NORPC PATH TO ZERO SAFETY ACTION PLAN

APPENDICES

APPENDIX A: EXISTING CONDITIONS TECHNICAL MEMO

TANGIPAHOA ST. JOHN ST. TAMMANY PATH TO ZERO

MEMORANDUM

DATE: April 29, 2024
TO: Nelson Hollings, Senior Transportation Planner, NORPC
CC: Karen Parsons, Principal Planner, NORPC
FROM: Volkert, Inc. Alliance Transportation Group, Urban Systems Associates, Grey Engineering, Svaapta Group
RE: NORPC Path to Zero - Existing Conditions Analysis

Overview

The memorandum describes the existing conditions analysis conducted to aid in the development of the New Orleans Regional Planning Council (NORPC) Safe Streets for All (SS4A) Safety Action Plan. The purpose of the SS4A plan is to develop infrastructure and policy changes that work towards achieving the US Department of Transportation's (USDOT) goal of having zero traffic fatalities or serious injuries. NORPC partnered with St. John the Baptist Parish, St. Tammany Parish, and Tangipahoa Parish in Louisiana to develop a safety action plan as a part of the SS4A program. The SS4A program was created with the passage of the Infrastructure Investment and Jobs Act (IIJA) in 2021. The IIJA is providing $5 billion for the SS4A program between 2022-2026 to fund initiatives aimed at eliminating roadway deaths and serious injuries.

To better understand the current state of the region, data was collected regarding the area's population, land use, roadway network, and active transportation facilities. This included calculating the acreage of each land use in the parishes and the miles of roadways and bicycle facilities.

Additionally, an equity analysis was conducted to help guide the public involvement process and the distribution of investments from the plan. This identified historically disadvantaged communities and individuals so that transportation investments in plans or projects can be fairly distributed within each parish.

A crash analysis was also conducted to identify areas of concern regarding traffic safety. Data was analyzed to identify crash trends based on crash types, demographics, and environmental conditions. Through this analysis the high injury network was developed to highlight roadways and intersections with frequent crashes and/or severe or fatal injury crashes. Included in this crash analysis is a description of the correlation between land use patterns and crash trends in St John the Baptist, St Tammany, and Tangipahoa parishes. Crash trends may be influenced by the activities occurring in or around areas of different land uses, traffic volumes, and the modes of transportation used. Analyzing the type, frequency, and severity of the crashes near specific land uses allows a greater understanding of the issues and potential mitigation strategies specific to the crash patterns of an area.

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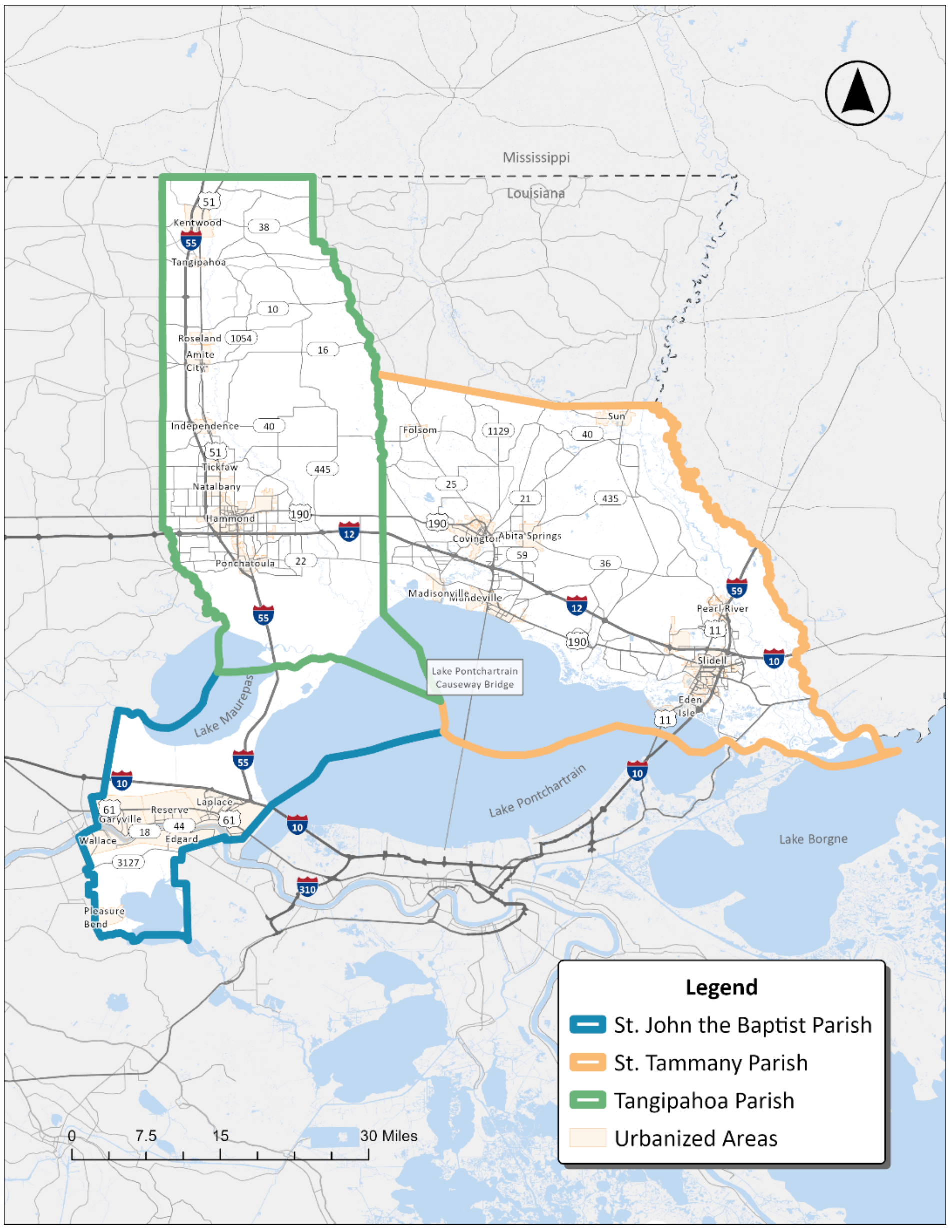
Existing Conditions

The following section will describe the current conditions regarding the study area's population, land use, roadway network, and active transportation facilities. Figure 1 displays the study area for the NORPC Path to Zero Safety Action Plan, which includes St John the Baptist, Tangipahoa, and St Tammany parishes.

Figure 1: NORPC SS4A – Study Area



Population

According to the US Census Bureau, the population of the study area was 437,995 people in 2021. Of the three parishes in the study area, St Tammany is the most populated with a population of 262,799, followed by Tangipahoa, then St. John the Baptist Parish. (Table 1)

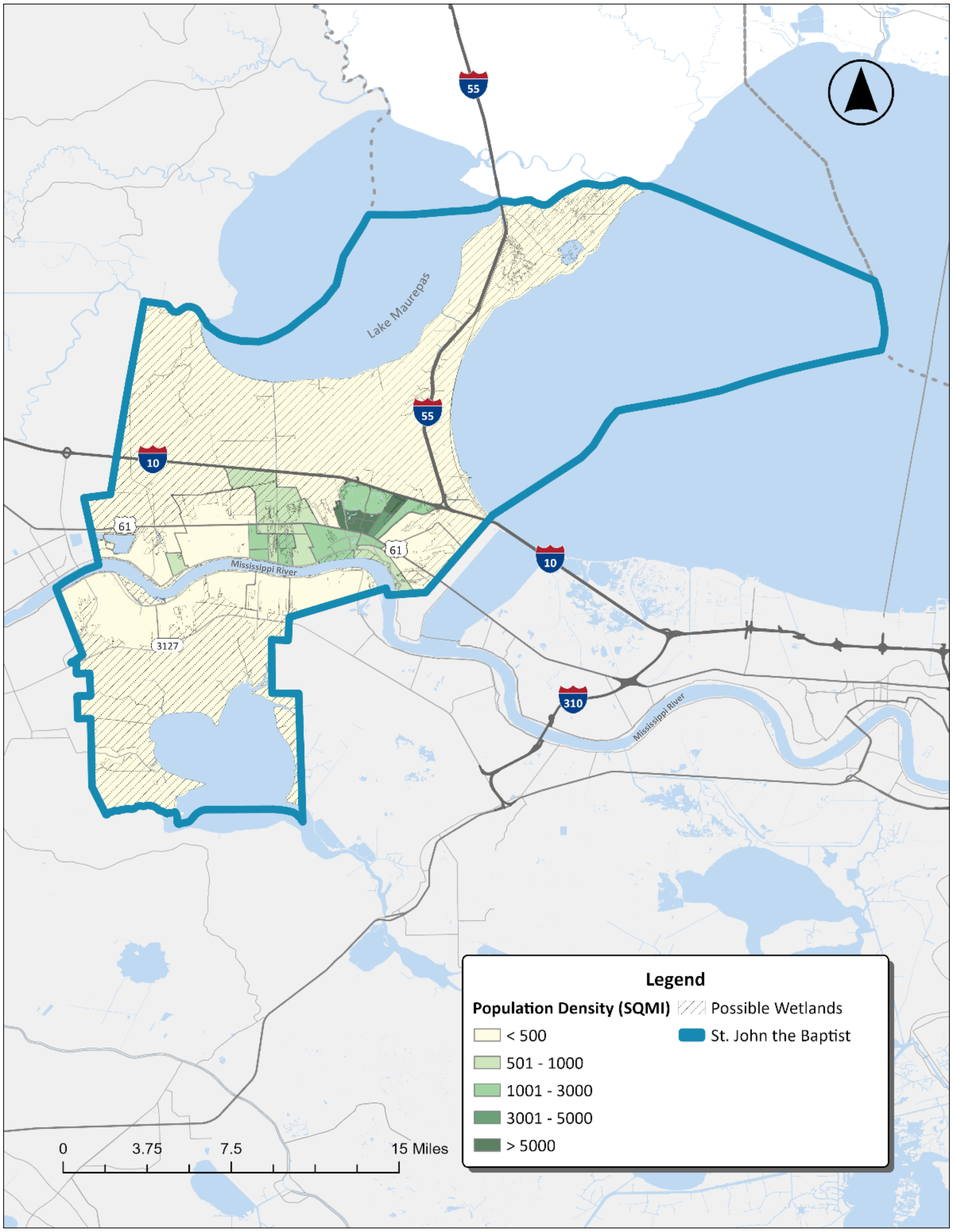
Table 1: Study Area Population and Projection

Parish	2021 Population
St John the Baptist	42,704
St Tammany	262,799
Tangipahoa	132,492
All Parishes	437, 995

Source: American Community Survey (ACS) 2021

The most populous areas in the region are concentrated along interstate routes I-10 and I-12. The most densely populated area in St John the Baptist Parish is the community of LaPlace (Figure 2). St Tammany Parish's population is concentrated in the cities of Covington, Mandeville, and Slidell along I-12 and in area between I-12 and Lake Pontchartrain (Figure 3). The population of Tangipahoa parish is mostly concentrated at the intersection of I-10 and I-55 in the cities of Hammond and Ponchatoula (Figure 4).

Figure 2: St John the Baptist Parish – Population Density

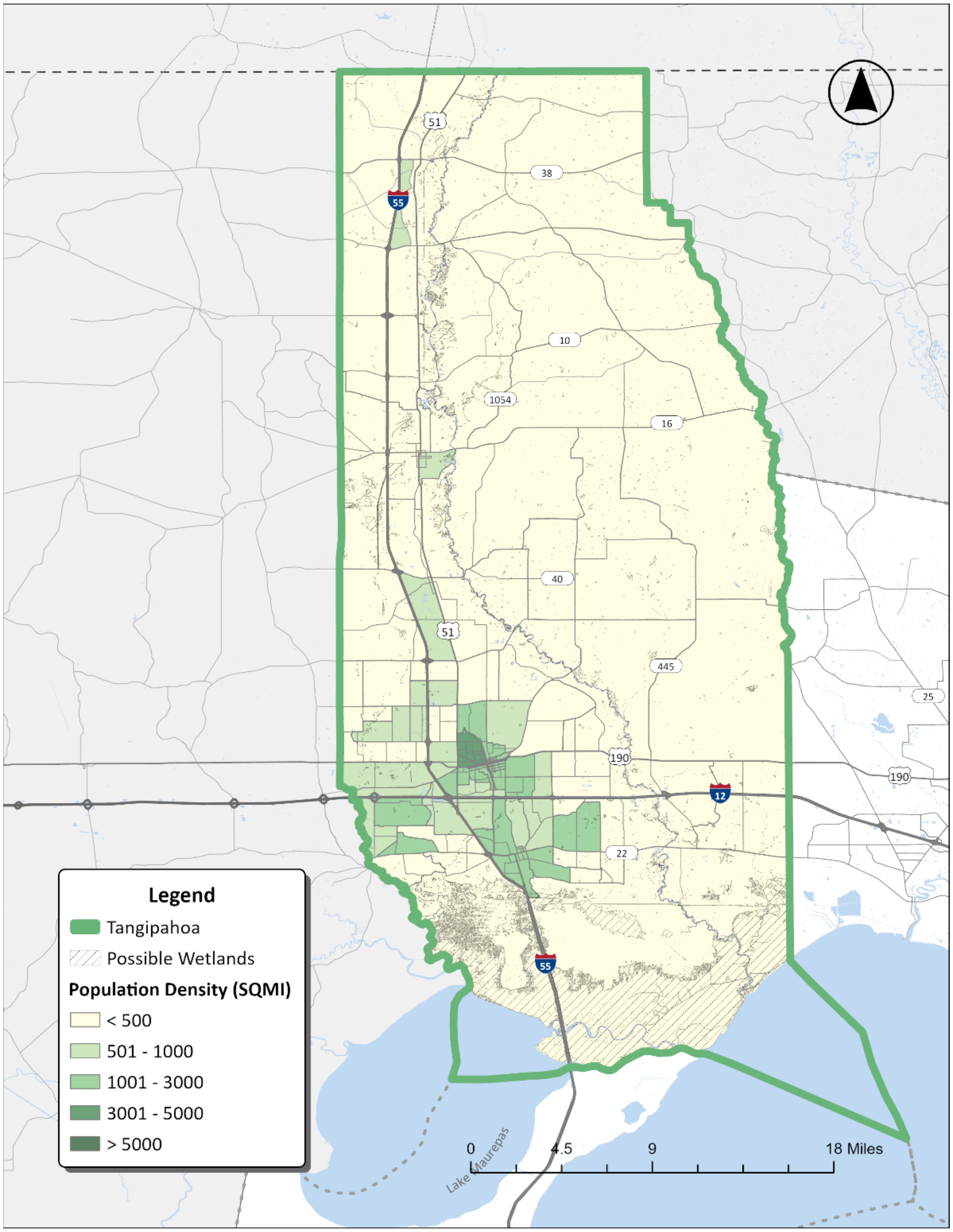


Source: NORPC, SVI (ACS 2021)

Figure 3: St Tammany Parish – Population Density

Source: NORPC, SVI (ACS 2021)

Figure 4: Tangipahoa Parish – Population Density



Source: NORPC, SVI (ACS 2021)

Income and Employment

The median household income for the study area was collected from the NORPC SVI. In 2021, all three parishes included in the study had median household incomes that were above the median household income for the State of Louisiana. With a median household income of $66,582, St Tammany Parish was the highest, followed by, St John the Baptist, then Tangipahoa. (Table 2)

Table 2: Median Household Income

Parish	Median Household Income (2021)	State of Louisiana Median Household Income (2021)
St John the Baptist	$60,743	**$52,087**
St Tammany	$66,582	
Tangipahoa	$52,872	

Source: NORPC SVI, ACS 2021

Data was also reviewed for the largest employers in the region. Table 3 shows the top five employers in each parish. This information helps us better understand the travel demands of the city by looking at where these employers are located compared to where the most populous areas in the parish are.

Table 3: Top Five Employers by Parish[1]

Parish	Employer
St John the Baptist	ADM Growmark
	ArcelorMittal
	Cargill, Inc.
	Diversified Well Logging, Inc.
	Degussa
St Tammany	St Tammany Parish Hospital
	Ochsner Medical Center-Northshore
	Home Health of St Tammany Hospice
	Slidell Memorial Hospital
	Textron Systems Marine & Land Systems
Tangipahoa	Tangipahoa Parish School System
	North Oaks Medical Center
	Southeastern Louisiana University
	Wal-Mart Distribution Center
	Sanderson Farms, Inc.

[1] Sources:
St John the Baptist: https://www.sjbparish.gov/Business/Demographics
Tangipahoa: https://tedf.org/employers
St Tammany: https://sttammanycorp.org/doing-business-here/major-employers-2/

Existing and Future Land-Use

Identifying current and future land-uses in each parish can provide insight into the travel trends in the area. Different land-uses can influence the routes and modes of transportation people take to get to their destination. This section will provide details on the land use and zoning of each parish in the study area. The land use will then be combined with crash data to inform a discussion included in the crash analysis that highlights how land use can impact traffic safety.

St John the Baptist Parish

Land-Use

According to land use data from St John the Baptist Parish, about 45% of the land currently has no human activity because wetlands hinder the ability to develop the land. Of the developable land, residential, industrial, and natural resources are the most common land-uses. Natural resources could include activities related to farming, livestock, grazing, logging, quarrying, mining, or dredging. Land on the south side of the Mississippi River is mainly used for natural resources, while the north side is divided primarily between industrial uses to the west and residential uses to the east. (Figure 5)

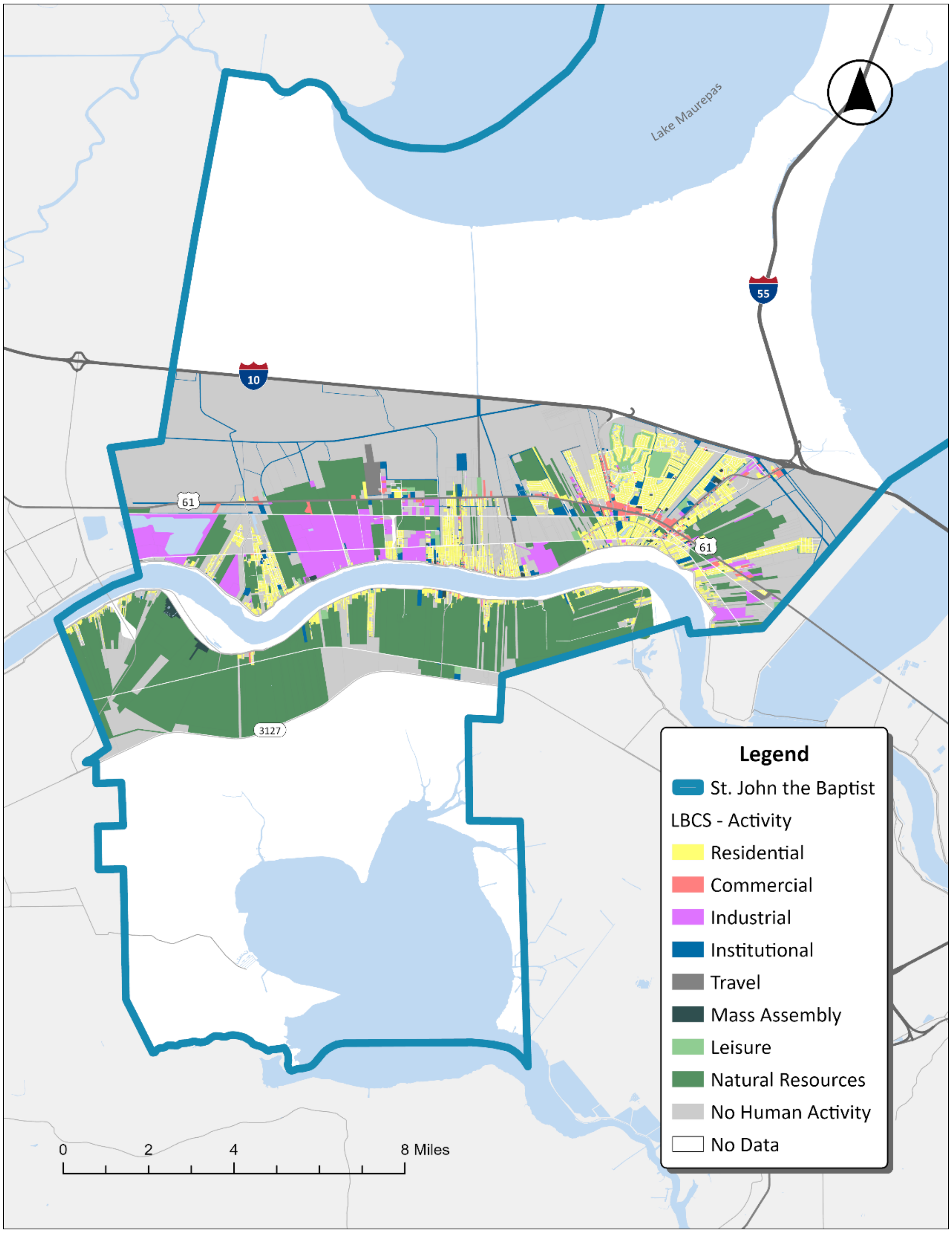
The future land-use in John the Baptist Parish is very similar to the existing. Land used for natural resources is anticipated to increase from 33.6% to 35.1% and every other category is set to decrease by 0.1% - 1%. (Figure 6)

Table 4: St John the Baptist – Land-Use (2011)

LBCS – Activity	Existing Land-Use (Acres)	Percent	Future Land-Use (Acres)	Percent
Residential	3,998.4	8.2%	3,998.37	8.0%
Commercial	472.3	1.0%	472.27	0.9%
Industrial	3,303.1	6.7%	3,303.10	6.6%
Institutional	1,377.3	2.8%	1,377.30	2.7%
Travel	325.4	0.7%	325.37	0.6%
Mass Assembly	174.7	0.4%	174.69	0.3%
Leisure	617.4	1.3%	617.36	1.2%
Natural Resources	16,452.1	33.6%	17,584.94	35.1%
No Human Activity	22,247.6	45.4%	22,247.59	44.4%

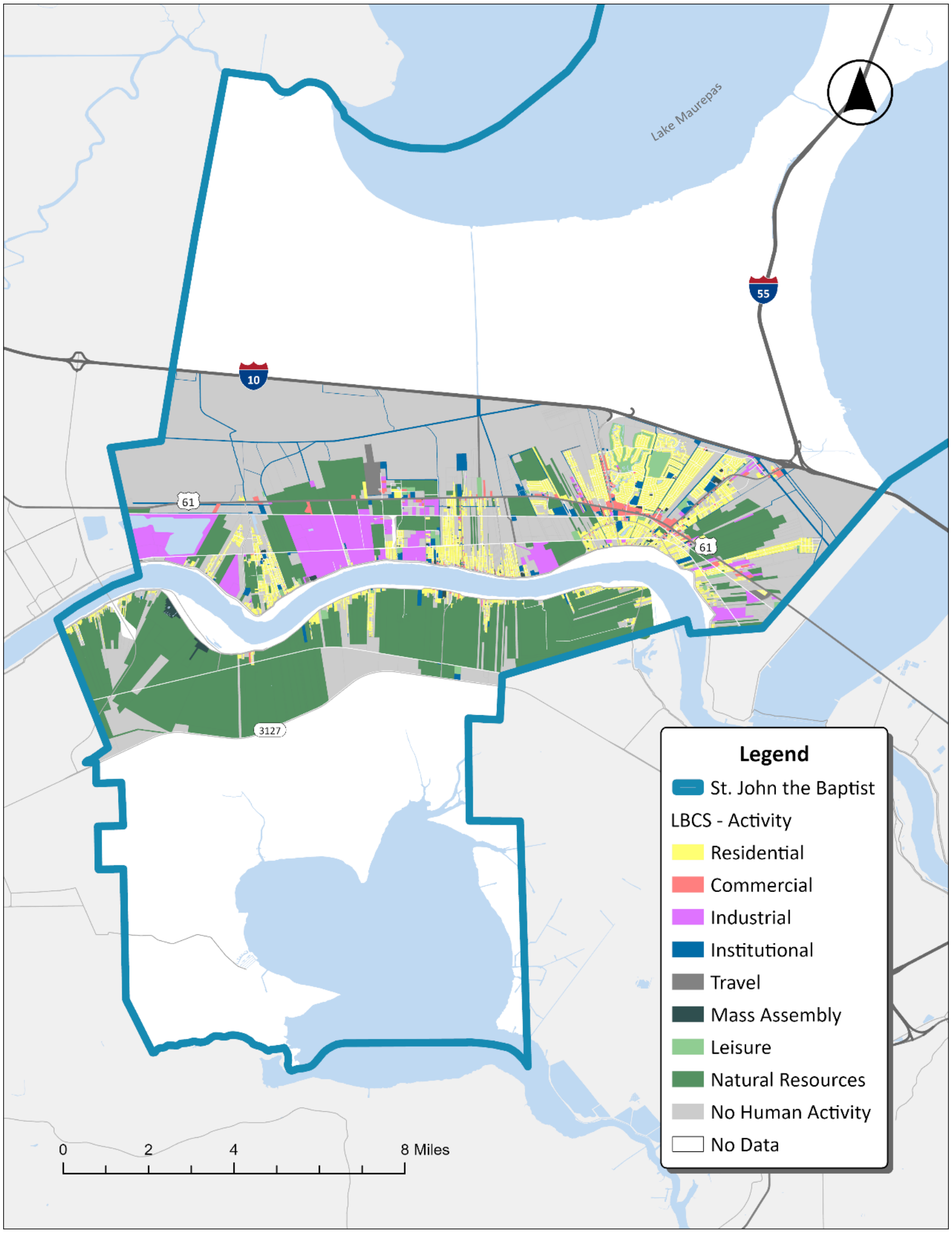
Source: *Existing Land Use Data, St. John the Baptist Parish, 2011*

Figure 5: St John the Baptist - Existing Land-Use



Source: St John the Baptist Parish, Land Use Data (2011)

Figure 6: St John the Baptist - Future Land-Use



Source: St John the Baptist Parish, Land Use Data (2011)

Zoning

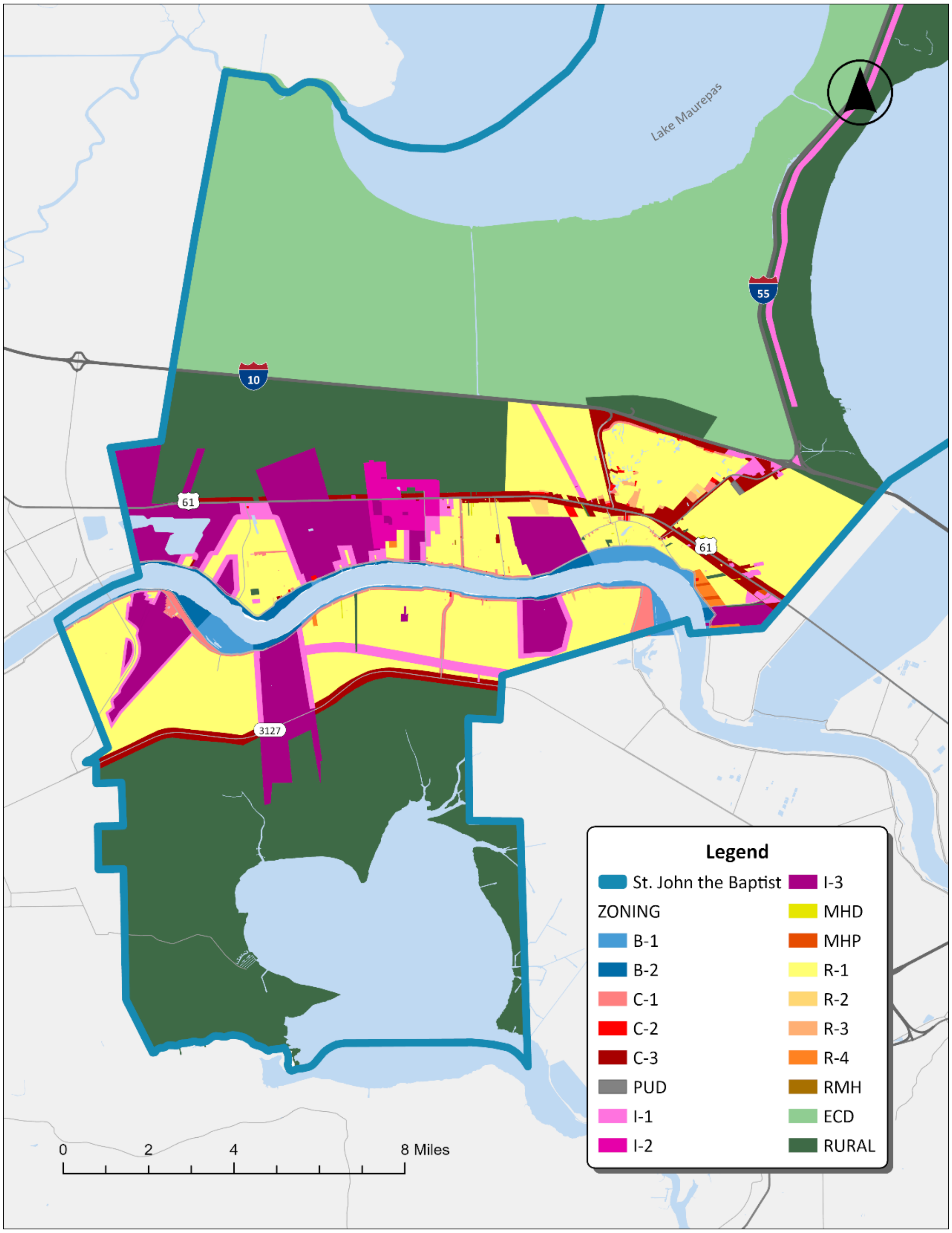
A significant amount of land in the northern most and southernmost portions of St John the Baptist parish are zoned as either rural districts or environmental conservation districts. The remainder of the parish is zoned mostly for residential and industrial uses with commercial zoning along major corridors US-61, US-51, LA-3188, and LA-3127.

Table 5: St John the Baptist Zoning Codes

Code	Categories
B – 1	Nonindustrial Batture District
B – 2	Industrial Batture District
C – 1	Commercial District One
C – 2	Commercial District Two
C – 3	Commercial District Three
PUD	Planned Unit Development District
I – 1	Industrial District One
I – 2	Industrial District Two
I – 3	Industrial District Three
MHD	Micro Housing Development
MHP	Mobile Home Park District
R – 1	Residential District One
R – 2	Residential District Two
R – 3	Residential District Three
R – 4	Residential District Four
RMH	Residential Medium/High Density
ECD	Environmental Conservation District
RURAL	Rural District

Source: Zoning, St. John the Baptist Parish, 2011

Figure 7: St John the Baptist - Zoning Map



Source: St John the Baptist Parish, (2011)

St Tammany Parish

Land Use

According to land use data from St Tammany Parish, about 37.8% of the land is rural or used for agricultural purposes. The second most common land-use is conservation areas (18.1%) followed by low intensity residential (17.8%). (Table 6) Most of the development in the parish lies adjacent to I-12 across the parish with the area north of the Covington used for low-intensity residential. Surrounding the existing municipalities are large areas designated as medium density residential. (Figure 8)

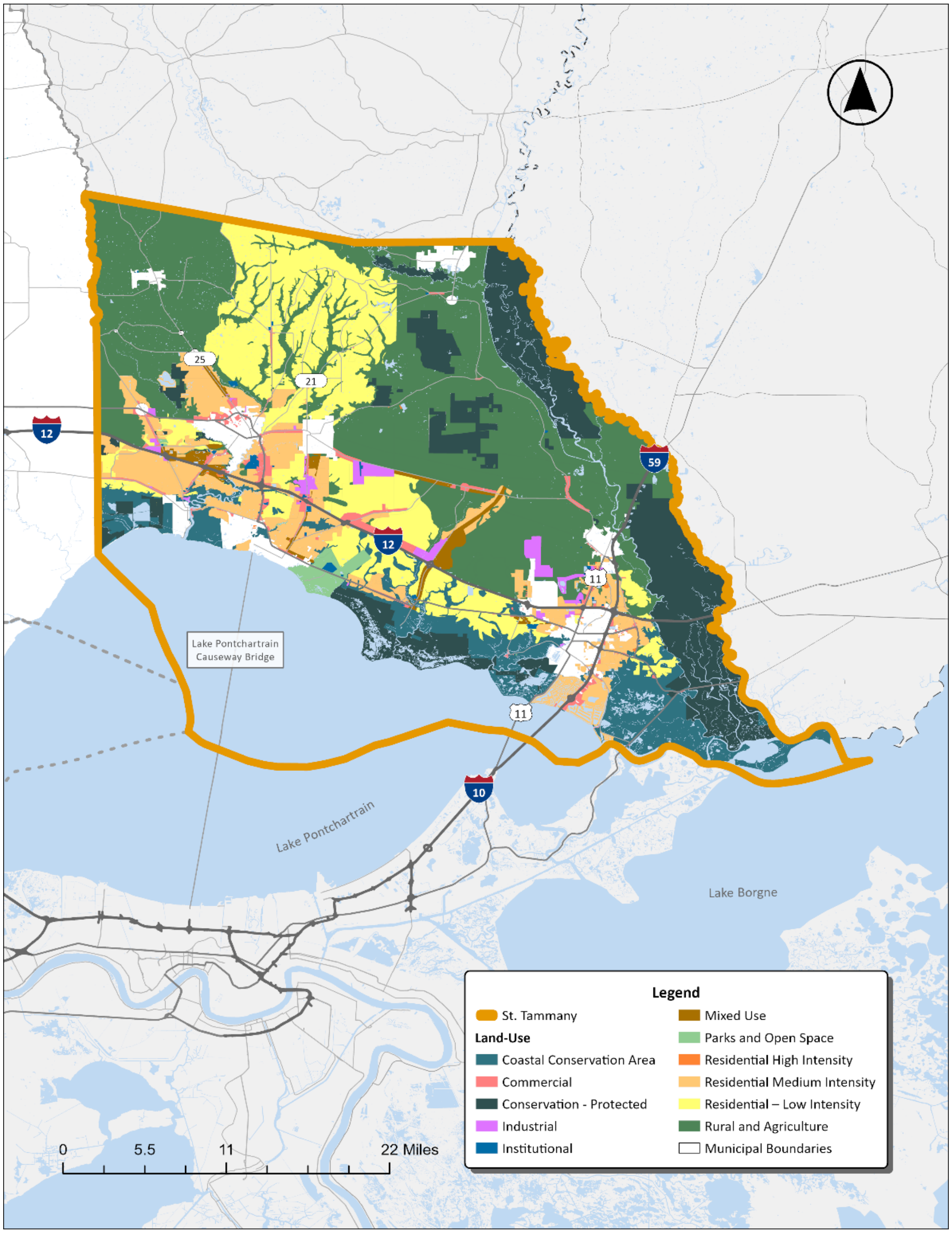
The most significant change from existing to future land-use is the reduction of low-intensity residential and the increase of mixed-use. The future land-use map reduces the amount of low-intensity residential from 17.8% to 11.5% and increases the mixed-use land-use from 1.3% to 7.2%. (Figure 9)

Table 6: St Tammany – Existing and Future Land-Use

Land-Use Category	Existing Land-Use (Acres)	Percent	Future Land-Use (Acres)	Percent
Residential – Low Intensity	94,332.97	17.8%	61,148.12	11.5%
Residential Medium Intensity	52,786.85	9.9%	48,177.04	9.0%
Residential High Intensity	285.30	0.1%	285.30	0.1%
Mixed Use	7,091.22	1.3%	38,118.48	7.2%
Commercial	11,028.72	2.1%	6,684.17	1.3%
Manufacturing and Logistics	-	-	17,025.63	3.2%
Industrial	6,419.93	1.2%	-	-
Institutional	1,667.62	0.3%	1,526.43	0.3%
Parks and Open Space	4,596.71	0.9%	3,615.28	0.7%
Rural and Agriculture	200,722.23	37.8%	201,934.94	37.9%
Coastal Conservation Area	56,124.41	10.6%	55,789.81	10.5%
Conservation – Protected	96,080.77	18.1%	98,627.88	18.5%

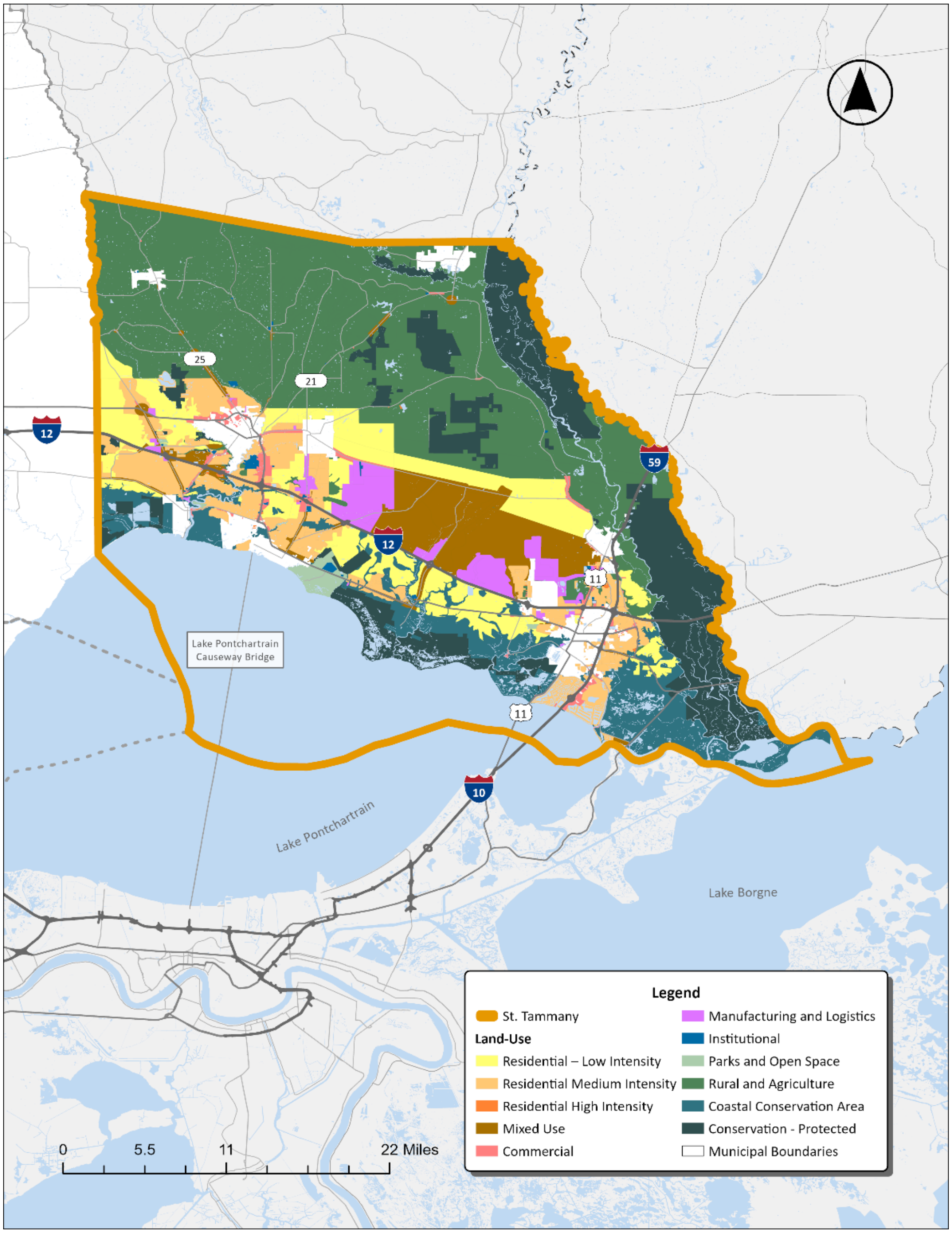
Source: St. Tammany Parish, 2022

Figure 8: St Tammany - Existing Land-Use



Source: St Tammany Parish, Land Use Data (2022)

Figure 9: St Tammany - Future Land-Use



Source: St Tammany Parish, Land Use Data (2022)

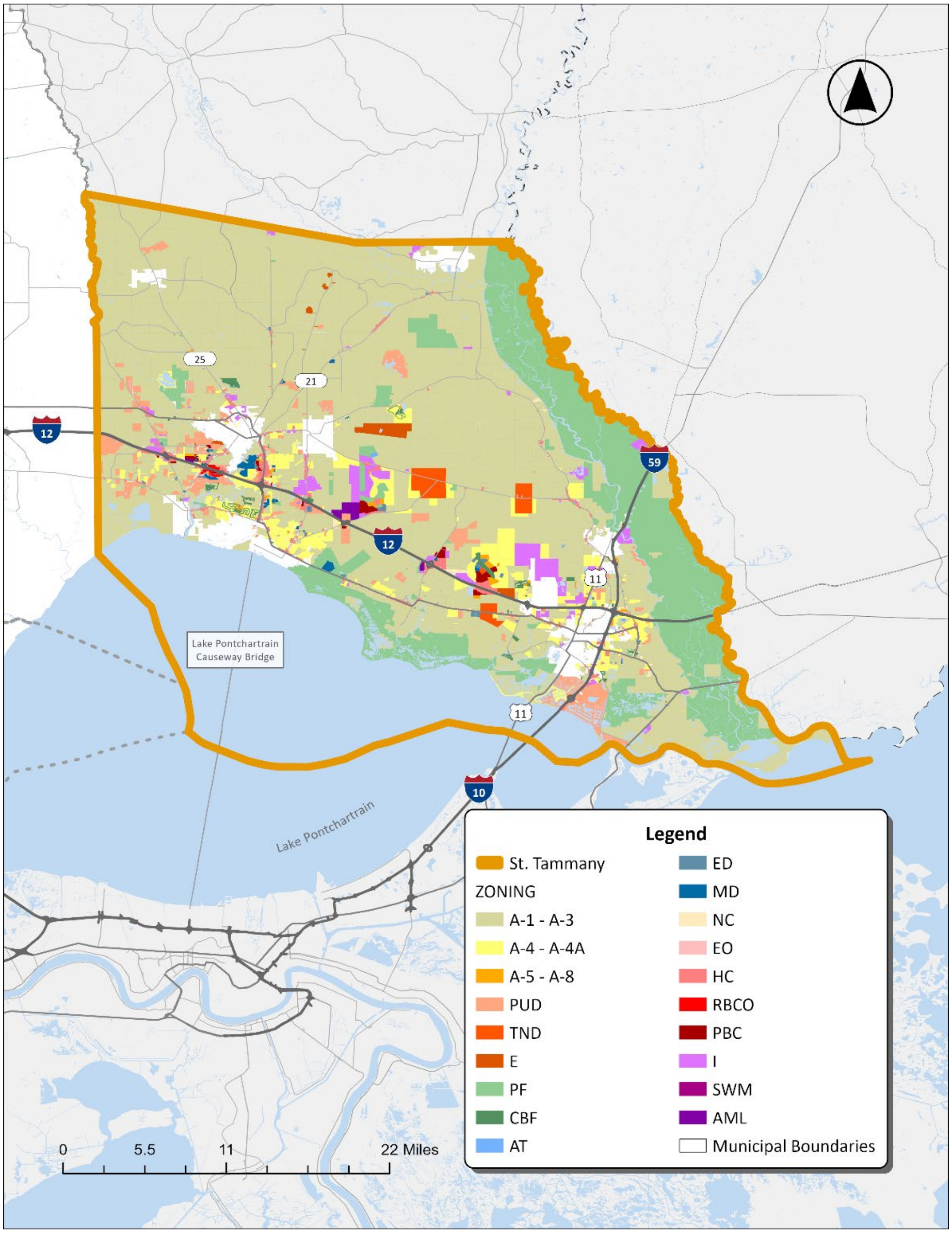
Zoning

Most of St Tammany Parish is zoned for suburban development with a large natural conservation area on the eastern edge of the parish that is zoned as public facilities. Most of the other zoning codes are focused along I-12. (Figure 10)

Table 7: St Tammany Zoning Codes

Code	Categories
A-1 – A-3	Suburban
A-4 – A-4A	Single Family Residential
A-5 – A-8	Multiple Family Residential
PUD	Planned Unit Development
TND	Traditional Neighborhood Development
E	Estate
PF	Public Facilities
CBF	Community Based Facilities
AT	Animal Training/Housing
ED	Education
MD	Medical
NC	Miscellaneous District (Professional Office, Indoor Retail and Service, Lodging, Neighborhood Institutional, Retail and Service, and Public, Cultural, recreational)
EO	Entertainment Overlay
HC	Highway Commercial
RBCO	Regional Business Center Overlay
PBC	Planned Business Campus
I	Industrial
SWM	Rural District
AML	Advanced Manufacturing and Logistics

Figure 10: St Tammany - Zoning Map



Source: St Tammany Parish, (2022)

Tangipahoa Parish

This section will provide maps for the current and future land use of Tangipahoa Parish. However, a zoning map will not be included as Tangipahoa Parish does not currently have zoning regulations.

Land Use

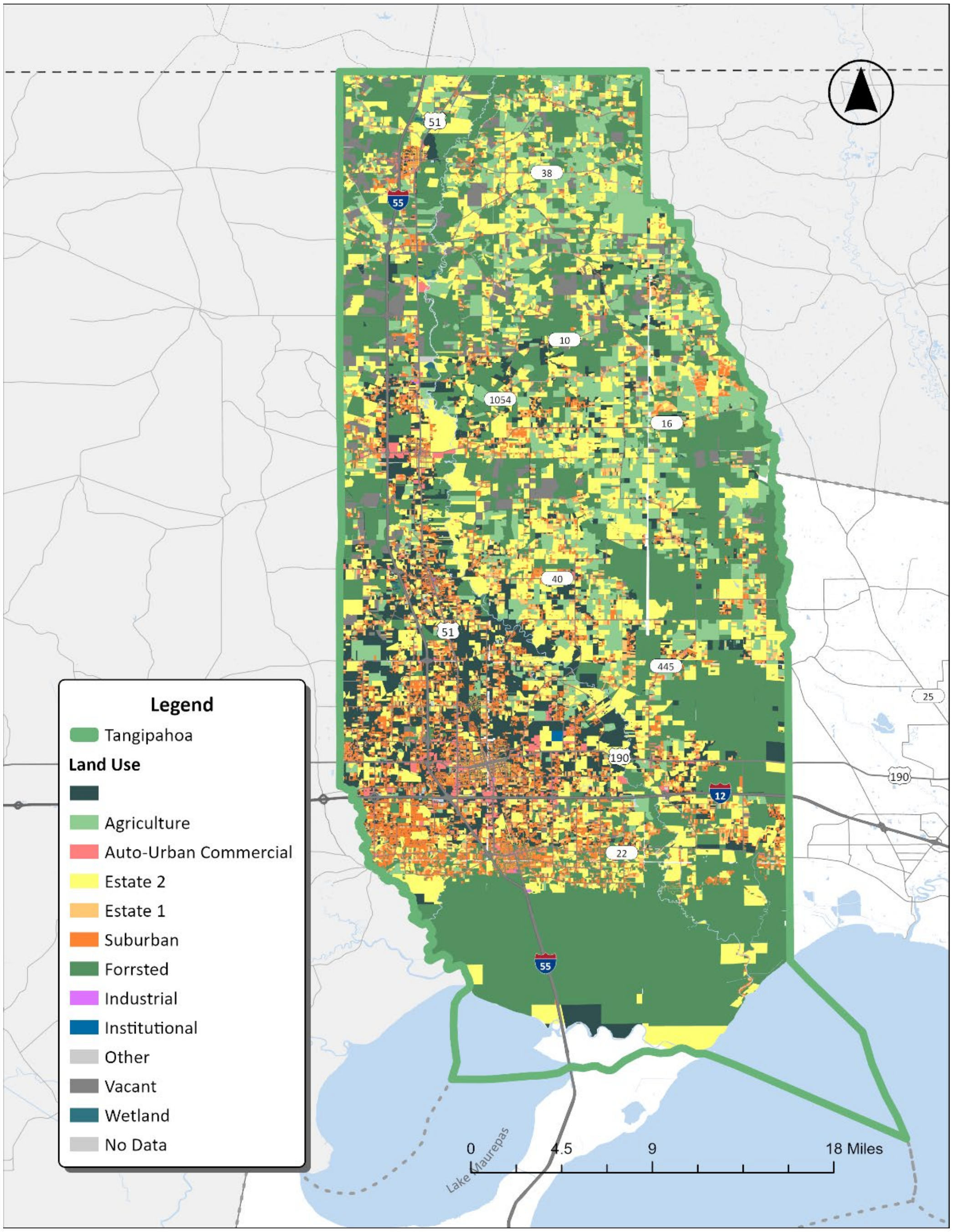
Based on the 2045 Tangipahoa Comprehensive Plan, "Rural" will be the most prominent land-use in the parish (65.9%), followed by "Low Density Residential" (17.3%), then "Commercial" (8.2%). The least prominent uses will be "Estate 2", "Suburban", and "Industrial". These uses combined will make up less than 9% of the total land use in the parish.

Table 8: Tangipahoa – Future Land Use

Land Use	Future Land Use (Acres)	Percent
Rural	312,869.3	65.9%
Estate 1 (Low density residential)	82,345.7	17.3%
Commercial	38,911.1	8.2%
Suburban (Medium to High density residential)	17,212.9	3.6%
Estate 2 (large estate with agricultural and residential uses)	12,577.0	2.6%
Industrial	10,716.7	2.3%

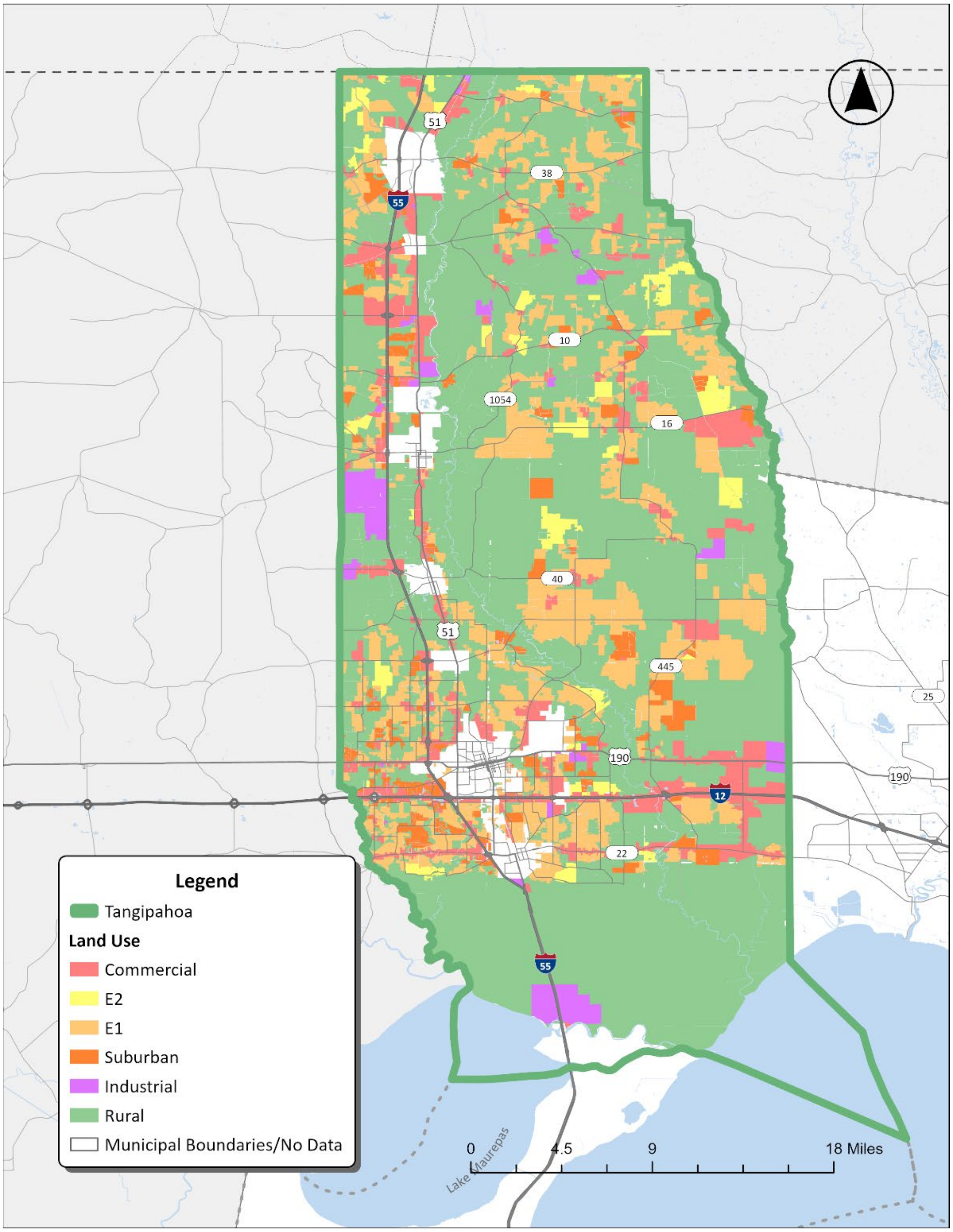
Note: Due to significant errors, missing data, and anomalies in the existing land use data, a table of acres by land use category was omitted for this parish

Figure 11: Tangipahoa – Existing Land Use



Source: Tangipahoa Parish, Land Use Data (2023)

Figure 12: Tangipahoa – Future Land Use



Source: Tangipahoa Parish, Land Use Data (2023)

Transportation System Overview

Functional Classification

The functional classification system is used to establish a hierarchy in the transportation system. The highest level in the hierarchy are Interstates and other freeways which are high-capacity, high speed roads with limited access. Next is arterial roads which are also designed for high-capacity and high speeds, but these roads will have controlled intersections and can directly serve abutting land-uses. After arterials are collector roads which serve to provide a connection between local roads and arterials. The last classification is local roads which are low-volume, low-speed roads meant to provide access to adjacent land uses.

Mapping out the functional classification of the roadway network can help identify major roadways in the region and better plan for the efficiency and safety of the roadway network. (Table 9)

Functional Classifications

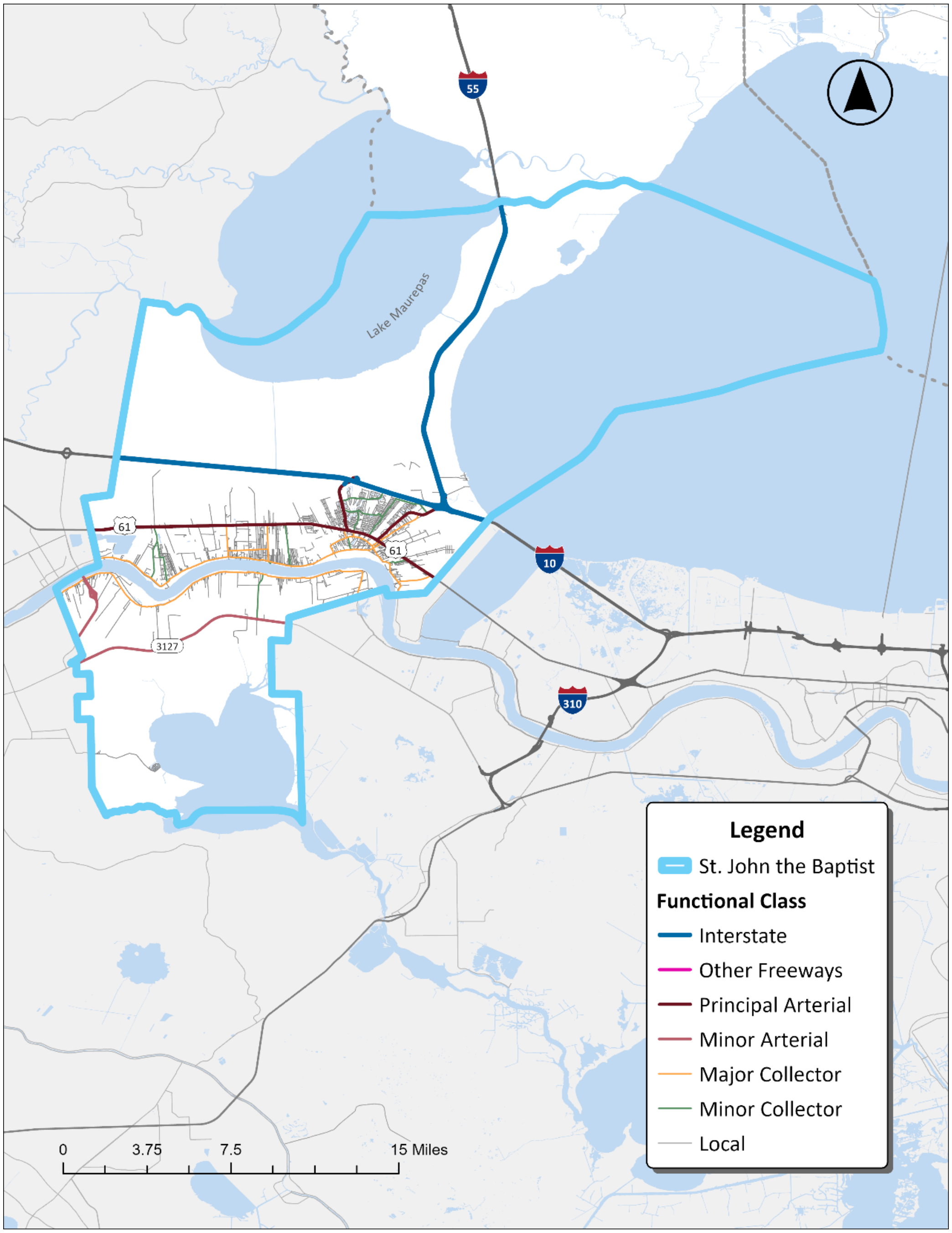
- Interstate
- Other Freeway or Expressway
- Principal Arterial
- Minor Arterial
- Major Collector
- Minor Collector
- Local

Table 9: Miles of Each Roadway Functional Classification

Parish	Interstate	Other Freeways	Principal Arterials	Minor Arterial	Major Collector	Minor Collector	Local
St John the Baptist	63.7	0.0	32.4	18.2	55.0	21.7	324.6
St Tammany	158.0	42.9	88.9	164.9	259.0	131.4	3,168.2
Tangipahoa	167.5	0.0	28.1	98.3	237.9	144.3	1,658.7
All Parishes	389.2	42.9	149.4	281.4	551.9	297.3	5,151.4

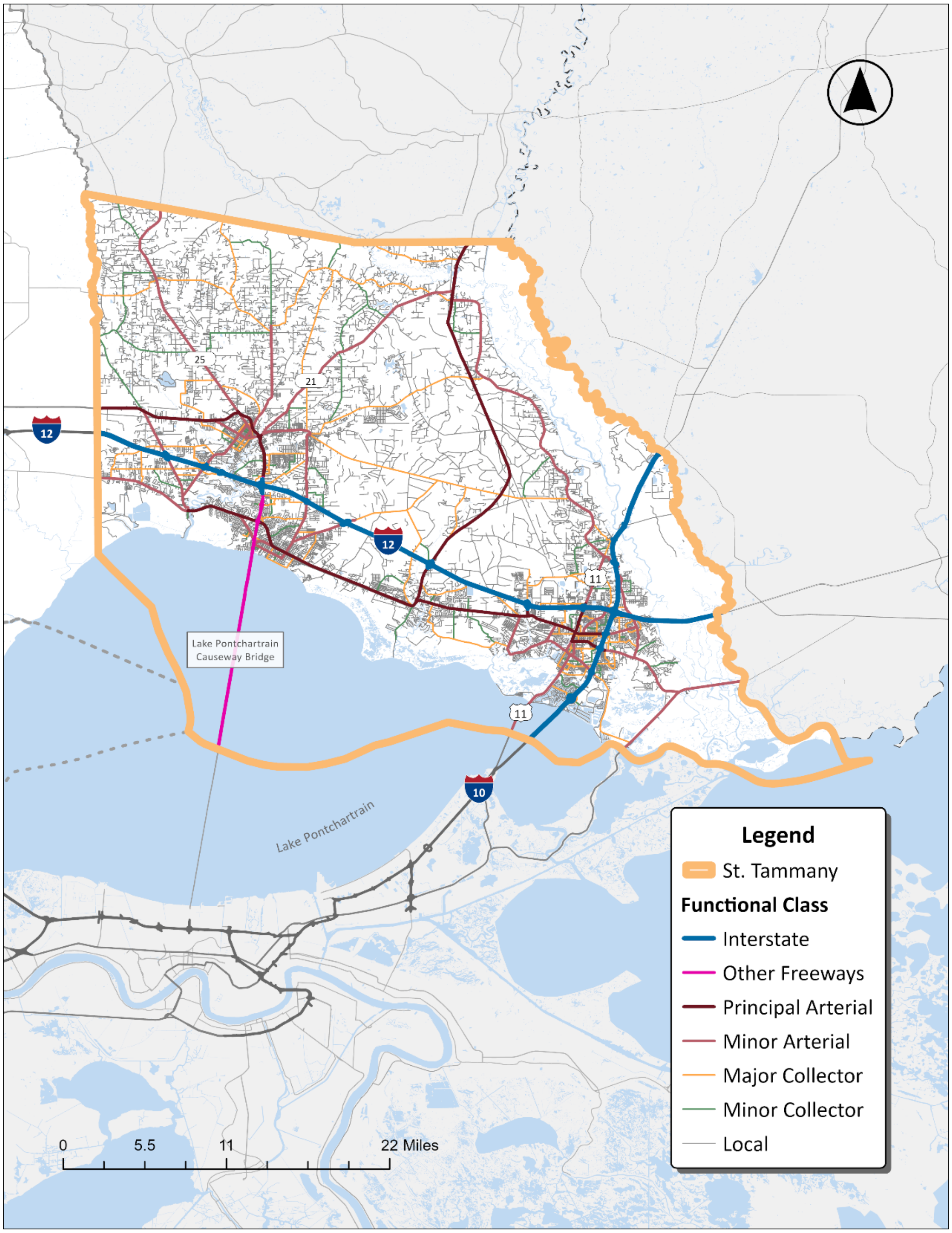
Source: LA DOTD (2023)

Figure 13: St John the Baptist Parish - Functional Class



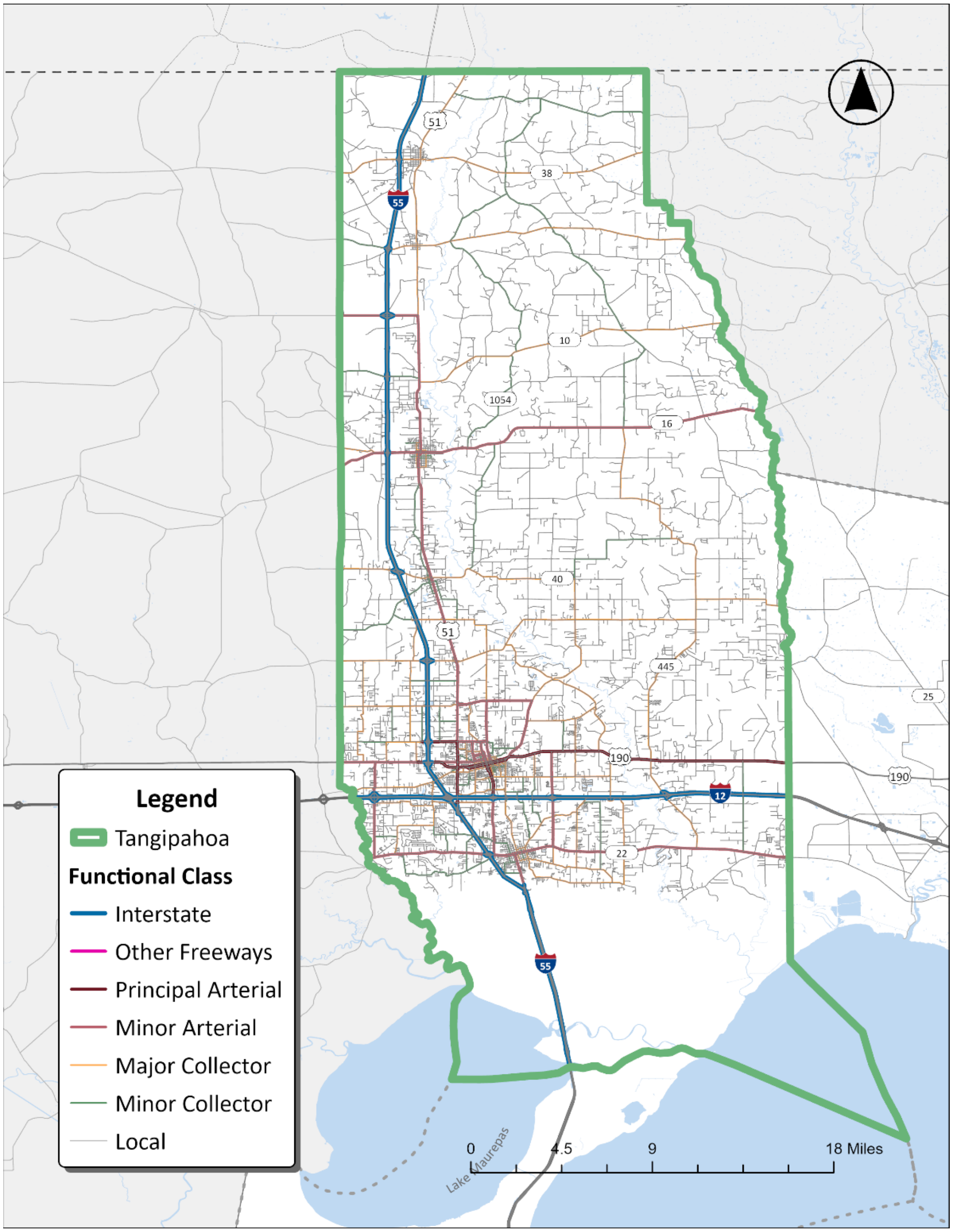
Source: LADOTD (2023)

Figure 14: St Tammany Parish - Functional Class



Source: LADOTD (2023)

Figure 15: St Tangipahoa Parish - Functional Class



Source: LADOTD (2023)

Bicycle Infrastructure

There are both on-street and off-street bicycle paths located throughout all three parishes included in the study area. Several bike paths are present within the existing municipalities and a couple serve to connect the municipalities to each other. The miles of existing and planned bike paths for each parish are listed below. (Table 10)

Table 10: Miles of Bike and Pedestrian Paths

Parish	Existing On-Street Bike Paths (MI)	Planned On-Street Bike Paths (MI)	Existing Off-Street Bike Paths (MI)	Planned Off-Street Bike Paths (MI)
St John	18.22	4.48	17.05	3.53
Tangipahoa	9.68	7.64	5.16	0.00
St Tammany	7.93	6.45	46.59	1.62
All Parishes	35.83	18.57	68.81	5.15

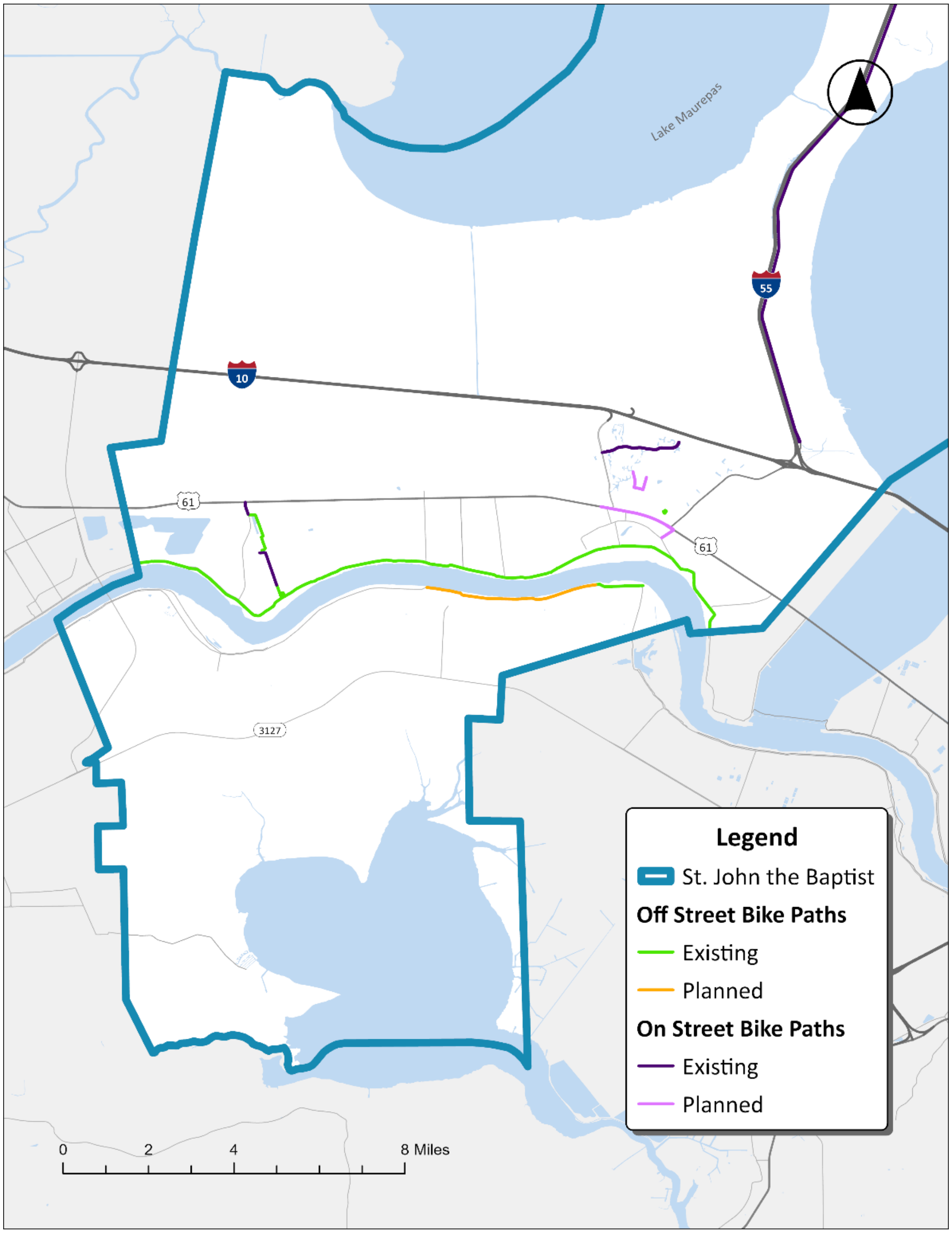
Source: NORPC (2023)

In St John the Baptist Parish there is one existing on-street bike path and three planned in LaPlace. In addition to these bike paths there is the Mississippi River Trail (MRT) that provides an off-street path along the river, as well as a partially off-street path that runs through Garyville to connect the Mississippi River Trail to U.S. 61. (Figure 16)

In St Tammany Parish planned and existing on-street bike paths are located in Slidell, Mandeville, and near Covington. All three cities are also connected by the Tammany Trace Trail, an off-street Shared Use Path which starts in Covington and ends in Slidell. (Figure 17)

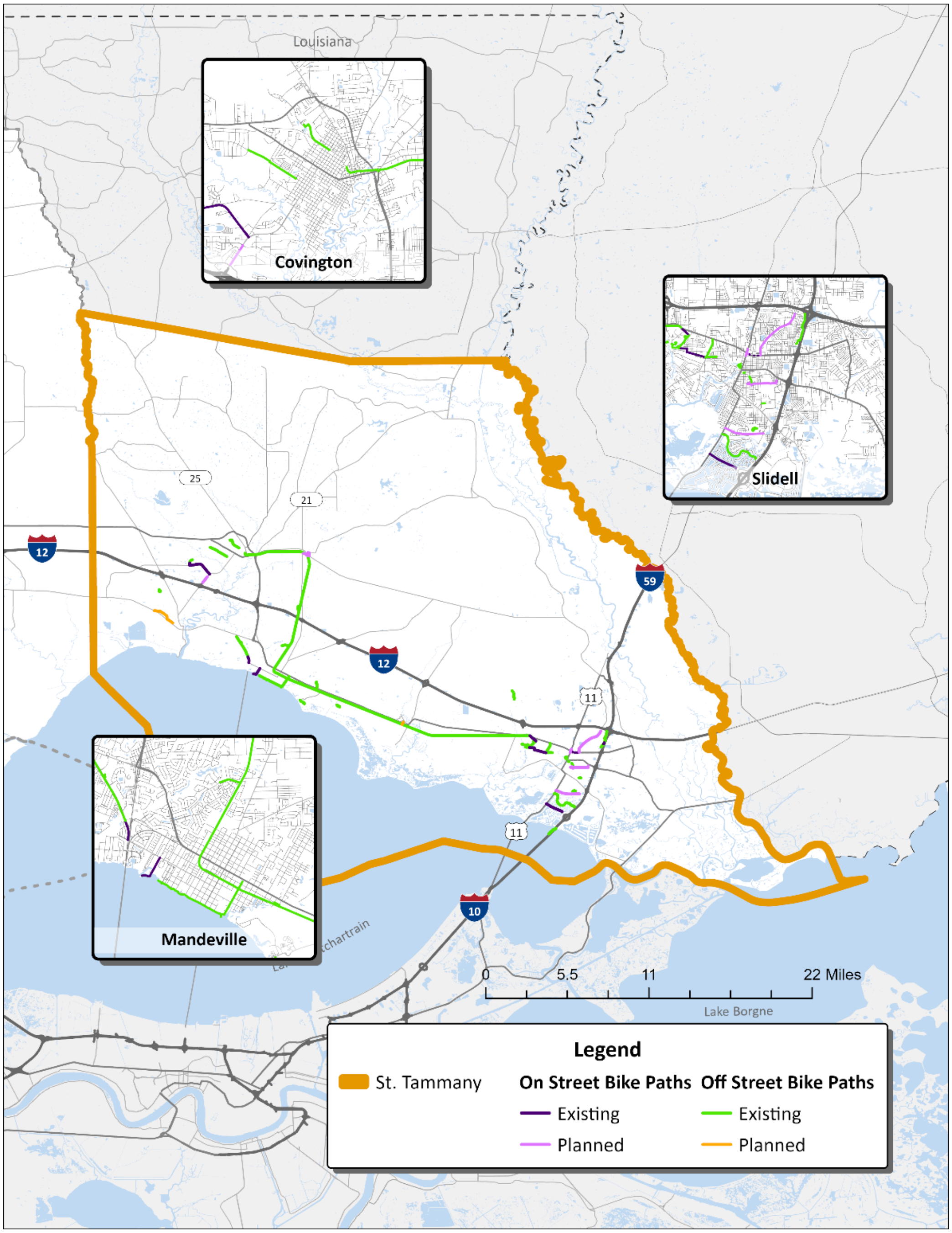
In Tangipahoa Parish there are planned on-street paths in Hammond, Ponchatoula, Independence, and Amite City. Ponchatoula is the only municipality that has existing on-street bike paths. There are multiple off-street paths that serve different parks in Hammond. The Chappapeela Sports Park, Zemurray Park, Cate Square Park, and North Oak Park all have bicycle paths within them. (Figure 18)

Figure 16: St John the Baptist - Bicycle Paths



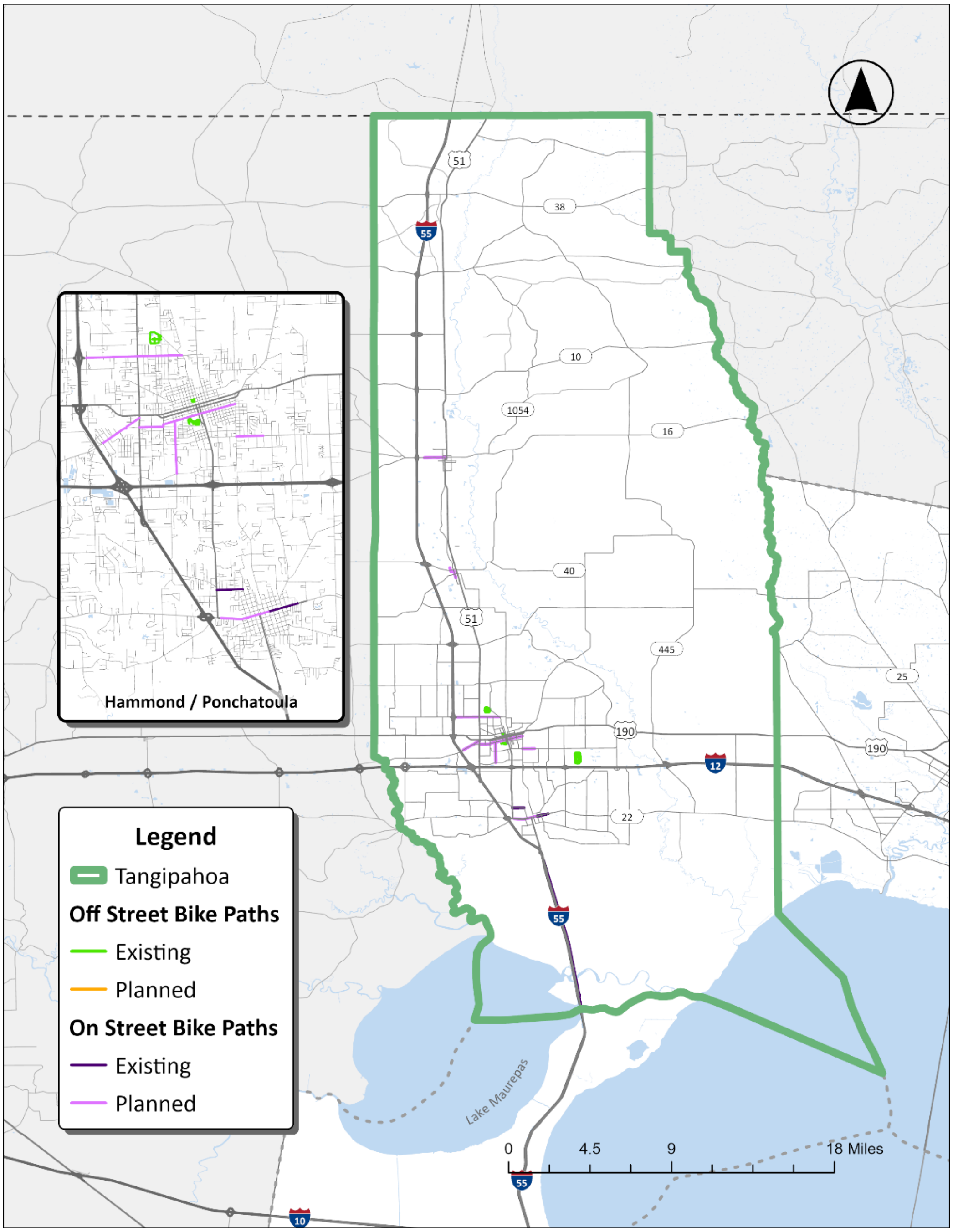
Source: NORPC (2023)

Figure 17: St Tammany - Bicycle Paths



Source: NORPC (2023)

Figure 18: Tangipahoa - Bicycle Paths



Source: NORPC (2023)

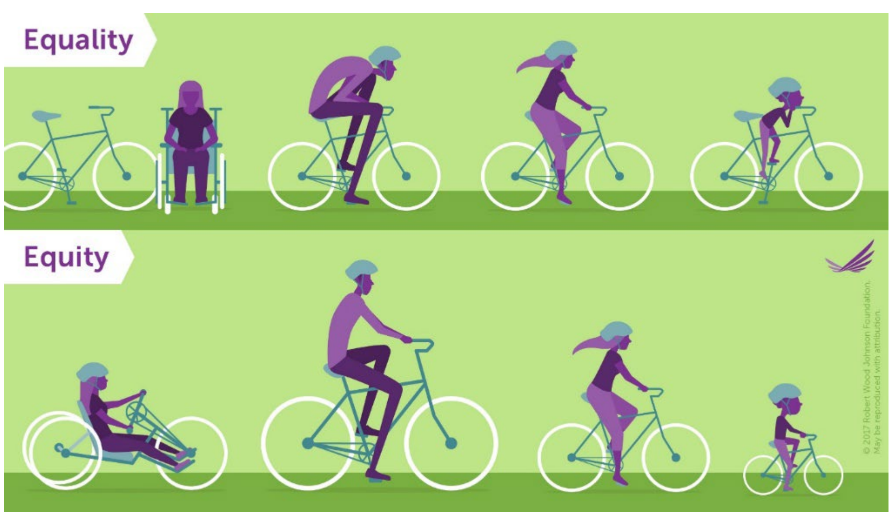
Equity Analysis

Equity is a basic human right that recognizes that people do not have fair access to resources and opportunities. In the context of transportation planning, transportation burdens, benefits, and opportunities should be fairly distributed among different groups of people so there are equal outcomes for everyone, regardless of their socio-economic status, race, gender, age, or other characteristics. Incorporating equity into the planning process should translate to public involvement strategies that result in collecting input about a plan or project from historically disadvantaged communities and people. At least 40 percent of transportation investments from a plan or project should benefit historically disadvantaged communities under the Justice40 Initiative (Justice40). A historically disadvantaged community, which is defined in detail under the Equity Analysis section, is a community that has been marginalized and burdened by pollution, or any Federally Recognized Tribe or Tribal entity.

Equity versus Equality

While equity and equality are important basic human rights, they do not mean the same thing. As visualized in **Figure 19** equity is the ***fair distributio***n of resources and opportunities, while equality is the ***equal distribution*** of resources and opportunities. Equity assumes that everyone should have an equal opportunity to be successful, so resources are distributed in a way that provides extra help to people who need it. Equity recognizes that barriers have prevented access to resources such as affordable housing, grocery stores, jobs, health care, education, and other essential services. Equality assumes that everyone benefits equally from being treated the same, such as equal pay for doing the same job regardless of gender, race, and age.

Figure 19: Equality versus Equity



Source: Robert Wood Johnson Foundation

Environmental Justice

Environmental justice protects the basic human rights of equity and equality. Environmental justice is a social movement and belief that addresses the need to give everyone equal protection under the law to live, work, and play in safe and healthy communities. The movement has removed barriers for people and protects the basic human right of equity and advocated for everyone to be treated equally under the law. The Environmental Justice Movement was sparked in 1982 when residents of Warren County, N.C., protested a plan to dump contaminated soil in a landfill located in a predominantly African American neighborhood. Warren County was not an isolated event. A 1987 study by the United Church of Christ Commission on Racial Justice found that toxic waste sites were likely to be in poor minority communities across the United States because city planners had typically used zoning designations that allowed it. While the Environmental Justice Movement gained momentum during the 1980s, federal legislation starting during the Civil Rights Movement of the 1960s and a series of Executive Orders have empowered people like the residents of Warren County to speak up about their human rights.

Federal Legislation

A series of federal legislation dating back to the Civil Rights Movement has provided legal support to the Environmental Justice Movement. The legislation is summarized by the following:

- **Civil Rights Act of 1964**: Signed by President Lyndon B. Johnson on July 2, 1964 (**Figure 20**), the Civil Rights Act is a comprehensive bill that banned discrimination in public accommodations and federal programs. Public accommodations can include private businesses, such as a restaurant and hotel. Title VI of the Civil Rights Act specifically banned discrimination by programs receiving federal support based on race, color, sex, religion, or national origin.
- **Age Discrimination in Employment Act of 1967**: Signed by President Johnson on December 15, 1967, the law prevents discrimination based on age and provides special protection for employees who are 40 years and older.
- **National Environmental Policy Act (NEPA) of 1969**: Signed into law by President Richard Nixon on January 1, 1970, NEPA was the first major piece of federal environmental legislation. It created the Council on Environmental Quality (CEQ) within the Executive Office to oversee the NEPA process for federally funded projects. (CEQ is responsible for developing the Climate and Economic Justice Screening Tool discussed under Executive Order 14008 and in the Equity Analysis section.) As part of the NEPA process, government agencies of all sizes are required to review environmental and health impacts to a community and consider alternatives before the project is built. Government agencies must also inform the public about the project and provide the public with an opportunity to comment on the project.

- **Title IX of the Education Amendments of 1972 (Title IX)**: Signed into law by President Nixon on June 23, 1972, Title IX protects students and others from discrimination based on sex in education programs and activities that receive federal funding.
- **Americans with Disabilities Act of 1990**: Signed into law by President George H. W. Bush on July 26, 1990, it protects people with disabilities from discrimination in areas of work, transportation, and public accommodations.
- **Bipartisan Infrastructure Law of 2021:** Signed into law by President Joe Biden signed on November 15, 2021, the Bipartisan Infrastructure Law defined Areas of Persistent Poverty and directed federal investments to those communities. For example, the Areas of Persistent Poverty Program (AoPP) awards grant funding for transit, bicycle, and pedestrian projects for communities that are considered an area of persistent poverty or historically disadvantaged communities.

Figure 20: President Lyndon B. Johnson Signing the Civil Rights Act of 1964

Source: Cecil Stoughton, White House Press Office

Presidential Executive Orders

Four Executive Orders issued from 1994 to 2023 have provided additional support to equity and environmental justice. The Executive Orders are summarized by the following:

- **Executive Order 12898:** Issued on February 11, 1994, by President Bill Clinton, the Executive Order required all federal agencies to comply with NEPA by mitigating disproportionately high and adverse health and environmental impacts on minority and poor communities. It also created a working group to provide guidance for collecting data used to identify environmental justice areas and develop strategies addressing environmental justice.
- **Executive Order 13166:** Issued on August 11, 2000, by President Clinton, the Executive Order expanded the definition of environmental justice to include people with limited English proficiency (LEP).
- **Executive Order 14008:** Issued on January 20, 2021, by President Biden, the Executive Order created the Justice40 Initiative (Justice40). Justice40 set a goal that 40 percent of the benefits from investments such as grants, programs, and initiatives benefit historically disadvantaged, underserved, and marginalized communities. As directed by the Executive Order, the CEQ developed the Climate and Economic Justice Screening (CEJS) Tool to identify historically disadvantaged communities using data on climate change, energy, health, housing, legacy pollution, transportation, water and wastewater, workforce development, and federally regulated tribes.
- **Executive Order 14096:** Issued on April 21, 2023, by President Biden, the Executive Order expanded the scope of environmental justice to include climate change, affordable housing, indigenous people, and people with disabilities. It also requires federal agencies to enforce environmental and civil rights laws as an integral part of environmental justice.

Why Does an Equity Analysis Matter?

Environmental justice regulation and policy support equitable communities, in part by addressing injustices from the past caused by discriminatory planning practices. A transportation project that receives federal funding is required to comply with Title VI, NEPA, and presidential Executive Orders. Justice40 set a measurable goal that 40 percent of transportation investments benefit historically disadvantaged, marginalized, and underserved communities. An equity analysis identifies those communities where public involvement plans need to be adapted to be inclusive, and where transportation investments need to be directed to offset unfair transportation burdens.

Equity Analysis

The Consultant Team conducted an equity analysis for St. John the Baptist Parish, St. Tammany Parish, and Tangipahoa Parish by identifying data for the following Census tracts and block groups.

- **Historically Disadvantaged Communities by Census Tracts:** This dataset was collected from the Climate and Economic Justice Screening (CEJS) Tool v1.0 that was developed by the CEQ under Executive Order 14008. A Census tract is considered a historically disadvantaged community if it meets a minimum threshold for at least one category of burden. Socioeconomic data is from the U.S. Census Bureau's American Community Survey (ACS) 2015-2019 5-Year Estimates (ACS 2019).
- **Areas of Persistent Poverty by Census Tracts:** This dataset was collected from the United States Department of Transportation (DOT) DataHub. A Census tract is considered an area of persistent poverty if it has a poverty rate of 20 percent or higher based on data from the ACS 2014-2018 5-Year Estimates.
- **Percentile of People of Color and Minority Persons by Block Group:** This dataset was collected from the Environmental Protection Agency's (EPA's Environmental Justice Screening and Mapping Tool (EJScreen) Version 2.2. The EJScreen's demographic data is from the ACS 2017-2021 5-Year Estimates (ACS 2021). People of color "list their racial status as a race other than white alone and/or list their ethnicity as Hispanic or Latino." People of Color and minority persons refers to everyone who is non-Hispanic white.
- **Percentile of Limited English Proficient (LEP) Households by Block Group:** This dataset was collected from the EJScreen 2.2 and CDC/ATSDR Social Vulnerability Index (SVI). The EJScreen's demographic data is from the ACS 2021. The SVI's demographic data is from the U.S. Census Bureau's American Community Survey (ACS) 2016-2020 5-Year Estimates (ACS 2020). A household is LEP if all members 14-years-old and older do not speak and read English well.
- **Percentile of Zero-Vehicle Households by Block Group:** This dataset was collected from the CDC/ATSDR Social Vulnerability Index (SVI). The SVI's demographic data is from the ACS 2020.
- **Percentile of Civilians with Disabilities by Block Group:** This dataset was collected from the SVI. The SVI's demographic data is from the ACS 2020. A person who has a disability is defined by the American with Disabilities Act (ADA) as someone who has a physical or mental impairment that substantially limits at least one major life activity, someone who has a history of the impairment, or someone who is perceived by others as having the impairment.

Tools for Assessing Environmental Justice

The following tools were used to conduct the equity analysis:

- CDC/ATSDR Social Vulnerability Index

- Climate and Economic Justice Screening (CEJS) Tool
- Environmental Justice and Mapping Screening (EJScreen) Tool 2.2
- The United States Department of Transportation (USDOT) DataHub
- USDOT Equitable Transportation Community (ETC) Explorer

Each tool is explained in the following sections.

CDC/ATSDR Social Vulnerability Index

The CDC/ATSDR Social Vulnerability Index (SVI) was created by the Centers for Disease Control and Prevention and Agency for Toxic Substances and Disease Registry. The SVI is a place-based index, database, and mapping tool. It measures the vulnerability of every Census tract in the United States based on 16 social factors based on data collected from the U.S. Census Bureau's American Community Survey (ACS). The SVI is updated every two years based on the Census Bureau's data releases.

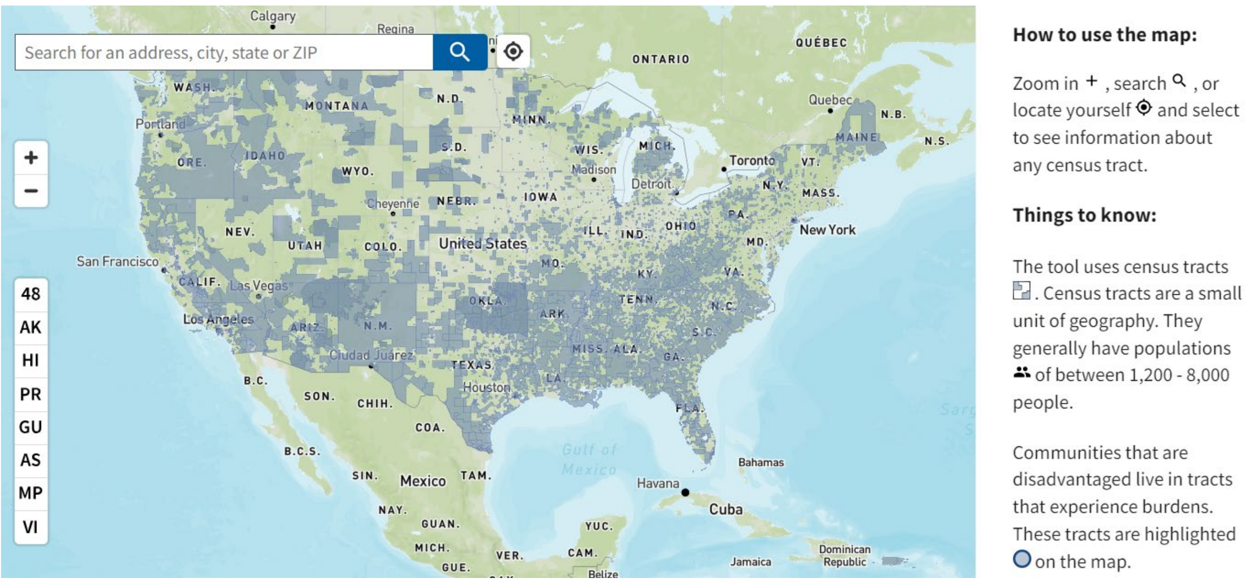
Table 11 lists the vulnerability measures and the respective social factors.

Table 11: Vulnerability Measures

Measure	Social Factors
Socioeconomic Status	• Below 150 percent Poverty • Unemployed • Housing Cost Burden • No High School Diploma • No Health Insurance
Household Characteristics	• Aged 65 and Older • Aged 17 and Younger • Civilian with a Disability • Single-Parent Households • English Language Proficiency
Racial and Ethnic Minority Status	• Hispanic or Latino (of any race) • Black or African American, Not Hispanic or Latino • Asian, Not Hispanic or Latino • Native Hawaiian or Pacific Islander, Not Hispanic or Latino • Two or More Races, Not Hispanic or Latino • Other Races, Not Hispanic or Latino

Measure	Social Factors
Housing Type and Transportation	• Multi-Unit Structures • Mobile Homes • Crowding • No Vehicle • Group Quarters

Climate and Economic Justice Screening Tool



Phase One of the CEJS was released on November 22, 2022, after it was developed by the CEQ as directed by Executive Order 14008. The tool visualizes Census tracts that are designated as historically disadvantaged communities. Federal agencies are directed to use the tool under Justice40 guidance that 40 percent of federal investments in climate, clean energy, transportation, and other areas benefit historically disadvantaged communities.

A tract containing a federally regulated tribe is automatically classified as a historically disadvantaged community. A tract designated as a historically disadvantaged community meets a minimum threshold for one of the categories of burden summarized in **Table 12**.

Table 12: Categories of Burden

Category of Burden	Indicator
Climate Change	A Census tract is at or above the 65th percentile for low income and at or above 90th percentile for at least one of the following: • Expected agricultural loss rate • Expected building loss rate • Expected population loss rate • Expected projected flood risk • Expected projected wildfire risk
Energy	A Census tract is at or above the 65th percentile for low income and at or above the 90th percentile for energy cost or Particulate Matter (PM2.5) in the air.
Health	A Census tract is at or above the 65th percentile for low income and at or above the 90th percentile for one of the following: • Asthma • Diabetes • Heart disease • Low life expectancy
Housing	A Census tract is at or above the 65th percentile for low income, experienced historic disinvestment, or at or above the 90th percentile for one of the following: • Housing cost • Lack of green space • Lack of indoor plumbing • Lead paint
Legacy Pollution	A Census tract is at or above the 65th percentile for low income. The tract is also at or above the 90th percentile for one of the following: • Proximity to hazardous waste facilities • Proximity to Superfund sites (National Priorities List) • Proximity to Risk Management Plan facilities • Or have at least one of the following: ○ Abandoned mine land

Category of Burden	Indicator
	○ Formerly used defense sites
Transportation	A Census tract is at or above the 65th percentile for low income and at or above the 90th percentile for one of the following: • Diesel particulate matter exposure • Transportation barriers • Traffic proximity and volume
Water and Wastewater	A Census tract is at or above the 65th percentile for low income or at or above the 90th percentile for at least one of the following: • Underground storage tanks and releases • Wastewater discharge
Workforce Development	A Census tract where more than 10 percent of people ages 25-years or older whose education is less than a high school diploma and the tract is at or above the 90th percentile for at least one of the following: • Linguistic isolation • Low median income • Poverty • Unemployment

Environmental Justice and Mapping Screening Tool

The EPA began developing the EJScreen in 2010 and released the tool to the public in 2015. The EJScreen is a mapping tool that aggregates a comprehensive dataset on demographics, environmental justice concerns, health disparities, critical service gaps, and wildfire and flood risks from multiple data sources. Public agencies can use the tool for environmental justice assessments. More can be learned about the data from the EJScreen Technical Documentation.

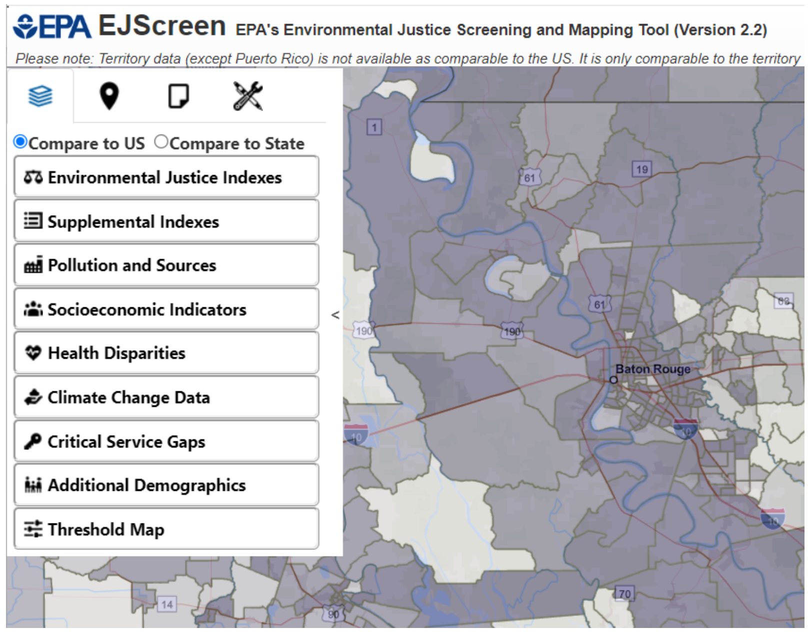


Table 13 lists the variables in the EJ Screen Tool.

Table 13: Environmental Justice Screen Indicators

Index or Category	Indicator
Environmental Justice Indices	• PM 2.5 • Ozone • Diesel PM • Air Toxics Cancer Risk • Air Toxics Respiratory HI • Toxic Releases to Air • Traffic Proximity and Volume • Lead Paint • Superfund Proximity • Risk Management Program (RMP) Facility Proximity
Demographic Index	Calculated average of: • Percent of people of color • Percent of low-income persons

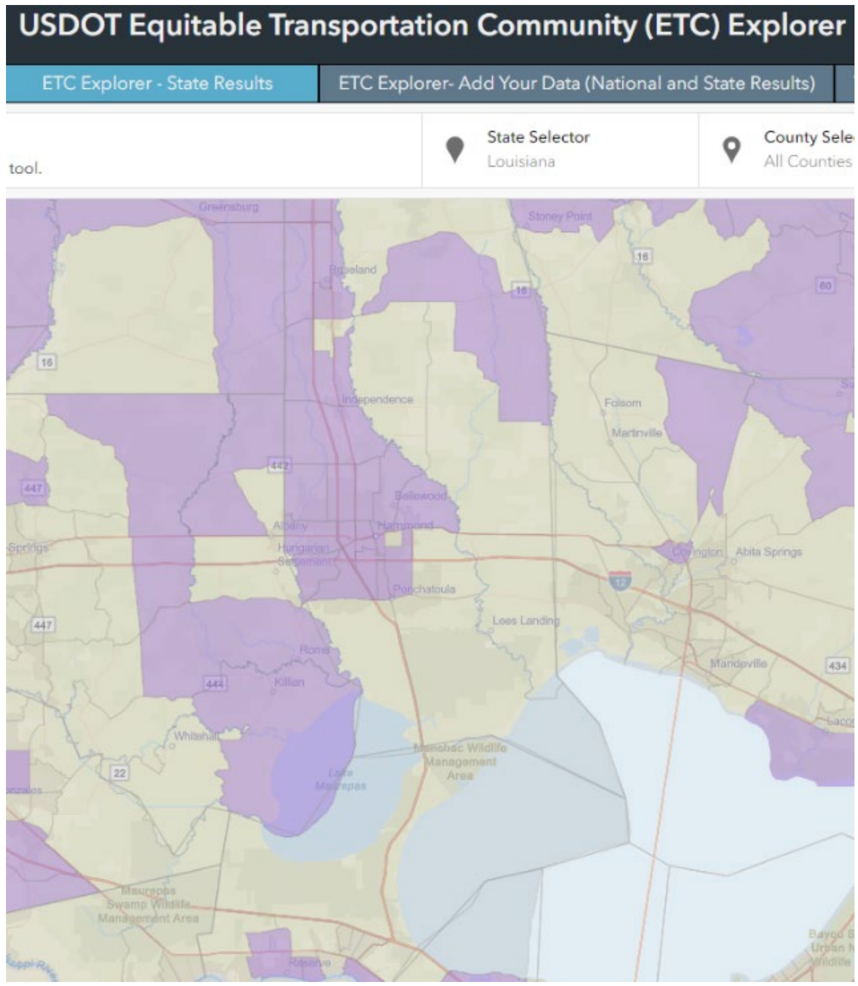
Index or Category	Indicator
Supplemental Demographic Index	Calculated average of five socioeconomic indicators: • Percent low-income • Percent limited English speaking • Percent less than high school education • Percent unemployed • Low life expectancy
Socioeconomic Indicators	• People of Color • Low-Income Population • Unemployment Rate • LEP Household • Less than High School Education. • Under Age 5 • Over Age 64
Health Disparities	• Low Life Expectancy • Heart Disease • Asthma • Cancer • Persons with Disabilities
Critical Service Gaps	• Broadband Gaps • Lack of Health Insurance • Housing Burden • Transportation Access • Food Desert
Wildfire and Flood Risks	• Wildlife Risk • Flood Risk

Environmental Justice Areas

The EPA does not define environmental justice areas using the EJ Screen. The EPA's guidance is that a Census tract or block group in the 80th percentile or higher relative to the United States warrants special considerations for additional review. The EPA recommends that agencies perform additional analysis before making any decisions about potential environmental justice issues. Additional analysis can include other demographic and environmental measures, other sources of information and data, local knowledge, proximity and exposure to environmental hazards, and susceptible populations.

Equitable Transportation Community (ETC) Explorer

The ETC Explorer is an interactive web application developed by the USDOT to complement the CEJS tool. Under USDOT's guidance, the CEJS is the primary tool that should be used to identify historically disadvantaged communities.



The ETC Explorer uses 2020 Census tracts and data to identify burdens that communities experience because of underinvestment in transportation. The ETC Explorer gives users the ability to compare how much a community is experiencing a burden compared to all other Census tracts nationally and within the state across five disadvantaged component areas and respective indicators listed in **Table 14**. (Definitions of the component areas and indicators can be found here.)

Table 14: Disadvantaged Component Areas and Indicators

Disadvantaged Component Area	Indicator
Transportation Insecurity	• Transportation Access • Transportation Cost Burden • Transportation Safety

Disadvantaged Component Area	Indicator
Environmental Burden	• Ozone Level • PM 2.5 Level • Diesel PM Level • Air Toxics Cancer Risk • Hazardous Sites Proximity • Toxics Release Sites Proximity • Treatment & Disposal Facility Proximity • Risk Management Sites Proximity • Coal Mine Proximity • Lead Mines Proximity • Pre-1980's Housing • High Volume Road Proximity • Railways Proximity • Airports Proximity • Ports Proximity • Impaired Surface Water
Social Vulnerability	• 200 Percent of Poverty Line • No High School Diploma • Unemployment • House Tenure • Housing Cost Burden • Uninsured • Lack of Internet Access • Endemic Inequality • 65 or Older • 17 or Younger • Disability • Limited English Proficiency • Mobile Homes
Health Vulnerability	• Asthma Prevalence • Cancer Prevalence • High Blood Pressure Prevalence • Diabetes Prevalence • Low Mental Health Prevalence
Climate and Disaster Risk Burden	• Annualized Disaster Losses (Annualized Losses Due to Hazards) • Future Climate and Disaster Risk Burden • Impervious Surfaces (from Land Cover)

Equity Analysis Results

The Consultant Team conducted an equity analysis using the data sources described in the previous section. The analysis identified the following by Census tracts and block groups:

- Historically Disadvantaged Communities by Census Tracts
- Areas of Persistent Poverty by Census Tracts
- Percentile of People of Color by Block Group
- Percentile of Limited English Proficient (LEP) Households by Block Group
- Percentile of Zero-Vehicle Households by Block Group
- Percentile of People with Disabilities by Block Group

Historically Disadvantaged Communities

Under Justice40, federal agencies are directed to guide 40 percent of federal investments in climate, clean energy, transportation, and other areas to historically disadvantaged communities. A historically disadvantaged community meets a minimum threshold for one of the categories of burden previously explained. As mentioned in the federal legislation section, funding from the Federal Transit Administration (FTA) is budgeted to pay for bicycle, pedestrian, and transit projects as part of the AoPP program. Projects located within Historically Disadvantaged Communities or Areas of Persistent Poverty are eligible to apply.

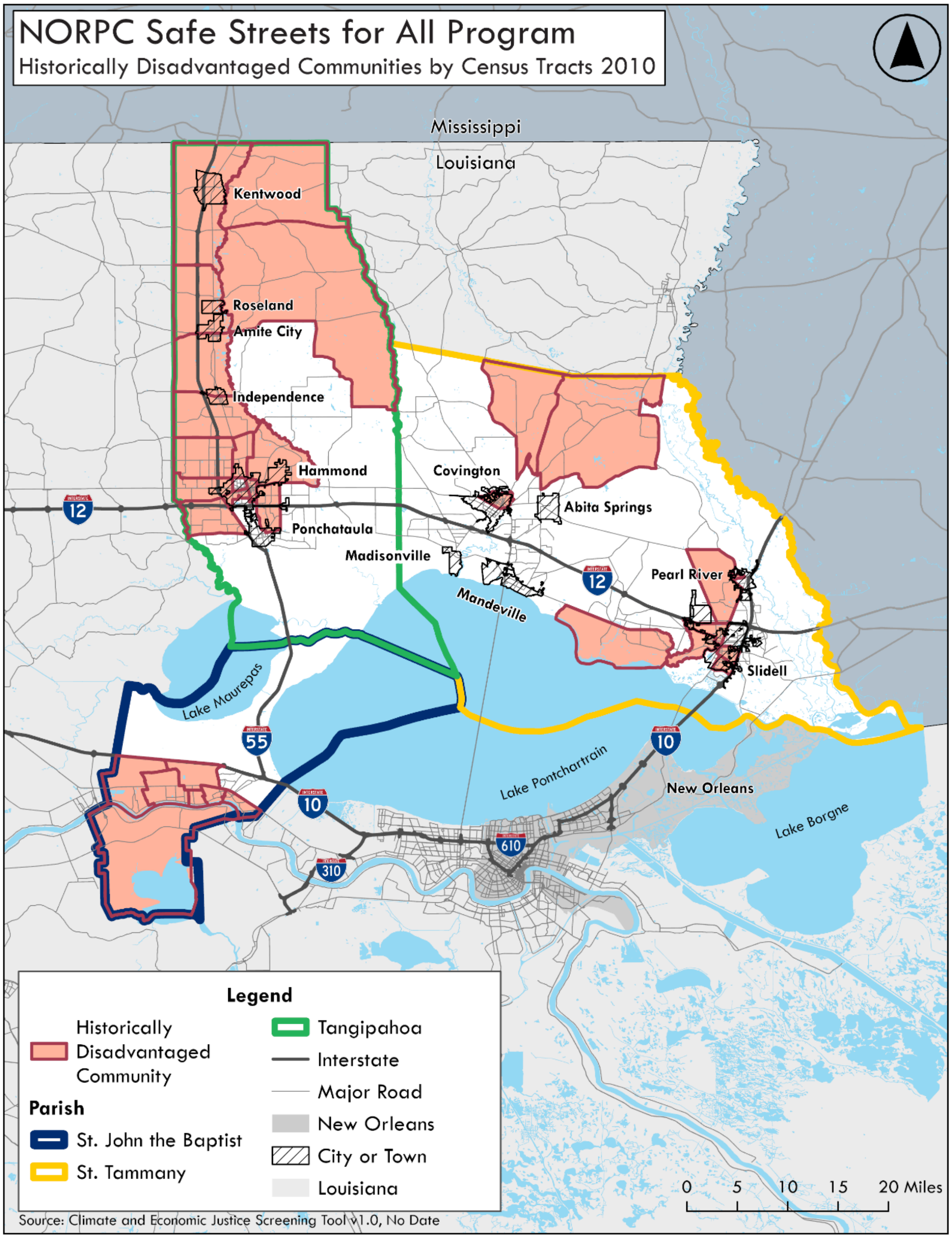
- **St. John the Baptist:** 64 percent of the Census tracts are historically disadvantaged communities.
- **St. Tammany:** 14 percent of the Census tracts are historically disadvantaged communities.
- **Tangipahoa:** 70 percent of the Census tracts are historically disadvantaged communities.

Historically disadvantaged communities are summarized in **Table 15** and displayed in **Figure 21**.

Table 15: Number of Census Tracts that are Historically Disadvantaged Communities by Parish

Parish	Number of Disadvantaged Community Tracts	Total Census Tracts (2010)
St. John the Baptist	7	11
St. Tammany	6	43
Tangipahoa	14	20

Figure 21: Historically Disadvantaged Communities



Areas of Persistent Poverty

A Census tract is considered an area of persistent poverty if it has a poverty rate of 20 percent or higher. Data from the USDOT DataHub and ETC were compared and summarized in the following:

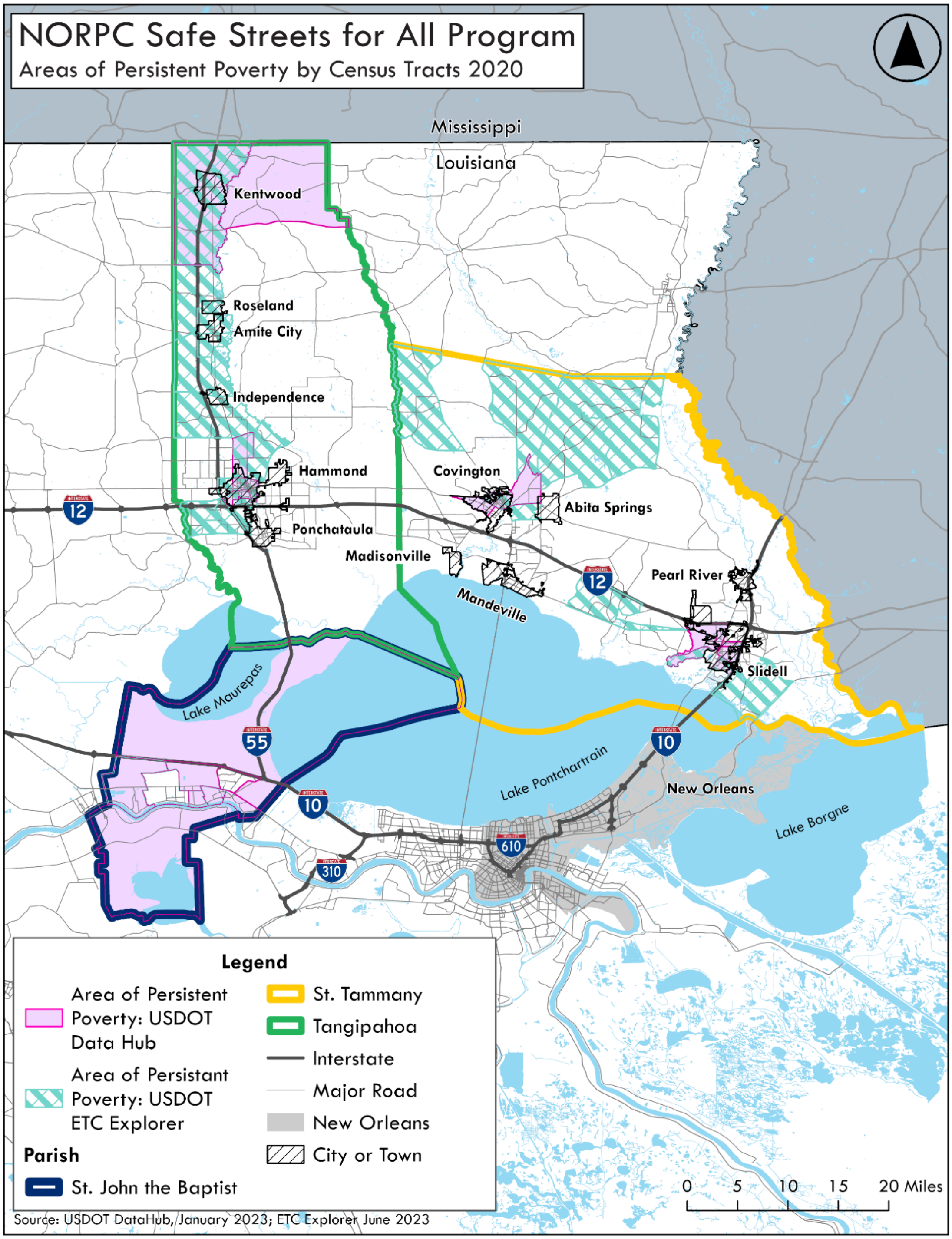
- **St. John the Baptist:**
  - DataHub: 64 percent of the Census tracts are areas of persistent poverty.
  - ETC: 36 percent of the Census tracts are areas of persistent poverty.
- **St. Tammany:**
  - DataHub: 10 percent of the Census tracts are areas of persistent poverty.
  - ETC: 17 percent of the Census tracts are areas of persistent poverty.
- **Tangipahoa:**
  - DataHub: 19 percent of the Census tracts are areas of persistent poverty.
  - ETC: 48 percent of the Census tracts are areas of persistent poverty.

Areas of persistent poverty are summarized in **Table 16** and displayed in **Figure 22**.

Table 16: Number of Census Tracts that Are an Areas of Persistent Poverty by Parish

Parish	Total AoPP Tracts)		Total Tracts (2020)
	DataHub	ETC	
St. John the Baptist	7	4	11
St. Tammany	6	10	59
Tangipahoa	6	15	31

Figure 22: Areas of Persistent Poverty by Census Tract



People of Color by Block Group and Minorities

People of color "list their racial status as a race other than white alone and/or list their ethnicity as Hispanic or Latino." People of Color refers to everyone who is non-Hispanic white.

A minority is a person who is at least one of the following:

- Hispanic or Latino (of any race)
- Black and African American, Not Hispanic or Latino
- American Indian and Alaska Native, Not Hispanic or Latino
- Asian, Not Hispanic or Latino
- Native Hawaiian and Other Pacific Islander, Not Hispanic or Latino
- Two or More Races, Not Hispanic or Latino
- Other Races, Not Hispanic or Latino

Data from the EJ Screen and SVI were compared and are summarized in the following:

- **St. John the Baptist:**
  - EJ Screen: 55 percent of the Census block groups are in the 80th percentile or higher.
  - SVI: 10 percent of the Census block groups are in the 90th percentile or higher.
- **St. Tammany:**
  - EJ Screen: 2 percent of the Census block groups are in the 80th percentile or higher.
  - SVI: No Census block groups are in the 90th percentile
- **Tangipahoa:**
  - EJ Screen: 13 percent of the Census tracts are in the 80th percentile or higher.
  - SVI: 5 percent of the Census tracts are in the 90th percentile or higher.

Table 17 summarizes the number of block groups that are within the 80th percentile or higher for People of Color and 90th Percentile or higher for Minority Persons. **Figure 23** and **Figure 24** respectively display percentiles for People of Color and Minority Persons by Block Group.

Table 17: Areas of Persistent Poverty by Parish

Parish	People of Color: 80th Percentile (EJ Screen)	Minority Persons: 90th Percentile (SVI)	Total Block Groups (2020)
St. John the Baptist	17	3	31
St. Tammany	4	0	161
Tangipahoa	11	4	83

Figure 23: Percentile of People of Color by Black Group

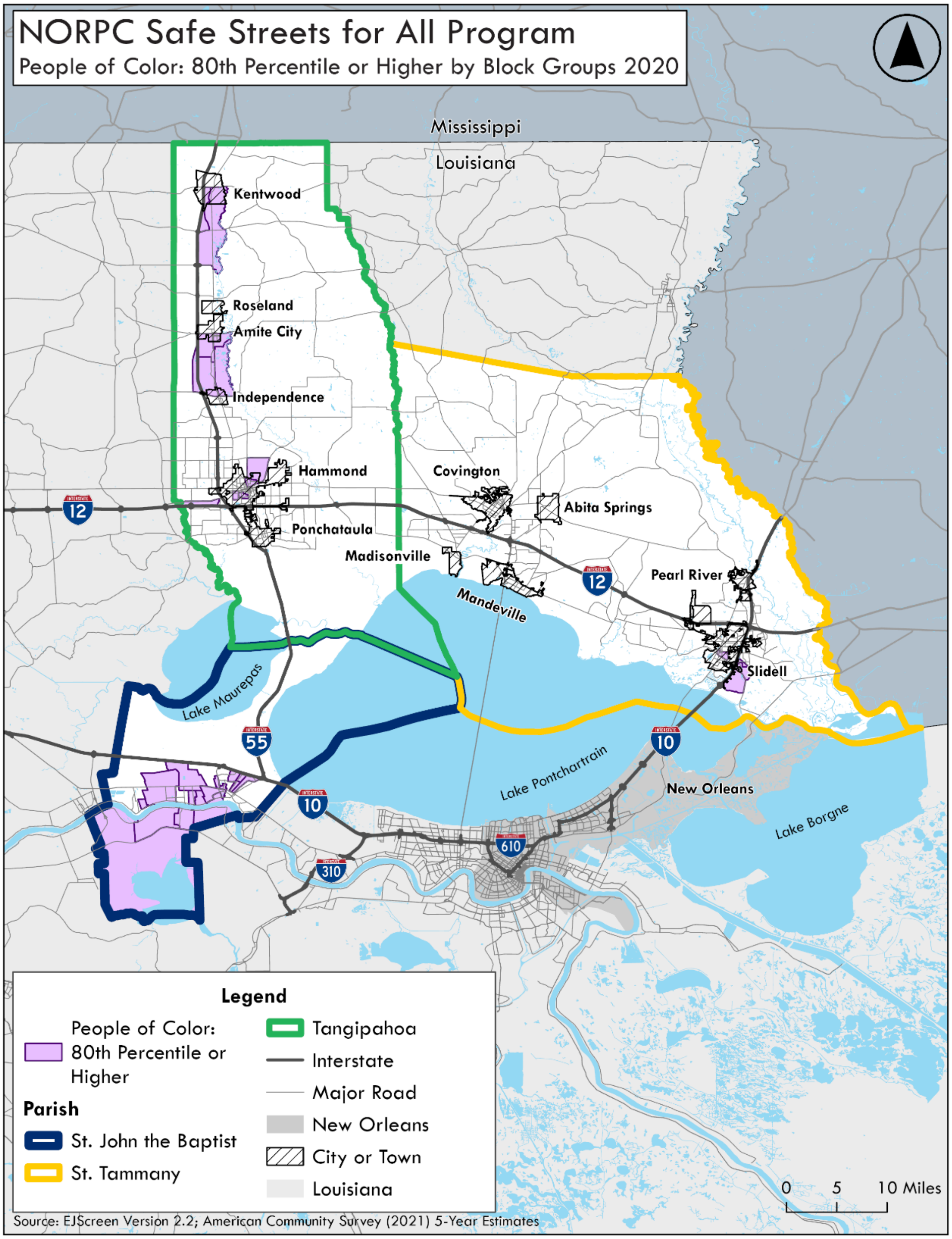
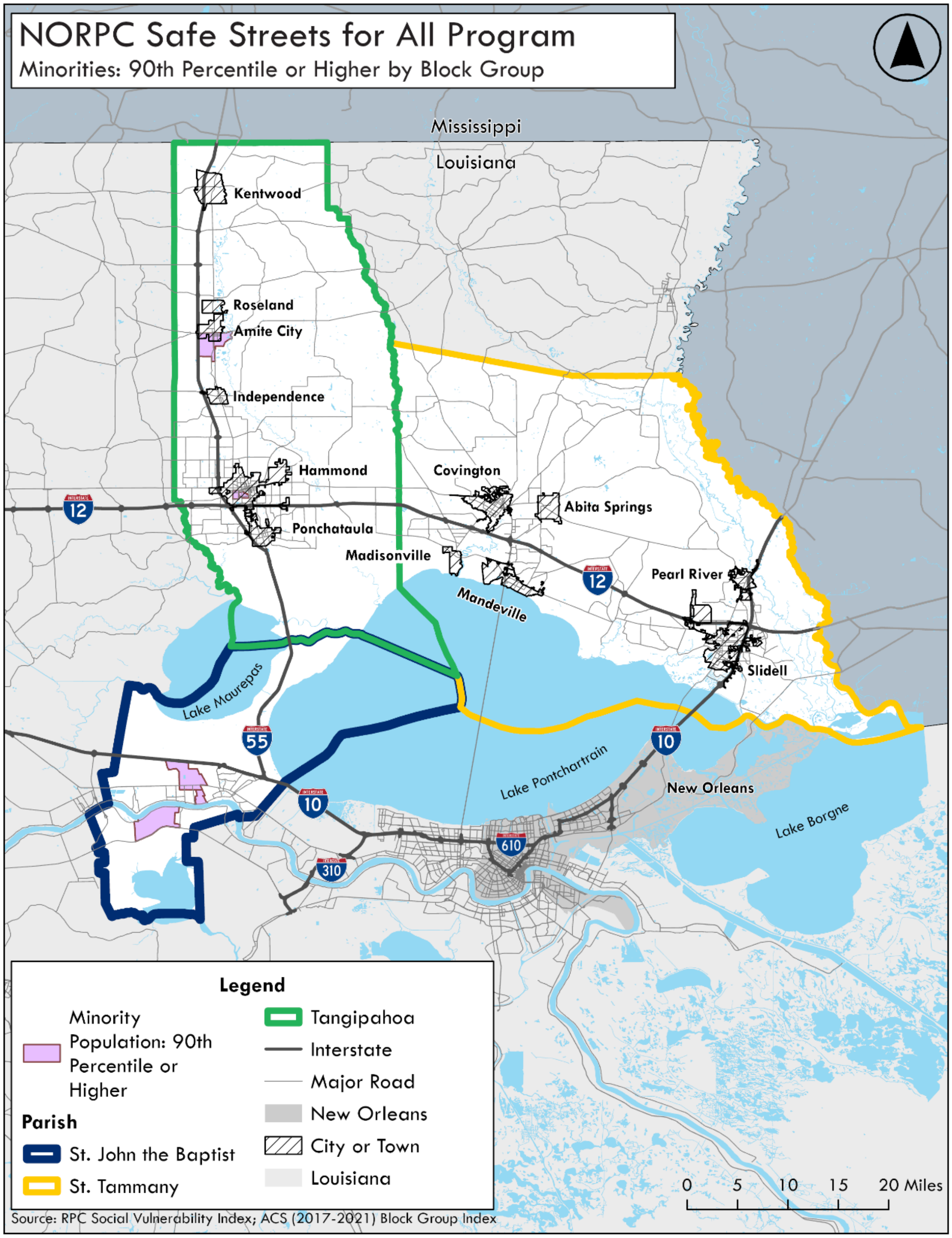


Figure 24: Percentile of Minority Persons



Limited English Proficient Households by Block Group

A household is considered LEP if all members 14-years-old and older do not speak and read English well.

Table 18 summarizes the number of block groups that are within the 80th percentile or higher and 90th Percentile or higher for LEP households.

Figure 25 and **Figure 26** respectively display the 80th percentile or higher and 90th percentile or higher block groups for LEP Households.

- **St. John the Baptist:**
  - EJ Screen: 13 percent of the Census block groups are in the 80th percentile or higher.
  - SVI: 10 percent of the Census block groups are in the 90th percentile or higher.
- **St. Tammany:**
  - EJ Screen: 22 percent of the Census block groups are in the 80th percentile or higher.
  - SVI: 9 percent of the Census block groups are in the 90th percentile or higher.
- **Tangipahoa:**
  - EJ Screen: 12 percent of the Census tracts are in the 80th percentile or higher.
  - SVI: 6 percent of the Census tracts are in the 90th percentile or higher.

Table 18: Limited English Proficiency by Parish

Parish	80th Percentile (EJ Screen)	90th Percentile (SVI)	Total Block Groups (2020)
St. John the Baptist	4	3	31
St. Tammany	36	14	161
Tangipahoa	10	5	83

Figure 25: Limited English Proficiency Households, 80th Percentile or Higher by Block Group

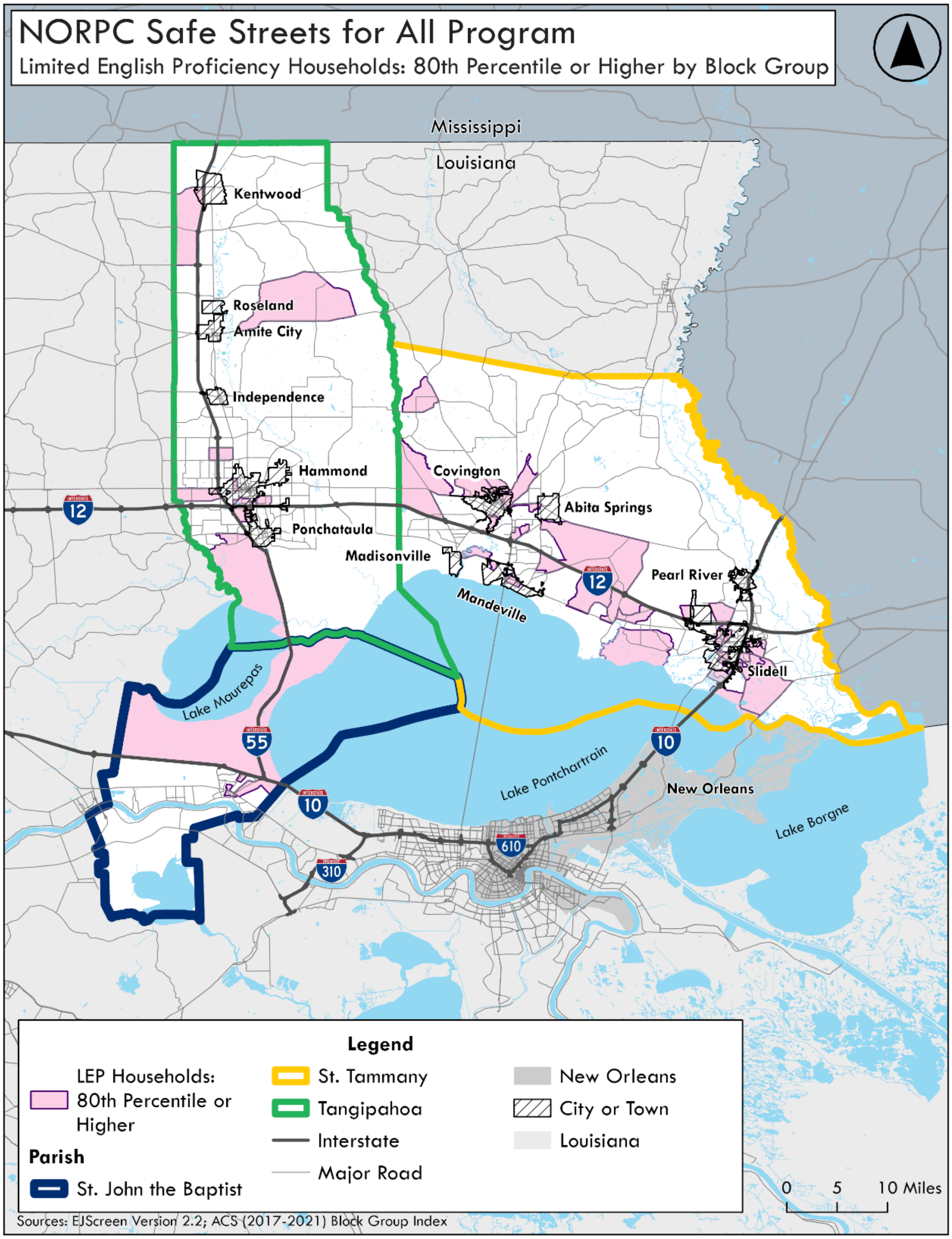
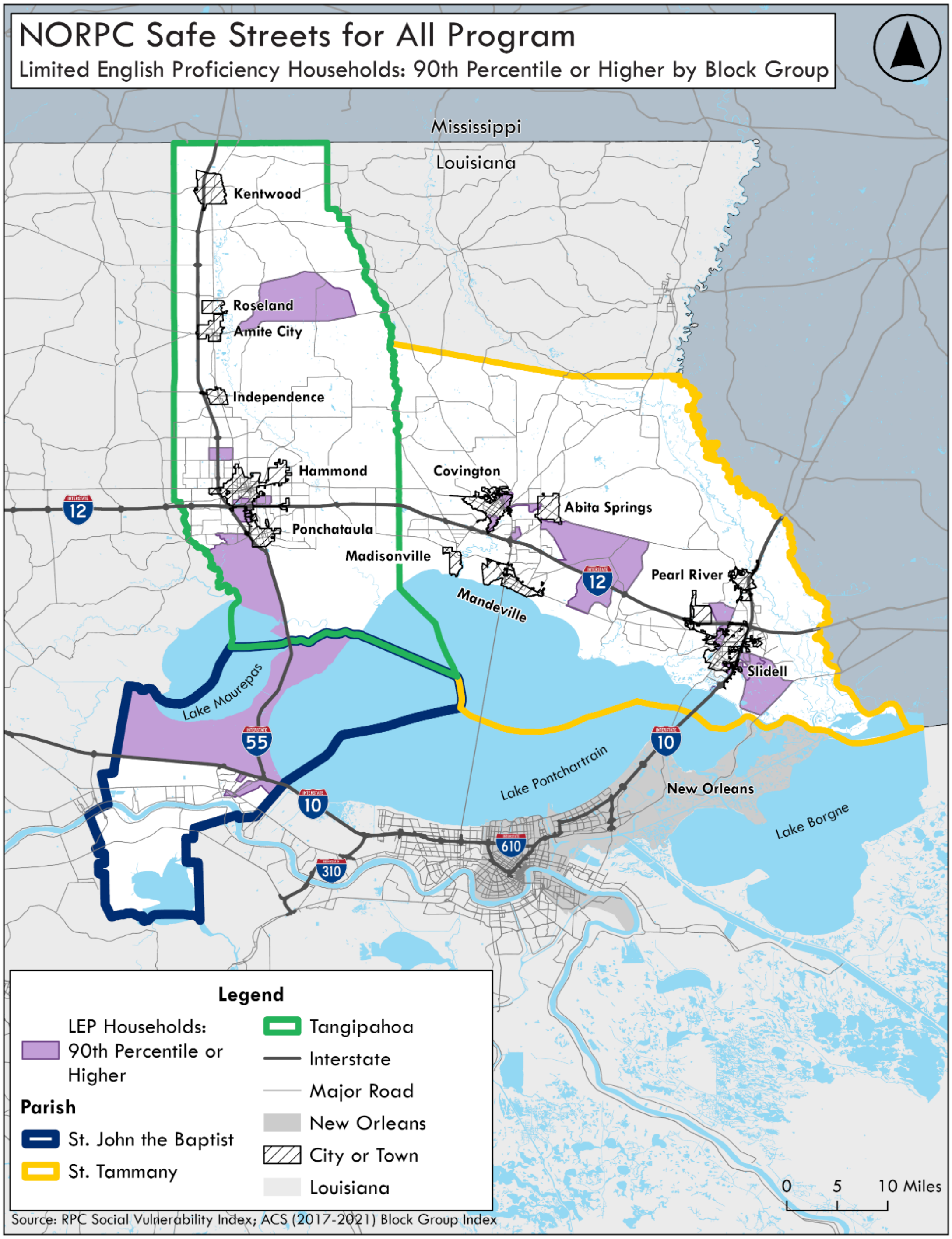


Figure 26: Limited English Proficiency Households, 90th Percentile or Higher by Block Group



Civilians with a Disability by Block Group

The ADA's definition of a person with a disability is someone who has a physical or mental impairment that substantially limits at least one major life activity, someone who has a history of the impairment, or someone who is perceived by others as having the impairment.

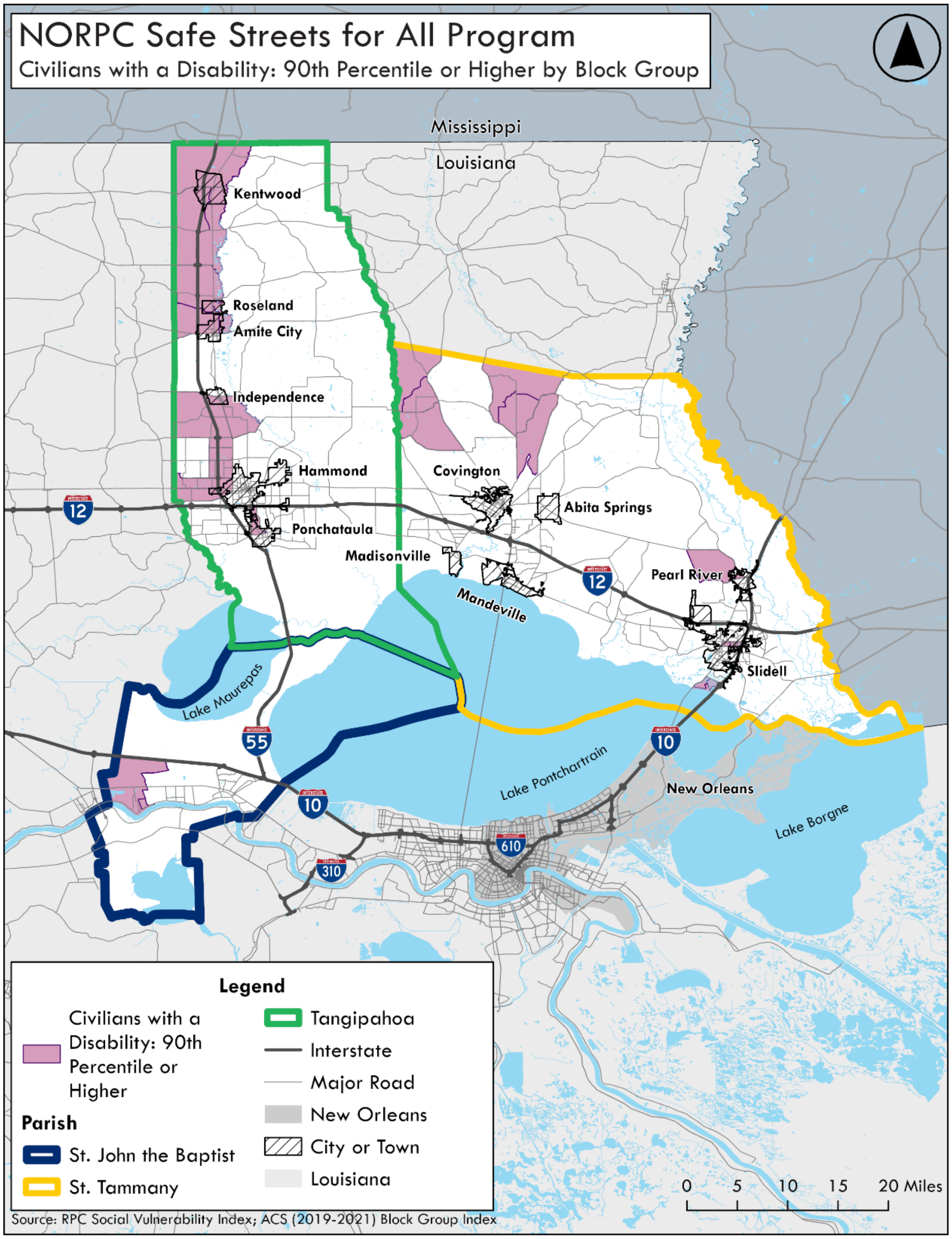
Table 19 summarizes, and **Figure 27** displays the number of block groups that are within the 90th percentile or higher by parish.

- **St. John the Baptist:** 6 percent of the Census block groups are in the 90th percentile or higher.
- **St. Tammany:** 9 percent of the Census block groups are in the 90th percentile or higher.
- **Tangipahoa:** 23 percent of the Census tracts are in the 90th percentile or higher.

Table 19: Block Groups 90th Percentile or Higher for Civilians with a Disability

Parish	90th Percentile (SVI)	Total Block Groups (2020)
St. John the Baptist	2	31
St. Tammany	14	161
Tangipahoa	19	83

Figure 27: Block Groups of Civilians with a Disability that Are 90th Percentile or Higher



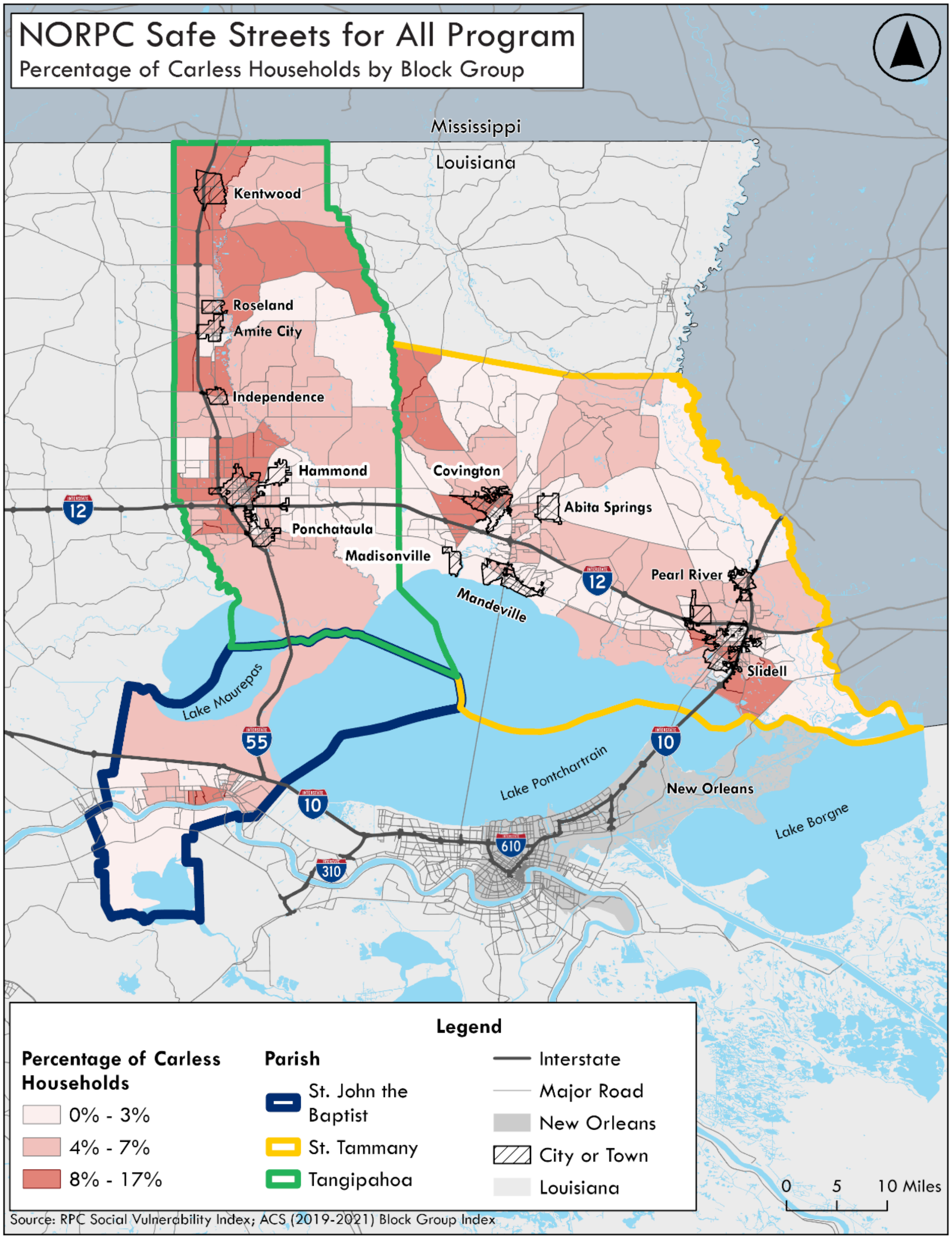
Households with No Vehicle Available by Block Group

While not owning a vehicle is a lifestyle choice for some, those individuals typically live in places where there are numerous transportation options that are practical to take, such as frequent transit service. Most communities are built for car travel, so most households that do not have access to a vehicle are burdened. These households lack sufficient access to resources like employment, healthcare, and education, which are important for enabling social mobility.

Understanding where higher concentrations of carless households are located helps planners and policymakers plan for implementing viable transportation options other than car travel. It also helps with developing strategies for public outreach in places where people cannot easily travel to and from a public workshop.

No block group is in the 90th percentile or higher in the three parishes. **Figure 28** displays percentiles and percentages of households that do not have access to a vehicle by block group.

Figure 28: Percentage of Carless Households by Block Group



Crash Analysis

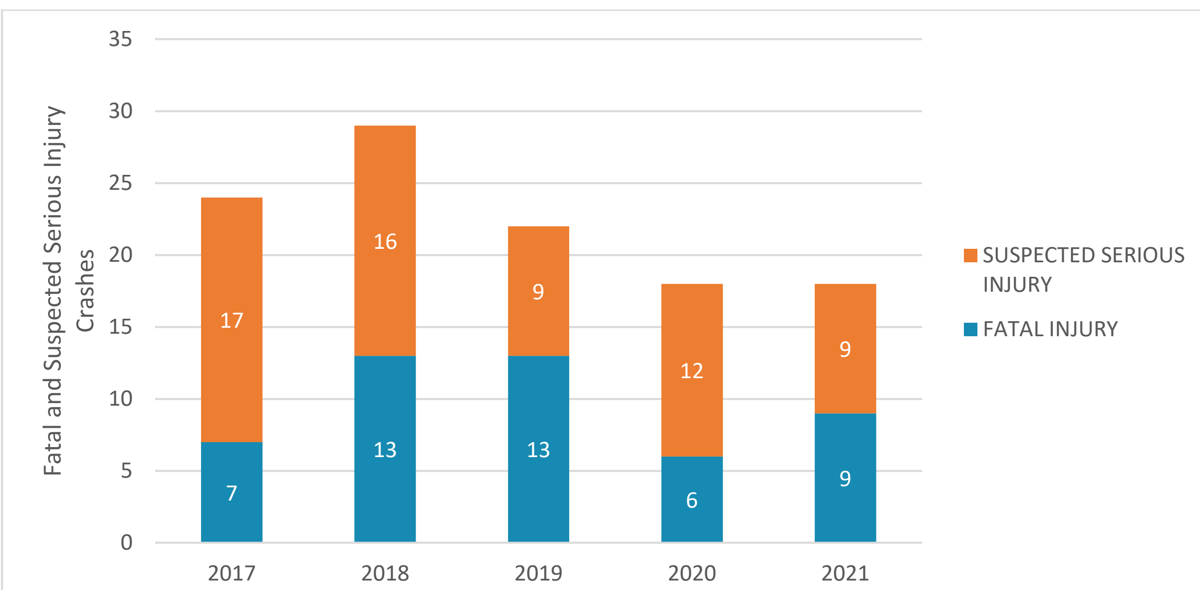
St. John Parish Crash Data Analysis

The Path to Zero project involves St. John, St. Tammany, and Tangipahoa Parishes and is part of the Safe Streets for All grant program, a federal program that funds local initiatives to prevent roadway fatalities and serious injuries. This safety analysis was based on historical crash data received from the New Orleans Regional Planning Commission (NORPC) for St. John Parish during the five-year period that occurred from January 1, 2017, to December 31, 2021. The purpose of this analysis was to discern patterns and trends in crash types, locations, contributing factors, and environmental factors for all reported fatal and suspected serious injury crashes that occurred during the five-year analysis period in St. John Parish.

Historical Crash Analysis

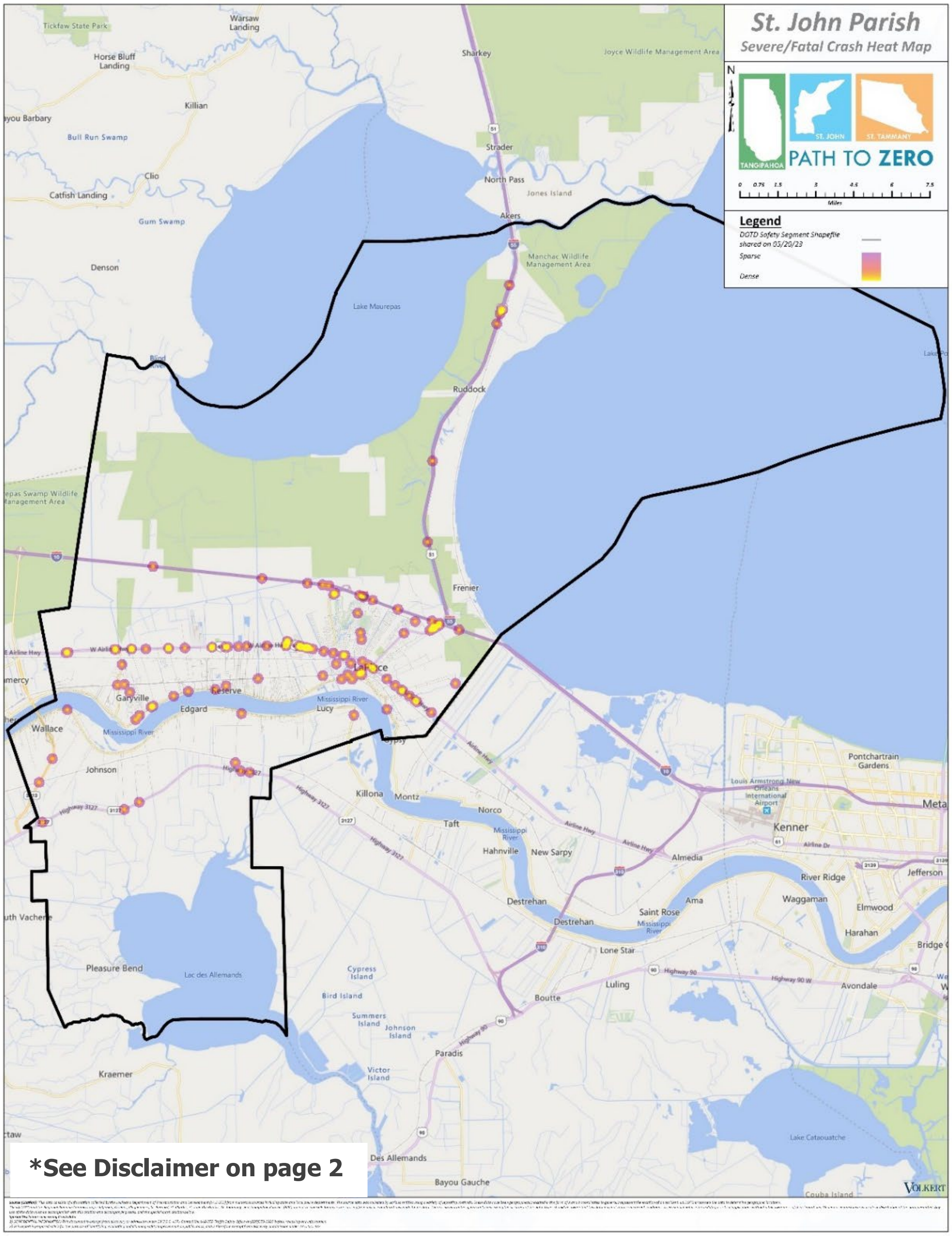
Within St. John Parish, there were 48 fatal crashes and 63 suspected serious injury crashes reported during the five-year analysis period. Figure 29 illustrates the fatal and suspected serious injury crashes reported by year within St. John Parish. Variations are anticipated year-to-year, but the slight declines in 2020 and 2021 are likely related to reduced road users during the height of the COVID-19 pandemic.

Figure 29: Fatal and Suspected Serious Injury Crashes by Year, 2017-2021



Crash locations appear to be concentrated on major corridors such as I-10 and US 61, especially where land use is developed more intensely. Figure 30 shows crash clusters where fatal and suspected serious injury crashes occurred throughout St. John Parish from 2017 to 2021.

Figure 30: Fatal and Suspected Serious Injury Crash Locations, 2017 – 2021



Crash Types

The most common crash type among the fatal and suspected serious injury crashes reported in the five-year analysis period was off road crashes, which accounted for approximately 21 percent (21%) of all fatal and suspected serious injury crashes in St. John Parish. Rear end crashes (17%), pedestrian crashes (17%), and angle (13%) were the next most common crash types reported. Table 20 summarizes the fatal and suspected serious injury crashes reported during the five-year analysis period by crash type.

Table 20: Crash Type by Year, 2017 – 2021

Crash Type	Year					Total
	2017	2018	2019	2020	2021	
Off Road	8	4	8	2	1	**23**
Rear End	2	7	4	3	3	**19**
Pedestrian	5	6	3	3	2	**19**
Left Turn	2	4	0	0	3	**9**
Other	3	1	2	2	3	**11**
Angle	4	1	3	4	2	**14**
Head On	0	3	1	1	4	**9**
Sideswipe	0	3	1	1	0	**5**
Bicycle	0	0	0	2	0	**2**
Animal	-	-	-	-	-	**0**
Right Turn	0	0	0	0	0	**0**
Total	*24*	*29*	*22*	*18*	*18*	**111**

(NOTE: Off Road, Pedestrian, Bicycle, and Animal crashes were counted independently from the other manners of collision to avoid being counted twice. All "Not a Collision Between Motor Vehicle" crashes not categorized as Off Road, Pedestrian, Bicycle, or Animal were counted as "Other.")

Environmental Circumstances

The environmental circumstances contributing to crashes can be helpful in determining potential areas for improvement within the roadway network to better accommodate the traveling public. Environmental circumstances such as lighting, weather, and surface conditions were evaluated for 111 fatal and suspected serious injury crashes reported in St. John Parish. Table 21 summarizes the contributing circumstances as reported during the five-year analysis period.

Approximately 48 percent (48%) of fatal and suspected serious injury crashes reported in St. John Parish during the five-year analysis period occurred under daylight conditions. Approximately 30 percent (30%) were coded as 'dark-lighted' indicating that there was street or intersection lighting present at the location of the crash. The lack of lighting does not appear to be a contributing factor to crashes in St. John Parish.

Approximately 86 percent (86%) of fatal and suspected serious injury crashes reported in St. John Parish during the five-year analysis period occurred on dry pavement. Approximately 90 percent (90%) of fatal and suspected serious injury crashes reported in St. John Parish during the five-year analysis period occurred during clear or cloudy weather conditions. Surface and weather conditions do not appear to be a contributing factor to crashes.

Table 21: Crashes by Contributing Circumstances, 2017 – 2021

Light Conditions	Year					Total
	2017	2018	2019	2020	2021	
Daylight	14	10	11	9	9	**53**
Dawn/Dusk	0	2	1	0	0	**3**
Dark - Lighted	9	11	3	5	5	**33**
Dark - Not Lighted	1	6	6	4	4	**21**
Other	0	0	1	0	0	**1**
Total	*24*	*29*	*22*	*18*	*18*	**111**
Surface Conditions	**Year**					**Total**
	2017	**2018**	**2019**	**2020**	**2021**	
Dry	20	23	19	17	16	**95**
Wet	4	6	3	1	2	**16**
Other	0	0	0	0	0	**0**
Total	24	29	22	18	18	**111**
Weather Conditions	**Year**					**Total**
	2017	**2018**	**2019**	**2020**	**2021**	
Clear	17	19	15	14	14	**79**
Cloudy	4	7	4	3	3	**21**
Rain	3	1	3	1	1	**9**
Other	0	2	0	0	0	**2**
Total	*24*	*29*	*22*	*18*	*18*	**111**

(NOTE: For Lighting conditions, "Other," "Not reported," and "Unknown" light conditions were included in the "Other" row. For Surface Conditions, "Ice/Frost," "Mud, Dirt, Gravel," "Not Reported," "Other," and "Unknown" surface conditions were included in the "Other" cells. For Weather Conditions, "Fog, Smog, Smoke," "Severe Crosswind," "Blowing Sand, Soil, Dirt," "Sleet/Hail," "Snow" "Not Reported," "Other," and "Unknown" were included in the "Other" cells.)

Temporal Patterns

The 111 fatal and suspected serious injury crashes reported in St. John Parish during the five-year analysis period were evaluated over temporal conditions as well.

Figure 31 below illustrates the monthly trends in crashes reported in St. John Parish. The late spring and early winter were the most common times of year for crashes. April was the month with the highest number of crashes, while May and December were both a close second. The fewest crashes were reported during January and June.

Figure 31: Fatal and Suspected Serious Injury Crashes by Month, 2017 - 2021

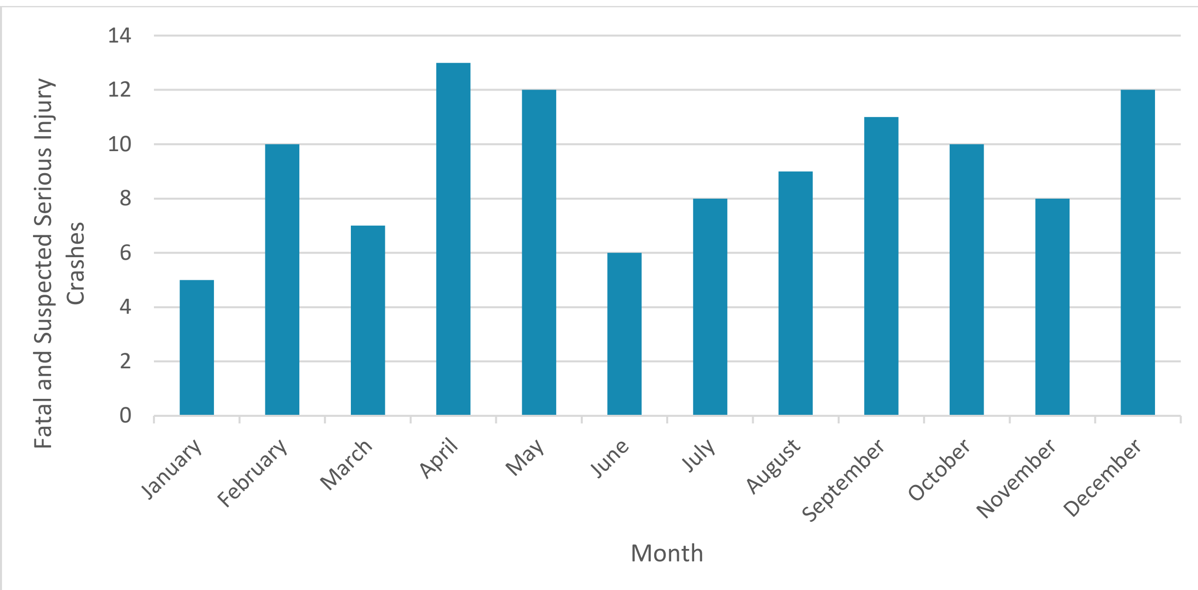


Figure 32 below illustrates the weekly trends in crashes reported in St. John Parish. Fatal and suspected serious injury crashes occurred more frequently on weekends than on weekdays, but Tuesdays were oddly higher than any other weekday and a close second to Saturdays. Approximately 53 percent (53%) of all crashes reported in the five-year analysis period occurred on a Friday, Saturday, or Sunday.

Figure 32: Fatal and Suspected Serious Injury Crashes by Weekday, 2017 - 2021

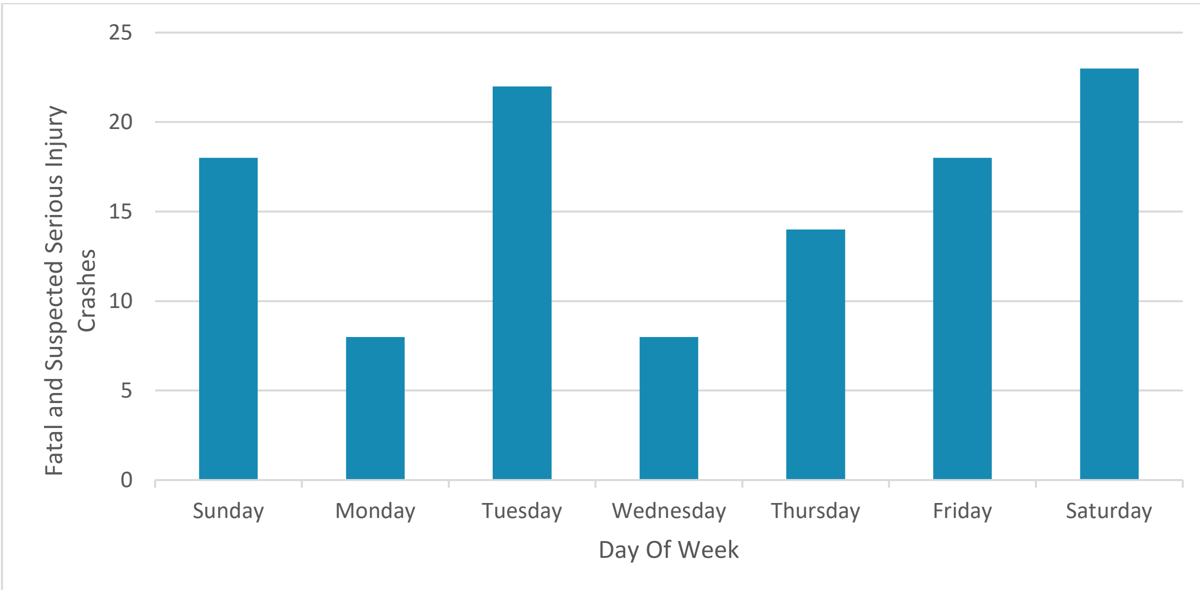
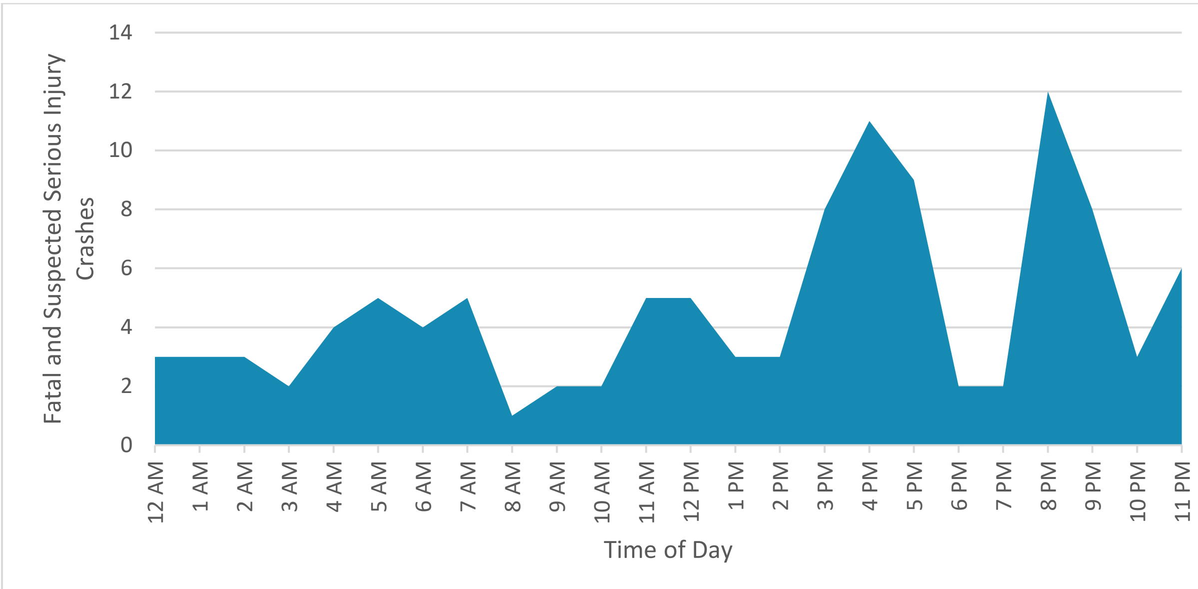


Figure 33 illustrates the time-of-day trends in crashes reported in St. John Parish. The occurrence of fatal and suspected serious injury crashes in the dataset correlates with typical traffic patterns except for the highest peak between 7 and 9 pm. The data indicates a minor increase before the typical morning peak traffic period, a similar increase during the midday peak, and a more significant increase prior to congested conditions in the evening peak traffic period. Once free flow conditions are restored following the evening peak period, the occurrence of fatal and suspected serious injury crashes are most significant. High-severity crashes most often occur during free-flow conditions. Perhaps most notably, congested periods have significant decreases in fatal and suspected serious injury crashes since speeds are physically constrained.

Figure 33: Crashes by Time of Day, 2017 - 2021



Demographic Patterns

The 111 fatal and suspected serious injury crashes reported in St. John Parish during the five-year analysis period were evaluated for patterns related to certain at-risk populations as well. Crashes involving aging drivers (age 65 or older), young drivers (ages 15-24), and drivers under the influence of alcohol or drugs were evaluated. Table 22 summarizes the involvement of these demographic characteristics in the crash data that was evaluated. Note that the crashes quantified in Table 22 are not mutually exclusive; two or more of the demographic categories included in the table could be involved in any one crash. For example, an aging driver could also be a driver under the influence of alcohol or drugs.

Aging drivers were involved in approximately 12 percent (12%) of the crashes reported during the five-year analysis period, and young drivers were involved in approximately 27 percent (27%). There were 26 drivers reported to be under the influence of alcohol or drugs; however, this is often underreported.

Table 22: Demographic Characteristics in Fatal and Suspected Serious Injury Crashes, 2017 – 2021

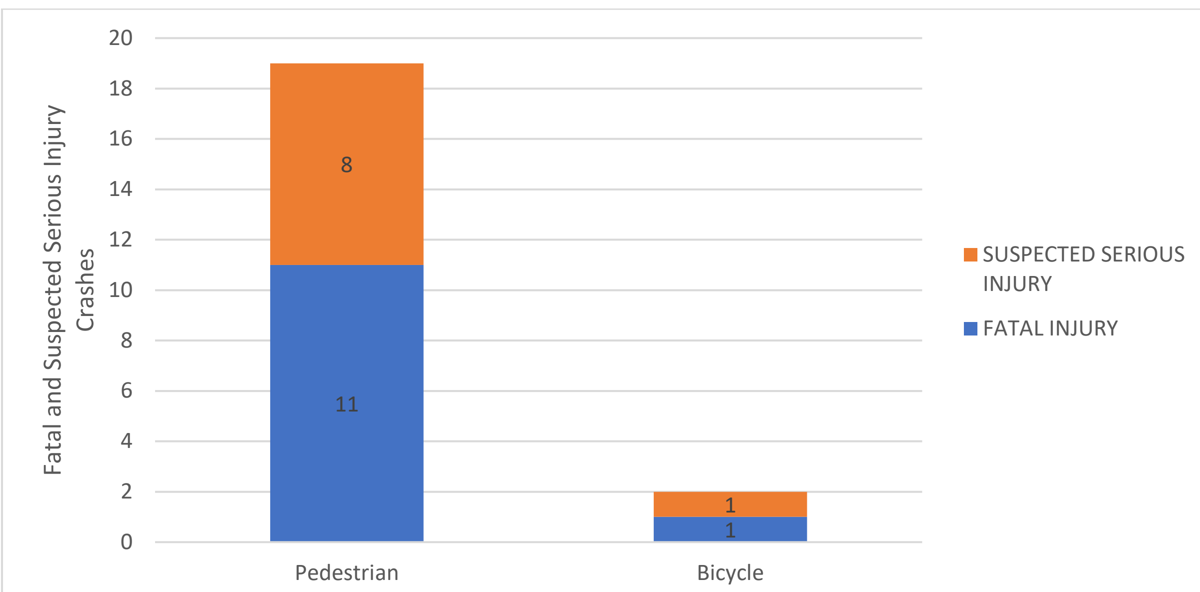
Demographic Information	Year					Total
	2017	2018	2019	2020	2021	
Aging Driver	4	3	3	1	2	**13**
Young Driver	6	10	7	3	4	**30**

Alcohol-Involved	Year					Total
	2017	2018	2019	2020	2021	
Parish-level Fatal and Suspected Serious Injury Crashes	1	10	7	4	4	**26**
% of Total Crashes	4%	34%	32%	22%	22%	**23%**
Statewide % of Total Crashes	21%	22%	22%	21%	21%	**21%**

Pedestrian and Bicycle Crash Summary

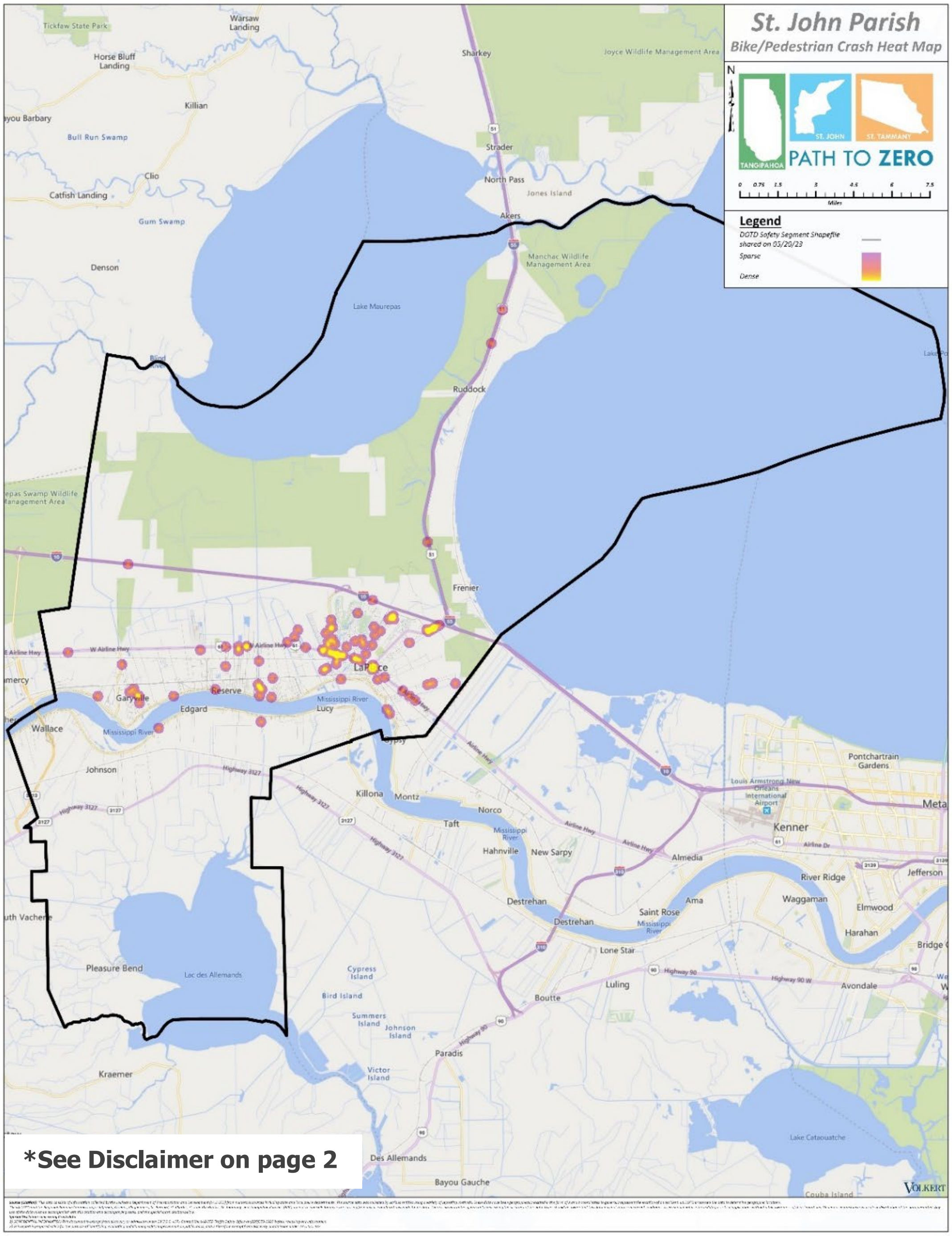
Among the 111 fatal and suspected serious injury crashes, there were 19 pedestrian crashes and 2 bicyclist crashes recorded within St. John Parish during the five-year analysis period as shown in Figure 34 below.

Figure 34: Pedestrian and Bicyclist Fatal and Suspected Serious Injury Crashes, 2017 – 2021



Pedestrian and bicycle crashes occur more often in Laplace, where demand for walking and biking is higher. Figure 35 shows pedestrian and bicyclist crashes throughout the parish.

Figure 35: Pedestrian and Bicyclist Crash Locations, 2017 – 2021



Both of the bicyclist crashes occurred on a weekday in 2020. One bicyclist was fatally struck on the shoulder of the roadway between 4 and 5 pm. The driver fled the scene. The other bicyclist was seriously injured on the roadway during dark conditions.

Over two-thirds of the pedestrians crashes occurred during dark conditions. 18 out of 19 occurred on the roadway, only 1 occurred on the shoulder. And only one of the on road crashes occurred at an intersection. Further investigation is needed to determine if the pedestrians were attempting to cross the roadway or walking along the roadway and if sidewalks are provided at these locations, and if driver violations were a factor (often underreported).

State Highway System

The Louisiana Department of Transportation (LADOTD) has a sophisticated methodology for identifying locations on state routes that may have a high potential for safety improvement (High PSI). LADOTD has developed total crash and fatal/injury safety performance functions (SPFs) for each facility type using methodologies from AASHTO's Highway Safety Manual. The LADOTD uses the Level of Service of Safety (LOSS) methodology for identifying High PSI locations and produces an annual report of High PSI locations for planners and engineers to use in developing projects. To qualify as a High PSI Segment, the expected number of crashes of "Fatal & Injury Crashes" is greater than the LOSS IV limit, and have at least 3 fatal, serious or moderate crashes on the segment for a 3-year period. To qualify as a High PSI Intersection, the expected number of crashes of "Fatal & Injury Crashes" is greater than the LOSS IV limit, and have at least 5 fatal, serious or moderate crashes at the intersection for a 5-year period. The 2021 High PSI Sections and 2021 High PSI Intersections annual reports were used to identify the High PSI locations in St. John Parish and they are described below.

High PSI Segments:

- Louisiana State Highway 18 (LA 18 from LA 3213 to the Parish Line) - 2-lane urban roadway with an AADT of 3,100 vehicles per day;
- Interstate 10 (I-10 from US 51 Interchange to the Parish Line) – 4-lane urban freeway with an AADT of 64,100 vehicles per day; and
- United States Highway 61 (US 61 from US 51 to LA 3188) with an AADT of 36,300 vehicles per day.

High PSI Intersections:

- Louisiana State Highway 3188 at St. Andrews
- United States Highway 61 at Emmett
- United States Highway 61 at Cambridge

- United States Highway 51 at United States Highway 61
- United States Highway 61 at Louisiana State Highway 3188
- United States Highway 61 at Louisiana State Highway 3224
- United States Highway 61 at Louisiana State Highway 44
- United States Highway 61 at Whitlow

Local Road System

Due to a lack of annual average daily traffic (AADT) information on local roads across the state of Louisiana, the LADOTD has not employed the LOSS methodology for the local roadway system yet. Therefore, for locally-owned roads the Equivalent Property Damage Only (EPDO) methodology was employed.

The equivalent property damage only (EPDO) method is documented in the Highway Safety Manual. In this method, weighting factors related to the societal costs of fatal, injury, and property damage-only crashes are assigned to crashes by severity (typically, at a given location over three to five years) to develop an equivalent property damage-only score that considers frequency and severity of crashes. The sites are ranked from high to low EPDO score. Those sites at the upper end of the list may be selected for investigation. The resulting Top 25 locations in St. John Parish are as follows:

Table 23: High EPDO Segments, St John Parish

Primary Road	EPDO Score	Total Crash Cost
CARROLLWOOD	194.57	$ 5,520,375
CAMBRIDGE	184.36	$ 5,231,301
FAIRWAY	159.5	$ 4,524,608
ST ANDREWS	105.16	$ 2,982,949
SAWGRASS	77.16	$ 2,188,463
MAIN	74.98	$ 2,127,671
WOODLAND	70.64	$ 2,004,484
SUGAR RIDGE	70.51	$ 2,000,193
GREENWOOD	64.3	$ 1,824,249
LA 637	56.85	$ 1,612,846
CAPT. G. BOURGEOIS	49.74	$ 1,410,856
YORKTOWNE	48.68	$ 1,381,216
19TH	47.98	$ 1,361,548
12TH	46.53	$ 1,320,001
JACKSON	44.06	$ 1,249,571

BELLE POINT	35.98	$	1,020,870
MUSEUM	35.53	$	1,008,008
ORMOND	33.36	$	946,556
HISTORIC MAIN	31	$	879,575
HOMEWOOD	30.68	$	870,360
RAILROAD	28.7	$	814,476
ELLERSLIE	28.53	$	809,145
CHURCH	27.53	$	780,782
3RD	26.7	$	757,750
MADEWOOD	25.68	$	728,545

High-Injury Network and Intersection Analysis

In addition to the LADOTD network screening analysis and the local roads EPDO analysis, an all-roads High-Injury Network (HIN) analysis was also conducted. All crashes within St. John Parish were mapped in a GIS Database alongside the corresponding roadway segment and intersection data, and GIS tools were used to quantify how many crashes occurred along each roadway segment and within 250 feet of each intersection. In order to qualify as a HIN segment or intersection, at least one fatal injury crash or 5 total injury crashes throughout the study period were observed. This data was used to create a High Injury Network (HIN) map and Hot Spot Intersection map for St. John Parish. Figure 36 presents all crash locations, Figure 37 presents the overall HIN Network, and Figure 38 presents the Hot Spot Intersections.

Figure 36: St John the Baptist Parish All Crash Locations, 2017 – 2021

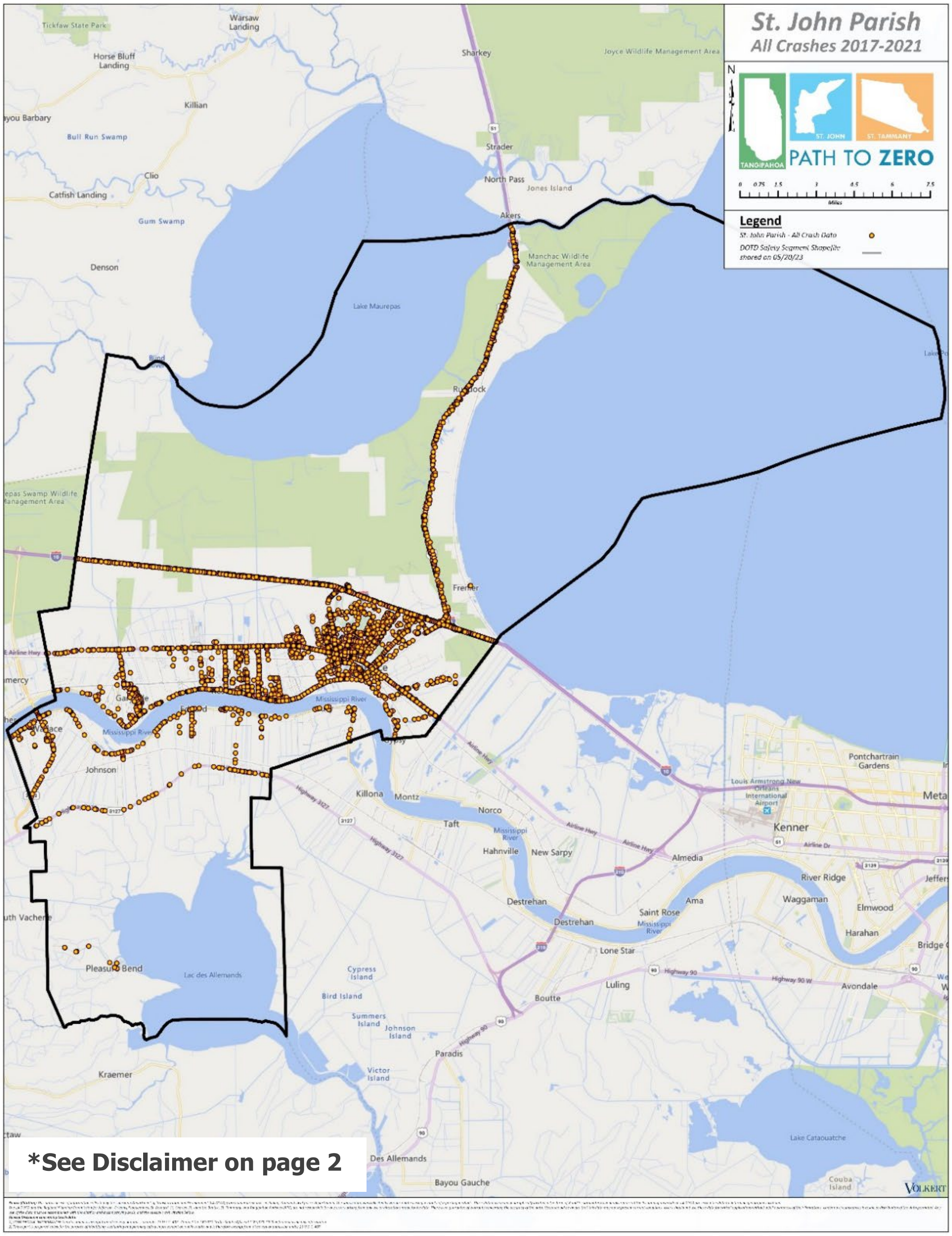


Figure 37: St. John the Baptist Parish High Injury Network Segments, 2017 – 2021

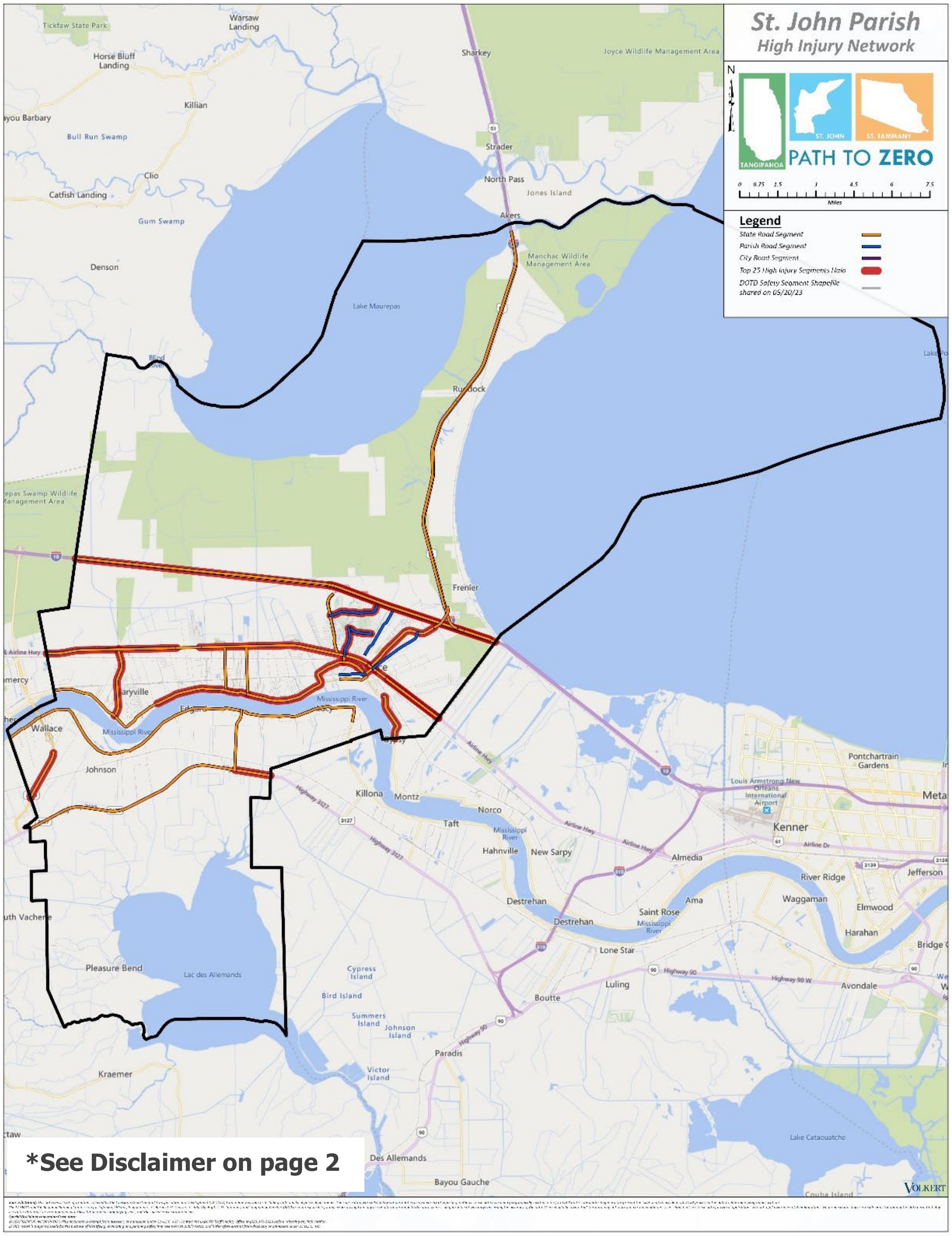
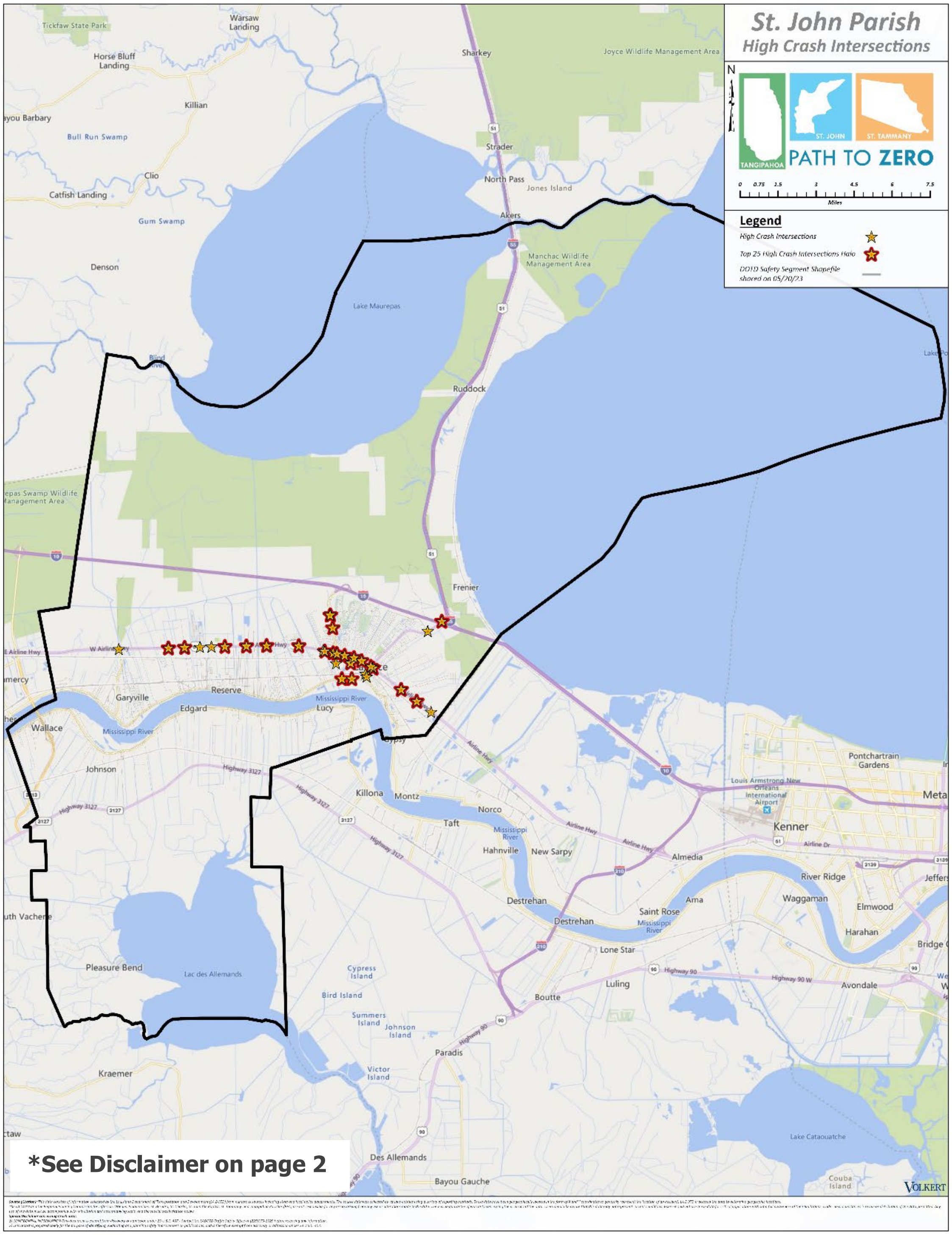


Figure 38: St. John the Baptist Parish Hot Spot Intersections, 2017-2021



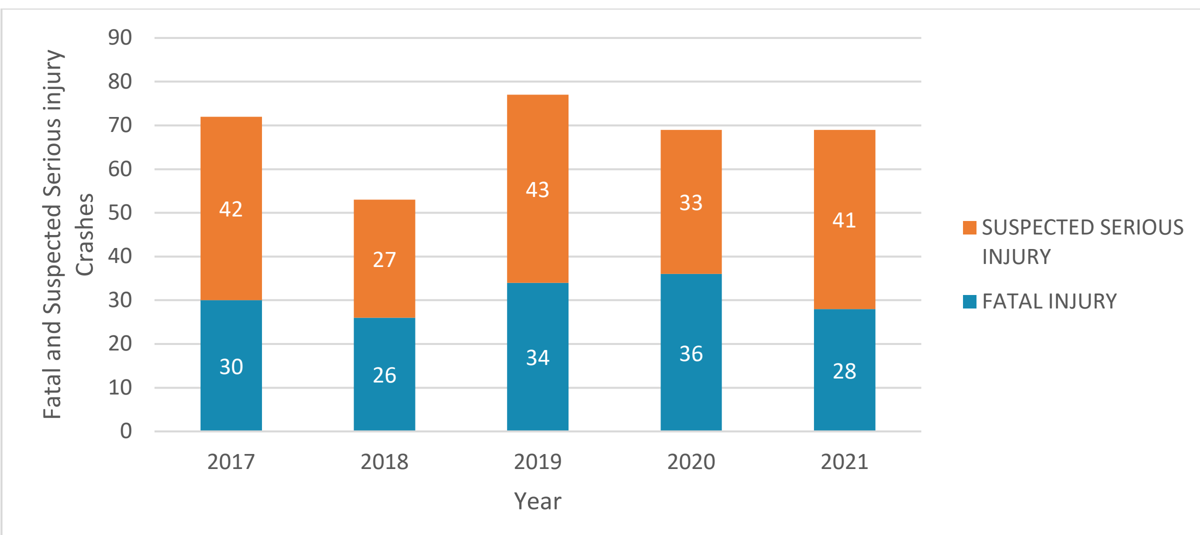
St. Tammany Parish Crash Data Analysis

The Path to Zero project involves St. John, St. Tammany, and Tangipahoa parishes and is part of the Safe Streets for All grant program, a federal program that funds local initiatives to prevent roadway fatalities and serious injuries. This safety analysis was based on historical crash data received from the New Orleans Regional Planning Commission (NORPC) for St. Tammany Parish during the five-year period that occurred from January 1, 2017, to December 31, 2021. The purpose of this analysis was to discern patterns and trends in crash types, locations, contributing factors, and environmental factors for all reported fatal and suspected serious injury crashes that occurred during the five-year analysis period in St. Tammany Parish.

Historical Crash Analysis

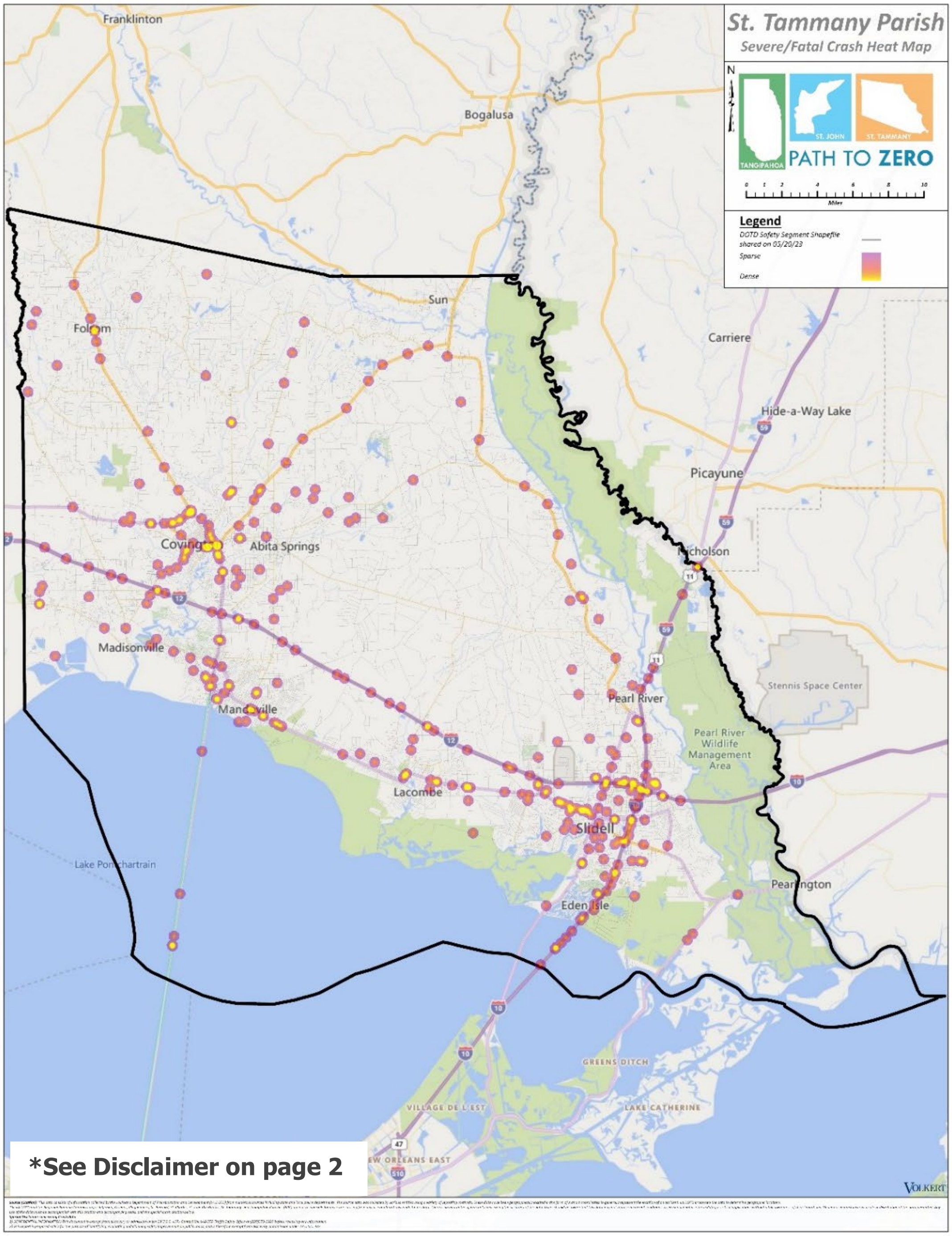
Within St. Tammany Parish, there were 154 fatal crashes and 186 suspected serious injury crashes reported during the five-year analysis period. Figure 39 illustrates the fatal and suspected serious injury crashes reported by year within St. Tammany Parish. Variation occurred year-to-year, but the number of fatal and suspected serious injury crashes within the region remained relatively steady, aside from a small dip in 2018. No specific contributing factor was determined that might have contributed to the crash reduction in 2018.

Figure 39: Crash Severity by Year, 2017 - 2021



Crash locations appear to be concentrated on major corridors such as I-10, I-12, and US 190, especially where land use is developed more intensely. Figure 40 shows crash clusters where fatal and suspected serious injury crashes occurred throughout St. Tammany Parish from 2017 to 2021. The map shows a higher concentration of crashes reported around Slidell and Covington regions.

Figure 40: Fatal and Suspected Serious Injury Crash Locations, 2017 – 2021



Crash Types

The most common crash type among the fatal and suspected serious injury crashes reported in the five-year analysis period was Non-Motor Vehicle related crashes (Off-Road + Other), which accounted for approximately 50 % of all fatal and suspected serious injury crashes in St. Tammany Parish. Rear end crashes (16%) and Right Angle (15%) were the next most common crash types reported. Pedestrian related crashes were reported to be 12%. Table 24 summarizes the fatal and suspected serious injury crashes reported during the five-year analysis period by crash type.

Table 24: Crash Type by Year, 2017 – 2021

Crash Type	Year					Total
	2017	2018	2019	2020	2021	
Off Road	18	15	38	28	29	**128**
Rear End	9	9	13	11	4	**46**
Pedestrian	11	7	8	9	7	**42**
Left Turn	6	4	4	3	5	**22**
Other	5	1	2	5	3	**16**
Angle	9	7	4	7	11	**38**
Head On	4	6	0	4	5	**19**
Sideswipe	5	0	5	1	0	**11**
Bicycle	5	3	3	1	4	**16**
Animal	0	0	0	0	1	**1**
Right Turn	0	1	0	0	0	**1**
Total	*72*	*53*	*77*	*69*	*69*	**340**

(NOTE: Pedestrian, Bicycle, and Animal crashes were counted independently from the other manners of collision to avoid being counted twice. All "Not a Collision Between Motor Vehicle" crashes not categorized as Road Departure were counted as "Other.")

Environmental Circumstances

The environmental circumstances contributing to crashes can be helpful in determining potential areas for improvement within the roadway network to better accommodate the traveling public. Environmental circumstances such as lighting, weather, and surface conditions were evaluated for 340 fatal and suspected serious injury crashes reported in St. Tammany Parish. Table 25 summarizes the contributing circumstances as reported during the five-year analysis period.

Approximately 35% of fatal and suspected serious injury crashes reported in the St. Tammany Parish during the five-year analysis period occurred under dark conditions (including dawn and dusk). Approximately 31% were coded as 'Dark – Not Lighted' indicating that there was no street or intersection lighting present at the location of the crash.

Approximately 14% of fatal and suspected serious injury crashes reported in the St. Tammany Parish during the five-year analysis period occurred with wet surface conditions, and approximately 10 percent (10%) occurred during rainy weather conditions. Surface and weather conditions do not appear to be a contributing factor to crashes.

Table 25: Crashes by Contributing Circumstances, 2017 – 2021

Light Conditions	Year					Total
	2017	2018	2019	2020	2021	
Daylight	36	32	37	37	26	**168**
Dawn/Dusk	4	0	4	0	5	**13**
Dark - Lighted	14	6	7	10	14	**51**
Dark - Not Lighted	18	15	28	22	24	**107**
Other	0	0	1	0	0	**1**
Total	*72*	*53*	*77*	*69*	*69*	**340**
Surface Conditions	**Year**					**Total**
	2017	2018	2019	2020	2021	
Dry	64	44	68	59	57	**292**
Wet	8	9	9	10	12	**48**
Other	0	0	0	0	0	**0**
Total	*72*	*53*	*77*	*69*	*69*	**340**
Weather Conditions	**Year**					**Total**
	2017	2018	2019	2020	2021	
Clear	59	37	61	52	46	**255**
Cloudy	5	10	8	8	13	**44**
Rain	6	5	7	8	9	**35**
Other	2	1	1	1	1	**6**
Total	*72*	*53*	*77*	*69*	*69*	**340**

(NOTE: For Lighting conditions, "Other," "Not reported," and "Unknown" light conditions were included in the "Other" row. For Surface Conditions, "Ice/Frost," "Mud, Dirt, Gravel," "Not Reported," "Other," and "Unknown" surface conditions were included in the "Other" cells. For Weather Conditions, "Fog, Smog, Smoke," "Severe Crosswind," "Blowing Sand, Soil, Dirt," "Sleet/Hail," "Snow" "Not Reported," "Other," and "Unknown" were included in the "Other" cells.)

Temporal Patterns

The 340 fatal and suspected serious injury crashes reported in St. Tammany Parish during the five-year analysis period were evaluated over temporal conditions as well.

Figure 41 below illustrates the monthly trends in crashes reported in St. Tammany Parish. The late summer, August, was the month with the highest number of crashes, and the fewest crashes were reported during the spring months, February, and March. The rest of the months reported a similar number of crashes.

Figure 41: Crashes by Month, 2017 - 2021

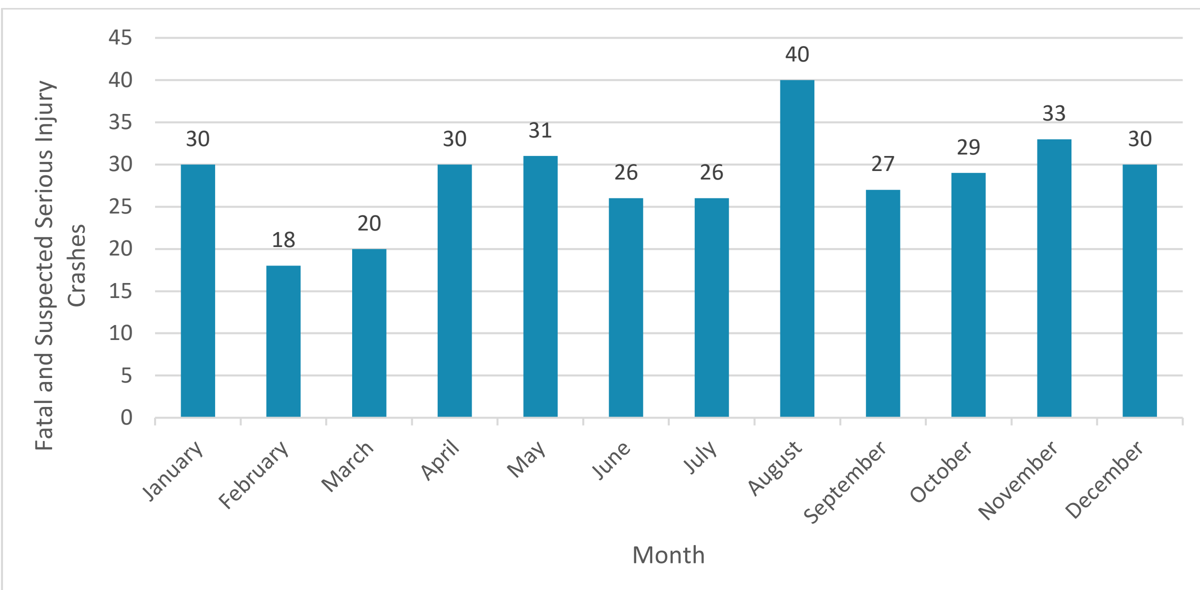


Figure 42: Crashes by Weekday, 2017 - 2021

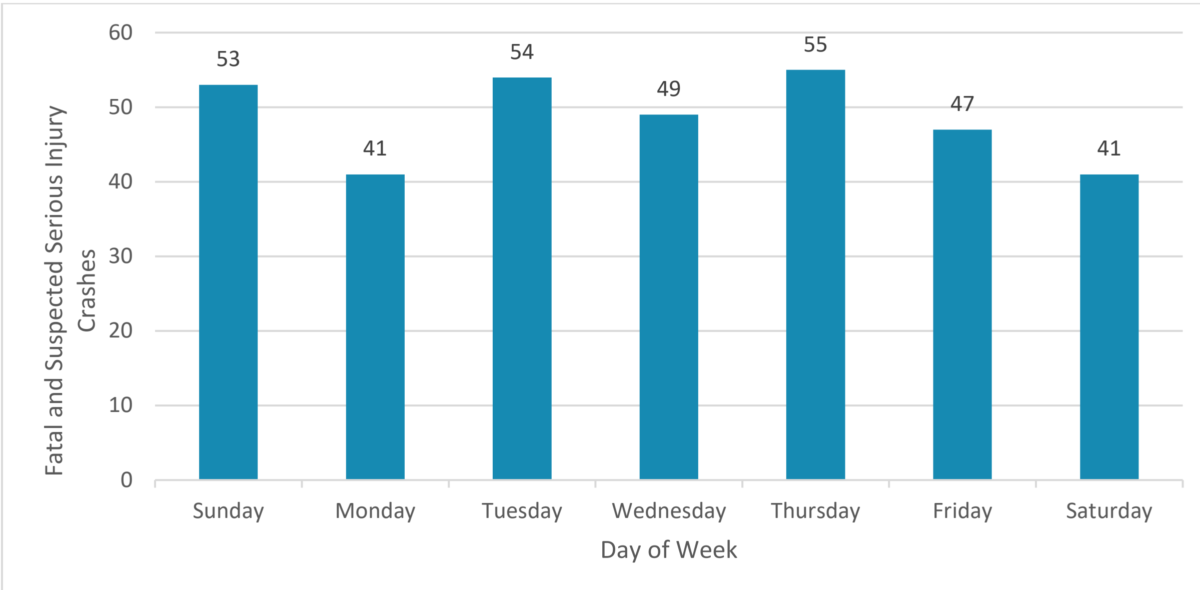
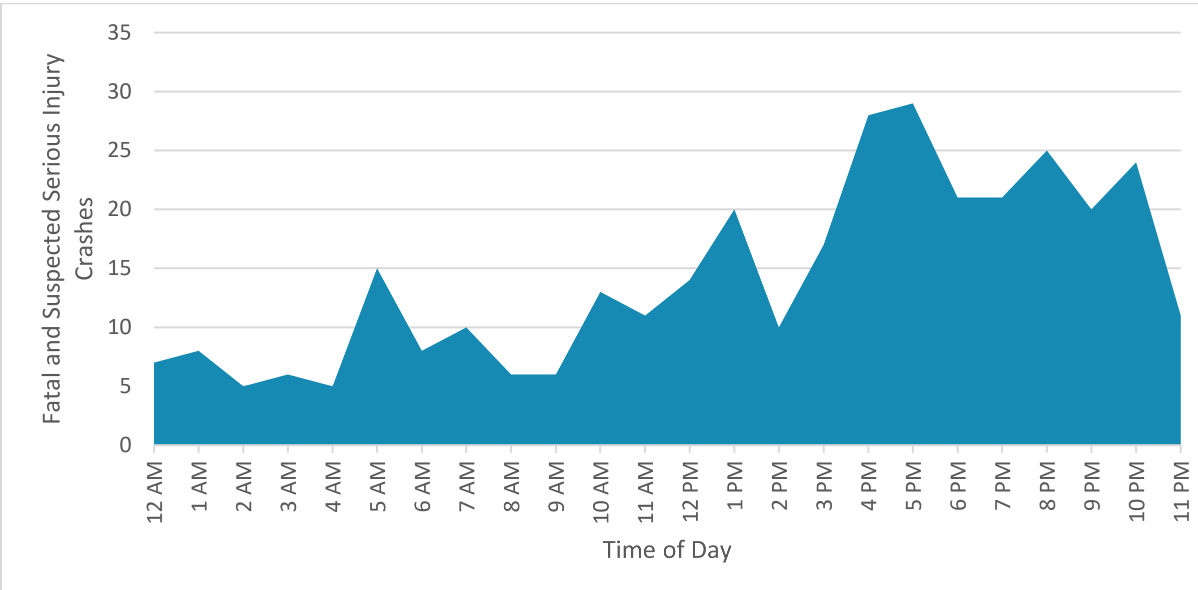


Figure 42 below illustrates the weekly trends in crashes reported in St. Tammany Parish. Fatal and suspected serious injury crashes didn't report any specific trend in crash occurrence by the day of the week. Compared to the weekly trend, most crashes were observed on Sunday, Tuesday, and Thursday.

Figure 43 illustrates the time-of-day trends in crashes reported in St. Tammany Parish. The occurrence of fatal and suspected serious injury crashes in the dataset correlates with typical traffic patterns, indicating a small uptick during the typical morning peak traffic period, and a more significant increase during the typical evening peak traffic period around 4:00 PM and 5:00 PM. Consistent with the previously noted finding that approximately 35% of fatal and suspected serious injury crashes occurred under dark conditions, approximately 25% of reported crashes occurred between 9:00 PM to 4:00 AM, of which approximately 38% involved alcohol.

Figure 43: Crashes by Time of Day, 2017 – 2021



Demographic Patterns

The 340 fatal and suspected serious injury crashes reported in St. Tammany Parish during the five-year analysis period were evaluated for patterns related to certain at-risk populations as well. Crashes involving aging drivers (age 65 or older), young drivers (ages 15-24), and drivers under the influence of alcohol or drugs were evaluated. Table 26 summarizes the involvement of these demographic characteristics in the crash data that was evaluated. Note that the crashes quantified in Table 26 are not mutually exclusive; two or more of the demographic categories included in the table could be involved in any one crash. For example, an aging driver could also be a driver under the influence of alcohol or drugs.

Approximately 21% of fatal and suspected serious injury crashes reported in St. Tammany Parish during the five-year analysis period involved alcohol use by one or more of the individuals involved in the crash.

Aging drivers were involved in approximately 19% of the crashes reported during the five-year analysis period, and young drivers were involved in approximately 26%.

Table 26: Demographic Characteristics in Fatal and Suspected Serious Injury Crashes, 2017 – 2021

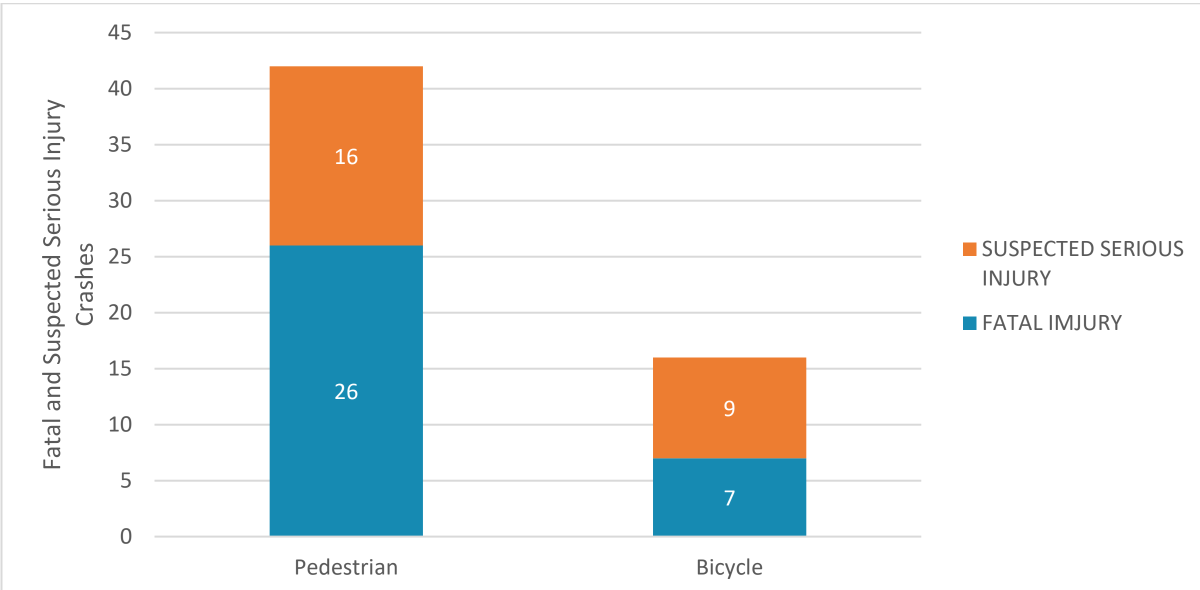
Demographic Information	Year					Total
	2017	2018	2019	2020	2021	
Aging Driver	11	10	16	14	13	**64**
Young Driver	19	14	14	18	23	**88**

Alcohol-Involved	Year					Total
	2017	2018	2019	2020	2021	
Parish-level Fatal and Suspected Serious Injury Crashes	8	8	23	16	15	**70**
% of Total Crashes	11%	15%	30%	23%	22%	**20%**
Statewide % of Total Crashes	21%	22%	22%	21%	21%	**21%**

Pedestrian and Bicycle Crash Summary

Among the 340 fatal and suspected serious injury crashes, there were 42 pedestrian crashes and 16 bicyclist crashes recorded within St. Tammany Parish during the five-year analysis period as shown in Figure 44 below.

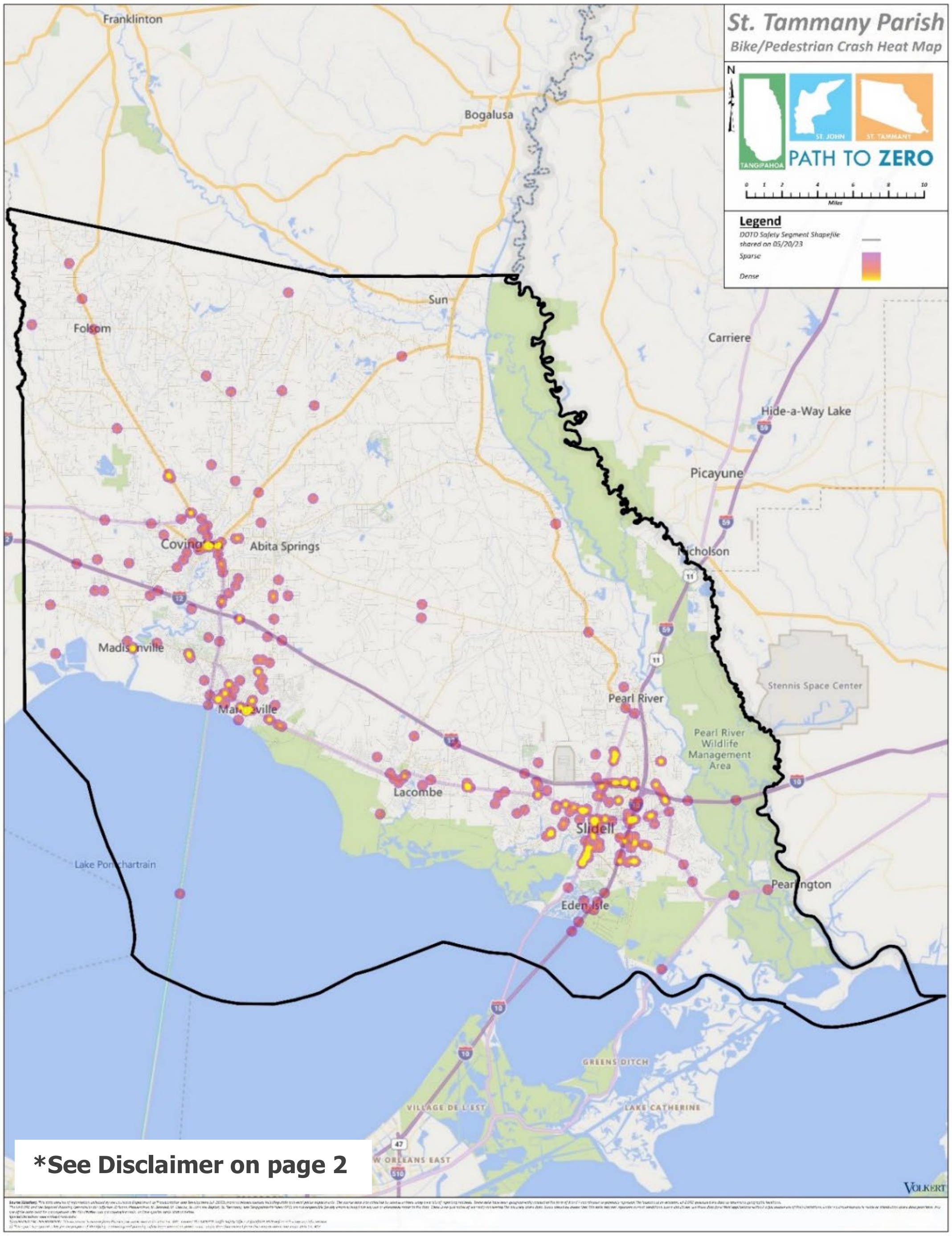
Figure 44: Pedestrian and Bicyclist Fatal and Suspected Serious Injury Crashes, 2017–2021



A majority of the pedestrian and bicycle crashes, approximately 50%, occurred under dark conditions. Just 12% of pedestrian crashes occurred with wet surface conditions and 18% of bicycle crashes occurred with wet surface conditions. A majority of pedestrian crashes, approximately 40%, and bicycle crashes, approximately 56%, within the region were attributed to the involvement of alcohol: 17 pedestrian crashes and 9 bicycle crashes.

Pedestrian and bicycle crashes more often occur in Slidell and Covington, where vulnerable road users, such as pedestrians and bicyclists, are more likely to be utilizing the roadway network. Figure 45 shows all pedestrian and bicyclist crashes throughout the parish.

Figure 45: Pedestrian and Bicyclist Crash Locations, 2017 – 2021



State Highway System

The Louisiana Department of Transportation (LADOTD) has a sophisticated methodology for identifying locations on state routes that may have a high potential for safety improvement (High PSI). LADOTD has developed total crash and fatal/injury safety performance functions (SPFs) for each facility type using methodologies from AASHTO's Highway Safety Manual. The LADOTD uses the Level of Service of Safety (LOSS) methodology for identifying High PSI locations and produces an annual report of High PSI locations for planners and engineers to use in developing projects. To qualify as a High PSI Segment, the expected number of crashes of "Fatal & Injury Crashes" is greater than the LOSS IV limit, and have at least 3 fatal, serious or moderate crashes on the segment for a 3-year period. To qualify as a High PSI Intersection, the expected number of crashes of "Fatal & Injury Crashes" is greater than the LOSS IV limit, and have at least 5 fatal, serious or moderate crashes at the intersection for a 5-year period. The 2021 High PSI Sections and 2021 High PSI Intersections annual reports were used to identify the High PSI locations in St. Tammany Parish and they are described below.

High PSI Segments:

- LA 437, a two-lane rural roadway, from Johnsen Rd to Highway 40 – with 38 Fatal & Injury Crashes in the last 3 years.
- US 11, a two-lane urban roadway, from Lafayette St to Powell Dr – with 30 Fatal & Injury Crashes in the last 3 years.
- US 190 (Gause Blvd), a four-lane urban undivided roadway, from US 11 (Front St) to LA 1091 (Robert Blvd) - with 22 Fatal & Injury Crashes in the last 3 years.
- Highway 433, a four-lane urban undivided roadway, from Hudson Dr to Voters Rd - with 14 Fatal & Injury Crashes in the last 3 years.
- US 190 (Gause Blvd), a four-lane urban divided roadway, from 14th St to I-10 - with 52 Fatal & Injury Crashes in the last 3 years.
- US 190, a four-lane urban divided roadway, from Lasalle St to Asbury Dr / St Joseph St - with 27 Fatal & Injury Crashes in the last 3 years.
- US 190(Gause Blvd), a three-lane urban roadway, from Northshore Blvd to US 11 (Front St) - with 136 Fatal & Injury Crashes in the last 3 years.

High PSI Intersections:

- US 190 at US 190 Bus (W 21st Ave) – with 15 Fatal & Injury Crashes in the last 5 years.

- US 190 (Collins Blvd) at LA 437 (Lee Rd) – with 15 Fatal & Injury Crashes in the last 5 years.
- US 190 (Collins Blvd) at E 32nd Ave – with 17 Fatal & Injury Crashes in the last 5 years.
- US 190 (Collins Blvd) at Claiborne Ave – with 22 Fatal & Injury Crashes in the last 5 years.
- US 190 at Privette Blvd – with 14 Fatal & Injury Crashes in the last 5 years.
- LA 25 at Airport Ln – with 11 Fatal & Injury Crashes in the last 5 years.
- US 190 at Pruden Rd – with 12 Fatal & Injury Crashes in the last 5 years.
- LA 21 (Tyler St) at W 19th Ave – with 13 Fatal & Injury Crashes in the last 5 years.
- LA 437 (W 30th Ave) at N Florida St – with 13 Fatal & Injury Crashes in the last 5 years.
- US 11 (Front St) at US 190 Bus (Fremaux Ave) – with 30 Fatal & Injury Crashes in the last 5 years.
- US 11 (Front St) at US 190 (Gause Blvd) – with 32 Fatal & Injury Crashes in the last 5 years.

Local Road System

Due to a lack of annual average daily traffic (AADT) information on local roads across the state of Louisiana, the LADOTD has not employed the LOSS methodology for the local roadway system yet. Therefore, for locally-owned roads the Equivalent Property Damage Only (EPDO) methodology was employed.

The equivalent property damage only (EPDO) method is documented in the Highway Safety Manual. In this method, weighting factors related to the societal costs of fatal, injury, and property damage-only crashes are assigned to crashes by severity (typically, at a given location over three to five years) to develop an equivalent property damage-only score that considers frequency and severity of crashes. The sites are ranked from high to low EPDO score. Those sites at the upper end of the list may be selected for investigation. The resulting Top 25 locations in St. Tammany Parish are as follows:

Table 27: High EPDO Segments, St. Tammany Parish

Primary Road	EPDO Score	Total Crash Cost
LAKE PONTCHARTRAIN	519.87	$ 14,748,825
NORTHSHORE	418.77	$ 11,883,073
BREWSTER	306.34	$ 8,691,750
BROWNSWITCH	306.15	$ 8,686,605
HARRISON	285.19	$ 8,092,243
LOWE DAVIS	273.31	$ 7,751,948
AIRPORT	242.46	$ 6,878,663
HOWZE BEACH	164.7	$ 4,672,196
MONROE	164.46	$ 4,666,036

FLORIDA	154.68	$	4,388,660
FISH HATCHERY	153.42	$	4,352,350
PINE	152.8	$	4,334,762
VOTERS	130.38	$	3,699,292
CARROLL	127.38	$	3,613,881
PONTCHARTRAIN	108.46	$	3,076,733
8TH	106.16	$	3,011,312
PARK	99.03	$	2,808,802
BAYOU PAQUET	96.14	$	2,727,162
FOREST	95.35	$	2,704,243
TYLER	92.38	$	2,621,459
BROWNSVILLAGE	85.72	$	2,431,726
OAK HARBOR	83.55	$	2,370,274
HALL	80.38	$	2,281,103
DOWNS	79.8	$	2,263,297
CARR	78.16	$	2,216,826

High-Injury Network and Intersection Analysis

In addition to the LADOTD network screening analysis and the local roads EPDO analysis, a separate all roads HIN analysis was performed for segments and intersections. For initial screening, to qualify as a HIN segment or intersection, the site should have at least one fatal injury crash or 5 total injury crashes throughout the study period. The sites are ranked from high to low-risk severity score, and all top segments that cumulate to 50% of parish segment crashes were selected for further detailed analysis. A similar process was applied for intersection screening. A High Injury Network (HIN) segment map and a Hot Spot Intersection map were created for St. Tammany Parish. Figure 47 shows all segment locations (148 segments) and Figure 48 shows all Hot Spot Intersections (126 intersections) that are selected for detailed evaluations.

Figure 46: All Crashes, St. Tammany Parish, 2017-2021

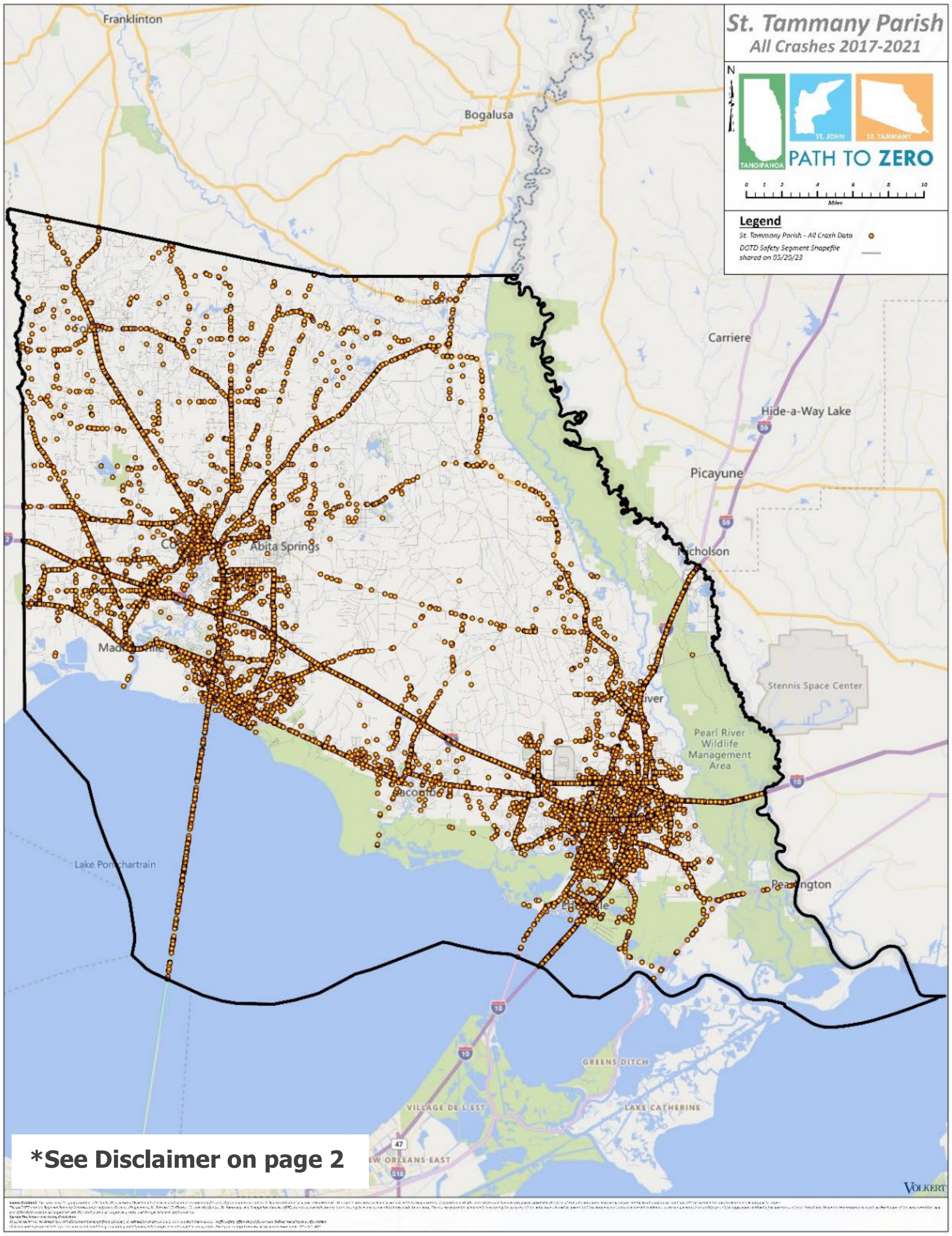


Figure 47: High Injury Network – Segments, 2017 – 2021

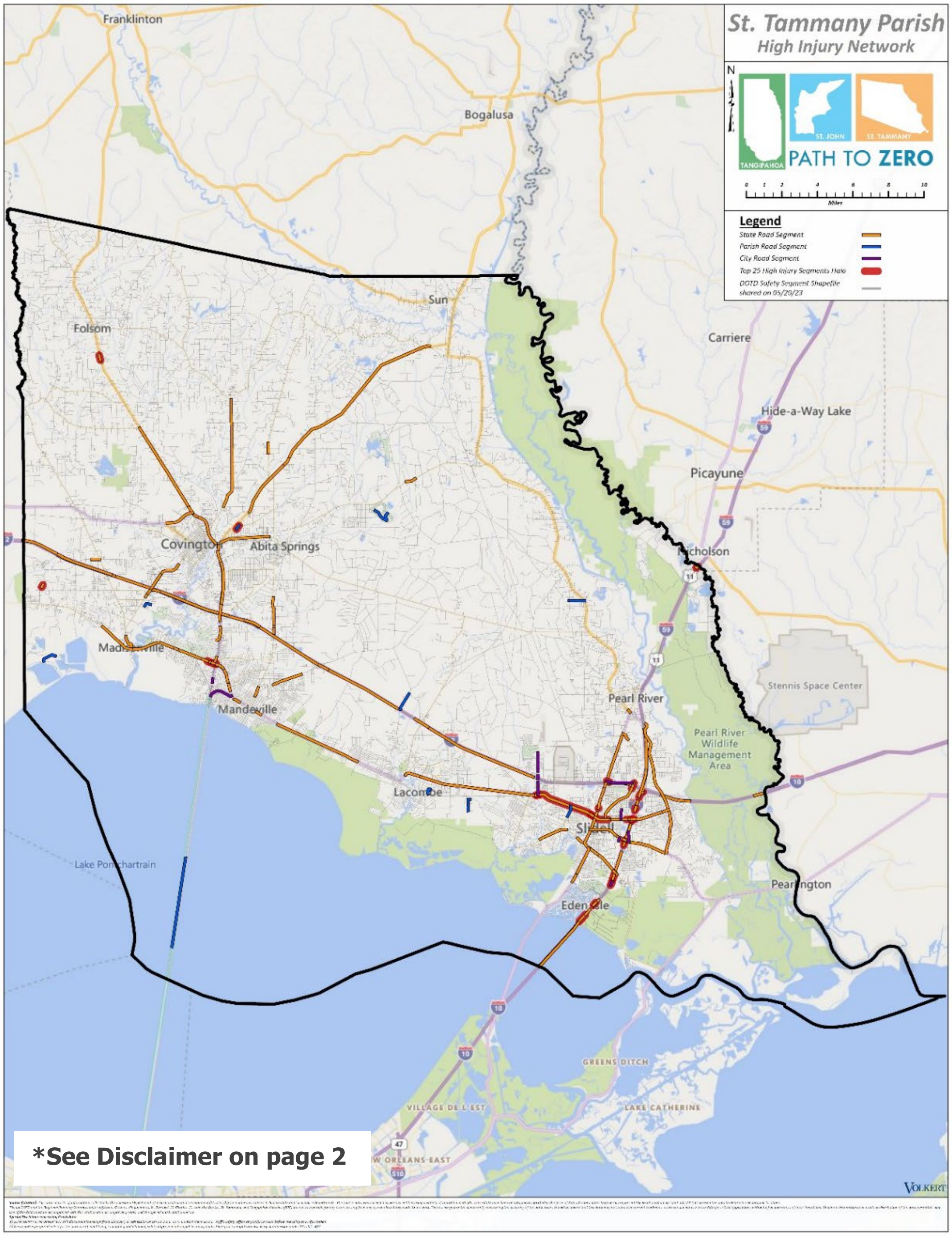
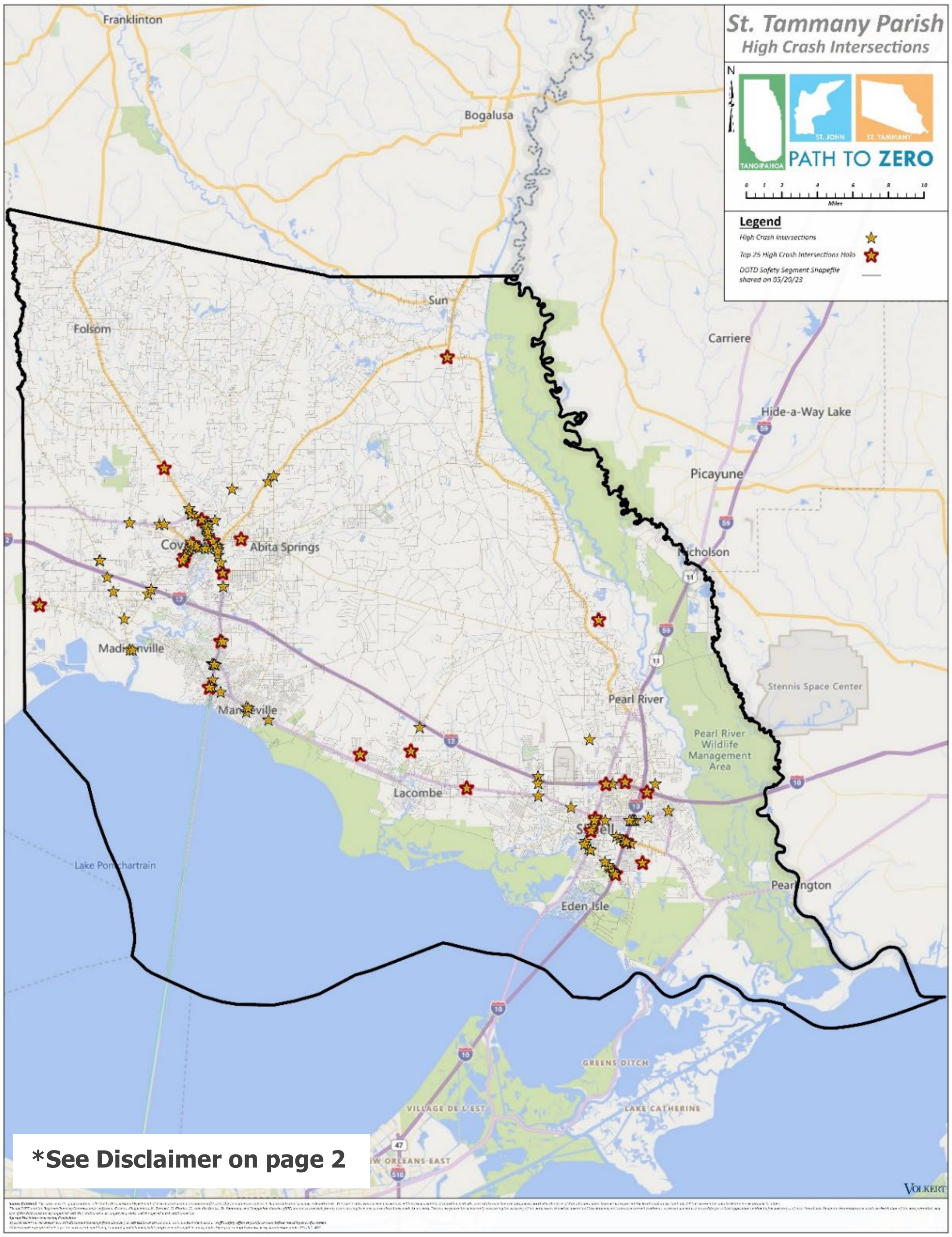


Figure 48: High Injury Network – Intersections, 2017-2021



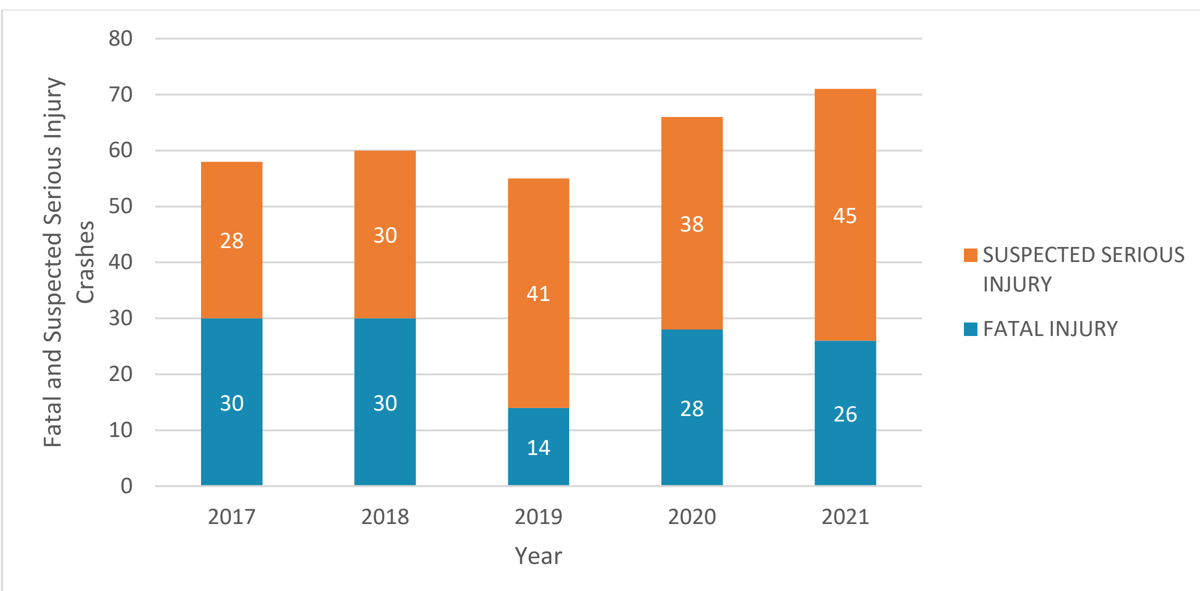
Tangipahoa Parish Crash Data Analysis

The Path to Zero project includes St. John, St. Tammany, and Tangipahoa parishes and is part of the Safe Streets for All grant program, a program that funds local initiatives to prevent roadway fatalities and serious injuries. This safety analysis was based on historical crash data received from the NORPC for Tangipahoa Parish during the five-year period that occurred from January 1, 2017, to December 31, 2021. The purpose of this analysis was to discern patterns and trends in crash types, locations, contributing factors, and environmental factors for all reported fatal and serious injury crashes in Tangipahoa Parish during the five-year analysis period.

Historical Crash Analysis

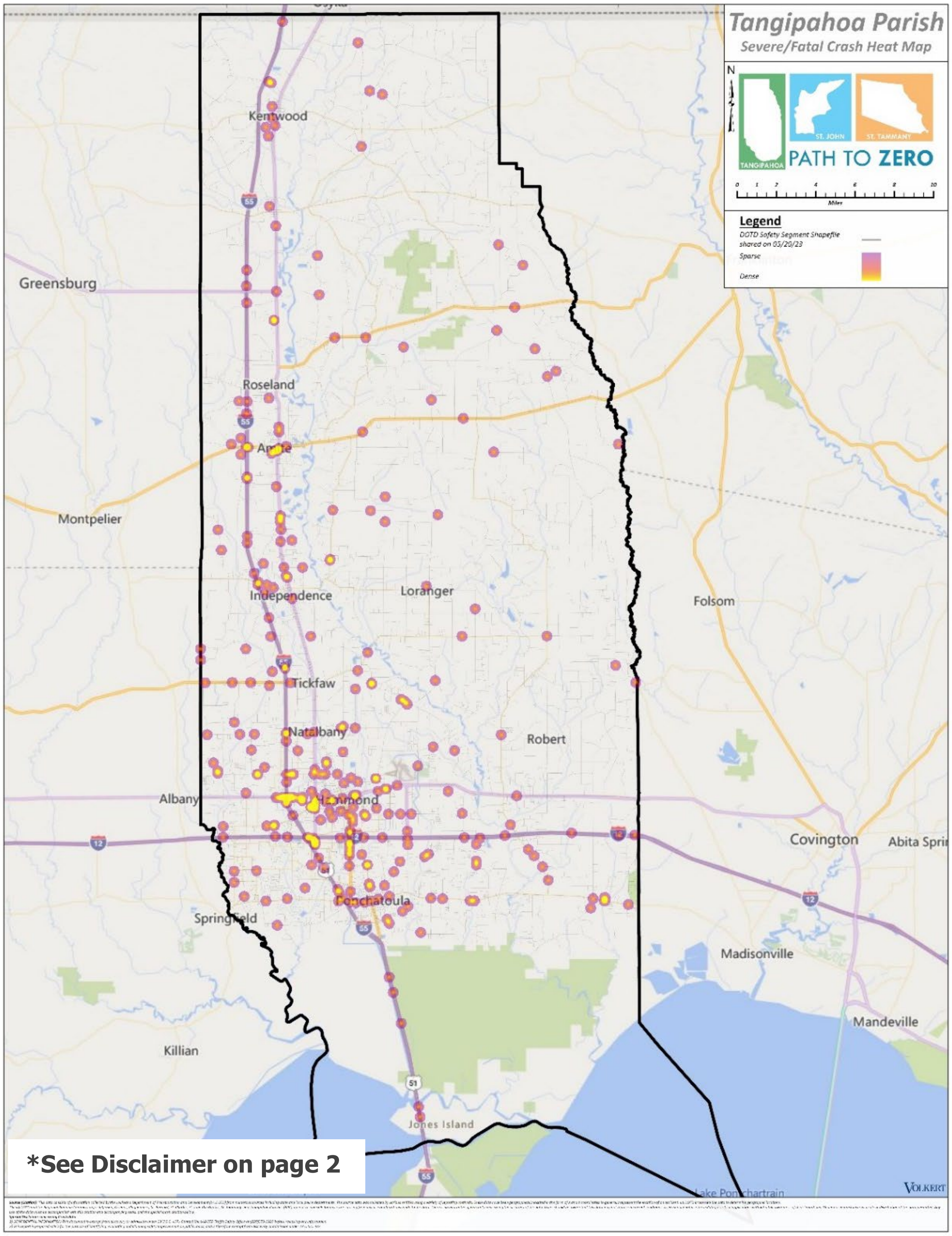
Between 2017 and 2021, 128 fatal crashes and 182 suspected serious injury crashes were reported in Tangipahoa Parish. Figure 49 presents the number of fatal and suspected serious injury crashes per year. The number of reported crashes fluctuated over the five-year period, with the lowest number of fatal and suspected serious injury crashes occurring in 2019 and the highest number in 2021.

Figure 49: Crash Severity by Year, 2017 – 2021



Crash locations appear to be concentrated on major corridors such as US 51 and US 190, especially where land use is developed more intensely. Figure 50 shows crash clusters where fatal and suspected serious injury crashes occurred throughout St. Tangipahoa Parish from 2017 to 2021.

Figure 50: Fatal and Suspected Serious Injury Crashes, 2017-2021



Crash Types

The breakdown of fatal and suspected serious injury crashes by crash is presented in Table 28. Among the fatal and suspected serious injury crashes, off-road crashes were the most common, which accounted for approximately 42% of all crashes. The next most common crash types were pedestrian (15%) and rear-end (12%).

Table 28: Crash Type by Year, 2017-2021

Crash Type	Year					Total
	2017	2018	2019	2020	2021	
Off Road	25	24	25	25	31	**130**
Rear End	9	7	5	9	8	**38**
Pedestrian	6	12	5	10	12	**45**
Left Turn	3	1	4	5	4	**17**
Other	4	2	2	2	3	**13**
Angle	5	4	3	4	7	**23**
Head On	4	3	4	5	1	**17**
Sideswipe	0	1	4	6	3	**14**
Bicycle	2	5	1	0	1	**9**
Animal	0	1	1	0	0	**2**
Right Turn	0	0	1	0	1	**2**
Total	*58*	*60*	*55*	*66*	*71*	**310**

Note: Off Road, Pedestrian, Bicycle, and Animal crashes were counted independently from the other manners of collision to avoid being counted twice. All "Not a Collision Between Two Motor Vehicles" crashes not categorized as Off Road, Pedestrian, Bicycle, or Animal were counted as "Other."

Environmental Circumstances

An evaluation of environmental elements including weather, lighting, and surface conditions was conducted. The breakdown of these contributing circumstances is presented in Table 29.

Fatal and suspected serious injury crashes were most common during dark conditions. Approximately 51% of all crashes occurred under dark lighting conditions.

Approximately 86% of the crashes occurred on dry pavement, and approximately 92% occurred during clear or cloudy weather conditions. The data indicated that surface and weather conditions were not contributing factors.

Table 29: Crashes by Environmental Circumstances, 2017 – 2021

Light Conditions	Year					Total
	2017	2018	2019	2020	2021	
Daylight	25	20	27	37	27	**136**
Dawn/Dusk	4	3	3	2	1	**13**
Dark - Lighted	1	12	8	10	16	**47**
Dark - Not Lighted	26	24	17	17	26	**110**
Other	2	1	0	0	1	**4**
Total	*58*	*60*	*55*	*66*	*71*	**310**
Surface Conditions	**Year**					**Total**
	2017	**2018**	**2019**	**2020**	**2021**	
Dry	49	53	46	58	61	**267**
Wet	9	7	9	8	9	**42**
Other	0	0	0	0	1	**1**
Total	58	60	55	66	71	**310**
Weather Conditions	**Year**					**Total**
	2017	**2018**	**2019**	**2020**	**2021**	
Clear	40	44	36	54	49	**223**
Cloudy	14	11	13	7	16	**61**
Rain	4	3	4	5	5	**21**
Other	0	2	2	0	1	**5**
Total	*58*	*60*	*55*	*66*	*71*	**310**

Please note: For Lighting conditions, "Other," "Not reported," and "Unknown" light conditions were included in the "Other" row. For Surface Conditions, "Ice/Frost," "Mud, Dirt, Gravel," "Not Reported," "Other," and "Unknown" surface conditions were included in the "Other" category. For Weather Conditions, "Fog, Smog, Smoke," "Severe Crosswind," "Blowing Sand, Soil, Dirt," "Sleet/Hail," "Snow," "Not Reported," "Other," and "Unknown" were included in the "Other" category.

Temporal Patterns

The 310 fatal and suspected serious injury crashes reported in Tangipahoa Parish during the five-year analysis period were evaluated over temporal conditions as well. Monthly, weekly, and daily trends were examined. Figures 51, 52, and 53 present a breakdown of fatal and suspected serious injury crashes by month, day of the week and time of day.

Figure 51: Crashes by Month, 2017 - 2021

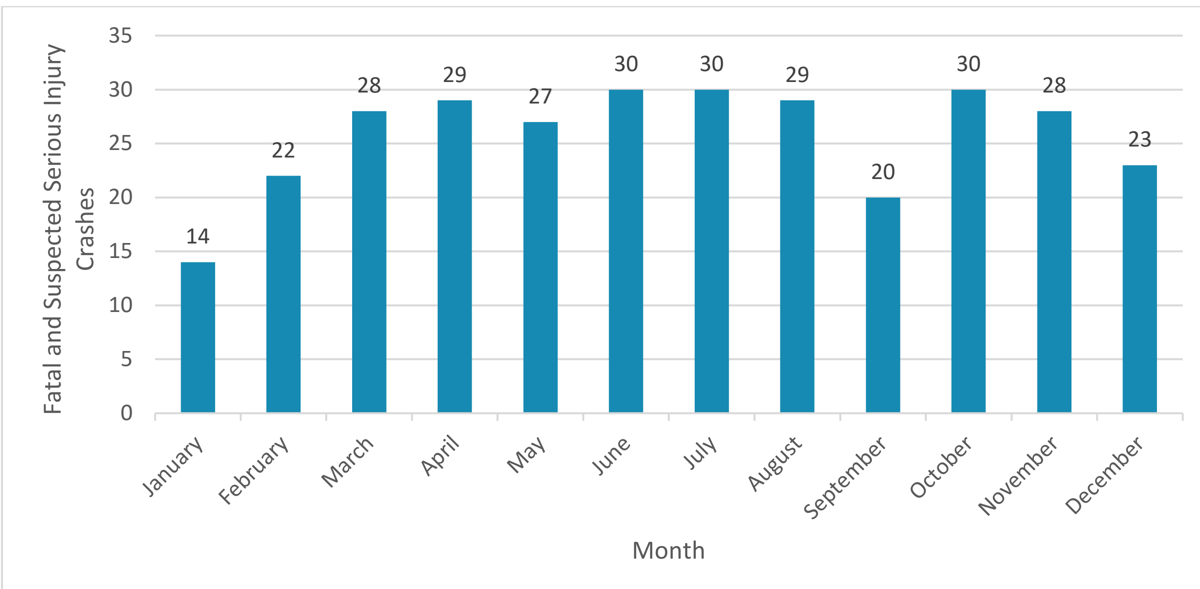


Figure 41 presents the number of reported fatal and suspected serious injury crashes per month. The monthly trends were fairly consistent, with the lowest number of crashes occurring during the months of January, February, and September. The highest number of crashes occurred during the months of June and August, accounting for roughly 29% of crashes. The lowest number of crashes occurred between the months of December and February, accounting for roughly 19% of crashes.

Figure 52: Crashes by Weekday, 2017 - 2021

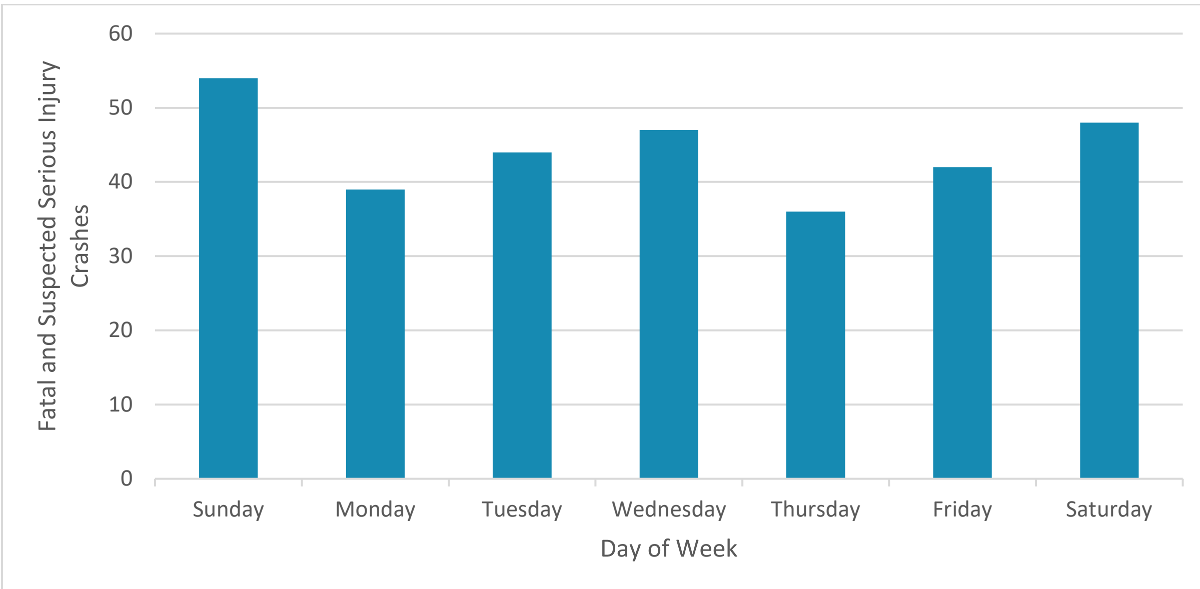


Figure 52 presents the weekly trends in reported fatal and suspected serious injury crashes in Tangipahoa Parish. Roughly 46% of crashes occurred on a Friday, Saturday, or Sunday. The largest number of fatal and suspected serious injury crashes occurred on Sundays, accounting for roughly 17%. The lowest number of crashes occurred on Thursdays, accounting for roughly 12%.

Figure 53: Crashes by Time of Day, 2017 - 2021

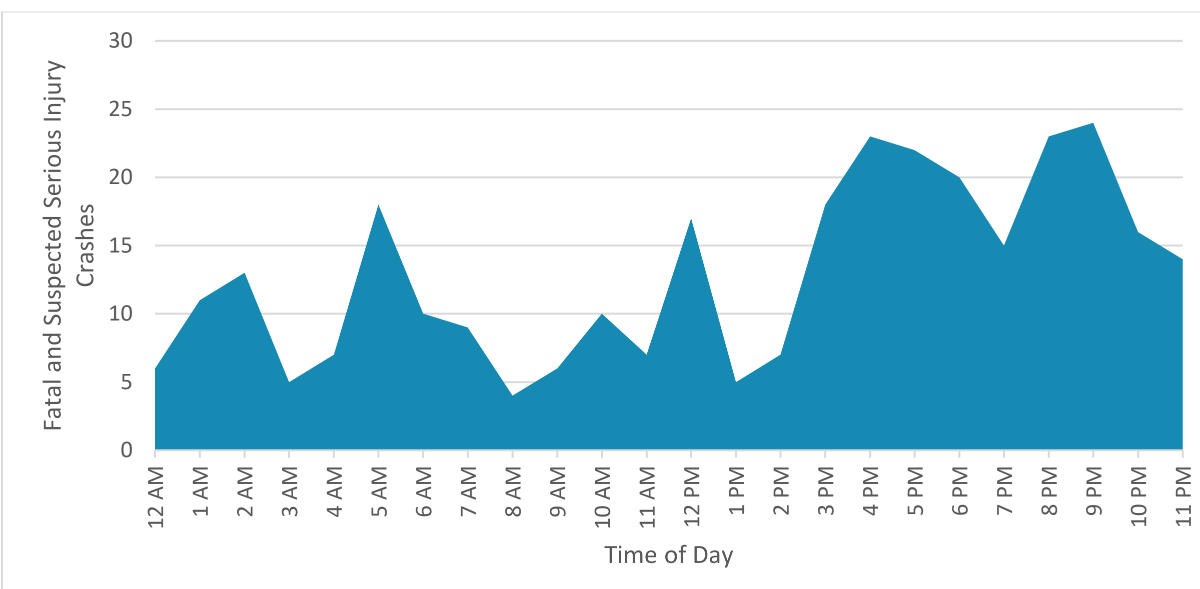


Figure 53 presents the number of reported fatal and suspected serious injury crashes based on time-of-day. The time-of-day trends indicated that fatal and suspected serious injury crashes were most common in the afternoon hours and evening hours, with roughly 47% of all crashes occurring between 3:00 PM and 9:00 PM. The highest number of crashes occurred between 4:00 PM and 7:00 PM, accounting for roughly 21% of all crashes. Furthermore, a spike in crashes between 5:00 AM and 7:00 AM as well as at 12:00 PM was observed. These trends are consistent with typical workday traffic patterns.

The data from Figure 53 supports findings that roughly 51% of fatal and suspected serious injury crashes occurred under dark conditions. Further analysis of the trends indicated that of the 144 crashes that occurred on a Friday, Saturday, or Sunday, roughly 53% occurred under dark conditions.

Demographic Patterns

A review of the reported fatal and suspected serious injury crashes quantified the percentage of crashes that involved alcohol, aging drivers (age 65 and older), and young drivers (ages 15-24). Roughly 14.2 % of all reported crashes during the five-year analysis period involved aging drivers while 28.4% involved young drivers. The percentage of reported crashes that involved alcohol was 19.8%, similar to the statewide percentage of 20.3%. Table 30 and Table 31 summarize the involvement of these demographic factors in the crash data that was evaluated.

Table 30: Age Factors in Fatal and Suspected Serious Injury Crashes, 2017 – 2021

Demographic Information	Year					Total
	2017	2018	2019	2020	2021	
Aging Driver	4	7	9	13	11	**44**
Young Driver	16	17	17	22	16	**88**

Table 31: Fatal and Suspected Serious Injury Crashes Involving Alcohol, 2017 – 2021

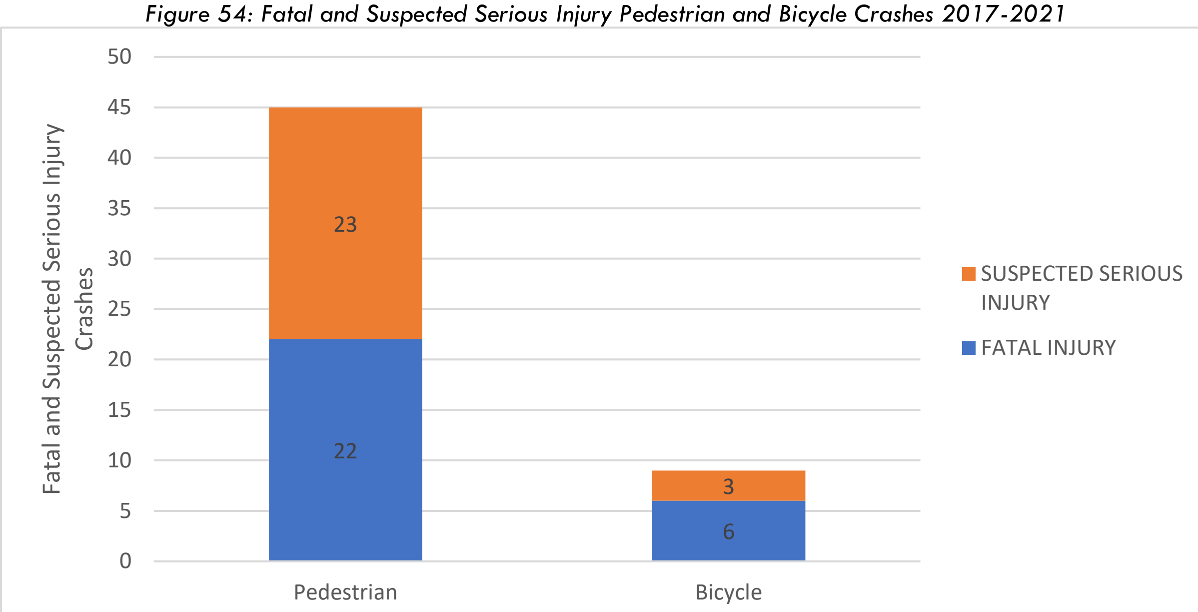
Alcohol-Involved	Year					Total
	2017	2018	2019	2020	2021	
Parish-level Fatal and Suspected Serious Injury Crashes	14	11	12	11	14	**62**
% of Total Crashes	24%	18%	22%	17%	20%	**20%**
Statewide % of Total Crashes	21%	22%	22%	21%	21%	**21%**

Pedestrian and Bicycle Crash Summary

A review of the fatal and suspected serious injury crashes also included quantifying pedestrian and bicycle crashes. Out of the 310 crashes, 45 were reported to have involved pedestrians and 9 involved bicycles. The breakdown of fatal vs suspected serious injury crashes involving pedestrians or bicycles is presented in Figure 54.

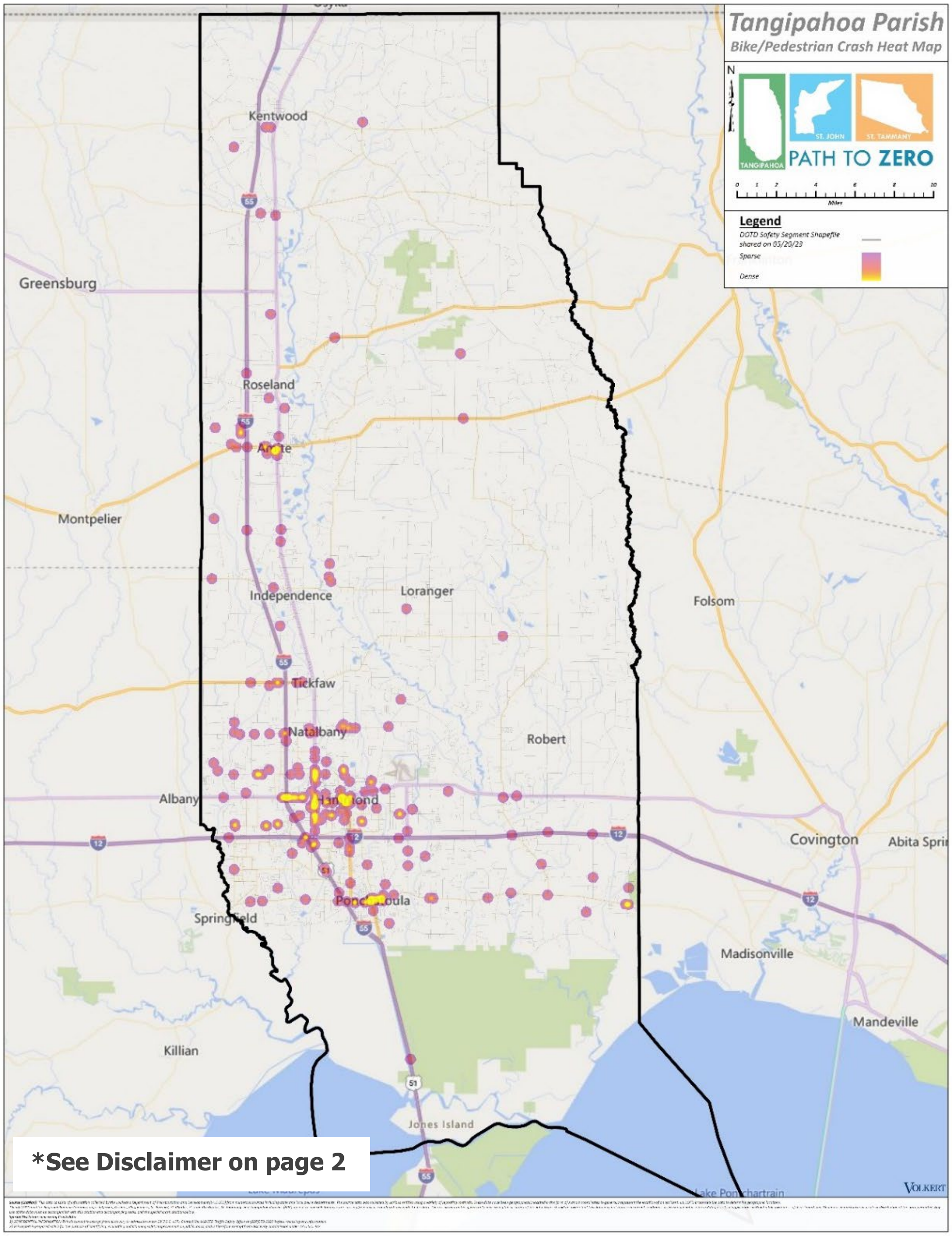
A review of the lighting conditions indicated that roughly 71% of pedestrian crashes and 67% of bicycle crashes occurred when it was dark.

Figure 54: Fatal and Suspected Serious Injury Pedestrian and Bicycle Crashes 2017-2021



Various maps (Figure 55 - Figure 58) were prepared to graphically present the crash data. The crash locations correlate with the population that is concentrated near the City of Hammond and along I-55.

Figure 55: Bicycle and Pedestrian Crashe Locations, 2017-2021



State Highway System

The Louisiana Department of Transportation has a sophisticated methodology for identifying locations on state routes that may have a high potential for safety improvement (High PSI). LADOTD developed total crash and fatal/injury safety performance functions (SPFs) for each facility type using methodologies from AASHTO's Highway Safety Manual. The LADOTD uses the Level of Service of Safety (LOSS) methodology for identifying High PSI locations and produces an annual report of High PSI locations for planners and engineers to use in developing projects. The 2021 High PSI Segments and 2021 High PSI Intersections annual reports were used to identify the High PSI locations in Tangipahoa Parish.

To qualify as a High PSI Intersection, the expected number of Fatal & Injury Crashes must be greater than the LOSS IV limit and have at least 5 fatal, serious, or moderate crashes at the intersection for a 5-year period.

High PSI Segments:

- LA 38 (From Allen Rd to parish line)
- US 51-X (From S 8th St to Gregoire Ln)
- US 190 (From Selser Canal to Bennett Rd/ River Rd)
- LA 16 (From Plueston Rd to Campo Rd)
- US 51-X (From W Club Deluxe Rd to Medical Arts Dr)
- LA 3158 (From I-12 to HWY 190)
- LA 1054 (From HWY 440 to Old Slaven Rd)
- US 51 (from Carter Ln to Old Genessee Rd)
- LA 1051 (From John Temple St to LA 1050)
- LA 22 (From Macedonia Rd to Dutch Ln)

High PSI Intersections:

- US 51-X at HWY 51
- US 51-X at W Oak St
- US 51-X at Campbell Rd
- US 51-X at S Oak St
- US 51-X at S Linden St

- LA 22 at SE Service Rd
- US 51 at W Mulberry St
- US 51-X at Natchez St
- US 51 at LA 1040
- US 51-X at Oak Meadow Ln
- US 190 at S Chestnut St
- US 51 at LA 3234
- US 51 at W Club Deluxe Rd
- US 51 at US 190

Local Road System

Due to a lack of annual average daily traffic (AADT) information on local roads across the state of Louisiana, the LADOTD has not employed the LOSS methodology for the local roadway system yet. However, the New Orleans Regional Planning Commission (NORPC) has provided a significant amount of local road traffic volume data. Therefore, the Equivalent Property Damage Only (EPDO) methodology was employed for local roads.

The equivalent property damage only (EPDO) method is documented in the Highway Safety Manual. In this method, weighted factors related to the societal costs of fatal, injury, and property damage-only crashes are assigned to crashes by severity (typically, at a given location over three to five years) to develop an equivalent property damage-only score that considers rate and severity of crashes. The sites are ranked from high to low EPDO score. Those sites at the upper end of the list shown below may be selected for further analysis. The resulting Top 25 locations in Tangipahoa Parish are shown in Table 32.

Table 32: High EPDO Segments, Tangipahoa Parish

Primary Road	EPDO Score	Total Crash Cost
RANGE	408.35	$ 11,586,740
CLUB DELUXE	327.76	$ 9,301,081
SISTERS	308.27	$ 8,746,106
WARDLINE	300.49	$ 8,525,125
OAK	294.49	$ 8,355,662
C M FAGAN	251.88	$ 7,147,969
FALLER	220	$ 6,240,030
HANO	212.03	$ 6,015,753
MINNESOTA PARK	196.06	$ 5,563,606
HOOVER	168.17	$ 4,771,964
DURBIN	154.31	$ 4,377,264
THIBODEAUX	142.89	$ 4,053,787
AIRPORT	123.15	$ 3,494,143
2ND	120.84	$ 3,427,864
DUMMY LINE	119.97	$ 3,402,865
BAPTIST	118.49	$ 3,362,063
WADESBORO	115.42	$ 3,273,912
BENNETT	113.83	$ 3,229,983
HAPPYWOODS	109.9	$ 3,118,296
MILTON	109.44	$ 3,104,254
COLEMAN	108.02	$ 3,065,334
MASHON	103.14	$ 2,925,703
BRIAR PATCH CEMETERY	100.8	$ 2,859,242
WEINBERGER	97.87	$ 2,775,966
COOPER	97.12	$ 2,755,658

High Injury Network and Intersection Analysis

In addition to the LADOTD network screening analysis and the local roads EPDO analysis, an all-roads High-Injury Network (HIN) analysis was also conducted. All crashes within Tangipahoa Parish were mapped in a GIS Database alongside the corresponding roadway segment and intersection data, and GIS tools were used to quantify how many crashes occurred along each roadway segment and within 250 feet of each intersection. In order to qualify as a HIN segment or intersection, at least one fatal injury crash or 5 total injury crashes throughout the study period were observed. This data was used to create a High Injury Network (HIN) map and Hot Spot Intersection map for Tangipahoa Parish. Figure 56 presents all crash locations, Figure 57 presents the overall HIN Network, and Figure 58 presents the Hot Spot Intersections.

Figure 56: All Crashes, Tangipahoa Parish, 2017-2021

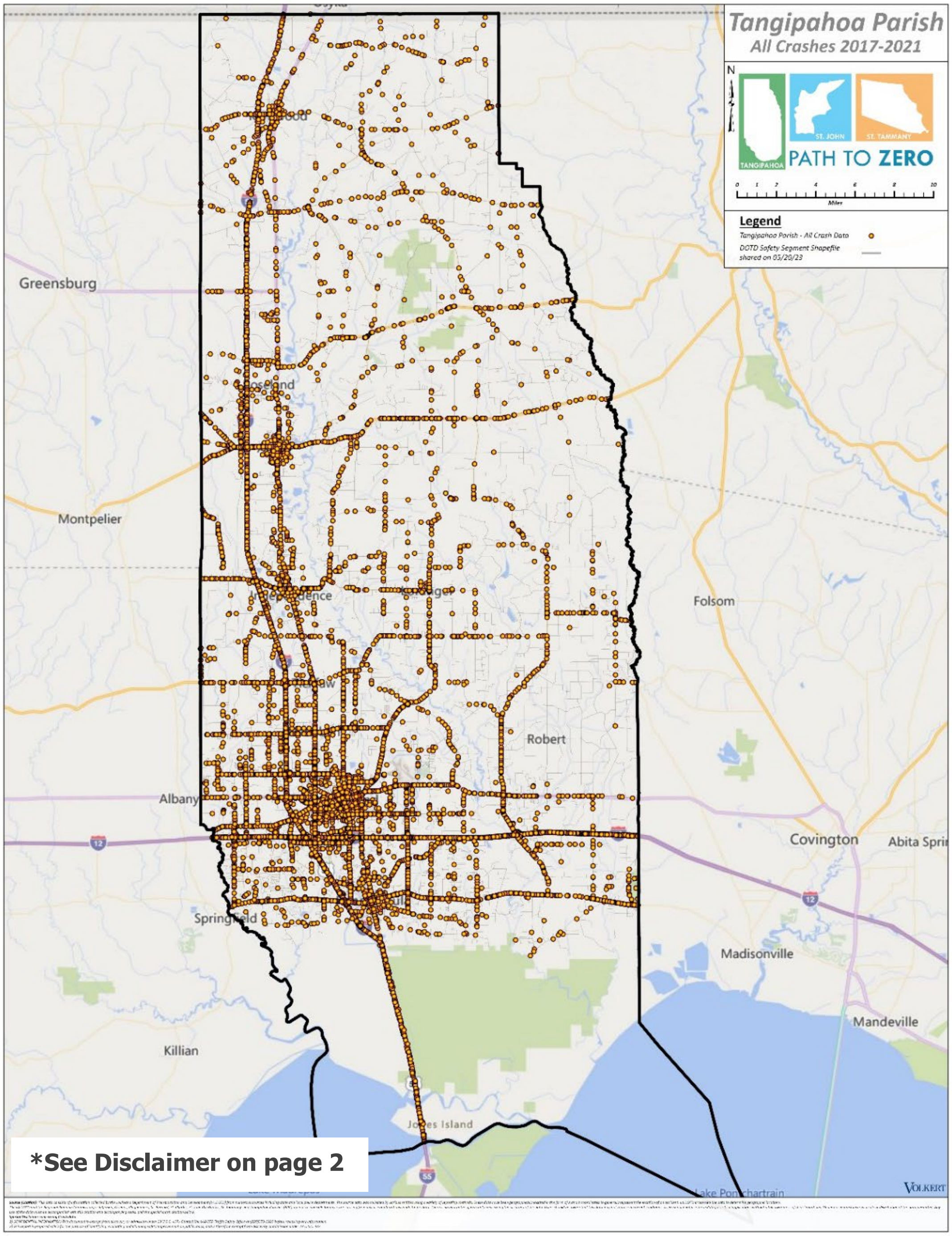


Figure 57: Tangipahoa High Injury Network, Segments

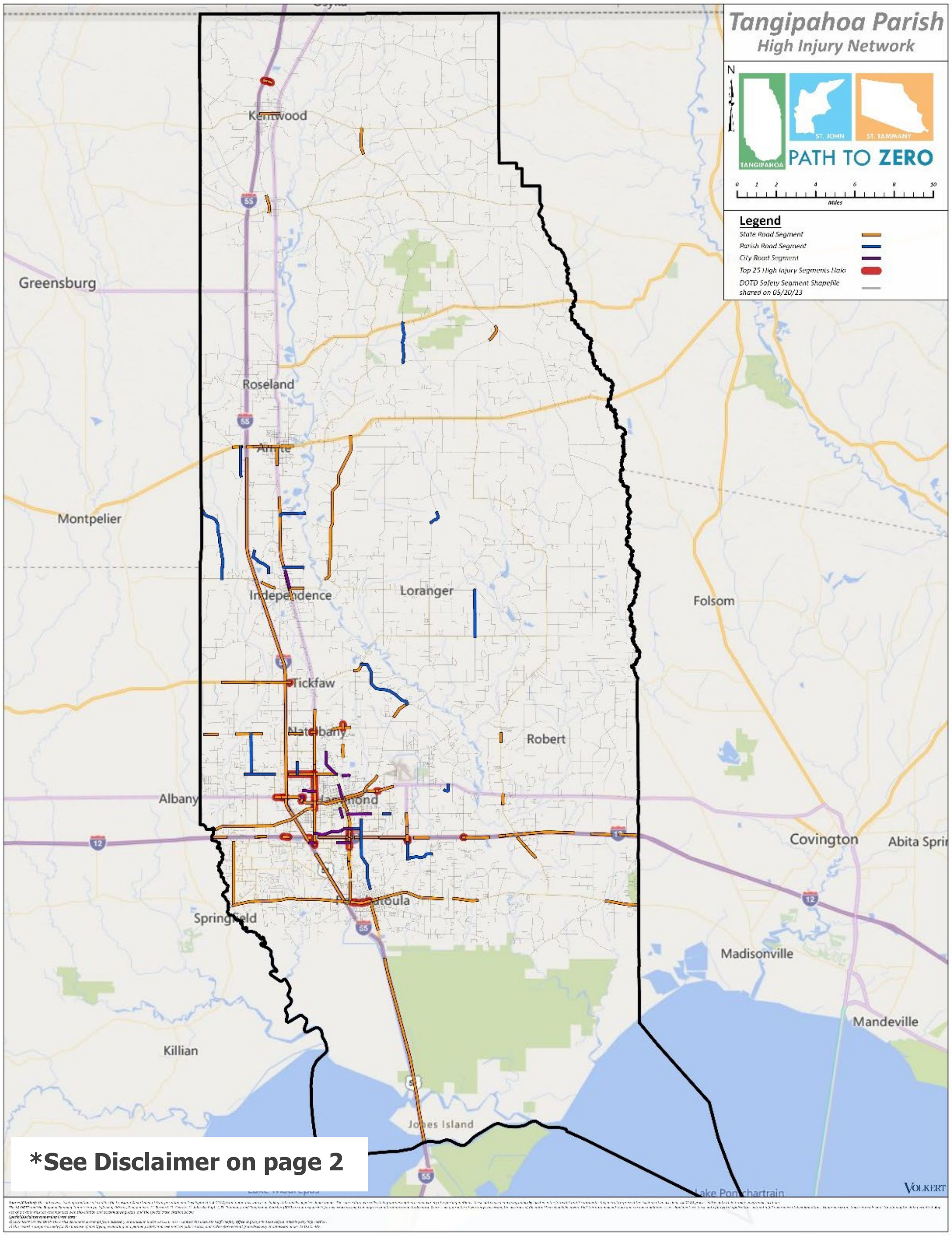
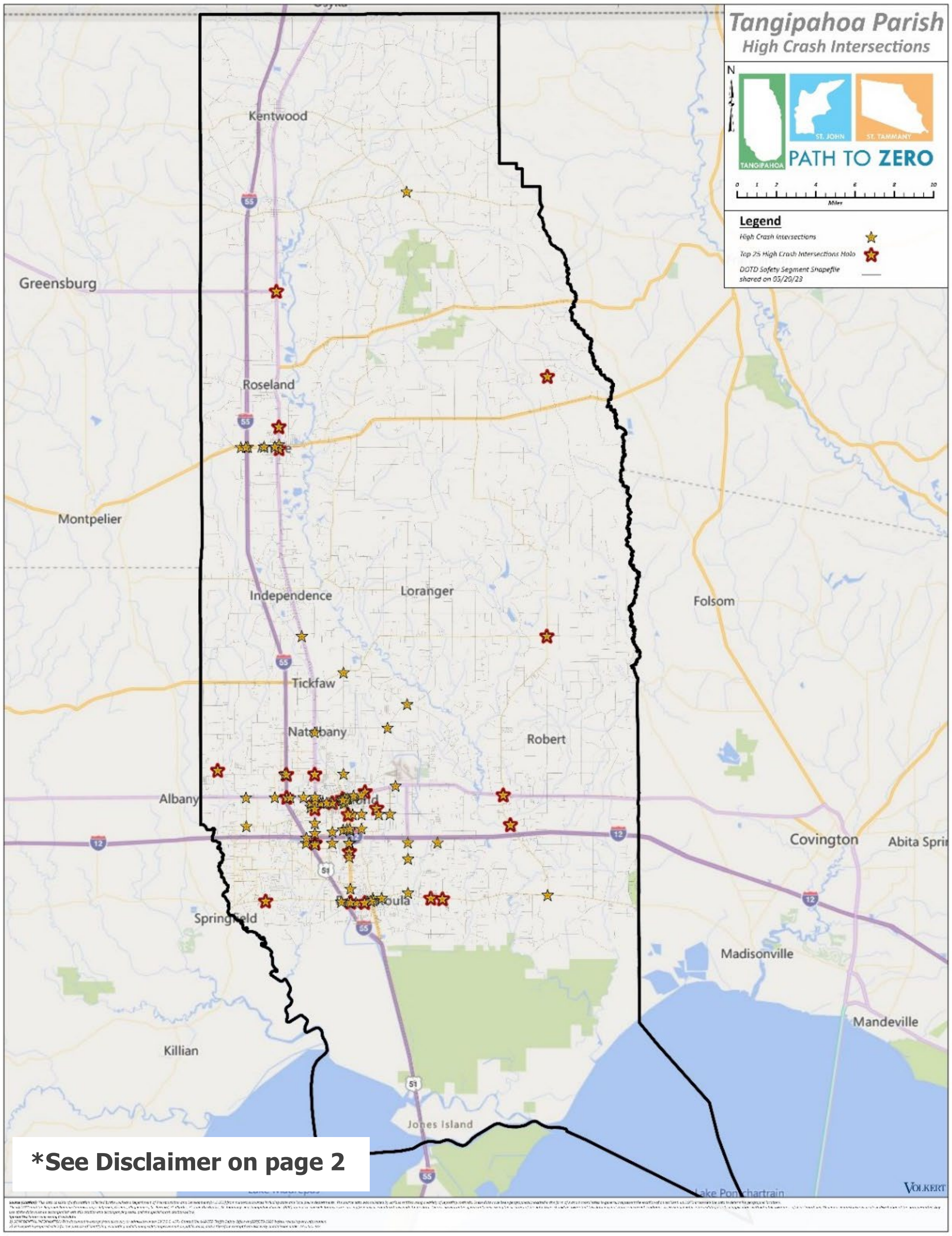


Figure 58: Tangipahoa High Injury Network, Intersections



Land Use Crash Analysis

Crash trends may be influenced by the activities occurring in or around areas of different land uses, traffic volumes, and the modes of transportation used. Observing the type, frequency, and severity of the crashes near specific land uses would allow a greater understanding of the issues and potential mitigation strategies specific to the crash patterns of an area. However, several issues led to complications in completing a more complex analysis.

First, each parish and the municipalities within them uses a vastly different land use methodology, requiring a great degree of simplification and normalization across the parishes and their municipalities. The project team attempted to normalize land uses across the geographies but encountered other issues with the analysis or land use data itself. Often, roadways are the boundary between land uses, which complicated a comprehensive analysis. Even more problematic toward completing the analysis were simply errors with land use data, missing data, missing classifications, illogical classifications, and more.

The project team reviewed and noted very little focus on land use in existing Vision Zero plans beyond a general idea of attempting to ensure roadway configurations (and typically, speeds) are consistent with the surrounding land use context. Occasionally, this was mentioned briefly in the narrative, but sometimes it only appears as a recommendation. A detailed land use-crash analysis was not found in any other Vision Zero plans reviewed, though some simply overlaid the HIN on the study area's existing land use map. However, the project team did discover some broad findings in the academic literature worth noting.

- Severe/moderate injury crashes involving trucks is high in areas with high employment, civic, commercial, and light industrial areas[2]
- Severe crashes involving pedestrians have a higher probability near commercial land uses, particularly areas with retail or night clubs (though less so near university campuses)[3]
- Most crashes occur in mixed residential and commercial areas with strip commercial and big box stores noted as major risk factors

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[2] *Modeling injury severity of crashes involving trucks: Capturing and exploring risk factors associated with land use and demographic in addition to crash, driver, and on-network characteristics*. Duvvuri, Pulugurtha, Mathew. 2022. https://www.sciencedirect.com/science/article/pii/S0386111222000565

[3] *Investigating Spatial Correlations Between Land Use and Pedestrian Injury Severity in Crashes Occurring Away From Intersections in Northwest Florida*. Koloushani, Karear, Moses. 2022. https://journals.sagepub.com/doi/abs/10.1177/03611981221096433?journalCode=trra

- Crashes involving pedestrians are more likely in census tracts with a higher proportion of commercial, industrial, open land, and schools than in tracts with higher proportion of residential use[4]

To observe the influence of land use on crash trends in the area, the high injury network developed during the crash analysis was placed over the existing land use map for each parish. This allows for a high level examination of the crash analysis in the context of land use. This section will highlight the key findings from each parish.

St John the Baptist Parish

In St John the Baptist Parish, the high injury network (HIN) primarily spans the major east/west corridors where there are areas with significant commercial and industrial activity (Figure 59). Among these corridors, US-61 stands out as the HIN segment with the highest number of high crash intersections in the parish. The segment of US-61 that has the highest crash intersections is also the area where most of the commercial activity in the parish occurs.

Also included in the HIN is LA-44, which runs parallel to both US-61 and the Mississippi. This state highway is another major east/west corridor that serves the several large industrial sites located along the Mississippi River. Additionally, this segment has the most commercial and residential activity on the West Bank of the Mississippi River.

In addition to the major east/west corridors there are multiple smaller roadways that are included in the HIN. These roadways provide connections between the major corridors and connect the parish to I-10. There are three connections to I-10 within the parish and the most significant two are at the northern edge of LaPlace. US-51 and LA-3188 are the HIN segments that intersect I-10 at LaPlace and connect the interstate to US-61. These shorter segments in the HIN the pass-through residential areas may provide an opportunity for further analysis to implement targeted countermeasures to reduce crashes along these segments.

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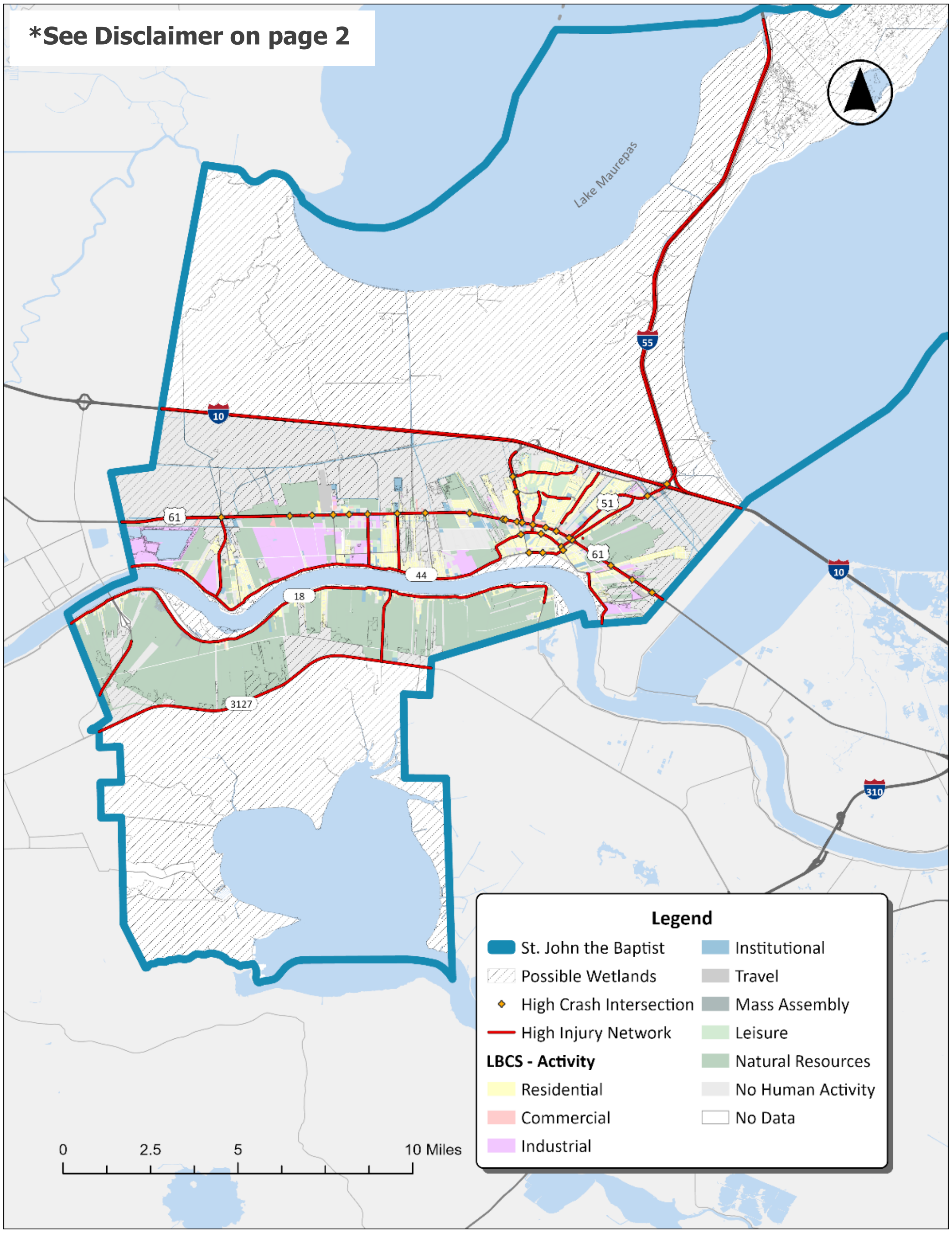
[4] *Examining spatial relationships between crashes and the built environment: A geographically weighted regression approach*. Huang, Wang, and Patton. 2018. https://www.sciencedirect.com/science/article/abs/pii/S0966692317306373

Figure 59: St John the Baptist - High Injury Network and Existing Land Use



Source: St John the Baptist Parish, Existing Land Use (2011)

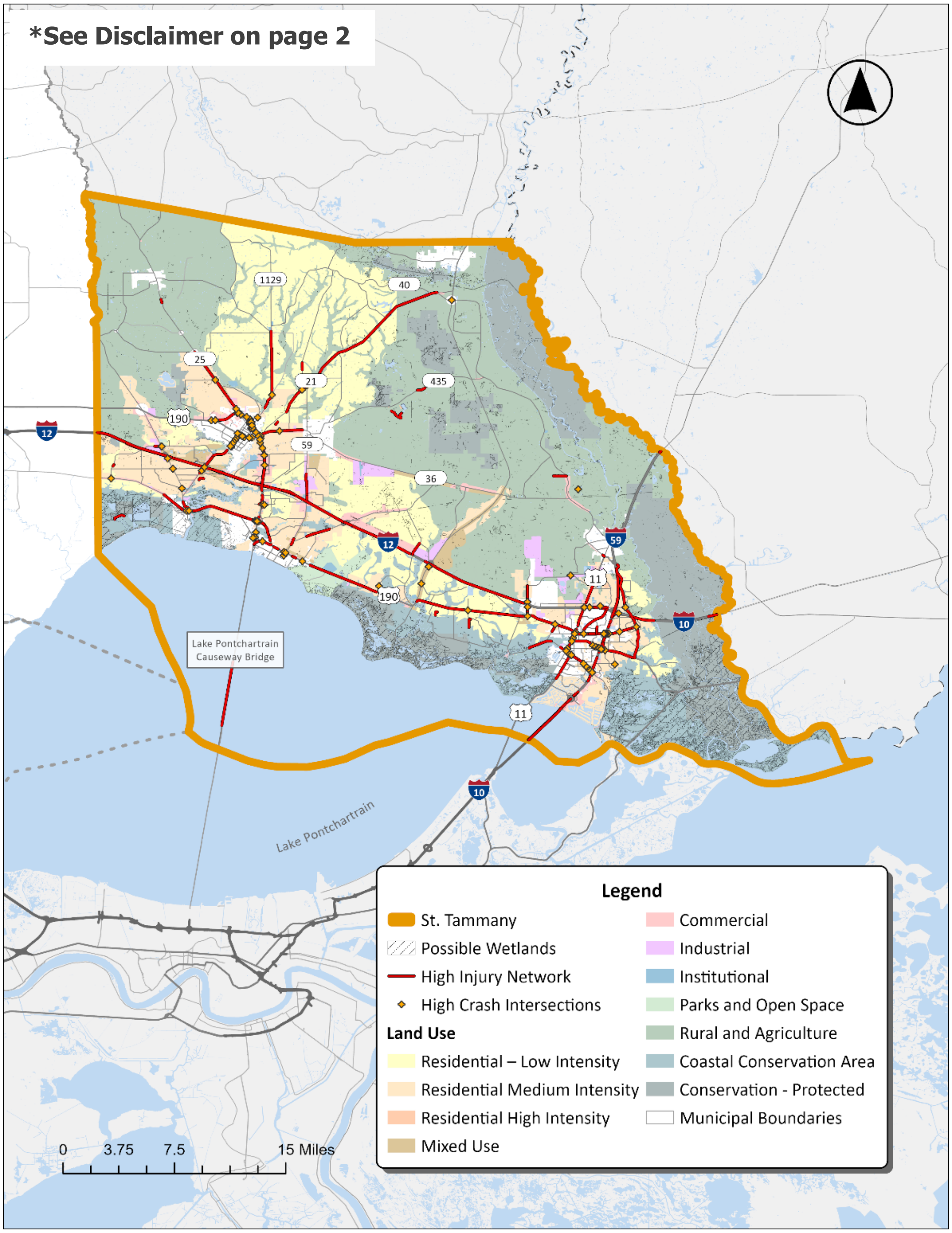
St Tammany Parish

In St. Tammany Parish, the HIN includes many segments on or along I-12, as well as many commercial corridors in or near Covington, Mandeville, and Slidell. Other segments included in the HIN were portions of rural state highways and low-density residential areas that should be examined on a case-by-case basis to determine the nature of the crashes to target countermeasures accordingly. (Figure 60)

Similar to the HIN, most of the high crash intersections were located within the municipalities in the area. The majority of the intersections were in Covington and Slidell.

In St Tammany, the HIN often included commercial corridors, but industrial uses in St. Tammany appear to have less influence on the crash trends in the area than St John the Baptist Parish. St. Tammany Parish has multiple large industrial areas that are not along a segment in the HIN or near a high crash intersection.

Figure 60: St Tammany - High Injury Network and Land Use



Source: St Tammany, Existing Land Use (2022)

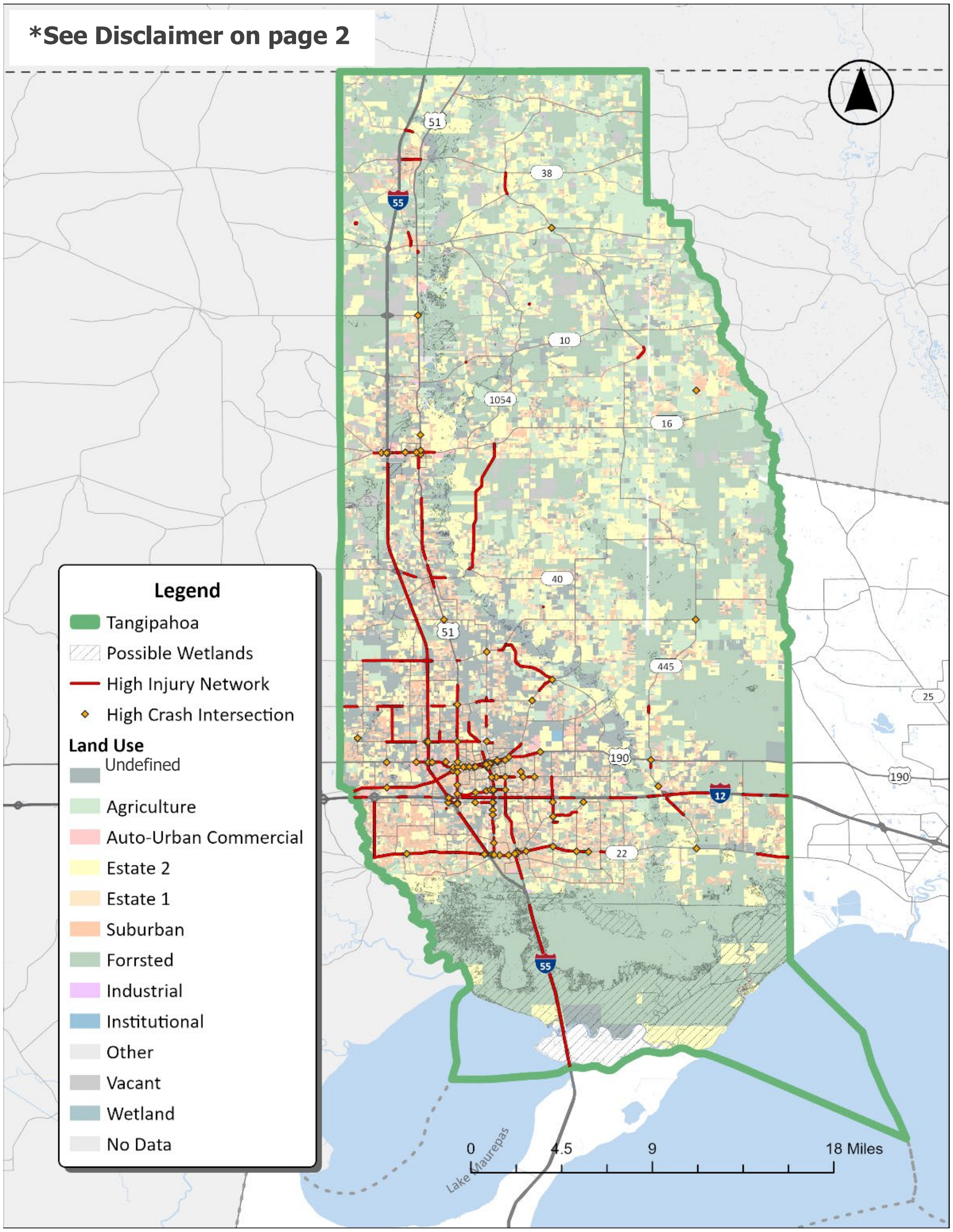
Tangipahoa Parish

In Tangipahoa Parish, the roadways included in the HIN are mostly concentrated in the western half of the parish in the areas along I-55. Many of the segments included in the HIN were major commercial corridors, most of which were located in or near Hammond and Ponchatoula. Some of the major commercial corridors on the HIN include I-55, I-12, US-51, US-190, LA-22 (Figure 61).

Most of the high crash intersections were located in municipalities along I-55. The City of Hammond had the most high crash intersections followed by Ponchatoula and Amite city.

Although most of the HIN and high crash intersections were in the western half of the parish, there were multiple segments and intersections located in rural areas on the eastern half of the parish. Most of which were near I-12.

Figure 61: Tangipahoa – High Injury Network and Existing Land Use



Source: Tangipahoa Parish, Existing Land Use (2023)

Key Findings

Comparing the HIN to the existing land use in each parish allows for several conclusions on the correlation between land use and crash trends. The key findings in the analysis include the following:

- Most of the HIN and high crash intersections were in municipalities, more densely populated, or mixed-use areas where both a diversity of roadway types and conflicts between transportation modes are more likely to exist.
- For similar reasons noted above, commercial activity may indicate an area with higher frequency or severity of crashes along a roadway, or at least indicate an area that requires closer examination of potential countermeasures.
- Industrial activity could potentially increase the frequency or severity of crashes, but its influence could vary depending on the location and industry type.

APPENDIX B: PUBLIC HEALTH METHODOLOGY TECHNICAL MEMO

TANGIPAHOA ST. JOHN ST. TAMMANY

PATH TO ZERO

MEMORANDUM

DATE: April 4, 2024
TO: New Orleans Regional Planning Commission

CC: Volkert
FROM: University of New Orleans Transportation Institute
RE: NORPC SS4A Task 4: Public Health Methodology Literature Review and Framework Narrative (Final)

Introduction

Improved integration of health and transportation planning has emerged as a significant area of growth in planning practice. Consideration of health goals and outcomes (e.g. physical activity, air quality, noise pollution, access to public health goods and services) in land use and transportation planning and decision-making provides the opportunity to achieve benefits from transportation benefits that impact the whole community, and particularly benefit vulnerable or marginalized populations. At the same time, methodologies developed in the public health field, specifically those focused on behavior change, have important applications in transportation planning practice to address problems and achieve goals that exist at the intersection of these sectors, such as physical activity, crash prevention, and access to health facilities and services.

The objective of this narrative is to inform overall Safe Streets for All Action Plan development – and subsequent interventions implemented - through interdisciplinary research into replicable strategies and tools for public engagement and improved integration of public health principles and modalities into transportation planning processes. Specifically, this strategy will seek to support better understanding of the social norms and behaviors of residents within the subject area, to identify appropriate interventions in support of safe and healthy built environments, and develop communication strategies that align with local perceptions, priorities, and needs. This framework specifically seeks to prioritize inclusion of groups, communities, and sectors who are traditionally underrepresented and/or underserved.

Literature Review

This narrative review draws on peer-reviewed articles, federal government-sponsored research reports, white papers, case studies, manuals, and toolkits from a variety of sources in planning, public health, psychology, and industrial sectors focused on the following three key areas of inquiry:

1. Traffic safety as a public health issue, and the integration of explicitly health-focused goals and data into transportation planning, emphasizing resources, partnerships, and strategies for both infrastructure and non-infrastructure interventions
2. Behavior change research, strategies and framing adapted from the public health sector to define the evidence base for direct and translatable change models and programs
3. Approaches to understanding the specific behaviors, social or cultural norms, and values of the subject communities that influence traffic safety outcomes and around which outreach, campaigns, and/or infrastructure priorities should be centered

In addition, the review draws from Center for Disease Control and Prevention (CDC) recommendations for program evaluation to ensure appropriate evidence gathering throughout the plan development process and pilot implementation of this methodological approach to support future iteration, use, and dissemination of the framework.

Traffic Safety as a Public Health Issue

Although planning, as a field of practice, originated out of public health goals, it diverged from this field over the course of the 20th century [1]. As recently as 2011, a survey of 890 local, regional, and state agency representatives in 48 states revealed that only 27% of comprehensive plans explicitly addressed public health. Among these, active transportation is among the most frequently cited health topics identified, with 57% of respondents indicating active living as a topic addressed. Surprisingly, only 36% addressed safety, with most of these referencing public safety in general and very few explicitly calling out injury prevention as a public health topic of concern. Moreover, most respondents did not report using any local public health data in their comprehensive planning processes [2].

In recent decades, improved integration of health and transportation planning has emerged as a significant, but historically overlooked, area of growth in planning practice [3] [4] [5]. This relationship is bi-directional: public health officials are becoming more involved in transportation and land use planning as a public health issue (particularly as pertains to traffic injuries), while planners are considering health outcomes and behaviors as key factors in planning processes. Increasingly, public health is considered within the strategies and performance measures of long-range planning processes, and transportation planning are embedded in health departments to address traffic safety concerns. These concurrent integrations typically emphasize planning strategies that encourage multimodal transportation, resulting in increased (and safer) physical activity and improved air quality [3].

However, to-date, most transportation and public health research has focused on health outcomes resulting from transportation systems, rather than application of public health principles to prevent adverse outcomes [6]. One exception to this finding is the increasing use of health impact assessments in transportation practice. However, these do not specifically address systemic safety issues [6]. Despite initiatives aimed at better integrating health and transportation and breaking down silos in research and practice, more work is needed to develop a new paradigm for evaluating and improving the built environment.

Consideration of health goals and outcomes (e.g. physical activity, air quality, noise pollution, access to public health goods and services) in land use and transportation planning and decision-making provides the opportunity to achieve benefits from transportation benefits that impact the whole community, and particularly benefit vulnerable or marginalized populations [5] [7]. Conversely, negative consequences of the transportation environment can include both direct costs (i.e., injuries and deaths from crashes, air pollution exposure, etc.) and indirect costs (e.g. physical inactivity correlating to built environments where active transportation is infeasible).

Injury prevention is, typically, a core shared goal within both transportation and health sectors and the primary focus of this framework in alignment with the objectives of the Safe Streets for All plan development process. As Ederer et al [6] explain, traffic crashes are representative of the fundamental public health model of the "epidemiological triad" of a host, agent, and environment, all three of which must be present to cause injury. This epidemiological concept has been substantially applied in vehicle safety standards, with an emphasis on passive measures (where individuals don't have to do anything to realize benefits). But, that alone isn't enough, especially when it comes to people outside of vehicles. Yet, Ederer argues, we have not applied these same, effective principles to infrastructure design or other aspects of a safe systems approach.

Health & Transportation Indicators

"Almost all road projects present a collection of negative impacts on public health," [5] (p.16), when negative impacts from more driving, air quality or climate change impacts, or inequities in traffic crashes are accounted for. But they can also bring positive public health benefits – especially transit projects and those that encourage more physical activity. Traditional transportation planning practice has historically relied on a few key indicators of system performance: e.g., overall crash outcomes, level of service (LOS), and measures of congestion or delay. Increasingly, public agencies seek to evaluate transportation systems more holistically and equitably, reflecting the system's impact on communities, rather than simply the efficiency of vehicle movement.

A selection of commonly identified key indicators (and corresponding frequently used national data sources for benchmarking) at the intersection of transportation and public health are summarized in Table 1**Error! Reference source not found.** [3].

Table 1 Commonly Used Transportation + Health Indicators and Data Sources [3]

Indicator	Description	Data Source
Commute Mode Share	% of commute trips to work by mode	American Community Survey
Presence of Complete Streets policies	Presence or absence of formally adopted policies prioritizing safety and access for all road users	National Complete Streets Coalition database

Alcohol-related fatalities	Number of traffic deaths involving alcohol (and/or drugs)	Fatality Analysis Reporting System
Housing and Transportation affordability	A measure of the combined costs as a share of household income	HUD Location Affordability Index
Land use mix	A measure of whether it is possible to reach a variety of destinations in a given area	EPA Smart Location Database
Person/Vehicle Miles Traveled	A measure of exposure to injury risk, by mode of transport	National Household Travel Survey; FHWA Highway Statistics; National Transit Database)
Transportation-related physical activity	Typical minutes of daily activity resulting from active transportation use	National Household Travel Survey
Proximity to major roadways	A measure of population pollution exposure	National Transportation Atlas Database
Traffic fatalities	By mode, and where possible, as a function of exposure rate	Fatality Analysis Reporting System; ACS (to calculate areawide exposure)
Seat belt use	Rate of seat belt usage (may also include other occupant protection indicators)	NHTSA Seat Belt Use Rates Report

Physical activity is perhaps the most widely emphasized health + transportation goal after injury prevention, reflected in countless communities' efforts to improve walkability, cited as contributing to obesity, diabetes, and cardiovascular disease outcomes, as well as an improved sense of community [5]. Many public agencies have also identified various cancers and respiratory diseases as "related to transportation" [5]. The adoption of Complete Streets policies has been identified as a tool for not only injury prevention, but also reductions in traffic, pollution exposure, and even crime [5].

Additional aspects of public health that relate to transportation which many communities have begun to prioritize include access to essential goods and services (such as health care, food, recreation, schools, and affordable housing), especially among low-income, minority, disabled, aging or other populations of concern, mental health (which may include impacts of level of traffic stress), climate adaptation, emergency preparedness, economic opportunity, social cohesion, and noise exposure [1] [5].

Appendix A summarizes several supplemental public health and behavior data sources and tools suitable for use in transportation planning and health equity analysis, along with preliminary findings from review of two key public health datasets for the three subject parishes. These resources may be useful in identifying health disparities, behavioral risks, or other factors related to roadway safety among particular groups or at disaggregated levels of geography.

Traffic Safety Risk Factors

Motor vehicle crashes are the primary leading cause of injury among individuals 24 years old or younger, and the second leading cause of injury among adults 25 and older [8]. Most pertinent to the explicit goals of this project (i.e., to improve traffic safety outcomes), the identification of risk factors associated with roadway injuries and fatalities is critical to informing appropriate intervention strategies and countermeasures. At the population level, all health problems – including traffic injuries – are preventable, by preventing and controlling risk factors and promoting protective factors [6]. Although specific issues correlating to crash outcomes vary widely by geography and population, typical behavioral risk factors associated with traffic-related injuries and deaths include [9]:

- Excessive speed
- Driving under the influence of alcohol or drugs
- Drowsy driving
- Improper seat belt or child restraint use
- Driver inexperience
- Driver distraction

Additional common risk factors that are specific to non-motorized and vulnerable road users (VRUs) include roadway orientation (e.g. bicycles riding on sidewalks, motorcycle "lane splitting"), use of protective gear, and impairment. Moreover, socioeconomic factors are widely acknowledged in the public health sector to influence individual decisions and behaviors, as well as exposure (i.e., the need to travel in particular circumstances). People who drive professionally, work at night, or live in low-income or minority neighborhoods are consistently disproportionately impacted by traffic injuries. However, these have historically been neglected in traffic safety modeling practice [6].

Traffic safety culture varies widely among regions and populations. Rural residents may have to drive more frequently and further to reach basic destinations, and spend more time in vehicles (which can have negative health impacts), tend to have lower incomes, and may have a). They may also be less likely to have high-speed internet and are more likely to be conservative and less trustful of government and medical experts. Rural populations tend to be more homogenous with more ingrained norms and values, and have been found to be less likely to wear seat belts. Younger drivers have been found to have riskier attitudes, higher crash risk overall, overrepresentation in speeding crashes, tailgaiting, failure to wear seat belts, alcohol use, and distraction. Male drivers are more likely to "feel safe" and to be more tolerant of alcohol use, driving tired, and speeding. Heterogenous traffic safety cultures in communities with high immigrant populations may be associated with higher rates of serious crashes. Years of driving experience, religion, and education levels have all been linked to measurable differences in unsafe driving behaviors [10].

Extensive research has documented a wide range of specific sociodemographic and contextual risk factors that interrelate to elevate crash risk, from the individual to the societal level (Table 2). Risk factors that are associated with three or more risky driving behaviors include young and male drivers, alcohol and drug use, depression or anxiety, marital status, veteran status, and environmental factors (e.g. road type, traffic, and weather).

Table 2: Traffic Safety Risk Factors and Relationship with Unsafe Driving Behaviors

	Interrelationship with Driving Behaviors						
	Risk Factor	**Speeding/ Aggressive Driving**	**Distracted Driving**	**Drowsy/ Fatigued Driving**	**Impaired Driving - Alcohol**	**Impaired Driving - Drugs**	**Seat belt Nonuse (adults)**
Individual	Age (populations 16-34 years old)	x	x	x	x	x	x
	Sex (male)	x	x		x	x	x
	Driving after alcohol use	x	x		x		x
	Alcohol-dependence	x			x	x	
	Cannabis use (general)	x			x	x	
	Depression/Anxiety	x			x	x	
	5+ drinks monthly	x			x	x	
	Binge drinking				x	x	
	Childhood trauma				x	x	
	Texting while driving		x				x
	Unemployment				x	x	
	Anger/Aggression	x					
	Driving after cannabis use	x					
	Education level (low attainment)				x		
	Daily driving		x				
	High education level (college grad or higher)		x				
	Insufficient sleep			x			

	Trip length (less than 2.5 miles)						x
Relationship	Driver marital status (unmarried or divorced)	x				x	x
	Risky behavior modeled by parent or caregiver		x		x		
	Peer norms model risky behaviors				x	x	
	Obligation to take work calls while driving		x				
	Single parent household				x		
Community	Iraq/Afghanistan war veterans and PTSD (male veterans)	x			x		x
	Difficulty finding alternative transportation				x		
	Driving in low-speed environments			x			
	Roadside advertisements		x				
	Rural, non-metropolitan areas						x
Societal	Environmental variables (road type, traffic, weather)	x	x	x			
	Use of mobile devices		x	x			
	Temporal variables (short trip lengths, driving at night)			x			x
	Absence of universal seatbelt laws						x
	Driving on busy roads	x					
	Driving on wider lanes			x			
	Driving in low-speed environments			x			

	High alcohol outlet density				x		
	Illegal alcohol sales				x		

Specific studies examining particular groups, behaviors, or contextual factors reveal a complex web of risk relationships. For instance, studies have found elevated risks among young male drivers in vehicles with other young male passengers, increased likelihood of fatality during weekend, nighttime crashes, and overrepresentation of older drivers in crashes that occur due to failure to yield while turning [11]. The National Academies of Sciences, Engineering, and Medicine [10] evaluated critical safety scenarios for vulnerable road users, finding three times as many pedestrian fatalities at night, which interrelates to increased likelihood of alcohol involvement. The World Health Organization [12], meanwhile, organizes a broad range traffic injury risk factors by whether they influence exposure, crash incidence, severity, or post-crash outcomes (Table 3).

Table 3: Traffic Injury Risk Factors by Area of Influence [8]

Area of Influence	Risk Factor
Risk Exposure	Economic Factors
	Demographic factors
	Land Use Patterns (length and mode of travel)
	Mixing high and low-speed road users
	Speed limit, road layout, and design
Crash Incidence	Speed
	Impairment
	Fatigue
	Being a young male
	Having youths in the same car
	Being a VRU in urban and residential areas
	Traveling in the dark
	Vehicle factors (braking, maintenance)
	Defects of road design or maintenance
	Inadequate visibility

	Road user eyesight
Crash Severity	Human tolerances
	Speed
	Seat belts and child restraints
	Helmet Use
	Roadside objects
	Occupant and non-occupant crash protection
	Impairment
Post-Crash Outcomes	Delay in transport to medical care
	Presence of fire from collision
	Hazardous materials
	Drugs or alcohol
	Rescue/extraction challenges
	Lack of pre-hospital care
	Lack of appropriate ER care

These findings highlight the importance of evaluating not just overall demographic and crash contributing factors, but specifically breaking out this data by age and sex (of passengers as well as drivers) to identify where problems – or overlapping risk factors - are concentrated. Contingent upon local relevance, the identification of risk factors that potentially relate to multiple negative behaviors or "critical safety scenarios" [10] can inform the development of high-impact programs and strategies.

Conversely, protective factors associated with mitigation of unsafe driving behaviors have also been documented and can help inform appropriate strategies. Table 4 outlines these factors (adapted from Safe States Alliance [8]), with factors related to age, personality or disposition, race/ethnicity, and access to community resources emerging as cross-cutting among three or more unsafe behaviors.

Table 4: Protective Factors and Relationship with Unsafe Driving Behaviors

		Interrelationship with Driving Behaviors					
	Protective Factor	**Speeding/ Aggressive Driving**	**Distracted Driving**	**Drowsy/ Fatigued Driving**	**Impaired Driving - Alcohol**	**Impaired Driving - Drugs**	**Seat belt**

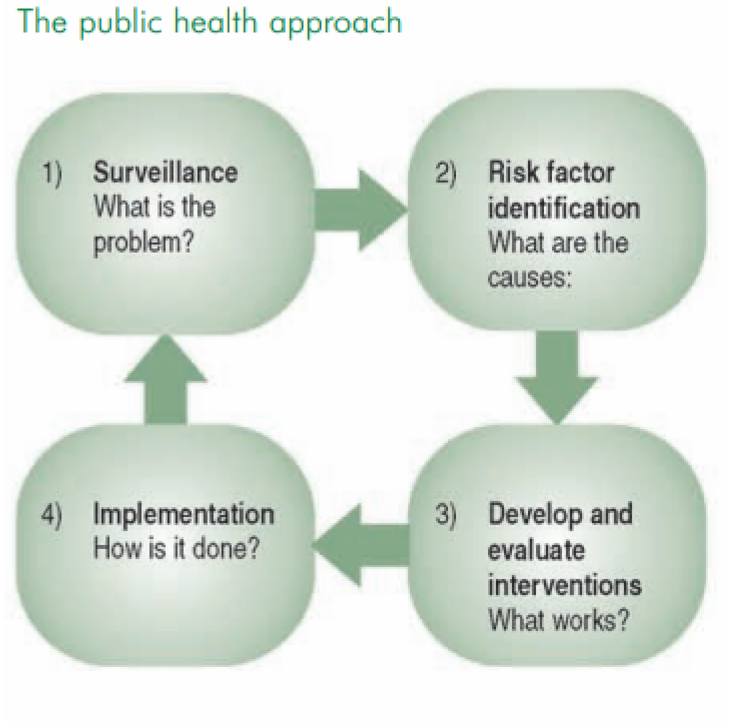
							Nonuse (adults)
Individual	Age (young adult to adult, excluding teens and older adults)		x		x	x	x
	Higher sensitivity to punishment (risk averse)	x			x	x	x
	Age (55+)	x	x				x
	Personality (low impulsivity/sensation seeking)		x		x	x	
	Race/ethnicity (non-white)				x	x	x
	Low anxiety/depression				x	x	
	Education level (some college or greater)						x
	Emotional stability	x					
	Recently ticketed						x
	Rest (before feeling fatigued or drowsy)			x			
	Mindfulness to lessen aggressive driving (self-reported)	x					
	Sex (female)						x
	Sleep duration (7+ hrs)			x			
	Air conditioning use			x			
Relationship	Marital status (married)	x					x
	Father's education level (college grad or higher)			x			
	Group norms promoting safe practices		x				

Community	Increased access to community-based youth programs	x			x	x	
	Low socioeconomic status (income/education)	x	x				
	Urban/metropolitan area						x
Societal	Enforcement of seat belt laws					x	x
	Alcohol marketing policies/regulations				x		
	Alcohol taxes				x		
	Blood Alcohol Content laws				x		
	Enforcement of mobile device use laws		x				

While identification of specific, problematic behaviors in a given focus area is critical to developing an approach to injury prevention (one needs to understand the problem, in order to select the correct strategy), it is equally important to understand the other factors influencing these behaviors, and to identify those which have the most potential for change, at the population level.

A public health approach to road safety and injury prevention is helpful in analyzing risk factors, and as a framework for decision-making. In broad terms, the World Health Organization (2006) defines the basic public health approach as consisting of four steps: First, determine the magnitude and characteristics of the problem – often with surveys or focus groups to understand who, what, when, where, and how incidents (e.g. crashes) occur. Then, identify the risk factors (the "why") and define high-risk populations. Third, assess possible interventions and methods for testing/evaluation. Finally, implement those interventions and evaluate them (Figure 1).

Figure 1. The Public Health Approach [12]



Recommendations for Integrating Public Health into Planning Practice

COVID-19 has altered, and in some cases exacerbated, previously documented findings: NHTSA data shows that fatalities increased significantly during COVID-19 despite there being fewer drivers on the road, an outcome attributed to social and behavioral shifts (e.g. more speeding and reckless drivers). These injuries and deaths disproportionately impact lower-income communities. Adopting a public health approach, practices, and messaging, is emerging as an opportunity to address this, applying lessons from previous public health campaigns to this topic [13].

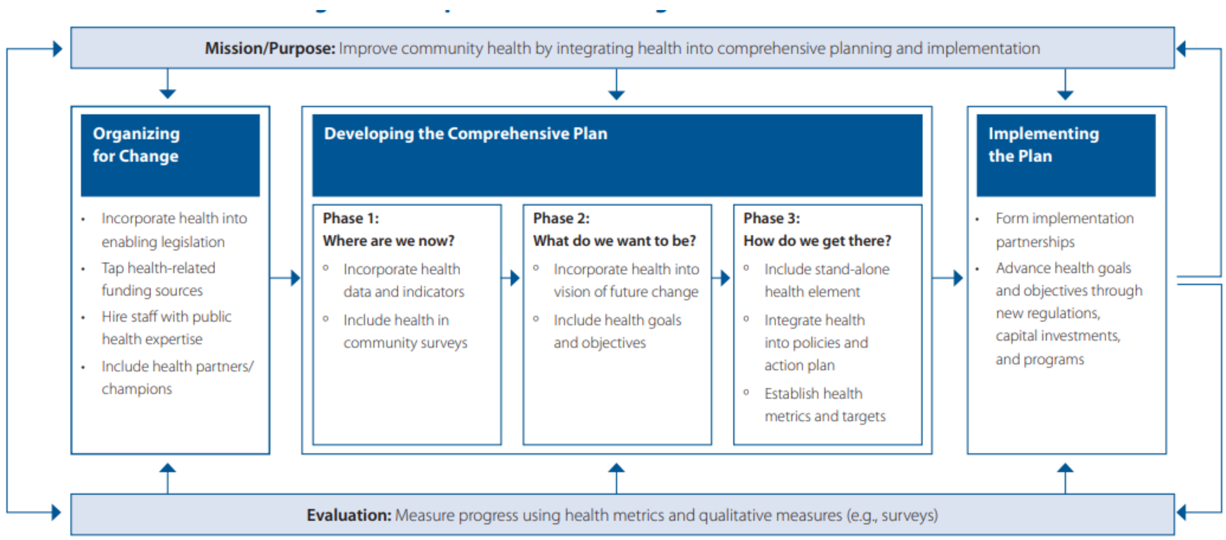
However, analysis of the ways in which the built environment affects public health is often underrepresented in planning practice due to a lack of available data, insufficient analysis of measures of access, few adopted metrics for measuring health-related goals and policies, and overall weak implementation strategies [1].

Ricklin and Kushner [1] define a basic model for the integration of health data and processes into comprehensive planning (Figure 2) and recommend the following basic steps for reframing planning practices to include health goals:

1. Identify (or develop) community and governmental champions
2. Develop messaging around topics that the community already cares about (e.g. quality of life or community character) rather than prescriptive messaging about health-related topics
3. Use outreach, surveys, etc. to define a community vision that reflects implicit health goals
4. Foster collaboration across departments or agencies with a diverse working group

5. Diversify sources of funding pursued and used
6. Identify regulatory and organizational barriers to implementation, institutionalize health-related goals and objectives, and give communities ownership over implementation
7. Build evaluation into the planning process

Figure 2. Model for Integration of Health Data and Processes in Comprehensive Planning [1]



Gogo, Brangaccio, and Kilgore [13] similarly identify several useful approaches to better understanding (and applying) public health campaign strategies in traffic safety, including:

- Research of demographic, linguistic, geographic, cultural, and experiential factors to create messages that are authentic and motivating to audiences, while advancing equity
- Testing messages and learning from audiences to understand motivations, unintended consequences, and how messages resonate at both intellectual and emotional levels
- Identifying credible individuals and organizations to deliver messages, especially for minority populations
- Targeting audiences through traditional media, digital and social media, and offline communications using partner organizations
- Tracking and evaluating messaging reach, as well as actual and self-reported behaviors.

Lyons et al [14] outline a framework for considering health in transportation planning with emphases on safety, access, air quality, and activity, highlighting the role of health data and motivations in long range planning processes and evaluation, although their overall approach emphasizes active transportation and access to healthy destinations, rather than strategies to promote safety for all road users, or topics specifically related to behavior change (Figure 3).

Figure 3. DOT Health and Transportation Planning Framework Planning Process [14]

Together, these examples highlight opportunities to expand transportation planning practice to integrate and apply additional data sources, adopt and adapt strategies from the public health sector to craft and deliver effective behavior-focused campaigns, and incorporate insights and values related to health into plan visioning, project prioritization, and evaluation functions.

Finally, beyond consideration of health-related data and theoretical framing, integration of public health-focused evaluation criteria in project prioritization (including competitive grant programs) is an additional, high-impact tool for ensuring that interventions with positive or negative impacts on health are sufficiently reflected in decision-making [5].

Public Health Planning and Behavior Change Models

People can, and do, change. Changes can be the result of personal, gradual growth over time, or may be "quantum" changes attributable to some kind of transformative intervention [15]. Behavior change campaigns can promote safe behaviors, or deter unsafe behaviors, by targeting one or more risk factors contributing to (in this case) serious crashes. Campaigns include a suite of activities to persuade behavior modification, and ideally should be combined with other strategies including infrastructure countermeasures, education programs, and enforcement efforts [9].

Key principles of human behavior that underpin behavior change research and practice include (but are not limited to) [16]:

- **Human behavior is guided by both deliberative (rational) and intuitive (unconscious) systems.** In traffic safety, we can work on peoples' intuitive systems through interventions like optical speed bars (OSBs) that create a sense of increasing speed on curves
- **Humans are not exclusively logical and rational: rather, they are guided by context, prior experience, emotion, cultural norms, morals, social pressure, convenience, habits, and other factors**. Interventions that make the right thing the more pleasant or convenient thing are more likely to be effective. Friends, families, colleagues, and authority figures may all influence behavior in complex ways.
- **Human behavior is influenced by the environment: physical, as well as social and organizational (e.g. policy).** Often, people can't really articulate these influences and are not directly aware of environmental factors. Research indicates that people are more likely to respond if they see a behavior modeled, even though they won't realize or report that this is why they changed the behavior. Rather, they'll attribute the response to some other factor. For instance, road widening makes people feel safer, but may, in turn, result in less safe behavior. Infrastructure interventions must respond to these unconscious responses and instead be made to account for how people really behave.
- **Humans make mistakes,** and tend not to simply do what they're told. Human error contributes to over 90% of crashes (but is seldom the sole factor!)

The public health sector has demonstrated the potential efficacy of well-planned campaigns to change human behavior to achieve goals serving the public good. These include efforts to address specific diseases, as well as a wide range of threats to human health and life to which an epidemiological approach has been applied. Examples include Guinea worm eradication, reductions in cigarette use, and – already directly related to traffic safety - increases in proper use of seat belts and child restraints. Effective campaigns typically employ a mix of laws, enforcement, education, and changes to the physical environment. Public health is an inherently interdisciplinary field; its theories are suitable for (and have been translated to) applications in multiple fields [10].

Meanwhile, the National Cooperative Highway Research Program (NCHRP) has identified "human factors" (defined as "an applied, scientific discipline that tries to enhance the relationship between devices and systems, and the people who are meant to use them", in other words, the response of road users to their environment) as a key component of roadway safety:

> *"Meaningful improvements in behavioral roadway safety must be predicated on an understanding of the scenarios and situations surrounding fatal crashes and the demographics of the road users involved and based on fundamental theories of behavioral outreach. When these aspects of the*

problem are understood, they can be combined to develop targeted safety outreach messages" [10].

This reflects growing acknowledgement at the federal level that "nominal" safety – in other words, meeting basic design standards – is insufficient: the human and environmental factors that lead to safety (or lack thereof) must also be addressed. Public health literature with relevance for traffic safety campaigns can come from previous safety-related campaigns (such as those focused on seat belt use) as well as from seemingly unrelated fields, including tobacco cessation, cancer or HIV/AIDS prevention, etc. [9]. Applying lessons learned from public health behavior change research – both directly linked to traffic safety problems and otherwise – can help address NCHRP's call to understand and address human factors in roadway safety.

Establishing a Behavior Change Theory

Data to inform traffic safety interventions – whether infrastructure or otherwise – typically relies on three basic components [17]:

1. Crash data
2. Previous research
3. Behavioral change theories

Crash data alone can indicate the location and circumstances of problematic behaviors but is seldom sufficiently robust to truly identify the underlying causes of the crash, let alone to indicate an appropriate intervention. Previous research – including predictive models that go beyond crash data to highlight systemic issues and risk factors – is valuable. However, relatively little routine evaluation of road safety interventions is done, resulting in gaps in the evidence-base. Where lack of concrete, relevant data/research is available, behavioral change theories can provide a basis [17].

Intervention failure is often because it was designed without an underlying theory [17]. Typically, this is associated with a focus on the wrong variable (often, due to a lack of evidence), or because practitioners are relying on an information deficit model: if only people had more information, they would refrain from risky behavior. The information deficit model assumes people do not know which behaviors are risky (they usually do), and that if they simply have more knowledge, their behavior will change (it may not). An evidence-based approach helps target funds more effectively by designing a relevant intervention focusing on the right locations, the right groups, and/or the right behaviors [17]. Importantly, "no change" isn't the worst-case outcome of a poorly designed intervention (although a common one): some safety interventions actually have negative safety outcomes [17].

As discussed above, the selection and application of a theory to guide an intervention – in addition to available data – provides a valuable framework to ensure that strategies or countermeasures logically connect to intended outcomes, while helping to identify the myriad factors, influences, and barriers to success which are likely to impact results. No single behavior change theory is all-encompassing; multiple theories may be required to promote different, specific behavioral changes [10]. The most successful programs for changing health behaviors at the individual levels use multiple theories, and multiple strategies, to encourage both initial change and maintenance of that behavior. A theoretical foundation guides the research or program, and provides a basis for specific campaign components, modalities utilized, and overall message concepts [10].

Implementation models, theories, or frameworks help us understand how and why a project or program succeeds. Nilsen [18], operating within the field of implementation science, categorizes these as theories, models, and frameworks:

- A **Theory** is a "set of analytical principles or statements designed to structure our observation, understanding, and explanation of the world." In other words, theories seek to explain.
- A **Model** is typically "a deliberate simplification of a phenomenon or a specific aspect of a phenomenon" and is prescriptive, rather than just descriptive.
- A **Framework** is a "structure, overview, outline, system, or plan consisting of various descriptive categories…and the relations between them that are presumed to account for a phenomenon." These are descriptive and not explanatory.

Although the terms are frequently used interchangeably or combined in practice, for the purpose of this planning process and framework, we seek an applicable overarching theory of change for addressing traffic safety from an epidemiological perspective, and one or more relevant models around which to organize the specific influences, components, and mediating forces impacting outcomes. The overall framework builds from this model to define recommended strategies, metrics, and actions for incorporating the theoretical basis into the current planning process.

Behavior Change Theoretical Models

All theoretical models are subject to constraints and limitations; none are likely to address every possible contextual factor for a given situation. Limited guidance exists for systematically selecting a guiding theory that incorporates an understanding of the nature of the behavior to be changed, and provides a way to characterize interventions [19]. For the purpose of potential theoretical approaches to addressing safety outcomes related to problematic road user behaviors, over two dozen models of change, with either direct or potential applications for traffic safety research, were reviewed, including several models specifically seeking to translate a public health approach to transport safety practice. Table 5 summarizes the scope of this review; a summary of each (including example use cases where available) is outlined in Appendix B.

Table 5. Summary Table of Behavior Change Models

Name	Description	Potential Application
Social Ecological Model	explains individual behavior through five progressive personal and environmental factors; each level is within and influenced by other levels	Defining and targeting risk factors at one or more levels with the potential for population-level impact
Health Belief Model	Model seeks to understand why individuals engage in healthy behaviors, based on self-perceptions	Focusing on self-efficacy, threat perception, and other individual-level barriers to change

	about susceptibility, barriers, and benefits	
Theory of Planned Behavior	views behavior as a function of one’s favorable or unfavorable perception of the behavior, social expectations from one’s community of influence, and perception of factors that limit or facilitate engagement in a behavior (or self-efficacy)	Addressing behavioral control factors inhibiting intention to change
Social Cognitive Theory	explains behavior through behavioral, environmental, and personal factors including control and reinforcement to achieve goal-directed change	Focus on perceived control as a key mediator of change
Transtheoretical Model	describes a six-step change process from unreadiness to change through termination of the old, undesired behavior	Identifying interventions that target key early or late stages of change process, as needed
Diffusion of Innovation Theory	explains how an idea or behavior (i.e., innovation) diffuses throughout a population over time	Investigating methods for reducing the time required to affect cultural/behavioral shifts
Kotter's 8-Step Change Model	Describes a method of raising awareness, organizing around a vision, removing obstacles to action, and achieving short-term and long-term change	Initiating an awareness campaign or identifying short-term wins to reinforce and accelerate behavioral change
Lewin's 3-Step Change Theory	focuses on “unfreezing” current behaviors and using individual and group influence to change the behavior and “refreeze” the new behavior	Identifying leadership support required to foster a need for change and "unfreeze" behavior
Nudge Theory	Recognizes biases influencing behavior and providing non-monetary, non-regulatory interventions to gently “nudge” behaviors	Identifying biases and designing interventions that subtly shift behaviors
Behavior Change Wheel	organizes change into sources of behavior, intervention functions, and policy categories to characterize how interventions operate	Matching policies or interventions to corresponding revealed sources of behavior

Prototype Willingness Model	focuses on the role of heuristics (i.e., rapid decision-making) as drivers of behavior	Establishing prototypes in media and social environment that guide better behaviors
Theory of Reasoned Action	stipulates that intentions are the principal predictors of behavior, and are influenced by personal attitudes and subjective norms	Assessing the extent to which stated intentions align (or not) with observed behaviors
Integrative Model of Behavioral Prediction	stipulates that behaviors are a result of 1) intention, 2) skills and abilities and 3) the presence of no precluding constraints	Breaking down misalignments between intention and behavior by identified background variables, skill deficits, and/or environmental constraints
Value-Belief-Norm Theory	relies on personal values to support social movements and cultural shifts, assuming that social norms (and cultural context) will support more robust and permanent behavior change	Identifying and classifying shared values that underlie group norms or behaviors
Elaboration Likelihood Model	describes what leads to changes in attitude and is typically used in advertising to persuade people based on both high-elaboration (central or cognitive) and low-elaboration (peripheral or heuristic) routes	Designing messaging that targets high-elaboration cognitive thought processes to influence behavior
Protection Motivation Theory	focuses on responses to threats and fear as mediated by threat appraisal and coping appraisal	Identifying positive and maladaptive responses to perceived threats based on severity, vulnerability, and response efficacy
Extended Parallel Process Model	categorize responses to threats as null, danger-control, or fear-control depending on threat perception and self-efficacy	Predicting whether threat-based messaging is likely to be rejected or result in change based on whether it it engenders a fear or control response
Behavior Change Research Cycle	describe a process by which “unhealthy” behaviors are complicated by their broader ecological contexts and a multiplicity of factors and relationships	Understanding differences in behavioral outcomes among individuals or groups and assessing intervention outcomes
The Safe Systems Pyramid	a framework specifically for Safe Systems policy approach applying principles of prevention and a focus on population health, along with	Prioritizing interventions based on their population health

	understanding specific causes of injury to implement policies	impact and level of individual effort required
Knowledge to Action Framework	a three-phase process for translating public health research into practice, emphasizing evaluation at all stages	Defining research needs and linking research to practice and policy
Persuasive Health Message Framework	translates behavioral change theories into effective threat or efficacy-based messages, and influencing audience receptivity	Developing persuasive messages that align with audience values, demographics, etc.
Agenda-Setting Theory	focuses on the role of the media, which sets what issues are ascribed importance and which shape public opinion	Strategizing around media role in messaging campaigns
Ward Model	examines the relationship between traffic safety culture and intention, and how this influences likelihood of an undesirable behavior	Describing cultural attitudes and norms and their underlying beliefs through value-laddering as the foundation for message content development
Strecher Model	emphasizes the relationship between behavior intentions and actual behaviors, centering "task difficulty" as something that gets in the way of a driver's intention	Identifying and addressing barriers to safe driving related to self-efficacy, skill, and identity
The Haddon Matrix	a framework for identifying risk factors before, during, and after a crash and selecting countermeasures based on temporal and categorical attributes	Analyzing crash data to determine factors associated with injury outcomes
Road Safety Equity Model	a public health-based approach to assessing equity in road safety centering regular (e.g., annual) assessments to identify equity issues, combined with sociodemographic data	Evaluating changes in perceptions before and after interventions

Behavior Change Strategies and Campaigns: Best Practices

A Safe Systems approach suggests that if many road users have made similar mistakes, at the same (or similar) locations, the problem is not solely with the user. However, modifications to infrastructure alone may be offset by behavioral adaptation (either positive or negative) – it's also not enough to focus exclusively on design and engineering. As defined by FHWA [16], there are two basic strategies to affect change:

1. Provide information
2. Change the environment

Providing information could include education, messaging, or raising awareness. However, it seldom works in isolation, and assumes that the information is new to the intended audience. Moreover, knowledge of the information alone is seldom sufficient to induce the desired outcome; other factors than lack of information are very frequently more important. In addition, the audience must believe there will be negative consequences, if information-based efforts are to be effective. Communication strategies, overall, are most effective when implemented along with other countermeasures or strategies [16] [20].

As relates to changing the environment, this may extend beyond the physical/built environment to include deterrents, incentives, or resources directing people to behave in a prescribed manner, as well as subtler features that address users' intuitive systems [16].

Typical barriers to change include [10]:

1. Lack of data
2. Lack of analysis framework (or practitioner understanding of framework)
3. Organizational, political, or societal resistance to change.

The first step to adopting a public health approach to a planning problem to attempt to overcome these barriers is to define the scope and magnitude of the issue, including the affected location(s) and population(s) [8]. Next, identify risk and protective factors, and corresponding strategies (based on research and evaluation) to meet the specific needs of the communities experiencing the problems identified. This step should include a feedback loop of design, implementation, and evaluation to improve processes, address barriers, and make interventions more effective. Finally, share the findings widely to reinforce their effectiveness, and encourage widespread adoption of what works.

The AAA's Foundation for Traffic Safety "toolkit" [9] reviewed and summarized campaign design, location, evaluation methods, and results for 48 previous campaigns to identify characteristics of successful programs based on clearly stated outcome measures and rigor of campaign design. The findings were synthesized into a five-phase roadmap for practitioners to guide a campaign from inception through evaluation (Figure 4).

Figure 4. Evidence-Based Behavior Change Campaign Roadmap for Practitioners [9]

Phase 1: Understand Behavior Change Campaigns and Theory

Step 1. Understand the purpose and goals of traffic safety behavior change campaigns

Step 2. Understand the theoretical basis for behavior change campaigns

Step 3. Review Commonly used theories, models, and frameworks for behavior change

Phase 2: Develop a Campaign Plan and Strategy

Step 1. Assess the health behavior by conducting a needs assessment and needs analysis

Step 2. Define objectives and goals of the campaign

Step 3. Define the intended audience by conducting an audience analysis

Step 4. Choose communication settings, channels, and activities for campaign messages

Step 5. Identify partners and develop partnering plans

Step 6. Develop a campaign strategy, including communication and evaluation plans, a logic model, and guiding theory

Phase 3: Develop and Pre-Test Messages

Step 1. Develop message concepts using frame analysis and pre-test the concepts

Step 2. Develop messages and materials and ensure messages match the intended settings and channels

Step 3. Pre-test messages and materials with the intended audience

Phase 4: Implement the Campaign

Step 1. Launch the campaign; determine the launch date and if there will be a kickoff event

Step 2. Manage the campaign by overseeing activities, staff, and budget

Step 3. Monitor the campaign and conduct a process evaluation to determine if the campaign is meeting its goals and if changes are needed

Step 4. Engage partners during implementation

Phase 5: Evaluate the Campaign

Step 1. Engage stakeholders to prepare for evaluation

Step 2. Describe the campaign and refer to evaluation plans developed during the planning stage

Step 3. Focus the evaluation design by developing research questions and determining methods

Step 4. Gather credible evidence, and determine indicators and data sources

Step 5. Justify conclusions and recommendations

Step 6. Ensure use of evaluation findings and share lessons learned to refine or adjust the campaign

Similarly, the National Cancer Institute [21] identifies six steps for campaign strategy development:

1. Assess the health behavior of concern
2. Define behavior change objectives and goals
3. Define the intended audience
4. Choose communications channels and activities
5. Identify partners and partnership plans
6. Develop an overarching campaign strategy, communication plan, media plan, partnering plan, implementation plan, timeline, logic model, and evaluation plan

The first step to implementing a behavior change strategy is to identify a specific behavior on which to focus. Problem identification begins with an analysis of crash data, sociodemographic data, and other facets of current conditions. This background information, in turn, is likely to lead to additional questions about behaviors and factors contributing to crash incidence, which may be best investigated through surveys (see Section X), observational studies, or other research aimed at better understanding the core nature of the issue. General categories of unsafe driving behavior are assumed below; however local data and analysis may reveal additional behaviors or factors on which to focus interventions.

Developing a Plan and Strategy

Developing a plan, strategy, or campaign to achieve change begins, as noted above, with an assessment of the health-related behaviors in question and an analysis of needs. Next, it requires definition of objectives and goals of the plan or campaign, identification of the target audience, involved partners, and an overarching strategy defining communication modalities and activities.

As a general rule, a public health-rooted strategy for addressing a target problem or behavior is more effective if it targets an entire population, rather than a few, high-risk individuals, even if, in practice, some population-level interventions may be delivered at an individual level [22] [19] [10]. Addressing high-risk behavior means differentiating between behavior and performance, e.g. in the case of young males, who are disproportionately responsible for traffic violence due not to lack of capability, but to their behaviors [15].

A Safe Systems approach to roadway safety centers collaboration and focuses interventions on human limitations [6]. The classic “3 Es” road safety framework of Education, Engineering, and Enforcement can be adapted for behavior change campaigns, though research indicates that education and enforcement-based strategies must generally be combined with other “Es” to be effective [10]. And, as Ederer et al [6] reflect, the contemporary tendency to supplement with various other “Es” (equity, evaluation, economics, exposure, emergency services, etc.) suggests that “if the initial Es sufficiently described the safety problem, further Es would not be needed,” and tend to promote a false equivalency among factors which, in reality, are not equally effective.

The fundamental strategies of change can also be described as “contingency management:” managing behavior through rewards and incentives, modifying environmental cues and conditions, and implementing laws and enforcement strategies. Brief interventions can elicit commitments to change behavior; these may be “early stage” elements that set an intention to change, or “late stage” elements that reinforce new behaviors and prevent relapse [15]. Where feasible, control groups should be identified and included for all types of interventions, to inform the evaluation of action efficacy [15]. Focus on shared risk and protective factors when selecting strategies and interventions and examine how social determinants of health increase or decrease risk of unsafe behaviors (i.e. how behaviors correlate to environmental, psychosocial, equity, or health outcome factors) [8]. Identify data at the individual, relationship, community, and societal levels that is relevant to risk or protective factors of interest and collect data highlighting the characteristics of crashes and injuries relative to risky behaviors [8].

Broadly, aspects of behavior which a given campaign or intervention may seek to address include [23]:

- Attitudes toward a behavior (positive and negative)
- Perceptions about acceptability and ubiquity (social norms)
- Perceptions of likelihood of negative consequences
- Perceptions of road users’ responsibility for their own behavior
- Perceived barriers and perceived ability (self-efficacy)
- Anticipated effect of behavior
- Road user intentions

Experts recommend isolating specific behaviors, rather than trying to tackle multiple behaviors simultaneously [10]. The efficacy of a campaign depends on the type of behavior being targeted, and the baseline against which change is measured: for example, seat belt campaigns have been highly effective, but that also means that campaigns in many places are likely to have little further effect [24]. A campaign against drunk driving or drowsy driving is unlikely to succeed if there are no alternatives provided [24]. The Safe States Alliance [8] compiled and summarized a range of behavior change strategies and interventions (categorized as effective, promising, or emerging based on available published evidence base) that illustrates how specific tactics might be applied to address one or more risky driving behaviors (Table 6). This list does not, however, represent an exhaustive compilation of potential interventions.

Table 6: Strategies to address unsafe driving behaviors [8]

Category	Strategy	Description/sub-strategies	Applicable Driving Behavior
Effective	Physician requirements for reporting to DOT based on the medical condition of a driver	confidential system of physician reporting for patients with ADHD or other medical conditions to DOT	Multiple
	Policy	Distracted Driving Laws that prohibit the use of cell phones or other vehicles while operating a vehicle	Multiple

		Graduated driver licensing policies that include a distracted driving component	Multiple
		Primary seat belt laws that require drivers to wear a seat belt	Multiple
		BAC laws	Multiple
		Employer-based safety programs that require consistent seat belt use at all times	Multiple
	Visible enforcement of state or local policy	Sobriety checkpoints	Multiple
		Ignition interlocks	Multiple
		Roadside drug testing	Multiple
		Incorporate substance-related traffic risk behaviors in early prevention/intervention strategies	Multiple
		Fines and penalties for violations	Multiple
		Interventions that address risk perception	Multiple
	Theoretical frameworks that explore behavioral intention within and across one or more risky driving behaviors	Theory of Reasoned Action	Multiple
		Theory of Planned Behavior	Multiple
		Theory of Normative Social Behavior	Multiple
	Behavioral psychotherapies in addressing maladaptive and destructive behaviors	The "big five personality factors" model to address behaviors as they relate to personality traits	Multiple
	Campaigns targeted at changing group norms	Social marketing campaigns designed to reset perceived social norms associated with distracted driving behavior	Distracted Driving
		Campaigns that focus on parental involvement, modeling, and monitoring of adolescent distracted driving behavior	Distracted Driving
	Clinical observation and treatment of obstructive sleep apnea	Expedite treatment of diagnosed OSA to minimize risk of motor vehicle related injury	Drowsy/Fatigued Driving
	Healthcare screening and referral programs	Include routine questions on drug-impaired driving/riding when screening for substance use problems	Impaired driving - other drugs

		law enforcement response that includes mandatory referral for evaluation and treatment of drug-impaired offenders	Impaired driving - other drugs
		Revocation of driving privileges until treatment programs are complete	Impaired driving - other drugs
		community-based screening for substance use behaviors	Impaired driving - other drugs
Promising	Driver Education (adult)	Educate drivers on scope of the problem	Multiple
		Educate drivers on dangers of unsafe driving practices	Multiple
		Education on benefits of reducing risky driving behaviors	Multiple
		Psychoeducational interventions	Multiple
		Motivational approaches (e.g. motivational interviewing)	Multiple
	Mindfulness training	Encourage emotion regulation and acceptance of - not reaction to - the current situation	Multiple
	Comprehensive approaches to reduce risky driving	Multi-sector strategies involving seat belt laws and enforcement, distracted driving laws, improved road design, improved emergency response, lower BAC limits, increased alcohol taxes, use of ignition interlocks, use of Driver Alcohol Detection System for Safety	Multiple
		Interventions that address drug-impaired driving more assertively and simultaneously with alcohol-impaired driving	Multiple
	Gender-based education	intervention strategies that are designed to increase awareness of the consequences of aggressive driving and speeding and promote safe driving practices	Aggressive Driving/Speeding
		Intervention strategies addressing gender as one of many moderating factors in aggressive driving behaviors	Aggressive Driving/Speeding
	Required annual recertification for commercial vehicle drivers with untreated obstructive sleep apnea	Updated guidelines and standards related to medical fitness of commercial motor vehicle drivers with OSA	Drowsy/Fatigued Driving

	Maintain or increase price/fees related to purchase or consumption of alcohol	Raise alcohol taxes to reduce impaired driving; retail price restrictions and minimum alcohol pricing	Impaired driving - alcohol
	Address physical availability of alcohol products	Regulate alcohol outlet density, hours and days of sales, state monopolization of alcohol sales	Impaired driving - alcohol
	Reduce illegal alcohol sales	Develop minimum legal drinking age laws/enforcement procedures, dram shop liability laws, social host liability standards, responsible beverage service/server training, sales to intoxicated persons, alcohol law enforcement	Impaired driving - alcohol
	Reduce the harmful effects of alcohol marketing	decrease number of advertisements or standardize advertisement times to avoid youth exposure to alcohol marketing	Impaired driving - alcohol
	Education/Awareness	school-based education programs, alcohol warning labels, and/or media campaigns	Impaired driving - alcohol
	Technological interventions	Personal devices and technology for estimating BAC	Impaired driving - alcohol
		Combine alcohol monitoring with behavior change that takes advantage of smartphone connectivity	Impaired driving - alcohol
	Advocacy	Educate stakeholders, policymakers on connections between and value of screening, intervention, and treatment of substance abuse issues	Impaired driving - other drugs
	Personal decision-making policies	Assess an individual's decision policy of wearing a seat belt while driving	Seat belt nonuse
Emerging	Reward-based programs	auto insurance rate discounts	Multiple
		Reduced fees for license renewal	Multiple
	Mobile phone technology solutions	Mobile applications that auto-respond to text messages when operating a vehicle	Distracted Driving
		Programs that text drivers messages when they're texting and driving	Distracted Driving
	Car safety features	Technology solutions based on the car make and model	Drowsy/Fatigued Driving
		Use of technology to detect or predict operator fatigue	Drowsy/Fatigued Driving

	New seat belt technology	Make seat belts more comfortable and convenient to use for individuals who are obese	Seat belt nonuse

Messaging and Modalities

When it comes to communication around roadway safety (whether pertaining to infrastructure interventions, behavior change campaigns, or other actions), no single modality can reach everyone, with "uniformly high efficacy in changing all relevant psychosocial predictors" [25] (p.34), e.g. perceived threat, affective beliefs, subjective norms, personality, identity, task difficulty, and habit [26]. Critically, while messaging campaigns are valuable, these should be in combination with systemic changes that go beyond targeted behavior [6] [27, 24]. Hoekstra and Wegman [24], reviewing a range of media campaigns for roadway safety, found virtually no impact on crashes for media campaigns alone, but reductions ranging from 9% to 39% depending on other strategies deployed simultaneously (e.g. legislation, law enforcement, etc.).

Research indicates a need to address both motivation to change, and intent to actually change, and to identify underlying motivations using value ladders and other tools to find the high-level factors that influence behavior [10]. Recognize that either reasoning-based or heuristic constructs might be more helpful for a specific scenario, and that self-efficacy and control are important and predictive of how much effort someone will expend to change: people have to believe that change is possible [10]. Identify challenges or barriers to self-efficacy, including denial, fear, guilt, etc.

Messages that include a positive framing, focused on achieving or gaining something and based on normative traits or behaviors considered acceptable the community are likely to be better tolerated than negatively-framed messages focused on punishment, loss, fear, or stopping something, as these may be perceived as a threat to freedom (although, may be important in certain circumstances) [10] [24]. Regardless of message content, it must be relatable, acceptable to the audience, memorable, and considerate of cultural aspects of groups involved. Where possible, social proof (e.g., from peer groups or authorities) should be used to influence persuasiveness [10]. Relatedly, messaging that "primes" the audience with sensory input associated with a desired behavior, or models a behavior that is encouraged (rather than portraying behaviors that are being discouraged) are advised [24].

Campaigns that rely on improving self-efficacy to affect change may require providing supplemental resources (e.g. driver training for those without means), or countering bad behaviors linked to an excess of confidence through influencing the opinions of friends or family or increasing awareness of possible repercussions [17].

Campaigns tend to be more effective if they're specifically targeted to certain groups [24]. Specific groups may have additional considerations in terms of delivery channels or content: groups with lower levels of education have been found to pay less attention to media campaigns, while those with low self-efficacy may become defensive toward fear-based messaging [24]. Rural residents have been identified as being more likely to have "distrust of academically framed safety messages" [10]. Consider how the recipients of a campaign may influence others (such as children on their parents, or young women on young men)

[24]. In general, messaging should provide clear, specific feedback about the behavior in need of modification, direct advice, and a choice of strategies for how to change [15].

In terms of messaging modalities, both traditional media and digital platforms, as well as non-media delivery modes, can have value. Digital media can be more interactive but tends to narrow the potential audience. Communications at community events, through interpersonal channels (peers, parents, primary care providers, teachers, or even non-traditional outreach methods like theater) is critical in combination with media-based campaigns [10, 25].

Regardless of delivery platform, always pilot test messages and materials with intended audiences to ensure the content is relevant, compelling, clear, and actionable [9] [24]. Optimally, messages should be timed for delivery at key moments when people are naturally prone to changes in automatic habits (such as a new job, child, or address) [24]. Messages should be clear and focused on a specific behavioral change or call to action [10].

Implementation and Monitoring

This narrative is principally aimed at structuring a framework through which to understand behavior change campaigns and theory, assess potential behaviors which may be important to address through infrastructure and non-infrastructure interventions, and begin to develop message concepts based on shared community values in the target communities. Implementation of these interventions (including any associated behavior change campaigns) is outside the scope of this planning process. However, a few general guidelines and best practices for implementation and monitoring of such practices are summarized below.

Campaigns should be continuously monitored and evaluated, including engagement of all relevant partners, with attention to any unintended consequences (either positive or negative) [9] [10]. Partnership with academic institutions to conduct formative research, and with media companies to track analytics as part of monitoring and evaluation, or other intersectoral and non-traditional can expand capacity [10, 8]. Principles should be prepared to mitigate issues that come up during the campaign, and to respond to competing narratives [10]. Many campaigns may produce initial, short-lived changes, then return to baseline conditions. Most fail to continue testing effectiveness over time: periodic evaluations to see whether a campaign is working long-term, or whether modifications are needed, is recommended [10].

Evaluation

Finally, a critical aspect of adopting a public health approach means building in evaluation to all programs and activities. Many safety campaigns are never meaningfully evaluated and may be ineffective [24]. Evaluation activities are likely to include observational surveys, knowledge/attitudinal surveys, activity records, data records, or tracking of media coverage [28]. A basic intervention evaluation framework adapted from the Centers for Disease Control and Prevention (Figure 5) involves the following six steps [29, 17, 8, 28]:

1. Engage stakeholders
    a. Both those involved in or affected by program and primary users of evaluation
    b. Evaluation is ongoing, and should involve all program stakeholders, not just experts
2. Describe the campaign
    a. Need, expected effects, activities, resources, stage, context, logic model
        i. An evaluation logic models summarizes a program's overall mechanism for change, linking processes to eventual effects, and the infrastructure needed to support the program. At a minimum, this will describe inputs, activities, outputs, results (immediate, intermediate, and long-term). The model should also reveal assumptions and indicate causal chains supported by prior research
    b. Define aims and objectives:
        i. What will be evaluated?
        ii. What aspects of the program will be considered when judging performance?
        iii. What standards constitute success?
        iv. What evidence will be used to assess performance?
    c. What conclusions can be drawn about program performance, in comparing evidence to selected standards?
    d. Define the target population and collect background data
3. Focus the evaluation design
    a. purpose, users, uses, questions, methods, and agreements
    b. E.g., experimental, quasi-experimental, non-experiment
    c. Select and design data collection methods
4. Gather credible evidence
    a. Indicators, sources, quality, quantity, logistics
    b. Foster interdisciplinary partnerships to analyze, interpret, and disseminate data
    c. Make data collection a routine practice when implementing interventions, behavior change strategies, etc
5. Justify conclusions
    a. standards, analysis/ synthesis, interpretation, judgement, recommendations
6. Ensure use of evaluation findings and share lessons learned
    a. Design, preparation, feedback, follow-up, dissemination
    b. Publish results (even if negative)
    c. Make improvements to the intervention based on those results

Figure 5. CDC Evaluation Framework [29]

Evaluation activities should be assessed based on their [29]:

1. **Utility** – does the information serve the needs of its users
2. **Feasibility** – realistic, prudent, diplomatic, and fugal
3. **Propriety** – legal, ethical, and with regard for welfare of those affected
4. **Accuracy** – does it reveal technically accurate information

When establishing evaluation metrics, be as specific as possible. For instance, don't aim to "reduce traffic deaths," if what you really mean is increase seat belt use. Don't try to "increase support for traffic safety" if what you really need is signatures on a petition to pass a new law, etc. [28]. If countermeasures are already "proven," (e.g. by NHTSA) concentrate evaluation on whether you met your actual objectives, not on whether the countermeasures themselves worked [28]. NHTSA cautions to be careful to differentiate between "important" evaluation measures, and convenient ones, whether they are primary outcomes (e.g. crash number or severity) or secondary/proxy measures (e.g. changes in observed or reported behaviors, awareness, activities, etc.) [28].

For roadway safety campaigns specifically, ROSPA outlines five key metrics for assessing outcomes: Exposure, Knowledge/Awareness, Attitudes and Intentions, Behavior, and Reduced Crashes (Table 7).

Table 7: Example Road Safety Campaign Metrics and Indicators [17]

Outcome Metric	Description	Example Indicators
Exposure	How many users were exposed to the campaign/how many people reached?	Total # of views
	How many times was campaign content shared (by channel and type)	# of views over X days
	Number of unique viewers of content during specified period (reach)	# unique views
	Number of interactions with digital content (engagement)	# engagements
Knowledge/ Awareness	Of people exposed to campaign, how many became aware of the issue/behavior addressed?	# of people referring to campaign
	Surveys, interviews, or focus groups may be used to assess	# of inbound links
		# of search engine searches
		Measure of recognition/recall
Attitudes and Intentions	Of people aware of the issues, how many express changed attitudes or intent to change behavior?	Likelihood to engage in specific behavior
	Focus groups, surveys, and interviews to capture this information	Opinions about a specific behavior
	When conducted pre- and post-campaign, measures self-reported behavior change	Perceived risk associated with specific behavior
Behavior	Observed behavior change relative to pre-campaign	# of traffic citations
	Traffic citations associated with behavior	Frequency/severity of observations of behavior

		from roadside surveys or dedicated observations
	Naturalistic driving data or traffic cameras may be used to assess behaviors	
Reduced Crashes	Has campaign achieved goal of reducing crashes in target area?	# of crashes by crash type
	Focus on specific crash types associated with behavior	# of crashes in specific locality
	Focus on specific locality or sub-population of interest	# of crashes involving specific sub-population
		crash rates

Use and Design of Surveys in Behavior Change Research

A robust behavioral research literature has emerged in recent years addressing various topics related to traffic safety, from the relationship of enforcement actions to safety outcomes [30, 31], to the specific needs of older adults [32, 33] to legislative actions [34], to changes in community attitudes over time [35]. National surveys have investigated the public's opinion of "underutilized" strategies to improve traffic safety, including policy actions like reducing blood alcohol concentration limits or lowering speed limits, to infrastructure interventions like roundabouts and rumble strips [36].

Multinational survey research by 3M found that drivers report grave concerns about distracted and negligent driving and support interventions for safe, multimodal streets [37]. The Traffic Safety Culture Index reported annually by AAA based on a sample of over 2,600 drivers highlights a "discordance" between drivers' perceptions and their behaviors (i.e., citing certain behaviors as very dangerous, but admitting to doing them anyway) [38]. The survey asks about driver perceptions and self-reported behaviors, as well as support for various potential countermeasures to address them (Appendix C).

Some states have conducted similar research about driver safety concerns, awareness of various safety campaigns, perceptions about vulnerable road user safety, laws, and infrastructure, and other topics (e.g., Ewald and Wasserman [39]). Colorado DOT (CDOT) conducts an annual Driver Behavior Survey via random address mailings supplemented by an online panel targeting groups with traditionally lower response rates, asking about speeding, seat belt use, stopping for pedestrians in and outside of crosswalks, distracted and impaired driving, anticipated law enforcement consequences, etc. [40].

Such surveys have employed a variety of methods and samples, from intercepts to random samples obtained through commercial panel vendors. NHTSA has conducted a series of national phone-based surveys of speeding attitudes and behaviors (most recently in 2011), aiming to develop improved countermeasures and interventions to address speeding [41]. The survey instrument asks about speed behaviors, attitudes/norms, attitudes toward enforcement and various safety countermeasures, crash and citation history, and other risky behaviors (Table 24). NHTSA has also provided guidelines – including a set of "core questions" about impaired driving, seat belt use, and speeding for states interested in tracking trends over time [42] (Table 25).

Internationally, the SARTRE survey, which has been repeated four times across a wide range of European countries, targets car drivers, motorcycles, and other road users through an extensive survey, delivered principally via in-person interviews. SARTRE aims to describe opinions and self-reported behaviors related to traffic risk. The most recent iteration aimed for 1000 adult respondents per participating country, with questions covering modes of transport used and estimated annual mileage, concern for social issues, questions about road safety, support for various types of countermeasures, perception of danger, personal safety behaviors, and demographics [43]. An analysis of several surveys conducted over a period of several years in Germany analyzed questions on attitudes, subjective norms, perceived behavior control, intention, and behavior to evaluate mobile phone use among young drivers [44]. Th UK Department of Transport's Social Attitudes to Road Traffic Risk survey aimed to measure car drivers' reported behaviors and attitudes, identifying a range of support for traffic regulations and safety measures, and searching for underlying social and cultural factors influencing behavior [45].

However, to date, few such efforts have been completed in Louisiana. Further, while some safe systems countermeasures may be implemented statewide, the majority of interventions are highly localized, and the specific behaviors, perceptions, built environments, and even applicable laws can vary notably from one jurisdiction to another. Questions of interest to state DOTs managing highway safety are not necessarily the same questions local or regional planning and public health agencies have when developing Safe Systems strategies for local roads and neighborhoods [46].

Regardless of content, surveys must be carefully designed and tested to minimize bias, and questions should relate directly to the behavior you are trying to change. Summaries of the survey instruments utilized described above can be found in Appendix C.

Framework Recommendations

At the most basic level, a public health approach to safety involves the following core components:

1. Assessing the nature of the problem to be solved
2. Identifying causes (risk factors) contributing to the problem

3. Developing and evaluating interventions (countermeasures) which are expected to address the problem, and
4. Implementing these interventions

The above-described practices, models, and recommendations pertain to one or more phases of planning, engagement, project implementation, and evaluation relating to roadway safety, and are intended to provide a broad overview of methods and approaches drawn from public health practice suitable for integration in transportation planning and policy. Many of the projects and programs noted above represent full-scale research studies, campaigns, or programs aimed at developing a base of knowledge around one or more behaviors, a theory-based program for addressing an identified behavior, and/or an in-depth, targeted evaluation of outcomes resulting from a program or countermeasure. Incorporation of public health practices and principles into comprehensive planning, project prioritization and evaluation, and program implementation is an ongoing process that can serve to strengthen NORPC's effectiveness overall.

For the purpose of this Safe Streets for All planning process, an appropriate framework for translating these findings into the current project scope consists of two main components:

- Phase 1: Adopting public health practices to improve public engagement and data collection, and;
- Phase 2: Developing policy and action plan recommendations that draw from integrated behavior change theories.

The following sections outline core recommendations for interpreting and applying public health methods to the process of developing a roadway safety action plan (Phase 1).

Phase 1: Public Engagement and Data

A core lesson from public health practice is the value of equitable engagement in not only answering questions about behaviors and perceptions to fill data gaps, but also to establish a vision for a plan, policy, or program that is rooted in shared community values. Crash data discussed below was based on historical crash data received from the NORPC for St. John, St. Tammany, and Tangipahoa during the five-year period that occurred from January 1, 207 to December 31, 2021.

The analysis of available data and existing conditions in the subject parishes reveals significant data gaps pertaining to several of the "Big 6" unsafe driving behaviors:

- Excessive speed
- Driving under the influence of alcohol or drugs

- Drowsy driving
- Improper seat belt or child restraint use
- Driver inexperience
- Driver distraction

In particular, the project team has determined that, based on the way crash data is currently collected and reported, and in the absence of local survey data, behavioral studies, etc., data pertaining to alcohol use, speeding, occupant protection, and distracted driving are underdeveloped and likely under-representative of the role these risk factors play in crash outcomes. Further, crash typologies may be inconsistently coded and insufficiently nuanced, particularly in the interpretation of crashes involving vulnerable road users.

In St. John the Baptist Parish and Tangipahoa Parish, off-road, rear-end, and pedestrian-involved crashes constituted over half of all crashes for the specified analysis period (2017-2021). In St. Tammany Parish, off-road and rear-end crashes alone make up 50% of the total reported, with crashes coded as "other" making up an additional 16% (in this analyses, pedestrian and bicycle-involved crashes are not extracted from overall crash type and likely constitute the bulk of "other" crashes). Lack of lighting appears to be associated with a disproportionate share of serious crashes in both Tangipahoa and St. Tammany Parishes. Alcohol involvement was cited as a factor in 21% of St. Tammany and 20% of Tangipahoa serious crashes, comparable with statewide averages. In St. Tammany, alcohol is linked to an even larger share of bicycle (56%) and pedestrian-involved (40%) crashes. Alcohol involvement was not identified as a factor in St. John's crash data, though this likely reflects a deficiency in the data rather than an anomaly relative to the rest of the state.

Current analyses of crash data for the present project also fail to break down and examine data by sociodemographic sub-groups, as recommended in the literature; e.g., off-road crashes involving young, male drivers; pedestrian crashes occurring at night involving low-income victims; or alcohol-involved crashes happening during late evening hours on weekends. Relatively low total crash numbers can, of course, make such disaggregated analyses impractical or unreliable. However, this gap hinders assessment of likely countermeasures – particularly those targeting behavior change among groups overrepresented in serious crashes – and highlights the need for additional data collection and review.

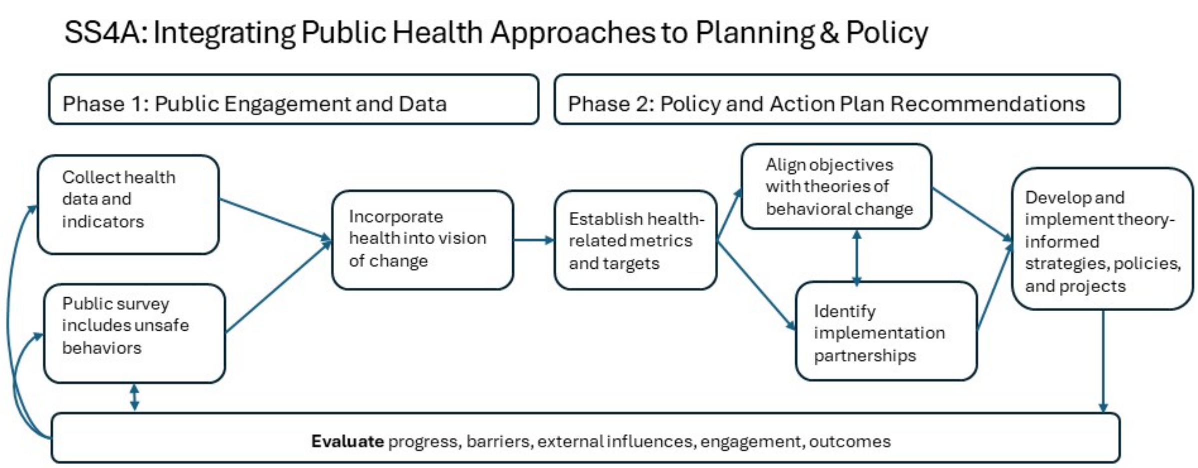
Planned outreach, including a community survey, can begin to address these gaps by identifying the degree to which subject communities perceive these behaviors to be a problem, resulting in the identification of widely-shared safety values. At early planning stages, understanding what will motivate community members to participate in the process, and later to support or advocate for changes in policy, infrastructure, etc., is key; the goal of outreach, surveys, etc. is to define a community vision that reflects implicit health goals. Critically, ensuring an adequately representative cross-section of the community (including specific geographic or demographic sub-groups where applicable) is required.

Overall, the basic steps of integrating a public health-informed approach to engagement and action plan development include:

1. Incorporate health data and indicators into existing conditions and equity analyses
2. Include questions pertaining to unsafe driving behaviors in public survey to better understand their prevalence and relative priority
3. Incorporate health into the community's vision of future change
4. Establish health-related metrics and targets
5. Align objectives with relevant theories of behavioral change
6. Identify interdisciplinary implementation partnerships with health-sector partners
7. Develop and implement public health theory-informed approaches into action plan policy and project recommendations
8. Measure progress using health metrics and qualitative measures (throughout)

The organization of these components, as envisioned in reference to the SS4A process, is diagrammed in Figure 32.

Figure 32: SS4A Integrating Public Health Approaches to Planning and Policy



Survey Questions

While many behavior-focused survey efforts in the public health field function as standalone projects with significant resources allocated to understanding the root factors contributing to one or more behaviors, for the purpose of this Safe Streets for All Action Plan, data collection should be integrated into a single, project-wide public survey in order to avoid survey fatigue, confusion or conflation with other, concurrent planning processes in the region, etc.

A few concise, targeted questions about the major unsafe behaviors are required to understand:

1. How prevalent these behaviors are (self and/or others), and
2. To what extent respondents perceive these to be a problem in their community

In addition, the data should be stratified by basic sociodemographic characteristics, including (at a minimum), age, race, income, and zip code (or other geographic identifier at this scale or smaller).

Suggested questions include:

1. How often do you usually drive a car or other motor vehicle? **(Exposure)/stratification**
2. What kind of vehicle do you drive most often? Is it a car, van or minivan, motorcycle, SUV, pickup truck or something else (e.g. bike/walk/taxi)? **(risk factors/stratification)**
3. In the past 30 days, how often have you...(Regularly, fairly often, a few times, just once, never) – **(Behavior)**
    - Driven while holding and talking on a cell phones
    - Driven while reading on cell phones
    - Driven while manually texting or emailing on cell phones
    - Used technology that allows hands-free use of your phone (Bluetooth, CarPlay, Android Auto, etc.)*
    - Driven 15 mph over the speed limit on freeways
    - Driven 10 mph over the speed limit on residential streets (neighborhood)
    - Driven through a light that had just turned red when you could have stopped safely
    - Driven aggressively (switching lanes quickly, driving very closely behind another car)
    - Driven when you were so tired that you had a hard time keeping your eyes open
    - Driven within 2 hours after drinking alcoholic beverages? Driven shortly (within an hour) after using marijuana
    - Driven after using potentially impairing prescription drugs
    - Driven without wearing a seatbelt
    - Other

4. How dangerous do you feel the following driving behaviors are? (Extremely dangerous, very dangerous, moderately dangerous, slightly dangerous, not at all dangerous) – **(Norms/Perceptions)**

- Driven while holding and talking on a cell phones
- Driven while reading on cell phones
- Driven while manually texting or emailing on cell phones
- Used technology that allows hands-free use of your phone (Bluetooth, CarPlay, Android Auto, etc.)*
- Driven 15 mph over the speed limit on freeways
- Driven 10 mph over the speed limit on residential streets (neighborhood)
- Driven through a light that had just turned red when you could have stopped safely
- Driven aggressively (switching lanes quickly, driving very closely behind another car)
- Driven when you were so tired that you had a hard time keeping your eyes open
- Driven within 2 hours after drinking alcoholic beverages? Driven shortly (within an hour) after using marijuana
- Driven after using potentially impairing prescription drugs
- Driven without wearing a seatbelt

5. What are your biggest safety concerns while traveling around your community? (Select all that apply) **(Values)**
    - Speeding
    - Distracted driving
    - Driving under the influence of drugs or alcohol
    - Improper seat belt or child restraint use
    - Driving aggressively (switching lanes quickly, driving very closely behind another car)
    - Additional possible factors:
        - Inadequate lighting
        - Not enough crosswalks
        - Not enough bicycle lanes or paths
        - Drivers not yielding to people in crosswalks
        - Lack of traffic enforcement
        - Unclear signage
        - Design of streets and intersections
        - Poorly maintained infrastructure (potholes, cracked sidewalks, faded crosswalks, etc)
        - Poor sightline visibility (length of roadway visible to a driver, such as at driveways, bicycle crossings, roundabouts, etc

Where feasible, in-person outreach provides the opportunity to solicit open-ended feedback pertaining to these topics.

Participant Recruitment Strategies

The draft Public Involvement Plan (PIP) for this effort outlines anticipated engagement processes reflecting the SS4A's core components of leadership commitment and goal setting, planning structure, engagement and collaboration, and equity. In the context of a public health-informed approach to planning and communication around injury prevention, the PIP's use of screening tools to identify historically disadvantaged, low-and moderate income, and socially vulnerable communities aligns with the identified challenge of engaging with and responding to those groups who are frequently disproportionately impacted by roadway safety deficiencies. Specifically, the following core strategies are recommended for aligning outreach activities with public health best practice:

1. **Identify credible individuals and organizations to deliver messages, especially for minority populations.** Each parish's Steering Group should help the project team identify relevant contacts and entities who have access to, and trust among, relevant communities.

2. **Target audiences through traditional media, digital and social media, and offline communications using partner organizations**. The Project Management Team and Steering Groups should identify leverage access to existing media channels, and help the consultant team identify partner groups and opportunities for in-person outreach.

3. **Consider engagement to be an iterative process**. Integrating evaluation into all phases of project delivery allows interim assessments of the reach and efficacy of initial outreach activities, allowing the team to target and address gaps, such as by programming in-person activities in locations or with community partners who are insufficiently represented in initial feedback.

Geographic and Demographic Analysis of Outreach Population

The Equity Analysis conducted in service to this planning effort defines and identifies disadvantaged communities along several dimensions, including areas of persistent poverty, communities of color, limited English proficiency, zero-vehicle households, disability status, and overall social vulnerability. This analysis informs outreach strategies (i.e., locations of outreach events and materials/survey distribution) and provides a basis for measuring the extent to which survey respondents participating in the project adequately and accurately reflect the diversity of the subject communities.

In order to benchmark representativeness of responses and, where needed, weight responses of communities of concern to achieve equity goals, the equity metrics identified in the analysis (generally provided at census tract or block group level) must be mapped against the jurisdictions and parameters of survey responses. To facilitate ease of data collection and mitigate privacy concerns associated with providing individual address data, surveys ask for respondents to identify only their zip code and parish. Zip code boundaries align poorly with census-designated boundaries, complicating the identification of clear "equity zones" among survey responses. To address this mismatch, each of the dimensions of equity status outlined in the analysis is cross-referenced against each zip code, to identify which zip codes in each parish are fully or partially overlap with one or more equity indicators. The results of this spatial exercise are summarized in Tables 8-10.

Table 8. St. John Parish - Equity Indicators by Zip Code

Indicator	Overlap	Zip Code					
		70049	70051	70068	70076	70084	70090
Historically Disadvantaged Community	Full	X	X		X	X	X
	Partial			X			
Areas of Persistent Poverty - Data Hub	Full	X	X		X		X
	Partial			X		X	
Areas of Persistent Poverty - ETC Explorer	Full						
	Partial						
Limited English Speaking Households 80th percentile (EJ Screen	Full						
	Partial			X			
Limited English Proficiency - 90th % (SVI)	Full						
	Partial			X			
Minority Population: 90th Percentile (SVI)	Full						
	Partial	X		X		X	
People of Color: 80th Percentile (EJ Screen)	Full	X					X
	Partial			X		X	
Disability - 90th Percentile *(NOTE: No data provided)*	Full						
	Partial						
Greater than 10% Carless Households*	Full						
	Partial			X		X	
TOTAL INDICATORS (count)	**Full**	**3**	**2**	**0**	**2**	**1**	**3**
	Partial	**1**	**0**	**7**	**0**	**4**	**0**

**Not an indicator included in Equity Analysis, used here as an additional reference point for higher-than-typical transportation choice needs*

Table 9. Tangipahoa Parish - Equity Indicators by Zip Code

Indicator	Overlap	70401	70402	70403	70422	70433	70435	70436	70437	70438	70442	70443	70444	70446	70451	70454	70455	70456	70465	70466
		Zip Code																		
Historically Disadvantaged Community	Full							X		X			X		X			X	X	X
	Partial	X		X	X				X		X	X		X		X				
Areas of Persistent Poverty - Data Hub	Full		X																X	
	Partial	X		X				X					X		X					X
Areas of Persistent Poverty - ETC Explorer	Full		X					X											X	
	Partial	X		X	X							X	X		X	X		X		X
Limited English Speaking Households 80th percentile (EJ Screen	Full																			
	Partial			X											X	X				X
Limited English Proficiency - 90th % (SVI)	Full																			
	Partial			X	X								X		X	X				X
Minority Population: 90th Percentile (SVI)	Full																			
	Partial			X	X															
People of Color: 80th Percentile (EJ Screen)	Full																		X	
	Partial	X		X	X			X				X	X							
Disability - 90th Percentile	Full																			
	Partial	X		X	X			X					X		X	X		X	X	X
Greater than 10% Carless Households*	Full																			
	Partial	X		X	X					X		X	X			X		X		X
TOTAL INDICATORS (count)	**Full**	**0**	**2**	**0**	**0**	**0**	**0**	**2**	**0**	**1**	**0**	**0**	**1**	**0**	**1**	**0**	**0**	**1**	**4**	**1**
	Partial	**6**	**0**	**9**	**7**	**0**	**0**	**3**	**1**	**1**	**1**	**4**	**6**	**1**	**5**	**6**	**0**	**3**	**1**	**6**

**Not an indicator included in Equity Analysis, used here as an additional reference point for higher-than-typical transportation choice needs*

Table 10. St. Tammany Parish - Equity Indicators by Zip Code

Indicator	Overlap	Zip Code																	
		70420	70427	70431	70433	70435	70437	70438	70445	70447	70448	70452	70457	70458	70460	70461	70463	70464	70471
Historically Disadvantaged Community	Full																X		
	Partial	X	X	X	X	X			X			X		X	X			X	
Areas of Persistent Poverty - Data Hub	Full																		
	Partial				X	X								X	X				
Areas of Persistent Poverty - ETC Explorer	Full																X		
	Partial	X	X	X	X	X			X			X		X	X	X		X	
Limited English Speaking Households 80th percentile (EJ Screen	Full																		
	Partial	X			X				X						X	X			X
Limited English Proficiency - 90th % (SVI)	Full																		
	Partial	X			X				X					X	X	X			X
Minority Population: 90th Percentile (SVI)	Full																		
	Partial																		
People of Color: 80th Percentile (EJ Screen)	Full																		
	Partial													X		X			
Disability - 90th Percentile *(NOTE: No data provided)*	Full																		
	Partial																		
Greater than 10% Carless Households*	Full																		
	Partial				X									X					
TOTAL INDICATORS (count)	**Full**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**0**
	Partial	**4**	**2**	**2**	**6**	**3**	**0**	**0**	**4**	**0**	**0**	**2**	**0**	**6**	**5**	**4**	**0**	**2**	**2**

**Not an indicator included in Equity Analysis, used here as an additional reference point for higher-than-typical transportation choice needs*

In some cases, outreach results may be evaluated against one or two equity indicators relevant to a specific finding (e.g., priorities for non-motorized transportation in communities with a high share of zero-vehicle households). In other cases, overall results may be weighted with an overall equity dummy variable or score. A simplified method of aggregating these equity criteria into a single score is provided in Table 11: each equity criterion that fully overlaps with a given zip code represents one point, partial overlap represents .5 points. A sum of these criteria scores provides a rough estimate of the degree to which that zip code represents an area of potentially enhanced investment need. These scores are provided in reference to the 2020 population of the share of that zip code which falls within the specified parish (in the case of zip codes that cross parish lines), as well as the percentage of total parish population represented by that zip code. Zip codes with relatively high aggregate equity scores and a larger percentage of parish population may be suitable for investment prioritization.

Table 11. Simplified Aggregate Equity Score and Percent of Parish Population by Zip Code

St John Parish	Percentage of Zip Code within Parish	2020 Population	% of Parish Population	Simplified Aggregate Equity Score
70049	1.0	1975	5%	3.5
70051	1.0	1777	4%	2
70068	0.9	31057	73%	3.5
70076	1.0	276	1%	2
70084	1.0	6411	15%	3
70090	0.1	976	2%	3
TOTAL		42473	100%	
Tangipahoa Parish	**Percentage of Zip Code within Parish**	**2020 Population**	**% of Parish Population**	**Simplified Aggregate Equity Score**
70401	1.0	21014	14%	3
70402	1.0	1634	1%	2
70403	0.9	28039	18%	4.5
70422	0.8	11230	7%	3.5
70433	0.0	58	0%	0
70435	1.0	20828	14%	0
70436	1.0	450	0%	3.5
70437	0.1	1033	1%	0.5
70438	0.0	61	0%	1.5
70442	1.0	468	0%	0.5
70443	0.7	7355	5%	2
70444	0.9	8450	5%	4

70446	1.0	7255	5%	0.5
70451	1.0	192	0%	3.5
70454	1.0	32154	21%	3
70455	1.0	2017	1%	0
70456	1.0	2741	2%	2.5
70465	1.0	425	0%	4.5
70466	0.9	8262	5%	4
TOTAL		153666	100%	

St. Tammany Parish	Percentage of Zip Code within Parish	2020 Population	% of Parish Population	Simplified Aggregate Equity Score
70420	1.0	8030	3%	2
70427	0.0	655	0%	1
70431	1.0	5134	2%	1
70433	1.0	41365	16%	3
70435	1.0	20772	8%	1.5
70437	0.9	6542	2%	0
70438	0.0	371	0%	0
70445	1.0	10866	4%	2
70447	1.0	17120	6%	0
70448	1.0	25670	10%	0
70452	1.0	13187	5%	1
70457	1.0	221	0%	0
70458	1.0	37798	14%	3
70460	1.0	22429	8%	2.5
70461	1.0	30740	12%	2
70463	1.0	98	0%	2
70464	1.0	220	0%	1
70471	1.0	23334	9%	1
TOTAL		264552	100%	

In addition to ensuring outreach adequately represents the specific zip codes identified in the equity analysis, it is critical to track the degree to which individual survey respondents represent the demographic makeup of their community. Demographic summaries at the parish and zip code level, aligned where feasible in accordance with how survey respondents are asked to self-identify in outreach materials, are provided in tables X – X. These figures will be used to determine whether all groups are being adequately represented, and, where necessary, to weight final survey results in order to adjust for underrepresentation among one or more groups.

Table 12. Parish Level Demographic Summary

Age	St John	Tangipahoa	St Tammany
0-14	20%	18%	19%
15-24	14%	11%	12%
25-40	25%	20%	19%
41-64	27%	31%	31%
65+	15%	20%	19%
Gender	**St John**	**Tangipahoa**	**St Tammany**
Female	51%	52%	51%
Male	49%	48%	49%
Other			
Race/Ethnicity*	**St John**	**Tangipahoa**	**St Tammany**
White	38%	71%	83%
Black/African American	59%	29%	15%
Hispanic or Latino	7%	5%	6%
American Indian or Alaskan Native	1%	3%	3%
Asian	2%	1%	2%
Native Hawaiian or Pacific Islander	0%		
Other	7%	6%	7%
Income	**St John**	**Tangipahoa**	**St Tammany**
Less than 25000	11%	12%	14%
25-49000	19%	20%	21%
50-74000	20%	22%	15%
75-99000	16%	14%	13%
100k or more	35%	32%	37%
Data Sources: U.S. Census Bureau. "Age and Sex." American Community Survey, ACS 1-Year Estimates Subject Tables, Table S0101, 2022, https://data.census.gov/table/ACSST1Y2022.S0101?g=050XX00US22095,22103,22105&y=2022&moe=false. Accessed on March 7, 2024; U.S. Census Bureau. "ACS Demographic and Housing Estimates." American Community Survey, ACS 1-Year Estimates Data Profiles, Table DP05, 2022, https://data.census.gov/table/ACSDP1Y2022.DP05?g=050XX00US22105&y=2022. Accessed on March 7, 2024; U.S. Census Bureau. "Income in the Past 12 Months (in 2022 Inflation-Adjusted Dollars)." American Community Survey, ACS 1-Year Estimates Subject Tables, Table S1901, 2022, https://data.census.gov/table/ACSST1Y2022.S1901?t=Income and Poverty&g=050XX00US22103&y=2022&moe=false. Accessed on March 7, 2024; U.S. Census Bureau. "Income in the Past 12 Months (in 2022 Inflation-Adjusted Dollars)." American Community Survey, ACS 5-Year Estimates Subject Tables, Table S1901, 2022, https://data.census.gov/table/ACSST5Y2022.S1901?t=Income and Poverty&g=050XX00US22095&y=2022. Accessed on March 7, 2024. (St. John Parish)			
**Race alone or in combination with one or more other races*			

PATH TO ZERO

Table 13. Zip code-Level Demographic Characteristics - St. John Parish

			Age					Gender		Race						
Zipcode	Total population		0-14	15-24	25-40	41-64	65+	Female	Male	White	Black/African American	Hispanic or Latino (of	American Indian or Alaskan	Asian	Native Hawaiian or Pacific	Other
	Count	1,975	334	217	352	528	449	1,070	905	94	1,768	13	2	1	1	8
70049	Percent	100%	17%	11%	18%	27%	23%	54%	46%	5%	90%	1%	0%	0%	0%	0%
	Count	1,777	312	197	332	616	320	886	891	869	823	34	3	0	0	2
70051	Percent	100%	18%	11%	19%	35%	18%	50%	50%	49%	46%	2%	0%	0%	0%	0%
	Count	33,213	6651	4392	6215	11219	4736	17,230	15,983	11,439	17,955	3,004	150	312	8	1,364
70068	Percent	100%	20%	13%	19%	34%	14%	52%	48%	34%	54%	9%	1%	1%	0%	4%
	Count	276	65	43	41	63	64	170	106	93	167	13	0	0	0	5
70076	Percent	100%	24%	16%	15%	23%	23%	62%	38%	34%	61%	5%	0%	0%	0%	2%
	Count	6,411	1100	774	1077	2142	1318	3,268	3,143	2,753	3,231	333	31	16	2	163
70084	Percent	100%	17%	12%	17%	33%	20%	51%	49%	43%	50%	5%	1%	0%	0%	3%
	Count	7,152	1310	821	1254	2331	1131	3,735	3,417	2,914	3,976	133	9	1	1	71
70090	Percent	100%	18%	12%	18%	33%	18%	52%	48%	41%	56%	2%	0%	0%	0%	1%

Data Source: U.S. Census Bureau; 2020 Decennial Census DP1

Table 14. Zip code-Level Demographic Characteristics - Tangipahoa Parish

Zipcode		Total population	0-14	15-24	25-40	41-64	65+	Female	Male	White	Black/Africa n American	Hispanic or Latino (of	American Indian or Alaskan	Asian	Native Hawaiian or Pacific	Other
70401	Count	21,014	4048	4228	4381	5523	2834	10,913	10,101	10,545	8,471	1,329	80	270	5	543
	Percent	100%	19%	20%	21%	26%	14%	52%	48%	50%	40%	6%	0%	1%	0%	3%
70402	Count	1,634	2	1620	5	4	3	1,018	616	677	836	71	2	9	0	15
	Percent	100%	0%	99%	0%	0%	0%	62%	38%	41%	51%	4%	0%	1%	0%	1%
70403	Count	29,737	6096	4100	6003	8753	4785	15,528	14,209	16,618	10,298	1,760	120	293	7	802
	Percent	100%	21%	14%	20%	30%	16%	52%	48%	56%	35%	6%	0%	1%	0%	3%
70422	Count	13,863	2503	1775	2672	4535	2378	6,757	7,106	7,042	5,934	519	54	64	2	302
	Percent	100%	18%	13%	19%	33%	17%	49%	51%	51%	43%	4%	0%	1%	0%	2%
70433	Count	41,423	7595	4836	7464	13147	8381	21,686	19,737	32,144	3,898	3,596	133	662	13	1,067
	Percent	100%	18%	12%	18%	32%	20%	52%	48%	78%	9%	9%	0%	2%	0%	3%
70435	Count	20,828	3985	2290	3601	6651	4301	10,641	10,187	16,947	1,631	1,522	73	123	6	365
	Percent	100%	19%	11%	17%	32%	21%	51%	49%	81%	8%	7%	0%	1%	0%	2%
70436	Count	450	108	60	103	134	45	227	223	86	359	1	1	0	0	1
	Percent	100%	24%	13%	23%	30%	10%	50%	50%	19%	80%	0%	0%	0%	0%	0%
70437	Count	7,575	1255	801	1157	2683	1679	3,852	3,723	6,260	635	504	23	16	0	120
	Percent	100%	17%	11%	15%	36%	22%	51%	49%	83%	8%	7%	0%	0%	0%	2%
70438	Count	19,652	3857	2442	3309	6359	3685	9,979	9,673	14,120	4,320	677	56	56	0	253
	Percent	100%	20%	13%	17%	32%	19%	51%	49%	72%	22%	3%	0%	0%	0%	1%
70442	Count	468	111	60	60	149	88	202	266	420	14	16	5	2	0	3
	Percent	100%	24%	13%	13%	32%	19%	43%	57%	90%	3%	3%	1%	0%	0%	1%

	Count	10,229	2192	1305	1875	3182	1675	5,237	4,992	5,975	3,149	787	29	32	3	526
70443	Percent	100%	22%	13%	18%	31%	16%	51%	49%	58%	31%	8%	0%	0%	0%	5%
	Count	9,667	1831	1211	1539	3184	1902	4,998	4,669	5,662	3,532	190	31	30	1	77
70444	Percent	100%	19%	13%	16%	33%	20%	52%	48%	59%	37%	2%	0%	0%	0%	1%
	Count	7,255	1561	867	1330	2306	1191	3,643	3,612	5,923	791	323	18	42	1	75
70446	Percent	100%	22%	12%	18%	32%	16%	50%	50%	82%	11%	5%	0%	1%	0%	1%
	Count	192	57	27	35	61	12	82	110	74	86	22	2	3	0	3
70451	Percent	100%	30%	14%	18%	32%	6%	43%	57%	39%	45%	12%	1%	2%	0%	2%
	Count	32,154	6560	3680	6713	10067	5134	16,580	15,574	24,358	4,892	1,671	130	205	5	469
70454	Percent	100%	20%	11%	21%	31%	16%	52%	48%	76%	15%	5%	0%	1%	0%	2%
	Count	2017	373	292	431	564	357	1036	981	1572	166	168	9	13	0	73
70455	Percent	100%	19%	15%	21%	28%	18%	51%	49%	78%	8%	8%	0%	1%	0%	4%
	Count	2,741	569	344	466	897	465	1,452	1,289	1,149	1,470	43	8	11	1	12
70456	Percent	100%	21%	13%	17%	33%	17%	53%	47%	42%	54%	2%	0%	0%	0%	0%
	Count	425	123	53	69	120	60	218	207	34	369	9	1	1	0	0
70465	Percent	100%	29%	13%	16%	28%	14%	51%	49%	8%	87%	2%	0%	0%	0%	0%
	Count	8,856	1921	1152	1790	2756	1237	4,555	4,301	5,567	2,279	731	57	40	0	341
70466	Percent	100%	22%	13%	20%	31%	14%	51%	49%	63%	26%	8%	1%	1%	0%	4%

Data Source: U.S. Census Bureau; 2020 Decennial Census DP1

Table 15. Zip code-Level Demographic Characteristics - St Tammany Parish

			Age					Gender		Race						
Zipcode		Total population	0-14	15-24	25-40	41-64	65+	Female	Male	White	Black/Africa n American	Hispanic or Latino (of	American Indian or	Asian	Native Hawaiian or Pacific Islander	Other
	Count	8,030	1477	923	1306	2637	1687	4,122	3,908	6,589	405	700	34	60	3	157
70420	Percent	100%	18%	12%	16%	33%	21%	51%	49%	82%	5%	9%	0%	1%	0%	2%
	Count	17,941	3526	2117	2992	5624	3682	9,326	8,615	10,649	6,111	564	53	108	0	241
70427	Percent	100%	20%	12%	17%	31%	20%	52%	48%	59%	34%	3%	0%	1%	0%	1%
	Count	5,173	788	599	720	1833	1233	2,609	2,564	4,764	38	255	14	11	5	63
70431	Percent	100%	15%	12%	14%	35%	24%	50%	50%	92%	1%	5%	0%	0%	0%	1%
	Count	41,423	7595	4836	7464	13147	8381	21,686	19,737	32,144	3,898	3,596	133	662	13	1,067
70433	Percent	100%	18%	12%	18%	32%	20%	52%	48%	78%	9%	9%	0%	2%	0%	3%
	Count	20,828	3985	2290	3601	6651	4301	10,641	10,187	16,947	1,631	1,522	73	123	6	365
70435	Percent	100%	19%	11%	17%	32%	21%	51%	49%	81%	8%	7%	0%	1%	0%	2%
	Count	7,575	1255	801	1157	2683	1679	3,852	3,723	6,260	635	504	23	16	0	120
70437	Percent	100%	17%	11%	15%	36%	22%	51%	49%	83%	8%	7%	0%	0%	0%	2%
	Count	19,652	3857	2442	3309	6359	3685	9,979	9,673	14,120	4,320	677	56	56	0	253
70438	Percent	100%	20%	13%	17%	32%	19%	51%	49%	72%	22%	3%	0%	0%	0%	1%
	Count	10,866	1794	1124	1778	3802	2368	5,303	5,563	7,233	1,972	870	81	79	4	352
70445	Percent	100%	17%	10%	16%	35%	22%	49%	51%	67%	18%	8%	1%	1%	0%	3%
	Count	17,120	4553	1884	3300	5487	1896	8,692	8,428	14,657	638	1,231	45	177	0	229
70447	Percent	100%	27%	11%	19%	32%	11%	51%	49%	86%	4%	7%	0%	1%	0%	1%
70448	Count	25,670	4996	3219	4128	9193	4134	13,149	12,521	21,298	1,007	2,258	72	301	10	566

	Percent	100%	20%	13%	16%	36%	16%	51%	49%	83%	4%	9%	0%	1%	0%	2%
	Count	13,187	2328	1575	2245	4546	2493	6,716	6,471	10,983	783	780	84	80	6	235
70452	Percent	100%	18%	12%	17%	34%	19%	51%	49%	83%	6%	6%	1%	1%	0%	2%
	Count	221	0	154	38	18	11	32	189	155	10	70	3	3	3	34
70457	Percent	100%	0%	70%	17%	8%	5%	14%	86%	70%	5%	32%	1%	1%	1%	15%
	Count	37,798	6836	4309	6963	12358	7332	19,542	18,256	25,440	7,285	2,850	215	786	22	829
70458	Percent	100%	18%	11%	18%	33%	19%	52%	48%	67%	19%	8%	1%	2%	0%	2%
	Count	22,429	4338	2718	4318	7340	3715	11,460	10,969	12,207	6,976	2,010	169	190	15	802
70460	Percent	100%	19%	12%	19%	33%	17%	51%	49%	54%	31%	9%	1%	1%	0%	4%
	Count	30,740	6229	4050	5659	10131	4671	15,914	14,826	18,069	8,433	2,290	151	897	7	878
70461	Percent	100%	20%	13%	19%	33%	15%	52%	48%	59%	27%	7%	1%	3%	0%	3%
	Count	98	10	10	14	40	24	47	51	73	20	2	1	1	0	2
70463	Percent	100%	10%	10%	14%	41%	24%	48%	52%	75%	20%	2%	1%	1%	0%	2%
	Count	220	44	22	47	52	55	106	114	182	4	17	3	2	0	1
70464	Percent	100%	20%	10%	21%	24%	25%	48%	52%	83%	2%	8%	1%	1%	0%	1%
	Count	23,334	4502	2877	3546	7869	4540	12,185	11,149	19,852	588	1,871	84	505	11	300
70471	Percent	100%	19%	12%	15%	34%	19%	52%	48%	85%	3%	8%	0%	2%	0%	1%

Data Source: U.S. Census Bureau; 2020 Decennial Census DP1

Survey Distribution Targets

From a statistical standpoint, it is always better to have a larger sample size. The overall sample pool will determine which and how many variables may be analyzed and the statistical significance of results. However, data collection is usually limited by practical considerations (e.g. recruitment costs, time frame of data collection, etc). Where there is obvious variation among various groups, significant results may be calculated at a smaller sample size. Where detailed information about the behaviors, priorities, or perceptions of specific groups is desired (e.g., among young, white, male drivers ages 16-24 in areas of persistant poverty), larger samples for each input category are needed to produce a valid sample of the subset.

Based on the demographic breakdowns indicated above, in order to ensure adequate representative responses from which weight results where needed and derive statistically reliable findings, the following sample targets are recommended:

- **Overall sample size:** Minimum 500 responses
- **Minimum samples per zip code:** 5
- **Minimum samples per demographic category (i.e., age, gender, race, and income strata):** 20

Engagement Evaluation

In addition to meeting the above-referenced minimum survey sample targets through digital, print, and in-person outreach, the following evaluation actions are recommended as part of the public engagement process to monitor efficacy:

- Build evaluation into the planning process by tracking and evaluating messaging reach, as well as observed and self-reported road user behaviors
- Use website analytics to track where user traffic is coming from, e.g., social media, computers, phones, etc
- Review interim survey results to inform and adjust engagement, e.g., by reviewing early online survey results and targeting pop-up events, meetings, and other outreach efforts in the remaining outreach period to fill identified gaps.
- Develop an evaluation dashboard to track process and outcome-oriented results

Next Steps

Following Phase 1 data gathering, a public health-informed plan development approach to identifying policy and action plan recommendations (Phase 2) will be employed.

General recommendations and best practices for research, implementation, and evaluation during the remaining planning process are expected to include:

- Identifying (and/or developing) community and governmental champions
- Fostering collaboration across departments or agencies, with an emphasis on diverse perspectives
- Researching demographic, linguistic, geographic, cultural, and experiential factors to create messages that are authentic and motivating to audiences, while advancing equity
- Developing messaging around topics that the community already cares about (as identified through outreach)
- Testing proposed messages and learning from audiences to understand motivations, unintended consequences, and how messages resonate
- Identifying a diverse range of potential funding sources for implementation
- Identifying regulatory and organizational barriers to implementation, institutionalizing health-related goals and objectives, and giving communities ownership over implementation

Based on the findings of engagement and data collection phase, Phase 2 will support the development of an overall theory of how the Safe Streets for All plan can address social, behavioral, and environmental determinants of injury outcomes, in addition to infrastructure investments.

Appendices

Appendix A: Supplemental Data Resources and Summary Findings

Table 16 summarizes several supplemental public health and behavior data sources and tools suitable for use in transportation planning and health equity analysis. These resources may be useful in identifying health disparities, behavioral risks, or other factors related to roadway safety among particular groups or at disaggregated levels of geography.

Table 16. Selected Recommended Resources for Supplemental Public Health and Behavioral Data

Name	Agency	Description	Geographic Level	Link
Louisiana Health Data Explorer	Louisiana Department of Health	Web portal for state data on health outcomes, environmental quality, etc	Varies by indicator	https://healthdata.ldh.la.gov/
County Health Rankings and Road Maps	University of Wisconsin Population Health Institute	Provides annual indicators for a variety of factors related to health, including health behaviors, clinical care, social and economic factors, and the physical environment	County/Parish	https://www.countyhealthrankings.org/
PLACES: Local Data for Better Health	CDC	Model-based, population-level analysis and community estimates of health measures at the census tract and ZIP code level, based on Behavioral Risk Factor Surveillance System 2021	County/Parish; Place; Census Tract; ZIP code	https://www.cdc.gov/places/index.html
National Environmental Public Health Tracking	CDC	Map-based query tool providing access to data about a variety of public health indicators, including transportation, environmental health, social vulnerability, and community design elements related to death and disability in the United states, e.g. access to parks and schools, proximity to highways	County/Parish; Census Tract	https://ephtracking.cdc.gov/DataExplorer/
Transportation and Health Tool	U.S. DOT	The tool provides data on a set of transportation and public health indicators for each U.S. state and metropolitan area that describe how the transportation environment	Metropolitan area	n/a - web links currently down

		affects safety, active transportation, air quality, and connectivity to destinations		
Smart Location Database	EPA	Nationwide geographic data resource for measuring location efficiency. It includes more than 90 attributes summarizing characteristics such as housing density, diversity of land use, neighborhood design, destination accessibility, transit service, employment, and demographics	Census block group	https://www.epa.gov/smartgrowth/smart-location-mapping#SLD
Smart Location Calculator	EPA	Web-based tool for exploring how workplace location affects worker commute travel. Indicators include worker commute mode-share, vehicle miles traveled, and workplace accessibility via transit.	Census block group	https://www.slc.gsa.gov/slc/
Health economic assessment tool (HEAT)	World Health Organization	Web tool for estimating value of reduced mortality that results from regular walking or cycling for project planning, policy assessment, and cost-benefit analysis		https://www.who.int/europe/tools-and-toolkits/health-economic-assessment-tool-for-walking-and-cycling
AAA Foundation for Traffic Safety	AAA	Data and research reports on driver behavior and performance, emerging technologies, roadway systems and drivers, and vulnerable road users	National	https://aaafoundation.org/

Table 17 summarizes selected indicators for the three subject parishes from the 2023 County Health Rankings and Road Maps [47]. County Health Rankings data reveals disparities among the three study area parishes, with St. Tammany ranking within the top 10 among all 64 Louisiana parishes across every overall dimension except "Physical Environment" (39th), and St. John and Tangipahoa parishes ranking near the state average, at 33rd and 36th overall respectively. Rates of physical inactivity exceed state averages in St. John and Tangipahoa parishes, while alcohol-involved driving deaths hover near the state average of 31%.

The share of residents with long commutes to work (driving alone) exceeds state averages in all three parishes, reaching 50% in St. John. The overall motor vehicle mortality rate in Tangipahoa parish and St. John parish exceed the state average; in all three parishes, racial disparities in motor vehicle mortality are apparent.

Table 17. 2023 County Health Rankings Selected Indicators [47]

	St. Tammany	St. John	Tangipahoa	Statewide Average
Rankings				
Overall rank (within state)	1	33	36	
Length of Life	3	38	30	
Quality of Life	7	36	17	
Health Behaviors	1	16	31	
Clinical Care	3	15	30	
Social and Economic Factors	4	50	38	
Physical Environment	39	34	33	
Ranked Measure Data (selected)				
% Poor or Fair Health	14	20	20	19
Average # of mentally unhealthy days	5.8	5.5	5.5	5.7
% Adults with obesity	31	44	41	38
Food Environment Index	7.7	7	5.8	5
% Physically Inactive	23%	32%	33%	28%
% With Access to Exercise Opportunities	81%	72%	65%	76%
# Alcohol-Impaired Driving Deaths	48	18	45	1203
% Driving Deaths with Alcohol Involvement	31%	34%	30%	31%
% Completed high school	91%	86%	82%	86%

% Unemployment	3.80%	8.50%	6.40%	6%
Income inequality (Income Ratio)	4.6	4.3	5.1	6%
% Children in Single-Parent Households	25%	40%	37%	35%
Social Association Rate	7.5	4.5	8.1	9%
Injury Death Rate	97	94	108	96%
Air Pollution (Average Daily PM2.5)	8.9	8.8	7.8	9%
% Driving alone to work	81%	88%	81%	81%
% Driving alone to work - Black	79%	86%	80%	79%
% Driving alone to work - White	79%	82%	83%	84%
% Driving alone to work - Hispanic	65%	81%	61%	70%
% Long Commute - Driving Alone	47%	50%	45%	34%
Additional Measure Data				
Drug overdose moratality rate	41	29	41	31
% Insufficient Sleep	37%	43%	35%	37%
% Disconnected youth	7%		5%	10%
# Motor vehicle deaths	235	56	297	5487
Motor Vehicle Mortality Rate	13	18	22	17
MV Mortality Rate - Black	19	22	26	18
MV Mortality Rate - White	12	16	21	17
MV Mortality Rate - Hispanic	13		25	14
Traffic Volume	307	207	208	507
% Household with Severe Housing Cost Burden	12	11	14	14
% Broadband Access	90%	84%	83%	81%
% Rural	23%	13%	41%	27%

Table 18 summarizes select county-level indicators for the three subject parishes from the CDC's PLACES dataset (July 2023 release) [48]. Census tract and zip-code level data from this resource is attached as an appendix. At the county level, relatively high rates of mobility-related and overall disability are notable in St. John and Tangipahoa parishes, as are high rates of depression (as an indicator of mental health). Rates of low sleep (less than 7 hours) are elevated, reaching 43% in St. John parish. At smaller levels of geography, these (and other) indicators may be correlated with crash outcomes to identify sub-areas or corridors at elevated risk of roadway crashes and injuries related to social and environmental factors.

Table 18. CDC PLACES - County-Level Data (Selected Indicators) [48]

Category	Measure	St. Tammany	St. John	Tangipahoa
		Data Value (Age-Adjusted prevalence, %)		
Disability	Any disability among adults aged >=18 years	26.6	35.7	36.4
	Mobility disability among adults aged >=18 years	12.2	17.2	17.6
Health Outcomes	Current asthma among adults aged >=18 years	9.5	10.7	10.7
	Depression among adults aged >=18 years	24.7	23.2	26
	Coronary heart disease among adults aged >=18 years	5.3	5.9	6.4
	Diagnosed diabetes among adults aged >=18 years	9.5	13.4	12.2
	High blood pressure among adults aged >=18 years	33	41	39.3
	Obesity among adults aged >=18 years	34.8	44.7	40.5
Health Risk Behaviors	Binge drinking among adults aged >=18 years	18.7	16.9	18.3
	No leisure-time physical activity among adults aged >=18 years	21.9	31.4	34

	Sleeping less than 7 hours among adults aged >=18 years	36.8	43	34.8
Health Status	Fair or poor self-rated health status among adults aged >=18 years	14.9	21.6	21.1
	Physical health not good for >=14 days among adults aged >=18 years	10.8	13	13.9

Appendix B: Behavior Change Model Review

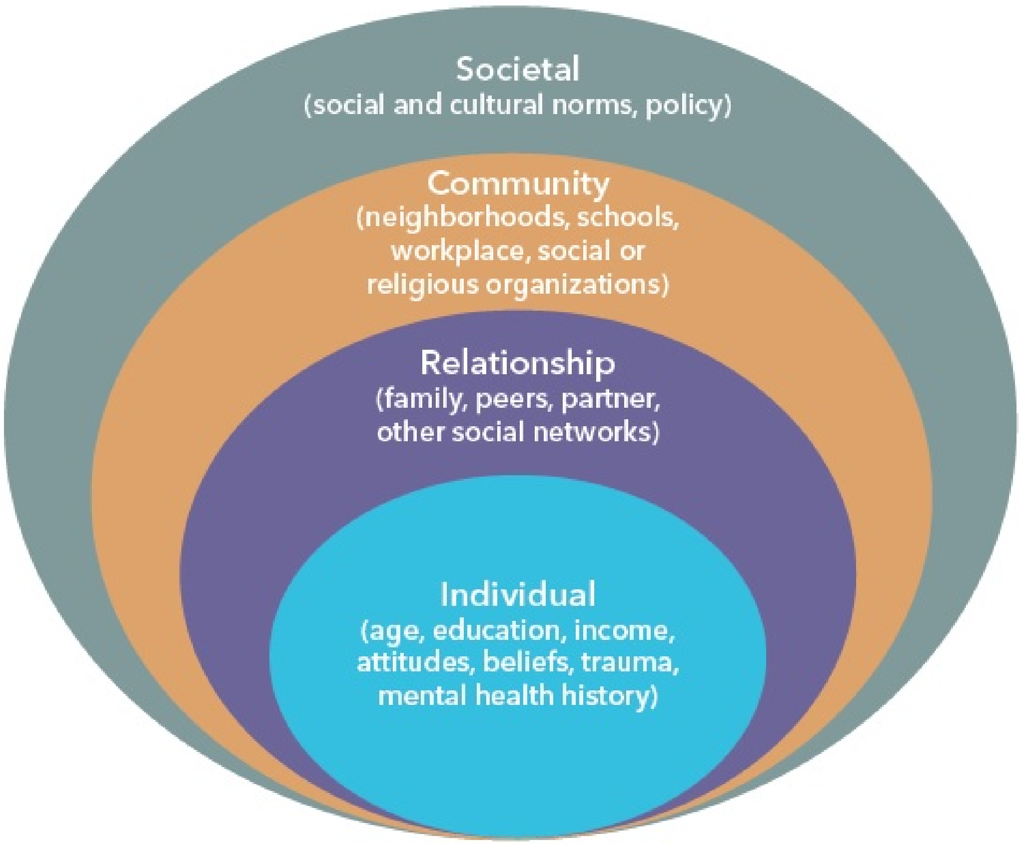
1. *Behavior Change Theoretical Models*

This section summarizes a wide range of theories identified in the literature, specifically those which have been associated with potential applications for traffic safety research.

Social-Ecological Model

This widely used model explains individual behavior through five progressive personal and environmental factors [49]. It emphasizes the interconnectedness of social elements in an environment across the lifespan; each level is within and influenced by other levels [8].

Figure 6. Social-Ecological Model [8]



In terms of traffic safety, the levels may correspond to the following [8]:

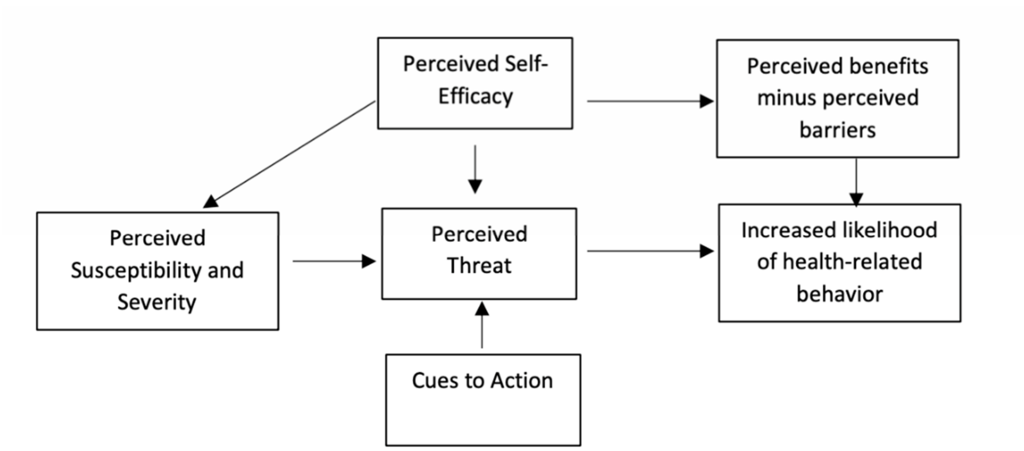
1. **Individual** – personal and biological factors that influence risky behavior, like age, education, income, and substance use. Prevention strategies at this level may include education, life skills training
2. **Relationship** – someone's close relationships influence their behavior, e.g. peers, partners, family. To address this level, focus on parenting, mentoring, or peer programs
3. **Community** – e.g. schools, work, health systems, neighborhoods – at this level we seek to identify characteristics associated with risky behavior. Prevention aims to improve economic and housing opportunities, reduce social isolation, and change policies to promote safety
4. **Societal** – social and cultural norms about the behavior, as well as health, economic, educational, and social policies that maintain inequities. Prevention includes laws, vehicle technology, and addressing substance abuse.

Health Belief Model (HBN)

The Health Belief Model seeks to understand why individuals engage in healthy behaviors, based on self-perceptions about susceptibility, barriers, and benefits [49]. This model emphasizes the costs (barriers) of a change, which could include monetary cost, inconvenience, unpleasantness, etc. The “cues” which spur action may be internal (e.g., physical symptoms of an illness), or external (e.g. media campaigns). In order to apply this model, information about peoples’ perceptions of benefits or costs of alternative behaviors are needed. This model emphasizes threat assessment (belief, and severity), and is frequently used in intervention programs [10].

A potential application of the Health Belief Model is to focus on addressing self-efficacy and other barriers to change, such as a perception that the potential threat does not apply to the individual.

Figure 7. Health Belief Model [49]

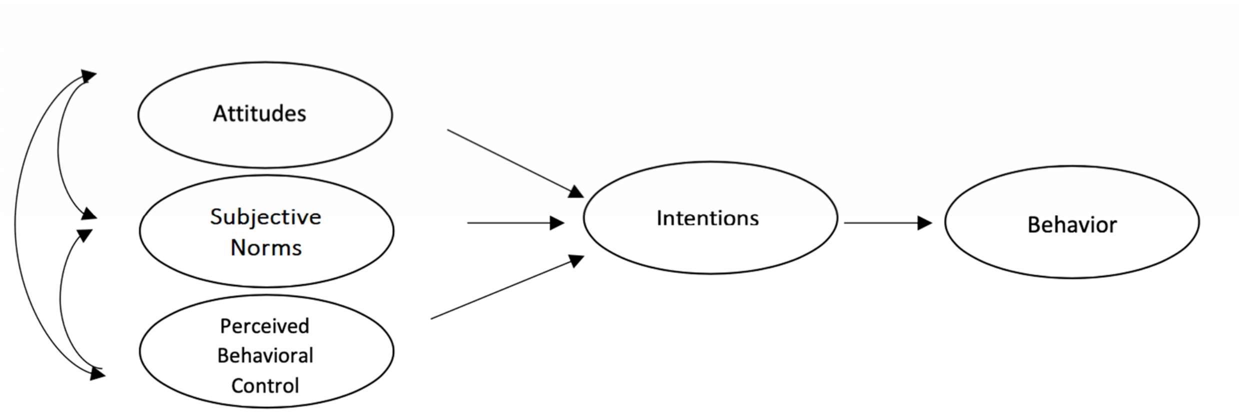


Theory of Planned Behavior (TPB)

This model views behavior as a function of one’s favorable or unfavorable perception of the behavior, social expectations from one’s community of influence, and perception of factors that limit or facilitate engagement in a behavior (or self-efficacy) [49]. The more “intention” a subject has, the more likely they are to perform a behavior.

A potential application is this model is to focus on behavioral control factors to better understand (and address) perceived barriers to change.

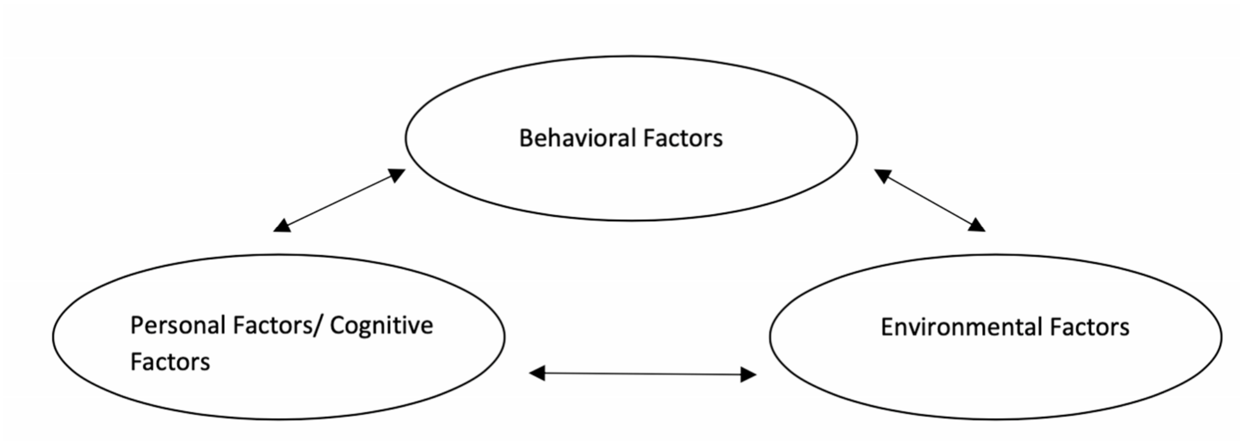
Figure 8. Theory of Planned Behavior [49]



Social Cognitive Theory (SCT)

This model explains behavior through behavioral, environmental, and personal factors including control and reinforcement to achieve goal-directed change [49]. extends the Theory of Reasoned Action and Theory of Planned Behavior to incorporate perceived control as a mediator and has been found to better predict behavior outcomes [10].

Figure 9. Social Cognitive Theory Model [49]



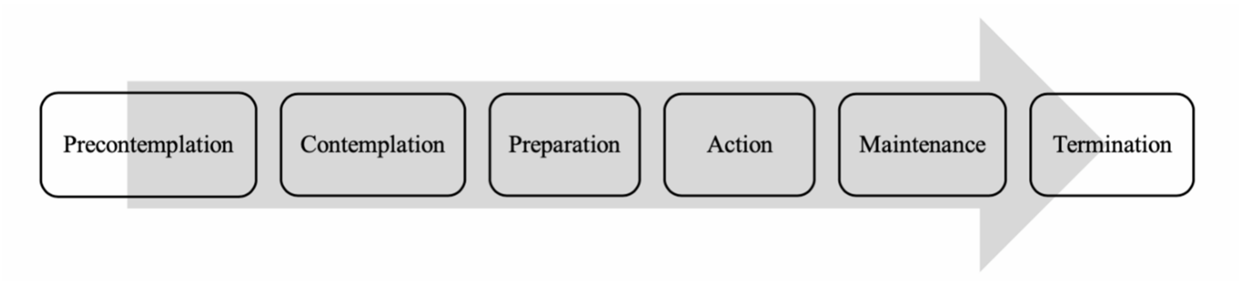
Transtheoretical Model/Stages of Change (SCM/TTM)

This model describes a six-step change process from unreadiness to change through termination of the old, undesired behavior [49]. People may not move through these stages linearly, or may cycle through several phases multiple times [17]. This is widely used in health promotion and readily translatable to practice but has been criticized for the sequence and delineation of stages and limited evidence of resulting behavior change [10].

The six steps include:

- Precontemplation – the subject is not intending to make a change, but may begin to have doubt about the behavior in question
- Contemplation – the subject is presented with, and potentially influenced by reasons to change, risks of the status quo, and intends to change behavior at some point in the future
- Determination/Preparation – actions to effect positive change are offered and encouraged, and the subject develops a plan of action
- Action – the subject makes a change, and assistance in plan development is offered to promote change
- Maintenance – strategies to prevent relapse to old behavior are identified and implemented. If unsuccessful and relapse occurs, assistance to reenter into the change process is required
- Termination – the subject has 100% efficacy and is maintaining the behavior – however, most never really achieve this and stay in maintenance indefinitely

Figure 10. Transtheoretical Model/Stages of Change [49]



In practice, the challenge of this model is likely to be initiating a shift from precontemplation (not ready to change), to preparation (ready to change). Roberts [15] further breaks down the elements of a treatment building on this model into “early” and “late” stage elements (Table 19).

Table 19. Elements of a Transtheoretical Model Treatment [15]

Stage	Element	Description
General	Systematic feedback	Provide data about the subject’s present situation
	Personal responsibility	Implicit or explicit statement that the subject is responsible for change
	Direct advice	May or may not take the form of specific goals
	Choice of strategy	Increase intrinsic motivation with a perception of freely chosen course of action
	Express empathy	Communicate respect for the subject
	Strengthen self-efficacy	Persuade the subject of their capacity for success
Early Stage	Consciousness raising	Provide information that spurs the subject to doubt their complacency
	Dramatic relief	Remind the subject that they have control; alleviate feelings of helplessness and mitigate state of threat and fear arousal
	Environmental reevaluation	Assist subject in reflecting on consequences of their behavior for others
	Social liberation	Help subject understand changing social norms
	Self-reevaluation	Treat cognitive dissonance between behavior and self-image a prompt for re-alignment through behavior change

Late Stage	Stimulus control	Provide information about cues linked to hazardous behavior and techniques for mitigation
	Helping relationships	Foster/encourage social support for behavior change
	Counter conditioning	Substitute healthier alternative behaviors while increasing salience and immediacy of negative consequences of previous behavior
	Contingency management	Increase rewards for positive behavior, decrease rewards for hazardous behavior; e.g. incentives (Note: may be counterproductive for those in early stages of change)
	Self-liberation	Help subject integrate behavior change as part of their identity

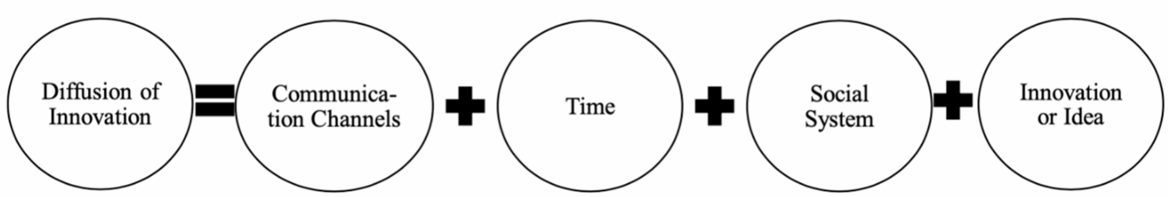
Diffusion of Innovation Theory

This model explains how an idea or behavior (i.e., innovation) diffuses throughout a population, and consists of four components [49]:

- Innovation or idea
- Communication channels used to spread the innovation
- Time required for diffusion
- The social system influencing innovation adoption

A key question for researchers is likely to be how to reduce the amount of time required in this equation, in order to affect urgently needed change.

Figure 11. Diffusion of Innovation Theory [49]

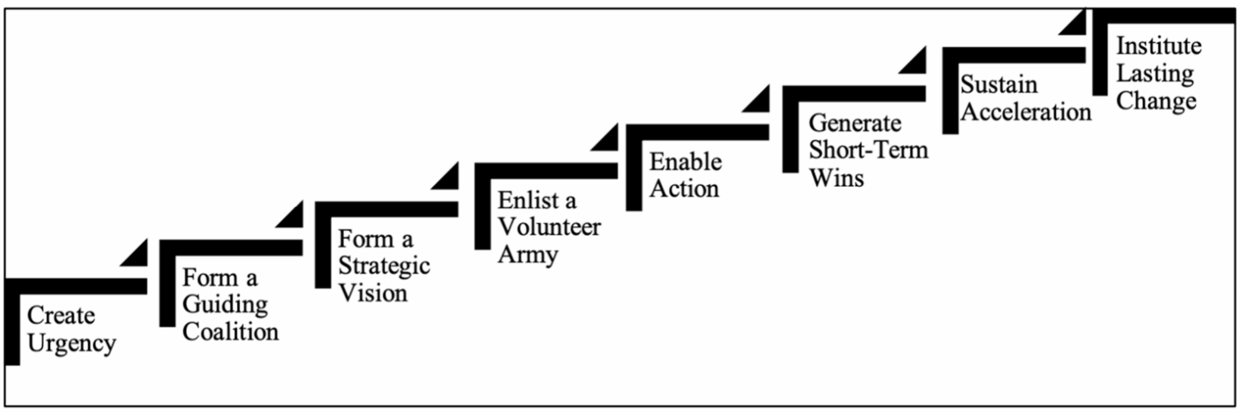


Kotter's 8-step Change Model

This model for organizational/employee change begins with making subjects aware of the urgency of the problem, organizing and creating a vision, removing obstacles to action, and achieving short-term and long-term change [49].

A key application of this model may involve identifying potential short-term wins that can help reinforce and accelerate behavioral changes.

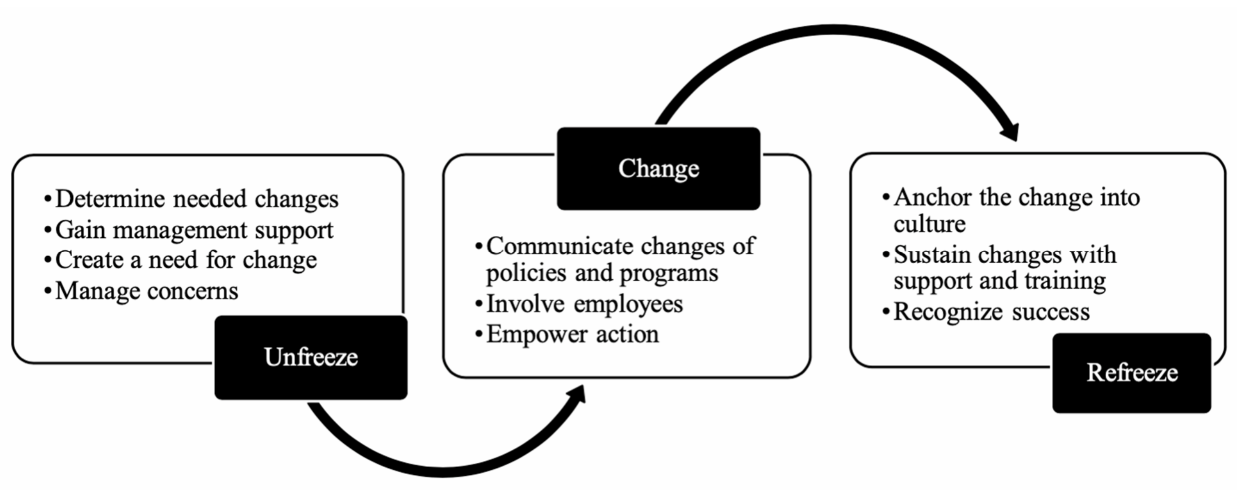
Figure 12. 8-Step Change Model [49]



Lewin's three-step change theory

This model focuses on "unfreezing" current behaviors and using individual and group influence to change the behavior and "refreeze" the new behavior [49]. A key research question in the application of this model is likely to involve identifying the kind of leadership (i.e., management support) that is required to foster a "need" for change.

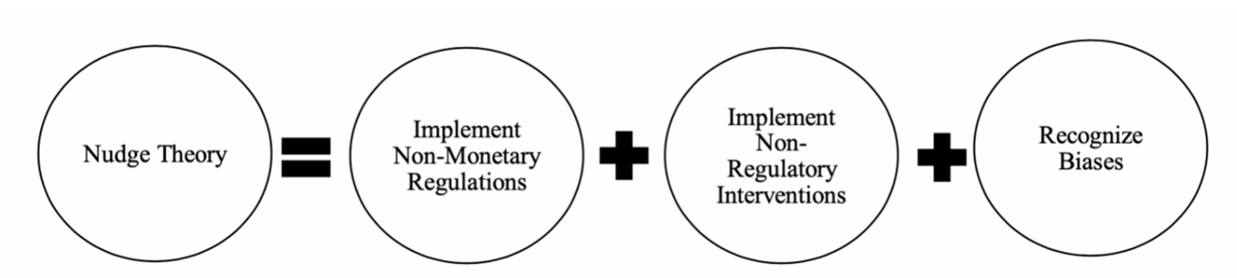
Figure 13. Lewin's Three-Step Change Theory [49]



Nudge Theory

This model recognizes biases influencing behavior and providing non-monetary, non-regulatory interventions to gently "nudge" behaviors [49]. Application requires identifying and addressing the biases that influence behavior and designing interventions (or nudges) that are likely to have an impact.

Figure 14. Nudge Theory [49]



The Behavior Change Wheel

Described by Michie et al [19], this model organizes change into sources of behavior, intervention functions, and policy categories to characterize how interventions operate on reflective and automatic systems.

Figure 15. The Behavior Change Wheel [19]

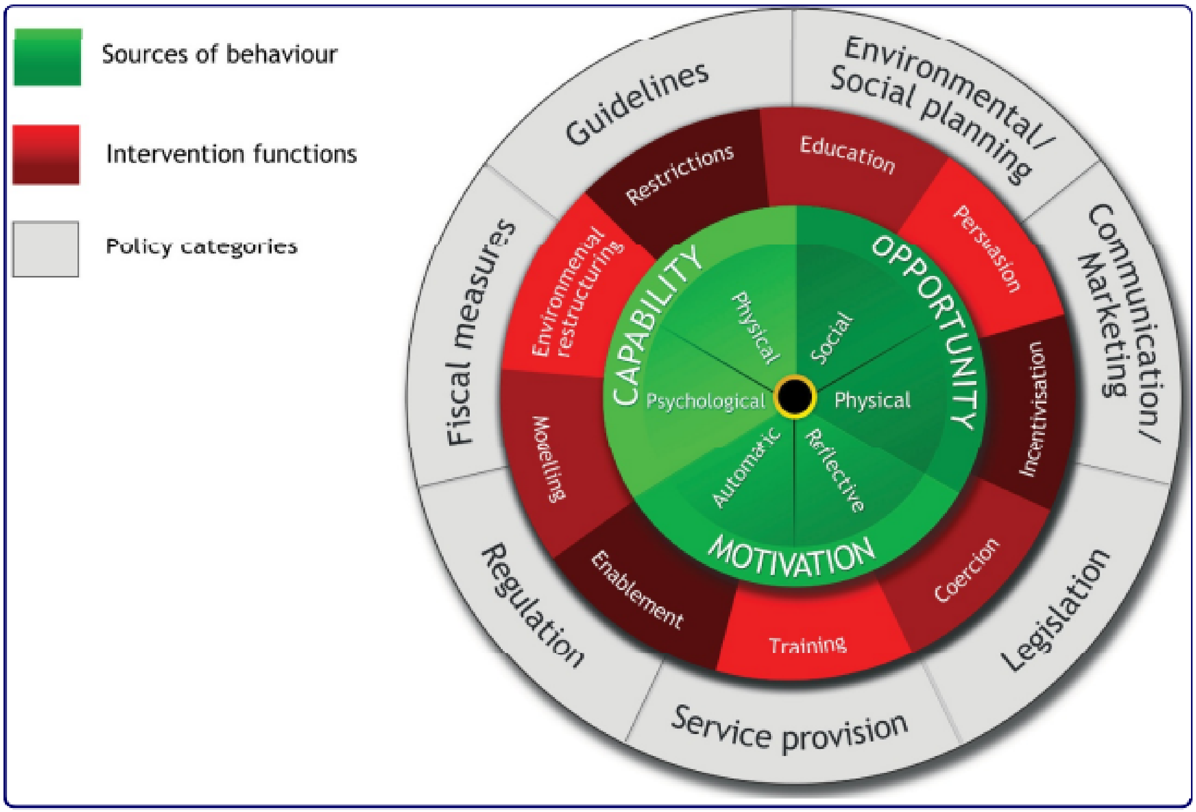


Table 20. Definitions of Policies and Interventions [19]

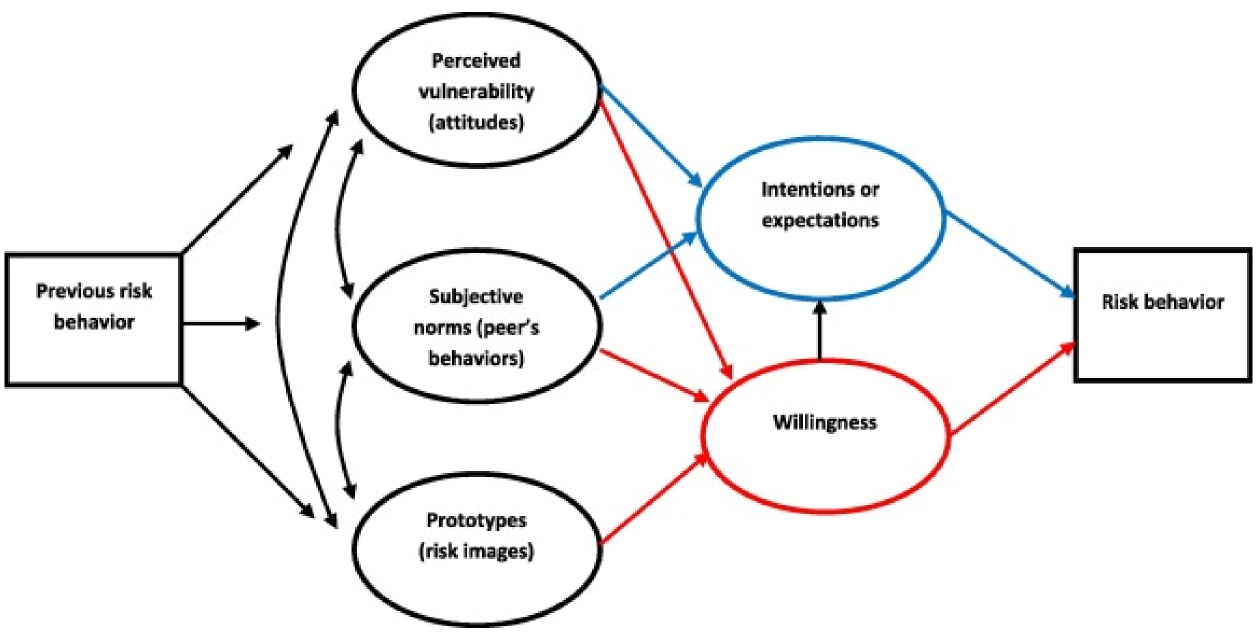
Policies	Definition
Communication/marketing	Using print, electronic, telephonic, or broadcast media
Guidelines	Creating documents that recommend or mandate practice
Fiscal	Using the tax system to reduce or increase financial cost
Regulation	Establishing rules or principles of behavior or practice
Legislation	Making or changing laws
Environmental/Social Planning	Designing and/or controlling the physical or social environment
Service provision	Delivering a service
Intervention	**Definition**
Education	Increasing knowledge or understanding
Persuasion	Using communication to induce positive or negative feelings or stimulate action
Incentivization	Creating expectation of reward
Coercion	Creating expectation of punishment or cost
Training	Imparting skills
Restriction	Using rules to reduce the opportunity to engage in the target behavior (or in competing behaviors)
Environmental restructuring	Changing the physical or social context
Modelling	Providing an example for people to aspire to or imitate
Enablement	Increasing means/reducing barriers to increase capability or opportunity

Gibbons and Gerrard's Willingness Model/Prototype Willingness Model (PWM)

in addition to intentions, people need behavioral willingness: how likely a person thinks they are to do something, depending on the circumstances. This is intended to account for unplanned behavior, particularly among people with less experience in certain situations (e.g. young people). This may differ from what they plan to do, or know they should do, as it is often related to social pressures [17]. This model focuses on the role of heuristics (i.e., rapid decision-making) as drivers of behavior, as much as intent, and acknowledges that some behaviors are not rational. It draws on behavior economics to understand which cognitive processes affect behavior. It suggests that the media and social environment expose subjects to images that establish prototypes that guide future behaviors; thus attention is needed to better support good heuristic decision-making through development of alternative images and prototypes [10].

Traffic safety interventions using this theory could include negative social consequences (e.g. public shaming) or positive. ROSPA [17] notes that among the same groups that this is a relevant model, e.g. young people, a countertendency to defy authority may come into play.

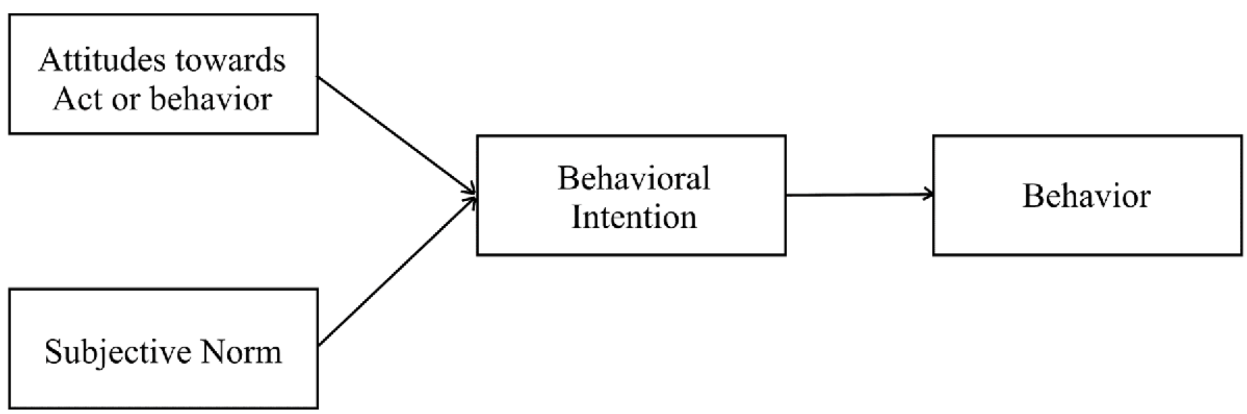
Figure 16. Prototype Willingness Model [50]



Theory of Reasoned Action (TRA)

This is a classic theory in which behavior is predicted by intentions. This theory is limited in application by having relatively few inputs and little accounting for control [10]. Researchers seeking to understand the motivational factors around drinking and driving among young male drivers deployed the Theory of Reasoned Action, concluding that previous interventions overestimated “perceived behavioral control” around this behavior [49] .

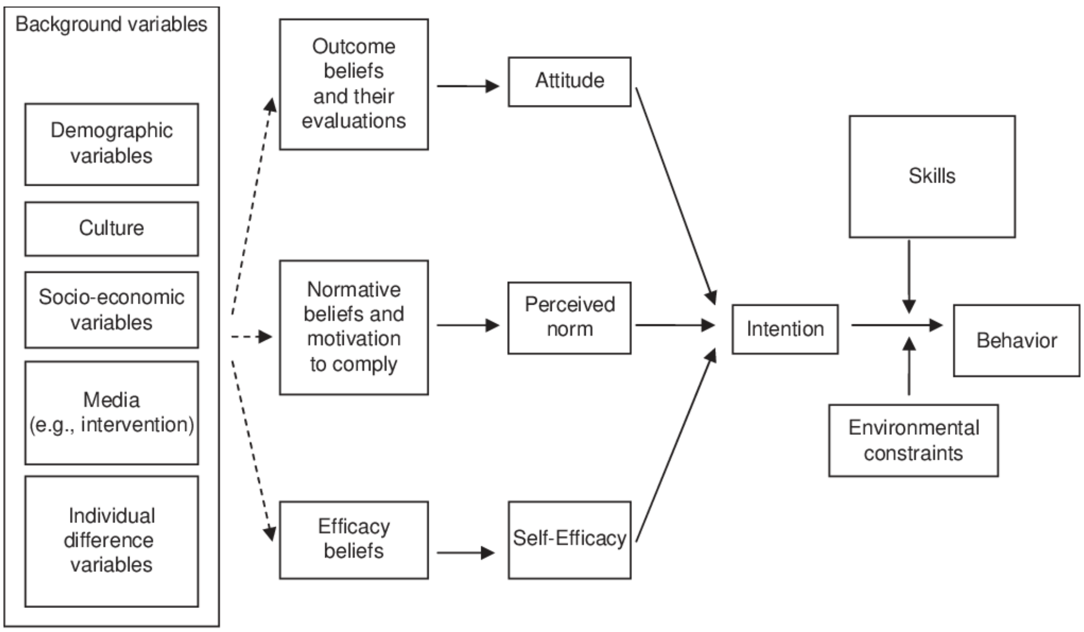
Figure 17. Theory of Reasoned Action [10]



Integrative Model of Behavioral Prediction *(IMBP)*

This model focuses on behavior and integrates aspects of Reasoned Action, Social Cognitive, Planned Behavior, and Transtheoretical theories to be more predictive. It stipulates that behaviors are a result of 1) intention, 2) skills and abilities and 3) the presence of no precluding constraints [10].

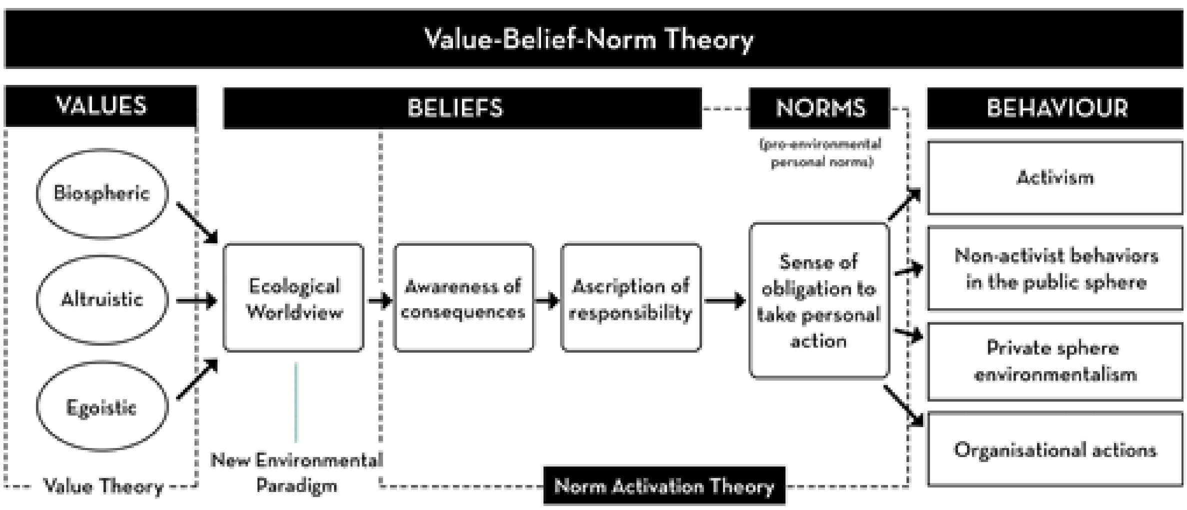
Figure 18. Integrative Model of Behavioral Prediction [51]



Value-Belief-Norm Theory (VBN)

This model relies on personal values to support social movements and cultural shifts. It assumes that social norms (and cultural context) will support more robust and permanent behavior change than focusing on individuals. However, it does not predict specific behaviors. This theory proposes that successful social movements shape personal norms into action [10].

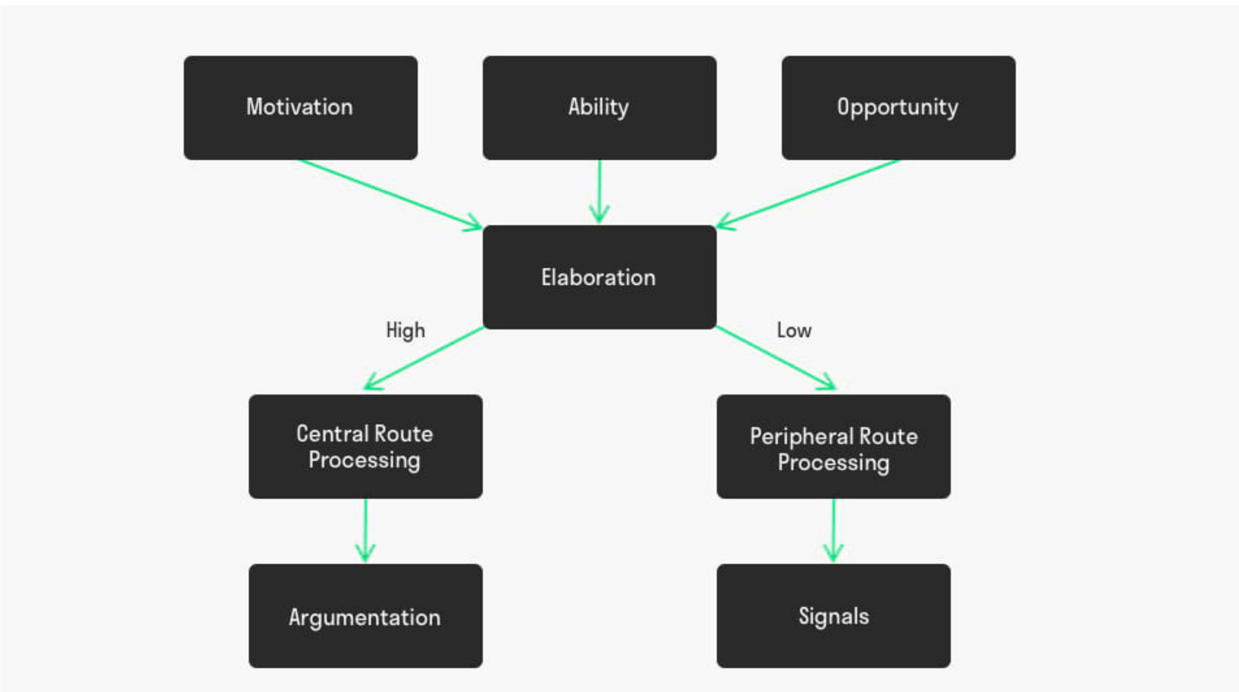
Figure 19. Value-Belief-Norm Theory [52]



Elaboration Likelihood Model (ELM)

This model describes what leads to changes in attitude and is typically used in advertising to persuade people based on both high-elaboration (central or cognitive) and low-elaboration (peripheral or heuristic) routes. This theory purports that attitudes resulting from high-elaboration cognitive thought are more predictive of behavior. However, this model has demonstrated limited predictive power [10].

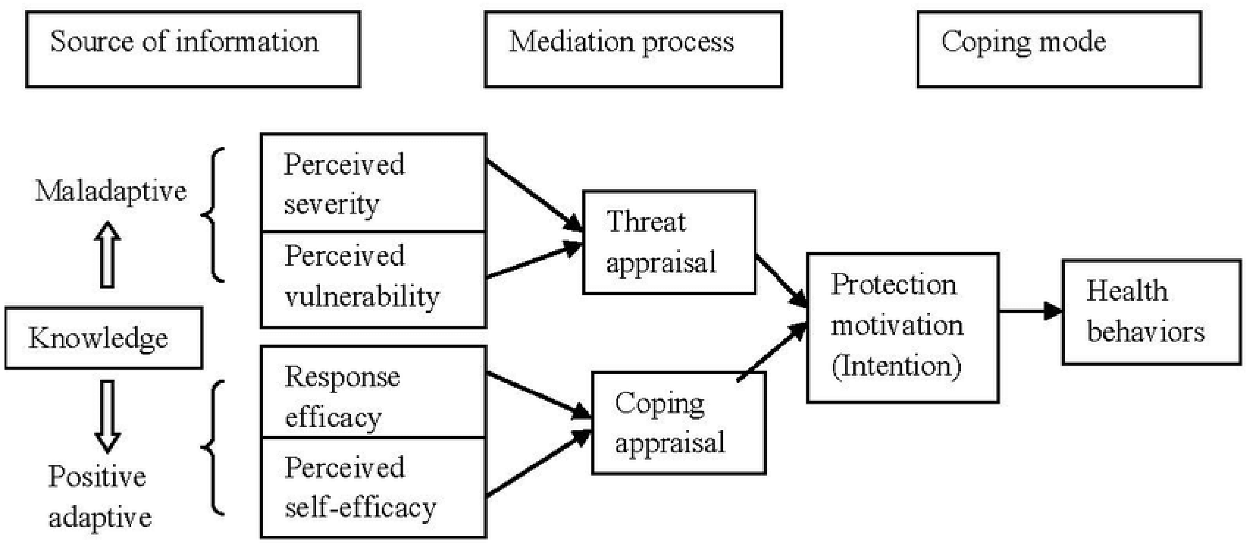
Figure 20. Elaboration Likelihood Model [53]



Protection Motivation Theory (PMT)

This builds on the health belief model and focuses on responses to threats and fear as mediated by threat appraisal (evaluating the threat and affecting individual response) and coping appraisal (evaluating potential positive responses to a threat). There has been some support in the literature for this theory as linked to behavior change, however, it can also backfire due to maladaptive responses to threat/fear stimuli [10].

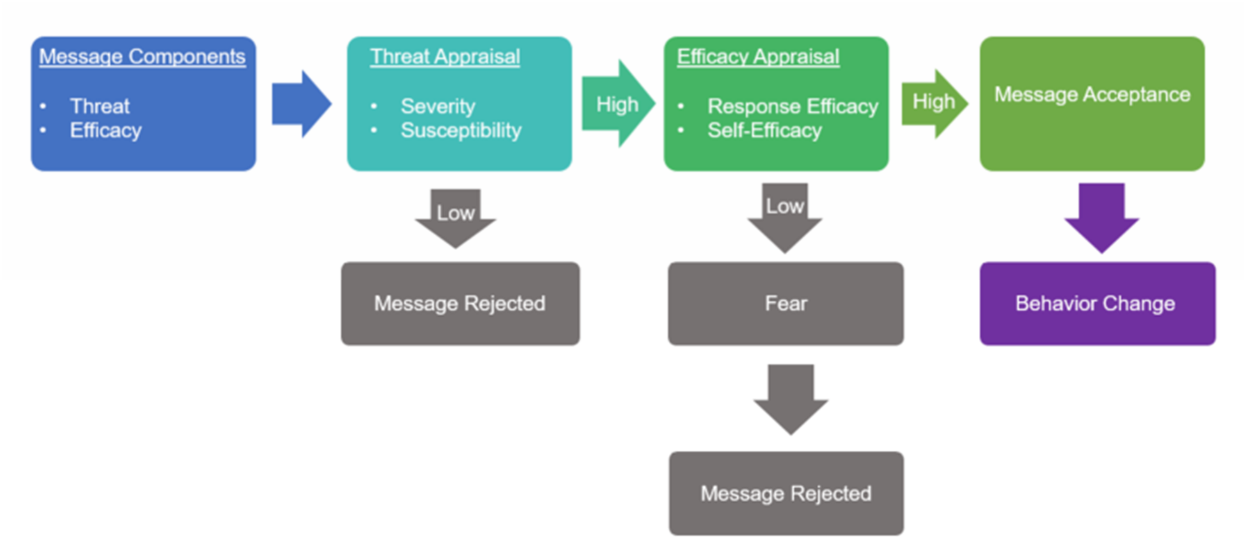
Figure 21. Protection Motivation Theory [54]



Extended Parallel Process Model (EPPM)

This model also centers threat appraisal, but refines it to categorize responses as null, danger-control, or fear-control depending on threat perception and self-efficacy. If an individual does not fear a negative outcome, they will not respond to a health threat. If they believe they can act against the threat, they will exhibit a danger control response. Or if they don't believe they have that power, a fear-control response. Empirical support for this theory is limited [10].

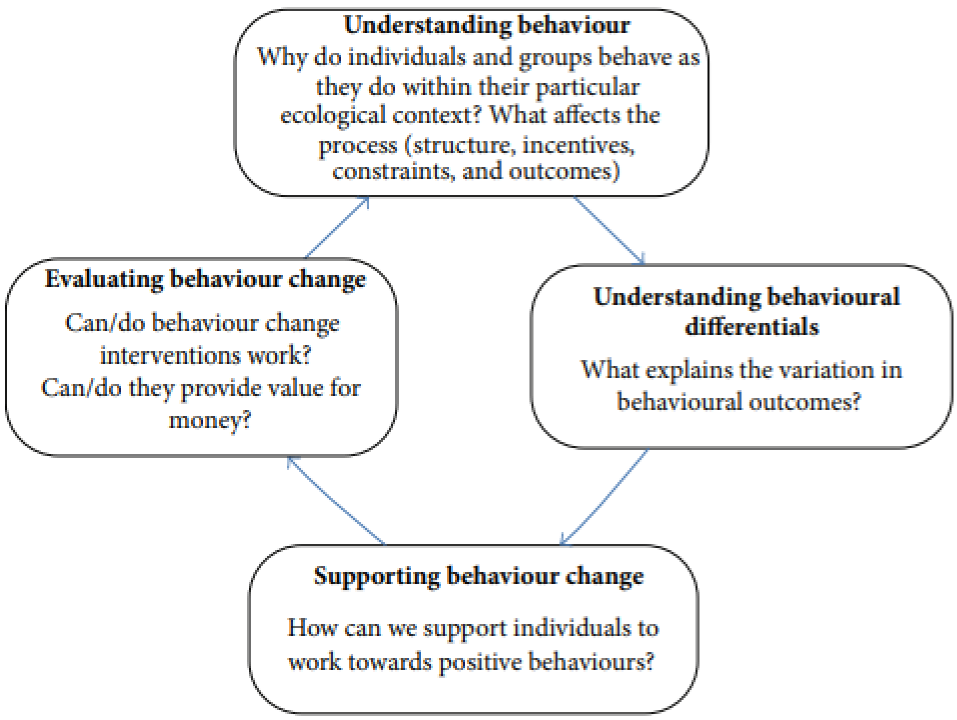
Figure 22. Extended Parallel Process Model [55]



Behavior Change Research Cycle (BCRC)

Pokhrel et al [56] describe a process by which “unhealthy” behaviors are complicated by their broader ecological contexts and a multiplicity of factors and relationships. In this model, change is identified as most likely to occur when individuals “find themselves in a completely new context.” The BCRC seeks to understand behaviors, variations in behavioral outcomes, opportunities to support behavior change, and means of evaluating the efficacy and value of interventions.

Figure 23. Behavior Change Research Cycle [56]



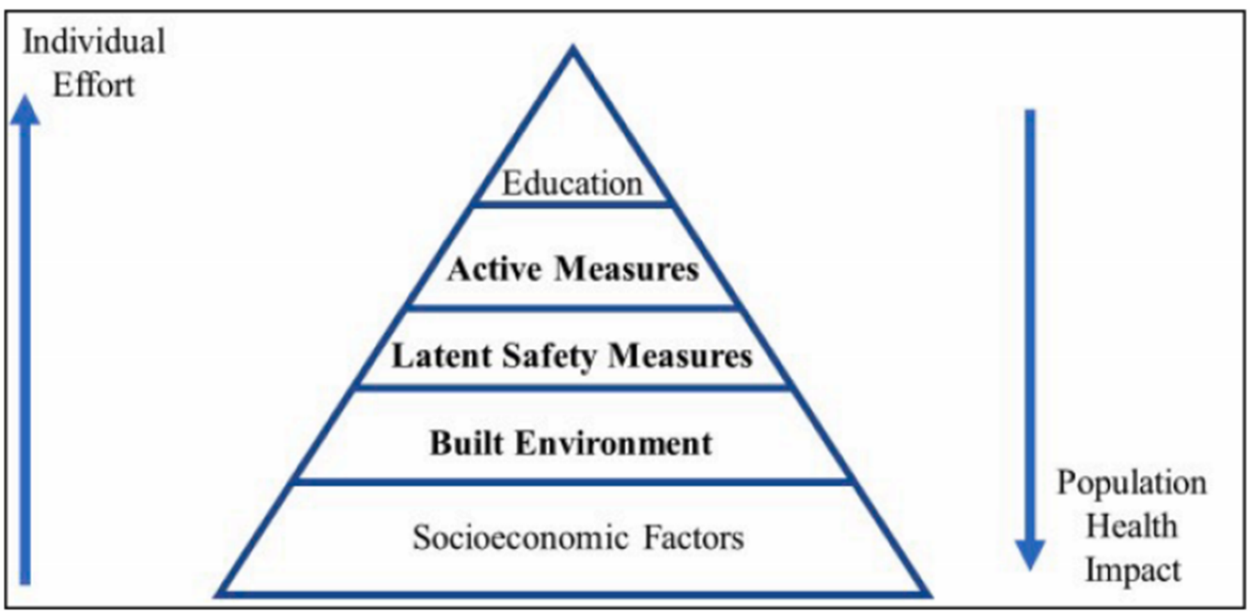
2. *Translational frameworks from public health to roadway safety*

In addition to the above summarized general models for behavior change, all of which have been applied in some capacity to topics related to roadway safety, several models specifically seeking to translate a public health approach to transport safety practice have been described in recent literature.

The Safe Systems Pyramid

Built on the Health Impact Pyramid, the Safe Systems Pyramid [6] is meant to serve as a framework for Vision Zero or Safe Systems policy approaches, applying principles of prevention and a focus on population health, along with understanding specific causes of injury to implement policies. It emphasizes effectiveness, effort, and exposure. It addresses the shortcomings of the traditional "Es" of traffic safety (engineering, education, and enforcement), by focusing on the human factors of behavior change. The authors apply epidemiological concepts to the public health problem of traffic safety to prioritize high-impact strategies, proposing a new framework for making decisions about design and engineering: the safe systems pyramid (Figure 24).

Figure 24. Safe Systems Pyramid [6]



This highlights that Education has the least impact, while addressing socioeconomic factors has the most. As Frieden [6] argues, "the need to urge behavioral change is symptomatic of failure to establish contexts in which healthy choices are default actions." These interventions are useful to raise awareness of new policies, and to promote safety as a cultural value, but should be a last resort after attempting the other levels, and always complementary to other approaches.

The pyramid emphasizes infrastructure solutions, e.g. aligning roadway functional classification with land use and a policy hierarchy emphasizing person mobility, over behavioral/awareness features, e.g., telling people not to drive at night. But the authors also reflect on the need to improve safety through affordable housing and land use policy, to acknowledge and address inherent inequities, and to focus on reducing driving overall first as a primary strategy to reduce exposure.

The further down the pyramid, the more population exposure to the protective factor: even if individual effects are small, the overall effect on population health will be larger than an intervention at the top of the pyramid. However, such interventions are also likely to be more politically challenging, and with high upfront costs (unless adjusted as a "unit cost").

For example, changing system-wide speeds (built environment intervention) impacts all road users, whereas targeted enforcement of the worst offenders (active measures) will impact only a few. This is a public health-framing: targeting the entire risk curve of the population, rather than targeting only the outliers.

Latent safety measures impact the population broadly, but only when they have saturated the population, which in the case of vehicle technology improvements takes a long time and is inequitably distributed. Automated vehicle enforcement can also help here, shifting the speed curve rather than only outliers. Active measures include seat belts, helmets, turn signals, etc. These are very effective but contingent on individuals using them.

Ultimately, Ederer et al argue, to achieve a safe systems approach transportation professionals must be active in efforts to reduce travel (through housing, transit, etc.), in order to address socioeconomic factors at the root. This also means prioritizing efforts at higher levels to the communities at highest risk due to socioeconomic factors.

Specifically, they argue you ultimately can't "balance" the trade-offs between (vehicle) mobility and safety in a truly systemic approach, and recommend the following:

1. prioritize countermeasures based on their effectiveness at preventing the transfer of kinetic energy
2. assess population-level impact
3. determine whether individual effort is needed and
4. support efforts that address social determinants of health.

A summary of example policies and interventions aligned with each tier of the pyramid is outlined in Table 21.

Table 21. Safe Systems Pyramid Example Policies and Interventions [6]

Tier	Approach to Prevention	Programs and Interventions	Relevant Policy
5	Education	Driver education programs; slow down campaigns	Drivers education requirements for licensing
4	Active Safety Measures	Signals and signs indicating stop/yield; collision warning technology; seat belts, helmets	Standards and guidance on sign and signal placement; vehicle standards
3	Latent Safety Measures	Signal timing to encourage slower traffic; leading pedestrian intervals; air bags; automated emergency braking systems, speed governors; alcohol ignition interlocks	Standards and guidance on signal placement and timing; vehicle standards
2	Built Environment	Roundabouts; speed humps; chicanes; raised crosswalks; sidewalks; bicycle infrastructure	Design guidance emphasizing safety over capacity; sidewalk ordinances
1	Socioeconomic Factors	Affordable housing near transit; zoning reform to reduce VMT; safety features on commercial fleets	Zoning policies; housing policy; occupational safety policy

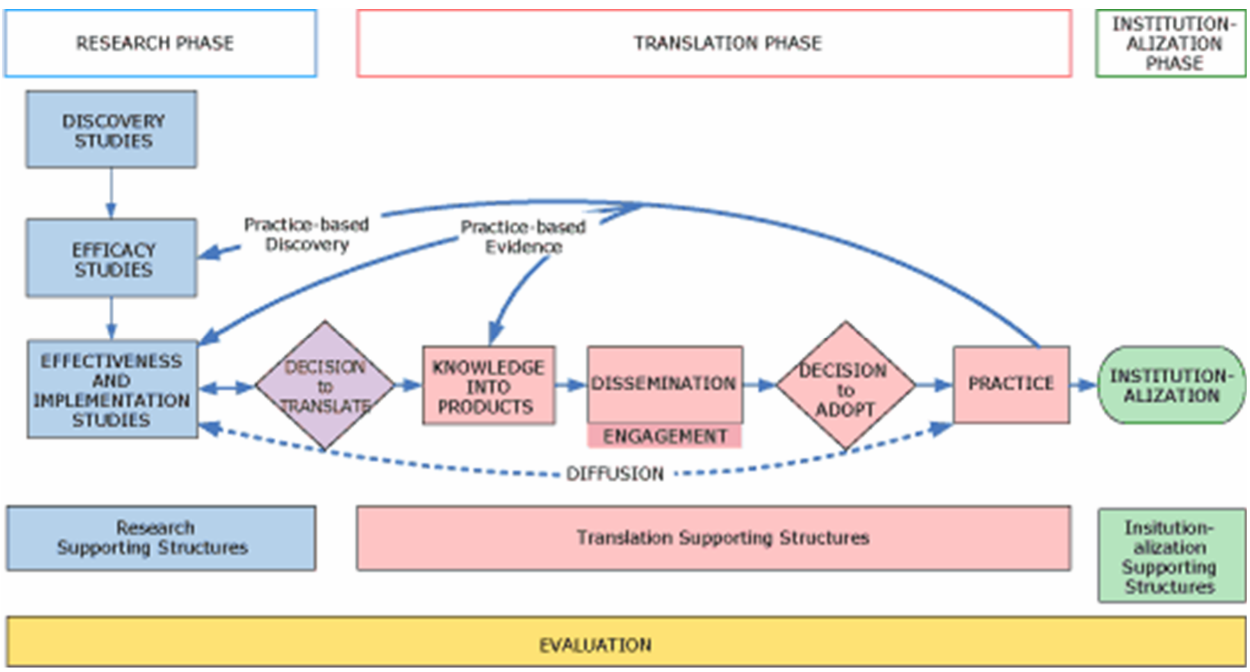
Knowledge to Action Framework (K2A)

This approach was developed by the CDC to model a process for translating public health research into practice. It is based on three phases:

1. Research – Foundational studies identifying intervention benefits and evaluation of efficacy
2. Translation – turning knowledge into products and disseminating them
3. Institutionalization – incorporating products into established activities.

The Framework emphasizes evaluation as a required component at all stages of the process [10].

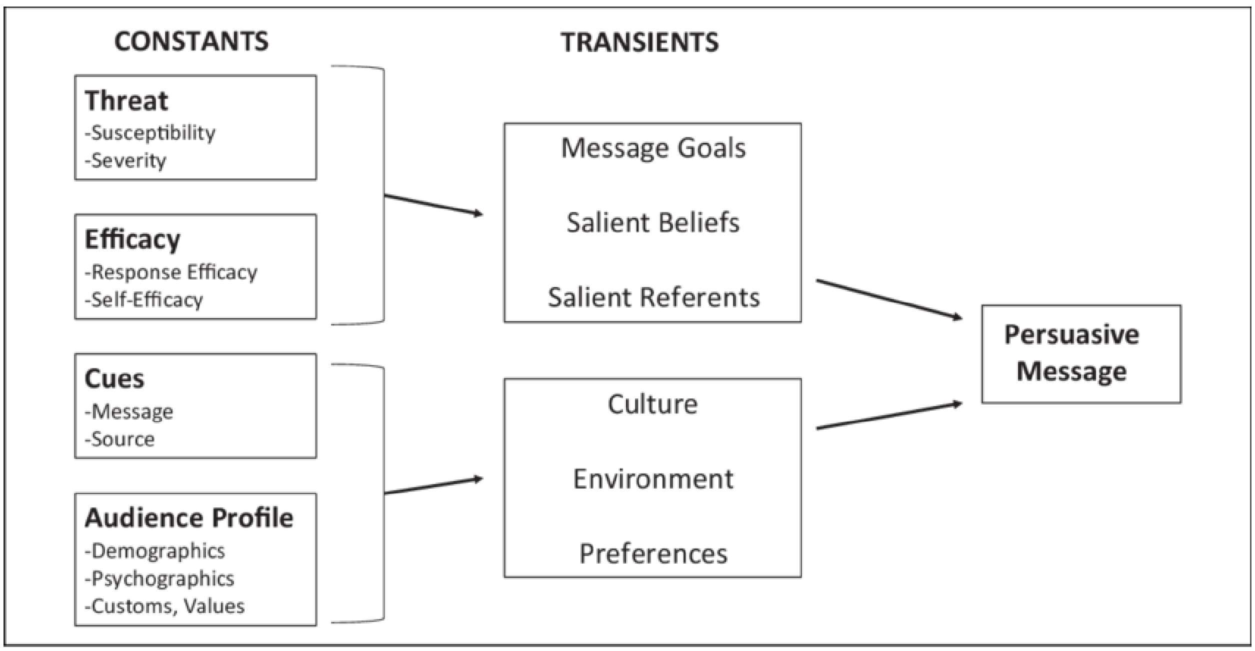
Figure 25. CDC Knowledge to Action Framework [57]



Persuasive Health Message Framework (PHM)

This model is intended to translate behavioral change theories into effective messages, based on adaptations of the Protection Motivation Theory, Elaboration Likelihood Model, and Theory of Reasoned Action. It contends that successful messages may incorporate threat-based messages to convince an audience that a threat exists, efficacy-based messages to convince them they can do something about it, and cues to influence the persuasive process by affecting receptivity, such as credibility of the messenger, demographics and values of the audience, style and modality of the message, etc. [10]

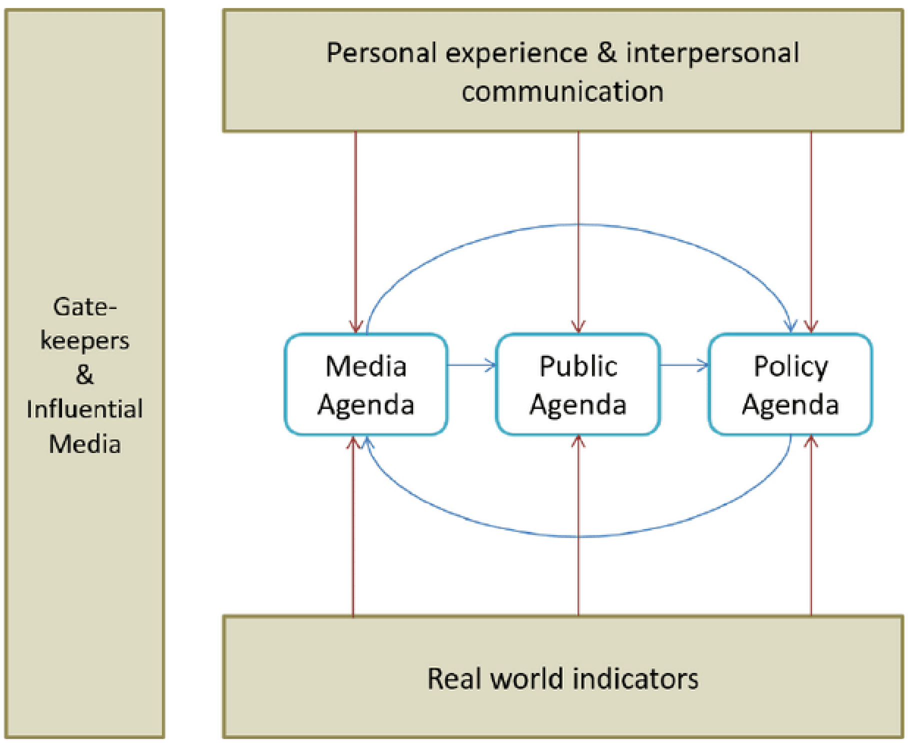
Figure 26. Persuasive Health message Framework [58]



Agenda-Setting Theory (AST)

This model focuses on the role of the media, which sets what issues are ascribed importance and then assigns various attributes of those issues salience, which may be substantive aspects or affective aspects (i.e., attitudes). Together, these shape public opinion in combination with individuals' own agendas and views. This theory emerged from political contexts but can inform framing and dissemination of safety messages: public opinion depends on how issues are described, and on message priming (i.e. if they are associated with information that media consumers already have) [10].

Figure 27. Agenda-Setting Theory [59]



Ward Model

This is a recent translational model adapted for road safety interventions that examines the relationship between traffic safety culture and intention, and how this influences likelihood of driving under the influence (in Ward's research case, Cannabis). It draws from the Theory of Reasoned Action, Value-Belief-Norm Theory, and Prototype Willingness Model to describe how willingness and intention mediate actual behaviors, in combination with cultural attitudes and norms [10]. This model has three phases:

1. Development of a core model of attitudes, norms, prototype images, and control
2. Identification of underlying beliefs with cultural context as the foundation for message content
3. Determination of lenses through which strategies are portrayed, based on specific group values

Ward's analysis found that fear-based interventions can be counterproductive and suggests that changing underlying beliefs and establishing/messaging positive norms is more valuable. "Value-laddering" is recommended as a means to identify motivations through a series of increasingly high-level "why" questions to identify core values around which such messaging should center [10].

Strecher Model

In the UK, Strecher et al [26] outlined a conceptual framework of safe driving behavior adapted from a variety of behavior change models: Fuller's Task-Capability Interface Model, Wilde's Homeostasis Theory, Deery's model of crash risk perception, Bandura's Social Learning Theory, Fishben and Asjen's Theory of Reasoned action, and Rosenstock's Health Belief Model.

The framework is aimed at examining issues pertaining to young drivers, as well as serious offenders. It emphasizes the relationship between behavior intentions and actual behaviors, defining 'safe driving behavior' as driving within speed limits, non-aggressive maneuvering, maintaining safe braking distances, wearing seat belts, and avoiding impairment or sleep deprivation. It centers "task difficulty" as something that gets in the way of a driver's intention: driving safely is difficult because of actual road hazards, as well as distractions. Intention can be turned into action for those with both high self-efficacy and high skill. On the other hand, the authors note, self-efficacy can also relate to overconfidence and an underestimation of risk, leading to reckless behavior.

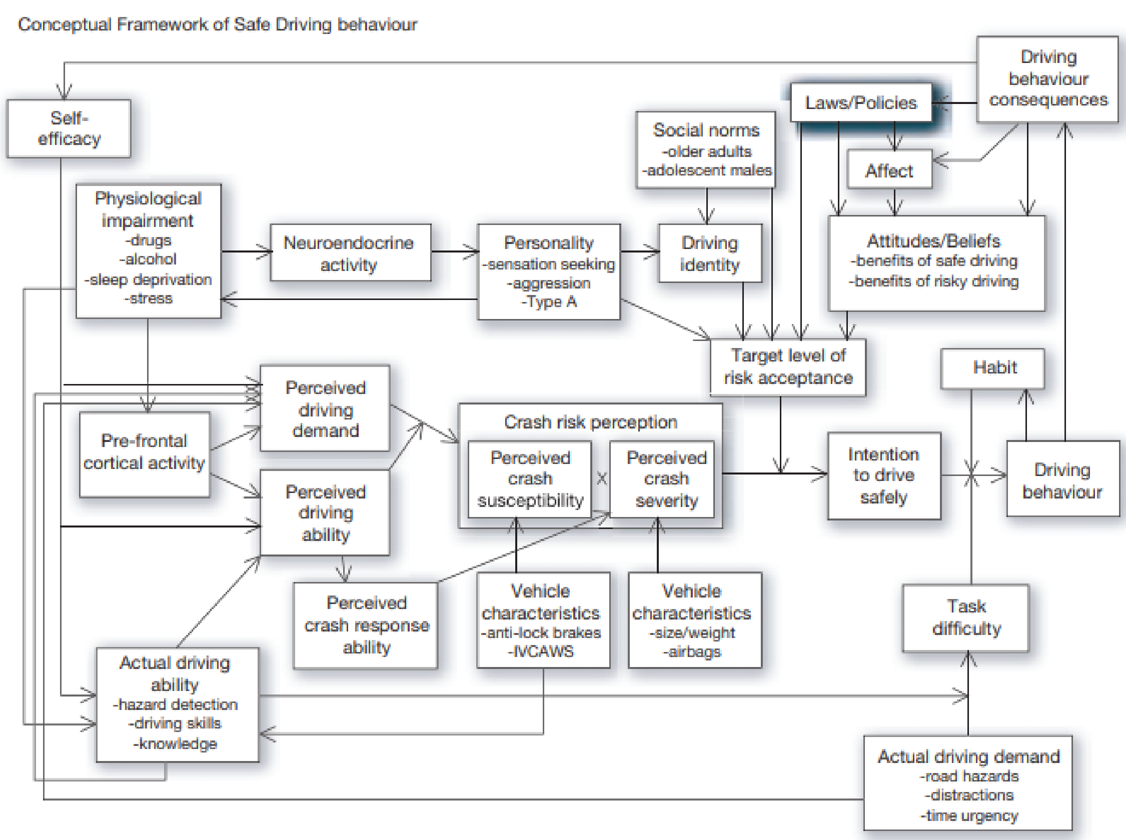
Habit is also a key factor in intention behavior inhibition, for instance, a habit of neglecting to use a seatbelt: past behavior is a strong predictor of future behavior for frequent tasks, whereas intention matters more for less frequent or non-routine events.

Risk perception is also central to many health-related theoretical models, including Strecher et al's. At a population level, risky behaviors lead to crashes, but at the individual level, negative consequences may not occur which leads to escalating risky behaviors due to low perception of risk. When drivers have high perceived driving ability, perceptions of crash risk may be skewed.

Perceived crash response ability, as well as perceptions about the characteristics of one's vehicle (size, airbags, etc.) influence perceived crash severity. Finally, impairment and physiological factors (i.e. immature pre-frontal cortices) are also a factor.

In this model, crash risk perception predicts intention to drive safely, which is moderated by a driver's level of risk tolerance. That, in turn, is influenced by "relatively stable attitudes and beliefs" (p.46), as well as the perceived benefits of unsafe driving and sensation-seeking, as well as social norms or identity/personality. These impact responses toward attempt to influence a behavior.

Figure 28. Strecher et al's Conceptual Framework of Safe Driving Behavior [26]



The Haddon Matrix

The Haddon Matrix [12] is a framework for identifying risk factors before, during, and after a crash. Countermeasures should be selected in relation to these risks in terms of both temporal (pre, peri, and post-crash) and categorical (e.g. human, vehicle, environment) factors.

Figure 29. The Haddon Matrix [12]

The Haddon matrix

PHASE		FACTORS: HUMAN	FACTORS: VEHICLES AND EQUIPMENT	FACTORS: ENVIRONMENT
Pre-crash	Crash prevention	Information Attitudes Impairment Police enforcement	Roadworthiness Lighting Braking Handling Speed management	Road design and road layout Speed limits Pedestrian facilities
Crash	Injury prevention during the crash	Use of restraints Impairment	Occupant restraints Other safety devices Crash protective design	Crash-protective roadside objects
Post-crash	Life sustaining	First-aid skill Access to medics	Ease of access Fire risk	Rescue facilities Congestion

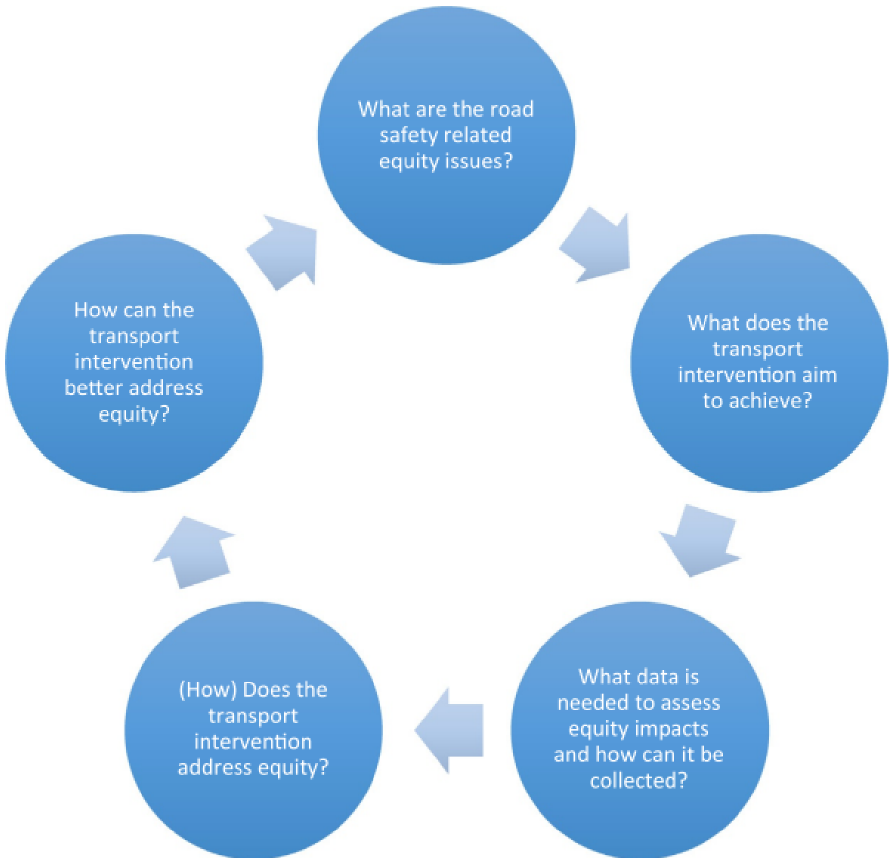
Source: reference 3.

Road Safety Equity (RoSE) Model

Finally, the RoSE Cycle [22] represents a public health-based approach to assessing equity in road safety, based on efforts to implement reduced speed limits in the UK. The goal of this intervention was to reduce harm from traffic crashes, to encourage active transportation, and to work within a broader "Safe Systems" approach. The authors note that typical evaluations simply measure vehicle speeds, collisions, injuries, and death – because that's the data most readily available. An equity impact analysis looks at these, but also at rates of walking and cycling, health and well-being perceptions, social cohesion, air quality, and more. The authors contend that it should include survey data to understand changes in perceptions before and after interventions. In Bristol, UK, they used household surveys to assess impacts on perceptions, in combination with an existing quality of life survey, in order to assess attitudes toward the 20mph speed limits.

The RoSE Model centers regular (e.g., annual) assessments to identify equity issues, combined with sociodemographic data. For instance, Davis and Pilkington note that areas with older fleets are likely to have lower safety standards. Even among high-income countries, socioeconomic differences in risk are clear: socioeconomic characteristics are strongly associated with pedestrian fatalities in particular, controlling for other population and built environment variables. Interim assessments, therefore, may not yield full results of an intervention. Rather, ongoing monitoring is needed [22].

Figure 30. The RoSE Cycle [22]



Appendix C: Sample Survey Instruments

Table 22. AAA TSCI Survey Questions: Behaviors and Perceptions

<table>
<tr><th>Category</th><th>Behavior</th><th colspan="4">Question & Response Choices</th></tr>
<tr><td rowspan="4">Distracted</td><td>Drivers holding and talking on cell phones</td><td rowspan="8">How dangerous do you feel the following driving behaviors are?</td><td rowspan="8">How likely is a driver to be caught by the police for the following behaviors?</td><td rowspan="8">How much do you believe people who are important to you would approve of each of the following behaviors?</td><td rowspan="8">In the past 30 days, how often have you...?</td></tr>
<tr><td>Drivers reading on cell phones</td></tr>
<tr><td>Drivers manually texting or emailing on cell phones</td></tr>
<tr><td>Drivers using technology that allows hands-free use of their phone (Bluetooth, CarPlay, Android Auto, etc.)*</td></tr>
<tr><td rowspan="4">Aggressive</td><td>Drivers speeding 15 mph over the speed limit on freeways</td></tr>
<tr><td>Drivers speeding 10 mph over the speed limit on residential streets (neighborhood)</td></tr>
<tr><td>Driving through a light that had just turned red when they could have stopped safely</td></tr>
<tr><td>Driving aggressively (switching lanes quickly, driving very closely behind another car)</td></tr>
<tr><td rowspan="4">Drowsy & Impaired</td><td>Driving when they were so tired that they had a hard time keeping your eyes open</td><td rowspan="5">Extremely dangerous, very dangerous, moderately dangerous, slightly dangerous, not at all dangerous</td><td rowspan="5">Very likely, somewhat likely, somewhat unlikely, very unlikely</td><td rowspan="5">Completely approve, somewhat approve, somewhat disapprove, completely disapprove</td><td rowspan="5">Regularly, fairly often, a few times, just once, never</td></tr>
<tr><td>Driving after drinking enough alcohol that they may be over the legal limit</td></tr>
<tr><td>Driving shortly (within an hour) after using marijuana</td></tr>
<tr><td>Driving after using potentially impairing prescription drugs</td></tr>
<tr><td>Other</td><td>Driving without wearing a seatbelt</td></tr>
</table>

Table 23. AAA TSCI Survey Question: Countermeasures and Support

Category	**Countermeasure**	**Question & Response Choices**
Distracted	Having a law against holding and talking on a cell phone while driving, for all drivers regardless of their age	How strongly do you support or oppose...?
	Having a law against using hands-free technology to read, type, or send a text message/email while driving	
Aggressive	Using cameras to automatically ticket drivers who drive more than 10 mph over speed limit on residential streets	
Drowsy & Impaired	Requiring all new cars to have a built-in technology that won't let the car start if the driver's alcohol level is over the legal limit	
	Having a law lowering the legal limit for a driver's blood alcohol concentration from 0.08 to 0.05	
	Lowering the legal limit for a driver's blood alcohol concentration to 0.05 for people transporting young children	
	Making it illegal to drive with more than a certain amount of marijuana in your system	Strongly support, somewhat support, oppose somewhat, oppose strongly
	Making it illegal to drive with any drug (not legally prescribed) in your system	
Other	Requiring all new drivers under the age of 21 years to go through training, practice time, and a restriction period	
	Require developers of self-driving car technologies to share safety information and testing results with the public before the vehicles are allowed on public roads	

Table 24. NHTSA 2011 Survey of Speeding Attitudes and Behaviors Summary of Questions [41]

General Driving Information
How often do you usually drive a car or other motor vehicle?
What kind of vehicle do you drive most often? Is it a car, van or minivan, motorcycle, SUV, pickup truck or something else?
Speed Behavior
Which of the following statements best describes your driving?
I tend to pass other cars more often than other cars pass me
Other cars tend to pass me more often then I pass them
Both/About equally
When driving I tend to...
Stay with slower moving traffic, or
Keep up with the faster traffic
Both/About equally

Speed Behavior on Various Road Types
How often do you drive on Multi-Lane, Divided Highways?
During the past seven days, approximately how many miles did you drive on Multi-Lane Divided Highways?
What do you consider to be a safe speed limit for (most) Multi-Lane, Divided Highways in good weather on roads with no congestion during the day?
When driving on Multi-Lane, Divided Highways in good weather during the day, how fast do you normally drive?
How often would you say you drive 15 miles an hour over the speed limit on Multi-Lane, Divided Highways?
How many miles per hour over the speed limit do you think the average driver can go on Multi-Lane, Divided Highways, before he or she will receive a ticket?
How often do you drive on two lane highways, one lane in each direction? Do you drive on this type of road . . . ?
During the past seven days, approximately how many miles did you drive on two-lane Highways, one lane in each direction?
What do you consider to be a safe speed limit for (most) Two-Lane Highways, one lane in each direction in good weather during the day?
When driving on Two-Lane Highways, one lane in each direction in good weather during the day, how fast do you normally drive?
How often would you say you drive 15 miles an hour over the speed limit on Two-Lane Highways, one lane in each direction?
How far above the speed limit do you think the average driver can go on Two-Lane Highways, one lane in each direction, before he or she will receive a ticket?
How often do you drive on Neighborhood or Residential streets?
During the past seven days, approximately how many miles did you drive on Neighborhood or Residential streets?
What do you consider to be a safe speed limit for (most) Neighborhood or Residential streets in good weather during the day?
When driving on Neighborhood or Residential streets in good weather during the day, how fast do you normally drive?
How often would you say you drive 10 miles an hour over the speed limit on Neighborhood or Residential streets?
How far above the speed limit do you think the average driver can go on Neighborhood or Residential streets, before he or she will receive a ticket?
Norms/Factors on Speeding

People sometimes go faster than the speed limit for different reasons. On those occasions when you do, what do you think are the main reasons you drive faster than the speed limit?
Would you say you strongly (AGREE/DISAGREE) or somewhat (AGREE/DISAGREE)?
Everyone should obey the speed limits because it's the law.
People should keep pace with the flow of traffic
Speeding tickets have more to do with raising money than they do with reducing speeding.
Driving over the speed limit is not dangerous for skilled drivers.
There is no excuse to exceed the speed limits.
It is unacceptable to exceed speed limits by more than 20 mph.
If it is your time to die, you'll die, so it doesn't matter whether you speed.
I enjoy the feeling of driving fast.
The faster I drive, the more alert I am.
I often get impatient with slower drivers.
I try to get where I am going as fast as I can.
I worry a lot about having a crash.
I consider myself a risk taker while driving
Speeding is something I do without thinking
Would you say you strongly (AGREE/DISAGREE) or somewhat (AGREE/DISAGREE)? Driving at or near the speed limit . . .
Reduces my chances of an accident
Makes it difficult to keep up with traffic
Makes me feel annoyed
Makes it easier to avoid dangerous situations
Uses less fuel
Attitudes Toward Enforcement
How important is it that something be done to reduce speeding by drivers?
How often do you think police should enforce the speed limit?
How often do you see motor vehicles that have been pulled over by police on the streets and roads you normally drive?
Automated Photo Enforcement Devices
Before today, have you ever heard of speed cameras being used to ticket drivers who speed?
Thinking about locations where speed cameras might be useful, would you find it acceptable to use them . . . ?
Where it could be hazardous for a police officer to stop a driver
Where stopping a vehicle could cause traffic congestion
Where there have been many crashes

In a school zone
In a construction zone
On all roads
Along the routes you normally drive, are there speed cameras in use?
Have you ever received a ticket in the mail for a speed violation, identified by a speed camera?
Would you say you strongly (AGREE/DISAGREE) or somewhat (AGREE/DISAGREE)?
Speed cameras are used to prevent accidents
Speed cameras are used to generate revenue
Attitudes Toward Speeding Countermeasures
How would you feel about using the following measures in your community to reduce speeding?
More frequent ticketing for speeding
Issuing higher fines for speeding tickets
Increasing public awareness of the risks of speeding
Road design changes, like speed humps and traffic circles, to slow down traffic
Electronic signs by the road that warn drivers that they are speeding and should slow down
Increased use of speed cameras in dangerous or high crash locations
A speed governor is a device which does not allow the vehicle to go above a certain speed. Do you think the mandatory use of a speed governor is a good idea or a bad idea for . . . . ?
Truck drivers
Drivers 18 years or younger
Drivers with multiple speeding tickets in one year
All drivers
Please tell me whether you think each of the following is a good idea or a bad idea to help reduce speeding
A device in your motor vehicle that notifies you with a buzzer or a flashing light when you drive faster than the speed limit
A device in your motor vehicle which records your speed data and gives you the option to provide the information to your insurance company to lower your premiums, if you obey the speed limits
A device in your motor vehicle, which slows the motor vehicle down when it senses another car or object is too close to your motor vehicle
Would it prevent you from speeding?
Would you say you would be very (LIKELY/UNLIKELY) or somewhat (LIKELY/UNLIKELY) to use this device?
A device in your motor vehicle that does not allow you to drive faster than 10 miles over the posted speed limit

A device in your motor vehicle that you can switch on or off, that prevents you from driving faster than the speed limit
A device in your motor vehicle which allows parents to limit the maximum speed of the motor vehicle, when the teenager drives the motor vehicle
Some roadways use digital signs to change the speed limit on a section of road based on traffic or weather conditions. Do you think it is a good idea or a bad idea to use these signs in the following situations:
Construction zones
School zones
Bad weather
Congested Roadways
Crash Experience
How many times have you been in a speeding related accident in the past five years?
How long ago was the most recent accident?
Did you receive any injuries as a result of the most recent speeding related accident?
Did your injuries require you to go to the hospital?
How long did you stay in the hospital?
Personal Sanctions
In the past TWELVE MONTHS have you been STOPPED for speeding by the police?
How many times have you been stopped for speeding in the past twelve months?
Did you receive a ticket during the last time you were stopped for speeding?
Did you receive a warning the last time you were stopped for speeding?
Did you change your driving behavior as a result of receiving the (TICKET/WARNING) for speeding?
Other Risky Behaviors
When driving your primary vehicle how often do you wear your seatbelt?
In the past 30 days, have you driven a vehicle when you thought you might have consumed too much alcohol to drive safely?
Use of Cell Phone Behaviors
When you drive a motor vehicle, do you usually have a cell phone or wireless phone of some type in the vehicle with you?
How often do you talk on the phone while you are driving?
When you are talking on the phone while driving, do you tend to ...?
Hold the phone in your hand
Squeeze the phone between your ear and shoulder
Use a hands–free earpiece
Use a built-in-car system (OnStar, Sync, or built-in Bluetooth)

Use the cellular phone's speakerphone feature
How often do you read OR send text messages while you are driving and the vehicle is moving?

Table 25. NHTSA-GHSA Working Group Core Motorist Survey Questions

Impaired Driving	In the past 30 days, how many times have you driven a motor vehicle within 2 hours after drinking alcoholic beverages?
	In the past 30 days, have you read, seen or heard anything about alcohol impaired driving (or drunk driving) enforcement by police?
	What do you think the chances are of someone getting arrested if they drive after drinking?
Seat Belt Use	How often do you use safety belts when you drive or ride in a car, van, sport utility vehicle or pick up?
	In the past 30 days, have you read, seen or heard anything about seat belt law enforcement by police?
	What do you think the chances are of getting a ticket if you don't wear your safety belt?
Speed	On a local road with a speed limit of 20 mph, how often do you drive faster than 35 mph- most of the time, half the time, rarely, never?
	On a road with a speed limit of 65 mph, how often do you drive faster than 70 mph- most of the time, half the time, rarely, never?
	In the past 30 days, have you read, seen or heard anything about speed enforcement by police?
	What do you think the chances are of getting a ticket if you drive over the speed limit?

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MEMORANDUM

DATE: September 16, 2024
TO: New Orleans Regional Planning Commission

CC: Volkert
FROM: University of New Orleans Transportation Institute
RE: NORPC SS4A Task 4: Public Health Methodology Phase 2 Survey Analysis and Recommendations (Final)

Introduction

In service to the Safe Streets for All planning process, this task seeks to draft an appropriate framework for translating findings from the public health and behavioral change research fields into the current project scope consists of two main components (Figure 1):

- Phase 1: Adopting public health practices to improve public engagement and data collection, and;
- Phase 2: Developing policy and action plan recommendations that draw from integrated behavior change theories.

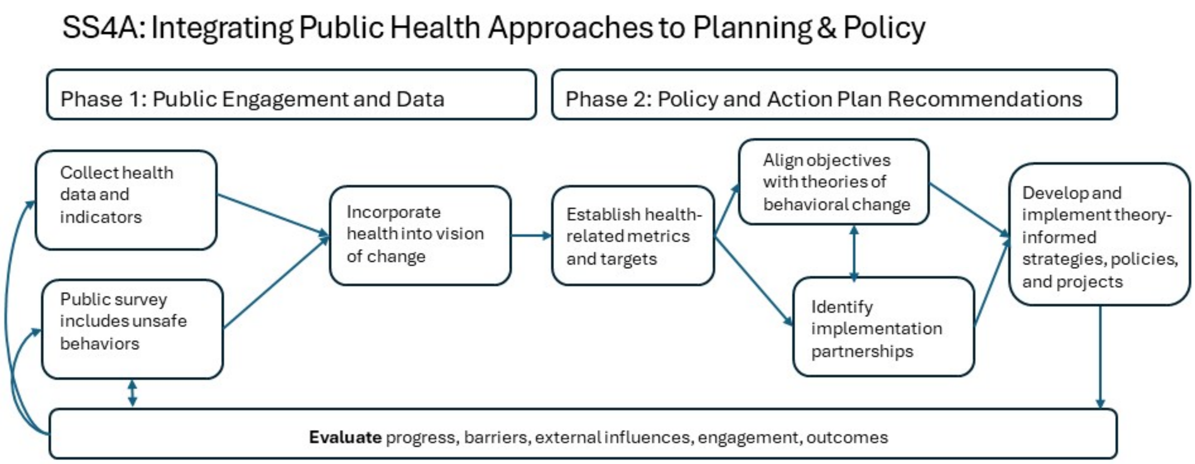
As described in the Phase 1 Memo, the basic steps of integrating a public health-informed approach to engagement and action plan development include:

1. Incorporate health data and indicators into existing conditions and equity analyses
2. Include questions pertaining to unsafe driving behaviors in public survey to better understand their prevalence and relative priority
3. Incorporate health into the community's vision of future change
4. Establish health-related metrics and targets
5. Align objectives with relevant theories of behavioral change
6. Identify interdisciplinary implementation partnerships with health-sector partners
7. Develop and implement public health theory-informed approaches into action plan policy and project recommendations
8. Measure progress using health metrics and qualitative measures (throughout)

The objective of this Phase 2 narrative is advance development of policy and action plan recommendations by analyzing findings from the public outreach process to identify insights priorities, and potential synergies that support plan implementation, particularly as pertains to non-infrastructure countermeasures and strategies, through three core activities:

1. Establishing Health-Related Metrics and Targets
2. Evaluating Public Perceptions and Behaviors
3. Aligning Community Priorities with Theories of Behavioral Change

Figure 1. Integrating Public Health Approaches to Planning & Policy Diagram



1. Establishing Health-Related Metrics and Targets

Phase 1 of this task identified a wide range of commonly used indicators pertaining to public health that are increasingly being incorporated into transportation planning processes. This section advances that discussion by providing additional context about traffic safety risk factors (based on longitudinal data trends from LSU'S Center for Analytics & Research in Transportation Safety or CARTS) that point to potential supplemental indicators related to key risk factors, as well as opportunities for future research or analysis where data is not presently available. It also provides an abbreviated list of recommended public health metrics which study area communities may which to adopt to benchmark progress toward Safe Streets for All goals.

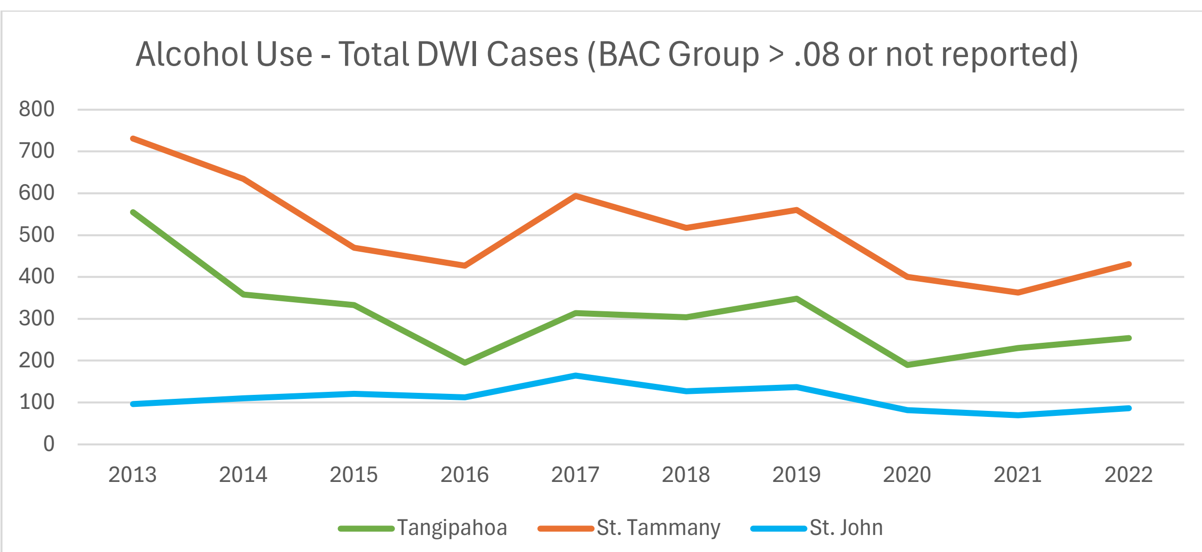
Traffic Safety Risk Factors

Key traffic safety risk factors involving driver behaviors include alcohol use, occupant protection, distracted driving, and speeding. Of these, reliable data on vehicle speeds at the time of a crash are most sparse. In recent years, however, data for the other three behaviors has become more widely documented in crash reports, facilitating further analysis of the relationship between these behaviors and various demographic characteristics, such as age, sex, and race. Although the literature suggests that in many cases, risky behaviors are often underreported overall, trends in these factors over time can help support identification of priority areas for safety interventions.

LSU's CARTS dashboard makes a variety of data comparisons available, including total DWI cases, as well as crashes involving distracted or inattentive driving and occupant protection failures (i.e. lack of restraint use). A selection of summary findings based on the data currently available to the public is presented below; additional analyses using the raw crash data are recommended to further parse trends over time and among specific sub-groups of interest.

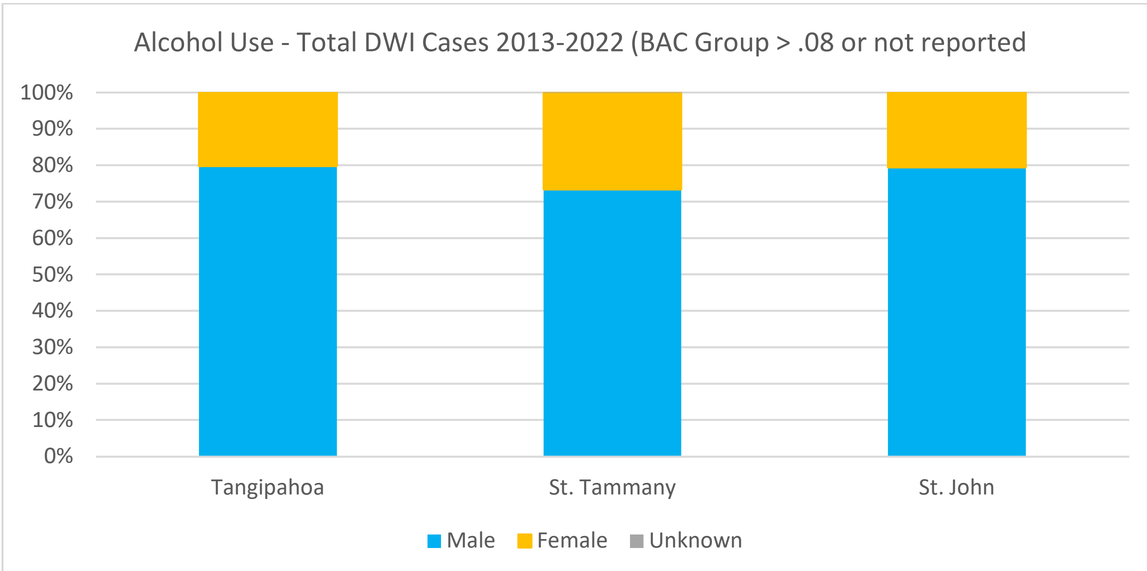
Annual reported crashes involving alcohol use (where reported BAC was above the legal limit of .08 or where a BAC was not reported) have trended downward over the last decade but experienced an apparent uptick since 2020 (Figure 2). The majority of DWI cases involve male drivers in all three parishes (Figure 3), while in Tangipahoa parish, a higher relative share of cases involve younger drivers (15-34) (Figure 4).

Figure 2. Alcohol Use - Total DWI Cases (BAC Group > .08 or not reported)



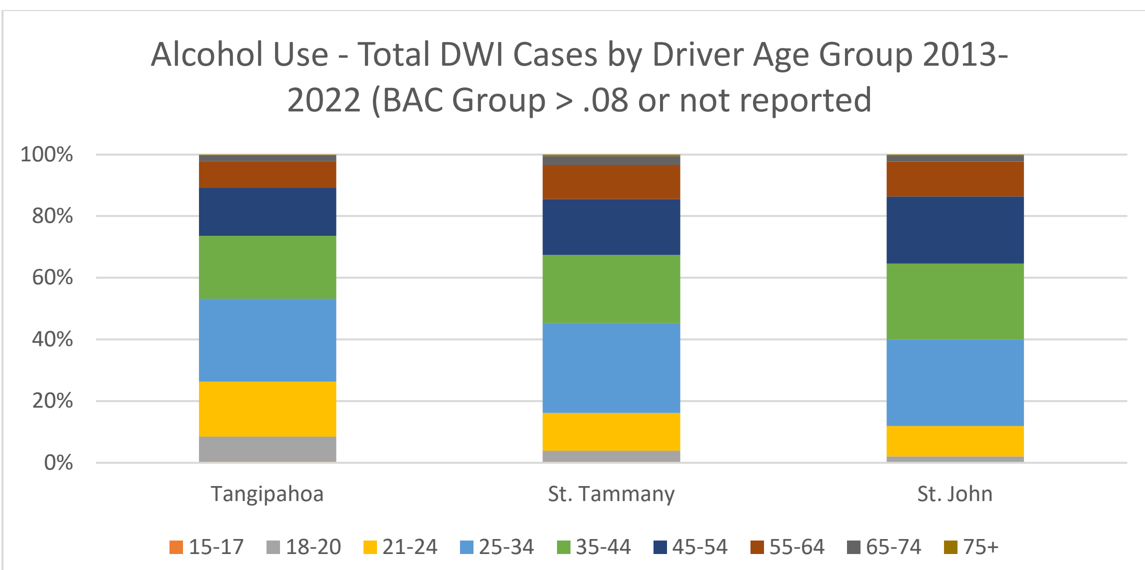
Data Source: CARTS Louisiana COBRA Dashboard https://carts.lsu.edu/datareports/report/dwi

Figure 3. Alcohol Use - Total DWI Cases by Driver Sex 2013-2022



Data Source: CARTS Louisiana COBRA Dashboard https://carts.lsu.edu/datareports/report/dwi

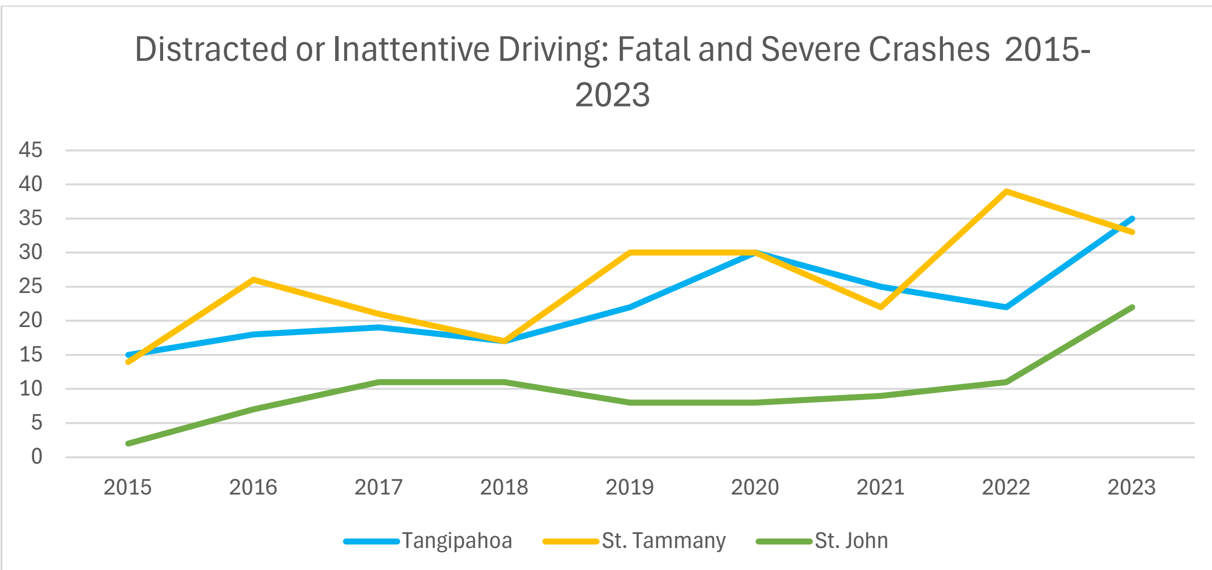
Figure 4. Alcohol Use - Total DWI Cases by Driver Age Group



Data Source: CARTS Louisiana COBRA Dashboard https://carts.lsu.edu/datareports/report/dwi

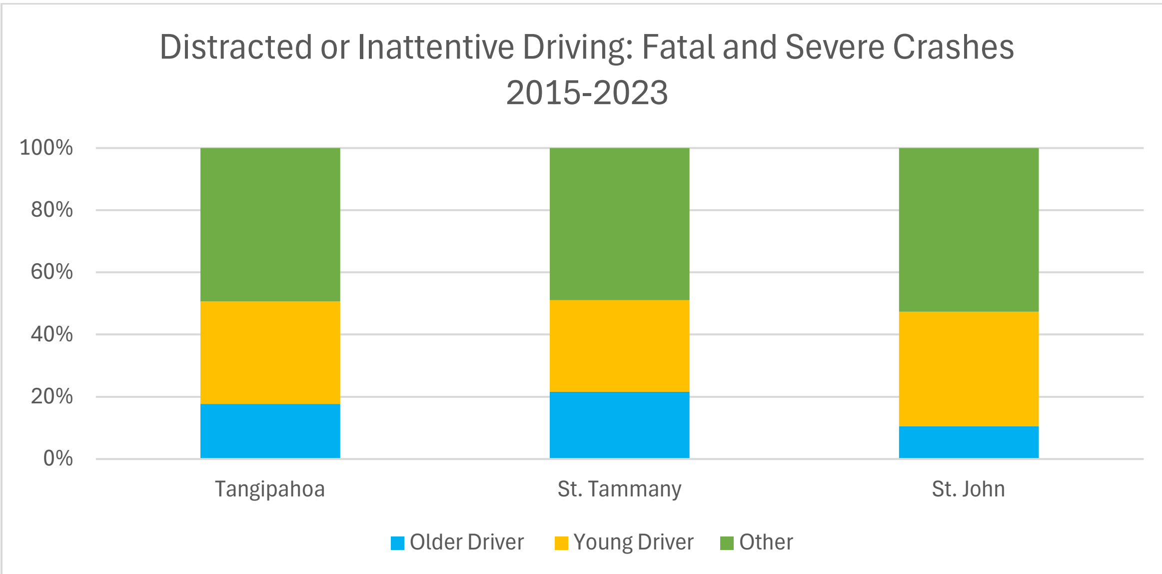
Distracted or inattentive driving has trended upward over the last decade, with record instances reported in all three parishes in 2022 or 2023 (Figure 5). Such crashes involving young drivers constitute a large share of fatal or severe crashes where distraction is documented, particularly in St. John Parish (Figure 6). Black drivers are overrepresented in distracted driving crashes relative to their proportion of the overall population in Tangipahoa and St Tammany Parishes (Figure 7), while men (Figure 8) and young drivers (up to age 24) (Figure 9) are overrepresented in crashes for all three parishes.

Figure 5. Distracted or Inattentive Driving: Fatal and Severe Crashes 2015-2023



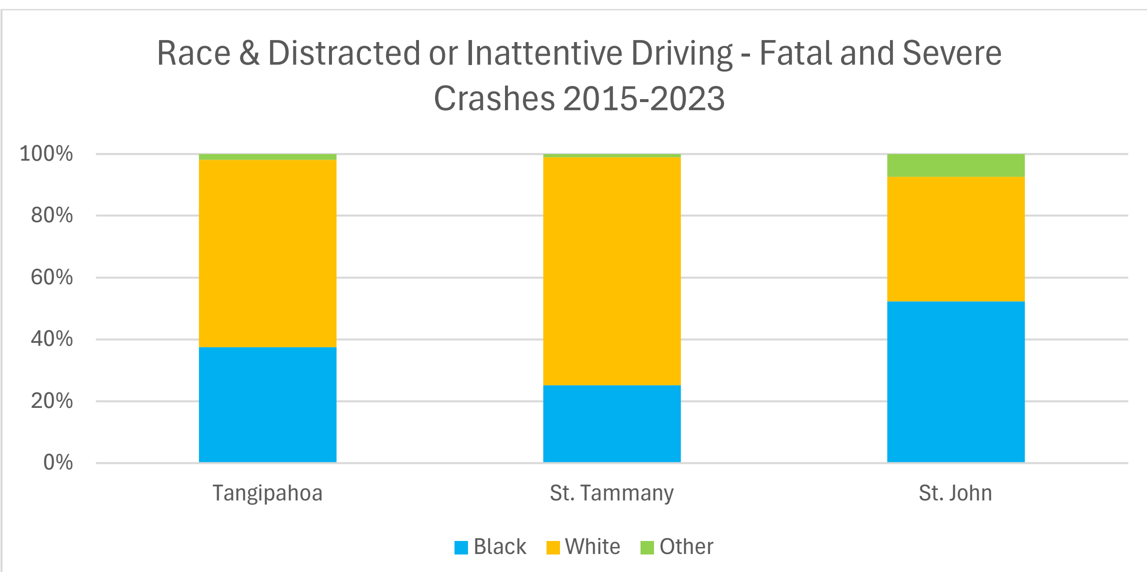
Data Source: CARTS SHSP Crash Dashboard, https://carts.lsu.edu/datareports/report/shspcrash, fatal and severe crashes

Figure 6. Distracted or Inattentive Driving: Fatal and Severe Crashes Involving Older or Young Drivers, 2015-2023



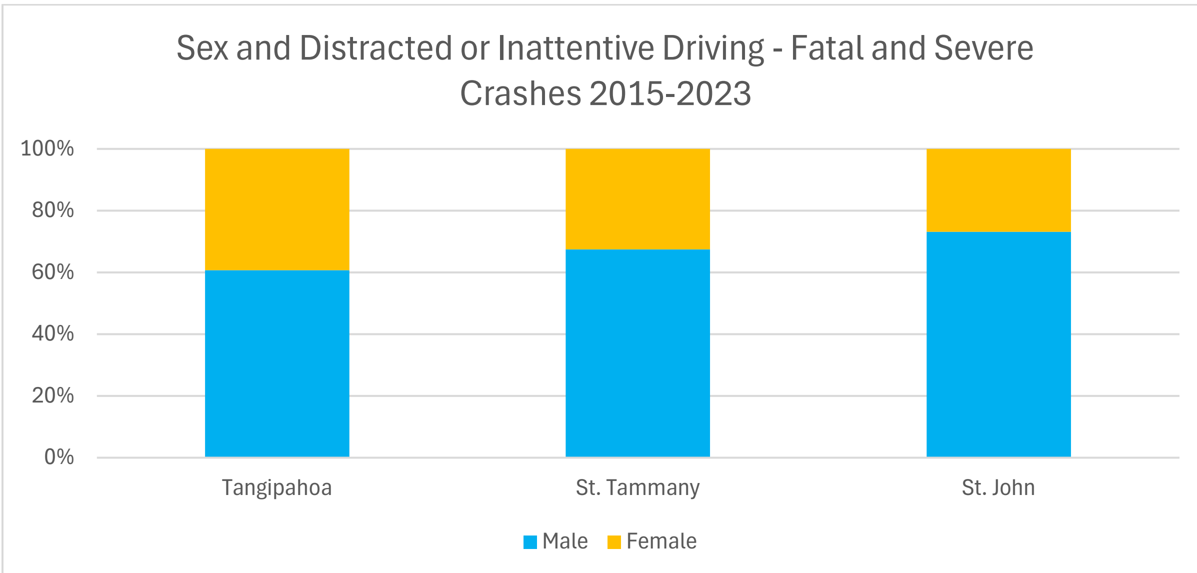
Data Source: CARTS SHSP Crash Dashboard, https://carts.lsu.edu/datareports/report/shspcrash, fatal and severe crashes

Figure 7. Race & Distracted or Inattentive Driving - Fatal and Severe Crashes 2015-2023



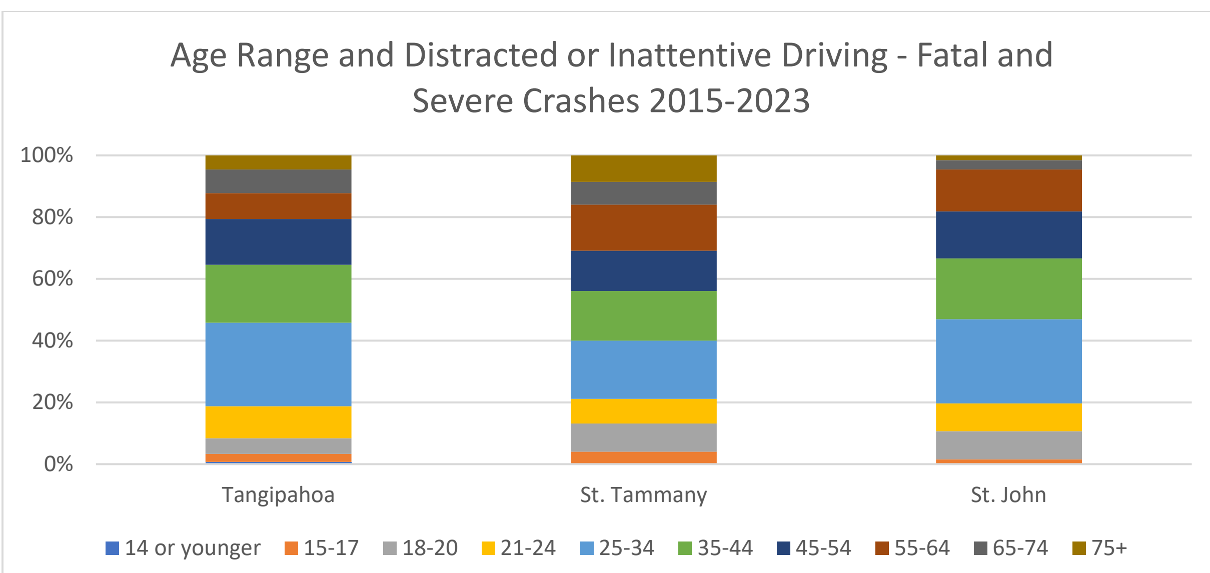
Data Source: CARTS SHSP Driver Dashboard; crash category Distracted or Inattentive https://carts.lsu.edu/datareports/report/shspdriver

Figure 8. Sex and Distracted or Inattentive Driving - Fatal and Severe Crashes 2015-2023



Data Source: CARTS SHSP Driver Dashboard; crash category Distracted or Inattentive
https://carts.lsu.edu/datareports/report/shspdriver

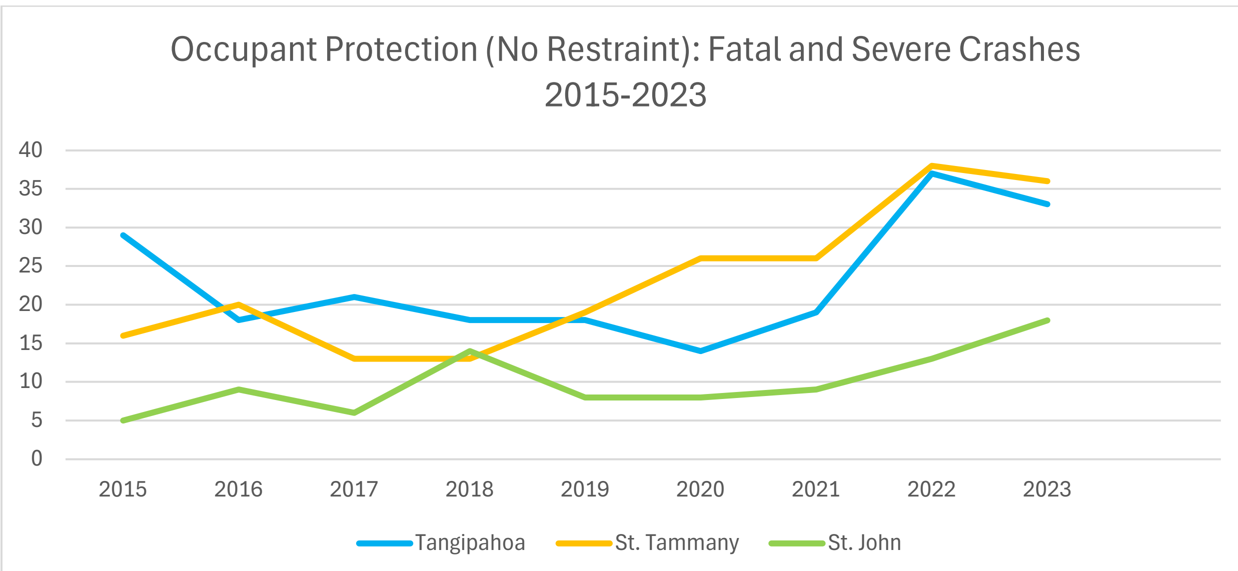
Figure 9. Age Range and Distracted or Inattentive Driving - Fatal and Severe Crashes 2015-2023



Data Source: CARTS SHSP Driver Dashboard; crash category Distracted or Inattentive
https://carts.lsu.edu/datareports/report/shspdriver

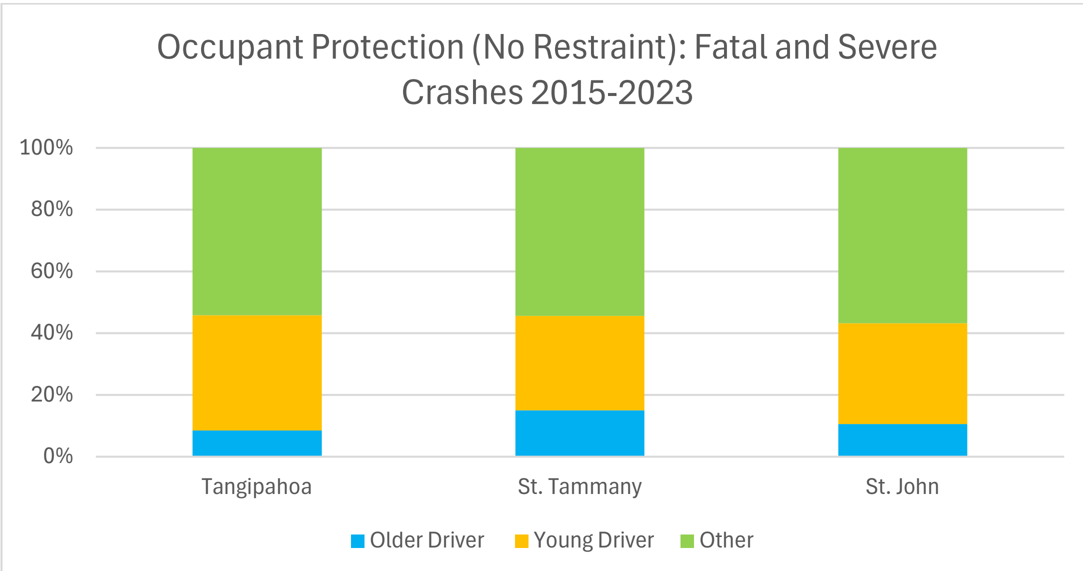
Finally, occupant protection (i.e., seat belt use) has been a factor in a large number of fatal and severe crashes over the last decade, again with elevated reporting of this issue during 2022 and 2023 (Figure 10), with a disproportionate share of such crashes involving young drivers (Figure 11). The share of serious and fatal crashes involving lack of restraint use again suggests disparities by age, race, and gender (Figures 12-14) which may suggest opportunities for targeted messaging or other interventions to improve compliance among those most likely to be involved.

Figure 10. Occupant Protection (No Restraint): Fatal and Severe Crashes 2015-2023



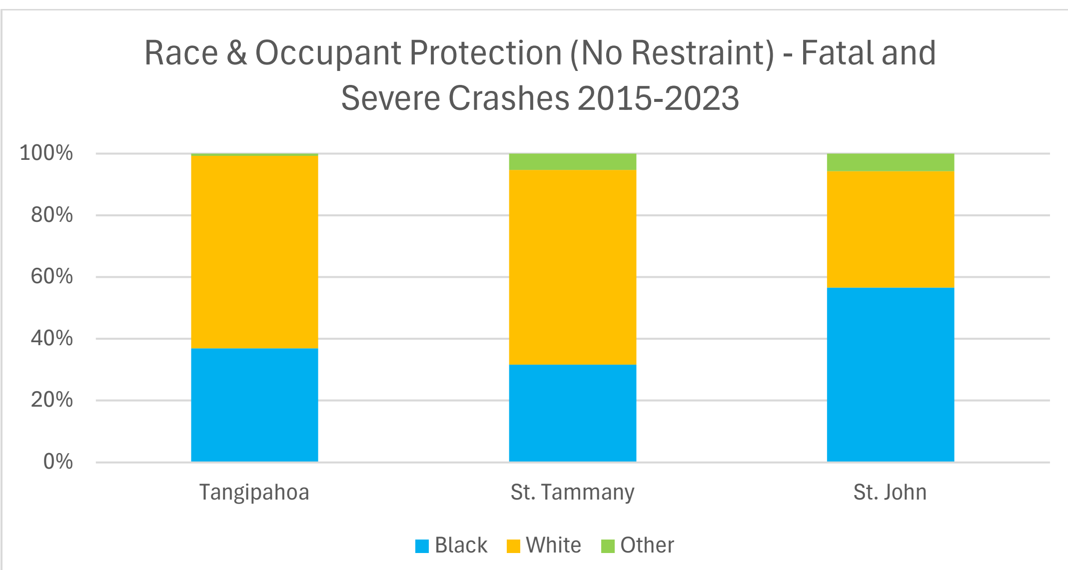
Data Source: CARTS SHSP Crash Dashboard, https://carts.lsu.edu/datareports/report/shspcrash, fatal and severe crashes

Figure 11. Occupant Protection (No Restraint): Fatal and Severe Crashes 2015-2023



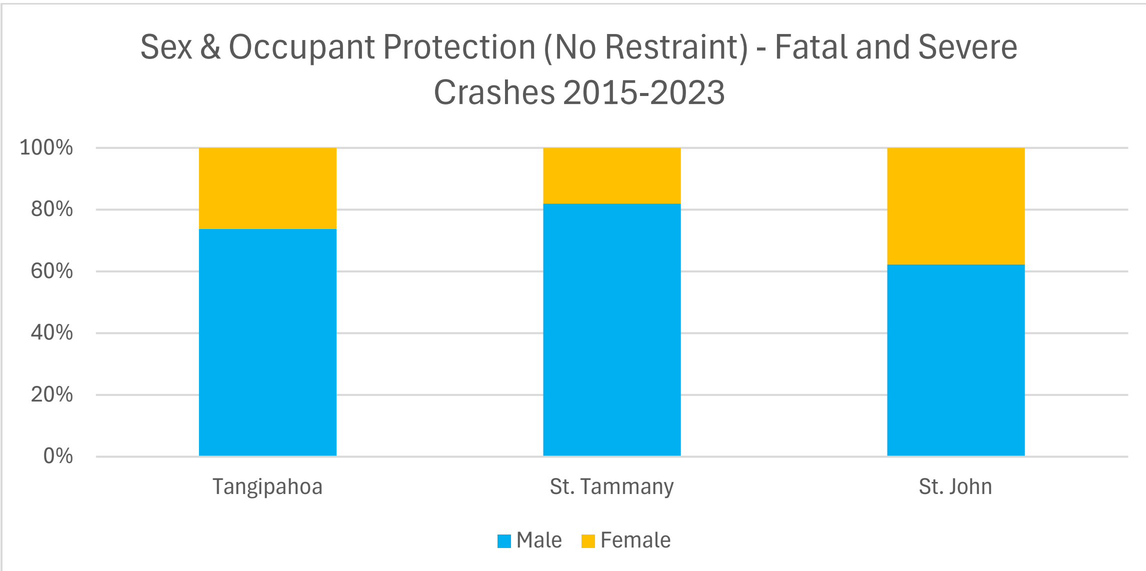
Data Source: CARTS SHSP Crash Dashboard, https://carts.lsu.edu/datareports/report/shspcrash, fatal and severe crashes

Figure 12. Race & Occupant Protection – Fatal and Severe Crashes 2015-2023



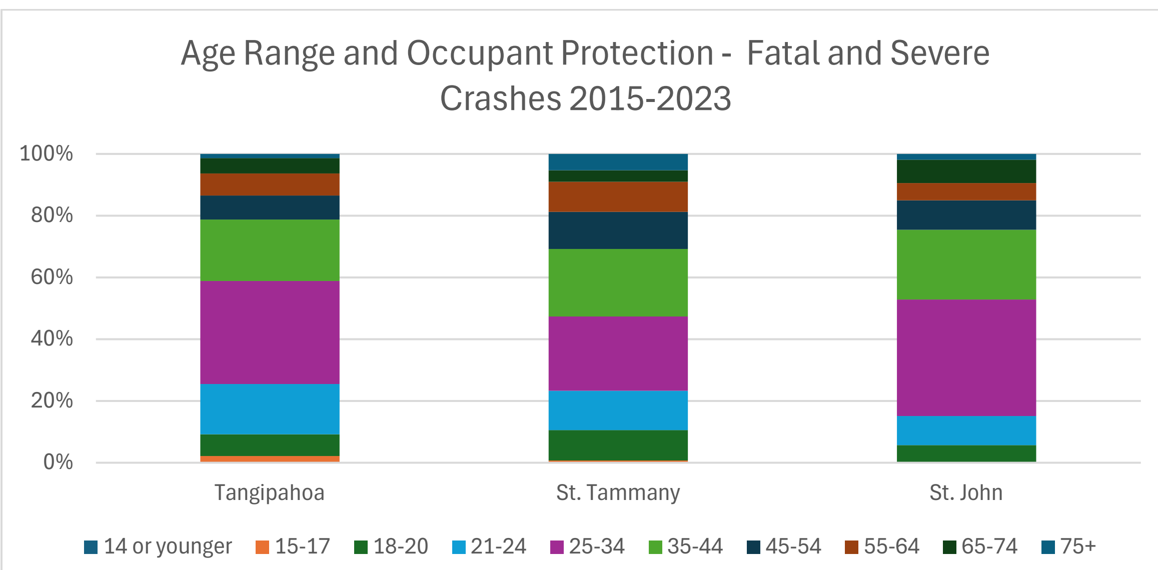
Data Source: CARTS SHSP Driver Dashboard; crashes flagged for "no restraint"
https://carts.lsu.edu/datareports/report/shspdriver

Figure 13. Sex and Occupant Protection - Fatal and Severe Crashes 2015-2023



Data Source: CARTS SHSP Driver Dashboard; crashes flagged for "no restraint"
[*https://carts.lsu.edu/datareports/report/shspdriver*](https://carts.lsu.edu/datareports/report/shspdriver)

Figure 14. Age Range and Occupant Protection - Fatal and Severe Crashes 2015-2023



Data Source: CARTS SHSP Driver Dashboard; crashes flagged for "no restraint"
[*https://carts.lsu.edu/datareports/report/shspdriver*](https://carts.lsu.edu/datareports/report/shspdriver)

Absent or available on a limited basis only from the publicly available CARTS dashboard data are several other key risk factors which warrant future research as they have been linked to crash outcomes:

- Demographic sub-strata of both drivers and passengers (e.g., crashes involving specific passenger types, crash typologies, or combinations of demographic characteristics)
- Cannabis Use (some data for drug involved crashes is published, but on a limited basis)
- Travel Speed
- Fatigue factors
- Aggressive driving

Recommended Public Health Metrics

Based on review of national practice and available data sources for Louisiana, the following table (Table 1 outlines an abbreviated list of recommended health-related indicators with implications for traffic safety behaviors, exposure, or risk factors which should be considered for integration into local plans, policy goals, and evaluation/performance monitoring practices.

Table 1. Recommended Public Health Metrics

Category	Metric	Data Source	Geographic Scale
Injury Prevention	Traffic Fatalities	DOTD / CARTS	Any (DOTD); Parish (CARTS)
	Traffic Injuries		
	Alcohol-Related Traffic Crashes		
	Distracted/Inattentive Traffic Crashes		
	Occupant Protection-Related Injuries and Fatalities		
	Physical Environment Score	County Health Rankings	Parish
	Binge drinking among adults	CDC PLACES	Census Tract

Active Mobility	Rate of Physical Inactivity	County Health Rankings	Parish
	% with access to exercise opportunities	County Health Rankings	Parish
	No leisure-time physical activity among adults	CDC PLACES	Census Tract
	Mobility disability among adults	CDC PLACES	Census Tract
Other Risk Factors	% Long Commute (Driving Alone	County Health Rankings	Parish
	% Insufficient Sleep	County Health Rankings	Parish
	Sleeping less than 7 hours among adults	CDC Places	Census Tract

2. Evaluating Public Perceptions and Behaviors

The public outreach phase of this planning process included a low-barrier survey including a few concise, targeted questions about the major unsafe behaviors are required to understand:

1. How prevalent these behaviors are (self and/or others), and
2. To what extent respondents perceive these to be a problem in their community

In addition, the data was collected to facilitate stratification by basic sociodemographic characteristics, including, age, race, income, and zip code.

Target minimum sample sizes were established to enable greater likelihood of statistically valid inferences to be made about overall community priorities, as well as to identify differences in perspective among the three target parishes as well as, potentially, among different demographic sub-groups within the overall sample. The resulting outreach met or exceeded these targets in most cases (with the exception of survey response in many rural or low-population zip codes, among children, and among minority racial or ethnic identities representing a low share of the study area population), with an overall sample of 486 substantively completed responses out of a target 500 (Table 2).

Table 2. Summary of Survey Respondents by Parish

Parish	Total Respondents			Area Population (2020 Census)	Survey Response Rate
	Survey #	**Survey %**	**Sample Target**		
Tangipahoa	118	24.3%	100	153,666	0.08%
St John	110	22.6%	100	42,473	0.26%
St Tammany	247	50.8%	100	264,552	0.09%
Other	11	2.3%			
TOTAL	**486**		**500**		

Although it is not possible to predict in advance whether statistically significant findings will be evident in survey response, the overall goal of establishing targets is to ensure that the opinions and experiences of all groups – and particularly those more likely to be involved in traffic crashes – are highlighted, as well as to understand whether there are apparent differences in attitudes about safety among different groups to inform future outreach and intervention strategies. Where sample targets are met, it is more feasible to weight or extrapolate the data and amplify voices of chronically underrepresented groups. Where sample targets were not achieved, it may not be feasible to confidently make inferences based on the responses received. Broad, overall outreach findings were previously reported in the *NORPC SS4A Survey Results Analysis* memorandum (June 2024) compiled by ATG.

The following sections outline of this memo take these findings further, breaking out results by parish, various demographic groups, and zip code where sufficient data permits, and identify areas where individual group responses differ from the parish overall and/or total regional 3-parish sample, in order to identify potential areas where further research, strategy development, and/or safety countermeasures may be warranted.

Survey Responses by Parish

Overall, residents of all three parishes sampled indicate robust support for a Vision Zero policy, with an average of 74% in favor and 7% opposed to establishing an official policy, with the remainder indicating they are "unsure." Among policy skeptics, there appears to be slightly greater resistance in St. Tammany Parish to the Vision Zero concept (Table 3, Figure 15. Vision Zero Policy Support by ParishFigure 15).

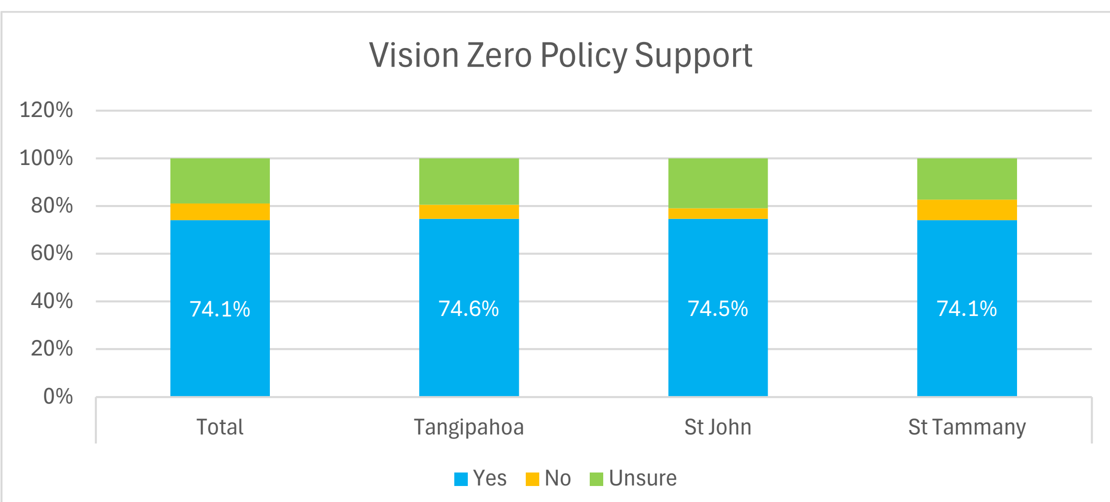
However, a Chi-Squared test (X^2=3.13, p-value=0.79) indicates a result that is not statistically significant. Thus, there is no significant difference in support for Vision Zero policy among these parishes.

Table 3. Policy Support by Parish

Do you think it is helpful to have a policy that establishes a vision of zero fatalities and serious injuries from traffic crashes?

	TOTAL		Tangipahoa		St John		St Tammany	
	#	%	#	%	#	%	#	%
Yes	360	74.1%	88	74.6%	82	74.5%	183	74.1%
No	34	7.0%	7	5.9%	5	4.5%	21	8.5%
Unsure	92	18.9%	23	19.5%	23	20.9%	43	17.4%
TOTAL	**486**		**118**		**110**		**247**	

Figure 15. Vision Zero Policy Support by Parish



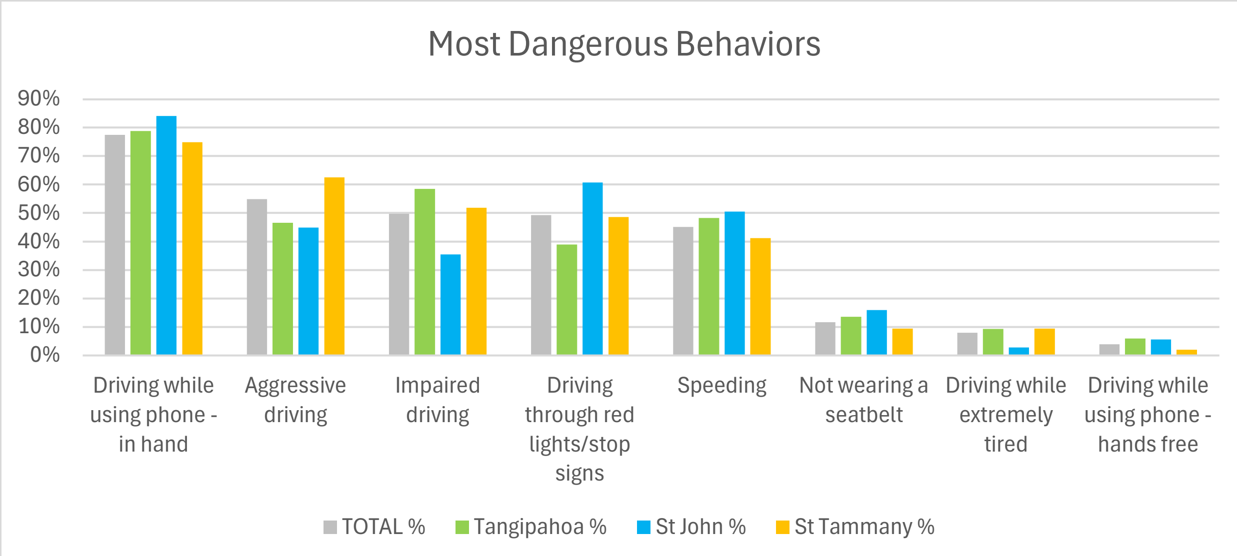
Overall, a majority of survey respondents indicated serious concern about the danger of distracted and aggressive driving. There appears to be a greater relative perception of danger around aggressive and impaired driving in St Tammany Parish, heightened concern about impairment in Tangipahoa, and more concern about disregard of traffic controls and speeding in St. John Parish (Table 4, Figure 16).

Table 4. Perception of Relative Level of Danger Associated with Driving Behaviors

Which of the following behaviors do you think are the most dangerous?

	TOTAL		Tangipahoa		St John		St Tammany	
	#	**%**	**#**	**%**	**#**	**%**	**#**	**%**
Driving while using phone - in hand	371	77.5%	93	78.8%	90	84.1%	182	74.9%
Aggressive driving	263	54.9%	55	46.6%	48	44.9%	152	62.6%
Impaired driving	238	49.7%	69	58.5%	38	35.5%	126	51.9%
Driving through red lights/stop signs	236	49.3%	46	39.0%	65	60.7%	118	48.6%
Speeding	216	45.1%	57	48.3%	54	50.5%	100	41.2%
Not wearing a seatbelt	56	11.7%	16	13.6%	17	15.9%	23	9.5%
Driving while extremely tired	38	7.9%	11	9.3%	3	2.8%	23	9.5%
Driving while using phone - hands free	19	4.0%	7	5.9%	6	5.6%	5	2.1%
TOTAL RESPONDING	**479**		**118**		**107**		**243**	

Figure 16. Most Dangerous Driving Behaviors by Parish



Inferential statistical testing indicates that there is some significant variation in these results among the three parishes, with significantly higher concern about aggressive driving in St Tammany Parish, about impaired driving in Tangipahoa Parish, and about driving through red lights or stop signs in St. John Parish:

- **Aggressive driving:** The result of a Chi-Squared test (X^2=14.56, p-value<0.05) is statistically significant. There is a difference in concerning the most dangerous behavior among these parishes. Residents in St Tammany Parish are more than expected to be concerned about aggressive driving.
- **Impaired driving:** The result of a Chi-Squared test (X^2=13.89, p-value<0.05) is statistically significant. There is a difference in concerning the most dangerous behavior among these parishes. Residents in Tangipahoa Parish are more than expected to be concerned about impaired driving. Residents in St John Parish are less than expected to be concerned about impaired driving.
- **Driving through red lights/stop signs:** The result of a Chi-Squared test (X^2=10.28, p-value<0.05) is statistically significant. There is a difference in concerning the most dangerous behavior among these parishes. Residents in John Parish are more than expected to be concerned about driving through red lights/stop signs. Residents in St Tangipahoa Parish are less than expected to be concerned about driving through red lights/stop signs.
- There is no statistical difference in other concerns among these parishes.

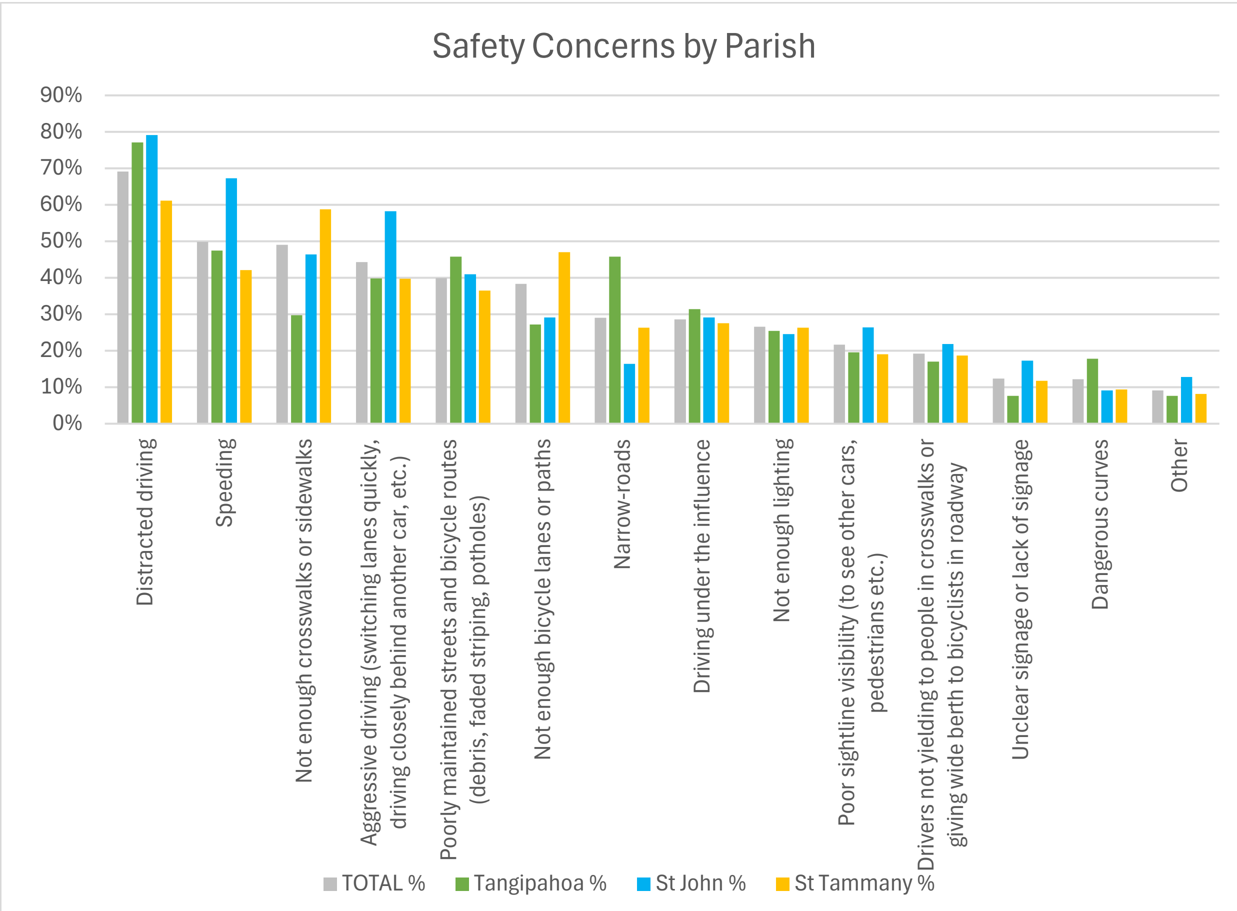
Top safety concerns, similarly, indicate that distracted driving is the dominant concern in all three parishes. Speeding and aggressive driving are a particular concern in St. John Parish, while pedestrian and bicyclist safety and accommodations are considered top priorities in St. Tammany Parish. In Tangipahoa, narrow roads and dangerous curves stand out as particular concerns among respondents (Table 5, Figure 17).

Table 5. Top Safety Concerns by Parish

What are your biggest safety concerns while traveling around your community?

	TOTAL		Tangipahoa		St John		St Tammany	
	#	%	#	%	#	%	#	%
Distracted driving	336	69.1%	91	77.1%	87	79.1%	151	61.1%
Speeding	242	49.8%	56	47.5%	74	67.3%	104	42.1%
Not enough crosswalks or sidewalks	238	49.0%	35	29.7%	51	46.4%	145	58.7%
Aggressive driving (switching lanes quickly, driving closely behind another car, etc.)	215	44.2%	47	39.8%	64	58.2%	98	39.7%
Poorly maintained streets and bicycle routes (debris, faded striping, potholes)	194	39.9%	54	45.8%	45	40.9%	90	36.4%
Not enough bicycle lanes or paths	186	38.3%	32	27.1%	32	29.1%	116	47.0%
Narrow-roads	141	29.0%	54	45.8%	18	16.4%	65	26.3%
Driving under the influence	139	28.6%	37	31.4%	32	29.1%	68	27.5%
Not enough lighting	129	26.5%	30	25.4%	27	24.5%	65	26.3%
Poor sightline visibility (to see other cars, pedestrians etc.)	105	21.6%	23	19.5%	29	26.4%	47	19.0%
Drivers not yielding to people in crosswalks or giving wide berth to bicyclists in roadway	93	19.1%	20	16.9%	24	21.8%	46	18.6%
Unclear signage or lack of signage	60	12.3%	9	7.6%	19	17.3%	29	11.7%
Dangerous curves	59	12.1%	21	17.8%	10	9.1%	23	9.3%
Other	44	9.1%	9	7.6%	14	12.7%	20	8.1%
TOTAL	**486**		**118**		**110**		**247**	

Figure 17. Top Safety Concerns by Parish



Inferential statistical testing indicates that there is some significant variation in several of these results among the three parishes as well:

- **Distracted driving:** The result of a Chi-Squared test (X^2=16.2, p-value<0.05) is statistically significant. There is a difference in the biggest safety concern of distracted driving among these parishes. Residents in Tangipahoa and St John Parishes are more likely to be concerned about distracted driving.
- **Speeding:** The result of a Chi-Squared test (X^2=21.86, p-value<0.05) is statistically significant. There is a difference in the biggest safety concern of speeding among these parishes. Residents in St John Parish are more likely to be concerned about speeding.
- **Aggressive driving**: The result of a Chi-Squared test (X^2=12.16, p-value<0.05) is statistically significant. There is a difference in the biggest safety concern of aggressive driving among these parishes. Residents in St John are more likely to be concerned about aggressive driving.

- **Not enough crosswalks or sidewalks:** The result of a Chi-Squared test (X^2=28.22, p-value<0.05) is statistically significant. There is a difference in the biggest safety concern of crosswalks or sidewalks among these parishes. Residents in St Tammany are more likely to be concerned about not enough crosswalks or sidewalks.
- **Not enough bicycle lanes or paths:** The result of a Chi-Squared test (X^2=19.27, p-value<0.05) is statistically significant. There is a difference in the biggest safety concern of bicycle lanes or paths among these parishes. Residents in St Tammany are more likely to be concerned about not enough bicycle lanes or paths.
- **Narrow-roads:** The result of a Chi-Squared test (X^2=25.78, p-value<0.05) is statistically significant. There is a difference in the biggest safety concern of narrow roads among these parishes. Residents in Tangipahoa are more likely to be concerned about narrow roads.
- **Dangerous curves:** The result of a Chi-Squared test (X^2=17.80, p-value<0.05) is statistically significant. There is a difference in the biggest safety concern of dangerous curves among these parishes. Residents in Tangipahoa are more likely to be concerned about dangerous curves.

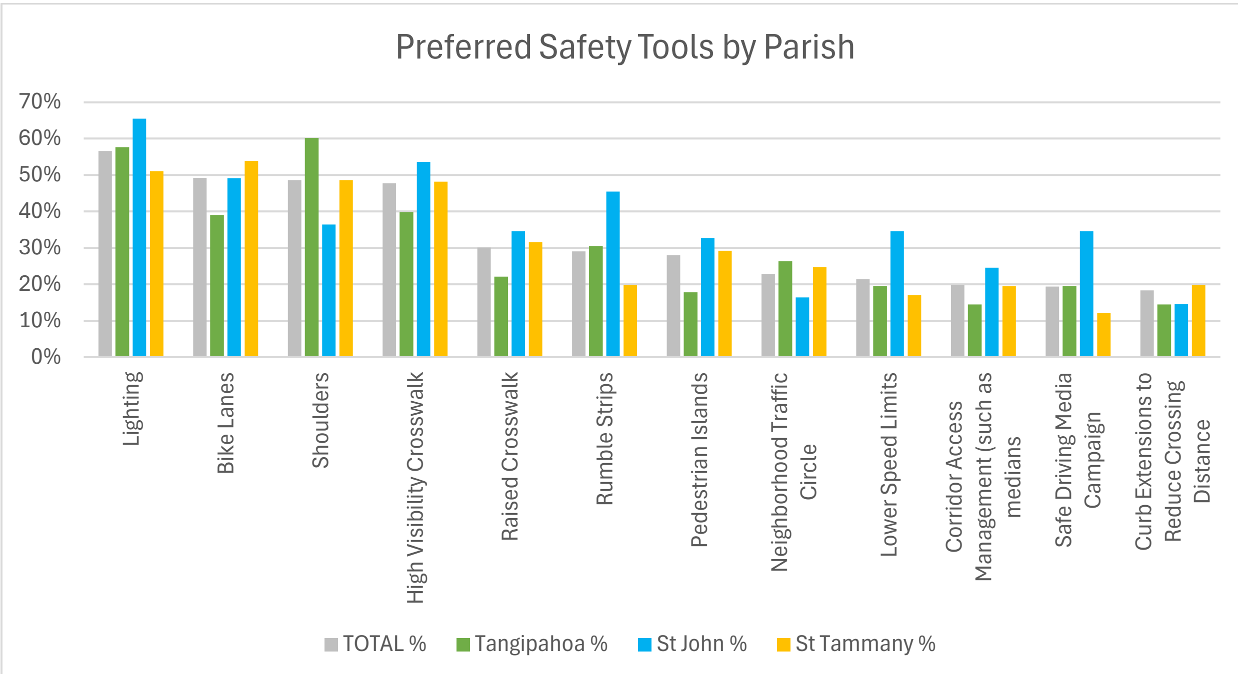
Potential tools and strategies for addressing these concerns also vary by community. St. John Parish respondents indicate opportunities to improve lighting and pedestrian facilities, while focusing on speed management and lane departures (e.g. by adding rumble strips). St. John also indicates the strongest support for media campaigns targeting road user behavior. In Tangipahoa parish, significant demand for improved shoulders and lighting is indicated. In St. Tammany, there is relatively little interest in safety campaigns or speed limit reductions, but strong demand for bicycle and pedestrian infrastructure enhancements (Table 6, Figure 18).

Table 6. Preferred Safety Tools by Parish

Which safety tools would you like to see in your neighborhood?

	TOTAL		Tangipahoa		St John		St Tammany	
	#	%	#	%	#	%	#	%
Lower Speed Limits	104	21.4%	23	19.5%	38	34.5%	42	17.0%
High Visibility Crosswalk	232	47.7%	47	39.8%	59	53.6%	119	48.2%
Bike Lanes	239	49.2%	46	39.0%	54	49.1%	133	53.8%
Raised Crosswalk	146	30.0%	26	22.0%	38	34.5%	78	31.6%
Curb Extensions to Reduce Crossing Distance	89	18.3%	17	14.4%	16	14.5%	49	19.8%
Pedestrian Islands	136	28.0%	21	17.8%	36	32.7%	72	29.1%
Neighborhood Traffic Circle	111	22.8%	31	26.3%	18	16.4%	61	24.7%
Corridor Access Management (such as medians	96	19.8%	17	14.4%	27	24.5%	48	19.4%
Rumble Strips	141	29.0%	36	30.5%	50	45.5%	49	19.8%
Shoulders	236	48.6%	71	60.2%	40	36.4%	120	48.6%
Lighting	275	56.6%	68	57.6%	72	65.5%	126	51.0%
Safe Driving Media Campaign	94	19.3%	23	19.5%	38	34.5%	30	12.1%
TOTAL	**486**		**118**		**110**		**247**	

Figure 18. Preferred Safety Tools by Parish



Statistical testing reveals several results which are significant, in terms of differing priorities among parishes:

- **Rumble strips:** The result of a Chi-Squared test (X^2=28.14, p-value<0.05) is statistically significant. There is a difference in the safety tool of rumble strips among these parishes. Residents in St John are more likely to support rumble strips.
- **Safe driving media campaign:** The result of a Chi-Squared test (X^2=24.94, p-value<0.05) is statistically significant. There is a difference in the safety tool of safe driving media campaign among these parishes. Residents in St John are more likely to support a safe driving media campaign.
- **Lower speed limits**: The result of a Chi-Squared test (X^2=15.39, p-value<0.05) is statistically significant. There is a difference in the safety tool of lower speed limits among these parishes. Residents in St John are more likely to support lower speed limits.
- **Lighting:** The result of a Chi-Squared test (X^2=9.55, p-value<0.05) is statistically significant. There is a difference in the safety tool of lighting among these parishes. Residents in St John are more likely to support lighting enhancements.
- **Shoulder enhancements:** The result of a Chi-Squared test (X^2=12.96, p-value<0.05) is statistically significant. There is a difference in the safety tool of shoulders among these parishes. Residents in Tangipahoa are more likely to support shoulder enhancements.

- **Pedestrian islands:** The result of a Chi-Squared test (X^2=14.41, p-value<0.05) is statistically significant. There is a difference in the safety tool of pedestrian islands among these parishes. Residents in St John and St Tammany are more likely to support pedestrian islands.
- **Curb extensions:** The result of a Chi-Squared test (X^2=17.74, p-value<0.05) is statistically significant. There is a difference in the safety tool of curb extensions among these parishes. Residents in St Tammany are more likely to support curb extensions.

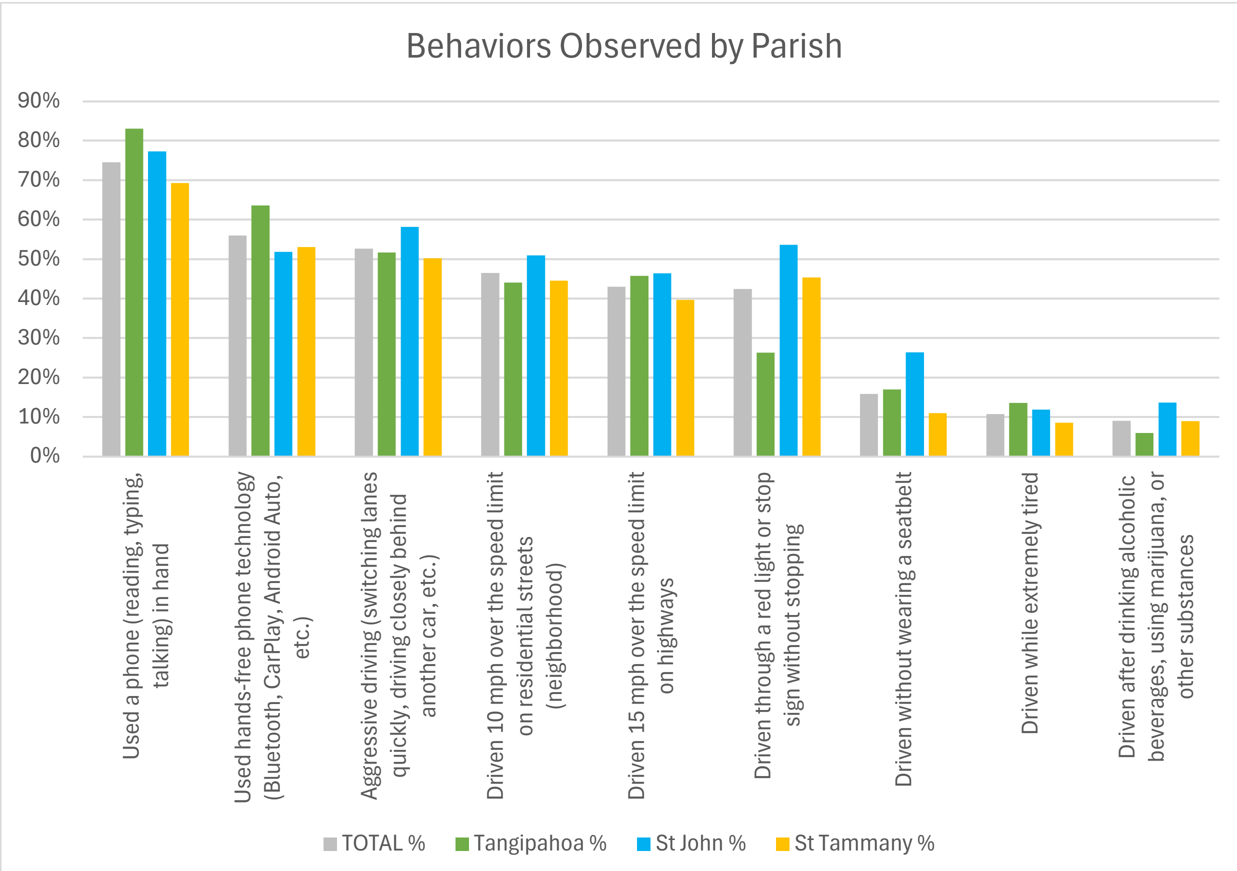
In terms of road user behaviors observed (including both those respondents may have engaged in themselves, or observed others doing), distracted driving again was widely observed everywhere, with a slight increase in reported incidence in Tangipahoa Parish. Aggressive driving and disregard of traffic control devices are widely reported in St. John Parish, which also reported lower levels of seatbelt use and higher incidence of observed impaired driving (Table 7, Figure 19).

Table 7. Behaviors Observed or Engaged in by Parish

Over the past week, which of the following behaviors have you personally done or observed others doing while driving?

	TOTAL		Tangipahoa		St John		St Tammany	
	#	%	#	%	#	%	#	%
Used a phone (reading, typing, talking) in hand	362	74.5%	98	83.1%	85	77.3%	171	69.2%
Used hands-free phone technology (Bluetooth, CarPlay, Android Auto, etc.)	272	56.0%	75	63.6%	57	51.8%	131	53.0%
Driven 15 mph over the speed limit on highways	209	43.0%	54	45.8%	51	46.4%	98	39.7%
Driven 10 mph over the speed limit on residential streets (neighborhood)	226	46.5%	52	44.1%	56	50.9%	110	44.5%
Driven through a red light or stop sign without stopping	206	42.4%	31	26.3%	59	53.6%	112	45.3%
Aggressive driving (switching lanes quickly, driving closely behind another car, etc.)	256	52.7%	61	51.7%	64	58.2%	124	50.2%
Driven while extremely tired	52	10.7%	16	13.6%	13	11.8%	21	8.5%
Driven after drinking alcoholic beverages, using marijuana, or other substances	44	9.1%	7	5.9%	15	13.6%	22	8.9%
Driven without wearing a seatbelt	77	15.8%	20	16.9%	29	26.4%	27	10.9%
TOTAL	**486**		**118**		**110**		**247**	

Figure 19. Behaviors Observed by Parish



Statistically significant differences among the three parishes emerge on only two behaviors observed: driving through red lights/stop signs, and driving without a seatbelt:

- **Driven through a red light or stop sign:** The result of a Chi-Squared test (X^2=19.30, p-value<0.05) is statistically significant. There is a difference in the observed behavior of driving through a red light or stop sign among these parishes. Residents in St Tammany and St John are more likely to observe the behavior of driving through a red light or stop sign.
- **Driven without wearing a seatbelt:** The result of a Chi-Squared test (X^2=14.09, p-value<0.05) is statistically significant. There is a difference in the observed behavior of driving without wearing a seatbelt among these parishes. Residents in St John are more likely to observe the behavior of driving without wearing a seatbelt.

To check whether a sufficient sample of mobility needs in the study area is represented, respondents were asked to indicate their primary mode of transportation. Most respondents in all three parishes principally drive for transportation. A handful report walking or using a mobility device, carpooling, using bicycles, or some form of transit service. While this is reasonably consistent with overall parish mode share estimates which indicate that most residents of these three parishes commute to work by driving, the sample likely underrepresents people who rely on alternate means of getting around, particularly those who carpool (estimated at 11% of commute trips in St. Tammany Parish, for example[1]), or regularly utilize taxis or motorcycles.

There is no statistically significant difference in travel modes observed in the sample among these parishes.

Table 8. Primary Mode of Transportation by Parish

What is your primary mode of transportation in a typical week?

	TOTAL		Tangipahoa		St John		St Tammany	
	#	%	#	%	#	%	#	%
Personal Vehicle	444	97.6%	111	94.9%	100	99.0%	222	98.2%
Walking or rolling (wheelchair)	6	1.3%	4	3.4%	1	1.0%	1	0.4%
Carpool with coworkers/friends, etc.	2	0.4%	0	0.0%	0	0.0%	2	0.9%
Bicycle	1	0.2%	0	0.0%	0	0.0%	1	0.4%
Public Transportation (Bus/Van)	1	0.2%	1	0.9%	0	0.0%	0	0.0%
Shared Mobility/E-scooters	1	0.2%	1	0.9%	0	0.0%	0	0.0%
Ride share (Uber, Lyft, Taxi, etc.)	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Motorcycle	0	0.0%	0	0.0%	0	0.0%	0	0.0%
TOTAL RESPONDING	**455**		**117**		**101**		**226**	

[1] American Community Survey 2022 1-year estimates Table S0801

Finally, respondents were also asked to report where they work (if applicable). The overwhelming majority of St. Tammany and Tangipahoa respondents work in the same parish in which they reside. However, a notable share of St. John the Baptist Parish residents work outside the parish, indicating an elevated need for regional collaboration with neighboring parishes.

Table 9. Respondent Home and Work Locations

	Work Parish													
	TOTAL		**Tangipahoa**		**St. Tammany**		**St. John the Baptist**		**Other**		**Does not work**		**No Response**	
Home Parish	**#**	**%**	**#**	**%**	**#**	**%**	**#**	**%**	**#**	**%**	**#**	**%**	**#**	**%**
TOTAL	446		110		175		67		*58*		36		40	
Tangipahoa	112	25.1%	99	88.4%	5	4.5%	3	2.7%	*4*	3.6%	1	0.9%	6	5.4%
St John	94	21.1%	0	0.0%	1	1.1%	59	62.8%	*16*	17.0%	18	19.1%	16	17.0%
St Tammany	230	51.6%	7	6.4%	169	73.5%	0	0.0%	*37*	16.1%	17	7.4%	17	7.4%
Other	10	2.2%	4	40.0%	0	0.0%	5	50.0%	*1*	10.0%	0	0.0%	1	10.0%

Survey Responses by Age

Next, survey responses were analyzed by age group, to identify potential differences in perceptions, norms, behaviors, and priorities among older and younger drivers. As discussed above, both groups are of particular concern due to overrepresentation in the crash data, with certain risk factors or behaviors associated with young drivers in particular. None of the survey respondents were 14 years old or younger, and teens and young adults are underrepresented overall, and particularly in St. John Parish. Older adults (65+) are also underrepresented relative to their share of the population in all three parishes. These results are typical for a principally online survey effort, but indicate a need to evaluate and potentially weight the responses of underrepresented groups. In addition, these may indicate areas where future outreach is needed.

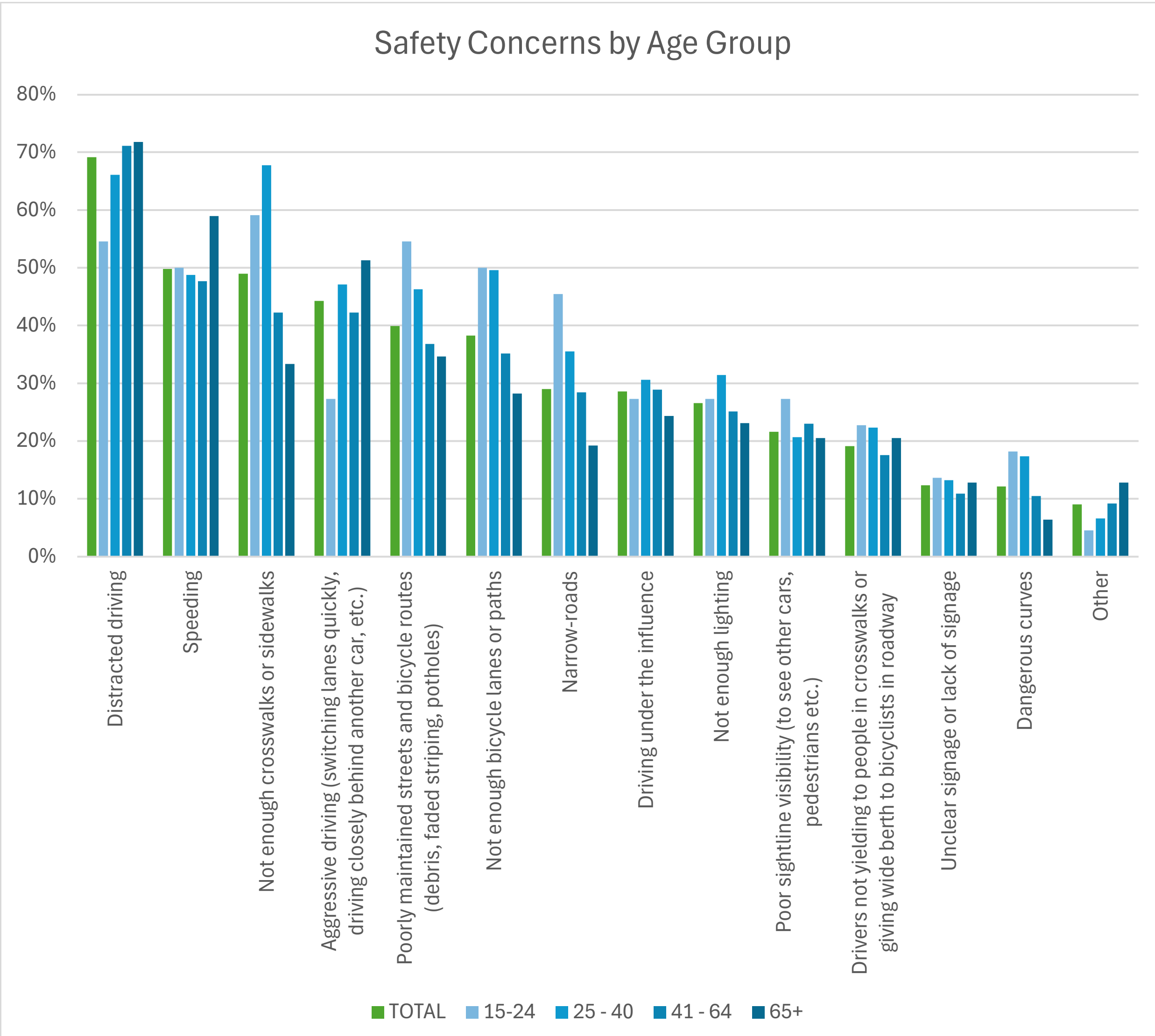
Table 10. Age Distribution of Survey Respondents and Parish Population

	Total			Tangipahoa			St John			St Tammany		
	Survey #	Survey %	Sample Target	Survey #	Survey %	2022 ACS Estimates	Survey #	Survey %	2022 ACS Estimates	Survey #	Survey %	2022 ACS Estimates
14 or younger	0	0.0%	20	0	0.0%	17.8%	0	0.0%	19.6%	0	0.0%	18.8%
15-24	22	4.8%	20	7	6.0%	10.8%	1	1.0%	14.2%	14	6.1%	12.0%
25 - 40	121	26.2 %	20	32	27.4 %	20.2%	11	10.6 %	24.5%	71	31.1 %	19.0%
41 - 64	240	52.1 %	20	63	53.8 %	31.2%	64	61.5 %	26.9%	110	48.2 %	31.1%
65+	78	16.9 %	20	15	12.8 %	20.1%	28	26.9 %	14.7%	33	14.5 %	18.7%
TOTAL RESPONSES	**461**			**117**			**104**			**228**		

*Data source: U.S. Census Bureau. "Age and Sex." American Community Survey, ACS 1-Year Estimates Subject Tables, Table S0101, 2022; *note ACS age category break down does not align for St John due to smaller sample size; ACS tables consolidate: 25 - 44; 45 – 64*

Despite apparent overrepresentation of young drivers in crashes flagged as distracted/inattentive, younger adults tend to report being less concerned than older groups about distracted driving. Rather, they report greater concern about the safety and availability of bicycle and pedestrian infrastructure, and about narrow roads. Conversely, older adults are highly concerned with distracted and aggressive driving behaviors (Figure 20).

Figure 20. Safety Concerns by Age Group



Statistical analysis indicates significant variation among age groups for three topics:

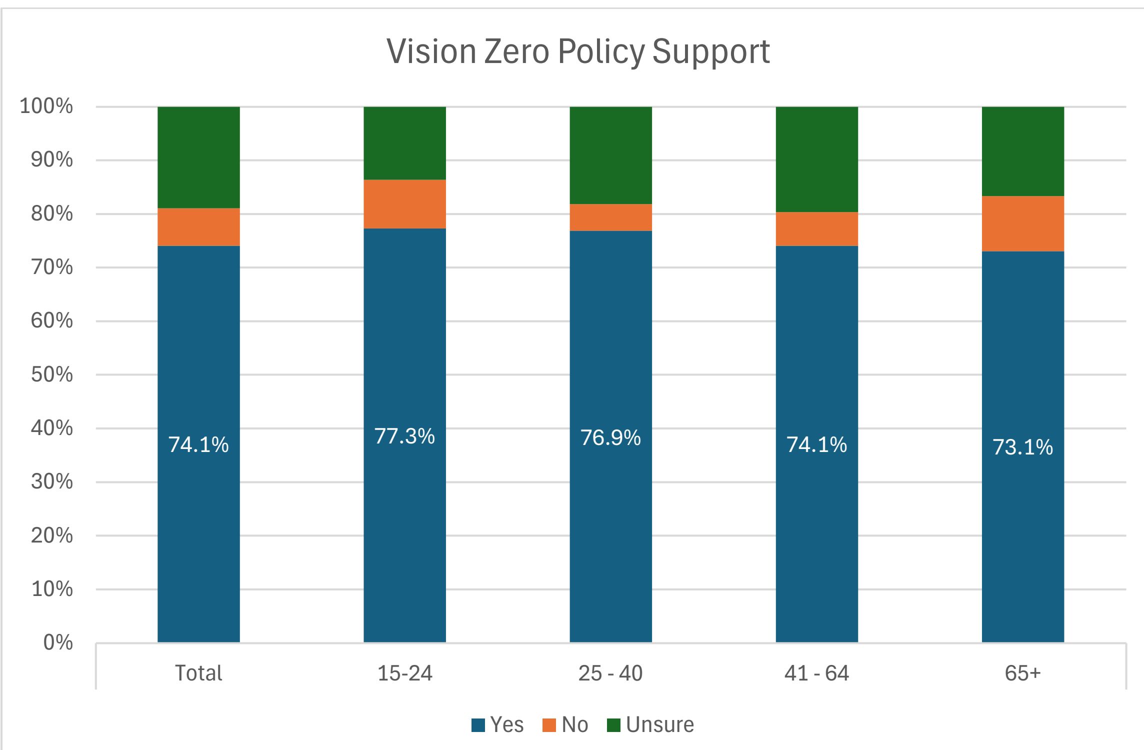
- **Not enough crosswalks and sidewalks:** The result of a Chi-Squared test (X^2=31.60, p-value<0.05) is statistically significant. There is a difference in the safety concern of not enough crosswalks and sidewalks among age groups. The age groups of 25-40 (and 15-24) are more likely to be concerned about not enough crosswalks and sidewalks.
- **Not enough bicycle lanes or paths:** The result of a Chi-Squared test (X^2=12.32, p-value<0.05) is statistically significant. There is a difference in the safety concern of not enough bicycle lanes or

paths among age groups. The age groups of 15-24 and 25-40 are more likely to be concerned about not enough bicycle lanes or paths.

- **Narrow roads:** The result of a Chi-Squared test (X^2=10.26, p-value<0.05) is statistically significant. There is a difference in the safety concern of narrow roads. The age groups of 15-24 and 25-40 are more likely to be concerned about narrow roads.

In terms of support for formally adopting a vision zero approach, there was minimal variation observed among age groups, but slightly more skepticism reported among the oldest and youngest respondents (Figure 21). There is no statistical difference in Vision Zero policy support observed in the sample among different age groups.

Figure 21. Vision Zero Policy Support by Age Group

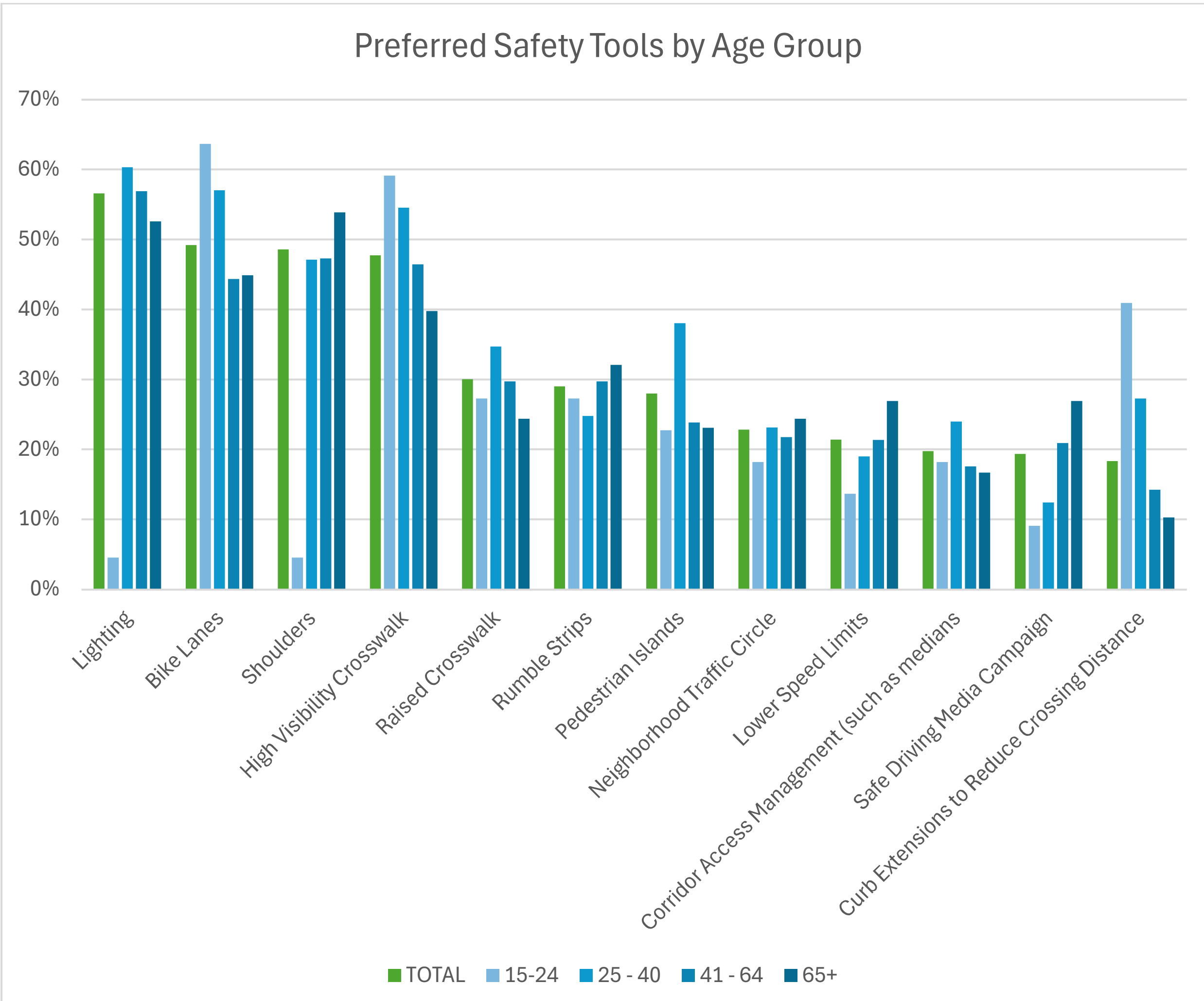


In terms of potential countermeasures, younger adults also indicated less emphasis on improving lighting and roadway shoulders, and a relative lack of interest in speed limit reduction or safety-focused campaigns. Instead, they indicate a preference for features that enhance walkability and bikeability like curb extensions, bike lanes, and crosswalks. Older adults indicate a preference for enhanced shoulders and rumble strips (potentially indicating concern about roadway departure crashes), and would like to see lower speed limits and safety campaigns implemented (Figure 22).

Statistical analysis indicates a significant finding for only one safety tool, Curb extensions:

- **Support for Curb Extensions:** The result of a Chi-Squared test (X^2=20.07, p-value<0.05) is statistically significant. The age groups of 15-24 and 25-40 are expected to more strongly support curb extensions as a safety countermeasure.

Figure 22. Preferred Safety Tools by Age Group

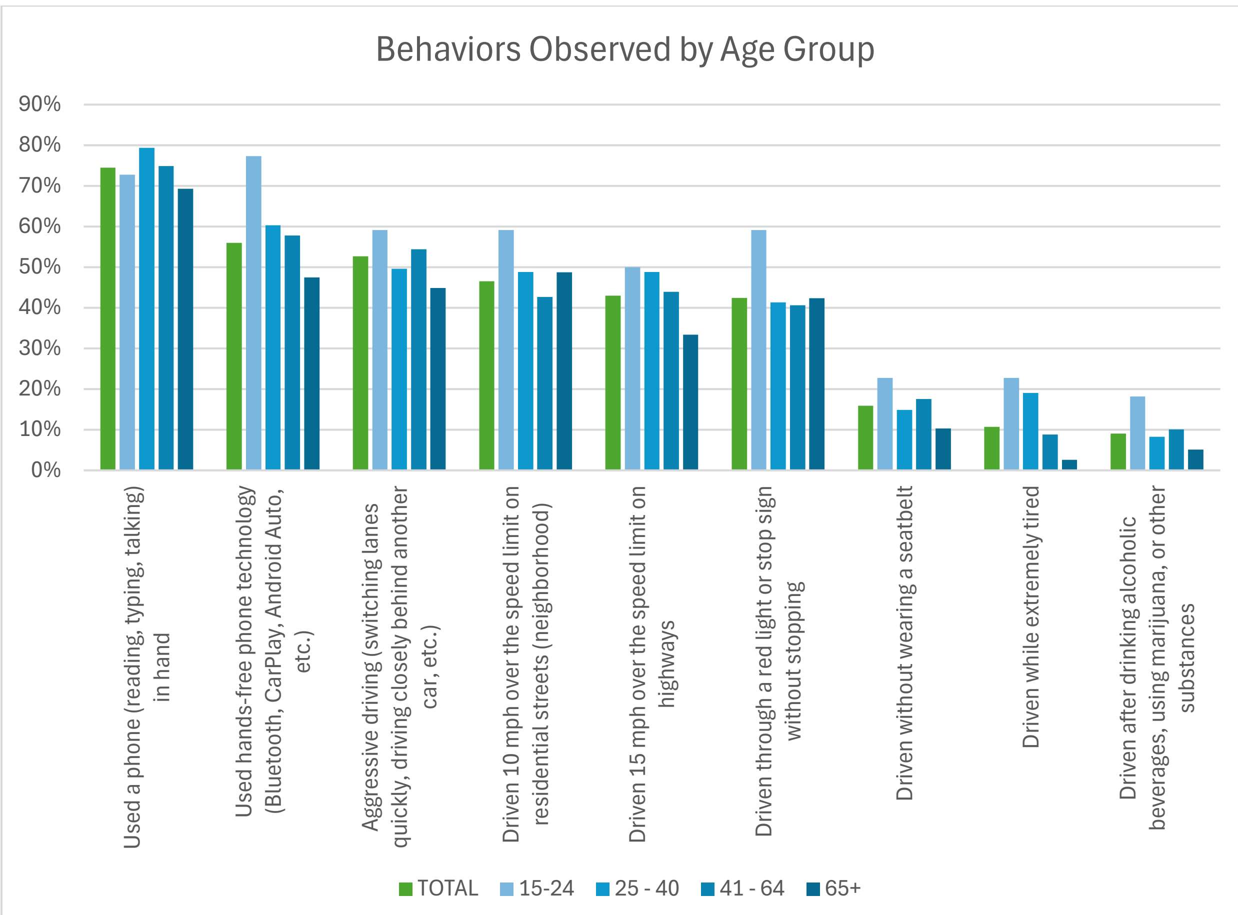


All age groups reported widespread observation of people using their phone (and/or admit to doing so themselves). Young adults report widespread use of hands-free technologies, as well as frequent disregard of traffic controls and speeding. They are also more likely to report observation of lack of restraint use, fatigued driving, and impaired driving. Older adults report lower observed incidence of extreme speeding than other groups, less use of hands-free technology, and less driving while fatigued or impaired (Figure 23). Because the questions were asked to allow for both observed and self-reported behaviors, it is unclear to what extent these findings reflect timing or duration of driving activities, perceptions of peer behaviors, or the respondents' own actions.

Statistical analysis indicates a significant finding for only one observed behavior: driving while extremely tired.

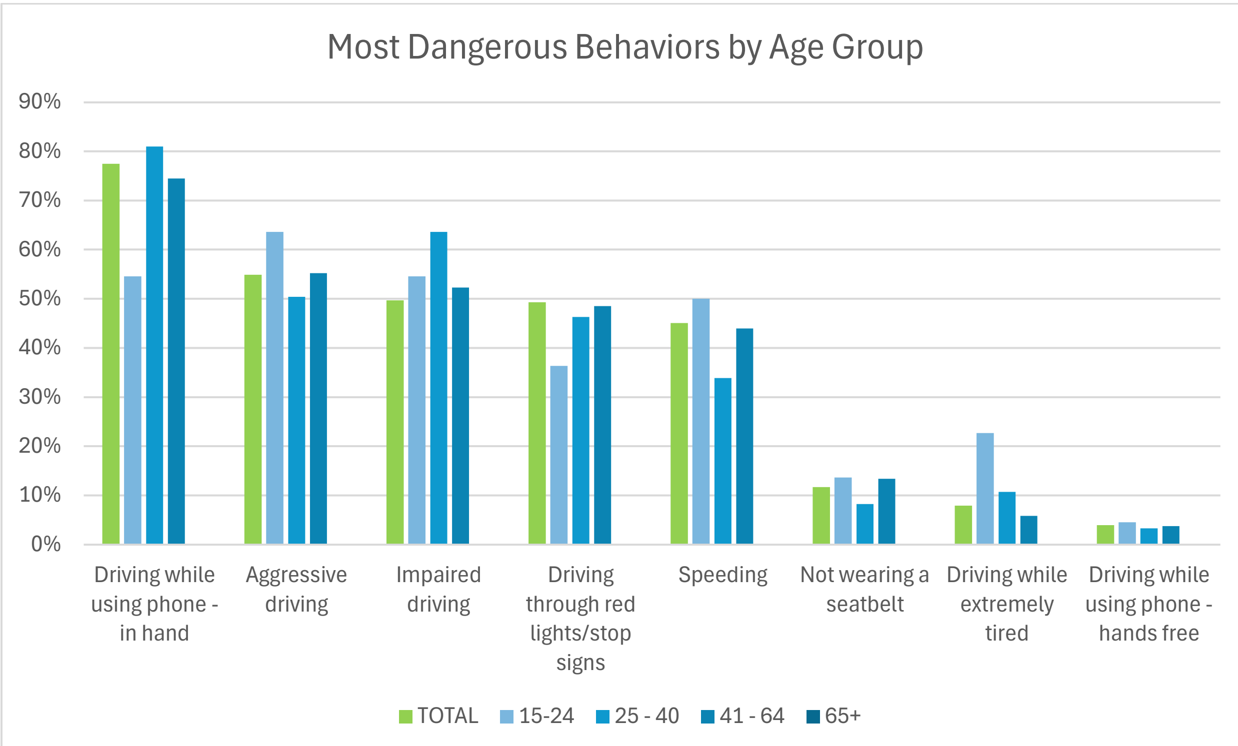
- **Fatigued Driving:** A Chi-Squared test (X^2=19.67, p-value<0.05) is statistically significant, and the age groups of 15-24 and 25-40 are expected to observe the behavior of driving while extremely tired more than other groups.

Figure 23. Behaviors Observed by Age Group



A clear gap exists between younger and older respondents regarding phone use, with the former much less likely to perceive phone-related distractions as a safety threat. Younger respondents also indicate heightened concern about aggressive driving, speeding, and fatigue. Older adults tend to be more concerned about disregard of traffic control and speeding. No age group indicates a perception that using hands-free technology for phones is a significant safety concern (Figure 24).

Figure 24. Most Dangerous Behaviors by Age Group

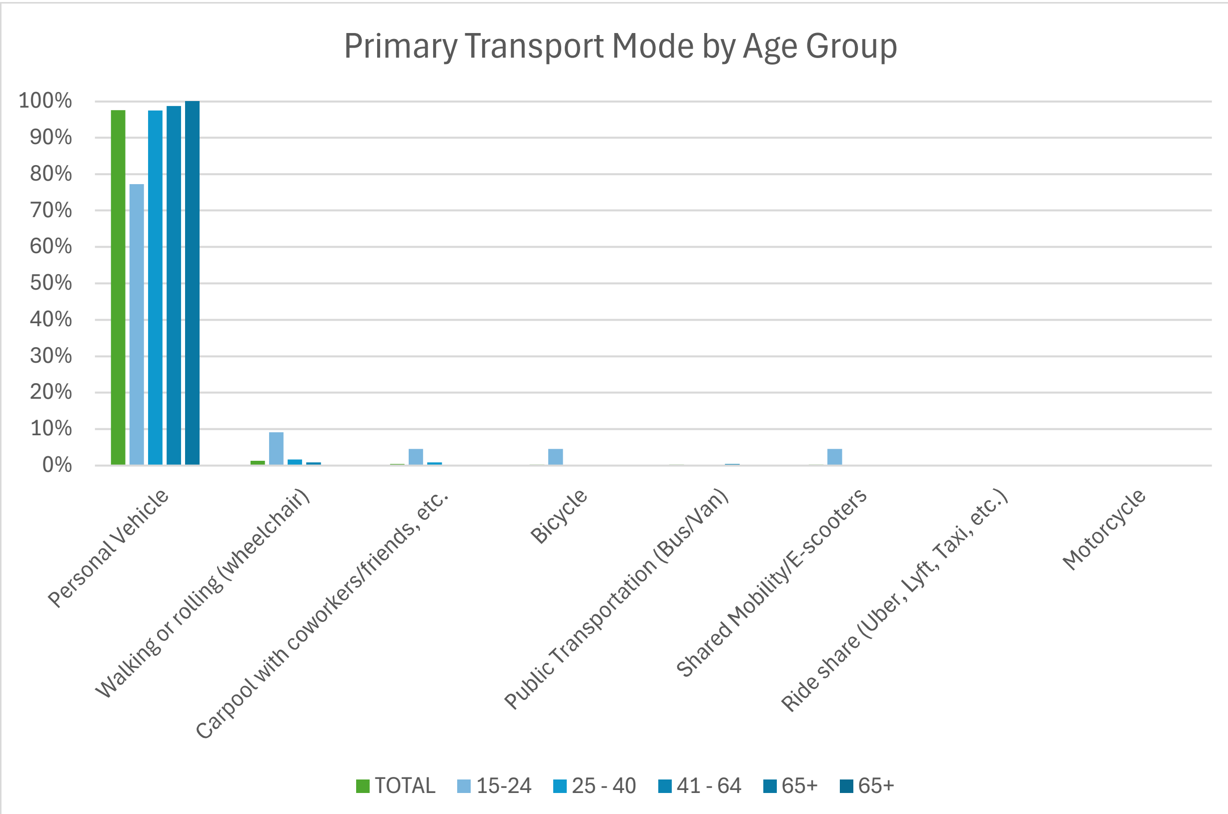


Statistical testing indicates significant results by age group for several behaviors:

- **Impaired driving:** The result of a Chi-Squared test (X^2=39.86, p-value<0.05) is statistically significant. There is a difference in the most dangerous behavior of impaired driving. The age group of 41-64 is more likely to think impaired driving is more dangerous.
- **Speeding:** The result of a Chi-Squared test (X^2=16.81, p-value<0.05) is statistically significant. There is a difference in the most dangerous behavior of speeding. The age groups of 15-24 and 65+ are more likely to think speeding is more dangerous.
- **Driving while extremely tired:** The result of a Chi-Squared test (X^2=11.7, p-value<0.05) is statistically significant. There is a difference in the most dangerous behavior of driving while extremely tired. The age group of 15-24 is more likely to think driving while extremely tired is very dangerous.

Finally, an important divergence is noted in primary transport mode by age group. While the majority of all respondents indicate they mainly drive their own vehicle, over 20% of the youngest respondents typically utilize alternate modes (Figure 25). This may contribute to a heightened prioritization of pedestrian and bicycle-supportive infrastructure as noted above. Due to low sample sizes representing modes other than driving, no statistically significant differences in these findings are present.

Figure 25. Primary Transport Mode by Age Group



Survey Responses by Gender

As noted in the crash data summary, men tend to be more likely to be involved in traffic crashes, particularly those involving risky behaviors like distracted driving, impairment, or lack of occupant protection. Evaluated based on respondent gender, women are substantially overrepresented in the survey sample overall in all three parishes (Table 11). Overall, women report being slightly more concerned about pedestrian infrastructure, as well as lighting and sightline visibility. Men report greater concern with distracted driving, disregard of traffic controls, and maintenance issues (Figure 26). Men also indicate somewhat less support overall for the vision zero policy approach (Figure 27).

Statistically significant differences in survey results were observed for two topics:

- **Not enough crosswalks or sidewalks:** The result of a Chi-Squared test (X^2=12.26, p-value<0.05) is statistically significant. There is a difference in the safety concern of not enough crosswalks or sidewalks. Women are expected to be more concerned about inadequate pedestrian facilities.
- **Distracted driving:** The result of a Chi-Squared test (X^2=6.74, p-value<0.05) is statistically significant. There is a difference in the safety concern of distracted driving. Men are expected to be more concerned about distracted driving.

There is no statistical difference in Vision Zero policy support observed in the sample between genders.

Table 11. Survey Responses and Population by Gender

	TOTAL			Tangipahoa			St John			St Tammany		
	Survey #	Survey %	Sample Target	Survey #	Survey %	2022 ACS Estimates	Survey #	Survey %	2022 ACS Estimates	Survey #	Survey %	2022 ACS Estimates
Female	305	67.8%	20	67	59.8%	51.8%	67	65.0%	51.0%	164	73.5%	50.7%
Male	142	31.6%	20	44	39.3%	48.2%	36	35.0%	49.0%	58	26.0%	49.3%
Other	3	0.7%		1	0.9%		0	0.0%		1	0.4%	
Prefer not to respond/No Response	15	3.3%		4	3.6%		2	1.9%		9	4.0%	
TOTAL RESPONSES	**450**			**112**			**103**			**223**		

Data Source: U.S. Census Bureau. "Age and Sex." American Community Survey, ACS 1-Year Estimates Subject Tables, Table S0101, 2022

Figure 26. Safety Concerns by Gender

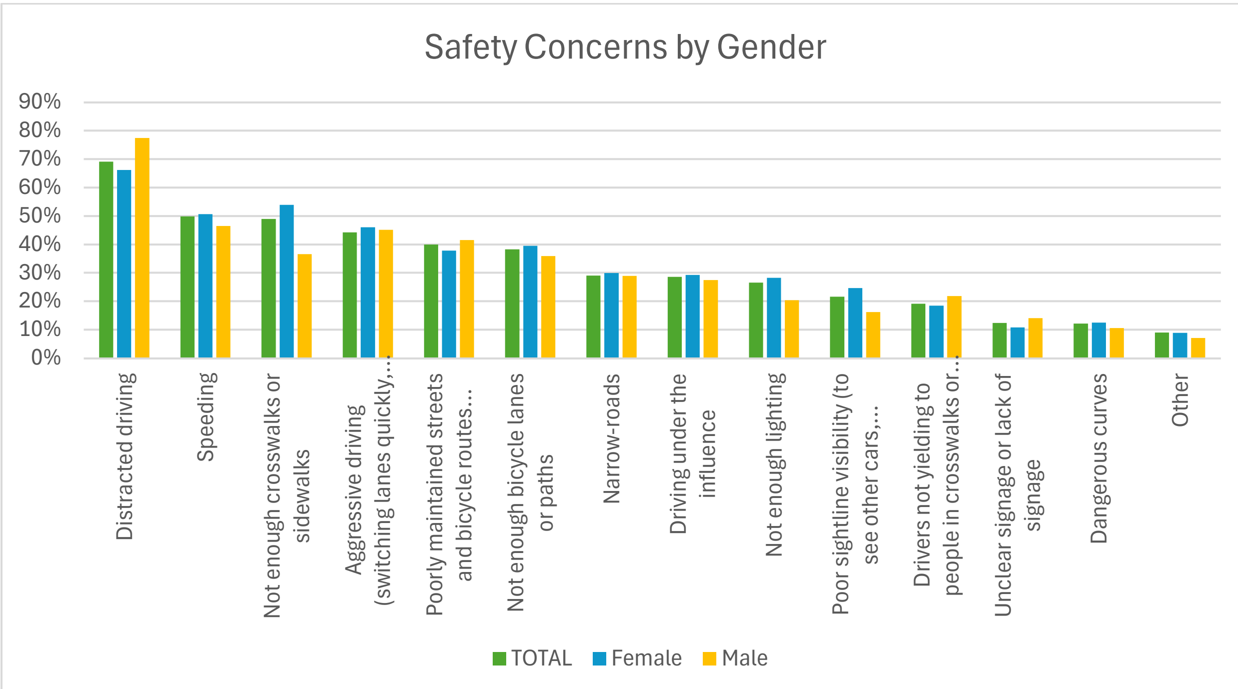
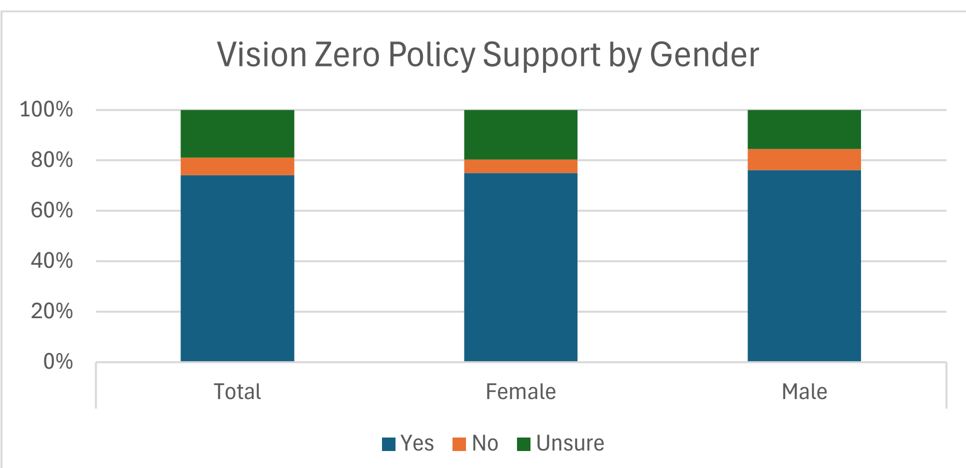
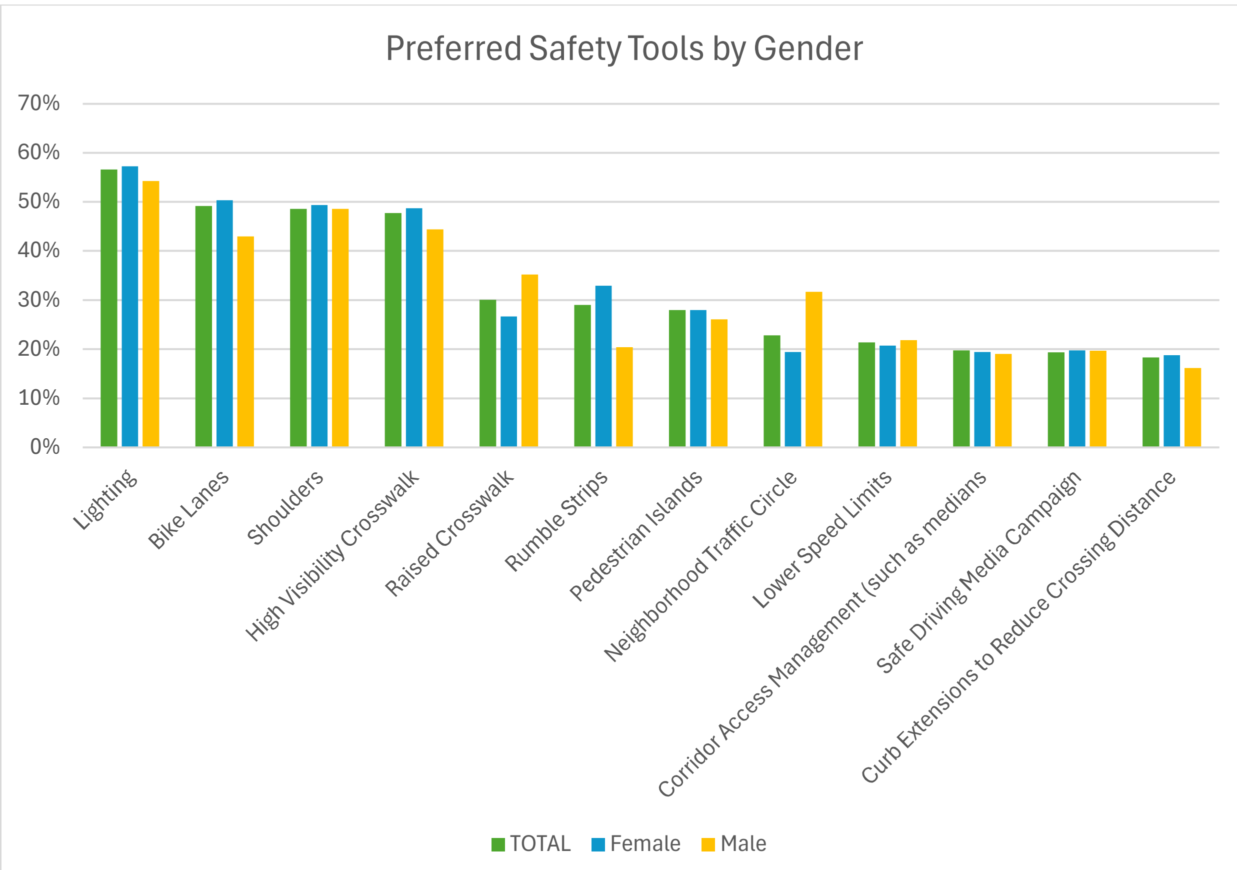


Figure 27. Vision Zero Policy Support by Gender



Women also indicate a stronger interest in bicycle infrastructure (although this difference is not statistically significant), whereas men report a greater interest in engineering countermeasures that are regionally less familiar such as raised crosswalks and neighborhood traffic circles (Figure 28). Male respondents' interest in neighborhood traffic circles in particular was found to be pronounced, with a Chi-Squared test (X^2=8.99, p-value<0.05) that is statistically significant. Conversely, women were found to have a statistically significant preference for rumble strips via Chi-Squared test (X^2=7.33, p-value<0.05).

Figure 28. Preferred Safety Tools by Gender



Men tend to report higher observed rates of hands-on phone use, as well as more frequent disregard of traffic controls, lack of restraint use, and more fatigued driving (Figure 29). However while they also report phone use and aggressive driving as top safety concerns, men appear to be less worried about seatbelt usage (Figure 30). These differences however are relatively small and not statistically significant within the sample. Very little overall difference in transportation mode is observed between male and female respondents (Figure 31).

Figure 29. Behaviors Observed by Gender

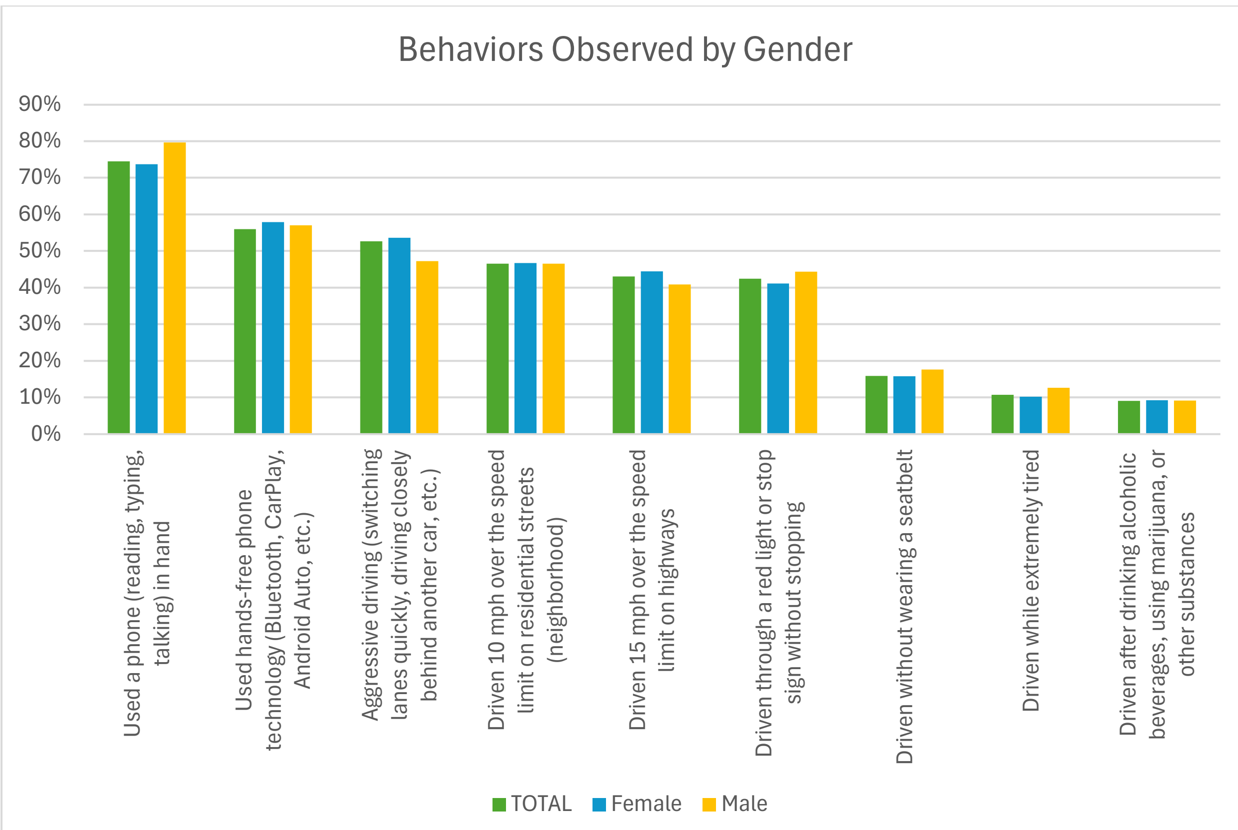


Figure 30. Most Dangerous Behaviors by Gender

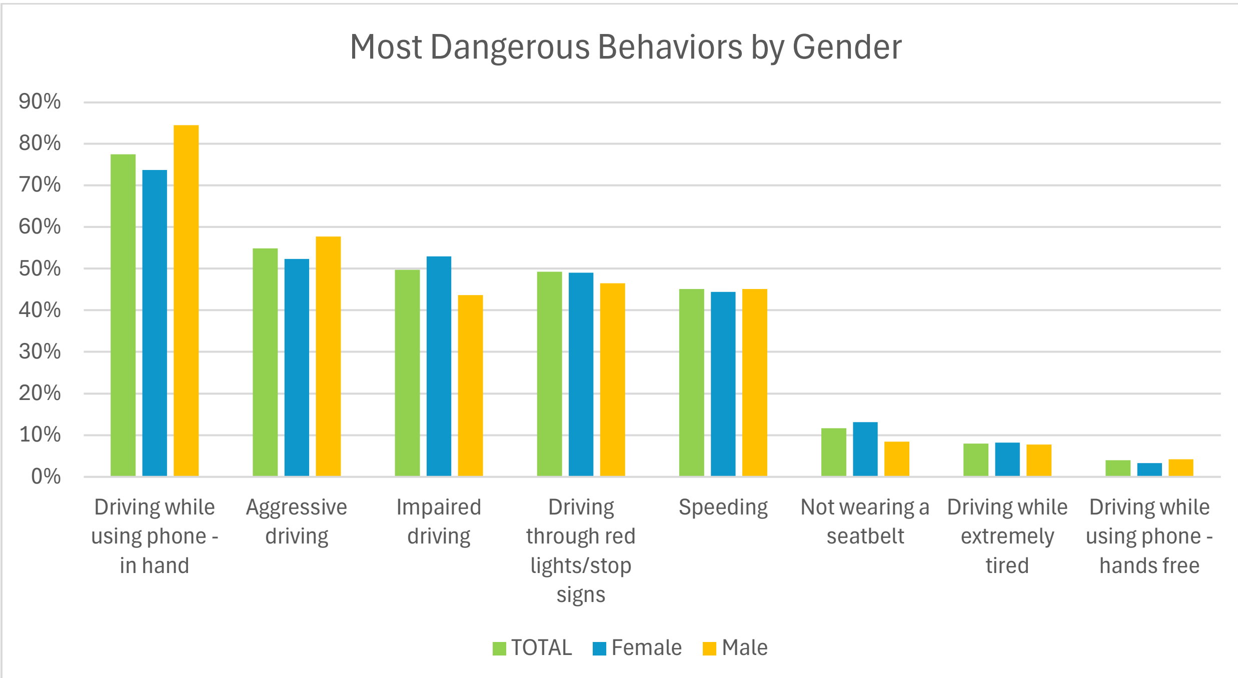
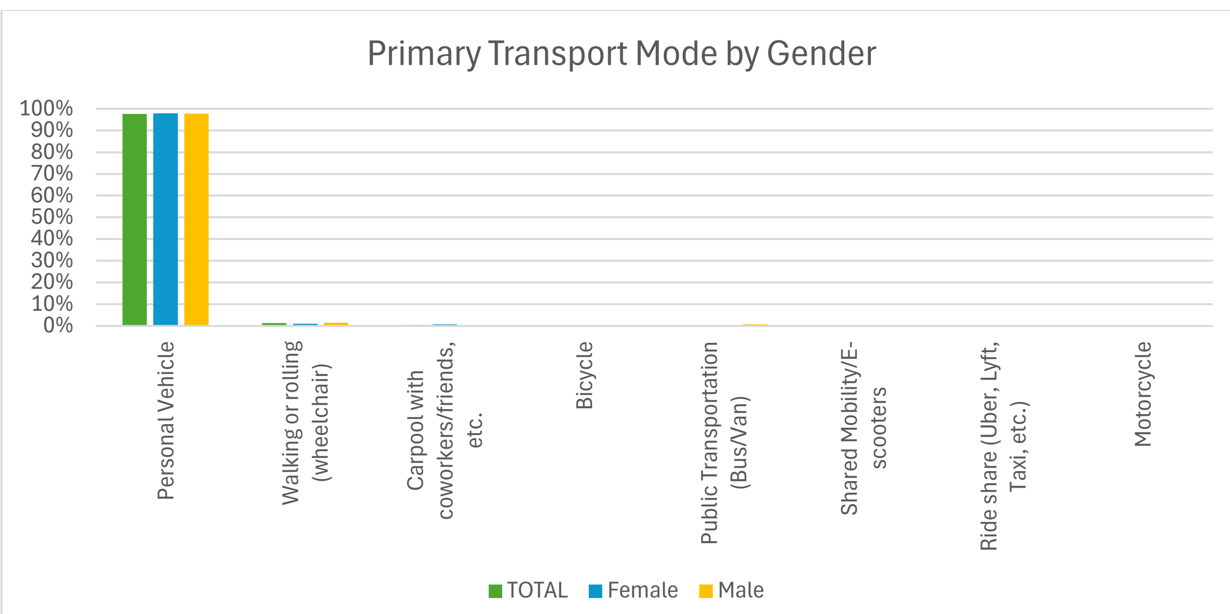


Figure 31. Primary Transport Mode by Gender



Survey Responses by Race

Crash data indicates that race is an important factor in transportation safety outcomes, with minority populations often overrepresented in injury and fatality statistics due to a wide range of factors. Black residents were underrepresented in the survey sample relative to their population, particularly in St. Tammany and Tangipahoa parish. Other minorities are likewise generally underrepresented, and there was minimal participation from populations identifying as Hispanic or Latino (regardless of race).

Table 12. Survey Respondents and Population by Race or Ethnicity

	TOTAL			Tangipahoa			St John			St Tammany		
	Survey #	Survey %	Sample Target	Survey #	Survey %	2022 ACS Estimates	Survey #	Survey %	2022 ACS Estimates	Survey #	Survey %	2022 ACS Estimates
Am Indian or Alaskan Native	4	0.9%	20	2	1.9%	3.4%	1	1.0%	0.90%	1	0.5%	2.6%
Asian	6	1.4%	20	3	2.8%	1.0%	0	0.0%	1.50%	3	1.5%	2.4%
Black/African American	61	14.4%	20	10	9.3%	29.0%	42	43.3%	58.60%	7	3.4%	15.4%
Hispanic or Latino/a/x	3	0.7%	20	0	0.0%	5.1%	0	0.0%	7.30%	3	1.5%	6.4%
Middle Eastern/North African	0	0.0%	20	0	0.0%		0	0.0%		0	0.0%	
Native Hawaiian/ Pacific islander	1	0.2%	20	0	0.0%		0	0.0%	0.10%	1	0.5%	
White	343	80.9%	20	93	86.1%	70.8%	53	54.6%	37.70%	186	90.3%	82.8%
Other	2	0.5%	20	0	0.0%	6.0%	0	0.0%	7.00%	2	1.0%	7.4%
Multiracial (any)	4	0.9%	20	0	0.0%		1	1.0%		3	1.5%	
Prefer not to respond/No Response	54	12.7%	20	9	8.3%		12	12.4%		33	16.0%	
TOTAL RESPONDING	**424**			**108**			**97**			**206**		

*Data Source: U.S. Census Bureau. "ACS Demographic and Housing Estimates." American Community Survey, ACS 1-Year Estimates Data Profiles, Table DP05, 2022, *Race alone or in combination with one or more other races*

Diverging perceptions about safety emerge among groups in a few key areas. Black respondents are slightly more likely to report being highly concerned with distracted driving, speeding, or aggressive driving. All non-white respondents indicate heightened concern about crosswalks and lighting (Figure 32). A few of these differences were identified as statistically significant:

- **Not enough lighting**: The result of a Chi-Squared test (X^2=9.20, p-value<0.05) is statistically significant. There is a difference in the safety concern of not enough lighting among races. Black/African American and all other races are more likely to be concerned by not enough lighting.
- **Poor sightline visibility:** The result of a Chi-Squared test (X^2=6.33, p-value<0.05) is statistically significant. There is a difference in the safety concern of poor sightline visibility among races. Black/African American and all other races are more likely to be concerned by poor sightline visibility.
- **Dangerous curves**: The result of a Chi-Squared test (X^2=7.71, p-value<0.05) is statistically significant. There is a difference in the safety concern of dangerous curves among races. Black/African American and all other races are more likely to be concerned by dangerous curves.

Support for the vision zero policy concept is strongest among Black respondents (Figure 33). However, there is no statistical difference in overall Vision Zero policy support observed in the sample among races.

Lighting is again identified as a priority safety tool by non-white survey respondents, as are crosswalks and lower speed limits. Black respondents also indicated stronger support for safe driving media campaigns and rumble strips (Figure 34). Several of these differences were identified as statistically significant:

- **Lower speed limits:** The result of a Chi-Squared test (X^2=19.42, p-value<0.05) is statistically significant. There is a difference in preferred safety tool of lower speed limits. Black/African American respondents and all other races are more likely to prefer lower speed limits.
- **Neighborhood traffic circles**: The result of a Chi-Squared test (X^2=13.01, p-value<0.05) is statistically significant. There is a difference in preferred safety tool of neighborhood traffic circle. Black/African American respondents are less likely to prefer neighborhood traffic circle.
- **Rumble strips:** The result of a Chi-Squared test (X^2=14.67, p-value<0.05) is statistically significant. There is a difference in preferred safety tool of rumble strips. Black/African American respondents are more likely to prefer rumble strips.
- **Media campaign**: The result of a Chi-Squared test (X^2=8.59, p-value<0.05) is statistically significant. There is a difference in preferred safety tool of media campaign. Black/African American respondents are more likely to support implementation of a media campaign.

Figure 32. Safety Concerns by Race

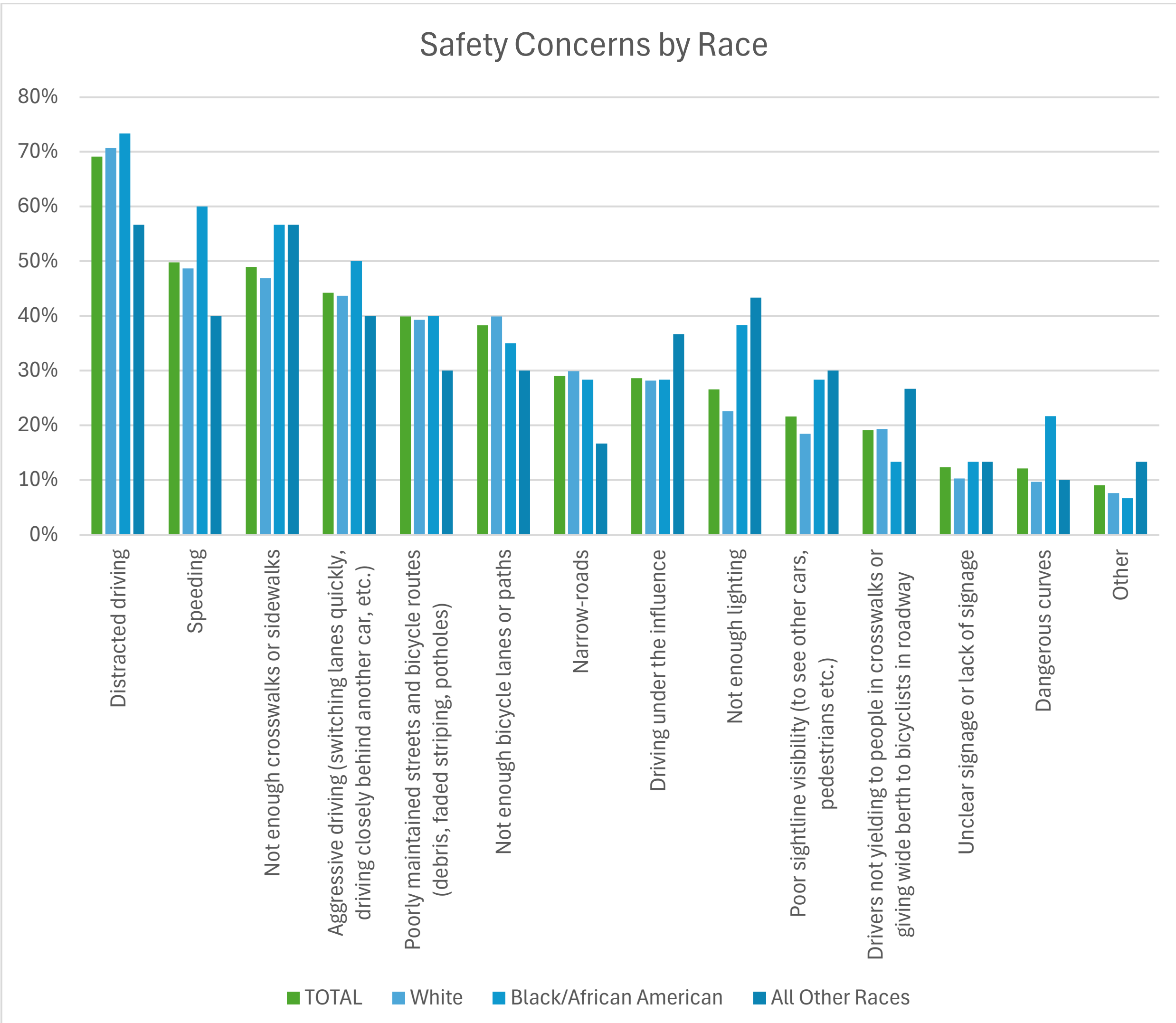


Figure 33. Vision Zero Policy Support by Race

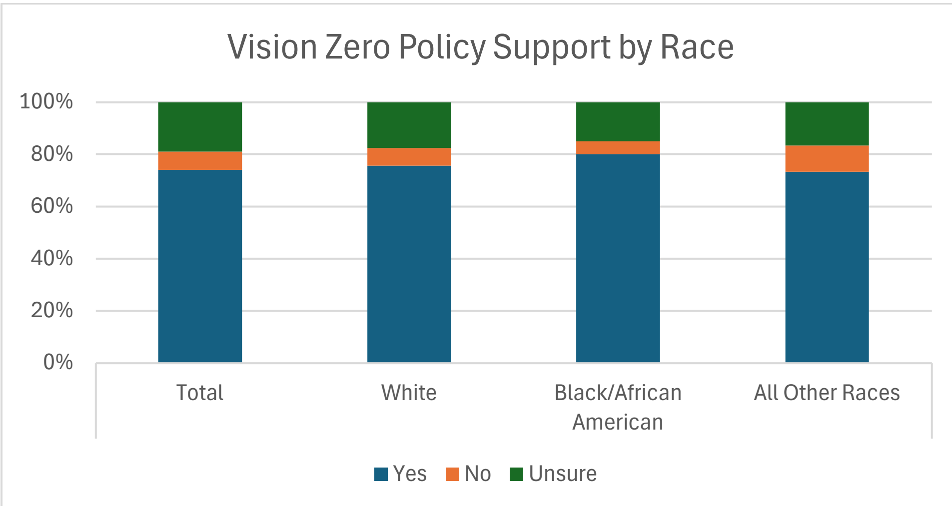
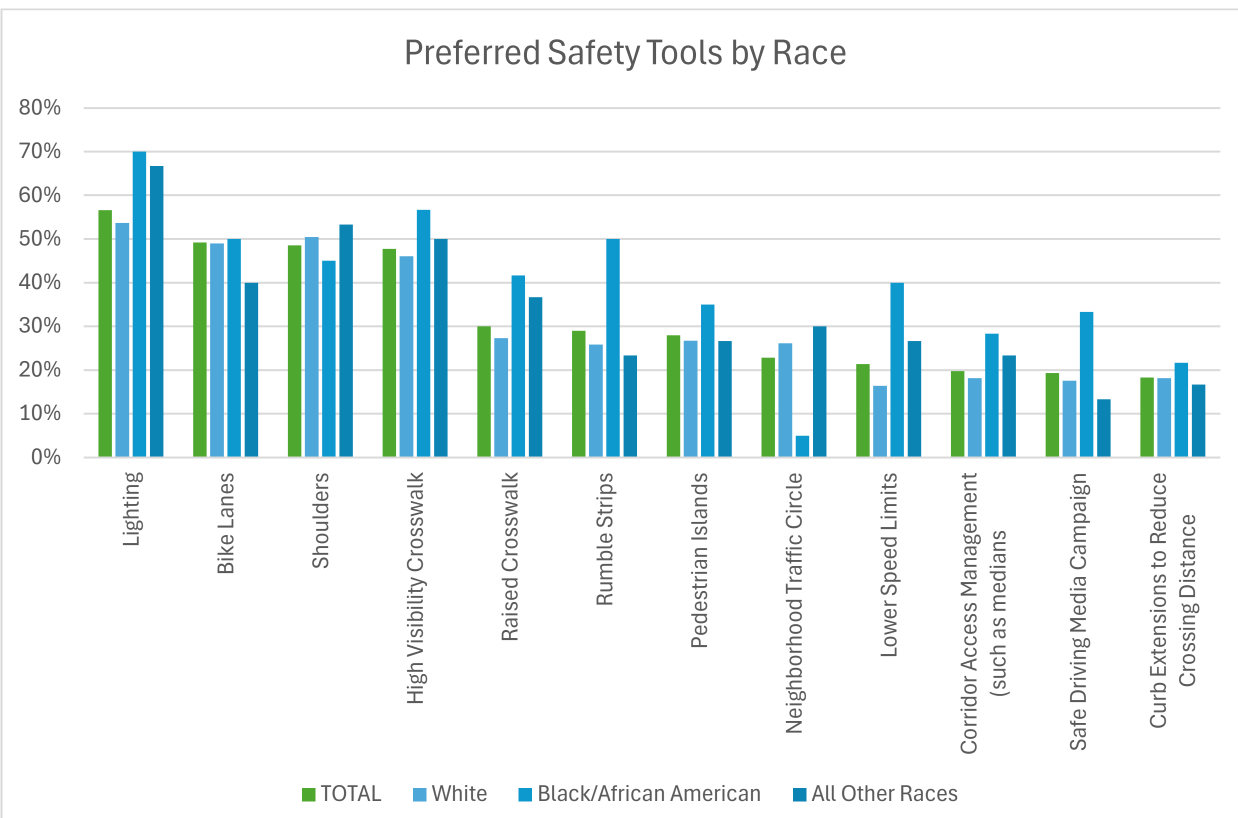


Figure 34. Preferred Safety Tools by Race



Black respondents (and all other races) were more likely to report observed hands-free technology use, as well as more frequent failure to wear seatbelts (Figure 35). Two differences in observed behaviors between groups were identified as statistically significant:

- **Used hands-free phone technology:** The result of a Chi-Squared test (X^2=9.47, p-value<0.05) is statistically significant. There is a difference in the observed behavior of using hands-free phone technology. All other races are less likely to report observed use of hands-free phone technology.
- **Driven without wearing a seatbelt:** The result of a Chi-Squared test (X^2=6.20, p-value<0.05) is statistically significant. There is a difference in the observed behavior of driving without wearing a seatbelt. Black/African American respondents are more likely to report observing driving without wearing a seatbelt.

This is reflected in an elevated perception of danger around lack of restraint use. However, these respondents were less likely to report aggressive or impaired driving as particularly dangerous (Figure 36). Both of these observations were statistically significant:

- **Aggressive driving:** The result of Chi-Squared test (X^2=11.83, p-value<0.05) is statistically significant. There is a difference in the perception of the danger of aggressive driving. White respondents are more likely to think aggressive driving is more dangerous.
- **Driven without wearing a seatbelt:** Chi-Squared test (X^2=11.14, p-value<0.05) is statistically significant. There is a difference in the in the perception of the danger of driving without wearing a seatbelt. Black/African American respondents are more than expected to think driving without wearing a seatbelt is more dangerous.

Although once again total respondents using modes other than driving are low, non-white respondents are notably more likely to use alternative means of transportation (Figure 37).

Figure 35. Behaviors Observed by Race

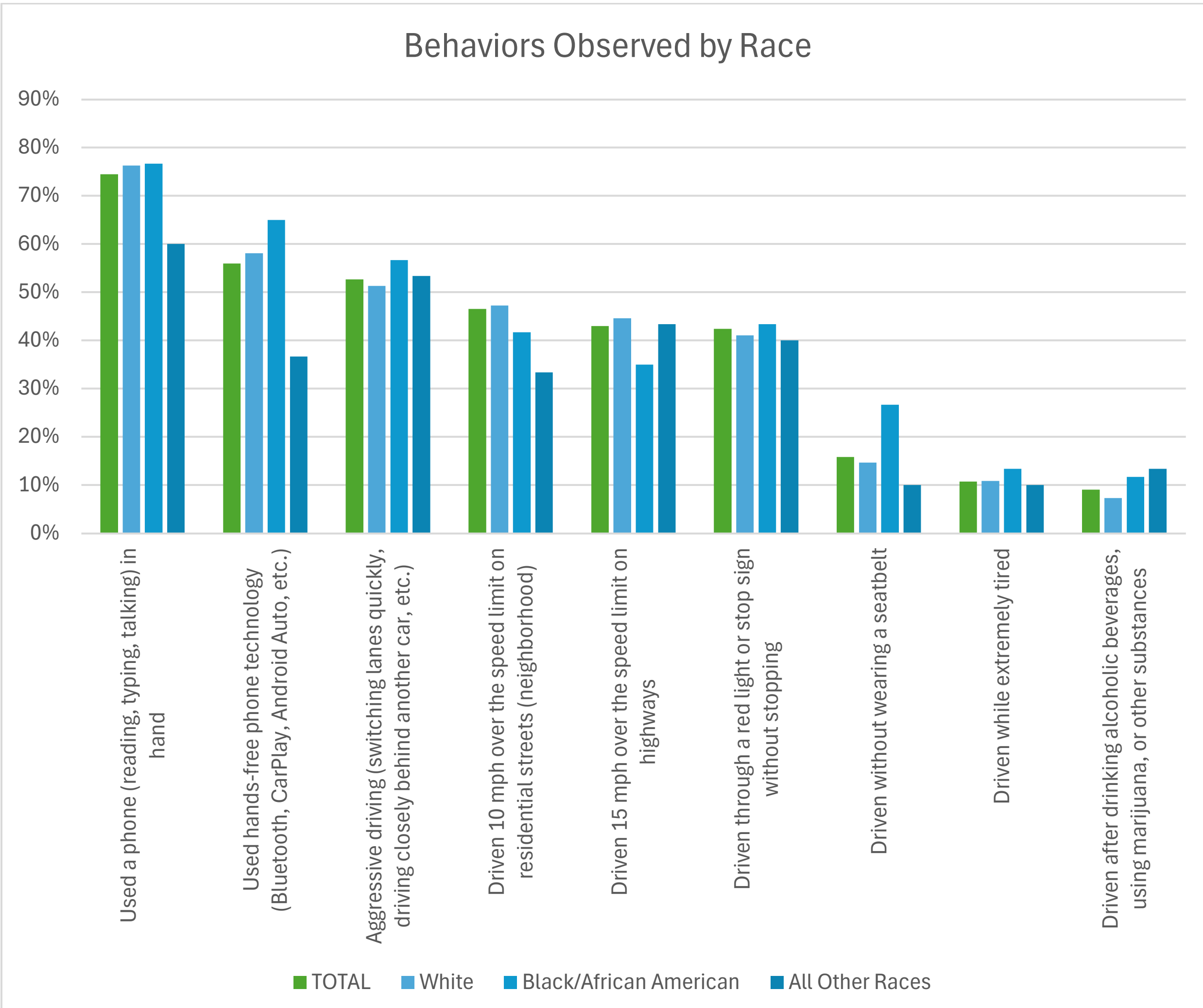


Figure 36. Most Dangerous Behaviors by Race

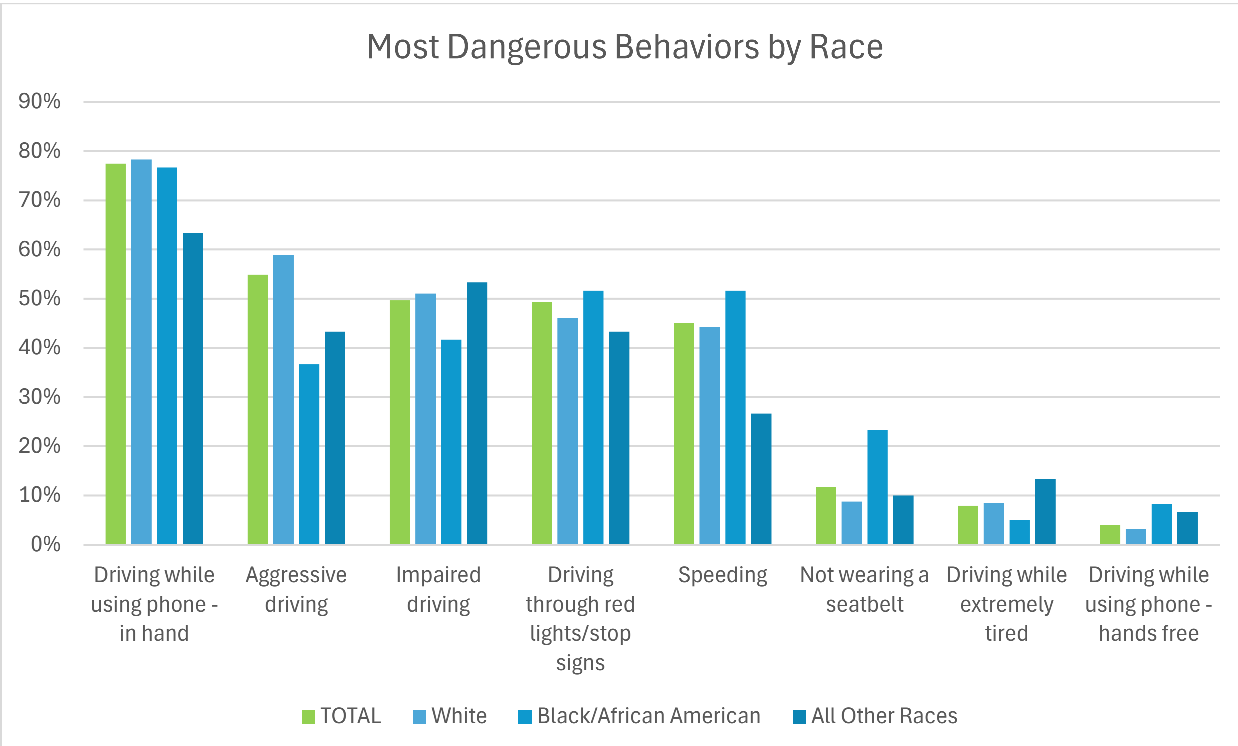
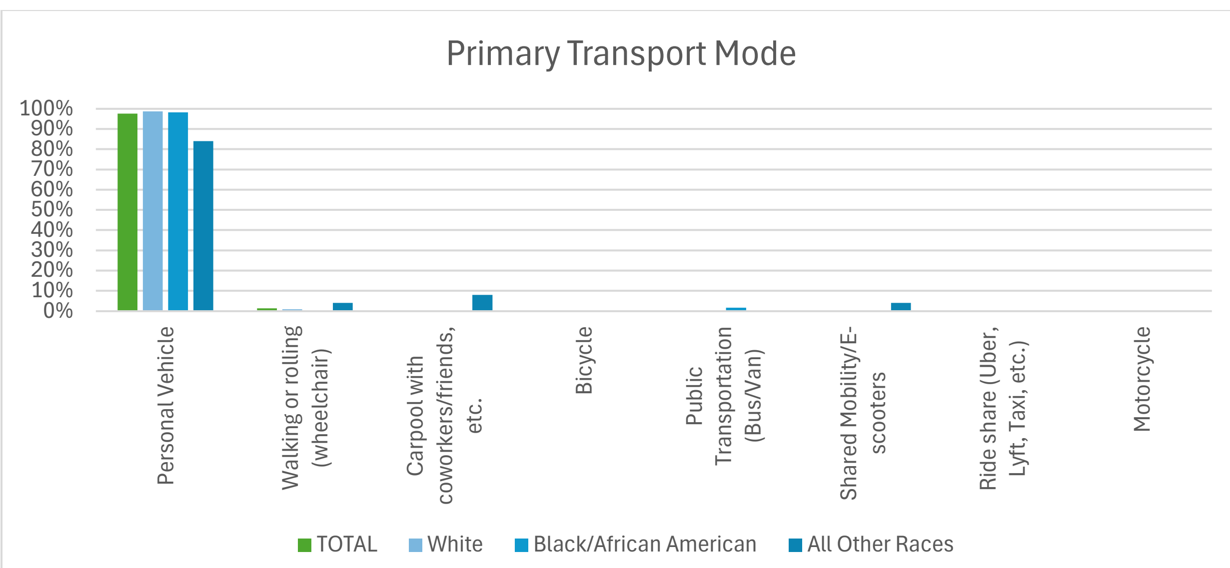


Figure 37. Primary Transport Mode



Survey Responses by Household Income

Predictably, very low-income households are underrepresented in this survey sample, particularly in Tangipahoa and St Tammany parishes, while the highest income groups are somewhat overrepresented (Table 13). Overall, the sample achieves a reasonable distribution and diversity of incomes, particularly if categories are collapsed (e.g. low, moderate, and high).

Table 13. Household Income Distribution of Survey Sample and Population

	TOTAL			Tangipahoa			St John			St Tammany		
	Survey #	Survey %	Sample Target	Survey #	Survey %	2022 ACS Estimates	Survey #	Survey %	2022 ACS Estimates	Survey #	Survey %	2022 ACS Estimates
less than 25k	23	5.7%	20	5	5.1%	11.8%	7	8.1%	11.1%	11	5.3%	14.2%
25 - 49,999	72	17.9%	20	17	17.3%	20.3%	11	12.8%	18.8%	42	20.1%	20.5%
50 - 74,999	79	19.7%	20	16	16.3%	21.8%	20	23.3%	19.5%	41	19.6%	14.7%
75 - 99,999	86	21.4%	20	25	25.5%	14.2%	15	17.4%	16.2%	44	21.1%	13.3%
100,000+	142	35.3%	20	35	35.7%	31.9%	33	38.4%	34.5%	71	34.0%	37.3%
Prefer not to respond/No Response	77	19.2%	20	20	20.4%		22	25.6%		33	15.8%	
TOTAL RESPONDING	**402**			**98**			**86**			**209**		

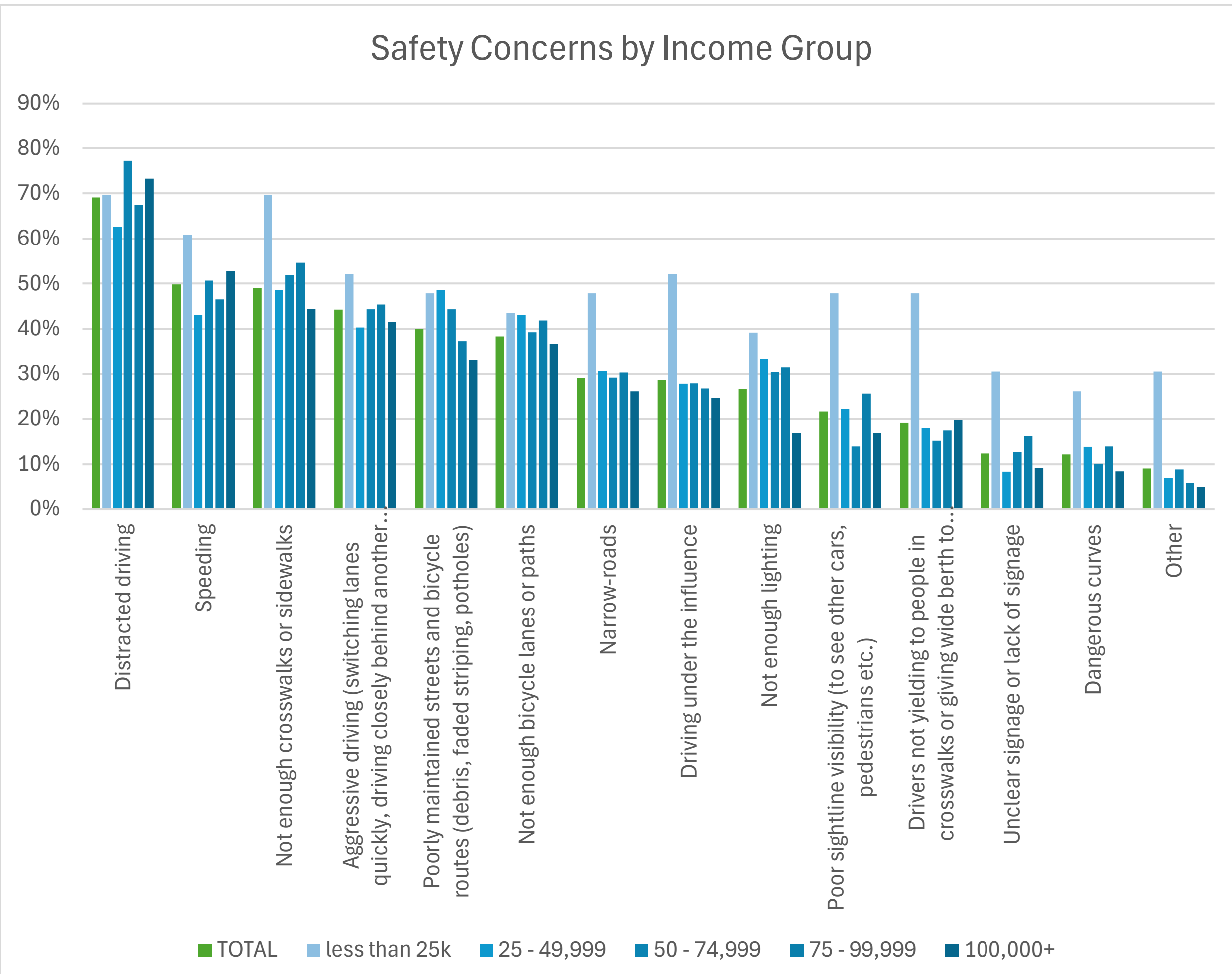
Data Source: U.S. Census Bureau. "Income in the Past 12 Months (in 2022 Inflation-Adjusted Dollars)." American Community Survey, ACS 5-Year Estimates Subject Tables, Table S1901, 2022, St John: (5 yr estimates)

Sharp variations emerge between the lowest income group and others in regard to which issues are top safety concerns. Low-income residents report elevated concerns about speeding, pedestrian infrastructure, aggressive driving, narrow roads, impaired driving, lighting, sightlines, yielding behavior, signage, and roadway curves. Wealthier households, on the other hand, report prioritization of distracted driving, speed, and yield behavior (Figure 38). A few of these apparent differences are statistically significant:

- **Poor sightline visibility:** The result of a Chi-Squared test (X^2=15.33, p-value<0.05) is statistically significant. There is a difference in the safety concern of poor sightline visibility among income levels. Households making under $25,000 per year, or making between $75,000 and $99,999 are more likely to be concerned by poor sightline visibility.

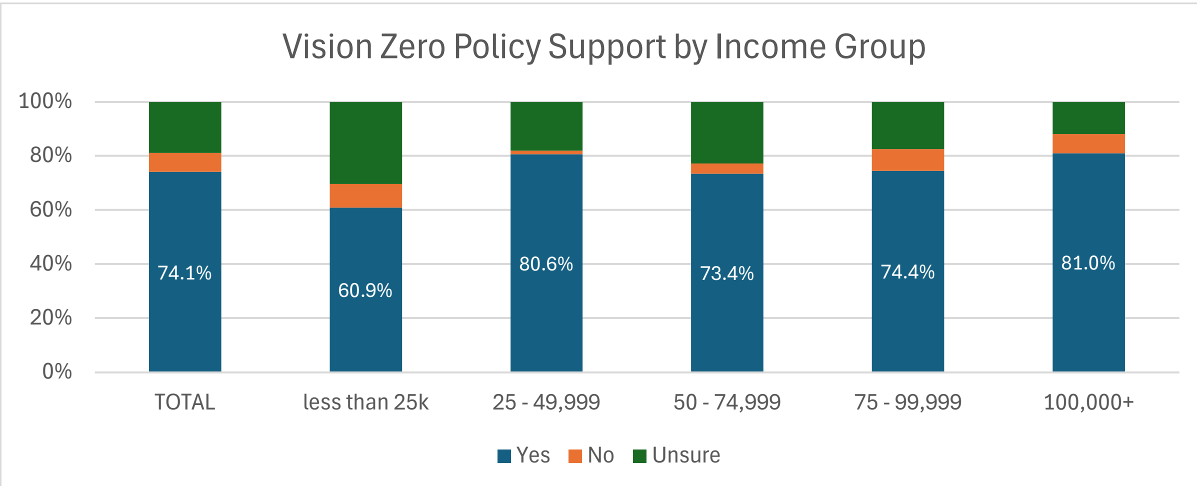
- **Drivers not yielding to people:** The result of a Chi-Squared test (X^2=13.61, p-value<0.05) is statistically significant. There is a difference in the safety concern of drivers not yielding to people among income levels. Households making less than $25,000 are more likely to be concerned by poor driver yield behavior.
- **Not enough lighting**: The result of a Chi-Squared test (X^2=12.08, p-value<0.05) is statistically significant. There is a difference in the safety concern of not enough lighting among income levels. All income levels except households making over $100,000 are more likely to be concerned by not enough lighting.

Figure 38. Safety Concerns by Income Group



Low-income households also indicate a notably lower level of support for Vision Zero policy (Figure 39), which may indicate a lack of trust in the efficacy of policy alone to affect change. This finding is statistically significant (Chi-Squared test (X^2=21.34, p-value<0.05).

Figure 39. Vision Zero Policy Support by Income Group

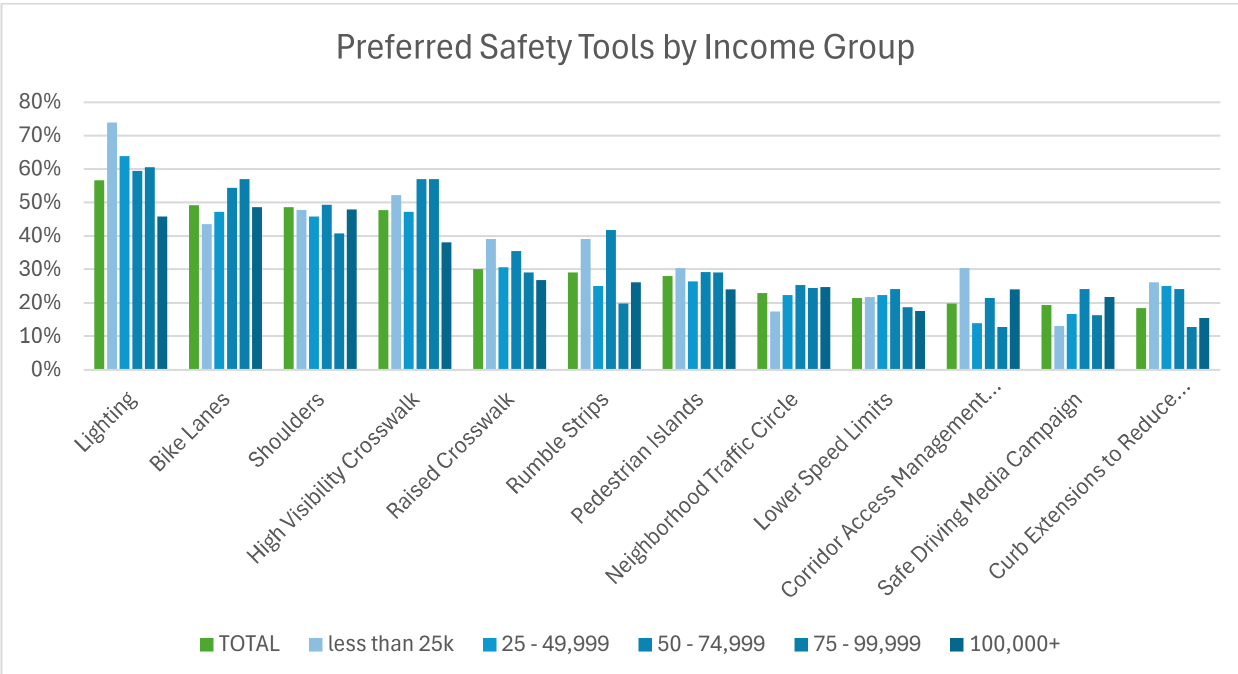


Low-income respondents also indicate very low levels of support for safety media campaigns. Instead, lower-income households appear to prioritize tangible improvements like lighting, raised crosswalks, rumble strips, as well as access management strategies. Two of these apparent preferences are statistically significant:

- **Lighting:** The result of a Chi-Squared test (X^2=11.94, p-value<0.05) is statistically significant. There is a difference in preference for the safety tool of lighting. Lower income respondents are more likely to prioritize lighting improvements.
- **Rumble strips:** The result of a Chi-Squared test (X^2=12.52, p-value<0.05) is statistically significant. There is a difference in preference for the safety tool of rumble strips. Households making less than $25,000, or between $50,000 and $75,000 are more likely to prefer rumble strips.

Middle and high-income households indicate stronger support for bike lanes and crosswalks, although this difference is not statistically significant (Figure 40).

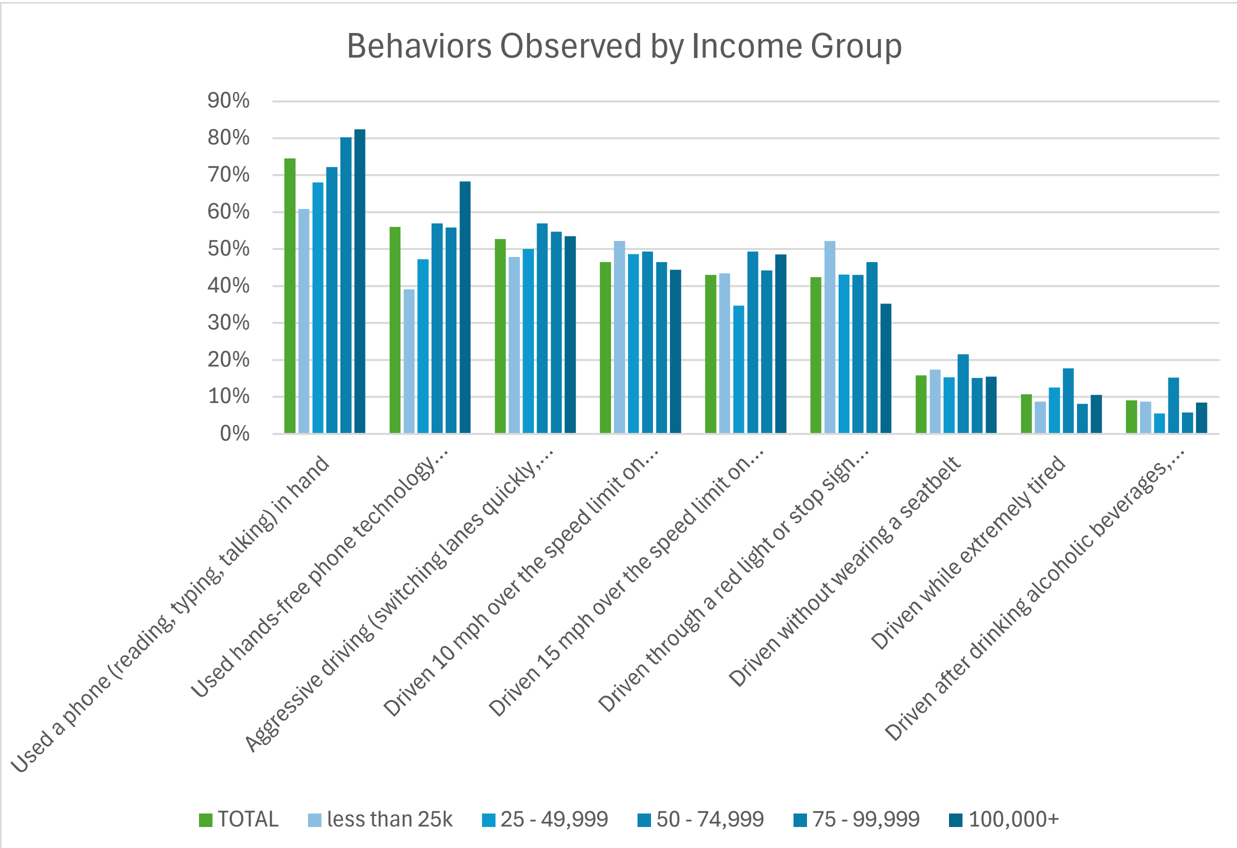
Figure 40. Preferred Safety Tools by Income Group



Low-income respondents indicate notably less observed use of phones while driving (either hands-on or hands-free, but higher incidence of disregard of traffic control. High income households report the greatest observation of phone use, while moderate income households report elevated observation of lack of restraint use, fatigued driving, and impaired driving (Figure 41). Two findings pertaining to phone use were found to be statistically significant:

- **Used hands-free phone technology:** The result of a Chi-Squared test (X^2=16.79, p-value<0.05) is statistically significant. There is a difference in the observed behavior of using hands-free phone technology among income levels. Households making over $100,000 are more likely to report observed use of hands-free phone technology.
- **Used a phone:** The result of a Chi-Squared test (X^2=12.91, p-value<0.05) is statistically significant. There is a difference in the observed behavior of using a phone among income levels. Households making $75000 or more are more likely to report observed use a phone while driving.

Figure 41. Behaviors Observed by Income Group



The lowest income respondents indicate sharply more concern with even hands-free phone use while driving, but less worry about aggressive driving, while the wealthiest households indicate heightened concern about speeding (Figure 42). Both results are statistically significant:

- **Driving while using phone-hands free:** The result of a Chi-Squared test (X^2=31.91, p-value<0.05) is statistically significant. There is a difference in the perception of danger around the behavior of driving while using phone-hands free among income levels. Households making $25,000 or less are more likely to think driving while using phone-hands free is more dangerous.
- **Speeding:** The result of a Chi-Squared test (X^2=11.64, p-value<0.05) is statistically significant. There is a difference in the perception of danger around the behavior of speeding among income levels. Households making $25,000 or less OR over $100,000 are more likely to think speeding is more dangerous.

As one would expect, low-income households are also the most likely to utilize alternative modes of transportation regularly (Figure 43).

Figure 42. Most Dangerous Behaviors by Income Group

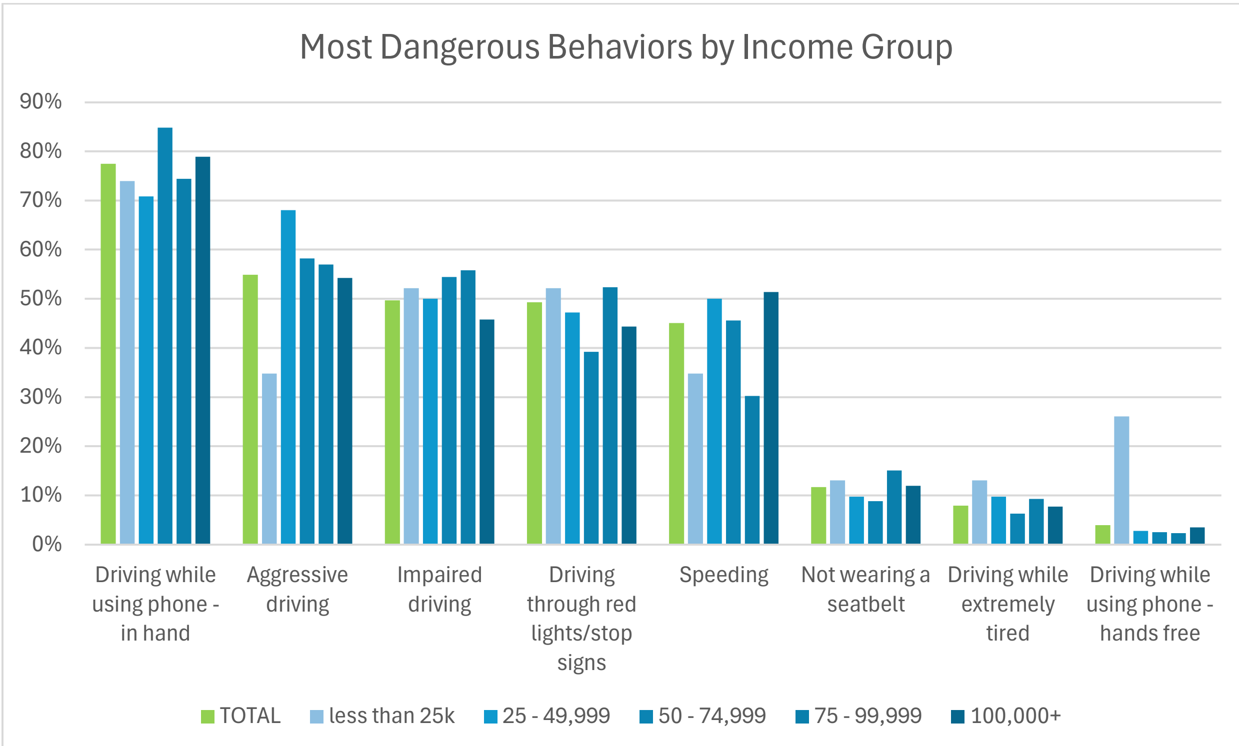
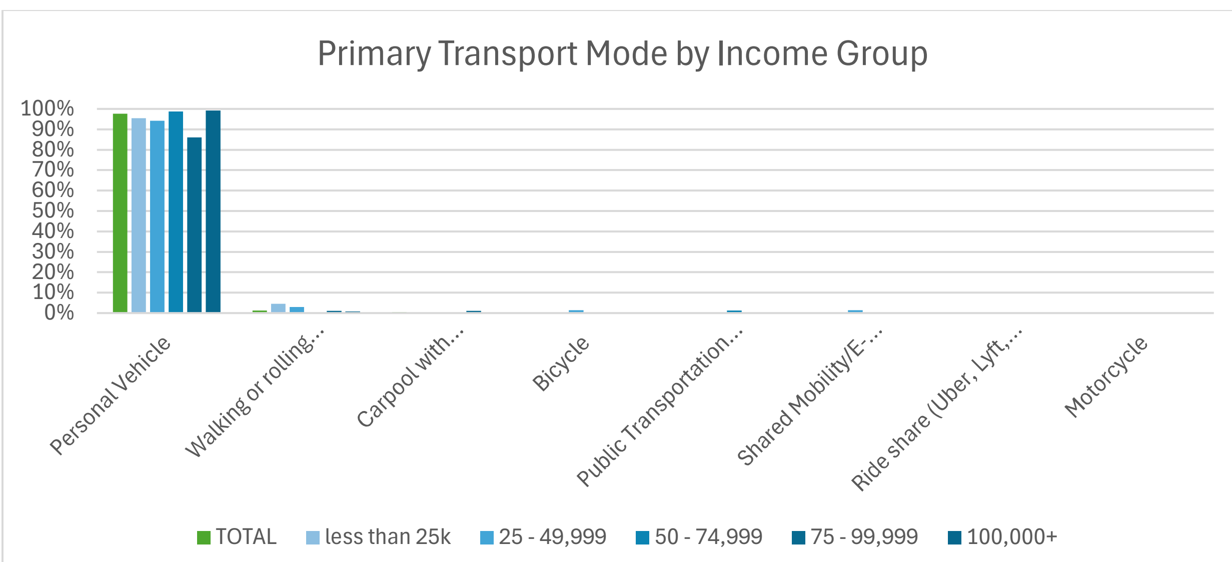


Figure 43. Primary Transport Mode by Income Group



Survey Responses by Zip Code

Finally, although an insufficient number of responses were received in many zip codes (the smallest unit of analysis convenient to survey takers) to facilitate meaningful disaggregated analysis, the data were broken down by zip code in order to identify gaps between where the project team received feedback, and areas where there is a significant population and/or presence of multiple equity indicators (see Phase 1 Memo). Survey distribution is reported for each parish. Due to sample size limitations and inconsistencies in response rate among geographic areas (i.e. many zip codes with too few samples from which to infer results), statistical analysis of findings is limited. Where sufficient samples exist (i.e., a minimum of 5), the data may be further analyzed to examine specific concerns or priorities of target areas. Where there is a mismatch between response rate and either population or equity score (with higher scores indicating a greater potential for additional attention or investment), Safety Plan strategies should consider opportunities for further outreach, research, and/or analysis.

Tangipahoa

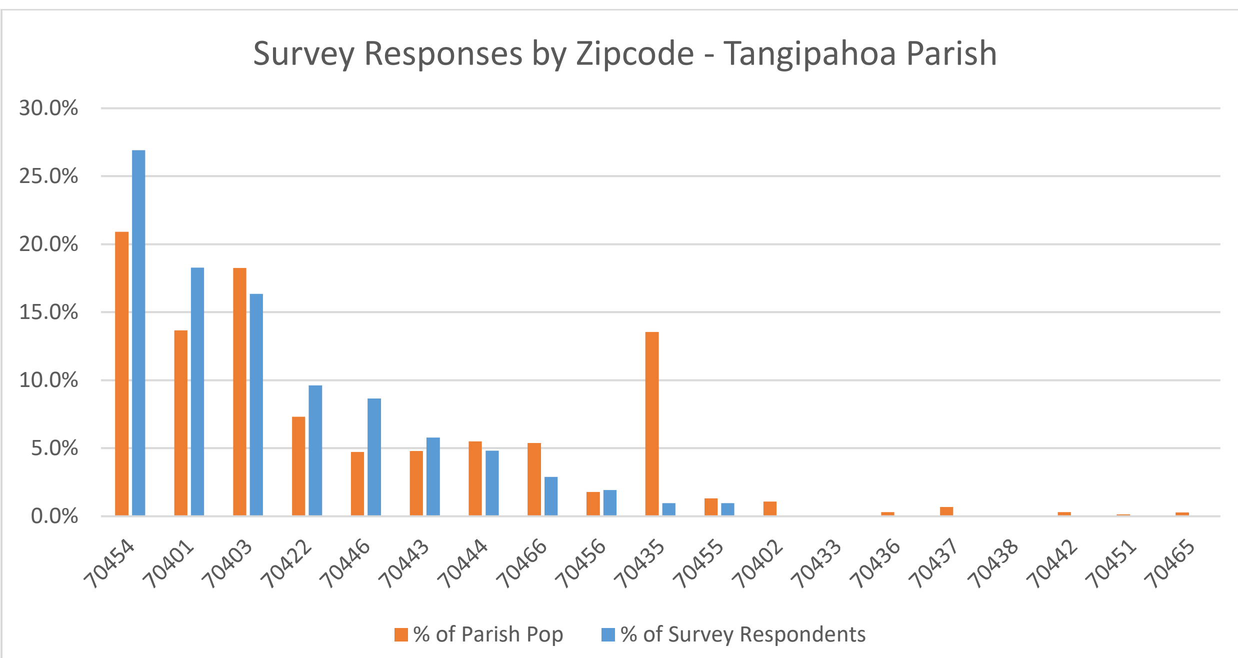
In general, responses from Tangipahoa Parish align reasonably well with area population centers (Table 14, Figure 44). One exception is zip code 70435, which represents almost 14% of the parish population but yielded only one survey response. However, this zip code also has relatively few overlapping equity indicators.

Table 14. Survey Response Distribution by Zip Code – Tangipahoa Parish

	2020 Pop	% of Parish Pop	Simple Weighted Equity Score	Survey Respondents	% of Survey Respondents
70454	32154	20.9%	3	28	26.9%
70401	21014	13.7%	3	19	18.3%
70403	28039	18.2%	4.5	17	16.3%
70422	11230	7.3%	3.5	10	9.6%
70446	7255	4.7%	0.5	9	8.7%
70443	7355	4.8%	2	6	5.8%
70444	8450	5.5%	4	5	4.8%
70466	8262	5.4%	4	3	2.9%
70456	2741	1.8%	2.5	2	1.9%

70435	20828	13.6%	0	1	1.0%
70455	2017	1.3%	0	1	1.0%
70402	1634	1.1%	2	0	0.0%
70433	58	0.0%	0	0	0.0%
70436	450	0.3%	3.5	0	0.0%
70437	1033	0.7%	0.5	0	0.0%
70438	61	0.0%	1.5	0	0.0%
70442	468	0.3%	0.5	0	0.0%
70451	192	0.1%	3.5	0	0.0%
70465	425	0.3%	4.5	0	0.0%
Other				3	
TOTAL				**104**	

Figure 44. Survey Response Distribution by Zip Code – Tangipahoa Parish



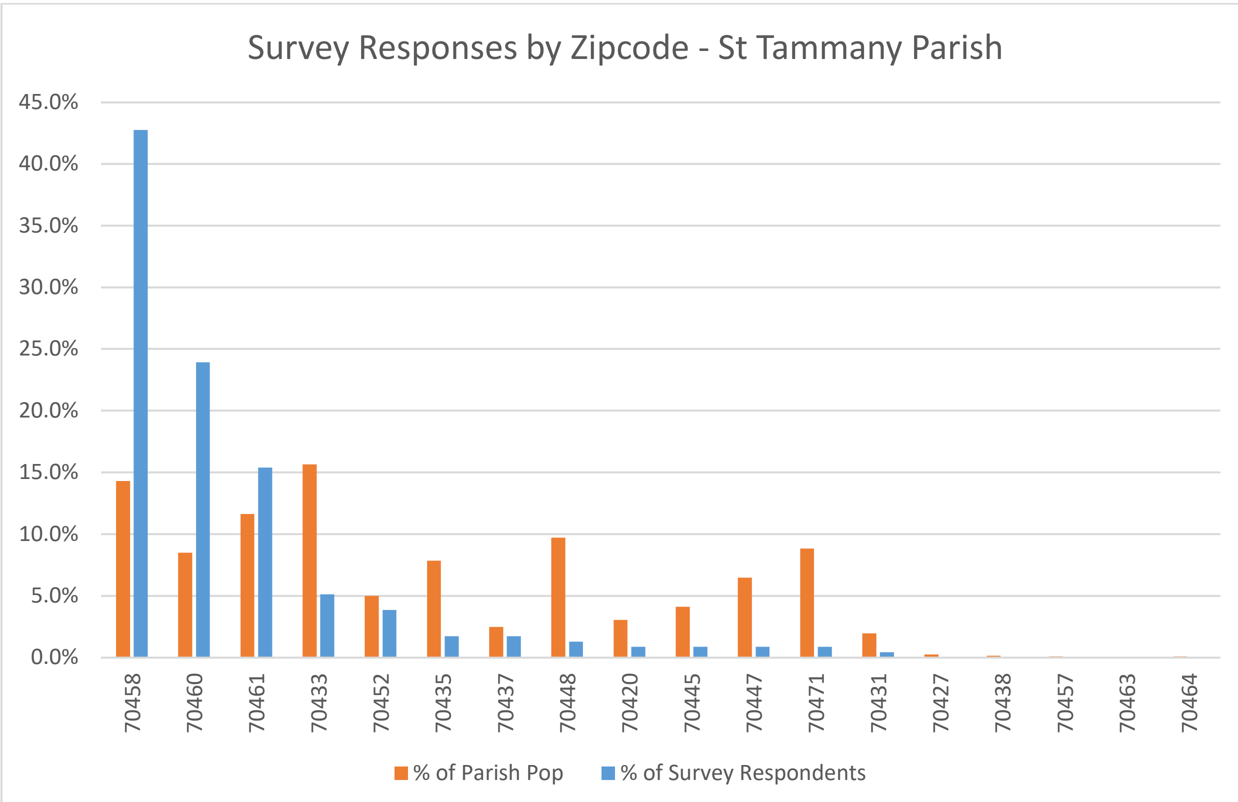
St Tammany

Several St. Tammany Parish zip codes were poorly represented, including some potential priority equity targets (Table 15, Figure 45). Meanwhile, certain zip codes (e.g. 70458 and 70460 which encompass most of Slidell) were substantially overrepresented in survey response relative to the share of population. Additional analysis is recommended to focus on needs in these communities, as well as to identify improved outreach strategies in the future for areas of the parish inadequately represented.

Table 15. Survey Response Distribution by Zip Code – St Tammany Parish

Zipcode	2020 Pop	% of Parish Pop	Simple Weighted Equity Score	Survey Respondents	% of Survey Respondents
70458	37798	14.3%	3	100	42.7%
70460	22429	8.5%	2.5	56	23.9%
70461	30740	11.6%	2	36	15.4%
70433	41365	15.6%	3	12	5.1%
70452	13187	5.0%	1	9	3.8%
70435	20772	7.9%	1.5	4	1.7%
70437	6542	2.5%	0	4	1.7%
70448	25670	9.7%	0	3	1.3%
70420	8030	3.0%	2	2	0.9%
70445	10866	4.1%	2	2	0.9%
70447	17120	6.5%	0	2	0.9%
70471	23334	8.8%	1	2	0.9%
70431	5134	1.9%	1	1	0.4%
70427	655	0.2%	1	0	0.0%
70438	371	0.1%	0	0	0.0%
70457	221	0.1%	0	0	0.0%
70463	98	0.0%	2	0	0.0%
70464	220	0.1%	1	0	0.0%

Figure 45. Survey Response Distribution by Zip Code – St Tammany Parish



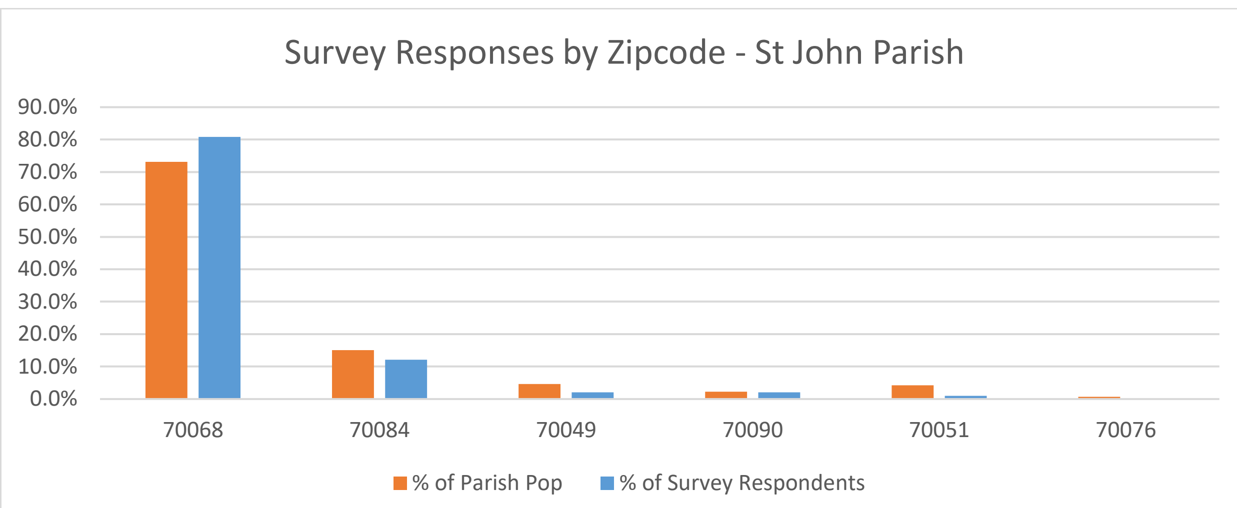
St John

In St. John Parish, the majority of the population – and the majority of survey respondents – live in zip code 70068. Thus, the parish achieves reasonably good representation overall, even though the total number of responses in many zip codes is low (Table 16, Figure 46). Particular further attention may be needed to the concerns of Westbank St. John Parish, from which fewer than 5 responses were received in total.

Table 16. Survey Response Distribution by Zip Code – St John Parish

Zipcode	2020 Pop	% of Parish Pop	Simple Weighted Equity Score	Survey Respondents	% of Survey Respondents
70068	31057	73.1%	3.5	80	80.8%
70084	6411	15.1%	3	12	12.1%
70049	1975	4.7%	3.5	2	2.0%
70090	976	2.3%	3	2	2.0%
70051	1777	4.2%	2	1	1.0%
70076	276	0.6%	2	0	0.0%
Other				2	2.0%
TOTAL				**99**	

Figure 46. Survey Response Distribution by Zip Code – St John Parish



3. Align Community Priorities with Theories of Behavioral Change

The community engagement and data collection phase of this planning process reveals core insights about the top concerns in each parish, as well as divergence among certain demographic sub-groups that interact with identified safety risk factors and/or behaviors. With these insights – as well as identification of gaps in our knowledge where further research may be needed – we can begin to develop an overarching theory for addressing social, behavioral, and environmental determinants of injury outcomes that work in concert with infrastructure investments to affect measurable change. A range of potential infrastructure and non-infrastructure countermeasures has been identified for consideration for future implementation, including those that build upon existing programs such as those outlined in the Louisiana Strategic Highway Safety Plan (SHSP), and locally, campaign-based activities conducted and evaluated by the Tangipahoa Parish Government Prevention Department and Tangipahoa-Reshaping Attitudes for Community Change (TRACC) Coalition.

A preliminary summary of observations from the disaggregated survey sample, as well as general potential countermeasures which may begin to address this finding (including further research and outreach where data gaps were identified) is presented in Table 17. For a wider range of non-infrastructure countermeasures addressing one or more risky behavior and which prior research indicates have been found to be effective, refer to the *Phase 1 Memo*.

Table 17. Summary of Outreach Observations

Target Group/ Area	Core Preliminary Observation	Potential Countermeasure(s) or Activity
All	Distracted driving is top concern in all 3 parishes	Hands-Free driving law; Enforcement activities; Awareness Campaigns
	Potential mismatch between the perceived danger of non-use of seatbelts, relative to crash outcomes	Awareness Campaigns
	Communities may be less likely to support infrastructure countermeasures that aren't locally common	Awareness campaigns; pilot projects
St Tammany Parish	Heightened concern about aggressive driving	Enforcement activities, Awareness campaigns
	Prioritizes pedestrian and bicyclist facility enhancements	Infrastructure projects
	Data gap: Black residents and other minority populations	Targeted research & outreach
	Data gap: lowest income households underrepresented	Targeted research & outreach
	Data gap: responses oversample Slidell area; underrepresent other communities	Targeted research & outreach
Tangipahoa Parish	Heightened concern about impaired driving	No Refusal Laws, Enforcement activities
	Prioritizes narrow roads and dangerous curves	Infrastructure projects
	Data gap: Black residents and other minority populations	Targeted research & outreach

	Data gap: lowest income households underrepresented	Targeted research & outreach
	Data gap: low response rate in zip code 70435	Targeted research & outreach
St John Parish	Heightened concern about speed and disregard of traffic controls	Enforcement activities, Awareness campaigns
	Strongest support for safe driving media campaigns	Awareness Campaigns
	Behavioral Focus: seatbelt use	Enforcement activities, Awareness campaigns
	Travel pattern insight: substantial interparish trips to/from St. John Parish	Interjurisdictional collaboration efforts
	Data gap: Hispanic or Latino populations	Targeted research & outreach
	Data gap: Westbank communities insufficiently represented	Targeted research & outreach
Older Adults	Older adults are more supportive of lower speed limits and safety campaigns	Support speed limit reduction
	Older adults may be more concerned about roadway departure crashes	Infrastructure projects
Young Adults	Data Gap: teens and young adults	Targeted research & outreach
	Younger adults are less concerned about distracted driving	Hands-Free driving law; Enforcement activities; Awareness Campaigns
	Younger adults are more concerned about provision of bike/ped infrastructure	Infrastructure projects
	Higher observed rates of impaired and fatigued driving among young adults	No Refusal Laws, Enforcement activities
	Younger adults are more likely to travel by means other than their own car	Long-range planning
Women	Women prioritize pedestrian and bike infrastructure	Infrastructure projects
	Women prioritize improvements to lighting and visibility	Infrastructure projects
Men	Men may be less supportive of formal Vision Zero policy adoption	Targeted research & outreach
	Men appear to be less concerned about safety value of restraint use	Enforcement activities, Awareness campaigns
POC	Greater degree of concern about distracted and aggressive driving and speeding among Black population	Hands-Free driving law; Awareness Campaigns; Infrastructure projects
	Greater concern about crosswalks and lighting among non-white population	Infrastructure projects
	Greater enthusiasm for safe driving media campaigns among Black population	Awareness Campaigns
	Non-white populations more likely to use alternative modes of transportation	Infrastructure projects
Other	Less support for Vision Zero policy adoption, safety campaigns among low-income households	Targeted research & outreach
	Data gap: people who usually commute by modes other than driving	Targeted research & outreach

The *Phase 1 Memo* also identified a wide range of behavior change models, as well as potential applications suggested in the literature. Based on the survey and outreach findings, this list of models is reduced to those which may be particularly applicable to one or more insight from this study (Table 18).

Table 18. Summary Table of Behavior Change Models

Name	Description	Potential Application	Outreach Insight
The Safe Systems Pyramid	a framework specifically for Safe Systems policy approach applying principles of prevention and a focus on population health, along with understanding specific causes of injury to implement policies	Prioritizing interventions based on their population health impact and level of individual effort required	Strong evidence of support for emphasis on population-level interventions rather than individual behavior response
Persuasive Health Message Framework	translates behavioral change theories into effective threat or efficacy-based messages, and influencing audience receptivity	Developing persuasive messages that align with audience values, demographics, etc.	Understanding divergence in priorities and concerns can inform targeted messaging
Ward Model	examines the relationship between traffic safety culture and intention, and how this influences likelihood of an undesirable behavior	Describing cultural attitudes and norms and their underlying beliefs through value-laddering as the foundation for message content development	Potential next-step for evaluating widely observed risky behaviors to develop more effective countermeasures
The Haddon Matrix	a framework for identifying risk factors before, during, and after a crash and selecting countermeasures based on temporal and categorical attributes	Analyzing crash data to determine factors associated with injury outcomes	Preliminary findings suggest demographic associations with key behaviors; additional research needed to better understand crash characteristics
Road Safety Equity Model	a public health-based approach to assessing equity in road safety centering regular (e.g., annual) assessments to identify equity issues, combined with sociodemographic data	Evaluating changes in perceptions before and after interventions	Collect similar data after intervention and compare to baseline findings to assess efficacy
Health Belief Model	Model seeks to understand why individuals engage in healthy behaviors, based on self-perceptions about susceptibility, barriers, and benefits	Focusing on self-efficacy, threat perception, and other individual-level barriers to change	Potential mismatch between perceived risk of behavior (e.g. seatbelt use) and crash outcomes

Theory of Planned Behavior	views behavior as a function of one's favorable or unfavorable perception of the behavior, social expectations from one's community of influence, and perception of factors that limit or facilitate engagement in a behavior (or self-efficacy)	Addressing behavioral control factors inhibiting intention to change	Distracted driving: Widely reported as most dangerous behavior, but also most widely observed/admitted
Diffusion of Innovation Theory	explains how an idea or behavior (i.e., innovation) diffuses throughout a population over time	Investigating methods for reducing the time required to affect cultural/behavioral shifts	May be useful in conjunction with integration of new infrastructure countermeasures
Kotter's 8-Step Change Model	Describes a method of raising awareness, organizing around a vision, removing obstacles to action, and achieving short-term and long-term change	Initiating an awareness campaign or identifying short-term wins to reinforce and accelerate behavioral change	Useful for policy/regulatory advocacy, e.g., Hands Free Law
Nudge Theory	Recognizes biases influencing behavior and providing non-monetary, non-regulatory interventions to gently "nudge" behaviors	Identifying biases and designing interventions that subtly shift behaviors	Implement infrastructure countermeasures that affect behavioral change
Theory of Reasoned Action	stipulates that intentions are the principal predictors of behavior, and are influenced by personal attitudes and subjective norms	Assessing the extent to which stated intentions align (or not) with observed behaviors	Guide further research: does reported prevalence of behavior align with objective observation?
Extended Parallel Process Model	categorize responses to threats as null, danger-control, or fear-control depending on threat perception and self-efficacy	Predicting whether threat-based messaging is likely to be rejected or result in change based on whether it engenders a fear or control response	Inform awareness campaign messaging to prioritize control response and enhance self-efficacy, rather than threat-based messaging

In particular, the Safe Systems Pyramid emerges as a broadly applicable framework developed specifically for Vision Zero or Safe Systems policy approaches, applying principles of prevention and a focus on population health, along with understanding specific causes of injury to implement policies. It emphasizes effectiveness, effort, and exposure. It addresses the shortcomings of the traditional "Es" of traffic safety (engineering, education, and enforcement), by focusing on the human factors of behavior change and applying epidemiological concepts to the public health problem of traffic safety to prioritize high-impact strategies, proposing an efficiency-focused framework for making decisions about design and engineering: the safe systems pyramid (**Error! Reference source not found.**).

Figure 47. The Safe Systems Pyramid

Source: Smith, T. (2024). [Thinking & Acting Differently for Vision Zero. Vision Zero Network News.]

The Safe Systems Pyramid emphasizes that, in isolation, interventions focused on education, awareness, enforcement, or “active measures” like focusing on signage and occupant protection require the most effort, yet yield the smallest overall impact. These interventions are useful to raise awareness of new policies, and to promote safety as a cultural value, but should be a last resort after attempting the other levels, and always complementary to other approaches.

The pyramid instead emphasizes infrastructure solutions, e.g. aligning roadway functional classification with land use and a policy hierarchy emphasizing person mobility, over behavioral/awareness features, e.g., telling people not to drive at night. But the authors also reflect on the need to improve safety through affordable housing and land use policy, to acknowledge and address inherent inequities, and to focus on reducing driving overall first as a primary strategy to reduce exposure.

This framing complements the Safe Systems approach, and is reflected in some of the core insights from public outreach in the three target parishes: while there is considerable concern about behavior-related safety factors, particularly distracted and aggressive driving and speeding, there is overall much less support or enthusiasm for interventions that focus on safety campaigns or enforcement-linked measures like lowering speed limits.

This model thus works well for guiding overall priorities for addressing roadway safety: focus on interventions with population-level impact and complement these with actions requiring higher individual-level effort. On the other hand, for those complementary interventions or strategies, a second, more targeted theoretical model may be useful, whether to guide message development, investigate mismatches between objective outcomes and perceptions of relevance, or to inform performance measurement approach. For any proposed countermeasure that aims to influence road user behavior (either actively or passively), a relevant theoretical grounding may be selected and applied to guide intervention strategy as well as outcome evaluation.

Conclusions and Next Steps

The preliminary research and outreach conducted through this planning process has yielded valuable information about the perceptions and priorities target communities as a whole, as well as specific insights into areas of divergence based on geographic and demographic characteristics. Although sample sizes for some demographic sub-groups and small geographic areas are in some cases small, the opportunity to disaggregate findings and identify numerous statistically significant differences in preferences, priorities, and attitudes about the extent and dangerousness of various behaviors known to contribute to traffic safety outcomes presents a valuable level of nuance for three distinct communities – and the diverse sub-groups within them – that are too often considered monolithically. In general, smaller towns and rural communities tend to receive fewer resources and less research attention, and the findings of this outreach effort reveal several key opportunities for developing safety interventions that respond to the distinct needs and values of various constituencies.

Overall, the data reveals (along with a strong demand for infrastructure improvements of all kinds) a clear concern for unsafe roadway behaviors, but relatively little confidence in regulatory or education-based approaches to improving safety. While this finding does not negate the utility and value of evidence-based behavior change campaigns and related efforts, it does highlight the need to clearly link them with other interventions (for example, pairing a campaign targeting driver yield behavior toward pedestrians with implementation of new crosswalks, or pairing speed enforcement activities with lane width reductions) and to prioritize careful campaign design and evaluation. This includes:

1. Preparing for change by defining the campaign purpose and goals, analyzing data pertaining to the target behavior, and identifying a relevant theory of change
2. Developing a campaign strategy, including defining the target audience, defining communication channels and ad activities, and identifying community and governmental partners and champions

3. Developing messages around topics the community already cares about, rather than prescriptive or threat-based messages, and, critically, pre-testing messages with the target audience prior to full launch
4. Continuously engage partners and monitor the campaign from launch to conclusion
5. Evaluate the campaign and share evaluation findings and lessons learned

Data suggests more narrowly targeted interventions, focused on a single behavior and possibly a specific sub-group (thus informing message content and channels of delivery), will tend to improve outcomes more than a broad, generic approach. Identifying the right "messenger" is also key to success. The Safe Systems Pyramid model provides a broadly applicable theoretical framework for prioritizing interventions, while a range of more focused theories of change may be applied to guide and inform specific countermeasure applications.

Implementation of behavior change strategies requires collaboration across departments or agencies, and a diverse, inclusive group of champions. Collaborative partnerships can help identify regulatory and organizational barriers to implementation, institutionalize health-related goals and objectives, and give communities ownership over implementation. In addition, they can identify and pursue a more diverse range of funding sources to support plan or program goals and address the social, behavioral, and environmental determinants of health and safety outcomes on Louisiana's roads.

APPENDIX C: DETAILED PROJECT TABLES

Tangipahoa Project Prioritization List

Map ID	Roadway	From INT	To INT	Segment Length (Feet)	Crash Issues					Observed Issues	Majority Manner Of Collision	Potential countermeasure	Improvement Description	Potential/ Proposed Eligible Funding Source									Total Estimated Cost w/ 20% Contingency	For Project Prioritization						Total Points	Priority	Timeframe	Roadway Owner
														Federal				State				Local		4	3	2	1	3	3				
					Pedestrian / Bicycle	Roadway Departure	Intersections	Speed Management	Integrative Approaches					SS4A Implementation	RAISE Grant	Other Federal Grants	Surface Transportation Block Grant (STBG)	Highway Safety Improvement Program	Local Road Safety Program	Safe Routes to Public Places	Transportation Alternatives Program (TAP)	General Fund		SS4A	Safety	Equity	Multimodal	Public Engagement	Continuity				
11	US 190	S Range	US 51	11000.00	x		x		x	No lighting and lack of pedestrian connectivity		Stage 0 Feasability Study	Feasibility Study										$ 360,000.00	X	X		X	X		11	High	Short	State
1	W University Ave (LA 3234)	I-55	Morrison Blvd (US 51)	13200	X		X		X	No lighting (LA 3234), TWLTL, Access Control, reflective markings missing, NB and SB left turn crashes during permitted green phase, Poor Striping, minimal lighting, Dual left turn lanes	Front to Rear - Rear End, Angle - Perpendicular/Other Angle, Angle - Left Across Flow, Sideswipe - with Flow	Lighting, Replace TWLTL with raised medians and turn bays, Flashing Yellow Arrow (FYA), Low-cost Countermeasures (Striping), Raised Pavement Markings, Roundabout	Improve nighttime visibility	X								X	$ 8,080,100.00	X	X	X	X	X		13	High	Long	State
25	Faller Rd	LA 443	LA 442	15893	X	X		X		Narrow road,open ditches, no lighting, no curve markings, poor/no striping	Not a collision between motor vehicles, side swipe, head on	Widen Roadway, add rumble strips, redo striping, add chevron singage, add lighting at LA 442 and LA 443	Warn of lane departure, increase passing space between vehicles,increase visibility of upcoming curve, increase nightime visibility at LA 442 and 443 intersections	X					X	X		X	$ 16,293,000.00	X	X	X		X		12	High	Long	Parish
26	CM Fagan Dr/ Minnesota Pk	Jackson Rd	S Range Rd	6900			X	X		TWLTL, lack of pedestrian facilities, Poor striping	Rear Ends, angle perpendicular, angle - left	Reduce roadway speed limit, corridor access management, protected crosswalks, striping	Redicing speeds allows for a greater reaction time. Due to the shopping center there is a large number of driveways increasing conflict points. Add a sfe route for pedestrian to cross at intersections. Striping is poor and faded	X					X	X		X	$ 5,402,000.00	X	X		X	X		11	High	Long	Parish
9	I-12	I-12 WB Exit Ramp	US 51 BUS	215			X			Roundabout Approach	Front to Rear - Rear End	Rumble strips (Intersection)	Alert driver of upcoming intersection	X			X					X	$ 4,400.00	X	X					7	Medium	Short	State
10	W Club Deluxe	Happywoods Rd	US 51	5700.00						N/A	Rear End	Low-cost Countermeasures (Signage), Rumble Strips (Intersection)	Intersection Warning				X					X	$ 6,750.00	X	X					7	Medium	Short	City
12	HWY 445 & LA 40	INTERSECTION				X	X		X	Lighting, Signage	Not a Collision with a Motor Vehicle	Lighting, Rumble Strips (transverse), Wide Edge Lines, Splitter Island, Low-cost Countermeasures (Signage)	Improve nighttime visibility	X			X	X				X	$ 47,400.00	X	X					7	Medium	Short	State
13	S LINDEN ST & US 190 (W Thomas St)	INTERSECTION					X			Angle crashes	Angle - Perpendicular/Other Angle	Low-cost Countermeasures (Signage), Low-cost Countermeasures (Striping)	Cross traffic does not stop	X			X	X	X			X	$ 1,100.00	X				X		7	Medium	Short	City
20	LA 1064 & US 51	INTERSECTION					X			Proper left on green signage not present. Add FYA	Front to Rear - Rear End Angle - Left / Perpendicular	Flashing Yellow Arrow (FYA), Low-cost Countermeasures (Signage), Low-cost Countermeasures (Striping), Rumble Strips (Intersection)	Prevents "green means go"	X			X	X				X	$ 23,000.00	X	X					7	Medium	Short	State
21	W PLEASANT RIDGE RD & Old Covington Highway	INTERSECTION					X			Bad line of sight from W Pleasant Ridge - needs clearing	Angle - Left / Perpendicular Front to Rear - Rear End	Rumble Strips (Intersection), Low-cost Countermeasures (Striping), Low-cost Countermeasures (Signage)	Alert driver of upcoming intersection	X			X					X	$ 10,000.00	X				X		7	Medium	Short	Parish
22	I-55 FRONTAGE RD & LA 22	INTERSECTION					X			Faded striping	Angle - Left / Perpendicular Front to Rear - Rear End	Raised Pavement Markings, Low-cost Countermeasures (Signage), Low-cost Countermeasures (Striping)	Get Drivers Attention										$ 4,100.00	X	X					7	Medium	Short	State
23	US 190 & US 51 BUS (eastbound and westbound)	INTERSECTION					X			Angle crashes, poor striping	Angle - Left / Perpendicular	Adjust Yellow Change Intervals/Optimize Signal Timing, Low-cost Countermeasures (Striping)	Less drivers running red lights	X			X	X	X			X	$ 11,000.00	X	X			X		10	Medium	Short	State
24	Morris (US 190) & Cate St	INTERSECTION					X			Left-Turn Crashes, poor striping	Left-Turn Overtake Crashes	Low-cost Countermeasures (Striping)	Improve driver's awareness of directionality of lanes	X			X	X	X			X	$ 1,000.00	X	X			X		10	Medium	Short	City
37	CORBIN RD & LA 1040 & US 51	INTERSECTION					X				Angle - Perpendicular/Other Angle (9) Front to Rear - Rear End (8)	Intersection Warning	Warns driver to pay attention	X				X	X	X		X	$ 1,000.00	X	X					7	Medium	Short	City
38	DUNSON RD & LA 22 & RIDGDELL RD	INTERSECTION					X				Angle - Perpendicular/Other Angle (6)	Low-cost Countermeasures (striping and signs)	Guides driver in right direction	X				X	X	X		X	$ 2,000.00	X	X					7	Medium	Short	Parish
39	DUMMY LINE RD & SPRUCE LN	INTERSECTION					X				Front to Rear - Rear End	Intersection Warning	Warns driver to pay attention	X		X		X	X	X		X	$ 1,000.00	X	X					7	Medium	Short	Parish
40	DURBIN RD & PHYLLIS LN	INTERSECTION					X				Front to Rear - Rear End	Intersection Warning	Warns driver to pay attention	X		X		X	X	X		X	$ 1,000.00	X	X					7	Medium	Short	Parish
41	E CHESTNUT ST & US 51	INTERSECTION					X			Railroad parallel to US 51	N/A	Threeway Stop Sign	Creates equal opportunity for turns from each segment	X				X	X	X		X	$ 1,000.00	X	X					7	Medium	Short	City
42	E PARK AVE & SIMPSON PL	INTERSECTION					X				Sideswipe - Right Against Flow Other	Threeway Stop Sign	Creates equal opportunity for turns from each segment	X				X	X	X		X	$ 1,000.00	X	X					7	Medium	Short	Parish
44	LA 22 & OAK LN	INTERSECTION					X				Front to Rear - Rear End	Intersection Warning	Warns driver to pay attention	X				X	X	X		X	$ 1,000.00	X	X					7	Medium	Short	Parish
45	ROBIN ST & US 51	INTERSECTION					X				Front to Rear - Rear End (3)	Intersection Warning	Warns driver to pay attention	X				X	X	X		X	$ 1,000.00	X	X					7	Medium	Short	City
46	DE MARCO LN & US 51 BUS	INTERSECTION					X				Front to Rear - Rear End (4) Angle - Perpendicular/Other Angle (2)	Intersection Warning	Warns driver to pay attention	X				X	X	X		X	$ 1,000.00	X	X					7	Medium	Short	City
47	LA 16 at Bennet Rd & Puleston Rd	INTERSECTION					X			Proper left on green signage not present. Add FYA	Front to Rear - Rear End Angle - Left / Perpendicular	Flashing Yellow Arrow (FYA), Low-cost Countermeasures (Signage), Low-cost Countermeasures (Striping), Rumble Strips (Intersection)	Prevents "green means go"	X			X	X				X	$ 27,000.00	X	X			X		10	Medium	Short	Parish
2	US 190	Oaklane Dr	Market St	7400	X		X		X	2 Pedestrian fatalities at night, No raised pavement markings, Walmart exit has left turn lane for cars to cross oncoming traffic to head west on US-190	Front to Rear - Rear End, Angle	Lighting, Rumble Strips (edge), Wide Edge Lines, Raised Pavement Markings, Add RIRO island at Walmart Exit, Optimize Signal Timing/Adjust Yellow Change Intervals on 190 Westbound, Low-cost Countermeasures (Striping)	Improve nighttime visibility	X			X					X	$ 170,000.00	X	X	X				9	Medium	Mid	State
3	US 190	Olivia Ln	Falcon Dr	4800		X	X		X	Off road crashes, no lighting or rumble strips	Not a Collision with a Motor Vehicle, Front to Rear - Rear End	Lighting, Wide Edge Lines, Rumble Strips (edge)	Improve nighttime visibility										$ 324,300.00	X	X					7	Medium	Mid	State

Tangipahoa Project Prioritization List

					Crash Issues									Potential/ Proposed Eligible Funding Source										For Project Prioritization									
														Federal				State				Local		4	3	2	1	3	3				
Map ID	Roadway	From INT	To INT	Segment Length (Feet)	Pedestrian / Bicycle	Roadway Departure	Intersections	Speed Management	Integrative Approaches	Observed Issues	Majority Manner Of Collision	Potential countermeasure	Improvement Description	SS4A Implementation	RAISE Grant	Other Federal Grants	Surface Transportation Block Grant (STBG)	Highway Safety Improvement Program	Local Road Safety Program	Safe Routes to Public Places	Transportation Alternatives Program (TAP)	General Fund	Total Estimated Cost w/ 20% Contingency	SS4A	Safety	Equity	Multimodal	Public Engagement	Continuity	Total Points	Priority	Timeframe	Roadway Owner
5	Veterans Ave (US 51 BUS)	W Club Deluxe	Medical Arts Dr	3900		X	X			Speed management, TWLTL, High percentage of rear ends at Paul Vega MD Dr, Lighting	Front to Rear - Rear End (5)	Wide Edge Lines, Median with left turn lane at Paul Vega MD Dr, Lighting, Rumble Strips (edge)	Enhance visibility of travel lane boundaries	X			X					X	$ 293,000.00	X	X					7	Medium	Mid	Parish
6	E Pine St (LA 22)	Oak Meadow Ln	N 3rd St	5280	X		X		X		Front to Rear - Rear End, Angle - Perpendicular/Other Angle, Sideswipe - with Flow, Angle - Left Across Flow	Pedestrian Signal, Bike Lane, RRFB, Flashing Yellow Arrow (FYA), Low-cost Countermeasures (Signage), Low-cost Countermeasures (Striping)	Provide safe travel paths	X							X	X	$ 346,200.00	X	X	X	X			10	Medium	Mid	State
8	W Church St	W Thomas St	Harden St	1500	X		X			Evenly distributed collision manners, 1 Bicycle crash	N/A	Low-cost Countermeasures (Striping), Wide Edge Lines, Rumble Strips (edge), Concrete sidewalk on both sides of W Church St, 24" PVC, Catch Basins, Pedestrian Signal	Increase lane visibility	X					X			X	$ 879,900.00	X		X				6	Medium	Mid	City
14	HWY 445 & US 190	INTERSECTION					X			Solid green for left turns	Front to Rear - Rear End Angle - Left Across Flow	Flashing Yellow Arrow (FYA), Low-cost Countermeasures (Signage), Low-cost Countermeasures (Striping), Rumble Strips (transverse)	Prevents "green means go"	X			X	X				X	$ 21,600.00	X	X					7	Medium	Mid	State
18	HWY 445 & LA 22	INTERSECTION			X	X	X		X	Off road crashes happening at night with no lights	Not a Collision with a Motor Vehicle Angle - Left / Perpendicular	Lighting, Rumble Strips (transverse), Rumble Strips (edge)	Improve nighttime visibility	X			X	X	X			X	$ 24,300.00	X	X			X		10	Medium	Mid	State
19	FALLER RD & LA 443 & LA 1064	INTERSECTION					X			Lighting, Bad line of sight from 1064 - needs clearing, possibly reduce speed limit on 443 to 50	Angle - Left / Perpendicular	Lighting, Rumble Strips (transverse), Low-cost Countermeasures (Striping), Low-cost Countermeasures (Signage)	Improve nighttime visibility	X			X	X	X			X	$ 21,100.00	X	X			X		10	Medium	Mid	Parish
43	HWY 445 & STEPP RD	INTERSECTION					X				N/A	Add Merge Lane	Allows smoother transition into hwy	X				X	X	X		X	$ 213,000.00	X	X			X		10	Medium	Mid	Parish
4	SW RAILROAD AVE (US 51 BUS) (Hammond Square Mall Corridor)	Duo Dr	2nd Ave	6313			X			TWLTL, Angle and rear end crashes	Front to Rear - Rear End, Sideswipe - with Flow, Angle - Perpendicular/Other Angle	Replace TWLTL with raised medians and turn bays, Raised Pavement Markings, Low-cost Countermeasures (Edge Striping), Roundabout	Provides lane for turning vehicles, provides access control										$ 4,874,000.00	X	X					7	Medium	Long	State
7	W Oak St (LA 16)	I-55	NW Central Ave	7400						Not enough WB right turn lane storage length, TWLTL Causing angle crashes	Rear End, Angle	Restripe to increase storage length, Add raised median to control access points	Decrease congestion										$ 409,000.00	X	X	X				9	Medium	Long	State
15	LA 443 & US 190	INTERSECTION					X			Angle crashes and conflicting turning movements	Angle - Perpendicular/Other Angle Angle - Left Across Flow	Roundabout	Slows drivers, reduces angle crashes	X			X	X	X			X	$ 3,600,000.00	X	X			X		10	Medium	Long	State
17	S HOOVER & LA 22	INTERSECTION					X			Angle Crashes, Speed Management	Angle Left Across Flow/Perpendicular Rear End	Roundabout	Slows drivers, reduces angle crashes										$ 3,600,000.00	X	X			X		10	Medium	Long	City
27	Wardline Rd	Crapanzano Rd	N Baptiste Rd	6900	X	X		X		Narrow road,open ditches, no lighting. Speeding potentially an issue	Not a collsion with a motor vehicle, rear end	widen roadway, close ditches, edgeline rumble strips, roundabout	widen road and add rumble strips to reduce roadway departures, construct a roundabout at Rufus bankston rd to reduce vehicular speed	X					X	X		X	$ 12,054,000.00	X	X					7	Medium	Long	Parish
28	Airport Rd (LA 3154)	South of I-12	Old Covington Hwy	5800		X		X		Narrow roadways	run off the roads	closing ditches, widen roadway, add rumble strips	warn of lane departures and safety measure for drivers who drive off the road	X				X	X	X		X	$ 9,792,400.00	X	X			X		10	Medium	Long	State
29	Mike Cooper/Harvey Lavigne Rd	LA 445	Firetower Rd	17400		X		X		Narrow roadways	run off the roads	closing ditches, widen roadway, add rumble strips	warn of lane departures and safety measure for drivers who drive off the road	X		X		X	X	X		X	$ 29,381,400.00	X	X			X		10	Medium	Long	Parish
30	S Coburn Rd	US 190	Coburn Loop	9500		X		X		Narrow roadways	run off the roads	closing ditches, widen roadway, add rumble strips	warn of lane departures and safety measure for drivers who drive off the road	X				X	X	X		X	$ 16,043,300.00	X	X			X		10	Medium	Long	Parish
31	Traino Rd	LA 22	Lee's Landing Rd	20500		X		X		Narrow roadways	run off the roads	closing ditches, widen roadway, add rumble strips	warn of lane departures and safety measure for drivers who drive off the road	X				X	X	X		X	$ 34,615,000.00	X	X			X		10	Medium	Long	Parish
32	General Ott Rd	LA 1249	Happywoods Rd	14250		X		X		Narrow roadways	run off the roads	closing ditches, widen roadway, add rumble strips	warn of lane departures and safety measure for drivers who drive off the road	X				X	X	X		X	$ 24,063,500.00	X	X			X		10	Medium	Long	Parish
33	Stafford Rd	LA 1064	LA 442	11800		X		X		Narrow roadways	run off the roads	closing ditches, widen roadway, add rumble strips	warn of lane departures and safety measure for drivers who drive off the road	X				X	X	X		X	$ 19,926,700.00	X	X			X		10	Medium	Long	Parish
34	Happywoods Rd	W Hoffman Rd	Old Baton Rouge Hwy	13800		X		X		Narrow roadways	run off the roads	closing ditches, widen roadway, add rumble strips	warn of lane departures and safety measure for drivers who drive off the road	X				X	X	X		X	$ 23,304,500.00	X				X		7	Medium	Long	Parish
35	Adams Rd	LA 22	Happywoods Rd	15600		X		X		Narrow roadways	run off the roads	closing ditches, widen roadway, add rumble strips	warn of lane departures and safety measure for drivers who drive off the road	X				X	X	X		X	$ 26,343,400.00	X	X			X		10	Medium	Long	Parish
36	Chappepela Rd	LA 443	LA 445	20750		X		X		Narrow roadways	run off the roads	closing ditches, widen roadway, add rumble strips	warn of lane departures and safety measure for drivers who drive off the road	X		X		X	X	X		X	$ 35,037,100.00	X	X			X		10	Medium	Long	Parish
16	OAK ST & US 190 (westbound and eastbound)	INTERSECTION			X		X			Angle crashes, pedestrian crashes, poor striping	Angle - Perpendicular/Other Angle	Adjust Yellow Change Intervals, Low-cost Countermeasures (Striping), Pedestrian Signal	Less drivers running red lights	X			X	X	X			X	$ 101,000.00	X			X			5	Low	Short	City

St. John the Baptist Project Prioritization List

Map ID	Roadway	From INT	To INT	Segment Length (Feet)	Crash Issues: Pedestrian / Bicycle	Roadway Departure	Intersections	Speed Management	Integrative Approaches	Observed Issues	Majority Manner Of Collision	Potential countermeasure	Improvement Description	Potential/ Proposed Eligible Funding Source: Federal: SS4A Implementation	RAISE Grant	Other Federal Grants	Surface Transportation Block Grant (STBG)	Highway Safety Improvement Program	State: Local Road Safety Program	Safe Routes to Public Places	Transportation Alternatives Program (TAP)	Local: General Fund	Total Estimated Cost w/ 20% Contingency	For Project Prioritization: SS4A (4)	Saftey (3)	Equity (2)	Multimodal (1)	Public Engagement (3)	Contnuity (3)	Total Points	Priority	Timeframe	Roadway Ownership
22	Jackson Ave	US 61	Creole	1550	X		X				Lane departure	Enhanced signing and striping, crosswalk across from park at Sunnyside, stripe bike lanes	Low-Cost Safety Improvements	X									$ 51,000.00	X	X	X	X	X	X	16	High	Short	Parish
6	LA 3224 (Hemlock St)	LA 44 (W 5th St)	US 61 (Airline Hwy)	1200		X	X			Should be local street, parking demand is high, one of the few railroad crossings to connect LA 44 to US 61; railroad overpass (consider closing Elm in trade for grade separation at Hemlock - where is the proposed NOLA-BR passenger rail stop in Laplace?)	Rear Ends and Other	Alternative access and off-site parking needed - feasibility study recommended; from US-61 to LA-44 / W 5th St, add Conventional Bike Lane	Improved Local Connectivity & Rail Safety										$ 240,000.00	X	X	X	X	X	X	16	High	Mid	State
14	Carrollwood	US 61 (Airline Hwy)	Fairway Dr	5090	X	X	X			Sidewalks are missing south of Madewood/Dominican, sidewalks are being used for on-street parking near Laplace Elementary, sidewalks are missing on the west side north of the school, and there's no connectivity across Fairway	Angle Crashes	Sidewalk connections and crosswalk at Fairway, bike boulevard from Greenwood Dr to US-61, bike lanes from Fairway to Greenwood	Corridor Enhancement	X			X			X	X	X	$ 119,000.00	X	X	X	X	X	X	16	High	Mid	Parish
17	Cambridge Drive	US 61	Woodland Drive	10400	X	X	X	X		very wide lanes, good sidewalks but lacking ADA facilities, many parallel park on-street	Rear Ends and Other	bike boulevard, ADA ramps, curb extensions at intersections or mini roundabouts, pedestrian crossing markings	Low-Cost Safety Improvements	X	X	X	X			X	X	X	$ 229,000.00	X	X	X	X	X	X	16	High	Mid	Parish
19	Tiffany Drive	US 61	Rebecca Lane	4670			X				Other	Add sidewalks on west side from Grove Park to US 61 and east side from Heather to US 61, add curb ramps to sidewalks for ADA compliance, mark 5' bike lanes and 10' travel lanes	Sidewalks and Low-Cost Safety Improvements	X							X	X	$ 194,000.00	X	X	X	X		X	13	High	Mid	Parish
1	US 61 (Airline Hwy)	Airport Rd	Parish Line (St Charles Line)	47520	X	X	X	X	X	High volume, high speed, but more urbanized development occuring; demand for walking/biking is high, but there are no proper crossings	There are high speed, angle crashes which often result in severe injury or death; there are also high speed rear ends that are more severe than expected; some lane departures on the more rural segments indicate an avoidance maneuver	Access Management (Install median), Improved Non-Motorized User Accessibility, Traffic Calming, Speed Enforcement; Add Crossing Markings, Pedestrian Activated Signal with Countdown Signal Heads, Refuge Islands at Magnolia Dr, Carrollwood Dr, LA-367 / W 10th St, Ormond Blvd, Belle Pointe Blvd, McReine Rd, LA 3188 / Belle Terre Blvd, Cambridge Dr, Main St, US-51, and Central Ave. From W 19th St to Emmett Ct, add a sidepath. From LA-637 / W 10th St to Railroad Ave, add a shoulder. Permissive to Protected Only Lefts, left turn lane installation at Emmett Court, remove channelized right turn lanes, add curbing and tighten corner radii at intersections, add sidewalks, crosswalks, and pedestrian signals; from Airline Hwy & LA-367 / W 10th St, add Signalized Intersection: Add Crossing Markings, Pedestrian Activated Signal with Countdown Signal Heads, Refuge Island	Corridor Enhancement	X	X	X	X	X		X	X	X	$ 30,338,000.00	X	X	X	X	X	X	16	High	Long	State
5	US 51	US 61 (Airline Hwy)	I-10 Interchange	14540	X	X	X	X	X	TWLTL, high volume, high speed, no pedestrian crossings	r Ends and Angle Cras	Access Management (Install Median), Improved Non-Motorized User Accessibility (Add a sidepath from US-61 to Chevron), Traffic Calming (barrier curb and landscaping adjacent to sidewalk), Speed Enforcement; at Woodland, add Crossing Markings, Pedestrian Activated Signal with Countdown Signal Heads, Refuge Island	Corridor Enhancement										$ 9,695,000.00	X	X	X	X	X	X	16	High	Long	State
9	Carrollwood	US 61 (Airline Hwy)	Fairway Dr	5090	X	X	X			Sidewalks are missing south of Madewood/Dominican, sidewalks are being used for on-street parking near Laplace Elementary, sidewalks are missing on the west side north of the school, and there's no connectivity across Fairway	Angle Crashes	At Airline, add Crossing Markings, Pedestrian Activated Signal with Countdown Signal Heads, Refuge Island; Mini roundabout at Madewood; From Airline to Madewood, add median and sidewalks (750'); add crosswalks at Marseille Dr; roundabout at Fairway Dr											$ 2,620,000.00	X	X	X	X	X	X	16	High	Long	Parish
21	Fairway St	Cartier Dr	E Frisco Dr	1275	X		X				Angle Crashes	Add sidewalks and ped bridge from Sugar Ridge to Belle Terre, stripe bike lanes from Cartier to Belle Terre, ped heads and refuge island at Belle Terre, buffered bike lanes from Belle Terre to Shadow, bike boulevard from Shadow to E Frisco Dr, ADA ramps at intersections where sidewalks exist, stripe mini roundabout at Lakewood	Corridor Enhancement	X						X	X		$ 323,000.00	X	X	X	X	X	X	16	High	Long	Parish
3	LA 44 (Jefferson Hwy)	Central Ave	W 5th Street	20539	X	X	X			No MS River Trail Crossings near access points, see SCPDC Bike Ped Plan recommendations for crossing locations	Rear Ends and Roadway Departure	6" Edge Lines, Pedestrian signage and striping at River Rd & E 29th St, LA-44 / River Rd & E 6th St, and LA-44 / River Rd & LA-53 / Central Ave, Bradford Place	Low-Cost Safety Improvements										$ 531,000.00	X	X					7	Medium	Short	State
4	LA 3127	LA 640	Parish Line	6500		X	X			Rural, high-speed, school located in the middle of agricultural land use with no residential development nearby	Lane departure	Rumble Strips, 6" Edge Lines	Low-Cost Safety Improvements										$ 171,100.00	X	X					7	Medium	Short	State
7	LA 3213 (St John Parish St)	Parish Line	LA 18 Interchange	8710		X				Only bridge across the MS River for miles	ar Ends & Lane Departu	Rumble Strips, 6" Edge Lines; Enhanced striping at lane drop	Increase lane visiblity										$ 229,000.00	X	X					7	Medium	Short	State
8	LA 628 (River Road)	McReine Road	Parish Line	8550	X	X	X			Pedestrian crossing sign but no markings	Roadway Departure	Rumble strips, 6" edge lines											$ 226,000.00	X	X	X	X			10	Medium	Short	State
10	LA 54	US 61 (West Airline Hwy)	Garyville Magnet Elementary	10982	X	X	X			Rural two-lane road with wide shoulders but no rumble strips, no turn lanes at school driveways	Roadway Departure	6" striping, centerline and edgeline rumble strips, left turn lane at school driveway	Low-Cost Safety Improvements										$ 409,931.46	X	X					7	Medium	Short	State
12	I-10 & US 51 Interchange						X			No apparent issues	Angle Crashes	Permissive to protected only left turn phasing	Signal Phasing										$ 5,000.00	X	X					7	Medium	Short	State
18	Woodland Drive	Revere Dr	Main St	8660						Only crash was a suspected serious injury head-on crash (appears to be random but not indicative of a pattern)	Head On	Enhanced striping and signing	Low-Cost Safety Improvements	X					X				$ 104,000.00	X	X					7	Medium	Short	Parish
20	Windsor Blvd	US 61	Berkshire St	2765		X					N/A	Centerline and edgeline pavement markings and enhanced signage	Low-Cost Safety Improvements	X									$ 34,000.00	X	X					7	Medium	Short	Parish

St. John the Baptist Project Prioritization List

					Crash Issues									Potential/ Proposed Eligible Funding Source										For Project Prioiritization									
															Federal				State			Local		4	3	2	1	3	3				
Map ID	Roadway	From INT	To INT	Segment Length (Feet)	Pedestrian / Bicycle	Roadway Departure	Intersections	Speed Management	Integrative Approaches	Observed Issues	Majority Manner Of Collision	Potential countermeasure	Improvement Description	SS4A Implementation	RAISE Grant	Other Federal Grants	Surface Transportation Block Grant (STBG)	Highway Safety Improvement Program	Local Road Safety Program	Safe Routes to Public Places	Transportation Alternatives Program (TAP)	General Fund	Total Estimated Cost w/ 20% Contingency	SS4A	Saftey	Equity	Multimodal	Public Engagement	Contnuity	Total Points	Priority	Timeframe	Roadway Ownership
13	LA 3188 (Belle Terre) @ St. Andrews Blvd						X			Span wire signal	ngle Crashes & Rear En	Signal upgrade with mastarms and backplates; permissive to protected only	Signal upgrades with mastarms and backplates; permissive to protected only; enhanced striping										$ 240,000.00	X	X					7	Medium	Mid	Parish
16	Capt. G.Bourgeois St.	Fir St	Spruce St	4530		X	X			Appears to be a very narrow roadway and to encroach on railroad ROW on a portion; Spruce St railroad crossing doesn't have lights and gates and alternative access is nearby via 5th St w/ lights and gates; train was involved in a crash	Sideswipe	Close railroad crossing at Spruce St (no lights and gates, alternative access via 5th St w/ lights and gates), add traffic calming	Low-Cost Safety Improvements	X		X		X					$ 200,000.00	X	X		X	X		10	Medium	Mid	Parish
23	Cardinal Street	W 2nd St	End of street (west of Matthew)	4200			X				Angle Crashes	Prevent lefts out at US 61, close railroad crossing (alternative access exists at Main St)	Access Management	X				X					$ 208,000.00	X	X					7	Medium	Mid	State
2	I-10	I-55 Merge	I-55 Merge	6500		X	X			The US 51 Interchange with I-10 is located less than a mile away from the I-55 Interchange	High speed rear ends, roadway departure, and sideswipes	Interchange Spacing Improvement, pavement markings and cable median barrier needs to be adequately maintained	IJR & Maintenance	X			X					X	$ 600,000.00	X	X					7	Medium	Long	State
11	St. Andrews Blvd	LA 3188 (Belle Terre Blvd)	S Pass Drive	8765			X			No left turn lanes where median openings exist, no golf cart/trail crossing markings	Rear Ends and Other	Convert median openings to right-in/right-out movements only and provide mini roundabouts or left turn lanes where median openings remain at specific intersections	Access Management										$ 240,000.00	X	X					7	Medium	Long	Parish
15	St. Andrews Blvd	LA 3188 (Belle Terre Blvd)	S Pass Drive	8765			X			No left turn lanes where median openings exist, no golf cart/trail crossing markings	Rear Ends and Other	Convert median openings to right-in/right-out movements only and provide mini roundabouts or left turn lanes where median openings remain at specific intersections	Access Management	X			X		X			X	$ 240,000.00	X	X					7	Medium	Long	Parish

St. Tammany Parish Project Prioritization List

					Crash Issues									Potential/ Proposed Eligible Funding Source										For Project Prioiritization									
															Federal				State			Local		4	3	2	1	3	3				
Map ID	Roadway	From INT	To INT	Segment Length (Feet)	Pedestrian / Bicycle	Roadway Departure	Intersections	Speed Management	Integrative Approaches	Observed Issues	Majority Manner Of Collision	Potential countermeasure	Improvement Description	SS4A Implementation	RAISE Grant	Other Federal Grants	Surface Transportation Block Grant (STBG)	Highway Safety Improvement Program	Local Road Safety Program	Safe Routes to Public Places	Transportation Alternatives Program (TAP)	General Fund	Total Estimated Cost w/ 20% Contingency	SS4A	Saftey	Equity	Multimodal	Public Engagement	Contnuity	Total Points	Priority	Timeframe	Roadway Ownership
1	I-10	US 190 BUS	US 190	6900	X					Interstate metal fencing down in several locations		Repair fence in downed locations. Construct new fencing where necessary/feasible	limit interstate access to pedestrians										$ 107,000.00	X	X	X		X		12	High	Short	State
X	Various				X							Demonstration project to work in conjunction with the St Tammany bike and pedestrian plan	Address Bike and Ped projects identified in the RATP that are located on the HIN	X							X	X	$ 1,200,000.00	X	X	X	X	X		13	High	Short	Various
18	BETH DR & US 190 BUS	INTERSECTION					X			NORPC Study in 2019	Left Turn	Extend Nellie St RCUT to this intersection		X									$ 900,000	X	X	X		X		12	High	Mid	City
12	US 190 Bus (W 21st Ave) at Tyler St	INTERSECTION					X			Backplates installed in 2020 and crashes reduced	Rear End & Left Turn	Corridor Study and Signal Retiming, add turn lanes on Tyler st, roundabout, access management	Long vehicle queues in street view	X									$ 1,500,000	X	X	X		X		12	High	Long	City
11	I-10 at LA 433	INTERSECTION					X				Left Turn	Corridor Study, Signal Retiming, and Signal Backplates	Clearances and Splits					X					$ 203,000	X	X	X				9	Medium	Short	State
13	LA 21 & W 11TH AVE	INTERSECTION					X			New Signal in 2018	Rear End	Ped Equipment and Ramps	Existing sidewalks	X				X		X			$ 54,000	X	X		X			8	Medium	Short	City
14	HOWARD OBERRY RD & LESTER DR	INTERSECTION								Only one fatal in 2020, none after, alcohol		One Direction Sign	Indicating to turn										$ 1,000	X				X		7	Medium	Short	Parish
15	Causeway at Florida St	INTERSECTION								Side St offsets by 100', both are signalized on Span wire	Rear End	Signal Rebuild and Backplates	Improve signal visibility	X				X					$ 600,000	X	X			X		10	Medium	Short	City
19	LA 1091 & US 190	INTERSECTION					X			No ped signal across East leg	Left Turn	Signal Modification	EBL Protected only, ped signals	X									$ 12,000	X	X		X			8	Medium	Short	State
21	GIROD ST & LA 59 & US 190	INTERSECTION									Rear End	Signal Rebuild with Ped Ramps		X									$ 600,000	X	X		X			8	Medium	Short	City
22	HERWIG BLUFF RD & LA 1090 & US 190	INTERSECTION								Span Wire, protected permitted lefts	Left turns and Rear End	Signal Modification	mast arms, backplates, protected only lefts on all approaches	X									$ 420,000	X	X			X		10	Medium	Short	Parish
24	LA 1077	South of I-12	Lalanne Rd	8000			X			Open Ditch, No Shoulders. Many Access/Intersections	Rear End, left turn and Angle	Traffic Study	Corridor Study to determine three lane section or 4 lane roadway	X		X		X	X				$ 180,000	X	X			X		10	Medium	Short	State
25	LA 21	Tchefuncte River	23rd St	7200							Rear End, left turn and Angle; pedestrian	Traffic Study	Corridor Study to determine three lane section or 4 lane roadway	X		X		X	X				$ 360,000	X	X					7	Medium	Short	State
26	US 190 (Ronald Regan Hwy)	Fitzsimmons Rd	US 190 (Collins Blvd)	21648	X		X			No sidewalks and crosswalks	Rear End, left turn and Angle; pedestrian	Traffic Study	widening, roundabouts, sidewalks, crosswalks	X				X	X				$ 360,000	X	X					7	Medium	Short	State
27	US 190	Sunshine Ave	US 190 Bus	3500	X		X			No sidewalks and crosswalks	Rear End, left turn and Angle; pedestrian	Traffic Study	sidewalks & crosswalks	X				X	X				$ 120,000	X	X					7	Medium	Short	State
33	LA 21 at 8th Ave	INTERSECTION					X			No Pedestrian Crossings		Crosswalks, Ped Equipment, Sidewalk NE Corner	Connections to Parking lots on all corners	X				X					$ 120,000	X			X	X		8	Medium	Short	State
6	LA 22	West of Lasalle St	Roger Storme Rd	14,200	X						Left turns, rear ends	Traffic Study, improve traffic flow	Sidewalks both sides and 4 signal upgrade	X									$ 3,904,000.00	X	X		X			8	Medium	Mid	State
10	HWY 1085 & LA 22	INTERSECTION					X				Rear End	EB Left Turn Lane, Advance Intersection Warnings Signs	Reduce Rear End and left turn crashes	X									$ 841,000	X	X			X		10	Medium	Mid	State
16	US 11 at US 190 Bus / Bayou Ln	INTERSECTION					X			Currently being studied by NORPC	Left turn	Left turn lanes and signal upgrade		X									$ 2,220,000	X	X	X				9	Medium	Mid	City
17	US 190 Bus at I-10 NB Ramp	INTERSECTION					X				Left Turn	Turn lanes											$ 960,000	X	X	X				9	Medium	Mid	State
20	E 32ND AVE & US 190	INTERSECTION					X			US 190 Currently being studied to widened to 4 lanes	Rear End	Signal Upgrade from Span Wire to Mast Arms											$ 420,000	X	X					7	Medium	Mid	City
32	LA 433 at Sgt Alfred St	INTERSECTION					X			no left on Sgt Alfred St	Left Turn and Angle	left turn on Sgt Alfred St, signal updgrade	Visibility of Signal and protected left turns	X									$ 480,000	X	X					7	Medium	Mid	City
2	US 190 (Gause Blvd)	Northshore Blvd	Military Rd	35400	X		X			Lack of pedestrian facilities, mid-block crashes	Rear-end, angle crashes	sidewalks, signal upgrades, access management, R-cut intersections	Corridor study required										$ 19,441,000.00	X	X	X	X			10	Medium	Long	State
4	LA 1091	Country Club Blvd	US 11	16400	X	X				Narrow roadway, no shoulders	roadway departures, head-on	widen roadway, restripe, rumble strips	widen roadway to allow the addition of wide edge lines and rumble strips										$ 21,653,000.00	X	X			X		10	Medium	Long	State
5	Brownswitch Rd	US 11	LA 1091	6650	X		X				Rear End, left turn and Angle; pedestrian	Center turn lane US 11 to Pawns Ln, Sidewalks, and RRFBs	Address left turn and angle crashes	X									$ 1,920,000.00	X	X		X			8	Medium	Long	City
7	LA 59	US 190	Lonesome Rd	10000		X				3 lane section, 10' lanes with TWLTL		Widen Lanes											$ 1,489,000.00	X	X					7	Medium	Long	State
8	LA 41	US 11	JamesCrosby Rd	700			X			Access Management	Left turn	Median Access management, Roundabout at US 11											$ 4,100,000.00	X	X			X		10	Medium	Long	State
9	Northshore Blvd	I-12	US 190	4100						Traffic Study Performed in 2020, two alternatives were recommended in Stage 0		Rounabouts and J turns (Stage 0 Study completed in 2020)											$ 18,424,600.00	X	X					7	Medium	Long	City
29	Airport Road	Vetrans Memorial	Airport	10032	X	X				Open Ditch	Runoff Road	Rumble Strips	Warn drivers of roadway edge	X					X				$ 6,000.00	X						4	Low	Short	City
30	Fish Hatchery St	Cloverland Dr	LA 1088	30624		X				Open Ditch	Runoff Road	Rumble Strips	Warn drivers of roadway edge	X					X				$ 20,000.00	X						4	Low	Short	Parish
31	BERRY TODD RD & LA 434	INTERSECTION									No significant Trend	Advance Intersection Warnings Signs											$ 1,000	X						4	Low	Short	Parish
23	E I-10 SRVRD & I-10 & TYLER DR & US 190	INTERSECTION								Heavy traffic on US 190	Sideswipe and rear end	Reconfigure intersection & US190 Corridor Study	Address sideswipe, improve flow on US 190	X									$ 360,000.00	X						4	Low	Mid	City
3	US 11	Spartan Dr	LA 433	6500	X		X			No sidewalks, TWLTL	sideswipe, left turns, angles	sidewalks, access management, signal upgrades	Corridor study required										$ 3,396,000.00	X		X				6	Low	Long	State
28	TOWN CENTER PKWY	LA 433	US 190 Bus	8976			X			Faded Stirping, wrong striping	Side Swipe	Re stripe, Reconfigure North Roundabout	Pavement Markings	X									$ 1,139,000.00	X						4	Low	Long	City
34	LA 21 South of Greenbriar Blvd (Bridge over Flower Bayou)			230	X					No pedestrian facilities to cross bayou		Construct Pedestrian Bridge	Allow a safe route for pedestrian travel	X									$ 690,000.00				X	X		4	Low	Long	State

APPENDIX D: PRIORITIZATION METHODOLOGY TECHNICAL MEMO

TANGIPAHOA ST. JOHN ST. TAMMANY

PATH TO ZERO

MEMORANDUM

DATE: June 10, 2024
TO: Nelson Hollings, Senior Transportation Planner, NORPC
CC:
FROM: Jonathan Gambino, P.E., PTOE, RSP_1
RE: NORPC SS4A Project Prioritization Methodology

Project Prioritization Methodology

Through analysis of crash data, a total of 257 hot spot intersections and 352 segments were identified throughout the three (3) parishes. St John contains 35 intersections and 47 segments, St. Tammany has 126 intersections and 147 segments, and Tangipahoa has 96 intersections and 158 segments. The top 25 hot spots and intersections were then identified to move onto project recommendations.

The project team analyzed each identified hot spot to obtain a more detailed insight as to why crashes occurred in these areas. Once the detailed analysis was completed a project recommendation was made to improve safety at the identified intersection or segment.

Due to the nature of the Safe Streets for All (SS4A) grant it is unlikely that all identified projects will receive implementation funding, therefore, a project prioritization methodology must be developed to identify which recommended project will have the greatest impact on the community. To achieve this goal, the following "point" system, depicted in **Table 1,** was created to rank the projects. A total of sixteen (16) points can be awarded to each project. 1-5 points define the project as **low** priority, 6-10 points define the project as **medium** priority, and 11-16 points define the project as **high** priority.

Each recommended project can receive points for one factor in each category. For example, a project may be on the High Injury Network (HIN) and in a historically disadvantaged community but will only receive 4 points.

Table 1: Ranking Criteria

Factor Description	Value
SS4A	
The project addresses safety issues on roadways that have been identified as part of the HIN	4
The project is in a census tract designated as a Historically Disadvantaged Community.	4
The project is in a census tract designated as an Area of Persistent Poverty.	4
Safety	
Fatal or serious injury crashes occurred in the project area during the crash data analysis period from 2017-2021.	3
The corridor speed limit in the project vicinity is greater than 35 miles per hour.	3
One of the 25 Highest Crash Segments	3
One of the 25 Highest Crash Intersections	3
Equity	
The project is in a block group that meets the 80th (or greater) percentile threshold minority population.	2
The project is in a block group where greater than 8 percent of households do not own a car.	2
Multimodal	
Fatal or serious injury crashes involving a bicyclist or pedestrian occurred within 100 feet of the project area during the crash data analysis period from 2017-2021.	1
The project vicinity lacks existing bicycle facilities.	1
The project vicinity lacks existing pedestrian facilities.	1
Public Engagement	
The project was identified as a safety concern through the public engagement process.	3
Continuity	
Removes a major barrier to transportation access	3
Project provided access to medical services/post crash care	3

APPENDIX E: PROGRESS AND TRANSPARENCY TECHNICAL MEMO

TANGIPAHOA ST. JOHN ST. TAMMANY

PATH TO **ZERO**

MEMORANDUM

DATE: June 20, 2024
TO: NORPC
CC: Volkert
FROM: ATG | DCCM
RE: Path to Zero: Progress and Transparency

Overview

Action Plans funded through the Safe Streets and Roads for All (SS4A) grant program require a progress and transparency component to measure plan outcome and share with residents and stakeholders. At minimum, this component requires annual reporting of progress to the public and that the Action Plan is posted online. The following provides a comprehensive overview of potential reporting strategies and mechanisms for tracking progress towards the objectives outlined in the Path to Zero Safety Action Plan for the NORPC region. Drawing insights from regional examples and existing plans nationwide, a range of quantifiable metrics and reporting mechanisms have been identified to align with the project's goals. The mechanism options, including report cards, online dashboards, interactive maps, transportation safety dashboards, and story maps, are discussed as well as their advantages and potential application. The following will offer background information as well as recommendations for the future maintenance of performance evaluation and public reporting of the project’s success. Ultimately, the following serves as a roadmap to navigate the reporting process in order to maintain transparency and accountability during the performance evaluation phase of the Path to Zero Project.

Reporting Strategies

Through a thorough examination of similar project examples nationwide, as well as a review of the Task 5 Vision and Goals document, several potential quantifiable metrics have been identified which align with the project's purpose. Additionally, several mechanisms have been explored to measure these metrics after the project's completion and into the future. To aid in selecting the most suitable approach, a decision tree has been developed, shown in Figure 1, which aligns directly with our project's objectives.

Regional Examples

The project team reviewed several implementation and progress plans from other awardees of SS4A grants, the majority of which are also at the regional level. This evaluation helps to create a comprehensive idea of the possibilities available to measure progress over time and share results with the public. The following plans were reviewed, and their applicable strengths are discussed below to consider integrating them into the NORPC plan.

Capitol Region Council of Governments, Connecticut | Regional Transportation Safety Plan, 2023

Chapter 9 of this plan reviews the Capitol Region Council of Government's (CRCOG) Implementation, Evaluation, & Update Requirements.[1] Their evaluation works with the Connecticut Department of Transportation to create clear numerical values for several targets, such as Number of Fatalities, Fatality Rate, Serious Injury Rate, and others. Their plan also highlights the annual actions to be taken by their organization to review the success of these metrics and to identify what worked and what did not. They are responsible for performing the annual review which collects and analyzes the data for each year by municipality, as well as collaborating on a state, regional, and municipality level to redevelop goals for the future. They identify both short term and long term goals and discuss what further funding may or may not be required for each.

Collier Metropolitan Planning Organization, Florida | Local Road Safety Plan, 2021

Section 4 of this plan discusses the Monitoring and Performances Measures adopted by the Collier MPO to track how well they are meeting the plan's targets.[2] This plan also collaborates with the Florida Department of Transportation to integrate their Vision Zero targets. The Director of the MPO is designated to provide an annual report on each of the performance targets. Their targets and reports are well-integrated with the other plans in progress such as the MPO's Transportation Improvement Program (TIP), the Transportation System Performance Report (TSPR), and the Long Range Transportation Plan (LRTP).

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[1] Regional Transportation Safety Plan, Capitol Region Connecticut 2023 (2024). Capitol Region Council of Governments. https://crcog.org/wp-content/uploads/2024/04/RTSP2023_cover-update.pdf. Pg. 43.

[2] Collier MPO Local Road Safety Plan (2021). Collier Metropolitan Planning Organization. https://www.colliermpo.org/wp-content/uploads/2021/05/LRSP-FINAL-APPROVED-5-14-2021.pdf. Pg. 72.

They highlight updating baseline data every five years in order to continuously track improvements with relevant data.

The City of El Paso, Texas | The City of El Paso Vision Zero Action Plan, 2023

El Paso's plan focuses on transparency and ensuring that data is available and easily accessible by the public, including crash data, plan progress, and funding allocation.[3] They encourage the community to use these tools to keep them accountable on the plan's implementation. They emphasized the creation of a permanent oversight committee specific to monitoring the success of this plan's implementation. This plan uniquely calls on the public for input on performance in the form of an annual progress report and encourages the community to stay involved in progress. The city has an interactive online dashboard made with ArcGIS Experience Builder which provides the public with updated data such as a High Injury Network and a Systemic Safety Overview which details crash data.[4] Although the data is not framed in reference to the performance metrics set, it provides an example of how public facing data can serve to educate and involve the public in aiming to eliminate all roadway deaths and injuries.

Wasatch Front Regional Council, Utah | Comprehensive Safety Action Plan, 2024

Chapter 9 of The Wasatch Front Regional Council's (WFRC) plan discussed their procedure for Monitoring and Evaluation over time and emphasizes the plan as a living document.[5] Similar to other examples, there are plans for regular meetings, an annual evaluation, plan updates, and a plan for future funding. Their plan integrates the specific statewide performance goals such as 'Reduce fatal crashes by 6.8% per year with the annual goal of reaching zero fatalities' and 'Reduce fatalities by 50% by 2030 as compared to 2010.' They also have specific performance measures organized into categories such as Activity and Behavior Measures, Core Measures, and Utah-Specific Measures. Some metrics include Number of Seat Belt Citations Issued, Number of Speeding Citations Issued, and Percent of Children in Crashes in Child Safety Seats. This plan also emphasizes integrating goals and data sharing between other organizations in the region. The WFRC reports on their overall success in an annual evaluation report specific to the Action Plan's success.

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[3] El Paso Vision Zero Action Plan (2023). The City of El Paso, Texas. https://www.elpasotexas.gov/assets/Documents/CoEP/Vision-Zero/El-Paso-Vision-Zero-Action-Plan.pdf. Pg. 76, 87.

[4] El Paso Vision Experience | One Vision For Safe Streets Dashboard. https://experience.arcgis.com/experience/5ebd2c1fd4c0427787078fffc122442f.

[5] Comprehensive Safety Action Plan (2024). Wasatch Front Regional Council. https://wfrc.org/programs/csap/. Pg. 18.

Takeaways

There are several themes that can be seen throughout the previously discussed plans that should be considered for implementation in the Path to Zero's measure of progress protocol. The following are highlights discovered in those plans that could be beneficially applied to the project's performance tracking:

- Collaboration with other organizations such as the state's DOT.
- Integration with other existing or in-progress plans across jurisdictions to take advantage of existing data, meeting times, and task forces.
- Creation of a permanent task force for updating data, goals, and evaluations specific to the plan.
- Data reporting annually, often using an updating time period (such as the previous 3-5 years) to show gradual and relative changes.
- Utilization of goals and metrics specific to the regions concerns, incorporating public feedback and priorities.
- Public facing reporting of progress addressing stated metrics, either using an online interactive dashboard or a posted annual report.

Potential Measures

The measures below are based on the goals stated in Task 5 Vision Goals and Strategy Development that were created from peer review and public engagement. Each goal has been assigned two to three quantifiable metrics that can be used to assess its success. These are the potential metrics that can be used in the evaluation to be created (whether with a report, online dashboard, or otherwise). Many of the performance measures were found in the regional examples review but are specifically tailored to the NORPC plan and feedback from the community on their priorities and concerns.

Alternative transportation

- Number of new crosswalks
- Number of serious/fatal bike and pedestrian crashes
- Number of new bike facilities

Reduce speeds

- Number of speed limit reductions

- Number of speed limit citations issued
- Number of traffic calming measures implemented

Change the culture and policies regarding transportation safety

- Number of outreach and education projects
- Number of media trainings
- Share of police trained in bicycle and pedestrian safety enforcement

Collaborate with all public, private, and community stakeholders

- Number of task force meetings
- Number of views/feedback on online dashboard from the public

Collect and utilize data to make informed decisions

- Number of projects within the High Injury Network
- Percentage of the population within range of new projects

Ensure equity

- Share of projects within disadvantaged communities
- Percentage of the population within range of new projects part of a historically disadvantaged group

Once the metrics have been fully developed and reviewed, specific targets can be made for each that will be integrated into the mechanism chosen.

Mechanism

The following options are all viable methods to portray the aforementioned performance metrics. Regardless of the type chosen, the data comprising these mechanisms should be updated on an annual basis at minimum if not quarterly to track progress over time. As each mechanism has advantages and disadvantages, the decision tree shown in Figure 1 can help in deciding which aligns best with the project team's priorities and ongoing implementation expectations.

Report Cards

Many of the plans reviewed utilized an annual report, or report card, to track progress toward each goal. The format of a report card can vary depending on the goals and metrics specific to the plan, but it should be clear and easily understood by the public audience. The report would be posted as a document on a public webpage. Depending on data availability and leadership, this report could also be released quarterly for increased accountability. The report card must include the actions taken and the corresponding performance measures, but agencies will often include additional information to be more transparent with the public.

The advantage to using any type of report card system is the flexibility given when releasing it to the public, as they can be posted when it is most convenient to the agency. A written document also may be more familiar to the average person online and can be easily shared as a PDF. The disadvantages to a report card system could be that a written document may not attract as many public readers as something more interactive. It also requires that the report be restarted each quarter or year in a new document, and the older versions available risk being shared while out of date. Report cards can be comprised of either a Strategies Update, a Graphics Report, or both, the details of which are described below.

Strategies Update

An example of a type of report card is the Strategies Update used for the Vision Zero Columbus plan (2020) which is released quarterly and formatted as a table with the following columns: [6]

- "Goal" – Related goal from the action plan
- "Action Strategy" – Action taken to support goal
- "Measurement" – Performance measure to be used for action taken
- "Quarter # Update" – Progress made during the quarter
- "Cumulative Progress" – Overall progress since plan implementation
- "Next Steps" – Additional steps needed for the action or follow up action needed
- "Completion Date" – Date action was completed based on the performance measure (if applicable)
- "Lead Agency" – Agency responsible for action taken

[6] Vision Zero Columbus 2020 | 2021 Strategies Update. The City of Columbus, OH. https://www.columbus.gov/files/sharedassets/city/v/1/business-and-development/design-amp-construction/contractor-information/vision-zero-home/vzap-q2-2021-strategies-update.pdf.

Graphics Report

In addition to the quarterly Strategies Update, Vision Zero Columbus created an accompanying graphics report using the data to make a more easily understood graphical document.[7] This annual visually appealing document used in conjunction with the quarterly table updates creates a high degree of clarity, accountability, and communication with the public. This could be a compromise between the simplicity of a document format while still being engaging and easy to understand.

Online Dashboards

Online dashboards display the progress of the plan with interactive maps, charts, and/or graphics. This form of reporting progress provides the public with easy-to-understand information that grabs attention through interactive interfaces. The Federal Highway Administration (FHWA) published a report on Transportation Management Center Performance Dashboards that provides techniques and best practices that should be considered when creating an online dashboard.[8] Some of the key dashboard development principles from Chapter 6 include: Failing to Plan is Planning to Fail, Communicate Constantly, Manage the Data, and Simple is Best. The sections discuss the checklist that should be considered when organizing a dashboard.

The advantages of an online dashboard are that they utilize data visualization techniques such as charts, graphs, and interactive maps to present complex information in a clear manner. This can make the public more likely to explore the data being shared and understand more easily. They also allow for more real-time monitoring than a pdf, as data can be updated as it is available without having to maintain the site directly. Although they may require more front-end development than a written document, they may require less maintenance going forward. The disadvantages of an online dashboard include technical challenges and that they still require some level of data maintenance and troubleshooting. They also may require the purchase of a platform subscription license.

There are several platform options for creating an online dashboard. Although all dashboard platforms typically have a great degree of customization, there may be preferences between platforms depending on the complexity of use, functionality options, or the general desired look. Some examples include ArcGIS Experience Builder, ArcGIS Story Maps, Tableau, and Power BI.

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[7] Vision Zero Columbus 2020 | 2021 Annual Report. The City of Columbus, OH. https://www.columbus.gov/files/sharedassets/city/v/1/business-and-development/design-amp-construction/contractor-information/vision-zero-home/vz_annualreport_updated_3.0.1.pdf.

[8] Transportation Management Center Performance Dashboards | Final Report (2021). U.S. DOT, Federal Highway Administration. https://ops.fhwa.dot.gov/publications/fhwahop20032/fhwa20032.pdf. Pg. 76.

Interactive Maps

Interactive maps are a common element of all online dashboards and can be an effective way to display progress towards the goals of the plan. They can show output-based performance measures by marking on the map where improvements to the transportation system have been made. Outcome-based performance measures can also be displayed by presenting crash data with comparative data from years prior. The Vison Zero Columbus plan features only an interactive map on the website to mark where progress is happening.[9] The map places different icons on the map to correspond with the action being taken at that location. If the user clicks on the icon a text box will appear that describes what improvements were made and what streets or intersections were affected.

Transportation Safety Dashboards

This type of dashboard displays the information as a series of interactive charts that show performance metrics relating to the overarching goals of the plan. Interactive maps like the one described above are often incorporated in this dashboard. An example is the Vision Zero plan for Austin, TX, which uses a dashboard to compare crash data from 2024 to data from 2023 and is frequently updated.[10] The dashboard tracks the total fatalities, years of life lost, serious injuries, and total crashes, then provides the difference from the year prior. Below this is a series of charts that provide the crash data in the city by travel mode, demographics, time of day, year/month, and rate by population. All these charts provide comparative data from previous years and allow you to adjust the info by crash severity. An interactive map with the information from the charts is also available on this dashboard. This dashboard used by the City of Austin was developed using the software provided by Power BI.

Story Maps

ArcGIS StoryMaps are websites that present information and control the narrative of a specific plan, still with a geographic component. The websites are designed so that text with corresponding images, charts or maps will appear as the user scrolls down the page. This controls the information presented and displays it in a specific order to tell the story of the plan. An example is Lancaster, PA which used a story map for their Lancaster Vision Zero Plan (2020).[11] Their story starts with planning, detailing its purpose and initial analysis with images and maps. It progresses to implemented actions, showcasing improved intersections through images and videos. Finally, it concludes with a forward-looking section outlining next steps for plan fulfillment.

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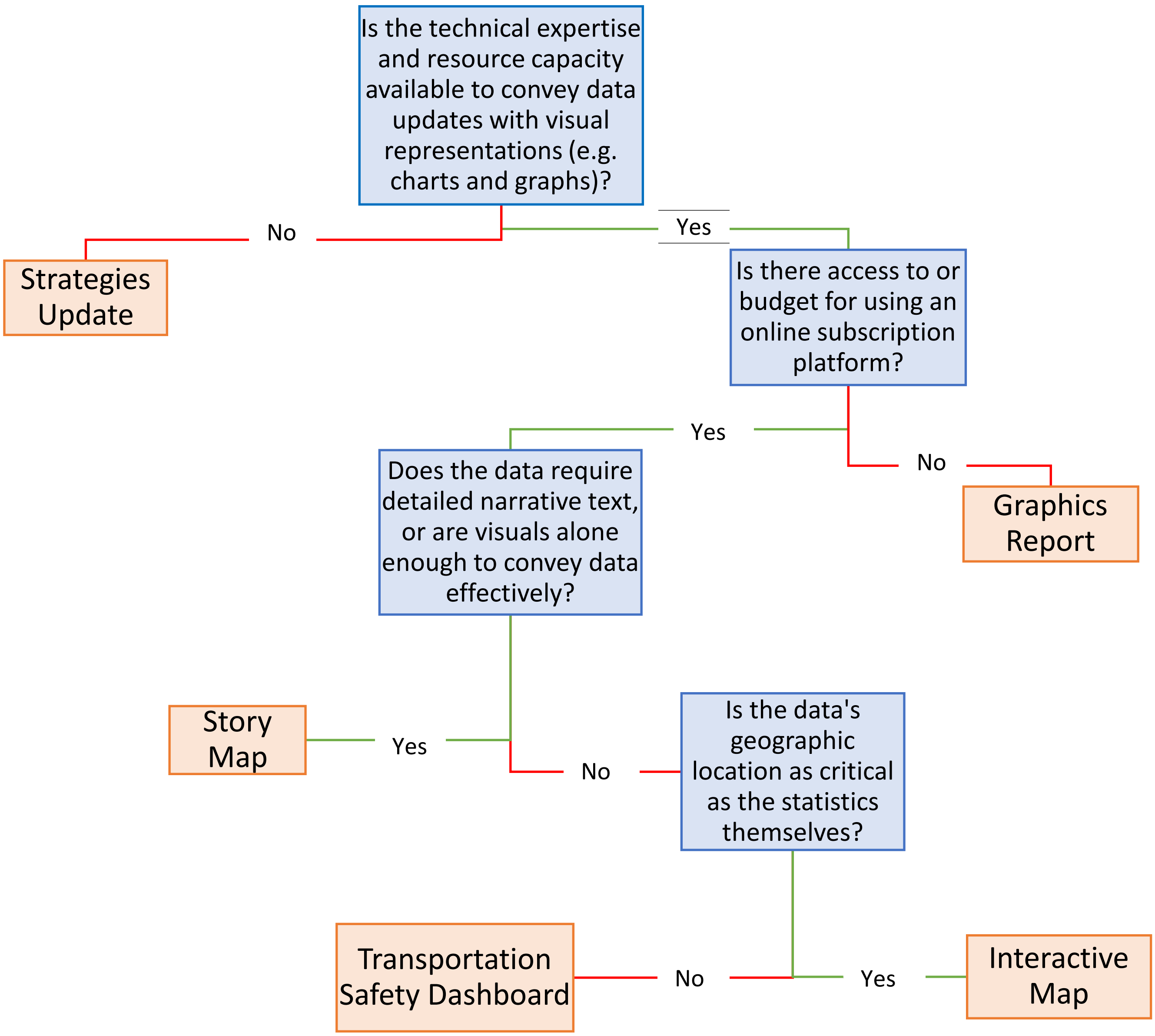
[9] Vision Zero Action Plan Improvements. Vision Zero Columbus. https://columbus.maps.arcgis.com/apps/dashboards/16d4f3416e014213a6a86d3da217a006.

[10] Vision Zero Viewer. City of Austin Transportation Public Works. https://visionzero.austin.gov/viewer/.

[11] 2021 Progress Report. Department of Public Works | Lancaster, PA. https://storymaps.arcgis.com/stories/e110d0de27d64ffead12c24a4b356679.

Figure 1: Mechanism Type Decision Tree

A combination of mechanisms could be chosen to best fit the project's goals. For any mechanism, updates can be given at either annual or quarterly intervals, although online mechanisms allow for instant updates when data is updated.



Reporting Responsibilities

There are several options for organizing the framework of responsibility for reporting the data and may vary depending on the resources available. A hybrid approach could utilize an outside entity to track and report the data back to NORPC. They would be responsible for monitoring the progress of the plan and if needed they could be supported by an additional subcommittee. A partnership of this kind could follow the example of the Pedestrian Bicycle Resource Initiative (PBRI), which is a joint project of the University of New Orleans Transportation Institute and NORPC. This partnership could act as the Vision Zero Task Force and would have the sole responsibility for overseeing the progress of the plan. Alternative options for possible subcommittees are listed below.

- Vision Zero Task Force
    - This task force is responsible for guiding the overall strategy of the Vision Zero plan and monitoring progress. A Vision Zero Task Force may include:
        - City Council Officials
        - Transportation Department Representatives
        - Law Enforcement Officials
        - Traffic Safety Advocates
        - Technical Experts
        - Data Analysts
        - Community Representatives
        - Business and Economic Stakeholders
    - Technical Advisory Committee
        - Committee of experts in transportation engineering, road design, and traffic safety.
    - Community Advisory Committee
        - These committees are comprised of community members and work to ensure the concerns and needs of the local population are considered.
    - Data and Analysis Committee
        - This committee focuses on data collection, analysis, and performance measurement.

Recommended Approach

Short Term Application

TBD

Long Term Application

TBD

Mechanism Examples

Mechanism Type	Examples
Strategies Update	Columbus, OH: https://www.columbus.gov/files/sharedassets/city/v/1/business-and-development/design-amp-construction/contractor-information/vision-zero-home/vzap-q4-2022-strategies-update.pdf
Graphic Report	Columbus, OH: https://www.columbus.gov/files/sharedassets/city/v/1/business-and-development/design-amp-construction/contractor-information/vision-zero-home/vz_annualreport_updated_3.0.1.pdf
Story Map	Lancaster, PA: https://storymaps.arcgis.com/stories/e110d0de27d64ffead12c24a4b356679 Napa Valley, CA: https://storymaps.arcgis.com/collections/27d8cbd46fa847c28821e7ab66fc12c6
Interactive Map	Columbus, OH: https://columbus.maps.arcgis.com/apps/dashboards/16d4f3416e014213a6a86d3da217a006
Transportation Safety Dashboard	Austin, TX: https://visionzero.austin.gov/viewer/ Tampa, FL: https://www.arcgis.com/apps/dashboards/7540ebfdff844fe7a60393842340c730 New Orleans, LA: https://app.powerbigov.us/view?r=eyJrIjoiNTQwZGVkMDMtNzU4Mi00ODY4LTliMWQtMDA1ZTBhNzg1MmVkIiwidCI6IjA4Y2JmNDg1LTFjYjctNGEwMi05YTIxLTBkZDliNDViOWZmNyJ9 Louisiana Destination Zero Deaths: https://destinationzerodeaths.com/
Combined Graphic Report/Online Dashboard	Portland, OR: https://public.tableau.com/app/profile/portland.bureau.of.transportation/viz/VisionZeroDashboard_16179023789280/VisionZeroDashboard

Goal	Goal Description	Action	Measurement
HSIP Safety Targets	**The Highway Safety Improvement Program (HSIP) requires MPOs to set HSIP targets for five safety performance measures.**	Design streets with a data-driven approach following the foundational elements of the HSIP and the Safe Systems Approach.	Number of fatalities
			Rate of Fatalities
			Number of serious injuries
			Rate of serious injuries
			Number of non-motorized fatalities and non-motorized serious injuries
Equity	**To ensure that all action items from this plan are equitable and outreach efforts to gather feedback includes diverse viewpoints.**	Prioritize transportation safety investments in low-income communities, communities of color, and/or low mobility communities.	Share of investments (or projects) in disadvantaged communities
Speed Reduction	**To reduce speeding and speed limits. Safe speeds is one of the main objectives of the Safe System Approach, and can greatly reduce crash severity.**	Deploy speed reader trailers and use other messaging devices to discourage speeding and increase traffic law compliance along high injury corridors and other arterials.	Number of traffic calming measures implemented
Data	**To share, collect, and utilize high quality data to inform context sensitive decision making.**	Post progress to the public.	Published an annual report card (y/n)
		Create a prioritized list of projects and inform the community of when improvements will take place.	Number of Projects Completed
Safety Culture Shift	**To change the culture regarding safety by recognizing that responsibility for safety is shared and that humans are vulnerable and make mistakes.**	Work with state and regional partners to provide and extend the reach of media campaigns that focus on traffic safety.	Number of educational campaigns / events by emphasis area
Collaboration and Community Support	**To continue collaboration between jurisdictions in the region and encourage community participation and feedback.**	Give periodic updates on project developments with the implementation team (or task force), as well as allowing for public progress tracking and comment.	Number of task force or progress update meetings

Goal	Goal Description	Action	Measurement
Alternative Transportation Design	**To improve safety for alternative modes of transportation, including pedestrians and cyclists, which are vulnerable road users.**	Incorporate appropriate bicycle and pedestrian accommodations into street planning.	Miles of bike lanes, trails, and sidewalks created
Safety Coalition Alignment	**To align actions and goals between the Safety Action Plan and the Safety Coalition, for efficient and comprehensive safety improvements.**	Apply Safe Systems principles to street planning, incorporating improvements informed by the Safety Coalition's collaboration.	Distracted Driving Fatalities Distracted Driving Serious Injuries Impaired Driving Fatalities Impaired Driving Serious Injuries Occupant Protection Fatalities Occupant Protection Serious Injuries Infrastructure and Operations Fatalities Infrastructure and Operations Serious Injuries