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## DEMOGRAPHIC FACTORS AND TRAFFIC CRASHES: PART II - GIS ANALYSIS

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<b>16. Abstract</b> <p>The objective of this report is to investigate the demographic characteristics of the drivers involved in the different types of crashes. GIS is used to locate the areas in Florida that have high crash rates for each demographic group. Four demographic characteristics are investigated: race, gender, age, and income. The analysis was performed using a GIS software, which located each crash record by its zipcode area. Drivers involved in traffic crashes were tracked back to the zipcode of their residence to identify the areas with high crash rates. Relationships were found between low income areas and alcohol and drugs related crashes. Also low income areas have higher crash rates where the driver ignored the use of the seat belt. Male drivers were found to have higher crash rates than females. Teen-age drivers are riskier than elderly drivers, and both groups have higher crash rates than the other age groups.</p>			
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## DISCLAIMER

“The opinions, findings and conclusions expressed in this publication are those of the authors and not necessarily those of the Department of Transportation or the U.S. Department of Transportation. This report is prepared in cooperation with the State of Florida Department of Transportation and the U.S. Department of Transportation.”

## ABSTRACT

Traffic safety requires a wide range of technical and management expertise, often technically and analytically complex. There are a variety of safety issues in traffic such as safety management, safety evaluation, safety countermeasures, and accident analysis and prediction. This REPORT will focus on analyzing one of the most important factor in traffic safety, the driver.

The first objective of this REPORT is to investigate the demographic characteristics of the drivers involved in crashes using the tools of geographic information systems (GIS). This analysis is performed for the purpose of targeting the areas in the state of Florida with drivers that have high crash rates. Therefore, provide them with suitable safety educational programs to enhance their knowledge of traffic safety in those areas. The second objective of this REPORT, is to find a relationship between income level and crash rates.

Four major demographic characteristics of drivers were investigated in this REPORT, which are: race, gender, age, and income. The analysis was performed using a geographic information software, which located each crash record by its zipcode number, therefore, drivers involved in traffic crashes were traced back to their residence. GIS provided maps for each of the major metropolitan areas showing zipcode areas with high crash rates for different crash types in conjunction with each of the demographic characteristics mentioned above. The socioeconomic data was obtained from the 1990 census data provided by the GIS

software. Using this data along with the crash data, the analysis was performed and the objectives were met.

A strong relationship was found between low income levels and alcohol and drug related crashes. In addition, low income areas had higher crash rates where drivers ignored the use of safety seat belts. In addition, male drivers were found to have higher crash rates than female drivers. Also African American drivers were found to have the highest crash rates among all three races, White, African American, and Hispanic. Finally, teen-age drivers were found to be more risky than elderly drivers, although both had high crash rates in their age groups.

## TABLE OF CONTENTS

LIST OF TABLES .....	viii
LIST OF FIGURES .....	x
CHAPTER 1 - INTRODUCTION .....	1
1.1 GIS and its Applications .....	2
1.2 Research Objectives .....	4
CHAPTER 2 - METHODOLOGY .....	6
2.1 Data Collection and Description .....	6
2.2 Software Used .....	9
2.2.1 Database Management Software .....	9
2.2.2 Geographic Information System (GIS) Software .....	10
2.3 Procedure .....	11
CHAPTER 3 - GEOGRAPHIC DISTRIBUTION OF TRAFFIC CRASHES IN FLORIDA .....	16
3.1 Total Traffic Crash Patterns .....	17
3.2 Crash Rates Involving Driver's Race .....	20
3.3 Alcohol and Drug Related Crashes .....	25
3.4 Fatal and Severe Injury Crashes .....	27
3.5 Crashes Without the Use of Safety Seat Belts .....	29
3.6 Teenage Drivers Crash Involvement (Age <20) .....	31
3.7 Elderly Drivers Crash Involvement (Age > 74) .....	33
3.8 Male and Female Drivers Crash Involvement .....	35
3.9 Crash Rates Vs. Education Level .....	41
3.10 Overall View of the Crash Patterns in Florida .....	43

CHAPTER 4 - ANALYSIS OF DEMOGRAPHIC CHARACTERISTICS FOR HILLSBOROUGH COUNTY .....	45
4.1 Income Level Vs. Crash Types (Tampa) .....	46
4.1.1 Income Level Vs. Alcohol and Drug Related Crashes (Tampa) .	48
4.1.2 Income Level Vs. Fatal and Severe Crashes (Tampa) .....	48
4.1.3 Income Level Vs. Crashes Without Use of Seat Belts (Tampa) .	51
4.1.4 Income Level Vs. Traffic Violations (Tampa) .....	53
4.1.5 Overall View of Income Level Vs. Crash Rates (Tampa) .....	53
4.2 Driver's Race Vs. Crash Types (Tampa) .....	57
4.2.1 White Drivers Crash Involvements Vs. Crash Types .....	57
4.2.1.1 White Drivers Vs. Alcohol and Drug Related Crashes .	57
4.2.1.2 White Drivers Vs. Fatal and Severe Crashes .....	57
4.2.1.3 White Drivers Vs. Crashes Without the Use of Seat Belts .....	60
4.2.1.4 White Drivers Vs. Traffic Violations .....	60
4.2.2 African American Drivers Crash Involvements Vs. Crash Types .....	64
4.2.2.1 African American Drivers Vs. Alcohol and Drug Related Crashes .....	64
4.2.2.2 African American Drivers Vs. Fatal and Severe Injury Crashes .....	64
4.2.2.3 African American Drivers Vs. Crashes Without the Use of Seat Belts .....	67
4.2.2.4 African American Drivers Vs. Traffic Violations .....	67
4.2.3 Hispanic Drivers Crash Involvements Vs. Crash Types .....	71
4.2.3.1 Hispanic Drivers Vs. Alcohol and Drug Related Crashes .....	71
4.2.3.2 Hispanic Drivers Vs. Fatal and Severe Injury Crashes .	71
4.2.3.3 Hispanic Drivers Vs. Crashes Without the Use of Seat Belts .....	74
4.2.3.4 Hispanic Drivers Vs. Traffic Violations .....	74
4.2.4 Overall View of Driver's Race Vs. Crash Rates .....	78
4.3 Driver's Age Vs. Crash Types (Tampa) .....	79
4.3.1 Teen-age Drivers Crash Involvement .....	80
4.3.1.1 Teen-age Drivers Vs. Alcohol and Drug Related Crashes .....	80
4.3.1.2 Teen-age Drivers Vs. Fatal and Severe Injury Crashes .	80
4.3.1.3 Teen-age Drivers Vs. Crashes Without the Use of Seat Belts .....	80
4.3.1.4 Tenn-age Drivers Vs. Traffic Violations .....	84
4.3.2 Elderly Drivers Crash Involvement .....	87

4.3.2.1	Elderly Drivers Vs. Alcohol and Drug Related Crashes	87
4.3.2.2	Elderly Drivers Vs. Fatal and Severe Injury Crashes	87
4.3.2.3	Elderly Drivers Vs. Crashes Without the Use of Seat Belts	90
4.3.2.4	Elderly Drivers Vs. Traffic Violations	90
4.3.3	Overall View of Drivers' Age Vs. Crash Rates	94
4.4	Driver's Gender Vs. Crash Types (Tampa)	95
4.4.1	Male Drivers Vs. Crash Types	95
4.4.1.1	Male Drivers Vs. Alcohol and Drug Related Crashes	95
4.4.1.2	Male Drivers Vs. Fatal and Severe Crashes	95
4.4.1.3	Male Drivers Vs. Crashes Without the Use of Seat Belts	98
4.4.1.4	Male Drivers Vs. Traffic Violations	98
4.4.2	Female Drivers Vs. Crash Types	102
4.4.2.1	Female Drivers Vs. Alcohol and Drug Related Crashes	102
4.4.2.2	Female Drivers Vs. Fatal and Severe Crashes	102
4.4.2.3	Female Drivers Vs. Crashes Without the Use of Seat Belts	105
4.4.2.4	Female Drivers Vs. Traffic Violations	105
4.4.3	Overall View of Driver's Gender Vs. Crash Rates	109

CHAPTER 5 - ANALYSIS OF DEMOGRAPHIC CHARACTERISTICS  
FOR MAJOR METROPOLITAN AREAS 111

5.1	Crash Involvements in Orlando (Orange County)	112
5.1.1	Income Level Vs. Crash Types (Orlando)	112
5.1.1.1	Income Level Vs. Alcohol and Drug Related Crashes (Orlando)	112
5.1.1.2	Income Level Vs. Crashes Without Use of Seat Belts (Orlando)	114
5.1.2	Driver's Race Vs. Crash Types (Orlando)	116
5.1.2.1	White Drivers Vs. Crash Types (Orlando)	116
5.1.2.2	African American Drivers Vs. Crash Types (Orlando)	117
5.1.2.3	Hispanic Drivers Vs. Crash Types (Orlando)	121
5.1.2.4	Overall View of Driver's Race Vs. Crash Rates (Orange County)	122
5.1.3	Drivers' Age Vs. Crash Type (Orlando)	124
5.1.3.1	Teen-age Drivers Crash Involvement (Orlando)	124
5.1.3.2	Elderly Drivers Crash Involvement (Orlando)	127
5.1.3.3	Overall View of Driver's Age Vs. Crash Rates (Orange County)	128
5.1.4	Drivers' Gender Vs. Crash Types (Orlando)	131
5.1.4.1	Male Drivers Vs. Crash Types (Orlando)	131
5.1.4.2	Female Drivers Vs. Crash Types (Orlando)	134

	5.1.4.3	Overall View of Driver's Gender Vs. Crash Rates (Orange County) .....	135
5.2		Crash Involvement in Miami (Dade County) .....	137
	5.2.1	Income Level Vs. Crash Types (Miami) .....	137
	5.2.1.1	Income Level Vs. Alcohol and Drug Related Crashes (Miami) .....	137
	5.2.1.2	Income Level Vs. Crashes Without Use Of Seat Belts (Miami) .....	139
	5.2.2	Driver's Race Vs. Crash Types (Miami) .....	141
	5.2.2.1	African American Drivers Vs. Crash Types (Miami) .	141
	5.2.2.2	Hispanic Drivers Vs. Crash Types (Miami) .....	145
	5.2.2.3	Overall View of Driver's Race Vs. Crash Rates (Dade County) .....	146
	5.2.3	Drivers' Age Vs. Crash Type (Miami) .....	149
	5.2.3.1	Teen-age Drivers Crash Involvement (Miami) .....	149
	5.2.3.2	Elderly Drivers Crash Involvement (Miami) .....	153
	5.2.3.3	Overall View of Driver's Age Vs. Crash Rates (Dade County) .....	154
	5.2.4	Drivers' Gender Vs. Crash Types (Miami) .....	157
	5.2.4.1	Male Drivers Vs. Crash Types (Miami) .....	157
	5.2.4.2	Female Drivers Vs. Crash Types (Miami) .....	161
	5.2.4.3	Overall View of Driver's Gender Vs. Crash Rates (Dade County) .....	162
5.3		Crash Involvement in Jacksonville (Duval County) .....	165
	5.3.1	Income Level Vs. Crash Types (Jacksonville) .....	165
	5.3.1.1	Income Level Vs. Alcohol and Drug Related Crashes (Jacksonville) .....	165
	5.3.1.2	Income Level Vs. Crashes Without Use of Seat Belts (Jacksonville) .....	167
	5.3.2	Driver's Race Vs. Crash Types (Jacksonville) .....	169
	5.3.2.1	African American Drivers Vs. Crash Type (Jacksonville) .....	169
	5.3.3	Driver's Age Vs. Crash Type (Jacksonville) .....	171
	5.3.3.1	Teen-age Drivers Crash Involvement (Jacksonville) ..	171
	5.3.3.2	Elderly Drivers Crash Involvement (Jacksonville) ...	173
	5.3.3.3	Overall View of Driver's Age Vs. Crash Rates (Duval County) .....	174
	5.3.4	Drivers' Gender Vs. Crash Types (Jacksonville) .....	176
	5.3.4.1	Male Drivers Vs. Crash Types (Jacksonville) .....	176
	5.3.4.2	Female Drivers Vs. Crash Types (Jacksonville) .....	179
	5.3.4.3	Overall View of Driver's Gender Vs. Crash Rates (Duval County) .....	180

5.4	Crash Involvement in Tallahassee (Leon County) . . . . .	182
5.4.1	Income Level Vs. Crash Types (Tallahassee) . . . . .	182
5.4.1.1	Income Level Vs. Alcohol and Drug Related Crashes (Tallahassee) . . . . .	182
5.4.1.2	Income Level Vs. Crashes Without Use of Seat Belts (Tallahassee) . . . . .	184
5.4.2	Driver's Race Vs. Crash Types (Tallahassee) . . . . .	186
5.4.2.1	African American Drivers Vs. Crash Types (Tallahassee) . . . . .	186
5.4.3	Driver's Age Vs. Crash Type (Tallahassee) . . . . .	187
5.4.3.1	Teen-age Drivers Crash Involvement (Tallahassee) . .	187
5.4.3.2	Elderly Drivers Crash Involvement (Tallahassee) . . . .	189
5.4.3.3	Overall View of Driver's Age Vs. Crash Rates (Orange County) . . . . .	190
5.4.4	Driver's Gender Vs. Crash Types (Tallahassee) . . . . .	191
5.4.4.1	Male Drivers Vs. Crash Types (Tallahassee) . . . . .	191
5.4.4.2	Female Drivers Vs. Crash Types (Tallahassee) . . . . .	193
5.4.4.3	Overall View of Driver's Gender Vs. Crash Rates (Duval County) . . . . .	194
CHAPTER 6 - CONCLUSIONS AND RECOMMENDATIONS . . . . .		195



**LIST OF TABLES**

2-1 Crash Database Structure ..... 10

3-1 Crash Data for Each County ..... 38

4-1 Crash Data for Hillsborough County ..... 55

4-2 White Drivers Crash Involvement Database ..... 63

4-3 African American Drivers Crash Involvement Database ..... 70

4-4 Hispanic Drivers Crash Involvement Database ..... 77

4-5 Teen-age Drivers Crash Involvement Database ..... 86

4-6 Elderly Drivers Crash Involvement Database ..... 93

4-7 Male Drivers Crash Involvement Database ..... 101

4-8 Female Drivers Crash Involvement Database ..... 108

5-1 White Drivers Crash Data for Orange County ..... 119

5-2 African American Drivers Crash Data for Orange County ..... 120

5-3 Hispanic Drivers Crash Data for Orange County ..... 123

5-4 Teen-age Drivers Crash Data for Orange County ..... 126

5-5 Elderly Drivers Crash Data for Orange County ..... 130

5-6 Male Drivers Crash Data for Orange County ..... 133

5-7 Female Drivers Crash Data for Orange County ..... 136

5-8 African American Drivers Crash Data for Dade County ..... 143

5-9	Hispanic Drivers Crash Data for Dade County .....	147
5-10	Teen-age Drivers Crash Data for Dade County .....	151
5-11	Elderly Drivers Crash Data for Dade County .....	155
5-12	Male Drivers Crash Data for Dade County .....	159
5-13	Female Drivers Crash Data for Dade County .....	163
5-14	African American Drivers Crash Data for Duval County .....	170
5-15	Teen-age Drivers Crash Data for Duval County .....	172
5-16	Elderly Drivers Crash Data for Duval County .....	175
5-17	Male Drivers Crash Data for Duval County .....	178
5-18	Female Drivers Crash Data for Duval County .....	181
5-19	African American Drivers Crash Data for Leon County .....	187
5-20	Teen-age Drivers Crash Data for Leon County .....	188
5-21	Elderly Drivers Crash Data for Leon County .....	190
5-22	Male Drivers Crash Data for Leon County .....	192
5-23	Female Drivers Crash Data for Leon County .....	194

**LIST OF FIGURES**

2-1 Schematic Framework of Procedure ..... 15

3-1 Reported Traffic Crashes (Numbers) ..... 18

3-2 Reported Traffic Crashes per 10,000 Licenced Drivers, 1995 ..... 19

3-3 White Drivers Crash Involvement ..... 21

3-4 African American Drivers Crash Involvement ..... 23

3-5 Hispanic Drivers Crash Involvement ..... 24

3-6 Alcohol and Drug Related Crashes ..... 26

3-7 Fatal and Severe Injury Crashes ..... 28

3-8 Crashes Without the Use of Seat Belts ..... 30

3-9 Teen-age Drivers Crash Involvement ..... 32

3-10 Elderly Drivers Crash Involvement ..... 34

3-11 Male Drivers Crash Involvement ..... 36

3-12 Female Drivers Crash Involvement ..... 37

3-13 Education Level Vs. Crash Rates ..... 42

4-1 Hillsborough County Income Level Vs. Crash Rates ..... 47

4-2 Hillsborough County Fatal and Severe Injury Crashes Vs. Income Level ..... 49

4-3 Hillsborough County Alcohol and Drug Related Crashes Vs. Income Level ... 50

4-4 Hillsborough County Crashes Without Seat Belts Vs. Income Level ..... 52

4-5	Hillsborough County Crashes with Drivers Cited for Violations Vs. Income Level .....	54
4-6	White Drivers Crash Involvement Vs. Alcohol and Drug Related Crashes .....	58
4-7	White Drivers Crash Involvement Vs. Fatal and Severe Injury Crashes .....	59
4-8	White Drivers Crash Involvement Vs. Crashes Without Seat Belts .....	61
4-9	White Drivers Crash Involvement Vs. Crashes with Cited Violations .....	62
4-10	African American Drivers Crash Involvement Vs. Alcohol and Drug Related Crashes .....	65
4-11	African American Drivers Crash Involvement Vs. Fatal and Severe Injury Crashes .....	66
4-12	African American Drivers Crash Involvement Vs. Crashes Without Seat Belts .....	68
4-13	African American Drivers Crash Involvement Vs. Crashes with Traffic Violations .....	69
4-14	Hispanic Drivers Crash Involvement Vs. Alcohol and Drug Related Crashes ..	72
4-15	Hispanic Drivers Crash Involvement Vs. Fatal and Severe Injury Crashes .....	73
4-16	Hispanic Drivers Crash Involvement Vs. Crashes Without Seat Belts .....	75
4-17	Hispanic Drivers Crash Involvement Vs. Crashes with Traffic Violations .....	76
4-18	Teen-age Drivers Crash Involvement Vs. Alcohol and Drug Related Crashes ..	81
4-19	Teen-age Drivers Crash Involvement Vs. Fatal and Severe Injury Crashes .....	82
4-20	Teen-age Drivers Crash Involvement Vs. Crashes Without Seat Belts .....	83
4-21	Teen-age Drivers Crash Involvement Vs. Crashes with Traffic Violations .....	85
4-22	Elderly Drivers Crash Involvement Vs. Alcohol and Drug Related Crashes ...	88
4-23	Elderly Drivers Crash Involvement Vs. Fatal and Severe Injury Crashes .....	89

4-24	Elderly Drivers Crash Involvement Vs. Crashes Without Seat Belts . . . . .	91
4-25	Elderly Drivers Crash Involvement Vs. Crashes with Traffic Violations . . . . .	92
4-26	Male Drivers Crash Involvement Vs. Alcohol and Drug Related Crashes . . . . .	96
4-27	Male Drivers Crash Involvement Vs. Fatal and Severe Injury Crashes . . . . .	97
4-28	Male Drivers Crash Involvement Vs. Crashes Without Seat Belts . . . . .	99
4-29	Male Drivers Crash Involvement Vs. Crashes with Traffic Violations . . . . .	100
4-30	Female Drivers Crash Involvement Vs. Alcohol and Drug Related Crashes . . . . .	103
4-31	Female Drivers Crash Involvement Vs. Fatal and Severe Injury Crashes . . . . .	104
4-32	Female Drivers Crash Involvement Vs. Crashes Without Seat Belts . . . . .	106
4-33	Female Drivers Crash Involvement Vs. Crashes with Traffic Violations . . . . .	107
5-1	Alcohol and Drug Related Crashes Vs. Income Level (Orange County) . . . . .	113
5-2	Crashes Without Seat Belts Vs. Income Level (Orange County) . . . . .	115
5-3	Alcohol and Drug Related Crashes Vs. Income Level (Dade County) . . . . .	138
5-4	Crashes Without Seat Belts Vs. Income Level (Dade County) . . . . .	140
5-5	Alcohol and Drug Related Crashes Vs. Income Level (Duval County) . . . . .	166
5-6	Crashes Without Seat Belts Vs. Income Level (Duval County) . . . . .	168
5-7	Alcohol and Drug Related Crashes Vs. Income Level (Leon County) . . . . .	183
5-8	Crashes Without Seat Belts Vs. Income Level (Leon County) . . . . .	185



## CHAPTER 1

### INTRODUCTION

In 1993, 40,115 people died in highway crashes in America, up slightly from the previous year. This is the equivalent of a jet crash killing 110 people every single day. Data from the National Highway Traffic Safety Administration (NHTSA) indicate that deaths in 1994 remained near the 1993 level. Motor vehicle crashes remain a major public health problem. They are the leading cause of death for people ages five to 32 and the leading cause of injury for all age groups. For this reason, transportation agencies all over the country are striving to find solutions to this problem in order to bring down the number of deaths on the nation's highways.

Transportation agencies are currently faced with ever-increasing demands for traffic safety information to support more effective decision making throughout their organizations, from engineering at the individual project level to statewide planning and management. This high demand drove these agencies to seek the help of the modern technology in collecting and analyzing spatial data in order to arrive at accurate and useful results. One of these technologies is Geographic Information Systems (GIS). Attention is turning to the application of this information technology to sophisticated transportation management problems, which is in this case traffic safety.

This report utilized geographic information system (GIS) to analyze traffic crash data in Florida. The next section contains an overview of Geographic Information Systems (GIS) and its applications in transportation, followed by description of the objectives of this report.

### **1.1 GIS and its Applications**

Geographic information, in its simplest form, is information which relates to specific location. The physical environment is represented by information about vegetation and buildings. In addition, there are aspects of the socioeconomic environment, such as bus service provision and unemployment, which cannot be observed directly, but which are also truly 'geographic' in nature. The 1980s saw a rapid evolution of Geographic Information Systems, which is known as 'GIS'.

GIS potentially offers far greater power for manipulation and analysis of data than had been available with earlier systems, broadly aimed at map or image reproduction, but also place greater demands on data accuracy and availability. The data in GIS may be accessed to obtain answers to questions such as 'what is at location X?', or 'how many of object A fall within area B?', which is true Geographic information.

Geographic information system may be summarized as having the following characteristics:

1. *Geographic*: The system is concerned with data relating to geographic scales of measurement, and which are referenced by some coordinate system to locations on the surface of the earth.

2. *Information*: It is possible to use the system to ask questions of the geographic database, obtaining information about the geographic world. This represents the extraction of specific and meaningful information from a diverse collection of data.

3. *Systems*: This is the environment which allows data to be managed and questions to be posed. In the most general sense, a GIS needs to be automated (a non-automated example would be a traditional map library), but should be an integrated set of procedures for the input, storage, manipulation, and output of the geographic information.

The impact of GIS has been widely felt in all fields that use geographic information in resource management, land-use planning, transportation, marketing, and in many applications in the geosciences and elsewhere. The last decade witnessed many government and private agencies that have been using GIS in many areas of transportation studies. The following are some fields in transportation engineering where GIS has been applied in many regions of the world:

- Superregional Transportation Modeling
- Analysis of Transit Service
- Highway Infrastructure Management
- Pavement Management
- Managing Hazardous Materials Shipments
- Traffic and Transportation Safety

Highway agencies employ computers to analyze accident data and identify high accident locations. Recently, many highway agencies have been using GIS for analyzing

highway accident data. The trend in analyzing accident data is to identify high accident locations, determine the priority sites, and plan for mitigation. This report focused on the use of GIS to locate high crash risk areas based on the driver's residence rather than the physical location of the accident.

## **1.2 Report Objectives**

“Traffic safety” should not be mistaken to indicate a narrow field. Traffic safety requires a wide range of technical and management expertise, often technically and analytically complex. There are a variety of safety issues in traffic such as safety management, safety evaluation, safety countermeasures, and accident analysis and prediction.

This report narrows down the wide range of traffic safety analysis to one of the most important factors in traffic safety, the driver. This report investigated the demographic characteristics of the drivers involved in crashes using GIS. This analysis was performed for the purpose of targeting areas in the state of Florida with drivers that have high crash risks, such as drivers involved in alcohol related crashes or those who ignored the use of safety seat belts while operating a vehicle.

Four major demographic characteristics of drivers were investigated in this report which are: race, gender, age, and income. Each demographic variable was analyzed against four types of crash involvements which are described as the following:

- Crashes involving the use of Alcohol and drugs
- Crashes involving drivers ignoring the use of safety seat belts
- Fatal and severe crashes

- Crashes where citations for traffic violation were issued

The role of the GIS in this report is providing an accessible and realistic model of what exists in the real world, allowing all kind of questions related to traffic crashes in the state of Florida to be addressed. An important and fast developing application field for GIS is that of socioeconomic or population-related data, which are data originally relating to individual members of a population which is scattered across geographic space. These data are results of censuses, surveys, and records gathered about individuals by health authorities, local government and the service sector.

In order for this analysis to be precise, drivers involved in crashes were traced back to their origin residence using their permanent address zipcodes. This enables us to look at a very detailed area of the state of Florida as whole. Thus, arrive to exact conclusions as of where do problems occur, and who are the drivers that are more risky and need help with their driving skills or habits. By providing the right educational programs to the right group of people in the right areas, we will be saving a lot of time and effort, and at the same time, we would witness low crash rates and therefore increase the safety of our roadways.

The uniqueness of this report is using the driver's zipcode to locate high crash risk areas rather than the physical location of high crashes on the network. Another important aspect of this study is finding a relationship between income and crash rates.



## **CHAPTER 2**

### **METHODOLOGY**

The methodology used in this report utilizes two major software, Visual dBASE is the database management software used to manipulate the crash data, and Mapitude is the Geographic Information System (GIS) software used to perform the crash analysis as it relates to the drivers' involvement and characteristics. This chapter describes the crash data used in this report including the collection process and the format of the data, then a description of the software used in this report is provided. Finally the process of linking the crash data to GIS and performing the crash analysis accordingly is described as well to cover all aspects of the methodology used in this report.

#### **2.1 Data Collection and Description**

The crash data used in this report was obtained from the Office of Management and Planning Services (OMPS), Statistics Department, for the year 1995. The OMPS Traffic Crash Database can provide crash data from 1986 through the most recent quarter of the current year. The Traffic Crash Database is a relational database consisting of seven files. Each file deals with a specific aspect of traffic crashes. The files may be linked as needed since there is a report number in each file, and using that report number, two or more files

could be matched to combine the information contained in each file for a certain record. This process is described later in this chapter. The crash files are described as follows:

1.     EVENTS: This file contains general information about the crash characteristics and circumstances.
2.     VEHICLE: This file contains information about the vehicles and vehicle actions in the traffic crash.
3.     DRIVER: This file contains information about the drivers and condition or action of the driver that contributed to the crash.
4.     PEDESTRIAN: This file deals with information on any pedestrians involved in the traffic crash.
5.     VIOLATIONS: This file lists the citations (if any) issued in connection with the traffic crash.
6.     PASSENGER: This file provides information about any passengers involved in the traffic crash.
7.     DOT SITE LOCATION: This file contains additional information about crash locations occurring on state roads only.

For the purpose of this report, only two files were used to perform the analyses which are the Driver and Vehicle files. Following is a description of the fields used from each of the two crash files:

1. Driver file: This file is the most important and critical file because it contains the data related to the drivers involved in the crashes including the zipcode number of the drivers residence which is indeed the key to this report. Following are the fields used in the analysis from the Driver file:

- Driver Age
- Alcohol/Drug use (Driver)
- Race of Driver
- Sex of Driver
- Injury Severity (Driver)
- Safety Equipment (Driver)

Each field has numeric codes as well, and these codes are described in Appendix A.

2. Vehicle file: Only one field was used from this file which is 'Vehicle Fault Code', which reflects whether the driver was cited for moving violation or not.

## **2.2 Software Used**

Following is a description of the software utilized in the analysis of this report:

### **2.2.1 Database Management Software**

Visual dBASE was the software used in manipulating the crash data and creating new databases for the use in the GIS environment. Visual dBASE was developed by Borland International, Inc in 1995. Visual dBASE is a dynamic database environment that accommodates everyone from new database users to application developers. Visual dBASE is both end-user database system and a complete programming and development environment. It has the ability of creating tables, querying them for data, and producing detailed and formatted reports on the data.

A program was written in Visual dBASE language to gather all the data from the crash files and report the number of crashes for each field described in the previous section with respect to each zipcode number in the state of Florida. This was done for the purpose of excluding the non-Florida residence from the crash database. The structure of the new database created by Visual dBASE is described in Table 2-1. This new database is the one used in the geographic information system software as described later in this chapter.

TABLE 2-1

CRASH DATABASE STRUCTURE

FIELD NAME	TYPE	WIDTH
ZIPCODE	NUMERIC	5
TOTAL CRASHES	NUMERIC	4
MALE DRIVERS	NUMERIC	4
FEMALE DRIVERS	NUMERIC	4
WHITE DRIVERS	NUMERIC	4
AFRICAN AMERICAN DRIVERS	NUMERIC	4
HISPANIC DRIVERS	NUMERIC	4
ALCOHOL AND DRUG CRASHES	NUMERIC	4
FATAL AND SEVERE INJURY CRASHES	NUMERIC	4
CRASHES WITH NO SEAT-BELT	NUMERIC	4
CRASHES WITH TRAFFIC VIOLATION	NUMERIC	4

**2.2.2 Geographic Information System (GIS) Software**

The GIS software used was Maptitude, developed by Caliper Corporation. Maptitude provides many versatile applications, including maps, U.S. Census demographic data, and host of commands and special data manipulation functions, such as performing mathematical calculations on the data used or performing statistical analysis on the data as well. It allows for the use of maps to analyze and scrutinize geographic relationships. The software is compatible with other major GIS software, such as ARCinfo, and Mapinfo. The software, on the other hand, had some limitation to its capabilities in providing more than two map

layers to present different data for each of the layers, which was the reason of using only two layers in the analysis of this report. In addition, the statistical analysis feature of Maptitude is very limited to basic statistical calculations, which limited the presentation of the data to graphical only. One of the tools provided is '*Locate by Zipcode*' command. This command locates the records in a given database using the zipcode of each record. If the database has records that share a common zipcode, which is the case with the crash database created in Visual dBASE, Maptitude has the capability of spreading out the records in the zipcode area enabling us to see every individual point on the map. The procedure of combining the crash database with the GIS in order to perform our analysis is described in detail in the following section.

### **2.3 Procedure**

1. The database created by Visual dBASE, presented in Table 2-1, contained the 1995 crash data for the state of Florida for each zipcode where each record in the database represents the driver's involvement in the crash. This crash database is imported in Maptitude (the GIS software) as a dataview format table, which are the format Maptitude uses to create tables, and this table will be the key to the next step of this process.
2. Using the zipcode field in the crash database, the GIS software locates each crash record by its zipcode and assigns X and Y coordinates for that record. This enables GIS to create a new map layer containing all the crash records for each zipcode. At this point we have a zipcode layer with the crash data presented by number of different types of crashes in each zipcode area.

3. The U.S. geographic files available in Maptitude contain detailed 1990 Census data. These data have been extracted from data tabulations produced by the Census Bureau. Using the 1990 census data files, Maptitude creates a second zipcode layer containing the 1990 census information, such as population, employment, education, and etc. for each zipcode area as well.

4. This is the most critical step in the procedure where both layers mentioned above are joined using a common field in both databases, which is in this case the zipcode number, creating a new map with one layer that contains data from both 1990 census data and 1995 crash data for each zipcode geographic area.

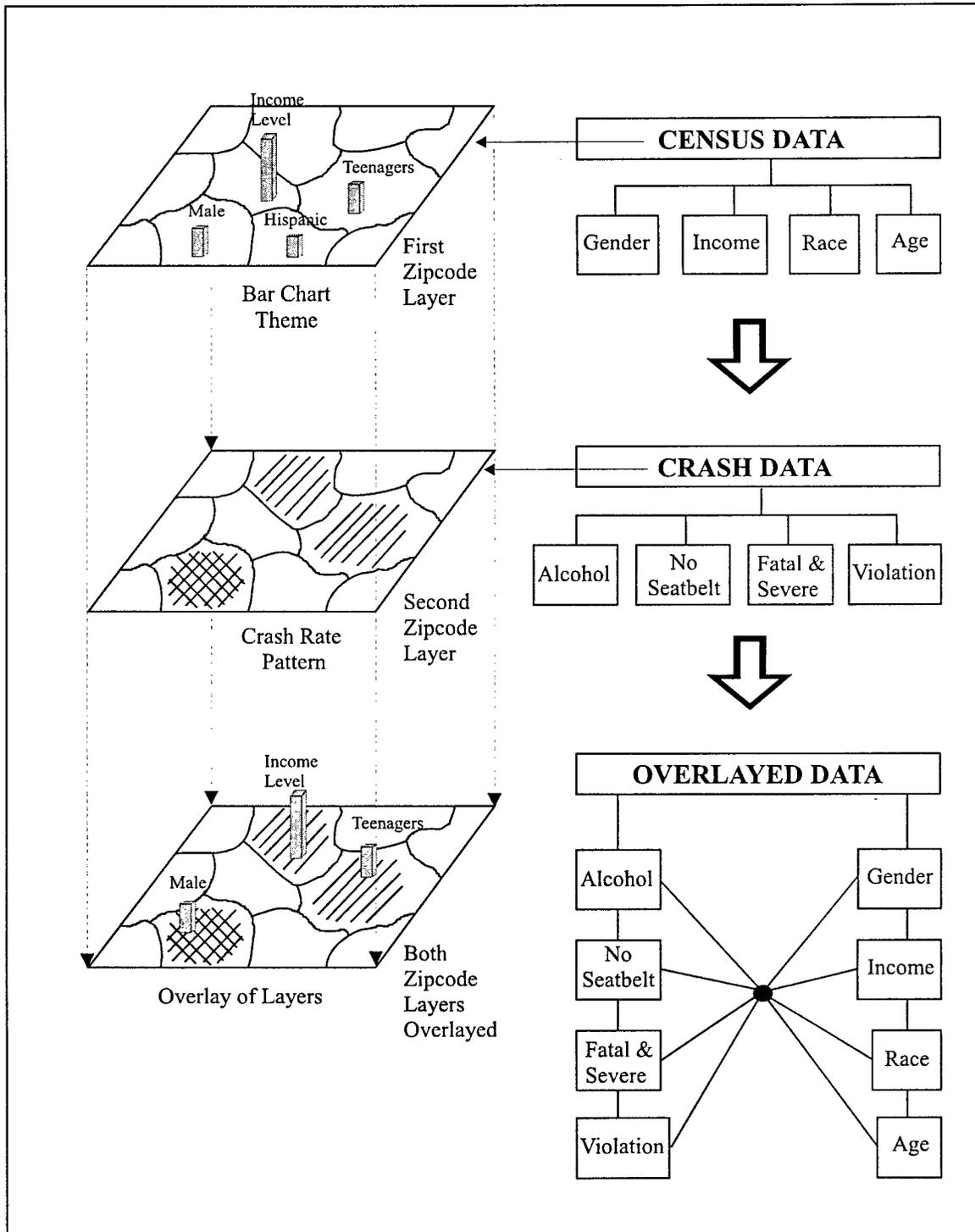
5. The crash data were normalized, to arrive at crash rates rather than numbers, by dividing number of crashes in each race, gender and age groups, by the population of each of the races, genders, and age groups available in the 1990 census data which is indeed factored to the year 1995 to match the crash data year. The factoring of the 1990 census population data was performed utilizing the *Florida Population Studies* developed by the Bureau of Economic and Business Research at the University of Florida. It provided population projections by age, sex, and race for the years 1995, 2000, 2005, and 2010. On the other hand, the 1990 income levels were factored as well to the year 1995 income levels utilizing the *1996 Florida Statistical Abstract*, which is also developed by the Bureau of Economic and Business Research at the University of Florida. The exposure measure that was used in this analysis was the population only, different exposure measures, such as Vehicle Miles Travel (VMT), were not applicable in this analysis because the VMT represents the road and network conditions, which is not the focus of this report.

6. The four types of crash involvements described earlier as crashes involving the use of Alcohol and drugs, crashes involving drivers ignoring the use of safety seat belts, fatal and severe injury crashes, and crashes where citations for traffic violation were issued, are being presented in each zipcode area by a color or pattern theme. This color or pattern theme groups the features in a map layer into classes, based on the value of the crash rate data field. When the map is drawn, the classes of the crash rates are displayed using different colors or patterns, so it is easy to tell them apart. This step is performed for three of the four demographic characteristics of the drivers that were described in chapter one as the age, race, and gender. The fourth is the income which is presented separately as described in the following step.

7. The field used from the Census data to describe the income level in each zipcode area was the '*Per Capita Income*' field. This field presents the income of each household, in each zipcode area, divided by the number of members in each household. This field was chosen in this analysis because it represents the income at an individual level, rather than an average income of the whole zipcode area, which gives us more specific numbers. This field is presented by vertical bar charts for each zipcode area. These charts are divided in three levels of income to show areas with high or low income depending on the height of the corresponding bar chart. The income bar charts are presented along with each of the four types of crash involvements mentioned above being colored using the color themes. Figure 2-1 presents a schematic framework of how the process of combining the crash database with the GIS layer in order to perform the analysis needed works.

8. The crash analysis can be performed at this point for each of the areas of interest, which are Orange, Hillsborough, Dade, Duval, and Leon Counties. Conclusions could be drawn with respect to each of the drivers demographic characteristics under investigation by this report, therefore, areas with high crash risks will be targeted for providing educational safety programs to the group of drivers found to have higher crash risks in any zipcode area of the counties analyzed.

**FIGURE 2-1  
SCHEMATIC FRAMEWORK OF PROCEDURE**



**CHAPTER 3**  
**GEOGRAPHIC DISTRIBUTION OF TRAFFIC CRASHES**  
**IN FLORIDA**

The procedure described earlier was performed, but in this chapter crash data was gathered for each county rather than each zipcode. This is done for the purpose of analyzing different aspects of traffic crash patterns in Florida, as a first step into the detailed analysis of the zipcode level. This chapter highlights the counties in Florida with drivers' groups that have high crash risk, and therefore gives an overview of where do traffic safety problems exist.

Nine (9) aspects of Florida traffic crash patterns were analyzed in this chapter which are as following:

- Pattern of crash occurrence.
- Crash rates involving driver's race (White, African American, and Hispanic).
- Crash rates related to the use of alcohol and drugs.
- Fatal and severe injury crashes.
- Crash rates without the use of safety seat belts.
- Crash rates involving teenage drivers.

- Crash rates involving elderly drivers.
- Crash rates involving Male and Female drivers.
- Crash rates vs. Education level

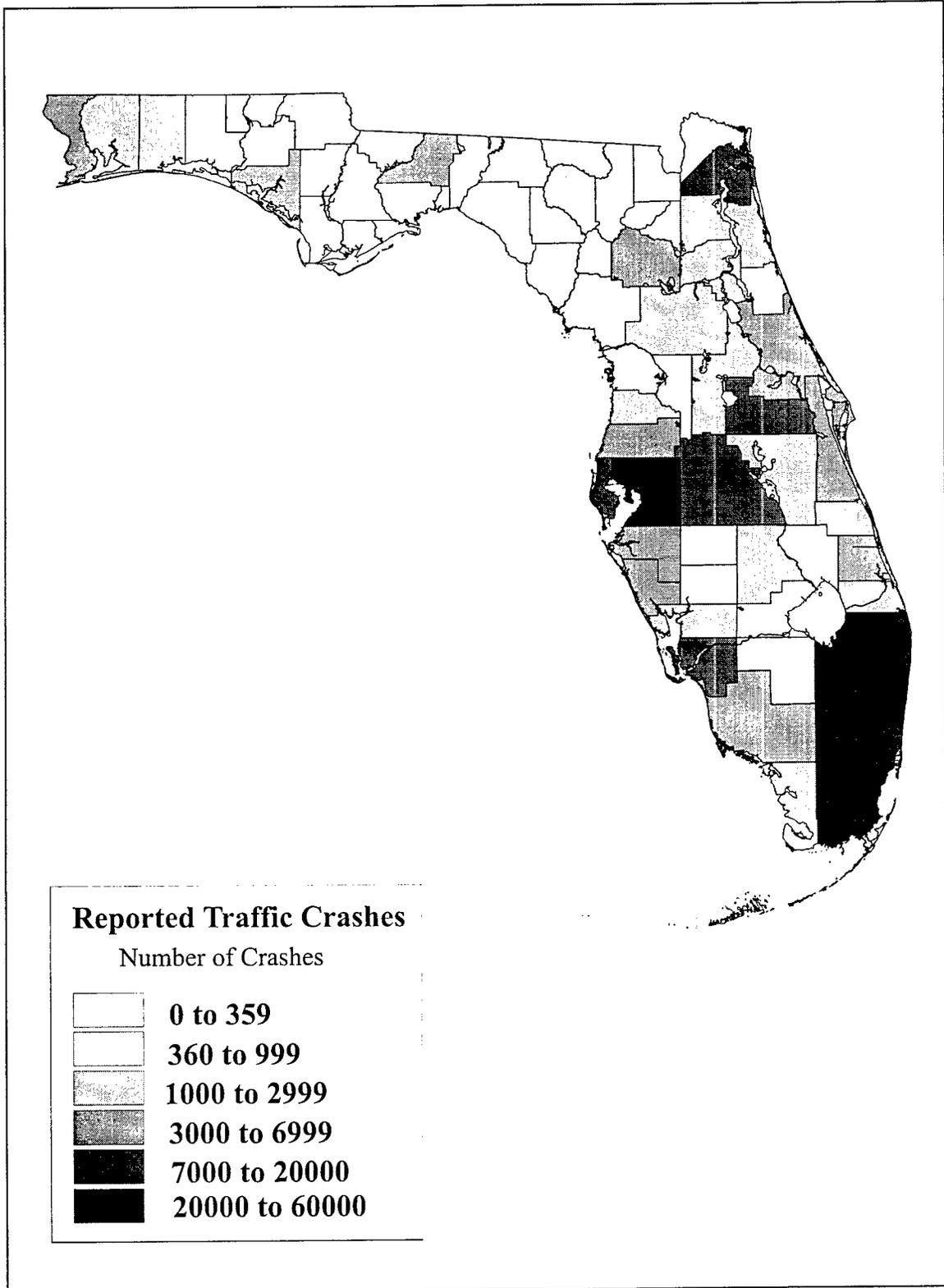
A map of the state of Florida showing the names of each county is provided in Appendix B, to help clarifying the maps in the following sections.

### **3.1 Total traffic crash patterns**

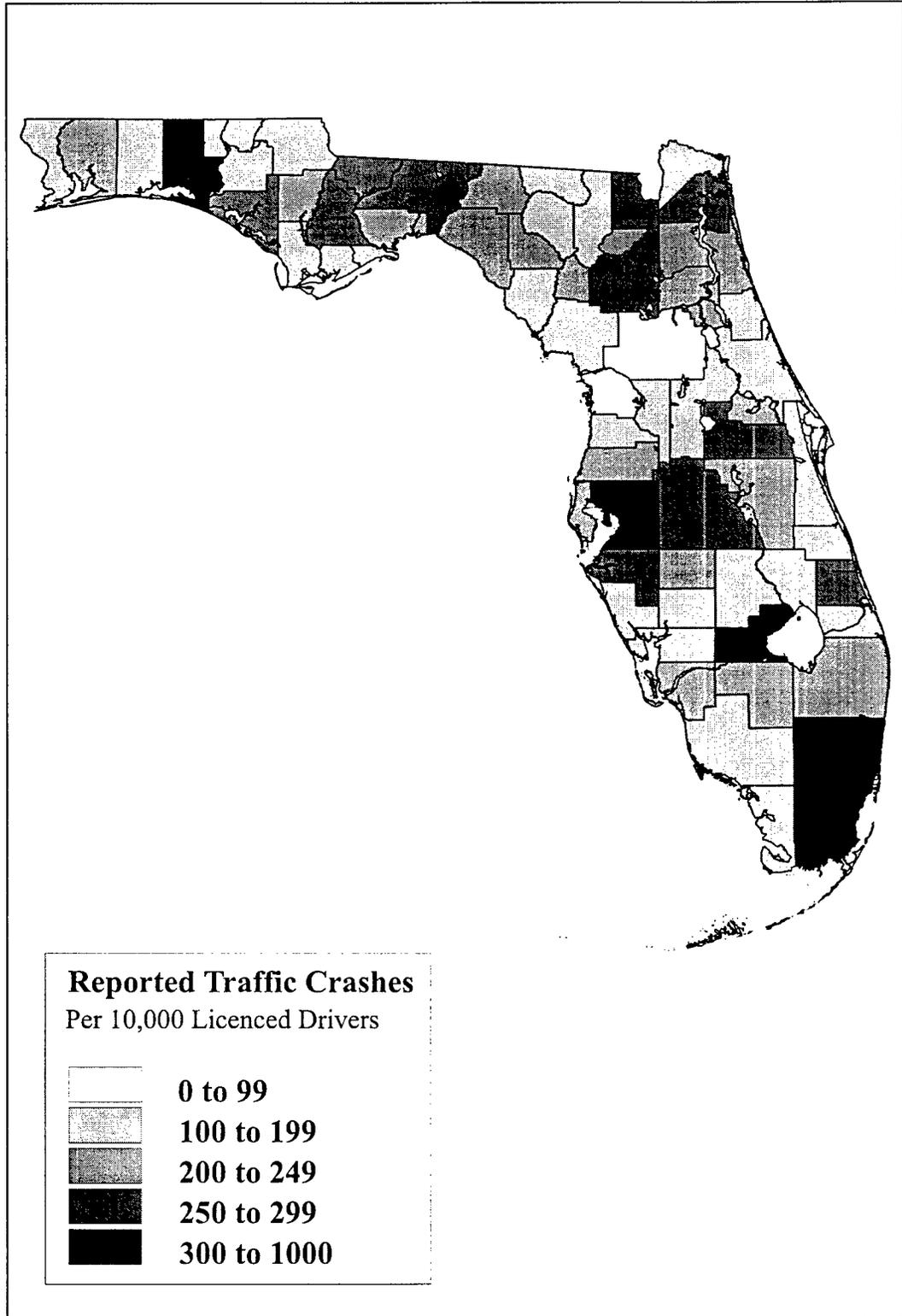
It is only logical to say that counties with large population will tend to have higher number of traffic crashes since there is high correlation between population and the number of crashes. Taking that into consideration, Dade County (Miami) had the highest number of crash involvement in the state in 1995 with 57,570 crashes, followed by Broward County (Ft. Lauderdale) with 37,099, Hillsborough (Tampa) with 30,722, Palm beach with 21,687, Orange (Orlando) with 18,358, and Duval (Jacksonville) with 15,445. The total number of drivers involved in crashes and residing in Florida was 364,925. Figure 3-1 presents the number of traffic crashes in each county in 1995.

A more accurate view of the crash data would be by normalizing the data and that is achieved by removing the effect of population when calculating a crash rate, which is the number of traffic crash involvements per 10,000 licenced drivers (1995 population of licenced drivers was obtained from the *1996 Florida Statistical Abstract*). High crash rates were clear to be distributed among the major Metropolitan areas of Florida. The county with the highest crash rate was Glades County (981 crashes per 10,000 licenced drivers), followed by Hillsborough (424), Walton (365), Dade (361), and Broward (311). Figure 3-2 presents these crash rates for each county.

**FIGURE 3-1  
REPORTED TRAFFIC CRASHES  
(NUMBERS)**



**FIGURE 3-2**  
**REPORTED TRAFFIC CRASHES**  
**Per 10,000 Licenced Drivers, 1995**



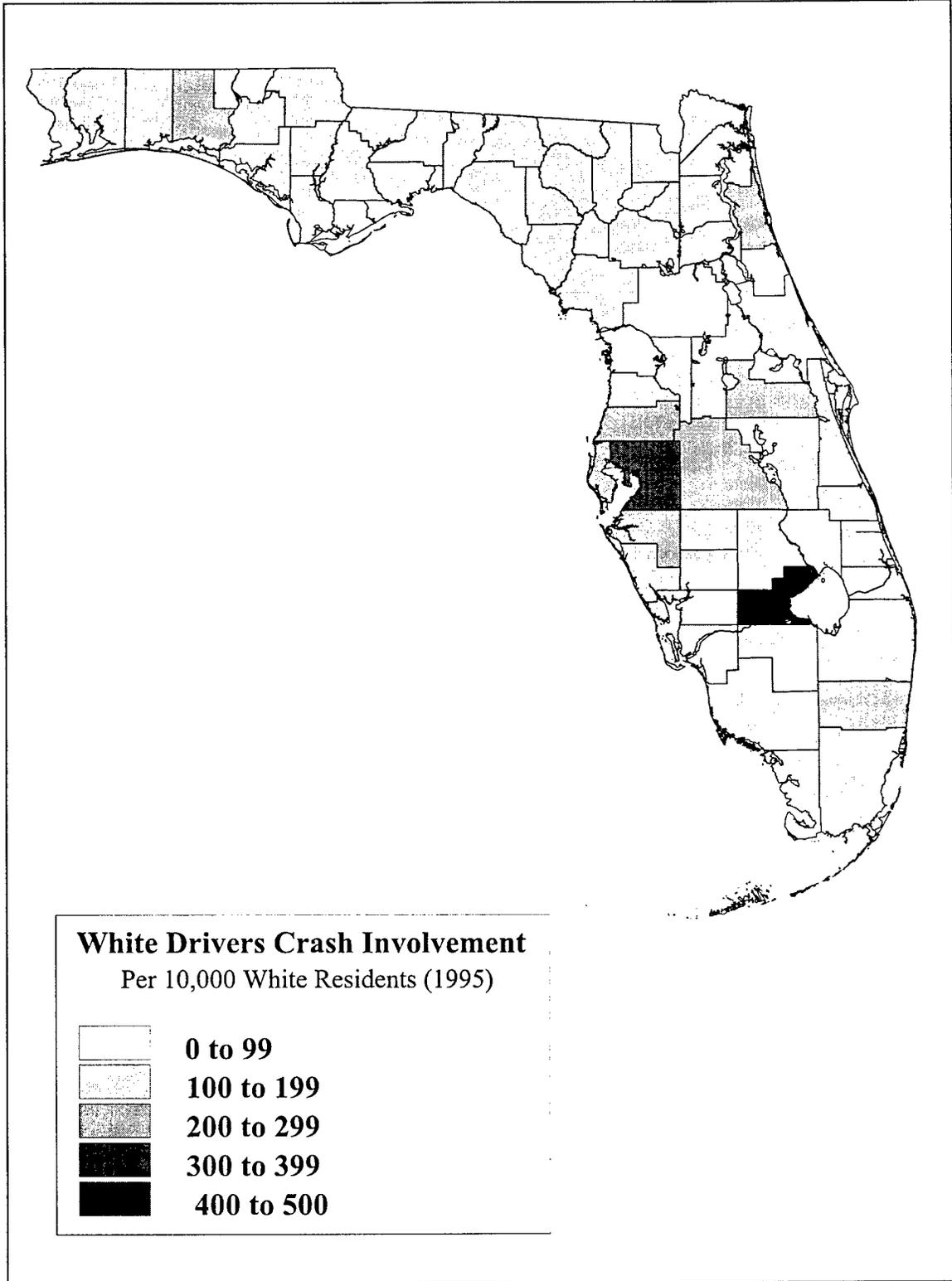
### 3.2 Crash Rates Involving Driver's Race

Driver's race is one of the demographic characteristics being examined in this report, therefore, race is addressed in this section. This is done for the purpose of locating the counties of the state with high crash rates with respect to the driver's race being White, African American, or Hispanic since these are the main races forming the population in the state. Also these are the only races included in the 1995 Florida crash database.

In order to analyze each driver's race crash involvement, crash rates for each race were calculated by dividing the number of crashes involving each race by the population of that race in Florida. The population of each was obtained from the GIS 1990 census data after it was factored to the year 1995 as mentioned before in this report. Note that the population of the licenced drivers for each race was not available, which was the reason for using the total population of each race, as provided by the census data, to normalize the crash data.

Crash rates (crashes per 10,000 White residents) were obtained for White drivers and presented in (Figure 3-3). It is noticeable that the highest crash rates involving White drivers is in Glades County (494 crashes per 10,000 White residents), followed by Hillsborough County (Tampa, 305). Other counties such as Orange, Polk, St. Johns, and Broward had medium to high crash rates involving White drivers as shown in Figure 3-3.

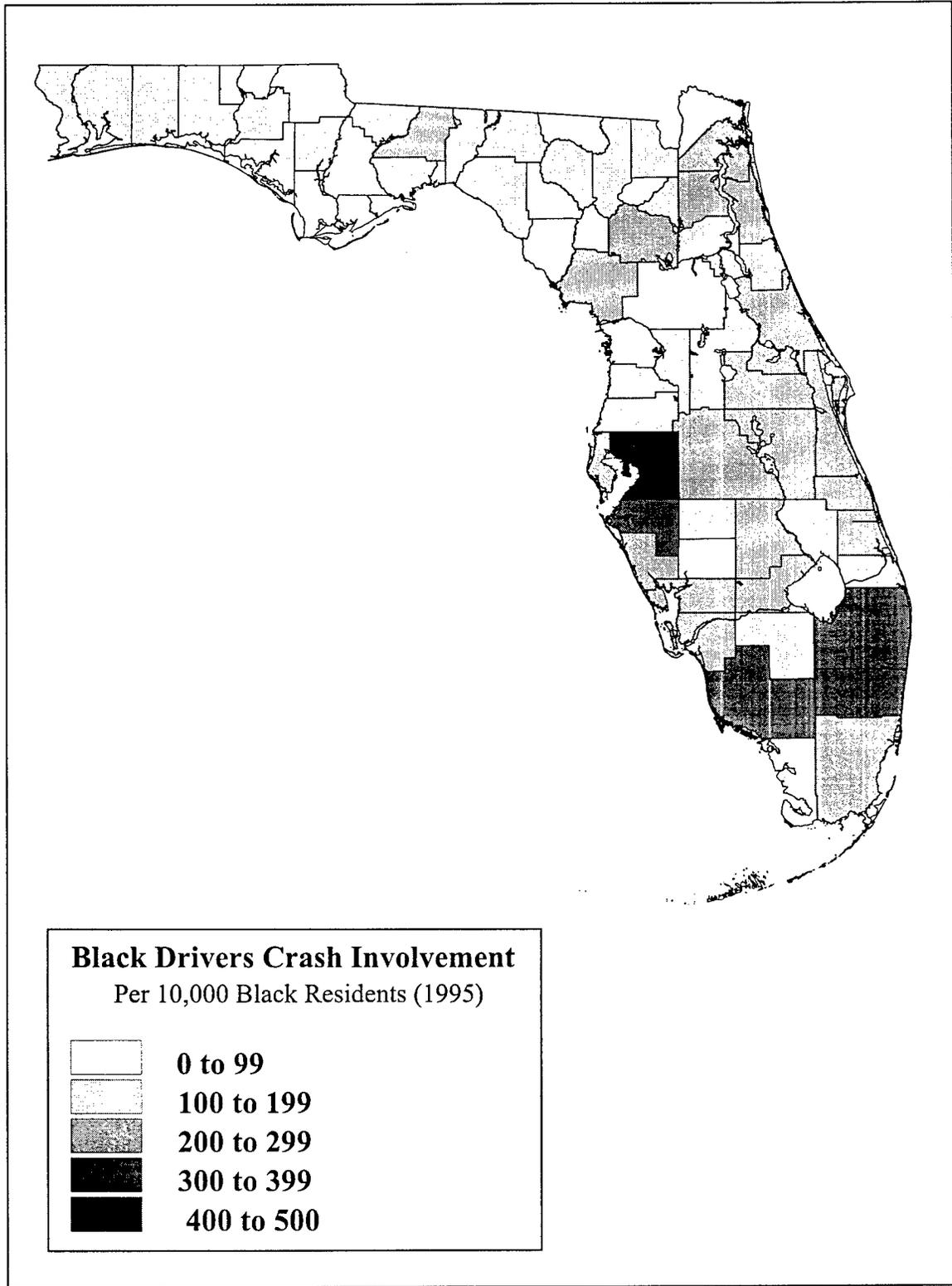
**FIGURE 3-3  
WHITE DRIVERS CRASH INVOLVEMENT**



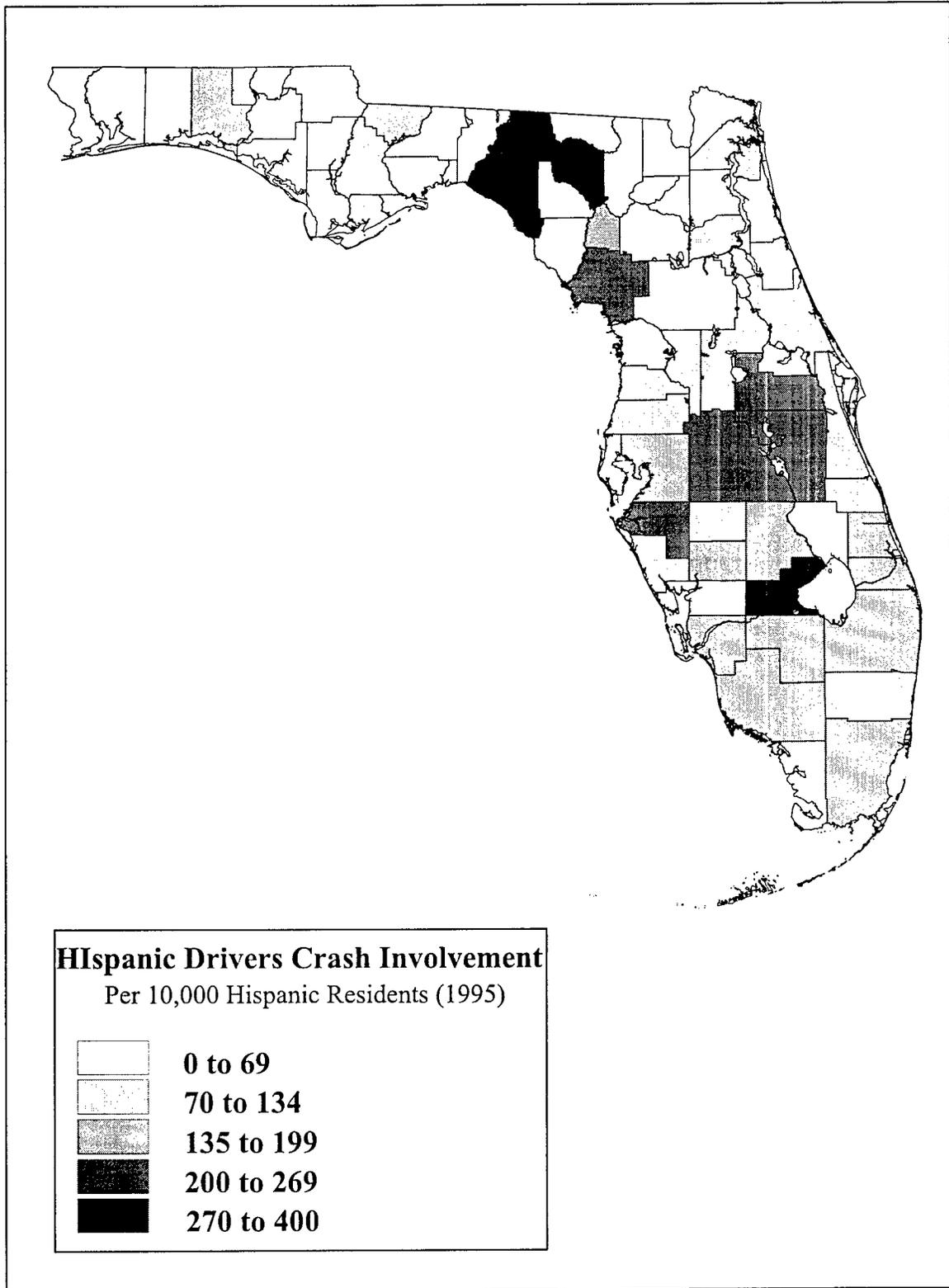
Crash rates (crashes per 10,000 African American residents) were obtained for African American drivers and presented in (Figure 3-4). It was found that the highest crash rate involving African American drivers is in Hillsborough County (Tampa, 415 crashes per 10,000 African American residents), followed by Broward (361), Manatee (329), Palm Beach (326), and Collier (306). Other counties with medium to high crash rates involving African American drivers such as Dade County, Orange, Duval, and Leon, were located in one of the major metropolitan areas of Florida.

Finally, crash rates (crashes per 10,000 Hispanic residents) were obtained for Hispanic drivers and presented as well in (Figure 3-5). It was found that the highest crash rate involving Hispanic drivers is in both Taylor and Glades (337 crashes per 10,000 Hispanic residents), followed by Madison (316), and Suwannee (270). Looking at the major Metropolitan areas of Florida, it was found that Orange County, Osceola, Dade, and Hillsborough had medium to high crash rates involving Hispanic drivers.

**FIGURE 3-4**  
**BLACK DRIVERS CRASH INVOLVEMENT**



**FIGURE 3-5  
HISPANIC DRIVERS CRASH INVOLVEMENT**



### **3.3 Alcohol and Drug Related Crashes**

After viewing the alcohol and drug-related crashes as a percentage of the total crashes in each county in Florida, as presented in (Figure 3-6), it was noticed that most of the high crash rates involving alcohol and drugs occurred in rural areas of the state. The counties with the highest alcohol and drug-related crash rates (percentage of total crashes in each county) in 1995 were Liberty (18.5%) and Franklin (17.11%), followed by Hamilton (16.95%), Gulf (16.49%), Union (15.17), and Gilchrist (15.56%). Other high alcohol and drug-related crashes were located in the North and Northwest (panhandle) areas of Florida.

On the other hand, the large urban counties, or the major Metropolitan areas of Florida, have the lowest crash rates involving alcohol and drugs. Dade (Miami) and Broward Counties had the lowest rates in the state, followed by Orange County (Orlando), Hillsborough (Tampa), Duval (Jacksonville), Leon (Tallahassee), and the rest of the major cities of the state.

When comparing Figure 3-6 to Figure 3-1 (Total number of crashes), it was noticed that the counties with the highest crash rates involving alcohol and drugs had the lowest number of crashes in the state, which explains the high percentages of alcohol and drug-related crashes in rural areas. In addition, there is a greater likelihood in rural counties of long distance driving after using alcohol or drugs, increasing the chance of an individual being involved in a crash.



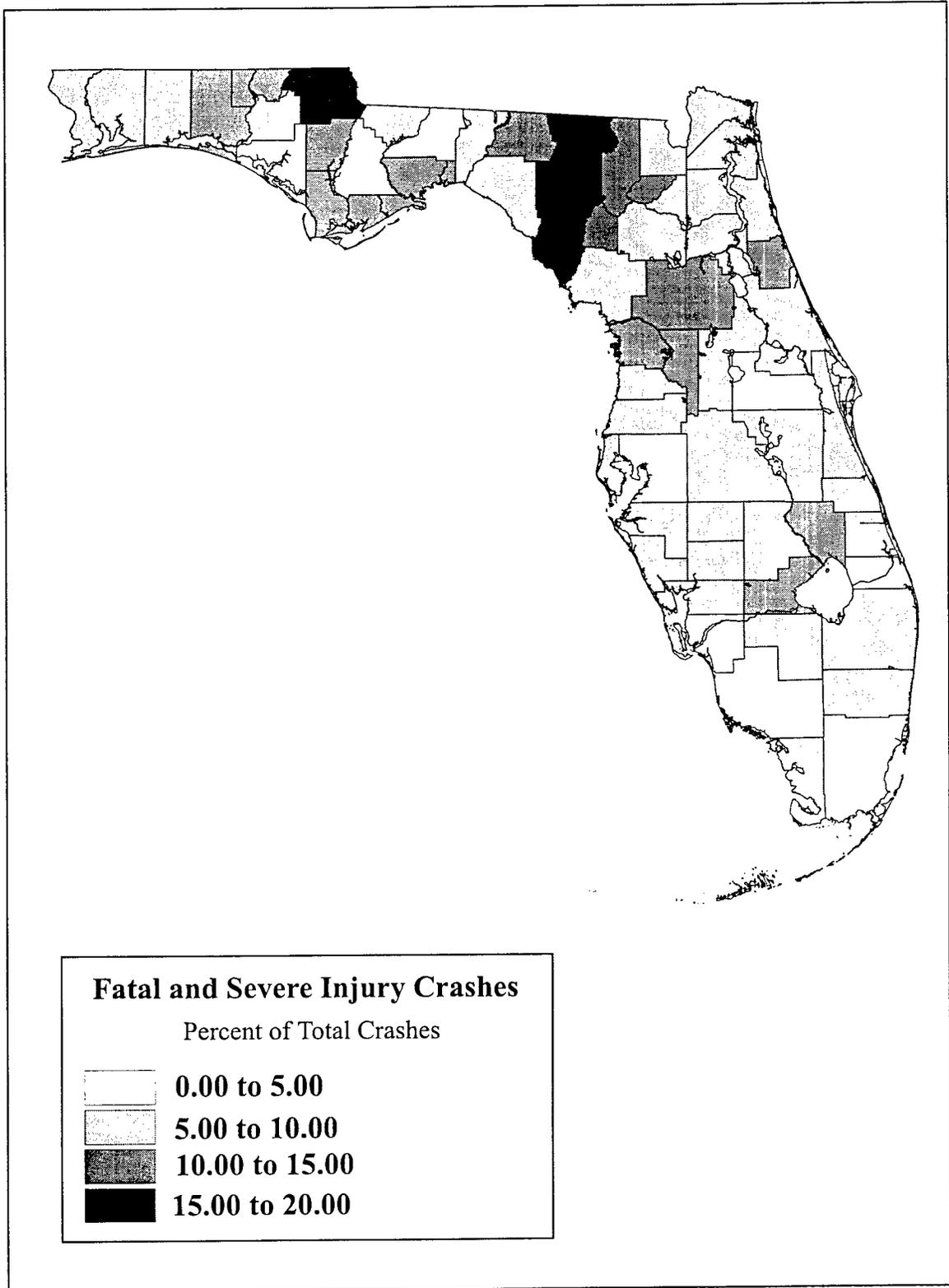
### **3.4 Fatal and Severe Injury Crashes**

According to the Bureau of Transportation Statistics, in 1994 Florida was ranked as the third highest state among the nation involved in fatal traffic crashes with 2,635 fatal crashes, after California with 4,163 and Texas with 3,037; Furthermore, 44.3% of those fatal crashes were alcohol related. This shows the high correlation between driving under the influence of alcohol and the rate of fatal crashes.

After viewing the fatal and severe injury crashes as a percentage of the total crashes in each county in Florida, as presented in (Figure 3-7), it was noticed that most of the fatal and severe crashes occurred in rural areas of the state. This is similar to the trend that was found in the alcohol and drug-related crashes. The highest fatal and severe injury crash rates (percentage of total crashes in each county) were found in Suwannee County (17.85%) and Dixie (16.28%), followed by Hamilton (16.1%), Lafayette (15.79%), and Jackson (15.54%). By comparing Figure 3-6 (alcohol and drug related crashes) with Figure 3-7 (fatal and severe injury crashes), it is clear that counties with high alcohol and drug related crashes had high fatal and severe crash rates as well, which shows a strong relationship between the two crash types.

The major metropolitan areas of Florida had the same pattern as the alcohol and drug related crashes, and is noticed in Figure 3-7 that Dade, Orange, Hillsborough, and Leon Counties had fatal and severe crash rates less than (5%). This is logical since congested networks tend to have low speeds, therefore less fatal and severe injury crashes.

**FIGURE 3-7**  
**FATAL AND SEVERE INJURY CRASHES**



### **3.5 Crashes Without the Use of Safety Seat Belts**

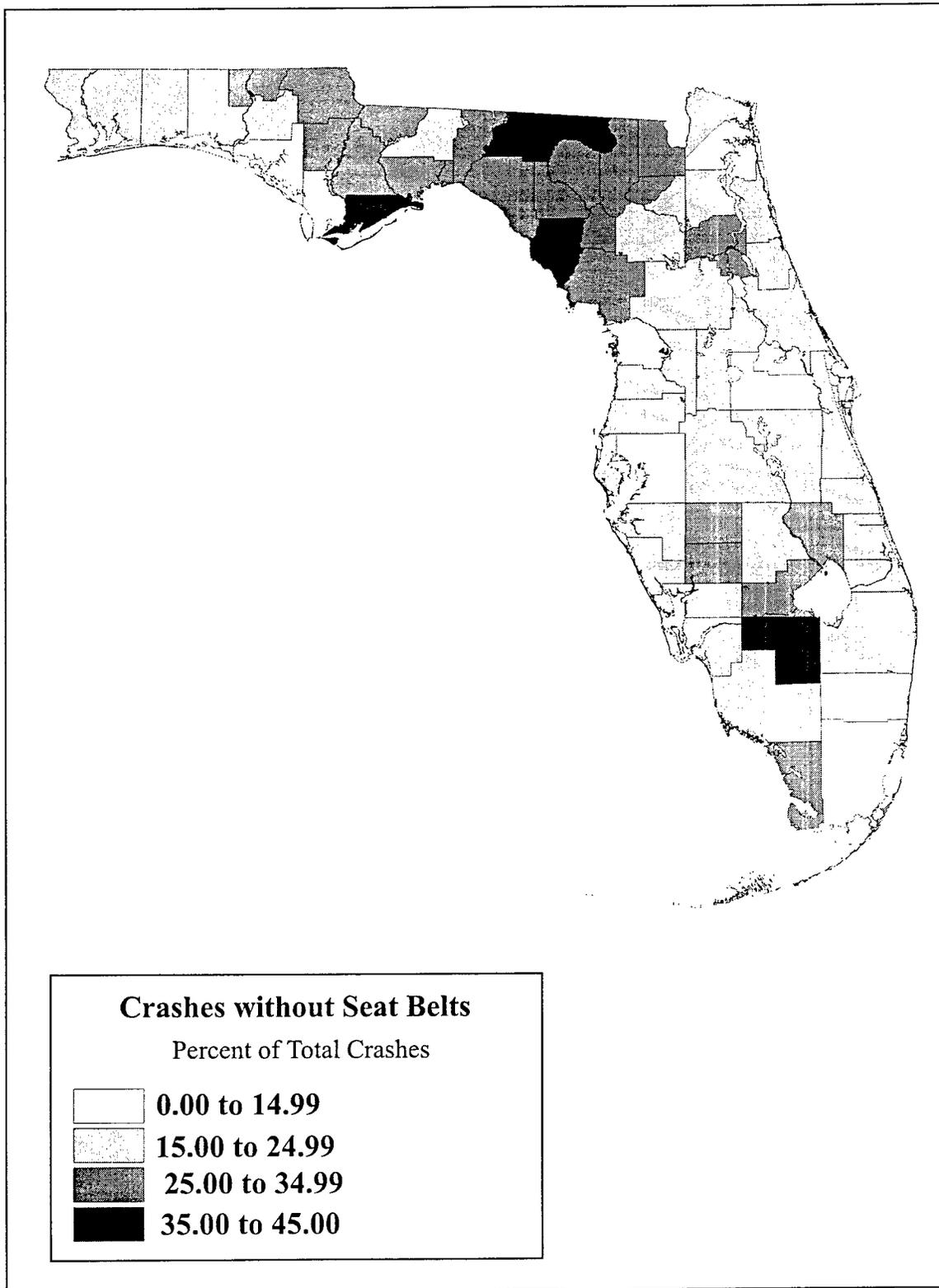
Lap and shoulder belts, when used, are the single most effective means for occupants to reduce the risk of death and serious injury in a highway crash. According to the Bureau of Transportation Statistics, seat belts are 40-50% effective in reducing deaths and 45-55% effective in preventing moderate-to-critical injuries to passenger vehicle occupants.

After reviewing the percentages of crash rates ignoring the use of seat belts, it was found, again, that most rural areas have the highest rates as shown in (Figure 3-8). This trend could be explained by the low level of education and knowledge in these rural areas, which leads to ignoring many safety issues when operating a vehicle including the seat belts.

When comparing Figure 3-7 (fatal and severe crashes) with Figure 3-8 (crashes with no seat belts), it was very clear that counties with high fatal and severe crashes had the highest rates with no use of seat belts, which also shows a correlation between the use of seat belts and the degree of severity of the traffic crashes.

The concentration of high crash rates (percentage of total crashes in each county) ignoring the use of seat belts was in the northern part of the state. Madison County led the state with (42.37%), followed by Franklin (40.79%), Dixie (38.76%), Hendry (38.45%), and Hamilton (38.14%). Again the major metropolitan areas has the lowest rates as noticed in Figure 3-8.

**FIGURE 3-8**  
**CRASHES WITHOUT THE USE OF SEAT BELTS**



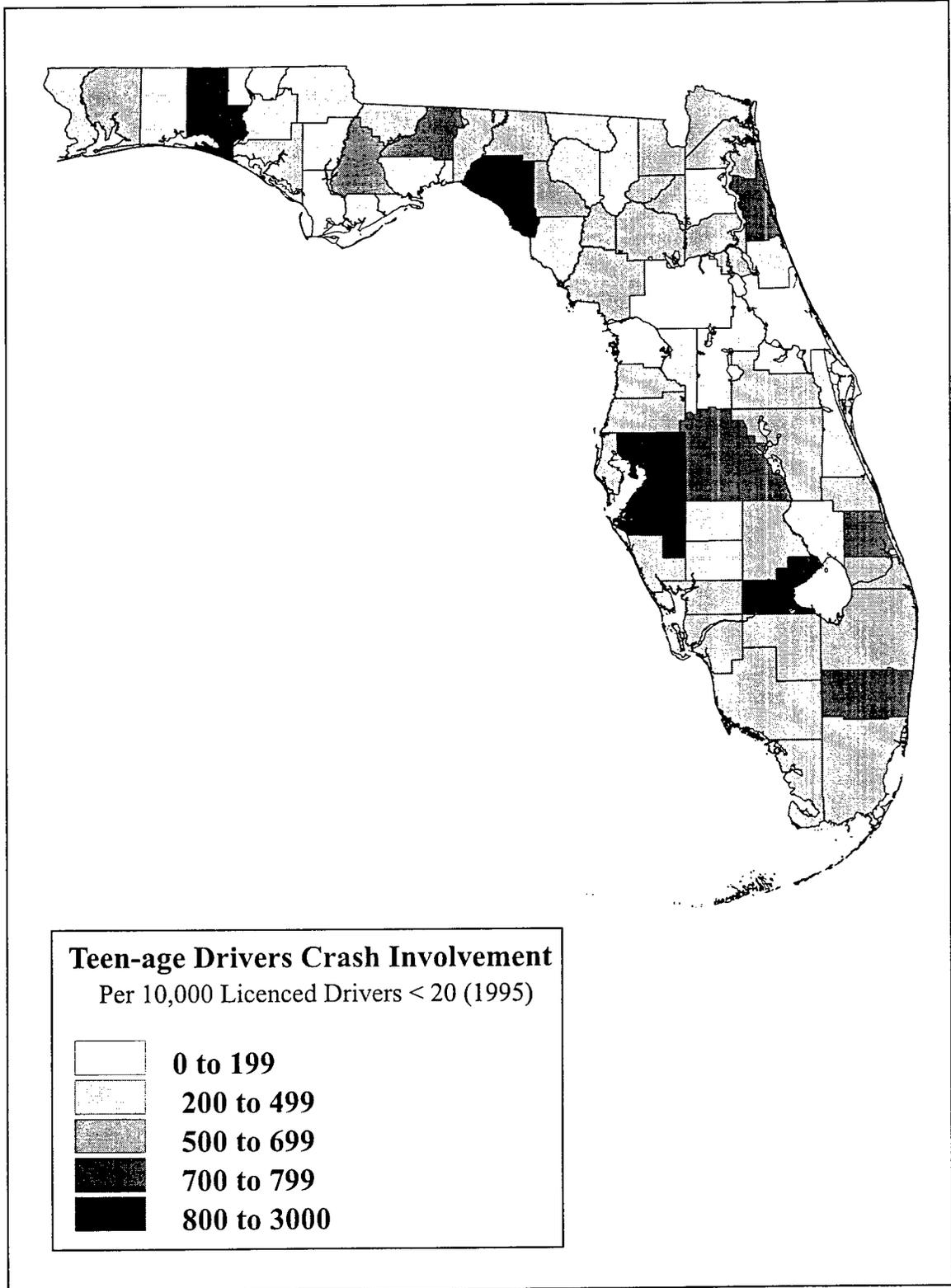
### **3.6 Teenage Drivers Crash Involvement (Age <20)**

Motor vehicle crashes are the leading cause of death for 15 to 20 year old according to the Bureau of Transportation Statistics. In 1994, an estimated 3,446 drivers 15 to 20 years old were killed, and an additional 330,000 were injured (Nationwide), in motor vehicle crashes.

In order to analyze the crash involvement of teenagers in the state of Florida, crash rates for the age groups under 20 years old were calculated by dividing the number of crashes involving drivers under the age of 20, by the 1995 population of licenced drivers in that age group (15-20) in Florida. The 1995 population of the licenced drivers was obtained from the *1996 Florida Statistical Abstract*.

Crash rates (crashes per 10,000 licenced drivers under age 20) were obtained for drivers under 20 years old and presented in (Figure 3-9). It was found that Glades County had the highest rate with (2893), while Walton was the second highest with (1006), followed by Hillsborough (968), Manatee (831), and Taylor (802). On the other hand, Marion County, Citrus, and Holmes had the lowest crash rates involving drivers under the agr of 20 in Florida.

**FIGURE 3-9**  
**TEEN-AGE DRIVERS CRASH INVOLVEMENT**



### 3.7 Elderly Drivers Crash Involvement (Age > 74)

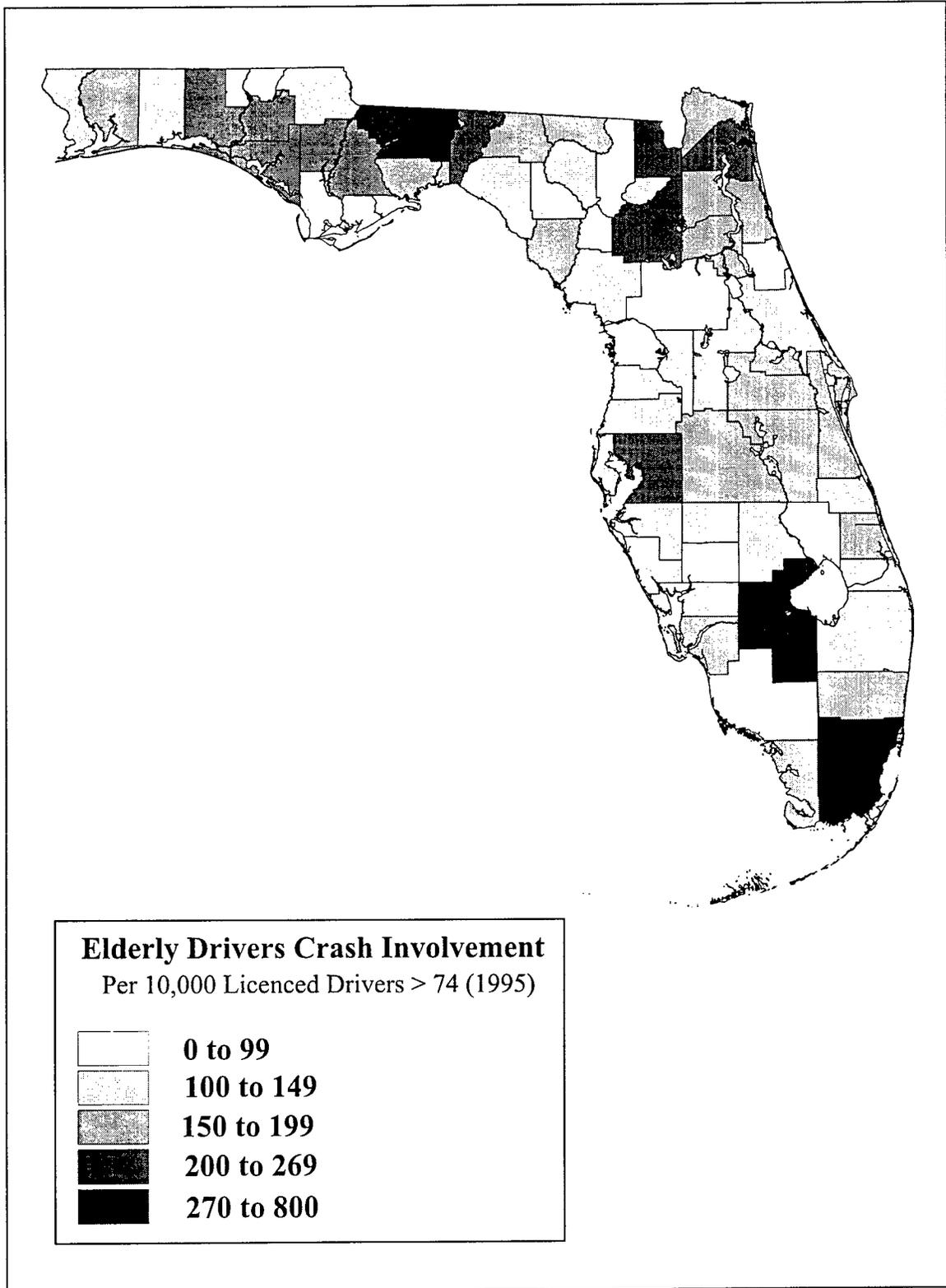
According to the Bureau of Transportation Statistics, there are more than 23.2 million people age 70 years and older in the United States in 1994, these older individuals made up to 13% of all traffic fatalities.

In order to analyze the crash involvement of elderly drivers in the state of Florida, crash rates for the age groups over 74 years old were calculated by dividing the number of crashes involving drivers over the age of 74 by the 1995 population of licenced drivers in that age group in Florida. The 1995 population of the licenced drivers was obtained from the *1996 Florida Statistical Abstract*.

Crash rates (crashes per 10,000 licenced drivers over age 74) were obtained for elderly drivers over 74 years old and presented in (Figure 3-10). It was found that Glades County had the highest rate with (753), while Hendry was the second highest with (303), followed by Gadsden (295), Dade (Miami, 279), and Leon (Tallahassee, 270).

It was noticed that Glades County had the highest rates of crashes involving both age groups (young and elderly), and that is explained by Glades County having a small population in all and at the same time, low number of crashes in all age groups, as seen in Figure 3-1. Therefore, by taking the rate of crashes per 10,000 population, the rates tend to be high even though the number of crashes was low. To avoid the confusion, Table 3-1 presents the number of crash involvements for each county along with the percentages of each crash types and the different crash rates as well.

**FIGURE 3-10**  
**ELDERLY DRIVERS CRASH INVOLVEMENT**



### **3.8 Male and Female Drivers Crash Involvement**

According to the Bureau of Transportation Statistics, male fatal crash involvement rate per 100,000 population was 3 times as high as for female drivers in 1994. 22% of male drivers involved in fatal crashes were intoxicated compared to 11% of female drivers. This shows that male drivers are more risky than female drivers.

In order to analyze the crash involvement of male drivers in the state of Florida, crash rates were calculated by dividing the number of crashes involving male drivers, by the 1995 male population in Florida. The 1995 male population was obtained from the GIS census data. The same procedure was done to calculate crash rates involving female drivers.

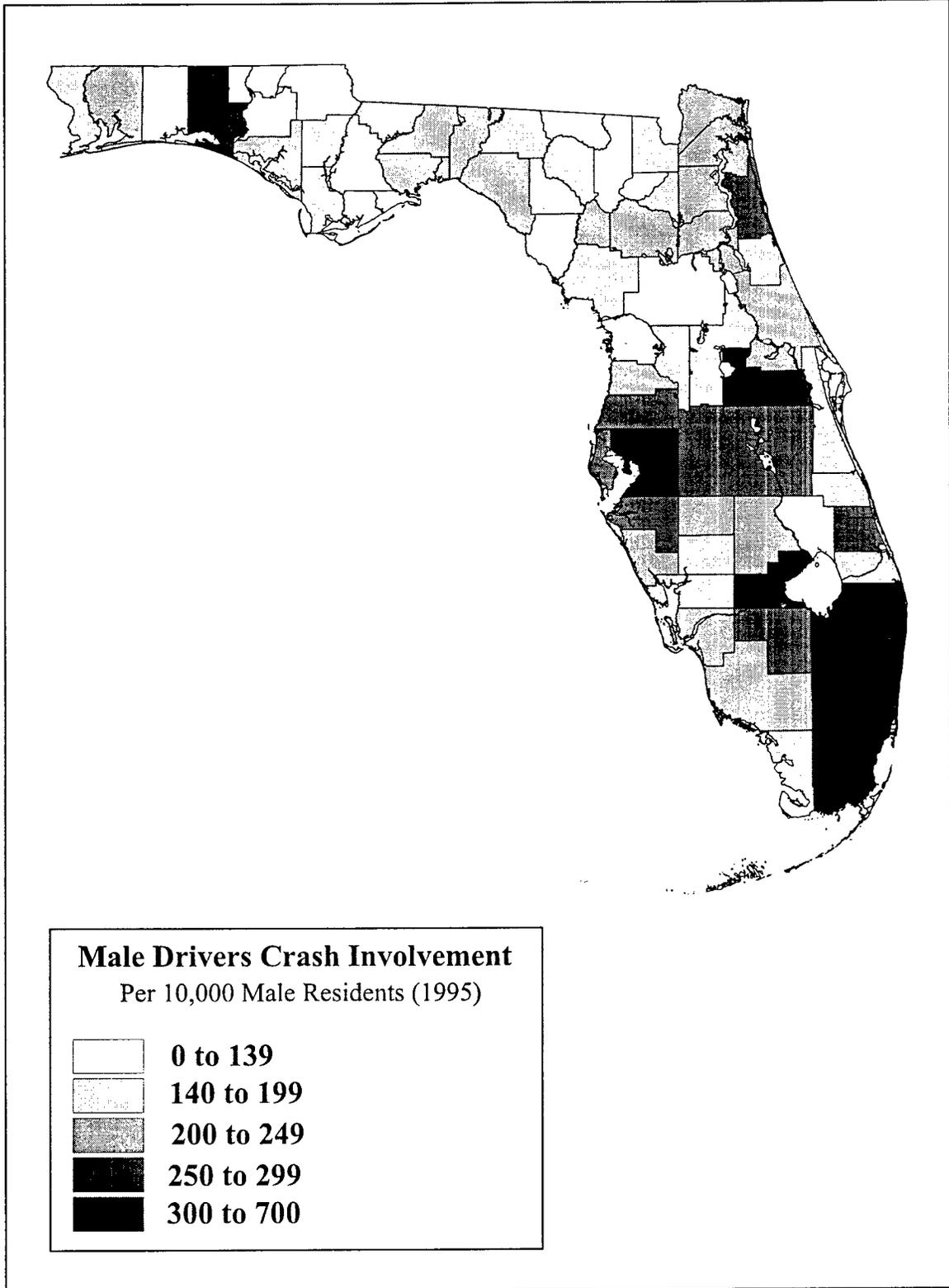
Crash rates (crashes per 10,000 male population) were obtained for male drivers and presented in (Figure 3-11). It was found that Glades County had the highest rate with (628), while Hillsborough was the second highest with (415), followed by Dade (Miami, 359), Broward (357), Walton (334), Orange, and Palm Beach both with (301).

On the other hand, Crash rates (crashes per 10,000 female population) were obtained for female drivers and presented in (Figure 3-12). It was found that Glades County had the highest rate with (325), while Hillsborough was the second highest with (262), followed by Walton (206).

By comparing Figures 3-11 and 3-12, it was noticed that male drivers have higher crash rates (628 crashes per 10,000 male population) than female drivers (325 crashes per 10,000 female population). This finding supports the statistics mentioned above.

Crash data for Figures (3-1 to 3-12) is presented in Table 3-1, after extracting it from GIS.

**FIGURE 3-11**  
**MALE DRIVERS CRASH INVOLVEMENT**



**FIGURE 3-12**  
**FEMALE DRIVERS CRASH INVOLVEMENT**

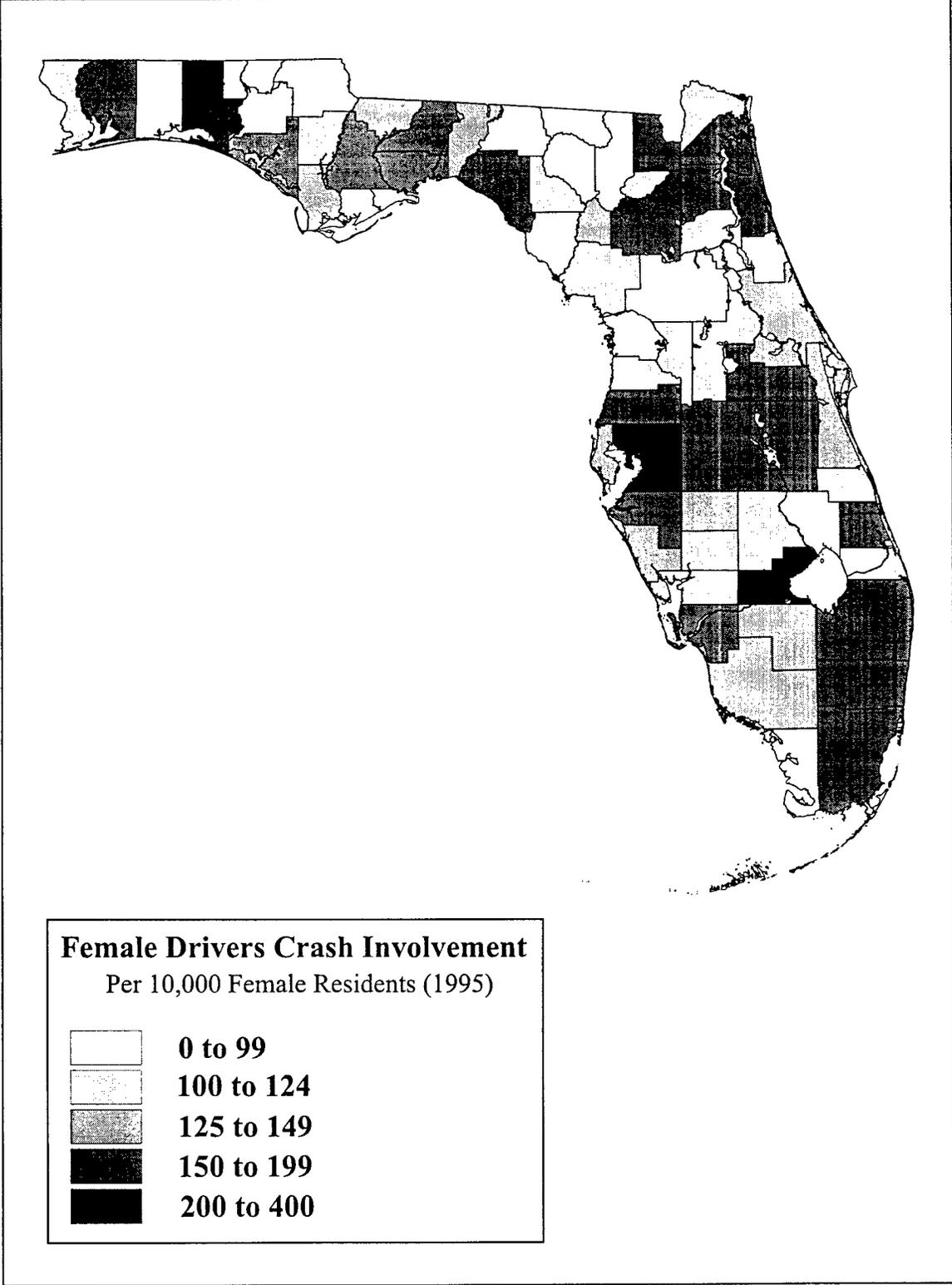


TABLE 3-1

CRASH DATA FOR EACH COUNTY

COUNTY	Total Crashes	% No Seat Belt	% Fatal & Severe	% Alcohol & Drugs	Crashes per 10,000dl Pop	Rate Age < 20	Rate Age > 74	Rate White	Rate Black	Rate Hispanic	Male Rate	Female Rate
ALACHUA	3969	19.02	5.74	6.58	252	697	223	189	241	48	231	170
BAKER	350	25.71	9.14	12.29	257	553	267	184	114	0	189	156
BAY	3619	14.31	4.12	8.18	292	565	242	189	192	44	226	152
BRADFORD	450	23.11	8.67	13.33	284	620	266	194	148	58	191	174
BREVARD	6762	18.69	6.89	9.76	173	475	152	144	216	73	184	126
BROWARD	37099	14.32	5.00	4.73	311	721	190	239	361	125	357	192
CALHOUN	161	31.06	13.66	13.04	209	493	213	139	122	0	150	117
CHARLOTTE	1883	18.27	6.96	7.70	167	550	127	141	227	63	197	114
CITRUS	169	13.61	11.24	7.69	18	5	23	16	8	6	22	11
CLAY	2223	17.27	6.75	8.28	218	459	195	182	216	54	232	153
COLLIER	3110	24.76	4.92	9.52	178	539	85	133	306	147	236	134
COLUMBIA	525	28.76	12.95	12.00	152	369	56	100	123	34	128	98
DADE FL	57570	14.50	3.96	3.59	361	658	279	171	294	167	359	191
DESOTO	350	28.57	9.43	11.71	186	425	86	121	93	188	154	112
DIXIE	129	38.76	16.28	12.40	149	446	183	113	32	0	134	88
DUVAL	15445	14.85	5.11	6.14	279	605	267	199	257	83	247	173
ESCAMBIA	4152	17.00	7.42	10.00	184	429	144	142	175	40	172	119
FLAGLER	389	23.14	10.80	11.83	113	434	86	98	161	28	161	90
FRANKLIN	76	40.79	14.47	17.11	104	270	84	83	25	84	107	50
GADSDEN	807	25.03	9.42	10.04	287	676	295	175	180	169	220	144
GILCHRIST	180	27.78	13.33	15.56	233	632	138	159	35	152	208	127
GLADES	396	34.60	11.36	14.39	981	2893	753	494	222	273	629	325
GULF	188	23.40	10.11	16.49	191	440	112	155	93	0	181	149
HAMILTON	118	38.14	16.10	16.95	152	337	160	105	74	33	129	65

COUNTY	Total Crashes	% No Seat Belt	% Fatal & Severe	% Alcohol & Drugs	Crashes per 10,000dl Pop	Rate Age < 20	Rate Age > 74	Rate White	Rate Black	Rate Hispanic	Male Rate	Female Rate
HARDEE	383	30.03	8.09	7.83	216	494	124	133	139	108	224	134
HENDRY	606	38.45	7.92	13.04	249	508	303	154	186	186	287	143
HERNANDO	1837	16.11	7.35	7.84	177	607	101	152	199	74	220	116
HIGHLANDS	1161	23.00	9.39	7.67	174	551	109	128	266	149	209	107
HILLSBOROUGH	30722	14.11	4.94	5.75	424	968	234	305	415	181	416	262
HOLMES	139	27.34	12.23	14.39	109	175	88	85	41	0	107	54
INDIAN RIVER	1529	20.99	7.26	8.04	160	613	113	140	260	86	188	124
JACKSON	534	26.97	15.54	11.80	166	338	138	122	99	9	138	98
JEFFERSON	227	29.96	9.69	10.13	267	680	244	154	188	0	239	133
LAFAYETTE	76	32.89	15.79	13.16	241	664	57	129	50	65	129	120
LAKE	2410	20.00	6.60	8.71	156	478	100	130	160	107	186	107
LEE	7201	18.55	3.90	8.69	215	627	154	176	275	174	244	151
LEON	4416	18.82	4.44	8.38	266	709	270	179	264	51	240	180
LEVY	437	29.75	9.15	11.44	193	560	129	133	215	202	190	122
LIBERTY	108	32.41	4.63	18.52	284	704	269	177	87	98	164	196
MADISON	236	42.37	13.14	12.71	204	566	159	124	129	316	162	97
MANATEE	5149	19.13	7.57	8.22	269	831	147	200	329	218	295	157
MARION	1016	18.50	10.43	7.48	52	87	43	43	55	18	58	38
MARTIN	1679	20.73	4.17	11.44	161	515	114	140	182	151	183	122
MONROE	1350	26.00	7.41	12.81	162	526	164	146	188	104	193	118
NASSAU	834	22.66	9.47	9.71	190	519	187	170	167	0	223	123
OKALOOSA	1828	19.58	8.59	11.71	132	289	148	115	110	8	140	93
OKEECHOBEE	290	32.76	11.38	12.07	100	268	45	78	116	55	107	70
ORANGE	18358	14.71	4.96	6.04	278	645	176	207	282	204	301	196
OSCEOLA	2703	18.90	6.25	7.44	224	614	157	165	209	206	283	179
PALM BEACH	21687	17.68	5.44	6.28	249	621	141	197	326	137	302	164
PASCO	6198	16.13	6.10	6.94	233	688	139	200	190	84	259	150
PINELLAS	18559	16.78	7.34	6.48	247	623	132	201	291	102	257	150
POLK FL	9763	20.26	6.28	6.90	283	769	162	204	255	254	281	164

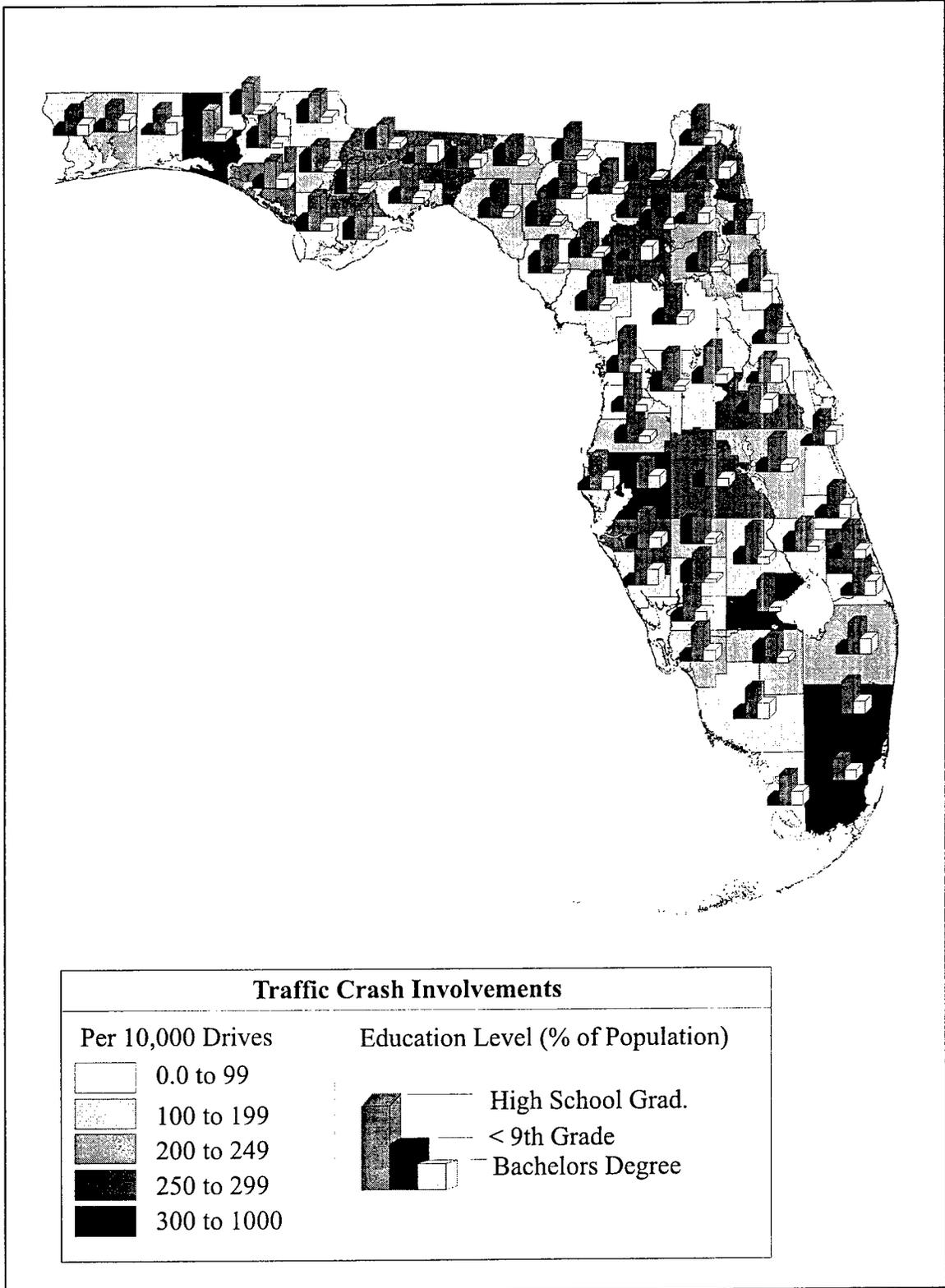
COUNTY	Total Crashes	% No Seat Belt	% Fatal & Severe	% Alcohol & Drugs	Crashes per 10,000dl Pop	Rate Age < 20	Rate Age > 74	Rate White	Rate Black	Rate Hispanic	Male Rate	Female Rate
PUTNAM	1108	25.45	9.84	13.72	226	540	165	154	169	134	201	113
SANTA ROSA	1741	18.27	8.50	12.18	209	549	199	185	146	46	238	153
SARASOTA	5151	18.05	7.53	8.89	184	666	121	165	235	96	213	131
SEMINOLE	5531	14.41	5.04	6.53	209	474	174	157	233	108	214	140
ST. JOHNS	2038	19.14	7.31	10.21	233	702	194	207	212	29	265	182
ST. LUCIE	3565	21.43	5.86	8.98	251	726	154	188	280	171	265	172
SUMTER	470	24.47	11.91	10.21	174	463	109	130	115	101	164	108
SUWANNEE	409	33.25	17.85	13.94	173	436	137	129	133	270	186	97
TAYLOR	328	31.10	6.10	14.94	241	802	125	184	163	337	201	153
UNION	145	28.97	11.03	15.17	239	511	138	130	76	0	134	123
VOLUSIA	6894	19.13	6.50	7.64	194	587	133	160	234	103	212	130
WAKULLA	296	28.72	14.86	14.19	240	455	184	178	149	94	213	168
WALTON	813	20.42	10.09	14.27	365	1006	230	255	129	135	334	207
WASHINGTON	196	15.82	8.67	6.12	135	302	216	105	104	0	121	92

### **3.9 Crash Rates Vs. Education Level**

In order to investigate a relationship between the education level and crash rates, the education level for each county was represented by bar charts dividing the education levels into three groups of percentages. The first group is a percentage of the population with education level up to the 9th grade, the second group is percentage of the population with education level up to High School, and the third group presents a percentage of population with education level up to Bachelors Degrees. The Three education level were compared against the crash rates (crashes per 10,000 licenced drivers) for each county. Figure 3-13 presents the three education levels vs. Crash rates for each county.

After looking at Figure 3-13, it was found that most of the counties had the highest percentage of education level having a High school diploma, which did not help in finding a relationship between the education level and the crash rates. As a result, there was no relationship found regarding this matter.

**FIGURE 3-13  
EDUCATION LEVEL VS. CRASH RATES**



### **3.10 Overall View of the Crash Patterns in Florida**

A comparison was performed across related maps, in order to find any trends in traffic crashes across the state. This comparison was based on the numbers in the legends of each map. The fact that each map had different range of crash rates, made it difficult to maintain the same categorization of the crash rates across all the maps, which was the reason of having different categorization in each map legend.

By comparing the legends in Figures 3-3 to 3-5, it appears that Hillsborough County has high crash rates involving the three races, African American being the highest, followed by White and Hispanic drivers, respectively. Glades County has high crash rates involving both White and Hispanic drivers.

The distribution of crash rates involving White drivers is almost equal throughout the state, as seen in Figure 3-3. Crash rates involving African American drivers are concentrated more in central and south of Florida, as seen in Figure 3-4. Crash rates involving Hispanic are also concentrated in central and south Florida, although three of the highest counties are located in the north part of Florida, as seen in Figure 3-5. In general, central and south Florida have higher crash rates involving all three races.

By comparing the legends of Figures 3-7 and 3-8, it was noticed that north Florida tend to have higher fatal and severe injury crash rates (percent of total), and higher crash rates without use of seat belts. Alcohol and drug related crashes are distributed more throughout the state, but north Florida also has the highest rates (percent of total) among the rest of the state. According to these three figures, Hamilton County is considered to have the highest crash risks involving: alcohol and drugs, fatal and severe injury, and no use of seat

belts. Dixie County is considered to be the second risky county having high fatal and severe injury crash rates (percentage of total crashes), and high crash rates (percentage of total crashes) without use of safety seat belts. Finally, Franklin County is ranked after Dixie County having high crash rates involving alcohol and drugs, and high crash rates without the use of safety seat belts.

After comparing the legends of Figures 3-9 and 3-10, the only conclusion that can be drawn is that young drivers (ages under 20) are more risky than elderly drivers (age over 74). Teen-age drivers had high crash rates up to (3000 crashes per 10,000 licenced drivers under 20), compared to elderly drivers with (800 crashes per 10,000 licenced drivers over 74).

Finally, when comparing the legends of Figures 3-11 and 3-12, it was noticed that male drivers are more risky than female drivers, with crash rates as high as ( 700 crashes per 10,000 male residents), compared to the highest crash rates for female drivers of (400 crashes per 10,000 female residents). Hillsborough, Glades, and Walton Counties had high crash rates involving both male and female drivers.

The investigation of a relationship between the education level and crash rates was not taken further, since Figure 3-13 did not show any existence of such a relationship.



## CHAPTER 4

### ANALYSIS OF DEMOGRAPHIC CHARACTERISTICS FOR HILLSBOROUGH COUNTY

After the crash analysis was performed for the whole state of Florida, the demographic characteristics of the drivers involved in traffic crashes was investigated in each zipcode area of the counties in the major metropolitan areas. This was done in order to locate the areas that need safety educational programs, which is one of the objectives of this report.

The four major demographic characteristics under investigation are income, race, age, and gender. As mentioned before, each of these demographic characteristics was examined against four types of crashes, which are the following:

- Alcohol and drug related crashes
- Fatal and severe injury crashes
- Crashes without the use of safety seat belts
- Crashes where traffic violations were issued to drivers

The analyses were performed for the major Metropolitan areas of Florida, which is Orlando, Tampa, Miami, Jacksonville, and Tallahassee located in Orange, Hillsborough, Dade, Duval, and Leon Counties, respectively. For the purpose of this chapter, Hillsborough

County was chosen as an example for the detailed analysis, which is explained further in the following sections.

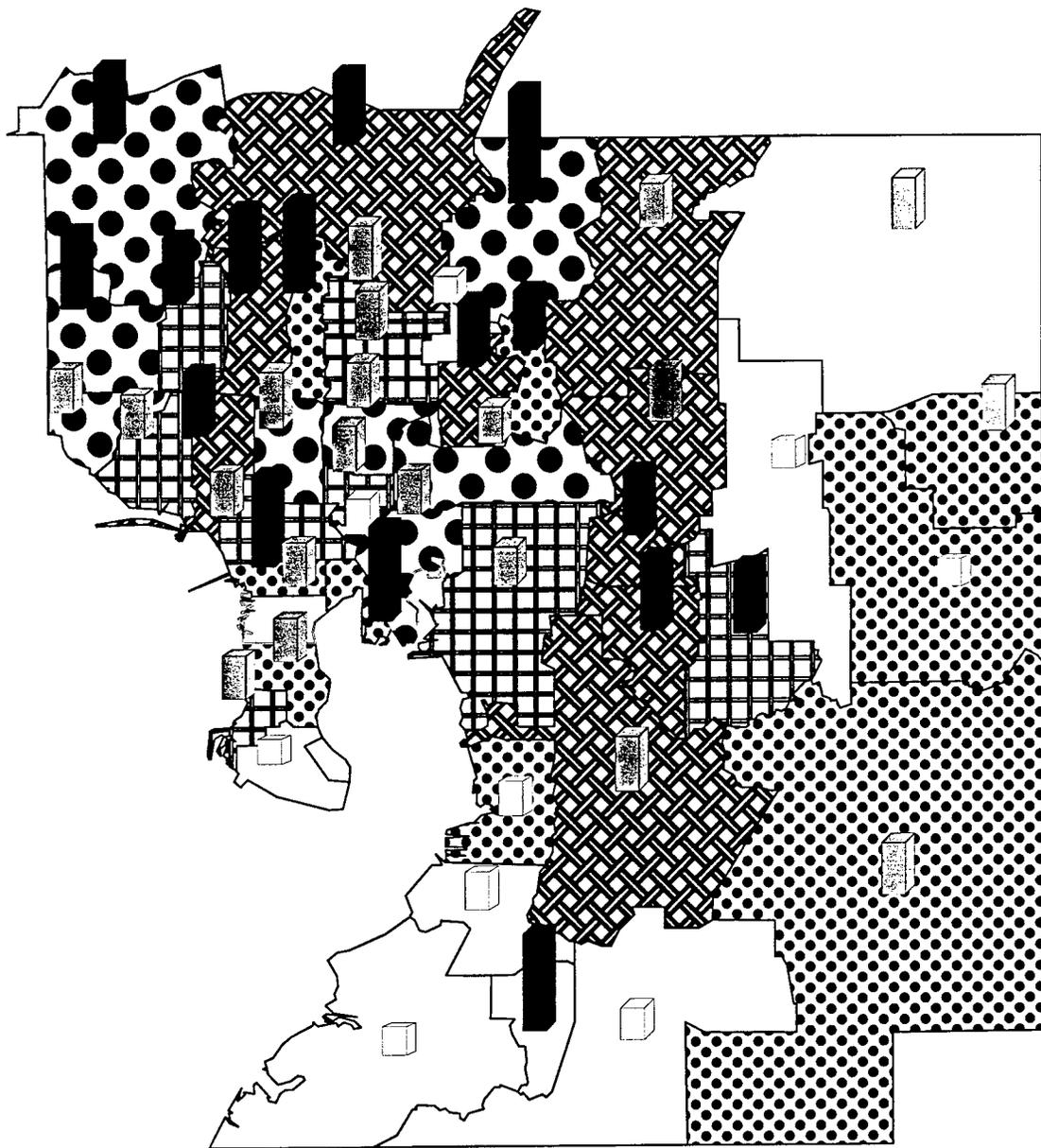
#### **4.1 Income Level Vs. Crash Types (Tampa)**

As mentioned earlier in this report, this report is the first to investigate the relationship between the income and the crash rates. The reason being that none of the traffic crash reports or data include the driver's income, therefore it is difficult to find a relationship between the driver's income and the crash rates just from the available crash data. The geographic information system (GIS) is used to overlay the crash data and the census data which have the income as one of its variables.

The methodology explained before is applied in this case having the income level presented by bar charts in each zipcode area, with the crash rates presented as a color or pattern for each zipcode area as well.

Before looking at the income level versus each of the crash types, an overall view of the income level versus the total crash rates (crashes per 1,000 drivers' population) was examined to see if there is a trend between the crash rates and different income levels. (Figure 4-1) presents the total crash rates for each zipcode area in Hillsborough County versus the 'Per Capita Income' for each zipcode area as well. From Figure 4-1, the relationship between income and crash rates is not very clear, since there are high crash rates in both low income areas and high income areas as well. This leads us to investigate this relationship more deeply and precisely, by comparing the income level in each zipcode area to each of the crash types, as explained in the following sections.

**FIGURE 4-1**  
**HILLSBOROUGH COUNTY**  
**Income Level Vs. Total Crash Rates**



Crashes Per 1,000 Drivers' Population		Per Capita Income 1995	
Rate			
0.0 to 36			30000
36 to 42			15000
42 to 46			7500
46 to 55			
55 to 80			

#### **4.1.1 Income Level Vs. Alcohol and Drug Related Crashes (Tampa)**

The relationship between income level and the alcohol and drug related crash rates was investigated in this section, Figure 4-2 represents the alcohol and drug related crashes as a percentage of the total crashes in each zipcode area versus the 'per capita income' for each zipcode. The income level is presented by bar charts, while the crash rates are presented by color themes. Figure 4-2 reflects the high relationship between the low income areas and the high alcohol and drug related crash rates.

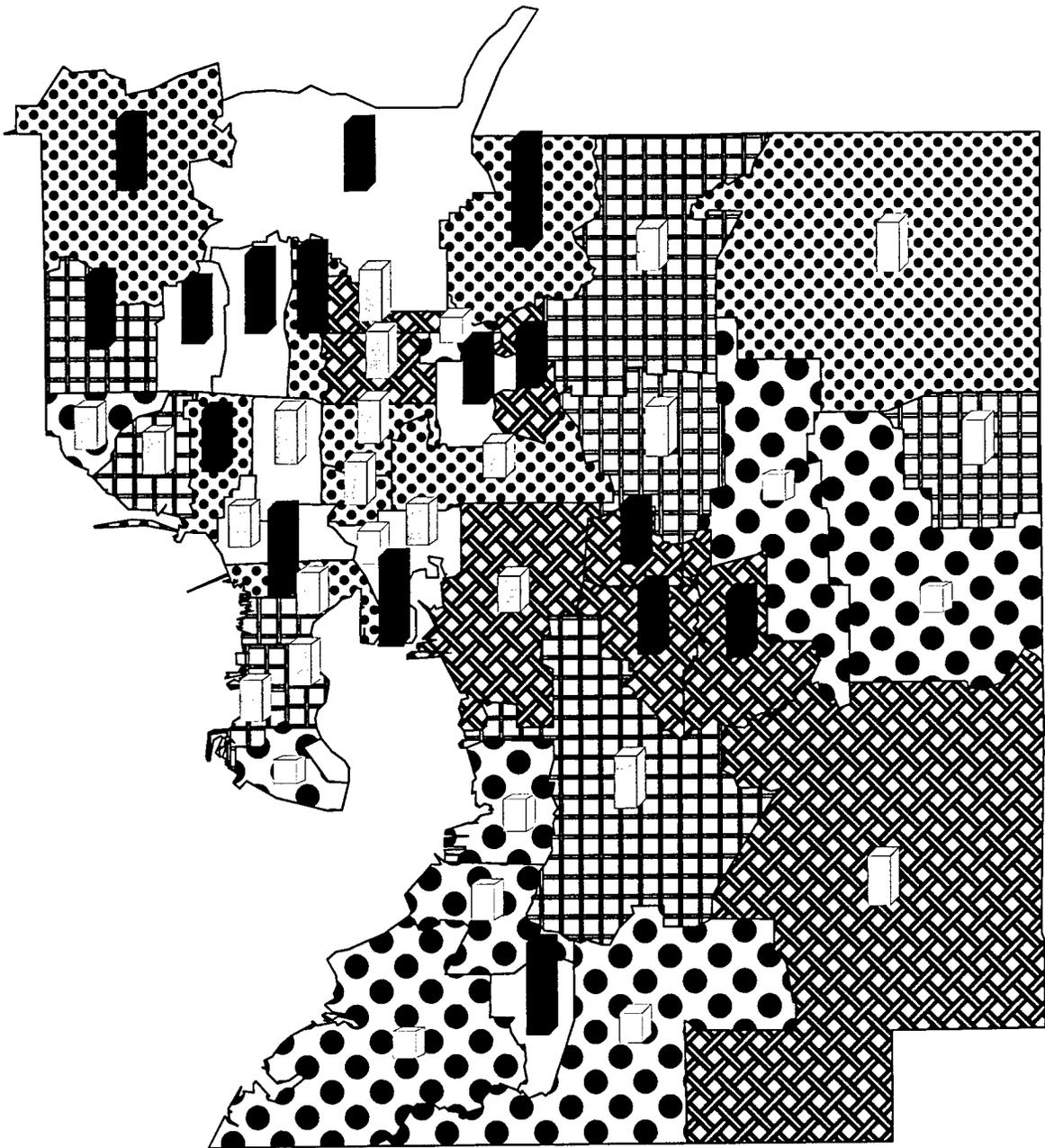
The following zipcodes in Hillsborough County have the highest alcohol and drug related crash rates (between 7.8% and 20%) of the total crashes in the respective zipcode: 33527, 33567, 33598, 33570, 33572, 33534, 33608, 33635, and 33620.

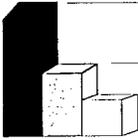
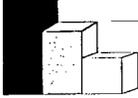
#### **4.1.2 Income Level Vs. Fatal and Severe Injury Crashes (Tampa)**

The relationship between income level and the fatal and severe injury crash rates was investigated in this section, (Figure 4-3) represents the fatal and severe crashes as a percentage of the total crashes in each zipcode area versus the 'per capita income' for each zipcode. The income level is presented by bar charts, while the crash rates are presented by color themes

Part of the fatal and severe crashes are related to the use of alcohol and drugs, so by comparing Figures 4-2 and 4-3, a big portion of the area with high alcohol and drug related crashes rates tend to have high fatal and severe crash rates. This reflects the same relationship

**FIGURE 4-2**  
**HILLSBOROUGH COUNTY**  
**Alcohol and Drug Related Crashes Vs. Income Level**



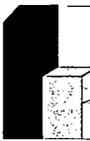
Alcohol and Drug Related Crashes	
% of Total Crashes	Per Capita Income 1995
 0.0 to 4.7	 30000
 4.70 to 5.43	 15000
 5.43 to 6.60	 7500
 6.60 to 7.80	
 7.80 to 20.00	

**FIGURE 4-3  
HILLSBOROUGH COUNTY  
Fatal and Severe Injury Crashes Vs. Income Level**



Fatal and Severe Injury Crashes	
	0.0 to 4.55
	4.55 to 4.80
	4.80 to 5.13
	5.13 to 6.06
	6.06 to 11.00

Per Capita Income 1995	
	30000
	15000
	7500

between income level and the severity of the crashes, although, this relationship is not very strong as that of the alcohol and drug related crashes.

The following zipcodes in Hillsborough County had the highest fatal and severe crash rates (between 6.0% and 11%) of the total crashes in the respective zipcode: 33547, 33598, 33570, 33534, 33608, 33629, 33635, 33637, and 33620.

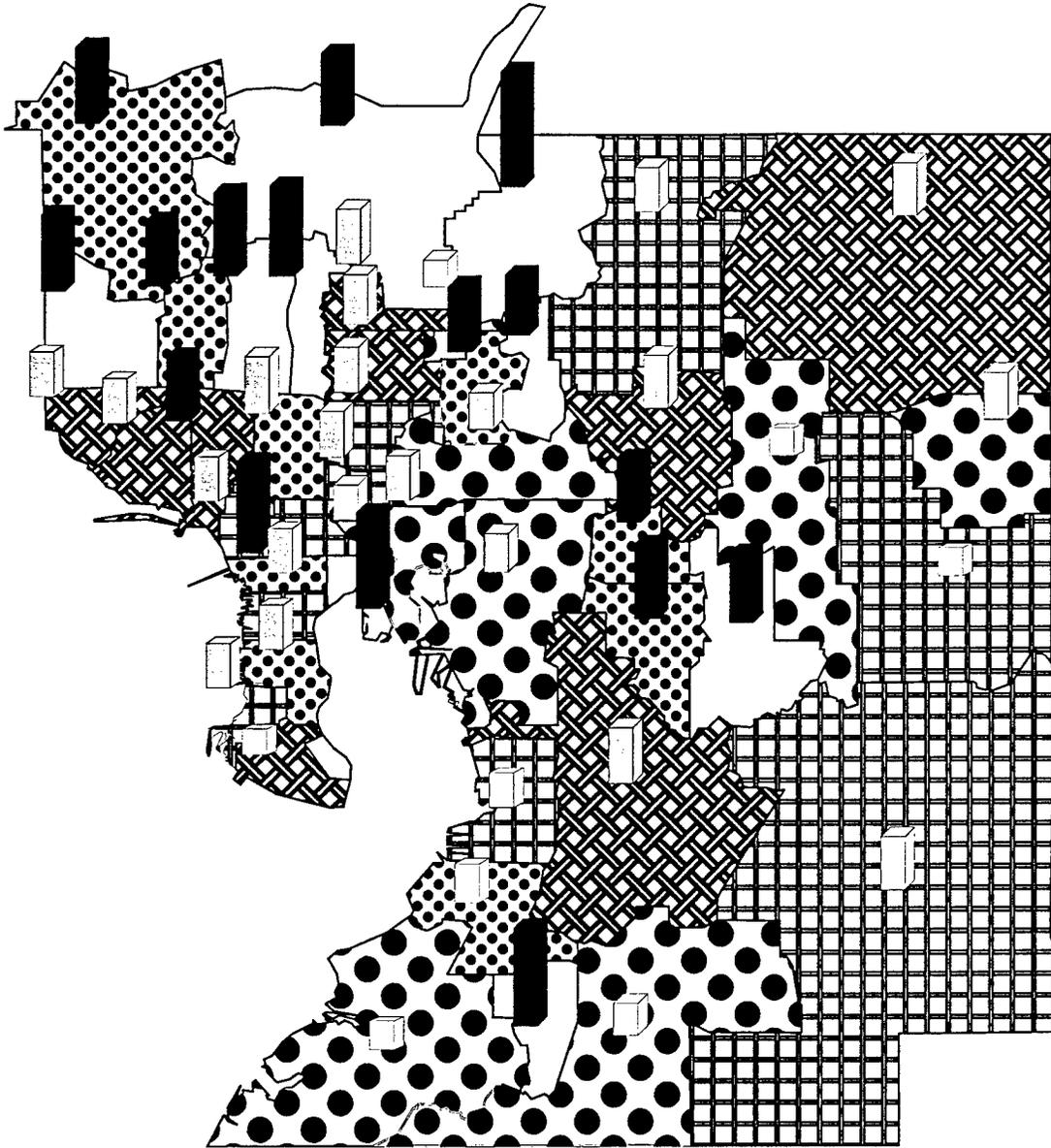
#### **4.1.3 Income Level Vs. Crashes Without Use of Seat Belts (Tampa)**

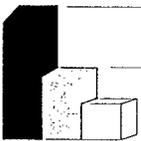
The relationship between income level and crashes without use of seat belts was investigated in this section, (Figure 4-4) represents crashes without the use of seat belts as a percentage of the total crashes in each zipcode area versus the 'per capita income' for each zipcode. The income level is presented by bar charts, while the crash rates are presented by color themes.

There is strong relationship between the low income areas and the high crash rates without the use of seat belts, as seen in Figure 4-4. This could be explained by the low income areas being less educated about the safety issues including the use of seat belts, which results in a high crash rate in that category.

The following zipcode areas in Hillsborough County have the highest crash rates without the use of seat belts (between 18% and 30%) of the total crashes in the respective zipcode: 33566, 33527, 33598, 33570, 33619, 33602, 33605, 33610, and 33620.

**FIGURE 4-4**  
**HILLSBOROUGH COUNTY**  
**Crashes Without Seat Belts Vs. Income Level**



Crashes Without Seat Belts	
<b>% of Total Crashes</b>	<b>Per Capita Income 1995</b>
 0.0 to 11.16	 30000 15000 7500
 11.16 to 13.00	
 13.00 to 15.30	
 15.30 to 18.90	
 18.90 to 30.00	

#### **4.1.4 Income Level Vs. Traffic Violations (Tampa)**

In order to find the area with drivers that have high crash risks, the percentages of crashes where traffic violations were issued to the driver were examined against the income level for each zipcode in Hillsborough County. Figure 4-5 represents the crashes where drivers were cited for traffic violations as a percentage of the total crashes in each zipcode area, versus the 'per capita income' for each zipcode. The income level is presented by bar charts, while the crash rates are presented by color themes

After analyzing Figure 4-5, there was not a clear relationship found between the income level and the percentage of crashes where drivers were cited for traffic violations. This means that a driver cited for traffic violation, has nothing to do with that driver's income level.

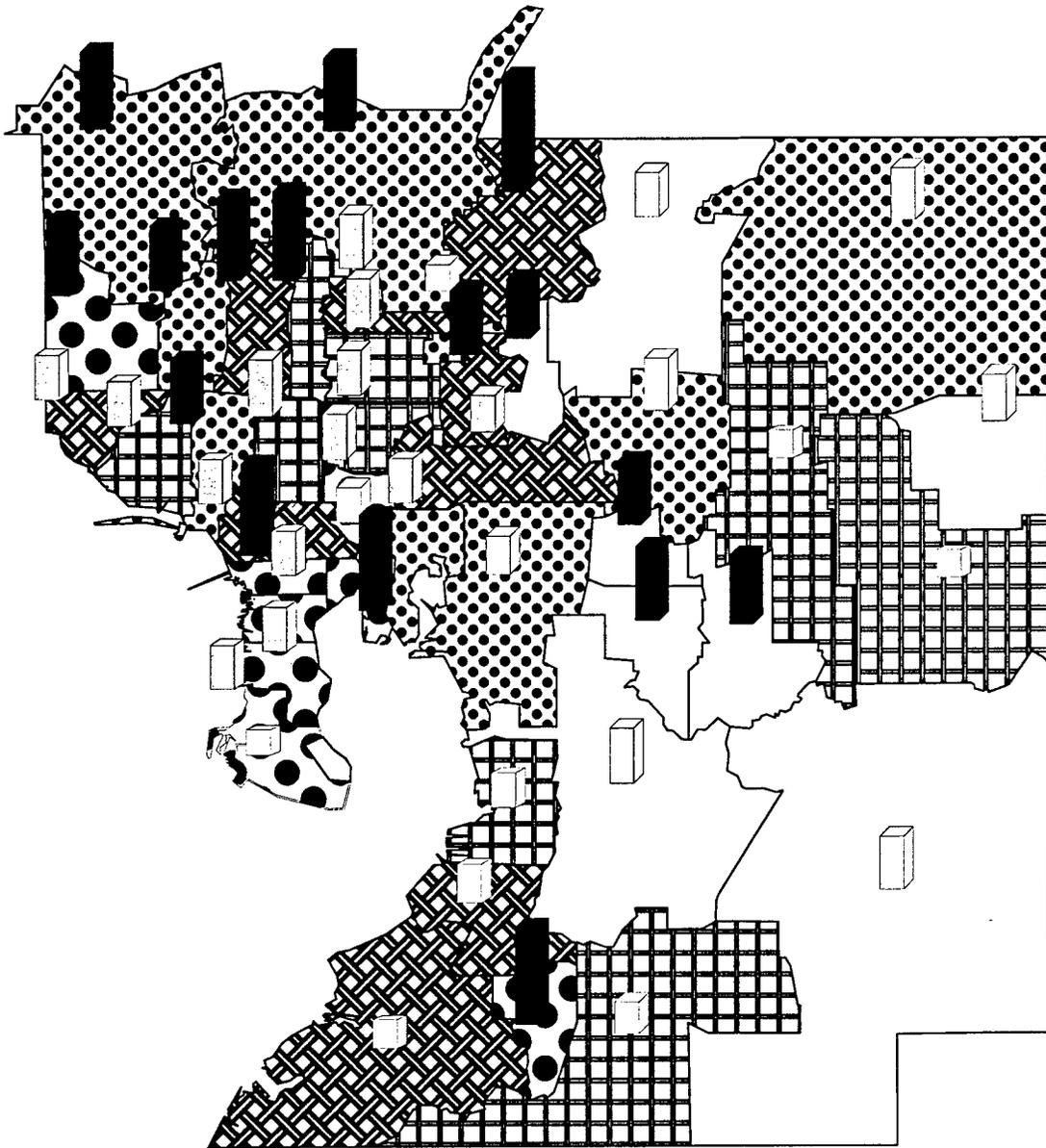
The following zipcode areas in Hillsborough County have the highest crash rates where drivers were cited for traffic violations (between 36% and 70%) of the total crashes in the respective zipcode: 33608, 33616, 33611, 33629, 33609, 33606, 33603, 33626, and 33573.

Table 4-1 represents the data used in Figures 4-2 to 4-5, as used in the GIS platform.

#### **4.1.5 Overall view of Income Level Vs. Crash Rates (Tampa)**

By comparing Figures 4-2 to 4-5, it is noticeable that there is a strong relationship between income level and two types of crashes: alcohol and drug related crashes, and crashes without seat belts. Areas with low income levels had higher crash rates in both crash types mentioned above.

**FIGURE 4-5**  
**HILLSBOROUGH COUNTY**  
**Crashes with Drivers Cited for Violations Vs. Income Level**



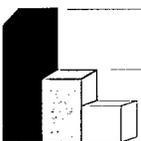
Crashes with Drivers Cited for Violations	
<b>% of Total Crashes</b>	<b>Per Capita Income 1995</b>
 20.00 to 28.60	 30000
 28.60 to 30.93	 15000
 30.93 to 33.30	 7500
 33.30 to 36.00	
 36.00 to 70.00	

TABLE 4-1

CRASH DATA FOR HILLSBOROUGH COUNTY

Zipcode	Total Crashes	% Alcohol & Drugs	%Fatal & Severe Injury	% No Seat Belt	% Cited for Violation
33605	437	4.07	4.63	19.21	30.28
33620	20	8.33	8.33	29.17	29.17
33598	1026	13.66	10.56	25.47	34.78
33602	361	1.84	5.30	19.12	21.89
33534	531	13.18	6.82	17.27	34.55
33610	330	5.02	4.75	18.93	30.97
33607	129	3.83	4.55	15.33	33.17
33619	1434	5.95	4.93	19.44	29.12
33608	673	10.00	10.00	15.00	45.00
33604	573	4.90	5.17	17.01	33.95
33592	835	6.94	3.79	15.77	26.50
33603	1828	4.99	5.24	16.11	36.70
33566	1319	7.32	5.04	20.49	28.46
33616	682	6.64	5.49	16.02	39.59
33570	351	12.62	6.62	23.03	32.18
33612	317	6.04	6.04	15.09	34.04
33527	161	11.02	4.96	20.39	35.54
33584	141	7.23	2.46	15.01	28.92
33547	86	5.45	10.00	18.18	27.73
33565	220	5.41	4.56	14.81	29.63
33567	434	9.19	4.68	18.72	34.84
33613	467	6.44	4.60	13.59	32.79
33569	885	7.38	5.10	13.83	28.19
33614	1075	4.54	5.25	11.82	34.79
33637	745	5.43	6.07	9.90	28.12
33634	1029	4.75	4.61	13.22	30.91
33510	682	5.87	3.81	12.02	28.01
33625	1031	4.36	4.01	11.17	30.37
33615	220	7.25	6.00	13.53	33.96
33635	577	7.88	6.36	14.85	31.52
33617	782	4.67	4.45	12.98	31.36
33611	1470	6.63	4.58	11.70	40.25
33594	1557	6.01	4.75	10.09	27.93
33549	979	4.51	4.86	10.58	29.58
33511	1453	5.54	4.86	11.47	27.41
33556	1371	5.41	4.84	12.82	30.77
33626	24	7.75	2.33	5.43	42.64
33572	313	9.22	4.96	12.77	32.62

Zipcode	Total Crashes	% Alcohol & Drugs	%Fatal & Severe Injury	% No Seat Belt	% Cited for Violation
33624	1153	4.55	3.34	10.01	31.24
33618	339	4.99	4.55	8.80	33.58
33609	733	5.08	4.90	12.62	37.85
33606	317	5.35	4.71	11.13	37.90
33573	363	1.16	5.81	9.30	38.37
33647	615	5.31	5.60	5.01	32.45
33629	351	7.20	9.70	16.07	68.98

## **4.2 Driver's Race Vs. Crash Types (Tampa)**

The four types of crashes (alcohol and drug use, fatal and severe injury, no seat belts, and cited violations) are being examined against the driver's race being White, African American, or Hispanic since these are the races that have the highest percentage of the population. In order to analyze each driver's race versus crash involvement, crash records were extracted, from the main crash database, for each race and percentages of total crashes for each crash type were calculated and presented in a map using a color theme.

### **4.2.1 White Drivers Crash Involvements Vs. Crash Types**

Following is an explanation of each of the crash types under investigation.

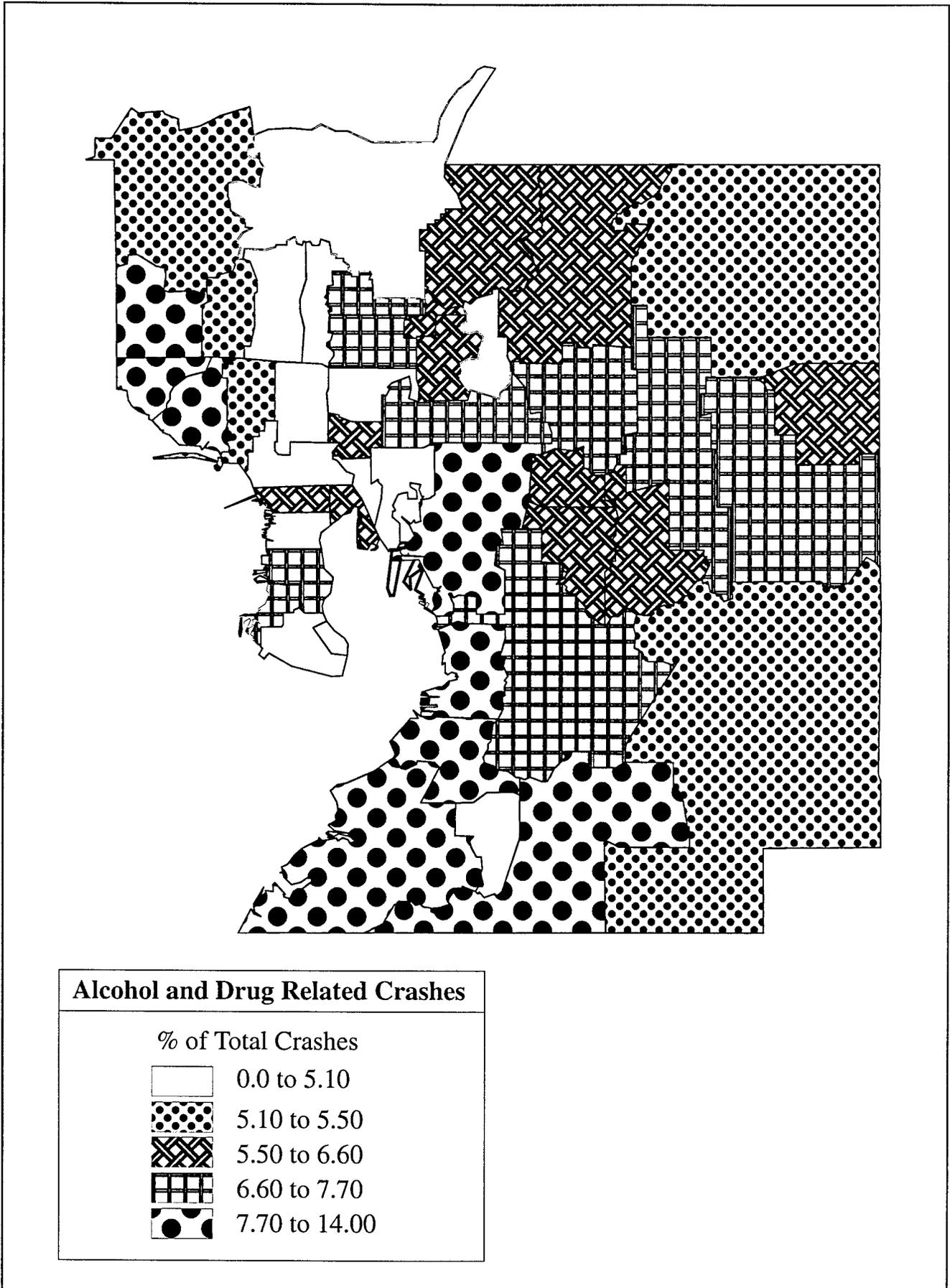
#### **4.2.1.1 White Drivers Vs. Alcohol and Drug Related Crashes**

Alcohol and drug related crash rates were obtained as a percentage of total crashes involving white drivers and presented in (Figure 4-6). It is noticeable that the highest alcohol and drug related crash rates involving white drivers (7% to 20%) are in the following zipcodes in Hillsborough County: 33626, 33635, 33615, 33619, 33534, 33572, 33570, and 33598.

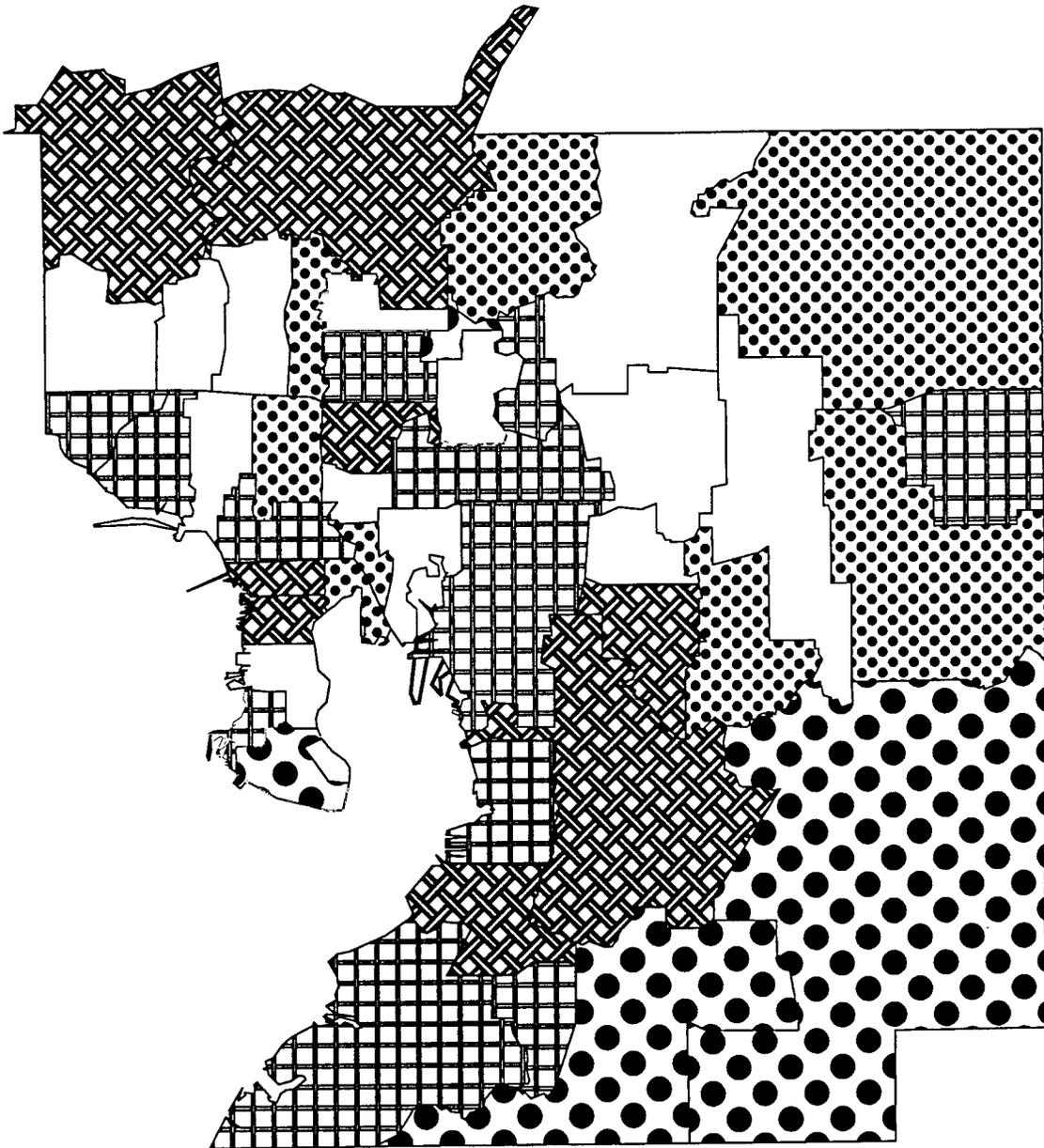
#### **4.2.1.2 White Drivers Vs. Fatal and Severe Crashes**

Fatal and severe crash rates were obtained as a percentage of total crashes involving white drivers and presented in (Figure 4-7). It is noticeable that the highest fatal and severe crash rates involving white drivers (10% to 12%) are in the following zipcodes in Hillsborough County: 33608, 33626, 33598, and 33547.

**FIGURE 4-6**  
**White Drivers Crash Involvement**  
**Vs. Alcohol and Drug Related Crashes**



**FIGURE 4-7**  
**White Drivers Crash Involvement**  
**Vs. Fatal and Severe Injury Crashes**



Fatal and Severe Injury Crashes	
	0.0 to 4.44
	4.44 to 4.90
	4.90 to 5.35
	5.35 to 10.0
	10.0 to 12.00

#### **4.2.1.3 White Drivers Vs. Crashes Without the Use of Seat Belts**

Crash rates where drivers ignored the use of safety seat belts were obtained as a percentage of total crashes involving white drivers and presented in (Figure 4-8). It is noticeable that the highest crash rates without the use of safety seat belts involving white drivers (18% to 40%) are in the following zipcodes in Hillsborough County: 33570, 33598, 33547, 33626, and 33566.

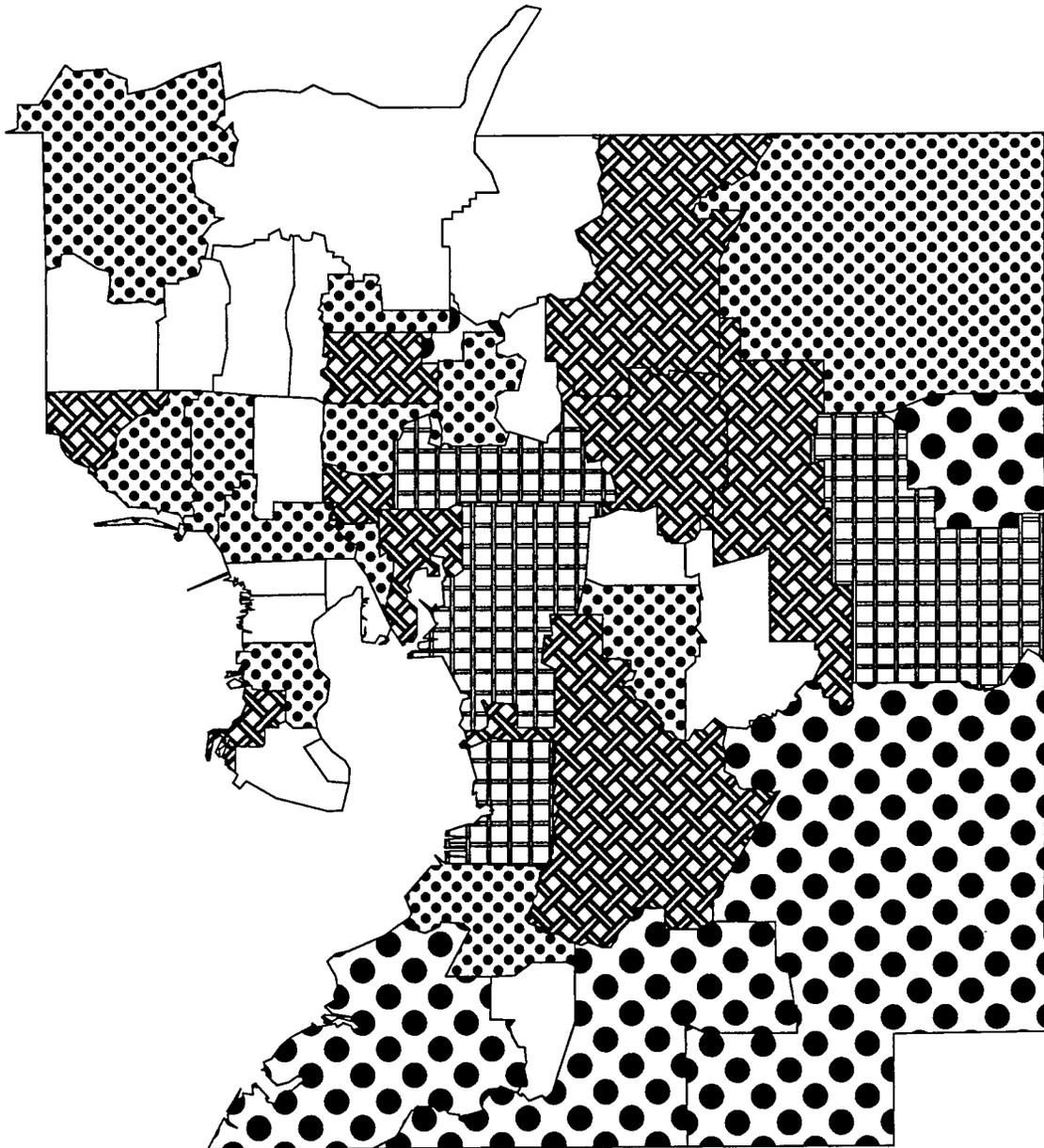
When comparing Figures 4-7 and 4-8, it is noticed that most of the zipcodes with high fatal and severe crashes tend to have the highest rates where drivers ignored the use of safety seat belts. This shows a logical relationship between the two crash types.

#### **4.2.1.4 White Drivers Vs. Traffic Violations**

Crash rates where drivers were cited for traffic violations were obtained as a percentage of total crashes involving white drivers and presented in (Figure 4-9). It was found that the highest crash rates where white drivers were cited for traffic violations (34% to 60%) are in the following zipcodes in Hillsborough County: 33573, 33567, 33527, 33608, 33616, 33611, 33629, 33609, 33606, 33603, 33604, 33612, 33647, and 33626.

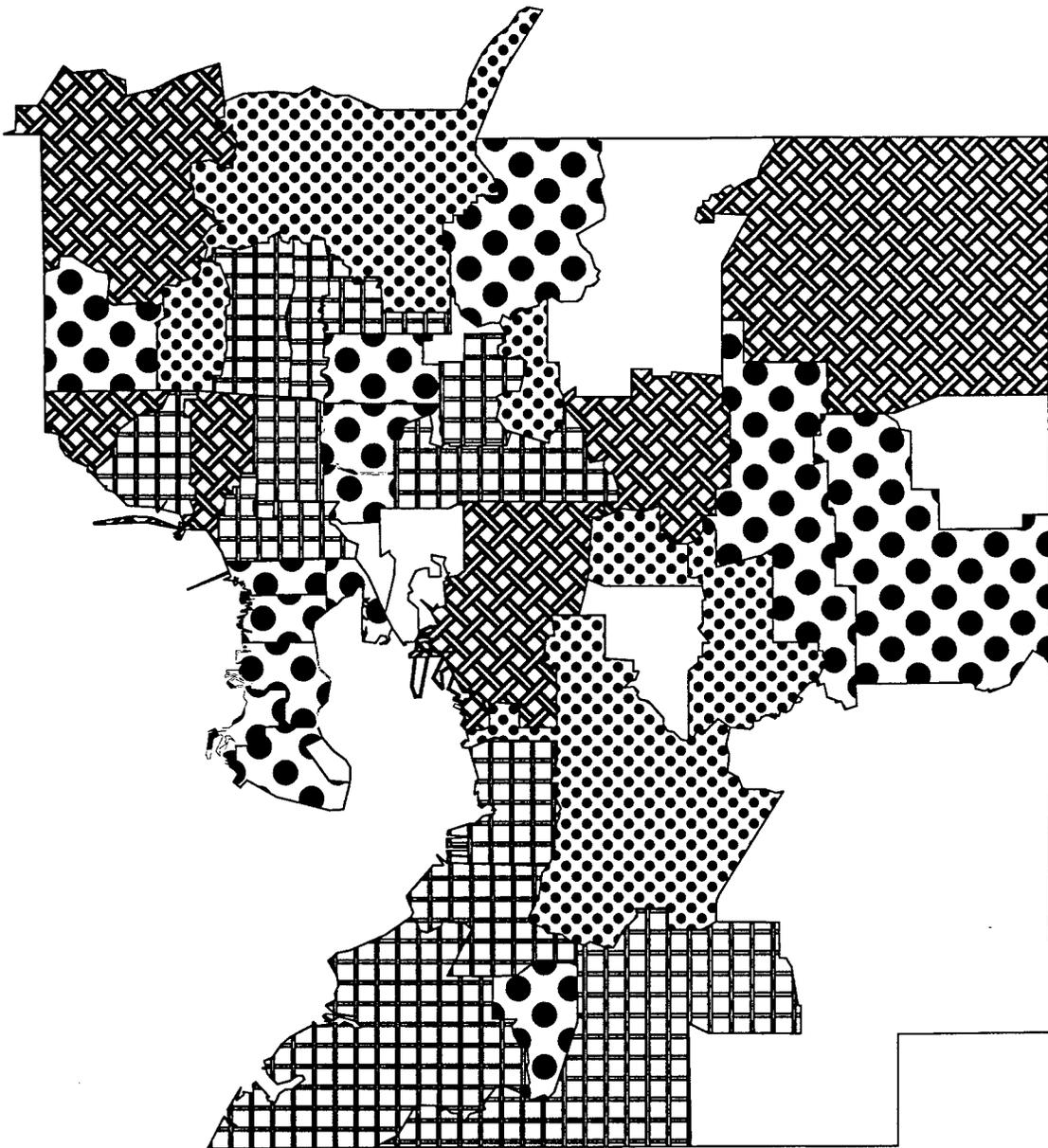
Table 4-2 represents the data used in Figures 4-6 to 4-9, as used in the GIS platform.

**FIGURE 4-8**  
**White Drivers Crash Involvement**  
**Vs. Crashes Without Seat Belts**



Crashes Without Seat Belts	
% of Total Crashes	
	0.0 to 11.64
	11.64 to 14.50
	14.50 to 16.50
	16.50 to 18.60
	18.60 to 35.00

**FIGURE 4-9**  
**White Drivers Crash Involvement**  
**Vs. Crashes with Cited Violations**



Crashes with Cited Violations	
% of Total Crashes	
	0.0 to 28.00
	28.00 to 29.30
	29.30 to 32.00
	32.00 to 34.50
	34.50 to 60.00

TABLE 4-2

## WHITE DRIVERS CRASH INVOLVEMENT DATABASE

Zipcode	Total Crashes	White Drivers Involv.	% Alcohol & Drug	% Fatal & Severe	% No Seat Belt	% Cited for Violation
33608	20	10	0.00%	10.00%	10.00%	60.00%
33620	24	18	5.56%	11.11%	33.33%	22.22%
33573	86	85	1.18%	5.88%	9.41%	38.82%
33598	161	95	13.68%	10.53%	21.05%	33.68%
33626	129	113	7.96%	1.77%	6.19%	42.48%
33572	141	134	8.96%	5.22%	12.69%	32.84%
33534	220	206	13.59%	6.31%	16.50%	34.47%
33602	434	211	1.90%	4.74%	11.85%	19.43%
33547	220	215	5.12%	10.23%	18.60%	27.91%
33605	885	224	4.02%	3.13%	15.63%	25.89%
33637	313	247	4.86%	6.48%	10.12%	28.34%
33570	317	261	12.26%	7.28%	21.84%	34.48%
33592	317	273	6.59%	2.56%	15.75%	27.47%
33635	330	288	7.99%	6.60%	15.28%	31.25%
33647	339	289	5.54%	4.84%	5.19%	34.60%
33527	363	294	6.80%	4.08%	16.33%	36.05%
33607	835	315	5.08%	5.40%	13.33%	33.97%
33556	351	327	5.20%	5.20%	12.54%	31.80%
33565	351	336	5.36%	4.46%	14.29%	30.06%
33616	437	339	7.67%	5.90%	15.63%	40.41%
33606	467	374	6.15%	4.55%	10.43%	39.57%
33609	531	423	5.67%	4.96%	10.64%	37.12%
33566	615	445	5.84%	5.62%	19.55%	27.87%
33567	577	474	7.59%	4.85%	17.93%	34.60%
33603	782	482	5.60%	4.36%	15.77%	38.38%
33625	573	487	5.13%	4.11%	11.50%	29.16%
33634	673	515	5.24%	4.08%	12.04%	29.90%
33610	1453	551	7.26%	5.44%	17.42%	33.21%
33510	682	594	6.23%	3.54%	11.62%	28.79%
33619	1075	597	7.71%	5.36%	18.43%	31.66%
33618	682	609	5.09%	4.60%	8.87%	33.99%
33629	361	623	4.17%	5.30%	8.19%	38.04%
33584	733	638	7.68%	2.35%	14.58%	29.62%
33569	745	682	7.04%	5.13%	14.66%	28.30%
33613	979	729	6.86%	4.12%	12.89%	33.47%
33611	1026	880	6.82%	4.43%	11.82%	41.14%
33511	1029	901	5.77%	5.33%	11.65%	27.53%
33617	1371	923	5.85%	4.33%	12.57%	32.29%

Zipcode	Total Crashes	White Drivers Involv.	% Alcohol & Drug	% Fatal & Severe	% No Seat Belt	% Cited for Violation
33594	1031	931	5.59%	4.83%	9.77%	28.14%
33604	1470	1015	5.02%	5.12%	14.19%	36.26%
33549	1153	1073	4.75%	5.13%	10.25%	29.17%
33612	1557	1089	7.53%	5.97%	14.97%	35.45%
33624	1319	1139	4.74%	3.34%	10.27%	32.22%
33615	1434	1149	7.75%	5.92%	13.40%	34.29%
33614	1828	1306	4.98%	4.67%	10.57%	34.23%

#### **4.2.2 African American Drivers Crash Involvements Vs. Crash Types**

Following is an explanation of each of the crash types under investigation.

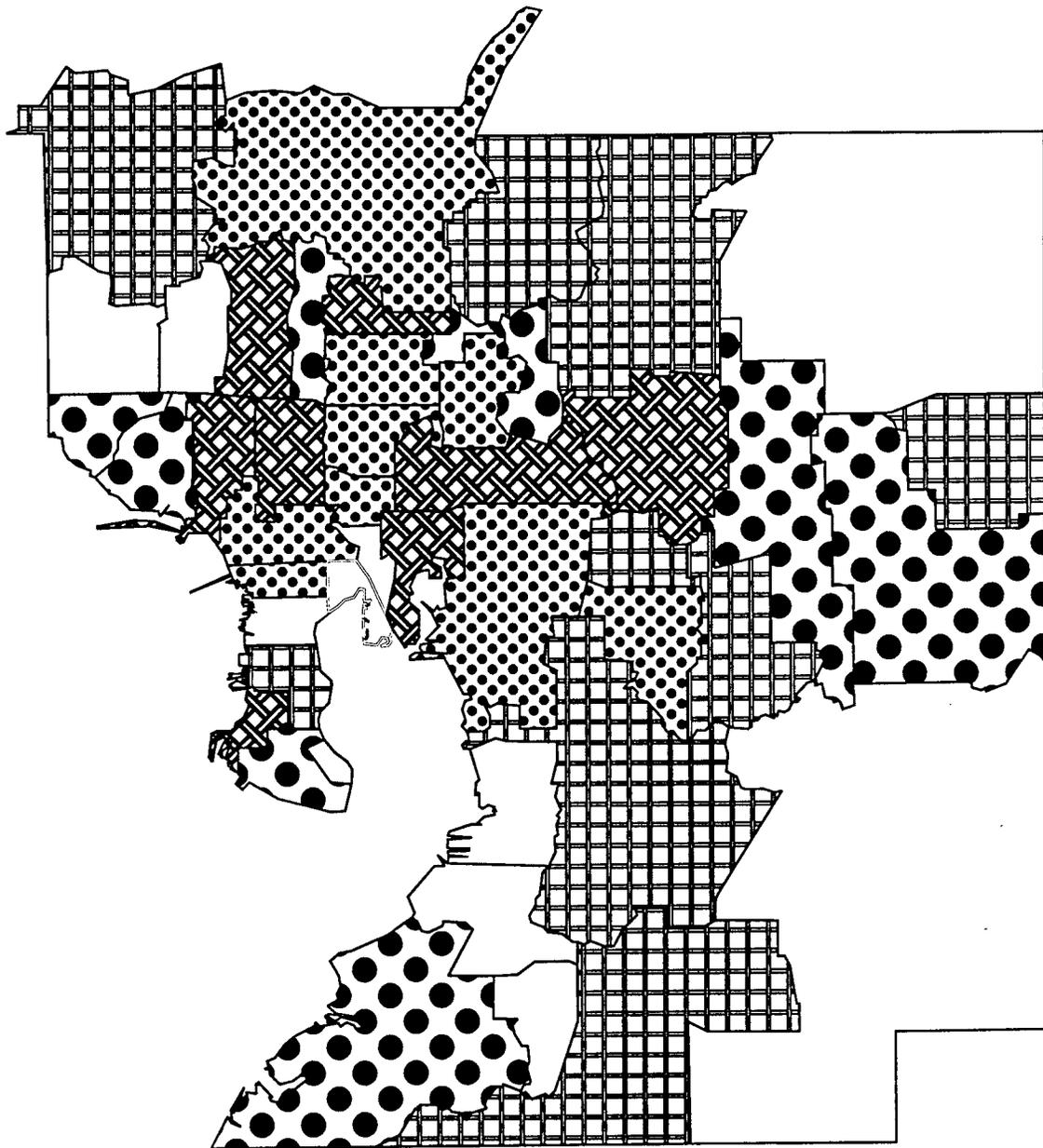
##### **4.2.2.1 African American Drivers Vs. Alcohol and Drug Related Crashes**

Alcohol and drug related crash rates were obtained as a percentage of total crashes involving African American drivers and presented in (Figure 4-10). It is noticeable that the highest alcohol and drug related crash rates involving African American drivers (7% to 40%) are in the following zipcodes in Hillsborough County: 33626, 33618, 33626, 33637, 33527, 33567, 33608, and 33570.

##### **4.2.2.2 African American Drivers Vs. Fatal and Severe Injury Crashes**

Fatal and severe crash rates were obtained as a percentage of total crashes involving African American drivers and presented in (Figure 4-11). It is noticeable that the highest fatal and severe crash rates involving African American drivers (7% to 30%) are in the following zipcodes in Hillsborough County: 33534, 33608, 33611, 33629, 33614, 33615, 33635, 33647, and 33592.

**FIGURE 4-10**  
**Black Drivers Crash Involvement**  
**Vs. Alcohol and Drug Related Crashes**

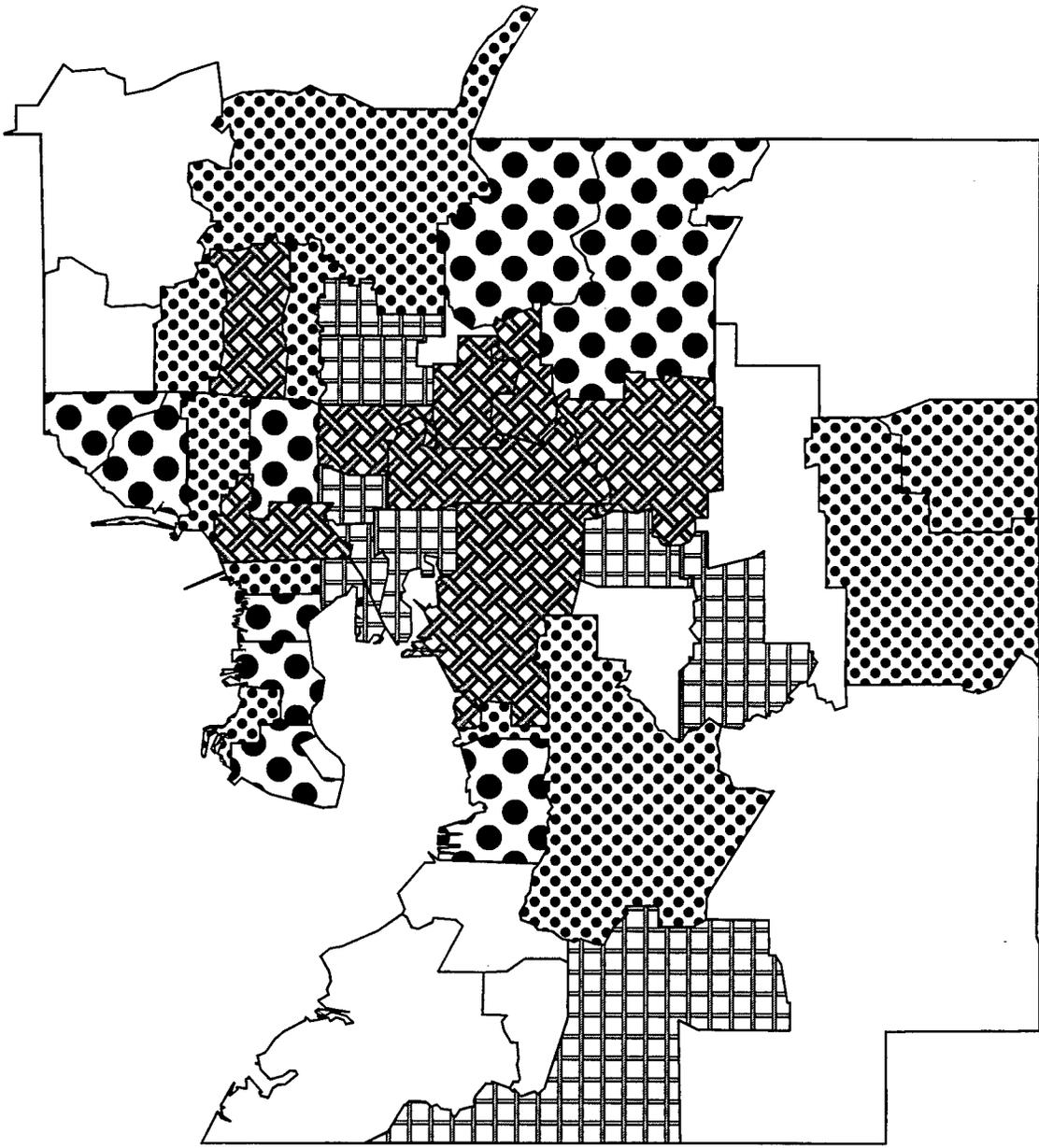


**Alcohol and Drug Related Crashes**

% of Total Crashes

- |   |               |
|---|---------------|
|  | 0.0 to 1.60   |
|  | 1.60 to 3.21  |
|  | 3.21 to 5.20  |
|  | 5.21 to 7.70  |
|  | 7.70 to 35.00 |

**FIGURE 4-11**  
**Black Drivers Crash Involvement**  
**Vs. Fatal and Severe Injury Crashes**



Fatal and Severe Injury Crashes	
% of Total Crashes	
	0.0 to 1.40
	1.40 to 3.80
	3.80 to 5.20
	5.20 to 7.50
	7.50 to 25.00

#### **4.2.2.3 African American Drivers Vs. Crashes Without the Use of Seat Belts**

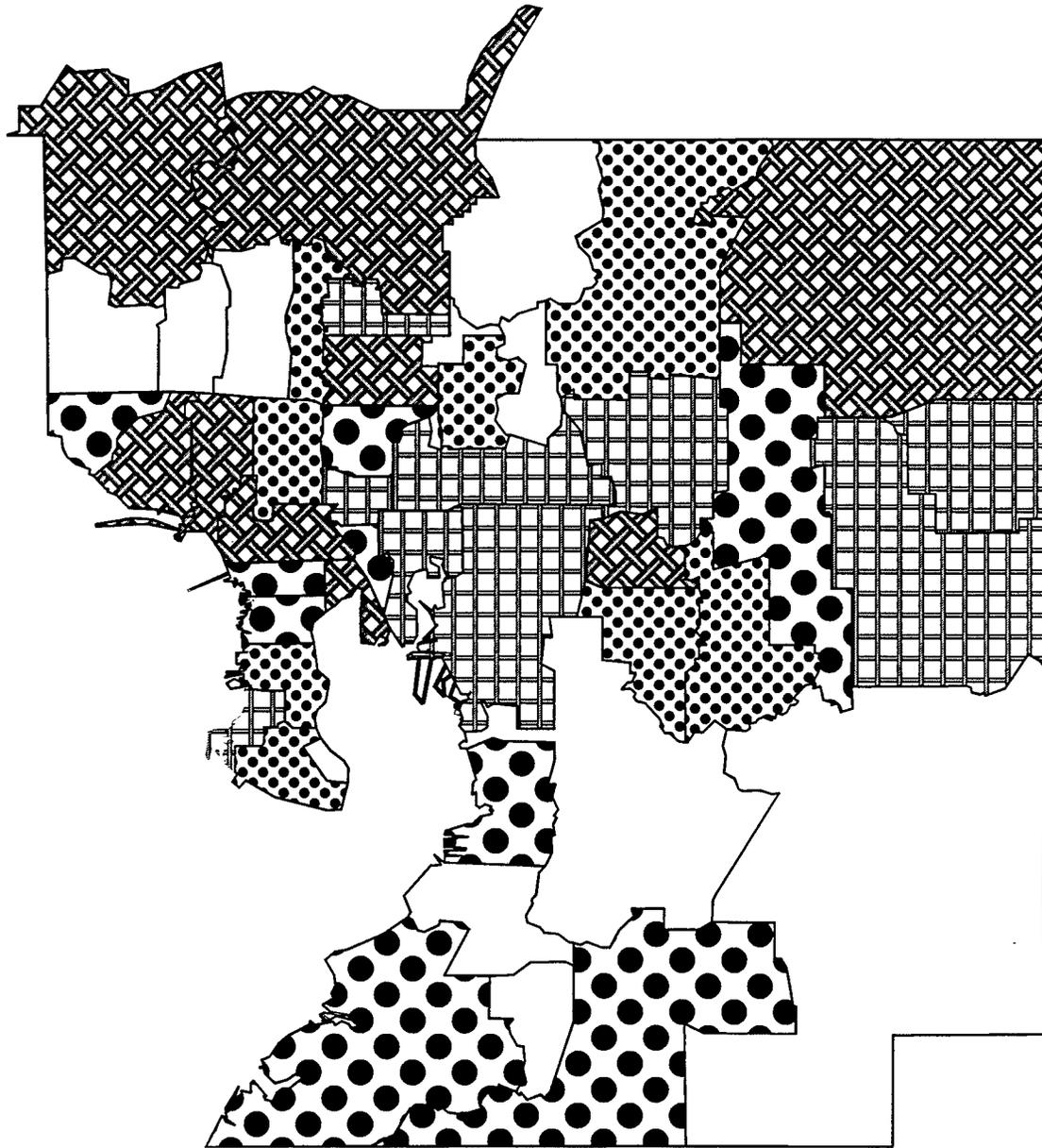
Crash rates where drivers ignored the use of safety seat belts were obtained as a percentage of total crashes involving African American drivers and presented in (Figure 4-12). It is noticeable that the highest crash rates without the use of safety seat belts involving African American drivers (24% to 80%) are in the following zipcodes in Hillsborough County: 33635, 33604, 33602, 33609, 33629, 33527, 33534, 33570, and 33598.

#### **4.2.2.4 African American Drivers Vs. Traffic Violations**

Crash rates where drivers were cited for traffic violations were obtained as a percentage of total crashes involving African American drivers and presented in (Figure 4-13). It was found that the highest crash rates where African American drivers were cited for traffic violations (34% to 80%) are in the following zipcodes in Hillsborough County: 33549, 33565, 33527, 33626, 33625, 33609, 33629, 33611, and 33616.

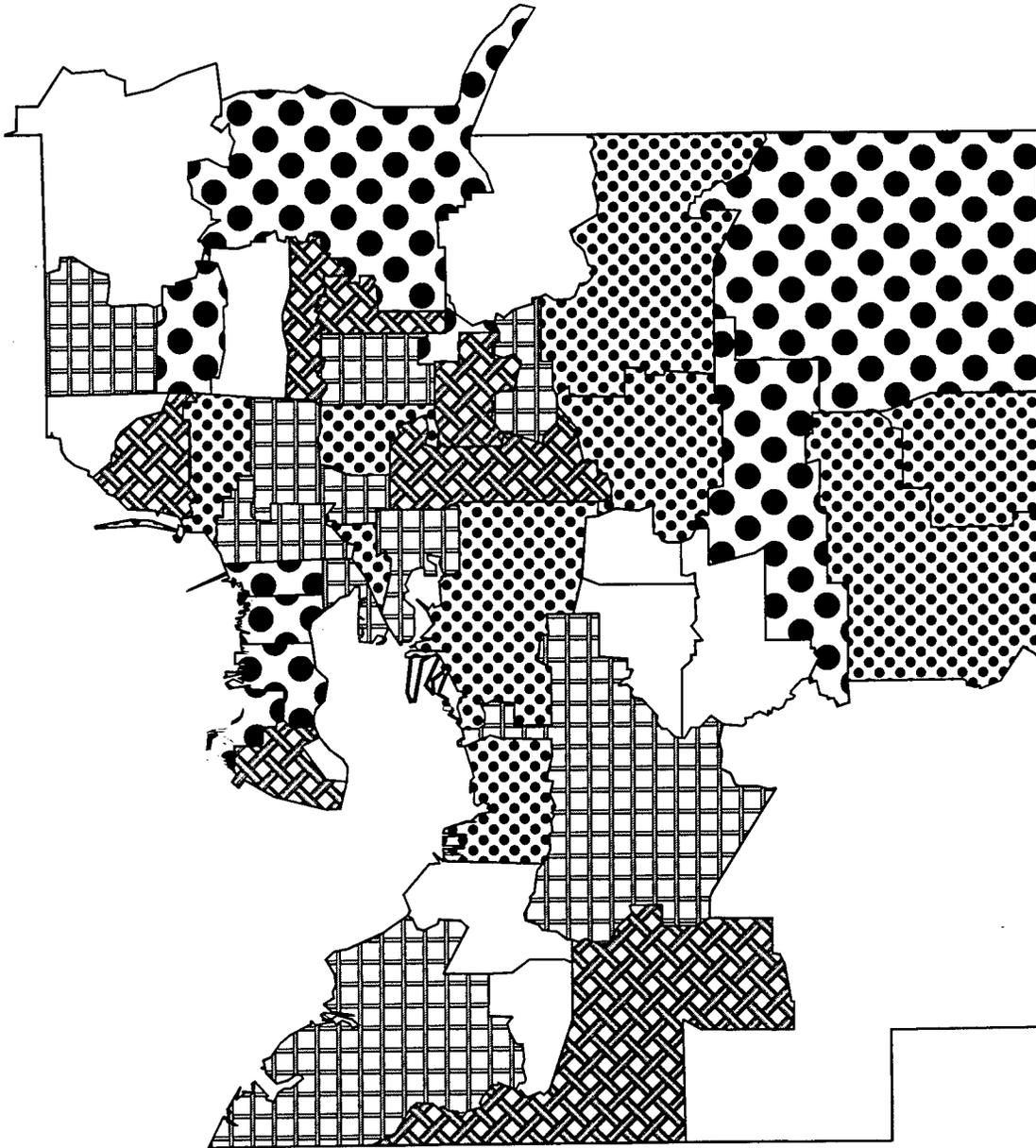
Table 4-3 represents the data used in Figures 4-10 to 4-13, as used in the GIS platform.

**FIGURE 4-12**  
**Black Drivers Crash Involvement**  
**Vs. Crashes Without Seat Belts**



Crashes Without Seat Belts	
% of Total Crashes	
	0.0 to 10.00
	10.00 to 15.00
	15.00 to 18.10
	18.10 to 24.00
	24.00 to 75.00

**FIGURE 4-13**  
**Black Drivers Crash Involvement**  
**Vs. Crashes With Traffic Violations**



Crashes With Traffic Violations	
% of Total Crashes	
	0.0 to 22.00
	22.00 to 28.00
	28.00 to 30.00
	30.00 to 34.00
	34.00 to 75.00

**TABLE 4-3**

**AFRICAN AMERICAN DRIVERS CRASH INVOLVEMENT DATABASE**

Zipcode	Total Crashes	African American Drivers Involv	% Alcohol & Drug	% Fatal & Severe	% No Seat Belt	% Cited for Violation
33573	86	0	0.00%	0.00%	0.00%	0.00%
33572	141	0	0.00%	0.00%	0.00%	0.00%
33547	220	1	0.00%	0.00%	0.00%	0.00%
33570	317	3	33.33%	0.00%	33.33%	33.33%
33527	363	4	25.00%	0.00%	75.00%	50.00%
33620	24	4	25.00%	0.00%	0.00%	75.00%
33534	220	4	0.00%	25.00%	25.00%	25.00%
33565	351	6	0.00%	0.00%	16.67%	50.00%
33608	20	7	14.29%	14.29%	14.29%	28.57%
33626	129	9	0.00%	0.00%	0.00%	33.33%
33629	361	10	0.00%	10.00%	30.00%	50.00%
33556	351	13	7.69%	0.00%	15.38%	7.69%
33598	161	14	7.14%	7.14%	35.71%	28.57%
33635	330	14	21.43%	14.29%	28.57%	14.29%
33647	339	27	7.41%	11.11%	3.70%	11.11%
33569	745	30	6.67%	3.33%	6.67%	33.33%
33618	682	32	9.38%	3.13%	12.50%	28.13%
33549	1153	40	2.50%	2.50%	15.00%	35.00%
33592	317	40	7.50%	10.00%	12.50%	22.50%
33637	313	42	11.90%	4.76%	9.52%	33.33%
33625	573	47	0.00%	2.13%	6.38%	34.04%
33609	531	54	1.85%	3.70%	25.93%	35.19%
33567	577	55	12.73%	3.64%	21.82%	27.27%
33510	682	56	5.36%	7.14%	17.86%	14.29%
33594	1031	56	7.14%	5.36%	12.50%	17.86%
33634	673	61	3.28%	1.64%	18.03%	24.59%
33616	437	62	3.23%	3.23%	20.97%	35.48%
33606	467	70	1.43%	7.14%	17.14%	30.00%
33511	1029	74	2.70%	1.35%	10.81%	21.62%
33624	1319	77	5.19%	3.90%	6.49%	20.78%
33584	733	78	5.13%	3.85%	19.23%	25.64%
33611	1026	79	6.33%	7.59%	11.39%	37.97%
33615	1434	102	7.84%	10.78%	17.65%	29.41%
33566	615	122	5.74%	3.28%	20.49%	25.41%
33613	979	171	4.09%	6.43%	18.13%	28.66%
33614	1828	172	3.49%	8.14%	13.37%	32.56%
33603	782	187	3.21%	7.49%	20.32%	31.55%
33602	434	193	1.55%	6.22%	28.50%	24.87%

Zipcode	Total Crashes	African American Drivers Invol	% Alcohol & Drug	% Fatal & Severe	% No Seat Belt	% Cited for Violation
33604	1470	312	3.21%	5.13%	28.21%	24.68%
33607	835	330	3.03%	4.24%	16.36%	30.91%
33617	1371	368	1.63%	4.89%	14.40%	28.26%
33612	1557	369	2.71%	6.23%	15.99%	30.08%
33619	1075	393	3.05%	4.58%	19.85%	25.45%
33605	885	549	3.46%	5.28%	20.95%	30.05%
33610	1453	852	3.87%	4.11%	20.31%	29.58%

### 4.2.3 Hispanic Drivers Crash Involvements Vs. Crash Types

Following is an explanation of each of the crash types under investigation.

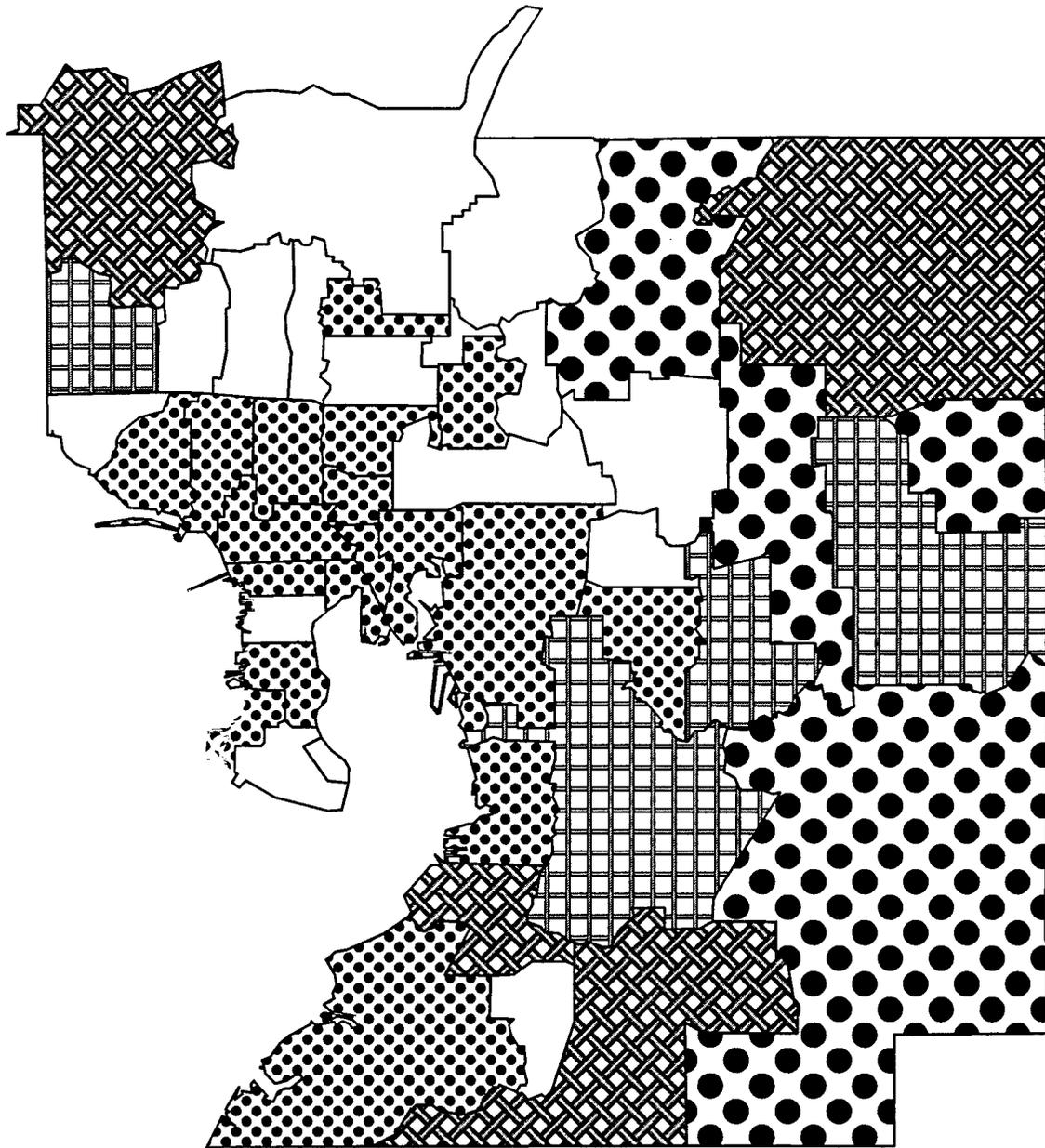
#### 4.2.3.1 Hispanic Drivers Vs. Alcohol and Drug Related Crashes

Alcohol and drug related crash rates were obtained as a percentage of total crashes involving Hispanic drivers and presented in (Figure 4-14). It is noticeable that the highest alcohol and drug related crash rates involving Hispanic drivers (25% to 40%) are in the following zipcodes in Hillsborough County: 33592, 33527, 33566, and 33547.

#### 4.2.3.2 Hispanic Drivers Vs. Fatal and Severe Injury Crashes

Fatal and severe crash rates were obtained as a percentage of total crashes involving Hispanic drivers and presented in (Figure 4-15). It is noticeable that the highest fatal and severe crash rates involving Hispanic drivers (12% to 30%) are in the following zipcodes in Hillsborough County: 33647, 33592, 33565, and 33534.

**FIGURE 4-14**  
**Hispanic Drivers Crash Involvement**  
**Vs. Alcohol and Drug Related Crashes**

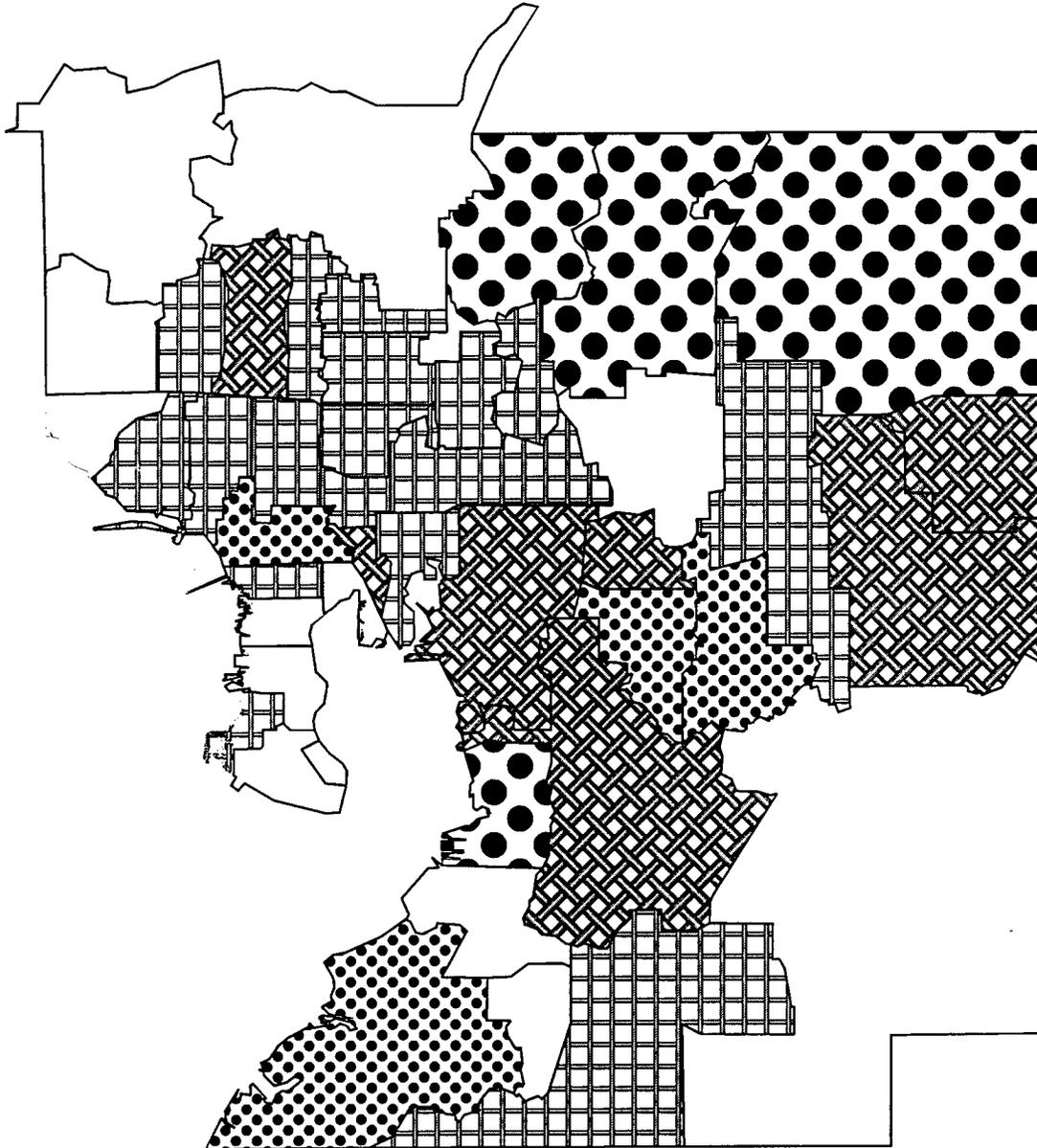


**Alcohol and Drug Related Crashes**

% of Total Crashes

	0.0 to 3.00
	3.00 to 14.00
	14.00 to 17.00
	17.00 to 25.00
	25.00 to 32.00

**FIGURE 4-15**  
**Hispanic Drivers Crash Involvement**  
**Vs. Fatal and Severe Injury Crashes**



Fatal and Severe Injury Crashes	
% of Total Crashes	
	0.0 to 1.38
	1.38 to 4.00
	4.00 to 4.67
	4.67 to 12.00
	12.00 to 25.00

#### **4.2.3.3 Hispanic Drivers Vs. Crashes Without the Use of Seat Belts**

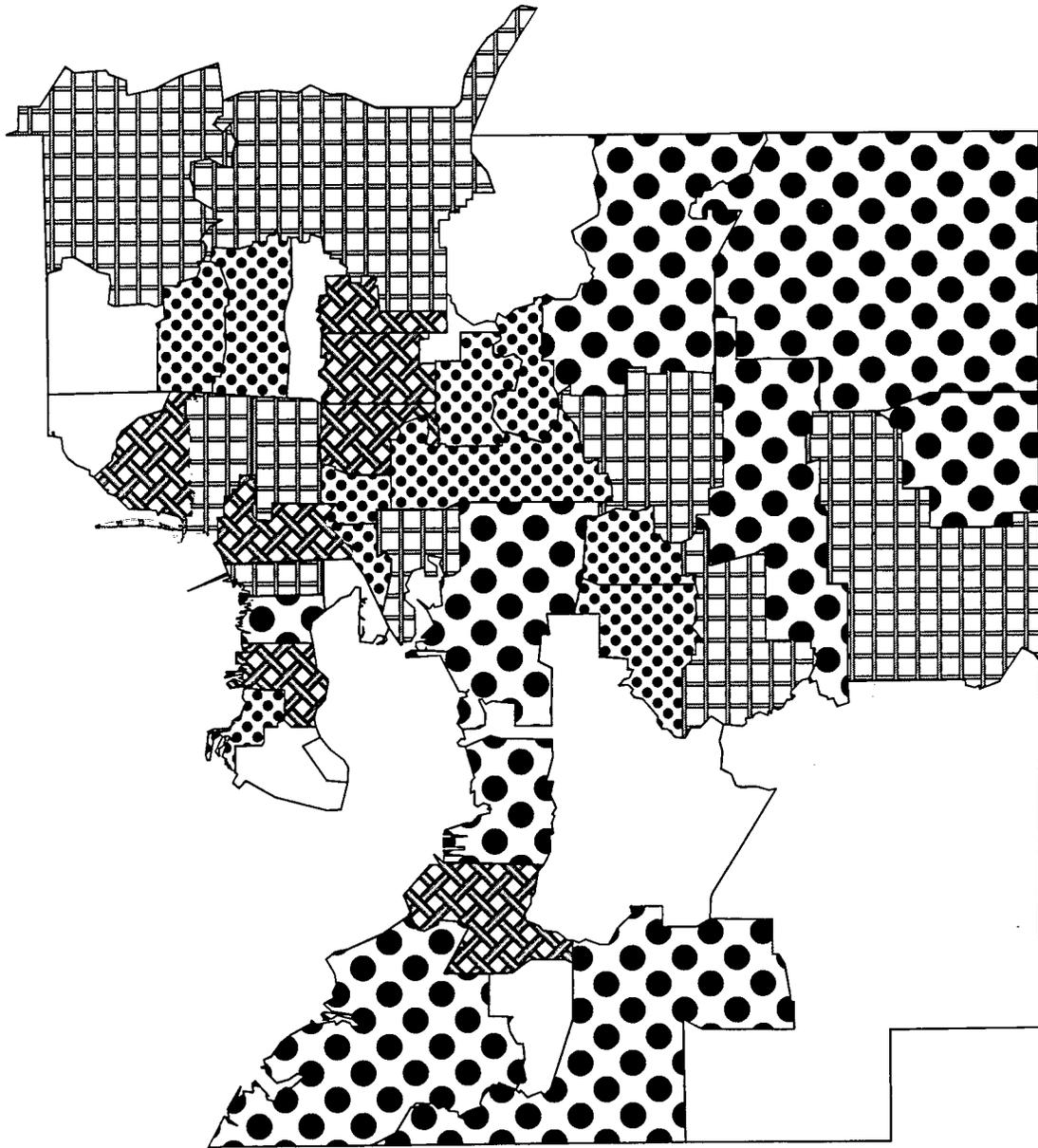
Crash rates where drivers ignored the use of safety seat belts were obtained as a percentage of total crashes involving Hispanic drivers and presented in (Figure 4-16). It is noticeable that the highest crash rates without the use of safety seat belts involving Hispanic drivers (25% to 50%) are in the following zipcodes in Hillsborough County: 33592, 33565, 33527, 33619, 33629, 33534, 33598, and 33570.

#### **4.2.3.4 Hispanic Drivers Vs. Traffic Violations**

Crash rates where drivers were cited for traffic violations were obtained as a percentage of total crashes involving Hispanic drivers and presented in (Figure 4-17). It was found that the highest crash rates where African American drivers were cited for traffic violations (42% to 60%) are in the following zipcodes in Hillsborough County: 33626, 33635, 33625, 33613, 33566, 33567, 33609, and 33608.

Table 4-4 represents the data used in Figures 4-14 to 4-17, as used in the GIS platform.

**FIGURE 4-16**  
**Hispanic Drivers Crash Involvement**  
**Vs. Crashes Without Seat Belts**



Crashes Without Seat Belts	
	0.0 to 8.00
	8.00 to 12.60
	12.60 to 16.60
	16.60 to 25.00
	25.00 to 50.00



Table 4-4

HISPANIC DRIVERS CRASH INVOLVEMENT DATABASE

Zipcode	Total Crashes	Hispanic Drivers Invol.	% Alcohol & Drug	% Fatal & Severe	% No Seat Belt	% Cited for Violation
33620	24	0	0.00%	0.00%	0.00%	0.00%
33573	86	0	0.00%	0.00%	0.00%	0.00%
33608	20	2	0.00%	0.00%	0.00%	50.00%
33592	317	4	25.00%	25.00%	50.00%	0.00%
33547	220	4	25.00%	0.00%	0.00%	25.00%
33626	129	5	20.00%	0.00%	0.00%	60.00%
33556	351	6	16.67%	0.00%	16.67%	33.33%
33565	351	7	14.29%	14.29%	42.86%	0.00%
33572	141	7	14.29%	0.00%	14.29%	28.57%
33534	220	8	12.50%	12.50%	37.50%	37.50%
33584	733	12	0.00%	0.00%	16.67%	25.00%
33629	361	12	0.00%	0.00%	25.00%	41.67%
33647	339	13	0.00%	15.38%	7.69%	23.08%
33635	330	16	0.00%	0.00%	6.25%	43.75%
33606	467	17	5.88%	0.00%	5.88%	41.18%
33616	437	19	5.26%	5.26%	10.53%	31.58%
33637	313	20	0.00%	5.00%	10.00%	20.00%
33618	682	23	0.00%	8.70%	4.35%	26.09%
33510	682	23	0.00%	4.35%	8.70%	34.78%
33569	745	24	20.83%	4.17%	4.17%	29.17%
33602	434	25	4.00%	4.00%	12.00%	20.00%
33549	1153	29	0.00%	0.00%	20.69%	34.48%
33625	573	32	0.00%	6.25%	12.50%	43.75%
33594	1031	34	17.65%	2.94%	17.65%	38.24%
33511	1029	36	8.33%	2.78%	11.11%	33.33%
33609	531	37	5.41%	5.41%	18.92%	43.24%
33611	1026	39	5.13%	0.00%	12.82%	38.46%
33610	1453	40	0.00%	7.50%	12.50%	35.00%
33613	979	41	12.20%	9.76%	14.63%	46.34%
33567	577	43	23.26%	4.65%	23.26%	48.84%
33566	615	47	25.53%	4.26%	27.66%	42.55%
33570	317	51	13.73%	3.92%	27.45%	21.57%
33598	161	52	15.38%	11.54%	30.77%	38.46%
33617	1371	54	7.41%	5.56%	11.11%	35.19%
33527	363	61	31.15%	9.84%	37.70%	32.79%
33624	1319	71	2.82%	4.23%	8.45%	30.99%
33619	1075	72	8.33%	4.17%	27.78%	33.33%
33612	1557	77	2.60%	5.19%	14.29%	37.66%

Zipcode	Total Crashes	Hispanic Drivers Invol.	% Alcohol & Drug	% Fatal & Severe	% No Seat Belt	% Cited for Violation
33634	673	81	3.70%	8.64%	17.28%	43.21%
33603	782	106	5.66%	5.66%	11.32%	37.74%
33605	885	107	7.48%	4.67%	18.69%	42.06%
33604	1470	123	8.94%	5.69%	13.01%	39.84%
33615	1434	147	4.08%	4.76%	12.93%	31.97%
33607	835	181	3.31%	3.87%	16.57%	37.02%
33614	1828	311	3.86%	6.43%	16.72%	37.62%

#### 4.2.4 Overall View of Driver's Race Vs. Crash Rates

A comparison was done across the maps regarding the drivers' race. It is important to note that the comparison is based on the numbers in the legends of the maps since the categorization of each legend is independent. The reason was that each map had different variation of crash rates (minimum to maximum), which made it difficult to keep the same categorization of these rates across all the maps the same. This process was maintained in the rest of the comparisons performed in this report. After comparing all the figures relating to the relationship between the driver's race and the different crash rates in Hillsborough County, the following characteristics were noticed with regards to the race of the drivers involved in traffic crashes:

- African American drivers had the highest crash rates involving alcohol and drugs, (up to 34%) of the total crashes involving African American drivers.
- Hispanic and African American drivers had the higher crash rates resulting in fatal or severe injury crashes, (up to 25%) of total crashes, than White drivers.

- African American drivers had the highest crash rates without the use of safety seat belts, (up to 75%) of the total crashes involving African American drivers.
- African American drivers had the highest crash rates where they were cited for traffic violations, (up to 75%) of the total crashes involving African American drivers.

These observations show that African American drivers have the highest risk involving in traffic crashes than any other race. Hispanic drivers are second highest risky drivers. White drivers, on the other hand, are noticed to be the least risky drivers. Although, White drivers do have high crash rates among their race group. The differences in the rate of involvements in traffic crashes for each race are dependent on many factors other than driving behavior. It has to with the cultural differences between races, the education level of each race, and the income level as well has an effect on different crash types.

#### **4.3 Driver's Age Vs. Crash Types (Tampa)**

Drivers' age is a very important factor affecting crash rates, as seen in the literature review, older drivers tend to be involved in traffic crashes more than mid-age drivers; On the other hand, young drivers as well contribute to a large percentage of traffic crashes each year. This report views two groups of drivers' age, teen-age drivers (ages < 20 years old), and elderly drivers (ages > 74 years old). Each age group was investigated against the four types of crashes under study.

### **4.3.1 Teen-age Drivers Crash Involvement**

The crash data was extracted for the drivers in the age group less than 20 years old and the analysis was done accordingly.

#### **4.3.1.1 Teen-age Drivers Vs. Alcohol and Drug Related Crashes**

Alcohol and drug related crash rates were obtained as a percentage of total crashes involving teen-age drivers and presented in (Figure 4-18). It is noticeable that the highest alcohol and drug related crash rates involving teen-age drivers (5% to 80%) are in the following zipcodes in Hillsborough County: 33592, 33527, 33534, 33570, and 33598.

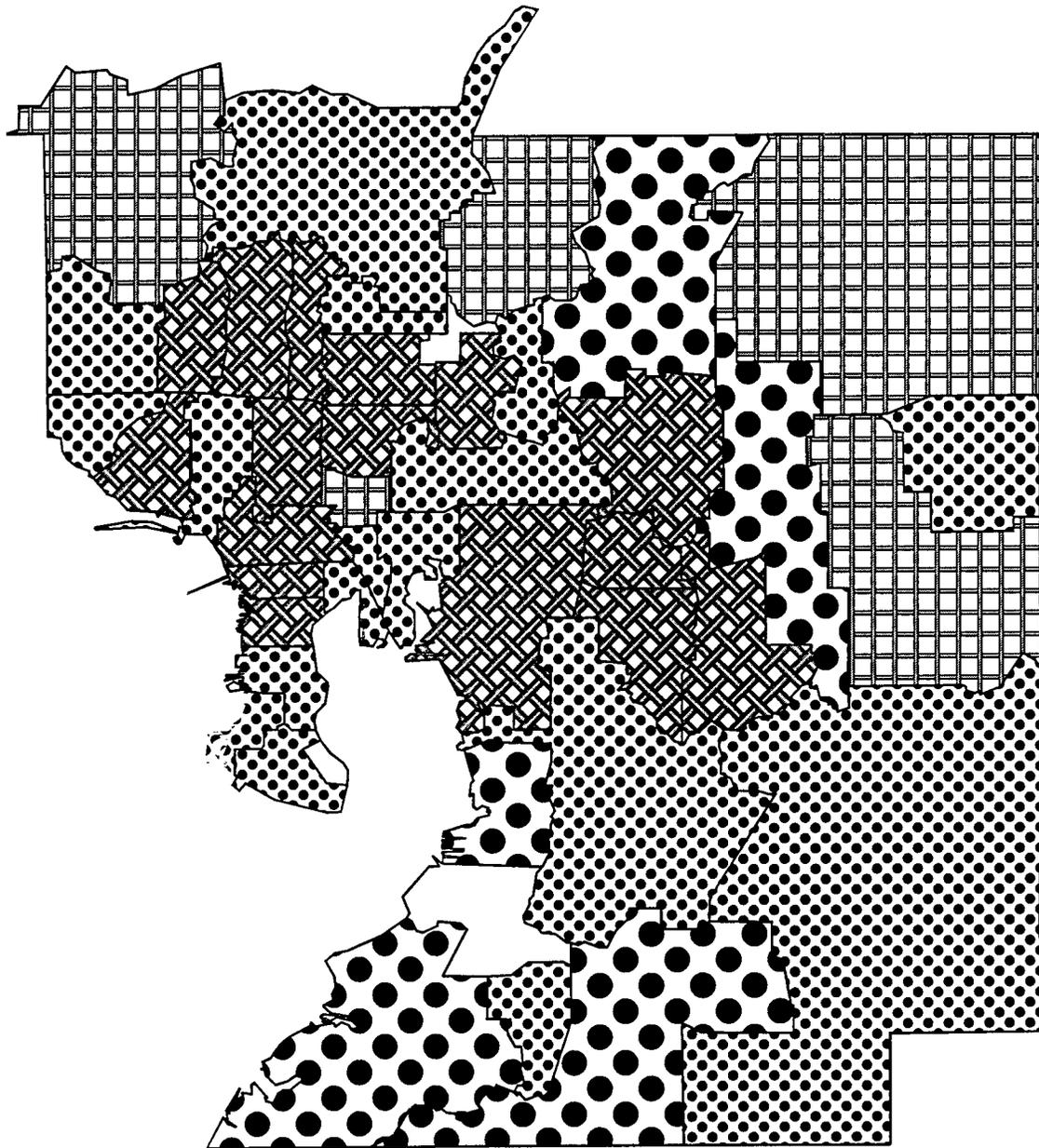
#### **4.3.1.2 Teen-age Drivers Vs. Fatal and Severe Injury Crashes**

Fatal and severe crash rates were obtained as a percentage of total crashes involving teen-age drivers and presented in (Figure 4-19). It is noticeable that the highest fatal and severe crash rates involving teen-age drivers (14% to 20%) are in the following zipcodes in Hillsborough County: 33616, 33570, and 33547.

#### **4.3.1.3 Teen-age Drivers Vs. Crashes Without the Use of Seat Belts**

Crash rates where drivers ignored the use of safety seat belts were obtained as a percentage of total crashes involving teen-age drivers and presented in (Figure 4-20). It is noticeable that the highest crash rates without the use of safety seat belts involving teen-age drivers (24% to 100%) are in the following zipcodes in Hillsborough County: 33570, 33573, 33598, 33534, 33527, 33608, 33602, 33603, 33604, 33605, and 33610.

**FIGURE 4-18**  
**Teen-age Drivers Crash Involvement**  
**Vs. Alcohol and Drug Related Crashes**

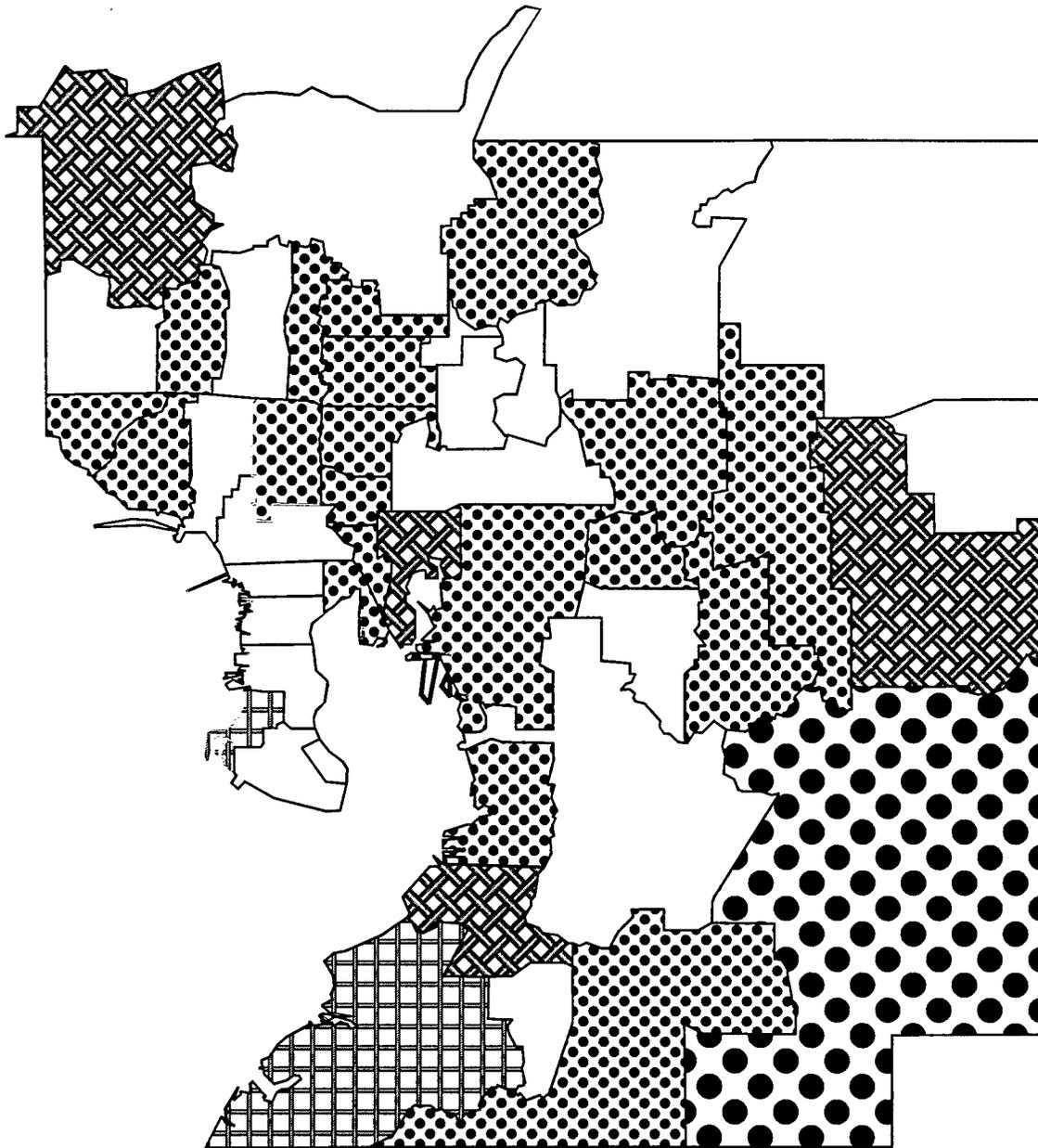


**Alcohol and Drug Related Crashes**

% of Total Crashes

- |   |              |
|---|--------------|
|  | 0.00 to 0.35 |
|  | 0.35 to 1.30 |
|  | 1.30 to 3.70 |
|  | 3.70 to 5.70 |
|  | 5.70 to 8.00 |

**FIGURE 4-19**  
**Teen-age Drivers Crash Involvement**  
**Vs. Fatal and Severe Injury Crashes**



Fatal and Severe Injury Crashes	
% of Total Crashes	
	0.0 to 3.60
	3.60 to 7.10
	7.10 to 11.00
	11.00 to 14.00
	14.00 to 20.00

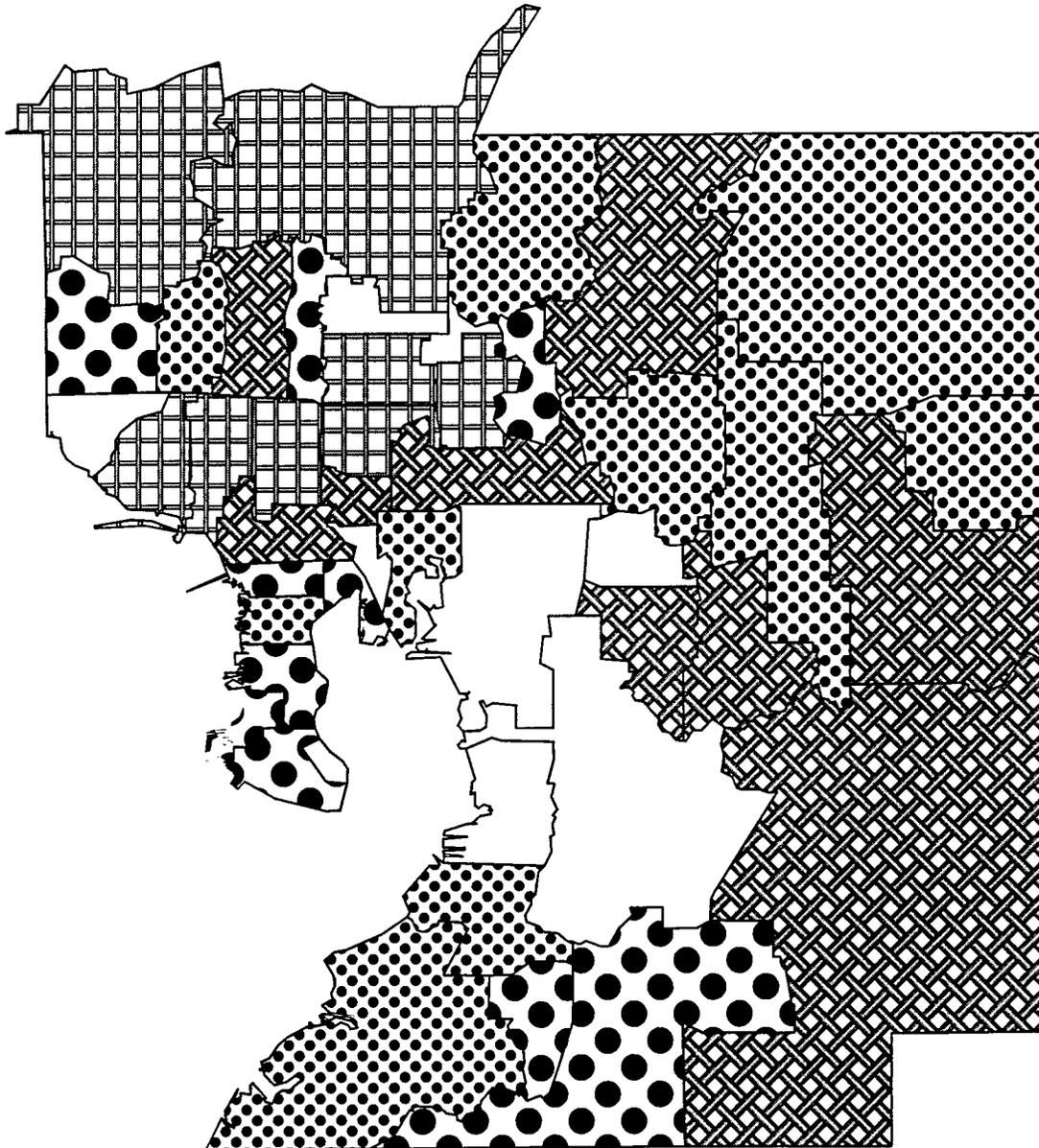


#### **4.3.1.4 Teen-age Drivers Vs. Traffic Violations**

Crash rates where drivers were cited for traffic violations were obtained as a percentage of total crashes involving teen-age drivers and presented in (Figure 4-21). It was found that the highest crash rates where teen-age drivers were cited for traffic violations (50% to 100%) are in the following zipcodes in Hillsborough County: 33626, 33618, 33637, 33606, 33609, 33611, 33616, 33608, 33573, and 33598.

Table 4-5 represents the data used in Figures 4-18 to 4-21, as used in the GIS platform.

**FIGURE 4-21**  
**Teen-age Drivers Crash Involvement**  
**Vs. Crashes With Traffic Violations**



Crashes With Traffic Violations	
% of Total Crashes	
	0.0 to 35.00
	35.00 to 39.30
	39.30 to 44.20
	44.20 to 50.00
	50.00 to 100.00

**TABLE 4-5**

**TEEN-AGE DRIVERS CRASH INVOLVEMENT DATABASE**

Zipcode	Total Crashes	Teen-age Drivers Invol.	% Alcohol & Drug	% Fatal & Severe	% No Seat Belt	% Cited for Violation
33573	86	1	0.00%	0.00%	100.00%	100.00%
33620	24	3	0.00%	0.00%	0.00%	33.33%
33608	20	3	0.00%	0.00%	66.67%	66.67%
33626	129	14	0.00%	0.00%	0.00%	71.43%
33635	330	22	0.00%	4.55%	13.64%	27.27%
33602	434	26	0.00%	3.85%	46.15%	23.08%
33572	141	28	0.00%	7.14%	17.86%	39.29%
33598	161	29	6.90%	6.90%	34.48%	62.07%
33534	220	29	6.90%	6.90%	31.03%	31.03%
33637	313	36	0.00%	2.78%	8.33%	52.78%
33647	339	36	5.56%	5.56%	2.78%	38.89%
33570	317	40	7.50%	12.50%	32.50%	35.00%
33606	467	40	0.00%	5.00%	5.00%	50.00%
33616	437	42	0.00%	11.90%	23.81%	66.67%
33547	220	45	0.00%	17.78%	22.22%	40.00%
33592	317	47	6.38%	0.00%	10.64%	42.55%
33565	351	53	3.77%	1.89%	18.87%	35.85%
33609	531	55	3.64%	0.00%	10.91%	50.91%
33527	363	67	5.97%	5.97%	25.37%	37.31%
33603	782	68	4.41%	4.41%	32.35%	44.12%
33556	351	69	4.35%	10.14%	18.84%	44.93%
33629	361	70	1.43%	2.86%	14.29%	38.57%
33607	835	73	1.37%	0.00%	23.29%	41.10%
33625	573	76	1.32%	6.58%	14.47%	36.84%
33634	673	80	1.25%	2.50%	15.00%	47.50%
33605	885	80	1.25%	8.75%	38.75%	37.50%
33611	1026	86	1.16%	3.49%	13.95%	52.33%
33618	682	91	3.30%	4.40%	12.09%	50.55%
33566	615	91	0.00%	2.20%	17.58%	37.36%
33567	577	101	4.95%	9.90%	22.77%	39.60%
33569	745	102	0.98%	1.96%	14.71%	30.39%
33613	979	105	0.00%	4.76%	12.38%	34.29%
33510	682	108	2.78%	5.56%	12.04%	27.78%
33584	733	111	2.70%	3.60%	19.82%	36.94%
33619	1075	119	1.68%	4.20%	21.01%	33.61%
33511	1029	132	2.27%	0.76%	9.85%	39.39%
33617	1371	135	2.22%	2.96%	17.78%	44.44%
33549	1153	140	0.71%	2.86%	9.29%	45.00%

Zipcode	Total Crashes	Teen-age Drivers Invol.	% Alcohol & Drug	% Fatal & Severe	% No Seat Belt	% Cited for Violation
33612	1557	145	1.38%	4.14%	20.00%	46.90%
33604	1470	153	1.96%	6.54%	28.76%	49.02%
33615	1434	157	3.18%	7.01%	20.38%	47.77%
33610	1453	157	1.27%	1.27%	24.20%	40.76%
33614	1828	178	2.81%	5.06%	15.17%	49.44%
33594	1031	180	2.78%	4.44%	11.11%	41.67%
33624	1319	232	3.02%	2.16%	12.50%	43.97%

### 4.3.2 Elderly Drivers Crash Involvement

The crash data was extracted for the drivers in the age group more than 74 years old and the analysis was done accordingly.

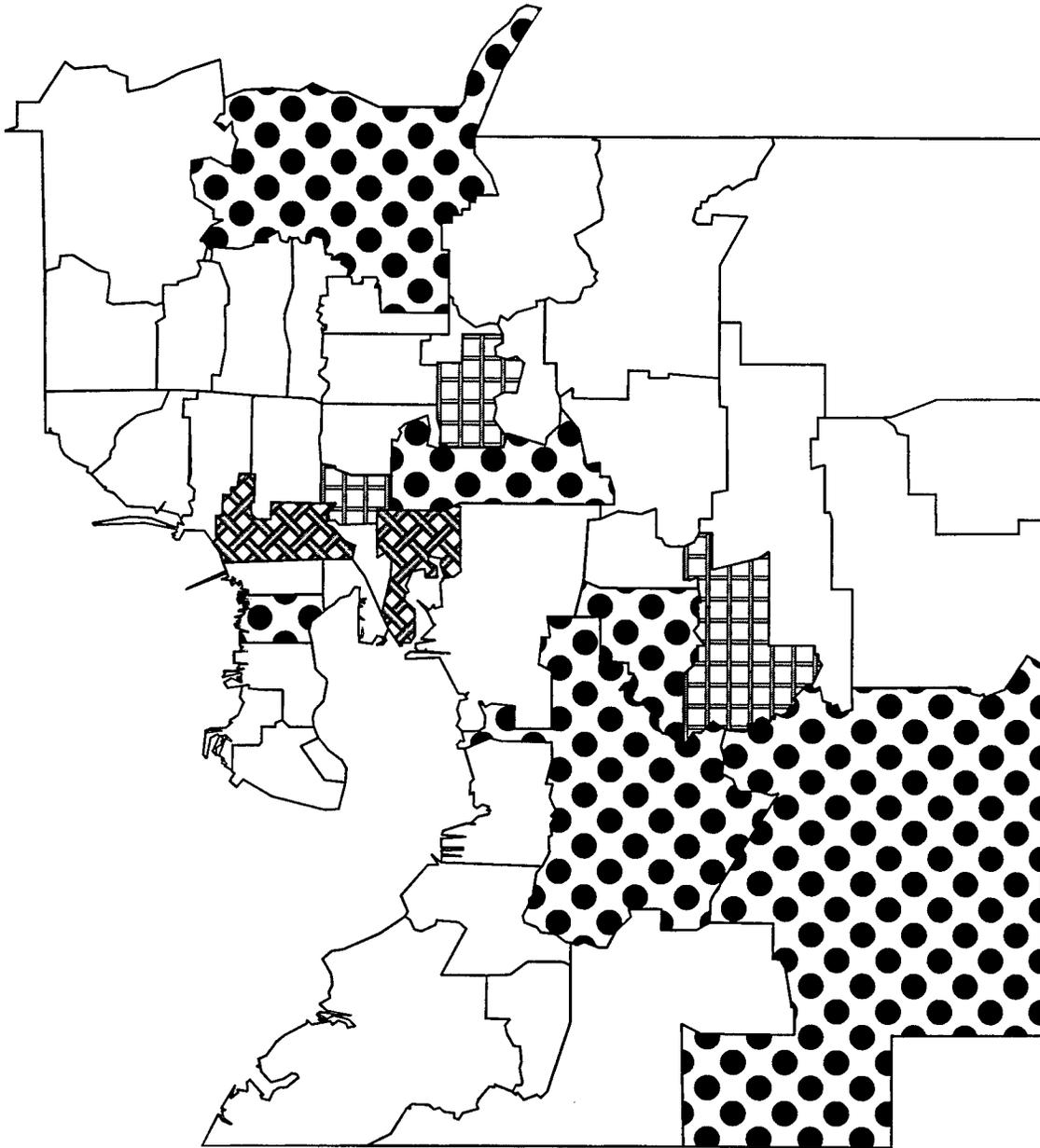
#### 4.3.2.1 Elderly Drivers Vs. Alcohol and Drug Related Crashes

Alcohol and drug related crash rates were obtained as a percentage of total crashes involving elderly drivers and presented in (Figure 4-22). It is noticeable that the highest alcohol and drug related crash rates involving elderly drivers (5% to 20%) are in the following zipcodes in Hillsborough County: 33629, 33549, 33610, 33569, and 33547.

#### 4.3.2.2 Elderly Drivers Vs. Fatal and Severe Injury Crashes

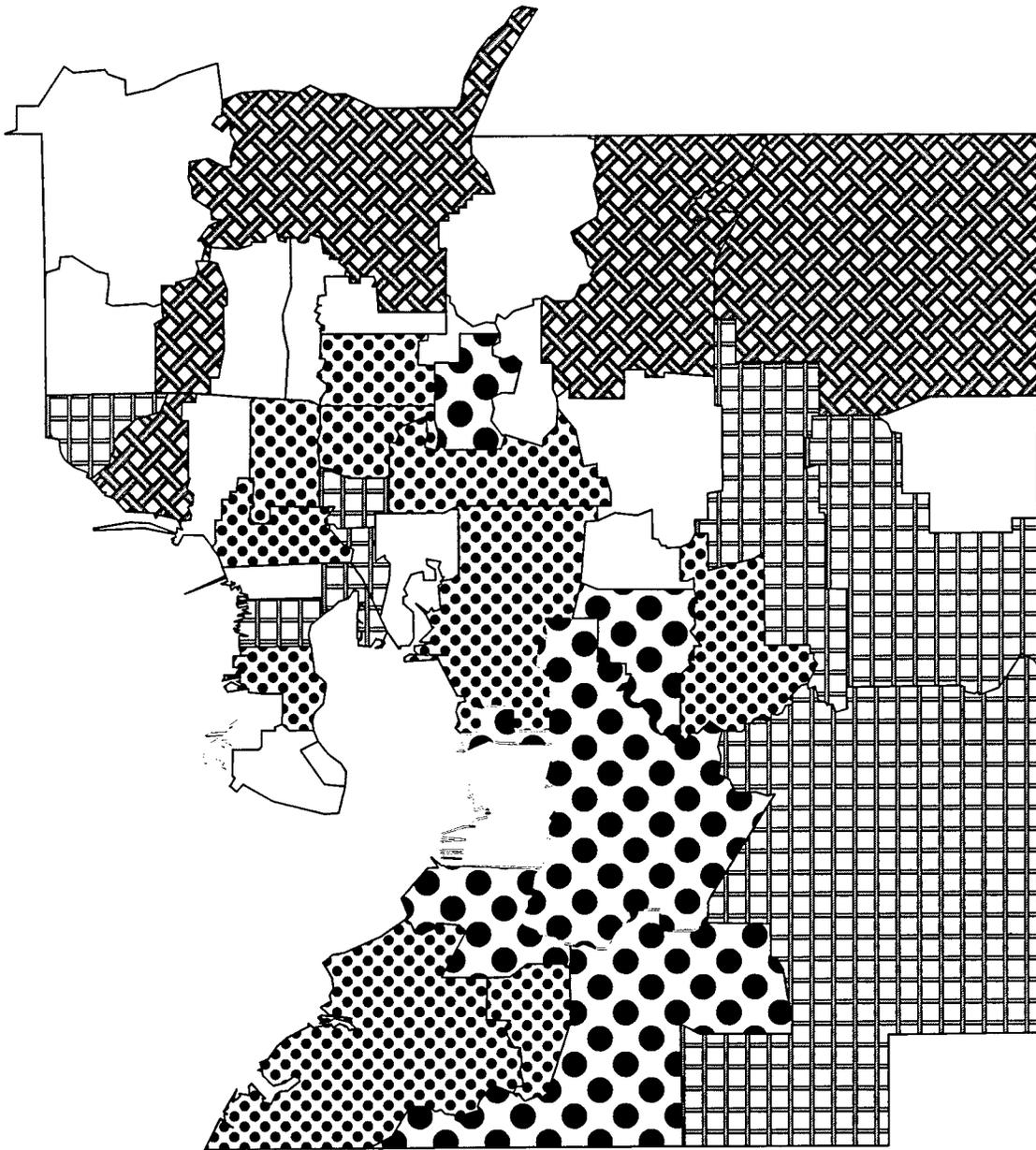
Fatal and severe crash rates were obtained as a percentage of total crashes involving elderly drivers and presented in (Figure 4-23). It is noticeable that the highest fatal and severe crash rates involving elderly drivers (17% to 40%) are in the following zipcodes in Hillsborough County: 33617, 33511, 33569, 33572, and 33598.

**FIGURE 4-22**  
**Elderly Drivers Crash Involvement**  
**Vs. Alcohol and Drug Related Crashes**



Alcohol and Drug Related Crashes	
	0.0 to 1.22
	1.21 to 3.50
	3.50 to 5.00
	5.00 to 20.00

**FIGURE 4-23**  
**Elderly Drivers Crash Involvement**  
**Vs. Fatal and Severe Injury Crashes**



Fatal and Severe Injury Crashes	
% of Total Crashes	
	0.0 to 1.31
	1.31 to 10.00
	10.00 to 12.00
	12.00 to 17.00
	17.00 to 35.00

#### **4.3.2.3 Elderly Drivers Vs. Crashes Without the Use of Seat Belts**

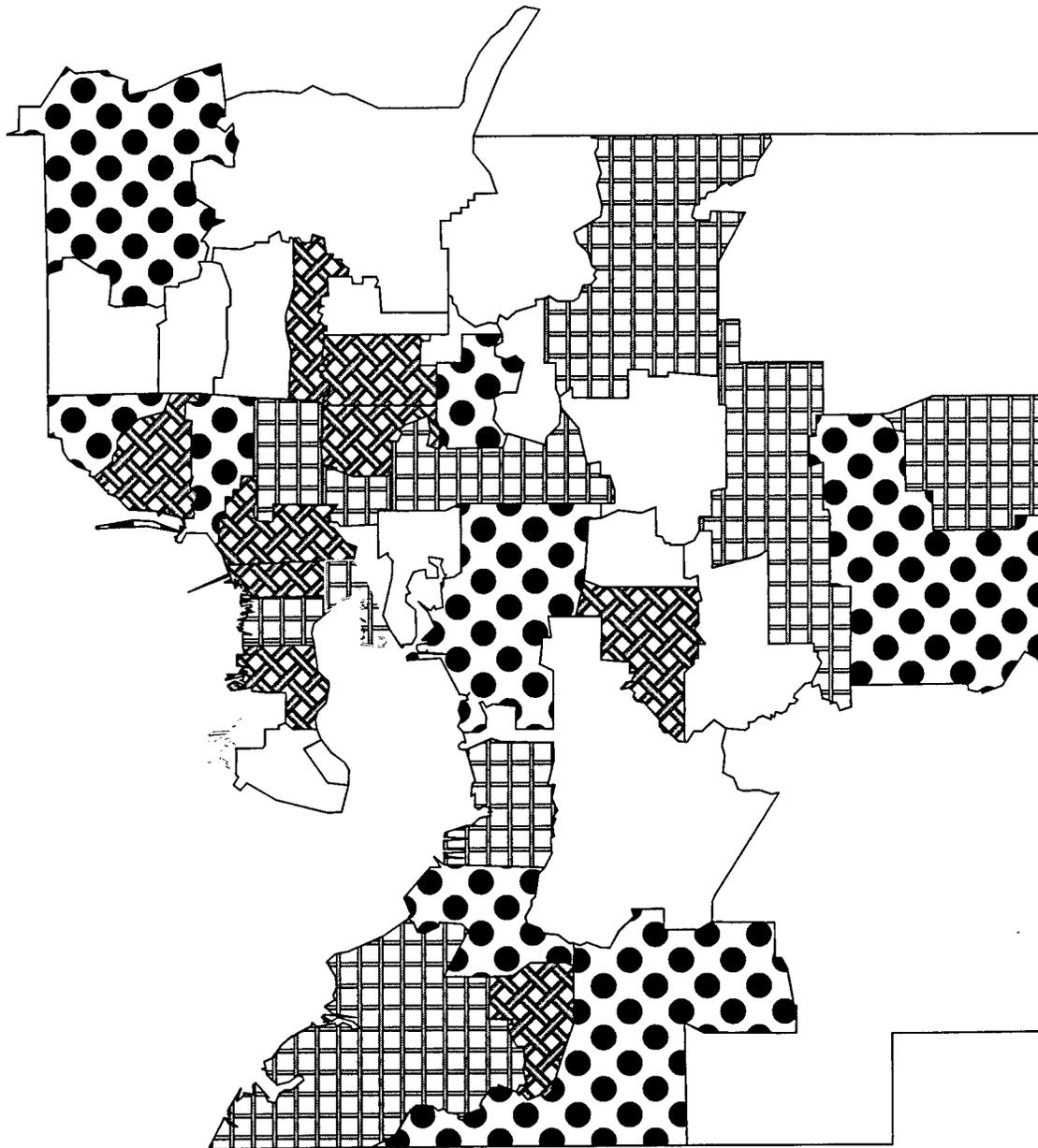
Crash rates where drivers ignored the use of safety seat belts were obtained as a percentage of total crashes involving elderly drivers and presented in (Figure 4-24). It is noticeable that the highest crash rates without the use of safety seat belts involving elderly drivers (17% to 40%) are in the following zipcodes in Hillsborough County: 33556, 33635, 33617, 33634, 33619, 33567, 33572, and 33598.

#### **4.3.2.4 Elderly Drivers Vs. Traffic Violations**

Crash rates where drivers were cited for traffic violations were obtained as a percentage of total crashes involving elderly drivers and presented in (Figure 4-25). It was found that the highest crash rates where elderly drivers were cited for traffic violations (50% to 70%) are in the following zipcodes in Hillsborough County: 33566, 33592, 33637, 33610, 33604, 33603, 33614, 33613, 33625, 33626, 33609, 33629, 33611, 33606, 33616, 33572, 33573, 33570.

Table 4-6 represents the data used in Figures 4-22 to 4-25, as used in the GIS platform.

**FIGURE 4-24**  
**Elderly Drivers Crash Involvement**  
**Vs. Crashes Without Seat Belts**



Crashes Without Seat Belts	
White	0.0 to 1.31
Cross-hatch	1.31 to 10.00
Grid	10.00 to 17.00
Black circles	17.00 to 34.00



TABLE 4-6

## ELDERLY DRIVERS CRASH INVOLVEMENT DATABASE

Zipcode	Total Crashes	Elderly Drivers Invol.	% Alcohol & Drug	% Fatal & Severe	% No Seat Belt	% Cited for Violation
33608	20	0	0.00%	0.00%	0.00%	0.00%
33620	24	0	0.00%	0.00%	0.00%	0.00%
33647	339	2	0.00%	0.00%	0.00%	0.00%
33637	313	3	0.00%	0.00%	0.00%	66.67%
33598	161	3	0.00%	33.33%	33.33%	0.00%
33626	129	3	0.00%	0.00%	0.00%	66.67%
33556	351	5	0.00%	0.00%	20.00%	20.00%
33616	437	5	0.00%	0.00%	0.00%	60.00%
33572	141	5	0.00%	20.00%	20.00%	60.00%
33547	220	6	16.67%	16.67%	0.00%	33.33%
33635	330	7	0.00%	14.29%	28.57%	42.86%
33584	733	7	0.00%	0.00%	0.00%	42.86%
33534	220	7	0.00%	0.00%	14.29%	28.57%
33634	673	8	0.00%	0.00%	25.00%	37.50%
33602	434	8	0.00%	12.50%	0.00%	25.00%
33527	363	8	0.00%	12.50%	12.50%	12.50%
33565	351	9	0.00%	11.11%	0.00%	44.44%
33625	573	10	0.00%	10.00%	0.00%	50.00%
33592	317	10	0.00%	10.00%	10.00%	50.00%
33510	682	10	0.00%	0.00%	0.00%	40.00%
33569	745	13	7.69%	30.77%	0.00%	15.38%
33618	682	13	0.00%	0.00%	7.69%	46.15%
33606	467	13	0.00%	15.38%	15.38%	53.85%
33511	1029	16	6.25%	18.75%	6.25%	31.25%
33566	615	19	0.00%	0.00%	15.79%	52.63%
33619	1075	20	0.00%	5.00%	20.00%	35.00%
33549	1153	20	5.00%	10.00%	0.00%	35.00%
33615	1434	20	0.00%	10.00%	5.00%	50.00%
33570	317	20	0.00%	10.00%	10.00%	50.00%
33567	577	21	0.00%	14.29%	19.05%	42.86%
33617	1371	22	4.55%	22.73%	22.73%	36.36%
33624	1319	22	0.00%	0.00%	0.00%	31.82%
33594	1031	24	4.17%	4.17%	0.00%	41.67%
33609	531	25	0.00%	0.00%	8.00%	52.00%
33613	979	25	0.00%	0.00%	0.00%	40.00%
33603	782	28	3.57%	14.29%	10.71%	67.86%
33605	885	29	3.45%	0.00%	0.00%	48.28%
33611	1026	30	0.00%	6.67%	3.33%	56.67%
33573	86	34	0.00%	5.88%	8.82%	50.00%

Zipcode	Total Crashes	Elderly Drivers Invol.	% Alcohol & Drug	% Fatal & Severe	% No Seat Belt	% Cited for Violation
33610	1453	37	5.41%	8.11%	16.22%	54.05%
33614	1828	37	0.00%	2.70%	10.81%	59.46%
33612	1557	38	0.00%	2.63%	2.63%	42.11%
33629	361	39	5.13%	12.82%	10.26%	61.54%
33607	835	41	2.44%	7.32%	7.32%	43.90%
33604	1470	47	0.00%	8.51%	8.51%	59.57%

### 4.3.3 Overall View of Drivers' Age Vs. Crash Rates

A comparison was performed across the maps, specifically the legends of the maps, between the two driver's age groups under investigation, and their relationship with the different crash rates in Hillsborough County. As a result of this comparison, the following characteristics of crash involvement were noticed between both age groups:

- Teen-age drivers had higher crash rates without safety seat belts (up to 100%) of the total crashes involving teen-age drivers compared to (up to 34%) of elderly drivers.
- Teen-age drivers had higher crash rates where they were cited for traffic violations (up to 100%) of the total crashes involving teen-age drivers compare to (up to 67%) of elderly drivers.
- Elderly drivers had higher crash rates resulting in fatal or severe injury crashes, (up to 34%) of the total crashes involving elderly drivers.
- Alcohol and drug related crash rates were not so different between both age groups, except for one zipcode (33547) where elderly drivers had high rate of (up to 17%), otherwise, the rest of the zipcode areas were compatible.

From the comparison between both age groups, it was noticed that teen-age drivers are more risky than elderly drivers in Hillsborough County

#### **4.4 Driver's Gender Vs. Crash Types (Tampa)**

From the literature review, it was found that male drivers are more likely to get involved in traffic crashes than female drivers. This section investigated the different crash type involvements in both genders, male and female.

##### **4.4.1 Male Drivers Vs. Crash Types**

The crash data was extracted for the male drivers and the analysis was done accordingly.

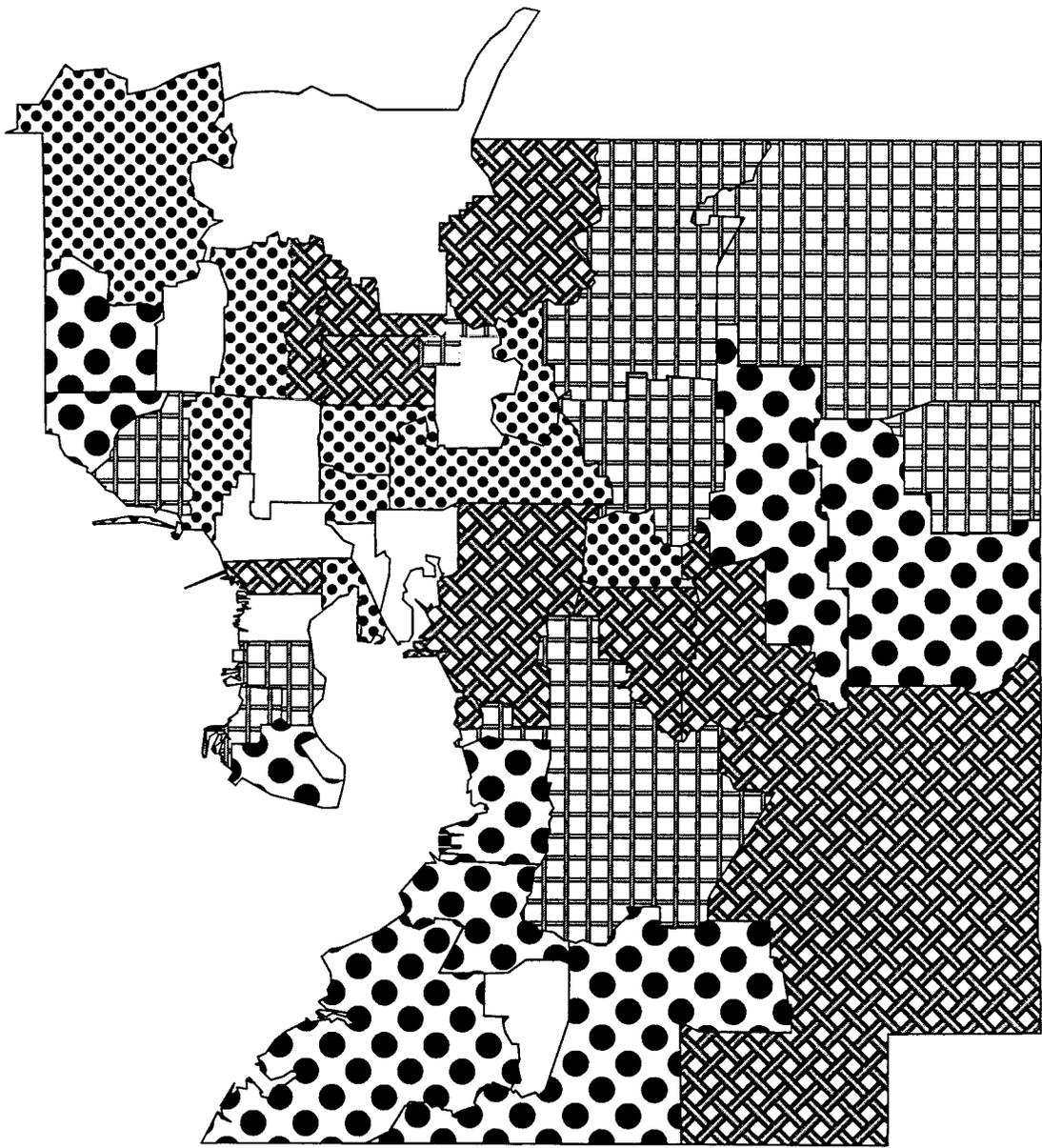
##### **4.4.1.1 Male Drivers Vs. Alcohol and Drug Related Crashes**

Alcohol and drug related crash rates were obtained as a percentage of total crashes involving male drivers and presented in (Figure 4-26). It is noticeable that the highest alcohol and drug related crash rates involving male drivers (10% to 20%) are in the following zipcodes in Hillsborough County: 33566, 33567, 33527, 33626, 33635, 33608, 33534, 33572, 33598, and 33570.

##### **4.4.1.2 Male Drivers Vs. Fatal and Severe Crashes**

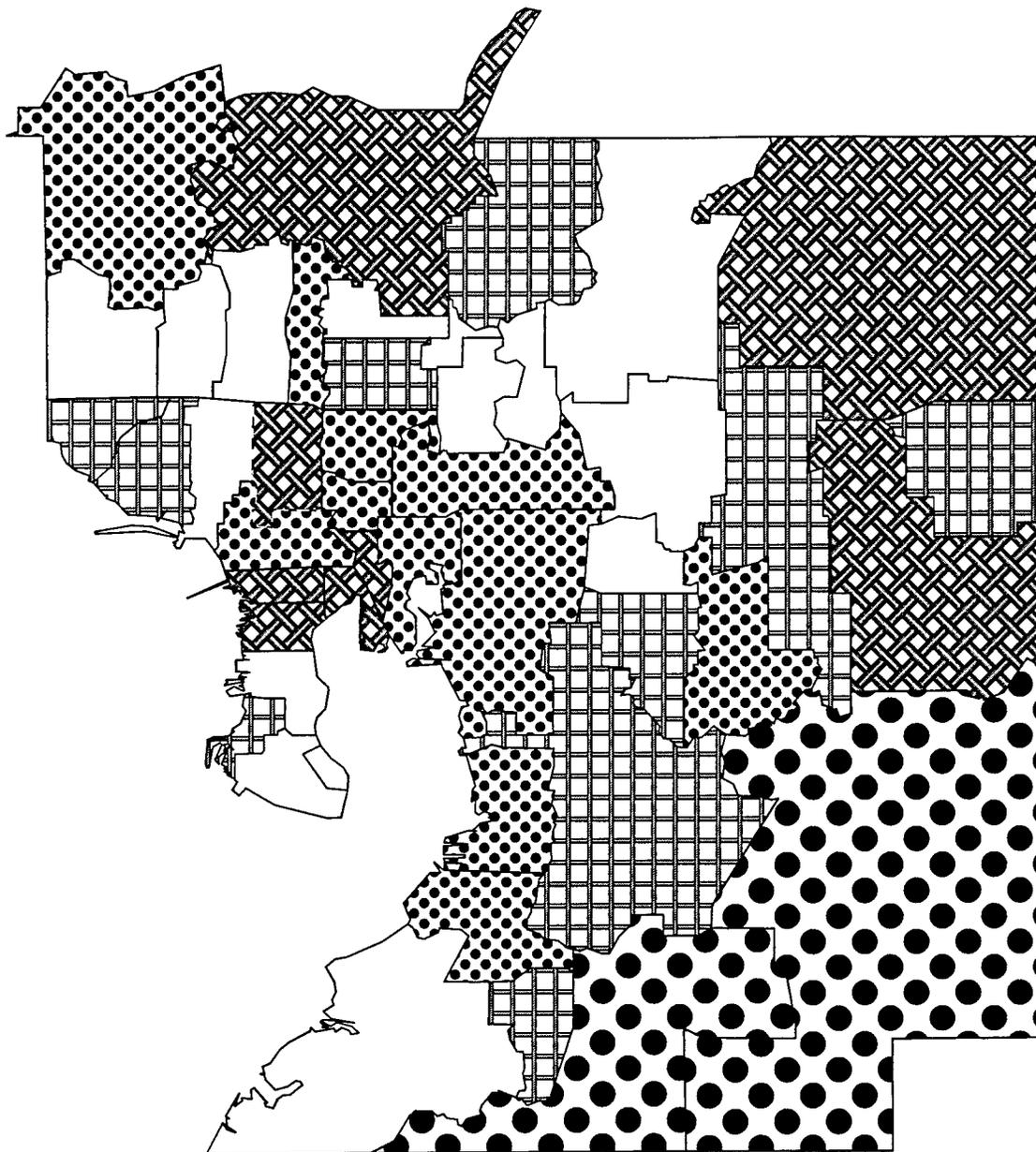
Fatal and severe crash rates were obtained as a percentage of total crashes involving male drivers and presented in (Figure 4-27). It is noticeable that the highest fatal and severe crash rates involving male drivers (10% to 20%) are in the following zipcodes in Hillsborough County: 33547, and 33598.

**FIGURE 4-26**  
**Male Drivers Crash Involvement**  
**Vs. Alcohol and Drug Related Crashes**



Alcohol and Drug Related Crashes	
	0.0 to 5.70
	5.70 to 6.70
	6.70 to 8.60
	8.60 to 10.90
	10.90 to 20.00

**FIGURE 4-27**  
**Male Drivers Crash Involvement**  
**Vs. Fatal and Severe Injury Crashes**



Fatal and Severe Injury Crashes	
% of Total Crashes	
	0.0 to 4.00
	4.00 to 4.66
	4.66 to 5.34
	5.34 to 10.00
	10.00 13.00

#### **4.4.1.3 Male Drivers Vs. Crashes Without the Use of Seat Belts**

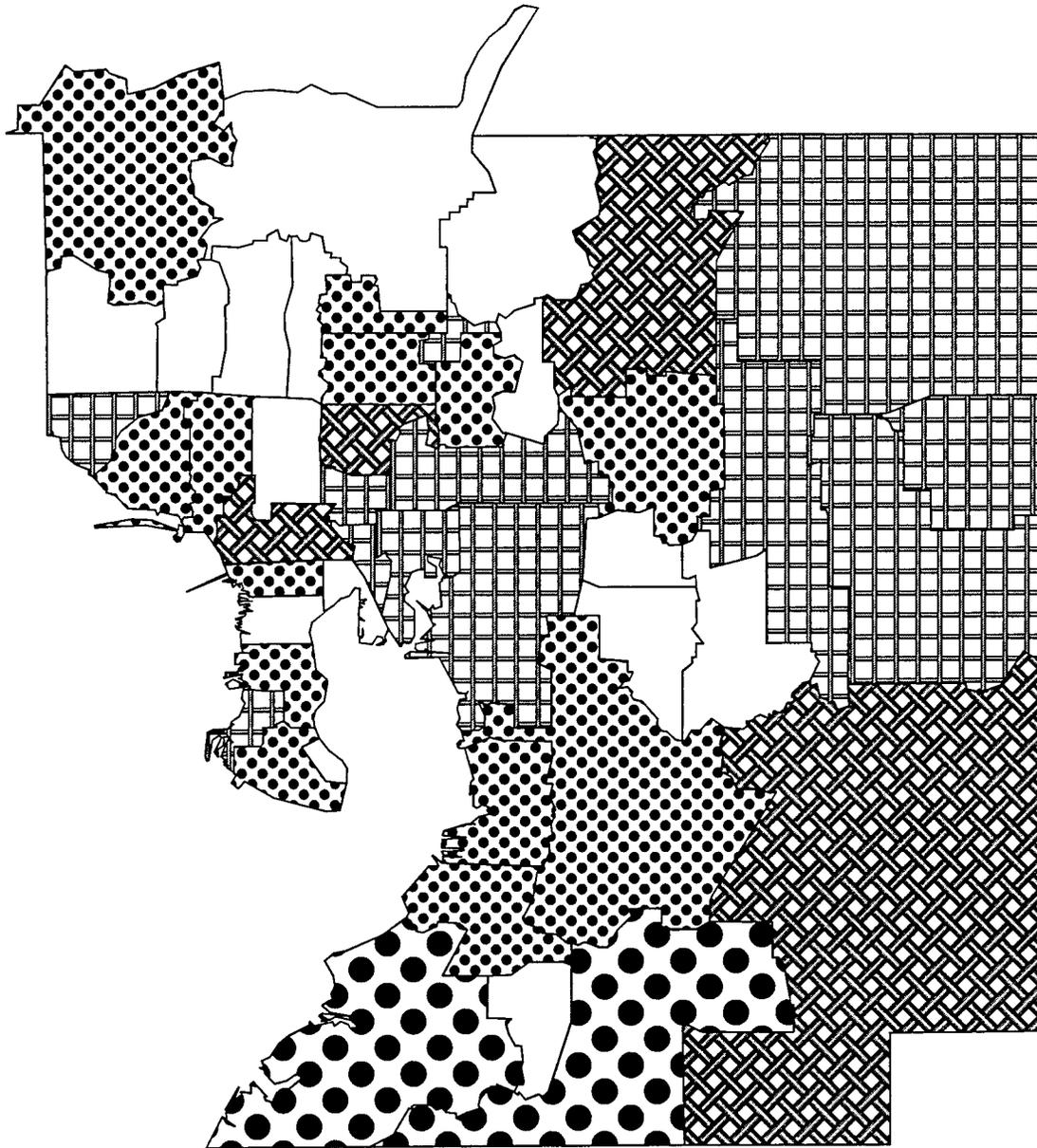
Crash rates where drivers ignored the use of safety seat belts were obtained as a percentage of total crashes involving male drivers and presented in (Figure 4-28). It is noticeable that the highest crash rates without the use of safety seat belts involving male drivers (23% to 40%) are in the following zipcodes in Hillsborough County: 33626, 33527, 33567, 33570, and 33598.

#### **4.4.1.4 Male Drivers Vs. Traffic Violations**

Crash rates where drivers were cited for traffic violations were obtained as a percentage of total crashes involving male drivers and presented in (Figure 4-29). It was found that the highest crash rates where male drivers were cited for traffic violations (37% to 50%) are in the following zipcodes in Hillsborough County: 33626, 33620, 33527, 33606, 33609, 33608, 33616, 33611, and 33573.

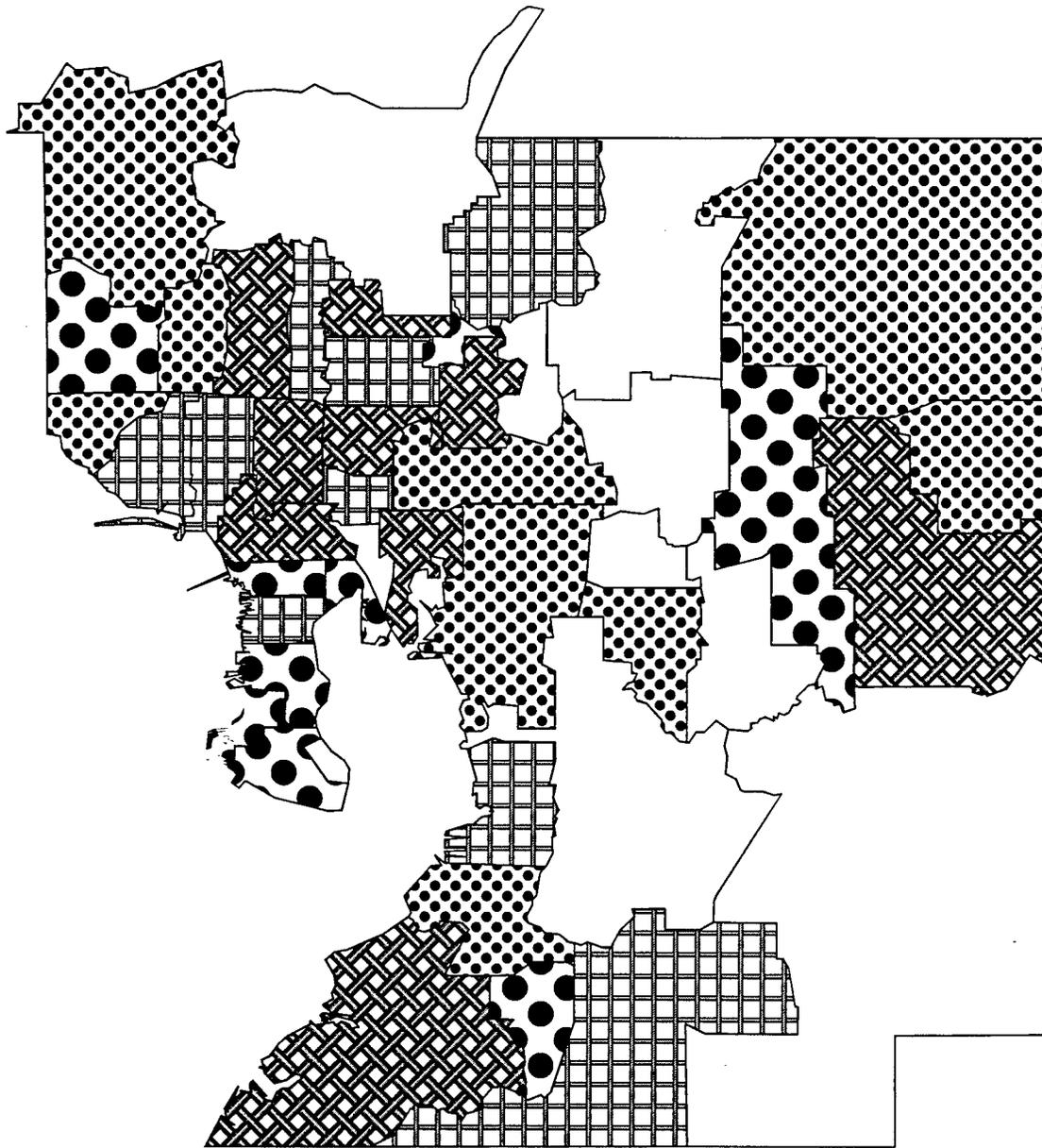
Table 4-7 represents the data used in Figures 4-26 to 4-29 for the male drivers crash involvement, as used in the GIS platform.

**FIGURE 4-28**  
**Male Drivers Crash Involvement**  
**Vs. Crashes Without Seat Belts**



Crashes Without Seat Belts	
% of Total Crashes	
	0.0 to 14.10
	14.10 to 19.00
	19.00 to 19.70
	19.70 to 23.00
	23.00 to 32.00

**FIGURE 4-29**  
**Male Drivers Crash Involvement**  
**Vs. Crashes With Traffic Violations**



Crashes With Traffic Violations	
% of Total Crashes	
	0.0 to 29.75
	29.75 to 31.80
	31.80 to 35.00
	35.00 to 37.00
	37.00 to 50.00

TABLE 4-7

MALE DRIVERS CRASH INVOLVEMENT DATABASE

Zipcode	Total Crashes	Male Drivers Invol.	% Alcohol & Drug	% Fatal & Severe	% No Seat Belt	% Cited for Violation
33620	24	11	9.09%	0.00%	27.27%	45.45%
33608	20	13	15.38%	0.00%	15.38%	38.46%
33573	86	47	0.00%	6.38%	8.51%	40.43%
33626	129	72	13.89%	0.00%	6.94%	48.61%
33572	141	91	10.99%	4.40%	14.29%	30.77%
33598	161	114	18.42%	12.28%	30.70%	36.84%
33547	220	122	7.38%	11.48%	19.67%	27.05%
33534	220	144	15.28%	4.17%	17.36%	36.11%
33637	313	170	5.88%	3.53%	13.53%	28.24%
33592	317	182	10.44%	2.20%	19.23%	29.12%
33647	339	191	8.38%	5.76%	4.71%	36.13%
33635	330	200	12.00%	7.50%	20.50%	30.00%
33570	317	201	14.43%	3.98%	24.38%	33.33%
33556	351	204	6.37%	4.41%	15.20%	29.90%
33565	351	213	8.92%	4.69%	19.72%	30.52%
33527	363	239	15.06%	5.44%	26.36%	37.24%
33616	437	256	10.55%	5.86%	21.48%	43.36%
33606	467	271	6.64%	5.17%	14.02%	41.33%
33602	434	277	2.17%	5.05%	21.66%	22.02%
33609	531	328	7.32%	4.88%	14.63%	37.50%
33629	361	355	4.79%	5.07%	10.14%	36.90%
33625	573	361	5.54%	3.60%	13.30%	30.19%
33567	577	364	12.36%	5.22%	23.35%	34.07%
33566	615	379	10.82%	5.80%	22.96%	30.61%
33618	682	396	7.07%	4.04%	11.36%	36.11%
33634	673	405	6.67%	3.46%	15.06%	35.80%
33510	682	409	6.60%	2.45%	13.69%	28.61%
33584	733	447	8.72%	2.68%	18.34%	29.53%
33603	782	453	5.96%	4.64%	20.31%	35.10%
33569	745	464	9.91%	5.39%	16.59%	28.88%
33607	835	499	5.01%	4.21%	19.04%	33.07%
33613	979	559	8.23%	3.94%	15.21%	32.74%
33605	885	572	5.59%	4.20%	20.98%	33.22%
33611	1026	578	8.65%	3.81%	14.19%	40.31%
33511	1029	581	6.71%	5.68%	12.39%	29.78%
33594	1031	616	7.14%	4.55%	12.18%	27.11%
33619	1075	676	7.40%	4.14%	22.49%	30.18%
33549	1153	680	5.29%	5.29%	12.79%	29.71%
33624	1319	738	5.96%	3.66%	12.74%	31.98%

Zipcode	Total Crashes	Male Drivers Involv.	% Alcohol & Drug	% Fatal & Severe	% No Seat Belt	% Cited for Violation
33617	1371	801	5.62%	3.75%	14.48%	33.71%
33615	1434	847	9.56%	5.79%	16.65%	36.48%
33604	1470	872	6.19%	4.47%	19.27%	33.83%
33610	1453	920	6.52%	4.24%	20.54%	31.74%
33612	1557	930	7.96%	6.34%	17.85%	36.13%
33614	1828	1169	5.30%	5.30%	13.60%	34.56%

#### **4.4.2 Female Drivers Vs. Crash Types**

The crash data was extracted for the female drivers and the analysis was done accordingly.

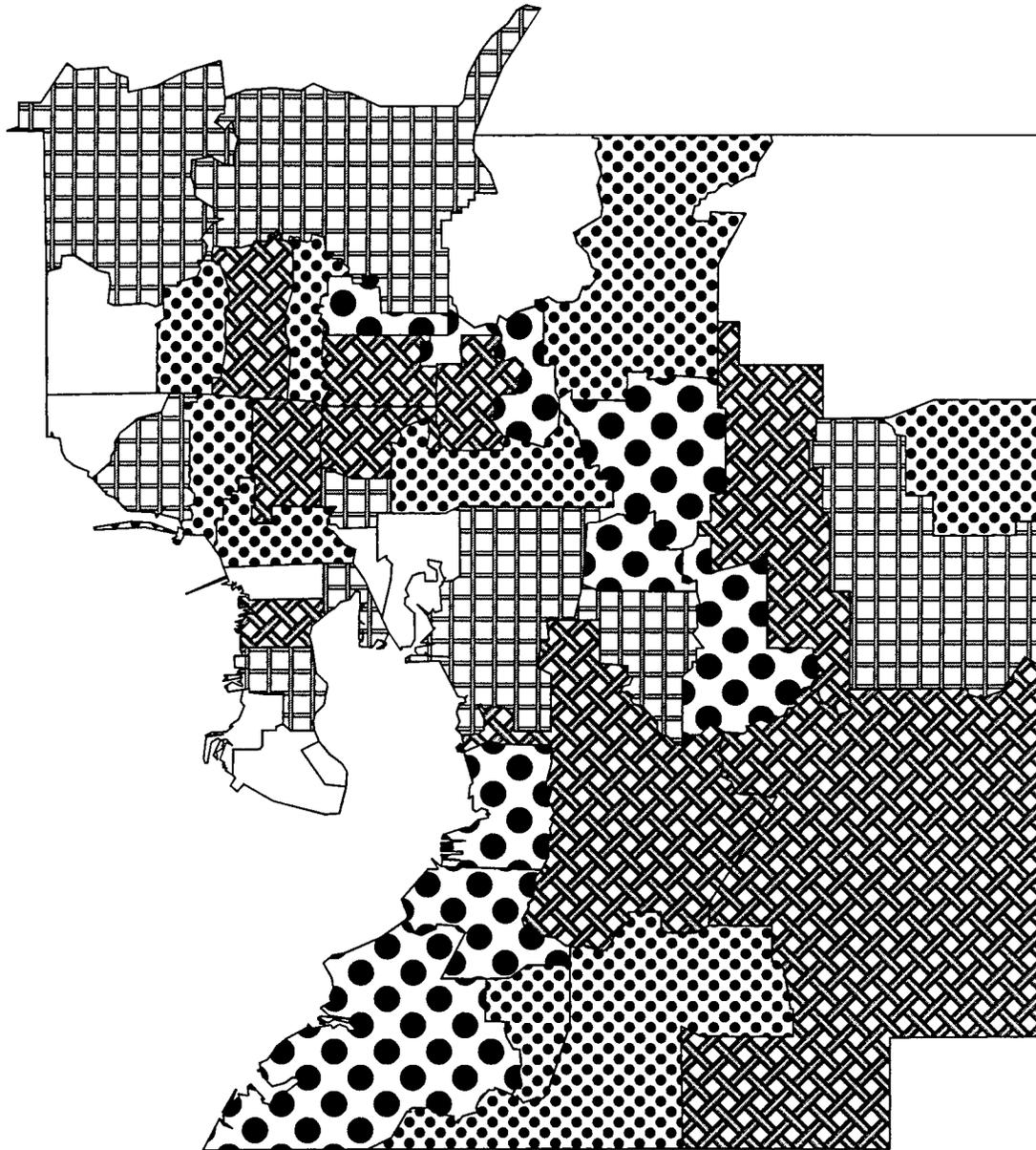
##### **4.4.2.1 Female Drivers Vs. Alcohol and Drug Related Crashes**

Alcohol and drug related crash rates were obtained as a percentage of total crashes involving female drivers and presented in (Figure 4-30). It is noticeable that the highest alcohol and drug related crash rates involving female drivers (4% to 10%) are in the following zipcodes in Hillsborough County: 33613, 33620, 33637, 33584, 33510, 33594, 33534, 33572, and 33570.

##### **4.4.2.2 Female Drivers Vs. Fatal and Severe Crashes**

Fatal and severe crash rates were obtained as a percentage of total crashes involving female drivers and presented in (Figure 4-31). It is noticeable that the highest fatal and severe crash rates involving female drivers (8% to 30%) are in the following zipcodes in Hillsborough County: 33620, 33637, 33608, 33534, 33547, and 33570.

**FIGURE 4-30**  
**Female Drivers Crash Involvement**  
**Vs. Alcohol and Drug Related Crashes**

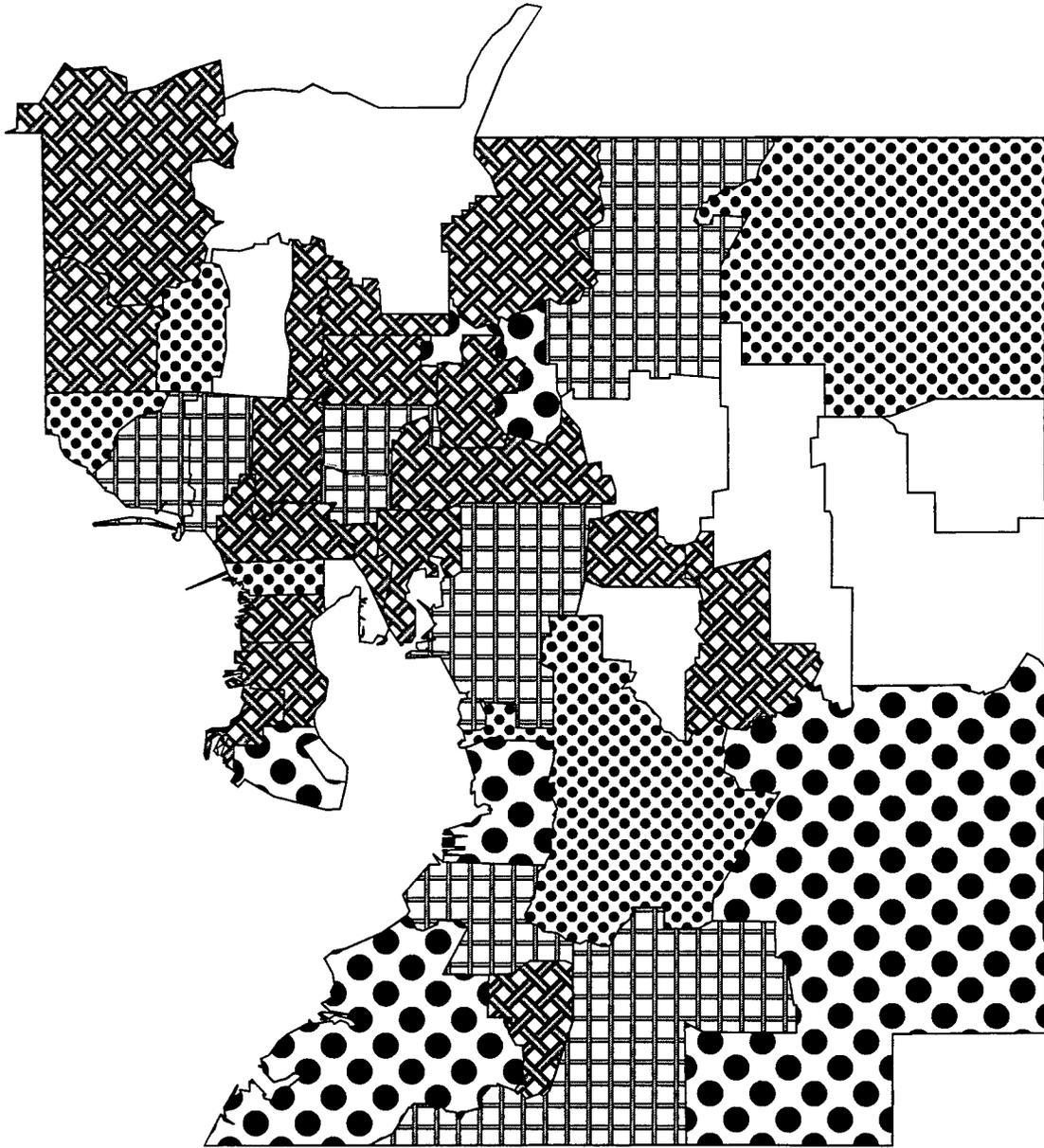


**Alcohol and Drug Related Crashes**

% of Total Crashes

- |   |               |
|---|---------------|
|  | 0.0 to 1.60   |
|  | 1.60 to 2.70  |
|  | 2.70 to 3.37  |
|  | 3.37 to 4.08  |
|  | 4.08 to 10.00 |

**FIGURE 4-31**  
**Female Drivers Crash Involvement**  
**Vs. Fatal and Severe Injury Crashes**



**Fatal and Severe Injury Crashes**

% of Total Crashes

	0.0 to 4.30
	4.30 to 5.00
	5.00 to 5.92
	5.92 to 8.00
	8.00 to 30.00

#### **4.4.2.3 Female Drivers Vs. Crashes Without the Use of Seat Belts**

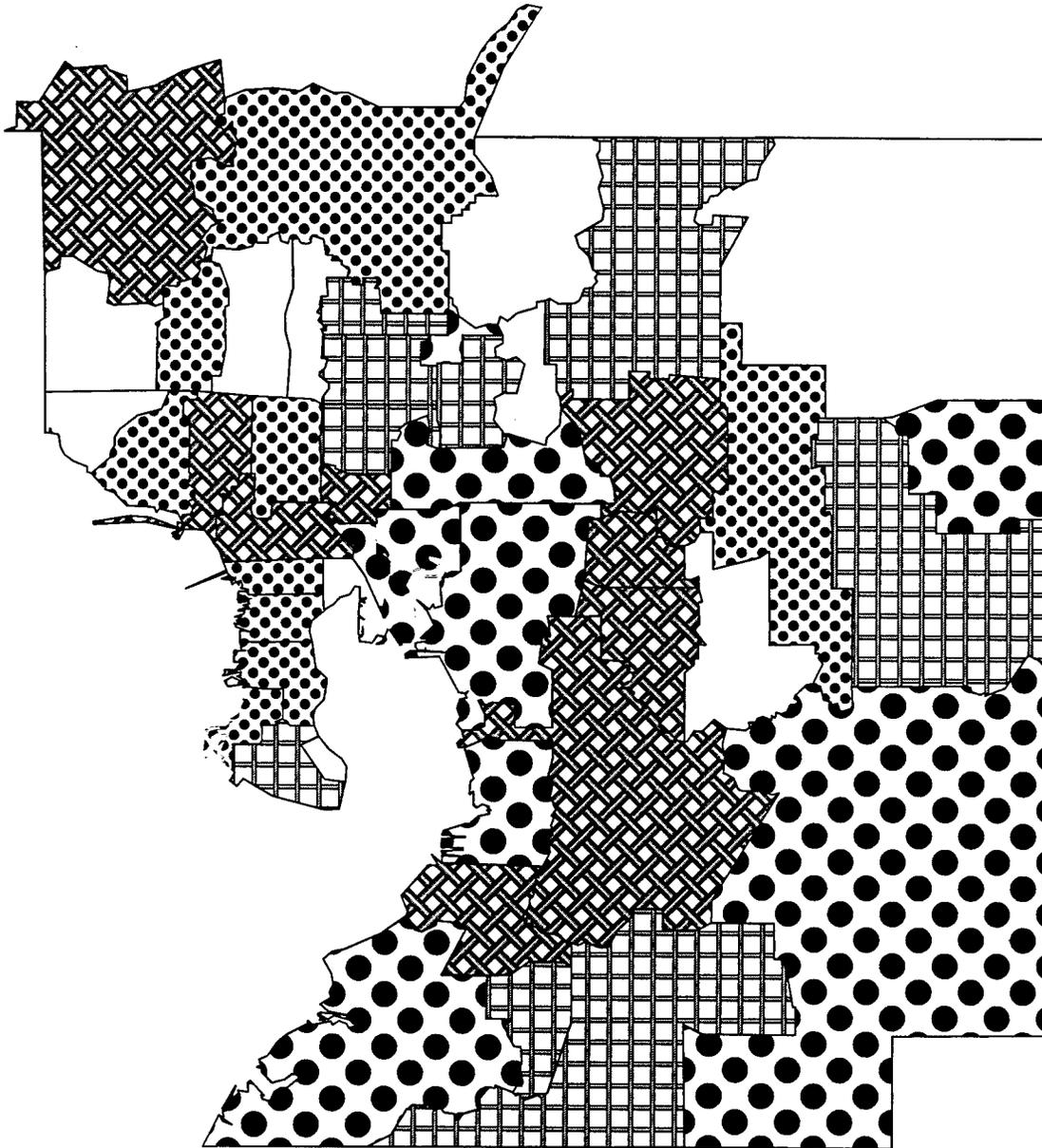
Crash rates where drivers ignored the use of safety seat belts were obtained as a percentage of total crashes involving female drivers and presented in (Figure 4-32). It is noticeable that the highest crash rates without the use of safety seat belts involving female drivers (14% to 40%) are in the following zipcodes in Hillsborough County: 33620, 33610, 33602, 33605, 33619, 33566, 33534, 33547, and 33570.

#### **4.4.2.4 Female Drivers Vs. Traffic Violations**

Crash rates where drivers were cited for traffic violations were obtained as a percentage of total crashes involving female drivers and presented in (Figure 4-33). It was found that the highest crash rates where female drivers were cited for traffic violations (35% to 60%) are in the following zipcodes in Hillsborough County: 33614, 33603, 33609, 33629, 33611, 33608, 33567, 33572, and 33573.

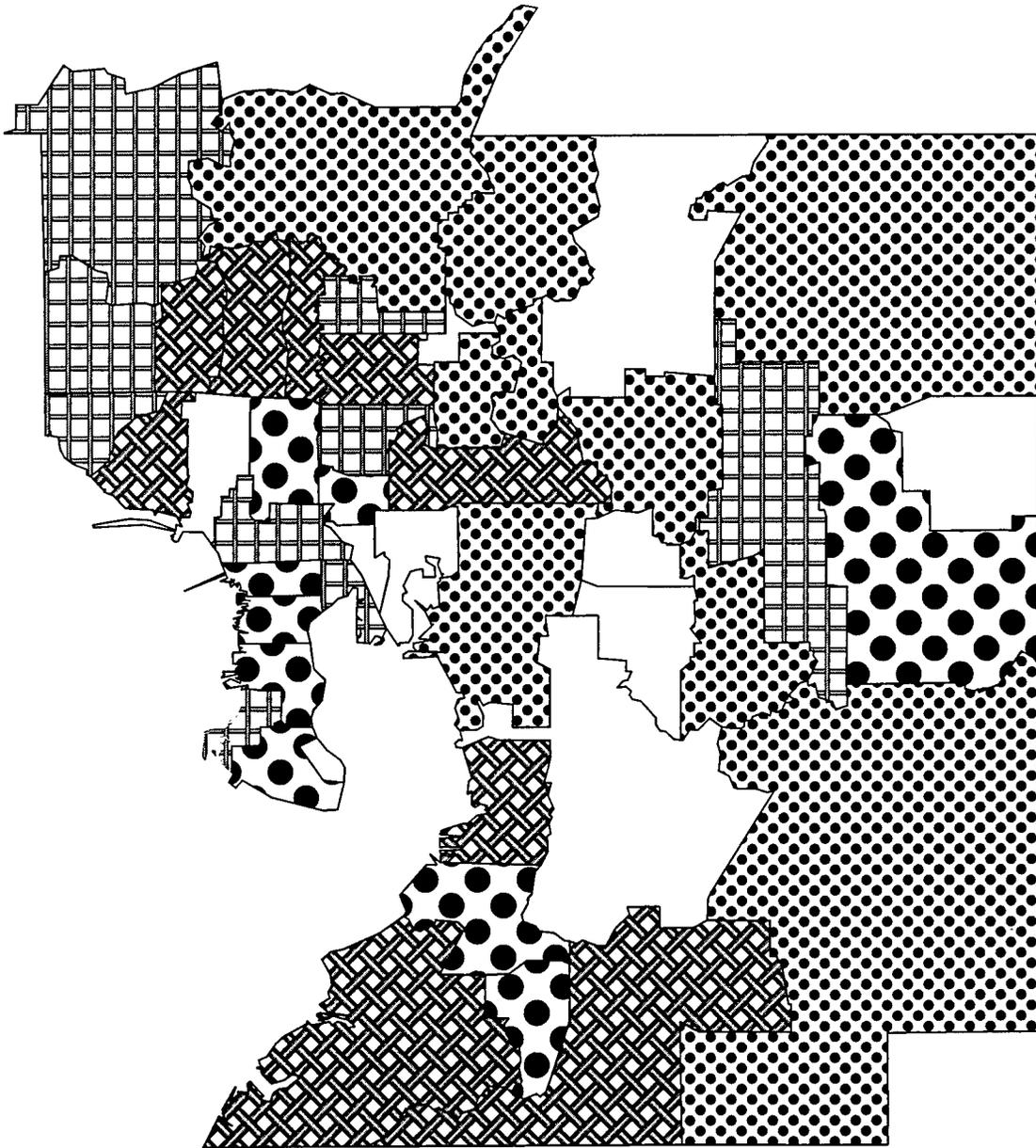
Table 4-8 represents the data used in Figures 4-30 to 4-33 for the Female drivers crash involvement, as used in the GIS platform.

**FIGURE 4-32**  
**Female Drivers Crash Involvement**  
**Vs. Crashes Without Seat Belts**



Crashes Without Seat Belts	
% of Total Crashes	
	0.0 to 7.30
	7.30 to 9.38
	9.38 to 10.50
	10.50 to 14.30
	14.30 to 32.00

**FIGURE 4-33**  
**Female Drivers Crash Involvement**  
**Vs. Crashes With Traffic Violations**



Crashes With Traffic Violations	
	0.0 to 27.50
	27.50 to 29.70
	29.70 to 31.70
	31.70 to 35.30
	35.30 to 60.00

**TABLE 4-8**

**FEMALE DRIVERS CRASH INVOLVEMENT DATABASE**

Zipcode	Total Crashes	Female Drivers Invol.	% Alcohol & Drug	% Fatal & Severe	% No Seat Belt	% Cited for Violation
33608	20	7	0.00%	28.57%	14.29%	57.14%
33620	24	13	7.69%	15.38%	30.77%	15.38%
33573	86	38	2.63%	5.26%	10.53%	36.84%
33598	161	47	2.13%	6.38%	12.77%	29.79%
33572	141	50	6.00%	6.00%	10.00%	36.00%
33626	129	57	0.00%	5.26%	3.51%	35.09%
33534	220	76	9.21%	11.84%	17.11%	31.58%
33547	220	98	3.06%	8.16%	16.33%	28.57%
33570	317	115	9.57%	11.30%	20.87%	30.43%
33527	363	123	3.25%	4.07%	8.94%	32.52%
33635	330	130	1.54%	4.62%	6.15%	33.85%
33592	317	135	2.22%	5.93%	11.11%	22.96%
33565	351	137	0.00%	4.38%	7.30%	28.47%
33637	313	141	4.96%	9.22%	5.67%	28.37%
33556	351	147	4.08%	5.44%	9.52%	31.97%
33647	339	148	1.35%	5.41%	5.41%	27.70%
33602	434	155	1.29%	5.81%	14.84%	21.94%
33616	437	180	1.11%	5.00%	8.33%	34.44%
33606	467	192	3.65%	4.17%	7.29%	33.85%
33609	531	203	1.48%	4.93%	9.36%	38.42%
33625	573	212	2.36%	4.72%	7.55%	30.66%
33567	577	212	3.77%	3.77%	10.85%	35.85%
33566	615	236	1.69%	3.81%	16.53%	25.00%
33634	673	267	1.87%	6.37%	10.49%	23.60%
33510	682	271	4.80%	5.90%	9.59%	27.31%
33569	745	277	3.25%	4.69%	9.39%	27.44%
33584	733	284	4.93%	2.11%	9.86%	28.17%
33618	682	285	2.11%	5.26%	5.26%	30.18%
33629	361	298	3.02%	5.70%	7.38%	39.60%
33605	885	308	1.30%	5.52%	16.23%	25.32%
33603	782	329	3.65%	6.08%	10.33%	38.91%
33607	835	332	2.11%	5.12%	9.94%	33.73%
33619	1075	393	3.56%	6.36%	14.50%	27.74%
33594	1031	411	4.38%	5.11%	7.06%	29.44%
33613	979	416	4.09%	5.53%	11.54%	33.17%
33611	1026	446	4.04%	5.61%	8.52%	40.36%
33511	1029	446	4.04%	3.81%	10.31%	24.44%
33549	1153	472	3.39%	4.24%	7.42%	29.45%
33610	1453	528	2.46%	5.68%	16.29%	29.92%

Zipcode	Total Crashes	Female Drivers Invol.	% Alcohol & Drug	% Fatal & Severe	% No Seat Belt	% Cited for Violation
33617	1371	565	3.36%	5.49%	10.97%	28.14%
33624	1319	577	2.77%	2.95%	6.41%	30.50%
33615	1434	586	3.92%	6.31%	9.04%	30.38%
33604	1470	596	3.02%	6.21%	13.76%	34.23%
33612	1557	623	3.21%	5.62%	10.91%	31.14%
33614	1828	656	3.20%	5.18%	8.69%	35.37%

#### 4.4.3 Overall View of Driver's Gender Vs. Crash Rates

The same procedure of comparing the legends across the maps regarding the gender of the drivers was utilized. The comparison was performed between the maps regarding male and female drivers crash involvement, and their relationship with the different crash rates in Hillsborough County. As a result of this comparison, the following characteristics of crash involvement were noticed between both genders:

- Male drivers had higher crash rates involving alcohol or drugs, (up to 20%) of the total crashes involving Male drivers compared to (up to 10%) of Female drivers.
- Female drivers were involved more in fatal and severe injury crashes than Male drivers, (up to 30%) of the total crashes involving Female drivers compared to (up to 13%) of Male drivers.
- Both genders had almost the same percentages of crashes without using the seat belts, (up to 31%) of the total crashes for each gender.
- Female drivers had higher crash rates where they were cited for traffic violations, (up to 60%) of the total crashes involving Female drivers compared to (up to 50%) of Male drivers.

Looking at the total crash rates involving each gender, it was noticed that Male drivers tend to be more risky than Female in Hillsborough County. This supports the findings of chapter 4, which showed that Male drivers had higher crash rates than Female drivers in the state of Florida.

**CHAPTER 5**

**ANALYSIS OF DEMOGRAPHIC CHARACTERISTICS FOR  
METROPOLITAN AREAS**

In the previous chapter, analysis was conducted for the demographic characteristics of the drivers involved in traffic crashes in Tampa, Hillsborough County for the year 1995. This chapter applied the same methodology to the other Metropolitan areas in Florida including Orlando, Miami, Jacksonville, and Tallahassee.

The same four demographic characteristics, described before in this report as income, race, age, and gender, were investigated against the four types of crashes mentioned earlier as well. The areas with high crash risks were highlighted in each of these counties to serve the purpose of this report.

Only maps related to the income level versus the different crash types are presented in this chapter since this aspect is a highlight of this report. No maps are presented since an example of Hillsborough County was presented in the previous chapter showing each map, as it relates to the indicated topic; although the crash databases are presented in tables covering each topic as they were used by the GIS platform. This chapter is intended to present the results of the analysis performed using the previously mentioned methodology.

## **5.1 Crash Involvements in Orlando (Orange County)**

Following is an explanation of each of the demographic characteristics under investigation in Orange County, as they relate to the different crash types.

### **5.1.1 Income Level Vs. Crash Types (Orlando)**

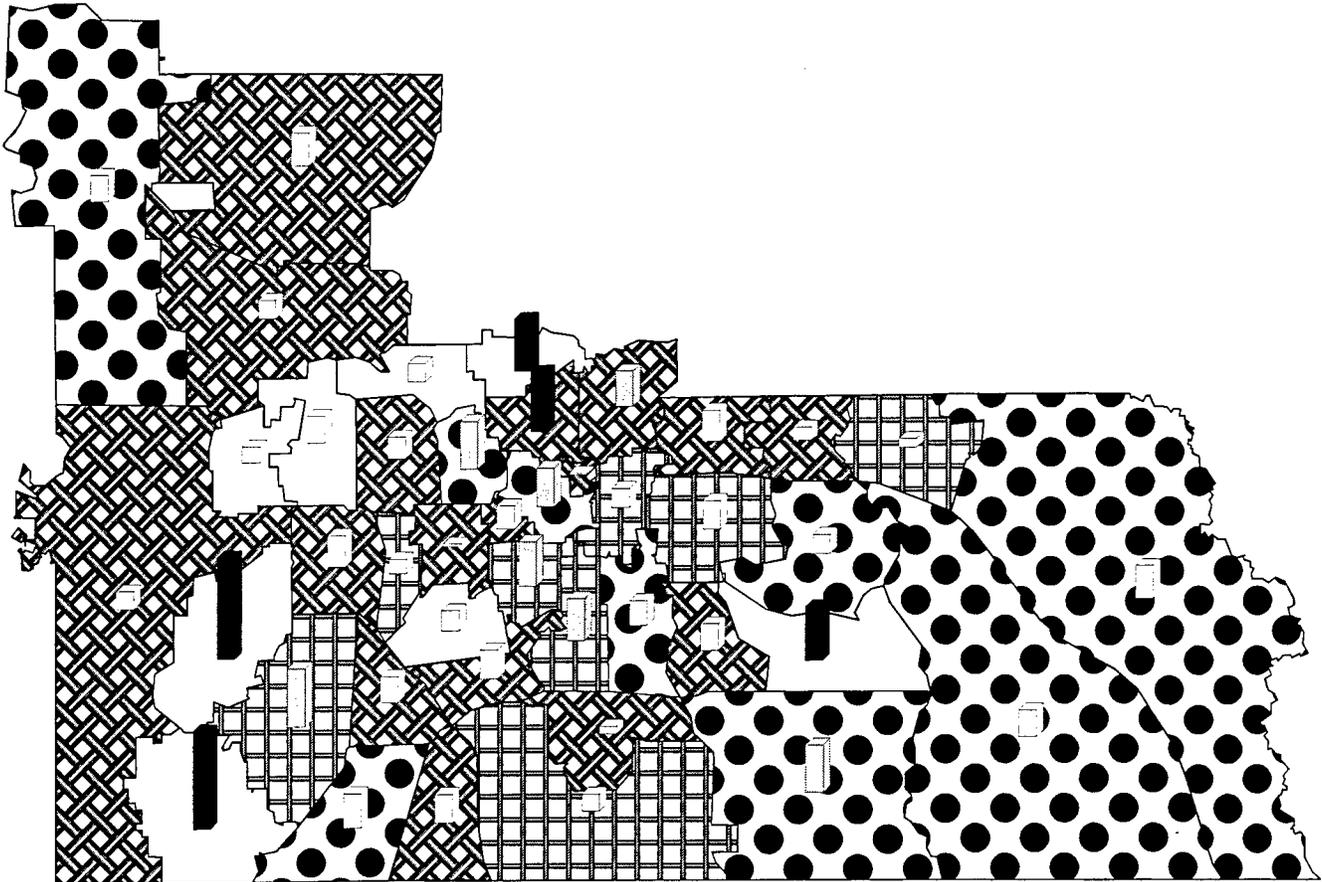
From the previous analysis of Hillsborough County, it was found that there is a weak relationship between the income level and the severity of the crash. In addition, there was no relationship found between the income level and the driver being cited for traffic violation. For this reason, income level was investigated only against the alcohol and drug related crashes, and crashes without the use of seat belts.

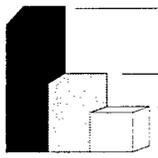
#### **5.1.1.1 Income Level Vs. Alcohol and Drug Related Crashes (Orlando)**

The relationship between income level and the alcohol and drug related crash rates was investigated in this section. (Figure 5-1) represents the alcohol and drug related crashes as a percentage of the total crashes in each zipcode area, versus the 'per capita income' for each zipcode. The income level is presented by bar charts, while the crash rates are presented by color themes. Figure 5-1 reflects the high relationship between the low income areas and the high alcohol and drug related crash rates. This observation is similar to that found in Hillsborough County.

In the effort of locating the high crash risk areas, the following zipcodes in Orange County were found to have the highest alcohol and drug related crash rates (between 8%

**FIGURE 5-1**  
**Alcohol and Drug Related Crashes**  
**Vs. Income Level (Orange County)**



Alcohol and Drug Related Crashes	
% of Total Crashes	Per Capita Income 1995
 0.0 to 5.20	 50000 29100 18700
 5.20 to 6.10	
 6.10 to 6.70	
 6.70 to 8.63	
 8.63 to 14.00	

and 14%) of the total crashes in the respective zipcode: 32757, 32804, 32803, 32822, 32828, 32821, 32832, 32833, and 32709.

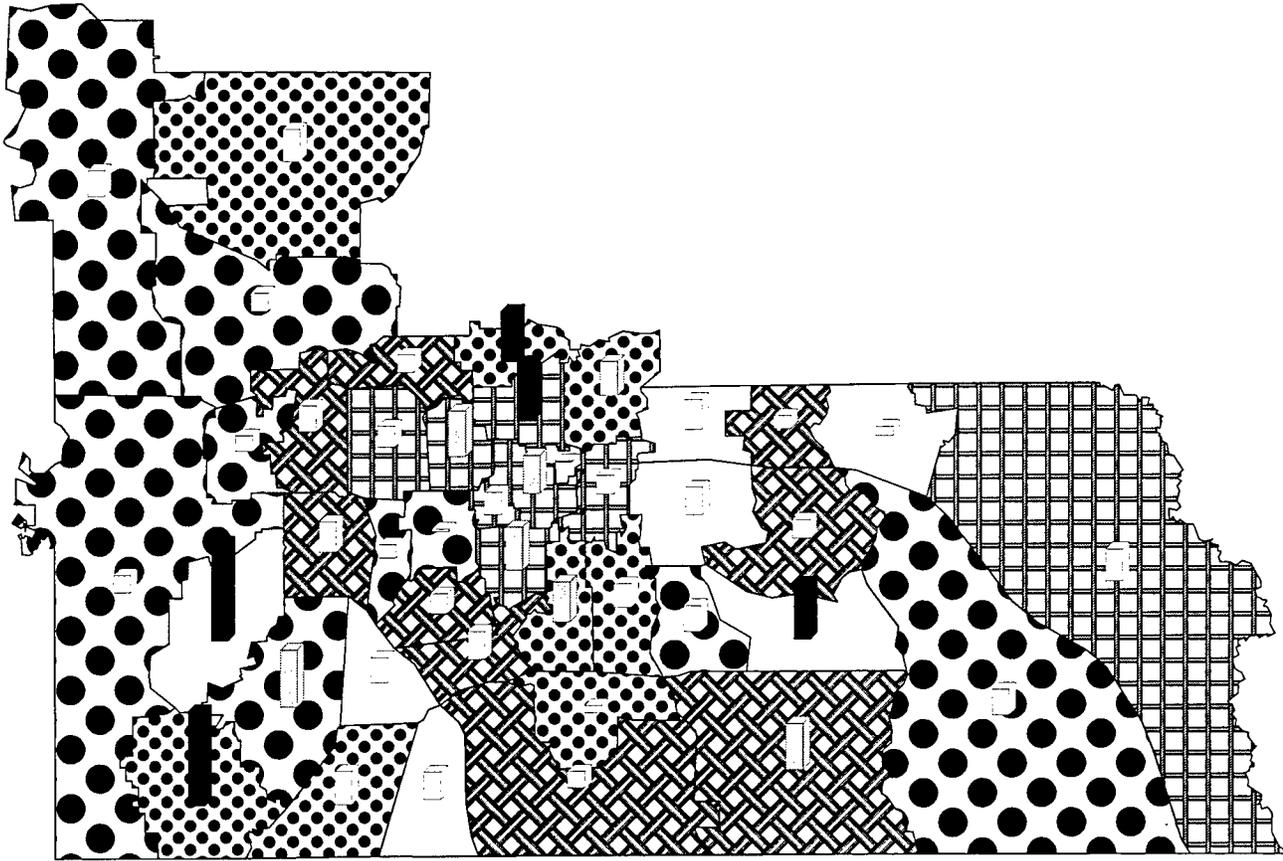
#### **5.1.1.2 Income Level Vs. Crashes Without Use of Seat Belts (Orlando)**

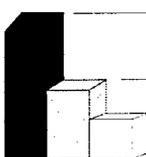
The relationship between income level and crashes without use of seat belts was investigated. (Figure 5-2) represents crashes without the use of seat belts as a percentage of the total crashes in each zipcode area versus the ‘per capita income’ for each zipcode. The income level is presented by bar charts, while the crash rates are presented by color themes.

There is a strong relationship between the low income areas and the high crash rates without the use of seat belts, as seen in Figure 5-2. This is also consistent with the observations in Hillsborough County as well.

The following zipcode areas in Orange County have the highest crash rates without the use of seat belts (between 16% and 30%) of the total crashes in the respective zipcode: 32757, 32703, 34761, 34787, 32811, 32805, 32836, 32829, and 32833.

**FIGURE 5-2**  
**Crashes Without Seat Belts**  
**Vs. Income Level (Orange County)**



Crashes Without Seat Belts	
% of Total Crashes	Per Capita Income 1995
 0.0 to 11.00	 50000
 11.00 to 13.76	 29100
 13.76 to 14.80	 18700
 14.80 to 16.60	
 16.60 to 30.00	

### **5.1.2 Driver's Race Vs. Crash Types (Orlando)**

All three races were found to have high risks in Orange County as seen in chapter 4 of this report; therefore, all races were investigated against the four types of crashes under study.

#### **5.1.2.1 White Drivers Vs. Crash Types (Orlando)**

The methodology that was applied to analyze Hillsborough County was utilized in Orange County as well, and following were the results of this analysis.

Alcohol and drug related crash rates were obtained as a percentage of total crashes involving white drivers in each zipcode in Orange County. It is noticeable that the highest alcohol and drug related crash rates involving white drivers (12% to 15%) are in the following zipcodes in Orange County: 32709, 32805, and 32821.

Severe crash rates were obtained as a percentage of total crashes involving white drivers in each zipcode area in Orange County. It is noticeable that the highest severe crash rates involving white drivers (6% to 10%) are in the following zipcodes in Orange County: 32757, 32801, 32805, 32806, 32832, 32824, 32821, 32820, and 32822.

Crash rates where drivers ignored the use of safety seat belts were obtained as a percentage of total crashes involving white drivers for each zipcode area in Orange County. It is noticeable that the highest crash rates without the use of safety seat belts involving white drivers (16% to 22%) are in the following zipcodes in Orange County: 32833, 32829, 32805, 34787, and 32836.

Crash rates where drivers were cited for traffic violations were obtained as a percentage of total crashes involving white drivers for each zipcode in Orange County. It was found that the highest crash rates where white drivers were cited for traffic violations (38% to 50%) are in the following zipcodes in Orange County: 32709, 32789, 32813, 32819, 32821, and 32820.

Table 5-1 presents the crash database for the White drivers, as used in the GIS platform.

#### **5.1.2.2 African American Drivers Vs. Crash Types (Orlando)**

The methodology was utilized to analyze the crash involvements of African American drivers in Orange County, and following were the results of this analysis.

Alcohol and drug related crash rates were obtained as a percentage of total crashes involving African American drivers in each zipcode in Orange County. It is noticeable that the highest alcohol and drug related crash rates involving African American drivers (6% to 12%) are in the following zipcodes in Orange County: 32757, 32789, 32806, 32801, 32826, 32826, 32819, and 32821.

Severe crash rates were obtained as a percentage of total crashes involving African American drivers in each zipcode area in Orange County. It is noticeable that the highest severe crash rates involving African American drivers (6% to 17%) are in the following zipcodes in Orange County: 32757, 34761, 32810, 32813, 32803, 32819, 32821, and 32837.

Crash rates where drivers ignored the use of safety seat belts were obtained as a percentage of total crashes involving African American drivers for each zipcode area in

Orange County. It is noticeable that the highest crash rates without the use of safety seat belts involving African American drivers (28% to 50%) are in the following zipcodes in Orange County: 32709, 34761, and 32836.

Crash rates where drivers were cited for traffic violations were obtained as a percentage of total crashes involving African American drivers for each zipcode in Orange County. It was found that the highest crash rates where African American drivers were cited for traffic violations (40% to 100%) are in the following zipcodes in Orange County: 32820, 32789, 32804, 34786, 32836, 32827, 32812, and 32829.

Table 5-2 presents the crash database for the African American drivers, as use in the GIS platform.

TABLE 5-1

## WHITE DRIVERS CRASH DATA FOR ORANGE COUNTY

Zipcode	Total Crashes	White Drivers Invol.	% Alcohol & Drug	% Fatal & Severe	% No Seat Belt	% Cited for Violation
32830	9	8	0.00%	0.00%	12.50%	25.00%
32831	10	10	0.00%	0.00%	0.00%	10.00%
32813	33	26	7.69%	0.00%	0.00%	50.00%
32832	34	33	9.09%	9.09%	15.15%	30.30%
32827	50	40	7.50%	0.00%	15.00%	32.50%
32709	61	56	14.29%	5.36%	16.07%	42.86%
32836	81	69	8.70%	2.90%	17.39%	30.43%
32820	84	75	8.00%	6.67%	12.00%	46.67%
32829	106	80	6.25%	2.50%	20.00%	33.75%
32833	100	88	11.36%	5.68%	20.45%	37.50%
34786	112	102	2.94%	4.90%	6.86%	23.53%
32805	740	134	12.69%	8.21%	21.64%	35.82%
32828	178	137	10.95%	5.84%	15.33%	30.66%
32824	261	158	6.33%	6.33%	14.56%	34.18%
32801	226	164	6.10%	6.10%	14.63%	26.83%
32821	240	184	12.50%	5.98%	14.67%	38.59%
32757	259	197	10.66%	6.09%	15.23%	36.04%
32751	318	262	3.82%	3.82%	11.07%	32.44%
32839	576	266	7.52%	4.14%	15.41%	32.33%
32837	379	268	6.34%	8.21%	9.33%	30.60%
32826	335	280	6.07%	3.57%	15.00%	32.86%
34787	390	304	6.25%	4.93%	16.78%	34.87%
32835	431	318	7.86%	3.14%	13.21%	34.91%
32789	387	319	5.96%	5.64%	15.05%	38.87%
32819	497	355	6.76%	3.94%	9.01%	39.44%
32811	1005	360	10.28%	5.83%	13.89%	36.39%
32804	388	363	9.37%	5.79%	15.70%	33.33%
32803	436	379	10.03%	6.07%	15.57%	33.77%
34761	420	380	4.47%	5.53%	16.05%	29.21%
32809	700	387	6.98%	4.13%	13.95%	32.82%
32810	597	397	6.05%	3.78%	13.85%	36.02%
32712	529	439	5.24%	3.64%	11.62%	32.80%
32806	511	444	9.46%	6.98%	16.22%	35.59%
32817	564	453	6.18%	2.43%	10.38%	34.66%
32818	891	470	6.60%	3.83%	14.26%	32.55%
32807	775	541	7.76%	4.81%	13.68%	36.23%
32812	693	562	8.19%	3.74%	12.28%	37.37%
32825	730	571	7.18%	3.15%	10.86%	32.05%
32808	1256	602	7.64%	3.65%	15.45%	35.05%
32703	932	656	7.93%	5.18%	15.40%	36.59%
32822	1042	757	9.78%	6.34%	13.61%	35.80%
32792	992	818	6.48%	4.77%	13.33%	34.47%

TABLE 5-2

## AFRICAN AMERICAN DRIVERS CRASH DATA FOR ORANGE COUNTY

Zipcode	Total Crashes	African American Drivers Invol	% Alcohol & Drug	% Fatal & Severe	% No Seat Belt	% Cited for Violation
32830	9	0	0.00%	0.00%	0.00%	0.00%
32831	10	0	0.00%	0.00%	0.00%	0.00%
32832	34	0	0.00%	0.00%	0.00%	0.00%
34786	112	2	0.00%	0.00%	0.00%	50.00%
32820	84	2	0.00%	0.00%	0.00%	100.00%
32709	61	2	0.00%	0.00%	50.00%	0.00%
32836	81	3	0.00%	0.00%	33.33%	66.67%
32833	100	5	0.00%	0.00%	0.00%	0.00%
32827	50	5	0.00%	0.00%	0.00%	40.00%
32813	33	6	0.00%	16.67%	0.00%	33.33%
32829	106	7	0.00%	0.00%	14.29%	42.86%
32821	240	11	9.09%	9.09%	9.09%	9.09%
32804	388	14	0.00%	0.00%	7.14%	42.86%
34761	420	14	0.00%	7.14%	28.57%	21.43%
32826	335	16	6.25%	6.25%	0.00%	31.25%
32803	436	18	11.11%	16.67%	11.11%	27.78%
32828	178	19	10.53%	5.26%	10.53%	26.32%
32817	564	23	0.00%	0.00%	13.04%	21.74%
32806	511	28	0.00%	3.57%	17.86%	17.86%
32812	693	34	0.00%	0.00%	5.88%	44.12%
32824	261	39	2.56%	0.00%	10.26%	33.33%
32837	379	39	2.56%	7.69%	7.69%	25.64%
32825	730	40	0.00%	5.00%	10.00%	30.00%
32712	529	45	2.22%	4.44%	13.33%	37.78%
32801	226	46	6.52%	6.52%	26.09%	26.09%
32751	318	48	0.00%	2.08%	22.92%	29.17%
32757	259	50	6.00%	10.00%	22.00%	36.00%
32807	775	60	1.67%	1.67%	16.67%	31.67%
32789	387	60	6.67%	5.00%	20.00%	45.00%
34787	390	61	1.64%	1.64%	27.87%	24.59%
32792	992	69	1.45%	4.35%	10.14%	26.09%
32835	431	71	1.41%	2.82%	12.68%	33.80%
32822	1042	74	5.41%	2.70%	12.16%	37.84%
32819	497	88	6.82%	10.23%	14.77%	34.09%
32810	597	143	2.80%	6.99%	16.08%	30.77%
32809	700	174	4.02%	5.75%	14.37%	37.93%
32703	932	194	2.06%	5.67%	27.84%	32.99%
32839	576	210	1.43%	2.38%	13.33%	35.71%
32818	891	318	2.20%	5.97%	13.21%	29.56%
32808	1256	530	2.08%	6.23%	15.85%	31.13%
32811	1005	582	5.33%	4.81%	20.10%	34.02%
32805	740	583	3.77%	4.80%	21.78%	32.76%

### **5.1.2.3 Hispanic Drivers Vs. Crash Types (Orlando)**

The methodology was utilized to analyze the crash involvements of Hispanic drivers in Orange County, and following were the results of this analysis.

Alcohol and drug related crash rates were obtained as a percentage of total crashes involving Hispanic drivers in each zipcode in Orange County. It is noticeable that the highest alcohol and drug related crash rates involving Hispanic drivers (16% to 40%) are in the following zipcodes in Orange County: 32757, 32806, 32826, and 32833.

Severe crash rates were obtained as a percentage of total crashes involving Hispanic drivers in each zipcode area in Orange County. It is noticeable that the highest severe crash rates involving Hispanic drivers (12% to 50%) are in the following zipcodes in Orange County: 32835, 32751, 32801, 32828, 32820, and 32709.

Crash rates where drivers ignored the use of safety seat belts were obtained as a percentage of total crashes involving Hispanic drivers for each zipcode area in Orange County. It is noticeable that the highest crash rates without the use of safety seat belts involving Hispanic drivers (23% to 40%) are in the following zipcodes in Orange County: 32712, 32757, 34787, 34761, 32835, 32811, 32789, and 32833.

Crash rates where drivers were cited for traffic violations were obtained as a percentage of total crashes involving white drivers for each zipcode in Orange County. It was found that the highest crash rates where Hispanic drivers were cited for traffic violations (42% to 100%) are in the following zipcodes in Orange County: 32792, 32803, 32807, 32811, 34786, 32827, 32824, and 34761.

Table 5-3 presents the crash database for the Hispanic drivers, as use in the GIS platform.

#### **5.1.2.4 Overall View of Driver's Race Vs. Crash Rates (Orange County)**

After comparing the crash data regarding the race of the drivers involved in traffic crashes in Orange County (Tables 5-1 to 5-3), the following characteristics were found:

- African American drivers had the highest crash rates without the use of safety seat belts, (up to 40%) of the total crashes involving African American drivers.
- African American drivers had the highest crash rates where they were cited for traffic violations, (up to 100%) of the total crashes involving African American drivers.
- Hispanic drivers had the highest crash rates involving alcohol and drugs, (up to 40%) of the total crashes involving Hispanic drivers.
- Hispanic drivers had the highest crash rates resulting in fatal or severe injuries, (up to 50%) of the total crashes involving Hispanic drivers.

These observations show that African American and Hispanic drivers are the most risky drivers in Orange County. White drivers, on the other hand, seem to be less risky drivers.

TABLE 5-3

## HISPANIC DRIVERS CRASH DATA FOR ORANGE COUNTY

Zipcode	Total Crashes	Hispanic Drivers Invol.	% Alcohol & Drug	% Fatal & Severe	% No Seat Belt	% Cited for Violation
32830	9	0	0.00%	0.00%	0.00%	0.00%
32831	10	0	0.00%	0.00%	0.00%	0.00%
32813	33	1	0.00%	0.00%	0.00%	0.00%
32832	34	1	0.00%	0.00%	0.00%	0.00%
34786	112	2	0.00%	0.00%	0.00%	100.00%
32709	61	2	0.00%	50.00%	0.00%	0.00%
32833	100	3	33.33%	0.00%	33.33%	33.33%
32827	50	5	0.00%	0.00%	0.00%	60.00%
32836	81	5	0.00%	0.00%	0.00%	40.00%
32789	387	5	0.00%	0.00%	40.00%	40.00%
32820	84	6	0.00%	16.67%	0.00%	16.67%
32751	318	6	0.00%	16.67%	0.00%	33.33%
32804	388	8	0.00%	0.00%	0.00%	37.50%
32757	259	12	25.00%	8.33%	33.33%	25.00%
32801	226	13	0.00%	15.38%	7.69%	30.77%
32805	740	15	0.00%	0.00%	0.00%	20.00%
32828	178	16	12.50%	12.50%	12.50%	37.50%
32829	106	17	11.76%	5.88%	11.76%	35.29%
34761	420	20	5.00%	10.00%	25.00%	55.00%
32826	335	22	18.18%	0.00%	22.73%	40.91%
34787	390	22	9.09%	4.55%	27.27%	31.82%
32835	431	23	8.70%	13.04%	26.09%	39.13%
32803	436	25	20.00%	0.00%	20.00%	52.00%
32806	511	25	8.00%	8.00%	12.00%	40.00%
32819	497	26	0.00%	0.00%	11.54%	38.46%
32821	240	31	3.23%	9.68%	6.45%	29.03%
32712	529	36	11.11%	11.11%	33.33%	33.33%
32811	1005	36	5.56%	11.11%	30.56%	50.00%
32810	597	42	4.76%	4.76%	19.05%	35.71%
32837	379	48	6.25%	10.42%	14.58%	35.42%
32817	564	52	1.92%	0.00%	9.62%	30.77%
32824	261	58	12.07%	10.34%	15.52%	46.55%
32818	891	66	7.58%	9.09%	18.18%	31.82%
32703	932	66	7.58%	4.55%	21.21%	36.36%
32839	576	73	4.11%	10.96%	9.59%	36.99%
32792	992	75	12.00%	0.00%	21.33%	45.33%
32812	693	78	3.85%	2.56%	14.10%	39.74%
32808	1256	86	8.14%	6.98%	19.77%	31.40%
32825	730	98	10.20%	6.12%	12.24%	35.71%
32809	700	107	9.35%	5.61%	16.82%	41.12%
32807	775	140	11.43%	5.00%	19.29%	42.14%
32822	1042	178	6.18%	4.49%	10.11%	35.96%

### **5.1.3 Drivers' Age Vs. Crash Type (Orlando)**

As mentioned before, this report views two groups of drivers' age, teen-age drivers (ages < 20 years old), and elderly drivers (ages > 74 years old). Each age group, in Orange County, was investigated against the four types of crashes under study.

#### **5.1.3.1 Teen-age Drivers Crash Involvement (Orlando)**

The crash data was extracted for the drivers in the age group less than 20 years old and the analysis was done accordingly.

Alcohol and drug related crash rates were obtained as a percentage of total crashes involving Teen-age drivers in each zipcode in Orange County. It is noticeable that the highest alcohol and drug related crash rates involving Teen-age drivers (4% to 20%) are in the following zipcodes in Orange County: 32757, 32818, 32804, 32792, 32826, 32809, 32836, and 32821.

Severe crash rates were obtained as a percentage of total crashes involving Teen-age drivers in each zipcode area in Orange County. It is noticeable that the highest severe crash rates involving Teen-age drivers (6% to 20%) are in the following zipcodes in Orange County: 32757, 32818, 32801, 32807, 32828, 32829, 32837, and 32832.

Crash rates where drivers ignored the use of safety seat belts were obtained as a percentage of total crashes involving Teen-age drivers for each zipcode area in Orange County. It is noticeable that the highest crash rates without the use of safety seat belts involving Teen-age drivers (22% to 40%) are in the following zipcodes in Orange County: 32703, 32810, 32808, 32804, 32792, 32801, 32805, and 32829.

Crash rates where drivers were cited for traffic violations were obtained as a percentage of total crashes involving white drivers for each zipcode in Orange County. It was found that the highest crash rates where Teen-age drivers were cited for traffic violations (60% to 75%) are in the following zipcodes in Orange County: 34787, 32836, 32813, 32829, 32820, and 32832.

Table 5-4 presents the crash database for the Teen-age drivers, as use in the GIS platform.

TABLE 5-4

## TEEN-AGE DRIVERS CRASH DATA FOR ORANGE COUNTY

Zipcode	Total Crashes	Teen-age Drivers Invol.	% Alcohol & Drug	% Fatal & Severe	% No Seat Belt	% Cited for Violation
32830	9	0	0.00%	0.00%	0.00%	0.00%
32831	10	0	0.00%	0.00%	0.00%	0.00%
32709	61	1	0.00%	0.00%	0.00%	0.00%
32827	50	2	0.00%	0.00%	0.00%	50.00%
32820	84	5	0.00%	0.00%	20.00%	60.00%
32832	34	5	0.00%	20.00%	20.00%	60.00%
32813	33	8	0.00%	0.00%	0.00%	75.00%
32821	240	9	11.11%	0.00%	0.00%	33.33%
32801	226	12	0.00%	16.67%	25.00%	50.00%
32829	106	12	0.00%	16.67%	25.00%	66.67%
32833	100	15	0.00%	0.00%	20.00%	33.33%
32836	81	20	10.00%	0.00%	15.00%	65.00%
32757	259	25	12.00%	20.00%	20.00%	48.00%
32803	436	26	3.85%	3.85%	3.85%	26.92%
34786	112	28	3.57%	3.57%	10.71%	46.43%
32828	178	29	0.00%	6.90%	13.79%	44.83%
32804	388	38	7.89%	2.63%	23.68%	47.37%
32826	335	40	7.50%	2.50%	15.00%	40.00%
32824	261	42	0.00%	4.76%	7.14%	52.38%
32751	318	44	2.27%	2.27%	20.45%	36.36%
32789	387	46	4.35%	4.35%	15.22%	52.17%
34787	390	49	2.04%	6.12%	22.45%	61.22%
32835	431	50	2.00%	2.00%	14.00%	46.00%
32839	576	51	0.00%	0.00%	9.80%	39.22%
32806	511	55	3.64%	5.45%	9.09%	41.82%
32805	740	56	1.79%	5.36%	37.50%	50.00%
32817	564	63	1.59%	1.59%	15.87%	39.68%
32809	700	66	4.55%	3.03%	16.67%	53.03%
34761	420	67	0.00%	2.99%	16.42%	35.82%
32837	379	69	0.00%	7.25%	5.80%	37.68%
32811	1005	76	2.63%	5.26%	19.74%	57.89%
32712	529	76	0.00%	3.95%	14.47%	50.00%
32819	497	77	1.30%	3.90%	9.09%	54.55%
32807	775	82	3.66%	7.32%	15.85%	53.66%
32818	891	84	5.95%	8.33%	19.05%	47.62%
32812	693	85	3.53%	5.88%	14.12%	47.06%
32810	597	93	1.08%	6.45%	23.66%	45.16%
32822	1042	93	2.15%	6.45%	15.05%	49.46%
32792	992	111	5.41%	5.41%	22.52%	54.05%
32825	730	113	4.42%	6.19%	14.16%	38.94%
32703	932	121	2.48%	5.79%	28.10%	52.07%
32808	1256	151	1.99%	4.64%	22.52%	47.02%

### **5.1.3.2 Elderly Drivers Crash Involvement (Orlando)**

The crash data was extracted for the drivers in the age group more than 74 years old and the analysis was done accordingly.

Alcohol and drug related crash rates were obtained as a percentage of total crashes involving Elderly drivers in each zipcode in Orange County. It is noticeable that the highest alcohol and drug related crash rates involving Elderly drivers (10% to 20%) are in the following zipcodes in Orange County: 32819, and 32818.

Severe crash rates were obtained as a percentage of total crashes involving Elderly drivers in each zipcode area in Orange County. It is noticeable that the highest severe crash rates involving Elderly drivers (14% to 50%) are in the following zipcodes in Orange County: 32835, 32824, 32807, and 32804.

Crash rates where drivers ignored the use of safety seat belts were obtained as a percentage of total crashes involving Elderly drivers for each zipcode area in Orange County. It is noticeable that the highest crash rates without the use of safety seat belts involving Elderly drivers (22% to 100%) are in the following zipcodes in Orange County: 32827, 32835, 32817, 32819, and 32805.

Crash rates where drivers were cited for traffic violations were obtained as a percentage of total crashes involving white drivers for each zipcode in Orange County. It was found that the highest crash rates where Elderly drivers were cited for traffic violations (60% to 100%) are in the following zipcodes in Orange County: 32837, 32709, 32835, 34761, 32817, 32821, 32789, 32757, 32812, 32703, and 32792.

Table 5-5 presents the crash database for the Elderly drivers, as use in the GIS platform.

### **5.1.3.3 Overall View of Driver's Age Vs. Crash Rates (Orange County)**

After comparing the crash data for both age groups under investigation in Orange County (Tables 5-4 and 5-5), the following characteristics were found:

- Elderly drivers had the highest crash rates resulting in fatal or severe injuries, (up to 50%) of the total crashes involving Elderly drivers.
- Elderly drivers had the highest crash rates where they were cited for traffic violations, (up to 100%) of the total crashes involving Elderly drivers.
- Hispanic drivers had the highest crash rates involving alcohol and drugs, (up to 40%) of the total crashes involving Hispanic drivers.
- Crash rates involving alcohol or drugs were roughly close in both age groups (around 20% of total crashes in each age group), but by the looking at the frequency of the crashes involving alcohol and drugs, it was noticed that teen-age drivers had high crash rates in many zipcode areas. The elderly drivers had high rates, involving alcohol and drugs, only in two zipcode areas where the total number of crashes was less than 10. This concludes that young drivers are more involved in alcohol and drug related crashes than elderly drivers in Orange County.

- The same observation regarding alcohol crashes was also found in crashes without the use of seat belts, meaning that young drivers have higher risk in not wearing seat belts while operating their vehicles.

TABLE 5-5

## ELDERLY DRIVERS CRASH DATA FOR ORANGE COUNTY

Zipcode	Total Crashes	Elderly Drivers Invol.	% Alcohol & Drug	% Fatal & Severe	% No Seat Belt	% Cited for Violation
32830	9	0	0.00%	0.00%	0.00%	0.00%
32836	81	0	0.00%	0.00%	0.00%	0.00%
32820	84	0	0.00%	0.00%	0.00%	0.00%
32813	33	0	0.00%	0.00%	0.00%	0.00%
32831	10	0	0.00%	0.00%	0.00%	0.00%
32832	34	0	0.00%	0.00%	0.00%	0.00%
32837	379	1	0.00%	0.00%	0.00%	100.00%
32827	50	1	0.00%	0.00%	100.00%	0.00%
32709	61	1	0.00%	0.00%	0.00%	100.00%
32829	106	2	0.00%	0.00%	0.00%	50.00%
32828	178	2	0.00%	0.00%	0.00%	0.00%
32833	100	2	0.00%	0.00%	0.00%	50.00%
34786	112	2	0.00%	0.00%	0.00%	0.00%
32835	431	2	0.00%	50.00%	50.00%	100.00%
32824	261	4	0.00%	25.00%	0.00%	25.00%
34761	420	5	0.00%	0.00%	0.00%	60.00%
32801	226	6	0.00%	0.00%	0.00%	50.00%
32839	106	6	0.00%	0.00%	0.00%	33.33%
32826	335	7	0.00%	0.00%	0.00%	28.57%
32817	564	8	0.00%	12.50%	25.00%	62.50%
32825	730	9	0.00%	11.11%	0.00%	11.11%
32819	497	9	11.11%	11.11%	22.22%	22.22%
32818	891	10	20.00%	0.00%	20.00%	40.00%
32810	597	12	0.00%	0.00%	0.00%	58.33%
32751	318	12	0.00%	8.33%	0.00%	50.00%
32712	529	12	0.00%	8.33%	0.00%	58.33%
32807	775	14	0.00%	14.29%	21.43%	42.86%
32821	240	14	0.00%	7.14%	14.29%	71.43%
34787	390	14	0.00%	7.14%	28.57%	50.00%
32811	1005	14	0.00%	7.14%	21.43%	42.86%
32789	387	15	0.00%	6.67%	13.33%	66.67%
32806	511	17	0.00%	11.76%	5.88%	47.06%
32809	700	18	0.00%	0.00%	11.11%	50.00%
32757	259	18	0.00%	11.11%	11.11%	66.67%
32812	693	20	0.00%	0.00%	5.00%	60.00%
32804	388	21	4.76%	14.29%	19.05%	42.86%
32703	932	21	0.00%	0.00%	23.81%	66.67%
32822	1042	22	0.00%	4.55%	13.64%	36.36%
32792	992	23	4.35%	0.00%	21.74%	60.87%
32808	1256	23	4.35%	13.04%	8.70%	39.13%
32803	436	24	4.17%	8.33%	0.00%	37.50%
32805	740	27	7.41%	3.70%	29.63%	59.26%

#### **5.1.4 Drivers' Gender Vs. Crash Types (Orlando)**

This section investigated the different crash type involvements in both genders, male and female, in Orange County.

##### **5.1.4.1 Male Drivers Vs. Crash Types (Orlando)**

Crash data was extracted for male drivers in Orange County, and the analysis was performed according to the methodology. Following are the results obtained from this analysis.

Alcohol and drug related crash rates were obtained as a percentage of total crashes involving Male drivers in each zipcode in Orange County. It is noticeable that the highest alcohol and drug related crash rates involving Male drivers (13% to 20%) are in the following zipcodes in Orange County: 32757, 32828, 32833, and 32832.

Severe crash rates were obtained as a percentage of total crashes involving Male drivers in each zipcode area in Orange County. It is noticeable that the highest severe crash rates involving Male drivers (7% to 10%) are in the following zipcodes in Orange County: 32833, 32832, 32837, and 32821.

Crash rates where drivers ignored the use of safety seat belts were obtained as a percentage of total crashes involving Male drivers for each zipcode area in Orange County. It is noticeable that the highest crash rates without the use of safety seat belts involving Male drivers (22% to 25%) are in the following zipcodes in Orange County: 34787, 34761, 32805, and 32833.

Crash rates where drivers were cited for traffic violations were obtained as a percentage of total crashes involving white drivers for each zipcode in Orange County. It

was found that the highest crash rates where Male drivers were cited for traffic violations (38% to 60%) are in the following zipcodes in Orange County: 32830, 32821, 32811, 32789, 32813, 32812, 32820, 32824, and 32709.

Table 5-6 presents the crash database for the Male drivers, as used in the GIS platform.

TABLE 5-6

## MALE DRIVERS CRASH DATA FOR ORANGE COUNTY

Zipcode	Total Crashes	Male Drivers Invol.	% Alcohol & Drug	% Fatal & Severe	% No Seat Belt	% Cited for Violation
32830	9	5	0.00%	0.00%	20.00%	60.00%
32831	10	7	0.00%	0.00%	0.00%	14.29%
32832	34	20	15.00%	10.00%	20.00%	30.00%
32827	50	28	7.14%	0.00%	17.86%	28.57%
32813	33	28	3.57%	3.57%	0.00%	53.57%
32709	61	44	11.36%	6.82%	18.18%	38.64%
32836	81	47	8.51%	4.26%	19.15%	25.53%
32833	100	53	13.21%	7.55%	24.53%	35.85%
32820	84	55	9.09%	5.45%	16.36%	43.64%
32829	106	60	6.67%	1.67%	21.67%	36.67%
34786	112	66	4.55%	3.03%	7.58%	30.30%
32828	178	110	15.45%	6.36%	14.55%	30.91%
32801	226	146	8.90%	6.16%	19.86%	26.71%
32821	240	152	12.50%	9.21%	14.47%	42.76%
32757	259	157	14.01%	7.01%	17.83%	37.58%
32824	261	173	8.67%	5.20%	13.87%	40.46%
32751	318	184	4.89%	4.35%	14.67%	31.52%
32826	335	201	8.96%	3.98%	16.42%	33.83%
32789	387	212	9.91%	5.66%	20.28%	42.45%
34787	390	212	8.49%	3.77%	22.17%	34.91%
32804	388	232	9.48%	3.88%	16.38%	35.78%
34761	420	236	5.93%	5.08%	22.88%	32.63%
32837	379	239	8.37%	7.53%	12.55%	32.22%
32835	431	260	8.46%	3.46%	16.54%	36.15%
32803	436	269	13.01%	5.58%	18.59%	35.32%
32819	497	283	9.54%	4.95%	12.72%	38.52%
32806	511	311	10.93%	5.14%	17.68%	33.12%
32712	529	334	7.78%	4.19%	14.97%	34.13%
32817	564	351	7.69%	2.28%	12.54%	35.90%
32810	597	357	5.60%	5.04%	15.69%	35.85%
32839	576	359	6.69%	4.18%	18.38%	33.43%
32812	693	391	10.23%	4.09%	13.56%	40.67%
32809	700	428	8.41%	4.44%	18.22%	35.98%
32825	730	435	9.43%	3.91%	14.02%	35.63%
32805	740	468	7.05%	5.34%	23.50%	34.62%
32807	775	469	10.23%	5.12%	19.19%	37.95%
32818	891	529	7.18%	5.48%	17.01%	33.84%
32703	932	558	8.24%	4.66%	19.89%	37.10%
32811	1005	581	9.98%	5.85%	21.86%	39.24%
32792	992	587	8.69%	4.94%	14.48%	37.65%
32822	1042	619	10.66%	6.62%	15.19%	37.00%
32808	1256	763	7.99%	4.72%	20.45%	35.12%

#### **5.1.4.2 Female Drivers Vs. Crash Types (Orlando)**

Crash data was extracted for female drivers in Orange County, and the analysis was performed according to the methodology. Following are the results obtained from this analysis.

Alcohol and drug related crash rates were obtained as a percentage of total crashes involving Female drivers in each zipcode in Orange County. It is noticeable that the highest alcohol and drug related crash rates involving Female drivers (8% to 20%) are in the following zipcodes in Orange County: 32813, 32833, and 32709.

Severe crash rates were obtained as a percentage of total crashes involving Female drivers in each zipcode area in Orange County. It is noticeable that the highest severe crash rates involving Female drivers (6% to 12%) are in the following zipcodes in Orange County: 32757, 34761, 32804, 32801, 32803, 32806, 32820, 32832, 32824, and 32837.

Crash rates where drivers ignored the use of safety seat belts were obtained as a percentage of total crashes involving Female drivers for each zipcode area in Orange County. It is noticeable that the highest crash rates without the use of safety seat belts involving Female drivers (15% to 20%) are in the following zipcodes in Orange County: 32757, 32703, 32805, and 34787.

Crash rates where drivers were cited for traffic violations were obtained as a percentage of total crashes involving white drivers for each zipcode in Orange County. It was found that the highest crash rates where Female drivers were cited for traffic violations (37% to 52%) are in the following zipcodes in Orange County: 32836, 32819, 32827, 32807, 32709, and 32820.

Table 5-7 presents the crash database for the Female drivers, as use in the GIS platform.

#### **5.1.4.3 Overall View of Driver's Gender Vs. Crash Rates (Orange County)**

After comparing the crash data regarding male and female drivers involved in traffic crashes in Orange County (tables 5-6 and 5-7), the following characteristics were found:

- Male drivers had the highest crash rates without the use of safety seat belts, (up to 25%) of the total crashes involving male drivers.
- Male drivers had the highest crash rates where they were cited for traffic violations, (up to 60%) of the total crashes involving male drivers.
- Male and female drivers had the same crash rates involving the use of alcohol or drugs, (up to 20%) of the total crashes of each gender.
- Female drivers had the highest crash rates resulting in fatal or severe injuries, (up to 12%) of the total crashes involving Female drivers.

These observations show that male drivers are more risky than female drivers in Orange County.

TABLE 5-7

## FEMALE DRIVERS CRASH DATA FOR ORANGE COUNTY

Zipcode	Total Crashes	Female Drivers Invol.	% Alcohol & Drug	% Fatal & Severe	% No Seat Belt	% Cited for Violation
32831	10	3	0.00%	0.00%	0.00%	0.00%
32830	9	4	0.00%	0.00%	0.00%	0.00%
32813	33	5	20.00%	0.00%	0.00%	0.00%
32832	34	14	0.00%	7.14%	7.14%	28.57%
32709	61	17	17.65%	5.88%	11.76%	41.18%
32827	50	22	4.55%	0.00%	4.55%	45.45%
32820	84	29	3.45%	10.34%	0.00%	51.72%
32836	81	34	5.88%	0.00%	14.71%	41.18%
34786	112	44	0.00%	6.82%	4.55%	20.45%
32829	106	46	6.52%	4.35%	13.04%	30.43%
32833	100	47	8.51%	2.13%	14.89%	34.04%
32828	178	68	4.41%	5.88%	13.24%	32.35%
32801	226	79	1.27%	7.59%	10.13%	26.58%
32824	261	87	3.45%	8.05%	13.79%	28.74%
32821	240	88	7.95%	3.41%	11.36%	26.14%
32757	259	102	4.90%	6.86%	16.67%	32.35%
32751	318	133	0.75%	3.01%	9.77%	33.08%
32826	335	134	2.99%	2.24%	11.94%	33.58%
32837	379	139	2.88%	9.35%	4.32%	29.50%
32804	388	156	7.69%	7.69%	12.82%	31.41%
32803	436	166	6.63%	7.83%	10.24%	34.34%
32835	431	170	3.53%	4.71%	10.00%	31.76%
32789	387	175	1.14%	5.71%	12.00%	36.00%
34787	390	178	2.25%	5.06%	15.73%	30.34%
34761	420	181	2.21%	7.18%	8.84%	27.07%
32712	529	195	1.54%	4.62%	10.26%	31.79%
32806	511	197	5.08%	10.15%	13.20%	36.55%
32819	497	213	2.35%	4.69%	7.04%	38.97%
32817	564	213	1.41%	1.88%	7.98%	31.46%
32839	576	217	1.38%	4.15%	6.45%	34.56%
32810	597	238	4.20%	3.78%	13.45%	32.35%
32805	740	271	2.21%	5.90%	18.08%	30.63%
32809	700	271	3.32%	5.17%	8.86%	35.42%
32825	730	292	3.42%	3.42%	5.82%	27.05%
32807	775	299	4.01%	3.34%	8.36%	37.12%
32812	693	299	3.01%	3.34%	10.37%	34.78%
32818	891	357	1.68%	5.04%	9.52%	28.29%
32703	932	372	4.30%	6.18%	16.40%	34.68%
32792	992	402	2.99%	3.48%	12.69%	29.85%
32822	1042	421	5.70%	4.51%	9.26%	35.15%
32811	1005	422	3.08%	4.74%	12.56%	32.23%
32808	1256	490	1.02%	5.10%	8.98%	30.00%

## **5.2 Crash Involvement in Miami (Dade County)**

Following is an explanation of each of the demographic characteristics under investigation in Dade County, as they relate to the different crash types.

### **5.2.1 Income Level Vs. Crash Types (Miami)**

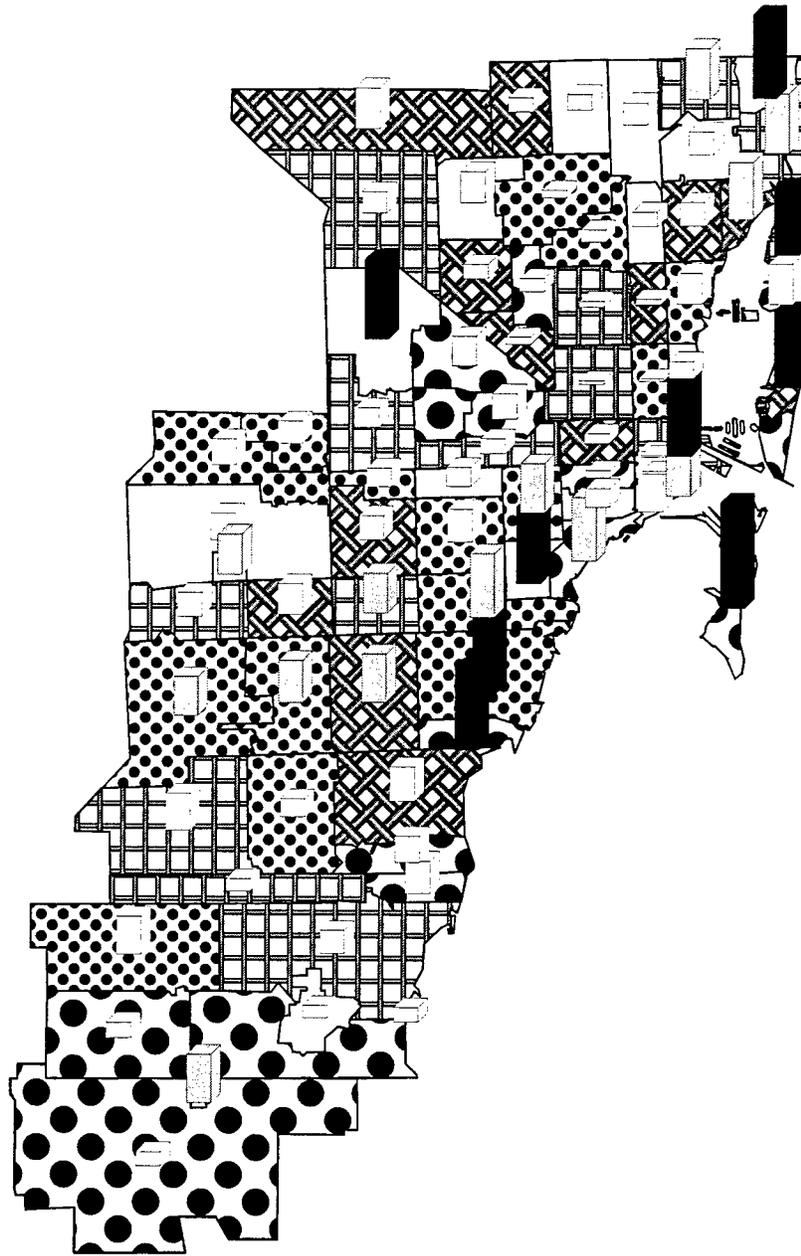
From the previous analysis of Hillsborough County, it was found that there is a weak relationship between the income level and the severity of the crash. In addition, there was no relationship found between the income level and the driver being cited for traffic violation. For this reason, income level was investigated only against the alcohol and drug related crashes, and crashes without the use of seat belts.

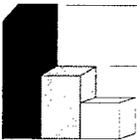
#### **5.2.1.1 Income Level Vs. Alcohol and Drug Related Crashes (Miami)**

The relationship between income level and the alcohol and drug related crash rates was investigated in this section. (Figure 5-3) represents the alcohol and drug related crashes as a percentage of the total crashes in each zipcode area, versus the 'per capita income' for each zipcode. The income level is presented by bar charts, while the crash rates are presented by color themes. Figure 5-3 reflects the high relationship between the low income areas and the high alcohol and drug related crash rates. This observation is similar to that found in Hillsborough County.

In the effort of locating the high crash risk areas, the following zipcodes in Dade County were found to have the highest alcohol and drug related crash rates (between 4.5%

**FIGURE 5-3**  
**Alcohol and Drug Related Crashes**  
**Vs. Income Level (Dade County)**



Alcohol and Drug Related Crashes	
<b>% of Total Crashes</b>	<b>Per Capita Income 1995</b>
 0.0 to 2.58	 50000
 2.58 to 3.35	 27800
 3.35 to 3.75	 16700
 3.75 to 4.50	
 4.50 to 8.00	

and 8%) of the total crashes in respective zipcode: 33141, 33139, 33149, 33130, 33128, 33135, 33122, 33166, 33013, 33133, 33158, 33189, 33190, 33033, 33030, and 33034.

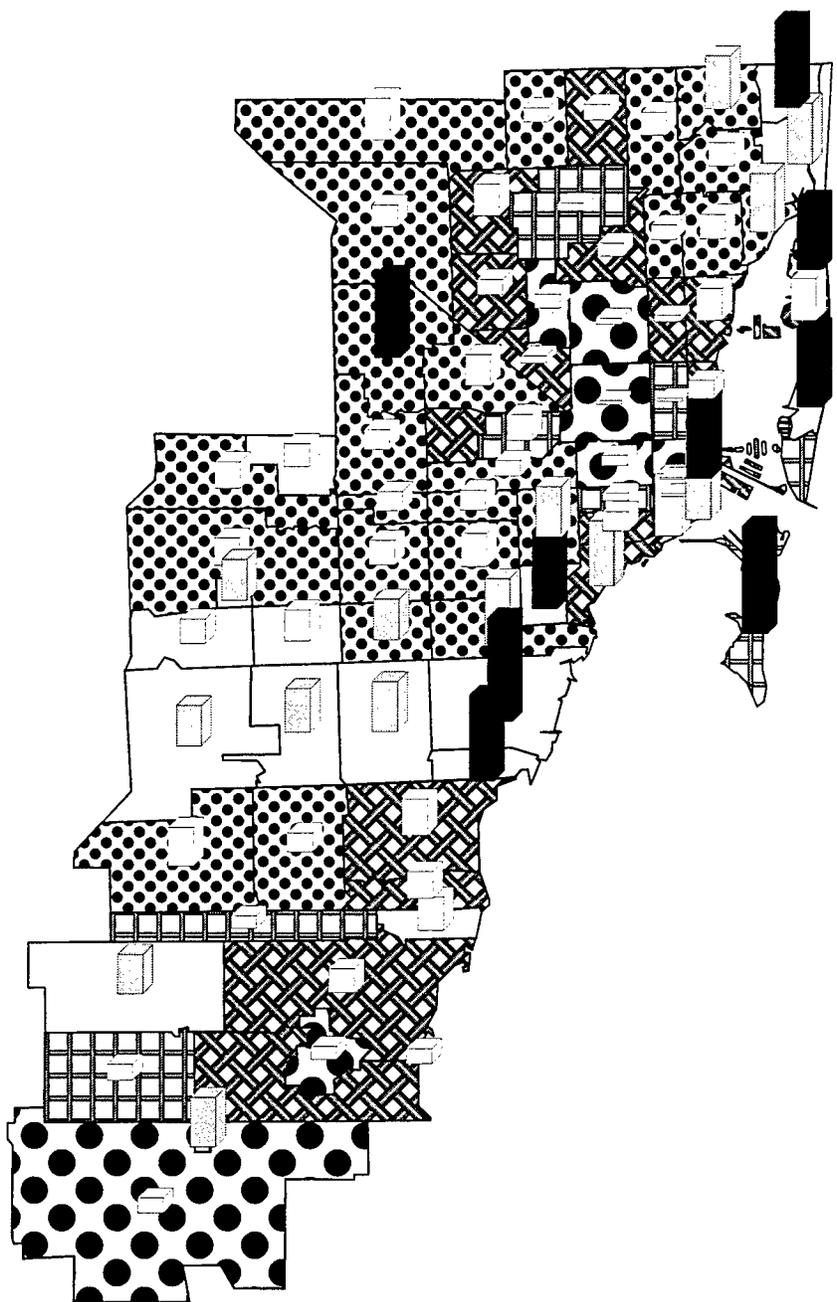
#### **5.2.1.2 Income Level Vs. Crashes without Use of Seat Belts (Miami)**

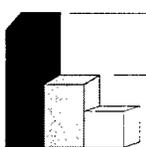
The relationship between income level and crashes without use of seat belts was investigated. (Figure 5-4) represents crashes without the use of seat belts as a percentage of the total crashes in each zipcode area versus the 'per capita income' for each zipcode. The income level is presented by bar charts, while the crash rates are presented by color themes.

There is a strong relationship between the low income areas and the high crash rates without the use of seat belts, as seen in Figure 5-4. This is also consistent with the observations in Hillsborough County as well.

The following zipcode areas in Dade County have the highest crash rates without the use of seat belts (between 20% and 40%) of the total crashes in the respective zipcode: 33030, 33039, 33034, 33149, 33139, 33130, 33128, 33135, 33136, 33127, 33142, 33147, 33031, and 33054.

**FIGURE 5-4**  
**Crashes Without Seat Belts**  
**Vs. Income Level (Dade County)**



Crashes Without Seat Belts	
<b>% of Total Crashes</b>	<b>Per Capita Income 1995</b>
 0.0 to 11.00	 50000 27800 16700
 11.00 to 12.68	
 12.68 to 14.85	
 14.85 to 18.50	
 18.50 to 40.00	

## **5.2.2 Driver's Race Vs. Crash Types (Miami)**

Only African Americans and Hispanic races were found to have high risks in Dade County as seen in chapter 4 of this report; therefore, African American and Hispanic races were investigated against the four types of crashes under study.

### **5.2.2.1 African American drivers Vs. crash types (Miami)**

The methodology was utilized to analyze the crash involvements of African American drivers in Dade County, and following were the results of this analysis.

Alcohol and drug related crash rates were obtained as a percentage of total crashes involving African American drivers in each zipcode in Dade County. It is noticeable that the highest alcohol and drug related crash rates involving African American drivers (4% to 20%) are in the following zipcodes in Dade County: 33160, 33016, 33013, 33154, 33166, 33140, 33128, 33145, 33129, 33130, 33133, 33175, 33156, 33196, and 33190.

Severe crash rates were obtained as a percentage of total crashes involving African American drivers in each zipcode area in Dade County. It is noticeable that the highest severe crash rates involving African American drivers (5% to 12%) are in the following zipcodes in Dade County: 33132, 33144, 33174, 33175, 33173, 33157, 33177, 33189, 33190, 33170, 33030, 33033, and 33034.

Crash rates where drivers ignored the use of safety seat belts were obtained as a percentage of total crashes involving African American drivers for each zipcode area in Dade County. It is noticeable that the highest crash rates without the use of safety seat belts involving African American drivers (24% to 40%) are in the following zipcodes in Dade

County: 33014, 33013, 33178, 33182, 33139, 33136, 33146, 33145, 33175, 33185, 33149, 33143, and 33158.

Crash rates where drivers were cited for traffic violations were obtained as a percentage of total crashes involving white drivers for each zipcode in Dade County. It was found that the highest crash rates where African American drivers were cited for traffic violations (36% to 60%) are in the following zipcodes in Dade County: 33016, 33154, 33137, 33136, 33130, 33135, 33145, 33129, 33144, 33146, 33175, 33186, 33158, and 33187.

Table 5-8 presents the crash database for the African American drivers, as use in the GIS platform.

TABLE 5-8

AFRICAN AMERICAN DRIVERS CRASH DATA FOR DADE COUNTY

Zipcode	Total Crashes	African American Drivers Invol.	% Alcohol & Drug	% Fatal & Severe	% No Seat Belt	% Cited for Violation
33039	3	0	0.00%	0.00%	0.00%	0.00%
33122	25	2	0.00%	0.00%	0.00%	50.00%
33185	181	3	0.00%	0.00%	33.33%	0.00%
33035	53	3	0.00%	0.00%	0.00%	33.33%
33149	163	3	0.00%	0.00%	33.33%	0.00%
33182	179	4	0.00%	0.00%	25.00%	0.00%
33031	151	5	0.00%	0.00%	0.00%	20.00%
33158	140	7	0.00%	0.00%	28.57%	42.86%
33131	81	7	0.00%	0.00%	28.57%	28.57%
33129	294	8	12.50%	0.00%	25.00%	50.00%
33184	512	8	0.00%	0.00%	0.00%	12.50%
33178	153	9	0.00%	0.00%	33.33%	0.00%
33174	768	11	0.00%	9.09%	9.09%	36.36%
33144	698	13	0.00%	7.69%	15.38%	38.46%
33154	318	14	7.14%	0.00%	21.43%	50.00%
33130	475	16	6.25%	6.25%	6.25%	37.50%
33140	477	16	6.25%	0.00%	18.75%	25.00%
33190	97	17	5.88%	11.76%	0.00%	35.29%
33145	744	17	11.76%	5.88%	23.53%	52.94%
33175	1438	18	5.56%	11.11%	38.89%	38.89%
33146	258	18	0.00%	0.00%	33.33%	38.89%
33013	632	19	5.26%	5.26%	26.32%	10.53%
33132	91	20	0.00%	10.00%	10.00%	5.00%
33166	503	20	5.00%	0.00%	20.00%	25.00%
33187	204	20	0.00%	5.00%	0.00%	40.00%
33155	1180	20	0.00%	5.00%	15.00%	25.00%
33134	816	21	0.00%	0.00%	14.29%	23.81%
33135	911	30	0.00%	3.33%	26.67%	36.67%
33165	1644	31	0.00%	0.00%	22.58%	19.35%
33173	879	31	3.23%	6.45%	19.35%	32.26%
33183	886	32	0.00%	0.00%	9.38%	9.38%
33156	695	34	8.82%	0.00%	20.59%	35.29%
33014	1023	35	2.86%	5.71%	28.57%	22.86%
33128	253	39	5.13%	0.00%	17.95%	20.51%
33016	1668	39	5.13%	0.00%	12.82%	41.03%
33126	1142	42	0.00%	0.00%	19.05%	26.19%
33172	941	44	0.00%	4.55%	9.09%	15.91%
33196	542	48	4.17%	4.17%	6.25%	29.17%
33139	1030	49	4.08%	4.08%	26.53%	30.61%

Zipcode	Total Crashes	African American Drivers Invol.	% Alcohol & Drug	% Fatal & Severe	% No Seat Belt	% Cited for Violation
33010	1383	51	1.96%	1.96%	13.73%	33.33%
33012	2333	52	3.85%	5.77%	23.08%	36.54%
33180	527	54	1.85%	3.70%	7.41%	31.48%
33193	699	57	1.75%	0.00%	12.28%	21.05%
33125	1295	66	3.03%	3.03%	15.15%	21.21%
33160	730	67	4.48%	1.49%	11.94%	26.87%
33141	937	71	2.82%	1.41%	14.08%	33.80%
33034	217	71	1.41%	8.45%	16.90%	33.80%
33143	677	86	1.16%	5.81%	24.42%	25.58%
33033	563	103	1.94%	6.80%	19.42%	29.13%
33189	503	107	2.80%	8.41%	16.82%	36.45%
33133	770	119	6.72%	2.52%	22.69%	28.57%
33170	220	132	2.27%	6.82%	17.42%	35.61%
33186	1340	133	3.76%	3.76%	7.52%	39.10%
33032	476	151	1.32%	5.30%	17.22%	27.15%
33136	294	160	3.75%	3.75%	25.00%	38.75%
33181	520	164	1.22%	3.05%	10.98%	29.88%
33030	750	168	0.60%	5.95%	20.83%	31.55%
33015	1106	211	1.90%	3.32%	13.27%	28.44%
33177	889	212	1.89%	9.43%	10.85%	24.53%
33179	891	219	2.28%	3.20%	10.05%	27.85%
33176	1295	252	2.78%	3.17%	10.71%	32.14%
33137	537	254	0.00%	3.94%	14.57%	41.34%
33138	838	415	0.48%	3.37%	18.31%	34.94%
33167	645	469	1.71%	4.05%	14.07%	26.44%
33157	1521	518	2.51%	7.34%	15.06%	29.73%
33127	805	547	1.10%	3.29%	17.73%	31.26%
33054	735	573	1.75%	3.66%	17.80%	26.53%
33168	944	588	1.36%	3.40%	13.95%	29.25%
33162	1265	594	1.35%	3.54%	14.65%	29.80%
33055	1398	632	3.64%	4.75%	15.82%	26.58%
33150	844	640	2.81%	4.38%	16.88%	27.34%
33056	901	774	2.07%	3.75%	15.89%	29.07%
33142	1481	790	2.91%	3.42%	21.90%	26.20%
33161	1659	842	2.14%	3.21%	11.76%	34.20%
33169	1093	850	1.88%	3.06%	11.65%	30.47%
33147	1678	1097	3.10%	3.74%	20.60%	26.53%

### **5.2.2.2 Hispanic Drivers Vs. Crash Types (Miami)**

The methodology was utilized to analyze the crash involvements of Hispanic drivers in Dade County, and following were the results of this analysis.

Alcohol and drug related crash rates were obtained as a percentage of total crashes involving Hispanic drivers in each zipcode in Dade County. It is noticeable that the highest alcohol and drug related crash rates involving Hispanic drivers (7% to 15%) are in the following zipcodes in Dade County: 33169, 33167, 33139, 33187, 33189, 33030, and 33034.

Severe crash rates were obtained as a percentage of total crashes involving Hispanic drivers in each zipcode area in Dade County. It is noticeable that the highest severe crash rates involving Hispanic drivers (5% to 14%) are in the following zipcodes in Dade County: 33056, 33054, 33168, 33161, 33181, 33160, 33140, 33132, 33146, 33183, 33193, 33177, 33189, 33032, 33030, and 33034.

Crash rates where drivers ignored the use of safety seat belts were obtained as a percentage of total crashes involving Hispanic drivers for each zipcode area in Dade County. It is noticeable that the highest crash rates without the use of safety seat belts involving Hispanic drivers (18% to 34%) are in the following zipcodes in Dade County: 33056, 33169, 33054, 33167, 33147, 33010, 33127, 33136, 33125, 33128, 33130, 33135, 33158, 33170, 33030, and 33034.

Crash rates where drivers were cited for traffic violations were obtained as a percentage of total crashes involving white drivers for each zipcode in Dade County. It was found that the highest crash rates where Hispanic drivers were cited for traffic violations

(34% to 60%) are in the following zipcodes in Dade County: 33180, 33169, 33054, 33138, 33139, 33132, 33143, 33173, 33189, 33031, 33039, 33033, 33030, and 33034.

Table 5-9 presents the crash database for the Hispanic drivers, as use in the GIS platform.

### **5.2.2.3 Overall View of Driver's Race Vs. Crash Rates (Dade County)**

After comparing the crash data regarding the race of the drivers involved in traffic crashes in Dade County (Tables 5-8 and 5-9), the following characteristics were found:

- African American drivers had the highest crash rates without the use of safety seat belts, (up to 40%) of the total crashes involving African American drivers.
- African American drivers had the highest crash rates where they were cited for traffic violations, (up to 60%) of the total crashes involving African American drivers.
- African American drivers had the highest crash rates involving alcohol and drugs, (up to 20%) of the total crashes involving African American drivers.
- Hispanic drivers had the highest crash rates resulting in fatal or severe injuries, (up to 14%) of the total crashes involving Hispanic drivers.

These observations show that African American drivers are the most risky drivers in Dade County, followed by Hispanic drivers.

TABLE 5-9

Hispanic Drivers Crash Data for Dade County

Zipcode	Total Crashes	Hispanic Drivers Invol.	% Alcohol & Drug	% Fatal & Severe	% No Seat Belt	% Cited for Violation
33039	3	1	0.00%	0.00%	0.00%	0.00%
33035	53	3	0.00%	0.00%	0.00%	0.00%
33122	25	8	0.00%	0.00%	0.00%	200.00%
33132	91	13	7.69%	100.00%	100.00%	600.00%
33170	220	16	0.00%	0.00%	0.00%	133.33%
33131	81	20	0.00%	0.00%	100.00%	900.00%
33158	140	21	9.52%	50.00%	400.00%	175.00%
33180	527	26	3.85%	100.00%	400.00%	275.00%
33031	151	26	0.00%	0.00%	400.00%	300.00%
33190	97	28	7.14%	0.00%	0.00%	150.00%
33154	318	28	0.00%	0.00%	400.00%	250.00%
33056	901	29	6.90%	150.00%	300.00%	100.00%
33149	163	31	6.45%	50.00%	500.00%	200.00%
33169	1093	32	9.38%	33.33%	600.00%	216.67%
33181	520	32	3.13%	200.00%	250.00%	200.00%
33167	645	44	11.36%	40.00%	400.00%	200.00%
33179	891	50	4.00%	50.00%	200.00%	750.00%
33034	217	51	13.73%	42.86%	566.67%	117.65%
33054	735	52	3.85%	350.00%	242.86%	129.41%
33136	294	54	3.70%	100.00%	650.00%	100.00%
33150	844	56	7.14%	25.00%	900.00%	222.22%
33146	258	58	1.72%	400.00%	150.00%	333.33%
33187	204	58	8.62%	40.00%	450.00%	155.56%
33178	153	61	3.28%	100.00%	300.00%	333.33%
33140	477	62	3.23%	200.00%	200.00%	237.50%
33160	730	63	6.35%	100.00%	200.00%	225.00%
33129	294	84	4.76%	100.00%	325.00%	215.38%
33168	944	84	3.57%	200.00%	166.67%	250.00%
33138	838	85	2.35%	100.00%	650.00%	276.92%
33185	181	86	0.00%		400.00%	337.50%
33032	476	87	4.60%	125.00%	220.00%	263.64%
33162	1265	89	4.49%	100.00%	300.00%	266.67%
33137	537	92	3.26%	33.33%	1600.00%	206.25%
33128	253	92	10.87%	20.00%	900.00%	161.11%
33182	179	94	2.13%	100.00%	200.00%	600.00%
33189	503	110	10.00%	63.64%	228.57%	262.50%
33127	805	118	6.78%	62.50%	540.00%	137.04%
33161	1659	124	4.84%	150.00%	133.33%	275.00%
33156	695	149	0.67%	600.00%	183.33%	418.18%

Zipcode	Total Crashes	HISPANIC Drivers Invol.	% Alcohol & Drug	% Fatal & Severe	% No Seat Belt	% Cited for Violation
33143	677	152	3.29%	60.00%	500.00%	400.00%
33033	563	159	6.92%	72.73%	287.50%	265.22%
33133	770	167	5.39%	33.33%	800.00%	237.50%
33166	503	177	1.69%	200.00%	483.33%	210.34%
33141	937	177	5.08%	77.78%	428.57%	196.67%
33139	1030	190	7.37%	57.14%	337.50%	274.07%
33030	750	204	12.25%	52.00%	400.00%	151.92%
33130	475	219	6.85%	80.00%	350.00%	176.19%
33196	542	222	3.15%	85.71%	350.00%	338.10%
33147	1678	229	6.99%	56.25%	477.78%	193.02%
33157	1521	229	3.49%	150.00%	191.67%	308.70%
33176	1295	271	3.32%	166.67%	173.33%	334.62%
33015	1106	274	1.46%	200.00%	325.00%	330.77%
33184	512	289	2.08%	100.00%	566.67%	276.47%
33055	1398	292	3.42%	100.00%	380.00%	250.00%
33177	889	300	1.67%	420.00%	128.57%	355.56%
33134	816	318	2.52%	150.00%	375.00%	248.89%
33142	1481	318	5.35%	35.29%	900.00%	187.04%
33145	744	319	1.57%	200.00%	470.00%	214.89%
33173	879	351	2.85%	170.00%	229.41%	335.90%
33193	699	359	3.90%	142.86%	195.00%	302.56%
33144	698	366	1.64%	216.67%	300.00%	276.92%
33183	886	428	4.44%	157.89%	163.33%	308.16%
33135	911	430	5.12%	95.45%	380.95%	167.50%
33014	1023	441	2.04%	233.33%	333.33%	192.86%
33174	768	462	3.25%	113.33%	317.65%	303.70%
33186	1340	482	2.70%	184.62%	154.17%	435.14%
33172	941	518	3.86%	65.00%	515.38%	232.84%
33125	1295	561	3.57%	90.00%	661.11%	168.07%
33126	1142	574	3.48%	90.00%	350.00%	284.13%
33155	1180	594	2.69%	187.50%	256.67%	240.26%
33013	632	617	3.08%	136.84%	365.38%	224.21%
33010	1383	701	3.28%	143.48%	396.97%	186.26%
33175	1438	833	2.28%	178.95%	241.18%	315.85%
33016	1668	840	3.21%	125.93%	388.24%	206.82%
33165	1644	957	3.24%	161.29%	242.00%	270.25%
33012	2333	1229	3.09%	139.47%	358.49%	207.89%

### **5.2.3 Drivers' Age Vs. Crash Type (Miami)**

As mentioned before, this report views two groups of drivers' age, teen-age drivers (ages < 20 years old), and elderly drivers (ages > 74 years old). Each age group, in Dade County, was investigated against the four types of crashes under study.

#### **5.2.3.1 Teen-age Drivers Crash Involvement (Miami)**

The crash data was extracted for the drivers in the age group less than 20 years old and the analysis was done accordingly.

Alcohol and drug related crash rates were obtained as a percentage of total crashes involving Teen-age drivers in each zipcode in Dade County. It is noticeable that the highest alcohol and drug related crash rates involving Teen-age drivers (3.5% to 50%) are in the following zipcodes in Dade County: 33181, 33154, 33131, 33128, 33146, 33149, 33143, 33185, 33158, 33158, 33189, 33031, 33030, and 33034.

Severe crash rates were obtained as a percentage of total crashes involving Teen-age drivers in each zipcode area in Dade County. It is noticeable that the highest severe crash rates involving Teen-age drivers (5% to 20%) are in the following zipcodes in Dade County: 33055, 33054, 33181, 33154, 33139, 33127, 33010, 33129, 33145, 33127, 33157, 33177, 33189, 33170, and 33031.

Crash rates where drivers ignored the use of safety seat belts were obtained as a percentage of total crashes involving Teen-age drivers for each zipcode area in Dade County. It is noticeable that the highest crash rates without the use of safety seat belts involving Teen-

age drivers (24% to 50%) are in the following zipcodes in Dade County: 33014, 33054, 33147, 33150, 33141, 33137, 33142, 33125, 33136, 33190, 33170, 33030, 33034.

Crash rates where drivers were cited for traffic violations were obtained as a percentage of total crashes involving white drivers for each zipcode in Dade County. It was found that the highest crash rates where Teen-age drivers were cited for traffic violations (50% to 80%) are in the following zipcodes in Dade County: 33169, 33154, 33138, 33140, 33137, 33166, 33178, 33184, 33131, 33146, 33128, 33136, 33132, 33158, 33189, 33190, and 33034.

Table 5-10 presents the crash database for the Teen-age drivers, as use in the GIS platform.

TABLE 5-10

## TEEN-AGE DRIVERS CRASH DATA FOR DADE COUNTY

Zipcode	Total Crashes	Teen-age Drivers Invol.	% Alcohol & Drug	% Fatal & Severe	% No Seat Belt	% Cited for Violation
33122	25	0	0.00%	0.00%	0.00%	0.00%
33039	3	0	0.00%	0.00%	0.00%	0.00%
33132	91	2	0.00%	0.00%	0.00%	50.00%
33131	81	2	50.00%	0.00%	0.00%	50.00%
33035	53	5	0.00%	0.00%	0.00%	0.00%
33190	97	7	0.00%	0.00%	28.57%	71.43%
33128	253	8	12.50%	0.00%	0.00%	50.00%
33178	153	10	0.00%	0.00%	10.00%	70.00%
33170	220	12	0.00%	8.33%	41.67%	41.67%
33149	163	17	5.88%	0.00%	5.88%	47.06%
33154	318	18	5.56%	5.56%	16.67%	50.00%
33146	258	19	0.00%	5.26%	0.00%	52.63%
33136	294	19	0.00%	10.53%	36.84%	52.63%
33181	520	20	5.00%	10.00%	15.00%	25.00%
33129	294	21	0.00%	9.52%	19.05%	33.33%
33182	179	21	0.00%	0.00%	4.76%	38.10%
33158	140	21	4.76%	0.00%	4.76%	57.14%
33185	181	22	4.55%	0.00%	4.55%	31.82%
33137	537	26	0.00%	0.00%	38.46%	50.00%
33187	204	27	0.00%	3.70%	14.81%	29.63%
33034	217	29	13.79%	3.45%	37.93%	51.72%
33140	477	30	0.00%	0.00%	16.67%	53.33%
33180	527	30	3.33%	0.00%	10.00%	40.00%
33130	475	32	3.13%	3.13%	25.00%	31.25%
33031	151	32	6.25%	6.25%	12.50%	43.75%
33139	1030	35	2.86%	5.71%	22.86%	34.29%
33127	805	36	2.78%	5.56%	27.78%	47.22%
33138	838	37	0.00%	0.00%	24.32%	51.35%
33032	476	41	2.44%	2.44%	14.63%	24.39%
33160	730	44	2.27%	0.00%	9.09%	34.09%
33166	503	46	4.35%	6.52%	23.91%	50.00%
33150	844	47	0.00%	4.26%	25.53%	25.53%
33133	770	50	2.00%	4.00%	22.00%	42.00%
33184	512	50	0.00%	2.00%	10.00%	58.00%
33189	503	51	7.84%	9.80%	15.69%	50.98%
33145	744	53	0.00%	5.66%	13.21%	33.96%
33134	816	55	0.00%	3.64%	12.73%	38.18%
33054	735	55	1.82%	7.27%	25.45%	36.36%
33167	645	56	0.00%	3.57%	23.21%	39.29%

Zipcode	Total Crashes	Teen-age Drivers Invol.	% Alcohol & Drug	% Fatal & Severe	% No Seat Belt	% Cited for Violation
33144	698	57	0.00%	3.51%	15.79%	43.86%
33196	542	57	1.75%	1.75%	7.02%	42.11%
33141	937	58	3.45%	3.45%	29.31%	36.21%
33135	911	59	0.00%	5.08%	22.03%	47.46%
33173	879	66	1.52%	4.55%	12.12%	43.94%
33033	563	69	1.45%	2.90%	14.49%	39.13%
33174	768	72	0.00%	4.17%	13.89%	34.72%
33143	677	72	4.17%	2.78%	20.83%	36.11%
33172	941	72	4.17%	0.00%	15.28%	33.33%
33168	944	76	0.00%	5.26%	14.47%	38.16%
33125	1295	79	0.00%	3.80%	25.32%	43.04%
33193	699	80	0.00%	2.50%	12.50%	41.25%
33030	750	82	4.88%	1.22%	24.39%	40.24%
33179	891	82	2.44%	2.44%	18.29%	46.34%
33126	1142	89	2.25%	4.49%	13.48%	44.94%
33155	1180	91	2.20%	5.49%	14.29%	41.76%
33162	1265	92	1.09%	5.43%	16.30%	38.04%
33177	889	93	1.08%	10.75%	10.75%	33.33%
33169	1093	96	1.04%	3.13%	16.67%	50.00%
33056	901	97	2.06%	5.15%	20.62%	39.18%
33014	1023	98	2.04%	5.10%	25.51%	35.71%
33156	695	98	1.02%	1.02%	10.20%	43.88%
33015	1106	101	0.00%	2.97%	16.83%	43.56%
33183	886	104	0.96%	0.96%	10.58%	37.50%
33161	1659	110	0.91%	0.91%	19.09%	41.82%
33142	1481	114	0.88%	5.26%	30.70%	28.95%
33013	632	116	0.86%	2.59%	15.52%	44.83%
33010	1383	132	3.79%	4.55%	21.21%	40.15%
33147	1678	138	0.72%	1.45%	30.43%	40.58%
33055	1398	149	0.00%	6.71%	17.45%	47.65%
33186	1340	156	0.00%	3.85%	12.18%	41.03%
33165	1644	157	2.55%	1.91%	15.29%	43.31%
33016	1668	160	0.00%	5.00%	14.38%	38.75%
33175	1438	173	1.73%	3.47%	10.40%	38.15%
33176	1295	173	2.31%	2.89%	10.40%	42.20%
33157	1521	191	1.57%	9.42%	18.32%	40.84%
33012	2333	225	0.89%	3.56%	20.89%	36.89%

### **5.2.3.2 Elderly Drivers Crash Involvement (Miami)**

The crash data was extracted for the drivers in the age group more than 74 years old and the analysis was done accordingly.

Alcohol and drug related crash rates were obtained as a percentage of total crashes involving Elderly drivers in each zipcode in Dade County. It is noticeable that the highest alcohol and drug related crash rates involving Elderly drivers (10% to 12%) are in the following zipcodes in Dade County: 33184, and 33030.

Severe crash rates were obtained as a percentage of total crashes involving Elderly drivers in each zipcode area in Dade County. It is noticeable that the highest severe crash rates involving Elderly drivers (14% to 50%) are in the following zipcodes in Dade County: 33187, 33034, 33016, 33055, and 33150.

Crash rates where drivers ignored the use of safety seat belts were obtained as a percentage of total crashes involving Elderly drivers for each zipcode area in Dade County. It is noticeable that the highest crash rates without the use of safety seat belts involving Elderly drivers (25% to 50%) are in the following zipcodes in Dade County: 33128, 33193, 33132, 33184, 33030, 33130, 33054, 33142, and 33150.

Crash rates where drivers were cited for traffic violations were obtained as a percentage of total crashes involving white drivers for each zipcode in Dade County. It was found that the highest crash rates where Elderly drivers were cited for traffic violations (50% to 100%) are in the following zipcodes in Dade County: 33131, 33190, 33158, 33185, 33182, 33196, 33128, 33187, 33189, 33132, 33136, 33031, 33034, 33055, 33181, 33174, 33133, 33162, 33157, 33156, 33140, 33176, 33010, 33134, 33165, 33179, 33160, and 33056.

Table 5-11 presents the crash database for the Elderly drivers, as use in the GIS platform.

### **5.2.3.3 Overall View of Driver's Age Vs. Crash Rates (Dade County)**

After comparing the crash data for both age groups of drivers involved in traffic crashes in Dade County (Tables 5-10 and 5-11), the following characteristics were found:

- Teen-age and elderly drivers had the same crash rates without the use of safety seat belts, (up to 50%) of the total crashes in each age group.
- Elderly drivers had the highest crash rates where they were cited for traffic violations, (up to 100%) of the total crashes involving elderly drivers.
- Teen-age drivers had the highest crash rates involving alcohol and drugs, (up to 50%) of the total crashes involving teen-age drivers.
- Elderly drivers had the highest crash rates resulting in fatal or severe injuries, (up to 50%) of the total crashes involving elderly drivers.

TABLE 5-11

ELDERLY DRIVERS CRASH DATA FOR DADE COUNTY

Zipcode	Total Crashes	Elderly Drivers Invol.	% Alcohol & Drug	% Fatal & Severe	% No Seat Belt	% Cited for Violation
33178	153	0	0.00%	0.00%	0.00%	0.00%
33039	3	0	0.00%	0.00%	0.00%	0.00%
33122	25	0	0.00%	0.00%	0.00%	0.00%
33131	81	1	0.00%	0.00%	0.00%	100.00%
33190	97	1	0.00%	0.00%	0.00%	100.00%
33158	140	2	0.00%	0.00%	0.00%	100.00%
33170	220	2	0.00%	0.00%	0.00%	0.00%
33185	181	2	0.00%	0.00%	0.00%	100.00%
33182	179	2	0.00%	0.00%	0.00%	100.00%
33035	53	3	0.00%	0.00%	0.00%	0.00%
33196	542	4	0.00%	0.00%	0.00%	50.00%
33128	253	4	0.00%	0.00%	50.00%	50.00%
33187	204	4	0.00%	50.00%	0.00%	75.00%
33189	503	4	0.00%	0.00%	0.00%	50.00%
33132	91	5	0.00%	0.00%	40.00%	40.00%
33136	294	5	0.00%	0.00%	20.00%	40.00%
33031	151	5	0.00%	0.00%	0.00%	80.00%
33149	163	6	0.00%	0.00%	0.00%	33.33%
33034	217	6	0.00%	16.67%	16.67%	66.67%
33193	699	7	0.00%	0.00%	28.57%	57.14%
33032	476	7	0.00%	0.00%	0.00%	57.14%
33033	563	8	0.00%	0.00%	12.50%	50.00%
33177	889	8	0.00%	12.50%	12.50%	37.50%
33056	901	8	0.00%	0.00%	12.50%	87.50%
33167	645	8	0.00%	0.00%	0.00%	25.00%
33137	537	9	0.00%	0.00%	11.11%	11.11%
33184	512	9	11.11%	0.00%	33.33%	11.11%
33030	750	10	10.00%	10.00%	30.00%	10.00%
33166	503	10	0.00%	10.00%	20.00%	40.00%
33168	944	11	0.00%	0.00%	9.09%	18.18%
33015	1106	13	0.00%	0.00%	7.69%	38.46%
33150	844	13	0.00%	15.38%	30.77%	38.46%
33183	886	13	0.00%	7.69%	0.00%	46.15%
33016	1668	14	0.00%	14.29%	7.14%	42.86%
33055	1398	14	0.00%	14.29%	14.29%	50.00%
33172	941	15	6.67%	6.67%	13.33%	40.00%
33130	475	16	0.00%	12.50%	25.00%	37.50%
33186	1340	16	0.00%	12.50%	6.25%	25.00%
33127	805	17	0.00%	5.88%	11.76%	29.41%

Zipcode	Total Crashes	Elderly Drivers Invol.	% Alcohol & Drug	% Fatal & Severe	% No Seat Belt	% Cited for Violation
33054	735	18	0.00%	0.00%	44.44%	27.78%
33146	258	19	0.00%	0.00%	5.26%	47.37%
33169	1093	20	0.00%	5.00%	5.00%	40.00%
33181	520	20	0.00%	10.00%	5.00%	65.00%
33144	698	22	0.00%	0.00%	22.73%	40.91%
33174	768	22	0.00%	4.55%	9.09%	59.09%
33014	1023	23	4.35%	13.04%	17.39%	47.83%
33133	770	24	0.00%	0.00%	8.33%	54.17%
33173	879	25	0.00%	8.00%	12.00%	48.00%
33162	1265	27	0.00%	7.41%	7.41%	51.85%
33138	838	28	3.57%	0.00%	3.57%	39.29%
33157	1521	28	3.57%	7.14%	17.86%	64.29%
33156	695	29	6.90%	6.90%	3.45%	55.17%
33175	1438	29	0.00%	3.45%	6.90%	41.38%
33143	677	30	0.00%	6.67%	13.33%	30.00%
33142	1481	32	0.00%	3.13%	34.38%	28.13%
33141	937	33	3.03%	6.06%	18.18%	39.39%
33129	294	34	0.00%	11.76%	5.88%	47.06%
33126	1142	34	0.00%	8.82%	5.88%	47.06%
33140	477	34	0.00%	2.94%	11.76%	50.00%
33147	1678	35	2.86%	0.00%	14.29%	42.86%
33139	1030	35	0.00%	5.71%	2.86%	40.00%
33013	632	36	0.00%	5.56%	13.89%	47.22%
33176	1295	36	0.00%	5.56%	2.78%	52.78%
33145	744	37	0.00%	8.11%	13.51%	32.43%
33010	1383	38	0.00%	5.26%	18.42%	50.00%
33155	1180	39	0.00%	0.00%	10.26%	41.03%
33154	318	40	2.50%	12.50%	12.50%	40.00%
33135	911	41	2.44%	2.44%	19.51%	36.59%
33134	816	42	0.00%	4.76%	2.38%	57.14%
33161	1659	46	2.17%	6.52%	19.57%	36.96%
33165	1644	52	0.00%	9.62%	19.23%	50.00%
33180	527	53	1.89%	3.77%	9.43%	41.51%
33125	1295	53	0.00%	3.77%	13.21%	32.08%
33179	891	54	1.85%	5.56%	9.26%	53.70%
33012	2333	59	1.69%	1.69%	15.25%	42.37%
33160	730	101	0.00%	4.95%	4.95%	51.49%

## **5.2.4 Drivers' Gender Vs. Crash Types (Miami)**

This section investigated the different crash type involvements in both genders, male and female, in Dade County.

### **5.2.4.1 Male Drivers Vs. Crash Types (Miami)**

Crash data was extracted for male drivers in Dade County, and the analysis was performed according to the methodology. Following are the results obtained from this analysis.

Alcohol and drug related crash rates were obtained as a percentage of total crashes involving Male drivers in each zipcode in Dade County. It is noticeable that the highest alcohol and drug related crash rates involving Male drivers (5.9% to 14%) are in the following zipcodes in Dade County: 33122, 33190, 33158, 33149, 33034, 33128, 33189, 33130, 33033, 33030, 33172, 33141, and 33139.

Severe crash rates were obtained as a percentage of total crashes involving Male drivers in each zipcode area in Dade County. It is noticeable that the highest severe crash rates involving Male drivers (5.6% to 8%) are in the following zipcodes in Dade County: 33031, 33154, 33032, 33189, 33030, 33177, and 33157.

Crash rates where drivers ignored the use of safety seat belts were obtained as a percentage of total crashes involving Male drivers for each zipcode area in Dade County. It is noticeable that the highest crash rates without the use of safety seat belts involving Male drivers (20.2% to 30%) are in the following zipcodes in Dade County: 33039, 33122, 33035,

33149, 33170, 33034, 33136, 33128, 33130, 33054, 33133, 33030, 33127, 33125, 33142, 33142, and 33147.

Crash rates where drivers were cited for traffic violations were obtained as a percentage of total crashes involving white drivers for each zipcode in Dade County. It was found that the highest crash rates where Male drivers were cited for traffic violations (34.8% to 41%) are in the following zipcodes in Dade County: 33122, 33131, 33146, 33189, 33130, 33033, 33156, 33144, 33174, 33133, 33186, 33176, 33013, 33010, and 33165.

Table 5-12 presents the crash database for the Male drivers, as use in the GIS platform.

TABLE 5-12

MALE DRIVERS CRASH DATA FOR DADE COUNTY

Zipcode	Total Crashes	Male Drivers Invol.	% Alcohol & Drug	% Fatal & Severe	% No Seat Belt	% Cited for Violation
33039	3	3	0.00%	0.00%	33.33%	33.33%
33122	25	15	13.33%	0.00%	26.67%	40.00%
33035	53	24	4.17%	0.00%	29.17%	41.67%
33131	81	58	5.17%	1.72%	13.79%	39.66%
33132	91	61	4.92%	3.28%	18.03%	32.79%
33190	97	63	7.94%	3.17%	12.70%	31.75%
33158	140	79	10.13%	5.06%	12.66%	31.65%
33031	151	85	4.71%	7.06%	8.24%	31.76%
33149	163	88	10.23%	4.55%	22.73%	37.50%
33178	153	97	2.06%	1.03%	13.40%	26.80%
33185	181	98	2.04%	1.02%	11.22%	24.49%
33182	179	103	3.88%	0.97%	11.65%	28.16%
33187	204	134	5.22%	5.22%	12.69%	28.36%
33170	220	135	5.19%	2.96%	20.74%	34.07%
33034	217	145	8.97%	5.52%	26.90%	33.10%
33146	258	165	3.64%	3.64%	12.12%	36.97%
33129	294	175	5.14%	4.57%	16.00%	32.00%
33154	318	195	5.64%	5.64%	14.87%	34.36%
33136	294	196	6.12%	3.57%	29.08%	34.69%
33128	253	203	5.91%	2.96%	20.69%	24.14%
33181	520	269	5.20%	2.97%	12.27%	33.46%
33140	477	287	3.83%	1.05%	10.80%	33.80%
33180	527	291	2.75%	4.12%	9.97%	30.58%
33166	503	297	5.72%	3.03%	17.51%	31.65%
33032	476	302	4.64%	6.29%	18.54%	29.80%
33184	512	312	4.17%	2.56%	13.78%	34.29%
33196	542	318	5.03%	3.46%	12.58%	32.39%
33189	503	319	9.09%	5.96%	15.67%	36.68%
33130	475	334	8.08%	2.69%	22.16%	32.34%
33033	563	363	7.16%	3.58%	17.08%	39.12%
33137	537	378	2.38%	2.65%	19.31%	40.48%
33143	677	386	4.66%	3.63%	17.62%	34.46%
33156	695	399	3.26%	4.51%	13.78%	37.09%
33167	645	419	3.10%	3.82%	15.04%	32.70%
33193	699	428	4.67%	3.97%	12.85%	31.31%
33160	730	434	5.76%	2.77%	11.98%	32.72%
33054	735	445	4.04%	4.94%	21.35%	30.56%
33144	698	453	2.65%	2.43%	15.01%	35.76%
33174	768	476	4.41%	3.36%	14.29%	35.92%

Zipcode	Total Crashes	Male Drivers Invol.	% Alcohol & Drug	% Fatal & Severe	% No Seat Belt	% Cited for Violation
33145	744	478	3.56%	3.56%	18.20%	34.52%
33133	770	478	6.90%	2.93%	20.50%	35.15%
33183	886	494	6.07%	3.64%	12.75%	31.17%
33179	891	505	5.35%	2.18%	13.27%	34.65%
33030	750	505	7.92%	6.73%	21.98%	34.46%
33056	901	512	3.71%	3.32%	18.55%	32.03%
33173	879	520	5.00%	2.69%	13.85%	34.62%
33134	816	525	4.38%	4.38%	16.00%	34.67%
33177	889	552	3.99%	7.43%	13.77%	30.07%
33127	805	554	3.43%	3.07%	21.48%	33.75%
33172	941	561	6.77%	3.92%	15.51%	29.77%
33150	844	564	3.90%	3.01%	17.38%	26.77%
33138	838	568	3.17%	3.52%	19.01%	33.80%
33168	944	596	2.01%	3.19%	15.10%	29.70%
33135	911	619	5.65%	3.39%	20.03%	34.57%
33141	937	633	6.32%	3.48%	16.90%	30.65%
33015	1106	645	4.34%	3.26%	13.02%	28.84%
33169	1093	655	3.66%	3.36%	14.20%	32.67%
33014	1023	664	3.46%	4.07%	16.11%	30.57%
33139	1030	697	7.60%	4.30%	20.09%	33.29%
33155	1180	738	4.20%	3.66%	15.58%	31.57%
33126	1142	751	4.93%	2.40%	17.04%	34.09%
33186	1340	760	4.34%	4.34%	9.87%	34.87%
33176	1295	769	5.07%	2.73%	12.48%	35.76%
33162	1265	805	2.48%	3.35%	15.90%	32.42%
33013	632	840	5.00%	4.29%	18.57%	35.12%
33157	1521	879	5.12%	6.60%	15.13%	31.85%
33055	1398	879	5.01%	4.21%	16.38%	31.17%
33175	1438	891	3.70%	3.82%	14.70%	32.10%
33125	1295	895	5.03%	2.46%	22.57%	34.30%
33010	1383	964	4.46%	3.73%	20.02%	34.96%
33142	1481	984	5.69%	3.25%	23.68%	29.57%
33016	1668	1025	5.17%	2.73%	15.41%	34.54%
33147	1678	1046	5.45%	2.96%	21.99%	29.16%
33165	1644	1046	5.07%	4.21%	13.96%	34.89%
33161	1659	1079	4.45%	2.78%	14.83%	33.83%
33012	2333	1548	4.91%	3.88%	16.60%	33.14%

#### **5.2.4.2 Female Drivers Vs. Crash Types (Miami)**

Crash data was extracted for female drivers in Dade County, and the analysis was performed according to the methodology. Following are the results obtained from this analysis.

Alcohol and drug related crash rates were obtained as a percentage of total crashes involving Female drivers in each zipcode in Dade County. It is noticeable that the highest alcohol and drug related crash rates involving Female drivers (2.5% to 7%) are in the following zipcodes in Dade County: 33132, 33190, 33128, 33158, 33187, 33034, 33149, 33130, 33140, 33167, 33193, 33150, 33141, and 33139.

Severe crash rates were obtained as a percentage of total crashes involving Female drivers in each zipcode area in Dade County. It is noticeable that the highest severe crash rates involving Female drivers (6.2% to 12%) are in the following zipcodes in Dade County: 33122, 33132, 33178, 33158, 33187, 33034, 33170, 33129, 33130, 33032, 33033, 33193, 33150, 33177, and 33183.

Crash rates where drivers ignored the use of safety seat belts were obtained as a percentage of total crashes involving Female drivers for each zipcode area in Dade County. It is noticeable that the highest crash rates without the use of safety seat belts involving Female drivers (13.7% to 20%) are in the following zipcodes in Dade County: 33035, 33034, 33149, 33130, 33167, 33127, 33150, 33054, 33141, 33139, 33125, 33010, 33142, and 33147.

Crash rates where drivers were cited for traffic violations were obtained as a percentage of total crashes involving white drivers for each zipcode in Dade County. It was

found that the highest crash rates where Female drivers were cited for traffic violations (33.6% to 60%) are in the following zipcodes in Dade County: 33131, 33128, 33034, 33146, 33137, 33140, 33033, 33166, 33180, 33181, 33138, 33139, 33179, and 33161.

Table 5-13 presents the crash database for the Female drivers, as use in the GIS platform.

#### **5.2.4.3 Overall View of Driver's Gender Vs. Crash Rates (Dade County)**

After comparing the crash data regarding male and female drivers involved in traffic crashes in Dade County (Tables 5-12 and 5-13), the following characteristics were found:

- Male drivers had the highest crash rates without the use of safety seat belts, (up to 30%) of the total crashes involving male drivers.
- Female drivers had the highest crash rates where they were cited for traffic violations, (up to 60%) of the total crashes involving female drivers.
- Male and female drivers had the same crash rates involving the use of alcohol or drugs, (up to 14%) of the total crashes of each gender.
- Female drivers had the highest crash rates resulting in fatal or severe injuries, (up to 12%) of the total crashes involving Female drivers.

These observations show that male drivers are more risky than female drivers in Dade County, even though they had higher crash rates where they were cited for traffic violations, male drivers were considered more risky since they had higher rates involving alcohol and drugs, and higher crash rates without the use of seat belts, as well.

TABLE 5-13

FEMALE DRIVERS CRASH DATA FOR DADE COUNTY

Zipcode	Total Crashes	Female Drivers Invol.	% Alcohol & Drug	% Fatal & Severe	% No Seat Belt	% Cited for Violation
33039	3	0	0.00%	0.00%	0.00%	0.00%
33122	25	9	0.00%	11.11%	0.00%	11.11%
33131	81	23	0.00%	0.00%	4.35%	52.17%
33035	53	29	0.00%	0.00%	13.79%	24.14%
33132	91	29	3.45%	6.90%	10.34%	13.79%
33190	97	34	2.94%	5.88%	2.94%	32.35%
33128	253	49	6.12%	0.00%	12.24%	34.69%
33178	153	54	1.85%	9.26%	7.41%	31.48%
33158	140	60	5.00%	6.67%	6.67%	30.00%
33031	151	65	1.54%	1.54%	4.62%	36.92%
33187	204	70	2.86%	8.57%	10.00%	27.14%
33034	217	72	4.17%	6.94%	19.44%	38.89%
33149	163	73	2.74%	4.11%	16.44%	30.14%
33182	179	76	1.32%	1.32%	1.32%	22.37%
33185	181	82	0.00%	2.44%	6.10%	23.17%
33170	220	84	2.38%	9.52%	11.90%	29.76%
33146	258	92	0.00%	5.43%	5.43%	35.87%
33136	294	97	1.03%	5.15%	9.28%	32.99%
33154	318	116	1.72%	5.17%	6.03%	27.59%
33129	294	118	0.85%	7.63%	10.17%	28.81%
33130	475	138	2.90%	7.25%	16.67%	30.43%
33137	537	156	0.00%	1.92%	10.90%	36.54%
33032	476	172	2.33%	6.40%	7.56%	25.58%
33189	503	183	1.09%	4.37%	10.38%	30.05%
33140	477	185	3.24%	2.16%	9.19%	36.22%
33184	512	198	1.52%	4.55%	11.11%	28.79%
33033	563	199	1.51%	7.04%	13.07%	34.67%
33166	503	205	2.93%	2.93%	7.80%	34.63%
33196	542	224	0.45%	3.57%	5.80%	27.23%
33167	645	224	2.68%	5.80%	14.73%	22.77%
33180	527	235	2.13%	2.55%	8.94%	36.17%
33030	750	242	2.48%	4.13%	11.98%	33.47%
33144	698	244	2.05%	6.15%	10.66%	27.46%
33127	805	248	1.21%	3.63%	16.13%	31.45%
33181	520	248	1.61%	4.03%	10.89%	34.68%
33145	744	258	0.78%	3.49%	12.02%	28.29%
33193	699	265	2.64%	7.17%	5.28%	34.72%
33138	838	266	2.26%	2.63%	12.03%	37.59%
33150	844	273	2.93%	6.23%	15.75%	31.50%

Zipcode	Total Crashes	Female Drivers Invol.	% Alcohol & Drug	% Fatal & Severe	% No Seat Belt	% Cited for Violation
33134	816	285	1.05%	5.61%	12.98%	30.18%
33133	770	286	2.45%	3.85%	13.64%	32.52%
33054	735	288	1.04%	4.17%	14.58%	25.69%
33135	911	288	2.43%	4.17%	16.32%	28.47%
33143	677	290	0.34%	5.17%	8.97%	30.00%
33174	768	291	1.03%	5.50%	9.97%	33.33%
33160	730	295	1.69%	3.73%	7.80%	32.54%
33156	695	295	1.69%	4.75%	5.42%	29.49%
33141	937	296	3.04%	3.38%	14.19%	31.42%
33139	1030	326	2.76%	4.29%	17.18%	35.58%
33177	889	332	1.81%	8.43%	8.73%	27.41%
33168	944	344	1.45%	4.65%	9.30%	29.36%
33013	632	353	0.85%	4.25%	10.76%	30.31%
33173	879	356	2.25%	5.06%	8.99%	32.58%
33014	1023	358	0.84%	4.19%	13.13%	29.05%
33172	941	376	1.06%	2.93%	8.51%	28.99%
33179	891	381	1.84%	3.15%	9.45%	33.60%
33183	886	387	0.78%	7.24%	6.46%	32.82%
33056	901	389	0.51%	5.14%	13.37%	25.19%
33126	1142	389	1.54%	3.08%	10.28%	32.39%
33125	1295	396	0.51%	4.04%	16.41%	29.55%
33010	1383	414	1.45%	4.11%	14.25%	29.71%
33169	1093	437	0.69%	3.20%	10.07%	29.98%
33155	1180	440	0.45%	5.45%	7.73%	31.36%
33162	1265	454	0.88%	5.73%	11.23%	31.06%
33015	1106	455	2.42%	3.08%	8.79%	27.69%
33142	1481	492	1.02%	2.44%	16.87%	27.44%
33055	1398	515	1.55%	5.24%	10.49%	27.77%
33176	1295	524	1.15%	4.96%	6.11%	30.92%
33175	1438	542	0.74%	4.24%	7.20%	26.94%
33186	1340	573	1.40%	3.84%	6.28%	31.24%
33161	1659	575	1.22%	4.35%	12.00%	33.74%
33165	1644	592	0.84%	5.24%	8.95%	29.22%
33147	1678	624	1.60%	4.81%	18.59%	27.08%
33016	1668	637	2.04%	3.77%	12.09%	30.14%
33157	1521	638	1.41%	5.17%	10.34%	27.12%
33012	2333	773	0.91%	3.88%	13.45%	27.43%

### **5.3 Crash Involvement in Jacksonville (Duval County)**

Following is an explanation of each of the demographic characteristics under investigation in Duval County, as they relate to the different crash types.

#### **5.3.1 Income Level Vs. Crash Types (Jacksonville)**

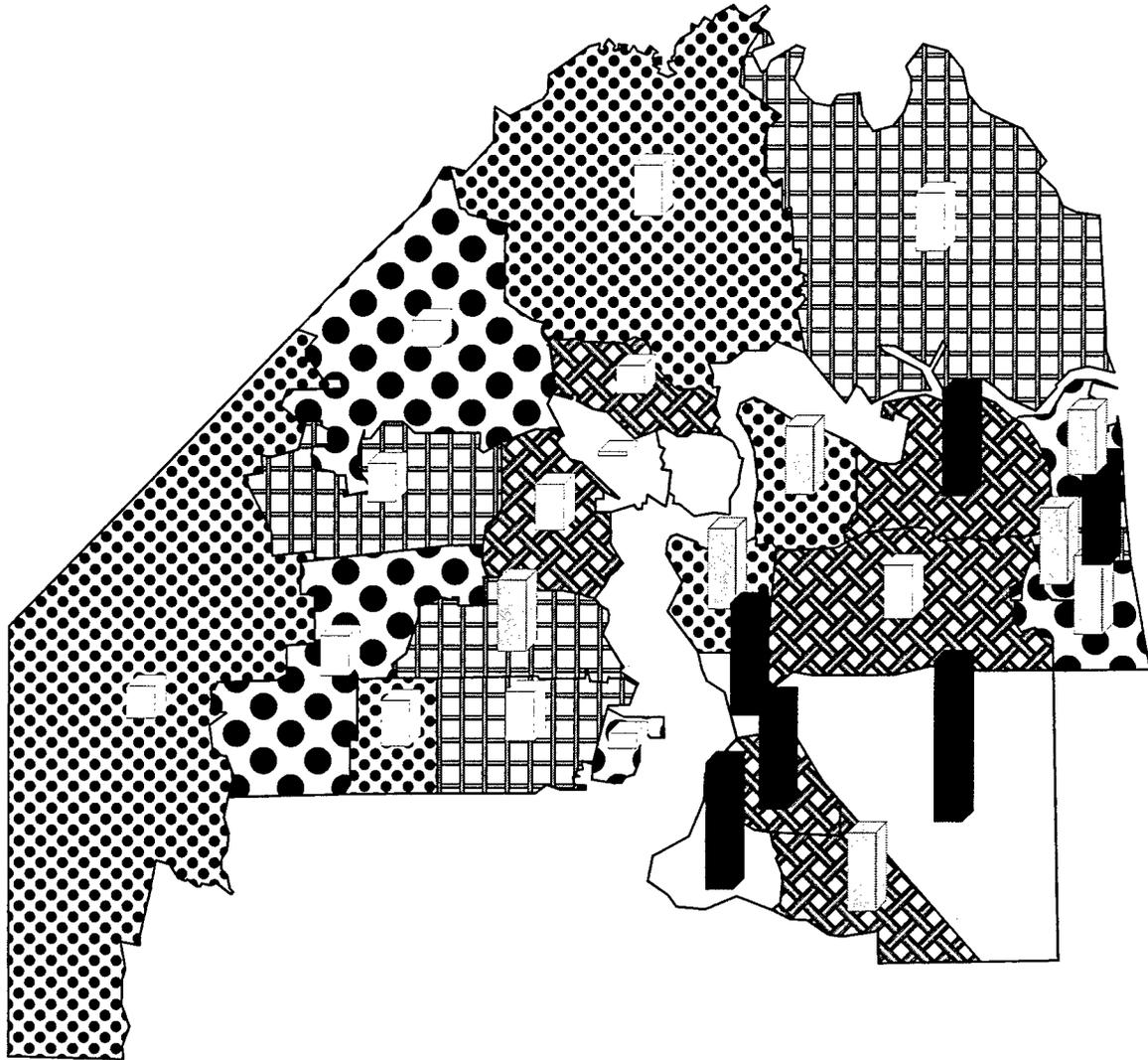
From the previous analysis of Hillsborough County, it was found that there is a weak relationship between the income level and the severity of the crash. In addition, there was no relationship found between the income level and the driver being cited for traffic violation. For this reason, income level was investigated only against the alcohol and drug related crashes, and crashes without the use of seat belts.

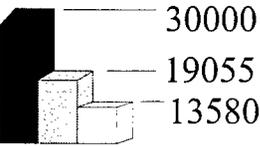
##### **5.3.1.1 Income Level Vs. Alcohol and Drug Related Crashes (Jacksonville)**

The relationship between income level and the alcohol and drug related crash rates was investigated in this section. (Figure 5-5) represents the alcohol and drug related crashes as a percentage of the total crashes in each zipcode area, versus the 'per capita income' for each zipcode. The income level is presented by bar charts, while the crash rates are presented by color themes. Figure 5-5 reflects the high relationship between the low income areas and the high alcohol and drug related crash rates. This observation is similar to that found in Hillsborough County.

In the effort of locating the high crash risk areas, the following zipcodes in Duval County were found to have the highest alcohol and drug related crash rates (between 7.4%

**FIGURE 5-5**  
**Alcohol and Drug Related Crashes**  
**Vs. Income Level (Duval County)**



Alcohol and Drug Related Crashes	
% of Total Crashes	Per Capita Income 1995
 3.00 to 5.30	
 5.30 to 5.90	
 5.90 to 7.00	
 7.00 to 7.42	
 7.42 to 11	

and 11%) of the total crashes in the respective zipcode: 32219, 32221, 32212, 32250, 32233, and 32224.

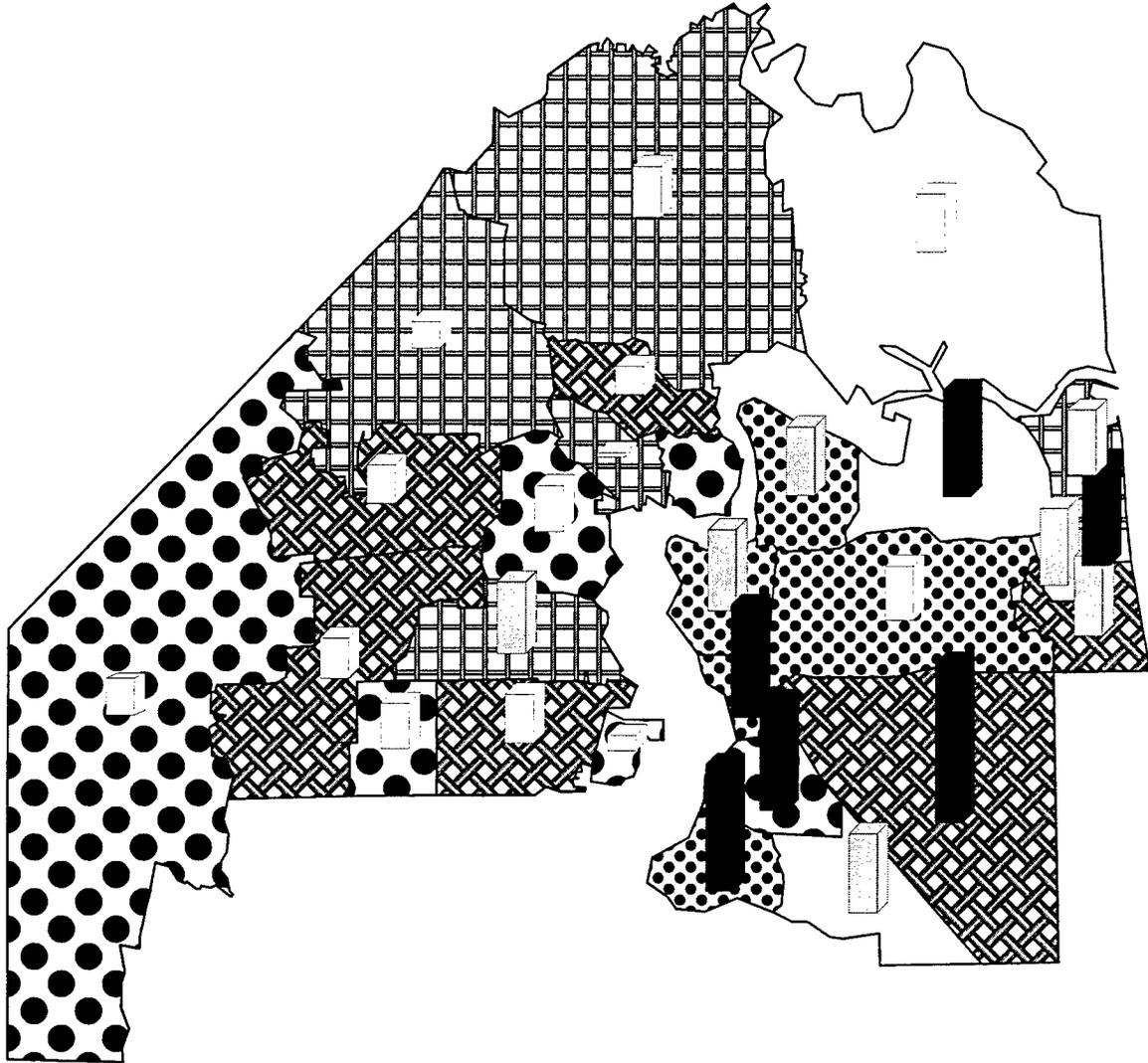
#### **5.3.1.2 Income Level Vs. Crashes Without Use of Seat Belts (Jacksonville)**

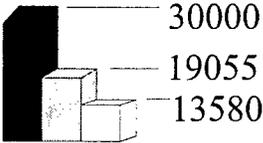
The relationship between income level and crashes without use of seat belts was investigated. (Figure 5-6) represents crashes without the use of seat belts as a percentage of the total crashes in each zipcode area versus the 'per capita income' for each zipcode. The income level is presented by bar charts, while the crash rates are presented by color themes.

There is a strong relationship between the low income areas and the high crash rates without the use of seat belts, as seen in Figure 5-6. This is also consistent with the observations in Hillsborough County as well.

The following zipcode areas in Duval County have the highest crash rates without the use of seat belts (between 16.8% and 30%) of the total crashes in the respective zipcode: 32212, 32257, 32206, 32205, 32222, and 32234.

**FIGURE 5-6**  
**Crashes Without Seat Belts**  
**Vs. Income Level (Duval County)**



Crashes Without Seat Belts	
% of Total Crashes	Per Capita Income 1995
 0.0 to 12.60	 30000 19055 13580
 12.60 to 14.10	
 14.10 to 15.53	
 15.53 to 16.80	
 16.80 to 30.00	

### **5.3.2 Driver's Race Vs. Crash Types (Jacksonville)**

Only African American race was found to have high crash rates in Duval County as seen in chapter 4 of this report; therefore, African American race was investigated against the four types of crashes under study.

#### **5.3.2.1 African American Drivers Vs. Crash Type (Jacksonville)**

Alcohol and drug related crash rates were obtained as a percentage of total crashes involving African American drivers in each zipcode in Duval County. It is noticeable that the highest alcohol and drug related crash rates involving African American drivers (8% to 14%) are in the following zipcodes in Duval County: 32226, 32212, and 32256.

Severe crash rates were obtained as a percentage of total crashes involving African American drivers in each zipcode area in Duval County. It is noticeable that the highest severe crash rates involving African American drivers (9% to 20%) are in the following zipcodes in Duval County: 32234, and 32221.

Crash rates where drivers ignored the use of safety seat belts were obtained as a percentage of total crashes involving African American drivers for each zipcode area in Duval County. It is noticeable that the highest crash rates without the use of safety seat belts involving African American drivers (19% to 40%) are in the following zipcodes in Duval County: 32224, 32212, 32234, 32220, 32233, and 32205.

Crash rates where drivers were cited for traffic violations were obtained as a percentage of total crashes involving white drivers for each zipcode in Duval County. It was found that the highest crash rates where African American drivers were cited for traffic

violations (40% to 55%) are in the following zipcodes in Duval County: 32226, 32234, 32220, and 32221.

Table 5-14 presents the crash database for the African American drivers, as use in the GIS platform.

**TABLE 5-14**

**AFRICAN AMERICAN DRIVERS CRASH DATA FOR DUVAL COUNTY**

Zipcode	Total Crashes	African American Drivers Invol.	% Alcohol & Drug	% Fatal & Severe	% No Seat Belt	% Cited for Violation
32266	127	1	0.00%	0.00%	0.00%	0.00%
32222	113	6	0.00%	0.00%	0.00%	16.67%
32226	167	12	8.33%	8.33%	0.00%	41.67%
32224	226	14	0.00%	0.00%	21.43%	35.71%
32212	46	15	13.33%	0.00%	33.33%	26.67%
32234	139	15	6.67%	13.33%	40.00%	53.33%
32220	245	15	6.67%	0.00%	20.00%	40.00%
32258	159	21	4.76%	0.00%	14.29%	38.10%
32223	454	29	6.90%	6.90%	13.79%	31.03%
32221	342	39	2.56%	10.26%	17.95%	41.03%
32250	551	40	7.50%	2.50%	17.50%	22.50%
32257	352	64	1.56%	7.81%	12.50%	23.44%
32256	496	72	9.72%	2.78%	18.06%	34.72%
32217	493	83	0.00%	4.82%	15.66%	38.55%
32233	525	89	5.62%	1.12%	21.35%	26.97%
32225	778	124	2.42%	5.65%	8.87%	29.03%
32219	283	132	6.82%	3.79%	12.12%	26.52%
32216	869	163	2.45%	4.29%	14.11%	25.15%
32244	957	174	5.75%	7.47%	16.09%	27.59%
32205	940	202	5.45%	7.43%	19.31%	25.25%
32207	774	221	4.07%	4.98%	15.38%	30.77%
32218	834	270	4.07%	6.30%	14.81%	25.56%
32211	1094	281	2.85%	3.56%	14.23%	27.05%
32210	1397	298	5.37%	4.36%	15.77%	34.90%
32206	551	423	3.78%	6.38%	17.26%	32.39%
32208	1043	743	3.63%	6.06%	15.48%	29.48%
32209	1207	1148	3.75%	4.36%	16.20%	32.40%

### **5.3.3 Drivers' Age Vs. Crash Type (Jacksonville)**

As mentioned before, this report viewed two groups of drivers' age, teen-age drivers (ages < 20 years old), and elderly drivers (ages > 74 years old). Each age group, in Duval County, was investigated against the four types of crashes under study.

#### **5.3.3.1 Teen-age Drivers Crash Involvement (Jacksonville)**

The crash data was extracted for the drivers in the age group less than 20 years old and the analysis was done accordingly.

Alcohol and drug related crash rates were obtained as a percentage of total crashes involving Teen-age drivers in each zipcode in Duval County. It is noticeable that the highest alcohol and drug related crash rates involving Teen-age drivers (3% to 7%) are in the following zipcodes in Duval County: 32258, 32224, 32220, 32221, 32250, 32205, and 32257.

Severe crash rates were obtained as a percentage of total crashes involving Teen-age drivers in each zipcode area in Duval County. It is noticeable that the highest severe crash rates involving Teen-age drivers (13% to 22%) are in the following zipcodes in Duval County: 32222, 32234, and 32220.

Crash rates where drivers ignored the use of safety seat belts were obtained as a percentage of total crashes involving Teen-age drivers for each zipcode area in Duval County. It is noticeable that the highest crash rates without the use of safety seat belts involving Teen-age drivers (22% to 60%) are in the following zipcodes in Duval County: 32219, 32205, 32218, and 32209.

Crash rates where drivers were cited for traffic violations were obtained as a percentage of total crashes involving white drivers for each zipcode in Duval County. It was found that the highest crash rates where Teen-age drivers were cited for traffic violations (53.4% to 60%) are in the following zipcodes in Duval County: 32266, 32226, 32219, 32223, and 32211.

Table 5-15 presents the crash database for the Teen-age drivers, as use in the GIS platform.

**TABLE 5-15**  
**TEEN-AGE DRIVERS CRASH DATA FOR DUVAL COUNTY**

Zipcode	Total Crashes	Teen-age Drivers Invol.	% Alcohol & Drug	% Fatal & Severe	% No Seat Belt	% Cited for Violation
32212	46	5	0.00%	0.00%	60.00%	40.00%
32222	113	10	0.00%	20.00%	10.00%	30.00%
32266	127	17	0.00%	0.00%	11.76%	58.82%
32234	139	19	0.00%	21.05%	10.53%	31.58%
32258	159	22	4.55%	0.00%	13.64%	45.45%
32226	167	25	0.00%	4.00%	20.00%	56.00%
32219	283	28	0.00%	7.14%	25.00%	53.57%
32224	226	28	3.57%	0.00%	7.14%	42.86%
32220	245	29	6.90%	13.79%	13.79%	41.38%
32256	496	35	0.00%	2.86%	17.14%	45.71%
32221	342	49	4.08%	8.16%	20.41%	53.06%
32217	493	50	2.00%	0.00%	20.00%	50.00%
32233	525	52	0.00%	5.77%	11.54%	46.15%
32206	551	53	0.00%	5.66%	16.98%	37.74%
32250	551	59	3.39%	5.08%	11.86%	42.37%
32207	774	68	2.94%	1.47%	14.71%	48.53%
32223	454	74	2.70%	8.11%	16.22%	54.05%
32216	869	91	1.10%	7.69%	17.58%	52.75%
32225	778	91	2.20%	5.49%	15.38%	48.35%
32244	957	94	1.06%	9.57%	20.21%	46.81%
32211	1094	94	1.06%	3.19%	10.64%	54.26%
32205	940	94	3.19%	10.64%	22.34%	34.04%
32257	352	96	4.17%	7.29%	13.54%	47.92%
32218	834	99	2.02%	5.05%	22.22%	37.37%
32208	1043	106	1.89%	7.55%	16.04%	35.85%
32209	1207	112	0.89%	2.68%	22.32%	41.07%
32210	1397	165	1.21%	7.88%	15.15%	40.61%

### **5.3.3.2 Elderly Drivers Crash Involvement (Jacksonville)**

The crash data was extracted for the drivers in the age group more than 74 years old and the analysis was done accordingly.

Alcohol and drug related crash rates were obtained as a percentage of total crashes involving Elderly drivers in each zipcode in Duval County. It is noticeable that the highest alcohol and drug related crash rates involving Elderly drivers (8% to 14%) are in the following zipcodes in Duval County: 32225, and 32207.

Severe crash rates were obtained as a percentage of total crashes involving Elderly drivers in each zipcode area in Duval County. It is noticeable that the highest severe crash rates involving Elderly drivers (15% to 35%) are in the following zipcodes in Duval County: 32234, 32220, 32221, 32233, and 32244.

Crash rates where drivers ignored the use of safety seat belts were obtained as a percentage of total crashes involving Elderly drivers for each zipcode area in Duval County. It is noticeable that the highest crash rates without the use of safety seat belts involving Elderly drivers (15% to 35%) are in the following zipcodes in Duval County: 32234, 32220, 32224, 32206, 32216, and 32205.

Crash rates where drivers were cited for traffic violations were obtained as a percentage of total crashes involving white drivers for each zipcode in Duval County. It was found that the highest crash rates where Elderly drivers were cited for traffic violations (60% to 100%) are in the following zipcodes in Duval County: 32234, 32220, 32221, 32224, 32233, and 32206.

Table 5-16 presents the crash database for the Elderly drivers, as use in the GIS platform.

### **5.3.3.3 Overall View of Driver's Age Vs. Crash Rates (Duval County)**

After comparing the crash data for both age groups under investigation in Duval County (Tables 5-15 and 5-16), the following characteristics were found:

- Elderly drivers had the highest crash rates resulting in fatal or severe injuries, (up to 35%) of the total crashes involving Elderly drivers.
- Elderly drivers had the highest crash rates where they were cited for traffic violations, (up to 100%) of the total crashes involving Elderly drivers.
- Teen-age drivers had the highest crash rates without the use of seat belts, (up to 60%) of the total crashes involving teen-age drivers.
- Crash rates involving alcohol or drugs were roughly close in both age groups (around 8% of total crashes in each age group), but by the looking at the frequency of the crashes involving alcohol and drugs, it was noticed that teen-age drivers had high crash rates in many zipcode areas. The elderly drivers had high rates, involving alcohol and drugs, only in one zipcode area (32210). This concludes that young drivers are more involved in alcohol and drug related crashes than elderly drivers in Duval County.

TABLE 5-16

ELDERLY DRIVERS CRASH DATA FOR DUVAL COUNTY

Zipcode	Total Crashes	Elderly Drivers Invol.	% Alcohol & Drug	% Fatal & Severe	% No Seat Belt	% Cited for Violation
32222	113	0	0.00%	0.00%	0.00%	0.00%
32258	159	1	0.00%	0.00%	0.00%	0.00%
32212	46	2	0.00%	0.00%	0.00%	50.00%
32234	139	3	0.00%	33.33%	33.33%	66.67%
32266	127	3	0.00%	0.00%	0.00%	33.33%
32226	167	4	0.00%	0.00%	0.00%	75.00%
32220	245	6	0.00%	33.33%	16.67%	66.67%
32221	342	6	0.00%	16.67%	0.00%	100.00%
32224	226	6	0.00%	0.00%	33.33%	66.67%
32219	283	7	0.00%	0.00%	14.29%	42.86%
32257	352	8	0.00%	12.50%	0.00%	37.50%
32223	454	9	0.00%	0.00%	11.11%	22.22%
32256	496	11	0.00%	0.00%	0.00%	27.27%
32233	525	11	0.00%	18.18%	9.09%	63.64%
32225	778	12	8.33%	8.33%	8.33%	58.33%
32244	957	12	0.00%	16.67%	8.33%	33.33%
32218	834	17	0.00%	11.76%	5.88%	41.18%
32217	493	19	0.00%	10.53%	10.53%	42.11%
32206	551	20	5.00%	0.00%	35.00%	60.00%
32250	551	22	0.00%	4.55%	9.09%	31.82%
32216	869	24	4.17%	12.50%	16.67%	54.17%
32208	1043	27	3.70%	7.41%	11.11%	33.33%
32211	1094	30	3.33%	6.67%	13.33%	50.00%
32205	940	32	0.00%	6.25%	15.63%	43.75%
32207	774	33	0.00%	9.09%	6.06%	33.33%
32210	1397	37	13.51%	5.41%	13.51%	43.24%
32209	1207	53	3.77%	3.77%	13.21%	39.62%

### **5.3.4 Drivers' Gender Vs. Crash Types (Jacksonville)**

This section investigated the different crash type involvements in both genders, male and female, in Duval County.

#### **5.3.4.1 Male Drivers Vs. Crash Types (Jacksonville)**

Crash data was extracted for male drivers in Duval County, and the analysis was performed according to the methodology. Following are the results obtained from this analysis.

Alcohol and drug related crash rates were obtained as a percentage of total crashes involving Male drivers in each zipcode in Duval County. It is noticeable that the highest alcohol and drug related crash rates involving Male drivers (10.37% to 15%) are in the following zipcodes in Duval County: 32226, 32219, 32233, 32250, 32244, and 32210.

Severe crash rates were obtained as a percentage of total crashes involving Male drivers in each zipcode area in Duval County. It is noticeable that the highest severe crash rates involving Male drivers (8% to 10%) are in the following zipcodes in Duval County: 32234, and 32220.

Crash rates where drivers ignored the use of safety seat belts were obtained as a percentage of total crashes involving Male drivers for each zipcode area in Duval County. It is noticeable that the highest crash rates without the use of safety seat belts involving Male drivers (19.6% to 30%) are in the following zipcodes in Duval County: 32234, 32206, 32205, and 32208.

Crash rates where drivers were cited for traffic violations were obtained as a percentage of total crashes involving white drivers for each zipcode in Duval County. It was found that the highest crash rates where Male drivers were cited for traffic violations (38% to 45%) are in the following zipcodes in Duval County: 32212, 32234, 32226, and 32224.

Table 5-17 presents the crash database for the Male drivers, as use in the GIS platform.

**TABLE 5-17**

**MALE DRIVERS CRASH DATA FOR DUVAL COUNTY**

Zipcode	Total Crashes	Male Drivers Invol.	% Alcohol & Drug	% Fatal & Severe	% No Seat Belt	% Cited for Violation
32212	46	34	14.71%	2.94%	29.41%	38.24%
32222	113	70	8.57%	5.71%	22.86%	17.14%
32266	127	74	5.41%	5.41%	12.16%	36.49%
32234	139	91	7.69%	9.89%	19.78%	40.66%
32258	159	102	7.84%	4.90%	9.80%	33.33%
32226	167	106	10.38%	2.83%	14.15%	38.68%
32224	226	135	9.63%	2.22%	14.07%	43.70%
32220	245	158	8.86%	8.86%	17.72%	30.38%
32219	283	161	11.18%	6.83%	19.25%	34.16%
32221	342	212	9.91%	5.19%	16.98%	33.96%
32223	454	256	5.08%	3.91%	15.63%	31.64%
32256	496	269	6.32%	2.97%	15.24%	33.09%
32217	493	271	3.69%	5.17%	16.61%	33.58%
32233	525	292	12.67%	2.74%	19.52%	35.62%
32250	551	305	11.80%	4.59%	19.34%	31.15%
32206	551	318	6.29%	5.03%	19.81%	36.48%
32257	352	340	4.41%	3.82%	13.24%	32.35%
32225	778	431	9.28%	3.71%	13.69%	33.64%
32207	774	444	8.11%	4.50%	15.09%	34.23%
32218	834	470	8.51%	5.53%	18.72%	32.77%
32216	869	499	9.02%	5.01%	17.64%	37.68%
32205	940	545	8.99%	5.50%	22.75%	32.84%
32244	957	546	10.99%	7.14%	17.58%	33.52%
32208	1043	598	7.19%	6.02%	20.57%	35.28%
32211	1094	616	8.12%	3.90%	13.64%	34.25%
32209	1207	674	5.79%	4.30%	19.14%	32.79%
32210	1397	810	10.37%	4.81%	18.89%	37.04%

#### **5.3.4.2 Female Drivers Vs. Crash Types (Jacksonville)**

Crash data was extracted for female drivers in Duval County, and the analysis was performed according to the methodology. Following are the results obtained from this analysis.

Alcohol and drug related crash rates were obtained as a percentage of total crashes involving Female drivers in each zipcode in Duval County. It is noticeable that the highest alcohol and drug related crash rates involving Female drivers (4.4% to 10%) are in the following zipcodes in Duval County: 32266, 32258, 32220, 32224, 32221, and 32250.

Severe crash rates were obtained as a percentage of total crashes involving Female drivers in each zipcode area in Duval County. It is noticeable that the highest severe crash rates involving Female drivers (9% to 12%) are in the following zipcodes in Duval County: 32226, 32220, and 32205.

Crash rates where drivers ignored the use of safety seat belts were obtained as a percentage of total crashes involving Female drivers for each zipcode area in Duval County. It is noticeable that the highest crash rates without the use of safety seat belts involving Female drivers (13% to 16%) are in the following zipcodes in Duval County: 32234, 32233, 32206, and 32205.

Crash rates where drivers were cited for traffic violations were obtained as a percentage of total crashes involving white drivers for each zipcode in Duval County. It was found that the highest crash rates where Female drivers were cited for traffic violations (34.1% to 42%) are in the following zipcodes in Duval County: 32266, 32226, 32221, 32223, and 32250.

Table 5-18 presents the crash database for the Female drivers, as use in the GIS platform.

#### **5.3.4.3 Overall View of Driver's Gender Vs. Crash Rates (Duval County)**

After comparing the crash data regarding male and female drivers involved in traffic crashes in Duval County (Tables 5-17 and 5-18), the following characteristics were found:

- Male drivers had higher crash rates without the use of safety seat belts, (up to 30%) of the total crashes involving male drivers.
- Male drivers had higher crash rates where they were cited for traffic violations, (up to 45%) of the total crashes involving male drivers.
- Male drivers had the higher crash rates involving the use of alcohol or drugs, (up to 15%) of the total crashes involving male drivers.
- Female drivers had the highest crash rates resulting in fatal or severe injuries, (up to 12%) of the total crashes involving Female drivers.

Again, these observations show that male drivers are more risky than female drivers in Duval County, as well.

TABLE 5-18

FEMALE DRIVERS CRASH DATA FOR DUVAL COUNTY

Zipcode	Total Crashes	Female Drivers Invol.	% Alcohol & Drug	% Fatal & Severe	% No Seat Belt	% Cited for Violation
32212	46	12	0.00%	0.00%	0.00%	25.00%
32222	113	41	0.00%	7.32%	7.32%	31.71%
32234	139	46	2.17%	4.35%	13.04%	26.09%
32266	127	53	9.43%	0.00%	9.43%	41.51%
32258	159	56	5.36%	1.79%	7.14%	32.14%
32226	167	61	1.64%	9.84%	9.84%	39.34%
32220	245	87	4.60%	11.49%	10.34%	29.89%
32224	226	91	6.59%	2.20%	7.69%	34.07%
32219	283	119	2.52%	2.52%	10.92%	23.53%
32221	342	128	5.47%	8.59%	11.72%	39.06%
32223	454	194	2.06%	3.61%	12.37%	35.05%
32217	493	220	2.73%	5.45%	9.55%	34.09%
32256	496	224	4.02%	3.13%	12.95%	32.59%
32233	525	229	3.06%	4.37%	13.54%	33.19%
32206	551	229	1.75%	9.17%	13.54%	30.57%
32250	551	240	6.25%	4.17%	10.00%	34.17%
32257	352	290	2.41%	5.86%	11.38%	31.72%
32207	774	323	2.48%	4.02%	9.60%	33.13%
32225	778	345	3.48%	2.61%	9.57%	31.88%
32218	834	359	2.23%	8.64%	11.70%	30.36%
32216	869	367	4.09%	4.90%	8.72%	32.70%
32205	940	387	3.62%	9.04%	15.76%	29.72%
32244	957	405	2.47%	7.65%	10.86%	26.42%
32208	1043	439	4.33%	5.69%	8.88%	25.28%
32211	1094	473	2.54%	4.23%	12.69%	30.23%
32209	1207	526	1.33%	4.18%	13.88%	31.75%
32210	1397	573	3.32%	5.58%	11.17%	30.89%

## **5.4 Crash Involvement in Tallahassee (Leon County)**

Following is an explanation of each of the demographic characteristics under investigation in Leon County, as they relate to the different crash types.

### **5.4.1 Income Level Vs. Crash Types (Tallahassee)**

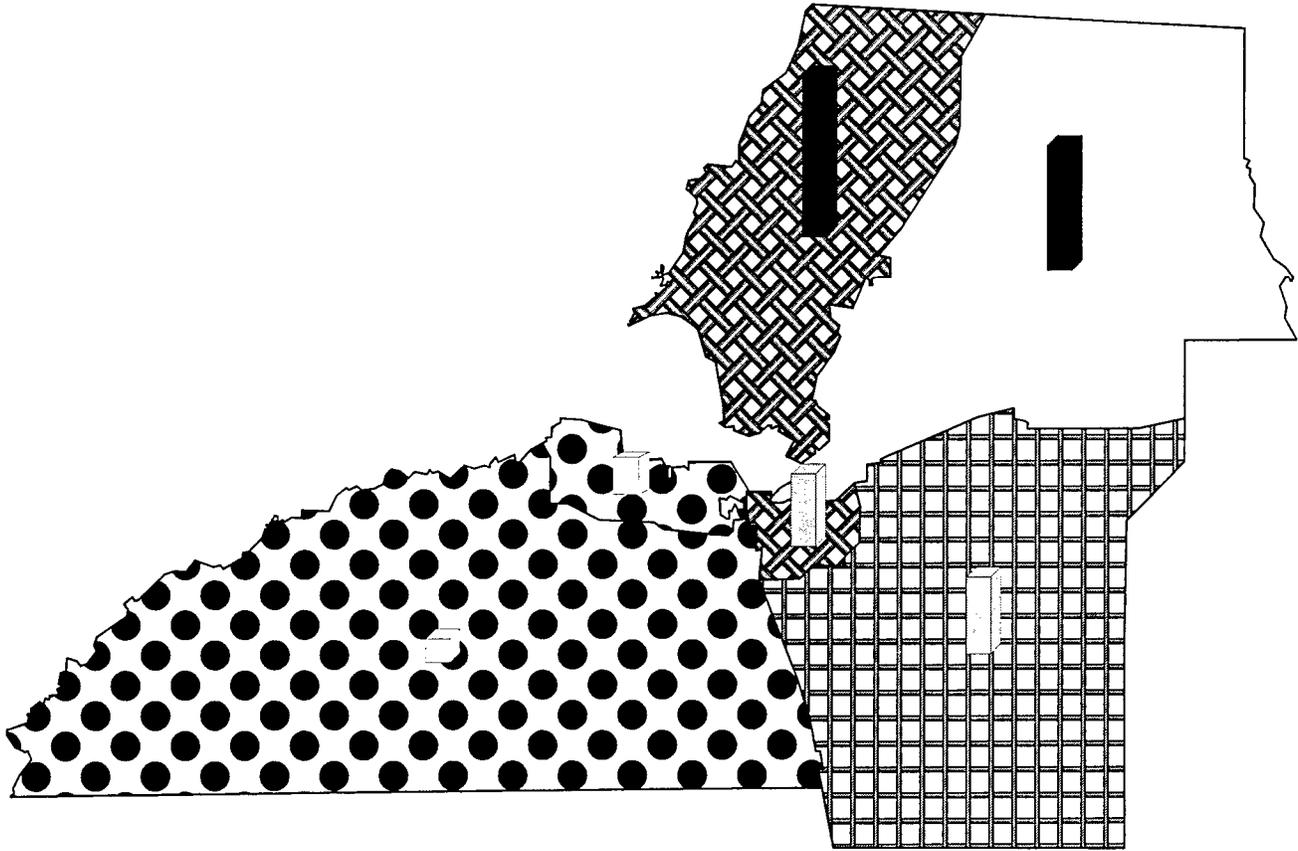
From the previous analysis of Hillsborough County, it was found that there is a weak relationship between the income level and the severity of the crash. In addition, there was no relationship found between the income level and the driver being cited for traffic violation. For this reason, income level was investigated only against the alcohol and drug related crashes, and crashes without the use of seat belts.

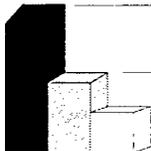
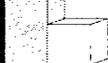
#### **5.4.1.1 Income Level Vs. Alcohol and Drug Related Crashes (Tallahassee)**

The relationship between income level and the alcohol and drug related crash rates was investigated in this section. (Figure 5-7) represents the alcohol and drug related crashes as a percentage of the total crashes in each zipcode area, versus the 'per capita income' for each zipcode. The income level is presented by bar charts, while the crash rates are presented by color themes. Figure 5-7 reflects the high relationship between the low income areas and the high alcohol and drug related crash rates. This observation is similar to that found in Hillsborough County.

In the effort of locating the high crash risk areas, the following zipcodes in Leon County were found to have the highest alcohol and drug related crash rates (between 9.3% and 11%) of the total crashes in the respective zipcode: 32310, and 32304.

**FIGURE 5-7**  
**Alcohol and Drug Related Crashes**  
**Vs. Income Level (Leon County)**



Alcohol and Drug Related Crashes	
% of Total Crashes	Per Capita Income 1995
 6.00 to 6.40	 30000
 6.40 to 9.00	 19310
 9.00 to 9.30	 13960
 9.30 to 11.00	

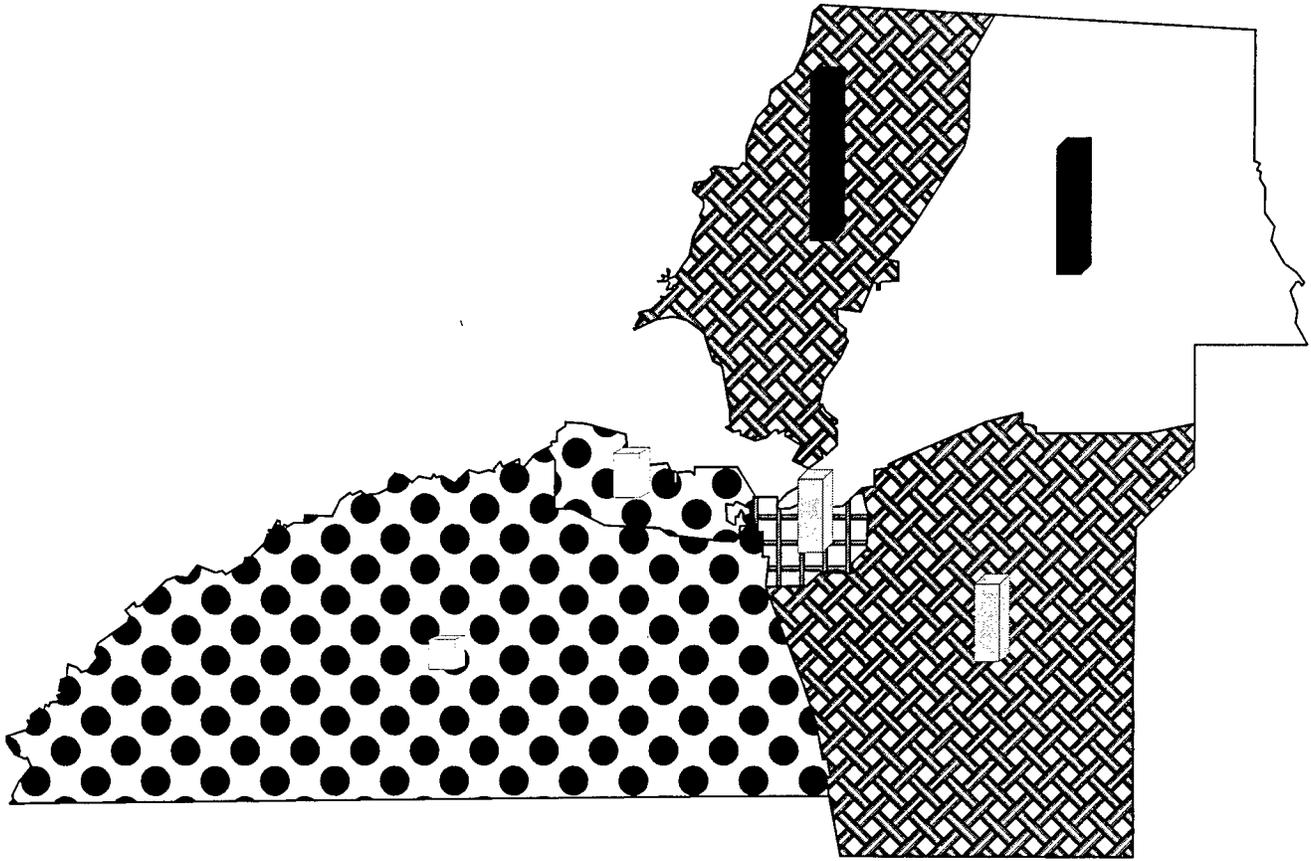
#### **5.4.1.2 Income Level Vs. Crashes Without Use of Seat Belts (Tallahassee)**

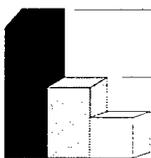
The relationship between income level and crashes without use of seat belts was investigated. (Figure 5-8) represents crashes without the use of seat belts as a percentage of the total crashes in each zipcode area versus the 'per capita income' for each zipcode. The income level is presented by bar charts, while the crash rates are presented by color themes.

There is a strong relationship between the low income areas and the high crash rates without the use of seat belts, as seen in Figure 5-8. This is also consistent with the observations in Hillsborough County as well.

The following zipcode areas in Leon County have the highest crash rates without the use of seat belts (between 21% and 30%) of the total crashes in the respective zipcode: 32310, and 32304.

**FIGURE 5-8**  
**Crashes Without Seat Belts**  
**Vs. Income Level (Leon County)**



Crashes Without Seat Belts	
% of Total Crashes	Per Capita Income 1995
 10.00 to 13.00	 30000 19310 13960
 13.00 to 20.00	
 20.00 to 21.40	
 21.40 to 30.00	

#### **5.4.2 Driver's Race Vs. Crash Types (Tallahassee)**

Only African American race was found to have high risks in Leon County as seen in chapter 4 of this report; therefore, African American race was investigated against the four types of crashes under study.

##### **5.4.2.1 African American Drivers Vs. Crash Types (Tallahassee)**

Alcohol and drug related crash rates were obtained as a percentage of total crashes involving African American drivers in each zipcode in Leon County. It is noticeable that the highest alcohol and drug related crash rates involving African American drivers (7% to 10%) are in the following zipcodes in Leon County: 32312, and 32310.

Severe crash rates were obtained as a percentage of total crashes involving African American drivers in each zipcode area in Leon County. It is noticeable that the highest severe crash rates involving African American drivers (5.4% to 7%) are in the following zipcodes in Leon County: 32312, 32311, and 32308.

Crash rates where drivers ignored the use of safety seat belts were obtained as a percentage of total crashes involving African American drivers for each zipcode area in Leon County. It is noticeable that the highest crash rates without the use of safety seat belts involving African American drivers (25.5% to 30%) are in the following zipcodes in Leon County: 32312, and 32310.

Crash rates where drivers were cited for traffic violations were obtained as a percentage of total crashes involving white drivers for each zipcode in Leon County. It was

found that the highest crash rates where African American drivers were cited for traffic violations (27.6% to 33%) are in the following zipcodes in Leon County: 32301, and 32304.

Table 5-19 presents the crash database for the African American drivers, as use in the GIS platform.

**TABLE 5-19**

**AFRICAN AMERICAN DRIVERS CRASH DATA FOR LEON COUNTY**

Zipcode	Total Crashes	African American Drivers Invol.	% Alcohol & Drug	% Fatal & Severe	% No Seat Belt	% Cited for Violation
32312	491	66	9.09%	6.06%	25.76%	24.24%
32311	454	109	5.50%	5.50%	19.27%	27.52%
32308	891	196	3.06%	5.10%	14.29%	22.96%
32301	749	284	5.63%	2.82%	23.59%	27.82%
32304	986	358	6.15%	3.63%	25.42%	32.12%
32310	845	397	7.30%	4.03%	27.20%	27.20%

**5.4.3 Drivers' Age Vs. Crash Type (Tallahassee)**

As mentioned before, this report views two groups of drivers' age, teen-age drivers (ages < 20 years old), and elderly drivers (ages > 74 years old). Each age group, in Leon County, was investigated against the four types of crashes under study.

**5.4.3.1 Teen-age Drivers Crash Involvement (Tallahassee)**

The crash data was extracted for the drivers in the age group less than 20 years old and the analysis was done accordingly.

Alcohol and drug related crash rates were obtained as a percentage of total crashes involving Teen-age drivers in each zipcode in Leon County. It is noticeable that the highest

alcohol and drug related crash rates involving Teen-age drivers (6% to 13%) are in the following zipcodes in Leon County: 32311, and 32304.

Severe crash rates were obtained as a percentage of total crashes involving Teen-age drivers in each zipcode area in Leon County. It is noticeable that the highest severe crash rates involving Teen-age drivers (5.6% to 9%) are in the following zipcodes in Leon County: 32301, and 32304.

Crash rates where drivers ignored the use of safety seat belts were obtained as a percentage of total crashes involving Teen-age drivers for each zipcode area in Leon County. It is noticeable that the highest crash rates without the use of safety seat belts involving Teen-age drivers (29% to 40%) are in the following zipcodes in Leon County: 32310, and 32304.

Crash rates where drivers were cited for traffic violations were obtained as a percentage of total crashes involving white drivers for each zipcode in Leon County. It was found that the highest crash rates where Teen-age drivers were cited for traffic violations (40% to 60%) are in the following zipcodes in Leon County: 32301, and 32311.

Table 5-20 presents the crash database for the Teen-age drivers, as use in the GIS platform.

**TABLE 5-20**

**TEEN-AGE DRIVERS CRASH DATA FOR LEON COUNTY**

Zipcode	Total Crashes	Teen-age Drivers Invol.	% Alcohol & Drug	% Fatal & Severe	% No Seat Belt	% Cited for Violation
32301	749	70	2.86%	5.71%	27.14%	42.86%
32311	454	78	12.82%	2.56%	17.95%	51.28%
32310	845	93	2.15%	1.08%	29.03%	35.48%
32312	491	111	3.60%	0.90%	9.91%	39.64%
32304	986	148	9.46%	8.11%	31.08%	38.51%
32308	891	168	2.98%	5.36%	17.86%	39.88%

#### **5.4.3.2 Elderly Drivers Crash Involvement (Tallahassee)**

The crash data was extracted for the drivers in the age group more than 74 years old and the analysis was done accordingly.

Alcohol and drug related crash rates were obtained as a percentage of total crashes involving Elderly drivers in each zipcode in Leon County. It is noticeable that the highest alcohol and drug related crash rates involving Elderly drivers (12% to 15%) are in the following zipcodes in Leon County: 32301.

Severe crash rates were obtained as a percentage of total crashes involving Elderly drivers in each zipcode area in Leon County. It is noticeable that the highest severe crash rates involving Elderly drivers (12% to 20%) are in the following zipcodes in Leon County: 32311.

Crash rates where drivers ignored the use of safety seat belts were obtained as a percentage of total crashes involving Elderly drivers for each zipcode area in Leon County. It is noticeable that the highest crash rates without the use of safety seat belts involving Elderly drivers (17% to 40%) are in the following zipcodes in Leon County: 32311, and 32304.

Crash rates where drivers were cited for traffic violations were obtained as a percentage of total crashes involving white drivers for each zipcode in Leon County. It was found that the highest crash rates where Elderly drivers were cited for traffic violations (55% to 60%) are in the following zipcodes in Leon County: 32311, and 32310.

Table 5-21 presents the crash database for the Elderly drivers, as use in the GIS platform.

**TABLE 5-21**

**ELDERLY DRIVERS CRASH DATA FOR LEON COUNTY**

Zipcode	Total Crashes	Elderly Drivers Invol.	% Alcohol & Drug	% Fatal & Severe	% No Seat Belt	% Cited for Violation
32311	454	5	0.00%	20.00%	40.00%	60.00%
32312	491	12	0.00%	0.00%	8.33%	16.67%
32310	845	14	0.00%	7.14%	7.14%	57.14%
32304	986	17	11.76%	11.76%	17.65%	52.94%
32301	749	21	14.29%	0.00%	14.29%	38.10%
32308	891	25	0.00%	0.00%	16.00%	32.00%

**5.4.3.3 Overall View of Driver's Age Vs. Crash Rates (Leon County)**

After comparing the crash data for both age groups under investigation in Leon County (Tables 5-20 and 5-21), the following characteristics were found:

- Elderly drivers had the highest crash rates resulting in fatal or severe injuries, (up to 20%) of the total crashes involving Elderly drivers.
- Elderly drivers had the highest crash rates where they were cited for traffic violations, (up to 60%) of the total crashes involving Elderly drivers.
- Crash rates involving alcohol or drugs were roughly close in both age groups (around 14% of total crashes in each age group), but by the looking at the frequency of the crashes involving alcohol and drugs, it was noticed that teenage drivers had high crash rates in many zipcode areas. The elderly drivers had high rates only in two zipcode areas where the total number of crashes was less than 17. This concludes that young drivers are more involved in alcohol and drug related crashes.

- The crash rates without the use of seat belts were the same for both age groups, (up to 40%)

#### **5.4.4 Drivers' Gender Vs. Crash Types (Tallahassee)**

This section investigated the different crash type involvements in both genders, male and female, in Leon County.

##### **5.4.4.1 Male Drivers Vs. Crash Types (Tallahassee)**

Crash data was extracted for male drivers in Leon County, and the analysis was performed according to the methodology. Following are the results obtained from this analysis.

Alcohol and drug related crash rates were obtained as a percentage of total crashes involving Male drivers in each zipcode in Leon County. It is noticeable that the highest alcohol and drug related crash rates involving Male drivers (14% to 15%) are in the following zipcodes in Leon County: 32310, and 32304.

Severe crash rates were obtained as a percentage of total crashes involving Male drivers in each zipcode area in Leon County. It is noticeable that the highest severe crash rates involving Male drivers (5% to 8%) are in the following zipcodes in Leon County: 32311, and 32304.

Crash rates where drivers ignored the use of safety seat belts were obtained as a percentage of total crashes involving Male drivers for each zipcode area in Leon County. It is noticeable that the highest crash rates without the use of safety seat belts involving Male drivers (25% to 40%) are in the following zipcodes in Leon County: 32310, and 32304.

Crash rates where drivers were cited for traffic violations were obtained as a percentage of total crashes involving white drivers for each zipcode in Leon County. It was found that the highest crash rates where Male drivers were cited for traffic violations (34% to 35%) are in the following zipcodes in Leon County: 32311, and 32310.

Table 5-22 presents the crash database for the Male drivers, as use in the GIS platform.

**TABLE 5-22**  
**MALE DRIVERS CRASH DATA FOR LEON COUNTY**

Zipcode	Total Crashes	Male Drivers Invol.	% Alcohol & Drug	% Fatal & Severe	% No Seat Belt	% Cited for Violation
32311	454	252	11.90%	7.94%	22.62%	34.52%
32312	491	273	8.79%	4.40%	15.75%	28.57%
32301	749	405	11.11%	3.70%	24.44%	32.59%
32308	891	455	7.25%	4.40%	15.16%	27.47%
32310	845	461	14.75%	4.12%	30.80%	34.27%
32304	986	571	14.54%	5.78%	26.80%	33.28%

#### **5.4.4.2 Female Drivers Vs. Crash Types (Tallahassee)**

Crash data was extracted for female drivers in Leon County, and the analysis was performed according to the methodology. Following are the results obtained from this analysis.

Alcohol and drug related crash rates were obtained as a percentage of total crashes involving Female drivers in each zipcode in Leon County. It is noticeable that the highest alcohol and drug related crash rates involving Female drivers (5% to 6%) are in the following zipcodes in Leon County: 32311, and 32308.

Severe crash rates were obtained as a percentage of total crashes involving Female drivers in each zipcode area in Leon County. It is noticeable that the highest severe crash rates involving Female drivers (4% to 5%) are in the following zipcodes in Leon County: 32301, 32308.

Crash rates where drivers ignored the use of safety seat belts were obtained as a percentage of total crashes involving Female drivers for each zipcode area in Leon County. It is noticeable that the highest crash rates without the use of safety seat belts involving Female drivers (15.2% to 18%) are in the following zipcodes in Leon County: 33570, 33598, 32310, and 32301.

Crash rates where drivers were cited for traffic violations were obtained as a percentage of total crashes involving white drivers for each zipcode in Leon County. It was found that the highest crash rates where Female drivers were cited for traffic violations (28.5% to 30%) are in the following zipcodes in Leon County: 32308, and 32312.

Table 5-23 presents the crash database for the Female drivers, as use in the GIS platform.

**TABLE 5-23**  
**FEMALE DRIVERS CRASH DATA FOR LEON COUNTY**

Zipcode	Total Crashes	Female Drivers Invol.	% Alcohol & Drug	% Fatal & Severe	% No Seat Belt	% Cited for Violation
32310	845	380	3.68%	3.68%	15.26%	24.47%
32304	986	402	4.98%	3.23%	15.17%	27.36%
32301	749	338	3.55%	4.73%	17.75%	24.85%
32311	454	198	5.56%	3.54%	10.10%	28.79%
32308	891	431	5.10%	4.41%	10.21%	28.07%
32312	491	215	3.72%	3.72%	11.63%	29.30%

**5.4.4.3 Overall View of Driver’s Gender Vs. Crash Rates (Leon County)**

After comparing the crash data regarding male and female drivers involved in traffic crashes in Leon County (Tables 5-22 and 5-23), the following characteristics were found:

- Male drivers had the highest crash rates without the use of safety seat belts, (up to 25%) of the total crashes involving male drivers.
- Male drivers had the highest crash rates where they were cited for traffic violations, (up to 35%) of the total crashes involving male drivers.
- Male drivers had higher crash rates resulting in fatal or severe injuries, (up to 8%) of the total crashes involving Female drivers.
- Male drivers had higher crash rates involving alcohol or drugs, (up to 15%) of the total.

These observations show that male drivers are more risky than female drivers in Duval County.

## CHAPTER 6

### CONCLUSIONS AND RECOMMENDATIONS

The main purpose of this report was to investigate the demographic characteristics of drivers involved in traffic crashes in the state of Florida. This was done in order to target the areas in Florida with drivers that tend to have high crash risks. By locating these high crash risk areas, which were defined as zipcode areas, the government may have the option of providing the suitable educational programs for those groups of people that need them. All to serve the purpose of improving the safety of our highways.

Another important objective of this report was to investigate the relationship between the income level of the drivers, and the crash rates of those drivers. The question of whether a relationship exists or not was a point of confusion to a lot of reporters in this field, especially in the human behavior aspect of it.

From the analysis in chapter 4, it was found that most of the alcohol and drug related crashes, and crashes where drivers ignored the use of safety seat belts, occurred in rural areas of the state. The major urban cities of the state had the lowest alcohol and drug related crash rates (percent of total), as well as crashes without seat belts.

Four (4) demographic characteristics of drivers were examined in this report, income, race, gender, and age. The following are the conclusions that were drawn from the analysis performed in this report regarding each of these demographic characteristics:

**1. Income**

When examining the income level versus different types of crashes, a strong relationship was found between low income level and alcohol-drug related crashes. In addition, low income areas had higher crash rates where drivers ignored the use of safety seat belts. No relationship was found between income and crash severity, nor crashes where drivers were cited for traffic violations.

**2. Race**

After viewing the total crashes involving drivers' race, it was noticed that African American drivers tend to have higher crash rates than White and Hispanic drivers. On the other hand, when analyzing different crash types, African American drivers had the highest crash rates (percent of total crashes) without the use of seat belts. African American drivers tend to be more involved in alcohol and drugs related crashes more than other races, although Hispanic drivers do have high crash rates involving alcohol and drugs. African American drivers were also found to be cited for traffic violations more than any other race, which makes them more risky than others. Hispanic drivers, on the other hand, tend to have higher severe crash rates than other races.

From the analysis of the race of the drivers involved in traffic crashes, it is evident that White drivers are safer than African American and Hispanic drivers. African American

drivers seem to have the most problems, therefore, safety programs should be targeted for this race group.

### **3. Gender**

After analyzing the gender of drivers involved in traffic crashes, it was found that generally, male drivers are more involved in crashes than female drivers. With regard to the different crash types, male drivers had the highest crash rates (percent of total) involving alcohol and drugs. In addition, male drivers had higher crash rates without using the seat belt than female drivers did. Female drivers, on the other hand, had higher severe crash rates (percent of total) than male drivers. Although male drivers are more involved in crashes than female drivers, female drivers were found to have higher crash rates (percent of total) where they were cited for traffic violations, than male drivers.

### **4. Age**

After looking at different age groups of drivers involved in traffic crashes, it was noticed that most of the safety problems were associated with two groups of drivers' ages. The two age groups that were analyzed in this report were, teen-age drivers (ages < 20), and elderly drivers (ages more than 74). Generally, teen-age drivers had higher crash rates (per 10,000 licenced drivers) than elderly drivers.

The only crash types where elderly drivers had higher crash rates (percent of total) than teen-age drivers, was the severity of the crash. Elderly drivers were more involved in fatal and severe injury crashes than teen-age drivers, which is logical considering their physical status at that age. There were some high rates where elderly drivers were cited for traffic violations, but those rates were still below those for the teen-age drivers.

The zipcode areas, in the major Metropolitan areas of Florida, that had high crash risks were highlighted in chapters 5 and 6 of this report. According to the methodology and analysis of this report, these highlighted zipcode areas have different problems related to traffic safety. Safety educational programs should be provided for these areas in conjunction with the type of problem each area has, whether it is an alcohol related issue, or seat belt issue.

The objective of this report was accomplished by locating the areas in Florida where drivers have higher crash risks, for the purpose of providing educational programs to enhance their knowledge about traffic safety. The methodology of this report is not only designed for the state of Florida, it could be implemented in any state as long as we have a crash database that could be manipulated for the use in a GIS environment. GIS was a very important and essential tool in performing this analysis. By applying this methodology and getting the corresponding results, we added a new touch to the use of GIS in the field of traffic safety analysis.