The Cornell Lab of Ornithology

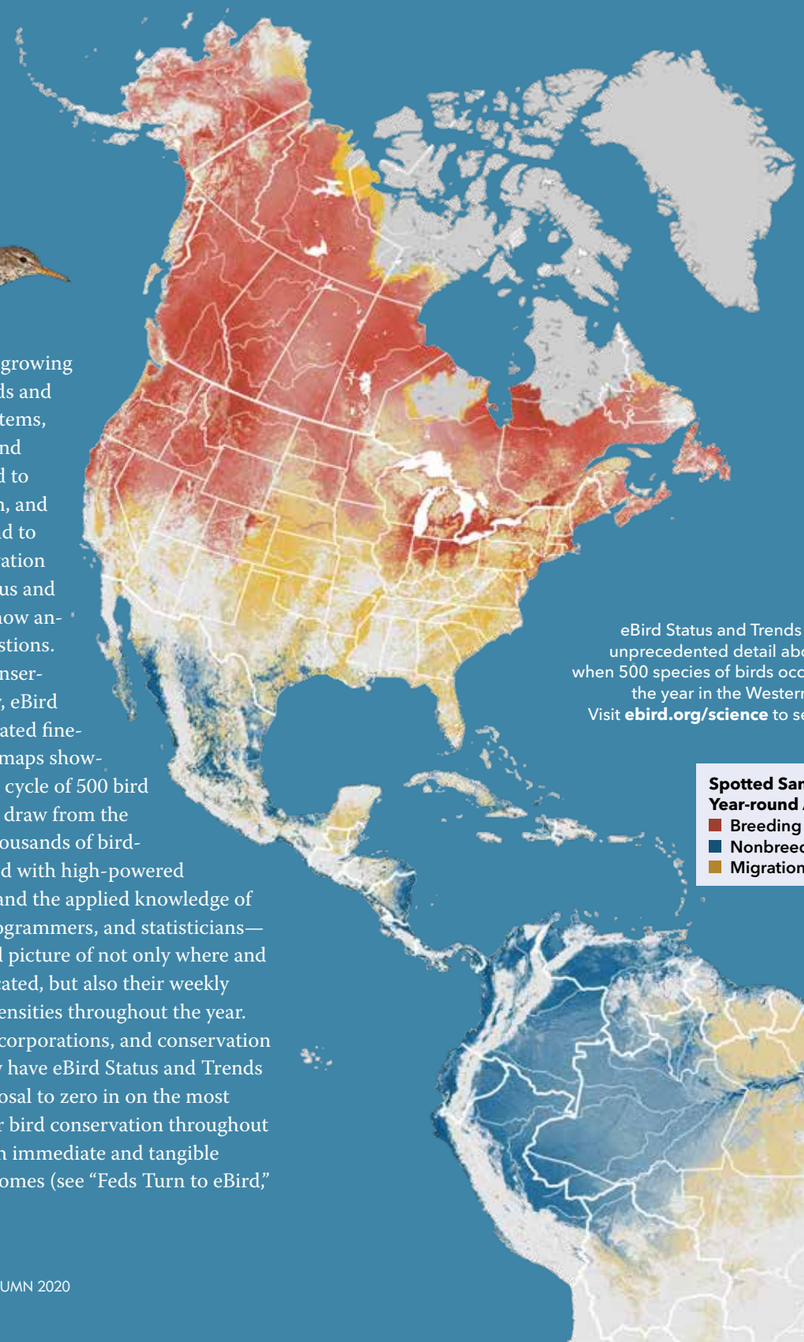
2020 ANNUAL REPORT

HOW YOU'VE HELPED THE BIRDS THIS YEAR

One of the 2020 young from the Lab's Red-tailed Hawk Cam flies above the Cornell campus. Photo by Cynthia L. Sedlacek.

Watching the World's Birds

Big Data Is Revolutionizing Bird Conservation



eBird Status and Trends maps provide unprecedented detail about where and when 500 species of birds occur throughout the year in the Western Hemisphere. Visit **ebird.org/science** to see animations.

To combat the growing threats to birds and Earth's natural systems, conservationists and policymakers need to know where, when, and how to protect land to maximize conservation impact. eBird Status and Trends maps are now answering these questions.

To serve the conservation community, eBird scientists have created fine-grained, dynamic maps showing the full annual cycle of 500 bird species. The maps draw from the observations of thousands of bird-watchers combined with high-powered cloud computing and the applied knowledge of ornithologists, programmers, and statisticians—painting a detailed picture of not only where and when birds are located, but also their weekly movements and densities throughout the year.

Governments, corporations, and conservation organizations now have eBird Status and Trends maps at their disposal to zero in on the most important sites for bird conservation throughout the Americas, with immediate and tangible conservation outcomes (see "Feds Turn to eBird," opposite page).

Merlin: Gateway to Birding

From an idea hatched back in 2009, Merlin has grown to be the most widely used bird identification app ever created, and a gateway to birding for millions, helping people around the world identify birds and connect to nature every single day. And, thanks to you, we continue to be able to offer it for free.

Merlin photo ID can now identify 8,000 species across six continents and is 92% accurate, even with mediocre pictures. August marked the launch of the latest version of Merlin, which includes a long-anticipated list-keeping function. Users now can save their identifications, forming a foundation for their life lists, opening the door to a world of birding for both personal enjoyment and the advancement of our understanding of birds.

White-breasted Nuthatch by Ryan Schain/Macaulay Library

Feds Turn to eBird For Wind Policy

The U.S. government was looking for a new way to define low-risk zones for wind energy development based on where and when Bald Eagles were most likely to be. This year, after rigorously comparing five different data sources for Bald Eagle occurrence throughout their annual cycle, the U.S. Fish and Wildlife Service found that newly available eBird Status and Trends abundance data painted the most accurate picture to help them analyze regional risks of potential projects—the first time eBird data has been used to directly shape policy decisions at the federal level.

Spotted Sandpiper by Matt Davis/Macaulay Library (opposite page). Windmills by Brad Hagan/Flickr Creative Commons. Bald Eagle by Liam Ragan/Macaulay Library.

Discovering Earth's Secrets

Houston skyline by Enigma Arts/Flickr Creative Commons

Lights Out Texas

The big Texas cities of Houston, Dallas, and Fort Worth are also big destinations for migrating birds. As Cornell Lab researchers discovered in 2019 using weather radar data, around 1 billion birds—one of every three birds that migrates to or through the U.S. each spring—pass through Texas, mostly at night.

But the lights that set buildings aglow each evening can be deadly for birds. This spring, the Cornell Lab launched Lights Out Texas to coordinate efforts across the state to turn out lights during the peak migration window (for Texas, April 19–May 7). Lights Out Texas made waves in cities across the state, even catching the attention of First Lady Laura Bush, who tweeted about the effort, and was quoted on the subject in the most-read *Dallas Morning News* editorial ever.

This fall, people in Houston and Dallas will be able to sign up for mobile alerts that use the power of the Cornell Lab's detailed bird migration forecasts (BirdCast) to signal the most important nights for keeping skylines and neighborhoods as dark as possible.

Revealing the Ocean Soundscape

The ocean remains Earth's undiscovered frontier—and now the next generation of underwater sound mapping devices is here. The Cornell Lab's Center for Conservation Bioacoustics has begun deploying state-of-the-art submersible recorders, known as Rockhoppers, to aid partners in discovering what lives beneath the waves around the world.

The waters in the northern Gulf of Mexico are often clamorous thanks to shipping traffic, as well as oil and gas exploration. The U.S. Bureau of Ocean and Energy Management asked for the Lab's help in mapping out a soundscape of the region to help them assess the effects of noise from marine traffic on protected species in this highly developed, highly biodiverse region.

In contrast, Rapa Nui Marine Protected Area near Easter Island, one of the largest marine reserves in the world, is one of the quietest places on Earth. Scientists only have the barest idea where and when, and even which marine mammals are using the area. The Cornell Lab has partnered with the University of Concepción and the local Rapa Nui authorities to use Rockhoppers to survey the natural sounds in the depths of the reserve. Conservation leaders will use this information to broaden protections for areas surrounding this pristine part of the ocean.

Photo by T photography/Shutterstock

Red-winged Blackbird by Don Danko/Macaulay Library

Bird Song ID Breakthrough

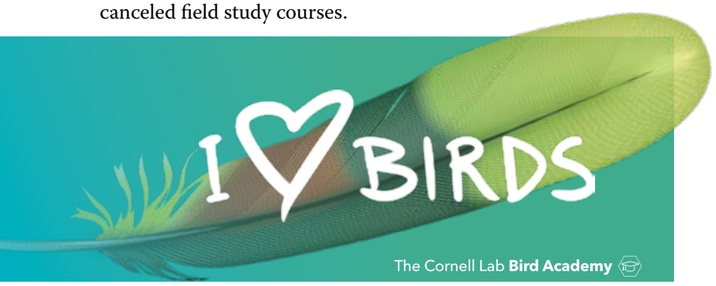
At this time last year, BirdNET, an app developed by the Lab's Center for Conservation Bioacoustics to advance research on bird sound identification, reached a milestone in the realm of artificial intelligence by being the first program to accurately identify 500 species in North America and Europe via bird song.

Now the AI behind this groundbreaking research has taken off: The prototype BirdNET app can identify 1,000 species and counting worldwide. Fueling this rapid expansion was the breadth and depth of recordings from the Macaulay Library and massive amounts of new data: In June users submitted around 300,000 sound recordings per day through the app for analysis. These new frontiers in sound identification will give millions around the world a new entry point for understanding and falling in love with birds by unraveling the mysteries of their sounds. BirdNET is available for Android devices in the Google Play store.

Facing a New Reality

Academia Turns to Bird Academy

During the first months of the Covid-19 outbreak in the U.S., the Cornell Lab's state-of-the-art online learning tools served a range of people looking for ways to connect with the natural world during isolation—from families discovering birds for the first time, to ornithology professors needing to quickly provide students with new resources to replace canceled field study courses.



In partnership with the American Ornithological Society, the Lab's Bird Academy connected with ornithology instructors around the nation to offer free access to the college-level online course Ornithology: Comprehensive Bird Biology, along with six other Bird Academy courses. More than 100 professors took advantage of the offer and in so doing reached thousands of college and university students.

"Normally I would be taking my students out for field trips during the latter part of this spring semester, and we would largely be focusing on bird identification in the field. This [course] seemed like a great way to try to create the next best thing. I hope that by doing so [we inspire] a lifelong interest in birds."

–Kathy Winnett-Murray, Professor of Biology, Hope College, Michigan

CURRICULUM FOR COOPED-UP KIDS

The Cornell Lab's K-12 Education program offered a suite of free nature-based learning activities centered on birds to anyone with an internet connection. More than 6,000 people accessed a series of eight hands-on units on topics ranging from bird diversity to nests and eggs to bird identification. Based on the average reach of educators who use K-12 Education materials, an estimated 150,000 elementary and secondary students benefited from thoughtful engagement with the natural world around their homes.

Photo courtesy of Conor Taff

Instructors Step Up

The pandemic turned the lives of millions of university students upside-down in March. Most had to transition rapidly to learning online, and many were forced to quickly relocate. The Lab's academic community was physically separated from each other, but thanks to the instructors—including Rose Postdoctoral Fellows and Bartels Science Illustrators—students not only completed their coursework, but many felt compelled to relate to us how rich their experiences were under difficult circumstances.

"On one of our last days meeting in person, the instructors [of Cornell University's Ornithology course] dedicated a good portion of the class for us to ask questions and raise concerns about going online," said Kelsie Lopez '21. "After transitioning, they matched each student up to faculty, which was absolutely critical for me to help develop my research ideas. Dr. [Jen] Walsh and Dr. [Conor] Taff were the most accommodating and understanding of any of my Cornell instructors."

Paige Pepling '23 created this Crested Caracara (above) as a final project for The Art and Science of Birds, a course taught remotely in 2020 by current and former Bartels Science Illustrators Jen Lobo and Jillian Ditner.

As a sophomore, Kelsie Lopez (below) traveled to Mpala, Kenya, to help a research team gather data for a project investigating how weavers may be changing their nest orientation to adapt to climate change. Photo courtesy of Kelsie Lopez.

Empowering Communities

Celebration and Awakening in the Peruvian Amazon

Photos by Marilu Lopez-Fretts

The Amazon River courses from border to border across the forested Loreto region in northern Peru—a global bird diversity hotspot that hosts 900 bird species and is home to 1 million people.

In the face of increasing development pressures and a changing climate that put the health of people and ecosystems at risk, the Cornell Lab is engaging with communities across Loreto to co-create programs that connect teachers, students, and families with the birds that surround them.

The Lab's Celebrate Urban Birds (CUBs) program works with more than 50 communities and 250 teachers across Loreto, reaching thousands of students and families with a mix of materials and events that incorporate science, culture, and the arts. Together, CUBs and the people of Loreto have created bird identification guides, nest guides, student workbooks, action guides, and bird data sheets in Spanish and indigenous languages. Additionally, many of the students have started bird clubs, and community leaders have organized bird festivals attracting hundreds, helping spread the message of conservation throughout the region.

Celebrate Urban Birds, made possible by the Tom Cade Bird and Nature Education Fund for Youth, is achieving regional success and garnering national attention: In June 2019, members of Peru's national education ministry met with the CUBs team and expressed strong interest in replicating the program throughout other rural communities in the country.

CONNECTING ACROSS BORDERS

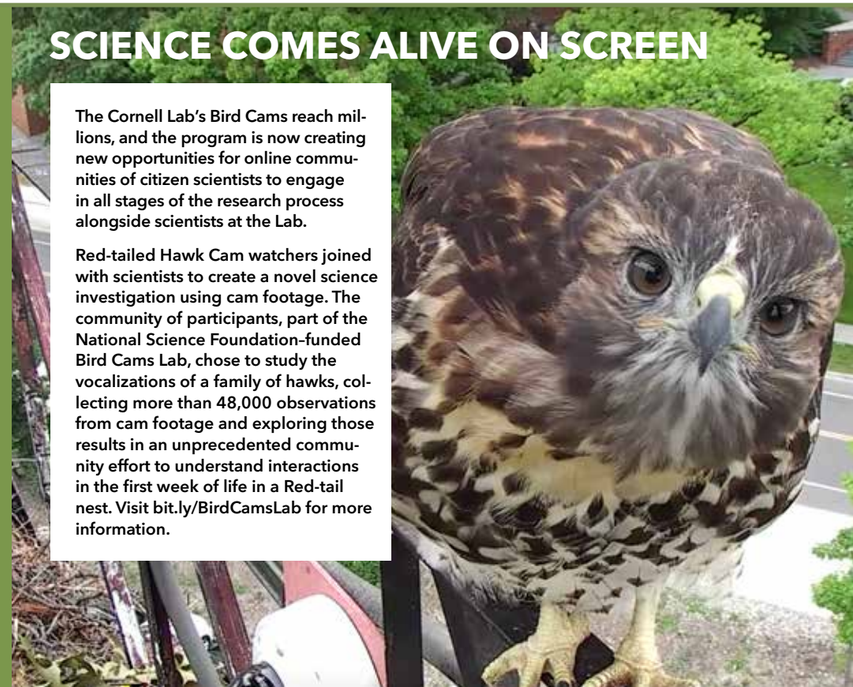
The Mayan Forest is the single most important region for wintering and migrating Neotropical birds. In 2017, the Cornell Lab launched the Yucatán Project—a multiyear effort aimed at developing a community bird-monitoring and conservation program in the region. This multicountry project in Mexico, Guatemala, and Belize envisioned unified bird monitoring and conservation across the three countries using Cornell Lab resources, tools, and knowledge as core pillars of the program.

Fast-forward to 2020: Bird monitors in all three countries have exchanged trainings and are using PROALAS, a protocol developed within eBird to standardize the way data is collected. Governments and NGOs now have a common source of information to monitor ecosystem health across the entire Mayan Forest, making it easier to conserve habitats for some of our most threatened Neotropical migrant and resident birds, while highlighting the forest's importance to biodiversity and local livelihoods.

Photo courtesy of CONAP (National Council of Protected Areas, Guatemala)

In the Maya Biosphere Reserve in Guatemala, PhD student Anna Lello-Smith (third from right) is researching how birds are responding to burned pastureland. Thanks to support from the Forest Park Fund for Conservation Collaborations, Lello-Smith is monitoring 25 sites across the eastern part of the reserve. With the help of local community birders, her work will improve our understanding of bird populations in the region, informing forest restoration strategies for one of the most important landscapes in the hemisphere for birds.

SCIENCE COMES ALIVE ON SCREEN



The Cornell Lab's Bird Cams reach millions, and the program is now creating new opportunities for online communities of citizen scientists to engage in all stages of the research process alongside scientists at the Lab.

Red-tailed Hawk Cam watchers joined with scientists to create a novel science investigation using cam footage. The community of participants, part of the National Science Foundation-funded Bird Cams Lab, chose to study the vocalizations of a family of hawks, collecting more than 48,000 observations from cam footage and exploring those results in an unprecedented community effort to understand interactions in the first week of life in a Red-tail nest. Visit bit.ly/BirdCamsLab for more information.

Sounding the Wake-up Call

Private Lands for Public Good

Bear Creek Preserve by Nicholas Tonelli/Flickr Creative Commons

We've lost more than a billion forest birds and more than half of all grassland birds since 1970, and habitat loss is a driving factor in the widespread declines. This means private lands matter when it comes to bird conservation: 83% of eastern forests and more than 80% of all U.S. grasslands are privately owned. Thankfully, over 50 million acres—twice as much land as the entire national park system in the Lower 48 states—are under protection thanks to a network of 1,400 private land trusts. Private support allows the Cornell Lab to bolster this network's bird conservation efforts with planning tools, workshops, and funding. Since 2017, the Land Trust Bird Conservation Initiative has funded over 20 high-priority, bird-focused conservation projects around North America through its small grants program.

The Land Trust Bird Conservation Initiative has funded over 20 conservation projects in 18 states. Within the Lower 48 states, private land trusts protect over 50 million acres, twice as much as the national park system.

In 2020, the Initiative awarded a $20,000 grant to Natural Lands and Audubon Pennsylvania for work to improve habitat for Wood Thrush, Golden-winged Warbler, and Ruffed Grouse at Natural Lands' Bear Creek Preserve. The grant will fund forest management as well as population monitoring through eBird to track the results in terms of bird occurrence. On completion, Natural Lands will host a workshop and share what they've learned with landowners and other partners in the region, and will use the preserve as a demonstration site. Oliver Bass, president of Natural Lands, says: "Thanks to the funding and support from the Cornell Lab, we'll be able to increase our efforts and improve our stewardship practices to provide habitat for important bird species that are declining in our region."

3 BILLION GONE: NOW WHAT?

In October 2019, the Lab spearheaded research, published in *Science*, that awakened the world to the precipitous decline in North American birdlife. A close partnership between the Lab, the American Bird Conservancy, and others led to the groundbreaking discovery that there are 3 billion fewer birds today than there were in 1970. For every four birds that there were in North America around 1970, there are just three today.

Getting the word out led to action in the policy arena, and new partnerships are helping us stem or reverse the declines that are facing the continent's birds.

On Capitol Hill in November, Republican congressman Morgan Griffith held up a copy of a Cornell Lab email about the bird decline research as he advocated for action on a Bird-safe Buildings Act—an indicator that leaders are hearing about and understanding the implications of this work. As of August, language from this bill, and the beneficial-to-birds Recovering America's Wildlife Act, has passed the House as part of the Moving Forward Act.

In July, partners met virtually to identify gaps in knowledge and start planning conservation actions across the hemisphere to address the threats facing the most rapidly declining species. As ornithologist Pete Marra put it, "You don't discover something like the loss of 3 billion birds and just go back to your day job...."

Two in five Baltimore Orioles have vanished since 1970.

Baltimore Oriole by Brad Imhoff/Macaulay Library

Engaging Partners

Coastal Solutions Takes Off

Two years ago, six early-career professionals and their mentors from across Latin America came to the Cornell Lab as the first cohort in the Cornell Lab's Coastal Solutions Fellows program, aimed at protecting the places that birds and people depend on along the Pacific Coast of Central and South America. These scientists, conservationists, engineers, and architects now form the foundation of a growing network that is changing the face of shorebird conservation.

Andres Osorio, professor of geosciences and the environment at the National University of Colombia, mentors Johann Delgado (see caption, right) a Fellow helping communities on the northwest coast of Colombia restore existing coastal ecosystems and create plans to protect them in the face of climate change and rising seas levels. "Johann ensured a collective-learning approach to engage the community in discussing and implementing the work, and has been quick to propose new ideas and new projects," says Osorio. "It is outstanding how Johann brings the joy and energy of a true leader to his efforts."

Thanks to your generosity and the support of the Packard Foundation, the second cohort of six fellows began their work in January 2020, and a third group will be selected this fall to begin in 2021. As this network of science-minded, action-oriented leaders across Latin America grows, so does their ability to enact positive changes for the environment across the Americas.

BELOW: Coastal Solutions Fellow Natalia Martinez is helping Hudsonian Godwits that migrate through and winter on the Chiloe Peninsula in southern Chile—by helping algae farmers learn more about what the godwits need. Martinez studied the godwit populations and created a model to guide harvesting practices when the birds are using the algae farms. She is using her results to connect directly with farmers to help them adjust their techniques to provide better bird habitat without losing any of the commercial value of their farms. Photo by Marcelo Olivares Herrara/Macaulay Library.

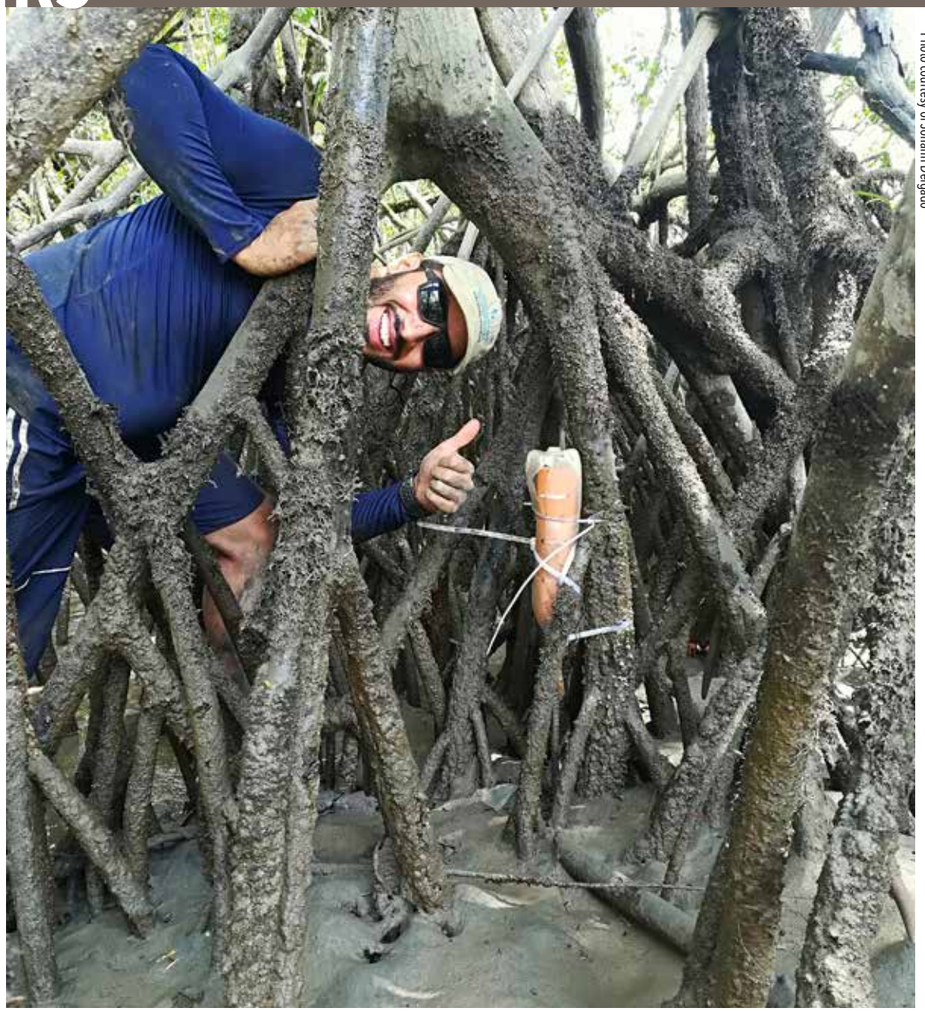


Photo courtesy of Johann Delgado

On Punta Soldado, an island off the coast of Colombia, increased wave intensity has caused protective mangrove forests to retreat, eroding habitat for both shorebirds and people. Coastal Solutions Fellow Johann Delgado is mapping out a way to restore the mangroves by promoting natural wave action and sediment capture. Delgado received a Fulbright scholarship during his time as a Fellow, and is now continuing his work as a PhD student in civil and environmental engineering at Cornell.

Media With a Mission

Fewer than 1,200 Greater Adjutants are left in the world. But in the state of Assam in northeast India, the local population of this largest stork in the world has rebounded over the last decade—from dozens to hundreds of nesting pairs—thanks directly to community conservation efforts (see "The Stork Sister," Summer 2020). The champion behind this initiative, Dr. Purnima Barman, realized in 2007 that saving the storks had to be a collaboration with the villagers who lived alongside them. After a decade of success, she enlisted the Cornell Lab's Center for Conservation Media to create films that would garner governmental and international support to build on the communities' accomplishments.

Last fall, one of the films received an audience with Assamese officials, including the Chief Minister Sarbananda Sonowal and other senior ministers. Following the screening, Sonowal called Barman directly to express the full support of the Administration, and immediately prioritized a tree census by the Department of Environment and Forests to enforce a ban on felling the stork's preferred nesting trees. Dr. Barman credits the collaboration with the Lab for enabling further community engagement, government outreach, and international support.

Greater Adjutants by Gerrit Vyn

We still believe we can save the world through birds.

Few people were prepared for the challenges that 2020 has brought. With the world facing restricted movements and increased stress, and with many people becoming more aware of the injustices around us, we at the Cornell Lab hope our work can provide comfort while being a force for positive change.

The Cornell Lab's world-leading science resources, track record of global engagement, and thoughtful, informed actions continue to propel science, conservation, and appreciation of birds forward.

Our groundbreaking science tools and digital archives are paving the way for the next wave of scientists and bird lovers. They will use the sounds and images in the Macaulay Library to make discoveries; they will use eBird Science to make never-before-possible conservation decisions to keep bird communities thriving.

Our bird discovery tools like Merlin and BirdNET are harnessing leading-edge technology to bring the wonder of birds to new parts of the world and spreading messages of conservation through the digital generation.

As we explore the world in these new ways, birds help teach us about our place in the biosphere: How are we changing the natural world? How should we act in light of those changes?

Thank you for supporting our work and our ability to change our world for the better. The Lab's impact is your impact–you and millions of others around the world who observe with us, learn with us, wonder with us, and experiment with us. Through our collective actions, we are pushing biology and technology forward, and catalyzing the most effective conservation measures for birds and all of the natural world that calls Earth home.

Linda R. Macaulay

Linda Macaulay
Chair, Board of Directors
Cornell Lab of Ornithology

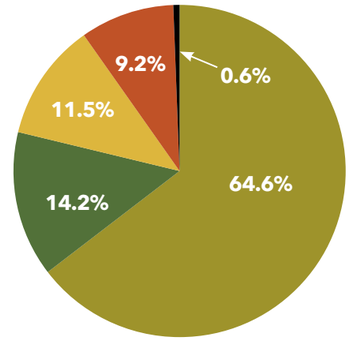
Anna's Hummingbird by Ronan Nicholson/Macaulay Library

Financial Report

2020 FISCAL YEAR–JULY 1, 2019 TO JUNE 30, 2020

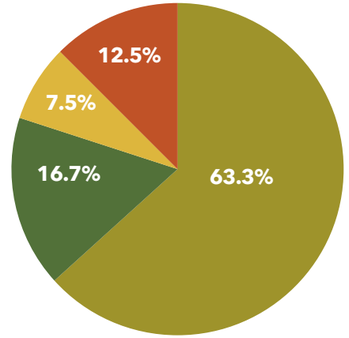
The Cornell Lab of Ornithology continues to thrive, thanks to our supporters. Thousands of members and donors provided more than 64% of our annual revenue during fiscal year 2020, a total of $24.8 million that expands our capacity to effect change for the birds. The Cornell Lab uses our strength as a mission-driven nonprofit organization associated with a large research institution to better leverage our resources and link our conservation work to the latest ornithological research and technological developments. All of this is possible thanks to our supporters, whose generosity has helped fuel the steady growth illustrated in the bar chart below.

FY2020 Revenue



Membership & Gifts	$24,888,040
Grants & Contracts	$5,462,284
Program Income	$4,416,481
Invested Funds Income	$3,533,786
Other	$229,675
Total REVENUE	**$38,530,266**

FY2020 Expenditures



Programs	$20,895,749
Development & Membership Services	$5,520,673
Administration & Infrastructure	$2,473,867
University Support Costs	$4,129,000
Total EXPENDITURES	**$33,019,289**

Corporate Partners

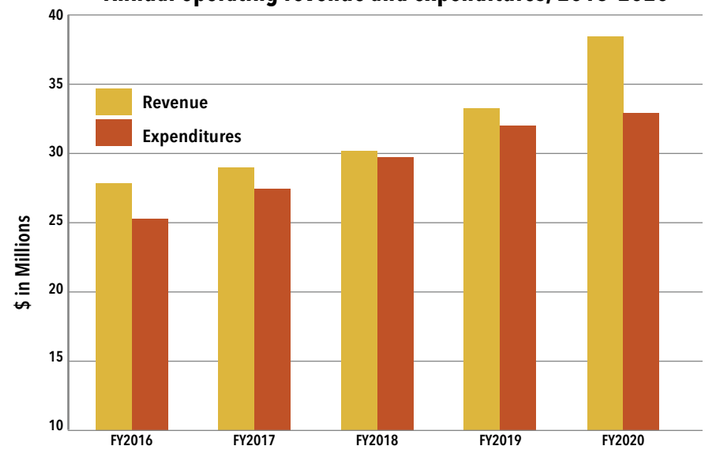
Through these 2020 partnerships we reached out to new audiences to improve the understanding and protection of birds in backyards and around the world. Thank you!

Aramark
Birds & Beans
Clarion Corporation
Classic Brands, LLC
D&D Commodities, Ltd.
Ecological Associates, Inc.
LOWA
Pennington Wild Bird Feed
Perky-Pet
Princeton University Press
Red River Commodities
Swarovski
Wild Birds Unlimited
Wild Birds Unlimited at Sapsucker Woods
Wood Warbler Coffee
Zeiss

For more information about partnership opportunities, contact Justin Cleveland at jbc258@cornell.edu.

We're pleased to include a list of Sapsucker Woods Society members and honor and memorial tributes online at birds.cornell.edu/donors

Annual operating revenue and expenditures, 2016–2020



If you have questions, comments, or requests for the Cornell Lab's membership and development team, please contact Bramble Klipple at 607-254-1105, bck42@cornell.edu, or Mary Guthrie at 607-254-2157, msg21@cornell.edu.