

REVERSING AMERICA'S WILDLIFE CRISIS

SECURING THE FUTURE OF OUR FISH AND WILDLIFE



MARCH 2018

REVERSING AMERICA'S WILDLIFE CRISIS

SECURING THE FUTURE OF OUR FISH AND WILDLIFE

Copyright © 2018 National Wildlife Federation

Lead Authors: Bruce A. Stein, Naomi Edelson, Lauren Anderson, John J. Kanter, and Jodi Stemler.

Suggested citation: Stein, B. A., N. Edelson, L. Anderson, J. Kanter, and J. Stemler. 2018. *Reversing America's Wildlife Crisis: Securing the Future of Our Fish and Wildlife*. Washington, DC: National Wildlife Federation.

Acknowledgments: This report is a collaboration among National Wildlife Federation (NWF), American Fisheries Society (AFS), and The Wildlife Society (TWS). The authors would like to thank the many individuals from these organizations that contributed to this report: Taran Catania, Kathleen Collins, Patty Glick, Lacey McCormick, and David Mizejewski from NWF; Douglas Austen, Thomas Bigford, Dan Cassidy, Steve McMullin, Mark Porath, Martha Wilson, and Drue Winters from AFS; and John E. McDonald, Jr., Darren Miller, Keith Norris, Bruce Thompson, and Gary White from TWS. We are especially grateful to Maja Smith of MajaDesign, Inc. for report design and production.

Cover image: Swift fox (*Vulpes macrotis*), North America's smallest wild canid, has disappeared from about 60 percent of its historic Great Plains range. Once a candidate for listing under the Endangered Species Act, collaborative state and federal conservation efforts have stabilized the species across much of its remaining range. Photo: Rob Palmer

Reversing America's Wildlife Crisis is available online at: www.nwf.org/ReversingWildlifeCrisis



National Wildlife Federation
1200 G Street, NW, Suite 900
Washington, D.C. 20005
www.nwf.org

FOREWARD



The United States harbors an extraordinary diversity of wildlife, like this striking 'i'iwi (Vestiaria coccinea) from the island of Kauai. More than 150 U.S. species already have gone extinct—including many related Hawaiian forest birds—and the 'i'iwi itself has suffered dramatic population declines. Photo: Jim Denny

America is blessed with an extraordinary diversity of wildlife, ranging from large and charismatic animals to minute and secretive creatures. Unfortunately, many of America's wildlife species are in serious decline. While many formerly scarce species, like wood duck, elk, and wild turkey, have flourished over the past several decades, these conservation successes mask a far broader pattern of declines, especially among species that are neither hunted nor fished. Indeed, an assessment of the best-known groups of U.S. plants and animals indicates that as many as one-third of America's species are vulnerable, with one in five imperiled and at high risk of extinction. Concerns about species decline and loss are not hypothetical: more than 150 U.S. species already have gone extinct, while another 500 are "missing in action" and may also be extinct.

America's wildlife crisis extends well beyond rare and endangered species, and now affects many widespread and previously abundant creatures, such as the little brown bat and monarch butterfly. These declines are also affecting many of our most beloved songbirds—from eastern meadowlarks to cerulean warblers—and fully a third of North America's bird species require urgent conservation attention. More broadly, state wildlife agencies have identified nearly 12,000 species

Concerns about species decline and loss are not hypothetical: more than 150 U.S. species already have gone extinct, while another 500 are "missing in action" and may also be extinct.



*Amphibians like the northern leopard frog (*Lithobates pipiens*) are sentinels of broader environmental conditions. With U.S. amphibian populations declining on average four percent a year, there is an urgent need to dramatically increase conservation efforts for these and other native species. Photo: Ted Lee Eubanks/Fermata, Inc.*

nationwide in need of conservation action. Without concerted attention, our growing wildlife crisis will almost certainly lead to many more species qualifying for protection under federal and state endangered species laws.

The decline of America's wildlife can be stopped—and even reversed. A growing body of research demonstrates that when we focus on and invest in conservation we can make a difference. Congressionally mandated state wildlife action plans offer a science-

An investment of this magnitude should significantly reduce the number of species in decline, and decrease the number of species requiring protection under the Endangered Species Act.

based blueprint for sustaining and recovering the nation's fish and wildlife heritage. States, together with their federal, tribal, local, and private partners, have had many conservation successes that simply would not have been possible without the vision and conservation actions made possible through these wildlife action plans and the federal funds supporting their implementation. These successes also build on a strong and growing foundation of science. That's why the National Wildlife Federation was proud to develop this report in collaboration with the American Fisheries Society and The Wildlife Society, the nation's preeminent professional societies for America's leaders in fish and wildlife science, management, and conservation.

Recovering our broad and diverse wildlife species will require a dramatic increase in funding for proactive and collaborative conservation. I had the privilege of serving on a Blue Ribbon Panel, consisting of a diverse group of 28 business and conservation leaders, who worked together for more than a year to look for innovative ways to increase funding for wildlife conservation. The panel ultimately recommended the creation of a dedicated funding stream at a scale commensurate with the challenge of conserving the full breadth of our nation's fish and wildlife. The Panel's recommendations have been incorporated into the recently introduced **Recovering America's Wildlife Act**, which would dedicate \$1.3 billion annually for implementing state-based wildlife action plans. An investment of this magnitude should significantly reduce the number of species in decline, and decrease the number of species requiring protection under the Endangered Species Act.

The **Recovering America's Wildlife Act** offers a once in a generation opportunity to ramp up the nation's conservation efforts in a way that matches the scale of threats to our wildlife heritage. Now is the time to build on the successes of the past to ensure that our hard-fought conservation legacy has a bright future.

Collin O'Mara
President and CEO
National Wildlife Federation



Sandhill crane (Grus canadensis) populations have rebounded thanks to strong wildlife laws and decades of collaborative conservation work by state and federal agencies in partnership with landowners and non-profit organizations. Photo: Marijak Willis

TABLE OF CONTENTS

AMERICA'S EXTRAORDINARY WILDLIFE LEGACY	1
THE GROWING WILDLIFE CRISIS	2
WHAT'S THREATENING AMERICA'S FISH AND WILDLIFE?	4
INVESTING IN CONSERVATION MAKES A DIFFERENCE	8
STATE WILDLIFE ACTION PLANS: BLUEPRINTS FOR CONSERVATION	10
PUTTING CONSERVATION PLANS INTO ACTION	11
RECOVERING AMERICA'S WILDLIFE: THE NEED FOR DEDICATED FUNDING ...	23
REFERENCES	27



*The southeastern United States is the global center of diversity for salamanders, such as this frosted flatwood salamander (*Ambystoma cingulatum*). Although often inconspicuous, salamanders are the most abundant vertebrate animals in many eastern forests.
Photo: Pierson Hill*

Wildlife is central to our identity as a nation and strongly defines our sense of place. The distinctive character of America's regions is closely tied to such emblematic species as salmon in the Pacific Northwest, bison across the Great Plains, and moose in the great north woods, as well as alligators along the Gulf Coast, and road runners in the desert Southwest. Such iconic species, however, represent just a tiny fraction of the nation's overall diversity of life. Indeed, America is blessed with an extraordinary array of plants and animals, and scientists have documented more than 200,000 species across the United States.¹ Ranging from large and charismatic animals to minute and secretive organisms, each represents an essential thread in the fabric of the American landscape.

Although the term "wildlife" can broadly apply to the full array of wild species, both fauna and flora, most people associate the word with vertebrate species, such as birds, mammals, and fish. The United States is home to more than 2,500 native species of vertebrates, including nearly 800 species of birds, more than 400 mammals, about 800 freshwater fishes, almost 300 reptiles, and about 250 species of amphibians.² Some groups of U.S. vertebrates stand out even from a global perspective. For example, more species of salamanders are found in the United States than in any other country on Earth, and the southeastern U.S. is recognized as the global center of diversity for these amphibians. The

AMERICA'S EXTRAORDINARY WILDLIFE LEGACY

United States also harbors an exceptional diversity of freshwater fishes, many of which are similarly clustered in the Southeast. In contrast, mammal diversity is highest in the arid western U.S. with California alone home to nearly 200 species.^{3,4} And while there are more bird species in Texas than any other state, making it a popular bird-watching destination, Hawaii has the most distinctive avifauna. Most of Hawaii's native birds are found no place else on Earth, and are the result of an evolutionary radiation surpassing the famous Galapagos Islands.

America's extraordinary diversity of wildlife extends to its many species of invertebrate animals, which include organisms such as bees, butterflies, beetles, and bivalves. Although many insects and other invertebrates are inconspicuous and poorly known, they are essential to the healthy functioning of natural ecosystems and agricultural productivity. Indeed, Harvard biologist E.O. Wilson has referred to invertebrates as "the little things that run the world."⁵

Certain groups of invertebrates display exceptional levels of diversity in the United States. For example, America has the largest number of freshwater mussels in the world, with nearly 300 species.⁶ And as many fly fishermen know from trying to "match the hatch", there is an extraordinary variety of aquatic insects in American rivers and streams. With more than 600 species of stoneflies,⁷ the United States is the global center of diversity for that insect group, and for several other aquatic invertebrates important for fly fishing, such as caddisflies and mayflies. Native bees, so important for pollinating crops and wild plants alike, are another highly diverse U.S. group of invertebrates with roughly 4,000 species.



Cerulean warbler (Setophaga cerulea), a beautiful bird inhabiting treetops of eastern deciduous forests, is emblematic of America's growing wildlife crisis. Over the past several decades the species has suffered a 74 percent population decline, among the most severe of any migratory songbird.
Photo: D. J. McNeil

THE GROWING WILDLIFE CRISIS

Unfortunately, many wildlife species are in serious decline in America despite its remarkable diversity. Although populations of many formerly scarce species, like white-tailed deer, elk, and wild turkey, have been successfully rebuilt over the past several decades, these conservation accomplishments mask a far broader pattern of population declines, especially among species that are neither hunted nor fished. Emblematic of these declines, more than 1,600 U.S. species are now receiving protection under the federal Endangered Species Act, of which 442 are vertebrate animals, 272 are invertebrates, and 947 are plants.⁸ Listings under the Act are not an accurate barometer of the overall conservation status of U.S. species, however, and the number of species of conservation concern is far higher

than what is formally listed as federal threatened and endangered species. Indeed, an assessment of the best-known groups of U.S. plants and animals indicates that as many as one-third of America's species are vulnerable, with one in five imperiled and at high risk of extinction.⁹

An assessment of the best-known groups of U.S. plants and animals indicates that as many as one-third of America's species are vulnerable, with one in five imperiled and at high risk of extinction.

Concern about species extinction is not just hypothetical. More than 150 U.S. species already have gone extinct,¹⁰ representing a permanent loss of the nation's wildlife heritage. Extinct U.S. species include some that previously were common, widespread, and abundant, such as the passenger pigeon and Carolina parakeet (both of which went extinct in 1914). Others, like the Las Vegas leopard frog (last seen in 1942) or Scioto madtom (a fish not observed since 1957), were probably always rare. Documenting extinction is notoriously difficult because "absence of evidence is not evidence of absence." As a result, a determination to classify a species as "presumed extinct" is made only after a considerable time has elapsed and exhaustive searches of suitable habitat carried out. Nearly 500 additional U.S. species have not been seen in recent decades and are regarded as "possibly extinct."¹¹ Taken together, then, roughly 650 U.S. species have already disappeared or are "missing in action."

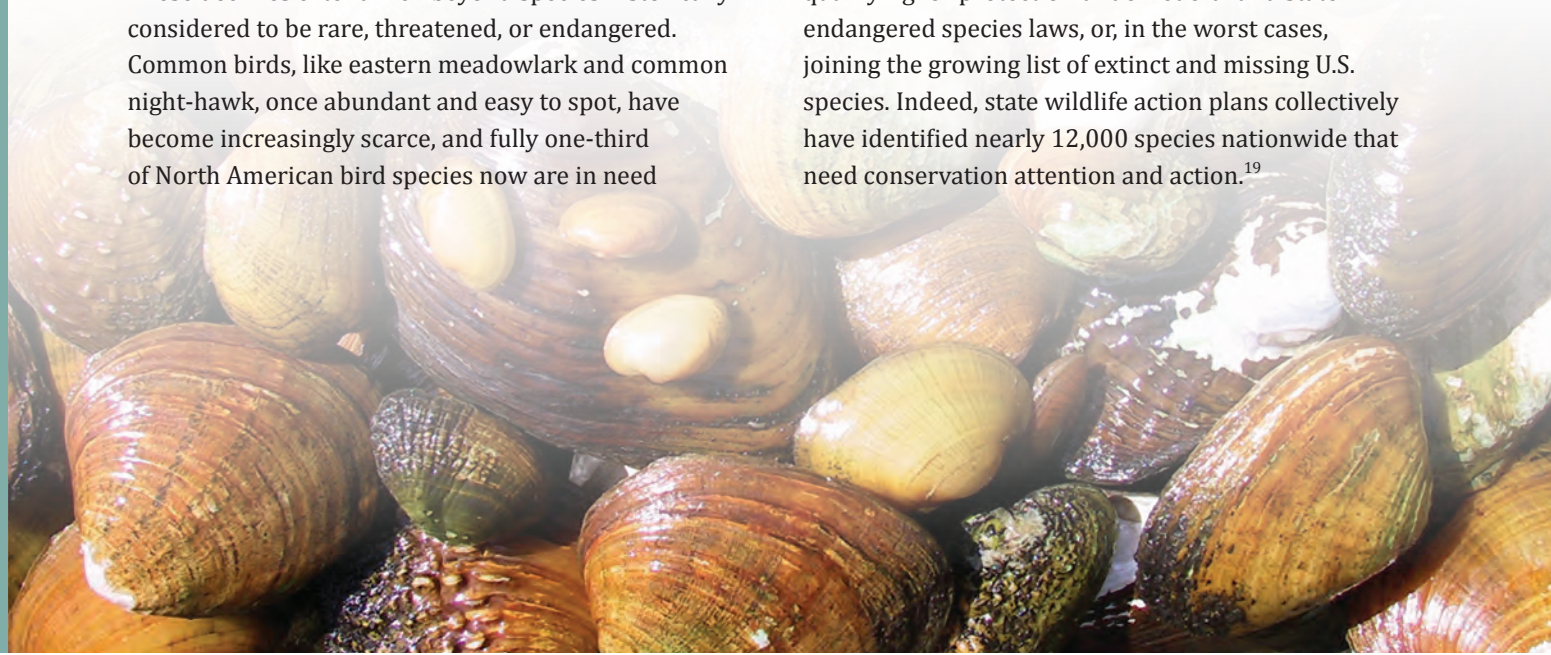
America's freshwater animals have been particularly hard hit and approximately 40 percent of the nation's freshwater fish species are now rare or imperiled.¹² Similarly, nearly 60 percent of the nation's freshwater mussel species are imperiled or vulnerable, and an additional 10 percent of these globally significant species are already extinct.^{13,14}

These declines extend well beyond species historically considered to be rare, threatened, or endangered. Common birds, like eastern meadowlark and common night-hawk, once abundant and easy to spot, have become increasingly scarce, and fully one-third of North American bird species now are in need

of conservation attention.¹⁵ Similarly, pollinators like bees and butterflies that once filled yards are experiencing pervasive declines. Monarch butterfly populations, for instance, have dwindled by 90 percent over the past two decades. Bats, which play an important role in controlling agricultural pests, have also suffered steep losses over the past twenty years, with 30 percent of North America's bat species showing significant declines in conservation status.¹⁶

Conservationists increasingly are concerned not just about the loss of entire species, but also about sharp drops in the number of individual wild animals. Based on a compilation of population monitoring data from around the world, researchers estimate that approximately half of the world's wild animals have been lost over the past 40 years.¹⁷ These sobering global trends are evident here in the United States as well, as illustrated by declines in amphibian populations. The U.S. Geological Survey has documented that on average populations of U.S. amphibians are disappearing from their known localities at a rate of 4 percent each year, with some of the most threatened species showing annual declines of nearly 12 percent.¹⁸

Without concerted attention, our growing wildlife crisis will almost certainly lead to many more species qualifying for protection under federal and state endangered species laws, or, in the worst cases, joining the growing list of extinct and missing U.S. species. Indeed, state wildlife action plans collectively have identified nearly 12,000 species nationwide that need conservation attention and action.¹⁹



America's aquatic organisms, like these freshwater mussels, exhibit especially high levels of imperilment. Although the United States leads the world in diversity of freshwater mussels, nearly 70 percent of U.S. species are at risk or already extinct. Photo: VA Department of Game and Inland Fisheries



Tricolor blackbird (Agelaius tricolor) is a highly social and gregarious species that breeds in colonies of up to 50,000 birds. Loss of wetland habitat and other factors have contributed to a population decline of more than 80 percent in this California native. Photo: Teddy Llovet

WHAT'S THREATENING AMERICA'S FISH AND WILDLIFE?

The threats to America's fish and wildlife have evolved over time, and a careful understanding of historical, current, and future threats is key to creating an effective response. Currently, the leading threats to wildlife are loss and degradation of habitat, invasive species, disease, and chemical pollution.²⁰ A rapidly changing climate is amplifying the effects of these existing threats and posing new challenges for our native wildlife.

HABITAT LOSS AND DEGRADATION

The American landscape has changed dramatically, with major consequences for wildlife. Nearly a quarter of the lower 48 states is now in agriculture and another six percent of the landscape has been developed for housing and other uses.²¹ More than



White nose syndrome, a fungal disease of bats, is infecting and killing millions of hibernating bats, such as this little brown bat (Myotis lucifugus) in New York State. Photo: Ryan Von Linden

half of the nation's wetlands have been lost,²² and by some estimates quality natural habitat remains on only about one-third of the land area in the conterminous U.S.²³ Loss of habitat remains a continuing problem. For example, more than seven million acres of prairie, rangeland, forests, and other natural habitats have been converted to crop production as an unintended consequence of policies promoting the use of food-based fuels in the nation's fuel supply.²⁴ The effect of land cover changes on wildlife can be complex, since some species can thrive even in urban environments, while others are highly sensitive to virtually any human disturbances. Nonetheless, the large-scale conversion of natural lands to human-dominated uses has severely reduced suitable habitat available for many species.

Even lands and waters that remain in natural or semi-natural condition can be highly altered, with profound consequences for wildlife. Longstanding fire suppression policies, for instance, have changed the natural fire cycle in many forests, often degrading their habitat value and increasing the risk of severe "megafires."²⁵ Similarly, most of our nation's rivers have been dammed and are managed in ways that divert water and alter natural hydrologic cycles, to the detriment of fish and other aquatic wildlife. Fragmentation of the nation's landscapes and waterways is an increasingly significant problem, as human developments impede the movement of wildlife to migrate, forage, breed, or seek shelter.

WILDLIFE DISEASES

The emergence of new diseases poses a particularly dire threat to U.S. wildlife. White-nose syndrome, a fungal disease that affects hibernating bats, has killed more than seven million bats in the East and Midwest, and in 2016 was discovered in the western United States.²⁶ White-nose syndrome already has led to listing of the northern long-eared bat under the federal Endangered Species Act. Another fungal disease, chytrid fungus or "Bd," has caused the decline of numerous U.S. frog species,²⁷ while the potential arrival of a related salamander disease ("Bsal"), recently found in Europe, would be catastrophic for the United States' enormous diversity of salamanders.²⁸ Chronic wasting disease is a contagious neurological disease affecting some of America's most iconic large-game species, including mule deer, white-tailed deer, moose, and elk. First noticed in captive deer in the late 1960s, the disease—which is related to mad cow disease and Creutzfeldt-Jakob disease in humans—has now been found in more than 23 states.

INVASIVE SPECIES

Another growing threat is the spread of non-native invasive species. Without natural predators or controls, these non-native pests can flourish unchecked, degrading habitat and competing with or preying on native wildlife. For example, the emerald ash borer, a native of Asia, was first found in the United States in 2002. This beetle already has spread to 30 states, killing hundreds of millions of ash trees and precipitating a major transformation of forests in the East and Upper Midwest. Similarly, non-native cheat grass is leading to the conversion of large swaths of wildlife-rich sagebrush habitat across the Great Basin. Feral hogs also are highly destructive invasives that are degrading wildlife habitat across the South and in California. The nation's aquatic systems have been greatly affected by invasive organisms, such as zebra and quagga mussels, which having wreaked havoc in the Great Lakes are now spreading into many western water bodies. Meanwhile, Asian carp are now in much of the Mississippi River drainage, and poised to enter the Great Lakes with potentially catastrophic consequences for fisheries in those water bodies.



The widespread use of neonicotinoid pesticides poses a growing risk to pollinators, including these native sweat bees. These “systemic” chemicals permeate every part of the plant, making pollen and nectar toxic to bees, butterflies, and other beneficial insects. Photo: Tom Potterfield

POLLUTION

Chemical pollution still represents a threat to fish and wildlife, but the nature of this danger has changed over time. Rachel Carson famously sounded the alarm over the use of the pesticide DDT and related compounds, which causes eggshell thinning in many birds. Banning DDT set the stage for the successful recovery of previously endangered birds, such as bald eagle and brown pelican. Similarly, the nation has made profound progress in reducing many forms of water pollution since the 1960s thanks to aggressive implementation of the Clean Water Act. Nonetheless, nutrient and chemical contamination of waterways

is still a problem, often coming from more diffuse “non-point” sources. And new classes of chemicals and synthetic compounds pose emerging threats to fish and wildlife. As an example, the introduction of neonicotinoid pesticides was intended to provide a safer alternative to some of the pesticide classes that Rachel Carson fought against. Unfortunately, research is revealing that these widely used pesticides are causing mortality and declines among many native insect pollinators, including bees, bumblebees, and butterflies,²⁹ and are even affecting vertebrates such as birds.³⁰

A CHANGING CLIMATE

Numerous scientific studies show that America's wildlife already is being affected by observed changes in climate. Average temperatures across the United States have increased over the last century by nearly 2°F, although there is significant regional variation in this warming.³¹ Alaska, for example, has experienced increases of more than twice the national average, leading to thawing permafrost and other significant ecological changes.³² Sea levels have risen by up to one foot in some regions, leading to wetland losses and saltwater intrusion into upland habitats. And precipitation patterns are changing rapidly, with some regions, such as the Northeast, experiencing dramatic increases in heavy downpours while other regions, like the Southwest, are subject to more prolonged drought conditions. Across the country increased climate variability and extreme weather is becoming the new normal.

These climatic shifts are contributing to the decline of species across the country. Researchers have documented climate-related shifts in species ranges, shortening of breeding seasons, disruptions to the interactions among interdependent species, and changes in habitat availability.³³ As an example, earlier snowmelt in the Yellowstone region is leading to hybridization of prized cut-throat trout with invasive rainbow trout, two species whose breeding previously was separated in time.³⁴ Climate-related impacts already appear to be causing the disappearance or extirpation of local populations in wildlife ranging from mammals and bumblebees to butterflies.³⁵ In the face of these rapid changes, wildlife and fisheries managers are beginning to craft adaptation strategies designed to reduce climate-related risks to vulnerable species and habitats.^{36,37,38}



*As climatic shifts alter the timing of snow melt and river levels, the spawning of native Westslope cutthroat trout (*Oncorhynchus clarki lewisi*) is starting to overlap with that of invasive rainbow trout (*O. mykiss*). Resulting hybridization now threatens the genetic purity of the highly prized sport fish. Photo: Alec Underwood*

INVESTING IN CONSERVATION MAKES A DIFFERENCE

The road to recovery for many species is steep, but the decline of America's wildlife can be stopped—and even reversed. We have done it before with species like the bald eagle, and we can do it again. Although the Endangered Species Act (ESA) is in place to prevent U.S. species from going extinct, more needs to be done to prevent the decline and endangerment of wildlife in the first place. Addressing these declines before ESA listing is warranted not only results in more successful conservation outcomes but saves money and reduces possible impacts to other sectors of society. Evolving threats and insufficient funds, however, have limited the ability of state and federal agencies to halt the decline of many species and adequately address the wildlife crisis.

Unregulated commercial hunting, including to supply wild game to burgeoning urban markets, was among the earliest pressures on U.S. wildlife. This threat was successfully tackled through passage of landmark wildlife protection laws, like the Lacey Act of 1900, and establishment of professional wildlife management agencies to regulate harvest and scientifically manage fish and game populations. Key to the success of what would become known as the North American Model of Wildlife Conservation³⁹ was creation of robust and dedicated funding streams based on a user-pay/user-benefit model, initially through the Pittman-Robertson Act of 1937 and later for sport fish through the Dingell-Johnson Act of 1950. These efforts led to the successful recovery of many of the species on which our hunting and fishing heritage and economy depend. These funds have been used to secure and manage millions of acres of habitat for the benefit of fish and wildlife. By the 1960s, however, it became increasingly clear that many species, especially those not the focus of hunting and fishing, were seriously declining and at risk of disappearing.



*Once on the verge of extinction in the continental United States, bald eagles (*Haliaeetus leucocephalus*) have made a dramatic recovery thanks to a ban on the pesticide DDT and major investments in eagle protection, habitat conservation, and reintroductions. Photo: FWS*

With passage of the Endangered Species Preservation Act of 1966, and later the Endangered Species Act of 1973, the nation began a concerted effort to address the important task of working to prevent species of all types from becoming extinct. The ESA has been extremely successful at doing just that: 98 percent of species that have received protection under the Act continue to survive, and scientists estimate that the Act has directly prevented the extinction of more than 200 species.⁴⁰ Yet despite the recovery of a few iconic wildlife species—from peregrine falcon and American alligator to Steller sea lion—limited funding has hampered overall recovery efforts. Researchers estimate that total spending over the past 15 years has covered only about one-third of species' recovery needs. Furthermore, the amounts spent on recovery of individual species vary enormously. Just five percent of listed species—mostly salmon and sturgeon—receive more than 80 percent of recovery funding, while 80 percent of listed species receive just

five percent of the funding.⁴¹ For listed species managed solely by the U.S. Fish and Wildlife Service, average annual expenditures totaled just \$2,686 per species!⁴²

During the 1970s and 1980s, the need for additional wildlife funding became increasingly apparent. While game species received the majority of funds derived from hunting and fishing license dollars and federal excise taxes on related equipment, and endangered species received at least limited federal recovery funds, the majority of wildlife species had no stable or consistent funding. Various states tried different approaches to fill that gap, ranging from voluntary state tax check-off programs and sale of specialty license plates, to allocation of lottery funds and passage of sales or real estate transfer taxes for conservation purposes. These creative efforts benefited many species, but the amount of money raised from these piecemeal sources fell well short of the need. To bolster these individual state efforts, in the 1990s more than 3,000 businesses

and organizations formed the Teaming with Wildlife coalition to urge the U.S. Congress to provide additional federal funds to support state-based efforts to prevent wildlife from becoming endangered.

To help fill this disparity in funding, in 2000 Congress created the State and Tribal Wildlife Grants program. This program is intended to serve as the nation's core effort to prevent wildlife species from becoming so rare and endangered that they require costlier "emergency room" conservation and recovery efforts. Since the program was created, an average of about \$60 million dollars has been provided annually through this program, distributed across all states and U.S. territories. This funding has spurred increased attention to many previously neglected wildlife species. Nevertheless, \$60 million dollars a year falls far short of the need given the thousands of species identified by states and territories as being in need of urgent conservation attention. Even with these limited funds, states have demonstrated that by strategically targeting conservation and engaging in private and public partnerships, wildlife can be put on a path to recovery before they reach the point of requiring protection under the Endangered Species Act.

This experience is consistent with a growing body of research demonstrating that when we focus on and invest in collaborative conservation we can make a difference. For instance, a global review of the status of vertebrate animals found that targeted and strategic conservation actions have been successful in reducing rates of species declines.⁴³ Similarly, a study looking at conservation investments made by countries around the world documented that those investments reduced expected declines in biodiversity by nearly a third.⁴⁴ By dramatically ramping up investments in proactive state-based conservation, the United States can not only reduce ongoing species declines, and the need for future endangered species listings, but actually recover and conserve America's extraordinary wildlife heritage for future generations.



Pronghorn (Antilocapra americana) are the fastest North American land mammal, but their speed was no match for 19th century market hunters. Recovery of this uniquely American animal was made possible by enacting hunting regulations and conserving habitat. Maintaining migratory corridors across an increasingly fragmented landscape is a 21st century challenge for conserving the species. Photo: B.G. Smith/Getty

STATE WILDLIFE ACTION PLANS: BLUEPRINTS FOR CONSERVATION

In establishing the State and Tribal Wildlife Grants Program in 2000, Congress mandated that state fish and wildlife agencies develop State Wildlife Action Plans to guide the expenditure of these funds. These plans are intended to set clear priorities for conservation by identifying those species in greatest need of attention, the habitats on which they depend, and the conservation actions necessary to sustain and restore their populations. Wildlife conservation depends on strong collaboration and partnership, particularly between state and federal fish and wildlife agencies. Although development of these plans is led by state wildlife agencies, they are crafted in coordination with a wide array of public and private partners and intended to reflect a comprehensive and shared vision for wildlife conservation in the state. By laying out such a vision for sustaining fish and wildlife in every state and territory, wildlife action plans collectively offer a national blueprint for sustaining and recovering our fish and wildlife.

The first generation of plans were completed in 2005, and by 2015 all states had revised and updated the original versions. Each plan is required to address eight common elements, but the states were given wide latitude to use methods and approaches that conform to each state's individual needs and capacities, and to allow for innovation.⁴⁵ As part of the planning process, experts assess available scientific information about the distribution, abundance, and trends for the species found within their states. These assessments inform the development of state-based lists of "species of greatest conservation need" (SGCN), which in turn are eligible for funding under the federal grants program. In the most recent (2015) plans, approximately 12,000



State Wildlife Action Plans, like this plan from Nebraska, have been crafted by all U.S. states and territories and represent a shared vision for conservation action and investment.

species and subspecies were identified by one or more states as needing conservation attention.⁴⁶ Encompassing terrestrial, freshwater, and marine species, this includes approximately 2,500 vertebrate species and 5,000 invertebrates that range from familiar species, like mule deer, to less well-known ones like the regal fritillary butterfly. About 4,000 plant species are also included, but because flora is treated differently than fauna under this federal grants program, just 15 states incorporated plants in their priority species lists.

State Wildlife Action Plans have proven to be an effective means for states and their partners to target science-based conservation actions on behalf of the nation's declining wildlife resources. Coupled with investments from other state, federal, and private initiatives, funding from the State and Tribal Wildlife Grants Program has brightened the prospects for many species of concern.

Wildlife conservation depends on strong collaboration and partnership, particularly between state and federal fish and wildlife agencies.

PUTTING CONSERVATION PLANS INTO ACTION



Fisher (Pekania pennanti), a forest-dwelling member of the weasel family, was extirpated from Washington State by the mid-1900s. Reintroduction of fisher to the state, identified as a priority in its wildlife action plan, began in 2008 thanks to a broad collaboration among state, federal, tribal, and non-profit partners. Photo: Paul Bannick

Wildlife action plans have provided states with a greater understanding of the condition and conservation needs for the species in their states, along with a clear path toward tackling those needs. Conservation in the 21st century is a complex endeavor that must consider not only wildlife biology, but a host of social and economic factors that can either hinder or enhance the recovery of species and habitats. To that end, wildlife action plans are designed to promote the use of effective conservation tools and actions for stabilizing and recovering targeted species and populations. These actions can include species management techniques, such as reintroducing species to areas

where they have been lost, habitat restoration and enhancement practices, as well as research and inventory to improve understanding of species condition, distribution, and needs. These actions can also involve regional collaborations that promote shared priorities and help ensure that the needs of wildlife are taken into account in both conservation and development decisions.

Over the past decade there has been considerable effort in putting these plans into action. As a result, states and their partners have had many conservation successes that simply would not have been possible without the shared vision, targeted actions, and funding made possible

through this program. The examples that follow spotlight how conservation funding has allowed states and their partners to reverse the decline of species in need. As these profiles of conservation action make clear, effectively deploying the wildlife conservation toolbox—with dependable funding—can make a difference for our nation’s wildlife.

“There is no bigger thrill than watching fisher return to Washington State after such a long absence. Their reintroduction is a prime example of an innovative public-private partnership to restore and conserve our region’s imperiled wildlife!”

—Dave Wertz, Conservation Northwest

RECOVERING SPECIES

At the heart of state wildlife action plans are strategies to stabilize and recover declining species, employing a wide array of species management techniques. This not only includes rebuilding populations in areas where they have declined, but also reintroducing valued species to areas where they previously existed but were lost.

The No Longer Missing Lynx

By the late 1970s, not a single Canada lynx—the elusive tufted-eared cat of the high country—was found in Colorado. This had larger implications for Colorado’s wildlife, as the solitary cats play an important ecological role, balancing the populations of snowshoe hares, voles and other smaller mammals.

In 1999, Colorado Parks and Wildlife began to reintroduce lynx into the San Juan Mountains in the southwestern part of the state.⁴⁷ Over time, the lynx established breeding populations in the San Juan Mountains and expanded their range into Summit County and other parts of Colorado’s high country. Based on surveys, the state wildlife agency declared the lynx reintroduction effort a success in 2010.⁴⁸ An estimated 150-250 of the cats now roam Colorado’s backcountry.



Canada lynx (Lynx canadensis) has been successfully reintroduced to its high-country habitat in the state of Colorado. Photo: Eric Kilby

Canada Lynx has also benefited from conservation efforts in other states, including the permanent protection of private working forests in Maine, and lynx-friendly conservation provisions in federal forest management areas. Growth of lynx populations has been promising enough that in January 2018 the U.S. Fish and Wildlife Service announced it was considering the delisting of Canada lynx as a threatened species. Despite these positive signs, however, lynx populations remain far lower than historical levels and the species continues to face an uncertain future as climate change affects availability of the snow pack it depends on.

Bringing Back the Cottontail

While people in the northeast see rabbits often, typically they are seeing an introduced species, the eastern cottontail. The northeast's native rabbit, the New England cottontail, is about 20 percent smaller, and, unlike its more open-country cousin, requires dense shrubs and thickets of young trees.



New England cottontail (Sylvilagus transitionalis) is making a recovery in the Northeast thanks to a multi-state collaboration to restore its young forest habitat, and through the reintroduction of captive-bred rabbits. Photo: NH Fish and Game

Over the last century, the young forests that New England cottontails prefer have dwindled, either lost to development or maturing into older, less-dense forests. While regrowth and maturation of forests benefit some species, they offer little for the New England cottontail. As a result, in recent years, states, federal agencies, tribes, and non-profit organizations have worked together to re-create the mix of mature forests, open meadows, and shrubby fields favored by New England cottontails.⁴⁹

With new habitat available, the partners have turned to reintroducing captive-bred rabbits. The Roger Williams Park Zoo in Providence, Rhode Island has been breeding New England cottontails in captivity since 2010, and in 2015 was joined by the Queens Zoo in New York. Together, the partners have successfully released over 200 captive-bred cottontails in designated focus areas. These collaborative conservation efforts are paying dividends—in September 2015, the U.S. Fish and Wildlife Service removed the New England cottontail as a candidate for listing under the Endangered Species Act.⁵⁰

Reintroducing Alaska's Wood Bison

The wood bison—a subspecies of the American bison—is the largest land animal in North America and was once a common resident of the vast boreal forests in Alaska and much of northwestern Canada. By the early 1900s, however, unregulated hunting and habitat changes had extirpated the wood bison in Alaska—and just a few small herds remained in Canada.⁵¹ The Canadian federal government spent decades recovering the species from the brink of extinction.



Wood bison (*Bison bison athabasca*), a distinct northern subspecies, was extirpated from Alaska by the early 1900s. In 2015, these magnificent animals were reintroduced to the southwestern portion of the state and are now thriving. Photo: Michelle Holihan/Getty

In 2008, Canadian wildlife authorities agreed to transfer a small population of wood bison to the United States for reintroduction in Alaska. The Alaska Department of Fish and Game used State Wildlife Grant funding to feed and house these bison until they could legally be released. In 2015,

“Today, after many years of effort and thanks to the dedication of countless individuals, Alaska is finally home to a population of wood bison once again. With a little luck, they will prosper and rejoin the ecosystem of Alaska and the culture of the people who live here.”

—Tom Seaton, Alaska Department of Fish & Game

the agency was finally able to release 130 wood bison into the wild along the Innoko River near the community of Shageluk in Southwest Alaska. That same year, 16 calves were born, the first wild-born wood bison on America soil in over a hundred years. Today, this herd appears to be thriving in its new Alaskan home, with the members of the herd appearing healthy and breeding well.⁵²

Restoring Riffleshells, Lilliputs, and Dartersnappers

Native mussels are the mini-workhorses of freshwater ecosystems, helping to clean our river systems and provide an important food source for many other species—but freshwater mussels are in deep trouble. Dams, pollution and



*Biologists releasing captive-reared golden riffleshell mussels (*Epioblasma florentina aureola*) in Indian Creek of southeast Virginia. This 2017 release comes nearly two decades after this extraordinarily rare species was wiped out from the nearby Clinch River by a chemical spill. Photo: Gary Peeples/FWS*

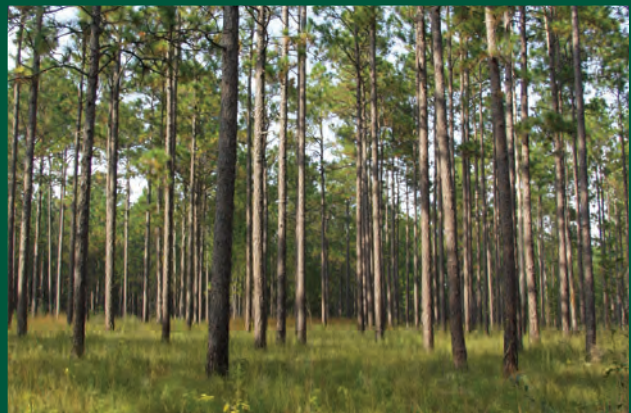
invasive species are taking their toll and overall, 70 percent of North America's freshwater mussels are imperiled or already extinct.⁵³ States in the Upper Tennessee River Basin have been working together with a variety of partners to turn the tide. The Alabama Department of Conservation and Natural Resources and Tennessee Wildlife Resources Agency, working closely with the Tennessee Valley Authority, U.S. Fish and Wildlife Service and a number of non-profit organizations, has propagated pale lilliput mussels and Duck River dartersnapper mussels for reintroduction into the Duck River and Bear Creek. Similarly, the Virginia Department of Game and Inland Fisheries has raised and released golden riffleshell mussels in the Clinch River, a national hotspot of aquatic diversity. Combined with other propagation and release programs across the Midwest and Southeast, states and their partners are working to restore our globally significant native freshwater mussel populations.

RESTORING AND ENHANCING HABITAT

Fish and wildlife depend on healthy habitat to survive. With native grasslands, forests and wetlands being lost to development and other threats, restoring and enhancing habitat is among the most important and effective conservation strategies.

Restoring the Longleaf Ecosystem

Longleaf pine forests once dominated the southeastern United States. These pine woodlands and savannas are noted for their open canopy and highly diverse understories of grasses and herbs. This high value timber tree was lost from most of the Southeast due to logging, and conversion to agriculture, plantation forestry, other forest types, and urban development. As this biologically rich habitat declined, so too did many of the native plant and animal species that use



Longleaf pine forests are among the most biodiverse habitat types in the nation and characterized by a particularly rich and open understory. Collaborative efforts are underway to restore this uniquely southeastern ecosystem, to the benefit of the many wildlife species that depend on this system. Photo: Randy Browning/FWS

these open pine forests. Declining or endangered species associated with these forests include red-cockaded woodpecker, Bachman's sparrow, indigo snake, and gopher tortoise.

Stands of longleaf rely on periodic, low intensity fires to keep their canopy open and maintain a variety of grasses and forbs in the understory. Well planned prescribed fire can mimic the natural processes that maintain southern pine forests and savannas. Longleaf restoration has been a major collaborative effort among southeastern states, private landowners, and federal agencies, and these partners have identified priority areas for restoration across the ecosystem's former range.⁵⁴ These collaborations have included some unlikely conservation allies, including the Department of Defense, whose installations contain some of the best remaining longleaf stands, and whose managers have become expert at combining longleaf restoration with maintaining military readiness.⁵⁵ Partners across the southeast have restored or protected hundreds of thousands of acres of longleaf woodland and savanna, efforts that are helping red-cockaded woodpecker and many other species that rely on these stately southern pines.

"I have brought hundreds of people to the shores of the Delaware Bay to view this incredible migratory bird phenomenon. Witnessing natural spectacles around us gives people personal hope and meaning in a sometimes depressing and dangerous world."

–Joe Sebastiani, Delaware Nature Society



Delaware Bay is a critical stop for migrating red knots (Calidris canutus rufa), which consume massive amounts of horseshoe crab eggs to fuel their journey to arctic breeding grounds. In the aftermath of Hurricane Sandy, states and their partners quickly mobilized to restore crab spawning habitats along the bayshore. Photo: Greg Breese/FWS

Restore the Shore

The Delaware Bay's sandy beaches serve as a critical stopping point for migrating shorebirds that feed on the eggs of horseshoe crabs every spring. Unfortunately, coastal erosion has resulted in the significant loss of the sandy beach habitat where horseshoe crabs spawn. About 70 percent of spawning habitat was destroyed by Superstorm Sandy in 2012 when storm surge stripped away sand and deposited rubble. After the storm, very little sandy shoreline remained for horseshoe crabs to spawn and the rubble created obstacles that trapped crabs or otherwise prevented them from reaching spawning areas above the high tide line. The potential impact was catastrophic to horseshoe crabs—and to the shorebirds that depend on crab eggs for the nourishment they need to continue on to their Arctic nesting grounds.



*Well-designed research and monitoring efforts are key to understanding the changing condition and conservation needs of our fish and wildlife species, such as this green sea turtle (*Chelonia mydas*) in Florida. Photo: Andy Wraithmell/FWC*

In response to this crisis, states around the Delaware Bay sprang into action. In New Jersey, a coalition of conservation organizations and government agencies quickly managed to raise over \$1.4 million to restore the beaches. Together the partners removed over 80 tons of debris and restored vital beach habitat by depositing 40,000 tons of sand before the next spawning season.⁵⁶ In Delaware, the state agency worked with conservation partners to secure more than \$5 million to restore important beach habitat for spawning crabs, as well as coastal wetland habitats used by shorebirds for safe roosting between feeding bouts. These rapid actions ensured that when red knots, ruddy turnstones and other shorebirds reached the Delaware Bay the next spring, they found plenty of eggs around the bay to eat and safe places to rest at this critical migratory stopover. Yet, much more restoration and protection work needs to be done to ensure the long-term resilience of Delaware Bay habitats that support migratory shorebirds and horseshoe crabs.

IMPROVING THE SCIENTIFIC BASIS FOR CONSERVATION ACTIONS

Stabilizing and recovering declining wildlife species depends on a firm understanding of how the species is faring, where they are found, the reasons for its declines, and opportunities for its conservation. Scientific research and inventory efforts are essential for crafting and deploying effective conservation actions. Additionally, inventory and monitoring efforts often reveal that little-known species may be more abundant and secure than previously thought, resulting in the need for fewer endangered species listings.

Protecting Relicts of the Prehistoric Past

With their armor-like shell, turtles might seem capable of protecting themselves from the challenges thrown at them. But due to their slow rate of maturity, collection for the pet trade, and increasingly fragmented habitats, turtles are in decline across much of the country. The northeastern states have been working together to conduct surveys and better understand the status, distribution, and conservation needs of turtles—including Blanding’s, spotted, and wood turtles, and northern diamondback terrapin—to keep them from being added to the endangered species list. With the results of these surveys, states across the northeast have been in a better position to identify priority areas for turtle conservation and strategically target limited conservation dollars. Because much of the habitat needed for nesting

is on private lands, states are working with landowners to encourage voluntary stewardship using state and federal cost-share programs to pay for habitat restoration.

Another risk to turtles is ending up as road kill, since they often must cross roads between their wetland homes and nesting areas. By tracking the detailed movements of individual turtles, scientists can identify when and where the risk from road crossings are the highest. Armed with this detailed spatial data, it is possible to target public outreach efforts by making residents and landowners aware of their movement patterns, and in places even install seasonal turtle crossing signs or road access restrictions. With increasingly accurate scientific information, state agencies and their partners are thus able to help ensure that these relicts from our prehistoric past continue to survive and thrive.

*Researchers in the Northeast are exploring the genetic variation of Blanding’s turtle (*Emydoidea blandingii*) populations across the region. Such insights will allow state agencies and their partners to better design conservation strategies for this species of regional concern.
Photo: Robert Scholl/Alamy*



Keeping the Mountains on the Prairies

Mountain plovers make their home in the shortgrass prairies, nesting in open fields and pastures. These birds were once a candidate for listing under the Endangered Species Act and in 2000 there were only two documented breeding pairs in the panhandle of Nebraska. The state began intensive surveys using federal State Wildlife Grant funding and soon found that there were 200-400 nesting pairs in Nebraska. Similar status assessments in Colorado, Wyoming and Montana revealed more robust populations than previously thought. These discoveries helped to keep the mountain plover off the endangered species list in 2002, and the various states have continued work to conserve the species. Much of the mountain plover's nesting habitat is on private property and states and their partners have actively engaged ranchers in the conservation efforts. Landowners have become engaged in monitoring efforts as well as implementing new management practices to avoid destroying plover nests during cultivation. In celebration of the bird, the town of Karval, Colorado even hosts an annual Mountain Plover Festival where local ranchers host birdwatchers seeking to spot this ghost of the prairie.

Help for Hellbenders

The eastern hellbender is the largest fully-aquatic salamander in the United States, averaging about 15 inches long. Hellbenders rely on clean, clear rivers and streams and they are highly sensitive to fungal infections. In addition, these amphibians nest under rocks and much of their nesting habitat has been reduced through sedimentation from unsustainable land use practices. As a result, their cousin the Ozark hellbender is federally listed as an endangered species, and the eastern hellbender population is feared to also be in steep decline.

States and their partners are working together to halt that decline and conserve this unique salamander. To better assess the status of the hellbender population, researchers are conducting stream surveys, including through deploying high tech methods, such as environmental (or "e") DNA assays, for detecting the species in streams where they might be found. With this more precise distributional and status information, fish and wildlife managers will be able to implement targeted actions including stream bank restoration, conservation of key land parcels, and species reintroductions.



*New survey techniques that detect DNA traces in water are allowing researchers to dramatically increase their understanding of where populations of secretive species like the eastern hellbender salamander (*Cryptobranchus alleganiensis*) still exist and how to help them. Photo: Brian Gratwicke*

PROMOTING REGIONAL COLLABORATIONS

Wildlife do not respect political boundaries, and to be successful conservation should be coordinated across state boundaries. State wildlife agencies are engaged in a number of regional collaborations designed to identify and act on shared conservation responsibilities.

Saving the Brook Trout

Brook trout are the only native trout inhabiting most eastern states, and are highly prized by anglers. So central are these fish to the culture of many places across this region that brook trout have been adopted by multiple states—including Virginia, New Hampshire, and Michigan—as the official state fish. Brook trout depend on cold, clear streams and are indicators of clean water and healthy aquatic systems. Unfortunately, these trout have been lost from much of their historic range due to a lethal combination of threats—urbanization, agriculture, mining, and competition with non-native species—stresses to which we can now add rapidly warming waters. Researchers estimate that across the fish’s 17-state eastern range, wild brook trout remain in just 22 percent of the watersheds where they previously existed, and healthy trout populations exist in less than 10 percent of historic drainages.^{57,58}

A broad conservation partnership has emerged, however, to fight for the continued survival of this revered fish and to restore fishable populations. From Georgia to Maine, the Eastern Brook Trout Joint Venture is promoting a broad, cross-state



Eastern brook trout (Salvelinus fontinalis) are the focus of a 17-state regional conservation effort designed to sustain the fish in the face of multiple threats, including warming waters, and to restore fishable populations where possible. Photo: J. and K. Hollingsworth/FWS

collaboration designed to protect and restore brook trout and their diminishing habitat. In partnership with 17 state fishery agencies, the joint venture has assessed the status of brook trout across more than 11,000 drainages, and has developed a comprehensive conservation strategy that identifies regionally appropriate goals for protecting and restoring the species.⁵⁹ Regional strategies range from reducing habitat fragmentation and mitigating acid mine drainage to reducing competition from invasive species. Such conservation practices as restoring streamside buffers, done in collaboration with willing and engaged landowners, are intended to create habitat, provide shade, and protect water quality. Other practices, like replacing antiquated culverts and reconnecting habitat, are being carried out in coordination with local and state governments to improve the flood resilience of roadways and enhance fish habitat. This regional effort illustrates the power of collaborative planning and action, and is leading to better future for the brook trout.



"I've always liked butterflies, so when I read they were in trouble, I wanted to do something to help."

—Genevieve Leroux, 12-year-old butterfly gardener

*In response to dramatic declines in monarch butterfly (*Danaus plexippus*) populations, the 16-state Mid-America Monarch Conservation Strategy aims to plant more than 1.3 billion milkweed stems over the next two decades. Photo: Jason and Kimberlee Leroux*



Genevieve Leroux sowing milkweed seeds to plant and give away. Photo: Jason Leroux

Monarchs Matter

Children and adults alike delight in the flight of monarch butterflies, and their long distance, multi-generational migration is a wonder of the animal world. The eastern population of monarchs breed in the United States and Canada with later generations migrating south to overwinter in a small patch of coniferous forests in the mountains of Mexico. Unfortunately, the conversion of native prairies to agricultural crops along with increased use of herbicides and pesticides has provided a one-two punch, and the species is reeling. Populations of the monarch butterfly east of the Rockies have declined by an estimated 90 percent in the last two decades.⁶⁰ In 2014, the U.S. Fish and Wildlife Service was petitioned to protect the monarch butterfly under the Endangered Species Act and a final listing decision is anticipated in June 2019.

To reverse these declines, a broad array of state, federal, and private partners are collaborating to restore habitat and reduce mortality. State fish

and wildlife agencies, the Monarch Joint Venture, the U.S. Fish and Wildlife Service, private conservation organizations and other partners have collaboratively developed the Mid-America Monarch Conservation Strategy.⁶¹ The 16-state plan maps out specific habitat protection, restoration, and enhancement needs, together with expanded population monitoring.

A key goal is to increase native milkweed species—the plants monarchs depend upon to lay their eggs—by 1.3 billion additional stems over the next 20 years. In addition, partners are working to expand nectar sources by increasing floral diversity throughout the region, and to increase awareness of best practices for insecticide use. With coordinated action—from backyard gardens to continental scale corridors—restoring the monarch presents an opportunity to showcase how coordinated conservation can make a difference for even the smallest of species.

Let's CHAT: Crucial Habitat Assessment Tool

Western states, at the direction of their governors, developed a mapping tool to provide greater certainty and predictability to development and infrastructure planning efforts. The Crucial Habitat Assessment Tool (CHAT) identifies the overlaps between important wildlife habitat and areas identified for possible development.⁶² Most states used their State Wildlife Action Plan's Species of Greatest Conservation Need as the foundation for species

included in CHAT. States agreed to common definitions of crucial wildlife habitat and corridors and issued guidelines to help each state prioritize habitat within its boundaries to meet its specific conservation objectives. Managed by the Western Association of Fish and Wildlife Agencies, this regional tool is designed to reduce conflicts and surprises for businesses while ensuring wildlife values are better incorporated into land use planning.

*By making information on the location of sensitive wildlife areas easily accessible, the Crucial Habitat Assessment Tool ensures that the needs of mule deer (*Odocoileus hemionus*) and other western species can be considered in land use decisions. Photo: Jeremy Maestas/NRCS*



“Release of the Western Governors’ CHAT shows the Governors’ commitment to responsible development of Western resources, while at the same time protecting the environment”

–John Hickenlooper, Colorado Governor and WGA chair



Reversing America's wildlife crisis will require a dramatic increase in funding for proactive conservation. The Recovering America's Wildlife Act offers a once-in-a-generation opportunity to conserve our nation's extraordinary diversity of wild species, such as these black skimmers (Rynchops niger) along the Gulf Coast. Photo: Clarence Holmes/Alamy

RECOVERING AMERICA'S WILDLIFE: THE NEED FOR DEDICATED FUNDING

Despite the dire condition of America's wildlife, the research is clear that collaborative conservation actions can make a difference, and can ensure that the nation's species not only survive but thrive. These successes depend on a variety of factors, including clear priorities, good science, strong partnerships, and, perhaps most importantly, adequate resources and funding. Fortunately, state wildlife action plans provide a solid path forward for setting strategic

priorities for conservation action. The development of increasingly sophisticated scientific approaches and the application of advanced technology is dramatically improving our understanding of species and their habitats, and enabling truly 21st century approaches to wildlife management. And broad-scale partnerships and collaborations, often at regional or landscape scales, are improving the delivery and effectiveness of conservation and restoration across public and private lands and waters.

Yet while we now have a firm grasp of the scale of the problem as well as plans in place to turn the situation around, the amount of funds currently available for wildlife conservation are only capable of meeting a small fraction of the need. Annual appropriations for the State and Tribal Wildlife Grant program, the nation's primary program for keeping species from becoming endangered, have fluctuated between \$50 and \$100 million over the life of the program. In fiscal year 2017, \$52 million was allocated, meaning that most states received less than \$1 million to implement their State Wildlife Action Plans, a sum that falls far short of the funding needed. Indeed, estimates are that current funding levels for this program are less than five percent of what is necessary to conserve the full complement of species identified by the states as being "of greatest conservation need."

"Conservation means balancing the sustainability of fish and wildlife with the many needs of humans. It is our responsibility to lead the way so our state fish and wildlife agencies have the resources they need to conserve species and manage our natural resources—the future of our industry and the outdoor sports we love depend on this investment."

–Johnny Morris, founder of Bass Pro Shops

There is a clear gap between what states collectively have identified as being necessary to put America's fish and wildlife on the path to recovery, and what they currently are able to carry out. The result is that states are forced to target a limited set of species in need, leaving many others unattended. Unfortunately, without proactive attention many of the species falling through this funding gap may end up declining to the point where they become eligible for listing as threatened or endangered. To more fully execute these state-based conservation blueprints, and avoid or reduce the need for such listings, will require a dramatic increase in funding for proactive conservation. The Association of Fish and Wildlife Agencies estimates it would cost approximately \$1.3 billion annually to implement three-quarters of every state's wildlife action plan.



Wildlife watching, such as at this shorebird festival near Cordoba, Alaska, is a major contributor to the U.S. economy. Outdoor recreation overall generates \$887 billion annually, supporting 7.6 million American jobs, and many of those outdoor experiences depend on healthy fish and wildlife populations. Photo: Jim Kohl/Alaska Stock

RECOVERING AMERICA'S WILDLIFE ACT

In 2016, the Blue Ribbon Panel on Sustaining America's Diverse Fish and Wildlife Resources announced their recommendations on providing secure funding for all our nation's fish and wildlife.⁶³ This panel of 26 leaders from outdoor recreation retailers and manufacturers, the energy industry, sportsmen's groups, and other conservation organizations spent two years assessing many potential funding options. In the end, the group determined that using existing federal revenues from non-renewable natural resources, such as oil and gas, was a pragmatic and logical solution that would benefit the economy and our nation's fish and wildlife heritage.

The Blue Ribbon Panel recommendations have been encompassed in federal legislation—the Recovering America's Wildlife Act—that would dedicate \$1.3 billion annually for state fish and wildlife agencies to implement their wildlife action plans. This allocation would come from existing revenues the government receives from the leasing of energy and mineral resources on federal lands and waters. This amount of funding is just a fraction of total leasing revenues, and would leverage additional funds from the required 25 percent state match. This should significantly reduce the number of species in decline, and decrease the number of species that may require protection under the Endangered Species Act.

ENSURING THE FUTURE OF OUR FISH AND WILDLIFE

Recovering and conserving the wealth of America's fish and wildlife will be no easy task. Halting and reversing the current trend will require significant investment in widespread on-the-ground efforts by state and federal agencies along with local and private partners. But it can be done.

Fish and wildlife conservation in the United States began in earnest more than a century ago when hunters, anglers and other conservationists came together to restore decimated game populations, but it has grown to encompass so much more than that—and it is time to plan for science-based wildlife management and conservation for the next century. The National Wildlife Federation, The American Fisheries Society, and The Wildlife Society believe in a 21st century model of science-based wildlife management and conservation. One that follows the blueprints developed by state fish and wildlife agencies to recover all wildlife, from mammals, fish, and birds to salamanders and monarch butterflies. The **Recovering America's Wildlife Act** offers a once in a generation opportunity to ramp up the nation's conservation efforts to match the scale of the threats to our wildlife heritage. Now is the time to build on the successes of the past to ensure that our hard-fought conservation legacy has a bright future.



Members of the Blue Ribbon Panel present their recommendations, which call for dedicating an additional \$1.3 billion annually to enhance wildlife conservation efforts across the nation. Photo: Anne Bolen/NWF



Abundant and accessible fish and wildlife are key to providing opportunities to connect kids with nature, such as this father and son fly fishing along Oregon's Deschutes River. Investing in the future of wildlife in America is, in turn, an investment in the next generation of conservation-minded citizens. Photo: Kevin Schafer/Alamy

“For me, like many children, Oregon’s coastal cutthroat trout was our ‘gateway drug’ to sea-running salmon and trout—it was a catchable and admirable prize, but still required a lot of effort. The fishery closed in the mid-1990s, but thankfully has re-opened with limited harvest. If we lose those species most accessible to beginner enthusiasts, we lose the next generation of conservationists.”

–Bob Rees, Association of Northwest Steelheaders

REFERENCES

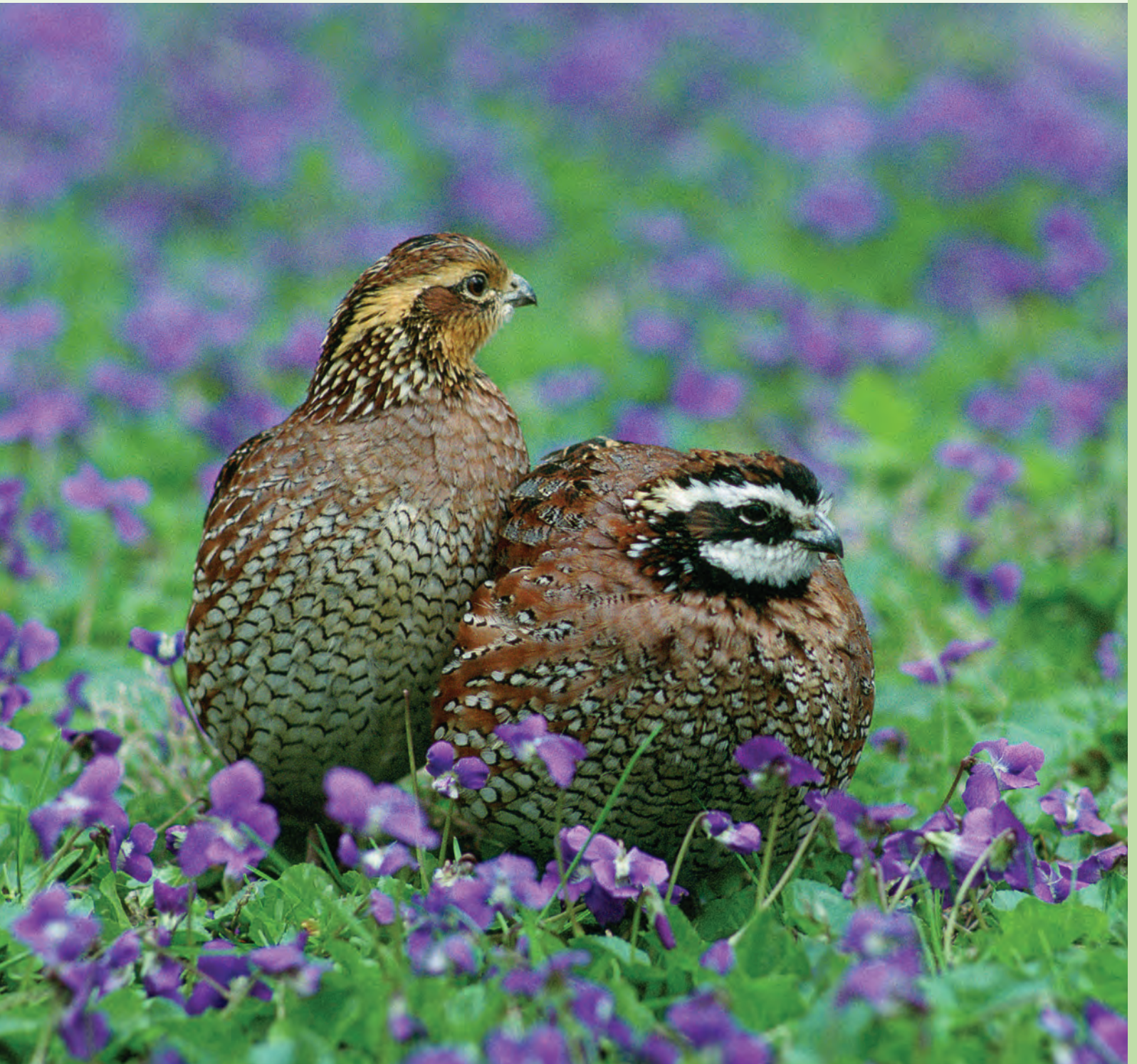
- 1 Stein, B. A., L. S. Kutner, J. S. Adams eds. 2000. *Precious Heritage: The Status of Biodiversity in the United States*. New York: Oxford University Press.
- 2 Wilcove, D. and L. M. Master 2005. How many endangered species are there in the United States? *Frontiers in Ecology and Environment* 3: 414-420.
- 3 Stein, B. A. 2002. *States of the Union: Ranking America's Biodiversity*. Arlington, VA: NatureServe.
- 4 California Department of Fish and Game. 2003. *Atlas of the Biodiversity of California*. Sacramento: California Department of Fish and Game.
- 5 Wilson, E. O. 1987. The little things that run the world (the importance and conservation of invertebrates). *Conservation Biology* 1: 344-346.
- 6 Graf, D. L. and K. S. Cummings. 2007. Review of the systematics and global diversity of freshwater mussel species (Bivalvia: Unionoida). *Journal of Molluscan Studies* 73: 291-314.
- 7 Fochetti R. and J. M. T. de Figueroa. 2007. Global diversity of stoneflies (Plecoptera; Insecta) in freshwater. In: E.V. Balian, C. Lévêque, H. Segers, and K. Martens, eds., *Freshwater Animal Diversity Assessment*. Dordrecht: Springer.
- 8 USFWS 2017. ECOS Environmental Conservation Online System, Listed Species Summary (Boxscore). <https://ecos.fws.gov/ecp0/reports/box-score-report> (accessed November 20, 2017).
- 9 Stein, B. A., L. S. Kutner, J. S. Adams eds. 2000. *Precious Heritage: The Status of Biodiversity in the United States*. New York: Oxford University Press.
- 10 NatureServe. 2017. NatureServe Explorer: An online encyclopedia of life [web application]. Version 7.0. Arlington, VA: NatureServe. <http://explorer.natureserve.org> [accessed November 17, 2017].
- 11 *Ibid* NatureServe.
- 12 Jelks, H. L., S.J. Walsh, N.M. Burkhead, et al. 2008. Conservation status of imperiled North American freshwater and diadromous fishes. *Fisheries*. 33: 372-407.
- 13 Williams, J. D., M. L. Warren, K. S. Cummings, J. L. Harris, and R. J. Neves. 1993. Conservation status of freshwater mussels of the United States and Canada. *Fisheries* 18: 6-22.
- 14 Lydeard, C., R. H. Cowie, W. F. Ponder, et al. 2004. The global decline of nonmarine mollusks. *BioScience* 54 321-330.
- 15 North American Bird Conservation Initiative. 2016. *The State of North America's Birds 2016*. Ottawa, Ontario: Environment and Climate Change Canada.
- 16 Hammerson, G. A., M. Kling, M. Harkness, M. Ormes, and B. E. Young. 2017. Strong geographic and temporal patterns in conservation status of North American bats. *Biological Conservation* 212: 144-152.
- 17 World Wildlife Fund. 2016. *Living Planet Report 2016. Risk and Resilience in a New Era*. Gland, Switzerland: WWF International.
- 18 Grant, E. H. C., D. A. W. Miller, B. R. Schmidt, et al. 2016. Quantitative evidence for the effects of multiple drivers on continental-scale amphibian declines. *Scientific Reports* 6: 25625.
- 19 U.S. Geological Survey. 2017. A national look at Species of Greatest Conservation Need as reported in State Wildlife Action Plans [web application]. <https://www1.usgs.gov/csas/swap/> (accessed November 17, 2017).
- 20 Wilcove, D. S., D. Rothstein, J. Dubow, A. Phillips, and E. Losos. 1998. Quantifying threats to imperiled species in the United States. *BioScience* 48: 607-615.
- 21 Homer, C. G., J. A. Dewitz, L. Yang, et al. 2015. Completion of the 2011 National Land Cover Database for the conterminous United States-representing a decade of land cover change information. *Photogrammetric Engineering and Remote Sensing* 81: 345-354.
- 22 Dahl, T. E. 1990. *Wetlands-Losses in the United States, 1780's to 1980's*. Washington, DC: U.S. Fish and Wildlife Service.
- 23 Hak, J. C. and P. J. Comer. Modeling landscape condition for biodiversity assessment: application in temperate North America. *Ecological Indicators* 82: 206-216

Dramatically increasing investments in conservation will benefit the full array of America's wildlife, including invertebrates such as this jewel-like seaside dragonlet (Erythrodiplax berenice). Photo: Brian E. Kushner/Getty



- 24 Lark, T. J., J. M. Salmon, and H. K. Gibbs. 2015. Cropland expansion outpaces agricultural and biofuel policies in the United States. *Environmental Research Letters* 10: 044003.
- 25 Heyck-William, S., L. Anderson, and B. A. Stein. 2017. *Megafires: The Growing Risk to America's Forests, Communities, and Wildlife*. Washington, DC: National Wildlife Federation.
- 26 Haman, K., C. Hibbard, and M. Lubeck. 2016. Bat with white-nose syndrome confirmed in Washington State. Olympia, WA: Washington Department of Fish and Wildlife and U.S. Geological Survey.
- 27 Vredenburg, V. T., R. A. Knapp, T. S. Tunstall, and C. J. Briggs. 2010. Dynamics of an emerging disease drive large-scale amphibian population extinctions. *Proceedings of the National Academy of Sciences* 107: 9689–9694.
- 28 Tiffany A. Yap, T. A., M. S. Koo, R. F. Ambrose, D. B. Wake, and V. T. Vredenburg. 2015. Averting a North American biodiversity crisis. *Science* 349: 481-482.
- 29 Maj Rundlöf, M., G. K. S. Andersson, R. Bommarco, et al. 2015. Seed coating with a neonicotinoid insecticide negatively affects wild bees. *Nature* 521: 77–80.
- 30 Gibbons, D., C. Morrissey, and P. Mineau. 2015. A review of the direct and indirect effects of neonicotinoids and fipronil on vertebrate wildlife. *Environ. Sci. Pollut. Res. Int.* 22: 103-118.
- 31 Melillo, J.M., T. C. Richmond, and G. W. Yohe, eds. 2014. *Climate Change Impacts in the United States: The Third National Climate Assessment*. Washington, DC: U.S. Global Change Research Program.
- 32 Chapin, F. S., S. F. Trainor, P. Cochran, et al. 2014. Chapter 22: Alaska. Pages 514-536 in J. M. Melillo, T.C. Richmond, and G.W. Yohe, eds, *Climate Change Impacts in the United States: The Third National Climate Assessment*. Washington, DC: U.S. Global Change Research Program.
- 33 Staudinger, M. D., S. L. Carter, M. S. Cross, et al. 2013. Biodiversity in a changing climate: a synthesis of current and projected trends. *Frontiers in Ecology and the Environment* 11: 465-473.
- 34 Muhlfeld, C. C., R. P. Kovach, R. Al-Chokhachy, et al. 2017. Legacy introductions and climatic variation explain spatiotemporal patterns of invasive hybridization in a native trout. *Global Change Biology* 23: 4663-4674.
- 35 Wiens, J. 2016. Climate-related local extinctions are already widespread among plant and animal species. *PLoS Biology* 14: e2001104.
- 36 Stein, B. A., P. Glick, N. Edelson, and A. Staudt, eds. 2014. *Climate-Smart Conservation: Putting Adaptation Principles into Practice*. Washington, DC: National Wildlife Federation.
- 37 The Wildlife Society. 2008. Adapting to climate change (special issue). *The Wildlife Professional* 2: 1-72.
- 38 Paukert, C. P., B. A. Glazer, G. J. A. Hansen, et al. 2016. Adapting inland fisheries management to a changing climate. *Fisheries* 41:3 74-384.
- 39 Organ, J. F., V. Geist, S. P. Mahoney et al. 2012. *The North American Model of Wildlife Conservation*. The Wildlife Society Technical Review 12-04. Bethesda, MD: The Wildlife Society.
- 40 Evans, D. M., J. P. Che-Castaldo, D. Crouse et al. 2016. Species recovery in the United States: increasing the effectiveness of the Endangered Species Act. *Issues in Ecology* 20: 1-28.
- 41 *Ibid* Evans.

- 42 *Ibid* Evans.
- 43 Hoffman, M. et al. 2010. The impact of conservation on the status of the world's vertebrates. *Science* 330: 1503-1509.
- 44 Waldron, A., D. C. Miller, D. Redding, et al. 2017. Reductions in global biodiversity loss predicted from conservation spending. *Nature* 551: 364-367.
- 45 State Wildlife Action Plan Best Practices Working Group. 2012. *Best Practices for State Wildlife Action Plans: Voluntary Guidance to States for Revision and Implementation*. Washington, DC: Association of Fish and Wildlife Agencies.
- 46 U.S. Geological Survey. 2017. A national look at Species of Greatest Conservation Need as reported in State Wildlife Action Plans [web application]. <https://www1.usgs.gov/csas/swap/> (accessed November 17, 2017).
- 47 Colorado Parks and Wildlife. n.d. Lynx reintroduction program [webpage]. <http://cpw.state.co.us/learn/Pages/SOC-LynxResearch.aspx> (accessed February 9, 2018).
- 48 Devineau, O., T. M. Shenk, G. C. White, et al. 2010. Evaluating the Canada lynx reintroduction programme in Colorado: patterns in mortality. *Journal of Applied Ecology* 47: 524-531.
- 49 Fuller, S. and A. Tur. 2012. Conservation strategy for the New England Cottontail (*Sylvilagus transitionalis*). New England Cottontail Technical Committee. https://newenglandcottontail.org/sites/default/files/conservation_strategy_final_12-3-12.pdf (accessed February 9, 2018).
- 50 Fergus, C. 2018. Sharing the science to conserve New England Cottontails. <https://newenglandcottontail.org/news/sharing-science-conserve-new-england%E2%80%99s-native-cottontail> (accessed February 9, 2018).
- 51 Alaska Department of Fish and Game. n.d. Wood Bison species profile [web page]. http://www.adfg.alaska.gov/index.cfm?adfg=woodbison.main&_ga=2.69116370.250649195.1516917665-1703548023.1516917665 (accessed February 9, 2018).
- 52 Taras, M. 2017. 24 Calves born to Alaska wood bison. Anchorage, AK: Daily News Miner; June 2, 2017.
- 53 U.S. Fish and Wildlife Service. n.d. America's mussels: silent sentinels [web page]. <https://www.fws.gov/midwest/endangered/clams/mussels.html> (accessed February 9, 2018).
- 54 Regional Working Group for America's Longleaf. 2009. Range-Wide Conservation Plan for Longleaf Pine. America's Longleaf. http://www.americaslongleaf.org/media/86/conservation_plan.pdf (accessed February 9, 2018).
- 55 Stein, B. A. 2008. Biodiversity and the military mission. Pages 2-33 in: N. Benson, J. D. Ripley, and F. Powledge, eds. *Conserving Biodiversity on Military Lands: A Guide for Natural Resources Managers*. Arlington, VA: NatureServe.
- 56 Niles, L. J., J. A. M. Smith, D. F. Daly, et al. 2013. Restoration of horseshoe crab and migratory shorebird habitat on five Delaware Bay beaches damaged by Superstorm Sandy. http://arubewithaview.com/wordpress/wp-content/uploads/2012/12/RestorationReport_112213.pdf (accessed February 9, 2018).
- 57 Hurdy, M., T. M. Thieling, N. Gillespie, and E. P. Smith. 2008. Distribution, status, and land use characteristics of subwatersheds within the native range of brook trout in the Eastern United States. *North American Journal of Fisheries Management* 28: 1069-1085.
- 58 Hurdy, M., K. Nislow, E. P. Smith, A. R. Cooper, and D. M. Infante. 2013. The importance of scale: assessing and predicting brook trout status in its southern native range. *Eastern Brook Trout Joint Venture*.
- 59 Eastern Brook Trout Joint Venture. n.d. *Eastern Brook Trout: Roadmap to Restoration*. Eastern Brook Trout Joint Venture.
- 60 Jepsen, S., D. F. Schweitzer, B. Young, et al. 2015. *Conservation Status and Ecology of Monarchs in the United States*. Arlington, VA and Portland, OR: NatureServe and Xerces Society for Invertebrate Conservation.
- 61 Midwest Association of Fish and Wildlife Agencies. n.d. Mid-America Monarch Conservation Strategy [web page]. http://www.mafwa.org/?page_id=2347 (accessed February 9, 2018).
- 62 Western Association of Fish and Wildlife Agencies. n.d. Crucial Habitat Assessment Tool: Mapping Fish and Wildlife Across the West [web page]. <http://www.wafwachat.org/> (accessed February 9, 2018).
- 63 Blue Ribbon Panel on Sustaining America's Diverse Fish and Wildlife Resources. 2016. *The Future of America's Fish and Wildlife: A 21st Century Vision for Investing in and Connecting People with Nature*. Washington, DC: Association of Fish and Wildlife Agencies.



Northern bobwhite quail (*Colinus virginianus*). Photo: Steve Maslowski/USFWS

“My love of the outdoors stems from early morning walks into the woods with my dad as we went to hunt. As I grew older, my grandfather and dad would talk for hours about that prince of game birds, the bobwhite quail. But even in the 70s the call of the wild quail grew more and more rare. They’re still out there, but oh so few. It’s one of the reasons I work in conservation—I want my grandkids to know the thrill of a bobwhite call at evening time...and I selfishly want that thrill again myself.”

–Mike Worley, Georgia Wildlife Federation



National Wildlife Federation
1200 G Street, NW, Suite 900
Washington, D.C. 20005
www.nwf.org