Regional Strategic Highway Safety Plan

Photo Credit: Southern Arizona Guide

Prepared for:

SouthEastern Arizona Governments Organization (SEAGO)

and

Sierra Vista Metropolitan Planning Organization (SVMPO)

JULY 2018

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Executive Summary

The 2018 Strategic Highway Safety Plan (SHSP) was developed for the SouthEastern Association of Governments (SEAGO) and Sierra Vista Metropolitan Planning Organization (SVMPO) to address fatal and serious injury traffic crashes occurring in the region. This safety plan was developed based on:

- Crash data analysis
- Stakeholder and public input

Vision and Goal: The SHSP vision is **"Stay Alive, Focus on the Drive"** with a goal to **"Improve the Safety of Our Roads…Let's Reduce Fatalities and Severe Injuries in the Next 5 Years"**.

Crashes: 13,919 crashes occurred in the region from 2011-2016, with 173 fatal and 459 serious injury crashes. Single vehicle crashes accounted for 39% of all crashes, 57% of fatal crashes, and 47% of serious injury crashes.

Emphasis Areas: SEAGO selected six emphasis areas to concentrate their safety efforts on; SVMPO added a seventh emphasis area targeted for the Sierra Vista region (pedestrians):

- Lane Departure
- Occupant Protection
- Speeding
- Impaired Driving
- Young Driver Under 25
- Distracted Driving
- Pedestrian (SVMPO)

Safety Strategies were developed for the emphasis areas using the Four E's of traffic safety: engineering, enforcement, education, and emergency services.

Priority Intersections were identified based on crash data; the top 10 locations are below (note that the Campus Dr/Colombo Ave intersection was recently signalized):

Signalized Intersections	Owner
Fry Blvd & Carmichael Ave	Sierra Vista
Martin Luther King Jr Pkwy & Coronado Dr	Sierra Vista
Fry Blvd & 7th St	Sierra Vista
Coronado Dr & Fry Blvd	Sierra Vista
Charleston Rd & Colombo Ave	Sierra Vista
Lenzner Ave & Fry Blvd	Sierra Vista
Calle Portal & Fry Blvd	Sierra Vista
Avenida Cochise & Coronado Dr	Sierra Vista
Buffalo Soldier Trail & Fry Blvd	Sierra Vista
Fry Blvd & Avenida Escuela	Sierra Vista

Unsignalized Intersections	Owner
Avenida Del Sol & Desert Shadows Dr	Sierra Vista
Campus Dr & Colombo Ave	Sierra Vista
Coronado Dr & Tacoma St	Sierra Vista
Lenzner Ave & Busby Dr	Sierra Vista
9th St & A Ave	Douglas
Maley St & Arizona Ave	Willcox
Tacoma St & 7th St	Cochise County
Wilcox Dr & Carmichael Ave	Sierra Vista
8th St & 10th Ave	Safford
8th Ave & Airport Rd	Graham County

Safety Projects: SHSP findings resulted in the following project applications for ADOT's Highway Safety Improvement Program (HSIP) funds:

Agency	Road	Location	Countermeasures
Cochise County	Charleston Rd	Sierra Vista to Tombstone	Rumble strips
	Double Adobe Rd	SR 80 to US 191	Rumble strips
	Barataria Blvd	Moson Rd to Ranch Rd	Rumble strips
Santa Cruz County	Pendleton Dr	0.35 miles west of Kent Ave	Box culverts
Graham County	Cottonwood Wash Rd	1200 South to Cottonwood Wash Loop	Rumble strips, paved shoulders
	Golf Course Rd	Hoopes Ave to 20th St	Rumble strips, paved shoulders
Greenlee County/ Duncan/ADOT	SR 75 in Duncan	Old Virden/Fairgrounds Rd to Family Dollar Store	Sidewalk both sides, high visibility crosswalk at Old Virden, lighting

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23 USC § 409 - Discovery and admission as evidence of certain reports and surveys

Notwithstanding any other provision of law, reports, surveys, schedules, lists, or data compiled or collected for the purpose of identifying, evaluating, or planning the safety enhancement of potential accident sites, hazardous roadway conditions, or railway-highway crossings, pursuant to sections 130, 144, and 148 of this title or for the purpose of developing any highway safety construction improvement project which may be implemented utilizing Federal-aid highway funds shall not be subject to discovery or admitted into evidence in a Federal or State court proceeding or considered for other purposes in any action for damages arising from any occurrence at a location mentioned or addressed in such reports, surveys, schedules, lists, or data.

Introduction

A Strategic Highway Safety Plan (SHSP) is a data-driven regional safety plan that establishes transportation safety goals and provides a guide for improving highway safety. This report represents the first SHSP for the SEAGO and SVMPO regions. This plan establishes a vision, goal, emphasis areas, strategies, network screening methodology, and potential safety projects for the region, consistent with those set forth by the Arizona SHSP. The purpose of this safety plan is to reduce the risk of death and serious injury for all transportation users in the SEAGO and SVMPO region.

This safety plan was developed based on:

- State crash data analysis
- Stakeholder input
- Public input
- Coordination with the Arizona Strategic Highway Safety Plan

The SEAGO/SVMPO SHSP will serve as a tool for recommending projects for inclusion in the regional agency's Transportation Improvement Program (TIP).

SEAGO's planning area includes Cochise, Graham, Greenlee and Santa Cruz Counties and the cities and towns in those Counties, including the San Carlos Apache Tribe. SVMPO covers the City of Sierra Vista and surrounding unincorporated Cochise County. SEAGO and SVMPO have collaborated on this SHSP effort to address vehicular, bicycle and pedestrian safety issues that can be resolved at a regional or systemic level.

Public Involvement

This safety plan was created with support from local stakeholders, community members and the SEAGO and SVMPO Technical Advisory Committees (TACs), all of which provided important information regarding the current safety conditions in the region.

Public involvement was key in getting stakeholder and community feedback to address safety issues and concerns. Several opportunities were provided to facilitate participation in the safety plan development, including study sessions, public meetings, and TAC meetings. These meetings provided opportunities to obtain input for the plan development, to educate on traffic safety issues, and to solicit cooperation in implementing the safety plan, both on an agency and an individual basis.

Study sessions were held May 24-25, 2016 in:

- Thatcher, May 24, 2016 (11 participants)
- Sierra Vista, May 24, 2016 (12 participants, 2 sessions)
- Nogales, May 25, 2016 (6 participants)
- Benson, May 25, 2016 (9 participants)

Public meetings were held in:

- Sierra Vista, July 13, 2016 (11 participants)
- Safford, October 27, 2016 (8 participants)

In addition to meetings, the public had an opportunity to provide comments online using a Social Pinpoint mapping tool. The online public engagement platform was launched April 25, 2016 to supplement the public meeting outreach events listed above. The Social Pinpoint tool provided users with an easy to use platform to identify specific locations on a map to comment on safety concerns from a driver, a pedestrian, and a bicyclist perspective. 327 comments were received through the online mapping tool.

Appendix A provides more details on the public outreach effort, including comments from the Social Pinpoint mapping tool. SEAGO and SVMPO member agencies are encouraged to use these comments to help identify potential safety issues that may need to be addressed.

System Performance Trends

Crash data from the ADOT Accident Location Identification and Surveillance System (ALISS) was obtained and used for this study. The most recent five years of crash data (2011-2015) at the time of the study was analyzed to determine existing crash performance, comparison to state data, and identify crash hot spots in the region.

Key findings from the crash data analysis include:

- 61% of fatal crashes involved lane departure
- 53% of fatal crashes involved unrestrained occupants
- 39% of fatal crashes involved speeding
- 36% of fatal crashes involved impaired driving
- 25% of fatal crashes involved drivers under the age of 25

Table 1 shows the crashes in the region by agency and injury severity for the study period; Table 2 shows the crashes by agency and collision manner.

Table 1: Crash Severity by Agency 2011-2015

Agency	Fatal	Incapacitating Injury	Non-Incapacitating Injury	Possible Injury	No Injury	Total
Benson	**4**	**12**	**43**	**47**	**265**	**371**
Bisbee	**1**	**7**	**15**	**7**	**74**	**104**
Clifton	**2**	**2**	**25**	**17**	**121**	**167**
Cochise County	**64**	**152**	**488**	**272**	**2,252**	**3,228**
Douglas	**1**	**8**	**54**	**73**	**587**	**723**
Duncan	**2**	**0**	**0**	**0**	**2**	**4**
Graham County	**10**	**40**	**102**	**83**	**435**	**670**
Greenlee County	**6**	**19**	**48**	**32**	**196**	**301**
Huachuca City	**0**	**2**	**4**	**4**	**18**	**28**
Nogales	**11**	**17**	**78**	**150**	**1,001**	**1,257**
Patagonia	**0**	**1**	**2**	**0**	**1**	**4**
Pima	**0**	**0**	**0**	**0**	**0**	**0**
Safford	**3**	**10**	**48**	**96**	**380**	**537**
San Carlos Apache Tribe	**8**	**0**	**0**	**2**	**6**	**16**
Santa Cruz County	**19**	**37**	**165**	**137**	**939**	**1,297**
Sierra Vista	**7**	**53**	**294**	**328**	**1,893**	**2,575**
Thatcher	**2**	**8**	**30**	**23**	**136**	**199**
Tombstone	**0**	**0**	**0**	**0**	**4**	**4**
Willcox	**2**	**2**	**19**	**14**	**102**	**139**
Total	**142**	**370**	**1,415**	**1,285**	**8,412**	**11,624**

Table 2: Collision Manner by Agency 2011-2015

Agency	Angle	Head On	Left Turn	Other	Bicyclist	Pedestrian	Rear End	Rear to Rear	Rear to Side	Sideswipe Opposite Direction	Sideswipe Same Direction	Single Vehicle	Unknown	Total
Benson	50	11	23	16	1	3	70	1	5	5	34	152		371
Bisbee	8	1	8	3	0	3	21	2		8	2	45	3	104
Clifton	9	5	7	7			39	2	3	4	8	77	6	167
Cochise County	120	33	147	111	14	24	493	7	25	37	193	2,012	12	3,228
Douglas	133	17	27	29	5	14	141	24	85	13	125	85	29	727
Duncan				1		1	1					1		4
Graham County	46	17	36	20	5	7	87		4	21	32	394	1	670
Greenlee County	8	4	8	3			27			6	12	229		297
Huachuca City	5	3	4	2			6			1	2	5		28
Nogales	159	18	97	50	4	13	463	6	30	27	157	225	8	1,257
Patagonia							1					3		4
Pima														0
Safford	131	9	73	17	4	5	142	2	21	18	49	60	6	537
San Carlos Apache		2		1	1	2	2					7	1	16
Santa Cruz County	54	14	40	62	4	7	200	1	10	25	81	796	3	1,297
Sierra Vista	411	29	343	69	42	41	970	11	52	26	255	299	27	2,575
Thatcher	35	1	36	6	1	1	54	5	17	5	13	23	2	199
Tombstone				1								3		4
Willcox	28	3	18	13	2	1	27	2	6	1	14	23	1	139
Total	1,197	167	867	411	83	122	2,744	63	258	197	977	4,439	99	11,624

Figure 1: Crash Severity by Year

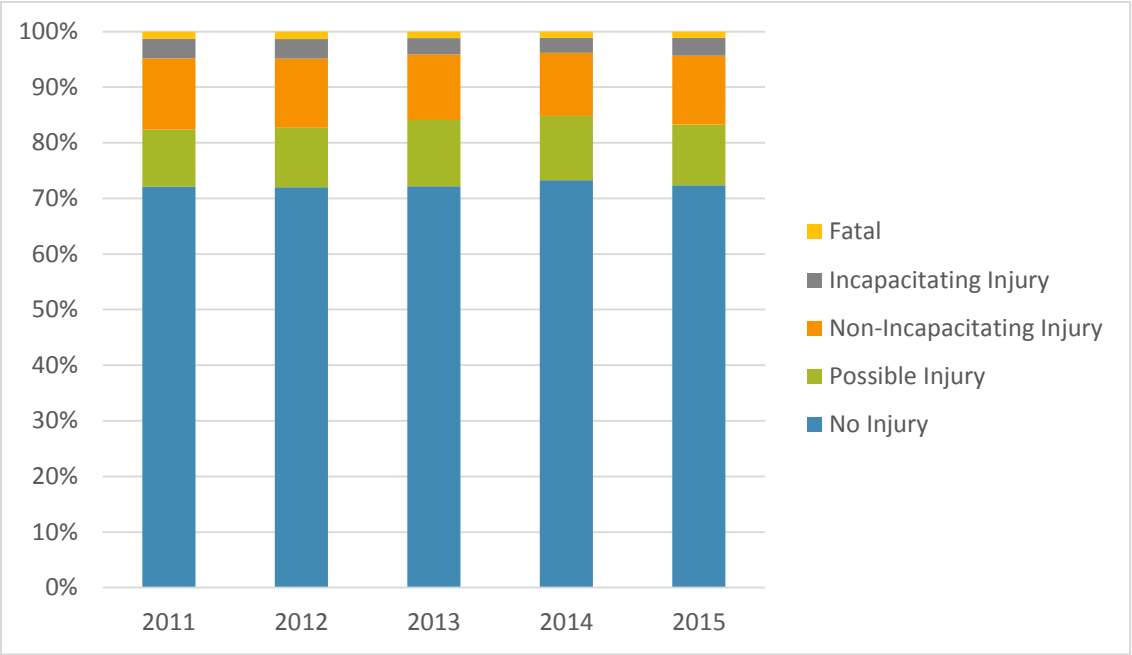


Figure 2: Crash Count by Month and Severity

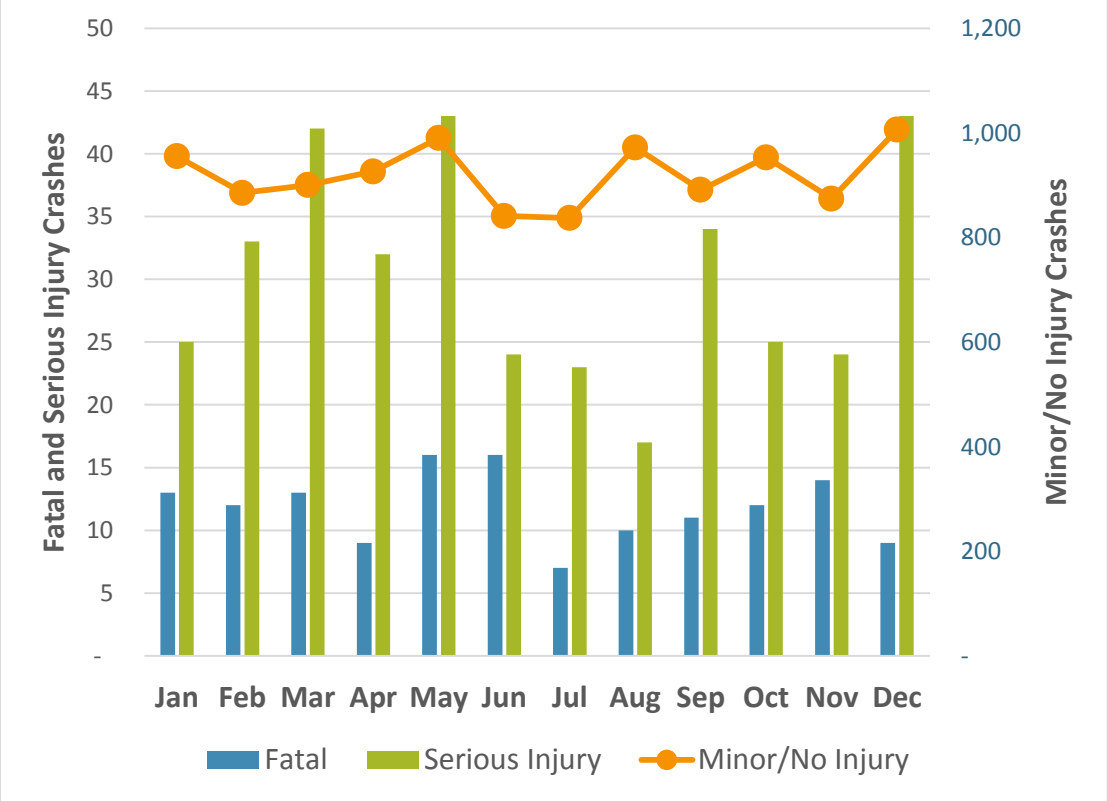


Figure 3: Crash Count by Day of Week and Severity

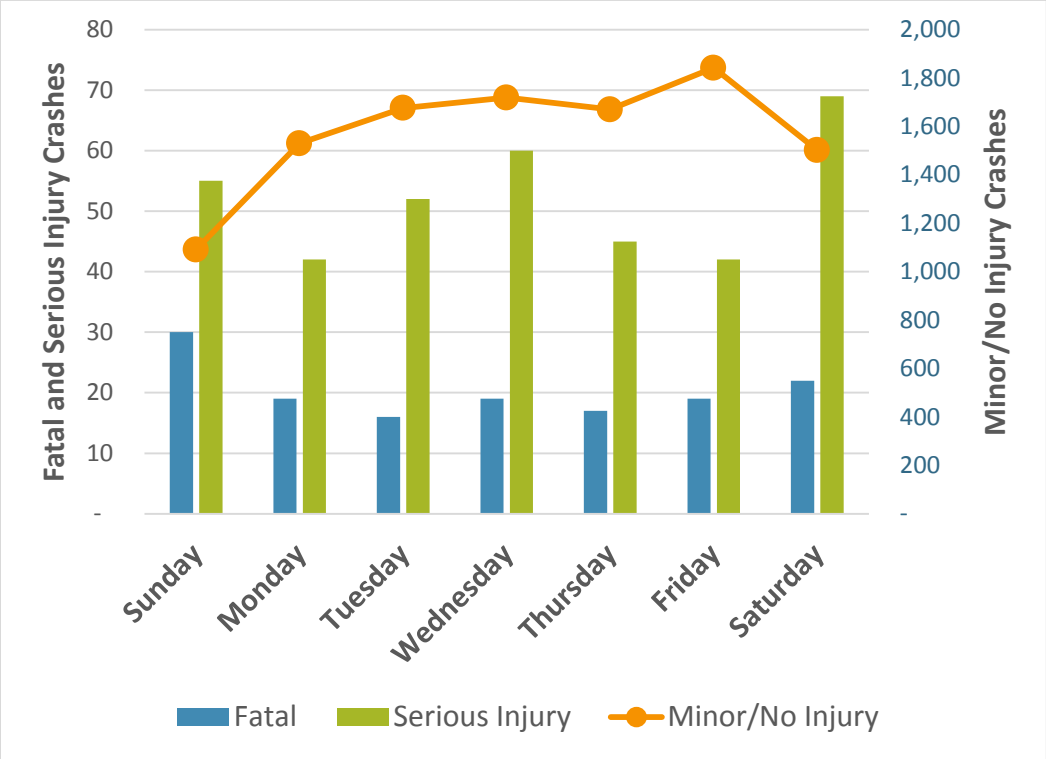


Figure 4: Crash Count by Hour and Severity

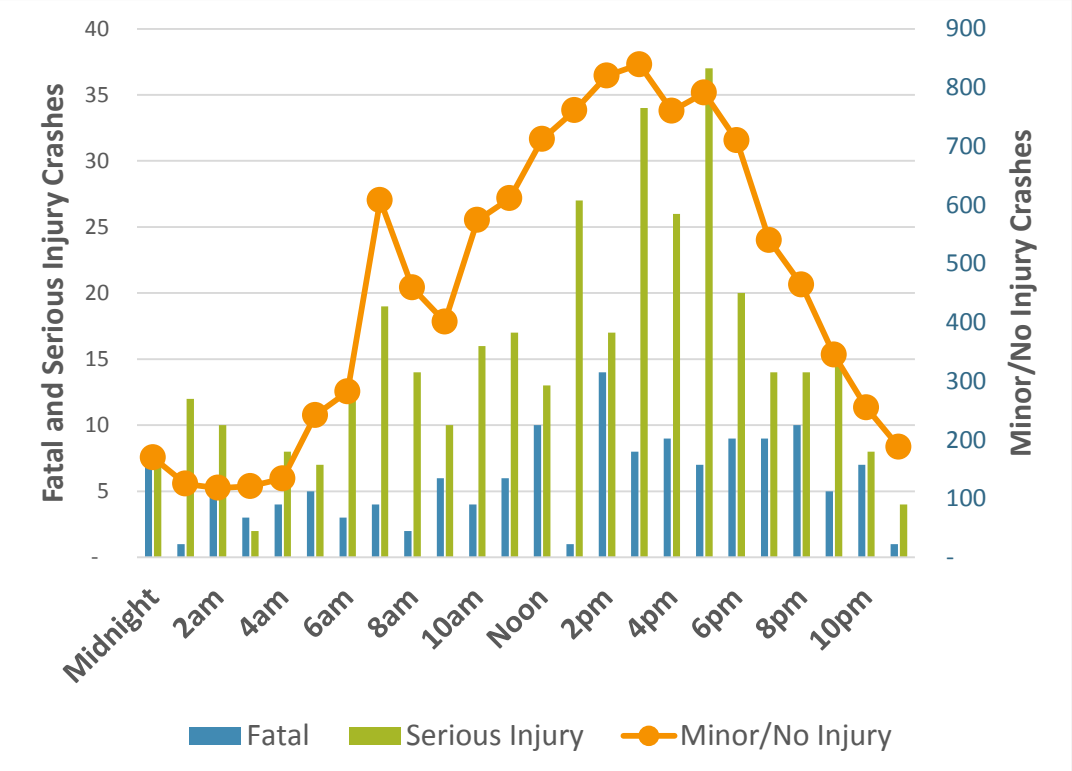


Figure 5: Violations Involved in Crashes

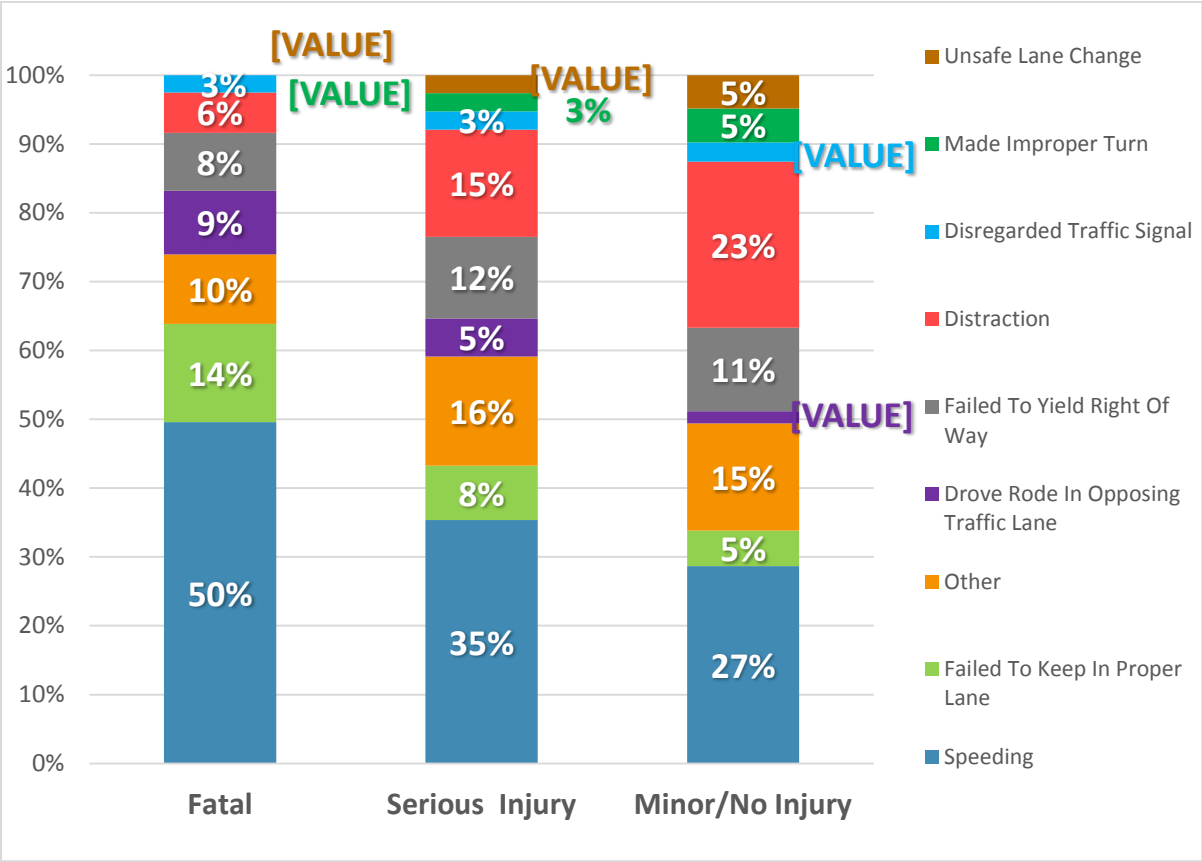


Figure 6: Impaired Driver Crashes

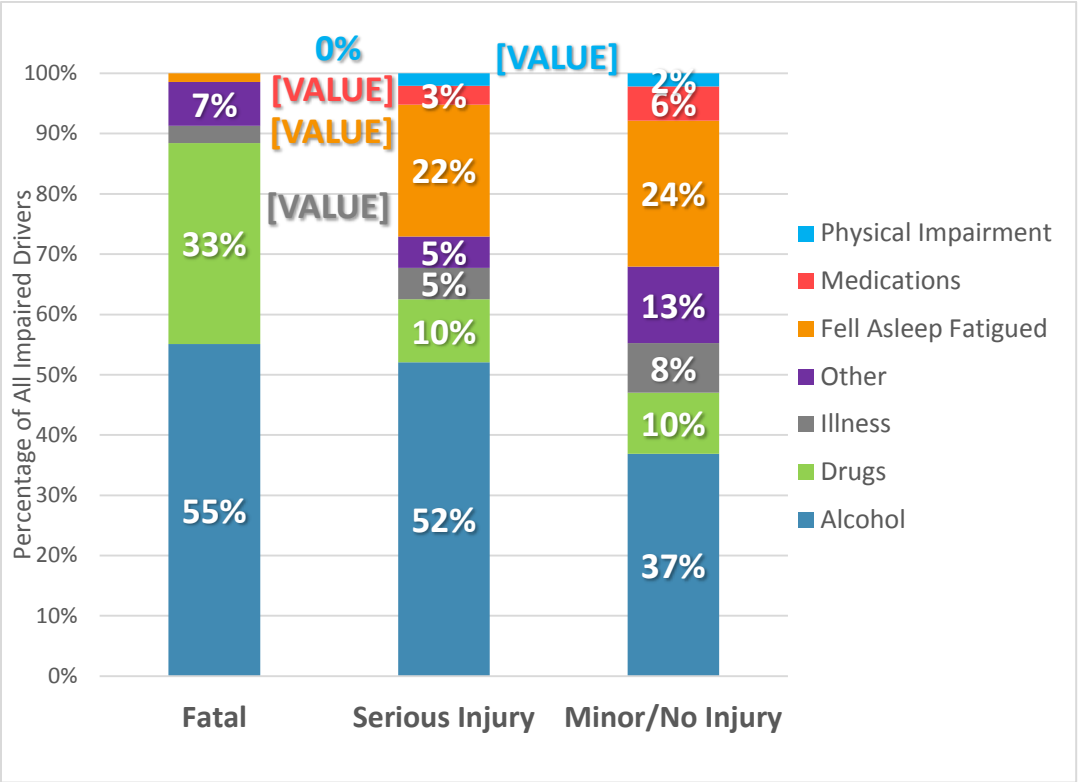


Figure 7: Crashes Involving Speeding or Distraction

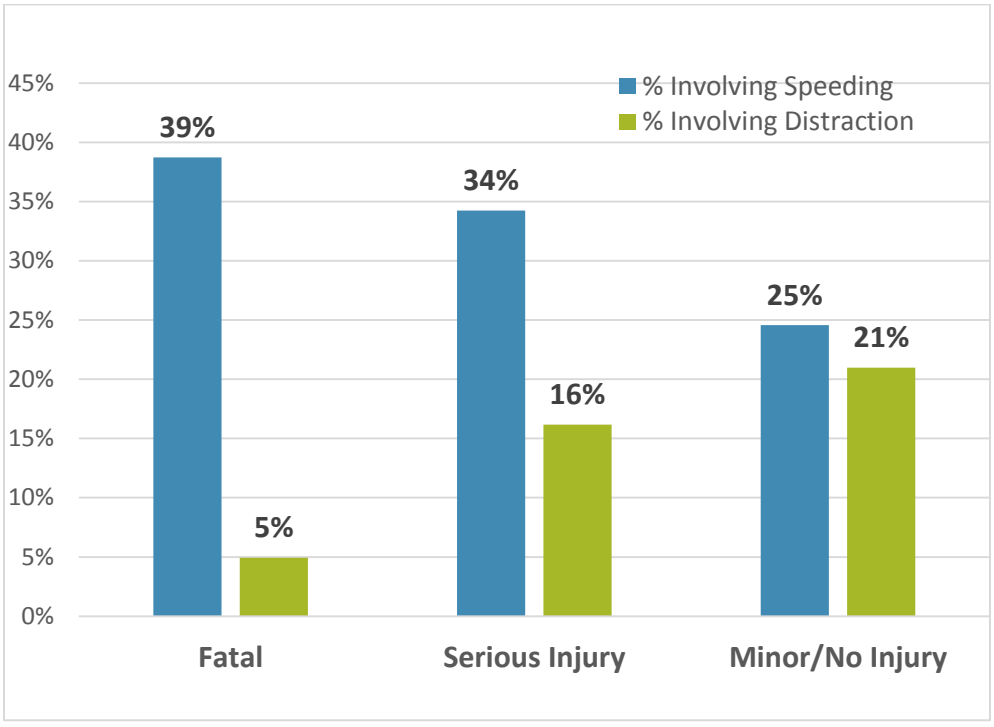


Figure 8: Crashes with at Least One Driver Impairment

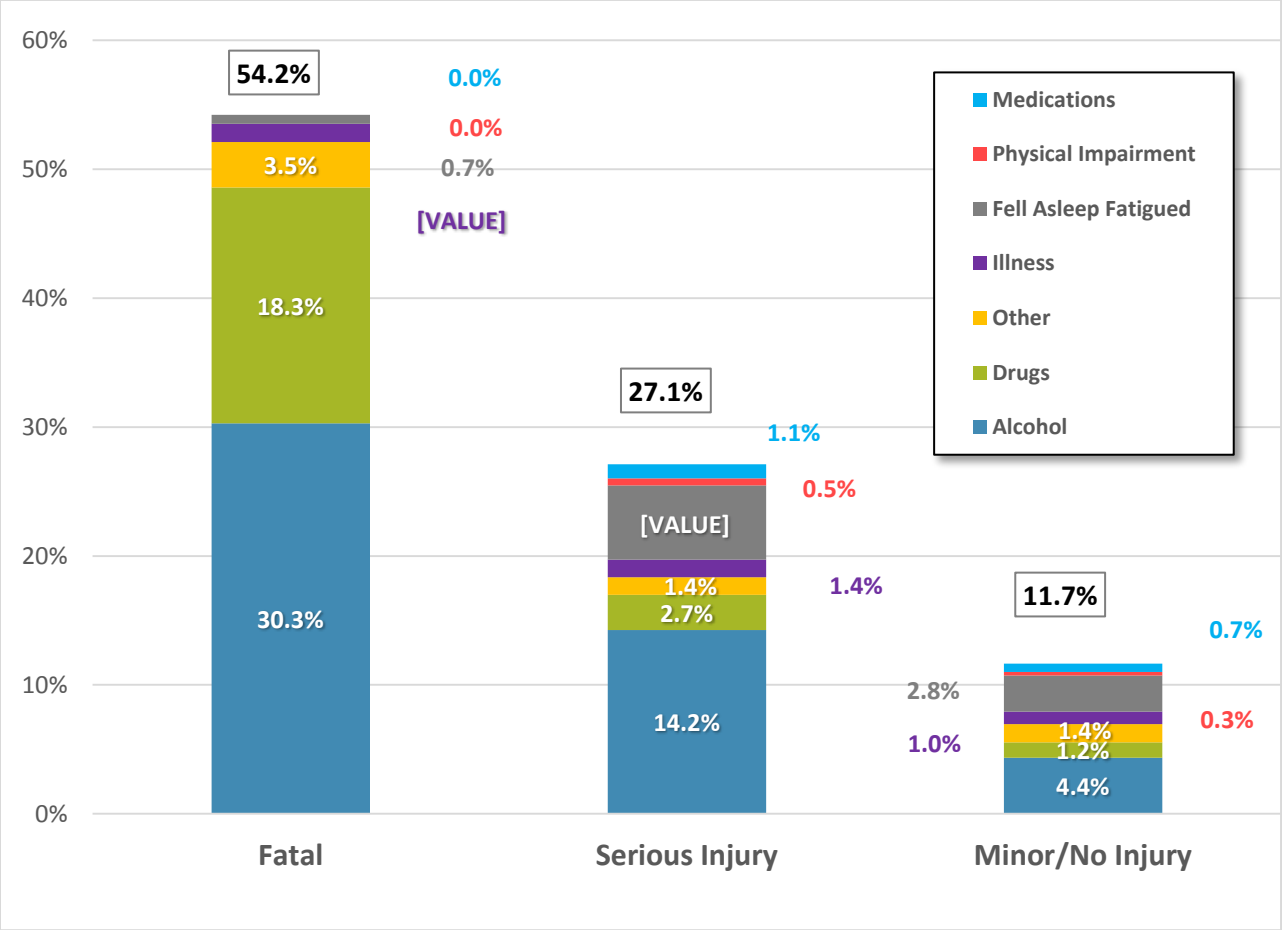


Figure 9: Unrestrained Occupants

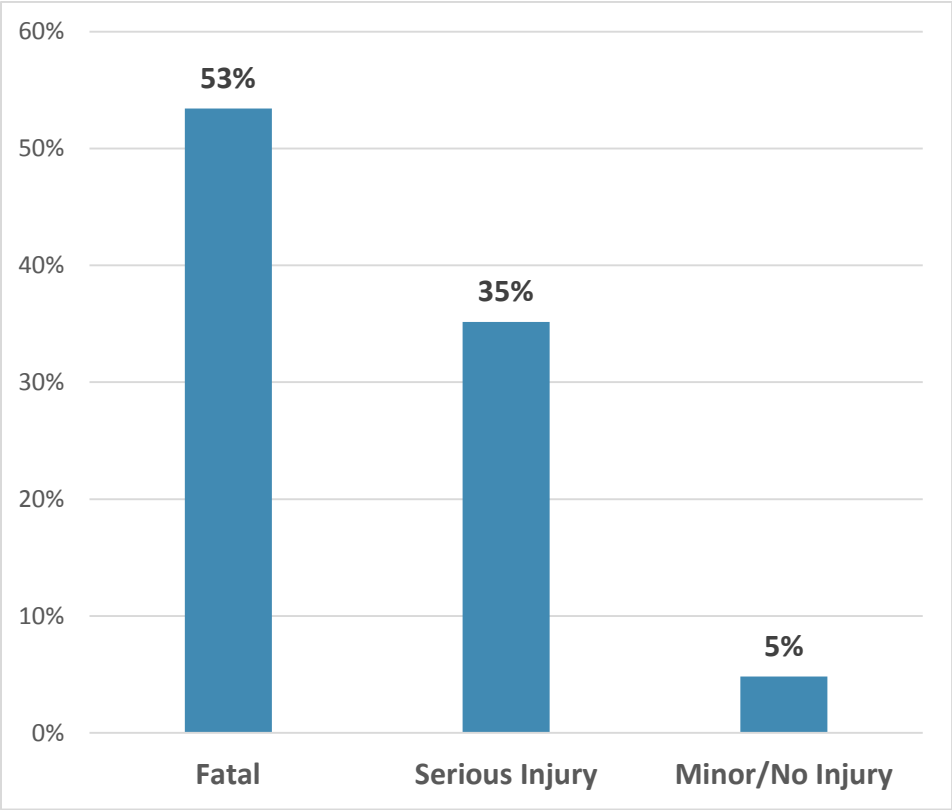


Figure 10: Crash by Light Condition and Injury Severity

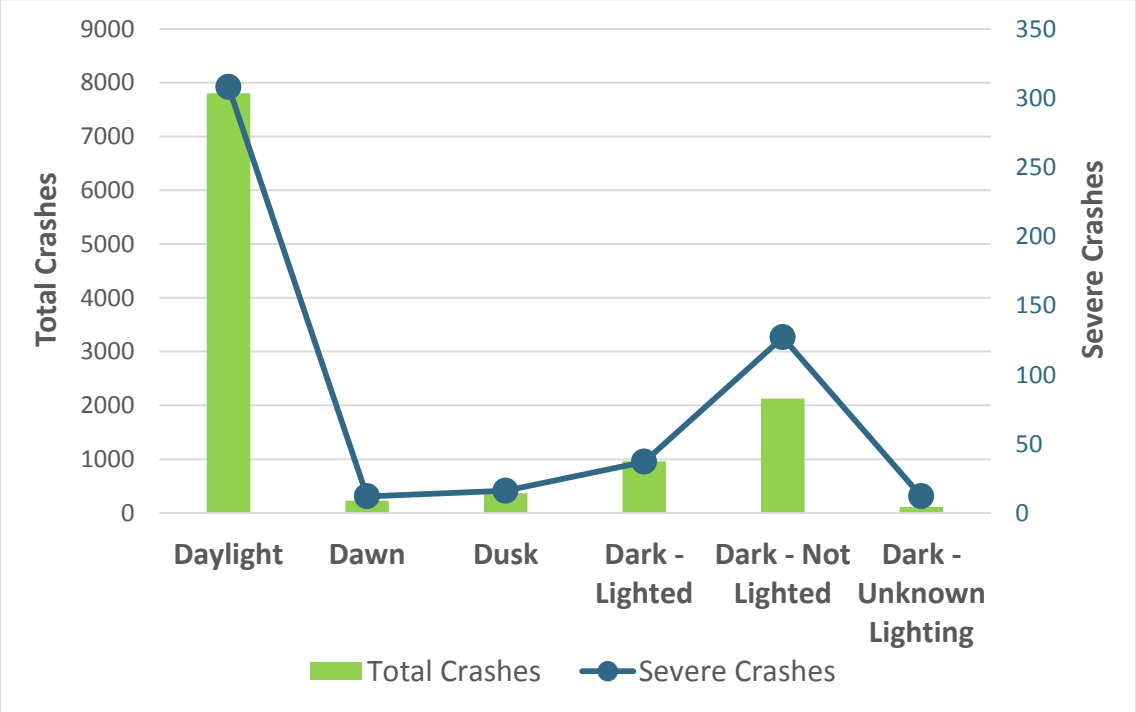


Figure 11: Drivers by Age Involved in Crashes

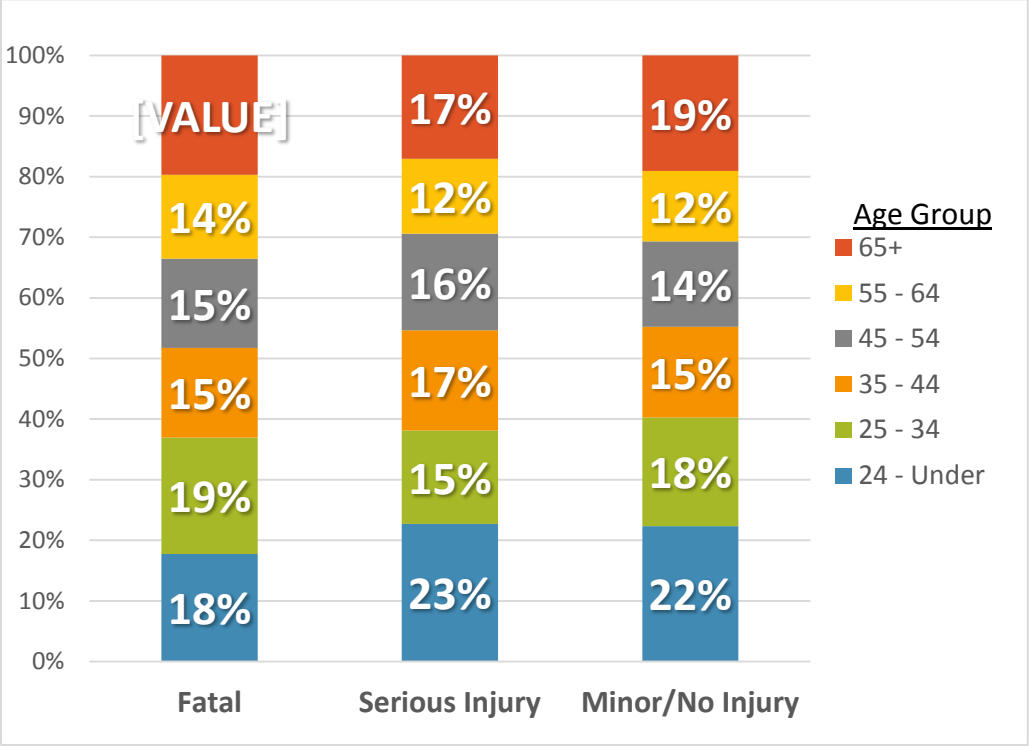


Figure 12: Crashes with At Least One Driver in Age Group

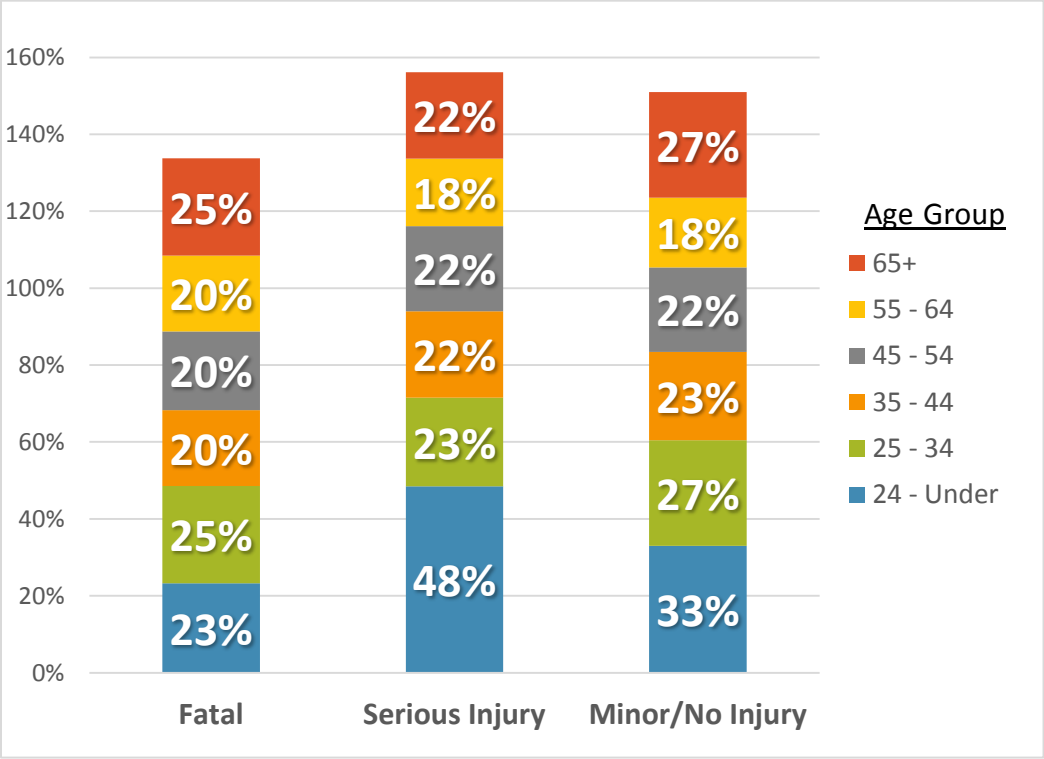
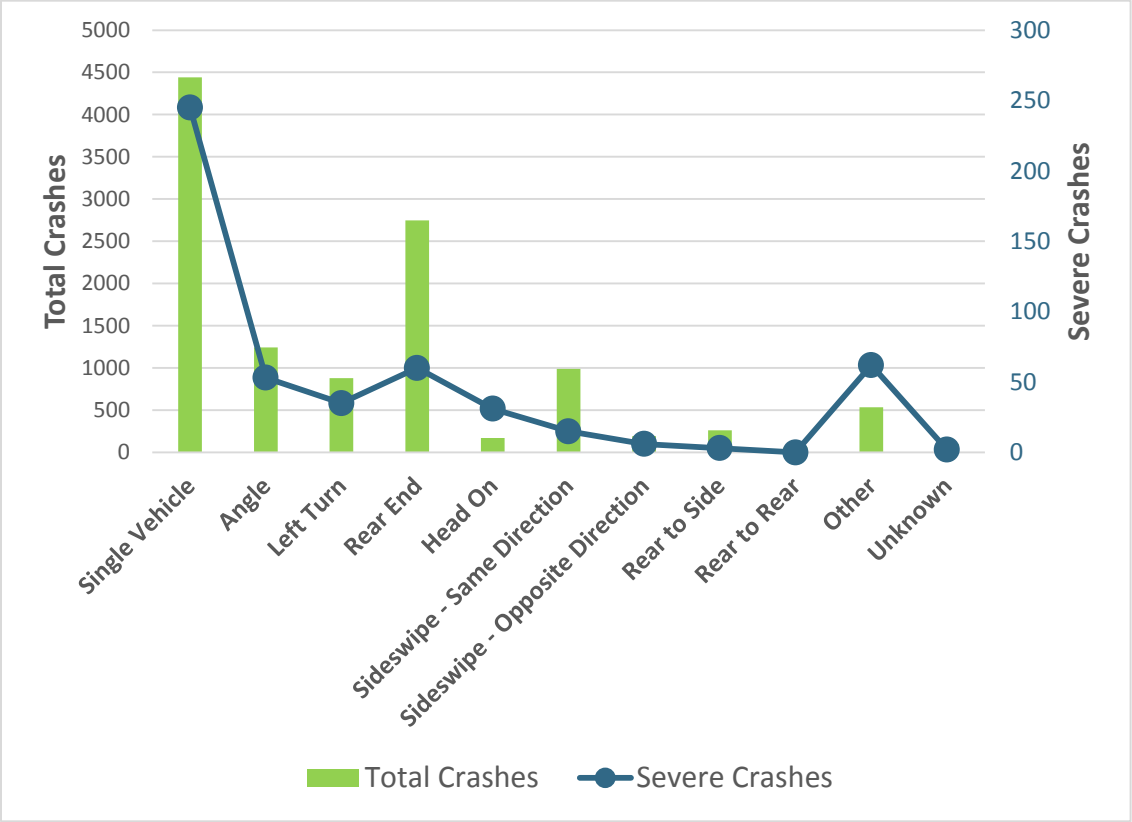


Figure 13: Crash by Collision Manner and Injury Severity



The maps in Figure 14 through Figure 25 show locations of all crashes, fatal and serious injury crashes, and pedestrian and bicycle crashes. Because ADOT crash data for 2016 became available late in this study, it was added to the crash maps, which include six years of crash data (2011-2016).

Figure 14: 2011-2016 All Crash Locations - Santa Cruz County

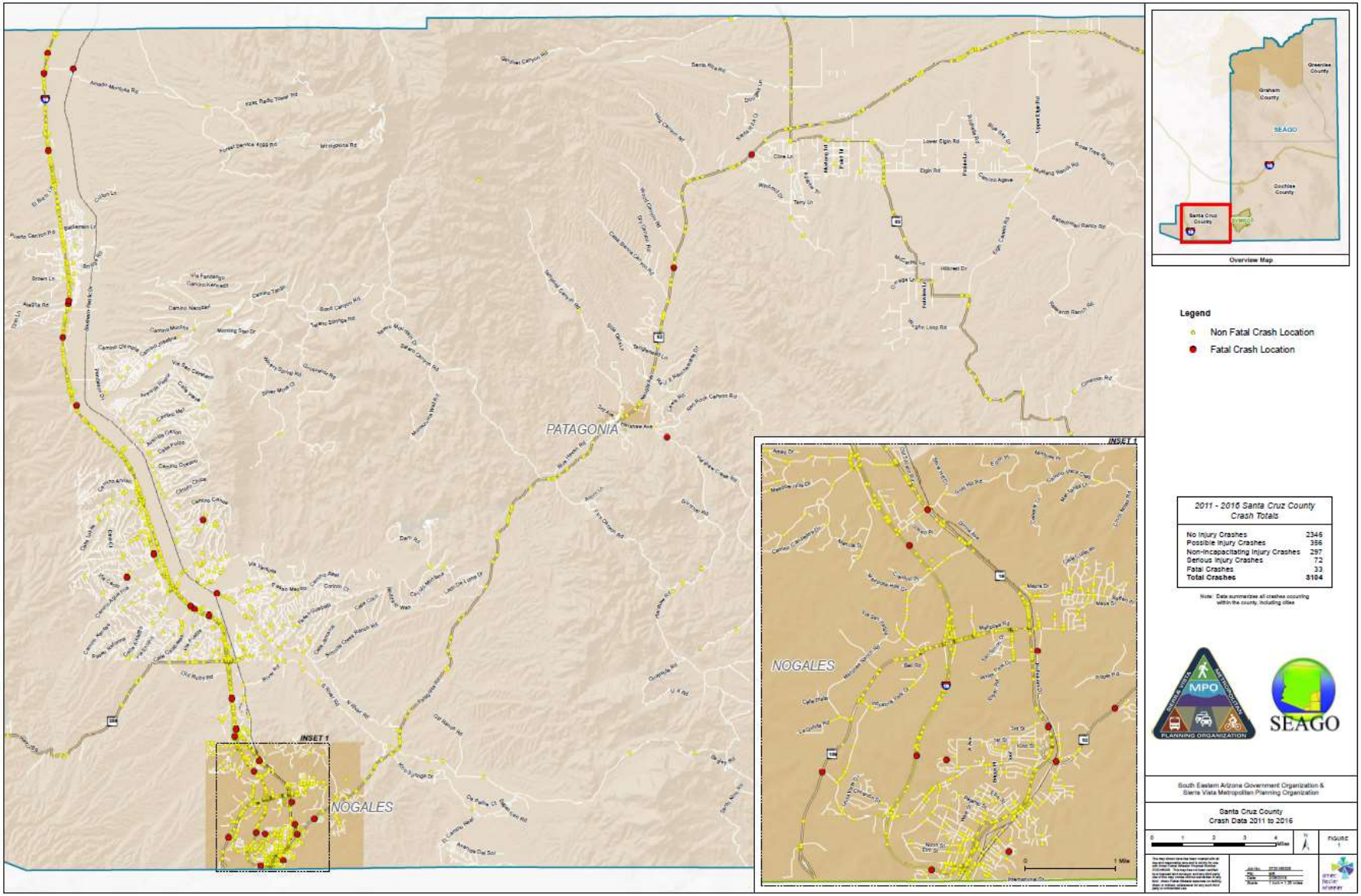


Figure 15: 2011-2016 Fatal and Serious Injury Crash Locations - Santa Cruz County

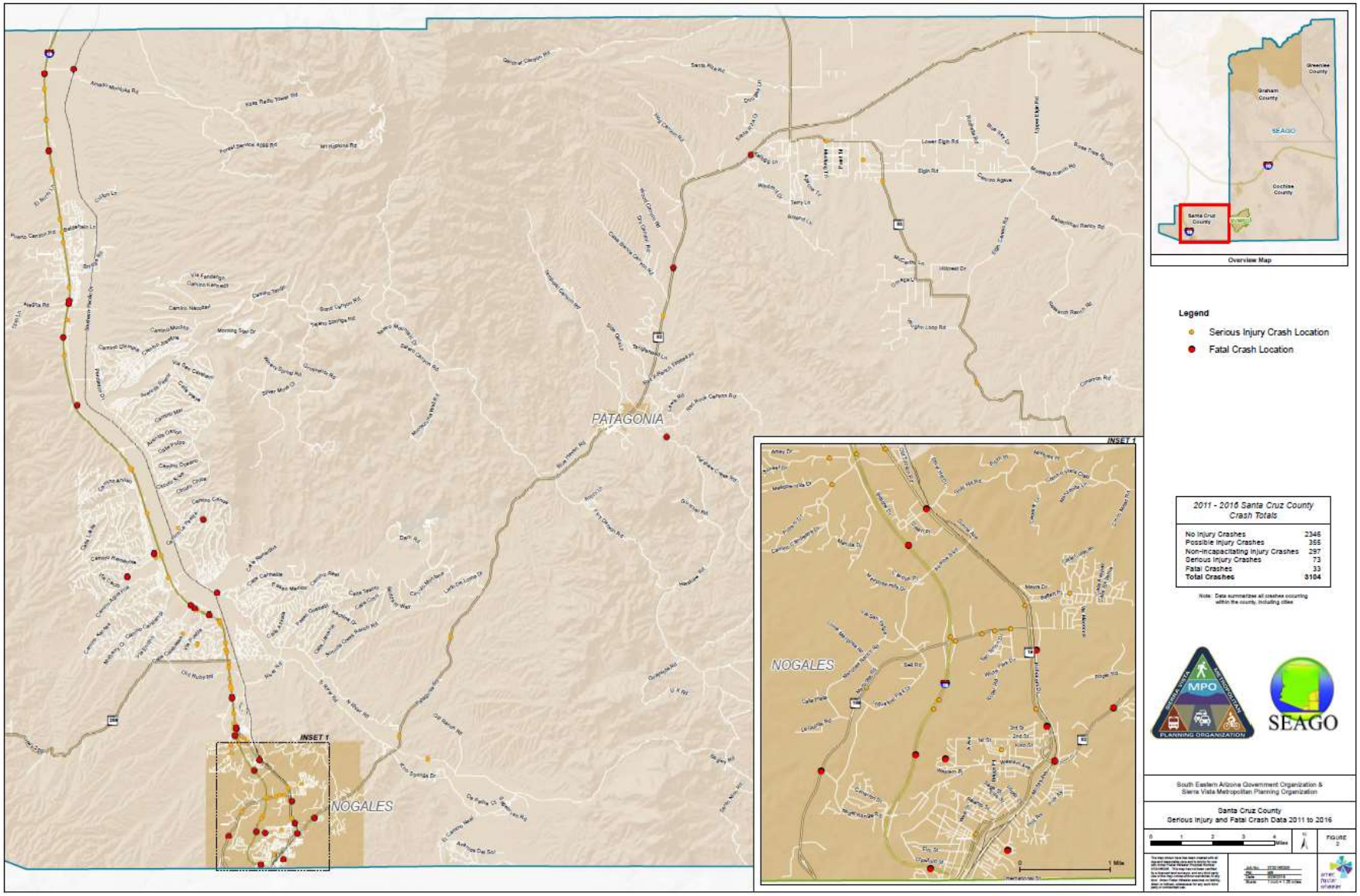


Figure 16: 2011-2016 Pedestrian and Bicycle Crash Locations - Santa Cruz County

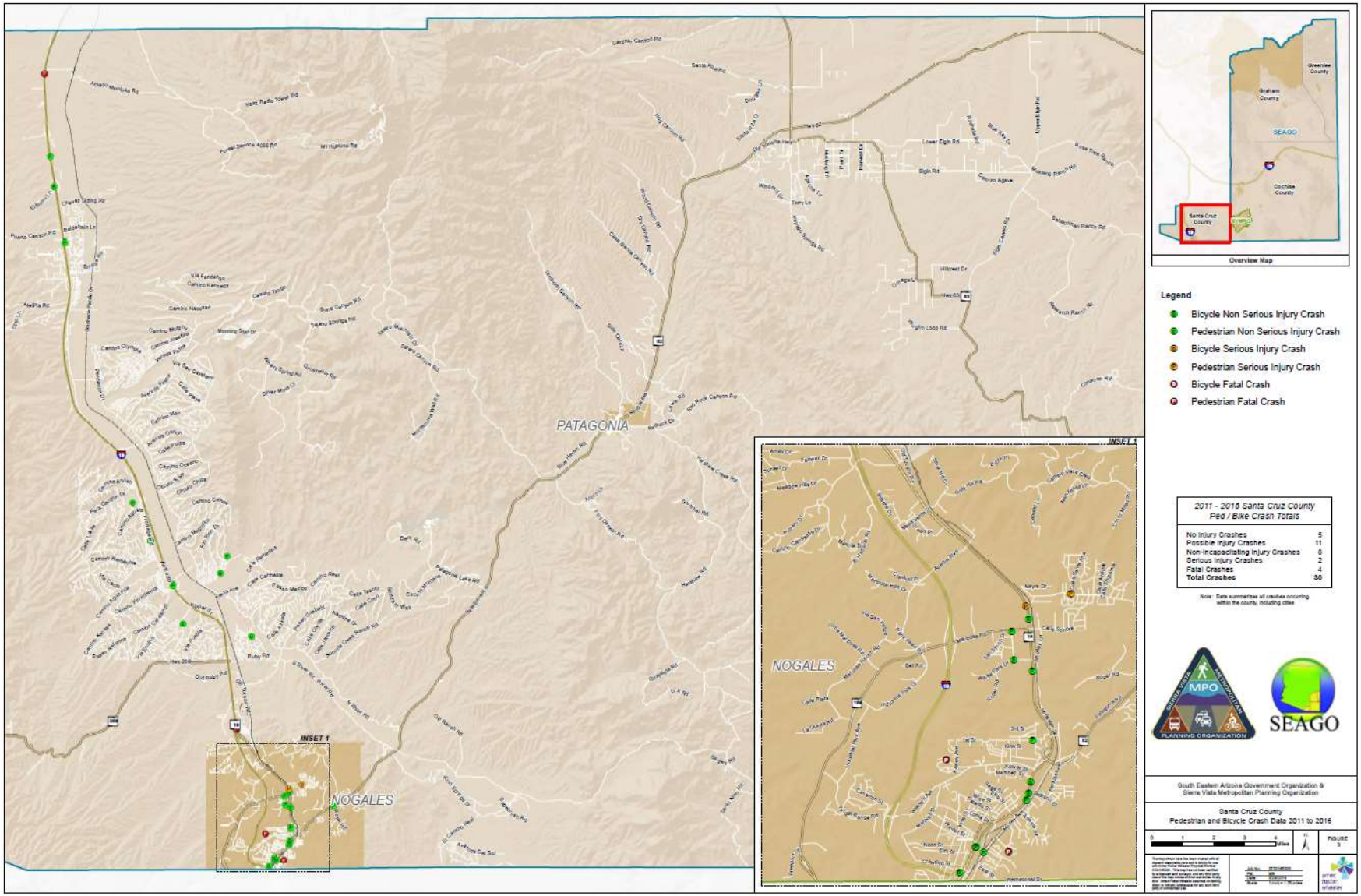


Figure 17: 2011-2016 All Crash Locations – Sierra Vista

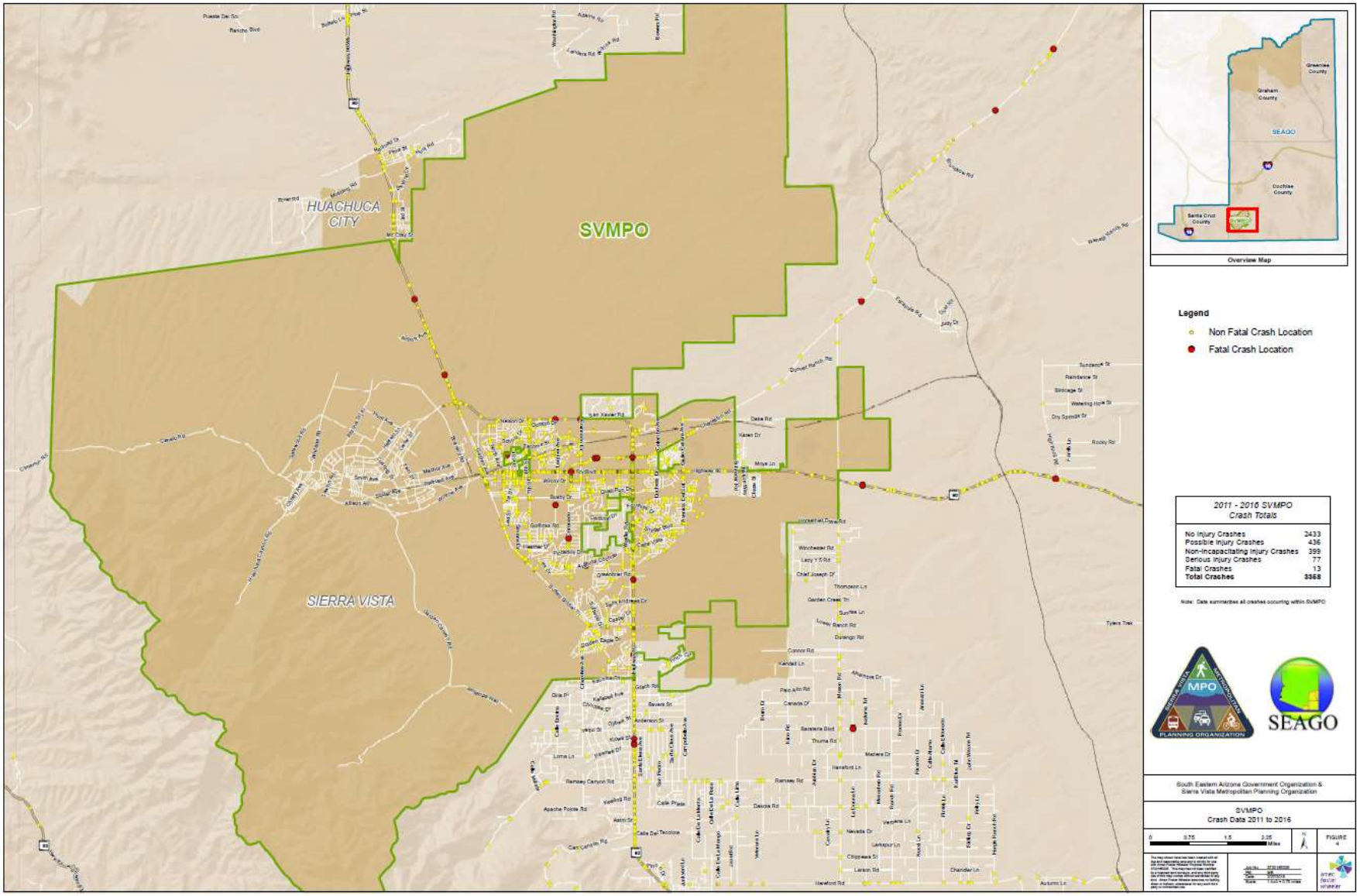


Figure 18: 2011-2016 Fatal and Serious Injury Crash Locations – Sierra Vista

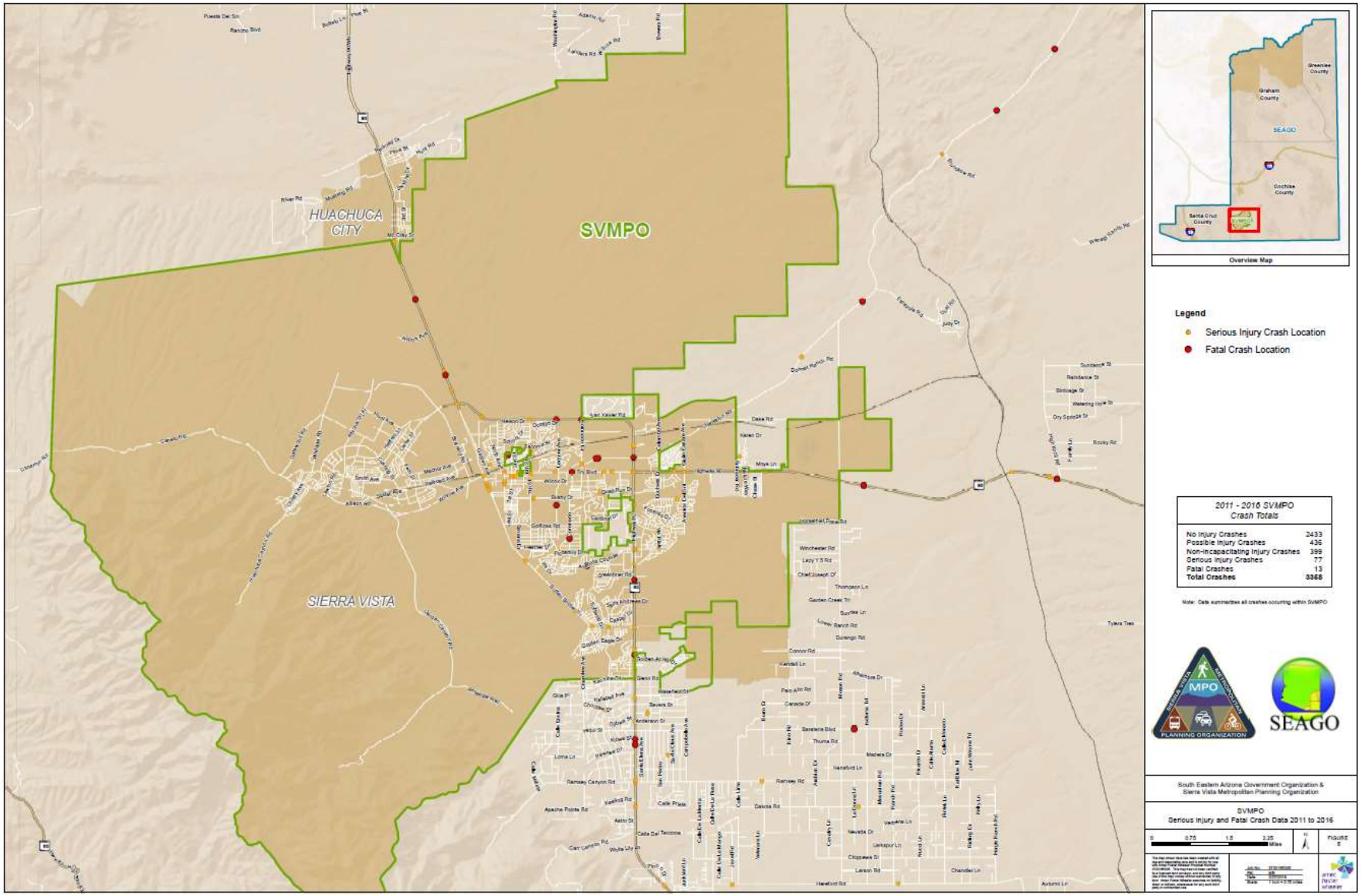


Figure 19: 2011-2016 Pedestrian and Bicycle Crash Locations – Sierra Vista

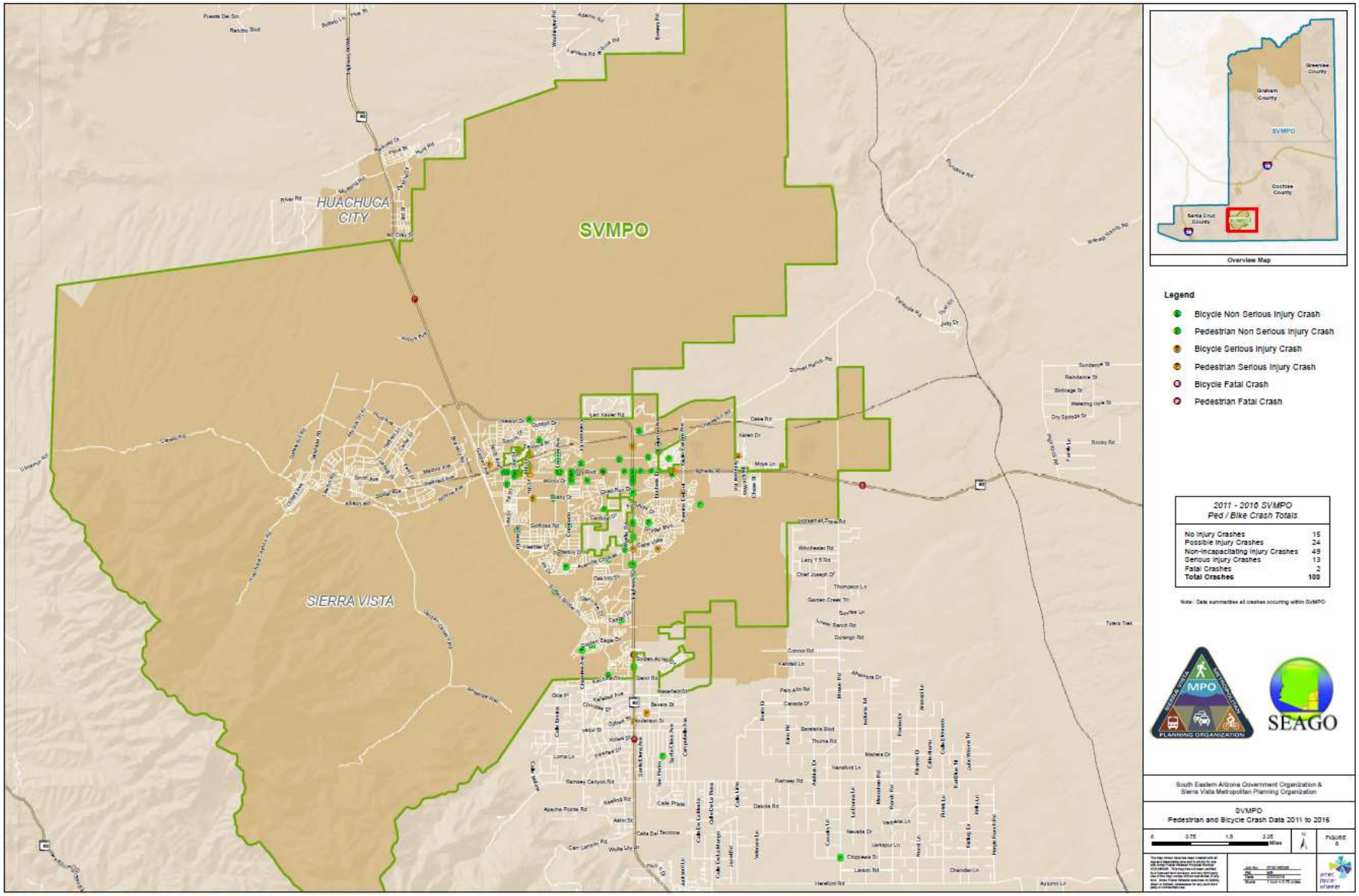


Figure 20: 2011-2016 All Crash Locations – Cochise County

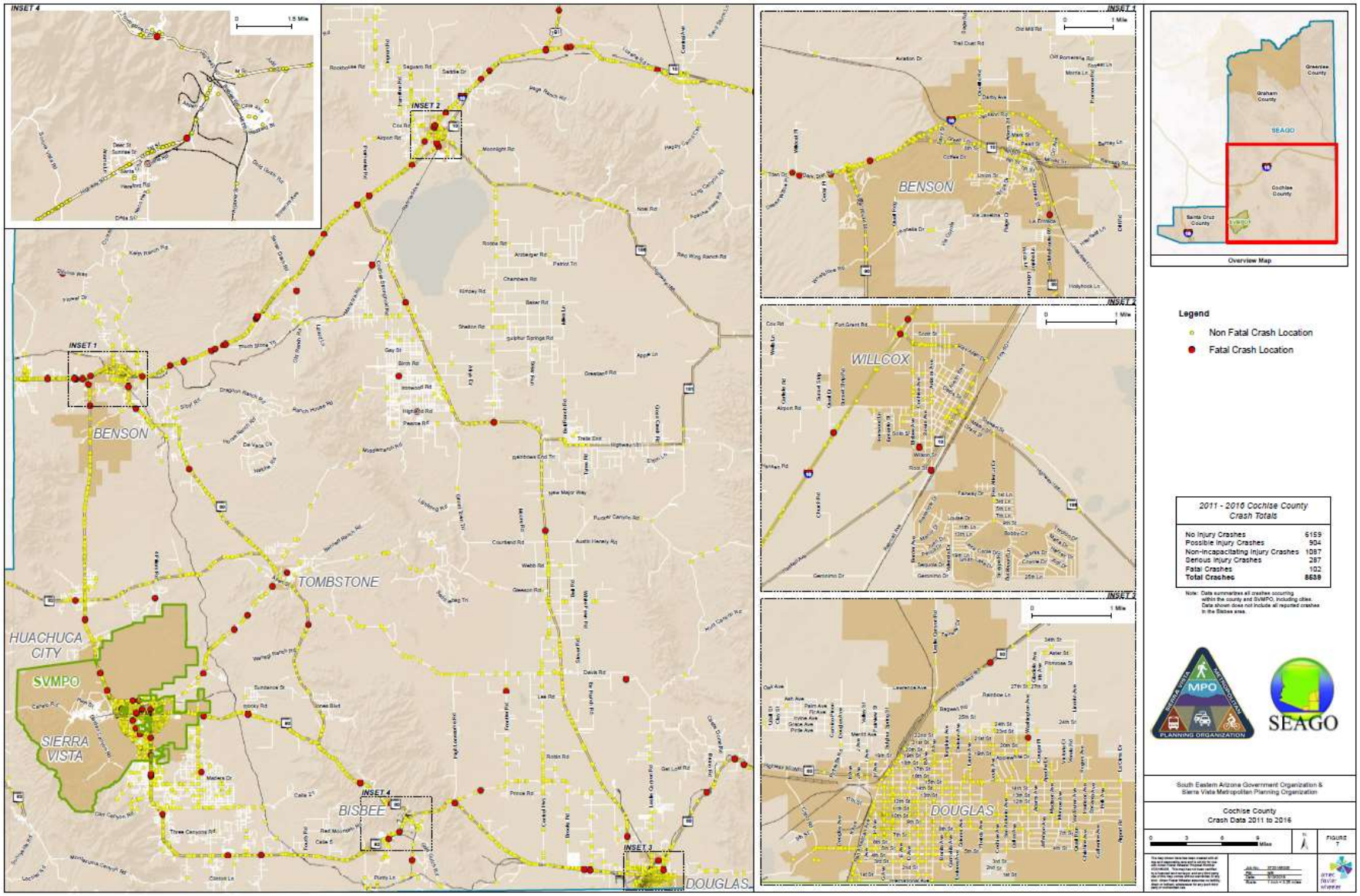


Figure 21: 2011-2016 Fatal and Serious Injury Crash Locations – Cochise County

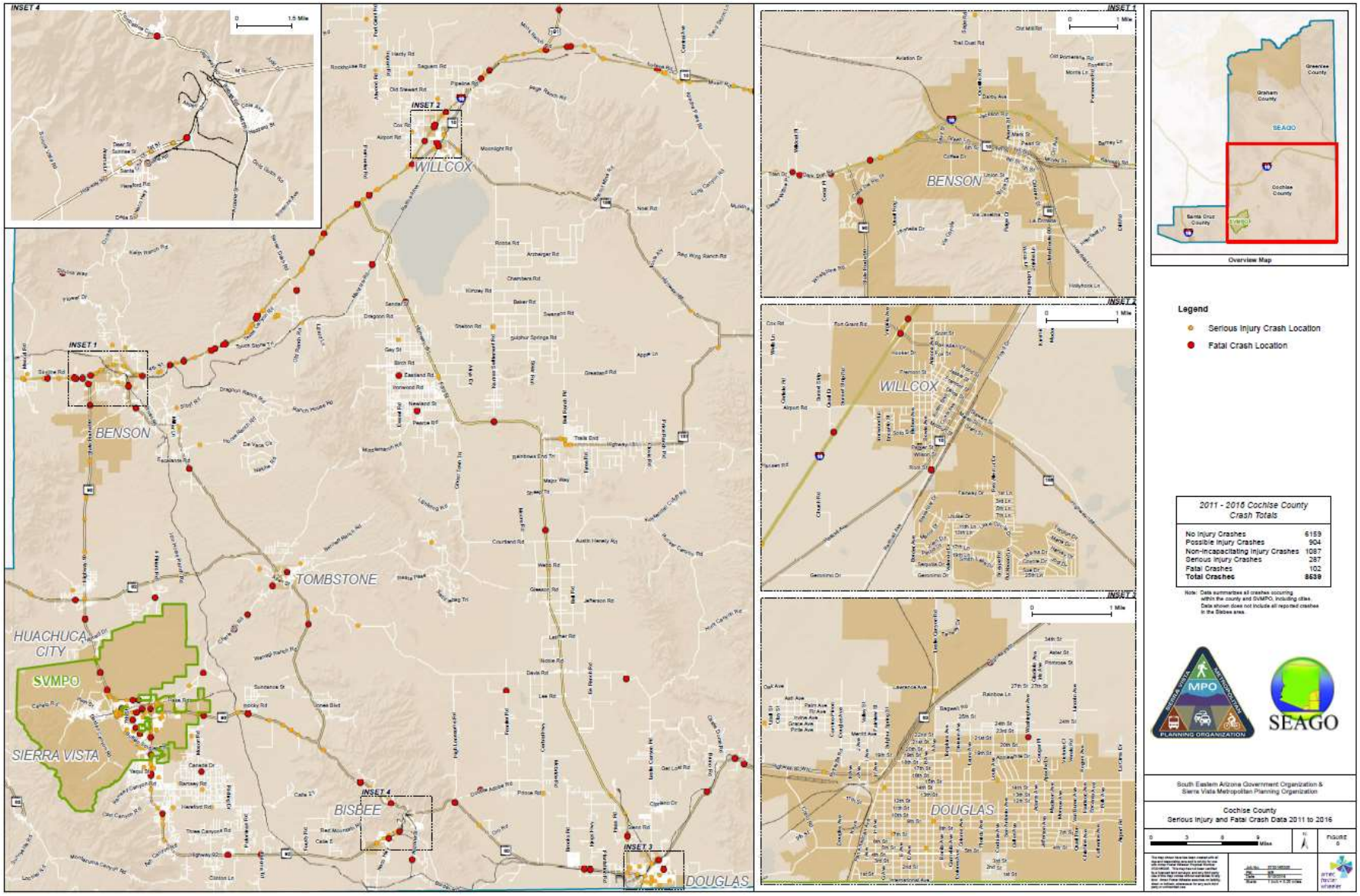


Figure 22: 2011-2016 Pedestrian and Bicycle Crash Locations – Cochise County

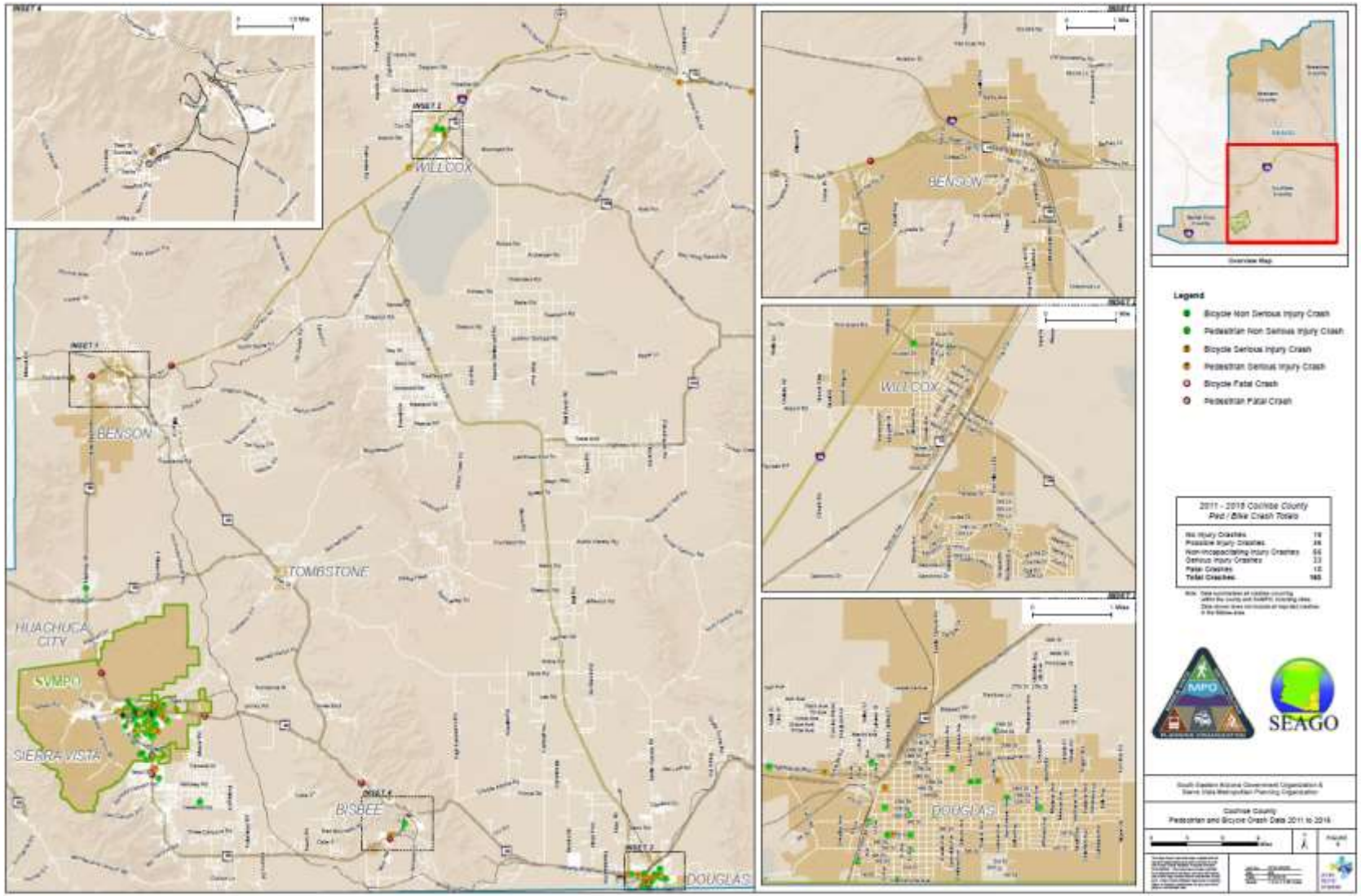


Figure 23: 2011-2016 All Crash Locations – Graham and Greenlee Counties

Figure 24: 2011-2016 Fatal and Serious Injury Crash Locations – Graham and Greenlee Counties

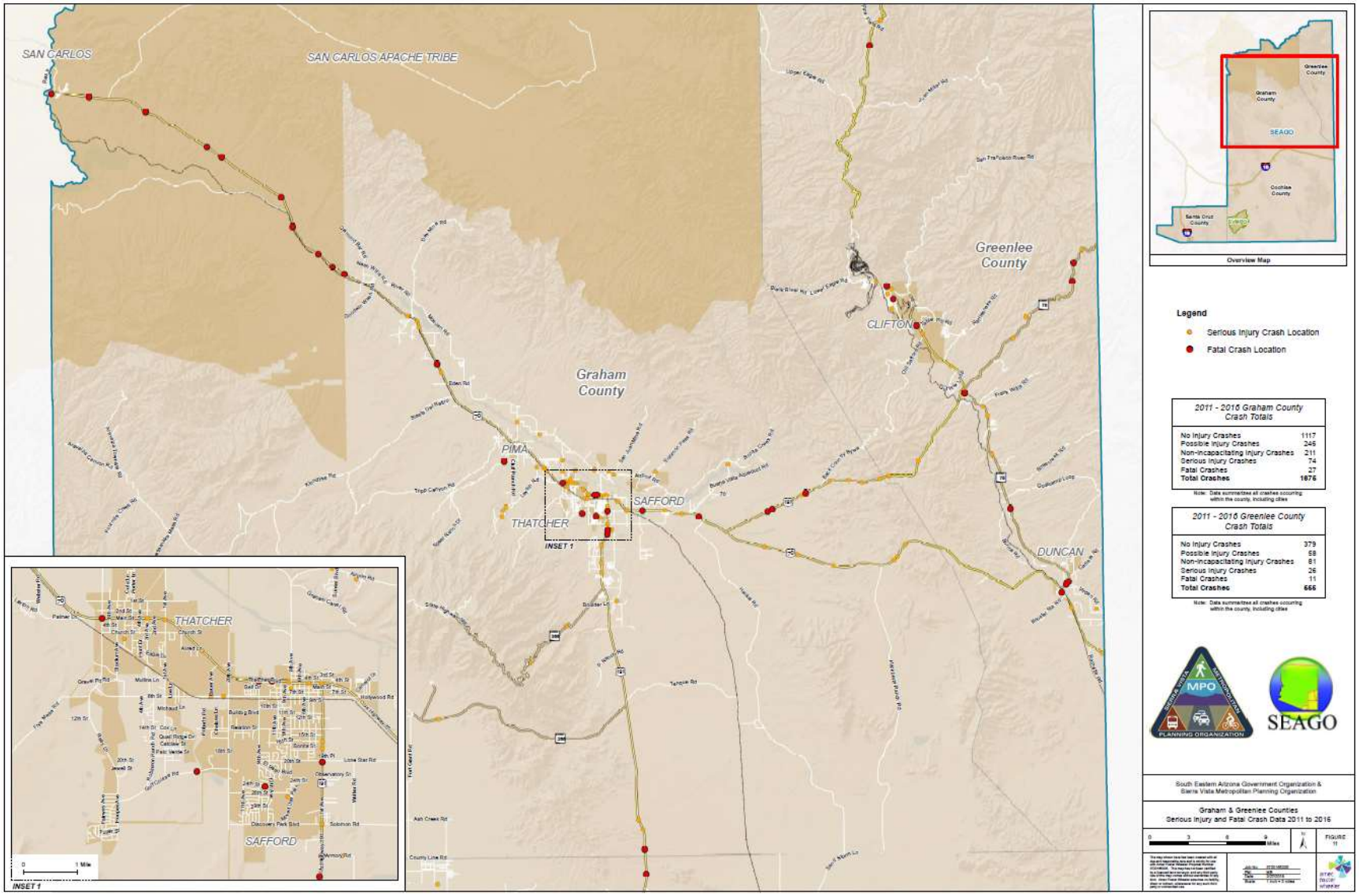
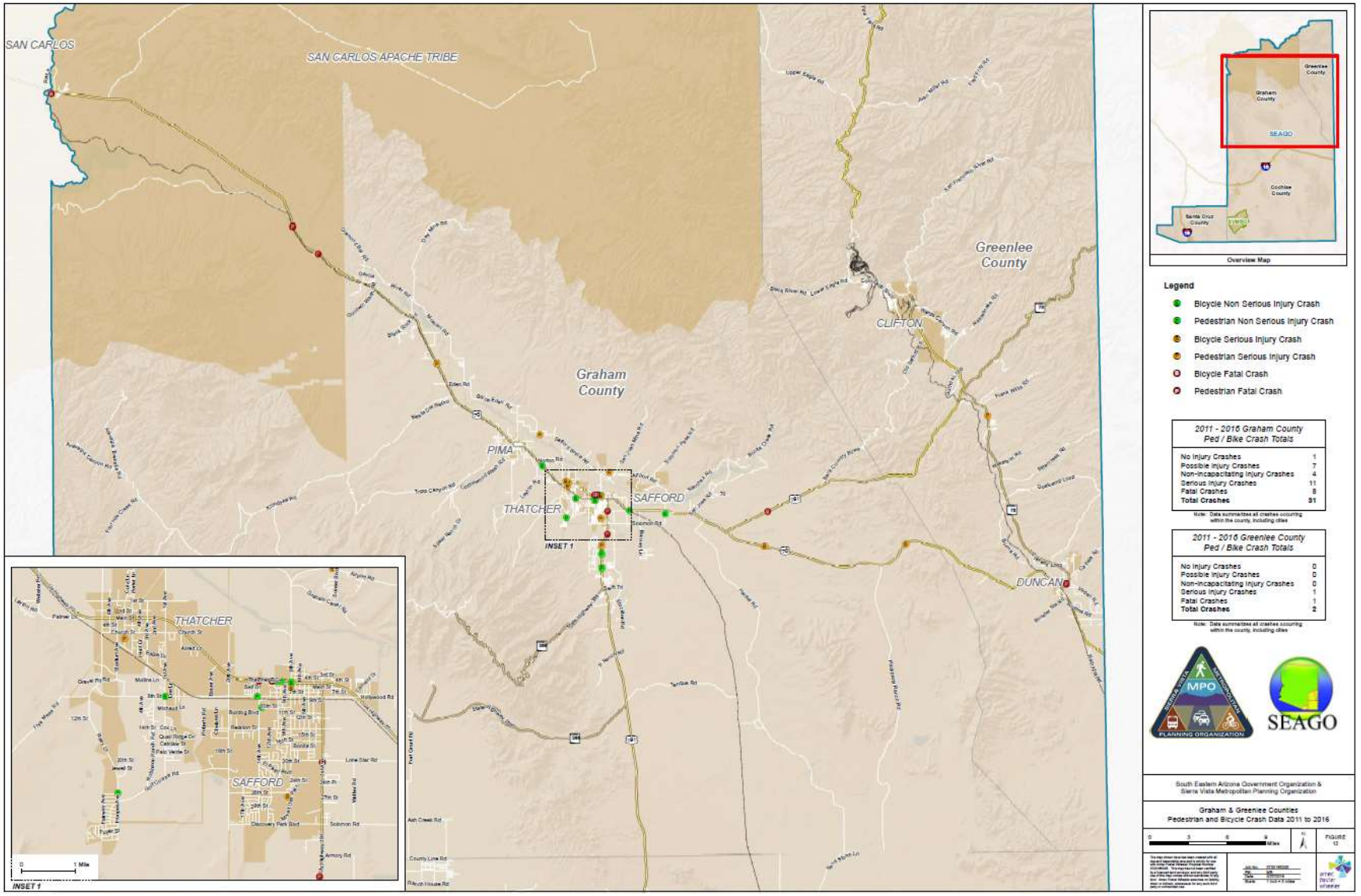


Figure 25: 2011-2016 Pedestrian and Bicycle Crash Locations – Graham and Greenlee Counties



Transportation Safety Resources

Available Programs

Several local and state safety programs are available to SEAGO/SVMPO and member agencies. The following programs are intended to be a resource to allow collaboration among the various agencies across the region regarding safety strategies.

National Highway Traffic Safety Administration (NHTSA) "5 to Drive" Campaign

The "5 to Drive" campaign encourages parents to visit www.safercar.gov/parents/teendriving and discuss with their teens one safety topic each day during the October national teen driver safety week. The "5 to Drive" campaign topics are:

1. No cell phone use or texting while driving,
2. No extra passengers,
3. No speeding,
4. No alcohol, and
5. No driving or riding without a seat belt.

The list is designed to counteract poor driving decisions that have contributed heavily to the high death rate among teen drivers

Arizona Bicycle and Pedestrian Program

ADOT maintains a website dedicated to providing bicycling and walking information. Resources such as maps, safety tips, organizations/programs, commuting information, walking and biking to school resources, as well as the Statewide Bicycle and Pedestrian Plan, are included at this website. More information can be found at the ADOT Bicycle and Pedestrian Program webpage (http://www.azbikeped.org/).

Arizona Road Safety Assessment Program

ADOT manages the Arizona Road Safety Assessment (RSA) Program, a free service to public agencies in Arizona. An RSA is a formal examination of user safety of a roadway by an independent multidisciplinary audit team. The RSA team identifies safety issues and appropriate countermeasures for the specific location. (https://www.azdot.gov/business/engineering-and-construction/traffic/traffic-safety/roadsafety-assessments).

Arizona Strategic Highway Safety Plan

The Arizona SHSP was developed through a data-driven, collaborative approach among Arizona's safety stakeholders. The SHSP represents the Arizona state safety goal statement and identifies the Emphasis Areas that the state will focus on to achieve its goal. The SHSP is an overarching strategic statewide safety document to guide safety planning and programming processes; facilitate implementation of recommended safety strategies and action steps or countermeasures through existing plans and programs; and modify current planning processes over time to adopt and institutionalize a change in Arizona's transportation safety culture. The plan can be accessed through the Arizona SHSP webpage (https://azdot.gov/about/transportation-safety/arizona-strategic-highwaysafety-plan).

Funding Sources

The Highway Safety Improvement Program (HSIP) is a core federal aid program administered by ADOT with Federal Highway Administration (FHWA) oversight. The goal of the program is to achieve a significant reduction in traffic fatalities and serious injuries on all public roads. Use of HSIP funding requires a data-driven, strategic, and performance-based approach to improving highway safety on all public roads. The federal legislation states that "a highway safety improvement project is any strategy, activity, or project on a public road that is consistent with the data-driven State Strategic Highway Safety Plan (SHSP) and corrects or improves a hazardous road location or feature or addresses a highway safety problem." Candidate projects submitted by local agencies for HSIP funding can address spot locations or systemic treatments. Potential projects are prioritized based on Benefit/Cost ratio, potential crash reduction for fatal and incapacitating injury crashes, and connection with the state's SHSP emphasis areas. With passage of the FAST Act, HSIP funds can no longer be used for non-infrastructure projects (e.g., education, enforcement, etc.).

Beginning with fiscal year 2019 call for HSIP projects, sub-allocations of HSIP funds to COGs and MPOs was discontinued. All agencies applications must now follow a competitive process for funding allocations through fiscal year 2024. The SEAGO/SVMPO SHSP has positioned SEAGO and SVMPO and its member agencies to better compete for the statewide HSIP funds by identifying and justifying safety projects through a data-driven process.

The Fixing America's Surface Transportation (FAST) Act replaced the MAP-21 Transportation Alternatives Program (TAP) with a set-aside of Surface Transportation Block Grant (STBG) program funding for transportation alternatives. These set-aside funds include all projects and activities that were previously eligible under TAP, encompassing a variety of smaller-scale transportation projects such as pedestrian and bicycle facilities, recreational trails, and safe routes to school projects. For example, STBG funds could be used for installing a pedestrian hybrid beacon, or HAWK, at a pedestrian crossing experiencing pedestrian crashes. Approximately $7,000,000 in transportation alternatives funding is available annually in Arizona for local agencies (excluding MAG and PAG regions, which have an additional set-aside). Similar to HSIP funding, STBG transportation alternatives funds will be allocated through a statewide competitive process.

The Governor's Office of Highway Safety (GOHS) administers NHTSA funding through grant applications. Typical projects include law enforcement activities such as targeted DUI checkpoints, as well as modernization of crash data collection systems. Local agencies have utilized GOHS funding to purchase portable speed feedback trailers to rotate placement on streets experiencing speed-related crashes. GOHS funds have also been used in educational efforts, for example, to conduct mock crash demonstrations at high schools during prom season. Annual funding available through GOHS is approximately $8,000,000 in Arizona.

The ADOT Railroad-Highway Grade Crossing Program administers approximately $2,300,000 annually for improving safety at public railroad crossings. A diagnostic review team consisting of representatives from ADOT, the Arizona Corporation Commission, FHWA, the Railroad and the Road

Sponsor (State, City, County, or Tribe) evaluates railroad crossings and develops a list of potential projects.

The High Risk Rural Road (HRRR) funding set-aside was eliminated in the 2012 Moving Ahead for Progress in the 21st Century Act (MAP-21) federal legislation. That set-aside has been replaced with a Special Rule that requires states with an increase in fatality rates on rural roads to obligate 200% of the state's 2009 HRRR funding amount, which was $1,800,000 in Arizona, meaning $3,600,000 of HSIP funds would be required to be used on HRRRs. The use of HRRR-related HSIP funding would become an option for the SEAGO member agencies if Arizona was found to have an increase in fatalities on rural roads over the most recent two years.

The Federal Transit Administration (FTA) Rural Transit Assistance Program (RTAP) provides funding for safety services, technical assistance projects and training for transit operators in rural areas. RTAP funding can be used to support four areas: training, technical assistance, research and related support services.

The ADOT Section 5311 Rural Public Transportation Program provides grants to fund transit services in rural parts of the state to increase mobility access to health care, shopping, employment centers and other community points of interest. Mobility can be a concern in rural areas that cover large areas or have limited pedestrian and bicycle facilities. Funding is provided to counties, cities, towns and Native American tribes to operate transit systems at the local level through an application process. The goal of the program is to support a statewide, multimodal transportation system.

The USDOT Better Utilizing Investments to Leverage Development (BUILD) Transportation Discretionary Grants program replaced the Transportation Investment Generating Economic Recovery (TIGER) grant program. BUILD Transportation grants are for investments in surface transportation infrastructure and are to be awarded on a competitive basis for projects that will have a significant local or regional impact. BUILD funding can support roads, bridges, transit, rail, ports or intermodal transportation. Projects for BUILD will be evaluated based on criteria that include safety, economic competitiveness, quality of life, environmental protection, state of good repair, innovation, partnership, and additional non-Federal revenue for future transportation infrastructure investments. USDOT intends to award a greater share of BUILD Transportation grant funding to projects located in rural areas that align well with the selection criteria.

Transportation Safety Vision and Goal

The FHWA vision for transportation safety is "Towards Zero Deaths". This campaign is a data driven effort to reduce fatal crashes and to create a traffic safety culture across the country. The 2014 Arizona SHSP further expanded on this vision by adopting "Towards Zero Deaths by Reducing Crashes for a Safer Arizona". The safety goal that was established to accomplish this statewide vision is to reduce fatalities and serious injuries by 3-7% over the next 5 years (2014-2018).

A SEAGO specific safety vision and goal was voted on and approved by the SEAGO TAC. The regional vision and goal were developed to be consistent with the statewide vision and goal.

The SEAGO/SVMPO safety vision is:

Stay Alive, Focus on the Drive

The goal for transportation safety is:

Improve the Safety of Our Roads…Let's Reduce Fatalities and Severe Injuries in the Next 5 Years

Emphasis Areas and Safety Strategies

Emphasis Areas

The 2014 Arizona SHSP identifies 12 emphasis areas that comprise the top crash categories for serious injury and fatal crashes across the state. The statewide emphasis areas are

1. Speeding and Aggressive driving
2. Impaired driving
3. Occupant protection
4. Motorcycles
5. Distracted Driving
6. Roadway Infrastructure and Operations
7. Age Related
8. Heavy Vehicles
9. Non-Motorized users
10. Natural Risks
11. Traffic incident management
12. Interjurisdictional

The first five listed emphasis areas are the top focus for the state, due to the high number of fatal and serious injury crashes or due to an upward trend in fatal and serious injury crashes that relate to those crash categories.

The SEAGO TAC selected 6 of the 12 statewide emphasis areas for the region to focus on to improve traffic safety. SVMPO identified an additional emphasis area, Pedestrians, in addition to the 6 SEAGO emphasis areas, due to the higher frequency of pedestrian fatalities in Sierra Vista (22% of fatal crashes were pedestrians). Table 3 shows these regional emphasis areas and gives the regional and statewide percentages of fatal crashes for each.

Table 3: Statewide Emphasis Areas vs. SEAGO/SVMPO Region

State Emphasis Areas	SEAGO/SVMPO Fatal Crashes	State Fatal Crashes
Lane Departure	**61%**	**45%**
Occupant Protection	**53%**	**45%**
Speeding	**39%**	**38%**
Impaired Driving	**36%**	**34%**
Young Driver Under 25	**25%**	**28%**
Distracted Driving	**5%**	**15%**
Pedestrian (SVMPO)	**22% (SVMPO)**	**18%**

Safety Strategies

The following safety strategies were developed as a response to the fatal and serious injury crashes related to the regional emphasis areas. The safety strategies follow the Four E's of safety: engineering, enforcement, education and emergency services. This list is provided to give ideas of potential safety improvements to target the emphasis areas; however, it is not intended to be a comprehensive list of potential solutions and project owners are encouraged to explore alternative solutions as needed.

Lane Departure

Engineering

- Use traffic control devices to better delineate the edge of the roadway (i.e. signs, raised pavement markers, edgelines, rumble strips)
- Construct roadway infrastructure improvements (e.g. paved/graded shoulders, gradual side slopes, Safety Edge, etc.)
- Install guardrail
- Proactively address potential sight distance issues during the development review process
- Identify and systematically re-configure "flying y" intersections

Education

- Increase public education on corrective roadway departure driving techniques

Occupant Protection

Enforcement

- Conduct high-visibility, saturated seat belt enforcement campaigns
- Consider adopting a primary seat belt law.

Education

- Conduct seat belt education events for children
- Provide child protection seat distribution programs coupled with high-profile inspection events/clinics utilizing certified child protection seat technicians
- Train law-enforcement personnel to check for proper child restraint use during all motorist encounters

Speeding

Enforcement

- Targeted enforcement in school zones and locations with speeding related crashes

Engineering

- Install speed feedback signs
- Install traffic calming to reduce speeds
- Reduce default speeds on unpaved roads to 45 mph

Education

- Launch NHTSA's "5 To Drive" campaign in area high schools
- Coordinate with the health department, medical facilities, and schools to strengthen driver education

Impaired Driving

Engineering

- Implement wrong-way detection systems to reduce wrong-way crashes on freeways

Education

- Improve public awareness of and access to alternate forms of transportation
- Partner with employers to suggest policies and procedures aimed at reducing impaired driving by their employees
- Develop materials for educating target groups for impaired driving including mass-media campaigns on DUI dangers and penalties
- Utilize Dynamic Message Signs for impaired driving educational messages

Enforcement

- Conduct high visibility DUI saturation patrols
- Promote policies and practices that result in the imposition of meaningful penalties for impaired-driving convictions

Young Drivers

Engineering

- Promote technology which monitors young driver behavior

Education

- Identify best practices for promoting and/or implementing Safe Driving pledge campaigns
- Strengthen driver education
- Promote stronger parental/guardian education and engagement in the licensure process for young drivers
- Launch NHTSA's "5 To Drive" campaign in area high schools
- Develop outreach campaigns to young drivers and their families about safe driving behavior and programs (e.g. consider adopting the Tucson Police Department's Safe Teen Accident Reduction Training (START) Program)
- Develop public relations campaigns highlighting the risks of distracted driving
- Promote insurance and other incentives for safe driving
- Conduct mock crash demonstrations for high school students

Distracted Driving

Engineering

- Install centerline and shoulder rumble strips

Education

- Initiate/strengthen distracted driving school campaigns

Enforcement

- Implement local ordinances banning texting while driving

Pedestrians

Engineering (Planning/Policy):

- Encourage submittal of TIP projects that include safety elements for all modes by including safety as an explicit project evaluation criterion
- Promote the use of "best practices" that integrate safety analysis and design throughout the planning process
- Identify high risk locations for potential implementation of enhanced pedestrian crossings
- Develop and implement a Complete Streets program
- Develop a system to evaluate whether certain midblock and/or multi-lane uncontrolled crosswalks should remain, be improved, or be removed
- Develop an ADA Transition Plan

Engineering (Design/Implementation)

- Evaluate and install controlled pedestrian crossings, making use of pedestrian hybrid beacons and rectangular rapid flash beacons
- Install medians and pedestrian crossing islands
- Provide sidewalks, multi-use paths, and/or marked crosswalks
- Improve sight distance and/or visibility between motor vehicles and pedestrians
- Utilize the Safe Routes to School program
- Provide street lighting at uncontrolled arterial crosswalks

Education

- Develop/maintain training and public information pedestrian safety campaigns
- Increase pedestrian safety education for all roadway users
- Promote the use of pedestrian safety lights

Network Screening

Network screening of a roadway system is the data-driven analysis of the intersections and segments within the system. The process utilizes spatial analysis of crash data and is performed to determine high priority locations that may require safety improvements. Crashes are spatially attributed to individual intersections and segments to facilitate network analysis.

The goal of network screening is to develop a list of specific sites, for example, signalized intersections, that are ranked by priority. Priority is typically developed from crash frequency, rate, and severity, but other crash factors can be incorporated into the analysis as appropriate. This priority list is then used to plan and implement safety projects at individual locations or at the

system-wide level. The list can also serve as a resource for local governments when applying for state or federal traffic safety funding.

A Priority Index (PI) ranking was used to screen intersections and a combination of PI ranking and sliding window analysis was used to screen segments. The PI ranking system has been used successfully in Arizona by the Pima County DOT, Pima Association of Governments (PAG), and other MPOs and COGs to identify high-risk locations and is recommended for use by SEAGO and SVMPO based on:

- Minimal data requirements (traffic volumes and crash frequency and severity)
- Reliability in identifying high-risk locations
- Flexibility (agencies can adjust the importance of the 3 crash factors used to calculate the PI)

The PI rankings developed for this SHSP gave equal weighting to crash frequency, crash severity, and crash rate.

Intersection Priority Index Ranking

The resulting lists of signalized and unsignalized intersections are intended to provide SEAGO and SVMPO with a guideline in determining locations that may require a closer examination for safety improvements. Individual priority ranking lists were developed for signalized and unsignalized intersections. Traffic volumes were assigned to intersections using the ADOT, SEAGO, and SVMPO Transportation Data Management System databases. The top 20 signalized intersection priority ranking is shown in Table 4. The top 20 unsignalized intersection priority ranking is shown in Table 5. Following are explanations of the values in each column:

- ADT – average daily traffic volume, in vehicles per day, entering the intersection
- Crash Freq. – number of crashes at the intersection in 5 years (2011-2015)
- Crash Rate – crashes per million vehicles entering the intersection
- Severity Index – weighted score based on the distribution of the five crash severity subtotals at the intersection
- PI Rank – Priority Index rank based on composite score of crash frequency, crash rate, and severity index rank

A complete ranking list of signalized and unsignalized intersections for local and ADOT owned facilities is shown in Appendix B. It should be noted that the traffic control in place at the time of the analysis is what is shown in the rankings, and that some intersections were signalized after completion of the network screening and ranking, including Golf Links and Coronado, Busby and Coronado, and Campus and Columbo.

Table 4: Top 20 Signalized Intersections

Intersection	Owner	ADT	Crash Freq	Crash Rate	Severity Index	PI Rank
Fry Blvd & Carmichael Ave	Sierra Vista	11791	29	0.67	1.57	1
Martin Luther King Jr Pkwy & Coronado Dr	Sierra Vista	13108	31	0.65	1.51	2
Fry Blvd & 7th St	Sierra Vista	25974	64	0.68	1.38	3
Coronado Dr & Fry Blvd	Sierra Vista	29890	83	0.76	1.34	4
Charleston Rd & Colombo Ave	Sierra Vista	11442	22	0.53	1.67	5
Lenzner Ave & Fry Blvd	Sierra Vista	21917	47	0.59	1.32	6
Calle Portal & Fry Blvd	Sierra Vista	22016	49	0.61	1.20	7
Avenida Cochise & Coronado Dr	Sierra Vista	7911	17	0.59	1.47	8
Buffalo Soldier Trail & Fry Blvd	Sierra Vista	18072	25	0.38	1.39	9
Fry Blvd & Avenida Escuela	Sierra Vista	22626	49	0.59	1.16	10
Buffalo Soldier Trail & Avenida Cochise	Sierra Vista	15562	21	0.37	1.48	11
Buffalo Soldier Trail & Wilcox Dr	Sierra Vista	19147	25	0.36	1.43	12
Buffalo Soldier Trail & Saint Andrews Dr	Sierra Vista	10648	24	0.62	1.17	13
Willcox Dr & Coronado Dr	Sierra Vista	17158	26	0.42	1.31	14
A Ave & 10th St	Douglas	13334	21	0.43	1.33	15
Avenida Cochise & Oakmont Dr	Sierra Vista	12562	16	0.35	1.50	16
El Camino Real & Fry Blvd	Sierra Vista	24472	27	0.30	1.37	17
Willcox Dr & 7th St	Sierra Vista	20028	18	0.25	1.60	18
Buffalo Soldier Trail & Cherokee Ave	Sierra Vista	13218	14	0.29	1.63	19
Charleston Rd & Guilio Cesare Ave	Sierra Vista	12322	15	0.33	1.45	20

Table 5: Top 20 Unsignalized Intersections

Intersection	Owner	ADT	Crash Freq	Crash Rate	Severity Index	PI Rank
Avenida Del Sol & Desert Shadows Dr	Sierra Vista	2740	6	0.60	2.30	1
Campus Dr & Colombo Ave	Sierra Vista	5568	12	0.59	1.57	2
Coronado Dr & Tacoma St	Sierra Vista	6259	10	0.44	1.50	3
Lenzner Ave & Busby Dr	Sierra Vista	8610	10	0.32	1.78	4
9th St & A Ave	Douglas	7626	14	0.50	1.49	5
Maley St & Arizona Ave	Willcox	3100	7	0.62	1.43	6
Tacoma St & 7th St	Cochise County	8622	8	0.25	1.85	7
Wilcox Dr & Carmichael Ave	Sierra Vista	7950	16	0.55	1.19	8
8th St & 10th Ave	Safford	6970	7	0.28	1.71	9
8th Ave & Airport Rd	Graham County	4160	7	0.46	1.43	10
Golf Links Rd & Coronado Dr	Sierra Vista	5804	7	0.33	1.43	11
Norton Rd & Reay Ln	Graham County	1494	2	0.37	2.00	12
Snyder Blvd & Avenida Del Sol	Sierra Vista	6408	6	0.26	1.50	13
Arizona Ave & Railroad Ave	Cochise County	162	1	1.69	5.80	14
8th St & G Ave	Douglas	5454	9	0.45	1.11	15
Relation St & 20th Ave	Safford	11890	11	0.25	1.36	16
Crawford St & Sonoita Ave	Nogales	5819	8	0.38	1.13	17
Coronado Dr & Busby Dr	Sierra Vista	10418	11	0.29	1.09	18
Hoopes Ave & Golf Course Rd	Graham County	4889	6	0.34	1.17	19
Crawford St & Terrace Ave	Nogales	11068	11	0.27	1.00	20

Segment Priority Index Ranking

Priority Index values were generated for segments using a sliding window analysis. This analysis excluded intersection crashes to focus on crashes on just the segments. PI values were calculated for a window length of 0.3 miles. This window is incrementally moved by 0.1 miles along each corridor and crash frequency and severity are aggregated within each window. This is repeated until the entire road has been analyzed by 0.3-mile segments. The 0.3-mile-long windows with the highest PI values are the segments identified as high crash risk locations. Results of the segment analysis are highlighted in Figure 26 through Figure 29.

Driver Violation Network Screening

Heat maps were created for major driver violations associated with crashes; the violations included exceeding the lawful speed, speed too fast for conditions, impaired driving, and not wearing a seat belt. These heat maps, shown in Figure 30 through Figure 44 are useful for law enforcement to conduct targeted enforcement and education campaigns.

Figure 26: Sliding Window Analysis – Santa Cruz County

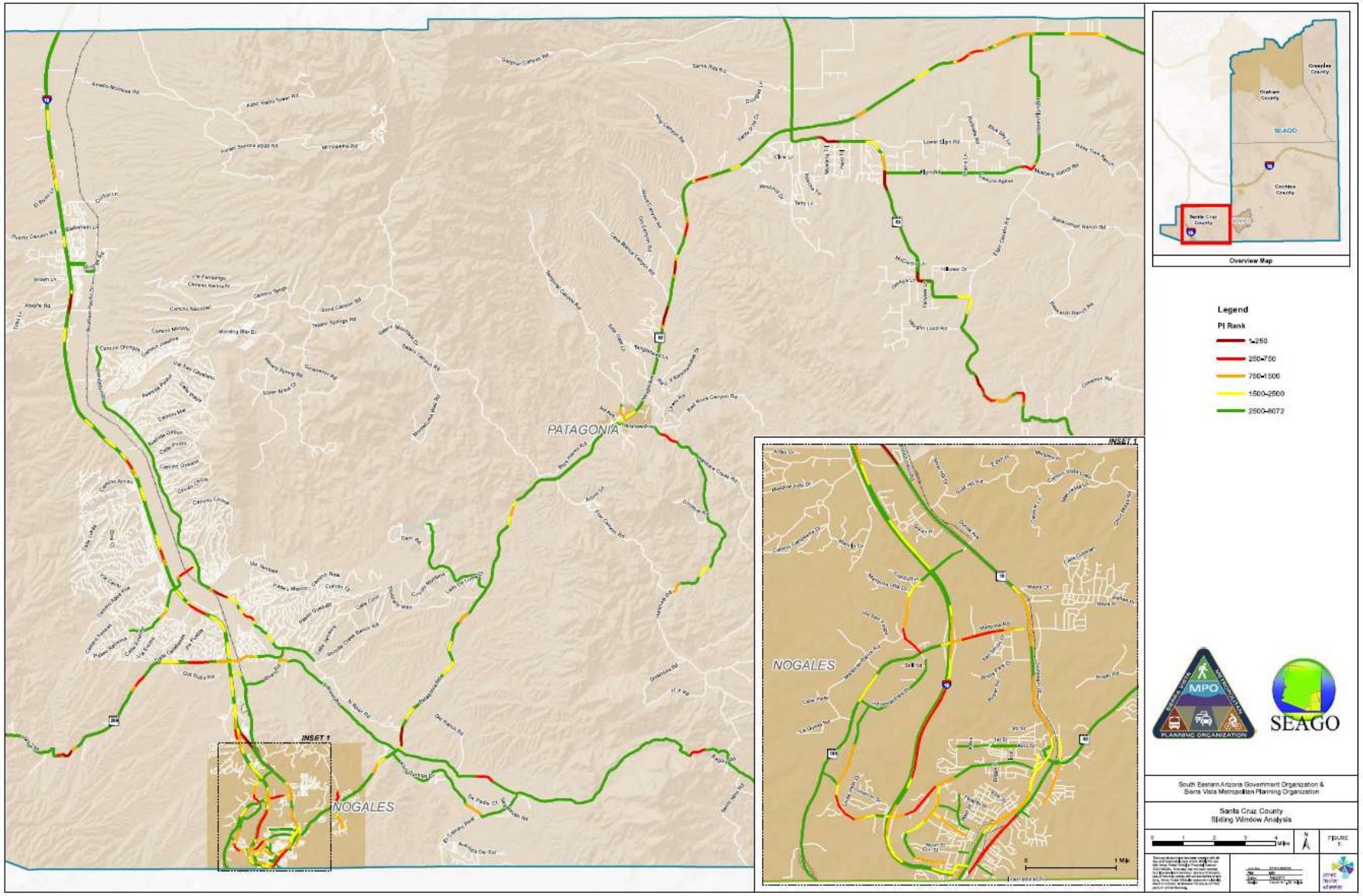


Figure 27: Sliding Window Analysis – Sierra Vista

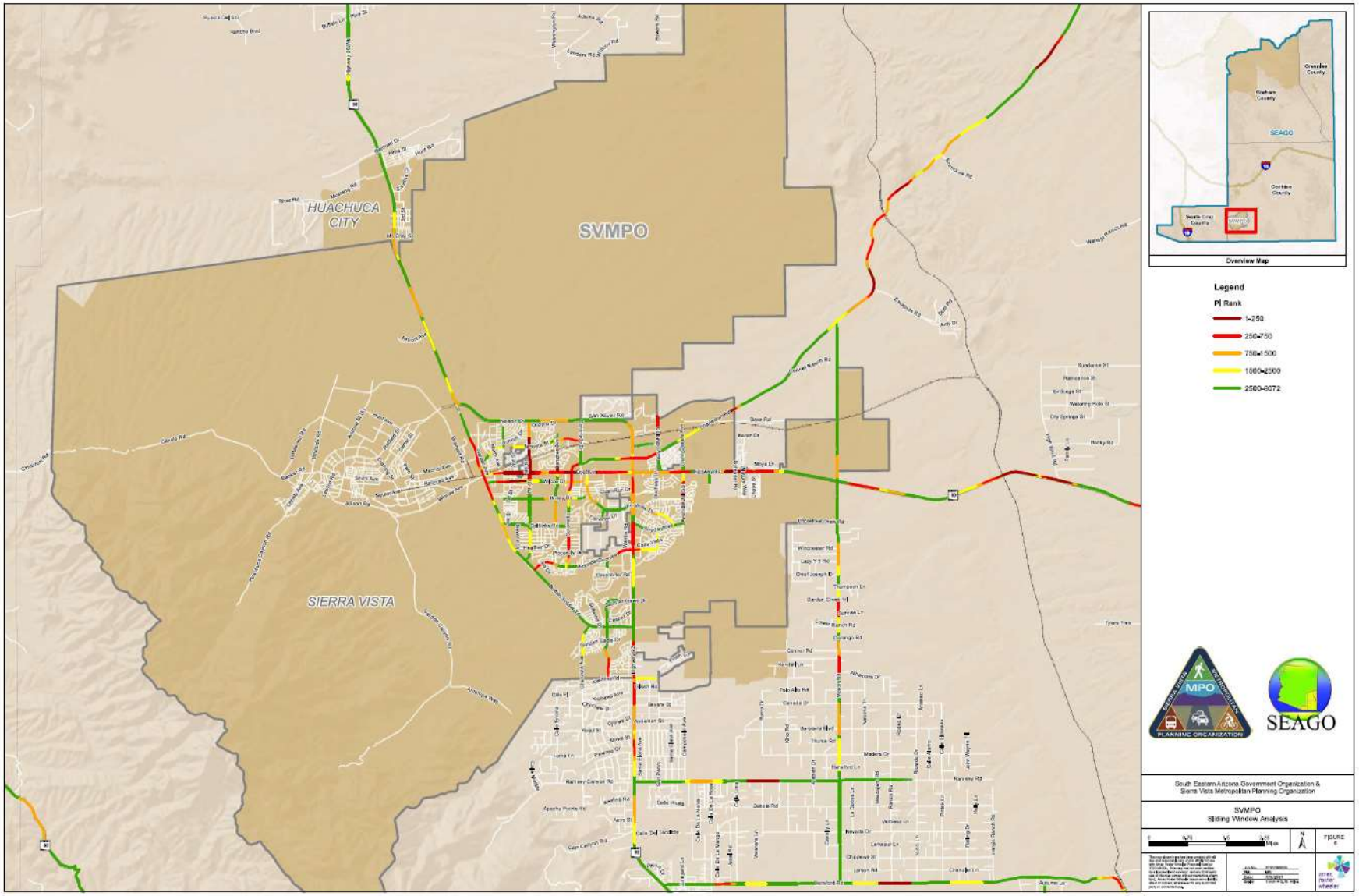


Figure 28: Sliding Window Analysis – Cochise County

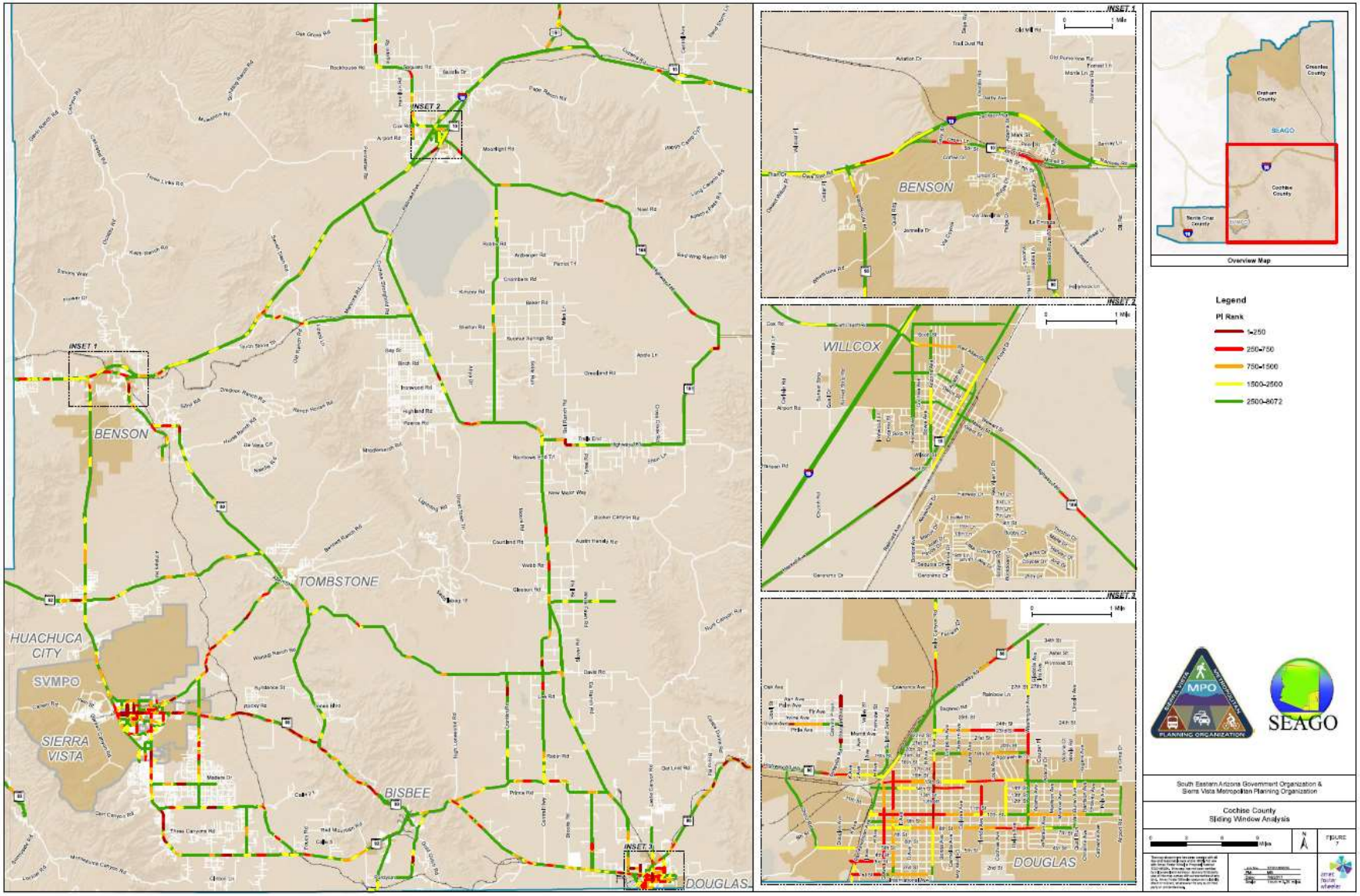


Figure 29: Sliding Window Analysis – Graham and Greenlee Counties

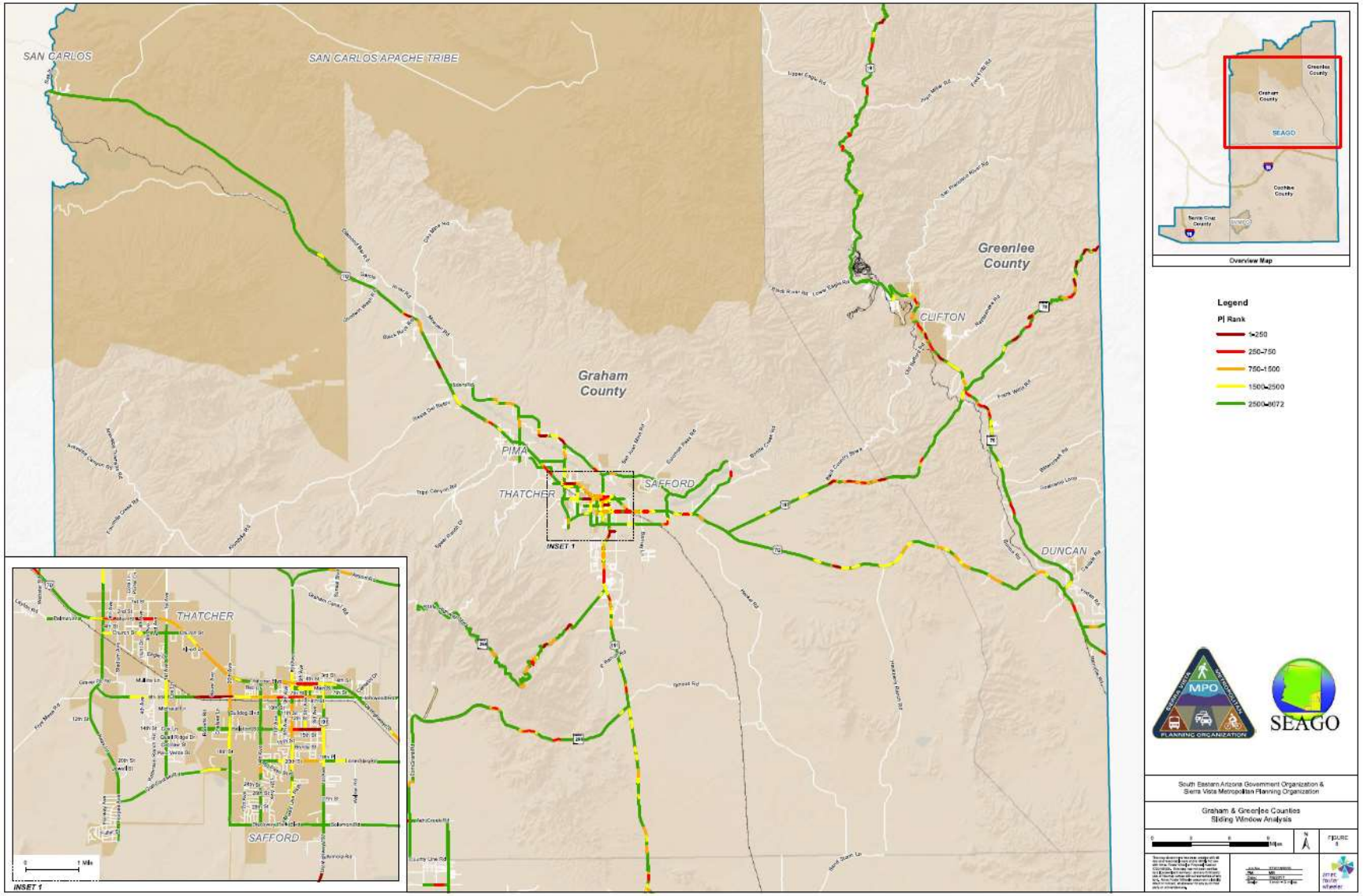


Figure 30: Heat Map – No Restraint Enforcement Area – Santa Cruz County

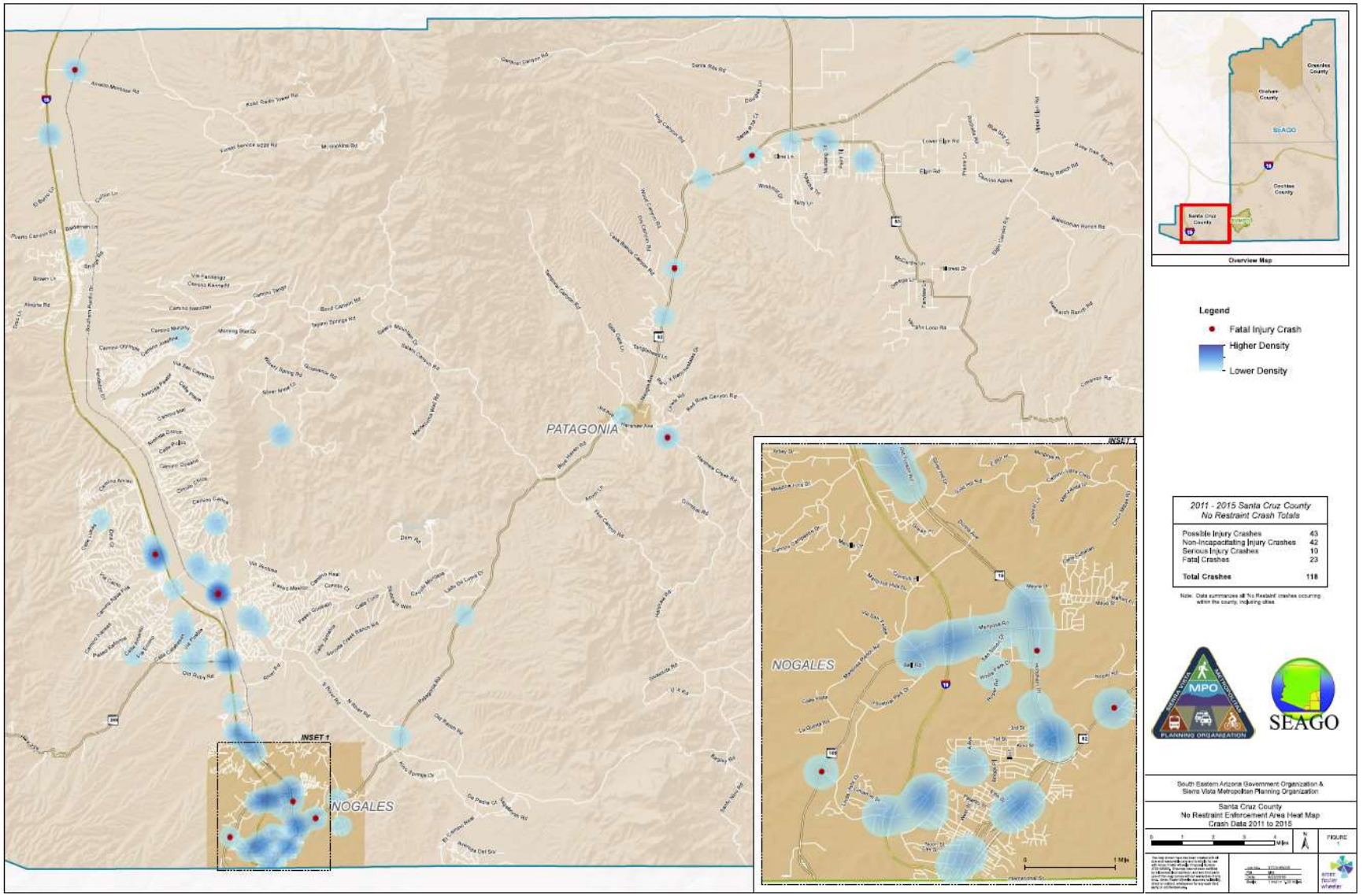


Figure 31: Heat Map – Driver Impairment Enforcement Area – Santa Cruz County

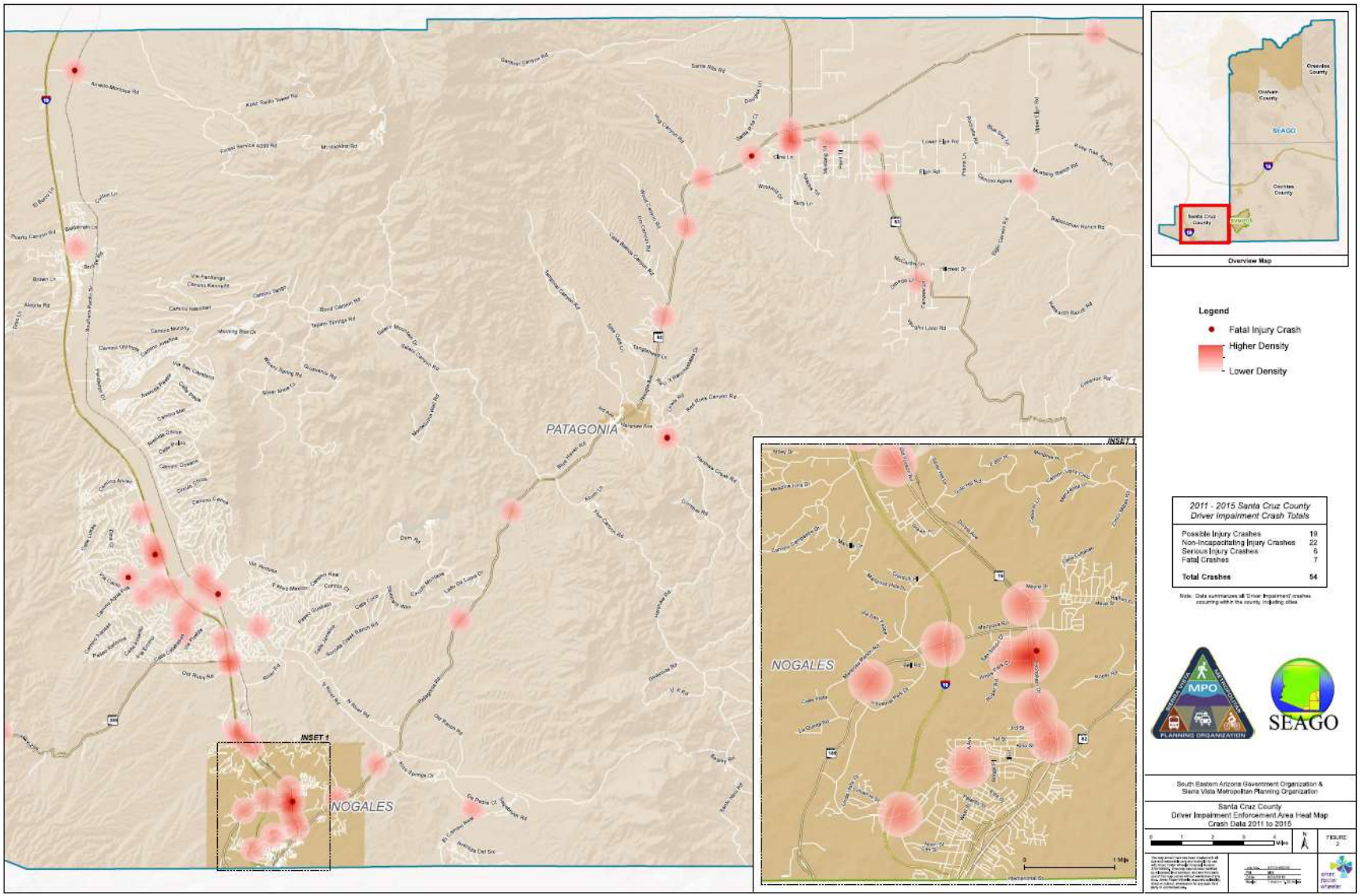


Figure 32: Heat Map – Unlawful Speeding Enforcement Area – Santa Cruz County

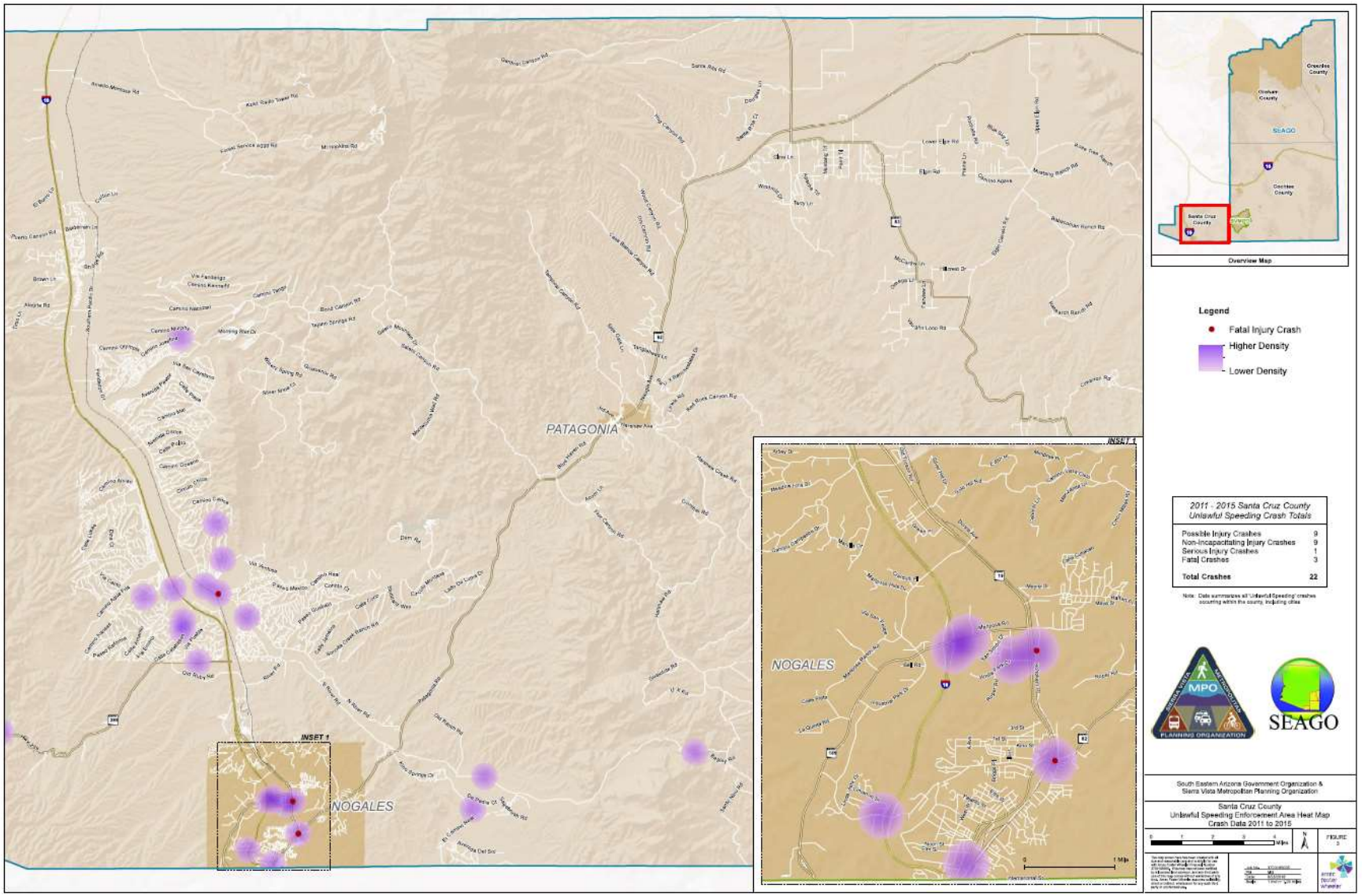


Figure 33: Heat Map – No Restraint Enforcement Area – Sierra Vista MPO

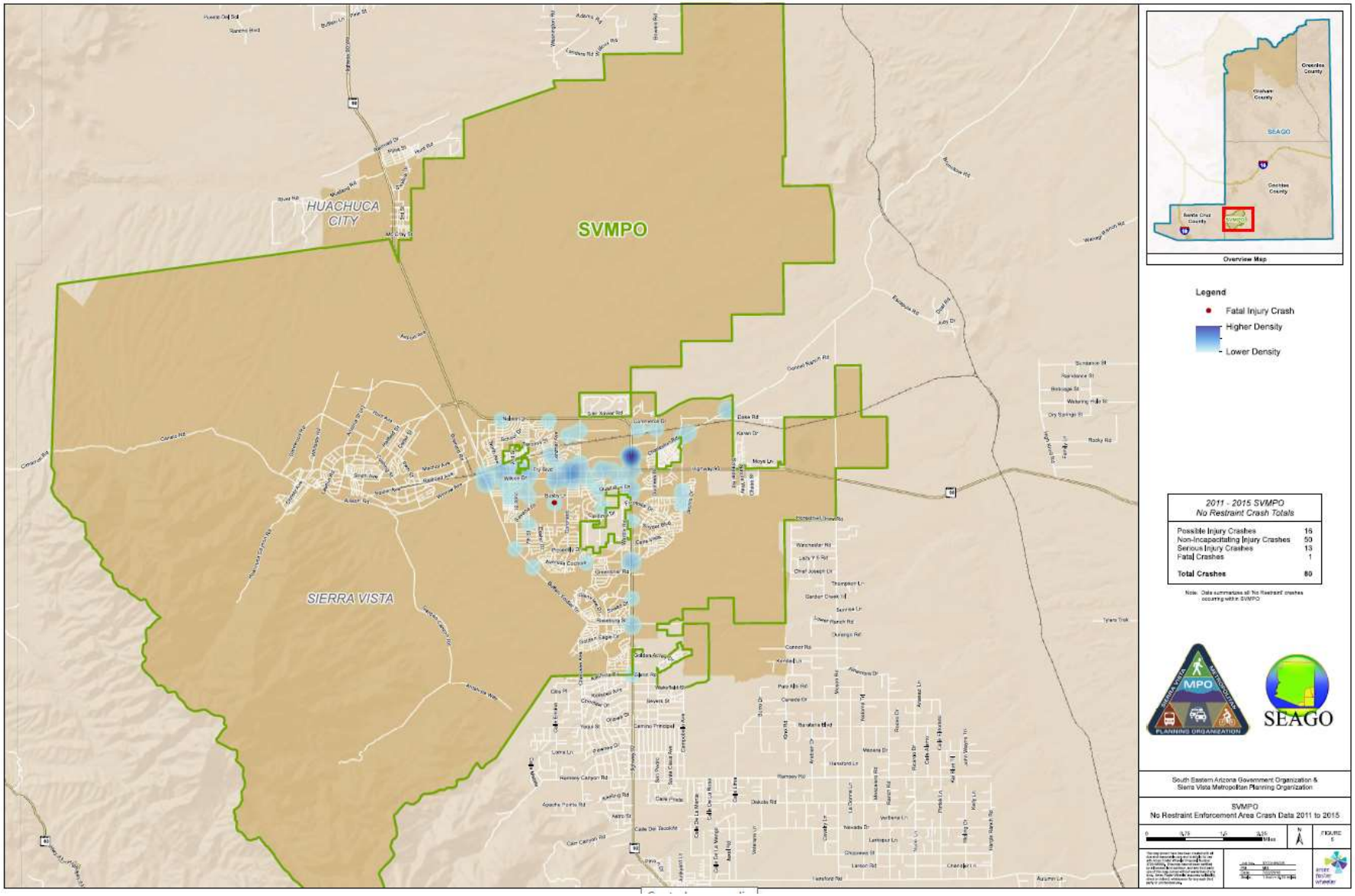


Figure 34: Heat Map – Speed Too Fast for Conditions Enforcement Area – Santa Cruz County

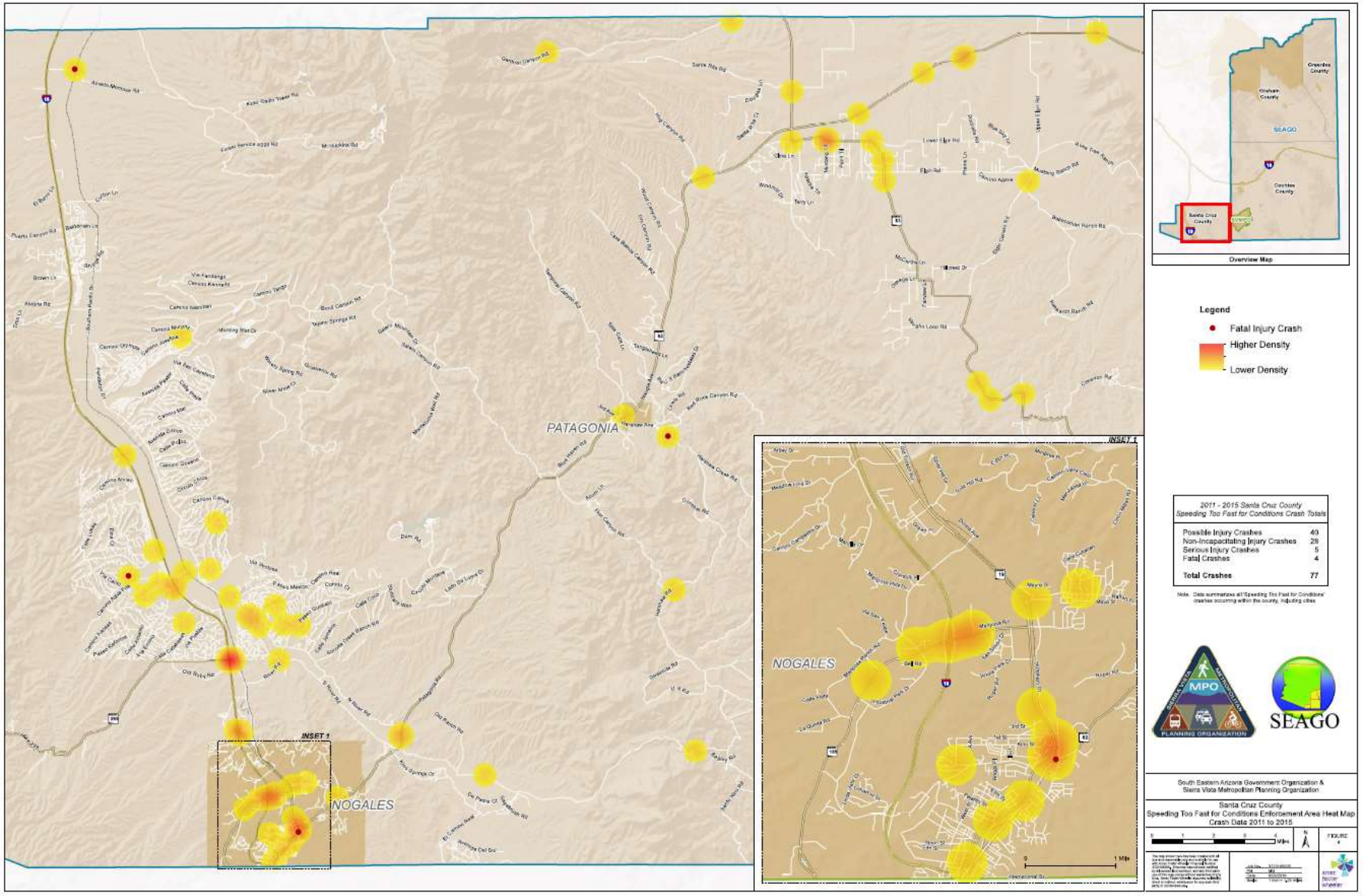


Figure 35: Heat Map – Driver Impairment Enforcement Area – Sierra Vista MPO

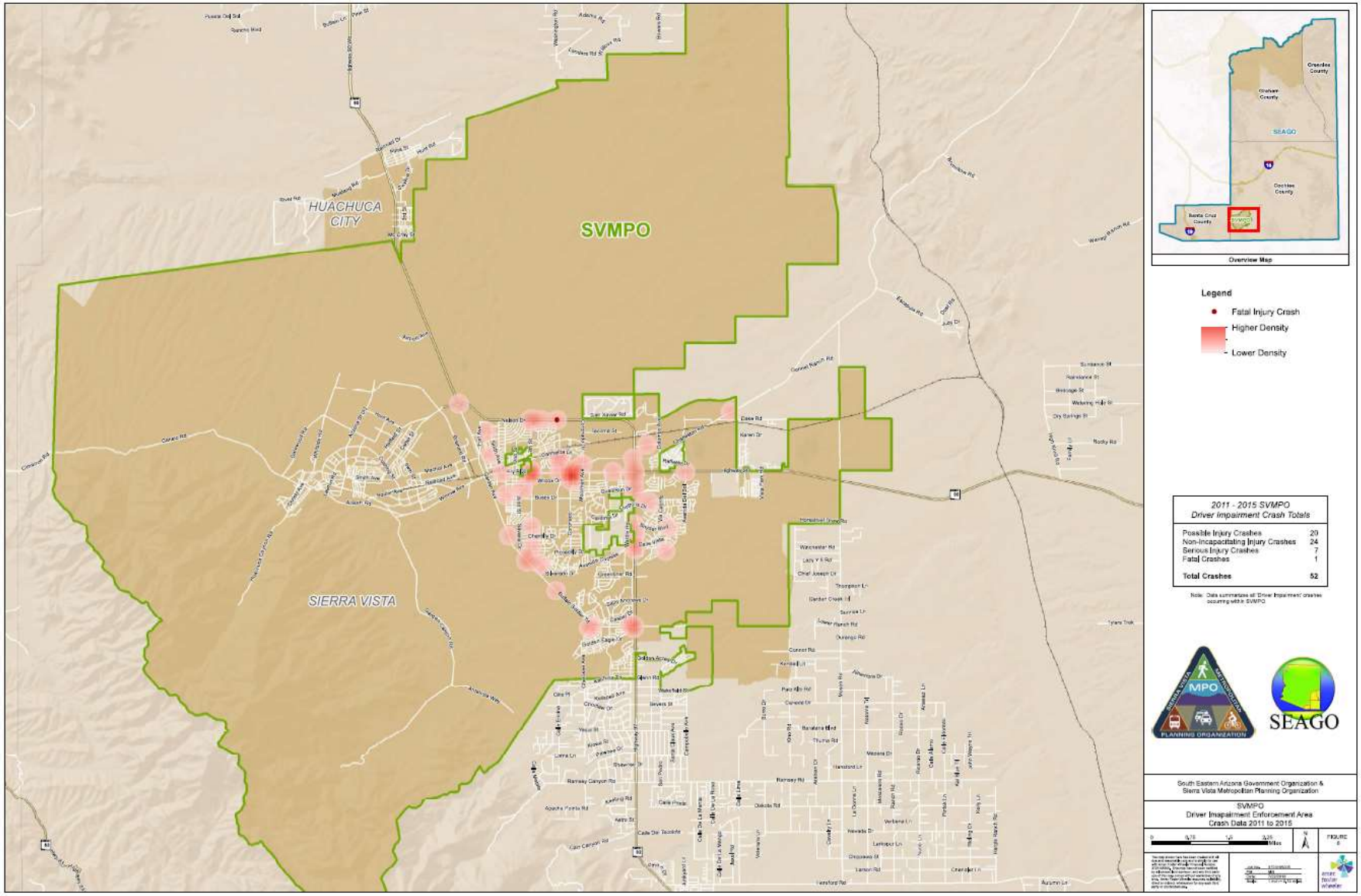


Figure 36: Heat Map – Unlawful Speeding Enforcement Area – Sierra Vista MPO

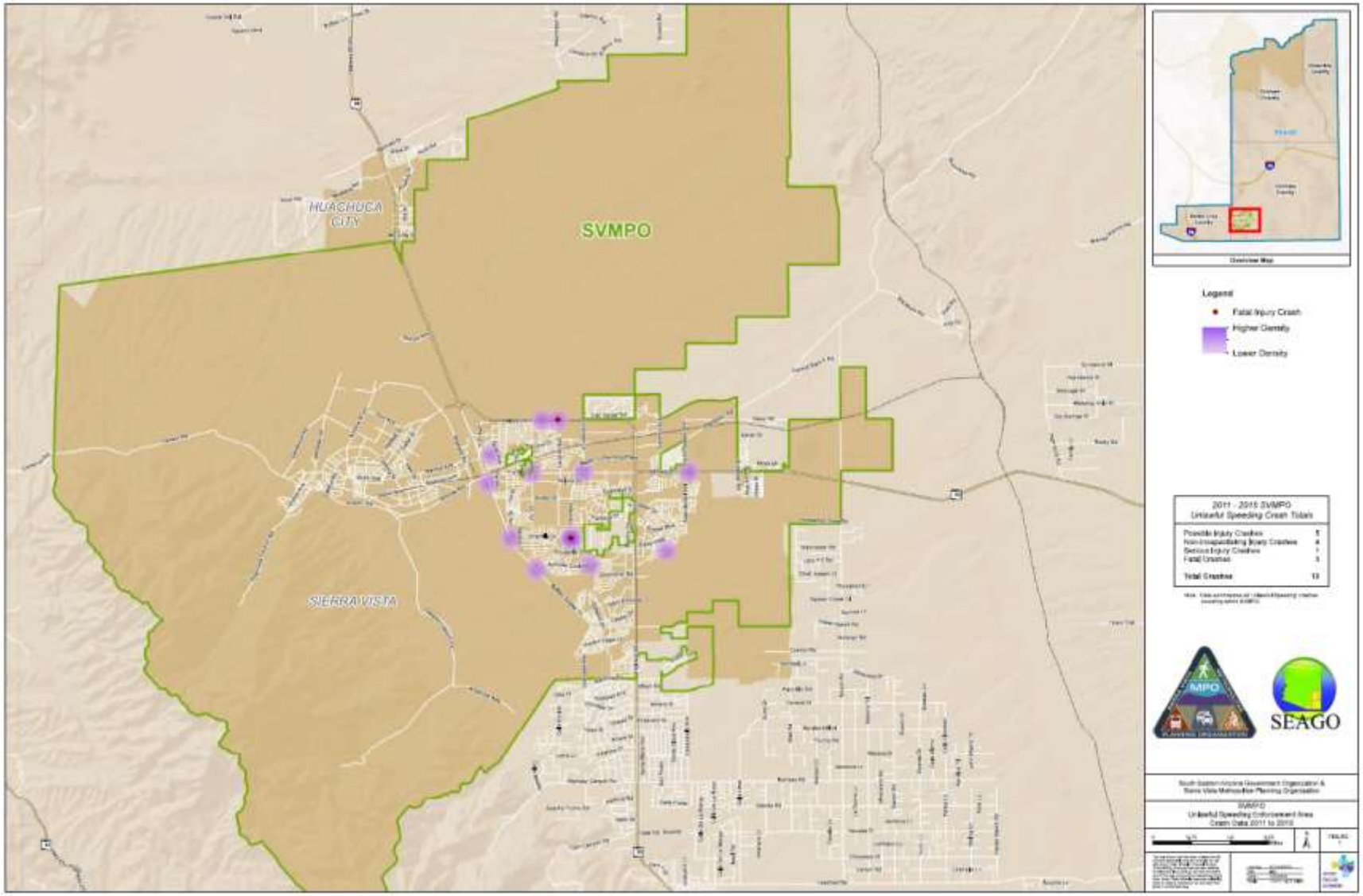


Figure 37: Heat Map – No Restraint Enforcement Area – Cochise County

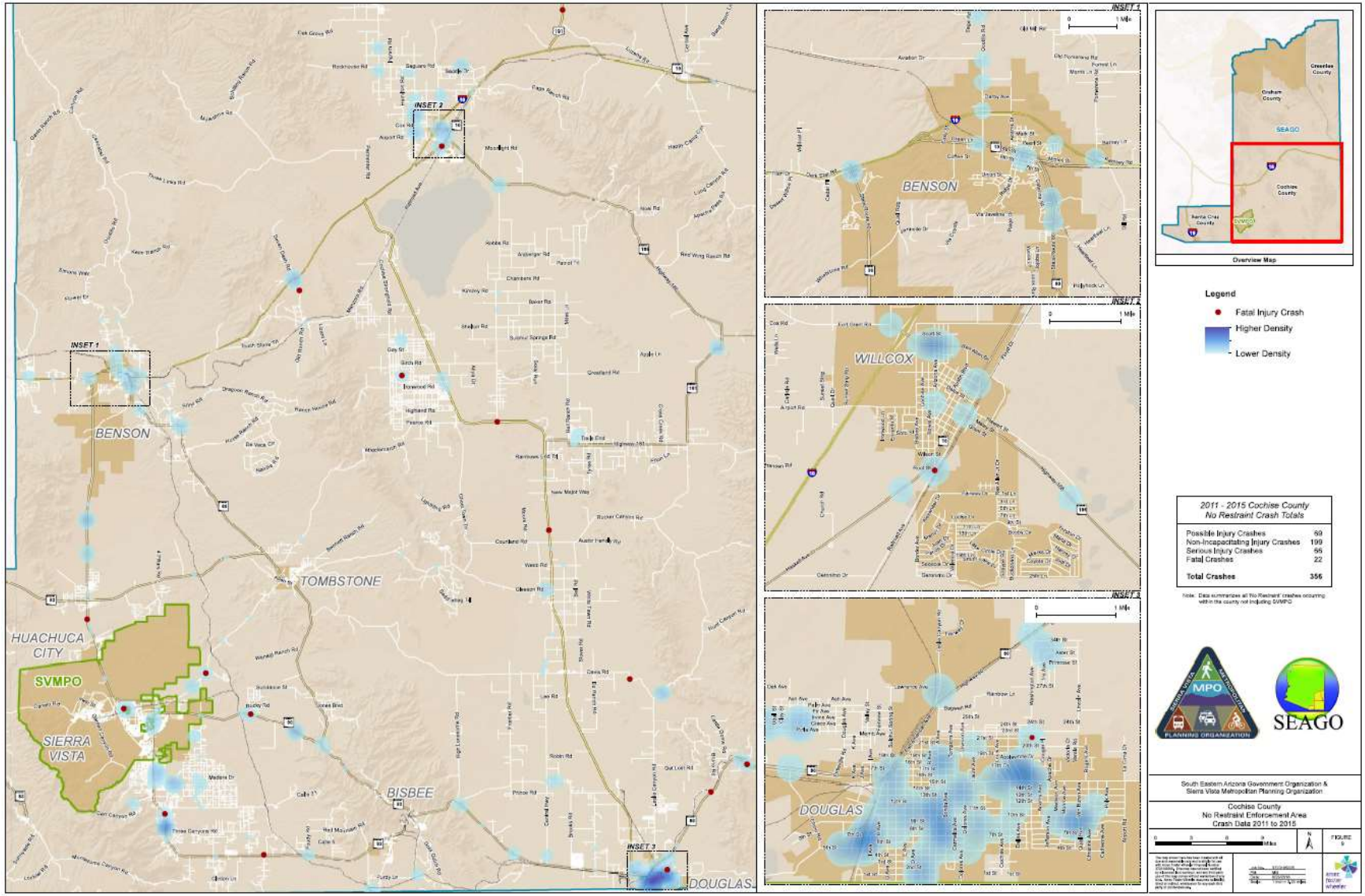


Figure 38: Heat Map – Speed Too Fast for Conditions Enforcement Area – Sierra Vista MPO

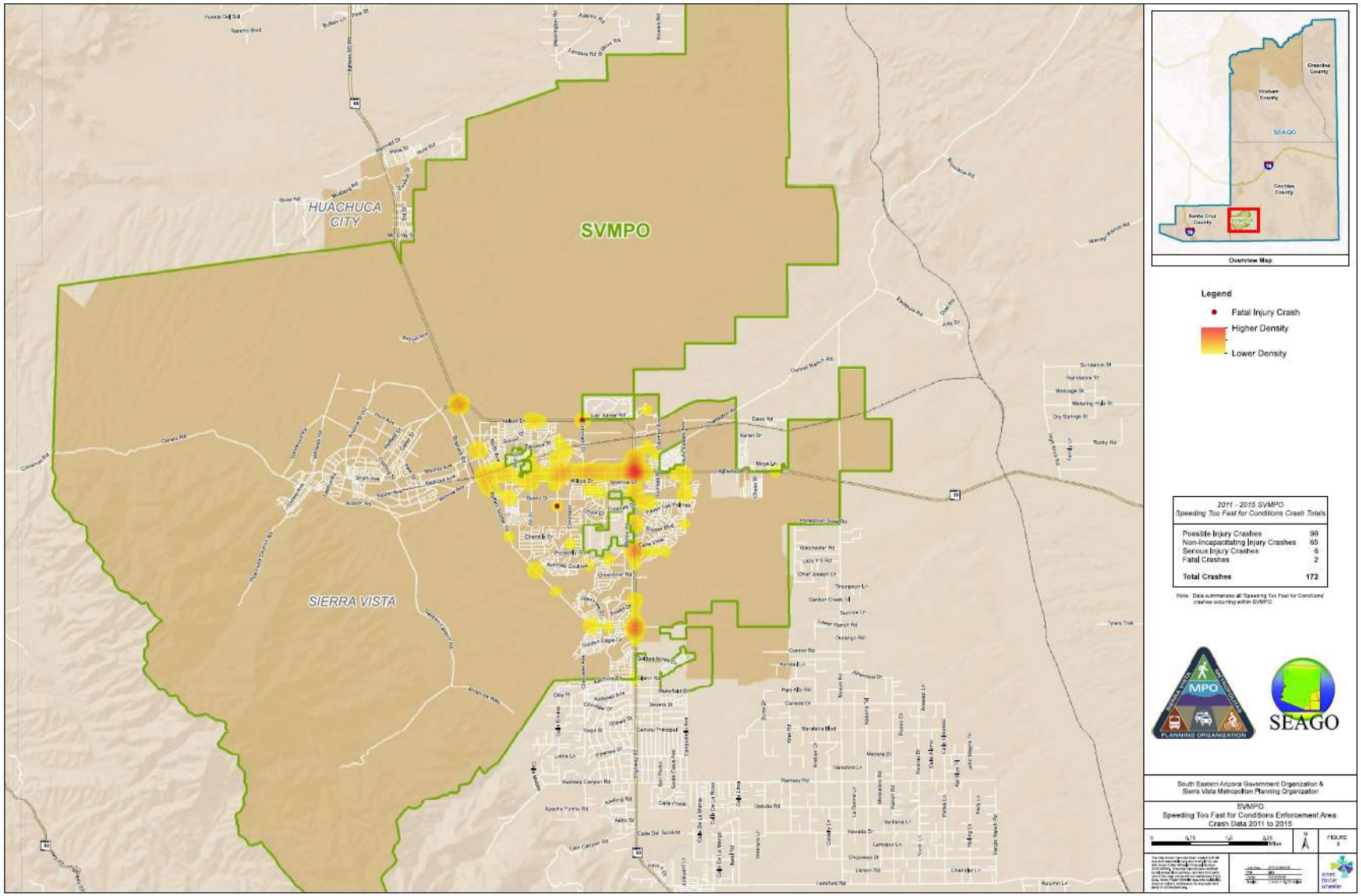


Figure 39: Heat Map – Unlawful Speeding Enforcement Area – Cochise County

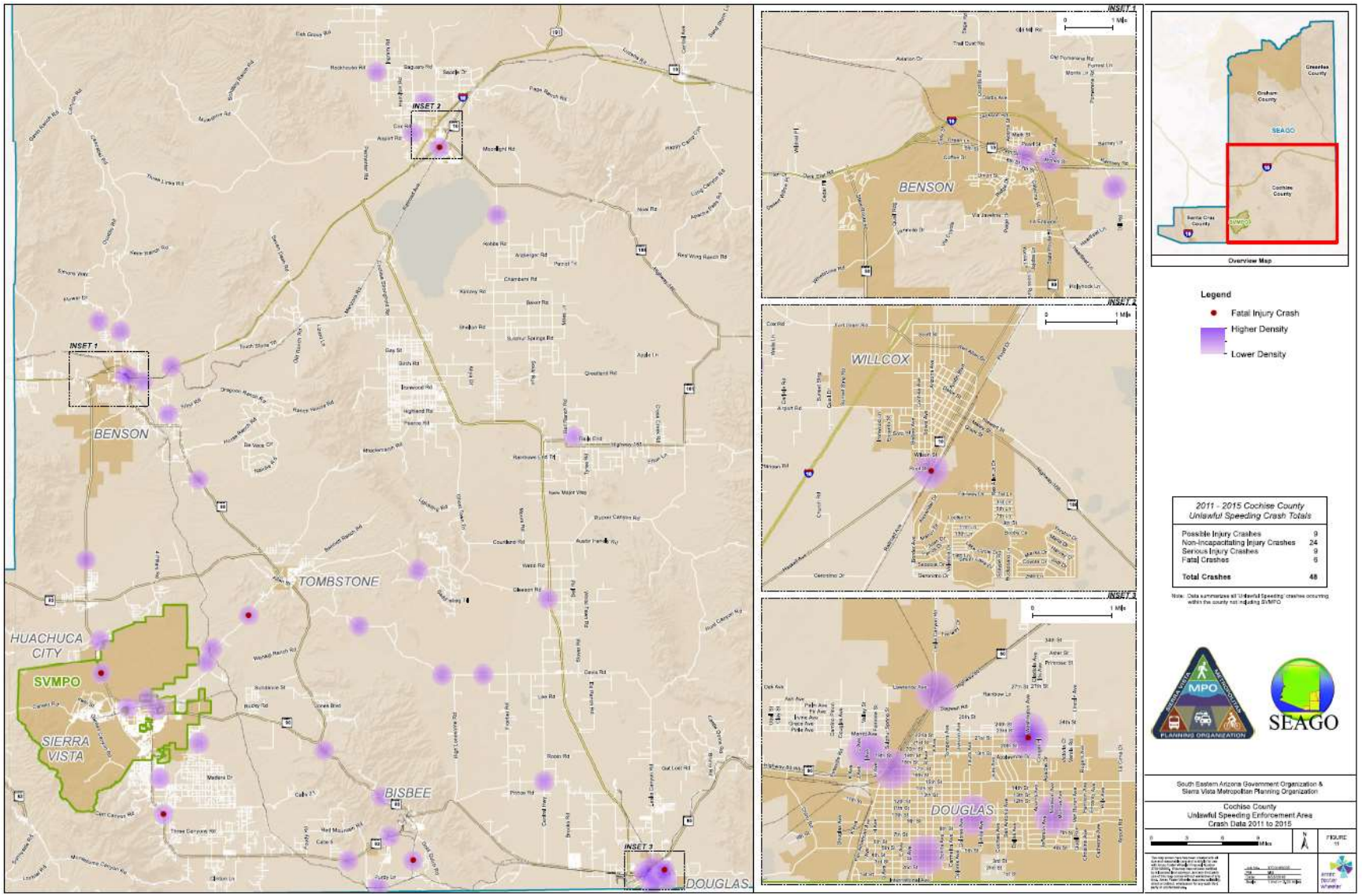


Figure 40: Heat Map – Driver Impairment Enforcement Area – Cochise County

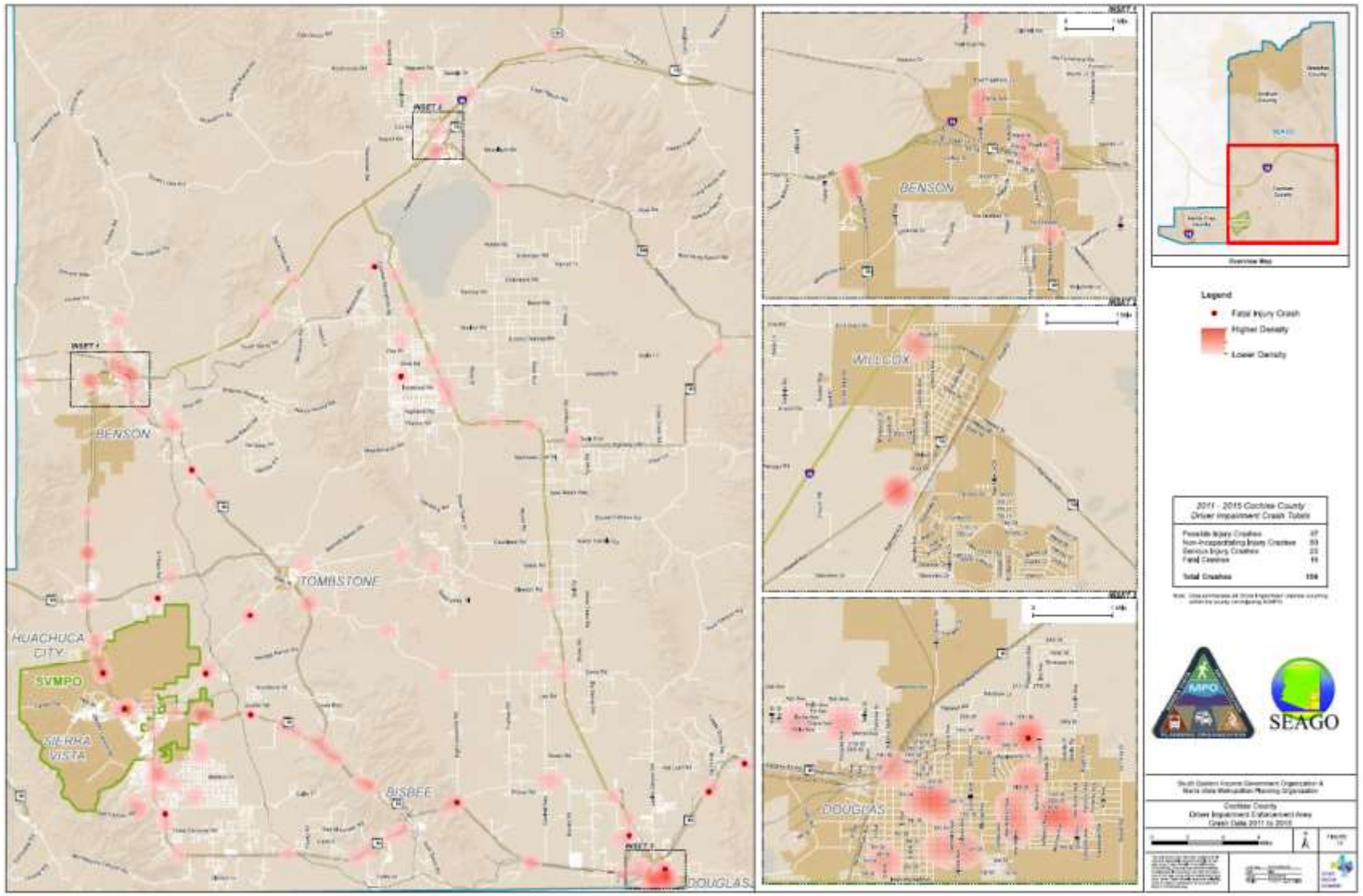


Figure 41: Heat Map – Speed Too Fast for Conditions Enforcement Area – Cochise County

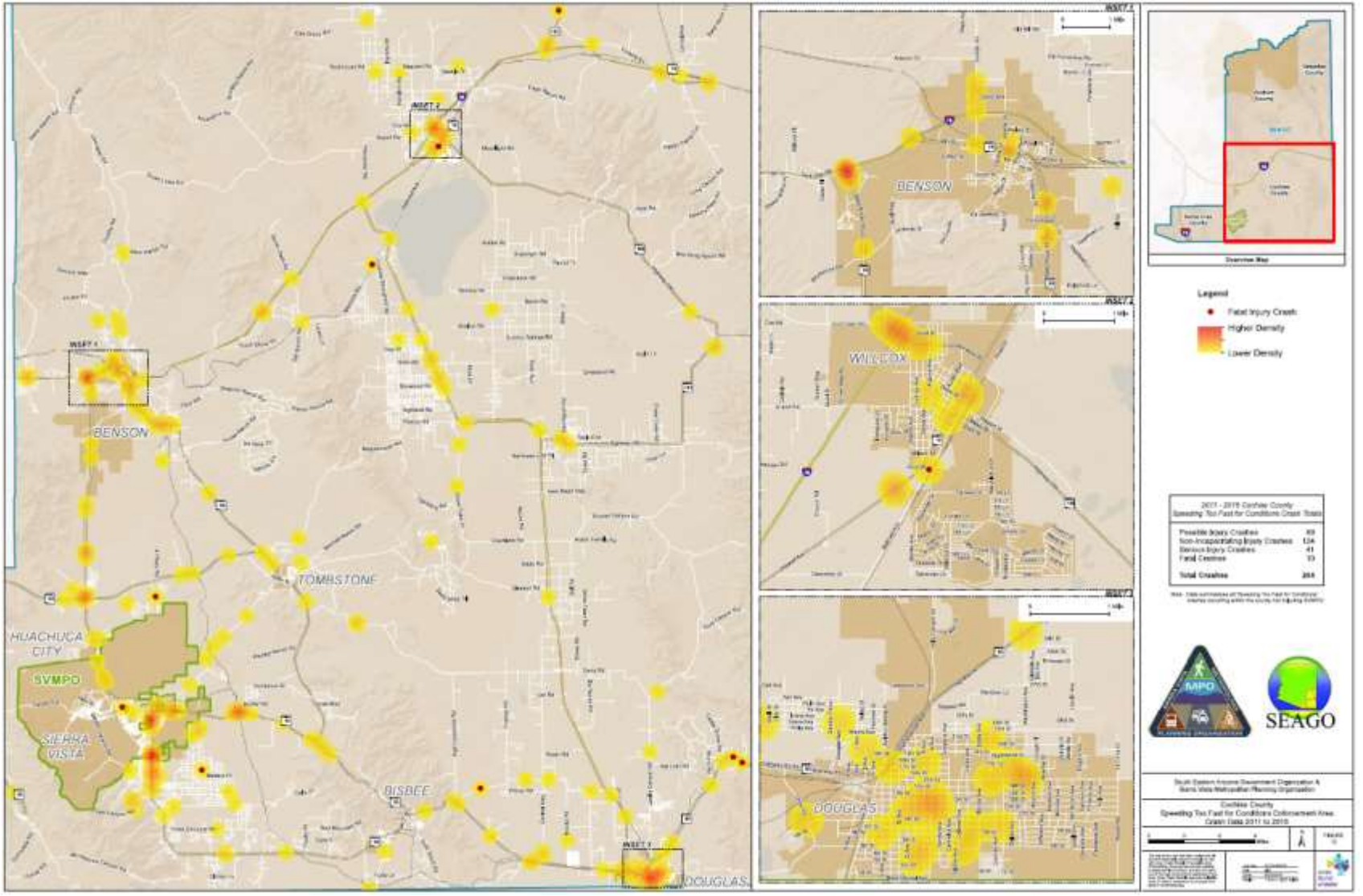


Figure 42: Heat Map – No Restraint Enforcement Area – Graham and Greenlee Counties

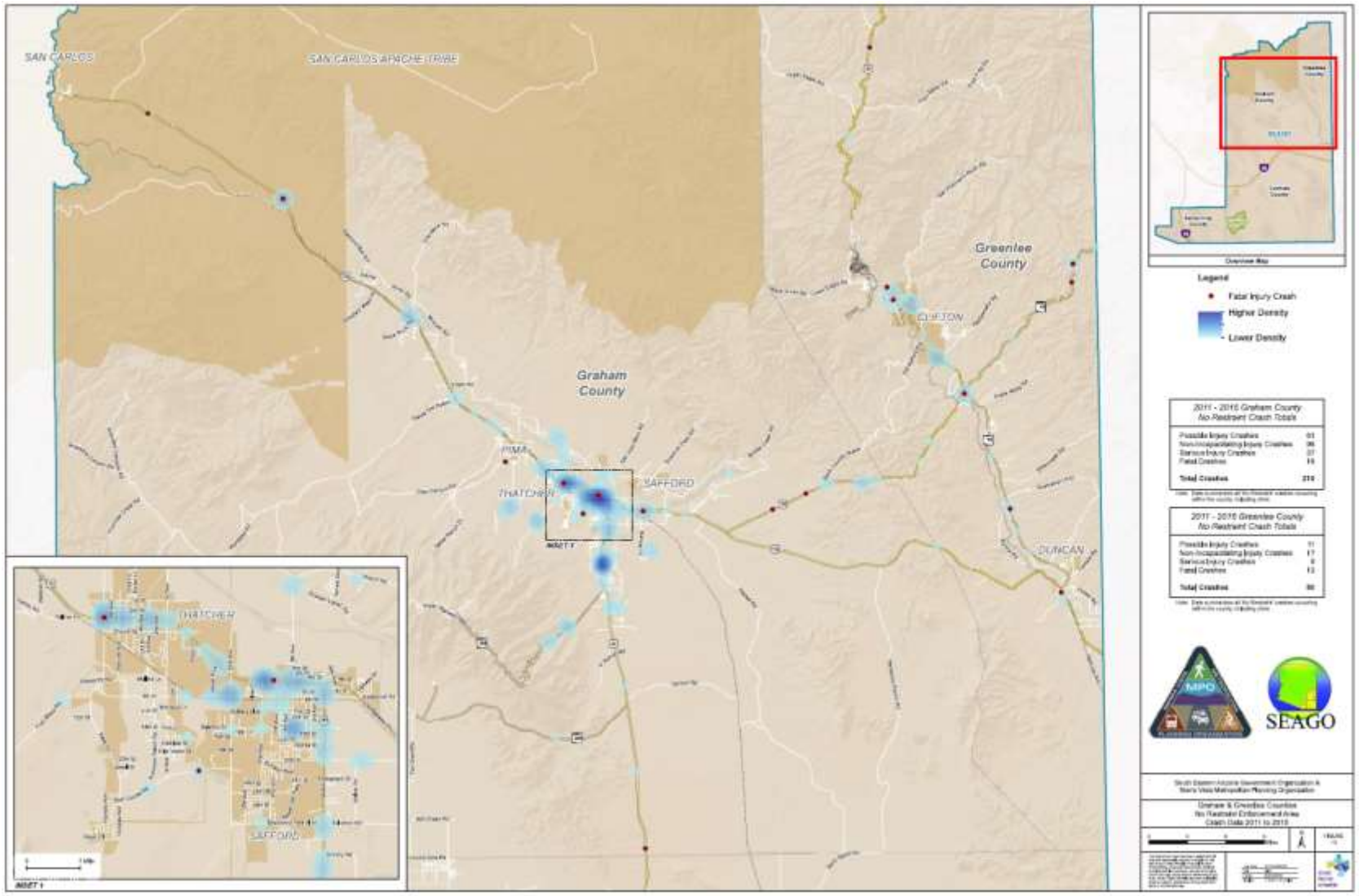


Figure 43: Heat Map – Driver Impairment Enforcement Area – Graham and Greenlee Counties

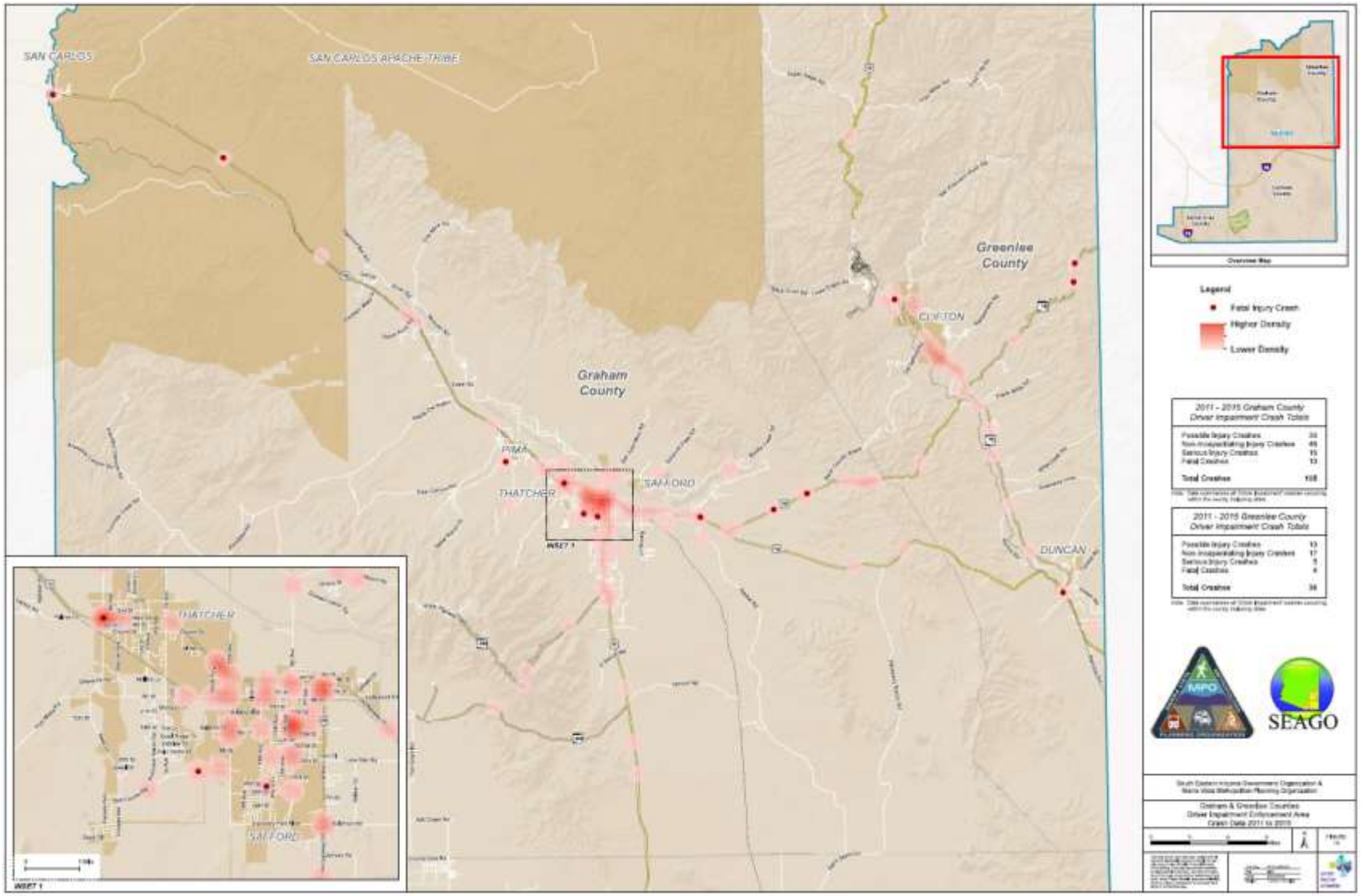
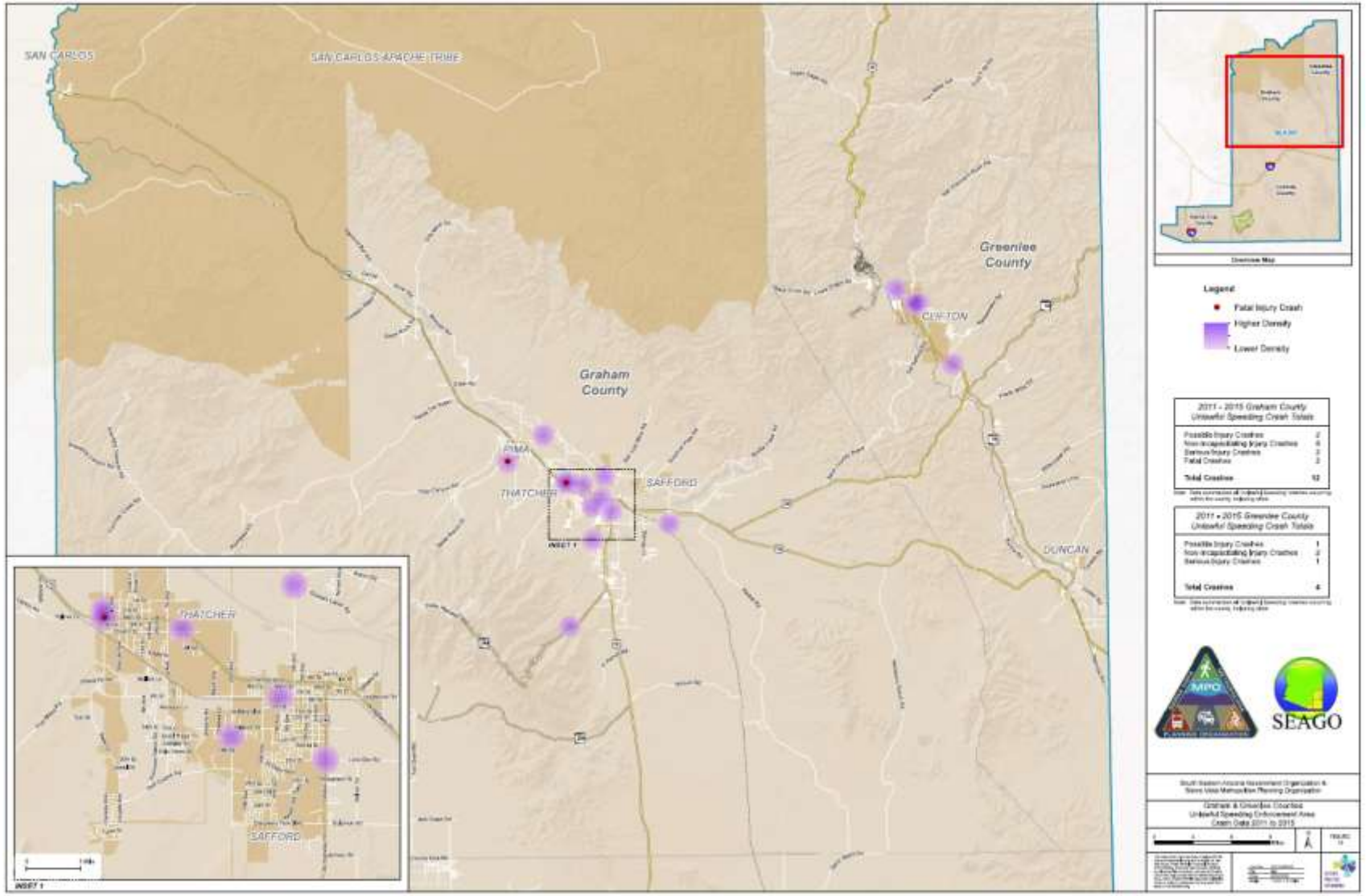


Figure 44: Heat Map – Unlawful Speeding Enforcement Area – Graham and Greenlee Counties



Performance Measures

On April 14, 2016, the FHWA final rule for "National Performance Management Measures: Highway Safety Improvement Program" went into effect. This rule established the procedures, data, reporting requirements, and potential consequences for safety performance at State DOT and MPO levels. In general, this rule is designed to further the use of data to better inform transportation planning and programming with the aim of reducing fatalities and serious injuries. Key provisions in the rule include:

- Five Performance Measures are required:
  1. Number of Fatalities
  2. Rate of Fatalities per 100 million vehicle miles traveled (VMT)
  3. Number of Serious Injuries
  4. Rate of Serious Injuries per 100 million VMT
  5. Number of Non-motorized Fatalities and Serious Injuries
- Annual update frequency
- A target must be set for each of the 5 performance areas by February 27, 2018
- 5-year rolling averages are used to smooth variability in data
- States have "met" or "made" significant progress if four out of five targets are met, or performance is better than baseline
- MPOs are to report their targets to the State in an agreed upon manner
- Fatality Analysis Reporting System FARS is to be used for fatal data
- State crash database is to be used for serious injury data

States were required to establish statewide targets for these five performance measures by August 31, 2017 for calendar year 2018, and annually thereafter. MPOs must establish targets specific to the MPO planning area for the same five safety performance measures for all public roads in the MPO planning area within 180 days after the State establishes each target. COGs are not required to establish safety performance measures or targets, but it is recommended. MPOs may select one of the following options for each individual safety performance measure:

- Agree to support the State target; or
- Establish specific targets for a safety performance measure (number or rate).

The Southeastern Arizona SHSP adopted the 2018 ADOT safety targets, based on five year rolling averages:

- Number of Fatalities: 4% Increase
- Rate of Fatalities: 2% Increase
- Number of Serious Injuries: 0% Increase
- Rate of Serious Injuries: 1% Decrease
- Number of Non-motorized Fatalities and Serious Injuries: 2% Increase

Some of these targets show an increase in crashes because the 5-year average is trending upward – while the overall goal is to reduce crashes, ADOT has established yearly targets based on the current upward or downward trend in crashes. These targets will be reset each year based on the 5-year rolling average of crashes.

Implementation Plan

Potential HSIP Projects

Fiscal year 2018 was the final year of regional apportionments of HSIP funds, which in the past amounted to approximately $500,000 each for SEAGO and SVMPO to program for regional safety projects. Beginning in 2019, ADOT will no longer provide these regional set-asides for safety funds; all agencies will compete statewide for HSIP funding. Spot improvement projects tend to generate low benefit/cost ratios with low fatal and serious injury crashes. To improve the odds of receiving these federal funds and generate projects with the greatest potential to reduce serious injury and fatal crashes, SEAGO and SVMPO should focus on corridor or systemic projects that have a significant number of fatal and serious injury crashes. Systemic projects address a particular crash type or road user for the entire roadway network (e.g., pedestrian crashes or road departure crashes).

ADOT's updated HSIP guidelines include the following requirements for a project to be considered for HSIP funds:

- Minimum benefit/cost ratio of 1.5
- Only fatal and serious injury crashes can be used to calculate benefits
- Minimum project cost of $250,000
- Most recent 5 years of crash data must be used
- Project must address emphasis area(s) in the state SHSP

In 2017, ADOT issued a statewide request for HSIP projects, with approximately $22 million in funding for fiscal years 2019 and 2020. A list of potential HSIP project locations was developed based on corridors with the highest number of fatal crashes, with the number of serious injury crashes as the secondary factor; this was based on ADOT's HSIP process which uses only fatal and serious injury crashes in determining the benefit/cost (B/C) ratio, which is the value used in determining HSIP eligibility. The most recent five years of crash data (2011-2015) was utilized in this analysis. Interstates were excluded from the selection process. Most of the locations incorporate state and US routes, since these are the locations with high number of fatal and serious injury crashes. Several of these state routes also serve as "main streets" in urban areas. Table 6 identifies the list of potential HSIP projects as ranked by the SEAGO TAC.

The region decided to support a SVMPO HSIP application for the Cochise County portion of Charleston Road. This Cochise County project was selected by ADOT and included $624,000 in FY19-20 design and construction funding.

Table 6: SEAGO TAC Ranking of Potential HSIP Projects

SEAGO Ranking	Region	Potential HSIP Corridor	Serious Crashes	Fatal Crashes
N/A	SVMPO	Coronado Dr/Martin Luther King Pkwy/Charleston Rd from Baywood Ln to about 4 miles north of Brunckow Rd	8	5
N/A	SVMPO	SR 90/SR 92, Pine St to Andalusian Way	31	9
1	Graham/Greenlee Counties	US 70/US 191 South, Reay Ln to south of Armory	15	6
2	Graham/Greenlee Counties	US 70/US 191 Northeast, Barney to Old Safford Rd	9	5
3	Graham/Greenlee Counties	US 70 thru San Carlos Apache Tribe boundaries	0	7
4	Santa Cruz County	Business 19/SR 82, Gold Hill Rd to E Ranch Grande	5	4
5	Cochise County	SR 80, Lee Station Rd to NM Border	4	5
6	Graham/Greenlee Counties	SR 78 near New Mexico Border	5	2
7	Graham/Greenlee Counties	US 191 Clifton area	4	2
8	Graham/Greenlee Counties	SR 75/Main St/North Ave/US 70, Virdan Rd to Escomillas Ln	1	2
9	Cochise County	Naco Highway/SR 92/SR 80, to Kings Highway	3	3
10	Santa Cruz County	Calle Toruno/Camino Ramanote/West Frontage, from Circulo Sopori to Camino Vencejo	1	2
11	Cochise County	SR 90 out of Benson, Barrel Cactus Ridge to Kartchner Trail	0	2

In 2018, ADOT issued another request for HSIP projects, with approximately $55 million in funding for fiscal years 2021 and 2022. A new list of potential HSIP project locations was developed with the focus on non-ADOT routes and ADOT routes running through local communities. The latest available crash data (2012-2016) was used in this analysis. Table 7 identifies the list of potential HSIP projects, with those selected for HSIP applications by the SEAGO TAC highlighted in yellow.

Table 7: Potential HSIP Project Ranking by B/C Ratio

Agency	Project	Road	Location	Length (miles)	Countermeasures	Estimated Cost	B/C Ratio
Cochise County	1	Charleston Rd	Tombstone to 4.8 miles S of Tombstone	4.8	Rumble strips	$253,000	34.3
	2	Purdy Rd/Arizona St	Naco Hwy to Hazzard St	6.8	Rumble strips	$340,000	12.8
	3	Double Adobe Rd	SR 80 to US 191	13.9	Rumble strips	$648,000	6.7
	4	Frontier Rd	Davis Rd to Double Adobe Rd	9.2	Rumble strips	$444,000	9.8
	5	Sanders/Adams/ Jefferson/Truman	SR 82 to SR 82	5.4	Rumble strips	$279,000	15.5
	6	Barataria Blvd	Moson Rd to Ranch Rd	1.0	Rumble strips	$88,000	48.2
	7	Cascabel Rd	E3 Links Rd to Pomerene Rd	13.5	Rumble strips	$630,000	6.9
	8	Projects 1-7 combined		54.6	Rumble strips	$2,412,000	14.3
Santa Cruz County	9	Pendleton Dr	Camino Olympia to Julie Ann Rd	12.5	Rumble strips	$587,000	7.4
	10	Calle Toruno/ Camino Ramanote/ Corrida de Toros	W Frontage to End of Pavement	6.0	Rumble strips	$305,000	14.2
	11	Harshaw Rd	Red Rock Dr to near Harshaw Creek Rd (S)	4.6	Rumble strips	$253,000	17.1
	12	Projects 9-11 combined		23.1	Rumble strips	$1,061,000	12.3
Graham County	13	US 191/20th St/Lone Star Intersection	ADOT/Graham Co/Safford		Pedestrian Hybrid Beacon (HAWK)	$330,000	16.1
	14	Cottonwood Wash Rd	1200 South to Saguaro Dr	3.5	Rumble strips	$197,000	22.0
	15	Golf Course Rd	Hoopes Ave to Elizabeth Ann Dr	1.6	Rumble strips	$114,000	37.5
	16	Projects 14-15 combined		5.1	Rumble strips	$281,000	30.9
Greenlee County/ Duncan/ADOT	17	SR 75 Duncan	Old Virden/Fairgrounds Rd to Family Dollar Store	0.8	Sidewalk both sides, high visibility crosswalk at Old Virden/Fairgrounds	$312,000	31.4
	18	SR 75	Virden Hwy to US 191	17.4	Rumble strips	$799,000	16.4
Safford/ADOT	19	US 70/just west of 11th Ave			Pedestrian Hybrid Beacon (HAWK)	$330,000	16.1
Sierra Vista	20	Coronado Dr/MLK Pkwy	Laurel Ln to SR 90	2.6	To be determined with City (signal improvements, speed feedback signs, etc.)	$721,000	24.3

In July 2018 ADOT announced FY 22-23 project awards, with Cochise County, Santa Cruz County, and Graham County projects being funded for $4,410,000 in design and construction. In addition, Sierra Vista will receive $939,000 for Phase 1 funding for a systemic adaptive signal control project.

ADOT plans to issue another request for HSIP applications in early 2019, with approximately $80 million in funding for fiscal years 2023 and 2024. It is highly recommended that SEAGO and SVMPO plan on updating their crash data in late 2018 to include the 2017 crashes to identify high priority HSIP corridors for project proposals.

Implementing an Effective SHSP

An effective strategic transportation safety plan is feasible, living, and regularly updated and embraced by safety stakeholders. Figure 45 highlights FHWA's eight elements of a SHSP Implementation Process Model.

Figure 45: SHSP Implementation Process Model, FHWA

These elements and the following components are key factors in the Implementation Plan:

- Document measurable objectives and performance measures for each emphasis area
- Determine the data requirements for each performance measure
- Identify the required resources and action steps for implementing each countermeasure
- Identify a process to track countermeasure and action step implementation
- Integrate the SHSP with other transportation safety plans
- Market SHSP through branding, news events, web sites, and newsletters
- Track regularly the extent to which emphasis area strategies are being implemented

Recommendations to implement, evaluate, and update the SHSP and to encourage stakeholder participation in implementing the plan include:

- At the September TAC meeting, review the SHSP and updated crash data
- Develop HSIP applications based on the review of updated crash data, and review the applications during the March TAC meeting
- Invite law enforcement to participate in a TAC meeting to discuss safety issues and any new crash patterns, especially fatal crashes
- Keep key advocacy groups, such as the Cochise Bicycle Advocates, involved by inviting them to participate in safety meetings and TAC meetings
- Develop a Regional Traffic Safety Conferences to promote traffic safety for all stakeholders
- Update the SHSP on a regular cycle (e.g., every 3 to 5 years)
- Update crash data annually
- Update intersection and segment crash analysis annually to determine high priority locations
- Collect traffic volumes to generate updated crash rates and performance measures
- Include safety recommendations and projects in regional and local agency transportation plans
- Utilize the ADOT RSA Program to address high risk locations
- Identify, apply for and construct awarded prioritized HSIP projects

Updated crash data for the previous year is typically made available by ADOT in June (e.g., crash data for all of 2017 should be available in June 2018 for updating regional crash data).

Appendices

Appendix A: Public Involvement and Social Pinpoint Mapping
Appendix B: Intersection Ranking Tables