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CONSERVATION & RESEARCH UPDATES FROM THE NATIONAL AVIARY

flightpaths

FALL 2014

AVIAN MEDICINE

Aviary Birds Breathe Easier Thanks To Preventative Therapy

by Pilar Fish, DVM

Aspergillosis is a common infection for birds in zoos and wildlife centers that can cause life-threating pneumonia. The infection occurs when fungus in the environment is inhaled and grows rapidly in moist lungs and air sacs. Once a bird shows symptoms of labored breathing, the infection usually is too advanced to cure. Various treatments involve oral medicines, flushes of the respiratory system, oxygen therapy, and even surgery to remove the fungus.

Because the prognosis for recovery is so poor, the National Aviary focuses instead on preventing the disease. This benefits our birds by enabling them to remain comfortable and healthy, while also protecting species whose future survival in the wild may one day depend on the existence of a thriving population of captive birds.

An African Penguin inhales a medicated mist to prevent Aspergillosis.

Penguins, raptors, and waterfowl are the most susceptible to aspergillosis. We designed a novel program that administers regular preventative therapy to high risk birds. Medicine is administered by a nebulizer machine similar to that used for human asthma attacks. The nebulizer produces a constant fine mist of an antifungal medicine (*Amphotericin*) for up to 10 minutes. Microscopic particles of the medicine are carried deep within the bird's lungs and air sacs, killing any fungus they may have previously inhaled before the fungus can spread.

The success of this program has been remarkable. We have had no active cases of primary aspergillosis in any of the penguins, raptors, or waterfowl receiving the preventative inhaled treatment. The program has grown over the past eight years and now includes about 100 birds at the Aviary, all of which receive treatments once or twice a year. The National Aviary shares its proven disease prevention protocols with wildlife rehabilitators and others charged with providing health care for birds in captivity. ■

ANIMAL PROGRAMS

Conserving Mariana Islands Avifauna

Kurt Hundgen, Director of Animal Collections

Accidentally introduced on Guam after World War II, the brown tree snake was the first land predator that birds living on the island had ever faced — and they had no natural defenses to protect themselves, their nests, their eggs, and their young.

In just a few short decades the invasive brown tree snake was directly responsible for the extirpation of nine of eleven forest bird species by the 1980s. Five of these were endemic to Guam, which means they were found nowhere else in the world. Three species were lost forever, and the Guam Rail and the Guam Micronesian Kingfisher survive only in zoos. They are the legacy of birds rescued from extinction by biologists working on the island.

Despite years of attempts to eradicate it, the snake continues to thrive on

continued on page 7

On a recent trip to Saipan the author participated in a cooperative effort to conserve Golden White-eyes and other at-risk species.

HUMAN POPULATION IMPACTS

Making Pittsburgh Bird-Safer

Robert Mulvihill and Matt Webb

An Ovenbird, found stunned after colliding with a window downtown, was successfully rescued by BirdSafe volunteers.

Matt Webb, BirdSafe organizer, explains BirdSafe procedures to volunteers.

Building collisions are one of the top anthropogenic (human-associated) threats to birds in the United States. Studies estimate that up to a billion birds are killed each year by colliding with window glass, with the vast majority of these deaths occurring at residential and low-rise commercial buildings.

Eight organizations including the National Aviary recently have joined together in an effort dubbed "BirdSafe Pittsburgh." Led by Matt Webb of the American Bird Conservancy, the group's goal is to document birds injured or killed by collisions with window glass, and to determine which settings are especially hazardous to migratory birds.

Similar to projects in more than a dozen large cities in the U.S. and Canada, the objective of BirdSafe Pittsburgh is to assess quantitatively and spatially the occurrence of bird-window strikes in the Pittsburgh area during the spring and fall migration seasons and to increase public awareness of the problem.

Volunteers for BirdSafe Pittsburgh either walk designated routes in the downtown area, or monitor a convenient area of their own choosing anywhere in the Greater Pittsburgh region (e.g., a college campus, office complex, or shopping district). They walk around the perimeter of buildings looking carefully for dead or injured birds that may have collided with windows. Both injured and dead birds are taken to the Animal Rescue League's Wildlife Center in Verona. Live birds are checked over for injuries and released as soon as possible, and dead birds are salvaged for research and education purposes.

Last spring six dedicated volunteers surveyed six different walking routes in the downtown area a total of 139 times from April 14 through June 16. Dead or injured birds of fifteen species were found on 58 of those runs, with the most frequent victims of window strikes being Wood Thrush (7 birds), Ovenbird (5) White-throated Sparrow (4), and Cedar Waxwing (3). Fifteen birds were rescued, rehabilitated, and released to continue their migration journeys.

Not only does BirdSafe Pittsburgh save the lives of many individual migratory birds, over time it will lead to a much clearer understanding of when and where migrating birds face the greatest risk.

You can help make Pittsburgh bird-safer in the future! For more information, or to become a volunteer, visit *www.birdsafepgh.org*, or email Matt at *birdsafepgh@gmail.com*. ■

NATIONAL AVIARY

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

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FROM THE EDITOR

Building for Conservation

"Building" may not be the first word one associates with conservation. More often when we think about conservation we probably think "remote" or "pristine" or some other descriptor of wild places. But at the National Aviary we are building, literally and figuratively, for conservation success every day.

The author participated in the ribbon cutting to officially open the new condor flight enclosure at Bioparque Amaru.

In this issue of FlightPaths, you can read about how the National Aviary has recently partnered with a conservation-leading Ecuadorian zoo, Bioparque Amaru, to build a new breeding facility for rescued Andean Condors that cannot be returned to the wild. Completion of this enclosure made national news in Ecuador because it launched a critically important piece of the recovery effort in southern Ecuador for this iconic, endangered species.

We also build for the future by making conservation a focus of all of our education programs. National Aviary educators continually strive to connect people to nature. They employ innovative techniques, live bird encounters, and engaging activities to enable children to forge early conservation connections that span the globe.

The National Aviary continues to build conservation capacity by supporting college students and interns. In this issue we highlight the work of several of our students. Andrea Thomen, a Dominican student, has been investigating the role farmers' attitudes and management styles play in conserving bird populations in cacao plantations. Mack Frantz, a National Aviary Field Associate and doctoral candidate at West Virginia University, is using cutting-edge genetic techniques to investigate contaminants in food chains. Kristen Tobin, one of the Aviary's veterinary technicians, interned for three months in Ecuador in order to gain experience and strengthen the National Aviary's relationship with Bioparque Amaru.

Finally, the National Aviary strives to build the knowledge base and develop new techniques that can further conservation efforts. In this issue of FlightPaths you can read about an innovative method of inhalation therapy that our Director of Veterinary Medicine, Dr. Pilar Fish, developed as prophylaxis for aspergillosis, a respiratory disease often contracted by captive birds — especially raptors, penguins, and waterfowl — whose health and well-being in captivity is essential to survival of their species in the wild.

If you would like to help increase the capacity of the National Aviary to engage in bird conservation efforts around the world, I hope you will consider becoming a Donor Society member *www.aviary.org/Donate*.

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

PARTNERING FOR CONSERVATION

Preserving the Iconic Symbol of a Country and a Region

Steven Latta

In Ecuador, in the heart of the Andes, the iconic Andean Condor population has dwindled dangerously to no more than 50 birds. In response, the National Aviary has partnered with an Ecuadorian zoo, Bioparque Amaru, to take dramatic steps to help reverse this decline.

On July 7, 2014, the National Day of the Condor in Ecuador, I attended a national conference in Cuenca that brought together wildlife and zoo veterinarians, avian conservationists, wildlife preserve owners, biologists, environmental ministry workers, and local and national level policymakers. It was covered by local and national newspapers, as well as radio and TV. I presented methods of monitoring Andean Condor populations and the use of nest cams to build public support for conservation efforts, based on the National Aviary's experience with nest cams at Peregrine Falcon and Bald Eagle nests here in Pittsburgh.

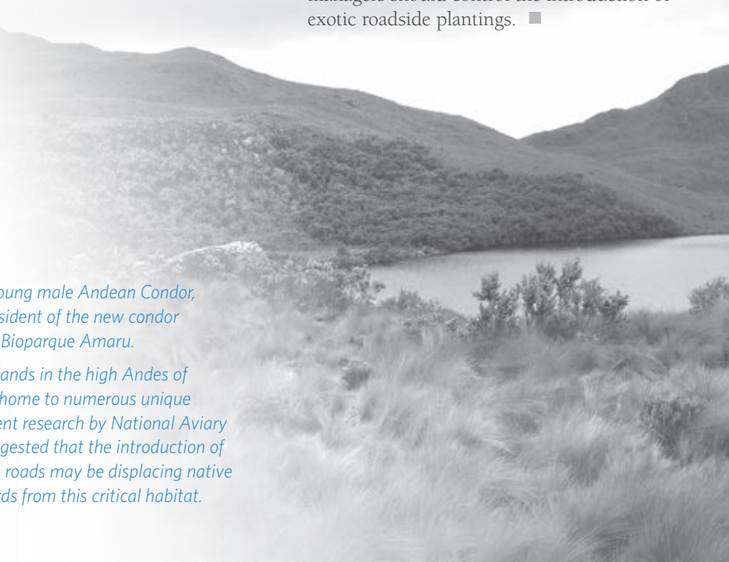
To coincide with the condor celebration and conference, Bioparque Amaru opened Phase I of a new condor breeding facility. This facility, made possible with funding from the National Aviary, includes a huge outdoor flight enclosure. It creates one of the largest condor breeding facilities of its kind and launches a significant new Andean Condor recovery effort in southern Ecuador.

The National Aviary looks forward to embarking on collaborative field research to better understand what wild condors require in order to survive. Future goals include collecting data on historical and active sites used by condors for roosting and nesting; mapping the potential distribution of condors based on topographic and environmental features and determining whether there are genetically distinct condor populations across the range of the species, something that is crucial for effective captive breeding and successful reintroductions. In addition, we will look to support community education specialists working in rural areas in order to gain an understanding of how locals perceive condors and to help them better understand the importance and value of conserving them.

The Andean Condor serves as a flagship species not only for the people of Ecuador, but now also for the National Aviary. In the same way that the recent return of our national symbol, the Bald Eagle, to Pittsburgh's Three Rivers has raised the spirits of so many people, we believe that the successful conservation of this iconic bird will help restore ecological balance and cultural pride to Ecuador and surrounding Andean countries. ■

Guambi, a young male Andean Condor, is the first resident of the new condor enclosure at Bioparque Amaru.

Right: Grasslands in the high Andes of Ecuador are home to numerous unique species. Recent research by National Aviary staff has suggested that the introduction of shrubs along roads may be displacing native grassland birds from this critical habitat.



RECENT LITERATURE

Study Defines Risk of Roads to Ecuadorian Birds

Steven Latta

National Parks face a variety of challenges when it comes to protecting biodiversity, from the illegal extraction of natural resources to unforeseen problems resulting from the popularity of recreation. Impacts may be particularly serious in sensitive habitats or areas of high biodiversity and endemism such as the tropical Andes.

In a collaborative study recently published in *Studies on Neotropical Fauna and Environment*, I worked with Ecuadorian colleagues to analyze the impact of roads on the birds of páramo grasslands above the treeline in Ecuador. More than 1,100 individuals of 28 páramo bird species were recorded. The number of species did not differ between sites near and far from roads, but the abundance of typical páramo species was significantly higher further from the road. This concerns conservation biologists because it suggests that birds that require this unique grassland habitat may be suffering the most. We suspect that this change in the bird community near roads is the result of the planting of non-native, woody trees, and we have suggested that in order to reduce the impact of roads on native biodiversity, park managers should control the introduction of exotic roadside plantings. ■

NOTES FROM THE FIELD

A Bird in the Hand is Worth...Lots of Smiles!

Robert Mulvihill

People of all ages enjoy the hands-on Neighborhood Nestwatch experience. With birds in hand, Myra Mann, Julie Marn, and Rachel Vallozzi are all smiles!

With financial support from the Smithsonian Migratory Bird Center, the National Aviary was able to field two teams of banders for season two of Pittsburgh Neighborhood Nestwatch, and this enabled us to put smiles on even more faces this year!

Thirty-two of the original 36 families participated again this summer, and we welcomed 68 new participants. These 100 addresses were spread out over 58 different communities in and around the city of Pittsburgh — 101 if you count the very last day of the season when we banded birds right here in the Aviary's own Neighborhood, the Northside! Counting the participants, their families, and the friends and neighbors that they invited, my assistant, Matt Webb, and I — with help almost every day from one or two dedicated National Aviary volunteers — interacted with more than 750 people of all ages, answered lots of questions, and imparted lots of information about bird identification, best backyard bird conservation practices, and more.

From mid May to early August, we captured nearly 2,000 birds of 40 species in our nets, and we color-banded over 800 birds belonging to one of the eight target Neighborhood Nestwatch species, doubling our 2013 banding totals for American Robin, Gray Catbird, Carolina Wren, House Wren, Black-capped or Carolina Chickadee, Northern Cardinal, and Song Sparrow. Despite the expanded effort this season, we still could not catch our first Northern Mockingbird!

We hope to be able to expand Pittsburgh Neighborhood Nestwatch in 2015. So, if you would like to enroll your backyard or shared public green space (e.g., at a senior home, neighborhood park, school grounds) in Pittsburgh Neighborhood Nestwatch for the 2015 season, email Bob Mulvihill at *Robert.Mulvihill@aviary.org* or call 412-258-1148. For more information about the project, and a more detailed summary of our results to date, visit *www.aviary.org/NeighborhoodNestwatch*.

Last but not least, if you can help the project to continue to grow by making an individual donation or by becoming a corporate sponsor, please contact Desiree Wienand, Director of Development, at 412-258-9429, or email *Desiree.Wienand@aviary.org*. ■

Humming*brrrds*!

Robert Mulvihill

We've all heard it, the admonition that you should take your hummingbird feeder down after Labor Day so that the hummingbirds will migrate to Central America like they're supposed to. Rest assured, feeders or no feeders, Ruby-throated Hummingbirds will continue their migration to Central America throughout the month of September and even into October.

After this, when you no longer see Ruby-throated Hummingbirds at your feeder, then you can take the feeder down...

No, wait!

Leave (or put) your hummingbird feeder up until the end of December. Believe it or not, six other species of hummingbird have surprised homeowners by showing up at hummingbird feeders in late fall and early winter, well after all the Ruby-throats have left! The Rufous Hummingbird is the most common of these, with a few dozen sightings in Pennsylvania each year.

Breeding from Oregon to Alaska and usually wintering in Mexico, Pennsylvania would seem to be far off track for a migrating Rufous Hummingbird. But, a growing number of cold-hardy pioneers have begun to express a new migratory direction-sense that brings them east all the way to Pennsylvania on their way to new wintering grounds on the Gulf Coast.

The National Aviary belongs to the Hummer Bird Study Group (*www.hummingbirdsplus.org*). If you see a hummingbird at your feeder after mid-October, contact *Robert.Mulvihill@aviary.org* or call 412-522-5729. ■

A Rufous Hummingbird

PHOTO BY GEOFF MALOSH

MEETINGS

National Aviary Contributes to International Ornithological Conference

by Steven Latta

Several National Aviary staff journeyed to Estes Park, CO in October to participate in an ornithological conference that brought together members of the American Ornithologists' Union, the Cooper Ornithological Society, and the Society of Canadian Ornithologists. I participated in a symposium on the effects of non-traditional oil and gas development on birds, and presented a recent study on increased levels of metals occurring in Louisiana Waterthrush in watersheds where hydraulic fracturing has taken place. Brian Trevelline, a Research Associate of the National Aviary and doctoral student at Duquesne University, presented a poster on his work with the waterthrush. Trevelline's poster was titled, "DNA barcoding as a non-invasive strategy for the identification of prey from the feces of the Louisiana Waterthrush." His work marks an important advance in our ability to non-destructively identify what birds are eating without having to collect the bird or force them to regurgitate its food. Also participating in the many workshops and symposia were staff ornithologist, Bob Mulvihill, and our Education Department's Laura King. ■

Steve Latta speaking at the ornithological conference in Colorado.

EDUCATION

Education Forges Conservation Connections

Patricia O'Neill, Director of Education

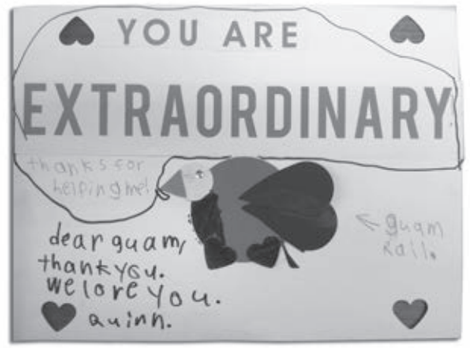
At its foundation, conservation education is about connections. At National Aviary summer camps, educators created programs for 9-12 year olds illustrating the connection between our breeding and health care for birds here in Pittsburgh with conservation efforts for those species halfway around the world.

In order to make conservation a concrete concept, we introduced the concept of invasive species by focusing on the impacts of invasive brown tree snakes on birds inhabiting the island of Guam. Campers learned how the snakes first arrived on the island sometime after World War II, probably as stow-aways in the cargo of a ship from Australia or Papua New Guinea, where the snake is native. We explained that the island populations of Guam Rail and other species that had evolved no defenses to snake predators were quickly decimated, and that only the quick actions of biologists to take the remaining birds into captivity saved them from extinction.

Next, our campers explored the National Aviary's Tropical Forest and Canary's Call exhibits to look for our resident Guam Rails. Searching for and finding them in the exhibits, campers directly observed that Guam Rails are flightless, and this helped the campers to understand how the brown tree snake could be so destructive to birds that had evolved on an island formerly free of natural predators.

As the children asked questions and discussed the issue, we described the Guam Rail Reintroduction Program and explained that the National Aviary program to breed Guam Rails is connected with ongoing reintroduction efforts for the species in the Northern Mariana Islands. We explained that the National Aviary has hatched 57 Guam Rails since welcoming its first wild-caught pair in 1984, and that it has returned 23 of these for in situ breeding programs on the neighboring, snake-free islands of Cocos and Rota.

Finally, we helped our campers to make one last important connection: they wrote thank you notes to our partners in Guam that we will include when we make our next shipment of supplies there this fall. ■



"Thank you for saving the Guam Rails. We all appreciate all the work you did to save the life of all the birds. You should be proud of yourself for your work for nature."
From, Logan.

"Dear Guam, thank you for helping save our precious Guam Rails and Micronesian Kingfisher. I really like Guam Rails and I hope they will never get extinct."
Love, Cooper.

"...You have done Great! You guys are bringing back species that have been nearly extinct!
Keep it Up!"
Anonymous Camper

STUDENTS, FIELD ASSOCIATES, AND RESEARCH ASSOCIATES

Building Ties in Ecuador

by Kristen Tobin

Through the National Aviary, I was able to intern for three months this past summer at a zoo called Bioparque Amaru in Cuenca, Ecuador. Many animals brought to Amaru are injured or illegally trafficked wildlife. The hope of the dedicated staff is that many of these animals can be fully rehabilitated and released back into the wild. But, that is not always possible, so some animals become permanent residents of the zoo.

Using knowledge that I gained from my work with Dr. Pilar Fish at the National Aviary, I developed a set of rules for Bioparque Amaru regarding conduct in the quarantine area to protect and improve animal health, including new practices for cleaning and feeding. The changes I outlined were detailed in a quarantine manual that will be used in the future to introduce new employees and volunteers to best practices employed with great success at the National Aviary.

Also inspired by my work at the National Aviary, I started a "Meet-a-Patient" program at Amaru. Visitors to the zoo can meet some of the animals not on exhibit that have required extra medical attention. They can see how staff takes care of animals harmed by illegal animal trafficking and, at the same time, learn about Amaru's conservation efforts.

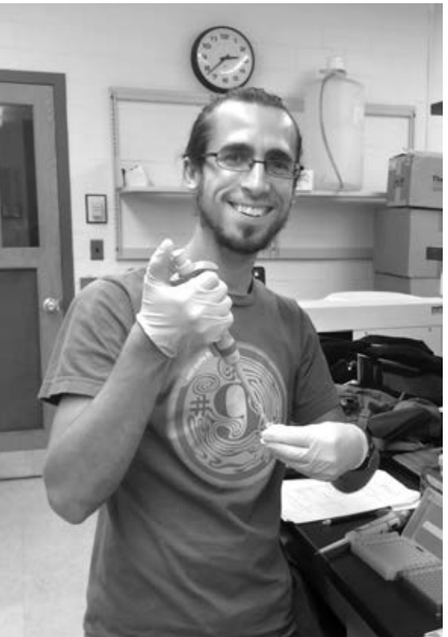
Finally, I was able to begin development of a new volunteer program for Bioparque Amaru. Cuenca has become a popular city for retired expatriates, and after talking to several of them I realized there was a lot of interest in volunteering at the zoo. My hope is that volunteers will help the regular staff by preparing diets and creating enrichments for the animals.

University of Pittsburgh student and future veterinarian, Kristen Tobin, on the job at Bioparque Amaru.

Interning at Bioparque Amaru and living in the city of Cuenca was an incredible opportunity that provided me with invaluable experience, as well as added inspiration to apply for veterinary school after I complete my undergraduate studies at the University of Pittsburgh. ■

DNA Techniques May Reveal Hidden Environmental Problems

by Mack Frantz



I am collaborating with the National Aviary on a study that focuses on the Louisiana Waterthrush *(Parkesia motacilla)*, a headwater stream-adapted songbird that is abundant in the mid-Appalachian region. Shale gas development that uses hydraulic fracturing (or fracking) to extract natural gas from the Marcellus Shale play is widespread in this same region. Previous studies have demonstrated that waterthrushes are reliable bio-indicators of stream pollution related to the extraction and combustion of coal, especially acidification from abandoned mine drainage and so-called "acid rain." My study will determine if they also are sensitive to shale gas extraction.

My objective is to determine if there is a correlation between shale gas development and DNA methylation rates in Louisiana Waterthrushes. Methylation of the DNA molecule, which occurs when a methyl (CH3) group attaches to the surface of DNA, can have the effect of switching genes off or on. The study of changes in organisms caused by such non-genetic changes in the way that genes are expressed at the protein level is called epigenetics. Importantly, the incidence of DNA methylation is known to change in response to environmental stressors.

The author preparing samples for his study of DNA methylation rates in waterthrushes.

For my study, I am performing methylation-sensitive-amplified fragment length polymorphism (MS-AFLP) studies that will indicate the methylation state at a particular restriction site from blood samples. I am comparing adults and nestlings on streams with and without hydraulic fracturing activity. If epigenetic alterations in waterthush DNA are detected, more study will be needed in order to determine if these changes have an effect on waterthrush survival or reproduction. ■

Birds and Chocolate

by Andrea Thomen

We've all heard of bird-friendly coffee; but what about bird-friendly chocolate?

The Dominican Republic ranks twelfth in the world for cacao production with about 140,000 acres under cultivation. In a 2007 report, the Dominican Republic had 60% of the global market share of organic cocoa, with more than 400,000 planted acres distributed over 40,000 farms – with much of it in the province of Duarte.

In 2012, I set out to evaluate bird communities at organic cacao farms in Duarte, Dominican Republic. I conducted numerous avian point counts and vegetation surveys, supplemented with a community-based approach to better understand human impacts on the birds. I interviewed a hundred local farmers in order to examine past and current attitudes that might influence their farming practices: Did their views towards birds impact their practices? Were the organic cacao farms more bird-friendly?

Whether by stating that Black-and-white Warblers "cleaned cocoa shrubs," or Palm-chats "planted trees for free," cacaotaleros (farmers who raise cocoa beans) were nearly unanimous in viewing most birds as beneficial to their farms.

A different view prevailed, however, when specifically discussing woodpeckers, large frugivores (fruit-eating species), diurnal raptors, and owls. For instance, the endemic Hispaniolan Woodpecker is considered a major pest because it is commonly thought to damage cacao pods in order to feed on insects. Very few farmers reported hunting woodpeckers, though, citing the presence of private certifiers and community groups.

I discovered that while selective logging and localized hunting do occur, most farmers nonetheless indicate strong support for avian conservation and research efforts, as well as timber reforestation and riparian restoration. I learned that farmer communication networks and community engagement offer powerful tools for environmental education and conservation in this region. I came away from my experience convinced that acknowledging and understanding the views of Dominican cacao farmers will be essential for effective bird conservation planning in this region. ■

The author compares bird survey results for her graduate research with field assistant, Eudes Paulino. Both have worked with National Aviary's Director of Conservation and Field Research, Dr. Steven Latta.

continued from page 1

Conserving Mariana Islands Avifauna

Guam, with an estimated population of 1-2 million! What conservationists have long feared is that this snake will somehow find its way to other nearby islands in the Northern Mariana archipelago, and that similar devastation of endemic bird populations will occur.

To combat this possibility, the Mariana Avifauna Conservation Project (MAC) was formed in 2006, and has been actively working ever since on the islands of Saipan and Tinian. MAC is a collaborative effort among the government of the Commonwealth of the Northern Mariana Islands, the U.S. Fish and Wildlife Service, several facilities accredited by the Association of Zoos and Aquariums (AZA), and Pacific Bird Conservation.

While bird populations on the Mariana Islands generally remain strong, the conservation strategy of the MAC Project has been to develop safe and efficient techniques to capture, transport, exhibit, and breed Mariana avifauna in order to establish "assurance populations" in the event future reintroduction programs are warranted. To date, captive populations of six Mariana species have been started in AZA Zoos.

A second conservation strategy has been the translocation of birds from Saipan and Tinian to other snake-free islands to establish additional satellite populations. Since 2008, four species have been translocated to the island of Sarigan. Recent field surveys conducted on Sarigan are very encouraging: two species are confirmed to be increasing there. In the coming years, a detailed strategic plan calls for additional translocations to six other islands in the Mariana Archipelago.

This spring, the National Aviary joined the MAC Project, and as the National Aviary's Director of Animal Collections, I traveled to the Northern Mariana Islands to participate in field projects. Using mist nets, we captured 51 Fantail Flycatchers on Tinian and translocated these to Sarigan for release. Fecal and feather samples were collected from Tinian Monarchs and Collared Kingfishers to aid in the development of baseline data on stress hormone levels to compare with birds held in captivity.

At the National Aviary, 40% of species are included in a Species Survival Plan (SSP) that ensures there will be a sustainable and genetically diverse captive population far into the future. We are pleased to have been selected to help research and develop effective captive husbandry protocols for both species of White-eyes. ■