



TheCornellLab 

2019 ANNUAL IMPACT REPORT



***"Your support is truly
changing our world, and the birds' world,
for the better."***

Dear Cornell Lab Supporters,

Since I joined the board of trustees in 1992, I've been humbled by the generosity and participation of our members, supporters, and volunteers, and gratified to witness the innovations in bird science that we've fueled together.

In the pages that follow, you'll read stories of how our supporters have helped the Cornell Lab forge new pathways for bird study and bird conservation. From technological advances yielding insights into bird movements around the world, to partnerships that give students and researchers access to unprecedented bird information, to groundbreaking research and citizen-science projects that connect people with the natural world, your support is truly changing our world for the better.

Yet, just as our knowledge of birds and the natural world grows, the threats to birds are growing as well. According to a new paper

published in the journal *Science*, more than one out of four birds in North America has been lost in the past 50 years. The Lab has ambitious goals to help reverse these trends, and we are thankful for your part in helping us understand and transform the relationship between humanity and the rest of the life on our planet.

We believe in the power of birds to ignite discovery and inspire action. Together, we will provide the science and training, data-driven services and tools, and creative communications that help more people than ever before enjoy, understand, and protect birds and the natural world.

My heartfelt thanks to the tens of thousands of Cornell Lab members and donors who generously offer support as we work tirelessly for the benefit of the birds we hold so dear, and to whose fate our own is inexorably tied.

Linda R. Macaulay



HARNESSING BIG DATA FOR BIG IMPACT



LECONTE'S SPARROW BY JEFF TIMMONS/MACAULAY LIBRARY

For decades, the Cornell Lab has deployed science and technology to enhance the understanding of birds and the world we share. The Lab supports the largest repository of biological data in the world, as well as the scientists committed to mining this resource to support the work of researchers, educators, birders, and conservationists around the globe.

THE CENTER FOR AVIAN POPULATION STUDIES

What if a coastal community knew exactly where and when to take conservation actions to support birds? And what if building managers in cities knew what specific nights to turn off lights to prevent bird strikes? Given the many concerns facing people and nature, conservation in the 21st century must be flexible, creative, and based on the best science. The Lab's new Center for Avian Population Studies is committed to creating and disseminating this best-in-class science in service to birds and the communities that support them.

Building on more than two decades of work—from eBird, to the Macaulay Library, to the emerging field of radar ornithology—the

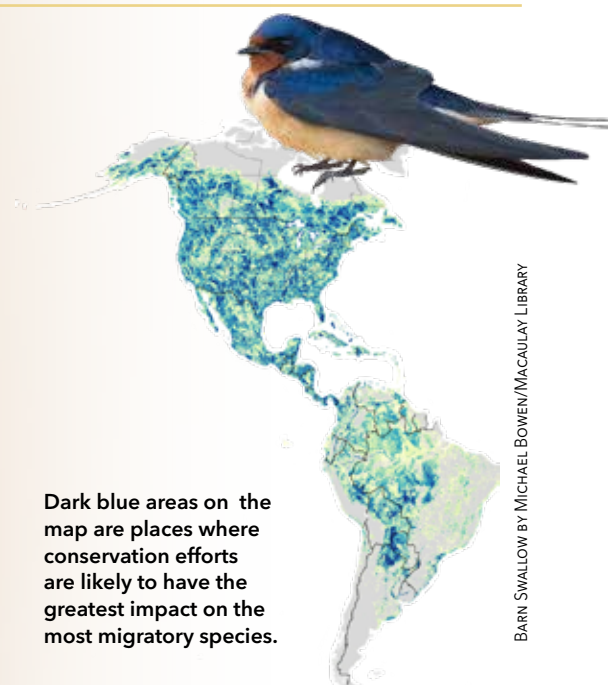
Center for Avian Population Studies is consolidating the Lab's efforts to collect, analyze, visualize, and disseminate data about bird distribution, abundance, and movement. It will allow us to understand birds at the scale of hemispheres, with the ultimate goal of tracking data for every species of bird and turning this science into conservation action. The center will create resources and tools that scientists, practitioners, policy makers, and citizens can use for an array of issues, from land-use planning, to conservation finance deals, city lights-out campaigns, antipoaching efforts, wildlife-friendly wind farms, and more.

EBIRD GUIDES GLOBAL CONSERVATION

More than a third of Neotropical migratory birds are declining in population, yet a 2015 global assessment found that only 9% of migratory bird species have adequate habitat protection across their yearly range. And conserving land for migratory birds at the hemispheric scale is difficult, given their vast ranges and varied habitats.

An international team of scientists used the Lab's global citizen-science database, eBird, to calculate how best to conserve the mix of habitats that birds across the Western Hemisphere use throughout the year. Thanks in part to millions of data points contributed by citizen scientists, conservation planners now have scientifically grounded guidance on the locations and amounts of land that must be conserved to protect a critical mass of Neotropical migratory bird species.

"Our work shows how globally crowd-sourced data—in this case, eBird—can help us to get the best return on conservation



Dark blue areas on the map are places where conservation efforts are likely to have the greatest impact on the most migratory species.

BARN SWALLOW BY MICHAEL BOWEN/MACAULAY LIBRARY

investments. No other data source could have achieved anything close to this level of detail and efficiency in spatial planning over such a vast area," says Cornell Lab senior conservation science director and coauthor Amanda Rodewald.

BIRDNET: A NEW TOOL FOR BIRD SOUND ID

Knowing when and where birds occur, and how populations change over time, are critical to conservation, but historically, monitoring birds has been a resource-intensive process that requires many people tracking observations in the field. With support from donors, including the Arthur Vining Davis Foundation, the Cornell Lab is partnering with the Chemnitz University of Technology in Germany to develop BirdNET, an automated sound analysis software that detects and identifies bird sounds.

Starting with pilot projects at Sapsucker Woods in Ithaca, New York, Hubbard Brook Experimental Forest in New Hampshire, and the Chemnitz Zoo in Germany—and using the extensive catalog of bird recordings in the Macaulay Library—researchers are using artificial intelligence to train BirdNET to identify 400 bird species in North America and 100 species in Europe.

As more species are added, and BirdNET's algorithms are further refined, BirdNET will help researchers around the world analyze long-term acoustic data sets to further conservation goals.



ASHIK RAHAMAN

Bird sounds in Sapsucker Woods (Ithaca, New York) are recorded 24 hours a day using audio recorders and analyzed with BirdNET. The sounds are turned into spectrograms, fed into BirdNET and identified in near real-time. See a demo at birdnet.cornell.edu/live.

EBIRD TAKES OFF IN INDIA AND ISRAEL

The Lab's efforts to make eBird available to birders all around the globe are paying off: In the month of May 2019, citizen scientists broke a new monthly worldwide record for checklists submitted (around 1.25 million) and for total observations (more than 20 million). Much of this recent growth in participation has come from outside of North America.

Since eBird India launched in 2014 (in partnership with Bird Count India), eBirders have submitted 10 million observations of more than 1,300 species, including 200,000 audio recordings and photographs. These data have helped clarify the ranges, abundances, and seasonal movements of many bird species. Scientists working on bird conservation on the subcontinent now have a flood of new data they can use to inform their work and spread the message of bird conservation throughout their country.

With the launch of eBird Israel last spring, the Cornell Lab and The Society for the Protection of Nature in Israel created the first eBird portal adapted for a language that reads right to left, setting the stage to expand the world's largest citizen-science project to regions throughout the Middle East and South Asia. With every new coverage area, eBird opens up opportunities for both citizens and scientists to deepen their understanding of the birds in their region and around the world.

In 2018, researchers published a new assessment of Sarus Crane populations in Uttar Pradesh, India—one of over two dozen Indian ornithology papers that have used eBird data since 2016.

SARUS CRANES BY VIKAS PAWAR/MACAULAY LIBRARY



SPARKING CONSERVATION ACTION



GREAT EGRET BY MELISSA JAMES MACAULAY LIBRARY

The loss of one out of every four birds in North America over the past 50 years is another reminder of the urgent need to find solutions to challenges facing our planet. The Lab is dedicated to using our best-in-class science to inspire conservation action and inform decision-makers and individuals all around the world.

GIVING BIRDS A VOICE ON CAPITOL HILL

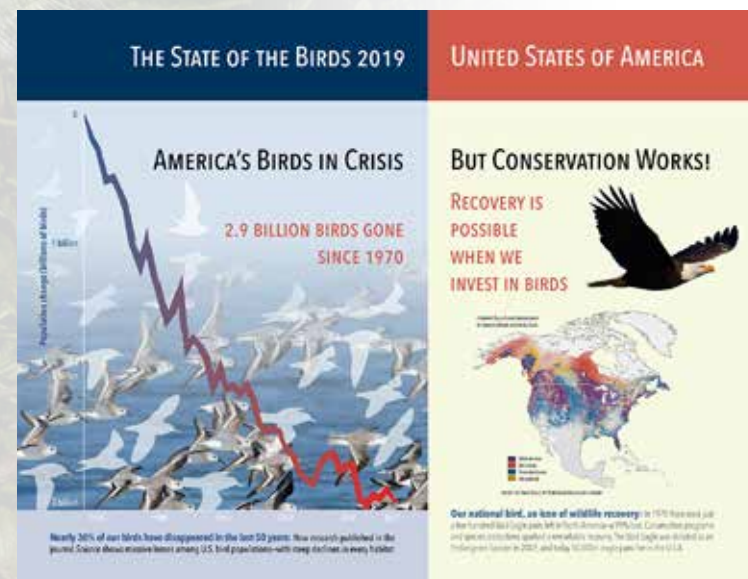
In June 2019, Cornell Lab of Ornithology senior director of conservation science Amanda Rodewald went to the nation's Capitol to testify before the House Subcommittee on Water, Oceans, and Wildlife. Rodewald provided scientific perspective on a recent reinterpretation of the Migratory Bird Treaty Act, which eliminates penalties for incidental or accidental harm to birds. Under this reinterpretation, companies that kill birds through negligence—as happened during the 2010 Deepwater Horizon oil spill—would no longer be subject to fines.

"The exclusion of incidental take renders the [MBTA] impotent on most sources of mortality for migratory birds and eliminates a powerful incentive for industry," Rodewald said at the House hearing.

Rodewald also coauthored an opinion article in the journal *Proceedings of the National Academy of Sciences* that outlined scientific concerns about the reinterpretation of a rule under the Clean Water Act that would exclude over half



of this country's wetlands and one-third of its streams from protection against pollution. "The apparent opposition to enacting science-based policies undermines decades of efforts...to clean and protect our nation's waters," wrote Rodewald with her coauthors. "Every nation's citizens need clean water to be healthy and productive—today and into the future."



Since 2009, The Cornell Lab has taken a leadership role in producing the "State of the Birds" reports, which track regional and continental trends in North America's bird populations. The reports, the ninth of which is being released this fall (left), get delivered to every congressional office along with dozens of federal, state, and local policy makers so leaders can consider the best science available when making decisions.



Above: Residents in Papua New Guinea learn how preservation of birds can help their community in the Lab's Conservation Media film, *Tanah Papua: A Paradise for Birds*.

CONSERVATION MEDIA COMPELS LEADERS TO ACT

In April 2018, officials from the United Kingdom Climate Change Unit Indonesia reached out to the Cornell Lab to create media to support conservation in the forests of Indonesian New Guinea. Although the island is home to the third-largest tropical rainforest in the world, and 75% of its forests are still intact, New Guinea's habitats are very much at risk because of development for palm oil, timber, and infrastructure.

The Cornell Lab's Conservation Media team produced two inspirational films to raise awareness of New Guinea's rich biodiversity and the spectacular birds-of-paradise that live there.

The films showed local and national leaders from different parties, with different priorities, all voicing support for their common conservation goals. Last October, the governors of the two provinces of New Guinea (Papua and West Papua) committed to conserving 70% of the forest cover for the western half of the island, an exciting blueprint for the future of climate change mitigation, bird conservation, and sustainable livelihoods in the region.



RED BIRD-OF-PARADISE BY TIM LAMAN

THOUSANDS FLOCK TO BIRD OF PREY MOVIE

On August 13, over 7,000 Filipinos gathered in the Ormoc City Superdome in the Philippines to watch *Bird of Prey*, the Cornell Lab's award-winning documentary about the Philippine Eagle—part of a 40-city screening tour for the film around

the country. As more people in the Philippines and around the world are exposed to this powerful film, support grows for the continuing conservation efforts helping to stabilize and increase populations of the world's largest and most endangered eagle.



EMPOWERING THE NEXT SCIENTIFIC LEADERS



One of the world’s premier institutes for the study of birds, the Cornell Lab educates students and researchers at all levels. Our vibrant community of scholars benefits from Cornell’s world-class specimen collections; audio, visual, and media archives housed in the Macaulay Library; and the world’s largest biodiversity database, eBird. Studying these digital and physical specimens in concert provides researchers with new insight into the biology of organisms, facilitating breakthrough discoveries.

BRINGING THE BIRDS OF THE WORLD, TO THE WORLD

For 20 years, the Cornell Lab has managed the online resource Birds of North America, the most comprehensive reference for the life histories of more than 760 bird species. This past year, the Lab acquired the digital rights to the *Handbook of the Birds of the World*, which will soon allow the Lab to offer an unprecedented amount of academic research, data, and media for every bird species around the world.

The Lab is working with Lynx Edicions, the publisher of original handbook and the Internet Bird Collection, to create Birds of the World. This online resource will build on the existing information in the handbook to create unparalleled services for students, researchers, and bird lovers worldwide.

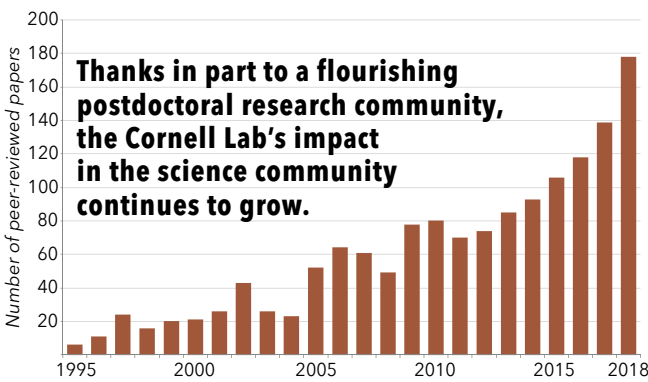
Using the Lab’s digital expertise, photos, and recordings from the Macaulay Library, and the constant flow of bird data and analyses from the global birding community of eBird, the new Birds of the World will be singular in the breadth and depth of information it offers about birds.

“This ambitious project is a global milestone for ornithology,” says Cornell Lab Director John Fitzpatrick, “and will be used and cherished by people of all ages and cultures around the world.”

The hardcover edition of the *Handbook of the Birds of the World*, published in 17 volumes between 1992 and 2013, is the only comprehensive encyclopedia of every bird species in the world.



Images and recordings from the Macaulay Library will help the Birds of the World become an unparalleled resource for the ornithological community. Kea by Alex Berryman/Macaulay Library.



FELLOWS AT THE FOREFRONT OF ORNITHOLOGY

The Edward W. Rose Postdoctoral Scholars Program at the Cornell Lab is currently home to more than 20 postdoctoral researchers—early-career leaders in their respective fields—who are advancing our understanding of everything from the effects of airplane noise on bird breeding, to the importance of female bird song in evolution.

Camila Gomez is using bird specimens from the Cornell University Museum of Vertebrates to evaluate how bird populations in Colombia have changed over the last century—research that will allow us to better predict the future for these birds and plan conservation actions accordingly.



Alli Injaian studies the effects of airplane overflights on dawn chorusing behavior across species, and the stress levels of nesting birds when exposed to artificial light at night—work that could help conservation planners identify where and how to reduce light and noise pollution.

Karan Odom cofounded the Female Bird Song Project to increase awareness among scientists and the public that female birds sing, and that studying their songs may hold keys to our understanding of bird evolution and behavior.

Jen Walsh investigates populations of saltmarsh birds along the Atlantic Coast to learn more about their unique adaptations, and to inform conservation efforts for several rapidly declining species.

UNDERGRADUATES CONTRIBUTE TO THE LAB'S MISSION

Last year, the Kristen Rupert and John Foote Undergraduate Research Fund supported more than 20 young scholars from a range of Cornell departments—including Biology and Environmental Science and Sustainability, but also Mechanical Engineering, Communications, and Comparative Literature—providing them with important experiences as they work to further the Lab’s mission.



Chris Sayers: “In April 2018, I traveled with a team of other undergraduates to the Mpala Research Centre in central Kenya. Our mission was to collect media for the Macaulay Library, but we also filmed and interviewed Shailee Shah, a Cornell alumna (’14) conducting her PhD research on Superb Starlings. I worked with staff in Con-

servation Media to produce a short documentary about Shailee’s work, building a video from scratch and trying to find the best way to share Shailee’s passion with the viewer. In the finished video, Shailee’s voice narrates over images of her working in the field, and images of a variety of Kenyan wildlife. This was my first try at making a movie, and I’m really happy with the result.” Watch the video at bit.ly/mpalavideo.

Nick Gershfeld: “This past semester, I worked in the Cornell Lab’s Bioacoustic Research Program on the Haikubox project—a high-tech bird feeder (shown below) that will take pictures and record audio to determine the bird species that visit. This information would be uploaded to a server or website where the bird feeder’s owner would be able to access it.

“When I started, very little of the code was written. Over time, I created new code, and learned to troubleshoot old code as needed. In contrast to my regular programming class assignments (where the professor knows how the completed project should look), on this project my mentors and I were figuring out the solutions together on the way to creating something brand new.”



UNITING A BROADER AUDIENCE THROUGH BIRDS



INDIAN PARADISE-FLYCATCHER
BY SIVAGURU NOOPURAN/MACAULAY LIBRARY

People from all backgrounds, all around the world, must come together if we are to understand and protect birds and their habitats. The Cornell Lab is collaborating with students, researchers, faculty, staff, and supporters from diverse organizations and diverse backgrounds to further science and conservation, creating programs that address the specific needs of communities and birds worldwide.

FOSTERING SCIENCE EQUITY

The Cornell Lab's Celebrate Urban Birds (CUBS) program has partnered with more than 10,000 community organizations and distributed more than half a million education kits to engage students and teachers in citizen-science projects. Now with a grant from the National Science Foundation, CUBS is launching the Noise Project—a collection of research efforts related to noise pollution and the environment—in four diverse U.S. communities. As part of this cocreated project, community members work alongside scientists in designing, carrying out, analyzing, and sharing the results of the research. For perhaps the first time in the history of modern science, community members are also coprincipal investigators (lead researchers) on academic research, working as peers with scientists from the Cornell Lab.

"This community science project is very different from anything we've done," says Karen Purcell, CUBS director and principal investigator on the project. "It's being developed by underserved communities collaborating with the Lab on equal footing. It's the difference between a project imposed on people from the outside and one that takes shape from within a community."

As a part of the grant, CUBS is working with four community-based organizations around the country, documenting the process, and sharing results within the Lab, Cornell University, and

"When we involve the community at every stage of the scientific process, then the results of the project have more meaning." -Karen Purcell, CUBS director

throughout the broader scientific community. The results will help the entire field of science become more equitable and inclusive. "This process calls for self-reflection. It takes time, but we have been learning about this for years," says Purcell, "and we know this approach leads to increased scientific engagement with these communities, and promotes better science overall."



JOHN ANNONI

High schooler Erick Litardo participates in the Noise Project as a student at Camp Compass Academy in Allentown, Pennsylvania. Noise-cancelling headphones have become a symbol of this group's work as they explore ways to create peaceful sanctuaries, free from the typical noises of an urban environment.

WORKING WITH COLOMBIAN COFFEE FARMERS

The Cornell Lab is engaging with coffee farmers in Colombia to measure the impact of farming practices that promote biodiversity and protect bird habitat. During Global Big Day 2019, a group from the Lab, led by Cornell researcher Viviana Ruíz-Gutiérrez, visited coffee farms around Jardín, Colombia to launch a project aimed at training coffee producers, students, and local youth to record bird observations, as part of a larger research project aimed at measuring the impact that forest-friendly practices and crop diversification have on birds. The farms are part of the Nespresso AAA Sustainable Quality™ Program, which includes more than 30,000 farms in Colombia. Farmers in the program meet a range of sustainability standards, including maintaining their lands with a mix of natural and working forests. The Big Day surveys by Ruíz-Gutiérrez and her team are laying the foundation for a multinational effort to use birds to quantify the benefits for biodiversity that result from supporting landscape-scale, sustainable production practices.



JENNY MUÑOZ

On a coffee-farm birding blitz (above), Cornell Lab researcher Viviana Ruíz-Gutiérrez and Colombian bird guide and researcher Jose Castaño-Hernández were part of a team that found a pair of Parker's Antbirds (right), a rare species first described in the late 1990s.



PARKER'S ANTIBIRD BY IAN DAVIES/MACAULAY LIBRARY

TEACHING SOUND RECORDING AROUND THE WORLD

Twenty birders from across India gathered in the city of Dehradun in April for the Macaulay Library's first-ever Sound Recording Workshop in South Asia. Workshop attendees learned the fundamentals of natural sound recording, as well as new recording techniques. Participants added over 100 new recordings from India to the Macaulay Library during the workshop, and have since added hundreds more as they continue their recording efforts.



WHITE-THROATED KINGFISHER BY RAMESH DESAI/MACAULAY LIBRARY



INSPIRING NATURE ENTHUSIASTS OF EVERY AGE



Nearly 50 million people in North America engage in some form of bird watching, making birds a powerful force for individuals to connect with the natural world, and to care about conserving it. Our thriving citizen-science programs, print and web publications, and online educational offerings enable us to reach and inspire a wide range of bird enthusiasts.

INSTILLING A PASSION FOR CONSERVATION

Engaging children with the natural world at a young age fosters a conservation ethic later in life. A new curriculum uses eBird to teach science and math concepts to elementary, middle, and high school students, while also getting kids outside to explore nature and observe birds. The Cornell Lab K-12 Education team designed *eBird Explorers*, which provides teachers with hands-on lessons for students to make careful observations, conduct bird surveys, and analyze data to explore trends and patterns of bird occurrence.

With this series of teacher-tested, standards-based activities, students become

scientists across the grade levels. Elementary school students explore the similarities and differences between local birds, while middle and high school students collect and analyze real data, investigating how global changes impact life on earth. Over the past year alone, Cornell Lab educational materials have reached about a million students around North America.



ROBIN KOVAL

Left: Detail of the cover of "Building Literacy Through Nature," one of four new *eBird Explorers* curricula released this fall. Artwork by Regina Macedo. Above: Fourth graders conduct an eBird count.



DEEPENING CONNECTIONS THROUGH BIRD ACADEMY

Through online Bird Academy courses, students delve into subjects such as behavior, biology, and identification, and their knowledge and passion for birds often spreads throughout their communities. In the past year, enrollment in online Bird Academy courses has doubled, from around 22,000 to around 45,000. One recent student wrote: "I am an environmental educator for Audubon New York. I have learned an immense amount by taking this course [*Ornithology: Comprehensive Bird Biology*]. I have recommended it to all of my colleagues, and my lessons and curriculum development work have benefited from the deeper knowledge I've gained."

CITIZEN SCIENTIST FINDS A NEW HYBRID WARBLER

Last fall, one citizen scientist's unlikely discovery of a new hybrid warbler stirred the imagination of birders around the world, and showed how anyone who takes the time to look carefully at birds has a chance to make a scientific discovery.

In May 2018, Lowell Burket, a lawyer from Pittsburgh, captured photos, audio, and video of a mystery bird on his family's farm in Roaring Spring, Pennsylvania. The bird turned out to be a hybrid between a Chestnut-sided Warbler and a Brewster's Warbler (which is itself a hybrid between the Blue-winged and Golden-winged Warbler). The triple-hybrid warbler stayed around for weeks, allowing Burket to collect information and confirm the identity of the bird with the help of Cornell Lab postdoctoral researcher David Toews, now an associate professor at Penn



BRIAN BURKET

Lowell Burket (left) and David Toews with the triple hybrid warbler that Burket discovered (below).

State University.

An eBirder since 2013, Burket told *Forbes* magazine that he had "literally no knowledge of birds before seven years ago" when his father-in-law turned him on to the hobby. "And now I end up discovering what appears to be a first-of-its-kind bird! It can happen to anyone!"



LOWELL BURKET

SPONSORS

The Cornell Lab thanks our sponsors for their support in 2019.

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

Thank you!

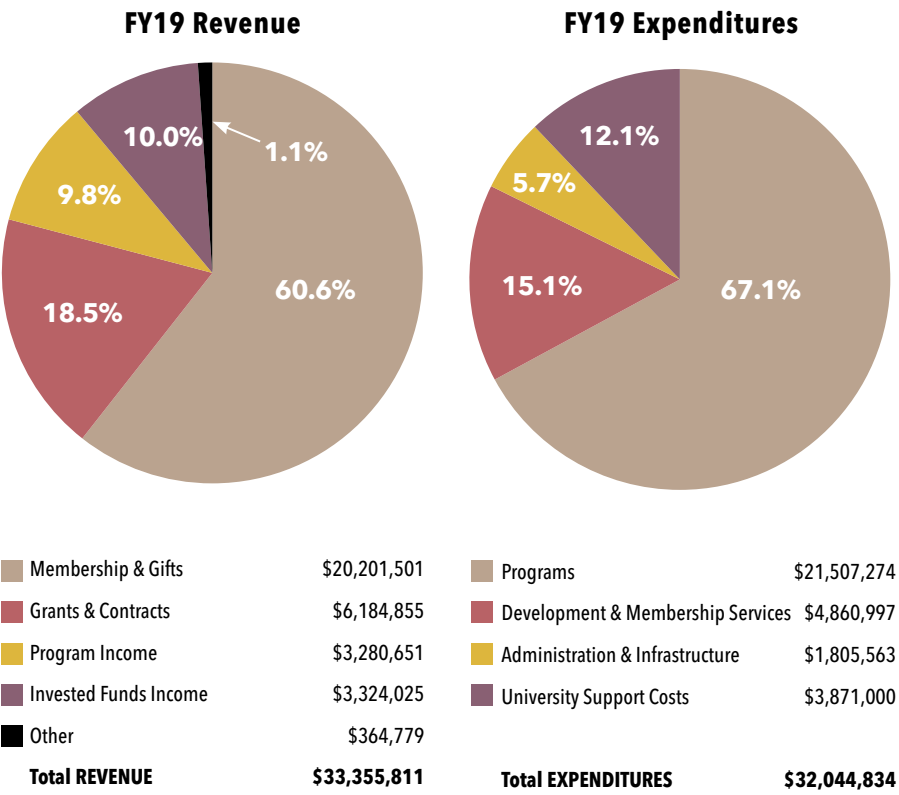
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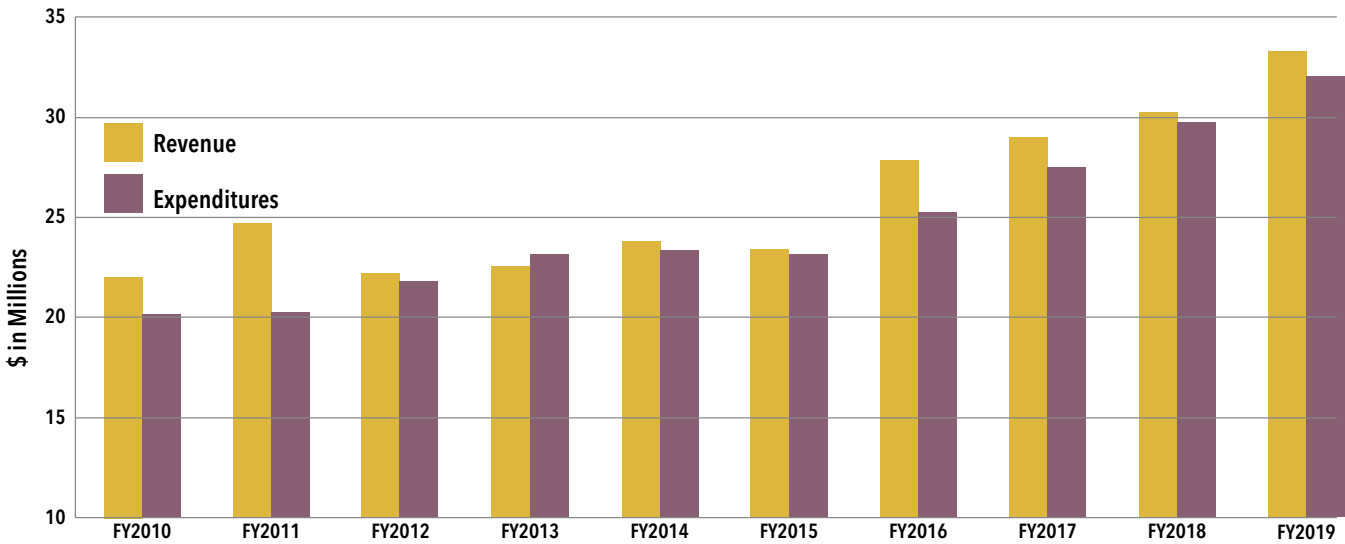
FINANCIAL REPORT

2019 FISCAL YEAR: JULY 1, 2018 TO JUNE 30, 2019

The Cornell Lab of Ornithology continues to thrive, thanks to our supporters. Thousands of members and donors provided more than 60% of our annual revenue during fiscal year 2019, a total of \$20.2 million that expands our capacity to effect change for the birds. As an organization, the Cornell Lab uses our strength as a mission-driven nonprofit that is also part of a large research institution to better leverage our resources, and link our conservation work to the latest ornithological research and technological developments. In the past 10 years, the Cornell Lab has bolstered existing programs and launched new ones, created dozens of additional positions, and broadened our scope so we can tackle issues on a global level. All of this was made possible thanks to members like you, whose generosity has helped fuel the steady growth illustrated in the bar chart below.



Annual operating revenue and expenditures, 2010-2019



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.



Golden-wing Society members learned to draw and paint birds from Bartels Science Illustrator Jessica French (left) at the June 2019 “Weekend at Sapsucker Woods” donor event.

Special thanks to all our members and donors

We are deeply grateful to our more than 100,000 supporters at every level, all of whom make it possible for the Cornell Lab of Ornithology to advance the understanding of nature and engage people of all ages in learning about birds and protecting the planet. We’re pleased to include a list of our leadership supporters online at birds.cornell.edu/donors.

LEAVE A **LEGACY** FOR BIRDS

By including the Cornell Lab in your will, trust, or beneficiary designation, you can create a personal legacy that will have a lasting impact for birds, discovery, and conservation. We would be happy to help you make a plan that will benefit you, your family, and ultimately, the birds.

CALL: 607-254-2471 EMAIL: labgifts@cornell.edu VISIT: birds.cornell.giftplans.org

RED-THROATED LOONS BY GERRIT VYN

The **Cornell Lab** of Ornithology