

## /// THE DIRT

# Expanding Costa Rican highway could be harmful to 'green tunnels'

By Terry Platz

The following is a Q&A by Terry Platz of Beacon Institute for Rivers and Estuaries of Clarkson University and Tom Langen, Ph.D., an associate professor in the departments of biology and psychology at Clarkson and a member of the faculty for River University, a Beacon Institute/Clarkson undergraduate program that runs June 10-28 in Beacon. Langen teaches courses on animal behavior, ecology, conservation biology and global environmental change. A certified senior ecologist and master bird bander, Langen earned his Ph.D. in biology from the University of California, San Diego.

**Your research on the impact of highways on amphibians and reptiles extends to Costa Rican national parks, known for their biodiversity. What kinds of highway impacts are you seeing on amphibian/reptile habitats and populations there?**

**Langen:** In Costa Rica, I have principally worked at a very large national park that is bisected by the Pan-American Highway. My Costa Rican colleagues and I evaluate the impacts on amphibians, reptiles, birds and mammals. Costa Rica has a



Tom Langen

## IF YOU GO ...

**What:** River University, an interdisciplinary undergraduate program in environmental science and water policy. Tom Langen, Ph.D., will teach the course "Life of an American River: Ecology, Policy and Place" as part of the program. Participants can earn six Clarkson University credits.

**When:** June 10-28.

**Where:** Beacon Institute for Rivers and Estuaries, Clarkson University, Center for Environmental Innovation and Education at Denning's Point in Beacon. River University includes three days on the Sloop Clearwater.

**Web:** www.RiverUniversity.com.

much higher diversity of species than we have in New York, and the natural history and population sizes of many are poorly known.

In hot tropical climates, the humidity is higher, the temperature is cooler and the air is calmer along stretches of road where the tree canopy is allowed to overgrow the roadway, creating a "green tunnel" effect. We found that arboreal animals such as monkeys cross over the road via the tree canopy at such places. Small ground-living forest animals cross the road at green tunnels, too, because these places are cool, shady and offer cover. Animals avoid areas where trees have been cut back to leave the

roadway and its verge open to the sky.

When the Pan-American Highway was built 50 years ago, large culverts were installed where the roadway crossed seasonal streams in a region that years later would become a national park. To observe the effects of these culverts on wildlife, we placed cameras in 10 of these culverts, and found they are superhighways for animals. Puma, ocelot, deer, peccary and many other kinds of animals readily use these culverts to pass under the road.

The Pan-American Highway in Costa Rica is presently a two-lane highway. Our research is timely — Costa Rica has started a project to amplify the Pan-American Highway into a four-lane divided highway, much like a U.S. interstate highway, to expand international trade.

Such development will eliminate the green tunnels, creating a significant barrier to animal movement and likely increasing wildlife road mortality. We have provided the Costa Rica National Park Service with research results that they are using to argue against expansion of the road through the park.

If the road expansion cannot be avoided, our research provides guidance about what kinds of mitigation should help reduce the effects on wildlife.

*Terry Platz is associate public affairs officer for the Beacon Institute of Rivers and Estuaries in Beacon.*

## /// SUSTAINABLY SPEAKING



Bard Center for Environmental Policy Director Eban Goodstein, center, talks with Helena Kolenda, the Lucre Foundation program director for Asia, left, and Robyn Smyth, science professor at the Bard Center for Environmental Policy. PHOTO COURTESY OF EMILY KROHN

## Environmental issues in Asia get spotlight

By Alicia Caruso

Bard College's conference on water, forests and Communities in Asia held from Jan. 31 to Feb. 2, featured speakers from three Asian countries who presented topics on a wide array of environmental topics.

T.J. Lah from Yonsei University in South Korea discussed environmental views in his country. We learned that while the country is openly committed to developing a "green economy," the emphasis to date has been more about economy.



Alicia Caruso

He cited an example in the Four Major Rivers Project. The idea came from President Lee, formerly the CEO of Hyundai Engineering and Construction Ltd. The project was completed in October 2011. It consisted of large-scale engineering of four major rivers in Korea, allegedly for flood control. However, it was clear the project was too ambitious. There are already problems with the structures' foundations.

Machiko Nishino of Biwako Seikei Sport College in Japan talked about lake management. She played a major part in management activities at Lake Biwa, Japan's largest freshwater lake. Much of the focus rested on fish population restorations. The fish and the rice paddies evolved alongside each other during Japan's long history. In the 20th century, the people around the lake upgraded the paddies, to the exclusion of the fish. Once the lake managers realized this led to a decline in fish populations, they created "fishways" for the fish to get into their preferred spawning areas. Unfortunately, this is a slow and expensive process, but it has met with success.

Two Chinese speakers talked about two very different topics. Hu Tao, an executive at the World Resources Institute, spoke on air quality in China. He suggested China is going through a phase similar to what the United States and Europe went through in the 1960s and 1970s. Air is an immediate, visible problem, which may serve as an impetus for stricter and more effective pollution controls in China.

Hu gave a positive example of a measure that worked in Urumqi in the far west of China, which has suffered from severe smog. Economic incentives were put in place encouraging use of cleaner burning fuel, and so far it has worked.

Scholar Minhua Chen of Nanchang University, gave a presentation on Poyang Lake in Jianxi Province. Anyone who had read about the lake would have thought that, while it had once been the largest freshwater lake in China, it had been greatly diminished because of infrastructure along its tributaries. However, the water body is more of a lagoon and its volume fluctuates throughout the year. Chen asserted that there were more birds and fish in the lake than ever before, and that the water is clean enough to drink.

Between presentations, there were also panel discussions on environmental management, including one from the Bard graduate students on lakes.

Audience members came away understanding Asian governance structures and politics, methods of effective environmental management — particularly with lakes — and the extent to which environmental issues are global.

It is increasingly important to collaborate across borders through dialogue and research. Learning another person's stories or hearing questions from people in other fields widens our perspective. From hearing the stories about Korea, Japan and China, we learned something new about setting and implementing environmental agendas, and how alike the challenges are in addressing environmental problems.

*Alicia Caruso is a student in environmental policy at Bard College. Sustainably Speaking is written by students, graduates and staff of the Bard Center for Environmental Policy.*

## Winter

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lated by snow."

The timing was perfect for a recent family-friendly winter walk led by Andrea Caruso, an ecology education program assistant at the Cary Institute. The group of about 40 could clearly spot animal tracks, because there was snow on the ground. And it had fallen recently enough that the prints hadn't been obscured by those of humans.

"A lot of animals we think might have gone off are actually present, so we tried to look for evidence," Caruso said. "The squirrel is an animal that kind of bounces and lands on two feet, then brings the front feet down and jumps again. The four prints are all in one group. Of course deer have hooves, but another clue is that in the case of animals like deer and coyotes, the prints are spread out. They walk instead of jump."

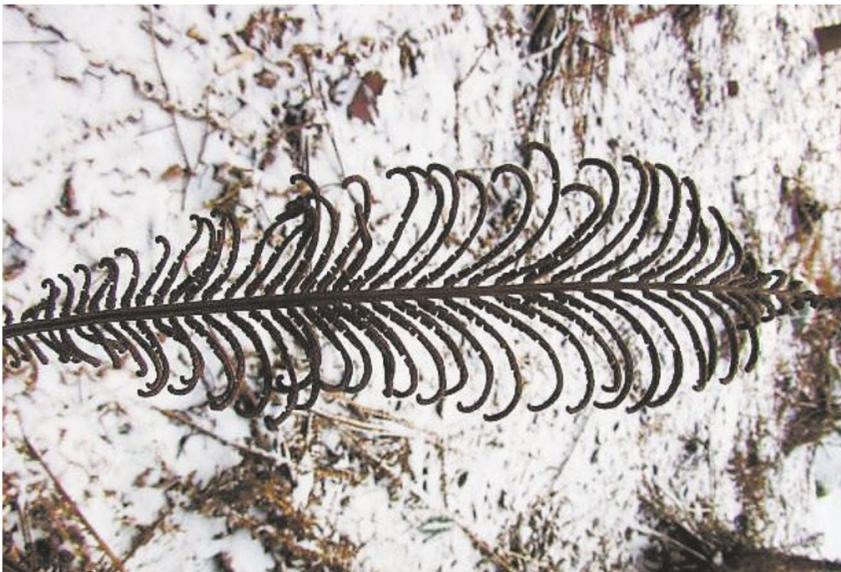
Shiga-Gattullo said that while the claws or nails of dogs and other local animals are clearly visible along with their paw prints, the claws of cats are not, because they are able to retract them. Even preschoolers enjoy using that clue to spot cat prints in the snow.

She added that there's fun to be had with human footprints, too. Children of preschool age and up can have fun playing Follow the Leader, attempting to stay within the footprints of the walker who preceded them.

Snow can also serve as a canvas for artists of any age. "Use sticks or fallen pine needles or stones to make a design on the background of white snow," Shiga-Gattullo suggested.

On the nature walk Caruso led, she showed families how to follow up the long distance view of a tree and its bare branches, by moving in closer for a bark rubbing. Sheets of tracing paper are required. Charcoal is often used to create a rubbing. Caruso supplied the children and their families with large-sized crayons with their paper wrappings removed.

By holding the paper right up against the bark, then covering it with up and down strokes of the crayons held sideways, children can watch a distinct pattern emerge. Besides displaying the resulting art works, families can use the clues yielded by that activity to identify the type of tree, even when the identifiers most people use — its leaves — are missing. Young outdoor detectives can match their traced bark designs with examples printed in a field guide (see box of resources), to determine the tree type.



A fertile ostrich fern frond remains from summer at the Cary Institute in Millbrook. COURTESY PHOTO



Andrea Caruso gives a demonstration of how a squirrel walks during a walk at the Cary Institute. COURTESY PHOTO

## NATURE GUIDES

Nature guides recommended by Andrea Caruso, Cary Institute:

- » "Bark: A Field Guide to Trees of the Northeast," by Michael Wojtech (University Press of New England, 2011)
- » "Mammal Tracks and Scat: Life-Size Tracking Guide," by Lynn Levine (Heartwood Press, 2008)

Caruso and Shiga-Gattullo both suggested bringing black fabric outside during a snow fall and, with a magnifying glass, examining single flakes that have landed on it.

"If you watch for a while, you can see their diversity of shape and size," Caruso said.

Before winter walks she has led at the Institute, she has supplied children with the materials to cut out circles of cardboard, glue black felt to them and attach a ribbon long enough so they can wear their creations around their necks as they walk outside during a snow fall. If it's not snowing, she said, a child can stand under a tree while someone gently shakes a branch, causing snow to fall on the felt.

She warned that in that case, "many flakes will fall at once. You don't get to see that beautiful six-sided shape, but it's still a lot of fun to look at (under a magnifier)."

Shiga-Gattullo said that, unlike most of her friends and neighbors, she does not clean up her garden as winter approaches, but waits until spring. She said that with seeds contained in everything from weeds to the sunflowers many people include in their gardens, an uncleared plot can offer a view of animal customers dropping by for the winter harvest.

She said that winter's early nightfalls bring a special gift.

"Stargazing in winter is a great thing, because there are easily recognizable constellations, like Orion, and crisp views," due to the dry winter weather on nights when there is no precipitation. She added that because it gets dark early, children have the opportunity to look up at the night sky before bedtime.

Exposing children to the

adventure and beauty of the outdoors can affect their lives from that point on. Caruso grew up in a garden apartment setting in Westchester County, but regularly visited an aunt and uncle in the Capitol region, who lived closer to woods.

She acknowledges that she has always had a love of science. Likewise, teaching has always attracted her, "because I love to encourage people to look more closely at things." But she said those visits upstate also played a part in affecting her habits as an adult.

When her aunt took her walking in the woods, "she would encourage me to stop once in a while and take a good look." She remembers doing just that, at about the age of 7, as she stood with her aunt and watched a deer move near them. She can feel the effect of that day on her lifelong habits.

"The serenity of it helped inspire me to do that kind of thing on a regular basis."

*Marij Yablon is a writer and voice-over performer from Ulster County. Reach her at newsroom@poughkeepsiejournal.com.*