ABSTRACT

SAFETY ANALYSIS IN TRANSPORTATION PLANNING: A PLANNING AND GEOGRAPHIC INFORMATION SYSTEMS INTERNSHIP WITH THE MIAMI VALLEY REGIONAL PLANNING COMMISSION

by Emma Linette Troesch

This report summarizes my activities as Planning Intern for the Miami Valley Regional Planning Commission (MVRPC) from May 2014 through May 2015. The following report is organized by a history of Metropolitan Planning Organizations, MVRPC, and common aspects involved in transportation planning. This is followed by the role that MVRPC plays in environmental planning, transportation safety planning and the work that I contributed to the programs in that area. Major work that I contributed includes a preliminary analysis of traffic safety data in the Miami Valley Region for the years 2011 to 2013. Finally, I discuss how MVRPC may enhance safety planning as well as how the Institute for the Environment and Sustainability (IES) program at Miami University has impacted my education and career goals.
SAFETY ANALYSIS IN TRANSPORTATION PLANNING: A PLANNING AND GEOGRAPHIC INFORMATION SYSTEMS INTERNSHIP WITH THE MIAMI VALLEY REGIONAL PLANNING COMMISSION

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List of Acronyms

MVRPC- Miami Valley Regional Planning Commission
IES- Institute for the Environment and Sustainability
GIS- Geographic Information Systems
MPO- Metropolitan Planning Organization
ISTEA- Intermodal Surface Transportation Efficiency Act of 1991
TEA-21- Transportation Equity Act for the 21st Century
SAFETEA-LU- Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users
MAP-21- Moving Ahead for Progress in the 21st Century
LRTP- Long Range Transportation Plan
TIP- Transportation Improvement Program
AQAC- Air Quality Advisory Committee
AWQMP- Areawide Water Quality Management Plan
CERCLA- Comprehensive Environmental Response, Compensation, and Liability Act
NPL- National Priority List
GDRTA- Greater Dayton Regional Transit Authority
ECP- Eastern Corridor Project
DOT- Department of Transportation
ODOT- Ohio Department of Transportation
ODPS- Ohio Department of Public Safety
GCAT- GIS Crash Analysis Tool
DaRSI- Dayton Regional Safety Initiative
RTPO- Regional Transportation Planning Organization
INTRODUCTION
The following report details a yearlong internship with the Miami Valley Regional Planning Commission (MVRPC) of Dayton, Ohio. This professional internship experience will act as the final step towards completing a Master of Environmental Science with the Institute for the Environment and Sustainability (IES) at Miami University. I chose to fulfill this requirement with an internship at MVRPC that relates to my career goals of working on sustainability in regional planning. Through this internship, I was able to expand my competence in problem solving, communication, and quantitative analysis. This internship allowed me to further explore my concentration of studies in Sustainability in Marketing and Planning as well as utilize my experience in Geographic Information Systems (GIS).

Through my internship with MVRPC, I worked as the Transportation Planning Intern primarily under the supervision of Ana Ramirez, Director of Long Range Planning and Engineering. A majority of my time was spent on various tasks associated with long range transportation planning. Major tasks under this departmental supervision included work in the Traffic Monitoring Program and Regional Crash Analyses. I have worked on additional projects in the Department of Regional Planning under the Direction of Martin Kim including a 2015 Open Space Data Update and have helped with a number of marketing events in the Department of Marketing and Public Affairs under the Direction of Laura Loges. Each of these Directors reports to Brian O. Martin, Executive Director of MVRPC (see Table I). The main focus of this report centers on the work that I contributed under the Department of Long Range Planning and Engineering, specifically pertaining to safety in transportation planning.
Table I. MVRPC Department Organization
Source: MVRPC 2014.
Miami Valley Regional Planning Commission: A Metropolitan Planning Organization

The Miami Valley Regional Planning Commission is the Regional Planning Commission for the Miami Valley Region of Ohio, home to approximately 938,728 individuals (2010 Census). The planning area encompasses Darke, Greene, Miami, Montgomery and Preble Counties and the communities of Carlisle, Franklin, Franklin Township and Springboro in Warren County (hereafter referred to as northern Warren County). This accounts for a total of 27 cities, 47 villages and 66 townships (see Figure 1). MVRPC provides these communities with transportation planning services, environmental planning services, as well as research and GIS services (MVRPC 2013).

Figure 1. MVRPC Members Map
Source: MVRPC 2014, Back Cover.
MVRPC is also the Metropolitan Planning Organization (MPO) for Greene, Miami, Montgomery, and northern Warren County (see Figure 2). This means that MVRPC is “responsible for developing, implementing, monitoring, and updating a variety of transportation plans that are designed to enhance the Region’s competitive position, promote regional growth, improve personal mobility, and preserve the environment” (MVRPC 2012, 1).

Additionally, MVRPC facilitates regional cooperative efforts for the region, acting as an association of local governments and non-governmental organizations surrounding Dayton, Ohio. These organizations use MVRPC as a forum and resource to develop priorities, public policy, and strategies to improve life and economic vitality throughout the Miami Valley (see Appendix A) (MVRPC 2013).
BACKGROUND

MPOs: Origins and Roles in Transportation Planning

Federal Legislation

Metropolitan Planning Organizations were established as part of the Federal-Aid Highway Act of 1962 giving them a role in regional transportation planning for metropolitan areas with populations of 50,000 or more (Plant, Johnston, and Ciocirlan 2007). MPOs plan integrated regional transportation systems, not individual transportation projects (Cullingworth and Caves 2014).

The Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA) provided authorization for highways, highway safety, and mass transit over fiscal years 1992 to 1997 (FHWA 2013). The purpose of the act was to, “to develop a National Intermodal Transportation System that is economically efficient, environmentally sound, provides the foundation for the Nation to compete in the global economy and will move people and goods in an energy efficient manner” (FHWA 2013). With ISTEA came increased funding, increased local decision-making, use of new technologies, and partnerships with the private sector (NCTCOG 2014).

In 1998, the Transportation Equity Act for the 21st Century (TEA-21) built on the initiatives established in ISTEA and enhanced the responsibilities of MPOs in regional transportation planning (Plant, Johnston, and Ciocirlan 2007). TEA-21 protected transportation revenues for transportation uses, increased funding, provided equity in returning Federal gasoline taxes back to the States, and enhanced safety and the environment (NCTCOG 2014). TEA-21 highlights specific areas for MPOs to consider when developing their plans, which were even further improved upon in the next federal transportation bill.

This Act was the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) and was signed into law in 2005. It added more emphasis in the areas of security and the environment for MPOs to consider in developing their plans, and introduced transportation security as a stand-alone factor (MVRPC 2012). This bill was said to represent the largest investment in surface transportation history in the United States (Cullingworth and Caves 2014). It invested in safety, equity, innovative finance, congestion relief, mobility and productivity, efficiency, environmental stewardship, and environmental streamlining (Cullingworth and Caves 2014).

SAFETEA-LU states that “The metropolitan transportation planning process shall be continuous, cooperative, and comprehensive, and provide for consideration and implementation of projects, strategies, and services that will address the following factors:

1. Support the economic vitality of the metropolitan area, especially by enabling global competitiveness, productivity, and efficiency;

2. Increase the safety of the transportation system for motorized and non-motorized users;

3. Increase the security of the transportation system for motorized and non-motorized users;

4. Increase the accessibility and mobility of people and for freight;

5. Protect and enhance the environment, promote energy conservation, improve the quality of life, and promote consistency between transportation improvements and State and local planned growth and economic development patterns;
6. Enhance the integration and connectivity of the transportation system, across and between modes, for people and freight;
7. Promote efficient system management and operation; and
8. Emphasize the preservation of the existing transportation system” (see Figure 3) (MVRPC 2012, 9).

Moving Ahead for Progress in the 21st Century (MAP-21) was signed into law in 2012. It was a two-year $105 billion surface transportation authorization that reauthorized the federal-aid highway, highway safety and transit programs that were last authorized by SAFETEA-LU (NCTCOG 2014). MAP-21 funding was set to expire August 1, 2014 and on July 31, 2014 Congress approved a temporary stopgap plan to prevent a funding lapse (Memoli 2014). This will provide funding through May 2015 (Memoli 2014).

Transportation Plans required of an MPO
In addition to their annual plan of work, MPOs are required under ISTEA to create two plans, a long-range transportation plan and a short-range transportation plan. MPOs and the state carry out the transportation plans while the MPO acts as, “the forum for cooperative transportation decision making to an urbanized area” (Cullingworth and Caves 2014).

Long Range Transportation Plans (LRTPs) include projects over a twenty-year time frame (Plant, Johnston, and Ciocirlan 2007). The Miami Valley region’s LRTP, entitled Long Range
Transportation Plan 2040, is a long-range strategy and capital improvement program developed to guide investment of public funds in multimodal transportation facilities. It is updated every four years and has recently been updated in 2012 to encompass long-range transportation planning for the Miami Valley region through the year 2040. This plan encompasses a vast range of criteria used for transportation planning in the region. In addition to the aforementioned federal policies, planning must comply with state and local planning requirements. It also must address the state of the region, congestion management, highways, transit, sustainable growth, regional planning, environmental planning, community impact assessments, as well as involve public participation and consultation.

The Transportation Improvement Program (TIP) is a more detailed transportation capital improvement program detailing specific projects planned for immediate implementation. The TIP is the short-term plan, covering a minimum of three years and is updated every one or two years depending on state planning rules and the needs of the region (Plant, Johnston, and Ciocirlan 2007). MVRPC updates their TIP every two years.

History of MVRPC

Between 1950 and 1960, the population of the Miami Valley Region grew by 31.5% from 587,522 to 772,733 due to economic expansion after World War II (includes Darke, Greene, Miami, Montgomery, and Preble counties) (MVRPC 2014). The Federal Highway Act and Ohio’s Department of Highways brought construction of 1,500 miles of the Interstate system to Ohio. This caused uncontrolled growth and expansion and a number of problems resulted; population and jobs started shifting towards suburbs, loss of farmland at a rate of 200,000 acres per year, expressways shifting population from central cities, imbalanced tax base, as well as communities resorting to crisis zoning (MVRPC 2014).

MVRPC began in February 1964 as a result of a meeting called between business leaders and Chambers of Commerce in the Miami Valley region to discuss these issues and solutions. They agreed that a “vehicle to study and propose solutions to regional problems with cross jurisdictional boundaries was needed” (MVRPC 2015). Membership consisted of elected officials from each chamber, municipality, and county, as well as private sector representatives.

In the 1970’s, population growth slowed in the Region. In response to Federal mandates and increased funding, the organization evolved into being solely comprised of elected officials, encompassing Darke, Greene, Miami, Montgomery, and Preble Counties (MVRPC 2015). Six areas were added to the scope of its comprehensive planning program: human services, criminal justice, water quality, economic development, air quality, and solid waste (MVRPC 2014).

By 1980, federal programs and funds dramatically decreased (by 30%) (MVRPC 2014). This resulted in a smaller organization with cutbacks in specific departments, but it also meant the organization had fewer constraints on its structure and functions (MVRPC 2015). In 1984, MVRPC adopted a new strategic plan and amended its constitution and bylaws to reflect a more locally responsive and locally determined organization (MVRPC 2014). Private sector membership (up to 25 percent) was also reinstated (MVRPC 2015).

Also in the early 1980’s, the Transportation Coordinating Committee, the transportation planning body for the urbanized area (Montgomery and Greene Counties), which had been jointly housed
with MVRPC for many years, formally became part of MVRPC (MVRPC 2015). Miami County became designated as part of the urbanized area in 1992 (MVRPC 2015).

In the 1990’s MVRPC focused on improving the Region’s coordination and economic development, with emphasis on transportation investments (MVRPC 2014). With the introduction of ISTEA in 1991, Metropolitan Planning Boundaries had to include the entire air quality non-attainment area in order to better coordinate the best mix of transportation projects to improve air quality in the Region (MVRPC 2014). In 1998, TEA-21 provided a 36% increase in Ohio’s transportation funding (MVRPC 2014).

Since the 2000’s, MVRPC has focused on supporting a stronger economy in the Region through: corridors of commerce, partnerships, quality of life, and providing resources to communities and organizations (MVRPC 2014). In 2005, northern Warren County joined MVRPC (MVRPC 2014).

The entire Miami Valley Region has been recovering from the Great Recession. In 2014, MVRPC reorganized and added a new department to their agency- Sustainable Solutions and Transportation Alternatives. This new department combines current MVRPC activities in the areas of water quality protection, transit, specialized transportation, and bike and pedestrian programs.

**ASPECTS OF TRANSPORTATION PLANNING**

**Environmental Considerations in Transportation Planning**

MPOs like MVRPC follow the highway authorization protocol as laid out in MAP-21. An important aspect of MAP-21’s highway program transformation includes a transition to a performance and outcome-based program (FHWA 2012). One major national performance goal for Federal Highway programs includes aspects pertaining to environmental sustainability. MAP-21 strives “to enhance the performance of the transportation system while protecting and enhancing the natural environment” (FHWA 2012).

MAP-21 helps to streamline the environmental review process by providing for earlier coordination and greater linkage between the planning and environmental review process (FHWA 2012). MAP-21 also provided $115 million per year for the Highway Research and Development program including areas of safety, planning and environment among others (FHWA 2012). A portion of the $24 million per year funding dedicated to training and education goes to competitively selected center for transportation excellence in the areas of environment, surface transportation safety, rural safety, and project finance (FHWA 2012).

Through MAP-21, the federal Highway Administration has been working to build and refine many of the highway, transit, bike, and pedestrian policies established in years prior (FHWA 2012). This allows local communities the capacity to build multimodal, sustainable projects such as passenger rail and transit as well as bicycle and pedestrian paths.
Environmental Planning at MVRPC

Air Quality
MVRPC has a variety of environmental aspects to consider in their planning. The Clean Air Act Amendments of 1990 expanded transportation’s role in contributing to national clean air goals, which MVRPC must adhere to in the LRTP and TIP since transportation emissions are considered a “mobile” source contributing to air pollution (MVRPC 2012). MVRPC is responsible for making recommendations to reduce air pollution in Dayton and Springfield (MVRPC 2012). They have created the Air Quality Advisory Committee (AQAC) to receive local input about ways to reduce air pollution in the area. AQAC members include health advocates, industry and business representatives, air quality regulators, environmental advocates, and academia.

Additionally, MVRPC developed the Miami Air Quality Program to educate the public about ways they can help improve air quality. MVRPC monitors local air pollution and issues notices when high levels of particulate pollution are forecasted. During these “Air Pollution Advisory” days, citizens are encouraged to drive less, refuel vehicles after 6:00pm, limit gasoline powered equipment and eliminate outdoor burning (MVRPC 2012, 77). Members of the Miami Valley Air Quality Program include the following: MVRPC, the Regional Air Pollution Control Agency, the Clark County-Springfield Transportation Coordinating Committee, the Greater Dayton Regional Transit Authority, the Springfield City Area Transit, and the Downtown Dayton Partnership.

Water Quality
MVRPC serves as the Designated Water Quality Planning Agency for the Miami Valley Region, in accordance with the 1972 amendments to the Water Pollution Control Act (MVRPC 2011). They prepared and continually maintain the Areawide Water Quality Management Plan (AWQMP). AWQMP, along with linked documents, reports, maps, and studies describes the Miami Valley Region’s water resources, identifies sources of surface and groundwater pollution, and recommends strategies for addressing them (MVRPC 2011). A component of the AWQMP is the Wastewater Treatment Facility Plans that are managed and developed by the wastewater treatment providers in Miami Valley. They address the protocols for managing wastewater in an efficient manner and address how to protect valuable water resources.

Environmental Mitigation
MVRPC must also include a discussion of environmental mitigation in their LRTP, as required by metropolitan transportation planning rules. The discussion must be developed in consultation with Federal, State, and Tribal land management, wildlife, and regulatory agencies (MVRPC 2012, 191). Projects are determined “Significant” if there is a probability that their implementation or construction would bring about potential negative impacts to the Region’s natural resources (MVRPC 2012). Examples of typical categories include road widening, land additions, and interchange additions or modifications (MVRPC 2012). Figure 4 shows projects classified according to their potential environmental impact. Projects were also evaluated to determine whether they are in direct contact with each of the region’s environmental resources including: endangered species habitats, wetlands, parklands, etc.
Wetlands, Rivers and Streams
In order to receive funding, MVRPC must ensure that all federally funded projects comply with environmental statutes (MVRPC 2012). MVRPC follows mitigation guidelines developed by the U.S. Army Corps of Engineers and Ohio Environmental Protection Agency for projects involving wetlands, rivers and streams (MVRPC 2012). Mitigation strategies include “on-site” (natural channel design techniques, bankfall culverts, wetland creation, etc.) and “off-site” projects, which are implemented within one mile of the initial project area (mitigation banking, stream and wetland creation, restoration, and/or preservation) (MVRPC 2012).

Threatened and Endangers Species/Fish and Wildlife
All projects must also comply with the National Environmental Policy Act, Endangered Species Act, Clean Water Act, and Ohio Revised Code (MVRPC 2012, 196). Mitigation measures include; restricting clearing of trees, surveying to identify presence or absence of endangered mussels and plant species, prevention of disturbance of Indiana bats, measures to allow terrestrial species to pass unharmed through construction areas, measures to ensure proper working equipment to reduce noise and equipment spills and leaks, construction and post construction plan notes (MVRPC 2012).

Historic, Cultural, or Archaeological Resources
Projects involving historic and cultural resources must comply with the National Environmental Policy Act, the National Historic Preservation Act, Section 4(f) of the Department of
Transportation Act, the Ohio Revised Code, and 36 CRF Part 800 (MVRPC 2012, 198). Some mitigation methods include aesthetic treatments, avoidance, archaeological data recovery, creative mitigation, salvage and re-use of historic materials, informing/educating the public, and Historic American Buildings Survey/Historic American Engineering Record documentation (MVRPC 2012, 198).

**Parklands**

Section 4(f) of the Department of Transportation Act requires the preservation of public parks and recreation lands, wildlife and waterfowl refuges, and historic sites (MVRPC 2012, 199). Mitigations measures may involve a replacement of land and/or facilities of comparable value and function, or monetary compensation (used to enhance the remaining land) (MVRPC 2012).

**Hazardous Materials**

Projects involving hazardous materials must also be monitored due mainly to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980 and the amendments that followed in the Superfund Amendments and Reauthorization Act of 1986 (MVRPC 2012). CERCLA established a hazard ranking system and the National Priority List (NPL) details the highest ranking sites. There are 10 sites in the Miami Valley Region on the NPL and an additional 40 sites not on the list are potentially contaminated sites and sources of concern (MVRPC 2012). Transportation projects are designed to avoid these sites, however if it cannot be avoided, it is necessary to perform environmental site assessment screenings on a project-by-project basis (MVRPC 2012).

**Sustainability**

MAP-21 established a new program to provide for alternative transportation projects in which MPOs must develop a competitive application for distributing sub-allocated funding (FHWA 2012). Transportation Alternatives is an integral part of MVRPC’s planning process. The Greater Dayton Regional Transit Authority (GDRTA) is required by the Americans with Disabilities Act of 1990 to make transit more accessible to people with disabilities (MVRPC 2012). GDRTA reached full compliance in 1996 and MVRPC has endorsed their plan (MVRPC 2012).

Pedestrian facilities (sidewalks and pathways) provide access for pedestrians to easily reach commercial developments, entertainment districts, recreational areas, and public facilities. They accomplish this without needing to drive short distances, helping to limit air pollution and roadway congestion (MVRPC 2012). MVRPC strives to support a regional pedestrian network and they have been able to make improvements through multi-jurisdictional efforts.

Additionally MVRPC conducts outreach to encourage walking and cycling through media and print including the Miami Valley Recreational Trails Map and the “Drive Less, Live More” campaign (MVRPC 2012). MVRPC also published *The Book on Walkability and Walkable Communities*, which aids local governments in integrating pedestrian and bike-friendly designs into their communities (MVRPC 2012). MVRPC’s Rideshare program connects those living or working in the Miami Valley Region through an online database that allows users to coordinate carpooling or biking to work together.

The Going Places land use planning initiative strives to develop a shared future land use vision as the Region grows and develops in years to come. By cooperating with local jurisdictions and regional stakeholders, the Region can gain perspective on future land use decisions. This
communication will help to achieve consistency between future transportation investment, infrastructure, and development, all the while protecting the Region’s environmental resources (MVRPC 2012, 147). With a regional land use strategy, the reliance on single-occupant vehicles could also be reduced (MVRPC 2012).

Connecting Environmental Resources and Transportation Planning

Conservation agencies and transportation agencies are working together to build more integrated planning due in part to SAFETEA-LU regulations. As required by SAFETEA-LU, transportation agencies must fulfill mandates considering environmental factors at the long range planning stage. Transportation planners must consider environmental factors in the project design and construction stages of planning, while conservation agencies also incorporate this shift in approach into their own planning process (McVoy et al. 2008.)

A study performed by the Standing Committee on the Environment in 2008 as requested by the American Association of State Highway and Transportation Officials identified many key themes in the evolving practice of collaborative decision-making. Many respondents believe that the local transportation project level is positively influenced by the information that comes out of the integrated planning process (McVoy et al. 2008). Respondents also recognize that collaboration is incremental and project level success is important in reaching an integrated cross-disciplinary planning process.

Though challenging for many agencies, initiating cross-agency dialogue is key and an increasing number of transportation and conservation agencies are beginning to establish collaborations (McVoy et al. 2008). It is also important to have high quality data shared by all partners and one way of doing this is through geospatial frameworks. It is recognized that financial and staff capacity constraints present a barrier to collaboration. There are resources provided by state DOTs as well as the Federal Highway Administration Eco-Logical grants that can improve and standardize data collection, however more investments are needed (McVoy et al. 2008).

There are many working examples of effective integrated planning across the United States. One example is the Eastern Corridor Project (ECP) with a project area extending from downtown Cincinnati, Ohio, to eastern Hamilton County and to western Clermont County. The ECP was designed to consider options to minimize impacts to the Little Miami River, an environmentally sensitive area, when developing plans for a new multimodal crossing of the river (McVoy et al. 2008). This project was led by ODOT and involved a 65-member local task group from 18 jurisdictions that worked together to ensure that the plan benefited everyone in the region. The ECP cited historic preservation plans, wetland conservation plans, conservation frameworks for Endangered Species Act listed species, and other high-priority site plans (McVoy et al. 2008).

Safety in Transportation Planning

MVRPC facilitates many aspects of planning. One of my main extended projects includes the Regional Safety Analysis reporting under the Department of Long Range Planning and Engineering. The remainder of this report will focus primarily on the role that an MPO plays in transportation safety planning.
Transportation planning considers safety by identifying the most effective strategies for reducing crashes (FHWA 2007). MVRPC’s identification process includes analyzing crash data to determine the emphasis to be given to critical focus areas. In general there are several types of focus areas: engineering, enforcement, education, and emergency services (FHWA 2007). The crash data help to identify which focus areas should receive funding priority for improving safety in the region (FHWA 2007). Crash data also identify high-accident locations to be given priority for improvements (FHWA 2007). Additionally, MPOs tend to have safety campaigns that educate the public on good safety practices.

MPO and state Department of Transportation (DOT) planners coordinate any planned safety related transportation improvements with their safety partners, usually those responsible for the state’s Strategic Highway Safety Plan, the state Governor’s Office of Highway Safety, law enforcement agencies, and emergency service providers (FHWA 2007). By receiving input from these partners, the safety elements of planning processes improve, ensuing in strong collaboration.

Many state DOTs and local transportation agencies have developed safety management systems that monitor accident locations in their jurisdictions over time (FHWA 2007). MPOs can participate in data collection or coordinate the development of a regional safety management system (FHWA 2007).

MAP-21 supports DOT’s safety agenda by strengthening the linkage between modal safety programs and creating an agenda to reduce highway fatalities. MAP-21’s national performance goal for safety is, “to achieve a significant reduction in traffic fatalities and serious injuries on all public roads (FHWA 2012).

**Dayton Regional Safety Initiative**

MVRPC’s regional safety management system is the Dayton Regional Safety Initiative (DaRSI) beginning in State Fiscal Year 2006 as a response to meet the roadway safety planning objectives set forth by SAFETEA-LU, the Federal Highway Administration, and ODOT.

**Regional Safety Analyses**

MVRPC conducts a Regional Safety Analysis every three years, which acts as the first step towards understanding safety conditions in the Miami Valley region. The Regional Safety Analysis identifies trends in crashes and generates a list of priority locations that may need improvement (MVRPC 2013). The most recently published analysis uses crash data from 2008 to 2010, which MVRPC receives from ODOT and the Ohio Department of Public Safety (ODPS). A number of statistical and comparative analyses are performed on this regional crash data. The 2008 to 2010 report identified 154 intersections and 229 roadway segments as high-crash locations (see Figure 5). MVRPC is currently working toward an analysis for the years 2011 to 2013.
Available Safety Programs and Resources Through MVRPC

In November, 2013, MVRPC produced *A Guide to Roadway Safety Programs and Resources*, which details lists of programs and resources available to member jurisdictions to advance multi-modal roadway safety priorities. The guide categorizes different programs under the following categories: informational resources that provide crash data, statistics, or countermeasures, funding programs or resources that advance safety priorities through engineering, funding programs or resources that advance safety priorities through enforcement, and funding programs or resources that advance safety priorities through education (MVRPC 2013). The guide can be utilized by local jurisdictions throughout the Miami Valley Region, including villages, cities, townships, and counties. The guide provides transportation professionals, engineers and road safety advocates with access to the resources to identify safety problems in their jurisdiction, select countermeasures to make improvements, and find funding sources (MVRPC 2013).

One major resource that MVRPC provides to safety advocates is the Regional Safety Analysis. Additionally, MVRPC has access to ODOT’s online GIS Crash Analysis Tool (GCAT), which spatially locates crashes across the State of Ohio allowing for crash data to be queried, downloaded, and quickly analyzed (MVRPC 2013). If requested, MVRPC can use GCAT to provide their safety advocates with crash data and/or preliminary crash analysis for an area, specific intersection or road. MVRPC can also provide technical assistance to jurisdictions that apply to ODOT’s Highway Safety Program. This program requires a safety study to be submitted with the application. MVRPC aids jurisdictions with their safety study by providing crash data,
traffic volume and other data, and in conducting preliminary crash analyses (MVRPC 2013). MVRPC also monitors funding available to jurisdictions in the Miami Valley and notifies them when they are eligible for a safety funding program (MVRPC 2013).

Through *A Guide to Roadway Safety Programs and Resources*, MVRPC also lists a number of programs and grants that jurisdictions can apply for. They detail eligibility requirements, the application process, and what funding would be provided. A few examples of these programs are: the OVI Task Force and the Safe Communities Coalition Traffic Safety Grant through ODPS-Office of Traffic Safety, Safe Routes to School through ODOT, and the Railroad Crossing Safety Improvement Programs through the Ohio Rail Development Commission among others (MVRPC 2013).

**PROJECT: Regional Safety Analysis**

**Quality Checking with GIS**

My main project as a Planning Intern with MVRPC is aiding in the Regional Safety Analysis for the years 2011 to 2013. My first task has been to geographically analyze the vehicular crash data from the years 2011-2013 in Greene, Miami, Montgomery, and northern Warren Counties using GIS software. This information is analyzed in order to generate a preliminary list of locations in need of countermeasures to reduce the frequency or severity of accidents. Data is provided to MVRPC from Ohio Department of Transportation and the Ohio Department of Public Safety (MVRPC 2009).

MVRPC receives the number of crash records from ODOT. Many crashes from the total crash records are removed from the final dataset for the following reasons: they are either not good candidates for further analysis (i.e. crashes involving construction zones or animals as these occurrences are temporary), not located on a network roadway, or cannot be accurately located (MVRPC 2009). The most recent crash analysis in progress (2011-2013 update) involves 42,502 crashes out of all crash records received from ODOT.

These remaining crashes are assigned to their respective roadway segments or intersections to be analyzed for the analysis report. Network roads primarily include urban and rural arterial and collector roadways. Only intersections involving two or more network roadways are analyzed as part of the analysis. MVRPC also does not include limited-access roadways (i.e. interstates and expressways) in the final analyses due to separate funding from ODOT (MVRPC 2009).

**Methods**

For the 2011-2013 update, I quality checked all of the crash data from Montgomery County using ArcGIS. There were 26,200 crashes total reported in Montgomery County during the years 2011-2013 (*see* Figure 6).
The crash data from ODOT were displayed in ArcGIS as shapefiles with accompanying geography and an attribute table. Each data point included information in the attribute table for accurately mapping the location of each crash site. I ensured that the documented crashes (red point) occurring on network roads (yellow lines) were snapped to the correct locations of crashes (see Figure 7). Snapping is, “an automatic editing operation in which points or features within a specified distance (tolerance) of other points or features are moved to match or coincide exactly with each others’ coordinates” (ESRI 2014).

Frequently, the crashes were snapped to the incorrect road, so I edited the point and moved it to the correct location according to the ancillary data I was provided with (see Figure 7).

Additionally, I analyzed freeway crash data in a similar process for Montgomery, Greene, and Miami counties. In some cases, important data were missing from the data table needed to identify crash locations. When this occurred, I looked up the actual vehicle crash report as filled out by the on-scene officer through the Ohio Department of Public Safety website (see Figure 8).
Viewing the crash report offered a visual aid that is especially helpful in locating certain crashes that occurred on on/off ramps to major freeways. If our data said the crash occurred on “IR 75,” the crash report allowed me to view whether it occurred on the major freeway or on one of the off ramps.

Figure 8. Example Crash Report
Source: Ohio Department of Public Safety 2015.
Raw Data Analysis

My second task has been to provide MVRPC with a preliminary analysis exploring a number of different areas and trends in the 2011-2013 crash data. The preliminary analysis will aid MVRPC in determining what information to present in their next regional crash analysis and what areas to examine further. Ultimately it will aid in improving road safety in the region.

Methods

All of the crash analysis was completed through the creation of Pivot Tables of the raw data in Microsoft Excel. Additionally all charts were created with Excel utilizing the Pivot Tables. A series of four GIS Maps were created in addition to the graphs. 2010 Census Blocks were used to calculate the populations for different per capita crash comparisons of jurisdictions. Census Blocks are “statistical areas bounded by visible features, such as streets, roads, streams, and railroad tracks, and by nonvisible boundaries, such as selected property lines and city, township, school district, and county limits and short line-of-sight extensions of streets and roads” (U.S. Census Bureau 2012). Blocks are the smallest geographic unit used by the United States Census Bureau for tabulation of data collected from all houses, rather than a sample of houses (U.S. Census Bureau 2012). Census Blocks are useful when making cross comparisons between geographical areas within ArcGIS.

I explored many topic areas using the raw data, searching for interesting trends that would prove useful in safety planning. The following section consists of the most useful and important trends found through my analysis.


The Miami Valley Regional Planning Commission (MVRPC) analyzes crash data from the Ohio Department of Transportation and the Ohio Department of Public Safety in 3-year cycles. This report examines the trends found in the crash data from the years 2011 to 2013 for the Miami Valley Region (Montgomery, Miami, Greene and northern Warren Counties).

This preliminary analysis will allow transportation planners to identify useful areas of the data to explore further. The analysis includes new areas of study that previously have not been analyzed including: drug involvement in crashes, gender of drivers, weather and light conditions during crashes, intersection crashes, objects struck during crashes, estimated speed of vehicles, and driver distractions.

Regional Road Network Crashes

A total of 42,502 crashes were reported from 2011 to 2013 on the regional road network (see Table II). The regional road network is primarily the Region’s collectors, arterials, and freeways. This report excludes local roads and examines the crashes only occurring on the network.
Severe Crashes

A total of 12,234 injury-causing and 170 total fatal crashes occurred. These severe (fatal & injury-causing) crashes represented 29% of all crashes. The remaining 71% were property damage only (see Figure 9).

Fatal crashes were more common on roads in rural parts of the Region. For every 1,000 crashes that occurred in rural areas 6.7 were fatal, compared to 3.8 fatal crashes per 1,000 on urban roads (see Figure 10).

Fatal Crashes

The jurisdiction in the Region with the highest fatal crashes per capita was Moraine with 69.1 fatal crashes per capita (per 100,000 population) (see Figure 11). The jurisdictions of West Milton, Dayton, Carlisle, Tipp City, Germantown, Trotwood, Riverside, and Brookville were also high with 12.6 – 22.2 fatal crashes per capita (per 100,000 population). This specific information was gathered excluding all crashes that occurred on freeways in the Region. Population numbers were based on U.S. Census 2010 data gathered at the block level.
Figure 11. 2011-2013 Per Capita Fatal Crashes of Jurisdictions in Miami Valley Region
Types of Crashes

Several types of crashes occurred on the regional road network from 2011 to 2013. The most common crash types were rear end (31%), angle (17%), and fixed object (16%) crashes (see Figure 12). However, these common crash types were not the most severe.

![Figure 12. Top Crash Types by Percent](image)

Fifty-two percent (52%) of head-on crashes and 66% of overturning (car flipping over) crashes lead to fatalities or injuries (see Figure 13). The most vulnerable road users, pedestrians and bicyclists, had even higher percentages. Ninety-one percent (91%) of crashes involving pedestrians (369 out of 407 total pedestrian crashes) and 80% of crashes involving bicyclists (230 out of 288 total bicycle crashes) resulted in a fatality or injury.

![Figure 13. Percent Severity of Crash Types](image)
Thirty-two percent (32%) of injury-causing crashes were rear end crashes (see Figure 14). Fixed-object and crashes involving pedestrians were the crash types that made up a major portion of fatal crashes. When combined, fixed-object and crashes involving pedestrians accounted for over half (51%) of fatal crashes (see Figure 15).

**Contributing Factors**

Contributing factors are the driver or non-motorist’s actions that were reported as the initial cause of the crash. The most common contributing factors were following too close (30%), failure to control (16%), and failure to yield (15%) (see Figure 16). The contributing factors that had the highest severity leading to injuries or fatalities were running a red light, running a stop sign or yield sign, and turning left of center (making a left turn from the center of the road). Forty-four percent (44%) of crashes caused by running a red light and 43% of crashes caused by running a stop sign or yield sign led to injuries or fatalities (see Figure 17).
Alcohol Related Crashes

The crash data indicate the dangerous implications of driving while under the influence of alcohol. From 2011 to 2013, a total of 4,371 crashes involved someone who had been drinking. Alcohol was involved in 46% of fatal crashes (79 of 170 total fatal crashes) (see Figure 18). Young people (ages 16 to 25) were most likely to be involved in alcohol related fatal crashes (see Figure 19).

The most common crash types involving alcohol were fixed object (31%) and rear end crashes (22%) (see Figure 20). The top contributing factor of alcohol related crashes was failure to control (29%) (see Figure 21).

Figure 18. Crash Severity by Alcohol Involvement

Figure 19. Total Number of Drivers by Age Involved in Alcohol-Related Fatal Crashes

Figure 20. Top Crash Types Involving Alcohol by Percent

Figure 21. Top Contributing Factors Involving Alcohol by Percent
Alcohol involvement in crashes was highest on Fridays through Sundays with 49% of all crashes involving alcohol occurring in this timeframe (see Figure 22).

Most alcohol related crashes occurred Friday night/Saturday morning between 11pm-4am (7%) or Saturday night/Sunday morning between 11pm-3am (6%) (see Table III).

Table III. Percent of Alcohol Related Crashes by Day and Time

|          | 12am | 1   | 2   | 3   | 4   | 5   | 6   | 7   | 8   | 9   | 10  | 11  | 12pm | 1   | 2   | 3   | 4   | 5   | 6   | 7   | 8   | 9   | 10  | 11  |
|----------|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Sunday   | 1.1% | 1.1%| 2.2%| 0.8%| 0.6%| 0.3%| 0.1%| 0.2%| 0.2%| 0.1%| 0.3%| 0.4%| 0.2%| 0.3%| 0.4%| 0.6%| 0.6%| 0.9%| 0.8%| 0.5%| 0.6%| 0.8%| 0.8%| 0.5%|
| Monday   | 0.5% | 0.3%| 0.6%| 0.4%| 0.1%| 0.1%| 0.2%| 0.3%| 0.3%| 0.5%| 0.3%| 0.4%| 0.5%| 0.4%| 0.7%| 0.9%| 0.8%| 0.8%| 0.7%| 0.4%| 0.6%| 0.6%| 0.7%|
| Tuesday  | 0.6% | 0.4%| 0.5%| 0.5%| 0.1%| 0.1%| 0.1%| 0.5%| 0.3%| 0.4%| 0.4%| 0.4%| 0.5%| 0.6%| 0.6%| 0.7%| 0.5%| 1.0%| 0.8%| 0.4%| 0.6%| 0.7%| 0.5%|
| Wednesday| 0.6% | 0.5%| 0.5%| 0.2%| 0.2%| 0.1%| 0.1%| 0.5%| 0.4%| 0.3%| 0.3%| 0.4%| 0.3%| 0.5%| 0.6%| 0.7%| 0.8%| 0.9%| 0.9%| 0.7%| 0.5%| 0.9%| 0.9%|
| Thursday | 0.7% | 0.8%| 0.9%| 0.5%| 0.2%| 0.2%| 0.2%| 0.5%| 0.3%| 0.3%| 0.3%| 0.3%| 0.7%| 0.5%| 0.6%| 0.6%| 0.7%| 0.8%| 1.0%| 1.0%| 1.1%| 0.7%| 0.8%|
| Friday   | 0.8% | 0.5%| 0.9%| 0.4%| 0.3%| 0.2%| 0.4%| 0.4%| 0.5%| 0.3%| 0.5%| 0.5%| 0.6%| 0.5%| 0.6%| 0.8%| 0.9%| 1.1%| 0.8%| 1.3%| 1.1%| 1.1%| 1.0%|
| Saturday | 1.3% | 1.6%| 1.9%| 1.3%| 0.5%| 0.3%| 0.3%| 0.2%| 0.2%| 0.4%| 0.4%| 0.4%| 0.4%| 0.6%| 0.6%| 0.6%| 0.8%| 0.6%| 0.8%| 0.7%| 0.9%| 0.8%| 0.9%|

Drug Related Crashes

The crash data also show the implications of driving while under the influence of drugs. A total of 590 crashes involved someone who been using drugs at the time of the crash. Sixteen percent (16%) of fatal crashes (28 out of 170 total fatal crashes) involved drivers using drugs (see Figure 23). People ages 26-35 were most likely to be involved in drug related fatal crashes, though counts for people of all age groups were similar.
The most common crash types involving drugs were fixed object (43%) (see Figure 24). Nearly 50% of drug related crashes were attributed to a failure to control the vehicle (47%) (see Figure 25).

![Figure 24. Top Crash Types Involving Drugs by Percent](image)

![Figure 25. Top Contributing Factors Involving Drugs by Percent](image)

**Alcohol and Drug Related Crashes**

Alcohol and drug related crashes were highest in the jurisdictions of Moraine, Dayton, Miamisburg, Piqua, Franklin, Riverside, and Troy with 373.1 - 760 crashes per capita (per 100,000 population) (see Figure 26). This specific information was gathered excluding all crashes that occurred on freeways in the Region. Population numbers were based on U.S. Census 2010 data gathered at the block level.
Figure 26. 2011-2013 Per Capita Alcohol and Drug Related Crashes of Jurisdictions in Miami Valley Region
Crashes with Youth and Seniors

Young people (ages 16 to 25) were most likely to be involved in crashes. There were 19,140 youth involved crashes (see Figure 27). Young people were most often involved in rear end crashes (37%) (see Figure 28).

There were 6,646 seniors (aged 66+) involved in crashes (see Figure 27). Over 30% of seniors (aged 66+) were involved in rear end crashes (see Figure 28). Additionally, 27% of crashes involving seniors were angle crashes (see Figure 28).

People ages 56 and older were most likely to be involved in fatal crashes. For every 1,000 crashes with someone ages 56-65, 4.3 of them were fatal crashes (see Figure 29). For every 1,000 crashes with someone ages 65 and older, 4.2 of them were fatal crashes.
Crash Location

The jurisdictions in the Region with the highest crash rates per capita were Moraine with 0.071, Franklin with 0.057, and Troy with 0.054 crashes per capita (see Figure 30). This specific information was gathered excluding all crashes that occurred on freeways in the Region.

Each of the four counties that comprise the Miami Valley Region had similar crash rates per capita: Greene has 5.7% compared to Miami with 5.1%, Montgomery with 4.8% and Warren with 5.3% (see Figure 30). The populations for each county were based off 2010 Census Blocks.
The top crash types for urban locations were rear end (33%), angle (18%), and fixed object (15%) (see Figure 31). In rural locations, fixed object (29%) and rear end (13%) were also top types but animal crashes also made up a majority of rural crash types (see Figure 32). Twenty-eight percent (28%) of crashes occurring in rural locations were animal related (see Figure 32).

**Gender**

A total of 30,016 drivers involved in crashes were male and 25,606 were female (see Figure 33). Females were slightly more likely to be involved in severe crashes than males. Thirty-one percent (31%) of crashes involving females were severe, while 29% of crashes involving males were severe (see Figure 34).
Thirty-seven percent (37%) of the crashes involving women drivers were rear end crashes and 20% were angle crashes (total of 25,606 crashes with female drivers) (see Figure 35). Thirty-three percent (33%) of crashes involving male drivers were rear end crashes and 18% were angle crashes (total of 30,016 crashes with male drivers) (see Figure 35). Men were more likely to be involved in fixed object crashes than were women.

Thirty-five percent (35%) of crashes involving female drivers were due to following too close and 18% were due to a failure to yield (see Figure 36). Thirty-one percent (31%) of crashes involving male drivers were due to following too close, 16% were due to a failure to yield, and 14% were due to failure to control (see Figure 36).

Almost twice as many men were involved in alcohol and drug related crashes than the number of women involved. A total of 2,781 men were involved in alcohol related crashes and a total of 428 men were involved in drug related crashes (see Figure 37).
Injury Severity

A total 12,234 injury-causing crashes occurred in the region, but with varying degrees of seriousness. A total of 1,282 crashes resulted in one or more serious injuries (visibly incapacitating). Twenty-six percent (26%) of serious injury crashes were fixed object crashes (see Figure 38). A total of 5,336 crashes resulted in one or more minor visible injuries. Rear end crashes resulted in the largest amount of minor injuries with 25% (see Figure 38).

Bicycle and Pedestrian Crashes

Bicycle and pedestrian crashes only account for a small fraction of all crashes (1.6%). However, these crashes were severe. Ninety-one percent (91%) of pedestrian crashes and 80% of bicycle crashes resulted in injuries or fatalities (see Figure 39). The top contributing factor for bicycle and pedestrian crashes was failure to yield, which caused 35% of these crashes (see Figure 40).
Pedestrian Crashes

The jurisdiction of Dayton had the highest pedestrian crash rate per capita with 111.6 (per 100,000 population) (see Figure 41). The jurisdictions of West Milton, Troy, Miamisburg, Piqua, Kettering, and Yellow Springs were also high with pedestrian crash rates per capita between 42.9 and 66.7 (per 100,000 population) (see Figure 41). This specific information was gathered excluding all crashes that occurred on freeways in the Region. Populations were based on 2010 U.S. Census Blocks.

Figure 41. 2011-2013 Per Capita Pedestrian Crashes of Jurisdictions in Miami Valley Region
Adverse Weather Conditions

Twenty-one percent (21%) of all crashes had some sort of adverse weather condition present at the time of the crash (8,978 of total crashes). All types of adverse weather (snow, rain, fog, heavy wind) resulted in crashes similar in severity. Twenty-nine percent (29%) of crashes involving rain and 28% of crashes involving fog resulted in fatality or injury (see Figure 42).

The top crash types when heavy wind, snow, or rain was present were fixed object, rear end, angle, and sideswipe-passing. Between weather events, animal crashes are highest when fog is present. Fifteen percent (15%) of crashes during fog were animal related (see Figure 43). Forty-four percent (44%) of crashes during heavy wind and 40% of crashes during snow were fixed object crashes (see Figure 43). The most common crash type during rain was rear end crashes. Thirty-six (36%) of crashes during rain were rear end crashes (see Figure 43).
Light Conditions

The amount of darkness or light available contributes to different types of crashes. Animal crashes primarily occurred with little to no light available. Nearly 80% of animal crashes occurred in some type of darkness (see Figure 47). Almost 50% of fixed object crashes and pedestrian crashes occurred with little to no light available (see Figure 47).

Pavement defects accounted for a small fraction of contributing crash factors (0.1% or 42 of the total crashes) but are more likely to occur with little to no light available. Fifty-five percent (55%) of crashes with pavement defects as a contributing factor occurred with little to no light available (see Figure 48). Nearly 50% of crashes when drivers failed to control their vehicles occurred with little to no light available (see Figure 48).
Intersection Crashes

A total of 9,630 crashes in the region occurred at an intersection of network roads (23% of total crashes). Rear end crashes were the most common type of crash to occur in an intersection (35% of total intersection crashes) (see Figure 44). Additionally, the top contributing factor of intersection crashes was due to following too close (32% of total intersection crashes) (see Figure 45).

The severity of intersection crashes when compared to non-intersection crashes was similar. Thirty-two percent (32%) of intersection crashes resulted in fatalities or injuries while 28% of non-intersection crashes resulted in fatalities or injuries (see Figure 46).
Objects Struck During Crashes

A total of 9,161 objects were struck during crashes (fixed object crashes account for 16% of total crashes). The object type with the highest number of times being stuck was a utility pole with 1,445 strikes (see Figure 49). Curbs were struck 1,354 times and guardrails were struck 1,208 times (see Figure 49). Failure to control was the top contributing factor of these three commonly struck objects accounting for 63% of utility pole crashes, 54% of curb crashes, and 46% of guardrail crashes (no Figure).

Of the 221 times embankments were struck, 49% resulted in a fatality or injury (see Figure 50). Of the 597 times a tree was struck, 46% resulted in a fatality or injury (see Figure 50).
Estimated Speed of Vehicles

A large portion of crashes (41%) occurred with an estimated speed of 20 MPH or under (see Figure 51).

Crashes involving vehicles moving at an estimated speed above 65 MPH were more severe than vehicles moving at an estimated speed of 20 MPH or under. Thirty-six percent (36%) of crashes involving vehicles moving at an estimated speed above 65 MPH resulted in a fatality or injury (see Figure 52).
Driver Distractions

The most frequent distraction that led to crashes was when another individual was present in a vehicle at the time of a crash (494 out of 1,245 or 40%) (see Figure 53). Another frequent distraction was something external to the vehicle (378 out of 1,245 or 30%) (see Figure 53).

The data show the dangerous implications of attempting to use communication devices while driving. Although texting/emailing (37 out of 1,245 or 3%) and electronic communication devices (21 out of 1,245 or 2%) account for small numbers of distractions, they were the most severe crashes. Over 40% of crashes where drivers were using an electronic communication device led to fatalities or injuries (see Figure 54). Forty percent (40%) of crashes where drivers were texting/emailing led to fatalities or injuries (see Figure 54).
DISCUSSION: How Regions Handle Safety in Transportation Planning

The crash data analyzed in this Preliminary Report will help to improve traffic safety in the Miami Valley Region with an ultimate goal of reducing crash incidents. MVRPC uses an approach towards reducing the number of vehicular crashes through the four E’s of traffic safety: engineering, enforcement, education, and emergency services (Washington et al. 2006). State DOTs work with law enforcement agencies, state traffic safety offices and the National Highway Traffic Safety Administration to embrace this approach as well. MPOs like MVRPC integrate safety planning throughout the engineering of transportation projects or improvements. MVRPC also strives to educate member jurisdictions about their available resources for safety planning through A Guide to Roadway Safety Programs and Resources, which is a major component of the DaRSI.

There are many different topics to consider when incorporating safety into transportation plans. Major areas of interest from the Preliminary Report include pedestrian crashes, bike crashes, alcohol use, driver distractions, and crashes involving youth. The vast majority of the analyzed crashes were caused by driver error as opposed to a transportation system error. Driver errors are one of the leading attributes of vehicular crashes as reported by the Federal Highway Administration (City of Naperville 2002). Other factors include vehicle failure and roadway environment (including weather and/or facility deficiencies) (City of Naperville 2002).

Pedestrian and Cyclist Safety

Pedestrian and cyclist safety are of a national concern. Governing magazine stresses that pedestrian deaths are more common in low-income neighborhoods as opposed to more wealthy communities (2014). There are no published national data that assess income or poverty status of those killed in traffic accidents (Maciag 2014). However, Governing magazine analyzed 22,000 pedestrian deaths nationwide between 2008 and 2012. They found that in the nation’s metro areas, the bottom third of census tracts, in terms of per capita income, recorded pedestrian fatality rates twice that of higher income tracts (Maciag 2014). Additionally low-income neighborhoods are twice as likely as high-income neighborhoods to lack basic infrastructure such as sidewalks, cross walks and stop lights to protect cyclists and pedestrians (Vock, 2015).

Many city officials have sought to improve pedestrian safety by making cities more walkable. MVRPC seeks to make the Miami Valley Region more walkable as well mostly through educational materials they’ve produced to be utilized by local planning jurisdictions (i.e. The Book on Walkability and Walkable Communities). MVRPC has also produced public service announcements regarding “Safe Cycling Tips.” These public service announcements were created in 2009 and were made for both bicyclists and drivers. MVRPC produced the brochure entitled, “Drive Your Bike” detailing important safety tips such as using hand signals to indicate turns, where to ride in the lane, and tips for riding at night.
Educational Efforts through Local and Region-Wide Plans

Alcohol and Youth
Transportation safety planning is a coordinated effort between local, regional, and federal governments. At the local level, it is common to see jurisdictions using education to improve safety in their transportation planning. Cities like Naperville, IL have implemented a number of programs addressing pedestrian safety, driver/passenger safety, and high crash locations. Many programs are catered toward assuring that children have safe walking routes to school. Children and young adults are the main targets of the educational programs that incorporate bike safety and driver’s education. However, there are programs for members of the community for all age groups including the North Central College DUI Education Program and the general Education Program that informs residents of proper safety behaviors while driving (City of Naperville 2002). Naperville also intends to develop GIS programs to identify and analyze problem locations. It is likely that the MPO in this region, the Chicago Metropolitan Agency for Planning, would provide Naperville with the adequate data and resources needed to build a High Crash Location Program, much like MVRPC does for their member jurisdictions.

A Louisiana MPO, the South Central Planning and Development Commission, faces similar issues as MVRPC regarding alcohol related crashes leading to fatalities. The Commission has created a Regional Transportation Safety Plan solely dedicated to improving safety measurements in transportation planning. Measures taken to prevent impaired driving include public education programs in the region and implementing a campaign that will target schools, colleges, and businesses. As in the Miami Valley Region, this region of Louisiana also sees a large amount of crashes involving youth. The South Central Planning and Development Commission has incorporated plans to reduce teen crash fatalities through a public information campaign for middle and high schools, where they will incorporate social media to engage students and partner with the local school board (SCPDC 2013).

Driver Distractions
The city of Dublin, Ohio actively promotes a set of campaigns to reduce driver distractions. Driver distractions are “anything inside or outside the car that causes motorists to take their eyes or mind off the road, or their hands off the wheel” (City of Dublin 2014). In the state of Ohio, all drivers below the age of 18 are banned from using cellphones while behind the wheel and all drivers, regardless of age, are banned from texting (City of Dublin 2014). In September 2014, the city of Dublin started a law enforcement campaign and education campaign to end distracted driving. Components of these campaigns include increased targeting of high crash areas by law enforcement, special events, and educational public service announcements. Additionally there are local and national initiatives incorporating the message “Don’t Text and Drive.” Some campaigns encourage drivers to sign a pledge to safe driving. The National Highway Traffic Safety Administration’s campaign, “Stop the Texts. Stop the Wrecks” has a website with video public service announcements, facts, tips, and ways to become a campaign advocate (2015).

The Baltimore Metropolitan Council, the MPO for the Baltimore region, has a Distracted Driving Campaign detailed on their website. The campaign includes a series of radio spots educating drivers about how to avoid distractions. Additionally, the webpage lists various tips to avoid distracted driving and tips for parents teaching their children how to drive. Simple tips include avoiding eating while driving, presetting electronic devices like GPS units, and
establishing family rules for when riding in the car (Baltimore Metropolitan Council 2010). This MPO among others has established a Transportation Safety Subcommittee to monitor the progress of the Strategic Highway Safety Plan in the region. The committee is composed of various stakeholders from member jurisdictions who meet regularly to develop plans and programs using MPO leadership to raise safety awareness (Baltimore Metropolitan Council 2014).

**Possible Future for MVRPC**

Many educational safety programs are implemented at the local and national levels. Yet there are some regional transportation commissions that do make larger plans for safety within their comprehensive transportation plans. Currently MVRPC offers access to many safety resources and programs for member jurisdictions under the DaRSI, through Regional Safety Analyses and *A Guide to Safety Programs and Resources*. In the future, it may be beneficial for MVRPC to create safety education programs of their own in addition to those already offered by federal, state, and local agencies. These safety programs could be implemented region-wide throughout the Miami Valley and catered towards different age groups as exemplified by other regional planning commissions.

Another option for MVRPC to enhance safety planning in the Region may be to establish a Transportation Safety Subcommittee to collaboratively address regional transportation safety issues. Other MPOs have begun to demonstrate establishing Safety Subcommittees, which may prove effective in communicating safety issues with various stakeholders in the region.

MVRPC may also create a Regional Transportation Safety Plan. They could look at case studies of safety plans created by other regional transportation planning commissions to find working examples of successful programs. It could greatly benefit the Miami Valley Region if a comprehensive safety plan were to be made in connection with existing transportation planning. Even incorporating safety projects into the already existing Dayton Regional Safety Initiative may be a good first step in implementing growth and knowledge about transportation safety in the Miami Valley.

**REFLECTION: IES Experience**

My undergraduate studies at Miami University in Sustainability provided me with a foundation for knowledge of environmental principles, while the IES Masters program allowed me to put these principles into practice. Through IES, I have gained the necessary skills required of someone entering the environmental field. I have gained valuable experience in teamwork, research, and outreach leading towards a professional application of these attributes.

Additionally, working as an intern with MVRPC has prepared me for a career at the intersection of the environmental and planning sectors. The scope of my work at MVRPC was catered towards transportation planning and did not inherently involve an environmental focus. However, MVRPC does have a small number of staff solely dedicated to environmental planning. In the future I can see myself working for an agency much like this one, but perhaps under a department that is more environmentally focused as this caters more to my interests and strengths.
IES greatly aided me in obtaining and excelling in this opportunity to be a planning intern. The GIS skills I learned were incredibly useful in my every day work. IES taught me most importantly how to manage my time for large projects and how to work on a team. I have applied project management skills in regional planning and have gained a great appreciation for the communication skills I gained through IES. Being able to effectively communicate is especially important in working with supervisors and the various members of the Board.

While working with this regional transportation planning department, I became interested in social issues connected to transportation planning, such as why more vehicle crashes involving pedestrians occur in low income neighborhoods as opposed to more wealthy communities. I am looking to apply my experience and new interests to a social advocacy role. I am interested in working in planning for community development or sustainable planning. I also have the option to obtain a planning degree and seek a program where I can focus more on social and environmental issues. I am grateful to have had the opportunity to work for MVRPC, a position I feel I could not have obtained without the IES program. The IES program has prepared me to excel in any professional career I may choose to pursue.
List of References


## Appendices

### Appendix A: Board of Directors

**Table IV. MVRPC Board Members**  
Source: Adapted from MVRPC 2014.

<table>
<thead>
<tr>
<th>Name</th>
<th>Organization</th>
<th>Title</th>
<th>MPO Member</th>
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<tr>
<td>Debborah Wallace</td>
<td>Beavercreek</td>
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<tr>
<td>Carol Graff</td>
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<tr>
<td>Bob Baird</td>
<td>Bellbrook</td>
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<td>Jerome Hirt, Sr.</td>
<td>Bethel Twp.</td>
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<td>Terry Johnson</td>
<td>Carlisle</td>
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<td>Robin Lehman</td>
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<td>Donald Pence</td>
<td>Concord Twp.</td>
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<td>Phil Parker</td>
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<td>President and CEO</td>
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<td>Jeff Hoagland</td>
<td>Dayton Development Coalition</td>
<td>President</td>
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<td>Timothy Kambitsch</td>
<td>Dayton Metro Library</td>
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<td>Robert Stallman</td>
<td>Dayton Power and Light</td>
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<td>Rebecca Benna</td>
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<td>S. Ted Bucaro</td>
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<td>Govt and Regional Relations Dir</td>
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