BIRDCONSERVATION

The Magazine of American Bird Conservancy

WINTER 2016-17

BIRD'S EYE VIEW

The Nature of Threats to Birds

ere's a simple taxonomy of threats to birds. Those that are natural (normal predation, disease, weather events, etc.); those affecting reproduction (nesting habitat loss or degradation); and those affecting the survivorship of adults (everything else). How we think about these in the context of human priorities is critical in understanding the future of birds.

We largely accept natural threats as an unfortunate matter of course. Bird populations have evolved to survive natural threats—unless something else gets out of whack. Robust populations can survive a hurricane, but what about a species whose range has dwindled to a single island? That's why Hurricane Matthew's recent track over the Bahamas has us worried about the Bahama Oriole and the stillrecovering Kirtland's Warbler on its wintering grounds.

Threats that adversely affect habitat, such as agricultural expansion and wind energy facilities, are worse because they are normally irreversible. Most habitat lost to development is lost forever; examples of restoration are rare. Some of the best-known conservation groups focus on preventing habitat loss. They do this because it is important and because many people regret habitat loss and support protection for what remains.

It is the "everything else" category free-roaming cats, pesticides, wind turbines in migratory corridors that causes most man-versus-birds problems. Although addressing



Bird populations have evolved to survive natural threats—unless something else gets out of whack. Robust populations can survive a hurricane, but what about a species whose range has dwindled to a single island?

these non-habitat threats sometimes requires policy action, our government friends, barred from advocating for policy positions, cannot touch these issues, much as they may care. So the job of protecting birds falls to a subset of conservation nonprofit groups and concerned citizens.

Further complicating matters, some ecologists and ornithologists are susceptible to the canard that a threat to birds is unimportant unless a demonstrable "population

level effect" exists. What's a few birds lost to window collisions in the larger scheme of things, these scientists think. (In fact, it's billions each year.) We should put this myth to rest. What really matters is the cumulative effect of all threats on bird species' populationsespecially the 40 percent or so that are now in decline. Such callousness for individual birds is perilous in considering the future of conservation.

Addressing threats to birds has been a major component of ABC's work since our very beginning. Our Cats Indoors program is now in its 20th year. And we continue to take on the toughest challenges for birds, whether it's opposing poorly sited wind energy projects or developing bird-friendly building guidelines for architects. We've learned that reducing threats to birds is a lot like stopping cigarette smoking: It is the work of decades, requiring endurance and persistence.

The lesson here is that we can develop solutions that both protect wildlife and serve people. Sometimes it's difficult to find those solutions, and sometimes the solutions are not perfect. But as this issue of Bird Conservation shows, they are always there if we work hard to find them.



George H. Fenwick President. ABC

AMERICAN BIRD CONSERVANCY

ABC is the Western Hemisphere's bird conservation specialist-the only organization commitment to achieving conservation results for native wild birds and their habitats throughout the Americas.

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Senior Editor: Libby Sander VP of Communications: Clare Nielsen Graphic Design: Gemma Radko Contributors: Aditi Desai, Chris Farmer, Steve Holmer, Jennifer Howard, Michael Hutchins, Casey Lott, Jack Morrison, Mike Parr, Andrew Rothman, Cristina Santiestevan, Christine Sheppard

For more information contact:

American Bird Conservancy 4249 Loudoun Avenue, P.O. Box 249 The Plains, VA 20198 540-253-5780 · info@abcbirds.org





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Yellow-billed Cuckoo by Paul Sparks, Shutterstock

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<u>ON the WIRE</u>



In the Dominican Republic, Helping to Protect Habitat for Bicknell's Thrush

ABC has been working closely with SOH Conservación (SOH) and the Ministry of Environment and Natural Resources of the Dominican Republic (MARENA) to improve the protection of the globally important Sierra de Bahoruco National Park and the neighboring Loma Charco Azul Biological Reserve, which ABC lobbied to create.

The park and reserve, which are on the border with Haiti, include forest that provides habitat for the rare and threatened Bicknell's Thrush. They are also home to 28 of 31 bird species endemic to the Dominican Republic and provide one of the few known nesting sites for the Black-capped Petrel.

Yet the protected areas are experiencing a human and environmental crisis. Until 2014, large tracts of forest were illegally converted into small subsistence agricultural plots, or cut down and baked into charcoal for use in Haiti and for export to international markets.

ABC's collaboration with SOH is decreasing the threats to the forest where Bicknell's Thrush spend their winters. With more than 70 percent of all Bicknell's Thrush wintering on the island of Hispaniola, maintaining effective protection instruments is key to this species' survival. In the last two years, ABC has helped SOH and MARENA to hire additional staff and provide them with training (in security and firefighting, for instance) and equipment (radios, boots, canteens); improve

With more than 70 percent of all Bicknell's Thrush wintering on the island of effective protection is key to this species' survival.

guard communications and patrol protocols; and construct two new guard houses in areas that were heavily impacted by illegal activities.

The efforts are making a difference. Guards have destroyed or confiscated more than 150 charcoal ovens and have installed boundary markers, and many people who were living illegally in the park have



relocated outside the park. Together, ABC and partners continue to look for solutions that protect habitat and support local livelihoods.

Funding for this work comes from the Neotropical Migratory Bird Conservation Act, administered by U.S. Fish and Wildlife Service, Critical Ecosystem Partnership Fund; private donors; and MARENA.



Leaders in park conservation, shown at an initial meeting at Sierra de Bahoruco National Park's Visitor Center. Shown left to right: Cesár Abrill Caceres (Coordinator-SOH); Ramón Marrero Terrero (Provincial Director of Pedernales); Luis Peguero (Coordinator-Protected Areas); Jorge Brocca (Executive Director, SOH); Professor José Almonte (Chairman of the Planning Commission); and José Jimenez (former park administrator). Photo courtesy of SOH, May 2015

New Colony of Chicks Keeps Hope Alive for Rare Newell's Shearwater

or the second year in a row, — conservationists in Hawaiʻi have translocated seabird chicks to a predator-proof colony. Last year, ABC and its Hawai'i-based partners successfully moved 10 Hawaiian Petrels to a protected site at Kilauea Point National Wildlife Refuge. Last month, it was the turn of eight threatened Newell's Shearwater ('A'o) chicks to be flown by helicopter from their montane nesting areas to their new home at the refuge. Both species breed only in Hawai'i.

It's the first translocation of Newell's Shearwater chicks ever undertaken. Like Hawaiian Petrels, Newell's Shearwater chicks imprint on their birth colony location the first time they emerge from their burrows and see the night sky; as adults, they will return to breed

at the same colony. Since these chicks were removed from their natural burrows before that critical imprinting stage, it's hoped that they will emerge from their artificial burrows, imprint on the new colony, and return there as adults after three to five years at sea.

The new colony will be the only fully protected colony of this species anywhere in the Hawaiian Islands—an enormous step toward recovering this rare seabird.

So far the young birds appear to be adjusting nicely to their big move, says Dr. Lindsay Young, the project coordinator with Pacific Rim Conservation, one of several partners that made this project possible. By mid-October, five of the eight chicks had already flown away from their burrows, headed to sea.

Millerbirds Continue to Flourish on Laysan

illerbirds are thriving on Laysan Island in the Northwestern Hawaiian Islands several years after ABC, the U.S. Fish and Wildlife Service (FWS), and other partners moved 50 birds from Nihoa island to Laysan. The species was last sighted on Laysan in 1916.

In August, a monitoring team from FWS surveyed Laysan for Millerbirds, and found that core breeding habitat in the northern section of the island continues to expand and provide more potential breeding areas.

The researchers' impression was that there were more Millerbirds in the core breeding habitat than in 2014, the last year the team



had conducted an intensive demographic study. The Laysan visit, with several birds observed carrying food to nestlings and/or fledglings, suggesting the birds can

The translocation was made possible by multiple partners, including the Kaua'i Endangered Seabird Recovery Project, Pacific Rim Conservation, the Hawai'i Department of Land and Natural Resources' Division of Forestry and Wildlife, University of Hawaii-Pacific Cooperative Studies Unit, and the U.S. Fish and Wildlife Service. The National Fish and Wildlife Foundation, The David and Lucile Packard Foundation, and ABC donors provided funding support.

birds were still breeding during this breed nearly year round on Laysan.

There were five to eight birds detected outside the extended core breeding habitat in two different areas. While most were territorial males, researchers noted that there were possibly females and a juvenile present as well.

"The continued growth and expansion of the Millerbirds on Laysan is extremely encouraging," said Chris Farmer, ABC's Hawai'i Program Director. "This project has been a total success, and shows that Hawaiian birds can be saved when dedicated conservationists have sufficient resources and support."

Millerbird by Robby Kohley

ON the WIRE

A few of the bird species known to be victims of the Blue Creek Wind Farm, shown clockwise from top: Golden-winged Warbler, Sora, Black-throated Blue Warbler, Lapland Longspur, Golden-crowned Kinglet







Wind Company Sues to Keep Bird Kill Data From Public

B lue Creek Wind Farm, owned by the Spanish company Iberdrola Renewables, has filed a lawsuit in Ohio to prevent two state agencies from making public what it calls "trade secrets." The legal action comes after an Ohio bird conservation group, Black Swamp Bird Observatory (BSBO), asked to see bird and bat mortality data for Blue Creek. BSBO is not a party to the litigation.

"Iberdrola has sued to keep their data hidden from the public and from conservation organizations," said Dr. Michael Hutchins, Director of ABC's Bird-Smart Wind Energy Campaign. "What are they trying to hide?"

The facility occupies about 80 square miles in an agricultural area rich in bird life. Blue Creek puts larger birds, including raptors, at risk. But it also creates a serious hazard for bats and many smaller bird species, including Horned Lark and Golden-winged Warbler.

The company's attempt to use the legal system to block access would set a dangerous precedent if it succeeds.

ABC strongly believes that the public and environmental groups should have access to reliable data about how many of these birds and bats are killed by the facility, and that the company's attempt to use the legal system to block access would set a dangerous precedent if it succeeds. Mortality data provided by wind energy companies is a direct conflict of interest and notoriously unreliable. ABC has repeatedly called for changes in how and by whom that data is collected.

The history of the Blue Creek legal action goes back to 2013, when BSBO submitted a Freedom of Information Act request to the U.S. Fish & Wildlife Service (FWS) to find out how many birds and bats were being killed at the site. FWS denied the request, and in 2014 BSBO petitioned the Ohio Department of Natural Resources and the Ohio Power Siting Board to release the data. That triggered the company's current lawsuit against the two agencies.

ABC thanks the Leon Levy Foundation and the Robert J. Kleberg, Jr. and Helen C. Kleberg Foundation for their generous support of our work to protect birds from collisions with wind turbines.

Communication Towers Change Lighting to Protect Birds

ew guidelines for communication tower lights put in place by the Federal Communications Commission and the Federal Aviation Administration spell out how tower operators can save birds and energy without sacrificing safety. The guidelines strongly encourage tower operators to turn off or reprogram steadyburning red or white lights in favor of flashing lights, which are less deadly to birds yet still alert pilots to the towers' presence.

As of late October, operators of more than 750 tall towers nationwide had already updated their lighting systems under the new guidelines. Making the switch saves energy, reduces operating costs, and reduces bird collisions substantially.

Steady red or white lights on communication towers attract or disorient migratory birds flying at night. As many as 7 million birds a year die in collisions with towers and the guy wires supporting them.

"By extinguishing the non-flashing lights on towers, we can reduce nighttime bird fatality rates by as much as 70 percent," said Christine Sheppard, ABC's Bird Collisions Campaign Manager.

Raising Awareness of the Dangers of Neonics

N eonicotinoids are the most widely used insecticides. They are ingredients in hundreds of products, including insect sprays, seed treatments, soil drenches, tree injections, and veterinary ointments to control fleas in dogs and cats. Concentrations in products sold for residential use on ornamental plants can be as much as 30 times the amount allowed in the agricultural sector.

ABC has been researching this issue for years. In 2013, we authored a study revealing that neonics are toxic to birds and invertebrates, even in small quantities, and that they persist in soils for months and even years. In a separate study, in 2015, we found neonics present in more than 90 percent of the food samples tested from Congressional dining halls.

These chemicals have the potential to affect entire food chains. They persist in the environment, infiltrate groundwater, and have cumulative



and largely irreversible effects on the invertebrates that form the basis of the ecological food chain. The elevated levels of these chemicals in many surface waters are already high enough to kill the aquatic invertebrate life on which so many birds, bats, and other pollinators depend.

Unfortunately, many people may be unknowingly using these products in their gardens. ABC recently "There are still some 15,000 tall towers across the U.S. with outdated lights that are dangerous for birds," Sheppard added. "We are asking all tower operators to make this costsaving and life-saving switch to help migratory birds."

The new guidelines explain how owners of towers taller than 350 feet above ground level and built before 2015 can use a series of easy steps to end the use of non-flashing lights. The FCC and FAA are expected to release specifications for flashing lights on towers 150 to 350 feet above ground level.

launched a social media campaign, including five infographics, to raise awareness of this widespread threat. Follow us on Facebook and Twitter to stay informed!

ABC's Pesticides Program is grateful for the generous support of the Wallace Genetic Foundation, the Turner Foundation, the Ceres Trust, the Cornell Douglas Foundation, and the Sarah K. de Coizart TENTH Perpetual Trust.



Help Us Lift Up

From every habitat and neighborhood in the United States, twice a year, in wave after wave, billions of birds in the Western Hemisphere lift up and migrate. Waterfowl, shorebirds, raptors, thrushes, warblers, swifts, cranes, loons, and more: The phenomenon of migration is an amazing airborne spectacle each of us is fortunate to witness.

But migration and migratory birds are in trouble and need your help.

As one with a passion for birds and conservation, you have no doubt noticed habitat loss throughout the Americas is on the rise, and migratory paths are increasingly fraught with manmade threats such as wind energy facilities, pesticides, windows, and free-roaming cats. Right now, you can make a difference.

Migratory Birds

Will you help ABC save migratory birds with an extra year-end gift?

We have a special opportunity thanks to a \$500,000 challenge match launched by ABC's Board of Directors and friends. From now until December 31, your gift will be matched dollar for dollar, doubling protection for migratory birds on their breeding and wintering grounds, and reducing threats on the routes between.

Raising \$1 million by year's end is a big goal, but saving migration is the largest, most ambitious bird conservation challenge ever undertaken. With your help we can succeed!

Please use the enclosed envelope to make an additional gift, or give online at: support.abcbirds.org/helpmigratorybirds



Sandhill Cranes by Critterbiz, Shutterstock

The New Face of Wind Energy?

Alternative technologies could be safer for birds,

by Libby Sander

early every week, Kimberly Kaufman receives messages from birders and conservationists alerting her to new wind energy designs that bill themselves as safe for wildlife. The technologies come in all shapes and sizes and are in varying stages of development. Yet each claims to do one thing that conventional wind turbines can't: harness the incredible power of wind without killing birds.

Kaufman, who is the Executive Director of Ohio's Black Swamp Bird Observatory, spends a sizable portion of her waking hours trying to raise awareness of the perils that traditional wind turbines—towering monopoles with blades that churn the air up to 175 miles an hour pose for birds. So she's intrigued by the notion that entrepreneurs are dreaming up new ways to capture wind energy. And she appreciates that the Observatory's supporters are paying attention.

But she's also cautious. "If any of these designs are going to gain a foothold, we have to show that they are as efficient or at least close to the efficiency of the conventional design," says Kaufman, who is also an ABC board member. And the only way to know for sure if they're safe for birds is to build them and test them out, which raises an uncomfortable question: "Where do you decide you're going to experiment?"

Deadly Designs

Conventional wind energy technology is treacherous for birds. A 2013 study published by the ornithologist K. Shawn Smallwood in The Wildlife Society Bulletin found that wind turbines killed an estimated 573,000 birds annually in the United States. That figure may be conservative for several reasons: The country's wind capacity has since increased. Data on bird fatalities are typically collected not by independent, third parties, but by paid consultants to the wind industry. And dead birds are often hard to find—carried off by predators, or struck in such a way that they end up far from the turbine itself.

Fast-spinning blades of wind turbines are particularly dangerous to birds during spring and fall, when migrants take to the skies in billions. The wind industry has asserted that birds fly well above turbines' rotor blades. But research by federal scientists suggests otherwise: Earlier this year, a radar study along the shore of Lake Ontario by scientists with the U.S. Fish and Wildlife Service found that birds fly at altitudes that place them squarely at risk of colliding with turbines.

It's a sobering pattern that plays out all over the country, as wind projects continue to jeopardize many bird species—some of them threatened or endangered. Among the worst are Texas's Gulf Wind, which sits within two critical migratory pathways and on habitat for grassland species such as Sprague's Pipit and Long-billed Curlew; and West Virginia's Laurel Mountain, where Wood Thrush and Goldenwinged Warbler pass through or breed nearby.

Plans for new wind projects, meanwhile, have popped up in many other areas that are important for birds. They include Cape Wind, an offshore project in Nantucket Sound, an area with one of the highest concentrations of migratory birds in the world; and Nebraska's Ninnescah, which would feature a 66-mile-long power line traversing



and conservationists are watching closely

the migratory corridor of federally endangered Whooping Cranes.

With all of these projects—existing and proposed—much of the conflict between infrastructure and wildlife could be eliminated through better science and stricter regulation, says Dr. Michael Hutchins, Director of ABC's Bird-Smart Wind Energy Campaign. But there's another route, too, he says. "One of the best solutions," Dr. Hutchins says, "would be bird- and bat-friendly wind energy technology."

TOP: SheerWind, based in Minnesota, has developed a technology called Invelox that it claims is safer for birds. Pictured here is the Invelox facility on Palmyra Atoll. Photo by Cindy Coker

Entrepreneurs are trying to seize the opportunity. The resulting technologies are often otherworldly in their designs: A giant sail that funnels wind through a central turbine; a helium-filled airship outfitted with "fins" that generate electricity as the structures rotate; and a vertical mast mounted with an oscillating device meant to mimic the tilting tail of a humpback whale.

All of these new wind technologies still have a lot to prove, Dr. Hutchins says. Can they produce energy at a similar cost to traditional turbines? And can they prove they don't harm wildlife?

"If they can, then there will be no excuse for continuing to build and operate the bird- and bat-killing kind," he says. But it's not as simple as developing technologies that are friendlier to wildlife, he adds. "Government regulators don't hold wind energy companies accountable for bird deaths, so they have no incentive to change."

A Different Approach

One of the new companies is SheerWind, whose Invelox technology harvests wind energy even in areas where airflow is minimal. Invelox captures wind by funneling it through tubes that "squeeze" the wind and increase its speed, much in the same way that putting one's finger over a garden hose will accelerate the flow of water. Then, multiple turbines located inside the structure generate power from the magnified wind speed.

Daryoush Allaei, the founder and Chief Executive Officer of Sheer-Wind, first heard of wind energy's "bird issues" while researching traditional turbines' adverse effects on other creatures: humans. As he dug into the matter of noise and vibration, he discovered that bird fatalities were a major concern, too. So he got to thinking about different ways to harvest wind.

"The problem is that wind turbines are the only electromechanical system ever invented where the fuel is not controlled," says Dr. Allaei, a mechanical engineer who has done research and development for the U.S. military for nearly 30 years. "Fuel in this case is wind. And when the fuel is not controlled, you have bird issues, noise issues, cost issues, efficiency problems. Invelox basically puts the fuel under control. When you do that, you solve all those issues."

Dr. Allaei claims one Invelox structure produces between two and a half and three times as much energy as one traditional turbine. He also says there are several reasons why the technology is safe for birds: the funnel-like structure has no rotating components on the outside; nets can be installed at the opening to prevent birds or bats from entering;





and because the technique works just as well in low wind speeds, it doesn't need to be installed in windy corridors along or near birds' migratory pathways.

Invelox is currently operating at three locations: a test facility at SheerWind's corporate headquarters, in Chaska, Minn.; at the U.S. Army National Guard's Fort Custer, in Michigan; and on Palmyra Atoll, a tiny dot in the Pacific 1,000 miles south of Hawai'i that is co-owned by The Nature Conservancy and the U.S. Fish and Wildlife Service. Several more installations are being built, including sites in China, Denmark, the Netherlands, and New Zealand.

SheerWind does not systematically collect data on bird fatalities at its three existing wind facilities. But Dr. Allaei notes that every day, company employees inspect the Minnesota structure, which has been operational since 2012, and so far have only once encountered feathers—presumably from a pigeon that wandered into the funnel. Although the company has no data on birds from the Palmyra Atoll installation, it could be particularly instructive: Palmyra provides nesting habitat for more than a million seabirds.

Still, Dr. Allaei says he is optimistic that his technology doesn't harm birds. "We are bird-safe. We have no evidence otherwise," he says. "Common sense tells me that birds are more equipped naturally to avoid a static structure than a rotating structure. So for that reason I think we have a better chance."

A Need for Innovation and Vigilance

Although he's cautiously optimistic about such new technologies, Hutchins says an absence of dead birds isn't the same as scientific proof that a technology is safe for wildlife. Empirical evidence through rigorous scientific testing is the only way to determine whether Invelox or any other approach is truly "bird-safe." Palmyra provides nesting habitat for more than a million seabirds, such as this Red-footed Booby.

Photo by Cláudia Brasileiro Martins Kagiyama

He would also like to see the federal government devote greater financial support to research and development of alternative wind energy designs—especially those that seem most promising.

Cindy Margulis, Executive Director of Golden Gate Audubon, in California, thinks Silicon Valley could provide a boost, too. "In our patch of the nation, we recognize that the combination of incentives and exacting design constraints sometimes produces true innovation," Margulis says. What if, she wonders, a wealthy benefactor were to underwrite a competition to design a new way of generating renewable energy that is 100 percent compatible with sustaining wildlife populations, and doesn't destroy existing habitats?

"Our wildlife populations would sure be well served if we could figure out how to produce renewable energy widely without adversely impacting wildlife and sensitive habitats," Margulis says.



Until that happens, however, bird conservationists have their hands full with monitoring the current industry. For more than a decade, Golden Gate Audubon has pressed industry and government to stop the slaughter of wildlife at the Altamont Pass Wind Resource Area in Northern California, where at least 4,700 birds die every year—including 1,300 raptors—at Altamont's facilities.

Thousands of miles away, in northern Ohio, Kim Kaufman is fighting a similar battle. Two years ago, Black Swamp Bird Observatory petitioned two state agencies to release data on how many birds were dying at Blue Creek Wind Farm. The facility's parent company, Iberdrola, is now suing the agencies to keep the information private. (See page 6).

Conflicts like these make Kaufman circumspect about the new technologies. Regulation of the current wind energy industry is woefully inadequate, she says. "Once we develop a better regulatory framework, then we can start to talk about how to fit other designs into that framework."

There are many lingering questions, she says. How would these alternative designs be regulated? What procedures and protocols would be necessary to monitor and evaluate them? How might they negatively affect birds in ways that are different from traditional wind turbines? Addressing those questions will be crucial, she says, "So we're not looking back and saying, 'We made the same mistakes we made with the conventional design.'"

Dr. Hutchins thinks the answers are within reach. "Bladed turbines are a 2,000-year-old technology," he says. "We can do better."



Libby Sander is Senior Writer and Editor at ABC. A journalist for 13 years before joining ABC, she wrote news stories and award-winning features for The New York Times, the Washington Post, and The Chronicle of Higher Education. You can follow her on Twitter at @libsander.



Among the species killed by wind turbines at Blue Creek in Ohio (clockwise from top left): American Tree Sparrow, Killdeer, Black-and-white Warbler, and Horned Lark

Learn more about Bird-Smart Wind Energy: abcbirds.org/program/ wind-energy/

Seeing the INVISIBLE

An architect uses ABC's bird-smart building guidelines to highlight window collisions

By Cristina Santiestevan

t first glance, the building fragments could be mistaken for a series of abandoned, half-finished houses. And that is entirely intentional. Architect Joyce Hwang and artist Ellen Driscoll conceived and created the three cedar-and-glass structures that make up their art installation, known as Bower, as a tangible reminder that our homes and buildings are very much a part of the larger natural world.

"When we think of buildings and built structures, we think of them as being only for humans," says Hwang, an associate professor of architecture at the University at Buffalo. "But in reality, anything that's out there in the world is inhabited by a whole host of users, whether or not they're intended."

Hwang hopes Bower—a recent addition to Artpark, a visual and performing arts park in Niagara County, N.Y.—will inspire visitors to think broadly about the impact of human-built structures on wildlife. But she and Driscoll designed their installation specifically to highlight a problem many people overlook: birds colliding with glass windows.

"We constantly want to look through glass to frame the world," Hwang says, "but it is something that is so deadly to animals, and to birds in particular. It's something



that I think is not often acknowledged by the public."

Earlier this year, Artpark and City as Living Laboratory, an organization that raises environmental awareness through the arts, commissioned Hwang and Driscoll to create their installation. The pair soon discovered a mutual interest in birds. Hwang was eager to spotlight the Bower, an art installation in New York State, aims to bring attention to the problem of birds colliding with glass windows. The project is a collaborative effort between architect Joyce Hwang and artist Ellen Driscoll. Photo by Joyce Hwang

contradiction of windows as something both beautiful and dangerous, while Driscoll wanted to explore a new vehicle for her illustrations of birds and habitat. Bower, with its three post-and-beam structures and beautiful and birdsafe windows, was the result. Functional birdhouses sit atop the walls. Driscoll's illustrations and other birdsafe treatments adorn each window to create a piece of art that emphasizes windows' transparency—so dangerous for birds—and solutions to address it. Even the name "Bower" acknowledges the relationship between built environments and the natural world; the word is defined as both a rustic dwelling or cottage and a leafy shelter or recess.

Lethal Miscalculations

The problem with glass is simple: birds can't see it. They, like humans, either see through the glass or see the reflection in the glass. Unlike humans, birds cannot distinguish between the two.

"A lot of people believe that humans can see glass," says Christine Sheppard, ABC's Bird Collisions Campaign Manager. "But the fact is that we cannot. People learn about the concept of glass. People understand architectural cues. So, even though the glass is invisible, we know that a window frame means there's glass there. Birds never learn that concept. They take what they see literally." Unable to comprehend glass as a barrier, birds fly into windows with startling and lethal frequency. Current estimates from the Smithsonian Migratory Bird Center put the number of birds killed by collisions with windows at somewhere between 365 million and 1 billion every year in the United States alone.

According to Sheppard, migrating birds such as Wood Thrush and Ruby-throated Hummingbird are especially vulnerable. "The majority—but by no means all—of the birds that hit glass are songbirds that are migrating from their wintering grounds to their breeding grounds and back again," she says. The birds travel by night, and then forage during the day. Because each day brings new territory, the migrants are continually exposed to unfamiliar panes of glass.

"Whether you say 'up to a billion' or 'hundreds of millions,' it's still an enormous number," Sheppard says. "Everybody has seen a bird hit a window, or heard a bird hit a window. But they all think it's kind of unusual. People don't realize how many birds have to be hitting windows in order for basically everybody to have had that experience."

The majority of the birds

that hit glass are songbirds

that are migrating from

their wintering grounds to

their breeding grounds and

back again.

Windows are the second-most lethal threat to birds that can be linked directly to human activity. Only domesticated cats kill more birds. And while glass-wrapped skyscrapers probably kill the most birds per building, private homes are responsible for approximately half of all bird deaths by window collision. The reason for this is straightforward: there are many more private homes than there are skyscrapers.

This presents a challenge and an opportunity. Glass—in the form of windows as well as other architectural features—is so common that it can seem an insurmountable problem. Yet solutions are readily available, and anyone with access to a pane of glass has the potential to save the lives of birds, Sheppard says. "This is one of the very few conservation issues where you can go home and actually make a difference."

There are two ways to help. Hide the glass—and its reflection—completely, or modify the glass so there appears to be a barrier between the bird and its intended destination. Retractable solar blinds mounted to the exterior of a window is one method, and works well for conference rooms or guest rooms where windows are rarely used by human occupants. Elsewhere, applying decals, paint, insect screens, or other visible barriers to the exterior of a window will do the trick.

"It turns out that birds are very good at accurately estimating the size of their bodies," Sheppard says. Birds use this ability to gauge whether they can fly through or between an obstruction. This knowledge helped guide the creation of ABC's recommendations for bird-friendly building design and bird-safe glass. Hwang referred to

Swainson's Thrush by Double Brow Imagery, Shutterstock



these guidelines during the creation of both Bower and No Crash Zone, an earlier installation that was also meant to draw attention to the problem of window collisions.

Art and Advocacy

Bower's origin story may date back to 1998, when Hwang was working at an architecture firm. Asked to select products to keep birds off a building, she looked at catalogs of bird spikes and wires and thought it strange that the building would invite birds to land, and thus require deterrents. Then, while pursuing a Master of Architecture degree at Princeton University, she enrolled in a course called Architecture and Biology.

"That's when the wheels started turning a bit more," Hwang says. "After I finished grad school, I really was trying to develop my own agenda."

Hwang completed her graduate studies in 2003, and in 2005 joined the faculty of the University at Buffalo. She now divides her time between teaching and developing installations, weaving together her interests in wildlife and architecture. Hwang's first project of this kind was Bat Tower, completed in 2010. That installation provided habitat for bats and also highlighted the threat of white-nose syndrome, a fast-spreading disease that has killed millions of bats since 2007.

"It seemed like this great ecological crisis that no one was paying attention to," Hwang says. "So I wanted to make a structure that would draw awareness to these animals and reveal them or bring some attention to them as a critical part of our ecosystem."

Bat Tower was followed by Bat Cloud. Hwang then broadened her focus to include birds, incorporating both bat houses and bird houses in her next installation, Habitat Wall. Bower is Hwang's most recent work, and she has already begun two new projects.

Sheppard, who has yet to visit Bower herself, says she wishes more people could see the installation





Architect Joyce Hwang's interest in wildlife and architecture has resulted in several projects, including Bower, pictured here. Photo by Sergio Lopez-Pineiro

because it makes real a poorly understood problem. "Even architects who are interested in sustainable design often have not thought about birds," she says. "They don't know that it's a big problem. But the minute you point it out to them, they agree that sustainable buildings should not kill birds."

Hwang, for her part, has always been fascinated by humans' conflicted relationships with animals. In exploring this struggle through Bower and her other projects, she says she hopes to emphasize the problems and perhaps inspire change. "I feel very strongly that architecture can be a form of advocacy."

Visit **birdsmartglass.org** for a list of ABC-recommended solutions for homes and commercial buildings.



Cristina Santiestevan is an independent writer and editor committed to sharing stories about nature and conservation in today's world. She has written about the ecology of gardens, the myriad impacts of climate change and habitat loss, and the surprising conservation value of whale poop. Visit her blog at outlawgarden.com.

Turning Tragedy into Advocacy

A veterinarian reflects on his feathered patients—and their legacy

By Aditi Desai

One out of seven. That's how many small birds brought to the Wildlife Center of Virginia have been captured and injured by domestic cats. Of those, 80 percent die or have to be euthanized because of the severity of their injuries.



TOP: Dr. Dave McRuer examining a newly admitted patient. The Brown Thrasher, which had been attacked by a cat, later died of its injuries. Photo by Aditi Desai

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Backyard birds—American Robins, Mourning Doves, Blue Jays—are the most frequent victims, but the center's veterinarians also treat migrating warblers and vireos; raptors; and even species such as Purple Gallinule. It's a problem that plays out across the country with staggering frequency in yards, neighborhoods, and even the most remote landscapes: Scientists estimate that outdoor cats kill 2.4 billion birds in the United States every year.

The Wildlife Center of Virginia recently published an analysis in The Journal of Wildlife Management of nearly 21,000 birds and small mammals brought to the center between 2000 and 2010. The study concluded that cat-caused injuries were the second-greatest cause of death for the center's small avian patients.

We spoke with Dr. Dave McRuer, Director of Veterinary Services at the center and a co-author of the study, about the problem of freeroaming cats inflicting serious, and often fatal, injuries on birds.

Aditi Desai: What is the process for treating a bird that comes in with injuries from a free-roaming cat?

Dave McRuer: These birds are often very stressed because of the attack, human rescue, and transportation to the Center. So we often will give them some time to rest.

When we do have the bird in our hands, we examine it from one end to the other, looking very, very carefully for any kinds of lesions that might be on the skin. The most frequent kind of injury on cat attack patients has to do with trauma to the muscles and skin, and fractures.

AD: Do you ask the rescuer for additional information about the injured bird during the intake process? Is this information helpful for the treatment?

DM: We rely a lot on the rescuers to tell us whether they suspect a cat has been involved. Because if



there's a cat in the picture whatsoever, we prophylactically will start to administer antibiotics. If we don't start antibiotics right away, then the chance of death increases tremendously; cats' teeth are incredibly sharp and they carry a deadly bacterium in their mouths.

After our physical exam, if we find any wounds, we flush the lesions to remove as much bacteria as possible. Then we'll either try to close the skin, or we repair fractures and/ or try to repair some of the soft tissue that may have been damaged.

In addition to antibiotics, we always treat these patients with fluids and anti-inflammatory or anti-pain medications and try to do everything possible in veterinary medicine to give them the best opportunity to survive. If the bird survives for the first 24 to 48 hours and there are no severe tissue wounds, the prognosis for release is greatly increased.

AD: Do all wildlife attacked by cats have visible injuries?

DM: We've analyzed our data, and we've determined that of the birds admitted following a cat attack, about 15 percent show no signs of injury whatsoever. However, most of those have to be euthanized or die. The reason is that a cat's tooth is very sharp and can cause little puncture holes in the skin and muscle tissue. Feathers tend to mask where the injuries are, and we may not see them on our physical exams.

A cat's mouth has a number of different bacterial species. One produces a toxin that can be deadly even with veterinary care. [It's also harmful to humans.] If the bacterium is in the bird and we don't know the wound exists, we don't have an opportunity to flush the wound to try to get rid of some of that bacteria. And if we don't put that animal on antibiotics right away, then we

A few of the many cat-killed birds seen by the Wildlife Center each year. Photo by Dr. Dave McRuer

know that within 24 to 48 hours that animal is going to die from septicemia, or blood poisoning.

AD: When you examine these injured animals, how do you feel? What do you hope rescuers and cat owners can take away from these incidents?

DM: When we admit animals that have been captured by cats, I feel saddened, as most of these injuries are preventable. We always try to do what's best for our wildlife patients and think about the quality of life of those animals. So if the animal has injuries that are non-sustainable with surviving in the wild, then the best option is humane euthanasia.

We try to highlight many of our patients' stories and use them as teachable moments for wildlife conservation. If we can discuss the injuries and consequences of freeroaming cats, even just focusing on the individual rescued animal, it often leads to conversations about prevention. These include the importance of keeping owned cats inside and the need to reduce the number of free-roaming cats in the environment. Many people are only aware of the small number of cat victims they personally witness, not the massive number of wildlife injured by all free-roaming cats.

AD: Do you think there is a longterm solution that will protect birds and other native wildlife?

DM: It's an extremely daunting issue to have free-roaming cats in the wild when we know that they prey upon our native wildlife. As a veterinarian working with injured wildlife, it's incredibly depressing because we know that those animals that come in only stand about a 20 percent chance of surviving to a point where they can be released.



Domestic cats are not native to North America and they don't belong in the environment.

definitely are being impacted by

late for many species.

What keeps you going?

my colleagues.

free-roaming cats, and I hope that realization occurs before it is too

AD: You see so many discourag-

ing things on a day-to-day basis.

DM: The fact that we are able to

release a third of our patients. They

have a second chance at survival.

and that means a lot to me and to

It's also heartening to train stu-

dents who are interested in helping

injured wildlife. Our students learn

about many current conservation is-

sues, like the impact of free-roaming

cats on wildlife or the consequences

car window. We hope our students

of throwing an apple core from a

share these messages with family,

friends, and their larger communi-

ties to help spread the word. That

ABC thanks the DI&T Foundation.

Lynde Uihlein, and the Frances

V.R. Seebe Trust for their support

Go to abcbirds.org/program/cats

to learn how you can protect birds

gives me a lot of hope.

from free-roaming cats.

In terms of solutions, I think we have to recognize that domestic cats are not native to North America and they don't belong in the environment. They are wonderful house pets. I have cats myself and love them dearly. However, my cats are indoor cats, or we put them into outdoor cat rooms or areas where they can still have a wild experience but they don't have contact with wildlife.

AD: Do you think advocates for keeping cats indoors will succeed in shifting mindsets and policies enough to protect all native wildlife?

DM: I am hopeful for a world of indoor cats, where wildlife are free from unnecessary predation and cats are able to live longer and healthier lives. But sadly I don't think domestic cats are ever going to be completely removed from the North American environment. It is encouraging that many people are working hard to find solutions for this contentious conservation issue through education, compromises, and the love of all animals.

I think there will be a time when people will recognize that wildlife



and Senior Producer at ABC. Her work has taken her from the prairies of Wildlife Center of Virginia and saw firsthand the dedication of staff and

of our efforts.



By Jennifer Howard

One of the biggest threats to Hawai'i's native forest birds is also one of the tiniest. Non-native mosquitoes that spread two deadly diseases, avian malaria and avian pox, have infiltrated the main islands. The diseases, like the mosquitoes, are also non-native, and they're decimating native bird populations already stressed by habitat loss and introduced plants and animals.

Aditi Desai currently works as the Assistant Director of Communications North Dakota to the forests of Pennsylvania. Aditi spent four days at the volunteers as they cared for injured native wildlife.

Mosquitoes spread disease among Hawai'i's struggling forest birds.

Can biotechnology help?

TOP: 'Apapane being bitten by a mosquito. Photo by Jack Jeffrey. Mosquito photo by Isara Kaenla, Shutterstock

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The threat is becoming even more dangerous for Hawai'i's birds. For many species, global climate change is projected to increase the transmission risk as mosquitoes—and the malaria parasite—are able to survive at ever higher altitudes. A wave of extinctions could follow.

Recent advances in biotechnology could prevent this epidemic. Several techniques now exist to modify, suppress, or even eliminate mosquito populations to preclude the spread of avian diseases. Some of these approaches, including the introduction of sterile male mosquitoes and a bacteria that disrupts the reproduction of mosquitoes and pathogens, have been tested successfully and safely elsewhere. Other more controversial techniques, notably so-called gene drives, are still in the developmental stages.

None of these techniques have been shown to directly affect human health. And removing the mosquitoes could help to restore the islands' natural state of affairs. These unwelcome insects "are not a natural part of the Hawaiian food web. No native species depends on them," says Chris Farmer, ABC's Hawai'i Program Director.

Still, manipulating nature can have unintended consequences, and conservationists are approaching the matter with care. When, where, and if any of these techniques are deployed to save Hawai'i's birds depends not just on the state of the science, but on appropriate oversightand, most critically, on making sure that Hawai'i's human population supports such an intervention to save the islands' birds.

Carriers of Disease

Hawai'i has no native species of mosquitoes. The insect invaders began arriving by ship in the 19th century, carried as larval stowaways in vessels' water supplies. Two species of mosquito, Aedes aegypti and Aedes albopictus, are the chief vectors for diseases that affect humans, including malaria, chikunguya, dengue fever, and Zika, which has been raising alarms around the world this year. Hawai'i's Big Island suffered an outbreak of dengue fever earlier this year that sickened more than 260 people.

For birds, a different species of mosquito, Culex quinquefasciatus, is the one to worry about. The insects don't have to penetrate feathers; they aim for the skin of the legs or around the eyes. When they bite, infected mosquitoes transmit the

These unwelcome insects are not a natural part of the

Hawaiian food web. No native species depends on them.

The 'I'iwi is another Hawaiian honeycreeper that is vulnerable to mosquito-borne diseases. Photo by Robby Kohley



avian pox virus or the parasite that causes avian malaria.

The consequences for the victims are ugly and often fatal. A bird infected with pox can develop large tumors on its legs and eyes and around its bill—"anywhere there's exposed skin," Farmer says. "Birds can just get so many tumors that they die."

Avian malaria, though less gruesome, is no less dire. It ruptures red blood cells, causes internal organs to swell, and infected birds become lethargic and often die from fever. If they survive, they can suffer lasting effects that make it harder for them to reproduce and live out full lifespans.

Decimating Hawai'i's Forest Birds

By the late 1800s, as the *Culex* mosquitoes spread, avian pox had

taken hold among the islands' bird populations, contributing to a rash of extinctions around 1890. By the early 1900s, avian malaria had begun to take a noticeable toll as well, leading to many extinctions in the first half of the century and limiting the range of most remaining bird species to elevations above 4,500 feet.

Native honeycreepers such as critically endangered 'Akikiki, 'Akeke'e, and the more widespread 'I'iwi are currently the biggest losers. The first two species are already on the brink of extinction—each has fewer than 1,000 individuals remaining—and increasing exposure to diseases could push them over the edge. As climate change increases temperatures and alters rainfall patterns, the mosquitoes are spreading upslope. Some population and habitat-change

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population declines of more than 90 percent in recent years.

models suggest that without fast conservation action, many species could be wiped out as soon as 2020.

Kaua'i, with its lower elevations, has been especially hard hit. "Most of Kaua'i's endemic birds are crashing pretty hard," says Farmer, with some species suffering population declines of more than 90 percent in recent years.

Too many have already vanished. Only 17 species of native forest honeycreeper remain, down from 39, according to Joshua Fisher, an invasive species biologist with the U.S. Fish & Wildlife Service. Avian malaria is one of the main culprits. "Our birds have been dealing with this for decades, and we're in critical

TOP: Native Hawaiian birds find refuge from mosquitoes in the montane forests of Kaua'i's Alaka'i Swamp. Photo by Jack Jeffrey

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numbers now," Fisher says. The remaining birds have been restricted to higher-elevation stands of forest that remain mosquito-free. But as temperatures warm and rainfall patterns change, mosquitoes will invade those refuges as well.

Fisher coordinates an avian malaria working group in Hawai'i that has brought together scientists and conservationists from federal and state agencies, universities, and NGOs, including ABC. Their goal: to assess an array of different biotech solutions that could resolve this crisis and provide more habitat for the birds—if the science and public opinion agree.

End of the Line

The simplest way to reduce or eliminate mosquitoes is to make sure they don't reproduce. Under an approach called Sterile Insect Technique (SIT), for instance, sterilized male insects are released into the wild in large numbers. Female mosquitoes, overwhelmed by the influx of sterile males, are unable to produce offspring. Release enough sterile insects, and the population crashes.

SIT, which doesn't affect other species or the environment, has been around for decades. It has a record of success in the United States and beyond, having been used effectively for more than 40 years against agricultural pests in California, Florida, and other states, and to eradicate screwworm from the U.S. and Central America.

Kenneth Kaneshiro is Director of the Center for Conservation Research and Training at the University of Hawai'i at Mānoa. He was central to an SIT program in Japan, where the technique succeeded in

Everybody involved in these ongoing conversations agrees on one thing: Public approval is critical before biotech can be brought to bear

on Hawai'i's mosquitoes.



ridding the Okinawa archipelago of two non-native species of fruit fly, with no damage to public health or the native ecosystem. In September 2016, during the IUCN World Conservation Congress in Hawai'i, Kaneshiro convened a two-day workshop to discuss the feasibility of a mosquito-free Hawai'i.

Everybody involved in these ongoing conversations agrees on one thing: Public approval is critical before biotech can be brought to bear on Hawai'i's mosquitoes. "We need to be sure that the general public will accept any mosquito eradication program that's adopted in the Hawaiian Islands," Kaneshiro says.

A group called Revive & Restore, which promotes the "genetic rescue" of endangered or extinct species, has been active in these discussions. Ryan Phelan is Revive & Restore's Co-founder and Executive Director. Among the techniques she believes "could be really effective at knocking down mosquito populations even in remote areas" is a naturally occurring bacterium called Wolbachia. This parasite can

affect mosquitoes in a variety of ways, including female sterility and a reduced ability to transmit agents of disease.

Wolbachia has been used for some time in agriculture as a sort of natural pesticide against a range of insects, and some people find it an attractive solution because it does not require genetic manipulation. Using it in Hawai'i, she says, might "give the birds a chance."

Genetic Interventions

Many conservationists also have high hopes for a technique that involves mosquitoes genetically edited to be unable to breed successfully. It's a type of modified SIT: release enough of the altered insects, and mosquito populations plummet. A firm called Oxitec has pioneered this approach in Brazil and elsewhere against dengue and Zika, with Florida next on the list. That work doesn't involve the Culex mosquito-yet-but the technique could be applied to that species for the benefit of birds.

A completely different approach that has grabbed headlines lately is so-called gene drive technology. It involves altering an organism's genome in order to "drive" a trait through a population. For instance, Culex mosquitoes could be modified in order to derail their ability to breed. Although many researchers are at work on gene drive techniques, they are controversial and many years away from being fieldready. The National Academy of Sciences, among others, has made it clear that policy and regulatory safeguards have to catch up with the science before the techniques leave the lab.

'Akikiki by Jack Jeffrey



the benefits to Hawai'i's birds would be immense.

In the meantime, Hawai'i's birds could still benefit from the enormous efforts being made to reduce mosquito-borne threats to humans. "All this energy, all this momentum, all this funding is going into eliminating the mosquito as a vector," Phelan says. "Conservation has a unique opportunity right now to capitalize on the investment being made in human health."

Whatever the decision. it needs to be made soon. "The window is definitely closing on these birds," says ABC's Farmer. "We don't have a ton of time. Doing nothing—whether through indecision, lack of awareness, or any other reason-will lead to further extinctions."

ABC hasn't endorsed any one approach but is staying abreast of the

science and is actively involved in the discussions. "Some of these techniques are controversial, but the technologies are so different from one another that it's like comparing a paper plane to a jet engine," says Mike Parr, ABC's Chief Conservation Officer. "You don't throw them all out just because one is especially contentious."

Regardless, Parr says, it's critical that the public has every chance to weigh in on the policy- and decision-making. "This is a community decision, and not



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something a single organization or agency can decide."

If invasive mosquitoes were safely controlled or eliminated, the benefits to Hawai'i's birds would be immense. Species now confined to small patches of mountain habitat could expand their range again if lower elevations were mosquitofree. "The birds we have left are the most robust species," ABC's Farmer says. "They survived this long. And if we give them a little bit of help, they can survive for future generations."

Jennifer Howard is Director of Public Relations at ABC. She was a writer and reporter with The Chronicle of Higher Education for 10 years and before that was a contributing editor and columnist with The Washington Post. She writes nonfiction for The Times Literary Supplement and the Boston Review and her fiction work has been published by Virginia Quarterly Review and others. Follow Jen on Twitter at @JenHoward.

FINAL GLIMPSE

While Confronting Climate Change, **Remember Conservation's Roots**

By Casey Lott and George Fenwick

limate change is not the biggest threat to birds. It's much more important than that. Climate change is the biggest threat to life on Earth. The way we respond to climate change will determine the fate of humans and the entire range of species over the next century and beyond. Fortunately, there are many high-quality organizations and individuals working tirelessly to reduce the ill effects of climate change on humans and wildlife. These organizations deserve our support.

At ABC, we believe that although climate change is clearly an existential threat, we simply can't afford to ignore or de-emphasize the other major issues that have caused declines for birds over the past century. These issues must still form, as they always have, the backbone of our conservation.

When it comes to bird conservation, the largest and most acute threats are still what they've always been: habitat loss, habitat degradation, and direct mortality from human activities. These threats require specific actions that may have nothing to do with climate change remediation. If bird conservation in particular, and wildlife conservation in general, fails to stay focused on anthropogenic threats separate from climate change, many species will continue to decline—and some will become extinct-well before climate change has the chance to threaten them.

Direct causes of habitat loss such as deforestation, urban and



If bird conservation fails to stay focused on anthropogenic threats separate from climate change, many species will continue to decline-and some will become extinctwell before climate change has the chance to threaten them.

suburban growth, the expansion of industrial-scale agriculture, and habitat fragmentation due to resource extraction are not going away in the near future. That's why we at ABC take on many of the specific causes of bird mortality that are serious enough to place some species in danger of extinction: poisoning by environmental contaminants,



Casey Lott is Vice President for Conservation Information Synthesis at ABC. He has diverse ornithological experience working with passerines, seabirds, and raptors, and has participated in conservation programs to monitor raptor populations and decrease bird collisions with towers on migration routes.

survival depends on it.

over-exploitation for illegal wildlife

shooting, collisions with windows

and other human structures, and

new dimension to many of these

threats, but it does not supplant or

additional threat of climate change.

protect native bird species and their

and routinely consider native birds

in all land-use and policy decisions.

trade, direct persecution from

more. Climate change adds a

ABC is committed to a vision

that does not waver given the

We envision an Americas-wide

landscape where landowners,

producers, governments, and

conservationists collaborate to

habitats, value their protection,

This approach guides our work

in many ways. We team up with

partners across Latin America to

protect rare birds and help many

other species. We join forces with

state and federal agencies in the

U.S. to restore bird habitats from

coast to coast. And we advocate in

Washington, D.C., to reduce some

threats to birds, pushing for stricter

industry. We will continue to fight,

first and foremost, for birds. Their

oversight of pesticides and more-

effective regulation of the wind

of the thorniest human-caused

develop reserve networks that

diminish them.



I became a member of American Bird Conservancy in 2006 and was so impressed [with the organization] that I joined ABC's Legacy Circle in 2007.

My path to ABC and the conservation sector started many years ago with a deeply held commitment to the protection of the environment and the birds and wildlife that depend on it. This commitment has guided my charitable giving and how I spend my personal time-birding, hiking, running, and nature photography.

Five years ago I chose a new career path that enabled me to marry avocation and vocation. I now work at a well-respected environmental

organization, but it is equally important to me that I make a positive impact beyond my lifetime on bird conservation and the creatures that bring me so much joy. That is why I joined ABC's Legacy Circle.

I am involved with and provide financial support to a number of well-known bird conservation and environmental organizations. Yet, it is ABC that is best aligned with my goals of advancing a strong bird conservation agenda and achieving strategic and meaningful results.

There are many reasons why I have included ABC in my will and why I share my enthusiasm for its work with friends,

You can leave a legacy for birds when you join ABC's Legacy Circle with an estate gift through your will, retirement plan, trust, or life insurance policy. If you would like more information, or if you have already included ABC in your estate plans, please contact Jack Morrison, Planned Giving Director, at 540-253-5780, or at jmorrison@abcbirds.org.

family, and colleagues. ABC creates and protects habitats, develops and shares best practices that ground its work, leads collaborations to leverage resources and multiply the results, and takes on difficult challenges to reduce threats to birds. No organization has done as much as ABC to protect birds across the Americas.

The staff of ABC is incredibly effective and committed and I am fortunate to have experienced several ABC field trips with them. It is a privilege to be associated with this outstanding organization now and in the future. I hope that you will become part of the ABC family too.

- Cindy Ferguson



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The Hispaniolan Crossbill, a distinctive bird found only in the Dominican Republic and protected by the conservation work of ABC and in-country partners. Photo by Guillermo Armenteros

