

Policy Report: Challenges and Opportunities for Implementing Conservation Measures for Mojave Desert Tortoise Along Roads



Photo Credit: NPS/Brad Sutton

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Desert Tortoise Transportation Ecology Task Force

This report is a product of the Desert Tortoise Transportation Ecology Task Force (Task Force). The Task Force was formed in 2021, following the Desert Tortoise Transportation Ecology Workshop (Fairbank et al. 2021). The Task Force was made up of a voluntary group of representatives from a variety of agencies and organizations and was an interdisciplinary effort to identify challenges and opportunities for Mojave desert tortoise (*Gopherus agassizii*) conservation and recovery related primarily to roads. Task Force members were divided into subgroups based on their interests and expertise and tasked with assisting the research team, made up of the Center for Large Landscape Conservation, the Western Transportation Institute, ARC Solutions, and the U.S. Fish & Wildlife Service, in documenting challenges, as well as best practices and recommendations to support successful implementation of conservation and recovery measures for Mojave desert tortoises with respect to roads.

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- ARC Solutions
- Bureau of Land Management
- Center for Large Landscape Conservation
- Clark County, NV
- Federal Highway Administration
- Nevada Department of Transportation
- U.S. Fish & Wildlife Service
- Western Transportation Institute

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Table of Contents

Introduction	6
Policy Context	8
Federal Policy.....	8
State Policies.....	10
Implementing Partners and Decision-makers.....	12
Methodology.....	14
Policy Challenges and Opportunities	15
Policy Inconsistencies	15
Implementation and Maintenance of Transportation Mitigation Measures.....	17
Interagency Coordination and Commitment of Agency Leaders	17
Recommendations	18
Potential Funding Opportunities	20
Federal Infrastructure Funding Sources	20
Transportation Funding Sources	20
Discretionary Grant Programs.....	21
State, Federal, Tribal, and Local Allocation Programs and Funding.....	29
Additional Funding Opportunities Under IIJA	35
Relevant Federal Conservation Funding Opportunities	36
References	38
Appendices.....	43
Appendix A: Policy Problem Statements	43
Appendix B: Interview Questions	44

Definition of Terms

ARC Solutions: Animal Road Crossing Solutions

BLM: United States Bureau of Land Management

Caltrans: California Department of Transportation

CESA: California Endangered Species Act

CEQ: Council on Environmental Quality

CEQA: California Environmental Quality Act

CLLC: Center for Large Landscape Conservation

Desert Tortoise Fencing: Fencing intended primarily to reduce road mortality as a high-priority recovery action, then guide animals toward crossing structures.

DOD: United States Department of Defense

DOI: United States Department of the Interior

EIR: Environmental Impact Report

ESA: Federal Endangered Species Act

FHWA: Federal Highway Administration

HCP: Habitat Conservation Plan

LWCF: Land and Water Conservation Fund

MDT: Mojave desert tortoise (*Gopherus agassizii*)

MND: Mitigated Negative Declaration

MSHCP: Multiple Species Habitat Conservation Plan

ND: Negative Declaration

NDOT: Nevada Department of Transportation

NDOW: Nevada Department of Wildlife

NEPA: National Environmental Policy Act

NPS: National Park Service

PBO: Programmatic Biological Opinion

Road Effect Zone: Desert tortoise presence and observation of desert tortoise sign is reduced within habitat that occurs in close proximity to unfenced roadways, particularly those with high traffic volumes.

ROW: Right-of-way

USFWS: United States Fish and Wildlife Service

USGS: United States Geological Survey

Wildlife Infrastructure: Built infrastructure to reduce wildlife-vehicle collisions and provide for connectivity of habitat

WTI: The Western Transportation Institute

Introduction

The Mojave desert tortoise (*Gopherus agassizii*) is a federally threatened species found in Arizona, California, Nevada, and Utah. The recovery of the Mojave desert tortoise (“desert tortoise”) continues to be threatened by transportation impacts. Desert tortoises suffer direct mortality on roads when they are hit by vehicles and habitat fragmented by roads leaves populations genetically isolated. These impacts have contributed to declining desert tortoise populations across the range of the species.

Desert tortoise road mortality and illegal collection along roads and highways are identified as significant issues relative to the recovery of this species (U.S. Fish and Wildlife Service (USFWS) 2011; USFWS 2015). The construction of over 60,000 kilometers of roads and highways throughout the range of desert tortoises has permanently fragmented previously contiguous habitat and reduced connectivity among extant meta-populations (USFWS 2011). The desert tortoise has been identified as one of the highest-risk species for road mortality, which can have significant cumulative effects on population viability (Brehme et al. 2018).

Roads can also have numerous indirect effects on population viability. For example, the presence of roads may also result in significant habitat loss and degradation (e.g., altered hydrology, introduction and spread of non-native invasive plant species, elevated subsidized predator densities, and increased risk of fire) (USFWS 2011). Structures and artificial subsidies along roads, such as garbage, roadkill, transmission towers, billboards, poles, and water resources, may attract and support populations of ravens and other subsidized predators who prey on desert tortoises (USFWS 2011).

Modeling studies of road effects on desert tortoise populations suggest that even low levels of road mortality significantly threaten local desert tortoise population stability and persistence due to decreased adult vitality rates (Peadar 2017). Modeled desert tortoise populations along roads, highways, interstates, and county roads with high traffic volumes were predicted to have population decreases of >20% (-28.9%, -28.7%, and -25.4%, respectively) over 50 years with an average of 5.2 deaths per year across all road types (Figure 1; Peadar 2017). Most major roads within the range of the desert tortoise were constructed over 50 years ago and are likely a major factor in the steady declines observed among desert tortoise populations. Traffic volumes have been steadily increasing as human populations continue to increase and expand, further exacerbating the negative impacts of roads on desert tortoise recovery.

Boarman et al. (1997) estimated about one tortoise mortality per every 3.2 kilometers (or about 2 miles) of road per year, which could potentially result in thousands of desert tortoise mortalities per year throughout the range of this species. Desert tortoise observation data collected during culvert monitoring studies within 10 and 15-mile fenced sections of U.S. 93 and U.S. 95 in Nevada, respectively, provide contact rate estimates ranging from 0.78 to 1.03 individual desert tortoise contacts per mile of road that bisect low to moderate density populations within a year timeframe (BLM and USFWS, unpublished data, 2020). Each desert tortoise contact with the road represents a potential mortality event that could result in a cumulative loss of at least 10 desert tortoises per year within these relatively short and unfenced road sections. The desert tortoise Management Oversight Group (MOG) identified 370 miles of road segments within critical habitat that remain unfenced, leaving the surrounding desert tortoise populations vulnerable to significant population declines within a relatively short time.

On average, desert tortoises must survive a minimum of 18-20 years to reach a midline carapace length of about 180 millimeters (mm), which is the adult (reproductive) age class (Turner et al. 1987; USFWS

2011). Although high numbers of hatchlings and juveniles are produced, the number of individuals that survive to the adult age class is quite low (Doak et al. 1994; USFWS 2011). Survival of desert tortoises into the adult reproductive age class is necessary to ensure long-term population viability. Therefore, high survivorship of adult desert tortoises is critical to long-term population viability (Doak et al. 1994; USFWS 2011).

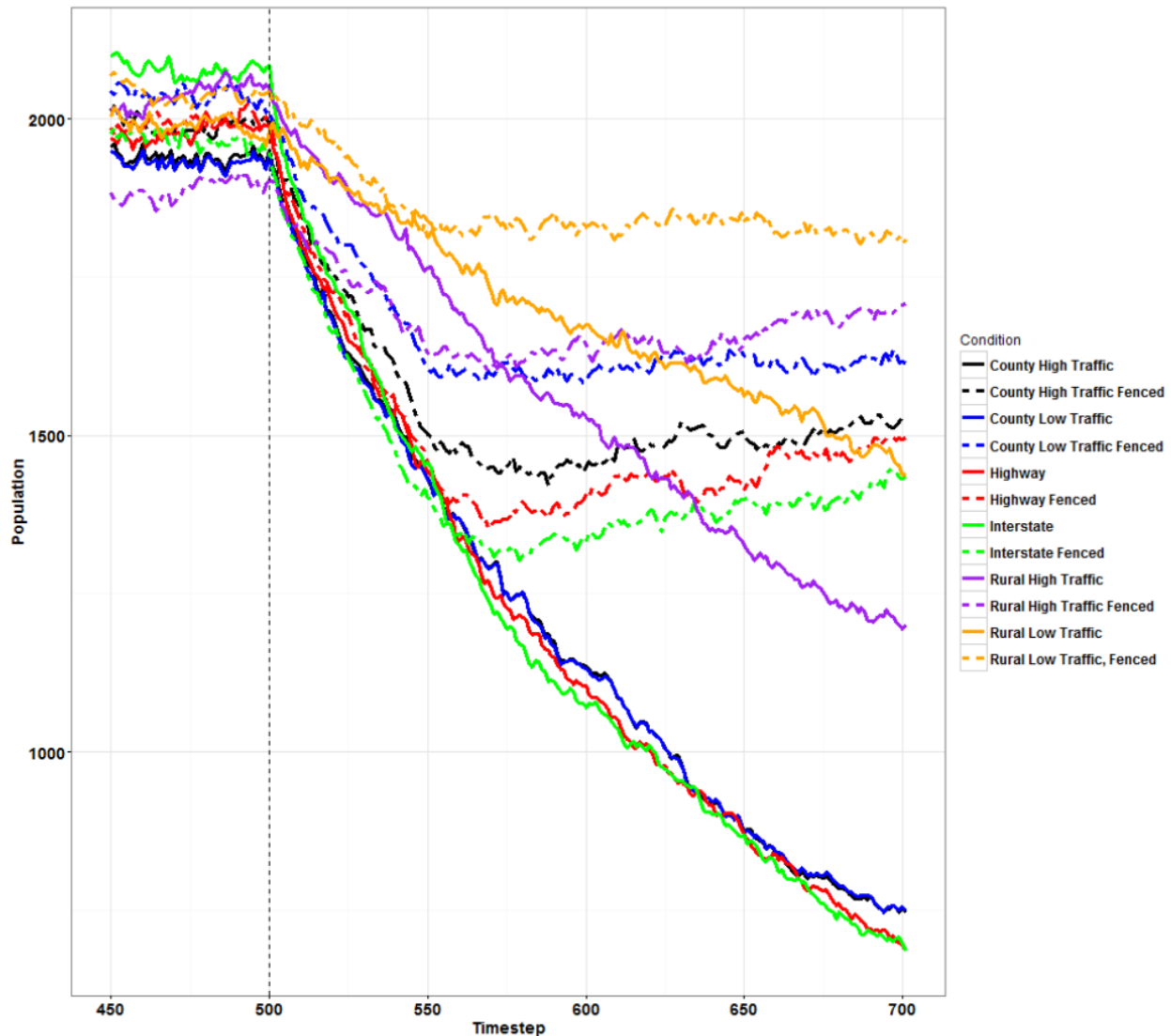


Figure 1. From Peadar (2017), this figure shows model outputs of road mortality effects on desert tortoise populations without fencing, and the rate of demographic recovery after fencing installation: “Replicates of stable baseline desert tortoise population model responding to road threats using the means of 50 models per condition. Roads were introduced at time step 500. Fencing, if present, was introduced at time step 550 and continued for the duration of the model.”

Fortunately, culverts and accompanying roadside fencing can address these issues by preventing desert tortoises from accessing the road and guiding them to safely pass under roads (systems often referred to more broadly as “wildlife crossings”). Combined, fencing and crossing structures have the potential to mitigate road mortality, turn population expansion rates positive, and reconnect habitat. Recovery actions such as habitat conservation and restoration are more likely to achieve their goals if road

mortality has been addressed through the installation of the funnel and exclusionary fencing, retrofit and purpose-built culverts, and other mitigation measures. However, funding, policy issues, and multipurpose design issues hinder the implementation of these proven solutions.

The Mojave Desert Tortoise Transportation Ecology Task Force was created in 2021 to bring together experts and practitioners from across the range of the Mojave desert tortoise to develop solutions to the problems roads pose to the recovery of the species. As part of this task force, a policy subgroup was created to discuss, identify, and address policy challenges affecting transportation networks and associated desert tortoise recovery. Through the subgroup's meetings, a set of issues were identified, and several key themes emerged, including the following: regulatory inconsistencies and mitigation standards; barriers to implementation and maintenance of transportation mitigation measures; interagency coordination and communication; and agency commitment to and capacity for addressing Desert Tortoise policy issues.

This report focuses on transportation mitigation policy issues relevant to the desert tortoise. It provides an overview of relevant federal and state policies and key stakeholders involved in related desert tortoise recovery and highlights key policy issues gleaned from the task force and key-informant interviews. This report concludes by identifying policy and funding recommendations to advance desert tortoise recovery goals in the face of the conservation challenges posed by transportation networks.

Policy Context

Federal Policy

Endangered Species Act

The Mojave desert tortoise was federally listed under the Endangered Species Act (ESA) as a threatened species in 1990 (50 CFR Part 17 RIN 1C18-AB35). Under that law, the term “threatened” is used for any species expected to become endangered in the foreseeable future and offers similar protection as any species deemed “endangered.” The desert tortoise is listed as threatened throughout its range, except in Arizona south and east of the Colorado River, and in Mexico. The Mojave desert population covered by the listing includes all individuals found north and west of the Colorado River in California, southern Nevada, southwestern Utah, and northwestern Arizona. Destruction and degradation of habitat, illegal collection, upper respiratory disease, predation by subsidized predators (e.g., ravens and coyotes), and vandalism were all cited as threats to the desert tortoise, leading to its listing.

Section 4(a)(3) of the ESA requires that the Secretary of the Interior (Secretary) to designate critical habitat for listed species. In addition, the USFWS and the National Marine Fisheries Service are required to develop recovery plans that outline the species' ecological needs, threats, and conservation actions that will lead to its recovery. In 1994, the USFWS published a recovery plan for the Mojave desert tortoise, proposed Desert Wildlife Management Areas, and designated 6.4 million acres of critical habitat in all four states. In 2011, the recovery plan was extensively revised (USFWS 2011).

The recovery plan details six overarching recovery actions:

1. Develop, Support, and Build Partnerships to Facilitate Recovery
2. Protect Existing Populations and Habitat
3. Augment Depleted Populations through a Strategic Program

4. Monitor Progress toward Recovery
5. Conduct Applied Research and Modeling in Support of Recovery Efforts within a Strategic Framework
6. Implement an Adaptive Management Program.

Section 6 of the ESA structures cooperation between the USFWS and states. This includes consultation with states before acquiring land or water for the purpose of conserving any listed species and provides for management agreements with states to administer and manage established areas for listed species. The law also permits the use of cooperative agreements for approved conservation programs, in which the state receives federal assistance for implementation. These ESA programs must be reviewed by the Secretary annually.

Section 7(a)(2) of the ESA requires that all federal actions be reviewed by the USFWS to ensure these actions are not likely to jeopardize the continued existence of federally listed species or destroy or adversely modify designated critical habitat. Such consultations must include descriptions of the proposed action, its effects, and efforts to offset such effects. This then results in the creation of a Biological Opinion, which details the effect of the proposed federal project on the listed species. If USFWS concludes that the proposed project will likely jeopardize the species, the agency will offer “reasonable and prudent alternatives.” Mitigation requirements are also determined as part of Section 7 consultation if the proposed activity is related to federal funding, permitting, or an agency action (see FWS 1981, 81 CFR 83440).

The ESA prohibits the take, import, export, ship, or sale of a listed species. The ESA defines “take” as harassment, harm, pursuit, hunting, shooting, wounding, killing, trapping, capturing, or collecting. The law also makes it illegal to possess, sell, deliver, carry, transport, or ship the species when it is illegally taken. Incidental Take Permits may be issued exempt otherwise prohibited activities and are available for scientific purposes, to enhance the propagation or survival of the species, zoological exhibition, educational purposes, special purposes consistent with the purposes of the Act, and/or for incidental take. Section 10(a)(1)(b) of the ESA provides a way for non-federal parties to request permits for “take.” The applicant must prepare a conservation plan that outlines the impact of the illegal “take,” steps to minimize and mitigate impacts (FWS 1981), funding for implementation, and alternative actions. After a public comment period, the Secretary may grant a permit as long as the take is incidental, impacts are minimized and mitigated, adequate funding is provided, and the action will not reduce the likelihood of the survival and recovery of the species.

National Environmental Policy Act

The National Environmental Policy Act (NEPA) requires federal agencies to conduct environmental reviews to examine the environmental effects of their proposed actions prior to finalizing decisions. Such actions can include:

- permit applications,
- federal land management actions, and
- constructing highways and other publicly-owned facilities.

Under NEPA, agencies must assess the environmental, social, and economic impacts of their proposed actions and the significance of those impacts. Agencies also provide opportunities for public review and comment on those evaluations. The creation of NEPA established the Council on Environmental Quality

(CEQ), which is responsible for developing federal procedures for implementing NEPA. The CEQ defines mitigation (40 CFR 1508.20) as:

- Avoiding an impact by not taking a certain action or parts of an action
- Minimizing impacts by limiting the magnitude of an action and its implementation
- Rectifying an impact by repairing, rehabilitating, or restoring the affected environment
- Reducing or eliminating an impact over time by preservation and maintenance operations during the life of an action
- Compensating for an impact by replacing or providing substitute resources or environments.

The CEQ directs agencies to use the NEPA process to identify and assess reasonable alternatives to their proposed actions that will avoid or minimize adverse effects (40 CFR § 1500.2). While NEPA requires the consideration of mitigation, it does not require mitigation in itself. However, federal agencies can ensure mitigation actions for specific impacts are implemented as part of their project and operations approvals.

State Policies

Arizona

In 1988, the Arizona Game and Fish Commission prohibited the “take” of desert tortoise (later recognized as both Mojave desert tortoise and Sonoran desert tortoise (*G. morafkai*)). Arizona Revised Statutes (ARS) 17-306 and ARS 17-309 prohibit the release of wildlife (including the desert tortoise) in Arizona without prior approval from the Commission or Arizona Game and Fish Department and establish a penalty for a violation. Arizona Administrative Code R12-4-402 prohibits importing, exporting, or selling live wildlife, including the desert tortoise. It also is illegal to propagate captive desert tortoises. No state laws regulate the modification of desert tortoise habitat.

California

Plant, fish, and animal species may be listed as a candidate, threatened, or endangered under the California Endangered Species Act (CESA, Fish and Game Code Section 2050 *et seq.*) after a formal listing process undertaken by the California Fish and Game Commission. Article 3, section 2080 of the Fish and Game Code prohibits a CESA-listed species from being imported, exported, “taken,” possessed, purchased, or sold without proper authorization from CDFW through an incidental take permit or memorandum of understanding. Take is defined in Fish and Game Code section 2084: “hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture, or kill.” In 1989, the Commission amended the California Code of Regulations (§ 670.5(b)(4) of title 14) to list the desert tortoise as a threatened species. In March 2020, the Fish and Game Commission received a petition to list the desert tortoise as an endangered species, and on October 14, 2020, the Commission determined that listing as an endangered species may be warranted and voted to make desert tortoise a candidate for listing as an endangered species (See 2020 Cal. Reg. Notice Register, No. 44-Z, pp. 1445 (October 30, 2020)). The desert tortoise is protected under California’s Fish and Game Code (Division 5. Protected Reptiles and Amphibians, Article 1. Desert Tortoises [5000 – 5002]). Section 5000 also makes it illegal to sell, purchase, harm, take, possess, transport, or shoot a projectile at a desert tortoise when not authorized by the CDFW through an incidental take permit consistent with Sections 2081(b) and (c) of the Fish and Game Code.

CESA requires that impacts to the species authorized through an incidental take permit are both minimized and fully mitigated (California Fish and Game Code, Section 2081(b)). When an incidental take permit (ITP) is granted for a project affecting the desert tortoise, full compensatory mitigation typically entails management of the species through on-site or off-site habitat restoration, creation or enhancement, and/or permanent conservation through onsite or offsite acquisition and land protection. Fencing is currently considered a minimization measure by CDFW, and installation of fencing is not a form of full mitigation. Still, it could reduce the amount of compensatory mitigation land required to achieve full mitigation because impacts are reduced. Another compensatory mitigation measure is conservation banking, which entails conserving private or public lands for their natural resource value with affiliated credits for the sensitive species of interest (FGC Section 1797). Bank sponsors then sell or transfer habitat credits to developers who must compensate for their project's impacts on species covered in the ITP.

Additionally, state and local public agencies must comply with CEQA before making a discretionary approval of a project. Compliance can be met by determining whether a project is exempt from CEQA or preparing an environmental analysis, typically a negative declaration (ND), mitigated negative declaration (MND), or environmental impact report (EIR). MNDs and EIRs identify and contain an analysis of a project's significant environmental effects and discuss feasible measures to avoid or mitigate those effects. EIRs also analyze a reasonable range of potentially feasible alternatives to the proposed project that would avoid or substantially lessen the project's significant effects. Compliance with other environmental laws and regulations is also typically discussed in an MND or EIR.

CDFW is California's Trustee Agency for the State's fish, wildlife, and plant resources. CDFW, in its trustee capacity, has jurisdiction over the conservation, protection, and management of fish, wildlife, native plants, and habitats necessary for biologically sustainable populations of those species. For the purposes of CEQA, CDFW is charged by law to provide, as available, biological expertise during public agency environmental review efforts, focusing specifically on projects and related activities that have the potential to adversely affect fish and wildlife resources. CDFW may act as a Responsible Agency when it has some level of responsibility for carrying out or approving a project for which a lead agency is preparing or has prepared an environmental document. This most frequently occurs when a project requires a Lake and Streambed Alteration Agreement or a California Endangered Species Act Incidental Take Permit. CDFW may also act as a Lead Agency in certain circumstances when it is the only agency issuing a permit or approval for a project such as a Lake and Streambed Alteration Agreement or a California Endangered Species Act Incidental Take Permit.

Nevada

The desert tortoise is protected under Nevada Revised Statute (NRS 501.100) and Nevada Administrative Code (NAC 503.080). Desert tortoises are considered wildlife (NRS 501.097) and belong to the people of Nevada (NRS 501.100), and are classified as threatened (NRS 503.080). NRS Section 503.597 makes it unlawful to transport a desert tortoise within the State or across State lines without the written consent of the Nevada Department of Wildlife. Nevada does not have any laws pertaining to desert tortoise habitat degradation.

Utah

The desert tortoise is protected under Utah Administrative Rule (R657-53). It is considered a “prohibited reptile.” Prohibited species are animals that are not allowed to be collected, imported, transported, possessed, sold, transferred, or released because they pose unacceptable disease, ecological, environmental, or human health or safety risks. A special permit is required to touch, disturb, collect, or harm a wild desert tortoise or disturb a desert tortoise burrow. Desert tortoise remains cannot be collected, and desert tortoises and their eggs cannot be bought or sold. No other state regulations protect the desert tortoise from loss of habitat or habitat degradation.

Implementing Partners and Decision-makers

The federal and state partners and decision-makers listed below are involved in and instrumental to Mojave desert tortoise recovery.

Bureau of Land Management (BLM)

The BLM’s mission is to “sustain the health, diversity, and productivity of public lands for the use and enjoyment of present and future generations” (BLM 2023). The BLM operates under a multiple-use mandate, under which they balance energy development, livestock grazing, recreation, and timber harvesting on the public lands within their jurisdiction. More than half of desert tortoise habitat is found on lands managed by the BLM.

Department of Defense (DoD)

The DoD's mission is “to provide the military forces needed to deter war and ensure our nation's security” (DoD 2023). Part of the Mojave desert tortoise’s habitat lies on DoD sites. The DoD has been engaged in desert tortoise recovery for many years and, more recently, through the Recovery and Sustainment Partnership.

Federal Highway Administration (FHWA)

The FHWA’s mission is to “enable and empower the strengthening of a world-class highways system that promotes safety, mobility, and economic growth while enhancing the quality of life of all Americans” (FHWA 2023). FHWA stewards the construction, maintenance, and preservation of highways, bridges, and tunnels.

National Park Service (NPS)

The NPS “preserves unimpaired the natural and cultural resources and values of the National Park System for the enjoyment, education, and inspiration of this and future generations.” (NPS 2023). NPS manages large areas of desert tortoise habitat, namely Joshua Tree National Park and Mojave Desert National Preserve.

U.S. Fish and Wildlife Service (USFWS)

The USFWS’ mission is “to work with others to conserve, protect, and enhance fish, wildlife, and plants and their habitats for the continuing benefit of the American people” (Service 2023). The USFWS leads the recovery and conservation of species listed under the ESA, including designating critical habitat,

developing associated regulations, developing and implementing recovery plans, monitoring and evaluating species status, and working with non-federal partners to develop conservation plans.

U.S. Geological Survey (USGS)

The USGS monitors, analyzes, and predicts current and evolving Earth-system interactions and delivers actionable information at scales and timeframes relevant to decision-makers. The USGS provides science about natural hazards, natural resources, ecosystems, and environmental health, and the effects of climate and land-use change ([USGS 2023](#)). USGS contributes to monitoring and research aimed at better understanding the desert tortoise's habitat needs, threats, and recovery impacts.

California Department of Fish and Wildlife (CDFW)

CDFW is California's state fish and wildlife agency. Its mission is to "manage California's diverse fish, wildlife, and plant resources, and the habitats upon which they depend, for their ecological values and for their use and enjoyment by the public" ([CDFW 2023](#)). CDFW works to study, protect, and preserve CESA-listed species and their habitats, runs regulatory permitting programs that authorize the take of listed species, and engages in a formal listing process under CESA.

Caltrans

Caltrans is California's department of transportation. Caltrans' mission is to "provide a safe and reliable transportation network that serves all people and respects the environment." ([Caltrans 2023](#)) Caltrans manages California's highways, and inter-city rail and permits public and special use airports/heliports.

Nevada Department of Transportation (NDOT)

NDOT's mission is to "provide, operate, and preserve a transportation system that enhances safety, quality of life, and economic development through innovation, environmental stewardship, and a dedicated workforce" ([NDOT 2023](#)). NDOT plans for, constructs, operates, and maintains Nevada's state highway system.

Nevada Department of Wildlife (NDOW)

NDOW's mission is "to protect, conserve, manage and restore wildlife and its habitat for the aesthetic, scientific, educational, recreational, and economic benefits to citizens of Nevada and the United States, and to promote the safety of persons using vessels on the waters of Nevada" ([NDOW 2023](#)). NDOW restores and manages Nevada's fish and wildlife resources.

Desert Tortoise Management Oversight Group

The Desert Tortoise Management Oversight Group was established in 1998 and includes representatives from the BLM, DOD, NPS, USFWS, USGS, and state and local agencies. The group's tasks include standardizing data analysis procedures, establishing funding and research priorities, preparing reports, and reviewing laws and plans related to the desert tortoise. The group meets regularly to discuss desert tortoise monitoring and action plans and includes participants from state and local agencies.

Methodology

To identify policy barriers and opportunities for mitigating transportation-related impacts on the desert tortoise, we used qualitative methods to collect and analyze information from two sources: working group discussions and semi-structured interviews with agency staff. Over the past year, the Mojave Desert Tortoise Transportation Ecology Task Force (“task force”) has been working to develop collaborative solutions to support desert tortoise recovery efforts related to transportation infrastructure. The Task Force is comprised of subgroups, including a policy task force, which met periodically from 2021 to 2022. Task force participants represented the following organizations: ARC Solutions, BLM, Caltrans, Clark County (NV), CLLC, FHWA, NDOT, USFWS, and WTI Montana State University. During a series of meetings conducted over several months, task force members discussed policy barriers affecting their desert tortoise recovery work and drafted a set of policy problem statements detailing those issues. A set of themes were identified by the task force.

To elicit further information on policy challenges for mitigating transportation impacts on desert tortoise populations, semi-structured interviews with agency practitioners involved in transportation planning and desert tortoise policy and management were conducted. We aimed to speak with respondents representing the diversity of agencies responsible for desert tortoise recovery across the species’ range. After soliciting 26 individuals for interviews, we completed 13 interviews with respondents from the following agencies: BLM (California and Nevada State Offices), Caltrans, CDFW, Clark County (Nevada), FHWA, NDOT, NDOW, and USFWS. Interviews lasted approximately an hour and were recorded and transcribed. To structure interviews, we used an interview guide that included questions grouped by the themes identified by the task force: regulatory inconsistencies, implementation of mitigation measures and infrastructure maintenance, and interagency coordination and communication. Once interviews were complete, we used qualitative analysis methods to integrate, organize and interpret our data from working group discussions and interviews.

Despite our best efforts, we were not able to speak with all the relevant stakeholders, including higher-level decision-makers at the agencies responsible for recovering the desert tortoise. We also found that many study participants held differing views and perceptions of policy issues. Given these considerations, many of our findings from interviewees and task force members reported below reflect perceptions and opinions rather than established facts. To address this issue, we sought to clarify in the text—using wording such as “*perceived*” or “*felt*”—statements that reflect study participants' views. We also highlighted where viewpoints were commonly held or where there was disagreement. Finally, we also specify findings that emerged from either of the two different groups in our study (Task force and additional interviewees) or from both (“study participants”).

Policy Challenges and Opportunities

Three categories of policy challenges emerged from our analysis: regulatory inconsistencies, implementation and maintenance of transportation mitigation measures, and interagency coordination and commitment of agency leadership. In this section, we relate findings from each of these themes in turn.

Policy Inconsistencies

Differences in policies, such as legislative statutes and administrative policies, among various levels of government are a common challenge for the conservation of wide-ranging species in the United States. We found that managing transportation impacts to Desert Tortoise is no different. The most commonly cited driver of policy conflict in our study was differences among federal and state agency missions and mandates. Human safety, rather than species conservation, is fundamental to the mission of transportation agencies, which can make it difficult to elevate desert tortoise conservation as a priority. Differences in federal mandates are also relevant. Many interviewees pointed out that due to the Bureau of Land Management's mandate for multiple uses, it is challenging to ensure that conservation efforts are long-lasting and robust. This is not a concern for the National Park Service, which has a preservationist mission. There are also relevant cross-state policy differences. In contrast to California, for example, Utah, Arizona, and Nevada do not have legal frameworks for mitigating impacts to suitable habitat for desert tortoise.

Conservation efforts for the desert tortoise, a species with a long lifespan, are also complicated by the mismatch between shorter-term planning cycles and longer-term recovery goals. For instance, sustained commitment for mitigation and maintenance is difficult when agency leadership often changes with election cycles. Interviewees said that shifting agency priorities can create inconsistencies in an agency's actions and commitments over time. Political, cultural, and ecological heterogeneity across the desert tortoise's range also complicates efforts to establish consistent recovery actions over larger geographic areas. Finally, differences among municipal, state, and federal permitting standards, processes, and timelines complicate environmental reviews that require decision-makers' input and/or approval at various jurisdictional levels.

Study participants highlighted a specific issue regarding USFWS and CDFW definitions of rights-of-way (ROW) as habitat. CDFW considers areas within road ROWs and medians as desert tortoise habitat. As a result, when roadside fencing is installed as mitigation for a different project (to reduce road mortality and guide animals towards crossing structures), land acquisition is needed to compensate for the fencing because desert tortoises will be excluded from accessing these areas. One interviewee believed that the CDFW-established compensatory ratio for roadside habitat was as high as 2.5 to 1, meaning for every acre of roadside habitat impacted by fencing, 2.5 acres of habitat would need to be protected somewhere else to offset impacts. Fencing installed proactively by Caltrans would not include a requirement for mitigation, but these projects are very difficult to fund. The USFWS, on the other hand, has determined based on the best available science that because road ROWs and medians attract predators, and provide immediate access to roads and increased risk of road mortality, they do not provide suitable habitat. Accordingly, the USFWS and BLM view the installation of exclusion fence as an effective means to restore habitats in road-effect zones along roads by allowing desert tortoises to safely access and recolonize these areas while minimizing the risk of road mortality. Given this inconsistency, some interviewees and task force members believed that CDFW could modify their

internal, administrative policies for compensatory land acquisition, so they reflect recent science that highlights the low value of roadside ROW for desert tortoise.

At the same time, staff from CDFW noted that the BLM's multiple-use mandate makes it hard to ensure that land on both sides of a fenced roadway will be effectively and durably conserved. To address these issues, CDFW emphasized the importance of using durability agreements. A durability agreement is a legal agreement that clarifies the roles and responsibilities of agencies regarding the durable (long-term) conservation of BLM land. Durability agreements recognize the important role that BLM lands play in species conservation and provide a way for agencies like CDFW to utilize BLM lands for species conservation actions or project-level mitigation. Durability Agreements can satisfy mitigation requirements on BLM land by providing accountability and assurances of conservation to meet CESA standards of full minimization and mitigation (i.e. by relinquishing grazing allotments and adding layers of protection so land is not open for leasing for development). The task force noted that since the inception of the Desert Renewable Energy Project, BLM and CDFW have completed one durability agreement (Rudnick Common Allotment) to satisfy compensatory mitigation requirements for CESA. This process is complex and time-consuming for BLM and CDFW to accomplish, but may ultimately be beneficial in several ways, including improved federal and state coordination for mitigation; avoiding duplicative mitigation efforts (e.g. developers mitigating twice for the same impacts); reduced cost of mitigation for developers (since they do not have to pay for land acquisition costs), and reducing conflicts with local governments concerned about the loss of their tax base from mitigation offsets on private land. Furthermore, endowment funds and co-management agreements between CDFW and BLM established through durability agreements may provide additional funding and staffing capacity for management and enforcement actions on BLM lands. One recent example of success using a durability agreement is the JB Eastern Slope Mitigation Project, which will restore 158,000 acres in Kern County, CA as mitigation for solar development on private lands.

A second and related issue raised by study participants relates to how fencing is considered within the context of mitigation for development. Study participants noted that in the context of mitigation for development projects in California (e.g. renewables), fencing alone does not constitute a mitigation measure, as it does for BLM. For CDFW, fencing is conceptualized as a "minimization" measure that must be combined with other mitigation measures, typically land protection and acquisition, to comply with the state's fully mitigated standard. Within the mitigation framework of the BLM-led Desert Renewable Energy Conservation Plan, by contrast, fencing along roadways is a form of "non-acquisition compensation" that has a calculated equivalent to land acquisition in Desert Tortoise Recovery Areas (BLM 2016, pg. H-101; Darcy et al. 2013). Interviewees from BLM said that CDFW's "fully mitigated standard" for desert tortoise makes it hard to fund fencing out of project mitigation funds and increases the financial burden for mitigation. A few study participants emphasized that the CDFW could potentially adjust their internal policies for fulfilling the "fully mitigated standard" for desert tortoise so it is aligned with federal mitigation frameworks.

Task force members also highlighted more general NEPA-related challenges for implementing desert tortoise mitigation measures and recovery actions, such as limited funding and lengthy timelines (1-3 years minimum) for completing the NEPA process and required cultural surveys. The task force also suggested that in some cases, agencies may not be able to apply for funding for desert tortoise fencing until NEPA has been completed, which results in missed funding opportunities. However, agencies may be reluctant to allocate funding to complete the NEPA process unless there are assurances that funding will be available for fencing installation. Lastly, agencies cannot apply for ROW encroachment permits from transportation agencies for fencing until NEPA has been completed.

Implementation and Maintenance of Transportation Mitigation Measures

A second identified policy issue was inadequate funding for fencing installation, culvert retrofitting and construction, and long-term maintenance of these structures. While up-front funding for the construction of wildlife infrastructure is available through federal transportation programs, funding for long-term maintenance has previously come out of state transportation budgets. Members of the task force felt that transportation agencies, such as NDOT and Caltrans, are reluctant to allow fencing to be installed along their ROWs because of the high maintenance costs. State transportation agencies are often reluctant to build more wildlife crossings for desert tortoises due to inadequate funding and staffing to manage the increased maintenance burden. Likewise, study participants said local public agencies may be unwilling to install tortoise exclusion fence on their rights-of-way instead of the highway right-of-way when that is an option.

Many study participants said that in California, purchasing and managing lands to replace excluded acreage within ROWs and medians (to meet mitigation requirements) is expensive, especially when combined with fencing installation and maintenance costs. The current availability of high-quality habitat parcels is also scarce. Moreover, most parcels purchased provide minimal benefit to desert tortoise recovery because they are not often located within strategic conservation areas. Study participants felt this is a considerable impediment to the implementation of roadside fencing and is not an effective or efficient use of limited resources for desert tortoise recovery.

Given these issues, interviewees said that mechanisms for third-party contributions of both funding and staffing would be critical to ensure the adoption and success of fence and culvert solutions implemented outside the Section 7(a)(2) or 10(a)(1)(b) consultation processes, and those associated with past and future section 7 and 10 consultations. BLM staff, for example, noted that the agency does not have a maintenance department and cannot legally require endowment funds, which could potentially be used to offset the costs of maintenance and land management. However, there is also a reluctance to allow third parties, such as contractors or NGOs, to assume responsibility for the maintenance of fencing because of concerns about legal liability, jurisdictional responsibilities, and access. Without dedicated and long-term funding for maintenance or an allowance for other partners to install and maintain fencing, newly funded mitigation projects cannot be completed.

Interviewees also cited economic issues regarding third-party mitigation banks, given that it is currently less expensive for project developers to buy credits than to install fencing. Developers often want an immediate solution and, fencing projects are not typically shovel-ready. General issues in fencing installation were also mentioned, such as terrain, effects on other wildlife, and consideration of cultural resources under state and federal historic preservation policies. Hydraulic function and debris collection within culverts were also identified by state transportation agency staff as a challenge for retrofitting culverts to improve passage for the desert tortoise. Finally, interviewees cited the need to find cost-effective culvert designs that work for a suite of target species within the project area.

Interagency Coordination and Commitment of Agency Leaders

The task force and interviewees perceived that improved communication and coordination is needed to mitigate the impacts of roads on the desert tortoise. Interviewees said there was a need for more regular meetings and coordination, especially between higher-level agency staff, to ensure each agency is aware of the processes other agencies must complete. Ensuring effective communication early in the implementation process was highlighted as a specific need. The task force noted that interagency

communication needs to be much more proactive and should be initiated very early in the project scoping process by the state transportation agencies, given their lengthy planning process. Too often, biological consultation and management actions are identified months or even years after a project has been scoped and budgeted by state transportation agencies. Also, projects are often submitted to the USFWS for consultation without any funding allocated for fencing or culverts during the scoping and planning. At that point, it is too late to allocate funding for the recommended mitigation actions. This can result in fencing not being installed in priority road segments or extra costs for “change orders” from contractors required to install fencing after project initiation.

Study participants emphasized that stakeholders and agencies from across the four-state range of the desert tortoise need to come together to develop policies and processes for a “shared stewardship framework” that ensures that the responsibilities for mitigating transportation infrastructure for the desert tortoise are shared equitably across agencies. Cross-agency coordination and buy-in is also needed to establish consistency in the establishment and implementation of range-wide mitigation measures. Finally, high-level and consistent coordination between senior agency leaders is essential for the effective funding and implementation of actions for achieving desert tortoise recovery goals.

Recommendations

Prioritize desert tortoise recovery efforts, including mitigating the impacts of transportation, at the highest levels of agency leadership.

Ongoing commitment and buy-in from upper-level management in state and federal agencies across the 4-state range of the desert tortoise will be critical to enact successful policy changes that address current barriers to desert tortoise recovery. This will be necessary for all other recommendations to move forward.

Establish frameworks for programmatic recovery planning and mitigation at state levels.

To address regulatory inconsistencies between states, study participants emphasized the need for recovery planning via a state-by-state process. Study participants said that it is easier to coordinate recovery planning at a state level than it is to do so across the four-state range of the desert tortoise and that state-based working groups could focus on specific policy hurdles relevant to each state.

In California, policy inconsistencies may be addressed through the creation of a CDFW recovery plan for Desert Tortoise, or alternately (and more feasibly), the adoption (or adoption with revisions) of an existing federal recovery plan, as provided for under state law (Fish and Game Code sec. 2079.1). Alternatively, CDFW can use its discretion to modify its assessment of ROWs as viable habitat or determine that fencing constitutes a non-acquisition form of mitigation (as has occurred for the DRECP). Indeed, an internal review of the implementation of California’s fully mitigated standard notes that “CDFW can facilitate the issuance of ITPs that comply with the full mitigation requirement of CESA while accommodating new ideas, evolving circumstances and CDFW staff’s individual analysis of each unique project” (CDFW 2013). In the near-term, continued conversations between upper-level CDFW, USFWS, and BLM decision-makers on potentially coupling mitigation land acquisition with fencing installation on BLM land should continue to be pursued.

Interviewees and task force members suggested developing a system to complete all necessary regulatory work (*e.g.* section 7(a)(2) consultation, NEPA, state regulatory processes) at a programmatic scale, state by state, before individual opportunities for individual implementation projects arise. This would make projects more “shovel-ready” once funding becomes available.

Programmatic agreements and environmental analysis could also align with the use of efficient Environmental Assessments (EAs) or newly defined Categorical Exclusions (CEs) for projects that implement desert tortoise mitigation measures, such as culverts and fencing. This would avoid the more expensive and lengthy Environmental Impact Statements and their more intensive cultural survey requirements. EAs and CEs could allow on-site cultural monitors to protect resources as fencing is installed, which would be much more time and cost-efficient.

Identify funding mechanisms and sources for installing *and* maintaining desert tortoise fencing and culverts.

Improving implementation and maintenance of mitigation measures requires adequate funding and the ability and capacity to seek new funding. Interviewees and task force members emphasized the importance of flexibility in funding mechanisms and finding funding for fencing construction outside of compensatory mitigation. Suggestions include:

1. Setting up a dedicated fund with the National Fish and Wildlife Foundation (NFWF) to compensate state transportation agencies for fence maintenance costs. The presence of long-term maintenance funding for wildlife transportation infrastructure could allow state transportation agencies to move forward with identifying design and construction funding. One possibility suggested is an “adopt-a-fence” type of program.
2. Using offsite mitigation funds from solar and HCP development for mitigating roads. In Nevada, the BLM collects section 7(a)(2) fees agreed upon in Programmatic Biological Opinions and Biological Opinions. The agency maintains an internal section 7(a)(2) fund that is used for desert tortoise research and recovery projects. In California, NFWF accounts collect funds for solar projects on BLM lands that are used exclusively for raven predation reduction efforts.
3. A collaboration between BLM, CDFW, and USFWS to seek grant funding for desert tortoise fencing installation.
4. To the extent possible, agencies could prioritize funding sources that do not require NEPA to be completed before applying. This would avoid delays and complications due to NEPA timelines.
5. In California, ITP Permittees could fund, install, and maintain desert tortoise fencing as a minimization measure that reduces their financial burden for compensatory mitigation. As an alternative ITP minimization measure, CDFW could consider requiring contribution to a desert tortoise fencing fund to be held by NFWF and implemented by BLM, CDFW, and USFWS similar to the existing raven management fund disbursed by NFWF.

Hire designated desert tortoise staff to liaise with other state and federal partners.

To promote more proactive, consistent, and robust interagency coordination and communication, task force members and interviewees suggested that agencies hire designated staff to coordinate desert tortoise recovery efforts and liaise with other state and federal agency partners. This investment could lead to streamlined consultation, faster timelines, and stronger relationships between wildlife and transportation agencies at all levels of government.

Use memoranda of understanding and/or cooperative agreements to collaboratively address the impacts of transportation on the desert tortoise.

In addition to having dedicated coordinators, memoranda of understanding or cooperative agreements facilitate proactive coordination and can help address conflicts as they arise. Additionally, they provide the opportunity to clarify the roles of each agency in environmental review processes and equitably distribute the responsibility of installing and maintaining mitigation measures. These agreements can also serve as tools to engage upper-level management and secure commitments from agency leadership to address the impacts of transportation infrastructure on the desert tortoise. PBO, HCP, or MSHCP documents are some potential avenues that were recommended that could be used to memorialize burden-sharing agreements or programs. Additionally, there is an opportunity to establish additional durability agreements between CDFW and BLM.

Lastly, another recommended idea from a study participant was to develop and implement a fence and culvert cooperative agreement between departments of transportation and USFWS. Regular letters of support or commitment from agency leadership to support DOT's inclusion of fences and culverts on upcoming projects while accepting maintenance risk could be beneficial.

Potential Funding Opportunities

There are a variety of potential funding sources that could be used to support desert tortoise transportation mitigation strategies. Brief summaries of potential opportunities are summarized below.

Federal Infrastructure Funding Sources

Enacted in 2021, the *Infrastructure Investment and Jobs Act*, Pub. L. 117-58 (IIJA), includes a variety of new, expanded, and existing potential Federal transportation funding sources that may be used to pay for the implementation of recovery measures aimed at reducing motorist collisions involving desert tortoises and/or maintaining or improving habitat connectivity for desert tortoises. As summarized below, these programs include both discretionary grant programs that are competitive at the national level as well as funds that are distributed via formula directly to State Departments of Transportation (DOTs), Federal Land Management Agencies (FLMAs), and Tribes (formula programs) (FHWA 2022a).

Transportation Funding Sources

The IIJA re-authorizes close to \$350 billion in funding over 5 years for a host of Federal surface transportation programs (FHWA 2022a). It is a remarkable transportation law that explicitly makes available funding for projects aimed at reducing the number of motorist collisions involving wildlife and/or maintaining or improving ecological connectivity. These discretionary grant and formula programs constitute potential sources of significant funding for wildlife infrastructure, including the mitigation measures recommended in this report.

As described below, applicability and alignment between recommended desert tortoise mitigation measures and available funding sources is based on a variety of considerations, including but not limited to: whether the target facility is owned and maintained by a State DOT, FLMA, Tribe, or local entity; whether it is within a rural or an urban area; and, in some cases, whether the project qualifies as a

planning project, a small project, or a large project under the funding program. Similarly, the total estimated cost of the project; the anticipated size of the grant request; and other information, including the potential to integrate recommended measures into current or future planned transportation projects, may also affect the ability of a particular desert tortoise project to successfully compete for funding.

Discretionary Grant Programs

Wildlife Crossing Pilot Program (WCPP)

The IIJA includes – for the first time ever – \$350 million in dedicated Federal funding over 5 years to reduce motorist crashes involving wildlife while improving habitat connectivity for terrestrial or aquatic species (23 USC § 171). Eligible applicants include FLMAs, Tribes, States, Metropolitan Planning Organizations and local governments; eligible project partners include all eligible applicants plus foundations; non-governmental organizations; universities; Federal, Tribal, regional, or State governmental entities; as well as groups of the above. In addition to the program’s principal purpose of reducing WVCs while improving habitat connectivity, secondary selection criteria include leveraging of non-Federal funds (including through public-private partnerships); support of local economies and visitation opportunities; and the project’s integration of innovative technologies and advanced design techniques; monitoring and research activities aimed at identifying best practices; and education and outreach opportunities.

Application to Recommended Mitigation Measures: As of the date of this report, USDOT has not yet released a notice of funding opportunity for the wildlife crossing pilot. As a result, key considerations remain unknown at this time, including in particular whether projects to reduce motorist collisions involving non-safety species will be eligible, and, if eligible, whether such proposals will be less competitive than submissions involving species that present a motorist safety risk. Because funding is dedicated, the pilot, at a minimum, is likely to attract a large number of highly competitive applicants.

Rebuilding American Infrastructure with Sustainability and Equity (RAISE)

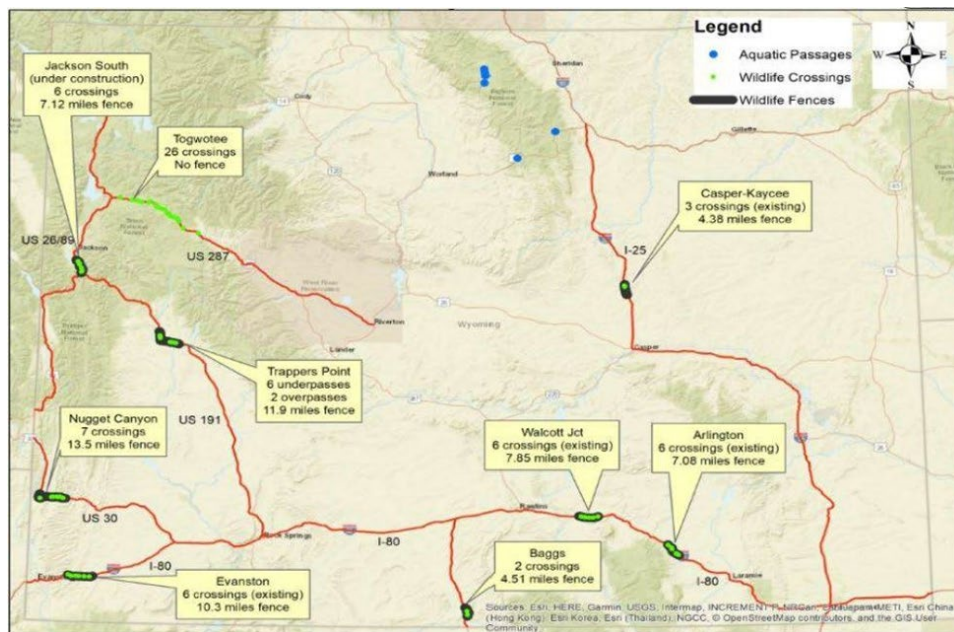
The IIJA authorizes \$7.5 billion in funding over five years for the Local and Regional Project Assistance program (49 U.S.C. § 6702(j)). Known as the “Rebuilding American Infrastructure with Sustainability and Equity,” or RAISE grant¹, the program was originally administered by the FHWA as part of the *American Recovery and Reinvestment Act of 2009*, Pub. L. No. 111-5. Since its inception, the program has received more than 11,000 applications requesting close to \$200 billion in funding (USDOT 2022a), and has awarded over \$12 billion to 769 road, rail, transit, and port projects during 14 rounds of competitive grants (FHWA 2022a).

The primary goal of the RAISE program is to fund investments that “have a significant local or regional impact and improve transportation infrastructure” (49 U.S.C. § 6702(b)(2)). Funding is available for both planning and capital projects, which include but are not limited to highway and bridge projects; public transportation and passenger and freight rail projects; intermodal projects; port and airport infrastructure; investments in Federally-owned or maintained surface transportation facilities located on Tribal lands; and projects to improve habitat for aquatic species by replacing or rehabilitating culverts,

¹ The RAISE grant was formerly known as the Better Utilizing Investments to Leverage Development (BUILD) grant, and, before that, the Transportation Investment Generating Economic Recovery (TIGER) grant.

or by preventing stormwater runoff. Primary grant award criteria include the extent to which the project improves or contributes to (1) safety, (2) environmental sustainability, (3) quality of life, (4) mobility and community connectivity; (5) economic opportunities (including increased tourism), and (6) a state of good repair. Additional selection criteria include cost-effectiveness; collaborative partnerships; use of innovative technologies or techniques; and demonstrated project readiness. The maximum award under IIA is \$25 million per project. Urban and rural areas may receive up to 50% of available funding, and no single state may receive more than 15% of the total funding made available (USDOT 2022e).

Application to Recommended Mitigation Measures: A project aimed at mitigating the effect of highways on desert tortoise has the potential to advance several primary and secondary grant selection criteria, including improved environmental sustainability; involvement of a diverse range of public and private partners; and use of innovative technologies or techniques. To the extent a proposed project involves the construction, replacement, or rehabilitation of culverts or other dual-purpose infrastructure, it may also increase infrastructure resiliency, thereby contributing to a state of good repair. While at least one project to reduce WVCs with ungulates (mule deer, pronghorn, moose) has previously secured RAISE funding, it is unclear how well a mitigation project aimed at reducing crashes with smaller animals such as the desert tortoise, which is not typically perceived as a motorist safety risk, would compete. Moreover, the sheer breadth of eligible projects, coupled with an applicant pool that has averaged approximately 800 proposals and resulted in about 55 awards per round – roughly a 7% success rate – for each of the past 14 funding cycles, further underscores the stiff competition for RAISE funding. Despite being highly competitive, RAISE remains a potential source of significant funding for wildlife infrastructure; as with other discretionary grant programs discussed in this report, the odds of success may be improved by integrating recommended mitigation measures into planned projects that offer the potential to fulfill additional selection criteria.



Case Study: Various applicants have submitted proposals to RAISE’s predecessor, BUILD (and, before that, TIGER), seeking funding for wildlife infrastructure. While earlier proposals were not successful, Wyoming was awarded \$14.5 million in BUILD funding in 2019 for the *Dry Piney Creek Wildlife Habitat Connectivity Project*, which entailed construction of a network of wildlife crossings and associated

fencing, jump-outs and other improvements along a 19-mile stretch of US 189 between La Barge and Big Piney, WY (USDOT 2019). Image: Wyoming DOT.

Rural Surface Transportation Grant Program

Newly established under the IIJA, the Rural Surface Transportation Grant Program (Rural) makes available up to \$2 billion in discretionary grant funds over five years to improve and expand surface transportation infrastructure in rural areas². The goal of the program is to increase transportation connectivity; improve the safe and reliable movement of people and freight; generate regional economic growth; and improve quality of life (USDOT 2022d).

Rather than establish an independent list of eligible projects, Rural provides funding for projects that are otherwise eligible under several existing Federal highway programs, including the Surface Transportation Block Grant Program, the Tribal Transportation Program, and the Highway Safety Improvement Program. These programs in turn provide funding for the following wildlife-related projects: construction of wildlife crossing structures (23 USC § 133(b)(1)(G)); projects and strategies aimed at reducing WVCs, including certain project-related costs such as planning, design, preventative maintenance, and monitoring (23 USC § 133(b)(14)); environmental mitigation to reduce wildlife mortality due to vehicles, or to restore and maintain terrestrial and aquatic habitat connectivity (USDOT-FHWA 2022d); activities to mitigate the effect of roads on or adjacent to Tribal lands on “wildlife, aquatic organism passage, habitat, and ecosystem connectivity, including the costs of constructing, maintaining, replacing, or removing culverts and bridges” (23 U.S.C. § 202(a)(1)(A)(vi)); and projects to add or retrofit infrastructure or other measures aimed at reducing WVCs (23 U.S.C. § 148(a)(4)(B)(xvii)).

To receive a grant, projects must demonstrate that they will be cost-effective; will generate regional economic, safety, or mobility benefits; and will aid in meeting national performance goals such as environmental sustainability. They must also be based on preliminary engineering and be expected to begin construction within 18 months of funding (USDOT 2022d). Additional grant selection considerations are varied and include the extent to which the project will improve the surface transportation system’s state of good repair; increase its capacity or connectivity and improve mobility in rural areas; benefit local economies and jobs; enhance recreational and tourism opportunities by providing access to public lands; improve geographic diversity of award recipients; and use innovative project delivery or transportation technologies (23 USC § 173(h)).

Application to Recommended Mitigation Measures: Desert tortoise mitigation measures recommended in this report appear to have the potential to satisfy most of the primary selection criteria, including cost-effectiveness; aiding in meeting a national performance goal (environmental sustainability); being based on preliminary engineering; and being shovel-ready within 18 months. As with other discretionary grant programs, one strategy may be to integrate recommended mitigation measures into a planned infrastructure project as a way to bolster the project’s overall ability to fulfill selection criteria that would otherwise be challenging for a desert tortoise mitigation project to satisfy on a stand-alone basis.

Nationally Significant Multimodal Freight and Highway Program (INFRA)

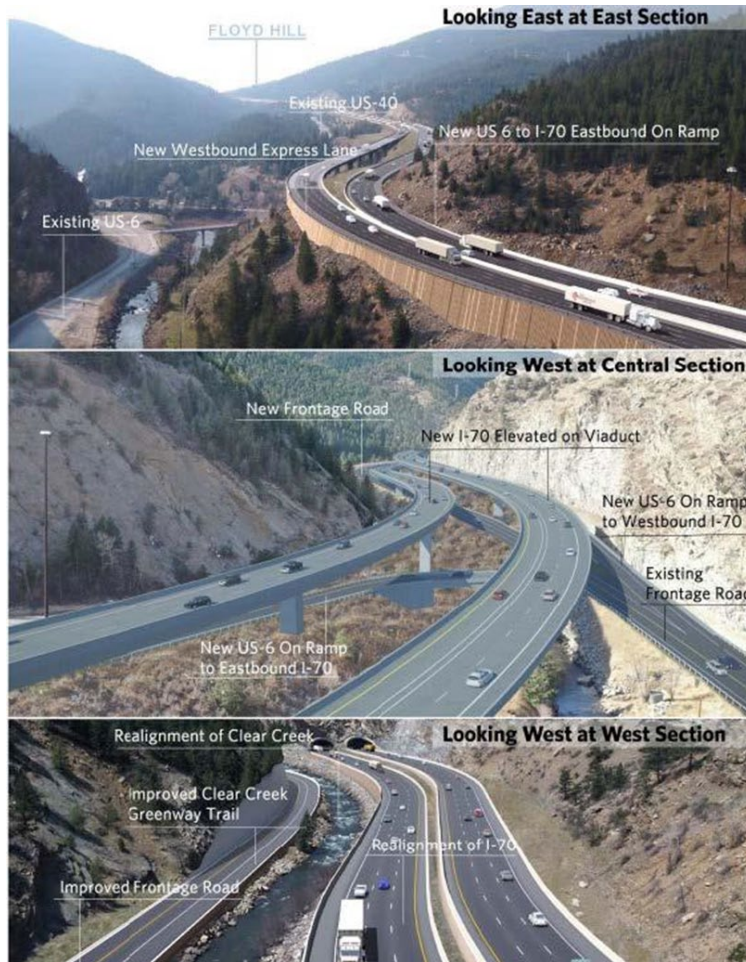
The IIJA authorized up to \$8 billion in funding over five years for the Nationally Significant Multimodal Freight and Highway Program (INFRA), which provides Federal funding for projects of regional or

² Rural defines the term “rural area” as “an area that is outside an urbanized area with a population of over 200,000.” 23 USC §173(a)(2); (USDOT 2022d).

national significance (USDOT 2022d). The IJA also revised the list of eligible projects to include wildlife crossings (23 USC § 117(d)(1)(A)(v)). At least 15% of annual INFRA funding is reserved for small projects, which require a minimum grant request of \$5 million, and at least 30% of small project funds must be awarded in rural areas.¹²¹ Up to 85% of annual INFRA funding is reserved for large projects, which require a minimum grant request of \$25 million, and at least 25% of large project funds must be awarded in rural areas. Large projects within the study footprint (AZ, CA, NV, UT) are also required to meet a minimum total project size threshold of \$100 million (USDOT 2022d).

Program goals vary and include (1) improving the safe, efficient, and reliable movement of people and freight; (2) generating economic benefits; (3) reducing congestion; (4) improving intermodal freight connectivity; (5) enhancing critical infrastructure resiliency and environmental protection; (6) improving national energy security; and (7) addressing the effects of population growth on moving people and freight (23 USC § 117(d)(1)(B)(i)). Grant selection considerations for large projects include that it will be cost-effective; will generate regional or national economic, safety, or mobility benefits; and will aid in meeting national performance goals; large projects also must be based on preliminary engineering and expected to begin construction within 18 months of funding. In addition, a large project must show that it cannot be efficiently or easily completed without additional Federal funding and that there is a dependable source of non-Federal funding available to support the project. Selection criteria for small projects include the project's cost-effectiveness and its effect on State and regional mobility and on freight corridor safety hazards, including wildlife crossing onto the roadway (INFRA NOFO).

Application to Recommended Mitigation Measures: Desert tortoise mitigation measures recommended in this report would appear to have the potential to meet 4 out of 5 of the primary selection criteria, including cost-effectiveness; aiding in meeting a national performance goal (environmental sustainability); being based on preliminary engineering; and being shovel-ready within 18 months. However, the ability of a stand-alone desert tortoise project to demonstrate that it will contribute to State, regional, or national economic, safety, or mobility benefits appears less certain. The recent FY22 INFRA awards include an example of a multimodal project involving wildlife mitigation in Clear Creek County, CO, that succeeded in securing a \$100 million grant (USDOT 2022b). As demonstrated by the *I-70 Floyd Hill to Veterans Memorial Tunnels Improvements* project [**Case Study**], one strategy to maximize potential funding may be to explore opportunities to integrate recommended mitigation measures into larger, planned infrastructure projects as a way to optimize the project's ability to satisfy economic, safety, mobility, and other selection criteria that may be challenging for a desert tortoise mitigation project to fulfill on a stand-alone basis.



Case Study: The *I-70 Floyd Hill to Veterans Memorial Tunnels Improvements* project in Clear Creek County, Colorado, received a \$100 million INFRA grant to increase safety along the I-70 Mountain Corridor by adding a third westbound travel lane, a frontage road connection, and a new on-ramp for US Highway 6, among other improvements. In addition to using innovative technologies such as dynamic signage, connected vehicle infrastructure, and electric vehicle charging, the multimodal project provides funding to restore the nearby creek and wetland areas and to integrate wildlife crossings and associated fencing (USDOT 2022b). [Image:](#) Colorado DOT.

Bridge Investment Program (BIP)

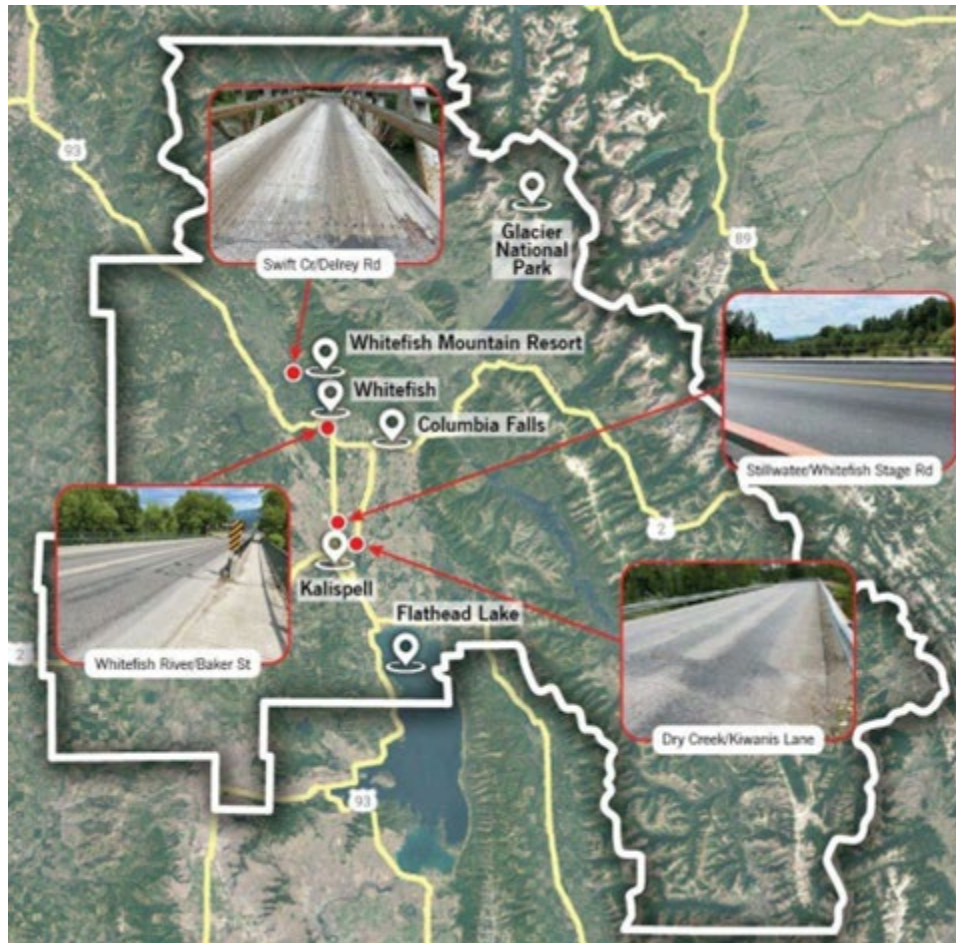
The IIJA authorized \$12.5 billion in funding for the Bridge Investment Program, a new national discretionary grant program that provides funding for (1) bridge planning projects, (2) small bridge projects, and (3) large bridge projects. Aimed at encouraging investment to improve the condition, safety, efficiency, and reliability of our nation’s bridges and culvert system for both people and freight, eligible activities include projects to replace, rehabilitate, preserve, or protect bridges on the National Bridge Inventory, including replacing or rehabilitating culverts with the goal of improving flood control and aquatic habitat connectivity. Up to 5% of funding each year may be awarded to eligible projects consisting solely of culvert replacement or rehabilitation. Small bridge projects require a minimum grant size of at least \$2.5 million, and the maximum assistance available for small projects under BIP cannot exceed 80% of the project’s total eligible costs. Large bridge projects (which are defined as having total

eligible project costs of more than \$100 million) require a minimum grant size of \$50 million, and the maximum amount of assistance that can be provided by a BIP grant is capped at 50% of total eligible project costs. Bridge planning proposals do not have a minimum or maximum grant award size (USDOT 2022c).

Evaluation criteria for a small bridge and large bridge projects are extensive. Factors include whether the project addresses a needed improvement to the bridge's condition; whether it is cost-effective; and whether it will generate safety benefits for motorists, non-vehicular (bicyclists/pedestrians) and public transportation users; as well as the project's effect on person and freight mobility; national or regional economies; infrastructure resiliency (including improving seismic or scour protection); innovative technologies, design, or construction techniques; and environment benefits (including wildlife connectivity) (USDOT 2022c).

Application to Recommended Mitigation Measures: The Bridge Investment Program offers another source of potential funding for recommended mitigation measures that have the potential to be integrated into a proposed bridge or culvert project³.

³ Wildlife-related mitigation measures associated with bridge construction / reconstruction projects also appear to be eligible for BIP funding given IJA's revision of the statutory definition of "construction" to expressly include wildlife crossing structures and other improvements to reduce wildlife-vehicle collisions (23 USC § 101(a)(4)(H)). For the same reason, such wildlife-related improvements would also appear to be eligible under the Bridge Formula Program, which received \$27.5 billion in funding over 5 years under IJA for the replacement, rehabilitation, preservation, protection, and construction of bridges (FHWA 2022).



Case Study - Bridge Planning Grant: The Flathead County Bridge Improvement Project secured \$240,000 in funding to support initial planning activities for four county bridges: Dry Creek Bridge, Swift Creek Bridge, Baker Avenue Bridge, and Whitefish Stage Bridge. Project benefits included anticipated cost-savings from preventing the closure or reduced use of the bridges; numerous benefits to safety; infrastructure resiliency; and environmental benefits, including wildlife connectivity (USDOT-FHWA 2022a). Image: Flathead County.

Tribal Transportation Program Safety Fund (TTPSF)

The IIJA allocates up to \$120 million over 5 years to Tribal Transportation Program Safety Fund projects to be awarded on a competitive basis to Federally-recognized Tribes. Eligible projects include strategies, activities, or projects aimed at correcting or improving hazardous roadway locations or features or other highway safety problems on or near Tribal lands. TTPSF supports projects that focus on the role of planning, data collection, and analysis in informing strategic safety investments. In addition to planning-related activities, eligible TTPSF projects include the “addition or retrofitting of structures or other measures to eliminate or reduce crashes involving vehicles and wildlife” (USDOT 2022g).

Application to Recommended Mitigation Measures: To the extent the measures recommended in this report would benefit from Tribal planning, data collection, or analysis or would entail new or retrofitted structures, or other mitigation measures on or adjacent to Tribal lands, TTPSF offers another source of potential funding.



Case Study: The Blackfeet Nation secured \$140,000 in TTPSF funding to support the development of a reservation-wide *Animal-Vehicle Collision Reduction Master Plan* (Fairbank et al. 2019). In addition to addressing motorist safety concerns, the report recommends that select bridges be modified to include wildlife passageways underneath, as depicted in this artist’s rendering (USDOT 2021) Image: Ed Jenne.

Nationally Significant Federal Lands and Tribal Projects

The IJA authorized \$275 million over five years for the National Significant Federal Lands and Tribal Projects (NSFLTP) program, which provides funding for nationally significant projects to construct, reconstruct, or rehabilitate transportation facilities within, adjacent to, or that provide access to Federal or Tribal lands. Eligible projects include environmental mitigation within or adjacent to Federal or Tribal lands that aims to improve public safety and reduce wildlife mortality due to motorists while maintaining habitat connectivity (USDOT 2022f). Projects to “mitigate the damage to wildlife, aquatic organism passage, habitat, and ecosystem connectivity, including the costs of constructing, maintaining, replacing, or removing culverts and bridges” are also eligible for funding for Federal Lands and Tribal transportation facilities (23 U.S.C. §§ 203(a)(1)(A)(iv)(II) (FLTP), 202(a)(1)(A)(vi)(II) (TTP)). Program priorities include projects that advance safety, a state of good repair, and economic competitiveness; enhance the quality of life; improve facility deficiencies; use innovative or new technologies; support national and regional economies; involve two or more states; and service land owned by multiple FLMA’s or Tribes. Projects must have a total estimated construction cost of at least \$12.5 million, and each fiscal year, half of all NSFLTP funding must go to projects involving Tribal transportation facilities (USDOT 2022f).

Application to Recommended Mitigation Measures: To the extent there are opportunities to integrate recommended desert tortoise mitigation measures within an NSFLTP proposal, this program offers another source of potential funding. These funding opportunities would likely require new agreements with Tribes/FHWA/State DOTs to implement any larger desert tortoise burden-sharing agreements because these programs are not administered for FHWA through the State DOT.

State, Federal, Tribal, and Local Allocation Programs and Funding

Highway Safety Improvement Program (HSIP)

The IJA allocates \$15.6 billion over 5 years to reduce traffic fatalities and serious injuries on all public roads, including non-State-owned public roads and roads on Tribal lands (23 U.S.C. § 148(b)). The Highway Safety Improvement Program (HSIP) requires States to use these funds for safety projects consistent with their highway safety plans. In producing these plans, State DOTs are required to consult with other State, Federal, Tribal, regional, and local stakeholders to develop a series of strategies and countermeasures aimed at reducing or eliminating identified safety hazards based on traffic, crash, and roadway safety data, as well as other relevant considerations (23 U.S.C. § 148(a)(13)). Eligible wildlife-related projects include the addition or retrofitting of structures or other measures to improve safety by eliminating or reducing crashes involving vehicles and wildlife.

Application to Recommended Mitigation Measures: Because HSIP funds are typically allocated based on crash rate and crash severity prioritization through cost-benefit analyses, measures aimed at mitigating high rates of WVCs compete with all other crash types for funding. Although States have allocated HSIP funding for projects to reduce WVCs involving larger animals, its use to advance mitigation measures aimed solely at non-safety species such as desert tortoise appears to be limited, if not nonexistent, absent potential opportunities to facilitate safe passage for desert tortoise as part of a project to reduce WVCs with animals that present a safety risk to motorists.



Case Study: The large underpass shown here is one of a network of 24 planned wildlife structures aimed at reducing crashes involving mule deer and elk as well as smaller animals along a 20-mile segment of Hwy 160 near Durango, CO. Eighty percent of funding for the underpass came from the Highway Safety Improvement Program, which was supplemented by a 20% state / local match (Pace 2015). Image: Shaun Stanley / Durango Herald.

Surface Transportation Block Grant Program (STBGP)

The Surface Transportation Block Grant Program provides \$64.8 billion over 5 years in flexible funding for State and local governments to pay for surface transportation projects on Federal-aid highways.^[4] Eligible wildlife-related projects include (1) construction of wildlife crossing structures and (2) “projects and strategies designed to reduce the number of wildlife-vehicle collisions, including project-related planning, design, construction, monitoring, and preventative maintenance” (23 USC § 133(b)(1)(G),

(b)(14)). One of the largest sources of Federal transportation funding, STBGP’s primary goal is to provide flexible funding for State and local governments to meet their transportation needs (23 USC § 133(a)). Funding is broadly available for projects on “the roughly one million miles of Federal-aid highways, [and] for bridges on any public road” (White House 2022)⁴.

Application to Recommended Mitigation Measures: Given its broad scope and flexible application to both wildlife infrastructure and other projects and strategies to reduce WVCs including project-related costs, STBGP constitutes an important potential source of funding for recommended mitigation measures on State, Tribal, and local roads, bridges, and other eligible transportation facilities. Unlike many other Federal funding programs, STBGP may also be used to pay for preventative maintenance.

Transportation Alternatives (TA) Set-Aside

A critical source of funding for local transportation facilities, the Transportation Alternatives set-aside provides \$7.2 billion over 5 years in funding for a variety of local transportation-related projects including the construction of cyclist and pedestrian facilities, historic preservation and community improvement activities, recreational trails and safe routes to school projects, vulnerable road user safety assessments, and environmental mitigation activities aimed at reducing wildlife mortality due to roads, or restoring and maintaining terrestrial or aquatic habitat connectivity. The Transportation Alternatives set-aside is also unique in that it (1) requires states to employ a competitive grant process for local governments and other eligible entities to apply for TA funding, and (2) allows non-profit entities to apply directly for funding (USDOT-FHWA 2022d).

Application to Recommended Mitigation Measures: To the extent recommended mitigation measures involve projects aimed at reducing vehicle-caused desert tortoise mortality on local roadways or maintaining and improving habitat connectivity across such roads, this program offers a key source of potential funding.

⁴ STBGP funding is generally not available for local or rural minor collector roads unless the roadway was part of the Federal-aid highway system as of January 1, 1991, absent certain noted exceptions such as bridge or tunnel projects and transportation alternatives (23 USC § 133(c), (g)).



Case Study: The project depicted here was undertaken by a group of public-private partners who successfully secured both a Transportation Alternatives grant and a USFWS State Wildlife Grant to provide safe passage for salamanders and frogs migrating from one side of a local road, where they winter in upland forest habitat, to the other side, where they breed in spring. Coupled with matching private contributions, these grants were used to construct two concrete, box-style underpasses plus associated fencing (ARC 2022). Image: Vermont Agency of Transportation.

Federal Lands and Tribal Transportation Programs

The IIJA re-authorizes funding for three Federal Lands and Tribal transportation programs: the Federal Lands Transportation Program (FLTP), the Federal Lands Access Program (FLAP), and the Tribal Transportation Program (TTP) (23 U.S.C. §§ 201-204).

Federal Lands Transportation Program (FLTP)

The IIJA authorizes \$2.2 billion over 5 years for the Federal Lands Transportation Program. Funds may be used for Federal Lands transportation facilities owned and maintained by FLMAs. The largest share of FLTP funds is set aside for the National Park Service, which receives more than \$1.7 billion over 5 years (ranging from \$332 million in FY22 to \$360 million in FY26); the Service receives \$180 million (\$36 million per year), and the USDA Forest Service receives \$130 million (\$24 million per year). With the exception of a guaranteed apportionment of not less than \$7 million per agency per fiscal year, the remaining funds (\$154 million) are competitively apportioned among the Bureau of Land Management; Army Corps of Engineers; the Bureau of Reclamation; and other federal agencies with land management responsibilities (FHWA 2022c). Funds are allocated on the basis of need as determined by the USDOT Secretary in consultation with FLMAs and in coordination with their required transportation plans (23 USC § 203(b)(1)). In evaluating proposed funding applications, the Secretary must consider how well the programs would support applicable performance management goals, including a state of good repair; reduced bridge deficiencies; safety improvements; high-use Federal recreational sites or Federal economic generators; and FLMA resource and asset management goals (23 USC § 203(b)(2)). Eligible

wildlife-related projects include environmental mitigation within or adjacent to Federal land open to the public “(I) to improve public safety and reduce vehicle-caused wildlife mortality while maintaining habitat connectivity; and (II) to mitigate damage to wildlife, aquatic organism passage, habitat, and ecosystem connectivity, including the costs of constructing, maintaining, replacing, or removing culverts and bridges” (23 U.S.C. § 203). There is a cap of \$20 million per fiscal year for eligible FLTP activities aimed at reducing wildlife mortality (23 U.S.C. § 203(a)(1)(D)).

Application to Recommended Mitigation Measures: To the extent recommended desert tortoise mitigation measures involve Federal Lands transportation facilities, this program offers an important source of potential funding. This funding opportunity would likely require new or additional agreements with the Tribes/FHWA/State DOTs to implement any larger desert tortoise burden sharing agreements developed because these programs are not administered for FHWA through the State DOT or the FHWA state Division. FLTP projects are administered through the Central Federal Highway Lands Division.

Federal Lands Access Program (FLAP)

The Federal Lands Access Program (FLAP) complements FLTP as well as other Federal transportation programs by providing \$1.5 billion in funding over 5 years. This funding is designated for projects to improve Federal Lands Access Transportation Facilities (FLATFs) that are located within, adjacent to, or that provide access to, Federal lands, but are owned or maintained by a State, Tribe, or other local government entity (FHWA 2022b). Funding is allocated by formula among States with Federal lands, and there is a preference for projects associated with high-use Federal recreation sites or Federal economic generators (23 U.S.C. § 204(b)-(c)). Funding may be used for environmental mitigation to improve public safety and reduce wildlife mortality due to roads, while maintaining habitat connectivity (23 U.S.C. § 204(a)(1)(A)(iv)).

Application to Recommended Mitigation Measures: To the extent desert tortoise mitigation projects are on FLATFs that constitute important economic generators, FLAP would be a significant potential funding source. This funding opportunity would likely require new or additional agreements with the FHWA and State DOTs to implement any larger desert tortoise burden sharing agreements developed because these programs are not administered for FHWA through the State DOT or the FHWA state Division. FLAP projects are administered through the Central Federal Highway Lands Division.



Case Study: The Texas Department of Transportation and the U.S. Fish and Wildlife Service have built a network of wildlife underpasses to mitigate the effect of state roads on one of the U.S.’s last-known populations of ocelots, for whom roadways are a leading cause of known mortality events. The USFWS has used FLAP and FLTP funds to pay for speed control measures on the entrance road to Laguna Atascosa National Wildlife Refuge in the Rio Grande Valley, South Texas (Ament et al. 2021). Image: The USFWS.

Tribal Transportation Program (TTP)

The Tribal Transportation Program (TTP) is the largest source of federal funding for projects involving tribal transportation facilities. Under the IIJA, the program will receive \$3 billion over 5 years to provide access to basic community services to enhance the quality of life on tribal lands (FHWA 2022d). Funding from this program can be used to pay for environmental mitigation within or adjacent to tribal land “(I) to improve public safety and reduce vehicle-caused wildlife mortality while maintaining habitat connectivity; and (II) to mitigate the damage to wildlife, aquatic organism passage, habitat, and ecosystem connectivity, including the costs of constructing, maintaining, replacing, or removing culverts and bridges” (23 U.S.C. § 202).

Application to Recommended Mitigation Measures: To the extent desert tortoise mitigation projects are within or adjacent to Tribal lands, TTP may provide a significant source of funding. This funding opportunity would likely require new or additional agreements with the Tribes/FHWA/State DOTs to implement any larger desert tortoise burden sharing agreements developed because these programs are not administered for FHWA through the State DOT.

Infrastructure Resiliency and Mitigation Planning Programs

While not a direct source of funding for wildlife infrastructure, the IJA contains two other provisions of potential relevance as decision-makers seek to diversify Federal support for desert tortoise-related planning and capital projects. The first is the Promoting Resilient Operations for Transformative, Efficient, and Cost-saving Transportation (PROTECT) program (23 U.S.C. § 176), which aims to promote infrastructure resiliency. The second authorizes States to develop programmatic mitigation plans aimed at addressing the potential impacts of future transportation projects (23 U.S.C. § 169).

Promoting Resilient Operations for Transformative, Efficient, and Cost-saving Transportation (PROTECT)

Although wildlife infrastructure is not expressly eligible for funding, the PROTECT program provides \$8.7 billion (including \$7.3 billion in State formula funding plus \$1.4 billion in discretionary grants) to States and communities for two new categories of surface transportation resiliency improvements: natural infrastructure and protective features (23 USC § 176). Natural infrastructure is defined as infrastructure that “uses, restores, or emulates natural ecological processes” created by natural processes or by humans, or that involve the “use of plants, soils, and other natural features” (23 USC § 101(a)(17)). Protective features include improvements designed to mitigate the risk of recurring damage, or the cost of future repairs, due to extreme weather events, flooding, or other natural disasters (23 USC § 176(d)(4)(A)(ii)(II)). Among other things, PROTECT provides enhanced opportunities to upsize culverts and bridges to the potential benefit of terrestrial and aquatic connectivity, where doing so would improve the resiliency of our nation’s infrastructure. Principally aimed at increasing infrastructure resiliency to weather events and natural disasters, projects involving natural infrastructure and protective features may offer cost-effective opportunities to both protect transportation assets while at the same time “improving ecosystem conditions, including culverts that ensure adequate flows in rivers and estuarine systems” (23 U.S.C. §§ 176(b)(2)(C)(iv), (c), (d)(5)(D)).

Application to Recommended Mitigation Measures: Although eligibility varies between formula allocation funding and discretionary grant funding, natural infrastructure and protective feature improvements may offer opportunities to improve desert tortoise connectivity and reduce mortality due to roads during PROTECT bridge and culvert repair, replacement, and rehabilitation projects within the 4-state desert tortoise range, including where bridges or culverts are upsized to accommodate an increased hydraulic flow. Alternatively, such projects may present an opportunity to advance the measures recommended in this report by supplementing PROTECT funding with targeted investments from one of the other identified programs for which wildlife infrastructure is directly eligible. For example, during a PROTECT-funded project to upsize a culvert or add or lengthen a bridge deck, State, Federal, Tribal, or local officials could potentially allocate funding from another program to pay for associated desert tortoise infrastructure such as fencing. The ability to incorporate supplemental mitigation measures for desert tortoise, as appropriate, into planned resiliency improvement projects under PROTECT is likely to be especially cost effective – creating a unique opportunity to advance transportation infrastructure resiliency while at the same time reducing desert tortoise mortality due to roads and improving desert tortoise habitat connectivity.

Programmatic Mitigation Plans

Federal transportation law also empowers States to develop programmatic mitigation plans to address the potential environmental impacts of future transportation projects (23 U.S.C. § 169). These plans may

be developed on a regional, ecosystem, watershed, or statewide scale and may encompass multiple environmental resources within a defined geographic area or may focus on a specific resource, such as aquatic resources, parkland, or wildlife habitat. Overall, such plans help ensure a more systematic approach to highway planning and projects, rather than simply constructing individual projects on a “one-off” basis.

Application to Recommended Mitigation Measures: If desired, the Desert Tortoise Task Force could work with its member States to assess the propriety of integrating the recommended recovery measures from this study into their long-range transportation planning and short-term programmed highway safety improvement projects, as warranted.

Conclusion

In sum, the mitigation measures recommended in this report have the potential to compete for funding from more than 10 Federal transportation programs, depending on program applicability and alignment with a variety of project-specific considerations, such as facility ownership; anticipated grant size; total project costs; potential opportunities to integrate the recommended measures into planned transportation projects; and other relevant criteria.^[6]

Additional Funding Opportunities Under IJA

In addition to the explicit transportation programs discussed above, IJA provides funding for habitat connectivity measures under the broader infrastructure programs outlined below.

Collaborative-based, Aquatic-focused, Landscape-scale Restoration Program

This competitive \$80 million program is for projects to restore water quality or fish passage on federal and non-federal lands, including tribal forest land or rangeland. Priority is given to a proposal resulting in the most miles of streams being restored for the lowest amount of federal funding. Projects should contain proposed non-federal funding and request no more than \$5 million.

Forest Service Legacy Road and Trail Remediation Program

This program provides \$250 million in direct federal spending on capital improvement and maintenance. Eligible projects include decommissioning and repairing roads and trails to mitigate detrimental impacts to sensitive ecosystems and watersheds. Additionally, funding can be used to replace or install bridges and culverts (or low-water trail crossings), address public safety of roads and trails, restore unneeded roads and trails to a more natural state, address storm-damaged areas, and remove or replace pipes and other structures that restrict or prevent fish and other aquatic organisms from reaching their traditional habitat.

Relevant Federal Conservation Funding Opportunities

Some key federal conservation funding opportunities available to assist in the conservation and recovery of the desert tortoise are outlined below.

America the Beautiful Challenge

The America the Beautiful Challenge (ATBC) combines funding from federal agencies and the private sector (USFWS, Natural Resources Conservation Service, Forest Service, U.S. Department of Defense, Native Americans in Philanthropy, and other non-governmental sources) to support the implementation of large-scale ecosystem restoration projects across public and private lands. The program provides funding for projects to address five conservation objectives, one of which is “connecting and reconnecting wildlife corridors, large landscapes, watersheds, and seascapes.”

ATBC combines federal conservation and restoration funding with private and philanthropic investments to provide a total of \$1 billion over the next 5 years. The first funding cycle was completed in November 2022 and awarded \$91 million in grants. State government agencies, U.S. territories, Indian Tribes, non-profit 501(c) organizations, local governments, municipal governments, and educational institutions are eligible to apply.

Land and Water Conservation Fund (LWCF)

The LWCF Cooperative Endangered Species Conservation Fund provides funding to states for species and habitat conservation for candidate, proposed, and listed species on non-Federal lands. States must contribute a match of 25%, or 10% when the project encompasses two or more states. The Fund consists of four grant programs:

- **Traditional Conservation Grants:** This program supports the development and implementation of state programs to conserve and monitor species and can fund habitat restoration, species surveys, education and outreach, propagation and restoration, genetic studies, and management plan development.
- **Habitat Conservation Plan Land Acquisition Grants:** This program provides additive, matching grants to conserve species habitat on approved and permitted habitat conservation plan projects.
- **Conservation Planning Assistance Grants:** This program provides funding to support states in the development, renewal, or amendment of new Habitat Conservation Plans, Safe Harbor Agreements, and Candidate Conservation Agreements with Assurances. Funding can be used for document preparation, outreach, species and habitat surveys, and inventories.
- **Recovery Land Acquisition Grants:** This program leverages funds for the acquisition of land to support USFWS-approved recovery plans and outlines.

Funding is available to states and territories who enter into a cooperative agreement with the Secretary of the Interior. Additionally, individuals and groups may apply for LWCF grants as subgrantees. A total of \$80 million was awarded under the four grant programs in 2022.

Partners for Fish and Wildlife Program

The USFWS Partners for Fish and Wildlife Program (PFW) provides free technical and financial assistance to landowners and nonprofits for wildlife habitat restoration. Priority goes to projects providing habitat for listed species. Participants receive help planning, designing, supervising, and monitoring habitat restoration projects on their private land. Projects must last at least 10 years and have a maximum federal grant award of \$750,000. PFW staff identify geographic focus areas and habitat conservation priorities within the focus areas. These geographic focus areas define where the program directs resources. Prospective applicants must consult with a regional PFW office before applying. \$15 million is available under the Fiscal Year 2023 grant opportunity, with applications due September 30, 2023.

Recovery and Sustainment Partnership Initiative

The Recovery and Sustainment Partnership is a joint initiative between the Department of the Defense and the Department of the Interior to develop species conservation and recovery programs. A memorandum of understanding was signed in 2018 between the two entities in order to develop species conservation and recovery while furthering flexibility for military missions. The desert tortoise is one of the species of focus. The initiative has led to the development of a species action plan and a series of short-term and medium-term habitat and species conservation objectives, as well as the 2022 Mojave Desert Tortoise Recovery Implementation Plan.

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Appendices

Appendix A: Policy Problem Statements (compiled by the Policy Task Force, June 2022)

1. Inconsistent regulations and mitigation requirements exist across the range for effective Mojave desert tortoise (*Gopherus agassizii*) transportation mitigation resulting in interagency policy roadblocks, which often preclude installation of fencing where it is most needed. This has resulted in a consistent decline of tortoise populations due to unabated road mortality, especially in areas where the additive effects of raven predation have not been significantly minimized. Recovery actions such as land acquisition and habitat restoration will have minimal effect on tortoise recovery unless road mortality has been addressed through installation of fencing.

Several examples are provided below:

- a. Transportation agencies, such as Nevada Department of Transportation (NDOT) and Caltrans are reluctant to allow fencing to be installed along their right-of-ways (ROWs) because of increased funding and staffing burdens associated with maintaining the integrity of increased miles of tortoise fencing. The state DOTs often cite inadequate funding and staffing to manage the increased maintenance burden. There is also reluctance to allow third parties, such as contractors or NGOs, to assume responsibility for maintenance of tortoise fencing because of concerns regarding legal liability as well as jurisdiction and access issues.

Several ideas have been suggested, such as funding maintenance as a form of mitigation or setting up a dedicated NFWF fund to compensate DOTs for the increased costs of fence maintenance. Endowment funds for maintenance could be extremely helpful to DOTs and encourage them to move forward with projects that include fencing installation knowing that they will have support for long-term maintenance responsibilities.

Clear roles and responsibilities regarding installation and maintenance of fencing should be established at the start of projects. Often up-front funding for construction is available through federal transportation programs, but funding for long-term maintenance falls solely on state DOT budgets. A mechanism for third party contributions of both funding and capacity are needed, potentially through cooperative agreements being established during project planning.

- b. California Department of Fish and Wildlife (CDFW) considers areas within road ROWs and medians as desert tortoise habitat and requires land acquisitions to compensate for habitat lost from these areas when fencing is installed because tortoises will be excluded from accessing these areas. The U.S. Fish and Wildlife Service (Service) has determined that road ROWs and medians do not provide suitable habitat because these areas are often highly disturbed and provide immediate access to roads and increased risk of road mortality. The Service believes that installation of fencing is self-mitigating because it “restores” habitat in dead zones along roads through allowing tortoises to safely access and recolonize these areas while minimizing the risk of road mortality.

Purchasing and managing lands to replace excluded acreage within ROWs and medians is extremely expensive, especially in addition to the cost of fencing installation and maintenance. Current availability of high quality habitat parcels is scarce, and the majority of parcels purchased provide low to medium quality habitat while often not located within strategic

conservation areas, generally providing little benefit to MDT recovery. This is a huge impediment to the implementation of roadside fencing and is not an effective or efficient use of limited resources when it comes to MDT recovery.

There has been discussion between Bureau of Land Management (BLM) and the CDFW regarding the possibility of establishing durable conservation easements on BLM lands to satisfy mitigation requirements and allow for the installation of fencing to be considered mitigation. This is complex for BLM to accomplish, and disagreements may prohibit fencing from being used as a mitigation strategy to reduce road mortality and allow tortoises to safely recolonize dead zones. Guidance and support from upper management is needed to pursue this potential option, as well as the need for policy change by CDFW to address land compensation issues. Instead of allocating large amounts of funding for compensatory land acquisition, it could instead be directed toward more effective recovery actions (such as construction, maintenance, and monitoring of fencing and culverts) that would provide much greater benefit for MDT recovery.

2. There is a need for development of MOUs or cooperative agreements and a more collaborative approach to resolving policy conflicts and equitable distribution of responsibility for installing and maintaining tortoise fencing. Stakeholders need to come together to develop policies and processes for a shared stewardship framework to ensure that the responsibilities of mitigating transportation infrastructure for MDT do not become the sole burden of any single agency.
3. Interagency communication needs to be much more proactive and should be initiated very early in the project scoping process by the DOTs. Often biological consultation and management actions are identified months/years after a project has been scoped/budgeted by the DOTs and funding has not been allocated for the recommended actions, such as fencing installation or culvert modification to minimize road mortality and ensure connectivity. This can result in fencing not being installed in priority road segments or extra costs for “change orders” from contractors required to install fencing after they project has been initiated.
4. Currently, DOTs may face challenges in being able to retrofit culverts to improve passage for MDT and reduce maintenance burdens due to hydraulic issues and collection of debris within culverts. Retrofitting or constructing culverts as mitigation should be a net positive and DOTs should not be penalized for doing so.
5. Fully engaged upper-level management support is necessary for effective funding and implementation of high priority MDT recovery actions, such as fencing installation, culvert construction/retrofitting, and raven monitoring and control. High-level consistent coordination among agency leadership is essential for successful funding and implementation of actions for achieving MDT recovery goals as well.

Appendix B: Interview Questions

Introduction

1. Could you tell me a bit about your role and how long you’ve been working on DT?
2. What proportion of you or your team’s time is dedicated to developing, planning and implementing DT recovery actions?

3. What types of desert tortoise recovery projects have you funded, implemented, or directly been involved with?
4. Are there any major challenges and opportunities you see with regard to implementing high priority recovery actions for DT along roads?
5. What is your biggest issue in working on DT transportation ecology? If you had a magic wand to fix it, what would you do?

Regulatory Inconsistencies

6. Have you experienced challenges due to regulatory inconsistencies among agencies? If so, can you describe them? (Follow-up questions to prompt such as CEQA/NEPA, land acquisition, jurisdictional and land ownership issues in ROWs, etc.)
7. What issues would be most helpful to resolve in order to be able to efficiently fund and implement recovery actions such as fencing, culverts, and raven management? (Chicken/egg situation with NEPA funding for fencing projects)

Implementation and Maintenance Issues

8. Are there any great obstacles to building and maintaining mitigation measures for DT along roads? (funding, lack of data, lack of buy-in, regulatory issues, etc.)
9. Do you see any opportunities for addressing these issues?
10. What types of processes/mechanisms would be most helpful to streamline funding and implementing projects?

Interagency Coordination and Communication

11. Are there any big barriers for interagency coordination and communication? When do these issues arise in the process?
12. What are potential solutions to address these issues? (MOUs, interagency agreements, etc.)

Engagement and Commitment by upper-level managers to implement high-priority recovery actions

13. How would you characterize your leaderships/agency's commitment to DT recovery? (follow up with the "why/why not?") What would it take to elevate this to a higher priority?
14. Do you feel that you have the high-level commitment, guidance, and support to successfully fund and implement projects for DT recovery? Does this support come from within or outside of your agency?

Stakeholder Engagement

15. In your opinion, who are the major stakeholders? What is their level of engagement? When and how do they need to be involved? What role would they play?
16. Have you worked with external NGOs? Is there an opportunity to engage/leverage NGOs?

Conclusion

17. Is there anything that we missed or anything else that you'd like to add?