

**Promoting habitat connectivity across the United States
is a powerful tool for preventing extinctions and
safeguarding biodiversity**

Statement for the Committee on Science, Space and Technology

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Introduction

The 2019 Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) report on biodiversity from the United Nations delivered the unfortunate news that up to a million species worldwide are now at risk of extinction. Here in the United States, we also face an extinction crisis, one that is tempered somewhat by our strong Endangered Species Act and our long history of investing in land and water conservation. Nevertheless, far too many species remain on the brink of extinction in this country, including for example the red wolf, tragically down to fewer than 40 individual animals left in the wild.ⁱ

The forces driving extinction in the United States are the same basic challenges facing species conservation across the rest of the world. Our tremendous biodiversity is under serious threat from habitat loss, habitat fragmentation (breaking what is left of natural habitats into smaller and more isolated pieces), emerging diseases, invasive species, climate change, overharvesting & overfishing, and environmental degradation.

One core strategy for preventing further extinctions in the United States is to focus more efforts on protecting and restoring habitat connectivity

Over 20 years of published scientific research from 180 scientific studies have shown that maintaining habitat connectivity and corridors are critical for the survival of many speciesⁱⁱ Corridors increase the movement of species between populations by approximately 50% compared to patches that are not connected with corridorsⁱⁱⁱ Maintaining or in many cases restoring habitat connectivity can help stabilize or even reverse the impacts of habitat loss and fragmentation, and connectivity is essential for allowing species to adapt to climate change as well. We therefore suggest that improving habitat connectivity should be considered a top priority in this country and across the globe, if we are serious about forestalling the current biodiversity extinction crisis.

How do we enhance connectivity for biodiversity? One common approach is to identify and protect wildlife corridors, which are protected movement pathways that allow animals and plants to migrate or move between two or more specific places. Another way is to protect habitat linkages, which are broader and more generalized areas that provide connectivity at the regional-scale. A third strategy is to mitigate the effects of roads on wildlife movement, since roads and traffic often act as the most significant barriers to terrestrial animals roaming around the landscape. Lastly, connectivity for species that live in the water can often be greatly enhanced by removing or modifying dams or other impediments that would otherwise block fish passage.

How does improving habitat connectivity prevent species extinction?

A well-connected natural landscape provides essential opportunities for species to migrate in response to climate change. In fact, improving habitat connectivity is the strategy most often recommended by scientists for allowing species to adapt to changing climate conditions. This makes sense, as based on what we know, migration is how species have survived historical changing climates for millions of years. The current pace of human-generated climate change is quite fast, and unfortunately at the same time we've broken many landscapes up in such a way that species can no longer move to keep up with their preferred conditions. We need to take immediate steps to reconnect our natural landscapes to enable the massive levels of migration that will be vital to preventing climate-induced extinctions across the United States.

Wildlife corridors and habitat linkages serve a vital role in connecting parks and wildlife refuges that are otherwise too small on their own to maintain viable populations of many species. We have realized in the years since the protection of Yellowstone National Park that even our largest natural protected areas are too small to maintain robust populations of certain wide-ranging mammals, including wolves, grizzly bears, elk, bison, and pronghorn antelope. These animals need tremendous amounts of habitat. For example, grizzly bears and other species have been shown to need the entire Greater Yellowstone Ecosystem to survive, and it is therefore essential to maintain connections between Yellowstone National park and the surrounding national forests. Many of these wide-ranging species have been shown to be "keystones" to the ecosystem. For example, gray wolves are now better appreciated for the vital ecological role they play in and around Yellowstone. The presence of such keystone species helps prevent the extinction of countless other organisms, and only by providing large-scale networks of habitat will we be able to keep them around. Of course, many small-to-medium sized protected areas (such as state parks) around the United States are not adequate by themselves to protect even smaller species of wildlife (such as bobcats, indigo snakes, and box turtles). Maintaining and restoring habitat connections between protected areas is essential to warding off extinction events caused by wildlife populations being too small.

Habitat connectivity at different scales is crucial for allowing animals to make the routine daily, seasonal, annual, and intergenerational migrations that they need to access the resources and conditions that help them survive. For example, pronghorn antelope make an annual migration from the Upper Green River Valley in Wyoming (their low elevation winter range) to Grand Teton National Park (their higher elevation summer range). This "Path of the Pronghorn" is the only federally designated wildlife corridor and perhaps the most famous wildlife corridor in the United States. Protecting the corridor from encroachment by development and roads has become a top priority for ensuring the survival of the antelope into the future. Likewise, monarch butterflies make an incredible multi-generational migration loop around North America, and it is essential to the survival of these beautiful insects that sufficient corridors of appropriate, milkweed-rich vegetation are protected along the way. In the aquatic realm, salmon provide a third well-known example of impressive annual migrations that depend on connectivity. Salmon live in the ocean most of their lives but attempt to return to the upper reaches of rivers to lay their eggs. Dams can block these migrations, devastating salmon populations. However, if fish passage can be restored, healthy salmon runs have returned to many rivers.

Even in situations where species might be otherwise able to survive in isolated populations, we also know that safeguarding habitat connectivity is critical to maintaining healthy levels of genetic exchange. Populations that are too small and isolated can suffer tremendous negative impacts from inbreeding. For example, the Florida panther was stuck in a small area of extreme southern Florida, and years of isolation were leading to serious levels of inbreeding to the point where it seemed inevitable the panther population would go extinct. However, the cats were at least temporarily rescued by the addition of a few female mountain lions from Texas. Over the long-term, it will be essential to reestablish connections between panther and mountain lion populations so that healthy levels of genetic exchange can take place. This is true for countless other species as well, including game animals such as deer. No one wants to see their favorite animal populations become isolated and inbred, and therefore increasing habitat connectivity is key.

Mitigating the effects of roads on wildlife is an increasingly well-appreciated solution for enhancing habitat connectivity around the United States. For example, wildlife crossing structures (both underpasses and overpasses) have been proven to almost completely eliminate

road mortality for wildlife when properly sited and installed. This is especially true when wildlife crossings are placed at the critical junctions where wildlife corridors are bisected by major roads. Even if corridors of natural vegetation can be protected and restored across many US landscapes, busy roads will still threaten many species with decline and possibly extinction, unless we greatly increase our efforts to install mitigating solutions across the country.

Protecting wildlife supports the United States economy

Protecting wildlife across the United States is an important component of ensuring a resilient and diversified national economy. Direct economic impacts from various wildlife-related industries are important to overall national GDP and especially important to many rapidly diversifying rural economies across the country. Estimates place the economic contribution of outdoor recreation at \$412 billion per year (or 2.2 percent of GDP)^{iv}, including hunting and angling at over \$200 billion per year^v; bird watching at \$41 billion per year.^{vi} The economic value of ecosystem services related to wildlife habitat and behavior are hard to quantify, but similarly important to both national economic productivity and quality of life. Protection of wildlife, on an individual, population-level and habitat basis, is necessary to preserve dependent economic and business opportunities and associated standards of living across communities within the United States.

A national approach is needed to protect wildlife corridors

The IPBES Report recognizes the central role that national governments play in conservation and specifically recommends that governments prioritize, “planning ecologically representative **networks of interconnected protected areas** to cover key biodiversity areas.”^{vii} In the United States, on May 16, 2019, landmark federal legislation to protect wildlife corridors, **The Wildlife Corridor Conservation Act**, was introduced in the House and the Senate. The Act grants authority to key federal agencies to create a National Wildlife Corridor system to on federal public land and creates a Wildlife Movement Grant Program to incentivize the protection of wildlife corridors by states and tribal agencies, as well as private landowners, on non-federal lands. It provides funds for tribes to protect wildlife corridors and creates a scientific database to share wildlife movement information. Passing this bill will provide a most critical tool in our national effort to protect biodiversity and stem extinctions. **Famed Harvard biologist, Dr. E. O. Wilson recently stated, “The Wildlife Corridor Conservation Act would provide the most important step of any single piece of legislation at the present time in enlarging the nations protected areas and thereby saving large swaths of America’s wildlife and other fauna and flora, especially in the critical time of climate change...”**^{viii}

Across the United States, we are seeing a groundswell of support for protecting wildlife corridors. This year, 12 states including Wyoming, Florida, New Hampshire, Oregon, Maine and Mississippi have introduced bills to protect wildlife corridors and crossings. An ambitious wildlife corridor protection bill recently passed in New Mexico. A public consensus to protect wildlife corridors is beginning to echo the scientific consensus. Although the predictions from the IPBES Report are dire, protecting wildlife corridors is a strategy that can reverse many of these trends and provide hope that we can protect our treasured wildlife for generations to come.

Wildlands Network envisions a world where nature is unbroken, and where humans co-exist in harmony with the land and its wild inhabitants. Our mission is to reconnect, restore, and rewild North America so life in all its diversity can thrive.

Resources for more information:

Ament, R., R. Callahan, M. McClure, M. Reuling, and G. Tabor. 2014. Wildlife Connectivity: Fundamentals for conservation action. Center for Large Landscape Conservation: Bozeman, Montana. <https://largelandscapes.org/wp-content/uploads/2019/05/Wildlife-Connectivity-Fundamentals-for-Conservation-Action.pdf>

Conservation Corridor. A comprehensive website on the science of habitat connectivity maintained by the lab of Dr. Nick Haddad at Michigan State University. <https://conservationcorridor.org/>

Heller, N.E. and E. S. Zavaleta, 2009. Biodiversity management in the face of climate change: a review of 22 years of recommendations. *Biological Conservation* 142:14-32. <https://www.sciencedirect.com/science/article/abs/pii/S000632070800387X>

Hilty, J.A., A.T.H. Keeley, W.Z. Lidicker Jr., and A.M. Merenlender, 2019. Corridor Ecology: Linking landscapes for biodiversity conservation and climate adaptation. Island Press, Washington, DC. 368 pp. <https://islandpress.org/books/corridor-ecology-second-edition>

Tabor, G. 2019. Ecological Connectivity: A bridge to preserving biodiversity. Pages 24-37 in UNEP (2019). *Frontiers 2018/19 Emerging Issues of Environmental Concern*. United Nations Environment Programme, Nairobi. https://largelandscapes.org/wp-content/uploads/2019/03/2018-2019_UNEP_Frontiers_ch2_Ecological-Connectivity_A-bridge-to-preserving-biodiversity.pdf

Wildlife Conservation Society 2014. Path of the Pronghorn. Award-winning video about this crucial wildlife corridor. <https://vimeo.com/78590437>

Wildlands Network - a conservation nonprofit dedicated to reconnecting nature in North America. www.wildlandsnetwork.org

ⁱ <https://www.fws.gov/southeast/wildlife/mammals/red-wolf/>

ⁱⁱ Dr. EO Wilson, Harvard University, letter to Congress, May 15, 2019

ⁱⁱⁱ Gilbert-Norton L, Wilson R, Stevens J.R. Beard K H 2010. A Meta analytic review of corridor effectiveness, *Conservation Biology* 24:660-668

^{iv} <https://www.bea.gov/news/2018/outdoor-recreation-satellite-account-updated-statistics-20122016>

^v <https://www.nwf.org/~media/PDFs/Water/WOTUS%20Econ%20fact%20sheet%203252014.pdf>

^{vi} <https://digitalmedia.fws.gov/digital/collection/document/id/1874>

^{vii} Summary of policymakers of the global assessment report on biodiversity and ecosystem services of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services, May 2019, p. 29

^{viii} <https://wildlandsnetwork.org/blog/wildlife-corridors-conservation-act-press-release-2019/>