NORTH CAROLINA
STATEWIDE MULTIMODAL FREIGHT PLAN

Planning for the Future of Freight Movement

FREIGHT WILDLIFE HABITAT ASSESSMENT - FINAL

North Carolina Statewide Multimodal Freight Plan

Freight Wildlife Habitat Assessment

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North Carolina Department of Transportation

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ACRONYMS

CTP	Conservation Planning Tool
CWA	Clean Water Act
CZMA	Coastal Zone Management Act
ESA	Endangered Species Act
FAA	Federal Aviation Administration
FEIS	Final Environmental Impact Statement
GIS	Geographic Information System
MPRSA	Marine Protection, Research, and Sanctuaries Act
NCDOT	North Carolina Department of Transportation
NCNHP	North Carolina Natural Heritage Program
NEPA	National Environmental Policy Act
STIP	State Transportation Improvement Program
USACE	US Army Corps of Engineers

FREIGHT WILDLIFE HABITAT ASSESSMENT

There is an unavoidable conflict between human transportation activity and the natural environment. The conflict is most obvious in vehicular impacts but also extends to impacts to animal habitats, especially foraging and breeding habitats. The N.C. Department of Transportation (NCDOT) keeps statistics on reported animal crashes at both the county-wide and statewide level. From 2013 to 2020, Wake County reported the largest number of animal crashes, with high levels of crashes reported in Pitt, Guilford, Union, Randolph, and Duplin Counties. In 2020, a total of 18,607 crashes were reported statewide. Between 2018 and 2020, wildlife crashes caused over $160 million in damages.

Freight improvement projects, no matter how well designed, have the potential to impact wildlife habitat. Various state and federal regulations are in place to ensure protect wildlife habitat. The National Environmental Policy Act (NEPA) of 1969 was created to ensure federal agencies consider the environmental impacts of their actions and decisions. Federal agencies are required to systematically assess the environmental impacts of their proposed actions and consider alternative ways of accomplishing their missions, which are less damaging to and protective of the environment. NEPA Section 101(b) states "it is the continuing responsibility of the federal government to use all practicable means, consistent with other essential considerations of national policy" to avoid environmental degradation, preserve historic, cultural, and natural resources, and "promote the widest range of beneficial uses of the environment without undesirable and unintentional consequences."

The Endangered Species Act (ESA) of 1973 is designed to protect species from extinction as a "consequence of economic growth and development untempered by adequate concern and conservation." This act is designed to protect both the species and “the ecosystems on which endangered species and threatened species depend.”

NCDOT evaluates each project to determine how to avoid and minimize impacts. Larger scale initiatives also take place to evaluate measures to protect habitat of federally endangered species, such as pine forests for the red cockaded woodpecker, stream habitat for mussel species such as the Carolina heelsplitter, caves and other hibernation areas for bat species such as the Northern long-eared bat, and savannah grasslands and prairie habitat for plant species such as Schweinitz’s sunflower. Examples of wildlife avoidance and minimization measures include:

- Widening toward the existing median when feasible to minimize habitat disturbance outside of the existing roadway.
- Evaluation of wildlife crossings for projects in known wildlife corridors or prime habitat areas. A wildlife crossing under Interstate 40 at Harmon Den Road in Haywood County is currently under construction.
- Minimization of impacts to streams and wetlands by using steeper slopes and rock plating where feasible.

Potential Highway Freight Habitat Impacts

NCDOT estimated the impact of improvements to facilities listed as Priority Highway Freight Network on wildlife habitat through a desktop evaluation using geographic information system (GIS) data. The department reviewed projects listed in the 2020-2029 State Transportation Improvement Program (STIP) that added capacity to facilities on the Priority Freight Network. This effort identified approximately 180 projects with potential habitat impacts.

To estimate the acreage of impacted habitat from the identified projects, roadway improvements were grouped into the following seven categories. Note, all medians were assumed to be maintained/disturbed habitat and facilities were interpreted as line features in some instances to expedite review.

1. Projects adding one lane to an existing four-lane, median divided facility were estimated to make improvements within the median. For these projects, impacts are most likely to occur in the vicinity of ramps. Ramp segments were identified and buffered by 40 feet from edge of pavement. The total ramp buffer width is 80 feet.

2. Widening of non-median divided facilities by one lane in each direction were estimated from edge of pavement buffered by 40 feet plus 30 feet for each 2 lanes lane added (15-foot lanes in both directions) to provide a conservative assessment of total area needed, including clearing requirements. This led to a total assigned buffer width of 110 feet.

3. New location two-lane projects that will not be median-divided were estimated to impact a 110-foot corridor for the entire length of the improvements based on the following assumptions, two 12-foot lanes, 4-foot shoulder/clearing areas, buffered by 40 feet in each direction. For a conservative assessment, this includes projects that listed segments of new location alignment, as the limits of new location construction were not specified.

4. New location median divided facilities were estimated to impact a 250-foot corridor for the entire length based on a review of recently constructed or in progress new location, four lane facilities.

5. Projects that added a center turn lane or median were assumed to add 15 feet (for the lane or median) buffered by edge of pavement plus 40 feet (in both directions). This led to a total buffer width of 95 feet.

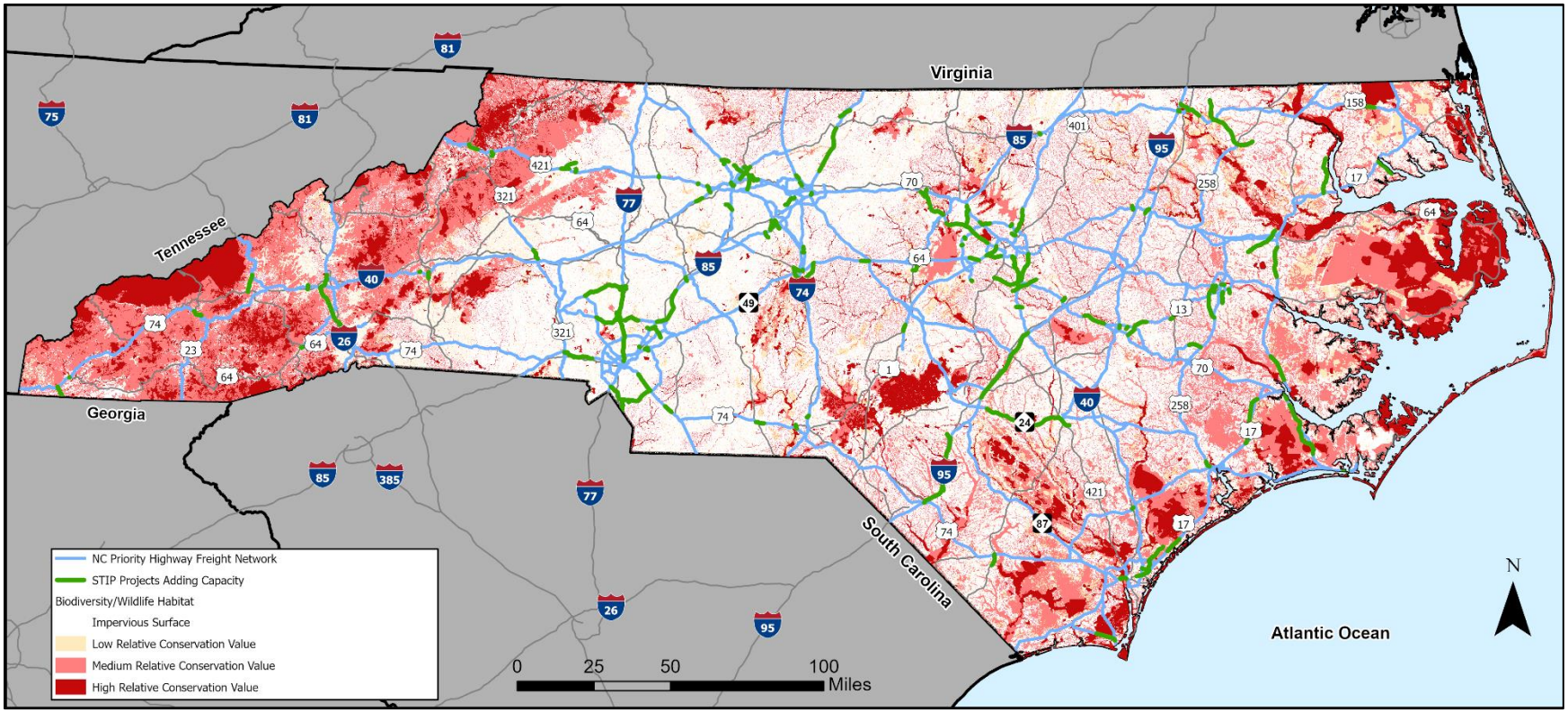
6. Projects that added more than one lane to a highway (generally for projects improving I-95) were anticipated to add 40 feet of lanes outside of the current facility plus an additional 40-foot buffer. This buffered the current edge of pavement by 80 feet on each side of the facility and led to a total width of 160 feet.

7. Improvements to non-median-divided facilities where lanes and a median were added were estimated from edge of pavement buffered by 40 feet plus 30 feet for each lane added (15 feet in both directions) with a 30-foot median added to provide a conservative estimate for a total buffer width of 130 feet.

NCDOT used the above assumptions to estimate habitat impacts based on improvements to facilities listed as Priority Highway Freight Networks. It should be noted that these improvements benefit not only freight, but also passenger transportation and in many cases, active transportation options.

To determine the habitat impacts associated with these improvements, NCDOT used the North Carolina Natural Heritage Program (NCNHP) Conservation Planning Tool (CPT) data layer to assign conservation values to land uses anticipated to be impacted by the proposed improvements. The tool designates habitat quality on a scale of one to ten. For this report, to simplify reporting, these values were grouped into three values (low – ranking 1 to 3; medium – ranking 4 to 6; and high – ranking 7 to 10). Figure 1 shows a map of these outputs where higher quality habitat is the darkest shade and tends to coincide with national parks, refuges, forests, and military installations.

Figure 1. Priority Highway Freight Network with Relative Conservation Value Areas



Source: NC NHP CTP, Biodiversity/Wildlife Habitat Assessment, May 2021

Table 1 summarizes impacts to habitats with low, medium, and high conservation values associated with STIP improvements to facilities listed as Priority Highway Freight Network.

Table 1. Acreage of Habitat Types Impacted by Improvements to Facilities Listed as Priority Highway Freight Network

Biodiversity / Wildlife Habitat Impacts from N.C. Priority Highway Freight Network Corridors by Relative Conservation Value		
Type	Potentially Impacted Area	Percentage of Total Impacts
Impervious Surface	8,080 acres	35%
Low Relative Conservation Value	690 acres	3%
Medium Relative Conservation Value	8,540 acres	37%
High Relative Conservation Value	5,770 acres	25%

Source: NCNHP CTP, Biodiversity/Wildlife Habitat Assessment, May 2021

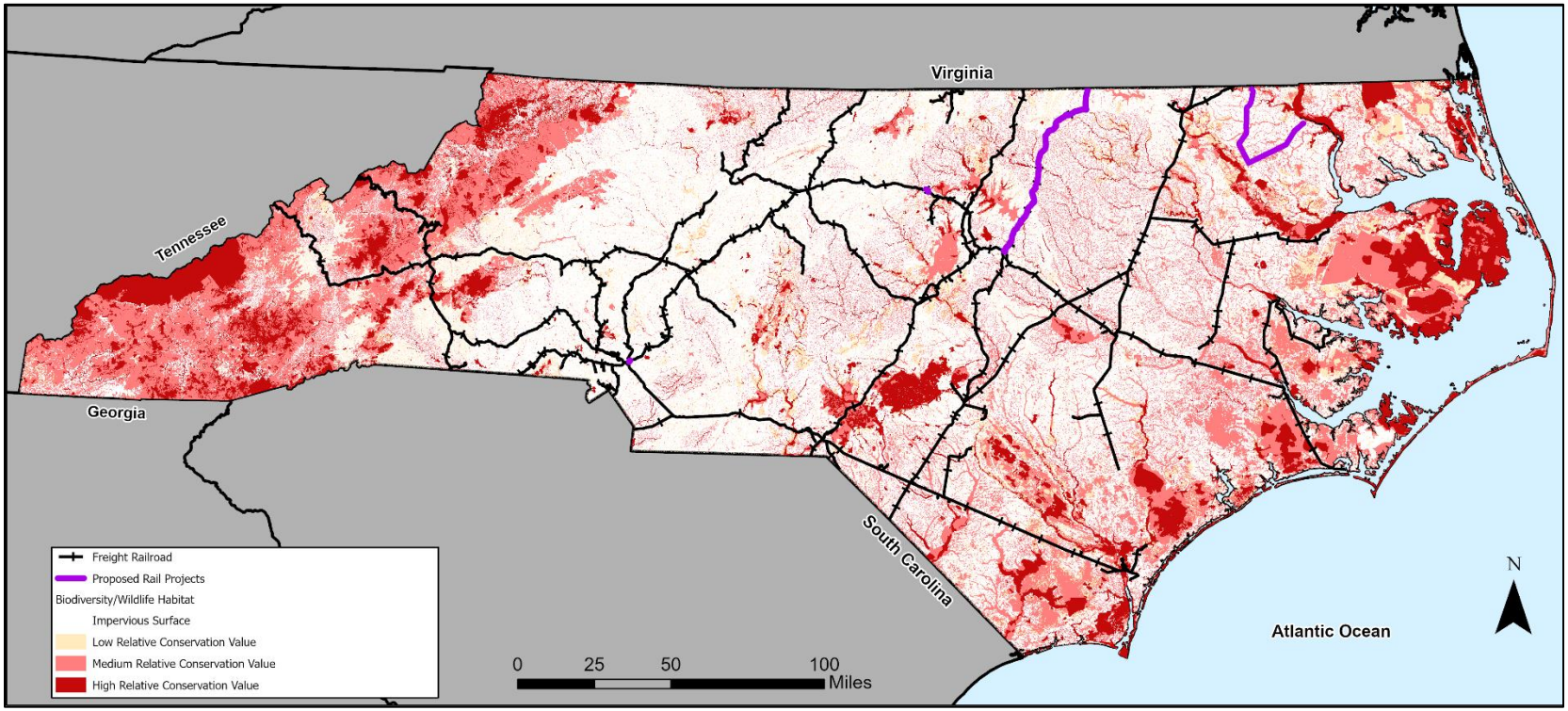
Potential Priority Rail Freight Habitat Impacts

Like roads, railways fragment habitat and can affect a variety of wildlife species in varying ways. Collisions are the most common cause of mortality, but some animals die from electrocution or being stuck between the rails, leaving them susceptible to predation, starvation or dehydration. Exactly how many animals die is unknown. Railway mortalities are usually not as visible to the public as roadkill, and railways can be harder to access for research and data collection. NCDOT does not currently track rail/animal strike data, according to NCDOT's Rail Division. A 2018 study of endangered gopher tortoises (*Gopherus polyphemus*), which have been known to cross railways near John F. Kennedy Space Center in Florida, noted that "nearly all tortoises in the vicinity of railways are susceptible to becoming entrapped or experiencing reduced movement and dispersal." The researchers recommended that trenches could be used to provide safe passage underneath railroad tracks.

Railroads frequently generate "edge habitats," where a variety of different plant species mix. These habitats often provide food sources that attract animal species. Approaches used to reduce wildlife impacts in these areas include acoustic warning systems that use recordings of barking dogs or alarms to teach animals to avoid track areas and providing clear sight lines for animals to see on-coming vehicles.

There is evidence that soil and hydrology contamination may affect vegetation and aquatic fauna while noise can affect terrestrial vertebrates. In fact, noise, light, and vibration due to railways have been observed to reduce the abundance and richness of some insects, amphibians, and birds, and to cause avoidance behavior on predators. In general, rail companies attempt to limit impacts by limiting work to existing rail rights of way. Figure 2 shows current and proposed projects in the Priority Freight Railroads in relation to conservation habitat areas. Habitat areas are scaled in the same manner as in Figure 1.

Figure 2. Priority Rail Freight Network with Relative Conservation Value Areas



For planned projects, limited data on potential habitat impacts are available for projects without NCDOT involvement and a completed environmental document. NCDOT's largest rail improvement project currently under development is the improvement/restoration of the S-Line corridor from Raleigh, NC to Richmond, VA. In the Final Environmental Impact Statement (FEIS), NCDOT calculated impacts to forested and maintained/disturbed habitats based on the limits of proposed disturbance (slope stake limits) plus 25 feet. Based on the FEIS, approximately 66% (975 acres) of the proposed area of disturbance was maintained/disturbed habitat and 34% (494 acres) was forested habitat.

Port and Airport Habitat Impacts

Estimates suggest that wildlife strikes cost the civil aviation industry in the U.S. up to $625 million annually, and nearly 500 people have been killed in wildlife strikes worldwide. Most wildlife strikes occur in the airport environment: 72% of all strikes occur when the aircraft is 500 ft (152 m) or greater above ground level, and 41% of strikes occur when the aircraft is on the ground during landing or takeoff.

The Federal Aviation Administration (FAA) keeps a record of airport/wildlife strikes. From May 1, 2021 to April 30, 2022, a total of 408 aircraft/wildlife strikes were reported. While bird and bat species were most often reported as the impacted species, strikes were also reported with white-tailed deer, turtle, striped skunk, raccoon, and coyote. FAA also estimates that only one in five strikes are reported, which adds up to a significant threat to property and life.

The NCDOT's Division of Aviation offers a wildlife program through a cooperative agreement with the U.S. Department of Agriculture's Wildlife Services. The program provides five regional trainings and assessments of one-third of the state's 72 public airports each year. It also provides "quick-response", direct management activities for airports experiencing wildlife hazards.

The quick response program provides both proactive and reactive management such as harassing geese, gulls, raptors and other birds using pyrotechnics, habitat management and, if warranted, lethal control. The USDA may live trap and relocate hazardous raptors such as hawks and falcons to suitable habitats miles away from the airport.

Trainings provide instruction and hands-on practice identifying common animal species, potential habitats and food sources that attract animals to airports and methods to safely deter wildlife from interfering with airport operations.

Limited data are available for potential habitat impacts associated with port and airport maintenance and expansion projects. Based on a GIS review, NC port facilities are located in developed areas, with limited potential for additional critical habitat disturbance.