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# Researchers head south to study mangroves and birds

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Led by Dr. Cathy Viverette and Dr. Edward Crawford, students will learn about conservation issues and the environmental threats that the prothonotary warbler faces in Panama



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As the weather cools and leaves turn color, images of holidays and hot chocolate pop into many people's minds. Some imagine family dinners with turkey and cranberry sauce while others dream of snowmen to be built and fireplaces to be lit. Not so for the prothonotary warbler.

Like many migratory birds, this bright yellow songbird seeks warmer refuge during the winter months. But warblers aren't the only ones flying south for the winter. For two weeks in January,



In her work with prothonotary warblers, Dr. Cathy Viverette does outreach with local middle school students. (Photo courtesy of Dr. Viverette)

**‘It’s gone. They drained it. All the mangrove trees died, and there’s a golf course next door,’ says Dr. Cathy Viverette.**

VCU researchers Dr. Cathy Viverette and Dr. Edward Crawford will accompany 18 students to Panama, where they will study mangrove conservation and avian field ecology.

During an immersive field research experience, students will learn about conservation issues and the environmental threats the prothonotary warbler faces. Their lab will be the austere swamps and mangrove forests of Panama, home sweet home to this little warbler species.

“It’s a great project for getting undergraduates involved in research,” Viverette said. “We have people throughout the breeding area we are working with, and throughout Latin America. It’s great for outreach; it’s great for getting undergrads out into the field and getting them excited.”

Unfortunately, the warbler’s holiday getaway is becoming a bitter homecoming as nesting areas are disappearing at an alarming rate and mangrove forests are being destroyed.

“Although on paper (mangrove forests) are protected, they’re being drained,” Viverette said. “One of our study sites, which was a site that was studied back in the ‘90s, was our best site. It was a mature mangrove, right on the city’s edge and at the edge of a very large continuous mangrove forest.”

“It’s gone. They drained it. All the mangrove trees died, and there’s a golf course next door. Every time we go down, it looks worse. Every time we go down, there’s more construction – literally high-rise condos at our study site.”

But there is hope. One of the goals of this VCU course is to highlight common conservation struggles that Panama shares with the U.S. Throughout the trip, students will work with



A prothonotary warbler (Photo courtesy of Dr. Cathy Viverette)



Researchers tag the warblers with colored bands. (Photo courtesy of Dr. Cathy Viverette)

Panamanian biologists in the breeding area and spend at least one day with local schoolchildren.

“We train their biologists when we’re down there,” Viverette said. “They have a huge environmental education program where they have teachers they’ve trained going into the schools. We get at least one day with the school kids who come out into the field with us.”

She said the course – Biology 415 Panama Avian Field Ecology – represents both service learning and a study-abroad opportunity.

“It gives our students an opportunity to learn field skills and how to analyze. They have to come back here and then compile, analyze, interpret and present the results,” Viverette said.

The VCU researchers will give the results to the Audubon Society’s branch in Panama. The organization then can use the data “as justification for protection of the mangroves,” Viverette said.

Studying prothonotary warblers may also give insight into the habits of other birds and the environmental issues they face.

“There’s a few different ways we can study migratory connectivity. And the real reason we’re doing this is conservation,” said Dr. Lesley Bulluck, an avian biologist and assistant professor in the VCU Department of Biology. She said the goal is to address the declining population of prothonotary warblers and other tropical migratory birds.

### **A diet is worth a thousand words**

Water quality is a common issue for Panama and the U.S. The health of a community often depends on access to clean water. A necessity



A group of VCU students in Panama (Photo courtesy of Dr. Cathy Viverette)

‘These birds eat aquatic insects so their health and well-being is dependent on water quality, as is the health and well-being of most communities.’



A middle school student in Panama releases a prothonotary warbler. (Photo courtesy of Dr. Cathy Viverette)

for life, it's no wonder many early civilizations flourished around abundant water sources.

“We call it ‘Chesapeake Bay to Panama Bay and back,’” Viverette said. “Birds are a reflection of the ecosystem. They can be used as an early warning system like the ‘canary in a coal mine.’ And these birds eat aquatic insects so their health and well-being is dependent on water quality, as is the health and well-being of most communities.”

One way researchers can analyze birds' migratory patterns is by looking at their feathers. Examining the ratios of stable hydrogen isotopes can reveal a lot about a bird's diet, since isotope levels differ by latitudinal region.

“It just turns out that you are what you eat,” Bulluck said. “We can collect feathers from birds in Colombia, South America and Panama throughout the wintering range, and collect a feather that we know is grown in North America, and then look at the isotopes in that feather and try to pinpoint where they're from.”

Isotopes refer to the different forms of a basic element based on mass. As an element gains a neutron, its chemical properties stay the same while its relative mass increases. The changes are detectable and varieties of this technique are used in many areas of avian research.

Feather brightness can also indicate habitat quality, Viverette says. Brighter birds usually have a healthier diet, which suggests they eat in better territory. This can have a significant impact on female birds and their young.

“You either have a good diet or you don't,” Viverette said. “So you would hypothesize that the brighter males and brighter females are going to raise more young, and if you have good



VCU researchers trained Audubon staff members in Panama how to band warblers. (Photo courtesy of Dr. Cathy Viverette)

water quality, you're more likely to have more birds like this."

### **The goal: protect warbler habitat**

These patterns illustrate common challenges migratory species face and where environmental efforts can be focused. Viverette hopes that studies like hers can help secure funding and advance legislation protecting warbler habitat.

"It's convincing governments that there's health reasons to protect them, and that there can be economic benefits from ecotourism if these resources are available, and to train local people to take advantage of that," Viverette said.

Returning students will continue their education in the classroom with a corresponding course taught by Viverette and Crawford in the spring.

"People have to care about something – that's where the bird comes in," Viverette said. "There's a lot we still don't know, and we will never stop asking questions." •