



flightpaths

FALL 2016

ANIMAL PROGRAMS



National Aviary Advances Husbandry Protocols for the Bridled White-eye

Kurt Hundgen, Director of Animal Collections

One of the more challenging bird management projects a staff can undertake is to develop captive breeding husbandry protocols for a species that has never bred in captivity before. Such is the case with the Bridled White-eye. This unique species is part of the avifauna of the Northern Mariana Islands that currently is at risk because of an invasive species, the brown tree snake.

Bridled White-eyes are a part of a captive breeding program through the Marianas Avifauna Conservation (MAC) project. This initiative is a vital collaboration between government and private organizations aimed at protecting bird populations in the region through conservation measures and captive breeding.

The National Aviary began participating in the MAC project in 2014. Our goal was to help develop captive breeding protocols to establish a captive assurance population in the event that a reintroduction program is ever warranted.

Based on their natural biology in the wild, we established a flock of four males

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EDUCATION

One Northside: A Once in A Lifetime Experience!

by Trisha O'Neill, Director of Education

After mist-netting and banding a Chipping Sparrow right there in the schoolyard, National Aviary Ornithologist Bob Mulvihill held the bird up to an awestruck group of 20 second-graders. They marveled at being so close to a wild bird, but one boy in the front was very mindful of where the bird belonged. He nervously said, "You should let it go," to which Bob replied: "How about if you let it go?" The boy's mouth dropped open in surprise, but his classmates cheered and encouraged him to step forward. Bob gently transferred the sparrow into the student's waiting hands, showing him the proper banders' grip. The student held the bird for a few moments before releasing it toward the trees. As a final surprise, instead of heading toward the tree line, the sparrow looped back over the students' heads to a chorus of "oohs" and "ahhs!"

The National Aviary and Buhl Foundation, in partnership with Pittsburgh Public Schools, Propel Charter School, Manchester Academic Charter School, and the Education Committee of the Northside Leadership Conference, launched *One Northside For Every Student* during 2015-16 school year. This unique program pairs students from Northside schools with various Northside organizations

over the course of a school year to help them become more aware of the cultural institutions within their own community. At the same time, students participate in unique academic programs designed to enhance their classroom experience.

As a founding participant in *One Northside*, the National Aviary is partnering with second grade teachers and students

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On one school visit, Bob Mulvihill located a Northern Cardinal nest in a rhododendron bush. As Bob presented the students with a pink skinned chick, beak agape, initial squeals of disgust turned to curious peeks, and eventually the entire class was gathered around the tiny bird huddled in Bob's hand. As Bob pointed out the importance of feeders and other habitat improvements, the students began to see with fresh eyes the green spaces around them that are a critical part of the hidden lives of wild animals.



NATIONAL AVIARY

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

Editor

Steven Latta, Ph.D.
Director, Conservation and Field Research
steven.latta@aviary.org

Managing Editor

Robert Mulvihill, M.Sc.
Ornithologist
robert.mulvihill@aviary.org

Allegheny Commons West
Pittsburgh, PA 15212-5248
412-323-7235



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FROM THE EDITOR

Birds, Energy, and the Environment

As our human population increases, our demand for energy also increases. Without question, affordable and reliable sources of energy are needed by everybody. Energy drives our standard of living, underpins national and international economies, and has become central to recent national security debates. At the same time, few things have had a greater impact on birds and wildlife than our production and use of energy. Understanding the environmental impacts of various types of energy development is critical for protecting the environment and human health.

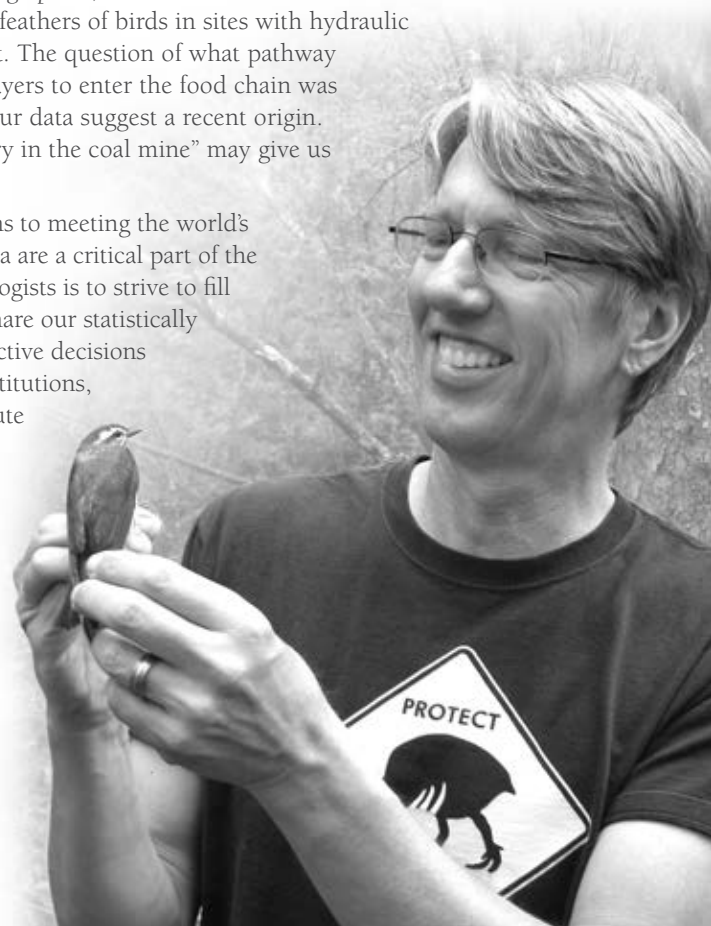
The National Aviary's conservation research scientists have been at the forefront in studying the impacts of energy development on birds. In this issue of *Flightpaths* we catch up with former National Aviary researcher, Dr. Todd Katzner, who is using cutting-edge technology to better understand how raptors, like the Golden Eagle, use wind currents during their migration through the Appalachian Mountains. The information he and his collaborators are learning has the potential to greatly reduce collision risks through relatively small but precise adjustments in the placement of wind turbines.

With decades-long studies of the stream-dependent Louisiana Waterthrush, National Aviary Ornithologist, Robert Mulvihill, and I have addressed the impacts of acidified water on this obligate riparian species. When their streams are polluted by acid rain or acidic drainage from abandoned coal mines, they become biologically much less diverse and productive, and waterthrushes are negatively affected. Degraded water quality in the upper reaches of watersheds has a large cumulative downstream effect, which means waterthrushes are like canaries in the coal mine, helping us to preserve the quality of a resource that is vital to human health and survival.

More recently, we have used this indicator species to better understand possible risks to surface-flowing waters where hydraulic fracturing has occurred. We measured concentrations of 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. As highlighted in the Fall 2015 issue of *Flightpaths*, our studies show that these metals occurred at statistically significant higher levels in feathers of birds in sites with hydraulic fracturing activity than in sites without. The question of what pathway these metals followed from the shale layers to enter the food chain was not examined by the study. However our data suggest a recent origin. Once again, we believe that this "canary in the coal mine" may give us clues to changes in our environment.

Although there are no easy solutions to meeting the world's energy demands, scientifically valid data are a critical part of the equation. Our role as conservation biologists is to strive to fill data voids with solid research and to share our statistically supported conclusions. Informed, objective decisions are the backbone of our democratic institutions, and we are proud to be able to contribute to decision-making processes with our applied conservation research program at the National Aviary.

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



RECENT PUBLICATIONS

A Bird's Feathers Reveal Its Fate

Steven Latta

Migratory birds, many of which have declining populations, face unique challenges throughout the annual cycle that can affect both survival and reproductive success. Migrant bird populations may be limited by conditions on the breeding and wintering grounds or those experienced during migrations. But, we have also learned that experiences in one season can have so-called “carry-over effects” in another season. Carry-over effects can be thought of as a domino effect, or a delayed reaction, where occurrences in one season may have an effect on a bird's condition that are manifested in a later season in terms of reduced survival or reproductive success.

Carry-over effects have most often been shown to operate in one direction, from the wintering grounds to the breeding grounds. For example, in the American Redstart, our colleague at the Smithsonian, Dr. Peter Marra, and his associates have learned that habitat quality affects the body condition of individuals, such that birds which overwinter in low-quality dry scrub habitats in the Caribbean arrive on their New England breeding grounds later in the spring, occupy lower quality breeding territories, and produce fewer young.

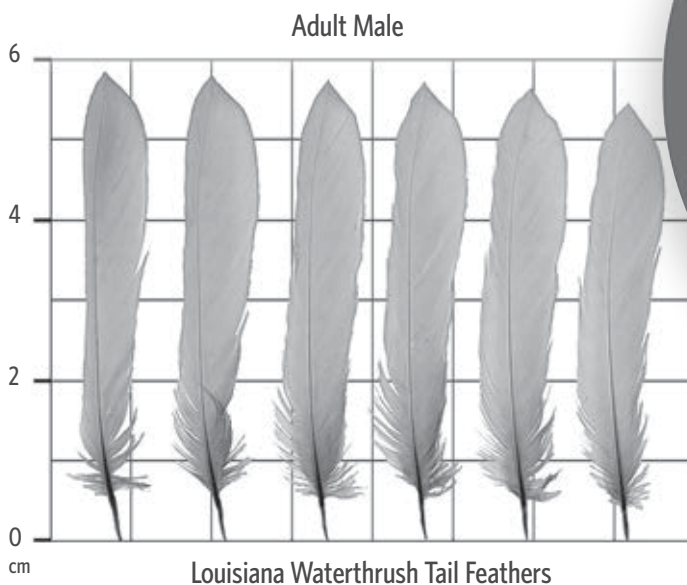
Although theoretically possible, carry-over effects related to occurrences in the breeding season on winter condition and survival have been little studied. We studied this question for the Louisiana Waterthrush using a unique approach involving hormones and feathers.

The waterthrush is a wood warbler that lives along small, forested streams where individual birds compete for high quality territories on both the breeding- and wintering-grounds. We used the amount of a stress hormone known as corticosterone occurring in the feathers as a measure of the physiological state of waterthrushes at the end of the breeding season, because that is when their feathers are grown. We found that birds arriving on wintering grounds with lower corticosterone (CORT) scores — scores indicating less physiological and energy stress — occupied higher quality winter territories and achieved better body condition during the over-winter period. Body condition, in turn, was important in determining whether adult birds returned to the wintering grounds in the subsequent year, with birds in better condition returning at greater rates. Together these data suggest

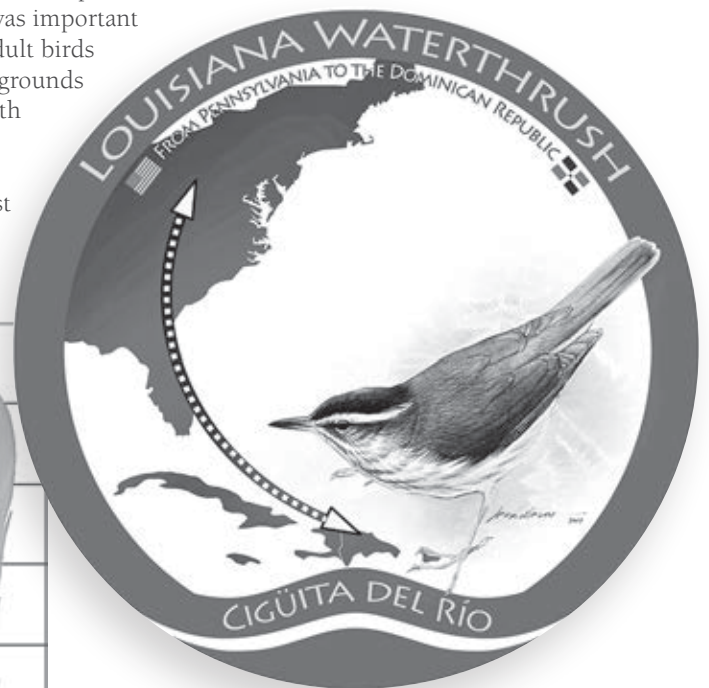
there is a carry-over effect from the breeding grounds to the wintering grounds that even extends beyond the winter season, affecting annual return rates.

Ours is one of very few studies that have used feather CORT to determine if events in the breeding season may have latent effects on the subsequent overwinter period or on annual survival. Studies like this are of particular interest for building models of population limitation of migratory birds and, ultimately, in crafting conservation plans for declining populations of migratory birds.

Editor's Note: Carry-over effects provide linkages across the annual cycle of a Neotropical migratory bird, the Louisiana Waterthrush *Parkesia motacilla*. *Ibis* 158: 395-406. 2016. S.C. Latta, S. Cabezas, D.A. Mejia, M.M. Paulino, H. Almonte, C.M. Miller-Butterworth, and G.R. Bortolotti. ■



Source: featheratlas@fws.gov



A ground-breaking study, led by National Aviary research director, Steven Latta, used naturally occurring hormone levels in feathers of a migratory bird to reveal that energy stress during the breeding season has significant “carry-over” effects: stressed birds occupied lower quality winter territories, had poorer body condition, and experienced reduced annual survival.

HUMAN POPULATION IMPACTS

Catching Up with Golden Eagles

by Todd Katzner

Editor's Note: The author, former Director of the Department of Conservation and Field Research at the National Aviary, now works for the U.S. Geological Survey in Boise, Idaho.

From a ridgetop in the Appalachians of central Pennsylvania, my heart raced as I watched the huge soaring raptor with broad, uplifted wings and a tawny head and neck – a migrating Golden Eagle! Until very recently the status of eastern Golden Eagles was virtually unknown.

I began studies of this iconic bird in 2005, when I was with the National Aviary. I collaborated with experts at Carnegie Museum, including Bob Mulvihill, who now works at the National Aviary. We realized that although eagles were regularly counted at Pennsylvania hawk watches, nobody knew how they traveled or where they wintered. We also realized that a burgeoning wind energy industry might lead to conflicts with this and other raptors using Appalachian ridges, where large turbine arrays, called wind farms, were being planned and constructed at a fast pace.

Clearly, research into the migration of this iconic species was needed. The first step was to catch eagles. To do this my team employed bait stations — deer carcasses dropped at

remote ridgetop sites — coupled with motion sensitive trail cameras to help us determine when and where we should concentrate our eagle-catching efforts. We quickly honed our techniques, and in the past ten years have successfully trapped, tagged, and tracked about 80 eagles using novel GPS-transmitters that incorporate cell phone technology.

In a series of peer-reviewed scientific papers we have shown that the species uses the ridges in very predictable ways. When winds are strong, they fly at lower altitude and use deflected air currents, called orographic lift; when winds are weaker they use rising warm air thermals and higher flight altitudes. Importantly, the information we've learned is so precise it can be used to site wind turbines in a way that significantly reduces the risk they pose to migrating eagles and other raptors, which was our goal from the very beginning.

What started as a means for catching eagles serendipitously resulted in our



A Golden Eagle is recorded using a motion-sensitive trail camera mounted next to a deer carcass; a Golden Eagle is about to be released with a GPS tracking unit on its back.

documenting the distribution and abundance of many secretive scavengers. Thanks to hundreds of volunteers who deployed our cameras at bait stations from Maine to Louisiana, we documented wintering Golden Eagles in every Appalachian state. But, the cameras also spied scavenging Bald Eagles, Red-tailed and Red-shouldered Hawks, Barred and Great Horned Owls, Red and Gray foxes, Striped and Spotted skunks, not to mention coyotes and ravens and bears (*Oh my!*). I have now set up a winter scavenger study in Idaho using the same camera trapping techniques perfected in Pennsylvania while I was at the National Aviary. ■

Climate Change: A Hot Topic for Pitt Students

by Dr. Edward McCord, Director of Programming and Special Projects, University of Pittsburgh Honors College

In 2013 the University of Pittsburgh Honors College inaugurated a *Climate Change Lecture Series* designed to inform students and help prepare them for the future.

The reach of the series rapidly expanded to audiences beyond the Pitt campus, thanks to the generous promotional support of other institutions including the National Aviary. Inspired by such support, Pitt's Honors College has run seven programs since the series began. Our program has included eminent speakers such as blogger and physicist, Joe Romm; climate scientist, Ray Bradley; economist, James Boyce; New York Times energy and environment correspondent, Coral Davenport; oceanographer, Kim Cobb; energy systems expert, Paulina Jaramillo;

and NASA's Goddard Space Lab hydrologist, Matthew Rodell.

In March we welcomed the series' eighth lecture courtesy of Donald Burke, Dean of the Graduate School of Public Health. Dr. Burke contacted his eminent colleague, Dr. Jonathan Patz, Director of the Global Health Institute at the University of Wisconsin, with an invitation to speak. Among many distinctions, Dr. Patz served as a lead author for the United Nations' Intergovernmental Panel on Climate Change — the organization that shared the 2007 Nobel Peace Prize with Al Gore.

The Honors College does not lightly undertake such an educational program,

but according to the Dean of the Honors College, Edward Stricker:

"The profound and multidisciplinary character of climate change is uniquely well-suited to our programming [and] we regard this matter to be so serious that everyone, and especially students, should understand the basic science at issue and the various response options that exist. This includes appreciating the challenges we face in shifting to alternative energy sources, in reducing energy consumption, in managing vested interests and politics, and in motivating the public amid doomsday scenarios."

The campus-wide, multidisciplinary orbit of the University of Pittsburgh Honors College has proven ideal for tackling big questions and big challenges like climate change. ■

PARTNERING FOR CONSERVATION

Avian Conservation Efforts in SW PA Recognized Nationally

by Matt Webb, Urban Bird Conservation Coordinator, Carnegie Museum of Natural History

BirdSafe Pittsburgh was created in the spring of 2013 as a partnership between the American Bird Conservancy and several local organizations, including the National Aviary, to research and address the issue of bird-window collisions throughout the Pittsburgh region. Over the past two years, BirdSafe Pittsburgh volunteers have saved some 150 birds that had suffered a collision with a window, taking them to the Animal Rescue League's Wildlife Center in Verona to be rehabbed and released. Volunteers have also documented several hundred dead birds, and these have been deposited into the scientific collections of Carnegie Museum of Natural History for future research and education.

In 2015, this growing multi-organizational partnership resulted in Pittsburgh being recognized via the federal Urban Conservation Treaty for Migratory



Birds. The Urban Bird Treaty program is a unique, collaborative effort between the U.S. Fish and Wildlife Service and some twenty participating U.S. cities that brings together private citizens, federal, state, and local governments, and non-governmental organizations in a common cause. Partners agree to work toward conserving migratory birds through education, hazard reduction, citizen science, conservation action, and habitat improvement in urban and surrounding suburban landscapes. In the

process, cities not only become better sanctuaries for birds and other wildlife, they also gain an enhanced quality of life for their human residents and visitors.

This new Pittsburgh-centered partnership has been formalized as the Allegheny Bird Conservation Alliance (ABCA), encompassing collaborative work done anywhere in southwestern Pennsylvania to help conserve birds and their habitats. ABCA partners currently include the American Bird Conservancy, the Carnegie Museum of Natural History, the National Aviary, the Audubon Society of Western Pennsylvania, the Animal Rescue League, the Western Pennsylvania Conservancy, the Green Building Alliance, and the Allegheny Land Trust. Look for many ABCA projects to be launched in Pittsburgh and surrounding areas in the years to come! ■

Bridled White-eye *continued from page 1*

and two females in our off-exhibit breeding center. By providing the females more males to potentially pair with, a more natural pair-bonding process was fostered.

Trying to establish breeding protocols for a species that has never bred in captivity has to be approached systemically; you have to sometimes first figure out the wrong management protocols in order to figure out the right ones. For example, when we first set up these birds in our breeding center, we noticed their natural behaviors seemed to be affected by our presence. Because knowing bird behaviors is crucial in developing any breeding protocols, we purchased motion-sensitive cameras that enabled us to observe the birds remotely.

Both females successfully pair-bonded, and together they produced a total of seven two-egg clutches. Although no offspring resulted, we were able to document courtship, nest building, incubation and pre-copulatory behaviors for the first time

in captivity. We also learned that pairs will build several nests before egg-laying and will reuse nests of other pairs. This information was compiled and recently shared with other AZA-accredited facilities working with this species. We hope that next nesting season, the information we've gained will enable us to set the stage for successful nesting of this species in captivity for the first time

Footnote: In 2016, the National Aviary is again working in the field with ongoing conservation efforts for the Marianas avifauna. Staff traveled to the Mariana Islands to assist in the field capture and translocation of 50 Bridled White-eyes and 50 Tinian Monarchs from the island of Tinian to the island of Guguan. ■

National Aviary Senior Aviculturist, Travis Henderson, fills a bin with bugs, worms and nesting material so the Bridled White-eyes are able to practice natural foraging behaviors.



From Fish to Birds: A Student's Journey

by Brandon Hoenic, Field Associate



Ever since I was young I have had a great interest in animals, specifically in the influences that their surroundings may have on their ability to be successful. As a boy who grew up on the Ohio River in Western Pennsylvania, my initial interests were highly focused on river-inhabiting fish species. Subsequently, the opportunities I've had to work with Dr. Latta at the National Aviary have broadened my interests and given me the desire to advance my understanding of avian ecology.

As a member of Dr. Brady Porter's research lab at Duquesne University, I have had many incredible opportunities to study different species of songbirds and the various factors that influence their ecology. These opportunities have allowed me to work at Carnegie Museum of Natural History's Powdermill Nature Reserve in southwestern Pennsylvania on a project to better understand the impacts of stream

The author (left) is pictured in the field with research associate Brian Trevelline.

water quality on the aquatic prey utilized by riparian songbirds.

In my collaboration with Dr. Latta and Dr. Porter, we have begun developing a project that attempts to understand potential carry-over effects (i.e., conditions experienced by a bird in one season that have a measurable effect on that bird in a different season) on Louisiana Waterthrush (*Parkesia motacilla*) by analyzing stress hormone levels in these birds. Our study looks to better understand how wintering ground habitat may influence habitat selection on the breeding grounds [a test of predictions stemming from Dr. Latta's recent publication (see p. 3)]. I hope that this project will be a step toward my goal of becoming an academic researcher and, at the same time, help improve our understanding of a stream-dwelling avian species and increase awareness of migratory bird conservation. ■

Piecing Together the Annual Cycle of a Songbird

by Nathan Brouwer, Research Associate

Documenting increases and declines in bird populations is fairly straightforward; much more challenging is to understand the factors underlying those changes. Especially in the case of population declines, we need to know the drivers of population change before we can develop an effective and efficient conservation strategy. Collaborating with the Department of Conservation and Field Research at the National Aviary, I am using statistical techniques, mathematical models, and computer simulations to synthesize a wealth of demographic data on a migratory bird, the Louisiana Waterthrush, data which Dr. Steven Latta and colleagues have collected on the breeding and wintering grounds of the species.

Like all migratory songbirds, the life cycle of a waterthrush has many components: for example, fledging from

the nest, surviving to independence, preparing for migration, migrating to the Gulf Coast, crossing the Gulf of Mexico to the Caribbean, successfully over-wintering in the tropics, reversing the journey in the spring, finding a nesting territory and a mate, building a nest and caring for eggs and young, molting, preparing for migration, etc. Factors affecting a bird's condition and survival during any of these stages could theoretically be important drivers of waterthrush population dynamics.

For each of these stages I am using available field data and published information to determine probabilities of success or survival. I will combine these into a mathematical framework for

estimating population change over time. This, in turn, can help us to determine, for example, if the waterthrush populations are affected more by events on the breeding and wintering grounds, or during migration between the two.

Nathan Brouwer recently completed his Ph.D. in Ecology at the University of Pittsburgh, where he studied the impacts of invasive species and deer on woodland plants with Dr. Susan Kalisz. ■



AVIAN MEDICINE

Training the Next Generation of Vet Students

Dr. Pilar Fish, DVM, Director of Veterinary Medicine

Students who want to become avian veterinarians and veterinary technicians can have challenges finding opportunities to train in wildlife and zoo medicine. The National Aviary offers a unique educational program in which pre-professional students work side-by-side with the veterinary staff in a teaching hospital. The National Aviary provides high-level health care for its collection of more than 500 birds representing 150 different species. This diversity gives students the opportunity to work with a wide variety of species such as African Penguins, Andean Condors, Guam Rails, Eurasian Eagle-Owls, and American Flamingos, in addition to birds as small as finches.

The National Aviary has created a special learning atmosphere in which students are immersed in all aspects of an avian hospital, including performing physical exams, taking x-rays, collecting test samples, filling prescriptions, changing bandages, administering treatments and vaccinations, and even observing surgery. In addition to hands-on learning of practical veterinary skills, the program also provides a structured academic component with lectures, case assignments, and interactive medical rounds.

The National Aviary teaches an average of 45 students a year in both the teaching hospital program and through a long-term mentorship program. The mentorship program offers students intensive one-on-one training on how to become a veterinarian including career counseling, preparation for veterinary school interviews, editing publications for journals, and presenting lectures at conferences. This program has been instrumental in helping young professionals acquire the experience and guidance they need to become full-fledged veterinarians.

Students interested in wildlife medicine can participate in an international program at a partnering wildlife center in Ecuador. This year four veterinary students that initially trained at the National Aviary traveled with me to Bioparque Amaru in Cuenca, Ecuador. There they learned how to perform physical examinations, collect

blood samples, and administer treatments on wild birds such as macaws, toucans, eagles, owls, and even an Andean Condor. Exposure to real-life medical situations is an essential step in learning the necessary skills to become an avian veterinarian.

The results of our specialized educational programs are far-reaching as we train and mentor the next generation of avian vets to care for birds in zoos and wildlife centers throughout the U.S. and internationally. ■



More than 40 students per year receive hands-on, practical experience and guidance working alongside Dr. Fish in the National Aviary's Avian Hospital.

One Northside: A Once in a Lifetime Experience! continued from page 1

from seven Northside elementary schools to bring science to life in their schools. Through live bird programming in the classroom, visits to the National Aviary, and wild bird studies on the school grounds, students explore the science and conservation of birds from across the globe and in their own schoolyard. For many of them, the program offers their very first experience with live animals and the outdoors.

The pilot program provided the National Aviary with an opportunity to creatively connect our conservation and field research efforts with our school programming. Since 2013, our ornithologist, Bob Mulvihill, has coordinated Neighborhood Nestwatch in the Pittsburgh area, in collaboration with the Smithsonian Institution. A dynamic research program focused on determining the impact of urbanization and the density of human populations on bird populations,

the program engages the public in their own backyards with bird counts, bird conservation, and up close observations of native birds. Several of the participating school campuses provided good settings for demonstrating Neighborhood Nestwatch, and we decided to engage the students in some basic field science activities. What resulted were some truly dynamic and impactful connections between children and nature — once in a lifetime experiences that we hope they never forget! ■



NATIONAL AVIARY

National Aviary in Pittsburgh, Inc.
Allegheny Commons West
700 Arch St.
Pittsburgh, PA 15212-5248

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- ① Pájaro Carpintero / Hispaniolan Woodpecker / *Melanerpes formicivorus*
- ② Pájaro Bobo / Hispaniolan Lizard Cuckoo / *Coccyzus longirostris*
- ③ Perdiz Colorado / Ruddy Quail-Dove / *Geotrygon montana*
- ④ Lechuza Cara Ceniza / Ashy-faced Owl / *Tyto glaucops*
- ⑤ Cigüeta Común / Bananaquit / *Coereba flaveola*
- ⑥ Barrancolí / Broad-billed Tody / *Todus subulatus*

Birds Prefer Dark (Shaded) Chocolate

Groves of cacao, the tree whose seed pods are the source of chocolate, can be very good habitat for birds, but only if they are managed properly. Working with partners from the **Grupo Acción Ecológica** in the Dominican Republic, the National Aviary has helped create the first **Bird Safe Cacao** campaign, promoting farming practices that are more beneficial to birds, including endemic species, like those shown above, as well as scores of North American migrants. These posters, created by the artist Gabriel Willow, are being used as an educational tool in cacao-growing communities throughout the country.