



The**Cornell**Lab  of Ornithology

ANNUAL REPORT TO MEMBERS | 2012



*"Only when you pause to look up into the emerald green vastness of the forest canopy do you start to appreciate that the living soul of the New Guinean cloud forest is in the network of moss-covered tree trunks and branches," wrote Cornell Lab scientist Ed Scholes in the book *Birds of Paradise*. Scholes' expeditions with photographer Tim Laman revealed wondrous places, such as cloud forests (above), and spectacular birds, such as the male King Bird-of-paradise (facing page), which waves the circular green disks at the ends of its tail to woo a mate. The joint Cornell Lab–National Geographic Birds-of-Paradise Project exemplifies how groundbreaking research can simultaneously advance scientific knowledge and capture the public's imagination. Photo by Tim Laman.*

A Message From JOHN FITZPATRICK

Visitors to the Cornell Lab of Ornithology, and readers of our annual reports, are routinely amazed by stories about saving Bicknell's Thrush habitat in Hispaniola, studying the night flights of migrating warblers, eBird apps for tech-savvy birders, and deep-sea digital audio recorders for blue whales. We often hear the question: How does all this fit under the roof of one conservation organization?

The common thread is information. In the 21st century, conservationists are challenged to think and act in new ways to adapt to a changing planet. The Cornell Lab is evolving a unique model for helping save places and species in the Information Age.

Conservation is a complicated mix of human endeavors—policy, economics, law, politics, ethics, even spirituality—but one key ingredient is essential for accomplishing meaningful conservation: science. In this report, you'll see how the Lab is providing groundbreaking scientific discoveries and volumes of data that form the core of arguments for conserving habitat for wildlife: mapping of key flight paths for Neotropical migrants, recordings of the cacophony of underwater noise disrupting ocean ecosystems, shifting ranges of North American birds responding to warmer temperatures, a prescription for clustered scrub-oak networks that improve the genetic integrity of endangered Florida Scrub-Jays.

The Lab also works as a conduit between science and communities. In this report you'll read about teach-

ing Guatemalan schoolchildren the importance of their cloud forests, and about building a critical mass of eBird observers that gets more people directly involved in saving birds than ever before. You will learn about the monumental mission undertaken by Lab scientist Ed Scholes and wildlife photojournalist Tim Laman to explore the remote rainforests of New Guinea and document, for the first time ever, all 39 species of the birds-of-paradise.

Today Ben Freeman, one of the Lab's several dozen graduate students, is toiling away in those same rain-soaked New Guinea jungles. Ben is retracing bird survey transects in mountain forests that were last studied in the 1960s, looking for signs of elevational range shifts as a result of climate change. Even as we celebrate Ed's and Tim's epic accomplishment in revealing the birds-of-paradise, we continue to seek a better understanding of how the world of humans affects the world of birds.

As I look through the pages of this annual report, I have to admit that I feel challenged by our ambition, our continuing mission to interpret and conserve the earth's biological diversity with an ever-broadening scope toward truly global conservation. But I also have enormous confidence in the talented scientists, staff, and students here at the Lab, and I am bolstered by your unwavering and enthusiastic support as Lab members and donors.

As we move forward on an amazingly diverse array of projects, I know we'll continue to do what we do



KING BIRD-OF-PARADISE (2) BY TIM LAMAN

best: supply science and information intertwined, packaged for use by decision makers and to inspire the masses. Recently, I learned an important phrase that helps focus our work: "You don't accomplish conservation by changing birds' behavior, it's the people that matter." This must be our model—to use birds and other charismatic organisms to inform people and inspire changes in attitude and behavior, so that we learn to live side by side with a stable and fully functioning natural world.

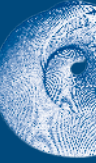
With warm gratitude for your continued support,

John W. Fitzpatrick
Louis Agassiz Fuertes Director

A handwritten signature in blue ink, reading "John W. Fitzpatrick". To the right of the signature is a small, stylized drawing of a bird in flight.

TECHNOLOGY

Our Model:



"Historically, bird research has focused on where we can easily observe birds with our eyes. Our knowledge during migration is like a black hole, yet that's when a lot of bird mortality occurs. We're using new technology to 'see' birds' night migrations with sound, and discover where important stopover habitats and flight paths are—critical information to stem declines for Neotropical migrant species."

—Ron Rohrbaugh,
Cornell Lab interim Conservation Science director

Innovation Opens New Possibilities for Discovery and Conservation



A burning passion for discovery drives the best scientific research, but innovative technology can push research even farther, into realms that were previously enigma. Realms like the mysteries of bird migration, which have been cracked open a bit wider with recent revelations about nighttime flights. Each spring and fall, unseen rivers of millions of Neotropical migrants flow overhead in the darkness. They speak a secret language of night flight calls that are very different from most of the vocalizations these birds make during the day. To interpret this vast mystery, Cornell Lab engineers are inventing and improving technologies to tune in to night flight calls and develop the fuller picture of bird migration needed to protect birds across our 21st-century landscape.

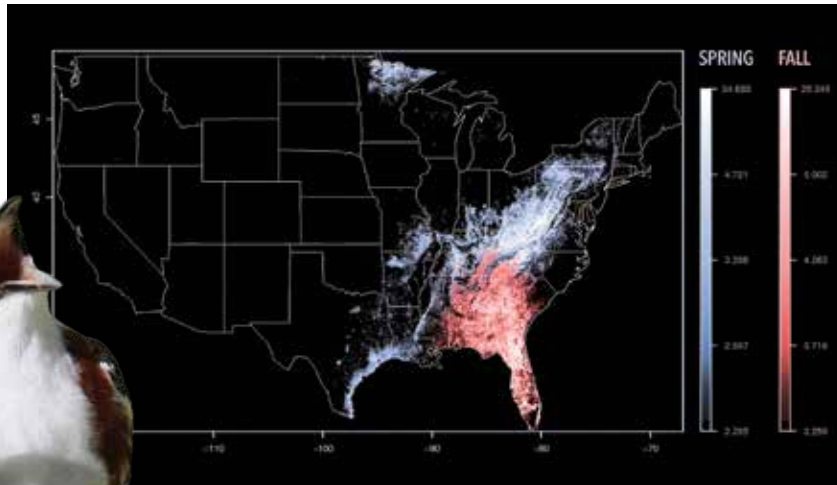
GATHERING THE DATA

THE POWER OF BIRDERS AND TECHNOLOGY

Fifteen years ago, programmers at the Cornell Lab harnessed the power of the Internet to launch the world's first online citizen-science project—the Great Backyard Bird Count. Ever since, they've continued to innovate new ways to engage birders in gathering, sharing, and exploring massive amounts of data for science and conservation. This year, a revolutionary new app called BirdLog enabled birders to upload their sightings from the field in real-time from iPhones and Androids. As bird observations submitted to eBird surpassed the 100 million mark this year, scientists made huge strides in mining the data to reveal new insights about bird migration.

SENSORS FOR THE NIGHT SKY

For millennia, humans have heard the fleeting sounds of birds migrating at night, but only in recent years have technological breakthroughs made it possible to reveal the details at many locations, night after night. By modifying autonomous recording units (ARUs) initially developed to listen to whales in the ocean, Cornell Lab engineers have created terrestrial ARUs that have captured nearly 18 terabytes of sound data from the night sky. These recordings reveal millions of birds that utilize travel corridors, including those that fly over an area overnight and are never seen. Someday, birders might help track nocturnal migration across the continent by mounting ARU-type units on their rooftops.



Chestnut-sided Warblers fly across the Gulf of Mexico on their annual migrations. New maps based on eBird data reveal that they take different paths in spring and fall, north through the western Gulf and Texas, and south via the eastern Gulf and Florida.

CHESTNUT-SIDED WARBLER BY MICHAEL FURTMAN

Night Flight Listener

Andrew Farnsworth has a rare talent: He can identify North American birds by ear at night, and he's driven to find out what those calls can tell us about migration. As a Cornell graduate student, he created the "Rosetta Stone" for warblers—a catalog of flight calls for 48 species of migrant warblers—and studied how these calls vary depending on evolutionary history, weather, migration density, and other factors. Now a Lab researcher, Farnsworth's deeply specialized expertise is vital to Lab efforts to monitor night flights and protect flyways for these unseen migrations.



PHILIP MONTGOMERY

From observation to impact

FINDING THE MEANING

SEEING SOUND

A human being would have to devote 12 years of 24/7, nonstop listening to analyze the millions of nocturnal flight calls collected by the Lab's autonomous recording units. And that person would need encyclopedic knowledge of nearly 24,000 types of calls made by 62 species. That's why Lab programmers are creating automated detection software that uses artificial intelligence to detect flight calls, convert them into visual spectrograms for analysis, and identify which species constitute the huge migratory flocks that fly overhead in the night sky.

Mapping Migration

With millions of bird observations from citizen-science projects, Lab scientists are now creating unprecedented, sophisticated maps of bird migration. These STEM (Spatio-Temporal Exploratory Model) maps combine eBird data with hundreds of environmental variables to show the expected occurrence for bird species each week of the year at more than 130,000 locations across the lower 48 states, revealing new insights about the dynamics of North American bird migration.

HELPING THE BIRDS

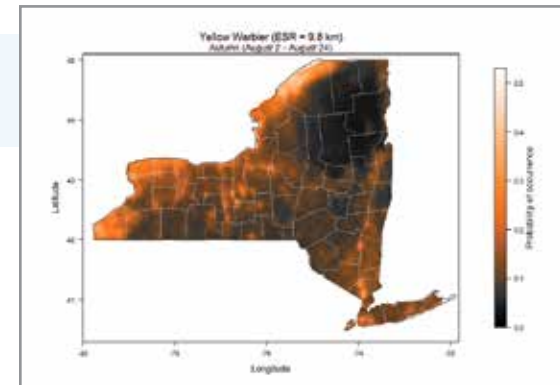
SAFER SPOTS, AND TIMES, FOR WIND TURBINES



GERRIT VYN

Using new maps based on eBird data, scientists can identify the migratory corridors birds rely on for safe passage between breeding and wintering grounds. The Lab and The Nature Conservancy are helping the New York State Energy, Research, and Development Authority evaluate places where wind energy development should be avoided. Lab researchers are also using ARUs at existing wind turbine sites to track night flight calls and identify the peak migration times when turbines should be powered down to avoid bird collisions.

This STEM probability-of-occurrence map for Yellow Warbler during fall migration shows the importance of shrub/forested wetland stopover sites in the Hudson Valley and along the Lake Ontario and Erie shorelines.



"And Now for Your Weekend Bird Forecast..."

Imagine a day when the local TV news weather segment includes a forecast of birds migrating through your area. It's happening today at the Lab through a partnership with Oregon State University and NOAA to produce *BirdCast*—a weekly report that uses eBird and STEM maps to track the migration in real time and forecast when and where birds are headed next. Someday BirdCast could be provided to meteorologists to educate the public about bird migration. And for conservation, BirdCast could be helpful in advising cities when to dim lights on buildings and towers to reduce the hundreds of millions of bird deaths from collisions every year.

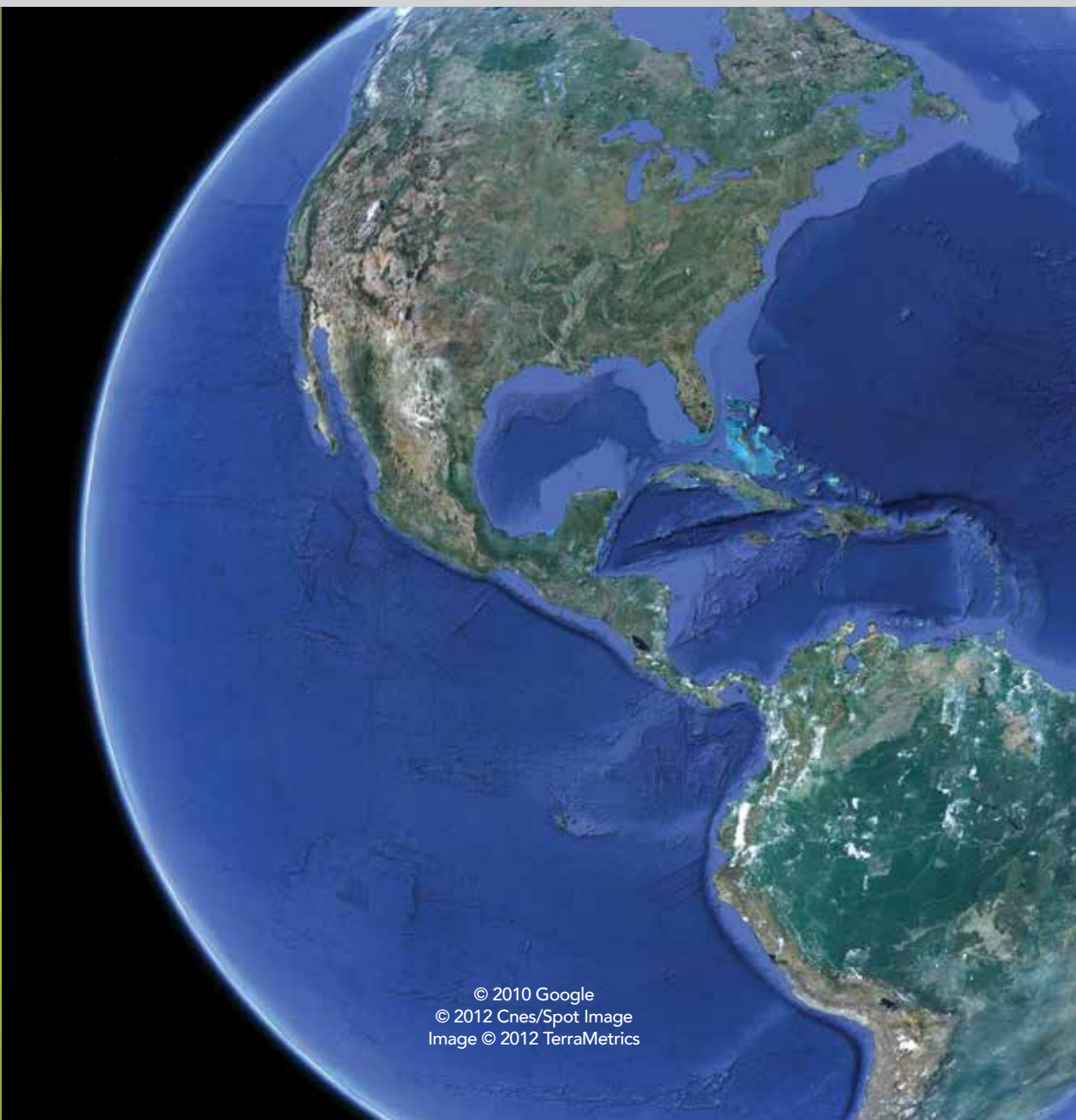
GLOBAL REACH

"There are bright, motivated, passionate conservationists everywhere. When we go to other countries, we find the local conservationists, and we provide them the training, technology, and strategy to gather the scientific data they need to succeed. It's really about empowering local partners, helping the dedicated people in each country to study and protect the birds and habitats that they know and love."

—Eduardo Iñigo-Elias, coordinator for the Cornell Lab's Neotropical Conservation Initiative



Our Model: Fostering Cooperative Conservation Across Borders



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Image © 2012 TerraMetrics

Protecting our birds means preserving both their breeding and wintering habitats, at home and abroad. And making good on our mission to “conserve the earth’s biological diversity” means exploring global conservation opportunities. In order to be successful long-term, cross-border conservation has to be operationally and culturally sustainable. Local partners must be empowered to confront daily challenges with their own data, tools, and solutions. That’s why the Cornell Lab designs capacity building into its research and conservation projects in foreign countries. The Lab is uniquely positioned to do this, as a hybrid institution that combines the training and technology expertise of a premier research university with the agility and reach of a nonprofit conservation group.

DATA

DISCOVERING NEST SITES IN HAITI

Black-capped Petrels, once thought to be extinct, are still critically endangered. But efforts to protect them have been stymied by lack of knowledge about their cliffside nest burrows. In 2008, James Goetz (now a Cornell Lab Ph.D. student) spearheaded expeditions along the forested cliffs of Haiti to search for petrel breeding colonies. Since then, Goetz has worked with the U.S. Fish and Wildlife Service, and local partners like Grupo Jaragua and Fondation Seguin, to find more than 30 petrel nesting locations—yielding a bounty of petrel nesting biology data where once there was a black hole.



JAMES GOETZ

Cornell Lab Ph.D. student James Goetz and partners in the Dominican Republic snapped one of the first photos of a Black-capped Petrel chick in a mountaintop cave in Haiti.

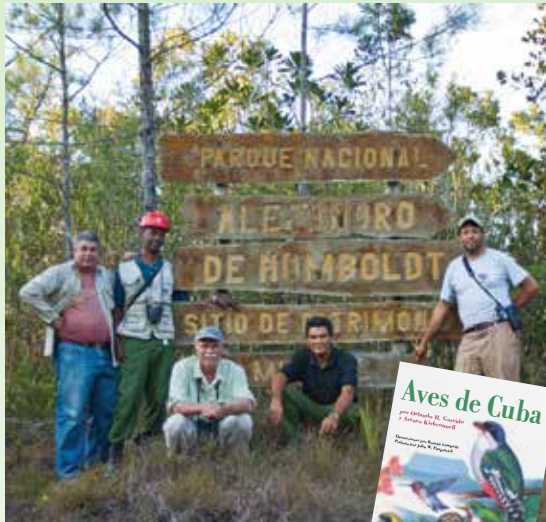
TRAINING

SAFEGUARDING THRUSH HABITAT IN HISPANIOLA

About 90 percent of the global Bicknell's Thrush population winters in Hispaniola. This is a species in serious decline, with fewer than 40,000 individuals left. To keep tabs on wintering Bicknell's Thrushes, and to identify and protect critical habitat, the Cornell Lab and partners such as the Vermont Center for Ecostudies conducted bird-monitoring workshops in the Dominican Republic and Haiti. The Lab's scientists trained university students and park rangers in mist netting, bioacoustics surveys, and radio telemetry. Haitian and Dominican biologists are now gathering data for a conservation plan that combines economic incentives, protected reserves, and forest restoration to safeguard Bicknell's Thrush wintering grounds.

Putting It All Together in Cuba

Cuba is critical habitat for birds. The Cuban Archipelago is the winter home or migratory flyway for 229 species of North American breeding birds, including 98 percent of Ospreys from the eastern United States and Canada and 80 percent of U.S. Black-throated Blue Warblers. The Cornell Lab of Ornithology has been working for the past 10 years on cooperative conservation projects in Cuba. The effort began with Cornell Lab and Cuban scientists conducting joint bird-survey expeditions into remote rainforests to identify wintering habitat for Neotropical birds. The surveys also found critical habitat for endangered Cuban endemics, such as the Fernandina Flicker (one of the world's rarest woodpeckers) and the world's smallest bird—the Bee Hummingbird (2 inches tall and weighing less than a penny). Over ensuing years, Lab scientists, educators, and audio experts returned to teach field ornithology courses and acoustic monitoring workshops. The Lab and Cuban partners produced and shipped 7,000 CDs of the first all-Cuban bird audio guide and 10,000 copies of *Aves de Cuba*—a Spanish-language Cuban bird field guide—to be distributed



Cornell Lab staff and Cuban biologists on a bird-survey expedition at Humboldt National Park in Cuba.

throughout the country's parks and schools. And in April 2012, the Lab brought a cohort of Cuban university students to Sapsucker Woods in Ithaca, New York, for an intensive bird conservation biology short-course—perhaps the largest group of Cuban student scientists to visit the United States in 50 years. All of this work was made possible by funding from the MacArthur Foundation and the Christopher Reynolds Foundation. These investments in Cuban bird conservation will live on in the talented, trained biologists and accumulating knowledge there. A decade after Lab scientists first arrived in Havana, our partners in Cuba are better trained and equipped to protect their birds, including wintering Neotropical migrants.

TOOLS

ENABLING CHILEANS TO TUNE IN TO THEIR BLUE WHALES

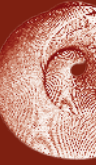
In 2003, Chilean scientists discovered a summer nursery for blue whales, one of the world's most endangered species, off the coast of Patagonia. To protect this sensitive habitat, conservationists needed to learn more. So researchers at the Universidad Austral de Chile used deep-sea audio recording devices from the Cornell Lab's Bioacoustics Research Program. After six months, the Chilean scientists began analyzing the underwater recordings at the Lab's Sound Analysis Workshop. The need for acoustic recording in this nearly pristine area is time-sensitive because increasing human intrusion for ecotourism and commerce, including seismic testing for energy resources, will affect the acoustic habitat for all the marine life, and thus their breeding and feeding.

OUTREACH

TEACHING CLOUD FOREST KIDS ABOUT BIRDS

In Guatemala, preserving cloud forests from cutting requires a shift in local attitudes. That means educating the next generation about the importance of their cloud forests. With funding from the U.S. Fish & Wildlife Service, local group Community Cloud Forest Conservation is using the Cornell Lab's *BirdSleuth* curriculum to teach children from eight remote village schools about their local birds and the incredible biodiversity around them. The students have developed their own Mayan eBird portal where they can identify birds in their native language and record sightings. The entire program is eligible for USFWS funds from the Neotropical Migratory Bird Act because Golden-winged Warblers winter in these Guatemalan highlands. Now, golden-wings have new advocates in the children of the cloud forests.

CITIZEN SCIENCE



"What we've built in eBird is an example of what can be accomplished when you engage a passionate community in doing what they love to do and show them how they can play an important role to help all of us better understand our world."

—Brian Sullivan, eBird project leader

Our Model: Engaging Birders in Science and Conservation



WOOD DUCK BY MELISSA GROO

Imagine the most comprehensive ecological inventory ever convened—legions of observers fanning out across North America, from coast to coast and all habitats in between, from forest and desert and prairie to city parks and suburban backyards. That kind of massive bird-monitoring campaign is occurring every day courtesy of the more than 200,000 people in the United States and Canada who are powering Cornell Lab citizen-science projects at feeders and nests, in schools and out in the wilds, turning millions of bird sightings into valuable data.

BIRDING

TOOLS FOR BEGINNING BIRDERS AND HARD-CORE LISTERS

Cornell Lab citizen-science programs recruit new demographics into birding, opening people's eyes to birds while connecting them to science. Initiatives like Celebrate Urban Birds bring birding to an inner-city audience, and yield insights about how certain species fare in heavily developed areas. The new YardMap program offers online landscaping tools for homeowners to design bird-friendly backyards. And eBird provides an invaluable online tool-set for birders at any level. In addition to easy e-listing, eBird offers maps with Hotspots and collections of eBird lists in prime birding areas. Time charts of species abundance allow birders to see when and where there's prime-time viewing for migratory birds. And for competitive birders, there's the eBird Top 100—a daily ranking of the most prolific birders by lists and total species.

eBird South of the Border

The eBird technology platform can easily be adapted to bird-monitoring projects in other countries. In Mexico, the aVerAves program (eBird Mexico) enabled a bird-survey project, coordinated by the Mexican government and its CONABIO conservation agency, that gathered data on almost 300 species in the mountainous southern Los Tuxtlas region, where critical bird habitat is threatened by agricultural expansion. In Chile, the launch of the Red de Observadores de Aves y Vida Silvestre eBird portal has been crucial to identifying important areas for bird conservation. Recently, the Chilean government announced that projects requiring environmental impact statements must consult with eBird Chile to evaluate effects on bird species.

Bird Data Powerhouse

THE BIGGEST AVIAN DATABASE EVER

Over the past decade, Cornell Lab computer engineers have built a single, unified platform that combines all the data collected by the Lab's entire suite of citizen-science programs. The platform includes more than 100 million bird observations from eBird, as well as 20 million winter bird records from Project Feeder-Watch and 10 million observations from the Great Backyard Bird Count. And the platform includes more than just bird sightings, with breeding data from the more than 400,000 nests that have been monitored by NestWatchers. It all adds up to more than 200 million records, the most powerful bird database ever created—and all of it easily accessible to scientists and conservationists.



Birding can be a powerful force for understanding and protecting birds



EVENING
GROSBEAK BY
JUDITH
BLAKELY



A Continuous Continental Winter Bird Survey

In 2012 Project FeederWatch celebrated 25 years with more than 50,000 backyard birders reporting on feeder activity—and providing scientists with a deep dataset of bird abundance and ranges. Cornell Lab researcher David Bonter examined FeederWatch data from 1989 to 2006 to describe a marked decline in Evening Grosbeaks, with a 27% decrease in flock size and 50% drop in sites reporting any grosbeaks at all. The University of Wisconsin's Ben Zuckerberg analyzed data collected between 1990 and 2010 revealing that American Robins arrived 13 days earlier in Wisconsin in spring, 1.5 days sooner for every 1° C increase in winter temperatures.

"Volunteer citizen-science programs such as Project FeederWatch and eBird have proven extraordinarily important, even indispensable, for the success of modern broad-scale avian ecological studies."

—Benjamin Zuckerberg,
Department of Forest and
Wildlife Ecology,
University of Wisconsin

SCIENCE

eBIRD ILLUMINATES CLIMATE-CHANGE SHIFTS

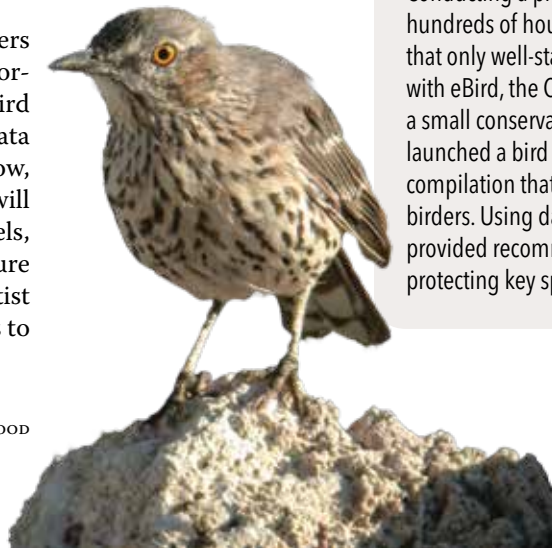
Studies examining changes in the arrival dates of migratory birds across their range have historically been constrained to small scales because formal data were recorded only at specific reserves or research stations. Then came eBird. In 2012, University of North Carolina researcher Allen Hurlbert published a groundbreaking study showing how climate change is affecting bird migration. Hurlbert examined millions of spring eBird observations for 18 bird species from 2000 to 2010. By cross-referencing with weather data, he found that bird species were shifting up their arrival dates almost a day for every Celsius degree of increasing spring temperature. A few species, such as Red-eyed Vireo, Great Crested Flycatcher, and House Wren, shifted up their arrival by as many as three to six days.

CONSERVATION

eBIRDERS IMPROVE OUTLOOK FOR SAGEBRUSH BIRDS

The *State of the Birds 2011* report, published by the Cornell Lab and partners and delivered to the U.S. Department of the Interior, highlighted the importance of public lands as bird habitat. As a follow-up the Lab provided eBird models to the Bureau of Land Management (BLM) showing distribution data for sagebrush birds in the Intermountain West, including Brewer's Sparrow, Sage Sparrow, Sage Thrasher, and Green-tailed Towhee. BLM policies will now be adjusted to maximize benefits for sagebrush birds. "These models, based on tens of thousands of eBird observations, represent the best picture we have of bird distributions in the West," said Lab conservation scientist Ken Rosenberg. "The eBird data opened the eyes of federal land managers to the tremendous opportunities for conserving birds on BLM lands."

SAGE THRASHER BY CHRIS WOOD



Important Bird Areas Near Chicago

Conducting a proper bird inventory used to require hundreds of hours of data processing, meaning that only well-staffed operations could do it. But with eBird, the Chicago Wilderness Habitat Project, a small conservation group in northeastern Illinois, launched a bird survey with automatic online data compilation that involved thousands of Chicago-area birders. Using data from its eBird portal, the group provided recommendations to land managers on protecting key species and sensitive nesting areas.



World Premiere for an Epic Quest:

BIRDS—OF—PARADISE

Eight years. 18 expeditions. 544 days in the field, in the rugged, remote jungles of New Guinea. An epic quest—to collect visual documentation of all 39 species of the reclusive, resplendent birds-of-paradise...for the first time, ever.

Cornell Lab scientist Edwin Scholes partnered with National Geographic photog-

rapher Tim Laman to study and document the breeding displays and behaviors of these fantastically plumed birds. They returned from New Guinea with tens of thousands of photos and more than 2,000 video clips that were archived into the Cornell Lab's Macaulay Library. It's a monumental accomplishment, considering the best visual evidence

of some of these species previously were paintings of museum specimens.

"What started out as a fascination for the birds-of-paradise and curiosity about exploring New Guinea evolved into an unprecedented opportunity to fill a gap in the documentation of the planet's biodiversity," said Scholes.

THE MALE RIBBON-TAILED ASTRAPIA'S TAIL MEASURES THREE FEET.
PHOTO BY TIM LAMAN.



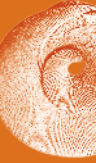
In fall 2012, the joint project with National Geographic goes public, allowing everyone to enjoy the mysterious splendor of the birds-of-paradise:

- The book, a glossy photographic volume with stunning imagery and tales from the expeditions;
- The stories, feature articles running in *National Geographic* and the Lab's *Living Bird* magazines;
- The film, a documentary premiering at the Banff Film Festival and broadcast on the National Geographic Channel;
- The exhibition, an interactive and imaginative multimedia exhibit that debuts at the National Geographic Museum before travelling to museums across the country;
- The speaking tour, a yearlong, nationwide lecture series featuring Scholes, Laman, and their photos and videos of the majestic birds-of-paradise.

Explore the birds-of-paradise yourself at BirdsofParadiseProject.org.

EDUCATION

Our Model:



"Chickadees chirping
Cheerful as a summer morn
It's twenty below...

Blue Jays, cardinals,
Brighten up trees like Christmas lights
Left up all year long."

—Alex, Grade 7, Minneapolis, MN



Inspiring Anyone, at Any Age, to Care About Birds and Nature



“We will conserve only what we love. We will love only what we understand. We will understand only what we are taught.” So goes the famous quote by Senegalese conservationist Baba Dioum. It’s more than a motto, it’s a commitment for the Cornell Lab’s education programs—using birds to help people better understand nature and be active citizens and stewards of the earth. And teaching about birds isn’t just for schoolkids. It’s for people of all ages, and all nations. Because birds are everywhere. They’re fascinating to grandkids and grandparents alike. And every bird in a backyard tree, near a playground jungle gym, on a skyscraper’s ledge, is an opportunity to teach about the interconnectedness of all living things.

SCHOOLKIDS

SCIENTIFIC INQUIRY FOR SCHOOLKIDS

Does precipitation affect how many Dark-eyed Juncos we see? Does the size of a bird affect the pitch of its call? K-12 students watch birds, ask intriguing questions, pose hypotheses, and collect and analyze data to formulate a conclusion in the Cornell Lab's *BirdSleuth* curriculum—a fun and interactive suite of investigatory projects that meet current science education standards. *BirdSleuth* is a great way to get kids outdoors and watching birds. Last year, thousands of students in hundreds of schools across the country conducted *BirdSleuth* science investigations. Some schools integrated their *BirdSleuth* projects into formal Lab citizen-science initiatives, such as eBird and Project FeederWatch, so their data contributed to professional analyses of regional bird trends—and budding ornithologists got their first taste of real science.

A Bird in the Hand

Texas 3rd grader Alisa Van Eerden's *BirdSleuth* project began with her question: Is it possible to train a wild bird to eat out of a human hand? Her experiment started with stuffing a pair of jeans and a jacket with old towels, and topping it off with a pumpkin head wearing sunglasses and a hat, to create a decoy she named "Stuff." After several weeks of watching birds feed near Stuff, and eventually out of the decoy's glove, Alisa traded places with Stuff—and *voilà!* A Tufted Titmouse in her hand. A 3rd grader with a big smile on her face.



SOURCE: YOUTUBE

TEENS

INSPIRING YOUNG SCIENTISTS

Global environmental issues meet emerging geospatial computer technologies in the Lab's *Crossing Boundaries* curriculum for middle- and high-schoolers, created in partnership with faculty at Hobart & William Smith Colleges. To learn about landscape changes in the United States and abroad, students compare historical and current satellite imagery on Google Earth. Then they explore geographic differences in biodiversity, from faraway places like the Amazon to their own communities, using a species database and the very same GPS and GIS technologies used by scientists. Students even get a taste of peer review by presenting their projects on wiki sites and exchanging feedback with classmates. The real-life research and personal stories of Cornell grad students are included in *Crossing Boundaries* units along the way, so students can begin envisioning what their futures might look like in conservation science.

HIGHER EDUCATION

MENTORSHIP...PASS IT ON

Last year the Cornell Lab continued its proud role as an academic research institution, with Lab scientists advising more than 100 undergrad and graduate students. Cornell Ph.D. candidate Nathan Senner was one of those students, with a dissertation on a multiyear research project that banded Hudsonian Godwits with GPS data loggers in sub-arctic Manitoba and monitored their extraordinary 6,000-mile flights to Ecuador and Chile. Senner became the first scientist to detail this godwit's marathon migrations, one of the

farthest recorded travels of any bird on earth. The project also ignited the imagination of a teenager named Andy Johnson, who attended Senner's godwit lecture at the Lab's 2009 Young Birders Event. Johnson enrolled at Cornell as a biology undergrad the following year and became a field assistant for Senner, travelling with him from Churchill, Manitoba, to Tierra del Fuego. Now Johnson is hard at work on his thesis project studying Whimbrels, and making plans for his own research journeys to the Arctic and South America.

LIFELONG LEARNING

BIRD STUDY FOR EVERYONE

Cornell Lab lifelong learning programs are based on the premise that you don't have to be a college biology major to study ornithology. In 1972 the Lab introduced "A Home Study Course in Bird Biology," the first college-level correspondence course in ornithology. Four decades later, the course has enrolled more than 10,000 people in 65 countries with a rigorous curriculum of bird behavior, ecology, evolution, and more. Several zoos across the nation have made it a required course for zookeepers in training. In 2013 the

latest edition of the course's *Handbook of Bird Biology* will be published by Wiley-Blackwell as an official college textbook for university ornithology courses. Another lifelong learning course created by the Lab in 2009, *Courtship and Rivalry in Birds*, uses interactive online learning to help individuals around the world develop new skills in observing and understanding bird behavior. Enrollees so far have come from 18 countries, ranging from beginning birders to park naturalists and wildlife professionals.



Hawk and Heron Reality Shows

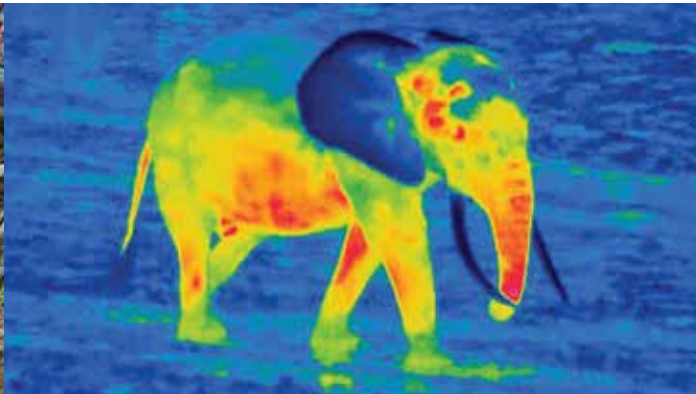
From February to June 2012, more than 2 million people from 176 countries watched the real-life drama of Great Blue Herons nesting atop a dead tree at Sapsucker Woods and Red-tailed Hawks atop a light pole on the Cornell campus, courtesy of HD web cams installed and operated by the Cornell Lab. Viewers ranged from *BirdSleuth* schoolchildren who got an educational look at nesting biology to adults who found the daily drama—from fending off owl attacks on the nest to a fragile fledgling's wavering first flight—as gripping as *General Hospital*. Three more cams launched in 2012, in partnership with other organizations, and broadcast nests from elsewhere across the country: American Kestrels in Idaho, Ospreys in Montana, and Pacific Loons in Alaska. Future cams may feature birds from more exotic locations, such as rainforests in the Amazon and jungles in Southeast Asia, thus furthering the Lab's goal to engage everyday people in the fascinating lives of birds.

MORE HIGHLIGHTS FROM 2012



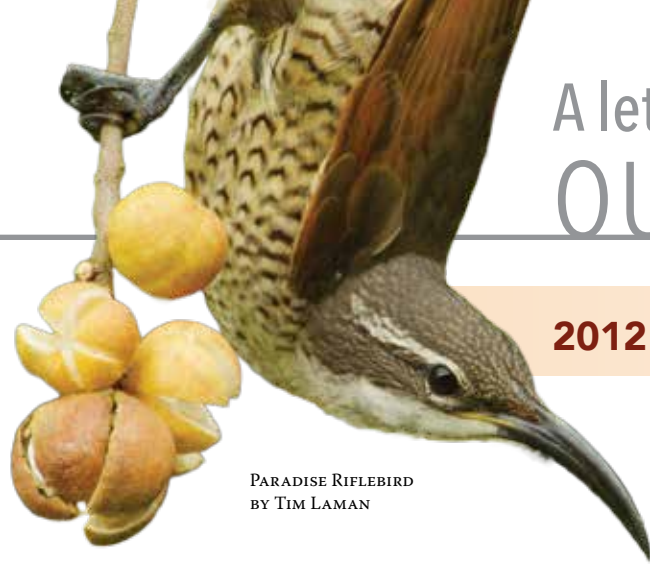
SIRA BARBET (*CAPITO FITZPATRICKI*) BY MICHAEL HARVEY

- **JANUARY:** The journal *Biology Letters* accepts a Cornell Lab paper showing how clustered habitat networks are needed to maintain the genetic diversity of imperiled Florida Scrub-Jays. The published paper prompts revision of the species' Endangered Species Act Recovery Plan.
- **FEBRUARY:** Twenty-three youth from the nation's major cities come to the Lab's "Celebrate Urban Birds" workshop, fostering connections between the arts, nature, and conservation. Said one student, "The thing I loved most was our walk in the woods at night in silence—I have never experienced anything like that before."
- **MARCH:** Lab researchers return from the Central African Republic with rare images of endangered forest elephants at night, taken using thermal-sensing technology.
- **APRIL:** On Earth Day, the world watches an egg crack and a chick emerge in a Red-tailed Hawk nest on the Cornell campus via a live stream from the Lab's high-def cams.
- **MAY:** Team Sapsucker ties the North American birding record for most species found in 24 hours. In the process they raise \$250,000 from supporters' pledges for bird conservation.
- **JUNE:** A new bird species found by Cornell graduates in Peru is named *Capito fitzpatricki* in honor of Lab director John Fitzpatrick.
- **JULY:** Citizen-science participants help beta-test the YardMap website and create more than 2,400 bird-friendly backyard designs in the first four months.
- **AUGUST:** The journal *Conservation Biology* publishes results from the Lab's deep-sea audio recorders showing that noise from ships interferes with the ability of endangered right whales to communicate with one another.
- **SEPTEMBER:** The Lab launches www.Birdcast.info, showcasing information about the new project to forecast the migrations of birds.
- **OCTOBER:** The book *Birds of Paradise: Revealing the World's Most Extraordinary Birds* is released, authored by Cornell Lab scientist Edwin Scholes and wildlife photographer Tim Laman.



MARIANNA HAGBLOOM, NEW ENGLAND AQUARIUM

From left to right: Millions of viewers around the world watched the Red-tailed Hawk hatchlings on the Cornell Lab's bird cams. The rare image of a juvenile forest elephant at night was recorded by the Lab's Elephant Listening Project. The North Atlantic right whale is one of the critically endangered whale species monitored by the Lab's Bioacoustics Research Program.



PARADISE RIFLEBIRD
BY TIM LAMAN

A letter to OUR DONORS

2012 was a milestone year for the Cornell Lab

Make Birds Your Legacy

It's easy to include the Cornell Lab in your estate plans—and sustain the study and conservation of birds for generations to come. To make a bequest through your will, simply include the language: "I give and bequeath the sum of \$_____ (or ____% of my residuary estate) to Cornell University, an educational institution in Ithaca, NY, for the Lab of Ornithology to be used in support of its charitable purposes." To learn more about estate planning opportunities that benefit you and the Lab, please call Scott Sutcliffe at **(607) 254-2424**. The Lab is pleased to acknowledge such friends in perpetuity as members of the Sapsucker Woods Society.

- **100,000** friends on the Lab's Facebook page, following our daily updates on birds from exotic rainforests to familiar backyard bird feeders;
- **2,000,000** people around the world tuned in to the Lab's web cams broadcasting the daily lives of nesting Great Blue Heron and Red-tailed Hawk families, from eggs to hatching to fledging;
- **100,000,000** eBird observations, the most year-round bird sightings ever recorded in a single database, thanks to the nearly 100,000 eBirders who have submitted data on 9,500 of the planet's 10,157 species of birds.

Never before has the Cornell Lab reached so many people with our messages of discovery, wonderment, hope, and environmental stewardship. And this fall we'll reach a whole new audience with the Birds-of-Paradise Project—a joint effort with the National Geographic Society that will introduce magazine readers, primetime TV viewers, museum goers, and many more to this elegantly plumed family of avifauna.

The triumph of the Birds-of-Paradise Project is your triumph, too. You and other members who left estate gifts for the Lab made it possible for Lab scientist Edwin Scholes to launch research

expeditions deep into the interior of New Guinea's jungles. And you should be as proud as we are to introduce the world to these incredible, strange, dazzling birds.

There's never been a better reason, nor a better time, to get the word out about our unique approach to bird conservation through groundbreaking research, technological innovation, training and education, citizen science, and mass communication via every possible channel. So invite your friends and family to discover the birds-of-paradise and the Cornell Lab that you know so well, and that you make possible with your generosity and commitment to a better world for birds and all living things.

Thank you so much for your support in 2012, and I look forward to the many milestones we'll achieve together in 2013.

Sincerely,

Sean Scanlon
Senior Director, Development and Philanthropy
(607) 254-1105; sbs259@cornell.edu

A handwritten signature in blue ink that reads "Sean Scanlon". The script is fluid and cursive, with the first letters of the first and last names being capitalized and prominent.

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FINANCIAL REPORT

(July 1, 2011–June 30, 2012)

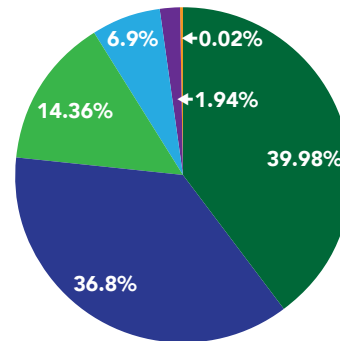
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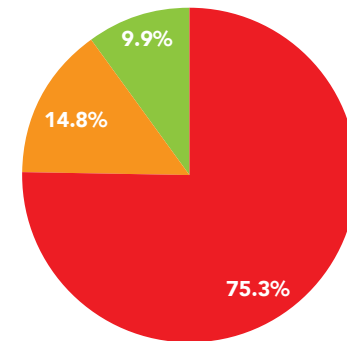
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FY12 Revenues



Membership and Gifts	\$8,859,992
Grants and Contracts.....	\$8,156,861
Program Income	\$3,182,905
Invested Funds and Related Income	\$1,528,162
Gifts Directed to Investment Funds.....	\$431,029
Other	\$3,430
Total Revenue	\$22,162,379

FY12 Expenditures



Program.....	\$16,374,246
Administration	\$3,228,620
Development	\$2,150,776
Total Expenditures	\$21,753,642

Annual Operating Revenue and Expense, 2005-2012

