LAND TRUSTS and WILDLIFE CROSSING STRUCTURES

A toolkit detailing how land trusts can contribute to highway infrastructure projects for wildlife

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September 2022 (Working Draft)

This resource serves to help land trusts start to or further engage in wildlife crossing structure projects by capturing lessons learned and best practices.

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As wildlife move about in their daily lives and life cycles, they often cut through landscapes made up of parcels with different land management goals and objectives—including public and private lands. Whether there are large blocks of public lands split by a few private inholdings, or a patchwork of landowners and parcel sizes, any effort to protect these movement pathways (sometimes called corridors or linkages)—and landscapes on a larger scale—must engage private landowners.

Land trusts play a vital role in habitat connectivity. Many land trusts contribute to reconnecting habitat through conservation easements or acquisitions in key landscape linkages and through land stewardship efforts that facilitate the movement of native species, such as modifying fences to make them less of an impediment. These private land conservation and stewardship efforts are especially important on lands in an area where there are existing structures or potential/proposed wildlife crossing structures (or "wildlife crossing," used interchangeably) to help wildlife safely cross roads bisecting their habitat.

Wildlife Crossings and Their Benefits

Conflicts between vehicles and wildlife are an increasingly urgent public safety, wildlife conservation, and economic issue. Each year in the US, wildlife-vehicle collisions kill more than one million large mammals, cause hundreds of human fatalities, and result in over 26,000 injuries[1]—all at a cost to Americans of roughly $9.7 billion annually.[2]

Roads not only cause direct mortality but also create a barrier that can deter wildlife from even attempting to reach habitat on the other side, impeding the daily and seasonal movements necessary for fish and wildlife to find food, water, and mates. Over time, roads can fragment ecosystems so severely that only a disconnected patchwork of habitat remains. This isolation of wildlife populations can result in a combination of threats - such as loss of genetic diversity, disease outbreaks, and an inability to adapt to climate change – that can lead to local extinction.

[1] https://www.fhwa.dot.gov/publications/research/safety/08034/08034.pdf
[2]https://largelandscapes.org/wp-content/uploads/2019/06/Roads-Infographic.pdf

Numerous studies suggest that wildlife crossing structures, combined with proper fencing that guides animals to these safe crossing routes, can reduce wildlife-vehicle collisions by 86-97%.[3] Wildlife crossing structures include overpasses, underpasses, bridges, culverts, and tunnels that allow wildlife to move through them. These structures pay for themselves relatively quickly by preventing costly and devastating accidents.[4] Existing culverts and bridges can also be modified to encourage increased wildlife use and keep them off roads in a cost-effective manner. The success of these projects—from small tunnels for amphibians in Vermont to overpasses for panthers in Florida and big game in the West—prove that wildlife crossing projects generate an impressive return on investment. These efforts are important no matter what part of the country your land trust works within; the likelihood is there are steps that can be taken to help humans and wildlife, large and small, move more safely and freely.

The Need for Private Land Protection Adjacent to Wildlife Crossings

When determining where to build wildlife crossing structures, decisionmakers generally require that land on either or both sides of the proposed site is protected in a way that will allow it to continue to serve as wildlife habitat over time. If the land adjacent to the site is private land that is not protected (e.g., through a conservation easement or acquisition), decisionmakers worry that the land will be developed and wildlife will eventually be unable to access the wildlife crossing structure.

It is sometimes deemed the most feasible to place wildlife crossing structures where public land abuts both sides of the road – but often the key pinch point locations for habitat connectivity occur where private lands are found – in valley bottoms, riparian areas, and other areas easily developed that also contain wildlife habitat. Ultimately, if the adjacent land is protected or very likely to be protected, the proposed wildlife crossing structure is more likely to be perceived as a wise, long-term investment. If there is private land is not yet protected but land trusts are working to conserve it and coordinating those efforts with state DOTs and other decisionmakers, this can increase the viability of a wildlife crossing structure proposal. Clearly, land trusts and private landowners can be critical for a wildlife crossing structure project.

Land Trusts Play a Vital Role in Wildlife Crossing Projects

The following functions that land trusts can play illustrate the value of land trust engagement in wildlife crossing structure projects:

Holding conservation easements or owning land. Some land trusts acquire and manage their own lands, some acquire and transfer ownership to land management agencies, while others focus on conservation easements with private landowners. All approaches can be valuable for wildlife crossing projects.

The following are examples where land trusts were essential for wildlife crossing projects:

- The Land Trust of Santa Cruz County protected three properties on both sides of Highway 17, collected data, raised funds, and is partnering with CalTrans and Santa Cruz County Regional Transportation Commission and others to construct a wildlife underpass.[5] [6] [7]

[3] https://largelandscapes.org/wp-content/uploads/2021/06/Highway-Crossing-Structures-for-Wildlife-Opportunities-for-Improving-Driver-and-Animal-Safety.pdf
[4] https://largelandscapes.org/wp-content/uploads/2021/01/Wildlife-vehicle-Conflict-Crossing-Structures-and-Cost-Estimates.pdf
[5] https://www.landtrustsantacruz.org/unprecedented-partnership-breaks-ground-on-highway-17-wildlife-tunnel-project/
[6] https://www.landtrustsantacruz.org/galleries/highway-17/
[7] https://www.landtrustsantacruz.org/something-to-celebrate/

- Mojave Desert Land Trust acquired land on both sides of a highway, and Caltrans plans include a potential wildlife crossing structure in the area.[8]
- The New Mexico Land Conservancy was a member of the Tijeras Canyon Safe Passage Coalition when land parcels in an important location opened for development and the Land Conservancy facilitated the purchase by the City of Albuquerque.[9] Fencing was added to funnel wildlife to existing structures.

Below is a list of some land trusts in the United States that have webpages relating to and are working on conservation easement or acquisition projects specifically involving wildlife crossing structure projects. *If you are part of a land trust is working on these issues that is not listed, please connect with us! We'd love to hear from you and add your project to the list – particularly across different regions in the U.S.*

- Land Trust of Santa Cruz County - Hwy 17/Laurel Curve Wildlife Crossing[10] [11]; Gabilan Wildlife Corridor[12]
- Peninsula Open Space Trust – Hwy 17[13]; Coyote Valley[14]; Hwy 152 Pacheco Pass[15]
- Sonoma Land Trust – Sonoma Valley wildlife corridor[16]
- Southern Oregon Land Conservancy – Colestin-Siskiyou Summit Focus Area[17]
- Mojave Desert Land Trust – Hwy 62[18]
- The Nature Conservancy – CA - I-15 Santa Ana to Palomar Mountains Linkage[19] [20]
- Santa Monica Mountain Conservancy – US-101- Liberty Canyon[21] (state conservancy)

Serving as interim landholders. Land trusts can serve as an interim or short-term landowner to help ease the way of wildlife crossing projects. Land trusts can be nimbler than government agencies in situations where land may need to be purchased quickly or may have access to funding sources not directly available to government agencies. Land trusts can step in to serve as an interim landowner to hold the property until a transfer can occur to convey the property to the final intended landowner/manager. Additionally, land trusts may have access to funding options such as bridge loans that other entities may not have access.[22]

Finding conservation buyers. Land trusts can help agencies and other partners find conservation buyers to purchase and own important parcels that have existing or future conservation easements from conservation-minded sellers. With their expertise, land trusts can ease the way for negotiation of final sale agreements and other complicated real estate transactions.

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[8] https://www.desertsun.com/story/news/environment/2021/08/16/mojave-desert-land-trust-wants-wildlife-overpass-highway-62/8102951002/
[9] http://www.safepassagecoalition.org/
[10] https://storymaps.arcgis.com/stories/40523de82f3042629f0e5f58112f3038
[11] https://www.landtrustsantacruz.org/category/protected-lands/hwy17-wildlife-crossing/
[12] https://www.landtrustsantacruz.org/1st-gabilan-wildlife-corridor-property-protected/
[13] https://openspacetrust.org/blog/wildlife-crossings/
[14] https://openspacetrust.org/blog/monterey-road-report/
[15] https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=189189
[16] https://sonomalandtrust.org/current-initiatives/sonoma-valley-wildlife-corridor/
[17] https://www.landconserve.org/news/we-did-it-nov2019
[18] https://www.desertsun.com/story/news/environment/2021/08/16/mojave-desert-land-trust-wants-wildlife-overpass-highway-62/8102951002/
[19] https://www.scienceforconservation.org/assets/downloads/SoCalLinkage_Report-2018.pdf
[20] https://www.nature.org/en-us/what-we-do/our-priorities/protect-water-and-land/land-and-water-stories/a-path-for-mountain-lions/
[21] https://smmc.ca.gov/liberty-canyon-wildlife-corridor/
[22] https://conservationtools.org/guides/123-bridge-loans-for-conservation-purchases

Designing conservation easements for land adjacent to wildlife crossings. While drafting a conservation easement, if the land is adjacent to a roadway, it can be helpful to consider whether a wildlife crossing structure may be desired, warranted, or proposed in the area in the future. Conservation easement language can be crafted so that habitat connectivity conservation is recognized as a purpose of the easement and use limitations can ensure future activities will not negatively impact the easement purposes.

- When land trusts design a conservation easement with a purpose of facilitating wildlife movement, they can include relevant and appropriate references to habitat connectivity and wildlife crossings in the easement language. Clauses can clearly establish the property's connectivity values for species movement as a purpose of the easement, and future uses of the property can be evaluated for consistency with this purpose. Buffer zones of reduced human activity near crossing structures could be considered.
- If a land trust may be interested in such efforts in the future but there are none planned, generic language could be included such as 'Improvements can be made to provide secure wildlife movement.'
- If a landowner and land trust may not be interested or able to take active part in a future wildlife crossing project, it would be beneficial to ensure the easement language did not inadvertently prevent a future project or otherwise hinder wildlife movement across a property.
- If an existing conservation easement has language that could be construed to impede the construction of an adjacent proposed wildlife crossing structure (such as with language prohibiting development or ground-disturbing activities), it is possible the conservation easement could have an administrative amendment if the land trust and landowner feel it is warranted and preferable.

Some resources regarding guidance on inclusion of habitat connectivity in conservation easement language include the following:

- Staying Connected Initiative created a document on Potential Conservation Easement Provisions Designed to Explicitly Address Connectivity in the Northern Appalachians.[23]
- Connecticut offers a drafting model for a Forever Wildlife Conservation Easement that is 'ideal for wildlife corridors.'[24]

If you are a land trust that has written wildlife crossing provisions into conservation easements, we'd love to hear from you.

Typically, DOTS are sensitive to potential landowner concerns regarding impacts of a wildlife crossing structure to their property. For instance, Florida DOT has wildlife crossing structure guidelines that ensure that the structure will not restrict access to adjacent property owners, negatively impact adjacent properties (e.g., provide access for people and/or wildlife to private properties where none presently exist), or have the potential to negatively impact existing drainage patterns or to flood off-site properties.[25]

Cultivating relationships with private landowners and local government agencies. Early and frequent engagement of land trusts and thus landowners in early phases of wildlife crossing structure project

[23] http://stayingconnectedinitiative.org/assets/connectivityconservationeasementlanguage_final.pdf
[24] https://ctconservation.org/wp-content/uploads/CT-FOREVER-WILD-CONSERVATION-EASEMENT-1st-Ed.-2019-rev.-May-2022.pdf
[25] https://fdotwww.blob.core.windows.net/sitefinity/docs/default-source/environment/pubs/wildlifecrossingguidelines_2018revisions.pdf?sfvrsn=e84b7844_0

consideration is invaluable.[26] Land trusts tend to have closer relationships with landowners than any other partner or agency may otherwise have.

Land trusts also often have closer relationships with local governments. These relationships can help lead to county ownership of open lands in locations key for wildlife crossing structures, or to help tap into local open space bonds to help with funding of land ownership or conservation easement for wildlife crossing projects. Land trusts may have close relationships with state or federal government agencies that may partner on projects where a land trust serves as an interim landowner with land conveyed to that agency.

Stewarding the management of private lands for wildlife habitat. Many landowners undertake high quality management actions that help habitat connectivity. Habitat improvements such as wildlife-friendly fencing, sustainable forest management, and riparian conservation and restoration on private land can help wildlife move more safely through a landscape. Some further actions in key wildlife areas such as near wildlife crossing structures may be helpful to reduce effects from human activities, such as low or no outdoor lights at night, protection of domestic animals with night-time shelters for livestock and housing for pets, and the use of native plants in outdoor landscaping. Many resources can be found to help provide wildlife habitat on private lands, including:

- Staying Connected Initiative and Tug Hill Tomorrow Land Trust management recommendations guide for landowners for habitat management strategies to enhance wildlife movement[27]
- Sonoma Land Trust brochure for landowners[28]
- Wildlife friendly fencing booklet for landowners[29]
- Southern Oregon Land Conservancy fences blog post[30]
- Best management practices for wildlife corridors journal article[31]

Helping steward adjacent improvements to culverts and bridges on protected private lands. Existing bridges, culverts, and tunnels created for other purposes such as hydrological flow can sometimes serve as wildlife crossing structures, helping to reduce the barrier of a roadway and serve as underpasses without the cost associated with constructing new structures. Wildlife use of these existing structures can be significantly increased with appropriate management and modifications nearby and within the structure.

If a landowner with a conservation easement has an existing bridge or culvert in the DOT right-of-way next to their property, they may be keen to help undertake one or several of these modifications. Relationships with nearby landowners and agreements with the DOT or other road manager (i.e., if on/under a city or county road) can be important to smoothly lead to improvements of the existing infrastructure.

Modifications can include:

- Vegetation management near structure to increase visibility of structure while maintaining security
- Addition of or repairing fencing to funnel wildlife to structure
- Removal of fencing or other obstacles that is blocking entrance or pathways to structure

[26] https://westernlandowners.org/publication/habitat-conservation-strategies-for-migrating-wildlife/
[27] http://stayingconnectedinitiative.org/assets/Management-Recommendations-for-Landowners-small.pdf
[28] https://sonomalandtrust.org/wp-content/uploads/2019/09/SLTWIldlifeBrochureforlandowners.pdf
[29] https://wgfd.wyo.gov/WGFD/media/content/PDF/Habitat/Habitat Information/Grazing Management and Prescribed Burning/A-Wyoming-Landowner-s-Handbook-to-Fences-and-Wildlife_2nd-Edition_-lo-res.pdf
[30] https://www.landconserve.org/news/wildlife-friendly-fences
[31] https://largelandscapes.org/wp-content/uploads/2021/04/Toward-Best-Management-Practices-for-Ecological-Corridors.pdf

- Removal of silt or debris buildup
- Providing hiding cover within structure such as continuous woody debris
- Adding a dry shelf, 'critter shelf', or bench within structure, particularly with flowing water
- Making a suitable travel path under bridge by adding soil on top of previously placed riprap
- For a larger effort - a smaller culvert can be replaced with a larger culvert or bridge for enhanced wildlife and hydrological passage. When effectively rebuilt, it can be designed to be more resilient to extreme weather and to allow better wildlife movement. Some states such as New Hampshire[32] and Oregon[33] have databases of culverts with barriers to fish passage that can be investigated for need for improvements.

Resources can be found offering modification recommendations, such as:

- Technical guidance and best management practices report for large animals (in Virginia)[34]
- Book chapter on modifying existing structures to enhance wildlife passage through them[35]
- Assessment system report to determine permeability of existing structures[36]

Examples of land trusts engaging in enhancements of existing culvert or bridge infrastructure include:

- Sonoma Land Trust partnered with Sonoma Water to clear an existing highway underpass to improve safe passage for wildlife and worked with four landowners to modify fences at structures that then provided increased passage for wildlife.[37]
- The Adirondack Chapter of The Nature Conservancy and New York State Department of Transportation installed NY's first critter shelf inside a large culvert to help wildlife safely cross underneath the road.[38] The work is supported by a best practices report.[39]
- Vermont Land Trust and Northeast Wilderness Trust are working to help further protect lands near a wildlife shelf/bench that Vermont Agency of Transportation had built under an existing highway bridge.

Opportunities for Land Trusts to Engage in Wildlife Crossing Projects

Land trusts may get involved in wildlife crossing projects for any number of reasons, from strategic planning decisions to opportunistic easements or acquisitions that lead to new program directions to long-term involvement in a regional connectivity coalition. It can be challenging to know where to start if interested in engaging in wildlife crossing projects. The following best practice opportunities are primarily focused on the planning, prioritizing, and funding of a wildlife crossing project. For further information on designing, constructing, monitoring, and maintaining a wildlife crossing structure, please explore other resources.[40] [41]

[32] http://nhdes.maps.arcgis.com/apps/webappviewer/index.html?id=21173c9556be4c52bc20ea706e1c9f5a
[33] https://nrimp.dfw.state.or.us/nrimp/default.aspx?pn=fishbarrierdata
[34] https://www.virginiadot.org/business/resources/LocDes/Large_Animal_Crash_Countermeasures_in_Virginia_April_2022.pdf
[35] https://www.fs.usda.gov/treesearch/pubs/56209
[36] https://www.wsdot.wa.gov/research/reports/fullreports/777.1.pdf
[37] https://sonomalandtrust.org/current-initiatives/sonoma-valley-wildlife-corridor/
[38] http://stayingconnectedinitiative.org/our-work/transportation-and-wildlife/new-york-crossings/
[39] http://stayingconnectedinitiative.org/assets/Securing-permeable-roadways-for-wide-ranging-wildlife-in-the-Black-River-Valley.pdf
[40] https://dot.ca.gov/-/media/dot-media/programs/research-innovation-system-information/documents/final-reports/ca20-2700-finalreport-a11y.pdf

Below are some best practices or resources for getting involved:

Join or initiate a coalition. Coalitions focused on connectivity and wildlife crossing projects bring together multiple stakeholders to help identify and implement coordinated actions that address wildlife-vehicle collision and connectivity problems in pinch point locations. They bring together groups and agencies that have a mixture of skillsets and knowledge, leading to unique, forward-thinking, shared visions. Partnerships can help with data collection (such as roadkill hotspot mapping and monitoring wildlife use of existing structures) and data analyses (such as connectivity mapping). Projects benefit by capitalizing on the nimbleness of non-profits in matters of funding and timing, and partnerships may help leverage the funding that makes a project viable.

Land trust involvement in these connectivity/crossing coalitions is highly important – land trust organizations understand land markets and local sentiment and can provide useful information for identifying land parcels to maximize landowner and conservation outcomes. With land trusts involved, the coalition may be prepared to act on unique private land conservation opportunities when they arise. Having more than one land trust in a coalition can be valuable; land trusts have different capacities, expertise, focal areas, and preferred transaction types (acquisitions, conservation easement, etc.) that are needed. A project may end up having a combination of easements and acquisitions, held by different entities.

Connectivity/crossing coalitions can include: state wildlife agencies, Tribal governments, county open space programs, state conservancies, open space authorities, metropolitan planning organizations, and nonprofit partners that focus on wildlife conservation, fishing and hunting organizations, foundations, and others.

Some partnerships have developed from a state wildlife and transportation summit, which have been effective at energizing efforts in a state (i.e., CO, MT, NM, WY). Existing partnerships through various federal programs can also help lead and engage in this area.

Coalitions exist in many regions and often include land trusts. Some current examples (with websites) include:

- Colorado Wildlife & Transportation Alliance includes Rocky Mountain Elk Foundation[42]
- Ecologicalconnectivity.com is a web platform sharing connectivity projects and coalition work in Eastern Canada and New England[43]
- Ocala-to-Osceola (O2O) Partnership includes North Florida Land Trust, Alachua Conservation Trust, Conservation Florida, Putnam Land Conservancy, The Conservation Fund, and The Nature Conservancy[44]
- Southern Oregon Wildlife Crossing Coalition includes Southern Oregon Land Conservancy and Pacific Forest Trust[45]
- Safe Passage I-40 Pigeon River Gorge Wildlife Crossing Project includes The Conservation Fund[46]
- Staying Connected Initiative includes numerous land trusts throughout several states[47]
- Summit County Safe Passages includes Continental Divide Land Trust[48]
- Virginia Safe Wildlife Corridors Collaborative includes Valley Conservation Council and The Nature Conservancy Virginia[49]

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[41] https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=134712
[42] https://www.coloradowta.com/home/
[43] https://ecologicalconnectivity.com/
[44] https://www.nflt.org/ocala-to-osceola-wildlife-corridor/
[45] https://www.myowf.org/sowcc
[46] https://smokiessafepassage.org/learn-more-about-safe-passage/coalition/
[47] http://stayingconnectedinitiative.org/about/#partners
[48] https://www.summitcountysafepassages.org/

Find out if there is a state or regional wildlife crossing or connectivity coalition near you and join – or initiate one if not yet in existence.

Leverage or initiate relationships with transportation agencies. While coalitions are valuable, a coalition itself is not necessary to work on wildlife crossing projects; many projects have occurred with partnerships between land trusts or conservation groups and state departments of transportation.

Transportation projects need advance, long-term planning so initiating relationship development long before a potential project may come forward is helpful. Many DOTs desire connections with land trusts to help achieve wildlife crossing structure projects but may not have yet reached out to or found the relevant land trust. Take the first step to meet your district DOT staff! There may be one or more key DOT staff who are supporters or champions of wildlife crossing structures in your area. Identify and meet key DOT champions for wildlife crossing structures. DOTs tend to be split into districts. Relevant DOT employees may hold titles such as: District Environmental Permits Coordinator, District Biologist, District Drainage Design Engineer, District Preconstruction Engineer, Environmental Services Bureau Chief, Wildlife Program Manager, and Environmental Manager. Some states have a transportation liaison position between the DOT and state fish and game agency.[50]

A different agency may have the jurisdiction of a roadway other than a DOT, such as a county, city, or municipality so a project would move through that agency. The approach is similar; establish relationships with relevant Transportation Authority or Public Works staff.

Identify and develop a relationship with key DOT (or equivalent agency) staff. Take the first step to meet them.

Examine or initiate wildlife crossing priority or action plans. Some state DOTs, state departments of wildlife, and/or partners have undertaken identification and prioritization analyses to determine data-driven locations for future wildlife crossing structure projects. These assessments and plans help ensure that the state and its partners work toward a common goal and that resources are used as effectively and efficiently as possible. Some examples of wildlife crossing assessment reports include:

- Arizona Statewide Wildlife-Vehicle Conflict Study (2021)[51]
- Blackfeet Nation Animal-Vehicle Collision Reduction Master Plan (2019)[52]
- British Columbia - Hwy 3 Transportation Mitigation for Wildlife and Connectivity (2019)[53]
- Colorado - Eastern Slope and Plains Wildlife Prioritization Study (2022)[54]
- Nevada - Prioritization of Wildlife-Vehicle Conflict in Nevada (2019)[55]
- New Jersey - Connecting Habitat Across New Jersey (2019)[56]
- New Mexico Wildlife Corridors Action Plan (2022)[57]
- Wyoming - Teton County Wildlife Crossings Master Plan (2018)[58]

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[49] https://vswcc.weebly.com/

[50] https://www.environment.fhwa.dot.gov/env_initiatives/liaisonCOP/documents/Establishing_a_Transportation_Liaison_Program_Guidebook_UpdatedFinal.pdf

[51] https://azdot.gov/planning/transportation-studies/completed-transportation-studies/wildlife-vehicle-conflict-study

[52] https://largelandscapes.org/wp-content/uploads/2021/04/Blackfeet-Nation-Animal-Vehicle-Collision-Reduction-Master-Plan.pdf

[53] https://www.roadwatchbc.ca/files/Hwy 3_Lee et al._ReportAmendment_2019_Final.pdf

[54] https://www.codot.gov/programs/research/pdfs/2022/wildlife-prioritization/eswps-report

[55] https://www.dot.nv.gov/home/showpublisheddocument/16038/636820992282700000

[56] https://dep.nj.gov/njfw/conservation/tools-of-chanj/

[57] https://wildlifeactionplan.nmdotprojects.org/wp-content/uploads/sites/39/2022/07/Wildlife-Corridors-Action-Plan_June-2022_FINAL-reduced.pdf

These analyses and prioritization efforts can be hugely helpful for land trusts to work more confidently on land protection near potential wildlife crossing structures into the future, knowing there is some level of priority for certain areas.

Some land trusts have been active initiators or members in research, analysis, and planning efforts that make recommendations for wildlife crossing structure improvements or development:

- Peninsula Open Space Trust: recommendation report on Monterey Road in California[59]; Linkage vision and design report for Coyote Valley landscape[60]; connectivity and safe passage assessment[61]
- Sonoma Land Trust: management and monitoring strategy report for Sonoma Valley wildlife corridor[62]

Find and examine existing reports or take part in developing the plans. If such an analysis has not occurred in your area, advocate to initiate one in your state or region or help hire a consultant to undertake its development.

Examine or initiate connectivity/linkage mapping and planning. Broader scale mapping and habitat connectivity assessments are invaluable, helping to clearly illustrate priority needs and to develop and promote a common vision among stakeholders. Connectivity or linkage assessments can be essential to help catalyze or organize connectivity efforts, helping focus energy and funding for larger scale conservation efforts. [63] They can help indicate where pinch points across highways may warrant private land conservation and wildlife crossing projects.

Land trusts can undertake their own connectivity assessments or can partner with others to help develop an analysis and implementation strategy, using modeling tools.[64] [65] Or rather than doing their own analyses, land trusts can use existing mapping to help identify parcels at important connectivity pinch points. There are many examples of habitat connectivity or linkage mapping, such as:

- California Essential Habitat Connectivity Project [66]
- New Hampshire Wildlife Corridors[67]
- Oregon Connectivity Assessment and Mapping Project[68]
- South Coast Missing Linkages Project[69]
- DataBasin (a science-based mapping and analysis platform that includes connectivity mapping)[70]
- State Wildlife Action Plans[71]

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[58] https://westerntransportationinstitute.org/wp-content/uploads/2016/10/4W6376-Huijser-et-al-Report-Teton-County-20180531-LR.pdf
[59] https://openspacetrust.org/blog/monterey-road-report/
[60]https://www.openspaceauthority.org/system/documents/Coyote%20Valley%20Landscape%20Linkage%20Report_Final_lowres.pdf
[61] https://openspacetrust.org/connectivity-study-download/
[62] https://sonomalandtrust.org/wp-content/uploads/2018/11/Management-Monitoring-Strategy-FINAL-INHOUSE-010414.pdf
[63] https://iopscience.iop.org/article/10.1088/1748-9326/ab3234
[64] https://conservationcorridor.org/corridor-toolbox/programs-and-tools/
[65] https://www.fishwildlife.org/download_file/view/3191/248
[66] https://wildlife.ca.gov/Conservation/Planning/Connectivity/CEHC
[67] https://www.wildlife.state.nh.us/nongame/corridors.html
[68] https://oregonconservationstrategy.org/success-story/the-oregon-connectivity-assessment-and-mapping-project-ocamp/
[69]www.scwildlands.org/reports/SCMLRegionalReport.pdf#:~:text=The%20South%20Coast%20Missing%20Linkages%20project%20has%20developed,be%20greater%20than%20the%20sum%20of%20the%20parts
[70] https://databasin.org/

Some efforts have focused specifically on mapping specific parcel for future conservation easements or acquisitions, with habitat connectivity in mind:

- Staying Connected in the Northern Green Mountains: Identifying Structural Pathways and other Areas of High Conservation Priority Report[72]
- Wyoming Open Spaces Initiative: Targeting Conservation Easement Purchases to Benefit Wildlife Report[73]
- Wolverine habitat connectivity and private land parcel mapping framework[74]

Find and examine existing habitat connectivity mapping, or undertake new mapping as a partnership, hiring a consultant, or internally. Examine where pinch point locations occur across roadways that could be addressed with protected private lands and wildlife crossing structures.

Examine upcoming/future transportation projects. One way to engage with DOTs and wildlife crossing projects can be to look at their long-range transportation plans (LRTPs) and short-term plans (called statewide transportation improvement programs or STIPs) to get a sense where transportation projects are likely to occur and whether they might overlap with current or future land trust projects. These plans can be found on your DOT's website and often include interactive maps. Note where and how any upcoming transportation projects or activities will impact your area of interest. Compare the LRTP and STIP to existing conservation, land-use and habitat connectivity plans, and look for overlaps, potential conflicts and projects that could include habitat connectivity or wildlife crossing structure considerations.[75] It is more effective to work at the LRTP time period scale, as STIP time periods may be too short to adjust or influence a project. If you encounter an area of interest that may have a transportation project in the future that could perhaps include a wildlife crossing structure, reach out to your DOT district engineer and biologist/environmental lead to initiate a conversation.

Look at future transportation projects in transportation agency planning documents to see if they overlap with your land trust priority areas or parcels.

Prioritize habitat connectivity and wildlife crossings in land trust strategic plans. Land trusts can prioritize this work by integrating goals related to improving habitat connectivity and reducing wildlife-vehicle collisions into their strategic plans or related documents. More specifically, land trusts can include habitat connectivity as a criterion for acquisition of easements or fee property, as an integral part of a land trust's mission and core values, and/or as a large-scale vision for conservation. Habitat connectivity and wildlife crossing structure projects can be key tools to help land trusts and partners address many overlapping goals of climate-informed land conservation, climate habitat resilience, community adaptation to climate impacts, and 30x30 goals.

Some examples of land trusts with habitat connectivity and safe wildlife movement across roadways in their mission, vision, initiatives, or programs include:

- Heart of the Rockies (HOTR) Initiative is a land trust partnership with a mission "to ensure connected habitat and working lands for people and wildlife by increasing the pace of durable conservation in the

[71] https://www.fishwildlife.org/afwa-informs/state-wildlife-action-plans
[72] http://stayingconnectedinitiative.org/assets/NGM_Structural_Pathways_and_Parcels_28Sept12_final.pdf
[73] http://www.uwyo.edu/haub/_files/_docs/ruckelshaus/open-spaces/2015-targeting-conservation-easements.pdf
[74] https://www.sciencedirect.com/science/article/pii/S2589004221008087
[75] https://defenders.org/sites/default/files/publications/getting_up_to_speed.pdf

Central Rockies of North America."[76] HOTR's Keep It Connected program[77] offers a searchable portfolio that highlights one active project from each of the 26 land trusts (in 5 states and 2 provinces) in the HOTR network. It is designed to find the funding necessary to move each project to completion and bring the next project into the spotlight. Some projects include transportation-related efforts.

- Southern Oregon Land Conservancy includes habitat connectivity and wildlife corridors in their 2022-2024 strategic plan[78] and specifically work on connectivity in one of their focus areas. They are a member of the Southern Oregon Wildlife Crossing Coalition.[79]
- Vital Ground Foundation has a One Landscape Initiative, with a goal of protecting 188,000 key acres on private lands that link habitats in the Northern Rockies.[80]

Include or prioritize habitat connectivity and wildlife crossings in your organizational strategic planning and other visioning opportunities.

Take advantage of—or support—relevant *state or federal* policies. Many state or federal policies are catalyzing habitat connectivity and wildlife crossing projects.[81] For instance, California, Colorado, Florida, Massachusetts, New Hampshire, New Mexico, Oregon, Utah, Vermont, and Virginia have all enacted wildlife crossings and/or connectivity legislation, and the governors of Colorado, Nevada, Washington, and Wyoming have all enacted executive orders protecting wildlife movement or migration.[82]

It is important for land trusts to identify and take advantage of opportunities to engage and share information with elected officials, agencies, and other stakeholders about the role of private lands conservation in habitat connectivity. Ultimately, this outreach can help ensure that important private lands connectivity considerations are integrated into state, regional, and local plans and policies pertaining to natural resource management, climate resilience, and transportation. [83]

Below are several examples of policies that promote voluntary habitat connectivity efforts on or between private lands:

- Department of the Interior Secretarial Order 3362 established the Western Big Game Seasonal Habitat and Migration Corridors Fund, which has provided funding for numerous voluntary habitat connectivity projects on private lands.[84]
- The Biden administration's America the Beautiful Challenge provides funding for voluntary, community-driven conservation, restoration, and stewardship projects that span public and private lands.[85] Numerous groups have submitted proposals for projects to collaboratively identify and prioritize locations for wildlife crossing structures or to plan and implement other habitat connectivity measures.

[76] https://heart-of-rockies.org/
[77] https://keepitconnected.org/
[78] https://www.landconserve.org/s/SOLCStrategicPlan2022-24-WEB.pdf
[79] https://www.myowf.org/sowcc
[80] https://www.vitalground.org/mapping-one-landscape-for-wildlife-and-people/
[81] https://largelandscapes.org/news/state-xing-legislation/
[82] https://www.ncelenviro.org/issue/wildlife-connectivity-and-crossings/
[83] https://largelandscapes.org/wp-content/uploads/2019/03/Wildlife_Connectivity_Opportunities_for_State-Legislation_2019.pdf
[84] https://www.nfwf.org/programs/rocky-mountain-rangelands/western-big-game-seasonal-habitat-and-migration-corridors-fund
[85] https://www.nfwf.org/programs/america-beautiful-challenge

- New Mexico's Wildlife Corridors Act of 2019[86] directed the NM Department of Transportation (NMDOT) and the NM Department of Game and Fish to develop a Wildlife Corridors Action Plan[87] for NMDOT roads statewide, which has led to prioritizing wildlife crossing structure projects across the state. Land trusts are offering key potential partnership opportunities in some of those priority locations with private lands.
- The Florida Wildlife Corridor Act (2021)[88] sets aside $400 million to protect and connect public and private lands[89] within the state-designated Florida Wildlife Corridor that was developed through a coordinated effort of the Florida Wildlife Corridor Coalition.[90] Funds can be used for fee simple or conservation easement acquisitions by the Department of Environmental Protection, which works with land trusts and other partners in its Florida Forever program.[91]
- CA Senate Bill 790 passed into law in 2021 and sets up a compensatory mitigation credit scheme that allows CDFW to grant Caltrans credits for crossings that can be used for future transportation projects requiring environmental mitigation.[92] Land Trust of Santa Cruz County was a key champion for the bill passing the state legislature.

Learn about existing connectivity and wildlife crossings-related policies in your state or in other states, or in federal policies. Share examples with relevant decision-makers and stakeholders. Advocate for or initiate policies in your state.

Take advantage of or support relevant *local and regional* government policies.[93] Policies at the local and regional levels can also catalyze efforts to improve habitat connectivity and reduce wildlife-vehicle collisions. For instance, local and regional development and land use plans offer critical opportunities to address habitat fragmentation and wildlife conflicts on roadways.

Additionally, open space programs can provide funding for connectivity, especially if they incorporate habitat connectivity goals into their planning documents. For example, in Colorado, Douglas County's Comprehensive Master Plan[94] includes priority areas for connectivity and goals, objectives, and policies[95] relating to wildlife movement corridors. Wildlife crossing structure projects have been built or are planned in some of these protected areas near the highway, with private landowner and county government engagement.

Learn about existing local government policies related to habitat connectivity and wildlife crossings. Share examples with relevant decision-makers and stakeholders. Advocate for or initiate policies in your area.

Relevant Funding Opportunities

Land trusts are highly attuned to many private lands conservation funding opportunities but may be less familiar with federal funding for habitat connectivity, including specific funding opportunities for wildlife crossing structures. Land trusts may be eligible as direct or sub-recipients of these funds and can be a part of public-

[86] https://www.wildlife.state.nm.us/wpfb-file/11-wildlife-corridors-act-pdf/
[87] https://wildlifeactionplan.nmdotprojects.org/
[88] https://www.flgov.com/2021/07/19/governor-ron-desantis-celebrates-the-signing-of-senate-bill-976-creating-the-florida-wildlife-corridor-act/
[89] https://floridadep.gov/lands/lands/documents/florida-wildlife-corridor
[90] https://floridawildlifecorridor.org/
[91] https://floridadep.gov/lands/environmental-services/content/florida-forever
[92] https://leginfo.legislature.ca.gov/faces/billTextClient.xhtml?bill_id=202120220SB790
[93] https://largelandscapes.org/policy-compendium-2022/
[94] https://www.douglas.co.us/planning/master-plans/comprehensive-master-plan/
[95] https://www.douglas.co.us/documents/cmp-section-9.pdf/

private partnerships for projects seeking funding under grant programs that require non-federal dollars to match federal investments.

State and local funding. In addition to the state funding opportunities mentioned in the policy overview above, some state and local governments fund habitat connectivity and wildlife crossing projects through Special Purpose Excise Taxes, general funds, wildlife stamps, lottery, sales taxes, real estate transfer taxes, deed recording fees, severance taxes, and business taxes.[96] For instance, Colorado Parks and Wildlife's (CPW) Colorado Wildlife Habitat Program[97] provides millions of dollars to help fund conservation easements, public access easements, and fee title acquisition by CPW. This program funds conservation easements held by open space agencies, land trusts, and CPW. Additionally, this year the state legislature passed House Bill 22-1072, which expands the scope of the Habitat Partnership Program to include "private land conservation and wildlife migration corridor efforts."[98]

Federal funding. Federal funding, such as the Land and Water Conservation Fund U.S. Department of Agriculture Farm Bill programs, and the aforementioned Big Game Migration and America the Beautiful Challenge grants from the National Fish and Wildlife Foundation, can be used for habitat connectivity and wildlife habitat land conservation.[99] Many land trusts are already well-versed in those opportunities. These funding opportunities may be best used for land acquisition projects in conjunction with infrastructure funding opportunities to plan and complete wildlife crossing structure projects.

The Infrastructure Investment and Jobs Act, also known as the *Bipartisan Infrastructure Law (BIL)* once it was enacted at the end of 2021, creates unprecedented funding opportunities for projects that reduce wildlife-vehicle collisions and improve habitat connectivity. [100] [101] [102] [103] The *Wildlife Crossings Pilot Program*—a $350 million-dollar competitive grant program—is the first-ever *dedicated* pot of federal funding to complete these projects.[104] Land trusts can participate as project partners through agreements with grant recipients (state transportation agencies, federal land management agencies, tribal agencies, metropolitan planning organizations, local governments, and regional transportation authorities). The Federal Highway Administration will evaluate grant proposals in part on the ability of project partners to leverage non-federal funds, especially through public-private partnerships. As previously mentioned, land trusts play a crucial role in forging those private-public partnerships, due to their connections with donors, foundations, landowners, and others who wish to provide the private match to public investments in these projects. Land trusts may also be helpful in ensuring that the project is designed to support local economic development, incorporate innovative technologies, provide opportunities for education and outreach, and include monitoring and evaluation—all of which are additional grant evaluation criteria.

In addition to this *dedicated* funding, projects that improve habitat connectivity and reduce wildlife-vehicle collisions are eligible for a wide range of federal transportation programs under the BIL. This expanded eligibility means billions of additional federal dollars are potentially available for these projects. These programs include: the Federal Lands Transportation program, the Federal Lands Access program, the Surface Transportation Block

[96] https://largelandscapes.org/wp-content/uploads/2019/03/Wildlife_Connectivity_Opportunities_for_State-Legislation_2019.pdf
[97] https://cpw.state.co.us/cwhp
[98] https://leg.colorado.gov/bills/hb22-1072
[99] https://wildlandsnetwork.org/resources/beyond-roads
[100] https://www.fhwa.dot.gov/bipartisan-infrastructure-law/
[101] https://largelandscapes.org/bipartisan-infrastructure-law/
[102] https://arc-solutions.org/article/dedicated-funding/
[103] https://wildlandsnetwork.org/news/demystifying-wildlife-crossing-projects
[104]https://largelandscapes.org/wp-content/uploads/2021/12/Crossing-Toolkit_Final.pdf

Grants program, the Nationally Significant Freight & Highways Projects program, the Nationally Significant Federal Lands & Tribal Projects program, the Rural Surface Transportation Grants program, the Tribal Transportation program, the Highway Safety Improvement program, the Promoting Resilient Operations for Transformative, Efficient & Cost-Saving Transportation program, the Bridge Investment program, Bridge Formula program, the National Culvert Removal, Replacement & Restoration Grants program, the Rebuilding American Infrastructure with Sustainability and Equity program, the Collaborative-based, Aquatic-focused, Landscape-scale Restoration Program, and the Forest Service Legacy Roads & Trails Remediation Program.[105] Most of these programs also require non-federal matching dollars, which again creates an opportunity for land trusts to facilitate public-private partnerships.

Advice from Land Trusts

On a final note, here is some (paraphrased) advice and encouragement from land trusts engaged in habitat connectivity and wildlife crossings projects:

> *Approach these efforts with a learning mindset – don't shy away if you do not have the expertise, as most people or organizations do not have all the answers. But this kind of work needs to happen.*
>
> *No one group or agency can do these projects alone. Coalitions and relationships are the key. We can learn from each other – try to find out what other land trusts have done in these efforts. Establish a network.*
>
> *This is a long game – early involvement can pay off in the long run, and land trusts have an important role in different phases and different moments in the process.*

Contact Us!

If you have any questions, comments, recommendations, suggested edits, or ideas as we update this "living document," please contact Kylie Paul, Road Ecologist with CLLC (kylie@largelandscapes.org).

We want to know what else you need to understand, and what else road ecologists and implementers need to understand about land trust involvement in these projects. More specifically, please let us know:

- If your land trust is engaged in a conservation easement or acquisition as part of a wildlife crossing structure project (whether the structure is existing, planned, or hopeful in the future)
- If your land trust helped retrofit or improve wildlife use of an existing bridge or culvert on or adjacent to land with a conservation easement or acquisition held by your land trust
- Whether/how you've reached out to landowners who may be interested in having a conservation easement in part to help with future wildlife crossing structures in priority areas – or what you'd recommend to others who propose to do so
- Any best practice recommendations you've gained from any experiences in these types of projects
- Any impediments you've experienced in engaging or attempting to engage in these types of projects
- Any recommendations to road ecologists or DOT partners about what they should understand regarding land trust engagement in wildlife crossing structure projects
- Any questions or requests for information on how land trusts may better engage in these projects

[105] https://largelandscapes.org/wp-content/uploads/2022/08/Federal-Funding-for-Wildlife-Crossings-CLLC-July-2022.pdf