



The North Carolina Department of Transportation (NCDOT) is seeking \$6.1 million from the US Department of Transportation's (USDOT's) Wildlife Crossings Pilot Program (WCPP) to upgrade multiple drainage structures and install approximately 2.2 miles of connecting wildlife fencing along I-40 near the North Carolina/Tennessee state line. Improvements to the ramp culverts at the nearby I-40 interchange with Cold Springs Creek Road (Exit 7, NFSR 148) complementing wildlife passage improvements already made by NCDOT are also proposed. NCDOT proposes to provide \$678,200 in matching funds as part of this I-40 Connecting Aquatic and Terrestrial Critical Habitat (I-40 CATCH) project.

I-40 is a critical part of North Carolina's infrastructure as a part of the National Highway Freight System and a North Carolina Strategic Transportation Corridor (Corridor Q). Traffic volume in this area is approximately 28,500 vehicles per day. According to Annual Average Daily Traffic (AADT) NCDOT data for 2021, 22 percent of the traffic in this area consists of large trucks.

I-40 in the Pigeon River Gorge (Gorge) area is a four-lane roadway with narrow shoulders and a nearly continuous barrier-divided median. The facility bisects extensive forests that provide quality habitat for black bear (*Ursus americana*) and other species. Much of the adjoining lands are US Forest Service holdings and Great Smoky Mountains National Park is located south of I-40.

When I-40 was constructed in 1968, extensive blasting was required along the deep and narrow Gorge, leading to numerous road cuts and fills that fragmented habitat. When wildlife attempt to cross the existing facility, the median barrier inhibits or blocks their passage. A study of highway crash reports, carcass removals, and roadkill surveys, conducted by Wildlands Network and the National Parks Conservation Association (NPCA), recorded 158 wildlife vehicle crashes (WVCs) along a 28-mile corridor of I-40 (including the project area) from 2018 to 2021. Black bear and whitetail deer (*Odocoileus virginianus*) were the primary animals recorded, along with at least one elk (*Cervus elaphus*). A study by Virginia DOT (VDOT) determined that standard highway crash data significantly undercounts the actual number of WVCs in this area by a factor of 8.5.

The I-40 CATCH project will improve terrestrial habitat connectivity and the ability of wildlife to cross I-40 by increasing the dry area of several existing stream culverts. While bears have been known to use the perched three-barrel culvert in Groundhog Creek, the partial streamflow through the pipes may be limiting use by other area wildlife. These and other nearby stream culverts would better accommodate a wider range of wildlife passage if dry auxiliary barrels or benching were available, as proposed with I-40 CATCH. Improvements in culvert structures in the area in tandem with wildlife fencing will not only provide passage for bear and help exclude whitetail deer from the roadway, it will also increase the permeability of the corridor for smaller wildlife with lesser ability to cross the highway.



NORTH CAROLINA WCPP APPLICATION

July 2023



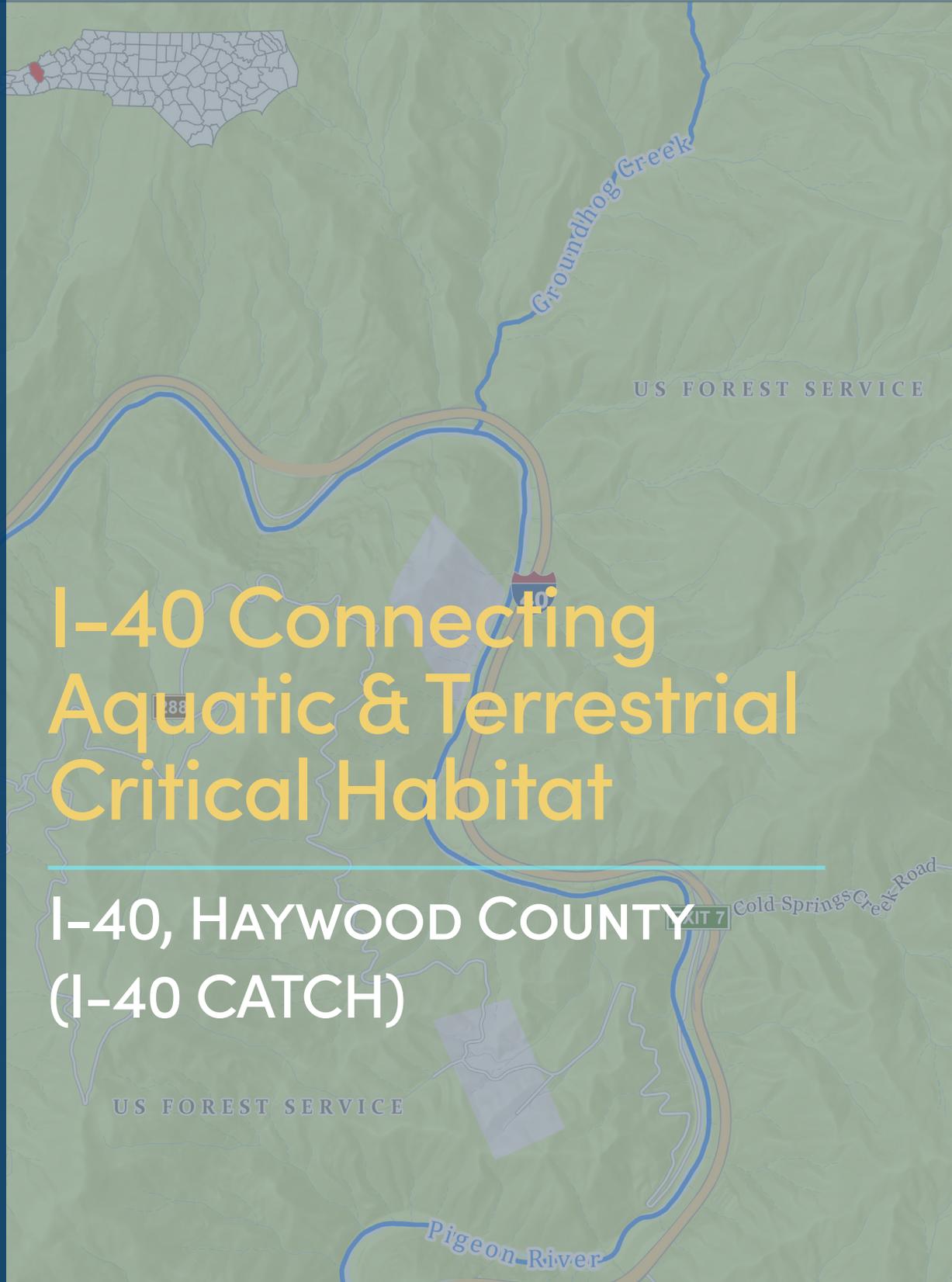
BLACK
BEAR



DEER



SKUNK



I-40 Connecting Aquatic & Terrestrial Critical Habitat

I-40, HAYWOOD COUNTY
(I-40 CATCH)

US FOREST SERVICE

US FOREST SERVICE

EXIT 7

Cold Springs Creek Road

Pigeon River

Groundhog Creek



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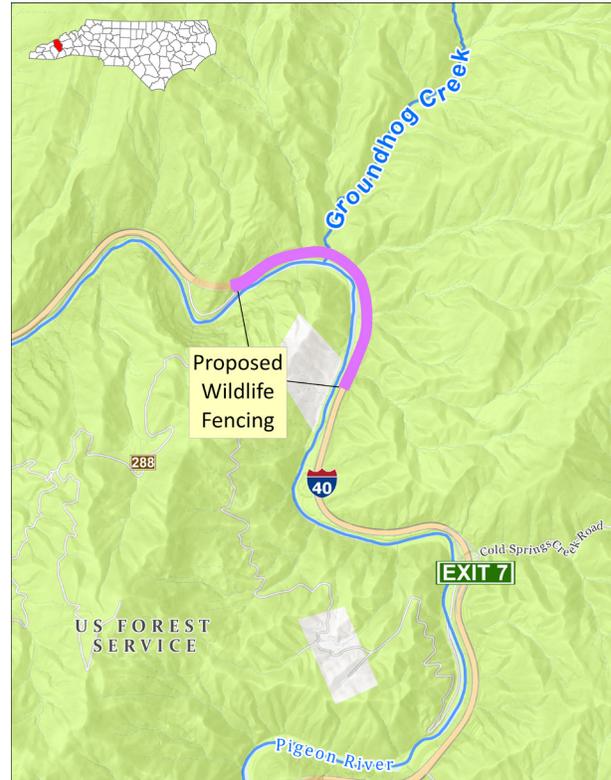


PROJECT DESCRIPTION

The North Carolina Department of Transportation (NCDOT) seeks \$6.1 million to provide wildlife crossing structures and wildlife fencing on I-40 in Haywood County. NCDOT proposes to provide \$678,200 in matching funds as part of the I-40 Connecting Aquatic and Terrestrial Critical Habitat (I-40 CATCH) project.



I-40 ROCK SLIDE IN THE PROJECT AREA (CIRCA 2008)



PROJECT LOCATION MAP

I-40 is a critical part of North Carolina’s infrastructure as a part of the National Highway Freight System and a North Carolina Strategic Transportation Corridor (Corridor Q). Traffic volume in this area is approximately 28,500 vehicles per day.

I-40 in the Pigeon River Gorge (Gorge) area is a four-lane, nearly continuous concrete median-divided highway with narrow paved shoulders. The facility crosses over extensive forests that are quality black bear (*Ursus americana*) and other wildlife habitat. Much of the adjoining lands are US Forest Service holdings and Great Smoky Mountains National Park further to the south.

When I-40 was constructed in 1968, extensive blasting was required along the deep and narrow Gorge, leading to numerous road cuts and fills that further fragmented habitat. Consequently, wildlife must cross the existing facility where the median barrier inhibits or blocks their passage. A study of highway crash reports, carcass removals, and roadkill surveys, conducted by Wildlands Network and the National Parks Conservation Association (NPCA), recorded 158 wildlife vehicle crashes (WVCs) along a 28-mile

corridor of I-40 (including the project area) from 2018 to 2021. Black bear and whitetail deer (*Odocoileus virginianus*) were the primary animals recorded, along with at least one elk (*Cervus elaphus*). Further analysis indicates that standard highway crash reports significantly underrepresent the number of WVCs in this area.

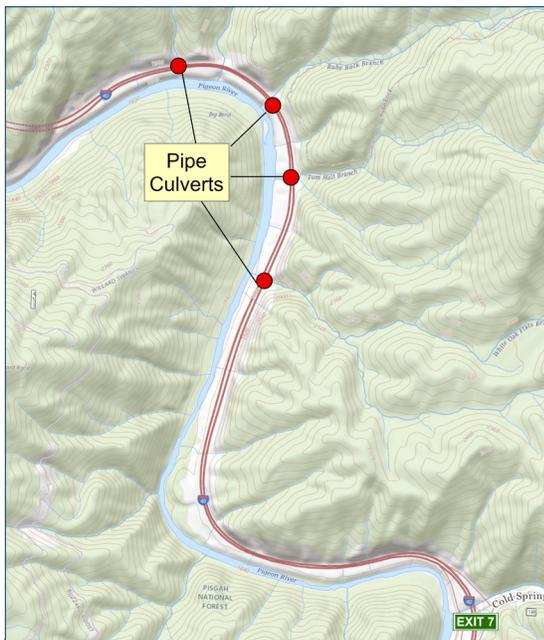
Compared to the surrounding area, the Groundhog Creek valley and adjacent tributaries have gentle terrain making them relatively conducive to wildlife movements. It is not surprising, therefore, that this area is frequently the site of WVCs. While bears have been known to use the three-barrel culvert at Groundhog Creek, the partial streamflow through the pipes may be limiting use by other area wildlife.



BEAR USING GROUNDHOG CREEK CULVERT TO PASS UNDER I-40 (NPCA)

This WCPP will fund the installation of 2.2 miles (1.1 mile on each side of I-40) of wildlife fencing to bracket multiple hydraulic structures under I-40 near Groundhog Creek. The project will reline and add backfill to the Groundhog Creek culverts and upgrade four other stream culverts with new 60-inch by 100- to 150-foot

welded steel pipes using directional bores, leaving the existing culverts as dry passage areas to facilitate increased permeability of the I-40 corridor for meso-mammals, black bear, herpetofauna, and other wildlife. Grading work will be required, particularly at the culvert outlets, to re-establish the stream grades and install bank tie-ins with the culvert inverts, which should further improve the permeability of these hydraulic structures to some mammals and herpetofauna, particularly amphibians. The project would also fund proposed improvements to the existing reinforced concrete box culverts (RCBC) under the existing ramps at the I-40 and Cold Springs Creek Road interchange (Exit 7, NFSR 148). These improvements would also include grading and installing sills/baffles and backfill in the RCBCs.



PROPOSED BORE LOCATIONS FOR NEW PIPES



PROJECT INFORMATION

PROJECT NAME	I-40 Connecting Aquatic and Critical Terrestrial Habitat (I-40 CATCH)
WCPP REQUESTED AMOUNT	\$6,103,800 (YOE)
TOTAL PROJECT COST	\$6,782,000 (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 \$678,200
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-40, Ground Hog Creek to Cold Springs Creek Road, in Haywood County, NC
US Census FIPS Code (2019)	Census Tracts 101 and 102
Geographic Coordinates	35.754046, -83.043157 35.737330, -83.023851
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

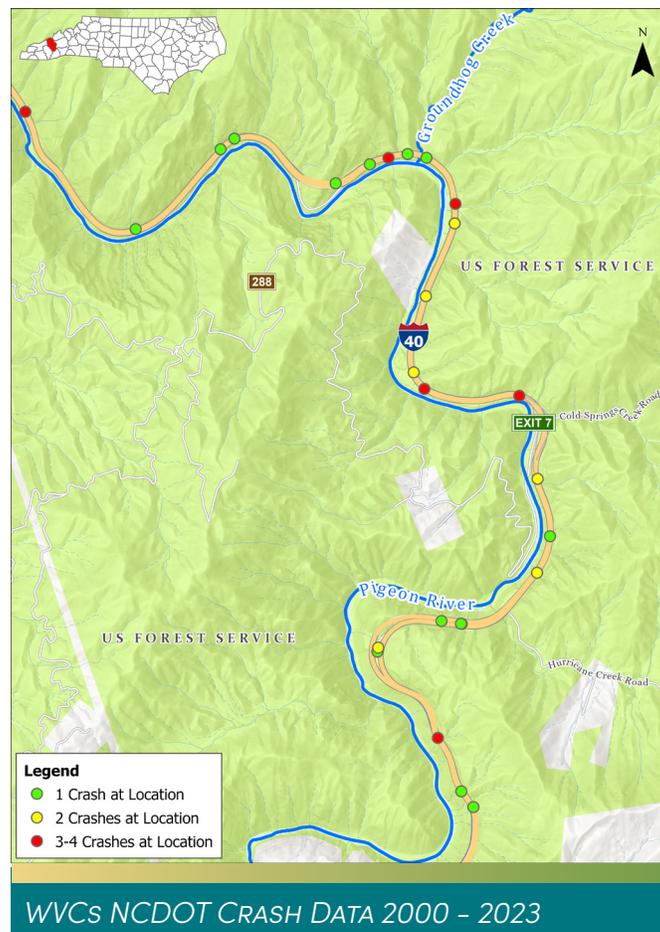
PROJECT COSTS

WCPP Requested Amount	\$6,103,800 (YOE)
Estimated Total of Other Federal Funding	\$0
Estimated Non-Federal Funding	NCDOT Interstate Maintenance Funds \$678,200 (YOE)
Future Eligible Project Cost	\$6,782,000 (YOE)
Previously Incurred Project Costs	\$0
Total Project Cost	\$6,782,000 (YOE)

PROJECT MERIT CRITERIA

CRITERION 1.1: WILDLIFE VEHICLE COLLISIONS

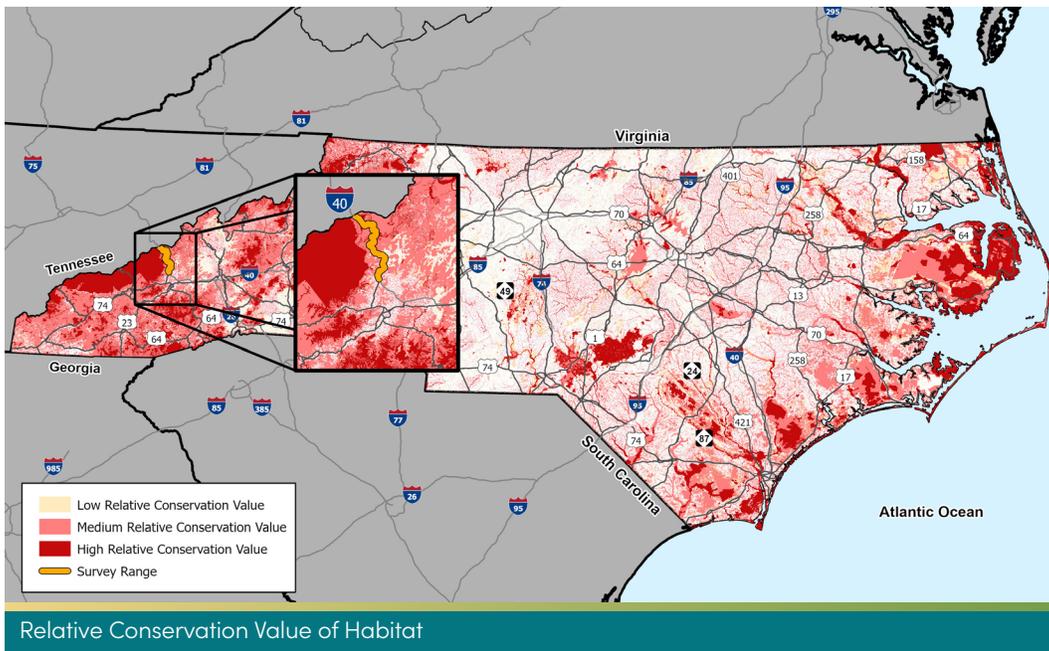
The project contributes to the Wildlife Vehicle Collisions (WVCs) criterion by installing wildlife fencing to direct wildlife to abandoned dry culverts and backfill culverts that cross I-40 in the vicinity of Groundhog Creek. As stated in the Project Description, from 2018 to 2021, a total of 158 WVCs were reported along the 28-mile segment of I-40 along Pigeon River Gorge, mostly involving bear, whitetail deer and at least one elk. This project area was listed as a top priority site for WVC improvements in NC per the Research Results and Mitigation Strategies document published by Wildlands and NPCA in June 2022.



It should be noted that most WVCs are not reported. Data from the Virginia Department of Transportation (VDOT) found that crash data underestimated WVCs by a factor of 8.5 in a given area (VDOT, 2017). Using this factor, over 1,300 crashes are estimated to have taken place along the corridor from 2018 through 2021.

CRITERION 1.2: TERRESTRIAL & AQUATIC HABITAT CONNECTIVITY

The project contributes to the Terrestrial and Aquatic Habitat Connectivity criterion by improving the usability of hydraulic crossing structures along I-40 by wildlife. The highway is a four-lane median-divided facility for the entire segment that is parallel to the Pigeon River. As such, it currently serves as an impediment or barrier to wildlife movements. The largely roadless GSMNP is to the south of the project area. As shown in the figure, an almost contiguous expanse of high and moderate quality wildlife habitat is located north of GSMNP.



The proposed improvements should increase habitat connectivity for a variety of mammal species, including black bear, long-tailed weasel (*Mustela frenata*), southern water shrew (*Sorex palustris punctulatus*), American mink (*Neogale vison*), bobcat (*Lynx rufus*), muskrat (*Ondatra zibethicus*), gray fox (*Urocyon cinereoargenteus*), raccoon (*Procyon lotor*), striped skunk (*Mephitis mephitis*), and eastern spotted skunk (*Spilogale putorius*). The improvements should also benefit terrestrial reptile and amphibian species including, but not limited to, spring salamander (*Gyrinophilus porphyriticus*), Eastern newt (*Notophthalmus viridescens*), longtail salamander (*Eurycea longicauda*), eastern box turtle (*Terrapene carolina Carolina*), timber rattlesnake (*Crotalus horridus*), spotted salamander (*Ambystoma maculatum*), wood frog (*Lithobates sylvaticus*), and Blue Ridge two-



LONG-TAILED WEASEL AT CAMERA TRAP (NCWRC)



lined salamander (*Eurycea wilderae*).

CRITERION 2.1: LEVERAGING INVESTMENTS

The project contributes to the Leveraging Investments criterion by minimizing the cost of culvert installation through directional boring. By retaining existing culverts and using directional bore drilling methods, the potential disruption to travelers along I-40 is minimized and existing structures are utilized for dry passage. This cost-effective practice can serve as an example for future crossing projects. In addition, this project will complement previous improvements to the I-40 bridge replacement over Cold Springs Creek Road (Exit 7, NFSR 148) constructed as NCDOT State Transportation Improvement Program (STIP) project B-6054A. B-6054A included short fencing and cattle guards to discourage wildlife access to I-40, in addition to narrow benches to allow wildlife passage under the new bridge. This effort will provide relatively dry crossings that allow for wildlife passage under existing ramps reducing WVCs on I-40. Collectively these efforts will enhance the permeability of this section of highway, which is an area with historically elevated WVCs.

As previously stated, these project areas were listed as top priority sites in NC per the Research Results and Mitigation Strategies document published by Wildlands and NPCA in June 2022. Therefore, NCDOT is leveraging the investment in research, monitoring and analysis that was performed throughout the Gorge by these groups in the period from 2018 to 2021.

NCDOT and NCWRC signed a Memorandum of Understanding (MOU) in April 2023 to 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 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-40 CATCH represents both agencies commitment and investment in accomplishing several goals established by the MOU.

The project would act in concert with past and current NCDOT projects, such as the previously discussed B-6054A, to limit WVCs on I-40. As previously noted, this area would be further improved by I-40 CATCH.

CRITERION 2.2: Economic Development & Visitation Opportunities

The project contributes to the Economic Development and Visitation Opportunities criterion through increasing awareness of wildlife and crossing structures and encouraging safe visitation to the area. The successful completion of this project, along with the extensive photographs of wildlife using the improved crossing structures that can be used as marketing materials at visitor centers (as noted in Criterion 2.4), will encourage travelers to the area by increasing awareness of wildlife.

According to the National Park Service (NPS), since 2012, Great Smoky Mountains National Park (GSMNP) has averaged almost 11.5 million visits per year, with more than 14 million visitors in 2021. It is the most visited national park in the US. While much of the tourist industry development for GSMNP is focused in nearby gateway communities such as Gatlinburg, TN, there is substantial tourist traffic flowing down I-40 through the Gorge to both the park and the adjacent (and equally popular) Pisgah and Cherokee National Forests. The Pigeon River itself has also become the center of a vibrant white-water rafting industry, with the rafts visible from I-40 where the river parallels the interstate. This tourist activity, which can only be expected to increase over time, can be leveraged and improved by the positive implementation of wildlife road crossing structures in the Gorge. Wildlife crossing projects, if communicated well to the public at local, regional, and national scales, will generate even more visitation interest in this beautiful mountain environment.

Tourism is of vital importance to Haywood County and surrounding areas. Based on the 2020 Census, the population of Haywood County, NC was 62,089. The median household income in Haywood County is \$33,922, with 11.5 percent of its population living below the poverty line. Furthermore, the largest employer in Haywood County, the Canton Paper Mill, permanently closed in Spring 2023. While this portion of Haywood



County is not classified as an Area of Persistent Poverty (APP) or a Historically Disadvantaged Community (HDC), it is adjacent to Cocke County Tennessee, which is classified as an HDC. This pilot program will bring increased awareness to the diversity of species accessing the crossing structures and encouraging visitation.

Criterion 2.3: Innovation

The project contributes to the Innovation criterion by assessing how establishing additional dry culverts under existing highway infrastructure can serve as a cost-effective alternative to more expensive structural approaches. Bears and many other wildlife use corrugated pipe culverts, including those at Groundhog Creek. This project can further our understanding of the use of corrugated pipes in an area with a high bear density by increasing the availability of dry culverts.

Criterion 2.4: Education & Outreach

The project contributes to the Education and Outreach criterion by providing information to tourists and area residents on wildlife crossings. Materials, including photographs of animals using the crossings, can also be placed at the North Carolina Welcome Center on I-40 and at the Haywood rest area.

Criterion 2.5: Monitoring & Research

The project contributes to the Monitoring and Research criterion by building on the extensive body of research collected for this area, which includes observed carcasses, crash reports, and survey data. Of the 336 reported WVCs in the 2001 study, 304 were determined to be caused by large mammals. This includes 167 reported bear WVCs, 85 deer WVCs, one elk WVC, and 51 indeterminate large mammal WVCs. This robust data set may be useful in the evaluation of pre-and post-construction estimates of the ability of



SPOTTED SKUNK AT CAMERA TRAP IN GROUNDHOG CREEK AREA (NCWRC)



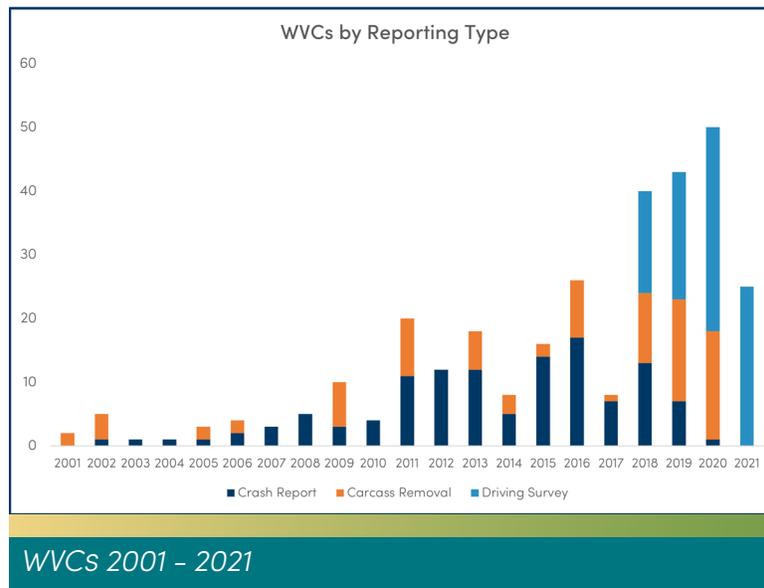
BEAR USING CULVERT UNDER I-40 (NPCA)



BOBCAT USING CULVERT UNDER I-40 (NPCA)



fencing/crossing structures to reduce WVCs in mountainous areas with bears.



Criterion 2.6: Survival of Species

The project contributes to the Survival of Species criterion by reducing crossing exposure for state-listed species in Haywood County, including timber rattlesnake, longtail salamander, and woodrat species (*Neotoma spp.*).

While Appalachian elktoe (*Alasmindonta raveneliana*) is not found in the project area, the improvements would be in proximity to potentially suitable habitat for the species.

PROJECT READINESS

Technical Assessment

ADMINISTRATION

NCDOT will administer the grant.

PROJECT PROGRAMMING

I-40 CATCH 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-40 CATCH Public Involvement Plan (PIP) will be developed. The PIP will identify opportunities to educate the public on the purpose and need for the 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.

A comprehensive public involvement effort has taken place in the area in support of wildlife crossing upgrades in Tennessee and North Carolina. The Safe Passage Coalition has committed itself not just to raising funds for wildlife improvements to the highway, but also to raising awareness and public support for the effort. Media content developed by the Coalition can be found at [Safe Passage Press](#).

PROJECT SCHEDULE

Upon funding award, for I-40 CATCH, NCDOT is prepared to move quickly toward implementation. NCDOT, in coordination with NCWRC, has already identified the locations and materials for fencing installation. Construction is anticipated to begin within 6 months of receiving funding and would be complete within 1 year.

AWARD RECEIVED



I-40 CATCH will take place within existing NCDOT right of way and is not anticipated to have jurisdictional impacts and every effort will be made to continue to avoid and minimize impacts. If impacts are determined during final design, 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-40 CATCH 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 and crossing culverts on I-40 is completely aligned with the National Roadway Safety Strategy, given the strong emphasis in our 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 crossings and 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 and crossing culverts on I-40 would promote the climate resilience of the entire Southern Appalachian Ecosystem. Improving the connectivity of habitats, both terrestrial and aquatic, 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. Finally, by installing new culverts at Groundhog Creek that are not perched, the system will be more resilient and better able to deal with high-flow events.

Equity

The proposed work on the I-40 corridor will promote urban-rural equity by marking a substantial investment in highway safety in rural Haywood County, NC. Haywood



County has a poverty rate of 11.5 percent and is facing economic distress due to the 2023 closing of the Canton Paper Mill. 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 a bear, deer, or elk. This reduction in WVCs will also benefit adjacent Cocke County, TN, which is a Historically Disadvantaged Community (HDC).

Workforce Development, Job Quality, and Wealth Creation

Installation of wildlife fencing and construction of new culverts 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.