

FIU BioNews

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FEATURE STORY

Amphibian Decline

“More than one-third of amphibian species are globally threatened, and over 120 species have likely suffered global extinction since 1980.”

The alarming statement comes from a recent article published by biology graduate student **Steven Whitfield** and others, including **Kristen Bell**, **Tom Philippi** and **Maureen Donnelly**, in which the team documented a 75 percent decline in the number of leaf litter amphibians and reptiles in a Costa Rican rainforest. The article appeared in the May 15, 2007 online edition of the Proceedings of the National Academy of Sciences.

Much of the world-wide amphibian decline has been attributed to anthropogenic factors, such as habitat loss and predation by invasive species. But scientists have been unable to pinpoint why species losses are occurring in relatively protected areas. “These “enigmatic” amphibian declines are a topic of much debate, and many factors, [including] UV-B radiation, global climate change, pollution, and emerging infectious diseases, have been raised as hypotheses,” said Whitfield.

With over 35 years of data collected at La Selva Biological Station in Costa Rica, Whitfield et al. show that none of these factors is to blame for the region’s loss of amphibians and reptiles. Instead, they believe habitat loss on a micro-scale is causing the decline.

A protected, old-growth rainforest, the La Selva Biological Station is relatively untouched by humans. But while the dark, wet macro-environment that its resident amphibians and reptiles adore is still intact, the density of leaf litter muck in which the critters

burrow may have decreased. This could be due to the increasingly warm and wet conditions observed in the past two decades since leaves are less likely to fall when conditions are wet and those leaves that do fall may be decompose rapidly. The team is currently investigating whether this hypothesis is true.

The work suggests that scientists’ knowledge of the barrage of threats to amphibians is incomplete and that more research must be done to identify the unique threats that affect regional communities of amphibians, as well as other taxa such as reptiles.

“Amphibians are very sensitive bio-indicators that respond quickly to deteriorating environmental quality - they have been likened to the ‘canary in the coal mine,’” said Whitfield. “If these sensitive species are in decline, it may be a sign that other species, or even human health, will soon be at risk.”



The Strawberry Poison Dart Frog (*Oophaga pumilio*) is the most common frog species at the team’s field site. Photo courtesy: Steven Whitfield

Steven M. Whitfield, Kristen E. Bell, Thomas Philippi, Mahmood Sasa, Federico Bolan, Gerardo Chaves, Jay M. Savage, and Maureen A. Donnelly. 2007. Amphibian and reptile declines over 35 years at La Selva, Costa Rica. PNAS, 104. www.pnas.org/cgi/doi/10.1073/pnas.0611256104

WHERE ARE THEY NOW?

Suzanne Kennedy

Suzanne Kennedy, former M.S. student of **Suzanne Koptur**, has put her degree to work by promoting ecological conservation during the land development process. As the founder and president of Floravista, Inc., an ecological consulting and native plant landscaping company based in central-eastern Florida, Suzanne has spent over 16 years working with land developers, engineers, and landscape architects to preserve ecosystems during land development. Her company, which employs one full-time person and six part-time subcontractors with various specializations, such as wildlife biology, GIS, geology, and environmental engineering, is recognized for its outstanding commitment to green development.



Suzanne Kennedy en route to study to study a tree canopy near Vero Beach. Photo courtesy: Suzanne Kennedy

While Suzanne believes that “preservation and contiguity of large preserves over 1,000 acres is superior to saving or restoring fragments in developments and suburbia,” she remains committed to protecting even small pieces of native landscape where it makes sense, believing that every bit can count.

She spends much of her time working to achieve this goal by identifying and inventorying plants and

wildlife in wetlands and uplands; planning and designing restoration and conservation sites, greenways, and wildlife corridors; creating habitats that attract butterflies and hummingbirds; and conducting environmental education activities, among other tasks. Many of these skills she learned from her FIU advisor, Suzanne Koptur, and other faculty at FIU.

But she also gained experience from six years as an environmental scientist at the Natural Resources Management Office of Brevard County, and as Assistant Curator of Endangered Species at Fairchild Tropical Botanic Garden. Suzanne obtained additional horticultural experience as an intern at Harvard University. She has a B.S. (1994) and M.S. (1998) degree in Biological Sciences from FIU, and received art, architecture, and design experience while studying at the Rhode Island School of Design.

A quote from her blog (floravista.blogspot.com) sums up Suzanne’s feelings about Florida landscapes:

“Everywhere you drive in Florida you see endless sun-beaten lawns punctuated by a sporadic palm and edged by wall-like hedges and splats of neon-colored Impatiens...Were these lawns part of old Florida, part of the natural Florida heritage?... Floravista-scapes, re-create the picturesque landscapes of real Florida. Each oasis, or habitat, that a Floravista-scape preserves or creates, cumulatively enriches and preserves Florida’s namesake and rich natural heritage.”

NEWS

DNA Core Facility Upgraded

The DNA Core Facility was recently upgraded to include a faster computer, new hardware that allows for both fragment and sequence analyses, and new software for fragment and sequence analysis.

In addition, the upgrades include a new slab gel apparatus that allows people to run their own samples.



Tim Collins (left) and Paul Sharp (right) load samples into a sequencer.

Currently used by 20 different labs, the DNA Core Facility allows researchers to sequence DNA and identify different fragment lengths in order to examine differences among individuals in a population. Fragment analyses are often used for population genetic analyses among closely related organisms, paternity analyses, and in forensics work.

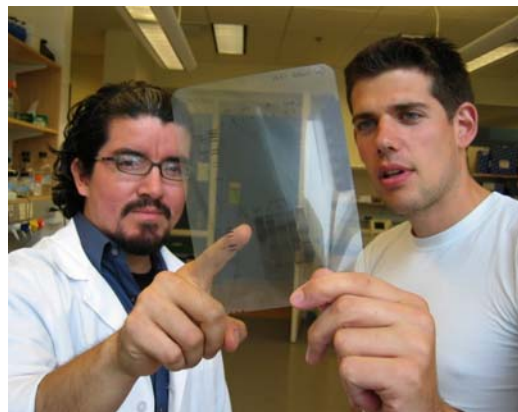
Founded in 1996 with the arrival of **Tim Collins** to the Department of Biological Sciences, the DNA Core Facility was later professionalized by the addition of an OPS position for a DNA Core Facility Manager. The facility's manager prior to **Paul Sharp** was **Matt Osentoski** (for 1 year). Establishment of the College of Medicine is expected to increase the usage of the facility.

The recent upgrades allow scientists to analyze 100,000 bases per day. Ultimately, though, the goal for the facility is to enable the analysis of a few billion bases per day, so that it is possible to completely sequence a human genome in 24 hours or less. This capability would help researchers to identify proclivity to diseases and the best medication for a particular genotype.

Rodrigo Goes to MIT

Biology undergraduate **Rodrigo García** did not spend his summer lounging by the pool reading light fiction and sipping margaritas. Instead he traveled to Cambridge, MA to participate in the "MIT Summer Research Program in Biology". Okay, so he did take a boat cruise, visit Martha's Vineyard, and attend several barbecues, but he also worked with post-doc, Sven Löbrich, in the lab of Elly Nedivi to characterize a candidate gene, CPG2, and its role in endocytosis of glutamate receptors.

The gene is one of several that are involved in the regulation of glutamate receptors in the neurons of the hippocampus, which, themselves, are involved in learning and long-term memory. The strength of the connections of the neurons in the hippocampus is regulated by the glutamate receptors.



Rodrigo García (left), with Dr. Sven Löbrich (MIT), looking at the results of an actin-binding assay.

"The program gave me exposure to the scientific research culture and the interactions that take place in a lab setting," said Rodrigo, who is the Department of Biological Sciences webmaster. "It also provided me with beneficial informal contacts," he said.

A member of the Biology Honors Program and the recently established FIU chapter of the Beta Beta Beta National Biological Honor Society, Rodrigo plans to focus on neuroscience when he goes to graduate school.

Quantifying Biology in the Classroom (Q`BIC)

Q`BIC has been funded for \$200K as a strategic initiative by the provost. The project is intended to expose students to a more rigorous curriculum in biology that is interdisciplinary in scope and quantitative in content. In this pilot, courses with areas of overlapping synergy, such as mathematics, statistics, computer science, and biology, will be organized together in blocks. The integration of subject areas will promote cooperative learning techniques and problem-based learning concepts. For example, data generated in the biology labs will be used to teach statistical concepts and biological

processes will be used to illustrate mathematical techniques. Thus, Q`BIC scholars will be able to see how mathematics can model biological processes.

Q`BIC is organized in two parts: Part 1 begins in the freshman year and continues through the sophomore year; Part 2 covers the junior and senior years. This block format has synchrony and is sequential. Q`BIC will include a *capstone summer workshop* following Part 1, which will concentrate on modeling and simulation. Part 2 will offer tailored-upper level courses and will encourage scholars to participate in funded research programs.

FACULTY AWARDS

The following faculty members were selected to receive a Faculty Award for outstanding academic achievements: **Case Okubo** (Excellence in Advising Award), **James Fourqurean** (Excellence in Research Award), **Michael Heithaus** (Excellence in Research Award), and **Jennifer Richards** (Excellence in Research Award).

Please join the FIU community in recognizing and celebrating these individuals' accomplishments. The formal award presentation will take place at Faculty Convocation on Friday, October 5, 2007 in the Wertheim Performing Arts Center at 9:00am.

STUDENT AWARDS

Theresa Meis Chomanski received a grant from the Florida Fish and Wildlife Conservation Commission (\$3,350) to support her research project entitled: "Morphological and Anatomical Analysis of Three Common Everglades Bladderwort Species: *Utricularia gibba*, *Utricularia subulata*, and *Utricularia cornuta*".

Robin Currey received a \$50,000 grant from Mercy Corps' Phoenix Fund in 2005. These funds provide seed capital to innovative and strategic economic development projects, encouraging high-risk, high-reward ventures in the world's poorest communities. These monies supported publication of "Apples in Home Gardens." Recently, she obtained \$50,000 for the expansion project from Mercy Corps' Phoenix

Fund and an additional \$75,000 from our implementing partner: Kompanion Financial Group, a micro credit financial institution in the Kyrgyz Republic.

Josette LaHee recently received a Grant in Aid of Research for \$996 from the Psychological Society of America to support her proposed research entitled "The effects of nutrient enrichment on benthic periphyton mat communities in two Florida Everglades coastal wetland habitats".

Marcy Lowenstein recently won a 2007 TA Excellence-in-Training Award from the FIU Academy for the Art of Teaching.

Jamie Myers was awarded the Bert and Lucy Williams Student Achievement Award for the best student verbal presentation at the 33rd Scientific Conference of the Association of Marine Laboratories of the Caribbean held in St. Thomas, US Virgin Islands June 4-8, 2007. The title of her presentation was "Culture, identification, DGGE analysis, and physiology of cyanobacteria associated with Black Band Disease of corals."

Cassandra Quave won the Fulling Award for the best student or recent Ph.D. presentation at the 48th Annual Meeting of the Society for Economic Botany in Chicago. The award, given to persons early in their career, includes a certificate, a \$500.00 award, and the paper is invited to be published in Economic Botany.

Steven Whitfield was awarded a three-year EPA STAR/GRO grant to support his dissertation research on the collapse of the La Selva herpetofauna. He also received a \$200 travel grant from the Society for the Study of Amphibians and Reptiles to attend the 2007 meeting of herpetologists and ichthyologists in St. Louis.