



# flightpaths

FALL 2015

ANIMAL PROGRAMS

HUMAN POPULATION IMPACTS

## Registrar: Keeper of All Needed Knowledge

*Julia Ecklar, Registrar*

**“How old is Bubba the Palm Cockatoo?”**  
*Seventeen years and ten months.*

**“How many eggs were laid at the National Aviary last year?”**  
*285 eggs were laid, representing 35 different species.*

**“How many African Penguins are there in zoos all over the world?”**  
*1264 males, 1174 females, 265 who haven't been sexed yet.*

As Registrar, these are just some of the questions I answer every day for guests, keepers, and ornithologists at the National Aviary. It's my job to collect every piece of information we know about our animals and make it available to the animal care and collection management staff as needed. With 574 birds under our care, that makes for a lot of information: everything from when Stanley the African Penguin started molting last year (June 15th) to how much the Black-faced Tanager weighs (31 grams on March 3, 2015) or what size band a Scarlet Ibis wears (size 7A).

But, the information safeguarded by registrars isn't just about weights, band sizes, and where in the Aviary a bird is currently living. It's also about how many generations of a species have been bred in captivity since the first “founder” specimens were taken from the wild. It's about precisely where in the wild those first founders came from, and how many offspring they've had. It's about how many times those offspring have reproduced, and with whom; or whether or not a Victoria Crowned Pigeon hatched in Vancouver is too genetically similar to one hatched in Florida to be safely bred to one another.

Like all AZA-accredited zoos, the National Aviary participates in multiple

*continued on page 7*

## New Study Uses Songbird as Bioindicator of Potential Impacts of Hydraulic Fracturing

*Steven Latta, Director of Conservation and Field Research*

Since the days when canaries were used in coal mines to warn workers of dangerous fumes, to the observations of Rachel Carson in identifying the role of pesticides in raptor population declines, birds are known to be valuable indicators of changes in our natural environment.

Building upon research begun in 1996, The National Aviary's Department of Conservation and Field Research has been studying the Louisiana Waterthrush as an indicator species for the health of Pennsylvania's watersheds.

Based on this proven sensitivity to water quality, the Pennsylvania Game Commission formally recognized the Louisiana Waterthrush as a “Species of Greatest Conservation Need” in its Wildlife Action Plan, and as an indicator of high

*Waterthrushes feed primarily on aquatic invertebrates, which they glean from the surface of rocks, leaves, and woody debris found in streams.*

quality forested headwaters in the state. Similarly, the National Park Service employed the waterthrush as a “Vital Sign” of stream ecosystem integrity across its entire Eastern Rivers and Mountain Network.

Once the waterthrush was established as a bioindicator of the health of riparian ecosystems, National Aviary researchers recognized that as a top predator, the waterthrush would be an excellent sentinel species.

Over the past several years my colleagues and I have dedicated research to better understand possible risks to surface waters from hydraulic fracturing activities. Building on our previous Louisiana Waterthrush research studies, this new study is based on feathers collected from waterthrushes inhabiting dozens of headwater streams in three states overlying the Marcellus and

*continued on page 7*



PHOTO BY MIKE DOUGHTERY



## NATIONAL AVIARY

*The National Aviary inspires respect for nature through an appreciation of birds.*

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FROM THE EDITOR

## Why the National Aviary Stands Out!



*The editor captured this Red-billed Tropicbird chick in order to get a small blood sample for a study of avian malaria.*

about our Andean Condor conservation and breeding program, and about the very important work done by the National Aviary's Registrar, Julia Ecklar, to carefully track demographic statistics, medical records, and breeding statuses for all of our birds.

Among the ways we live up to our national designation is by conducting cutting edge field research. We are fortunate to have funding for our Department of Conservation and Field Research that enables us to study a variety of stressors on bird populations. Our studies have explored how human population density, natural resource extraction, and land use decisions can threaten vulnerable species and alter bird communities. We have completed research that highlights the importance of clean water for maintaining healthy bird populations and for safeguarding human health. And, in this issue of *FlightPaths*, we show how collaborative research tracking avian malaria may help us understand evolutionary pathways for a variety of potentially devastating human diseases.

Last but not least, we teach award-winning field courses for major universities, mentor and advise graduate students pursuing Master's and Ph.D. degrees in ornithology and conservation biology, and provide life-changing internships and research experiences for high school and undergraduate college students. It is your membership and donations that enable us to stand out in these important ways.

Steven Latta, Ph.D.  
Director, Conservation and Field Research

In addition to being a favorite local and regional attraction for the city of Pittsburgh, the National Aviary strives to stand out as a leader in advancing global conservation of birds and their habitats through ecological research and environmental education.

Like many other zoos, we participate in a multi-institution captive breeding program called a Species Survival Plan (SSP) that helps ensure zoo populations of selected species will remain sustainable far into the future. In addition, we follow recommendations to carefully breed birds of some imperiled species so that we can support reintroduction programs aimed at boosting or restoring wild populations. In this issue of *FlightPaths*, you will read

PHOTO BY LETICIA SOARES

## Studies of Avian Malaria Can Inform Us about Human Health Risks

Steven Latta



*A small blood sample from this Yellow Warbler will be used to extract DNA to study the relationships of Yellow Warblers across the Caribbean and to determine what blood parasites they carry.*

Most people associate the Caribbean Islands with beautiful beaches and tropical breezes, but for researchers at the National Aviary and their colleagues, the Islands serve as a natural laboratory for studies of malaria in birds.

Caused by parasitic protozoans and transmitted primarily by mosquitoes, malaria affects humans in tropical and subtropical regions of Africa, Asia, and Latin America. More than 200 million cases and 750,000 deaths are reported each year. Impacts of this disease extend beyond the deplorable human toll to include major economic impacts from increased healthcare costs and lost work.

Birds can be infected by a malarial parasite closely-related to the one that sickens humans. Recent advances in DNA-sequencing have led to the discovery of dozens of different strains or lineages of avian malaria that vary among species of birds, habitats, and locations.

In a recent article in the Proceedings of the National Academy of Sciences, Dr. Robert Ricklefs of the University of Missouri-St. Louis and I, along with other co-authors, utilized a large data set to better understand how new species form in avian malarial parasites. Although we know that there is direct transmission between parasites and their hosts, and that new parasites often co-evolve with their hosts, much less is

known about the evolution of new lineages of parasites when the parasite requires an intermediary vector, such as a mosquito, in order to reach its host.

In our study of 181 lineages of avian malarial parasites, we found that host-shifting, often across host genera and families, is the rule. That is, closely related lineages of parasites were most frequently associated with host species that were not closely related. The geographic distribution of individual parasite lineages suggested that formation of new species primarily involves a shift or expansion of the range of their host species. This creates natural selection for local shifting of parasite lineages onto new host species.

Because so many emerging infectious diseases pose threats to humans and livestock, health care professionals will benefit from knowing more about the general propensity and means by which parasites can shift between hosts, and the role of host-shifting in creating new parasites.

We are continuing our collaborative studies of avian malaria. This past February I collected new blood samples from birds in the Dominican Republic, and in March visited the small islands of Saba and St. Eustatius in the Lesser Antilles for additional sample collections. ■

## Ten Years Monitoring Birds in Costa Rica

Steven Latta

In a scenic coffee-producing area in the southern highlands of Costa Rica, National Aviary collaborators from the San Vito Bird Club (SVBC) recently reached a milestone: completion of ten years of year-round bird population monitoring. This biologically rich region has many endemic bird species, like a spectacular toucan, the Fiery-billed Aracari; but it also is home to throngs of North American migrant songbirds for up to six months of the year.

The bird monitoring has been done at three privately-owned fincas, or ranches, containing second-growth forests typical of this region. SVBC co-investigators, Judy Richardson, Alison Olivieri, and Julie Girard, often lead local volunteers and visitors through an array of mist nets set up in the forest understory to capture birds for their bird-banding studies. On occasion they are thrilled to recapture birds banded months or even years earlier, which provides vital data concerning survival rates of birds.

The club not only monitors birds, it sponsors regular bird walks for community members, conducts birding outreach (Detectivos de Pajaros, or Bird Detectives) for local schools, participates in an annual Eco-Cultural Festival, and more. The National Aviary salutes its friends from the San Vito Bird Club and applauds all they have accomplished in a decade of bird population monitoring and conservation education! ■



*Populations of the Fiery-billed Aracari, an endemic toucan of the Costa Rican highlands, have been monitored for a decade.*

NOTES FROM THE FIELD

## Andean Condor Conservation Takes Collaboration

Nikki Becich, Field Associate

Just over a year ago, Ernesto Arbelaez, Director of Bioparque Amaru in Cuenca, Ecuador, announced that he and I would be going on a road trip to the northern Ecuadorian Andes. We were going to attend a Condor Conservation and Maintenance workshop near Latacunga at the Ilitio Rescue Center. Three condors confiscated from the illegal wildlife trade were housed at the center in outdoor aviaries bookended by the misty volcanoes, Cotopaxi and Rumiñahui. The activities of the National Andean Condor Conservation Group (*Group Nacional de Trabajo por la Conservación del Condor Andino, GNTCA*) were just beginning to gain serious momentum.

In April of the previous year, the first case against a person for killing an endangered condor had been won. Since laws against people exploiting wildlife in Ecuador have been historically hard to enforce, it was enough to get most of the country talking. I heard it on the streets whenever I told people I worked with confiscated wildlife at the zoo. “People can get in real trouble for harming

wildlife, now, you know,” they would tell me. They would usually say something about the death of the shot Andean Condor and ask if I knew the bird was the national symbol.

The Andean Condor is listed as “Critically Endangered” in Ecuador, with fewer than 50 breeding pairs left in the country. Since the early 2000s, a number of organizations have banded together in hopes of reversing the march towards extirpation of the Andean Condor. Fondo Tueri of the University of San Francisco in Quito (Ecuador’s first and only wildlife medicine teaching hospital), GNTCA, the

Ecuadorian Environmental Ministry, Jocotoco Foundation with Birdlife International, and The Peregrine Fund all have launched projects to increase knowledge of threats to the Andean Condors and their habitat.

The National Aviary began collaborating with Bioparque Amaru in 2013, and it played a hand in the organization of the country’s first National Condor Conservation Conference in July of 2014, when the country vowed to establish the Ecuadorian

Association of Zoos and Aquariums (EAZA), a coalition signed into reality by the head of the Environmental Ministry, Lorina Tapia, with

Ernesto Arbelaez as the first President, in October of that year. Dr. Andres Ortega, the country’s premier wildlife and zoo consulting vet, chose the Andean Condor as the first species to undergo health surveys and care assessments in all participating zoos, so that EAZA zoos can begin to rearrange birds in their collections to optimize socialization and captive breeding. The ultimate goal is the creation of a multi-zoo infrastructure to support release of zoo-bred Andean Condors back into the Ecuadorian wilds.

The development of a captive breeding and release program by the Guayllabamba Zoo in Quito has already been successful under director Juan Manuel Carrion: six chicks have been raised in the last two decades, with hope for more. The advent of more scientific and collaborative conservation efforts for the condor in the national media has triggered a wave of awareness and pride in the bird that both symbolizes the power of modern Andean countries and carries deep spiritual significance for native Andean cultures. Continued support from the National Aviary is helping biologists assess wild Andean Condor pairs and habitat in the southern Andes near Cuenca, with the hope that one day the offspring of captive condors from Ecuadorian zoos and the National Aviary can be safely released to soar in the skies their kind has owned for ages.

To learn more about the National Aviary’s Andean Condor Conservation program, make plans to visit our impressive new outdoor Andean Condor exhibit. ■



*Recent collaborations to promote the care and captive breeding of endangered Andean Condors sparked the formation of the Ecuadorian Association of Zoos and Aquariums.*



*A condor chick produced by an Andean Condor pair at the National Aviary in 2007 was later released into the wild in Bolivia.*



## The Spirit of the Andes Shines Bright in Pittsburgh

*Mia Prensky, National Aviary Volunteer*

It is an honor for Pittsburgh to be home to four magnificent Andean Condors, a species vitally important to the ecosystems and people of the Andes.

From Pre-Incan times to the present day, Andean Condors have been a unifying element not only of the ecological landscape, but of the human landscape as well. As a focal point of the collective identity of Andean peoples and nations, the Andean Condor is a keystone of cultural integration across a continent whose rich biological diversity mirrors its cultural diversity. Powerfully represented in religion, artistic expression, folklore, rituals, language and political identity, the Andean Condor is central to collective thought and memory of the Andean world.

For more than 2,500 years, Andean civilizations have depicted the Andean Condor in rock carvings and paintings, textiles, ceramics, sculpture and jewelry. Condor is derived from the Quechuan word for the bird, *kuntur*. The majestic bird was revered, and still is, amongst traditional groups as *Apu Kuntur*, Lord of the Skies and the Living Spirit of the Andes.

Long before the advent of the Inca, the condor embodied the sun deity, worshipped among different peoples as the divine messenger of the gods that united the earthly realm with the heavens. Because it was seen to soar higher than any other bird and appeared to touch the sun, Andean religious

belief frequently represents the condor as the caretaker of the sun, lifting the celestial body out of a sacred lake each morning and carrying it up into the sky. Some legends tell that the Condor brought light into the world by laying a golden egg that hatched into the sun.

As a divine being and intermediary between man and the gods, the condor was believed to possess many supernatural powers, such as secret knowledge of the universe and immortality. Like the legendary Phoenix, the condor does not die but rather chooses to plunge off the edge of a cliff when it feels old and feeble. At the moment of impact, though, it miraculously returns to its nest to be reborn and begin life anew.

Beyond its spiritual importance and supernatural attributes, the condor incarnates strength and intelligence, as well as good luck. In the 18th and 19th centuries the image of the Condor emerged as an emblem of sovereignty and liberty when Andean nations fought for their independence from Spain. Today the Andean Condor is the proud national symbol of Argentina, Bolivia, Chile, Ecuador, and Peru; it is featured on the coats of arms of Bolivia, Chile, Colombia, and Ecuador.

By helping to preserve this threatened species, the National Aviary is helping to preserve an integral part of South American cultural heritage. ■



*The Ecuadorian coat of arms features an Andean Condor, the national bird and national symbol of the country.*

*Condor images adorn this Mochican headdress, dated ca. 400 A.D., from the collection of the Larco Museum in Lima, Peru.*



STUDENTS, FIELD ASSOCIATES, AND RESEARCH ASSOCIATES

## Interns Create Their Futures

**Editor's Note:** Each year dozens of interns are trained at the National Aviary in animal care, veterinary techniques, education and research. Here, two graduates of our intern programs discuss how the National Aviary has affected their lives.

### Cailyn Pease

As a pre-veterinary student at the University of Pittsburgh, I gained experience at local veterinary hospitals, but I wanted to explore areas of veterinary medicine and animal care beyond companion animals. The National Aviary provided me with that opportunity in the summer of 2013.

The National Aviary's Hospital gave me hands-on experience with numerous species of birds, including those with special challenges and some in need of geriatric care. The internship taught me about avian husbandry techniques, the importance of vigilant surveillance, and the necessity for preventative treatment plans in caring for exotic species.

My internship under the guidance of Dr. Pilar Fish and Dr. Jacqueline Saint-Onge provided me with invaluable skills and resources, and my Avian Hospital experience gave me an advantage when applying to vet schools. Through my applications and interviews, I conveyed more confidence in my ability to handle animals, give and receive orders, work in a fast paced environment, handle multiple cases, and stay calm during emergencies. I would not have had that confidence if it had not been for the National Aviary and the wonderful staff of the Avian Hospital. I have since been accepted by three veterinary schools and am in the process of making a decision! ■



### Jessy McAtee

From a very early age I knew I wanted to work with animals. But, like most kids, I changed my mind a lot. By the time I got to college, I had decided to study art. The subject matter of my art changed a lot, too, but eventually it took on a strong conservation theme. Soon I found myself wanting to work directly in the conservation field.

In 2009, I took Conservation Biology from Dr. Steven Latta at the University of Pittsburgh's Pymatuning Laboratory of Ecology, and the class included a field trip to the National Aviary. It was my first real experience seeing zoos from a conservation perspective, and that day stuck with me. The very next summer I applied for and got an internship there. Three years later, with college behind me, I leaped at the chance to

take a seasonal position at the Aviary. I spent a few months taking care of birds that were off exhibit. When that position ended, I took another position with Buildings and Grounds, cleaning exhibits and caring for plants. After several months, a part-time Assistant Aviculturist position became available in the Animal Collections department, and I got to go back to working with birds. A year later, I was hired as a full-time Aviculturist.

Each step in my career has allowed me to be more directly involved in bird conservation and to pass the message of its importance on to others. I have more than fulfilled my childhood wish. ■

## Registrar *continued from page 1*

Species Survival Plans (SSPs). Without details about the pedigrees of the animals managed by the SSPs, it would be impossible for zoos around the world to maintain the genetic diversity required to keep their populations healthy.

Registrars are lucky nowadays to have tools like the Zoological Information Management System (ZIMS) to help in tracking and using all this information. This cloud-based database is instantly accessible by any zoo, anywhere in the world, facilitating the transfer of information about animals as they move between facilities for SSP-recommended pairings. ZIMS includes a comprehensive Medical Module with everything from surgical histories to prescriptions for every bird in our care. Most importantly, all this information is immediately accessible by

the people who need it — the vets and keepers who care for our entire collection. Simply put, data are of no use if they sit in a book, or aren't up-to-date, or can't be accessed when they're needed.

So the next time you find yourself asking a keeper, "How old are the Raggiana Birds-of-Paradise when they get their adult plumage?" (*around 5 years old*), you might hear them make a quick radio call to pass your question along to me. A good registrar will always have the answer, and much, much more information at her fingertips! ■

*Registrar Julia Ecklar not only keeps track of all data about the National Aviary's birds, she also helps care for birds like this African Penguin chick.*



## Study Suggests *continued from page 1*

Fayetteville shale regions. The feathers were analyzed for the presence of barium and strontium, two metals that are not harmful to humans but can act as markers because they are elements that occur naturally and abundantly in the shale layer but are not common in surface waters.

In both the Marcellus and Fayetteville shale regions, barium and strontium were found at statistically significant higher levels in feathers of birds in sites with fracking activity than at sites without fracking.

The question of what pathway these metals followed from the shale layers to enter the food chain was not examined by this study. Our data suggest, however, a recent origin for these metals in the riparian systems we studied; levels of barium and strontium in feather samples from reference sites in the Marcellus Region without fracking activity did not differ from historical samples of waterthrush feathers from the 1990s gathered prior to any fracking in the region.

Our finding of similarly elevated levels of metals associated with fracking in two geographically distant shale formations suggests hydraulic fracturing may be

affecting surface waters, and underscores the need for additional monitoring and study to further assess whether any ecological or human health risks are posed by the increasingly widespread development of unconventional sources of natural gas around the world. Our study was limited to the base line analysis described above, and extensive further testing and analysis would be required to determine the levels, if any, of any dangerous substances in the watershed.

As human populations increase, our demand for natural resources also increases. Water quality and energy development increasingly are critical issues to people across Pennsylvania, the U.S. and the world. Understanding the environmental impacts of energy development and the impact of development and land use decisions on water quality in particular, are absolutely needed. My hope is that the Louisiana Waterthrush will be understood as a biological 'canary in the coal mine.'

Funding for this study was provided primarily by The Heinz Endowments. The study was published in the September issue of *Ecosphere*, the online journal of the Ecological Society of America. ■

NATIONAL AVIARY  
2015  
**Wings & Wildlife**  
ART SHOW

## Art Show Returns

The National Aviary celebrates the return of its very popular Wings & Wildlife Art Show, starting with a black tie soirée and auction on Friday, November 6, 2015, followed on November 7-8 by a public show for National Aviary visitors.

Wings & Wildlife is a juried art exhibition and retail sale of nature and wildlife-themed artwork, including paintings, photography, jewelry, ceramics, wood carvings, and more. The show is both a National Aviary fundraising event and an effort to highlight the thriving art community of the Pittsburgh region. The National Aviary is a 501(c)(3) nonprofit, and revenue raised during Wings & Wildlife will support important conservation efforts, education, and animal care. ■



NATIONAL AVIARY

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### In this issue:

- Registrar: Keeper of All Needed Knowledge
- Study Uses Songbird as Bioindicator
- Avian Malaria and Human Health Risks
- Ten Years Monitoring Birds in Costa Rica
- Condors — in Ecuador and Pittsburgh
- National Aviary Interns Create Their Futures

### AVIAN MEDICINE

## Conservation Medicine in Ecuador

*Dr. Pilar Fish, DVM, Director of Veterinary Medicine*

I was very fortunate to travel in July to visit four partners in Ecuador at Bioparque Amaru, a zoo and national wildlife rescue center. The National Aviary supports an important conservation program there that helps injured and ill wildlife recover for release back into the wild. After providing funds to help build a clinic, the National Aviary conducted a medical supply drive last spring to stock it. I took medicines and supplies with me, helped set up the clinic, and developed medical programs

with the zoo's newly hired veterinarian and other staff. Together, we examined numerous animals and birds, collected tests, and gave treatments, enhancing each animal's care plan in the process. It was very rewarding to see the staff's enthusiasm and gratefulness for the medical training to help their special animals. I was also thrilled to work alongside four of my former veterinary students in Ecuador as part of an educational exchange that provides hands-on experience to veterinary students who have interned at the National Aviary. The National Aviary is honored to collaborate with Amaru to care for animals in Ecuador and develop new education programs in conservation medicine. The impact we can have together on wildlife conservation is exponential. ■



*Dr. Fish teaches Amaru's staff and veterinary students new methods to collect blood from Guambi, an Andean Condor. Guambi's large exhibit was funded by the National Aviary, and efforts to establish Amaru's clinic is one important step in establishing a future rehabilitation and release program in Ecuador for Andean Condors. Above, Ernesto Arbelaez, Executive Director of Amaru; Kira Hydock, University of Pennsylvania veterinary student; and Dr. Pilar Fish, Director of Veterinary Medicine at the National Aviary, pose with Guambi in his exhibit.*