

An Analysis of State and Local Policies to Maintain Ecological Connectivity

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Executive Summary

Landscape connectivity is critical for maintaining wildlife movements, such as the American West's iconic big game migrations. Yet, connectivity is threatened as landscapes become increasingly fragmented by human development including residential growth, traditional and renewable energy infrastructure, outdated agricultural fencing, and other activities that cut-off corridors and restrict wildlife movements. U.S. states and local governments have begun to adopt policies with the goal of protecting wildlife corridors and maintaining or enhancing landscape connectivity. However, little analysis has been done to understand the different approaches these policies have taken, the specific sectors they target, perceptions of the successes and challenges in implementing the policies, and their perceived impact on corridor integrity.



To fill this research gap, we analyzed 37 state and 10 county or municipal policies and interviewed 20 key individuals to better understand the scope, origin, structure, and impact of those connectivity policies. We found that most policies targeted the natural resources (n=37, e.g., wildlife management, forestry) and transportation sectors (n=37) and to a lesser degree the agricultural (n=12) and energy (n=8) sectors. The origin of policies varied from formal state-level legislation (n=16), county or municipal ordinances (n=10), administrative actions (n=9), executive orders (n=7), to resolutions or memorandums of understandings (MOUs, n=5). We also identified 10 distinct types of implementation mechanisms with the most common being the requirement to develop a plan or strategy (n=26) and the construction of roadway crossings for wildlife (n=17). Several policies, primarily in California, also included compensatory mitigation (n=7) as a novel way to address impacts to landscape connectivity.

Interviews with key individuals highlighted insights into policy creation and implementation. The need for funding was a reoccurring theme in many interviews as most of the policies did not specifically allocate new or dedicated funding for policy implementation, resulting in some agencies having to reallocate internal capacity and budgets to implement the policies. Notably, only five policies allocated funding for policy implementation. Several interviewees mentioned, however, that new and dedicated funding has or will likely result as an outcome of a policy. For example, several policies required the development of connectivity plans that prioritize locations for wildlife highways crossings, making these projects more competitive for federal transportation grants and other funding sources.

Another main theme that arose from the research was the important role municipalities and counties can play in the development of connectivity policies. Municipalities and counties are often a critical component to integrating policies – either vertically with other policies at higher or lower levels of government – or horizontally across sectors and agencies. The importance of horizontal and vertical integration is key to understanding that while policies are often developed and implemented individually, the cumulative impact is much greater. We analyzed policies separately to better understand the nuances of specific policies, but do not want to diminish the importance of understanding the cumulative impact of integrated policies.

Further, connectivity policies at the state and local level can play an important role in addressing the impacts of climate change. While only a small subset of the policies we reviewed specifically mentioned climate change, there was broad

understanding among the key individuals interviewed that connectivity policies are a critical aspect of climate change adaptation and mitigation. However, promoting connectivity policies as a strategy to adapt to climate change may polarize support when the actions these policies promote otherwise have broad bipartisan support.

Policy durability, or how well policies adapt through time and last through changing political administrations, emerged as an important consideration in ensuring long-term conservation of landscape connectivity. Policies, no matter how well-thought-out, will not have a desirable impact on connectivity if they are not durable. We noted several examples of how policymakers have found creative ways to ensure the durability of policies.

Overall, this project highlights the variety of policy structures, implementation mechanisms, and other considerations for policymakers as they determine if and how they want to conserve connectivity at the state, county, or municipal level.

Wyoming Migration Initiative



Introduction

Landscape connectivity is the ability of organisms and their genes to move across landscapes as part of their annual lifecycle or over longer periods in response to environmental change. Landscape connectivity is important because many species rely on different habitat types throughout their lifecycle, and without landscape connectivity, species are unable to access one or more necessary habitat types (Dennis, 2013). Yet, landscape connectivity is globally threatened by expanding human impacts on the environment (Diniz et. al., 2020; Hanski, 2015). Human development of the environment is among the largest causes of habitat loss and fragmentation, both of which are critical drivers of landscape connectivity loss (Zeller et. al., 2020; Perkl, 2018). Habitat loss occurs when habitat is removed, such as when a wetland is filled in, while habitat fragmentation occurs when connectivity is interrupted, such as by a road that renders otherwise intact habitat from one side of the road inaccessible from the other (Liu et. al., 2016, p. 2; Püttker et. al., 2020). Across a number of species, habitat loss and fragmentation are among the biggest drivers of species decline and biodiversity loss (Zeller et. al., 2020, p. 1; Hanski, 2015; Rybicki et. al., 2019). As connected landscapes decline, so do the number and type of species that rely on connected habitats.



Globally, efforts are underway to protect landscape connectivity for the sake of species conservation (National Climate Task Force, 2021; United Nations, n.d.; Convention on Biological Diversity, 2021). Some efforts focus on voluntary measures to protect connectivity, or incentivize market means of conserving wildlife (Secretariat of the Convention on Biological Diversity, 2020; Stokstad, 2020; Conference of the Parties to the Convention on Biological Diversity 2022). Others focus on strict regulatory schemes, such as the Endangered Species Act (ESA) to conserve wildlife and habitat. Overall, however, landscape connectivity and species are still in decline.

In the United States (U.S.), increasing awareness of the importance of connectivity have led governments at all levels to develop policies to maintain connected landscapes (Stoellinger, et al, 2020). In this report, we define policies as any public tool, such as a statutory mandate, executive order, non-binding resolution, administrative regulation, publicly funded incentive, or other effort created or passed by a public agency or branch of government (Breuer et. al., 2022).

At the federal level, there are a number of wildlife or connectivity policies, such as Secretarial Order 3362 (discussed below), that have received attention from scholars and policy analysts. However, state and local governments have also created a substantial number of connectivity conservation policies in recent years, the scope and focus of which are less understood. While this analysis includes a summary of federal connectivity policies, its focus is an analysis of state and local connectivity policies in the U.S. to better understand the various approaches that non-federal entities are using to maintain landscape connectivity. Our intent with this analysis is to provide insights for both practitioners and policymakers and promote learning across jurisdictions and administrative boundaries.

FEDERAL POLICIES

Department of the Interior

An emphasized federal focus on protection of wildlife connectivity began in earnest in 2018 during the Trump Administration when then Secretary of the Interior Ryan Zinke issued Secretarial Order 3362 (U.S. Department of the Interior, n.d.). The Order requires collaboration between agencies within the Department of the Interior and western states to help conserve big-game winter range and migration corridors (U.S. Department of the Interior, n.d.). Required actions include removing encroaching shrubs from sagebrush ecosystems, rehabilitating areas damaged by fire, and treating exotic invasive vegetation. The Order also designates a federal coordinator to collect information about key areas and policies, as well as a federal liaison in each region to support states in their efforts to conserve big-game winter-range and migration routes.

In April 2022, Interior Secretary Deborah Haaland announced the distribution of almost \$10 million of federal and private funds to seven states and three Tribes for projects to enhance big-game migration (U.S. Department of the Interior, 2022; National Fish and Wildlife Foundation, n.d.). Those funds came through the grant program started by Zinke. In addition, the U.S. Fish & Wildlife Service has initiated collaboration to improve migration habitat with the Native American Fish & Wildlife Society (Native American Fish and Wildlife Society, n.d.).

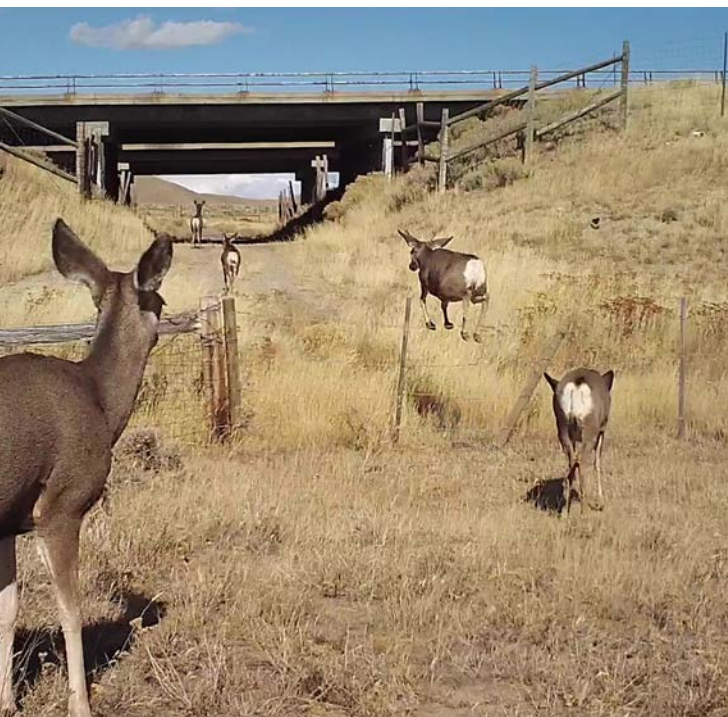
In November 2022, the Bureau of Land Management (BLM) issued an Instruction Memorandum requiring collection of new information and action to promote connectivity across the lands it manages (Bureau of Land Management, 2022). The memorandum provides that BLM will inventory public lands to assess habitat connectivity to determine how to best manage for connectivity. Agency staff shall consider a range of actions to enhance connectivity including: (1) removal of hazardous fencing, installation of wildlife-friendly fencing, improvements to fish passages and building wildlife crossings; (2) strategic development and location of water sources and other features to encourage wildlife utilization of suitable habitat across landscapes; and (3) consideration of development outside of critical habitat areas.

Department of Agriculture

Like the Department of the Interior, the Department of Agriculture (USDA), through the U.S. Forest Service (USFS) manages public land critical to wildlife migration (U.S. Forest Service, 2013). The first federally designated big game migration corridor was created through an amendment by the USFS to the Bridger-Teton National Forest Plan in 2008 (Berger & Cain, 2014; U.S. Forest Service, 2008). In designating the “Path of the Pronghorn”, the USFS required that “[a]ll projects, activities, and infrastructure authorized in the designated Pronghorn Migration Corridor will be designed, timed and/or located to allow continued successful migration of the pronghorn that summer in Jackson Hole and winter in the Green River basin” (U.S. Forest Service, 2008).

In addition to its management responsibility, the USDA through the Natural Resources Conservation Service (NRCS) offers significant funding to support





conservation on private lands critical to wildlife migration (Middleton et al, 2022). The Environmental Quality Incentives Program, for example, provides funding to improve soil, water, plant, animal, air, and related resources on privately-owned farms, ranches and forest land. Similarly, USDA's Farm Service Agency administers the Conservation Reserve Program that pays a yearly rental in exchange for farmers removing environmentally sensitive land from agricultural production and planting species that will improve environmental quality.

Recognizing the importance of private lands to connectivity, the USDA started the Working Lands for Wildlife Initiative (Working Lands for Wildlife, 2022). While originally focused on specific species conservation, such as the Greater sage grouse, the USDA has recently developed multi-state, biome-scale frameworks for wildlife conservation. These frameworks will guide conservation investment to help ensure that investments are impactful across larger landscapes (Middleton, et al, 2022).

Select Pending Federal Policies

Over the course of several years, federal legislators have made efforts to pass the Recovering America's Wildlife Act (Recovering America's Wildlife Act of 2023; Recovering America's Wildlife Act of 2022; Recovering America's Wildlife Act of 2021). The goal of the bipartisan act is to invest in habitat restoration efforts to conserve wildlife and biodiversity (Joint Economic Committee Democrats, 2023). The 2023 bill proposes an initial contribution of \$1.3 billion to state fish and wildlife agencies and \$97.5 million to Tribal fish and wildlife agencies, who are commonly tasked with wildlife conservation efforts. As of writing this, the 2023 version of the bill has been introduced but has not progressed in the Senate. Another bill, that could take the place of the Recovering American's Wildlife Act, was proposed in late 2023.

STATE POLICIES

As managers of wildlife within their borders, states have long recognized the importance of habitat connectivity to wildlife conservation. Even before Zinke's 2018 Secretarial Order 3362, several states had taken action focused on wildlife corridor conservation. For example, in 2007, Washington's Department of Transportation issued Executive Order 1031, Protections and Connections for High Quality Habitats (Washington State Department of Transportation, 2019). The order recognizes the importance of mobility to wildlife sustainability and provides for the use of a Habitat Connectivity Investment Priorities map to identify, prevent, and restore habitat connectivity as part of transportation planning.

Similarly, the Wyoming Game and Fish Department adopted an Ungulate Migration Corridor Strategy in 2016 (Wyoming Game and Fish Department, 2019). The strategy provided for the designation of ungulate migration corridors and updated the Wyoming Game and Fish Commission's Mitigation Policy to include ungulate bottlenecks and stopover areas as "vital" habitat areas. The policy aims to prevent "significant declines in species distribution or abundance or loss of habitat function" in designated vital habitat (Wyoming Game and Fish Commission, 2016).

In addition to action by state agencies, several state legislatures have acted to protect wildlife migration. On July 1, 2021, Florida Governor DeSantis signed SB 976 (the Florida Wildlife Corridor Act) (Fl. Legis. 2021-181, 2021 Fla. Sess. Law Serv.). This Act directs Florida's Department of Environmental Protection to encourage state and local land acquisition to ensure the continued viability of Florida's wildlife corridor. Florida's wildlife corridor comprises nearly 18 million acres of contiguous wild and working lands crucial to survival of many of Florida's 131 imperiled animals (Florida Wildlife Corridor Foundation, n.d.). California has also created a statutory mechanism to conserve wildlife connectivity that enables conservation efforts to count as mitigation for development (S.B. 790, 2021-2022 Leg., 2021 Sess.). And legislatures in Virginia, Oregon and New Mexico have required development of wildlife corridor action plans to identify key habitat areas and take steps to conserve them.

Finally, three western Governors have issued Executive Orders to promote wildlife corridor conservation. The Colorado and Wyoming orders specifically focus on big-game migration including deer and antelope (Colorado Executive Order D 2019 011, 2019; Wyoming Executive Order 2020-01, 2020). Nevada's order addresses wildlife habitat broadly (Nevada Executive Order 2021-18). Each executive order articulates the importance of wildlife habitats to the state and creates a process to identify and conserve key habitats.

LOCAL POLICIES

Some local governments are also acting to conserve landscape connectivity within their jurisdictions. For example, Teton County, Wyoming has adopted a Wildlife Crossings Master Plan (Huijser et. al., 2018). The Master Plan is part of the county's overall transportation effort and identifies wildlife-vehicle collision hot spots and mitigation options. Teton County is also moving forward with the development of four new wildlife highway crossings. Previously, wildlife crossing construction was limited to highway reconstruction led by the Wyoming Department of Transportation, or the USFS or National Parks Service. Through implementation of its Master Plan, the county intends to proactively address needed wildlife crossings on state highways beyond major reconstruction efforts (Teton County Board of County Commissioners, 2022).

Especially in areas with abundant wildlife, counties and cities are considering standards to their land use ordinances applicable to critical wildlife corridors. For example, Ventura County, California, adopted Ordinance No. 4539 to establish habitat connectivity and wildlife passage overlay zones. The Ordinance includes restrictions to outdoor lighting, setbacks from surface water and know wildlife crossings, prohibition on planting invasive species and limits on installation of wildlife impermeable fencing apply in these zones (Ventura County, State of California, 2019).



FUNDING

Our research revealed that connectivity conservation projects are often cost prohibitive, with one highway crossing project in Wyoming costing \$11 million, and hundreds or thousands of additional projects needed across the country (Holland, 2020). Though wildlife crossing projects represent a high cost compared to other projects, funding is still a significant hurdle for connectivity efforts even beyond highway crossings. When federal connectivity was initially prioritized in 2018, there were limited federal funding opportunities for connectivity conservation. Over the years,

funding has increased, most recently with the announcement that the Department of the Interior is offering four million dollars in grants for connectivity projects in nine western states through the Western Big Game Seasonal Habitat and Migration Corridors Fund (U.S. Department of Interior, 2023; National Fish and Wildlife Foundation, 2022). Other federal funding came from the America the Beautiful Challenge (National Conference of State Legislatures, 2022; Skroch & Hilaire, 2021), Infrastructure Investment and Jobs Act, Improving Habitat Quality in Western Big-Game Winter Range and Migration Corridors (U.S. Department of the Interior, 2020), the USDA-Wyoming Big Game Partnership Program, the Land and Water Conservation Fund (Brammer, 2022), the Inflation Reduction Act, and ongoing federal programs like the USDA's Conservation Reserve Program (U.S. Department of Agriculture, 2023) and Agricultural Conservation Easement Program, and U.S. Fish and Wildlife Service's Partners for Wildlife Program. Additional federal funding may be made available through the Farm Bill, which (as of writing this) is expected to pass by the end of 2024.

All this to say, there has never been as much money available to complete expensive connectivity conservation projects (Wearn & Paul, 2022). Resources are available to state and local governments to help them sort through the overwhelming amount of information related to the new federal funding opportunities, such as a snapshot of funding from ARC Solutions (ARC Solutions, 2023). States have the ability to access federal funding sources such as these, depending on their goals and intended projects. Federal funds are a significant source of funding for states are essential for many states to complete connectivity conservation projects.



States may also have the ability to create their own funding streams to help pay for connectivity. In Utah, for example, the state passed a budget that included \$20 million for roadway projects to improve connectivity (Gonzalez, 2023; Utah State Legislature, n.d.). State representatives hope that this contribution from the state will lead to additional federal funds. Similarly, New Mexico passed Senate Bill 72, which creates five million dollars in stable funding to pay for the implementation of the state's wildlife connectivity plan, including a number of roadway projects (Office of the Governor Michelle Lujan, 2023).

Though many states are creating sources of funding to pay for connectivity, there are other opportunities for states to pay for connectivity, some of which are highlighted by PEW Charitable Trusts in their report "Funding for Wildlife Crossing Infrastructure: An Evaluation of Revenue and Funding Mechanisms" (ECONorthwest, 2023). The National Caucus of Environmental Legislators has also created a list of funding resources or means of generating revenue that states can consider to help pay for wildlife conservation (National Conference of State Legislatures, 2022).

Local governments are often able to access federal and state funding sources to pay for connectivity, depending on the government's goals and intended use of the money. Generally, it is rare for counties to create funding sources to pay for connectivity. Of several counties reviewed by the Center for Large Landscape Conservation, only Teton County, Wyoming has created a consistent source of funding for connectivity conservation, through a special excise tax (Breuer & Hance, 2022). Local governments can use ARC's "Snapshot of Wildlife Infrastructure Funding Opportunities in the New Infrastructure Law" to find potential federal funding sources.

In all, policies are a critical means of conserving connectivity. Policies at federal, state, and local levels can incentivize conservation or restrict habitat loss or fragmentation. As policies become more ubiquitous, there are more funding sources coming available to help pay for the development and implementation of the policies—state and local governments need only determine which funding sources best suit their needs.

Methods

To assess the various state and local actions taken to promote landscape connectivity, we identified and analyzed 47 policies consisting of 37 state-level policies and 10 local or county-level policies. In collaboration with the Center for Large Landscape Conservation, we used their Ecological Connectivity Policy Compendium: U.S. Policies to Conserve Ecological Connectivity (May 2022) to identify relevant policies. Our analysis included connectivity policies enacted between 2007 and 2021, including 37 state policies from 13 states ranging from New England, the Pacific Northwest, the Southwest and the Rocky Mountain regions. We also analyzed ten local policies from seven different states. A majority of the policies originate in the western U.S.

We developed a framework to characterize each policy based on selected attributes. Twelve attributes were selected to inform the research: origin, sector, type of policy, impacted agency(ies), level of government impacted, contemplated coordination between agencies, funding, species focus, implementation mechanism, related policies, other mentions of the policy, and climate change considerations (see Table 1 for a summary of the attributes).

Table 1. Summary of Attributes

Attribute	Summary of Attribute
Origin	Classification of how the policy was created. Potential attributes include Administrative, County-Level, Executive Order, Legislation, and Resolution or other action by the legislative body.
Sector	Characterization of the industry sector(s) affected by the policy. Includes Transportation, Energy (traditional or renewable energy development), Natural Resources (wildlife management, recreation or land use), and Agriculture.
Type of Policy	A selection of how the policy reaches implementation. Includes Regulatory, Incentive, Procedural, and Symbolic.
Impacted Agency	A description of which agency(ies) were tasked with implementing the policy.
Level of Government Impacted	A description of which level(s) of government implement the policy.
Coordination Between Agencies	A description of whether the policy required or encouraged the agency tasked with implementation to coordinate with other agencies.
Funding	A description of whether funding was allocated for the implementation of the project, the amount of funding, and the source of funding.
Species Focus	A description of which species the policy was intended to conserve.
Implementation Mechanism	A selection of which mechanisms the policy would use to create intended impacts on the ground. Includes 10 mechanisms described in Table 2.
Related Policies	A description of other state, local, and federal policies related to the policy under review.
Other Mentions of Policy	A description of references to the policy in popular resources like newspapers.
Climate Change Considerations	A description of whether the policy considers dynamic management to address the impacts of climate change on migrating species.

Following the characterization of policy attributes, we searched websites of the agencies tasked with implementing the policies to determine what, if any, steps had been taken to implement the policy. This step also helped identify individuals to contact for later interviews. Finally, we searched for the policy on online search engines to find references to the policy in media reports, agency or non-profit communications, and other online materials. All of the information gathered was entered into matrices to create consistency in the information gathered for each policy and to provide an overarching perspective on policy characteristics.

INTERVIEWS

After characterizing and summarizing each policy, we conducted semi-structured interviews with knowledgeable stakeholders. In all, interviews were completed with 20 individuals. These interviews covered 19 policies from 11 jurisdictions. Several key stakeholders were versed in multiple policies, so were asked about more than one policy during their interviews.

Key stakeholders were initially identified based on a review of the policy, with a focus on agency personnel responsible for implementing the policy. From there, researchers used a snowball approach to identify additional key informants for further interviews. The interviews were intended to elicit insights into policies that would be difficult to learn without inside knowledge of the policy and its implementation. Interviews included individuals associated with policies that used different implementation mechanisms to provide broader insights on the range of approaches used to maintain landscape connectivity.

We designed the interviews to focus on three broad areas relating to the policies; structure, implementation, and durability. The structure of a policy relates to the creation and contents of the policy. In temporal terms, the structure is formation of the policy before the policy has made an impact on the ground. To better understand the structure of policies, researchers asked interviewees questions such as “does the policy include funding for implementation?”, and “does the policy consider the implications of climate change?” To gain additional understanding about implementation of the policy, we also asked interviewees questions like “how has the policy been implemented?”, “have projects been completed?”, and “where has this policy seen the greatest success?”. Finally we developed questions to assess the durability of the connectivity policy. Durability relates to a policy’s ability to last and create impacts beyond initial implementation. Durable policies will last through changes in administration at the local, state, and federal executive levels and shifts in public sentiment related to connectivity. To assess durability, we asked stakeholders questions like “how durable is the policy” and “does the policy have broad stakeholder and political support?”.

The analysis framework, paired with stakeholder interviews, formed our key findings presented below.

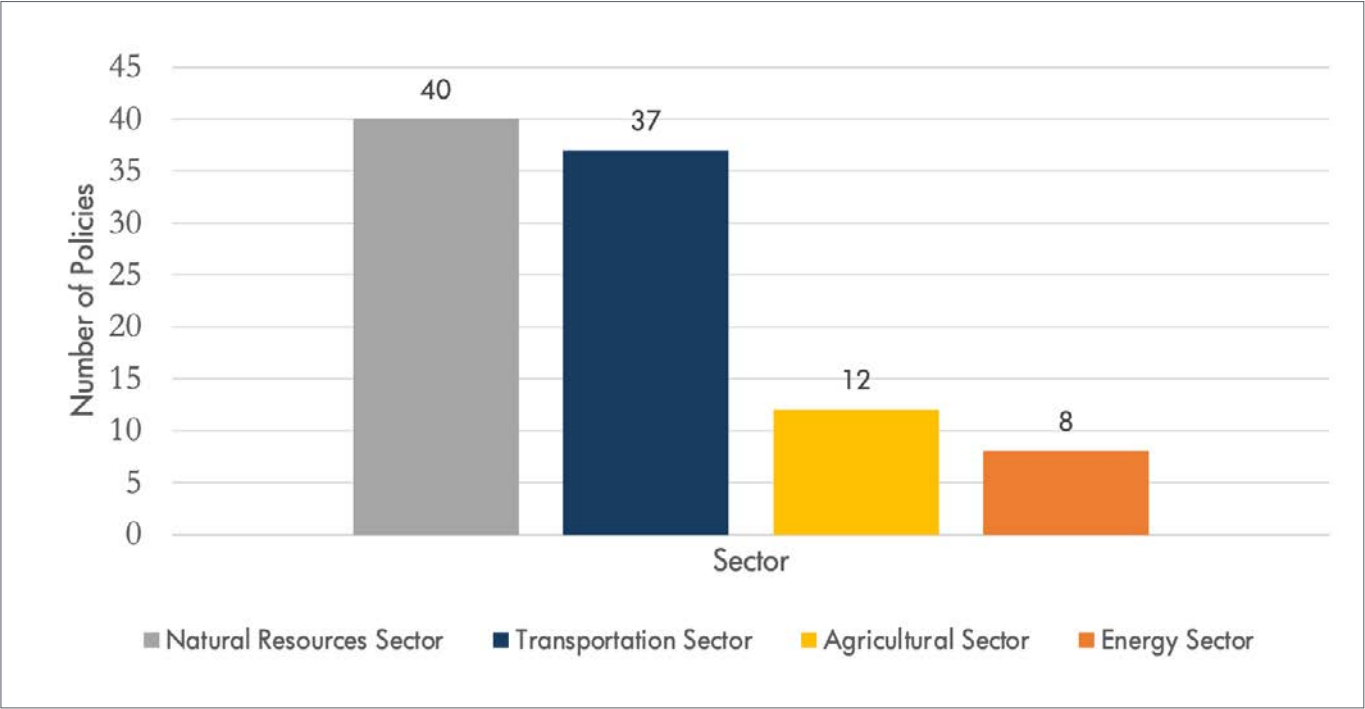


Results

POLICY ATTRIBUTES

At both the state and local level, 40 policies were relevant to the natural resources sector and 37 policies were relevant to the transportation sector (Figure 1). A majority of policies encompassed multiple sectors, and the most common combination of sectors included the natural resources and transportation sectors. This contributes to the finding that the most impacted agencies are state wildlife management agencies (included in the natural resources sector) and departments of transportation.

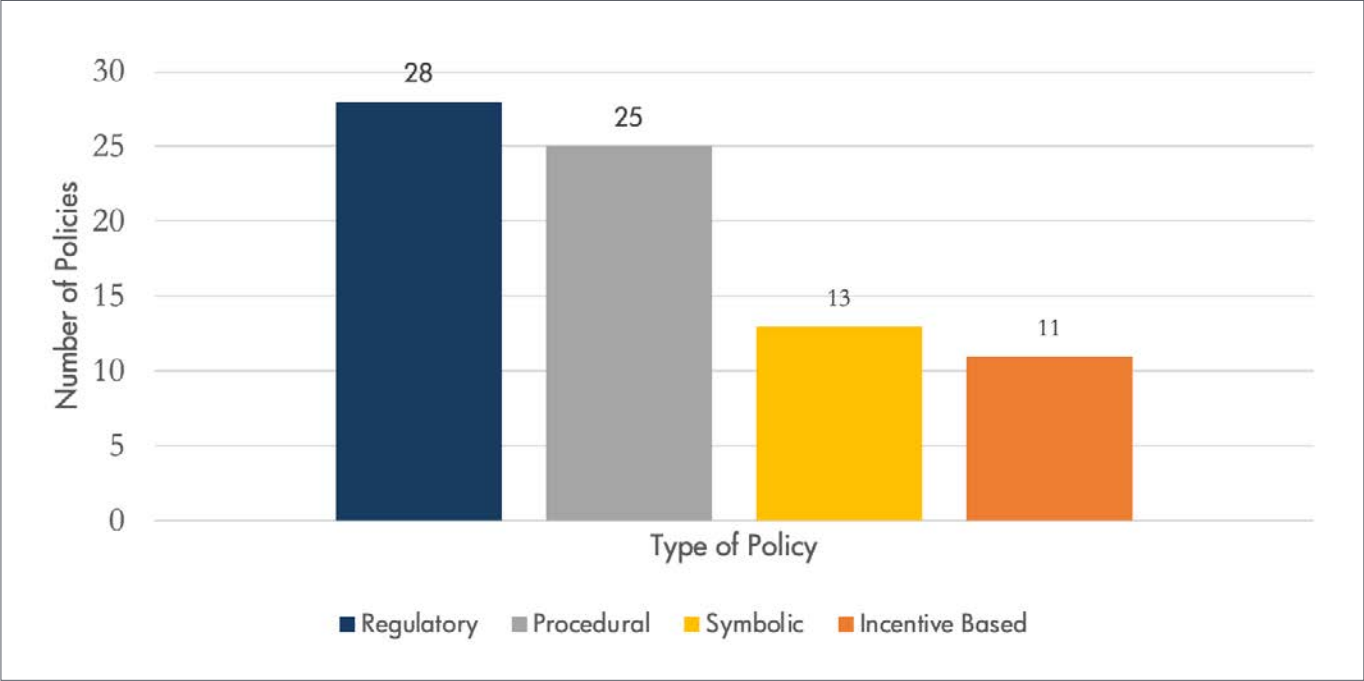
Figure 1. Number of policies relevant to each sector



Next, we analyzed the policies and classified them based on the type of policy determined by how the policies motivate action. We identified four categories of policy type including: regulatory policies, incentive policies, procedural policies, and symbolic policies. Regulatory policies are those that require action from state or local agencies or prohibit action from any of those agencies. Incentive policies create or reallocate funds to encourage or deter action. Procedural policies outline a procedure that an agency must follow to protect connectivity. And finally, symbolic policies show symbolic support or understanding of the importance of connectivity protections.

The most common type of policy we identified was regulatory policy, with a total of 28. There are also 25 policies that we identified as procedural (Figure 2). Many policies fell into more than one category. The most common combination was regulatory and procedural, in which the policy requires agencies to take action and outlines the procedure which the agency must follow.

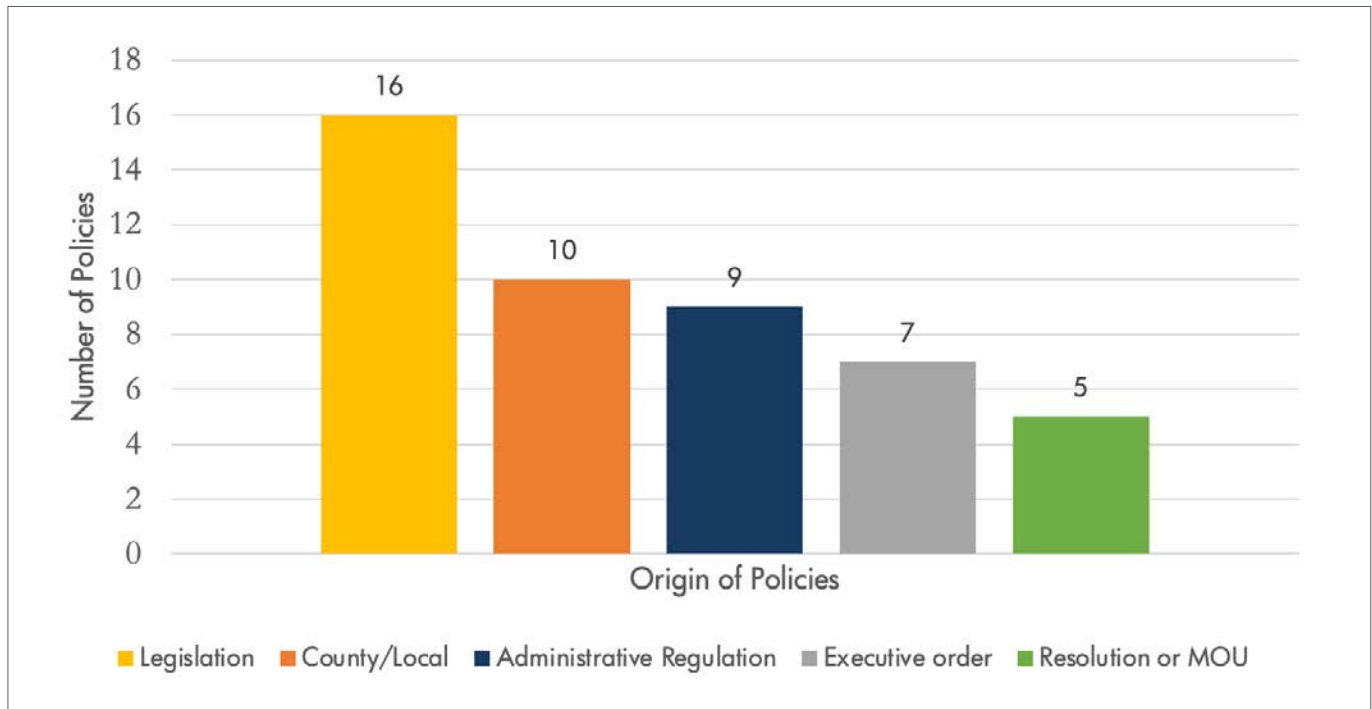
Figure 2. Number of policies by type



Next, we considered the mechanism or means in which the policy was established. At the state level, we identified four primary means of creating policies: administratively (direct agency action), through an executive order, legislatively, and through less binding means like a joint resolution in the legislature or memorandum of understanding (MOU) between agencies. In general, policies that are created through legislation tend to be more durable and last through changes of executive administrations as they are harder to amend or reverse. State policies created administratively, through executive orders, or through resolutions or MOUs are considered less durable as they can be more easily amended or repealed following an administrative change. Of the state level policies we reviewed, nine were administrative, seven were through executive order, 16 were legislative, and five resulted from a resolution or MOU (Cockerham & Crew, 2017; Thrower, 2017; Turner, 2020). There are 10 county or local level policies (Figure 3).



Figure 3. Number of policies by origin

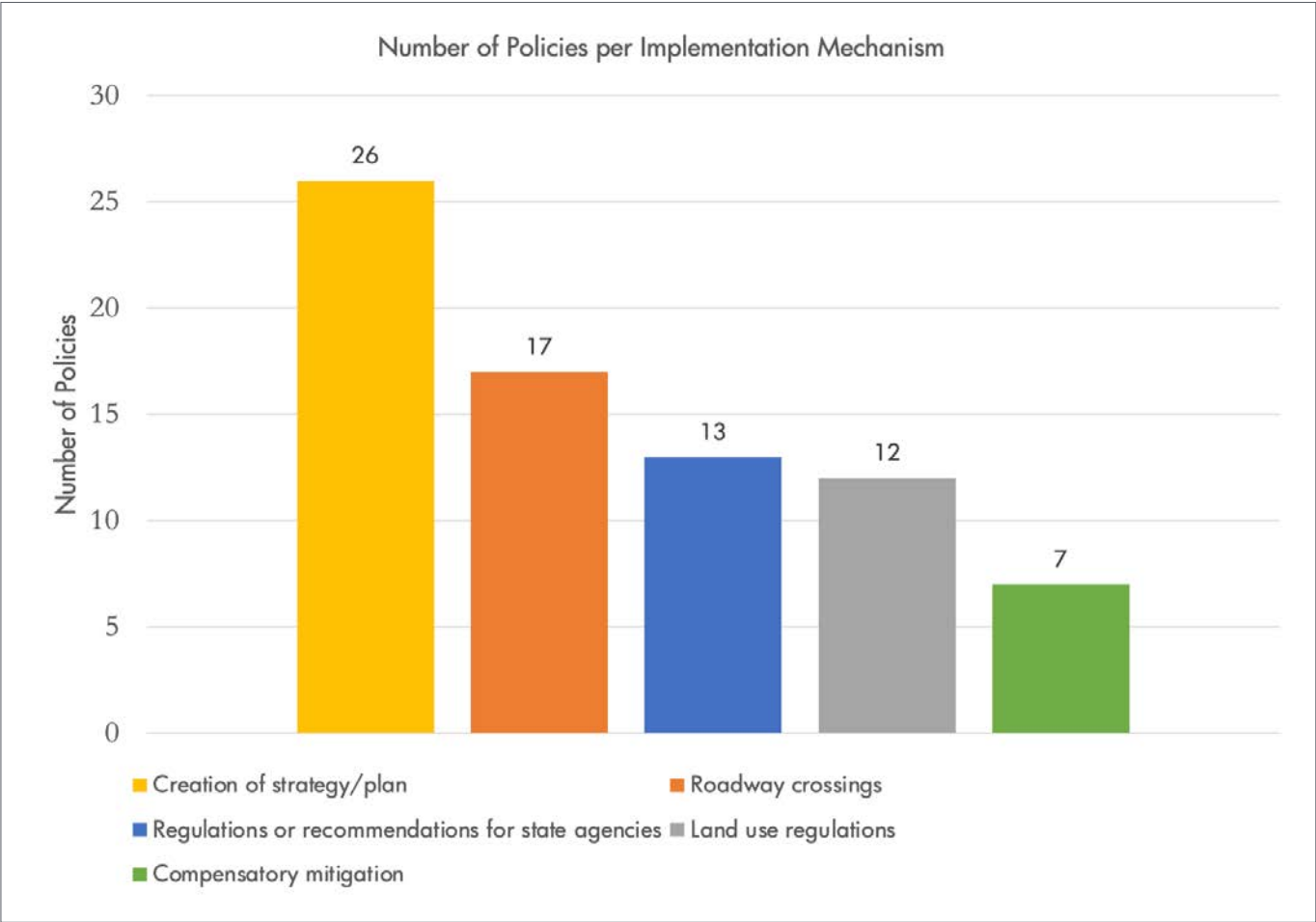


Finally, we reviewed the policies to characterize the mechanisms used for their implementation. We define an implementation mechanism as the means of achieving the on-the-ground impact intended in the policy. Of the policies reviewed, we identified 10 distinct implementation mechanisms including: compensatory mitigation, land use regulations, roadway crossings, allocation of funds or creation of a funding source, creation of strategy or plan, funding or conducting a study, regulations or recommendations for state agencies, symbolic recognition, seeking federal involvement, and creation of incentives. Table 2 further defines each implementation mechanism and Figure 4 shows the number of policies incorporating the five most common implementation mechanisms.

Table 2. Implementation mechanisms identified in policies.

Implementation Mechanism	Description
Creation of strategy or plan	Require a state or local agency to create a plan to conserve connectivity.
Roadway crossings	Require construction of roadway crossing or other transportation-oriented project.
Regulations or recommendations for state agencies	Require state agencies to take or avoid action for the conservation of connectivity.
Land use regulations	Regulate land use, either at a state or local level.
Compensatory mitigation	Established a means of compensatory mitigation or include connectivity in already existing mitigation frameworks.
Funding or conducting a study	Allocate funds to a state or local agency to study connectivity.
Allocation of funds or creation of funding source	Allocate funds from a specified or general account or create a way for the state to raise funds for connectivity.
Creation of incentives	Create monetary or other incentives for the purposes of conserving connectivity.
Seeking federal involvement	The intent is to put policies in place to later seek federal financial or technical help.
Symbolic recognition	Recognize the importance of connectivity.

Figure 4. Number of policies per implementation mechanism (5 most common mechanisms)



Gregory Nickerson / Wyoming Migration Initiative



Insights from Interviews and Characterization of Policies

Below we share insights into the structure, implementation, and durability of policies based on the policy analysis and interviews. We hope that the insights are generalizable to inform the development of connectivity policies in all regions and at both the state and local levels. We elaborate on the characteristics we considered for each category and provide illustrative examples of policies that highlight each insight. Since policy success is a difficult and often subjective attribute to measure, we instead objectively describe our insights so that others can build from the experiences of others involved with the development and implementation of connectivity policies.



STRUCTURE

We identified six key insights that relate to policy structure, including: (1) horizontal and vertical integration, (2) climate implications, (3) enforcement or flexibility, (4) education, (5) focus, and (6) funding. These insights were extrapolated from the interview results which are incorporated below. The goal here is to highlight experiences and examples of structuring policies that others may be able to use in their own policies.

Horizontal and Vertical Integration

A policy is horizontally integrated when it relates to other policies or priorities at the same jurisdictional level. For example, in Washington, Executive Order 1031 requires the Department of Transportation—when planning for roadway crossing projects—to consider already existing procedures created by the Department of Fish and Wildlife (Washington State Department of Transportation, 2019). Relying on already existing information, horizontally integrated policies streamline implementation, and policies may have more support because they are relying on and building from a record of success.

Some interviewees noted that horizontal integration is an important way to get multiple state agencies on the same page. For example, several states have memoranda of understanding (MOUs) between their game and fish and transportation departments relating to wildlife roadway crossing projects. Typically, those agencies would have little reason to cooperate in a systematic way, but the MOUs require it. MOUs are an often used and effective means of horizontally integrating two unrelated agencies.

A policy is vertically integrated when it considers the impacts of policies at levels above and below it, facilitating greater coordination between jurisdictional levels. In Colorado, for example, the Parks and Wildlife Commission issued a resolution supporting both a state level executive order and a federal secretarial order related to connectivity (Colorado Parks and Wildlife Commission, 2019). While in Nevada, the Governor and the BLM coordinated a simultaneous release of a state executive order and a BLM instruction memorandum on wildlife connectivity that complemented and built



off each other. According to the interviews, the multi-jurisdictional support for vertically integrated policies may also make the policy more durable.

Some interviewees viewed local policies' integration with state and federal policies as important because it can allow the smaller governments access to funding and resources from higher levels of government. Park County, Montana, provides an example where the county's growth policy considers working with state and federal agencies to access federal funding for corridor conservation (Kintsch & Singer, 2018). Some interviewees specifically noted that vertical integration is important in transportation policies because state departments of transportation have jurisdiction over many roadways. In Teton County, Wyoming, the county developed a Wildlife Crossings Master Plan that attempts to vertically integrate by coordinating with state and federal agencies to determine project priority areas (Juijser et. al., 2018).

Local and state corridor conservation policies often include provisions for federal involvement. The policies attempt to vertically integrate with federal funding priorities that can enable access to federal resources. Ultimately, we found horizontal or vertical integration between multiple agencies in 33 of the 47 of policies analyzed.

Climate Implications

Wildlife relying on connected landscapes may be susceptible to the detrimental impacts of climate change including subtle changes in seasonal habitat such as an earlier spring green-up. While traditional species conservation efforts have focused on the management of specific protected areas, as species respond to climate change by altering their routes and ranges, those initially protected areas may no longer be relevant. Conserving habitat may also contribute to climate change mitigation and prevent conversion of the land base or maintain lands that sequester carbon or filter water.

Our review of connectivity policies however, revealed that only a minority of policies mention climate change explicitly. In California, for example, the Regional Conservation Investment Strategy Act (Assembly Bill 2087, 2016) amended the Fish and Game Code to promote voluntary conservation or connectivity for the purpose of increasing landscape resilience to the impacts of climate change. Similarly, Oregon's Act Relating to Wildlife Corridors (House Bill 2834, 2019) requires the Oregon Department of Fish and Wildlife to develop a Wildlife Action Plan that includes a description of the impacts of climate change on the state's target species.

Few other states explicitly address climate change and its impacts in connectivity policies. Several interviewees shared that connectivity policies themselves are a method of climate change mitigation or adaptation and the interviewees thought there was no need to specifically reference climate change in connectivity policies because it would be redundant and may reduce the likelihood of the policy passing or receiving support from key stakeholders. Instead, interviewees pointed to the likely outcomes of the policies as better indicators of the policy's benefits to climate change mitigation and adaptation rather than including explicit climate change language.

Specificity and Flexibility

A key insight to successful connectivity policies emerging from the interviews was sufficient specificity to ensure the policy could be effectively implemented and enforced, but also flexibility in how to achieve the intended benefit. Specifically regarding compensatory mitigation policies, interviewees saw value in detailed, but flexible pathways to earn and apply mitigation credits. California's Wildlife Connectivity Actions: Compensatory Mitigation Credit Act (Senate Bill 790 (2021)) provides five options that the California Department of Fish and Wildlife can consider in determining the value of compensatory mitigation credits. This illustrates how a policy can balance specificity with flexibility. The policy specifies which practices qualify for mitigation credits and how many credits the practices can generate, while also leaving flexibility in the way the practices are implemented.



Interviewees also highlighted the benefits of flexibility to accommodate unique conditions. For example, policies that include funding for wildlife road crossings typically do not include the specific location of the crossing, but instead provide flexibility in the siting of crossings and design specifications. Interviewees indicated that this kind of flexibility made implementation easier because it provided agencies with discretion to make site-specific decisions based on specific site characteristics.

Education

Many of the interviewees stressed the importance of including a public education component in connectivity policies. An example of a connectivity policy that includes public education is New Hampshire's Act Relative to Wildlife Corridors (SB 200, 2019), which creates a funding source to help educate interested individuals on the importance of connectivity. Additionally, New Mexico's Wildlife Corridors Act (Senate Bill 228, 2019) requires public comment in the development of a state wildlife corridor action plan. Though the policy does not require public education, there were robust efforts before the comment period to educate the public on the safety impacts of connectivity conservation.

At the county or local level, a different type of education was identified as being important. Interviewees thought that cities and counties tend to have higher staff turnover than nonprofits or state governments, making continuing education on the importance of connectivity policies important. Interviewees indicated that cities and counties can consider NGOs an educational resource on connectivity policies.

Focus

Interviewees stressed the importance of narrowly tailoring connectivity policies for one sector or impact area. For example, in Teton County, Wyoming, the county Wildlife Crossing Master Plan focuses solely on the impact of roadways to connectivity. The plan addresses only those connectivity issues that can be resolved with transportation-related projects. This degree of focus in the structure of policies can make them easier to pass and implement. Interviewees noted that policies that try to cover all aspects of connectivity and migration tend to become unwieldy and are underutilized as a result.

Overall, interviewees shared a number of helpful insights and suggestions for how to best craft connectivity policies. The interviews also revealed that state and local policies may be better at addressing issues related to transportation, natural resources, agriculture, and energy. This is not to say that federal policies are ineffective at addressing these issues, only that federal policies tend to be broader in scope and may miss some of the nuances of those sectors in certain contexts. Many aspects of transportation, natural resource management, agriculture, and energy fall under state and local governments' traditional powers, so the smaller governments are likely to be more familiar and better suited to manage those sectors.

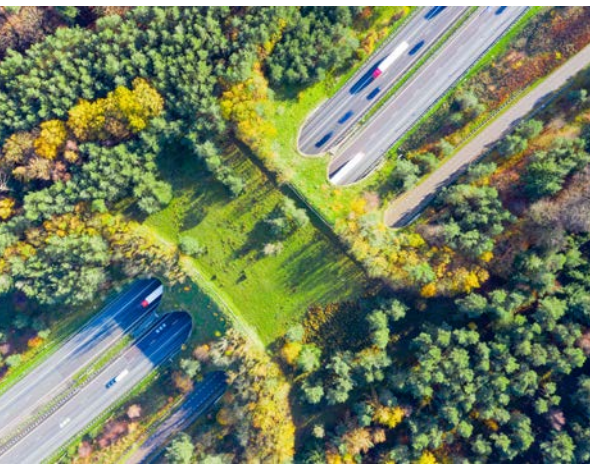
IMPLEMENTATION

This section highlights the implementation of policies, specifically how and through what mechanisms policies are put into action. For purposes of this analysis, we define implementation as the process of creating on the ground impacts or meeting the mandate or goal of the policy. However, many of the policies reviewed have yet to be implemented or are in the early stages of implementation, so a thorough analysis is difficult. Generally, the insights into implementation fall into six categories: (1) proactiveness, (2) funding, (3) research, (4) land ownership, (5) timing, and (6) mechanisms.

Proactiveness

Interviewees noted the importance of the proactive nature of many connectivity policies. Many wildlife conservation policies are only passed and implemented in reaction to a threatened or endangered listing of a species under the Endangered Species Act (ESA), or an acute loss of habitat or decline in a species population. Yet, in the case of connectivity conservation, many of the species of focus, like mule deer or pronghorn, are not at risk of ESA listing, but receive conservation from proactive policies to maintain population numbers or migratory behavior. Proactive policies will be critical for maintaining healthy populations of many species and improving the habitat of those species that are listed under the ESA.

Connectivity policies can also be used to proactively preclude an ESA listing. Wyoming for example, implemented a series of executive orders to conserve the Greater sage grouse, its habitat, and its habitat connectively to prevent a possible ESA listing. Interviewees at the county and local level expressed support for proactive connectivity policies as well. Local governments and their constituents are often greatly impacted by a species listing under the ESA, and therefore find value in policies that proactively conserve species habitat connectivity and potentially prevent ESA listings.



Funding

Including funding mechanisms for implementation within policies was critical in the minds of many of the interviewees. These interviewees suggested that including funding in policies, even if it is from the general fund and not a specified source, is important to ensure that the policies achieve the desired impact. Several of the policies reviewed require research or planning by a state agency, but did not include funding for that work. Presumably, this means that the state agency must use its general budget to carry out this work, which likely takes away from other needs in the agency and can create internal resistance from the reallocation of resources. Notably, of the policies reviewed, only five allocated funds or created a funding source to aid in the implementation of the policy.

Funding is also an important consideration for local policies. The Teton County (WY) Wildlife Crossings Master Plan received \$10 million from a city special excise tax. Without this level of funding, it seems unlikely that the plan would be implemented in meaningful way given the prohibitive costs of transportation related projects. County and city level interviewees also noted that finding ways to coordinate funding priorities across the different levels of government was a successful means of ensuring funding. The integration of connectivity policies within the goals of the larger governments enables city and county governments access to larger sources of funding. For example, by connecting a roadway crossing to a larger transportation project, such as road widening or realignment, the connectivity project may have an easier time seeking funding than if the project was a standalone connectivity project. Interviewees also emphasized the importance of considering that roadway projects are not a one-time expense but require long term maintenance and associated costs.



Research

Research is an integral part of many of the connectivity conservation policies reviewed. Implementing connectivity policies is complicated and nuanced, so interviewees perceived research to inform planning and implementation as critical. Thirteen of the policies reviewed included research to guide implementation. As an example of one of those policies, New Mexico's Wildlife Corridors Act (Senate Bill 228, 2019) required research to identify which roadways had the highest risk of wildlife vehicle collisions and impact on wildlife.

Interviewees also indicated that while they see the essential nature of robust research, there comes a time when a policy must create on-the-ground action. Yet for some policies, research or planning is the primary implementation mechanism. For example, New Hampshire's An Act Relative to Wildlife Corridors (Senate Bill 376, 2019) requires the Fish and Game and Environmental Services Departments to identify wildlife corridors. The identification of corridors is a research endeavor, so the policy is fully implemented once corridors are identified. Ideally, specific actions to conserve connectivity would follow the research and be envisioned in the development of the policy rather than solely focusing on research as the outcome of the policy.

Land Ownership

Land ownership patterns can impact the implementation of connectivity policies. According to interviewees, there is often political opposition to policies that regulate or restrict private lands (Bennett and Gautier, 2019), so states may avoid this by only passing policies that restrict state land. To address those political concerns, policies like Wyoming's executive order on migration corridors specifically states that it will not impact private landowners, but encourages landowners to consult with the Wyoming Game and Fish Department before developing in a migration corridor. On the other hand, Spokane County's ordinance limits private land use in certain connectivity areas and requires review of development plans if the development is to take place inside certain habitats.

Twelve of the policies reviewed include land use regulations, most often in the form of restrictions on private land development. Seven of those twelve policies are at the county level. This is logical as land-use planning and zoning occurs at the county-level in many jurisdictions. Interviewees also shared that incentives to encourage voluntary actions by private landowners could avoid some of the political concerns associated with regulating private land. Of the 47 policies reviewed, five created a means of incentivizing action. One policy that incentivizes action is the USDA-Wyoming Big Game Partnership program, which provides additional incentives through existing USDA Farm Bill programs for private landowners who own land within a big game migration priority area. This formal collaborative effort between the federal and state governments provides an innovative model to pair federal resources and conservation delivery infrastructure with state priorities, existing relationships, and local understanding of the issues. Additionally, Florida's Wildlife Corridor Act creates incentive programs to encourage landowners to keep their land in open space for connectivity.

Land ownership was also a significant consideration for local government interviewees who indicated local governments often work better with private landowners than higher levels of government. Hennepin County, Minnesota's plan offers an example of a local government policy that focuses on private landowners. Hennepin County developed a Natural Resources Strategic Plan, which included as one of its primary objectives the intention to "protect and enhance natural areas, corridors and green spaces." One means of achieving this objective is to work with landowners to identify natural areas or corridors and conserve them through voluntary conservation easements.

Implementation Mechanisms

Through our review of connectivity policies, we identified 10 distinct implementation mechanisms. The mechanisms were as simple as symbolic recognition to as complex as building an extensive network of roadway crossing infrastructure. Many of the policies reviewed included more than one implementation mechanism to achieve the goals of the policy. Creation of a strategy or plan was the most commonly used mechanism. Since conserving landscape connectivity is complex, planning or strategizing is a logical beginning. Land-use regulations are another popular mechanism, included in 12 of the policies reviewed. This is also logical as connectivity is inextricably tied to land use. A typical land use policy restricts development of private land to conserve connectivity, such as Vermont's Act 47. Vermont's Act 47 updates a land use plan which discourages development in areas that are important to the connectivity of the state by only allowing such development when "the public interest is clearly benefited."

At the city and county level, land-use regulations and the development of strategies or plans were also the most common implementation mechanisms. Several counties also used symbolic recognition or sought federal involvement or funding. Policies seeking federal engagement are not—on their own—enforceable but can result in vertical integration.

Overall, state and local connectivity policies are being implemented in a number of ways. The mechanisms used to implement these policies vary significantly and depend on a variety of contexts. As more policies are developed, implemented, and evaluated, researchers will be able to improve their understanding of



what works best in different contexts. Many interviewees expressed that a lack of funding and prolonged research were the primary barriers to successful policy implementation. Yet, interviewees noted that any sort of connectivity policy is a step in the right direction and worth commendation.

DURABILITY

Connectivity policies are most likely to be successful if they are durable over longer time horizons. Our consideration of durability includes the policy's origin, the breadth of support, security of funding, and its tangibility. Policy durability is important because connectivity conservation requires long-term political and capital investment to achieve ecologically significant results. Below are insights gathered during the analysis and interviews that highlight both the importance of durability and ways in which it can be achieved.

Policy origin

A policy's origin can influence its longevity and the ease with which it can be altered or ended. The general assumption is that policies with a legislative or statutory origin are more durable than policies created through administrative processes or executive orders. For instance, an executive order can be undone by a subsequent governor issuing a new executive order to end the policy. So legislation is often preferred. Sixteen of the policies reviewed were created through legislation, while 21 were created through less durable means. However, the interviewees indicated that they still found the administrative policies or executive orders to be fairly durable and capable of withstanding changes in state administrations.

Interviewees noted that there is value in less durable policies initially as they can socialize the idea of connectivity conservation, creating additional interest in connectivity policies, all of which may lead to more durable policy development. In Nevada, for example, Creating the Nevada Habitat Conservation Framework Executive Order 2021-18 required the development of a framework to provide for habitat conservation. In 2023, the state passed a new bill (Assembly Bill No. 112, 2023), which codified some of the conservation efforts included in the Executive Order. Another example comes from Summit County, Colorado, where the Summit County Commissioners formally endorsed, through resolution 2019-75, a connectivity plan written by a collaborative of federal, state, and local agencies. This resolution in itself is not durable or enforceable, however, it eventually led the Colorado State Department of Transportation to invest \$750,000 in a roadway crossing project in the county (Colorado Department of Transportation, n.d.; Colorado Parks and Wildlife, n.d., 2023).

On the other hand, some interviewees also wanted to be clear that legislation or other durable policies create more stability for those tasked with implementing the policies. Colorado's Conserving Colorado's Big Game Winter Ranges and Migration Corridors Executive Order 2019-11 is an example of an executive order that created durability by requiring the Colorado Department of Transportation and the Colorado Department of Natural Resources to enter into a MOU to implement the policy. Interviewees expressed that without sufficient durability, policies are likely to change over time, which can hinder implementation of the policy or create uncertainty and unnecessarily slow implementation.



Interviewees also noted that less durable policies can create value because they are easier to amend to incorporate new information and adapt to changing conditions. As policymakers consider future policies, interviewees suggested that policies must balance long-term connectivity conservation with nimbleness to ensure that policies can adapt to ever-changing conditions and quickly evolving scientific understanding.

Four of the policies reviewed used symbolic recognition as an implementation mechanism. Symbolic recognition is used in policies as a way to state the importance of connectivity and express support of connectivity conservation, but are unenforceable and not durable on their own. Interviewees suggested that stakeholders with an interest in conserving connectivity must find ways to create grassroots support and demonstrate that constituents have a vested interest in the outcome of connectivity policies. Once there is grassroots support for connectivity and connectivity policies, then those symbolic recognition efforts are more likely to lead to more durable policies.

Support

Interviewees identified the importance of broad political support of a policy as a critical factor in determining the policy's durability. Policies created through less durable means, like executive orders, but with broad support are more likely to lead to successful connectivity conservation. Yet policies created through more durable means without board support were identified as unlikely to be implemented in a meaningful way.

An example of the development of broad support comes from Colorado, where a group of state agencies and nongovernment organizations, including the Department of Natural Resources and the Department of Transportation created the Colorado Wildlife and Transportation Alliance. The Alliance worked to increase understanding of connectivity and was cited in both the Conserving Colorado's Big Game Winter Ranges and Migration Corridors Executive Order 2019-11, the Colorado Parks and Wildlife Commission's resolution, and several other subsequent policies. Interviewees indicated that groups like the Alliance demonstrate to policymakers that there is a broad base of support, which makes it more likely that policies will pass and will be more durable once passed. Nevada offers another example of broad support leading to durability via its Creating the Nevada Habitat Conservation Framework Executive Order 2021-18. The executive order was issued by a democratic governor, with broad support from across the state. When that democratic

governor was succeeded by a republican governor, the order was not reversed, and the state undertook efforts to strengthen connectivity conservation under the new administration, demonstrating that policies with broad support can span administration changes and changes in the controlling political party.

Interviewees also indicated that public support for the agencies involved is critical and recommend that policymakers think about the reputation of the agencies tasked with implementing the connectivity policy. For example, if public has a poor perception of the transportation department, a durable connectivity policy might require that the agency work with an agency with positive public perceptions. By empowering the agency that is most trusted, the policy is more likely to be durable. Additionally, interviewees noted that policymakers tend to be hesitant to burden agencies with more work, but



if interested parties can show that the impacted agency is supportive, it makes the passage more likely. Agency support of policies is a critical component of policy durability to ensure it will have internal advocates.

Particularly regarding city and county policies, interviewees thought that because local constituents have more of a vested interest in the outcome of the policy, those policies tend to be more durable. For example, if a county-level connectivity policy is proposed, and the residents of the county have been negatively affected by an increase in wildlife-vehicle collisions and the subsequent increase in insurance costs, they may be more likely to support the policy. Some interviewees indicated that the more this dynamic is made clear to policymakers, the more durable policies become, especially for those policies that impact the transportation sector or rely on roadway crossings. Teton County, Wyoming's Wildlife Crossings Master Plan, for example, provides significant background on the costs and risks associated with increased wildlife-vehicle collisions.



Funding

Insufficient or inconsistent funding is one of the biggest barriers to the durability of policies. Some interviewees indicated that for a policy to be durable, it should include permanent or stable funding. For example, in roadway crossing projects, the policy could include a connection with the larger transportation budget. Some interviewees also thought it was important to note that policymakers should try find ways to vertically integrate policies with federal efforts, which can enable access to federal funding sources.

Tangible Results

Particularly as it relates to policies that impact the transportation sector, some interviewees suggested that the more tangible results a policy can produce, the more durable it will be. For example, New Mexico's Wildlife Corridors Act (Senate Bill NM 228, 2019) specifically required the prioritization of areas with high wildlife/vehicle collisions. The plan was successfully created, and priority areas were identified, achieving one of the primary goals laid out in the policy. Following the identification of priority areas, in 2023, the state passed the Wildlife Corridors Fund Act (Senate Bill 7, 2023) which allocates consistent funding to connectivity projects. Interviewees indicated that when policies like the Wildlife Corridors Act result in tangible benefits, it can build support for durable funding sources (State of New Mexico, 2023).

Counties and cities also rely on tangible results for their connectivity policies. For example, in Summit County, Colorado, when the county commissioners developed the Safe Passages Plan, they specifically mentioned specific, targeted projects as a reason for their support (Board of County Commissioners of Summit County, 2019). Interviewees noted that the specificity in the plan and support might have led to the policy's durability because at the local level constituents are more keenly aware of what is happening in their area and more willing to engage with policymakers. Those implementing connectivity policies can use this familiarity to their advantage and ensure that the community feels as though its needs are being met and lean on local knowledge to develop policies in a meaningful way.

In conclusion, some interviewees felt that connectivity policies tend to be durable as a result primarily of broad public support and tangible outcomes. Connectivity is a long-term investment, so durability of policies is important, but it is also critical to remember that flexibility in policies can be valuable. Policymakers should certainly aim for durable policies to ensure predictability and political cover for impacted agencies, but to ensure the highest level of durability, policymakers need to find ways to fund connectivity policies. States and local governments should keep in mind that significant federal funding is available to support landscape connectivity efforts.

IMPLICATIONS

State and local governments have implemented a wide range of policies to conserve landscape connectivity. These policies have taken diverse forms and have targeted a spectrum of species. Many of the policies key individuals perceived as the most impactful also integrate vertically with other policies at higher or lower levels of government – or horizontally across sectors and agencies. This integration can be key to securing funding for connectivity projects and coordinating actions among diverse actors in complex social and ecological settings. The importance of policy integration also suggests that individual connectivity policies should not be considered in isolation, but in their broad policy context where they can be synergistically linked to policies vertically and horizontally to increase the collective policy impact. How to best approach policy integration depends on the specific circumstances of governmental jurisdiction in each state, but policy makers should consider a policy strategy that is able to adapt to changing administrative priorities at the federal level and developed over time to foster stakeholder support at local levels and across sectors.

Another key insight from our analysis is that science is critical to effective policy development and implementation. This science typically included mapping of hot spots of vehicle collisions with wildlife and mapping corridors of high use by migratory animals. In some situations and jurisdictions, existing science is sufficient and only needs to be translated into planning documents to support implementation. In other situations, primary data collection is necessary and will likely require longer time frames to conduct the science before it is actionable. However, while science is important and necessary, it is important to build momentum in policy implementation and not get stuck waiting for perfect science before moving forward.

Maintaining landscape connectivity will be critical for species and habitats to adapt to changing climates. While few of the policies explicitly reference or account for climate change in their terms, there was broad agreement among the key individuals that policies aiming to maintain connectivity are, in and of themselves, a key climate change adaptation strategy. While it may be desirable for some interest groups to emphasize climate change and promote connectivity as a climate adaptation strategy, they may do so at the risk of polarizing these policies politically when many of the specific actions these policies promote have broad bipartisan and grassroots support (e.g., Paolini et al., 2023, Gautier et al., 2019).

The durability of a policy is also important to consider in conserving connectivity over the long-term. In concept, the policy's origin (e.g., legislative, executive order) influences its durability and thus the likelihood of persisting overtime.



In practice, a policy's durability is likely dependent upon a suite of factors that includes its origin, but also the level of grassroots support among key constituencies and developing a track record of successful implementation. While some policies appear to be less durable on paper, they may likely remain in place or lead to more durable policies over time, such as an initial administrative regulation that leads to a legislative action as a result of broad support built by a diverse coalition. Building and maintaining this support requires ongoing outreach and education with those key constituencies and supporters of landscape connectivity policies should not view the adoption of a policy as the end game, but a key milestone in a longer-term strategy.



Conclusion

Notably, our analysis shows the diverse ways states and local governments have adopted and implemented landscape connectivity policies. This insight provides a spectrum of options for those looking to develop landscape connectivity policies including pursuing them at the various municipal and county levels, through leadership of specific state agencies, and through the state executive and legislative branches. This spectrum of options allows promoters of these policies to “venue shop” to identify places and sectors where there are ripe opportunities and alignment of political dynamics to advance connectivity efforts (Baumgartner and Jones 1993).

Ultimately, states and local governments can advance landscape connectivity goals in a myriad of ways. Our analysis provides insights into the diverse ways states and local governments have pursued these goals to date and demonstrates the wide range of options and great deal of flexibility at these sub-federal levels. Those looking to advance landscape connectivity policies can draw from existing examples in distinct ecological contexts and political environments documented in this report for inspiration of what might be possible in their own jurisdictions. Supporters of connectivity policies will likely find many opportunities to advance this work in diverse places where there is leadership, coalitions, and political support at state and local levels.



Appendix

List of policies included in the analysis*

Appendix Table 1. Policies included in the analysis (with hyperlinks to each policy).

State	Level	Year	Policy
AZ	State	2007 & 2008	Arizona Missing Linkages. 2007 and 2008 Design Reports
CA	State	2021	Wildlife Connectivity Actions; Compensatory Mitigation Credits
CA	State	2021	AB 149. An Act Relating to Transportation
CA	State	2016	AB 2087. Regional Conservation Investment Strategies
CA	State	2015	AB 498. An Act to Amend Sections 1797.5, 1930, and 1930.5 of the Fish and Game Code, Relating to Fish and Wildlife
CA	State	2008	AB 2785. Wildlife Conservation: Habitat Connectivity
CO	State	2021	SJR 21-021. Colorado Habitat Connectivity
CO	State	2021	Colorado Oil & Gas Conservation Commission (COGCC). Regulations
CO	State	2019	Memorandum of Understanding Between the Colorado Department of Transportation and the Colorado Department of Natural Resources Division of Parks and Wildlife
CO	State	2019	Colorado Department of Natural Resources Division of Parks and Wildlife Commission. Resolution 19-02 Regarding Support for Governor Polis's Executive Order D-2019-011: Conserving Colorado's Big Game Winter Ranges and Migration Corridors
CO	State	2019	Conserving Colorado's Big Game and Migration Corridors Executive Order D-2019-011
FL	State	2021	SB 976. An Act Relating to the Protection of Ecological Systems: Florida Wildlife Corridor Act
FL	State	2017	Florida Department of Transportation. Plans Preparation Manual
FL	State	2016 & 2018	Florida Department of Transportation. Wildlife Crossings Guidelines
FL	State	2013	Florida Wildlife Corridor Resolution
NH	State	2019	SB 200. An Act Relative to Wildlife Corridors
NH	State	2016	SB 376. An Act Relative to Wildlife Corridors
NM	State	2019	SB 228. Wildlife Corridors Act
NM	State	2013	HM1/SM11. Requesting that the Department of Transportation and the Department of Game and Fish Hold a Workshop to Identify Future Project to Help Reduce Wildlife-Vehicle Collisions; Requesting that the Governor Declare a Wildlife Safety Awareness Day
NM	State	2011	HJM 10. Requesting that the Department of Transportation, Department of Game and Fish and New Mexico State Police Work Together Using Existing Resources to Create a Pilot Traffic Safety Project in an Accident-Prone Area of the State to Save Lives by Reducing Collisions between Large Animals and Vehicles
NV	State	2021	Creating the Nevada Habitat Conservation Framework Executive Order 2021-18
OR	State	2019	Oregon Department of Motor Vehicles. Watch for Wildlife License Plate
OR	State	2019	HB 2834. An Act Relating to Wildlife Corridors

UT	State	2020	<u>HCR 13. Concurrent Resolution Supporting the Protection and Restoration of Wildlife Corridors</u>
VA	State	2021	<u>SB 1274. An Act Relating to Government Planning; Wildlife Corridors.</u>
VA	State	2020	<u>SB1004. An Act Relating to Wildlife Corridor Action Plan</u>
VT	State	2017	<u>Act 47. An Act Relating to the Commission on Act 250: The Next 50 Years</u>
VT	State	2016	<u>Act 171. An Act Relating to Timber Harvesting</u>
WA	State	2007	<u>Department of Transportation Executive Order 1031. Protections and Connections for High Quality Habitats</u>
WY	State	2022	<u>A partnership to Conserve Big Game Habitat in Wyoming</u>
WY	State	2020	<u>HB 69. An Act Relating to Wildlife Conservation</u>
WY	State	2020	<u>Mule Deer and Antelope Migration Corridor Protection Executive Order 2020-1</u>
WY	State	2019	<u>Wyoming Department of Transportation. Operating Policy on Fences and Cattle Guards</u>
WY	State	2019	<u>Greater Sage-Grouse Core Area Protection Executive Order 2019-3</u>
WY	State	2018	<u>HB 39. Wildlife Conservation License Plates</u>
WY	State	2016	<u>Wyoming Game and Fish Department. Ungulate Migration Corridor Strategy</u>
WY	State	2008	<u>Greater Sage-Grouse Core Area Protection Executive Order 2008-2</u>
CA	County	2019	<u>Ventura County Ordinance No. 4537</u>
CO	County	2019	<u>Resolution 2019-75: A Resolution Endorsing the Summit County Safe Passages Plan</u>
CO	County	2018	<u>Eagle County Safe Passages for Wildlife Final Report</u>
MN	County	2016	<u>Hennepin County Natural Resources Strategic Plan</u>
MT	County	2021	<u>Gallatin County Envision Gallatin Growth Plan</u>
MT	County	2019	<u>Missoula Area Land Use Element</u>
MT	County	2017	<u>Park County Growth Policy Update</u>
NM	County	2019	<u>County Resolutions in New Mexico</u>
WA	County	2018	<u>Spokane County Critical Areas Ordinance for the Protection of Wetlands, Fish and Wildlife Habitats, Geo-hazard Areas and Critical Aquifer Recharge Areas</u>
WY	County	2018	<u>Teton County Wildlife Crossing Master Plan</u>

**All but one policy was identified through the Center for Large Landscape Conservation's [Ecological Connectivity Policy Compendium: U.S. Policies to Conserve Ecological Connectivity 2007-2021](#). We also included Wyoming's "A partnership to Conserve Big Game Habitat in Wyoming", which was formalized in 2022.*

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