





Environmental Justice

What is Environmental Justice

As the US EPA defines it, “Environmental Justice is the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies.” In its implementation, this generally involves two aspects: ensuring that historically underserved populations are properly engaged and consulted during the decision-making process and a

The environmental justice movement grew out of environmental concerns of minority communities during the 1970s and 1980s. During that time period, a number of protests and lawsuits erupted from the inequitable distribution of environmental burdens and benefits stemming from land-use and other governmental policy decisions. One of these protests, in Warren County, North Carolina, is historically seen as the galvanizing point that started the- more formal- environmental justice movement. In 1982, Warren County, North Carolina was chosen to host a hazardous waste site in a predominantly African-American community. The NAACP and more than 500 residents reacted by protesting the site’s selection and drew nationwide attention to the inequitable distribution of environmental benefits and burdens associated with the placement of public facilities. Investigations that followed found that three of the four hazardous waste landfills in parts of the Southeast were located in minority neighborhoods and had detrimental

“Environmental Justice is the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies.” –US Environmental Protection Agency

effects on nearby residents health, property, and quality of life. Since the Warren County protests, statewide and national coalitions were developed to pursue environmental justice goals on local, state, and national levels. In 1994, President Bill Clinton issued Executive Order 12898: Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations. This order essentially brought the term “environmental justice” into the federal lexicon and placed a responsibility upon the federal government and its agencies to address the concerns stemming from the environmental justice movement.

In the realm of transportation and decisions made at the MPO, environmental justice principles apply to the involvement of historically disadvantaged populations in the MPO’s decision making process and examining the environmental benefits and burdens of planned transportation improvements. In determining where planned projects are to be located or how those burdens are to be mitigated, examining the distribution of those benefits and burdens throughout the many communities that make up our region is essential to making sure the

tenants of environmental justice are being addressed.

Federal Requirements

Federal legislation identifies Environmental Justice as the right to a safe, healthy, productive, and sustainable environment for all where “environment” is considered in its totality to include the ecological (biological), physical (natural and built), social, political, aesthetic, and economic setting. Environmental Justice refers to the conditions in which such a right can be freely exercised, whereby individual and group identities, needs are preserved, fulfilled, and respected in a way that provides for self-actualization and personal and community empowerment. (FHWA)

The US DOT has identified three basic principles of environmental justice:

- To avoid, minimize, or mitigate disproportionately high and adverse human health and environmental effects, including social and economic effects, on minority populations and low-income populations.
- To ensure the full and fair participation by all potentially affected communities in the transportation decision making process.
- To prevent the denial of, reduction in, or significant delay in the receipt of benefits by minority and low-income populations.

The US DOT also notes that these principles of environmental justice should be

considered throughout the planning and project development process and that efforts to involve historically disadvantaged groups in the decision-making process need to be made at all levels as well. Effective transportation decision making depends upon understanding and properly addressing the unique needs of different socioeconomic groups. Environmental Justice continues to receive greater attention throughout multiple stages of the transportation planning process. Public involvement is critical adequately addressing these issues. These federal policies make sure that every transportation project nationwide considers the human environment.

Minority and low-income populations within the MPO jurisdictions must be considered in terms of potential benefits or negative impacts with regards to transportation projects. Projects currently on the Statewide TIP will be assessed by FTA and FHWA for their compliance with Title VI and Environmental Justice requirements as part of a compliance “rendering” before the STIP is approved. Agencies receiving federal financial assistance are required to adhere to Environmental Justice considerations; as addressed in federal Executive Order 12898 and established in 1994. The French Broad River MPO is the recipient of and administers Federal Transportation Funds making these requirements applicable to local planning efforts.

A variety of federal laws, policies and orders provide the legal underpinning for environmental justice considerations. The

relevant laws are listed on the next page in a timeline with a brief description of each law and its relevancy to environmental justice.

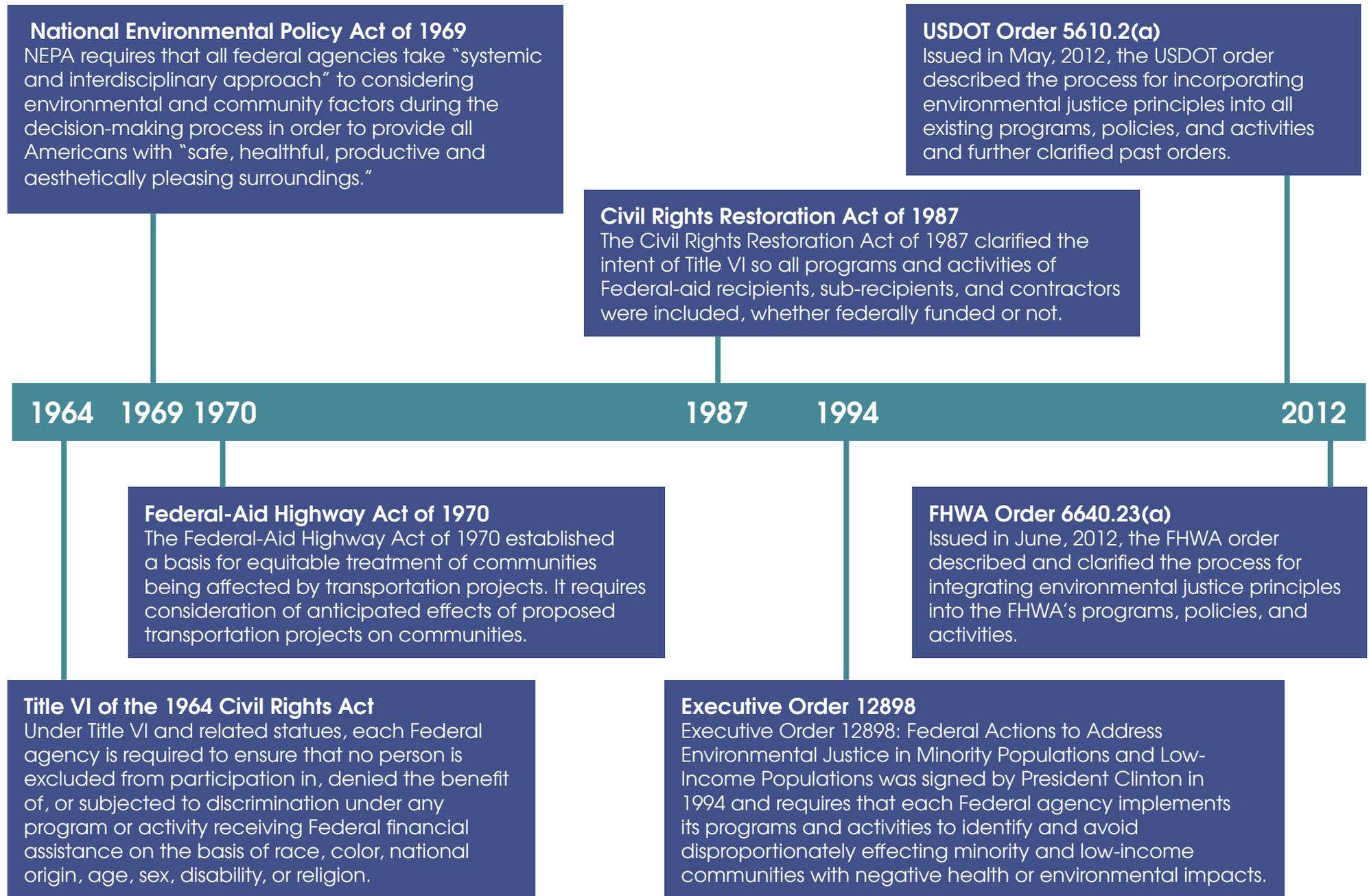
Adverse Effects on Underserved Populations Considered

One of the key aspects of incorporating environmental justice into transportation planning in the MPO’s MTP is to examine the adverse effects of planned transportation projects and where those effects are expected. While many of the projects in the MTP are early in the planning process, many assumptions can be reasonably made at this point about how the projects will affect their surroundings.

MPO staff took a project-by-project analysis of expected effects- both benefits and burdens- that are expected for communities. FHWA Order 6640.23(a) makes suggests what may constitute an environmental burden:

- Bodily impairment
- Infirmity
- Illness or death
- Air, noise, and water pollution or soil contamination
- Destruction or disruption of human-made or natural resources
- Destruction or diminution of aesthetic values
- Destruction or disruption of community cohesion or a community’s economic vitality

Figure 6.1
Federal Requirements Concerning Environmental Justice



- Destruction or disruption of the availability of public and private facilities and services
- Vibration
- Adverse employment effects
- Displacement of persons, businesses, farms, or nonprofit organizations
- Increased traffic congestion
- Isolation
- Exclusion or separation of minority or low-income individuals within a given community or from the broader community
- The denial of, reduction in, or significant delay in the receipt of, benefits of FHWA programs, policies, or activities

While these are all important aspects to be examined at some stage of the planning and design process, many of these categories are difficult to assess at the early planning stages. Instead, the following potential burdens and benefits were chosen to assess projects to be scored as either positive, neutral, or negative, based upon a project's expected impact on its surroundings.

This type of analysis has many limitations, due to how early in the planning process many of these projects are, but can give a helpful picture of the overall distribution of expected effects in the region. One limitation is that the dispersion of

Table 6.1: EJ Project Level Scoring Criteria

Mode	Category	Positive	Neutral	Negative
Accessibility	Transit Travel Times and Quality of Service	Improves a roadway on an existing transit route that will likely result in travel time savings for the bus route	No effect on transit travel times	Negatively impacts travel times on existing transit routes
	Connectivity of Network	A new link is created that did not previously exist or overcomes a barrier	No effect on the connectivity of the transportation network	Removes a link in the transportation network or builds a new barrier
	Bicycle and Pedestrian Crossings and Connections	Adds a new facility where none existed before or upgrades an existing facility to current standards	No effect on bicycle and pedestrian crossings and connections	Creates a new barrier to bicycle and/or pedestrian travel or exacerbates an existing barrier
Safety	Addressed High Bicycle and Pedestrian Crash Locations	Improves or removes existing conflict points	No effect on existing conflict points	Creates a new conflict point or exacerbates an existing conflict point
	CPTED Components	Addresses CPTED issues in areas where crime is a documented issue	No effect	Creates new security issues or exacerbates existing security issue
	Bicycle/Pedestrian Infrastructure	Adds bike/pedestrian infrastructure	No effect on bike/pedestrian infrastructure	Removes existing bike/pedestrian infrastructure
Environmental Health	Air Quality	Addresses access management, intersection improvements, or CMP hotspots to reduce emissions	No effect on volumes or emissions	Projected increase in volumes of greater than 5,000 vehicles/day
	Noise	Decrease in stop-and-go traffic	No effect on noise	Increase in traffic volumes, speeds, or increases stop-and-go traffic
Social Equity	Resident / Business Displacement	Mitigation that may improve historically underserved community	No effect	Likely to displace residents/businesses of historically underserved populations
	Freight Volumes	Shifts freight volumes away from historically underserved populations	No effect on freight	Likely to increase freight near historically underserved communities

impacts is very difficult to predict. For aspects such as noise and air quality, effects can be far-ranging and can vary based on wind strength and patterns- which can vary by the hour. Because of the unknown dispersion of impacts, the MPO's analysis was fairly conservative and only counted impacts in the immediate area of planned projects.

Another unknown input is the exact location of projects. Project locations are likely to change as they go through the design process- especially new location projects. So while projects have been mapped based on current facilities or expected facilities mapped in CTPs or other planning documents, nothing is decided until the design process is complete. This problem is especially relevant in analyses to determine "Resident/Business Displacement." It is not known if any displacement will be required, instead an analysis of that nature shows that a project may have a higher likelihood to cause the displacement of residences and/or businesses and if a project intersects a block group with identified concentrations of historically underserved populations, the project scores negatively in that category.

Populations Addressed by Title VI and Environmental Justice Guidelines

Title VI of the Civil Rights Act prohibits discrimination on the basis of race, color, or national origin. The Office of Management and Budget (OMB) issued Policy Directive 15, Revisions to the

Standards for the Classification of Federal Data on Race and Ethnicity, in 1997, establishing five minimum categories for data on race. Executive Order 12898 and the DOT and FHWA Orders on Environmental Justice address persons belonging to any of the following groups:

- **American Indian and Alaskan Native** - a person having origins in any of the original people of North America and who maintains cultural identification through tribal affiliation or community recognition.
- **Asian** - a person having origins in any of the original peoples of the Far East, Southeast Asia, or the Indian subcontinent.
- **Black** - a person having origins in any of the black racial groups of Africa.
- **Hispanic** - a person of Mexican, Puerto Rican, Cuban, Central or South American, or other Spanish culture or origin, regardless of race.
- **Native Hawaiian or Other Pacific Islander** - a person having origins in any of the original peoples of Hawaii, Guam, Samoa, or other Pacific Islands.
- **Low-Income** - a person whose household income (or in the case of a community or group, whose median household income) is at or below the U.S. Department of Health and Human Services poverty guidelines.

FBRMPO Environmental Impact Analysis

In order to determine where concentrations of population

characteristics relevant to environmental justice and transportation planning are located in the FBRMPO region, the MPO utilized demographic information made available through the US Census's American Community Survey (ACS.) The ACS generates estimates for geographic areas based on community surveys. For this plan, 5-year estimates were utilized because they are considered to be more accurate, but not as up-to-date as 3-year and 1-year estimates.

For the MPO's analysis, the following historically groups were examined:

- **Racial or Ethnic Minority** - includes individuals that "self-identify" as at least one of the following racial or ethnic classes: African-American, American Indian, Asian, Pacific Islander, or Hispanic/Spanish/Latino. The other races category was also utilized.
- **Households Without a Vehicle** - includes households identified as having no regular access to a vehicle.
- **Elderly** - individuals identified as being sixty-five or older.
- **Households Below the Poverty Line** - individuals below the poverty level as defined by the Department of Health and Human Services.
- **Disabled** - individuals aged five and older in the civilian non-institutionalized population with a physical, mental, or emotional condition lasting six months or more which limits basic physical or self-care activities.

Table 6.2: Minority Populations

	Buncombe County	Haywood County	Henderson County	Madison County	Transylvania County			
Black	6.4%	0.9%	3.3%	1.5%	3.5%			
American Indian	0.3%	0.6%	0.3%	0.4%	0.4%			
Asian	1.0%	0.4%	0.9%	0.9%	0.6%			
Native Hawaiian	0.1%	0.1%	0.0%	0.0%	0.0%			
Some Other Race	0.9%	1.1%	1.9%	0.7%	2.4%			
Hispanic	6.1%	3.4%	9.8%	2.2%	2.9%	5-County Average	NC Average	US Average
Total Minority Population	14.8%	6.5%	16.2%	5.7%	9.8%	9.4%	35.1%	36.7%

Table 6.3: Other Demographics

	Households Without a Vehicle	Elderly (Age 65+) Population	Households Below the Poverty Line	Limited English Proficiency	Individuals with a Disability
Buncombe County	2.4%	16.5%	17.1%	3.4%	13.8%
Haywood County	1.4%	21.9%	16.6%	0.3%	15.5%
Henderson County	1.6%	22.9%	14.1%	6.0%	16.0%
Madison County	0.4%	18.4%	17.3%	1.2%	17.8%
Transylvania County	2.5%	26.7%	14.3%	0.8%	18.0%
5-County Average	2.1%	18.3%	15.2%	1.9%	
NC Average	9.1%	13.4%	17.5%	4.8%	13.3%
US Average	9.1%	13.4%	15.4%	8.6%	12.1%

Source: 2008-2012 ACS 5-Year Average

Overall, the FBRMPO region has a very different demographic make-up than the rest of North Carolina and the rest of the country. However, while some groups are more prevalent and other are less prevalent, this does not negate the need to analyze the area’s concentrations of those groups and the possible effects of planned transportation projects.

Determining Regional Thresholds

The next step for the MPO’s Environmental Justice process was to determine thresholds for areas determined to have high concentrations of historically disadvantaged populations. For the FBRMPO region, this proved somewhat arduous in that the demographic makeup of the region is considerably different from North Carolina and the United States.

One of the most prevalent groups in the region is elderly individuals, aged 65 years or older. Both the North Carolina and United States average is 13.4%, but the FBRMPO’s region is significantly higher. Even the county with the lowest proportion of elderly individuals (Buncombe County) has a considerably higher proportion of that population (16.5%.) Haywood, Henderson, and Transylvania counties have populations with 20% or more aged 65 years or more.

Initially, the MPO’s attempted to use block groups with concentrations of EJ populations above the regional average. This approach was troublesome due to the region’s demographic distribution of historically disadvantaged groups. Many of the region’s block groups were

triggered at what were considered to be false-positives, or areas with a concentration of a population above the regional average, but would be unlikely to be significant in many other areas.

Instead, block groups that were above the 75th percentile of regional block groups were used to determine areas of special environmental concern. This was found to be more effective when focusing on groups that were highly concentrated in selected parts of the region.

Determination of communities of concern

2008-2012 American Community Survey data from the US Bureau of the Census were the base for this analysis. This puts the foundation year of the plan—2010—at the center of the sample years, and ties with the decennial census, plus the land use and employment data used for the plan. The 5-county region was used to create the base instances for determining what constitutes the 75th percentile. For example, all the block groups in the region have a value for LEP populations. This population was divided by the block group population to yield a percentage of LEP in all the block groups. When a variable had households as a base, total households was the divisor. Those values became the range of values used to calculate the 75th percentile. This had more utility, since some variables are uncommon in the region compared to national or state values.

Table 6.4: Demographic Data for Five-County Area

	Total	% of Total Population
Population	458,044	-
Number of Households	194,968	-
Racial / Ethnic Minority	43,239	9.4%
Elderly	83,856	18.3%
Limited English Proficiency	8,856	1.9%
Low-Income	69,443	15.2%
Zero-Car Households	4,036	2.1%
Individuals with a Disability	68,995	15.1%

Source: 2008-2012 ACS 5-Year Average

Percentile was calculated in Microsoft Excel using the PERCENTIL.INC function. Here, v_P is the value of the P -th percentile of an ascending ordered dataset containing N elements with values $v_1 \leq v_2 \leq \dots \leq v_N$

Firstly, the rank is calculated:

$$n = \frac{P}{100}(N - 1) + 1$$

Then the rank is split into its integer component k and decimal component d , such that $n = k + d$

Then v_P is calculated as:

$$v_P = \begin{cases} v_1, & \text{for } k = 0 \\ v_N, & \text{for } k = N \\ v_k + d(v_{k+1} - v_k), & \text{for } 0 < k < N \end{cases}$$

These percentiles were calculated for the following variables: Age 65+, Race, Hispanic/Latino, Limited English Proficiency, Zero Car Households, and Poverty. Disability data were not available at the block group geography for the ACS release used.

Environmental Benefits and Burdens Analysis

The final step of the MPO's Environmental Justice analysis was to combine the anticipated environmental benefits and burdens of each project in the MTP with the block groups in the region found to be above the area's threshold. This analysis focuses on how environmental benefits and burdens are distributed

throughout the region's communities and can examine if environmental burdens are disproportionately placed upon EJ communities.

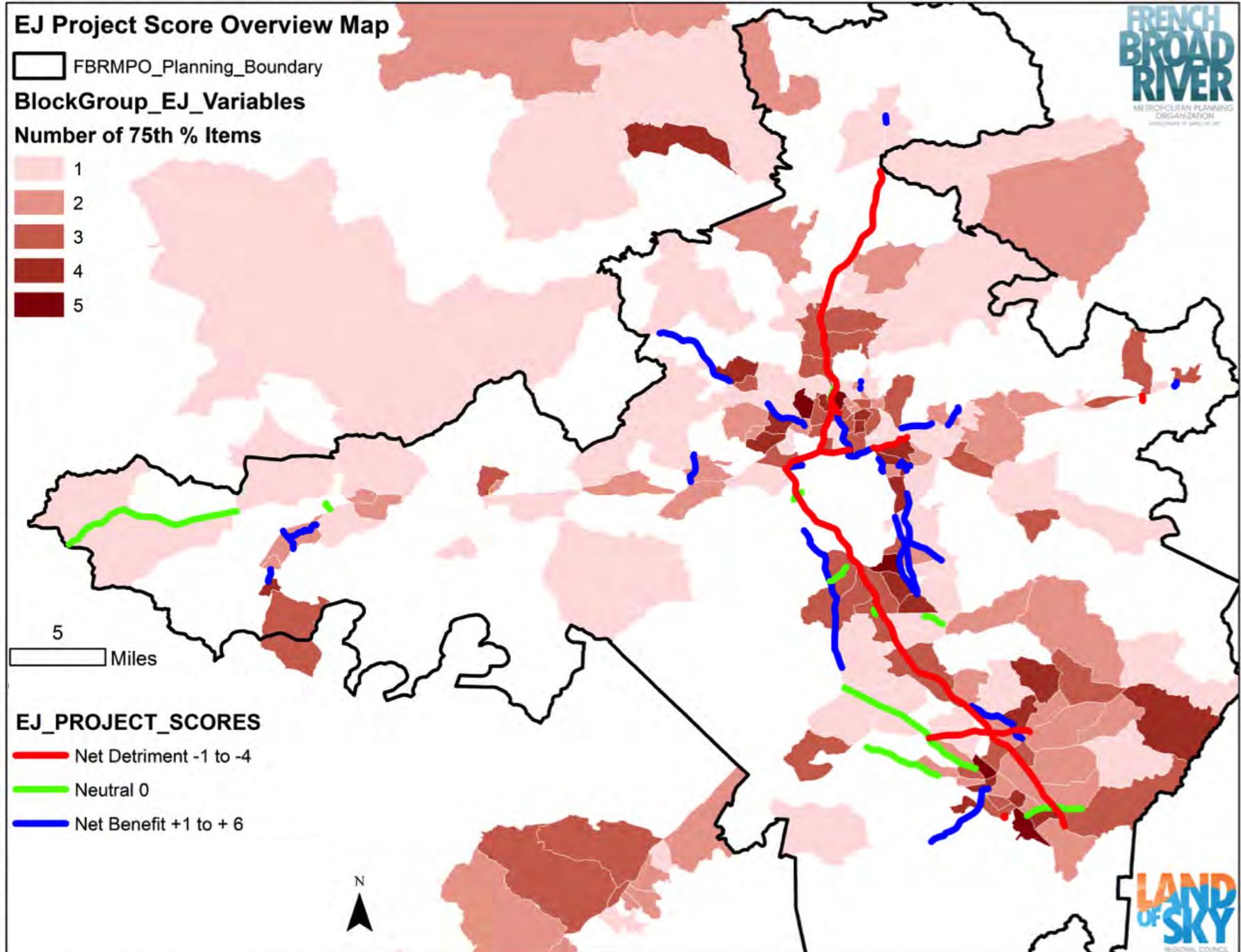
The FBRMPO conducted a system-level evaluation of how well projects were distributed around the region, and how the projects related to populations likely to trigger environmental justice issues. The MPO looked at the number of census block groups that were likely to contain EJ populations and the character of projects in this plan. This document will refer to those block groups as "communities of concern".

In addition to determining communities of concern, the MPO wanted to look at how projects affected these communities. This was done as a 2-stage process, with a component that looked at the geographic distribution of projects to determine if communities were getting a fair share of projects. The second part was to look at individual projects to determine if a project was likely to have a net benefit or detriment to a community of concern. For the latter, the MPO staff and the FBRMPO Prioritization Subcommittee created a scoring methodology that could operate at a high-level, and would remain valid regardless of a particular alignment of a project. The region has very few new location projects, which makes this methodology easy to apply. For example, an interstate widening is likely to induce additional traffic volumes, including more freight. While this might be beneficial to a region, the additional

noise and air pollution are likely to be detrimental to communities in close proximity to the new capacity. Similarly a new sidewalk would likely improve safety, and since higher percentages of EJ populations walk than the general population, it would be seen as beneficial to a community of concern. When the scoring criteria are examined, there is a bias toward smaller projects that impact local travel and against projects likely to have high speeds and traffic volumes.

Each project was run through the scoring, which included the categories in Table 1: EJ Project Level Scoring Criteria. Each score was a simple -1, 0, +1 score, to denote net detriment, no effect, or positive effect for each item of the score. These were then summarized for a net score for the project. While an initial look at project type groupings as a surrogate for this was considered, it missed some important project details, such as if an interstate widening included accommodations for a greenway crossing. The group wanted to acknowledge the contribution these kind of accommodations could make to offset other harmful effects at the local level.

Map 6.1: EJ Project Score Overview Map



Overall, the projects recommended in this plan have a net score of 0.83. The possible range of scores is -10 to +10, meaning that the combination of projects in this plan has the potential for a net positive effect on communities of concern. Stated a different way, on a 100 point scale where -10 equals zero and +10 equals 100, the plan scores 54 out of 100.

The next step was to look at the geographic relationship of communities of concern and the projects. Looking at all block groups with at least one variable in the 75th percentile, 51 of 53 projects are within 60' of a project, with an average EJ score of 0.9. The MPO used 60' based on previous work by the Durham-Chapel Hill-Carrboro MPO that used 60' to mimic an average right-of-way width for a corridor.

For block groups with 2 or more variables present at 75th percentile, there were 47

projects, with an average positive EJ score of 0.89. With 3 or more variables, there were 33 projects with an average score of 0.82, and for 4 or more variables there were 21 projects with 1.31 average. Finally, for 5 variables there are 6 projects with an average score of 0.67.

EJ Analysis of Bicycle, Pedestrian and Transit

For information on individual projects, consult Appendix H, Project Dossiers. EJ scores, including their components, and communities of concern block groups are shown together on the EJ maps in the dossiers.

Table 6.5: Number of Variables at 75th Percentile-Block Group

Number of Variables at 75th Percentile-Block Group	Number of Projects (out of 53)	Average EJ Score
0-5 (all projects)	53	0.83
1-5	51	0.90
2-5	47	0.89
3-5	33	0.82
4-5	21	1.31
5	6	0.67

Safety and Security

In accordance with policies outlined in Moving Ahead for Progress in the 21st Century (MAP-21), MPOs are encouraged to effectively address safety and security in transportation planning. The Highway Safety Improvement Program (HSIP) is a core program of MAP-21 focused on reducing fatalities on highways, rail, and other modes within the transportation system. Funding for results-based infrastructure safety improvements is made available through HSIP.

The FBRMPO has actively incorporated safety and security measures for the region's transportation system through the following actions:

- a. **Safety Audits** – NC DOT's Traffic Engineering Accident Analysis (TEAAS) crash data is used to identify specific areas of concern within the region. Critical crash rates and raw number of crashes are factors in the prioritization of projects for the MTP. Crash rates help identify to what degree the facility itself may be contributing to a safety problem, whereas raw numbers of crashes indicate the number of users being impacted who may benefit from safety improvements. Maps illustrating the crash data for the region and each county are shown in Figure XXX.
- b. **ITS Safety** – Intelligent Transportation Systems (ITS) provides an opportunity for improved communication and collaboration with emergency responders and participation in safety-related outreach efforts. This is of particular

importance for communicating highway closures and detours due to landslides, flooding, or highway crashes.

- c. **Slope Failure** – The region's mountainous terrain leads to a prevalence of roads in steep, narrow valleys subject to rockslides or slope failures. Interstate-40 in the Pigeon River Gorge is an area of particular concern as there have been numerous landslides since its construction in 1956 resulting in road closure, traffic re-routing, and slope stabilization. The chronic problems facing this stretch of highway, as well as smaller facilities in the area, point to the importance of considering safety from rock slides.
- d. **Flooding** – The mountains and steep slopes contribute to floodplain development in along the rivers and streams. This land use pattern results in higher occurrence of flooding for structures and transportation facilities. For example, repeated hurricane events in 2005 culminated in significant flooding impacts such as, extensive road closures, bridge failures, and millions of dollars in damage throughout the region. The FBRMPO works with local government land use planners, emergency managers, NC DOT, NC DENR and other stakeholders to identify potential impacts and seek solutions or redesign opportunities.
- e. **Wildlife Collisions** – Wildlife crashes are a common concern in the region as the urbanized area is located in close proximity to large swaths of preserved natural land and critical wildlife corridors. The MPO considers innovative techniques to accommodate habitat and wildlife



to reduce the danger associated with wildlife conflict. For example, an underpass was constructed on a portion of I-26 to accommodate black bears.

- f. **Energy Assurance** – Energy independence has been a focus of the nation and region for many years. The fuel shortage that occurred in WNC in 2008 led to the development of the Local Energy Assurance Plan to identify ways that the region can be less dependent on oil and pipelines from gulf ports. Expansion of natural gas pipelines within the region speaks to this need. The Clean Cities and Clean Vehicles Coalition also works with local governments and companies to expand the infrastructure for alternative fuel vehicles. Identification of ways to prioritize and expand the infrastructure necessary for alternative fuels is a key factor to become a more energy secure region.
- g. **“Four E’s”** – The FBRMPO has begun implementing the “Four E’s” for bicycling and walking. The 2014 Blue Ridge Bike Plan recommended continued emphasis on education, engineering, enforcement, and encouragement to improve safety throughout the rural and urban areas. Examples include assisting with bike rodeos, safe routes to schools, Bike to Work week and other ways to promote bicycle and pedestrian travel.
- h. **Watch 4 Me NC** – The campaign incorporates bicycle and pedestrian

accommodations and infrastructure for on and off-road facilities. Increasing bicycle and pedestrian safety is a priority for the FBRMPO and region due to the growing number of pedestrian – vehicle accidents. Recent pedestrian injuries and fatalities in the Asheville area has drawn stark attention to the need for safety improvements throughout much of the region. Asheville was named the most dangerous for pedestrians per capita by NC DOT with an average annual pedestrian accident rate of 8.1 accidents per 10,000 residents from 2008 to 2012. North Carolina is currently recognized by FHWA as a “Pedestrian Emphasis” state and has encouraged pedestrian safety training to decrease the rate of accident, injury and fatality. Due to the region’s large number of recreational bicyclists, bicycle safety and awareness is also a high priority for both rural and urban communities. Large groups of bicyclists often meet to ride together on narrow rural routes, causing potential escalation between vehicles and bicyclists.

- i. **Safety Countermeasures** – The FBRMPO has worked with local governments, NC DOT and stakeholders to identify safety countermeasures along priority facilities that include pedestrian safety islands, marked crosswalks, road diets, and traffic calming.
- j. **Safety Metrics** – The FBRMPO includes accident and safety metrics during

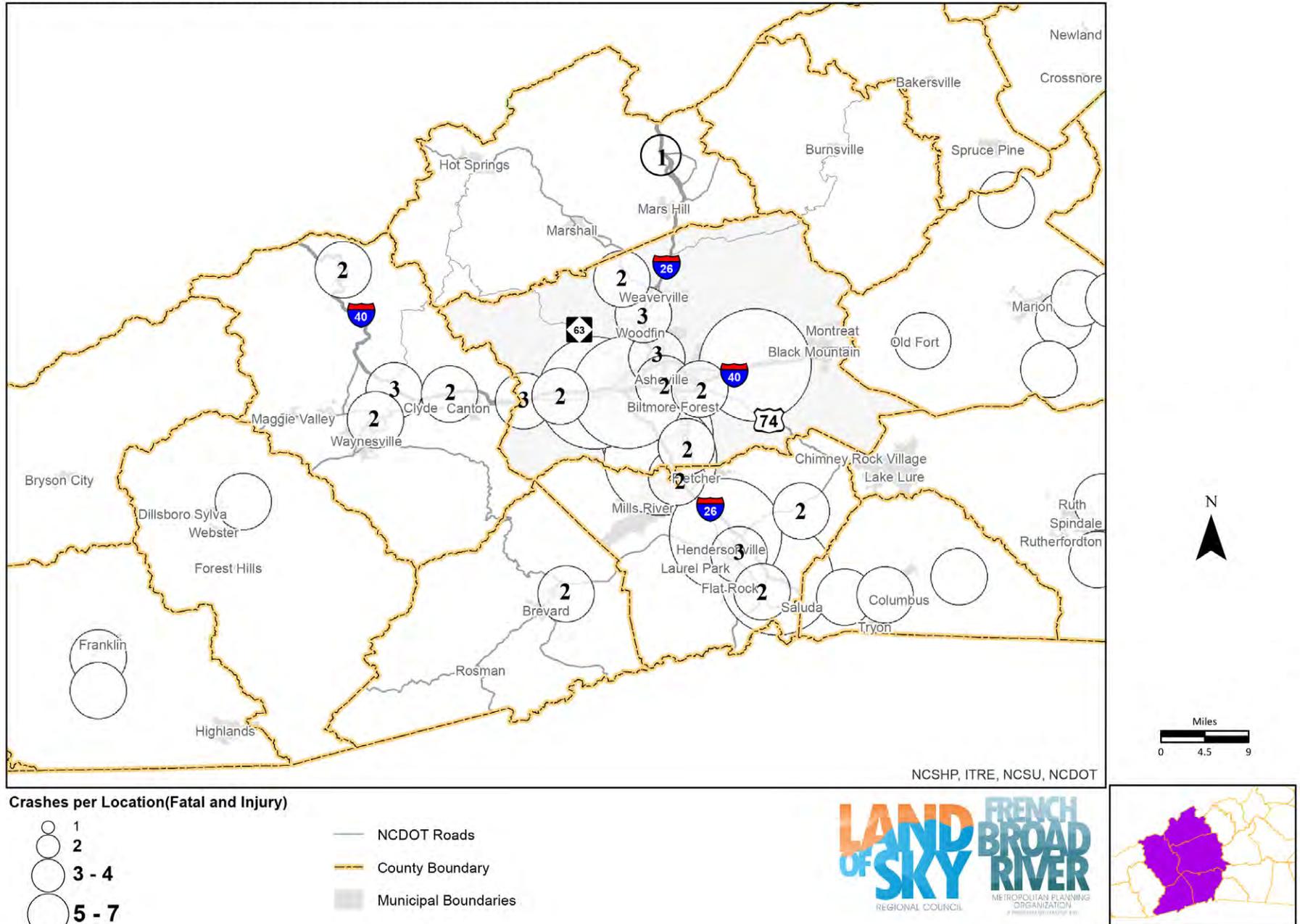
the prioritization process of roadway projects for the Transportation Improvement Program (TIP).

- k. **Transit Service Facilities** – Proposed projects near transit facilities are evaluated with safety metrics, often including stakeholder involvement and site evaluation.

Map 6.2: Truck Crashes

FBRMPO TRUCK CRASHES

Source: Institute for Transportation Research and Education

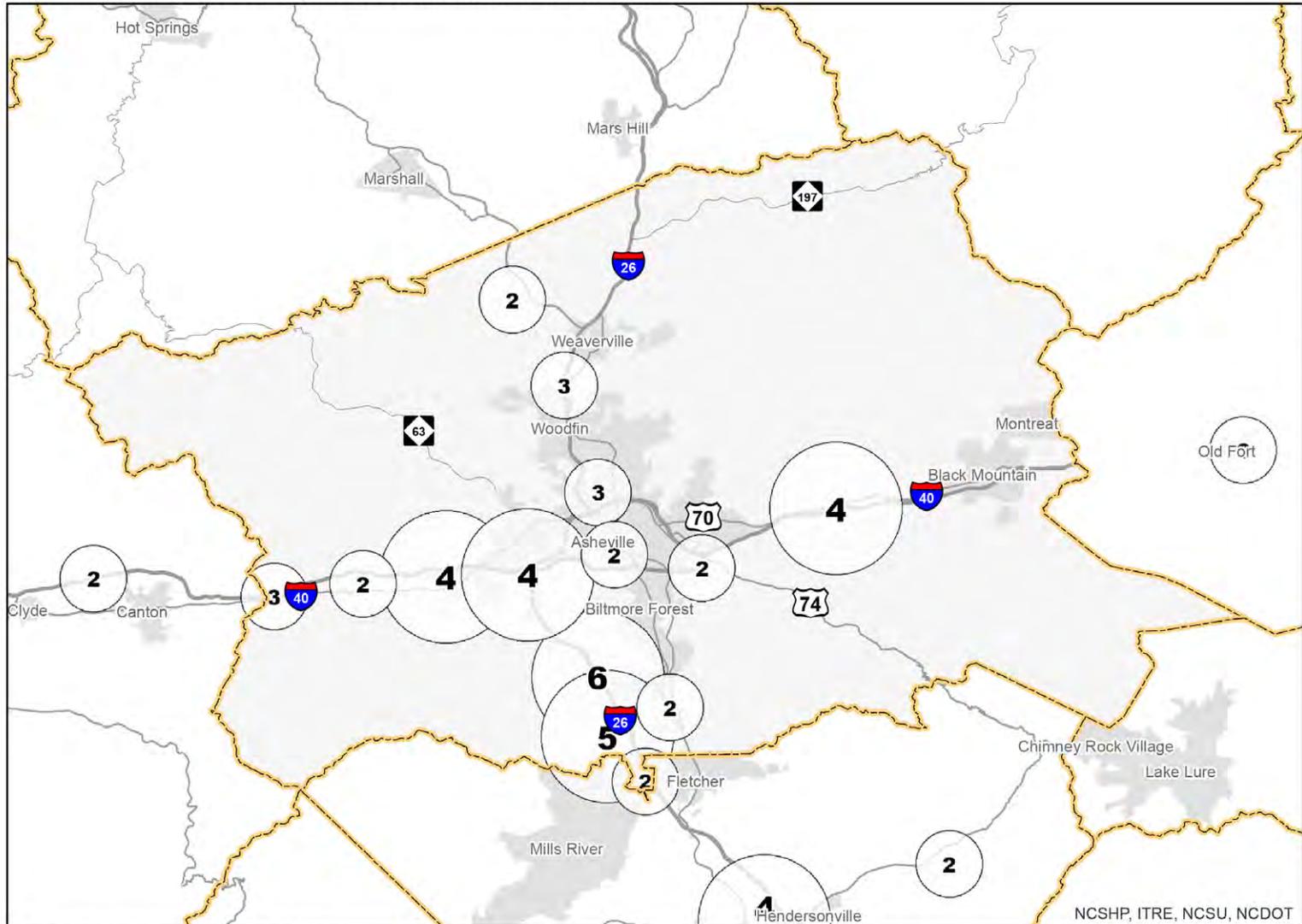


Source: 2013 NCDOT AADT Data

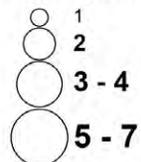
Map 6.3: Truck Crashes

BUNCOMBE COUNTY TRUCK CRASHES

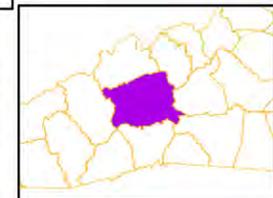
Source: Institute for Transportation Research and Education



Crashes per Location(Fatal and Injury)



- NCDOT Roads
- County Boundary
- Municipal Boundaries

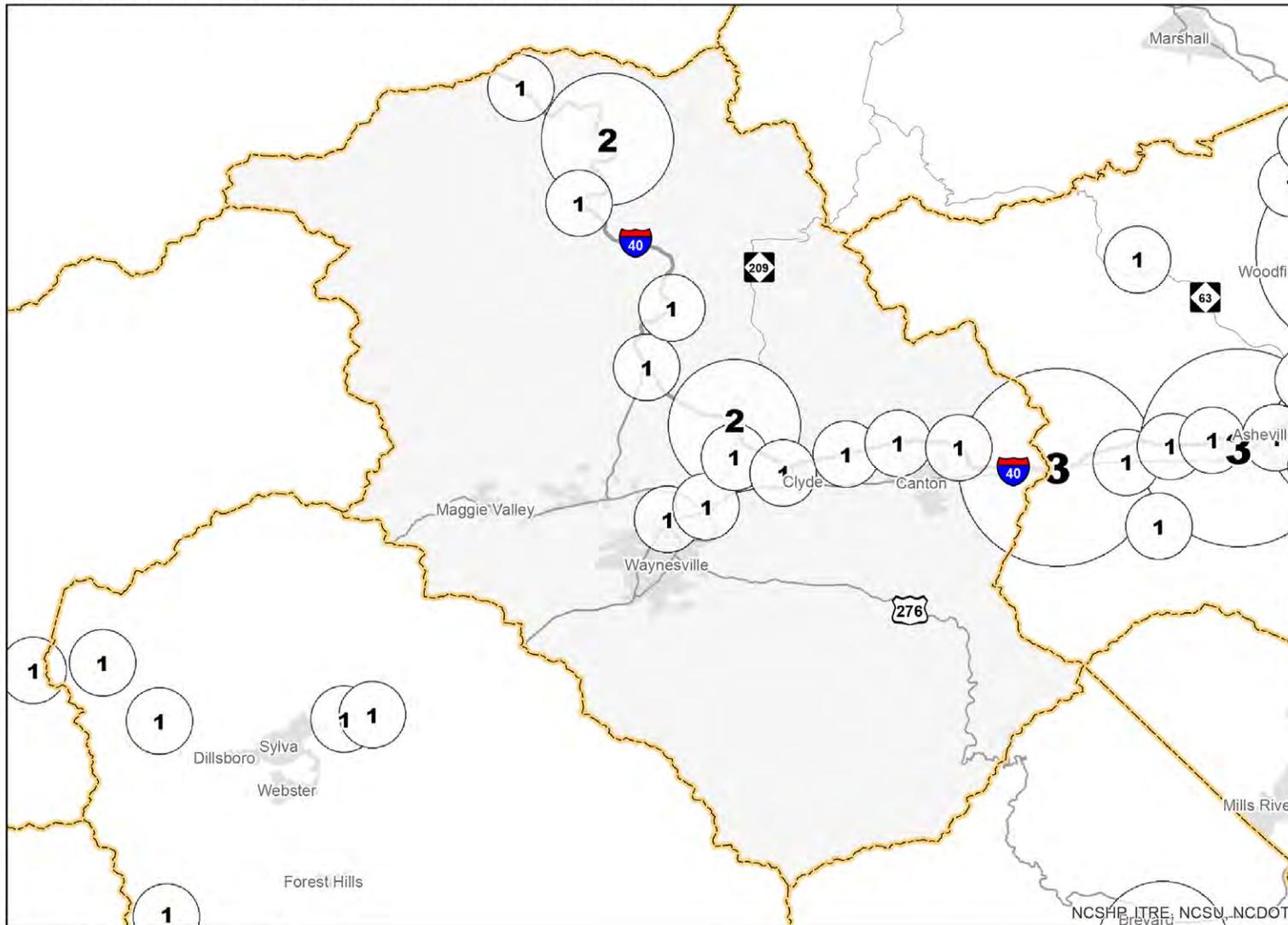


Source: 2013 NCDOT AADT Data

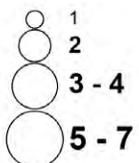
Map 6.4: Truck Crashes

HAYWOOD COUNTY TRUCK CRASHES

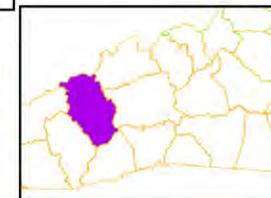
Source: Institute for Transportation Research and Education



Crashes per Location(Fatal and Injury)



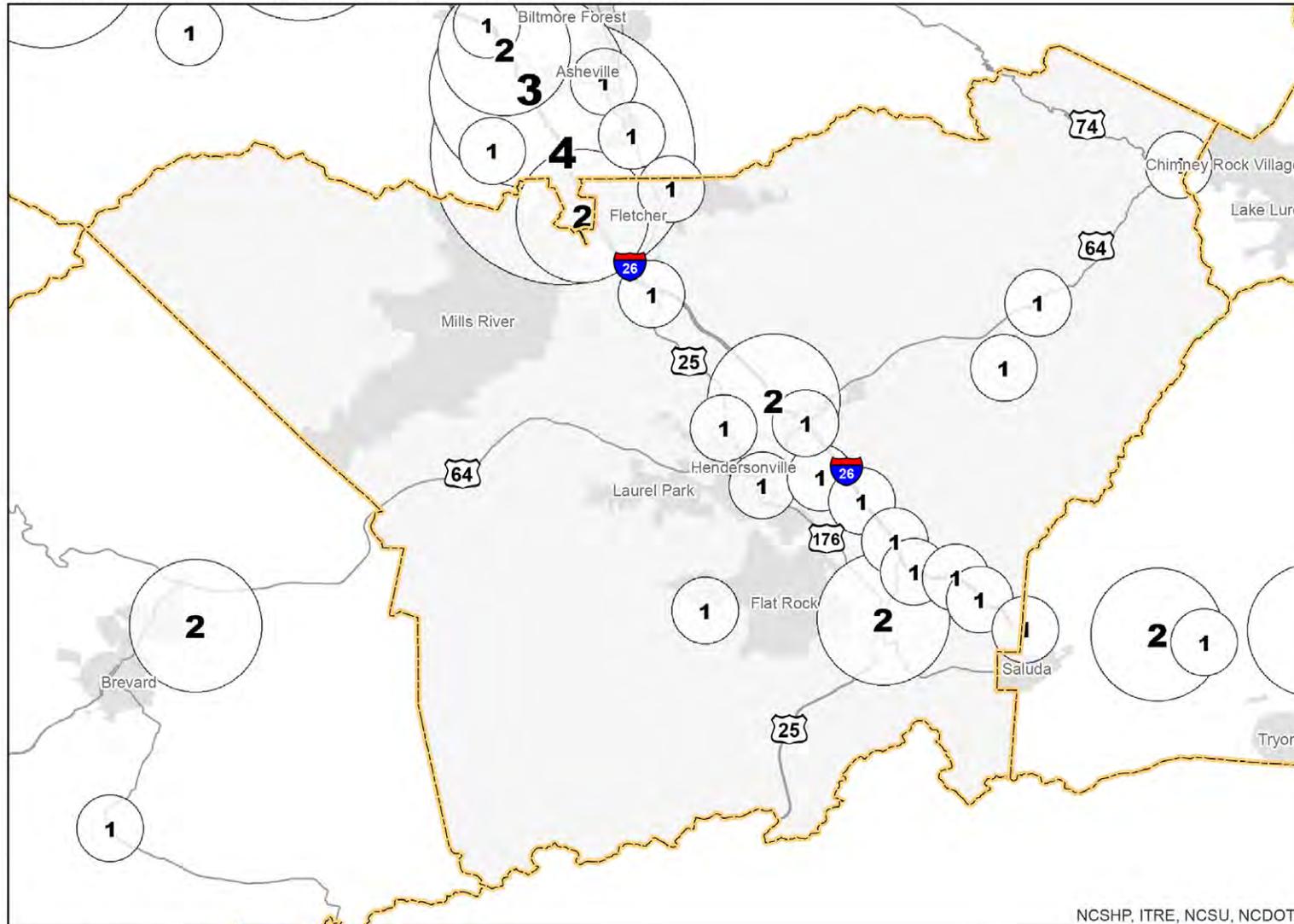
- NCDOT Roads
- County Boundary
- Municipal Boundaries



Map 6.5: Truck Crashes

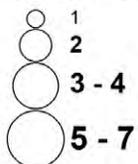
HENDERSON COUNTY TRUCK CRASHES

Source: Institute for Transportation Research and Education

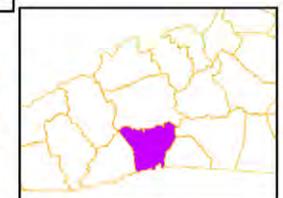


NCSHP, ITRE, NCSU, NCDOT

Crashes per Location(Fatal and Injury)



-  NCDOT Roads
-  County Boundary
-  Municipal Boundaries

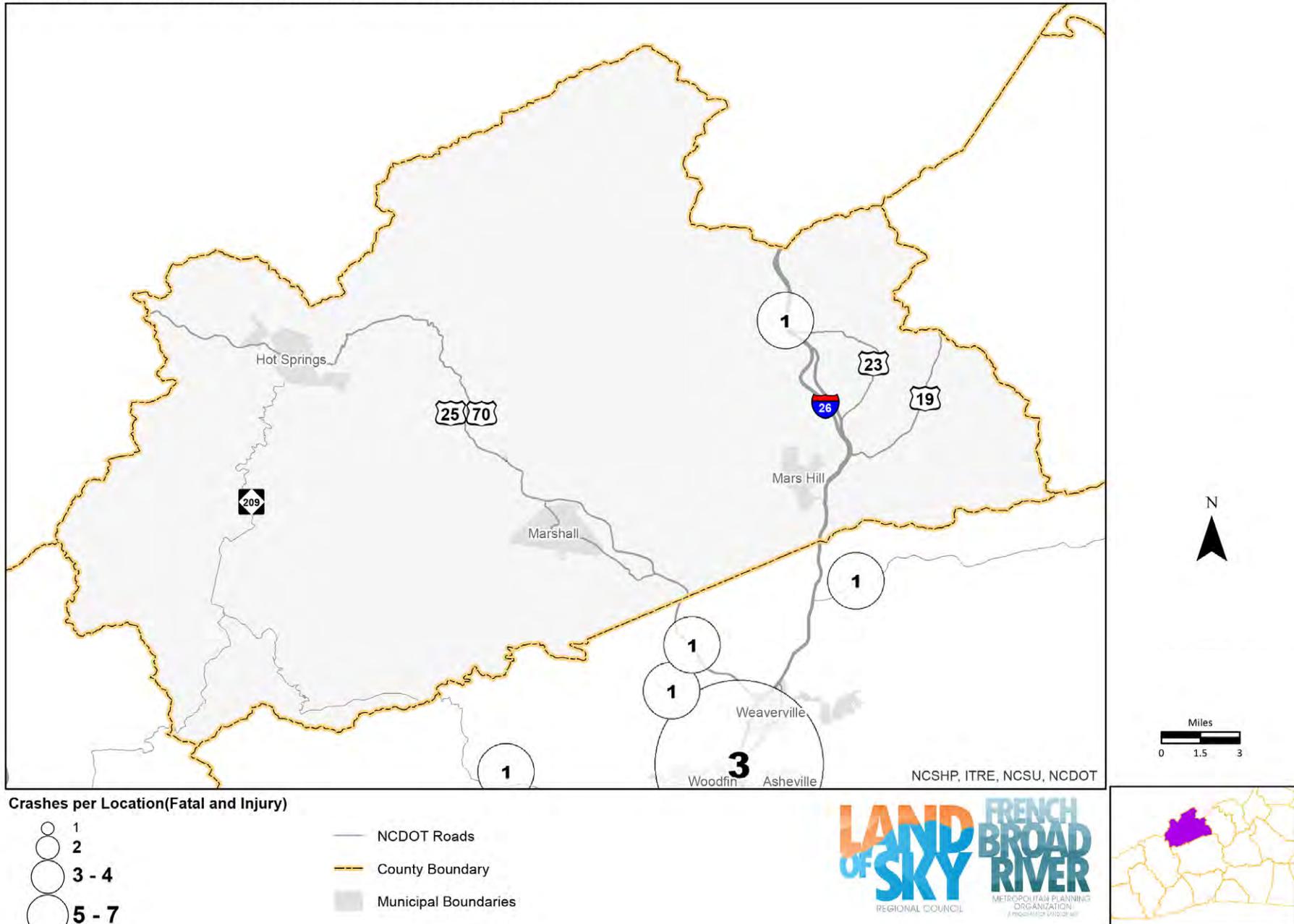


Source: 2013 NCDOT AADT Data

Map 6.6: Truck Crashes

MADISON COUNTY TRUCK CRASHES

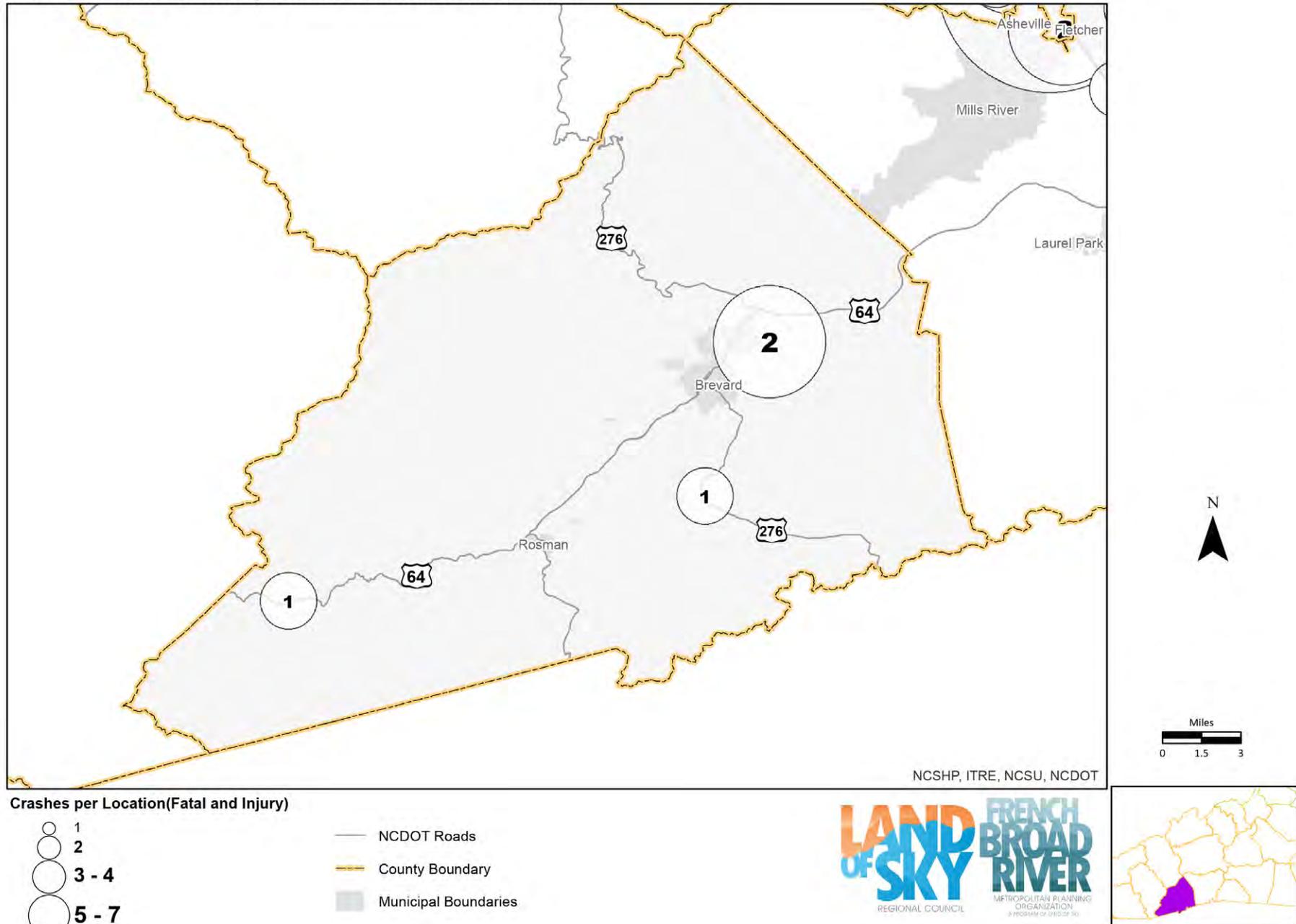
Source: Institute for Transportation Research and Education



Map 6.7: Truck Crashes

TRANSYLVANIA COUNTY TRUCK CRASHES

Source: Institute for Transportation Research and Education



Source: 2013 NCDOT AADT Data



Environmental Mitigation

The FBRMPO evaluated potential environmental impacts on roadway projects included in the MTP. The evaluation was based on spatial data for natural features, social features, safety data, land use data, and the output from the GroWNC Business as Usual Scenario Model. The resultant maps of the exercise are included with each project in Appendix H. This process is designed to identify potential significant environmental impacts early in the development of a project that may require costly mitigation; it is not intended to substitute for the thorough project-level analysis required as part of the National Environmental Protection Act.

Project Dossiers, as presented in Appendix H to the MTP, were developed to better communicate the surrounding context for each planned transportation project, including the natural and cultural resources in immediate proximity to the project corridor. These maps have been developed using data from a variety of local, state, and federal sources, and help to give a picture of the present, past, and projected future of each planned transportation project and its surroundings.

The list of Dossier pages includes the following: CTP/MTP Map which gives a general context and illustrates major roadways; general information and design page which provides project description, termini and cost estimate; project background page which indicates a brief history of the project; SPOT map with aerial photography and the most recent

SPOT score; AADT map, safety map which includes crash data from NCDOT; functional classification map; 2040 modeled traffic map; existing land use map based on 2010 data; pending development map; generalized future land use map; dwelling unit forecast; employment forecast; Environmental Justice review map; natural and cultural resources map and natural and other hazards map which includes past landslides, slope failures, wildfires and other potential hazards.

To facilitate early identification of environmental concerns, recommendation for the FBRMPO is to include a member of an environmental agency on the TCC. Due to the amount of federal forest land in the region, a candidate could be a representative of the US Forest Service.

The following are potential strategies to mitigate environmental features:

Archaeological

- Complete county Cultural Resource Plans in cooperation with the NC Division of Cultural Resources to identify sensitive resources
- Conduct archaeological excavations to ensure artifacts are not lost
- Realign and/or relocate the project to avoid the affected resource

Community Impacts

- Construct a bridge to help maintain community cohesiveness
- Construct sidewalks and bike lanes

- Install traffic calming devices
- Construct sound barriers

Farmland

- Work with local land conservancies or the North Carolina Department of Agriculture to determine ways to preserve prime agricultural lands

Fragmented Animal Habitats

- Build overpasses with vegetation or underpasses to allow animals to cross safely
- Realign and/or relocate projects to avoid impacted habitats

Historic Sites

- Realign and/or relocate the project to avoid the affected site
- Install landscaping to reduce visual impacts

Noise

- Erect noise barriers
- Install landscaping to reduce impacts.
- Threatened and Endangered Species
- Realign and/or relocate the project to avoid the affected species
- Enhance or restore degraded habitat
- Create new, off-site habitats

Stream and Lake Buffers

- Re-vegetate disturbed areas with native planting
- Ensure diffuse stormwater flow provided through the buffer from storm drain pipes
- Install stormwater treatment structures as mitigation either on-site or off-site
- Pay impact fees to jurisdictions

Air Quality

Currently the FBRMPO is in attainment for air quality. Poor air quality could affect community health, and impact the region's ability to market itself as a tourism destination and healthy place to live. Topographically, the Asheville area is prone to "inversion" episodes that trap pollutants within the Asheville basin. Although emissions from sources outside the region contribute to a significant portion of the pollutants in our area, especially in high elevation areas, local sources, including mobile sources such as autos and trucks, are still a major factor in local pollution problems. There are six key transportation-related pollutants derived from mobile emission sources that are "criteria" pollutants of the National Ambient Air Quality Standards established by EPA in response to the Clean Air Act (CAA) are:

- Ozone (O₃) and its precursors - volatile organic compounds (VOC) and nitrogen oxides (NO_x). Ozone at ground level is formed when pollutants emitted by cars, power plants, refineries, and other sources react chemically in the presence of sunlight.
- Particulate Matter (PM) or particle pollution - both "fine particles" (less than 2.5 micrometers; PM_{2.5}) and "coarse Particles" (between 2.5 and 10 micrometers; PM₁₀). PM is a mix of solids and liquid droplets in the air that come from combustion, including motor-vehicles, power plants, and outdoor burning, and from some industrial processes.
- Carbon Monoxide (CO) is an odorless and colorless gas that forms when carbon in fuels does not completely burn and comes from vehicle exhaust and other fuel combustion processes, including natural sources, such as

wildfires.

- Lead (Pb) is a metal found naturally in the environment and in manufactured products. Lead is persistent in the environment and accumulates in soils and sediments through deposition from air sources, direct discharge of waste streams to water bodies, mining, and erosion. As a result of EPA regulations that removed lead from on-road vehicle use gasoline, emissions of lead from the transportation sector have declined by 95 percent between 1980 and 1999.
- Nitrogen oxides (NO_x) include nitrogen dioxide (NO₂), nitrous acid and nitric acid. EPA's National Ambient Air Quality Standard uses NO₂ as the indicator for the larger group of nitrogen oxides. NO₂ forms quickly from emissions from cars, trucks and buses, power plants, and off-road equipment. Nitrogen dioxide contributes to the formation of ground-level ozone (O₃), and fine particle pollution; NO_x emissions are also linked with adverse effects on the respiratory system. No area of the country has been found to be out of compliance with the current NO₂ standards.
- Sulfur dioxide (SO₂) emissions primarily come from fossil fuel combustion at power plants (73%) and other industrial facilities (20%). Smaller sources of SO₂ emissions include industrial processes such as extracting metal from ore, and the burning of high sulfur containing fuels by locomotives, large ships, and non-road equipment. SO₂ is linked with a number of adverse effects on the respiratory system. EPA has last revised the primary SO₂ National Ambient Air Quality Standards (NAAQS) by establishing a new 1-hour standard at a level of 75 parts per billion (ppb).