State of the Birds Report

United States of America

2022

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We Can Bend the Curve to Bring Birds Back

The United States and Canada have lost 3 billion breeding birds since 1970—a loss of 1 in 4 birds, according to research published in *Science* in 2019. This steep decline in abundance can be reversed with new scales of conservation actions that benefit not only birds but also wildlife and people.

Lesser Yellowlegs

When Birds Thrive, We All Win

State of the Birds at a Glance

The trends for our nation's birds reveal a vital message. Birds are declining overall in every habitat except in wetlands, where decades of investment have resulted in dramatic gains.

Conservation works when we give birds and nature a chance. Let's do more to save our nation's birds and benefit people in every state.

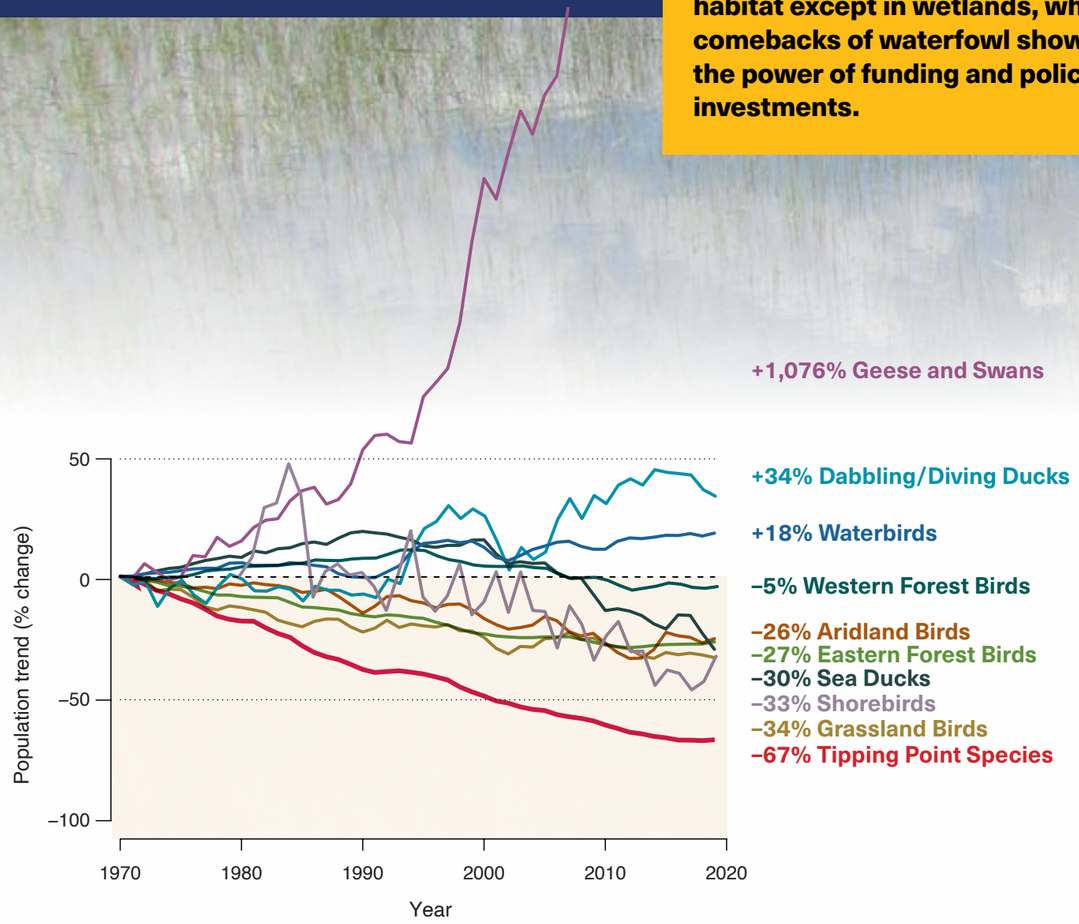
Three billion birds lost

1 in 4 breeding birds have been lost from the United States and Canada in the past 50 years.

70 Tipping Point bird species in the United States

These 70 species have lost two-thirds of their populations in the past 50 years, and are on track to lose another 50% in the next 50 years.

Birds across the U.S. show downward trends in every habitat except in wetlands, where comebacks of waterfowl show the power of funding and policy investments.



Trends for breeding bird species by group or by habitat during 1970–2019, except for the shorebirds trend, which begins in 1980. For details, see pages 6–13.

Vision for Our Shared Future

Birds are telling us that the health of our nation is at stake. But the way forward is clear. When we help birds thrive, we sustain the essential lands and waters needed for abundant wildlife, resources, and well-being.

Scale up conservation to bring birds back and benefit people.

Four decades of wetlands conservation have generated spectacular comebacks of ducks and geese—and improved water quality for people. Applying this winning formula in more habitats will help our nation's birds and natural resources rebound.

Restore habitats, improve quality of life.

- **Biodiversity:** Helping birds improves the outlook for wildlife throughout restored habitats—supporting recreation, economic opportunities, and well-being for people.
- **Environmental Justice:** Bird conservation is a multiplier that benefits the health of our communities and addresses environmental inequities.
- **Climate Resilience:** Investing in bird habitats can sequester carbon, improve water security, and protect people from climate disasters.

Support proactive, voluntary conservation.

Proactive bird conservation before a species requires Endangered Species Act protection is the fastest, most effective way to bring birds back. And it benefits everyone: birds, landowners, businesses, and communities in every state.

Bufflehead

Waterfowl have increased dramatically in the past 30 years with decades of investment by hunters, federal funding, and private-public partnerships to protect wetlands.

The State of the Birds

The 2022 State of the Birds report presents data on changes in bird populations across habitats of the United States in the past five decades. These changes are shown for the groups of breeding species that are most dependent on each habitat and for which long-term monitoring data are available.

Population rebounds of waterfowl show that when investments in habitat conservation are made, we can bring birds back. At the same time, continuing declines in other habitats show the critical need to restore ecosystems under stress.

The Birds of Conservation Concern (BCC) list, mandated by law and updated by the U.S. Fish and Wildlife Service, identifies 269 migratory nongame bird species that, without additional conservation actions, are likely to become candidates for listing under the Endangered Species Act.

In this report, scientists with the Road to Recovery initiative have identified 70 Tipping Point species from the BCC and/or state lists of Species of Greatest Conservation Need. These birds have lost half or more of their populations in 50 years and are on a trajectory to lose another half in the next 50 years—or they already have small remaining populations and face high threats, but lack sufficient monitoring data (see page 16).

The following pages highlight the plight of birds in each habitat, with the pronounced declines of Tipping Point species shown in red, for species with sufficient data.

In addition to summaries of trends, this report also highlights conservation opportunities and successes in each biome, as examples of how actions that benefit birds create healthier environments for people and all life that depends on these shared habitats.

Whimbrels

Ruddy Turnstone

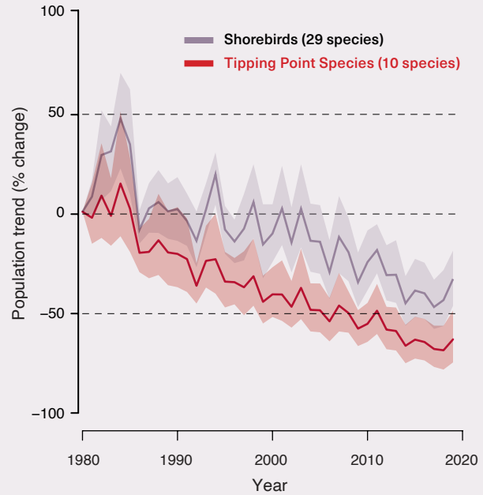
SHOREBIRDS

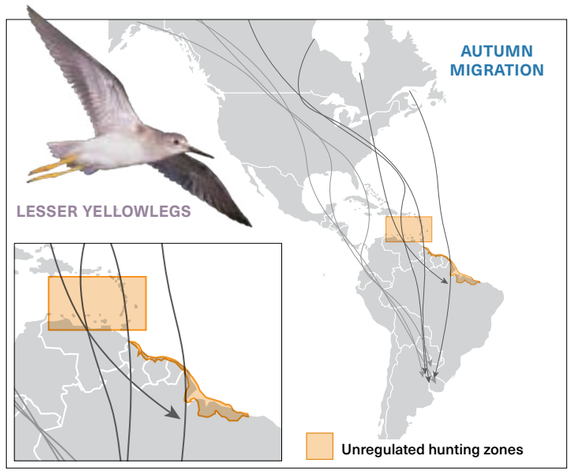
Conservation Spanning the Hemispheres

Status: Steep losses in the last three decades

Many shorebirds make epic long-distance migrations, flying thousands of miles between Arctic breeding grounds and South American wintering areas—and encountering threats throughout the Western Hemisphere. Shorebird populations are down significantly in the last 40 years. Threats include disturbance and loss of stopover habitat along coastal beaches and estuaries, unregulated hunting in the Caribbean and South America, and continued draining of shallow wetlands.

- One-third of shorebirds (10 species) are Tipping Point species with cumulative population losses exceeding 70% since 1980.
- Collaborative international shorebird conservation strategies have been completed in both the Atlantic and Pacific Flyways; a mid-continent shorebird conservation strategy is under development.





MIGRATION THROUGH CARIBBEAN HUNTING ZONES
GPS-tracked monitoring of Lesser Yellowlegs on their hemispheric migration routes showed that the birds that bred in eastern Canada were much more likely to pass through areas of high shorebird hunting pressure. Identifying specific risks and drivers of bird declines is one of the keys for bringing birds back. Source: McDuffie et al, "Eastern-breeding Lesser Yellowlegs Are More Likely Than Western-Breeding Birds to Visit Areas with High Shorebird Hunting During Southward Migration," *Ornithological Applications*, February 2022.

GPS Technology Identifies a Driver of Declines For Lesser Yellowlegs

The critical first step in bringing back declining species is to understand how different populations may be exposed to different threats throughout their annual migratory cycle. The steeply declining Lesser Yellowlegs is the most frequently harvested shorebird in Latin America. Scientists used state-of-the-art GPS tracking technology to follow more than 100 Lesser Yellowlegs on migration from breeding areas in Canada and Alaska to their wintering grounds in South America. The research showed that Lesser Yellowlegs populations that bred in eastern Canada were much more likely to pass through unregulated hunting zones in the Caribbean and northeast coast of South America than the yellowlegs populations from Alaska. With this discovery, biologists can create more targeted and effective management for conservation, such as sustainable harvest regulations and outreach efforts to protect Lesser Yellowlegs on migration.

Sprague's Pipit

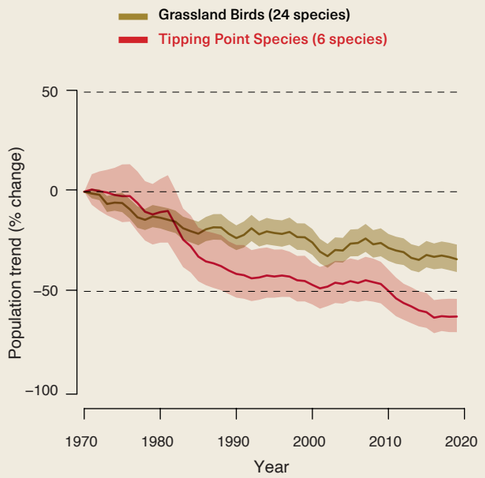
GRASSLAND BIRDS

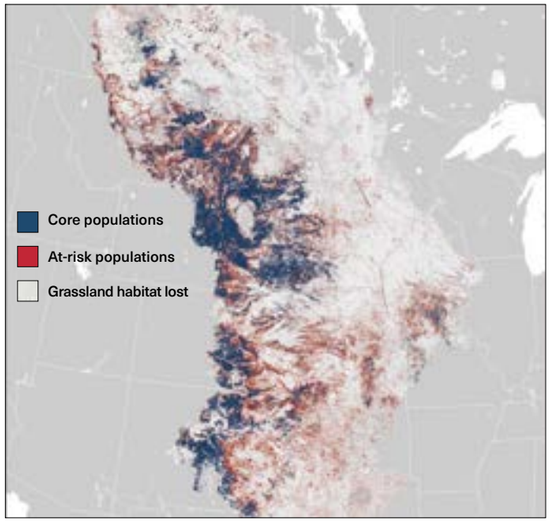
Incentivizing Habitat Conservation

Status: The biggest landbird declines of any habitat

Grassland birds have suffered the biggest bird declines of any terrestrial biome since 1970. The eastern Great Plains are a hotspot of population loss due to habitat conversion, tree and shrub encroachment, and pesticide applications.

- About two-thirds of this group (15 species) have experienced population declines since 1970.
- One-quarter of this group are Tipping Point species, including Mountain Plover, Sprague's Pipit, Henslow's Sparrow, Chestnut-collared Longspur, and Bobolink—which are all showing accelerating rates of decline.
- Massive losses of birds can be reversed with voluntary, incentive-based programs powered by partnerships, landowners, and Indigenous Nations to restore grasslands, using the successful North American Wetlands Conservation Act as a model.





CORE AND AT-RISK GRASSLAND BIRD POPULATIONS
The Central Grassland Roadmap Initiative has identified core and at-risk grassland bird populations across the central Great Plains in order to focus conservation and restoration on the best remaining grassland habitat. Source: Central Grassland Roadmap Initiative.

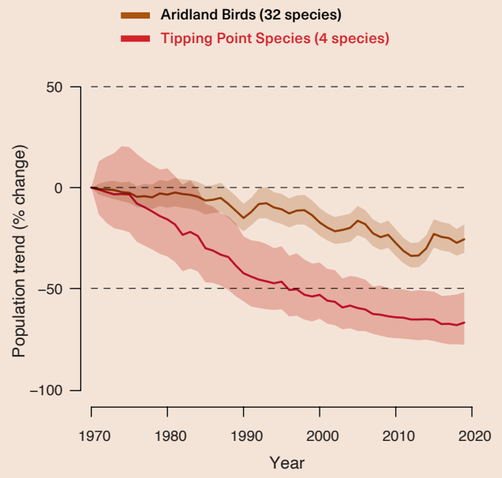
Conserving and Growing the Nation's Grasslands
Grasslands sustain rural economies and livelihoods in America's Heartland, including the shared heritage with Indigenous peoples. Yet grasslands are America's most endangered habitat—in the United States, more than 60% of native grasslands have been lost to agricultural conversion and tree encroachment, totaling 360 million acres of habitat loss. Another 125 million acres are at high risk of being lost in the near future. The Central Grassland Roadmap Initiative is spearheading a collaborative response to this emergency by rallying a diverse conservation community (landowners, state and federal agencies, nonprofit groups, Indigenous Nations, and industry) around a vision that sees hope and opportunity in America's grasslands. The Roadmap collaborative combined population trend models for five declining grassland bird species (including Baird's Sparrow and Chestnut-collared Longspur) with maps of habitat-conversion risk to identify priorities for grassland bird habitat conservation. The map showcases the plight of grasslands across the Great Plains and opportunities to ensure resilient grasslands for birds and people.

Greater Sage-Grouse

ARIDLAND BIRDS

A Key Role for Public Lands

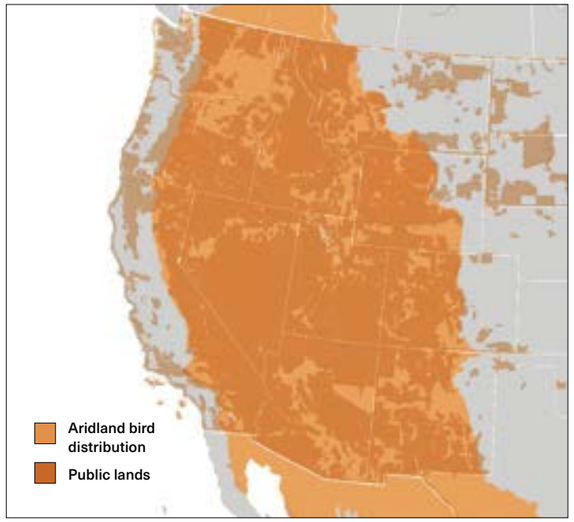
Status: Long-term declines with unrelenting habitat threats



Aridland birds have been in a long-term decline, with a slight improvement since 2012. Fires, drought, invasive plants, development, unsustainable grazing, and energy extraction pressures on habitat are all driving aridland bird declines.

- Several aridland birds (such as Chihuahuan Raven, Sage Thrasher, and Pyrrhuloxia) exhibit accelerated rates of decline since 2010.
- Bendire's and LeConte's Thrasher have experienced long-term declines, but the Bendire's Thrasher population has stabilized in the past decade.
- Greater Sage-Grouse shows a continued steep decline that warrants increased voluntary habitat conservation incentives and renewed strong federal and state protections.

Public Lands Are Essential for Aridland Bird Conservation
The federal government and state agencies have a vital role to play in turning around bird declines in sagebrush and desert habitats. According to the 2011 State of the Birds report, public lands in the American West support more than half of the breeding distribution of aridland birds. Bureau of Land Management lands are particularly important, supporting almost a quarter of the distribution of all aridland birds and more than two-thirds of the U.S. distributions of Sage Thrasher and Sagebrush Sparrow, both species with declining populations. U.S. Forest Service lands in coastal chaparral habitats are important for the declining Wrentit. National Park Service lands are important for some desert bird species, such as the Bendire's Thrasher (a Tipping Point species). The 2011 State of the Birds Report found that about 80% of publicly owned aridlands were vulnerable to activities that could potentially degrade bird habitat—including energy development, off-road vehicle traffic, grazing, mining, and logging. Aridland bird habitat conservation can be compatible with multiple land uses, but management plans for these landscapes need to include measures to ensure long-term healthy populations of aridland birds.



WESTERN PUBLIC LANDS ARE HABITAT FOR ARIDLAND BIRDS
This map shows the cumulative range for 30 aridland bird species in North America, with the vast majority of that range falling within the boundaries of federal and state public lands. Source: Aridland bird data from Bird Conservation Regions, Bird Studies Canada and NABCI. Public lands map from GISGeography.com.

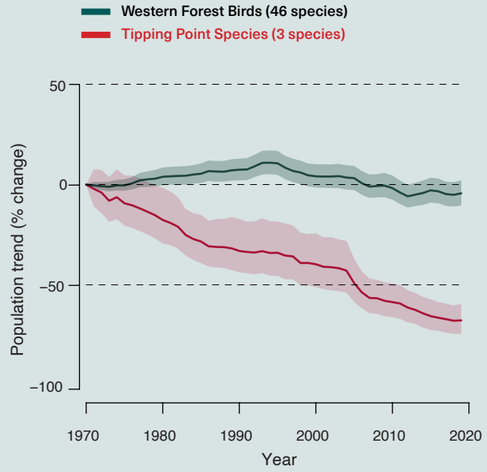
WESTERN FOREST BIRDS

Restoring Natural Cycles for Forest Health

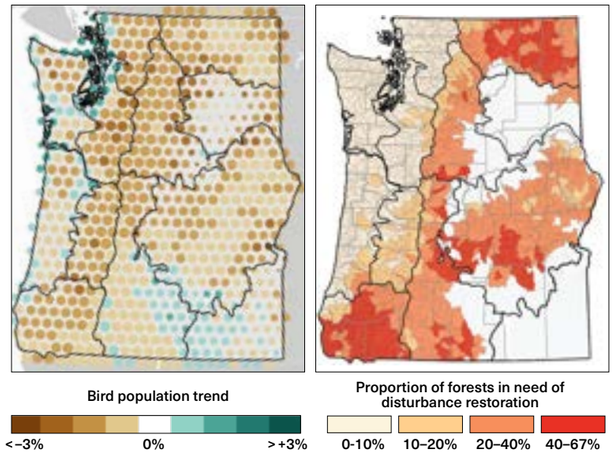
STATUS: Stable overall, but with warning signs

The overall population for the western forest birds group is much the same as it was 50 years ago, aided by protected habitats. But since reaching recent highs in the early 1990s, western forest birds have declined by nearly 20%.

- Almost half of this group (19 species) currently have declining population trends.
- Five species have lost more than half of their population since 1970, including Tipping Point species such as Pinyon Jay and Rufous Hummingbird with poorly understood life cycles. More science is needed to identify the drivers of their declines.
- Recent declining trends among Oak Titmouse, Williamson's Sapsucker, and other birds appear to be associated with the disruption of natural disturbance patterns such as fire cycles.



Birds Are Declining Where Western Forests Are Stressed
For most of the past 100 years, western forests have been managed to encourage conifer tree dominance and discourage fires. But for many centuries before the 1900s, fires were common on this landscape, both natural wildfires and intentional burns by Indigenous peoples. Today those historic disturbance patterns that created a mosaic of conifer and broadleaf forest cover and successional stages have been disrupted, and large swaths of western forest landscapes have departed from their natural range of tree species and structural diversity. These areas of forest departure from natural patterns are also hotspots for western forest bird declines. Furthermore, these compromised forests have very little resilience to the forces of wildfire and climate change, which puts greater forest landscape health and forest resources (such as water reservoirs) at risk of disaster. Investments in forest restoration can turn around this dim outlook for western forests and western forest birds.

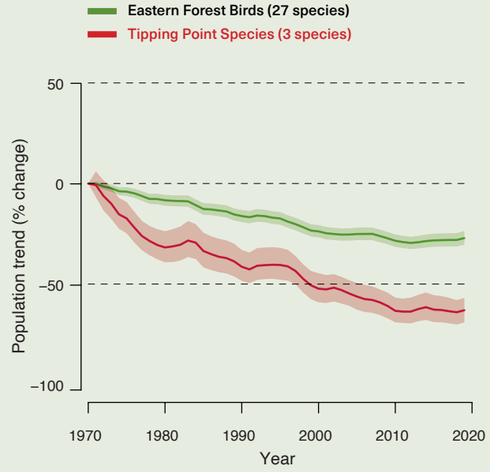


BIRD DECLINES IN FORESTS THAT HAVE DEPARTED FROM HISTORIC CYCLES
According to population trends generated by eBird data, bird numbers tend to be declining in forests that have departed from historic conditions and are most in need of disturbance restoration. Sources: Cornell Lab | eBird data 2007–2019 (left map); DeMeo et al, "Expanding Our Understanding of Forest Structural Restoration Needs in the Pacific Northwest," *Northwest Science*, Winter 2018 (right map).

EASTERN FOREST BIRDS

Partnerships Revitalize Forests and Wildlife

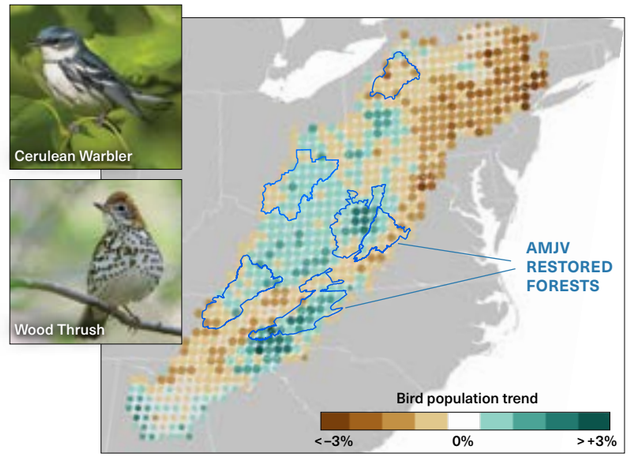
STATUS: Long-term decline has leveled off



Since 1970 the overall population for eastern forest birds shows almost a 30% loss, but that loss curve has straightened out since 2009. Today some species previously in steep decline—such as Red-cockaded Woodpecker—are showing modest population gains.

- Forest restoration efforts in the East appear to be bending the curve of bird loss. Today the overall population of eastern forest birds is back to where it was in 2010.
- Even the Tipping Point species in this group are showing signs of improvement. Though their population is collectively down by 63%, the rate of loss has slowed considerably in the past decade.
- Joint Ventures led by the U.S. Fish and Wildlife Service and partners have played a crucial role in targeting conservation actions with remarkable results.

Two Birds Making a Comeback
Over the last 50 years and across their ranges, the long-term population trends for Cerulean Warbler and Wood Thrush show declines of about 60%. But within the last decade, both birds are showing signs of stabilization—a lesser decline of about –0.03%/year for Cerulean Warblers and a slight increase of +0.68%/year for Wood Thrush. The Appalachian Mountains Joint Venture (AMJV)—a partnership of over 50 federal, state, and nonprofit organizations from Alabama and Georgia to New York—is leading the way to bend the loss curve for these declining birds, with forest management projects that restore the age and structural diversity of hardwood forests in the region. Some of the biggest local Cerulean Warbler and Wood Thrush population increases are occurring in AMJV work areas, which also benefit other songbirds and wildlife species as well as overall forest health.



FOREST RESTORATION WORKS FOR BRINGING BACK BIRDS
In areas where the Appalachian Mountains Joint Venture has helped restore forests, data from eBird show remarkable increases in numbers of Cerulean Warbler and Wood Thrush. Source: Cornell Lab | eBird 2007–2019.

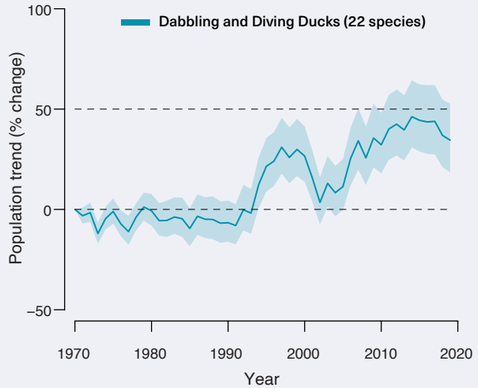
WATERFOWL AND WATERBIRDS

A Model Conservation Success Story

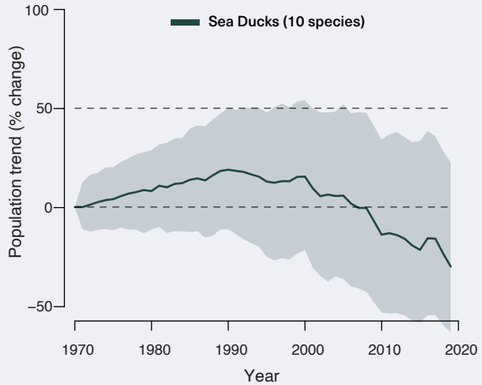
Mallards

STATUS: Decades of population growth driven by conservation policy and cleaner water

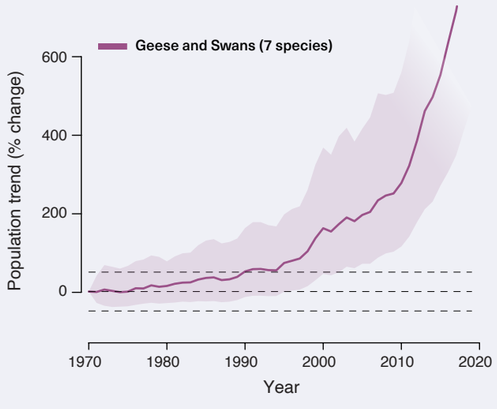
The long-term recovery of waterfowl and waterbird populations is largely due to successful policy (such as the North American Wetlands Conservation Act and U.S. Farm Bill conservation programs), along with coordinated efforts by public-private partnerships under the North American Waterfowl Management Plan.



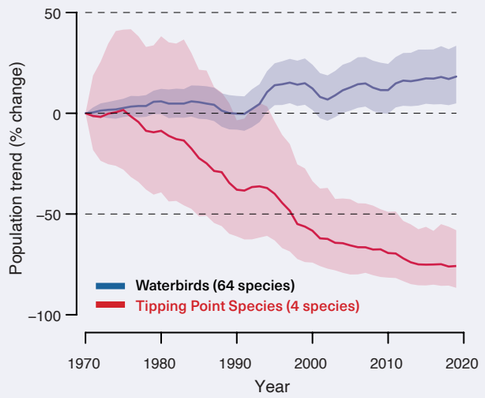
- Despite their decades-long gains, ducks continue to face pressures from grassland habitat loss, wetland drainage, coastal wetland loss, and climate change impacts. Recent droughts have tipped duck populations downward—underscoring the need for continued conservation investments to keep duck populations healthy and resilient.



- Sea ducks face elevated threats from climate change, including effects on food resources, altered predator communities, and rapid changes to breeding habitats. Strategic solutions will be needed to reverse declining trends for species that have not yet responded to large-scale conservation efforts.

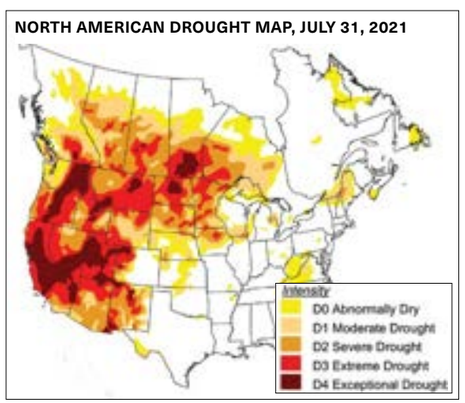


- Goose populations are near historic highs, largely due to successful adaptation to agricultural and urban landscapes. Yet some populations of Arctic and sub-Arctic nesting geese (such as Lesser Snow Goose) are being impacted by climate change and shifting environmental conditions.



- Populations of some fish-eating waterbirds such as pelicans have increased greatly in recent decades, signaling an improvement in water quality. But nearly a third of waterbirds show declines, including several heron and rail species that rely on marshes and ephemeral wetlands.

Recent Drought Emphasizes the Need to Protect Wetland Basins and Water Supplies



Source: www.ncei.noaa.gov/access/monitoring/nadm/

In recent years, extreme and widespread drought has affected many populations of waterfowl and wetland birds in areas where they were previously flourishing. Although many bird species have evolved strategies to withstand short-term droughts, climate projections are for drought to become more severe and frequent. Recent years of extreme drought offer a glimpse at a drier future and highlight the need for more robust and resilient water supplies.

The 2021–22 drought impacted some of North America's most important waterfowl breeding and migratory habitats:

Prairie Pothole Region: The Prairie Pothole Region supports up to 50% of North America's breeding duck populations, but it's a fragile landscape that has suffered extensive grassland and wetland loss over the past century. Recently a multi-year drought in the West caused the drying of shallow wetlands and amplified the importance of large-scale conservation to build landscape resilience. Future conservation efforts must continue to emphasize the protection and restoration of wetland basins and expansive grasslands.

TULE LAKE, SUMMER 2019

TULE LAKE, SUMMER 2021

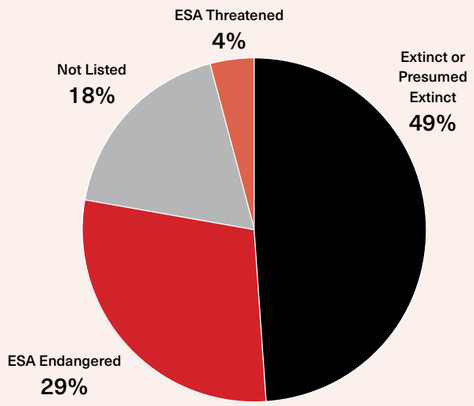
Western Waters: The crown jewels of waterfowl habitat in the American West—the Great Salt Lake, the Klamath River Basin, and the Central Valley of California—are turning into cracked-earth barrens. Years of drought and chronic below-average snowpacks have left vital water supplies at historic lows. The Great Salt Lake declined to its lowest level ever recorded in 2022. For the first time in their history, Lower Klamath and Tule Lake National Wildlife Refuges will be dry in fall 2022. In California's Central Valley, limited water supplies forced a 60% reduction in rice acreage in 2022, which traditionally provides crucial habitat for over 5 million wintering ducks. In all three regions, the effects of drought are exacerbated by rigid local water laws and over-allocation of limited water supplies that restrict sufficient water deliveries to waterfowl and waterbird habitats. Policies that create efficient water-sharing solutions are desperately needed if waterfowl and waterbird populations are to avoid drastic declines across the American West.

Iiwi

HAWAIIAN BIRDS

Addressing Threats in the Race Against Extinction

STATUS: A dire situation for some of the most endangered birds



The recent history of Hawaii's birds is full of extinctions, but current conservation actions are showing promise for turning the tide. Since western colonization began on the Hawaiian islands in 1778, almost half of the 73 endemic bird species and subspecies have gone extinct or are presumed extinct, and another third are today federally protected under the Endangered Species Act. Innovative and intensive science-driven conservation efforts are staving off the creeping threats of climate change and mosquitoes and are rescuing the last individuals of some species.

- The estimated cumulative population for the highest risk birds (including Akikiki, Kiwikiu, and Akekee) is dangerously low, with fewer than 5,500 total birds left among the 10 most endangered Hawaiian species.

- Emergency actions to bring critically endangered birds into captivity for breeding and translocation to safer habitats are buying time for some species, such as the Akikiki of Kauai. But ultimately these strategies won't avoid extinction unless Hawaii's forests are rid of mosquitoes that carry lethal diseases to birds.

Using Science to Fight Mosquitoes with Mosquitoes

The spread of non-native mosquitoes, which are vectors for diseases such as avian malaria, have devastated many populations of Hawaiian forest birds. Eleven of Hawaii's 17 honeycreeper species are federally listed under the Endangered Species Act, with several possibly going extinct within the next 3 years. For many honeycreepers, a single mosquito bite can prove lethal. The plague of mosquito-borne illnesses on the islands is spreading with warming temperatures that reach higher into forest habitats. Scientists are fighting back with new biological technologies, using the naturally occurring Wolbachia bacteria (which renders mosquito eggs unviable) to suppress mosquitoes in Hawaiian forests. Male mosquitoes (which don't bite birds or people) are bred in a lab with Wolbachia, then released to mate with wild female mosquitoes that then cannot successfully reproduce. Urgent efforts to begin releasing Wolbachia-male mosquitoes are underway, as landscape-scale mosquito control is the only hope for many endangered Hawaiian forest birds to survive in the wild into the next century.

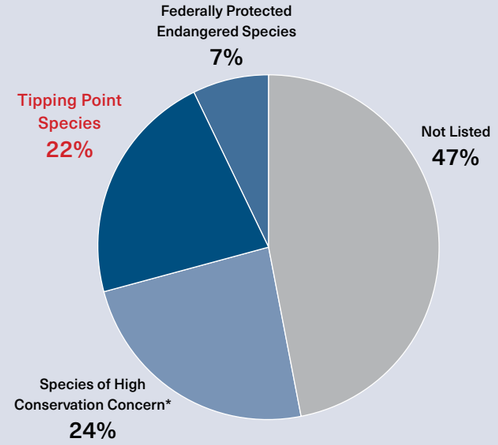
LAST CHANCE FOR HAWAIIAN FOREST BIRDS
Landscape-scale mosquito control is the only hope that many Hawaiian forest songbird species will survive into the next century, such as the Kiwikiu of Maui.

Atlantic Puffin

SEABIRDS

Reducing Climate Change and Ocean Hazards

STATUS: Global declines are reflected in U.S. waters



*From Avian Conservation Assessment Database

Seabirds are suffering cascading declines around the world; one study documented a 70% population loss for seabirds since the 1950s. Sadly those declines are also occurring in America's ocean waters, where about a quarter of U.S. seabird species are designated as Tipping Point species. Seabirds spend almost their entire lives on the ocean, so they are important indicators of the health of marine ecosystems.

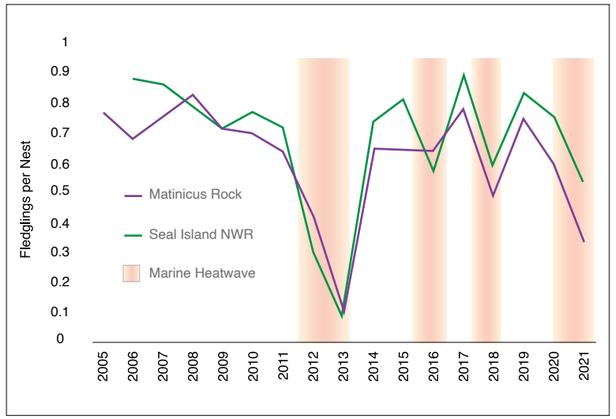
- Climate change is a major stressor on seabird populations, as warming and rising ocean waters reduce nesting habitat, impact prey fish populations, and whip up deadly storms.

- Fisheries bycatch and the overfishing of prey fish also contribute significantly to seabird declines.

- Other human-induced threats to seabirds include marine debris pollution (60% of seabird species have been found to ingest plastics and 40% have been entangled in debris) and invasive species on nesting islands (invasives such as rats have caused breeding population declines on islands for nearly half of seabird species).

Puffin Colony Declines on Both Coasts

Puffin nesting colonies along both the Atlantic and Pacific Coasts exemplify the threats that seabirds face from food shortages. Declines in forage fish populations, caused by climate change effects and over-harvesting by commercial fishing operations, directly impact the ability of puffins to survive and feed their young. In the East, Atlantic Puffin colonies in the Gulf of Maine have experienced widespread nesting failures during marine heat waves (periods of unusually warm ocean waters), which have become increasingly common over the past decade. In the Northwest, Tufted Puffin colonies along the Oregon coast have dramatically declined since 1979, with the number of active colonies down more than 50% and the estimated breeding population down a staggering 90%.



OCEAN HEAT WAVES CAUSE PUFFIN BREEDING FAILURES
At two Atlantic Puffin colonies on islands off the coast of Maine, breeding productivity plunged during periods of marine heatwaves. Higher ocean temperatures disrupt prey fish populations, which hurts the ability of puffins to feed their young. Source: Unpublished data from National Audubon Society and U.S. Fish and Wildlife Service Maine Coastal Islands National Wildlife Refuge Complex (see www.fws.gov/refuge/maine-coastal-islands-complex).

Bird Declines Are Reaching a Tipping Point

Sounding an Alarm About Steep Population Losses

In 2019, a study of 529 bird species with adequate long-term data for analysis (*Science*, Rosenberg et al.) found that 303 species in North America were declining—more than half of the bird species studied.

Now scientists with the Road to Recovery initiative have issued an alert for 90 declining bird species—birds that are not yet federally listed as threatened or endangered, but that have lost half or more of their breeding population since 1970. The scientists further identified a subset of 70 Tipping Point species that could lose another half or more of their populations in the next 50 years, based on recent trajectories and expert assessments.

These Tipping Point species are high priorities for science and conservation because of their high vulnerability to extinction, high urgency, and steep population declines where known. All are included on the Birds of Conservation Concern List of the U.S. Fish and Wildlife Service and/or state lists of Species of Greatest Conservation Need.

Two-thirds of Rufous Hummingbirds have been lost in the past 50 years.

On Alert: All of these bird species have lost half of their populations in the past 50 years

Baird's Sparrow
Black-billed Cuckoo
Black Skimmer
Black Swift
Canada Warbler
Cerulean Warbler
Clark's Grebe
Eastern Whip-poor-will
Grace's Warbler
Long-billed Dowitcher
Mourning Warbler
Olive-sided Flycatcher
Red-headed Woodpecker
Rock Sandpiper
Snowy Owl
Surfbird
Thick-billed Longspur
Western Grebe
Wilson's Plover
Wood Thrush

Allen's Hummingbird
American Golden-Plover
Ashy Storm-Petrel*
Audubon's Shearwater*
Bachman's Sparrow
Band-rumped Storm-Petrel*
Bendire's Thrasher
Bicknell's Thrush*
Black-capped Petrel*
Black-chinned Sparrow
Black-footed Albatross*
Black-vented Shearwater*
Black Rail*
Black Rosy-Finch*
Black Scoter
Bobolink
Bristle-thighed Curlew*
Brown-capped Rosy-Finch*

Buff-breasted Sandpiper
Cassia Crossbill*
Chestnut-collared Longspur
Chimney Swift
Craveri's Murrelet*
Elegant Tern*
Evening Grosbeak
Fea's Petrel*
Golden-winged Warbler
Great Black-backed Gull
Greater Sage-Grouse
Guadalupe Murrelet*
Harris's Sparrow
Heermann's Gull*
Henslow's Sparrow
Hudsonian Godwit
Ivory Gull*
King Eider

King Rail
Kittlitz's Murrelet*
Laysan Albatross*
Least Tern
LeConte's Sparrow
LeConte's Thrasher
Lesser Prairie-Chicken*
Lesser Yellowlegs
Mottled Duck
Mountain Plover
Murphy's Petrel*
Parkinson's Petrel*
Pectoral Sandpiper
Pinyon Jay
Prairie Warbler
Red-faced Cormorant
Red-legged Kittiwake*
Ruddy Turnstone

Rufous Hummingbird
Saltmarsh Sparrow*
Scripps's Murrelet*
Seaside Sparrow*
Semipalmated Sandpiper
Short-billed Dowitcher
Sprague's Pipit
Stilt Sandpiper
Townsend's Storm-Petrel*
Tricolored Blackbird*
Wandering Tattler
Whimbrel
Whiskered Auklet*
Yellow-billed Loon
Yellow-billed Magpie
Yellow Rail*

These Tipping Point species are on a trajectory to lose another 50% of their remnant populations in the next 50 years if nothing changes.

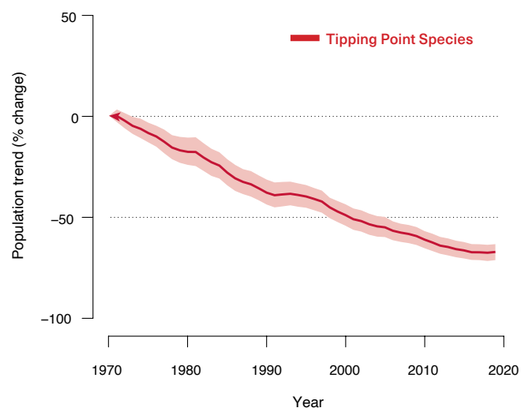
These 90 bird species lost 50% or more of their populations during 1970–2019. The Tipping Point species are on a trajectory to lose another 50% of their populations in the next 50 years (39 species), or already have perilously small populations and continue to face high threats, but lack sufficient monitoring data (31 species, indicated with an asterisk). For the USFWS Birds of Conservation Concern list, visit fws.gov/media/birds-conservation-concern-2021pdf.

The Next Set of Species Plummeting Toward Endangered Status

Of the 1,093 bird species protected under the Migratory Bird Treaty Act, 89 birds have received additional protections as either threatened or endangered under the U.S. Endangered Species Act to prevent their extinction.

The Tipping Point species represent another 70 birds that could be next to face threatened or endangered status. Cumulatively, the Tipping Point species that have sufficient data for monitoring have lost more than two-thirds of their populations in the past 50 years.

Tipping Point species come from varied habitats, but they all have the same urgency—immediate science and conservation actions are needed to turn around declines.



70 Tipping Point Species

Urgent action is needed to help these birds before they become endangered.

GRASSLAND BIRDS
Prairie specialists such as Mountain Plover, Sprague's Pipit, and Chestnut-collared Longspur have lost more than 75% of their populations since 1970.

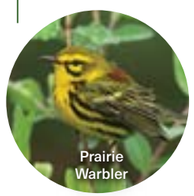
FOREST BIRDS
The steepest declines among forest birds include species that specialize on tree seeds (e.g., Pinyon Jay), long-distance migrants (e.g., Bicknell's Thrush), and aerial insect-eating specialists (e.g., Chimney Swift).

ARCTIC & ALPINE TUNDRA
Shrinking habitats due to changing climate and resource extraction threaten Arctic-breeding shorebirds (e.g., Hudsonian Godwit and Whimbrel) and alpine birds (e.g., Black Rosy-Finch).

Laysan Albatross

Bobolink

Greater Sage-Grouse


Prairie Warbler

King Rail

Hudsonian Godwit

COASTAL & OCEANIC
Nearly a quarter of seabirds found in U.S. waters are at risk of an Endangered listing, including murrelets, albatrosses, petrels, and shearwaters.

ARIDLAND BIRDS
Aridland birds are experiencing long-term declines, including Allen's Hummingbird, Bendire's Thrasher, and Greater Sage-Grouse.

WETLAND BIRDS
Though many waterbirds benefited from decades of wetland conservation, steep bird declines are still occurring in coastal saltmarshes (e.g., Saltmarsh Sparrow), freshwater marshes (e.g., Yellow Rail), and beaches (e.g., Least Tern).

Let's Help Birds Before They're Endangered

Our Best Chance for Success Is Now

Proactive conservation is the fastest, most effective strategy.
Once bird species are endangered, they are at greatest risk of extinction and require additional funding, protections, and decades of work to bring them back. A strategic road to recovery will advance science-based conservation solutions and voluntary partnerships needed to tip the balance, to drive steep declines upward before birds become endangered.

The Road to Recovery

Invest Now for the Biggest Payoff
Support capacity and strong public-private partnerships to keep birds from becoming endangered. Reversing declines of birds across habitats can boost wildlife and quality of life for people in all 50 states.

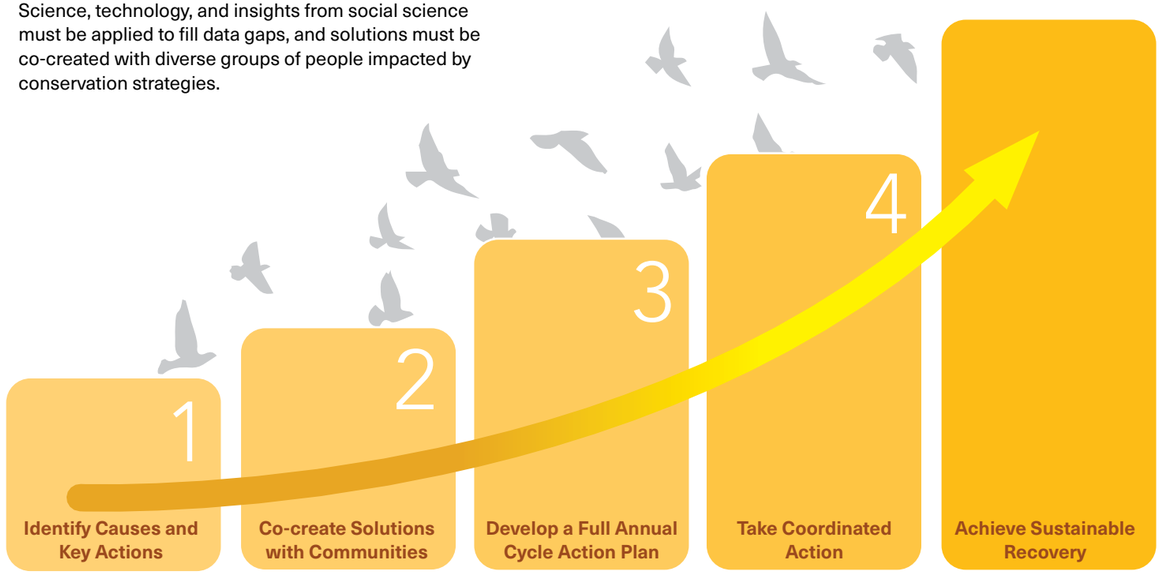
Power Up New Science and Technology for Precision Conservation
Unite research discoveries, emerging technologies, and social sciences to pinpoint acute causes of species declines and reveal data-driven insights for reversing those trends.

Co-create Solutions with Communities and International Partners
Generate solutions that work, based on collective knowledge, participation, and mutual goals from communities, businesses, scientists, land managers, and decision-makers.

Peregrine Falcons made a dramatic comeback after biologists identified the driver of declines (DDT) and innovated a new technique for breeding Peregrine Falcons in captivity and releasing them into the wild. Applying science and conservation can help bring birds back before they become endangered—a smart and cost-effective strategy for preventing extinction.

A Strategy to Reverse Declines

A strategic approach to bird conservation is needed to arrest declines of birds before they reach crisis levels. Science, technology, and insights from social science must be applied to fill data gaps, and solutions must be co-created with diverse groups of people impacted by conservation strategies.



1 Identify Causes and Key Actions
Support or establish working groups that apply new science, technology, and social science to identify the causes of declines and the human dimensions of conservation solutions.

2 Co-create Solutions with Communities
Shape solutions with those affected: landowners; local, underrepresented, and Indigenous communities; scientists, agencies, and decision-makers.

3 Develop a Full Annual Cycle Action Plan
Generate effective business plans and timelines, working with communities across the life cycle of birds.

4 Take Coordinated Action
Implement solutions with participation from communities and cross-sector partners. Monitor and adjust if needed to reach goals.

Achieve Sustainable Recovery
Healthy populations and increasing or stable numbers indicate successful recovery.

Evening Grosbeaks
have declined by 90% since 1970. Scientists are working to understand why.

Lesser Yellowlegs
will benefit from conservation plans that work with communities toward socioeconomic and cultural solutions for sustainable harvesting.

Golden-winged Warbler
management guidelines pinpoint and seek to address limiting factors on both breeding and wintering grounds.

Saltmarsh Sparrow
recovery is possible with prioritized actions to address sea-level rise across more than a dozen states identified by the Atlantic Coast Joint Venture.

Kirtland's Warbler
was removed from the Endangered Species list in 2019 after years of collaborative conservation efforts.

Birds, Our Heritage, and Our Future

Birds Offer Wins in Biodiversity, Climate Resilience, and Environmental Justice

The loss of 3 billion birds is an urgent biodiversity crisis for our country. Birds are key indicators of environmental health, so any successful measure of our nation's conservation and restoration progress should include evidence of a turnaround in bird populations. But the returns on helping birds will extend well beyond birds. Lands and waters across the United States will benefit as bird conservation offers bold opportunities for locally led, voluntary efforts that will protect, connect, and restore habitats.

Actions and initiatives to bring back birds can also play a role in achieving national goals for broader biodiversity protection, climate resilience, and environmental justice—all while staying true to the principles of benefitting all people, strengthening economies, using science as a guide, honoring Tribal sovereignty, and empowering private landowners as conservation drivers. The bottom line is that bird conservation benefits everybody: wildlife, people, entire ecosystems, and Planet Earth.

Birds Are a Key Investment for Protecting Biodiversity

With more than 12,000 animals and plants identified by wildlife agencies in all 50 states as Species of Greatest Conservation Need, the starting points for biodiversity conservation in the U.S. may seem almost endless. But birds offer a solid start—as species that are highly responsive to conservation efforts, and as indicators of biodiversity renewal that benefit all manner of plants, mammals, amphibians, insects, and fish.

When funding is dedicated to help a bird in distress—and science guides conservation action—bird populations respond with big gains. But that's not all. Ecosystem restoration is like the rising tide that lifts all boats; many other at-risk species of wildlife and plants benefit from habitat conservation for birds.

Restoring warbler habitat helps butterflies

The Kirtland's Warbler was a charter member of the Endangered Species Act in 1973, when only about 160 breeding pairs of these dandelion-yellow warblers were left in a sliver of Michigan. Almost 50 years later—after an intensive effort by the U.S. Forest Service, U.S. Fish and Wildlife Service, and state partners in Michigan—more than 2,300 Kirtland's Warbler pairs are breeding across Michigan, as well as in Wisconsin and Ontario, and the species was triumphantly delisted in 2019. Ecosystem restoration was the key to success, in particular the revitalization of jack-pine forests, which also benefitted other species—such as the federally endangered Karner blue butterfly.

Creating tree-cavity homes for woodpeckers and bats

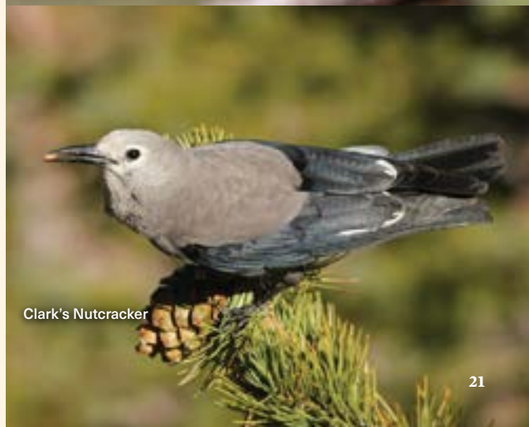
The Red-cockaded Woodpecker—another charter member of the ESA—has responded strongly to conservation action, with efforts focused on military bases and private forestlands in the Southeast. Over the past few decades, the range of the Red-cockaded Woodpecker has swelled from just a few states to 11 states today stretching from Virginia to Texas. The renewal of longleaf pine forests is bringing the woodpecker back, while also creating breeding habitat for other endangered tree-cavity nesters, like the Florida bonneted bat (one of the most imperiled mammals on Earth).

The future of many plants depends on birds

Recent research points to the interconnectedness of birds and plants, and shows why bringing back birds is a key to ensuring climate adaptation for plants. The study, published in the journal *Science* (Fricke et al. 2022), showed that the ability of animal-dispersed plants to keep pace with climate change has been reduced by 60% due to the loss of birds, as well as mammals. More than half of all plant species rely on animals to disperse their seeds, and the seed stage is the only time when plants have the opportunity to move into latitudes or elevations where climatic conditions may be most suitable in the future. Put simply, the loss of birds has much larger ecosystem ramifications; and conversely, the revival of bird populations holds the potential for much broader biodiversity gains.

Kirtland's Warbler

Red-cockaded Woodpecker



Clark's Nutcracker

Birds Are a Multiplier for Environmental Justice

Birds and people alike need healthy environments. Several recent studies show that Black, Latino, and Indigenous communities experience outsized environmental risks. Collaborative environmental investments in disadvantaged communities can advance environmental justice along with the conservation of birds.

Lazuli Bunting

"The community is so happy to finally have the new levee for meaningful flood protection, and to see all the birds that the new habitat is now attracting."

Jose Puente, community leader, Hamilton City, CA

California: Birds and ecosystem benefits make the difference for flood-ravaged farm community

Hamilton City is home to 2,000 people along the Sacramento River in one of the most flood-prone regions of California. Six times between 1980 and 2000, the community was evacuated due to rising waters.

The problem was an old levee—originally built to protect farm fields—that had become severely degraded, yet it was the only line of flood protection. For many years the U.S. Army Corps of Engineers was unable to make levee improvements, due to federal requirements for financial benefits from proposed flood control projects. Hamilton City is designated as a disadvantaged community by the California Department of Water Resources, and property values in the area couldn't meet the threshold for protected assets.

Hamilton City resident Jose Puente and his wife, Lee Ann Grigsby-Puente, had been working for levee improvements since the 1970s, organizing taco and tamale sales to form a community group that could make a case for support. Still the answers weren't good, and the future looked even worse—with water runoff along the Sacramento River projected to increase up to 60% by 2100 due to climate change. Then in 2000, Congress allowed ecosystem benefits to be included in assessments of flood-control projects. The Nature Conservancy of California stepped in to work with the U.S. Fish and Wildlife Service, the Corps, and the community on designing riparian habitat into a new levee system. The completed project would connect nearby national wildlife refuge lands and create one of the largest contiguous areas of wildlife habitat along the Sacramento River—benefitting local populations of Red-tailed Hawks; several at-risk bird species such as Lazuli Bunting and Bank Swallow; and 35 federally endangered species, including Western Yellow-billed Cuckoo and Least Bell's Vireo.

With the benefits for birds and riparian habitat included, the federal cost-benefit analysis climbed above the required threshold and the project was finally greenlighted for federal funding. TNC California helped acquire all land needed for the project, which was ultimately deeded to the local reclamation district. The Hamilton City setback levee was completed in 2021, and Puente's vision finally became reality—a $100 million federal flood-protection project at last delivered for a tight-knit community who had been asking for flood relief for 50 years.

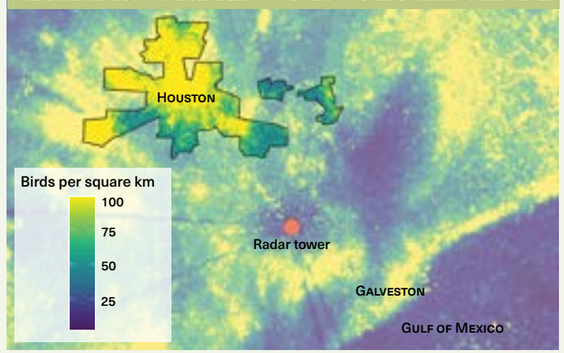
Houston: Greening up urban areas can provide relief for inner-city communities and migratory birds

Urban heat islands of concrete and pavement can get up to 22 degrees F hotter than surrounding suburban and rural areas. People living in heat islands are more vulnerable to heat exhaustion, which complicates heart and respiratory conditions. Climate forecasts say the problem is going to get worse, with more frequent and prolonged periods of extreme heat. Many of our nation's big cities (and urban heat islands) are clustered along the coasts, which are also major corridors for bird migration. For example, more than 2 billion birds migrate across the Gulf of Mexico in spring. The exhausted birds that make landfall along the Texas coast are looking for safe places to rest and refuel, with millions touching down in the Houston area. Federal bird conservation initiatives like the Urban Bird Treaty program offer a funding opportunity to green up urban heat islands and get two-for-one benefits—providing shade and cover for inner-city residents in the Houston neighborhoods that register the highest surface-heat temperatures, while also adding to the city's stopover habitat for migratory birds.

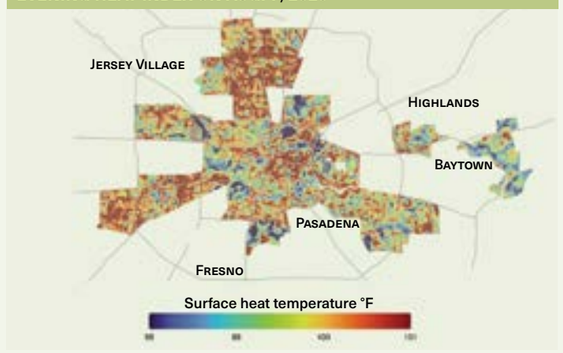
"Greening urban areas with native trees helps restore urban habitat for birds while also improving community health, especially for underserved, inner-city communities of color."

Helen Drummond, executive director, Houston Audubon

AVERAGE MIGRATORY BIRD DENSITY AFTER SUNSET DURING SPRING 2021



EVENING HEAT INDEX ON AUG. 7, 2020



CONSERVATION CROSSOVER OPPORTUNITY: WHERE URBAN BIRD TREATY GREENING COULD HELP BIRDS AND PEOPLE

A comparison of the stopover areas used by migratory birds (radar image of migratory birds taking off at sunset by BirdCast) and surface heat temperature readings in the Houston area (by the H3AT: 2020 Heat Mapping Campaign) shows where Urban Bird Treaty–funded greening projects could simultaneously provide migratory-bird habitat and cooling shade cover in heat islands.

Pueblo lands: Restoring Rio Grande backwaters to revitalize bird habitat and cultural traditions

In the Desert Southwest, wetlands and riparian areas are crucial to birds (harboring up to 90% of local avian diversity) and Indigenous peoples (for sustaining life and traditional practices). Several decades of channelization along the Rio Grande in New Mexico have lowered the river's water flows, in the process eliminating many wetlands, backwaters, oxbows, and wet meadows—and diminishing Tribal ways of life.

In recent years, more than a dozen Tribes in the region—including the Pueblos of Santa Ana, Isleta, Sandia, and Ohkay Owingeh—have been leading an effort to bring back the Rio Grande's backwaters and oxbows. By including birds and wildlife habitat in their projects, the Tribes were able to access federal funding and agency resources. The collaborative projects restored riparian habitat for local birds on the Endangered Species list, such as Southwestern Willow Flycatcher and Western Yellow-billed Cuckoo, while creating fertile meadows for the gathering of culturally important medicinal plants for Tribes.

Restored backwaters and oxbows flush with cottonwoods and willows also provide better water filtration—removing excess nitrogen and phosphorous for cleaner water—and the higher river flows provide more irrigation water for crops.

"Restoring rivers protects birds and people, which in turn helps preserve our culture. After all, we are one."

Governor Joseph Sanchez, Pueblo of Santa Ana

Bird Habitat Can Put America on a Fast Track to Climate Resilience

In 2021, Audubon released a report that showed how bird habitat can also play a key role in sequestering carbon. According to the Audubon Natural Climate Solutions Report, the United States could realize nearly a quarter of its Paris Agreement commitment to reduce greenhouse gas emissions by protecting and managing priority bird habitats that will keep more than 100 billion tons of carbon out of the atmosphere.

Those priority bird habitats can also provide climate resilience in other ways—by mitigating against floods, purifying and storing drinking water supplies, and making our air cleaner. Birds bring money to the climate-resilience fight, too. Across America, there are numerous examples of how bird-conservation funding for restoring forests, grasslands, and wetlands can also strengthen our communities in the face of climate change.

Four joint ventures could offset emissions from every registered vehicle in NYC for more than two decades

Migratory Bird Joint Ventures are working across North America to implement national bird conservation plans at local scales, cultivating partnerships in the landscapes where they work to restore habitats for priority bird species. Joint Ventures can play a big role in the nation's climate-resilience strategy, too.

Implementing just four JV habitat-conservation plans would yield the climate equivalent of removing the greenhouse gas emissions from more than 2 million vehicles per year over the next two decades—or every registered vehicle in New York City.

Restoring Forests in Appalachian Mountains

Implementing the Appalachian Mountains JV's habitat-restoration objectives for Wood Thrush (a Tipping Point species) would restore forests across 150,000 acres of Appalachian woodlands from Georgia to New York. The restored forests will have high volumes of carbon sequestration and storage, as well as improved resiliency against disease and invasive pests. The AMJV's plan will also add 4,000 Wood Thrush breeding territories to the region, while enhancing timber values on private lands and bolstering the Appalachians as one of America's largest carbon sinks.

10 Million Metric Tons Carbon

Reforesting Bottomlands in Lower Mississippi Valley

The Mississippi Alluvial Valley has lost more than 80% of bottomland forests in an important region for migratory birds—wintering home for 40% of waterfowl in the Mississippi Flyway and breeding home for a third of the global population of Prothonotary Warbler. The Lower Mississippi Valley JV aims to restore 1.73 million acres of bottomland forests in Arkansas, Kentucky, Louisiana, Mississippi, Missouri, and Tennessee—enough habitat to support healthy populations of breeding forest landbirds and diverse waterfowl species while storing nearly 60 million metric tons of carbon.

59 Million Metric Tons Carbon

Protecting Duck Habitat in Prairie Potholes

The Prairie Pothole region is the most important breeding grounds for waterfowl in all of North America, supporting more than 50% of the continental duck population. The Prairie Pothole JV habitat plan is built around five primary duck species (Mallard, Blue-winged Teal, Gadwall, Northern Shoveler, and Northern Pintail) and calls for perpetual protection of 133,000 acres of prairie wetlands and 446,000 acres of native grasslands—adding to the vast carbon-capture complex in the prairie pothole landscape of Iowa, Minnesota, Montana, and the Dakotas.

7 Million Metric Tons Carbon

Conserving Riparian Habitat in California's Central Valley

Along the Sacramento and San Joaquin Rivers in California, birds such as the federally endangered Western Yellow-billed Cuckoo and Least Bell's Vireo rely on riparian systems for breeding habitat. The Central Valley JV has produced a plan that calls for conserving more than 300,000 acres of riparian forests. Meeting the habitat goals for healthy populations of cuckoos, vireos, and many other bird species will also add to the buffers for local communities against river flooding and grow the Central Valley landscape's capacity to capture and store carbon.

7 Million Metric Tons Carbon

***Numbers of vehicle emissions calculated using EPA Greenhouse Gas Equivalencies Calculator**
****JV carbon sequestration figures calculated over 25 years, except for Prairie Pothole JV (20 years)**

Accelerating a fire-safe future for Oregon's forest communities

Throughout western forests, Collaborative Forest Landscape Restoration Programs (CFLRPs) have the potential to increase populations of at-risk birds, while decreasing severe wildfire risks for some of America's most vulnerable wildland-urban-interface communities. These fire-adapted forest landscapes historically burned regularly, but over the past 100 years such fires were suppressed and logging practices were largely unsustainable, causing fuel loads to build up. Now climate change is raising severe fire risks and threatening water security for communities such as Medford and Ashland in Oregon, which lie in one of the highest fire-risk landscapes in the Pacific Northwest.

These western forests also host a high diversity of at-risk bird species. The Partners in Flight (PIF) network developed a strategy to use forest management as a catalyst for bird conservation through forest restoration work that mimics the regular healthy wildfires of the past and mitigates severe fire risks in western forests. Working with the U.S. Forest Service and local communities through the Rogue Basin and Northern Blues CFLRPs, the Klamath Bird Observatory is leading the PIF effort to add bird-conservation science and funding into projects on national, ceded Tribal, state, and private forestlands. Projects involving forest thinning, strategic fuels reduction, and the reintroduction of wildfire through prescribed burning are designed to restore a mosaic of high-value forest conditions, while protecting old-growth forests and riparian areas.

By including PIF science in their planning, the CFLRPs have the potential to restore forests in a way that will reverse declines of Olive-sided Flycatcher and Rufous Hummingbird, as well as several other western forest birds in decline. By adding bird-conservation funding streams, the projects are designed to accelerate a safer future for communities who currently live at high risk for catastrophic wildfire, including the 100,000 people in Ashland and Medford.

Restoring playas for birds and water security in New Mexico

In 2018, the city of Clovis, New Mexico, estimated that if agricultural irrigation continued at the current rate, the underground drinking water supply would only meet community needs for about 11 to 25 more years. That year the city formed a partnership with Playa Lakes Joint Venture to include playa restoration in their plan to create a sustainable water future for people and birds.

Healthy playas—shallow, temporary wetlands found in the western Great Plains—are a primary source of groundwater recharge. Playas contribute up to 95% of the water flowing to the Ogallala Aquifer, which many rural communities depend on for their water supply, and they improve the quality of that water. However, many playas are no longer functional due to drainage and accumulated sediment.

Playas also provide important habitat for 185 species of birds, including Northern Pintail and Lesser Yellowlegs (a Tipping Point species). By working with state and local partners, Playa Lakes JV is blending bird habitat conservation and resilient communities funding to restore more than 4,100 acres of playas and surrounding grassland buffers in eastern New Mexico—enough playa wetlands to supply hundreds of millions of gallons of clean drinking water into the local aquifer for Clovis and other communities.

The PLJV model is so successful that it's spreading, as communities from Kansas to Texas are now incorporating playa conservation into water security and sustainability planning.

"The Ogallala Aquifer decline is something that a lot of mayors are going to be faced with. My advice to other towns and other mayors would be have a plan, and be ready to implement new ideas such as leveraging playa lakes as a way to recharge the aquifer."

Michael Morris, mayor of Clovis, New Mexico

A Convergent Destiny for Birds and People

by J. Drew Lanham

It's a perfectly destructive storm—climate change; habitat destruction; pesticide impacts; outdoor cats; persecution and downright negligent behavior—wreaking havoc on feathered beings around the globe.

Here in North America, birds face these Anthropocene headwinds and many struggle to make their way forward, even as they stand as symbols and impetus for so much environmental conservation and appreciation. According to the U.S. Fish and Wildlife Service, more than 45 million Americans call themselves birders or bird watchers, but billions of birds disappearing in a half century of decline posits an odd, juxtaposed picture of growing absence amidst heightened adoration.

For some species like the Black Rail and Cerulean Warbler, the steep declines imperil local populations with extirpation. For those and too many others, endangerment and extinction loom. As once common species like Northern Bobwhite and Rusty Blackbirds dwindle to rare across much of their range, how do we make head and heart space for considering birds and their welfare, in the midst of so much human suffering—pandemic, war, injustice, bias? Is there some link between us that can bring broad efforts at doing better for us both, to bear?

Yes. I believe because we share the same home ranges as the birds we love—and within those geographical overlaps, we share the same air, same water, same soil, and ultimately the same fate—there's a convergent moral imperative to bird conservation we can't underestimate. These aren't just "our" birds either. We share many migratory bird species with the rest of the Western Hemisphere and some with the world. This makes our actions, for better or for worse, wide-ranging.

Again that collective idea of range and fate sharing comes into play. Perhaps if we all saw ourselves as wild canaries in a global mine of finite resources and limited time, we'd become more urgent in our advocacy. Yes, millions make birds their hobby and perhaps thousands a profession. But it isn't just enough to watch or count or research or manage or even declare our love for the backyard robin, the shorebird at the beach, or the rare warbler in some hard-to-reach wilderness.

The dire circumstances at hand demand we activate affection, profession, and obsession into policy and practice that mitigate the storms that stall flight and ditch so many species into seas of declining despair.

Consider this: At some point in our not-so-long-ago history, someone looked skyward and dismissed the uncountable hordes of birds darkening the skies as inexhaustible, and in doing so, arrogantly dismissed abundance, even as avarice brought billions to one, then none. The Passenger Pigeons cannot be recovered, that road has long since closed. But we do have a chance now to act with science, managers, birders, and the public at large to co-produce (teamwork interdependently) saving solutions that will benefit us all, birds and human beings. Yes, the convergent calamities of our time have been hard to push through. But a few past successes like the Bald Eagle and Peregrine Falcon (delisted from Endangered Species status in 2007 and 1999, respectively) are indicators that there are paths we can follow. From where will the tailwinds come that give us easier passage to better days?

Doing the right things for birds benefits people. Doing right by one another as humans benefits all else. Same earth. Same fate. It will be all of us understanding common plight, and in that knowing of shared geographies, life requisites, and destinies between feathered and humanity, a move forward on this road to recovery.

At Left: Biologist Cathy Nishida holds a Willow Flycatcher during a project to study the flycatchers of the Sierra Nevada mountains. Flycatchers and humans both depend on water, namely clean and freely flowing rivers. Bringing back flycatchers and other birds holds the potential to bring back all the benefits that healthy ecosystems provide to people.

J. Drew Lanham

A native of Edgefield, South Carolina, J. Drew Lanham is an Alumni Distinguished Professor of Wildlife Ecology and Master Teacher at Clemson University. He is a writer and poet, the author of *The Home Place: Memoirs of a Colored Man's Love Affair with Nature*, which received the Reed Award from the Southern Environmental Law Center and the Southern Book Prize, and was a finalist for the John Burroughs Medal.

Protecting our natural heritage is essential for healthy communities today and for future generations. Wildlife and people alike are facing growing threats from habitat degradation, climate change, and natural disasters. By helping birds, we help ourselves.

With all hands on deck—involving local communities as well as state, federal, and international efforts—we can restore nature for stable economies, natural security, and human health.

"Nature is essential to the health, well-being, and prosperity of every family and every community in America."

–Report by U.S. Depts of Interior, Agriculture, Commerce and White House CEQ to the National Climate Task Force, 2021

Here's How to Lift Up Birds and Communities in Every State

Past successes show that bird conservation is a smart and cost-effective investment that can benefit everyone: birds, landowners, hunters and anglers, industries, and communities.

Springwaters restoration on the Pahranagat National Wildlife Refuge in Nevada.

Restoring Habitats

All Habitats: Investments from hunters and the North American Wetlands Conservation Act enabled waterfowl to rebound. Building on that success in other habitats can help save songbirds, shorebirds, seabirds, and more.

Across the Nation: Restoring lands and waters can create jobs and support healthy communities. Joint Ventures and the Urban Bird Treaty Program improve habitats for birds and benefit people.

Internationally: The Neotropical Migratory Bird Act improves habitats and helps birds survive their journeys across the U.S., Latin America, and the Caribbean.

Lights Out initiative to reduce bird collisions during migration season in Houston, Texas.

Effective Policies to Reduce Hazards

Bird Protections: Millions of birds are saved from harm through implementation of wildlife laws such as the Migratory Bird Treaty Act, which has prohibited killing or capturing protected species for more than a century.

On Land: Each year, hundreds of millions of birds die in window collisions in the U.S. and Canada. Federal, state, and local efforts can take action to limit collisions.

At Sea: Many seabird species are among the world's most imperiled birds and are at risk as commercial fisheries bycatch on our oceans. International efforts can expand coordination and implement actions to save seabirds.

Outfitting Whimbrels with GPS tracking tags on Deveaux Bank, South Carolina.

Smart Actions to Help Species in Trouble

Strategic Prioritization: The Fish and Wildlife Conservation Act requires steps to identify priority species, habitat, conservation actions, and population trends. New science and technology can fill data gaps and pinpoint solutions that will make the biggest difference.

Enabling All States: Enable states and Tribes to help recover 12,000 Species of Greatest Conservation Need, including birds, and benefit local communities.

Methodology

Summaries of Population Change for Birds by Habitat
Following the approach developed by Gregory and van Strien (2010), State of the Birds reports focus on composite summaries of population change for collections of species that share common characteristics such as a common primary habitat biome or taxonomic affinity. In this report, we provide composite indexes for biome obligate species as defined in earlier reports (Grassland, Aridland, Eastern Forest and Western Forest), for several taxonomic-based groups (Shorebirds, Waterbirds, Geese and Swans, Sea Ducks, and Dabbling/Diving Duck species), and for species on our Tipping Point list with adequate data. Lists of species included in each group, surveys used for their analysis, and summary trend estimates are presented as supplemental material at StateoftheBirds.org.
This report describes population change for 259 species of North American birds summarized from 5 surveys: the North American Breeding Bird Survey (BBS, 176 species, Sauer et al., 2020), the Christmas Bird Count (CBC, 60 species, Meehan et al., 2020), the Waterfowl Breeding Population and Habitat Survey (WBPHS, 14 species, U.S. Fish and Wildlife Service, 2021), the American Woodcock Signing-ground Survey (SGS, 1 species, Seamans and Rau, 2021), and International Shorebird Surveys (ISS, 9 species, Smith and Smith, 2022). All of these data sources were used in Rosenberg et al. (2019), and we refer readers to that publication for additional details on the surveys. For each species, annual indices of abundance were obtained from published sources (BBS, WBPHS, SGS) or from data managers (CBC, ISS). In this analysis, we used results from the time period 1970–2019 for all surveys except for the ISS, for which results were only available for 1980–2019.
Statistical analysis of composite summaries follows methods used in earlier State of the Birds reports. A quantitative description of the statistical model was published in Sauer and Link (2011). It employs a hierarchical model, for which input data are collections of estimates of population change for a species (at the survey-wide scale of summary) from a base year (1970 or 1980) to each subsequent year. For each year, the collection of actual population changes for all species from the base year to the year of interest are assumed to be normally distributed on the log scale, and the latent mean change for the collection is estimated. The model is fit to all years post-base year, and the resulting model-based means form the composite trajectories of change for the species group. The ratios of the annual indexes of each year, divided by the annual index of the base year, was used to estimate the cumulative change in the species population for that year. See Sauer and Link (2011) for additional details regarding the model and its fitting to BBS and other survey data.

On Alert and Tipping Point Species
Scientists for the Road to Recovery initiative have identified 90 On Alert bird species in need of strong and immediate scientific action to pinpoint causes of declines and to support practitioners dedicated to recovering their populations (page 16). These birds have **high vulnerability to extinction** and **steep population declines** as described below, with 50% or more of their populations lost during 1970–2019.
Of the 90 On Alert species, 70 are Tipping Point species that show continued or accelerated recent declines that if continued could lead to the loss of 50% or more of their populations in the next 50 years (**high urgency**)—or they have perilously small populations, high threats, and insufficient monitoring data (**presumed high urgency/data deficient**). We relied first on data already available in the Avian Conservation Assessment Database (ACAD)—a database maintained by Partners in Flight (PIF) and housed at Bird Conservancy of the Rockies. We categorized the species based on high vulnerability to extinction, steep population decline, and high urgency, as described below.
High Vulnerability to Extinction: Vulnerability in the ACAD is assessed by carefully scoring a series of independent factors (Population Size, Breeding and Nonbreeding Distribution, Threats, and Trend) that are combined into a single Combined Conservation Score (CCS) that ranges from 4 to 20 (see the ACAD Handbook for a thorough description). Species that meet a threshold of CCS > 13 are considered to be highly vulnerable and are placed on the ACAD Watch List. Species with CCS ≥ 16 show high vulnerability across multiple factors and constitute the Red Watch List.
Steep Population Decline: Based on the latest long-term population trend data for 529 U.S./Canada species (Rosenberg et al., 2019), we identified those species that are estimated to have lost 50% or more of their total adult breeding population since 1970. This group of species are assigned a Population Trend (PT) score = 5 in the ACAD and include many Watch List species. Trend data have been updated through 2019 for this report.
Urgency: To assess urgency, we examined the most recent population trajectories for each species, based on the most recent analysis of BBS and other survey data. This analysis mirrors the survey data used to assess trends for 529 species in Rosenberg et al. (2019) and have been updated through 2019. Notably this analysis includes a complete re-analysis of shorebird trend data by Paul Smith (unpublished 2021). By comparing long-term trends (back to 1970 for most species; to 1980 for shorebirds) with the most recent population trajectories (using a 3-generation period to define "recent" period), and examining trend estimates in light of the 2022 State of the Birds composite results, we identified species in two urgency categories, as follows:

Species of High Urgency—species with large long-term population loss (>50%) and with continued or accelerated recent declines that exhibit a "half-life" < 50 years when projecting forward the most recent 3-generation trend.

Presumed High Urgency/Data Deficient—Poorly monitored species that are believed to be declining have been assigned PT scores of 5 or 4 in the ACAD via expert opinion; for some of these, the population trend is completely unknown. This additional set of species are defined by a combination of small population size (PS = 4, 5) and high threats (TB or TN = 4, 5) and have expert-assigned PT scores of 5, 4, or 3. These species are marked with an asterisk on page 16.

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