

Pinal County
Multi-Jurisdictional
Hazard Mitigation Plan
2016

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This Plan was developed in cooperation with:

**Pinal County
City of Apache Junction
City of Casa Grande
City of Coolidge
City of Eloy
Town of Florence
Town of Kearny
Town of Mammoth
City of Maricopa
Town of Superior**

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SECTION 1: INTRODUCTION

1.1 Purpose

This Plan was prepared to guide hazard mitigation to better protect the people, property, community assets and land from the effects of hazards. This Plan demonstrates the participants' commitment to reducing risks from hazards and serves as a tool to help decision makers direct mitigation activities and resources. This Plan was also developed to make the participants eligible for certain types of Federal disaster assistance and hazard mitigation grant funding.

1.2 Background and Scope

Each year in the United States, disasters take the lives of hundreds and injure thousands more. Nationwide, taxpayers pay billions of dollars annually to help communities, organizations, businesses, and individuals recover from disasters. These monies only partially reflect the true cost of disasters, because additional expenses to insurance companies and nongovernmental organizations are not reimbursed by tax dollars. Many disasters are predictable, and much of the damage caused by these events can be alleviated or even eliminated.

Hazard mitigation is defined by FEMA as "any sustained action taken to reduce or eliminate long-term risk to human life and property from a hazard event." The results of a three-year congressionally mandated independent study to assess future savings from mitigation activities provides evidence that mitigation activities are highly cost-effective. On average, each dollar spend on mitigation saves society an average of \$4 in avoided future losses in addition to saving lives and preventing injuries (National Institute of Building Science Multi-Hazard Mitigation Council 2005).

Examples of hazard mitigation measures include, but are not limited to the following:

- Development of mitigation standards, regulations, policies, and programs
- Land use/zoning policies
- Strong building code and floodplain management regulations
- Dam safety program, seawalls, and levee systems
- Acquisition of flood prone and environmentally sensitive lands
- Retrofitting/hardening/elevating structures and critical facilities
- Relocation of structures, infrastructure, and facilities out of vulnerable areas
- Public awareness/education campaigns
- Improvement of warning and evacuation systems

Hazard mitigation planning is the process through which hazards that threaten communities are identified, likely impacts of those hazards are determined, mitigation goals are set, and appropriate strategies to lessen impacts are determined, prioritized, and implemented. This Plan documents the planning process employed by the Planning Team. The Plan identifies relevant hazards and risks, and identifies the strategy that will be used to decrease vulnerability and increase resiliency and sustainability.

This Plan was prepared pursuant to the requirements of the Disaster Mitigation Action of 2000 and the implementing regulations set forth in the Federal Register (hereafter, these requirements will be referred to as the DMA2K). While the act emphasized the need for mitigation plans and coordinated

mitigation planning and implementation efforts, the regulations established the requirements that hazard mitigation plans must meet in order to be eligible for certain Federal disaster assistance and hazard mitigation funding under the Robert T. Stafford Disaster Relief and Emergency Act.

Information in this Plan will be used to help guide and coordinate mitigation activities and decisions for future land use. Proactive mitigation planning will help reduce the cost of disaster response and recovery to the community and its property owners by protecting structures, reducing exposure and minimizing overall community impacts and disruption. The community has been affected by hazards in the past and is thus committed to reducing future disaster impacts and maintaining eligibility for Federal funding.

This is a multi-jurisdictional plan that geographically covers the communities within the Pinal County boundaries (hereinafter referred to as the Planning Area). The following communities participated in the planning process:

- Pinal County
- Apache Junction
- Casa Grande
- Coolidge
- Eloy
- Florence
- Kearny
- Mammoth
- Maricopa
- Superior

1.3 Assurances

This Plan was prepared to comply with the requirements of the Robert T Stafford Disaster Relief and Emergency Assistance Act of 1988 (as amended by the DMA); all pertinent presidential directives associated with the U.S. Department of Homeland Security and FEMA; all aspects of 44 CFR pertaining to hazard mitigation planning and grants pertaining to the mitigation of adverse effects of disasters; interim final rule and final rules issued by FEMA; and all Office of Management and Budget circulars and other federal government documents, guidelines and rules.

The participants of this Plan assure that they will continue to comply with all applicable Federal statutes and regulations in effect with respect to the periods for which it receives grant funding, in compliance with 44 CFR 13.11(c). This Plan will be amended whenever necessary to reflect changes in Federal laws and statutes as required in 44 CFR 133.11(d).

1.4 Plan Organization

This Plan is organized as follows:

- Section 1: Introduction
- Section 2: Community Profile
- Section 3: Planning Process
- Section 4: Risk Assessment
- Section 5: Mitigation Strategy
- Section 6: Plan Maintenance

SECTION 2: COMMUNITY DESCRIPTIONS

2.1 County Overview

Geography

According to the Arizona Department of Commerce¹, Pinal County was formed in 1875 from parts of Maricopa and Pima Counties by the Eighth Territorial Legislation. Florence, established in 1866, was designated and has remained the county seat to this day. The County's present area of 3,441,920 acres includes part of the Gila River Indian Community, Tohono O'odham Nation, and San Carlos Apache Tribe, as well as all of the Ak-Chin Indian Community.

Pinal County is located in the south-central portion of the State. Major roadway transportation routes through the County include Interstates 8 and 10, U.S. Highway 60, State Highways 77, 79, 84, 87, 88, 177, 187, 237, 287, 347, and 387, and Indian Route 15. Railroads include the Union Pacific, Magma Arizona, San Manuel Arizona Railroads, and the Copper Basin Railway.

Pinal County has two distinct regions. The eastern portion is characterized by mountains with elevations to 6,000 feet and copper mining. The western portion is primarily low desert valleys and irrigated agriculture. The terrestrial and environmental uniqueness of Pinal County is due in large measure to the three major and sometimes riparian watercourses associated with the San Pedro, Gila, and Santa Cruz Rivers. These three major waterways help to define the native ecosystem and their association of plant and animal species within the Upper Sonoran Desert Region. These same topographical features have also had a great influence on the settlement of the county, from prehistoric people to modern humankind. Mountains in the County break up the relatively flat valley floors and include the San Tans, Superstitions, Sierra Estrella, Santa Catalina, Table Top, Palo Verde, Casa Grande, Sacaton, Picacho Mountain, Sawtooth, Tortolita, Black, and Samaniego Hills.

The geographical characteristics of Pinal County have been mapped into four terrestrial ecoregions², which are described by the following:

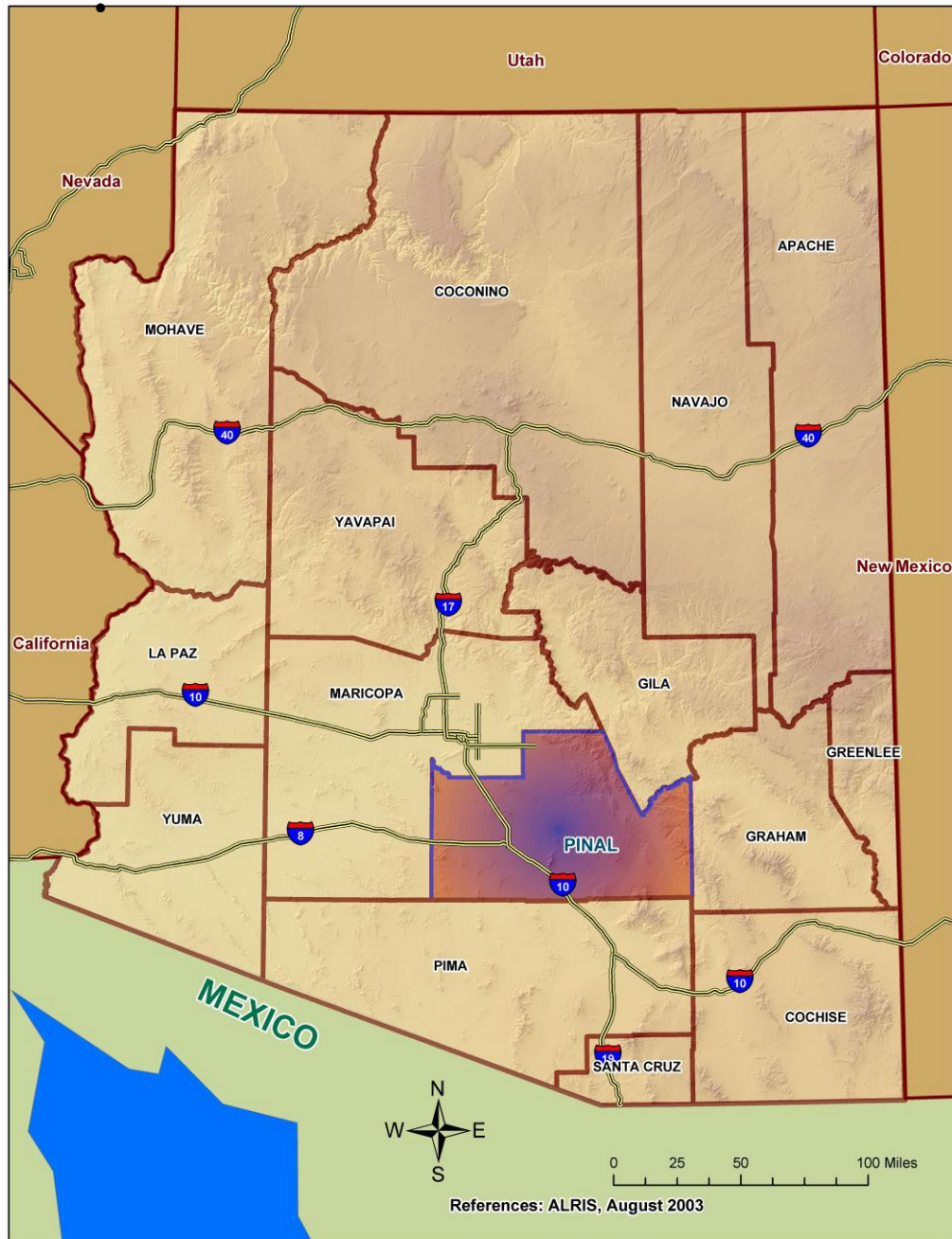
- **Arizona Mountain Forests** – mountainous landscape moderate to steep slopes. Elevations from approximately 4,000-13,000 feet, resulting in comparatively cool summers and cold winters. Vegetation is largely high altitude grasses, shrubs, brush, and conifer forests.
- **Chihuahuan Desert** – high altitude deserts and foothills and is found in much of the southeastern portion of Arizona. Elevations vary between 3,000-4,500 feet. Average temperature tends to be cooler than the Sonoran Desert due to the elevation differences. However, like its lower elevation cousin, the summers are hot and dry with mild to cool winters.
- **Sierra Madre Occidental Pine-Oak Forest** – predominant to mountainous regions in southeast Arizona with elevations generally above 5,000 feet. Tends to be cool during the summer and cold in winter.
- **Sonoran Desert** – an arid environment that covers much of southwestern Arizona. Elevation varies from approximately sea level to 3,000 feet. Vegetation in this zone is comprised mainly

¹ Arizona Department of Commerce, 2008, *Community Profile for Pinal County*

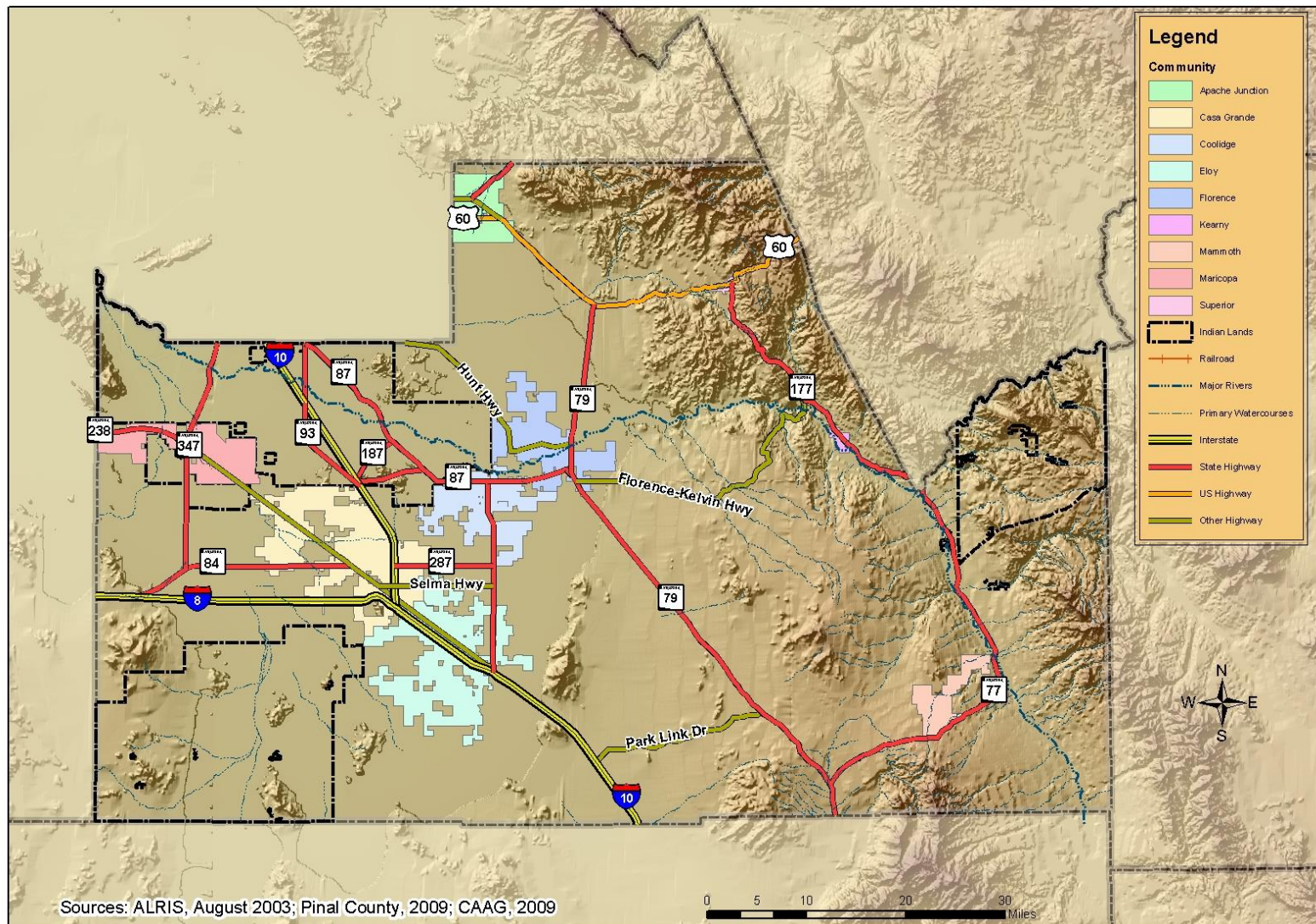
² World Wildlife Fund, 2010, GIS database of Terrestrial Ecoregions

of Sonoran Desert Scrub and is one of the few locations where saguaro cactus can be found. It is typically hot and dry during the summer and mild during the winter.

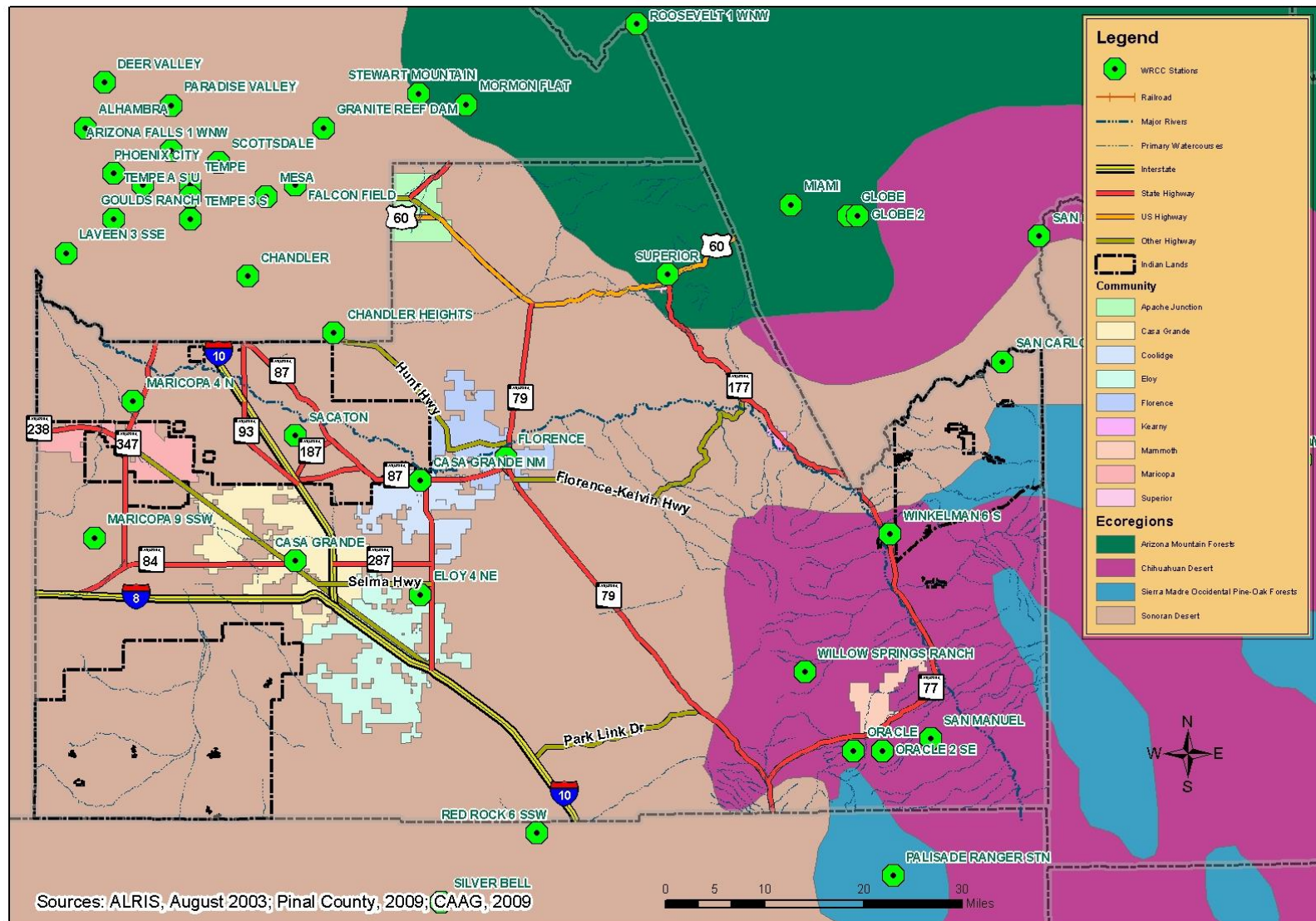
Land ownership within Pinal County is divided between Indian Reservation (32%), Private (29%), U.S. Forest Land (20%), State Trust Land (11%), Bureau of Land Management (7%), and other uses (1%).



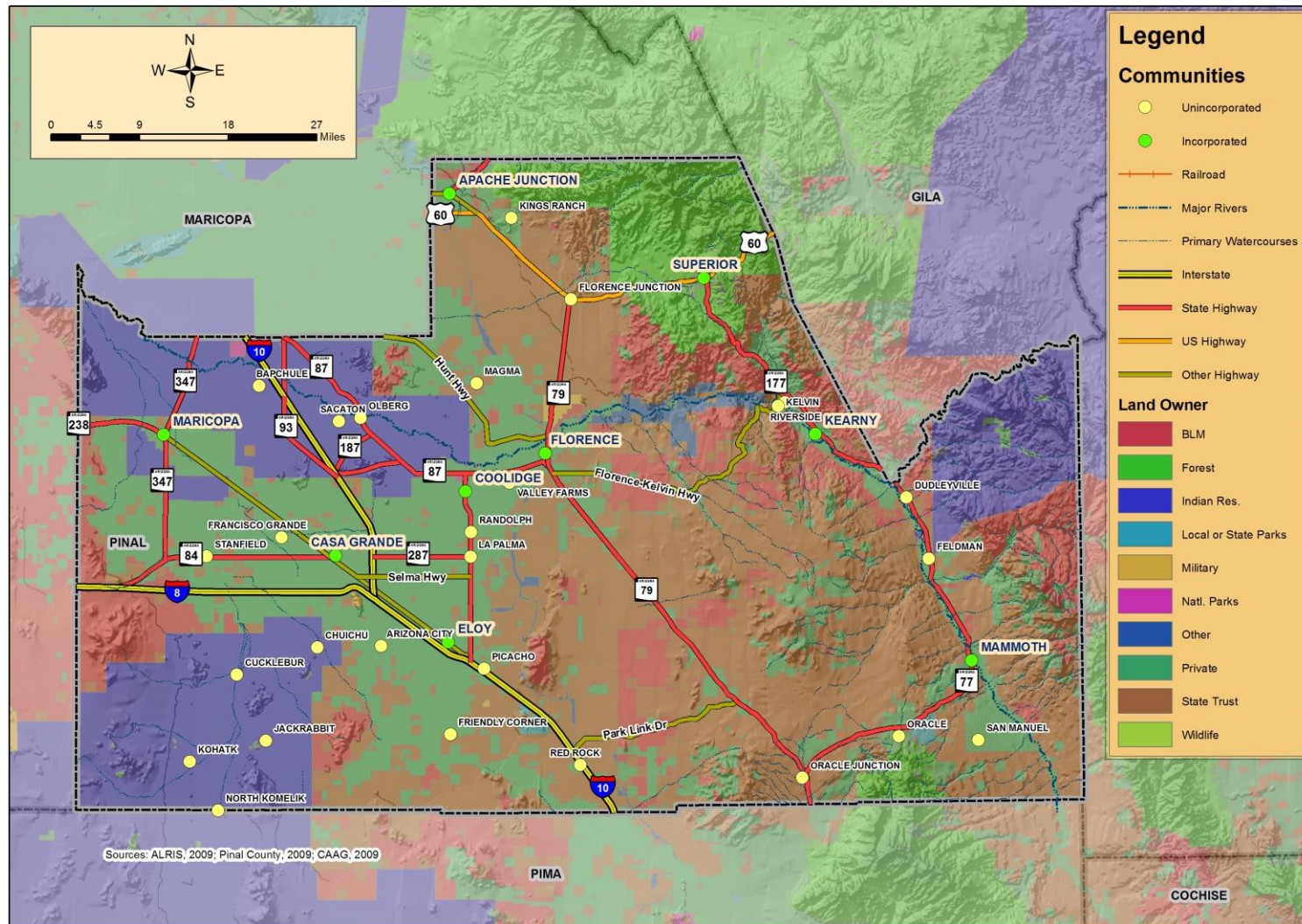
Map 2-1: Vicinity



Map 2-2: General Location and Transportation



Map 2-3: Ecoregions



Map 2-4: Community Location and Land Ownership

Climate

For the majority of Pinal County, the climate is typical to the Sonoran Desert areas of the state. In the relatively small areas of the county above 4,000 feet mean sea level, the climate tends to be more moderate. Climatic statistics for weather stations within Pinal County are produced by the Western Region Climate Center³ and span records dating back to the early 1900's.

Average temperatures within the County range from near freezing during the winter months to over 100°F during the summer months. The severity of temperatures in either extreme is highly dependent upon the location, and more importantly the altitude, within the county. For instance, temperature extremes in the foothill communities will generally be about 10° less than those in the valley communities.

Precipitation throughout Pinal County is governed to a great extent by elevation and season of the year. From November through March, storm systems from the Pacific Ocean cross the state as broad winter storms producing mild precipitation events and snowstorms at the higher elevations. Summer rainfall begins early in July and usually lasts until mid-September. Moisture-bearing winds move into Arizona at the surface from the southwest (Gulf of California) and aloft from the southeast (Gulf of Mexico). The shift in wind direction, termed the North American Monsoon, produces summer rains in the form of thunderstorms that result largely from excessive heating of the land surface and the subsequent lifting moisture-laden air, especially along the primary mountain ranges. Thus, the strongest thunderstorms are usually found in the mountainous regions of the central southeastern portions of Arizona. These thunderstorms are often accompanied by strong winds, blowing dust, and infrequent hail storms.⁴

Table 2-1: Average Climate Based on Florence as Location												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Avg High Temp (F)	66	70	74	83	91	101	102	101	97	87	74	66
Avg Low Temp (F)	38	41	44	50	58	67	76	75	69	57	44	39
Avg Precip (Inches)	1.06	1.06	1.14	.39	.28	.16	.94	1.22	.91	.91	.75	1.22
Source: U.S. Climate Data, http://www.usclimatedata.com/												

Population

As of January 2015, the total population for Pinal County is estimated to be 402,560 residents, which is nearly 200% greater than the 2003 estimate of 201,565 reported in the 2005 Plan. The majority of the citizens still live in the incorporated communities or reservation portion of Pinal County. The largest community is Casa Grande. All five incorporated cities and four towns are geographically dispersed throughout the County from each other. The other un-incorporated communities and places located throughout the county are usually situated along a major highway and are mostly comprised of only one structure or landmark.

³ Most of the data provided and summarized in this plan are taken from the WRCC website beginning at the following URL:
<http://www.wrcc.dri.edu/CLIMATEDATA.html>

⁴ Office of the State Climatologist for Arizona, 2004. Partially taken from the following weblink:
<http://geography.asu.edu/azclimate/narrative.htm>

Table 2-2: Population Estimates for Pinal County			
Jurisdiction	2010	2014	2020
Pinal County (Unincorporated)	187,868	199,215	235,715
Apache Junction	35,534	37,339	42,226
Casa Grande	48,664	50,821	60,135
Coolidge	11,855	12,027	17,698
Eloy	16,657	16,531	27,798
Florence	25,537	26,828	38,147
Kearny	1,947	1,989	2,107
Mammoth	1,425	1,451	1,801
Maricopa	43,598	46,708	63,861
Superior	2,835	2,869	3,189
Source: https://population.az.gov/population-estimates			

Economy

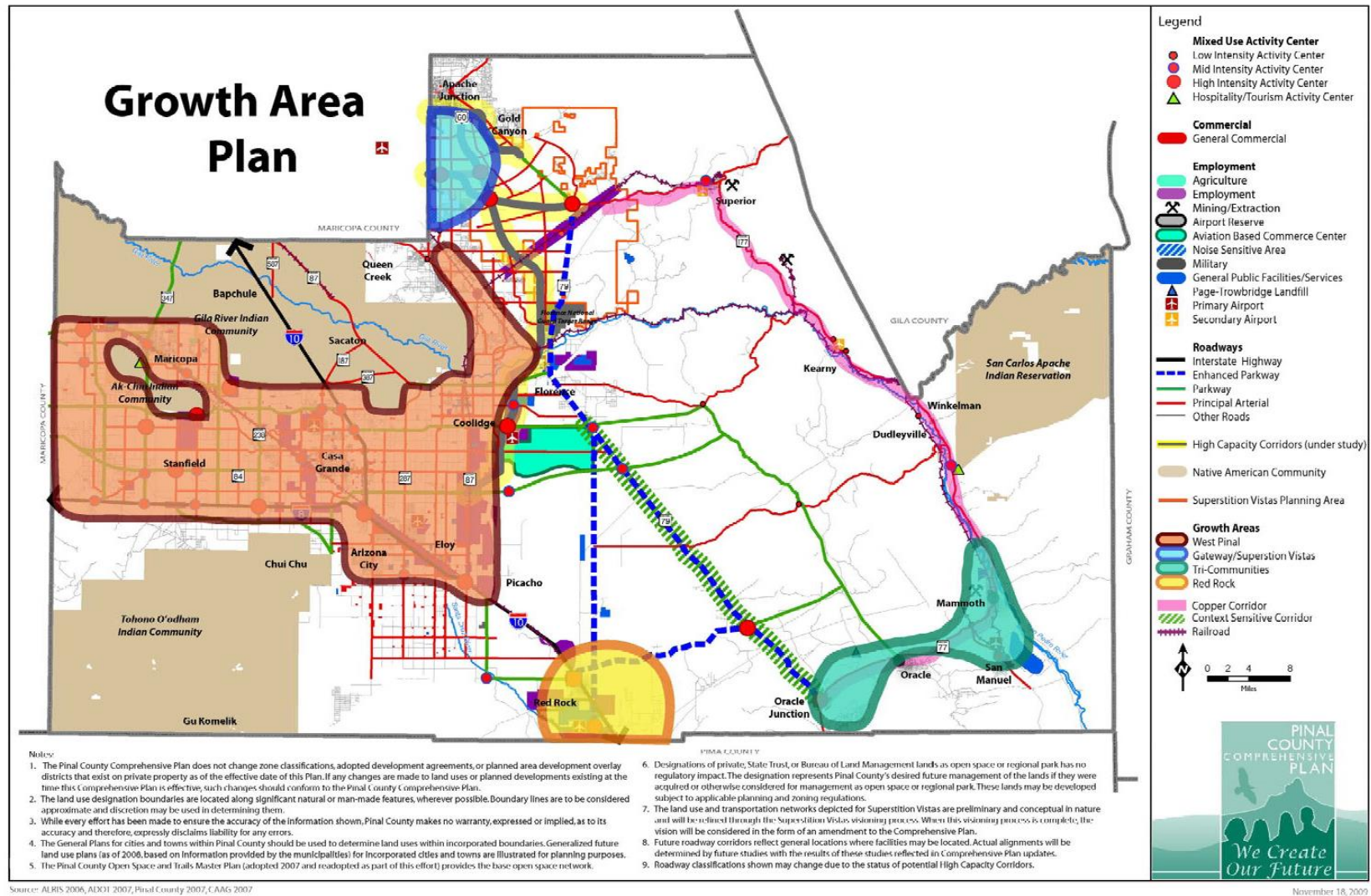
Many communities throughout Pinal County have been traditionally involved with copper mining, smelting, milling and refining, while others have developed agriculture based-economies. The larger communities such as Maricopa, Apache Junction, Coolidge, Eloy, and especially Casa Grande have included manufacturing, transportation/logistics, trade and services to diversify their economic base.

The residential and commercial/industrial growth experienced by Pinal County is through the expansion of the Sun Corridor which includes most of the county but more specifically areas in and around I-10 and I-8. The entire county is now included as part of Phoenix Federal Foreign Trade Zone #75 which carries significant tax reduction programs for manufacturing/warehousing companies that qualify. The balance of the county focuses on public administration, health services, retail trade, tourism, leisure and hospitality.

Over the last 13 years, and especially during the period of 2004-2008, people have flocked to Pinal County because of the affordability of larger homes at a lower price and the rural living. Enhanced growth factors of economic opportunity, cheap housing and land, beneficial climate, and an active lifestyle are transforming the region from a primarily agricultural center to a vibrant commercial, industrial, and recreational hub. Growth in the northern areas of the county commonly bordering Maricopa County, are due to the steady expansion of the Phoenix metropolitan areas. This is especially true in the areas around Apache Junction and Maricopa. Other areas around Coolidge, Casa Grande, and Eloy are also significantly outpacing previous population projections. This rapid growth presents a significant challenge to the County in maintaining sustained economic prosperity, enhancing the quality of life, and safety of county residents. Pinal County still maintains a current annual growth rate of 1.9% or about 7,000-8,000 new residents each year.

As of March 2010, the labor force was estimated at 125,225 with an unemployment rate of 11.8%.^[1] As of May 2015, the labor force was estimated at 152,200 with an unemployment rate of 5.8% which is a very good sign of economic prosperity returning to the county.

^[1] Source: Arizona Workforce Informer website at:
<http://www.workforce.az.gov/cgi/dataanalysis/?PAGEID=94&SUBID=142>



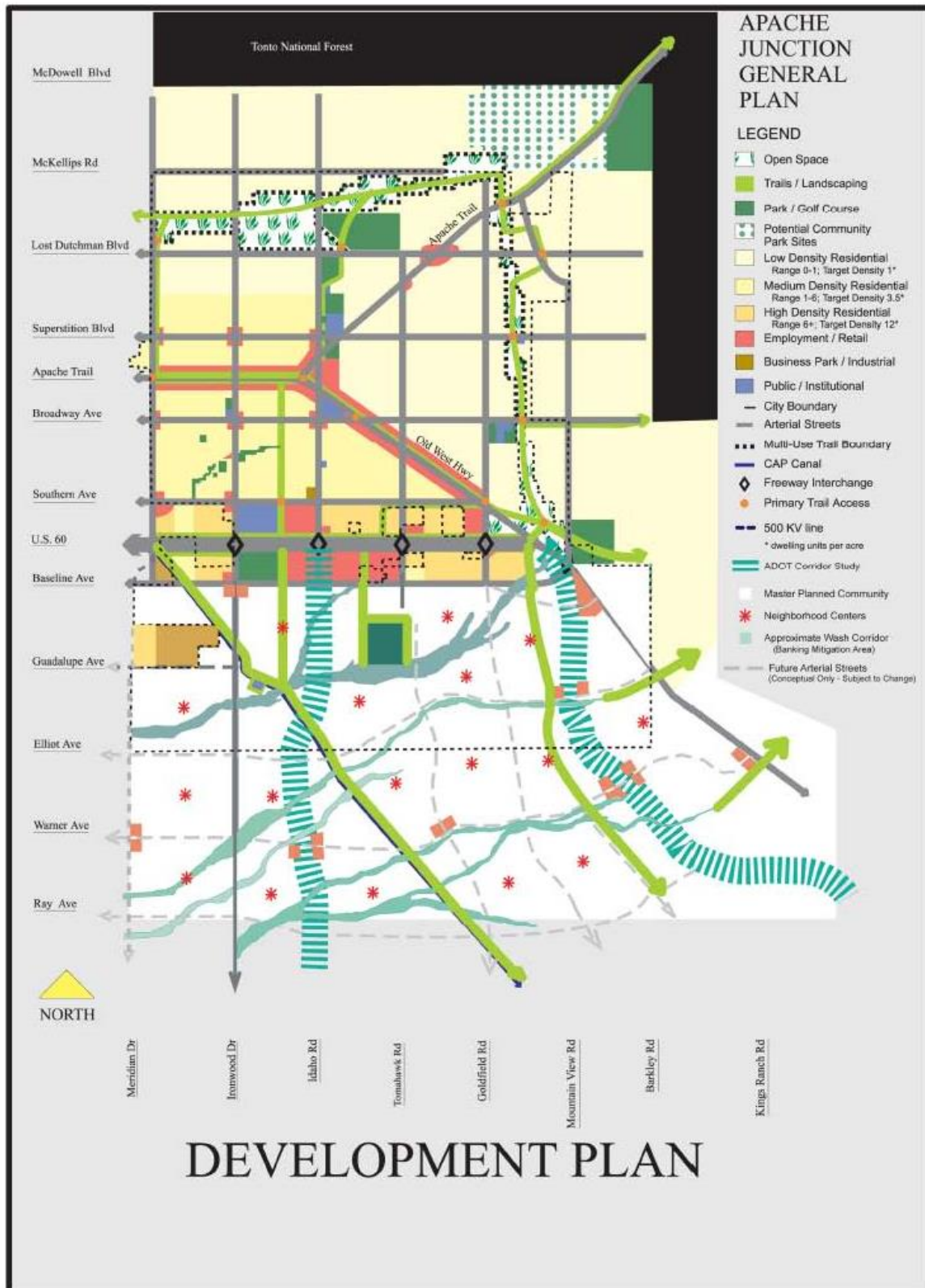
Map 2-5: Pinal County Growth Area

2.2 Jurisdictional Overviews

2.2.1 Apache Junction

Apache Junction received its name due to its location at the western end of the Apache trail, which in 1905, was created as a route from Phoenix and Globe to the construction site of the Roosevelt Dam. The route helped to transport needed supplies and parallels the Apache Indian's ancient path through the canyons. Today, Apache Junction is the eastern gateway into the Phoenix metropolitan area making US Highway 60 (Superstition Freeway) traveler's primary route into the Phoenix valley. Apache Junction also acts as the western gateway to the majority of Tonto National Forest's aquatic recreation venues for the metropolitan area via Superstition Freeway and State Route 88. The community retains a southwestern territorial feel characterized as a horse community surrounded by open space and a gateway to natural splendor dominated by the nearby Superstition and Goldfield Mountains.

Geographically, Apache Junction is located in the extreme north-central portion of Pinal County. The City is at an elevation of 1,715 feet, and encompasses 36.5 square miles with a year-round population estimated at 37,000. Each year this number is estimated to double as the City welcomes over 40,000 seasonal winter residents. State Route 88, Apache Trail, and the Old West Highway intersect at the heart of the City, and along with the Superstition Freeway, serve as the major roadway corridors through the City.



Map 2-6: City of Apache Junction Land Use

2.2.2 Casa Grande

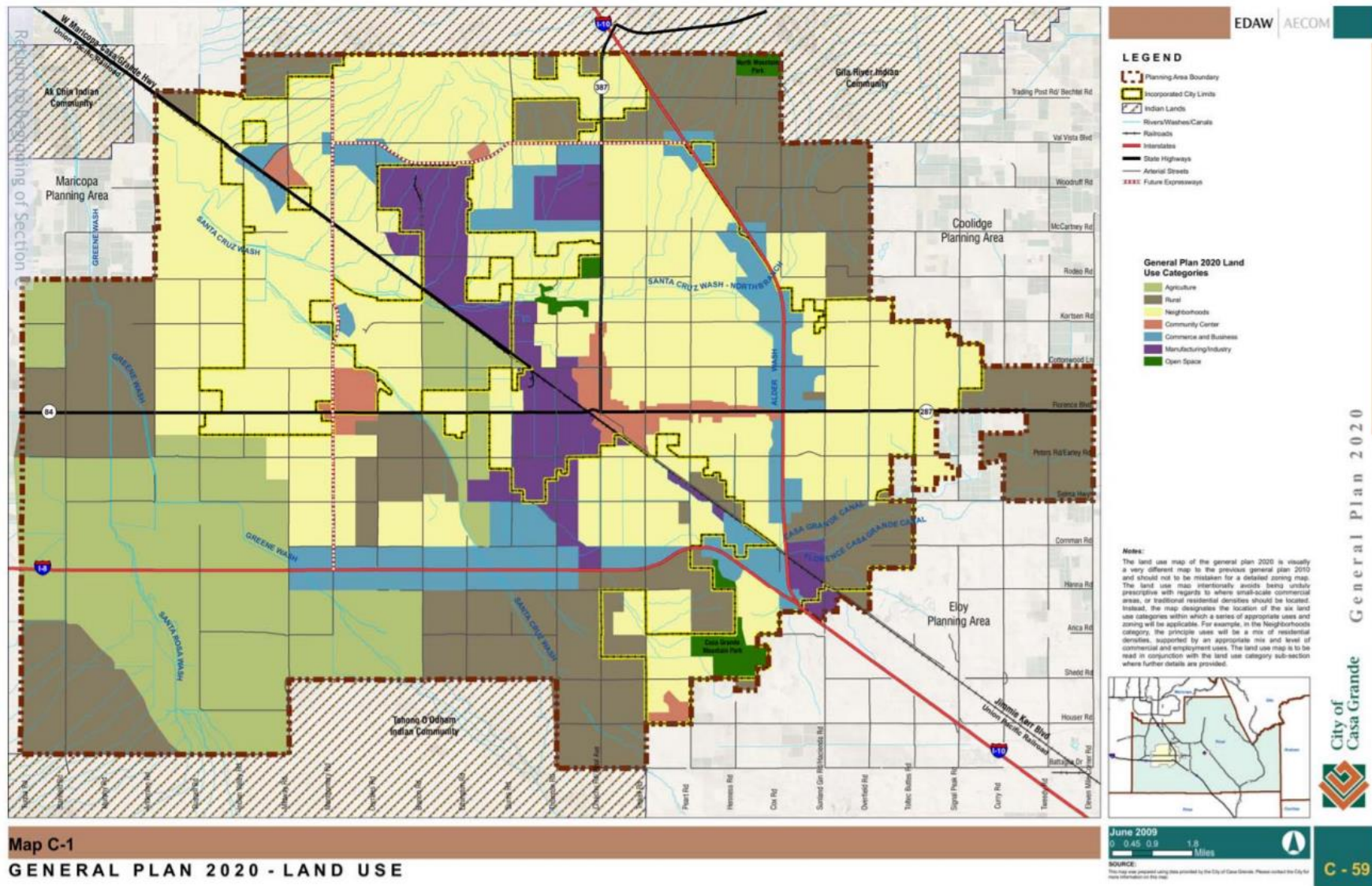
The City of Casa Grande traces its beginnings to the summer of 1879 when Southern Pacific Railroad stopped work on the rail line it was building from Yuma to El Paso, Texas. The construction crews ceased work due the hot temperatures. As supplies piled up at this desert stopping point, the railroad moved on leaving the community of Terminus, meaning “end-of-the-line” which consisted of five residents and three buildings, remaining. The railroad’s construction boss and 300 Chinese laborers arrived shortly thereafter and began laying track to Tucson. By September 1880, railroad executives renamed the settlement Casa Grande, for the prehistoric ruins located 20 miles northeast. By 1882, the mines used Casa Grande as the railhead. Twice in the same decade all the wooden structures burned to the ground, but community leaders and merchants rallied together to rebuild the town each time. During a national mining slump, Casa Grande nearly died in the 1890s. By 1902, the business district dwindled to a mercantile store, saloon, and two smaller stores. Agriculture became a mainstay for the community, while preventing the town from becoming another mining ghost town. Since its incorporation in 1915, the City has grown to be the largest community in western Pinal County.

Casa Grande is located in mid-central Pinal County and is situated at an elevation of 1,398 feet. Casa Grande is strategically located at the intersection of two interstate highways (I-8 and I-10) in an area known as Arizona’s Golden Corridor. Phoenix is located 45 miles to the northwest and Tucson 70 miles to the southeast. The Santa Cruz Wash and its North Branch are the two most prominent ephemeral watercourses impacting the City. The City limits of Casa Grande include approximately 110 square miles of developed and undeveloped land.⁵ Casa Grande’s location is primarily surrounded by Private and State Trust lands. Casa Grande is a progressive community with a rural heritage and hometown appeal. The economy is based around retail trade, shopping, manufacturing and agriculture. Based on Casa Grande’s current General Plan, the predominant land use is neighborhoods supported by agriculture, business/commerce, manufacturing/industrial uses.

The City of Casa Grande has a population of 50,111 with a civilian labor force of 18,493 (ACS 2009-2013) with an unemployment rate of 10.7%, a little higher than the State (9.9) and the Nation (9.3). In 2014, there were approximately \$200.3 million of taxable sales in the City.⁶

⁵ City of Casa Grande Web Site, Facts and Stats, Updated 2013

⁶ City of Casa Grande Finance Department



Map 2-7: City of Casa Grande Land Use

2.2.3 Coolidge

Founded in 1925 and incorporated in 1945, Coolidge is the commercial center of Arizona's cotton industry. According to the AZ Department of Commerce⁷, Coolidge was founded by R. J. Jones when he laid out an 80-acre site following the construction of Coolidge Dam and the delivery of precious irrigation water to flat desert lands. The City was named in honor of President Calvin Coolidge who dedicated the dam in 1930. Coolidge is also the home of the Casa Grande Ruins National Monument, which features a four-story caliche structure built around 1350 A.D. by the Hohokam people. It was the first historic site created by the United States Government, on June 22, 1892.

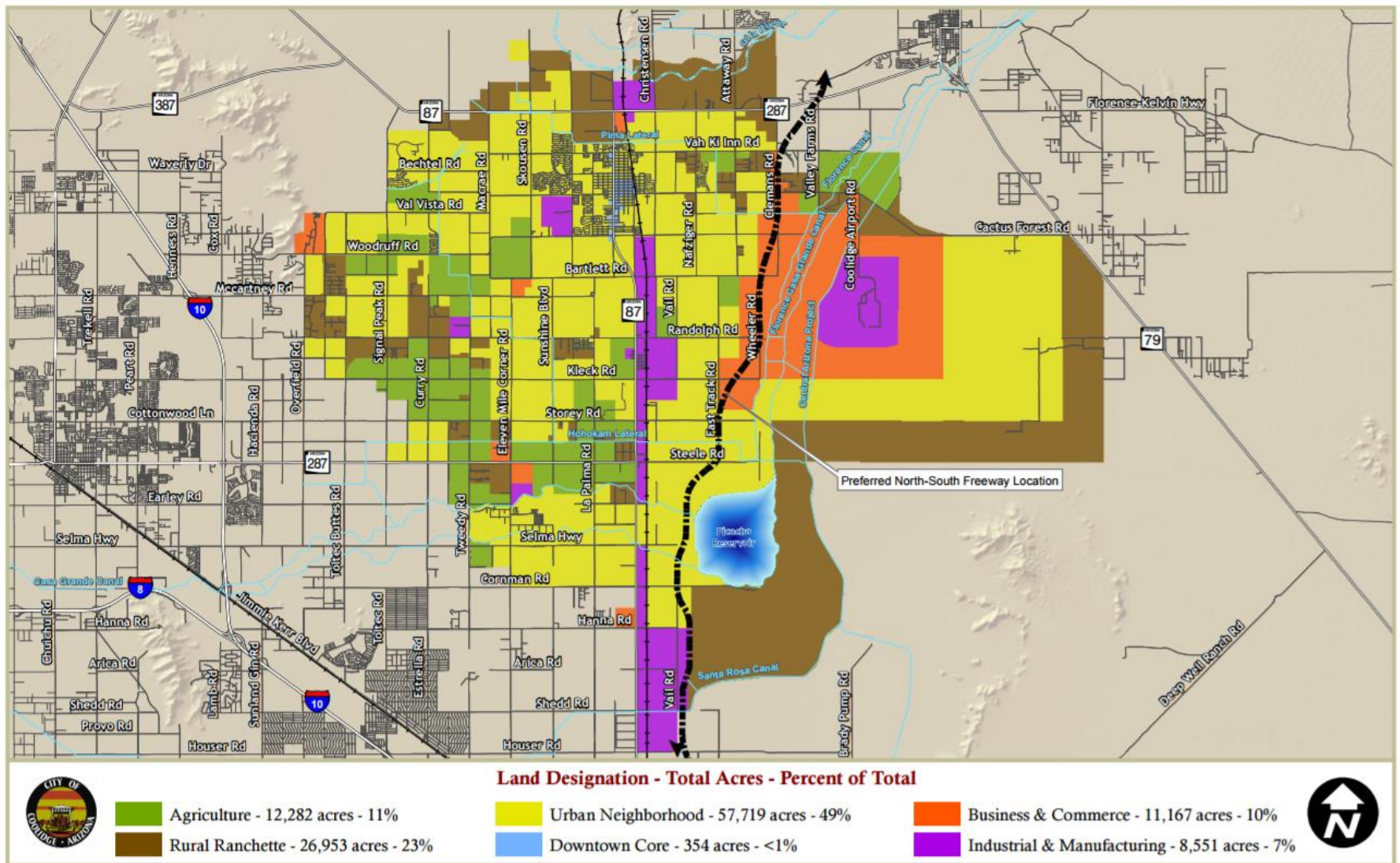
Coolidge is located in mid-central Pinal County and is situated at an elevation of 1,418 feet. State Routes 87 and 287 form the northern boundary of Coolidge with the southern extension of State Route 87 dividing the City. Phoenix is approximately 51 miles to the northwest and Tucson is approximately 67 miles to the southeast. The primary watercourse impacting the City is the Gila River, which is located approximately one-mile north of the City. The city limits of Coolidge include approximately 62 square miles of developed and undeveloped land. Coolidge's location is primarily surrounded by Private lands. Based on Coolidge's current General Plan, planned land uses vary from single family densities, commercial, industrial, and mix uses.

Up until the 1950s, the economy was primarily agriculture, and has since diversified into manufacturing, tourism and regional trade and services for agricultural producers and farm families. The 500-acre Pima-Coolidge Industrial park on the Gila River Indian Reservation has boosted manufacturing. The major public employers include City of Coolidge, Coolidge Unified School District, and Central Arizona College. The private employers include Wal-Mart Supercenter, Stinger Welding, and Bright International.

The civilian labor force in 2014 was 4,941 with an unemployment rate of 7.3%. Education, health care & social assistance was the highest ranked industry in terms of number of people employed, accounting for 25.4% of the labor force.

⁷ Arizona Department of Commerce, 2015, *Community Profile for Coolidge, Arizona*.

⁸ <http://www.azcommerce.com/doclib/COMMUNE/coolidge.pdf>



Map 2-8: City of Coolidge Land Use

2.2.4 Eloy

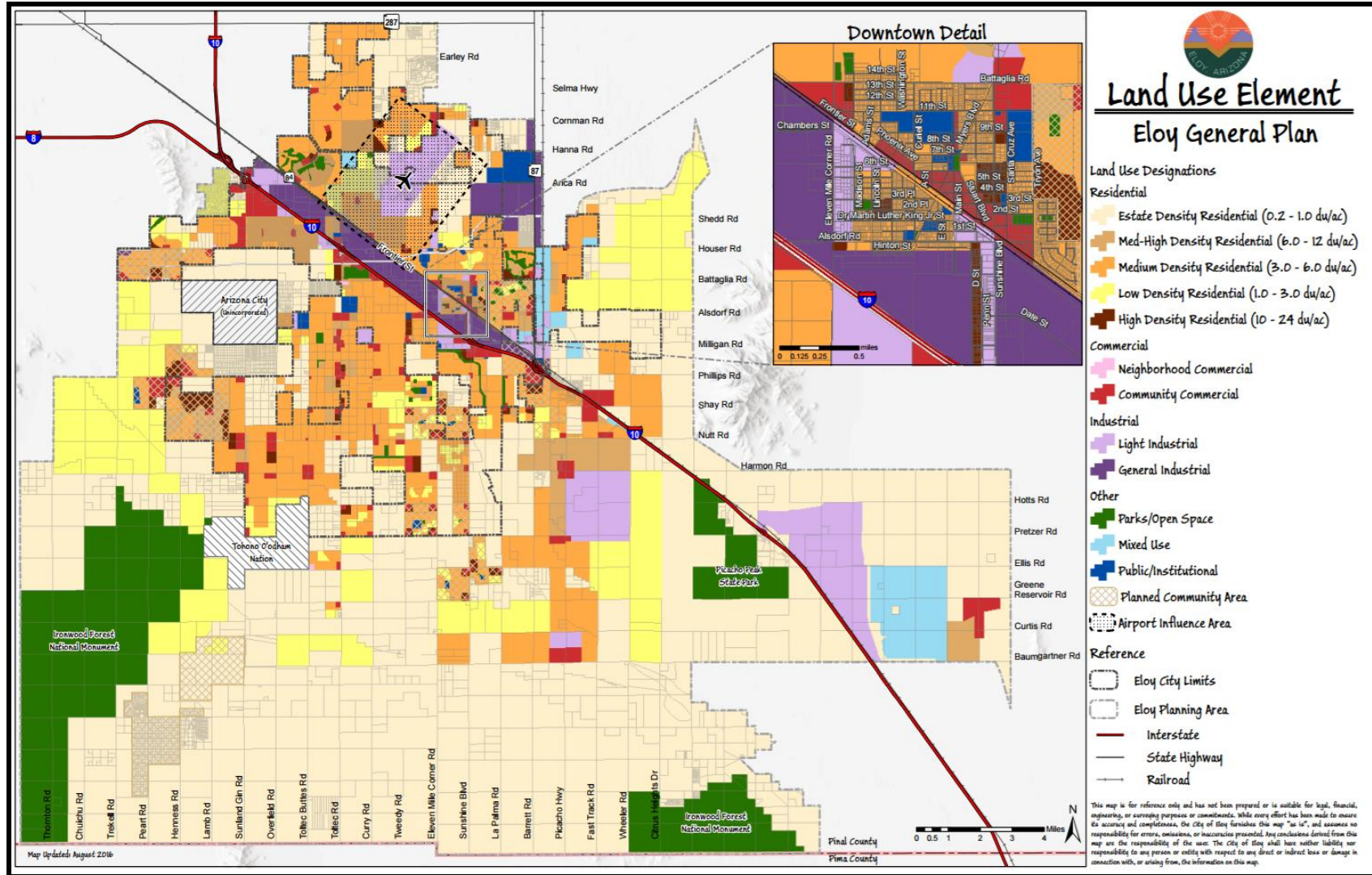
The City of Eloy is an agricultural/travel/commercial center situated between Phoenix and Tucson in a major growth corridor along Interstate 10. Eloy traces its origins to a time before the beginning of the 20th Century when the Southern Pacific Railroad was built to connect Tucson and Casa Grande. In 1902, the Southern Pacific Railroad built a switch approximately six miles west of Picacho Peak, which they named Eloy. After the construction of a levee across the Santa Cruz River near Eloy in 1908, the area became recognized for producing cotton and other agricultural products. Eloy is located within one of the state's most fertile agricultural areas known as the Santa Cruz Basin, which has over 100,000 irrigable acres. The city was officially incorporated in 1949.

Eloy is located in mid-central Pinal County and is situated at an elevation of 1,565 feet. Interstate Highway 10 divides the community and Interstate Highway 8 is nearby to the northwest. State Routes 87 and 287 are near the eastern and northern boundary of Eloy. Phoenix is approximately 69 miles to the northwest and Tucson is approximately 52 miles to the southeast. The primary watercourse impacting the City is the Santa Cruz River, which flows south to north through the City. The city limits of Eloy include approximately 119 square miles of developed and undeveloped land. Eloy's location is primarily surrounded by private lands.

Agriculture has historically been a large part of the City's economy. In recent years, a more diversified economic base had developed with over three-quarters of the city's business and nearly half its employment now in the industrial, wholesale/retail trade, and service sectors. Based on Eloy's current General Plan, planned land uses vary from multiple types of single family densities, commercial, industrial, and mixed use areas.

The civilian labor force in 2014 was 3,652 with an unemployment rate of 12.2%. Education, health care & social assistance was the highest ranked industry in terms of number of people employed, accounting for 27% of the labor force.⁹

⁹ <http://www.azcommerce.com/a/profiles/ViewProfile/57/Eloy>



Map 2-9: City of Eloy Land Use

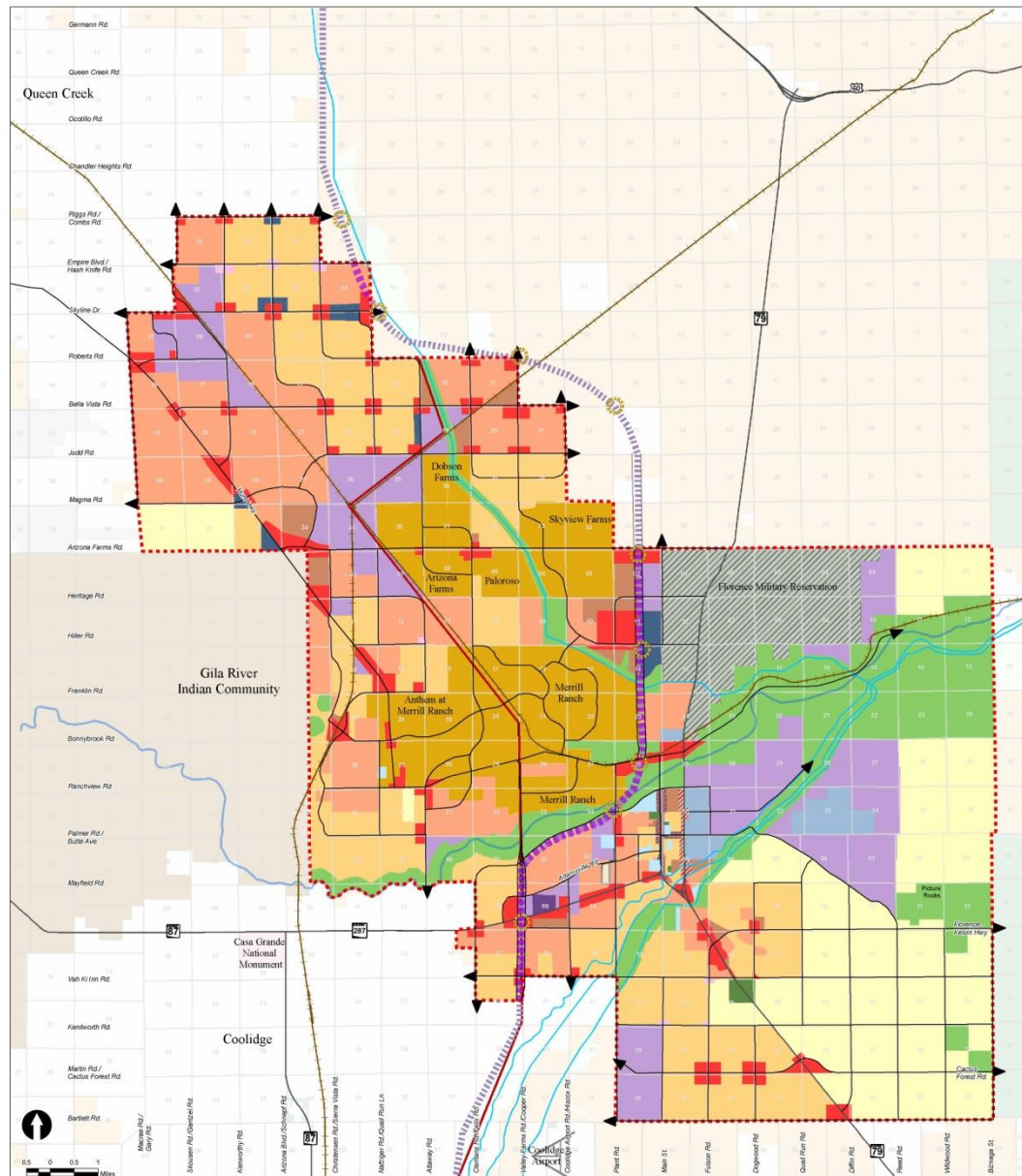
2.2.5 Florence

The Town of Florence is the County seat and home to the Pinal County government complex and the Arizona State Prison. The Town was first platted in 1866 by Colonel Levi Ruggles, an Indian Agent. In the 1920s, the Florence area became the agricultural center for the county. A few months after Florence was established as the County seat, silver was discovered in the mountains nearby. The Silver King Mine drew miners and entrepreneurs to Florence as well as a major stagecoach hub and pony express route. During the height of silver boom, Florence boasted 28 saloons being in business. In 1889, the mine closed and a sharp decline in population resulted. The town was incorporated in 1900 and in 1909 the Territorial Prison was moved from Yuma to Florence. During World War II, a prisoner of war camp was established just north of Florence to house German and Italian prisoners. In the 1960s, the site was converted into a retirement community, with lots sold for recreational vehicles and manufactured homes. An inventory of historical buildings was initiated in 1982 and over 125 buildings and sites were recognized and listed in the National Register of Historic Places. In the last decade, the Town has experienced the same building boom as the rest of Pinal County.

Florence is located in north central Pinal County and is situated at an elevation of 1,500 feet. State Highway 79 and 87 traverses the community. Nearby highways include Interstate 10, State Route 287 and Hunt Highway. Phoenix is approximately 61 miles to the northwest and Tucson is approximately 70 miles to the southeast. The primary watercourse impacting the Town is the Gila River, which flows east to west through the central part of the Town limits. The major transportation routes and land features around Florence are shown below. The Town limits of Florence include approximately 62 square miles of developed and undeveloped land. Florence's location is primarily surrounded by Private and State Trust lands.

The civilian labor force in 2014 was 3,170 with an unemployment rate of 8.3%. Major sources of employment for Florence include the State of Arizona and numerous private correctional facilities, a federal immigration center, and the county and town government. Public administration was the highest ranked industry in terms of number of people employed, accounting for 27.4% of the labor force. The mining industry still contributes to the local economy, but has dwindled greatly in the last decade. Other economic sectors include waste management, food services, retail trade, and travel accommodations. Agricultural products such as cotton, cattle, grains, and grapes make up the rest of the economy.

Based on Florence's current General Plan, land use planning includes various densities of residential development, commercial, industrial, and mixed land uses as illustrated below in Map 2-9.



Map 2-10: Town of Florence Land Use

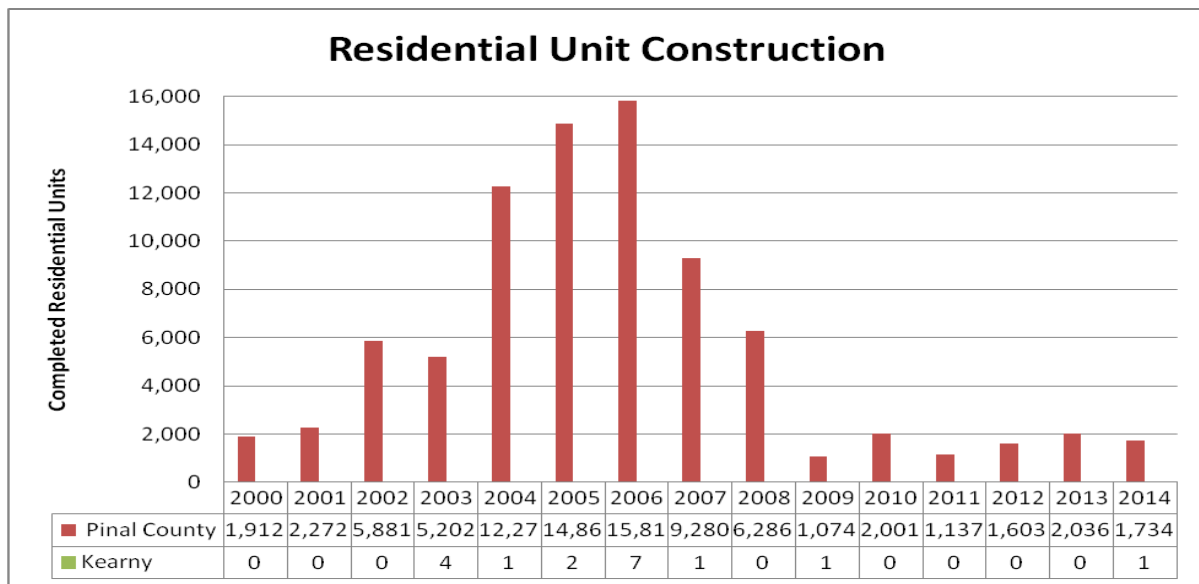
2.2.6 Kearny

During the period of 1849 – 1850, the leader of the “Army of the West”, General Stephen W. Kearny explored the area along the Gila River. The base camp he set up would later be known as the Town of Kearny. In 1958, a planned community was built for workers of Kennecott Copper Company which worked an open-pit mine and reduction plant. Currently, American Smelting and Refining Company operate the large open-pit copper mine, reduction plant and smelter near the town.

Kearny is located in eastern Pinal County and is situated at an elevation of 2,020 feet. State Highway 177 passes through the community. Other nearby highways include U.S. Highway 60. Phoenix is approximately 78 miles to the west and Tucson is approximately 80 miles to the south. The primary watercourse impacting the Town is the Gila River, which flows from the south to the north through the Town. The town limits of Kearny include approximately four square miles of developed and undeveloped land. Kearny’s location is primarily surrounded by Private and Bureaus of Land Management lands.

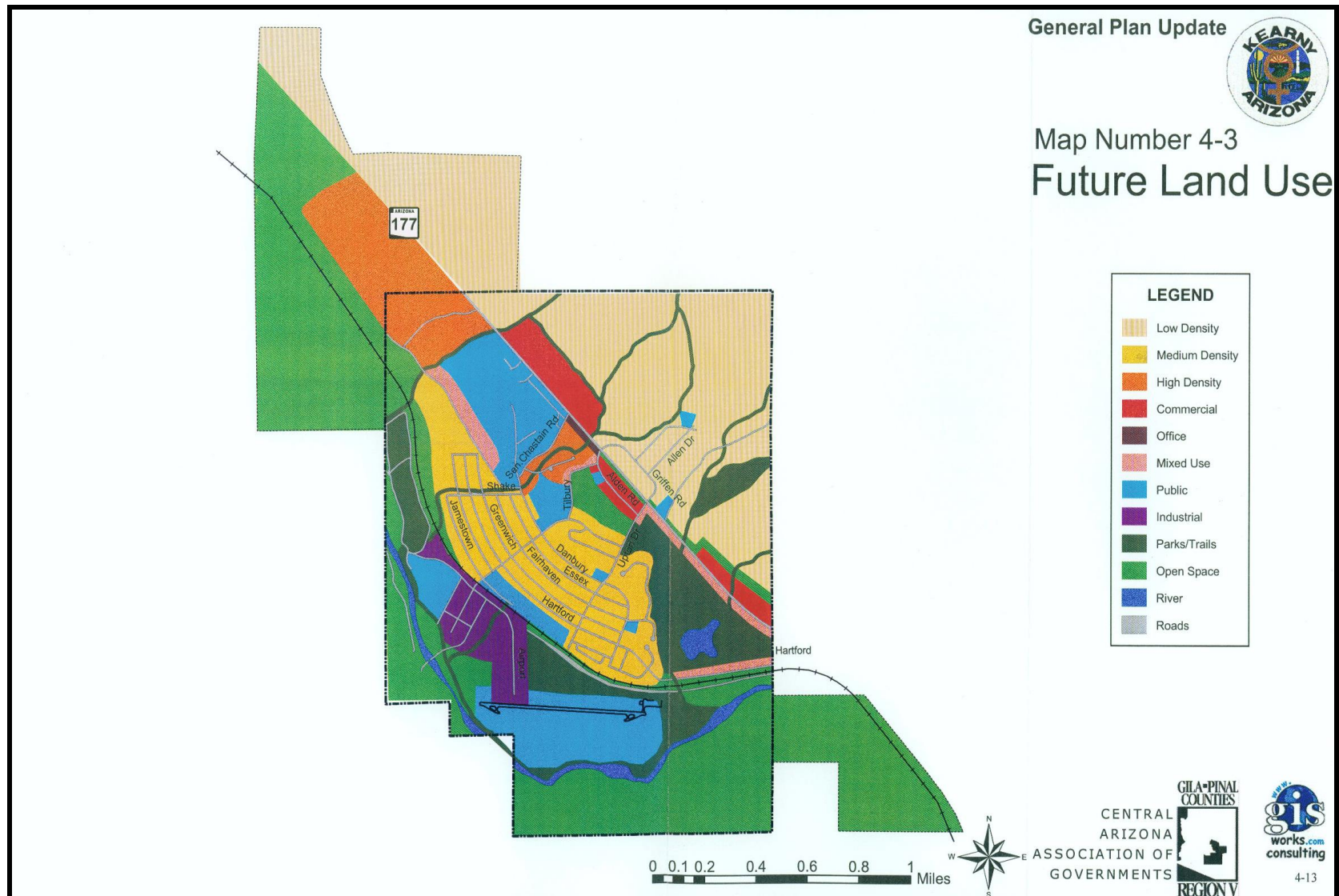
The civilian labor force in 2014 was 967 with an unemployment rate of 2.7%. Agriculture, forestry, fishing, hunting, & mining was the highest ranked industry in terms of number of people employed, accounting for 31.3% of the labor force. The major source of employment within this industry, and for the community as a whole, is the American Smelting and Refining Company’s smelter in Hayden and the mine itself. Other employment opportunities are found in the commercial and services sectors.¹⁰

Based on Kearny’s current General Plan, land use planning varies from multiple residential densities, commercial, and industrial. Residential units completed in the Town over the period of 2000-2014 are shown below. County-wide totals are also provided for comparison.



Residential units completed for Kearny during 2000 to 2014

¹⁰ <http://www.azcommerce.com/a/profiles/ViewProfile/76/Kearny/>



Map 2-11: Town of Kearny Land Use

2.2.7 Mammoth

The following description of the history for Mammoth is published by Carl Chapman of West USA Realty, Inc.:¹¹

“In 1883, Frank Schultz located the first mine in the area. The name Mammoth was given to the mine because it was believed that the gold ore deposits were of mammoth proportions. The mine realized that it was impossible to work the ore at the mine site. A stamp mill had to be built to solve the problem and the best place for the mill was along the San Pedro River. The location of the stamp mill became known as Mammoth, named after the mine. In the beginning, the ore was hauled down to the mill by mule teams and wagons. Then in 1903, aerial trams were constructed. Bucket loads of ore were sent down from the mine to the mill. Throughout the 1880’s, the town was one of the busiest mining camps in the country. The Mammoth post office was established in 1887. The Mammoth Mine changed owners and work was shut down in 1895. During this time, the mine developed a new system of milling. When molybdenum was found in the tailings during 1936, the mine had a short-lived resurgence. The Town was incorporated in 1958. The discovery of the nearby San Manuel Mine brought Mammoth alive again. The San Manuel Mine opened in the 1950’s, bringing more jobs to the surrounding mining towns. Today, production of metal continues to play a large role in the Town’s economy, along with ranching.”

Mammoth is located in southeastern Pinal County and is situated at an elevation of 2,350 feet. State Highway 77 passes through the community. Other nearby highways include Interstate 10 and State Route 177. Phoenix is approximately 140 miles to the northwest and Tucson is approximately 40 miles southwest. The primary watercourse impacting the Town is the San Pedro River, which flows to the north on eastside of town. The town limits of Mammoth include approximately 26 square miles of developed and undeveloped land. Mammoth’s location is primarily surrounded by Private and State Trust lands. Land uses represent a typical small town mix of residential, commercial, industrial and open space areas.

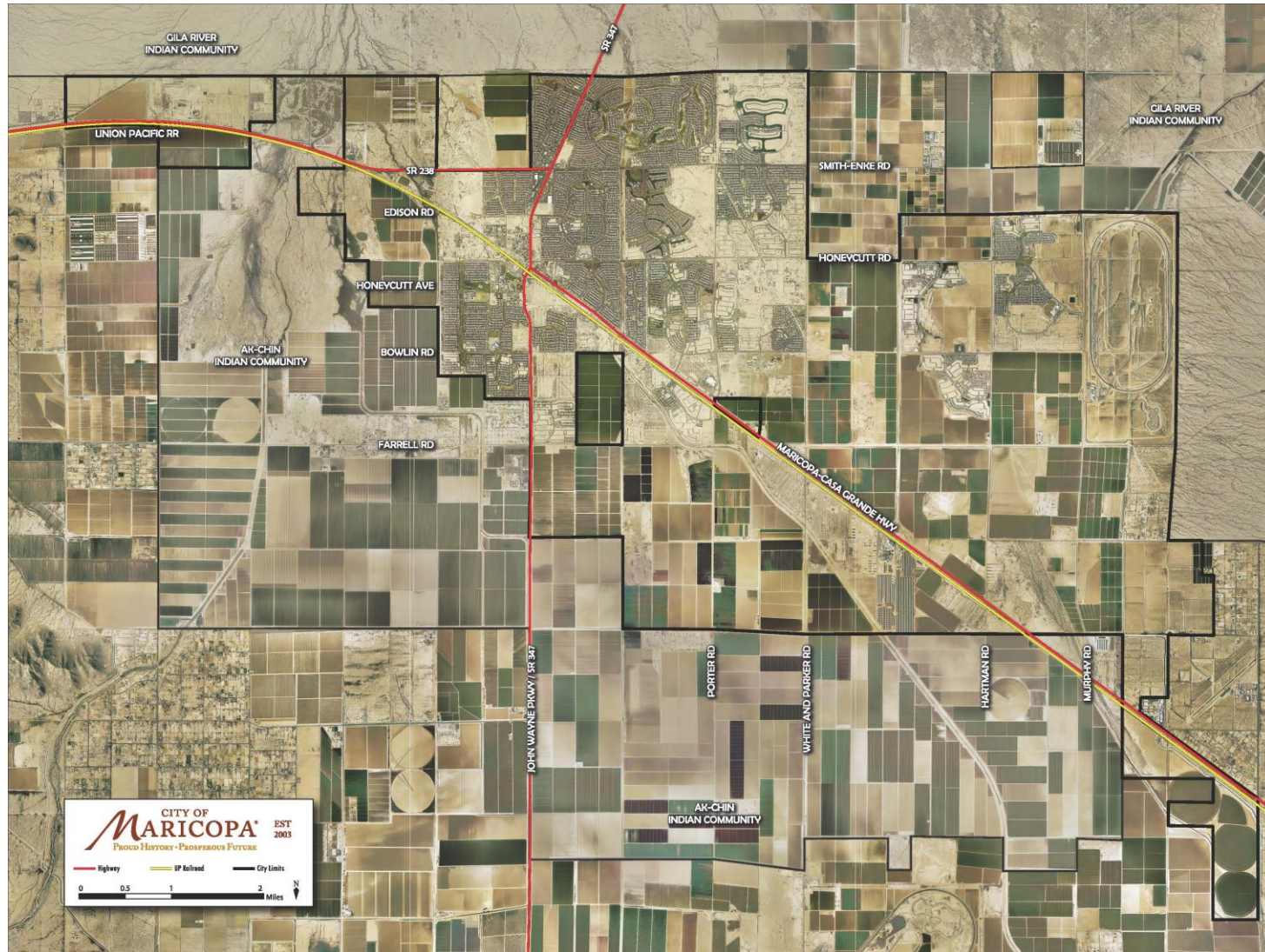
¹¹ <http://www.arizonan.com/Mammoth/>

2.2.8 Maricopa

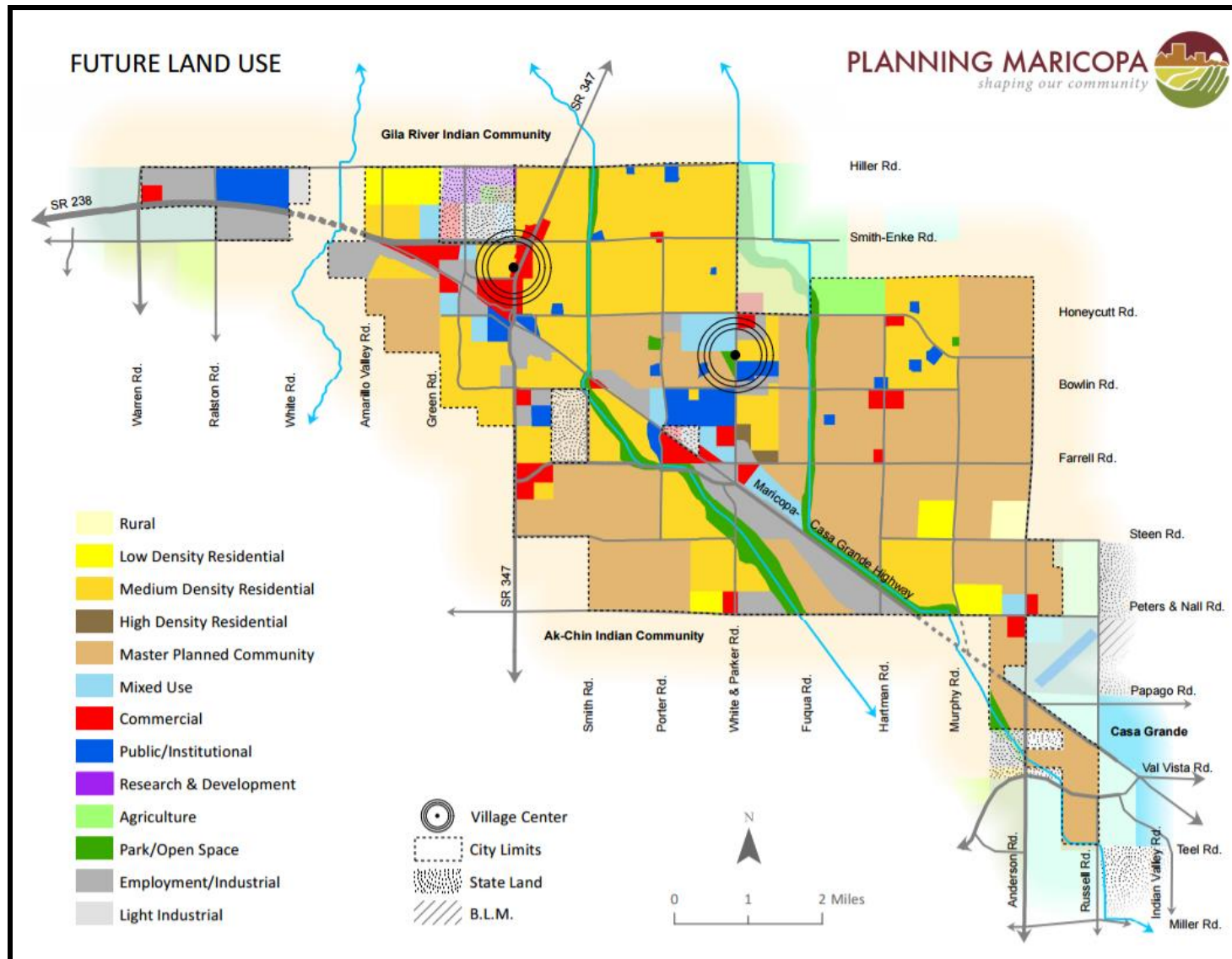
Maricopa's long and rich history starts over 300 years ago beginning with a 1694 journal entry by Father Eusebio Francisco Kino describing this area and calling it Maricopa Wells. During the mid – 1800s, it was a dependable source of water along the Gila Trail. This location became an important and well known stage stop, offering food, water and support to weary travelers on the Butterfield Stage Line traveling between San Antonio and San Diego. In the 1870s, the railroad was constructed south of the wells. At that time, Phoenix was just a little village exercising its political influence which led to the building of a spur line from Maricopa to Phoenix. In July of 1887, Maricopa became a major junction for two railroads, the Southern Pacific Railroad and Maricopa & Phoenix (M&P) Railroad, hundreds of people could be seen daily, waiting at the station or one of the two hotels for traveling to Tempe and Phoenix. The M&P suffered difficulties including frequent floods that washed out the line causing the trains to be days or weeks late. In 1935, the M&P was shut down and tracks were pulled up all the way to Phoenix. Maricopa's pace slowed down considerably due to lack of travelers from the north. The community once again relied considerably on a robust and consistent agricultural production, with cotton being the staple crop through the 1950s and 1960s. In the 1970s and 1980s hundreds of acres of farmland were sold to developers who subdivided it into three and a third acre mini-farms which attracted large numbers of residents from all walks of life and occupations, bringing with them a dream for a better life and a desire to raise their children in the country. The City incorporated on October 15, 2003, and has transitioned from a predominantly agricultural community to a residential bedroom community within easy commuting distance to Phoenix or Casa Grande. Since its incorporation in October 2003, the City of Maricopa has become Arizona's fastest growing community, transforming from an agricultural community of under 2000 to a city of 45,000 today. The population is projected to be of 144,500 residents by 2040. The average household size in Maricopa is currently 3.0. The number of families is 11,617. Maricopa's labor pool is highly educated with 48.7% holding a bachelor's degree or advanced degree at 89%.

The City of Maricopa is located in northwestern Pinal County and is situated at an elevation of 1,176 feet. State Highway 347 and 238 intersect within the community and other nearby highways include Interstate 8 and 10. Phoenix is approximately 15 miles to the north and Tucson is approximately 68 miles southeast. The primary watercourses impacting the city are Vekol, Santa Rosa and Santa Cruz Washes. The major transportation routes are the railroad tracks located center of the city. The railroad divides the city in two when regular trains travel, and passenger commuter trains stop to load and unload passengers. The City limits of Maricopa include approximately 56 square miles of land. Maricopa's location is primarily surrounded by private, State Trust and Indian lands.

In the fall of 2014, the City Council authorized City Manager Gregory Rose to launch a comprehensive citizen-driven project to create a strategic plan designed to guide Maricopa into the next 25 years of its future. The Maricopa 2040 Vision and Strategic Plan is a broad blueprint for positive change and progress that defines a vision and key strategic outcomes required to achieve that vision. The City's intent is to pursue a singular vision which, when realized, offers its residents a proud heritage, a high quality of life, a prosperous future, and the enjoyment of residing in an attractive City; a great place to live, work and play. On May 5, 2015 the Steering Committee presented a copy of the City of Maricopa 2040 Vision and Strategic Plan to the City Council for adoption. The strategic plan also defines those areas of strategic importance and focus stated as Vision Elements, where critical resources should be spent – time, talent and money – to reach the vision and answer the question, "What really is most important?" For each Vision Element, specific goals and strategies are proposed to aid the community and City in their pursuits to address the element toward achievement



Map 2-12: City of Maricopa



Map 2-13: City of Maricopa Land Use

2.2.9 Superior

The Town of Superior incorporated in 1976.

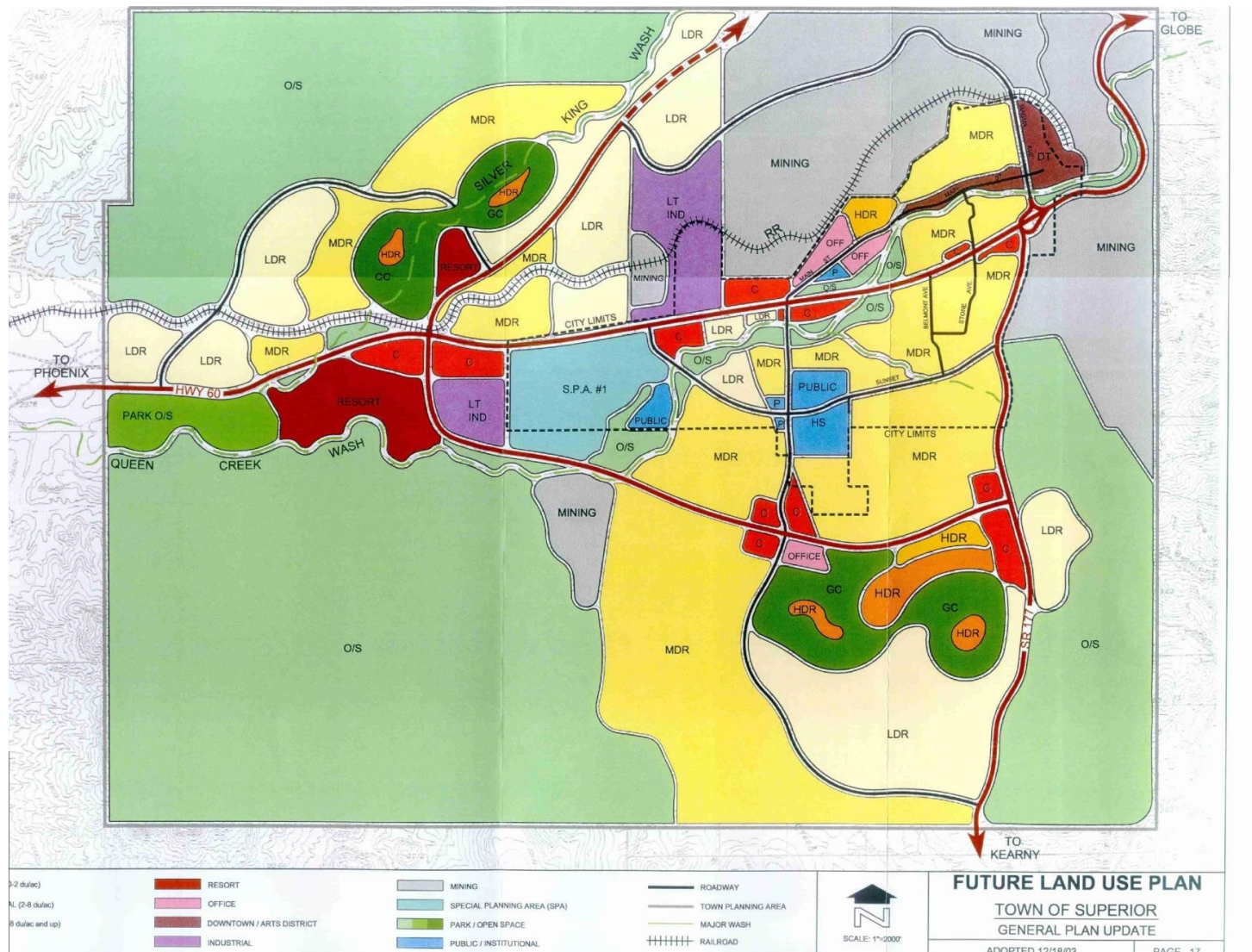
The Town of Superior is located in the Northeastern part of Pinal County, Arizona, and is situated at an elevation of 2,841 feet. The town covers approximately 1.94 square miles of formal boundaries and has 22.6 miles of total road surface. Superior has a transient working population with a base of 2,920 people as of the 2015, census. The Town is geographically positioned at longitude 111.11 degrees west and latitude 33.29 degrees north. U.S Highway 60 and State Highway 177 intersect within the community. The Town of Superior is surrounded by high hills and small mountain ranges consisting primarily of private and forest lands. Therefore, Superior receives a lot of rain water runoff from these mountain areas during monsoon season. The primary watercourse impacting the Town is Queen Creek.

Phoenix is approximately 63 miles to the west and Tucson is approximately 102 miles southward.

Based on Superior's current General Plan, land uses within the town reflect typical small town mixtures of commercial, residential, industrial, and open space areas, shown in figure 3-26. In an effort to build a diverse and sustainable economy for the Superior community, the town has embarked on a large, long term, project to attract new business and help existing businesses currently in town. As of 2016, the number of downtown businesses has increased to 25 from 18 in 2009, and the Chamber of Commerce now has 125 members, up from 20 in 2009.

The table below gives the most recent look into the town's housing survey. Superior residents have an average household income of around \$40,399, with the average family size of 3, and property values averaging at \$87,840.

Community Housing Survey 2013-2014		
Overall Condition	Number of Units	Total Percentage
Acceptable Housing	1,090	84.9
Noticeable Signs of Deterioration	27	2.1
Dilapidated or Burned House	167	13.0
Total	1,284	100.0



Map 2-14: Town of Superior Land Use

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SECTION 3: PLANNING PROCESS

3.1 Section Changes

3.2 Primary Points of Contact

**Throughout the update process, several jurisdictions had their primary point of contact change. The most up to date contact for each jurisdiction is provided below.*

Pinal County

Chuck Kmet
Emergency Manager
Office of Emergency
Management

Apache Junction

Shane Kiesow
Public Works Manager
City of Apache Junction

Casa Grande

Pedro Apodaca
Street Superintendent
City of Casa Grande

Coolidge

Mark Dillon
Chief
Fire Department

Eloy

Ken Martin
Public Works Director
City of Eloy

Florence

Terry Tryon
Lieutenant
Florence Police Department

Kearny

Anna Flores
Town Manager
Town of Kearny

Mammoth

Don Jones
Town Manager
Town of Mammoth

Maricopa

Eddie Rodriguez
Deputy Fire Marshal
Maricopa Fire Department

Superior

David Neuss
Chief
Superior Police Department

3.3 Planning Team and Activities

The role of the Planning Team was to perform the coordination, research, and planning activities required to update the 2010 Plan. The planning meetings were structured to progress through the planning process. Steps and procedures were discussed at each Planning Team meeting, and assignments were given as necessary. Each meeting built on information discussed and assignments given at the previous meeting.

At the beginning of this planning process, Pinal County identified members for the Planning Team by initiating contact with, and extending invitations to, all incorporated communities within the County limits. Other entities that were invited to participate included: Greene Reservoir Flood Control District, Stanfield Flood Control District, Midway Flood Control District, Magma Flood Control District, Maricopa Flood Control District, Ak-Chin Indian Community, Gila River Indian Community, San Carlos Apache Tribe, Tohono O'Odham Nation, and the Arizona Department of Emergency and Military Affairs. The participating members of the Planning Team are listed below and returning members are in bold print.

Table 3-1: Planning Team		
Name Title	Agency/Dept/Org	Role
Pedro Apodaca	City of Casa Grande	Represent Casa Grande in planning

**PINAL COUNTY
MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN**

2016

Streets Superintendent		process.
Glenn Boothe Emergency Manager	Ak-Chin Indian Community	Plan awareness. Ak-Chin is not a participating jurisdiction in this Plan.
Louis Bracamonte Mayor	Winkelman	Representing Winkelman in the planning process.
Art Carlton Administrator	Pinal Co Emergency Mgmt	Assisting in the overall coordination of the Plan update.
Benjamin Coker GIS Analyst	Pinal Co Public Works	Providing GIS services for inclusion in the Plan.
John Dirickson Asst Director	AZ Dept of Emergency & Military Affairs	Observe the planning process.
Ken Drozd Warning Coordinator	NWS, Tucson	Provide weather related information.
Anna Flores Town Manager	Town of Kearny	Represent Kearny in the planning process.
Margaret Gaston Town Manager	Town of Superior	Represent Superior in the planning process.
James Hughes Police Commander	City of Maricopa	Represent Maricopa in the planning process.
Rob Jarvis Fire Chief	City of Coolidge	Represent Coolidge in the planning process.
Steven Johnson Sergeant	Marana Police Dept	Represent Marana in the planning process.
John Kemp Battalion Chief	Town of Florence	Represent Florence in the planning process.
Shane Kiesow Manager	Apache Junction Public Works	Represent Apache Junction in the planning process.
Ken Lewis Emergency Management	Salt River Project	Act as SME where needed.
Ken Martin Director	Eloy Public Works	Represent Eloy in the planning process.
Jose Martinez CBO	Eloy	Represent Eloy in the planning process.
Bobby Miller Asst Chief	Maricopa Fire	Represent Maricopa in the planning process.
Scott Miller Fire Chief	City of Casa Grande Fire Dept	Represent Casa Grande in the planning process.
Dave Montgomery Asst Fire Chief	Superstition Fire & Medical	Act as fire SME where appropriate.
David Neuss Police Sergeant	Town of Superior	Represent Superior in the planning process.
Mark Nipp Chief of Police	Town of Superior	Represent Superior in the planning process.
John Padilla Emergency Mgmt Coordinator	APS	Act as SME where needed.
Cindy Perez Accountant I	Pinal County Public Works	Assisting in the overall coordination of the Plan update. Provide administrative assistance.

Bill Pitman Chief	Eloy Police Dept	Represent Eloy in the planning process.
Kore Redden PHEP Coordinator	Pinal Co Public Health	Provide health related hazard information for the Plan.
Eddie Rodriguez Deputy Fire Marshall	Maricopa Fire	Represent Maricopa in the planning process.
Maria Rojas Accountant	Pinal Co Public Works Emergency Mgmt/Finance	Assisting in the overall coordination of the Plan update. Provide administrative assistance.
Mike Simpson Administrator	Pinal Co Emergency Mgmt	Assisting in the overall coordination of the Plan update.
Greg Stanley County Manager	Pinal County	Act as SME where needed.
William Tatlock Police Sergeant	Town of Florence	Represent Florence in the planning process.
Kent Taylor Director Open Space & Trails	Pinal County	Act as SME where needed.
Christopher Wanamaker Engineer	Pinal County	Assisting in the overall coordination of the Plan update.
Ken Waters	NWS, Phoenix	Provide weather related information.
Kelly Weddle Asst Chief	Eloy Fire Dept	Represent Eloy in the planning process.

The Planning Team met for the first time on May 7, 2015 to begin the planning process. During that meeting mitigation was defined for this Plan's purpose as well as the requirements and process that would be followed for the update. The entire Plan was also reviewed and explained to familiarize the attendees with the document and what to expect. The current Plan's hazards were reviewed for accuracy and to determine if they needed to be adjusted. The second meeting was on June 23, 2015 which covered more work on the hazards and mitigation strategy. After both of these meetings there were assignments that were delivered via email and assistance was provided by DEMA. Additionally, other meetings were conducted at the local level to work through assignments as well as significant email and phone correspondence between various participants.

The planning process included coordination with agencies and organizations outside the participating jurisdiction's governance to obtain information and data for inclusion into the Plan or to provide more public exposure to the planning process. Information and data used in the Plan is developed or provided by the Planning Team as well as these other agencies or organizations. This is typically a result of the Planning Team reaching out to their own or surrounding resources, these resources included:

Table 3-2: Local Planning Resources		
Name Title	Agency/Dept/Division	Jurisdiction
Dave Montgomery Asst Fire Chief	Superstition Fire & Medical District	Apache Junction
Bryant Powell Asst. City Manager	Manager's Office	Apache Junction
Troy Mullender Captain	Police Dept.	Apache Junction
Scott Miller	Fire Dept.	Casa Grande

Chief		
Johnny Cervantes Chief	Police Dept.	Casa Grande
Jim Malinski Chief	Police Dept.	Coolidge
Susanna Struble Director/Engineer	Public Works Dept.	Coolidge
Rick Miller Director	Growth Mgmt	Coolidge
Bill Pitman Chief	Police Dept.	Eloy
Kelly Waddle Asst Chief	Fire Dept.	Eloy
John Kemp Batallion Chief	Fire Dept.	Eloy
Lisa Garcia Clerk/Deputy Town Mgr.	Town of Florence	Florence
Ken Piggott Superintendent and Fire Chief	Public Works and Fire Department	Kearny
M. Green Sgt.	Police Dept.	Mammoth
Erica Gomez Town Clerk	Manager's Office	Mammoth
Bobby Miller Asst Chief	Fire Dept.	Maricopa
Steve Stahl Chief	Police Dept.	Maricopa
David Maestas	Transportation/Transit Development Svcs Dept.	Maricopa
Todd Pryor Chief	Fire Dept.	Superior

3.4 Public and Stakeholder Involvement

Public involvement and input to the planning process was encouraged cooperatively among all the participating jurisdictions using several venues throughout the course of the pre-draft planning. This Plan will remain on the County website on a continual basis.

The pre-draft public involvement strategy for the Plan development included press releases, public notices and newspaper articles. The 2010 Plan was posted to the County website and made available for review and direction for comment was provided as well. The local jurisdictions placed announcements on their websites linking the reader to the Plan on the County website. The post-draft strategy included posting the draft plan to the County website and requesting public comment. Documentation of the outreach can be found in this Plan's appendices.

Table 3-3: Past Public and Stakeholder Involvement	
Jurisdiction	Activity or Opportunity
Pinal County	• Maintained the county website that included the current Plan and provided contact information for continued comment and input. • Developed brochures regarding local threats in conjunction with the mitigation website. • Attended at least two community fairs a year that included the dissemination of public information regarding the dangers of the areas' hazards. • Conducted Emergency Management Community Information Exchange meetings with local emergency management professionals on a quarterly basis, and discuss hazard mitigation events. • Conducted Flood Control District Quarterly meetings.
Apache Junction	• Presented Plan at City Council meeting and advised newly elected officials periodically. • Maintained a page on the city website including the current Plan, allowing the submittal of citizen comments, and staff response to citizen inquiries. • Distribute Floodplain Management brochures at public information distribution locations throughout City offices and departments, and at neighborhood meetings.
Casa Grande	• Provided mitigation brochures to the public at community events: • Silent Witness Anti-Crime Night • Mayor's State of the City Address • City Hall without Walls (targets different areas of the community at least four times a year)
Coolidge	• Provided mitigation brochures to the public at community events: • The Mayor's State of the City Address • Calvin Coolidge Days • Coolidge Cotton Days
Eloy	• Maintained City website containing the current Plan and contact information for those interested in contributing information or ideas to the planning process. • The Plan was delivered to the Economic Development Group of Eloy (EDGE), at its regularly scheduled meetings. • Advertising of the Plan was presented to the public by its inclusion into the City of Eloy Newsletter. • Periodically articles were published in the Eloy Enterprise to provide preparedness steps for the public to take in response to hazards.
Florence	• Participated in Wildfire Prevention Week coordinated by the Town's Fire Dept.
Kearny	• Published articles in the local newspaper about the current Plan and the status of any updates. • Provided floodplain related hazard mitigation information to targeted properties in high risk areas. • Provided news releases to local news media related to mitigation activities and floodplain management.
Mammoth	• Provided hazard and mitigation brochures at the Town Hall and Town Library. • Had a copy of the Plan available at the Town Hall. • Actively participated with Pinal County Flood Control District, to targeted properties in high risk areas.
Maricopa	• Brochures / flyers prepared and provided by DEMA were handed out by in the City booth at these events: Salsa Festival (April), July Fourth Celebration (July), and Founder's Day (October). • Fire and police (Safety Division) had a booth at these events and provided additional information for distribution.
Superior	• Published articles in local newspaper regarding the Plan. • Provided floodplain related hazard and mitigation information to targeted properties in high risk areas as requested. • Released periodic media statements related to mitigation activities and floodplain management.

The following table summarizes activities for public involvement and dissemination of information that shall be pursued whenever possible and appropriate, throughout the coming 5-year planning period.

Table 3-4: Future Public and Stakeholder Involvement	
Jurisdiction	Activity or Opportunity
Pinal County	• Host a ‘Be Prepared’ area on the County website. This discusses steps individuals can take to prepare themselves for a disaster, and also provides a hazard viewer. • Attend at least two community fairs a year that include the dissemination of public information regarding the dangers of the areas’ hazards, and continue to increase public outreach moving forward. • Support active Community Emergency Response Team (CERT) programs, and continue to encourage other jurisdictions to establish CERT programs. • Continue to build and support the Pinal County Community Organizations Active in Disaster (PC-COAD). • Create social media pages (Facebook and Twitter) to post updates regarding the mitigation plan, mitigation activities, and other seasonal emergency preparedness information. • Encourage the public to register on the Pinal Emergency Notification System (PENS) to receive emergency alerts and important community information. • Keep the hazard mitigation plan posted to the website to ensure public access and input. • Conduct Emergency Management Community Information Exchange meetings with local emergency management professionals on a quarterly basis, and discuss hazard mitigation events. • Create and disseminate mitigation fact sheets for each jurisdiction.
Apache Junction	• Increase private partnerships for the planning and readiness activities for the community. • Inter-agency/jurisdictional Briefing Meetings and Situational Assessments to better coordinate hazard mitigation initiatives, develop deeper understandings, further identify stakeholder viewpoints and interests, and to continually improve the education and participatory processes across jurisdictional boundaries. • Use of city’s social media accounts (particularly Facebook and Twitter), to give notifications and announcements educating the populace on hazard mitigation issues and on available participatory processes. • Press/Media news releases to further public education on the subject and communicate participatory opportunities.
Casa Grande	• Maintain a page on the City of Casa Grande website that will contain a copy of the current Plan, allowing the submittal of citizen comments, and staff response to citizen inquiries. This page will be monitored and updated by the City’s Planning Team Representative. • Provide news release to local media/City website related to mitigation activities and floodplain management. • Annually provide floodplain related hazard and mitigation information in coordination with Pinal County Flood Control District, to targeted properties in high risk areas. • Establish a Community Emergency Response Team (CERT) program. • Discuss the plan and other disaster preparedness related activities at the Casa Grande Business Ready Partnership quarterly meetings.
Coolidge	• Discuss updates to plans, and disseminate important emergency preparedness information at City Council meetings. • Provide mitigation brochures that raise the public awareness of the hazards that may pose a risk to the community at community events such as; the Mayor’s State of the City Address, Calvin Coolidge Days, and Coolidge Cotton Days.

Table 3-4: Future Public and Stakeholder Involvement

Jurisdiction	Activity or Opportunity
Eloy	• Provide and encourage professional development opportunities for local officials regarding emergency preparedness and how to proactively prepare the community. • Participate in Fire Prevention Week and encourage public input at the monthly public meetings of the Eloy Fire District. • Periodically publish articles in the Eloy Enterprise providing preparedness steps for the public to take in response to specific hazards.
Florence	• Disseminate mitigation information to the public through community involvement with Fire and Police. • On duty crews from the Florence Fire Department will continue to deliver public safety information on such topics as: fire safety, water safety, and life safety, to schools, organized neighborhood meetings, church groups, daycare centers, and other organized community meetings. • Seek public input on Hazard Mitigation Plan utilizing city website.
Kearny	• Publish information on website. • Send brochures to residents regarding the Hazard Mitigation Plan. • Provide news releases to local news media regarding mitigation activities and floodplain management.
Mammoth	• Hold public meetings where input is encouraged from citizens, and make announcements regarding updates to the Hazard Mitigation Plan. • Distribute public safety and mitigation brochures at community events, and have distribution points at the Town Hall and Town Library.
Maricopa	• Further support and enhance the capabilities of the Maricopa Community Emergency Response Team (CERT). • Use the CERT program to distribute information regarding the Hazard Mitigation Plan at local events. • Post mitigation information on city of Maricopa website. • Disseminate information at City Council meetings (open to the public notices).
Superior	• Provide mitigation brochures to citizens at community events such as; Legends of Superior (LOST) Trail Fest, Mining Festival, Casino Night, Fiesta & Car Show, Prickly Pear Festival, Trunk or Treat Halloween event, Miracle on Main St. Christmas event • Publish articles in the local newspaper regarding the Plan and any new or ongoing mitigation activities.

3.5 Program Integration

Over the course of the planning process, other plans, studies, reports, and technical information were obtained and reviewed for incorporation or reference purposes, they are:

Table 3-5: Resources Reviewed for Incorporation or Reference in this Plan

Resource	Jurisdiction/ Agency	Description or Relevance to Plan
U.S. Forest Service	Federal	Source for local wildfire data. Used in the risk assessment.
Arizona Department of Commerce	State	Reference for demographic and economic data for the county. Used for community descriptions
Arizona Department of Water Resources	State	Resource for data on drought conditions and statewide drought management (AzGDTF), and dam safety data. Used in risk assessment.

Table 3-5: Resources Reviewed for Incorporation or Reference in this Plan

Resource	Jurisdiction/ Agency	Description or Relevance to Plan
Arizona Geological Survey	State	Resource for earthquake, fissure, landslide/mudslide, subsidence, and other geological hazards. Used in the risk assessment.
Arizona Land Subsidence Group	State	Resource for fissure and subsidence data. Used in the risk assessment.
Arizona State Land Department	State	Source for statewide GIS coverage (ALRIS) and statewide wildfire hazard profile information (Division of Forestry). Used in the risk assessment.
Arizona Wildland Urban Interface Assessment (2004)	State	Source of wildfire hazard profile data and urban interface at risk communities. Used in the risk assessment.
Pinal Co Comprehensive Plan (2009)	Pinal Co	Source for history, demographic, and development trend data for the unincorporated county.
Pinal Co Community Wildfire Protection Plan (LSD, 2009)	Pinal Co	Source of wildfire hazard profile data for hazard mapping and risk assessment
Pinal Co Capital Improvement Plan (2014)	Pinal Co	Source for designated projects & assets needed to improve functionality of government, transportation needs, economic development through Public Works capital projects (includes infrastructure and flood control improvements)
Pinal Co Floodplain Management Plan	Pinal Co	Source for determined projects, measures, studies, etc. related to floodplain management. Provides historical data as well as improvement plans, recommendations.
Pinal Co Transportation Plans	Pinal Co	Source for historical data related to transportation and infrastructure as well as proposed improvements, ordinances, projects, etc., based on current needs and conditions.
Pinal Co Stormwater Management Plan	Pinal Co	Source for historical data as well as overall plan for control, diversion and overall mitigation of stormwater and area drainage.
Pinal Co Zoning Ordinance	Pinal Co	Source for laws related to zoning and community planning and development.
Apache Junction Chamber of Commerce - website	Apache Junction	Source for history, demographic, and community description information for the city.
Apache Junction - website	Apache Junction	Source for history, street infrastructure, and community description information for the city.
Pinal Co Multi-Jurisdictional Hazard Mitigation Plan 2010	Apache Junction	Formed the starting point for the update process with the information on the Apache Junction. Source of geographic and community description information for the city.
Apache Junction General Plan	Apache Junction	Source of data for hazard mapping and formulating risk assessment.
Apache Junction Emergency Response and Recovery Plan 2006	Apache Junction	Used to assist in identifying hazard events for the community used in the risk assessment.

Table 3-5: Resources Reviewed for Incorporation or Reference in this Plan		
Resource	Jurisdiction/ Agency	Description or Relevance to Plan
Apache Junction Stormwater Master Plan 2002	Apache Junction	Source for hazard information, flooding data, and historic event records used in the risk assessment.
Casa Grande General Plan 2020	Casa Grande	Source for history, demographic, and development trend data.
Coolidge General Plan	Coolidge	Source for history, demographic, and development trend data.
Coolidge Website	Coolidge	Source for history, demographic, codes, development trend data for the city, and other general information.
Eloy General Plan	Eloy	Source for history, demographic, and development trend data.
Florence General Plan	Florence	Source for history, demographic, and development trend data.
Kearny General Plan	Kearny	Source for history, demographic, and development trend data.
Maricopa 2040 Vision Plan	Maricopa	Source for history, demographic, and development trend data.
Superior General Plan	Superior	Source for history, demographic, and development trend data.

SECTION 4: RISK ASSESSMENT

One of the key elements to the hazard mitigation planning process is the risk assessment. The risk assessment provides the foundation for the rest of the planning process, primarily the mitigation strategy. The risk assessment answers the fundamental questions of “what” can occur, “how often” it is likely to occur, and “how bad” the effects could be. The primary components of this risk assessment are generally categorized according to:

Hazard Identification

Hazard Profiling

Vulnerability Analysis

The risk assessment was performed using a county-wide, multi-jurisdictional perspective, with the information gathered and developed by the Planning Team. This approach was used as many hazard events are likely to affect numerous jurisdictions within the County, and are not often relegated to a single jurisdictional boundary. The vulnerability analysis was performed in a way such that the results reflect vulnerability at an individual jurisdictional level, and at a countywide level.

4.1 Section Changes

The Planning Team has determined that beginning with this Plan, they will continue to assess vulnerability as an overview summary of the hazard’s impact on the community and its vulnerable structures, rather than in a quantitative manner.

In addition, while conducting the update of the 2010 plan, CPRI values for the identified hazards may have changed. After careful consideration of current conditions and a complete understanding of the four categories (probability, magnitude/severity, warning time, & duration) by members of the Planning Team, several changes were decided upon. These changes to the CPRI values assist in displaying a more accurate representation of the hazard, and the overall risk it presents to each jurisdiction of Pinal County.

4.2 Hazard Identification

For this Plan, the hazards identified in the 2010 Plan were reviewed by the Planning Team to determine if the list reflects the hazards that pose the greatest risk to the Planning Area. The review included an initial screening process to evaluate each of the listed hazards based on the following considerations:

- Experiential knowledge of the Planning Team with regard to the relative risk associated with the hazard
- Past events (especially events that have occurred during the last plan cycle)
- The ability/desire to develop effective mitigation measures for the hazard

The historic hazard database was one resource used to determine the planning area’s most threatening hazards. The information was updated for this Plan.

Table 4-1: Past Declared Hazard Events That Included Pinal Co. 1967-2016				
Hazard	No. of	Recorded Losses		
	Declarations	Fatalities	Injuries	Damage Costs (\$)
Drought (Statewide)	12	0	0	\$303,000,000
Flooding / Flash Flooding	14	28	112	\$534,670,000
Tropical Storm	3	14	975	\$760,200,000
Wildfire	20	0	0	\$38,135,000
Notes: Damage Costs include property and crop/livestock losses and are reported as is with no attempt to adjust costs to current dollar values. Furthermore, wildfire damage costs do not include the cost of suppression which can be quite substantial.				
Sources: DEMA, FEMA, USDA				

The culmination of the review process resulted in the confirmation of keeping the same hazards as the previous Plan. Therefore, the hazards identified for this Plan are:

- Dam Failure
- Drought
- Fissure
- Flooding/Flash Flooding
- Levee Failure
- Severe Wind
- Subsidence
- Wildfires

4.3 Vulnerability Analysis Methodology

The following sections summarize the methodologies used to perform the vulnerability analysis portion of the risk assessment.

Calculated Priority Risk Index (CPRI) Evaluation

The first step in the vulnerability analysis (VA) is to assess the perceived overall risk for each of the plan hazards by assigning them risk ratings using the Calculated Priority Risk Index (CPRI). The CPRI value is obtained by assigning varying degrees of risk to four categories for each hazard, and then calculating an index value based on a weighting scheme. The table below summarizes the CPRI risk categories and provides guidance regarding the assignment of values and weighting factors for each category.

As an example, assume that the team is assessing the hazard of flooding, and has decided the following assignments best describe the flooding hazard for their community:

- Probability = Likely
- Magnitude/Severity = Critical
- Warning Time = 12 to 24 hours
- Duration = Less than 6 hours

The CPRI for the flooding hazard would then be:

$$\text{CPRI} = [(3 \times 0.45) + (3 \times 0.30) + (2 \times 0.15) + (1 \times 0.10)]$$

$$\text{CPRI} = 2.65 \text{ (maximum 4.00)}$$

Table 4-2: Calculated Priority Risk Index (CPRI) Categories and Risk Levels

CPRI Category	Degree of Risk			Assigned Weighting Factor
	Level ID	Description	Index Value	
Probability	Unlikely	- Extremely rare with no documented history of occurrences or events. - Annual probability of less than 0.001.	1	45%
	Possible	- Rare occurrences with at least one documented or anecdotal historic event. - Annual probability that is between 0.01 and 0.001.	2	
	Likely	- Occasional occurrences with at least two or more documented historic events. - Annual probability that is between 0.1 and 0.01.	3	
	Highly Likely	- Frequent events with a well documented history of occurrence. - Annual probability that is greater than 0.1.	4	
Magnitude/ Severity	Negligible	- Negligible property damages (less than 5% of critical and non-critical facilities and infrastructure). - Injuries or illnesses are treatable with first aid and there are no deaths. - Negligible quality of life lost. - Shut down of critical facilities for less than 24 hours.	1	30%
	Limited	- Slight property damages (greater than 5% and less than 25% of critical and non-critical facilities and infrastructure). - Injuries or illnesses do not result in permanent disability and there are no deaths. - Moderate quality of life lost. - Shut down of critical facilities for more than 1 day and less than 1 week.	2	
	Critical	- Moderate property damages (greater than 25% and less than 50% of critical and non-critical facilities and infrastructure). - Injuries or illnesses result in permanent disability and at least one death. - Shut down of critical facilities for more than 1 week and less than 1 month.	3	
	Catastrophic	- Severe property damages (greater than 50% of critical and non-critical facilities and infrastructure). - Injuries or illnesses result in permanent disability and multiple deaths. - Shut down of critical facilities for more than 1 month.	4	
Warning Time	Less than 6 hrs	Self explanatory.	4	15%
	6 to 12 hrs	Self explanatory.	3	
	12 to 24 hrs	Self explanatory.	2	
	More than 24 hrs	Self explanatory.	1	
Duration	Less than 6 hrs	Self explanatory.	1	10%
	Less than 24 hrs	Self explanatory.	2	
	Less than one wk	Self explanatory.	3	
	More than one wk	Self explanatory.	4	

Asset Inventory

The asset inventory establishes a baseline data-set for assessing the vulnerability of each jurisdiction's assets and is generally tabularized into **critical** and **non-critical** categories. **Critical facilities and infrastructure** are systems, structures and infrastructure within a community whose incapacity or destruction would:

- Have a debilitating impact on the defense or economic security of that community.
- Significantly hinder a community's ability to recover following a disaster.

The 2010 Plan used a combination of the asset inventory and HAZUS data to represent the critical and non-critical facilities for Pinal County jurisdictions. The table was updated for the 2016 Plan based on local jurisdiction institutional knowledge.

Table 4-3: Critical and Non-Critical Facilities								
Participating Jurisdiction	Critical Facilities and Infrastructure							
	Communications Infrastructure	Electrical Power Systems	Gas and Oil Facilities	Banking and Finance Institutions	Transportation Networks	Water Supply Systems	Government Services	Emergency Services
County-Wide Totals ^b	53	14	9	23	83	79	206	73
Apache Junction	4	3	1	7	4 ^a	10	13	8
Casa Grande	6	0	2	0	1	4	10	7
Coolidge	1	0	0	5	2	2	3	2
Eloy	1	2	4	1	17	25	60	3
Florence	5	2	1	4	8	9	12	5
Kearny	0	2	0	2	3	3	3	2
Mammoth	3	0	0	0	2	5	1	3
Maricopa	29	4	0	4	35	16	4	9
Superior	2	1	1	0	2	2	2	2
Unincorporated Pinal County	2	0	0	0	9	3	98	32

It should be noted that the facility counts in the table above do not represent a comprehensive inventory of all the category facilities that exist within the County. They do represent the facilities inventoried to-date by each jurisdiction and are considered to be a work-in-progress that may be expanded and augmented with each Plan cycle.

Loss Estimations

For this Plan, each jurisdiction has expressed, in an overall summary, their community's vulnerability to each hazard identified in the Risk Assessment. This is a change from previous versions of this Plan and is largely based on the perceived ineffectiveness of the HAZUS and/or GIS based loss estimation data. The decision to change was also influenced by the amount of resources required to update the data previously presented. Additionally, the Planning Team believes it is much more beneficial to express vulnerability in narrative form while taking into consideration the unique characteristics of their jurisdictions.

Risk Assessment Summary

The jurisdictional variability of risk associated with each hazard is demonstrated by the various CPRI and vulnerability information. Accordingly, each jurisdiction has varying levels of need regarding the hazards to be mitigated, and may not consider all of the hazards as posing a great risk to their communities. The table below summarizes the hazards selected for mitigation by each jurisdiction and will be the basis for each jurisdictions mitigation strategy.

Table 4-4: Hazards to be Mitigated								
Jurisdiction	Flooding	Severe Wind	Wildfire	Drought	Fissure	Levee Failure	Subsidence	Dam Failure
Unincorporated Pinal County	X	X	X	X	X	X	X	
Apache Junction	X	X		X				
Casa Grande	X	X		X				
Coolidge	X	X		X				X
Eloy	X	X			X			
Florence	X	X	X	X				
Kearny	X	X	X	X				
Mammoth	X	X	X	X				
Maricopa	X	X						
Superior	X	X	X	X				
Hazard listed in order of most threatening as determined by the jurisdictions' CPRIs.								

4.4 Hazard Risk Profiles

The following sections summarize the risk profiles of the hazards identified and include the following elements:

- **Description**
- **History**
- **Probability and Magnitude**
- **Vulnerability**

4.4.1 Dam Failure

Description

The primary risk associated with dam failure in Pinal County is the inundation of downstream facilities and population by the resulting flood wave. Dams within or impacting the County can generally be divided into two groups: (1) storage reservoirs designed to permanently impound water, provide flood protection, and possibly generate power, and two (2) single purpose flood retarding structures (FRS) designed to attenuate or reduce flooding by impounding stormwater for relatively short durations of time during flood events. The majority of dams within the County are earthen FRS equipped with emergency spillways. The purpose of an emergency spillway is to provide a designed and protected outlet to convey runoff volumes exceeding the dam's storage capacity during extreme or back-to-back storm events. Dam failures may be caused by a variety of reasons including: seismic events, extreme wave action, leakage and piping, overtopping, material fatigue and spillway erosion.

History

Pinal County has no history of dam failure.

Probability and Magnitude

The probability and magnitude of dam failure discharges vary greatly with each dam and are directly influenced by the type and age of the dam, its operational purpose, storage capacity and height, downstream conditions, and many other factors. There are two sources of data that publish hazard ratings for dams impacting Pinal County. The first is the Arizona Department of Water Resources (ADWR) and the second is the National Inventory of Dams (NID). Hazard ratings from each source are based on either an assessment of the consequence of failure and/or dam safety considerations, and they are not tied to probability of occurrence.

ADWR has regulatory jurisdiction over the non-federal dams impacting the County and is responsible for regulating the safety of these dams, conducting field investigations, and participating in flood mitigation programs with the goal of minimizing the risk for loss of life and property to the citizens of Arizona. ADWR jurisdictional dams are inspected regularly according to downstream hazard potential classification, which follows the NID classification system. High hazard dams are inspected annually, significant hazard dams every three years, and low hazard dams every five years. Via these inspections, ADWR identifies safety deficiencies requiring correction and assigns each dam one of six safety ratings. Examples of safety deficiencies include: lack of an adequate emergency action plan, inability to safely pass the required Inflow Design Flood (IDF), embankment erosion, dam stability, etc.

Table 4-5: ADWR Safety Categories	
ADWR Safety Rating	Definition
No Deficiency	Not Applicable
Safety Deficiency	One or more conditions at the dam that impair or adversely affects the safe operation of the dam.
Unsafe Categories	
Category 1: Unsafe Dams with Elevated Risk of Failure	These dams have confirmed safety deficiencies for which there is concern they could fail during a 100-year or smaller flood event. There is an urgent need to repair or remove these dams.
Category 2: Unsafe Dams Requiring Rehabilitation or Removal	These dams have confirmed safety deficiencies and require either repair or removal. These dams are prioritized for repair or removal behind the Category 1 dams.

Table 4-5: ADWR Safety Categories	
ADWR Safety Rating	Definition
Category 3: Unsafe Dams with Uncertain Stability during Extreme Events (Requiring Study)	Concrete or masonry dams that have been reclassified to high hazard potential because of downstream development (i.e. hazard creep”). The necessary documentation demonstrating that the dams meet or exceed standard stability criteria for high hazard dams during extreme overtopping and seismic events is lacking. The dams are classified as unsafe pending the results of required studies. Upon completion of these studies, the dams are either removed from the list of unsafe dams or moved to Category 2 and prioritized for repair or removal.
Category 4: Unsafe Dams Pending Evaluation of Flood-Passing Capacity (Requiring Study)	In 1979, the U.S. Army Corps of Engineers established Federal Guidelines for assessing the safe-flood passing capacity of high hazard potential dams (CFR Vol. 44 No. 188). These guidelines established one-half of the “probable maximum flood” (PMF) as the minimum storm which must be safely passed without overtopping and subsequent failure of the dam. Dams unable to safely pass a storm of this size were classified as being in an “unsafe, non-emergency” condition. Prior studies for these earthen dams (mostly performed in the 1980’s) predicted they could not safely pass one-half of the PMF. They were predicted to overtop and fail for flood events ranging from 30-46% of the PMF. Recent studies both statewide and nationwide have indicated that the science of PMF hydrology as practiced in the 1990’s commonly overestimates the PMF for a given watershed. The ADWR is leading efforts on a statewide update of probable maximum precipitation (PMP) study scheduled for completion in 2011. These dams should be re-evaluated using updated methods to confirm their safety status. Upon completion of these evaluations, they are either removed from the list of unsafe dams or moved to Category 2 and prioritized for repair or removal.
Source: ADWR, 2009.	

The NID database contains information on approximately 77,000 dams in the 50 states and Puerto Rico, with approximately 30 characteristics reported for each dam, such as: name, owner, river, nearest community, length, height, average storage, max storage, hazard rating, Emergency Action Plan (EAP), latitude, and longitude.

The NID and ADWR databases provide useful information on the potential hazard posed by dams. Each dam in the NID is assigned one of the following three hazard potential classes based on the potential for loss of life and damage to property should the dam fail (listed in increasing severity): low, significant, or high. The hazard potential classification is based on an evaluation of the probable present and future incremental adverse consequences that would result from the release of water or stored contents due to failure or improper operation of the dam or appurtenances, regardless of the condition of the dam. The ADWR evaluation includes land-use zoning and development projected for the affected area over the 10-year period following the classification of the dam. It is important to note that the hazard potential classification is an assessment of the consequences of failure, but not an evaluation of the probability of failure or improper operation. The table below summarizes the hazard potential classifications and criteria for dams regulated by the State of Arizona.

Table 4-6: Downstream Hazard Potential Classes for State Regulated Dams		
Hazard Potential Classification	Loss of Human Life	Economic, Environmental, Lifeline Losses
Low	None expected	Low and generally limited to owner

Significant	None expected	Yes
High	Probable. One or more expected	Yes (but not necessary for this classification)
Note: The hazard potential classification is an assessment of the consequences of failure, not an evaluation of the probability of failure. Source: ADWR and NID 2009		

The NID database includes dams that are either:

- High or Significant hazard potential class dams, or,
- Low hazard potential class dams that exceed 25 feet in height and 15 acre-feet storage, or,
- Low hazard potential class dams that exceed 50 acre-feet storage and 6 feet height.

There are 21 dams in Pinal County based on the two databases. Of the 21 dams, nine are under ADWR jurisdiction.

The magnitude of impacts due to dam failure are usually depicted by mapping the estimated downstream inundation limits based on an assessment of a combination of flow depth and velocity. These limits are typically a critical part of the EAP. For inundation resulting from dam failure, the following two classes of hazard risk are depicted:

High Hazard = Inundation limits due to dam failure

Low Hazard = All other areas outside the inundation limits

Vulnerability

Table 4-7: CPRI Results for Dam Failure					
Jurisdiction	Probability	Magnitude/ Severity	Warning Time	Duration	Rating
Apache Junction	Possibly	Limited	< 6 hours	< 6 hours	2.20
Casa Grande	Unlikely	Negligible	< 6 hours	< 24 hours	1.55
Coolidge	Possibly	Limited	12 - 24 hours	< 24 hours	2.00
Eloy	Unlikely	Negligible	> 24 hours	< 6 hours	1.00
Florence	Possibly	Critical	12-24 hours	> 1 week	2.50
Kearny	Unlikely	Critical	< 6 hours	< 24 hours	2.15
Mammoth	Unlikely	Negligible	> 24 hours	< 6 hours	1.00
Maricopa	Unlikely	Critical	12-24 hours	< 24 hours	1.85
Superior	Unlikely	Negligible	> 24 hours	< 6 hours	1.00
Unincorporated Pinal Co	Unlikely	Catastrophic	< 6 hours	< 1 week	2.55
County-wide average CPRI =					1.78

Table 4-8: NID and ADWR Dams by Hazard Classification								
Hazard Class	ADWR ID No.	NID ID No.	Dam Name	ADWR Safety Types	EAP	Inundation Mapping	Nearest Downstream Development	Distance in Miles
High	11.02	AZ00082	Powerline FRS	Safety Deficiency	Yes	Yes	Mesa / Apache Junction	3
	11.05	AZ00083	Magma FRS	Unsafe Dams Requiring Rehabilitation or Removal	Yes	Yes	Florence	0.5
	11.06	AZ00027	Florence FRS	No Deficiency	Yes	Yes	Florence	1.5

Table 4-8: NID and ADWR Dams by Hazard Classification

Hazard Class	ADWR ID No.	NID ID No.	Dam Name	ADWR Safety Types	EAP	Inundation Mapping	Nearest Downstream Development	Distance in Miles
	11.11	AZ00084	Vineyard FRS	No Deficiency	Yes	Yes	Williams Air Force Base	9
	11.12	AZ00085	Rittenhouse FRS	No Deficiency	Yes	Yes	Williams Air Force Base	10
	11.15	AZ00211	Apache Junction FRS	No Deficiency	Yes	Yes	Apache Junction	0.5
	11.19	AZ00244	Kearny Lake	No Deficiency	Yes	Outdated (1999)	Gila River	0
	11.23	AS00343	Maricopa Road Basin	Unsafe Dam with Elevated Risk of Failure	No	No	No Data in our database	No Data in our database
	11.24	AZ00344	Green Road Basin	Unsafe Dam with Elevated Risk of Failure	No	No	No Data in our database	No data in our database
	N/A	AZ10004	Whitlow Ranch	Federal Dam – No ADWR Jurisdiction	Yes	Yes	Queen Valley	1
	N/A	AZ10436	Coolidge	Federal Dam – No ADWR Jurisdiction	Yes	Yes	Winkelman	25
	N/A	AZ10008	Tat Momolikot	Federal Dam – No ADWR Jurisdiction	Yes	Yes	Cocklebur	1
Significant	11.16	AZ00233	Main PLS	No Deficiency	Yes	Yes	Roosevelt Lake Estates	20
	11.18	AZ00235	Inlet Control Structure	No Deficiency	Yes	Yes	Roosevelt Lake Estates	20
	11.25	AZ00345	Amarillo Valley Road	Not assigned/assessed	No	No	No Data in our database	No Data in our database
	N/A	AZ82905	Tat Momolikot East Saddle Dike	Federal Dam – No ADWR Jurisdiction	No Data	No Data	Stanfield	22
	N/A	AZ82906	Tat Momolikot Village Dike	Federal Dam – No ADWR Jurisdiction	No Data	No Data	Stanfield	22
	N/A	AZ82907	Tat Momolikot West Saddle Dike	Federal Dam – No ADWR Jurisdiction	No Data	No Data	Stanfield	22

Sources: NID, ADWR Dam Safety Database (July 2015)

The Planning Team has determined that beginning with this Plan, they will continue to assess vulnerability as an overview summary of the hazard's impact on the community and its vulnerable structures, rather than in a quantitative manner.

Based on the results from the assessments performed for the previous Plan, there are potentially \$101 million in estimated losses related to dam failure inundation, \$470 million in losses to HAZUS defined residential, commercial, and industrial facilities. Based on the 2013 State Hazard Mitigation

Plan, a total population of 121,090 or 32.22% of the total County population, is potentially exposed. The potential for deaths and injuries are directly related to the warning time and type of event. The amount of water impounded, the density, type, and value of development and infrastructure located downstream, and speed of failure all have great influence on the potential severity. Given the magnitude of such an event, it is realistic to anticipate at least one death and several injuries. There is also a high probability of population displacement for most of the inhabitants within the inundation limits downstream of the dam(s).

Within Pinal County, there are multiple dams which are classified as high hazard. A high hazard dam poses the greatest potential for downstream impacts should failure occur. A high hazard failure is expected to result in loss of life and may also cause significant economic losses, including damages to downstream property or critical infrastructure (e.g., washed out roads, bridges, and railroad tracks), environmental damage, or disruption and/or closure of business and industry. Electric generating facilities and transmission lines could also be damaged and affect life support systems in communities outside the immediate inundation zones. Injuries and fatalities may occur by way of debris, bodily injury, or drowning. Standing water may also pose health concerns after the failure, as could the available water supply, and overall water quality. Although there have been no dam failures within Pinal County, there have been events which led dams in the County to be classified as unsafe.

After fissures were discovered in the vicinity of the Powerline and Vineyard structures, the Powerline FRS was classified as an Unsafe Dam with Elevated Risk of Failure by ADWR. The potential for dam failure from potential earth fissures through the embankments would cause breaching of the dam, and a major flooding event. To combat the fissures, an Interim Dam Safety Measure (IDSM) project was completed, consisting of three major elements to address the concerns associated with the Powerline FRS foundation. These elements were designed with a design life of 15 to 20 years. Following completion, a more permanent solution was developed. The permanent solution consists of Powerline FRS being replaced with a channel approximately 3.5 miles in length. Meanwhile, the Vineyard Road FRS and Rittenhouse FRS will be raised and rehabilitated. The Vineyard Road FRS and Powerline Channel construction is to be substantially complete by September 2018. The three dams currently provide flood hazard protection from the 100-year rainfall event for the Central Arizona Project, 72 square miles of downstream property, and more than 150,000 persons within portions of both Pinal and Maricopa counties.

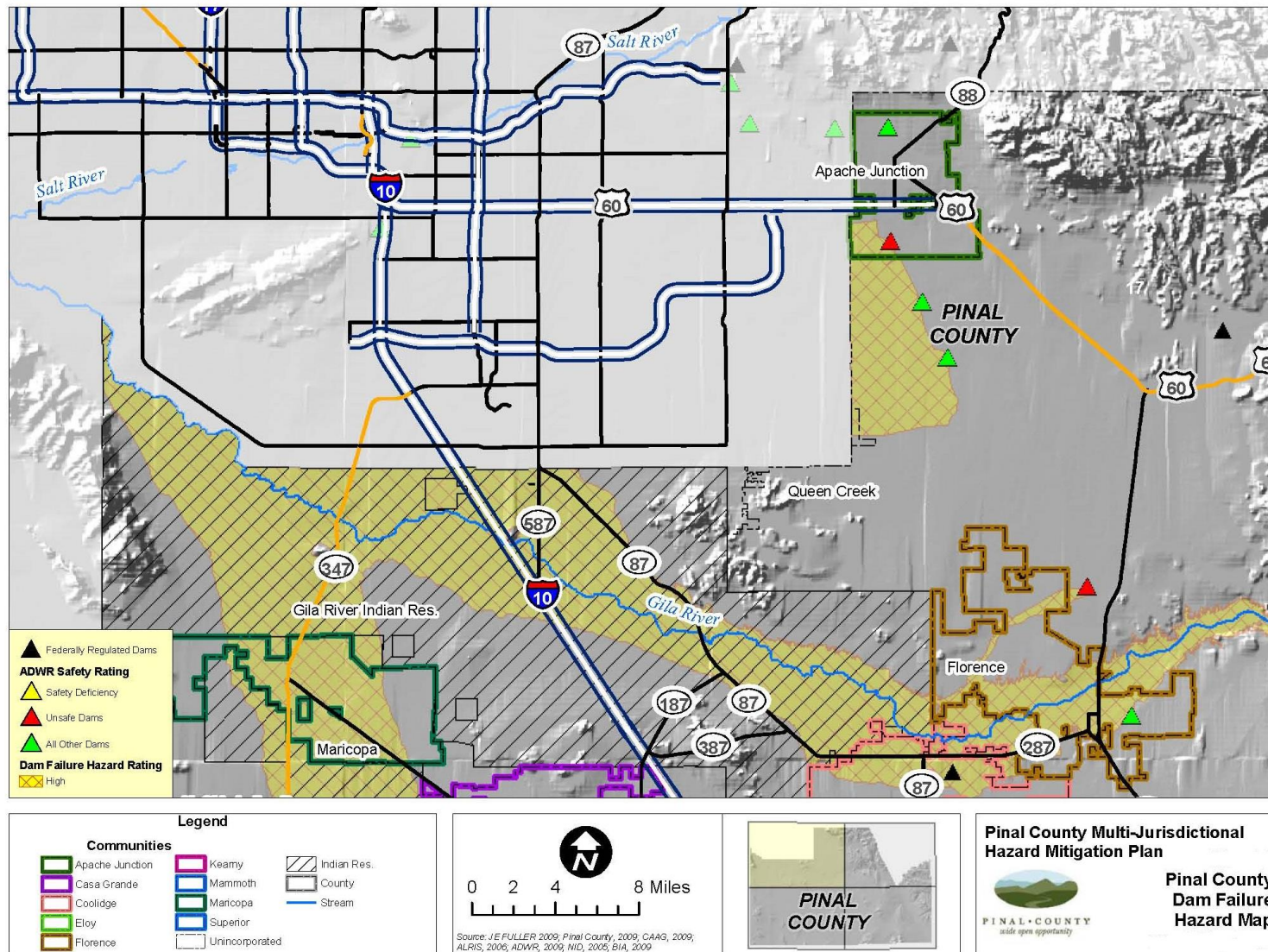
In 2008 the Magma FRS had a major test, to the point where evacuations were contemplated, and the EAP was initiated. Construction to repair and strengthen the dam began in 2011 and went through two phases. It is expected that during the next inspection, the structure will be able to remove the unsafe designation. The Magma FRS provides protection to approximately 9,000 residents. This includes the majority of Anthem at Merrill Ranch in Florence, 500 residential and commercial properties, agricultural land, and related infrastructure. Additional residents and structures will be protected in the future as development continues to occur in the downstream benefitted area.

The Amarillo Valley basins, named after adjacent roadways and located south of the City of Maricopa, are both below ground storage and above-ground embankments that intercept runoff from the upstream watershed. In the 1990's, these basins were originally designed for the 25-year flood event, and not believed to be intended to provide flood protection or flood mitigation for downstream properties or developments. Those downstream should not rely on these basins to provide adequate protection from flooding events, as the storage provided by these basins has negligible effect on the base flood event. Safety deficiencies were recently noted at the high hazard structures due to the presence of earth fissures, leading both the Maricopa Road Basin and Green Road Basin to be classified as unsafe. It is unlikely that any reasonable or cost-effective engineering solution is available to safely operate these two dam structures due to the presence of the earth fissures. Future

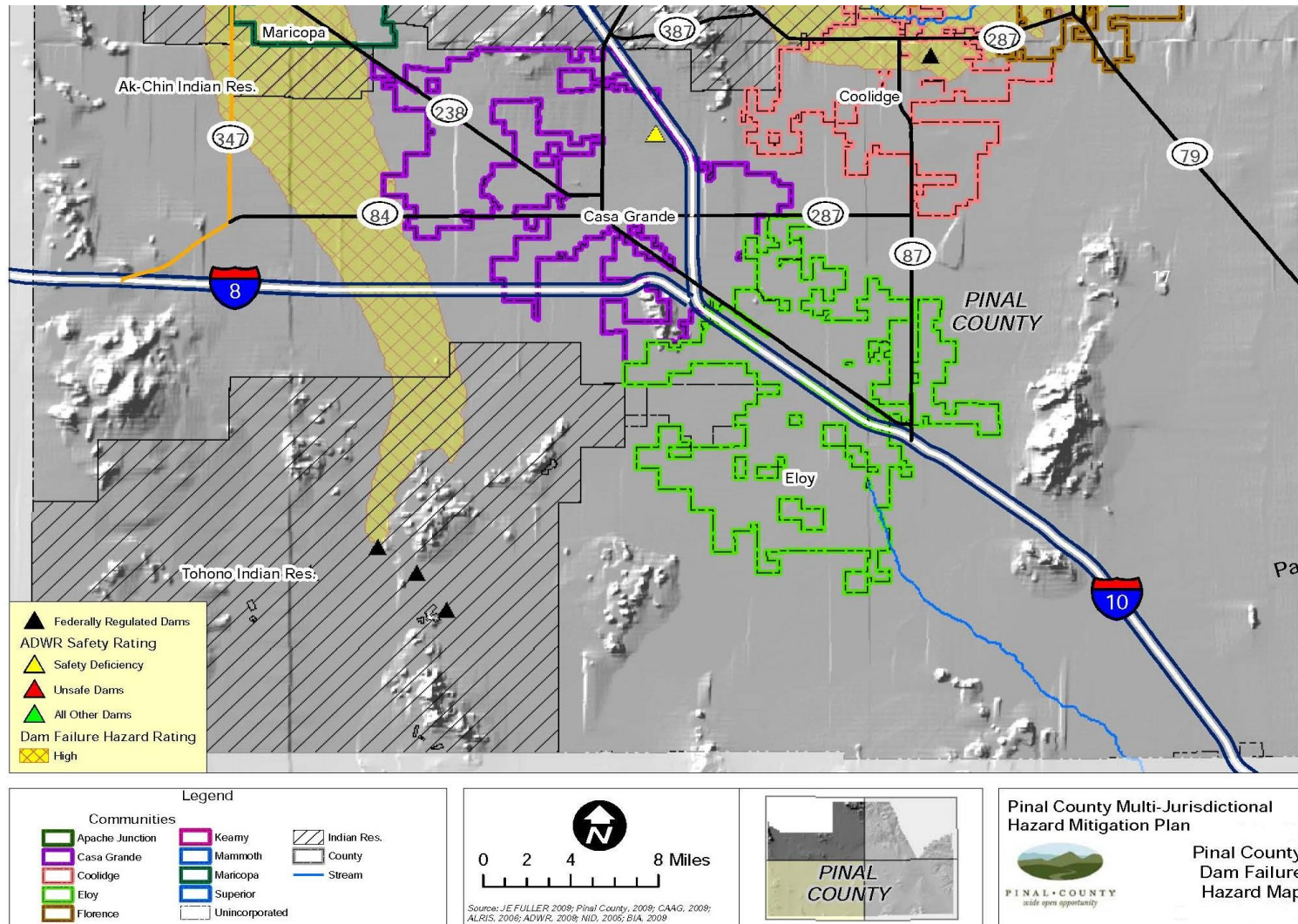
modification may include lowering or breaching the structures so that height and volume limitations of jurisdictional status are not violated. Design and construction options are currently being discussed.

There are several other high hazard dams in the County, which in the extremely unlikely event of a failure, could cause significant damages. The Coolidge Dam is arguably the most notable dam which has an effect on the County. A flood wave from a catastrophic failure of the dam would move rapidly along the Gila River and would be immediately life-threatening to the first residents located downstream, including the jurisdictions of Kearny and Florence. A failure of the Tat Momolikot Dam is also seen as extremely unlikely, however, a catastrophic failure of the dam would cause significant flooding in the City of Maricopa, and have tremendous consequences in the unincorporated community of Stanfield. The Florence FRS Dam provides flood protection to the Town of Florence, State of Arizona correctional facilities, the Central Arizona Project, and agricultural land. As a high hazard dam, the failure of this structure would have a substantial impact, as would any other high hazard dam in the unlikely event it were to fail. In addition to the high hazard dams, there are several “significant” dams as well, whereas a failure would be unlikely to result in loss of human life but may cause significant disruption or impact on lifeline facilities. Property losses would occur in a predominantly rural or agricultural area with a transient population but significant infrastructure.

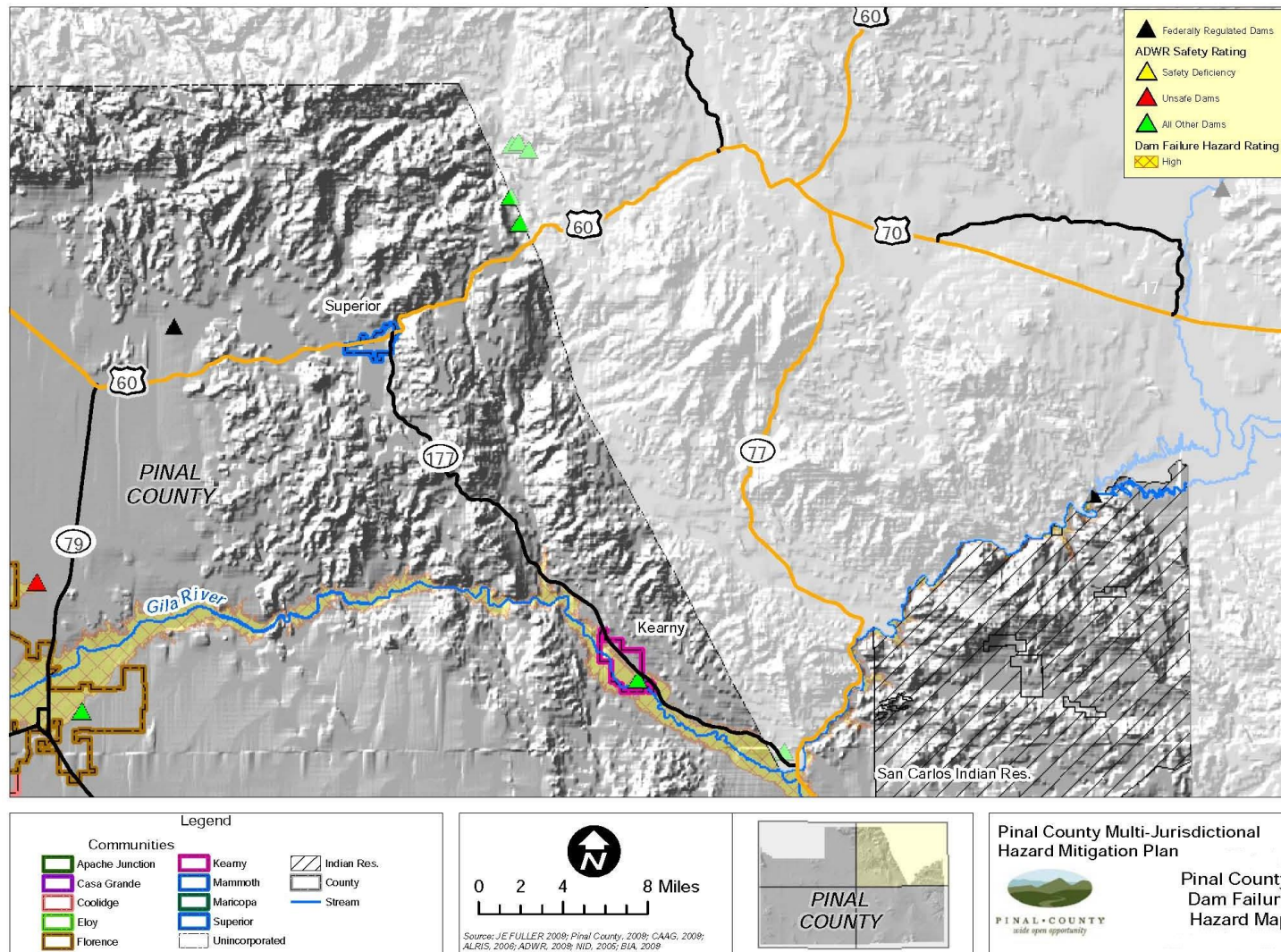
In addition to dam failure, it is also important to consider emergency spillway discharges when assessing risk (although not considered in the CPRI). Development located downstream of a dam is more likely to be impacted by an emergency spillway discharge than by a dam failure. The dynamics of the flood wave associated with an emergency spillway discharge are different than that of a dam failure. A dam failure is an uncontrolled release of water impounded behind a dam through a breach in the dam itself, and is usually catastrophically destructive. An emergency spillway discharge usually increases in magnitude gradually, and then decreases gradually as the structure drains. As an example, in 1993, water from the Coolidge Dam was released in record levels because storage capacity had been reached. Although the dam did not fail, critical infrastructure was disrupted, which included a bridge failing upstream from Coolidge.



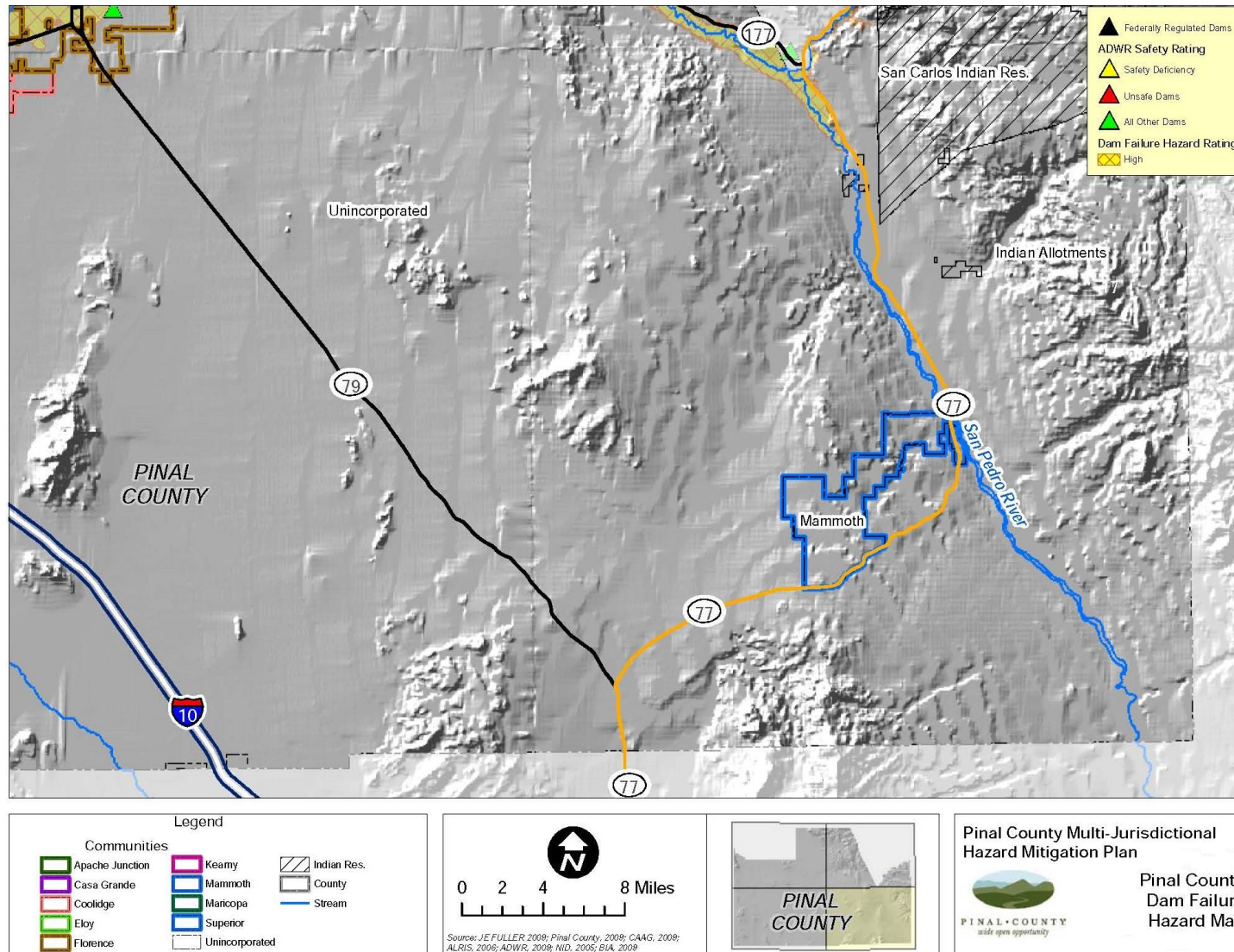
Map 4-1: Pinal County Dam Failure Hazard Area (1)



Map 4-2: Pinal County Dam Failure Hazard Area (2)



Map 4-3: Pinal County Dam Failure Hazard Area (3)



Map 4-4: Pinal County Dam Failure Hazard Area (4)

Vulnerability – Development Trend Analysis

The flood protection afforded by dams in Pinal County has encouraged development of downstream lands, and it is reasonable to expect additional development within these areas. Public awareness measures such as notices on final plans and public education on dam safety are ways that the County and local city and town officials can mitigate the potential impact of a dam failure. To ensure the safety of downstream developments, over the past five years, Pinal County and several of the local flood districts have been actively working to update and improve dams across the county. They have also worked on installing gages and telemetry to provide tools for monitoring and prediction. In addition, Emergency Action Plans that establish potential dam failure inundation limits, notification procedures, and thresholds are also prepared for response to potential dam related disaster events.

Sources

AZ Dept of Water Resources <http://www.azwater.gov/AzDWR/SurfaceWater/DamSafety/default.htm>

AZ Division of Emergency Management, *State of AZ Multi-Hazard Mitigation Plan*.

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4.4.2 Drought

Description

Drought is a normal part of virtually every climate on the planet, including areas of high and low rainfall. It is different from normal aridity, which is a permanent characteristic of the climate in areas of low rainfall. Drought is the result of a natural decline in the expected precipitation over an extended period of time, typically one or more seasons in length. The severity of drought can be aggravated by other climatic factors, such as prolonged high winds and low relative humidity (FEMA, 1997).

Drought is a complex natural hazard which is reflected in the following four definitions commonly used to describe it:

- Meteorological – defined solely on the degree of dryness, expressed as a departure of actual precipitation from an expected average or normal amount based on monthly, seasonal, or annual time scales.
- Hydrological – related to the effects of precipitation shortfalls on streamflows and reservoir, lake, and groundwater levels.
- Agricultural – defined principally in terms of naturally occurring soil moisture deficiencies relative to water demands of plant life, usually arid crops.
- Socioeconomic – drought associates the supply and demand of economic goods or services with elements of meteorological, hydrologic, and agricultural drought. Socioeconomic drought occurs when the demand for water exceeds the supply as a result of weather-related supply shortfall. It may also be called a water management drought.

A drought's severity depends on numerous factors, including duration, intensity, and geographic extent as well as regional water supply demands by humans and vegetation. Due to its multi-dimensional nature, drought is difficult to define in exact terms and also poses difficulties in terms of comprehensive risk assessments.

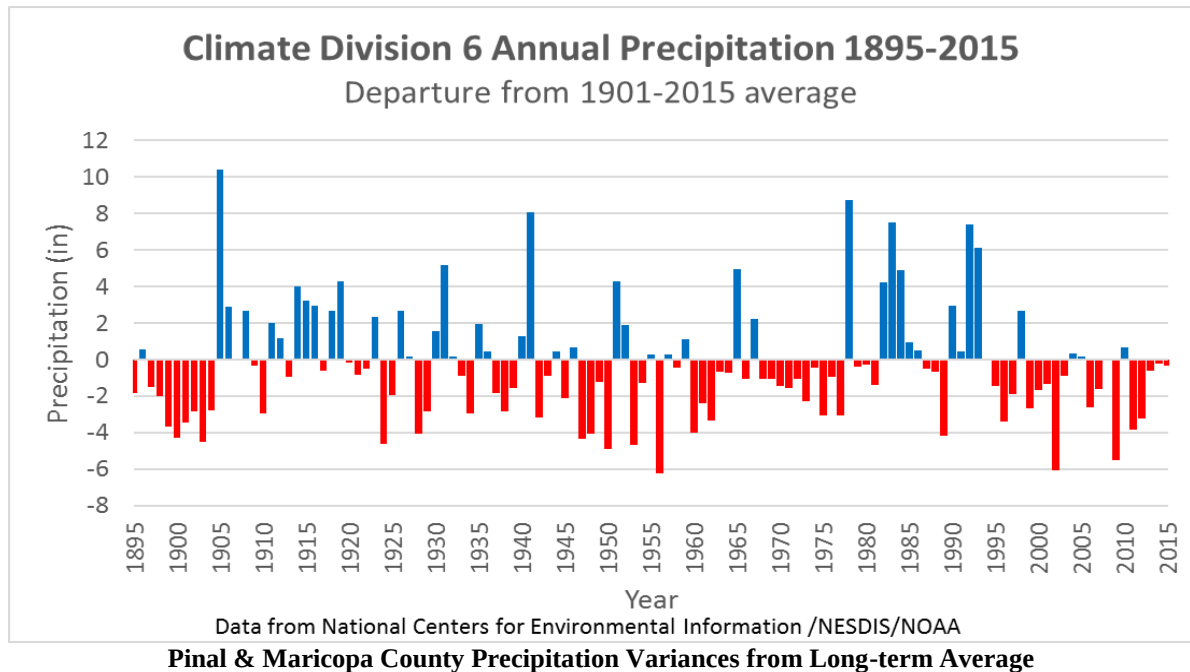
Drought differs from other natural hazards in three ways. First, the onset and end of a drought are difficult to determine due to the slow accumulation and lingering effects of an event after its apparent end. Second, the lack of an exact and universally accepted definition adds to the confusion of its existence and severity. Third, in contrast with other natural hazards, the impact of drought is less obvious and may be spread over a larger geographic area. These characteristics have hindered the preparation of drought contingency or mitigation plans by many governments.

Droughts may cause a shortage of water for human and industrial consumption, hydroelectric power, recreation, and navigation. Water quality may also decline and the number and severity of wildfires may increase. Severe droughts may result in the loss of agricultural crops and forest products, undernourished wildlife and livestock, lower land values, and higher unemployment.

History

Arizona has experienced 17 droughts declared as drought disasters/emergencies. In 1999, the Governor of Arizona determined that the lack of precipitation had and would continue to have an adverse impact on the citizens of the State, and that a declaration of drought emergency was justified. As of 2016, this declaration, in addition to the Drought Declaration for the State of Arizona (Executive Order 2007-10) are still in effect. Below is the most recent precipitation data from NCDC regarding average statewide precipitation variances from normal. Between 1849 and 1905, the most prolonged period of drought conditions in 300 years occurred in Arizona (Jacobs, 2003). Another prolonged drought occurred during the period of 1941 to 1965. The period from 1979-1993 appears to

have been anomalously wet, while the rest of the historical records shows that dry conditions are most likely the normal condition for Arizona. Between 1996 and 2015, there have been far more months with below normal precipitation than months with above normal precipitation.



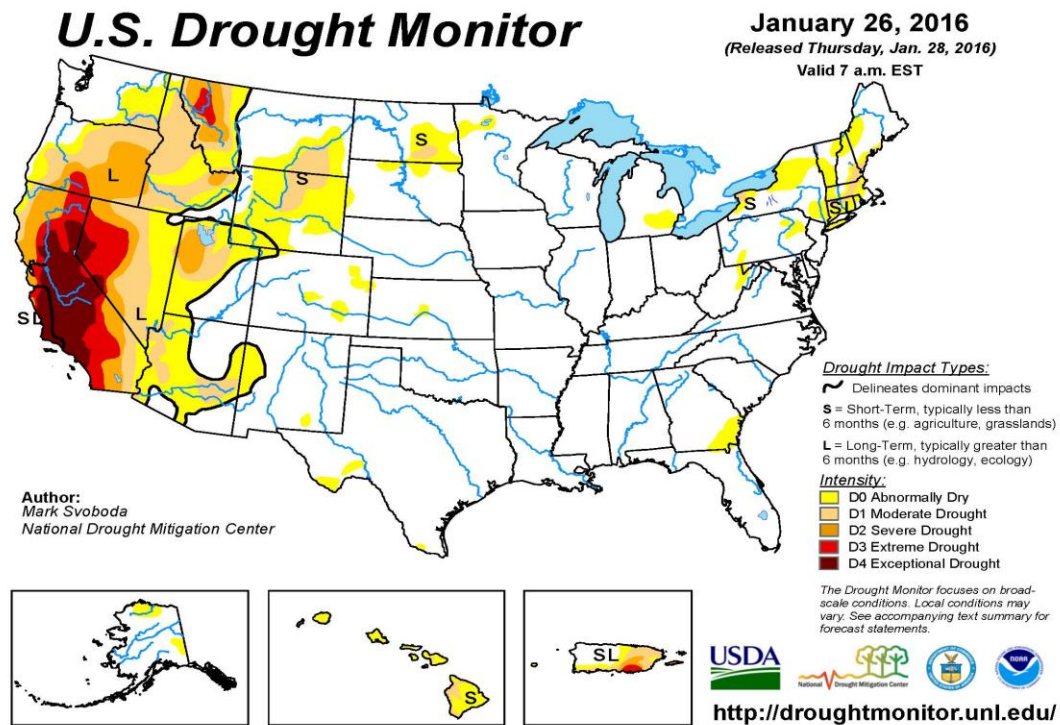
Pinal & Maricopa County Precipitation Variances from Long-term Average

Probability and Magnitude

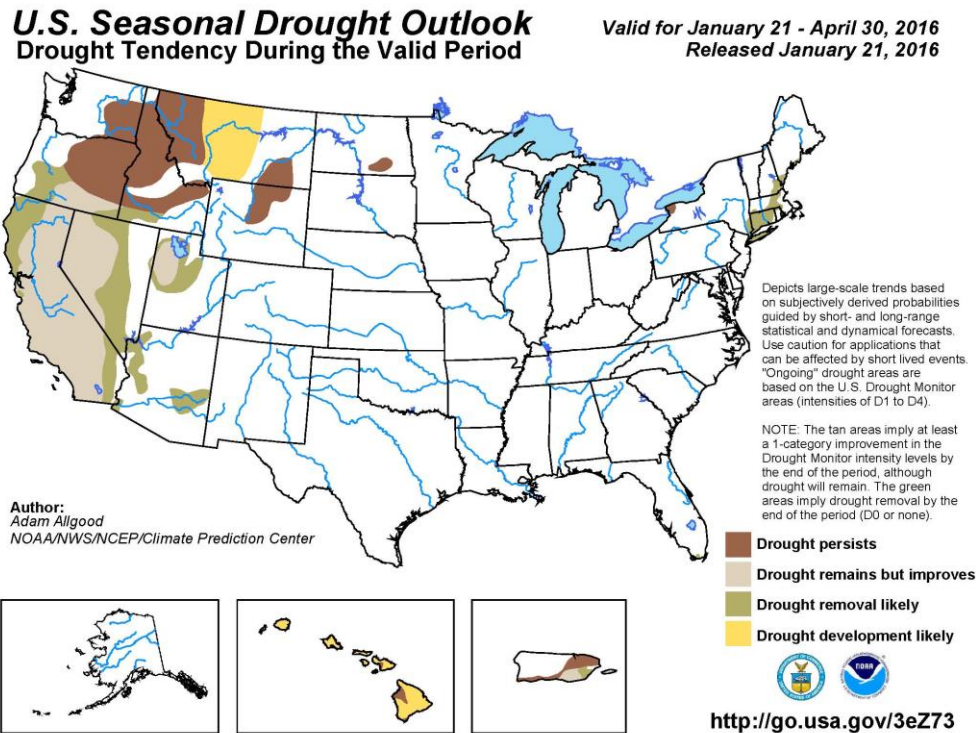
There is no commonly accepted return period or non-exceedance probability for defining the risk from drought (such as the 100-year or 1% annual chance of flood). The magnitude of drought is usually measured in time and the severity of the hydrologic deficit. There are several resources available to evaluate drought status and even project expected conditions for the very near future.

The National Integrated Drought Information System (NIDIS) Act of 2006 (Public Law 109-430) prescribes an interagency approach for drought monitoring, forecasting, and early warning (NIDIS, 2007). The NIDIS maintains the U.S. Drought Portal¹² which is a centralized, web-based access point to several drought related resources including the U.S. Drought Monitor (USDM) and the U.S. Seasonal Drought Outlook (USSDO). The USDM is a weekly map depicting the current status of drought and is developed and maintained by the National Drought Mitigation Center. The USSDO is a six month projection of potential drought conditions developed by the National Weather Service's Climate Prediction Center. The primary indicators for these maps for the Western U.S. are ocean-atmosphere coupled long-lead forecast models, El Nino-Southern Oscillation patterns, persistence and some statistical models. The indicators are used to calculate the Palmer Hydrologic Drought Index and the 60-month Palmer Z-index. The Palmer Drought Severity Index (PDSI) is a commonly used index that measures the severity of drought for agriculture and water resource management. It is calculated from observed temperature and precipitation values and estimates soil moisture. However, the Palmer Index is not considered to be consistent enough to characterize the risk of drought on a nationwide basis (FEMA, 1997) and neither of the Palmer indices are well suited to the dry, mountainous western United States.

¹² NIDIS U.S. Drought Portal website is located at: <http://www.drought.gov/portal/server.pt/community/drought.gov/202>



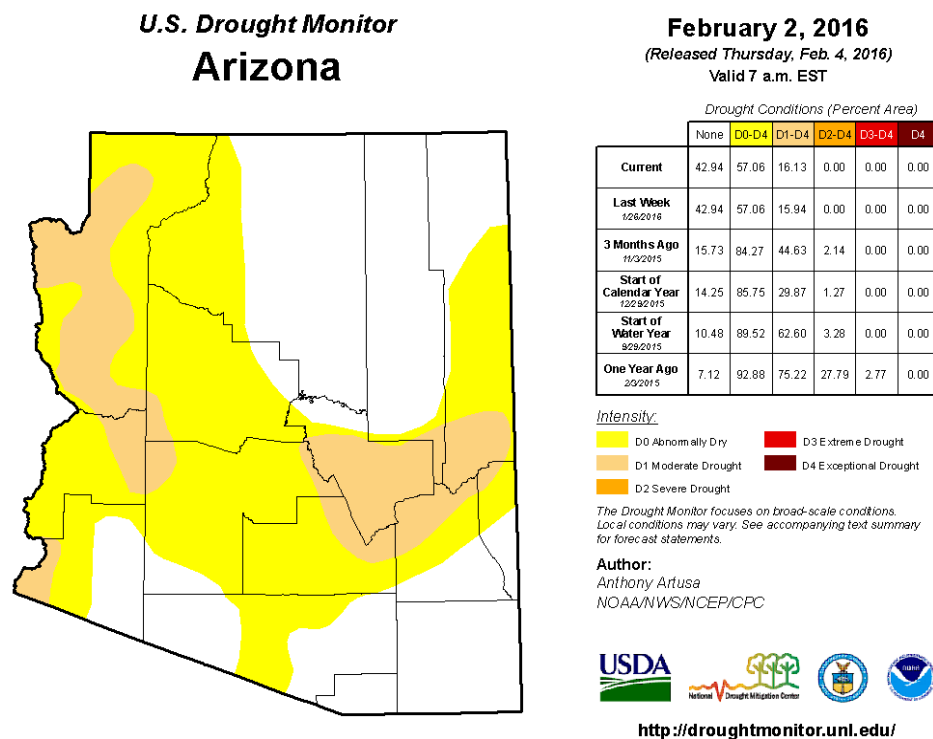
Map 4-5: U.S. Drought Monitor January 26, 2016



Map 4-6: U.S. Seasonal Drought Outlook Spring 2016

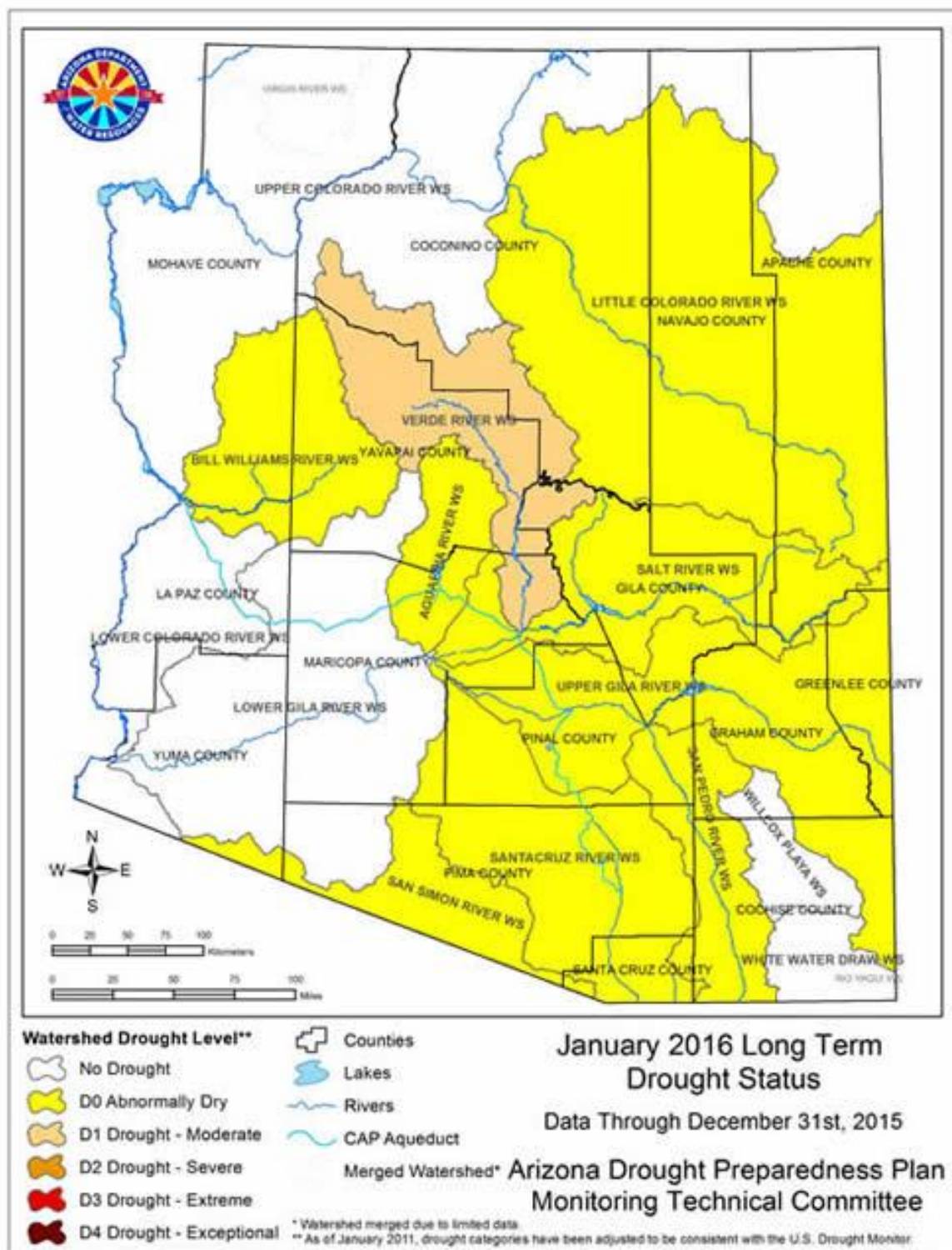
In 2003, Governor Janet Napolitano created the Arizona Drought Task Force (ADTF), led by ADWR, which developed a statewide drought plan. The plan includes criteria for determining both short and long-term drought status for each of the 15 major watersheds in the state using assessments that are based on precipitation and stream flow. The plan also provides the framework for an interagency group which reports to the governor on drought status, in addition to local drought impact groups in each county and the State Drought Monitoring Technical Committee. Twice a year this interagency group reports to the governor on the drought status and the potential need for drought declarations. The counties use the monthly drought status reports to implement drought actions within their drought plans. The State Drought Monitoring Technical Committee uses the Standardized Precipitation Index (SPI) for the short-term drought status and a combination of the SPI and streamflow for the long-term drought status.

The current drought maps are in agreement that Pinal County is currently abnormally dry in both the short and long-term. Northeastern Pinal County along the Gila County border is in moderate drought.



Source: NDMC, 2016, National Drought Mitigation Center – U.S. Drought Monitor - February 2016

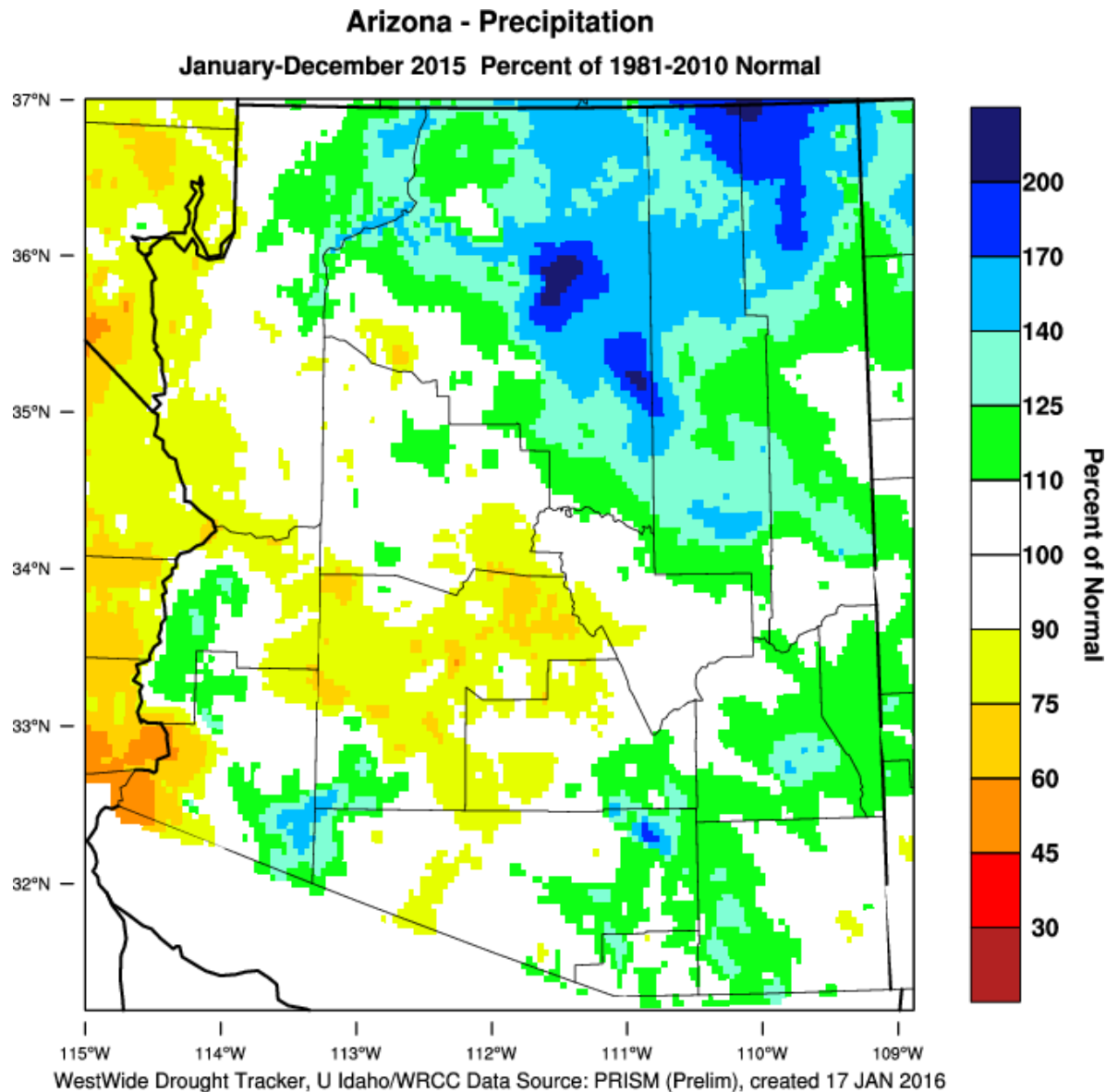
Map 4-7: Arizona Short Term Drought Status



Source: ADWR, 2016, Arizona Drought Monitor Report - January 2016

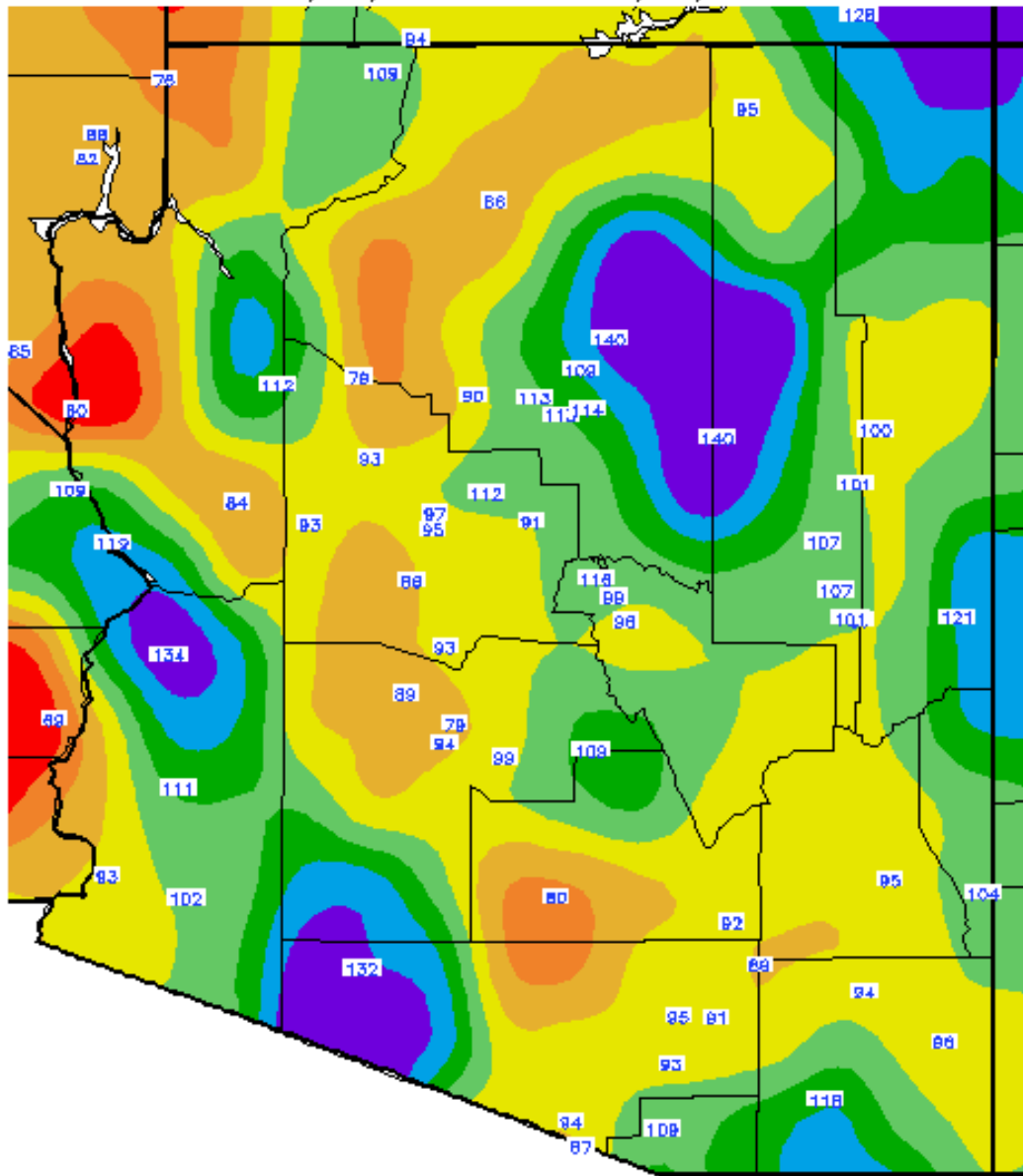
Map 4-8: Arizona Long Term Drought Status

To understand the severity of the drought and the potential for drought recovery, the next two maps show the percentage of normal precipitation over the past 12 months for the short-term and the past 36 months for the long-term. These maps indicate how far below the normal rain and snowfall the state has been for these two periods. Drought recovery will require sufficient precipitation to make up for these deficits. The deficits are typically understated by the rainfall maps, however, because the warmer temperatures experiences over these periods have resulted in more water demand by vegetation as well as human and agricultural activities, depleting aquifers and soil moisture.



Map 4-9: Percent of Normal Precipitation Indicative of the Precipitation Surplus/Deficit.

Percent of Average Precipitation (%)
2/8/2013 – 2/7/2016



Generated 2/08/2016 at WRCC using provisional data.
NOAA Regional Climate Centers

Map 4-10: Percent of Normal Precipitation Indicative of the Precipitation Surplus/Deficit.

Vulnerability

Table 4-9: CPRI Results for Drought					
Jurisdiction	Probability	Magnitude/ Severity	Warning Time	Duration	Rating
Apache Junction	Highly Likely	Negligible	> 24 hours	> 1 week	2.65
Casa Grande	Likely	Negligible	> 24 hours	> 1 week	2.20
Coolidge	Likely	Limited	> 24 hours	> 1 week	2.50
Eloy	Likely	Limited	> 24 hours	> 1 week	2.50
Florence	Possibly	Negligible	> 24 hours	> 1 week	1.75
Kearny	Likely	Negligible	> 24 hours	< 1 week	2.10
Mammoth	Likely	Limited	> 24 hours	> 1 week	2.50
Maricopa	Possibly	Critical	> 24 hours	< 1 week	2.25
Superior	Likely	Limited	> 24 hours	< 1 week	2.50
Unincorporated Pinal Co	Highly Likely	Limited	> 24 hours	> 1 week	2.95
County-wide average CPRI =					2.39

Apache Junction – Apache Junction depends on tourism that are related to the recreation activities of the four lakes, (e.g., Roosevelt, Apache, Canyon and Saguaro) northeast of the City on the Salt River. An extended drought (4-5 years) could have an adverse effect on these lakes which would result in a great economic impact on tourism dollars. Apache Junction is also dependent on the winter visitor population.

Casa Grande – Dust storms brought on by or worsened by drought conditions have an impact to the number of transportation accidents as the City boundaries are flush with the major transportation corridors.

Coolidge – The area’s business sectors are primarily industrial and agriculture. These sectors can be impacted in many ways including economically due to the lack of water and transportation accidents that drought could affect.

Eloy – Eloy is very similar to Coolidge and is vulnerable in many of the same ways.

Florence – Drought conditions can adversely affect wildfire potential occurrences and intensity creating a real problem to the already at risk Town.

Kearny – Like other jurisdictions, Kearny is at risk of wildfires, therefore the Town can be impacted not only by the direct effects of drought but it can also lead to the worsening of other hazards.

Mammoth – Mammoth is also at risk of wildfires. The Town has some critical communication towers that if damaged by wildfires will disrupt communication through most of County, making drought a risk for them.

Superior –The Town’s large mining facility depends largely on water for its operation. The mine also helps economically to maintain the Town by its large tax contribution, and by employing many who live in the Town. Wildfire brought on or worsened by drought is also a real problem for the Town due to the large business of the mine.

Unincorporated Pinal County – Having a large agriculture and livestock sector, there is the potential for drought to have a noticeable impact on the economy of the County. Drought also affects dust storms which also have an adverse effect on agriculture and livestock as well as increasing the potential for transportation accidents.

No standardized methodology exists for estimating losses due to drought and drought does not generally have a direct impact on critical and non-critical facilities and building stock. A direct correlation to loss of human life due to drought is improbable for Pinal County. Instead, drought

vulnerability is primarily measured by its potential impact to certain sectors of the County economy and natural resources including:

- Crop and livestock agriculture
- Municipal and industrial water supply
- Recreation/tourism
- Wildlife and wildlife habitat

Sustained drought conditions will also have secondary impacts to other hazards such as fissures, flooding, subsidence and wildfire. Extended drought may weaken and dry the grasses, shrubs, and trees of wildfire areas, making them more susceptible to ignition. Drought also tends to reduce the vegetative cover in watersheds, and hence decrease the interception of rainfall and increase the flooding hazard. Subsidence and fissure conditions are aggravated when lean surface water supplies force the pumping of more groundwater to supply the demand without the benefit of recharge from normal rainfall.

From 1995 to 2014, Pinal County farmers and ranchers received \$24.6 million in disaster related assistance funding from the U.S Department of Agriculture (USDA) for crop and livestock damages (EWG, 2014). During the time period of 2009 to 2014, approximately \$3.1 million of those funds were received, with the majority being distributed in 2014. Other direct costs such as increased pumping costs due to lowering of groundwater levels and costs to expand water infrastructure to compensate for reduced yields or to develop alternative water sources, are a significant factor but very difficult to estimate due to a lack of documentation. There are also the intangible costs associated with lost tourism revenues, and impacts to wildlife habitat and animals. Typically, these impacts are translated into the general economy in the form of higher food and agricultural goods prices and increased utility costs.

Vulnerability – Development Trend Analysis

Population growth in Pinal County will also require additional surface and ground water to meet the thirsty demands of potable, landscape, and industrial uses. It is unlikely that significant growth will occur in the ranching and farming sectors given the current constraints on water rights, grazing rights, and available range land. Drought planning should be a critical component of any domestic water system expansions or land development planning. The ADTF is also working cooperatively with water providers within the State to develop System Water Plans that are comprised of three components:

- *Water Supply Plan* – describes the service area, transmission facilities, monthly system production data, historic demand for the past five years, and projected demands for the next five, 10 and 20 years.
- *Drought Preparedness Plan* – includes drought and emergency response strategies, a plan of action to respond to water shortage conditions, and provisions to educate and inform the public.
- *Water Conservation Plan* – addresses measures to control lost and unaccounted for water, considers water rate structures that encourage efficient use of water, and plans for public information and education programs on water conservation.

The combination of these requirements will work to ensure that future development in Pinal County will address and/or recognize drought as a potential constraint.

Sources

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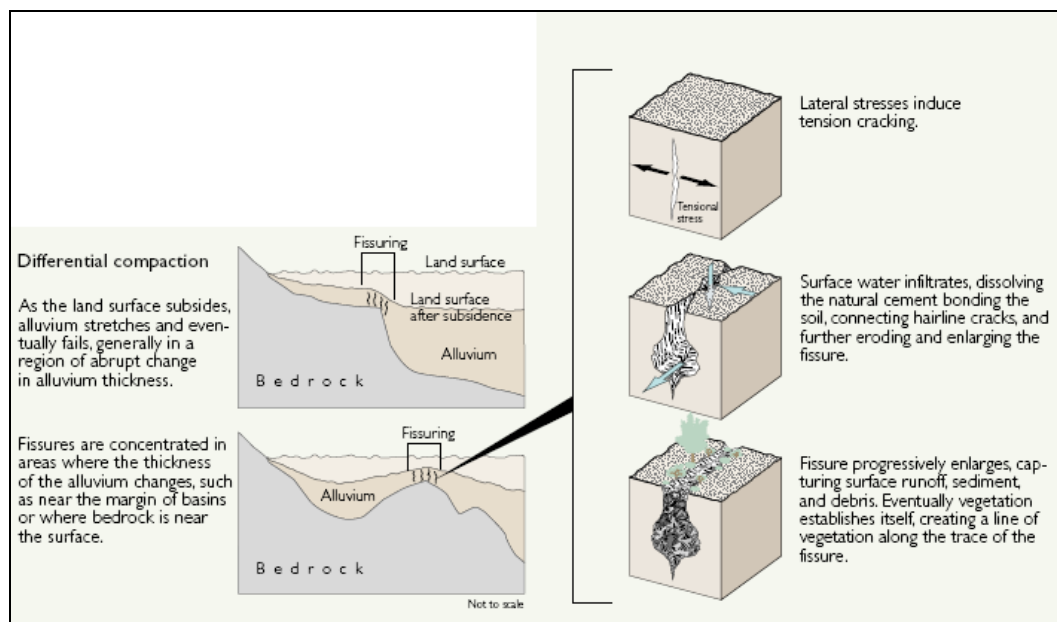
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NOAA, NWS, Climate Prediction Center, 2010,
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4.4.3 Fissure

Description

Earth fissures are linear cracks, seams, or separations in the ground surface that extend from the groundwater table or bedrock, and are caused by tensional forces related to differential land subsidence. In many cases, fissures form as a direct result of subsidence caused by groundwater depletion. The surface expression of fissures ranges from less than a yard to several miles long and from less than an inch to tens of feet wide. The longest fissure in Pinal County and the State is near the community of Picacho and is over 10 miles long. Earth fissures occur at the edges of basins, usually parallel to mountain fronts, or above local bedrock highs in the subsurface, and typically cut across natural drainage patterns. Fissures can alter flood patterns, break buried pipes and lines, cause infrastructure to collapse, provide a direct conduit to the groundwater table for contaminants, and even pose a life safety hazard for both humans and animals.



Source: AZGS, 2010

History

In Arizona, fissures were first noted near Picacho in 1927. The number of fissures has increased dramatically since the 1950s due to the accelerated depletion of groundwater. Initially the heaviest use of groundwater was for agricultural irrigation use. More recently, however, exponential population growth has dramatically increased domestic demands. The risk posed by fissures is also increasing as the population expands into the outlying basin edges and mountain fronts. Fissure case histories documented by the Arizona Geological Survey (AZGS) for the Pinal County area are summarized below.

- Picacho, Pinal County
 - I-10 – AZ Dept. of Transportation trying to determine effective mitigation for the fissure crossing.
 - Picacho Pump Station – fissure crosses access road and runs near the Central Arizona Project canal; damaged road in 1984.
- Ak-Chin Indian Community, Pinal County

- Three homes valued at \$60,000 each, one home at \$89,000, and one home at \$104,000 were damaged due to fissures/subsidence over the period of 1998-2008.
- San Tan Mountains, Maricopa and Pinal Counties
 - Foothills – undermining at least one home, and crossing several roads; trapped dogs and horses in flash flood flowing through the fissure in 2007
 - Y-crack – crosses the Hunt Highway and San Tan Boulevard east of Sossaman Road; present at least by 1969; catastrophically re-opened from 195th Street and Happy Road to San Tan in 2005 and again in 2007, damaging roads, corrals, fences, driveways, stranding and trapping vehicles, and killing a horse
- Apache Junction/East Mesa, Maricopa County
 - Baseline and Meridian – fissure crosses diagonally under the intersection, fissure zone over one mile long
 - Ironwood and Guadalupe – industrial facilities built on top of several fissures in the area; fissures stop immediately east of subdivision; fissures crossing power lines
- Flood retarding structures, Maricopa and Pinal Counties
 - McMicken Dam, White Tank Mountains – dam had to be removed and replaced; cost several million dollars
 - Powerline FRS, Apache Junction – fissure was discovered within 1,200 feet of the FRS; as part of the Supplemental Watershed Plan and Environmental Assessment for the structure, the Powerline FRS will be replaced with a system of channels

Probability and Magnitude

There are no methods of quantifiably predicting the probability and magnitude of earth fissures. The locations of potential fissures or extension of existing fissures may be predictable in specific areas if enough information about the subsurface material properties and groundwater levels are available. It is a fair assurance that continued groundwater depletion will result in more fissures. The magnitude of existing and new fissures is dependent upon several variables including the depth to groundwater, type and depth of surficial material present, amount and rate of groundwater depletion, groundwater basin depth, depth to bedrock, volume and rate of runoff due to precipitation entering the fissure, and human intervention.

Vulnerability

Table 4-10: CPRI Results for Fissure					
Jurisdiction	Probability	Magnitude/ Severity	Warning Time	Duration	Rating
Apache Junction	Possibly	Negligible	< 6 hours	< 1 week	2.10
Casa Grande	Possibly	Negligible	> 24 hours	> 1 week	1.75
Coolidge	Possibly	Negligible	> 24 hours	> 1 week	1.75
Eloy	Likely	Limited	> 24 hours	> 1 week	2.50
Florence	Unlikely	Negligible	> 24 hours	> 1 week	1.30
Kearny	Unlikely	Limited	> 24 hours	< 1 week	1.50
Mammoth	Unlikely	Negligible	> 24 hours	< 1 week	1.30
Maricopa	Possibly	Negligible	> 24 hours	< 1 week	1.65
Superior	Unlikely	Negligible	> 24 hours	< 1 week	1.30
Unincorporated Pinal Co	Highly Likely	Limited	< 6 hours	< 1 week	3.30
County-wide average CPRI =					1.85

The Arizona Land Subsidence Group (ALSG) prepared a white paper in 2007 (ASLG, 2007) that summarizes fissure risk and various case studies. The following table is an excerpt from that report listing various types of damages that either have or could occur as a result of fissures:

Table 1. Hazards Directly Associated with Earth Fissures	
• Cracked or collapsing roads • Broken pipes & utility lines • Damaged or breached canals • Cracked foundation/separated walls • Loss of agricultural land • Livestock & wildlife injury or death	• Severed or deformed railroad track • Damaged well casing or wellhead • Disrupted drainage • Contaminated groundwater aquifer • Sudden discharge of ponded water • Human injury or death

(After Pewe, 1990; Bell & Price, 1993; and Slaff, 1993)

Recorded losses in Pinal County due to fissures include damages to residential structures, roadways, pipelines, and other miscellaneous improvements. According to the ALSG: *“The problems encountered with subsidence and earth fissures in Arizona will increase as groundwater continues to be withdrawn at unsustainable levels. More damage to structures and infrastructure can be expected with ever increasing economic losses, and, more importantly, a burgeoning threat to human health and safety, too.”* (ASLG, 2007)

There are no commonly accepted methods for estimating potential fissure related losses. Many variables including groundwater withdrawal, rainfall runoff frequency, and exposure to fissures contribute to the potential for human and economic losses.

Based on the results from the assessments performed for the previous Plan, \$27.4 million in critical and non-critical identified assets are exposed to high hazard fissure zones Countywide. An additional \$76.2 million of HAZUS defined residential, commercial, and industrial facilities for all participating jurisdictions are exposed to a high hazard fissure zone. Regarding human vulnerability, the 2013 State Hazard Mitigation Plan estimates a total population of 31,497 people, or 8.38% of the total 2010 County population, is potentially exposed to a high hazard fissure zone (population counts based on census 2010 blocks intersection with fissure zone areas defined by AZGS - the Arizona Geological Survey has mapped known and suspected fissure lineaments for certain areas of the County; GIS data is consistently updated for these fissure study areas.). The potential for death and/or injury is possible, although no occurrences have been documented to date. Short and long-term displacement is also likely should structures become damaged.

The Planning Team has determined that beginning with this Plan, they will continue to assess vulnerability as an overview summary of the hazard’s impact on the community and its vulnerable structures, rather than in a quantitative manner.

Apache Junction – In Apache Junction, the southwest corner of the city is most vulnerable to fissures, and is included in one AZGS fissure study area; the Apache Junction Study Area. This small section of the community, south of Baseline Avenue and west of Ironwood Drive, was mapped in April of 2008 and contains both continuous and discontinuous earth fissures. The greatest risk lies along the intersection of Baseline and Meridian, where a fissure crosses diagonally under the intersection, and north of Guadalupe Road where industrial facilities are built on top of several fissures. The most recent applicable data for Apache Junction projected a total of \$11,951,000 in potential economic impact due to building exposure in high hazard fissure zones.

Casa Grande – The city of Casa Grande is included in two AZGS fissure study areas; the Toltec Buttes Study Area, which was mapped in August 2008, and the Sacaton Butte Study Area, which was mapped in March 2011. The southeast corner of Casa Grande is the area covered in the Toltec Buttes Study, where several fissures are marked along I-8. In addition, a small portion of the northwest corner of Casa Grande was included in the Sacaton Butte Study, while there were no fissures noted within city limits, both continuous and discontinuous earth fissures were noted in the study area

nearby. Although these fissures do not expose a large number of people to a high hazard area, the most recent applicable data for Casa Grande projected a total of \$10,610,000 in potential economic impact due to building exposure in high hazard fissure zones.

Coolidge – The city of Coolidge is included in one AZGS fissure study area; the Picacho Peak and Friendly Corner Study Area, which was mapped in January 2016. The study area covers the southernmost areas of the community, and in reference to Coolidge, maps the approximate locations of unconfirmed earth fissures – with several being in close proximity to the City of Coolidge Municipal Airport. These fissures currently do not expose any population to a high hazard area. The most recent applicable data for Coolidge projected a total of \$0 in potential economic impact due to building exposure in high hazard fissure zones.

Eloy – The city of Eloy is included in two AZGS fissure study areas (Toltec Buttes Study Area & Picacho Peak and Friendly Corner Study Area), and is in close proximity to others as well. In the Toltec Butte Study Area, several unconfirmed fissures are identified near the Toltec community and the northwestern limits of the city. Several noteworthy continuous and discontinuous fissures are noted south and southeast of the Casa Grande Mountains. In addition, far eastern sections of Eloy are included within the Picacho Peak and Friendly Corner Study Area, where a multitude of fissures are identified. However, most of these fissures lie to the east of AZ-87, outside of Eloy. The most recent applicable data for Eloy projected a total of \$30,633,000 in potential economic impact due to building exposure in high hazard fissure zones.

Florence – Florence is not included in any of the AZGS fissure study areas. The probability of fissures having an impact on the community is unlikely. The most recent applicable data for Florence projected a total of \$0 in potential economic impact due to building exposure in high hazard fissure zones.

Kearny – Kearny is not included in any of the AZGS fissure study areas. The probability of fissures having an impact on the community is unlikely. The most recent applicable data for Kearny projected a total of \$0 in potential economic impact due to building exposure in high hazard fissure zones.

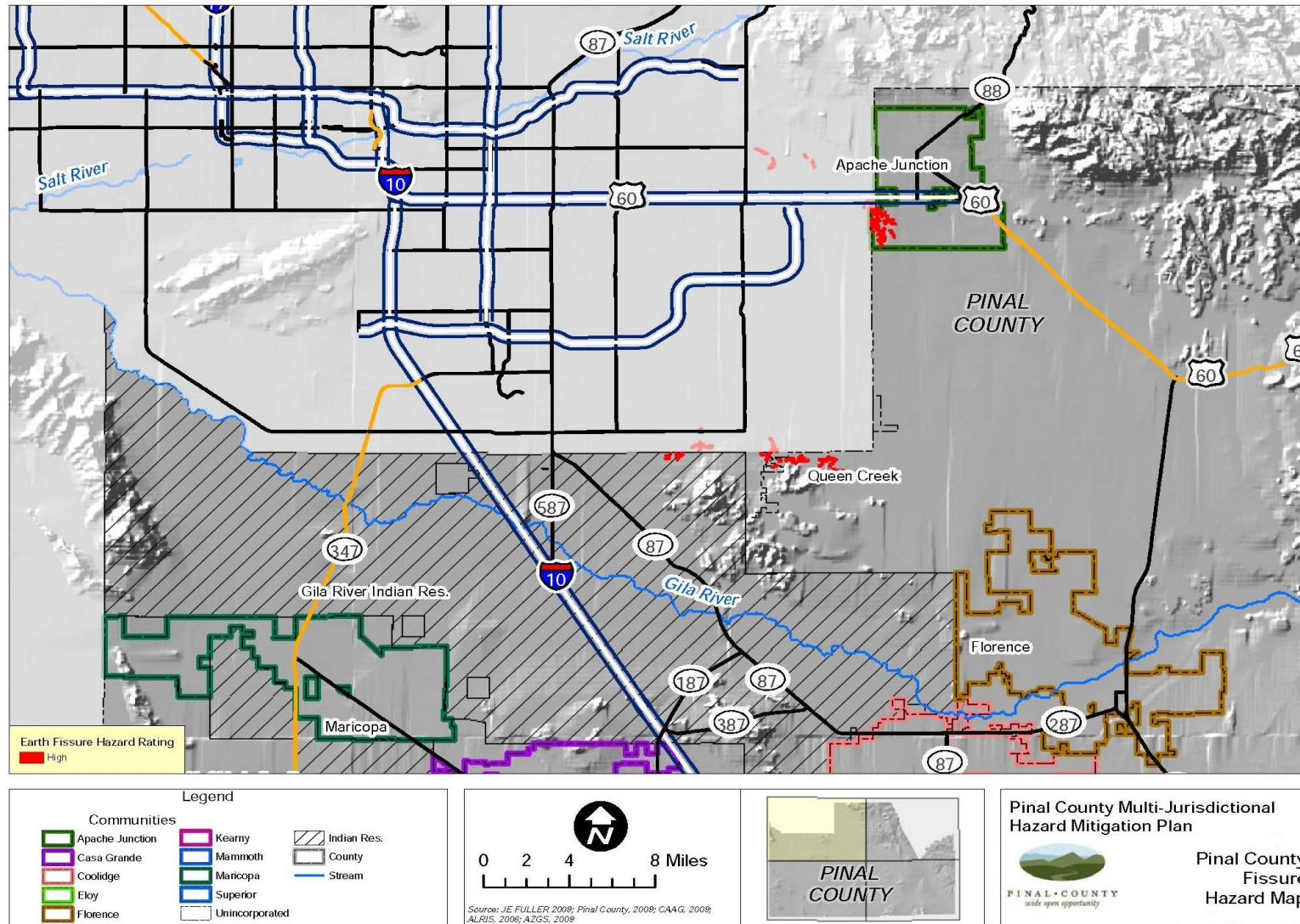
Mammoth – Mammoth is not included in any of the AZGS fissure study areas. The probability of fissures having an impact on the community is unlikely. The most recent applicable data for Mammoth projected a total of \$0 in potential economic impact due to building exposure in high hazard fissure zones.

Maricopa – Fissures are not as prevalent in the Maricopa area, however, portions of the community are included in two AZGS fissure study areas. The Sacaton Butte Study Area fissure map was prepared by AZGS in March 2011, and noted both continuous and discontinuous earth fissures adjacent to the southeastern limits of the city, near the Ak-Chin Regional Airport. The Heaton Study Area, in western Maricopa, which was mapped in February of 2009 noted both continuous and discontinuous earth fissures north of Arizona State Route 238, along with approximate locations of unconfirmed fissures. These fissures currently do not expose any population to a high hazard area. The most recent applicable data for Maricopa projected a total of \$0 in potential economic impact due to building exposure in high hazard fissure zones.

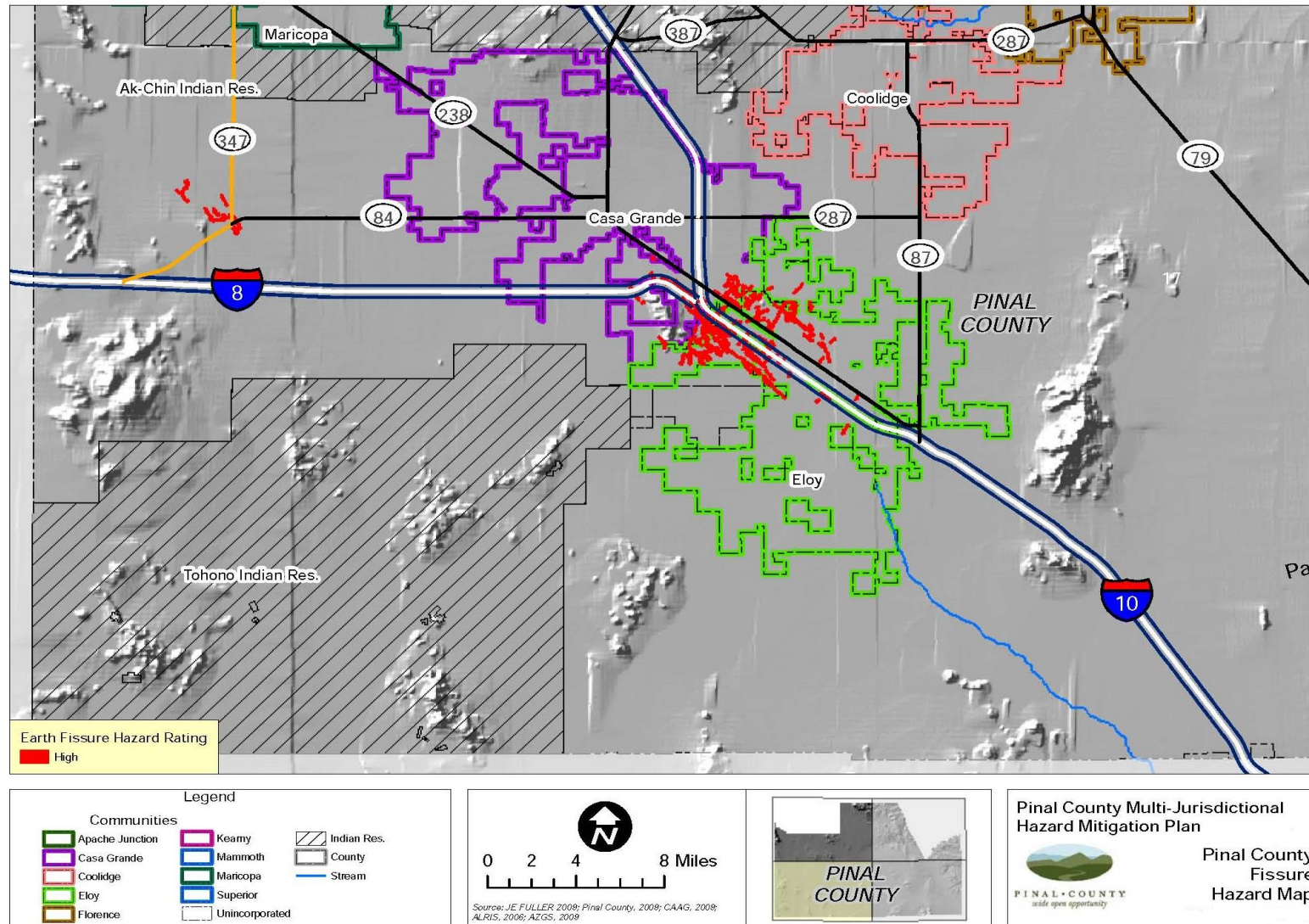
Superior – Superior is not included in any of the AZGS fissure study areas. The probability of fissures having an impact on the community is unlikely. The most recent applicable data for Superior projected a total of \$0 in potential economic impact due to building exposure in high hazard fissure zones.

Unincorporated Pinal County – Several areas of unincorporated Pinal County are vulnerable to fissures. In the northern section of Pinal County, along the Maricopa County line, several fissures have been noted along Hunt Highway as part of the Chandler Heights Study Area. Fissures in this area, the Y-crack in particular, have presented several issues over the years. The Picacho Peak and

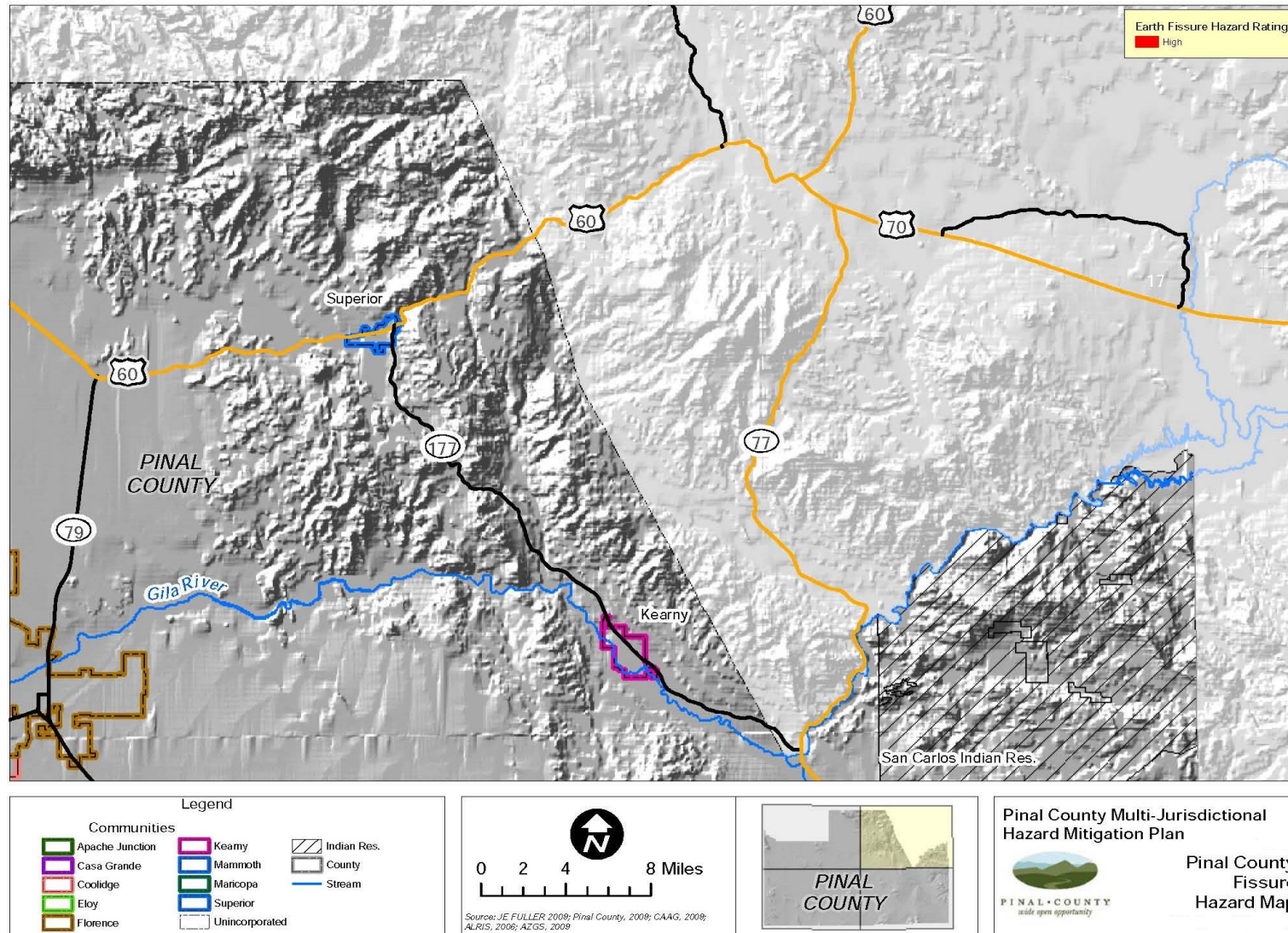
Friendly Corner Study Area, located primarily among rural, unincorporated areas of the county, contains a significant number of noteworthy continuous and discontinuous fissures. Additional study areas impacting the unincorporated areas of the county include; Tator Hills, Greene Wash, White Horse Pass, Santa Rosa Wash, and Pete's Corner. Although fissures are highly likely, the magnitude/severity observed in these areas is limited, primarily due to the rural geographical location, and thus a smaller number of people potentially affected. In estimating potential building exposure to a high hazard fissure zone(s), the most recent applicable data projected the Potential Economic Impact (x \$1,000) of total building exposure (Residential, Commercial, and Industrial) to be \$15,514.



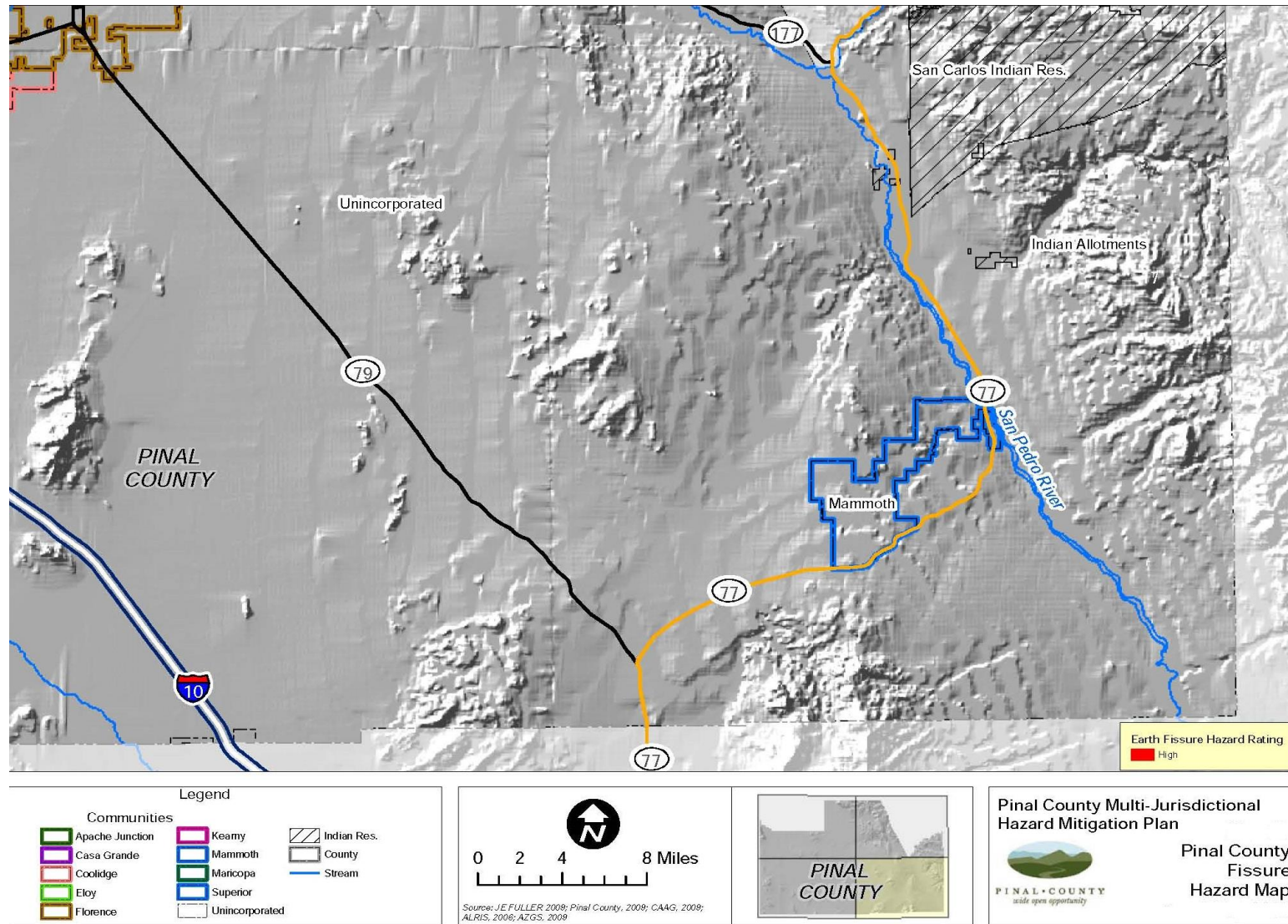
Map 4-11: Pinal County Fissure Hazard Area (1)



Map 4-12: Pinal County Fissure Hazard Area (2)



Map 4-13: Pinal County Fissure Hazard Area (3)



Map 4-14: Pinal County Fissure Hazard Area (4)

Vulnerability – Development Trend Analysis

Earth fissures pose a major geologic hazard to developments and may prove restrictive to improvements and construction near to the fissures. All new development should be evaluated for potential impacts due to earth fissures, where potential for earth fissuring exists, appropriate mitigation measures should be included in the design. However, given the isolated nature of the identified fissure risk area, it is not anticipated that significant development of the area will occur in the future. Monitoring of the fissure and regular maintenance of the roadway within the fissure area will probably be the extent of needed activity.

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4.4.4 Flood / Flash Flood

Description

For this Plan, the hazard of flooding addressed in this section will pertain to floods that result from precipitation/runoff related events. Flooding due to dam or levee failures is addressed separately. The three seasonal atmospheric events that tend to trigger floods in Pinal County are:

- *Tropical Storm Remnants*: Some of the worst flooding tends to occur when the remnants of a hurricane that has been downgraded to a tropical storm or tropical depression enter the State. These events occur infrequently and mostly in the early autumn, and usually bring heavy and intense precipitation over large regions causing severe flooding.
- *Winter Rains*: Winter brings the threat of low intensity; but long duration rains covering large areas that cause extensive flooding and erosion, particularly when combined with snowmelt.
- *Summer Monsoons*: In mid to late summer the monsoon winds bring humid subtropical air into the State. Solar heating triggers afternoon and evening thunderstorms that can produce extremely intense, short duration bursts of rainfall. The thunderstorm rains are mostly translated into runoff and in some instances, the accumulation of runoff occurs very quickly resulting in a rapidly moving flood wave referred to as a flash flood. Flash floods tend to be localized and cause significant flooding of local watercourses.

Damaging floods in the County include riverine, sheet, alluvial fan, and local area flooding. Riverine flooding occurs along established watercourses when the bankfull capacity of a watercourse is exceeded by storm runoff or snowmelt and the overbank areas become inundated. Sheet flooding occurs in regionally low areas with little topographic relief that generate floodplains over a mile wide. Alluvial fan flooding is generally located on piedmont areas near the base of local mountains, such as the Tortolita Fan, that are characterized by multiple, highly unstable flowpaths that can rapidly change during flooding events. Local area flooding is often results from poorly designed or planned development wherein natural flowpaths are altered, blocked or obliterated, and localized ponding and conveyance problems result. Erosion is also often associated with damages due to flooding.

History

Flooding is clearly a major hazard in Pinal County, resulting in over 15 presidential disaster declarations. There have also been several non-declared events of reported flooding incidents. The following incidents represent examples of major flooding that has impacted the County:

- September 2014, tropical storm Norbert came through Arizona and caused severe damages to areas and communities within Maricopa and Pinal counties. The storm caused severe flooding throughout the area, including the shut-down of Interstate 10 in Phoenix. Locally, Pinal County agencies had to close over 20 roads for flooding, including major thoroughfares. Road tops and shoulders were damaged in many areas. A flood control levee was breached, sending tens of thousands of gallons of water overtop a road, washing it out completely and cutting off the only ingress/egress road for a community of around 800 people. The community was cut off from any services for roughly 12 hours as the water continued over the road and had to use the unfinished road with caution until it was fixed six months later. Two fatalities were the result of a car being washed downstream as it attempted to travel through a wash that ran over the road. No other injuries were reported. The event was a Presidential Disaster Declaration for Maricopa County and State Governor's Disaster Declaration for Pinal County. Response and recovery costs were approximately \$200,000 for Pinal County

- January 2010, about 18 inches of water flooded roads and homes near Blackwater and Toki. In Arizona City, many homes had flood damage that lasted several days generally between two and four inches of rain fell in this area during the five days ending on January 22. Streets and highways were closed and homes and businesses were flooded after the third storm system of the week moved across the deserts and into the foothills. Some locations reported flooding during the day of January 21, while the major flooding in Wenden struck in the early morning hours of Friday, January 22. Damages were estimated at \$300,000 (NCDC, 2010). A presidential disaster was declared (FEMA-1888-DR-AZ) for several counties and Indian tribes in the state, however, Pinal County was not included in that declaration.
- July, 2008, heavy rain moving through the Pinal County area caused major flooding county-wide. The gage at Magma Dam recorded nearly 3 inches from the evening of the 10th into the early morning hours on the 11th of July. County-wide damages were estimated to exceed \$500,000. (NCDC, 2010).
- July and early August 2006, several areas of the state were struck by severe storms and flooding during the period of July 25 to August 4, 2006. Tropical moisture poured into Southeast Arizona, saturating the ground at most locations. As rainfall continued, additional runoff quickly filled rivers and washes, exceeding bank full capacities and flooding homes and businesses as well as nearby roads. Some roadways were washed away due to the strong flood waters. Numerous streets and fields were flooded south of Arizona City after the Santa Cruz Wash was breached upstream of Arizona City. One area that was hit the hardest was Silver Bell Estates. Three structures were flooded in the town of Kearny. Three homes were destroyed and a county bridge was damaged along Arivaipa Creek. One home in the town of Dudleyville was flooded. The flooding prompted a federal disaster declaration (FEMA-1660-DR-AZ) for Gila, Graham, Greenlee, Pima, and Pinal Counties. Total disaster expenditures exceeded \$13.6 million.
- February 2005, a strong storm system drew moist subtropical air from the Pacific to give northern and central Arizona widespread moderate to heavy rains. The precipitation event began the night of February 10th and lasted through the early hours February 14th. Rainfall totals of 2 to 3 inches were common in many locations. The flooding prompted a federal disaster declaration (FEMA-1586-DR-AZ) for Gila, Graham, Greenlee, Pinal, Yavapai, Maricopa, and Mohave Counties. Total disaster expenditures exceeded \$9.5 million.
- October 2000, a series of storms rolled through the county causing wide-scale flooding and erosion. A presidential disaster declaration was received on October 27, 2000 (FEMA-1347-DR-AZ). Flooding and erosion occurred across much of County with approximately \$0.95 million in FEMA restoration money being used to restore or repair flood damages at 56 locations.
- December 1992 - early January 1993, a series of winter storms produced record breaking precipitation amounts and severe weather across much of Arizona. Heavy rains combined with melting snowpack caused heavy flooding of both local washes and regional rivers within Pinal County. Nearly every community and city within the county was impacted by the storms at some level. Most of the heavy damage was associated with the Gila, San Pedro, and Santa Cruz Rivers. According to the USACE Flood Damages Report, the total public and private damages from the 1993 floods were estimated to exceed \$21.5 million in Pinal County alone.¹³ The flooding prompted a federal disaster declaration (FEMA-977-DR-AZ)

¹³ US Army Corps of Engineers, Los Angeles District, 1994, *Flood Damage Report – State of Arizona – Floods of 1993*

for almost the entire state. Pinal County received approximately \$2.1M in federal aid to restore or repair flood damages at 86 locations across the county.

Probability and Magnitude

For the purposes of this Plan, the probability and magnitude of flood hazards in Pinal County jurisdictions are based on the 1% probability floodplains delineated on FEMA Flood Insurance Rate Maps (FIRMs), plus any provisional floodplain delineations used for in-house purposes by participating jurisdictions. FEMA has completed a map modification program to update the FIRMs for the County into a digital FIRM (DFIRM) format. The effective date for the new DFIRM maps is September 28, 2007. DFIRM floodplain GIS base files were obtained from FEMA and are the basis for the flood hazard depictions in this Plan. Therefore, the vulnerability analysis results in this plan are likely conservative.

Two designations of flood hazard are used. Any “A” zone is designated as a HIGH hazard area. MEDIUM flood hazard areas are all “Shaded X” zones. All “A” zones (e.g. – A, A1-99, AE, AH, AO, etc.) represent areas with a one percent (1%) probability of being flooded at a depth of one-foot or greater in any given year. All “Shaded X” zones represent areas with a 0.2% probability of being flooded at a depth of one-foot or greater in any given year. These two storms are often referred to as the 100-year and 500-year storm, respectively.

Vulnerability

Table 4-11: CPRI Results for Flooding					
Jurisdiction	Probability	Magnitude/ Severity	Warning Time	Duration	Rating
Apache Junction	Highly Likely	Critical	6-12 hours	< 24 hours	3.35
Casa Grande	Highly Likely	Limited	< 6 hours	< 24 hours	3.20
Coolidge	Likely	Limited	< 6 hours	< 24 hours	2.75
Eloy	Highly Likely	Limited	< 6 hours	> 24 hours	3.30
Florence	Likely	Limited	> 24 hours	< 1 week	2.40
Kearny	Likely	Critical	< 6 hours	< 24 hours	3.05
Mammoth	Highly Likely	Limited	< 6 hours	> 24 hours	3.30
Maricopa	Likely	Critical	6-12 hours	> 1 week	3.10
Superior	Likely	Limited	< 6 hours	> 24 hours	2.85
Unincorporated Pinal Co	Highly Likely	Limited	12-24 hours	< 1 week	3.00
County-wide average CPRI =					3.03

For the previous Plan, the estimation of potential exposure to high and medium flood hazards was accomplished by intersecting the human and facility assets with the flood hazard limits depicted on this section’s maps. Loss estimates to all facilities located within the high and medium flood hazard areas were made based on the loss estimation tables published by FEMA (FEMA, 2001). Most of the assets located within high hazard flood areas will be subject to three feet or less of flooding. It is assumed that all structural assets located within the high hazard areas will have a loss-to-exposure ratio of 0.20 (or 20%). A loss to exposure ratio of 0.05 (5%) is assumed for assets located in the medium hazard areas.

Based on the previous Plan’s assessment, there is an estimated \$37.9M and \$2M in asset related losses for high and medium flood hazards, for all the participating jurisdictions in Pinal County. An additional \$113.7 and \$118.9M in high and medium flood losses to HAZUS defined residential, commercial, and industrial facilities is estimated for all participating County jurisdictions. Regarding human vulnerability, a total population of 18,918 people, or 5.03% of the total population, is potentially exposed to a high hazard flood event. A total population of 43,737 people, or 11.64% of

the total population, is potentially exposed to a medium hazard flood event. Based on the historic record, multiple deaths and injuries are plausible and a substantial portion of the exposed population is subject to displacement depending on the event magnitude.

The Planning Team has determined that beginning with this Plan, they will continue to assess vulnerability as an overview summary of the hazard's impact on the community and its vulnerable structures, rather than in a quantitative manner.

Apache Junction – The City of Apache Junction is located on an alluvial fan at the base of the Superstition and Goldfield Mountains. The alluvial fan is characterized by the presence of many intermingling washes. Weekes Wash is the largest wash in the community, and places the greatest number of residents at risk for flooding. Several homes are located within the 1-percent chance annual flood hazard area due to their close proximity to the Weekes Wash. A significant portion of the city, particularly the western parts of the community (west of Tomahawk Road), is located within the .2-percent chance annual flood hazard area. The city is subject to the effects of both summer flash flooding, and also general winter storm flooding. Two structures included in the Buckhorn-Mesa Watershed Project, the Apache Junction FRS and Weekes Wash Dam, help reduce the flooding hazard within the community. However, due to large the extent of homes, businesses, and infrastructure located within FEMA mapped flood hazard areas, potential magnitude/severity is rated as critical, as the impact to the community could be extensive.

Casa Grande – In the City of Casa Grande lying to the north, along the North Branch of the Santa Cruz Wash, the area is subject to sheet flow flooding. Several residents in this area are subjected to either a 1-percent or .2-percent chance of annual flooding. In the southern portion of Casa Grande, inadequate drainage for run-off originating in or near the city results in localized ponding in many areas (e.g. Businesses located at the intersection of Florence Boulevard & N Cameron Street). The impact on the central business district could result in economic distress for the local economy. Due to the lack of well-defined stream channels, intense rainfall of short duration, 2 to 3 inches in less than an hour, creates severe drainage problems in the community. The drainage problem could result in closed roads and be a major disruption to transportation within the City. All streams in the vicinity of Casa Grande are ephemeral, flowing occasionally in response to large amounts of rainfall in short intervals of time. Winter and summer precipitation falls as intense rains from thunderstorms whereas winter precipitation generally results from low intensity storms lasting from one to three days. In all, the magnitude/severity of flooding within the city is seen as limited, due to a large majority of the community being outside of FEMA identified at-risk areas.

Coolidge – Flooding in Coolidge is seen as limited, as the area at risk is not great in size, and the 1-percent flood-risk areas are restricted to agricultural areas. Several homes are located within the .2 percent annual flood-risk area, with the potential for more to be included in the future, as development continues in the FEMA mapped area of the community. In addition, there is a 24 unit low-income apartment complex, and a 27 unit income restricted senior &/or disabled community apartment complex located within this area. This could pose evacuation issues, and place a heavy burden on residents if displacement occurs.

Eloy – Based on FEMA flood insurance rate maps, there are approximately 112 square miles of land in Eloy that lie within the 100-year floodplain area, this amount comprises approximately 21 percent of Eloy's entire planning area. The rivers and streams within the Planning Area are nearly always dry, but will provide a means for conveying water during rain or storm events. These water corridors may experience flooding during severe storm events. The greatest flood risk within the community lies to the south of the Casa Grande-Picacho Highway and the railroad tracks, as multiple homes are located within this 1-percent flood risk area, along with several properties in the industrial corridor. Flooding in this area could result in economic disruption, and a large number of displaced residents. In

addition, a large portion of land below I-10 is within a 100-year floodplain as well, however, this area is not seen as a particularly vulnerable section of the community as it is primarily agricultural land.

Florence – The major flooding risk present in Florence comes by way of the Gila River, which divides the town into northern and southern areas. A thin strip of the town runs across the Gila River floodplain; although little development has taken place in this strip, as it is mainly used for agricultural purposes, the concerns are enhanced due to the critical infrastructure buildings which are located within the flood risk area. The Pinal County Superior Court, Pinal County Sheriff's Office, Pinal County Jail, Florence Correctional Center, CCA Central Arizona Detention Center, Florence Town Hall, and the Florence Fire Department are all situated within FEMA mapped flood hazard areas. In addition to the potential physical damages of critical facilities, and disruption of governmental operations, flooding can also cause significant transportation and evacuation issues (e.g. if water rises high enough on the Gila River, the bridge on AZ-79 could be shut down, leaving the town split). Although the existence of the Coolidge Dam considerably lessens the threat of flooding from large flood events, a threat still exists due to localized flooding, and the potential for flooding originating from events centered over the watershed downstream of Coolidge Dam. Assuming the reservoir to be at capacity, there are three types of events which would lead to severe flooding on the Gila River: (1) a widespread frontal type storm of large magnitude and long duration, (2) a warm air mass moving in on a large snow accumulation, or (3) a frontal type storm falling on snow.

Kearny – In Kearny, the Gila River is the primary flood hazard. If flooding were to occur, the Kearny Airport and Kearny Golf Club would likely be impacted as they are located within the regulatory floodway. In addition, homes and industry in the southwest corner of the community are also at risk (1-percent-annual-chance-floodplain), this area includes; Industrial Drive, Beauford Road, and the northern section of Veterans Avenue. The railroad tracks running through the city keep the majority of Kearny separated from the potential rising waters of the Gila River, leaving the area east of the railroad tracks in an area of minimal risk (outside the 1-percent and .2-percent-annual-chance floodplains). Kearny is subject to flooding during almost any season of the year, while rainfall is the main cause of flooding.

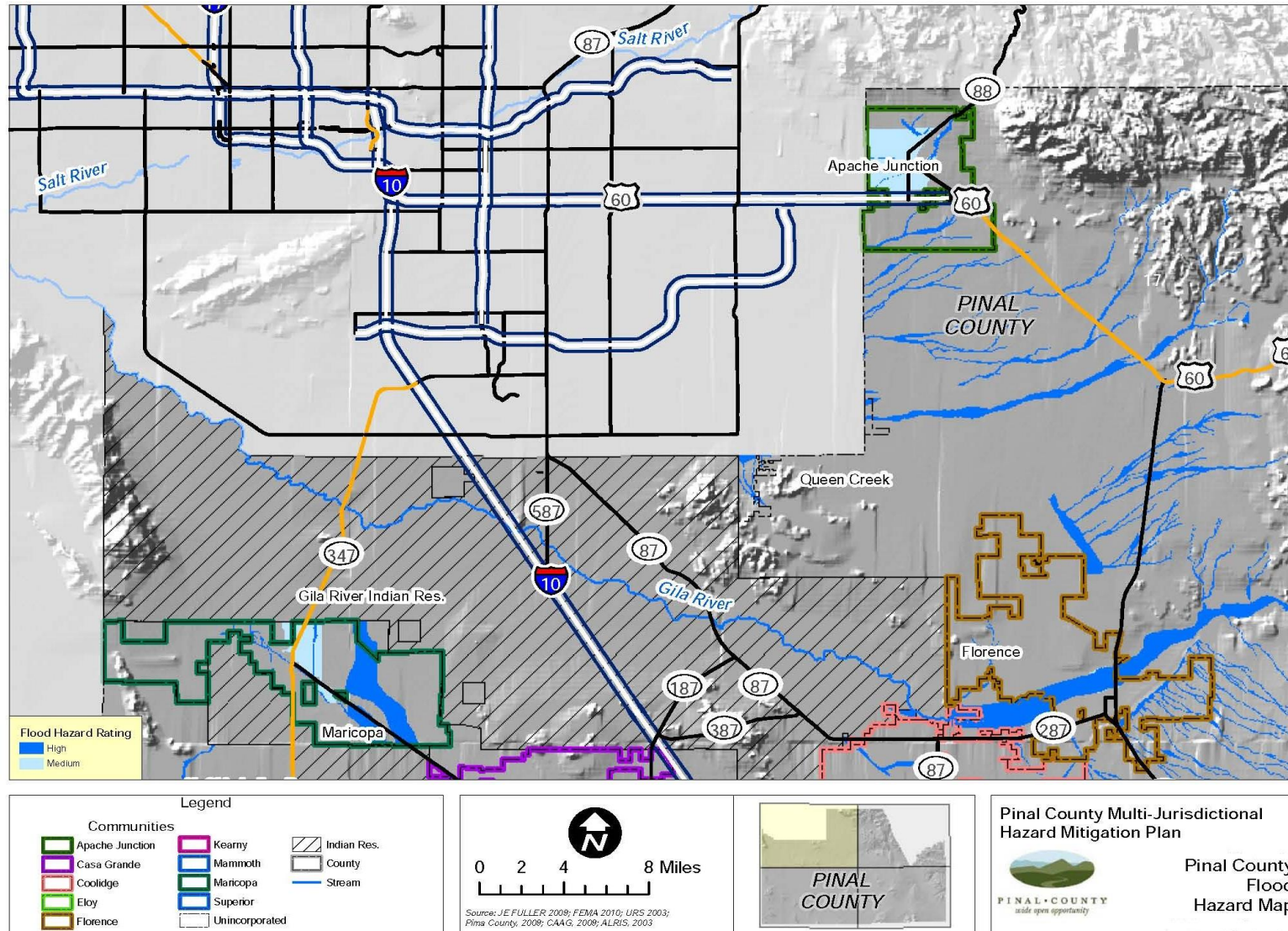
Mammoth – In Mammoth, the San Pedro River, situated along the eastern edge of the community, poses the greatest flood risk. Homes and businesses on the east of South Main Street and east of Tiger Drive are located within 100 Year Flood Zones. In addition, a large section of the community, primarily the lower half is within a FEMA designated 500 Year Flood Zone. Major floods along the river usually occur during the fall months. In addition to the San Pedro River, flooding from the Tucson Wash affects a small portion of the northern part of the community. Several other un-named washes may cause shallow flooding, with average depths of less than one foot.

Maricopa – Within Maricopa, the Santa Cruz River system represents the major flood hazard. Although many dikes have been constructed and channels dredged to divert floodwater away from the community, most of these structures are capable of conveying only small recurrence interval flood events, and would be ineffective against a 1-percent chance or greater flood. Heavy runoff and flooding of major washes and tributaries running through the city may produce a moderate to high impact with high probability. The Vekol Wash and its tributaries represent a major flooding source affecting the community. The Vekol Wash has a time of concentration in terms of hours, meanwhile the Santa Cruz River system has a time of concentration of several days. The greatest flood threat results when heavy rain falling at higher elevations (Tucson), flows into lower elevation rivers and washes leading to Maricopa. Several homes, businesses, and churches within the city are located in a 1-percent chance flood area, including key pieces of community infrastructure (e.g. US Post Office, Maricopa Fire Department administration offices, and sections of the Maricopa High School campus). In addition, a significant portion of Maricopa is located within the .2-percent chance flood hazard

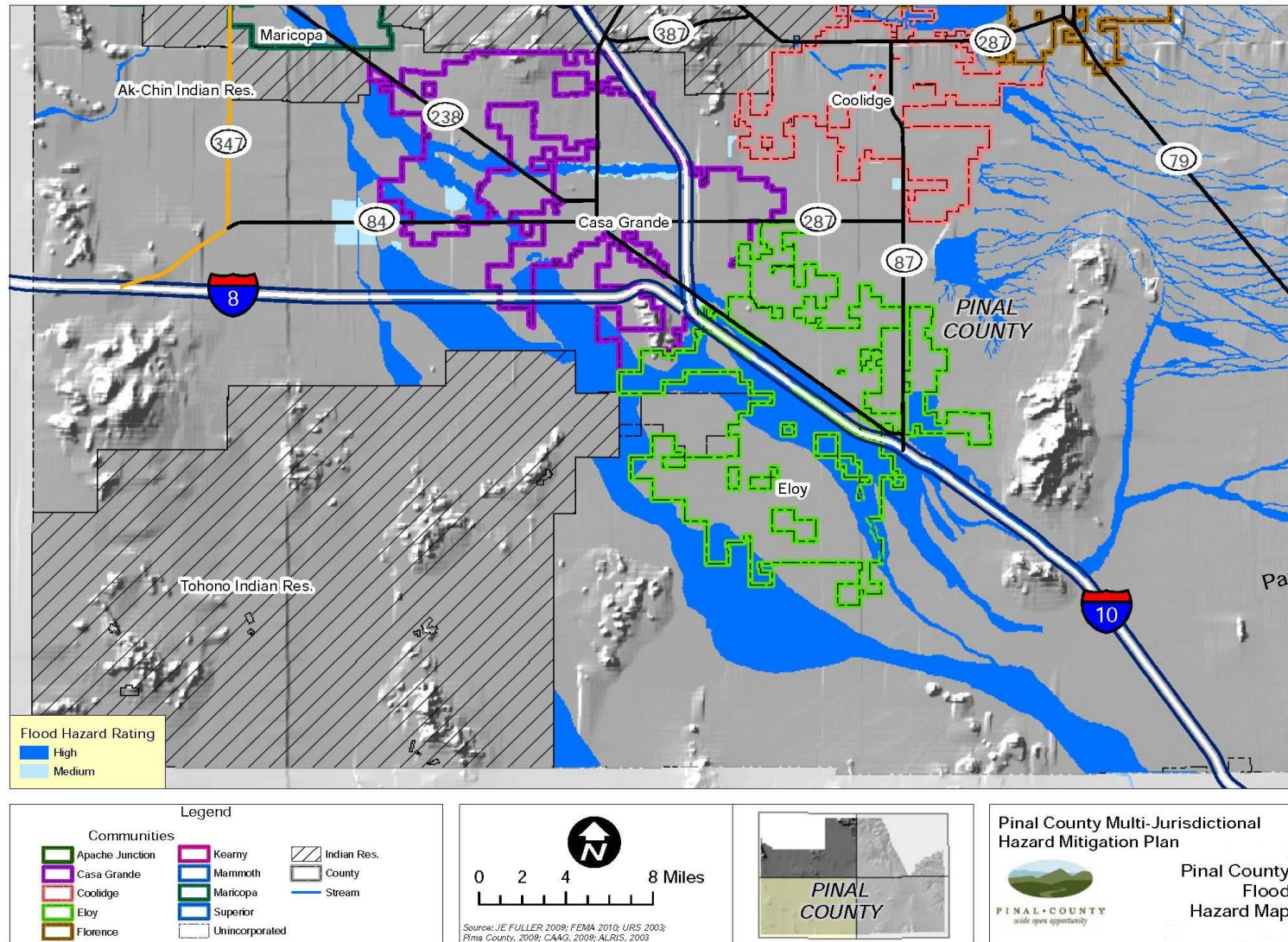
area. Historically, flooding has impacted the arterial streets and roadways, and been the cause of emergency water rescue operations by the Maricopa Fire Department. Due to the number of homes and infrastructure identified in at-risk flooding zones by FEMA, the severity of a flood is seen as having a “critical” potential, as the widespread flooding could cause significant disruption for the residents of Maricopa.

Superior – In Superior, Queen Creek, flowing south-westerly through the community, poses the greatest flood risk. Development within the floodplain is primarily residential. The major vulnerabilities include displaced residents and disruption to travel. Within the community, Mine Wash and School Wash are tributaries to Queen Creek, and could also pose a slight flood risk to homes in the community. Flooding in the town may occur at any time of the year, although summer thunderstorms will produce floods of the greatest magnitude. Due to the close proximity of Mine Wash, School Wash, and Cross Canyon Creek to Queen Creek and the town center, it is likely that all four flooding sources would flood concurrently. Runoff within the town would concentrate rapidly, peak, and recede in a matter of hours.

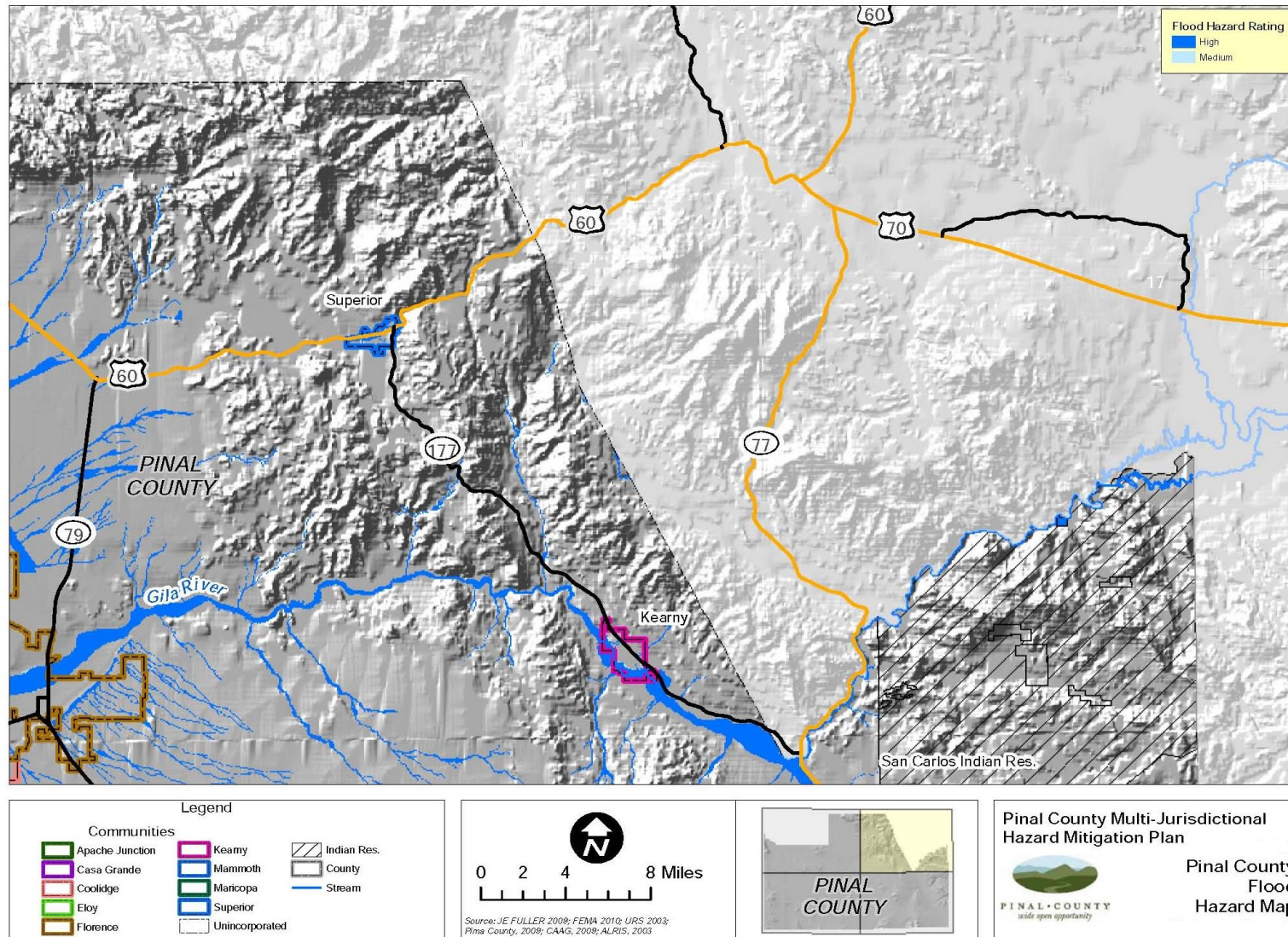
Unincorporated Pinal County – Within Pinal County, the three primary watercourses are the San Pedro River, the Gila River, and the Santa Cruz River system. The principal flood hazard results from overflow of major rivers during large flood events. This overflow results in the inundation of generally wide, flat floodplains, encompassing any residential, commercial, or agricultural development located within them. In addition, the region is subject to intense, short-duration rainfall, resulting in flash floods, which rise quickly, and cause high-velocity flood flows carrying large amounts of debris and sediment. Erosion of natural and newly-created earthen drainage channels, adds to the potential hazard from flooding. Outside of the jurisdictions already discussed, several unincorporated areas of Pinal County are at risk for a potential damaging flood. For example; in San Manuel, a significant majority of the community is placed under the .2-percent annual flood chance by FEMA, a 500 year flood could result in widespread physical damages, economic disruption, and a large displacement of citizens. In Queen Valley, the Queen Creek poses the greatest flood risk, placing a large number of homes within a FEMA mapped floodplain. It is also important to note, that although some areas may not be included within the FEMA 100-year or 500-year floodplain, that damaging, disruptive flooding in these areas may still occur. In addition, major flooding in one jurisdiction may have a county wide impact; road closures may effect several communities indirectly, displaced residents may look to other communities for lodging and hospitality, and the economic impacts could carry a ripple effect throughout the county.



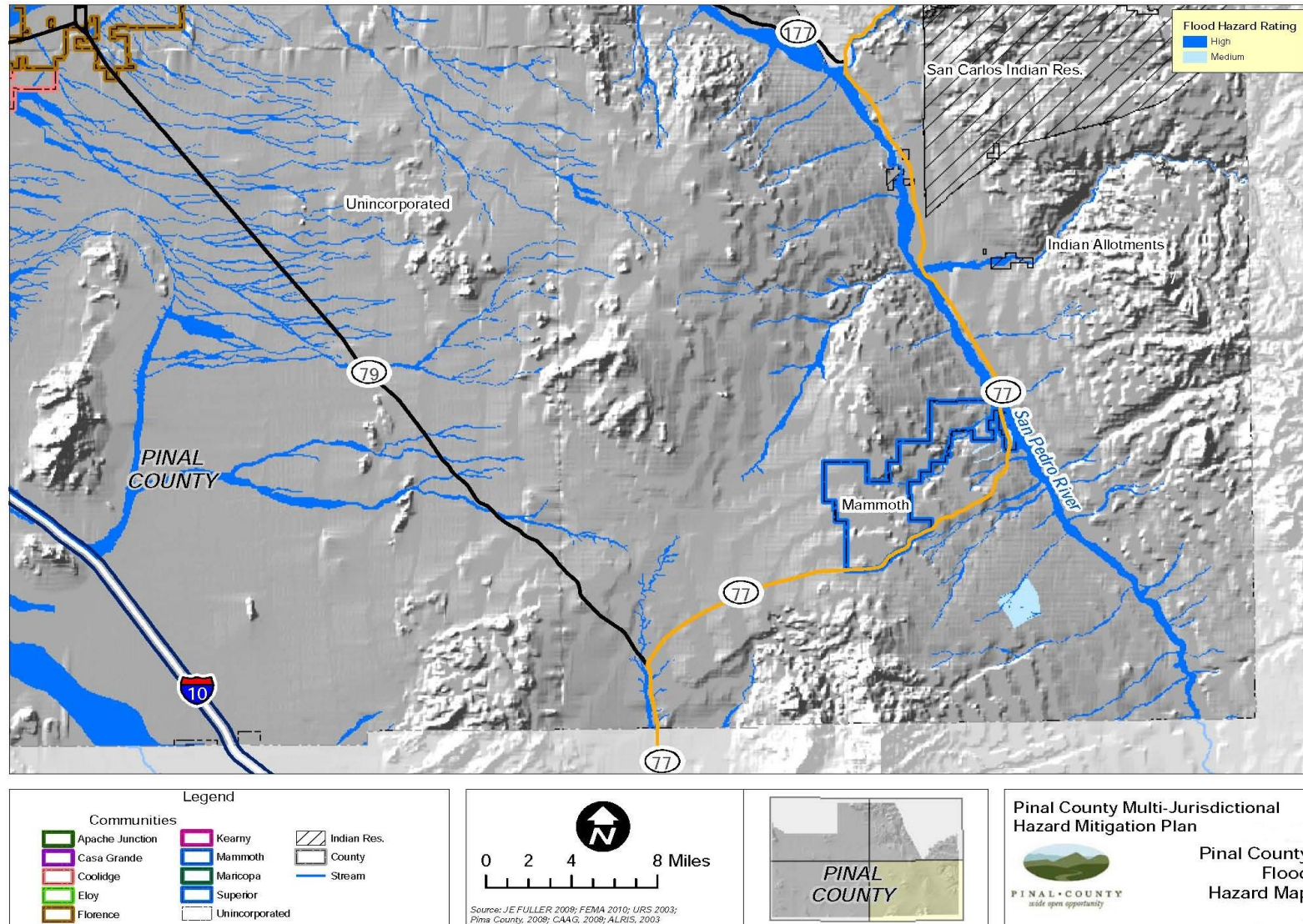
Map 4-15: Pinal County Flood Hazard Area (1)



Map 4-16: Pinal County Flood Hazard Area (2)



Map 4-17: Pinal County Flood Hazard Area (3)



Map 4-18: Pinal County Flood Hazard Area (4)

Vulnerability – Repetitive Loss Properties

Repetitive Loss (RL) properties are NFIP-insured properties that since 1978 have experienced multiple flood losses. FEMA tracks RL properties and in particular to identify Severe RL (SRL) properties. RL properties demonstrate a track record of repeated flooding for a certain location and are one element of the vulnerability analysis. These properties are also important to the NFIP, since structures that flood frequently put a strain on the National Flood Insurance Fund. FEMA records dated April 2014 indicate that there are 4 identified RL properties in Pinal County, with a total of over \$164,000 in associated building and contents value payments.

Table 4-12: RL Properties in Pinal County

Jurisdiction	No. of Properties	No. of Properties Mitigated	Total Payments
Casa Grande	1	1	\$26,640
Unincorporated Pinal County	3	0	\$137,510

Source: FEMA, 2014

National Flood Insurance Program Participation

Participation in the NFIP is a key element of any community's local floodplain management and flood mitigation strategy. Pinal County and the incorporated jurisdictions participate in the NFIP. Joining the NFIP requires the adoption of a floodplain management ordinance that requires jurisdictions to follow established minimum standards set forth by FEMA and the State of Arizona, when developing in the floodplain. These standards require that all new buildings and substantial improvements to existing buildings will be protected from damage by the 100-year flood, and that new floodplain development will not aggravate existing flood problems or increase damage to other properties. As a participant in the NFIP, communities also benefit from having Flood Insurance Rate Maps (FIRM) that map identified flood hazard areas and can be used to assess flood hazard risk, regulate construction practices and set flood insurance rates. FIRMs are also an important source of information to educate residents, government officials and the private sector about the likelihood of flooding in their community.

Table 4-13: NFIP Statistics for Pinal County as of Feb 2016

Jurisdiction	Current Effective Map Date	Number of Policies	Amount of Coverage	Floodplain Management Role
Pinal County	06/16/2014	517	\$112,987,600	Provides floodplain management for the Unincorporated County, Coolidge, Eloy, Mammoth, Maricopa, and Superior.
Apache Junction	12/4/2007	69	\$ 15,290,900	Provides in-house floodplain management.
Casa Grande	12/4/2007	90	\$ 20,313,500	Provides in-house floodplain management.
Coolidge	12/4/2007	5	\$ 973,000	Defers floodplain management responsibilities to Pinal County.
Eloy	12/4/2007	59	\$ 12,135,100	Defers floodplain management responsibilities to Pinal County.
Florence	12/4/2007	47	\$ 11,880,400	Provides in-house floodplain management.
Kearny	12/4/2007	4	\$ 740,000	Provides in-house floodplain management.

Table 4-13: NFIP Statistics for Pinal County as of Feb 2016

Jurisdiction	Current Effective Map Date	Number of Policies	Amount of Coverage	Floodplain Management Role
Mammoth	12/4/2007	3	\$ 267,800	Defers floodplain management responsibilities to Pinal County.
Maricopa	06/16/2014	600	\$167,764,300	Defers floodplain management responsibilities to Pinal County.
Superior	12/4/2007	10	\$ 1,125,000	Defers floodplain management responsibilities to Pinal County.

Community Rating System

The Community Rating System (CRS) is a voluntary program for NFIP participating communities. The goals of the CRS are to reduce flood damages to insurable property, strengthen and support the insurance aspects of the NFIP, and encourage a comprehensive approach to floodplain management. The CRS has been developed to provide incentives in the form of premium discounts for communities to go beyond the minimum floodplain management requirements to develop extra measures to provide protection from flooding.

There are 10 CRS classes; Class 1 provides the most credit points and gives the greatest premium discount; Class 10 identifies a community that does not apply for the CRS, or does not obtain a minimum number of credit points and receives no discount. Activities recognized as measures for eliminating exposure to floods and worth CRS points are organized under four main categories: Public Information, Mapping and Regulation, Flood Damage Reduction, and Flood Preparedness. According to a report effective as of 2016, Casa Grande participates in the program and their class rating is 8, while Pinal County has a class rating of 7.

Vulnerability – Development Trend Analysis

For most Pinal County jurisdictions, adequate planning and regulatory tools are in place to regulate future development. Challenges with new growth will include the need for master drainage planning and additional floodplain delineations to identify and map the flood hazards within the growth areas where no mapping currently exists. The Pinal County Flood Control District will continue to be proactive, and will work cooperatively with all jurisdictions to update and refine existing floodplain mapping as needed.

Sources

AZ Division of Emergency Management, State of AZ Multi-Hazard Mitigation Plan.

FEMA, 2001, Understanding Your Risks; Identifying Hazards & Estimating Losses, Doc #386-2.

U.S. Dept of Commerce, National Climatic Data Center, Storm Events Database,
<http://www4.ncdc.noaa.gov/cgi-win/wwwcgi.dll?wwevent~storms>

U.S. Army Corps of Engineers, Los Angeles District, 1994, Flood Damage Report, State of AZ, Floods of 1993.

4.4.5 Levee Failure

Description

FEMA defines levees as man-made structures, usually earthen embankments that are designed and constructed in accordance with sound engineering practices to contain, control or divert the flow of water to provide protection from temporary flooding. National flood policy now recognizes the term “levee” to mean only those structures which were designed and constructed according to sound engineering practices, have up to date inspection records and current maintenance plans, and have been certified as to their technical soundness by a professional engineer. FEMA has classified all other structures that impound, divert, and/or otherwise impede the flow of runoff as “non-levee embankments”. In Pinal County, these “non-levee embankments” might be comprised of features such as roadway and railway embankments, canals, irrigation ditches and drains, and agricultural dikes. Currently there is no State or Federal Levee Safety Program and no official state or federal levee inventory.

By design, levee and many non-levee embankments increase the conveyance capacity of a watercourse by artificially creating a deeper channel through embankments that extend above the natural overbank elevation. Upon failure, floodwaters will return to the natural overbank areas. FEMA urges communities to recognize that all areas downstream of levees and embankments are at some risk of flooding and there are no guarantees a levee or embankment will not fail or breach if a large quantity of water collects upstream.

Mechanisms for levee failure are similar to those for dam failure. Failure by overtopping could occur due to an inadequate design capacity, sediment deposition and vegetation growth in the channel, subsidence, and/or a runoff that exceeds the design recurrence interval of the levee. Failure by piping could be due to embankment cracking, fissures, animal boroughs, embankment settling, or vegetal root penetrations.

History

Levees (certified or not) have been used in Pinal County for over a hundred years to protect communities and agricultural assets from flooding, as well as to facilitate the delivery and removal of irrigation water. These levees range from simple earthen embankments pushed up by small equipment to large engineered embankments lining both sides of a watercourse. The structural integrity of levees with regard to flood protection and policy has been discussed at a national level since the early 1980s but was elevated to a high priority after the collapse and breach of New Orleans’ levees after Hurricane Katrina in 2005.



There are no documented failures of certified levees within Pinal County. Non-levee embankment failures, however, occur on a regular basis and the risk posed by the thousands of uncertified embankments in the county’s inventory is great. According to the Pinal County Flood Control District, recent failures have included documented breaches and piping failures, which have resulted in flooding of and damages to downstream agricultural fields, irrigation ditches, a correctional facility, and private residences.



Probability and Magnitude

There are varied probability and magnitude criteria regarding levee failure due to variability in design, ownership and maintenance. For flood protection credit under the NFIP, FEMA has

established certain deterministic design criteria based on the 1% (100-year) storm event and corresponding minimum freeboard requirements. Federally constructed levees are usually designed for larger, more infrequent events that equate to 250 to 500 year events plus freeboard. Recent recertification procedures proposed by U.S. Army Corps of Engineers, require that a certifiable levee have at least a 90% assurance of providing protection from overtopping by the 1% chance exceedance flood for all reaches of a levee system with a design freeboard height of at least three feet. For levees with less than three feet of design freeboard, the assurance is increased to 95%, and no certification will be made for levees with less than two feet of freeboard unless approved via a waiver. This assurance is only for containment (overtopping failure) and does not include probability of failure by any other mode (USACE, 2007). FEMA certified levees within Pinal County are designed to safely convey the 100-year event, with a minimum additional freeboard of 3 feet.

For this Plan, the Planning Team chose to map only the zones related directly to known certified levees and to assign a High hazard rating to these areas. The currently identified high hazard levee failure zones are indicated below (Map 4-19 through Map 4-22).

Vulnerability

Table 4-14: CPRI Results for Levee Failure					
Jurisdiction	Probability	Magnitude/ Severity	Warning Time	Duration	Rating
Apache Junction	Unlikely	Limited	< 6 hours	< 6 hours	1.75
Casa Grande	Possibly	Limited	< 6 hours	< 24 hours	2.30
Coolidge	Possibly	Limited	6-12 hours	< 24 hours	2.15
Eloy	Unlikely	Negligible	< 6 hours	< 6 hours	1.45
Florence	Unlikely	Negligible	> 24 hours	< 1 week	1.20
Kearny	Unlikely	Limited	< 6 hours	< 1 week	1.95
Mammoth	Unlikely	Negligible	< 6 hours	< 6 hours	1.45
Maricopa	Unlikely	Critical	> 24 hours	< 6 hours	1.60
Superior	Unlikely	Negligible	< 6 hours	< 6 hours	1.45
Unincorporated Pinal Co	Possibly	Limited	< 6 hours	< 1 week	2.40
County-wide average CPRI =					1.77

The Planning Team has determined that beginning with this Plan, they will continue to assess vulnerability as an overview summary of the hazard's impact on the community and its vulnerable structures, rather than in a quantitative manner.

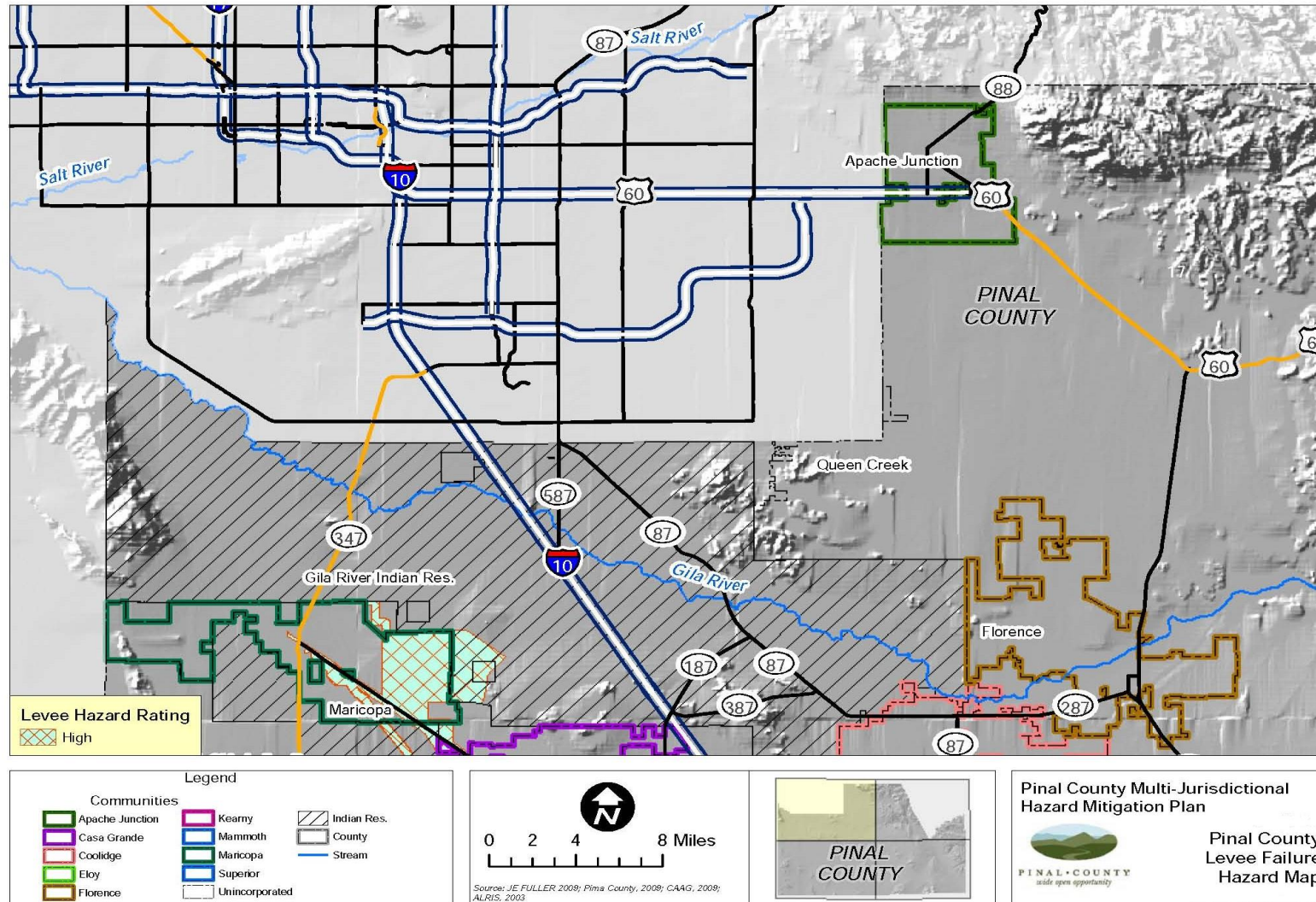
Levees and levee-type embankments are located throughout Pinal County, particularly in existing and former farmlands. Currently, the only FEMA certified levees are; the "Santa Rosa Levee" which is located along the west bank of the Santa Rosa Wash from the Union Pacific Railroad tracks to approximately the Bowlin Road alignment in the City of Maricopa, and the "Smith Farms Levee" located within the City of Maricopa, adjacent to White and Parker Road from north of Farrell Road to just north of Bowlin Road. Information available from FEMA indicates that the Santa Rosa Levee was breached during the flood events of 1957 and 1983. The west bank of the levee was reconstructed sometime after the 1983 flood event, while additional improvements were performed in 2004 in order to accredit the structure through FEMA. The City of Maricopa would be most heavily impacted if one or both of these certified levees were to fail, while Casa Grande would also be affected, as identified in the high hazard levee failure zone maps. As previously stated, along with these certified levees, there are numerous non-levee embankments that pose a risk throughout the planning area, such as; roadways and railroad tracks, canals, irrigation ditches and drains, and agricultural dikes.

Floodplain areas behind these "non-levee embankments" are shown as if the levee simply does not exist. This is due to the fact that it is generally difficult to characterize the effects these structures

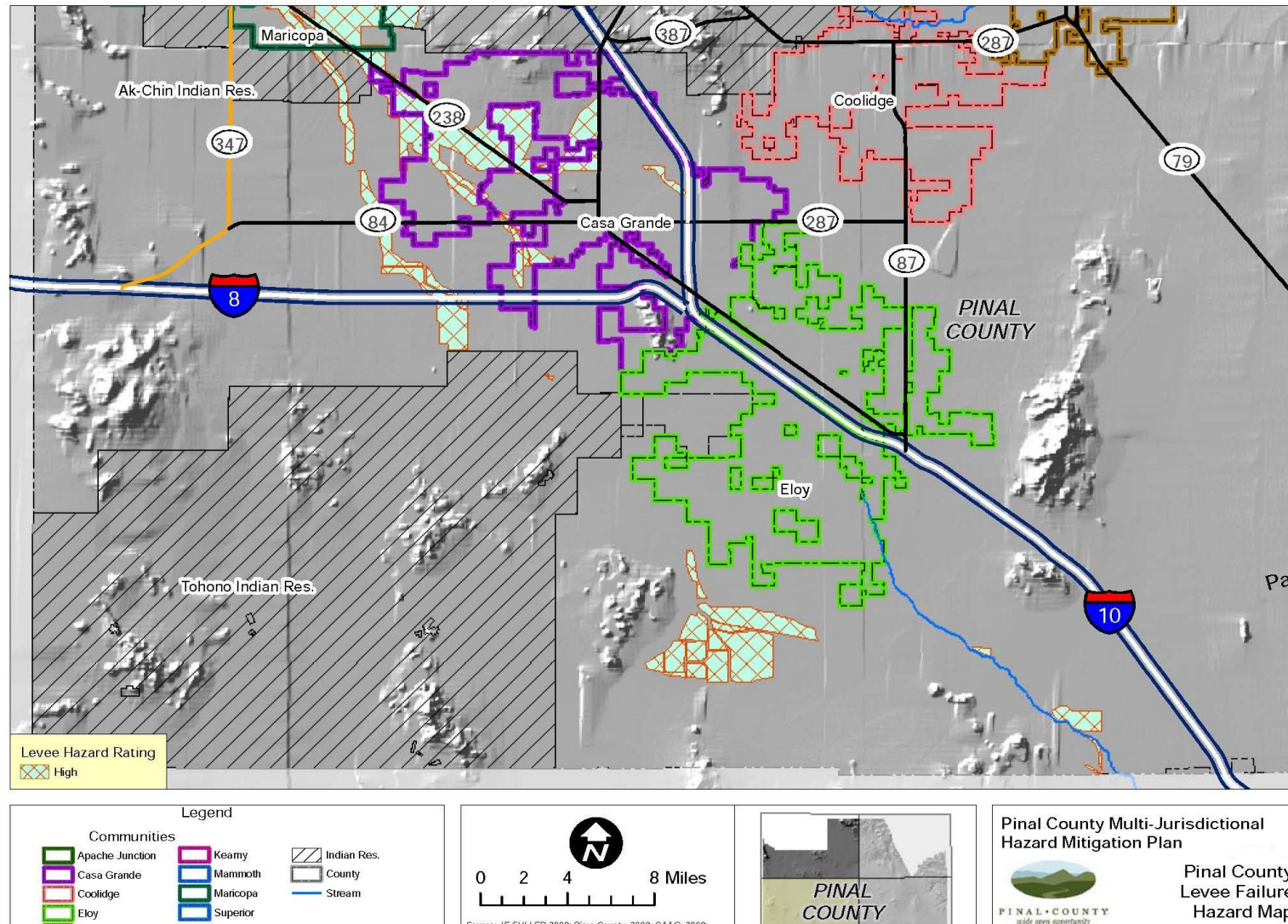
have on regional drainage, as they may fail during flooding events. The failure may occur after upstream water has collected behind the structure, this could lead to flooding which exceeds the pre-structure condition. As displayed in recently updated FIRMs, FEMA mapping standards are now including the worst-case scenario of both the non-levee embankment failing and the non-levee embankment remaining. Therefore, the risk associated with these non-engineered structures are represented in the Flooding profile (4.4.4) of this plan.

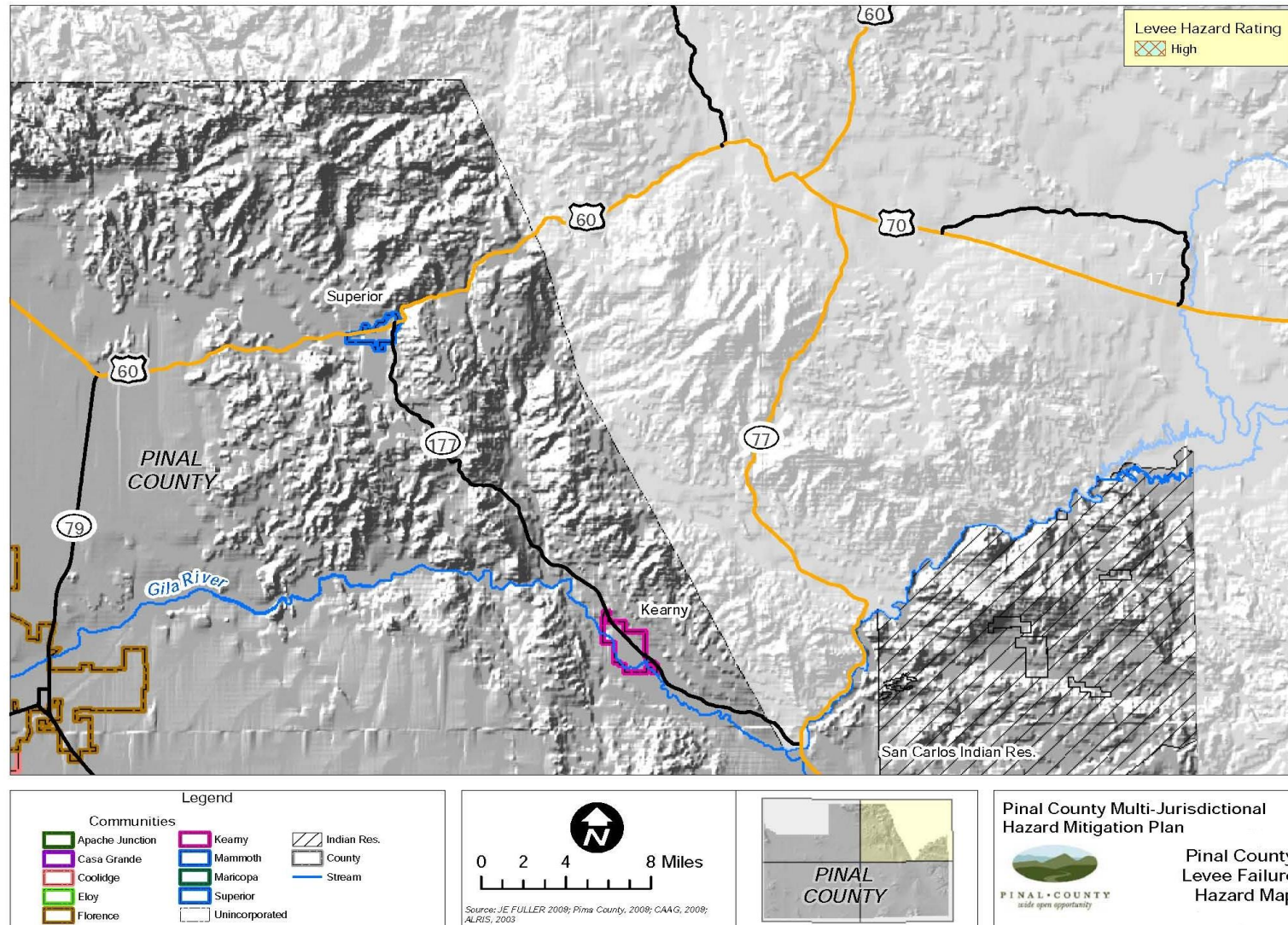
Based on the assessments performed for the previous Plan, there was determined to be an estimated \$66.6 million in county-wide assets exposed to a high hazard levee failure. An additional \$135.5 million in county-wide high hazard levee failure exposure of HAZUS defined residential, commercial, and industrial facilities is estimated. However, there are no commonly accepted methods for estimating potential levee related losses. Losses are difficult to predict as there are multiple variables which contribute to the potential for human and economic loss, such as; the size, speed, and timing at which a levee breach or failure occurs, volume of water impounded by the levee, size of the watershed, duration and size of the storm event, and downstream slope, vegetation, and soil characteristics. Physical impacts to be considered include property loss and damage, personal injury, and possible fatalities. It can also be expected that a large portion of the exposed population is subject to displacement depending on the event magnitude. Severity of the event will also dictate economic losses and degree of transportation disruption. Secondary effects of a breach or failure are similar to flood events, and could include moderate to severe erosion, flooded cropland, downstream sediment deposition and additional economic losses from downstream land-use restrictions.

In summary, levees have the potential to divert, concentrate, obstruct, or impound surface water runoff, and play a critical role in protecting communities, critical infrastructure, and valuable property. However, all areas downstream of levees and embankments are at some risk, as there is no guarantee a levee or embankment will not fail or breach if a large quantity of water collects upstream. Residences and business that are located downstream of a levee or embankment, particularly if the structure was not designed and constructed to provide flood protection, should plan accordingly.

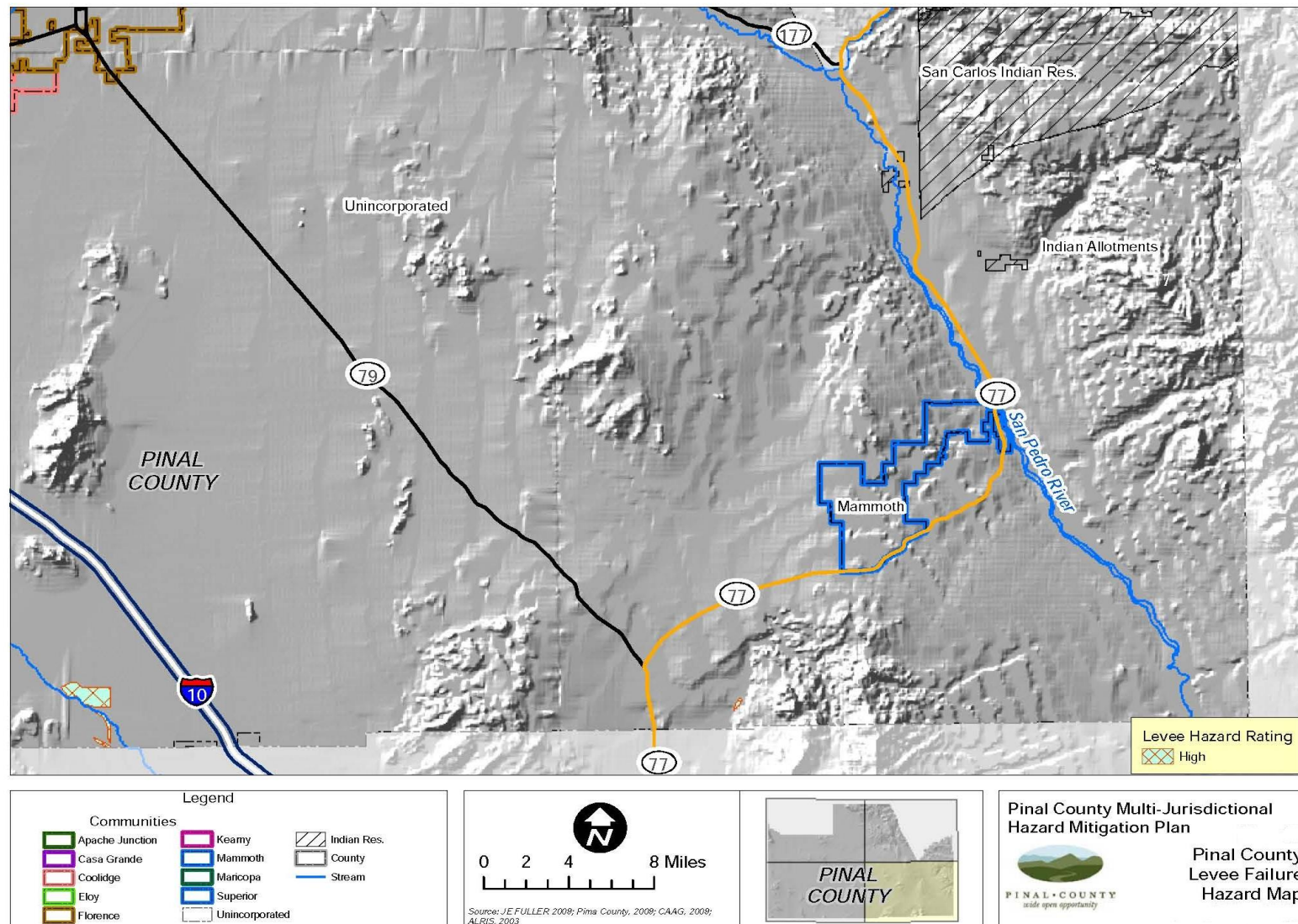


Map 4-19: Pinal County Levee Failure Hazard Area (1)





Map 4-21: Pinal County Levee Failure Hazard Area (3)



Map 4-22: Pinal County Levee Failure Hazard Area (4)

Vulnerability – Development Trend Analysis

There is a new focus on residual downstream risk for the land-side of levees and a general refocusing of national levee regulation and policy. Therefore, it is likely that new and old developments in these areas will need to be revisited to determine if additional measures are necessary for adequate flood protection. Many structures located downstream of non-levee embankments are being re-mapped into Special Flood Hazard Zones. New developments should be evaluated to determine if sufficient protection is proposed to mitigate damages should the upstream structure fail.

Development in areas protected by levees and embankments shall follow current Pinal County floodplain and drainage regulations, as well as current FEMA guidelines for floodplain delineation and flood mitigation. The engineer of record for the proposed development shall make a prudent assessment of the level of protection provided by upstream levees and embankments, the potential impacts on the proposed development, and the effect of FEMA regulatory and levee certification policies on the flood hazard.

Sources

AZ Division of Emergency Management, State of AZ Multi-Hazard Mitigation Plan.

FEMA, Understanding Your Risks; Identifying Hazards & Estimating Losses, Doc #386-2.

FEMA, http://www.fema.gov/plan/prevent/fhm/lv_intro.shtm#3

Pinal County, GIS files with levee failure hazard areas.

USACE, *Certification of Levee Systems for the National Flood Insurance Program (NFIP) – DRAFT*, ETL 1110-2-570.

4.4.6 Severe Wind

Description

The hazard of severe wind encompasses all climatic events that produce damaging winds. For Pinal County, severe winds usually result from either extreme pressure gradients that usually occur in the spring and early summer months, or from thunderstorms. Thunderstorms can occur year-round and are usually associated with cold fronts in the winter, monsoon activity in the summer, and tropical storms in the late summer or early fall.

Three types of damaging wind related features typically accompany a thunderstorm: downbursts, straight line winds, and infrequently tornadoes.

Downbursts are columns of air moving rapidly downward through a thunderstorm. When the air reaches the ground, it spreads out in all directions, creating horizontal wind gusts of 80 mph or higher. Downburst winds have been measured as high as 140 mph. Some of the air curls back upward with the potential to generate a new thunderstorm cell. Downbursts are called macrobursts when the diameter is greater than 2.5 miles, and microbursts when the diameter is 2.5 miles or less. They can be either dry or wet downbursts, where the wet downburst contains precipitation that continues all the way down to the ground, while the precipitation in a dry downburst evaporates on the way to the ground, decreasing the air temperature and increasing the air speed. In a microburst the wind speeds are highest near the location where the downdraft reached the surface, and are reduced as they move outward due to the friction of objects at the surface. Typical damage from downbursts includes uprooted trees, downed power lines, mobile homes knocked off their foundations, block walls and fences blown down, and porches and awnings blown off homes.

Straight line winds are developed similar to downbursts, but are usually sustained for greater periods as a thunderstorms reaches the mature stage, traveling parallel to the ground surface at speeds of 75 mph or higher. These winds are frequently responsible for generating dust storms and sand storms, reducing visibility and creating hazardous driving conditions.

A tornado is a rapidly rotating funnel (or vortex) of air that extends toward the ground from a cumulonimbus cloud. Most funnel clouds do not touch the ground, but when the lower tip of the funnel cloud touches the earth, it becomes a tornado and can cause extensive damage. For Pinal County, tornadoes are the least common severe wind to accompany a thunderstorm.

History

- September 2014, a train derailment caused by a severe wind event resulted in 30 cargo cars toppling over and off the tracks in Eloy. Other than creating a large disruption to railway traffic, there was no other impact to property or lives.
- July 2012, a severe wind dust storm caused a tanker and multi-car accident on the highway in Eloy. The accident resulted in two fatalities and the hwy being shut-down for 8 hours and being rerouted traffic through State Route 79. One of the vehicles damaged power lines causing a power loss in the Red Rock community. Damages are estimated to exceed \$250,000.
- November 2009, areas of blowing dust along Interstate 10 resulted in several vehicle collisions near the Casa Grande and Eloy areas including a fatal collision between a mini-van and tractor/trailer. Locally dense blowing dust reduced visibility, causing the mini-van to collide with the tractor/trailer from behind. Four other accidents occurred as a result of the locally dense blowing dust, all of them near mile markers 214 and 215 on Interstate 10. One of these collisions involved six vehicles, and three of them resulted in an unknown number of injuries. Damages were estimated to exceed \$100,000. (NCDC, 2010).

- July 2009, scattered thunderstorms moved slowly across the south central deserts and resulted in heavy rains and locally damaging winds. About 25 homes on the Gila River Indian Community sustained wind damage with many trees uprooted. Power poles were blown down at Highway 587 and Sesame Street. Four persons suffered minor injuries. Damages were estimated to exceed \$250,000. (NCDC, 2010).
- August 2007, about 11 power poles were destroyed along the west side of Arizona Boulevard on the edge of the Casa Grande Ruins National Monument in Coolidge. About 2,300 households and businesses lost power for more than 40 hours and phone service was disrupted. Winds also uprooted trees in the area. The Red Cross estimated that more than 340 people received assistance in the form of food, water and shelter since a cooling station was established at the high school. Additional damage was reported in other areas of the County. Damages were estimated to exceed \$200,000. (NCDC, 2010).
- August 2007, about 90 mobile homes were damaged or destroyed at Las Casitas trailer park. One third of them were blown off their foundations. About 150 people evacuated due to damage and numerous gas leaks. Unknown number of people had minor injuries. Numerous trees were blown down and about a mile-long stretch of power poles were damaged. This same storm caused similar damages in Casa Grande and Arizona City. Damages were estimated to exceed \$5 million. (NCDC, 2010).
- July 2007, a dust storm along Interstate 10 in Eloy caused a series of accidents involving 11 vehicles. Scattered thunderstorms caused strong winds and flash flooding across Eastern Pima County and the Tohono O'odham Nation. Outflow winds from these thunderstorms also caused a dust storm in Southeast Pinal County. Damages were estimated to exceed \$50,000. (NCDC, 2010).
- August 2006, severe thunderstorm winds estimated at over 50 mph blew down trees and took down power lines. Damages were estimated to exceed \$100,000. (NCDC, 2010).

Probability and Magnitude

Most severe wind events are associated with thunderstorms as previously mentioned. The probability of a severe thunderstorm occurring with high velocity winds increases as the average duration and number of thunderstorm events increases.

The NWS issues a severe thunderstorm watch when conditions are favorable for the development of severe thunderstorms. The local NWS office considers a thunderstorm severe if it produces hail at least 3/4-inch in diameter, wind of 58 mph or higher, or tornadoes. When a watch is issued for a region, residents are encouraged to continue normal activities but should remain alert for signs of approaching storms, and continue to listen for weather forecasts and statements from the local NWS office. When a severe thunderstorm has been detected by weather radar or one has been reported by trained storm spotters, the local NWS office will issue a severe thunderstorm warning. A severe thunderstorm warning is an urgent message to the affected counties that a severe thunderstorm is imminent. The warning time provided by a severe thunderstorm watch may be on the order of hours, while a severe thunderstorm warning typically provides an hour or less warning time.

Based on the historic record, the probability of tornados occurring in Pinal County is limited. Tornado damage severity is measured by the Fujita Tornado Scale, which assigns a numerical value of 0 to 5 based on wind speeds with the letter F preceding the number (e.g., FO, F1, F2). Most tornadoes last less than 30 minutes, but some last for over an hour. The path of a tornado can range from a few hundred feet to miles. The width of a tornado may range from tens of yards to more than a quarter of a mile.

Table 4-15: Fujita Tornado Scale		
Category	Wind Speed	Description of Damage
F0	40-72 mph	Light damage. Some damage to chimneys; break branches off trees; push over shallow-rooted trees; damage to sign boards.
F1	73-112 mph	Moderate damage. The lower limit is the beginning of hurricane speed. Roof surfaces peeled off; mobile homes pushed off foundations or overturned; moving autos pushed off roads.
F2	113-157 mph	Considerable damage. Roofs torn off frame houses; mobile homes demolished; boxcars pushed over; large trees snapped or uprooted; light-object missiles generated.
F3	158-206 mph	Severe damage. Roofs and some walls torn off well constructed houses; trains overturned; most trees in forest uprooted; cars lifted off ground and thrown.
F4	207-260 mph	Devastating damage. Well-constructed houses leveled; structures with weak foundations blown off some distance; cars thrown and large missiles generated.
F5	261-318 mph	Incredible damage. Strong frame houses lifted off foundations and carried considerable distance to disintegrate; automobile-sized missiles fly through the air in excess of 100-yards; trees debarked.
Source: FEMA, 1997.		

Vulnerability

Table 4-16: CPRI Results for Severe Wind					
Jurisdiction	Probability	Magnitude/ Severity	Warning Time	Duration	Rating
Apache Junction	Highly Likely	Critical	< 6 hours	< 24 hours	3.50
Casa Grande	Highly Likely	Critical	< 6 hours	< 6 hours	3.40
Coolidge	Highly Likely	Critical	< 6 hours	< 6 hours	3.40
Eloy	Highly Likely	Critical	< 6 hours	< 6 hours	3.40
Florence	Likely	Negligible	< 6 hours	< 6 hours	2.35
Kearny	Unlikely	Limited	< 6 hours	< 1 week	1.95
Mammoth	Likely	Limited	< 6 hours	< 6 hours	2.65
Maricopa	Unlikely	Limited	< 6 hours	< 6 hours	1.75
Superior	Likely	Limited	< 6 hours	< 6 hours	2.65
Unincorporated Pinal Co	Highly Likely	Limited	6-12 hours	< 6 hours	2.95
County-wide average CPRI =					2.80

The entire County is assumed to be equally exposed to the damage risks associated with severe winds. Typically, incidents are fairly localized and damages associated with individual events are relatively small. Based on the historic record, it is feasible to expect average annual county-wide losses of \$1.0 to \$1.5 million. It is difficult to estimate losses for individual jurisdictions within the County due to the lack of concrete data.

The Planning Team has determined that beginning with this Plan, they will continue to assess vulnerability as an overview summary of the hazard's impact on the community and its vulnerable structures, rather than in a quantitative manner.

Apache Junction – The Town has a high number of manufactured homes as well as older home which are more susceptible to damage from wind events.

Casa Grande – Similar to the potential effects of drought, transportation issues are of concern in this area due to its close proximity to the major transportation corridors.

Coolidge – Same conditions as above.

Eloy – Same conditions as above.

Florence – Wind events are of particular concern, as Florence is the County seat and has a large number of critical facilities, infrastructure, and services that could be potentially damaged. Damage or destruction of these systems could have a serious effect of the entire county.

Kearny – Many older and manufactured homes in this area are highly susceptible to property damage due to wind events.

Maricopa – The area has a large agricultural sector and can be damaged from wind events resulting in economic loss for both businesses and individuals.

Superior – Due to the elevated geographic area and that most of the homes are very old and some are built on hillsides the area is highly susceptible to damage due to wind events. There is also potential health hazard impacts due to mine chemicals and tailings.

Vulnerability – Development Trend Analysis

Future development will expand the exposure of life and property to the damaging effects of severe wind events. Enforcement and/or implementation of modern building codes to regulate new developments in conjunction with public education on how to respond to severe wind conditions are arguably the best way to mitigate against losses.

Sources

AZ Division of Emergency Management, State of AZ All Hazard Mitigation Plan.

AZ Division of Emergency Management, State of AZ Multi-Hazard Mitigation Plan.

Changnon, Jr. S., *Climatology of Thunder Events in the Conterminous U.S., Part I: Temporal Aspects and Part II: Spatial Aspects*, Journal of Climate, Vol. 1, No. 4, pp. 389-405.

U.S. Dept of Commerce, National Climatic Data Center, Storm Events Database,
<http://www4.ncdc.noaa.gov/cgi-win/wwcgi.dll?wwevent~storms>

4.4.7 Subsidence

Description

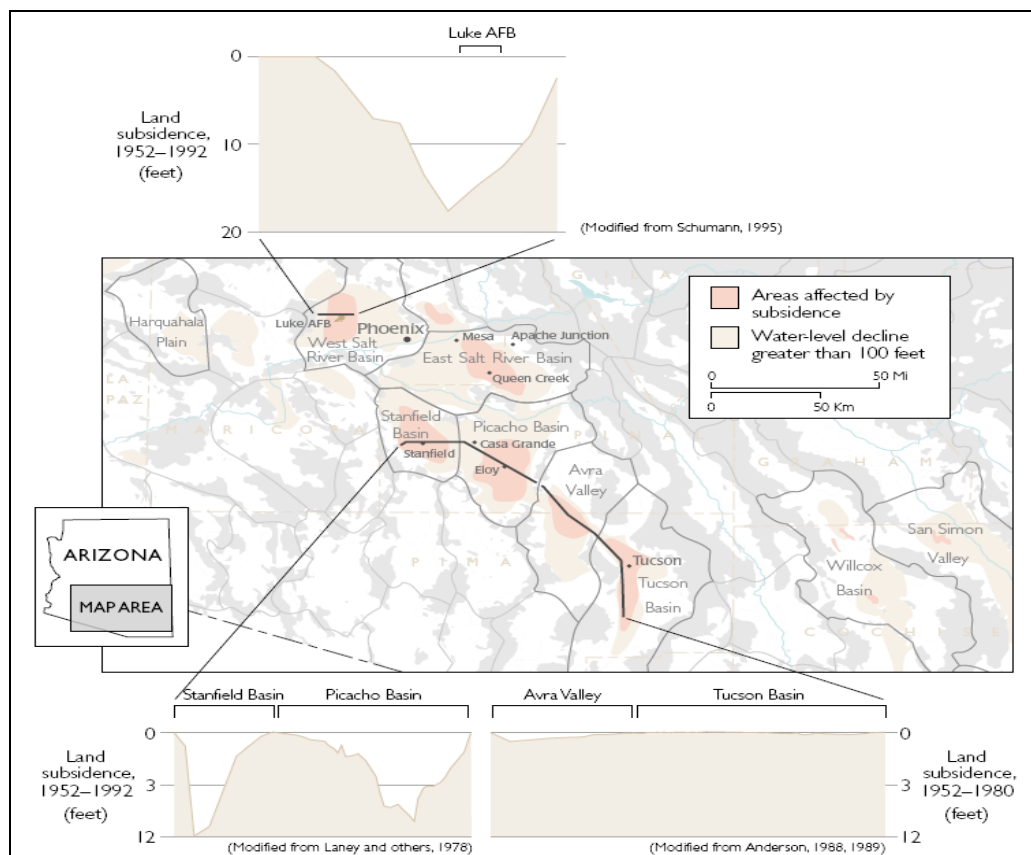
Subsidence occurs when the original land surface elevation drops due to changes in the subsurface. Causes of subsidence include, but are not limited to, removal of fluids (water, oil, gas, etc.), mine collapse, and hydrocompaction. Of these causes, hydrocompaction and mine collapse tend to be localized events, while fluid removal may occur either locally or regionally. The main cause for subsidence in Pinal County is excessive groundwater withdrawal, wherein the volume of water withdrawn exceeds the natural recharge. Once an area has subsided, it is likely the ground elevation will not rise again due to consolidation of the soils, even if the pumped groundwater is replaced.

Subsidence causes regional drainage patterns to change. Impacts include unexpected flooding, storm drain backwater, reversal of channel and sewer system drainage patterns, and damages to infrastructure both in the subsurface (water, sewer, electric lines, well casings, etc.) and surface (roads, canals, drainages, surveyed benchmarks, etc.) and subsidence also causes fissures.

Land-use areas that are predominantly agricultural tend to experience the most intense subsidence due to groundwater based irrigation practices. Subsidence is not, however, restricted to only rural areas since exponential population growth also places great demands on groundwater.

History

Active subsidence has been occurring in certain areas of Pinal County for over 60 years and is primarily due to groundwater overdraft. By 1980 ground-water levels had declined at least 100 feet county-wide and between 300 and 500 feet in some areas (Carpenter, 1999). The following illustrates profile estimates of ground subsidence in several south-central Arizona locations.



Source: USGS (Carpenter, 1999)

These groundwater declines have resulted in the following:

- Queen Creek – by 1977, an area of almost 230 square miles had subsided more than 3 feet (Carpenter, 1999).
- Eloy – by 1977, nearly 625 square miles had subsided around Eloy, where as much as 12.5 feet of subsidence was measured (Carpenter, 1999).
- Stanfield – by 1977, another 425 square miles had subsided around Stanfield, with a maximum subsidence of 11.8 feet (Carpenter, 1999).
- US 60 Superstition Freeway – ADOT performed surveys over an eight year period between 1975 and 1983 to measure subsidence of the freeway through a 12 mile stretch centered at around Meridian Road. In that time, the freeway grades lowered as much as 2.5 feet. (AMEC, 2006).

There are no documented damages directly attributable to subsidence in Pinal County.

Probability and Magnitude

There are no statistical probability estimates for subsidence. The magnitude of land subsidence has been detected over the years using surveying techniques such as differential leveling and high accuracy Global Positioning System (GPS) surveying. In the early 1990's, scientists began to use a satellite based technology called Synthetic Aperture Radar (SAR) and interferometric processing (InSAR) to detect land surface elevation changes. InSAR has been developed into a highly reliable land subsidence monitoring technique that has been utilized by ADWR since 2002. ADWR has identified numerous subsidence features around the State and continues to monitor the extent and rates of these features on an annual basis (ADWR, 2009). In Pinal County, ADWR monitors 3 geographical areas using InSAR.

The Planning Team reviewed and chose to use the zones currently being monitored by ADWR to depict the subsidence hazard for the County. Areas defined by ADWR as active subsidence areas were mapped as high hazard zones and all other areas were assigned a low hazard.

Vulnerability

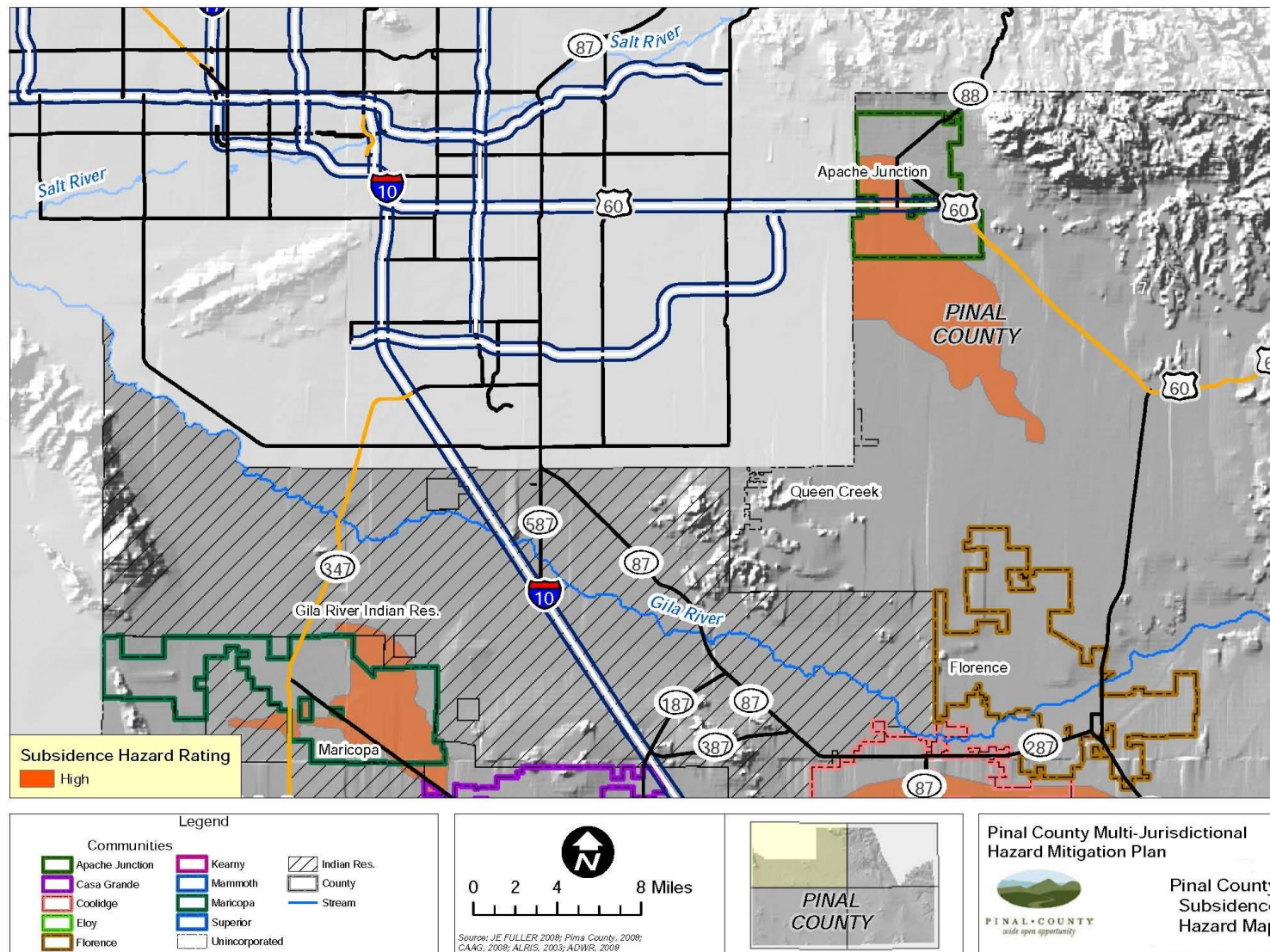
Table 4-17: CPRI Results for Subsidence					
Jurisdiction	Probability	Magnitude/ Severity	Warning Time	Duration	Rating
Apache Junction	Possibly	Limited	> 24 hours	> 1 week	2.05
Casa Grande	Possibly	Negligible	> 24 hours	> 1 week	1.75
Coolidge	Possibly	Limited	12-24 hours	> 1 week	2.20
Eloy	Likely	Limited	> 24 hours	> 1 week	2.50
Florence	Unlikely	Negligible	> 24 hours	> 1 week	1.30
Kearny	Unlikely	Negligible	> 24 hours	> 1 week	1.30
Mammoth	Unlikely	Negligible	> 24 hours	< 6 hours	1.00
Maricopa	Possibly	Negligible	< 6 hours	< 6 hours	1.90
Superior	Unlikely	Negligible	> 24 hours	< 6 hours	1.00
Unincorporated Pinal Co	Highly Likely	Negligible	> 24 hours	> 1 week	2.65
County-wide average CPRI =					1.77

The Planning Team has determined that beginning with this Plan, they will continue to assess vulnerability as an overview summary of the hazard's impact on the community and its vulnerable structures, rather than in a quantitative manner.

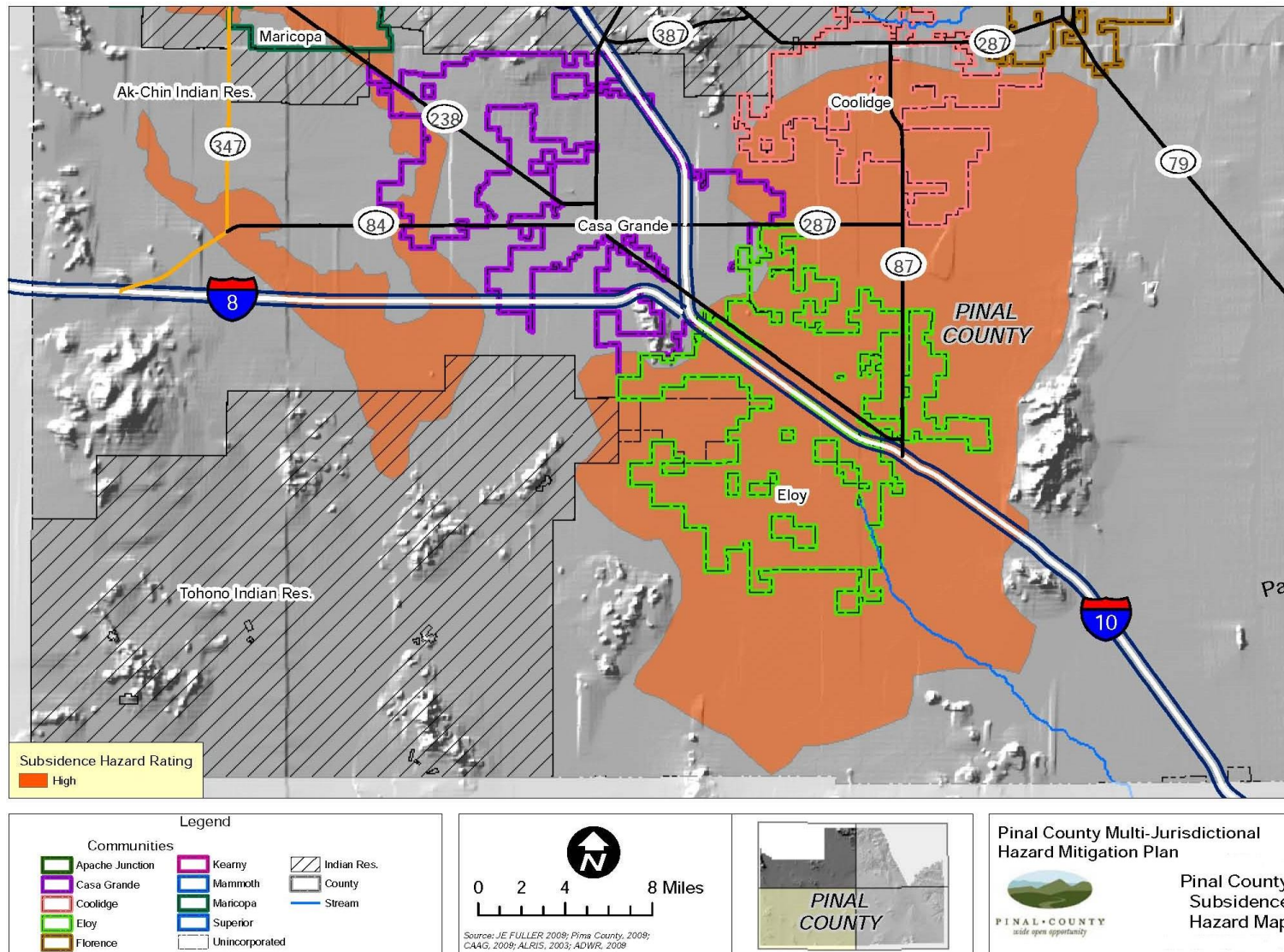
Based on the assessments performed for the previous Plan there are estimated to be \$619 million in identified critical and non-critical facilities County-wide exposed to high hazard subsidence areas. Additionally \$3.4 billion in HAZUS defined residential, commercial, and industrial facilities are exposed to high hazard subsidence areas for the planning area. Regarding human vulnerability, 100,522 people, or 26.75% of the County population is potentially exposed to a high hazard subsidence area. It is unlikely that death and injury might be the direct result of subsidence, however secondary impacts related to fissures may pose the risk.

Within Pinal County, ADWR monitors three geographical areas using InSAR. The communities of Eloy, Coolidge, and a small portion of Florence are located within the Picahco-Eloy land subsidence feature, the Hawk Rock land subsidence feature includes the city of Apache Junction, and the Maricopa-Stanfield land subsidence feature includes the city of Maricopa. These geographical areas will continue to be monitored closely.

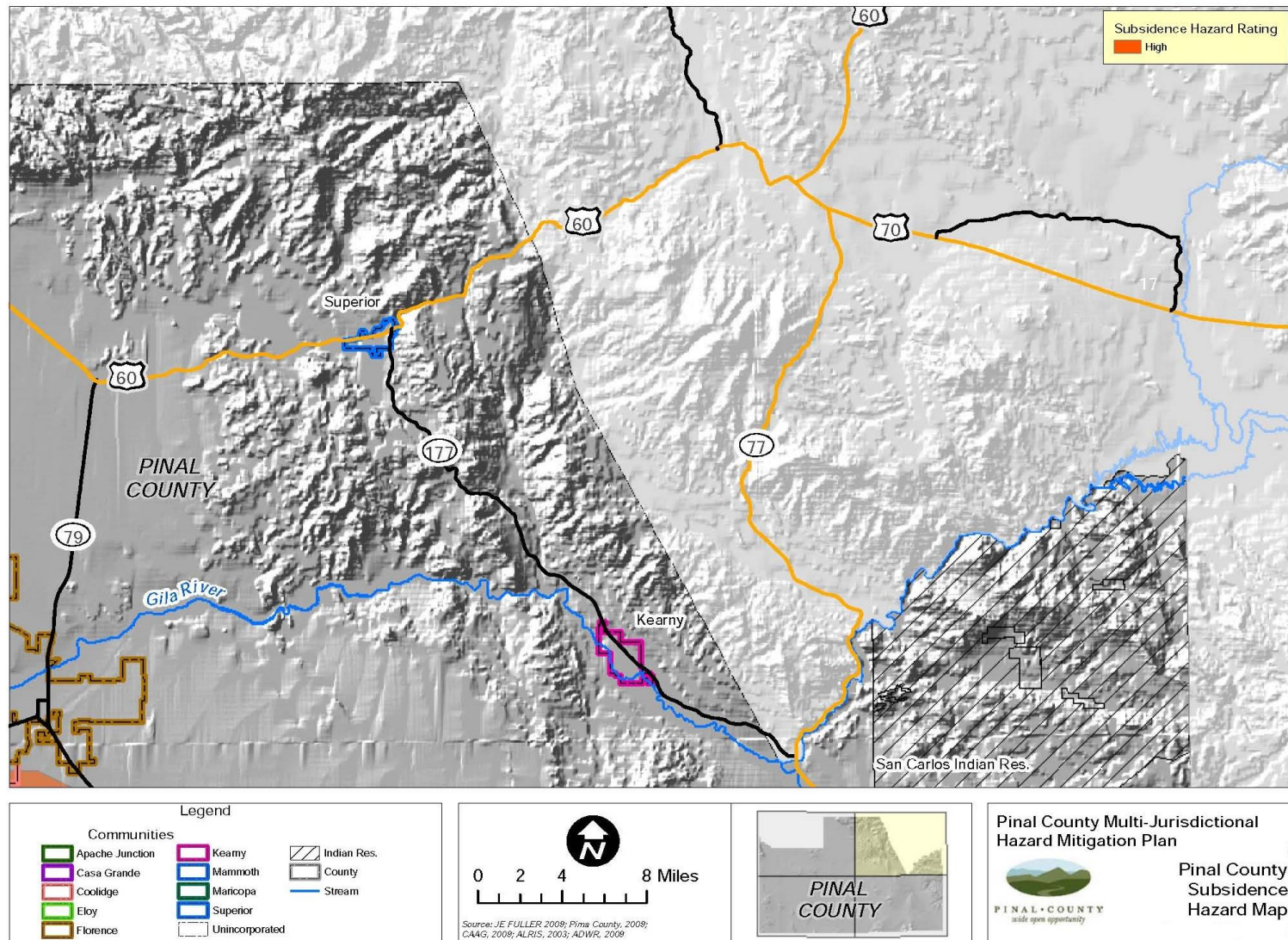
Although subsidence is widespread in Pinal County, and several communities are located within a high hazard area, there have been no documented damages found to be directly attributable to subsidence. Most of the time, there is no clear and identifiable sign that land subsidence has even occurred. With subsidence, buildings normally sink uniformly with the ground, and are undamaged in the process. Damage is more likely to be observed when differential subsidence occurs. Differential subsidence is when adjacent areas subside at different rates, this may cause damage to buildings by lowering one side of a building more than another. Longer facilities are most often impacted by this, such as canals and pipelines which cross all, or a large part of a subsidence feature. Canals, aqueducts, sewers, and drains may all be affected, as these are all built with very precise slopes, which allow the liquid to flow effectively. Subsidence, however, may cause changes in the slope and cause liquids to flow too slowly, too fast, or not at all, which may cause ponding, overflowing, or overloading of checkpoints. Other critical infrastructure such as gas lines and roads may also be damaged by subsidence, which has the potential to cause major disruptions for citizens. Although the rate of subsidence has generally been reduced through a shift from groundwater to alternate sources, the areas affected by land subsidence and the problems encountered may expand in the future if groundwater is withdrawn at unsustainable levels.



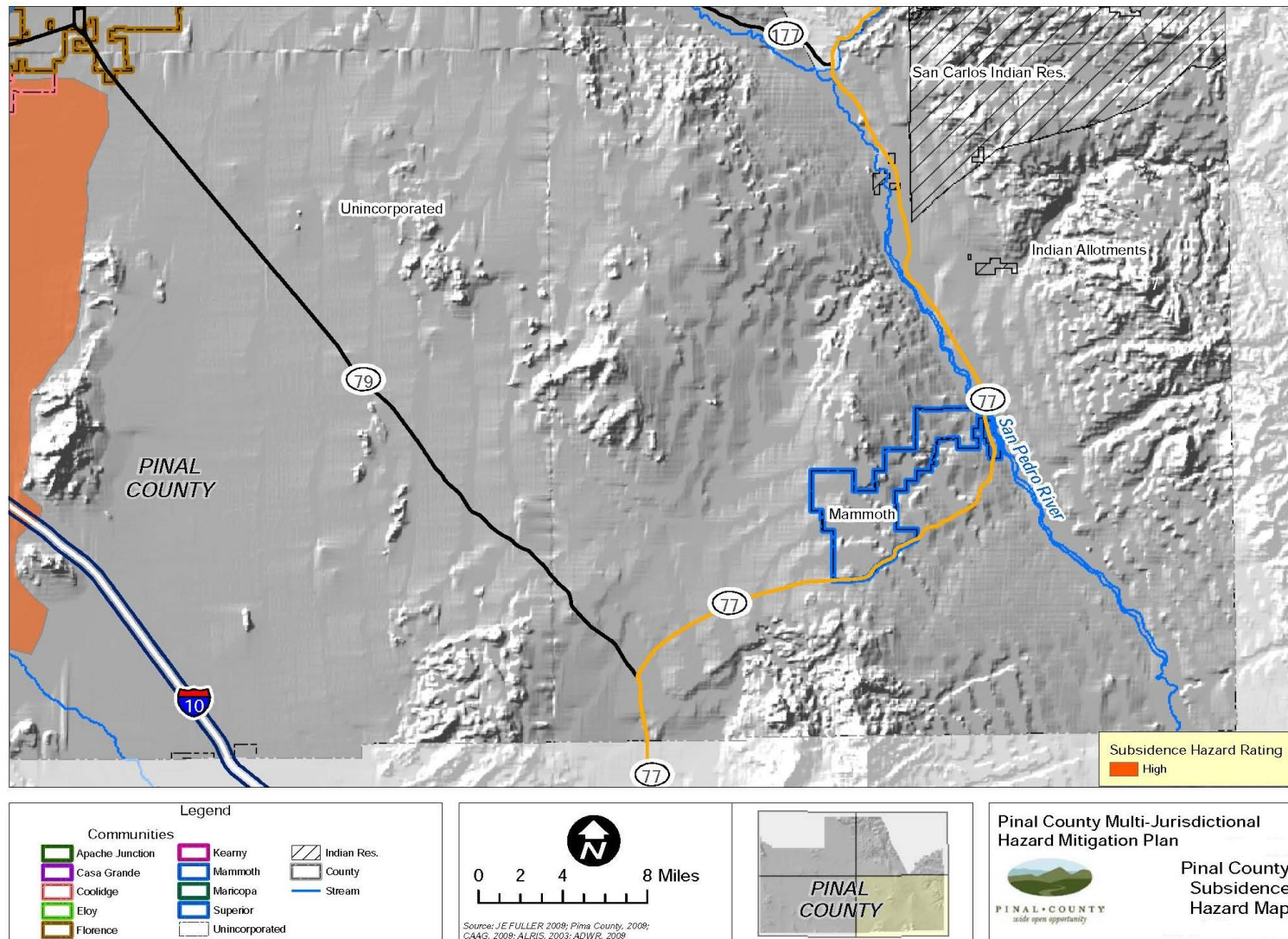
Map 4-23: Pinal County Subsidence Hazard Area (1)



Map 4-24: Pinal County Subsidence Hazard Area (2)



Map 4-25: Pinal County Subsidence Hazard Area (3)



Map 4-26: Pinal County Subsidence Hazard Area (4)

Vulnerability – Development Trend Analysis

As ADWR continues its mapping and tracking programs, more data will become available for use in regulating future development. Public awareness of the hazard is a key element to any effective mitigation measure, as well as the need to slow the depletion of groundwater sources. New regional drainage features and structures should always refer to the maps in this plan, or those found through the Arizona Department of Water Resources, to determine the need for special design considerations that address subsidence.

Sources

AMEC Earth & Environmental, Inc., Earth Fissure Risk Zone Investigation Report, Powerline and Vineyard Flood Retarding Structures, Pinal County, AZ

AZ Dept of Water Resources,

http://www.azwater.gov/DWR/Content/Find_by_Program/Hydrology/land-subsidence-in-arizona.htm

AZ Division of Emergency Management, State of AZ Multi-Hazard Mitigation Plan.

AZ Geological Survey, Land Subsidence and Earth Fissures in Arizona

AZ Land Subsidence Group. Land subsidence and earth fissures in AZ: Research and informational needs for effective risk management, white paper, Tempe, AZ.

<http://www.azgs.az.gov/Earth%20Fissures/CR-07-C.pdf>

Carpenter, M.C., Land subsidence in the United States, South-Central Arizona: Earth fissures and subsidence complicate development of desert water resources, [Galloway, D., Jones, D.R., and Ingebritson, S.E., editors], USGS Circular 1182.

Understanding Your Risks; Identifying Hazards and Estimating Losses, FEMA Document No. 386-2.

4.4.8 Wildfire

Description

A wildfire is an uncontrolled fire spreading through wildland vegetative fuels and/or urban interface areas where fuels may include structures. They often begin unnoticed, spread quickly, and are usually signaled by dense smoke that may fill the area for miles around. Wildfires can be human-caused through acts such as arson or campfires, or can be caused by natural events such as lightning. If not promptly controlled, wildfires may grow into an emergency or disaster. Even small fires can threaten lives, resources, and destroy improved properties.

The indirect effects of wildfires can also be catastrophic. In addition to stripping the land of vegetation and destroying forest resources and personal property, large, intense fires can harm the soil, waterways and the land itself. Soil exposed to intense heat may temporarily lose its capability to absorb moisture and support life. Exposed soils in denuded watersheds erode quickly and are easily transported to rivers and streams thereby enhancing flood potential, harming aquatic life and degrading water quality. Lands stripped of vegetation are also subject to increased landslide hazards.

History

For the period of 1980 to 2013, data compiled by the Arizona State Forestry Division for the 2013 State Plan update indicates that at least 193 wildfires greater than 100 acres in size, have occurred in all of Pinal County, including 42 that have exceeded 1,000 acres. Below are some of the County's more significant wildfire events:

- June 2015, the Kearny River Fire burned at least 1,428 acres. Two mobile home parks (300 people) were evacuated. The fire also threatened Copper Basin Railway and power lines in the Hayden area. Four homes were destroyed in Kearny.
- July 2013, the Shipman Fire burned 518 acres up against Kearny and threatened power lines that service Hayden and the mine. Evacuated several mobile homes south of Kearny. A total of two homes were destroyed by the fire.
- May of 2006, the White Fire, a lightning caused fire, burned an area 5 miles south of Superior. The fire started May 2nd and was controlled May 5th. The fire burned a total of 110 acres with over \$50,000 in fire suppression costs.
- July of 2005, the Peachville Fire began on the 17th about 4 miles north of Superior burned 11,000 acres (NWCG, 2010 and AZ State Forestry Division, 2009).
- May of 2005, the Chapman Fire, a fire of unknown cause, burned an area 4-5 miles south of Florence. The fire started May 5th. The fire burned a total of 3,500 acres with over \$110,000 in fire suppression costs. One outbuilding was destroyed. (NWCG, 2010 and AZ State Forestry Division, 2009).
- June of 2003, the Aspen Fire, a human caused fire started on June 17, 2003 and burned for about a month on Mount Lemmon, part of the Santa Catalina Mountains located in the Coronado National Forest north of Tucson, and in the surrounding area. It burned 84,750 acres of land, and destroyed 340 homes and businesses of the town of Summerhaven. Damages to electric lines, phone lines, water facilities, streets and sewers totaled \$4.1 million. Firefighting costs were over \$17 million, and the Forest Service spent an estimated \$2.7 million to prevent soil loss. In 2002, the year before the fire started, Congress had been requested to allocate about \$2 million to cover the implementation of fire prevention measures in the Coronado National Forest. However, that allocation was reduced to about

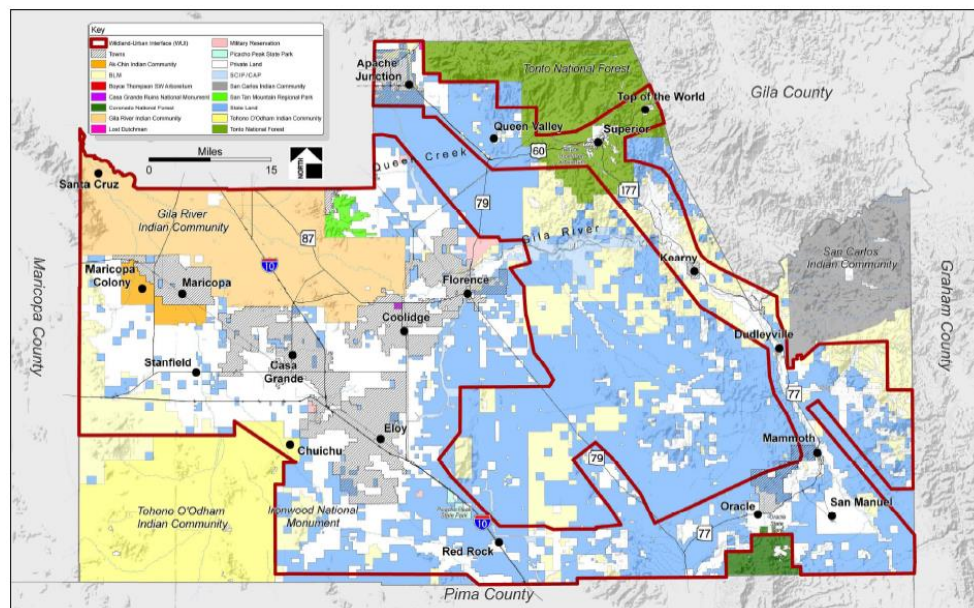
- \$150,000 in the Congressional budget process. A presidential disaster declaration (FEMA-1477-DR) was made on July 14, 2003.
- May of 2002, the Bullock Fire started on the 1^{9th} in the Reddington Pass area of the Coronado National Forest, Santa Catalina Ranger District. The fire spread to threaten homes and communications resources on top of Mt. Lemmon. There were two residences and five outbuildings destroyed and a total of 12 injuries relating to the firefight. The fire burned 30,563 acres with \$14.4 million in suppression costs and was declared fully contained in early June (NWCG, 2010 and AZ State Forestry Division, 2009).

The declared disaster and historic hazard data summarized earlier in this section does not adequately reflect the true cost of a wildfire. This is particularly the case with the cost of wildfire suppression efforts to prevent structure and human loss. For example, realistic damage estimates for the two residences and five outbuildings destroyed by the Bullock Fire would likely be less than \$250,000. However, the suppression costs for the Bullock Fire exceeded \$14.4 million.

Probability and Magnitude

The probability and magnitude of wildfire incidents for Pinal County are influenced by numerous factors including vegetation densities, previous burn history, hydrologic conditions, climatic conditions such as temperature, humidity, and wind, ignition source (human or natural), topographic aspect and slope, and remoteness of area. Two sources were used to map the wildfire risk for Pinal County. The first is the data developed for the Pinal County Community Wildfire Protection Plan (PCCWPP) (LSDI, 2009). The second is a statewide coverage developed by the State of Arizona as a part of the 2003/04 AZ Wildland Urban Interface Assessment (AWUIA) project (Fisher, 2004).

Pinal County and participating jurisdictions developed a community wildfire protection plan in 2009. The objective of the plan was to help local governments, fire departments and districts, and residents identify at-risk public and private lands to better protect those lands from severe wildfire threat. Elements identified in the PCCWPP include delineation of the wildland urban interface (WUI) areas, mapping of vegetative fuels and topographical slope and aspect elements impacting wildfire risk, and mapping of wildfire risk zones that include consideration for the built environment.

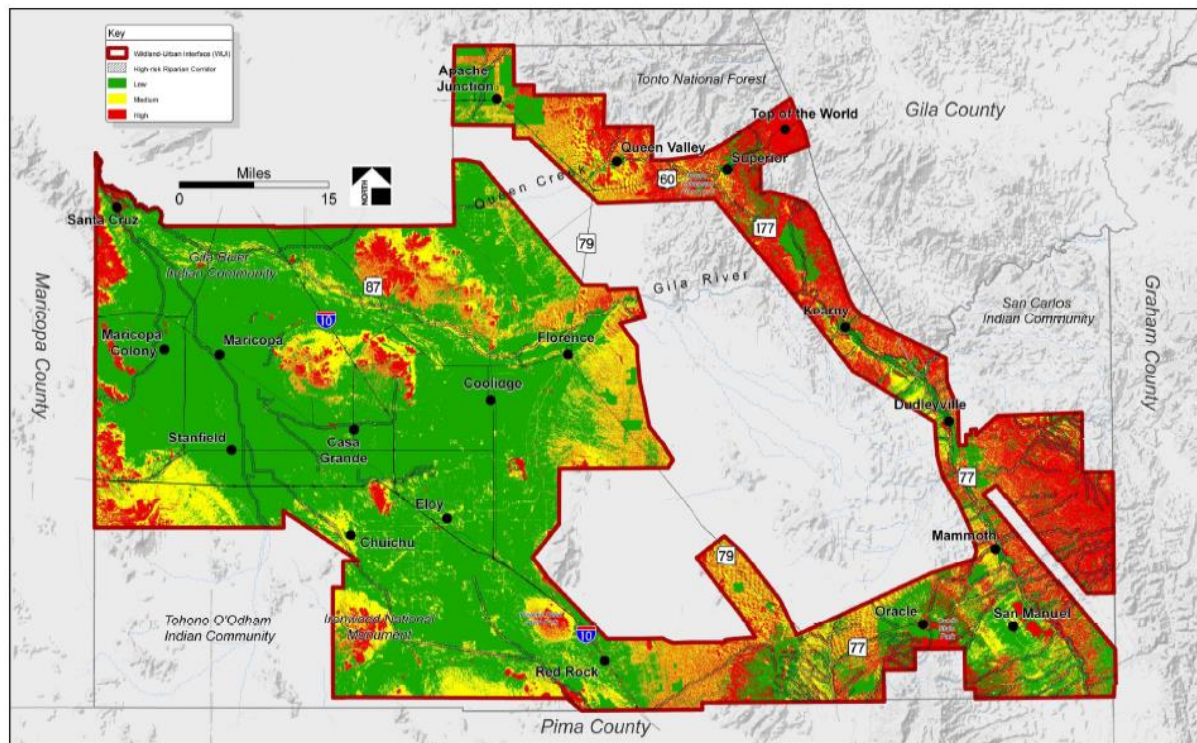


Map 4-27: Pinal County Wildland Urban Interface Area

The PCCWPP also identified two models of wildland fuel hazards to represent a typical year of rainfall and an extraordinarily heavy rainfall year to present a range of wildland fuel hazards across the County. Each model divided the fuel hazard into three categories; high, medium and low. The Planning Team chose to use the extraordinary rainfall fuel hazard model.

In 2004, the State of Arizona prepared the AWUIA to analyze wildfire risk at a statewide basis, using a common spatial model. The model results were used for validation of those communities listed in the federal register as WUI, and for further identification other communities possibly at risk. The AWUIA approach used four main data layers:

- TOPO – aspect and slope derived from 30 meter Digital Elevation Model data from USGS.
- RISK – historical fire density using point data from fire record years 1986–1996 from all wildland agencies.
- HAZARD – fuels, natural fire regimes and condition class.
- HOUSE – houses and/or structures



Source: Pinal County CWPP, May 2009

Map 4-28: Extraordinary Rainfall Year Fuel Hazards

A value rating in the range of 1-15 was assigned for all layers to represent the level of risk.

Two separate results were developed. The first coverage used an applied weighting scheme that combined each of the four data layers to develop a ranking model for identifying WUI communities at greatest risk. The second coverage, referred to as the “Land Hazard”, also applied a weighting scheme that combined only the topo, risk, and hazard layers, as follows:

$$\text{Land Hazard} = (\text{hazard} \times 70\%) + (\text{risk} \times 20\%) + (\text{topo} \times 10\%)$$

Weighing percentages were determined through discussion with the Arizona Interagency Coordinating Group. The “Land Hazard” layer produced from this model is based on a 250-meter

raster grid (some data originated at 1,000-meter). The resultant raster values range from 1-15 and were classified into three groups to depict wildfire hazard without the influence of structures: high (values of 10-15), medium (values of 7-9), and low (values of 1-6).

The following table is an excerpt from the PCCWPP that summarized the WUI risk for all communities within Pinal County.

Community ^a	WUI risk	Fire department/ district	Community	WUI risk	Fire department/ district
Dudleyville	Moderate	Dudleyville Fire District	Apache Junction	Low	Apache Junction Fire District
Kearny	High	Kearny Fire Department	Queen Creek	Low	Queen Creek Fire Department
Oracle	High	Oracle Fire District	Eloy	Low	Eloy Fire District
Santa Cruz	Moderate	Gila River Indian Community Fire Department	Superior	High	Superior Fire Department
Maricopa Colony	Low	Ak-Chin Indian Community Fire Department	San Manuel	Low	San Manuel Fire District
Top of the World	High	None	Casa Grande	Low	Casa Grande Fire Department
Florence	Moderate	Florence Fire Department	Mammoth	Low	Mammoth Fire District
Coolidge	Low	Coolidge Fire Department	Maricopa	Low	Maricopa Fire Department
Queen Valley	High	Queen Valley Fire District	Stanfield	Low	Stanfield Fire District
Arizona City	Low	Arizona City Fire District	Oracle Junction/Saddlebrook	Moderate	Golder Ranch Fire District
Avra Valley	Low	Avra Valley Fire District	Galiuro Mountains	Low	None
Thunderbird Farms	Low	Thunderbird Fire District	Chuichu	Moderate	Tohono O'odham Nation Fire Department
Picacho	Low	None			

^aDudleyville listed as low, Kearny listed as moderate, Oracle listed as high, Santa Cruz listed as moderate, Maricopa Colony listed as low, and Top of the World listed as high on the 2007 *Arizona Communities at Risk Matrix* (<http://www.azsf.az.gov>).

Vulnerability

Table 4-18: CPRI Results for Wildfire					
Jurisdiction	Probability	Magnitude/ Severity	Warning Time	Duration	Rating
Apache Junction	Possibly	Limited	< 6 hours	< 24 hours	2.30
Casa Grande	Possibly	Negligible	6-12 hours	< 24 hours	1.85
Coolidge	Likely	Limited	< 6 hours	< 24 hours	2.75
Eloy	Likely	Limited	< 6 hours	< 24 hours	2.75
Florence	Likely	Limited	6-12 hours	< 24 hours	2.60
Kearny	Highly Likely	Limited	< 6 hours	< 1 week	3.30
Mammoth	Highly Likely	Limited	< 6 hours	< 1 week	3.30
Maricopa	Unlikely	Negligible	> 24 hours	< 6 hours	1.00
Superior	Likely	Limited	< 6 hours	< 1 week	2.85
Unincorporated Pinal Co	Highly Likely	Limited	< 6 hours	> 1 week	3.40
County-wide average CPRI =					2.61

The Planning Team has determined that beginning with this Plan, they will continue to assess vulnerability as an overview summary of the hazard's impact on the community and its vulnerable structures, rather than in a quantitative manner.

In Pinal County, wildfires pose the greatest danger in the eastern region of the County, where the fuels are more supportive of extreme fires, but are a threat throughout the planning area. The wildfire

hazard has the potential to destroy buildings, cause damage to vital infrastructure, and result in the loss of life, agricultural land, and animals. Depending on the parameters and size of the fire, a wildfire can have a significant economic impact, such as disruption to industries and supply chains, and the closure of vital transportation networks. According to the PCCWPP, a total of 458,479 acres are located in areas with a high wildfire risk. From the most recent applicable data available, \$93,000 and \$5.6 million in asset related losses are estimated for high and medium wildfire hazards, for all the planning area. An additional \$148 and \$860 million in high and medium hazard wildfire losses to HAZUS defined residential, commercial, and industrial facilities, is estimated for the planning area. It should be noted that these exposure dollar amounts do not include the cost of wildfire suppression, which can be substantial.

Regarding human vulnerability, a County-wide population of 18,293 and 38,717 people, or 4.87% and 10.30% of the total, is potentially exposed to a high and medium hazard wildfire event, respectively. The most exposed population are those living within WUI zones. Other populations to consider include children, the elderly, or those with breathing conditions who may be exposed to high levels of smoke. Also important to consider long term care facilities or other skilled care facilities because of the potential for increased evacuation times. Typically, deaths and injuries not related to firefighting activities are rare. However, it is feasible to assume that at least one death and/or injury may be plausible. There is also a high probability of population displacement during a wildfire event, especially in the urban wildland interface areas.

It is duly noted that the loss and exposure numbers listed above represent a comprehensive evaluation of the County as a whole. It is unlikely that a wildfire would occur that would impact all of the high and medium wildfire hazard areas at the same time.

Apache Junction – In the Apache Junction WUI, the areas at highest risk for wildfires occur primarily along the slopes of the Superstition Mountains in the eastern portion of the WUI, and the Goldfield Mountains in the northern portion of the WUI. As with other communities, vulnerability of homes and businesses increases as the distance of the property to wildfire prone areas decreases. Vegetation associations within the Apache Junction area range from desert scrub types on the desert floor to mixed desert shrub associations in the mountain foothills. During years of extraordinary rainfall, these areas of the WUI require greater attention as they present a heightened risk. In addition, there is an overall elevated risk from the density of developed areas in proximity to high risk wildland fuels.

Casa Grande – The majority of the Casa Grande WUI is classified as low wildfire risk. There are several large dry riparian areas in the WUI and the immediate surrounding areas such as; the Santa Rosa Wash, Greene Wash, and the Casa Grande canal downstream of the Picacho Reservoir, which are considered areas of elevated wildfire concern. The relatively flat landscape is composed of desert scrub-shrub vegetative communities, which dominate the landscape and are not conducive to intensive wildfire due to noncontiguous aerial or ground fuels. However, during extreme rainfall years, abundant annual and invasive grasses can create areas of increased risk within the foothills of the Sacaton and Casa Grande Mountains, in addition to the dry riparian habitat areas mentioned earlier.

Coolidge – The majority of the Coolidge WUI is classified as low risk of wildfire. The immediate area surrounding the WUI is largely open land, with a majority of the land being used for agricultural purposes. The relatively flat landscape is composed of desert scrub-shrub vegetative communities, which dominate the landscape and are not conducive to intensive wildfire due to noncontiguous aerial or ground fuels. During extreme rainfall years, abundant annual and invasive grasses can create areas of increased risk.

Eloy – The Eloy WUI, located within the Santa Cruz Flat, is composed of desert scrub-shrub vegetative communities, which dominate the landscape and are not conducive to intensive wildfire due to noncontiguous aerial or ground fuels. The City of Eloy and immediate surrounding area, has a history of low numbers of wildfire ignitions, in addition, fires are usually quickly extinguished due to the low fuel loads. Areas of highest wildfire risk are located to the east of the city, within the foothills of the northern extension of the Picacho Mountains and in the riparian habitats within the Picacho Reservoir and its associated canals and drainages. The northern extension of the Picacho Mountains is classified as moderate risk based on prior wildfire ignitions.

Florence – The Florence WUI is located within the relatively flat lowlands of the Gila River Valley. The vegetation ranges from desert scrub-shrub communities, which dominate the landscape and are not conducive to intensive wildfire due to noncontiguous aerial or ground fuels, to upland Sonoran desert shrub communities, which during extreme rainfall years can produce abundant light fuels from invasive annual and perennial grasses. In extreme rainfall years, significant ground fuels are produced within the bajadas of the western slopes of the Tortilla Mountains and the ascending slopes north of the community to the Mineral Mountain and White Canyon Wilderness area, which create areas of high risk to wildfire. Although Florence has a high population density within its WUI, due to the low number of wildfire ignitions and an overall low wildfire risk, the overall wildfire risk rating is moderate.

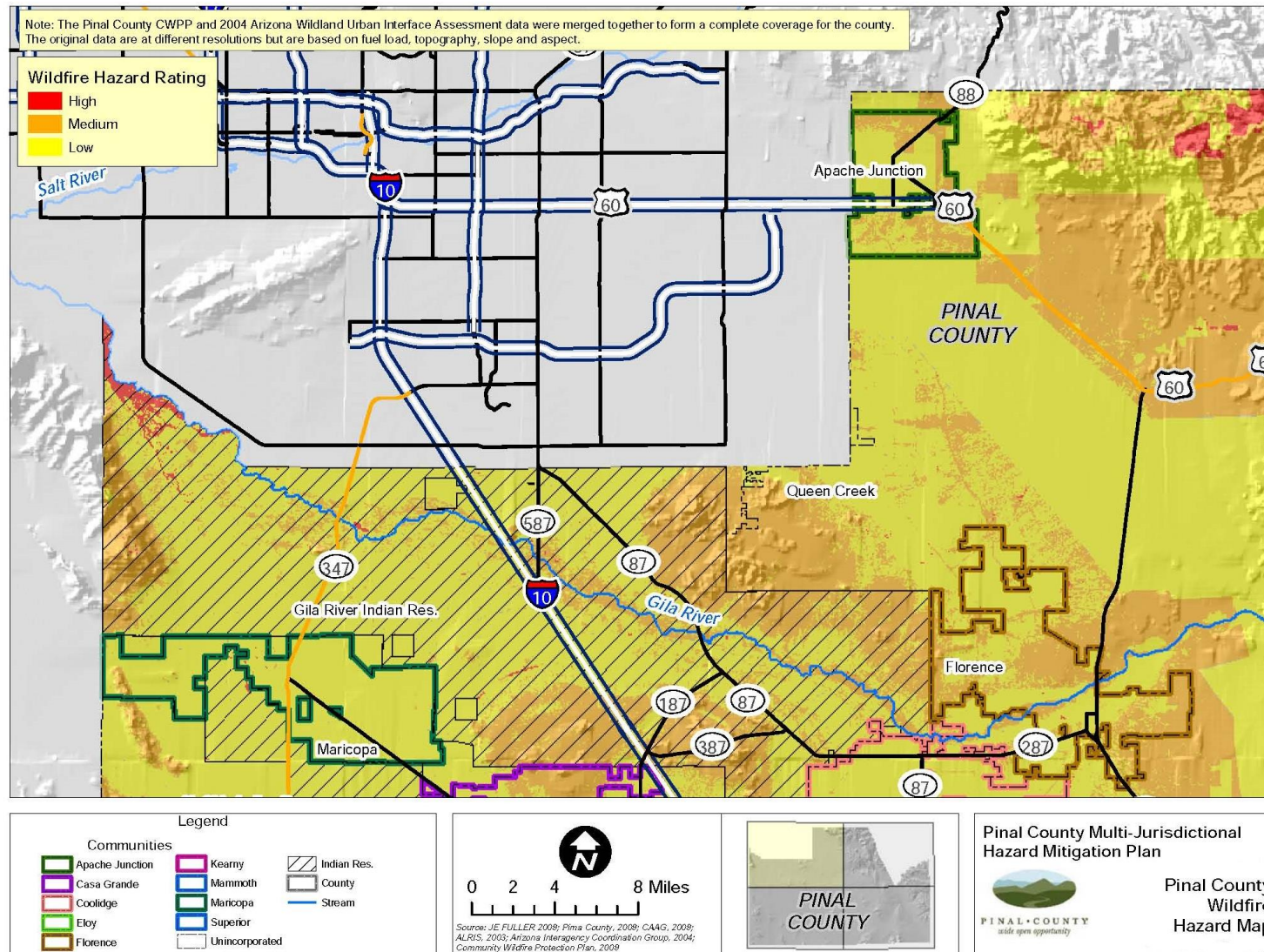
Kearny – In Kearny, the areas at highest risk for wildfires are along both sides of the Gila River riparian corridor in areas on ascending slope in conjunction with woodland vegetation associations. The Gila River riparian corridor, which has the highest incidences of ignition, with its associated side channels and drainages, are considered areas of elevated risk from wildfire. Vegetation associations at highest risk for wildfire consist primarily of riparian, woodland, and mixed desert scrub. Businesses and homes south and west of the railroad tracks face the greatest risk, as this area primarily contains the greatest fuel load.

Mammoth – In Mammoth, the areas at highest risk for wildfires occur primarily along the San Pedro River riparian corridor and in upland areas with ascending slope to the east of the riparian corridor. The San Pedro River riparian corridor, with associated side channels and drainages within the community, are considered of elevated risk from wildfire. Vegetation associations at highest risk consist primarily of riparian, woodland, and mixed desert scrub. The Town has some critical communication towers that if damaged by wildfires will disrupt communication through most of County, making wildfire a heightened risk.

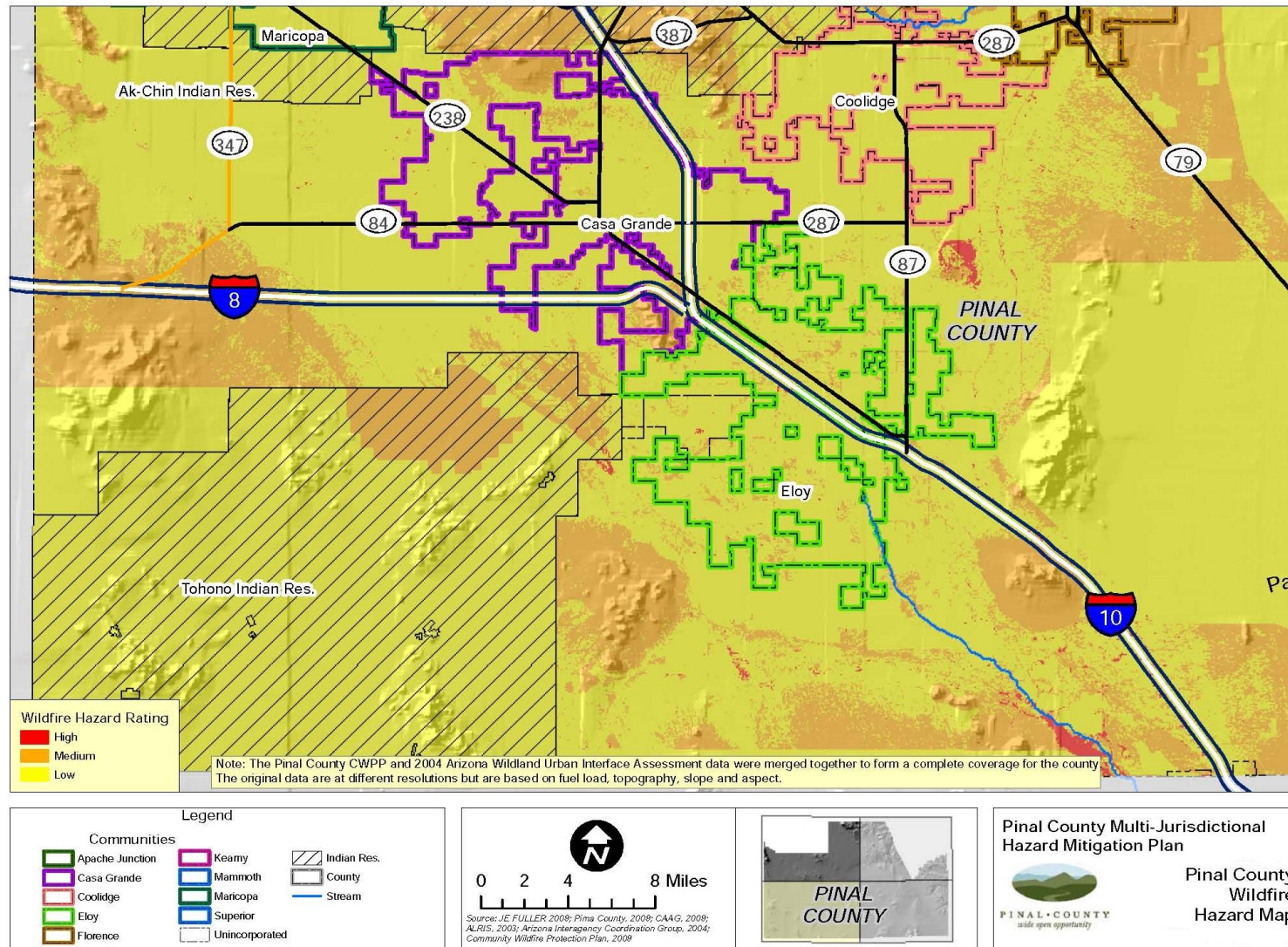
Maricopa – Maricopa is located in a low desert valley area that is composed of desert scrub-shrub vegetative communities, which dominate the landscape and are not conducive to intensive wildfire due to noncontiguous aerial or ground fuels. In extreme rainfall years significant ground fuels are produced within the foothills of the Sacaton Mountains, east of Maricopa. Due to a low wildfire risk and a low ignition history, the overall wildfire risk rating is low. Most fires are usually extinguished in their initial stages being less than one acre in area, therefore damages are likely to be negligible.

Superior – Superior, and the surrounding area is composed primarily of high wildfire risk vegetation. Significant threats to structure and infrastructure are found within and adjacent to the community. Meanwhile, several large wildfires have occurred within or adjacent to the community. The Boyce Thompson Southwestern Arboretum east and north along US 60, due to its ignition history, presents an increased wildfire risk to Superior. Vegetative associations range from desert scrub types on the desert floor to mixed desert shrub associations in the mountain foothills. During years of extraordinary rainfall, these areas require greater attention as they present a major heightened risk. Focus areas primarily consist of the areas west of Mary Drive and east of Ray Road, as fires started in these non-residential parts of the community could spread into, and heavily impact the community.

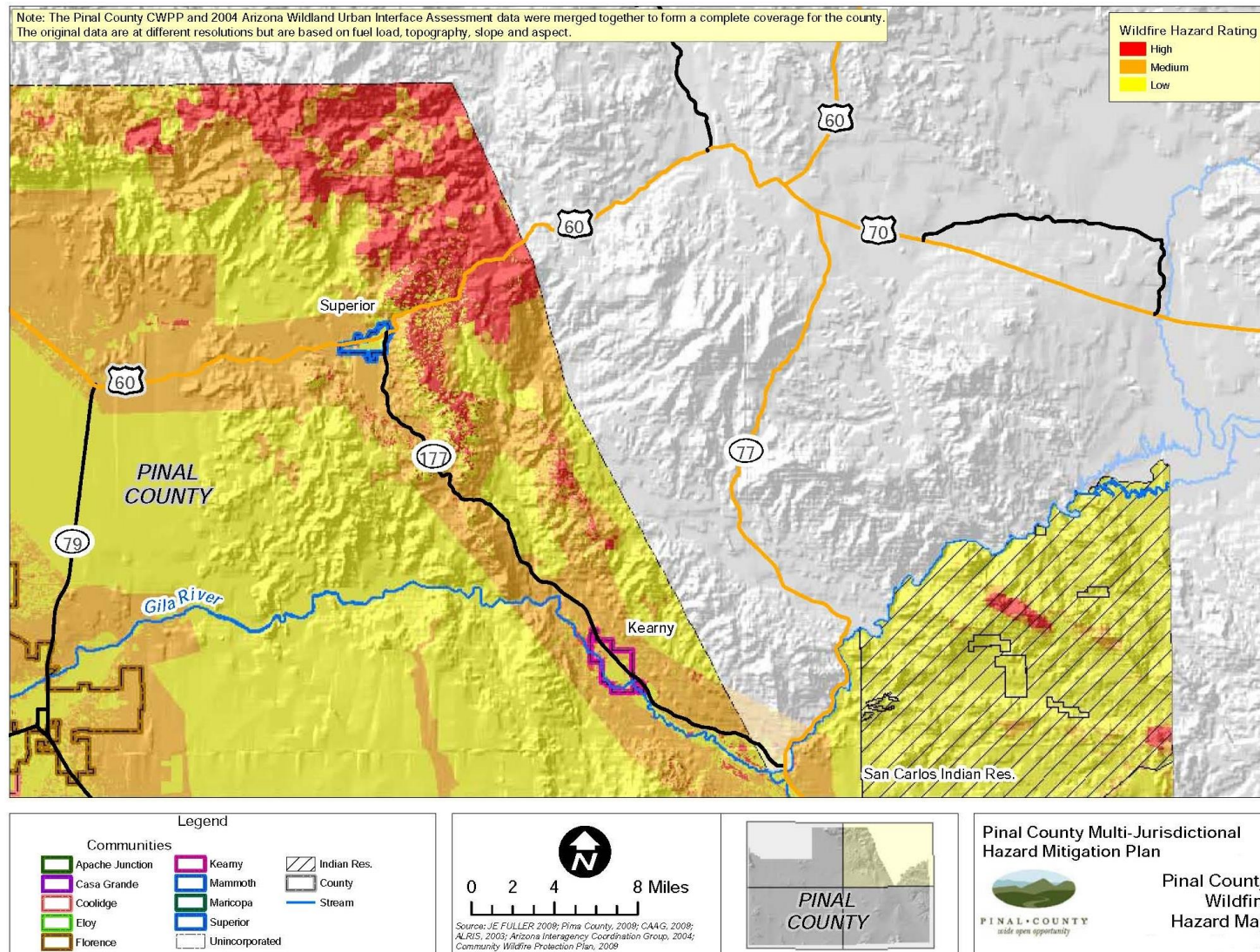
Unincorporated Pinal Co – Several unincorporated communities of Pinal County face heightened risk of wildfires due to their geographic locations. In San Manuel, the highest risk is located primarily along the San Pedro River riparian corridor and in upland areas. Wildfires in this area could create concerns for response resources and community evacuation. In Queen Valley, vegetation varies from desert scrub types on the desert floor to mixed desert shrub and woodlands in the foothills of the Superstition Mountains. Due to hillsides near homes having a high density of brush growth, there are areas classified as high risk. In Top of the World, the area faces a high wildfire risk due to the combination of volatile vegetative associations occurring in conjunction with southerly exposures of increasing steep slopes. In addition, the community is not within a fire district and therefore has an ISO rating of 10. In Oracle, due to the proximity to high vegetative fuels and structure density, the southern and eastern portions of the community are at the greatest risk for damaging wildfires. To account for the wildfire risk, Oracle has taken the initiative to be designated as a FireWise community, and the community has written, mapped, and coordinated community evacuation procedures.



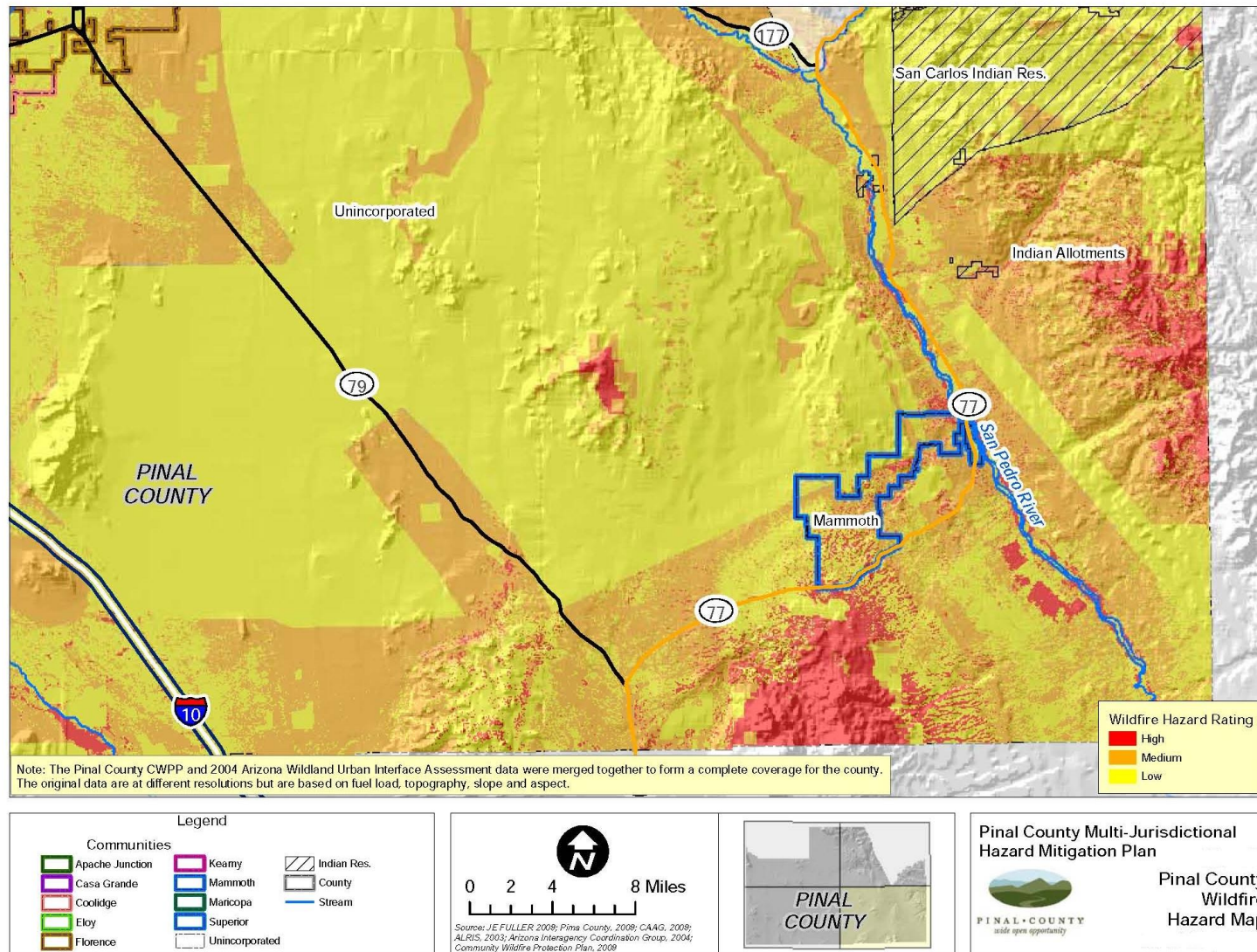
Map 4-29: Pinal County Wildfire Hazard Map (1)



Map 4-30: Pinal County Wildfire Hazard Area (2)



Map 4-31: Pinal County Wildfire Hazard Area (3)



Map 4-32: Pinal County Wildfire Hazard Area (4)

Vulnerability – Development Trend Analysis

By its very definition, the WUI represents the fringe of urban development as it intersects with the natural environment. As previously discussed, wildfire risks are significant for a sizeable portion of the county. Any future development will only increase the WUI areas and expand the potential exposure of structures to wildfire hazards. The PCCWPP addresses mitigation opportunities for expanding WUI areas and provides recommended guidelines for safe building and land-use practices in wildfire hazard areas.

Sources

AZ Division of Emergency Management, State of AZ Multi-Hazard Mitigation Plan.

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Logan Simpson Design, Inc., *Pinal County Community Wildfire Protection Plan*

National Wildfire Coordination Group, Historical ICS 209 reports http://fam.nwcg.gov/fam-web/hist_209/report_list_209

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SECTION 5: MITIGATION STRATEGY

The mitigation strategy discusses the actions that will reduce or possibly remove the community's exposure to hazard risks. The primary components of the mitigation strategy are generally categorized into the following:

Goals and Objectives

Capability Assessment

Mitigation Strategy

5.1 Section Changes

A new format is used for the Capability Assessment. The table should encourage more discussion about the current and potential resources.

5.2 Hazard Mitigation Goals

The 2010 Plan goal and objectives were reviewed and it was determined by the Planning Team that there were no adjustments necessary, therefore they remain as follows:

GOAL: Reduce or eliminate the risk to people and property from natural hazards.

Objective 1: Reduce or eliminate risks that threaten life and property within Pinal County.

Objective 2: Reduce risk to critical facilities and infrastructure from impacts of hazards within Pinal County.

Objective 3: Promote hazard mitigation throughout Pinal County.

Objective 4: Increase public awareness of hazards and risks within Pinal County.

5.3 Capability Assessment

An important component of the Mitigation Strategy is a review of the jurisdiction's resources in order to identify, evaluate, and enhance the capacity to mitigate the effects of hazards. For this Plan, a new format was implemented with questions regarding the capabilities. Answers to these questions are not required, however may be of some benefit moving forward. Therefore, the Planning Teams in subsequent updates to this Plan will continue to consider and address those questions as appropriate.

Table 5-1: Capability Assessment for Pinal County		
PLANNING and REGULATORY		
PLANS	Yes/No Year	Does the plan address hazards? Does the plan ID projects to include in the mitigation strategy? Can the plan be used to implement mitigation actions?
Capital Improvements Plan	Yes - 2014	Yes to all
Community Wildfire Protection Plan	Yes - 2008	Yes to all
Comprehensive/Master Plan	Yes - 2009	No. No. Yes.
Continuity of Operations Plan	No	
Economic Development Plan	Yes	No to all
Emergency Operations Plan	Yes - 2004	Yes. No. No.
Floodplain Management Plan	Yes - 2006	No to all – County ordinance
Stormwater Management Plan (Area Drainage Master Plan)	Yes - 2005	Yes to all
Transportation Plan	Yes - multiple	Yes to all
BUILDING CODES, PERMITTING, INSPECTIONS	Yes/No	What type of codes? Are codes adequately enforced?
Building Codes	Yes	County Ordinance. Yes.
Site plan review requirements	Yes	Site Plan Review Process. Yes.
LAND USE PLANNING & ORDINANCES	Yes/No	Is the ordinance effective for reducing hazard impacts? Is the ordinance adequately administered and enforced?
Floodplain ordinance	Yes	Is not adequately enforced on back end. Good enforcement on permitting process prior to.
Subdivision ordinance	Yes	Yes
Zoning ordinance	Yes	Yes with exception of enforcement – staffing may be an issue to the workload.
How can capabilities be expanded and improved to reduce risk? Increase enforcement on some ordinances through fines, hearing office process.		
ADMINISTRATIVE and TECHNICAL		
ADMINISTRATION	Yes/No	Describe capability. Is coordination effective?
Mutual aid agreements	Yes	AZMAC Signatory as well as most jurisdictions within County are signatory
Planning Commission	Yes	Regular Planning Commission meetings occur.
TECHNICAL STAFF	Yes/No FT/PT	Is staff trained on hazards and mitigation? Is coordination between agencies and staff effective? Have skills/expertise been used to assess/mitigate risk in the past?
Building Official	Yes - FT	No on training for hazard mitigation. Building safety, yes.
Community Planner	Yes – FT	Yes to all
Emergency Manager	Yes – FT	Yes to all

Engineer	Yes – FT	Yes to all
Floodplain Manager/Administrator	Yes – FT	Yes to all
GIS/HAZUS Coordinator	Yes – FT	Yes to all
Grant writer	Yes - FT	Yes to all
How can capabilities be expanded and improved to reduce risk? Continue training for all aspects of Emergency Management and include additional stakeholders. Ensure adequate staffing levels.		
FINANCIAL		
FINANCIAL	Yes/No	Has the funding resource been used in past and for what type of activities? Could the resource be used to fund future mitigation actions?
Capital improvements project funding	Yes	Facilities; Transportation; Flood Control, Public Safety Equipment. Yes, resource could be used to fund future mitigation actions.
Community Development Block Grant	Yes	Housing Rehabilitation Program. Yes, could be used but with eligibility requirements.
Authority to levy taxes for specific purposes	Yes	Flood Control; Library; Transportation; Public Health. Yes, could be used.
Impact fees for new development	Yes	Public Safety facilities and equipment; Parks & Open Space; Transportation projects. Yes, if mitigation project is directly related to growth and identified in the approved Development Impact Fee Capital Improvement Plan
Incur debt through special tax bond	Yes	Special tax bonds have not been used in recent history. Last time was 1996.
Incur debt through general obligation bonds	Yes	Facilities; Transportation. Yes, if mitigation project was identified in the bond public report. Have not used in recent past. Require voter approval before being used.
How can capabilities be expanded and improved to reduce risk? Providing funding source options allows the County to continue with mitigation projects without waiting upon grant funding or other sources.		
EDUCATION and OUTREACH		
PROGRAM / ORGANIZATION	Access / Eligibility (Yes/No)	Describe program/organization and how it relates to disaster resilience and mitigation. Could the program/organization help implement future mitigation activities?
Firewise Communities certification	Yes	We have one FireWise community in Oracle. Beginning development in Kearny this year. We have this as a mitigation project and will keep it as a project for the update.
StormReady certification	No	We have conducted an inquiry with NWS – Tucson in order to begin this certification process.
Citizen groups focused on emergency preparedness, environmental protection, etc.	Yes	We have two active CERT programs in Oracle and city of Maricopa. We plan to continue to support them and are attempting to get other jurisdictions established as well. Casa Grande and Apache Junction are our next focus areas. We have active citizen participation in the County's LEPC meetings.
Public education/information programs (fire safety, household preparedness, responsible water use, etc)	Yes	We have conducted some outreach but do not have an established program. One the duties of program staff will be to put together an outreach program. We've attended area safety fairs and will continue to support those projects.
Public-private partnership initiatives addressing disaster-related issues	Yes	Casa Grande Business Ready Partnership – active member. Quarterly meeting to collaborate with private sector partners. We've established a working relationship with

		the County's Economic Development Director to provide guidance services to partners to existing and potentially new business partners. Sponsored an Economic Development TTX in 2012.
How can capabilities be expanded and improved to reduce risk? Increase public education and outreach to include new business enterprises with the "Return" motto – "Return to work, Return to school, Return to home."		

Table 5-2: Capability Assessment for Apache Junction		
PLANNING and REGULATORY		
PLANS	Yes/No Year	Does the plan address hazards? Does the plan ID projects to include in the mitigation strategy? Can the plan be used to implement mitigation actions?
Capital Improvements Plan	Yes	Plan addresses many flood hazard mitigation related projects.
Community Wildfire Protection Plan	No	
Comprehensive/Master Plan	Yes	City's General Plan does factor in known hazards such as any flood plains and special flood hazard areas.
Continuity of Operations Plan	No	Not comprehensive but current efforts being made in this area.
Economic Development Plans (DRIS and EDAPT)	Yes	DRIS does address a study for a special flood hazard area located within city's primary business district.
Emergency Operations Plan	Yes	City's 2006 ERRP currently under revision.
Floodplain Management Plan	Yes	City administers own Floodplain Management.
Stormwater Management Plan	Yes	2002 Stormwater Master Plan is slated to be updated in fiscal year 2017.
Transportation Plan	Yes	Localized plans exist. City-wide plan is in the near future (within 5 years).
BUILDING CODES, PERMITTING, INSPECTIONS	Yes/No	What type of codes? Are codes adequately enforced?
Building Codes	Yes	Most current codes used (i.e. IBC, IFC, NEC, etc.). Are adequately enforced.
Site plan review requirements	Yes	All site plan reviews include review by Floodplain Management administrator. Alterations of stormwater conveyance for existing private properties still an issue causing localized flooding.
LAND USE PLANNING & ORDINANCES	Yes/No	Is the ordinance effective for reducing hazard impacts? Is the ordinance adequately administered and enforced?
Floodplain ordinance	Yes	AJ City Code Vol. II, Ch.5, Floodplain Management and Stormwater Regulations. Floodplain ordinance adequately enforced; stormwater needs attention.
Subdivision ordinance	Yes	Has been effective in reducing hazards and seems to be adequately enforced.
Zoning ordinance	Yes	Has been effective in reducing hazards and seems to be adequately enforced.
How can capabilities be expanded and improved to reduce risk? Research and development of processes to address on-site (private property) alterations of stormwater conveyance would extend capabilities and reduce flood risks.		
ADMINISTRATIVE and TECHNICAL		
ADMINISTRATION	Yes/No	Describe capability. Is coordination effective?
Mutual aid agreements	Yes	Consists of various IGAs with community/county agencies and SFMD. City is a signatory to the Arizona Mutual Aid Compact.
Apache Junction City Council	Yes	City's governing board.

Multi-Agency Emergency Management Committee	Yes	Representatives include, but not limited to, SRP, SFMD, Pinal County Emergency Management, Apache Junction Water Dist., SMCDF, and AJUSD.
TECHNICAL STAFF	Yes/No FT/PT	Is staff trained on hazards and mitigation? Is coordination between agencies and staff effective? Have skills/expertise been used to assess/mitigate risk in the past?
Building Official	Yes/FT	
Community Planner	Yes/FT	
Emergency Manager	No	City's ERRP recognizes the Assistant City Manager as the Director of Apache Junction's Office of Emergency Management.
Engineer	Yes/FT	
Floodplain Manager/Administrator	Yes/PT	
GIS/HAZUS Coordinator	No	In the process of hiring a fulltime GIS Coordinator.
Grant writer	Yes/FT	
How can capabilities be expanded and improved to reduce risk? On-going training is always a need and goal. City's emergency procurement and logistic readiness are identified for improvement. City's progress with developing a CIP program would also expand capability to reduce risk.		
FINANCIAL		
FINANCIAL	Yes/No	Has the funding resource been used in past and for what type of activities? Could the resource be used to fund future mitigation actions?
Capital improvements project funding	Yes	Used for projects for all identified hazards.
Community Development Block Grant	Yes	Often used for projects with flood mitigation benefits.
Authority to levy taxes for specific purposes	Yes	Has been used in past for vertical CIP construction and more recently for street maintenance. Possibility may exist to use this authority to fund future mitigation actions.
Impact fees for new development	Yes	Often used for street improvement projects that improve drainage (flood mitigation benefits).
Incur debt through special tax bond	Yes	Not used historically for hazard mitigation actions but possibility may exist in the future.
Incur debt through general obligation bonds	Yes	Not used historically for hazard mitigation actions but possibility may exist in the future.
How can capabilities be expanded and improved to reduce risk? Future policy discussions with City Council for staff to explore/implement alternative revenues for further hazard mitigation projects are possible.		
EDUCATION and OUTREACH		
PROGRAM / ORGANIZATION	Access / Eligibility (Yes/No)	Describe program/organization and how it relates to disaster resilience and mitigation. Could the program/organization help implement future mitigation activities?
Firewise Communities certification	No	
StormReady certification	No	
Citizen groups focused on emergency		Only government representative committees focused 100% on emergency preparations

preparedness, environmental protection, etc.	No	are known to exist within the city.
Public education/information programs (fire safety, household preparedness, responsible water use, etc)	Yes	Many initiatives taken up through SFMD covering the city along with periodic initiatives from the City on Flood, Outage, Fire hazards etc.
Public-private partnership initiatives addressing disaster-related issues	Yes	To date this includes quasi-public partnerships with the intent/plans to further these partnerships to private entities in near future.
How can capabilities be expanded and improved to reduce risk? Increase private partnerships for the planning and readiness activities for the community.		

Table 5-3: Capability Assessment for Casa Grande		
PLANNING and REGULATORY		
PLANS	Yes/No Year	Does the plan address hazards? Does the plan ID projects to include in the mitigation strategy? Can the plan be used to implement mitigation actions?
Capital Improvements Plan	Yes/2016	Yes, Yes, Yes
Community Wildfire Protection Plan	No	
Comprehensive/Master Plan	Yes/2010	Yes, Yes, Yes
Continuity of Operations Plan	Yes/2005	Yes, Yes, Yes
Economic Development Plan	Yes/2014	Yes, Yes, Yes
Emergency Operations Plan	Yes/2005	Yes, Yes, Yes
Floodplain Management Plan	Yes/2007	Yes, No, Yes
Stormwater Management Plan	Yes/2002	Yes, No, Yes
Transportation Plan	Yes/2007	No, new one will, No, Yes
BUILDING CODES, PERMITTING, INSPECTIONS	Yes/No	What type of codes? Are codes adequately enforced?
Building Codes	Yes	IBC, Yes
Site plan review requirements	Yes	Ordinances, Yes
LAND USE PLANNING & ORDINANCES	Yes/No	Is the ordinance effective for reducing hazard impacts? Is the ordinance adequately administered and enforced?
Floodplain ordinance	Yes	Yes, Yes
Subdivision ordinance	Yes	Yes, Yes
Zoning ordinance	Yes	Yes, Yes
How can capabilities be expanded and improved to reduce risk? Collaboration among staff members and open communication.		
ADMINISTRATIVE and TECHNICAL		
ADMINISTRATION	Yes/No	Describe capability. Is coordination effective?
Mutual aid agreements	Yes	Fire, Law Enforcement and Equipment resource sharing. Yes
Planning Commission	Yes	Full Planning Commission Membership. Yes, very effective coordinating staff.
TECHNICAL STAFF	Yes/No FT/PT	Is staff trained on hazards and mitigation? Is coordination between agencies and staff effective? Have skills/expertise been used to assess/mitigate risk in the past?
Building Official	Yes/FT	Yes, Yes, Yes
Community Planner	Yes/FT	Yes, Yes, Yes
Emergency Manager	Yes/PT	Yes, Yes, Yes
Engineer	Yes/FT	Yes, Yes, Yes

Floodplain Manager/Administrator	Yes/PT	Yes, Yes, Yes
GIS/HAZUS Coordinator	Yes/FT	Looking at opportunities for training. Yes, Yes
Grant writer	Yes/FT	Yes, Yes, Yes
How can capabilities be expanded and improved to reduce risk? Collaboration within departments and inter-agencies. Regular updates of plan.		
FINANCIAL		
FINANCIAL	Yes/No	Has the funding resource been used in past and for what type of activities? Could the resource be used to fund future mitigation actions?
Capital improvements project funding	Yes	No, lack of funding. Yes
Community Development Block Grant	Yes	No, Yes
Authority to levy taxes for specific purposes	Yes	With voter approval. Yes
Impact fees for new development	No	
Incur debt through special tax bond	Yes	With voter approval, Yes
Incur debt through general obligation bonds	Yes	With voter approval, Yes
EDUCATION and OUTREACH		
PROGRAM / ORGANIZATION	Access / Eligibility (Yes/No)	Describe program/organization and how it relates to disaster resilience and mitigation. Could the program/organization help implement future mitigation activities?
Firewise Communities certification	No	
StormReady certification	No	
Citizen groups focused on emergency preparedness, environmental protection, etc.	Yes	Casa Grande Business Ready Partnership is a public/private group that meets quarterly to provide continuing education, networking with fellow emergency planners from government, private companies and businesses to discuss what is going on in our community regarding disaster preparedness. Members of the public who have an interest in preparedness also attend and participate. The Casa Grande Fire Chief currently serves as the chair of this partnership. The partnership has created "Ready Your Business" a 12-Point Program for Success, Business Continuity Planning Guidebook for community members to use. This program has been presented at all the local chamber of commerce in Pinal Co.
Public education/information programs (fire safety, household preparedness, responsible water use, etc)	Yes	The Casa Grande Fire Dept provides free public education information and events to members of the community on fall injuries, remembering when program for the senior members of our community, middle school fire camp, fire explorer program, prom crash awareness, too hot for tots campaign, vial of life program, health & life safety concerns and of course, fire safety. The Fire Dept's Prevention Division is in all the pre-schools, elementary schools, middle schools and high schools during the school year teaching and mentoring students on many topics of these topics. Yes
Public-private partnership initiatives addressing disaster-related issues	Yes	Same as "Citizen groups focused on emergency preparedness, environmental protection, etc." program.
How can capabilities be expanded and improved to reduce risk? Community involvement – Education and Training - Funding		

Table 5-4: Capability Assessment for Coolidge		
PLANNING and REGULATORY		
PLANS	Yes/No Year	Does the plan address hazards? Does the plan ID projects to include in the mitigation strategy? Can the plan be used to implement mitigation actions?
Capital Improvements Plan	Yes	
Community Wildfire Protection Plan	No	Coolidge recognizes the Pinal County CWPP
Comprehensive/Master Plan	Yes	
Continuity of Operations Plan	No	
Economic Development Plan	Yes	Strategic agenda for economic development
Emergency Operations Plan	Yes	
Floodplain Management Plan	No	Coolidge recognizes the Pinal County Flood Plain
Stormwater Management Plan	No	
Transportation Plan	Yes	
BUILDING CODES, PERMITTING, INSPECTIONS	Yes/No	What type of codes? Are codes adequately enforced?
Building Codes	Yes	2006 ICC (IBC, IFB, IRC, IMC, IPC, IEBC, IECC, IFGC, & IPMC) 2005 NEC
Site plan review requirements	Yes	Zoning Ordinance
LAND USE PLANNING & ORDINANCES	Yes/No	Is the ordinance effective for reducing hazard impacts? Is the ordinance adequately administered and enforced?
Floodplain ordinance	No	Coolidge recognizes the Pinal County Flood Plain Ordinance
Subdivision ordinance	Yes	
Zoning ordinance	Yes	
ADMINISTRATIVE and TECHNICAL		
ADMINISTRATION	Yes/No	Describe capability. Is coordination effective?
Mutual aid agreements	Yes	Fire is a signer on the Pinal County Mutual Aid Agreement
Planning Commission	Yes	
TECHNICAL STAFF	Yes/No FT/PT	Is staff trained on hazards and mitigation? Is coordination between agencies and staff effective? Have skills/expertise been used to assess/mitigate risk in the past?
Building Official	Yes	
Community Planner	No	Growth Management Director fills this role
Emergency Manager	No	Fire and Police Chief primarily fill this role
Engineer	Yes	
Floodplain Manager/Administrator	No	Public Works Director fills this role
GIS/HAZUS Coordinator	Yes	

Grant writer	Yes	
FINANCIAL		
FINANCIAL	Yes/No	Has the funding resource been used in past and for what type of activities? Could the resource be used to fund future mitigation actions?
Capital improvements project funding	Yes	
Community Development Block Grant	Yes	
Authority to levy taxes for specific purposes	Yes	
Impact fees for new development	No	
Incur debt through special tax bond	Yes	
Incur debt through general obligation bonds	Yes	
EDUCATION and OUTREACH		
PROGRAM / ORGANIZATION	Access / Eligibility (Yes/No)	Describe program/organization and how it relates to disaster resilience and mitigation. Could the program/organization help implement future mitigation activities?
Firewise Communities certification	No	
StormReady certification	No	
Citizen groups focused on emergency preparedness, environmental protection, etc.	No	
Public education/information programs (fire safety, household preparedness, responsible water use, etc)	Yes	
Public-private partnership initiatives addressing disaster-related issues	No	
How can capabilities be expanded and improved to reduce risk? Most of the short comings are financially based issues.		

Table 5-5: Capability Assessment for Eloy		
PLANNING and REGULATORY		
PLANS	Yes/No Year	Does the plan address hazards? Does the plan ID projects to include in the mitigation strategy? Can the plan be used to implement mitigation actions?
Capital Improvements Plan	Yes	5-year CIP cycle. Yes to all.
Community Wildfire Protection Plan	No	Eloy recognizes the Pinal County CWPP.
Continuity of Operations Plan	No	
Economic Development Plan	Yes 2010	General Plan.
Emergency Operations Plan	Yes 2008	Yes to all.
General Plan	Yes 2010	Yes to all. <i>(Plan is currently being updated)</i>
Stormwater Management Plan	No	
Transportation Plan	Yes 2010	
Wasterwater Master Plan	Yes 2007	
Water Conservation Plan	Yes 2009	
Water Quality Management Plan	Yes 2007	
BUILDING CODES, PERMITTING, INSPECTIONS	Yes/No	What type of codes? Are codes adequately enforced?
Building Codes	Yes	2012 IBC – International Building Code 2012 IRC – International Residential Code 2012 IMC –International Mechanical Code 2012 IPC – International Plumbing Code 2012 IFC – International Fire Code 2012 IEC – International Energy Code 2011 NEC - National Electrical Code 2010 ADA-American Disability Act 2012 IPMC-International Property Maintenance Code 1997 UFC –Abatement of Dangerous Buildings Yes, codes are enforced.
Site plan review requirements	Yes	Ordinances, yes.
LAND USE PLANNING & ORDINANCES	Yes/No	Is the ordinance effective for reducing hazard impacts? Is the ordinance adequately administered and enforced?
Floodplain ordinance	Yes	2001 Ordinance transfer of Eloy Floodplain Management to Pinal Co Flood Control District 2001 Eloy adoption of Pinal Co Floodplain Management Ordinance

		Yes, enforced.
Subdivision ordinance	Yes	2004 Eloy Zoning and Subdivision Ordinances – Yes, enforced.
Zoning ordinance	Yes	2004 Eloy Zoning and Subdivision Ordinances – Yes, enforced.
ADMINISTRATIVE and TECHNICAL		
ADMINISTRATION	Yes/No	Describe capability. Is coordination effective?
Mutual aid agreements	Yes	Police and Fire have agreements in place.
Planning Commission	Yes	
TECHNICAL STAFF	Yes/No FT/PT	Is staff trained on hazards and mitigation? Is coordination between agencies and staff effective? Have skills/expertise been used to assess/mitigate risk in the past?
Building Official	Yes/FT	Building Safety, Chief Building Official – Yes, Yes, Yes.
Community Planner	Yes/FT	Community Development, Director/Planner – Yes, Yes, Yes.
Emergency Manager	No	
Engineer	Yes/FT	Public Works, City Engineer – Yes, Yes, Yes.
Floodplain Manager/Administrator	Yes/FT	Pinal County Flood Control District, Floodplain Administrator – Yes, Yes, Yes. The city manager is appointed as the national flood insurance program floodplain administrator for the city and is responsible for coordinating with the flood control district of Pinal County and will serve as the community point of contact on national flood insurance program issues for county, state and federal officials.
GIS/HAZUS Coordinator	Yes/FT	GIS Mapping Coordinator – Yes, Yes, Yes.
Grant writer	Yes/FT	Finance Department, Grants Coordinator – Yes, Yes, Yes.
FINANCIAL		
FINANCIAL	Yes/No	Has the funding resource been used in past and for what type of activities? Could the resource be used to fund future mitigation actions?
Capital improvements project funding	Yes	Could be used for future mitigation actions.
Community Development Block Grant	Yes	
Authority to levy taxes for specific purposes	Yes	Could be used for future mitigation actions.
Impact fees for new development	Yes	Yes – Municipal facilities, water & sewer, police, parks and recreation, library.
Incur debt through special tax bond	Yes	
Incur debt through general obligation bonds	Yes	Voter approval required.
EDUCATION and OUTREACH		
PROGRAM / ORGANIZATION	Access / Eligibility (Yes/No)	Describe program/organization and how it relates to disaster resilience and mitigation. Could the program/organization help implement future mitigation activities?
Firewise Communities certification	No	

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2016

StormReady certification	No	
Citizen groups focused on emergency preparedness, environmental protection, etc.	No	
Public education/information programs (fire safety, household preparedness, responsible water use, etc)	Yes	The Eloy Fire District and Eloy Police Department participate in several events to increase public education, such as the Annual City of Eloy Safety Fair and Fire Prevention Week, among others.
Public-private partnership initiatives addressing disaster-related issues	Yes	Coordination with the Economic Development Group of Eloy (EDGE).

Table 5-6: Capability Assessment for Florence		
PLANNING and REGULATORY		
PLANS	Yes/No Year	Does the plan address hazards? Does the plan ID projects to include in the mitigation strategy? Can the plan be used to implement mitigation actions?
Capital Improvements Plan	Yes	Town plan
Community Wildfire Protection Plan	Yes	State Contract for wild fires
Comprehensive/Master Plan	Yes	Town plan
Continuity of Operations Plan	Yes	Town plan
Economic Development Plan	Yes	Town plan
Emergency Operations Plan	Yes	Town plan
Floodplain Management Plan	Yes	Town plan
Stormwater Management Plan	Yes	Town plan
Transportation Plan	Yes	Town plan
Historic District Advisory Guidelines	Yes	Town plan
Downtown Redevelopment Plan	Yes	Town plan
Drought Management Plan	Yes	Town plan
Parks, Trails, and Open Space Master Plan	Yes	Town plan
Manual on Uniform Traffic Control Devices for Streets and Highways	Yes	Public works with Town plan
MAG Uniform Stand Specifications and Details for Public Works Construction	Yes	Town plan
BUILDING CODES, PERMITTING, INSPECTIONS	Yes/No	What type of codes? Are codes adequately enforced?
Site plan review requirements	Yes	Enforced
Int'l Building Code, 2006	Yes	Enforced
Int'l Existing Building Code, 2006	Yes	Enforced
Int'l Residential Code, 2006 Edition and Appendices H and M of the Int'l Residential Code 2006	Yes	Enforced
Int'l Mechanical Code, 2006	Yes	Enforced
Int'l Plumbing Code, 2006	Yes	Enforced
Int'l Property Maintenance Code, 2006	Yes	Enforced
Int'l Fuel Gas Code, 2006 Edition	Yes	Enforced
Int'l Energy Conservation Code, 2006	Yes	Enforced
Nat'l Electrical Code, 2005		Enforced

Int'l Accessible and Usable Buildings and Facilities Code, 2003	Yes	Enforced
Uniform Fire Code (UFC), 2003	Yes	Enforced
LAND USE PLANNING & ORDINANCES	Yes/No	Is the ordinance effective for reducing hazard impacts? Is the ordinance adequately administered and enforced?
Floodplain Management Ordinance	Yes	Enforced
Subdivision ordinance	Yes	Enforced
Zoning ordinance	Yes	Enforced
Wildfire Ordinance	Yes	State wild land contract
Weed Abatement Ordinance	Yes	Enforced
ADMINISTRATIVE and TECHNICAL		
ADMINISTRATION	Yes/No	Describe capability. Is coordination effective?
Mutual aid agreements	Yes	Coordination is effective when applied.
Planning Commission	Yes	Staffing
TECHNICAL STAFF	Yes/No FT/PT	Is staff trained on hazards and mitigation? Is coordination between agencies and staff effective? Have skills/expertise been used to assess/mitigate risk in the past?
Building Official	Yes	Fulltime
Community Planner	Yes	Certified planner
Emergency Manager	Yes	Administration: Town Manager
Engineer	Yes	Certified
Floodplain Manager/Administrator	Yes	Administration: Town Manager Public Works Dept: Public Works Director/Town Engineer
GIS/HAZUS Coordinator	Yes/FT	Information Technology: GIS Coordinator, IT Tech Public Works Dept: Engineering Tech
Grant writer	Yes	Finance Dept: Grant Coordinator, Grants Writer
Information Technology	Yes	Information Technology: IT Manager, IT Tech
Staff with education or expertise to assess the community's vulnerability to hazards	Yes	Public Works Dept: Public Works Director/Town Engineer Planning Dept: Planning Director, Building Inspector II Fire Dept: Fire Chief Police Dept: Police Chief
Surveyors	Yes	Public Works Dept.: Public Works Director/Town Engineer
Planner(s) or engineer(s) with knowledge of land development and land management practices	Yes	Public Works Dept: Public Works Director/Town Engineer Planning Dept: Planning Director, Planner I
FINANCIAL		

FINANCIAL	Yes/No	Has the funding resource been used in past and for what type of activities? Could the resource be used to fund future mitigation actions?
Community Development Block Grants	Yes	Florence partners with Winkleman and receives funding every other year for CDGB eligible activities.
Capital Improvements Project funding	Yes	7 Year CIP Plan, which re-evaluated annually.
Authority to levy taxes for specific purposes	Yes	Town development
Impact fees for new development	Yes	Town development
Fees for water, sewer, gas, or electric service	Yes	Fees for Water and Sewer.
Incur debt through general obligation bonds	Yes	Town development
Incur debt through special tax bonds	Yes	Town development
EDUCATION and OUTREACH		
PROGRAM / ORGANIZATION	Access / Eligibility (Yes/No)	Describe program/organization and how it relates to disaster resilience and mitigation. Could the program/organization help implement future mitigation activities?
Firewise Communities certification	Yes	Fire Department
Storm Ready certification	Yes	Town plan
Citizen groups focused on emergency preparedness, environmental protection, etc.	Yes	PIO information given
Public education/information programs (fire safety, household preparedness, responsible water use, etc)	Yes	Fire Department
Public-private partnership initiatives addressing disaster-related issues	Yes	Information to the public through community involvement with Fire and Police

Table 5-7: Capability Assessment for Kearny		
PLANNING and REGULATORY		
PLANS	Yes/No Year	Does the plan address hazards? Does the plan ID projects to include in the mitigation strategy? Can the plan be used to implement mitigation actions?
Capital Improvements Plan	Yes/2011	
Community Wildfire Protection Plan	No	
Comprehensive/Master Plan	Yes/2002	
Continuity of Operations Plan	No	
Economic Development Plan	Yes/2002	
Emergency Operations Plan	Yes/2006	Yes the plan addresses hazards
Floodplain Management Plan	Yes/2006	
Stormwater Management Plan	Yes/2006	
Transportation Plan	No	
BUILDING CODES, PERMITTING, INSPECTIONS	Yes/No	What type of codes? Are codes adequately enforced?
Building Codes	Yes	Pinal County handles our building codes
Site plan review requirements	No	
LAND USE PLANNING & ORDINANCES	Yes/No	Is the ordinance effective for reducing hazard impacts? Is the ordinance adequately administered and enforced?
Floodplain ordinance	Yes/2007	
Subdivision ordinance	Yes/2006	
Zoning ordinance		
ADMINISTRATIVE and TECHNICAL		
ADMINISTRATION	Yes/No	Describe capability. Is coordination effective?
Mutual aid agreements	Yes	
Planning Commission	No	
TECHNICAL STAFF	Yes/No FT/PT	Is staff trained on hazards and mitigation? Is coordination between agencies and staff effective? Have skills/expertise been used to assess/mitigate risk in the past?
Building Official	No	
Community Planner	No	
Emergency Manager	Yes	
Engineer	Yes	
Floodplain Manager/Administrator	Yes	

GIS/HAZUS Coordinator	Yes	
Grant writer	Yes	
FINANCIAL		
FINANCIAL	Yes/No	Has the funding resource been used in past and for what type of activities? Could the resource be used to fund future mitigation actions?
Capital improvements project funding	No	
Community Development Block Grant	Yes	
Authority to levy taxes for specific purposes	Yes	
Impact fees for new development	Yes	
Incur debt through special tax bond	Yes	
Incur debt through general obligation bonds	Yes	
EDUCATION and OUTREACH		
PROGRAM / ORGANIZATION	Access / Eligibility (Yes/No)	Describe program/organization and how it relates to disaster resilience and mitigation. Could the program/organization help implement future mitigation activities?
Firewise Communities certification	No	
StormReady certification	No	
Citizen groups focused on emergency preparedness, environmental protection, etc.	No	
Public education/information programs (fire safety, household preparedness, responsible water use, etc)	Yes/Fire No	
Public-private partnership initiatives addressing disaster-related issues	Yes	

Table 5-8: Capability Assessment for Mammoth		
Regulatory Tools for Hazard Mitigation	Description	Responsible Department/Agency
CODES	- Town has IGA with Pinal Co for Building, Masonry, Concrete, Electrical, and Plumbing Code enforcement and compliance. - Electrical inspection and coded compliance provided by BIA/San Carlos Irrigation Project - Mammoth Land Use and Development Codes 2003	- Public Works - Planning & Zoning - Pinal Co Development Services
ORDINANCES	- Pinal Co Floodplain Management Ordinance 2006 - Zoning Ordinance per General Plan	- Public Works - Pinal Co Flood Control District
PLANS, MANUALS, and/or GUIDELINES	- Mammoth General Plan (1999) - Mammoth Emergency Response and Recovery Plan (2007) - Pinal Co Community Wildfire Protection Plan, 2005 - Pinal Co Drainage Manual, 2004	- Planning & Zoning - Police Dept - Fire Dept - Pinal Co
STUDIES	- Tucson Wash Gaging Study, 2006 - FEMA DFIRM Maps	- Public Works - Pinal Co Flood Control District

Technical Staff and Personnel Capabilities for Mammoth		
Staff/Personnel Resources	☒	Department/Agency - Position
Planner(s) or engineer(s) with knowledge of land development and land management practices	☐	Defer to Pinal County
Engineer(s) or professional(s) trained in construction practices related to buildings and/or infrastructure	☐	Defer to Pinal County
Planner(s) or engineer(s) with and understanding of natural and/or human-caused hazards	☐	Defer to Pinal County
Floodplain Manager	☐	Provided by Pinal County Flood Control District
Surveyors	☐	
Staff with education or expertise to assess the community's vulnerability to hazards	☐	Defer to Pinal County
Personnel skilled in GIS and/or HAZUS	☐	Defer to Pinal County
Scientists familiar with the hazards of the community	☐	
Emergency Manager	☒	Police Department – Police Chief (currently unfilled)
Grant writer(s)	☒	Administration – Town Clerk

Fiscal Capabilities for Mammoth		
Financial Resources	Accessible or Eligible to Use (Yes, No, Don't Know)	Comments
Community Development Block Grants	Yes	
Capital Improvements Project funding	No	
Authority to levy taxes for specific purposes	Yes	Subject to Council approval
Fees for water, sewer, gas, or electric service	Yes	Water, sewer, sanitation, cemetery
Impact fees for homebuyers or new developments/homes	Yes	
Incur debt through general obligation bonds	Yes	Subject to Council approval
Incur debt through special tax bonds	Yes	Subject to Council approval

Table 5-9: Capability Assessment for Maricopa		
PLANNING and REGULATORY		
PLANS	Yes/No Year	Does the plan address hazards? Does the plan ID projects to include in the mitigation strategy? Can the plan be used to implement mitigation actions?
Capital Improvements Plan	CIP 2015-2020	Yes, yes, and yes
Community Wildfire Protection Plan	-	
Comprehensive/Master Plan	General Plan Update 2030	In Progress, will include and address all of the above
Continuity of Operations Plan		
Economic Development Plan		
Emergency Operations Plan		
Floodplain Management Plan		
Stormwater Management Plan		
Transportation Plan	ATP 2015 Update	In Progress will address floodplain and drainage issues
BUILDING CODES, PERMITTING, INSPECTIONS	Yes/No	What type of codes? Are codes adequately enforced?
Building Codes	IBC 2012	Building Codes; yes
Site plan review requirements	Zoning Code, Section 505	Zoning Code; yes
LAND USE PLANNING & ORDINANCES		Is the ordinance effective for reducing hazard impacts? Is the ordinance adequately administered and enforced?
Floodplain ordinance	Ordinance 14-01	Yes, Yes
Subdivision ordinance	2006	Yes, Yes
Zoning ordinance	Adopted Nov. 5, 2014	Yes, Yes
ADMINISTRATIVE and TECHNICAL		
ADMINISTRATION	Yes/No	Describe capability. Is coordination effective?
Mutual aid agreements	Yes	
Planning Commission	Yes	Yes, Yes
TECHNICAL STAFF	Yes/No FT/PT	Is staff trained on hazards and mitigation? Is coordination between agencies and staff effective? Have skills/expertise been used to assess/mitigate risk in the past?

Building Official		
Community Planner	FT	Yes, Yes
Emergency Manager		
Engineer		
Floodplain Manager/Administrator	FT	Yes, No
GIS/HAZUS Coordinator		
Grant writer	FT	Yes, Yes
FINANCIAL		
FINANCIAL	Yes/No	Has the funding resource been used in past and for what type of activities? Could the resource be used to fund future mitigation actions?
Capital improvements project funding	Yes	General capital improvement projects.
Community Development Block Grant	Yes	Received several grants for infrastructure, safety and mitigation
Authority to levy taxes for specific purposes	Yes	Public Safety – Primary Property Tax; Debt – Secondary Property Tax
Impact fees for new development	Yes	Public Safety, Parks, and Streets
Incur debt through special tax bond	No	
Incur debt through general obligation bonds	Yes	Construction of multigenerational recreation center and regional park.
EDUCATION and OUTREACH		
PROGRAM / ORGANIZATION	Access / Eligibility (Yes/No)	Describe program/organization and how it relates to disaster resilience and mitigation. Could the program/organization help implement future mitigation activities?
Firewise Communities certification	No	
StormReady certification	No	
Citizen groups focused on emergency preparedness, environmental protection, etc.	Yes	Community Emergency Response Team (CERT) – dedicated to emergency preparedness through community involvement and education – Yes
Public education/information programs (fire safety, household preparedness, responsible water use, etc)	Yes	
Public-private partnership initiatives addressing disaster-related issues		

Table 5-10: Capability Assessment for Superior		
PLANNING and REGULATORY		
PLANS	Yes/No Year	Does the plan address hazards? Does the plan ID projects to include in the mitigation strategy? Can the plan be used to implement mitigation actions?
Capital Improvements Plan	No	No, but it could in the future.
Community Wildfire Protection Plan	No	
Comprehensive/Master Plan	No	
Continuity of Operations Plan	No	
Economic Development Plan	No	It is currently being updated.
Emergency Operations Plan	Yes/2010	Yes
Floodplain Management Plan	Yes/2010	Ordinance by County
Stormwater Management Plan	No	
Transportation Plan	No	
BUILDING CODES, PERMITTING, INSPECTIONS	Yes/No	What type of codes? Are codes adequately enforced?
Building Codes	Yes	Pinal County does this and No
Site plan review requirements	Yes	Town reviews zoning codes and Yes
LAND USE PLANNING & ORDINANCES	Yes/No	Is the ordinance effective for reducing hazard impacts? Is the ordinance adequately administered and enforced?
Floodplain ordinance	Yes	By Superior and Pinal County Flood Control district, No
Subdivision ordinance	Yes	Pinal County does this, No
Zoning ordinance	Yes	It's under review, No
How can capabilities be expanded and improved to reduce risk? The Pinal Co Enforcement Section could teach the town how to better enforce and regulate the existing ordinances. The County could instruct our Magistrate on appropriate adjudication of said ordinances once cited into court.		
ADMINISTRATIVE and TECHNICAL		
ADMINISTRATION	Yes/No	Describe capability. Is coordination effective?
Mutual aid agreements	Yes	With Pinal County and yes
Planning Commission	No	
TECHNICAL STAFF	Yes/No FT/PT	Is staff trained on hazards and mitigation? Is coordination between agencies and staff effective? Have skills/expertise been used to assess/mitigate risk in the past?
Building Official	No	
Community Planner	No	
Emergency Manager	No	The County Assists
Engineer	No	

Floodplain Manager/Administrator	No	The County Assists
GIS/HAZUS Coordinator	No	
Grant writer	Yes	Not Trained, Coordination with County is Effective
How can capabilities be expanded and improved to reduce risk? The town cannot expand its capabilities at this time.		
FINANCIAL		
FINANCIAL	Yes/No	Has the funding resource been used in past and for what type of activities? Could the resource be used to fund future mitigation actions?
Capital improvements project funding	No	
Community Development Block Grant	Yes	It's always used for needed repairs for town infrastructure
Authority to levy taxes for specific purposes	No	
Impact fees for new development	No	
Incur debt through special tax bond	No	
Incur debt through general obligation bonds	No	
How can capabilities be expanded and improved to reduce risk? Nothing to expand at this time.		
EDUCATION and OUTREACH		
PROGRAM / ORGANIZATION	Access / Eligibility (Yes/No)	Describe program/organization and how it relates to disaster resilience and mitigation. Could the program/organization help implement future mitigation activities?
Firewise Communities certification	No	
Storm Ready certification	No	
Citizen groups focused on emergency preparedness, environmental protection, etc.	No	
Public education/information programs (fire safety, household preparedness, responsible water use, etc)	Yes	We send information out to all households; police/fire does school presentations. Yes we can assist with future implementation.
Public-private partnership initiatives addressing disaster-related issues	No	
How can capabilities be expanded and improved to reduce risk? Police/Fire can bring in outside resources to educate the public on the dangers surrounding our town.		

5.4 Mitigation Actions and Projects

Mitigation actions/projects (A/Ps) are identified activities that when implemented, will have the effect of reducing the community's exposure and risk to the particular hazard or hazards being mitigated.

The process for defining the list of mitigation A/Ps for the Plan was accomplished by performing an assessment of the actions and projects specified in the 2010 Plan. A new list of A/Ps for the Plan was developed by combining the carry forward results from the assessment with new A/Ps. Details of the process and the results are summarized in the following sections.

Previous Mitigation Actions/Projects Assessment

The A/Ps from the 2010 Plan were reviewed and assessed by their respective jurisdiction. A/Ps with a disposition classification of "Keep" or "Revise" were carried forward to become part of the A/P list for this Plan update. All A/Ps identified for deletion were removed and are not included in this Plan. The results of the assessment of the 2010 Plan's actions and projects can be found in this Plan's Appendix.

Current Mitigation Actions / Projects

Each jurisdiction developed/identified new A/Ps using the goals and objectives, results of the vulnerability analysis and capability assessment, and the planning team's institutional knowledge of hazard mitigation needs in the community. For each A/P, the following elements were identified:

- **Description** – a brief description of the A/P and project name if appropriate.
- **Hazard(s) Mitigated** – a list of the hazard or hazards mitigated.
- **Estimated Cost** – cost estimate that may be a dollar amount or estimated as staff time.
- **Anticipated Completion Date** – an estimation of completion expressed in month/year or year format.
- **Primary Agency** – the agency, department, office, or other entity responsible for implementation.
- **Potential Funding Source(s)** – the potential source or sources of anticipated funding.

Priority Ranking – each A/P was assigned a priority ranking of either "High", "Medium", or "Low". The assignments were subjectively made using a simple process that assessed how well the A/P satisfied the following considerations:

- A favorable benefit versus cost evaluation, wherein the perceived direct and indirect benefits outweighed the project cost.
- A direct beneficial impact on the ability to protect life and/or property from natural hazards.
- A mitigation solution with a long-term effectiveness

Table 5-11: Mitigation Strategy for Pinal County

Priority Ranking	Description	Hazard(s) Mitigated	Estimated Cost & Completion	Project Lead	Potential Funding Source(s)	Status	Explanation or brief description of work so far or reason for 'no progress'
M	Develop IGAs with County dependent communities to define and clarify roles in implementing the NFIP program and managing the floodplains	Flood	\$15,000+ Staff Time Jan 2018	Pinal Co Flood Control District / Section Chief	Flood Control District Levy	In Progress	IGA with Eloy complete. Still working with other communities.
H	Develop Wildfire Mitigation and Prevention program to include community awareness.	Wildfires	\$30,000+ Staff Time 2017	Pinal Co Office of Emergency Mgt	Grant Funding	In progress	Oracle Fire is only FireWise community, so revise project to get other jurisdictions on board.
M	Conduct quarterly flood control Meetings with all districts, Indian Tribes, and Cities	Flood	Staff Time Ongoing	Pinal Co Flood Control District	Flood Control District	In Progress	Quarterly meetings are held with stakeholders.
M	Fissure monitoring for state-wide mapping by AZGS and promote fissure awareness with the public	Subsidence, Fissure	\$10,000/ yr + Staff Time Ongoing	Pinal Co Office of Emergency Mgt	OEM Grant Funding	In Progress	IGA with ADWR and the Pinal County FCD pays for InSAR coverage.
M	All Weather Access analysis. Review County transportation network and determine areas in need of stream crossing upgrades to improve public access.	Flood	\$20,000+Staff Time June 2020	Pinal Co Transportation Planner	Flood Control District Levy/ HURF	In Progress	No separate analysis – there is some data in the ADMP's about access issues.
M	Superior Flood Prone Property Plan. Develop a plan to address homes currently located in FEMA floodway. Plan to address feasibility of mitigation projects and potential property buy-outs.	Flood	\$2M+ Staff Time June 2020	Pinal Co Flood Control District	Flood Control District Levy	No Progress	PCFCD is working on a survey and possible flood mitigation project at this time. It may include land acquisition, but we want the Town to buy into the concept.
H	Queen Valley Flood Mitigation Plan. Multi-phase project to address flooding in the community. Planned elements include construction of new culverts, improved channel segments, and removal of floodplain encroachments.	Flood	\$1.5M + Staff Time Dec 2017	Pinal Co Flood Control District	Flood Control District Levy	Complete	Plan is complete. There is more in the plan we could implement.
M	Santa Cruz River Watercourse Master Plan. Develop a reconnaissance study to determine possible flood mitigation alternatives.	Flood	\$1.5M+ Staff Time June 2018	USACE/Pinal Co Flood Control District	Federal Funding	In Progress	Cost share for PCFCD is \$1.5 million for 3 years.

Table 5-11: Mitigation Strategy for Pinal County

Priority Ranking	Description	Hazard(s) Mitigated	Estimated Cost & Completion	Project Lead	Potential Funding Source(s)	Status	Explanation or brief description of work so far or reason for 'no progress'
M	Emergency Shelters/Redundant Power. Develop Shelter Operations Plan along with appropriate contracts & agreements. Plan for ensuring shelter sites have permanent or access to back-up power.	Severe Wind	\$30,000	Pinal Co Office of Emergency Mgt	General Fund	In Progress	Finalize shelter plan; get schools to sign AZMAC; retrofit schools for generator power.
M	ALERT Gauges. Includes the maintenance of the existing ALERT system as well as yearly software and hardware upgrades.	Flood	\$200,000+ Staff Time Ongoing	Pinal Co Flood Control District	Flood Control District Levy	In Progress	Yearly we spend between \$150,000 and \$200,000 on ALERT.
H	Provide all-weather and emergency access on Sunland Gin Road at the Greene Canal. Improvements to increase conveyance will consist of culverts, grading, and erosion protection.	Flood	\$1.6M + Staff Time April 2020	Pinal Co Flood Control District	FEMA PDM Grant	In Progress	Notice of Intent submitted to AZDEMA.
M	Develop educational materials to disseminate, and coordinate public effort to mitigate damage and losses due to drought.	Drought	Staff Time Ongoing	Pinal Co Office of Emergency Mgt	AZDWR and USDA	In Progress	Have created flyers and other educational material to disseminate. Will use social media to increase reach.
H	Continue the enforcement of zoning and building codes to reduce the effects of drought, flood, severe wind, and other hazards on new buildings and infrastructure.	Drought, Flood, Severe Wind	Staff Time Ongoing	Pinal Co Building Safety	General Fund	In Progress	Enforcement is conducted on an ongoing basis.
M	Research landscaping alternatives for use in reducing wind velocity in high risk areas of the county (e.g. tree lines)	Severe Wind	Staff Time Dec 2018	Pinal Co Public Works	General Fund	No Progress	New project, currently in the initial planning stages.

Table 5-12: Mitigation Strategy for Apache Junction

Priority Ranking	Description	Hazard(s) Mitigated	Estimated Cost & Completion	Project Lead	Potential Funding Source(s)	Status	Explanation or brief description of work so far or reason for 'no progress'
H	Perform public outreach and education regarding the negative impacts of improper development within the floodplain and especially the floodway.	Flood	\$10,000 (Staff Time) On-going	AJPW, DSD	Local	In Progress	Has been communicated at several Neighborhood Meetings. Fliers distributed in public areas throughout many city departments.
H	Build a box culvert and related roadway improvements on 16th Avenue across Palm wash to mitigate flooding of the street and surrounding properties.	Flood	\$750K 2020	AJPW	MAG or PCFCD	No Progress	No progress due to no funding yet.
H	Drainage channel improvement and box culvert retrofit for Weekes Wash crossing at Tomahawk Road to reduce flooding and improve sediment transport capacity.	Flood	\$250K 2020	AJPW	Local & PCFCD	In Progress	Design completed; no funding yet.
H	Emergency backup power for Well #6 and Booster #2 for mitigation of downtime due to severe wind related power failures.	Severe Wind	\$60,000 2020	AJWD	FIWA & AJWD	In Progress	Estimated completion 2017.
M	Research reclaimed water use strategies and develop implementation guidelines for future developments.	Drought	\$10,000 (Staff Time) 2018	AJWD/DSD	Local	In Progress	Strategies and research currently taking place.
M	Implement Stormwater Master Plan Project No. 4 to design and construct a storm drain in Superstition Blvd from Meridian Dr. to Gold Dr. and a detention basin at Valley Dr. and Superstition Blvd.	Flood	\$3.6M 2017	AJPW	None	In Progress	Several small segments completed. Awaiting further funding.
M	Implement Stormwater Master Plan Project No. 4a to design and construct the Delaware Dr. and Pinal St. storm drains and a detention basin at Valley Dr. and Superstition Blvd.	Flood	\$2.7M 2020	AJPW	CDBG	In Progress	Currently in design. Planned construction in 2018/19.
L	Implement Stormwater Master Plan Project No. 11 to design and construct a culvert on Palm Wash at the Junction Dr. crossing.	Flood	\$93K 2019	AJPW	None	No Progress	No progress due to no funding yet.

Table 5-12: Mitigation Strategy for Apache Junction

Priority Ranking	Description	Hazard(s) Mitigated	Estimated Cost & Completion	Project Lead	Potential Funding Source(s)	Status	Explanation or brief description of work so far or reason for 'no progress'
M	Design and construct a detention and sedimentation basin on Weekes Wash north of Lost Dutchman Blvd. to reduce the downstream impact of sedimentation and attenuate peak discharges.	Flood	\$9M 2020	AJPW	CAC	No progress	No progress due to no funding yet.
M	Update 2002 Stormwater Master Plan.	Flood	\$100K 2017	AJPW	None	No Progress	No progress due to no funding yet.
H	Inventory of stormwater outfalls and public drainage easements citywide.	Flood	\$20,000 (Staff Time) 2016	AJPW	HURF	In Progress	Outfalls mapped in 2016.
H	Update Emergency Response and Recovery Plan	All	\$20,000 (Staff Time) 2016	AJPW, AJPD, SFMD	Various	In Progress	In progress.
M	Emergency back-up power supply for select city buildings and water facilities.	Severe Wind	\$400K 2018	AJPW, AJPD, AJWD	General Fund	In Progress	Most critical facilities complete.

Table 5-13: Mitigation Strategy for Casa Grande

Priority Ranking	Description	Hazard(s) Mitigated	Estimated Cost & Completion	Project Lead	Potential Funding Source(s)	Status	Explanation or brief description of work so far or reason for 'no progress'
M	Create Storm water Management program to identify, design and implement drainage and flood control related projects within the City.	Flood	\$500,000 plus Staff Time FY 2018	Public Works	General Fund/ Storm water Utility	In Progress	Requires new regulations and funding.
L	Acquire the Floodplain Certificates on all existing structures in the SFHA that have not been documented yet.	Flood	No cost to Municipality Jan 2019	Planning & Development Dept	General Fund	In Progress	Requires a building permit & elevation certificate for structures in the floodplain.
M	Have new developers dedicate portions of the Santa Cruz Wash for open space.	Flood	\$15,000 FY 2020	Planning & Development Dept/Community Services Dept	General Fund/ Developer Donation	In Progress	Lack of Development
M	Develop a master plan to create and utilize open space along the Santa Cruz Wash. By preserving the channel as open space, we can reduce exposure from flooding.	Flood	\$150,000 2020	Parks & Recreation Dept	Development impact fees	Complete	City Council adopted the Trails Master Plan in 2008. Development of the trail system is coordinated with adjacent residential and commercial construction and improvements to major arterial street crossings at Kortsen, Montgomery, Bianco and Selma Roads along with State Hwy 287.
H	Continue to enforce zoning and building codes through current site plan, subdivision, and building permit review processes to reduce the effects of drought, flood, thunderstorm/high wind, and other hazards on new buildings and infrastructure.	Flood, Severe Wind, Drought	On-going	Planning & Development Dept	General Fund	In Progress	Ongoing commitment
L	Establish and sign a truck route for hazardous materials to avoid residential areas.	HazMat	\$150,000 Ongoing	Public Works/Engineering Division	General Fund/ HURF	No Progress	Requires additional infrastructure

Table 5-13: Mitigation Strategy for Casa Grande

Priority Ranking	Description	Hazard(s) Mitigated	Estimated Cost & Completion	Project Lead	Potential Funding Source(s)	Status	Explanation or brief description of work so far or reason for 'no progress'
M	Develop a Database of HAZMAT locations of businesses.	HazMat	\$30,000 2017	Fire Dept	General Fund	In Progress	Ongoing- we wish to create a Tier II listing of City Businesses
H	Maintain the Santa Cruz area, to allow the drainage way to function more efficiently and thereby reduce exposure from flooding.	Flood	\$100,000 As needed basis	Public Works	General Fund/ HURF	In Progress	Ongoing after major rainstorms
M	Enforce City Code regarding the drainage of basins within 36 hours	Flood	\$60,000 FY 2017	Public Works/ Engineering Division	General Fund/HURF/St orm water Utility	In Progress	Unknown property owners of drainage basins

Note: Mitigation measures from the 2010 plan are still relevant, and align with the greatest needs, in regards to reducing risk in the community. These measures need to be completed before additional actions/projects are added.

Table 5-14: Mitigation Strategy for Coolidge

Priority Ranking	Description	Hazard(s) Mitigated	Estimated Cost & Completion	Project Lead	Potential Funding Source(s)	Status	Explanation or brief description of work so far or reason for 'no progress'
M	Low Water-Use Fixture Requirements - Continue to require the use and installation of low water-use fixtures in new residential and commercial developments	Drought	Staff Time On-going	Growth Management/ Building Safety	General Fund	In Progress	Slow but continuous growth, modify as technology improves
L	Xeriscape Landscaping Recommendations - Continue to encourage the use of low water-use plants and xeriscape	Drought	Staff Time On-going	Growth Management/ Building Safety	General Fund	In Progress	Ongoing, modify as technology improves
M	Thunderstorm Public Education Campaign - Conduct a public awareness campaign to educate citizens about the hazards of high winds associated with thunderstorms	Severe Wind	\$5,000 Annual	Growth Management, Building Safety, Fire, State of AZ	Grants, General Fund, Donations	In Progress	Need additional material and training supplies to enhance
M	Thunderstorm Damage Reduction - Continue to require tie downs/anchors for new manufactured homes, accessory buildings, carport awnings, and perimeter fences to mitigate damages due to high winds/microbursts.	Severe Wind	\$5,000 On-going	Growth Management, Building Safety, Fire, State of AZ	Grants, General Fund, Donations	In Progress	Ongoing, modify as technology improves
M	Hazard Mitigation Awareness - Develop public service announcements for media releases to educate citizens about drought, flooding, thunderstorms/high winds, and other natural hazards	All Hazards	Staff Time On-going, at least annually	State of AZ, Pinal Co, Administration	Grants, General Fund, Donations	In Progress	Need additional material and training supplies to enhance
M	Update/Revise Dam Failure Inundation Mapping - Contact and coordinate with the Arizona Department of Water Resources, the San Carlos Irrigation Project, and the San Carlos Apache Tribe to obtain updated inundation mapping for Coolidge Dam	Dam Failure	Staff Time As available	ADWR, SCIP, Pinal Co Flood Control	Individual Agencies	In Progress	Ongoing, modify as technology improves
L	HAZMAT Route Establishment - Investigate and develop a plan that defines allowable HAZMAT corridors and prepare and adopt municipal codes for the signage and enforcement of the defined routes	HAZMAT	\$10,000 Jan 2018	Police & Fire	General Fund, Grants, Donations	In Progress	Recent annexation, road studies, development and general plan will change routes
M	Flood Control Structures Maintenance - Perform regular maintenance on existing City owned storm drains, drainage ditches, and retention/detention basins	Flood	\$30,000 On-going	Public Works, Parks	General Fund , Enterprise Funds	In Progress	Ongoing with new development

Table 5-14: Mitigation Strategy for Coolidge

Priority Ranking	Description	Hazard(s) Mitigated	Estimated Cost & Completion	Project Lead	Potential Funding Source(s)	Status	Explanation or brief description of work so far or reason for 'no progress'
H	Enforcement of Zoning and Building Code Ordinances - Continue to enforce zoning and building codes through current site plan, subdivision, and building permit review processes to reduce the effects of drought, flood, thunderstorm/high wind, and other hazards on new buildings and infrastructure	All Hazards	\$20,000 Staff Time On-going	Growth Management, Building Safety, Planning	General Fund, Permit Fees, Development Fees	In Progress	Ongoing with new development
H	Mutual Aid/IGA's - Develop agreements with adjoining cities, tribes and Pinal County for mitigation of hazards	All Hazards	Staff Time On-going	Administration, Police, Fire	General Fund	Complete	Need to maintain and update with growth
Note: Mitigation measures from the 2010 plan are still relevant, and align with the greatest needs, in regards to reducing risk in the community. These measures must be completed, or continued on an on-going basis moving forward.							

Table 5-15: Mitigation Strategy for Eloy

Priority Ranking	Description	Hazard(s) Mitigated	Estimated Cost & Completion	Project Lead	Potential Funding Source(s)	Status	Explanation or brief description of work so far or reason for 'no progress'
H	McClellan Wash Watercourse Master Plan (in progress) for the purposes of identifying drainage improvement alternatives, cost sharing options rules of development, and cumulative effects of existing and future development and encroachment into floodplain areas within study area.	Flood	Reimburse developer by area property owners. Under review	City Engineer, Pinal Co Flood Control and Study Consultants.	Property owners within study area and development	In Progress	Study is currently being conducted.
M	Maintain IGA with Pinal Co Flood Control District for establishing procedural guidelines for the implementation and enforcement of the NFIP floodplain management.	Flood	Time devoted by staff. On-going	Pinal Co Flood Control District/Eloy City Manager, Engineer, Building Official	General Fund	In Progress	IGA completed. Will maintain IGA, and continue to work with Pinal Co Flood Control.
H	Continue the enforcement of zoning and building codes to reduce the effects of fissures, flooding, severe wind, and other hazards on new buildings and infrastructure.	Fissure, Flood, Severe Wind	Time devoted by staff. On-going	Chief Building Official	General Fund	In Progress	Enforcement is conducted on an ongoing basis.
H	Eloy Industrial Park Floodplain Delineation Study. Identify and accurately map flooding hazards within the industrial corridor within the Town of Eloy.	Flood	\$500,000 FY 2020	Pinal Co Flood Control District	Pinal Co Flood Control District	In Progress	Project is currently in for review with FEMA. FEMA has initiated a Physical Map revision process which is slated to take at least three years to complete.
H	Eloy Industrial Park Drainage Mitigation Project to reduce the adverse effects of localized flooding on several properties within the industrial corridor.	Flood	\$350,000 FY 2019	Town of Eloy / Pinal Co Flood Control District	Pinal Co Flood Control District / Eloy General Fund	In Progress	Design is complete and construction is planned to begin in late 2017.
M	Implementation of Multi-Jurisdictional Hazard Mitigation Plan for City of Eloy.	Fissure, Flood, Severe Wind,	Time devoted by staff. On-going	City Manager, Engineer, Building Official	General Fund	In Progress	Implement 2016 plan into future planning activities.

Table 5-16: Mitigation Strategy for Florence

Priority Ranking	Description	Hazard(s) Mitigated	Estimated Cost & Completion	Project Lead	Potential Funding Source(s)	Status	Explanation or brief description of work so far or reason for 'no progress'
M	Update building code to IBC 2007 or better to ensure adequate design of new or remodeled facilities	Flood, Severe Wind, Drought,	\$5,000 plus Staff Time 2017	Development Services / Building Official	General Fund	In Progress	Update to 2012 codes
H	Develop IGAs with county dependent communities to define and clarify roles in implementing the NFIP program and managing the floodplains	Flood	Staff Time 2017	Pinal Co Flood Control District / Section Chief	Flood Control District Levy	In Progress	Unknown
H	Community Awareness: Design and implement a comprehensive, concerted campaign for community awareness and education regarding hazards impacting the Town of Florence	All	Staff Time Jan 2018	Administration/ Town Clerk	General Fund	In Progress	Town General Plan
M	Volunteer Force: Continue to recruit and train volunteers to provide support in safeguarding Florence before, during, and after any Man made or Natural Disasters.	All	Staff Time On-going	Police Dept/ Police Chief	General Fund	In Progress	Ongoing annual and monthly training along with recruitment.
M	Fire Inspection: Continue to undertake an aggressive fire inspection program	Wildfire	Staff Time On-going	Fire Dept/ Fire Chief	General Fund	In Progress	On-Going Progress Training, Education, Recognition
H	Stormwater Management: Establish Florence Stormwater Management Program and enhance/interface with Pinal County Stormwater Programs	Flood	Staff Time On-going	Public Works Director	HURF	In Progress	Unknown
M	Heat Exhaustion Plan: Provide prevention and relief to high-risk groups through updates/revisions to the Town of Emergency Operation Plan. Plan would include setting up heat shelters, providing news releases, transportation to shelters, and fans, and monitoring high-risk groups.	Drought	Staff Time	Administration/ Town Clerk	General Fund	In Progress	Public awareness bulletin issued by PIO.
L	Drought Awareness: Initiate a drought awareness program as part of an existing water conservation campaign through existing town code and coordination with the Arizona Governor's Drought Task Force.	Drought	Staff Time On-going	Public Works Director	Water Utility Fund	In Progress	Public awareness bulletin issued by PIO

Table 5-16: Mitigation Strategy for Florence

Priority Ranking	Description	Hazard(s) Mitigated	Estimated Cost & Completion	Project Lead	Potential Funding Source(s)	Status	Explanation or brief description of work so far or reason for 'no progress'
M	Bridge over Gila: Construct an alternate bridge across the Gila River to improve emergency access across the river.	All	\$6.5M On-going	Planning / Public Works Director	Planning / HURF	In Progress	In planning stage and budget planning
H	Floodplain Management: Improve the methods, standards and procedures for floodplain management by implementation of codes, standards, and municipal/regulatory requirements with all review processes of new buildings and critical/non-critical infrastructure.	Flood	Staff Time On-going	Floodplain Administrator: Town Manager / Public Works Director / Planning Director	Planning / HURF	In Progress	Ongoing work
H	Community Development: Formalize hazard mitigation as a factor in community development activities, including business growth planning and long-term regional growth planning.	Flood	Staff Time On-going	Planning Dept Director	General Fund	In Progress	Ongoing work / Certified
L	GIS Upgrade and continued support.	All	Staff Time On-going	Administration IT Director	General Fund Utilities / HURF Fund	In Progress	Ongoing work
M	Flood Warning: Implement flood warning and response tools, and develop operational plans for their use.	Flood	Staff Time On-going	Public Works Director	HURF	In Progress	Use technology for up to date weather information
M	Low Water Crossing Education: Conduct public education on the dangers of low water crossings.	Flood	Staff Time On-going	Public Works Director	HURF	No Progress	Identify areas and notify public with new areas
M	Post Disaster Flood Preparation: Enhance the readiness to carry out post-disaster flood mitigation projects for restoring critical infrastructure to operating standards by establishing pre-disaster on-call services	Flood	Staff Time On-going	NIMS Coordination	Water / Sewer / HURF	In Progress	Ongoing training
M	Utility Flooding: Encourage property owners to install utilities above the base flood elevations through enforcement of existing floodplain ordinances and building codes	Flood	Staff Time On-going	Public Works Director	Water / Sewer Funds	No Progress	Budget issues

Table 5-16: Mitigation Strategy for Florence

Priority Ranking	Description	Hazard(s) Mitigated	Estimated Cost & Completion	Project Lead	Potential Funding Source(s)	Status	Explanation or brief description of work so far or reason for 'no progress'
M	Stormwater CIPs: Implement recommended drainage solutions/alternatives developed through the Florence Stormwater Management Program	Flood	Staff Time On-going	Public Works Director	HURF	In Progress	Ongoing work
M	Wash Protection: Provide increased erosion protection from wash flooding to structural crossings throughout the Town.	Flood	Staff Time On-going	Public Works Director	HURF	In Progress	Ongoing work
M	NFIP Awareness: Increase participation in and awareness of the NFIP homeowner insurance program to all residents on an ongoing basis.	Flood	Staff Time On-going	Floodplain Administrator	General Fund	In Progress	Ongoing work
M	Wash BMPs: Design and implement in-wash erosion stabilization projects through the development review process.	Flood	Staff Time On-going	Public Works Director	HURF	In Progress	Ongoing work
L	Vulnerability Assessment: Complete water vulnerability assessments for water supply and water treatment systems and make improvements to harden security and ensure that appropriate emergency plans are in-place	All	Staff Time On-going	Public Works Director	Water	In Progress	Gates installed with locks
L	Extreme Heat: Initiate an extreme heat public awareness and educational campaign through the distribution of published information.	Drought	Staff Time On-going	Administration	General Fund	In Progress	PIO updates
L	Accident Reporting: Improve accident reporting and engineering investigations of collisions to determine patterns, improve signals, traffic markings, and educational efforts to reduce accidents.	All	Staff Time On-going	Public Works Director	HURF	In Progress	Ongoing work
M	Upgrade Hydrants: Fire hydrant upgrades to include water distribution systems.	Wildfire	\$150,000 2020	Public Works Director	Water Fund	In Progress	Ongoing work with some hydrants updated
M	Water Upgrades: Various water supply and distribution projects in creating a looped system for pressures, fire flow, reduction of main breaks, and replacement of undersize mains.	All	\$850,000 2020	Public Works Director	Water Fund	In Progress	Ongoing work/ New well installed and lines

Table 5-16: Mitigation Strategy for Florence

Priority Ranking	Description	Hazard(s) Mitigated	Estimated Cost & Completion	Project Lead	Potential Funding Source(s)	Status	Explanation or brief description of work so far or reason for 'no progress'
M	Replace Valves: Valve replacement program on water systems.	All	\$190,000 On-going	Public Works Director	Water Fund	In Progress	Ongoing work
M	SH287 and SH79B Roundabout: Construct a roundabout traffic calming hazard mitigation measure at SH 287 and SH79B.	All	\$2M 2019	ADOT / Public Works Director	HURF	In Progress	Design stage
M	Fire Safety: Continue and enhance fire prevention and fire safety awareness educational efforts.	Wildfire	Staff Time On-going	Florence Fire Dept	General Fund	In-Progress	On-Going Progress Training, Education, Recognition
M	Signal at Diversion Dam Road and SH 79: Construct a traffic signal for accident mitigation at the intersection of Diversion Dam Road and SH79.	All	\$1.184 2018	Town Manager / Public Works Director	Private / Inter-governmental / HURF	In Progress	Pre-construction phase
M	Replace bridge and realign roadway on Old Kelvin Highway to mitigate accident potentials due to insufficient bridge rating and unsafe curvature.	All	\$2M 2020	Public Works Director	HURF	In Progress	Planning Stage
Note: Mitigation measures from the 2010 plan are still relevant, and align with the greatest needs, in regards to reducing risk in the community. Before additional actions/projects are added moving forward, these measures need to be adequately addressed.							

Table 5-17: Mitigation Strategy for Kearny

Priority Ranking	Description	Hazard(s) Mitigated	Estimated Cost & Completion	Project Lead	Potential Funding Source(s)	Status	Explanation or brief description of work so far or reason for 'no progress'
M	Water Conservation Plan Review - Water conservation plan is currently under development and at draft stage.	Drought	Staff Time 2017	Town Manager	General Fund, Utilities	No Progress	No progress due to no funding yet.
M	The Emergency Services Coordinator will investigate repair, replacement or removal of non-functional flood warning siren and funding for same.	Flood, Severe Wind	\$0- \$50,000 June 2020	Town Manager, Police Chief	General Fund, Bond	No Progress	No progress due to no funding yet.
M	Flood Management - Town Manager will include flood management issues in annual review of Kearny's general plan, ordinances, codes, and Community Emergency Response Plan in an effort to reduce the effects of flooding hazards on new buildings and infrastructure.	Flood	Staff Time June 2018	Town Manager	General Fund	In Progress	The General Plan will be updated.
M	Zoning and Building Code - Continue enforcement of zoning ordinances and building codes through the Town's zoning clearance/site plan review process and IGA with Pinal County for building permits to reduce the effects of flooding hazards on new buildings and infrastructure	Flood	Staff Time On-going	Town Manager	General Fund	In Progress	Project is 50% complete and going as anticipated.
L	Dispatch Review - Police Chief will review existing policies and procedures in the police dispatch area with respect to community power/phone outages on an annual basis	Flood, Severe Wind	\$50,000 On-going	Police Chief	Grants, Bonds	In Progress	This is reviewed on an annual basis.
L	Evaluation - A survey of a random sampling of households and businesses will be conducted to evaluate the effectiveness of the education program and recommended mitigation measures.	Flood, Severe Wind, Drought	Staff Time On-going	Town Manager	General Fund	No Progress	No progress due to no funding yet.
H	Design and build storm drainage system on Tilbury Drive.	Flood	\$450,000 2020	Town Manager	Bonds	No Progress	No progress due to no funding yet.

Table 5-17: Mitigation Strategy for Kearny

Priority Ranking	Description	Hazard(s) Mitigated	Estimated Cost & Completion	Project Lead	Potential Funding Source(s)	Status	Explanation or brief description of work so far or reason for 'no progress'
H	Perform tree/brush thinning on Gila River.	Wildfire	\$50,000 On-going	Fire Chief	Grants	No Progress	No progress due to no funding yet.
Note: Mitigation measures from the 2010 plan are still relevant, and align with the greatest needs, in regards to reducing risk in the community. There is a strong desire to complete and/or continue these measures on an on-going basis moving forward, before other measures are added.							

Table 5-18: Mitigation Strategy for Mammoth

Priority Ranking	Description	Hazard(s) Mitigated	Estimated Cost & Completion	Project Lead	Potential Funding Source(s)	Status	Explanation or brief description of work so far or reason for 'no progress'
M	Coordinate with ADOT to remove vegetation and improve the conveyance capacity for the roadside drainage channel on the west side of SR77 between ADOT milepost 15 and 16 (between Tucson Wash and San Pedro River)	Flood, Wildfire	Staff Time Dec 2017	Public Works / Director	Wastewater Treatment Plant Enterprise	No Progress	Right-of-way coordination.
M	Maintain current IGA with Pinal County Flood Control District for coordination of floodplain management duties per the NFIP program.	Flood	Staff Time Ongoing	Public Works / Director	General Fund	Complete	Vital to continue partnership, and maintain IGA.
H	Construct curbs to direct street runoff in Main Street from SR 77 to approximately one mile north to reduce flooding of adjacent properties.	Flood	\$80,000 Dec 2018	Public Works / Director	HURF, CDBG	In Progress	Partial completion. Additional funding needed.
M	Buy and install backup generators for government buildings and critical facilities in order to mitigate against power failures during hazard events.	All	\$135,000 Dec 2019	Town Manager	CDBG, HSGP	No Progress	No progress, new project.
M	Promote all-hazards awareness by distributing and publishing educational materials concerning the hazards in Mammoth and their associated risks.	All	Staff Time On-Going	Administration	General Fund	In Progress	Continues on a yearly basis.

Table 5-19: Mitigation Strategy for Maricopa

Priority Ranking	Description	Hazard(s) Mitigated	Estimated Cost & Completion	Project Lead	Potential Funding Source(s)	Status	Explanation or brief description of work so far or reason for 'no progress'
H	Design and construct culvert, bridges, drainage improvements (retention/detention basins) near the Santa Cruz Wash and Santa Rosa Wash and for areas with potential threat from flooding to improve capacity and prevent flooding of adjacent residential and commercial areas.	Flood	\$ 5-6M On-going	Engineering Dept	Development Impact Fee (DIF)	In Progress	USACE study in progress.
H	Design and construct Santa Cruz Wash Channelization (realignment) per the Regional Flood Control Solution	Flood	\$20M On-going	City of Maricopa/ private	General Fund, Private/ Public Partnership	In Progress	Pre-design stage, waiting on USACE study.
M	Design and Construct channel and culvert crossing improvements along the Casa Blanca Canal from Hartman Road to the Santa Cruz Wash.	Flood	\$500,000 On-going	City of Maricopa / Pinal Co Flood Control District	Pinal Co. Flood District, City of Maricopa General Fund, Private	No Progress	The design is on hold until the regional solution (Santa Cruz Wash) is constructed. This channel will terminate at the location of the future regional solution.
M	Conduct floodplain analysis for Heritage District North of the Union Pacific Railroad and West of Roosevelt Road. The goal would be to accurately map flooding risks in order to understand impacts to the City's Fire Station and nearby Public Works Facility. The results of the study would be used to support future flood mitigation efforts.	Flood	\$150,000 FY 2018	City of Maricopa	City of Maricopa General Fund	In Progress	City staff is working on getting this project started.
H	Porter Road / Santa Rosa Wash all weather crossing design and construction. The roadway crossing at Porter Road / Santa Rosa Wash has been identified as a critical access point for emergency services.	Flood	\$1.5M FY 2020	City of Maricopa	City of Maricopa General Fund	No Progress	The City is currently looking for funding opportunities.
M	Coordinate efforts with Pinal Co in implementing the NFIP program and managing the floodplain through projects such as CLOMR/LOMR; elevation certificates; adoption of a master drainage study; certification of levees, and project review and approval for construction within the floodplains	Flood	Staff time On-going	Pinal Co Flood Control District / City of Maricopa Floodplain Administrator	Pinal Co Flood District, City of Maricopa General Fund	In Progress	Coordination with PCFCD will continue.

Table 5-19: Mitigation Strategy for Maricopa

Priority Ranking	Description	Hazard(s) Mitigated	Estimated Cost & Completion	Project Lead	Potential Funding Source(s)	Status	Explanation or brief description of work so far or reason for 'no progress'
M	Continue the enforcement of zoning and building codes to reduce the effects of flooding, severe wind, and other hazards on new buildings and infrastructure.	Flood Severe Wind	Time devoted by staff. On-going	City of Maricopa Development Services	General Fund	In Progress	Enforcement of zoning and building codes will continue on an ongoing basis.
L	Prepare and sign an IGA between City of Maricopa and Arizona Department of Transportation (ADOT) for bridge inspection and maintenance	Flood Severe Wind	Staff time On-going	Engineering Dept Transportation Dept	City of Maricopa, ADOT	In Progress	Coordination with ADOT will continue.

Table 5-20: Mitigation Strategy for Superior

Priority Ranking	Description	Hazard(s) Mitigated	Estimated Cost & Completion	Project Lead	Potential Funding Source(s)	Status	Explanation or brief description of work so far or reason for 'no progress'
M	Update Fire Department 5-year plan	Fire & HazMat	\$5,000 Staff Time On-Going	Fire Dept	General Fund	In progress	Revised every year
M	Abatement of Vacant or Abandoned Buildings	Fire, Crime & Public Nuisance	\$1.2M FY 2018	Public Safety Dept & Building Safety Dept	CDBG	No progress	CDBG funding 3yrs in future
M	Initiate an all-hazards awareness and educational campaign through the distribution of published information.	All	Staff Time On-Going	Administration	General Fund	In progress	Continues on a yearly basis
H	Reconstruct the low-water crossing on Mary Drive into an all-weather crossing.	Flood	\$500,000 Staff Time FY 2019	Public Works	CDBG, HURF, General Fund	No progress	No funding

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SECTION 6: PLAN MAINTENANCE PROCEDURES

This section defines and documents the processes for maintaining and updating this Plan within the following areas:

- Monitoring, Evaluating and Updating**
- Incorporation into Other Planning Mechanisms**
- Continued Public and Stakeholder Involvement**

Pinal County and the participating jurisdictions recognize that this hazard mitigation plan is intended to be a “living” document with regularly scheduled monitoring, evaluation, and updating.

Although the Plan was reviewed and referred to on several occasions, formal evaluations were not conducted. Reasons for the lack of formal evaluation are basically changes in staff and leadership and a lack of effectively communicating plan maintenance requirements and responsibilities.

The Planning Team discussed ways to make sure the Plan is appropriately maintained going forward, the results of those discussions are in the following sections and plan maintenance strategy.

6.1 Monitoring, Evaluating and Updating

The Planning Team established the following monitoring and evaluation procedures:

- **Schedule** – The Plan shall be reviewed on at least an annual basis or following a major disaster. The Pinal County Office of Emergency Management will take the lead in the evaluation organization and completion. The evaluation target date will be on or around the yearly anniversary date of the Plan’s approval by FEMA.
- The Planning Team will review the Plan and assess the following areas:
 - **Hazard Identification:** Have the risks and hazards changed?
 - **Goal and objectives:** Are the goal and objectives still able to address current and expected conditions?
 - **Mitigation Actions and Projects:** What is the status of the actions/projects?

Documentation of the evaluation will include notes on the results of the meeting as well as information on proposed changes to the Plan for the next update cycle.

The Plan updates will adhere to a set schedule using the following procedure:

- One year prior to the Plan expiration date, the Planning Team will re-convene to review and assess the Plan and the evaluation documentation.
- The Planning Team will update and/or revise the appropriate or affected portions of the Plan and produce an updated plan.
- The updated Plan will be submitted to DEMA and FEMA for review, comment and approval.
- The updated Plan will be presented before the respective councils and boards for an official concurrence/adoption.
- The signed resolutions from all the participating jurisdictions will be submitted to FEMA to prompt official approval.

6.2 Incorporation into Existing Planning Mechanisms

Incorporation of the Plan into other planning mechanisms, either by content or reference, enhances the ability to perform hazard mitigation by expanding the scope of the Plan's influence. The jurisdictions revealed that success of incorporating the 2010 Plan elements over the past planning cycle into other planning programs, have varied. The ways the Plan has been incorporated or referenced into other planning mechanisms are as follows:

Pinal County	• The Plan mitigation strategy was used by the Pinal County Flood Control District in the preparation and prioritization of flood control projects. • The Plan risk assessment data was used by emergency management personnel to garner community threat/vulnerability data for use in development and assessment of threat profiles. • The Plan risk assessment data was incorporated into the revision of the County Emergency Operations Plan. • Used for the Community Rating System (CRS) certification. • Used for creating the Community Wildfire Protection Plan (CWPP).
Apache Junction	• The Plan was referenced for long range CIP projects.
Casa Grande	• The Plan was used for the City of Casa Grande's General Plan. • The Plan was used for long range CIP projects. • The Plan was referenced for implementation of Building Code Ordinance updates.
Coolidge	• The Plan has been used in the update to the city's comprehensive plan. • The Plan mitigation strategy was incorporated into the city's capital improvement planning. • The Plan risk assessment was used to update the emergency operations plan.
Eloy	• Used to update building code ordinances.
Florence	• Public Works Dept has incorporated some of the Plan mitigation strategy elements as Capital Improvement Projects via the Capital Improvement Plan as a way to itemize potential projects that decreases the vulnerability of community assets subject to storm water/flooding episodes. • Planning and Zoning Dept used elements of the Plan with the General Plan Update.
Kearny	• The Plan mitigation strategy was referred to by the Town during each annual review and update of the Town's Capital Improvement Program. • The Plan risk assessment was referenced during a review of the Town's current Drought Management Plan. • Was used to develop the Community Wildfire Protection Plan (CWPP).
Mammoth	• Was used for the CIP program. • Used it for building codes.
Maricopa	• Used it to update Emergency Response Plan and Community Action Plan.
Superior	• The Plan was used to update the capital improvement plan. • The Plan was used for the emergency operations plan.

Typical ways the jurisdictions plan to incorporate the Plan over the next five-year planning cycle include:

Pinal County	• To update the county emergency and response and recovery plan. • To develop the County's first Multi-Year Training and Exercise Plan (MYTEP) plan. • For revising long range cap improvement plan. • To use risk assessment data to revise the County Emergency Operations Plan. • To develop a County air quality plan. • To revise Community Wildfire Protection Plan (CWPP). • To develop a regional transportation plan.
Apache Junction	• To update capital improvement plan. • To update emergency operations plan.
Casa Grande	• To update general plan. • To develop public works flood control plan. • To develop economic development plan.
Coolidge	• To update capital improvement plan. • To develop flood control and wastewater plans. • The risk assessment will be used to update the city's emergency operations plan.
Eloy	• To update the general plan. • To update the emergency operations plan.
Florence	• To update capital improvement plan, emergency operations plan and develop an economic development plan.
Kearny	• To update the response and recovery plan. • To update the drought management plan • The mitigation strategy will be referred to during annual reviews and updates of the Town's Capital Improvement Program.
Mammoth	• To update and maintain building codes. • To develop a community development and capital improvement plans. • To update the emergency operations plan.
Maricopa	• To update the community action plan. • To update the general and transportation plans. • To update the emergency operations plan.
Superior	• To update the emergency operations and floodplain management plans. • To create an economic development plan. • To update the capital improvement plan.
Plan incorporation for the smaller communities remains a challenge as some do not have a large amount of community plans, however they strive to find new ways to use the plan to benefit the community.	

The Plan will continue to function as a standalone document subject to its own review and revision. The Plan will also serve as a reference for other mitigation and land planning needs of the jurisdictions. Whenever possible, the jurisdictions will endeavor to incorporate the risk assessment results and mitigation actions and projects identified in the Plan, into existing and future planning mechanisms. At a minimum, the responsible agencies/departments will review and reference the Plan and revise and/or update the legal and regulatory planning documents, manuals, codes, and ordinances, as appropriate. Specific incorporation of the Plan risk assessment elements into the natural resources and safety elements of the jurisdictions' general plans (county comprehensive plan)

and development review processes, adding or revising building codes, adding or changing zoning and subdivision ordinances, and incorporating mitigation goals and strategies into general and/or comprehensive plans, will help to ensure hazard mitigated future development.

APPENDIX A: PLAN TOOLS

Acronyms

ADEQ	Arizona Department of Environmental Quality
ADWR	Arizona Department of Water Resources
AGFD	Arizona Game and Fish Department
ARS	Arizona Revised Statutes
ASCE	American Society of Civil Engineers
ASERC	Arizona State Emergency Response Commission
ASLD	Arizona State Land Department
ASU	Arizona State University
AZGS	Arizona Geological Survey
BLM	Bureau of Land Management
CAP	Central Arizona Project
CAP	Community Assistance Program
CFR	Code of Federal Regulations
CRS	Community Rating System
CWPP	Community Wildfire Protection Plan
DEMA	Arizona Department of Emergency and Military Affairs
DFIRM	Digital Flood Insurance Rate
DMA 2000	Disaster Mitigation Act of 2000
DOT	Department of Transportation
EHS	Extremely Hazardous Substance
EPA	Environmental Protection Agency
EPCRA	Emergency Planning and Community Right to Know Act
FCDMC	Flood Control District of Pinal County
FEMA	Federal Emergency Management Agency
FMA	Flood Mitigation Assistance Grant Program
GIS	Geographic Information System
HAZMAT	Hazardous Material
HAZUS-99	Hazards United States 1999
HAZUS-MH	Hazards United States Multi-Hazard
IFCI	International Fire Code Institute
LEPC	Local Emergency Planning Committee
MMI	Modified Mercalli Intensity
NCDC	National Climate Data Center
NDMC	National Drought Mitigation Center
NESDIS	National Environmental Satellite, Data and Information Service
NFIP	National Flood Insurance Program
NFPA	National Fire Protection Association
NHC	National Hurricane Center
NIBS	National Institute of Building Services
NID	National Inventory of Dams
NIST	National Institute of Standards and Technology
NSF	National Science Foundation
NOAA	National Oceanic and Atmospheric Administration
NRC	National Response Center
NWCG	National Wildfire Coordination Group
NWS	National Weather Service
PCOEM	Pinal County Office of Emergency Management
PSDI	Palmer Drought Severity Index
RL	Repetitive Loss
SARA	Superfund Amendments and Reauthorization Act
SRP	Salt River Project
UBC	Uniform Building Code
USACE	United States Army Corps of Engineers
USDA	United States Department of Agriculture

USFSUnited States Forest Service
USGSUnited States Geological Survey
VAVulnerability Analysis
WUIWildland Urban Interface

APPENDIX B: OFFICIAL RESOLUTION OF ADOPTION

APPENDIX C: PLANNING DOCUMENTATION

Louis Andersen
Public Works Director

Scott Bender
County Engineer



Greg Stanley
County Manager

April 7, 2015

Dear Whole Community Partner,

As a valued stakeholder, I would like to invite you and/or your designee(s) to participate in the planning process for the update of the Pinal County "Multi-Jurisdictional Hazard Mitigation Plan." An initial planning meeting will be held on Thursday, May 7, 2015 from 8 am – 12 pm at the Pinal County Emergency Operations Center, 31 North Pinal Street, Building F, in Florence, Arizona. Lunch will be provided.

The Federal Emergency Management Agency (FEMA) requires state, county, city, and tribal jurisdictions to complete hazard mitigation plan updates every five years, which are submitted to FEMA for review and approval. Having an approved plan is a prerequisite for qualifying for specific federal disaster assistance funding programs in the event of a gubernatorial or presidentially declared disaster.

FEMA promotes a "whole community" approach to emergency planning which includes reaching out to a broad array of disciplines and organizations that could be involved in activities that cover all aspects of emergency management, including mitigation. This approach not only includes prior planning participants such as law enforcement, fire departments, emergency management, public works, and flood control; but also planning and zoning, public health, building inspectors, community development, economic development, chambers of commerce, NGO's (Red Cross, The Salvation Army), hospitals, schools, and others.

At the initial planning meeting, we will review the hazards potentially facing the County and determine whether the hazards listed in the existing plan need revision, removal, or addition. Representatives from the Arizona Department of Emergency & Military Affairs will be on hand to assist with the meeting and throughout the update process. We will also discuss the method and timeline for reviewing and updating the entire plan, a key piece of which will be developing specific mitigation projects that can be undertaken in a cost effective manner to reduce the potential impact of the identified hazards.

As part of the "whole community" concept, your consideration of participating in this process will be greatly appreciated. Please RSVP (including any dietary restrictions) with Maria Rojas at 520-866-6486 or maria.rojas@pinalcountyyaz.gov by Friday, May 1st by close of business. While this initial meeting will need to be in-person, additional meetings will have teleconferencing capabilities.

Sincerely,

Charles Kmet, B.S.
Emergency Manager

PUBLIC WORKS DEPARTMENT

31 North Pinal Street, Building F, PO Box 727 Florence, AZ 85132

T 520-509-3555 Hours M-F 8:00 am – 5:00 pm F 520-866-6511 www.pinalcountyyaz.gov



Pinal County
Hazard Mitigation Plan Update Meeting #1
May 7, 2015 – 8am-12pm
Pinal County EOC, 31 N. Pinal St., Bldg. F, Florence, AZ

AGENDA

- 8:00am Welcome
- Introductions
- Overview
- What is Mitigation?
 - Mitigation Plan Purpose
 - Plan Benefits
 - DMA 2000 (DMA2K) Requirements
- Plan Review & Update
- Community Descriptions
 - Public Involvement
 - Program Integration
 - Hazards for Plan
 - Hazards Prioritization
 - Mitigation Actions & Projects
- Next Meeting
- 12:00pm Adjourn



PINAL COUNTY
wide open opportunity

Pinal County
Hazard Mitigation Planning Mtg #1
May 7, 2015

Name (Please Print)	Title	Agency/Org	Email and/or Phone
SCOTT MILLER	FIRE CHIEF	CITY OF CASA GRANDE FIRE DEPARTMENT	SMILLER@CASAGRANDAZ.GOV
John Dierksen	ASSISTANT DIRECTOR	DERMA	John.Dierksen@AZDermAco
JOHN PADILLA	EMERG. MGMT. COORD.	ARS	john.padilla@aps.com
DAVE MONTGOMERY	ASST. FIRE CHIEF	SPRINGSTON FIRE & MEDICAL	dave.montgomery@springstn.az.gov
BILL FITMAN	CHIEF	ELON P.T.D.	bfittman@elonyaz.gov
Jose Martinez	CBO	Eloy	JMartinez@eloyaz.gov
Ken Martin	PW Director	Eloy	kmartin@eloyaz.gov
LOUIS BRACAMONTE	MAYOR	WINKELMAN	LOUIS.BRACAMONTE@qmaric.com
STEVEN SUTHER	MAYOR SUTHER	MAYOR PP	SSutHER@pinal.net
Ken Waters	ICM	Phoenix NHS	Ken.waters@ncaa.gov
Kelly Waddell	ASST CHIEF	Eloy Fire Dept	KWaddell@EloyFire.org
Kore Redden	PLATE COORDINATOR	Pinal County Public Health	kore.redden@pinalcountnaz.gov
Shane Kriesow	PW Manager	CITY OF AZ	SKriesow@ajcity.net



PINAL COUNTY
wide open opportunity

Pinal County
Hazard Mitigation Planning Mtg #1
May 7, 2015

Name (Please Print)	Title	Agency/Org	Email and/or Phone
GREG STANLEY	County Manager	Pinal County	GREGORY.STANLEY@PINALCOUNTY.AZ.GOV
Bobby Miller	Assistant Chief	MARICOPA FIRE	bobby.miller@maricopa-az.gov
BENJAMIN COCKER	GIS ANALYST	PINAL COUNTY PW	BENJAMIN.COCKER@PINALCOUNTY.AZ.GOV
Kent Taylor	Director Operations	Pinal County	Kent.Taylor@pinalcountyaz.gov
Mike Simpson	Administrator	PCOFM	mike.simpson@pinalcountyaz.gov
Ken Drozd	Warning Coordinator	NWS Tucson	Kenneth.drozd@noaa.gov
Eddie Rodriguez	Deputy Fire Marshal	Maricopa Fire	eddie.rodriguez@maricopa-az.gov
Glenn Boothie	Emergency manager	AK-Chin Indian Community	gboothie@ak-chin.nsn.us
MARK NIPP	CHIEF OF POLICE	SUPERIOR POLICE	MARK.NIPP@MARICOPACOUNTY.AZ.GOV 480.415.6010
Margaret Gaston	Town Manager	Town of Superior	MARGARET.GASTON@CITY.SUPERIOR.AZ.GOV 520-639-5752
DAVID NEUSS	SERGEANT POLICE	TOWN OF SUPERIOR	david.neuss@pinalcountyaz.gov 520.405.2797
Ken Lewis	Emergency Management	Salt River Project	KEN.LEWIS@SRP.NET.COM 602.703.3822



PINAL COUNTY
wide open opportunity

Pinal County
Hazard Mitigation Planning Mtg #1
May 7, 2015

Name (Please Print)	Title	Agency/Org	Email and/or Phone
James Heblitz	Police Commander	City of Moraga	James.heblitz@moraga-ca.gov
William Throck	Police Sergeant	Town of Florence	William.Throck@FlorenceCA.gov
Rob Jarvis	Fire Chief	City of Coolidge	jarvis@coolidgeaz.gov
CHRISTOPHER WAINWATER	ENGINEER	PINAL COUNTY	christopher.wainwater@pinalcountyaz.gov
Anna Flores	Town Manager	Town of Kearny	aflores@townofkearny.com
John Kemp	Battalion Chief	Town of Florence	John.Kemp@FlorenceCA.gov
ART CARLTON	ADMINISTRATOR	PINAL COUNTY EMERGENCY MANAGEMENT	art.carlton@pinalcountyaz.gov
Cindy Perez	Accountant I	Pinal County Public Works	Cindy.perez@pinalcountyaz.gov
MARIA S. ROSAS	Accountant	Pinal County Public Works Emergency Management/Finance	maria.rosas@pinalcountyaz.gov



Minutes of Meeting
PINAL COUNTY
MULTI -JURISDICTION & HAZARDOUS MITIGATION 2010 PLAN UPDATE
Thursday, May 7, 2015 at 8:00 a.m.
Pinal County Emergency Operations Center
31 N. Pinal St., Bldg F Florence AZ 85132

Instructor:

Sue Wood, DEMA

- Introductions (see attached attendance sheet)

Overview

- **Mitigation:** Effort to reduce loss of property and life and the action to plan, purpose, preparedness, hazard, impacts, outreach, long term, local responsibility, and first responders
- **Plan Benefits:** Plan process; Draft/ FEMA/ Approval/ Adopt Plan
Provide press release on website, and message to include link of the current plan. For Pinal County, contact Joe Pyritz for any press release, announcements and feedback.
- **Risk Assessments:** Climate change impacts hazards and affect HAZUS. Plan for climate changes and potential losses.
Hazards U.S. HAZUS: Methodology and Census /GIS data to create model based estimate of potential losses from natural hazards, such as floods, earthquakes, hurricane winds, wild fires distributed by FEMA. All are estimations and values for economic losses of building and infrastructure. It is not recommended to exclude HAZUS.
- **Mitigation Strategy:** Set goals and objectives and mitigation assessment.
- **Disaster Mitigation Act of 2000 (DMA 2K):** Legal basis for FEMA mitigation planning requirements for state, local and tribal governments as

mitigation grant assistance and authorization up to 7 percent of HMGP funds for state, local and tribal mitigation plans.

1. Each community/agency must participate in planning process.
2. All plans must be approved and officially adopt the plan.
3. Each community/agency must assess risk facing the entire community.
4. Each community/agency must identify specific action items to the jurisdiction of the plan.

Plan Review and Update

- Community Descriptions: Each community/agency is required to have a mitigation plan and strategy.
- Any natural hazard that poses a significant threat or impact to a community.

Sue Wood: Mentioned she will be sending Program Integration documents.

- Public and other stakeholder involvement: Set public meeting to review final draft of plan prior to plan approval. Must advertise a public hearing for feedback of plan.
- Hazards for Plan: Point of Contact for each agency/jurisdiction.

1. C.G. – Pedro Apodaca
2. Pinal County- Charles Kmet
3. Coolidge- Rob Jaruis
4. Eloy- Ken Martin
5. Florence- John Kemp
6. Kearny- Anna Flores
7. Maricopa- Eddie Rodriguez
8. Superior- Margaret Gaston
9. A.J.- Shane Kiesow

- Hazards that can potentially disrupt life and property. General descriptions of the hazards and historical occurrences are the basis of the hazard profile plan.



Pinal County
Hazard Mitigation Plan Update Meeting #2
June 23, 2015 – 8am-12pm
Pinal County EOC, 31 N. Pinal St., Bldg. F, Florence, AZ

AGENDA

8:00am Welcome

Overview

- What is Mitigation?
- Mitigation Plan Purpose
- Plan Benefits
- DMA 2000 (DMA2K) Requirements
- Assignment Status

Plan Review & Update

- Public Involvement
- Hazards for Plan
 - Hazards Prioritization (CPRI)
 - Hazards for Plan
 - Hazards per Jurisdiction
 - Hazard Profile Update Responsibility
- Mitigation Strategy
- Plan Incorporation
- Continued Public & Stakeholder Involvement

Next Meeting

12:00pm Adjourn



PINAL COUNTY
wide open opportunity

Pinal County
Hazard Mitigation Planning Mtg #2
June 23, 2015

Name (Please Print)	Title	Agency/Org	Email and/or Phone
Scott Miller	Fire Chief	CASA GRANDE F.D.	SMILLER@CASA-GRANDE.AZ.GOV
Pedro Apodaca	Street Superintendent	City of Casa Grande	Papodaca@casagrandeaz.gov
Morris Taylor	Supervisor	Town of Florence	Morris.Taylor@Florenceaz.gov
BENJAMIN COKER	GIS ANALYST	PC PUBLIC WORKS	BENJAMIN.COKER@PINALCOUNTY.AZ.GOV
Mike Sampson	Administrator	PCPW-Fire Dept	520-866-6985
William F. Brock	Secretary	Florence Police	520-251-2392
Shane Kiesow	PW Manager	City of Apache Jct.	William.F.Brock@Florenceaz.gov
Ken Martin	PW Director	City of Eloy	skiesow@ajcity.net
Jose Martinez	Building Inspector	City of Eloy	kmartin@eloyaz.gov
Rob Jarvis	FIRE CHIEF	CITY OF COOLIDGE	jmartinez@eloyaz.gov
Eddie Rodriguez	Deputy Fire Marshal	Maricopa Fire	jarvis@coolidgeaz.gov
Cindy Perez	Admin.	Pinal County Emergency Mgt.	eddie.rodriguez@maricopa-az.gov
			Cindy.perez@pinalcountyaz.gov



Minutes of Meeting
PINAL COUNTY
HAZARD MITIGATION PLAN UPDATE
Tuesday, June 23, 2015 at 8:00 a.m.
Pinal County Emergency Operations Center
31 N. Pinal St., Bldg F Florence AZ 85132

Facilitator:

Sue Wood, DEMA

- In attendance (see attached attendance sheet)

Overview

- **Mitigation Plan for 2010:** Adopted in 2011. Mitigation is to create safer communities. Having a FEMA-approved mitigation plan gives participating jurisdictions eligibility to apply for grants for FEMA's hazard mitigation grant programs. Plan must be updated every 5 yrs.
- **Public Involvement:** The County will place a link on Pinal County website. Link will have the current mitigation plan for each jurisdiction to link their webpage to. Pinal County will notify all jurisdictions once website is available.

Review Point of Contact for each agency/jurisdiction:

1. C.G. – Pedro Apodaca
2. Pinal County- Chuck Kmet
3. Coolidge- Rob Jarvis
4. Eloy- Ken Martin
5. Florence- Morris Taylor
6. Kearny- Anna Flores
7. Maricopa- Eddie Rodriguez
8. Superior- Mark Nipp
9. A.J.- Shane Kiesow

- **Hazards for Plan:** Possible hazards to be included in plan:
 1. Dam Failure
 2. Drought
 3. Fissure
 4. Flood
 5. HazMat
 6. Levee Failure
 7. Severe Wind
 8. Subsidence
 9. Wildfire

Plan Review and Update

- **Community Descriptions:** Section 4- Background information which includes geography, climate population and economy and explanation of each hazard. Must create new priorities for new hazards to plan. Plan on long-term solution for plan. Must include justification if any hazards are being removed from current plan.
- **Risk Assessment Risk Index:** Calculation of CPRI risk categories for each hazard and calculating an index value based on a weighing scheme. FEMA requires prioritization of plan's hazards.
- **Hazard Risk Profile:**
 - Description
 - History
 - Probability
 - Vulnerability
 - Profile Maps (if applicable)

*History Profile: Include significant information in Hazard Profiles.

Sue Wood went over current hazards in our plan and jurisdictions reviewed and discussed hazard items that can possibly be removed from plan.

- Riot/Terrorism
- Health Issues
- Extreme Heat
- Transportation Accidents

Mitigation Strategy:

- Jurisdictional Capabilities
- NFIP (National Flood Insurance Program)
- Community Rating System

HAZUS: Geographic information system that analyzes risk from natural hazards in developments and communities. HAZUS is a GIS tool that can model flooding, hurricanes surges and earthquakes.

- Loss Estimations
- Development Analysis

Sue Wood- If HAZUS loss estimation tables are omitted from plan, the vulnerability requirement must be met through discussion or other ways. Mitigation strategy must have specific actions and projects for each jurisdiction. For each risk assessment should have at least two mitigation actions.

Next steps - New list will be sent out to all jurisdictions.

Assignments:

- New action project list.
- Continue public stake holder involvement.
- Work on updating hazard profiles, narratives and profile maps (due in 45 days).
- County posting link to County Website (send notification to all jurisdictions).

Next Meeting

Date: TBD (First week of August 2015)

Time: TBD

Location: Pinal County Emergency Operations Center in Florence, AZ

Meeting Adjourned: 12:00 p.m.

APPENDIX D: PUBLIC & STAKEHOLDER INVOLVEMENT RECORDS

The screenshot shows a web browser window with the address bar displaying www.pinalcountyz.gov/EmergencyManagement/Pages/HazardMitigationPlanning.aspx. The website header includes navigation links: County Home, Online Services, Visitors, Jobs, Government, and Economic Development. A search bar is present with the placeholder text "I'm looking for...". The main content area features the Pinal County logo and a navigation menu with links to Emergency Management, Public Works, Contact Information, and Documents & Information. The "Menu" section lists: Emergency Management Home, Hazard Mitigation Planning, Preparedness, Mitigation, Local Emergency Planning Committee, and Items of Interest. The "Items of Interest" section lists: Pinal County Multi-Jurisdictional Hazard Mitigation Plan, EPA Pacific Southwest Region - Improving Chemical Safety and Security May 2015 Update, and Home Owners Insurance Reviews. The main heading is "Pinal County Multi-Jurisdictional Hazard Mitigation Plan Review and Update". The text describes a planning team review of the 2010 plan, public input opportunities, and contact information for Charles Kmet. It also mentions the Disaster Mitigation Act of 2000 (DMA2K) and the plan's focus on reducing risk from hazards. The footer includes the Pinal County Government logo and contact information: 31 N. Pinal Street, Florence, AZ 85132, 520.509.3555 (Local), 888.431.1311 (Toll Free). The Windows taskbar at the bottom shows various application icons and the system clock indicating 4:02 PM on 7/8/2015.

Hazard Mitigation Planning

www.pinalcountyz.gov/EmergencyManagement/Pages/HazardMitigationPlanning.aspx

County Home | Online Services | Visitors | Jobs | Government | Economic Development

I'm looking for...

PINAL COUNTY
Wide open opportunity

Emergency Management | Public Works | Contact Information | Documents & Information

Menu

- Emergency Management Home
- Hazard Mitigation Planning
- Preparedness
- Mitigation
- Local Emergency Planning Committee

Items of Interest

- Pinal County Multi-Jurisdictional Hazard Mitigation Plan
- EPA Pacific Southwest Region - Improving Chemical Safety and Security May 2015 Update
- Home Owners Insurance Reviews

Pinal County Multi-Jurisdictional Hazard Mitigation Plan Review and Update

A planning team comprised of representatives from Pinal County, Apache Junction, Casa Grande, Coolidge, Eloy, Florence, Kearny, Mammoth, Maricopa, Superior and other stakeholders is reviewing and updating the existing 2010 Pinal County Multi-Jurisdictional Hazard Mitigation Plan. The current 2010 Pinal County Multi-Jurisdictional Hazard Mitigation Plan (Plan) is available for review and comment. Click here for 2010 [Hazard Mitigation Plan](#).

Public input on the current Plan is important and residents are encouraged to review the PLAN and offer comments. The final DRAFT of the updated 2015 plan will be made available for review and comment in August 2015.

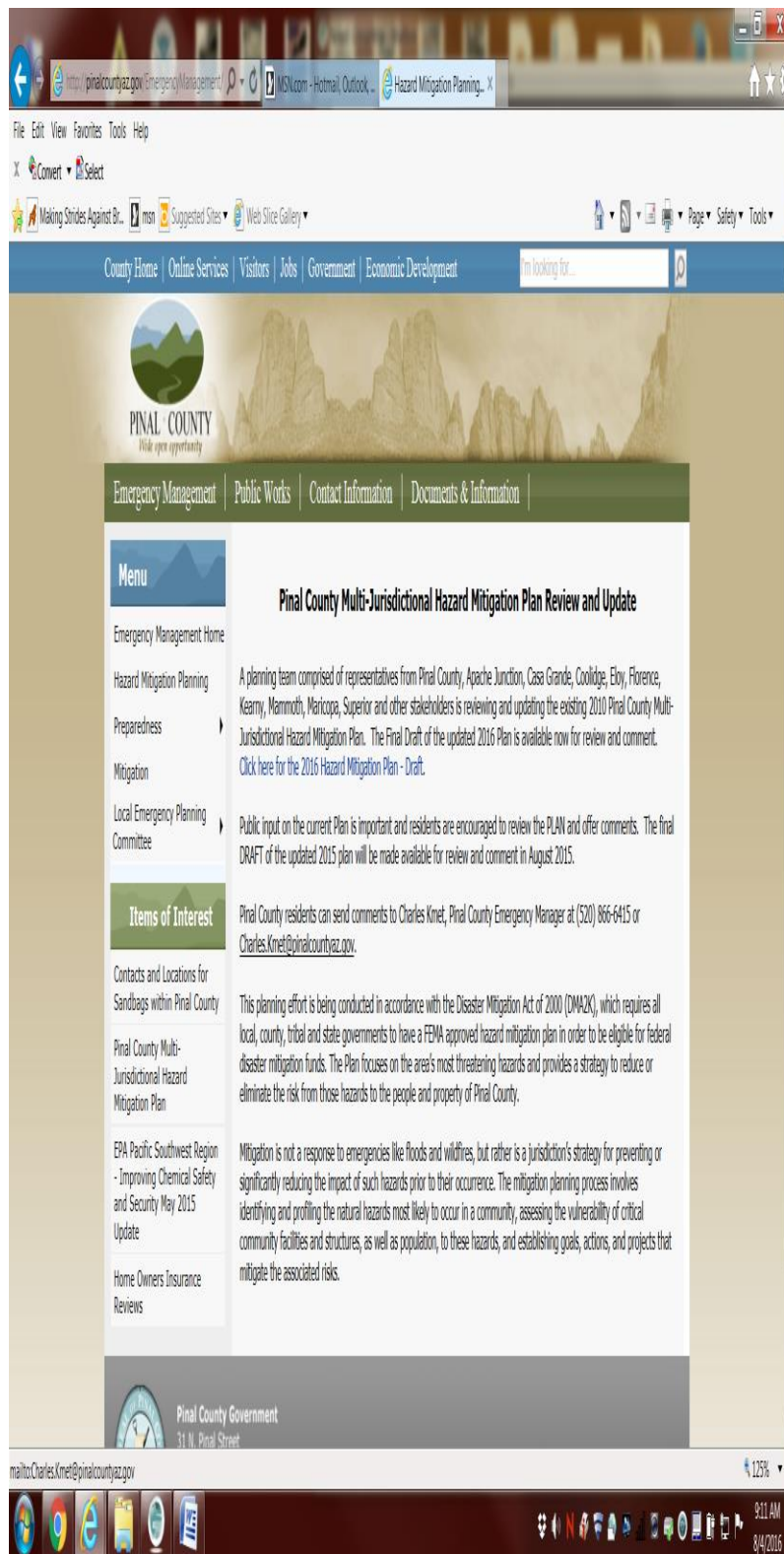
Pinal County residents can send comments to Charles Kmet, Pinal County Emergency Manager at (520) 866-6415 or Charles.Kmet@pinalcountyz.gov.

This planning effort is being conducted in accordance with the Disaster Mitigation Act of 2000 (DMA2K), which requires all local, county, tribal and state governments to have a FEMA approved hazard mitigation plan in order to be eligible for federal disaster mitigation funds. The Plan focuses on the area's most threatening hazards and provides a strategy to reduce or eliminate the risk from those hazards to the people and property of Pinal County.

Mitigation is not a response to emergencies like floods and wildfires, but rather is a jurisdiction's strategy for preventing or significantly reducing the impact of such hazards prior to their occurrence. The mitigation planning process involves identifying and profiling the natural hazards most likely to occur in a community, assessing the vulnerability of critical community facilities and structures, as well as population, to these hazards, and establishing goals, actions, and projects that mitigate the associated risks.

Pinal County Government
31 N. Pinal Street
Florence, AZ 85132
520.509.3555 (Local)
888.431.1311 (Toll Free)

4:02 PM
7/8/2015





NEWS RELEASE

For More Information Contact:

City of Apache Junction
Public Information &
Community Outreach
480-474-5066

FOR IMMEDIATE RELEASE

City of Apache Junction and Pinal County Emergency Management Seek Citizen Input on Multi-Hazard Mitigation Plan Update

Apache Junction, Arizona.....July 9, 2015

A planning team comprised of representatives from Pinal County and the incorporated jurisdictions within the County meet regularly to participate in a mitigation planning process. The purpose of this process is to review and update the existing multi-hazard mitigation plan for Pinal County and its respective jurisdictions. The planning effort is conducted in accordance with the Disaster Mitigation Act of 2000 (DMA2K), which requires all local, county, tribal and state governments to have a FEMA approved hazard mitigation plan in order to be eligible for certain types of pre- and post- federal disaster and mitigation funds. This plan will focus on the area's most threatening hazards and provide a strategy to reduce or eliminate the risk from those hazards to the people and property of Pinal County. The planning team anticipates having a plan draft in mid-September 2015, at which time the public will be provided access and the opportunity to comment.

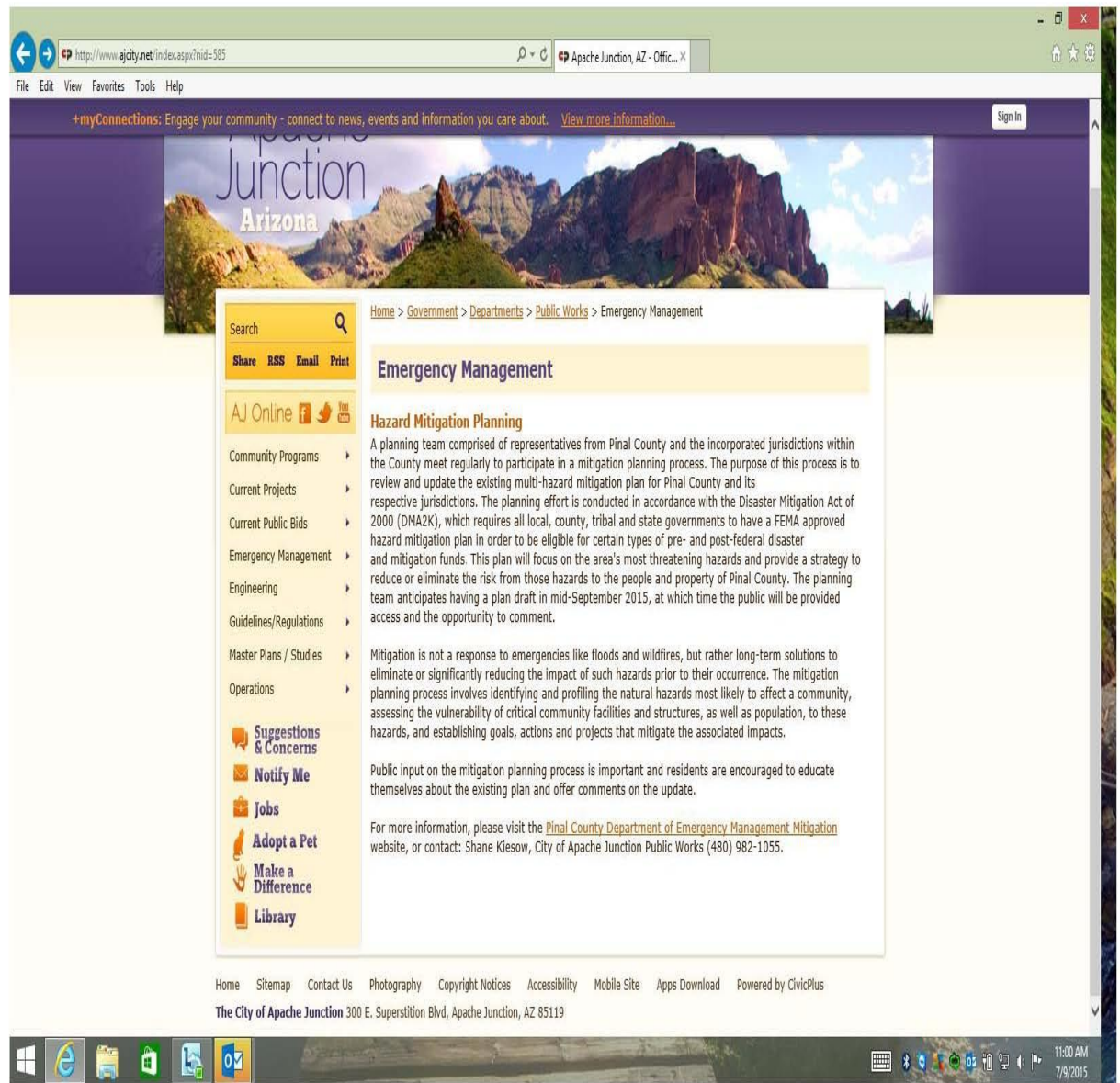
Mitigation is not a response to emergencies like floods and wildfires, but rather long-term solutions to eliminate or significantly reducing the impact of such hazards prior to their occurrence. The mitigation planning process involves identifying and profiling the natural hazards most likely to affect a community, assessing the vulnerability of critical community facilities and structures, as well as population, to these hazards, and establishing goals, actions and projects that mitigate the associated impacts.

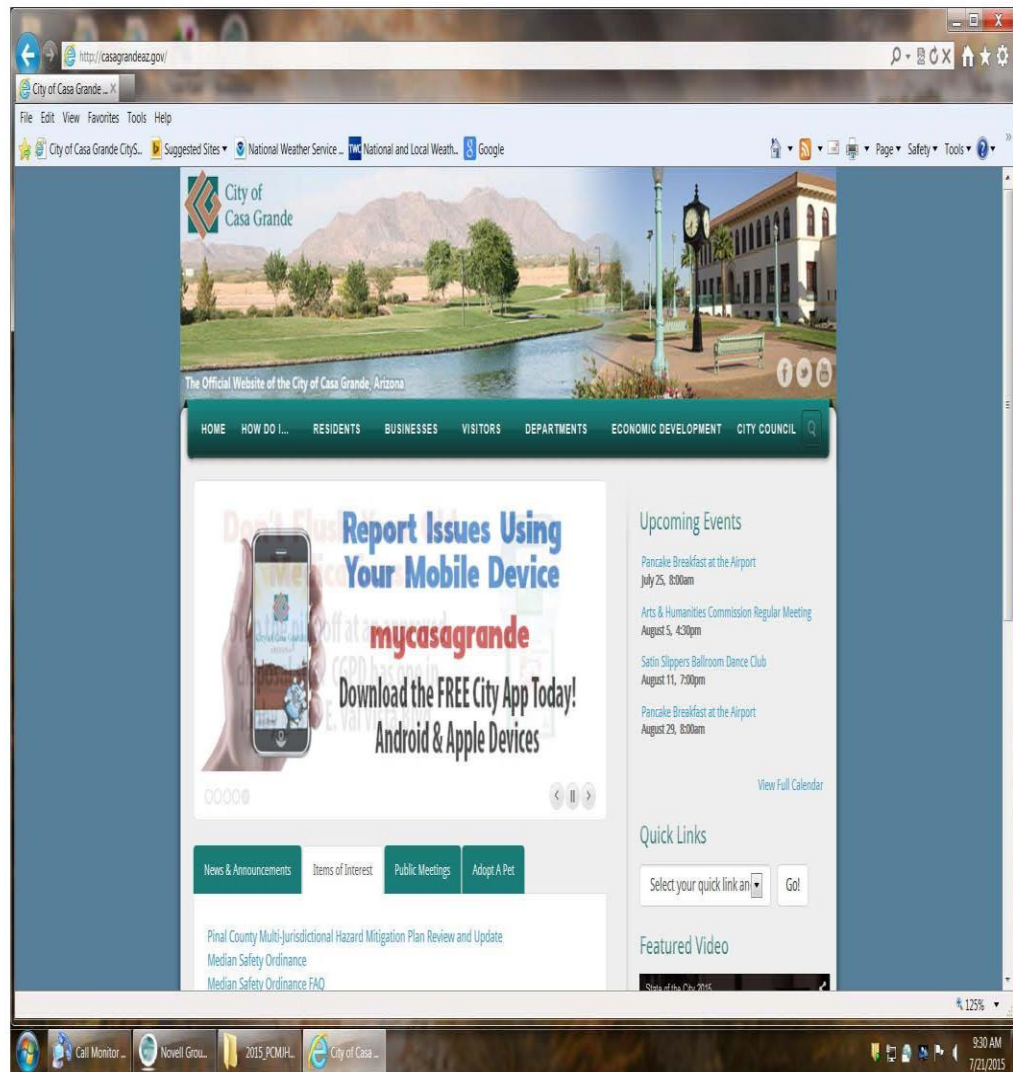
Public input on the mitigation planning process is important and residents are encouraged to educate themselves about the existing plan and offer

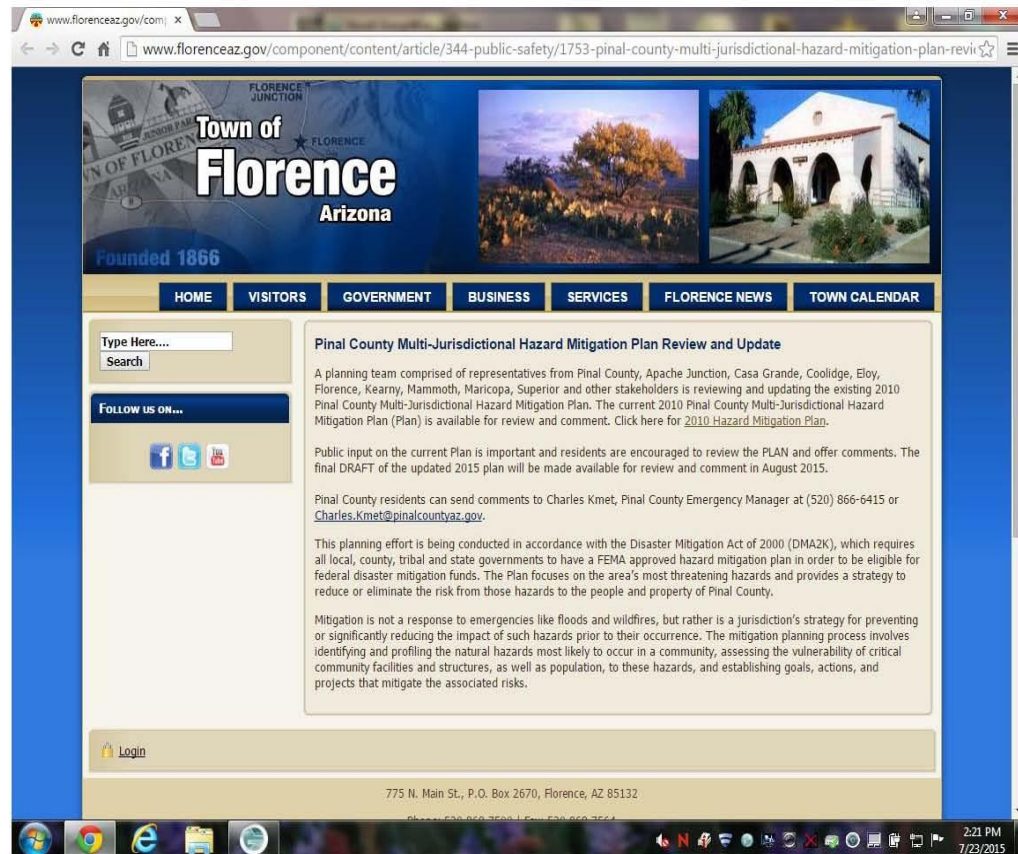
comments on the update.

To review the plan and comment, please visit the Pinal County Department of Emergency Management Mitigation website:
www.pinalcountyz.gov/emergencymanagement/pages/mitigation.aspx, or
contact: Shane Kiesow, City of Apache Junction Public Works (480) 982-1055.

###







COPPER BASIN
NEWS

Welcome to
HAYDEN HIGH SCHOOL

**Kearny begins work
on multi-jurisdictional
hazard mitigation plan**

The Town of Kearny, with other municipalities, and Pinal County, is working on the hazard mitigation plan for the area.

The hazard mitigation plan will focus on the area's most threatening hazards and provide a strategy to reduce or eliminate the risk from those hazards to the people and property of the Town of Kearny.

All local, County, Tribal and State governments must have a FEMA approved hazard mitigation plan in order to be eligible for Federal disaster mitigation funds.

For more information, contact the Kearny Town Hall at 520-363-5547.

APPENDIX E: PREVIOUS MITIGATION STRATEGY STATUS

**PINAL COUNTY
MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN**

2016

Assessment of Previous Plan's Actions & Projects for Pinal County							
Description	Hazard(s) Mitigated	Estimated Cost & Completion Date	Project Primary or Lead	Potential Funding Source(s)	Status • No Progress • In Progress • Complete	Disposition • Keep • Delete • Keep, revise	Explanation or brief description of work so far or reason for 'no progress'
Thunderstorm Education	Severe Wind	\$5,000+ Staff Time Dec 2015	Pinal Co Office of Emergency Mgt	Grant Funding	Complete	Delete	
AZ City Flood Mitigation project	Flood	\$1.2 million	Pinal Co Flood Control District	Flood Control District Levy	Complete	Delete	New project to take its place
Dudleyville Flood Mitigation project	Flood	\$1.5 million	Pinal Co Flood Control District	Flood Control District Levy	Complete	Delete	New project to take its place
Traffic Control-Power Interruption Plan	Severe Wind	\$20,000+ Staff Time Dec 2014	Pinal Co Public Works Traffic Section	HURF	Complete	Delete	
Develop IGAs with county dependent communities to define and clarify roles in implementing the NFIP program and managing the floodplains	Flood	\$15,000+ Staff Time Jan 2018	Pinal Co Flood Control District / Section Chief	Flood Control District Levy	In Progress	Keep	IGA with Eloy complete. Still working with other communities.
Develop Drought Awareness campaign to educate stakeholders	Drought	\$3,000 Dec 2015	Pinal Co Office of Emergency Mgt	OEM funding	Complete	Delete	
Develop Wildfire Mitigation and Prevention program to include community awareness.	Wildfires	\$30,000+ Staff Time June 2017	Pinal Co Office of Emergency Mgt	Grant Funding	In progress	Keep, Revise	Oracle Fire is only FireWise community so revise project to get other jurisdictions on board.
Flood Control Meetings with all districts, Indian Tribes, and Cities	Flood	Staff Time (Ongoing)	Pinal Co Flood Control District	Flood Control District	In Progress	Keep	Quarterly meetings are held with stakeholders.
Fissure monitoring for state-wide mapping by ASGS and promote fissure awareness with the public	Subsidence, Fissure	\$10,000/ yr + Staff Time (Ongoing)	Pinal Co Office of Emergency Mgt	OEM Grant Funding	In Progress	Keep, Revise	IGA with ADWR and the Pinal County FCD pays for

**PINAL COUNTY
MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN**

2016

Assessment of Previous Plan's Actions & Projects for Pinal County							
Description	Hazard(s) Mitigated	Estimated Cost & Completion Date	Project Primary or Lead	Potential Funding Source(s)	Status • No Progress • In Progress • Complete	Disposition • Keep • Delete • Keep, revise	Explanation or brief description of work so far or reason for 'no progress'
							InSAR coverage
All Weather Access analysis (Review County transportation network and determine areas in need of stream crossing upgrades to improve public access.)	Flood	\$20,000+ Staff Time June 2020	Pinal Co Transportation Planner	Flood Control District Levy/ HURF	In Progress	Keep, Revise	No separate analysis – there is some data in the ADMP's about access issues
Aravaipa Canyon flood hazard mapping	Flood	\$300,000+ Staff Time Dec 2015	Pinal Co Flood Control District	Flood Control District Levy	Complete	Delete	FEMA remapped the area in 2007
Superior Flood Prone Property Plan to address homes currently located in FEMA floodway. Plan to address feasibility of mitigation projects and potential property buy-outs.	Flood	\$2M+ Staff Time June 2020	Pinal Co Flood Control District	Flood Control District Levy	No Progress	Keep, Revise	PCFCD is working on a survey and possible flood mitigation project at this time. It may include land acquisition, but we want the Town to buy into the concept.
Queen Valley Flood Mitigation Plan (Multi-phase project to address flooding in the community. Planned elements include construction of new culverts, improved channel segments, and removal of floodplain encroachments.)	Flood	\$1.5M + Staff Time Dec 2017	Pinal Co Flood Control District	Flood Control District Levy	Complete	Keep, Revise	Plan is complete. Construction on some of the plan is underway. There is more in the plan we could implement.
Santa Cruz River Watercourse Master Plan (The US Army Corps of Engineers is working on a reconnaissance study to determine possible flood mitigation alternatives.)	Flood	\$1.5M+ Staff Time June 2018	USACOE/Pinal Co Flood Control District	Federal Funding	In Progress	Keep, Revise	Cost share for PCFCD is \$1.5 million for 3 years

**PINAL COUNTY
MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN**

2016

Assessment of Previous Plan's Actions & Projects for Pinal County							
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Emergency Operations Center Assessment	Flood	\$30,000+ Staff Time Dec 2011	Pinal Co OEM	General Fund	Complete	Delete	Will replace with new project
Emergency Shelters/Redundant Power (Develop Shelter Operations Plan along with appropriate contracts & agreements. Assess and develop plan for ensuring shelter sites have permanent or access to back-up power)	Severe Wind	\$30,000 June 2016	Pinal Co OEM	General Fund	In Progress	Keep, Revise	Finalize shelter plan; get schools to sign AZMAC; retrofit schools for generator power
Embankment/levee identification and mitigation plan	Flood Levee Failure	\$200,000+ Staff Time	Pinal Co Flood Control District	Flood Control District Levy	Complete	Delete	Mitigation plan will be on a case by case basis.
HAZMAT Commodity Flow Study	Hazardous materials	\$60,000+ Staff Time Dec 2013	Pinal Co OEM	HMEP	No progress	Delete	State responsibility
Topographic Mapping	Flood	\$500,000+ Staff Time Aug 2014	Pinal Co Flood Control District	Flood Control District Levy	Complete	Delete	Santa Cruz River topography complete. No project scheduled at this time to get remaining County mapped.
ALERT Gauges (Project includes the maintenance of the existing ALERT system as well as yearly software and hardware upgrades.)	Flood	\$200,000+ Staff Time (Ongoing)	Pinal Co Flood Control District	Flood Control District Levy	In Progress	Keep	Yearly we spend between \$150,000 and \$200,000 on ALERT

Assessment of Previous Plan's Actions & Projects for Apache Junction							
Description	Hazard(s) Mitigated	Estimated Cost & Completion Date	Project Primary or Lead	Potential Funding Source(s)	Status • No Progress • In Progress • Complete	Disposition • Keep • Delete • Keep, revise	Explanation or brief description of work so far or reason for 'no progress'
Perform public outreach and education regarding the negative impacts of improper development within the floodplain and especially the floodway.	Flood	\$10,000 (Staff Time) On-going	AJPW, DSD	Local	In Progress	Keep	Has been communicated at several Neighborhood Meetings.
Build a box culvert and related roadway improvements on 16th Avenue across Palm wash to mitigate flooding of the street and surrounding properties.	Flood	\$750K 2013	AJPW	MAG or PCFCD	No Progress	Keep	No progress due to no funding yet.
Drainage channel improvement and box culvert retrofit for Weekes Wash crossing at Tomahawk Road to reduce flooding and improve sediment transport capacity.	Flood	\$250K 2013	AJPW	Local	In Progress	Keep	In pre-design.
Emergency backup power for Well #6 and Booster #2 for mitigation of downtime due to severe wind related power failures.	Severe Wind	\$60,000 2017	AJWD	FIWA & AJWD	In Progress	Keep	Estimated completion 2017.
Review and revise applicable portions of the Engineering Design Guidelines and Procedures Manual relating to floodplain management and flood control.	Flood, Drought	\$10,000 (Staff Time) 2016	AJPW	Local	In Progress	Keep	Estimated completion 2016.
Research reclaimed water use strategies and develop implementation guidelines for future developments.	Drought	\$10,000 (Staff Time) 2016	AJWD/DSD	Local	No Progress	Keep	No progress due to limited resources.
Implement Stormwater Master Plan Project No. 3 to design and construct a storm drain and channel in San Marcos Drive from 16 th Ave to ADOT detention basin.	Flood	\$2.3M 2013	AJPW	HURF	Complete	Delete	Completed in 2013 for approx. \$1.3M.
Implement Stormwater Master Plan Project No. 4 to design and construct a storm drain in Superstition Blvd from Meridian Dr. to Gold Dr. and a detention basin at Valley Dr. and Superstition Blvd.	Flood	\$3.6M 2017	AJPW	None	No Progress	Keep	No progress due to no funding yet.

Assessment of Previous Plan's Actions & Projects for Apache Junction							
Description	Hazard(s) Mitigated	Estimated Cost & Completion Date	Project Primary or Lead	Potential Funding Source(s)	Status • No Progress • In Progress • Complete	Disposition • Keep • Delete • Keep, revise	Explanation or brief description of work so far or reason for 'no progress'
Implement Stormwater Master Plan Project No. 4a to design and construct the Delaware Dr. and Pinal St. storm drains and a detention basin at Valley Dr. and Superstition Blvd.	Flood	\$2.7M 2017	AJPW	CDBG	In Progress	Keep	Project has been split into several phases with first phase completed in 2013.
Implement Stormwater Master Plan Project No. 5 to design and construct the Ironwood storm drain from Apache Blvd to Broadway Rd. and from 10 th Ave. to Palm Wash.	Flood	\$2.0M 2017	AJPW	STP/PCFCD	In Progress	Keep	In final design..
Implement Stormwater Master Plan Project No. 9 to design and construct a culvert under Meridian Rd. approximately 500 feet north of Southern Ave.	Flood	\$300K 2012	AJPW	Street Development Fees	Complete	Delete	Completed in 2012.
Implement Stormwater Master Plan Project No. 11 to design and construct a culvert on Palm Wash at the Junction Dr. crossing.	Flood	\$93K 2018	AJPW	None	No Progress	Keep	No progress due to no funding yet.
Design and construct a detention and sedimentation basin on Weekes Wash north of Lost Dutchman Blvd. to reduce the downstream impact of sedimentation and attenuate peak discharges.	Flood	\$9M 2010	AJPW	None	No Progress	Keep	No progress due to no funding yet.
Broadway Road Detention Basin, Stormwater Master Plan Project No. 6	Flood	\$100K 2013-14	AJPW	None	No Progress	Keep	No progress due to no funding yet.
Review and revise applicable portions of the Engineering Design Guidelines and Procedures Manual relating to floodplain management and flood control.	Flood, Drought	\$10,000 (Staff Time) 2016	AJPW	Local	Complete	Delete	Completed in April 2016.

Assessment of Previous Plan's Actions & Projects for Apache Junction							
Description	Hazard(s) Mitigated	Estimated Cost & Completion Date	Project Primary or Lead	Potential Funding Source(s)	Status • No Progress • In Progress • Complete	Disposition • Keep • Delete • Keep, revise	Explanation or brief description of work so far or reason for 'no progress'
Implement Stormwater Master Plan Project No. 5 to design and construct the Ironwood storm drain from Apache Trail to Broadway Ave. and from 10 th Ave. to Palm Wash.	Flood	\$2.0M 2017	AJPW	STP	Complete	Delete	Completed January 2017.
Broadway Road Detention Basin, Stormwater Master Plan Project No. 6	Flood	\$0K 2020	AJPW	None	Complete	Completed with improvements made on CAC campus.	Broadway Road Detention Basin, Stormwater Master Plan Project No. 6.
FEMA Risk Map Study.	Flood, Drought	\$150K 2016	AJPW	FEMA Grant	Complete	Delete	Completed in March 2016.
GIS Mapping and inventory of city owned critical infrastructure.	Flood, HazMat, Severe Wind, Levee Failure,	\$100,000 (Staff Time) 2016	AJPW, DSD, IT	General Fund, District Fund, and HURF	Complete	Delete	Completed in late 2016.
Construct potable water treatment plant.	Drought, Severe Wind	\$14.5M 2016	AJWD	District Fund	Complete	Delete	Completed in August 2016.

Assessment of Previous Plan's Actions & Projects for Casa Grande							
Description	Hazard(s) Mitigated	Estimated Cost & Completion Date	Project Primary or Lead	Potential Funding Source(s)	Status • No Progress • In Progress • Complete	Disposition • Keep • Delete • Keep, revise	Explanation or brief description of work so far or reason for 'no progress'
Investigate updating the current building codes to include requirements for installation of low water-use fixtures.	Drought	\$15,000 On-going as needed	Planning & Development Dept	General Fund	Complete	Delete	
Create Storm water Management program to identify, design and implement drainage and flood control related projects within the City.	Flood	\$500,000 plus Staff Time FY 2018	Public Works	General Fund/ Storm water Utility	In Progress	Keep	Requires new regulations and funding.
Acquire the Floodplain Certificates on all existing structures in the SFHA that have not been documented yet.	Flood	No cost to Municipality Jan 2012	Planning & Development Dept	General Fund	In Progress	Keep	Requires a building permit & elevation certificate for structures in the floodplain.
Have new developers dedicate portions of the Santa Cruz Wash for open space.	Flood	\$15,000 FY 2020	Planning & Development Dept/Community Services Dept	General Fund/ Developer Donation	In Progress	Keep	Lack of Development
Develop a master plan to create and utilize open space along the Santa Cruz Wash. By preserving the channel as open space, we can reduce exposure from flooding.	Flood	\$150,000 2008	Parks & Recreation Dept	Development impact fees	Complete	Keep and revise plan as needed	City Council adopted the Trails Master Plan in 2008. Development of the trail system is coordinated with adjacent residential and commercial construction and improvements to major arterial street crossings at Kortsen, Montgomery, Bianco and Selma Roads along with State Hwy 287.

Assessment of Previous Plan's Actions & Projects for Casa Grande							
Description	Hazard(s) Mitigated	Estimated Cost & Completion Date	Project Primary or Lead	Potential Funding Source(s)	Status • No Progress • In Progress • Complete	Disposition • Keep • Delete • Keep, revise	Explanation or brief description of work so far or reason for 'no progress'
Continue to enforce zoning and building codes through current site plan, subdivision, and building permit review processes to reduce the effects of drought, flood, thunderstorm/high wind, and other hazards on new buildings and infrastructure.	Flood, Severe Wind, Drought	On-going	Planning & Development Dept	General Fund	Complete	Keep	
Establish and sign a truck route for hazardous materials to avoid residential areas.	HazMat	\$150,000 Ongoing	Public Works/Engineering Division	General Fund/HURF	No Progress	Keep	Requires additional infrastructure
Database of HAZMAT	HazMat	\$30,000	Fire Dept	General Fund	In Progress	Keep	Ongoing- we wish to create a Tier II listing of City Businesses
Maintain the Santa Cruz area, to allow the drainage way to function more efficiently and thereby reduce exposure from flooding.	Flood	\$100,000 As needed basis	Public Works	General Fund/HURF	In Progress	Keep	Ongoing after major rainstorms
Enforce City Code regarding the drainage of basins within 36 hours	Flood	\$60,000 FY 2017	Public Works/Engineering Division	General Fund/HURF/Storm water Utility	In Progress	Keep Revise	Unknown property owners of drainage basins

Assessment of Previous Plan's Actions & Projects for Coolidge							
Description	Hazard(s) Mitigated	Estimated Cost & Completion Date	Project Primary or Lead	Potential Funding Source(s)	Status • No Progress • In Progress • Complete	Disposition • Keep • Delete • Keep, revise	Explanation or brief description of work so far or reason for 'no progress'
Low Water-Use Fixture Requirements - Continue to require the use and installation of low water-use fixtures in new residential and commercial developments	Drought	Staff Time On-going	Growth Management/ Building Safety	General Fund	In Progress	Keep, revise as technology changes and improves	Slow but continuous growth, modify as technology improves
Xeriscape Landscaping Recommendations - Continue to encourage the use of low water-use plants and xeriscape	Drought	Staff Time On-going	Growth Management/ Building Safety	General Fund	In Progress	Keep, revise as technology changes and improves	Ongoing, modify as technology improves
Thunderstorm Public Education Campaign - Conduct a public awareness campaign to educate citizens about the hazards of high winds associated with thunderstorms	Severe Wind	\$5,000 Annual	Growth Management, Building Safety, Fire, State of AZ	Grants, General Fund, Donations	In Progress	Keep	Need additional material and training supplies to enhance
Thunderstorm Damage Reduction - Continue to require tie downs/anchors for new manufactured homes, accessory buildings, carport awnings, and perimeter fences to mitigate damages due to high winds/microbursts.	Severe Wind	\$5,000 On-going	Growth Management, Building Safety, Fire, State of AZ	Grants, General Fund, Donations	In Progress	Keep	Ongoing, modify as technology improves
Hazard Mitigation Awareness - Develop public service announcements for media releases to educate citizens about drought, flooding, thunderstorms/high winds, and other natural hazards	All Hazards	Staff Time On-going, at least annually	State of AZ, Pinal Co, Administration	Grants, General Fund, Donations	In Progress	Keep	Need additional material and training supplies to enhance
Update/Revise Dam Failure Inundation Mapping - Contact and coordinate with the Arizona Department of Water Resources, the San Carlos Irrigation Project, and the San Carlos Apache Tribe to obtain updated inundation mapping for Coolidge Dam	Dam Failure	Staff Time As available	ADWR, SCIP, Pinal Co Flood Control	Individual Agencies	In Progress	Keep	Ongoing, modify as technology improves

Assessment of Previous Plan's Actions & Projects for Coolidge							
Description	Hazard(s) Mitigated	Estimated Cost & Completion Date	Project Primary or Lead	Potential Funding Source(s)	Status • No Progress • In Progress • Complete	Disposition • Keep • Delete • Keep, revise	Explanation or brief description of work so far or reason for 'no progress'
HAZMAT Route Establishment - Investigate and develop a plan that defines allowable HAZMAT corridors and prepare and adopt municipal codes for the signage and enforcement of the defined routes	HAZMAT	\$10,000 Jan 2012	Police & Fire	General Fund, Grants, Donations	In Progress	Keep	Recent annexation, road studies, development and general plan will change routes
Flood Control Structures Maintenance - Perform regular maintenance on existing City owned storm drains, drainage ditches, and retention/detention basins	Flood	\$30,000 On-going	Public Works, Parks	General Fund , Enterprise Funds	In Progress	Keep	Ongoing with new development
Enforcement of Zoning and Building Code Ordinances - Continue to enforce zoning and building codes through current site plan, subdivision, and building permit review processes to reduce the effects of drought, flood, thunderstorm/high wind, and other hazards on new buildings and infrastructure	All Hazards	\$20,000 Staff Time On-going	Growth Management, Building Safety, Planning	General Fund, Permit Fees, Development Fees	In Progress	Keep	Ongoing with new development
Mutual Aid/IGA's - Develop agreements with adjoining cities, tribes and Pinal County for mitigation of hazards	All Hazards	Staff Time On-going	Administration, Police, Fire	General Fund	Complete	Keep	Need to maintain and update with growth

Assessment of Previous Plan's Actions & Projects for Eloy							
Description	Hazard(s) Mitigated	Estimated Cost & Completion Date	Project Primary or Lead	Potential Funding Source(s)	Status • No Progress • In Progress • Complete	Disposition • Keep • Delete • Keep, revise	Explanation or brief description of work so far or reason for 'no progress'
McClellan Wash Watercourse Master Plan (in progress) for the purposes of identifying drainage improvement alternatives, cost sharing options rules of development, and cumulative effects of existing and future development and encroachment into floodplain areas within study area.	Flood	Reimburse developer by area property owners. Under review	City Engineer, Pinal Co Flood Control and Study Consultants.	Property owners within study area and development	In Progress	Keep	Study is currently being conducted.
Area Drainage Remediation Study, Picacho Heights Subdivision.	Flood	\$175,000 FY 2013	City Engineer, Public Works Department	General Fund	Complete	Delete	Study was done, cost was going to be too much.
Develop IGA with Pinal Co Flood Control District for establishing procedural guidelines for the implementation and enforcement of the NFIP floodplain management.	Flood	Time devoted by staff. 2011	Pinal Co Flood Control District/City of Eloy Manager, Engineer, Building Official	General Fund	Complete	Keep, revise	IGA completed. Will maintain IGA, and continue to work with Pinal Co Flood Control.
Adopt more recent edition of the International Building Code-2006 as related to ensure adequate design guidelines for new or remodeled residential, commercial, industrial, educational, hazardous or institutional occupancies.	Flood, Severe Wind, Earthquake	\$5,000 2010	Chief Building Official	General Fund.	Complete	Delete	Eloy adopted 2012 Building Code
Implementation of Multi-Jurisdictional Hazard Mitigation Plan for City of Eloy.	Flood, Severe Wind, Earthquake, Fissure	Time devoted by staff. 2010	City Manager, Engineer, Building Official	General Fund	In Progress	Keep, revise	Implement 2016 plan into future planning activities.

**PINAL COUNTY
MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN**

2016

Assessment of Previous Plan's Actions & Projects for Florence							
Description	Hazard(s) Mitigated	Estimated Cost & Completion Date	Project Primary or Lead	Potential Funding Source(s)	Status • No Progress • In Progress • Complete	Disposition • Keep • Delete • Keep, revise	Explanation or brief description of work so far or reason for 'no progress'
Update building code to IBC 2007 or better to ensure adequate design of new or remodeled facilities	Flood, Severe Wind, Drought,	\$5,000 plus Staff Time FY 2010	Development Services / Building Official	General Fund	In Progress	Keep	Update to 2012 codes
Develop IGAs with county dependent communities to define and clarify roles in implementing the NFIP program and managing the floodplains	Flood	Staff Time Jan 2011	Pinal Co Flood Control District / Section Chief	Flood Control District Levy	In Progress	Keep	Unknown
Community Awareness: Design and implement a comprehensive, concerted campaign for community awareness and education regarding hazards impacting the Town of Florence	All	Staff Time Jan 2011	Administration/ Town Clerk	General Fund	In Progress	Keep	Town General Plan
Volunteer Force: Continue to recruit and train volunteers to provide support in safeguarding Florence before, during, and after any Man made or Natural Disasters.	All	Staff Time On-going	Police Dept/ Police Chief	General Fund	In Progress	Keep, Revise	Ongoing annual and monthly training along with recruitment.
Fire Inspection: Continue to undertake an aggressive fire inspection program	Wildfire	Staff Time On-going	Fire Dept/ Fire Chief	General Fund	In Progress	Keep	On-Going Progress Training, Education, Recognition
Stormwater Management: Establish Florence Stormwater Management Program and enhance/interface with Pinal County Stormwater Programs	Flood	Staff Time On-going	Public Works Director	HURF	In Progress	Keep	Unknown
Heat Exhaustion Plan: Provide prevention and relief to high-risk groups through updates/revisions to the Town of Emergency Operation Plan. Plan would include setting up heat shelters, providing news releases, transportation to shelters, and fans, and monitoring high-risk groups.	Drought	Staff Time 2012	Administration/ Town Clerk	General Fund	In Progress	Keep	Public awareness bulletin issued by PIO.

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2016

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Drought Awareness: Initiate a drought awareness program as part of an existing water conservation campaign through existing town code and coordination with the Arizona Governor's Drought Task Force.	Drought	Staff Time On-going	Public Works Director	Water Utility Fund	In Progress	Keep	Public awareness bulletin issued by PIO
Bridge over Gila: Construct an alternate bridge across the Gila River to improve emergency access across the river.	All	\$6.5M On-going	Planning / Public Works Director	Planning / HURF	In Progress	Keep	In planning stage and budget planning
Floodplain Management: Improve the methods, standards and procedures for floodplain management by implementation of codes, standards, and municipal/regulatory requirements with all review processes of new buildings and critical/non-critical infrastructure.	Flood	Staff Time On-going	Floodplain Administrator: Town Manager / Public Works Director / Planning Director	Planning / HURF	In Progress	Keep	Ongoing work
Community Development: Formalize hazard mitigation as a factor in community development activities, including business growth planning and long-term regional growth planning.	Flood	Staff Time On-going	Planning Dept Director	General Fund	In Progress	Keep	Ongoing work / Certified
GIS Upgrade and continued support.	All	Staff Time On-going	Administration IT Director	General Fund Utilities / HURF Fund	In Progress	Keep	Ongoing work
Flood Warning: Implement flood warning and response tools and develop operational plans for their use.	Flood	Staff Time On-going	Public Works Director	HURF	In Progress	Keep	Use technology for up to date weather information
Low Water Crossing Education: Conduct public education on the dangers of low water crossings.	Flood	Staff Time On-going	Public Works Director	HURF	No Progress	Keep	Identify areas and notify public with new areas

Assessment of Previous Plan's Actions & Projects for Florence							
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Post Disaster Flood Preparation: Enhance the readiness to carry out post-disaster flood mitigation projects for restoring critical infrastructure to operating standards by establishing pre-disaster on-call services	Flood	Staff Time On-going	NIMS Coordination	Water / Sewer / HURF	In Progress	Keep	Ongoing training
Utility Flooding: Encourage property owners to install utilities above the base flood elevations through enforcement of existing floodplain ordinances and building codes	Flood	Staff Time On-going	Public Works Director	Water / Sewer Funds	No Progress	Keep	Budget issues
Stormwater CIPs: Implement recommended drainage solutions/alternatives developed through the Florence Stormwater Management Program	Flood	Staff Time On-going	Public Works Director	HURF	In Progress	Keep	Ongoing work
Flood Insurance CRS Rating: Increase the community's score to reduce flood insurance based upon participation in NFIP, floodplain mapping, public outreach/education, zoning regulations, and amount of open space in the floodplain	Flood	Staff Time On-going	Public Works Director	HURF	In Progress	Keep	Site raised
Wash Protection: Provide increased erosion protection from wash flooding to structural crossings throughout the Town.	Flood	Staff Time On-going	Public Works Director	HURF	In Progress	Keep	Ongoing work
NFIP Awareness: Increase participation in and awareness of the NFIP homeowner insurance program to all residents on an ongoing basis.	Flood	Staff Time On-going	Floodplain Administrator	General Fund	In Progress	Keep	Ongoing work
Wash BMPs: Design and implement in-wash erosion stabilization projects through the development review process.	Flood	Staff Time On-going	Public Works Director	HURF	In Progress	Keep	Ongoing work

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2016

Assessment of Previous Plan's Actions & Projects for Florence							
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Vulnerability Assessment: Complete water vulnerability assessments for water supply and water treatment systems and make improvements to harden security and ensure that appropriate emergency plans are in-place	All	Staff Time On-going	Public Works Director	Water	In Progress	Keep	Gates installed with locks
Extreme Heat: Initiate an extreme heat public awareness and educational campaign through the distribution of published information.	Drought Extreme Heat	Staff Time On-going	Administration	General Fund	In Progress	Keep	PIO updates
Accident Reporting: Improve accident reporting and engineering investigations of collisions to determine patterns, improve signals, traffic markings, and educational efforts to reduce accidents.	All	Staff Time On-going	Public Works Director	HURF	In Progress	Keep	Ongoing work
Upgrade Hydrants: Fire hydrant upgrades to include water distribution systems.	All	\$150,000 FY 12/13	Public Works Director	Water Fund	In Progress	Keep	Ongoing work with some hydrants updated
Water Upgrades: Various water supply and distribution projects in creating a looped system for pressures, fire flow, reduction of main breaks, and replacement of undersize mains.	All	\$850,000 FY 14/15	Public Works Director	Water Fund	In Progress	Keep	Ongoing work/ New well installed and lines
Replace Valves: Valve replacement program on water systems.	All	\$190,000 On-going	Public Works Director	Water Fund	In Progress	Keep	Ongoing work
SH287 and SH79B Roundabout: Construct a roundabout traffic calming hazard mitigation measure at SH 287 and SH79B.	All	\$2M FY 13/14	ADOT / Public Works Director	HURF	In Progress	Keep	Design stage
Fire Safety: Continue and enhance fire prevention and fire safety awareness educational efforts.	Wildfire	Staff Time On-going	Florence Fire Dept	General Fund	In-Progress	Keep	On-Going Progress Training, Education, Recognition

Assessment of Previous Plan's Actions & Projects for Florence							
Description	Hazard(s) Mitigated	Estimated Cost & Completion Date	Project Primary or Lead	Potential Funding Source(s)	Status • No Progress • In Progress • Complete	Disposition • Keep • Delete • Keep, revise	Explanation or brief description of work so far or reason for 'no progress'
Florence FRS Dam Rehabilitation Coordination: Coordinate/cooperate with the Pinal Co Flood Control District and the Natural Resources Conservation Service in the study, design, and construction of rehabilitation measures for the Florence FRS.	Flood	N/A On-going	Florence Flood Control District	N/A	Complete	Delete	Completed
Magma FRS Dam Rehabilitation Coordination: Coordinate/cooperate with the Magma Flood Control District and the Natural Resources Conservation Service in the study and design of rehabilitation measures for the Magma FRS.	All	\$11.5M	Magma Flood Control District	Private Flood Control District	Complete	Delete	Completed
Signal at Diversion Dam Road and SH 79: Construct a traffic signal for accident mitigation at the intersection of Diversion Dam Road and SH79.	All	\$1.184 FY11/12	Town Manager / Public Works Director	Private / Inter-governmental / HURF	In Progress	Keep	Pre-construction phase
Take action to remove town owned property from the flood plain – Phase I.	Flood	\$1M FY 11/12	Planning Dept Director	General Fund	Completed	Delete	Completed
Replace bridge and realign roadway on Old Kelvin Highway to mitigate accident potentials due to insufficient bridge rating and unsafe curvature.	All	\$2M FY 13/14	Public Works Director	HURF	In Progress	Keep	Planning Stage

**PINAL COUNTY
MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN**

2016

Assessment of Previous Plan's Actions & Projects for Kearny							
Description	Hazard(s) Mitigated	Estimated Cost & Completion Date	Project Primary or Lead	Potential Funding Source(s)	Status • No Progress • In Progress • Complete	Disposition • Keep • Delete • Keep, revise	Explanation or brief description of work so far or reason for 'no progress'
Reconstruct Well No. 2 to better flood proof it - Current project is underway to raise the well above the 100-year flood level and flood-proof it.	Flood	\$150,000 June 2011	Town Manager	CDBG	Complete	Delete	Project was completed in 2015, its full cost was \$350,000
Water Conservation Plan Review - Water conservation plan is currently under development and at draft stage.	Drought	Staff Time June 2011	Town Manager	General Fund, Utilities	No Progress	Keep	No progress due to no funding yet.
The Emergency Services Coordinator will investigate repair, replacement or removal of non-functional flood warning siren and funding for same.	Flood, Severe Wind	\$0- \$50,000 June 2012	Town Manager, Police Chief	General Fund, Bond	No Progress	Keep	No progress due to no funding yet.
Flood Management - Town Manager will include flood management issues in annual review of Kearny's general plan, ordinances, codes, and Community Emergency Response Plan in an effort to reduce the effects of flooding hazards on new buildings and infrastructure.	Flood	Staff Time June 2012	Town Manager	General Fund	In Progress	Keep	The General Plan will be updated.
Zoning and Building Code - Continue enforcement of zoning ordinances and building codes through the Town's zoning clearance/site plan review process and IGA with Pinal County for building permits to reduce the effects of flooding hazards on new buildings and infrastructure	Flood	Staff Time June 2012	Town Manager	General Fund	In Progress	Keep	Project is 50% complete and going as anticipated.
Dispatch Review - Police Chief will review existing policies and procedures in the police dispatch area with respect to community power/phone outages on an annual basis	Flood, Severe Wind, Drought	\$50,000 Jan 2013	Police Chief	Grants, Bonds	In Progress	Keep	This is reviewed on an annual basis.

Assessment of Previous Plan's Actions & Projects for Kearny							
Description	Hazard(s) Mitigated	Estimated Cost & Completion Date	Project Primary or Lead	Potential Funding Source(s)	Status • No Progress • In Progress • Complete	Disposition • Keep • Delete • Keep, revise	Explanation or brief description of work so far or reason for 'no progress'
Evaluation - A survey of a random sampling of households and businesses will be conducted to evaluate the effectiveness of the education program and recommended mitigation measures.	Flood, Severe Wind, Drought	Staff Time Jan 2012	Town Manager	General Fund	No Progress	Keep	No progress due to no funding yet.
Storm drainage system on Tilbury Drive	Flood	\$450,000 June 2014	Town Manager	Bonds	No Progress	Keep	No progress due to no funding yet.
Tree/brush thinning on Gila River	Wildfire	\$50,000 June 2012	Fire Chief	Grants	No Progress	Keep	No progress due to no funding yet.

Assessment of Previous Plan's Actions & Projects for Mammoth							
Description	Hazard(s) Mitigated	Estimated Cost & Completion Date	Project Primary or Lead	Potential Funding Source(s)	Status • No Progress • In Progress • Complete	Disposition • Keep • Delete • Keep, revise	Explanation or brief description of work so far or reason for 'no progress'
Coordinate with ADOT to remove vegetation and improve the conveyance capacity for the roadside drainage channel on the west side of SR77 between ADOT milepost 15 and 16 (between Tucson Wash and San Pedro River).	Flood, Wildfire	Staff Time Dec 2017	Public Works / Director	Wastewater Treatment Plant Enterprise	No progress	Keep	Right-of-way coordination.
Maintain current IGA with Pinal County Flood Control District for coordination of floodplain management duties per the NFIP program.	Flood	Staff Time Ongoing	Public Works / Director	General Fund	Complete	Keep	Vital to continue partnership, and maintain IGA.
Construct curbs to direct street runoff in Main Street from SR 77 to approximately one mile north to reduce flooding of adjacent properties.	Flood	\$80,000 Dec 2018	Public Works / Director	HURF, CDBG	In progress	Keep	Partial completion. Additional funding needed.

Assessment of Previous Plan's Actions & Projects for Maricopa							
Description	Hazard(s) Mitigated	Estimated Cost & Completion Date	Project Primary or Lead	Potential Funding Source(s)	Status • No Progress • In Progress • Complete	Disposition • Keep • Delete • Keep, revise	Explanation or brief description of work so far or reason for 'no progress'
Design and construct culvert, bridges, drainage improvements (retention/detention basins) near the Santa Cruz Wash and Santa Rosa Wash and for areas with potential threat from flooding to improve capacity and prevent flooding of adjacent residential and commercial areas.	Flood	\$ 5-6M On-going	Engineering Dept	Development Impact Fee (DIF)	In Progress	Keep	USACE study in progress
Update building code to IBC 2006 to ensure adequate design of new or remodeled facilities	Flood, Severe Wind	Staff time FY 2009	Development Services / Building Official	General Fund	Complete	Delete	Maricopa adopted IBC 2012
Coordinate efforts with Pinal Co in implementing the NFIP program and managing the floodplain through projects such as CLOMR/LOMR; elevation certificates; adoption of a master drainage study; certification of levees, and project review and approval for construction within the floodplains	Flood	Staff time On-going	Pinal Co Flood Control District / City of Maricopa Floodplain Administrator	Co Flood District, City of Maricopa General Fund	In Progress	Keep	On-going coordination with PCFCD needed
Conduct and adopt City of Maricopa Master Drainage Study so that adequate review and approval for construction within the floodplains may be conducted	Flood	\$425,000 plus Staff time FY 2009	Engineering Dept	General Fund	Complete	Delete	Plan completed in March 2010
Design and construct Santa Cruz Wash Channelization (realignment) per the Regional Flood Control Solution	Flood	\$20M On-going	City of Maricopa/ private	General Fund, Private/ Public Partnership	In Progress	Keep	Pre-design stage, waiting on USACE study
Prepare and sign a IGA between City of Maricopa and Arizona Department of Transportation (ADOT) for bridge inspection and maintenance	Flood Severe Wind	Staff time On-going	Engineering Dept Transportation Dept	City of Maricopa, ADOT	In Progress	Keep	On-going coordination with ADOT needed

Assessment of Previous Plan's Actions & Projects for Superior							
Description	Hazard(s) Mitigated	Estimated Cost & Completion Date	Project Primary or Lead	Potential Funding Source(s)	Status • No Progress • In Progress • Complete	Disposition • Keep • Delete • Keep, revise	Explanation or brief description of work so far or reason for 'no progress'
Update Fire Department 5-year plan	Fire, EMS, & Hazardous Materials	\$5,000 Staff Time June 2010	Fire Dept	General Fund	In progress	Keep	Revised every year
Update building code to ICC 2006 or better to ensure adequate design of new or remodeled facilities	Flood, Severe Wind, Drought,	\$5,000 Staff Time FY 2010	Fire Dept & Building Dept	General Fund	Complete	Delete	Pinal will keep & update
Upgrade existing radio and CAD systems to P-25 compliant and narrow band compliant infrastructure	Public Safety Communication Interoperability	\$220,000 Staff Time FY 2011	Public Safety Dept	SHSGP & General Fund	Complete	Delete	
Abatement of Vacant or Abandoned Buildings	Fire, Crime & Public Nuisance	\$1.2M FY 2015	Public Safety Dept & Building Safety Dept	CDBG	No progress	Keep, revise	CDBG funding 3yrs in future
Queen Creek/Fuels Mitigation and beautification project	Wildfire	\$250,000 Staff Time FY 2012	Public Works	SHSGP	No progress	Delete	Unable to meet grant requirement
Mary Drive/All Weather Crossing	Flood	\$500,000 Staff Time FY 2015	Public Works	CDBG, HURF, General Fund	No progress	Keep, revise	No funding