

USA TODAY NETWORK

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PARADISE

LOST

HABITAT  
DESTRUCTION AND  
CLIMATE CHANGE  
ARE PUSHING BIRDS  
TO THE BRINK



PARADISE *LOST*



MALE  
PASSENGER  
PIGEON



OUR ANCESTORS  
UNDERSTOOD THE  
*SANCTITY OF BIRDS*

NOW, WE MUST  
*PROTECT  
THEM*

Deb Haaland Special to USA TODAY NETWORK

As a Pueblo kid, much of my knowledge about our culture and traditions was passed down to me by my mom and grandparents. In the summers, I’d rise early and eagerly accompany my grandfather to his cornfield on the north side of Mesita Village on the Pueblo of Laguna – my peoples’ ancestral homelands. Neat rows of corn and several apricot trees graced the landscape. • Beyond the fields, the Rio San José – a primary water source for the region’s people and animals – flowed quietly, and an occasional train sounded its roll along the tracks. A towering red sandstone mesa loomed over it all.

Birds always dotted the skies and the land, and my grandfather would point out which ones carried his prayers near, far, close to the ground, and up high to the heavens. I found pride in irrigating and cultivating the plants that fed us, as well as the birds who carried our prayers to the spirits up above. There on the Pueblo, everything was connected.

Since time immemorial, birds have appeared in Pueblo culture and art because they are foundational to our lifeways. Motifs like eagles, with their black-tipped wings and round, sharpened beaks, commonly adorn Indian art and jewelry.

But so too do hummingbirds, robins, hawks, wild turkeys, roadrunners, New Mexico’s avian mascot. Even parrots appear on my peoples’ pottery, jewelry, paintings and more. Whether through art or utilitarian items, Pueblo peoples pay homage to the birds who carry our prayers, pollinate our crops, and keep our ecosys-

tems intact. To this day, the Pueblos use feathers in their ceremonies throughout the year. During various feast days across New Mexico, visitors may have opportunities to witness eagle dancers moving in unison to the beat of the drum, emulating the flight of eagles with outstretched arms. These dancers pray as they dance, and bring the blessings of the eagles to the people watching and to the larger community.

Years before I became Secretary of the Interior, I had a special fascination for passenger pigeons, which at one time numbered in the billions. Onlookers commonly reported these massive flocks darkening the skies in flight, sometimes for days at a time. Potawatomi Chief, author, and Native American advocate Simon Pokagon wrote in his 1895 essay, “The Wild Pigeon of North America”:

Continued on next page







SAGE  
GROUSE

Continued from previous page

“It was proverbial with our fathers that if the Great Spirit in His wisdom could have created a more elegant bird in plumage, form, and movement, He never did...I have seen them move in one unbroken column for hours across the sky, like some great river, ever varying in hue; and as the mighty stream, sweeping on at sixty miles an hour, reached some deep valley, it would pour its living mass headlong down hundreds of feet, sounding as though a whirlwind was abroad in the land. I have stood by the grandest waterfall of America and regarded the descending torrents in wonder and astonishment, yet never have my astonishment, wonder, and admiration been so stirred as when I have witnessed these birds drop from their course like meteors from heaven.”

*Like meteors from heaven.*

Passenger pigeons once numbered 3 billion to 5 billion. By 1914, the last of the species, a pigeon named Martha, died in the Cincinnati Zoo. It was the failed result of a last-ditch effort to save an animal whose extinction was driven by extreme demand for its feathers and meat, and habitat loss from human development.

It was ecological disasters like this and their ripple effects that gave way to the passage of the Endangered Species Act of 1973, a law that has saved 99% of protected wildlife from extinction, including our national bird, the bald eagle. Every day, brilliant scientists, biologists, and ecologists – many of whom work at the Interior Department – diligently uphold this indispensable safety net alongside the communities they serve.

But, as the climate crisis grows more fearsome each year, and as essential habitats disappear before our eyes, we can no longer rely on safety nets to protect the critters we share this planet with. We know the stakes are too high. Earlier this year, the U.S. Fish and Wildlife Service released its sixth congressionally mandated Wetlands Status and Trends report outlining a historic loss of wetlands upon which half of North American birds depend.

We must act.

Our efforts to combat habitat and species loss are happening nationwide, in partnership with local communities. We are powering this work with historic funding from President Joe Biden’s Investing in America agenda through an ongoing Restoration and Resilience Framework that includes conservation across a landscape iconic to the American West: the sagebrush steppe ecosystem.

Spanning over 175 million acres, sagebrush country contains immeasurable biological, cultural, and economic resources while being home to over 350 species. Among them, the iconic greater sage grouse – with its magnificently spiked tails and elegant white collars – depend on this landscape.

*Passenger pigeons  
once numbered*

# IN THE BILLIONS

*By 1914, the last of the species,  
a pigeon named Martha, died in  
the Cincinnati Zoo.*

America’s sagebrush ecosystem is the largest contiguous ecotype in the United States, comprising one-third of the land mass of the lower 48 states. But in the last 20 years, half of this area has been lost due to climate change and rapid habitat destruction.

To combat this, we’re putting millions of dollars into our Sagebrush Keystone Initiative – one piece of our framework – to restore the native vegetation and riparian habitat that sage-grouse depend on for survival and that regional Indigenous communities have long defended.

Climate change has left no ecosystem unscathed, even the lush forests of the Hawaiian Islands, where Hawaiian forest birds have lived and thrived for millennia. From the ‘apapane to the ‘akeke’e, these birds are remarkable in both the color and value they bring to the forest.

The Native Hawaiian Community has revered these species for centuries and has sustainably gathered and used their feathers in the making of capes, helmets, leis and cloaks. Their health directly translates to the ecosystem’s harmony and longevity.

And yet they face an immediate extinction crisis. Habitat loss, combined with warming temperatures that create optimal breeding grounds for disease-carrying mosquitos, are forcing the birds higher and higher into the canopy. Here again, funding from the president’s Investing in America agenda – combined with scientific tools like Indigenous knowledge – is giving these iconic birds a shot at survival through our Hawaiian Forest Bird Keystone Initiative.

As a Pueblo woman, I know that no matter where I travel, birds connect us to our peoples’ understanding of the balances and interconnectedness of nature. It’s a reality we have learned over millennia: when one resource disappears, we all suffer. This is why we must recognize that nature is our most important ally in our fight against climate change.

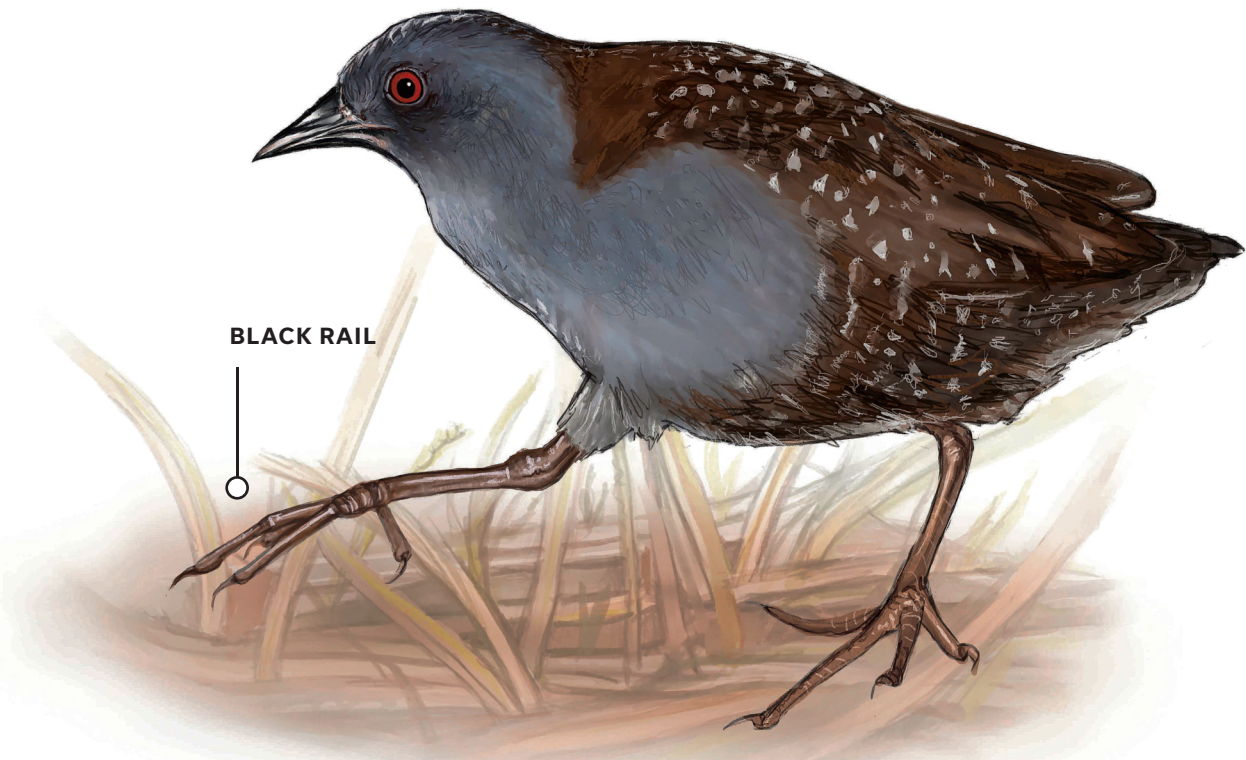
Today, the Rio San José is severely impacted by extreme drought conditions. Yet despite the risks that the climate crisis brings, the river still flows, carrying with it the water that is so critical to our people, our land, and the birds who rely on it.

The people still embellish our pots and jewelry with the birds who carry our prayers up to the sky. I know that regardless of what challenges may befall this vital waterway, it will continue to bring us life – for our birds, for our community and for our future.

**DEB HAALAND** is U.S. Interior secretary and a former U.S. representative from New Mexico. She is a member of the Pueblo of Laguna and a 35th generation New Mexican. She is the first Native American to serve as a cabinet secretary.







BLACK RAIL

# YEARNING TO HEAR BLACK RAIL CALLING

Amy Davis Special to USA TODAY NETWORK

One spring not too long ago, New Jersey Audubon hired me and another field technician to find black rails in the state’s high salt marshes. ● We never found them. ● How not to find black rails: Paddle out into the darkness as marsh wrens chatter from reeds and an eastern whip-poor-will sings in the distance from a clump of trees you know must be there but you can’t see. ● Admire the stars reflected in the black saltwater channels through the marsh. Glance down at the GPS unit to make sure you’re on track to get to your appointed transect for the night.

Haul your kayak up into a hedge of groundsel, take off your life jacket, and pull on your waders to start walking to the coordinates of your first point count. Get to know the salt marsh way too intimately when you take the wrong step into bare mud. Sink in up to your hip as glowing raccoon eyes laugh at you in the dark. Clamber out of the mud with your teammate’s help and hop from clump to clump of the grasses that anchor the marsh. Find the best place to cross little salt streams by following your younger, bolder teammate until he sinks into chest-deep water. Give him a hand and avoid that spot next time. Pick your way around the mud potholes. Swat mosquitoes and greenheads. Creep up to the coordinates for your point count on hands and knees so the osprey nesting nearby doesn’t dive bomb you again. Cue up the black rail recordings.

You can see forever out on the high salt marsh, as wide open a vista as you can get in the Garden State. Atlantic City beckons in neon. Heat lightning flickers. Hundreds of fireflies twinkle green. On the Fourth, you see fireworks explode over every little beach town. Once, you see owl eyes. Once, a fledgling salt marsh sparrow appears on the ground in the light of your headlamp, a tiny survivor of king tides, storm surges and hungry raccoons. You’ve been straining for the eerie notes of salt marsh sparrow’s unmusical song every night without hearing it, so you’re happy and surprised to find this precious fledgling. Take a cell phone photo of it. Listen as northbound migrant birds call though early June and southbound shorebirds start piping up a few weeks later. Listen especially for grunting rails. Play the recordings over and over. Pull out your grimy clipboard and write down all the marsh birds you hear during each point count on your wilted data sheets. Maybe this will be the night you’ll hear an answer to the recorded *kee-kee-kerr* you blast out into the marsh, daring any black rail in the vicinity to respond and defend his territory. Keep your cell phone at the ready in case you hear him. Think to yourself, *if I hear it, I’ll get*

*a recording, so everyone believes me. If I hear it tonight, it will all be worth it. Maybe tonight’s the night. Kee-kee-kerr. Kee-kee-kerr. Kee-kee-kerr.* It was never the night. Maybe, once, a small black bird flushed by our footsteps flew low across the beam of my headlamp — could it be? Maybe. Probably not. Do black rails ever flush like that? They probably just scamper away like mice. Do everything right. Try to find comfort in the fact that all those zeroes you keep writing are still good data. Try not to wonder if the black rails are all gone from these marshes. Try not to ask yourself, *What am I documenting, exactly? Am I counting birds at the end of the world?* Cry and refuse to run one of the transects again because it’s too flooded. That habitat is underwater, you keep getting stuck in the mud and you just can’t do it anymore.

Watch huge billows of smoke on the horizon one night. *There’s no way that’s a controlled burn.* Tie a wet kerchief over your nose and mouth, hurry to finish your transect, and paddle back through the haze as thousands of acres of pine barrens burn upwind. Walk away from a stranded great shearwater one night, because you have to find another species that’s barely hanging on as seawater slowly creeps up to drown its habitat. It’s too late for that shearwater in the sand. It’s gone when you return. Stay positive for your teammate; black rail would be a lifer for him. You could still get one. You never know. But start studying up on limpkin calls. Once a south Florida specialty, they seem to be turning up everywhere these days, following the northward spread of invasive snails and warmer water temperatures. If you can’t find a black rail, you’ll take what you can get. You get neither. Months later, you find out that one black rail call was recorded by U.S. Fish and Wildlife Service at one of your study sites. Be happy at least one hung on in New Jersey that season, and sad you weren’t the one to find it. Hear black rails calling in your dreams.

SALT MARSH SPARROW



AMY DAVIS is associate editor of North American Birds and special issues of Birding, as well as editor of the American Birding Association’s online Field Ornithology series and regional compiler for NAB’s Hudson-Delaware region.





# PROVIDING *SHELTER*

Rodney B. Siegel Special to USA TODAY NETWORK

North American bird populations are declining. A recent analysis of bird population trends across the U.S. and Canada suggests that we have lost 30% of our overall bird numbers since 1970, a reduction of nearly 3 billion individual birds. Declines of particular species are driven by diverse threats, but many of them are or will be exacerbated by human-caused climate change. And climate change is expected to accelerate in the coming years, with its negative effects on bird populations likely increasing in tandem.

The most important thing people can do to protect birds from climate change is to slow that change by reducing carbon emissions. But that is not the only thing we can do.

My colleagues and I have been monitoring bird populations in mountainous, mostly forested national parks of the American West for over two decades, and that work is yielding an unmistakable ray of hope: Bird populations in protected areas like national parks are faring better than birds across the continent at large.

Taking care of our parks is part of taking care of our birds.

Bird populations in parks and other protected areas are generally less affected by many of the non-climate stressors – like feral cats, collisions with buildings, or habitat conversion to agriculture and urbanization – that are contributing to population losses.

But parks can also bolster resilience to climate change. Particularly in western conifer forests, the structural characteristics of old-growth forest, including attributes like the presence of very large trees and a multi-layered forest canopy, appear to provide cooler micro-climates. There, bird species like the Wilson’s warbler and the hermit warbler, which have been shown to be sensitive to temperature increases, continue to thrive.

This past June, while counting birds in giant sequoia groves of Sequoia and Kings Canyon national parks in California as part of a long-term collaborative study by the National Park Service and the Institute for Bird Populations, I was struck by the cacophony of sound. These and other bird species sang vigorously to proclaim and defend their densely packed territories among some of the largest trees on Earth.

Colleagues and I have previously determined that giant sequoia groves are the “birdiest” habitats in these parks, with many individual bird species reaching their highest densities among the towering, ancient trees – the same individual trees where some of their direct ancestors may have defended territories, built nests, and raised young well over 2,000 years ago. These species encompass ecologically and taxonomically diverse groups of birds, including multiple species of woodpeckers, year-round resident species like red-breasted nuthatches, and neotropical migrant species like western tanagers, hermit warblers and western flycatchers. Tiny golden-crowned kinglets are perhaps the most abundant of all bird species in the giant sequoia groves,

where their frequent whispery notes almost seem to give voice to the trees themselves.

Most of the bird species that live in giant sequoia groves are not endangered by any stretch, but ecological conservation isn’t just about saving the last individuals of a species – it’s also about keeping robust ecosystems intact and full of thriving populations of their constituent species.

Evidence is mounting that parks and other protected areas can accomplish exactly that for birds, in national parks of the Pacific Northwest and California’s Sierra Nevada where I study birds, but also, for example, in parks of the San Francisco Bay Area, and even in coastal zones of the Atlantic and Gulf regions.

In protected areas within those coastal zones, researchers have shown that a combination of habitat protection and active stewardship measures, like fencing off nesting areas to prevent beachgoers or dogs from entering nesting colonies, is succeeding in bolstering populations of waterbirds that are declining across much of their range due to climate change and other factors.

That last point, about the value of habitat protection combined with active stewardship measures, may be key to protecting birds in the giant sequoia groves as well. Recent fire seasons, exacerbated by particularly long, hot summer conditions, killed an estimated 13-20% of all the world’s large giant sequoias, including many in Sequoia and Kings Canyon National Parks.

Concerns have also arisen that the sequoias are exhibiting more vulnerability to native bark beetles than has been observed previously, perhaps as a result of climatic stress. Researchers and land managers are racing to better understand how climate change is affecting the trees, and how to intervene to best protect them and the birds and other wildlife that depend on them.

RODNEY B. SIEGEL is executive director of The Institute for Bird Populations. He has published approximately 80 papers in peer-reviewed journals and co-authored multiple conservation strategies for California birds.

GOLDEN-CROWNED KINGLET

HERMIT WARBLER

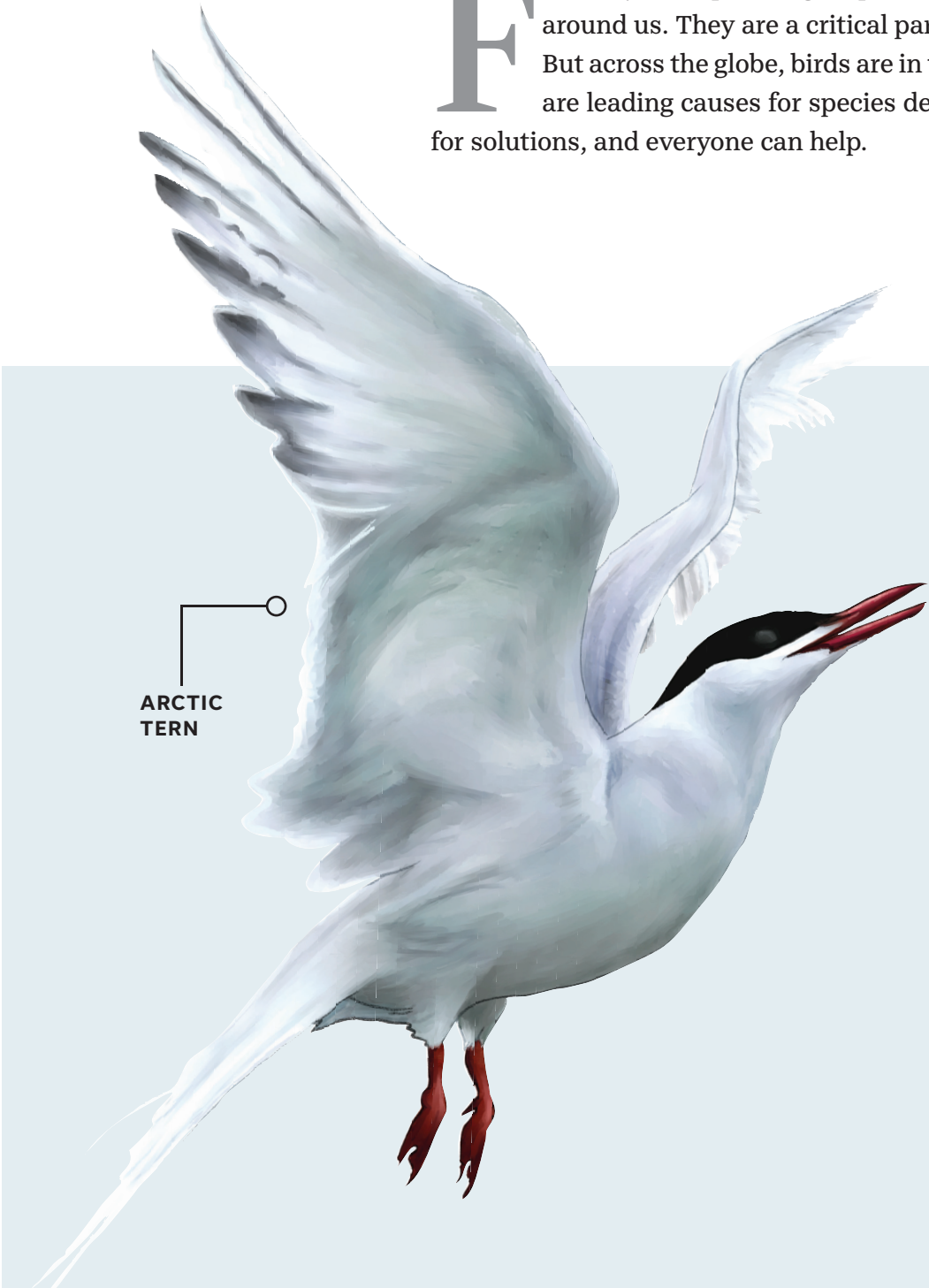
WILSON’S WARBLER





# BIRDS IN OUR OWN BACKYARDS

From city birds perching on power lines to seabirds soaring over the ocean, birds are all around us. They are a critical part of the food chain and the fabric of our soundscape. But across the globe, birds are in trouble. Loss of habitat, fatal collisions and predation are leading causes for species declines. Luckily, Smithsonian scientists are searching for solutions, and everyone can help.



ARCTIC  
TERN

## Arctic avians

Migrations are driven by seasonal changes in day length, temperature and food availability. Birds arrive on their breeding grounds to take advantage of the spring emergence of insects and other prey needed to lay eggs and raise their young. For Arctic birds, migrations can be remarkably long, such as the Arctic tern’s jaw-dropping 18,000-mile flight from Antarctica to the Arctic Circle!

Unfortunately, the Arctic region is warming faster than any other biome on the planet, and these changes may impact the timing of prey availability for the birds. Some birds might need to migrate sooner as a result so that their breeding coincides with the peak in food abundance. Others will miss this key window and struggle to raise healthy chicks. Smithsonian scientists are studying these far-flung flights using tracking devices and accelerometers to understand how they match birds’ movements with their environment.

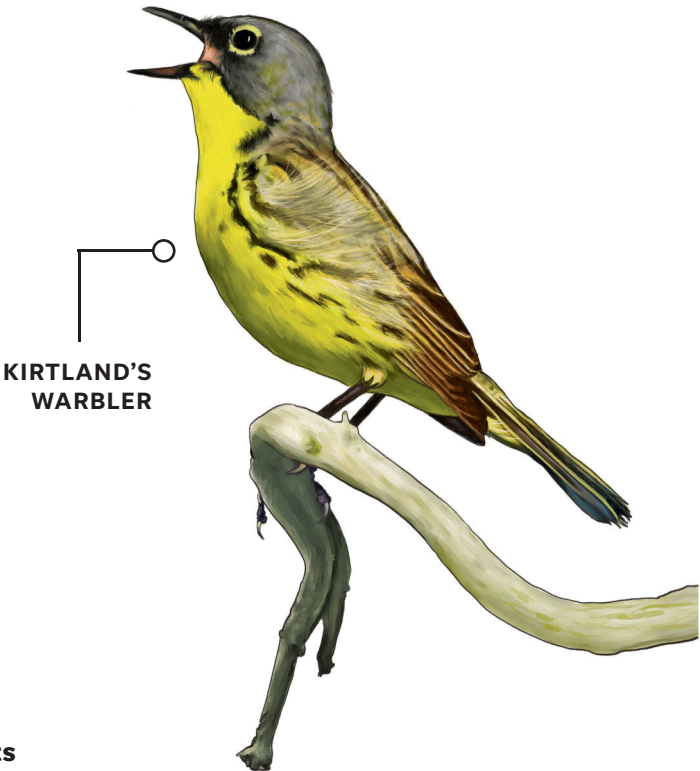
Arctic migratory birds include seabirds, shorebirds and songbirds that visit us throughout the United States. To help them and their habitats, we can do our part to opt for environmentally friendly transportation such as carpooling, public transit or biking, and supporting renewable energy to help reduce carbon emissions. We can also support them when they visit our forests, grasslands and coastlines too, by following the tips for other habitats they might visit throughout the year.

## Grasslands

Grasslands once covered a vast swath of the United States. But today, native grasslands are rapidly disappearing with devastating impacts. Grasslands are the least protected ecosystem type globally, and grassland birds are one of the fastest declining groups in North America, with many species losing more than 75% of their population since 1970. Natural grasslands are terrific carbon sinks that provide critical habitat for a wide variety of birds during the breeding, migratory and non-breeding periods, but much of our nation’s grasslands have been converted for row-crop agriculture, degraded by poor grazing practices or tree encroachment, or otherwise developed for human use. Some agricultural uses, such as vast monocultures of corn and soybeans, destroy habitat, while others, such as wildlife-friendly grazing practices, can improve degraded grasslands.

Given the crucial role grazing animals play in maintaining grasslands, Smithsonian scientists are collaborating directly with ranchers, farmers and land managers to develop mutually beneficial solutions for grassland bird conservation on working lands. For hay-producing grasslands, Smithsonian research has shown that delaying hay harvests by just a few weeks can save countless birds. Research also indicates that lowering stocking densities of grazing animals and implementing improved grazing strategies can greatly improve grassland bird nesting success. Ultimately, restoring native vegetation and keystone species, such as bison and prairie-dogs, will be essential for reversing declines of grassland bird populations into the future.

Even if you don’t live in an agricultural community, protecting these spaces for wildlife is relatively easy. Making sustainable choices at the grocery store can help birds as well as the planet. Choosing to reduce your meat consumption or purchasing from ranches that raise grass-fed, grass-finished beef helps protect the critical grasslands and lowers cattle’s carbon footprint.



KIRTLAND’S  
WARBLER

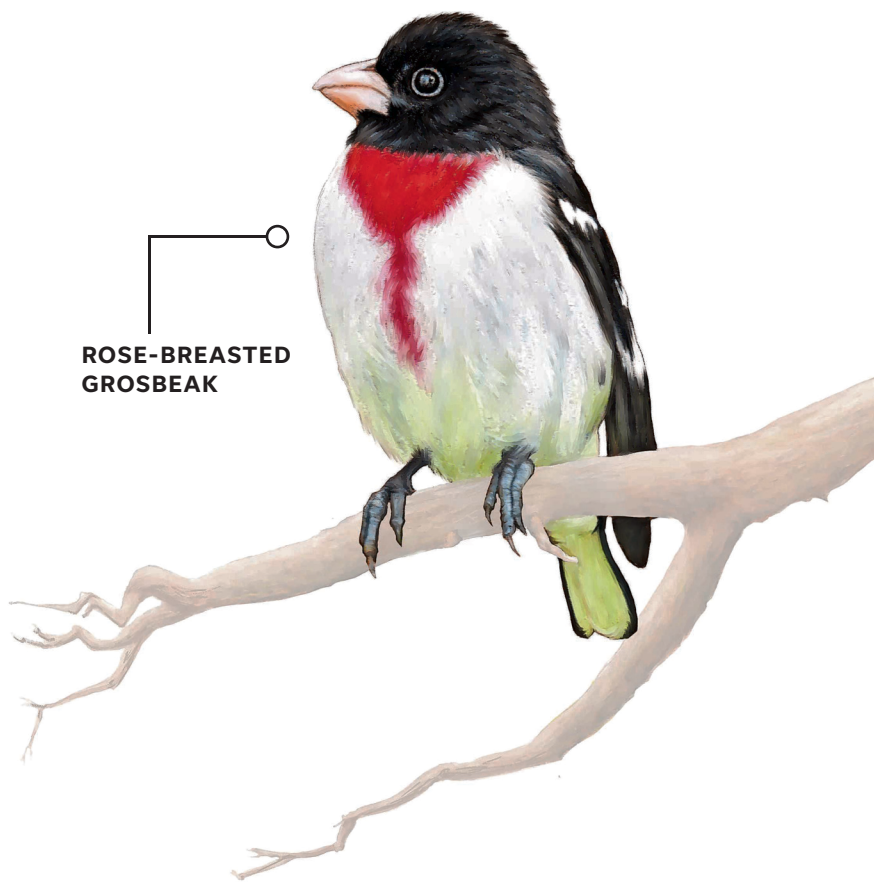
## Forests

American forests are home to hundreds of species of birds and can act as a buffer against the rising temperatures, both as carbon sinks and as cooling mechanisms. But droughts and wildfires fueled by climate change threaten the health of our forests and the birds who rely on them.

Climate change has led to more frequent and severe droughts in some tropical areas where migratory birds spend the non-breeding season, with negative results for species that breed in U.S. forests. New research from Smithsonian scientists has shown that when Caribbean wintering grounds are dry, Kirtland’s and black-throated blue warblers are less likely to survive their spring migration back to northern breeding grounds. As the Caribbean continues to dry due to climate change, researchers expect the shift will have direct impacts on the warbler populations.

Managing our forests to reduce wildfire risks and retain large areas of mature forest habitat benefits both birds and our climate. Using recycled or responsibly sourced wood products and reducing the amount of single-use packaging can make a difference for forests.





ROSE-BREASTED GROSBEAK

Who we are

At the cutting edge of conservation research and innovation, the Smithsonian's National Zoo and Conservation Biology Institute works with communities and partners in more than 47 countries to build a more sustainable future for people, wildlife and the planet.

With free admission at the Zoo in Washington, D.C., and online via animal webcams and virtual learning, we connect millions to the wonder of animals and nature.

Committed to helping future scientists and zoo professionals, our team teaches the next generation, preparing them to help wildlife on the brink, care for animals, protect habitats and rebuild landscapes on a changing planet.

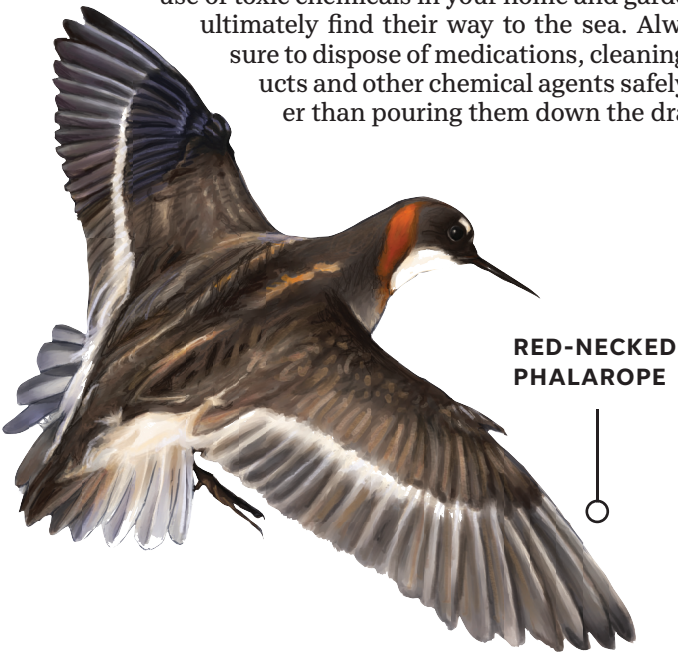
To learn more about how you can help birds across the nation, visit [nationalzoo.si.edu/migratory-birds/live-bird-friendly](https://nationalzoo.si.edu/migratory-birds/live-bird-friendly) or scan the QR code.



Marine and coastal

While we might associate shorebirds and seabirds with beaches and harnessing the winds to wander the open oceans, these birds truly connect all of America! Throughout the year, they can be found across tundra, wetlands, coastal habitats, and even grasslands and tropical forests.

We make choices every day that affect shorebirds and seabirds. Protecting coastal habitats from over-development and choosing sustainably caught seafood can help these birds and other marine life. Even if you don't live near water, you can help seabirds and shorebirds by reducing your use of single-use plastics that pollute beaches and oceans, and eliminating your use of toxic chemicals in your home and garden that ultimately find their way to the sea. Always be sure to dispose of medications, cleaning products and other chemical agents safely, rather than pouring them down the drain.



RED-NECKED PHALAROPE

Tropics

Many of us think of migratory warblers, orioles and tanagers as our birds, yet they only come north for 3–4 months per year to breed and spend most of their lives in the tropics. We share the responsibility to protect these species with our southern neighbors.

Neotropical migratory songbirds undertake impressively long flights each year to Central and South America, returning north to breed as the weather warms. Just like in North America, agriculture and urban areas are expanding and intensifying in the tropics, meaning migratory birds are losing habitat on both ends of their annual cycles. The richly biodiverse forests of the tropics continue to be clear cut to grow food, but Smithsonian scientists have shown the two don't need to be in opposition. Both coffee and cocoa can be grown under the shade of native trees, providing critical habitat for resident and migratory birds.

To protect critical wintering habitat for migratory birds, the Smithsonian developed the Bird Friendly certification as an environmental gold standard that guarantees coffee and cocoa farms protect biodiversity. Bird Friendly coffee and cocoa farms are free of pesticides, certified organic and maintain diverse native plants and trees that provide food and homes for birds. The environmental quality of the crops also gives farmers a tool to negotiate higher prices for their hard work. The result is coffee and cocoa that are better for birds, farmer incomes and our planet.

The choice to drink Bird Friendly coffee and eat Bird Friendly chocolate is easy and tasty. The National Zoo's website even has a directory to the 85 coffee roasters and 3 chocolatiers that sell Bird Friendly products near you.

Urban areas

The places where we live and work can sustain birds and other wildlife, but urban habitats pose unique hazards.

Free-roaming cats and collisions with windows have the largest, direct effects on survival of birds in our communities. Each year in the U.S. alone, cats kill more than 2 billion birds, and window collisions may kill up to one billion birds.

Indirect impacts may have an even greater influence on bird populations. For example, caterpillars, a key food source for nestling birds, have declined due to widespread use of pesticides and non-native plants (which many caterpillars can't digest) in our yards and public spaces. Light pollution exacerbates window collisions — nocturnal migrants can be attracted to artificial light and may mistake vegetation reflected on windows for a place to perch.

Diseases, such as mycoplasma conjunctivitis, which spread at bird feeders are another indirect stressor. Habitat loss, manicured lawns, and impervious surfaces — roads and parking lots — have the largest indirect impact by limiting the capacity of our urban landscapes to support birds.

We can make our towns and cities better for birds. Keeping cats indoors protects birds from predation. Properly installed window treatments and reducing light pollution helps birds avoid window collisions. Avoiding pesticides, using native plants in our yards, and cleaning bird feeders regularly will help birds overcome the challenges of urban living. Most importantly, we can increase tree cover and green spaces, especially in cities. Our built environment covers an area bigger than any National Park and offers many opportunities to provide habitat and increase well-being for both people and birds.



CARDINAL

Contributors to this special section include Smithsonian Institution staff Ruth Bennett, Andy Boyce, Nathan Cooper, Brian Evans, Autumn-Lynn Harrison, Amy Johnson, Amy Scarpignato, Scott Sillett and Ellie Tahmaseb.



PARADISE *LOST*

OUR WORLD IS  
*AT RISK*

Clay Henderson Special to USA Today Network

Growing up in coastal Florida, colorful and exotic birds were part of the landscape. Unlike most children, my daughter’s first word was not Mom or Dad, but was “buurd.”

- Birds in Florida and many other places now live in constant stress. Though habitat loss from urban encroachment remains the biggest concern, Florida is also on the front lines of climate change.
- I recently co-authored a report listing the effects of climate change on the Indian River Lagoon. This 156-mile estuary along Florida’s east coast is considered the most biologically diverse in North America, including the 370 bird species recorded there. Climate change now puts this biodiversity at risk.

Climate change imposes additional stressors that affect birds. Sea level rise has been documented along the Atlantic Coast since 1823 when the Navy moved into Key West. Even small changes in sea level alter the width of the beach and the depth of coastal waters where shorebirds and wading birds feed. Global warming contributes to extreme heat waves and elevated ocean temperatures, which produce more intense tropical storms with greater rainfall amounts, reducing the salinity of estuaries. Warmer waters ignite harmful algal blooms with associated sea grass die offs, fish kills and bird deaths. During an algal bloom in 2015, over 300 brown pelicans died.

Like many Audubon members, I’ve participated in the annual Christmas Bird Count over three decades. For most of those years I coordinated the same area near my home. We joked that we knew some of those birds by name.

One of them was Hugo, a great blue heron, who arrived on my dock each year on Oct. 1 and remained until he departed on March 1. We called him Hugo because his arrival in 1989 was delayed, which we blamed on Hurricane Hugo, which slammed into

Charleston in late September.

Hugo is a visible example that birds time their migration to the angle of the sun. They have no idea what the weather is going to be during migration, but with changes in climate patterns, migration becomes harder, adding more stress on an otherwise arduous journey that can exceed several thousand miles.

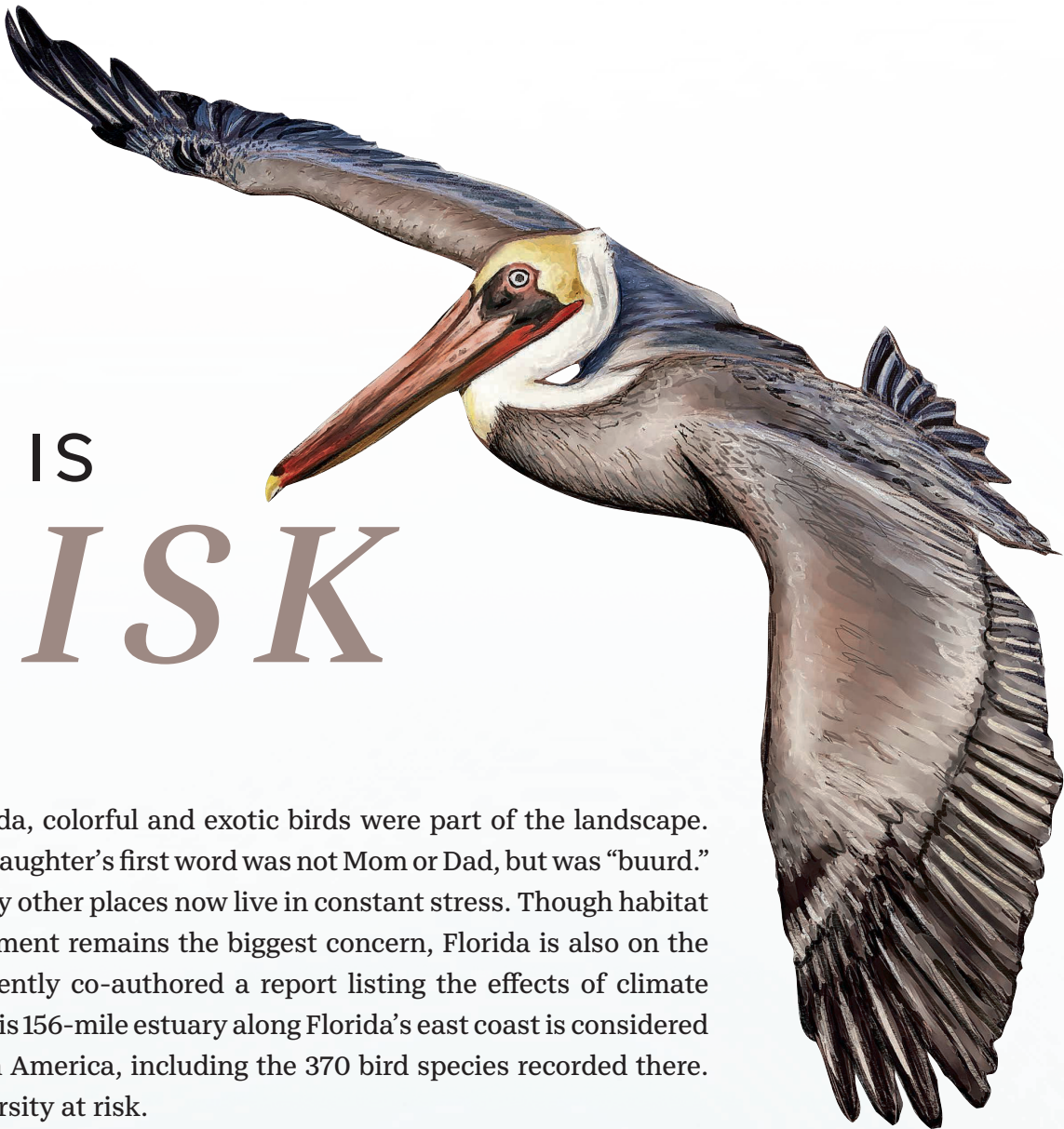
For a few years we participated in the Cape Ann Christmas Bird Count, just north of Boston. We joined very serious birders who braced against the sub-freezing temperatures and gale force winds and trudged through the deep snow of a typical New England winter.

This “count circle” is one of the oldest in the country with records that stretch back over 90 years. But the 2023 CBC was off the charts. It was a record-breaking year as they counted 124 species, including four species never seen before. According to NOAA it was the warmest winter ever recorded in Massachusetts. There was no snow or frozen ponds on that 50-degree December day. It was a record count as many species didn’t head south for the winter.

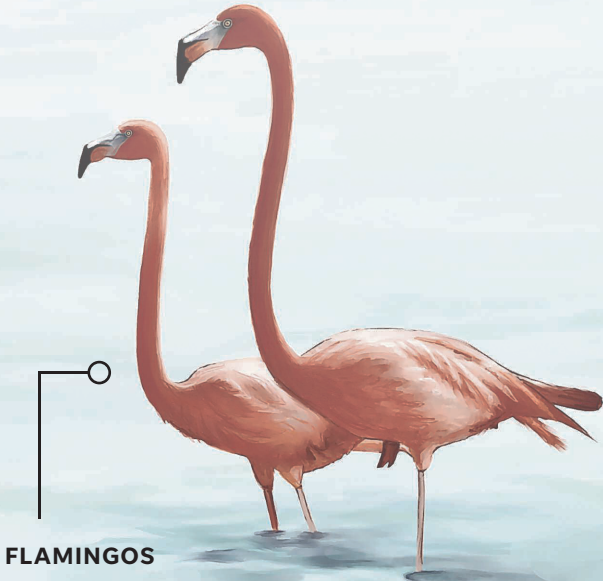
Merritt Island National Wildlife Refuge near Cape Canaveral is the preeminent birding hotspot on Florida’s east coast. I remember one Sunday afternoon driving to the refuge noticing the space shuttle gleaming on the launch pad. Many cars were pulled off to the side with people holding long-lens cameras, binoculars, and spotting scopes, but with their backs to the space shuttle. They were looking at flocks of thousands of ducks and wading birds.

The Christmas Bird Count for this area was famously the first to surpass the 200-species mark. It was so competitive that Sports Illustrated wrote about it like it was a team sport. In the early 1960s the count recorded species numbers that ranged from 191 to 206. But for Christmas 2023, only 127 species were recorded there. American robins were almost as plentiful at Cape Ann as Merritt Island.

See AT RISK, Page 10PP



BROWN PELICAN



FLAMINGOS



ROSEATE SPOONBILL

CLAY HENDERSON is an environmental lawyer, educator and writer long involved in environmental policy. He has served as president of Florida Audubon Society and Florida Trust for Historic Preservation. He is an author of several books and has published numerous articles on birds.



# PERFECTING TIMING

Scott Weidensaul Special to USA TODAY NETWORK

This autumn, I will be spending a lot of time in the woods at night, listening to what sounds like a garbage truck endlessly backing up, a loud, mechanical *toot, toot, toot, toot...* • It’s not a truck. Rather, it’s a recording of the call of a male northern saw-whet owl, a pint-sized predator as big as a soda can that weighs about as much as a robin, and nests in the forests of northern North America, and in the mountains as far south as Tennessee and North Carolina in the East, and down through the West deep into Mexico.

In October and November, saw-whet owls migrating south through the Appalachians of central Pennsylvania will hear that call and find themselves gently captured in whisper-fine mist nets strung in the dark forest. This is where, for nearly 30 years, an all-volunteer team I lead has been studying their migration, detaining them for a short while as we weigh and measure them before sending them off again with a lightweight numbered leg band.

In all, we’ve banded more than 13,000 of these diminutive mouse hunters, hundreds of which have been recaptured months or years later by colleagues up and down the migration path conducting research under special federal and state permits.

That’s shown us where these owls go and what habitats they use. But it’s also cast another light on their world, and how it is changing. As the climate has warmed, the timing of the owls’ autumn flights has shifted significantly, just within the few decades we have been studying them. Our research, published last year, demonstrates that the owls’ migration has shifted later and later in the autumn since the early 1990s – a finding, perhaps not coincidentally, that almost perfectly mirrors a similar drift, averaging about a day per decade, in the autumn migration timing of many day-flying raptors like hawks, eagles and falcons over the same period.

The term *phenology* refers to the timing (and the study of timing) in nature. It has become starkly clear that the seasons in North America are changing, and with it the timing of natural phenomenon like bird migration. That some species like northern saw-whet owls are altering their own migration phenology may seem reassuring, but a growing body of research strongly suggests that birds are actually falling further and further behind, in ways that may imperil their long-term survival.

While our owl research focuses on autumn, the clearest examples of this involve migration and seasonal phenology in springtime. As any gardener – indeed, anyone who steps outside – can tell, spring is coming earlier and earlier every year, by weeks compared with previous decades, with trees leafing out and insects emerging on an ever-accelerating schedule.

Yet billions of birds, especially migratory songbirds like warblers, vireos, thrushes, hummingbirds and orioles that breed in North America winter in the tropics of Latin America and the Caribbean. They depend on a migratory schedule anchored in complex internal timetables that are in many respects genetically ingrained.

Sitting in a forest in Guatemala or Bolivia, or an island in the West Indies, they cannot know if it’s a late, cold winter up in Michigan or Washington state, or an early, mild spring in New England or Missouri. Consequently, their arrival times have shifted only marginally. Colleagues of mine analyzed 50 years of bird-banding data for one such migrant, the lovely black-throated blue warbler, and found that by 2015, the birds were coming back just five days earlier than in 1966, even though spring had advanced by weeks during that period. Other researchers have found that female migrants may not be responding as quickly as adult males, exacerbating the problem.

Should they fall too far out of synch with the seasons, the warblers may find themselves in caught in a “phenological mismatch,” where the early summer flush of insects they need to feed their chicks has already passed by the time the babies are at their hungriest.

This is not theoretical; scientists have observed the devastating effects of such a mismatch on a migratory bird called the pied flycatcher, which winters in tropical Africa but breeds, among other places, in the oak forests of central and western Europe. Between the mid-1980s and early 2000s, rapid warming in late April and early May, during the most critical part of their breeding season, produced a severe mismatch between the late-arriving European flycatchers and the caterpillars they needed to feed their chicks. The populations of the birds fell between up to 90 percent in some parts of their range.

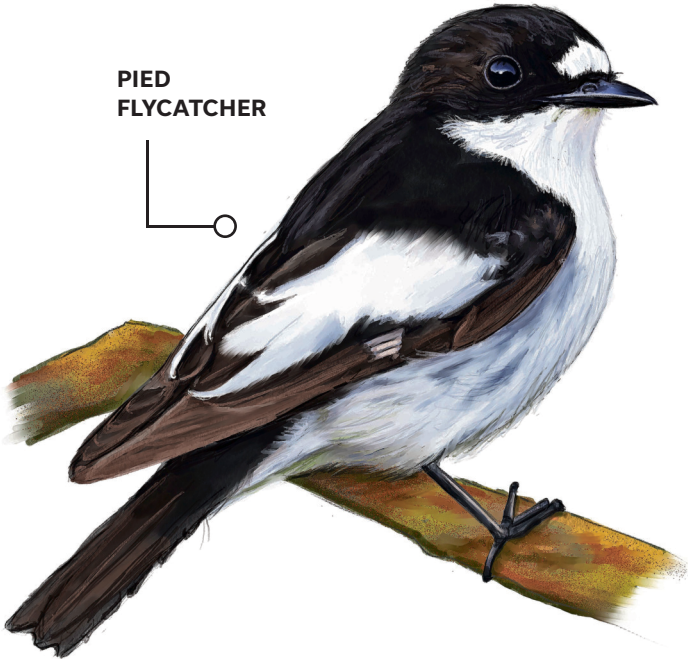
We haven’t seen such profound mismatches among North American songbirds, at least not yet, perhaps

See TIMING, Page 10PP

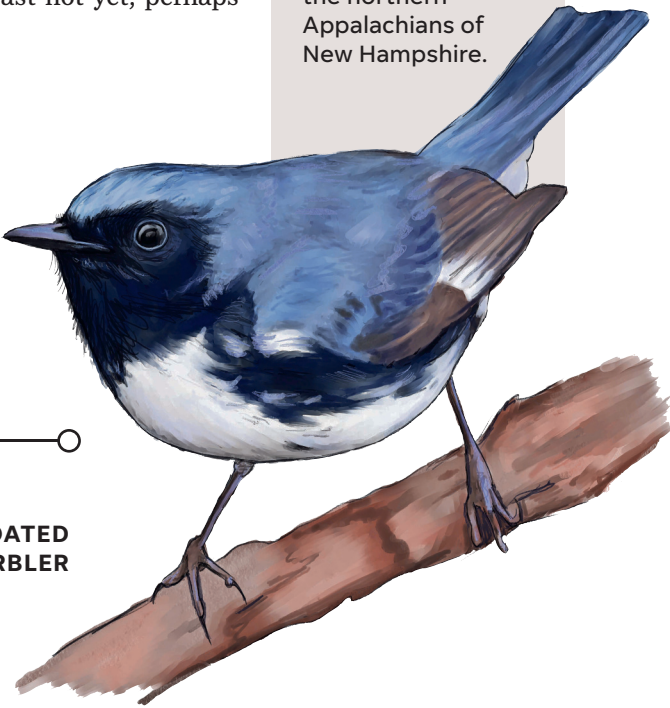


SAW-WHET OWL

PIED FLYCATCHER



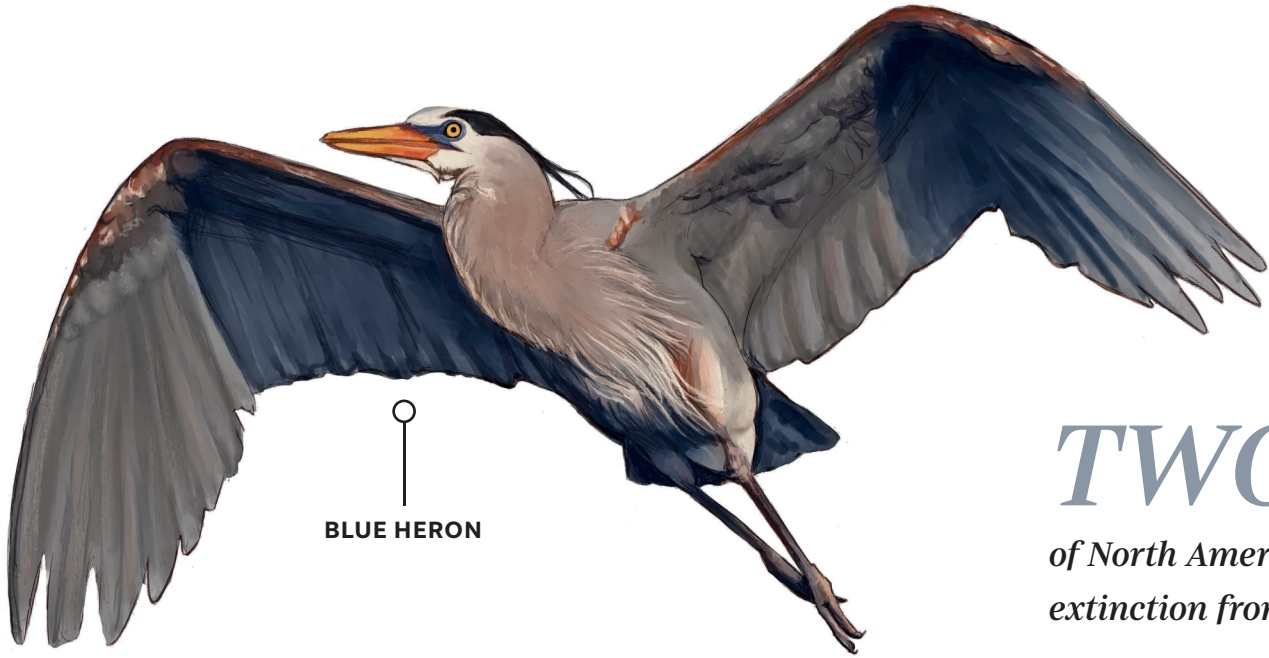
BLACK-THROATED BLUE WARBLER



SCOTT WEIDENSAUL is an ornithologist, author and lecturer who has written more than 30 books and published numerous articles. In addition to writing about wildlife, Weidensaul is an active field researcher whose work focuses on bird migration. He is a Fellow of the American Ornithological Society and lives in the northern Appalachians of New Hampshire.

*As the climate has warmed, the timing of the owls’ autumn flights has shifted significantly, just within the few decades we have been studying them.*





# TWO THIRDS

*of North American birds are at risk of extinction from climate change*

RECENT STUDY BY NATIONAL AUDUBON SOCIETY

Continued from Page 8PP

In my youth, American oystercatchers were a common sight along the local oyster bars. The clownish looking shorebird has a distinctive long orange beak and piercing yellow and orange eyes. They nest along the sand bars and oyster bars that rise just inches above the high tide line.

Sea level rise now brings “sunny-day flooding” which is taking its toll by flooding oystercatcher nests. These beautiful birds are now imperiled, and the most recent Christmas Bird Count recorded a mere 83 birds along the entire east coast of Florida.

Two of Florida’s iconic pink species are reacting to the changes in climate. Roseate spoonbills were completely killed off in Florida before the turn of the 20<sup>th</sup> century as their bright pink feathers were favored for lady’s hats. Once they were protected, some returned to the Everglades, but in the early 1990s, many wading birds abandoned this highly impacted system and started moving north.

After 1993, spoonbills were quite common along the Indian River Lagoon, but in the last decade they have kept moving farther north. They now breed in North Florida and have been seen as far north as New England.

American flamingos present a similar story. They were plentiful when John James Audubon saw them in the Florida Keys in 1832 but gone by century’s end. Last year, Hurricane Idalia blew a flock from Yucatan to Florida, and a recent count found 101 across the state. But they have also ventured out, and one recently made it all the way to Cape Cod. This will only be a success story if the flamingo heads back south for the winter.

A recent study by National Audubon Society documents that two-thirds of North American birds are at risk of extinction from climate change. Changes in weather patterns confound the niches that each species has historically used for survival. Shrinking habitat creates unnecessary stressful competition among species to survive.

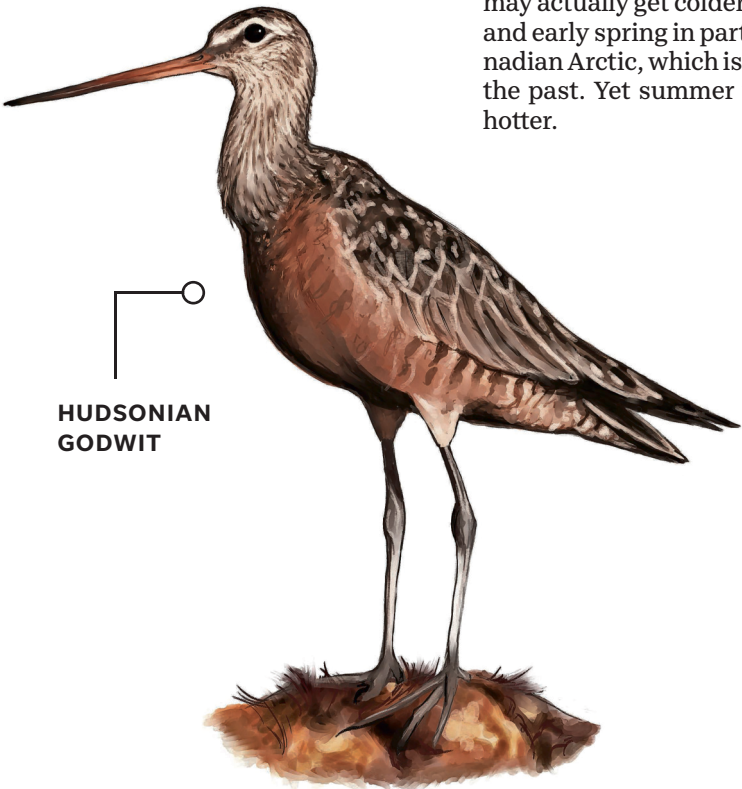
Like the “canary in the coal mine,” these birds are trying to tell us the world as we know it is now at risk.



Continued from Page 9PP

because our forests have a greater diversity of caterpillars, and our migrants need not fly so far. But we have seen similarly disastrous effects in other long-distance migrants.

One counterintuitive consequence of climate change is that some places, at some times of the year, may actually get colder, as has happened in late winter and early spring in parts of the eastern and central Canadian Arctic, which is now snowier and colder than in the past. Yet summer there has become significantly hotter.



*It has become starkly clear that the seasons in North America are changing, and with it the timing of natural phenomenon like bird migration.*

For species like Hudsonian godwits, long-legged, pigeon-sized shorebirds that migrate 9,000 miles from southern South America to nest in places like Hudson Bay, arriving on schedule means finding the land still locked in ice and snow. So their nesting is delayed. But once the snow melts and they do start raising a family, the climate flips, and the unnaturally hot summer weather brings out the seasonal insect peak on which their chicks depend even earlier than in the past. The birds are late, the bugs are early, and as a result, in many years, few of the godwit chicks survive to adulthood.

But birds are resilient, given even a small break. Here again, the lesson of the pied flycatcher is instructive. Starting about 2005, springtime phenology stabilized in places like the Netherlands, where flycatcher numbers had fallen so drastically since the 1980s. (Researchers there stress that climate change didn’t stop, but the very rapid advances during that period slowed.)

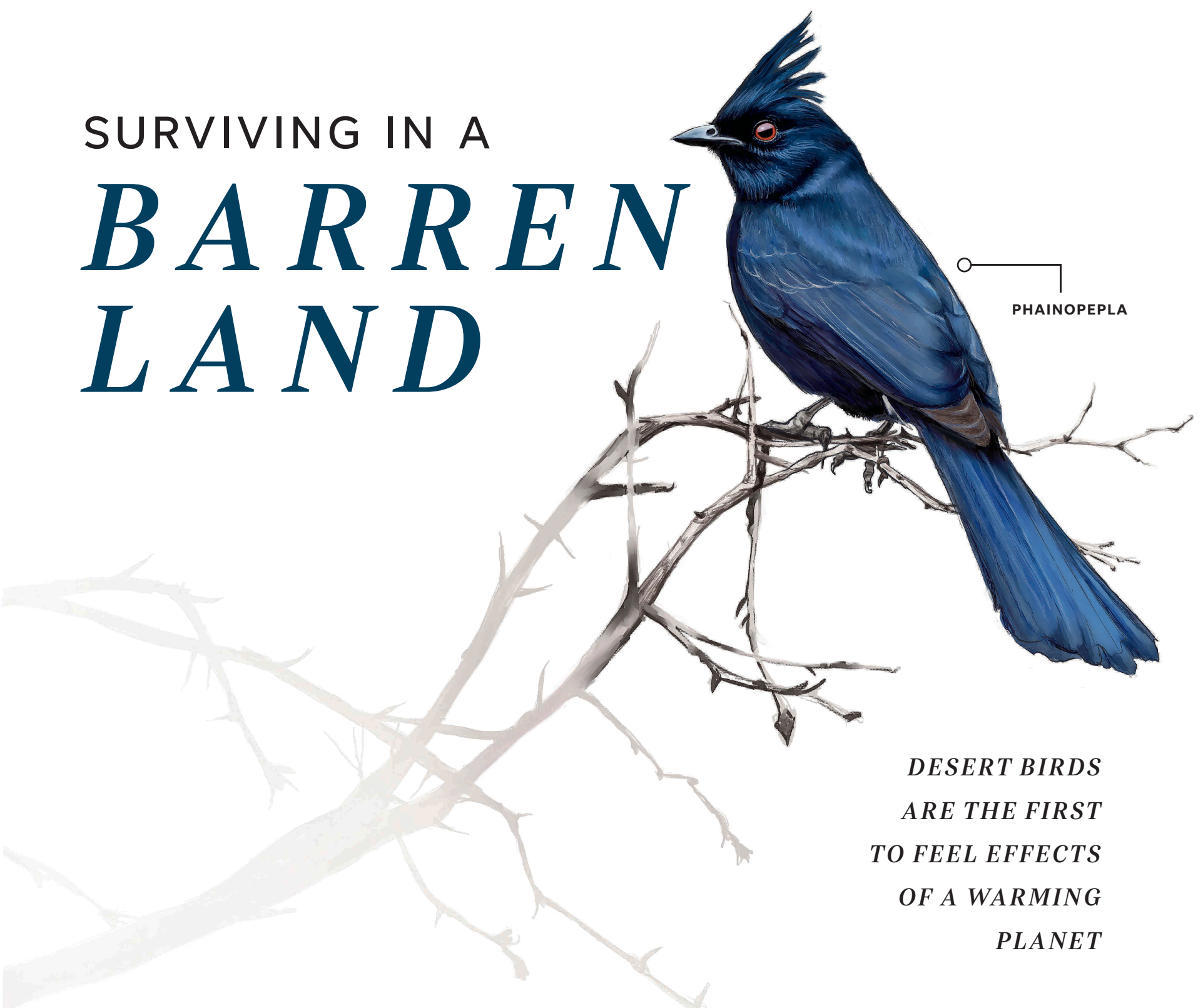
The birds quickly caught up with the earlier spring timing, evolving an earlier arrival from Africa and earlier nesting period, and their populations have largely recovered.

Birds have shown us that they are often more adaptable than we assume, if we give them half a chance. That is no reason for complacency, but it is a reason for hope, and to push harder to solve the climate crisis, giving them – and ourselves – the chances we all need.





SURVIVING IN A  
*BARREN*  
*LAND*



PHAINOPEPLA

*DESERT BIRDS  
ARE THE FIRST  
TO FEEL EFFECTS  
OF A WARMING  
PLANET*

Miyoko Chu Special to USA TODAY NETWORK

For 500 miles, I’d driven south, air conditioner blasting, radio on. When I arrived at the desert field station and stepped out onto the gravel, I was hit all at once by the heat, the quiet, and a thrilling sight: a slender jet-black bird, perched on a twisted tree. I could see its red eyes through my binoculars as it looked at me, flicking its tail from side to side. It was the bird I had come all this way to find. An urban kid from California, I’d never driven this far anywhere, never seen a desert. I’d only read and wondered about this bird whose name, phainopepla, in Greek, means “shining robe.”

“Wurp, wurp?” it called, as if to seal the deal. I would spend the next five years studying this bird and its mysterious vanishing act.

Desert birds live on the edge. Summer heat can rise to lethal levels above 115 degrees. In drought, an entire year may pass with just an inch of rain.

To survive, phainopeplas and other desert birds nest in the cooler winter months. They gamble on rain that might yield blooms of flowers or insects to feed their young. If needed, they’ll survive for weeks without drinking, sustained by nectar, fruit or “metabolic water” gained by consuming protein from insects.

In June, as the desert heat crosses a threshold into the uninhabitable, most birds move out and quit breeding for the year. Phainopeplas, though, reappear a hundred miles away in oak and sycamore wood-

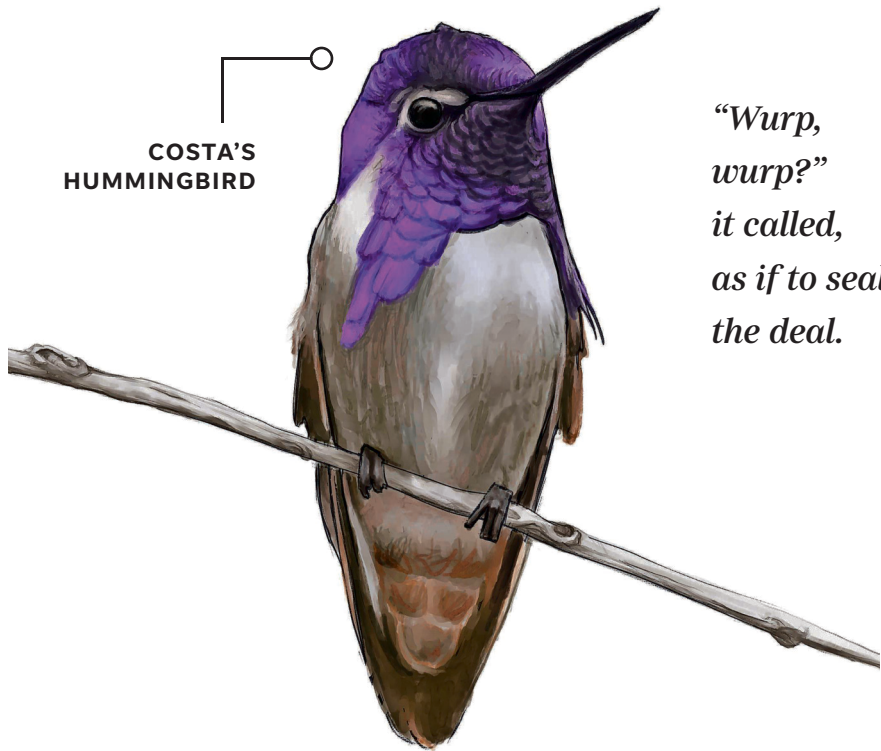
lands. Astonishingly, they begin courting and nesting all over again, raising a new set of young in what appears to be a rare strategy against the booms and busts of desert living.

With the desert’s extremes of heat and its lack of water, I had expected it to be mostly barren. Instead, I found it full of life. Cactus wrens called out from blooming beavertail cactuses with a dry and raspy “chur-chur-chur-chur...” Canyon wrens sang from the cliffs, their liquid waterfall of notes descending across the canyon.

A Costa’s hummingbird zinged in great arcs, diving down from a height then rising so quickly, I could see only a blur and hear the high-pitched whistle of its tail feathers as it streaked back up into the sky. Coveys of Gambel’s quail darted among rocks in the dry creek bed, their jaunty head plumes bobbing as a dozen chicks trailed behind them.

I watched as phainopeplas plucked berries from tangles of desert mistletoe in palo verde trees. They sallied from the tops of dead tree snags, snapping up insects in mid-flight. Bills full, they alighted on their nests and delivered food into the wide open gapes of their young.

In dry years, though, the mistletoe was bare, insects scarce. Some Phainopeplas surveyed the desert canyon from atop the palo verde trees but soon abandoned their territories. A few built nests but then gave up, leaving behind their eggs and nestlings. In the five years I studied them, two years ended in widespread nesting failures.



COSTA'S HUMMINGBIRD

*“Wurp,  
wurp?”  
it called,  
as if to seal  
the deal.*

Continued on next page



Continued from previous page

Most desert birds have a single shot to raise their young each year. If it's too dry to breed in one year, they're counting on rain in the next one. I calculated that if the time when I studied them was a representative snapshot, phainopeplas would persist only if the birds that vanished from the desert each spring were the same ones that reappeared in woodlands in summer and tried to breed again, unlike any other bird of our southwestern deserts.

But what if two dry years had turned to three? The numbers showed that too many drought years would tip the population into decline. As I packed the car and drove away from the field station for the last time, I hoped the palo verde trees and the mistletoe would still be here if I came again. I hoped that a phainopepla would be here to greet me.

It's been nearly 25 years since I finished my study of phainopeplas in the Sonoran Desert of California and moved east. I work at the Cornell Lab of Ornithology now, home to eBird, a project that enables scientists to monitor more than 10,000 bird species, thanks to observations from a million birders around the world.

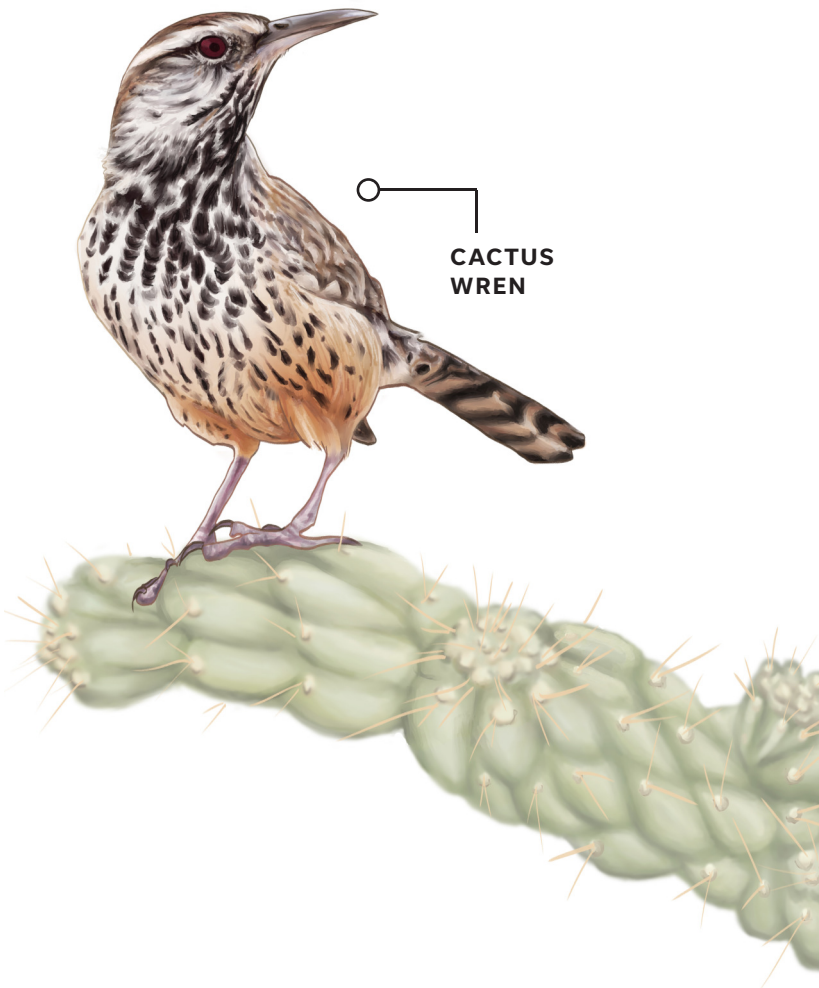
In just a few clicks on the eBird website, I can see how phainopeplas in California are faring. The most recent data show they've declined by 21% in just 10 years. That period coincided with California's five-year drought, itself embedded in the driest 22-year span in the Southwest in the past 1,200 years.

In the Mojave Desert, bird communities are collapsing, mostly because of climate change, according to researchers at the University of California, Berkeley. The Mojave sites they surveyed have lost nearly half of their bird species in the past 50–100 years.

In the United States, aridland bird species have declined by 26% since 1970, according to the 2022 U.S. State of the Birds report. The causes: development and unsustainable land use, as well as drought, fires and invasive plants that now often follow in the wake of burns.

It's not just birds that are imperiled. It's people too. The year 2023 was the hottest in recorded history. If temperatures rise by 2 degrees Celsius (3.6 degrees Fahrenheit) by the end of the century, we might see 360% more heat-related deaths globally and 525 mil-

*In the United States, aridland bird species have declined by 26% since 1970 ...*



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lion more people experiencing food insecurity in the next 25 years, according to the 2023 report of The Lancet Countdown.

3.6 degrees. It doesn't sound like a lot. Desert birds, already living at the extremes, are among the first to signal the consequences of a hotter planet. But all of us are living on the edge of a miraculous but eroding margin.

Of all the places in the universe, we're here now in the one place with just enough water and the right range of temperatures for life as we know it. Earth is truly an oasis in a desert of time and space. Our planet is warming but we can still cool it. Birds are vanishing but they are still singing. We can and must bring them back, for their sake and ours.

**MIYOKO CHU** is senior director of science communications at Cornell Lab of Ornithology at Cornell University. She has worked as a field assistant studying birds and as a science journalist in California.

