Guam Rail Conservation: A Milestone 30 Years in the Making

by Kurt Hundgen, Director of Animal Collections

At the end of 2019 the conservation world celebrated a momentous achievement: Guam Rail, once 'Extinct in the Wild,' was elevated to 'Critically Endangered' status thanks to the recent successful reintroduction of the species to the wild. This conservation milestone is more than thirty years in the making—the hoped-for result of intensive collaboration among multiple zoos and government agencies separated by oceans and continents. It is an extremely rare conservation success story, shared by only one other bird: the iconic California Condor.

The Brown Tree Snake (Boiga irregularis), which was accidentally introduced on Guam in the mid-twentieth century, underwent a population explosion, reaching densities of up to 30,000 snakes per square mile by the late 1980s. They rapidly decimated populations of nine of Guam's 11 endemic forest bird species. In 1987, wildlife biologists managed to rescue the few remaining Guam Rails—a mere 21 birds—and place them in the care of a handful of Association of Zoos and Aquariums (AZA) accredited zoos.

Working together through the Guam Rail Species Survival Plan® (SSP), some twenty zoos strategized ways to ensure the genetic diversity and health of this small population of Guam Rails in human care. Their goal was to increase the size of the zoo population and eventually introduce the species onto islands near Guam that remained free of Brown Tree Snakes.

Guam wildlife officials have slowly returned Guam Rails to the wild on the small neighboring islands of Cocos and Rota. Reintroduction programs are most successful when local governments and citizens invest in and drive the efforts. Reestablishing wild populations of ko'ko' birds, as the species is called on Guam, has been a tremendous source of pride for the people of Guam.

Even during the COVID-19 pandemic, the work of conserving the species has continued. In October 2020, 49 more rails were introduced on Rota, eight of which hatched at the National Aviary. The National Aviary has hatched more Guam Rails for reintroduction than any other North American zoo. Birds are thriving in their new island homes, and,

best of all, recent sightings of unbanded rails there confirm that the species has already successfully reproduced in the wild for the first time in almost 40 years.

The international collaboration that made the success of the Guam Rail reintroduction possible likely will go down in conservation history. Behind every ko'ko' once again living in the wild is the very successful collaboration among many organizations and hundreds of dedicated conservationists.

And we hope that there will be another headline-grabbing story to share: after decades of work in select zoos, the population of Guam Kingfishers—another 'Extinct in the Wild' species—may soon be large enough to support another historic reintroduction effort. Our partners continue to focus on preventing further spread of Brown Tree Snakes so that the restored population of Guam Rails (and, potentially, of Guam Kingfishers, too) will be able to once again thrive in the wild.

Your support makes conservation success stories like this possible. **Donate today.**



A Guam Rail and her recently hatched chicks in the National Aviary's Tropical Rainforest. More Guam Rails have hatched at the National Aviary than any other North American zoo.



NATIONAL AVIARY PITTSBURGH, PA

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

700 Arch Street Pittsburgh, PA 15212-5201 412-323-7235









aviary.org
Follow us on Twitter: @National_Aviary
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Your donation supports the National Aviary's work to save birds and protect their habitats.

Conservation Involves Us All

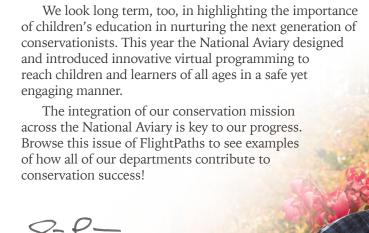
At the National Aviary, our vision statement emphasizes the importance of avian conservation through the use of "education, entertainment, ecological research, husbandry, and healthcare." Indeed, the integration of conservation throughout the National Aviary and other Association of Zoos and Aquariums (AZA) institutions is one of our great strengths as leaders in bird conservation.

In FlightPaths we often highlight our ecological research efforts, but in this issue we focus on the diversity of conservation programs offered across the many departments at the National Aviary.

For example, our Director of Animal Collections shares the incredible story of the Guam Rail, which will go down in conservation history. Only the second bird species to ever be rescued from 'Extinct in the Wild,' the National Aviary played a fundamental role in breeding birds in human care to be released back into the wild. Even under the increased precautions dictated by the COVID-19 pandemic, partners in the Guam Rail recovery effort were able to release another 49 birds into the wild, including eight raised at the National Aviary.

We look for comparable success now as world leaders in the conservation of the African Penguin. In this issue of FlightPaths we introduce you to our new staff member, Dr. Patricia McGill, who is also the African Penguin SAFE (Saving Animals From Extinction) Program Leader. Joining Senior Aviculturist Chris Gaus, a key member of the Species Survival Plan® program, we will use our expertise to find and fund solutions, and leverage the collective power of AZA institutions to solve the challenges facing our beloved penguins.

Our crew from Buildings and Grounds seeks conservation-minded solutions to various challenges on a daily basis, but also works closely with contractors and staff to achieve long-term results. Here we put the spotlight on our recent adoption of a specially laminated, bird-friendly glass product from Vitro Architectural Glass in the construction of our new event space, The Garden Room.



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

Taking the Lead to Keep African Penguins SAFE

by Dr. Patricia McGill, AZA African Penguin SAFE Program Leader and Senior Conservation Scientist at National Aviary

Penguins are among the most charismatic, endearing, intriguing creatures on earth—known to us from the time we were children. Importantly, we all need to understand that, with few exceptions, the world's 18 penguin species are in serious decline, and humans are the reason why. The National Aviary is taking the lead to keep one Endangered species, the African Penguin, safe from extinction.

Thirteen penguin species are Near Threatened, Vulnerable, or Endangered according to the International Union for the Conservation of Nature (IUCN) Red List. All penguin species found in temperate and sub-tropical latitudes (African, Humboldt, Magellanic, Galapagos, and Little Blue Penguins) plus temperate populations of Yellow-eyed Penguins, are showing population declines. Recently, the IUCN Penguin Specialist Group designated three species, including African Penguins, as requiring urgent conservation action.

Why are the world's penguins in such trouble? There are different specific threats for individual species, but key threats affecting all penguins include climate change (specifically, warming oceans); over-harvesting of their principal prey—the same forage fish that humans consume in vast quantities; unsustainable harvesting of nutrient-rich guano; and disturbance and destruction of their nesting grounds.

The National Aviary helps support conservation efforts for African Penguins in South Africa, and it is a leader in sustaining a very healthy population of African Penguins in human care. As a recent addition to the National Aviary's staff, I will continue to lead the Association of Zoos and Aquariums (AZA) Saving Animals From Extinction (SAFE) program for African Penguins. SAFE is a collaborative conservation effort focused on threatened species. SAFE engages colleagues across the species' range in conservation, and works to achieve strategic conservation outcomes in time to preserve species.

National Aviary Senior Aviculturist Chris Gaus is also directly involved in the SAFE program through his increasing activity as a key member of the Species Survival Plan® (SSP) steering committee. Chris ensures best management of the SSP population and engages SSP institutions to become directly involved in SAFE conservation projects.

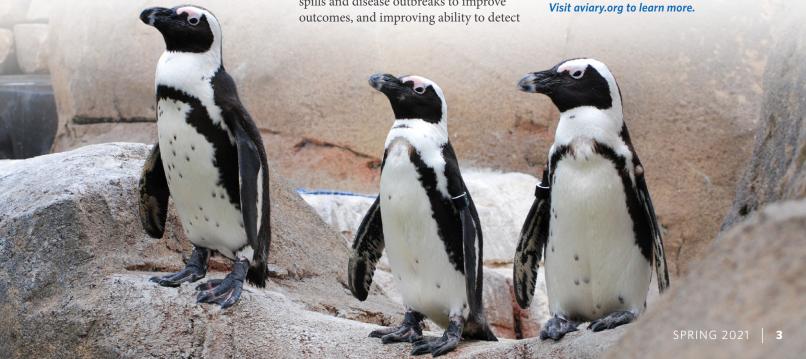
Through its involvement and leadership with the SAFE program, the National Aviary promotes several key projects focused on meeting the short-term needs of the species and addressing longer-term challenges. Short-term projects will focus on designing and deploying artificial nest burrows to improve breeding success where habitat is degraded, enhancing response to local disasters such as oil spills and disease outbreaks to improve outcomes, and improving ability to detect

and respond to emerging medical issues in wild populations.

The SAFE program is also focused on finding solutions to longer-term challenges. Using RFID/PIT tags and readers, we will learn about local movements and dispersal patterns to detect important sites and local threats. We will uncover and mitigate potential negative interactions with fisheries. SAFE will develop management solutions informed by an understanding of penguin movements at sea, including long-distance dispersal patterns at different life stages, and correlate these with fluctuating fish densities. And, we will engage the staff, volunteers, members, and guests of the National Aviary, and encourage them to learn about and take action on behalf of African Penguins.

The National Aviary, working with its partners in the African Penguin SAFE program, will continue to work toward a better understanding of the issues facing African Penguins in the wild. We will use that knowledge to find and fund solutions. Above all, we will leverage the collective power of all AZA institutions to engage animal lovers in solving the huge conservation challenges facing our planet's beloved penguins: global climate change and the non-sustainable, industrial-scale harvesting of the ocean's fish. ■

Help create a brighter future for African Penguins with a donation, purchase of a Penguin Plaque, or Adopt-a-Bird. Visit aviary.org to learn more.



Bringing Nature Education Home: Innovation and Opportunity During the Pandemic

by Jennifer Torpie, Curator of Education and Public Programs

What happens when vital education programs that rely on face-to-face and face-to-beak encounters suddenly cease to exist? How was the National Aviary able to continue to offer intriguing, innovative, and stimulating educational programs for students and adults alike in the face of the statewide and countywide COVID-19 shutdowns?

The National Aviary's robust education strategy has focused on engaging guests in our immersive habitats, providing standards-aligned formal education programs for schools, and creating fun public programing for learners of all ages. These in-person programs give us the opportunity to inspire appreciation for birds and their conservation through face-to-face interactions.

But, what happens when in-person education becomes impossible? Since the start of the global COVID-19 pandemic, educational institutions around the world have grappled with how to engage learners remotely. Our education team quickly realized we needed to adapt our program strategy to meet our audiences were they were: at home!

From our first conversation about virtual programs, we had two clear goals: to support teachers in the transition to remote learning and to create safe activities for our community that provide authentic human connection and connect them with birds. Within two weeks of the National Aviary's closure in March of 2020, the Education Department launched CyBIRD Distance Learning, which allowed teachers to easily integrate virtual field trips into their remote classrooms. A creative and completely original suite of virtual public program offerings including Aviary After School, a Virtual Speaker Series, and Virtual Brushes & Birds quickly followed.

In addition to paid programs, the Education Team also identified a need for free programs and activities to engage our community. For two months, the Education Team created free weekly activity packets, coloring pages, and

word searches for families. They also launched the "Reading With Red" program (named after Red, our beautiful Scarlet Macaw) to incentivize reading in school-aged learners. And, since March 2020, we have worked with foundation partners to provide free virtual programs to schools in Western Pennsylvania during the 2020-2021 school year.

COVID-19 closed many doors, but it opened new ones, too. We developed a new outdoor program partnership with L.L.Bean that enables us to provide Birdwatching Kayak Tours in Pittsburgh's North Park, and we successfully relaunched Owl Prowls and special event weekends like Owl-o-ween with enhanced safety protocols.

The critical pivot to virtual programs allowed us to expand our reach to more than 9,000 participants from across the United States in 2020. We will remember this as a year of often difficult changes, but also as a year filled with innovation and growth for the National Aviary. ■

Above: Cathy Schlott, Director of Animal Programs and Experiences, conducts a CyBIRD Distance Learning class with a Eurasian Eagleowl. Below: children watch an Aviary After School program at home. (Photo courtesy of PA Cyber, the National Aviary's Virtual Education sponsor.)

Project Owlnet: More Owls than Ever

by Robert Mulvihill, Ornithologist

Although COVID-19 slowed opportunities for human interaction, the migration of Northern Saw-whet Owls continued as always, and a reduced core of National Aviary researchers and assistants took to the field to monitor and study this little understood phenomenon.

While strictly following COVID-19 safety protocols, we conducted a modified eighth season of Project Owlnet, operating our station on just 14 nights between October 17 and December 5, 2020 (>20 nights of effort is usual). A handful of individual visitors (honorary field assistants) were permitted by special reservation only, regular volunteer assistance was strictly limited also, and no drop-in visitation was allowed.

Notwithstanding these restrictions, it was our busiest season by far—we banded 59 new Northern Saw-whet Owls, almost twice the previous high fall total of 31 in 2016 (Fig. 1), and saw the second highest percentage of hatching year birds (Fig. 2). In addition, we documented five local recaptures of birds banded at our field station, and two foreign retraps of birds banded elsewhere. The foreign birds were originally banded 400 and 800 km to the north in central Ontario—the former just 25 days prior to our recapture of it (Fig. 3, E &F).

When we launched Project Owlnet at Sewickley Heights Borough Park, about 12 miles northwest of downtown Pittsburgh, in fall 2013, virtually no information existed about the migration of the species in southwestern Pennsylvania, and very little was known about its occurrence within urban and ex-urban landscapes anywhere in the East. The 66 owl encounters in fall 2020 brings our total to 187 banding records since the project began. Thanks to the data generated by these, we have already learned much about the timing and annual variation in the migration of this smallest of our eastern owls. At the same time, we have introduced hundreds of people to our owl research, and we look forward to resuming our work with the public again soon.



Figure 1. Total fall bandings, recaptures, and foreign retraps of migrating Northern Saw-whet Owls at Sewickley Heights Borough Park, 2013-2020

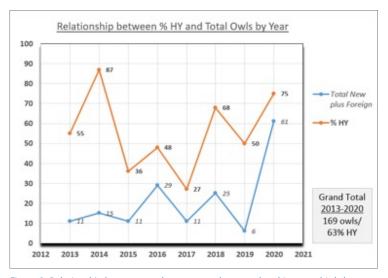


Figure 2. Relationship between total captures and percent hatching year birds by year

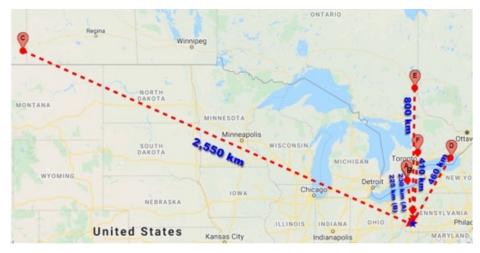


Figure 3. Origins of foreign retrap owls recaptured at Sewickley Heights Borough Park



White-crested Laughingthrush: All in the Family

by Julia Ecklar, Registrar

For some visitors to the National Aviary's Tropical Rainforest habitat, the Whitecrested Laughingthrush may not inspire much interest. Its brown, rufous, white, and black feathers can hardly compete with the iridescent blues, greens, and yellows of the Golden-breasted Starling, for example. But, if you take the time to seek them out, you will discover one of the most active, engaging, and downright comical birds our Tropical Rainforest habitat has to offer!

Native across a wide swath of Southeast Asia, White-crested Laughingthrushes live in lively family groups of more than a dozen birds. While foraging together on insects and berries, they keep in touch using soft whistles and chatter calls. Occasionally, though, something will incite one to sing uproariously in a manner so infectious that every member of the family joins in the singing performance. These intermittent outbursts of song help keep the family bond strong.

In Laughingthrush families, parents do all the nest building and egg laying, but their offspring from previous clutches typically assist them in brooding and feeding the nestlings. These older siblings take over parental care almost completely once the new chicks have fledged. This makes it possible for White-crested

Laughingthrushes to raise multiple clutches in one season, and the older chicks get practice with skills that will make them successful parents one day. In the meantime, they are helping contribute to the survival of their own full siblings, with whom they share half of their DNA.

The complexities of White-crested Laughingthrush family and social life are very interesting, but they present a big challenge to managing the species under human care. These lively, active birds need a lot of space, and few zoos have the ability to house ten or more adults at the same time. At the National Aviary, we start each breeding season with a single pair of Laughingthrushes. Nest building and egg laying proceed as they would in the wild. Then, once the eggs hatch, our aviculturists step in to fill the role of "helpers-at-thenest" for the first brood of the season.

Our human helpers supply the Laughingthrush parents with a surfeit of bugs, and they even climb a ladder three times a day to deliver extra food directly to the chicks. When the chicks are ready to fledge, they transfer the entire nest and both parents to a protected "fledging habitat," where the chicks can safely exit the nest and learn to navigate the bigger world around them. By this time, the chicks are

no longer interested in accepting food from humans, but the fledging habitat enables us to continue to supply them and their parents with larger-than-normal quantities of food, encouraging self-feeding and making parent-feeding quick and efficient.

The real magic happens once the youngsters are self-sufficient and ready to return to the main habitat. The parents begin nesting again almost immediately, and their recently fledged youngsters are eager to help. We have observed the fledged offspring taking turns incubating the next clutch of their parents' eggs, and they are every bit as busy as their parents are when it comes to bringing bugs to the chicks when they hatch.

The National Aviary successfully reared five chicks in 2019, all of which have now moved to other Association of Zoos and Aquariums facilities within the Species Survival Plan® (SSP) to begin their own Laughingthrush family adventures. As the days are getting longer, the sun is shining brighter, and love is once again in the air for the National Aviary's always exuberant White-crested Laughingthrushes. ■

Wood Warbler Molt: **Fast and Furious**

by Robert Mulvihill, Ornithologist

For a wood warbler weighing less than 10 grams, like an American Redstart or Yellow Warbler, life is a fast-paced race. Out of the starting blocks, redstarts race north from wintering grounds in the West Indes to forests of the northeastern United States. Next, they must hurry up and find a territory; if possible, quickly attract a mate; build a nest and raise a nest-full of young. If that all goes well, and quickly, they may even race to raise a second brood.

But, their seasonal clock is ticking, and they will have to molt like mad (maybe even get a head start by initiating molt before having raised that second brood of young), even to the point of becoming nearly flightless. This is so they can replace their worn feathers in time to hurry back south again, before the prime wintering territories are all claimed by other, young upstart redstarts!

In our recently published study, my colleagues, Dr. Ron Mumme from Allegheny College, Professor David Norman from the Merseyside (England) Ringing Group, and I reviewed thousands of molt data I collected while working at Powdermill Nature Reserve from 1983 to 2010. Our analysis shows that thirteen migratory species of wood warblers all undergo an exceptionally high-intensity molt that is squeezed into a few weeks between (and even overlapping slightly) their nesting and fall migration. Molt intensity is the number of flight feathers concurrently molting (out of a total of



An adult female American Redstart undergoing a very intense molt in mid-June, immediately following her nesting attempt. 62% of her flight feathers—all 12 of her rectrices (tail feathers) and half (18) of her remiges (wing feathers) are molting at the same time! Not only does this require a tremendous amount of energy for protein synthesis, it also greatly impacts her aerodynamic efficiency and ability, even to the point of nearflightlessness. This, of course, hinders her ability to capture aerial prey and also her ability to escape from predators. For these reasons, the short but intense molting period of this and other wood warblers constitutes an extremely consequential part of their annual cycle.

36 wing and 12 tail feathers). At peak molt intensity, wood warblers replace all 12 rectrices (tail feathers) and 24 to 32 remiges (wing feathers), or 75-90% of their flight feathers. In fact, we determined that wood warblers have among the very highest molt speed and intensity of any studied passerines.

This high-intensity post-breeding molt by wood warblers carries with it a significant challenge—how do you stay safe from predators when you are practically flightless for 2 to 3 weeks? This question is driving a new study by the National Aviary's Department of Conservation and Field Research. Our new study will quantify the importance of small forest gaps to wood warblers and other forest-nesting songbirds

when they are molting (adults) and newly independent (fledglings). In particular, we will be studying a system of low-impact forestry practice that has a small footprint, but possibly an outsized positive ecological impact on populations of songbirds in the surrounding, unharvested forest matrix—songbirds like the American Redstart and Yellow Warbler that may require especially safe habitats while undergoing their critical, high-intensity, post-breeding molt. ■

We are grateful to the S. Kent Rockwell Foundation which provided funding for this study.

One Way to Save Birds is Crystal Clear

by Molly Toth, Communications and Content Specialist

onfused by foliage realistically reflected by large panes of architectural glass in the daytime, or disoriented by bright lights at night, the built environment can often be a deadly hall-of-mirrors for migratory birds. But, it doesn't have to be. One solution is crystal clear: bird-safe glass can save birds' lives.

Bird-safe glass has become an important sustainability feature in recent building projects at the National Aviary, and its use throughout the renovated Tropical Rainforest habitat and the newly constructed Garden Room event space demonstrates that bird-friendly glass can be innovative, functional, and aesthetically pleasing.

The 2018 renovation of the Tropical Rainforest habitat required a unique glass product that would protect birds both inside and outside the habitat while allowing in enough UV light to keep all of the habitat's birds and plants healthy.

bird-safe glass. **Inset:** Workers install Vitro Architectural Glass bird-safe glass during the construction of The Garden Room.

Over 3,000 panes of old glass were replaced by Vitro Architectural Glass, using a specially laminated product with a glazed surface that prevents glare and reflection. The result is an energy efficient, safe and comfortable, light-filled space for birds and people alike.

Bird-safe glass also has a prominent place in The Garden Room, the National Aviary's new 9,000-square-foot event space overlooking scenic Allegheny Commons Park. The building is constructed of wood and masonry with bird-friendly glass walls and windows on three sides. Large windows and doors complement the surrounding park and garden, and incorporate about 2,700 square feet of Vitro Architectural Glass. The glass uses an attractive bird-safe pattern of horizontal etched lines that will prevent window strikes while still providing our guests with beautiful views of the park.

Bird-safe glass is just one option to make birds' journeys safer as they pass by your home. Other measures you can take include:

- 1. Keep curtains and blinds drawn during the day to reduce glare.
- 2. Apply decals or strips of "bird tape" to the outside of your windows.

 The more closely spaced they are, the more effective they will be. A 2" (vertical) x 4" (horizontal) pattern is the proven standard for protecting birds from striking windows.
- Install taut garden netting or a conventional window screen over windows that face toward bird habitat.
- 4. Apply a thin, UV-reflective film on the outside of your windows— it will be only minimally noticeable to you from inside your house, but it will be very conspicuous to the birds outside, because birds' vision is sensitive well into the UV-range.
- 5. Move your bird feeders closer to the window (less than 10 feet). Birds tend to slow down as they approach feeders, and if they are flushed from the feeders toward the window, they will not be flying as fast from that shorter distance away.
- 6. Building new or replacing windows?

 Consider using bird-safe glass. With its popularity rising, bird-safe glass (often with attractive etched designs) is becoming an affordable option



Fieldwork: From Rainforest Raptors to Elusive Ivorybills

by Peggy Shrum, Field Intern

How does a tree-climbing raptor biologist in the Peruvian Amazon feel about becoming a key member of the National Aviary's Project Principalis, a search for the Ivory-billed Woodpecker? Well, let me tell you that I am delighted to have joined the Project Principalis team!

I have been an occasional field volunteer for the project for several years now, but I'm excited for the opportunity to spend more time in the field and to participate as part of the core search team!

I am a Wildlife Biologist from Clemson University. In 2005, I graduated with a BS in Wildlife Biology. My emphasis areas included ornithology, comparative physiology, behavior, and environmental toxicology. I went on to complete my Masters at Clemson in 2009. My research has primarily focused on birds of prey in the Peruvian Amazon, where I studied raptors as bioindicators of ecosystem contaminants—particularly mercury from transient gold mining. In 2010, I started my PhD, looking at how increases in elevated mercury levels may affect these birds of prey.

Fieldwork in the Amazon Rainforest is exhilarating, challenging, intense, and compelling. The pristine areas of rainforest truly represent the last great wilderness.

I feel so fortunate to have spent a few years of my life in that environment. However, to say that it is, at times, inhospitable, would be an understatement. The tropical heat is both glorious and suffocating, and the misty dampness of the rainforest penetrates any physical boundary.

Fieldwork is hard work, but loving it as I do, it would be much harder not to do it! It is my hope that my years spent traipsing around the jungle spying on elusive, highly secretive birds has prepared me for searching for the Ivory-billed Woodpecker in its own inhospitable and forbidding habitat!

Although it may seem like a long way from raptors to woodpeckers, my interest in the Ivory-billed Woodpecker has actually been lifelong. I grew up fishing with my dad in the "Big Woods" in the White River region of Arkansas. My spark, like that of many, was reignited in 2005 by the infamous Luneau video, a controversial clip that shows a woodpecker—possibly an Ivorybill in flight. That year I had just begun what would become 12 years of research in Peru, but I always kept in mind the possibility of revisiting my childhood stomping grounds in the Big Woods one day, and participating in the search for the Ivorybilled Woodpecker.

Someday became sooner rather than later, as I became so intrigued by the work being done in Louisiana by Project Coyote, now Project Principalis that I felt compelled to participate as a volunteer. I am now part of a full-time effort, and I am genuinely thrilled to be a part of this search and excited about the next field season!



Under Lockdown, We Turned to Birds

by Robert Mulvihill, Ornithologist

In the past year, COVID-19 has impacted every single person on earth in countless big and small ways. But, out of this life-changing global tragedy, there have been some positive outcomes—lives saved, medical advances made, priorities reset, and, for many of us, time to try new things, like birdwatching

Birdwatching is a healthy activity that provided many people a purpose for being in nature, even as the usual worka-day opportunities were closing down all around them. Not only that, but the greatly increased time spent indoors in

our homes meant more time looking out through our windows, and, so, more opportunities to notice birds in our backyards. Noticing spawned curiosity, which spawned learning, which fed more curiosity—a benign cycle of awareness, satisfaction, and action:

- What is that bird with the bright red head?
- Wow! Did you see that hawk zoom by?
- What is singing that pretty song?
- How many kinds of birds are there anyway?
- I'd like to learn what kinds of birds we have?
- How can we attract more kinds of birds to our yard?
- Maybe when this is all over we should take a trip to see different birds! Did you know that there are more than 10,000 kinds of birds in the world?!

COVID-19, although it profoundly changed the way we live, work, and play, nevertheless opened the eyes of adults and children alike to a welcoming world of birds. That world can be seen through our windows and enjoyed while exploring by ourselves (or, socially distanced, with friends or family) in a neighborhood park!

In September, you can use your time watching birds during fall migration to benefit the National Aviary! Registration for the National Aviary's Hike-A-Thon Presented by UPMC Health Plan opens April 15. Hike, bike, birdwatch, and explore wherever you are, and support the National Aviary's conservation work!