WILDLIFE CONNECTIVITY

OPPORTUNITIES FOR STATE LEGISLATION

by Rob Ament, Renee Callahan, Laramie Maxwell,
Grace Stonecipher, Elizabeth Fairbank & Abigail Breuer

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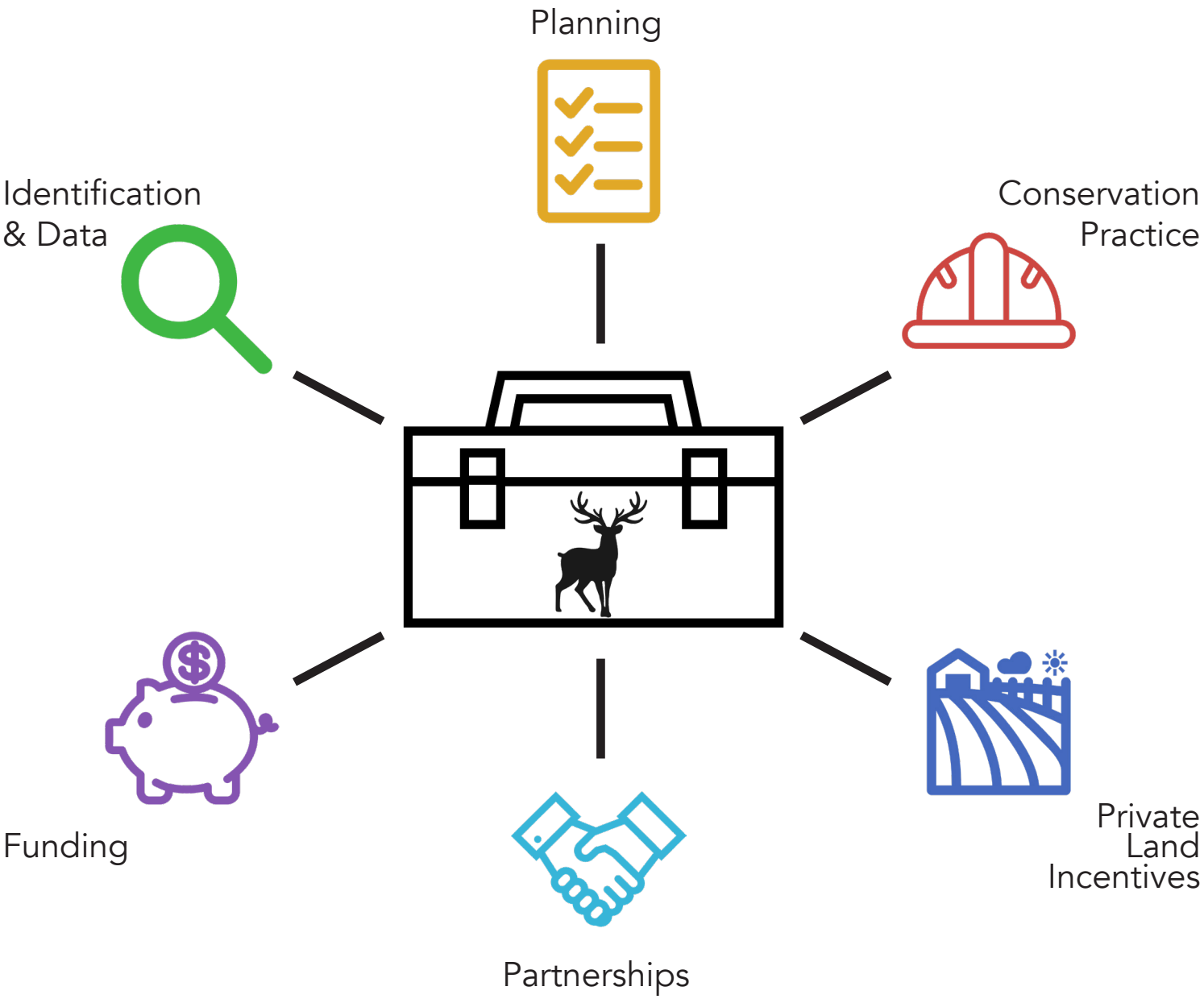

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Menu of Provisions

Introduction

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Identification & Data

- **Direct state agencies to identify wildlife corridors**
  By formally identifying wildlife corridor habitat, states take a vital early step in prioritizing where to spend scarce public resources on corridor management.
- **Improve connectivity data collection, analysis, storage, and distribution**
  By improving connectivity data management and sharing, states make the best science available as a planning resource for relevant stakeholders.

Planning

- **Direct relevant agencies to develop interagency, statewide plans for connectivity conservation aimed at preserving state wildlife corridors**
  By developing statewide connectivity action plans, agencies can effectively work together to manage for connectivity.
- **Use identified wildlife corridors to inform federal, tribal, regional, state, local, and other land use, land management, and project planning**
  By sharing state-identified corridors to inform land management planning at all scales, states increase the efficacy of corridor management by ensuring coordination across jurisdictions.
- **Require the incorporation of wildlife corridor information into State Wildlife Action Plans (SWAPs)**
  By including connectivity management provisions in SWAPs, connectivity can be managed as an important element of state wildlife resources.

Conservation Practice

- **Require development of best management practices (BMPs) for wildlife corridors bisected by roads, railways, pipelines, and transmission lines**
  By developing BMPs for wildlife corridors bisected by roads and other linear infrastructure, states can manage for habitat connectivity by supporting responsible infrastructure development.
- **Require development of best management practices (BMPs) for wildlife corridors potentially affected by forestry, mining, grazing, and activities on state lands**
  By creating BMPs to protect wildlife corridors from potentially harmful activities on state lands, states ensure that the lands sustain multiple uses while also allowing for habitat connectivity and wildlife movement.

Private Land Incentives

- **Require state agencies to provide technical assistance to increase Federal Farm Bill incentive program funds for wildlife corridors**
  By providing technical assistance, state agencies may increase the funding available for private landowners to implement conservation practices that protect corridors.
- **Establish and promote state-based programs that encourage conservation on private lands**
  By establishing and promoting incentive-based programs, states ensure that willing private landowners have access to funding and other capacity to protect habitat connectivity.
- **Establish state-based incentive programs such as conservation banking**
  By assuming the role of governing agency, states can create conservation banks that promote connectivity, as well as prioritize other state species or environmental efforts.

Partnerships

- **Develop interagency and interdisciplinary partnerships to advance effective and unified wildlife corridor policies**
  By authorizing collaboration on wildlife corridor identification, planning, and research, states increase efficacy of connectivity work.
- **Authorize public outreach and education campaigns to bolster state wildlife habitat connectivity policy**
  By increasing public knowledge about the importance of connectivity through education and outreach efforts, states increase support for connectivity policymaking.

Funding

- **Facilitate robust, long-term funding for wildlife corridors**
  By pursuing funding opportunities, states bolster the long-term success of wildlife corridors.

Introduction

On March 1, 1872, Yellowstone became the world's first national park. At the time, no one imagined, despite covering more than 2 million acres, Yellowstone would ultimately prove too small to sustain the species that call it home. Almost 150 years later, researchers have concluded that our existing national parks and other protected areas are not big enough, standing alone, to sustain our cherished native wildlife. Rather, it is critical that these core protected areas be connected by **corridors** – natural areas that connect patches of habitat – to allow animals and plants to move freely across the landscape.[1] In addition to ensuring healthy wildlife populations amid working landscapes, **corridors** are vital to sustaining our nation's social and economic health and welfare.[2]

Benefits of Wildlife Corridors

Corridors facilitate the movement of organisms, genetic material, and ecological processes, and provide important benefits to both human and wildlife populations.[3] Corridors allow species to move across the landscape to reach food, water, and mates.[4] They also facilitate seasonal migrations, once-in-a-lifetime dispersal events to seek new territories, and multi-generational range shifts in response to climate trends.[5] It is important to note that corridors are not just for connectivity on land, but also for connectivity across aquatic and atmospheric systems (think salmon, birds, and butterflies). The ability of species to move is critical to supporting genetic diversity, which is in turn essential to the health and resilience of wildlife populations.[6]

Healthy wildlife populations are a tremendous source of pride for many Americans. A 2016 report by the U.S. Fish and Wildlife Service found that over 100 million Americans participated annually in wildlife-related recreation including hunting, fishing, and wildlife-viewing.[7] During the same year, expenditures for wildlife-related recreation exceeded $150 billion, bolstering local economies, delivering nutritional sustenance, and providing countless hours of enjoyment for Americans of all socioeconomic backgrounds.[8]

In addition to benefitting wildlife, corridors also provide **ecosystem services**, defined as the contribution of natural systems to human well-being.[9] Ecosystem services provided by these pathways of natural habitat include: regulating air and water quality, regulating water flow, maintaining soil structure and quality, erosion control, pollination of crops and other plants, and climate regulation.[10] Overall, these services protect the health of the American public, make our infrastructure more resilient to extreme events, and ultimately save taxpayers money.

Role of State Legislators

State legislation is a simple and effective way to ensure that state governments and their partners identify and protect important wildlife corridors. Some states have begun to recognize the importance of habitat connectivity. For example, in 2007, 19 members of the Western Governors' Association unanimously passed a **bipartisan Wildlife Corridors Initiative**, and the WGA has since issued several policy resolutions recognizing the continued importance of state wildlife science and data.[11] Similarly, the 2016 Conference of New England Governors and Eastern Canadian Premiers, including Connecticut, Massachusetts, New Hampshire, Rhode Island and Vermont, passed a resolution recognizing the importance of connectivity to its resilient ecosystems and human communities.[12]

Recently, the states of California and New Hampshire have enacted legislation that champions wildlife corridors, addresses specific connectivity "hot spots," encourages volunteer efforts to protect corridors, improves aquatic connectivity, and develops a funding strategy. The legislature in New Mexico has used another legislative tool – a Joint Memorial – to direct its state agencies to address connectivity.[13] These groundbreaking state legislative efforts are springboards to more comprehensive efforts in the future.

How to Use this Document

This document provides a variety of potential provisions for state legislators. Each provision attempts to address and improve different facets of identifying and protecting state wildlife movement and habitat connectivity. The following pages provide rationales for enhancing existing or creating new provisions and, where available, include examples of model or sample legislative language.

Although intended to be sufficiently flexible to apply anywhere in the U.S., the sample provisions included in the document are not tailored to any specific state. As a result, those provisions may require additional modifications or refinements, depending upon the state's desired goal, as well as the enactment of additional provisions related to compliance, enforcement, or other avenues of accountability.

Case Studies

Arizona Wildlife Linkages Assessment[14]

After recognizing the shortcomings of their state's current processes for incorporating connectivity and wildlife needs into transportation planning, the Arizona Department of Transportation and Department of Game and Fish led a statewide effort to create a map of important areas for wildlife connectivity to be used as a resource in both conservation and transportation planning. The interdisciplinary Arizona Linkages Working Group was formed in 2004 and included members of state and federal natural resource agencies, transportation agencies, universities, and non-profit conservation organizations. In 2006, the Arizona Linkages Assessment was released and has since been used as a decision-making tool by managers across the state.

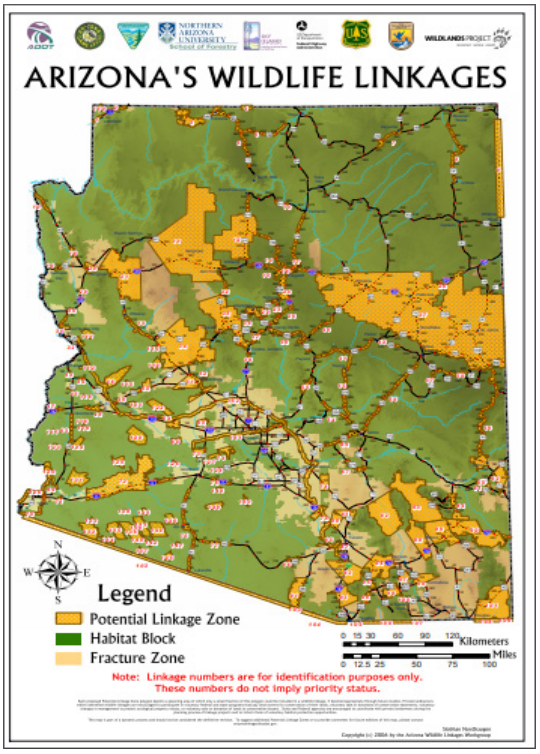

Image from: https://www.azdot.gov/docs/planning/arizona_wildlife_linkages_assessment.pdf

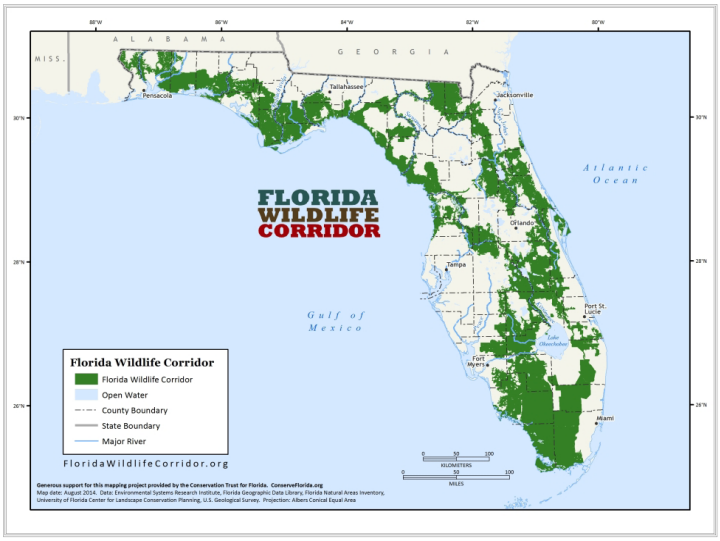

Image from: http://floridawildlifecorridor.org/maps/

Florida Wildlife Corridor[15]

In 2013, the Governor and Cabinet of the State of Florida recognized the importance of the Florida Wildlife Corridor. The corridor runs approximately 1000 miles through the state of Florida from the Everglades to the Georgia border. The corridor protects biodiversity by providing habitat for 42 federally listed endangered species, 24 threatened species, and 15 candidate species. In addition, the corridor protects ecosystem services and the rural and cultural heritage of the state.

Path of the Pronghorn Wildlife Crossings[16]

In 2008, the U.S. Forest Service (USFS) established the nation's first federally designated wildlife corridor to protect a pronghorn antelope herd's age-old annual migration path across USFS lands in Wyoming. This migration path is bisected by many roads, including U.S. Highway 191. Along this highway, the path—now known as The Path of the Pronghorn—was being threatened by increasing conflicts with vehicles. In 2012, the Wyoming Department of Transportation completed construction of two overpasses, six underpasses, and wildlife exclusion fencing along a 12-mile stretch of the highway. Since construction, these crossing structures and associated fencing have increased habitat connectivity and reduced motorist collisions involving wildlife by more than 80%.

A wildlife crossing structure at Trapper's Point in Wyoming over U.S. Highway 191.

References

[1] L. Gilbert-Norton et al., "A Meta-Analytic Review of Corridor Effectiveness," *Conservation Biology* 24, no. 3 (2010): 660–68, Link; M. A. Benedict and E. T. McMahon, "Green Infrastructure: Smart Conservation for the 21st Century," *Renewable Resources Journal* 20, no. 3 (2002): 12–17, Link; C. B. Chetkiewicz, C. C. St. Clair, and M. S. Boyce, "Corridors for Conservation: Integrating Pattern and Process," *Annual Review of Ecology, Evolution, and Systematics* 37, no. 1 (2006): 317–42, Link.

[2] Benedict and McMahon, "Green Infrastructure," Link.

[3] C. Liquete et al., "Mapping Green Infrastructure Based on Ecosystem Services and Ecological Networks: A Pan-European Case Study," *Environmental Science & Policy* 54 (December 1, 2015): 268–80, Link.

[4] R. Ament et al., "Wildlife Connectivity: Fundamentals for Conservation Action" (Bozeman, MT: Center for Large Landscape Conservation, 2014), Link.

[5] Ament et al., Link.

[6] Ament et al., Link.; Chetkiewicz, St. Clair, and Boyce, "Corridors for Conservation," Link.

[7] U.S. Fish & Wildlife Service, "2016 National Survey of Fishing, Hunting and Wildlife-Associated Recreation" (U.S. Fish & Wildlife Service, 2018), Link.

[8] U.S. Fish & Wildlife Service, Link.

[9] Liquete et al., "Mapping Green Infrastructure Based on Ecosystem Services and Ecological Networks," Link.

[10] Liquete et al., Link; Ament et al., "Wildlife Connectivity: Fundamentals for Conservation Action," Link.

[11] Western Governors' Association, "State Wildlife Science, Data and Analysis," Policy Resolution 2017-08 (2017), Link.

[12] New England Governors and Eastern Canadian Premiers, "Resolution on Ecological Connectivity, Adaptation to Climate Change, and Biodiversity," Resolution 40-3 (2016), Link.

[13] The Legislature of the State of New Mexico, "House Joint Memorial 4," 49th Legislature (2009), Link; The Legislature of the State of New Mexico, "House Joint Memorial 10," 50th Legislature (2011), Link.

[14] The Arizona Wildlife Linkages Workgroup, "Arizona's Wildlife Linkages Assessment," 2006, Link.

[15] T. Hoctor et al., "The History of Florida Wildlife Corridor Science and Planning Efforts.," 2015, Link.

[16] Hall Sawyer, Patrick A. Rodgers, and Thomas Hart, "Pronghorn and Mule Deer Use of Underpasses and Overpasses along U.S. Highway 191," *Wildlife Society Bulletin* 40, no. 2 (2016): 211–16, Link.

Direct state agencies to identify wildlife corridors

Expected Outcomes

A review of 20-plus years of peer-reviewed science literature confirms that the #1 recommendation by conservation biologists for protecting biodiversity in the face of a changing climate is to ensure wildlife habitats are connected on a landscape scale.[1] As a result, an important state policy to ensure viable wildlife populations is to establish connected "links" or "corridors" that allow wildlife to move freely across the landscape to meet their daily, seasonal, and long-term needs.

Corridors have been defined in many different ways. In general, there is agreement that a corridor is a distinct component of a landscape that provides habitat connectivity. A *corridor* is defined as any space, usually linear in shape, which improves the ability of organisms to move among patches of habitat.[2] *Wildlife corridors* are specific to wildlife movement; they are defined by the species of interest and the nature of their movement.

A key component of sound wildlife policy for a state should be to identify its wildlife corridors through a scientifically-credible process that includes drawing boundaries of these distinct and vital elements of the landscape.

Corridor Identification and Connectivity

Defining the location of wildlife corridors is an elemental first step in establishing a statewide system or "network for nature" of high-quality habitats that are connected to each other to provide for the safe movement of wildlife. Legislators might choose to direct an appropriate state wildlife or natural resource agency to develop a program to first identify, then seek to protect, wildlife corridors.

Potential Policy Action

Examples of steps that could be undertaken to identify and protect wildlife corridors include:

- Delegate a state agency to develop and manage a wildlife corridor identification process
- Assure that the best available science is used to establish criteria for corridor identification
- Establish a public engagement process to help accurately identify wildlife corridors and prioritize conservation actions
- Establish state policy to guide the management of identified corridors

Potential criteria for identifying wildlife corridors might include, but are not limited to:

- Based on the best available science
- Based on historic, current, or likely future use by native species
- Informed by needs of state-defined species of conservation importance as well as species listed under the Endangered Species Act

- Corridors that have been identified by other jurisdictions (i.e. federal, tribal, local)
- Areas that contribute to connectivity, persistence, resilience, and adaptability of native species by providing for:
    - Dispersal and genetic exchange among populations
    - Range shifts, range expansion, and/or range restoration
    - Various adaptations in response to extreme events (i.e., wildfires) or climate trends
    - Seasonal movement and/or migration
    - Succession, movement, or recolonization following population disturbances

Potential management actions for identified corridors may include, but are not limited to:

- Prevent habitat loss and fragmentation within the corridor
- Maintain or restore the natural integrity of the corridor
- Mitigate human-caused barriers to native species movement within the corridor
- Use existing conservation programs to enhance habitat in identified corridors
- Where corridors cross jurisdictional boundaries, coordinate management of the corridor with all relevant agencies, governments, landowners, and other entities
- Set maximum road densities and/or take other steps to mitigate the harmful effects of roads on wildlife movement within the corridor
- Recognize that state corridor management will not take priority over federal trust responsibilities to Indian tribes
- Require the consideration of state-identified corridors during federal, state, and local resource and land management planning processes
- Provide for restoration where the existing habitat is degraded and/or native species no longer reside or pass through the corridor

Legislation should establish an identification system that includes clear criteria and management goals, measurable outcomes, and a budget to sustain the system. The state agency responsible for this program should have the autonomy to evaluate and apply site-specific management and work cooperatively with stakeholders. In addition to state agency-initiated corridor identification, the legislation might also include a process for the public to submit a petition to designate a corridor.

References

[1] N.E. Heller and E.S. Zavaleta, "Biodiversity Management in the Face of Climate Change: A Review of 22 Years of Recommendations," *Biological Conservation* 142, no. 1 (January 1, 2009): 14–32, *Link*.

[2] J.A. Hilty, W.Z. Lidicker, and A.M. Merenlender, *Corridor Ecology: The Science and Practice of Linking Landscapes for Biodiversity and Conservation*. (Washington, D.C.: Island Press, 2006).

Improve connectivity data collection, analysis, storage, and distribution

Expected Outcomes

Most states face the growing pressures of development, land use change, expanding linear infrastructure, and other increases to the "human footprint" which have, in many places, already caused significant fragmentation of important wildlife habitat. Sustaining wildlife habitat connectivity and, at the same time, meeting the needs of growing human communities is an increasingly difficult and complex challenge. In order for this challenge to be met, data on wildlife corridors must be collected, analyzed, and made available to inform land use decision-making processes at multiple scales. Most states are already collecting data on wildlife and habitat; however, the quality and quantity of this data can vary greatly. Even in states that excel at collecting wildlife data, that data is rarely compiled and analyzed to identify wildlife corridors, and is seldom made available to land managers, developers, or other entities. For this reason, information on wildlife corridors is rarely incorporated into land use planning decisions.

Data and Connectivity

An effective program to identify wildlife corridors and maintain or improve connectivity requires using the best available science to guide coordinated action by many agencies and organizations. In order to accomplish this, states must dedicate time and resources to ensure that data on wildlife corridors is collected, compiled, analyzed, and stored in a way that is transparent and useable by a variety of stakeholders and agency decision-makers. Fortunately, the advancement of geographic information system (GIS) software, computing power, availability of remote sensing data, and knowledge of species-specific responses to a variety of landscape attributes make mapping wildlife corridors possible at increasingly high spatial resolution and extent. A vast array of methods for collecting and analyzing connectivity data now exists that can identify and/or predict locations of wildlife corridors in complex landscapes. By using the best available science, states can identify and map the exact locations of wildlife corridors. By making those maps available as a planning resource for public and private land managers, conservation groups, and the public, states can play an integral role in reducing habitat fragmentation and conserving and improving wildlife corridors.

Potential Policy Action

To ensure that wildlife corridors are identified and mapped, legislators can require relevant state agencies to conduct statewide connectivity analyses using the best available science, and to make this data available to other agencies, organizations, and the public. Some states, such as California and Washington, have already done this. In 2007, Washington's Executive Order 1031, "Protections and Connections for High Quality Habitats," prompted the formation of the Washington Habitat Connectivity Working Group (WHCWG). The WHCWG is a voluntary public-private partnership between state and federal agencies, universities, tribes, and non-profit organizations, and is co-led by the Washington Department of Fish and Wildlife (WDFW) and the Washington Department of Transportation (WSDOT).[1] The WHCWG conducted a statewide habitat connectivity assessment, bringing together data from a variety of stakeholders and identifying wildlife corridors throughout the state. This analysis is now available online via a report,[2] as well as an online "Linkage Mapper."[3]

In 2008, California's AB 2785 required the Department of Fish and Game to compile a database of the state's most critical wildlife corridors and habitat linkages, and to make the resulting information available to other agencies and the public. In order to comply with this bill, the multidisciplinary California Essential Habitat Connectivity Project was formed to produce a statewide connectivity assessment with the goals of incorporating natural resource considerations into transportation and land use planning, increasing the efficiency and cost-effectiveness of transportation and land use planning, and providing a framework for regional analysis, planning, and implementation.[4] This project created a transparent, scientifically defensible procedure that can be replicated by other states. In addition, AB 1630, introduced in California's 2017-2018 legislative session, requires the Department of Fish and Wildlife to update the California Essential Habitat Connectivity Project; create a formal avenue for scientific data on wildlife movements gathered by universities, non-profit corporations, public agencies, and independent biologists to be submitted to the department; and to make this data available for the public on their website by January 1, 2020.

References

[1] Washington Wildlife Habitat Connectivity Working Group, "Washington Connected Landscapes Project: Statewide Analysis" (Olympia, WA: Washington Department of Fish and Wildlife and Washington Department of Transportation, 2010), *Link*.

[2] Washington Wildlife Habitat Connectivity Working Group, *Link*.

[3] B.H. McRae and D.M. Kavanagh, "Linkage Mapper Connectivity Analysis Software" (Seattle, WA: The Nature Conservancy, 2011), *Link*.

[4] W.D. Spencer et al., "California Essential Habitat Connectivity Project: A Strategy for Conserving a Connected California" (Prepared for California Department of Transportation, California Department of Fish and Game, and Federal Highways Administration, 2010), *Link*.

Direct relevant agencies to develop interagency, statewide plans for connectivity conservation aimed at preserving state wildlife corridors

Expected Outcomes

Wildlife corridors can often transverse large geographic areas, ideally linking together a series of high-quality habitats that results in an ecological network that sustains native wildlife populations. To effectively manage for this scale of connectivity, comprehensive statewide plans for connectivity conservation must be established. Such a plan should involve multiple agencies and take into account the unique aspects of a state's key habitats and its variety of species. An interagency, statewide plan that directs efforts at state, regional and local scales for connectivity conservation will ensure that the movement areas needed by wildlife to ensure their long-term viability are conserved.

Statewide Plans and Connectivity

Advancing a statewide plan is crucial for protecting habitat connectivity for a variety of species. Creating a statewide plan ensures both that corridors are identified across the state, and that strategies are put in place to protect crucial connectivity areas. Other agencies and organizations will also benefit from a connectivity plan; they will be able to incorporate its findings into their management plans and use it to screen future development proposals. A statewide plan can be also be used as a resource for land trusts to prioritize conservation easements or land exchange acquisitions. A statewide, interagency wildlife corridor plan will ensure that the state and its partners work toward a common goal and that resources are used as effectively and efficiently as possible.

Potential Policy Action

State wildlife agencies should be directed to lead efforts that engage other relevant agencies to develop statewide plans to manage for wildlife habitat connectivity. An interagency, statewide plan should include various essential elements, including but not limited to:

- Identifying and mapping existing wildlife habitat blocks and their corridors at three spatial levels: statewide, regional, and local.
- Assuring the connectivity needs of a variety of species, from wide-ranging to local endemics, are incorporated into the statewide plan.
- Assessing the ecological values of identified corridors.
- Identifying protocols and procedures for incorporating the statewide plan into community development, transportation, and natural resource extraction plans and projects.
- Developing a public education and outreach effort to communicate the findings and importance of the statewide plan to the state's citizens and other key stakeholders.

California Department of Fish and Wildlife has produced the "California Essential Habitat Connectivity Project" which serves as an example of this type of statewide connectivity conservation plan.[1]

In addition to directing relevant state agencies to collaborate on such a plan, funds must be allocated to carry out the collaboration, science, and other work necessary to make the plan a reality.

References

[1] W.D. Spencer et al., "California Essential Habitat Connectivity Project: A Strategy for Conserving a Connected California" (Prepared for California Department of Transportation, California Department of Fish and Game, and Federal Highways Administration, 2010), *Link*.

Use identified wildlife corridors to inform federal, tribal, regional, state, local, and other land use, land management, and project planning

Expected Outcomes

It is important for a state's wildlife conservation partners, regardless of jurisdiction, to have access to, and take into consideration, the latest and best data on state-identified wildlife corridors during land use, land management, and project planning. Since states have the primary authority for wildlife conservation, it is incumbent that state wildlife agencies provide other jurisdictions with the appropriate wildlife corridor information they need, to better protect wildlife movement and corridor habitat.

Legislators could further harmonize wildlife corridor management by directing state agencies to work with each other and with federal, tribal, regional, and local agencies and other decision-makers to integrate state wildlife corridor information into their plans. This will help assure the state's partners receive the appropriate wildlife corridor data needed to help them avoid impacts to corridors and/or to support commitments they might make to ensure the long-term viability of state wildlife corridors and the species the corridors support. Doing so will help ensure that decision-makers at all jurisdictional levels and geographic scales are in the best position possible to effectively and efficiently protect and manage state-identified corridors.

Land Use Planning and Connectivity

Tribes, counties, state transportation agencies, and federal land managers—such as the Bureau of Land Management (BLM) and U.S. Forest Service—are just a few of the many entities operating within a state's geographic boundaries that are responsible for adopting and implementing land use, land management, and project-specific plans. Because wildlife corridors do not end when an animal or its habitat crosses from a parcel owned by one jurisdiction to another, it is crucial that other agencies that are conducting plans or projects consider wildlife corridors identified by the state in their decision-making.

Potential Policy Action

There are a number of policy actions that legislators could take to advance use of state wildlife corridor information by other decision-makers. At a minimum, legislators should consider directing the state agency in charge of wildlife habitat connectivity data to proactively share such information with other state agencies as well as with federal, tribal, regional, local, and other decision-makers who are in a position to help protect state-identified wildlife corridors. One way to accomplish this would be to direct the appropriate state agency to develop and maintain a spatially-explicit (GIS) database of wildlife corridors and wildlife movement areas. The wildlife corridor database should also be accessible to the public, free-of-charge.

Legislators could also authorize state wildlife agencies to establish and share wildlife corridor management guidelines with other agencies and their decision-makers, and to recommend which guidelines might best apply on a case-by-case basis.

The following examples outline different frameworks for sharing data and management best practices that have been successfully employed at the federal, tribal, regional, state, and local levels:

Federal

- ***Department of the Interior (DOI) Secretarial Order (SO) 3362: Improving Habitat Quality in Western Big-Game Winter Range and Migration Corridors***.[1] SO 3362 authorizes the DOI to "work in close partnership with [western states] to enhance and improve the quality of big game winter range and migration corridor habitat…in a way that recognizes state authority to conserve and manage."[2] The order expressly recognizes the need for DOI land managers such as the BLM, U.S. Fish and Wildlife Service, and National Park Service to work with states to "harmonize State fish and game management and Federal land management of big-game winter range and corridors."[3] Among other things, the order provides for DOI agencies to "[a]ssess State wildlife agency data regarding wildlife migrations early in the planning process for land use plans and significant project-level actions that bureaus develop," and to "[e]valuate and appropriately apply site-specific management activities, as identified in State land use plans, [or] site-specific plans . . . that conserve or restore habitat necessary to sustain local and regional big-game populations."[4] By taking the simple step of sharing data and preferred management guidelines for state-identified wildlife corridors, states can help federal land managers ensure that state priorities are effectively integrated into DOI land management plans and policies.
- ***Forest Service Land Management Plans.*** Federal law requires national forests to update their forest management plan approximately every 10 years.[5] The 2012 Forest Planning Rule requires that these plans include management actions to promote wildlife habitat connectivity.[6] By sharing information about the location and preferred management of state corridors, states can enlist federal land managers in helping ensure protection of state corridors that cross national forest lands. The Flathead National Forest Plan[7] in Montana and the Carson National Forest Plan[8] in New Mexico are examples of recently updated forest management plans that incorporate management actions specific to wildlife habitat connectivity.
- ***Federal incentive programs such as the Conservation Reserve Program within the Agricultural Improvement Act of 2018***, Public Law No. 115-334. Federal programs that incentivize conservation on private lands would also benefit greatly from information on state-identified corridors. For example, after passage of the Agriculture Improvement Act of 2018, the Grasslands Program in the Conservation Reserve Program provides federal funding for the Secretary to prioritize lands "of ecological significance, including land that … improves or creates wildlife habitat corridors."[9] In addition to benefiting state connectivity, use of state data and related management guidelines by federal incentive programs will also likely lead to more efficient use of scarce program dollars.

Tribal

- ***Blackfeet Climate Change Adaptation Plan.***[10] In April 2018, the Blackfeet Tribe, located in Browning, Montana, published a Climate Change Adaptation Plan. The plan includes a goal to "maintain wildlife populations and habitat and limit disturbance in the face of changing climatic conditions" by "identifying and mapping key corridors and connectivity areas on and across the Blackfeet Nation."[11] While tribes often have their own wildlife and natural resource agencies, as in the case of the Blackfeet, they also work frequently with state agencies. With readily available wildlife movement area information, states could actively and effectively engage with tribes to enhance their land management plans.

Regional

- ***Western Governors' Association (WGA) Policy Resolution 07-01: Protecting Wildlife Migration Corridors and Crucial Wildlife Habitat in the West.***[12] The central provision of this resolution calls for "science-based policy recommendations to ensure healthy natural landscapes for flourishing wildlife populations."[13] A Memorandum of Understanding (MOU) signed by the WGA and various federal agencies, including the U.S. Departments of Interior, Agriculture, and Energy, committed to work with WGA member states to "create state-based decision support systems

that develop, coordinate, make consistent, and integrate quality data about wildlife, corridors, and crucial habitat across landscapes…to inform decision-makers at all levels of government."[14] States could consider using similar processes such as inter-agency MOUs and similar principles for developing a decision support system or other appropriate framework for sharing corridor data and management guidelines, to ensure that such information is readily accessible when needed to inform state agency land use, land management, and project plans.

State

- ***Washington Growth Management Act.***[15] This statute requires designation of critical habitat and open space corridors in counties that have a population of more than 50,000 or that have seen a 17% increase over 10 years. States could consider adopting similar guidelines for conducting sequential prioritization of corridors. Moreover, in Washington and other states with similar statutes, state, tribal, regional, and local decision-makers would directly benefit from having access to state wildlife corridor data and preferred management guidelines.

County

- ***Park County, Montana Growth Policy.***[16] As Park County's 2017 Growth Policy recognizes, although counties do not manage wildlife, wildlife often impact private property within counties.[17] As a result, Park County's growth policy includes objectives and recommended management actions to "identify and protect wildlife corridors in planning using expertise, information, and data from state and federal wildlife managers."[18] Local and county land planning occurs frequently and presents many opportunities to incorporate state-based wildlife corridors. For example, Objective 2.2 of the policy is to "Identify critical wildlife corridors for development, infrastructure and conservation planning." In addition to allowing the county to map known corridors, "[l]andowners can use this information to voluntarily manage wildlife movement on their property (an example is a landowner's voluntary effort to replace fence that prohibited the movement of pronghorn antelope in the Paradise Valley). In addition, knowing where wildlife crosses highways will assist Park County staff in conversations with Montana Department of Transportation (MDT) about mitigating impacts to public health and safety and to wildlife in these areas."[19] By making corridor data and management guidelines readily available to local decision-makers, states can empower county planners and other local officials to more effectively protect state-identified corridors that fall within county boundaries.

References

[1] U.S. Dep't of Interior, Sec. Order No. 3362: Improving Habitat Quality in Western Big-Game Winter Range and Migration Corridors (Feb. 9, 2018). *Link*.

[2] Id. § 1. *Link*.

[3] Id. § 3. *Link*.

[4] Id. § 4.b.(4)-(5). *Link*.

[5] USDA, Forest Service, "National Forest System Land Management Planning," 36 § 219 (2016), *Link*.

[6] USDA, Forest Service. *Link*.

[7] C. Weber and J. Krueger, "Forest Plan: Flathead National Forest" (Kalispell, MT: USDA: Forest Service Northern Region, 2017), *Link*.

[8] K. Naranjo et al., "Preliminary Draft Proposed Land and Resource Management Plan for the Carson National Forest [Version 2]" (Taos, NM: USDA: Forest Service Southern Region, 2017), *Link*.

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Require the incorporation of wildlife corridor information into State Wildlife Action Plans (SWAPs)

Expected Outcomes

State Wildlife Action Plans (SWAPs) are conservation plans developed by a state to identify and protect at-risk species and their habitat before they become too rare or costly to restore. In 2005, all 50 states and 5 U.S. territories developed SWAPs as required by the U.S. Congress before they could receive U.S. Fish and Wildlife Service (USFWS) grants. Decadal revisions to the plans by each state and territory occurred by the end of 2015.

Each SWAP includes the identification of Species of Greatest Conservation Need (SGCN) for that state. They also describe the threats to the SGCNs identified and recommend actions to address those threats. Moreover, a number of laws require federal land managers to consult with state government and, in some cases, ensure that federal plans are consistent with state plans (where possible). For example, the Federal Land Policy and Management Act of 1976, as amended, 43 USC § 1701, § 1712, requires the Bureau of Land Management to consider relevant state land use and management plans and to ensure the federal plan's consistency, to the maximum extent possible, with the state plans.

SWAPs and Connectivity

After the 2005 SWAPs were completed and before their 2015 revisions were finalized, an analysis was conducted regarding how well the initial plans addressed connectivity. The content analysis by Lacher and Wilkerson[1] revealed common language used among SWAPs and an unexpectedly low relative emphasis on wildlife connectivity for the majority of plans. This finding contrasts with the fact that 50 SWAPs listed habitat fragmentation as a leading threat, that all plans examined had at least one wide-ranging terrestrial species of conservation concern, and that maintaining wildlife connectivity is a well-recognized conservation objective.

Despite the lack of emphasis on wildlife linkages, Lacher and Wilkerson were able to use 11 exemplary plans for their analysis, and published literature and interview responses to develop recommended best practices for planning and management of ecological connectivity. This demonstrates that for those states with SWAPs that lack sufficient emphasis on wildlife linkage, many improvements can still be made.

Potential Policy Action

There are two ways in which SWAPs can be updated to promote habitat connectivity. First, SWAPs are revised every ten years, so this will occur next in approximately 2025. Second, SWAPs can be updated by amendment if a SWAP revision process is not underway.

State legislation could include a provision that directs a state's wildlife authority responsible for the SWAP to develop a revision that formally recognizes habitat connectivity as a priority as well as includes actionable management items to identify and conserve wildlife corridors. If legislators would like to see improvements on connectivity in the SWAP sooner rather than later, the provision should direct the state wildlife agency to amend its SWAP, which could begin as soon as the legislation passes into law. It should be noted that all SWAPs, their revisions, and any amendments must be approved by the USFWS.

As a first step, legislators should direct state wildlife agencies to incorporate geographically-specific wildlife corridors into their SWAPs. In addition, legislators should consider the benefits of other potential policy actions involving SWAPs, as excerpted below:

Arizona SWAP[2]

- "Identify and protect key wildlife corridors for landscape connectivity" (p. 97, 98, 99, 108, 109, 111).
- "Renovate/restore suppressed or extirpated native wildlife communities, habitats, and connectivity" (p. 98, 103, 105-106, 111-112).
- "Design forest/woodland harvesting and management strategies that promote wildlife habitat diversity and connectivity" (p. 101-102, 104).

Colorado SWAP[3]

- "Study metapopulation dynamics, to understand importance of barriers and seasonal connectivity in life history, to direct future conservation activities" (p. 130, 166-167).
- "Maintain linkages and connectivity (e.g., wildlife over/under passes, habitat corridors, wildlife-friendly fences, fish passages)" (p. 205-209, 212-214, 219, 221, 259, 263, 268, 334).
- "Maintain landscape connectivity to allow for species movement" and to improve resiliency (p. 221, 225, 226).

Maine SWAP[4]

- "Encourage improved municipal planning for siting for new or retrofitting development, taking into account future environmental change, to improve connectivity for diadromous fish passage" (p. 16).
- "Restoring habitat connectivity at road crossings is an important conservation action for many SGCN and often involves coordination among state and local transportation agencies, biologists, landowners, and other partners" (p. 39).
- "Conduct statewide/watershed scale connectivity planning" (p. 45) and "Encourage partnership projects among transportation agencies, utility companies, etc. to facilitate fish passage and maintain connectivity in or near subtidal, intertidal, and tidal marsh habitats especially in cases where structures have different purposes for different users" (p. 49, 58, 68).

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[2] Arizona Game and Fish Department, "Arizona's State Wildlife Action Plan: 2012 – 2022" (Phoenix, AZ: Arizona Game and Fish Department, 2012), *Link*.

[3] Colorado Parks and Wildlife, "Colorado's 2015 State Wildlife Action Plan" (Denver, CO: Colorado Parks and Wildlife, 2015), *Link*.

[4] Maine Department of Inland Fisheries and Wildlife, "Maine's Wildlife Action Plan" (Augusta, ME: Maine Department of Inland Fisheries and Wildlife, 2015), *Link*.

Require development of best management practices (BMPs) for wildlife corridors bisected by roads, railways, pipelines, and transmission lines

Expected Outcomes

Roads, rails, pipelines, transmission lines, and other types of linear infrastructure allow for the movement of people and resources across the landscape. However, linear infrastructure also impedes the ability of wildlife to move across the landscape to access the resources necessary for their survival. The network of roads and other linear infrastructure in the U.S. continues to expand and few places now remain that are not impacted. Linear infrastructure slices through the landscape, causing it to be fragmented into ever-shrinking habitat patches. Some of the impacts of roads and other linear infrastructure on the natural world include: habitat loss and degradation, barriers to movement and migration, increased human access and disturbance, genetic isolation, and wildlife mortality. Combined, these have far-reaching effects on landscapes, ecosystems, and wildlife, and represent a major driving force of biodiversity loss worldwide.[1] By requiring relevant state agencies to develop and follow BMPs for linear infrastructure projects, states can play an important role in maintaining and improving habitat connectivity, and thereby help to ensure sustainable wildlife populations including pollinators and other wildlife critical to human agricultural and other enterprises.

Linear Infrastructure and Connectivity

Linear infrastructure networks have caused dramatic changes in land use over the last century, fragmenting once-continuous habitat into smaller and smaller habitat patches between cities and towns. While the most obvious and direct disturbance to the landscape occurs along the infrastructure's physical footprint, the indirect effects can extend far beyond into the surrounding landscape. In the U.S., there are currently over 4 million miles of public roads, which have direct ecological impacts to over 22% of land in the contiguous U.S.[2] Power lines also affect U.S. lands at a vast scale, with hundreds of thousands of miles of high-voltage power lines and millions of miles of low-voltage power lines.[3] In addition, the U.S. has hundreds of thousands of miles of railroads[4] and over 3 million miles of natural gas pipelines.[5]

In order to address the impacts of linear infrastructure and maintain habitat connectivity for wildlife, BMPs must be developed and implemented throughout all phases of infrastructure development. These BMPs are especially critical in areas that have been identified as wildlife corridors, as some types of linear infrastructure—such as high-volume roads—can become complete barriers to wildlife movement.

Potential Policy Action

State agencies governing the management of wildlife, transportation, and energy should be required to develop BMPs for habitat connectivity. In areas where habitat corridors have been identified, these BMPs should be legally binding to ensure that habitat connectivity and wildlife movement are preserved. Some examples of state BMPs for addressing the impacts of linear infrastructure already exist, such as the Vermont Best Management Practices for Highways and Wildlife Connectivity.[6]

Another example, although administrative, is a policy action to protect wildlife corridors from linear infrastructure in Washington State via Executive Order 1031 - Protections and Connections for High Quality Habitats (2007). This was mandated by the Secretary of Transportation and is the state Department of Transportation's policy directive, which requires consideration of habitat values and wildlife movement needs in all transportation activities.[7]

One type of planning BMP that could be mandated by states is the requirement of a cumulative effects assessment (CEA) in addition to the environmental impact assessments traditionally required under NEPA. These CEAs would determine not only the impacts of the current project, but the cumulative impacts of the project in combination with past, current, and future human actions.[8]

References

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[3] U.S. Energy Information Administration, "How Electricity Is Delivered To Consumers," Energy Explained, accessed February 4, 2019, *Link*.

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[5] Energy Information Administration, "Natural Gas Pipelines," Energy Explained, accessed February 4, 2019, *Link*.

[6] F. Shilling et al., "Vermont's Best Management Practices for Highways and Wildlife Connectivity" (Prepared for the Vermont Agency of Transportation, 2012), *Link*.

[7] Washington State Department of Transportation, Exec. Order No. 1031, Protections and Connections for High Quality Habitats (2007). *Link*.

[8] R.K. Morgan, "Environmental Impact Assessment: The State of the Art," Impact Assessment and Project Appraisal 30, no. 1 (March 1, 2012): 5–14, *Link*.

Require development of best management practices (BMPs) for wildlife corridors potentially affected by forestry, mining, grazing, and other activities on state lands

Expected Outcomes

State-owned lands are managed by relevant state agencies for a variety of purposes, including forestry, mining, energy extraction, grazing, recreation, and other activities. Certain state-owned lands, such as state trust lands, typically depend on natural resource use or extraction to create revenue for trust beneficiaries, such as public-owned schools or prisons. Often, revenues are generated through a leasing process, where lands are listed at a public auction and available for bidding.

BMPs are often developed for different land use practices to allow for continued use, while mitigating potential environmental impacts. BMPs are usually site and context specific, and when applied appropriately, can help to fulfill environmental regulatory requirements. Some BMPs are legally binding, while others are voluntary. In creating BMPs specifically related to connectivity to promote wildlife movement, states have an opportunity to make BMPs legally binding on state-owned lands as a condition of the lease, while still gaining revenue from natural resource use.

By establishing model BMPs to protect wildlife corridors, state agencies have the opportunity to lead the way in ensuring that wildlife have the opportunity to move across the entire landscape, by developing BMPs on state-owned lands that could be used by other jurisdictions.

State Land BMPs and Connectivity

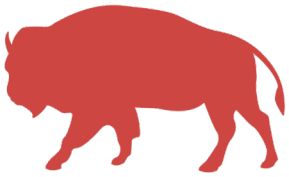
The use of state land for the activities described above often inhibits wildlife movement. Therefore, it is important to have mechanisms in place ensuring that habitat connectivity and wildlife movement are protected, especially in areas identified as wildlife corridors. Creating a set of wildlife corridor BMPs for forestry, mining, energy extraction, grazing, recreation, and other related activities on state lands will help ensure that animals can continue to move across the landscape to meet their daily, seasonal, annual, and lifetime needs, regardless of the permitted use. The promulgation and adherence to BMPs for state lands aimed at protecting connectivity will ensure that state lands work for both people and wildlife.

Potential Policy Action

State legislators could direct relevant state agencies to develop BMPs to protect habitat connectivity and wildlife movement for all activities permitted on state lands that are likely to otherwise result in environmental harm. In areas identified as wildlife corridors, these BMPs should be legally binding. In the same way that BMPs have been created to protect resources such as water and soil,[1] connectivity-specific BMPs would allow for the multiple use of state lands while also protecting wildlife movement.

There are many available resources upon which staff from relevant state agencies can draw to create BMPs for connectivity. For example, Montana, Arizona, Wyoming, and other states provide

guidelines for wildlife-friendly fences. Montana's "A Landowner's Guide to Wildlife Friendly Fences," is a resource that provides numerous examples of how landowners can install fencing that still allows for landscape connectivity.[2] These same techniques can be used on state-owned grazing land. Another source of BMP information is the Intermountain Oil and Gas BMP Project which has created a database, searchable by resource or issue, with suggested BMPs to help minimize the environmental impact of selected extraction activities.[3] BMPs relevant to connectivity may cover a variety of topics, ranging from bans on drilling during mating or migration season, to creating buffer zones around active nests or riparian areas.[4] Agency staff will have ample scientific information to create BMPs for wildlife movement and corridor habitat for all relevant state permitted land uses.



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[3] University of Colorado Boulder, "Oil & Gas Drilling Best Management Practices in Colorado, Wyoming, Montana, New Mexico, Utah," Intermountain Oil and Gas BMP Project, accessed February 4, 2019, *Link*.

[4] C. Davenport, "Trump Drilling Plan Threatens 9 Million Acres of Sage Grouse Habitat," The New York Times, December 6, 2018, sec. Climate, *Link*.

Require state agencies to provide technical assistance to increase Federal Farm Bill incentive program funds for wildlife corridors

NOTE: The "Farm Bill" is reauthorized every few years, so the name changes regularly, as do the programs, including those for conservation. The most recent version is entitled "Agricultural Improvement Act of 2018," and was passed in December, 2018.

Expected Outcomes

Several Farm Bill programs offer the potential to fund activities by private landowners to improve and safeguard wildlife habitat on rural landscapes. Interested landowners can receive significant payments—as much as 50-75% of total cost—to achieve wildlife-friendly fencing and riparian and upland habitat improvements, as well as income from habitat set asides.[1]

Farm Bill program implementation is designed to be responsive to local communities. State Technical Committees and Local Working Groups play a significant, if advisory, role in determining state and local priorities for available funding and also in creating special initiatives. While State Technical Committees include representatives of state wildlife and natural resource agencies by mandate, Local Working Group composition is variable. In any county or watershed, the allocation of Farm Bill funding for specific conservation practices depends on the input of both the Local Working Group and State Technical Committee, as each plays a role in setting and ranking priority natural resource concerns in competitive funding programs.[2] Because Local Working Groups and State Technical Committees set their own program objectives and rankings, states have the opportunity to direct Farm Bill funds to improve habitat in wildlife corridors in areas of local, regional, or statewide concern.

Farm Bill Programs and Connectivity

Under the most recent Farm Bill, formally named the Agricultural Improvement Act of 2018, at least 10% of funds under the Environmental Quality Improvement Program (EQIP) are designated for practices that benefit wildlife habitat, which is also a focus of the Conservation Stewardship Program (CSP).[3] In addition, grasslands that serve as wildlife habitat corridors are eligible for support under the Conservation Reserve Program (CRP).[4] Moreover, state agencies and partners can apply for funding under the Regional Conservation Partnership Program (RCCP) to improve biodiversity and protect habitat in wildlife corridors.[5]

Potential Policy Action

By directing state wildlife and natural resources agencies to participate in and promote connectivity and habitat considerations within Local Working Groups and State Technical Committees, significant cost-share funding can be available for private landowners to implement wildlife conservation practices. These practices include wildlife-friendly fencing, habitat and management improvements, and rolling and permanent easements.

Because substantive decision-making on ranking criteria for Farm Bill program awards occurs at the county or watershed level,[6] the provision of technical assistance by state natural resource agencies to Local Working Groups is vital to gain support for habitat conservation activities on private land. Because State Technical Committees recommend statewide conservation priorities and funding allocations,[7] substantive habitat and corridor conservation programs exist where sanctioned.

Examples of 2018 state and multi-state RCCP projects that promote connectivity are:

- **Hawaii:** *Hawaii Watershed Initiative.* Double the amount of protected highest priority watershed forests that serve as rare and endangered species habitat by 2030. State natural resource agencies: Hawaii Department of Land and Natural Resources and Division of Forestry and Wildlife.
- **Florida:** *The Ocala to Osceola Wildlife Corridor.* Increase protected lands and provide management incentives to connect the state's two large national forests, and provide critical habitat for wildlife such as the Florida Black Bear and at-risk species such as the red-cockaded woodpecker and gopher tortoise. State natural resource agencies: Florida Department of Protection, Florida Forest Service, and Florida Fish and Wildlife Conservation Commission.
- **New England:** *Connecting the Connecticut River Watershed.* Improve and connect aquatic and riparian habitat across the four-state Connecticut River Watershed. State natural resource agencies: Connecticut Department of Environmental Protection, Massachusetts Division of Fisheries and Wildlife, New Hampshire Fish and Game, and Vermont Fish and Wildlife.
- **Wyoming:** *Securing the Grass Highway for Wyoming Migrations.* Secure critical areas by means of conservation easements, fence modifications, and habitat enhancements within Greater Yellowstone migration corridors. State natural resource agencies: Wyoming Game and Fish (lead).

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[2] "USDA Conservation Program Delivery," Title 440 Conservation Programs Manual § 501 Subparts A-C (2010), *Link*.

[3] "H.R.2 - Agricultural Improvement Act of 2018," Pub. L. No. 115–334, § 2304 (c)(2)(B), 16 U.S.C. § 3839aa *et seq.* (2018), *Link*.

[4] "H.R.2 - Agricultural Improvement Act of 2018," Pub. L. No. 115–334, § 2201(c)(2)(B)(iii)(III), 16 U.S.C. § 3831 *et seq.* (2018), *Link*.

[5] Regional Conservation Partnership Program, "Regional Conservation Partnership Program: Fiscal Year 2018 Projects by State" (USDA-NRCS, 2018), *Link*; "H.R.2 - Agricultural Improvement Act of 2018," Pub. L. No. 115–334, § 2701 et seq., 16 U.S.C. § 3871 *et seq.* (2018), *Link*.

[6] USDA Conservation Program Delivery, *Link*.

[7] USDA Conservation Program Delivery, *Link*.

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Establish and promote state-based programs that encourage conservation on private land

Expected Outcomes

More than two-thirds of the land in the U.S. is privately owned.[1] As a nation, we cannot adequately protect biodiversity without enlisting the help of private landowners as partners. Thus, it is critical that private landowners have access to public funds and other financial incentives to engage in conservation efforts on their properties that benefit the greater public good. While several national programs provide such incentives at the federal level,[2] state legislators have a unique opportunity to establish programs that create new or complementary incentives. Moreover, while federal programs are typically limited in scope, states have greater flexibility to create diverse incentives aimed not only at species-specific conservation measures but more broadly at state-specific goals, such as conserving habitat identified as important for wildlife movement and habitat connectivity.

Private Land Conservation and Connectivity

Since wildlife have no sense of land ownership they often spend significant time living on, or moving across, private lands. Voluntary private land conservation and restoration is an effective way to improve landscape connectivity by helping to mitigate the habitat fragmentation that often results from human development. There are many different ways that private lands can be managed to promote habitat connectivity, including wildlife-friendly fencing practices, limiting new development through conservation easements, or restoring degraded habitat, to name a few. However, undertaking such measures on one's own may be costly, time-consuming, or simply not of interest to private landowners; thus, making funding available and creating other incentives to promote habitat connectivity is an important action that state legislators can take.

Potential Policy Action

There are many potential policy approaches to encouraging conservation action on private lands. The most well-known approach is a conservation easement, whereby landowners receive tax breaks by entering into a legally-binding agreement with a land trust or government agency to manage their land for specific conservation goals in perpetuity. Easements are already used widely throughout the U.S. and there are many well-established land trusts establishing and monitoring these easements. States have a unique opportunity to build upon this existing framework by establishing new or complementary state-based incentive programs for connectivity conservation.

When considering what types of measures to enact that incentivize private landowners to conserve wildlife movement, legislators may choose from a variety of existing state incentive programs. In addition to conservation easements, a number of states have adopted programs that create incentives for landowners to enter into wildlife-related plans. For example, Oregon's *Wildlife Habitat Conservation and Management Program* provides tax breaks for landowners in eligible geographic areas who create, submit, and follow a wildlife management plan.[3] California's *Private Lands Management Program*, in contrast, provides landowners who enter into a recreation plan with state wildlife managers an opportunity to earn additional income from wildlife-related recreation on their lands.[4]

Regardless of the specific mechanism employed, states have the authority to explicitly target habitat connectivity as an intended goal of the newly-adopted incentive program. Although doing so is easier if a state has already identified spatially-explicit wildlife corridors, the fact that corridors have

not yet been identified by a state is not fatal to the creation of incentive-based programs. Pending identification of state corridors, for example, states could provide additional or complementary incentives for connectivity projects identified by conservation organizations, federal agencies, tribes, or others.

As shown below, another option would be for states to expand eligibility criteria for existing programs, such as those in Oregon and California, to include priority wildlife corridors. Similarly, states could make increasing habitat connectivity a target of wildlife-related management, recreation and other plans.

Example: Legislators could revise Oregon's *Wildlife Habitat and Conservation Management Program* to add priority wildlife corridors to existing eligibility criteria, as follows:

308A.415 Designation by State Fish and Wildlife Commission of land eligible for wildlife habitat special assessment

(1) At the request of the governing body of a county, the State Fish and Wildlife Commission may designate the following land in unincorporated areas within the county as eligible for wildlife habitat special assessment:

(a) Any land that is zoned for exclusive farm use, mixed farm and forest use or forest use under a land use planning goal protecting agricultural land or forestland; or

(b) Land that is clearly identifiable as containing significant wildlife habitat[5]

(c) Land within a priority wildlife corridor as identified by the state *(possible revision to include corridors)*

Example: California Assembly Bill No. 498 *Wildlife Conservation: wildlife corridors* encourages connectivity conservation on private lands by amending section 1930.5 of the Fish and Game Code to read:

(c) (1) It is the policy of the state to promote the voluntary protection of wildlife corridors and habitat strongholds in order to enhance the resiliency of wildlife and their habitats to climate change, protect biodiversity, and allow for the migration and movement of species by providing connectivity between habitat lands. In order to further these goals, it is the policy of the state to encourage, wherever feasible and practicable, voluntary steps to protect the functioning of wildlife corridors through various means, as applicable and to the extent feasible and practicable, those means may include, but are not limited to:

(A) Acquisition or protection of wildlife corridors as open space through conservation easements.

(B) Installing of wildlife-friendly or directional fencing.

(C) Siting of mitigation and conservation banks in areas that provide habitat connectivity for affected fish and wildlife resources.

(D) Provision of roadway undercrossings, overpasses, oversized culverts, or bridges to allow for fish passage and the movement of wildlife between habitat areas.[6]

References

[1] US Fish and Wildlife Service, "For Private Landowners: The Partners for Fish and Wildlife Program," fws.gov, 2017, *Link*.

[2] See, e.g., Partners for Fish and Wildlife Act of 2006 (16 USC § 3771), *Link*. Managed by the U.S. Fish and Wildlife Service, this program provides technical and financial assistance to private landowners willing to conserve the habitat of Federal Trust Species including migratory birds, threatened and endangered species, inter-jurisdictional fish, certain marine mammals, and species of intergenerational concern.

[3] Oregon Department of Fish and Wildlife, "Wildlife Habitat Conservation and Management Program: Rewarding Private Landowners for Helping Wildlife," *Link*.

[4] State of California, "Conservation Bank and Mitigation Bank Applications and Fees," CA Fish & Game Code § 1797 - 1799.1 (2013), *Link*.

[5] "Designation by State Fish and Wildlife Commission of Land Eligible for Wildlife Habitat Special Assessment," Oregon Revised Statute § 308A.415 (2017), *Link*.

[6] Levine, "Wildlife Conservation: Wildlife Corridors," CA Assembly Bill 498 (2015), *Link*.

Establish and promote state-based programs such as conservation banking

Expected Outcomes

A conservation bank is a parcel of land that is permanently protected and managed for its natural resource value, typically as habitat for listed or at-risk species under the Endangered Species Act (ESA). Conservation banks are intended to serve as offsite mitigation for development projects that have unavoidable adverse impacts to ESA-listed species. Developers can purchase species-specific credits to offset their "take," which would otherwise be prohibited under the ESA.[1]

With one exception, the U.S. Fish and Wildlife Service (USFWS) is the enforcing body for conservation banking in the U.S. Conservation banks are formed through an agreement between the landowner and USFWS, in which the landowner agrees to grant a conservation easement that prohibits future development and to adhere to other requirements designed to ensure the easement's conservation value in perpetuity.[2] USFWS in turn determines the number of credits that a landowner may sell, and in what region or "service area" the credits apply.[3] Landowners otherwise retain full control of their private property.

Conservation banking has historically been perceived as a win-win for both landowners and developers. The one-time purchase of credit is a simple process for developers, and it provides a financial incentive for private landowners to protect important habitat.[4] By adopting their own conservation banking policies and assuming the role of the governing agency, states have an opportunity to use market-based financial incentives to promote the creation of conservation banks that maintain or improve habitat connectivity, prioritize state species of concern not covered by the federal ESA, and stimulate other related environmental outcomes, as desired.

Conservation Banking and Connectivity

Both the USFWS and the State of California have recognized the potential for conservation banking to maintain or improve habitat connectivity.

In a 2003 departmental memorandum, the USFWS explained that "conservation banking reduces the piecemeal approach to conservation efforts that can result from individual projects by establishing larger reserves and enhancing habitat connectivity."[5] Building upon this foundation, the prior Administration issued a variety of policies that sought to streamline and advance the use of conservation banking to enhance landscape-level habitat connectivity.[6] However, these federal directives were subsequently revoked by the current Administration in 2017, effectively creating a return to the pre-2009 policy.[7]

The State of California, which formed the first statewide conservation banking program in 1995,[8] is, as of today, also the only state with its own state-specific conservation banking policy. In 2015, California amended this policy to explicitly recognize the role of conservation banks in protecting habitat connectivity:

1797.5 For the purposes of this chapter, the following terms shall have the following meanings:

(d) "Conservation bank" means a publicly or privately owned and operated site that is to be conserved and managed in accordance with a written agreement with the department that includes provisions for the issuance of credits, on which important habitat, including habitat for threatened, endangered, or other special status species, exists, has been, or will be created to do any of the following:

*(5) To the extent feasible and practicable, **protect habitat connectivity** for fish and wildlife resources for purposes of this section.*[9] (emphasis added)

Potential Policy Action

A potential opportunity exists for states to (1) adopt their own statewide conservation banking policies; and (2) assume the role of the governing agency for conservation banks within the state. In so doing, states have the flexibility to adopt rules including desired requirements that exceed (but do not conflict with) existing federal requirements. This has two advantages. First, it allows states to include requirements related to state-specific (non-ESA) species of concern, which the USFWS does not have authority to do. Second, it permits states to fill any perceived voids created by the return at the federal level to pre-2009 policy direction.

For guidance on formulating their own conservation banking policies for connectivity, states could look to the example provided by California and select those elements deemed suitable. The California Department of Fish and Wildlife also signed a Memorandum of Understanding with USFWS and other federal agencies to standardize the establishment of conservation banks, which could serve as a template for other states.[10] Another option would be to look to existing state legislation regarding mitigation banking, which is conceptually similar to conservation banking, albeit for aquatic resources,[11] for guidance on the role of banking in promoting habitat connectivity.

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[2] U.S. Fish and Wildlife Service, *Link*.

[3] U.S. Department of the Interior, "Special Topics: Conservation Banking (Chapter 14 of Economic Report FY 2012)" (US DOI, 2013), *Link*.

[4] D. Bunn, M. Lubell, and C. Johnson, "Reforms Could Boost Conservation Banking by Landowners," California Agriculture 67, no. 2 (April 1, 2013): 86–95, *Link*.

[5] U.S. Fish and Wildlife Service, "Guidance for the Establishment, Use, and Operation of Conservation Banks" (Washington, D.C.: USFWS, 2003), *Link*.

[6] See, e.g., U.S. Fish and Wildlife Service, "Endangered and Threatened Wildlife and Plants; Endangered Species Act Compensatory Mitigation Policy," 81 FR § 95316 (2016), *Link*; U.S. Fish and Wildlife Service, "Endangered Species Act Compensatory Mitigation Policy Questions and Answers" (USFWS, 2016), *Link*.

[7] M. Feldman, T. Jensen, and S. Snodgrass, "Federal Mitigation Policies Revoked: What Will It Mean to Developers?," *Holland & Hart* (blog), April 6, 2017, *Link*.

[8] D.P. Wheeler and J.M. Strock, "Official Policy on Conservation Banks" (The Resources Agency and The California Environmental Protection Agency, 1995), *Link*.

[9] Levine, "Wildlife Conservation: Wildlife Corridors," Pub. L. No. CA Assembly Bill 498 (2015), *Link*. This bill amended Section 1797.5 of the state Fish and Game Code to add (d)(5).

[10] California Natural Resources Agency et al., "Memorandum of Understanding Concerning Mitigation and Conservation Banking and In-Lieu Fee Programs in California," September 22, 2011, *Link*.

[11] *See* Environmental Protection Agency. Mitigation Banking Factsheet (explaining the origin of mitigation banking under Section 404 of the Clean Water Act), *Link*.

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Develop interagency and interdisciplinary partnerships to advance effective and unified wildlife corridor policies

Expected Outcomes

Because wildlife corridors often cross jurisdictional boundaries, their protection requires the cooperation of multiple agencies. If state, federal, tribal, and local agencies work together in a coordinated fashion, they may better help wildlife species to make use of habitat across a patchwork of land ownership and management boundaries. For this reason, authorizing relevant state agencies to enter into cooperative agreements to develop unified policies that protect wildlife corridors promotes habitat connectivity.

Cooperative, Multijurisdictional Instruments and Connectivity

Across the U.S., state agencies are charged with the conservation and management of wildlife on behalf of their citizens. Although Memorandums of Understanding (MOUs) and cooperative working agreements are relatively common among state, federal, tribal, and local agencies responsible for public safety and human well-being, they are not as usual among agencies whose jurisdictions affect wildlife connectivity. These include transportation, natural resources, and regulatory bodies. Within states, departments of transportation and wildlife are increasingly deliberating on means to protect wildlife corridors. Similarly, multijurisdictional, state-federal partnerships are also being explored to address wildlife movement. Such efforts lead to efficiencies, such as reduced time for permitting, fewer regulatory conflicts, and innovative mitigation and conservation solutions.

Potential Policy Action

Several states have pioneered multijurisdictional partnerships for connectivity, finding advantages in the ability to streamline required consultation processes and more readily meet agency mandates. While these partnerships may arise from administrations, state legislatures can also encourage various types of cooperation by authorizing state agencies to partner on wildlife corridor identification, planning, and protection, along with research and other related activities.

For example, in 2016, New Hampshire's SB 376-FN directed the New Hampshire Departments of Fish and Game, Transportation, and Environmental Services to "identify existing and needed wildlife corridors, including riparian corridors and potential crossings of transportation arteries," and to "audit existing statutes, rules, and regulations that affect wildlife corridors and make recommendations concerning necessary changes."[1] The resulting report describes the New Hampshire Stream Crossing Initiative, which arose from an earlier legislature-directed study, as an example of existing cooperation among the forenamed agencies, and also the Department of Safety. Further, concurrent with the activities mandated by SB 376-FN, the state Departments of Transportation and Fish and Game formed a new Transportation & Wildlife Working Group.

Additional frameworks for multijurisdictional connectivity working groups and agreements follow below:

State-level Examples

From 2007-2010, the Washington Department of Fish and Wildlife and Department of Transportation co-led a Wildlife Connectivity Working Group to produce tools and analyses that identify and prioritize opportunities to provide habitat connectivity. The effort culminated in a publication, the *Washington Connected Landscapes Project: Statewide Analysis*,[2] which the Department of Transportation uses, along with additional research, to establish priorities for investing in more wildlife-friendly highways.

In 2008, the Massachusetts Department of Transportation (MassDOT) and the Massachusetts Division of Fisheries and Wildlife/Natural Heritage and Endangered Species Program (MassWildlife) entered into an interagency agreement to streamline Massachusetts Endangered Species Act review, with MassDOT providing the means for MassWildlife to hire a dedicated biologist for transportation review. The agreement has enabled a) detailed early project coordination, evaluation, and modification of preliminary project designs to reduce impacts, b) integration of fluvial geomorphology and bioengineering principles into project development, c) investigation of creative cost-effective mitigation and enhancement opportunities, and d) enhanced interagency coordination.[3]

Multistate Example

In 2009, New Mexico and Colorado signed an MOU to work together to "identify key habitat connectivity, travel and migration corridors used by elk, deer, pronghorn antelope and big horn sheep, and as identified by the two states, other key species of wildlife," and further to "develop and prioritize strategies that will positively contribute to the protection of wildlife corridors…."[4] The MOU commits to consultation with tribal authorities when corridors cross tribal lands.

State-Federal Examples

In 2008, Colorado Departments of Transportation and Natural Resources signed an MOU with the U.S. Forest Service (USFS), U.S. Fish and Wildlife Service (USFWS), Bureau of Land Management (BLM), and Federal Highway Administration (FHWA) that identifies "linkage interference zones" along the I-70 corridor. Further, the MOU "ensures agencies' participation in development of subsequent Tier II site-specific analyses and implementation of long-term impact mitigation measures within the context of a Corridor-long, landscape-based ecosystem approach to Corridor impacts on wildlife needs and conservation measures."[5]

From 2009-2012, the Oregon Wildlife Movement Strategy Working Group convened the Oregon Departments of Fish and Wildlife and Transportation, along with the USFS, USFWS, BLM, and FHWA to identify wildlife linkage areas near roads through collaborative, science-based workshops: "Participants integrated datasets on wildlife movement, roadkill, and collision hotspots and identified needs for design guidance, monitoring, and maintenance going forward."[6] Findings have been integrated into the ongoing Oregon Conservation Strategy and several roadway improvement efforts to enhance connectivity.

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Authorize public outreach and education campaigns to bolster state wildlife habitat connectivity policy

Expected Outcomes

Legislators can strengthen state policies by drawing from the diverse and valuable knowledge of their state's citizenry. Engaging citizens through studies, task forces, working groups, and public engagement campaigns is necessary to implement sound policy and effectively manage resources. Public outreach and engagement promotes buy-in and increases accuracy of management actions. Often the public will also benefit from education and outreach campaigns that strengthen their knowledge and understanding of a topic.

Engaging the Public and Connectivity

Wildlife movement and corridor habitat conservation across a state will only be realized if a state's citizens are informed and engaged in the process. The concept of habitat connectivity may be unfamiliar to many of the general public; therefore, engagement may be necessary to increase public knowledge of what connectivity is and why it is important. Such knowledge can subsequently promote buy-in on management actions to protect connectivity. Beyond education, the public should also be engaged to help inform policy regarding both areas important for connectivity and how best to protect them. Policies that promote and protect wildlife movement will be more effective if studies, task forces, working groups, and public engagement campaigns are used to engage the public in the full process of state policymaking on connectivity.

Potential Policy Action

Lasting, effective policy that promotes wildlife movement and corridor habitat will often need to address large geographic areas and multiple jurisdictions. Therefore, it is necessary to authorize collaborative outreach and communication efforts so that stakeholders are engaged in creating strong enduring conservation actions for wildlife corridor protection.

Policymaking to engage citizens to protect wildlife corridors will most likely vary based on each state's needs. One example comes from the Interstate Highway 90 transportation project on Snoqualmie Pass in Washington State. This project involved collaboration between the Washington State Department of Transportation, USFS, USFWS, local non-profit organizations, state natural resources agencies, and concerned citizens to ensure increased connectivity for wildlife during and after a road expansion and improvement project. Partners formed working groups to conduct various environmental impact studies of the area, and public awareness was increased through a campaign titled "Bridging Futures" which engaged local students. As students learned about the importance of safe wildlife passage across highways, they shared this knowledge with their parents, increasing understanding of this important issue across generations. As a whole, the creation of partnerships as well as efforts to increase public engagement and support for the wildlife crossings were crucial to the success of the Snoqualmie Pass project, which provides an excellent model for similar, future efforts.

Partnerships

To learn more about the groundbreaking connectivity project on Washington state's I-90 transportation corridor, ***please view the short film here***.

Additional examples of state legislation that could address this issue:

- Authorize state agencies to institute public-private partnerships to garner funds, raise awareness, and carry out science and management actions that bolster connectivity.
- Authorize and fund state programs to engage citizens in citizen-science projects in locations that need additional data for decision-making around connectivity policymaking.
- Authorize and fund state agencies to request information from citizens from across the state to help inform where wildlife corridors exist, where they are threatened, and where opportunities for proactive, collaborative management exist.

The above list is not exhaustive, and in some cases, could potentially be achieved through administrative rather than legislative action. Nonetheless, these examples underscore the importance of citizen involvement via studies, task forces, working groups, and public outreach campaigns to promote and protect wildlife habitat connectivity.

Facilitate robust, long-term funding for wildlife corridors

Expected Outcomes

Traditional funding for state wildlife agencies comes from the Federal Aid in Wildlife Restoration Act (also referred to as the Pittman Robertson Act) of 1937, which levies an excise tax of 11% on firearms, firearm ammunition, archery equipment, and arrow components. Wildlife Restoration Act funds are allocated to states based on their geographic size and number of licensed hunters.[1] The funds require a 3:1 match. Together with the similar Federal Aid in Sport Fish Restoration Act (commonly called the Dingell Johnson Act) of 1950, Wildlife Restoration Act allocations, along with hunting and fishing license fees, make up roughly 60% of most state fish and wildlife agency budgets.[2] By enhancing the flexibility of state agencies to employ creative solutions to secure required funds to match federal and other funds, legislators will have taken a simple and effective step to bolstering the ability of states to maximize available funding sources.

State Funding and Connectivity

Wildlife Restoration Act funds can support research and habitat acquisition programs that contribute to the protection of wildlife corridors. Yet, many states seek to develop additional sources of revenue in recognition of decreasing interest in hunting and fishing.[3] In order to protect wildlife corridors, states need to ensure connectivity provisions are included in existing land and habitat conservation programs, in addition to developing new funding sources. Additional funding sources for wildlife and habitat conservation vary greatly by state—as many as 51 sources have been identified[4] - and include direct appropriations from general funds, sales and severance taxes, lottery allocations, voluntary contributions via income-tax and vehicle registration check-offs, and special license plates.[5] Success in each type of measure varies by state and may fluctuate over time, depending on changing interests and priorities.[6]

Potential Policy Action

States can enable funding for wildlife corridors through statutes that dedicate specific revenue, general fund appropriations, and, with the help of voters, constitutional amendments. Both transportation-specific and habitat-based measures exist. Many states leverage their funding through federal and philanthropic initiatives, such as State Wildlife Grants or programs of the National Fish and Wildlife Foundation. Further, interagency cooperation and public-private partnerships provide additional avenues to magnify the impact of state funds. As demonstrated by the examples below, legislatures have provided funds for conservation even in times of scarcity, and such measures often enjoy wide citizen support. Whether through dedication of existing or new taxes, various fees, or voluntary, opt-in measures, conservation funding measures have succeeded across the U.S. Common elements of programs that gain support include: dedicated revenue, broad coalitions of support, flexibility, the ability to leverage funds and goals, and strong public encouragement.[7]

<u>Transportation corridor funding example</u>

Special Purpose Excise Tax

The State of Wyoming allows counties to collect Specific Purpose Excise Taxes (SPET), which more than one-half of counties use for voter-approved infrastructure improvements.[8] In 2017, the citizens of Teton County, Wyoming allocated $1.5 million of $10-12 million collected per year under the county SPET toward a pathway, underpass, and wildlife fencing along U.S. Highway 89.[9] Efforts are underway to include wildlife crossings on an upcoming SPET ballot.

Habitat protection funding examples

General Funds

The Washington legislature created the Washington Wildlife and Recreation Program (WWRP) in 1989, "to acquire as soon as possible the most significant lands for wildlife conservation and outdoor recreation."[10] Funded through a biennial allocation in the state's capital budget, the WWRP has averaged $56.4 million each biennium since its inception, 45% of which supports critical habitat acquisition through matching grants. Managed by a Board that includes the directors of the Departments of Fish and Wildlife, Natural Resources, and State Parks and Recreation Commission, and guided by a robust system of prioritization and public involvement through a 280-member non-profit coalition, the program enjoys broad support.[11]

Wildlife Stamp

In 2006, Colorado authorized a Wildlife Habitat Stamp, which anyone 18 to 64 must purchase prior to buying a hunting or fishing license. The $10/year stamp generated $9.3 million in 2016, and has been used to protect a total of 253,000 acres since 2007, primarily via easements.[12] Under C.R.S. 33-4-102.7, "priority is given to conserve and protect winter range and vital habitats, including migration corridors, for deer, elk, and other big game wildlife species." Public access for hunting, fishing, and wildlife-related recreation; protection of species of concern; and wildlife diversity are also prioritized.

Lottery

Matching funds for Wildlife Habitat Stamp projects often come from the Greater Outdoor Colorado Trust Fund, established in 1992 by amendment to the Colorado Constitution through a citizen ballot initiative.[13] Under the Fund, which gained nearly $64 million in FY2016,[14] the net proceeds of all state lottery funds are "guaranteed and permanently dedicated to the preservation, protection, enhancement and management of the state's wildlife, park, river, trail and open space heritage."[15]

Oregon's Parks and Natural Resources Fund receives 15% of the proceeds of the Oregon state lottery, by amendment to the Oregon Constitution. Citizens supported the initial 1998 citizen ballot initiative, and its re-authorization in 2010.[16] About $80 million is generated annually to support wildlife habitat and state parks.

Intended as a ballot initiative, the Maine Outdoor Heritage Fund was established by the legislature in 1995 in response to citizen support.[17] About $700,000 is raised annually "for the sole purpose of maintaining, improving and expanding state and local natural resource conservation programs and associated compatible public uses."[18]

Sales Taxes

As a result of legislation in 1976 and 1996, respectively, Missouri and Arkansas each dedicate a percent of their general sales taxes to support activities of their fish and wildlife agencies, which benefit from significant revenue. Similarly, the Texas and Virginia legislatures have allocated a portion of taxes on sporting goods to their fish and wildlife agencies since the 1990s. In the case of Virginia, revenues from "wildlife-watchers' goods" are included with those from hunting and fishing equipment.[19] In 2008, Minnesota voters approved the Clean Water, Land and Legacy Amendment to the state constitution. The amendment increased the general sales tax by 3/8th of 1% to support outdoor recreation and conservation, including "acquisitions that provide expansions, connections, or otherwise close gaps providing less fragmented ecosystems and habitat."[20]

Georgia voters approved the Georgia Outdoor Stewardship Amendment in 2018. The Amendment allows the legislature to allocate up to 80% of existing taxes collected at sporting goods stores for land conservation.[21]

Real Estate Transfer Taxes and Deed Recording Fees

Since 1996, the North Carolina legislature has dedicated 75% of its real estate transfer tax to a Parks and Recreation Fund, with the remaining 25% dedicated to the state's Natural Heritage Trust Fund.[22] Established by the legislature in 2008, a $9 fee on deed recordings provides revenue for the West Virginia Heritage Conservation Fund to acquire interest and enable stewardship of "unique or important wildlife habitat as specified in the state Wildlife Conservation Action Plan," among other types of land.[23] In 2014, Florida voters approved a Constitutional Amendment to provide one-third of deed recording revenue to land conservation.[24]

Severance Taxes

Initially established by the legislature in 1976, the Michigan Natural Resources Trust Fund has received the revenues of all oil, gas, and other mineral lease and royalty payments since voters approved a constitutional amendment in 1985.[25] The Trust funds land purchases for resource conservation and public recreation, and the development of recreational facilities. Alabama's Forever Wild Land Trust gains up to $15 million/year in interest earned from offshore natural gas royalties. Established by a constitutional amendment through a ballot initiative in 1992, and re-authorized in 2012 for 20 years more, the Trust has secured 268,000 acres of land in Alabama for nature preserves and recreation areas.[26]

Business Tax

In 2014, New Jersey voters allocated 6% of the state's Corporation Business Tax to environmental, conservation, and preservation programs, in perpetuity. Under the Preserve New Jersey Act of 2016 in response to the citizen-based amendment, over 70% of over $100 million in revenues are allocated to conservation of land, including acquisition for state parks and wildlife refuges.[27]

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