

Primer for Counties:

County Planning for Wildlife Habitat Connectivity

Mission

Strengthen America's Counties

Vision

Healthy, safe and vibrant counties across America

About

The National Association of Counties (NACo) strengthens America's counties, serving nearly 38,000 county elected officials and 3.6 million county employees. Founded in 1935, NACo unites county officials to:

- **Advocate** county priorities in federal policymaking
- **Promote** exemplary county policies and practices
- **Nurture** leadership skills and expand knowledge networks
- **Optimize** county and taxpayer resources and cost savings, and
- **Enrich** the public understanding of county government.



As a signature program of the NACo Research Foundation, the **National Center for Public Lands Counties (NCPLC) advances the policy and practice study for America's public lands counties** by educating intergovernmental policymakers about the unique opportunities and challenges faced by county officials in areas with significant federal public lands, conducting research and facilitating public forums to inform policies and practices and fostering dialogue between federal, state, tribal and local governments on key issues.

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Executive Summary

Growing demands for affordable housing and commercial development create significant pressure on county leaders. Land use availability, density, zoning authority, economic growth, environmental protection, stakeholder engagement and added factors can create significant challenges for counties when considering long-range plans or community development projects.

One common – yet often underrecognized – challenge facing county land use planning is wildlife habitat fragmentation and habitat connectivity loss across large landscapes. This issue is especially important for public lands counties – the two-thirds of U.S. counties that contain federal public lands – because these jurisdictions often encompass extensive wildlife migration corridors. They also encompass recreation and transportation networks and the interfaces between public and private lands.

As development, road construction and changing land use patterns fragment wildlife habitat, public lands counties often face detrimental impacts on public safety, transportation infrastructure and local economies, including elevated rates of wildlife-vehicle collisions (WVC). The Federal Highway Administration has found that elevated numbers of WVC frequently occur near public land boundaries, where wildlife movement corridors intersect with growing transportation and development pressures.ⁱ

Federal and state governments have enacted laws and policies to reduce WVC by improving wildlife habitat connectivity, allowing animals to move safely between food and water sources, shelter and breeding areas

without crossing roadways and thereby reducing the risk of human-wildlife conflicts. **As intergovernmental partners, counties can substantially contribute to reducing WVC through land use planning that supports wildlife habitat connectivity, preserves healthy native species and supports federal and state wildlife habitat connectivity planning and project delivery.**

Today, in the United States, approximately 1,000 dedicated wildlife crossing structures are guiding wildlife safely across busy roadways.

This report examines wildlife habitat connectivity and how county land use planning can strengthen the broader network of federal and state efforts to mitigate this significant public safety hazard. It outlines specific federal and state policies enacted to protect wildlife connectivity and how counties can be effective intergovernmental partners in implementation. It also identifies practical tools counties can use to incorporate wildlife connectivity into their land use plans, drawing on five case studies highlighting how public lands counties have implemented measures to reduce WVC and improve public safety, including San Diego County, Calif.; Routt County, Colo.; Kane County, Utah; Albemarle County, Va.; and Teton County, Wyo.

Key Takeaways

1. Wildlife-vehicle collisions are a public safety and economic concern nationwide. A 2008 national study, funded by the U.S. Department of Transportation Federal Highway Administration (FHWA), estimated the annual cost of (WVC), based on available data, to be over \$8 billion.ⁱⁱ

2. Federal legislation to fund wildlife habitat connectivity was first enacted in 2021. Administered by the FHWA, Congress enacted the Wildlife Crossings Pilot Program, offering competitive grants to counties through FY26 for wildlife habitat connectivity improvements and WVC reduction.ⁱⁱⁱ Four bills to reauthorize the wildlife program were introduced in the House and the Senate during the 119th Congress.^{iv}

3. State governments are increasingly enacting wildlife habitat connectivity legislation. As of April 2024, 17 states have introduced 32 bills to improve wildlife habitat connectivity.^v Several of these states require counties to consider wildlife habitat connectivity in land use planning and have established wildlife connectivity funding.^{vi}

4. Counties play a vital role in wildlife habitat connectivity through land use planning. As intergovernmental partners, counties that include elements such as habitat fragmentation and priority wildlife corridor maps into land use plans and regulations can contribute to effective mitigation measures for public safety and economic stewardship.



Key Considerations When Reviewing County Planning Documents

Consideration #1

Is wildlife corridor protection included in the county's comprehensive plan?

- If yes, are wildlife corridors identified?
- Is there a policy for cluster development (grouping residential or commercial structures on a land parcel to preserve open space on the remaining land in the parcel)?
- Are undeveloped open spaces prioritized for wildlife protection and/or potential acquisition?

Consideration #2

Is wildlife habitat connectivity included in county zoning ordinances to translate wildlife protection policy into enforceable ordinances?

- Are overlay zones included on top of base zones to specify wildlife mitigation measures inside the county and adjacent to other jurisdictions?
- Do the ordinances restrict incompatible development that could potentially impede animal movement through identified corridors?
- Are wildlife mitigation measures, permeable fencing and roadway crossings also included in low-density and agricultural areas?

County land-use planners may apply additional standards to project development proposals through subdivision regulations, site design standards, project review processes and other planning documents. Counties can use these tools to incorporate wildlife habitat connectivity considerations into local development decisions while balancing community growth, public safety and economic priorities. These implementation tools are most effective when they align with and reinforce policies established in comprehensive plans and zoning ordinances.^{vii}



Glossary of Terms

Definitions in most cases are drawn directly from the original source. See endnotes for detail.

Critical habitat: Specific geographic areas having features essential to the conservation of a listed species that may require special management or protection.

Development pressure: Urgent demand for land use conversion that fragments habitats and isolates wildlife populations.

Ecological networks: Interactions of animal species and landscape ecosystems at a large-landscape scale including:

- conservation core areas
- corridors and linkages
- buffer zones and sustainable use of non-conservation lands
- human cultural and socioeconomic factors that affect wildlife needs, such as rural communities that coexist with wildlife.^{viii}

Focal species: Species chosen to represent the needs of all wildlife in the linkage planning area including:

- a) Species dependent on a single habitat type
- b) Area-sensitive species
- c) Species most sensitive to barriers^{ix}

Habitat connectivity: Extent to which an area of landscape helps ecological processes such as wildlife movement, seed dispersal and gene flow.^x

Habitat fragmentation: Process through which previously intact areas of wildlife habitat are divided into smaller disconnected areas by roads, urbanization or other barriers.^{xi}

Habitat patch: Area of land that provides suitable conditions for one or more species.

Landscape permeability: Refers to the degree to which landscapes are conducive to wildlife movement and can sustain ecological processes.^{xii}

Linkage design: Land that if conserved will keep or restore the ability of wildlife to move between wildland blocks. A linkage design joins biologically best corridors for focal species, avoids urban areas, minimizes edges and includes parcels of conservation interest.^{xiii}

Structure Types:

- **Approach/funnel fencing:** Fencing that serves to funnel wildlife toward passage structures.^{xiv} For larger animals (e.g., elk, deer), fencing promotes highway safety through reduced incidence of wildlife-vehicle collisions.^{xv} A 2013 Arizona Game and Fish Department study recorded a nearly five-fold increase in passage through underpasses and an elk-vehicle collision decline after approach/funnel fencing was correctly installed.^{xvi}
- **Escape measures:** Animals can sometimes breach fenced corridors and get trapped within the fenced portion of a highway corridor, potentially causing collisions with vehicles.^{xvii} Measures that allow animals to escape from fenced corridors may be installed. Each measure has strong and weak points that may make it more or less suitable based on site-specific conditions.
 - One-way gates
 - Escape ramps
 - Large wood plank ramps
 - In-line application
 - Corner application
 - Large concrete wall ramp
 - Small escape ramps
 - Slope jumps^{xviii}

Unintentional take: The terms “unintentional take” and “incidental take” are used in the Endangered Species Act to refer to the accidental killing or harming of any protected species as an unintentional or incidental side effect of another activity. The legal definition of “take” is to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, collect or attempt to engage in any such conduct.

Wildland blocks: Areas that the linkage design connects; may include varied landownership but must be biologically important to focal species and likely to remain in a relatively natural condition for at least 50 years. Blocks may contain non-natural elements but must have a long-term prospect of serving as wildlife habitat. The capacity for wildland blocks to support healthy wildlife populations is eroded if habitat connectivity between them is lost. Tribal sovereignty includes the right to develop tribal lands within blocks.^{xix}

Wildlife corridor: Areas in the landscape that enable wildlife to move between larger areas of intact habitat for seasonal migrations or to find food, water and mates.

Wildlife crossing: Human-made structures, such as bridges or tunnels, that help wildlife move safely over roads and other infrastructure, thereby reducing barriers to movement and wildlife-vehicle collisions.

Wildlife overpass: Structure built over a road that is designed to connect habitats and wildlife on either side. It is generally layered with topsoil, planted with vegetation and bordered by a wall or fence. Fencing of some design is connected at each side to direct animals toward the structure.

Wildlife underpass: Viaduct-type structures that are built underneath roadways exclusively for wildlife use. Underpasses are constructed in areas with high landscape permeability, known as wildlife corridors, and prohibit any motor vehicle or all-terrain vehicle use, provide ample natural lighting and conform to natural topography, including soils.

The Wildlife Habitat Connectivity Concept

Wildlife habitat connectivity is a process that allows animals to complete their life cycles with unimpeded movement. Animals need to move to water and food sources, shelter and favorable sites for breeding and raising young. When critical habitats are divided by structures, human-wildlife conflicts can occur.

Landscape ecologist Gray Merriam, PhD, first introduced the “landscape connectivity” concept at a conference in Denmark in 1984.^{xx} He explained that disrupting natural wildland blocks and linkages among habitat patches endangers both humans and animals. Merriam noted that understanding the interaction between animals and the landscape is fundamental to whether safe animal movement succeeds or fails.

Wildlife habitat connectivity is a process that allows animals to complete their life cycles with unimpeded movement.

Wildlife habitat connectivity was defined in 1993 as the “degree to which the landscape facilitates or impedes [wildlife] movement between resource patches.”^{xxi} Different focal species have unique needs that call for the collaborative work of biologists, engineers, planners and land managers to create linkage designs that reduce public safety hazards. The term “urban wildlife” (animals that live in or have adapted to survive in counties, cities, suburbs and towns) has become common among scientists in public and private sectors who study ways to support integration of wildlife populations with urban and suburban areas.^{xxii}

Fast-moving vehicles collide with wildlife, causing death and injury for humans and animals. In the 1950s, French transportation engineers designed the first known “ecoducts,” unmonitored bridges built to guide animals across highways as game management infrastructure.^{xxiii} The idea spread throughout Europe, and in the 1980s, the Netherlands built their first ecoduct, Ecoduct Woeste Hoeve, allowing animals to safely cross high-density infrastructure. The first wildlife bridge in the United States was constructed in 1975 by the Utah Department of Transportation near the town of Beaver, in Beaver County, Utah.^{xxiv}

Today, in the United States, approximately 1,000 dedicated wildlife crossing structures are guiding wildlife safely across roadways. One example is the Wallis Annenberg Wildlife Crossing, opening in Los Angeles County in December 2026. The inspiration for this massive structure was a mountain lion tagged as P-22 by the National Park Service (NPS). Emerging from the Santa Monica mountains, this cat survived crossing 12 lanes of California freeway and made his home in the smallest mountain lion habitat ever documented by NPS in Griffith Park. The story of his impossible journey spread globally and inspired the world’s largest wildlife crossing.

For county land use planners, it may seem counterintuitive to make wildlife habitat connectivity a top priority when faced with growing demands for affordable housing and commercial development. However, in some areas, it can be a vital piece of the overall puzzle. County leaders must balance land use availability, density, zoning compliance, economic growth, environmental protection, stakeholder engagement and other factors when considering comprehensive, long-range plans or community development projects.

Including accurate data about wildlife habitat connectivity in the preliminary stages of county land use planning reduces public safety risk while promoting economic growth. Thriving wildlife ecosystems have other benefits, such as clean air, healthy soil and a higher quality of life for county residents. In public lands counties with significant numbers of WVC, well-planned habitat connectivity networks are essential to public safety. There may be distinct types of wildlife habitats and/or unique needs across a single project area that are best informed by collaborative consideration, including multi-jurisdictional expertise and scientific review.

Accurate data collection relating to highway segments, animal movement, transportation density, land configurations and multiple land jurisdiction responsibilities is essential for determining effective wildlife mitigation measures. Counties can strategically align mitigation opportunities with community priorities to enhance the value and quality of county lands for residents, wildlife and local economies alike. **Integrating wildlife habitat connectivity measures into county land use planning is a long-term process that requires sustained coordination, planning and implementation over years.**



Reprinted with copyright permission from Steve Winter, National Geographic, Ghost Cats (2013)

Habitat Fragmentation Costs the Nation Billions

Habitat fragmentation threatens public safety, wildlife populations and local economies, costing the nation billions of dollars each year due to wildlife-vehicle collisions (WVC), infrastructure damage and lost economic activity tied to recreation and tourism. The FHWA estimates that **more than 1 million WVC occur annually nationwide, resulting in more than \$8 billion in economic losses** from vehicle damage, medical costs, lost income and other associated impacts.^{xxv}

In the 2025 Center for Large Landscape Conservation report for land use planners, *Integrating Wildlife Habitat Connectivity into Local Planning*, a fragmented landscape is described as being “like a shattered dinner plate – instead of one whole space for holding everything, it is scattered with pieces too small to use or too hard to reach.”^{xxvi} For wildlife, habitat fragmentation can create areas that are too small to sustain populations or too isolated to reach, threatening long-term species survival.

As habitat fragmentation and development pressures increase, these public safety and economic costs continue to grow across many public lands counties. Public lands counties often experience these impacts most directly because major wildlife migration routes frequently intersect with county roads, highways and expanding development near federal and state lands. The roads and other infrastructure interrupt the natural movement of animals in search of food, water and mates.

Fragmentation is caused by barriers that isolate wildlife populations and disrupt natural functions, including migration across seasonal ranges, access to forage and water, predator-prey interactions and breeding. Common barriers include roadways, railways, urban development, agricultural areas and fencing. Because counties guide land use planning and permit development near migration routes, roadway corridors and public lands boundaries,

county decisions regarding subdivision design, roadway placement, fencing and growth management can either worsen habitat fragmentation or help maintain wildlife connectivity and reduce WVC.

“A fragmented landscape is like a dropped and shattered dinner plate – instead of one whole space for holding everything, it is scattered with pieces too small to use or too hard to reach.”^{xxvii}
— Paul, Kylie, and A. Breuer, 2025

County governments that incorporate wildlife fragmentation and landscape integrity into land use development standards create additional benefits for residents and visitors. Many public lands counties depend on hunting, recreation and tourism to support local economies, making healthy and connected landscapes important economic and community assets. Declining wildlife populations can slow local economies, impact constituent livelihoods, adversely affect the hunting community and reduce lodging tax revenues.

Addressing wildlife fragmentation during initial county community development discussions and decision-making can improve project efficiency, accelerate larger-scale state and federal planning efforts, expand federal funding opportunities and help protect both human and animal lives. Creating a county urban wildlife planner position can also help counties make more informed land use decisions. An urban wildlife planner can conduct wildlife habitat research and data analysis, review development

applications and plans to reduce human-animal conflicts and build public awareness about incorporating wildlife considerations into community development.

While counties do not typically construct wildlife crossing structures, local land use policies and regulations can help preserve the migration routes and open space networks necessary for those structures to function effectively. Counties also provide critical local knowledge about development patterns, transportation needs and landscape conditions. Wildlife habitat connectivity planning is most effective when counties contribute timely local data and ground-truth recommendations to interagency partners.

Do Wildlife Crossings with Fencing Work?

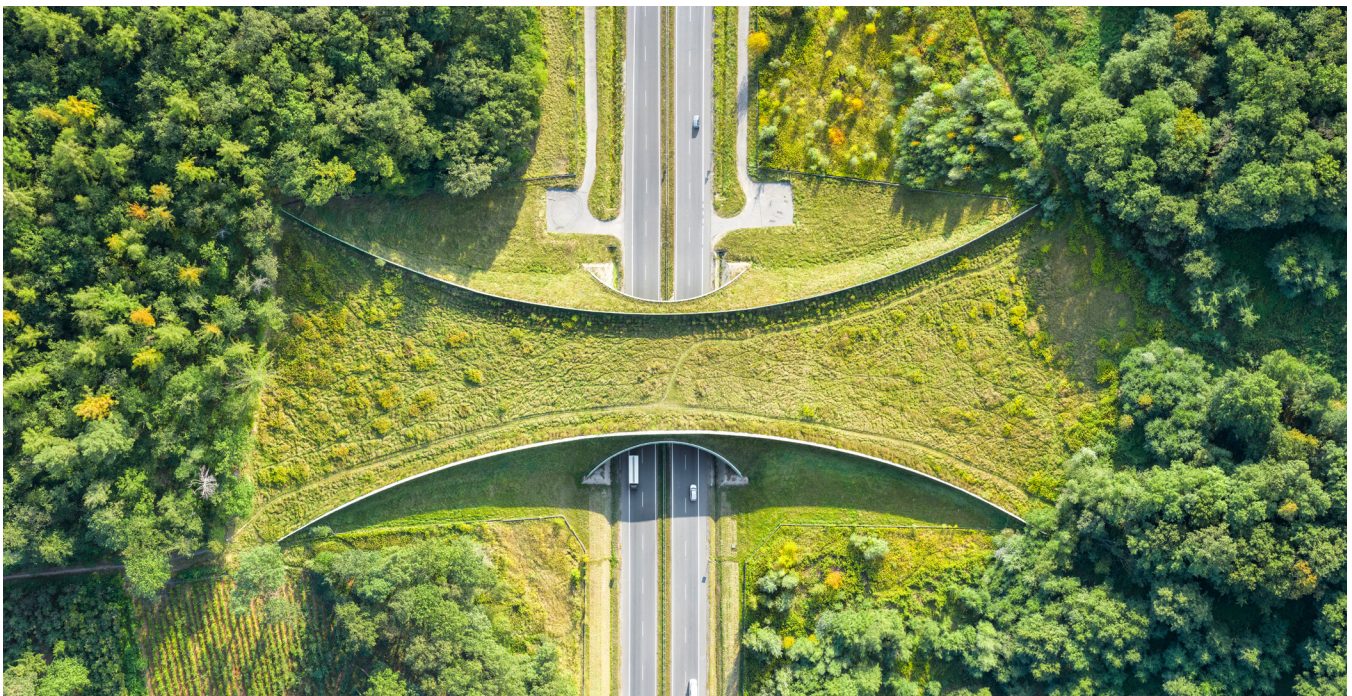
A 2025 review, conducted by Scioto Analysis, found that “...in both Colorado and Washington, wildlife crossings have proven to reduce wildlife vehicle collisions by 90 percent or more when they are built near migration routes and include directional fencing to guide wildlife.”^{xxviii}

A 2016 study had similar findings: “...the combination of fencing and crossing structures led to an 83% reduction

in roadkill of large mammals, compared to a 57% reduction for animal detection systems, and only a 1% [reduction] for wildlife reflectors.”^{xxix}

Without ungulate-proof fencing, the use of large wildlife underpasses by elk and mule deer was limited (most animals continued to cross at grade), and the incidence of wildlife-vehicle collisions increased dramatically. After approach/funnel fencing was installed, passage through underpasses increased nearly fivefold. Elk landscape permeability increased 60%, and elk-vehicle collisions declined 85%.

Wildlife often needs time to adapt to new crossing structures. State wildlife connectivity teams have found that data from collared animals helps identify the most effective crossing locations and that wildlife use during the first year can remain limited as animals adjust to funnel fencing and learn to navigate the crossings. Within roughly two years, use of crossing structures often increases significantly. Teams have also found that properly scaled “escape measures” incorporated into crossing designs further reduce WVC.



Intergovernmental Coordination: Existing Federal and State Policies and the County Role

U.S. Fish and Wildlife Federal Strategies Protect Endangered Species

U.S. Fish and Wildlife Habitat Conservation Plans (HCPs) are U.S. Fish and Wildlife (USFWS) planning documents that can vary from a single private landowner to larger regional plans. HCPs are “designed to accommodate economic development to the extent possible by authorizing the limited and unintentional take of listed species when it occurs incidental to otherwise lawful activities.”^{xxx}

HCPs allow projects to occur in endangered species habitats with specific measures for avoiding, minimizing or compensating for adverse effects on certain natural resources. Private companies and local and state governments may apply for an HCP, and individual landowners can join an existing HCP.

Counties can engage with USFWS HCPs in the following ways:

- 1. Negotiate Implementing Agreements with USFWS and states** to ensure all parties follow through on the HCP mitigation program delineated in the agreement
- 2. Apply to become the primary permittee** responsible for maintaining wildlife habitat preservation strategies
- 3. Collaborate with other jurisdictions** to apply for permits, including states, municipalities, special districts, Rural Transit Authorities or federally mandated transportation policy organizations such as Metropolitan Planning Organizations

The U.S. Fish and Wildlife Service administers the HCP program and encourages regional HCPs to promote land use planning efficiencies, reduce fragmentation and enhance permanent protection for species covered by the HCP. HCPs need to have five specific components:

- Biological goals and objectives
- Adaptive management (including methods for addressing uncertainty and biological goal monitoring and feedback)
- Compliance monitoring
- Permit duration
- Public participation, as required by the 1970 National Environmental Policy Act (NEPA)

State Wildlife Action Plans Provide Valuable Resources for County Land Use Planning

The USFWS administers a State Wildlife Action Plan (SWAP) program requiring states and territories to develop plans to manage “Species in Greatest Conservation Need.” Program participation makes states eligible for non-competitive and competitive federal project funding through the State and Tribal Wildlife Grants Program.^{xxxi}

USFWS State Wildlife Action Plans

Congress identified eight required elements to be addressed in each state's Comprehensive Wildlife Conservation Plan (State Wildlife Action Plan) as a condition of receiving federal funding through the State

Wildlife Grant Program. Plans must be reviewed and revised at least every 10 years. Column 3 in the table below specifies a USFWS planning focus area related to each element.^{xxxii}

EIGHT REQUIRED ELEMENTS

ELEMENT	FEDERAL REQUIREMENT	PLANNING FOCUS
1	Species distribution and abundance Information on the distribution and abundance of wildlife, including low and declining populations, indicative of the diversity and health of the state's wildlife.	Species status
2	Key habitats and community types Descriptions of locations and relative condition of key habitats and community types are essential to conservation of identified species.	Habitat
3	Problems and research needs Descriptions of problems that may adversely affect identified species or their habitats, and priority research and survey efforts needed to support restoration and improved conservation.	Threats
4	Conservation actions and priorities Descriptions of conservation actions proposed to conserve the identified species, habitats and priorities for implementing such actions.	Actions
5	Monitoring and adaptive management Proposed plans for monitoring focal species and their habitats, monitoring the effectiveness of conservation actions, and adapting those actions to respond to new information or changing conditions.	Monitoring
6	Plan review procedures Descriptions of procedures to review the plan at intervals not to exceed 10 years.	Review cycle
7	Agency and tribal coordination Plans for coordinating development, implementation, review and revision of the plan with federal, state and local agencies and Indian tribes that manage significant land and water areas or administer programs that significantly affect identified species and habitats.	Coordination
8	Broad public participation Provisions to ensure broad public participation in developing and implementing the plan, the projects conducted under it and identification of species in greatest need of conservation.	Public input

Source: U.S. Fish and Wildlife Service. <https://experience.arcgis.com/experience/45c94f0a195f41ed9cd7770f5d35fde3/page/Definitions-and-Resources>

Effective wildlife protections and habitat connectivity require a coordinated network of mitigation measures. Just as interagency cooperation is essential to emergency management, coordination among federal, state, county and municipal agencies is essential to effective wildlife protection. County land use planning for wildlife protection provides vital support to the larger connectivity network.

State Wildlife Action Plans (SWAPs) provide counties with science-based data and conservation priorities that can help guide local land use, transportation and community development decisions. Counties, in turn, play a critical role in implementing SWAP goals by incorporating wildlife habitat connectivity, migration

corridors and landscape health considerations into local planning, infrastructure coordination and development review processes.

Western State Governors Encourage Planning for Wildlife Habitat Connectivity

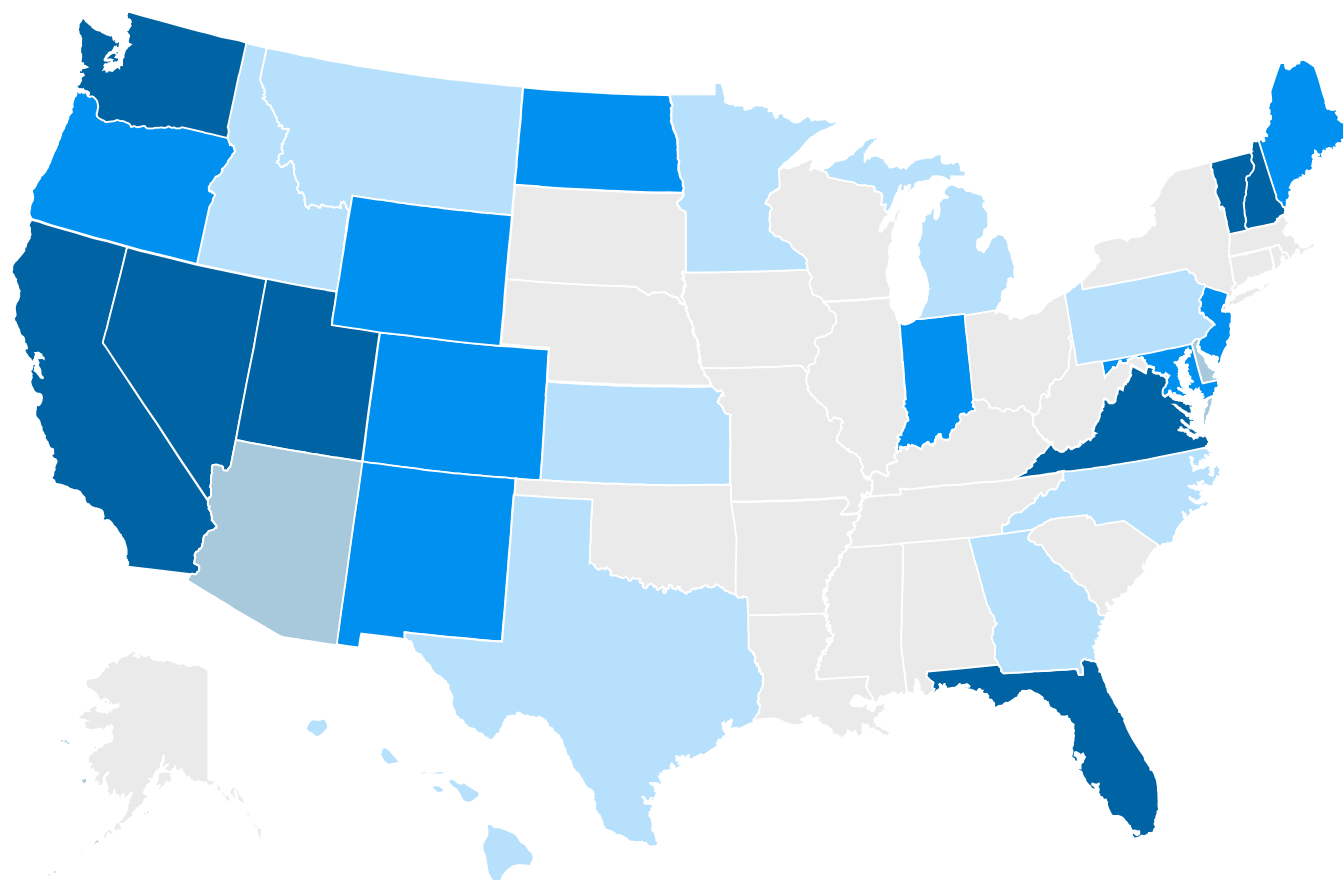
The Western Governors Association (WGA) supports finding, restoring and maintaining crucial habitats and wildlife corridors through their 2019 *Wildlife Migration Corridors and Habitat Policy Resolution 2019-08*. The resolution, renewed in 2025, acknowledges “patchworks of land ownership types,” including federal and private lands that complicate efforts to manage fragmentation issues effectively.^{xxxiii}



The WGA Policy Statement acknowledges the need to “identify monetary and non-monetary incentives to encourage voluntary corridor and habitat conservation

efforts.”^{xxxiv} Finding collaborative solutions through locally driven initiatives among different landowners is also encouraged.

STATES WITH LEGISLATION TO SUPPORT WILDLIFE CORRIDORS



■ Enacted Legislation (pre-2025) ■ Enacted in 2025 ■ Bill introduced in 2025 ■ No legislation tracked

Source: National Caucus of Environmental Legislators (NCEL) 2025 Legislative Recap. <https://ncelenviro.org/articles/2025-legislative-session-recap/>

As of 2025, at least 17 states have enacted legislation to support wildlife corridors:

When the 2021 Wildlife Crossings Pilot Program was enacted, 67 applications, far exceeding available funding, were submitted from 24 states during Round

1, with similar numbers in Round 2. Data for 16 FY25 Round 3 selections is now available.^{xxxv} The estimated total program grant funding was \$350 million; a fraction of the more than \$8 billion annual nationwide cost associated with WVC.

County Land Use Planning and Wildlife Connectivity

The land use planning tools presented here provide a basic framework that counties can use to incorporate wildlife habitat and corridor protection into local planning decisions. Development pressure, land availability, private land ownership and other factors create significant challenges for county land use decision-making.

At the same time, preserving larger connected areas of land and water can improve public safety by reducing human-wildlife conflicts while helping counties guide sustainable housing, commercial and industrial development to appropriate locations. **Connected landscapes also support economic activity tied to recreation, tourism, hunting and other natural resource-based industries that depend on healthy and functional ecosystems.**

Maintaining healthy populations of all native species within the county jurisdiction may be addressed by a collaborative interagency Resource Management Plan (RMP) or Area/Subarea Plan that supports Comprehensive Plan goals and specifies wildlife habitat connectivity priorities and projects. An RMP or Area/Subarea Plan can:

- Establish a consistent framework for action to guide county staff and interagency collaboration
- Map detailed data on animal movement/fragmentation areas and county mitigation measures
- Require annual monitoring reports that update data and track project progress
- Serve as a detailed public knowledge base for community development applicants

Comprehensive Plans

The Comprehensive Plan, sometimes referred to as a Master or General Plan, is an overarching land use blueprint that defines what is important to the quality of life within the jurisdiction. Plans can serve as a long-range non-regulatory vision statement and broad policy statements for land use within county boundaries. These plans can include wildlife habitat goals, objectives and policies in general terms. Comprehensive Plans can define:

- Urban growth boundaries
- Land use designations that protect sensitive areas
- Wildlife habitat connectivity goals, policies and objectives

Zoning Regulations

Zoning regulations implement and enforce the Comprehensive Plan. Often called “codes” or “ordinances,” zoning regulates land development in unincorporated areas of a county. County zoning codes define permitted land uses, building standards, development intensity and natural resource protections.

Because wildlife corridors and migration routes frequently cross jurisdictional boundaries, counties often work closely with municipalities, townships, neighboring counties and regional planning entities to promote coordinated land use planning and consistent conservation goals across landscapes.

Public lands counties also regularly coordinate with state and federal land management agencies to align development planning, transportation infrastructure and wildlife habitat connectivity priorities near federal and state lands.

Overlay Zones

Overlay zones are a valuable tool that can increase land use planning flexibility. An overlay zone applies additional standards over existing zoning districts to identify areas with a specific purpose or resource concern. Wildlife corridors can be mapped over existing zones to help guide development patterns, identify wildlife protection priorities and reduce habitat fragmentation and WVC.

In some states, including Texas, Alabama and Oklahoma, counties hold limited or no zoning authority over unincorporated areas, creating additional challenges for implementing wildlife habitat connectivity protections through local land use regulation. **In these areas, county leaders may need to work through state agencies, regional partnerships or voluntary planning frameworks to encourage coordinated conservation and development strategies.**

State preemption of local land use authority can also create challenges for wildlife habitat connectivity planning.

State preemption of local land use authority can also create challenges for wildlife habitat connectivity planning. Counties often possess the most detailed local knowledge regarding wildlife migration routes, roadway conflict areas and development pressures. **Limiting county involvement in land use and infrastructure decisions may reduce opportunities to incorporate local wildlife connectivity considerations into development planning and transportation projects.**



Resource Management Plan (RMP)

A RMP can be used as a foundational document for wildlife habitat connectivity. It includes greater detail than the Comprehensive Plan and may have specific, actionable items. For wildlife habitat connectivity, RMPs can include the following elements:

- **Collaborative partnerships and agreements** among county, state and federal agencies, municipalities, landowners, local nonprofit organizations and community groups representing diverse interests
- **A vision for protecting wildlife and minimizing human-wildlife conflicts** in the target area
 - Habitat evaluation (species identification, habitat condition/needs and corridor mapping)
- **Naming values of habitat areas** (cultural, economic, safety, public trust) within the target area
- **Mapping and designation of barriers** to wildlife movement for project consideration
- **Prioritized project plan** for restoring or starting wildlife protection that can include:
 - Planning goals and objectives
 - Acknowledgment of federal and state requirements
 - Incentivizing private land mitigations in sensitive habitat areas
 - Recommendations for balancing diverse community interests that can potentially compete
 - Plan compliance requirements for any projects in the target area
 - Regular plan implementation monitoring, reporting and records maintenance requirements (public information documents are included with regular reporting)

- Existing or potential funding stream partnerships (counties have used voter-approved Specific Purpose Excise Tax to fund wildlife protection projects)

For example, in 2015, Utah set a standard by enacting legislation requiring each county to incorporate a Resource Management Plan into its county general plan and allocating up to \$500,000 to support county plan development and completion. Each county in Utah now has an individual Resource Management Plan that covers 28 required resource topics, including threatened, endangered and sensitive species. Because counties did not require full allocation, Utah redirected the remaining funds toward developing additional story mapping and spatial data resources. This legislation requires that applicable state departments provide information and technical assistance to counties. Counties are also mandated to coordinate planning with other counties. All 29 Utah counties now have a detailed Resource Management Plan with robust data to present to federal agencies for collaborative planning on a wide range of natural resource topics.^{xxxvi}

County natural resource management planning helps position counties to pursue competitive federal funding opportunities and strengthens their role as effective cooperating agencies by providing locally grounded data, clearly identified priorities and established intergovernmental coordination frameworks. This planning capacity is becoming increasingly important as momentum for wildlife mitigation measures rapidly grows across the country.



Scan to learn more about Resource Management Planning in Utah.

Area/Subarea Plan

An Area/Subarea Plan is a more detailed planning document developed for a specific geographic area within a county or Resource Management Plan planning area. An Area/Subarea plan can guide land use, growth and sustainability in smaller areas based on geography, access to public lands, riparian areas, wildfire risk, water sustainability or other special needs.

More specific requirements for land development applicants may include site plan review with mapping showing wildlife movement paths, fencing requirements, lighting design or, in sensitive areas, an environmental assessment conducted by a qualified biologist.

Open-space acquisition for permanent protection may be recommended in selected areas as an added choice to reduce habitat fragmentation. Voter-approved tax measures or bonds are often used to fund acquisitions. **Routt County, Colo., has developed a voter-approved framework for open-space acquisition (see page 29 Routt County case study). Their voluntary Purchase of Development Rights program has successfully acquired agricultural and ranch land since the late 1990s.**

Voluntary Tools

Community education raises awareness and supports wildlife habitat connectivity. Including wildlife-friendly information in community development brochures, information sheets and workshops — and using these channels to report on project progress — can increase collaboration across various stakeholder groups and organizations.



Scan to learn more about Routt County, Colorado's Purchase of Development Rights Program.

Land Use Standards

Land use standards are regulatory provisions that define the minimum or maximum requirements for various aspects of land development to ensure consistency, safety, environmental protection and community goals.^{xxxvii}

Added requirements can be applied to overlay zones to ensure the appropriate protections are applied to a specific area. **Resource Management Plans or Area/Subarea Plans may be needed within that specific area to ensure all aspects of the area are adequately addressed and monitored by applicants and the county.**

Open-space acquisition for permanent protection may be recommended in selected areas as an added choice to reduce habitat fragmentation.

Counties Need Wildlife Corridor Mapping for Land Use Considerations

Wildlife corridor mapping is another essential tool for county land use planning staff. Many states today make GIS wildlife corridor linkage maps and connectivity assessments available to county planners who make land use recommendations to county governing bodies. These maps can also be available to community development applicants at the initial project development phase to ensure compliance with county land use standards and regulations.

The National Conference of State Legislators (NCSL) supports policies guided by scientific findings about seasonal wildlife migration patterns. In a 2022 Snapshot bulletin, NCSL emphasized the importance of wildlife migration corridors, noting that “the seasonal migration patterns of North American wildlife are essential to their survival.”^{xxxviii}

In 2018, the Secretary of the Interior issued Secretarial Order 3362, *Improving Habitat Quality in Western Big-Game Winter Range and Migration Corridors* focusing on federal lands in 11 states for Rocky Mountain elk, mule deer and pronghorn antelope.^{xxxix} The order requires Action Plans that include habitat management goals, measurable outcomes and budgets. Key considerations include state authority to conserve and manage big-game species and respect for private property rights.

States are beginning to collaborate on regional mapping databases; however, interagency collaboration can be affected when different agencies use different linkage mapping sources for planning. The Western Association of Fish and Wildlife Agencies is engaged in the most advanced regional effort with 11 states.^{xl} Mapping is focused on conserving winter range and migration corridors.

These states have collaborated with the U.S. Geological Survey and university and tribal scientists to map approximately 200 migration corridors and wildlife movement routes across the Western United States for bighorn sheep, elk, moose, mule deer and pronghorn in five volumes of the *Ungulate Migrations of the Western U.S.*^{xli}

As public lands counties use these mapping resources to guide growth, reduce fragmentation and coordinate with state and federal partners, county planning documents should be reviewed to determine whether wildlife habitat connectivity is clearly reflected in local policies, zoning tools and development standards.



Trappers Point overpass, Sublette County, Wyoming (Photo by Mark Gocke/WGFD).

Conclusion

A collaborative National Caucus of Environmental Legislators and Wildlands Network 2024 State of the States report notes that “80% of all U.S. habitat connectivity legislation has been passed within the last five years.”^{xliii} As community development demands increase, enriching local policies and strengthening zoning requirements for wildlife habitat connectivity is becoming an essential element of county land use planning.

County governments can play a central role in balancing growth, infrastructure development, public safety and natural resource stewardship. Through comprehensive planning, zoning, transportation coordination and development review, counties can help reduce habitat fragmentation, protect critical migration routes and minimize wildlife-vehicle collisions (WVC) while continuing to support housing, commercial and industrial development.

Wildlife corridor planning and related infrastructure investments can also help counties direct growth toward safer and more appropriate development areas while preserving landscape connectivity and ecological function. These efforts create long-term economic opportunities across multiple regions of a county by supporting recreation, tourism, hunting and other natural resource-based industries while improving transportation reliability and protecting public health and safety.

As counties evaluate future land use and infrastructure decisions, several broader questions emerge:

- Should wildlife habitat connectivity become a more formal component of county planning and public safety responsibilities?
- How can county development standards and permitting processes better account for wildlife migration routes and habitat fragmentation?
- What role should counties play in coordinating with state, federal and tribal partners on long-term planning for landscape connectivity?

As wildlife connectivity initiatives expand nationwide, public lands counties remain uniquely positioned to provide local knowledge, coordinate intergovernmental planning efforts and implement practical solutions that balance economic growth, infrastructure needs and long-term landscape health.



Utah Department of Natural Resources, Utah Division of Wildlife Resources, Wildlife Crossing Structures, Utah Wildlife Migration Initiative

Public Lands Counties Case Studies

The NACo National Center for Public Lands Counties, The Pew Charitable Trusts and the Center for Large Landscape Conservation have collaborated on selection criteria that balance diverse factors in wildlife management and conservation, public safety, economic viability and private interests for case study reviews. **Selection criteria include:**

- Expanding development pressures
- Economic impacts of wildlife-vehicle collisions
- Accelerating landscape fragmentation
- Role of private lands
- Watershed protection
- County innovations and partnerships
- Federal, state and local funding mechanisms
- Urban, rural and public land composition in counties



Connecting Corridors on Unincorporated Land: San Diego, Calif.

3.3 million POPULATION
39% MEDIUM SHARE OF FEDERAL PUBLIC LAND*



San Diego County's Biological Mitigation

Ordinance (BMO) implements and enforces the Multiple Species Conservation Program (MSCP) that applies to unincorporated county areas. **The BMO specifies land use tiers that encourage development outside of Priority Conservation Areas (PCA), which are large swaths of connected habitat, by increasing mitigation requirements in more sensitive areas.** Regional wildlife corridors must be factored into any project's analysis and design. The ordinance has been successfully and consistently applied since the 1990s.

The main tenet of the BMO requirements is that development areas are clustered to create significant blocks of habitat and reduce edge effects. This standard is consistently applied to all projects processed by the county, such as county parks, libraries, etc. The BMO has proven effective in minimizing impacts to PCAs and ensuring land set aside for conservation functions effectively as part of the interconnected preserve system. One weakness of this tool is that, in San Diego County, many distinct species and habitat types must be protected. In addition, San Diego County has a Resource Protection Ordinance (RPO) that prohibits development on steep slopes or in certain wetland areas. The RPO is essentially more prohibitive than the BMO.

In the early 1990s, San Diego County partnered with nine municipalities, community stakeholders, the U.S. Fish and Wildlife Service and the California Department of Fish and Wildlife (CDFW) to develop the South County Subarea Plan. The Subarea Plan supports the vision of the County of San Diego General Plan in greater detail.

Included in the plan was the 50-year Multiple Species Conservation Program (MSCP) focused on balancing wildlife protection, recreation, development and agricultural needs. The plan established funding structures and designated 582,000 acres for conservation with 98,379 acres chosen as county preserves to support 85 plant and animal species identified in the plan.

In 1997, the Board of Supervisors approved this Subarea Plan including the MSCP initiative for the southwestern part of San Diego County. **The MSCP's primary aim is to create wildlife corridors for 85 animal species on 98,379 acres of unincorporated area using large, connected preserves.** Creating these corridors reduces the need for animals to cross roadways.

The plan includes habitat evaluation modeling of PCAs. PCAs are areas of focus for future land acquisitions and where the county also incentivizes private development projects to place private mitigation. Basic elements of the habitat evaluation modeling include:

- Baseline biodiversity (all species and the vegetation community in a specific area)
- Conserved area identification
- GIS-based connectivity mapping

To date, 81,566 acres identified in the plan have been preserved.

The county Planning and Services Development Department also monitors Area/Subarea Plan progress and updates data through the MSCP Annual Report. The annual report includes two outreach documents for public distribution: the MSCP Brochure and the MSCP Information Sheet. In addition, the San Diego Parks Department hosts an annual public workshop to present and summarize MSCP progress.

A key feature of the 1997 Subarea Plan and MSCP is that both intentionally comply with the USFWS HCPs and the California Natural Community Conservation Program (NCCP). The NCCP mirrors the USFWS State Wildlife Action Grant by offering grant eligibility to entities that comply with NCCP requirements. San Diego County has used this grant funding to purchase conservation land and build out the county preserves. By increasing the county's amount of land under preservation, the county reduces potential project-specific conflicts.

An Implementing Agreement among the county, USFWS and the California Department of Fish and Wildlife provides the county with the legal obligation of a Section 10(a)(1)(B) Incidental Take Permit (ITP). The permit creates significant efficiencies for applicants by making the county a permitting authority. Permitted development is shielded from Endangered Species Act (ESA) Section 9 liability, provided all development activity complies with county BMO and MSCP requirements. San Diego County is a cost-saving “one-stop shop” for building and protected species permitting.

The next, more specific level of San Diego County wildlife habitat connectivity land use planning tools is Resource Management Plans (RMPs) that contain area-specific preserve management directives. Currently, the county has 16 Resource Management Plans for wildlife protection areas within the South Subarea, some of which are open to public access.

The RMPs include detailed property descriptions and management goals and objectives for the target area. RMP priorities are listed by category, including:

- Biological management and enhancement
- Public access, trails and recreation
- Hydrological management
- Grazing policy
- Wildfire prevention, control and management

Maps showing the Vicinity Area, Planning Area, MSCP Subarea and Corridors are included in the RMPs for clarity and quick reference.

The county still has significant WVC on one state route and moderate WVC on one interstate highway. Both roadways are currently being studied by the California Department of Transportation and the San Diego Association of Governments (SANDAG) as part of a multimodal corridor plan, including wildlife-corridor restoration crossings.

San Diego County’s Wildlife Habitat Connectivity Land Use Planning Framework

	County of San Diego General Plan	Interconnected Preserve System
	Multiple Species Conservation Program (MSCP)	50-year Implementing Agreement
	South County Subarea Plan	Delegated Permitting Authority Land Acquisition and Preservation Mechanisms
	Biological Mitigation Ordinance	(for South County MSCP Subarea Plan) Design Criteria for Linkages and Corridors
	Resource Management Plan	MSCP Management and Monitoring

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Building Wildlife Habitat Connectivity Through County Development Standards: Routt County, Colo.

25,243

POPULATION

47%

MEDIUM SHARE OF
FEDERAL PUBLIC LAND*



Examples from the UDC of appropriate mitigation strategies:

- Reclamation of a site when operations are complete
- Creation of added or improved habitat in the immediate area to

compensate for any habitat losses resulting from the development

- Reestablishment of populations affected by development
- Offsite mitigation to compensate for impacted habitat
- In instances where impacts on wildlife cannot be fully mitigated, compensatory offsets may be required^{xlv}

The UDC has additional standards for mitigation, including connectivity, site design, roads, vegetation and construction timing.

Wildlife mitigation plans that detail mitigation measures are required in high-priority habitat areas. There is also a requirement to implement site-specific best management practices that allow for animal movement, such as protecting wildlife corridors, using approved fencing designs and timing work according to habitat breeding seasons.

The UDC requirement for all development to adhere to the Colorado Parks and Wildlife's Recommendations to Avoid and Minimize Impacts to Wildlife from Land Use Development in Colorado matrix is enforceable, and the county reserves the right to require mitigation measures that are more restrictive than the state CPW requirements.^{xlvi}

A key feature of the county's land use planning framework is the Routt County Open Lands Plan, which is included in the Routt County Master Plan. The plan originated in the mid-1990s, when local

In the northwest corner of Colorado, Routt County has integrated wildlife protection and connectivity into both its 2022 Routt County Master Plan and its 2024 Unified Development Code (UDC).

The State of Colorado began addressing the costly issue of wildlife-vehicle collisions in 2018 by creating the Colorado Wildlife and Transportation Alliance, a statewide coalition of agencies and stakeholders led by the Colorado Department of Transportation and the Colorado Department of Natural Resources Division of Parks and Wildlife.

In 2019, in response to the Governor's Executive Order, Conserving Colorado's Big Game Winter Range and Migration Corridors, the two state departments signed a formal Memorandum of Understanding. The MOU began building a guiding framework for county land use planning that incorporates wildlife habitat connectivity and reduces human-wildlife conflicts.^{xliii}

The county incorporates the Colorado Parks and Wildlife Species Activity Mapping, which is updated every four years and incorporated into the UDC. Development applicants are required to use these maps to identify sensitive habitat areas and evaluate potential development impacts.^{xliv}

In high-priority habitat areas, the UDC requires a survey by a qualified biologist to assess possible impacts on the natural environment. In addition, the UDC adopts the state Colorado Parks and Wildlife (CPW) strategy of using three steps for private land development in sensitive areas: avoidance, minimization and mitigation strategies.

ranchers and the county commission began discussing conservation easements on privately owned ranches.

A 1996 voter-approved ballot initiative for the Purchase of Development Rights (PDR) program established the PDR Citizens Advisory Board (with equitable representation from diverse interests) which includes authorized program funding through a property tax levy.

The role of the PDR board is to review easement proposals and recommend funding for the county's acquisition of voluntarily offered development rights on ranch and agricultural lands and natural areas for preservation. In 2022, voters renewed the PDR program through 2035 with 84% voter approval.

As development pressure increases, county commissioners,

working with local partners, are exploring additional UDC mechanisms for applicant development guidelines in high-priority wildlife habitats. Mechanisms currently being explored by planning staff include:

- Establishing like-for-like offsets (developer replacement of the same type of damaged or destroyed habitat or ecological resource)
- Adopting a simple formula for habitat valuation
- Adopting study maps to guide land use planning
- Implementing a compensatory mitigation fund to leverage existing and/or future funding mechanisms for habitat protection or enhancement



Routt County Wildlife Habitat Challenges

The Mad Rabbit Trails Project in Routt County highlights some of the challenges faced when attempting to coordinate the work of several governmental agencies. The U.S. Forest Service approved plans for new hiking and biking trails that may disrupt ancestral wildlife migration routes and threaten the Bear's Ear elk herd. While the Forest Service has included adaptive management tools to minimize wildlife impacts in its plan, the county took an additional step.

In response to the Mad Rabbit proposal, using a combination of non-regulatory policies, the county partnered with the City of Steamboat Springs to create created the Routt County Recreation and Conservation Roundtable as a recommending body to land managers responsible for recreation and/or conservation planning and policy decisions.^{xlviii} The roundtable has documented community priorities in the Routt County Conservation and Recreation Strategy, which was approved by the county commission.

WVC are a challenge on U.S. Highway 40 through Routt County. The county is currently participating in a study to determine where mitigation and conservation investments will reduce WVC and support landscape-scale habitat connectivity. Highway segments and mitigation actions are being identified and reviewed to reduce human-wildlife conflicts.

Routt County has also partnered with local and neighboring municipalities to form the Yampa Valley Regional Transportation Authority (RTA), approved by voters in 2025. The RTA is building a framework for regional public transportation across both counties, including wildlife mitigation in the regional infrastructure. The RTA's jurisdictional collaboration is positioned to collectively address WVC on U.S. Highway 40 and other high-risk highway segments.

Routt County's Wildlife Habitat Connectivity Land Use Planning Framework



**Routt County
Master Plan**

Routt County Open
Lands Plan



**Routt County
Unified
Development Code**

Wildlife Mitigation
Plans and Colorado
Parks and Wildlife
Species Activity
Maps



**Purchase of
Development
Rights Program**

Voluntary Land
Acquisition Program



Subarea Plans

Stagecoach
Community Plan



**Routt County
Recreation &
Conservation
Roundtable
Conservation &
Recreation Strategy**

Conservation,
Destination
Management and
Recreation

** This data likely includes surface water and may not reflect the full mapping of all parcels due to sensitive areas. Private land in this data set could also include unmapped federal land. Some datasets may calculate land ownership using slightly different boundary files, classifications or reporting years than what counties use internally. Some counties also include roads, rights-of-way or leased public lands in their "private" acreage figures, which can change the percentage. Source: Headwaters Economics Public Land Ownership in the United States. <https://headwaterseconomics.org/public-lands/protected-lands/public-land-ownership-in-the-us/>*

Partnering Across Public Lands to Protect Wildlife Habitat Connectivity: Kane County, Utah

7,667 POPULATION
85% LARGE SHARE OF
FEDERAL PUBLIC LAND*



A primary principle of the current Kane County General Plan is “aligning the scope of county governance with our nation’s founding principles. This includes providing adequate protection without unduly restricting the liberties of residents and visitors.”^{xlviii}

The private land base is approximately 10% of 2.6 million acres inside county boundaries. The General Plan provides landowners with a “wide array of opportunities to use their property without undue constraint.”^{xlix} Zoning regulations focus on fundamental fairness in regulation and property value protection.

Portions of the Grand Staircase-Escalante National Monument are located within Kane County, with private, permitted and leased ranches inside monument boundaries; 85% of the county land base is managed by federal agencies, including the Bureau of Land Management, the U.S. Forest Service and the National Park Service.

The General Plan contains direct language describing the county’s expectations as “...a proactive equal partner in all public lands planning processes which impact the county land base.”ⁱ This sparsely populated county partners with the Utah Department of Natural Resources in engaging with federal agencies, sharing state mapping data from mule deer collaring and contributing county resources to state wildlife mitigation projects.

This collaboration produced one of the most successful mule deer mitigation projects in North America.ⁱⁱ U.S. Highway 89, the National Park Highway, bisects the Paunsaugunt mule deer herd migration route, causing wildlife-vehicle collisions (WVC) primarily during spring and fall migration.

Multiple federal agencies, Utah and Arizona state agencies, and nonprofit partners collaborated on the Kanab-Paunsaugunt Wildlife Crossing project to construct fencing, escape measures and new culverts along Highway 89 to guide deer under the highway. The county contributed in-kind work installing cattle guards and field-level knowledge to resolve cattle fencing issues and hunter and visitor disruptions that initially restricted animal movement through the culverts.

The public lands within Kane County attract between three and five million visitors annually, making natural resource management an important priority. The Kane County, Utah Resource Management Plan (RMP) is a component of the General Plan focused on guiding land use decisions, managing natural resources and maintaining the county’s position as a proactive, equal partner in all public lands planning processes that impact the county’s limited private land base.

The RMP states the county’s position on a wide range of natural resource topics. This county resource management statement is an outgrowth of the State of Utah’s 2015 legislation requiring each Utah county to include Resource Management Plans within all County General Plans. A county Resource Development Committee was formed, representing diverse county interests, to advise the board of commissioners on resource development planning.ⁱⁱⁱ

By resolution in 2021, the county established the Kane County Public Lands Department to maintain partnership status in public lands management within county boundaries. The new department oversees the work of the Resource Development Committee and the Resource Management Plan. The county views interagency partnership as crucial to its stewardship of public lands within Kane County and has participated in the most recent Grand Staircase-Escalante Monument Management Plan.

In the RMP sections titled “Threatened, Endangered & Sensitive (Candidate) Species,” Kane County “agrees to restrict (or prevent) use if necessary or when irreparable harm would result to the species if the use was allowed.” Subsequent plan sections provide detailed information for each focal species type, including location and habitats, collaborative studies and potential for human-wildlife conflicts.

The document creates a thorough record of county conservation actions. When a county-specific conservation plan is not in place, the county defers to the Utah Wildlife Action Plan.

Mitigation work is still needed along U.S. Highway/State Route 89 North to Salt Lake City as significant WVC still occur near Alton, Utah in Long Valley. The state has formally incorporated the U.S. Highway into its system and the Utah Department of Transportation organizes regional meetings involving several counties to address long-range planning for its jurisdictional roadways.

The challenge for regional planners is that Highway 89 North is not a mule deer migration route. Animals cross the roadway to access forage and water. Further study is needed to identify highway segments with the highest incidences of WVC. Further study may involve collaring animals and tracking their movements over time to identify the most effective public safety locations for mitigation infrastructure.

Kane County’s Wildlife Habitat Connectivity Land Use Planning Framework



**Kane County
General Plan** Equal Interagency
Partnership



**Kane County
Administrative
Land Use Authority** Sensitive Land
Protection



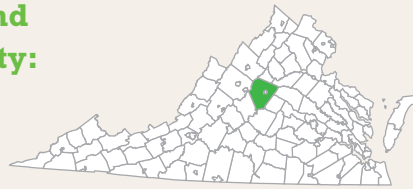
**Kane County
Resource
Management Plan** Wildlife Crossings
and Connectivity

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Planning for Biodiversity and Wildlife Habitat Connectivity: Albemarle County, Va.

117,313 POPULATION

3.1% SMALL SHARE OF
FEDERAL PUBLIC LAND*



At the foothills on the eastern side of the Blue Ridge Mountains, Albemarle County is in central Virginia with approximately 95% of the county land base located in the Rural Area zone intended for agriculture, natural resource protection and some residences. Two waterways, the Rivanna River and the James River, flow through county lines. Albemarle County also serves as a gateway community to Shenandoah National Park, Skyline Drive and the Blue Ridge Parkway, with tourism, outdoor recreation and regional transportation networks closely tied to park access and the surrounding Blue Ridge landscape.

The Board of Supervisors adopted a new comprehensive plan (AC44) in 2025 based on four guiding principles: a green and resilient community, a welcoming and equitable community, a connected and accessible community and a thriving and prosperous community.

The county engages in extensive public outreach and stakeholder engagement during all land use planning policy and regulation development. Residents, the Natural Heritage Committee, and local conservation organizations provided input on the Environmental Stewardship chapter of the new Comprehensive Plan.

The primary goal in the AC44 Environmental Stewardship chapter is prioritizing the protection, restoration and expansion of areas that provide



habitats and connect land and water networks for local species. Objectives include:

- Restoration of critical habitats including a network of large, well-connected habitat blocks, guided by additional county plans
- Improving wildlife habitat connectivity by removing barriers to wildlife movement

In 2005, the Board of Supervisors created the Natural Heritage Committee, a public body charged with advising the county on biodiversity issues and advancing local biodiversity awareness and education. The committee includes local landowners and citizens with diverse interests. Not all members are required to be county residents. Non-resident committee members are typically biodiversity or environmental education experts.

The Natural Heritage Committee assisted in drafting the 2018 Biodiversity Action Plan, which was originally called for in the county's 1998 comprehensive plan. Separate from AC44, the BAP identifies important forest blocks and establishes wildlife connectivity as an important conservation goal (one of several conservation goals).

Information from the BAP (and other relevant sources) is applied to decisions on proposed voluntary conservation projects, especially conservation easements.

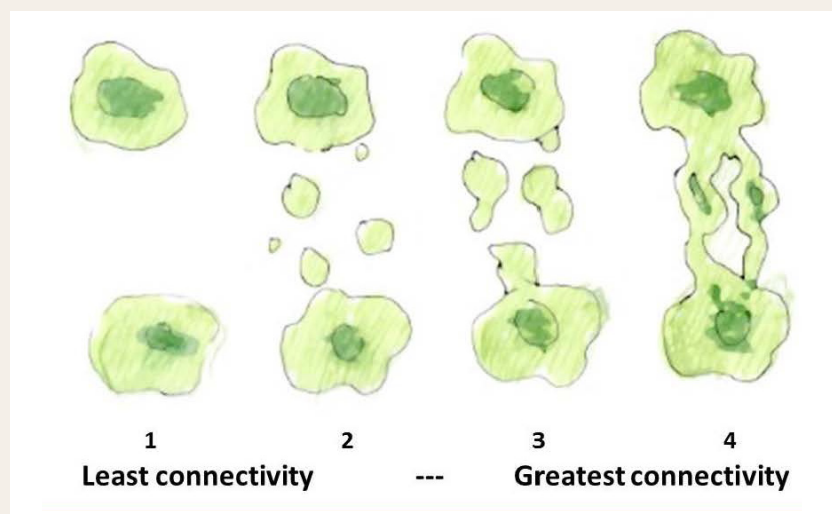
In reviewing forested habitat across Albemarle County for the BAP, four characteristics were assessed:

1. Edge and interior habitat
2. Size of habitat areas
3. Shape of habitat areas
4. Connectivity among areas of habitat

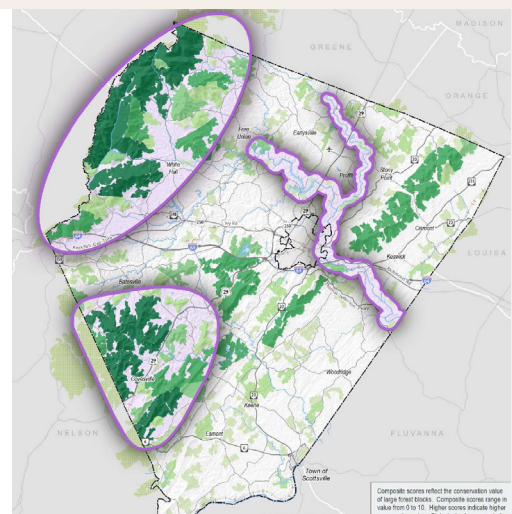
The size of the habitat area is generally considered the most important factor in determining conservation value. The first figure below illustrates the importance of habitat connectivity and the second figure shows the actual Albemarle Conservation Focus Areas.

In its Zoning Ordinance, the county does not have a specific “habitat-sensitive design” requirement. However, there are clustering options, including a rural clustering option that protects a portion of the developed property for agricultural and open-space purposes. The county does not require cluster development, but encourages it

ALBEMARLE COUNTY CONNECTIVITY MAP



Four examples of differing levels of connectivity between habitat areas.



Conservation Focus Areas

Source: Albemarle County Biodiversity Action Plan. <https://mmillericeland.wordpress.com/>

where possible in the Rural Area, and makes the option available in some residential zoning districts. The rural clustering option is not frequently used.

The county's Community Development Department has invested in two full-time conservation program staff and has one part-time conservation easement monitor supported by state funds. Staff members' responsibilities include:

- Managing voluntary land-conservation programs (conservation easements, open space use agreements and agricultural-forestal districts)
- Providing input into comprehensive planning and individual development projects review
- Supporting a conservation easement authority and two advisory committees (the Natural Heritage Committee and the advisory committee for the agricultural-forestal districts program)
- Implementing a Stream Health Initiative, including development of a riparian-buffer ordinance

U.S. Route 29, a major highway through Albemarle County, bisects the Southern Albemarle Mountains and is a significant impediment for wildlife crossing.

County staff worked with the Virginia Polytechnic Institute and State University Master Naturalist volunteer program to collect data on road-killed wildlife locations, helping identify potential crossing sites.

Implementing the Biodiversity Action Plan remains a key county goal. The plan's core focus areas related to wildlife-vehicle collisions (WVC) are preserving and improving habitat blocks and conserving forested corridors.

Albemarle County's Wildlife Habitat Connectivity Land Use Planning Framework



**Albemarle County
Comprehensive
Plan AC44**

Environment
Stewardship Chapter



**Albemarle County
Code – Chapter 18
Zoning**

Range of Zoning
Districts



**Albemarle County
Natural Heritage
Committee**

Biodiversity Advisory
Group



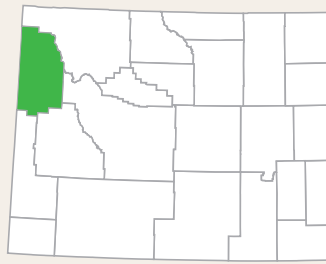
**Albemarle County
Biodiversity Action
Plan**

Conservation Focus
Areas

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Advancing Ecosystem Stewardship Through County Land-Use Planning: Teton County, Wyo.

23,400 POPULATION
97% LARGE SHARE OF
FEDERAL PUBLIC LAND*



Teton County partners with the town of Jackson, Wyo., for long-range land use planning and annually reviews work plans and impacts on the ecosystem. This collaboration has resulted in a range of land use policies and regulations for addressing public

The Jackson Hole area, with its surrounding National Forest, National Elk Refuge, Grand Teton and Yellowstone National Park lands, is in the northwest corner of Wyoming. An average of 3 million tourists annually visit the region and navigate the equally large populations of bison, black bears, elk, grizzly bears, moose, pronghorn and wolves that roam across the public and private lands. Seasonal migrations and exceptional habitat mean that wildlife movements intersect a network of rural highways, scenic byways, and local roads, putting wildlife and human safety at risk from collisions.

safety and maintaining healthy populations of all native species. In 2012, the two elected bodies adopted a Comprehensive Plan that starts with a vision statement focused on preserving and protecting the area's ecosystem and the land use planning framework built around that statement.

The county encompasses approximately 2,697,000 total acres, of which only approximately 76,000 acres are privately held; the remaining 97% are either federally or state owned or managed land. Development pressure is significant, in addition to substantial annual tourism service needs. To address these pressures, Teton



County land use planning is designed around three Common Values of Community Character: ecosystem stewardship, growth management and quality of life.

Ecosystem stewardship is described as a core value of Teton County’s Community Character. Centered on the commitment to preserving its legacy of natural resources for future generations and leading by example in strategic planning and adaptive management, the county guides land use decisions through an ecosystem stewardship lens.

Wildlife-Vehicle Collisions (WVC) hotspots are identified in Teton County’s Wildlife Crossing Master Plan, adopted by the county from the Western Transportation Institute at Montana State University. The Wyoming Highway 22 and 390 intersection, near the Snake River Bridge, is the location of the highest concentration of moose-vehicle collisions in the state. WVC at this hotspot, in the Snake River riparian corridor, were successfully reduced through collaborative funding among Teton County, Wyoming Department of Transportation and the Wyoming Wildlife and Natural Resources Trust partners through the construction of wildlife underpasses and fencing.

The county contributed as a funding partner for this project, using voter-approved Specific Purpose Excise Tax (SPET) dollars derived from sales tax revenue. Since 1985, the town of Jackson and Teton County have identified and agreed on ballot initiatives, including this type of infrastructure project. Residents then vote to approve or deny SPET local funding for proposals. In 2019, 79% of voters approved an SPET measure in support of funding \$10M for wildlife crossings infrastructure.^{liii}

Natural Resource Protection Standards in the Teton County Land Development Regulations (LDR) enforce land use requirements using a Natural Resources Overlay Map covering all LDR zones with Tiered Habitat Protection Standards.

Fragmentation is specifically addressed in these regulations. Clustering development on-site, within the context of habitat values on a parcel, is used to avoid and minimize fragmentation. Projects that occur in high-tier habitat require a thorough environmental analysis that includes mitigation requirements. Staff use environmental data and site reviews to determine four primary factors:

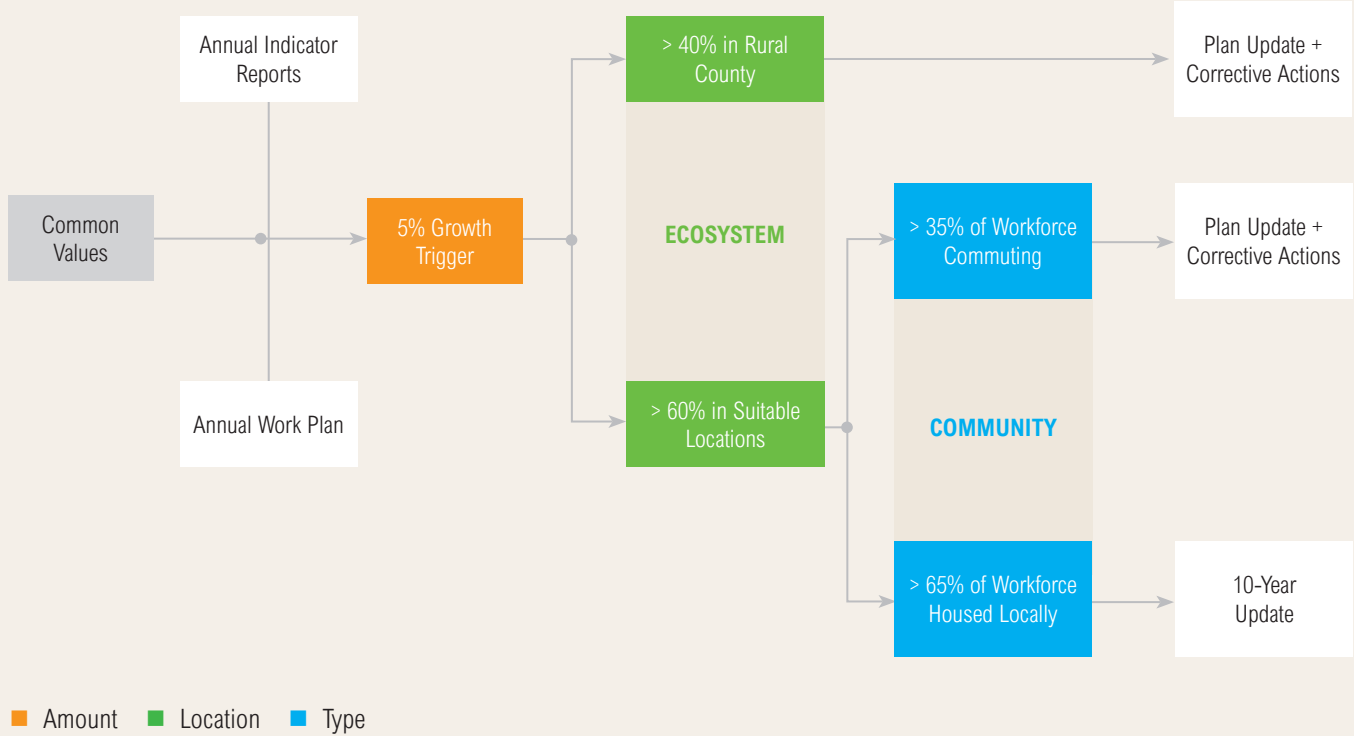
- a. Number of existing patches
- b. Habitat patch size
- c. Edge length
- d. Perimeter area ratio

Based on environmental analysis, county staff may explore development alternatives to avoid habitat interruptions.

Teton County’s Wildlife Habitat Connectivity Land Use Planning Framework

	Jackson Teton County Comprehensive Plan	Natural Resource Protection Standards
	Teton County Land Development Regulations	Natural Resource Overlay with Tiers
	Teton County Wildlife Crossings Master Plan	Adopted from Montana State University
	Jackson Teton County FY26 Implementation Work Plan	Project Monitoring

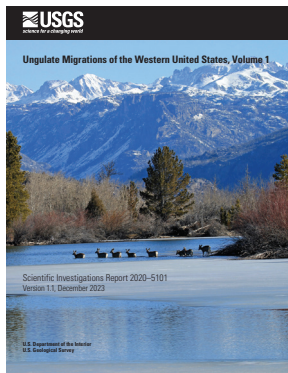
JACKSON TETON COUNTY COMPREHENSIVE PLAN DEVELOPMENT DECISION TREE



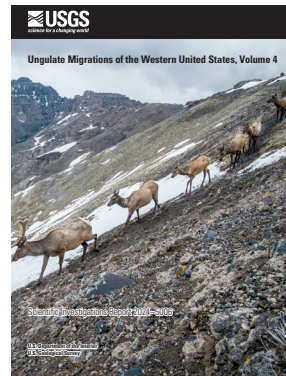
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Appendix: Map Applications

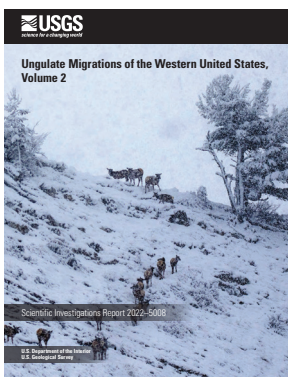
The U.S. Geological Survey and university and tribal scientists collaborated to map just over 200 migration corridors and wildlife movement routes across the Western United States for bighorn sheep, elk, moose, mule deer and pronghorn in five volumes of the Ungulate Migrations of the Western U.S.



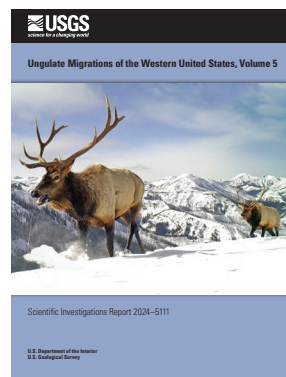
Volume 1: Arizona, Idaho, Nevada, Utah and Wyoming



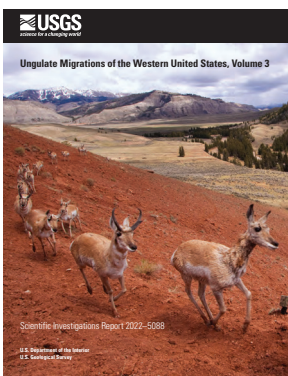
Volume 4: Arizona, California, Nevada, New Mexico, Utah, Washington, Wyoming, Wind River Reservation, Oregon, Colorado, Pueblo of Tesuque, N.M.



Volume 2: (expanded coverage) Arizona, California, Idaho, Nevada, New Mexico, Utah, Washington, Wyoming and Wind River Indian Reservation



Volume 5: Arizona, California, Colorado, Idaho, Nevada, New Mexico, Oregon, Wyoming, Navajo Nation (Series total: 218 migrations mapped)



Volume 3: Arizona, California, Idaho, New Mexico, Utah, Washington, Wyoming and the Navajo Nation



Endnotes

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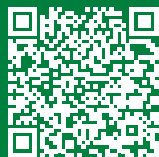
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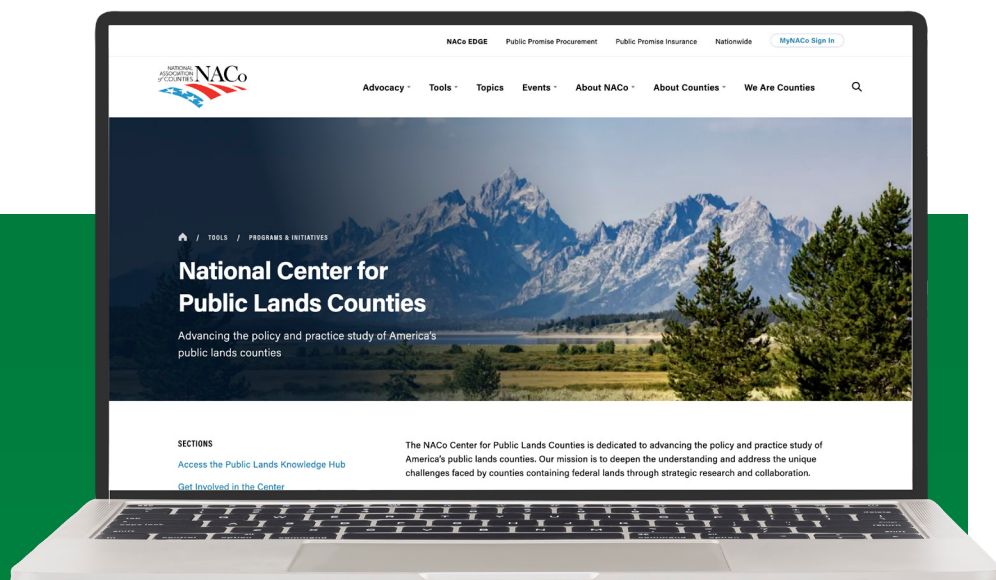
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