her friend then wrote an updated version of the book as they went called The Connecticut River Boating Guide. It took the whole summer to do that trip. They used a hand-held GPS unit to figure out the precise position at all times to better record what they

were seeing. Elizabeth Farnsworth must like adventures, or she wouldn't have made a kayak and gone on so many adventures in it!

How to Make a Kayak

1. Cut long boards into thin strips, 1" wide and 3/8" thick.
2. Lay the strips around the ribs of the boat using a hot glue gun.
3. Attach the hull to the deck.
4. Cut a hole in the deck for a seat and two smaller holes on either end for storage.
5. Use a couple layers of fiberglass, durable fabric you can lay on a boat.
6. Paint a couple layers of epoxy over everything.


**Dr. Boyd Kynard**
**Fisheries Biologist**
**University of Massachusetts, Amherst**
**Department of Natural Resources Conservation**
**by Victor and Liam**

Dr. Boyd Kynard took his education very seriously. After he graduated high school, he went into the U.S. Marine Corps, and he went off to college and graduate school for nine years. As an undergraduate at Millsaps College in Mississippi, he majored in biology, chemistry, and English! He considered being an English professor, but he was worried about being stuck in a classroom all day. He decided to get a Master's degree at Mississippi State University, and while he was there he chose fishery biology as his specialty. After teaching for some time he made up his mind to go back to school and get a PhD in fishery biology. After he finished school he had to start putting his knowledge to the test.

When Boyd Kynard was a boy, he loved the outdoors. He practically lived out there. He had a real passion for the woods. Boyd Kynard knew he wanted to work outdoors. He grew up in Mississippi near the Pearl River, went to college in Mississippi, and then went to graduate school in Seattle. He studies ecology in Asia, North America, Europe, and the large country of Brazil. Now he is retired from the U.S. government, but he still does the same work. He is just not being paid by the government. As of now, Boyd Kynard has been involved with river science for forty to fifty years and counting.

Boyd Kynard is a hard working man who has had many jobs in his life and has stuck with each of them until he decided what to do next. Boyd was a paperboy for seven years, and when he graduated high school he enlisted in the Marines, where he stayed for three and a half years. When he left the Marines, he went to Millsaps College to get a Bachelors degree, and during that time he worked for a floor covering business. When he was done, he went to Mississippi State University to get a Masters degree then to the University of Washington in Seattle for a PhD in fishery biology. After school he became a professor at the University of Arizona, then became a Federal Research Fish Biologist for the United States Geological Survey's team of researchers at the University of Massachusetts, Amherst, in the Department of Natural Resources Conservation. In September of 2008, Boyd embarked on a month-long trip to China to study the Chinese sturgeon in the Yangtze River. Boyd Kynard as you see has been a very busy man. Through his long list of jobs he has found what he wanted to specialize in. From paperboy to researcher, he is now trying to protect migratory fish, his dream job.

Boyd Kynard is a river scientist who studies many types of fish. He is especially interested in sea lampreys that live in the Fort River and the Connecticut River. If you don't know what sea lamprey are, you're missing out on knowing about a really cool fish. They're bigger than leeches but smaller than sharks. They are blood-sucking fish that will attach onto a fish and suck its blood until it's in such a

weakened state that it will die within a couple of days. Sea lampreys are pretty interesting once you get to know the facts, like these for instance:

1. They lay about 200,000 eggs and at least half of them die.
2. After the female lays the eggs she dies.
3. They grow eyes and a blood-sucking mouth when they're four to five years old and then migrate to the ocean.
4. While they wait for their eyes to grow, they burrow into the river bed of sand, gravel, or rocks to make a tunnel. Then when the tunnel is made, they shed their skin to make a solid sort of inner shell of the tunnel. They then stay in it for a long period of time. When they come out, they can see. If you've ever been in any river and stepped into a crater, it might have been a sea lamprey's home.
5. After a little while they migrate towards the ocean. They stay in the ocean for one and a half years and then come back to spawn, like salmon.


# Dr. Piotr Parasiewicz
# Civil Engineer & Director, Rushing Rivers Institute
# by Sammy and Ethan

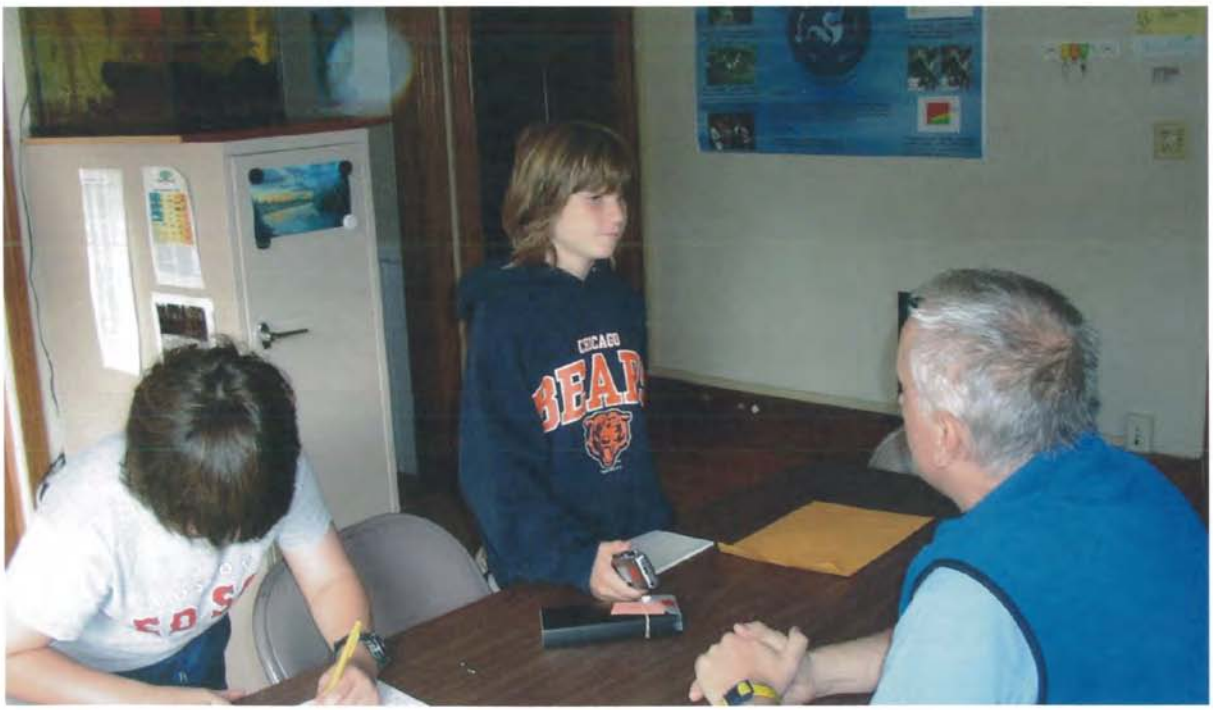
Dr. Piotr Parasiewicz enjoyed his childhood. As a kid, he loved fishing in rivers and got to go fishing often. He grew up and went through school in Warsaw, Poland. He was always a great math student in school. He went to college in Austria and studied science. He also studied acting for a semester. After college, he came to the United States because a friend told him about an exciting job that involved studying fish habitats. As a kid in Poland, he had owned his own fishing ponds. He always loved fishing and being around rivers, so this was a perfect job for him. It's good we have Dr. Parasiewicz here because now we can feel safer about the rivers in New England. Dr. Parasiewicz's childhood, love for rivers, and schooling brought him to where he is today.

Fish weren't the only things Dr. Parasiewicz was interested in as a kid. Dr. Parasiewicz's childhood experiences with and interest in computers prepared him for a career in ecology and engineering. This led him to become an engineer. Dr. Parasiewicz has never stopped enjoying computers. Today he helps design computer programs with his colleague Joe Rogers, a geologist, at the Rushing Rivers Institute.

Dr. Parasiewicz is the founder and has been the director of the Rushing Rivers Institute since January 2007. His job involves a lot more than doing work at a desk. Dr. Parasiewicz goes down to a river and looks at how the fish are doing, what needs to be changed, the health of the river, and what he can do to help the river. He uses his computer to make models of the river. These models allow him to look at where the water lever is. The models also allow him to get a bird's eye view of the water, meaning he looks at the water like a bird flying under or right above the water. Dr. Parasiewicz's engineering skills come in handy when he studies rivers. For example, he knows how to build things that will help make the river be a better fish habitat, and that will allow him and others study the river's habitat in a better way. The parts of his job he likes least are trying to find money to build what he wants, trying to hire new workers, and the worst of all, paperwork. His favorite part of his work is to go to the river, collect the data, work on the river, and when he's done, just to realize the beauty of it all. Dr. Parasiewicz really enjoys his job as a river scientist.

Dr. Parasiewicz and his colleague Joe design and use a lot of technological gear and gadgets working with the Rushing Rivers Institute. A couple of weeks ago, Piotr and Joe went to the Upper Delaware River to see how they could help the rivers create better fish habitats. Along with them they brought Streamscouts. Streamscouts is a computer program that uses Palm Organizers to record data that people walking up and down the river put into them. The "Palms" (touch screen devices that hold information) then transmit the data back to the computer on the boat, which then e-mails the data back to their office. Due to the fact that people

disturb what is naturally happening in a river, such as heat and aquatic life activity when they enter the water, Dr. Parasiewicz uses some special gadgets to collect accurate data. He uses such devices as his personal favorite piece of equipment: the thermometer gun. He also uses high definition waterproof video cameras that attach to the bottom of streams and rivers. If Rushing Rivers Institute had the money, they would have all the ability to build more cool things, such as amphibian water creature robots that "think" for themselves. They also have the technology (but not the money) to have lots of mini radio-controlled helicopters with video cameras on them as. As you can see, Dr. Parasiewicz is a very smart man and uses a lot of innovative technological gizmos to help him with his work.



## Kim Noyes
## Ichthyologist
## Northfield Mountain Recreation and Environmental Center
## by Sophia and Henry

As a child in school, Kim was not initially particularly fascinated by fish, but she loved to be outside. On the first Earth Day, in 1970, her school had a large celebration, to which a national news team came. This inspired her to become very interested in the environment, something not many people knew much about at the time. Her interest in the environment inspired her to work at Northfield Mountain, educating people about the environment. Some time later, Kim was asked by her

colleagues at Northfield Mountain to help run the fish ladders. This involved teaching people about fish, something Kim did not know much about. For some time, she would read about fish one night, and then teach what she read the next day. After a while though, she learned all that she needed to teach. Kim Noyes's interest in the environment started at a young age, and eventually led her to her current work: teaching people about the fish ladders.

Throughout her life Kim Noyes studied and helped with many different things. She attended an all girls' high school, which, as she put it, taught her to believe in herself. At that school, she studied English, which she now uses very often in her job. After high school, she went to Bowdoin College, in Maine. At Bowdoin, she volunteered to help clean up an oil spill along the coast of Maine because of her love of the environment. She also spent three summers outside, two of which she studied mussels as a marine biologist, and the third summer studying a species of storm petrel off the coast of Canada. These things made Kim interested in learning to run the Holyoke dam fish lift.

Kim Noyes is an ichthyologist, and she mostly looks at diadromous fish: fish that are born in the river, swim to the ocean, and then come back to spawn. Typically the diadromous fish that go through the fish ladders include: American Shad, Gizzard Shad, Sea Lamprey, Atlantic Salmon, Blue Back Herring, and Striped Bass. Kim Noyes's favorite fish that travels through the fish ladder are the sea lamprey. Sea lampreys are diadromous and they live by catching onto another fish's side, liquefying the insides, then sucking them out. Kim Noyes likes this fish so much because it is mistreated for trying to live. She also admires the salmon because it is so strong and athletic. Salmon can jump from a gym floor over and in through the hoop without touching the rim. Kim Noyes does a lot with these amazing fish.

Kim Noyes teaches the public about fish ladders and why they are important. She has been at Northfield Utilities Recreation Center for 23 years. Kim Noyes teaches kids' programs, makes newsletters for the fish ladders, and she even redid a nature trail. In the spring, she teaches the public about the fish ladders, trains the staff for it, and teaches the schools that come. The fish ladders are a series of steps that the fish swim up to get over the dam. There is always water flowing over the steps so that they can breathe. Coming from the bottom of the steps, a diverted flow of water tells the migrating fish that this is the way upstream. Those waters are called attraction waters and the scientists wouldn't be able to get the fish over the dam without them. There is also something called a fish elevator, which serves the same purpose: to get the fish over the dam. A fish elevator is a cage under water that the fish swim into with the help of attraction waters. Periodically, the cage closes and the

fish can't get out. The cage lifts into the air, and extra water gets pumped in, and then the cage goes over the dam. After the cage opens the fish can swim away.

The very first fish ladder was made in 17th century France. It was built of bundles of branches so the fish could get over obstacles. In 1837 Richard McFarlan of Bathurst, New Brunswick designed the fish pass. Finally, in 1880 at Patuxet Falls, Rhode Island the first fish ladder was made. The biggest fish ladder is 66 steps. People from all over the world come to our country to learn about fish ladders. Now every time a dam is built, some kind of a fish passage is built too. We have come very far from just bundles of branches for migrating fish, and Kim Noyes has done a lot to teach the public about how they work and the fish that migrate over them.

## Dr. Sean Werle
## Biologist
## University of Massachusetts, Amherst
## by Ruthie and Molly

Sean Werle, river diver and biologist, was asked the question, "Did your studies in college help you prepare for what you do?" Like most people would expect, the answer was yes. He studied aquatic science first at the University of Rhode Island, and later at the University of Massachusetts—Amherst. At URI, Sean studied zoology. Later, at UMass he specialized in entomology, which is the study of insects. He researched a kind of ant that lives in New England turf grass. In 2004, when he was getting his doctorate, he focused on a group of flies (Diptera) called the

Chironomidae. Now Sean is mostly interested in other kinds of macro-invertebrates, especially the dwarf wedge mussel and the yellow lamp mussel. Both of these creatures are extremely rare, but they live right here in the Fort River and in parts of the Connecticut River. Both of these rivers must be pretty healthy, at least in part, to support such rare species.

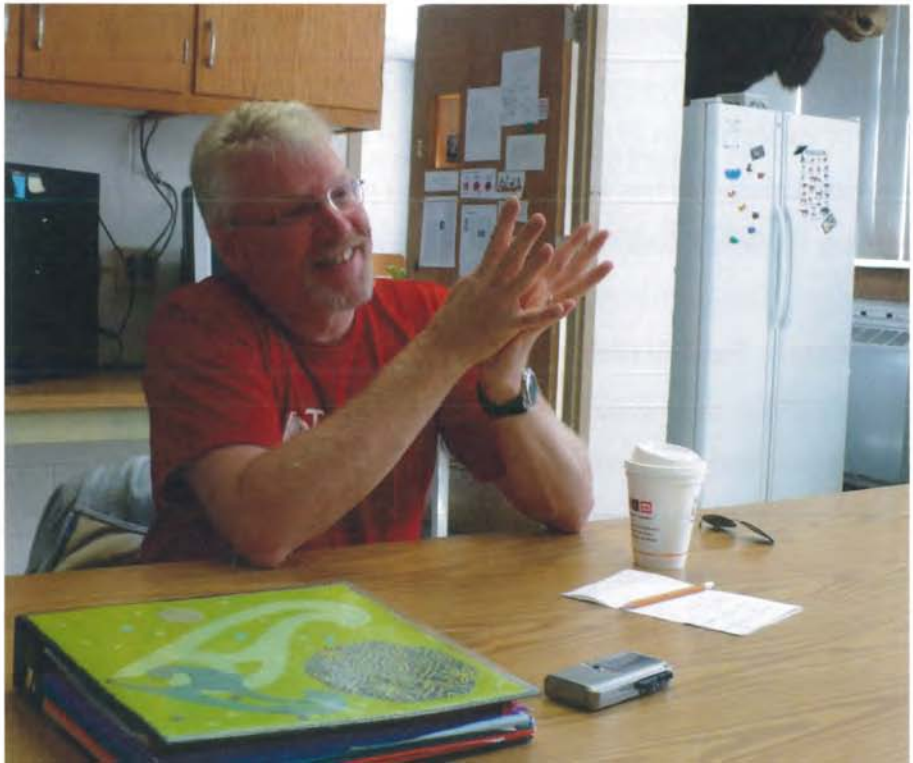
Sean took a different route to his career than many other scientists. He wanted to be a scientist from the time he was six. He has always loved bugs, In addition to that he also liked tide pools. However, during the time when many young people were going off to college, Sean wasn't ready to join them. Instead he pursued other jobs. For example, he served in the U.S. Coast Guard and then became an electrician. In 1990 he was badly injured and had to give up his job as an electrician. At that point he decided to be what he had wanted to be since he was six: a scientist. He became an entomologist when he was 28. Sean took a different route to his career than many other scientists, but it ended up helping him in the end!

One of the subjects Sean Werle frequently studies is the aquatic life in the Connecticut River. In order to do this work, he has dived approximately 2,000 times in this river. For example, in graduate school he dove four to five times a week! One of the interesting things he has found is a small pistol under a bridge. Along with his graduate advisor Ed Klekowski he also found a trench in the Connecticut River that was 130 feet deep! Also in this river Sean has found some dwarf wedge mussels and yellow lamp mussels, (which were thought to have disappeared from the Connecticut until then). Out on the river Sean has seen beavers, bald eagles and deer. The Connecticut is a place of interest for many scientists, including Sean.

In addition to being interested in aquatic life in the Connecticut River watershed, Sean is interested in the history of rivers in this area. One of the questions he was asked on this subject was, "What is the most recent, most interesting thing that you have found in a river?" His answer was a medicine bottle

that he found in the Squannacook River in Massachusetts that was from the very early 1800's. It read "Ezekiel Byam's Liquid Opodeldoc"! Hopefully this is not used any more!

One of the historical things that Sean has been involved in is helping Ed Klekowski with finding evidence of the South Hadley Canal. The canal was a shortcut for the flatboats to get away from the meandering of the Connecticut River. Now the canal is dried up and no longer used, but many scientists are trying to find out more about this important historical landmark. Sean and the other scientists' work will tell us more about the history of New England rivers.



## Ted Watt
## Educator & Naturalist
## Hitchcock Center for the Environment
## by Selah and Keagan

Ted Watt was inspired to become a naturalist because as a kid, his grandmother showed him a hummingbird nest. When he saw it, he was amazed because it is rare to see a nest. But what he thought was even cooler was how special it was to his grandma that they had a nest outside their kitchen window. Ted's father also took him hiking on the Long Trail in Vermont. He grew to love nature. He is a big gardener, and has two gardens. In the past he has worked at other nature centers such as Drumlin Farm, Arcadia Preserve, and Huyck Preserve. Now he is a naturalist at The Hitchcock Center in Amherst, MA.

There is no typical week for Ted Watt. He has many jobs and studies the Connecticut River (among other things). One of the things he does is teach a

program called "The River That Connects Us". This program helps teachers learn about the Connecticut River watershed, including its geology and history. Then they can teach their students about it. He also works and writes at the Hitchcock Center in Amherst, MA. Ted wants people to live in a sustainable way, so he helps run programs about that, mostly at night and on the weekends. In addition to all of this, he often travels to classrooms to run science programs in schools all around. Sometimes he even dresses up as different animals and does performances to teach kids about the environment, such as when he helps to run the Enchanted Forest at the Larch Hill Conservation site. He hopes that all of his different jobs at the Hitchcock Center will help the environment.

Ted Watt studies animals in the Connecticut River and uses lots of equipment for his job. He uses binoculars to do this work, and he also uses big nets, laptops, and hand lenses. He enjoys teaching kids. Often he goes outside with kids to help them learn. They do things like catch creatures in ponds and look under logs for salamanders. If kids have questions, he helps them find the answers by doing research and experiments with the animals and plants. Examples of questions kids have asked are, "What do mice like to eat?" and "Do pill bugs prefer to be in light or dark?" All in all, Ted loves his job and he makes learning about nature really fun.

Ted Watt said to us, "If you like animals, observe them. Go out into nature and explore. You also can read books and field guides about them." He followed his own advice. Ted studied biology and botany at colleges and in the field. He also studied botany at the New England Wild Flower Society. In these places, Ted has gotten a chance to study many different types of living things. Ted likes many animals, but his favorite animal is the wolverine because it was his totem animal at a nature camp he went to in Canada, where he went on a very exciting canoe trip. Though he has never seen a wolverine, he still chose it to be his totem animal. He likes it not for its strength but its soul. Ted Watt studies animals by getting out in nature to watch them in their settings. Then he reads about them. He teaches others how to learn about animals too.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