

Carola Lott interviews Cary's Emma Rosi-Marshall, aquatic scientist

By Carola Lott

Freshwater is one of our most vital and threatened resources. "We demand a lot from our rivers," said Dr. Emma Rosi-Marshall, Aquatic Ecologist at the Cary Institute of Ecosystem Studies. "We ask them to assimilate a lot of waste and at the same time want them to be clean and nice and provide habitat for fishes and birds."

Rosi-Marshall grew up in Traverse City on Lake Michigan, which may explain why she became interested in fresh water ecology. From the age of ten she wanted to become an entomologist. "I just loved insects when I was a kid," she said. After graduating from the University of Michigan at Ann Arbor, she went to the University of Georgia where she got her masters in entomology and a PhD in ecology. By the time she had finished college she realized "I could do this as my job which is great. I like being out in the field and I love being able to understand nature."

After a couple of years at Notre Dame completing her post doc, Rosi-Marshall spent five years as a professor at Loyola in Chicago. A year ago she came to the Cary Institute of Ecosystem Studies, which she said, "is a really special community of scientists." Her work there is mainly focused on research but at the same time allows her to do a little teaching as well as mentoring students "which is the really fun part."

For the past month Rosi-Marshall and three other scientists - Drs. Jennifer Tank, University of Notre Dame, Michelle Baker, ~~Utah State University,~~ and Robert Hall, University of Wyoming - have been studying the way five rivers in Idaho and Wyoming assimilate and take up nutrients. The four colleagues had previously worked together measuring small streams, and a couple of years ago, after developing a method to measure uptake in a large river, wrote a proposal to the National Science Foundation for a three-year study. It will be the first time that anyone has scientifically measured how large rivers absorb nutrients.

For their first summer, they have been based at the Grand Teton Field Station in Wyoming studying the waters of the Buffalo Fork of the Snake, the Green River, the Henry's Fork in Idaho, and the Snake around Moose Junction in Wyoming. They will spend their final week on the Salmon River in Idaho.

The four scientists have chosen to study Western rivers because they are biologically active with large amounts of algae and bacteria both on the bottom and in the water column, which assimilate the nutrients and make the water exceptionally clean. "You can look at a river and say it's just water, but if you turn over the rocks or study it under a microscope you realize that what's there is pretty amazing,"



Dr. Emma Rosi-Marshall, Aquatic Ecologist. Photo by John Halpern.

Rosi-Marshall said.

Each week the four scientists, assisted by three graduate students, three undergraduates and two technicians, work on a given stretch of river. First they measure how the water moves through the channel. Then they add trace amounts of nutrients, and set up at different stations downstream to measure how quickly the river takes up what they have added.

After three days out on the river the team repairs to the lab where they spend the next couple of days measuring the nutrient chemistry - nitrogen, phosphorus and ammonia - of that particular stretch of water and enter the data in a computer.

In the past people made assumptions about what rivers do without any scientific basis of fact. People thought that in a large river there was so much water and it was moving so fast that not much was going on, but Rosi-Marshall and her colleagues have found that there's a lot happening in the these large rivers. In fact the rivers they have studied this summer "have exceeded our expectations and can take up a lot more nutrients than we thought."

Of course conditions will vary from river to river depending on the number of humans in the watershed, the amount of nutrients that are there, and the presence of agriculture in the drainage. Consequently their project will last three years and involve fifteen rivers in the west and Midwest in order to understand what variables influence their ability to assimilate nutrients.

As for the future, Rosi-Marshall says "I have a lot of hope for the world. Nature has an amazing way of coming back, which is what keeps me going. And by understanding and knowing how rivers function we have the potential to use them as well as preserve them."