

# COUNTERMEASURES FOR Pedestrian and Bicycle HIGH CRASH LOCATIONS



## Appendices



APPENDIX A  
PRESENTATIONS

Local Action Team for Safer People, Safer Streets

COUNTERMEASURES FOR  
**Pedestrian and Bicycle**  
HIGH CRASH LOCATIONS




WORK ORDER #GPC V-27  MIAMI-DADE METROPOLITAN PLANNING ORGANIZATION

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COUNTERMEASURES FOR  
**Pedestrian and Bicycle**  
HIGH CRASH LOCATIONS

## Study Goals

- Develop multi-disciplinary strategies to reduce traffic crashes involving pedestrians and bicyclists.
- Develop an on-going process for continuing safety monitoring, analysis and improvement.

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## Miami-Dade's Traffic Safety Problem

- Florida's pedestrian and bicycle fatality rates are among the highest in the US.
- Miami-Dade County has the highest number of pedestrian and bicycle crashes in Florida.

Fatal Traffic Crashes in Miami-Dade County (2013)

Category	Count	Percentage
Motorists/Other	99	44%
Pedestrian	69	31%
Motorcycle	45	20%
Cyclist	11	5%

Source: DHSMV

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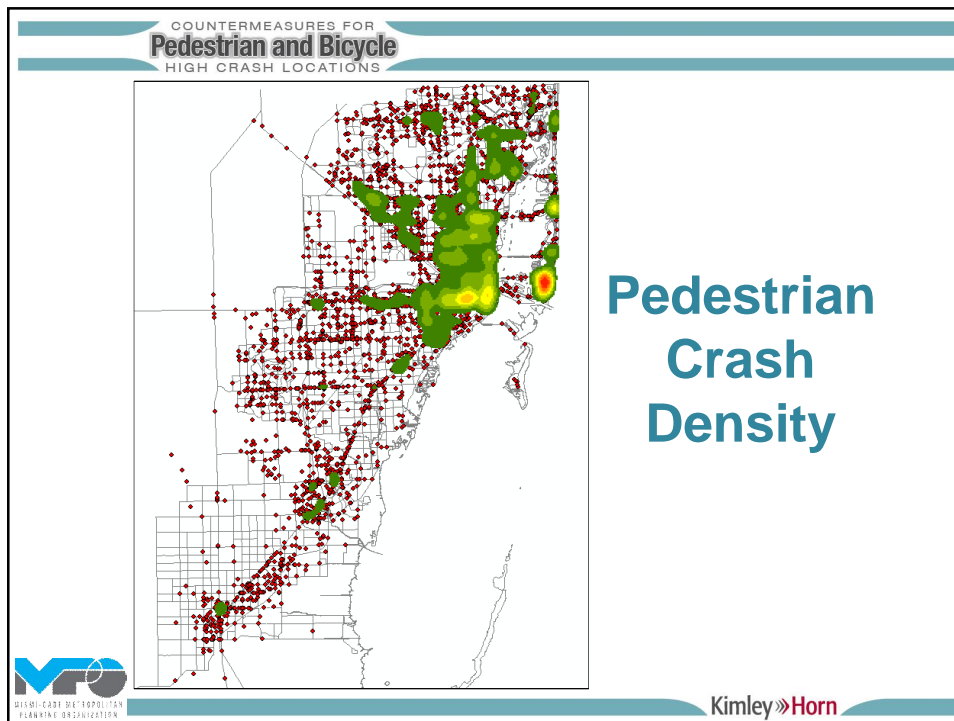
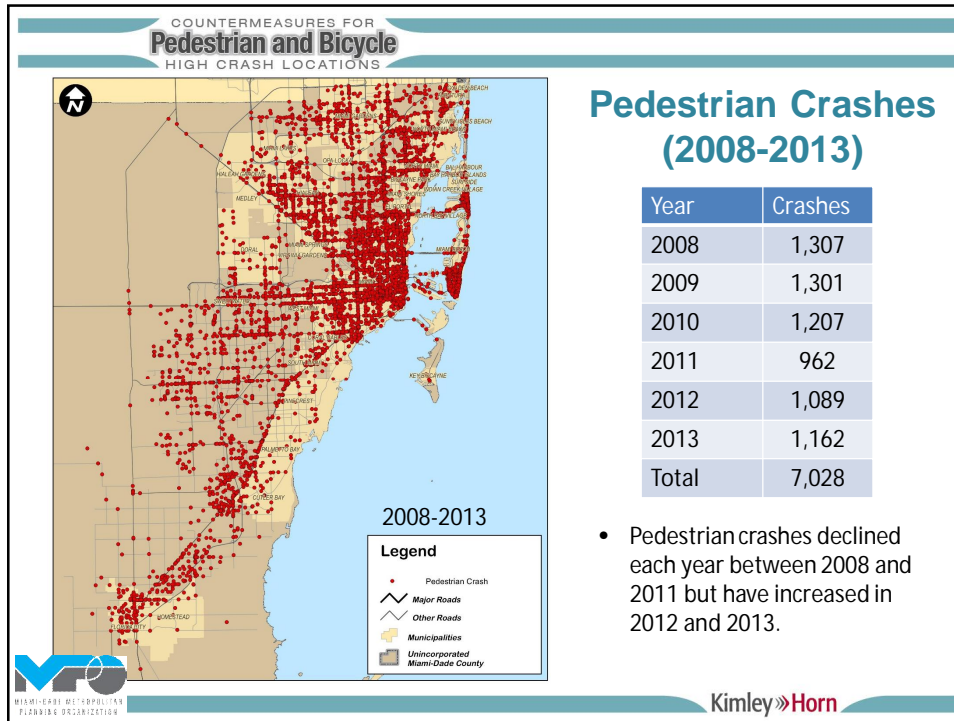
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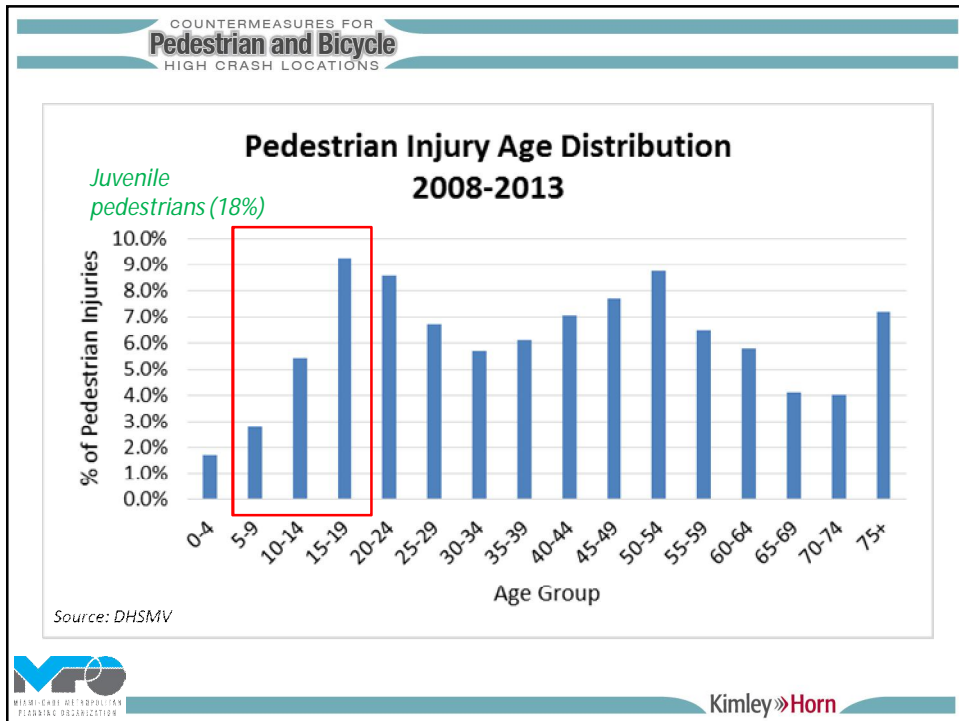
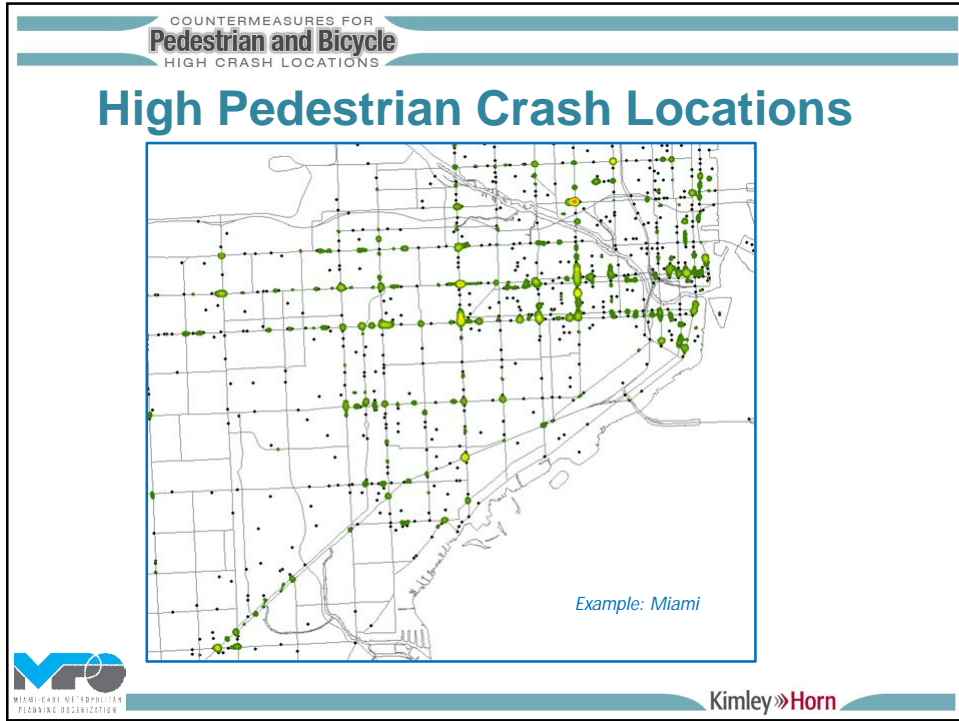
COUNTERMEASURES FOR  
**Pedestrian and Bicycle**  
HIGH CRASH LOCATIONS

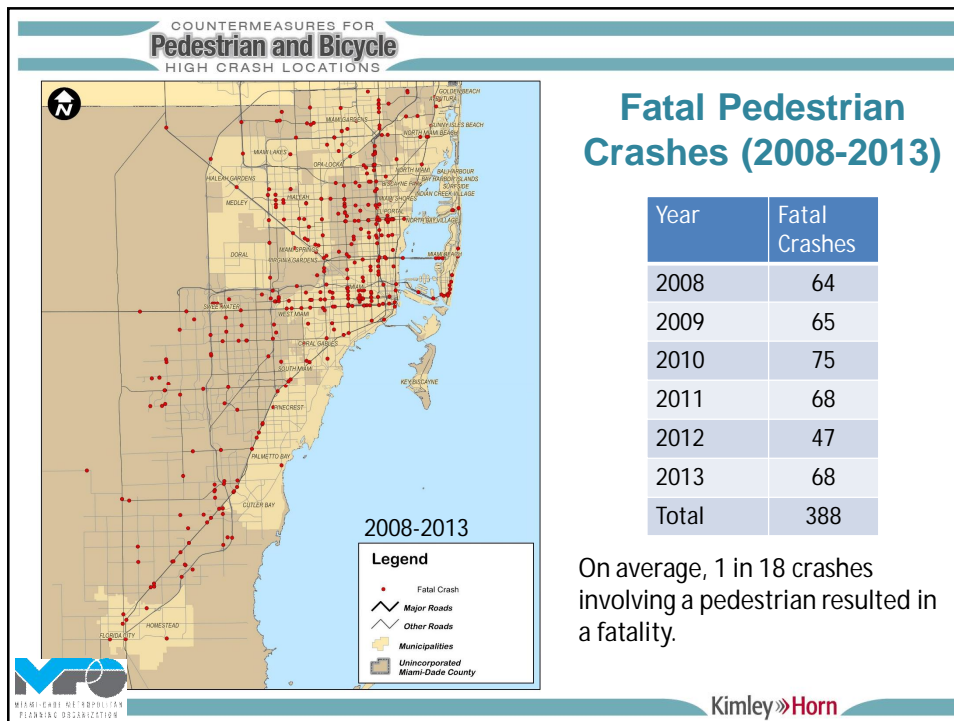
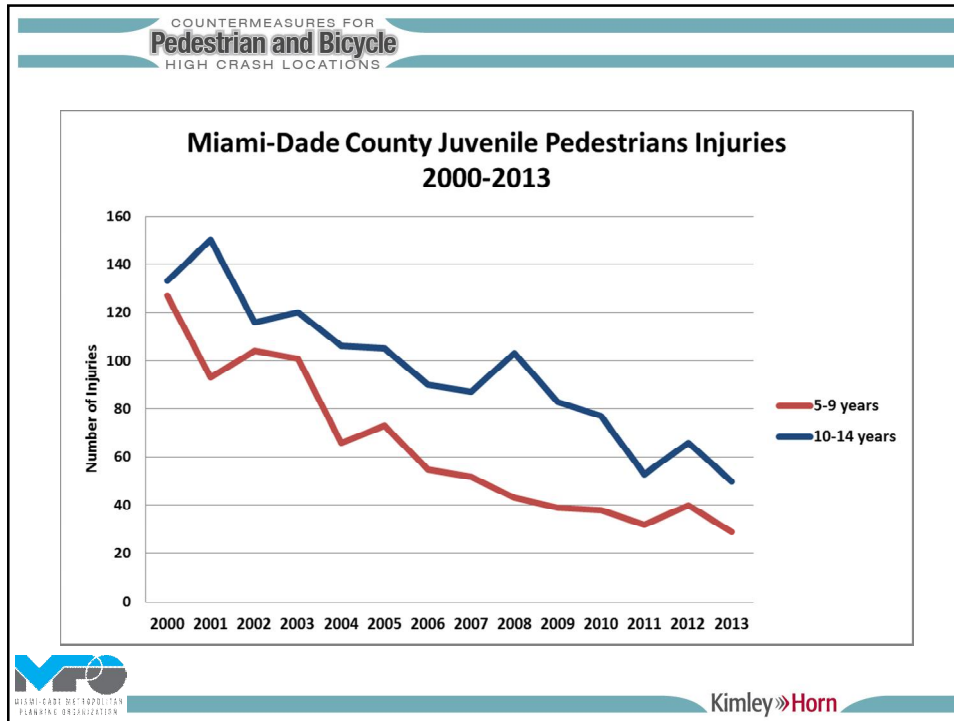
## Pedestrian Crashes

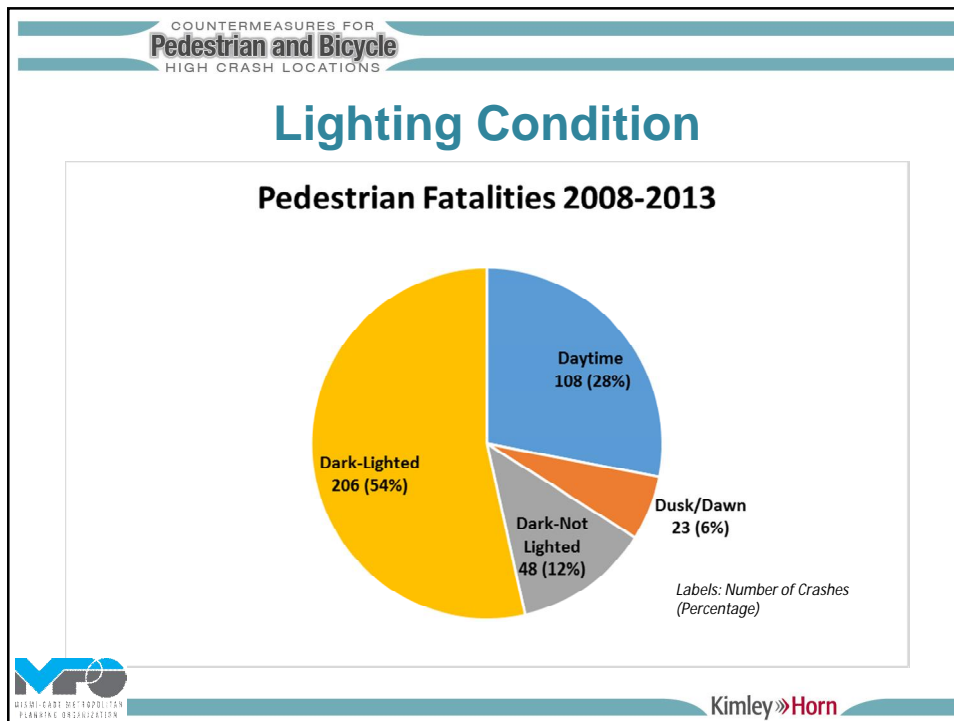
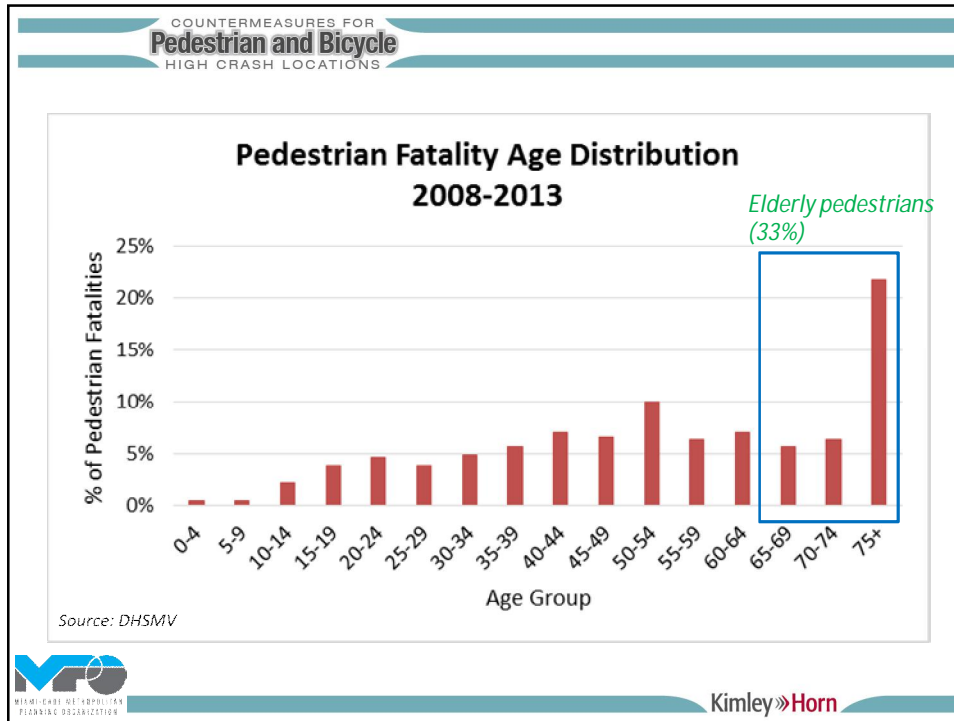
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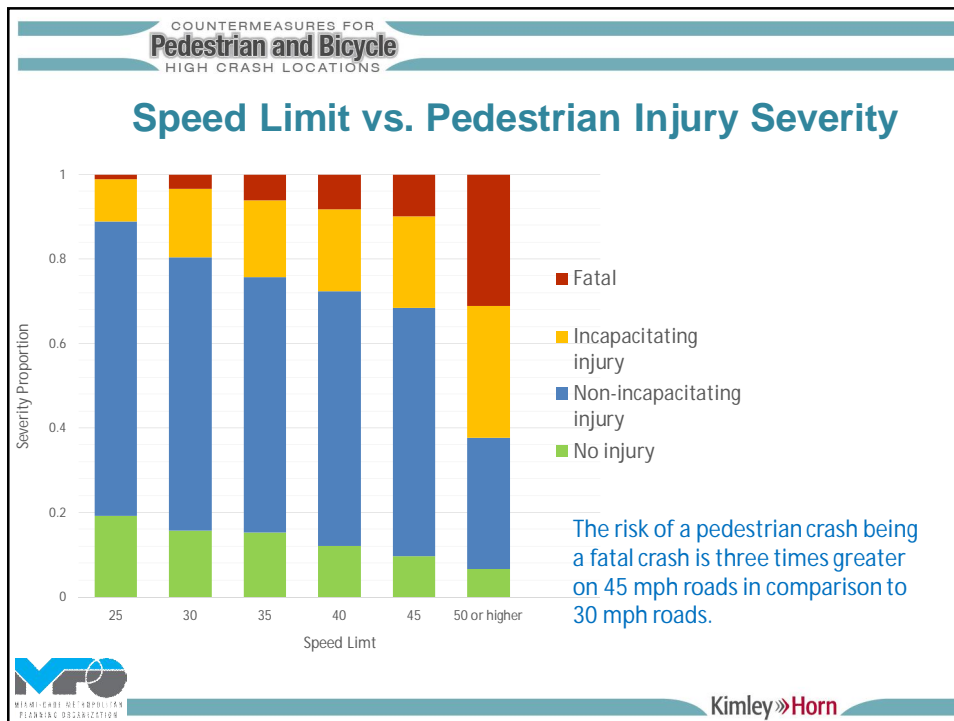
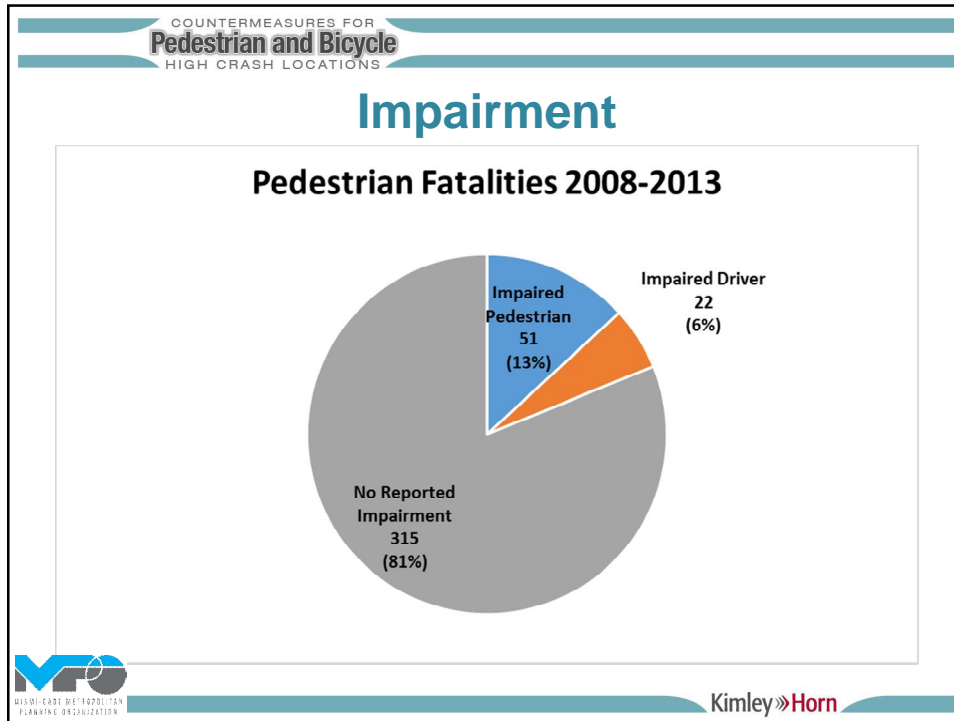
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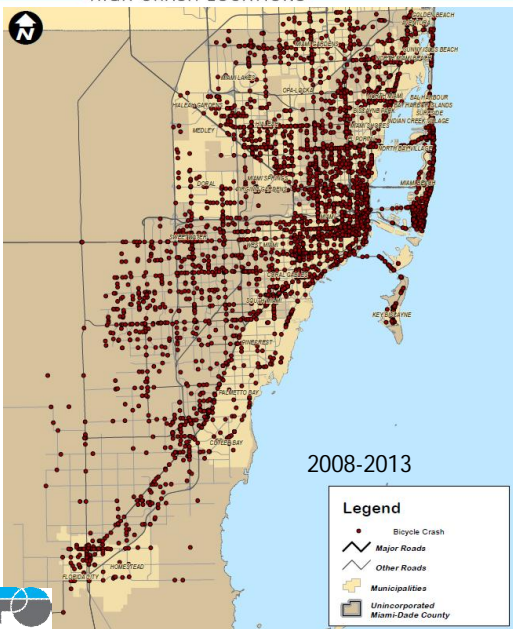


COUNTERMEASURES FOR  
**Pedestrian and Bicycle**  
HIGH CRASH LOCATIONS

# Bicycle Crashes

COUNTERMEASURES FOR  
**Pedestrian and Bicycle**  
HIGH CRASH LOCATIONS





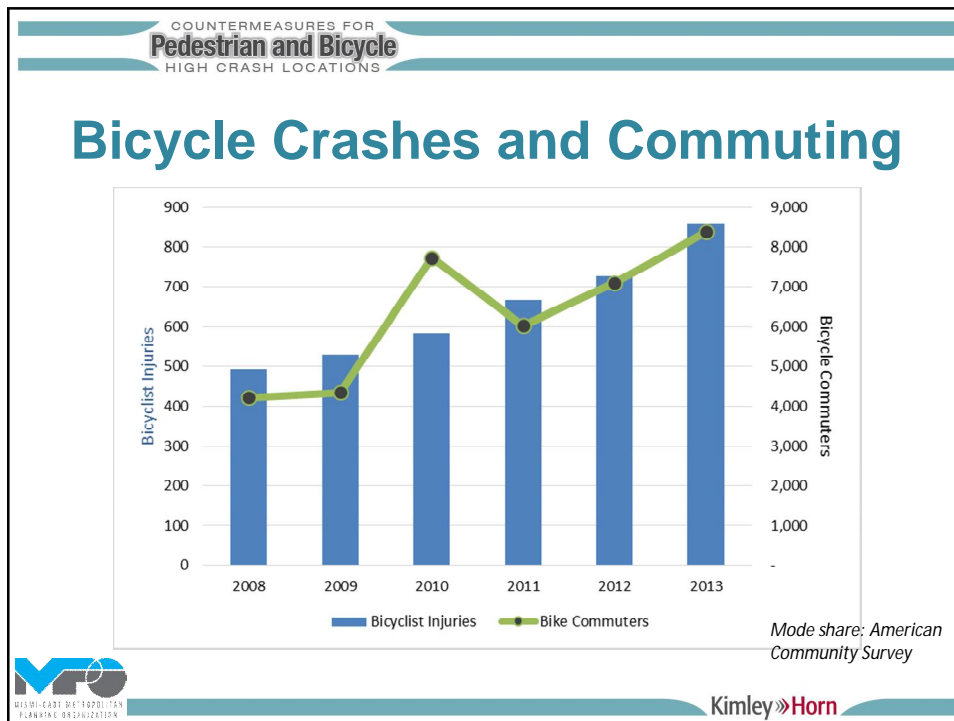
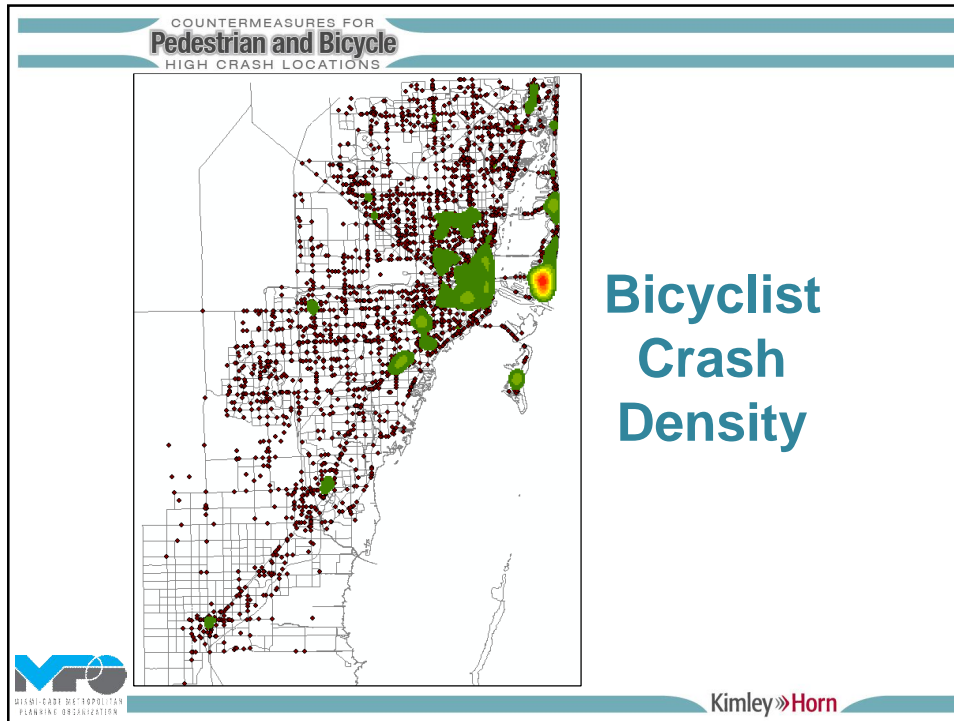
2008-2013

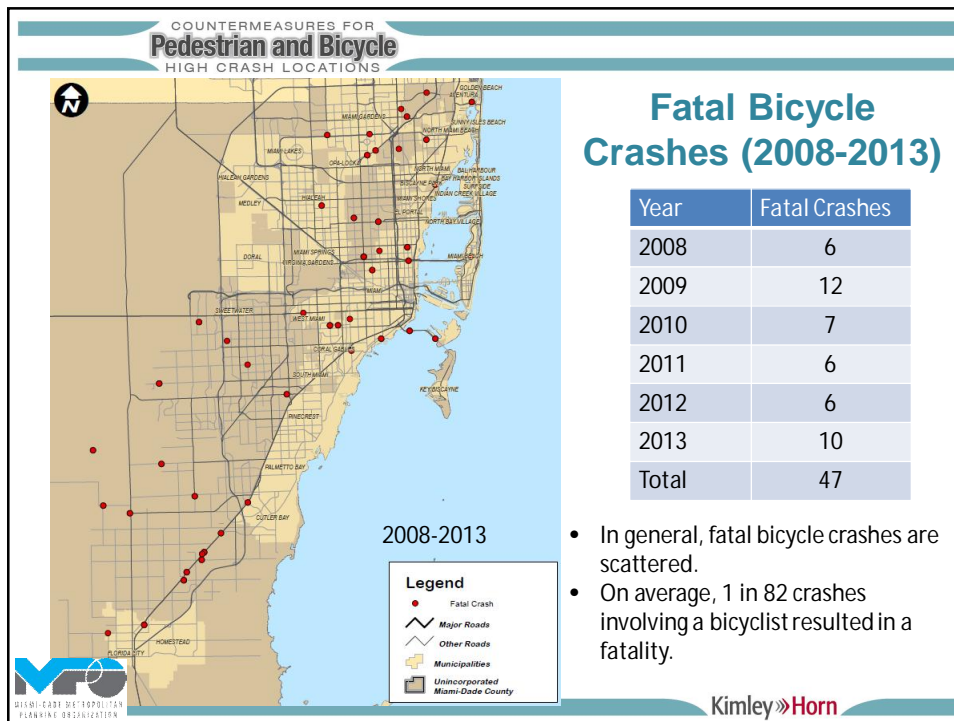
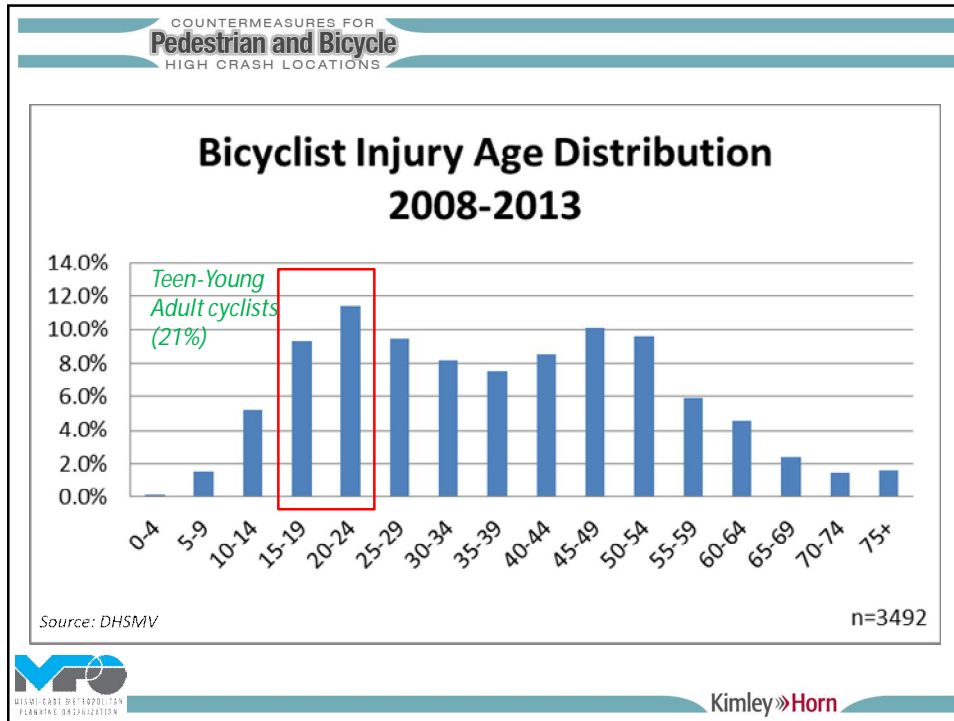
## Bicycle Crashes (2008-2013)

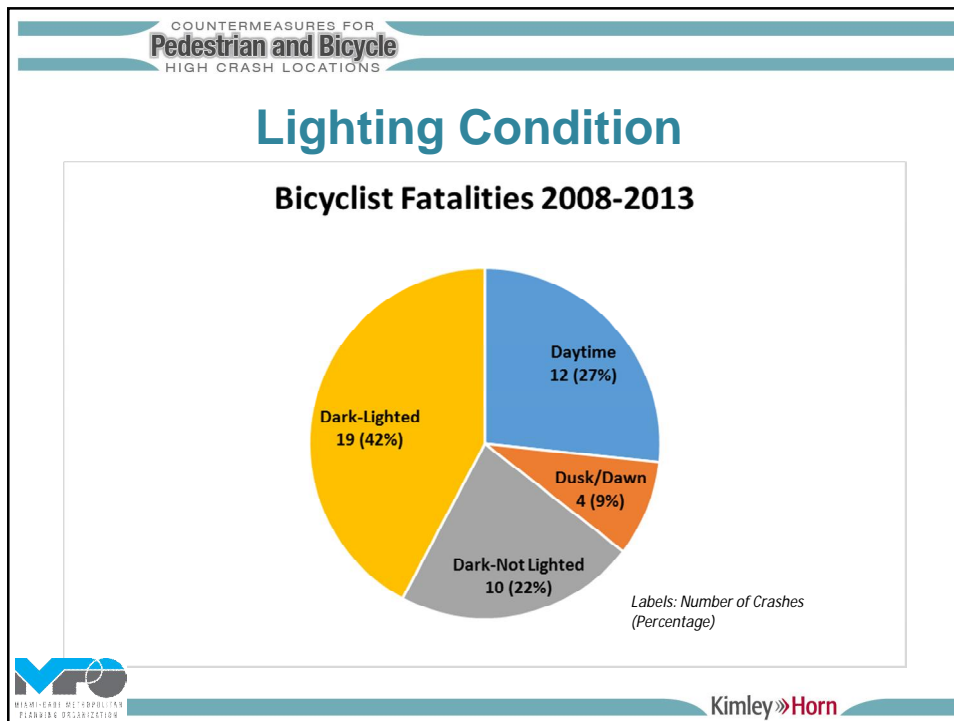
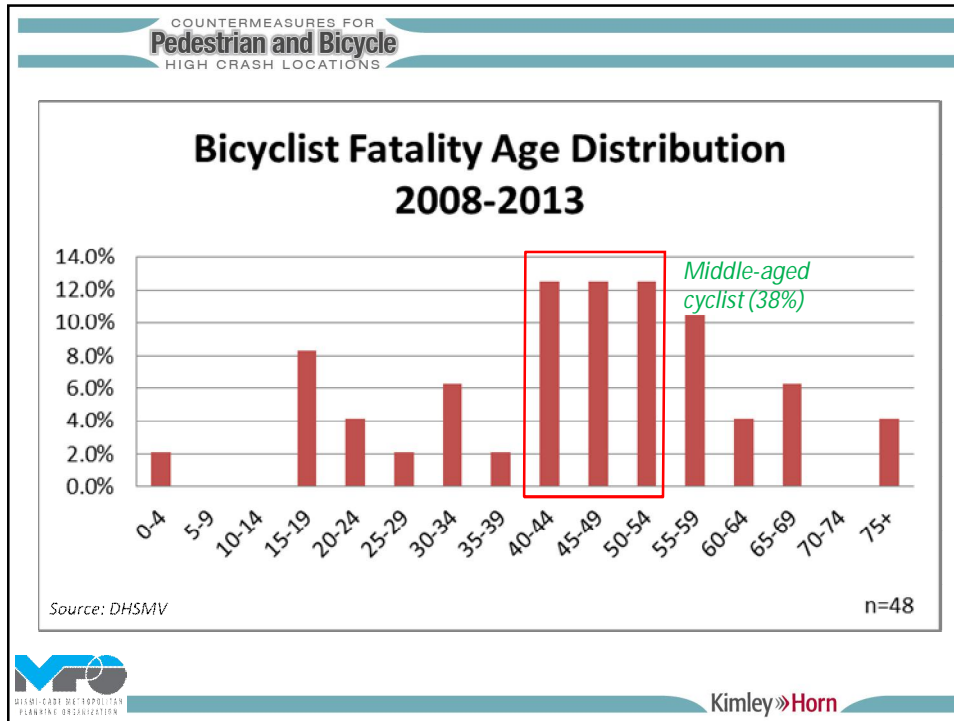
Year	Crashes
2008	492
2009	528
2010	583
2011	667
2012	727
2013	857
<b>Total</b>	<b>3,854</b>

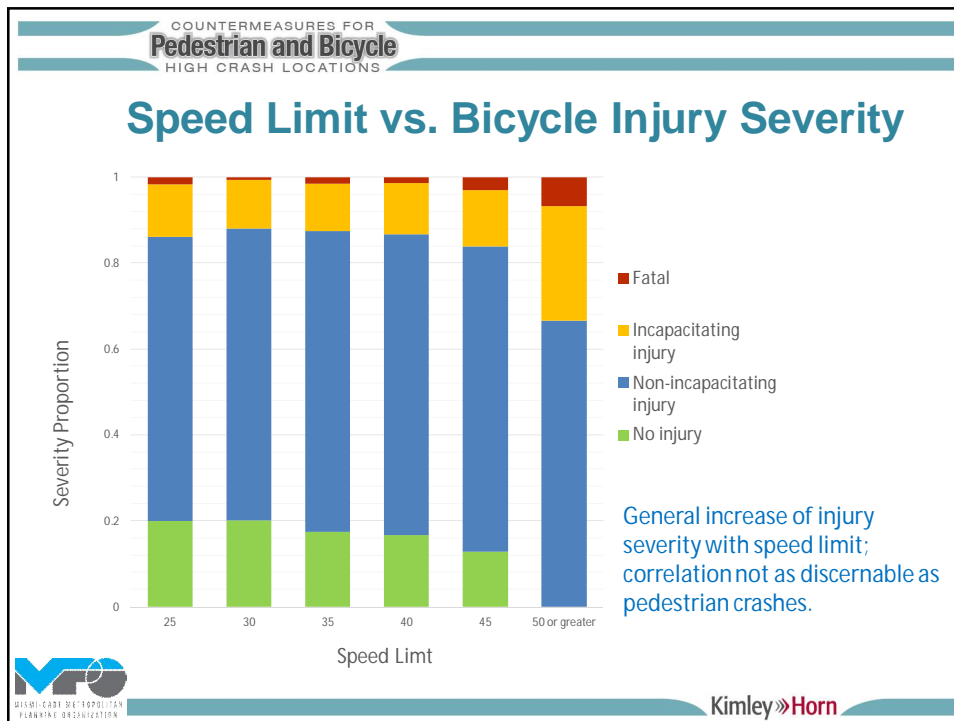
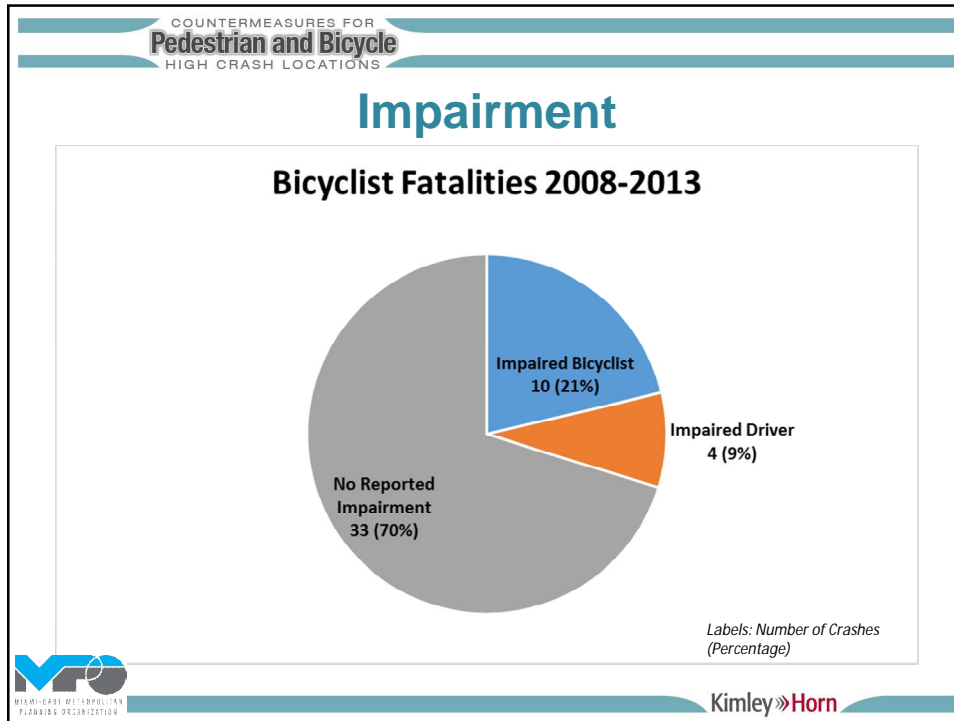
- 74% increase in bicycle crashes between 2008 and 2013.









COUNTERMEASURES FOR  
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HIGH CRASH LOCATIONS

## Next Steps

- Coordinate with stakeholder agencies.
  - FDOT
  - Miami-Dade County
  - Municipalities
  - WalkSafe, Alliance on Aging, Miami-Dade Public Schools, and outreach groups
  - Enforcement agencies
  - Miami-Dade Transit
- Conduct field reviews and develop countermeasures
  - Engineering
  - Education, and
  - Enforcement strategies.

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## Study Advisory Committee #1

COUNTERMEASURES FOR  
**Pedestrian and Bicycle**  
HIGH CRASH LOCATIONS



October 20, 2015


WORK ORDER #GPC V-27  MIAMI-DADE METROPOLITAN PLANNING ORGANIZATION

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COUNTERMEASURES FOR  
**Pedestrian and Bicycle**  
HIGH CRASH LOCATIONS

## Study Goals

- Identify high pedestrian and bicycle crash locations.
- Work with stakeholder agencies to develop multi-disciplinary strategies to reduce traffic crashes involving pedestrians and bicyclists.
- Develop an on-going process for continuing safety monitoring, analysis and improvement.



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HIGH CRASH LOCATIONS

## Role of Study Advisory Committee

- Review preliminary analysis results.
- Assist to refine the preliminary results based on safety efforts already completed by stakeholder agencies.
- Identify engineering and non-engineering countermeasures to reduce the risk for bike/pedestrian crashes.
- Explore opportunities to incorporate high crash locations into stakeholder agencies' safety efforts.

COUNTERMEASURES FOR  
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HIGH CRASH LOCATIONS

## Miami-Dade's Traffic Safety Problem



Traffic Crash Fatalities in Florida (2013)

Category	Count	Percentage
Motorists/Other	1325	55%
Pedestrian	498	21%
Motorcycle	444	18%
Cyclist	135	6%

Traffic Crash Fatalities in Miami-Dade County (2013)

Category	Count	Percentage
Motorists/Other	99	44%
Pedestrian	69	31%
Motorcycle	45	20%
Cyclist	11	5%

Source: DHSMV

COUNTERMEASURES FOR  
**Pedestrian and Bicycle**  
HIGH CRASH LOCATIONS


## Crash Data

- Analysis period: 2008-2013
- Data source: FDOT's Unified Basemap Repository
- This data was taken from a GIS database, and hence may not be consistent with DHSMV statistics.

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## Pedestrian Crashes

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HIGH CRASH LOCATIONS

## Pedestrian Crash Data (2008-2013)

- Total crashes: 7,028
- Fatal crashes: 388
- Incapacitating injury crashes: 1,188

*On average, one in 18 crashes involving a pedestrian resulted in a fatality.*

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COUNTERMEASURES FOR  
**Pedestrian and Bicycle**  
HIGH CRASH LOCATIONS

2008-2013

**Legend**

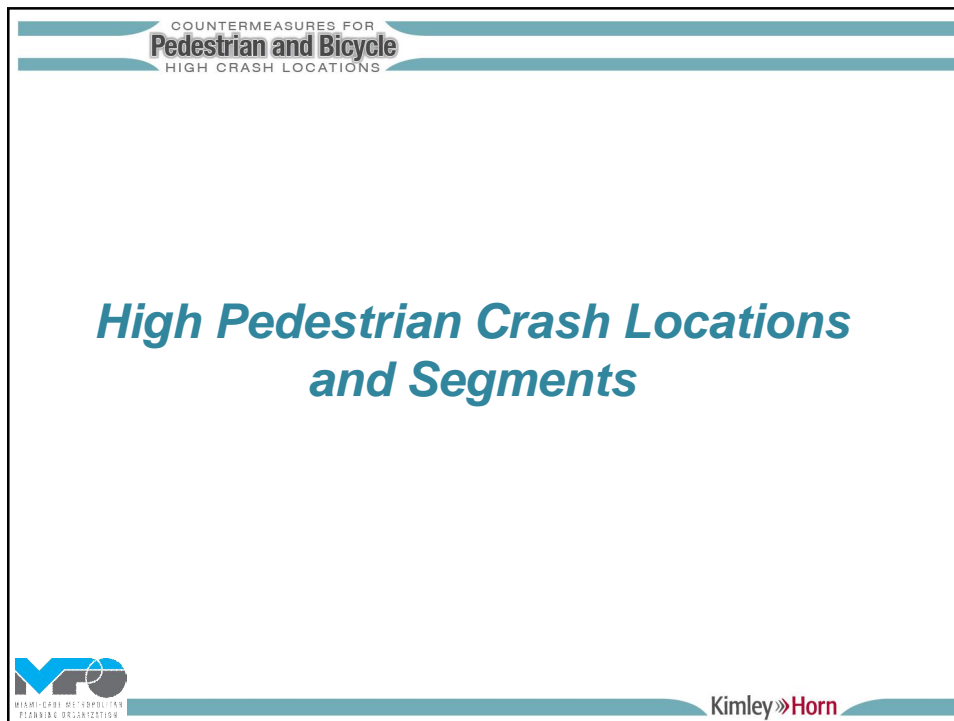
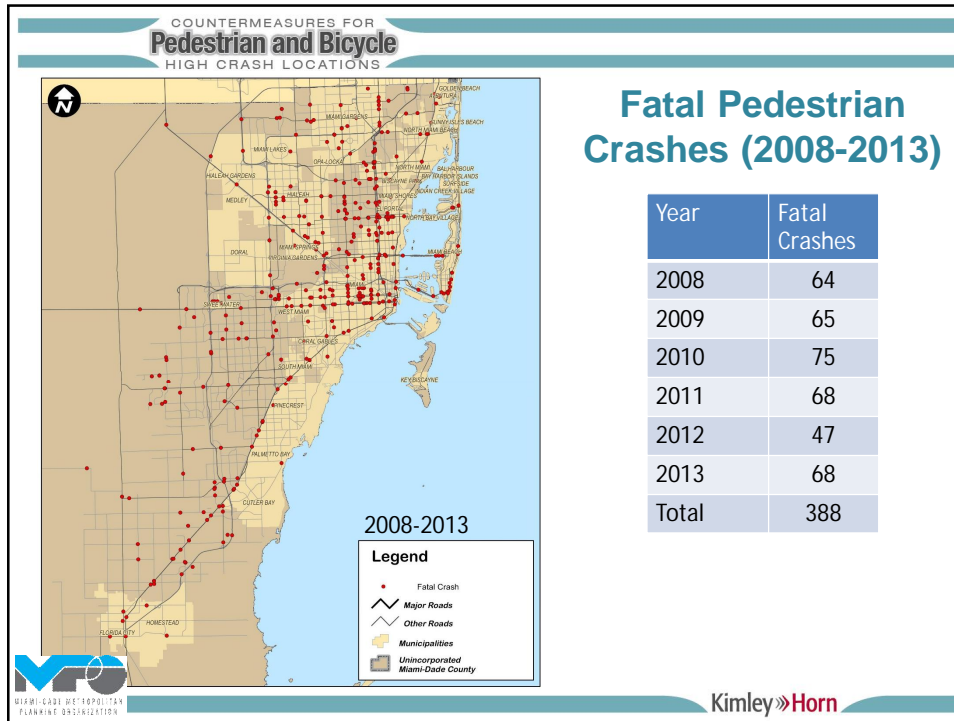
- Pedestrian Crash
- Major Roads
- Other Roads
- Municipalities
- Unincorporated
- Miami-Dade County

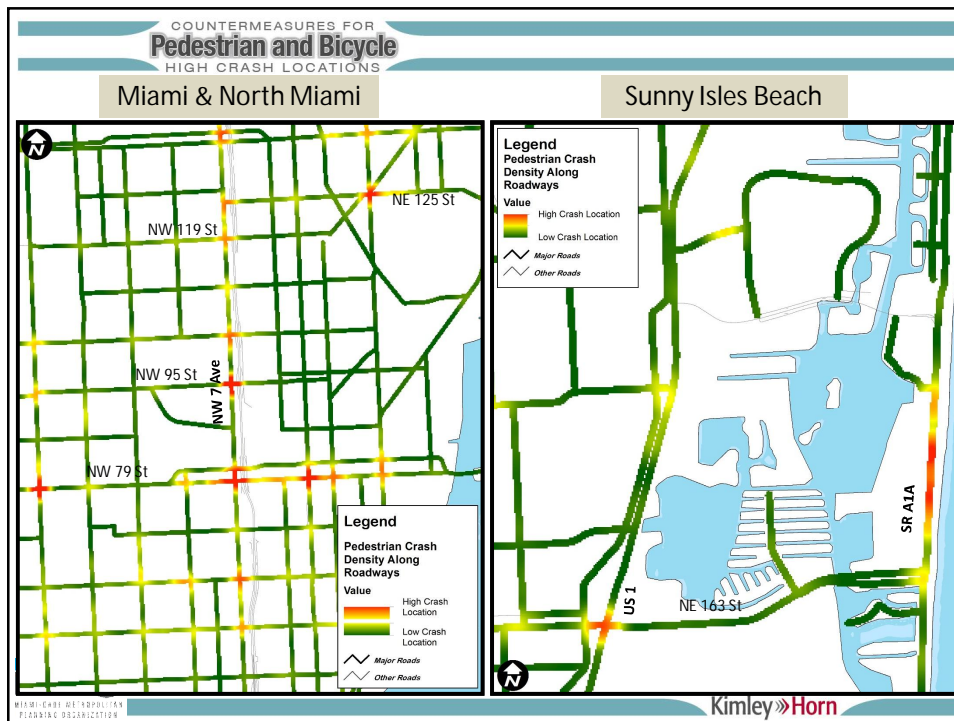
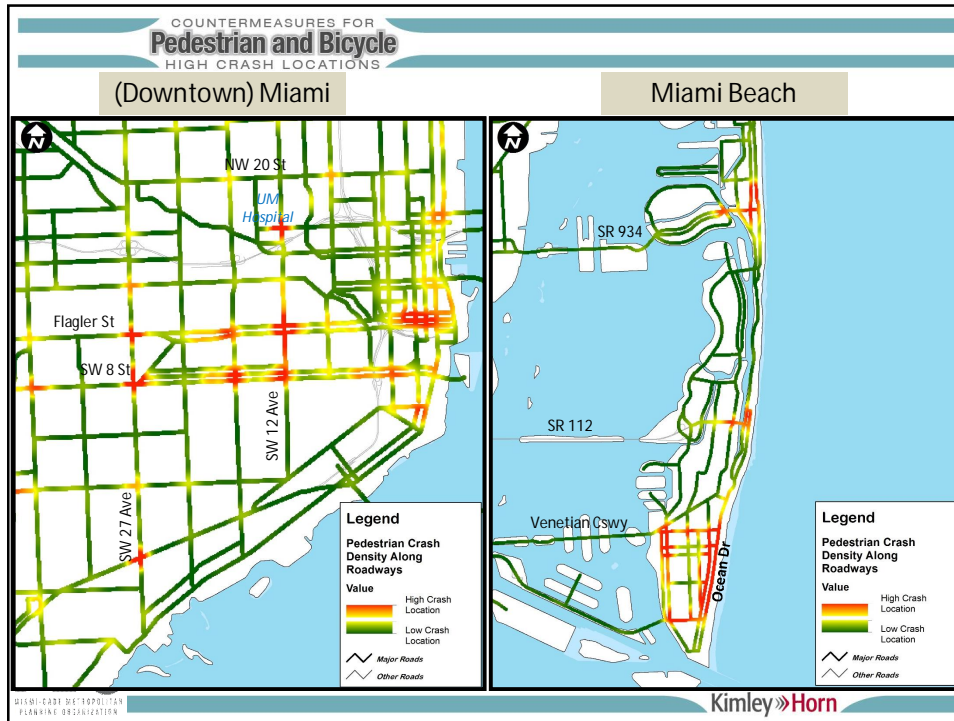
### Pedestrian Crashes (2008-2013)

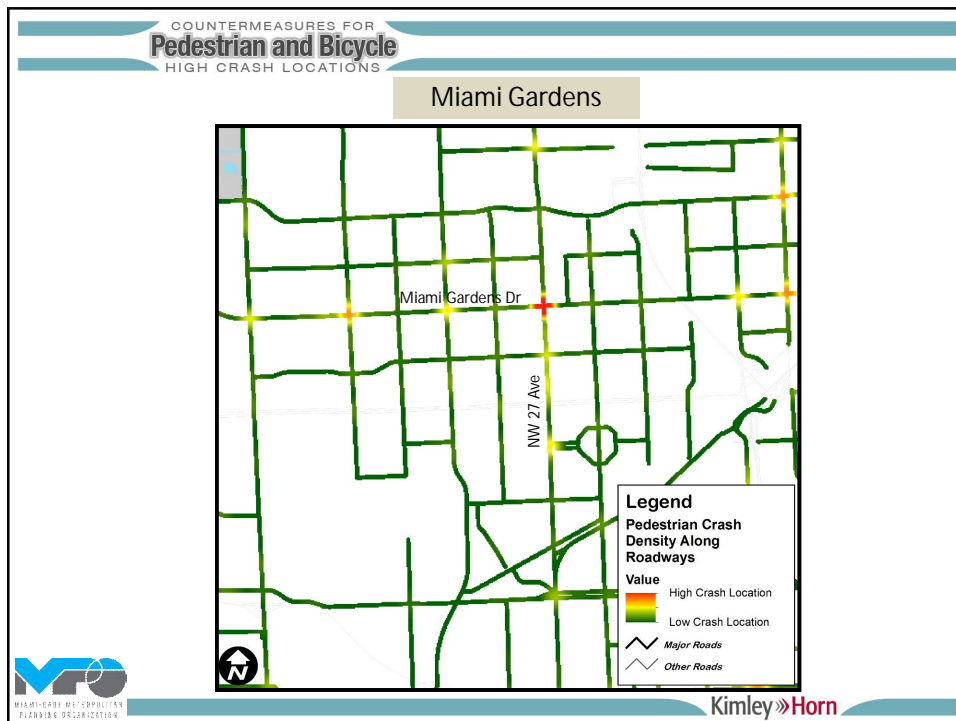
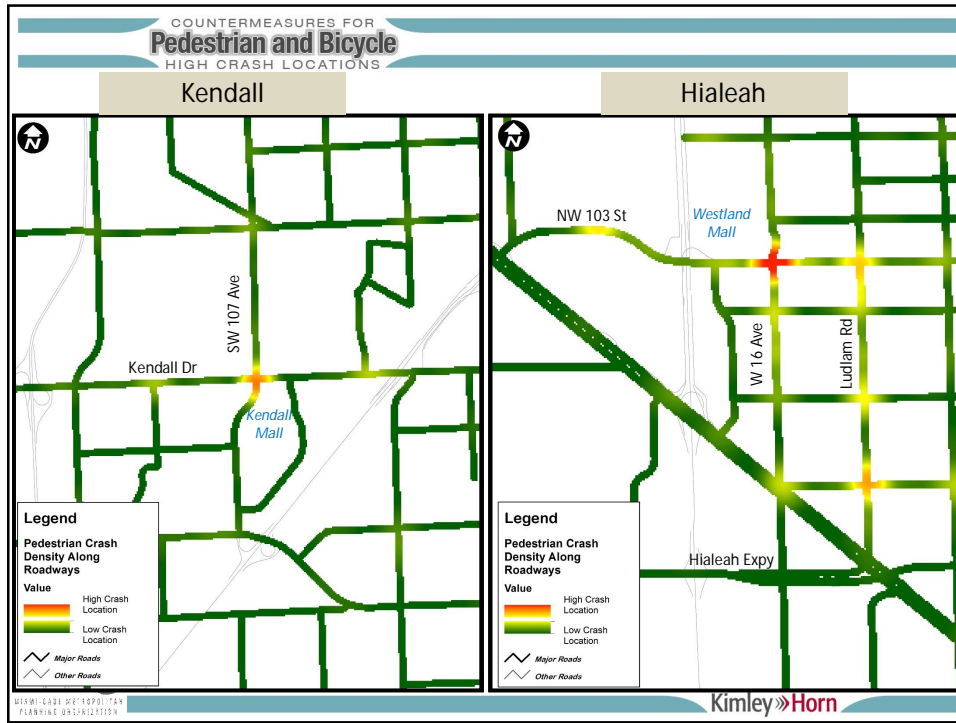
Year	Crashes
2008	1,307
2009	1,301
2010	1,207
2011	962
2012	1,089
2013	1,162
<b>Total</b>	<b>7,028</b>

- Pedestrian crashes declined each year between 2008 and 2011 but have increased in 2012 and 2013.

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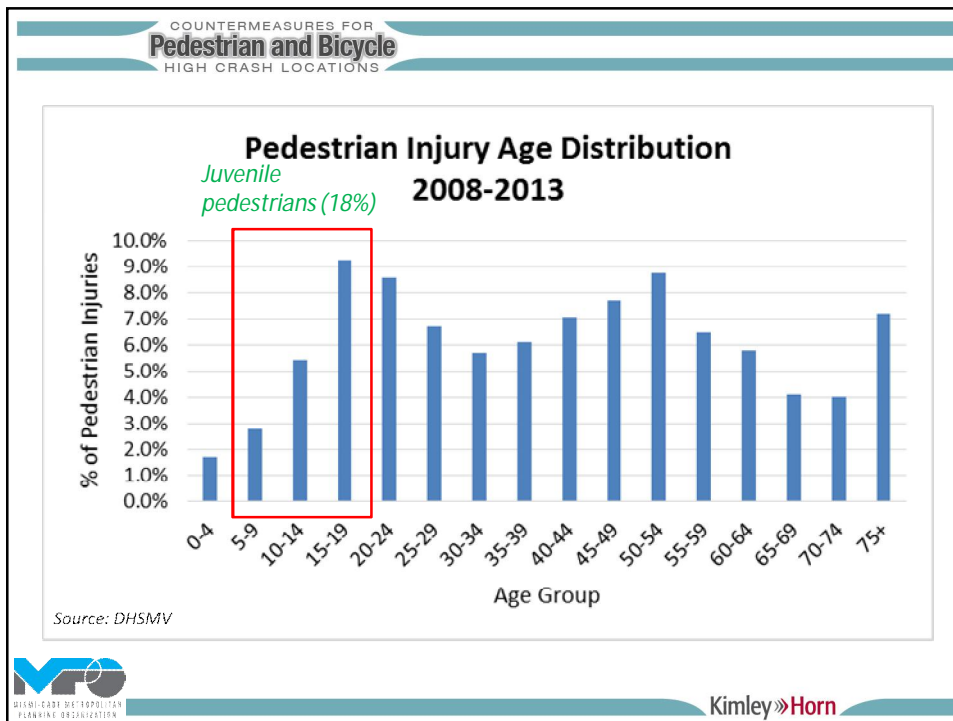


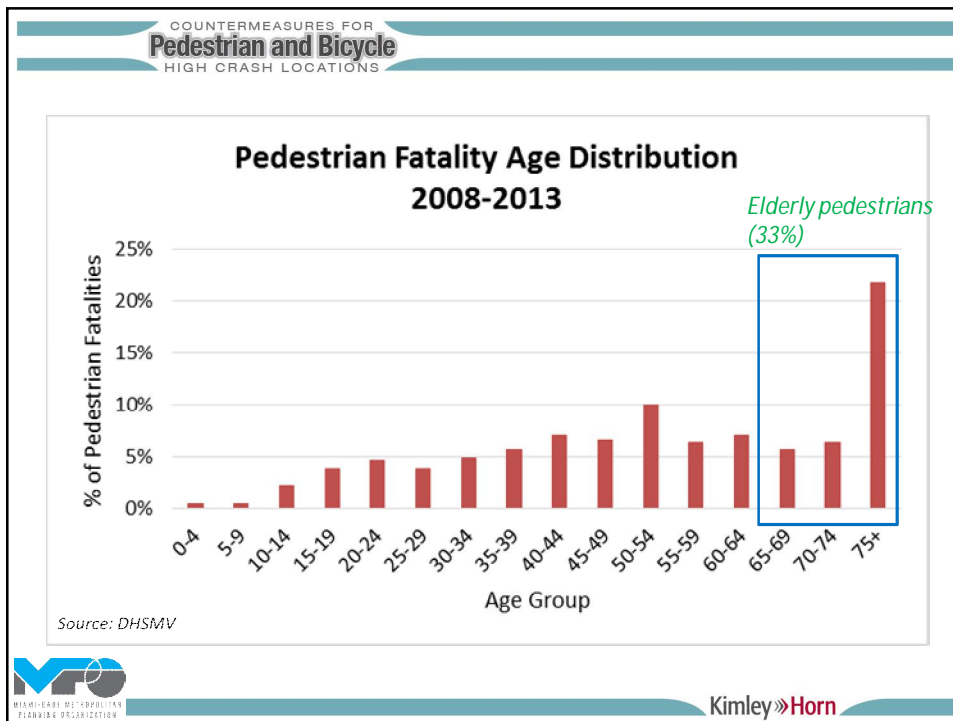
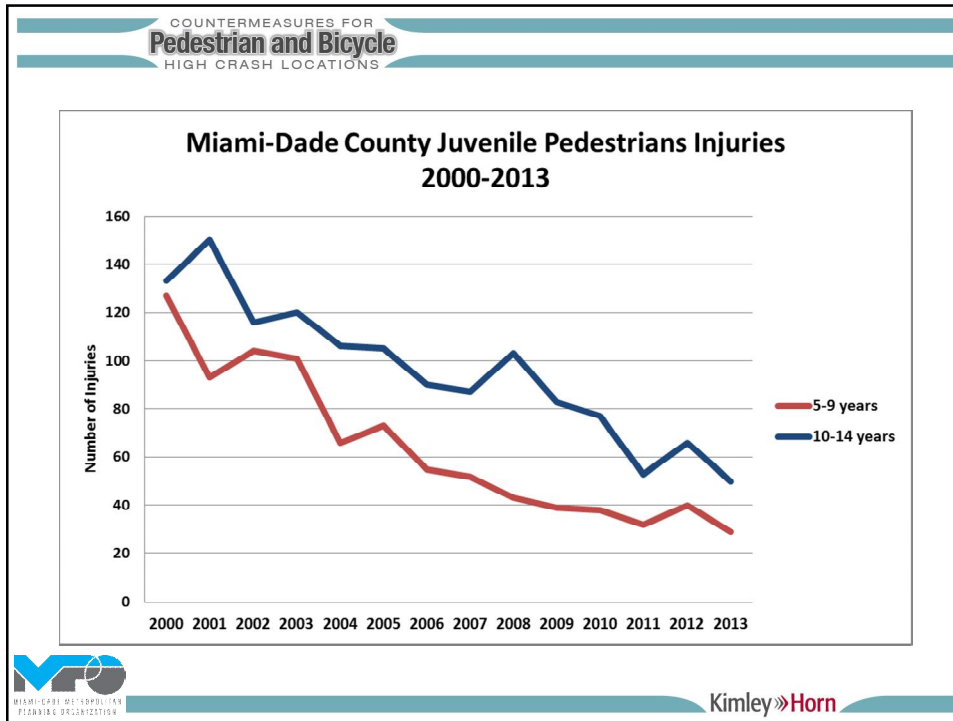
COUNTERMEASURES FOR  
**Pedestrian and Bicycle**  
HIGH CRASH LOCATIONS

## At-Risk Pedestrian Groups

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COUNTERMEASURES FOR  
**Pedestrian and Bicycle**  
HIGH CRASH LOCATIONS

## Lighting Conditions

COUNTERMEASURES FOR  
**Pedestrian and Bicycle**  
HIGH CRASH LOCATIONS

## Lighting Condition



**All Pedestrian Crashes**

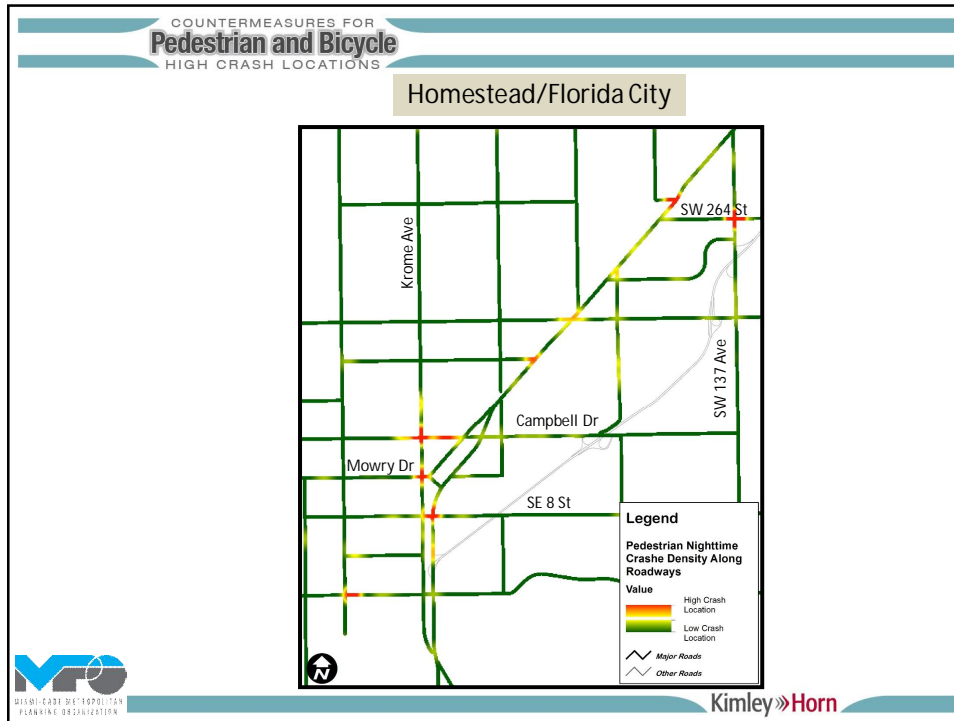
Lighting Condition	Count	Percentage
Daytime	4327	62%
Dark - Lighted	1974	28%
Dark - Not Lighted	347	5%
Dusk/Dawn	307	5%

**Fatal Pedestrian Crashes**

Lighting Condition	Count	Percentage
Dark-Lighted	206	54%
Daytime	108	28%
Dark-Not Lighted	48	12%
Dusk/Dawn	23	6%

- One third of total pedestrian crashes and two thirds of fatal pedestrian crashes occurred under dark conditions.
- The risk of a pedestrian crash being a fatal crash is five times greater under dark conditions in comparison to daylight conditions.

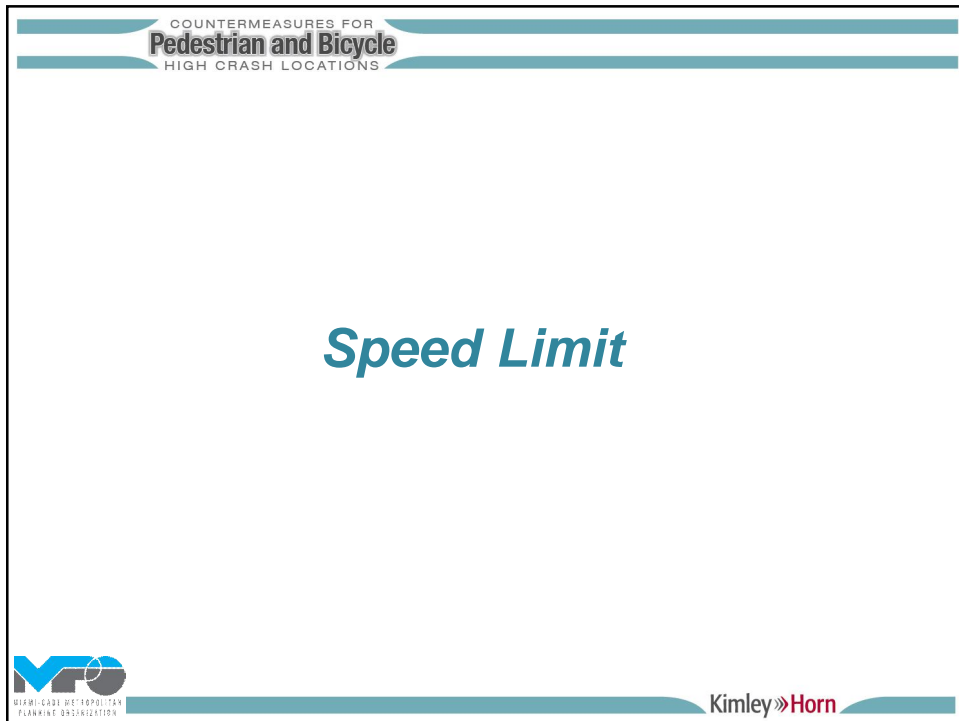
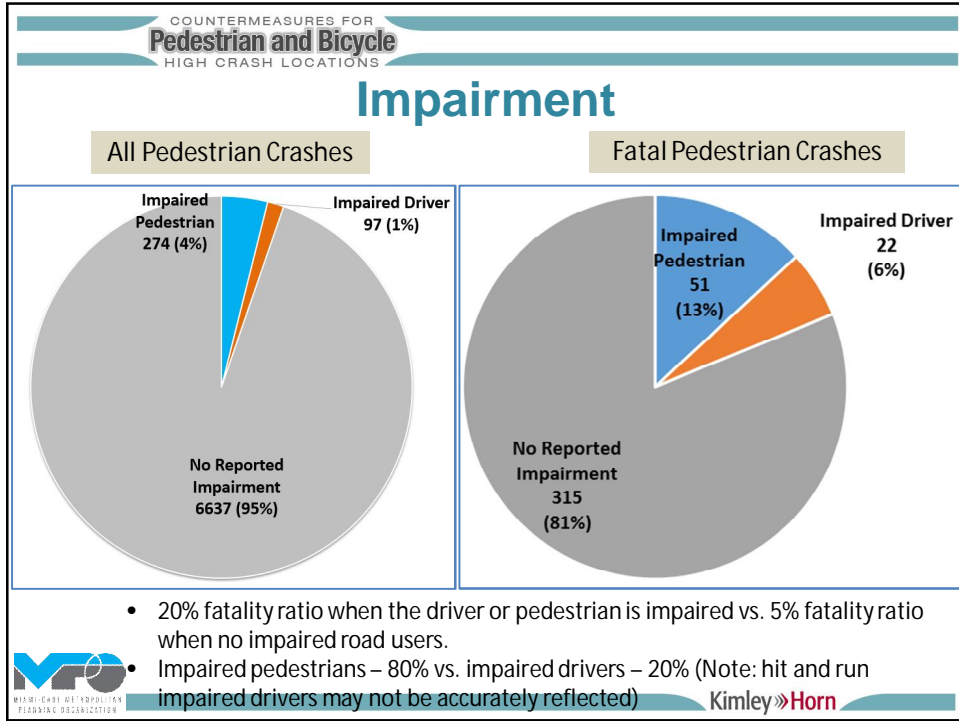


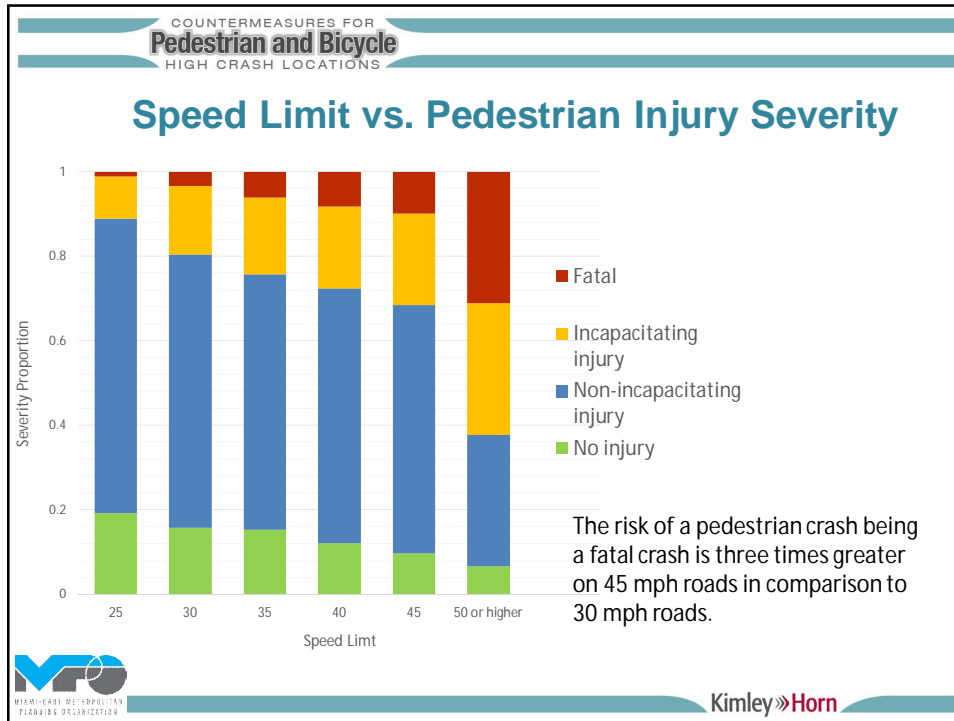
COUNTERMEASURES FOR  
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HIGH CRASH LOCATIONS

*Impairment*

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COUNTERMEASURES FOR  
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HIGH CRASH LOCATIONS

### Other Findings – Pedestrian Crashes

**Municipalities with the highest crashes**

- Miami, Miami Beach and Hialeah – total crashes.
- Miami, Hialeah and Miami Gardens – fatal crashes.

**Crashes on State vs. local (non-State) roads**

- Total crashes on state and local roads are approximately equal.
- State roads had twice as many fatal crashes as local roads.



**Intersection and mid-block crashes**

- 46% of total crashes and 30% of fatal crashes occurred at intersections.
- 44% of total crashes and 61% of fatal crashes occurred at mid-block locations.

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COUNTERMEASURES FOR  
**Pedestrian and Bicycle**  
HIGH CRASH LOCATIONS

## Bicycle Crashes


 

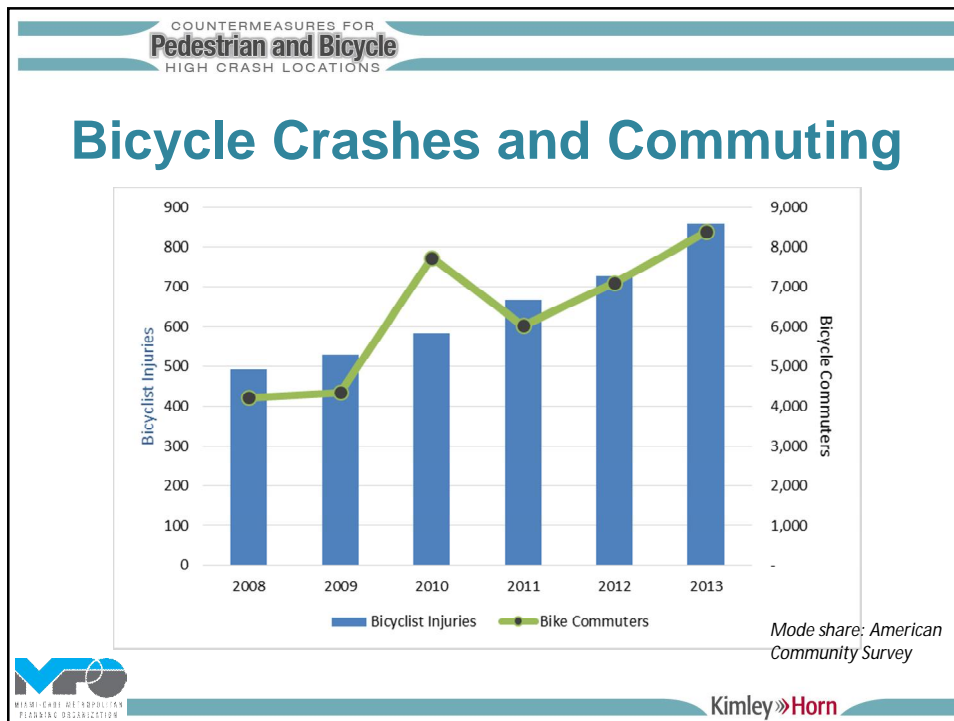
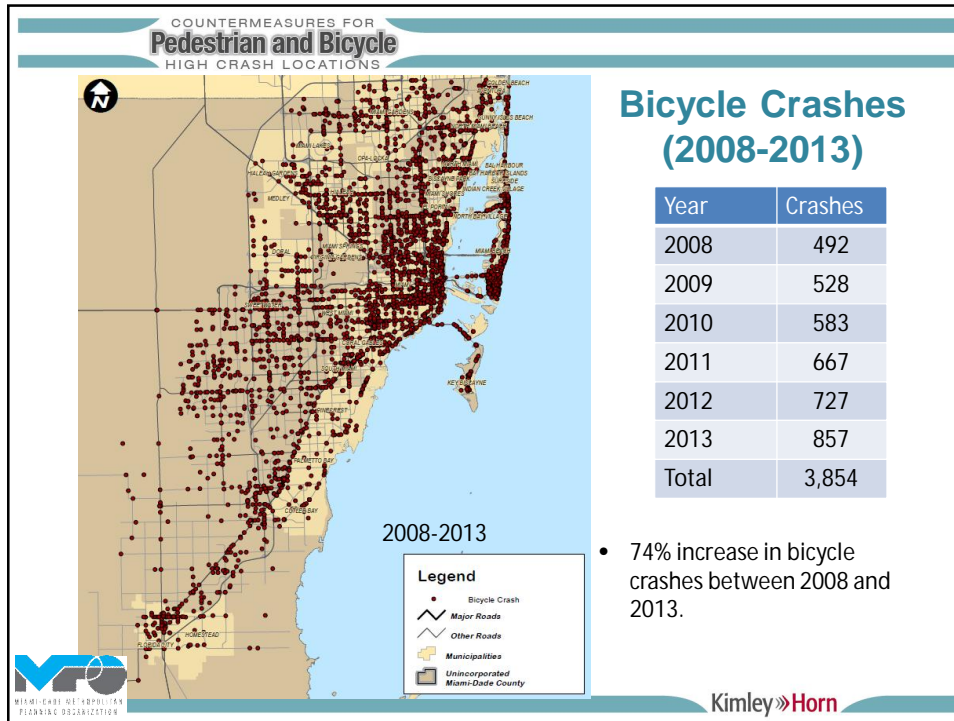
COUNTERMEASURES FOR  
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HIGH CRASH LOCATIONS

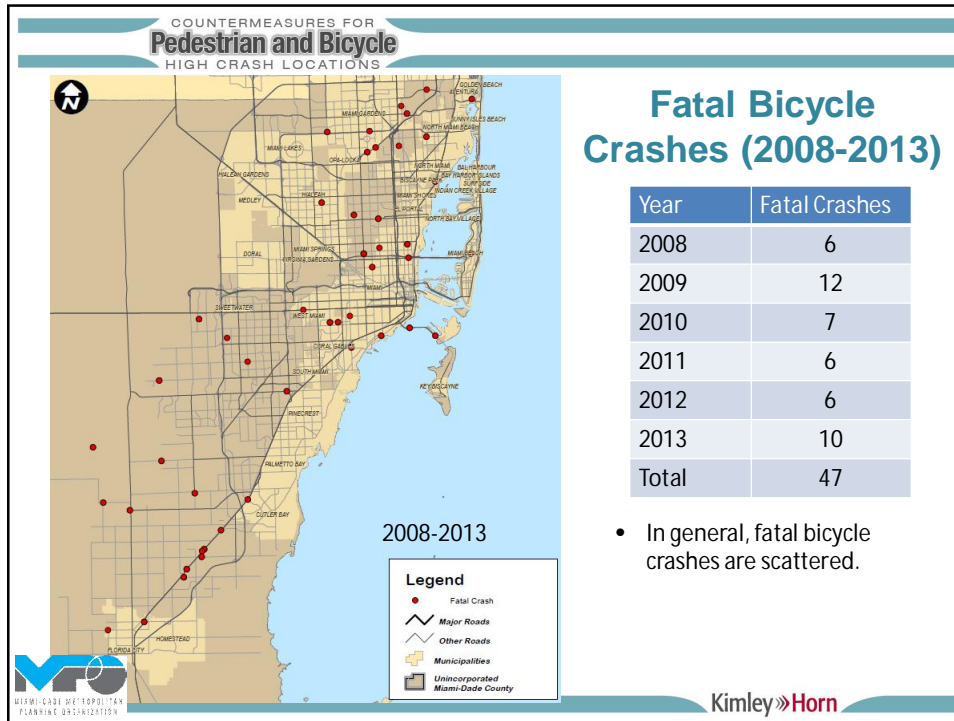
## Bicycle Crash Data (2008-2013)

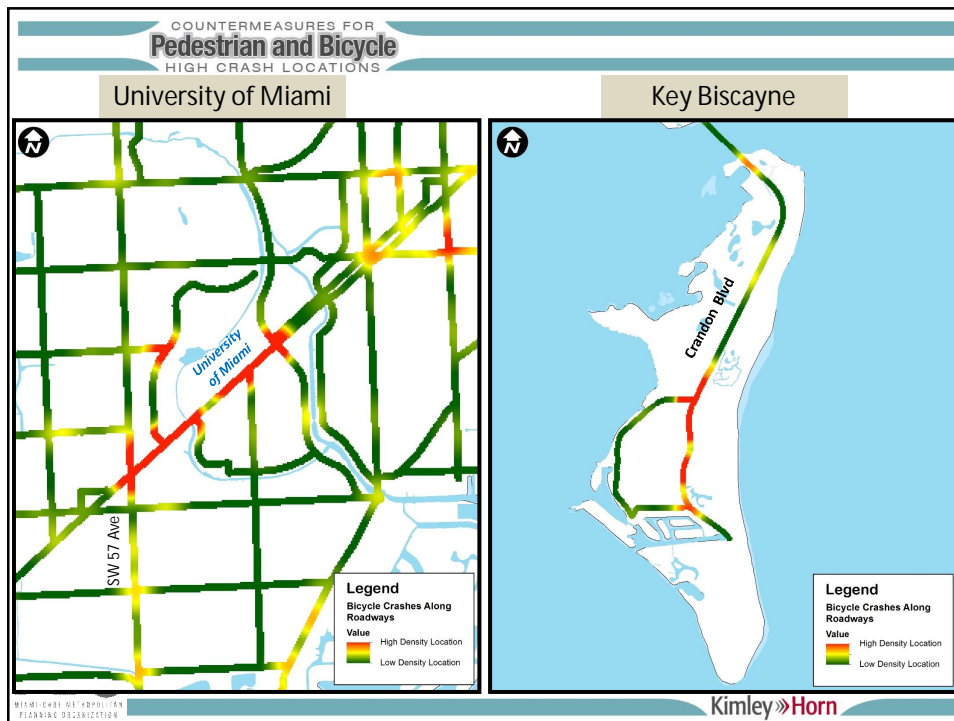
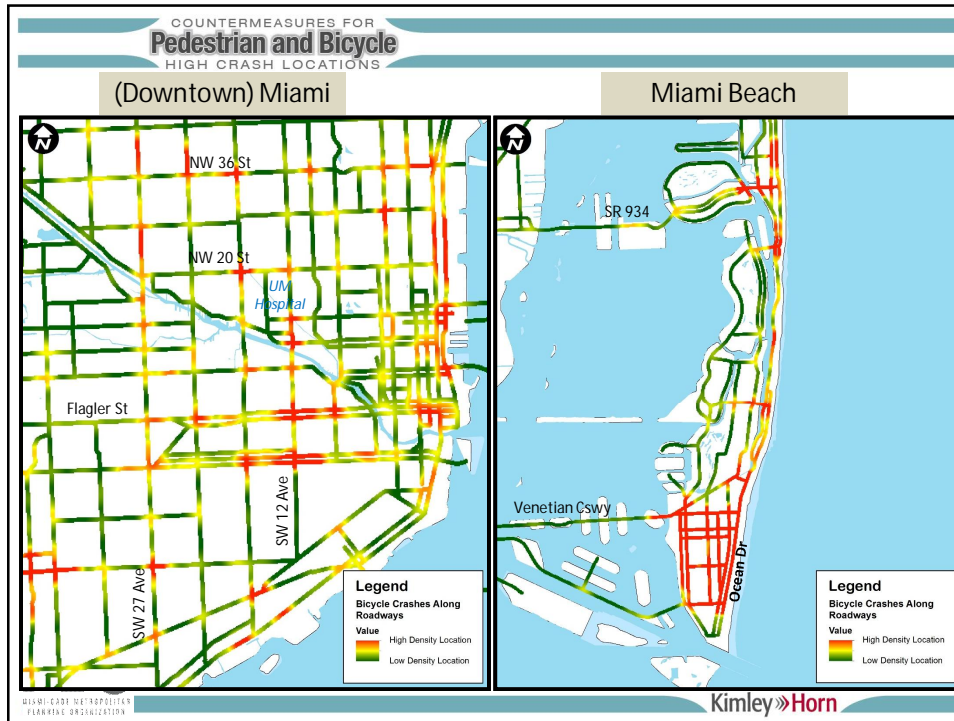
- Total crashes: 3,854
- Fatal crashes: 47
- Incapacitating injury crashes: 422

*On average, one in 82 crashes involving a bicyclist resulted in a fatality.*











COUNTERMEASURES FOR  
**Pedestrian and Bicycle**  
HIGH CRASH LOCATIONS

## Bicycle Crashes with Parked Vehicles




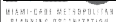
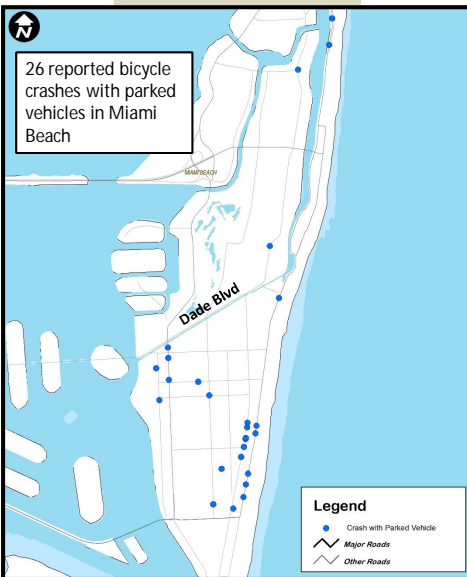
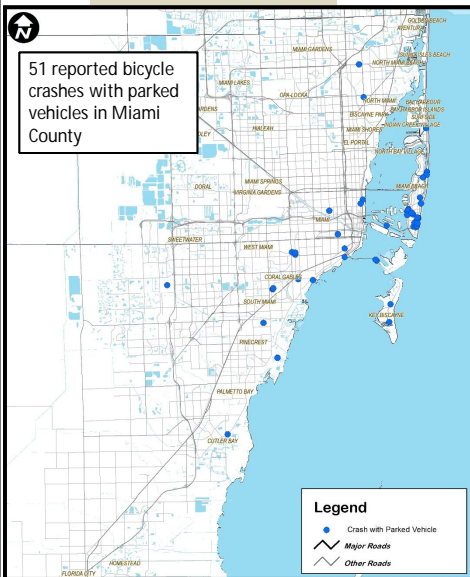
COUNTERMEASURES FOR  
**Pedestrian and Bicycle**  
HIGH CRASH LOCATIONS

### County Overview

51 reported bicycle crashes with parked vehicles in Miami County

### Miami Beach

26 reported bicycle crashes with parked vehicles in Miami Beach

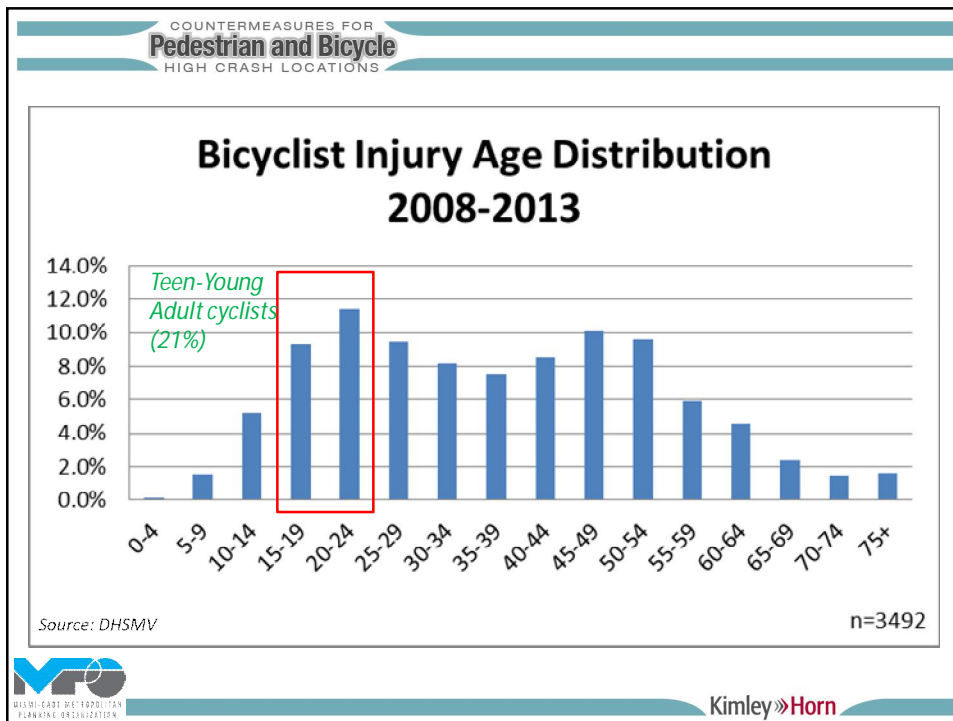


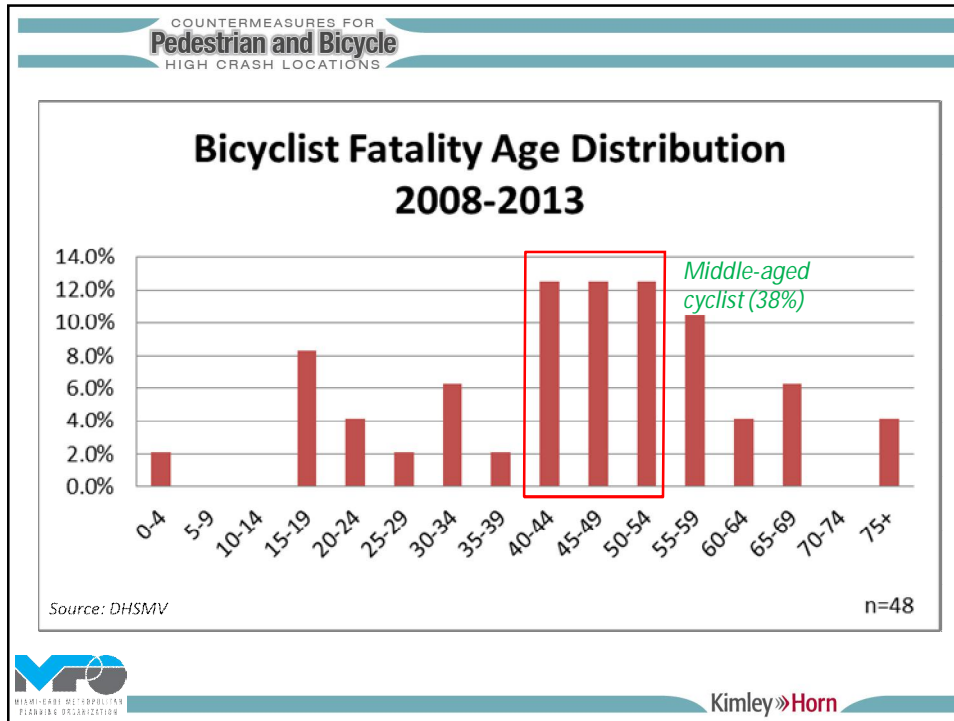
COUNTERMEASURES FOR  
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HIGH CRASH LOCATIONS

## At-Risk Bicyclist Groups

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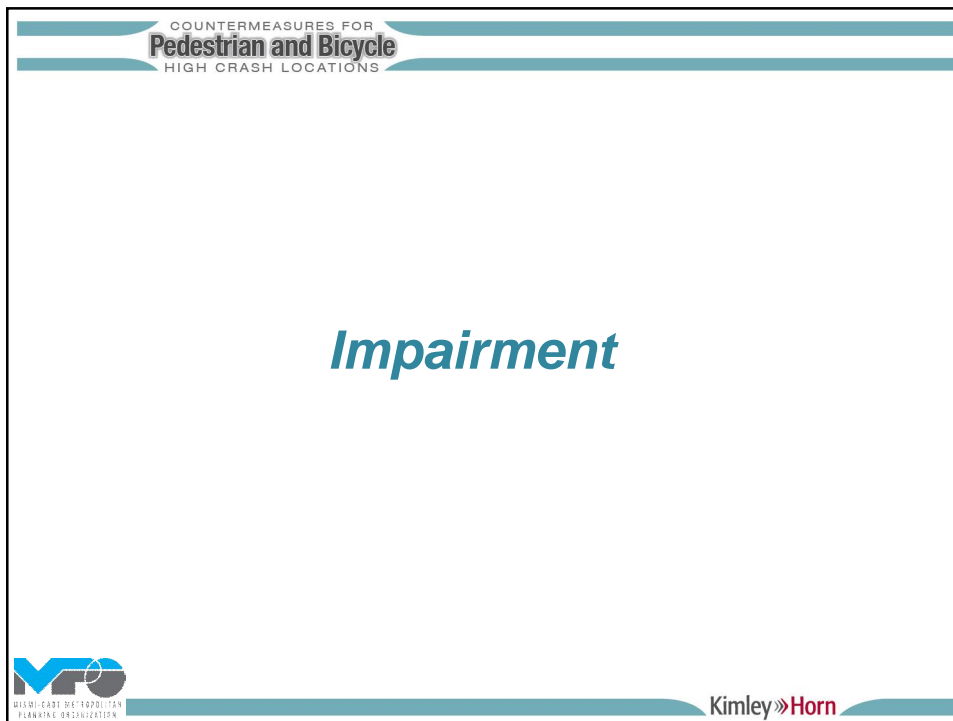
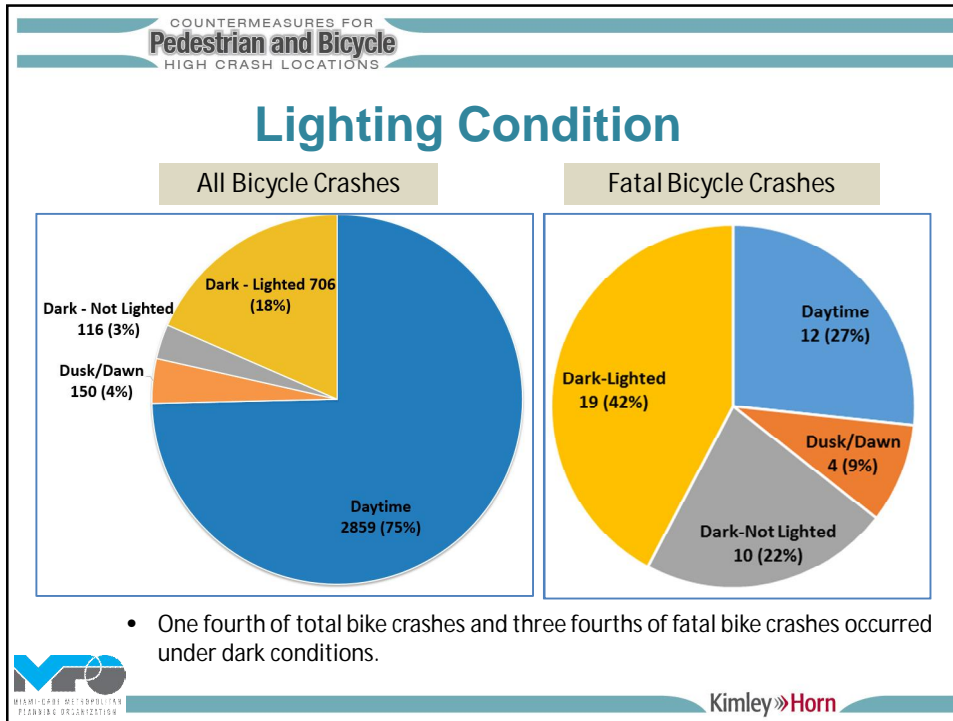


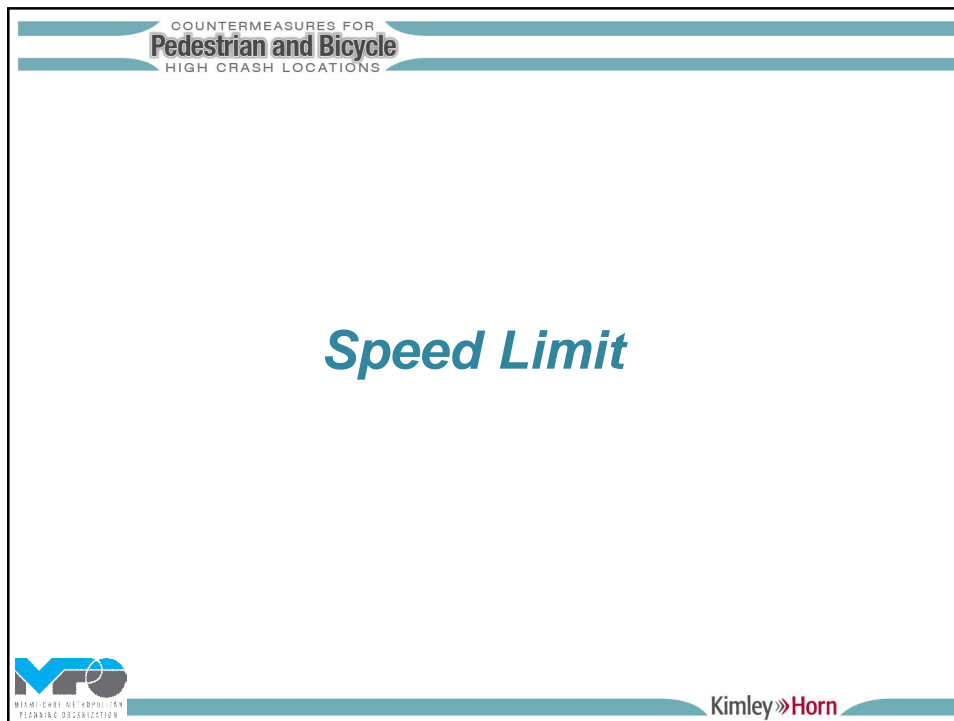
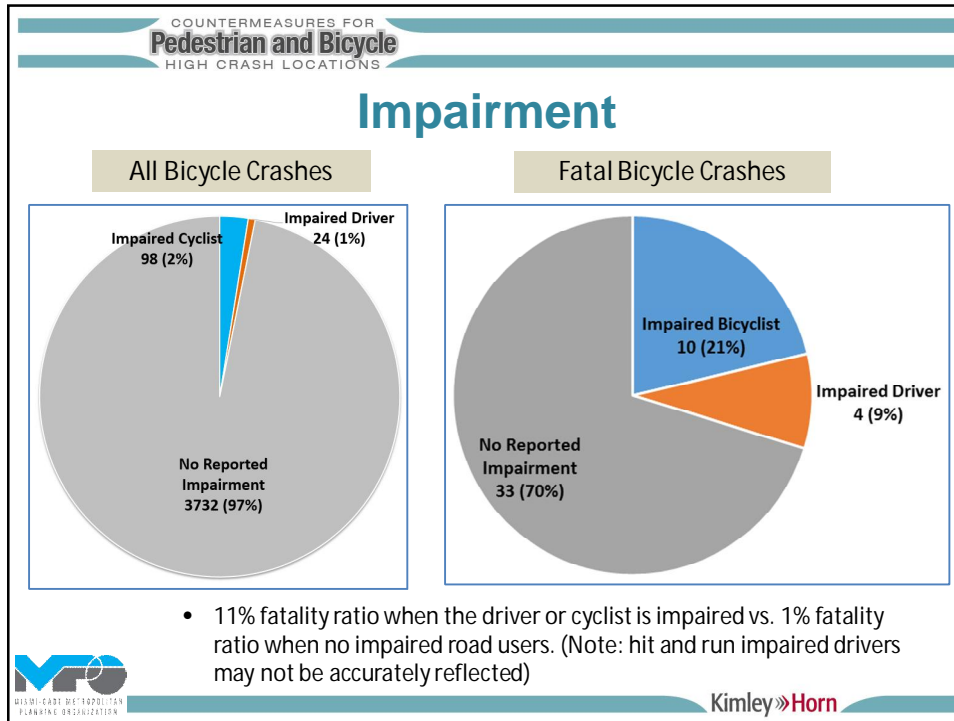


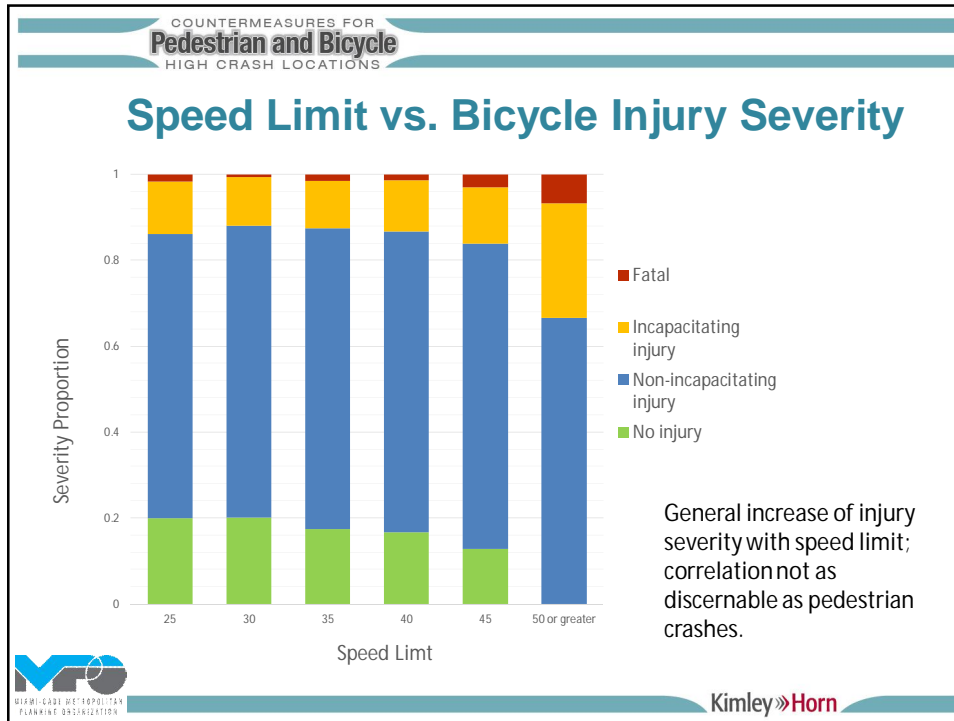
COUNTERMEASURES FOR  
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## Lighting Conditions

**MPO** MIAMI-DADE COUNTY POLYTECHNIC EDUCATION ORGANIZATION Kimley»Horn







- COUNTERMEASURES FOR  
**Pedestrian and Bicycle**  
HIGH CRASH LOCATIONS
- ### Other Findings – Bicycle Crashes
- Municipalities with the highest crashes
    - Miami, Miami Beach and Hialeah
  - Crashes on State vs. local (non-State) roads
    - 55% of bicycle crashes occurred on non-State roads.
    - 65% of fatal bicycle crashes occurred on non-State roads.
  - Intersection crashes
    - 49% of total crashes and 34% of fatal crashes occurred at intersections.
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## Next Steps

- Stakeholder agencies to provide input **by November 6th.**
- Refine high crash locations based on stakeholder input.
- Develop multidisciplinary strategies to address crash patterns.

## Study Advisory Committee #2

COUNTERMEASURES FOR  
**Pedestrian and Bicycle**  
HIGH CRASH LOCATIONS



May 25, 2016


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COUNTERMEASURES FOR  
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HIGH CRASH LOCATIONS

## Study Goals

- Identify high pedestrian and bicycle crash locations.
- Develop strategies to reduce traffic crashes involving pedestrians and bicyclists.
- Develop a process for continuing safety monitoring, analysis and improvement.



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COUNTERMEASURES FOR  
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## Study Progress

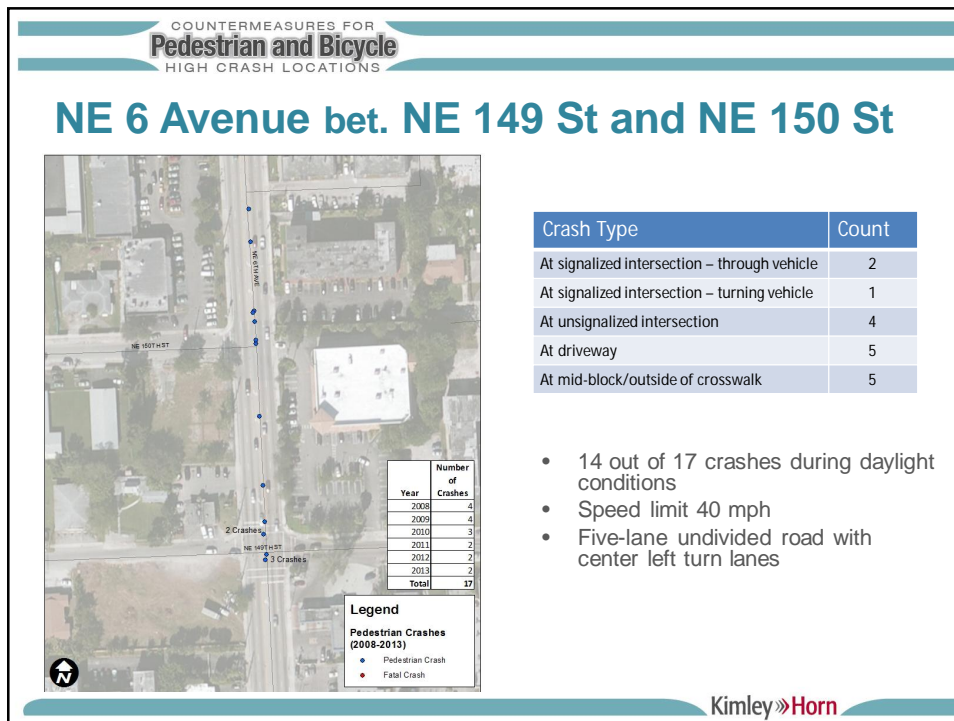
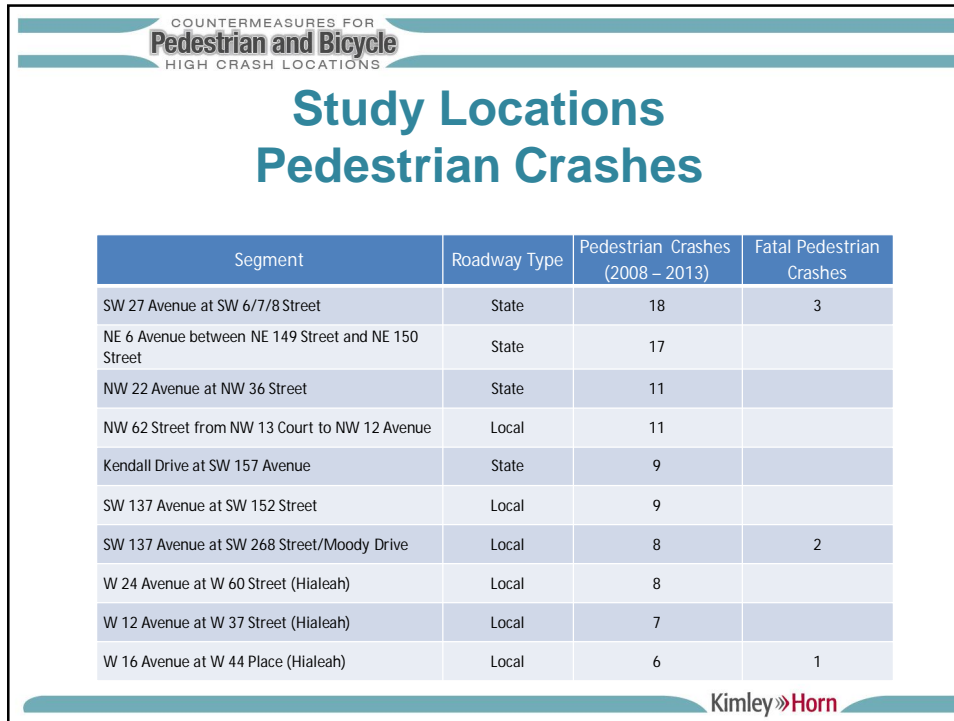
- Detailed crash data analysis completed
  - Presented results to the Committee in October 2015
- Conducted high crash location field reviews
- Developed a process for future evaluation of bike/pedestrian safety data and stakeholder coordination

COUNTERMEASURES FOR  
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HIGH CRASH LOCATIONS

## High Crash Location Assessment



COUNTERMEASURES FOR  
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## NE 6 Avenue bet. NE 149 St and NE 150 St





**Key Recommendations**

- Evaluate the feasibility of installing a mid-block crosswalk on NE 6 Avenue north of NE 150 Street.
- Evaluate the feasibility of reconfiguring NE 6 Avenue (add a raised median)

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COUNTERMEASURES FOR  
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## NW 62 Street bet. NW 13 Ct and NW 12 Av



City of Miami



Crash Type	Count
At signalized intersection – through vehicle	4
At signalized intersection – turning vehicle	1
At unsignalized intersection	1
At mid-block/outside of crosswalk	5

- 6 crashes during daylight conditions
- 5 crashes during dark conditions
- Four lane divided road; 30 mph
- Staggered street lighting along NW 62 St

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COUNTERMEASURES FOR  
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## NW 62 Street bet. NW 13 Ct and NW 12 Av

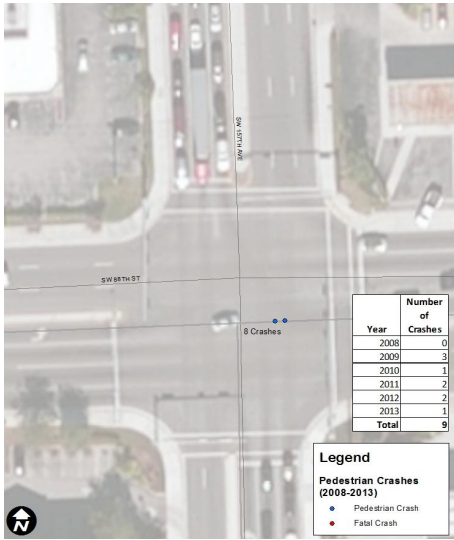
**Key Recommendations**

- Review overall crash data to determine if there is a high incidence of nighttime crashes; if so, conduct a lighting assessment.
- Review pedestrian clearance times at NW 12 Ave and make adjustments, if needed.
- Consider an educational campaign to encourage pedestrians to use the crosswalks. Target populations are transit users and local residents

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COUNTERMEASURES FOR  
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## Kendall Drive at SW 157 Avenue



Year	Number of Crashes
2008	0
2009	3
2010	1
2011	2
2012	2
2013	1
<b>Total</b>	<b>9</b>

**Legend**  
Pedestrian Crashes (2008-2013)  
• Pedestrian Crash  
• Fatal Crash

Crash Type	Count
At signalized intersection – through vehicle	1
At signalized intersection – turning vehicle	5
At mid-block/outside of crosswalk	3

- 5 crashes during daylight conditions
- 4 crashes during dark conditions
- Street lighting only on the south side of Kendall Drive; no lighting along SW 157 Avenue
- No crossing on the west leg

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COUNTERMEASURES FOR  
**Pedestrian and Bicycle**  
HIGH CRASH LOCATIONS

## Kendall Drive at SW 157 Avenue



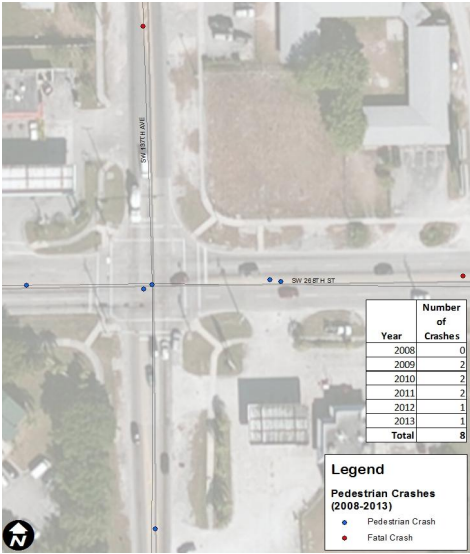

**Key Recommendations**

- Review overall crash data to determine if there is a high incidence of nighttime crashes; if so, conduct a lighting assessment.
- Evaluate the feasibility of installing a signalized crossing on the west leg of the intersection.

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COUNTERMEASURES FOR  
**Pedestrian and Bicycle**  
HIGH CRASH LOCATIONS

## SW 137 Avenue at SW 268 Street/Moody Dr



Year	Number of Crashes
2008	0
2009	2
2010	2
2011	2
2012	1
2013	1
<b>Total</b>	<b>8</b>

**Legend**

**Pedestrian Crashes (2008-2013)**

- Pedestrian Crash
- Fatal Crash



Crash Type	Count
At signalized intersection – turning vehicle	2
At driveway	1
At mid-block/outside of crosswalk	5

- 2 crashes during daylight conditions
- 6 crashes during dark conditions
- 2 crashes were fatal
- Street lighting is not provided at the intersection

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COUNTERMEASURES FOR  
**Pedestrian and Bicycle**  
HIGH CRASH LOCATIONS

## SW 137 Avenue at SW 268 Street/Moody Dr

**Key Recommendations**

- Review overall crash data to determine if there is a high incidence of nighttime crashes; if so, conduct a lighting assessment.
- Review pedestrian clearance times and make adjustments, if needed.
- Consider an educational campaign to encourage pedestrians to use the crosswalks.

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COUNTERMEASURES FOR  
**Pedestrian and Bicycle**  
HIGH CRASH LOCATIONS

## Summary of Recommendations

Location/Segment	Pedestrian signal feature upgrades	Pedestrian signal timing	Street lighting	Mid-block crosswalks	Complete street concepts	ADA facility upgrades	Signs and markings	Bus stop relocation	Drainage improvements	Education/awareness
SW 27 Avenue at SW 6/7/8 Street	x					x	x			
NE 6 Avenue between NE 149 Street and NE 150 Street				x	x		x		x	x
NW 22 Avenue at NW 36 Street	x						x			
NW 62 Street from NW 13 Court to NW 12 Avenue	x	x	x			x	x		x	x
Kendall Drive at SW 157 Avenue			x			x	x			
SW 137 Avenue at SW 152 Street	x	x	x				x			
SW 137 Avenue at SW 268 Street/Moody Drive	x	x	x			x	x			x
W 24 Avenue at W 60 Street (Hialeah)						x	x			x
W 12 Avenue at W 37 Street (Hialeah)	x					x	x	x		
W 16 Avenue at W 44 Place (Hialeah)	x					x			x	

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COUNTERMEASURES FOR  
**Pedestrian and Bicycle**  
HIGH CRASH LOCATIONS

## Study Locations Bicycle Crashes

Segment	Roadway Type	Bicycle Crashes (2008 – 2013)	Fatal Bicycle Crashes
Crandon Blvd between Crandon Park Tennis Center and Seaview Drive	Local	46	0
SR A1A/Collins Avenue between Bayview Drive and 174 Street	State	19	0
W 29 Street between Palm Avenue and W 16 Avenue/Milam Diary Road	Local	17	0
SR 976/SW 40 Street/Bird Road at SR 973/SW 87 Avenue	State	7	0
SW 112 Avenue between Old Cutler Road and US 1	Local	11	0
SW 312 Street/Campbell Drive between SW 177 Avenue and NE 1 Road*	Local	12	0

\* SW 312 Street/Campbell Drive was evaluated for pedestrian and bicycle crashes. There were 18 pedestrian crashes.

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COUNTERMEASURES FOR  
**Pedestrian and Bicycle**  
HIGH CRASH LOCATIONS

## Crandon Blvd bet. Harbor Dr. and Seaview Dr.

Crash Type	Count
Motorist right turn onto driveway	15
Motorist right turn at signalized intersection	8
Motorist right turn at unsignalized intersection	6
Motorist exiting driveway	6
Motorist turning left	2
Parked vehicle next to bike lane - dooring	2
Other/Unknown	7

Year	# of Crashes (Total)	# of Daytime Crashes	# of Nighttime Crashes
2008	7	6	1
2009	6	5	1
2010	11	9	2
2011	13	11	2
2012	7	7	0
2013	12	11	1
<b>Total</b>	<b>46</b>	<b>42</b>	<b>4</b>

- 42 out of 46 crashes during daylight conditions
- 29 crashes associated with right turn vehicles
- Bike lanes exist
- 30 mph speed limit
- County's green colored bike lane pilot project – north of city limits

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COUNTERMEASURES FOR  
**Pedestrian and Bicycle**  
HIGH CRASH LOCATIONS

## Crandon Blvd bet. Harbor Dr. and Seaview Dr.



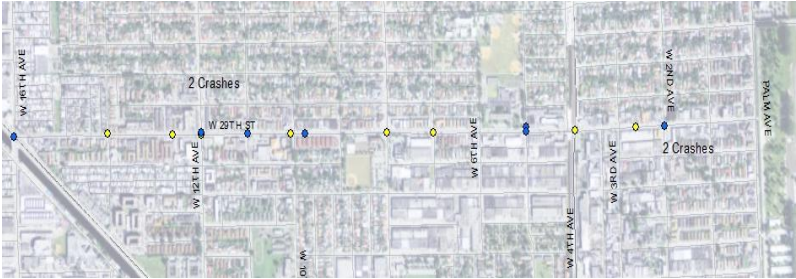

**Key Recommendations**

- Green bike lanes along Crandon Boulevard at intersections and areas of conflict to increase the emphasis of bike lanes.
- Install Bicycle/Pedestrian warning signs (W11-2) with “Ahead” or “LOOK” plaque on (unsignalized) streets connecting to Crandon Boulevard

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COUNTERMEASURES FOR  
**Pedestrian and Bicycle**  
HIGH CRASH LOCATIONS

## W 29 St bet. Palm Ave and W 16 Ave/ Milam Dairy Rd



- 10 crashes during daylight conditions
- 7 crashes during dark conditions
- Four-lane undivided road; 30 mph
- Street lighting is provided on the north side

Crash Type	Count
Motorist right turn at signalized intersection	4
Bike crossing mid-block	3
Motorist exiting driveway/parking lot	2
Motorist turning left	2
Motorist (through) failed to yield at intersection	2
Bicyclist failed to yield at intersection	1
Motorist right turn at unsignalized intersection	1
Other/Unknown	2

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COUNTERMEASURES FOR  
**Pedestrian and Bicycle**  
HIGH CRASH LOCATIONS

## W 29 Street bet. Palm Ave and W 16 Ave/ Milam Dairy Rd





**Key Recommendations**

- Evaluate the feasibility of reconfiguring W 29 Street to provide bike lanes, a raised median, and reduce conflicts between parking and bikes/pedestrians.
- Enforce parking violations
- Install “ Maintain a minimum 3-foot clearance when passing a bicyclist” signs along W 29 Street

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COUNTERMEASURES FOR  
**Pedestrian and Bicycle**  
HIGH CRASH LOCATIONS

## Campbell Drive bet. SW 177 Avenue and NE 1 Road





Pedestrian Crash Types	Count	Bike Crash Types	Count
At signalized intersection – through vehicle	2	At signalized intersection – through vehicle	5
At signalized intersection – turning vehicle	4	Motorist right turn at signalized intersection	1
At unsignalized intersection	2	Motorist turning left	1
At driveway	2	Bike mid-block crossing	1
At mid-block	8	Motorist right turn at unsignalized intersection	1
		At unsignalized intersection – through vehicle	1
		Other/Unknown	2

- 20 crashes - daylight conditions
- 10 crashes – dark conditions
- 4-lane divided; 30 mph

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COUNTERMEASURES FOR  
**Pedestrian and Bicycle**  
HIGH CRASH LOCATIONS

## Campbell Drive bet. SW 177 Avenue and NE 1 Road

Key Recommendations

- Evaluate the need for enhancing corridor street lighting.
- Evaluate the feasibility of providing a crosswalk on the east leg of Campbell Drive at NE 2 Avenue
- Consider a pedestrian safety awareness program to reduce mid-block crossing in the vicinity of NE 2 Avenue

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COUNTERMEASURES FOR  
**Pedestrian and Bicycle**  
HIGH CRASH LOCATIONS

## Campbell Drive bet. SW 177 Avenue and NE 1 Road

Key Recommendations

- Install Shared Lane Markings (Sharrows) along Campbell Drive.
- Evaluate potential countermeasures to improve safety of Mavericks High students who cross N Flagler Avenue south of Campbell Drive:
  - A pedestrian safety awareness program to encourage the use of existing crosswalk at Campbell Drive and N Flagler Avenue
  - Evaluate the feasibility of installing a crosswalk across N Flagler Avenue south of Campbell Drive with RRFB.
- Install pedestrian signal heads at Campbell Drive and NE 1 Road.
- Trim overgrown median landscaping along Campbell Drive.

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COUNTERMEASURES FOR  
**Pedestrian and Bicycle**  
HIGH CRASH LOCATIONS

## Summary of Recommendations

Location/Segment	Green bike lanes in conflict areas	Complete street concepts	Bicycles share the road signs	Bike/pedestrian warning signs on driveways	New bike lanes	State law - 3-foot clearance sign	Other signs	Street lighting	Education/Enforcement	Landscape maintenance
Crandon Blvd between Crandon Park Tennis Center and Seaview Drive	x			x		x	x			
SR A1A/Collins Avenue between Bayview Drive and 174 Street			x	x			x			
W 29 Street between Palm Avenue and W 16 Avenue/Milam Dairy Road		x			x	x	x		x	
SR 976/SW 40 Street/Bird Road at SR 973/SW 87 Avenue			x							x
SW 112 Avenue between Old Cutler Road and US 1					x		x			
SW 312 Street/Campbell Drive between SW 177 Avenue and NE 1 Road*			x				x	x	x	x

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COUNTERMEASURES FOR  
**Pedestrian and Bicycle**  
HIGH CRASH LOCATIONS

## Crash Data Analysis




COUNTERMEASURES FOR  
**Pedestrian and Bicycle**  
HIGH CRASH LOCATIONS

## Crash Data

- Analysis period: 2008-2013
- Data source: FDOT's Unified Basemap Repository (UBR)
- UBR data
  - GIS databases
  - Event, Vehicle and Occupant data as separate shapefiles
  - State and non-State road crashes

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COUNTERMEASURES FOR  
**Pedestrian and Bicycle**  
HIGH CRASH LOCATIONS

## Safety Data Comparison

Traffic Crash Fatalities in Florida (2013)

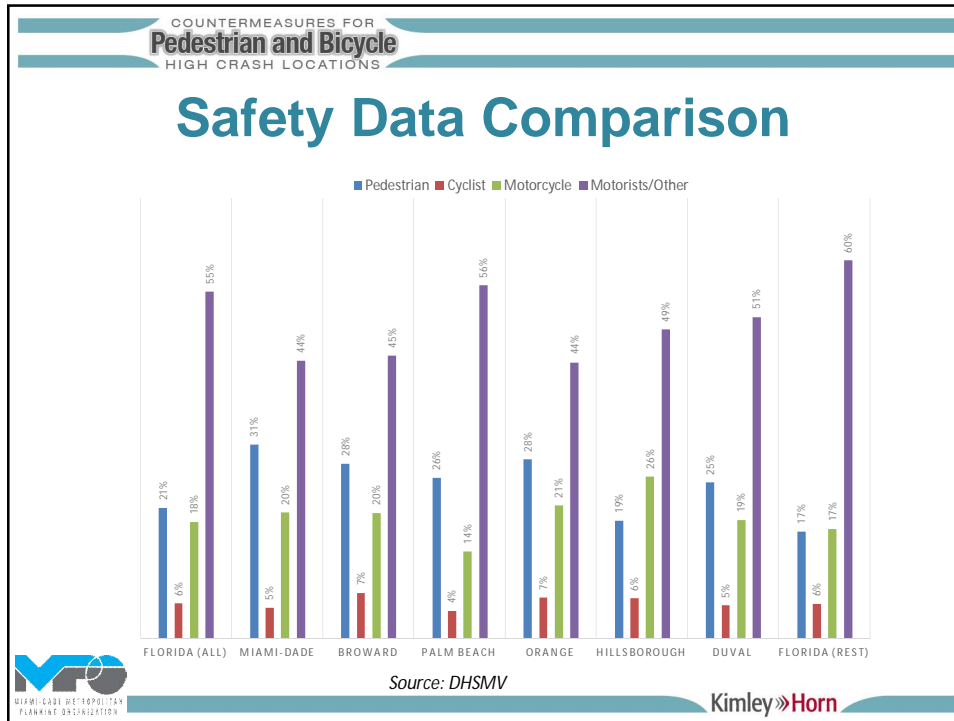
Category	Count	Percentage
Motorists/Other	1325	55%
Pedestrian	498	21%
Motorcycle	444	18%
Cyclist	135	6%

Traffic Crash Fatalities in Miami-Dade County (2013)

Category	Count	Percentage
Motorists/Other	99	44%
Pedestrian	69	31%
Motorcycle	45	20%
Cyclist	11	5%

Source: DHSMV

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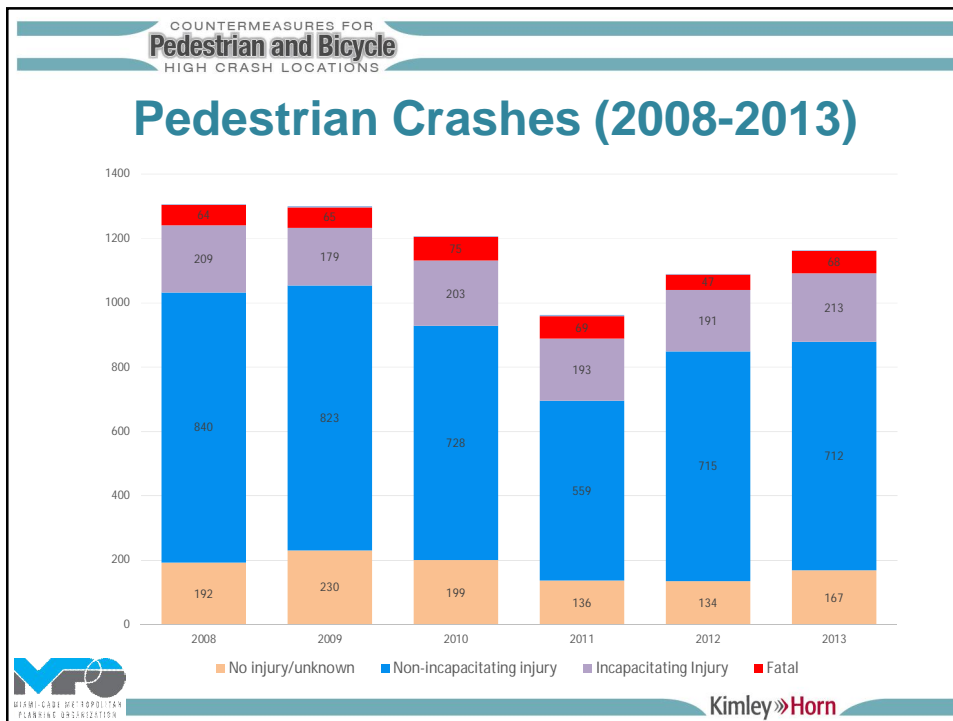
COUNTERMEASURES FOR  
**Pedestrian and Bicycle**  
HIGH CRASH LOCATIONS

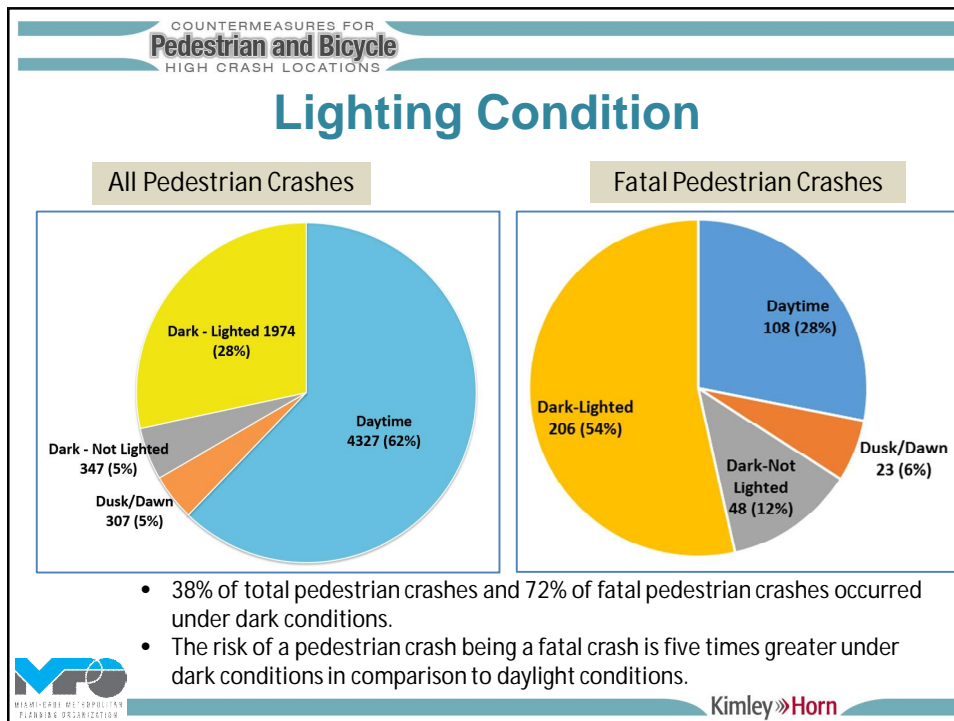
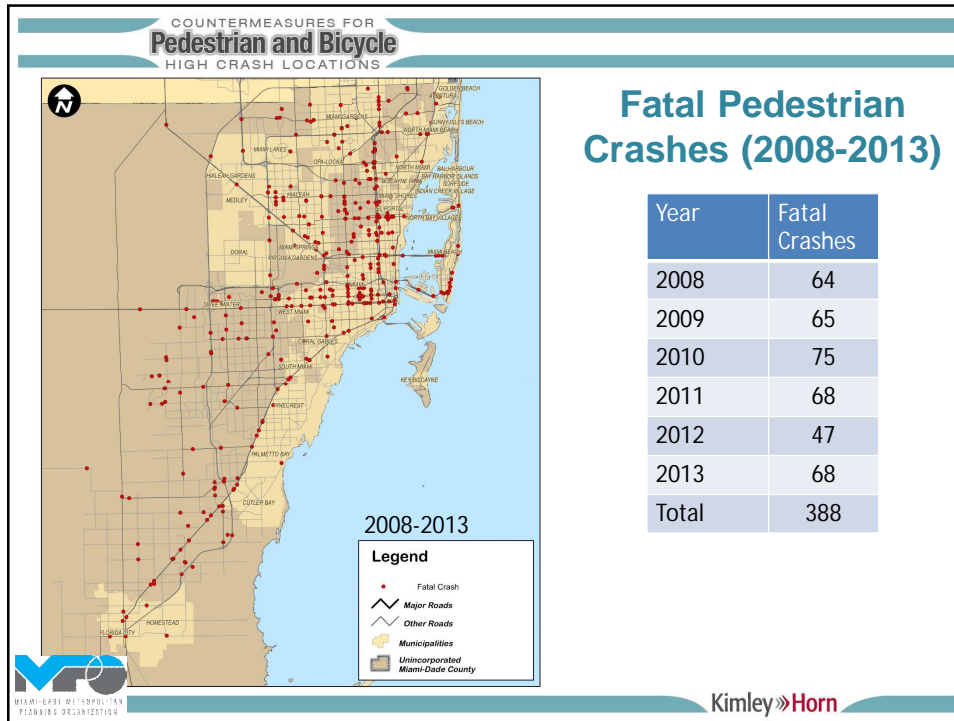
## Pedestrian Crash Data (2008-2013)

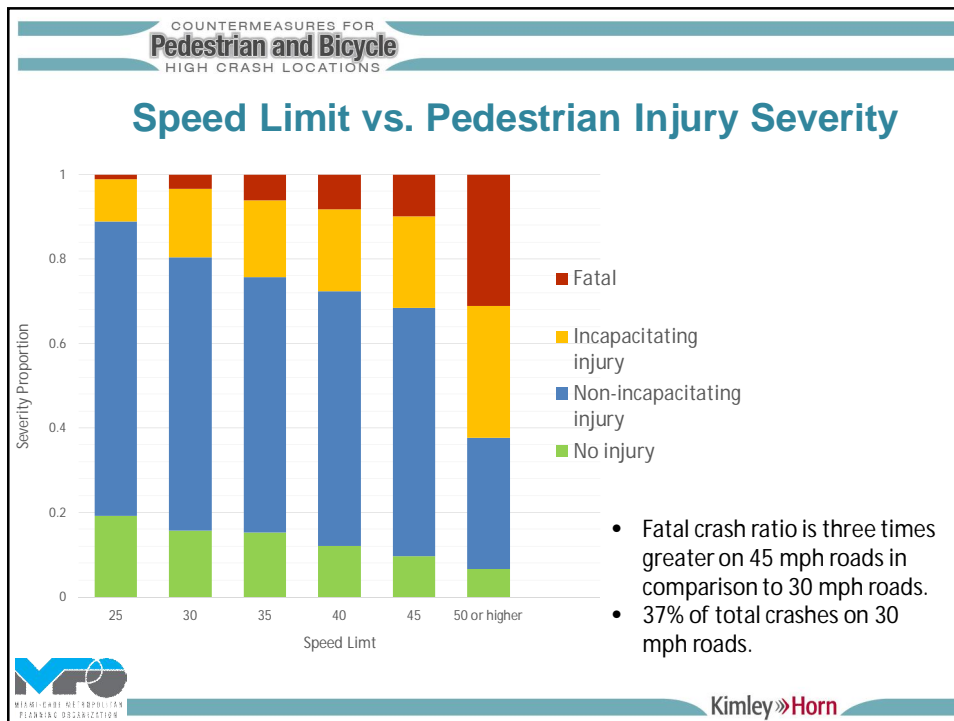
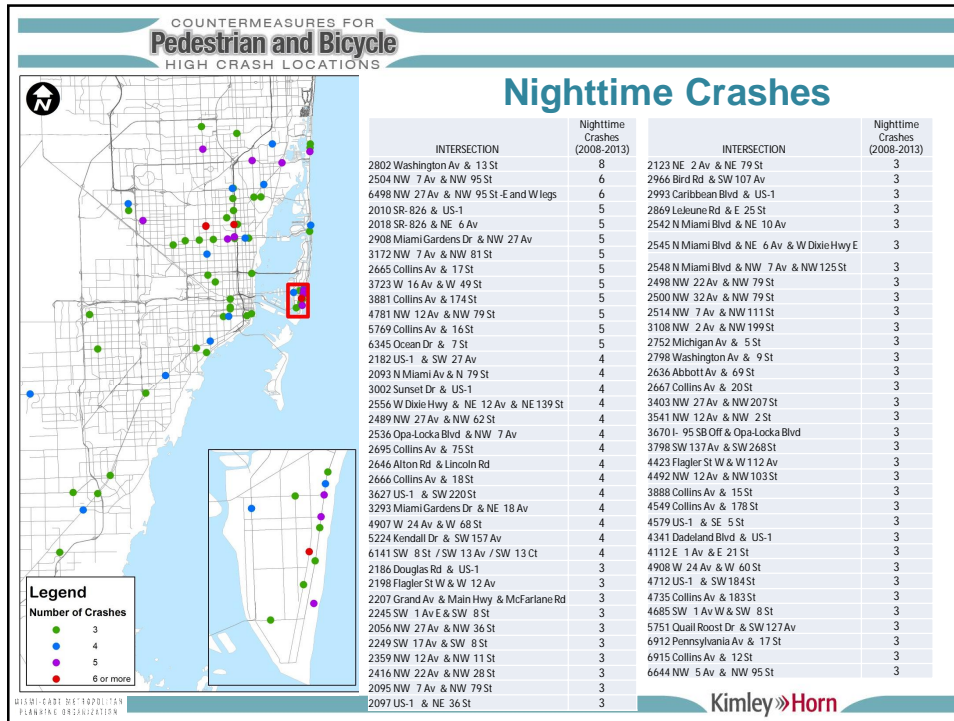
- Total crashes: 7,028
- Fatal crashes: 388
- Incapacitating injury crashes: 1,188

*On average, one in 18 crashes involving a pedestrian resulted in a fatality.*

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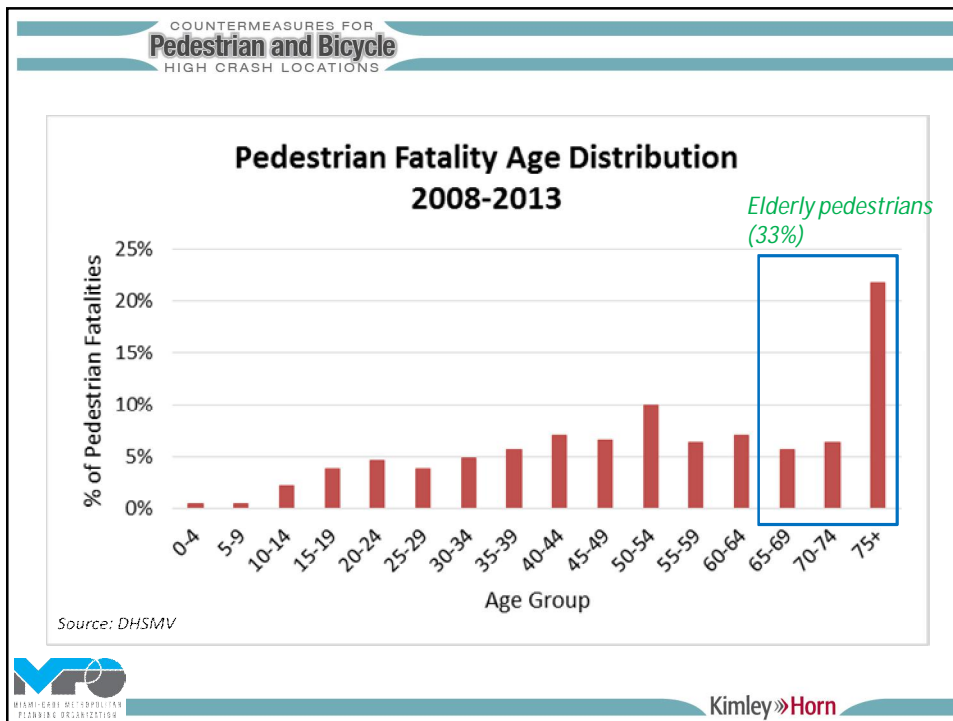
COUNTERMEASURES FOR  
**Pedestrian and Bicycle**  
HIGH CRASH LOCATIONS

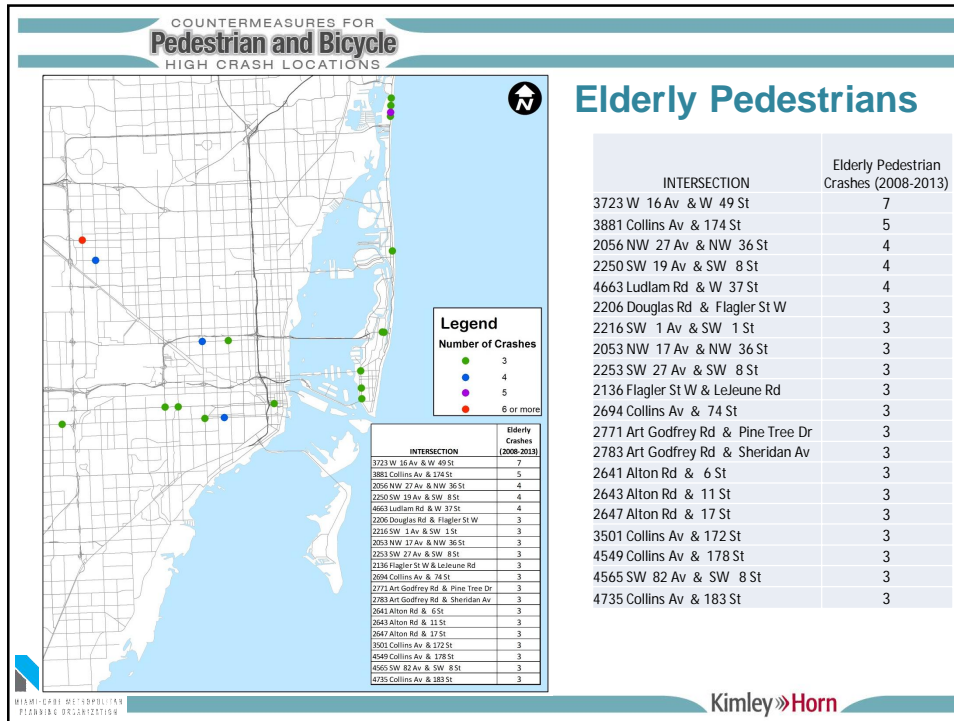
## Elderly Pedestrians

- One third of fatal pedestrian crashes; but only 16% of total crashes
- 1 in 9 crashes was fatal (overall fatal pedestrian crash ratio is 1 in 18)
- No reduction in the number of crashes between 2008 and 2013.
- 73% of crashes occurred during daytime
- Slightly higher percentage of crashes at intersections compared to the overall data

Note: Juvenile pedestrian crashes have reduced over the study years.

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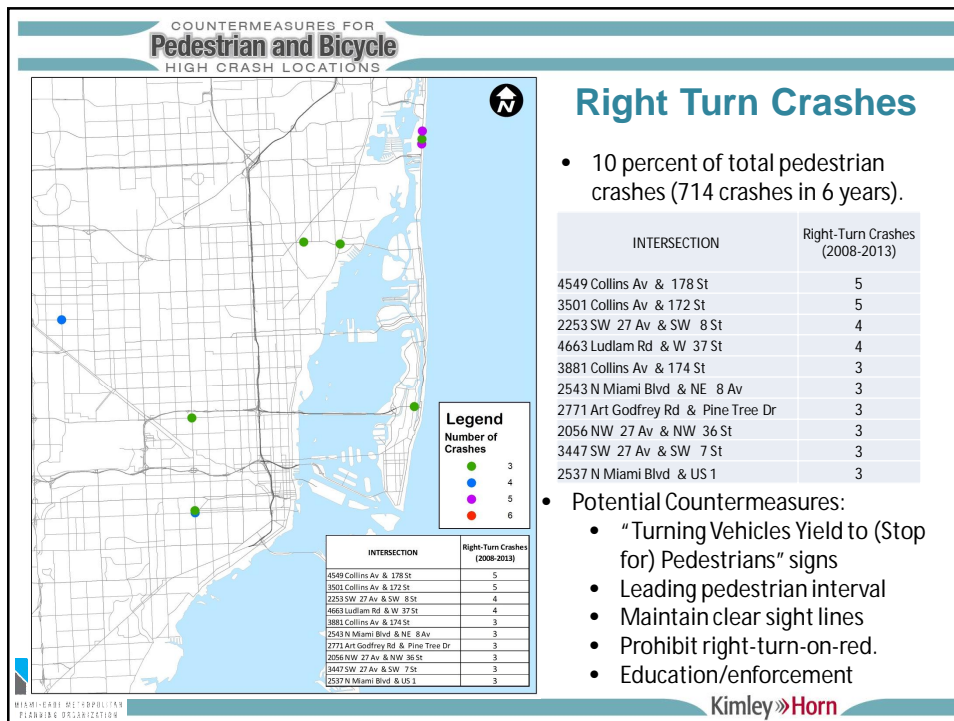
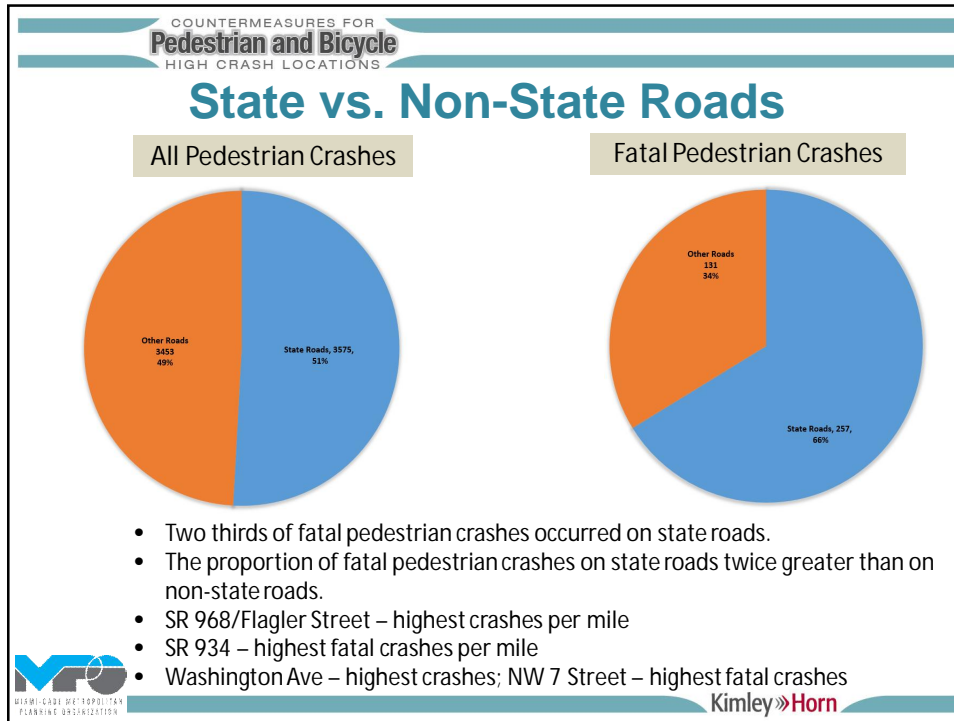


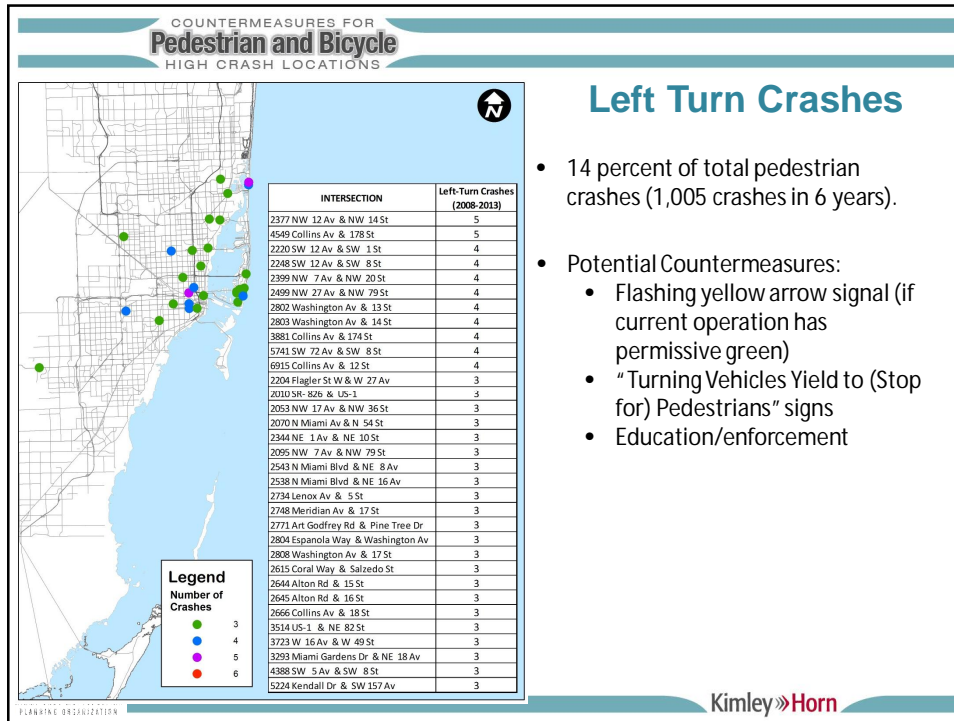
COUNTERMEASURES FOR  
**Pedestrian and Bicycle**  
HIGH CRASH LOCATIONS

## Elderly Pedestrians

- **Engineering**
  - Larger signs
  - Countdown signals (audible features where warranted)
  - Pedestrian clearance interval adjustments as needed
  - Bus stop relocation
  
- **Education**
  - Safe Steps (Pasos Seguros) Program
    - Alliance for Aging, Inc.
    - Bilingual
    - Community level meetings
    - TV campaign
  - Outreach through Golden Passport program

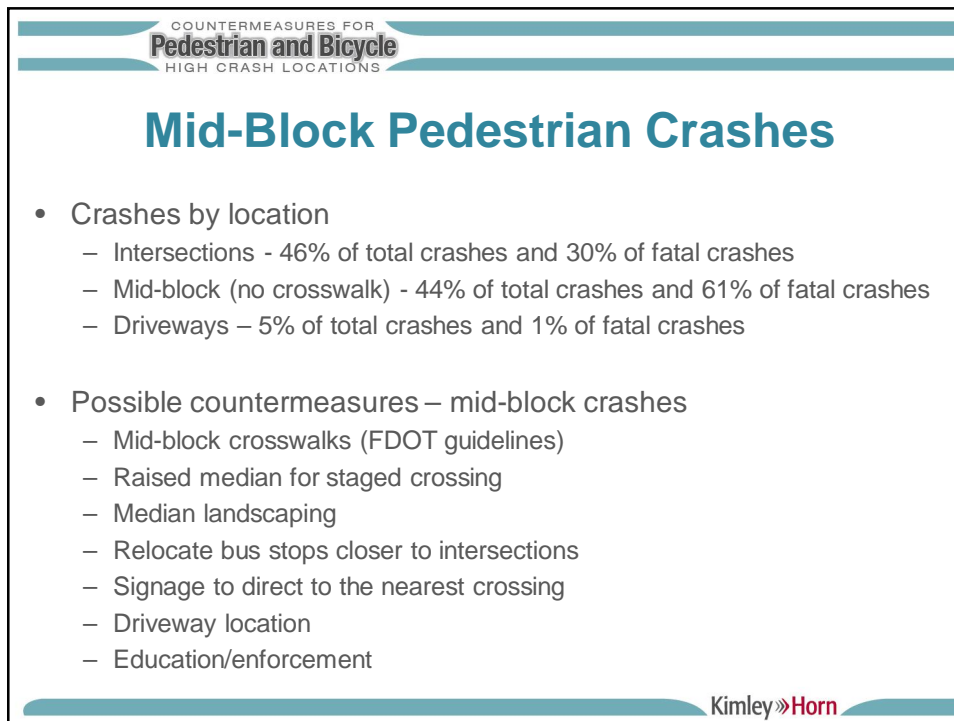
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## Left Turn Crashes

- 14 percent of total pedestrian crashes (1,005 crashes in 6 years).
- Potential Countermeasures:
  - Flashing yellow arrow signal (if current operation has permissive green)
  - “Turning Vehicles Yield to (Stop for) Pedestrians” signs
  - Education/enforcement



COUNTERMEASURES FOR  
**Pedestrian and Bicycle**  
HIGH CRASH LOCATIONS

## Other Findings – Pedestrian Crashes


- Juvenile pedestrian crashes
  - Decreasing trend of injuries
- Impairment
  - 20% of impairment related crashes were fatal (5% fatality ratio when no impairment)
- Municipalities with the highest crashes
  - Total Crashes - Miami (30%), Miami Beach (10%), Hialeah (8%); unincorporated areas (30%)
  - Fatal Crashes – Miami (27%), Hialeah (8%), Miami Beach (5%), Miami Gardens (5%); unincorporated areas (40%)

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COUNTERMEASURES FOR  
**Pedestrian and Bicycle**  
HIGH CRASH LOCATIONS

## Bicycle Crash Data (Summary of Key Results)

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MIAMI-DADE COUNTY  
TRANSPORTATION ORGANIZATION

COUNTERMEASURES FOR  
**Pedestrian and Bicycle**  
HIGH CRASH LOCATIONS

## Bicycle Crash Data (2008-2013)

- Total crashes: 3,854
- Fatal crashes: 47
- Incapacitating injury crashes: 422

*On average, one in 82 crashes involving a bicyclist resulted in a fatality.*

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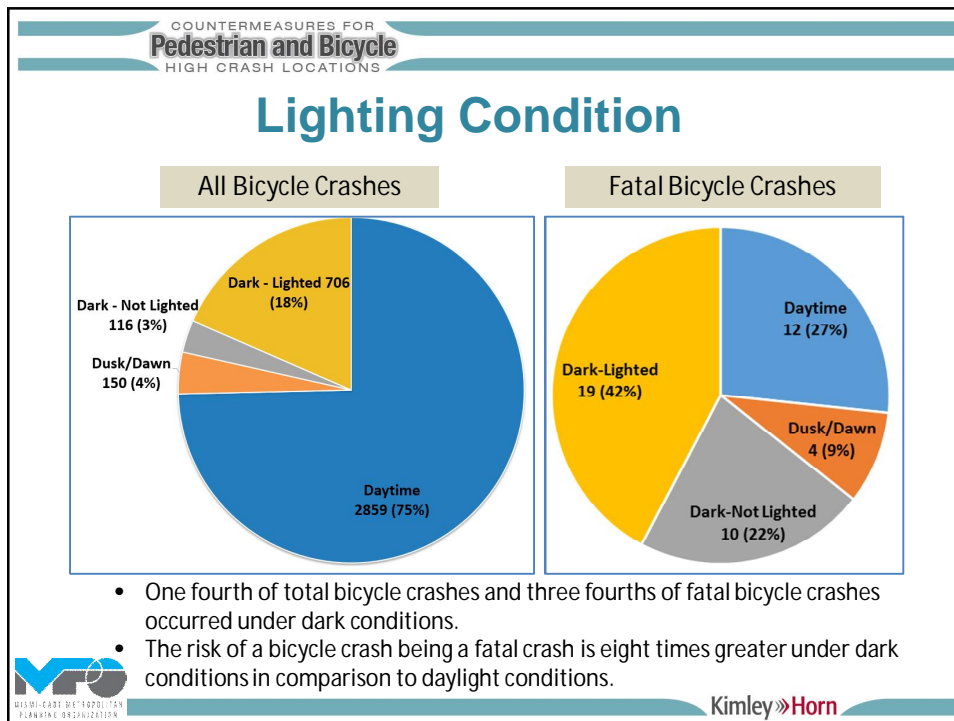
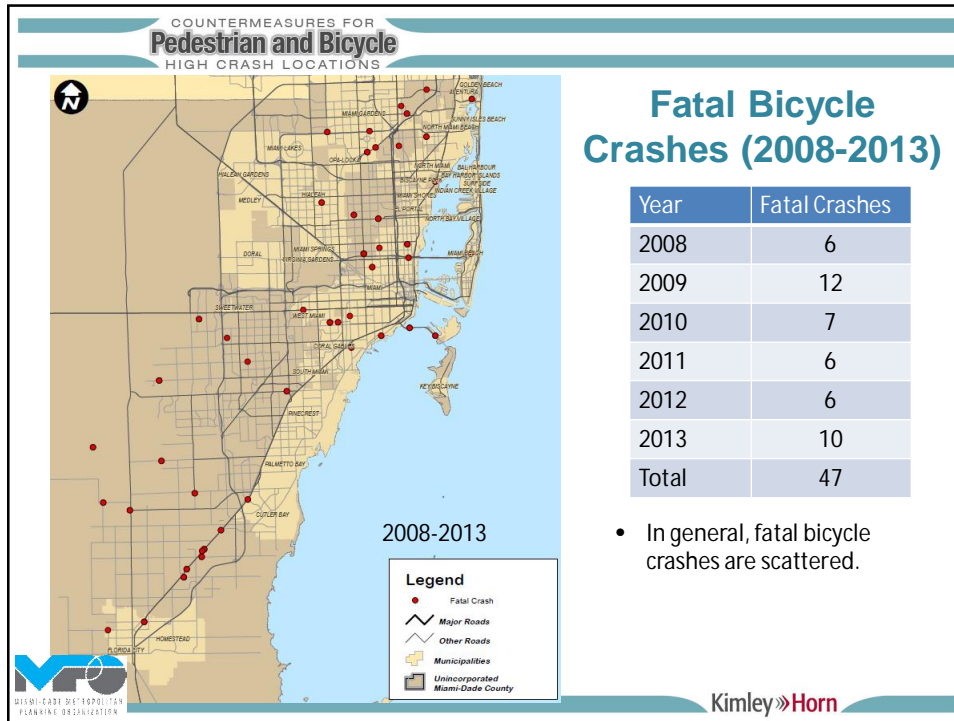
COUNTERMEASURES FOR  
**Pedestrian and Bicycle**  
HIGH CRASH LOCATIONS

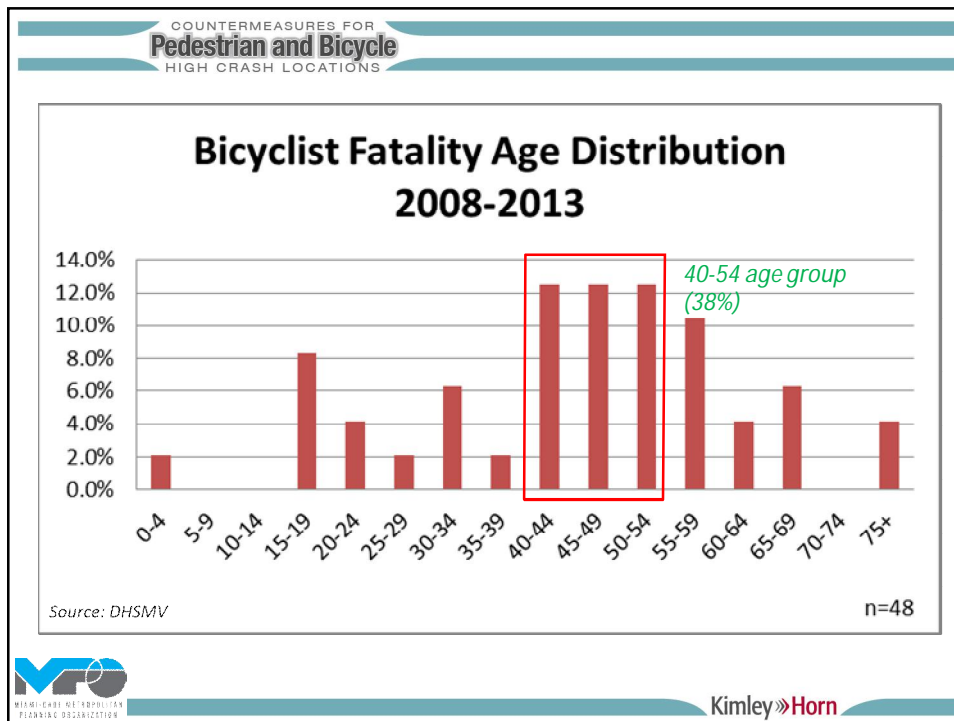
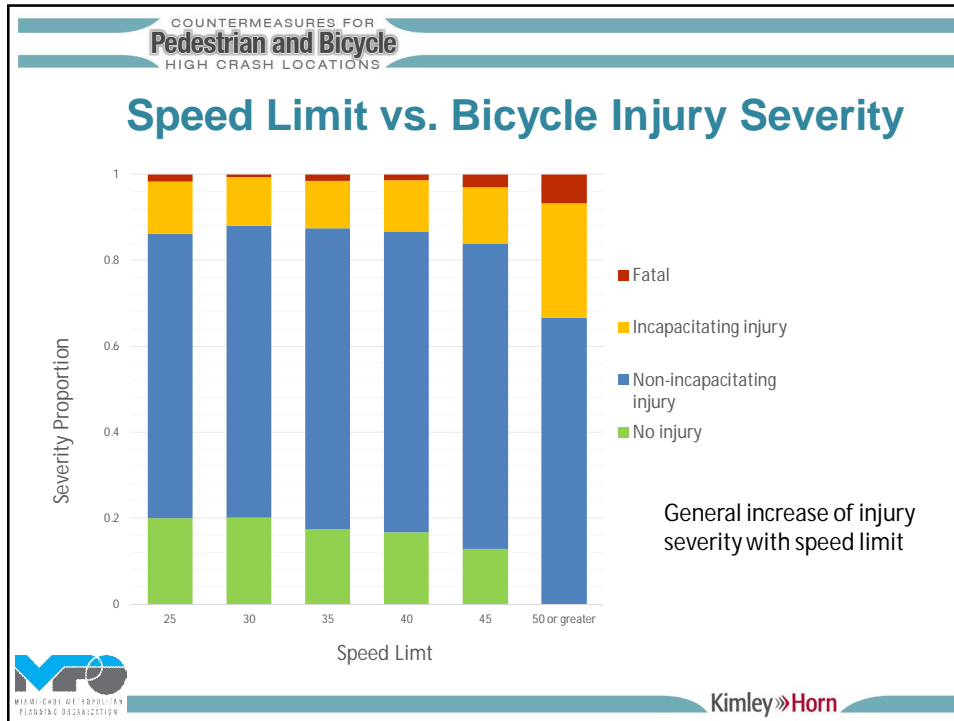
## Bicycle Crashes and Commuting

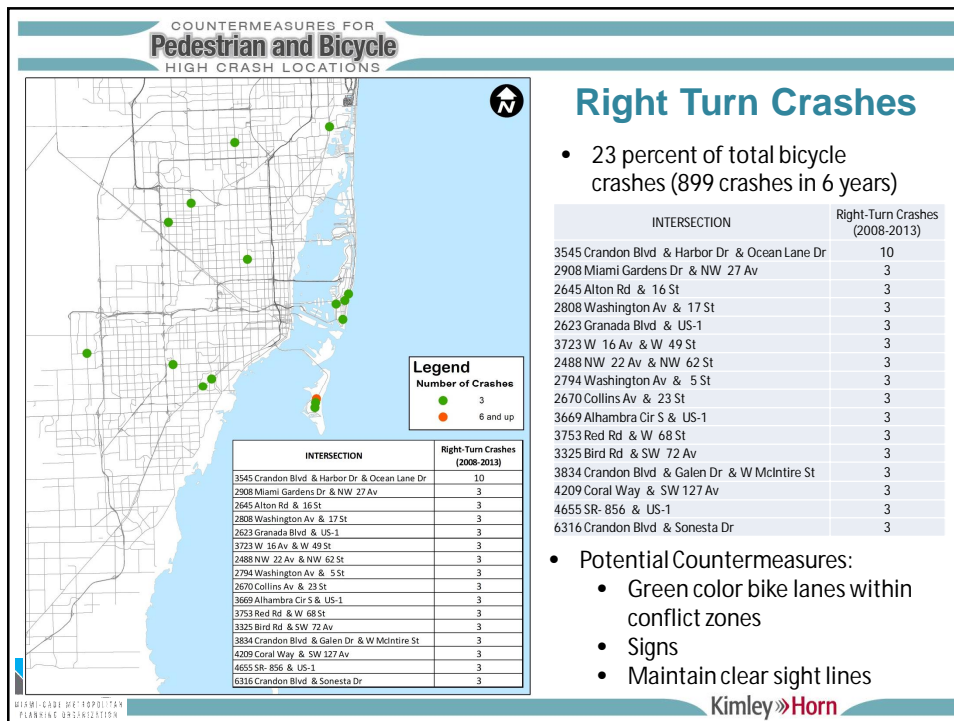
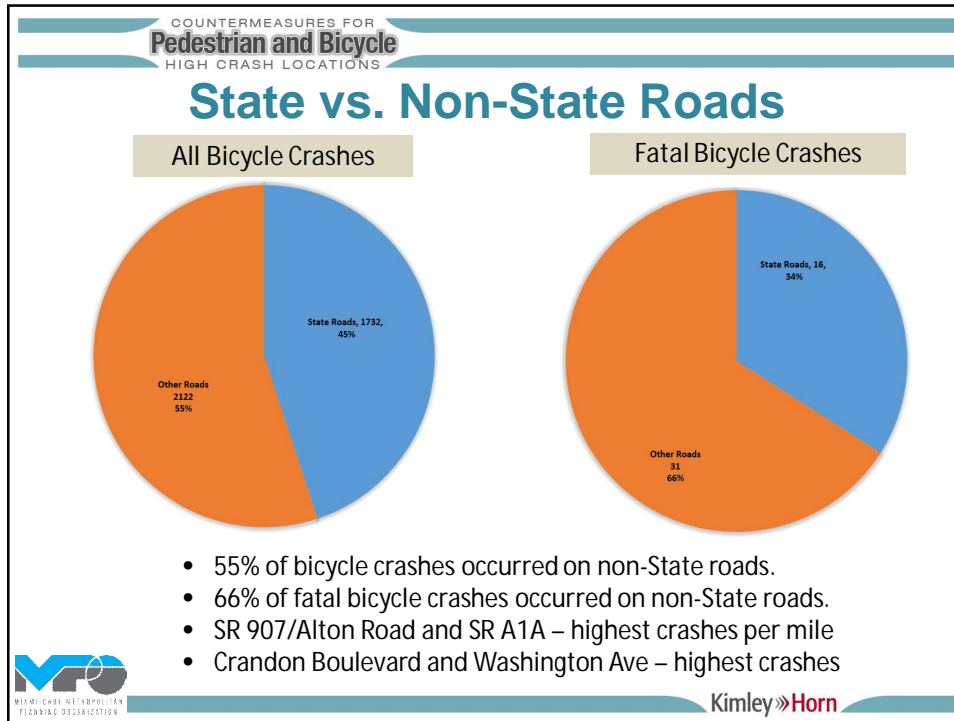
Year	Bicyclist Injuries	Bike Commuters
2008	490	4,200
2009	520	4,300
2010	580	7,800
2011	670	6,000
2012	710	7,100
2013	850	8,400

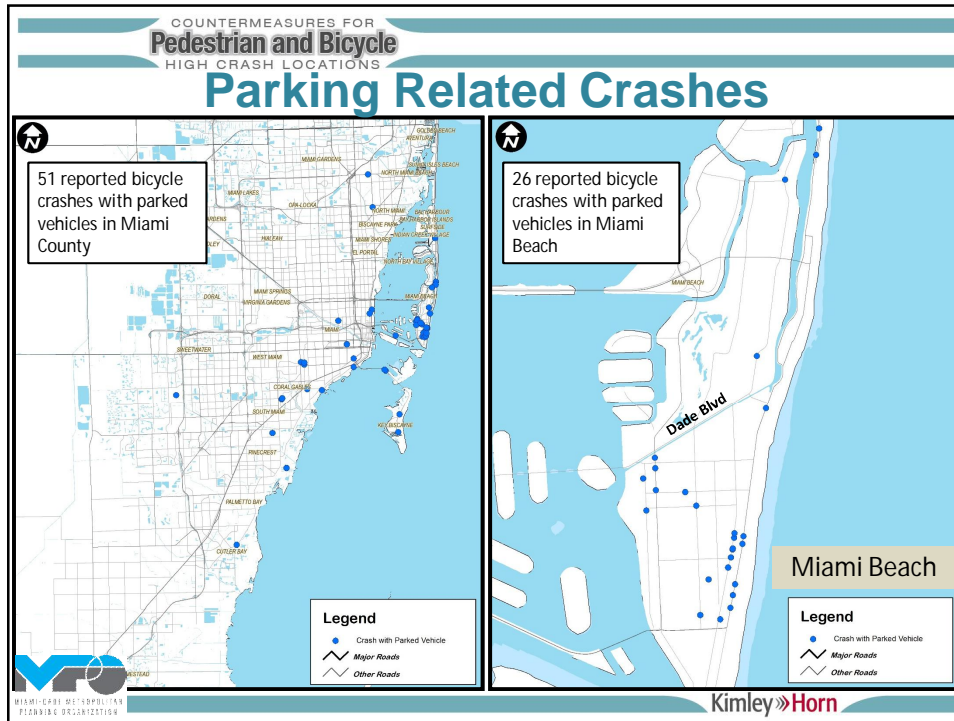
*Mode share: American Community Survey*

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COUNTERMEASURES FOR  
**Pedestrian and Bicycle**  
HIGH CRASH LOCATIONS

## Other Findings – Bicycle Crashes

- Crash Location
  - Fatal bicycle crash ratio at mid-block locations was twice greater than at intersections.
- Municipalities with the highest crashes
  - Total Crashes - Miami (22%), Miami Beach (14%), Hialeah (6%); unincorporated areas (32%)
  - Fatal Crashes – Miami (17%); unincorporated areas (57%)
- US 1 between Granada Blvd and Red Road (near UM)
  - 16 out of 28 crashes involved bicyclists in the 18-24 year age range.
- US 1 between SW 216 Street and SW 264 Street
  - 10 bicycle crashes, 3 were fatal crashes
  - Fatal crashes occurred at nighttime (11pm – 3am)

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COUNTERMEASURES FOR  
**Pedestrian and Bicycle**  
HIGH CRASH LOCATIONS


## Process Development

COUNTERMEASURES FOR  
**Pedestrian and Bicycle**  
HIGH CRASH LOCATIONS

## Summary of Proposed Process

- **Crash Data Analysis**
  - Full 5-year data analysis once in 3 years
  - Interim years
    - Limited to the latest year of data
    - Focused on sub areas or specific safety issues of interest
- **Agency Coordination Mechanism**
  - Form a Bicycle - Pedestrian Community Traffic Safety Team
  - Serve as advisory committee to future MPO safety studies
  - Facilitate agency coordination for implementation
  - Facilitate information sharing on safety initiatives



## Next Steps

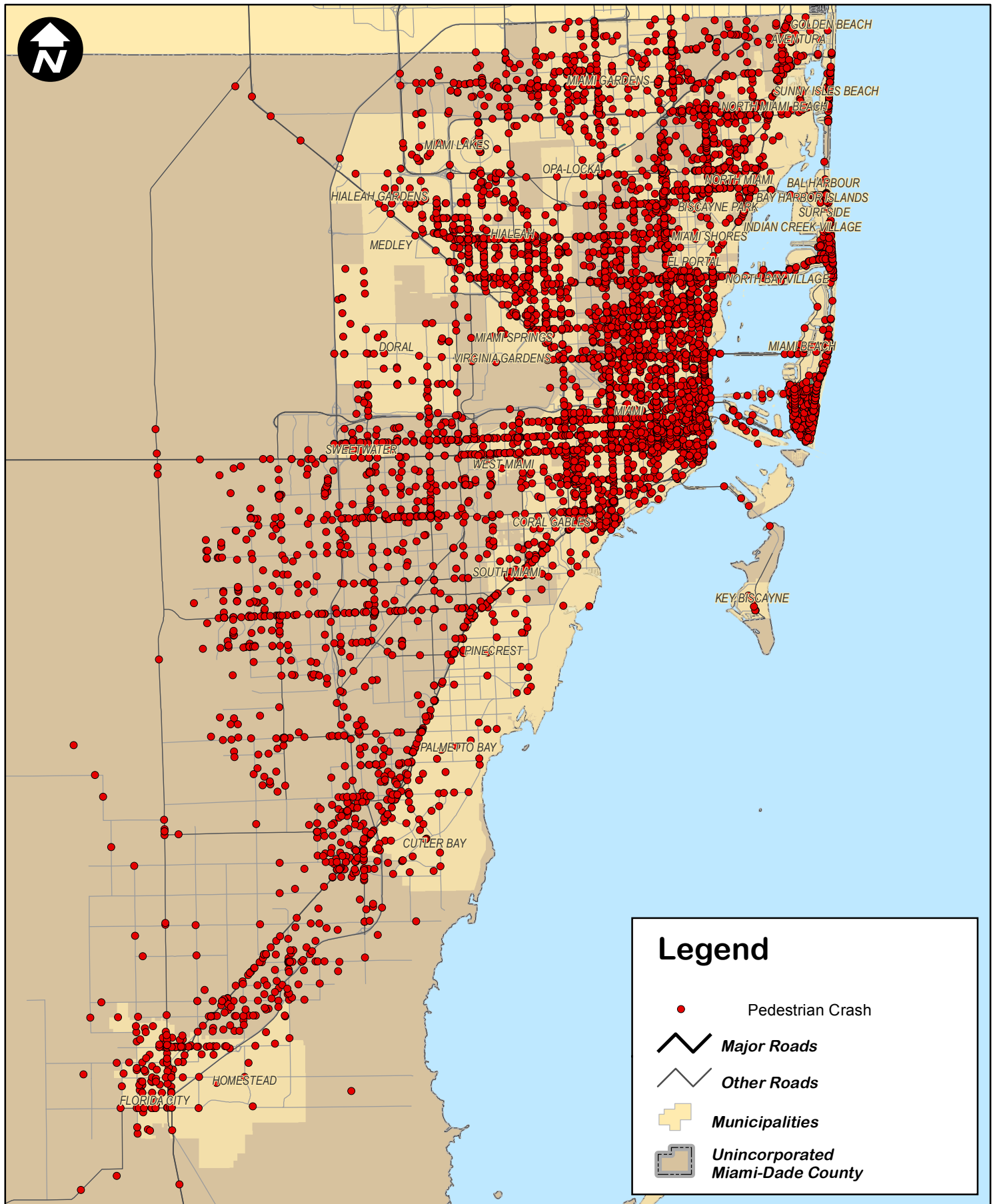
- Incorporate committee input
- Finalize documents
- Agency coordination on recommendations

## APPENDIX B

### PEDESTRIAN CRASH DATA ANALYSIS MAPS

# MIAMI-DADE MPO BICYCLE AND PEDESTRIAN SAFETY STUDY

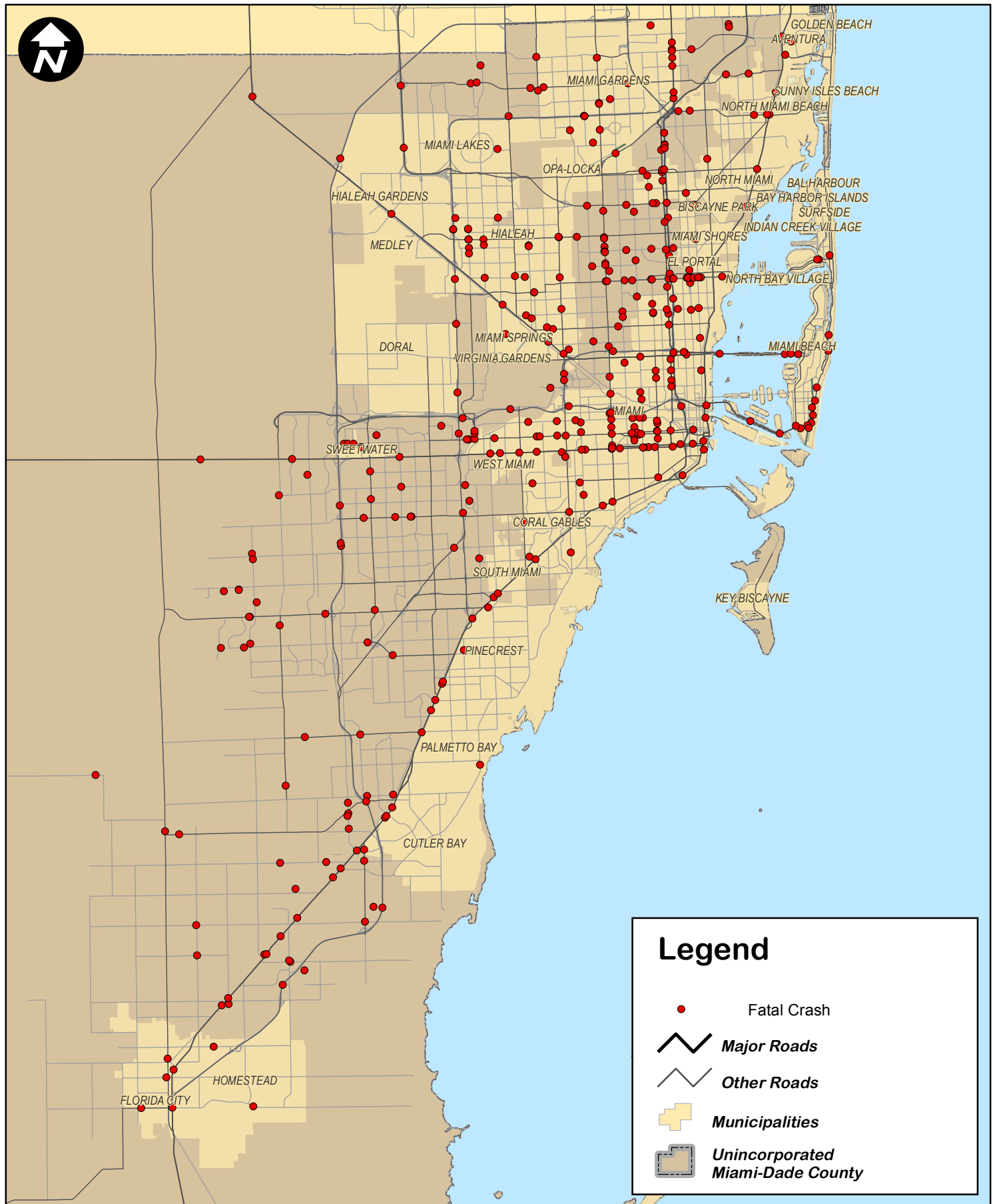
## PEDESTRIAN CRASH ANALYSIS PEDESTRIAN CRASHES (2008 - 2013)



0 0.75 1.5 3 4.5 6 Miles

# MIAMI-DADE MPO BICYCLE AND PEDESTRIAN SAFETY STUDY

## PEDESTRIAN CRASH ANALYSIS PEDESTRIAN FATAL CRASHES (2008 - 2013)

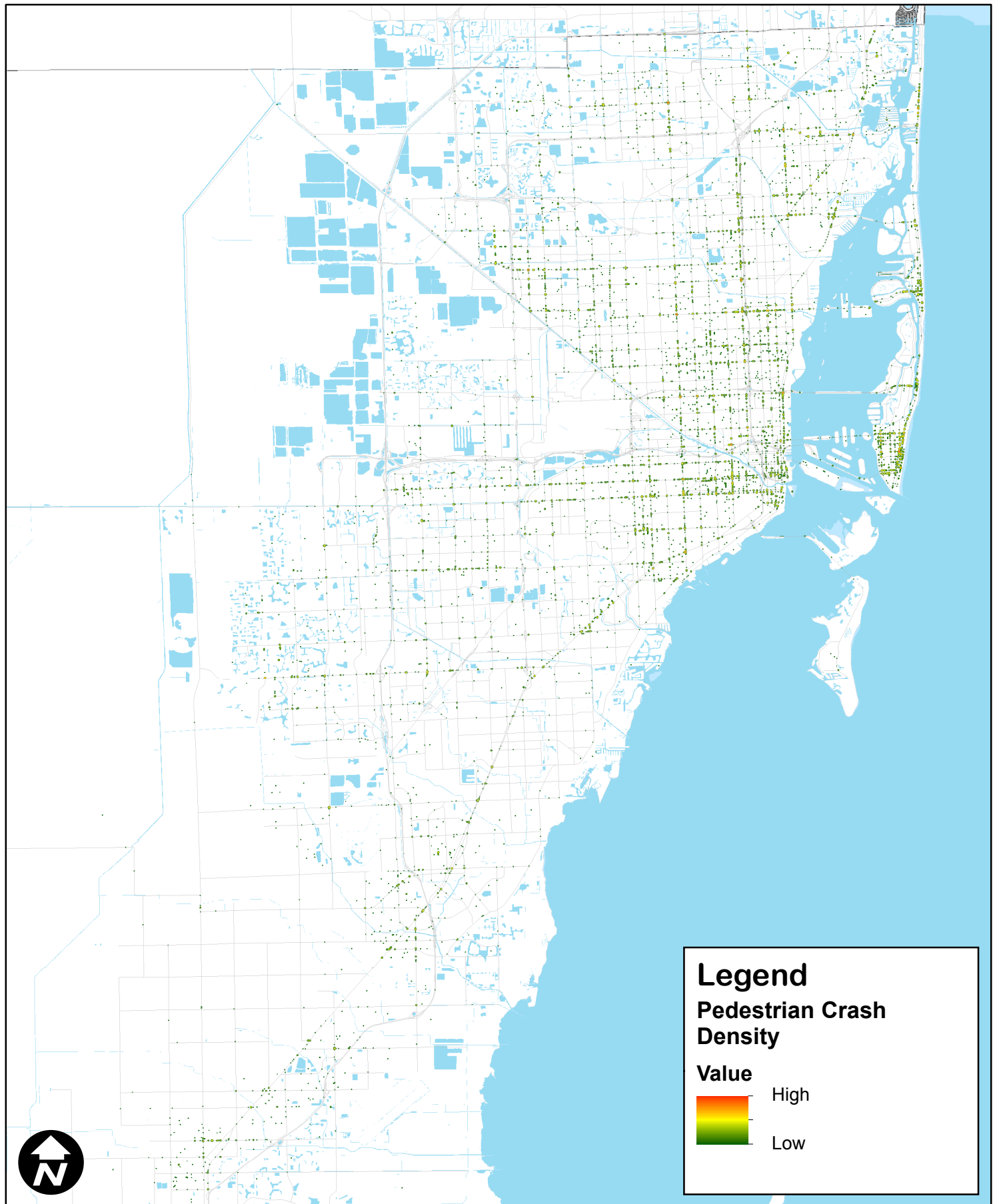


0 0.75 1.5 3 4.5 6 Miles

**MIAMI-DADE MPO  
BICYCLE AND PEDESTRIAN SAFETY STUDY**



**PEDESTRIAN CRASH ANALYSIS (2008 - 2013)**

**PEDESTRIAN CRASH DENSITY**



**Legend**  
**Pedestrian Crash Density**

**Value**

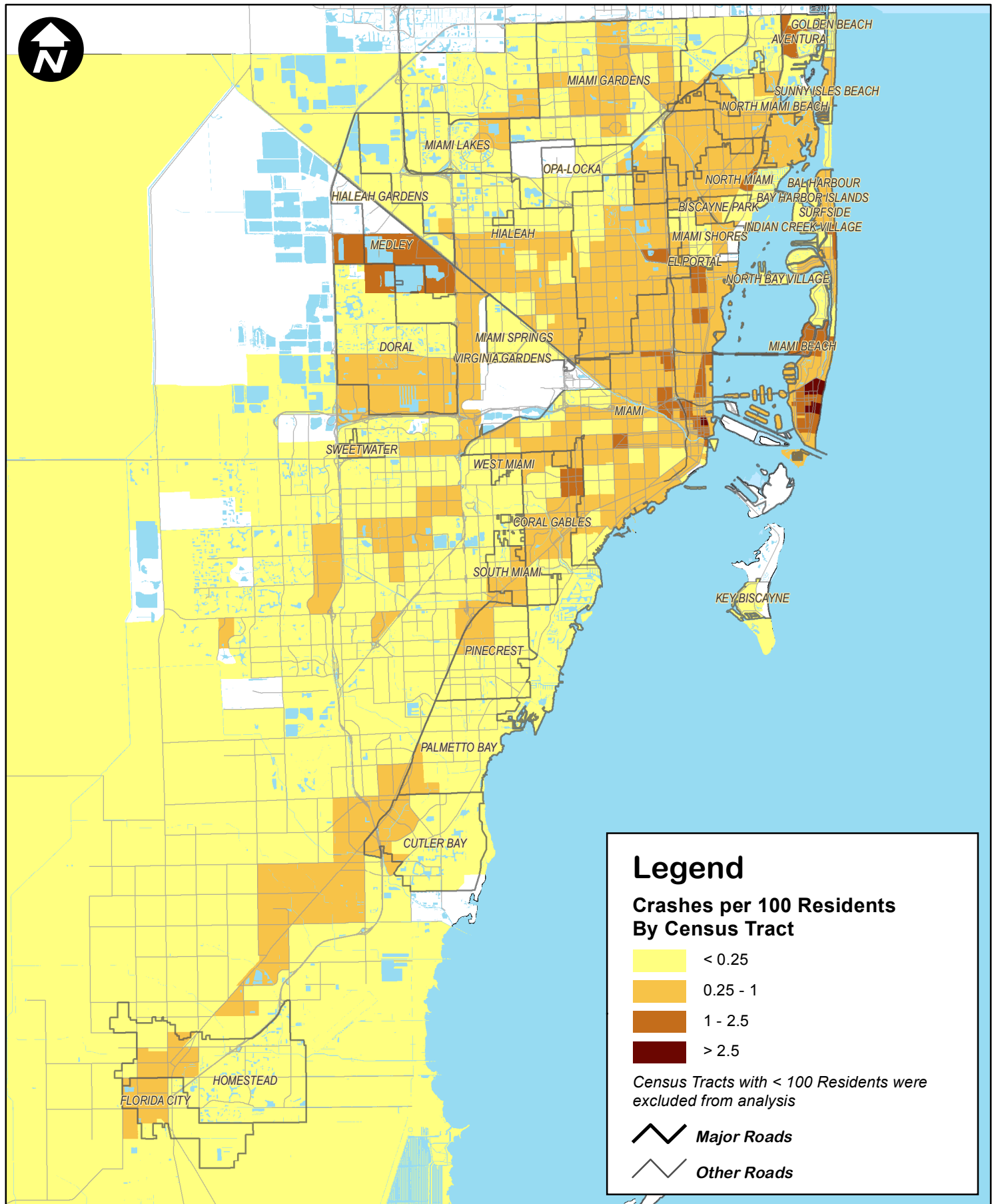
	High
	Low



0 2.5 5 10 Miles

# MIAMI-DADE MPO BICYCLE AND PEDESTRIAN SAFETY STUDY

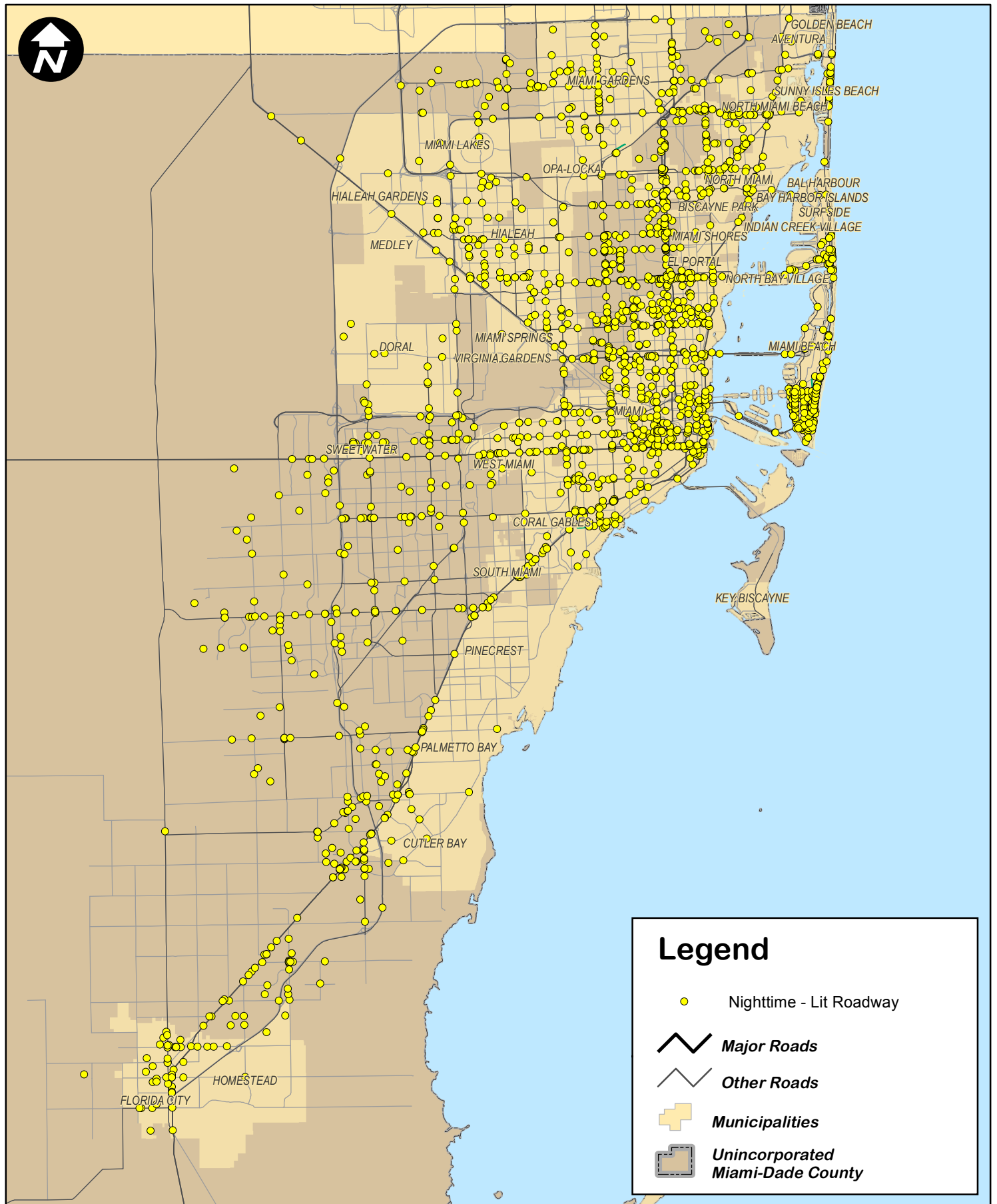
# PEDESTRIAN CRASH ANALYSIS CRASHES BY CENSUS TRACT (2008 - 2013)



0 0.5 1 2 3 4 Miles

# MIAMI-DADE MPO BICYCLE AND PEDESTRIAN SAFETY STUDY

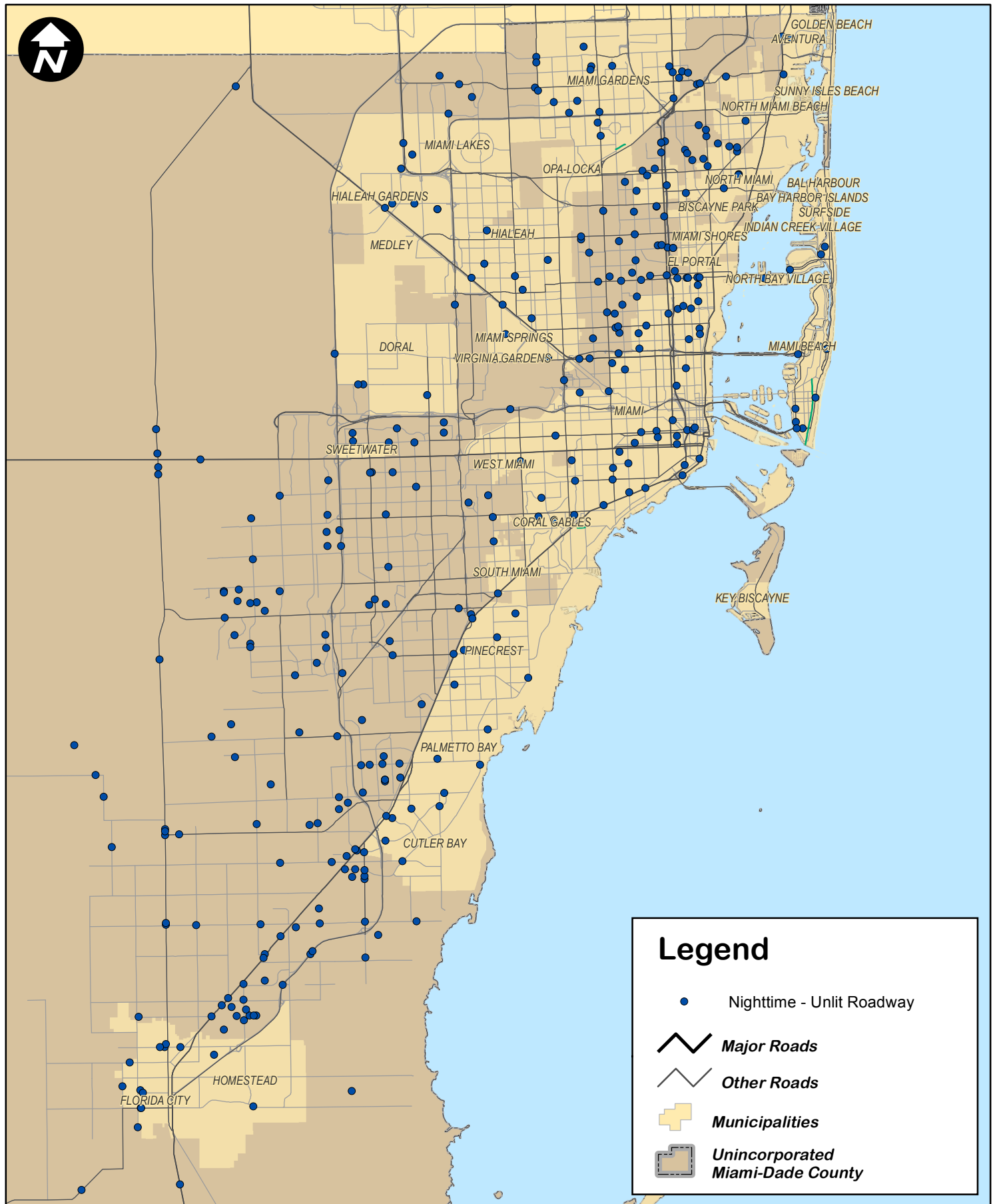
## PEDESTRIAN CRASH ANALYSIS NIGHTTIME PEDESTRIAN CRASHES (2008 - 2013)



0 0.75 1.5 3 4.5 6 Miles

# MIAMI-DADE MPO BICYCLE AND PEDESTRIAN SAFETY STUDY

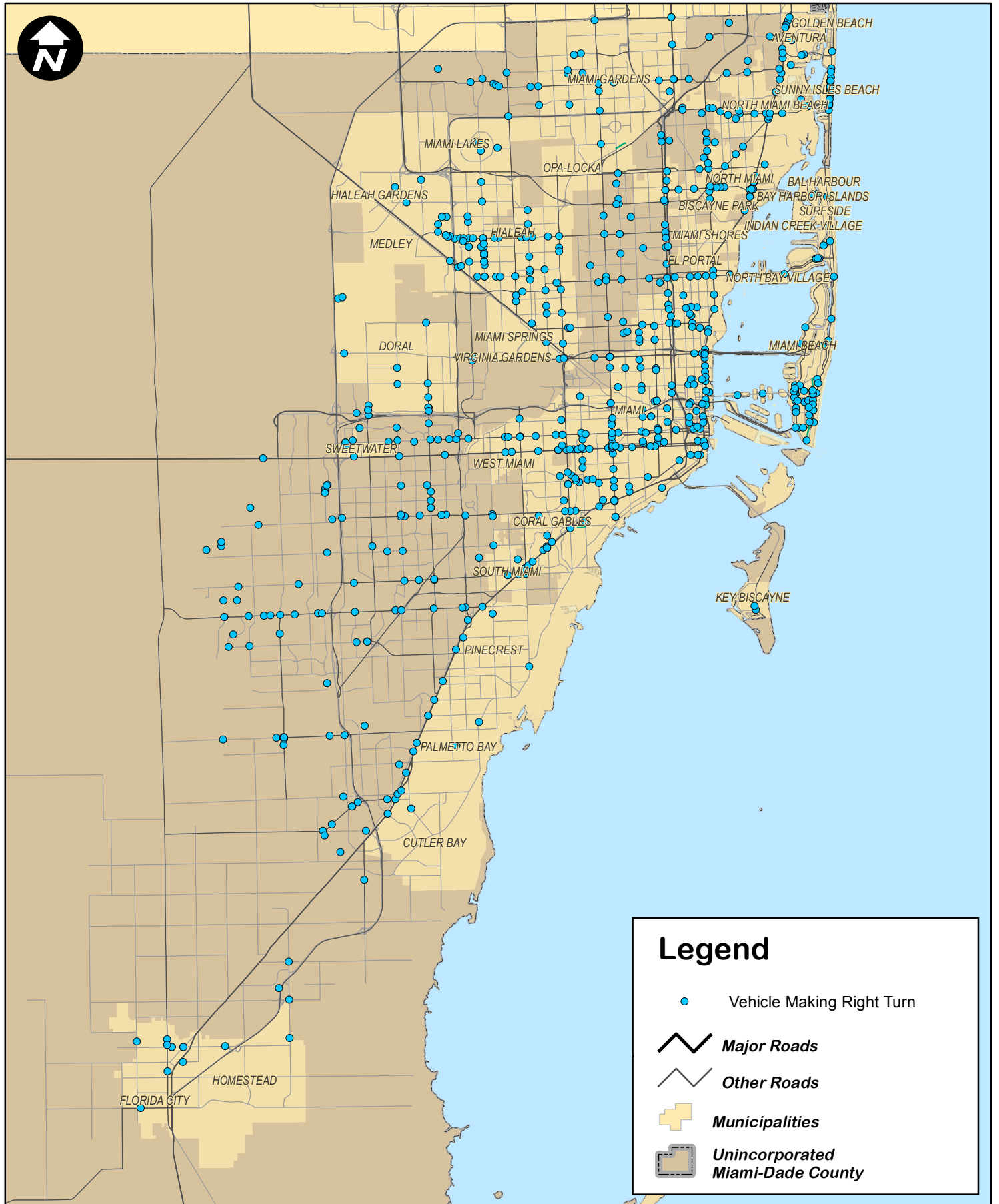
## PEDESTRIAN CRASH ANALYSIS NIGHTTIME PEDESTRIAN CRASHES (2008 - 2013)



0 0.75 1.5 3 4.5 6 Miles

# MIAMI-DADE MPO BICYCLE AND PEDESTRIAN SAFETY STUDY

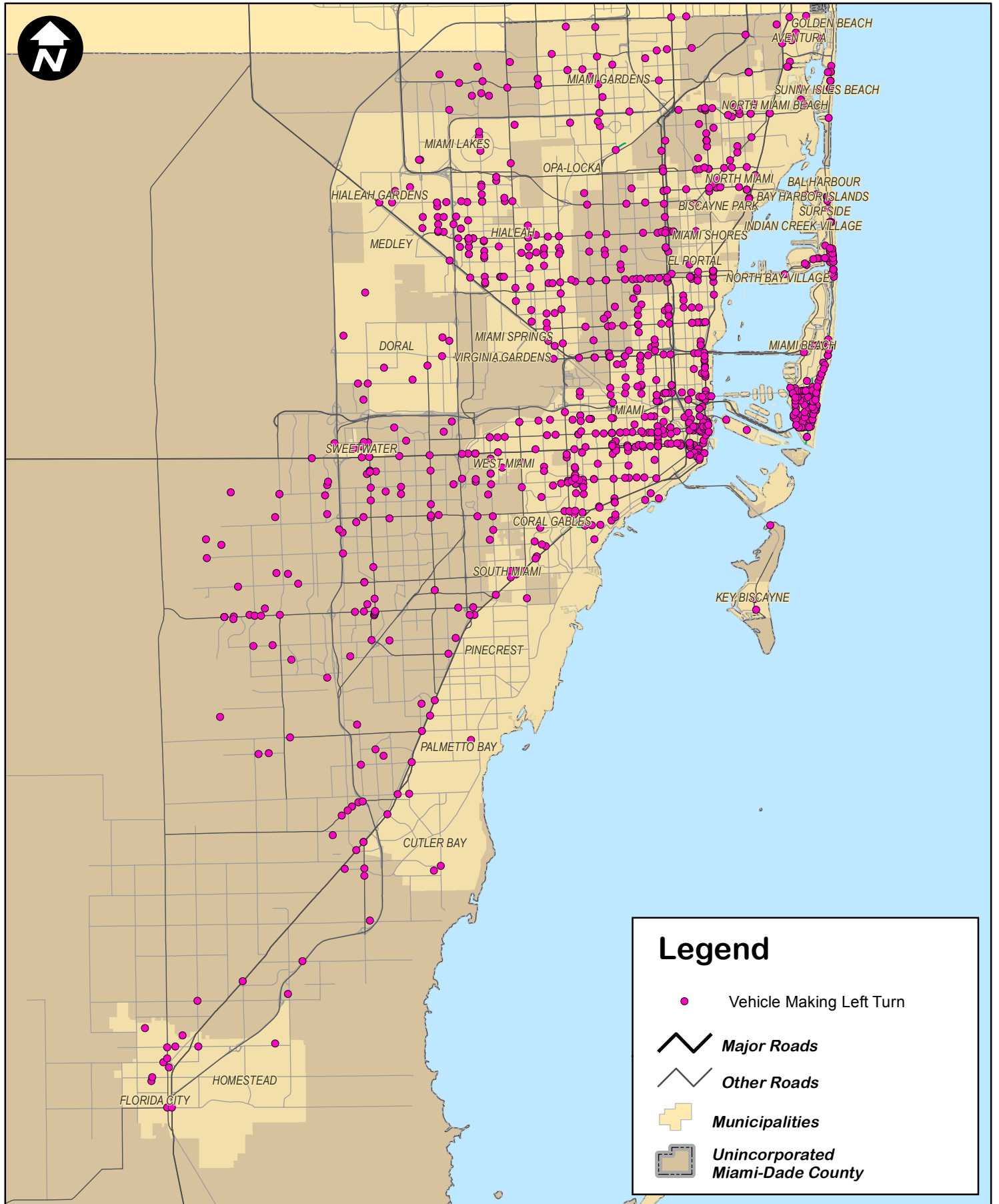
## PEDESTRIAN CRASH ANALYSIS RIGHT-TURN CRASHES (2008 - 2013)



0 0.75 1.5 3 4.5 6 Miles

# MIAMI-DADE MPO BICYCLE AND PEDESTRIAN SAFETY STUDY

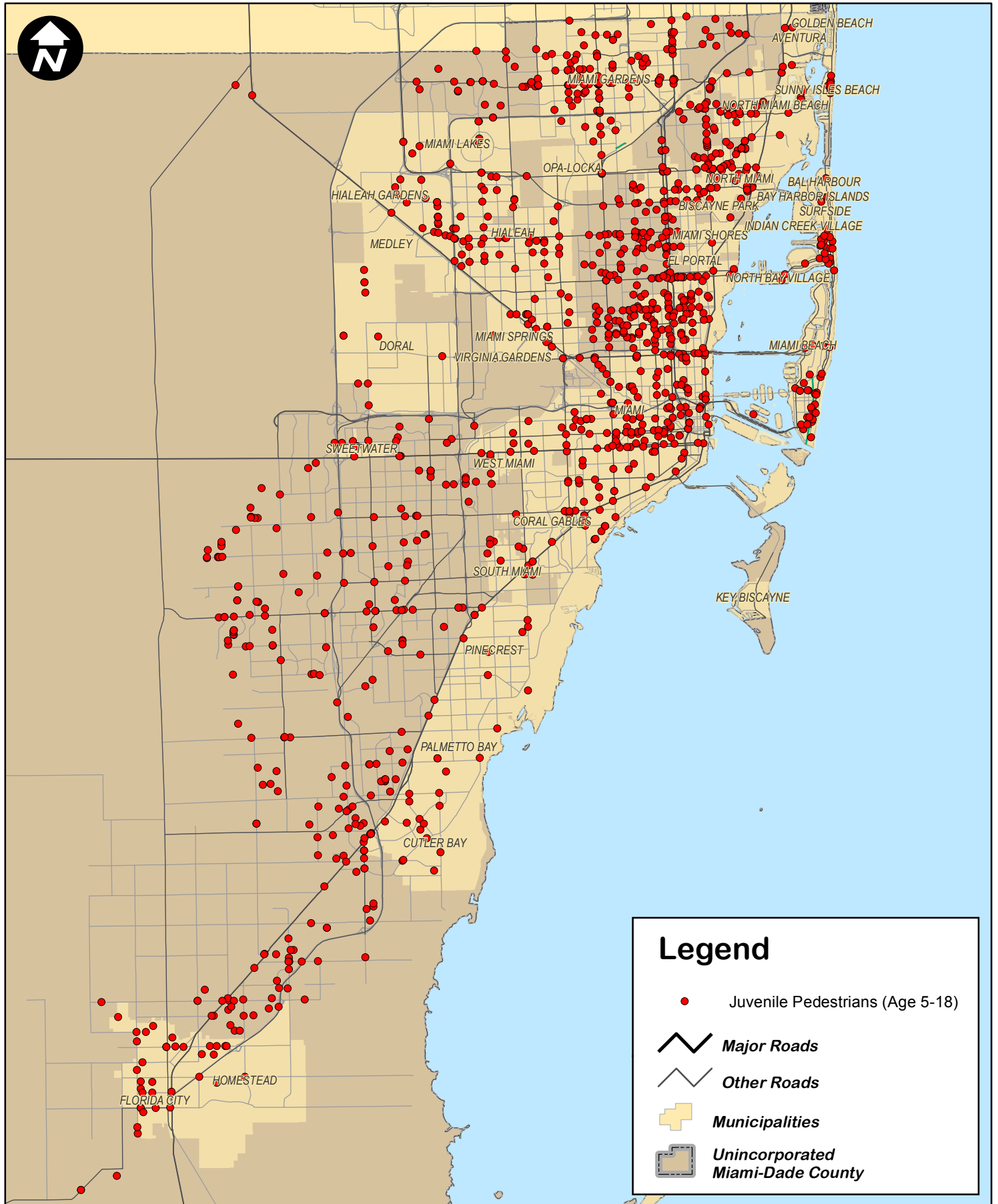
## PEDESTRIAN CRASH ANALYSIS LEFT-TURN CRASHES (2008 - 2013)



0 0.75 1.5 3 4.5 6 Miles

# MIAMI-DADE MPO BICYCLE AND PEDESTRIAN SAFETY STUDY

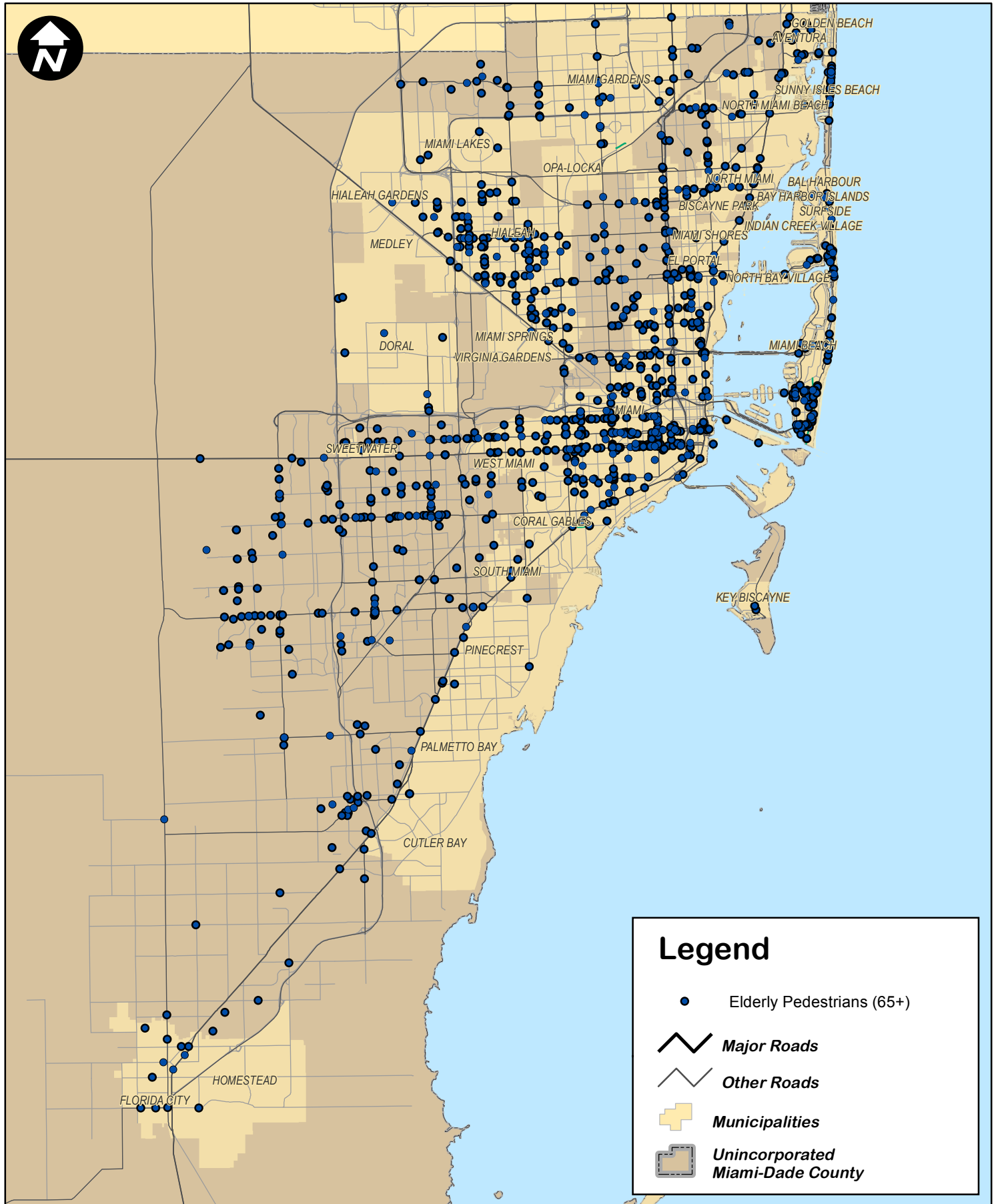
## PEDESTRIAN CRASH ANALYSIS JUVENILE PEDESTRIAN CRASHES (2008 - 2013)



0 0.75 1.5 3 4.5 6 Miles

# MIAMI-DADE MPO BICYCLE AND PEDESTRIAN SAFETY STUDY

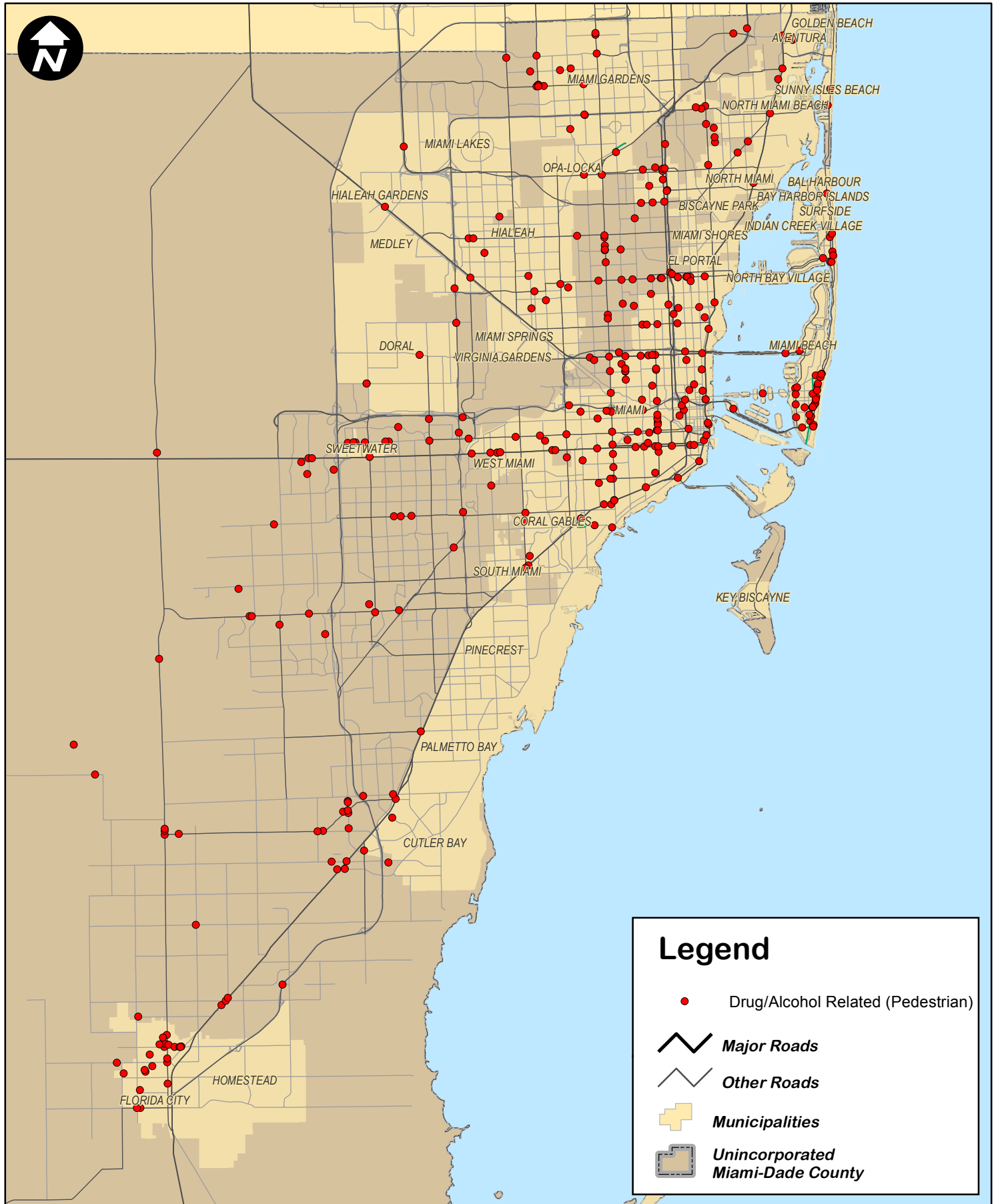
## PEDESTRIAN CRASH ANALYSIS ELDERLY PEDESTRIAN CRASHES (2008 - 2013)



0 0.75 1.5 3 4.5 6 Miles

# MIAMI-DADE MPO BICYCLE AND PEDESTRIAN SAFETY STUDY

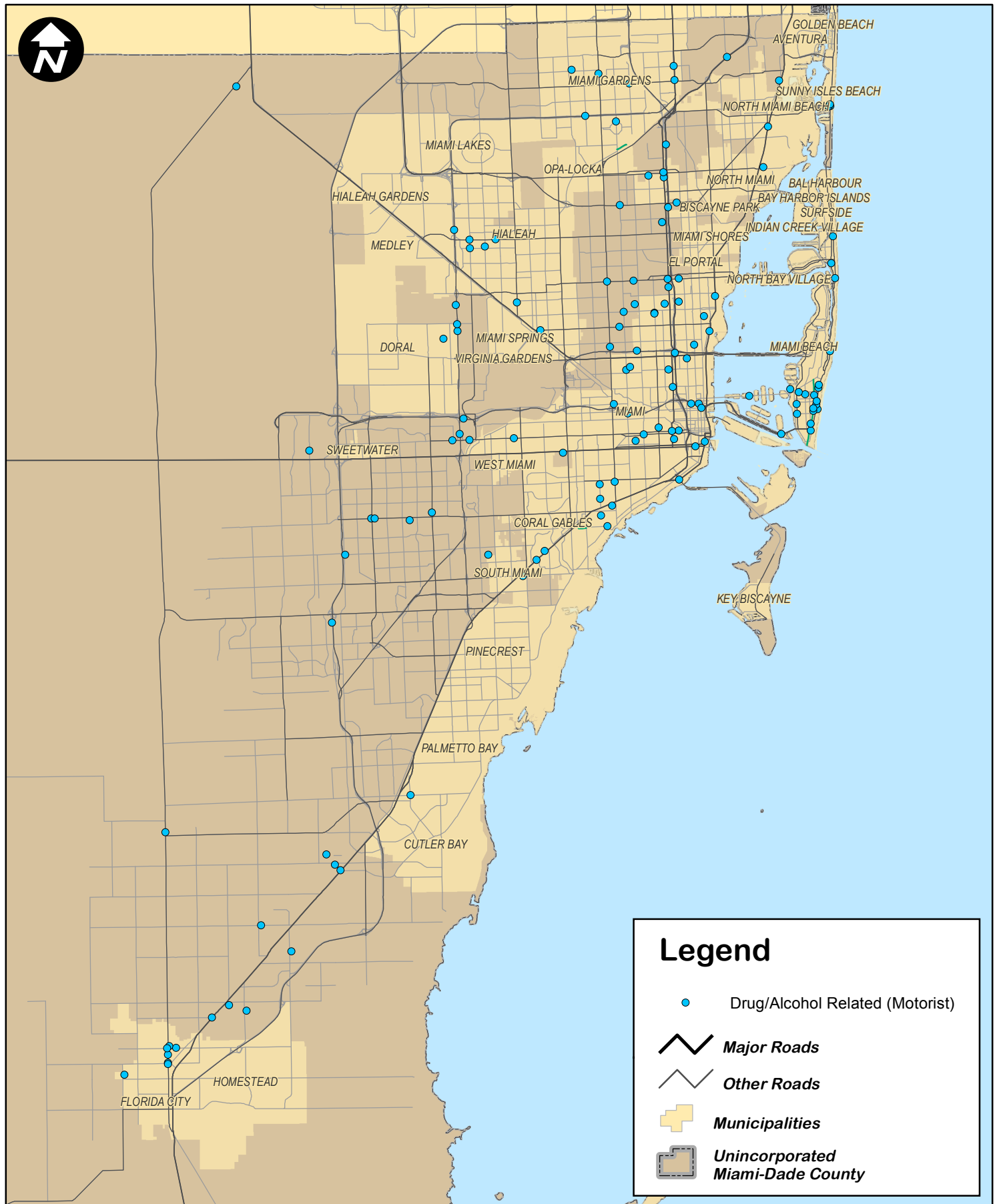
## PEDESTRIAN CRASH ANALYSIS DRUG/ALCOHOL RELATED CRASHES (2008 - 2013)



0 0.75 1.5 3 4.5 6 Miles

# MIAMI-DADE MPO BICYCLE AND PEDESTRIAN SAFETY STUDY

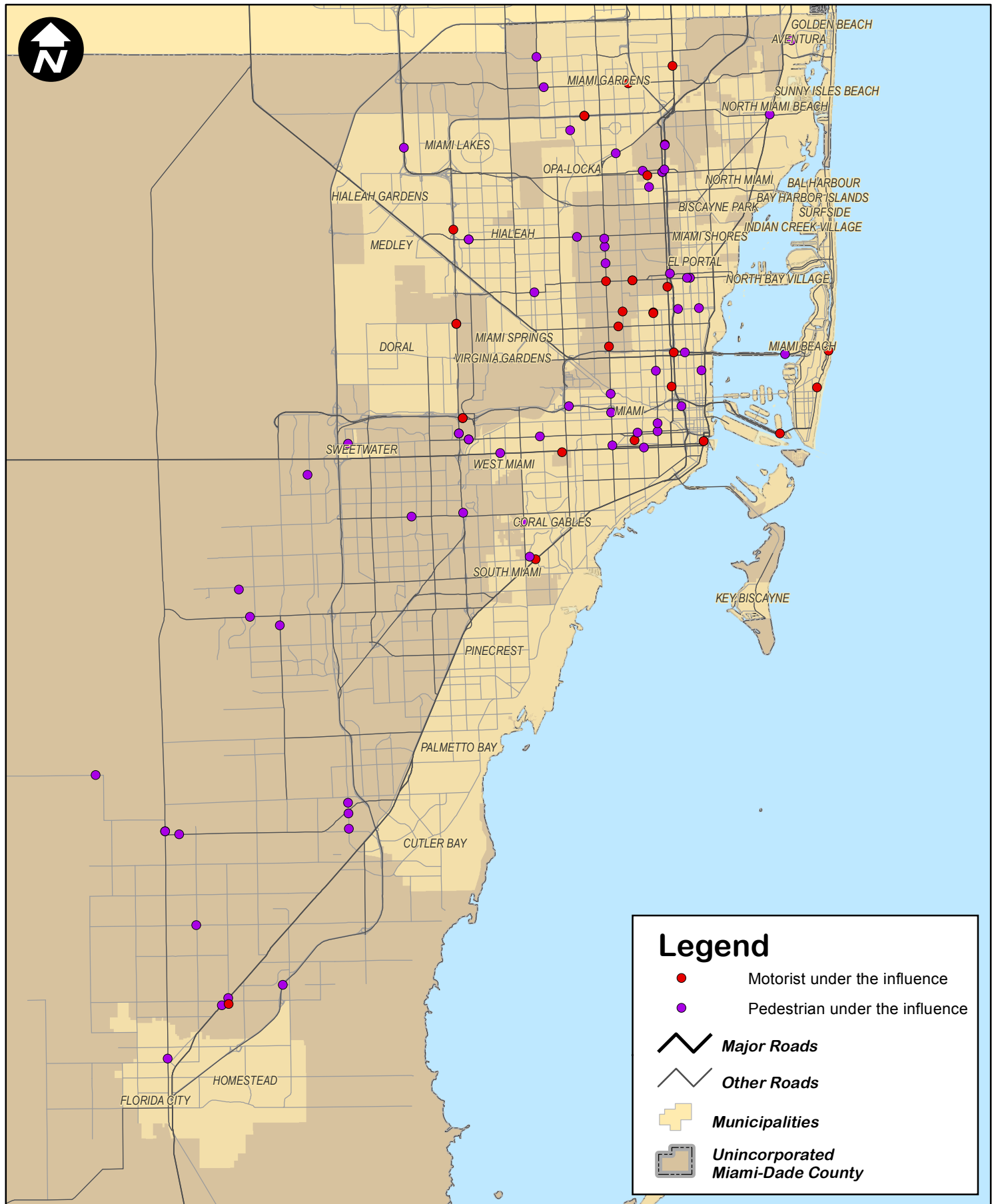
## PEDESTRIAN CRASH ANALYSIS DRUG/ALCOHOL RELATED CRASHES (2008 - 2013)



0 0.75 1.5 3 4.5 6 Miles

# MIAMI-DADE MPO BICYCLE AND PEDESTRIAN SAFETY STUDY

## PEDESTRIAN CRASH ANALYSIS PEDESTRIAN FATALITIES (2010 - 2013)



0 0.75 1.5 3 4.5 6 Miles

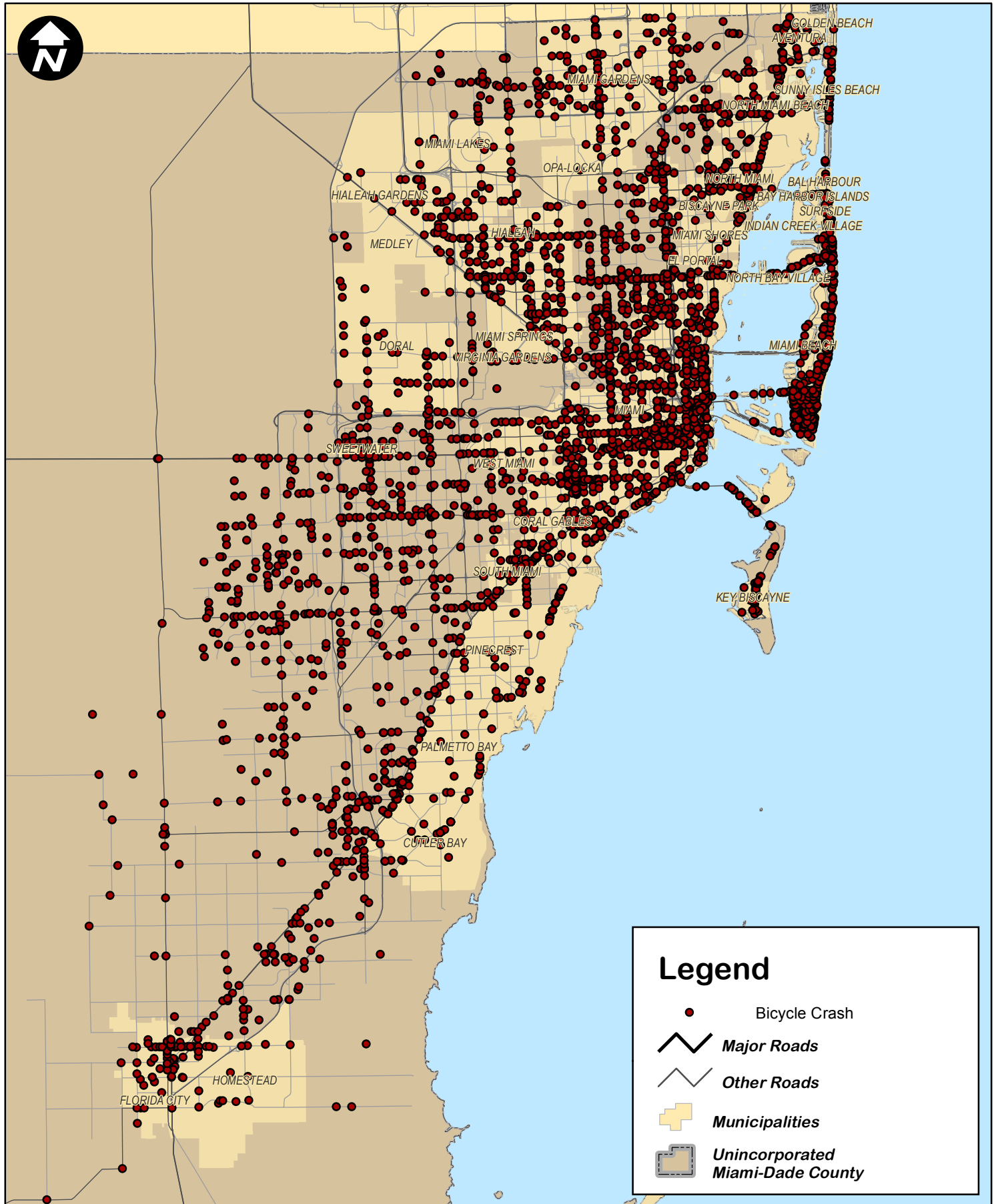
## APPENDIX C

### BICYCLE CRASH DATA ANALYSIS MAPS

**MIAMI-DADE MPO  
BICYCLE AND PEDESTRIAN SAFETY STUDY**

**BICYCLE CRASH ANALYSIS (2008-2013)**

**BICYCLE CRASHES**

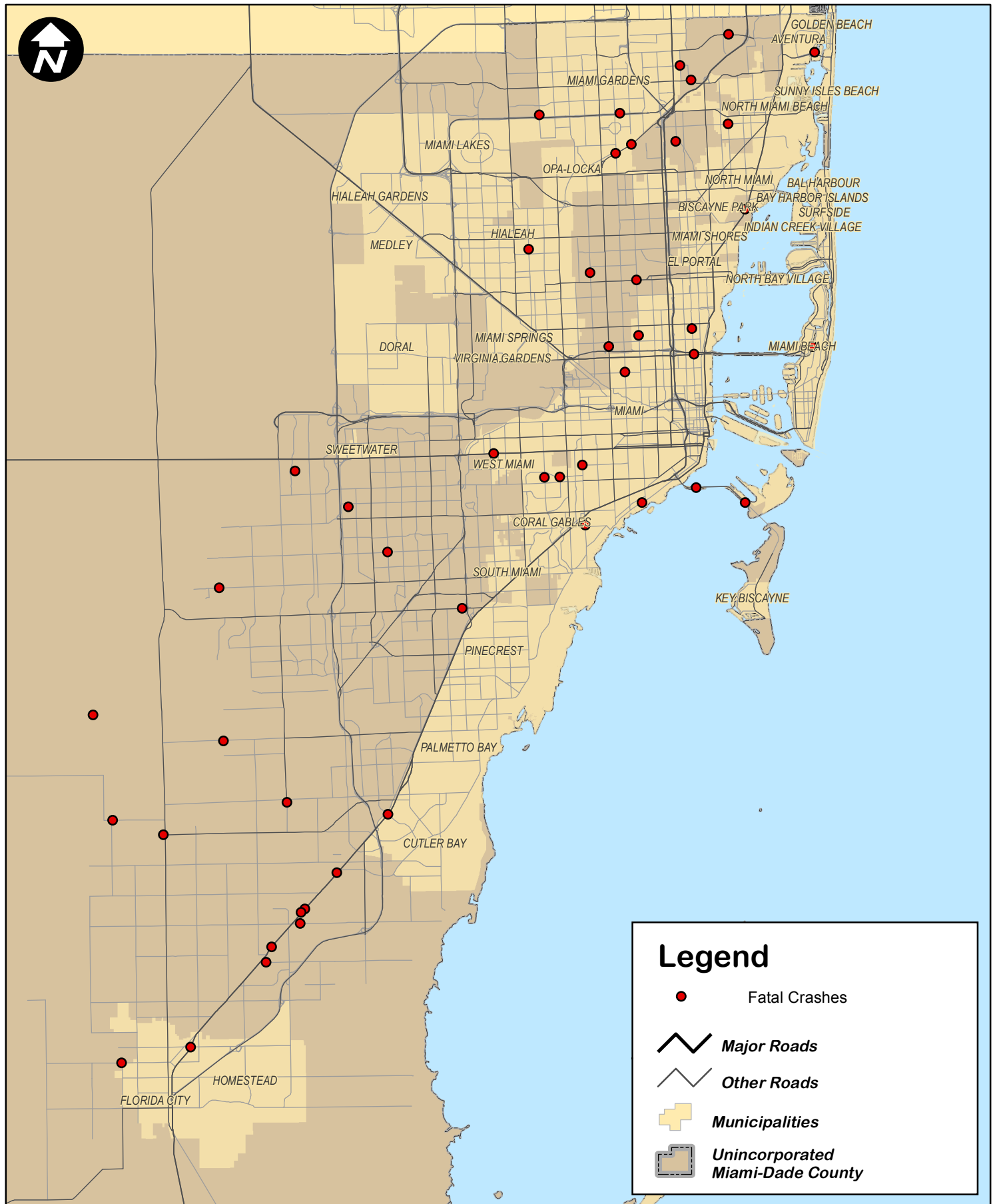


0 0.75 1.5 3 4.5 6 Miles

# MIAMI-DADE MPO BICYCLE AND PEDESTRIAN SAFETY STUDY

## BICYCLE CRASH ANALYSIS (2008-2013)

### FATAL CRASHES

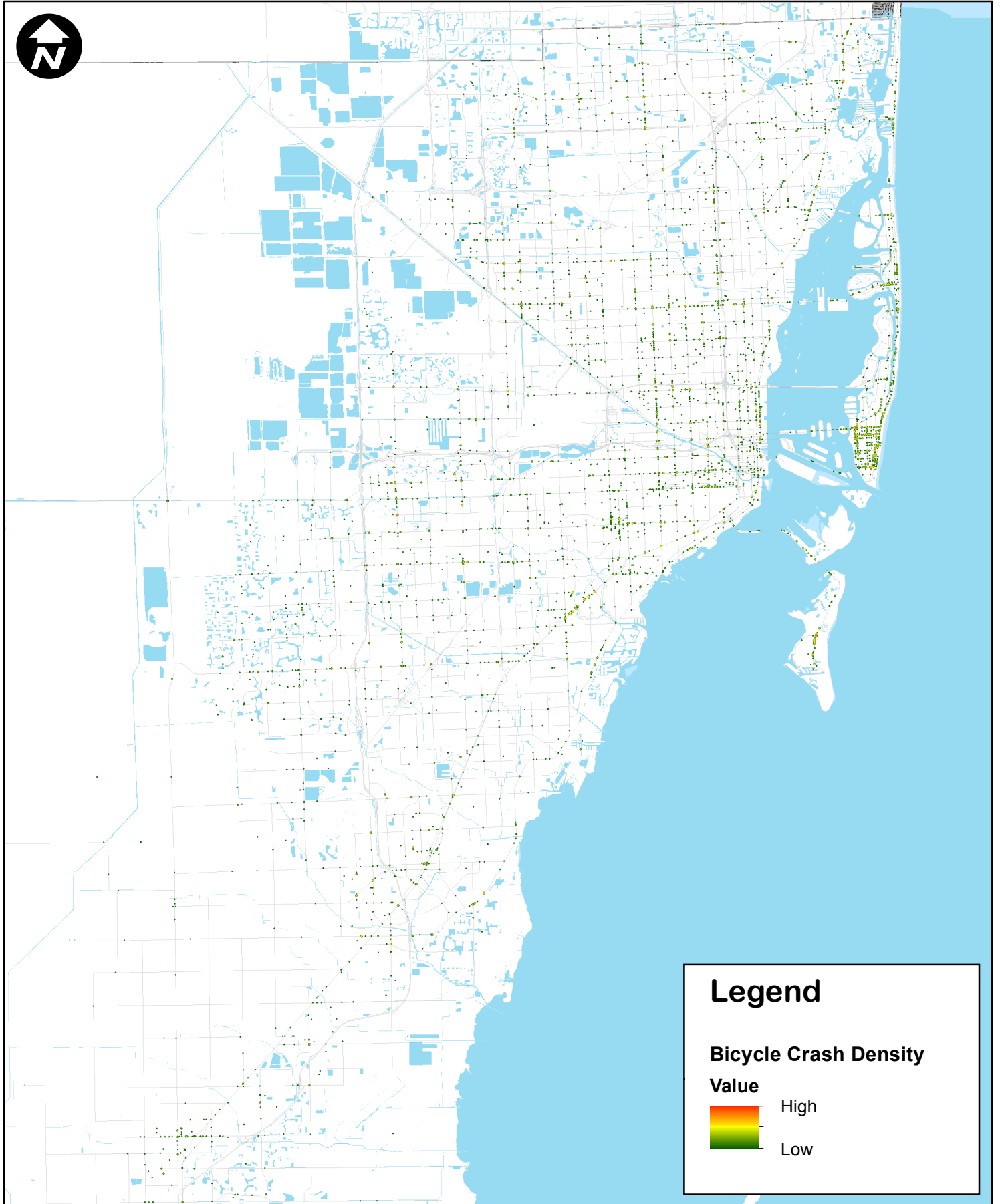


0 0.75 1.5 3 4.5 6 Miles

**MIAMI-DADE MPO  
BICYCLE AND PEDESTRIAN SAFETY STUDY**

**BICYCLE CRASH ANALYSIS (2008-2013)**

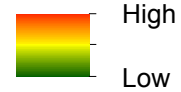
**BICYCLE CRASH DENSITY**



**Legend**

**Bicycle Crash Density**

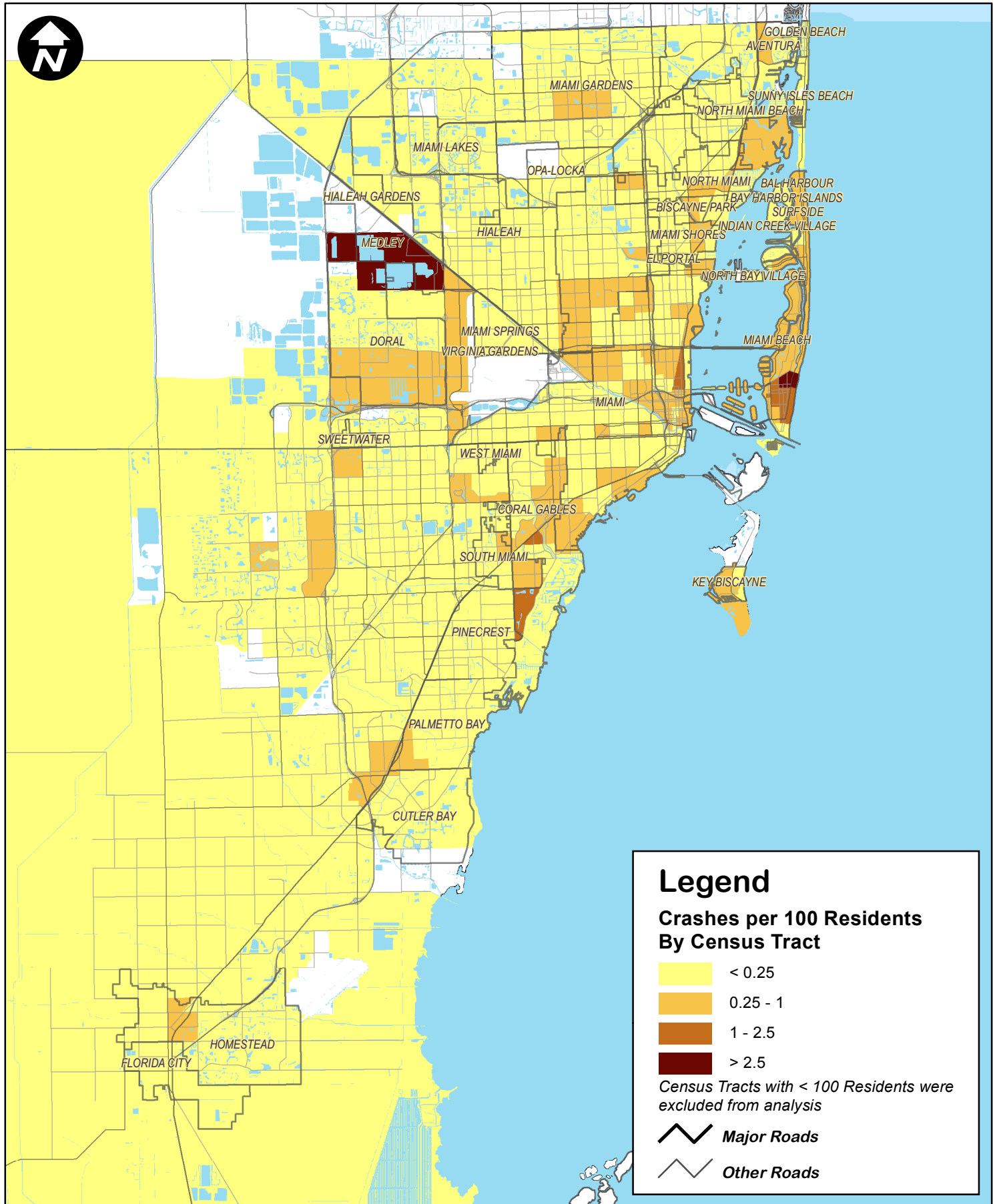
**Value**



0 1.25 2.5 5 7.5 10 Miles

**MIAMI-DADE MPO  
BICYCLE AND PEDESTRIAN SAFETY STUDY**

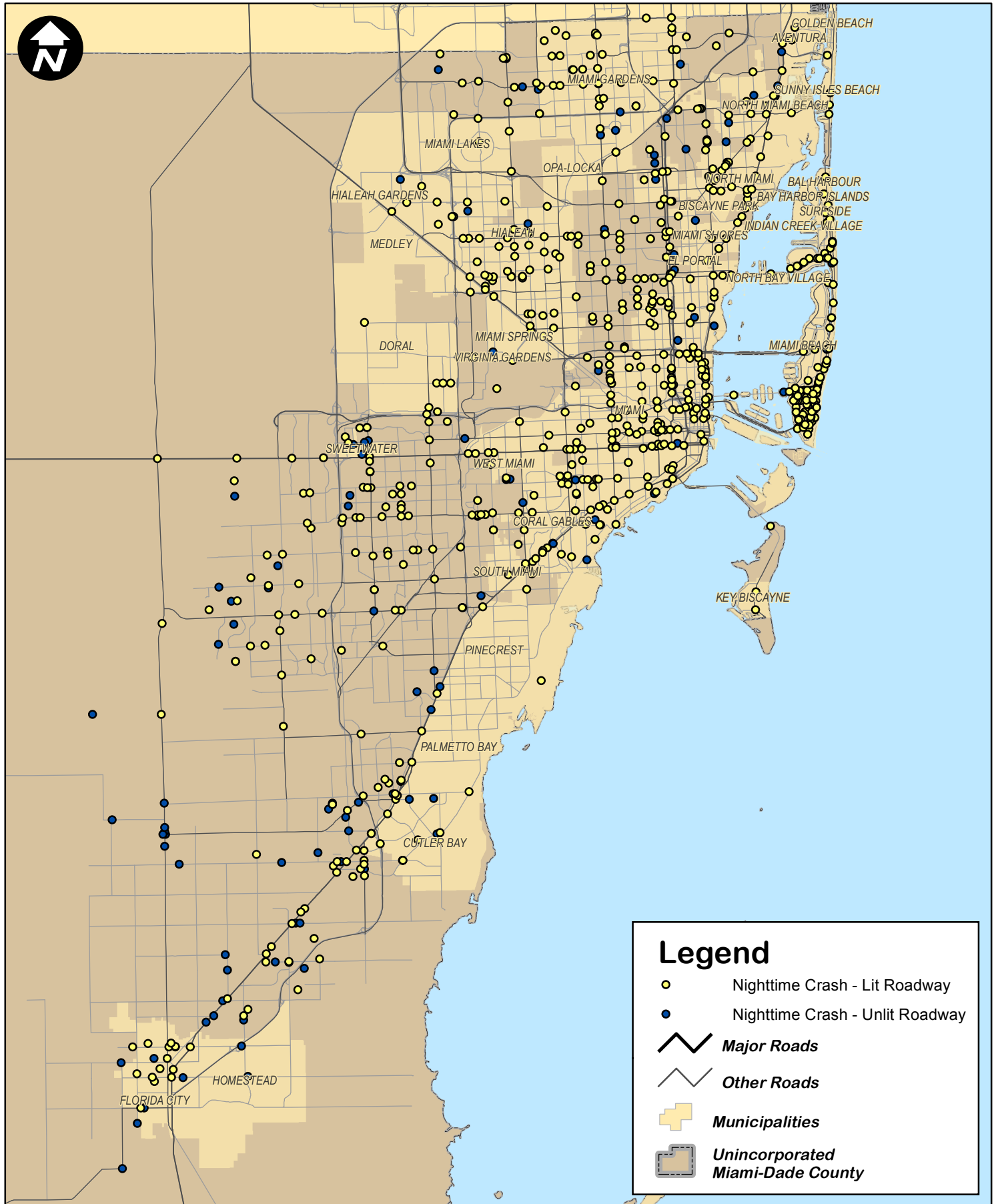
**BICYCLE CRASH ANALYSIS (2008-2013)  
CRASHES BY CENSUS TRACT**



0 0.75 1.5 3 4.5 6 Miles

# MIAMI-DADE MPO BICYCLE AND PEDESTRIAN SAFETY STUDY

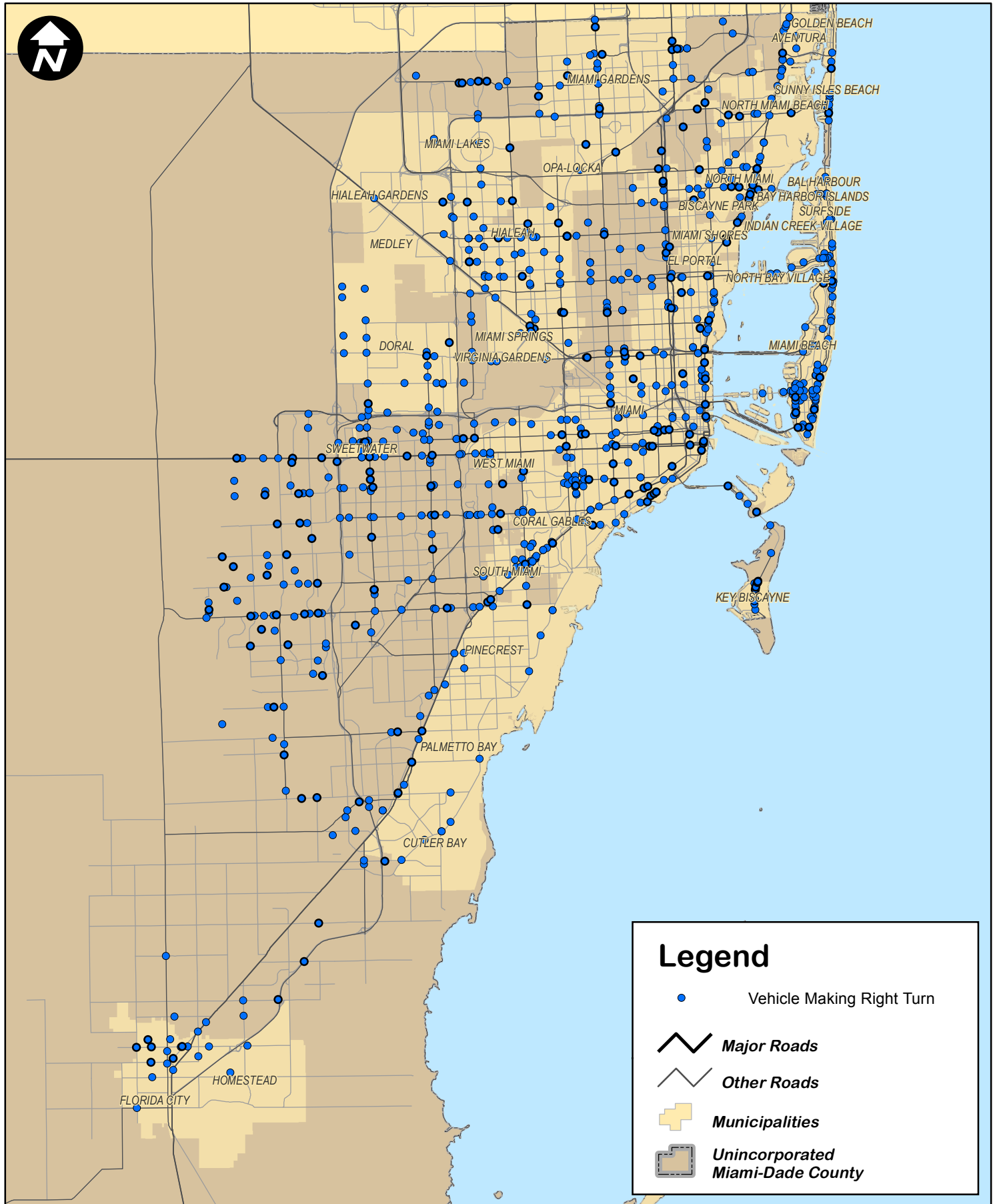
## BICYCLE CRASH ANALYSIS (2008-2013) NIGHTTIME CRASHES



# MIAMI-DADE MPO BICYCLE AND PEDESTRIAN SAFETY STUDY

## BICYCLE CRASH ANALYSIS (2008-2013)

### RIGHT-TURN CRASHES

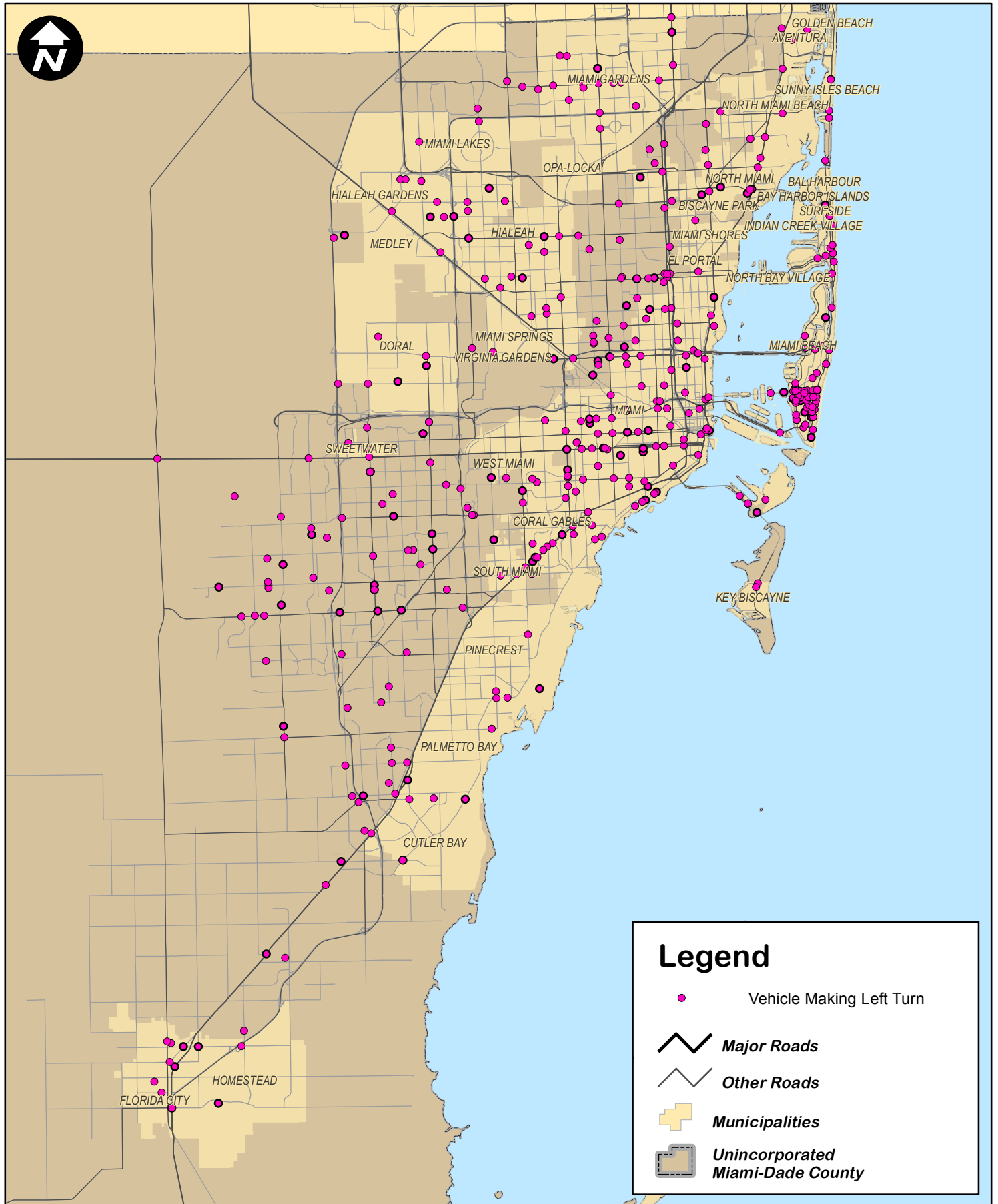


0 0.75 1.5 3 4.5 6 Miles

# MIAMI-DADE MPO BICYCLE AND PEDESTRIAN SAFETY STUDY

## BICYCLE CRASH ANALYSIS (2008-2013)

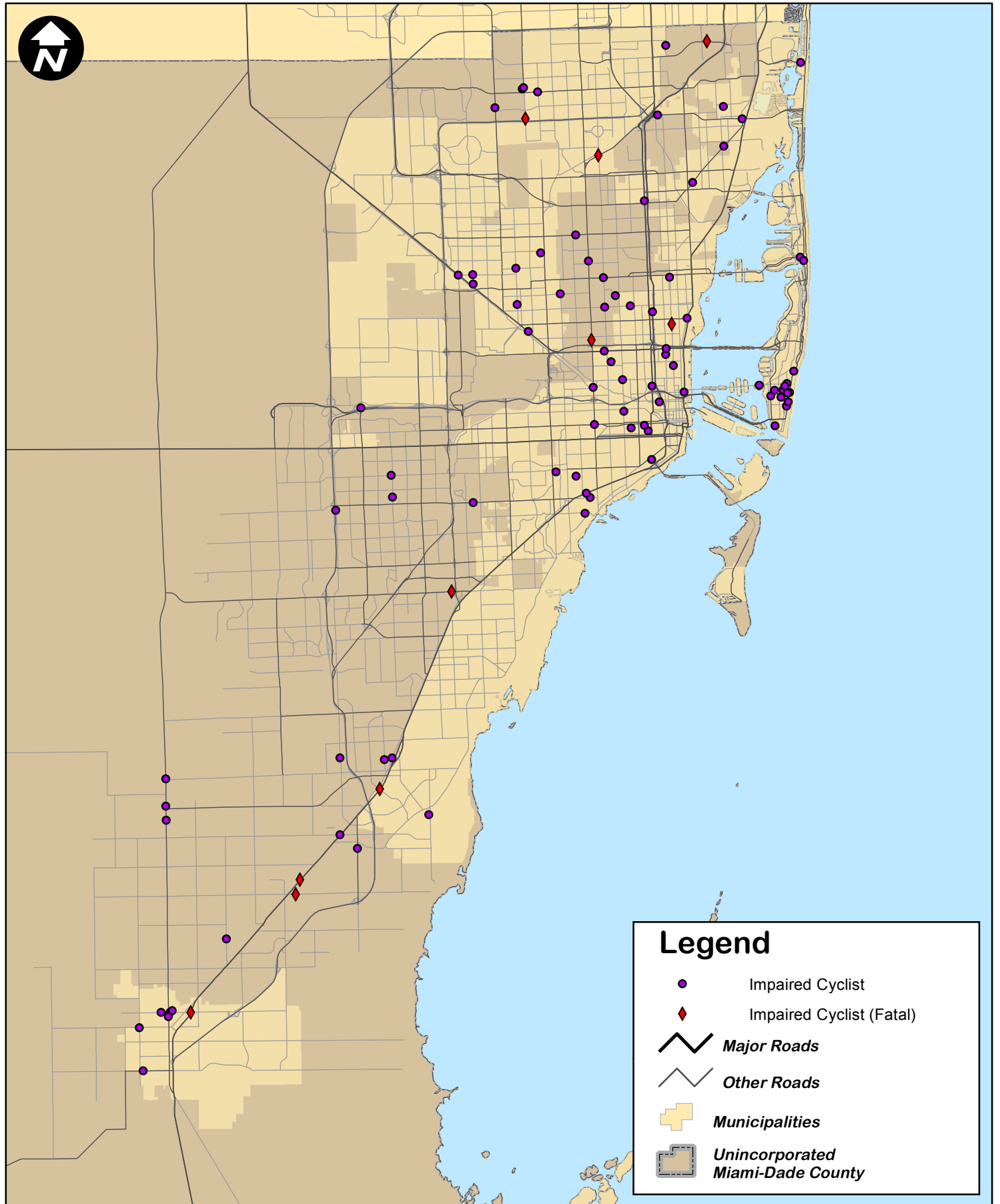
### LEFT-TURN CRASHES



0 0.75 1.5 3 4.5 6 Miles

**MIAMI-DADE MPO  
BICYCLE AND PEDESTRIAN SAFETY STUDY**

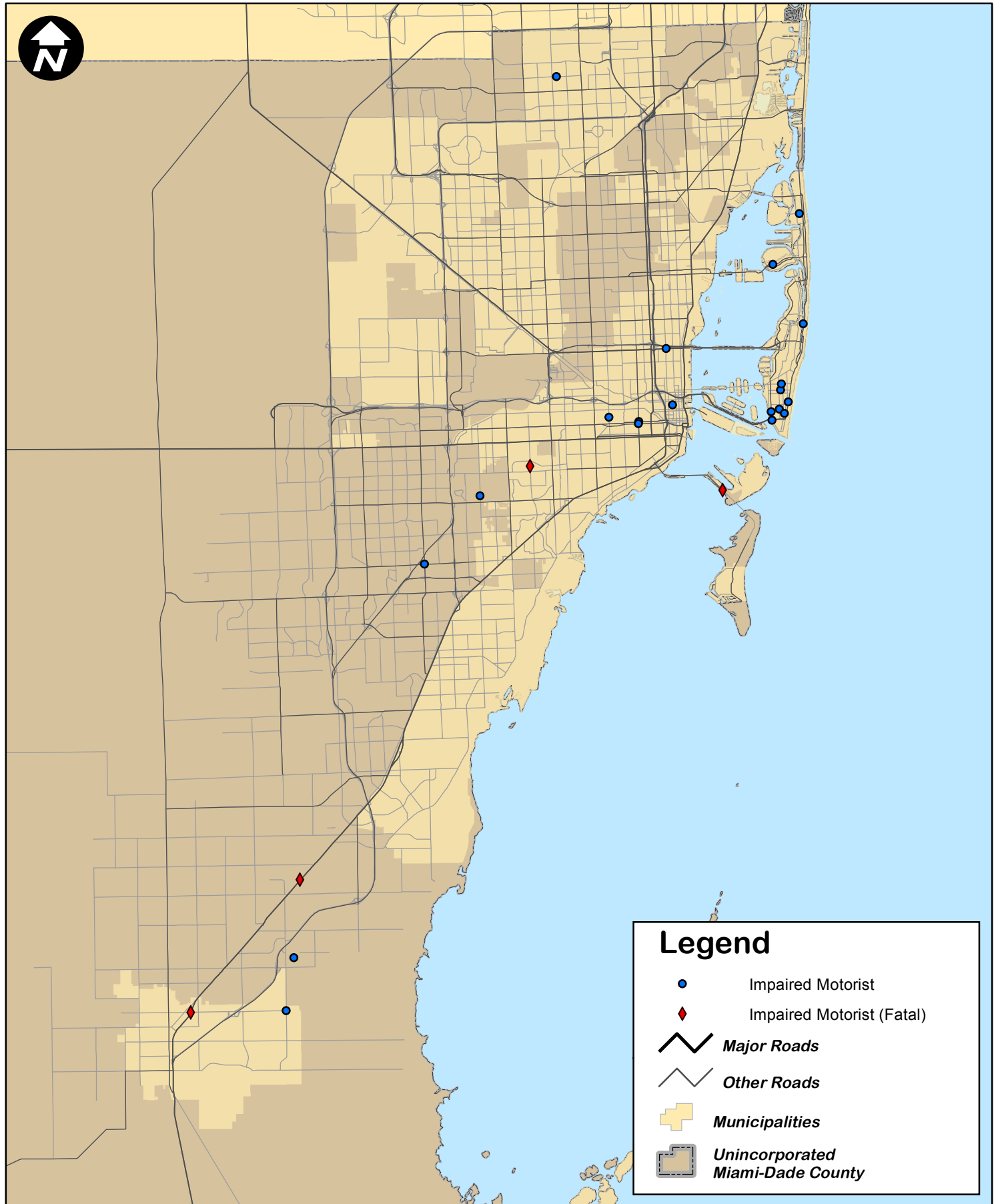
**BICYCLE CRASH ANALYSIS (2008-2013)  
IMPAIRED CYCLIST CRASHES**



0 0.75 1.5 3 4.5 6 Miles

**MIAMI-DADE MPO  
BICYCLE AND PEDESTRIAN SAFETY STUDY**

**BICYCLE CRASH ANALYSIS (2008-2013)  
IMPAIRED MOTORIST CRASHES**



0 0.75 1.5 3 4.5 6 Miles

## APPENDIX D

### PRELIMINARY LIST OF HIGH CRASH LOCATIONS

## High Pedestrian Crash Locations Selected for Field Reviews

	Location	Jurisdiction	Number of Pedestrian Crashes (2008 – 2013)	Number of Fatal Pedestrian Crashes	Notes
1.	SW 27 Avenue at SW 6/7/8 Street	State	22	3	
2.	NE 6 Avenue at NE 149 Street/NE 150 Street	State	17		3R project completed – possible candidate for a raised median
3.	NW 22 Avenue at NW 36 Street	State	11		NE corner has supermarket; raised median on the east leg?
4.	NW 62 Street from NW 13 Court to NW 12 Avenue	Local	11		
5.	Kendall Drive at SW 157 Avenue	State	9		
6.	SW 137 Ave at SW 152 St	Local	9		
7.	SW 137 Avenue at SW 268 Street/Moody Drive	Local	8	2	
8.	W 24 Avenue at W 60 Street (Hialeah)	Local	8		
9.	W 12 Avenue at W 37 Street (Hialeah)	Local	7		
10.	W 16 Avenue at W 44 Place (Hialeah)	Local	6	1	Elderly pedestrian related crashes? Opportunities for educational effort?

### Other locations considered but not selected:

- Flagler Street at W 12 Avenue
- Flagler Street at W 17 Avenue
- Flagler Street at W 27 Avenue
- Alton Road at 17 Street – FDOT project
- Alton Road at Dade Boulevard -FDOT project
- Arthur Godfrey Road/W 41 Street at Pine Tree Drive
- Arthur Godfrey Road/W 41 Street at Indian Creek Drive
- Normandy Drive/71 Street at Bay Drive E
- NE 6 Avenue at W Dixie Hwy and NE 125 Street – FDOT project
- NE 79 Street at N Miami Avenue
- NE 167 Street at NE 6 Avenue
- NE 199 Street at NE 29 Place – *City of Aventura studied this location*

- NW 199 Street/Ives Dairy Road at US 441/NW 2 Avenue – FDOT project
- NW 2 Avenue at Miami Gardens Drive
- NW 7 Avenue at NW 62 Street
- NW 7 Avenue at NW 79/81 Street
- NW 12 Avenue at NW 14 Street
- NW 27 Avenue at NW 36 Street – FDOT safety project
- NW 27 Avenue at NW 79 Street
- NW 27 Avenue at Miami Gardens Drive – *FDOT studied this location in the past; flex poles installed on NW 27 Ave*
- NW 37 Avenue at Miami Gardens Drive
- NW 47 Avenue at Miami Gardens Drive
- NW 57 Avenue at Miami Gardens Drive
- NW 103 Street/W 49 Street at W 16 Avenue
- NW 103 Street/W 49 Street at NW 67 Avenue/W 12 Avenue
- SW 1 Street at W 12 Avenue
- SW 7/8 Street at SW 12 Avenue
- SW 7/8 Street at SW 17 Avenue
- SW 22 Street/Coral Way between SW 37 Avenue and SW 42 Avenue
- SW 88 Street/Kendall Drive at SW 107 Avenue
- SW 117 Avenue at Quail Roost Drive
- US 1 at NE 15 Street
- US 1 at NE 79 Street
- US 1 at NE 36 Street
- US 1 at SW 72 Street
- US at SW 136 Street
- US at SW 152 Street
- US 1 at NE 163 Street – FDOT project
- US at SW 184 Street
- US 1 at SW 200 Street/Caribbean Blvd
- US 1 at SW 220 Street

## High Bicycle Crash Locations for Field Reviews

	Segment	Jurisdiction	Crashes (2008 – 2013)	Fatal Crashes	Notes
1.	Crandon Blvd between Crandon Park Tennis Center and Seaview Drive	Local	46		
2.	SR A1A/Collins Avenue between Bayview Drive (south of NE 163rd Street) and 174th Street	State	19		
3.	W 29 <sup>th</sup> Street between Palm Avenue and W 16 <sup>th</sup> Avenue/Milam Dairy Road	Local	17		
4.	SW 40 <sup>th</sup> Street/Bird Road at SW 87 <sup>th</sup> Avenue	State	7		
5.	SW 112 <sup>th</sup> Avenue between Old Cutler Road and US 1	State	11		
6.	SW 312 Street/Campbell Drive between SW 177 Avenue and US 1	Local	12		

## High Bicycle Crash Locations Identified for Data Review

	Segment	Jurisdiction	Crashes (2008 – 2013)	Fatal Crashes	Notes
7.	US 1 between Granada Blvd and Red Road (near University of Miami)	State	38		Bicyclists in 18-24 age range were involved → 14 out of 38
8.	US 1 between SW 216th Street and SW 264th Street	State	10	3	All three fatalities occurred during nighttime. None of the bicyclists were wearing protective gear.
9.	NW 27th Avenue between NW 54th Street and NW 71st Street	State	19		<p>None of the crashes directly linked with the MetroRail Station.</p> <p>Two Main types of crashes  <u>Bicyclist failed to yield:</u>            Vehicle traveling along NW 27 Ave, and cyclist approaching from side-street failed to yield to vehicles.</p> <p><u>Vehicle failed to yield:</u>            Vehicle on private driveway or approaching side-street failed to yield to bicyclist on the sidewalk.</p>

## APPENDIX E

### LIST OF REFERENCED DOCUMENTS

1. Bicycling & Walking in the United States, 2016 Benchmarking Report. Alliance for Biking & Walking.
2. Bicycle/Pedestrian Safety Plan Update. Kimley-Horn and Associates and Miami-Dade Metropolitan Planning Organization. 2014.
3. Florida Driver License Handbook. 2015. Florida Department of Highway Safety and Motor Vehicles.
4. Florida Pedestrian and Bicycle Strategic Safety Plan. The Center for Urban Transportation Research, University of Florida and Florida Department of Transportation, February 2013.
5. Improving the Safety of Older Pedestrians: From Understanding of the Problem to Generating Strategies. Jeanette Montufar and Jocelyn Mamchur (University of Manitoba), and Luis Escobar (City of Winnipeg).
6. Pedestrian Safety Guide for Transit Agencies. Federal Highway Administration. February 2008.
7. Pedestrian Safety at Signalized Intersections – A Balancing Act. Miguel Nunez (Fehr & Peers) and Joaquin Siques (City of Pasadena).
8. Traffic Safety Facts – Pedestrians, 2013 Data. National Highway Traffic Safety Administration, February 2015.
9. Traffic Safety Facts – Bicyclists and Other Cyclists, 2013 Data. National Highway Traffic Safety Administration, May 2015.