



The North Carolina Department of Transportation (NCDOT) is seeking \$8.3 million from the US Department of Transportation's (USDOT's) Wildlife Crossings Pilot Program (WCPP) to add wildlife fencing along Interstate 26 (I-26) in Madison County, North Carolina. I-26 is a vital part of the Nation's infrastructure. It is part of the National Highway System and is a North Carolina Strategic Transportation Corridor (Corridor C).

The project area is a 9-mile section of I-26, completed in 2003, that extends from the Tennessee-North Carolina state line at Sam's Gap to near US Highway 19 (US 19) in Mars Hill, NC. The originally installed standard, 4.5-foot-tall, woven wire control-of-access fencing follows the right-of-way except where it was pulled in to help funnel wildlife to wildlife culverts. This control-of-access fencing has limited effectiveness at excluding or directing wildlife away from the roadway. NCDOT proposes to provide \$924,000 in State Interstate Maintenance Funds as a project match.

During the development of this new location roadway project, biologists with the North Carolina Wildlife Resources Commission (NCWRC) raised concerns that I-26 would fragment habitat for black bear (*Ursus americanus*). The roadway's proposed overall width of six, 12-foot travel lanes and a median with concrete barrier was predicted to impede bear movements and contribute to localized bear mortality from wildlife vehicle collisions (WVCs). To mitigate this problem, the NCDOT constructed two 8 x 8-foot concrete box culverts under the highway for use by black bears and other area wildlife. These culverts were anticipated to provide two locations where wildlife could cross I-26, in addition to crossing under the I-26 bridge over Big Laurel Creek.

Black bears, white-tailed deer (*Odocoileus virginianus*), and other wildlife have been observed using the culverts to cross I-26. However, despite the presence of 4.5-foot control-of-access fencing along the facility, WVCs still occur in the project corridor. This is due to inadequate fencing, wildlife passing through the woven wire, climbing, or jumping the fence. Also, in many locations, the right of way fence alignment extends far from the road shoulder into surrounding forests, which has left large areas for wildlife to gather between fencing and the highway. A NCDOT crash analysis for the period from January 1, 2003 to March 31, 2023, determined that 117 reported WVCs within the project area. The average reported property damage per crash was approximately \$3,000. Appropriate wildlife fencing is needed to better direct wildlife to the crossings and limit wildlife access to the roadway.

It should be noted that most WVCs are not reported. For example, a Virginia Department of Transportation (VDOT) study found that WVCs were underreported by a factor of 8.5 when compared to deer carcass removal data from the same facility (VDOT, 2017). Using this correction factor, approximately 1,000 WVCs are estimated to have taken place along this section of the I 26 corridor in the last 20 years.

The project study area includes 2019 U.S. Census Tracts 100, 600, and 700 in Madison County. Census Tracts 100 and 700 meet USDOT Justice40 criteria as Historically Disadvantaged Communities (HDC). Census Tract 100 also meets the Justice40 criteria as an Area of Persistent Poverty (APP). This project would provide improvements to the safety of the traveling public and better exclude wildlife from the roadway and facilitate cross-highway movements.

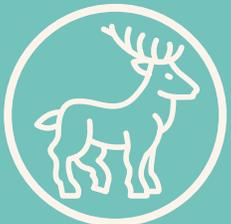


NORTH CAROLINA WCPP APPLICATION

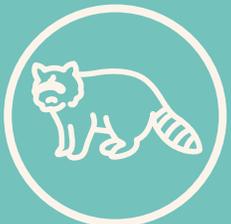
July 2023



BLACK
BEAR



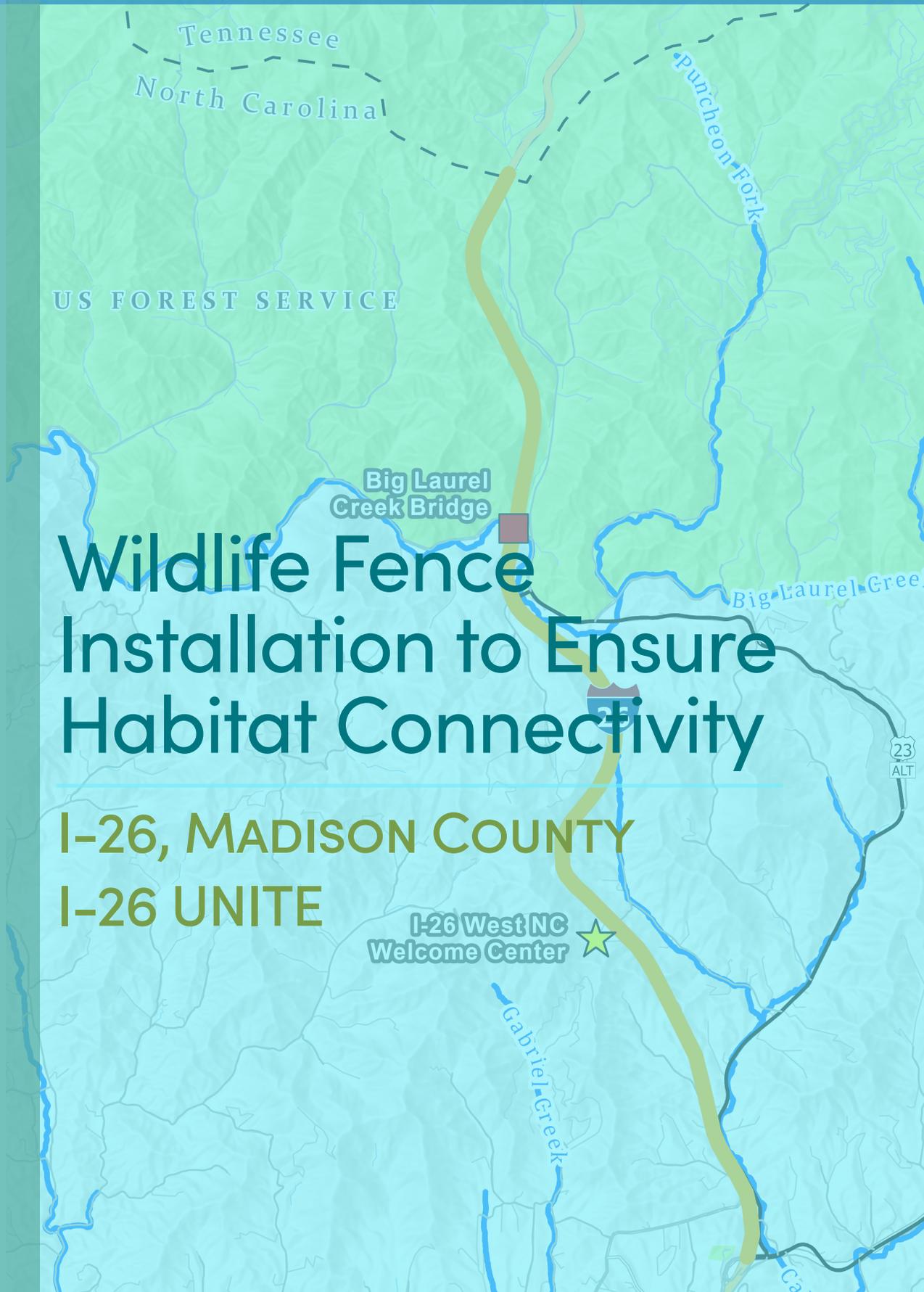
DEER



RACCOON



FOX



Wildlife Fence Installation to Ensure Habitat Connectivity

I-26, MADISON COUNTY
I-26 UNITE



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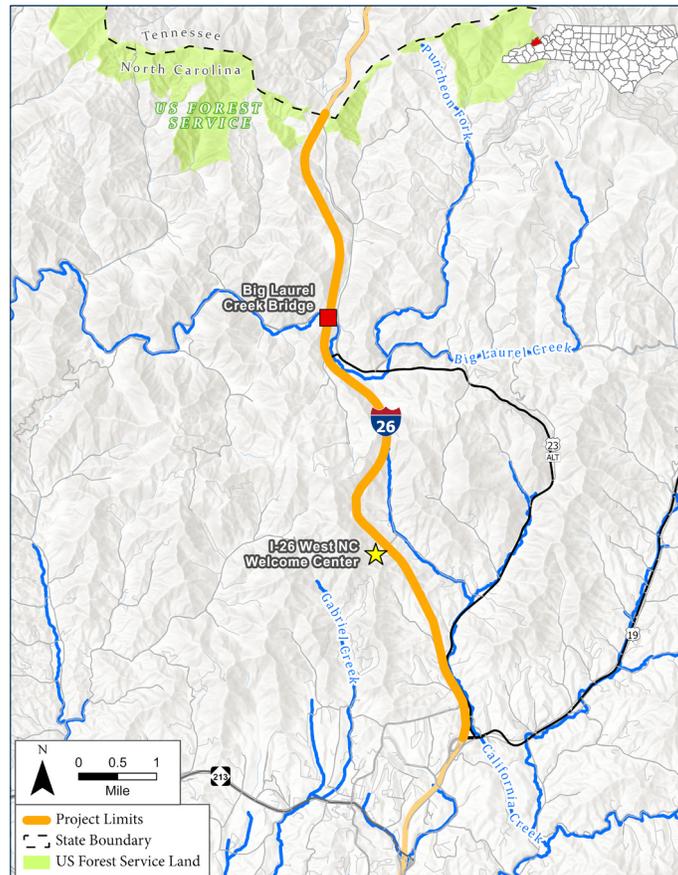
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PROJECT DESCRIPTION

North Carolina Department of Transportation (NCDOT) seeks \$8.3 million to improve safety and habitat connectivity along I-26 by adding wildlife fencing in the mountains of Madison County, NC. In 2003, NCDOT constructed this 9-mile new location highway that bisected the high-quality wildlife habitat from the Mars Hill area north to the Tennessee state line. Two wildlife culvert underpasses were installed to minimize impacts, specifically targeting the area's black bear (*Ursus americanus*) populations. The standard control-of-access fencing that was installed has been twice documented (Jones, 2003 and in press 2023) to be insufficient in reducing wildlife access to I-26 near the underpasses. NCDOT would provide \$924,000 in matching funds from the State's Interstate Maintenance Fund to install wildlife fencing closer to I-26 adjacent to these two culverts and the I-26 bridge



I-26 FROM HIGHWAY CUT (NCWRC)



PROJECT LOCATION MAP



over Big Laurel Creek where robust wildlife use under this bridge has been documented (Jones, in press 2023).

I-26 is a vital part of the Nation’s infrastructure. It is part of the National Highway System and is a North Carolina Strategic Transportation Corridor (Corridor C). The efficient operation of this corridor is of critical importance not only for North Carolina but also for the nation. Due to its relatively undeveloped location in the North Carolina mountains, it is home to a wide variety of wildlife.

The I-26 UNITE project would install appropriately designed wildlife fencing. The 10-foot-tall fencing would minimize the over and under fence highway access while directing wildlife to the culverts and the Big Laurel Creek bridge. The fencing placement would be set closer to the highway thereby reducing the area of vegetation inside the fencing. Past and on-going wildlife studies have documented robust wildlife use along the I-26 corridor in the project area. Wildlife use of the culverts and slopes above the creek have been documented. Furthermore, wildlife use is sometimes higher, at or just beyond the culvert openings and nearby surrounding forest, suggesting the culverts are in good locations. Therefore, this project is a cost-effective way to increase wildlife usage of the culverts and hydraulic structures in this region.



DEER CROSSING UNDER I-26 AT WILDLIFE CULVERT (NPCA)

Wildlife monitoring of the culverts began two years after construction. The initial study by N. C. State University researchers found support for wildlife crossing site selections. Significant crossing structure use was documented for mesomammals but large mammals were less likely to use the culverts. This was attributed to human activity, traffic, structure design and inadequate fencing. However, current guidance reports that culverts with these dimensions are used effectively used by black bear. Ongoing, recent monitoring by National Parks Conservation Association (NPCA) has observed increased but still infrequent use of the crossing structures. Monitoring observations have included digital videography, still photographs, and local resident observations. This valuable monitoring data enables a more refined assessment of the pre- and post-project

effectiveness of reducing WVC along I-26.



BEAR CROSSING UNDER I-26 AT BIG LAUREL CREEK BRIDGE (NCWRC)

In addition to large species like black bear and white-tailed deer (*Odocoileus virginianus*), the wildlife crossing structures benefit smaller species as well. Species in the area that may also benefit include bobcat (*Lynx rufus*), raccoon (*Procyon lotor*), grey and red fox (*Urocyon cinereoargenteus* and *Vulpes vulpes*, respectively), long-tailed weasel (*Mustela frenata*), and striped skunk (*Mephitis mephitis*). In addition, the area is home two state-listed reptile species including timber rattlesnake (*Crotalus horridus*). Although reptile species are generally less mobile than mammal species, many reptiles have dispersal or seasonal migrations and can benefit from the crossing structures.



PROJECT INFORMATION

PROJECT NAME	Wildlife Fence Installation to Ensure Habitat Connectivity (I-26 UNITE)
WCPP REQUESTED AMOUNT	\$8,316,000 (YOE)
TOTAL PROJECT COST	\$9,240,000 (YOE)

ELIGIBILITY CRITERIA

Who is the Eligible Applicant?	NC Department of Transportation (NCDOT)
Is there an Eligible Partner?	No
Indicate the amount, type, and source(s) of the standard 20% non-Federal match under 23 U.S.C. 120(b).	NCDOT Interstate Maintenance Funds \$924,000
Eligible Project Type	Construction project, including all activities that lead to a built project.
Consultation with the State DOT	No consultation because we are the State DOT
State(s) and/or Tribal land in which the project is located	NC
Lead Applicant	NCDOT

LOCATION INFORMATION

Location of project area	I-26, from TN/NC state line to approximately Mars Hill, in Madison County, NC
US Census FIPS Code (2019)	Census Tracts 100, 600, 700
Geographic Coordinates	35.954774, -82.560382 35.909001, -82.557646
Is the project located in an urban area or rural area?	Rural
Is the project located (entirely or partially) in federally designated community development zone?	No. For all federally designated community development zones.
Is the project area located on a federally recognized Indian Tribe land?	No.
Congressional district(s)	NC US District 11

PROJECT COSTS

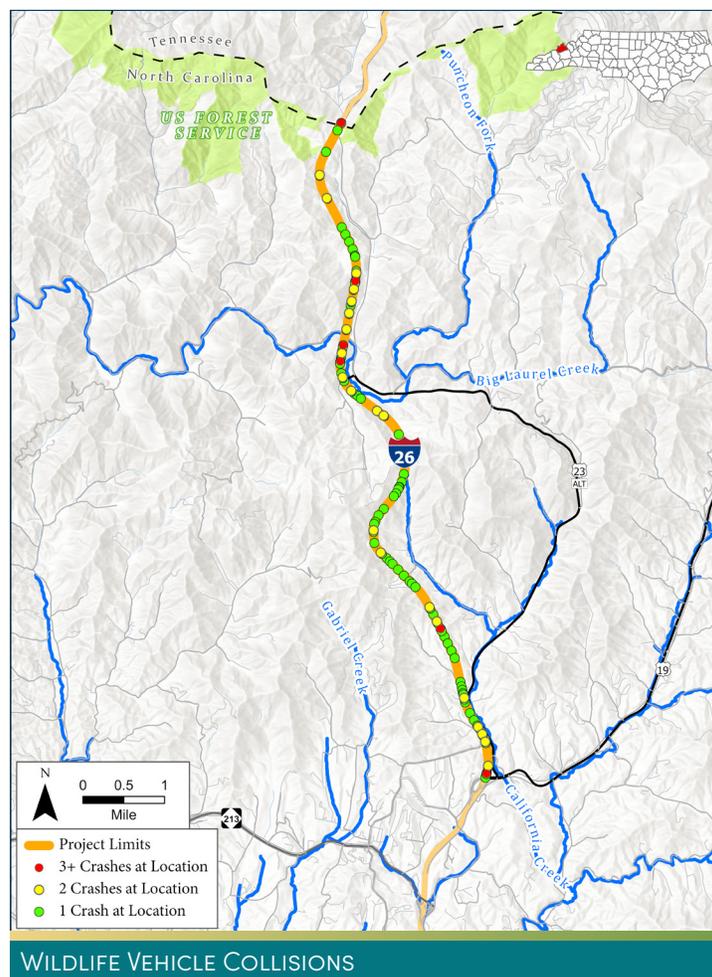
WCPP Requested Amount	\$8,316,000 (YOE)
Estimated Total of Other Federal Funding	\$0
Estimated Non-Federal Funding	NCDOT Interstate Maintenance Funds \$924,000 (YOE)
Future Eligible Project Cost	\$9,240,000 (YOE)
Previously Incurred Project Costs	\$0
Total Project Cost	\$9,240,000 (YOE)

PROJECT MERIT CRITERIA

CRITERION 1.1: WILDLIFE VEHICLE COLLISIONS

The project contributes to the Wildlife Vehicle Crossing (WVC) criterion by improving the existing fencing infrastructure. Wildlife fencing is known to be the most effective measure to reduce WVC (Clevenger and Huijser 2011). The addition of wildlife fencing along I-26 would decrease white-tailed deer and black bear at-grade crossings. The addition of wildlife fencing along I-26 would reduce collision risk and improve driver safety.

The current control-of-access fencing is approximately 4.5 feet high, which discourages some wildlife from crossing I-26, but does not sufficiently funnel wildlife to crossing structures. It is also notable that the black bear population in the region has been increasing since I-26 was constructed, which is likely contributing to increasing WVCs over time. With improved wildlife fencing, it is anticipated that WVCs can be substantially reduced from the current rate of 0.91 reported WVCs per mile of fencing per year (7.74 when corrected using VDOT data).



CRITERION 1.2: TERRESTRIAL & AQUATIC HABITAT CONNECTIVITY

The project contributes to the Terrestrial and Aquatic Habitat Connectivity criterion by installing improved fencing to direct species to the existing crossings. This section of the I-26 corridor offers prime wildlife habitat. The surrounding landscape is primarily forested with mountainous terrain. Without wildlife fencing and despite the concrete barrier, black bear regularly access and attempt to cross the I-26 project corridor. While larger animal species such as the black bear and deer were the target species for the wildlife crossings, they benefit a range of species. Improved usage by mammals of all types can be expected. Mammals in the project area have large ranges extending from tens to hundreds of acres in the case of larger mammals. While area reptiles generally have smaller habitat ranges, they access different parts of the I-26 area through the year.



BOBCAT CROSSING UNDER I-26 (NPCA)



BEAR CROSSING UNDER I-26 (NPCA)

CRITERION 2.1: LEVERAGING INVESTMENTS

The project contributes to the Leveraging Investments criterion by improving on existing fence and crossing infrastructure.

NCDOT and NCWRC signed a Memorandum of Understanding (MOU) in April 2023 that outlines specific procedures for integrating project planning and coordination; public safety; maintenance and expansion of habitat connectivity and wildlife habitat conservation; inventory, monitoring, and biological studies; reducing impacts to WVCs; and information and education.



The agencies will:

- Cooperatively seek to make highways less hazardous for wildlife and lessen the impact highways have on important habitats and ensure maximum benefit and consideration for mitigation efforts that promote wildlife habitat conservation and connectivity.
- Further develop methods for evaluating the success of wildlife mitigation measures, including monitoring crossing structures and fences to determine their effectiveness in facilitating wildlife passage.
- Create a WVC data collection tool that will be made jointly available for encouraged use and contribution by both agencies (and possibly others) for traffic safety and conservation project evaluations.
- Develop effective and efficient passage structures and associated barriers for various species of wildlife to make highways less hazardous for motorists and wildlife while minimizing effects of habitat fragmentation.
- Jointly develop a “Wildlife Passage Guidance” document that will aid in the familiarity and incorporation of standard prescriptions for highway projects.
- Work together to investigate avenues to minimize highway impacts to federally listed and other sensitive species, and their habitats.
- Cooperate during transportation long-range planning, project development, and operations. allowing NCWRC to provide substantive wildlife resource recommendations to NCDOT.
- Utilize our mutual understanding of each agency’s missions, goals, and objectives to seek opportunities and funding for cooperative projects and activities dealing with highway/wildlife issues.

I-26 UNITE represents both agencies commitment and investment in accomplishing several goals established by the MOU.

CRITERION 2.2: Economic Development & Visitation Opportunities

The project contributes to the Economic Development and Visitation Opportunities by encouraging awareness of wildlife conservation and recreation along the corridor. The I-26 West NC Welcome Center is located at the southern end of the project at mile marker 6 and markets travelers on outdoor activities in the area.

As part of a growing local coalition in Madison County (NC) and Unicoi County (TN), the National Park Conservation Association (NPCA) is partnering with the NC Welcome Center to create a public information display on the importance of this area for wildlife and efforts to improve wildlife connectivity and reduce WVCs. The display will be housed within the Welcome Center and will include an 8-foot black bear specifically carved for this project by local artist John Beaudet; a video and poster; and other road ecology-related informational items.



The video and poster include pictures and research along the I-26 corridor. The expected launch date is summer/fall of 2023. NPCA's primary nexus for this work is the Appalachian Trail (a National Park Service unit) that crosses through the area.

Criterion 2.3: Innovation

The project contributes to the Innovation criterion by providing useful "before-and-after" data that can show how upgrading fencing effects wildlife crossing use and WVCs. The effectiveness of wildlife crossing structures, particularly those that involve large mammals, in mountainous terrain in the eastern United States is not well understood. Data collected before and after construction will enable more efficient cost-benefit analyses that can be used to inform future spending decisions on animal crossings.

Criterion 2.4: Education & Outreach

The project contributes to the Education and Outreach criterion by providing opportunities to educate travelers of the I-26 corridor about the benefits of wildlife crossing structures, possibly with a display in the visitor center. Due to the extensive data collection activities along the corridor, it will be possible to collect real time data on the effectiveness of the project as soon as the construction is complete. Data can be used in media communications and other outreach efforts.

Criterion 2.5: Monitoring & Research

The project contributes to the Monitoring and Research criterion by expanding on previous studies along this corridor that can be used to develop best practices for other facilities in the Southern Appalachians. This project will provide data that will augment the 2008 study by North Carolina State University, "The Effectiveness of Wildlife Crossing Structures for Black Bears in Madison County, North Carolina". Implementation of this grant will expand an understanding of wildlife crossing effectiveness in mountainous terrain in the eastern United States through ongoing monitoring and research including camera-trapping and roadkill monitoring by the NCWRC, NPCA, and other researchers.

Criterion 2.6: Survival of Species

The project contributes to the Survival of Species criterion by minimizing the decline of sensitive species, especially local reptile species. Madison County is home to several North Carolina state-listed species that would benefit from the improved fencing. Species may include timber rattlesnake, woodrat (*Neotoma spp.*), and southern zigzag salamander (*Plethodon ventralis*). While most reptile and amphibian species range over relatively small areas, populations may disperse in association with seasonal and inter-annual habitat changes and shifts. "Wildlife Crossing Structure Handbook, Design and Evaluation for North America" (FHWA, 2011), notes that amphibian and reptile species will use crossing structures designed to accommodate large mammals. During still camera



monitoring, broken-striped newts (*Notothalmus viridescens*) were observed at one of the crossings (Jones, 2008).

PROJECT READINESS

Technical Assessment

ADMINISTRATION

NCDOT will administer the grant.

PROJECT PROGRAMMING

I-26 UNITE is not programmed in the State Transportation Improvement Program, Land of Sky Rural Planning Organization (RPO) Long-Range Transportation Plan, or the State Long Range Transportation Plan.

PROJECT PUBLIC INVOLVEMENT

NCDOT acknowledges the importance of its obligation to provide robust public involvement throughout the decision-making process and project implementation across the state. These efforts, as directed by NCDOT, are critical to the success our projects. Following our Statewide Public Involvement Plan and in coordination with our Public Involvement Team and Communications Office, a comprehensive I-26 UNITE Public Involvement Plan (PIP) will be developed. The PIP will identify opportunities to educate the public on the purpose and need for the I-26 UNITE project as well as education on wildlife in the region and wildlife corridors and crossings. Public engagement opportunities may include meetings, stand-alone kiosks at rest areas and visitor centers, and participation at area events.

PROJECT SCHEDULE

Upon funding award for I-26 UNITE, NCDOT is prepared to move quickly toward implementation. No right of way acquisition is anticipated for I-26 UNITE. NCDOT, in coordination with NCWRC, has already identified the locations and materials for fencing installation. As this is a simple fence installation within the right of way, no further design is needed. Construction is anticipated to begin within 6 months of receiving funding and would be complete within 1 year.

AWARD RECEIVED



I-26 UNITE is not anticipated to have jurisdictional impacts and every effort will be made to continue to avoid and minimize impacts. Where the fence crosses wetlands or streams, the NCDOT will work with the US Army Corps of Engineers and NC Division of Water Resources to permit these areas. Further, the potential federal listing of tricolored



bat (*Perimyotis subflavus*) under the Endangered Species Act, which is anticipated to occur in late 2023, will not affect the project schedule. NCDOT is developing a programmatic consultation for the species in coordination with the FHWA, the US Army Corps of Engineers, and the US Fish and Wildlife Service.

Environmental Review and Permitting Risk

NCDOT has already begun environmental review and regulatory coordination for I-26 UNITE as part of this application. The NEPA process for the project will begin within 1 month of receiving funding award and will be completed within 6 months. NCDOT anticipates that this project will be classified as a Categorical Exclusion (CE) based on its current Programmatic Agreement with Federal Highway Administration (FHWA) for CEs.

The NCDOT has designated liaisons within all necessary regulatory agencies who are assigned to work specifically on NCDOT projects. The project will take place entirely within existing NCDOT right of way. Utility conflicts at the site are minimal and coordination can begin as soon as funding is announced. Potential regulatory and permitting concerns have been addressed through early coordination in the site selection process and designated liaisons within the regulatory agencies will ensure streamlined coordination and timely issuance of permits.

ADMINISTRATIVE PRIORITIES

Safety

Our proposed construction of wildlife fencing on I-26 is completely aligned with the National Roadway Safety Strategy, given the strong emphasis in the project for reducing the number of dangerous, potentially lethal crashes between vehicles and large-bodied wildlife. See Criteria 1.1 above. A properly designed system of wildlife fencing can be expected to reduce wildlife vehicle collisions by as much as 90 percent, making this one of the more effective and efficient highway safety interventions available.

Climate Change and Sustainability

The construction of wildlife fencing on I-26 would promote the climate resilience of the entire Southern Appalachian Ecosystem. Improving habitat connectivity will increase the ability of species to seek shifting microclimates that are suitable as the climate changes. See Criteria 1.2 for more information on how the project reduces barriers between high quality habitat areas. Also, by reducing major crashes involving large mammals, the project will also serve to reduce WVC related traffic congestion and increased greenhouse gas emissions.



Equity

The proposed work on the I-26 corridor will promote urban-rural equity by marking a substantial investment in highway safety in rural Madison County NC. By reducing crashes, the crossing projects will promote the livelihood and prosperity of rural residents who can least afford the property damage and health care implications of a high-speed collision with large animals such as bear and deer.

Workforce Development, Job Quality, and Wealth Creation

Installation of wildlife fencing will bring economic benefits to the area. The construction project will last at least six months, bringing opportunities to local workers and revenue to the restaurants, hotels, and other businesses that will benefit from the construction activities. This will promote wealth creation in the area. In addition, NCDOT has a legislatively mandated Disadvantaged Business Program to ensure disadvantaged businesses have the opportunity to do business with the Department. The N.C. Department of Administration administers the Historically Underutilized Business Program to promote economic opportunities for historically underutilized businesses in state government contracting and procurement.