

# Joint Statement Regarding Climate-Informed Wildlife Crossings

## Consensus Authors

**Kimberly Andrews**  
*University of Georgia*

**Renee Callahan**  
*ARC Solutions*

**Patricia Cramer**  
*Wildlife Connectivity Institute*

**Molly Cross**  
*Wildlife Conservation Society*

**Norris Dodd**  
*AZTEC Engineering Group*

**Jeff Gagnon**  
*Arizona Game and  
Fish Department*

**Meade Krosby**  
*University of Washington*

**Renee G. Seidler**  
*Jackson Hole Wildlife  
Foundation*

**Justin Suraci**  
*Conservation Science Partners*

**Ron Sutherland**  
*Wildlands Network*

**Anna Wearn**  
*Center for Large Landscape  
Conservation*

**Leslie Duncan\***  
*The Pew Charitable Trusts*

**Julia Kintsch\***  
*ECO-resolutions*

**Caitlin Littlefield\***  
*Conservation Science Partners*

**Matt Skroch\***  
*The Pew Charitable Trusts*

*\*Consensus Organizers*

## Our Vision

We envision a modern, resilient transportation network that provides for ecological processes, accommodates climatic changes, and enables the safe and efficient movement of not only people and goods but also wildlife.

## The Context

From migrating elk to breeding salamanders, from roaming cougars to sea-run salmon, wildlife crossings over and under our roads help animals safely traverse our human infrastructure. When properly sited and designed, wildlife crossings **reduce wildlife-vehicle collisions by up to 90%**. This proven solution not only reduces wildlife mortality, but also improves driver safety, avoids costly accidents, and keeps traffic flowing.

More broadly, wildlife crossings can **reduce habitat fragmentation and improve landscape connectivity** to support animal movements and the ecological processes and services that humans rely upon, including pollination, free-flowing water, and recreational opportunities like hunting, fishing, and wildlife watching. But there is another tremendous benefit of wildlife crossings that is often underappreciated: the potential to **enhance the resilience and adaptive capacity of ecosystems and infrastructure in the face of changing climatic conditions** and increasingly extreme weather events. As effective as wildlife crossings can be, their siting and design too often fail to account for climate impacts. Incorporating these considerations is increasingly important to support climate-driven wildlife movements and range shifts.

Climatic changes are already affecting human and natural communities. **Warming temperatures, shifting precipitation patterns, and more frequent and severe climate-exacerbated disasters** are transforming habitats, prompting wildlife to shift their ranges, and compromising infrastructure, among other impacts. Federal, state, local, and tribal agencies are grappling with these challenges, which are compounded by increasing demands on aging, deteriorating infrastructure.

Author affiliations provided for identification purposes only. February 2023.

## The Context Cont.

Modernizing our infrastructure in response to these challenges is a prime opportunity to proactively steer investments—whether new builds, retrofits, or replacements—towards win-win solutions for both humans and wildlife in this era of rapid change. Mounting public and bipartisan support for conserving our natural heritage, which has given rise to unprecedented federal funding and policy commitments to enhancing connectivity and climate resilience, make these strategies all the more achievable. Elevating climate change considerations into wildlife crossing planning is not only fiscally responsible and safety-oriented, but it represents a once-in-a-generation opportunity to enhance the **long-term resilience and adaptive capacity of ecosystems and infrastructure**.

## A Strategic & Collaborative Approach

This opportunity for widespread, durable investments in climate-informed wildlife crossings requires a strategic and collaborative approach. For example:

- **The best available science and indigenous knowledge** should underpin every step of the process – from research, funding, and planning to design, operations, and maintenance—with sufficient flexibility to adapt to changing conditions and incorporate new information as it arises.
- Planning for climate-informed wildlife crossings should take a **long-term, landscape-scale approach** that extends beyond specific sites with high wildlife-vehicle conflict and that recognizes the interconnectedness of our human and natural systems.
- **Multi- and cross-jurisdictional coordination** should form the basis of comprehensive, climate-resilient infrastructure planning and should promote equitable engagement with Tribal nations and historically marginalized or underrepresented communities.
- Federal and state wildlife and transportation agencies should build the capacity of their staff to **advance climate-informed wildlife infrastructure** and share effective practices broadly.
- **Enhanced support and incentives for innovative practices** should propel the planning, design, and construction of modern, greener wildlife crossing systems.
- Accessible, actionable **science and support for monitoring** would enhance evidence-based decision making and adaptive management.

*We recognize that widespread deployment of climate-informed wildlife crossings requires substantial leadership, collaboration, and coordination across multiple sectors and levels of governance. We therefore call upon multiple players to advance this crucial effort.*



## Call to Action

1. We call upon **federal agency leaders, the White House, and Congress** to fund and incentivize development of climate-informed wildlife crossings; to build relevant programs and capacity within agencies to advance such infrastructure; and to direct agencies and staff to incorporate climate considerations into wildlife crossing planning efforts. We call upon governors and state legislatures to do the same within their states, and to appropriate funds that leverage federal investments.
2. We call upon **federal and state wildlife and transportation agencies** to enter into cooperative, equitable agreements with Tribal and local governments and private partners to prioritize investments that enhance safety, foster the adaptive capacity of and resilience of ecosystems, and bolster infrastructure durability over its complete life-cycle.
3. We call upon **non-governmental organizations and the scientific community** to address knowledge gaps in the science of climate-informed infrastructure; to facilitate the application of that science; and to foster collaborative planning and priority-setting for climate-informed wildlife crossings with diverse stakeholders.
4. We call upon **philanthropic organizations** to incorporate climate resilience considerations into their conservation funding priorities, to match state and federal investments in climate-informed wildlife crossings, and to aid agencies in building capacity to make such investments.

*We set forth below a series of recommendations to achieve these objectives.*

# Recommendations for Implementing Climate-Informed Wildlife Crossings to Enhance Ecosystem Resilience & Facilitating Adaptation

We respectfully submit the following recommendations to our elected officials, to federal and state wildlife and transportation agencies, and to the non-profit and scientific communities for promoting investments in climate-informed wildlife crossings. These investments expressly integrate climate impact considerations and reflect a holistic, landscape-scale approach that acknowledges the interconnectedness of human and ecological systems. The result will be a modernized and cost-effective transportation network that saves human and animal lives, enhances the resilience and adaptive capacity of ecosystems, and improves infrastructure durability in the face of climate impacts.



## **PLAN FOR LONG-TERM RESILIENCE AT THE LANDSCAPE-SCALE**

**Prioritize wildlife crossing investments in landscapes with high potential for ecosystem resilience and for ensuring wildlife's adaptive capacity.** Provide guidance for identifying and prioritizing wildlife crossing investments where intact, accessible, and diverse natural habitats offer the greatest potential for wildlife to adapt to changing climatic conditions—not only those locations with high wildlife-vehicle conflicts under current conditions.

**Establish permanent federal funding mechanisms that promote a climate-informed approach to wildlife crossing planning that looks at the affected ecological systems holistically.** Secure and strengthen reliable federal funding streams for climate-informed infrastructure, such as the Wildlife Crossings Pilot Program established under the 2021 Infrastructure Investment and Jobs Act. Crucially, such funds should account not only for planning and construction, but must also anticipate ongoing maintenance and monitoring needs.

**Develop rigorous performance metrics associated with funding opportunities.** Develop funding evaluation criteria that are results-oriented and that incentivize comprehensive wildlife crossing systems—including crossing structures, fencing, and adjacent lands—that address landscape-scale ecological processes, account for movement and habitat needs of diverse wildlife species, and accommodate climate-driven shifts.

**Establish policies and institutional norms that encourage climate-informed wildlife crossings.** Institutionalize the inclusion of climate adaptation considerations and foundational ecological principles (e.g., the importance of ecological connectivity) into transportation planning and procedures through administrative, executive, and regulatory actions.

**Incorporate wildlife considerations into transportation resiliency programs.** Align wildlife connectivity accommodations with transportation funding programs that support the incorporation of climate resilience into bridge and culvert replacements, such as upsizing culverts and widening bridge spans for improved infrastructure resilience under extreme weather events.

**Develop clear methodologies for considering and incorporating climate impacts on wildlife movement and ecological processes in short- and long-term transportation planning.** Institute methodologies (e.g., a pre-planning checklist) to ensure thorough consideration of indigenous knowledge and the best available science on projected climatic changes, impacts to wildlife and ecosystems, and wildlife movement and habitat needs.



## **SUPPORT MULTI- & CROSS-JURISDICTIONAL COORDINATION & PROMOTE EQUITABLE, INCLUSIVE PARTICIPATION**

**Empower and promote equitable engagement with Tribal nations and historically marginalized or underrepresented communities in infrastructure planning.** Traditional and local knowledge, values, and support are essential to building context-sensitive solutions and to developing integrative, equitable, and effective wildlife and human infrastructure. Recommendations, including the 2022 memoranda from the White House Council on Environmental Quality and the White House Office of Science and Technology Policy regarding the recognition and incorporation of indigenous knowledge, can guide this equitable inclusion.

**Encourage interagency agreements and memoranda of understanding to support coordination and strengthen partnerships that elevate climate-informed wildlife crossings.** These administrative actions should transcend leadership changes; enable the exchange of data and resources; build mutual accountability and buy-in; and encourage greater integration among state wildlife action plans, climate adaptation plans, and wildlife-friendly transportation planning.

**Expand and fund existing frameworks that encourage multi- and cross-jurisdictional coordination to incorporate ecological connectivity and climate adaptation.** Fund, update, and reinvigorate federal guidance and initiatives, such as the FHWA *Eco-Logical* framework, to spur inclusion, equity, and collaboration in the development of wildlife-friendly and climate-informed infrastructure.

**Direct wildlife agencies to share with transportation agencies information regarding wildlife movement to incorporate into transportation planning.** Both present-day and future projections on wildlife movement patterns, habitat needs, and suitable climatic conditions are crucial for ensuring wildlife crossings yield maximal adaptation benefits. Establishing protocols between agencies can help facilitate information sharing and access.

**Align climate-resilient infrastructure with emergency and natural disaster responses.** Efforts to respond and rebuild from emergencies and climate-exacerbated natural disasters offer near-term opportunities to restore infrastructure in a manner that proactively advances ecosystem resilience while ensuring that the infrastructure itself is durable in the face of mounting climate impacts.

## **BUILD CAPACITY & INTERDISCIPLINARY EXPERTISE**

**Facilitate regional and national peer learning opportunities and disseminate climate-informed wildlife crossings success stories.** Knowledge exchanges that convey information from one project to the next (e.g., through online clearing-houses and educational workshops) facilitate the sharing of successful strategies and lessons-learned to enable replication and adaptation to other locales.

**Promote interdisciplinary training and workforce development.** Interdisciplinary training in higher education and professional development programs, such as the VTrans Highways and Habitats program, build the skills and expertise needed to effectively and holistically plan, implement, and maintain climate-informed wildlife infrastructure. Such investments promote the inclusion of the best available science and foster a future workforce for climate-informed infrastructure planning and development, thereby resulting in more robust project outcomes.

## **STIMULATE INNOVATION**

**Incentivize innovation in the planning, design, procurement, and construction of climate-informed wildlife crossing systems.** Dedicate government or private funds that specifically reward strategic and safe innovation, including incentives for employing greener, less carbon-intensive materials and construction processes; for developing novel, adaptive designs; and for adopting a holistic, systems-based planning approach that strives to integrate ecological and climatic considerations at every step of the planning, implementation, and maintenance processes.

**Accelerate the uptake of climate-informed wildlife crossings by incorporating the future benefits of climate resilience into benefit-cost analyses in transportation planning.** Calculate the economic benefits of wildlife-friendly and resilient infrastructure for its entire lifecycle. Economic assessments should acknowledge the costs of inaction and savings associated with reducing infrastructure damage and loss due to climate-exacerbated disasters while supporting robust wildlife populations, ecosystems, and local economies.

## **PROMOTE MONITORING & ADAPTIVE MANAGEMENT**

**Establish or strengthen funding mechanisms for long-term, multi-species and population-level monitoring of wildlife crossing systems.** Monitoring is crucial for gauging the efficacy of wildlife crossing investments and managing adaptively to ensure resilience objectives for both infrastructure and ecosystems are being met. Monitoring should establish baselines prior to construction and measure changes relative to those baselines over time. Sustained funding for monitoring—and the adaptive management it informs—is a cost-effective mechanism for continuously improving wildlife infrastructure effectiveness and ensuring durability over infrastructure life cycles.

## **PROMOTE MONITORING & ADAPTIVE MANAGEMENT CONT.**

**Build internal and external capacity for monitoring.** Develop systems for increasing capacity within transportation agencies through increased partnership with universities and non-governmental organizations to implement research and monitoring programs. Institute standardized data protocols to improve efficiency in knowledge exchange and allow for synthetic science (e.g., meta-analyses) across project areas for greater knowledge gain.

**Support accessible and actionable science to advance evidence-based decision making.** The science and practice of climate-informed wildlife crossings is an emerging discipline and requires ongoing government and private funding for agency research departments, universities, and, crucially, boundary-spanning organizations (e.g., the USGS Climate Adaptation Science Centers) that ensure research is jointly informed by both scientists and practitioners and translated into action.

