

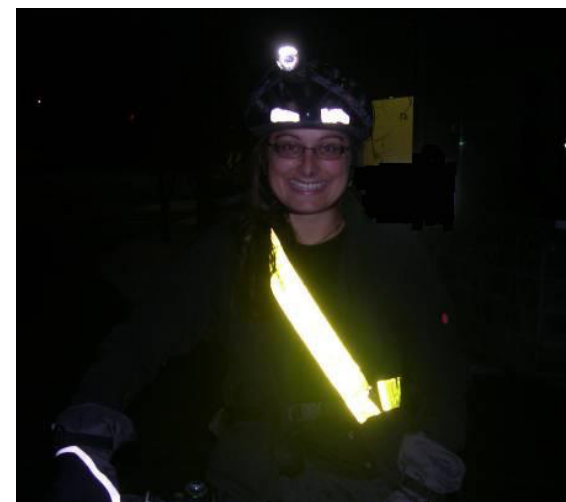
# Polk County

# Bicycle Safety Action Plan

PREPARED FOR:



Polk Transportation  
Planning Organization



PREPARED BY:



LANDIS EVANS  
+ PARTNERS

**AECOM**

APRIL 2020

---

*This page is intentionally left blank.*

---

# Table of Contents

- Executive Summary .....EX-1
- Goals, Objectives, and Action Strategies ..... 1
  - Introduction..... 1
  - Overview of Polk County Crash History .....3
  - Overview of Crash Countermeasures .....4
  - Priority Corridors and Intersections .....4
  - Actions and Performance Measures.....4
- Conclusion..... 10
- Appendices
  - A. Summary of Polk County Geometric and Temporal Trends, Including Discussion of Where, When, and How Bicycle Crashes are Occurring .....A-1
  - B. Countywide Crash Maps .....B-1
  - C. Polk Typical Crash Types and Countermeasures .....C-1
  - D. School-Related Crash Analysis .....D-1
  - E. Prioritization Methodology for Identifying High Bicycle Crash Locations .....E-1
  - F. Corridor-Level Crash Summaries.....F-1
  - G. Glossary of Countermeasures.....G-1
  - H. Potential Funding Sources.....H-1
  - I. Description of the Roadway Safety Audit Process and Two (2) Roadway Safety Audit Report Examples .....I-1
  - J. Crash Type Catalogue.....J-1
  - K. Countermeasures to Bicycle Crash Types .....K-1
  - L. Recommended Process for Prioritizing Cross-Modal Projects .....L-1

Front cover photo credits (left to right) from www.pedbikeimages.org / 1. Dan Burden; 2. Carl Sundstrom; 3. Dan Burden; 4. Mike Cynecki; 5. Unknknown; 6. Elvert Barnes; 7. Unknown; 8. Diana Redwood

---

*Note: The 2020 update of this Plan updated the crash statistics and priority corridor identification based on more recent data. Recommended countermeasures and associated performance measures, including target dates are being monitored by TPO staff, the Polk Vision Pedestrian/Bicycle Safety Team, and other interested stakeholders but results have not been compiled for publication here. Thus, the recommended tactics and performance measures remain based on the original 2016 version of this Plan.*

# Executive Summary

## Introduction

Between 2009 and 2018, over 500 people have been injured in bicycle crashes in Polk County. The purpose of the Polk County Bicycle Safety Action Plan (the Plan) is to identify specific actions that can be taken to reduce the incidence and injury severity of future bicycle crashes. Those actions will work to enhance the county's bicycle infrastructure, educate the public on bicycle safety issues and encourage modified behavior accordingly, solidify strategies for effective enforcement, and coordinate inter-agency cooperation and accountability to implement recommended policies and campaign tactics. Actions are tied to specific performance measures that can be used to monitor and evaluate the progress of action implementation.

## Ultimate Goal and Objectives of Safety Action Plan: Reduce the number and severity of bicycle crashes in Polk County

### Objectives:

1. Reduce the bicycle crash rate to a three-year average less than 10.4 crashes per 100,000 population by 2026.\* The average rate for the three years ending in 2018 was 11.2 bicycle crashes per 100,000 population.
2. Reduce the three-year average of serious injury and fatality bicycle crash rates to

less than 1.3 per 100,000 population by 2026.\* The average rate for the three years ending in 2018 was 1.8 serious injury and fatality crashes per 100,000 population. Serious injury and fatality crashes are combined in this measure because they tend to have similar contributing factors that precede them, while the determination of the severity of the outcome is often related to factors of where the injured party ended up after the collision.

\*In an effort to ensure that these metrics are accurate, and account for population growth and atypical dips or swells from year to year, the objectives are set with consideration of per capita rates over a 3-year average.

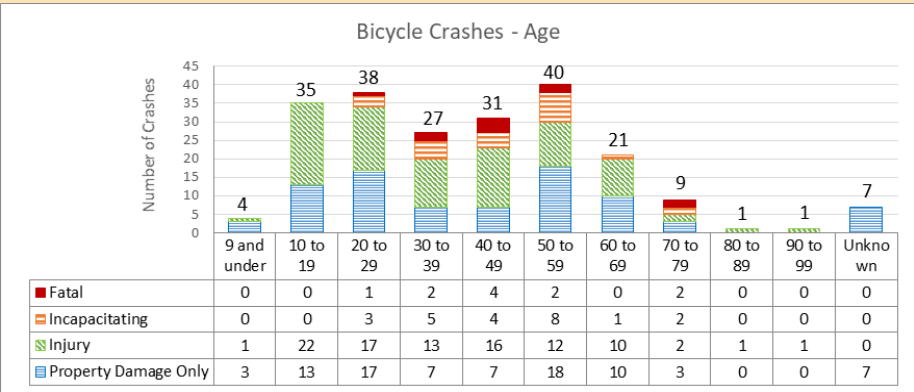
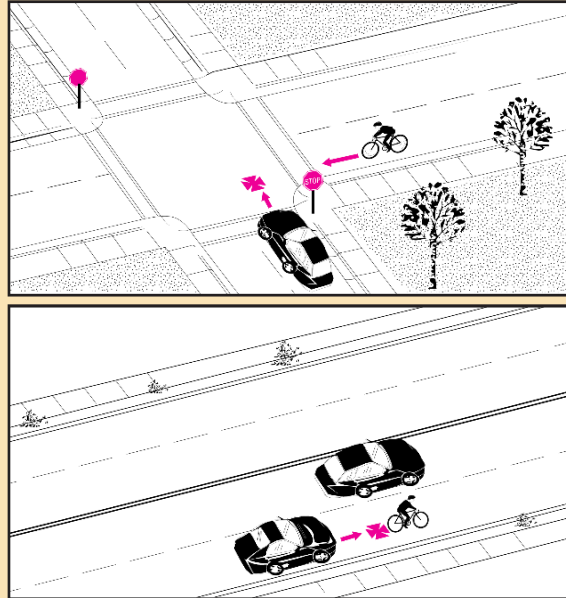
The Polk TPO has joined FDOT in adopting a vision of zero fatalities and injuries for non-motorized users of the transportation system. This is the ultimate goal for every year going forward. The incremental objectives outlined in this plan do not discount or otherwise undermine that goal, but instead show the manageable first steps needed move towards achieving the vision of zero fatalities and serious injuries. Overview of Polk County Crash History

A detailed analysis was conducted of five years' worth of bicycle crash reports (July 1 2014-June 30, 2019), including where those crashes occurred and their severity. While generally clustered near urbanized areas, many crashes are occurring in less developed parts of Polk County. In regards to time of day, while 70% (302/433) of bicycle

crashes occurred during daylight hours, 61% (43/70) of severe bicycle crashes - those resulting in incapacitating or fatal injuries - occurred during non-daylight hours. Two very similar types of crashes account for 26% of all bicycle crashes in Polk County: "Motorist Drive Out - Sign-Controlled Intersection" and "Motorist Drive Out- Commercial Driveway / Alley."

**What would a typical Polk County Bicycle Crash look like?** Based on crash typing data from 214 crashes along the identified high-crash corridors, a typical bicycle crash would involve a bicyclist being struck by motorist driving out from a side street at an unsignalized intersection (32 crashes). It would happen in daylight (148) on a clear day (177), while the road was dry (199). The bicyclist would be male (180) and between 20 and 24 years old (22). The crash would occur between 3 and 6 pm (51), on a weekday (168) between July and September (57).

(Cyclists from age cohorts 15-19 and 45-49 were each involved in 21 crashes.)



Example chart of bicycle crash data

## Overview of Countermeasures

A summary of crash types occurring throughout Polk County is provided in the Appendix A, along with descriptions of crash mechanisms to explain and illustrate those crash types (Appendix J). Those crash types were analyzed and a set of countermeasures developed (Appendix G) to address one or more types of crashes (see example on the right). Countermeasures can be categorized under one of three types: Engineering, Enforcement, or Education. By applying a strategic mix of these countermeasures, this plan and its supporting information can help reduce the frequency and severity of these crashes in the future.

### Bike Lanes

Exclusive, marked space, typically 4 to 6 feet in width, for bicycle travel along a street.



Crash types addressed by this countermeasure:

- Motorist Failed to Yield-Sign-Controlled/Signalized Intersection
- Motorist Overtaking Bicyclist
- Motorist Right Turn/Merge
- Motorist Left Turn/Merge
- Bicyclists Right Turn/Merge
- Bicyclist Overtaking Motorist

### Turning Restrictions-Limitations

Turning Restrictions-Limitations on motor vehicle turning movements, particularly right turn on red (RTOR), which limit potential conflicts between bicyclists and motorists at intersections.



Crash types addressed by this countermeasure:

- Motorist Failed to Yield – Sign-Controlled/Signalized Intersection

### Priority Corridors and Intersections

The Roadway Safety Audit program will continue in tandem with other efforts of this plan. Two Polk County roadway corridors will be reviewed annually to identify challenges and recommend corridor-specific countermeasures. A prioritization methodology has been created and applied to ensure that the audits are occurring first in locations most in need of bicycle safety improvements; a similar methodology was used to evaluate and determine the highest priority intersections. Since the original Pedestrian and Bicycle Safety

#### Top 10 High-Priority Corridors

- N. Massachusetts Avenue (from Cedar Street to Memorial Boulevard)
- N. Chestnut Road (from US 92 to Memorial Boulevard)
- S. Florida Avenue (from Alamo Drive to Beacon Road)
- S. Florida Avenue (from Lenox Street to Memorial Boulevard)
- US 98 (from Gibsonia-Galloway Road to A Street)
- US 27 (from Hunt Brothers road to Harding Avenue)
- Memorial Boulevard (from Kathleen Road to Lake Parker Avenue)
- Harden Boulevard (from Polk Pkwy to Greenwood Street)
- US 98 (from I4 to Gibsonia-Galloway Road)
- US 98 (from Kelton Hill Lane to Avon Park Cutoff)

Action Plans in 2016, the TPO has conducted seven Roadway Safety Audits on high crash corridors. Example reports from two of those audits are included in Appendix I.

### Actions and Performance Measures

The Polk County Bicycle Safety Plan addresses three major Action Areas:

- **Engineering and Infrastructure** - Improve the transportation infrastructure to promote the safe interaction between bicycles and other modes.
- **Public Outreach and Education** – Increase public awareness and knowledge related to bicycle safety in Polk County and its member jurisdictions.
- **Enforcement** – Establish support by law enforcement to the Safety Action Plan and adherence to the practices it prescribes.

Within each of these Action areas, specific tactics are identified, which can be implemented independently, or in concert, to achieve the Plan's primary objectives, and thus the ultimate goal – Reduce the number and severity of bicycle crashes in Polk County. In order to ensure the goal can be achieved, performance measures for each tactic are provided to improve accountability and timeliness.

*Note: The 2020 update of this Plan updated the crash statistics and priority corridor identification based on more recent data. Recommended countermeasures and associated performance measures, including target dates are being monitored by TPO staff, the Polk Vision Pedestrian/Bicycle Safety Team, and other interested stakeholders but results have not been compiled for publication here. Thus, the recommended tactics and performance measures remain based on the original 2016 version of this Plan.*

### Engineering and Infrastructure

Improve the transportation infrastructure to promote the safe interaction between bicyclists and other modes.

#### Maximize Continuity

- By 2017, develop a process for prioritizing and evaluating focus areas for bicycling continuity.
- By 2019, implement a process for evaluating at least one focus area evaluation and prioritization project per year.
- By 2021, complete at least two focus area studies and program improvements.

#### Conduct Roadway Safety Audits

- Conduct Roadway Safety Audits on at least two of Polk County's high bicycle crash corridors per year

#### Improve Lighting

- By 2017, ensure all development standards and project review protocols include consideration of

bicycle lighting requirements.

### Provide Complete Streets

- By 2017, ensure all development standards and project review protocols include consideration of complete street policies.

### Public Outreach and Education

Increase public awareness and knowledge related to bicyclist safety in Polk County and its member jurisdictions.

#### In-School Education

- By 2018, institute at least one of the above recommended tactics at each of the 150+ grade



schools within the county, reaching at least 50% of the 96,000+ students enrolled.

- By 2020, expand program(s) to reach 75% of student body.
- By 2021, develop a methodology for program evaluation (at the individual school level) to determine which tactics produce significant results.

#### Higher Education

- By 2019, carry out at least one of the above tactics at 50% of the colleges, universities, and

career centers within Polk County. By 2021, reach 75% of institutions.

#### Community Education

- By 2017, develop messaging and design for collateral.
- By 2018, produce and distribute 2,000 pieces.
- By 2020, produce and distribute 10,000 pieces.
- By 2021, create and run slide series once every 15 minutes on monitors at every DMV office across the country; reaching at least 30% of the 470,000+ motorists registered in Polk County.

#### Media Involvement

- By 2018, produce PSA to run on multiple radio stations broadcast across the County. By 2021, achieve 75% saturation of the listenership market.
- By 2017, craft two distinct bicycle safety “Street Smarts” pieces that can be distributed to area news stations. By 2019, secure four aired “Street Smarts” segments each year total. By 2021, secure 10 aired segments annually.
- Establish protocol requiring each law enforcement officer to review two (2) bicycle crashes every six months.

#### Enforcement

Establish support by law enforcement to the Safety Action Plan and adherence to the practices it prescribes.

- By 2017, identify benchmarks of high crash corridors that law enforcement officials can use to determine which enforcement tactics are most effective at reducing bicycle-related crashes.
- By 2020, establish long-term implementation plan for tactics deemed most effective.

#### Coordination and Monitoring

Ensure successful and timely implementation of the

Plan and its components.

For this plan to be successful there will have to be ongoing coordination with stakeholders and implementing agencies. Fortunately, Polk County already has a group dedicated to traffic safety that meets monthly – the Polk County Community Traffic Safety Team (CTST). Polk County TPO staff should work with the CTST working group to prepare and annual progress updates on the Bicycle Safety Action Plan.

- By 2017, create a working group of representatives from implementing agencies to coordinate the accomplishment of the Objectives of this Bicycle Safety Action Plan.
- Prepare annual progress reports on the Bicycle Safety Action Plans implementation.

#### Implementation and Funding Sources

The costs associated with implementing the various initiatives recommended in this Bicycle Safety Action Plan will likely exceed available TPO/ County resources. In anticipation of this fact, a guide to other available funding sources is included in the Plan’s Appendix H.

#### Conclusion

The formulation of this Polk TPO Bicycle Safety Action Plan is a critical step in the process toward achieving an improvement in roadway safety for area bicyclists and motorists, as well as improved overall accessibility in Polk County.

---

*This page is intentionally left blank.*

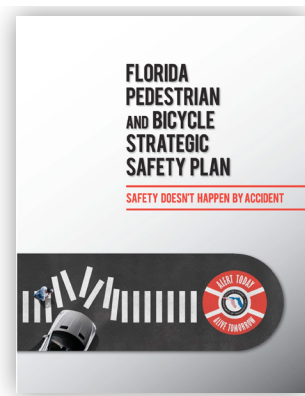
---

# Goals, Objectives, and Action Strategies

## Introduction

As roadways in Polk County have grown to meet capacity demands and urban form has evolved in some areas, the environment for bicycles has become not only less accommodating, but increasingly dangerous.

Over the ten year period from 2009 to 2018, over 500 people have been injured in pedestrian bicycle crashes in Polk County. In the same period, more than 25 bicyclists have died as a result of traffic crashes. While the number varies from year to year, the general trend is that the number of these crashes is rising over time. In 2018 alone, more than 6,500 bicycle crashes occurred in the state of



Florida, with 85 occurring in Polk County. When the Florida Department of Transportation created the Florida Pedestrian and Bicycle Strategic Safety Plan in 2013, Polk County was identified as one of the top ten highest priority counties in the state.

The purpose of the Polk County Bicycle Safety Action Plan is to identify specific actions that can be taken to reduce the incidence and injury severity of bicycle crashes in Polk County. These actions are tied to specific performance measures that can be used to monitor and evaluate the progress of action implementation. The Action Plan that follows is a strategic document, and the result of extensive evaluation and analyses of trends and circumstances specific to Polk County. Those efforts and their deliverables are included in the Appendices. The Polk County TPO envisions that the successful

execution of this plan will result in overall improved level of bicycle-friendly communities, and an improved quality of life for residents throughout the county.

### Ultimate Goal: Reduce the number and severity of bicycle crashes in Polk County.

The Polk TPO has joined FDOT in adopting a vision of zero fatalities and injuries for non-motorized users of the transportation system. This is the ultimate goal for every year going forward. The incremental objectives outlined in this plan do not discount or otherwise undermine that goal, but instead show the manageable first steps needed move towards achieving the vision of zero fatalities and serious injuries.

There are several metrics that could be used to evaluate this goal. The simplest is to reduce the raw number of bicycle crashes. Typically setting a measurable objective for this goal would involve identifying how crashes are currently trending and setting an objective to continue or accelerate existing improvements in crash numbers or rates. This approach is problematic in Polk County as bicycle crashes have been relatively constant over the last 10 years (see Figure 1)<sup>1,2</sup>, with a general trend of increase across variable year-to-year totals.

Using crashes per capita is an alternative measure which is intended to normalize for exposure; that is, one would assume that as the population grows

<sup>1</sup> The dotted line represents a trend line, but because of annual fluctuations in the crash rates the statistical correlation is so low as to make this theoretical trend meaningless.

<sup>2</sup> Data is from the Signal4 online database.

bicycle crashes would increase. By using a per capita rate, a more valid risk assessment can be made than just counting the number of bicycle crashes. The general trend for crashes per 100,000 population is slightly downward (Figure 2). The general trend for bicycle crashes per 100,000 population is essentially flat, if slightly upward (Figure 2). It is not a clear trend which could be reliably extrapolated.

An alternative to the evaluation and extrapolation of improving trends is to identify an attainable goal that represents a (statistically and practically) significant reduction in crashes. This approach includes identifying the average number of crashes per capita per year and setting the goal at one standard deviation below the average. This would result in a goal of reducing the annual number of bicycle-crashes per 100,000 population from an average of 13.0 to 10.4

As can be seen from Figure 3 The rate of crashes does have considerable year-to-year variation; the goal of 10.4 was reached in 2016, but the rate climbed back above that in 2017 and 2018. To ensure the goal of reducing crashes is truly reached, the recommendation is to track the three-year average. In Figure 3, the three-year average is shown in orange triangles, the blue bars illustrate the same ten-year trend data. There would need to be a sustained reduction in crashes to reduce the three-year average of bicycle crashes in Polk County.

**Objective: Reduce the bicycle crash rate to a three-year average less than 10.4 crashes/100,000 population by 2026. The average rate for the three years ending in 2018 was 11.2 bicycle crashes per 100,000 population.**

Reducing the severity of crashes is also a prime goal of this project. Looking at a ten-year trend, we find there is an upward trend in the number of severe injury and fatal crashes per 100,000 from 2009-2018 (see Figure 4). The objective to reduce serious injury and fatality crashes is based on the standard deviation from the mean of this ten-year trend. Serious injury and fatality crashes are combined in this measure because they tend to have similar contributing factors that precede them, while the determination of the severity of the outcome is often related to factors of where the injured party ended up after the collision

A three-year average metric is recommended for setting an objective to reduce severe injury and fatal crashes in Polk County Looking at a three-year average over the eight three-year periods that concluded between 2011-2018-years, we find the number of crashes per 100,000 population has generally risen, but did drop in 2018 (see Figure 5). The three-year averages were pulled upward by the spike in crashes in 2015, but by 2018 was back down at 1.8 per 100,000.

To meet the objective of fewer than 1.3 severe bicycle crashes per 100,000 population, there would need to be a continued reduction in crashes to reduce the three-year average of severe and fatal bicycle-crashes.

**Objective: Reduce the three year-average of serious injury and fatality bicycle crash rates to less than 1.3 crashes per 100,000 population by 2026. The average rate for the three years ending in 2018 was 1.8 serious injury and fatality crashes per 100,000 population.**

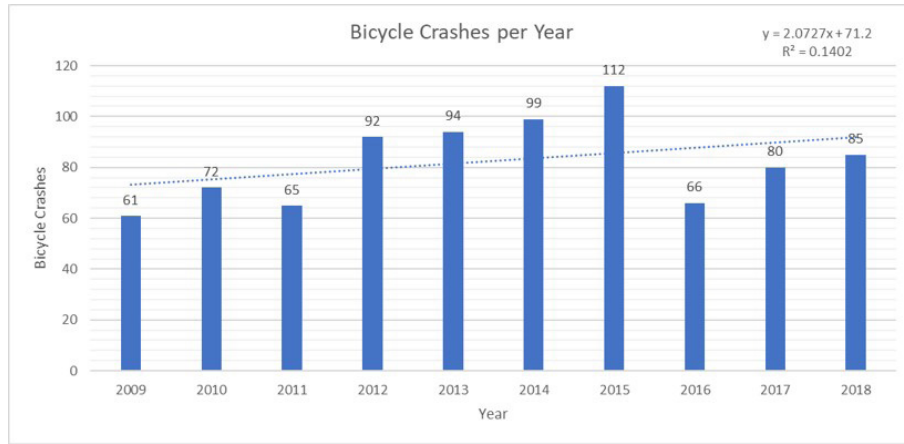


FIGURE 1: Bicycle crashes per year

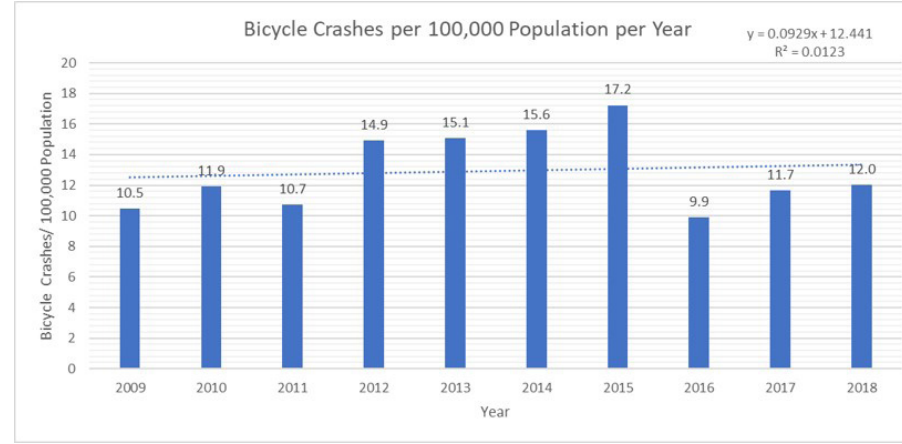


FIGURE 2: Bicycle crashes per 100,000 population

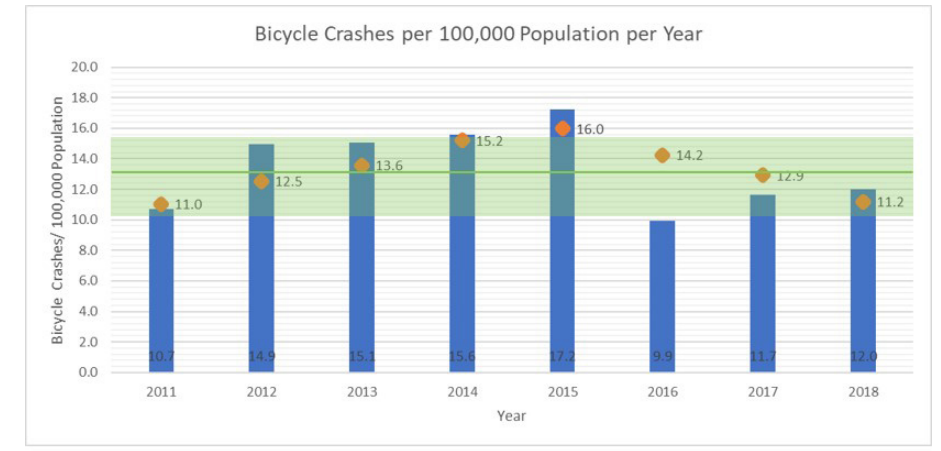


FIGURE 3: Bicycle crashes per 100,000 population; Three-year average

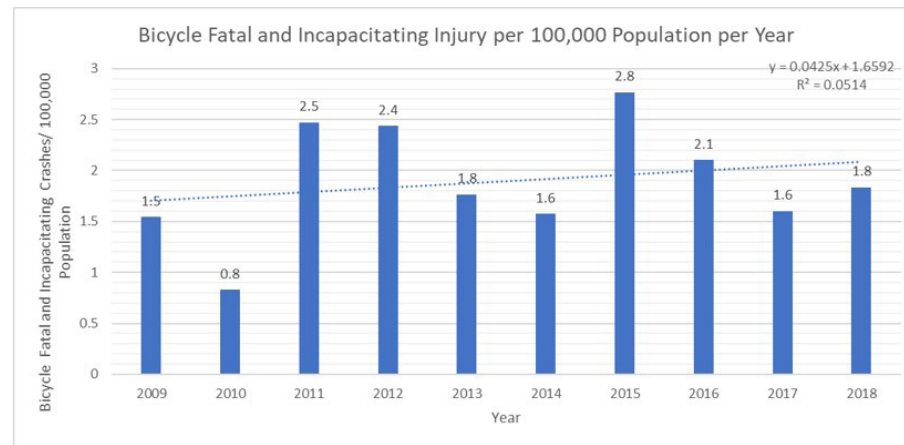


FIGURE 4: Bicycle fatal and serious injury crashes per 100,000 population, 2009-2018

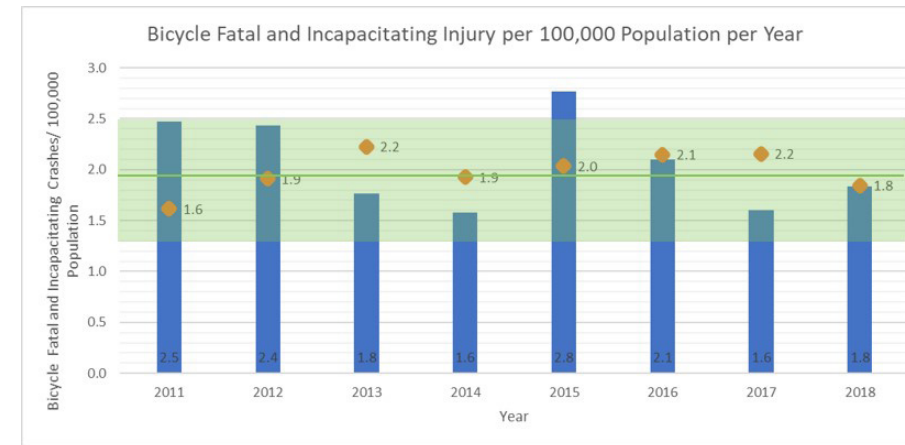


FIGURE 5: Bicycle fatal and serious injury crashes per 100,000 population, Three-year average

## Overview of Polk County Crash History

For this Plan, a detailed analysis was conducted of bicycle crash reports. At the highest level this analysis identified where bicycle crashes occurred and the severity of the crashes. While generally clustered near urbanized areas, many crashes are occurring in less developed parts of Polk County.

More detailed spatial and temporal analyses provide a better picture of the bicycle crashes in Polk County. A detailed discussion of these analyses is contained elsewhere in Appendix A of this Plan, while detailed analytic maps are presented in Appendix B. However, some observations are provided below:

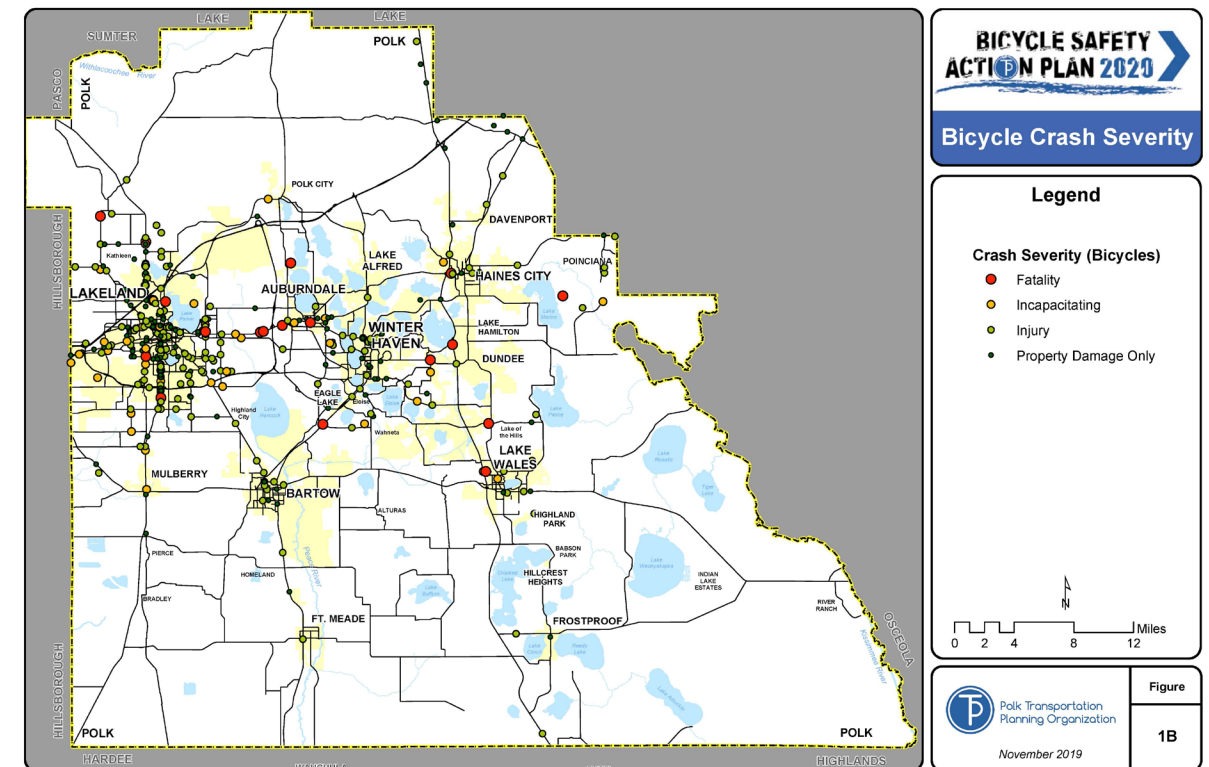
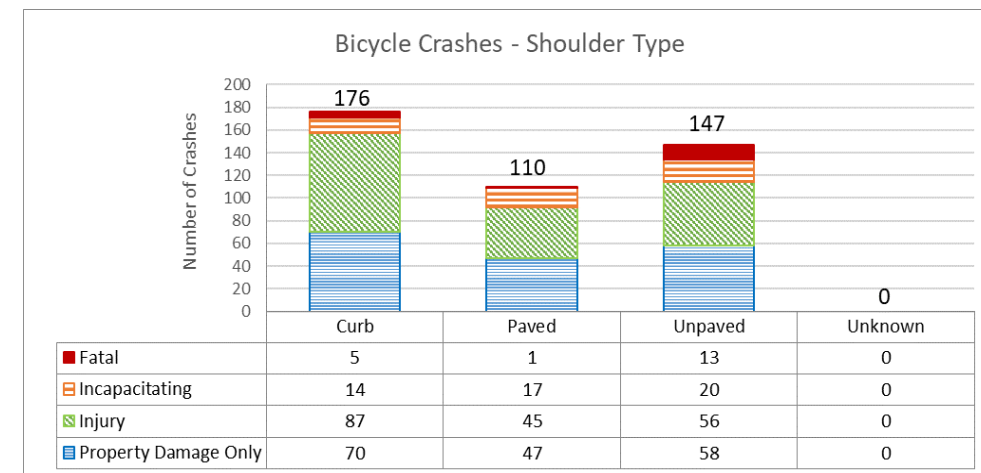
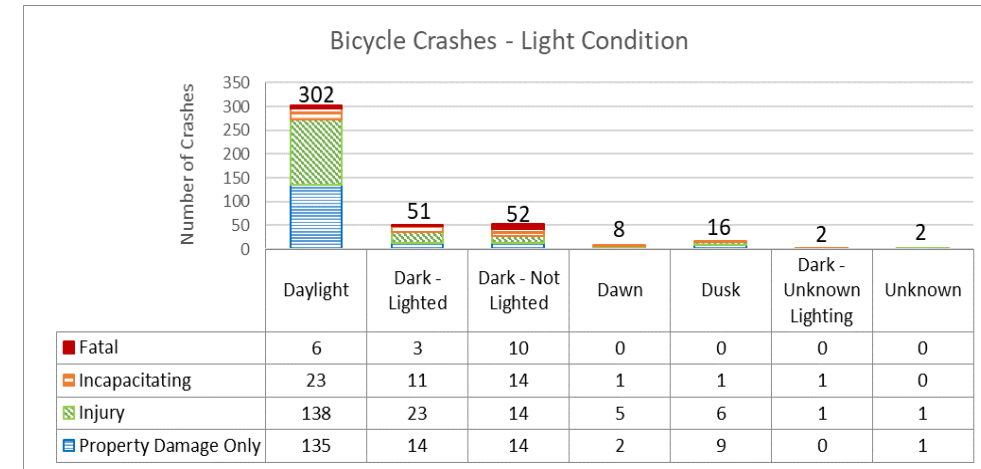
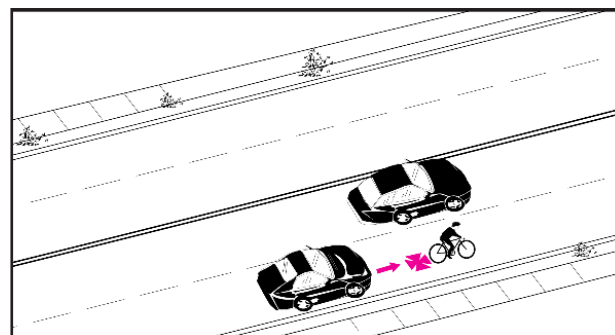
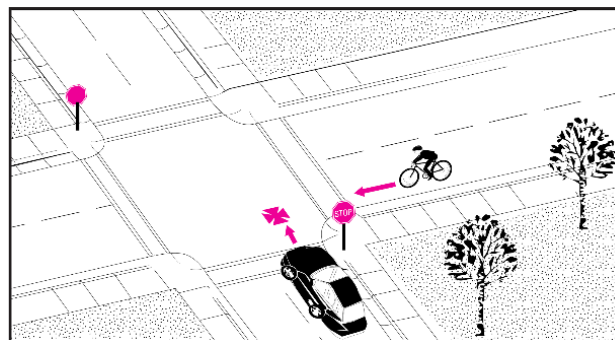
Most bicycle crashes (70%) occurred during daylight conditions. This correlates with the time of day data above. Moreover, Dark-Lighted and Dark-Not Lighted conditions generally resulted in a higher percentage of fatal and incapacitating injuries (61%). The overall low number of bicycle crashes during non-daylight conditions is likely tied to a reduction in bicycle traffic volume. The high percentage of serious and fatal crashes occurring during suboptimal lighting conditions suggests that these crashes are occurring with motor vehicles traveling at higher speeds. This could be the result of less congestion during night time hours; however, it is likely tied to the reduction in reaction time and potential deceleration prior to a crash caused by limited visibility of cyclists.

Bicycle crashes occurred most frequently where a curb was present (41%). Unpaved shoulder type had the second most bicycle crashes (34%), but had considerably more fatal and incapacitating injuries than the other shoulder types (52%). This large proportion of serious injuries for unpaved shoulders are likely these roadways being largely represented in more rural areas with higher travel speeds whereas curb and gutter is a more urban feature. Roadways with paved shoulders represented 26% of the crashes. This could be the result of exposure but suggests that shoulders can significantly reduce bicycle crashes, particularly those resulting in serious injuries.

Five years of bicycle crash reports were analyzed to determine the actual types of bicycle crashes that were occurring. Two

### What would a typical Polk County Bicycle Crash look like?

Based on crash typing data from 214 crashes along the identified high-crash corridors, a typical bicycle crash would involve a bicyclist being struck by motorist driving out from a side street at an unsignalized intersection (32 crashes). It would happen in daylight (148) on a clear day (177), while the road was dry (199). The bicyclist would be male (180) and between 20 and 24 years old (22). The crash would occur between 3 and 6 pm (51), on a weekday (168) between July and September (57). (Cyclists from age cohorts 15-19 and 45-49 were each involved in 21 crashes.)





Within each of these Action areas, we have identified specific tactics that can be implemented independently, or in concert, to achieve the Plan's primary objectives, and thus the ultimate goal – **Reduce the number and severity of bicycle crashes in Polk County.** To ensure that we achieve this goal, we have provided performance measures for each tactic to improve accountability and timeliness.

## Engineering and Infrastructure

When considering changes to reduce bicycle crashes, modifications to infrastructure are often the first improvements to be recommended. Infrastructure improvements are long term. They can often be implemented quickly. They also can support educational and enforcement campaigns. One of the most important aspects of infrastructure changes is that they are visible; you can point to them as successes, and they can help build momentum for future investments.

Many infrastructure improvements can be implemented through ongoing transportation improvement projects. Features such as bike lanes, buffered bike lanes, paved shoulders, improved bicycle detection at signals, vibratory edge lines and two-stage left turn boxes may be implementable with planned or programmed street and intersection projects.

To implement the Engineering and Infrastructure components of this Plan, four strategies and corresponding tactics have been identified, each with performance measures. These tactics should be applied on countywide, citywide, neighborhood, and street levels. Generalized crash trends should be used to identify countywide implementation of these strategies. Citywide and neighborhood programs can be based upon subsets of the countywide data. Street level tactics are best informed by Roadway Safety Audits.



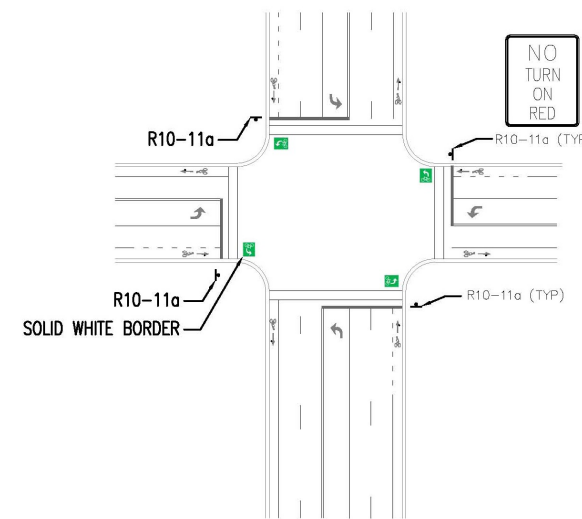
To effectively promote bicyclists' safety, all or many of the following tactics should be pursued and implemented according to the prescribed performance measures.

**Maximize Continuity** – Ensure cyclists have safe and comfortable facilities for the length of their trips.

A lack of facilities is frequently cited as a reason people choose not to bike ride. The quality of the bicycling environment needs to be such that bicyclists feel safe and comfortable. Traditionally, this has meant providing bike lanes on roadways. However, on busier street, separation is required to ensure cyclists of varying abilities feel safe.

Separated bikeways along roadways (buffered bike lanes, cycle tracks) and paths on independent alignments are preferred by many bicyclists. The design of separated facilities requires extra care to mitigate potential conflicts with motorists, but when well designed, they provide safe and comfortable places to ride. So where bike lanes and paved shoulders are desirable minimum facilities, separated bikeways are preferable on busy streets.

Another option, at least within developed areas,



may be to provide a network of bike routes off the main arterial roadway network. Communities such as Maitland, St. Augustine, and Winter Park have developed route networks that make use of existing infrastructure on lower volume roads, with minimal improvements, to create low stress routes for bicyclists. This provides a comfortable place to ride, provides access to key destinations, and allows bicyclists to avoid major arterial roadways.

While creating a continuous system is a laudable goal, it will take many years to eliminate all gaps in the Polk County bicycle network. To address the gaps, a process should be established that first identifies focus areas for evaluation. In other sections of this Plan, methods for prioritizing corridors based upon crash incidents have been



described. Since many roadways do not have crashes occurring, a method to prioritize gaps would include potential demand, access to transit, access to schools, and desired routes for recreational and fitness oriented rides.

**Performance Measure:** By 2017, develop a process for prioritizing and evaluating focus areas for bicycling continuity.

**Performance Measure:** By 2019, implement a process for evaluating at least one focus area evaluation and prioritization project per year.

**Performance Measure:** By 2021, complete at least two focus area studies and program improvements.

**Conduct Roadway Safety Audits (RSAs)** – Review roadways with bicycle crashes to identify context-specific crash reduction strategies.

Roadway Safety Audits are used to review roadways and make recommendations regarding engineering, education, and enforcement programs. The Roadway Safety Audit process involves assembling an interdisciplinary team



the sidewalk areas. The Florida Plans Preparation Manual and the Florida Greenbook both provide minimum levels for illumination. Additionally, these standards documents provide for levels of uniformity to which roadway lighting must comply. Roadways that are not adequately or uniformly lit – including the paved shoulders, bike lanes and separated bikeways - will have shadow areas which can mask the presence of bicyclists in the right of way. Poor lighting can also inhibit bicyclists’ ability to judge the speeds of oncoming vehicles.

Specific corridor reviews of street lighting will likely be conducted as part of bicycle and other roadway safety audits and could be included in continuity evaluations. However, development requirements and project review protocols should be evaluated to make sure they include review of bicycle lighting issues.

of safety professionals and advocates to review a roadway corridor. Crash data is collected for the study corridor and discussed with the audit participants. A bicycling/walking field review is conducted with members of the team reviewing crash reports, identifying safety concerns and recommending specific countermeasures to mitigate safety concerns. The process developed for Polk County includes two sample audits that contain full reports plus an overview of the study corridor and recommended improvements. The infrastructure improvements identified with RSAs provide a compact list of short- and long-term improvements that can be made to directly improve the safety and bikeability of a particular roadway. In so doing, they also can be used to identify trends among roadways that lead to elevated crash rates and that suggest improved designs for future roadways.



**Performance Measure: Conduct Bicycle Roadway Safety Audits on at least two of Polk County’s high bicycle crash corridors per year.**

**Improve Lighting** – Review street lighting to ensure it meets appropriate design values.

To provide for safe bicycle travel, street lighting must illuminate the roadway, the shoulders and

**Performance Measure: By 2017, ensure all development standards and project review protocols include consideration of bicycle lighting requirements.**

**Provide Complete Streets** – Continue to evaluate corridors for potential Complete Streets improvements.

Polk County has expended considerable resources to evaluate and identify improvements that will provide complete street environments for residents, shoppers, and commuters. By providing Complete Streets features, many of the other infrastructure elements recommended in these strategies will be addressed. In addition to providing tangible improvements, reduced travel speeds and lower incidence of crashes will also result.

All of the incorporated places within Polk County have enacted Complete Streets policies. In addition to the adopted policies, they should ensure their local development codes and review procedures support these Complete Streets policies.

**Performance Measure: By 2017, ensure all development standards and project review protocols include consideration of complete street policies.**

**Public Outreach and Education**

**Program Messaging** – Program messaging should not only be catered to specific demographic groups, it should also be crafted separately to motorists and bicyclists. Messaging geared toward motorists should focus on three (3) main principles: 1) Awareness of bicyclists while driving, even if there is no designated bike lane or path; 2) the necessity to yield to bicyclists when appropriate; and 3) understanding their responsibility to look for bicyclists crossing when entering a roadway from a collector road or driveway.



*Comparison of Lighting Strategies*



Messaging directed at bicyclists should focus on three (3) separate principles: 1) Bicyclists need to be aware that they are often difficult to see by motorists at dawn/dusk and at night, and that proper attire (and lighting) is necessary to improve/ensure visibility; 2) Bicyclists must understand that while riding a bike, they are legally considered to be 'operating a vehicle' and therefore they must abide by all rules of the road, including riding with traffic; and 3) obeying traffic signals.

**Education** – Education should include general safety efforts and targeted efforts aimed specifically at those behaviors that will reduce crashes that are common in a given environment. Broad safety campaigns include school-based safety programs, programs that can be presented to community groups, and general public service announcements, brochures and posters. In addition, location and demographic countermeasures should be developed to target specific problem areas within Polk County.

Educational programs should do more than just address individual crashes. To have a lasting effect they must result in changed attitudes on a communitywide or regional scale – essentially a cultural change to one in which people expect and respect bicyclists in the roadway environment is needed.

A concern regarding educational campaigns that

was expressed when developing the Plan objectives is that the public may be “campaigned out.” Given the frequency with which the public is bombarded by campaigns (both commercial and institution) of all types, it is reasonable to anticipate that there could be a decided challenge to individuals’ receptiveness of yet another campaign aimed at changing behavior. Admittedly, inspiring action, or behavioral change is the most challenging of campaign objectives, however it is not impossible and generally the most successful “campaigns” involve providing target audiences with customized messaging describing easy steps that can be taken to affect real (immediate and personally-beneficial) change. The following prescribed strategies and tactics could be executed as part of a unified multi-step campaign or, if desired, as individual initiatives (à la carte).

***In-School Education*** – In the effort to instill long-term attitude and behavior changes throughout Polk County, we recommend educating minors at all ages, so the considerations of bicycle safety are instilled early on and last well into adulthood. School age children (10-19 years of age) account for 23 percent of all Polk County bicycle crashes. Thus, school based educational programs are another way to promote bicycle safety. However, schools – and teachers specifically – have serious demands upon their time and adding lessons to their workload frequently is not met with enthusiasm. Programs that come to the school such as before/after school programs, Bike Rodeos, and in-class lessons taught by guest instructors can help reduce the effort required by teachers. Simple lesson plans can be specifically tailored to address state standards to promote their acceptance by schools and teachers. Several states have developed simple lesson plans directly tied to their educational standards so that they can be more easily implemented.

Children and adolescents are continually inundated

with new information both at school and at home, so it is necessary to find effective ways to surmount that oversaturation. The cognitive abilities and level of maturity of each age group should be considered when developing and instituting methods of outreach and education. A list of recommended tactics that can be implemented for students of various grade levels is provided below. Several of these tactics are in line with Polk County’s existing Safe Routes to School Program, and should be regarded as support for such initiatives, as well as a recommendation to carry out such initiatives more extensively across the county. Please note: The Safe Routes to School Program encourages both safety and an increase in students electing to walk or bike to school, we have chosen to exclude any objectives in this Plan that are not directly focused on improving bicycle safety.

***Elementary (Grades K-5)*** – We recommend holding “biking to school” drills to teach young students basic facts and practices about biking safely to and from school. “Bike Rodeos” are an excellent method of instilling and exercising safe bicycling practices. Consider including an interactive demonstration to show students the difficulty that cars have of seeing small children (especially at dusk/evening), and how much time cars need to stop when a bicyclist steps out into the roadway to cross (“stopping sight distance”).

Polk County schools typically provide – or encourage students to purchase – branded planners, which contain additional pages with information such as school policies, best homework practices, conversion tables, etc. A page could be included at the very front of the planner that engages students visually while offering a few digestible tips on bicycle safety.





Parents of young children can play a vital role in reasserting lessons taught during school hours, including bike safety. We recommend that a letter be sent home to parents that educates them on their children's abilities and limitations

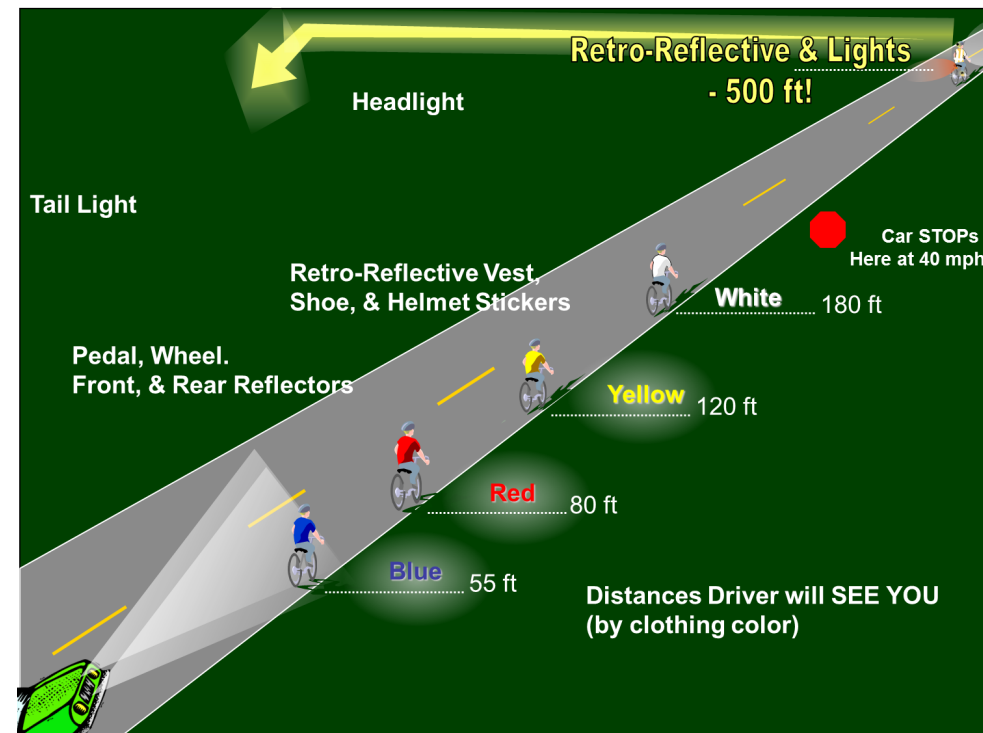
as bicyclists around roadways. The letter should encourage parents to supervise their children in traffic and teach them age-appropriate bike safety.

**Intermediate (Grades 6-8)** - We recommend schools integrate safety education into common assignment types. For instance, consider enlisting the participation of social studies (or possibly health) teachers to give students a current events assignment in which they must find a recent story about a bicycle-related crash and report on the factors that attributed to the crash and what best practices could have been observed to avoid such an incident.

Create and display a campaign poster in cafeterias and/or study hall rooms. The image should be engaging and could illustrate how difficult a bicyclist is to see at dawn/dusk or at night on the side of the road (see Example 1 and Example 2).

Including a promotional page in intermediate students' planners could also prove beneficial as a method or continued awareness and reinforcement of safety practices.

**High School (Grades 9-12)** - According to Polk County's Safe Routes to School programming, high school students have yet to be included in outreach efforts. High school students are an important target group, because while some do use bikes to get around, many are also becoming



Example 1: Effectiveness of proper bicycling attire and reflective gear on stopping site distance.

motorists. They need to be aware not only of their responsibilities as bicyclists, but also the very serious responsibilities of being behind the wheel.

Schedule small-group assemblies (large assemblies tend to create more of a distraction than a means of valuable information dissemination) at which a recruited (and local) bicycle crash victim and driver involved in similar crashes speak briefly to students about their experiences (and the parts they played) in their respective incidents.

Additionally, we recommend offering a drivers' education class as part of high schools' elective curriculum, in which the responsibilities of motorists and bicyclists are emphasized and the best practices that must be observed to ensure safety for all on the road, as well as legal consequences if those practices are not observed.

**Performance Measure:** By 2018, institute at least one of the above recommended tactics at each of the 150+ grade schools within the county, reaching at least 50% of the 96,000+ students enrolled.

**Performance Measure:** By 2020, expand program(s) to reach 75% of student body.

**Performance Measure:** By 2021, develop a methodology for program evaluation (at the individual school level) to determine which tactics produce significant results.

**Higher Education** - Several effective anti-drink-and-drive campaigns have incorporated interactive demonstrations to college students about the actual physical and cognitive effects of alcohol on a driver by conducting "beer goggle" simulations on campuses across the country. A similar tactic could be implemented by a community educator as it relates to demonstrating stopping sight distance



Florida law requires motorists to yield to all traffic on pathways next to a roadway. However, motorists often only look where they expect to see cars. If you are walking or riding on a path next to the roadway, a motorist turning into or out of a driveway may not look in your direction.

Watch for right turning motorists coming from driveways or side streets. Also, look out for left turning motorists coming from behind you. Before walking or riding in front of a car, make eye contact with the driver and be sure the driver is going to yield to you.



Example 2: Poster reminding bicyclists to be aware of driveways and the risk of biking against the direction of traffic.

for motorists, where students could experience the time and distance necessary to safely stop at various speeds when a bicyclist enters into the roadway ahead of them. This could help young adults observe firsthand the importance of being an alert motorist, as well as the considerations required of any bicyclist.

Give-away items such as car air fresheners could be produced and made available at college information desks, libraries, or other common spaces. Car air fresheners are affordable to produce in large quantities, will be hung on rear-view mirrors or dashboards for optimum visibility, and can include a simple safety message reminding drivers to be alert to the presence of bicyclists on or alongside roadways.

**Performance Measure:** By 2019, carry out at least one of the above tactics at 50% of the colleges, universities, and career centers within Polk County. By 2021, reach 75% of institutions.



**Community Education** – Inform the public about the issues, and what actions can be taken through strategic outreach tactics.

It is just as important to educate members of the general public, as it is to educate children and adolescents in school. However, there exist far fewer opportunities to speak to a captive audience of adults, or engage in valuable discussion or demonstration. For this reason, the tactics recommended below were developed with the intent to reach general populations as they proceed in their everyday lives, and take special advantage of opportunities when their attention may be more easily captured.

We recommend that posters, tent cards, and other collateral be produced and displayed at various public locations across the county including grocery stores, libraries, post offices, credit unions, houses of worship, Department of Motor Vehicle (DMV) offices, bus stops/stations, and any locally-owned businesses that are able and willing to support these efforts. Iterations of collateral should be consistent

with the messaging described above and be catered to the target audiences (i.e. bicyclists or motorists) appropriate for the location.

**Performance Measure: By 2017, develop messaging and design for collateral.**

**Performance Measure: By 2018, produce and distribute 2,000 pieces.**

**Performance Measure: By 2021, produce and distribute 10,000 pieces.**

We recommend that Polk County TPO take advantage of the volume of traffic and wait times at DMV offices. A slide, or series of slides on waiting area monitors would be an effective channel for communicating to local motorists. Slides could communicate local bicycle-crash statistics and/or easy ways to help improve or prevent the occurrence of such crashes.

**Performance Measure: By 2018, create and run slide series once every 15 minutes on monitors at every DMV office across the county; reaching at least 30% of the 470,000+ motorists registered in Polk County.<sup>3</sup>**

**Media Involvement** – Channeling public information through traditional media channels can be costly and effectiveness can be difficult to measure. Given that motorists are a major target of this campaign, and that the majority of motorists still listen to the radio on a daily basis, it would be prudent to speak to people about their driving habits while they are actually driving. A non-traditional PSA could be produced that captures the attention of motorists, communicating the necessary messages as described above in “Messaging.”

<sup>3</sup> Florida Department of Highway Safety and Motor Vehicle Annual Licensed Driver Report, 2016

**Performance Measure: By 2018, produce PSA to run on multiple radio stations broadcast across the County. By 2021, achieve 75% saturation of the listenership market.**

Polk County is without a dedicated news station, however surrounding metro areas broadcast across the county. News producers are always in need of credible content to fill newscasts, especially content that relates to timely news stories (such as serious bicycle-motorist crashes). We recommend providing surrounding news stations with a valuable “Street Smarts” or informational text (NOT a press release) that could be directly incorporated in a news broadcast following a bicycle-vehicle crash report, and read by an anchor. Text should include a few facts to inform drivers what local trends have been observed recently (see Appendix J for Crash Type Catalogue), and remind them of the importance of bicycle visibility and other best practices.

**Performance Measure: By 2017, craft two distinct bicycle safety “Street Smarts” pieces that can be distributed to area news stations. By 2019, secure four aired “Street Smarts” segments each year total. By 2021, secure 10 aired segments annually.**

Education of those enforcing motor vehicle operation and patrolling the roadways is equally important to educating those using them. Polk County sheriff’s officials and city police should be familiar with the factors that contribute to bicycle-related crashes. Law enforcement officials could review area crash reports as part of continued education and training efforts.

**Performance Measure: Establish protocol requiring each law enforcement officer to review two (2) bicycle crashes every six months.**

**Miscellaneous Tactics** – Other simple initiatives can be instituted in coordination with the above tactics, or individually when deemed appropriate. Air fresheners could be distributed not only on college campuses but at DMV offices, grocery store customer service counters, and libraries.

Brightly colored T-shirts could be printed and distributed at soup kitchens, shelters, YMCAs, or anywhere else where individuals may often congregate who often may walk or bike from place to place be in need of safer, bright-colored clothing or reflective gear to improve their visibility amongst motorists.

We also recommend the TPO pursue a partnership with Dollar Tree or Dollar General (or other discount store) where signage could display bicycle safety information as well as promote the sale of bicycle accessories, such as reflective tape or flashing lights available for \$1 or less.

### **Enforcement**

Police and the Polk County Sheriff’s office could play a significant role in providing positive messaging and procedural reinforcement to motorists, bicyclists, and pedestrians over the long term. Law enforcement officials should be properly trained and advised on the factors leading to motor vehicle-bicycle crashes locally (based on this study’s – and other – crash data analyses), and encouraged to hold bicyclists accountable for their role in ensuring safe transportation for themselves and other vehicles on the road.

Law enforcement officials should target high priority corridors where there are high volumes of bicycle/pedestrian traffic interacting with motorists. Tighter regulation of drivers in speed zones, as well as strict crackdown on motorists under the influence of alcohol will help ensure public accountability and

decrease the prevalence of such factors contributing to crashes in the county.

We recommend stationing officers along corridors that have experienced high frequencies of non-motorized crashes in recent years. Law enforcement officials should provide warnings and educational materials to motorists and bicyclists exhibiting unsafe behavior.

We recommend that bicycle safety and best practices be incorporated and emphasized in traffic school programs, driver's tests, DWI/DUI programs, and all defensive driving courses, including those specially gear toward senior drivers.

**Performance Measure: By 2017, identify benchmarks of high crash corridors that law enforcement officials can use to determine which enforcement tactics are most effective at reducing bicycle-related crashes.**

**Performance Measure: By 2020, establish long-term implementation plan for tactics deemed most effective.**

### Coordination and Monitoring

Ensure successful and timely implementation of the Plan and its components.

For this Plan to be successful, there will have to be ongoing coordination with stakeholders and



implementing agencies. Fortunately, Polk County already has a group dedicated to traffic safety that meets monthly – the Polk County Community Traffic Safety Team (CTST). The CTST, along with the Polk TPO, can monitor and facilitate the implementation of the Polk County Bicycle Safety Action Plan. The Plan takes a broad-based approach to improving bicycle safety, so there is a need to establish a working group or coalition with representatives from all stakeholders and implementing agencies.

It is recommended that the Polk TPO establish a safety coalition to oversee the implementation of both the Bicycle Safety Action Plan and the companion Pedestrian Safety Action Plan. The TPO can tap into existing safety efforts and resources in Polk County and seek to provide or acquire additional resources as needed. This coalition can provide regular updates to the Polk TPO, and the CTST, and be fully integrated with the efforts of these two entities.

**Objective: By 2017, create a working group of representatives from implementing agencies to coordinate accomplishment of the performance measures recommended in this Bicycle Safety Action Plan.**

**Objective: Prepare annual progress reports on the Bicycle Safety Action Plan's implementation.**

**Implementation and Funding Sources** - The costs associated with implementing the various initiatives recommended in this Bicycle Safety Action Plan will likely exceed available TPO/County resources. To help alleviate this deficiency, a summary of available funding sources was developed. The summary, available as Appendix H of this Plan, identifies and discusses the numerous sources which can be used to provide monetary assistance for bicycle (and



pedestrian) facilities and programs. The majority of these funding opportunities come from Federal sources, as administered by the Florida Department of Transportation, but several private sources are also included.

### Conclusion

The formulation of this Polk TPO Bicycle Safety Action Plan is a critical step in the process toward achieving a much needed improvement in roadway safety for area bicyclists and motorists, as well as improved overall accessibility in Polk County for non-motorized transportation. This Plan highlights the recommended actions that can work to enhance the county's bicycling infrastructure, educate the public on bicycle safety issues and encourage modified behavior accordingly, solidify strategies for effective enforcement, and coordinate inter-agency cooperation and accountability to implement recommended policies and campaign tactics. The successful implementation of many (or all) of the action items described above, will mean an:

**Ultimate reduction in the number and severity of bicycle crashes in Polk County.**

This goal will be evaluated based on achievement of the following primary objectives:

1. Reduce the pedestrian crash rate to attain a three-year average crash rate of 10.4 crashes/100,000 population by 2026.
2. Reduce the three-year average of serious injury and fatality bicycle crash rates to less than 1.3 per 100,000 population by 2026.