

# Going...

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*A surprising number and variety of North American wildlife  
species are quietly disappearing*

**An eastern towhee faces the wind in a Delaware snowstorm.  
Since 1966, their numbers have dropped nearly 50 percent.**



As a child in the 1960s, ornithologist Geoff LeBaron watched common nighthawks swoop above New Hampshire's Squam Lake, where his family owned a summer cabin. After completing graduate school two decades later, he continued seeing "waves and waves" of these acrobatic insectivores snatching bugs mid-air over a pond in Rhode Island's Burlingame State Park, where he worked as a naturalist.

"That just doesn't happen anymore," says LeBaron, now the Christmas Bird Count director for the National Audubon Society. Hampered by habitat loss, pesticides and vehicle collisions, nighthawk populations have plunged in

"most at risk of extinction without significant action." The list comprises such widespread and familiar birds as the eastern meadowlark, chimney swift and common grackle as well as more than a quarter of the continent's 45 grassland species, including the chestnut-collared longspur, grasshopper sparrow and bobolink.

The problem goes beyond birds. Based on analyses of the nation's best-studied groups of plants and animals—including birds, mammals, fish, reptiles, amphibians and vascular plants—scientists at NatureServe estimate that about a third of all U.S. species are at risk of extinction. That percentage translates to "more than 8,500 of our best-known plant and animal species," says Bruce Stein, the National Wildlife Federation's associate vice president of conservation science and author of *Precious Heritage: The Status of Biodiversity in the United States*. Only about 20 percent of the country's more than 200,000 identified species have been evaluated for extinction risk, he adds, "so the true total of imperiled plants and animals is most likely much higher."

In addition to the aesthetic and moral implications of species declines, "we as human beings depend on natural ecosystems for food, clean water and even safety, such as the coastal habitats that protect us from storms and floods," Stein says. "These ecosystems are made up of individual species. When they disappear, the systems that support us can unravel."

### Global biodiversity crisis

In the mid-1980s, the planet's "biodiversity crisis" burst forth as a critical conservation issue at the National Forum on Biodiversity, organized in Washington, D.C., by the National Research Council and spearheaded by Harvard University biologist Edward O. Wilson. According to Wilson and other forum participants, global species losses were accelerating at such a rapid pace that Earth was entering its sixth mass extinction event—the fifth having taken place some 65 million years earlier when the dinosaurs and countless other creatures disappeared forever.

From the beginning, concerns about species loss focused primarily on distant tropical habitats like Australia's Great Barrier Reef and



JAN WEGENER (BIA/MINDEN PICTURES)

**A common nighthawk soars during a display flight in Texas. Nationwide, these birds are in sharp decline.**

recent decades. According to the North American Breeding Bird survey, the birds declined 61 percent nationwide between 1966 and 2014.

Nighthawks are hardly alone. The species is one of hundreds of once-common U.S. birds that have decreased dramatically in recent years. According to the North American Bird Conservation Initiative, more than a third of the continent's 1,154 avian species are in trouble. The initiative's recent report, *The State of North America's Birds 2016*, features a Watch List of 432 species

**SPOTTED SALAMANDER**

U.S. amphibian populations are declining nearly 4 percent a year.



CLAY BOLT

**GREAT SPANGLED FRITILLARY**

Since 1950, at least five butterfly species have gone extinct in the United States.



TWAN LEENDERS

**EASTERN MEADOWLARK**

More than a third of North American bird species need urgent conservation action.



ROBERT CAMERON



TODD AMACKER

**DEERTOES MUSSEL**

At least 26 U.S. freshwater mussel species have gone extinct, and 87 are listed as threatened or endangered.





PETE OXFORD (MINDEN PICTURES)

In Tennessee's Hiwassee River, an eastern hellbender cruises along moss-covered rocks hunting for fish and crayfish. The continent's largest salamanders, hellbenders are declining throughout their eastern U.S. range.

Amazonia's rain forest. Today, NWF and its partners want to focus more attention on the biodiversity crisis taking place in our own backyards.

Not all species are in trouble, of course, and some are doing better than at any time in recent history. Conservationists have done a good job restoring large charismatic animals that were once imperiled, including bald eagles, gray wolves and grizzly bears. The same is true for game animals such as elk, white-tailed deer and wild turkeys. But many other species have been overlooked. "While most of us have felt satisfied with what we've accomplished, the truth is we're not winning the war to save biodiversity overall," says Kevin Coyle, NWF's vice president of education and training and coauthor of the Federation's new strategic vision seeking to reverse U.S. species declines (see page 30).

### **Barrage of threats**

Many factors are to blame for biodiversity loss, including wetlands destruction, damming and disruption of waterways, invasive species,

exotic wildlife diseases and climate change. We also continue to develop more and more of our nation's terrestrial habitats. Together, habitat loss and degradation are the leading causes of U.S. species declines, Stein says.

Weak laws, lackluster enforcement and inadequate funding exacerbate the problems. According to a study published in *Biological Conservation*, it takes an average of 12 years—and as long as 40 years—for proposed species to be listed as endangered or threatened under the U.S. Endangered Species Act (ESA). In addition, only 5 percent of plants and animals ultimately listed receive adequate conservation funding, concludes a recent *Issues in Ecology* report, with the lion's share of effort going to a handful of high-profile species.

Meanwhile, the primary agency responsible for ESA listings, the U.S. Fish and Wildlife Service (FWS), is chronically underfunded and under attack from some members of Congress, who in recent years have ramped up efforts to limit listings. And although game species of fish



JOEL SARTORE

Seven-year-old pallid sturgeon crowd a tank at a South Dakota fish hatchery. When the animals sexually mature at about age 20, their progeny will help replenish wild populations of this endangered species.

and wildlife receive reliable and significant conservation funding through the sales of fishing and hunting licenses and gear, no similar big pots of money exist to protect “nongame” animals.

These animals include the hundreds of bird species in decline as well as creatures as diverse as mussels, salamanders, frogs, butterflies and bumble bees. On the following pages, we provide a rundown of several groups of imperiled wildlife, along with what’s at risk if North American species fade away.

**Freshwater fish.** An ancient species that has survived since the days of dinosaurs, the pallid sturgeon can grow up to 6 feet long, take 20 years to sexually mature and live 70 years or longer. These rarely seen and poorly understood fish once thrived from the headwaters of the Missouri River in Montana downstream to the lower Mississippi River. Today, only a few hundred wild sturgeon remain, all of them hemmed in by dams and other river developments that make it difficult for the animals to spawn and find food.

Unique in many ways, the pallid sturgeon is all too typical in others. According to the Endangered Species Committee of the American Fisheries Society (AFS), 40 percent of North America’s freshwater fish species are imperiled or already extinct. Of 28 native species and subspecies of U.S. trout, three are extinct and 13 of the others occupy less than a quarter of their historic habitat, reports Trout Unlimited. AFS calls these declines “a major tragedy” because “the loss of aquatic organisms is occurring without any knowledge of effects on the dynamics of the ecosystems they inhabit.”

Causes of freshwater fish declines include sediment runoff, water pollution, introduced species, stream fragmentation, dams, dredging and river channelization. “As a whole, our freshwater biota is in much worse shape than our terrestrial biota,” Stein says, “but it does not get much attention because it’s largely out of sight.”

**Freshwater mussels.** With an estimated population of about 100 individuals, the golden





CLAY BOLT

A male rusty patched bumble bee rests on Joe Pye weed in Wisconsin, a state where the bees have steeply declined.

riffleshell mussel is one of the planet's rarest creatures, found only in a single creek in Virginia. Like the riffleshell, freshwater mussels as a group are among the nation's most endangered categories of animal. Most U.S. mussels live in the Southeast, a region that has the world's highest diversity of these mollusks: 302 known species. At least 26 of these species already have gone extinct, and another 87 are federally listed as endangered or threatened.

Once numbering in the hundreds of millions—perhaps billions—of individuals, mussels are ecologically important filter feeders that

act as giant water sieves. “Historically you could see 20 feet into the Tennessee River, and many of our rivers ran clear,” says Paul Johnson, program supervisor for the Alabama Aquatic Biodiversity Center.

Water pollution, sedimentation, dams and other river and stream alterations all contribute to mussel losses. The animals also have suffered from declines in the host fish they need to reproduce. Different mussel species rely on different host fish—including darters, minnows, bass and catfish—to disperse juvenile mussels. Female golden riffleshells, for example, open their shells in spring, exposing fleshy lures that, to darters, resemble food. When a fish comes in to feed, the mussel clamps shut, trapping the fish. The riffleshells then expel their larvae, which attach to released fish and fall off weeks later to colonize new habitat.

“The life cycles of freshwater mussels are incredibly interesting,” says Jess Jones, an FWS biologist stationed at Virginia Tech University's Freshwater Mollusk Conservation Center. “If more people knew the amazing things they do, we might have a greater interest in saving them.”

**Bumble bees.** Ranging from Minnesota to Maine, the rusty patched bumble bee was once among the most common and widespread bumble bees in the East as well as an important pollinator of plants ranging from native wildflowers to crops such as cranberries, blueberries, apples and alfalfa.

Today, the bee has vanished from nearly 90 percent of its range.

By far the best-studied of the continent's more than 4,000 native bee species, bumble bees as a whole are in trouble. In addition to the rusty patched, many other once-common species—including the southern plains, crotch, suckley cuckoo and variable cuckoo bumble bees—have disappeared from large portions of their ranges. A recently published analysis by the Xerces Society for Invertebrate Conservation and the Bumblebee Specialist Group of the International Union

for Conservation of Nature concludes that more than a quarter of North America's 47 bumble bee species "face some level of extinction risk."

The threats to bumble bees include habitat loss and fragmentation, climate change and pesticides, particularly a newer and widely used class of insecticides called neonicotinoids. Systemic compounds that remain in plant tissues long after treatment, neonicotinoids are ingested by bees when they feed on nectar and pollen. Scientists have found that even sublethal doses of the pesticides may alter the foraging behavior of bumble bees.

For some vanishing bumble bees, "the evidence points to disease as the primary culprit," says Robbin Thorp, a retired University of California–Davis entomologist who has studied the insects' decline for two decades. One disease, a fungus called *Nosema bombi*, was probably transported around the country with bumble bees reared in captivity to pollinate commercial crops. "We need to be more careful about moving species, and we need to get a handle on what diseases are being potentially moved," Thorp says. One likely *N. bombi* victim is the Franklin's bumble bee. Historically found from southern Oregon to northern California, the species has not been spotted by scientists since 2006, and most of them consider it to be extinct.

**Butterflies.** The tiny and delicate Karner blue butterfly lives only in pine barrens, oak savannas and a handful of other habitats from the upper Midwest to the Northeast. Just as monarch caterpillars depend on milkweeds as a sole source of food, Karner blue larvae eat only the leaves of wild lupine plants, further restricting the species' range. Within that range, the butterflies once were abundant, but habitat loss wiped them out everywhere except a small number of habitat pockets, and in 1992, the Karner blue was listed as endangered under the ESA.

In one of the butterfly's last strongholds, Indiana Dunes National Lakeshore, biologists fear it is now locally extinct. While surveys during the 1990s turned up more than 1,000 Karner blues each year, scientists in 2015 and 2016 found none.

Researchers suspect that—in addition to habitat loss and other culprits—warmer temperatures caused by climate change are forcing butterfly eggs to hatch too early, before lupine leaves are available to eat.

Several other butterflies are suffering range-wide declines. Since 1950, at least five species have gone extinct in the United States, and approximately 40 more moths or butterflies are listed under the ESA. "For many butterflies, we are seeing declines among broadly distributed habitat generalists, species that we would expect



JOHN ESFORD

A tiny Karner blue butterfly alights in New York's Wilton Wildlife Preserve, among a handful of habitats where the species survives.

to be resilient," says Sarina Jepsen, director of endangered species and aquatic programs for the Xerces Society. One example is the regal fritillary, which historically inhabited 32 states but has disappeared from 14 of them and is classified as imperiled or vulnerable in 15 others.

University of California–Davis researcher Arthur Shapiro has conducted what is believed to be the country's longest-running butterfly study, surveying 10 sites in California from sea level to the High Sierra for more than 40 years. His results reveal declines at every elevation except the very highest. "We are seeing an



accelerating movement of mid-elevation species upslope,” Shapiro says. Unfortunately, the host plants many of these butterflies depend on do not exist at higher elevations, making their upslope resettlement futile.

**Amphibians.** Growing up to 2 feet in length, hellbender salamanders are among the world’s largest amphibians. The animals prey on fish and crayfish and can live 25 years or longer. Once thriving in rivers and streams from Missouri to New York to Georgia, hellbenders are declining dramatically across most of their range. Degraded water quality, sedimentation, collection for the pet trade and infection by a nonnative fungal disease have all likely contributed to the declines. “It’s a bit of a mystery ... something seems to be going on with habitat quality or water chemistry, which may be associated with forest loss around streams,” says William Hopkins, a hellbender researcher and professor of wildlife conservation at Virginia Tech University who calls the animals “a regional treasure and a symbol of the wildness of Appalachia.”

Poor water quality combined with other threats—including wetlands loss, introduced disease and nonnative species—are hitting many North American amphibians hard from coast to coast. According to a 2016 study by the U.S. Geological Survey, the nation’s amphibian populations as a whole are decreasing by nearly 4 percent annually.

Salamanders are losing ground especially in the Southeast, which has the world’s greatest diversity of these amphibians. For frogs, the declines are sharpest in the Rocky Mountains and elsewhere in the West. Boreal toads, for example, have decreased 80 percent in the southern Rockies. Northern leopard frogs have disappeared from or become rare across much of their western range. And in California, the California red-legged frog, found only within that state, has declined by about 70 percent. Such losses can pose problems for entire ecosystems, notes Hopkins. “As both predators and prey, amphibians play critical roles in many food webs, including the control of harmful insects such as mosquitoes.”

## *New Vision for Wildlife*

Last June, the National Wildlife Federation’s state and territorial affiliates unanimously adopted a new vision to increase North America’s wildlife populations and enhance native species’ capacity to thrive in a rapidly changing world. Now the Federation is developing a strategy to make that vision a reality.

Because habitat loss and degradation are the main causes of species declines, the strategy emphasizes protecting, restoring and connecting core wildlife habitats across America, with a focus on protected natural areas, waters, working lands and communities.

Communities can be made more wildlife-friendly by protecting stream buffers and



restoring tree canopies. On working lands, “there are ways to farm and ranch that share land with wildlife,” says Bruce Stein, NWF’s associate vice president for conservation science, who adds that even protected areas can be better managed to make them more resilient to climate change.

NWF President Collin O’Mara notes that broad-based collaboration will be the key to success. “Across our nation, many great conservation initiatives are underway, but they are not yet at a scale needed to overcome the magnitude of the challenges facing wildlife,” he says. To meet those challenges, “we will mobilize a conservation army of tens of millions of Americans, unlike anything this country has ever seen.”



DEVIN EDMONDS (USGS)

A Sierra Nevada yellow-legged frog surveys its domain in Yosemite National Park, where populations of this endangered amphibian have increased sevenfold in recent years thanks to aggressive conservation action.

But not all news about imperiled amphibians is bad, and in California, some populations of the endangered Sierra Nevada yellow-legged frog are prime examples. Found only at high elevations within the central and northern portion of the Sierra—rarely more than 3 feet from water—the species has declined rangewide by 93 percent. The frogs fell victim to habitat loss and fragmentation, introductions of nonnative fish that devour their offspring and an epidemic of the invasive chytrid fungus that is wiping out frogs and other amphibians in many parts of the world.

### Story of hope

In Yosemite National Park, however, the species has bounced back, its numbers actually *increasing* sevenfold between 1996 and 2005. The frog's return is attributed to two factors. First, in 1991, the California Department of Fish and Wildlife stopped releasing into the park's waters predatory nonnative trout that had been stocked for decades for visiting anglers. In 2007, park employees also began to net and remove trout, a program that continues today. Second, some of

the park's frogs seem to have evolved resistance to the chytrid fungus, which during the 1990s killed virtually all the animals it infected.

Without trout, the handful of frogs that survived and developed resistance to the fungus were able to prosper, says San Francisco State University biologist Vance Vredenburg, who has studied the Sierra Nevada yellow-legged frog since the mid-1990s. "These animals are survivors," he says. "The lesson is that if you give them room without introduced fish and allow for time, with a little bit of luck and good management, they will evolve and survive."

Stein and other biologists hold out hope that many more disappearing species will be able to recover—with a little help from the conservation community. "In the face of rapid change, we can't put things back the way they used to be, but we can reverse wildlife declines," he says. "It's a big task but it's doable, and it is our most important conservation challenge." <sup>W</sup>

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*Paul Tolmé wrote about Malheur National Wildlife Refuge in the December–January 2017 issue.*