

**TABLE OF CONTENTS**

**SECTION 1: INTRODUCTION..... 2**

**1.1 Purpose .....2**

**1.2 Background and Scope .....2**

**1.3 Assurances .....3**

**1.4 Plan Organization .....3**

**SECTION 2: COMMUNITY DESCRIPTIONS ..... 2**

**2.1 County Overview.....2**

**2.2 Jurisdictional Overviews .....10**

        2.2.1 Apache Junction.....10

        2.2.2 Casa Grande .....12

        2.2.3 Coolidge.....14

        2.2.4 Eloy .....16

        2.2.5 Florence .....18

        2.2.6 Kearny.....20

        2.2.7 Mammoth.....22

        2.2.8 Maricopa .....23

        2.2.9 Superior.....1

**SECTION 3: PLANNING PROCESS..... 2**

**3.1 Section Changes .....2**

**3.2 Primary Points of Contact.....2**

**3.3 Planning Team and Activities .....2**

**3.4 Public and Stakeholder Involvement.....5**

**3.5 Program Integration .....8**

**SECTION 4: RISK ASSESSMENT ..... 10**

**4.1 Section Changes .....10**

**4.2 Hazard Identification.....10**

**.3 Vulnerability Analysis Methodology .....11**

**4.4 Hazard Risk Profiles .....15**

        4.4.1 Dam Failure .....15

        4.4.2 Drought .....32

        4.4.3 Fissure.....42

        4.4.4 Flood / Flash Flood .....57

        4.4.5 Levee Failure .....74

        4.4.6 Severe Wind.....88

        4.4.7 Subsidence .....92

        4.4.8 Wildfire.....106

**SECTION 5: MITIGATION STRATEGY ..... 123**

**5.1 Section Changes .....123**

**5.2 Hazard Mitigation Goals .....123**

**5.3 Capability Assessment .....123**

**5.4 Mitigation Actions and Projects .....147**

**SECTION 6: PLAN MAINTENANCE PROCEDURES..... 164**

**6.1 Monitoring, Evaluating and Updating .....164**

**6.2 Incorporation into Existing Planning Mechanisms.....164**

**APPENDIX A: PLAN TOOLS ..... 167**

**APPENDIX A: PLANNING DOCUMENTATION ..... 170**

**APPENDIX B: PUBLIC & STAKEHOLDER INVOLVEMENT RECORDS ..... 183**

**APPENDIX C: PREVIOUS MITIGATION STRATEGY STATUS ..... 191**

LIST OF MAPS

MAP 2-1: VICINITY .....	3
MAP 2-2: GENERAL LOCATION AND TRANSPORTATION .....	4
MAP 2-3: ECOREGIONS .....	5
MAP 2-4: COMMUNITY LOCATION AND LAND OWNERSHIP.....	6
MAP 2-5: PINAL COUNTY GROWTH AREA.....	9
MAP 2-6: CITY OF APACHE JUNCTION LAND USE .....	11
MAP 2-7: CITY OF CASA GRANDE LAND USE .....	13
MAP 2-8: CITY OF COOLIDGE LAND USE.....	15
MAP 2-9: CITY OF ELOY LAND USE .....	17
MAP 2-10: TOWN OF KEARNY LAND USE .....	21
MAP 2-11: CITY OF MARICOPA .....	24
MAP 2-12: CITY OF MARICOPA LAND USE .....	25
MAP 2-13: PINAL COUNTY LAND USE PLAN.....	ERROR! BOOKMARK NOT DEFINED.
MAP 4-1: PINAL COUNTY DAM FAILURE HAZARD AREA (1) .....	28
MAP 4-2: PINAL COUNTY DAM FAILURE HAZARD AREA (2) .....	29
MAP 4-3: PINAL COUNTY DAM FAILURE HAZARD AREA (3) .....	30
MAP 4-4: PINAL COUNTY DAM FAILURE HAZARD AREA (4) .....	31
MAP 4-5: U.S. DROUGHT MONITOR JANUARY 26, 2016 .....	34
MAP 4-6: U.S. SEASONAL DROUGHT OUTLOOK SPRING 2016 .....	34
MAP 4-7: ARIZONA SHORT TERM DROUGHT STATUS .....	35
MAP 4-8: ARIZONA LONG TERM DROUGHT STATUS .....	36
MAP 4-9: 12-MONTH PERCENT OF NORMAL PRECIPITATION INDICATIVE OF THE PRECIPITATION SURPLUS/DEFICIT. ....	37
MAP 4-10: 36-MONTH PERCENT OF NORMAL PRECIPITATION INDICATIVE OF THE PRECIPITATION SURPLUS/DEFICIT. ....	38
MAP 4-11: PINAL COUNTY FISSURE HAZARD AREA (1) .....	53
MAP 4-12: PINAL COUNTY FISSURE HAZARD AREA (2) .....	54
MAP 4-13: PINAL COUNTY FISSURE HAZARD AREA (3) .....	55
MAP 4-14: PINAL COUNTY FISSURE HAZARD AREA (4) .....	56
MAP 4-15: PINAL COUNTY FLOOD HAZARD AREA (1).....	68
MAP 4-16: PINAL COUNTY FLOOD HAZARD AREA (2).....	69
MAP 4-17: PINAL COUNTY FLOOD HAZARD AREA (3).....	70
MAP 4-18: PINAL COUNTY FLOOD HAZARD AREA (4).....	71

---

<b>MAP 4-19: PINAL COUNTY LEVEE FAILURE HAZARD AREA (1)</b> .....	<b>83</b>
<b>MAP 4-20: PINAL COUNTY LEVEE FAILURE HAZARD AREA (2)</b> .....	<b>84</b>
<b>MAP 4-21: PINAL COUNTY LEVEE FAILURE HAZARD AREA (3)</b> .....	<b>85</b>
<b>MAP 4-22: PINAL COUNTY LEVEE FAILURE HAZARD AREA (4)</b> .....	<b>86</b>
<b>MAP 4-23: PINAL COUNTY SUBSIDENCE HAZARD AREA (1)</b> .....	<b>102</b>
<b>MAP 4-24: PINAL COUNTY SUBSIDENCE HAZARD AREA (2)</b> .....	<b>103</b>
<b>MAP 4-25: PINAL COUNTY SUBSIDENCE HAZARD AREA (3)</b> .....	<b>104</b>
<b>MAP 4-26: PINAL COUNTY SUBSIDENCE HAZARD AREA (4)</b> .....	<b>105</b>
<b>MAP 4-27: PINAL COUNTY WILDLAND URBAN INTERFACE AREA</b> .....	<b>107</b>
<b>MAP 4-28: EXTRAORDINARY RAINFALL YEAR FUEL HAZARDS</b> .....	<b>108</b>
<b>MAP 4-29: PINAL COUNTY WILDFIRE HAZARD MAP (1)</b> .....	<b>118</b>
<b>MAP 4-30: PINAL COUNTY WILDFIRE HAZARD AREA (2)</b> .....	<b>119</b>
<b>MAP 4-31: PINAL COUNTY WILDFIRE HAZARD AREA (3)</b> .....	<b>120</b>
<b>MAP 4-32: PINAL COUNTY WILDFIRE HAZARD AREA (4)</b> .....	<b>121</b>

**LIST OF TABLES**

<b>TABLE 2-1: AVERAGE CLIMATE BASED ON FLORENCE AS LOCATION</b> .....	<b>7</b>
<b>TABLE 2-2: POPULATION ESTIMATES FOR PINAL COUNTY</b> .....	<b>8</b>
<b>TABLE 3-1: PLANNING TEAM</b> .....	<b>2</b>
<b>TABLE 3-2: LOCAL PLANNING RESOURCES</b> .....	<b>4</b>
<b>TABLE 3-3: PAST PUBLIC INVOLVEMENT</b> .....	<b>6</b>
<b>TABLE 3-4: FUTURE PUBLIC INVOLVEMENT</b> .....	<b>7</b>
<b>TABLE 4-1: PAST DECLARED HAZARD EVENTS THAT INCLUDED PINAL CO.</b> .....	<b>10</b>
<b>TABLE 4-2: CALCULATED PRIORITY RISK INDEX CATEGORIES AND RISK LEVELS</b> .....	<b>11</b>
<b>TABLE 4-3: CRITICAL AND NON-CRITICAL FACILITIES</b> .....	<b>13</b>
<b>TABLE 4-4: HAZARDS TO BE MITIGATED</b> .....	<b>15</b>
<b>TABLE 4-5: ADWR SAFETY CATEGORIES</b> .....	<b>16</b>
<b>TABLE 4-6: DOWNSTREAM HAZARD POTENTIAL CLASSES FOR STATE REGULATED DAMS</b> .....	<b>17</b>
<b>TABLE 4-7: CPRI RESULTS FOR DAM FAILURE</b> .....	<b>18</b>
<b>TABLE 4-8: NID AND ADWR DAMS BY HAZARD CLASSIFICATION</b> .....	<b>18</b>
<b>TABLE 4-9: ESTIMATED LOSSES DUE TO DAM FAILURE FLOODING</b> .....	<b>20</b>
<b>TABLE 4-10: ESTIMATED POPULATION EXPOSED TO DAM FAILURE</b> .....	<b>20</b>
<b>TABLE 4-11: PINAL CO ESTIMATED BUILDING EXPOSURE TO DAM FAILURE FLOODING</b> .....	<b>21</b>
<b>TABLE 4-12: APACHE JUNCTION ESTIMATED BLDG EXPOSURE TO DAM FAILURE FLOODING</b> ....	<b>21</b>

---

TABLE 4-13: CASA GRANDE ESTIMATED BUILDING EXPOSURE TO DAM FAILURE FLOODING ...	22
TABLE 4-14: COOLIDGE ESTIMATED BUILDING EXPOSURE TO DAM FAILURE FLOODING.....	22
TABLE 4-15: ELOY ESTIMATED BUILDING EXPOSURE TO DAM FAILURE FLOODING.....	23
TABLE 4-16: FLORENCE ESTIMATED BUILDING EXPOSURE TO DAM FAILURE FLOODING.....	23
TABLE 4-17: KEARNY ESTIMATED BUILDING EXPOSURE TO DAM FAILURE FLOODING.....	24
TABLE 4-18: MAMMOTH ESTIMATED BUILDING EXPOSURE TO DAM FAILURE FLOODING.....	24
TABLE 4-19: MARICOPA ESTIMATED BUILDING EXPOSURE TO DAM FAILURE FLOODING .....	25
TABLE 4-20: SUPERIOR ESTIMATED BUILDING EXPOSURE TO DAM FAILURE FLOODING .....	25
TABLE 4-21: UNINC PINAL CO ESTIMATED BUILDING EXPOSURE TO DAM FAILURE FLOODING	26
TABLE 4-22: CPRI RESULTS FOR DROUGHT .....	39
TABLE 4-23: CPRI RESULTS FOR FISSURE .....	43
TABLE 4-24: ESTIMATED LOSSES DUE TO FISSURE RISK .....	44
TABLE 4-25: ESTIMATED POPULATION EXPOSED TO FISSURE RISK .....	45
TABLE 4-26: PINAL CO ESTIMATED BUILDING EXPOSURE TO FISSURE RISK .....	46
TABLE 4-27: APACHE JUNCTION ESTIMATED BUILDING EXPOSURE TO FISSURE RISK.....	46
TABLE 4-28: CASA GRANDE ESTIMATED BUILDING EXPOSURE TO FISSURE RISK .....	47
TABLE 4-29: COOLIDGE ESTIMATED BUILDING EXPOSURE TO FISSURE RISK.....	47
TABLE 4-30: ELOY ESTIMATED BUILDING EXPOSURE TO FISSURE RISK .....	48
TABLE 4-31: FLORENCE ESTIMATED BUILDING EXPOSURE TO FISSURE RISK.....	48
TABLE 4-32: KEARNY ESTIMATED BUILDING EXPOSURE TO FISSURE RISK .....	49
TABLE 4-33: MAMMOTH ESTIMATED BUILDING EXPOSURE TO FISSURE RISK.....	49
TABLE 4-34: MARICOPA ESTIMATED BUILDING EXPOSURE TO FISSURE RISK .....	50
TABLE 4-35: SUPERIOR ESTIMATED BUILDING EXPOSURE TO FISSURE RISK.....	50
TABLE 4-36: UNINC PINAL CO ESTIMATED BUILDING EXPOSURE TO FISSURE RISK .....	51
TABLE 4-37: CPRI RESULTS FOR FLOODING .....	59
TABLE 4-38: ESTIMATED EXPOSURE TO HIGH & MEDIUM HAZARD FLOODING .....	60
TABLE 4-39: ESTIMATED POPULATION EXPOSED TO HIGH & MEDIUM HAZARD FLOODING.....	60
TABLE 4-40: PINAL CO ESTIMATED BUILDING EXPOSURE TO FLOODING.....	62
TABLE 4-41: APACHE JUNCTION ESTIMATED BUILDING EXPOSURE TO FLOODING .....	62
TABLE 4-42: CASA GRANDE ESTIMATED BUILDING EXPOSURE TO FLOODING .....	63
TABLE 4-43: COOLIDGE ESTIMATED BUILDING EXPOSURE TO FLOODING .....	63
TABLE 4-44: ELOY ESTIMATED BUILDING EXPOSURE TO FLOODING.....	64
TABLE 4-45: FLORENCE ESTIMATED BUILDING EXPOSURE TO FLOODING.....	64
TABLE 4-46: KEARNY ESTIMATED BUILDING EXPOSURE TO FLOODING.....	65

---

<b>TABLE 4-47: MAMMOTH ESTIMATED BUILDING EXPOSURE TO FLOODING .....</b>	<b>65</b>
<b>TABLE 4-48: MARICOPA ESTIMATED BUILDING EXPOSURE TO FLOODING .....</b>	<b>66</b>
<b>TABLE 4-49: SUPERIOR ESTIMATED BUILDING EXPOSURE TO FLOODING.....</b>	<b>66</b>
<b>TABLE 4-50: UNINC PINAL CO ESTIMATED BUILDING EXPOSURE TO FLOODING .....</b>	<b>67</b>
<b>TABLE 4-51: RL PROPERTIES IN PINAL COUNTY .....</b>	<b>72</b>
<b>TABLE 4-52: NFIP STATISTICS FOR PINAL COUNTY AS OF FEB 2016 .....</b>	<b>72</b>
<b>TABLE 4-53: CPRI RATING FOR HAZARDOUS MATERIALS INCIDENTS.....</b>	<b>ERROR! BOOKMARK NOT DEFINED.</b>
<b>TABLE 4-54: CPRI RESULTS FOR LEVEE FAILURE .....</b>	<b>75</b>
<b>TABLE 4-55: ESTIMATED LOSSES DUE TO LEVEE FAILURE .....</b>	<b>75</b>
<b>TABLE 4-56: ESTIMATED POPULATION EXPOSED TO LEVEE FAILURE.....</b>	<b>76</b>
<b>TABLE 4-57: PINAL COUNTY ESTIMATED BUILDING EXPOSURE TO LEVEE FAILURE.....</b>	<b>77</b>
<b>TABLE 4-58: APACHE JUNCTION ESTIMATED BUILDING EXPOSURE TO LEVEE FAILURE .....</b>	<b>77</b>
<b>TABLE 4-59: CASA GRANDE ESTIMATED BUILDING EXPOSURE TO LEVEE FAILURE.....</b>	<b>78</b>
<b>TABLE 4-60: COOLIDGE ESTIMATED BUILDING EXPOSURE TO LEVEE FAILURE .....</b>	<b>78</b>
<b>TABLE 4-61: ELOY ESTIMATED BUILDING EXPOSURE TO LEVEE FAILURE.....</b>	<b>79</b>
<b>TABLE 4-62: FLORENCE ESTIMATED BUILDING EXPOSURE TO LEVEE FAILURE .....</b>	<b>79</b>
<b>TABLE 4-63: KEARNY ESTIMATED BUILDING EXPOSURE TO LEVEE FAILURE.....</b>	<b>80</b>
<b>TABLE 4-64: MAMMOTH ESTIMATED BUILDING EXPOSURE TO LEVEE FAILURE .....</b>	<b>80</b>
<b>TABLE 4-65: MARICOPA ESTIMATED BUILDING EXPOSURE TO LEVEE FAILURE.....</b>	<b>81</b>
<b>TABLE 4-66: SUPERIOR ESTIMATED BUILDING EXPOSURE TO LEVEE FAILURE .....</b>	<b>81</b>
<b>TABLE 4-67: UNINC PINAL COUNTY ESTIMATED BUILDING EXPOSURE TO LEVEE FAILURE .....</b>	<b>82</b>
<b>TABLE 4-68: FUJITA TORNADO SCALE.....</b>	<b>89</b>
<b>TABLE 4-69: CPRI RESULTS FOR SEVERE WIND .....</b>	<b>90</b>
<b>TABLE 4-70: CPRI RESULTS FOR SUBSIDENCE .....</b>	<b>93</b>
<b>TABLE 4-71: ESTIMATED POPULATION EXPOSED TO SUBSIDENCE.....</b>	<b>94</b>
<b>TABLE 4-72: PINAL COUNTY ESTIMATED BUILDING EXPOSURE TO SUBSIDENCE.....</b>	<b>95</b>
<b>TABLE 4-73: APACHE JUNCTION ESTIMATED BUILDING EXPOSURE TO SUBSIDENCE .....</b>	<b>95</b>
<b>TABLE 4-74: CASA GRANDE ESTIMATED BUILDING EXPOSURE TO SUBSIDENCE .....</b>	<b>96</b>
<b>TABLE 5-75: COOLIDGE ESTIMATED BUILDING EXPOSURE TO SUBSIDENCE .....</b>	<b>96</b>
<b>TABLE 4-76: ELOY ESTIMATED BUILDING EXPOSURE TO SUBSIDENCE .....</b>	<b>97</b>
<b>TABLE 4-77: FLORENCE ESTIMATED BUILDING EXPOSURE TO SUBSIDENCE .....</b>	<b>97</b>
<b>TABLE 4-78: KEARNY ESTIMATED BUILDING EXPOSURE TO SUBSIDENCE .....</b>	<b>98</b>
<b>TABLE 4-79: MAMMOTH ESTIMATED BUILDING EXPOSURE TO SUBSIDENCE .....</b>	<b>98</b>
<b>TABLE 4-80: MARICOPA ESTIMATED BUILDING EXPOSURE TO SUBSIDENCE.....</b>	<b>99</b>

---

---

<b>TABLE 4-81: SUPERIOR ESTIMATED BUILDING EXPOSURE TO SUBSIDENCE .....</b>	<b>99</b>
<b>TABLE 4-82: UNINC PINAL COUNTY ESTIMATED BUILDING EXPOSURE TO SUBSIDENCE .....</b>	<b>100</b>
<b>TABLE 4-83: CPRI RESULTS FOR WILDFIRE.....</b>	<b>109</b>
<b>TABLE 4-84: ESTIMATED ASSET EXPOSURE TO HIGH &amp; MEDIUM HAZARD WILDFIRE .....</b>	<b>110</b>
<b>TABLE 4-85: ESTIMATED POPULATION EXPOSED TO HIGH AND MEDIUM HAZARD WILDFIRE.</b>	<b>111</b>
<b>TABLE 4-86: PINAL CO ESTIMATED BUILDING EXPOSURE TO WILDFIRE .....</b>	<b>112</b>
<b>TABLE 4-87: APACHE JUNCTION ESTIMATED BUILDING EXPOSURE TO WILDFIRE .....</b>	<b>112</b>
<b>TABLE 4-88: CASA GRANDE ESTIMATED BUILDING EXPOSURE TO WILDFIRE .....</b>	<b>113</b>
<b>TABLE 4-89: COOLIDGE ESTIMATED BUILDING EXPOSURE TO WILDFIRE.....</b>	<b>113</b>
<b>TABLE 4-90: ELOY ESTIMATED BUILDING EXPOSURE TO WILDFIRE .....</b>	<b>114</b>
<b>TABLE 4-91: FLORENCE ESTIMATED BUILDING EXPOSURE TO WILDFIRE .....</b>	<b>114</b>
<b>TABLE 4-92: KEARNY ESTIMATED BUILDING EXPOSURE TO WILDFIRE .....</b>	<b>115</b>
<b>TABLE 4-93: MAMMOTH ESTIMATED BUILDING EXPOSURE TO WILDFIRE.....</b>	<b>115</b>
<b>TABLE 4-94: MARICOPA ESTIMATED BUILDING EXPOSURE TO WILDFIRE .....</b>	<b>116</b>
<b>TABLE 4-95: SUPERIOR ESTIMATED BUILDING EXPOSURE TO WILDFIRE.....</b>	<b>116</b>
<b>TABLE 4-96: UNINC PINAL CO ESTIMATED BUILDING EXPOSURE TO WILDFIRE .....</b>	<b>117</b>
<b>TABLE 5-1: CAPABILITY ASSESSMENT FOR PINAL COUNTY .....</b>	<b>124</b>
<b>TABLE 5-2: CAPABILITY ASSESSMENT FOR APACHE JUNCTION.....</b>	<b>127</b>
<b>TABLE 5-3: CAPABILITY ASSESSMENT FOR CASA GRANDE .....</b>	<b>130</b>
<b>TABLE 5-4: CAPABILITY ASSESSMENT FOR CITY OF COOLIDGE .....</b>	<b>132</b>
<b>TABLE 5-6: CAPABILITY ASSESSMENT FOR FLORENCE.....</b>	<b>136</b>
<b>TABLE 5-7: CAPABILITY ASSESSMENT FOR KEARNY.....</b>	<b>139</b>
<b>TABLE 5-9: CAPABILITY ASSESSMENT FOR MARICOPA .....</b>	<b>143</b>
<b>TABLE 5-11: MITIGATION STRATEGY FOR PINAL COUNTY .....</b>	<b>148</b>
<b>TABLE 5-12: MITIGATION STRATEGY FOR APACHE JUNCTION.....</b>	<b>150</b>
<b>TABLE 5-13: MITIGATION STRATEGY FOR CASA GRANDE .....</b>	<b>153</b>
<b>TABLE 5-14: MITIGATION STRATEGY FOR COOLIDGE.....</b>	<b>155</b>
<b>TABLE 5-15: MITIGATION STRATEGY FOR FLORENCE.....</b>	<b>157</b>
<b>TABLE 5-16: MITIGATION STRATEGY FOR KEARNY.....</b>	<b>161</b>



**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**

## 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 Commerce<sup>1</sup>, 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 ecoregions<sup>2</sup>, which are described by the following:

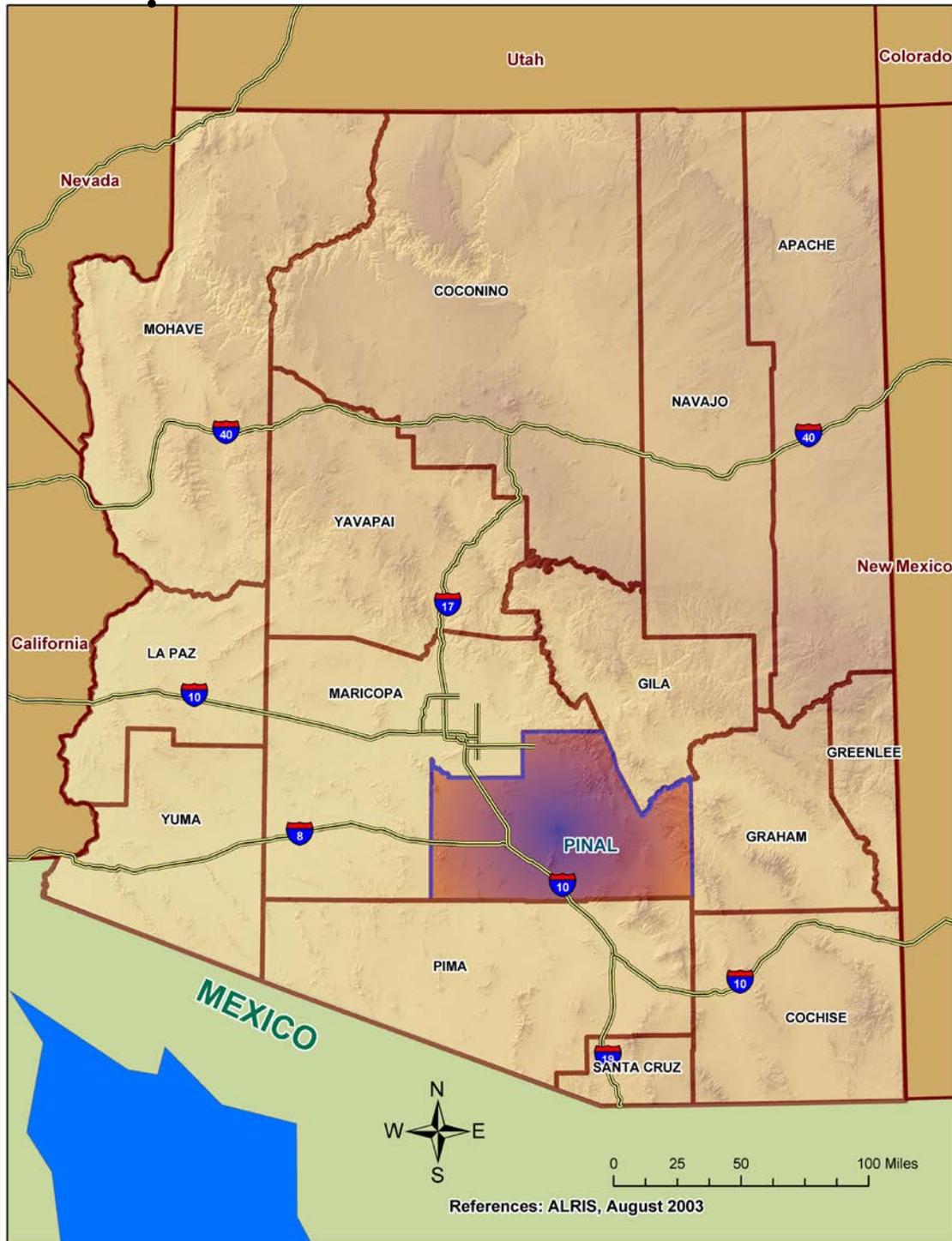
- **Arizona Mountain Forests** – mountainous landscape moderate to steep slopes. Elevations from approximately 4,000-13,000 feet, resulting in comparatively cool summers and cold winters. Vegetation is largely high altitude grasses, shrubs, brush, and conifer forests.
- **Chihuahuan Desert** – high altitude 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 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.

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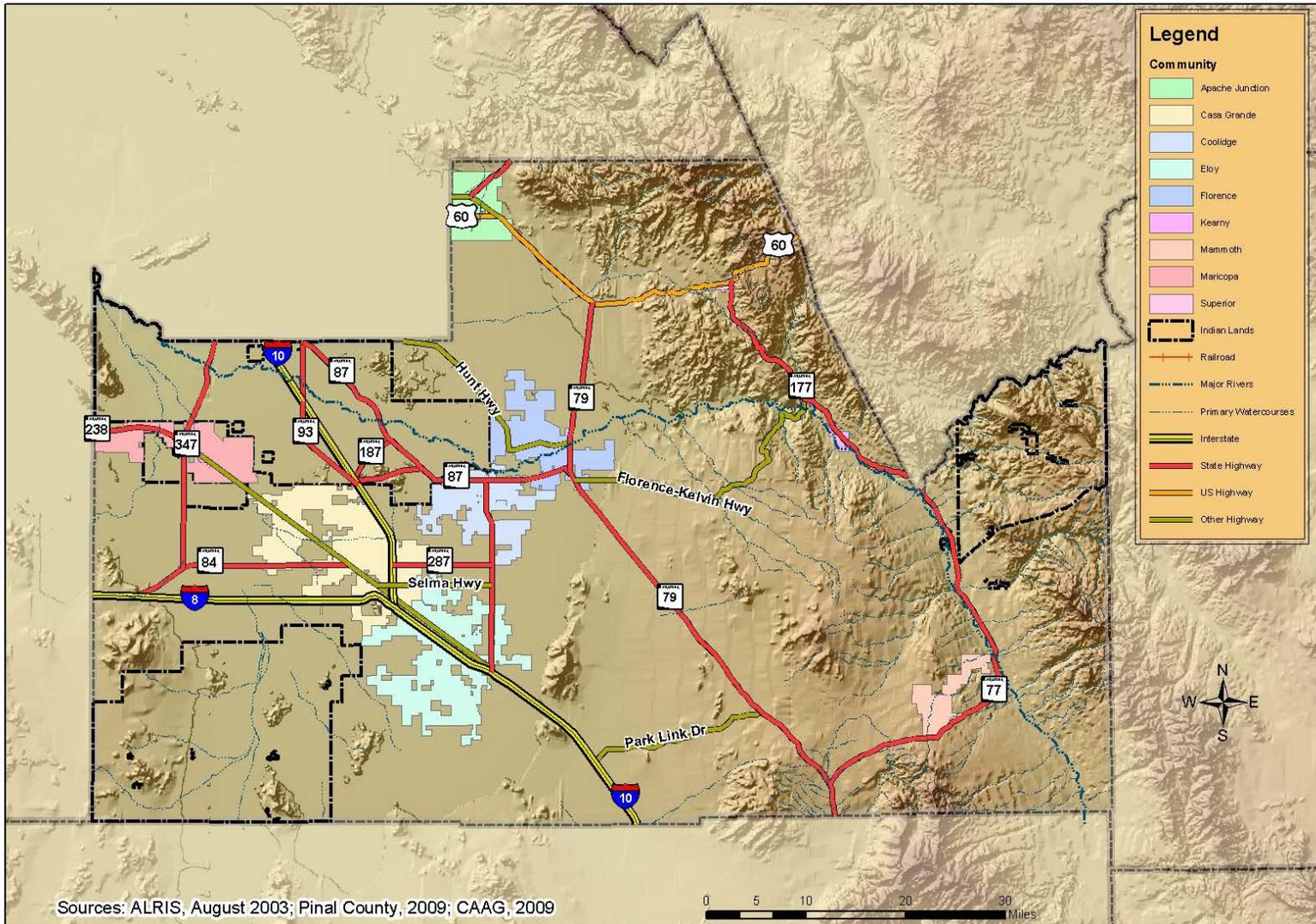
<sup>1</sup> Arizona Department of Commerce, 2008, *Community Profile for Pinal County*

<sup>2</sup> World Wildlife Fund, 2010, GIS database of Terrestrial Ecoregions

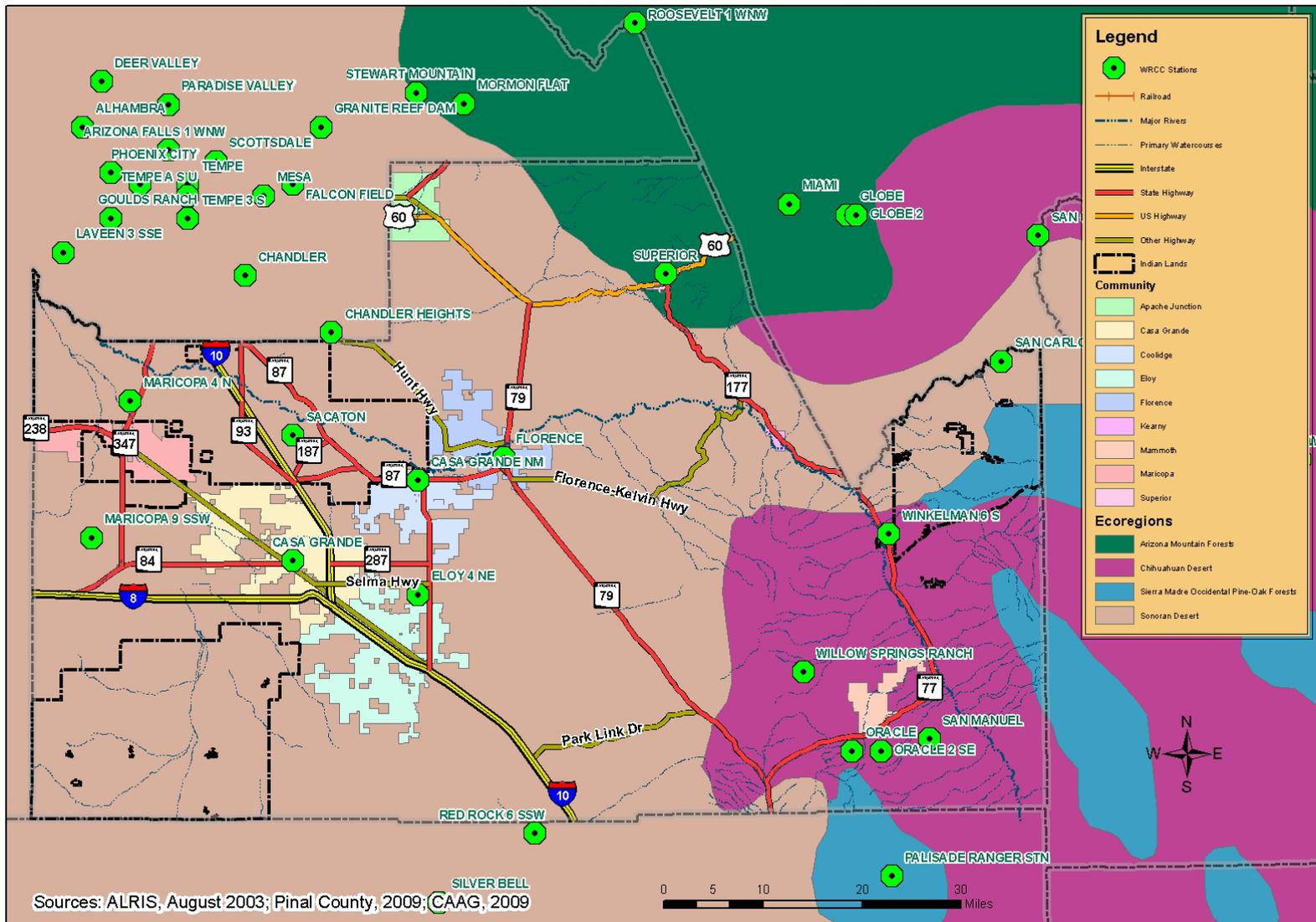
Land ownership within Pinal County is divided between Indian Reservation (32%), Private (29%), U.S. Forest Land (20%), State Trust Land (11%), Bureau of Land Management (7%), and other uses (1%).

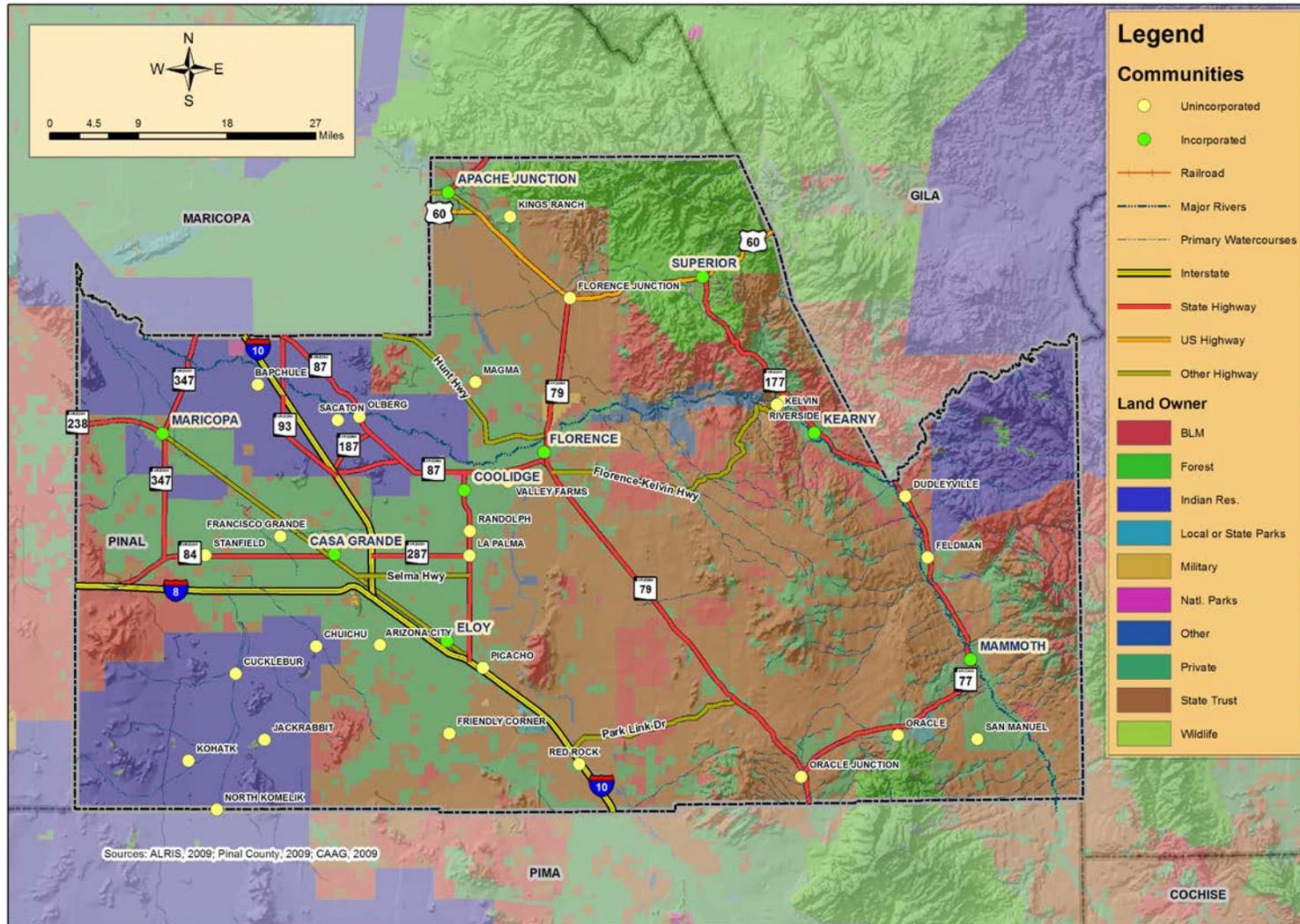


**Map 2-1: Vicinity**



Map 2-2: General Location and Transportation





Map 2-4: 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 Center<sup>3</sup> 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.<sup>4</sup>

**Table 2-1: Average Climate Based on Florence as Location**

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
<b>Avg High Temp (F)</b>	66	70	74	83	91	101	102	101	97	87	74	66
<b>Avg Low Temp (F)</b>	38	41	44	50	58	67	76	75	69	57	44	39
<b>Avg Precip (Inches)</b>	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.

<sup>3</sup> 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>

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

<b>Jurisdiction</b>	<b>2010</b>	<b>2014</b>	<b>2020</b>
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
Queen Creek	450	459	572
Superior	2,835	2,869	3,189
Winkleman	0	0	0
Note: Apache Junction, Queen Creek, and Winkleman have jurisdictional boundaries that span over Pinal Co and Maricopa (Apache Junction and Queen Creek) and Gila Co (Winkleman), however, the populations listed are specific to Pinal Co only. Source: <a href="https://population.az.gov/population-estimates">https://population.az.gov/population-estimates</a>			

### **Economy**

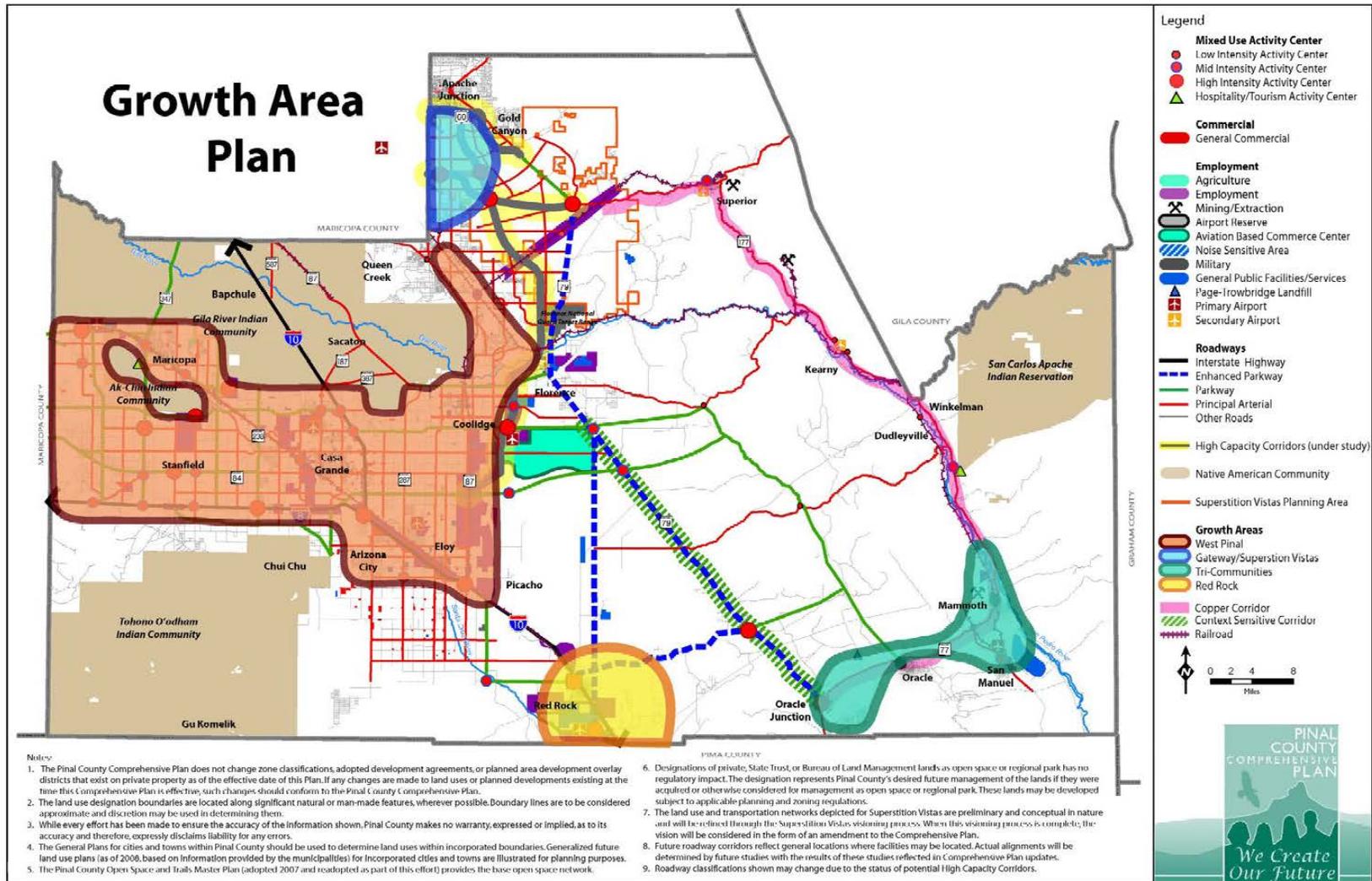
Many communities throughout Pinal County have been traditionally involved with copper mining, smelting, milling and refining, while others have developed agriculture based-economies. The larger communities such as Maricopa, Apache Junction, Coolidge, Eloy, and especially Casa Grande have included manufacturing, 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 had 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, Maricopa and Queen Creek. 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, enhance 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%.<sup>[1]</sup> 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.

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



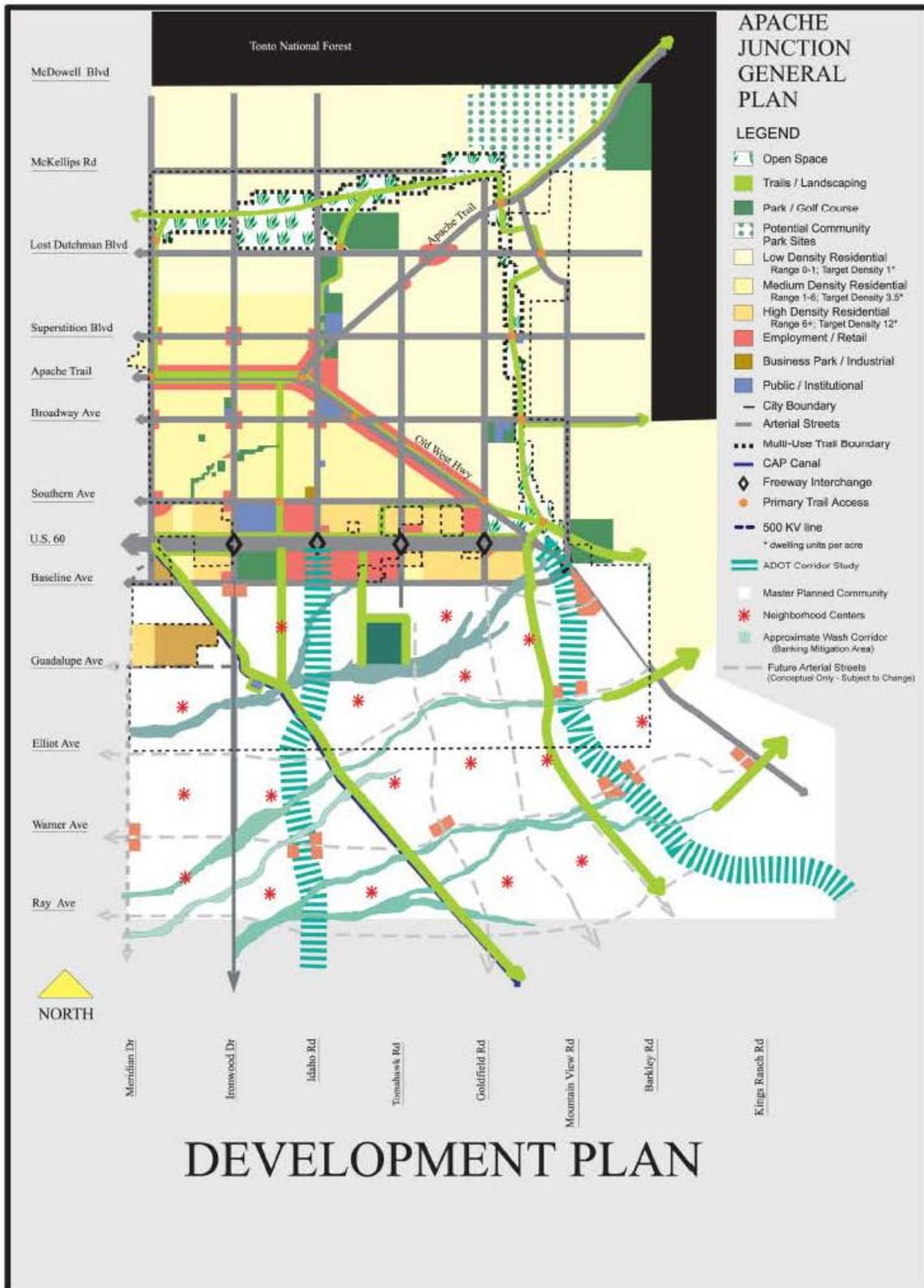
Map 2-5: Pinal County Growth Area

## **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.

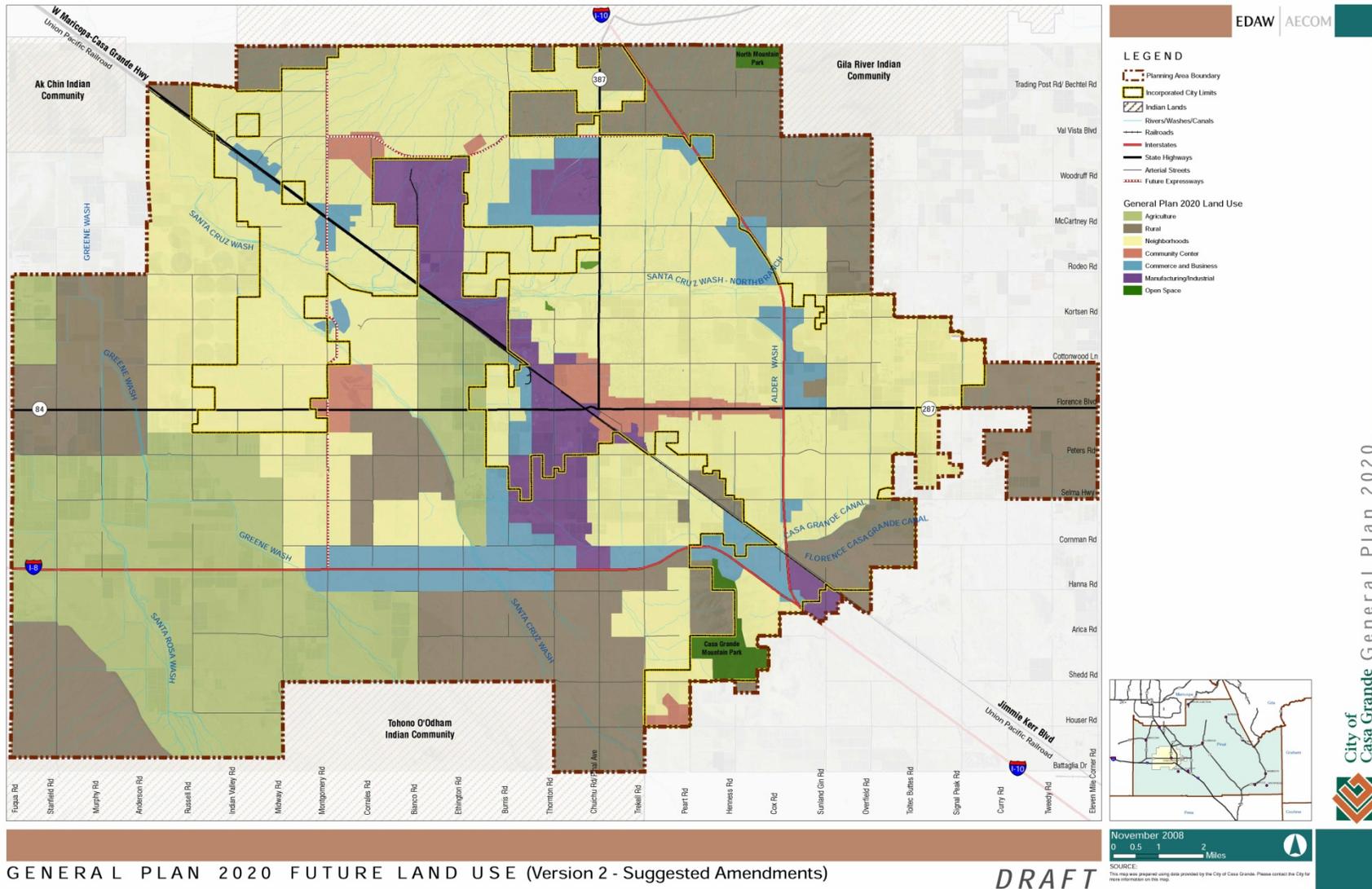
Casa Grande is located in mid-central Pinal County and is situated at an elevation of 1,398 feet. Casa Grande is strategically located at the intersection of two interstate highways (I-8 and I-10) in an area known as Arizona’s Golden Corridor. Phoenix is located 45 miles to the northwest and Tucson 70 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.<sup>5</sup> 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.<sup>6</sup>

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<sup>5</sup> City of Casa Grande Web Site, Facts and Stats, Updated 2013

<sup>6</sup> 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 Commerce<sup>7</sup>, 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.

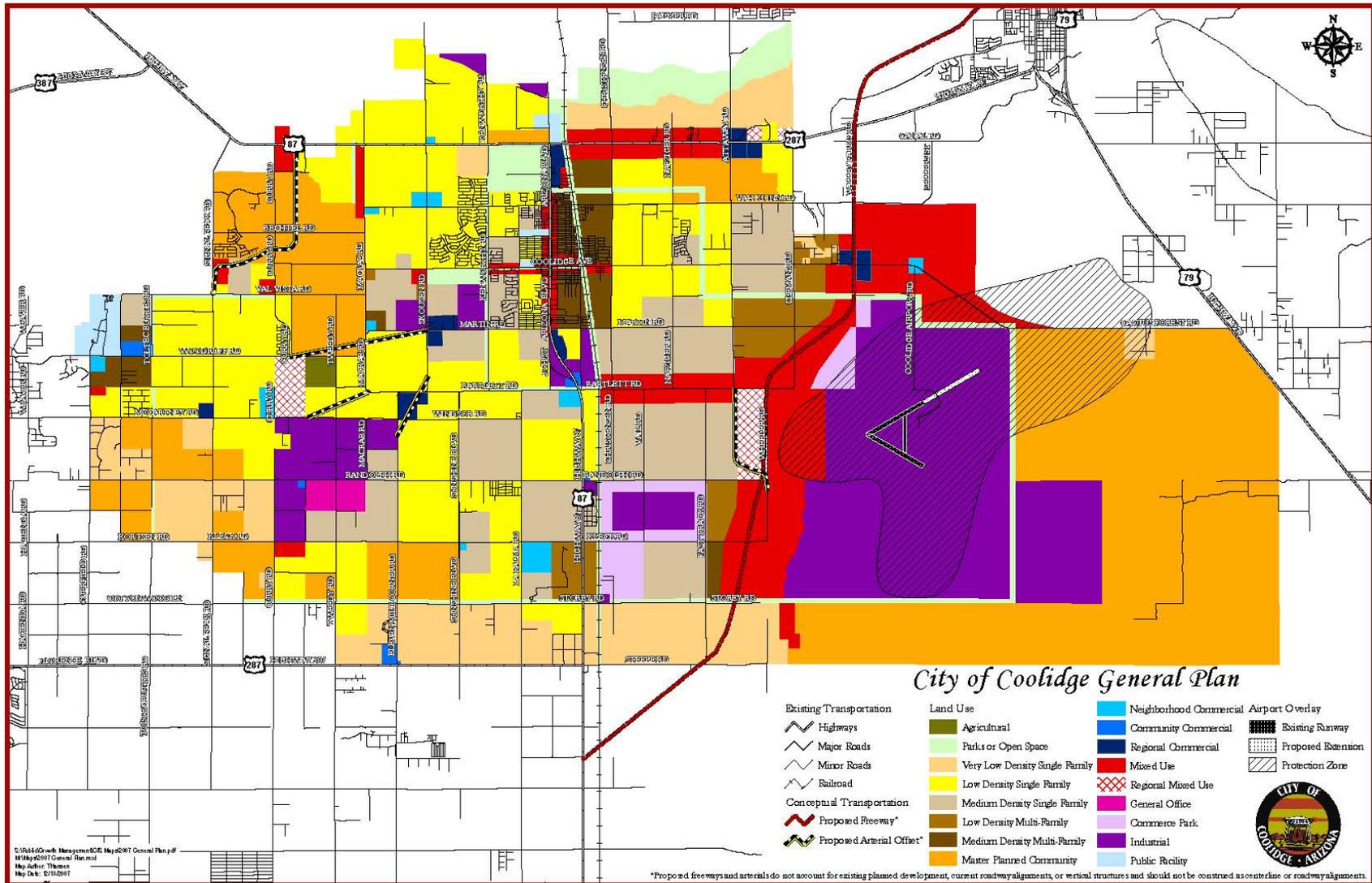
Up until the 1950s, the economy was primarily agriculture, and has since diversified into manufacturing, tourism and regional trade and services for agricultural producers and farm families. The 500-acre Pima-Coolidge Industrial park on the Gila River Indian Reservation has boosted manufacturing. The 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 2008 was 5,358 with an unemployment rate of 12.2%. In 2008, there were approximately \$177.2 million of taxable sales in the city.<sup>8</sup>

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<sup>7</sup> Arizona Department of Commerce, 2003, *Community Profile for Coolidge, Arizona*.

<sup>8</sup> <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 20<sup>th</sup> 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.

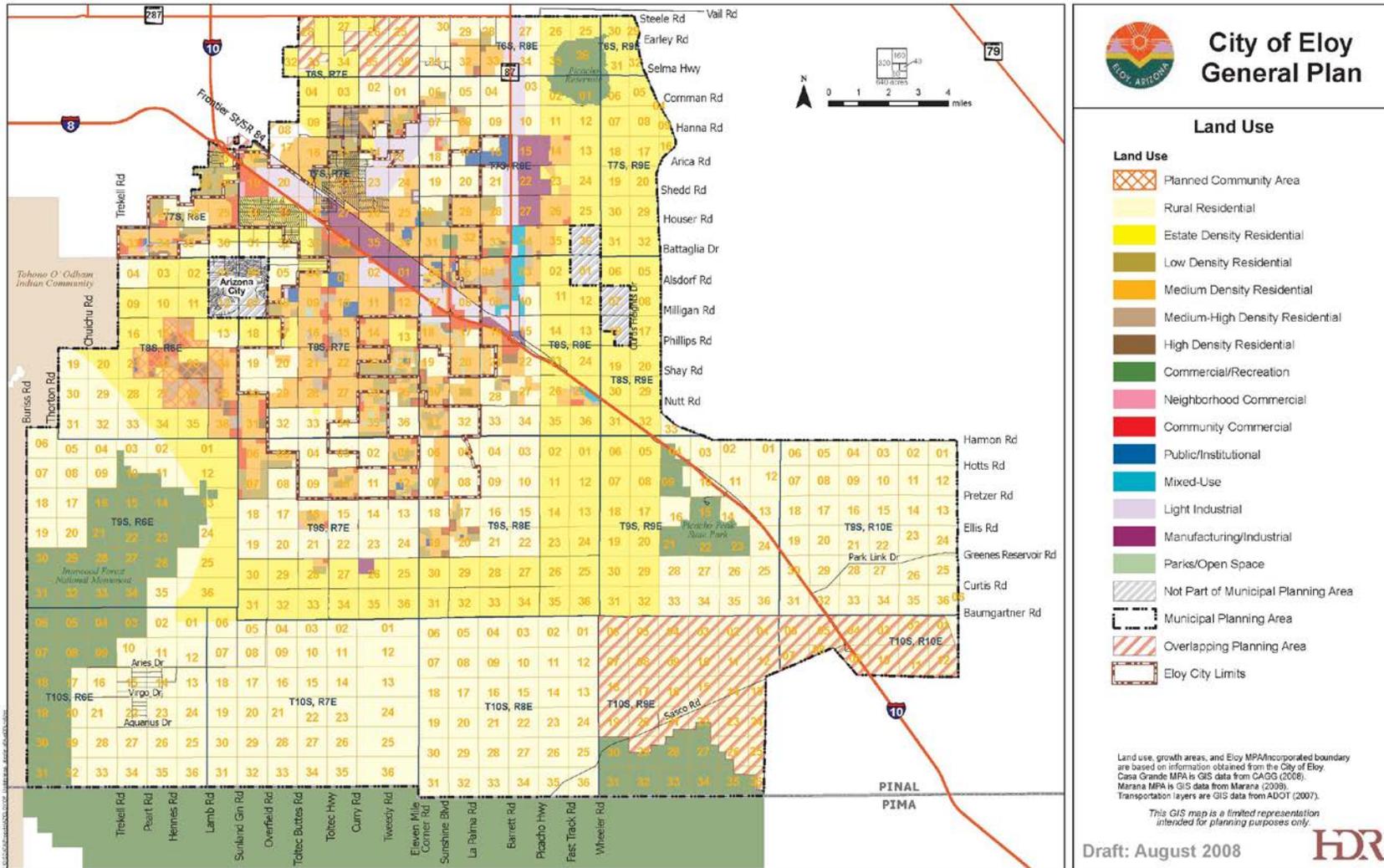
Eloy is located in mid-central Pinal County and is situated at an elevation of 1,565 feet. Interstate Highway 10 divides the community and Interstate Highway 8 is nearby to the northwest. State Routes 87 and 287 are near the eastern and northern boundary of Eloy. Phoenix is approximately 69 miles to 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 2008 was 5,820 with an unemployment rate of 10.1%. In 2008, there were approximately \$281.4 million of taxable sales in the city.<sup>9</sup>

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<sup>9</sup> <http://www.azcommerce.com/doclib/COMMUNE/eloy.pdf>



Map 2-9: City of Eloy Land Use

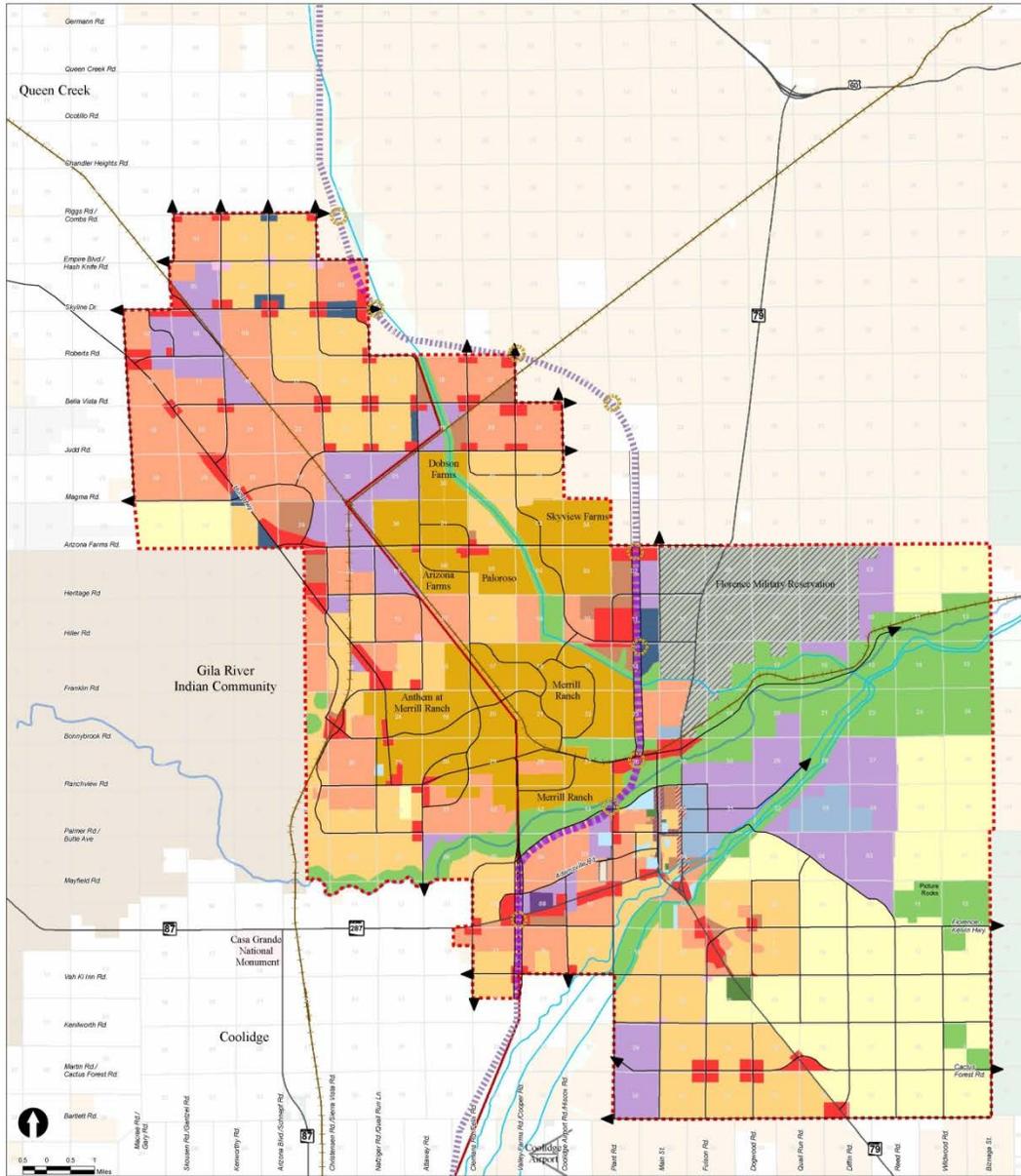
### **2.2.5 Florence**

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 as represented below.

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. 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.



Map 2-9: Town of Florence Land Use

**2.2.6 Kearny**

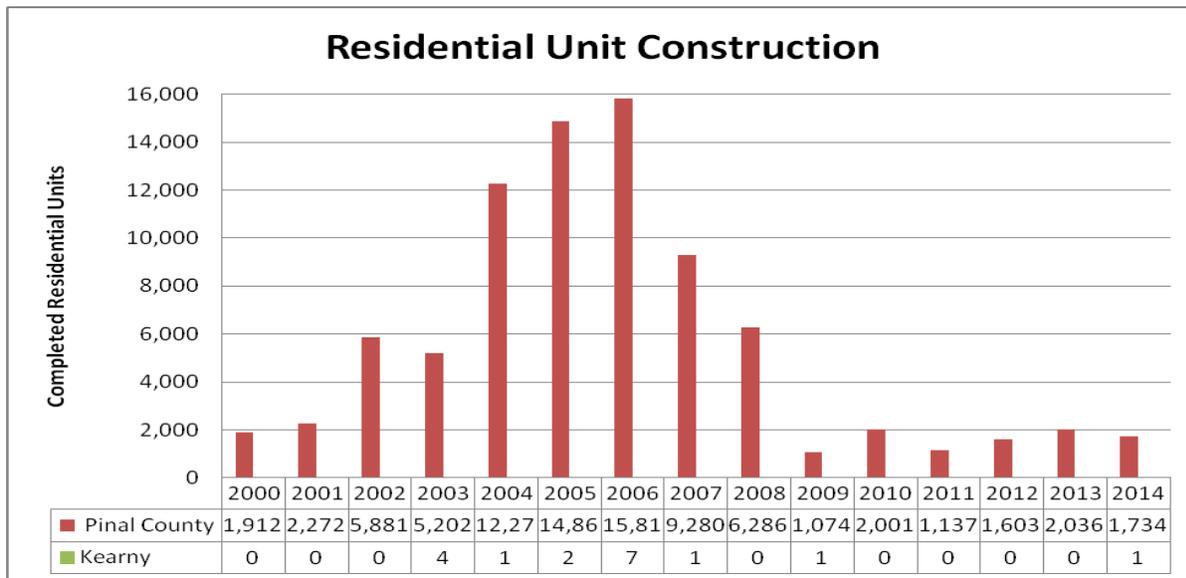
During the period of 1849 – 1850, the leader of the “Army of the West”, General Stephen W. Kearny explored the area along the Gila River. The base camp he set up would later be known as the Town of Kearny. In 1958, a planned community was built for workers of Kennecott Copper Company which worked an 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 major source of employment for the community 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.<sup>10</sup>

Based on Kearny’s current General Plan, land use planning varies from multiple residential densities, commercial, and industrial.

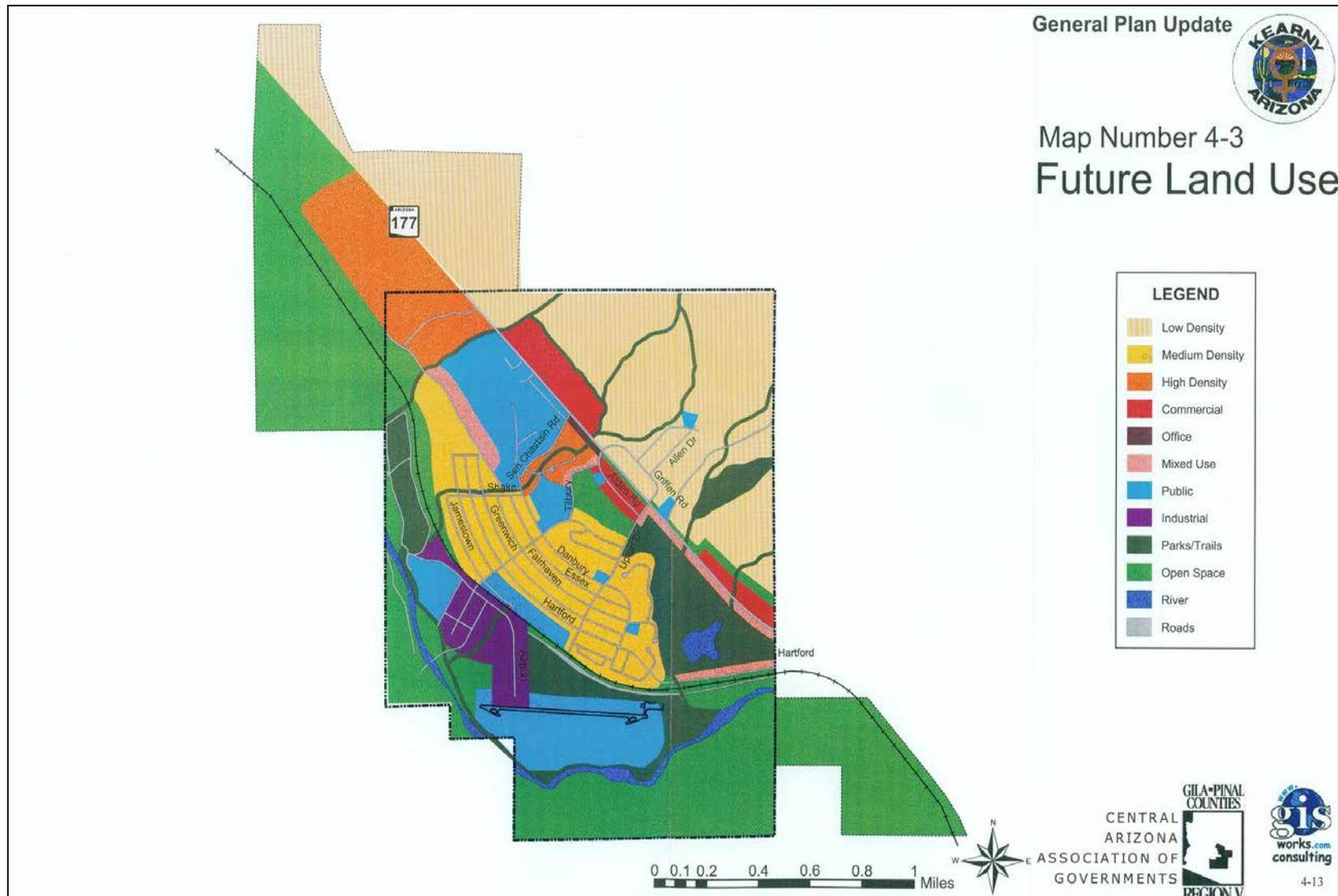
The civilian labor force in 2008 was 1,562 with an unemployment rate of 4.2%. In 2008, there were approximately \$14.2 million of taxable sales in the Town.<sup>11</sup> Residential units completed in the Town over the period of 2000-2009 are shown below. County-wide totals are also provided for comparison.



**Residential units completed for Kearny during 2000 to 2014**

<sup>10</sup> <http://www.azcommerce.com/doclib/COMMUNE/kearny.pdf>

<sup>11</sup> *ibid.*



Map 2-10: 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.:<sup>12</sup>

“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.

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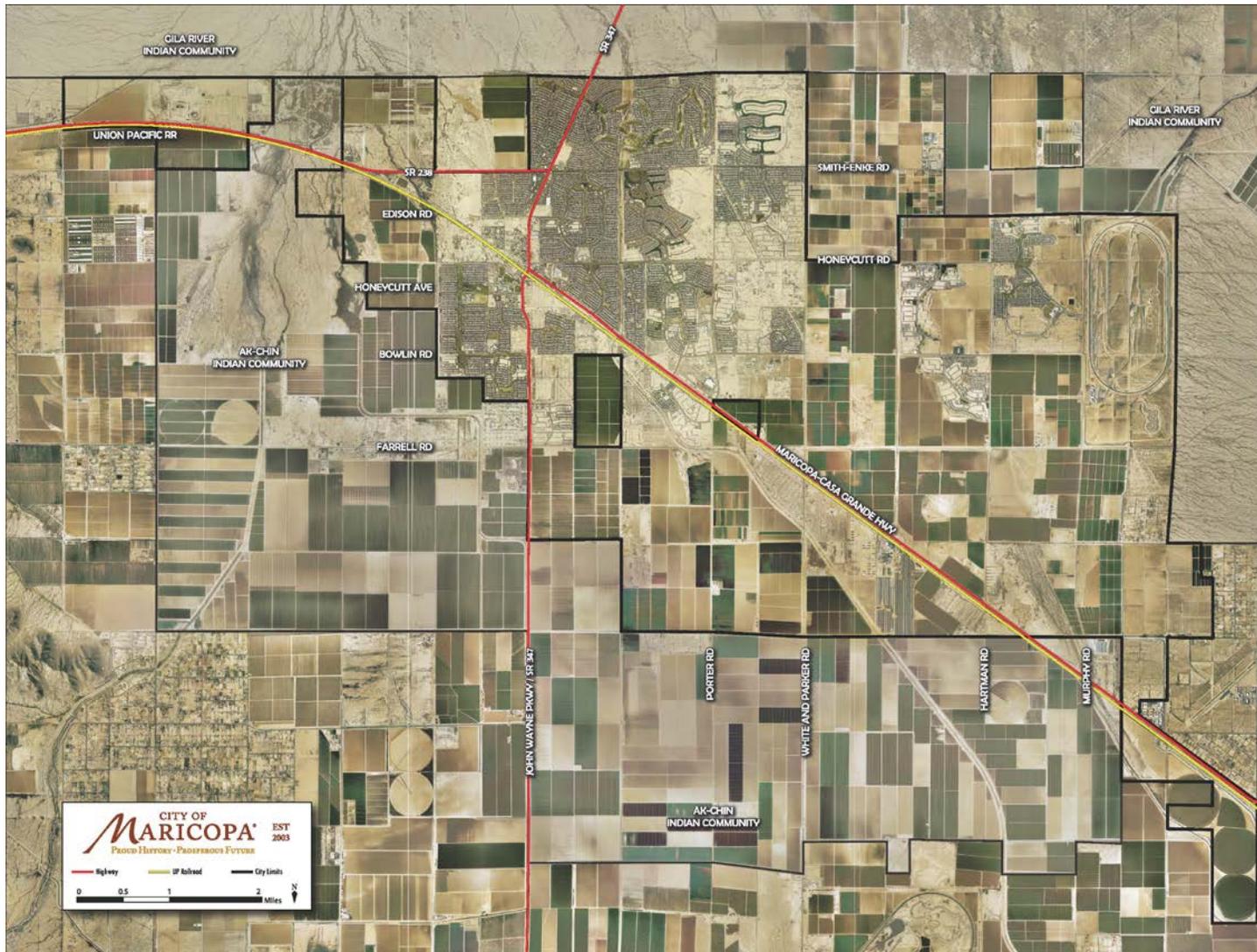
<sup>12</sup> <http://www.arizonan.com/Mammoth/>

### 2.2.8 Maricopa

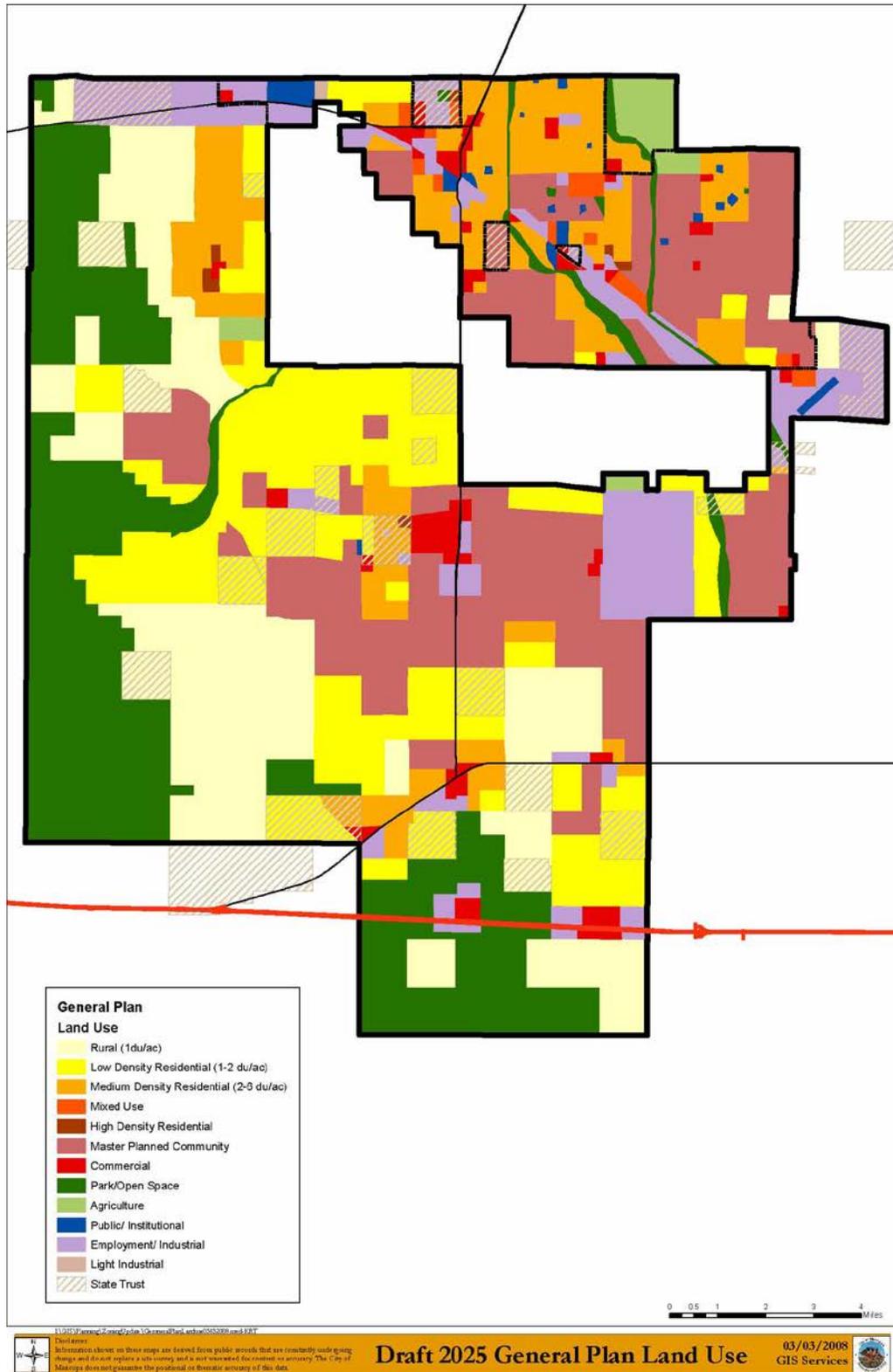
Maricopa's long and rich history starts over 300 years ago beginning with a 1694 journal entry by Father Eusebio Francisco Kino describing this area and calling it Maricopa Wells. During the mid – 1800s, it was a dependable source of water along the Gila Trail. This location became an important and well 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 2-11: City of Maricopa



Map 2-12: 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. The most recent residential growth has occurred in the area south of Superior High School known as Superior Highlands.

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.

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



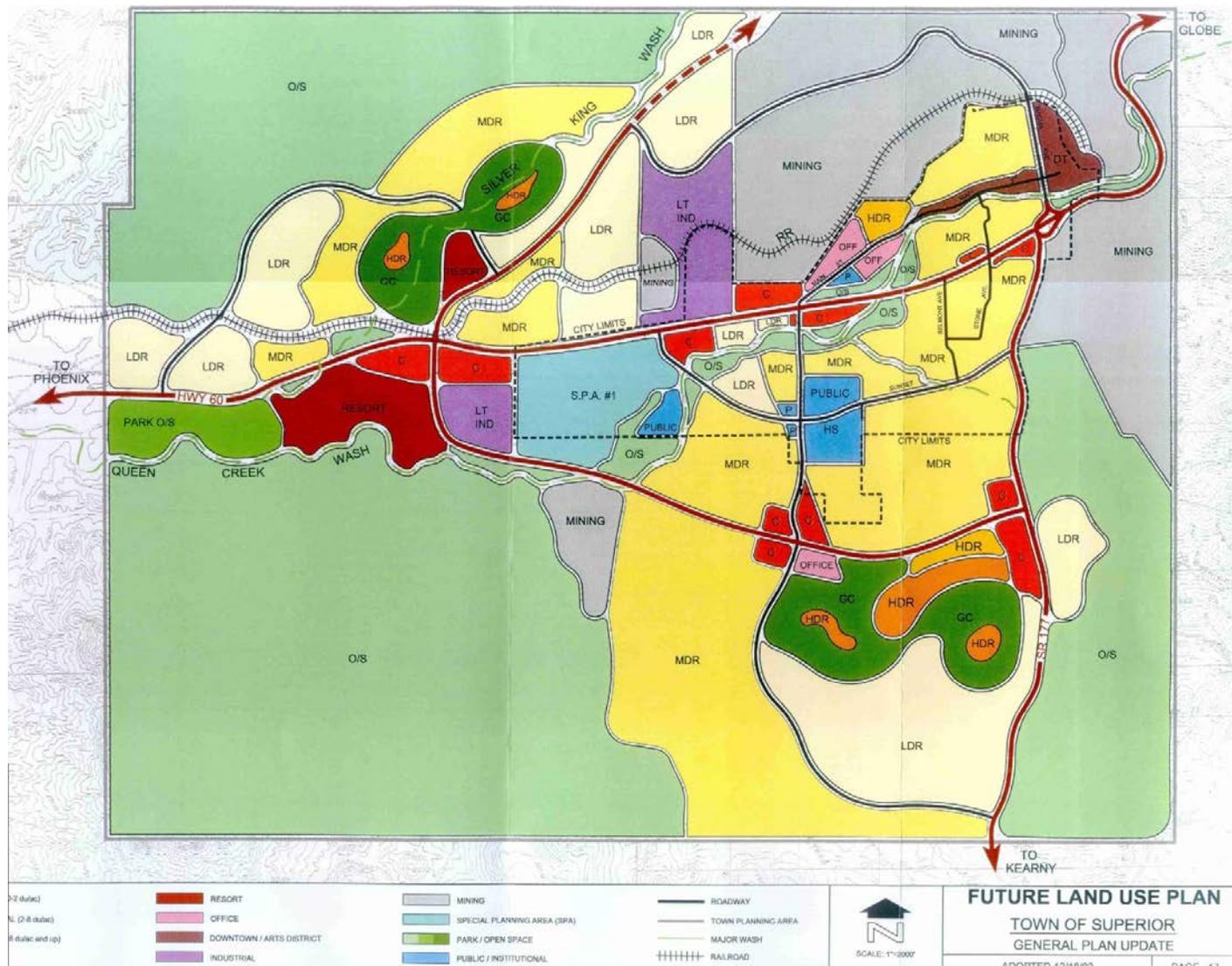


Figure 3-26: Town of Superior Land Use

**SECTION 3: PLANNING PROCESS**

**3.1 Section Changes**

**3.2 Primary Points of Contact**

**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**  
 Rob Jarvis  
 Chief  
 Fire Department

**Eloy**  
 Ken Martin  
 Public Works Director  
 City of Eloy

**Florence**  
 William Tatlock  
 Sergeant  
 Florence Police Department

**Kearny**  
 Anna Flores  
 Town Manager  
 Town of Kearny

**Mammoth**  
 Erica Garcia  
 Town Clerk  
 Town of Mammoth

**Maricopa**  
 Eddie Rodriguez  
 Deputy Fire Marshal  
 Maricopa Fire Department

**Superior**  
 Mark Nipp  
 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.

<b>Table 3-1: Planning Team</b>		
<b>Name Title</b>	<b>Agency/Dept/Org</b>	<b>Role</b>
<b>Pedro Apodaca Streets Superintendent</b>	City of Casa Grande	Represent Casa Grande in planning process.

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

2016

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.
<b>Art Carlton Administrator</b>	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.
<b>Scott Miller Fire Chief</b>	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	Eloy Police Dept	Represent Eloy in the planning

Chief		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:

<b>Table 3-2: Local Planning Resources</b>		
<b>Name Title</b>	<b>Agency/Dept/Division</b>	<b>Jurisdiction</b>
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 Chief	Fire Dept.	Casa Grande

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 Florence	Eloy
Ken Piggott Superintendent and Fire Chief	Public Works and Fire Department	Kearny
M. Green Sgt.	Police Dept.	Mammoth
Erica Gomez Town Clerk	Manager	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 of 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.

<b>Table 3-3: Past Public and Stakeholder Involvement</b>	
<b>Jurisdiction</b>	<b>Activity or Opportunity</b>
Pinal County	<ul style="list-style-type: none"> <li>• Maintained the county website that included the current Plan and provided contact information for continued comment and input.</li> <li>• Developed brochures regarding local threats in conjunction with the mitigation website.</li> <li>• Attended at least two community fairs a year that included the dissemination of public information regarding the dangers of the areas' hazards.</li> <li>• Conducted Emergency Management Community Information Exchange meetings with local emergency management professionals on a quarterly basis, and discuss hazard mitigation events.</li> <li>• Conducted Flood Control District Quarterly meetings.</li> </ul>
Apache Junction	<ul style="list-style-type: none"> <li>• Presented Plan at City Council meeting and advised newly elected officials periodically.</li> <li>• Maintained a page on the city website including the current Plan, allowing the submittal of citizen comments, and staff response to citizen inquiries.</li> <li>• Distribute Floodplain Management brochures at public information distribution locations throughout City offices and departments, and at neighborhood meetings.</li> </ul>
Casa Grande	<ul style="list-style-type: none"> <li>• Provided mitigation brochures to the public at community events:</li> <li>• Silent Witness Anti-Crime Night</li> <li>• Mayor's State of the City Address</li> <li>• City Hall without Walls (targets different areas of the community at least four times a year)</li> </ul>
Coolidge	<ul style="list-style-type: none"> <li>• Provided mitigation brochures to the public at community events:</li> <li>• The Mayor's State of the City Address</li> <li>• Calvin Coolidge Days</li> <li>• Coolidge Cotton Days</li> </ul>
Eloy	<ul style="list-style-type: none"> <li>• Maintained City website containing the current Plan and contact information for those interested in contributing information or ideas to the planning process.</li> <li>• The Plan was delivered to the Economic Development Group of Eloy (EDGE), at its regularly scheduled meetings.</li> <li>• Advertising of the Plan was presented to the public by its inclusion into the City of Eloy Newsletter.</li> <li>• Periodically articles were published in the Eloy Enterprise to provide preparedness steps for the public to take in response to hazards.</li> </ul>
Florence	<ul style="list-style-type: none"> <li>• Participated in Wildfire Prevention Week coordinated by the Town's Fire Dept.</li> </ul>
Kearny	<p>The Town of Kearny will perform or conduct the following public involvement activities:</p> <ul style="list-style-type: none"> <li>• Published articles in the local newspaper about the current Plan and the status of any updates.</li> <li>• Provided floodplain related hazard mitigation information to targeted properties in high risk areas.</li> <li>• Provided news releases to local news media related to mitigation activities and floodplain management.</li> </ul>
Mammoth	<ul style="list-style-type: none"> <li>• Provided hazard and mitigation brochures at the Town Hall and Town Library.</li> <li>• Had a copy of the Plan available at the Town Hall.</li> <li>• Actively participated with Pinal County Flood Control District, to targeted properties in high risk areas.</li> </ul>
Maricopa	<p>Brochures / flyers prepared and provided by DEMA were handed out by in the City booth at these events:</p> <ul style="list-style-type: none"> <li>• Salsa Festival (April),</li> <li>• July Fourth Celebration (July), and</li> <li>• Founder's Day (October)</li> </ul> <p>Additionally, fire and police (Safety Division) have a booth on these events and provide additional information for distribution.</p>

**Table 3-3: Past Public and Stakeholder Involvement**

Jurisdiction	Activity or Opportunity
Superior	<ul style="list-style-type: none"> <li>Published articles in local newspaper regarding the Plan.</li> <li>Provided floodplain related hazard and mitigation information to targeted properties in high risk areas as requested.</li> <li>Released periodic media statements related to mitigation activities and floodplain management.</li> </ul>

The following table summarizes activities for public involvement and dissemination of information that shall be pursued whenever possible and appropriate.

**Table 3-4: Future Public and Stakeholder Involvement**

Jurisdiction	Activity or Opportunity
Pinal County	<ul style="list-style-type: none"> <li>Attend at least two community fairs a year that include the dissemination of public information regarding the dangers of the areas' hazards.</li> <li>Conduct Emergency Management Community Information Exchange meetings with local emergency management professionals on a quarterly basis, and discuss hazard mitigation events.</li> <li>Conduct Flood Control District Quarterly meetings.</li> </ul>
Apache Junction	<ul style="list-style-type: none"> <li>Periodically present Plan at City Council meetings and whenever else requested.</li> <li>Maintain a page on the City website including the current Plan, allowing the submittal of citizen comments, and staff response to citizen inquiries.</li> <li>Distribute Floodplain Management brochures at public locations throughout the City and at public meetings.</li> </ul>
Casa Grande	<ul style="list-style-type: none"> <li>Provide hazard and/or hazard mitigation brochures and information to the public at community events.</li> </ul>
Coolidge	<ul style="list-style-type: none"> <li>Provide mitigation brochures and hazard related information to the public at community events and during other community events and other opportunities.</li> </ul>
Eloy	<ul style="list-style-type: none"> <li>Maintain City website containing the current Plan and contact information for those interested in contributing information or ideas.</li> <li>Present and discuss the Plan at the Economic Development Group of Eloy (EDGE) meetings.</li> <li>Advertise the Plan to the public via the City of Eloy Newsletter.</li> <li>Publish articles related to the area hazards and mitigation in the Eloy Enterprise to provide preparedness steps for the public to take in response to hazards.</li> </ul>
Florence	<ul style="list-style-type: none"> <li>Participate in Wildfire Prevention Week coordinated by the Town's Fire Dept.</li> </ul>
Kearny	<ul style="list-style-type: none"> <li>Publish hazard related articles in the local newspaper.</li> <li>Provide floodplain related hazard mitigation information to targeted properties in high risk areas.</li> <li>Provide news releases to local news media related to mitigation activities and floodplain management.</li> </ul>
Mammoth	<ul style="list-style-type: none"> <li>Provide hazard and mitigation brochures at the Town Hall and Town Library.</li> <li>Have a copy of the Plan available at the Town Hall.</li> <li>Participate with Pinal County Flood Control District to targeted properties in high risk areas.</li> </ul>
Maricopa	<ul style="list-style-type: none"> <li>Distribute brochures and other information sources at events such as Salsa Festival (April), July Fourth Celebration (July), and Founder's Day (October).</li> </ul>
Superior	<ul style="list-style-type: none"> <li>Publish informational hazard related articles in local newspaper.</li> <li>Provide floodplain related hazard and mitigation information to targeted properties in high risk areas as requested.</li> <li>Release periodic media statements related to mitigation activities and floodplain management.</li> </ul>

**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:

<b>Resource</b>	<b>Jurisdiction/ Agency</b>	<b>Description or Relevance to Plan</b>
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.
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.

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

<b>Resource</b>	<b>Jurisdiction/ Agency</b>	<b>Description or Relevance to Plan</b>
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.
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 trend data for the City
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 of history, demographic and development trend data.
Kearny General Plan	Kearny	Source for history, demographic and development trend data.
Maricopa 2040 Vision Plan	City of 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**

**4.1 Section Changes**

- Hazardous Materials Incidents (HazMat) has been added back into the Plan.

The risk assessment provides the foundation for the rest of the planning process, primarily the mitigation strategy. The risk assessment, properly done answers the fundamental questions of “what” can occur, “how often” it is likely to occur, and “how bad” the effects could and measures potential losses and damages from hazards. 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.

**4.2 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.

<b>Hazard</b>	<b>No. of</b>	<b>Recorded Losses</b>		
	<b>Declarations</b>	<b>Fatalities</b>	<b>Injuries</b>	<b>Damage Costs (\$)</b>
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

**.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:

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

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

**Table 4-2: Calculated Priority Risk Index Categories and Risk Levels**

CPRI Category	Degree of Risk			Assigned Weighting Factor
	Level ID	Description	Index Value	
Probability	Unlikely	<ul style="list-style-type: none"> <li>■ Extremely rare with no documented history of occurrences or events.</li> <li>■ Annual probability of less than 0.001.</li> </ul>	1	45%
	Possible	<ul style="list-style-type: none"> <li>■ Rare occurrences with at least one documented or anecdotal historic event.</li> <li>■ Annual probability that is between 0.01 and 0.001.</li> </ul>	2	

	Likely	<ul style="list-style-type: none"> <li>▪ Occasional occurrences with at least two or more documented historic events.</li> <li>▪ Annual probability that is between 0.1 and 0.01.</li> </ul>	3	
	Highly Likely	<ul style="list-style-type: none"> <li>▪ Frequent events with a well documented history of occurrence.</li> <li>▪ Annual probability that is greater than 0.1.</li> </ul>	4	
Magnitude/ Severity	Negligible	<ul style="list-style-type: none"> <li>▪ Negligible property damages (less than 5% of critical and non-critical facilities and infrastructure).</li> <li>▪ Injuries or illnesses are treatable with first aid and there are no deaths.</li> <li>▪ Negligible quality of life lost.</li> <li>▪ Shut down of critical facilities for less than 24 hours.</li> </ul>	1	30%
	Limited	<ul style="list-style-type: none"> <li>▪ Slight property damages (greater than 5% and less than 25% of critical and non-critical facilities and infrastructure).</li> <li>▪ Injuries or illnesses do not result in permanent disability and there are no deaths.</li> <li>▪ Moderate quality of life lost.</li> <li>▪ Shut down of critical facilities for more than 1 day and less than 1 week.</li> </ul>	2	
	Critical	<ul style="list-style-type: none"> <li>▪ Moderate property damages (greater than 25% and less than 50% of critical and non-critical facilities and infrastructure).</li> <li>▪ Injuries or illnesses result in permanent disability and at least one death.</li> <li>▪ Shut down of critical facilities for more than 1 week and less than 1 month.</li> </ul>	3	
	Catastrophic	<ul style="list-style-type: none"> <li>▪ Severe property damages (greater than 50% of critical and non-critical facilities and infrastructure).</li> <li>▪ Injuries or illnesses result in permanent disability and multiple deaths.</li> <li>▪ Shut down of critical facilities for more than 1 month.</li> </ul>	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.

For the purpose of this Plan, the following criteria are used to define critical facilities and infrastructure:

1. **Communications Infrastructure:** Telephone, cell phone, data services, radio towers, and internet communications, which have become essential to continuity of business, industry, government, and military operations.
2. **Electrical Power Systems:** Generation stations and transmission and distribution networks that create and supply electricity to end-users.
3. **Gas and Oil Facilities:** Production and holding facilities for natural gas, crude and refined petroleum, and petroleum-derived fuels, as well as the refining and processing facilities for these fuels.
4. **Banking and Finance Institutions:** Banks, financial service companies, payment systems, investment companies, and securities/commodities exchanges.
5. **Transportation Networks:** Highways, railroads, ports and inland waterways, pipelines, and airports and airways that facilitate the efficient movement of goods and people.
6. **Water Supply Systems:** Sources of water; reservoirs and holding facilities; aqueducts and other transport systems; filtration, cleaning, and treatment systems; pipelines; cooling systems; and other delivery mechanisms that provide for domestic and industrial applications, including systems for dealing with water runoff, wastewater, and firefighting.
7. **Government Services:** Capabilities at the federal, state, and local levels of government required to meet the needs for essential services to the public.
8. **Emergency Services:** Medical, police, fire, and rescue systems.

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.

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 <sup>b</sup>	53	14	9	23	83	79	206	73
Apache Junction	4	3	1	7	4 <sup>a</sup>	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

<b>Participating Jurisdiction</b>	<b>Critical Facilities and Infrastructure</b>							
	<b>Communications Infrastructure</b>	<b>Electrical Power Systems</b>	<b>Gas and Oil Facilities</b>	<b>Banking and Finance Institutions</b>	<b>Transportation Networks</b>	<b>Water Supply Systems</b>	<b>Government Services</b>	<b>Emergency Services</b>
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**

Losses are estimated by either quantitative or qualitative methods. Quantitative methods consisted of intersecting hazard map layers with the asset inventory map layer and the HAZUS map layer. Other quantitative methods included statistical methods based on historic data. The loss estimates for this Plan represent the current hazard map layers and asset databases using the procedures discussed below.

Economic loss and human exposure estimates for each of the final hazards identified in this Plan begin with an assessment of the potential exposure of critical and non-critical assets and human populations to those hazards. Exposure estimates of critical and non-critical assets identified by each jurisdiction are accomplished by intersecting the asset inventory with the hazard profiles. Human or population exposures are estimated by intersecting the same hazards with population statistics projected from Census Data population statistics.

Additional exposure estimates for general building stock not specifically identified with the asset inventory, are also accomplished using the HAZUS database. *It is duly noted that the HAZUS data population statistics may not equate to the statistics in Section 2 due to actual changes in population counts associated with a particular census block, GIS positioning anomalies and the way HAZUS depicts certain census block data. It is also noted that the building stock estimates for each census block may severely under-predict the actual buildings due to growth, the general lack data for some of the more rural areas, and the disparity of the HAZUS replacement cost estimates when compared to current market rates. However, without a detailed, site specific inventory, HAZUS is still the best available and is representative of a general magnitude of population and facility exposures to the hazards.* Combining the exposure results from the asset inventory and HAZUS provides a fairly comprehensive depiction of the overall exposure of building stock and the two datasets are considered complimentary and not redundant.

Economic losses to structures and facilities are estimated by multiplying the facility replacement cost estimates by an assumed loss to exposure ratio for the hazard which is summarized by hazards

identified. It is important to note that the loss to exposure ratios is subjective and the estimates are intended to provide an understanding of relative risk and potential losses.

Some of the hazards profiled in this Plan will not include quantitative exposure and loss estimates due to the uncertainty of where these hazards will occur as well as the relatively limited focus and extent of damage. In these cases, a qualitative review of vulnerability will be discussed to provide insight to the nature of losses associated with the hazard.

**Risk Assessment Summary**

The jurisdictional variability of risk associated with each hazard is demonstrated by the various CPRI and loss estimation results. 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.

<b>Jurisdiction</b>	<b>Dam Failure</b>	<b>Drought</b>	<b>Fissure</b>	<b>Flooding</b>	<b>Levee Failure</b>	<b>Severe Wind</b>	<b>Subsidence</b>	<b>Wildfire</b>
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

**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.

<b>Table 4-5: ADWR Safety Categories</b>	
<b>ADWR Safety Rating</b>	<b>Definition</b>
No Deficiency	Not Applicable
Safety Deficiency	One or more conditions at the dam that impair or adversely affects the safe operation of the dam.
<b>Unsafe Categories</b>	
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.
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	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

<b>ADWR Safety Rating</b>	<b>Definition</b>
(Requiring Study)	<p>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.</p> <p>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 probably 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.</p>
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.

<b>Hazard Potential Classification</b>	<b>Loss of Human Life</b>	<b>Economic, Environmental, Lifeline Losses</b>
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. Of the 21 dams considered, only nine emergency action plans showing downstream dam failure inundation limits were readily available. 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**

Jurisdiction	Probability	Magnitude/ Severity	Warning Time	Duration	Rating
Apache Junction	Unlikely	Negligible	< 6 hrs	<6 hours	1.45
Casa Grande	Unlikely	Negligible	< 6 hrs	<24 hrs	1.25
<b>Coolidge</b>	Possibly	Limited	12 - 24 hrs	<24 hrs	2.00
Eloy	Unlikely	Negligible	> 24 hours	<6 hours	1.00
Florence	Unlikely	Negligible	12-24 hours	>1 week	1.45
Kearny	Unlikely	Critical	< 6 hrs	<24 hrs	2.30
Mammoth	Unlikely	Negligible	> 24 hours	<6 hours	1.00
Maricopa	Unlikely	Negligible	>24 hours	<6 hours	1.00
Superior	Unlikely	Negligible	> 24 hours	<6 hours	1.00
Unincorporated Pinal Co	Unlikely	Catastrophic	<6 hours	<1 week	2.55
<b>County-wide average CPRI =</b>					<b>1.50</b>

**Vulnerability – Loss Estimations**

The estimation of potential losses due to inundation from a dam failure was accomplished by intersecting the human and facility assets with the inundation limits. As stated previously, delineated dam failure inundation limits were readily available for only 9 of the 21 dams. Therefore, the results of this analysis are expected to underestimate the exposure of people and infrastructure within Pinal County.

Hazard Class	ADWR ID No.	NID ID No.	Dam Name	ADWR Safety Types	EAP	Inundation Mapping	Nearest Downstream Development	Distance in Miles
<b>High</b>	11.02	AZ00082	Powerline FRS	Unsafe Dams with Elevated Risk of Failure	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
	11.11	AZ00084	Vineyard FRS	No Deficiency	Yes	Yes	Williams Air Force Base	9
	11.12	AZ00085	Rittenhouse	No Deficiency	Yes	Yes	Williams Air	10

**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
			FRS				Force Base	
	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
	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	Cockleburr	1
<b>Significant</b>	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
	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

Since no common methodology is available for obtaining losses from the exposure values, estimates of the loss-to-exposure ratios were assumed based on the perceived potential for damage. Any storm event, or series of storm events of sufficient magnitude to cause a dam failure scenario, would have potentially catastrophic consequences in the inundation area. Flood waves from these types of events travel very fast and possess tremendous destructive energy. Accordingly, an average event based loss-to-exposure ratio for the inundation areas with a high hazard rating are estimated to be 0.25. Low rated areas are zero.

It should be noted that the Planning Team recognizes that the probability of a dam failure occurring at multiple (or all) locations at the same time is essentially zero. Accordingly, the loss estimates presented below are intended to serve as a collective evaluation of the potential exposure to dam failure inundation events.

For the jurisdictions there are \$101 million in estimated losses related to dam failure inundation, \$470 million in losses to HAZUS defined residential, commercial, and industrial facilities and a total population of 33,207, or 18.5% 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. Given the magnitude of such an event(s), 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).

**Table 4-9: Estimated Losses Due to Dam Failure Flooding**

Community	Total Facilities Reported by Community	Impacted Facilities	Percentage of Total Community Facilities Impacted	Estimated Replacement Cost (x \$1000)	Estimated Structure Loss (x \$1000)
<b>HIGH</b>					
<b>County-Wide Totals</b>	<b>945</b>	<b>304</b>	<b>32.17%</b>	<b>\$402,304</b>	<b>\$100,576</b>
Apache Junction	54	1	1.85%	\$2,000	\$500
Casa Grande	71	0	0.00%	\$0	\$0
Coolidge	43	16	37.21%	\$51,200	\$12,800
Eloy	180	0	0.00%	\$0	\$0
Florence	89	73	82.02%	\$28,811	\$7,203
Kearny	38	18	47.37%	\$6,370	\$1,593
Mammoth	14	0	0.00%	\$0	\$0
Maricopa	143	122	85.31%	\$174,676	\$43,669
Superior	44	0	0.00%	\$0	\$0
Unincorporated Pinal County	269	74	27.51%	\$139,247	\$34,812

**Table 4-10: Estimated Population Exposed to Dam Failure**

Community	Total Population	Population Exposed	Percent of Population Exposed	Total Population Over 65	Population Over 65 Exposed	Percent of Population Over 65 Exposed
<b>HIGH</b>						
<b>County-Wide Totals</b>	<b>179,776</b>	<b>33,207</b>	<b>18.47%</b>	<b>29,040</b>	<b>2,544</b>	<b>8.76%</b>
Apache Junction	31,851	10	0.03%	8,279	6	0.07%
Casa Grande	27,298	0	0.00%	3,840	0	0.00%
Coolidge	8,810	2,865	32.52%	1,239	371	29.98%
Eloy	10,659	0	0.00%	627	0	0.00%
Florence	17,487	16,118	92.17%	1,420	1,034	72.77%
Kearny	2,392	2,079	86.94%	351	309	88.02%
Mammoth	1,757	0	0.00%	190	0	0.00%
Maricopa	1,874	1,454	77.59%	148	117	79.04%
Superior	3,238	0	0.00%	661	0	0.00%
Unincorporated Pinal County	64,057	4,286	6.69%	11,785	403	3.42%

	Residential		Commercial		Industrial		Summary		
Pinal County HAZUS Summary	Building Count	Potential Economic Impact (x\$1000)	Building Count	Potential Economic Impact (x\$1000)	Building Count	Potential Economic Impact (x\$1000)	Total of All Potential Economic Impact (x\$1000)	Loss-to-Exposure Ratio	Total Estimated Loss (x\$1000)
<b>County-Wide Totals</b>	<b>82,409</b>	<b>\$10,712,985</b>	<b>2,616</b>	<b>\$2,202,612</b>	<b>715</b>	<b>\$557,141</b>	<b>\$13,472,739</b>		
High Hazard Exposure	9,472	\$1,301,191	321	\$541,320	58	\$37,849	\$1,880,360	25%	\$470,090
Pinal County HAZUS Summary	% Building Count	% Potential Economic Impact	% Building Count	% Potential Economic Impact	% Building Count	% Potential Economic Impact			
High Hazard Exposure	11.49%	12.15%	12.28%	24.58%	08.16%	06.79%			

	Residential		Commercial		Industrial		Summary		
Apache Junction HAZUS Summary	Building Count	Potential Economic Impact (x\$1000)	Building Count	Potential Economic Impact (x\$1000)	Building Count	Potential Economic Impact (x\$1000)	Total of All Potential Economic Impact (x\$1000)	Loss-to-Exposure Ratio	Total Estimated Loss (x\$1000)
<b>Community-Wide Totals</b>	<b>19,216</b>	<b>\$2,012,133</b>	<b>463</b>	<b>\$301,822</b>	<b>140</b>	<b>\$73,412</b>	<b>\$2,387,367</b>		
High Hazard Exposure	9	\$599	7	\$5,873	5	\$10,106	\$16,578	25%	\$4,144
Apache Junction HAZUS Summary	% Building Count	% Potential Economic Impact	% Building Count	% Potential Economic Impact	% Building Count	% Potential Economic Impact			
High Hazard Exposure	0.05%	0.03%	01.49%	01.95%	03.49%	13.77%			

	Residential		Commercial		Industrial		Summary		
Casa Grande HAZUS Summary	Building Count	Potential Economic Impact (x\$1000)	Building Count	Potential Economic Impact (x\$1000)	Building Count	Potential Economic Impact (x\$1000)	Total of All Potential Economic Impact (x\$1000)	Loss-to-Exposure Ratio	Total Estimated Loss (x\$1000)
<b>Community-Wide Totals</b>	<b>11,076</b>	<b>\$1,780,401</b>	<b>572</b>	<b>\$562,479</b>	<b>137</b>	<b>\$158,896</b>	<b>\$2,501,776</b>		
High Hazard Exposure	0	\$0	0	\$0	0	\$0	\$0	25%	\$0
Casa Grande HAZUS Summary	% Building Count	% Potential Economic Impact	% Building Count	% Potential Economic Impact	% Building Count	% Potential Economic Impact			
High Hazard Exposure	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%			

	Residential		Commercial		Industrial		Summary		
Coolidge HAZUS Summary	Building Count	Potential Economic Impact (x\$1000)	Building Count	Potential Economic Impact (x\$1000)	Building Count	Potential Economic Impact (x\$1000)	Total of All Potential Economic Impact (x\$1000)	Loss-to-Exposure Ratio	Total Estimated Loss (x\$1000)
<b>Community-Wide Totals</b>	<b>3,889</b>	<b>\$452,027</b>	<b>139</b>	<b>\$96,995</b>	<b>22</b>	<b>\$21,642</b>	<b>\$570,664</b>		
High Hazard Exposure	1,058	\$136,692	40	\$32,199	2	\$734	\$169,625	25%	\$42,406
Coolidge HAZUS Summary	% Building Count	% Potential Economic Impact	% Building Count	% Potential Economic Impact	% Building Count	% Potential Economic Impact			
High Hazard Exposure	27.20%	30.24%	28.52%	33.20%	10.39%	03.39%			

	Residential		Commercial		Industrial		Summary		
Eloy HAZUS Summary	Building Count	Potential Economic Impact (x\$1000)	Building Count	Potential Economic Impact (x\$1000)	Building Count	Potential Economic Impact (x\$1000)	Total of All Potential Economic Impact (x\$1000)	Loss-to-Exposure Ratio	Total Estimated Loss (x\$1000)
<b>Community-Wide Totals</b>	<b>3,371</b>	<b>\$364,555</b>	<b>113</b>	<b>\$66,278</b>	<b>23</b>	<b>\$22,017</b>	<b>\$452,850</b>		
High Hazard Exposure	0	\$0	0	\$0	0	\$0	\$0	25%	\$0
Eloy HAZUS Summary	% Building Count	% Potential Economic Impact	% Building Count	% Potential Economic Impact	% Building Count	% Potential Economic Impact			
High Hazard Exposure	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%			

	Residential		Commercial		Industrial		Summary		
Florence HAZUS Summary	Building Count	Potential Economic Impact (x\$1000)	Building Count	Potential Economic Impact (x\$1000)	Building Count	Potential Economic Impact (x\$1000)	Total of All Potential Economic Impact (x\$1000)	Loss-to-Exposure Ratio	Total Estimated Loss (x\$1000)
<b>Community-Wide Totals</b>	<b>4,180</b>	<b>\$675,616</b>	<b>54</b>	<b>\$119,579</b>	<b>9</b>	<b>\$3,058</b>	<b>\$798,252</b>		
High Hazard Exposure	3,177	\$579,443	45	\$115,200	4	\$1,242	\$695,885	25%	\$173,971
Florence HAZUS Summary	% Building Count	% Potential Economic Impact	% Building Count	% Potential Economic Impact	% Building Count	% Potential Economic Impact			
High Hazard Exposure	76.0%	85.77%	84.33%	96.34%	44.0%	40.61%			

	Residential		Commercial		Industrial		Summary		
Kearny HAZUS Summary	Building Count	Potential Economic Impact (x\$1000)	Building Count	Potential Economic Impact (x\$1000)	Building Count	Potential Economic Impact (x\$1000)	Total of All Potential Economic Impact (x\$1000)	Loss-to-Exposure Ratio	Total Estimated Loss (x\$1000)
<b>Community-Wide Totals</b>	<b>970</b>	<b>\$174,690</b>	<b>24</b>	<b>\$20,823</b>	<b>1</b>	<b>\$258</b>	<b>\$195,772</b>		
High Hazard Exposure	820	\$142,211	14	\$10,681	0	\$35	\$152,926	25%	\$38,232
Kearny HAZUS Summary	% Building Count	% Potential Economic Impact	% Building Count	% Potential Economic Impact	% Building Count	% Potential Economic Impact			
High Hazard Exposure	84.52%	81.41%	55.66%	51.29%	07.88%	13.37%			

	Residential		Commercial		Industrial		Summary		
Mammoth HAZUS Summary	Building Count	Potential Economic Impact (x\$1000)	Building Count	Potential Economic Impact (x\$1000)	Building Count	Potential Economic Impact (x\$1000)	Total of All Potential Economic Impact (x\$1000)	Loss-to-Exposure Ratio	Total Estimated Loss (x\$1000)
<b>Community-Wide Totals</b>	<b>791</b>	<b>\$78,637</b>	<b>21</b>	<b>\$10,926</b>	<b>5</b>	<b>\$3,850</b>	<b>\$93,413</b>		
High Hazard Exposure	0	\$0	0	\$0	0	\$0	\$0	25%	\$0
Mammoth HAZUS Summary	% Building Count	% Potential Economic Impact	% Building Count	% Potential Economic Impact	% Building Count	% Potential Economic Impact			
High Hazard Exposure	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%			

	Residential		Commercial		Industrial		Summary		
Maricopa HAZUS Summary	Building Count	Potential Economic Impact (x\$1000)	Building Count	Potential Economic Impact (x\$1000)	Building Count	Potential Economic Impact (x\$1000)	Total of All Potential Economic Impact (x\$1000)	Loss-to-Exposure Ratio	Total Estimated Loss (x\$1000)
<b>Community-Wide Totals</b>	<b>797</b>	<b>\$59,759</b>	<b>55</b>	<b>\$35,469</b>	<b>9</b>	<b>\$12,357</b>	<b>\$107,585</b>		
High Hazard Exposure	575	\$44,574	44	\$27,991	7	\$11,648	\$84,213	25%	\$21,053
Maricopa HAZUS Summary	% Building Count	% Potential Economic Impact	% Building Count	% Potential Economic Impact	% Building Count	% Potential Economic Impact			
High Hazard Exposure	72.08%	74.59%	79.04%	78.91%	71.24%	94.27%			

	Residential		Commercial		Industrial		Summary		
Superior HAZUS Summary	Building Count	Potential Economic Impact (x\$1000)	Building Count	Potential Economic Impact (x\$1000)	Building Count	Potential Economic Impact (x\$1000)	Total of All Potential Economic Impact (x\$1000)	Loss-to-Exposure Ratio	Total Estimated Loss (x\$1000)
<b>Community-Wide Totals</b>	<b>1,552</b>	<b>\$186,666</b>	<b>40</b>	<b>\$16,334</b>	<b>11</b>	<b>\$11,096</b>	<b>\$214,096</b>		
High Hazard Exposure	0	\$0	0	\$0	0	\$0	\$0	25%	\$0
Superior HAZUS Summary	% Building Count	% Potential Economic Impact	% Building Count	% Potential Economic Impact	% Building Count	% Potential Economic Impact			
High Hazard Exposure	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%			

<b>Table 4-21: Uninc Pinal Co Estimated Building Exposure to Dam Failure Flooding</b>									
	<b>Residential</b>		<b>Commercial</b>		<b>Industrial</b>		<b>Summary</b>		
<b>Unincorporated Pinal County HAZUS Summary</b>	<b>Building Count</b>	<b>Potential Economic Impact (x\$1000)</b>	<b>Building Count</b>	<b>Potential Economic Impact (x\$1000)</b>	<b>Building Count</b>	<b>Potential Economic Impact (x\$1000)</b>	<b>Total of All Potential Economic Impact (x\$1000)</b>	<b>Loss-to-Exposure Ratio</b>	<b>Total Estimated Loss (x\$1000)</b>
<b>Community-Wide Totals</b>	<b>33,447</b>	<b>\$4,591,973</b>	<b>997</b>	<b>\$592,560</b>	<b>345</b>	<b>\$246,968</b>	<b>\$5,431,500</b>		
<b>High Hazard Exposure</b>	1872	\$192,575	101	\$60,342	34	\$11,952	\$264,869	25%	\$66,217
<b>Unincorporated Pinal County HAZUS Summary</b>	<b>% Building Count</b>	<b>% Potential Economic Impact</b>	<b>% Building Count</b>	<b>% Potential Economic Impact</b>	<b>% Building Count</b>	<b>% Potential Economic Impact</b>			
<b>High Hazard Exposure</b>	05.60%	04.19%	10.14%	10.18%	09.94%	04.84%			

### **Vulnerability – Development Trend Analysis**

The flood protection afforded by dams in Pinal County has encouraged development of downstream lands, and it 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. Over the past five years, Pinal County, Florence, and several of the local flood control districts have been actively working with ADWR and NRCS to update and improve the FRS dams upstream of Florence and Magma area. The Flood Control District also working with local stakeholders to develop rehabilitation plans for the Powerline, Vineyard and Rittenhouse FRS. They have also worked on installing gages and telemetry to provide tools for monitoring and prediction. Also, 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.

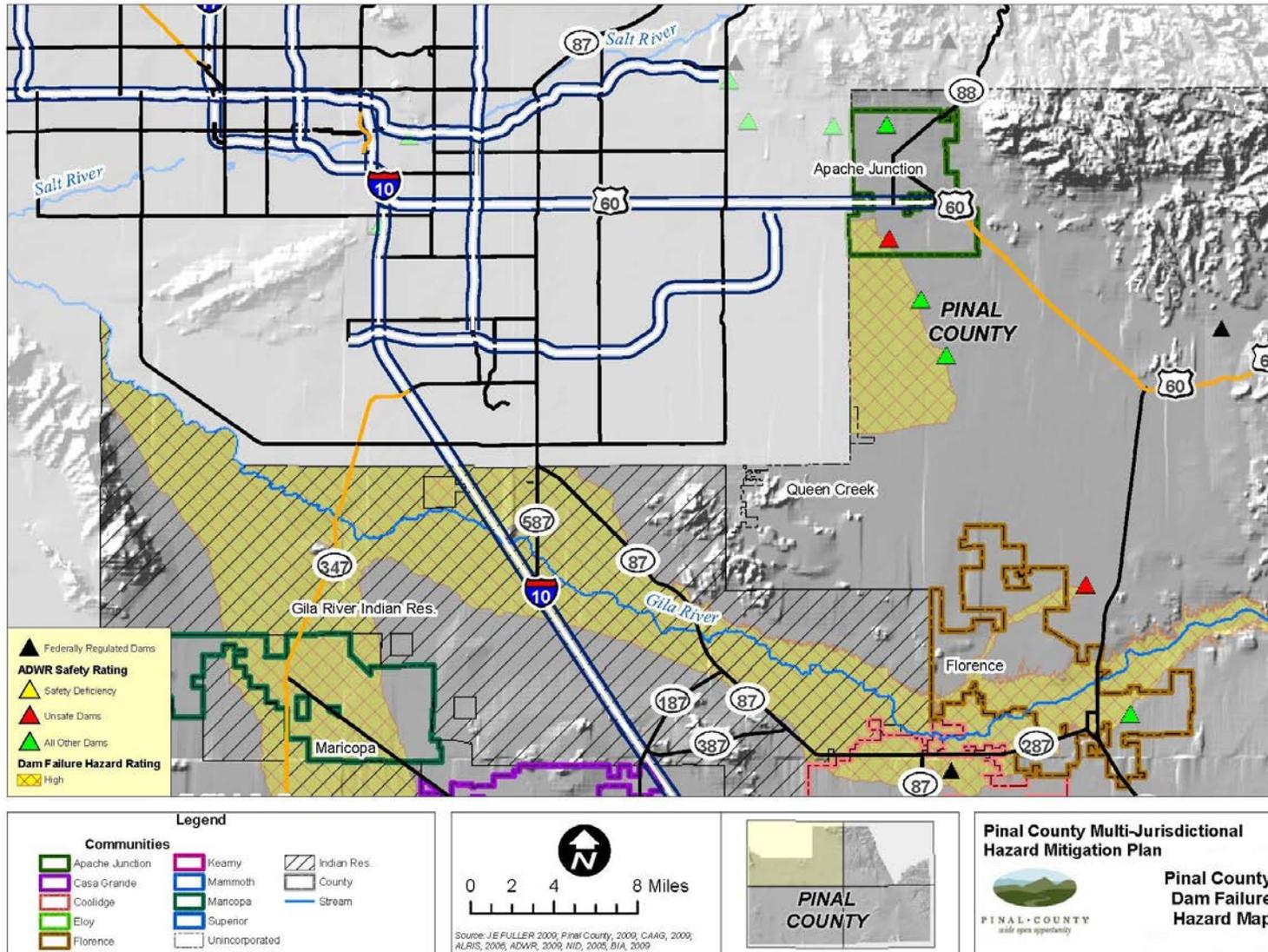
### **Sources**

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

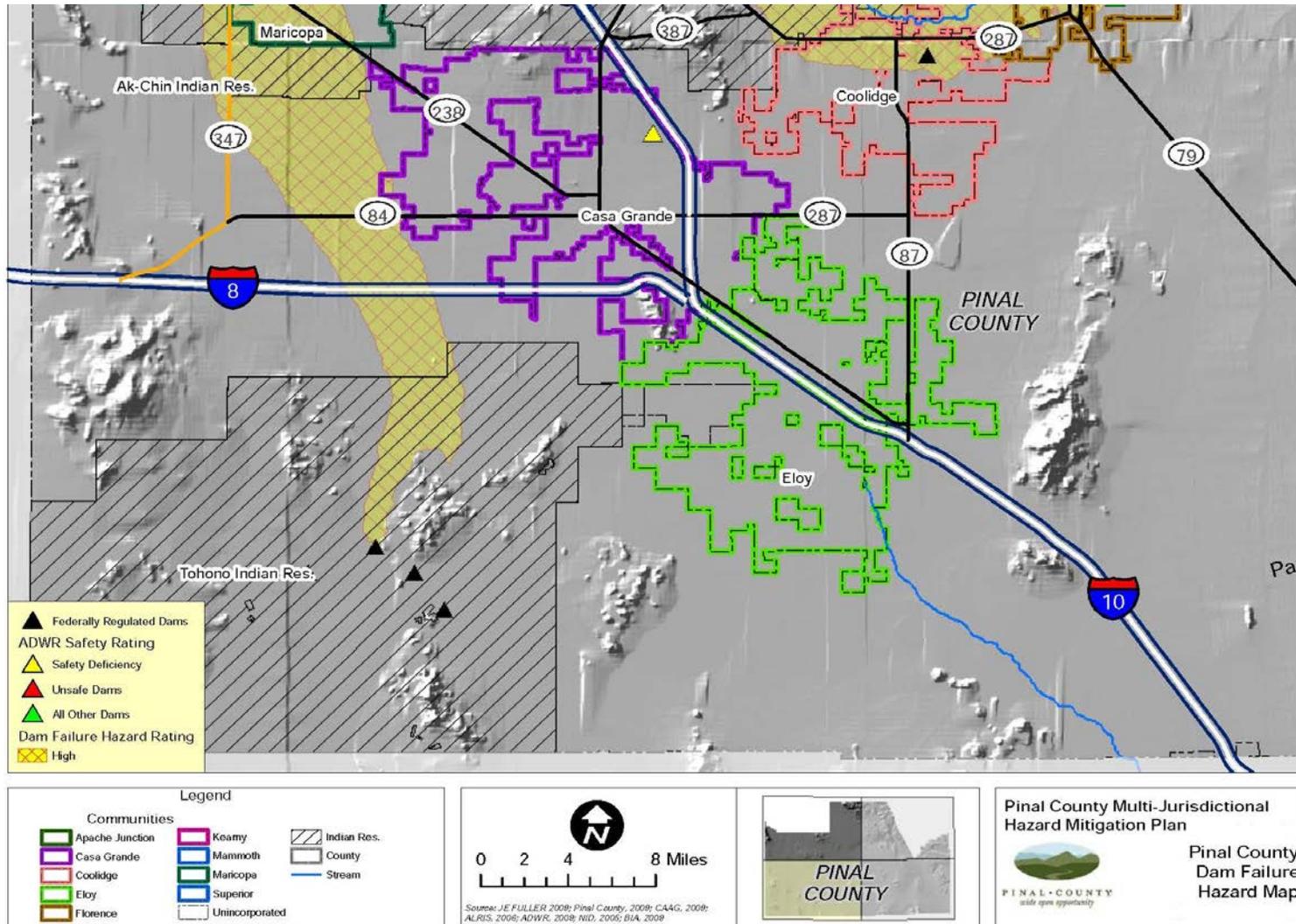
AZ Division of Emergency Management, *State of AZ Multi-Hazard Mitigation Plan*.

US Army Corps of Engineers, National Inventory of Dams, <https://nid.usace.army.mil/>

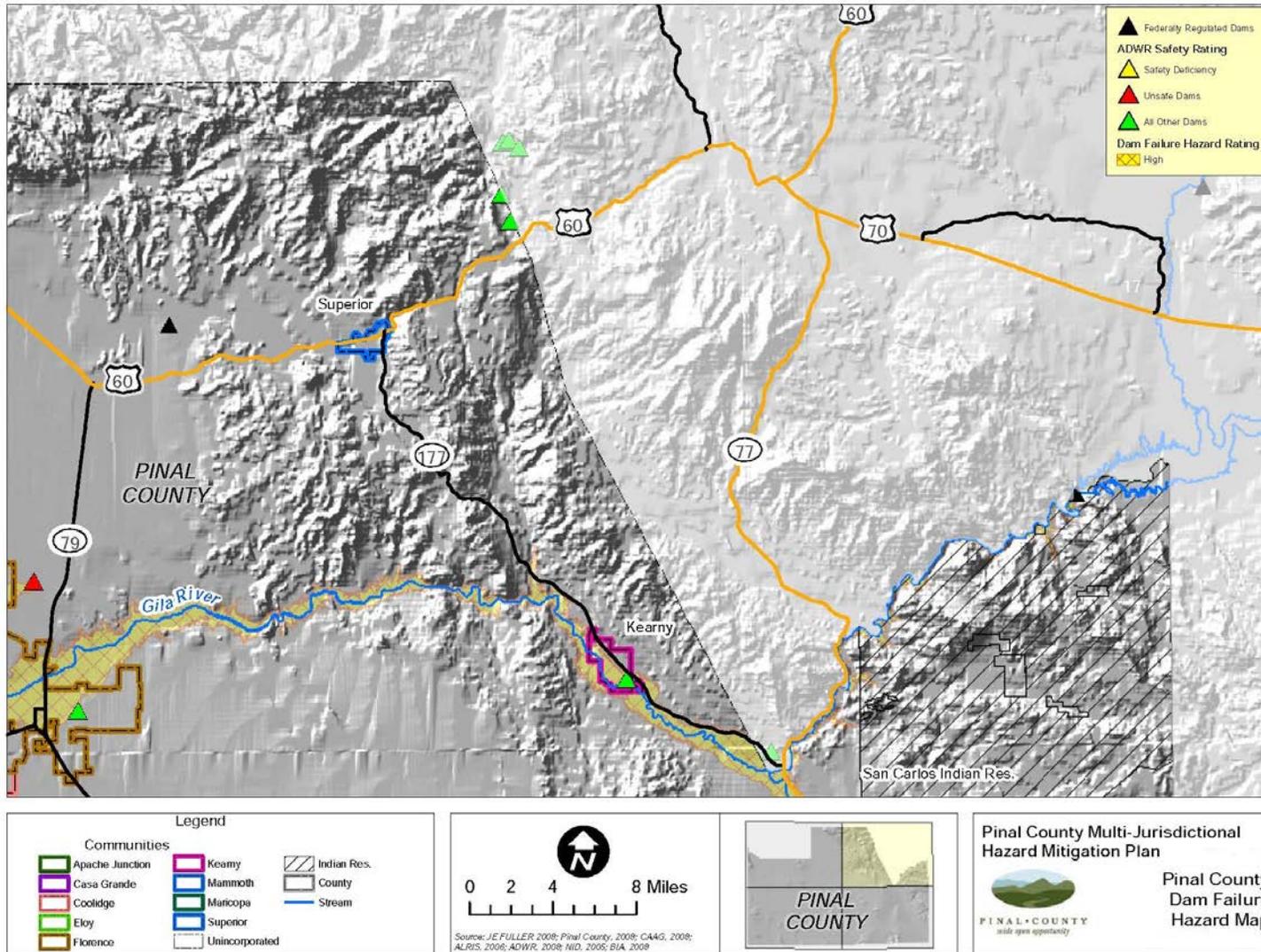
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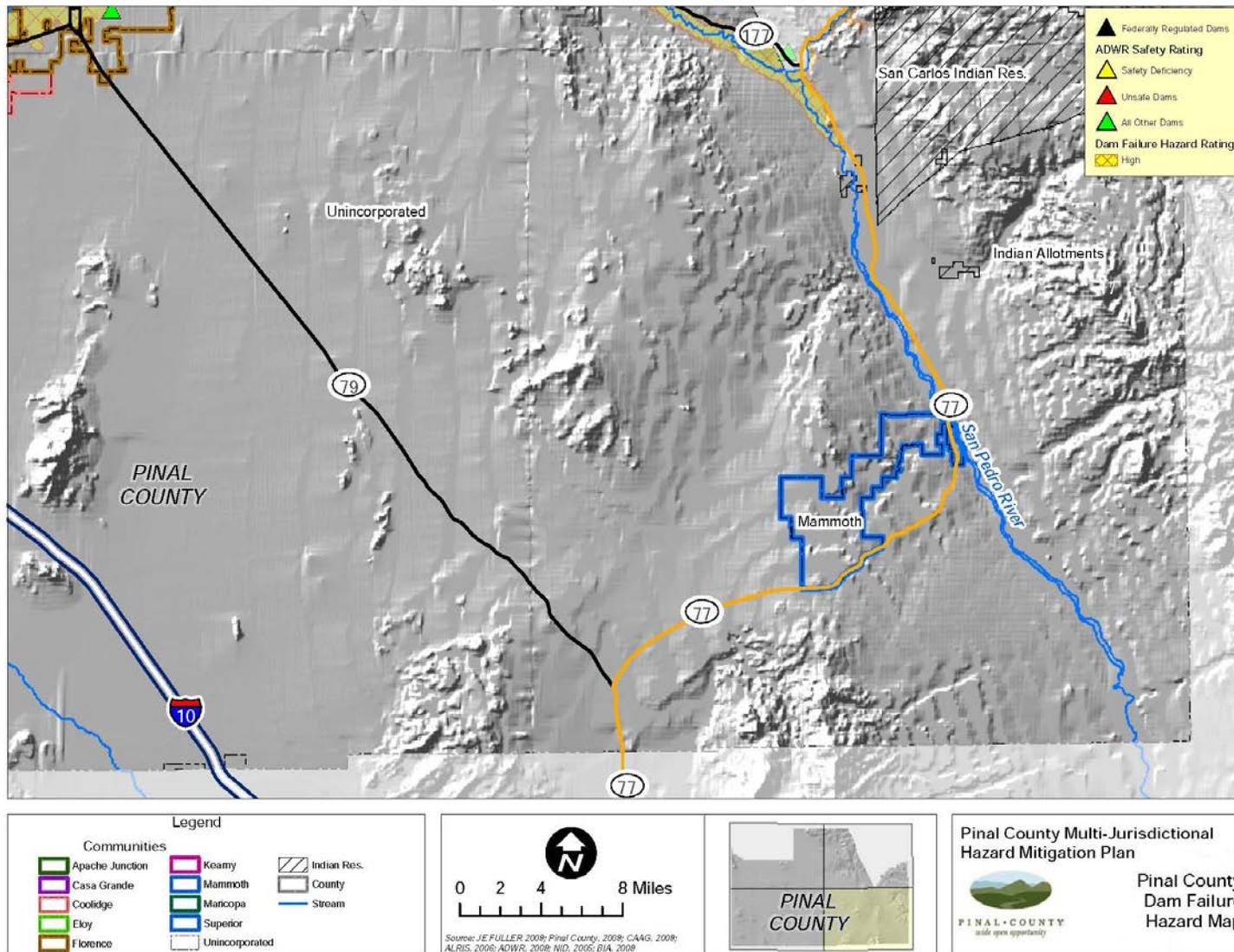
Map 4-1: Pinal County Dam Failure Hazard Area (1)



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)

#### 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.

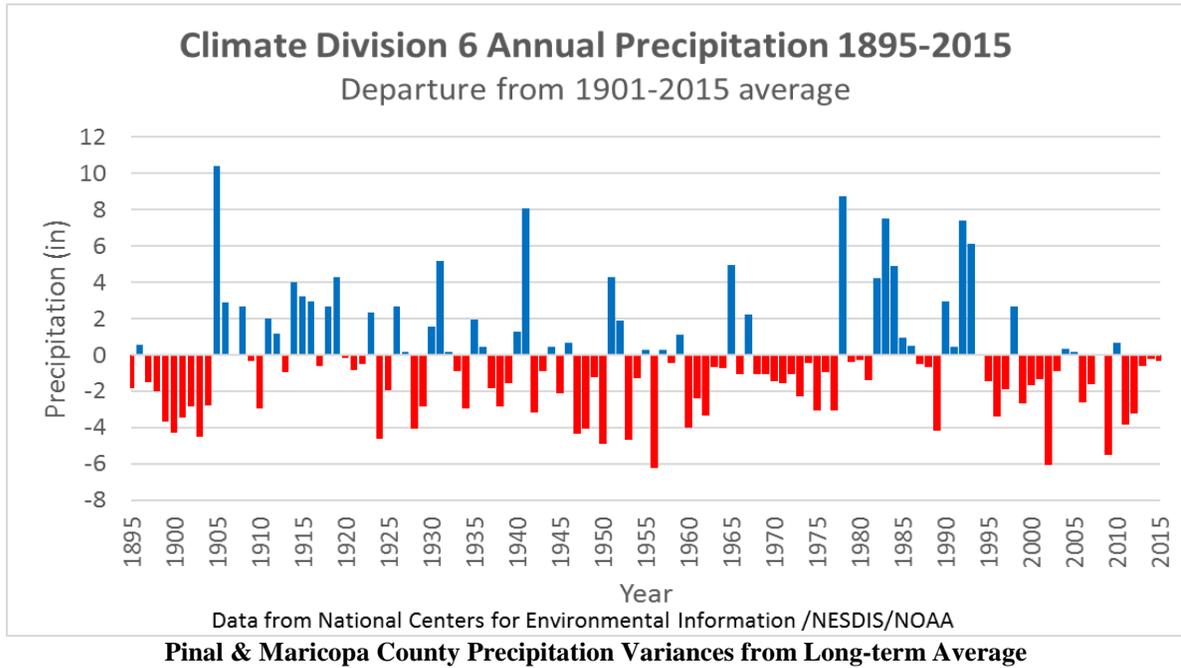
Droughts may cause a shortage of water for human and industrial consumption, hydroelectric power, recreation, and navigation. Water quality may also decline and the number and severity of wildfires may increase. Severe droughts may result in the loss of agricultural crops and forest products, undernourished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

##### History

Arizona has experienced 17 droughts declared as drought disasters/emergencies and 93 drought events (droughts affecting multiple years are recorded as a distinct event for each year affected). 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.

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Between 1998 and 2007, there have been more months with below normal precipitation than months with above normal precipitation.

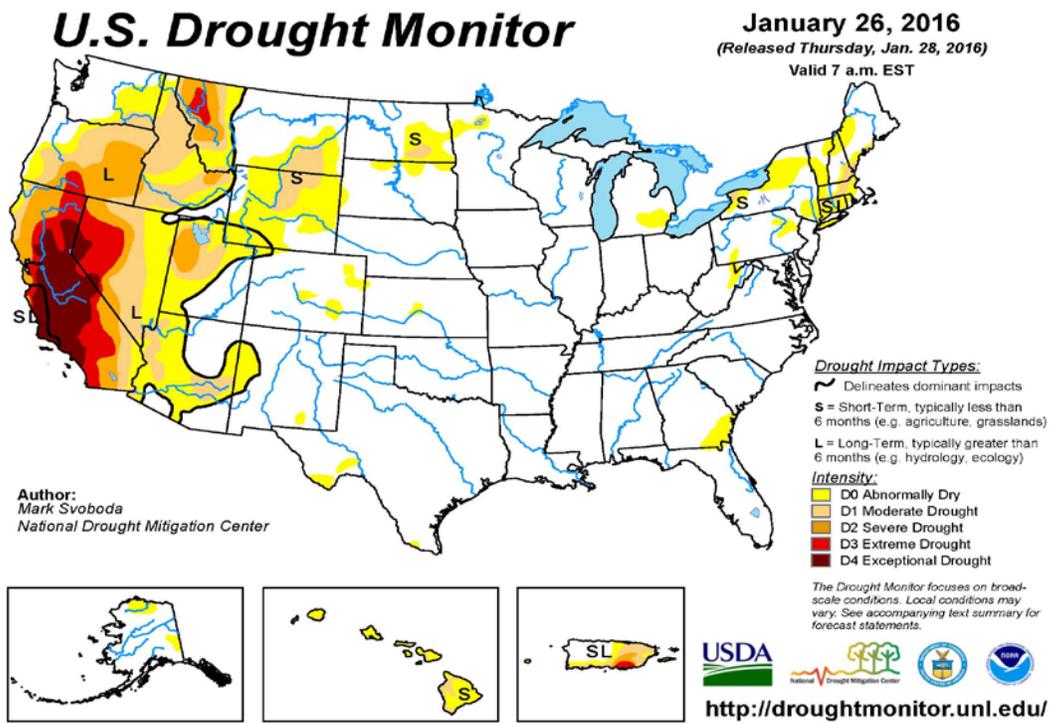


### Probability and Magnitude

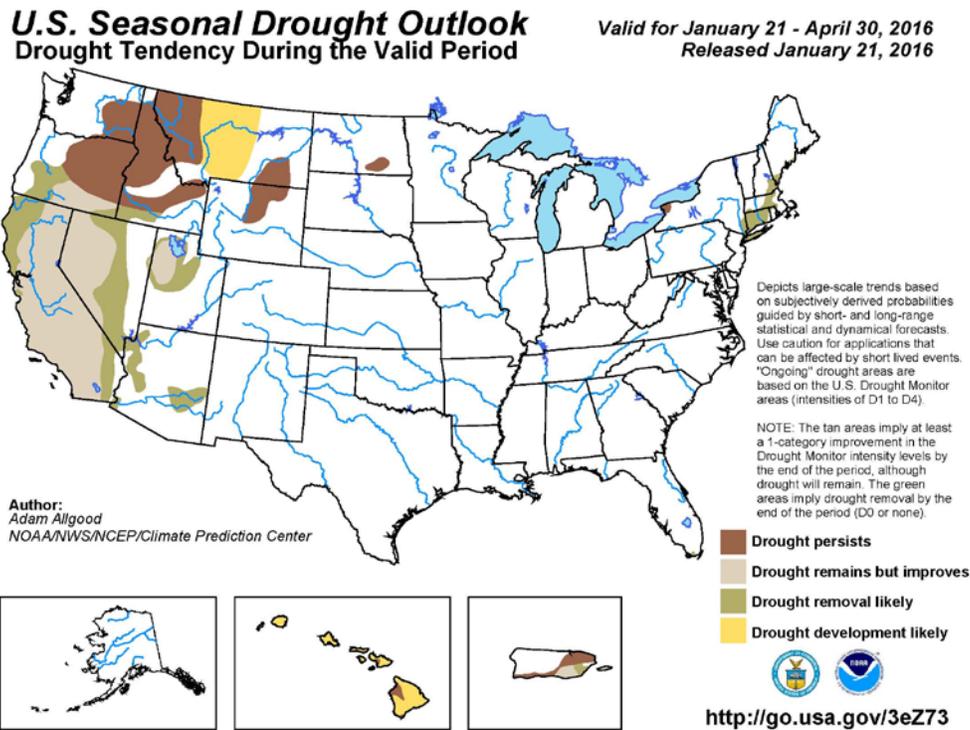
There is no commonly accepted return period or non-exceedance probability for defining the risk from drought (such as the 100-year or 1% annual chance of flood). The magnitude of drought is usually measured in time and the severity of the hydrologic deficit. There are several resources available to evaluate 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 Portal<sup>13</sup> 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.

<sup>13</sup> NIDIS U.S. Drought Portal website is located at: <http://www.drought.gov/portal/server.pt/community/drought.gov/202>



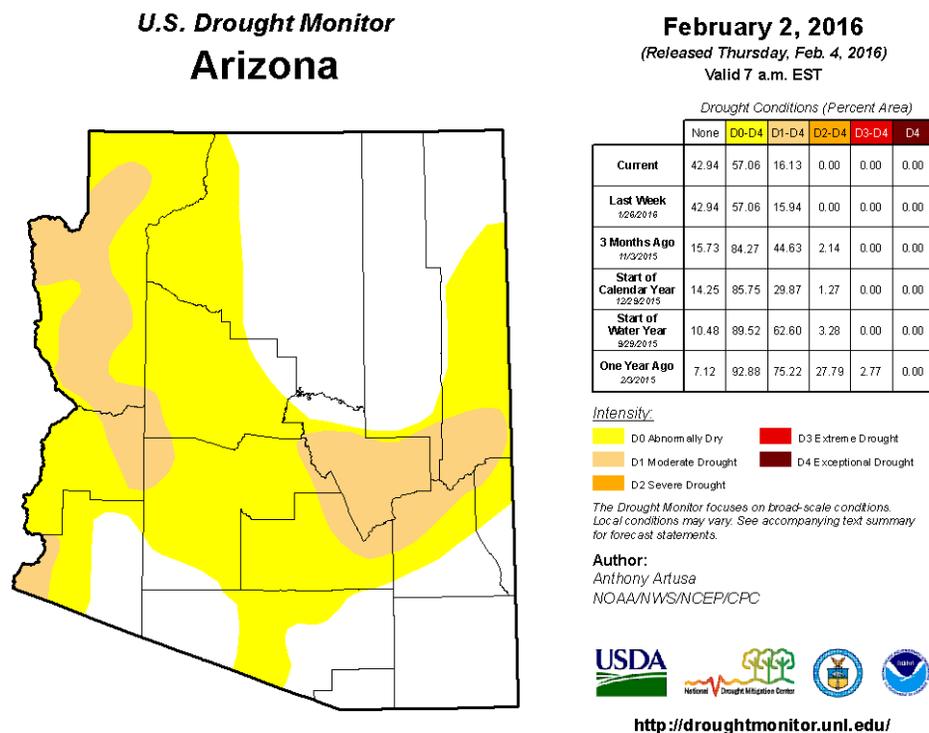
Map 4-5: U.S. Drought Monitor January 26, 2016



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

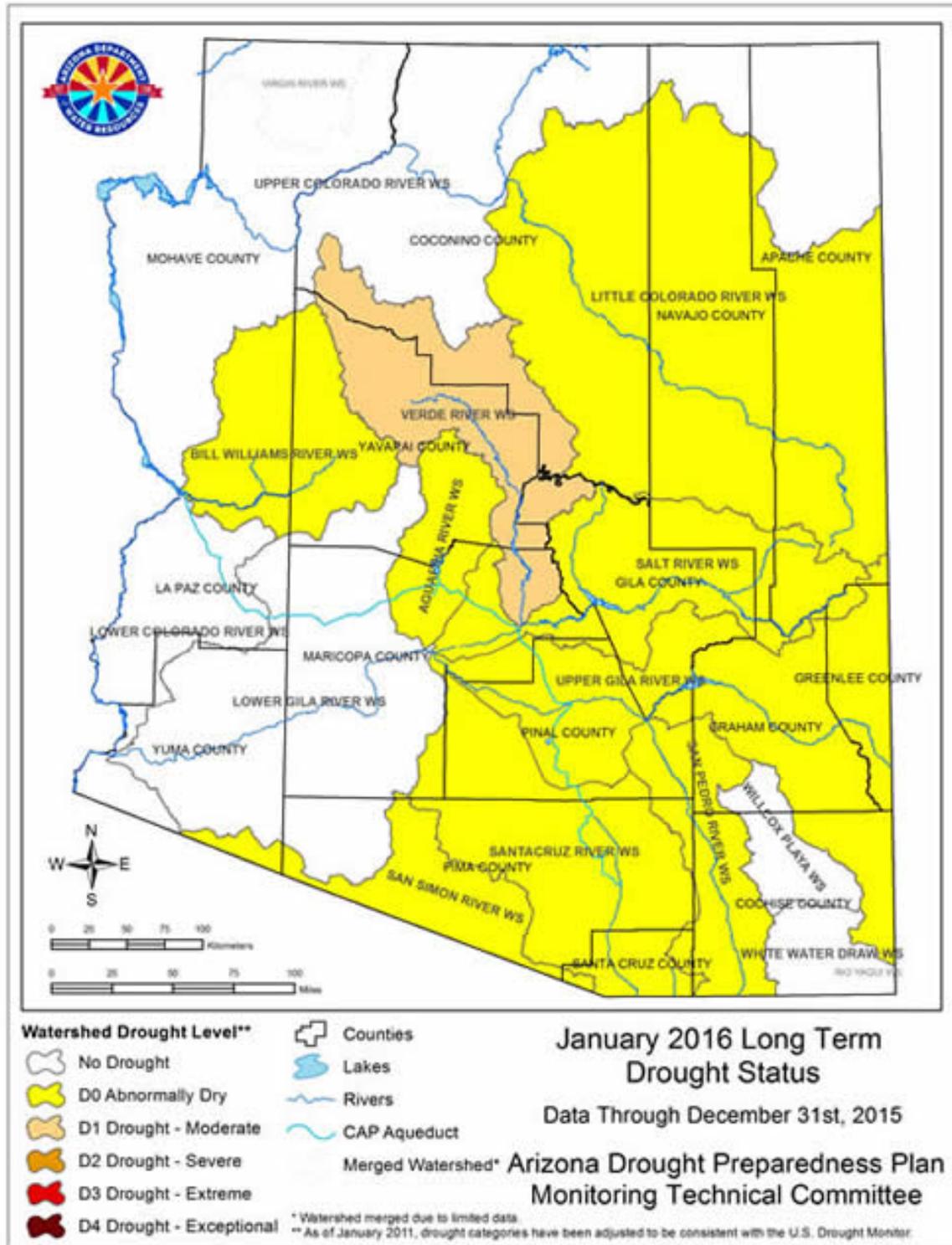
In 2003, Governor Janet Napolitano created the Arizona Drought Task Force (ADTF), led by ADWR, which developed a statewide drought plan. The plan includes criteria for determining both short and long-term drought status for each of the 15 major watersheds in the state using assessments that are based 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

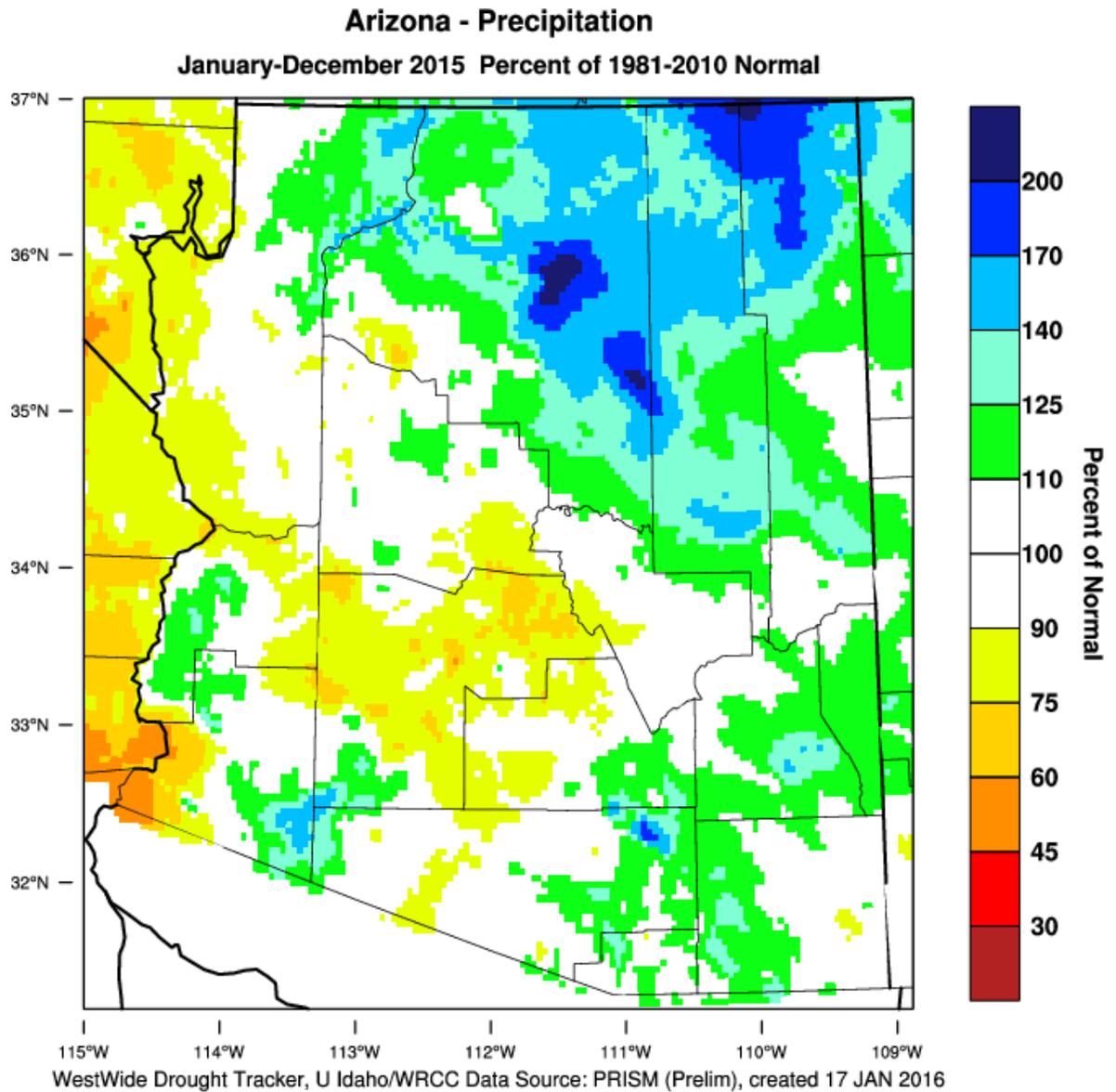
**Map 4-7: Arizona Short Term Drought Status**



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

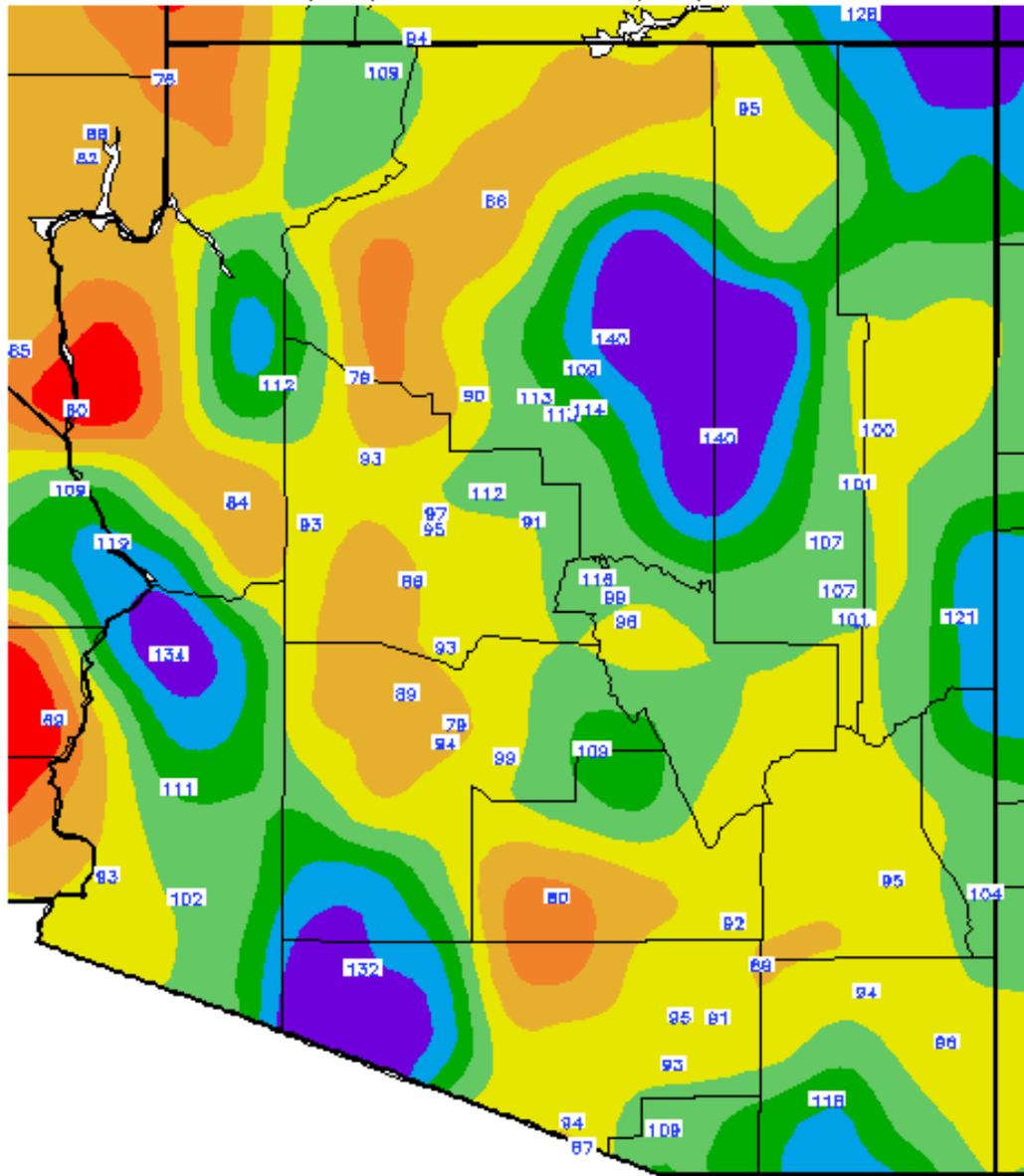
**Map 4-8: Arizona Long Term Drought Status**

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: 12-month 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: 36-month Percent of Normal Precipitation Indicative of the Precipitation Surplus/deficit.**

**Vulnerability**

<b>Jurisdiction</b>	<b>Probability</b>	<b>Magnitude/ Severity</b>	<b>Warning Time</b>	<b>Duration</b>	<b>Rating</b>
<b>Apache Junction</b>	Highly Unlikely	Negligible	> 24 hours	> 1 week	2.65
<b>Casa Grande</b>	Likely	Negligible	> 24 hours	> 1 week	2.20
<b>Coolidge</b>	Likely	Limited	> 24 hours	> 1 week	2.50
Eloy	Likely	Limited	> 24 hours	> 1 week	2.50
<b>Florence</b>	Unlikely	Negligible	> 24 hours	> 1 week	1.30
<b>Kearny</b>	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
<b>Superior</b>	Likely	Limited	> 24 hours	< 1 week	2.50
Unincorporated Pinal Co	Highly Likely	Limited	> 24 hours	> 1 week	2.95
<b>County-wide average CPRI =</b>					<b>2.34</b>

**Pinal County** – Having a large agriculture and livestock sector, there is the potential for drought to have a high impact 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.

**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 Town 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 can be impacted not only by the direct affects 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 requires largely on water for its operation. The mine also economically helps 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.

**Vulnerability – Loss Estimations**

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 2009, Pinal County farmers and ranchers received \$21.6 million in disaster related assistance funding from the U.S Department of Agriculture (USDA) for crop and livestock damages (EWG, 2009). Over \$11.6 million of those funds were received during the time period of 2000 to 2008, which corresponds to the most severe period of the current drought cycle for Pinal County. 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 Trends**

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 recognize drought as a potential constraint.

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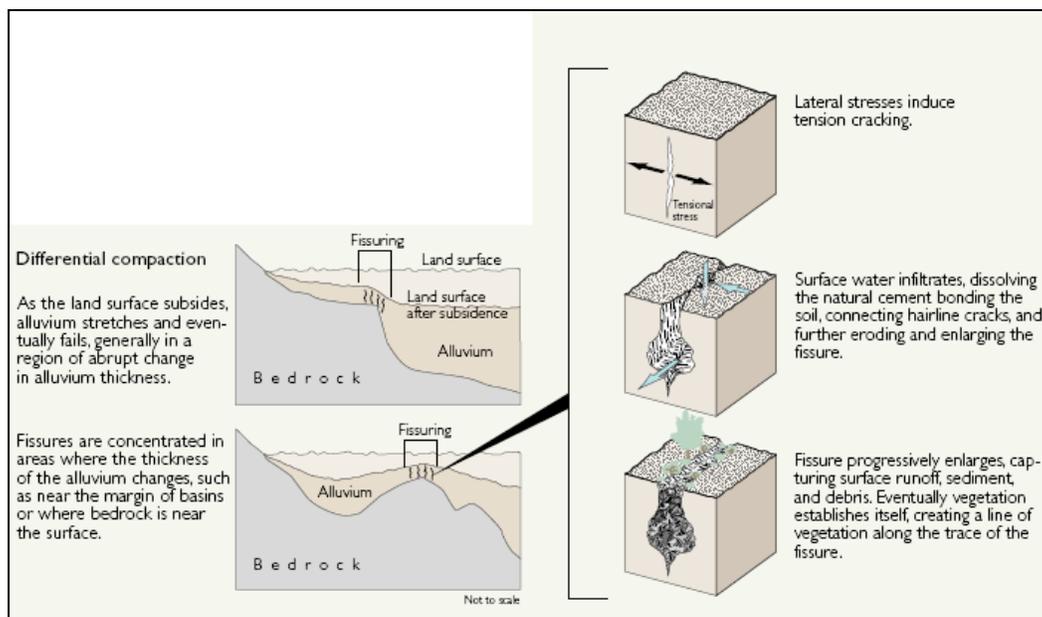
NOAA, NWS, Climate Prediction Center, 2010,  
[http://www.cpc.ncep.noaa.gov/products/expert\\_assessment/seasonal\\_drought.html](http://www.cpc.ncep.noaa.gov/products/expert_assessment/seasonal_drought.html)

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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 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 just discovered within 1,200 feet of the FRS; Flood Control District examining mitigation options

**Probability/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.

The Arizona Geological Survey has mapped known and suspected fissure lineaments for certain areas of the County, with the latest update of GIS data being June 22, 2009. In order to estimate the areas of immediate risk, the Planning Team chose to create polygons that represent a 500-foot buffer along the mapped fissures and assign a high hazard risk to areas within the buffered zone.

**Vulnerability**

<b>Table 4-23: CPRI Results for Fissure</b>					
<b>Jurisdiction</b>	<b>Probability</b>	<b>Magnitude/ Severity</b>	<b>Warning Time</b>	<b>Duration</b>	<b>Rating</b>
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
<b>Eloy</b>	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	Unlikely	Negligible	> 24 hours	< 6 hours	1.00
Superior	Unlikely	Negligible	> 24 hours	< 1 week	1.30
<b>Unincorporated Pinal Co</b>	Highly Likely	Limited	< 6 hours	< 1 week	3.30
<b>County-wide average CPRI =</b>					<b>1.65</b>

**Vulnerability – Loss Estimations**

The Arizona Land Subsidence Group (ALSG) prepared a white paper in 2007 (ALSG, 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	
<ul style="list-style-type: none"> <li>• Cracked or collapsing roads</li> <li>• Broken pipes &amp; utility lines</li> <li>• Damaged or breached canals</li> <li>• Cracked foundation/separated walls</li> <li>• Loss of agricultural land</li> <li>• Livestock &amp; wildlife injury or death</li> </ul>	<ul style="list-style-type: none"> <li>• Severed or deformed railroad track</li> <li>• Damaged well casing or wellhead</li> <li>• Disrupted drainage</li> <li>• Contaminated groundwater aquifer</li> <li>• Sudden discharge of ponded water</li> <li>• Human injury or death</li> </ul>

(After Pewe, 1990; Bell & Price, 1993; and Staff, 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.” (ALSG, 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. Accordingly, no estimates of loss are made in this Plan. Potential exposure of human and facility assets to the high hazard fissure zones are estimated instead.

In summary, \$27.4 million in critical and non-critical identified assets are exposed to high hazard fissure zones County-wide. 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, a total population of 834 people, or 0.05% of the total 2000 County population, is potentially exposed to a high hazard fissure zone. 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.

Community	Total Facilities Reported by Community	Impacted Facilities	Percentage of Total Community Facilities Impacted	Estimated Replacement Cost (x \$1000)	Estimated Structure Loss (x \$1000)
<b>HIGH</b>					
<b>County-Wide Totals</b>	<b>945</b>	<b>12</b>	<b>1.27%</b>	<b>\$7,931</b>	<b>\$0</b>
Apache Junction	54	0	0.00%	\$0	\$0
Casa Grande	71	0	0.00%	\$0	\$0
Coolidge	43	0	0.00%	\$0	\$0
Eloy	180	12	6.67%	\$7,931	\$0
Florence	89	0	0.00%	\$0	\$0
Kearny	38	0	0.00%	\$0	\$0
Mammoth	14	0	0.00%	\$0	\$0
Maricopa	143	0	0.00%	\$0	\$0
Superior	44	0	0.00%	\$0	\$0

**Table 4-24: Estimated Losses Due to Fissure Risk**

Community	Total Facilities Reported by Community	Impacted Facilities	Percentage of Total Community Facilities Impacted	Estimated Replacement Cost (x \$1000)	Estimated Structure Loss (x \$1000)
Unincorporated Pinal County	269	0	0.00%	\$0	\$0

**Table 4-25: Estimated Population Exposed to Fissure Risk**

Community	Total Population	Population Exposed	Percent of Population Exposed	Total Population Over 65	Population Over 65 Exposed	Percent of Population Over 65 Exposed
<b>HIGH</b>						
<b>County-Wide Totals</b>	<b>179,776</b>	<b>977</b>	<b>0.54%</b>	<b>29,040</b>	<b>96</b>	<b>0.33%</b>
Apache Junction	31,851	8	0.03%	8,279	5	0.06%
Casa Grande	27,298	32	0.12%	3,840	4	0.10%
Coolidge	8,810	0	0.00%	1,239	0	0.00%
Eloy	10,659	606	5.69%	627	46	7.32%
Florence	17,487	0	0.00%	1,420	0	0.00%
Kearny	2,392	0	0.00%	351	0	0.00%
Mammoth	1,757	0	0.00%	190	0	0.00%
Maricopa	1,874	0	0.00%	148	0	0.00%
Superior	3,238	0	0.00%	661	0	0.00%
Unincorporated Pinal County	64,057	309	0.48%	11,785	40	0.34%

	Residential		Commercial		Industrial		Summary		
Pinal County HAZUS Summary	Building Count	Potential Economic Impact (x\$1000)	Building Count	Potential Economic Impact (x\$1000)	Building Count	Potential Economic Impact (x\$1000)	Total of All Potential Economic Impact (x\$1000)	Loss-to-Exposure Ratio	Total Estimated Loss (x\$1000)
<b>County-Wide Totals</b>	<b>82,409</b>	<b>\$10,712,985</b>	<b>2,616</b>	<b>\$2,202,612</b>	<b>715</b>	<b>\$557,141</b>	<b>\$13,472,739</b>		
High Hazard Exposure	386	\$43,368	25	\$18,036	9	\$9,272	\$70,676	N/A	\$0
Pinal County HAZUS Summary	% Building Count	% Potential Economic Impact	% Building Count	% Potential Economic Impact	% Building Count	% Potential Economic Impact			
High Hazard Exposure	0.47%	0.40%	0.96%	0.82%	01.26%	01.66%			

	Residential		Commercial		Industrial		Summary		
Apache Junction HAZUS Summary	Building Count	Potential Economic Impact (x\$1000)	Building Count	Potential Economic Impact (x\$1000)	Building Count	Potential Economic Impact (x\$1000)	Total of All Potential Economic Impact (x\$1000)	Loss-to-Exposure Ratio	Total Estimated Loss (x\$1000)
<b>Community-Wide Totals</b>	<b>19,216</b>	<b>\$2,012,133</b>	<b>463</b>	<b>\$301,822</b>	<b>140</b>	<b>\$73,412</b>	<b>\$2,387,367</b>		
High Hazard Exposure	7	\$495	5	\$4,282	3	\$7,175	\$11,951	N/A	\$0
Apache Junction HAZUS Summary	% Building Count	% Potential Economic Impact	% Building Count	% Potential Economic Impact	% Building Count	% Potential Economic Impact			
High Hazard Exposure	0.04%	0.02%	01.08%	01.42%	02.01%	09.77%			

<b>Table 4-28: Casa Grande Estimated Building Exposure to Fissure Risk</b>									
	<b>Residential</b>		<b>Commercial</b>		<b>Industrial</b>		<b>Summary</b>		
<b>Casa Grande HAZUS Summary</b>	<b>Building Count</b>	<b>Potential Economic Impact (x\$1000)</b>	<b>Building Count</b>	<b>Potential Economic Impact (x\$1000)</b>	<b>Building Count</b>	<b>Potential Economic Impact (x\$1000)</b>	<b>Total of All Potential Economic Impact (x\$1000)</b>	<b>Loss-to-Exposure Ratio</b>	<b>Total Estimated Loss (x\$1000)</b>
<b>Community-Wide Totals</b>	<b>11,076</b>	<b>\$1,780,401</b>	<b>572</b>	<b>\$562,479</b>	<b>137</b>	<b>\$158,896</b>	<b>\$2,501,776</b>		
<b>High Hazard Exposure</b>	30	\$4,029	5	\$6,383	0	\$198	\$10,610	N/A	\$0
<b>Casa Grande HAZUS Summary</b>	<b>% Building Count</b>	<b>% Potential Economic Impact</b>	<b>% Building Count</b>	<b>% Potential Economic Impact</b>	<b>% Building Count</b>	<b>% Potential Economic Impact</b>			
<b>High Hazard Exposure</b>	0.27%	0.23%	0.87%	01.13%	0.12%	0.12%			

<b>Table 4-29: Coolidge Estimated Building Exposure to Fissure Risk</b>									
	<b>Residential</b>		<b>Commercial</b>		<b>Industrial</b>		<b>Summary</b>		
<b>Coolidge HAZUS Summary</b>	<b>Building Count</b>	<b>Potential Economic Impact (x\$1000)</b>	<b>Building Count</b>	<b>Potential Economic Impact (x\$1000)</b>	<b>Building Count</b>	<b>Potential Economic Impact (x\$1000)</b>	<b>Total of All Potential Economic Impact (x\$1000)</b>	<b>Loss-to-Exposure Ratio</b>	<b>Total Estimated Loss (x\$1000)</b>
<b>Community-Wide Totals</b>	<b>3,889</b>	<b>\$452,027</b>	<b>139</b>	<b>\$96,995</b>	<b>22</b>	<b>\$21,642</b>	<b>\$570,664</b>		
<b>High Hazard Exposure</b>	0	\$0	0	\$0	0	\$0	\$0	N/A	\$0
<b>Coolidge HAZUS Summary</b>	<b>% Building Count</b>	<b>% Potential Economic Impact</b>	<b>% Building Count</b>	<b>% Potential Economic Impact</b>	<b>% Building Count</b>	<b>% Potential Economic Impact</b>			
<b>High Hazard Exposure</b>	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%			

<b>Table 4-30: Eloy Estimated Building Exposure to Fissure Risk</b>									
	<b>Residential</b>		<b>Commercial</b>		<b>Industrial</b>		<b>Summary</b>		
<b>Eloy HAZUS Summary</b>	<b>Building Count</b>	<b>Potential Economic Impact (x\$1000)</b>	<b>Building Count</b>	<b>Potential Economic Impact (x\$1000)</b>	<b>Building Count</b>	<b>Potential Economic Impact (x\$1000)</b>	<b>Total of All Potential Economic Impact (x\$1000)</b>	<b>Loss-to-Exposure Ratio</b>	<b>Total Estimated Loss (x\$1000)</b>
<b>Community-Wide Totals</b>	<b>3,371</b>	<b>\$364,555</b>	<b>113</b>	<b>\$66,278</b>	<b>23</b>	<b>\$22,017</b>	<b>\$452,850</b>		
<b>High Hazard Exposure</b>	205	\$24,336	9	\$5,099	4	\$1,198	\$30,633	N/A	\$0
<b>Eloy HAZUS Summary</b>	<b>% Building Count</b>	<b>% Potential Economic Impact</b>	<b>% Building Count</b>	<b>% Potential Economic Impact</b>	<b>% Building Count</b>	<b>% Potential Economic Impact</b>			
<b>High Hazard Exposure</b>	06.09%	06.68%	07.70%	07.69%	16.0%	05.44%			

<b>Table 4-31: Florence Estimated Building Exposure to Fissure Risk</b>									
	<b>Residential</b>		<b>Commercial</b>		<b>Industrial</b>		<b>Summary</b>		
<b>Florence HAZUS Summary</b>	<b>Building Count</b>	<b>Potential Economic Impact (x\$1000)</b>	<b>Building Count</b>	<b>Potential Economic Impact (x\$1000)</b>	<b>Building Count</b>	<b>Potential Economic Impact (x\$1000)</b>	<b>Total of All Potential Economic Impact (x\$1000)</b>	<b>Loss-to-Exposure Ratio</b>	<b>Total Estimated Loss (x\$1000)</b>
<b>Community-Wide Totals</b>	<b>4,180</b>	<b>\$675,616</b>	<b>54</b>	<b>\$119,579</b>	<b>9</b>	<b>\$3,058</b>	<b>\$798,252</b>		
<b>High Hazard Exposure</b>	0	\$0	0	\$0	0	\$0	\$0	N/A	\$0
<b>Florence HAZUS Summary</b>	<b>% Building Count</b>	<b>% Potential Economic Impact</b>	<b>% Building Count</b>	<b>% Potential Economic Impact</b>	<b>% Building Count</b>	<b>% Potential Economic Impact</b>			
<b>High Hazard Exposure</b>	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%			

	Residential		Commercial		Industrial		Summary		
Kearny HAZUS Summary	Building Count	Potential Economic Impact (x\$1000)	Building Count	Potential Economic Impact (x\$1000)	Building Count	Potential Economic Impact (x\$1000)	Total of All Potential Economic Impact (x\$1000)	Loss-to-Exposure Ratio	Total Estimated Loss (x\$1000)
<b>Community-Wide Totals</b>	<b>970</b>	<b>\$174,690</b>	<b>24</b>	<b>\$20,823</b>	<b>1</b>	<b>\$258</b>	<b>\$195,772</b>		
High Hazard Exposure	0	\$0	0	\$0	0	\$0	\$0	N/A	\$0
Kearny HAZUS Summary	% Building Count	% Potential Economic Impact	% Building Count	% Potential Economic Impact	% Building Count	% Potential Economic Impact			
High Hazard Exposure	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%			

	Residential		Commercial		Industrial		Summary		
Mammoth HAZUS Summary	Building Count	Potential Economic Impact (x\$1000)	Building Count	Potential Economic Impact (x\$1000)	Building Count	Potential Economic Impact (x\$1000)	Total of All Potential Economic Impact (x\$1000)	Loss-to-Exposure Ratio	Total Estimated Loss (x\$1000)
<b>Community-Wide Totals</b>	<b>791</b>	<b>\$78,637</b>	<b>21</b>	<b>\$10,926</b>	<b>5</b>	<b>\$3,850</b>	<b>\$93,413</b>		
High Hazard Exposure	0	\$0	0	\$0	0	\$0	\$0	N/A	\$0
Mammoth HAZUS Summary	% Building Count	% Potential Economic Impact	% Building Count	% Potential Economic Impact	% Building Count	% Potential Economic Impact			
High Hazard Exposure	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%			

<b>Table 4-34: Maricopa Estimated Building Exposure to Fissure Risk</b>									
	<b>Residential</b>		<b>Commercial</b>		<b>Industrial</b>		<b>Summary</b>		
<b>Maricopa HAZUS Summary</b>	<b>Building Count</b>	<b>Potential Economic Impact (x\$1000)</b>	<b>Building Count</b>	<b>Potential Economic Impact (x\$1000)</b>	<b>Building Count</b>	<b>Potential Economic Impact (x\$1000)</b>	<b>Total of All Potential Economic Impact (x\$1000)</b>	<b>Loss-to-Exposure Ratio</b>	<b>Total Estimated Loss (x\$1000)</b>
<b>Community-Wide Totals</b>	<b>797</b>	<b>\$59,759</b>	<b>55</b>	<b>\$35,469</b>	<b>9</b>	<b>\$12,357</b>	<b>\$107,585</b>		
<b>High Hazard Exposure</b>	0	\$0	0	\$0	0	\$0	\$0	N/A	\$0
<b>Maricopa HAZUS Summary</b>	<b>% Building Count</b>	<b>% Potential Economic Impact</b>	<b>% Building Count</b>	<b>% Potential Economic Impact</b>	<b>% Building Count</b>	<b>% Potential Economic Impact</b>			
<b>High Hazard Exposure</b>	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%			

<b>Table 4-35: Superior Estimated Building Exposure to Fissure Risk</b>									
	<b>Residential</b>		<b>Commercial</b>		<b>Industrial</b>		<b>Summary</b>		
<b>Superior HAZUS Summary</b>	<b>Building Count</b>	<b>Potential Economic Impact (x\$1000)</b>	<b>Building Count</b>	<b>Potential Economic Impact (x\$1000)</b>	<b>Building Count</b>	<b>Potential Economic Impact (x\$1000)</b>	<b>Total of All Potential Economic Impact (x\$1000)</b>	<b>Loss-to-Exposure Ratio</b>	<b>Total Estimated Loss (x\$1000)</b>
<b>Community-Wide Totals</b>	<b>1,552</b>	<b>\$186,666</b>	<b>40</b>	<b>\$16,334</b>	<b>11</b>	<b>\$11,096</b>	<b>\$214,096</b>		
<b>High Hazard Exposure</b>	0	\$0	0	\$0	0	\$0	\$0	N/A	\$0
<b>Superior HAZUS Summary</b>	<b>% Building Count</b>	<b>% Potential Economic Impact</b>	<b>% Building Count</b>	<b>% Potential Economic Impact</b>	<b>% Building Count</b>	<b>% Potential Economic Impact</b>			
<b>High Hazard Exposure</b>	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%			

<b>Table 4-36: Uninc Pinal Co Estimated Building Exposure to Fissure Risk</b>									
	<b>Residential</b>		<b>Commercial</b>		<b>Industrial</b>		<b>Summary</b>		
<b>Unincorporated Pinal County HAZUS Summary</b>	<b>Building Count</b>	<b>Potential Economic Impact (x\$1000)</b>	<b>Building Count</b>	<b>Potential Economic Impact (x\$1000)</b>	<b>Building Count</b>	<b>Potential Economic Impact (x\$1000)</b>	<b>Total of All Potential Economic Impact (x\$1000)</b>	<b>Loss-to-Exposure Ratio</b>	<b>Total Estimated Loss (x\$1000)</b>
<b>Community-Wide Totals</b>	<b>33,447</b>	<b>\$4,591,973</b>	<b>997</b>	<b>\$592,560</b>	<b>345</b>	<b>\$246,968</b>	<b>\$5,431,500</b>		
<b>High Hazard Exposure</b>	132	\$13,273	5	\$1,707	1	\$533	\$15,514	N/A	\$0
<b>Unincorporated Pinal County HAZUS Summary</b>	<b>% Building Count</b>	<b>% Potential Economic Impact</b>	<b>% Building Count</b>	<b>% Potential Economic Impact</b>	<b>% Building Count</b>	<b>% Potential Economic Impact</b>			
<b>High Hazard Exposure</b>	0.39%	0.29%	0.50%	0.29%	0.39%	0.22%			

### **Vulnerability – Development Trends**

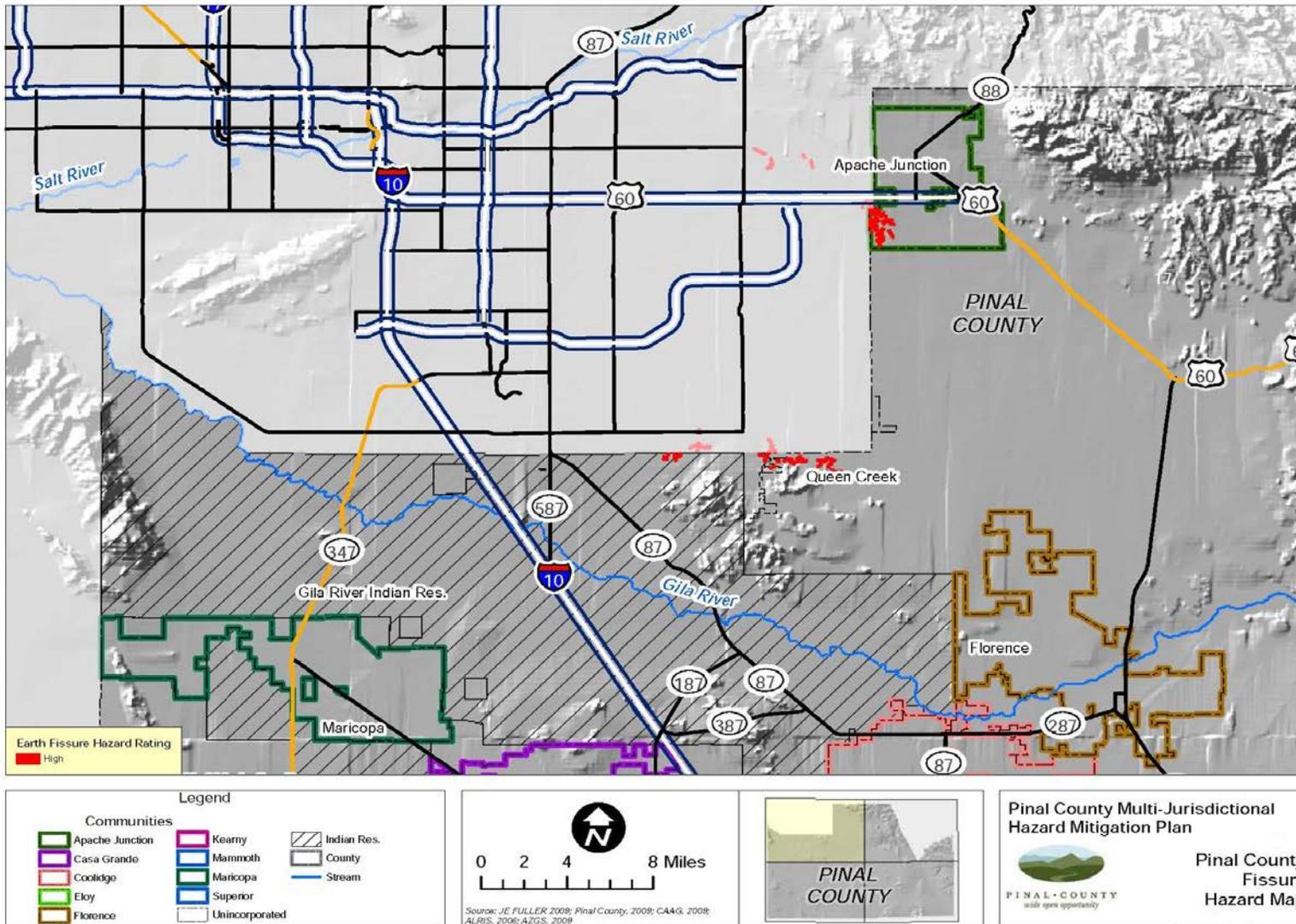
Given the isolated nature of the identified fissure risk area, it is not anticipated that significant development of the area will occur in the future. Monitoring of the fissure and regular maintenance of the roadway within the fissure area will probably be the extent of needed activity.

### **Sources**

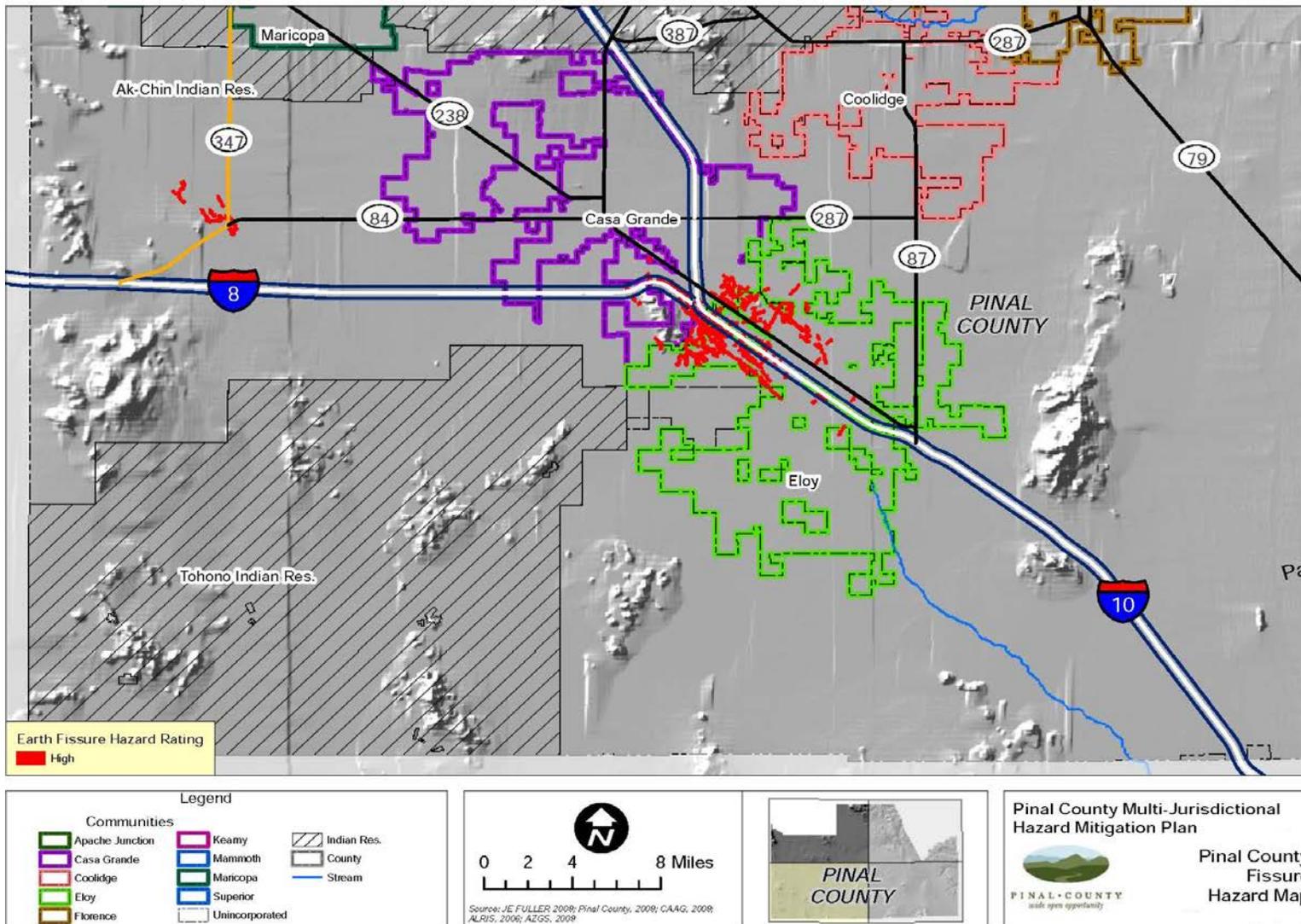
AZ Division of Emergency Management, State of AZ Hazard Mitigation Plan.

AZ Geological Survey <http://www.azgs.az.gov/EFC.shtml>

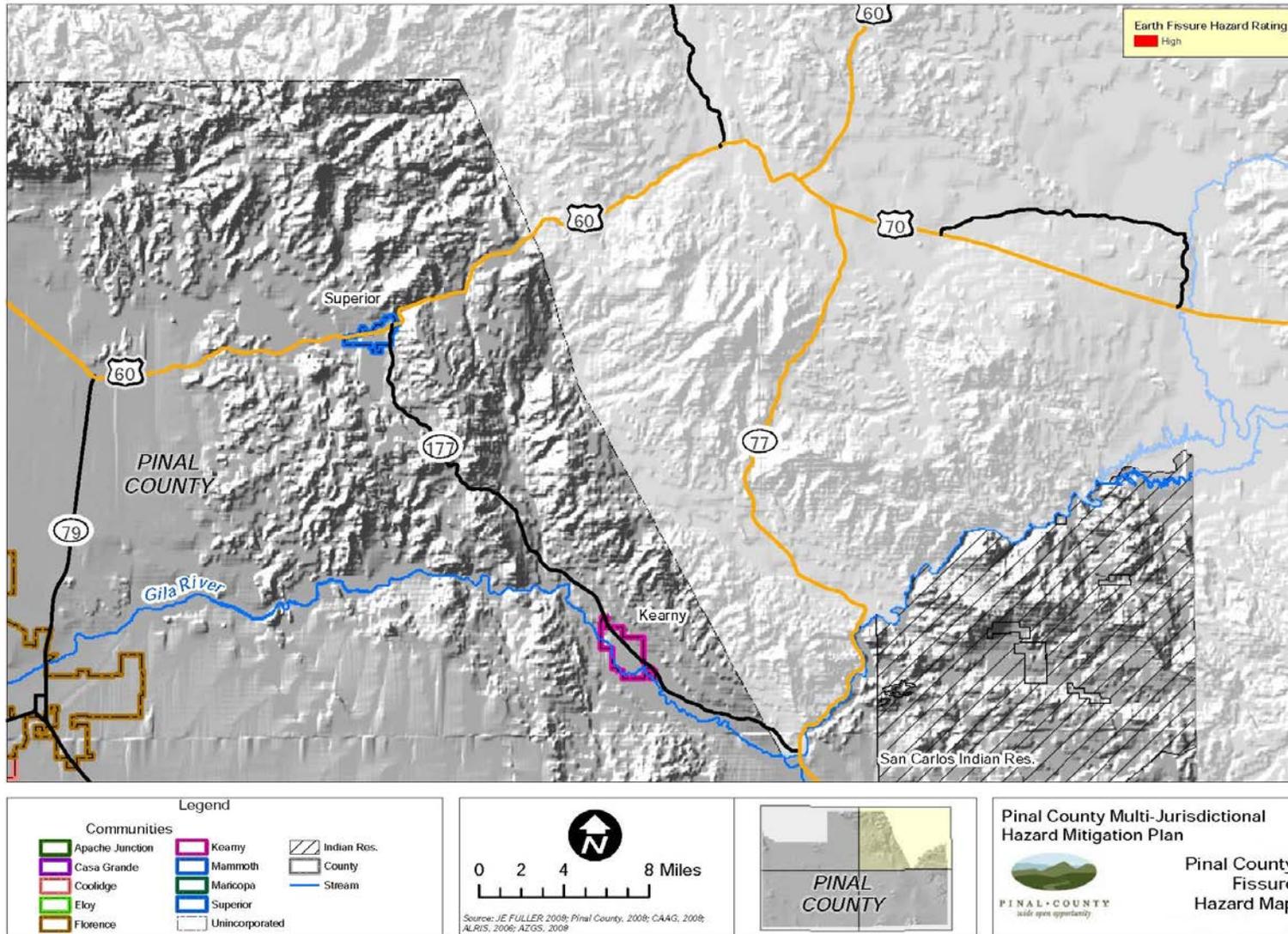
AZ Land Subsidence Group, 2007. Land subsidence and earth fissures in Arizona: Research and informational needs for effective risk management, white paper  
<http://www.azgs.az.gov/Earth%20Fissures/CR-07-C.pdf>



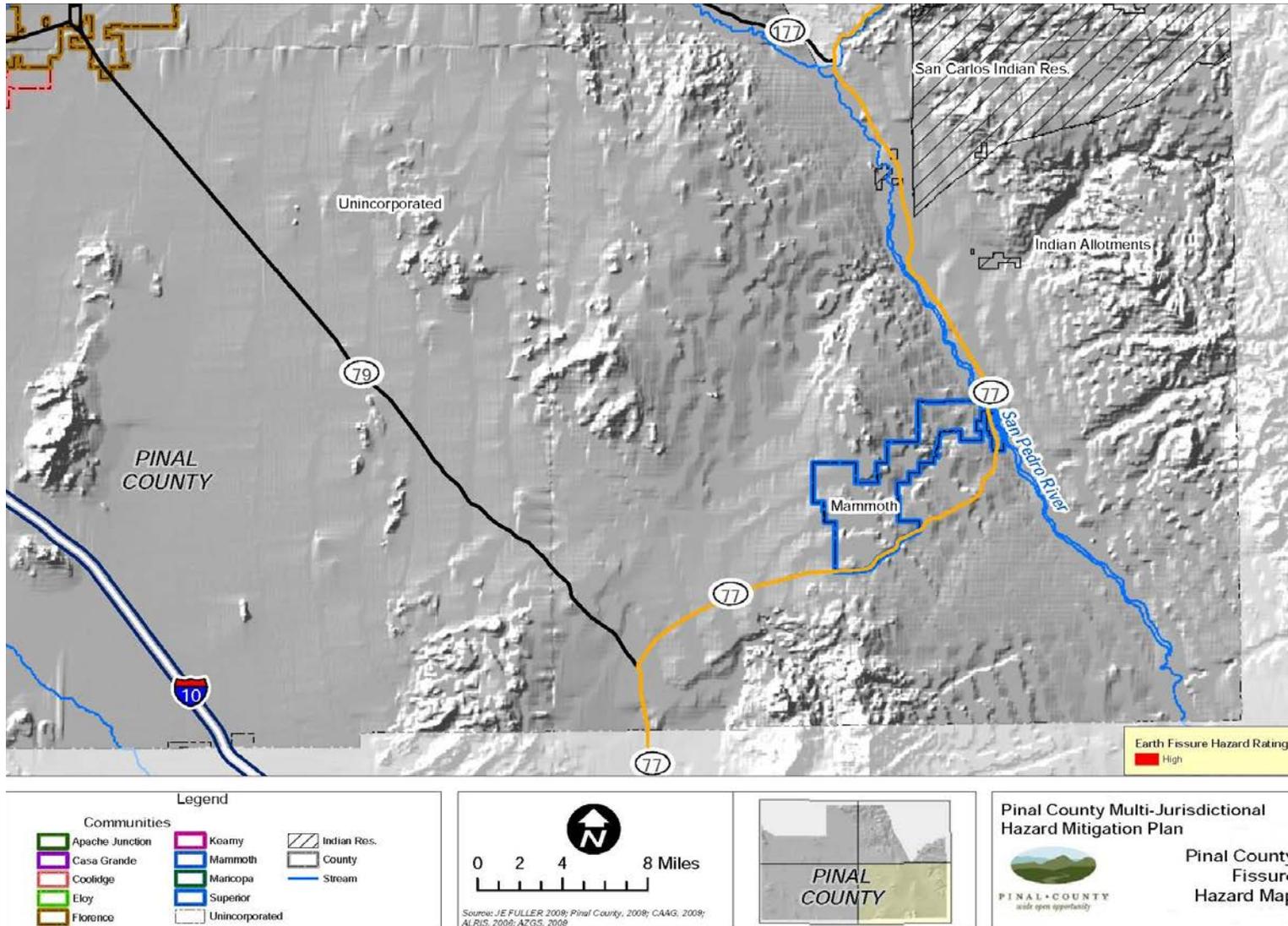
Map 4-11: Pinal County Fissure Hazard Area (1)



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



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



#### 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 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 10<sup>th</sup> and lasted through the early hours February 14<sup>th</sup>. 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.<sup>14</sup> The flooding prompted a federal disaster declaration (FEMA-977-DR-AZ)

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<sup>14</sup> US Army Corps of Engineers, Los Angeles District, 1994, *Flood Damage Report – State of Arizona – Floods of 1993*

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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**

<b>Table 4-37: CPRI Results for Flooding</b>					
<b>Jurisdiction</b>	<b>Probability</b>	<b>Magnitude/ Severity</b>	<b>Warning Time</b>	<b>Duration</b>	<b>Rating</b>
<b>Apache Junction</b>	Highly Likely	Critical	6-12 hours	< 24 hours	3.35
<b>Casa Grande</b>	Highly Likely	Limited	< 6 hours	< 24 hours	3.20
<b>Coolidge</b>	Likely	Limited	< 6 hours	< 24 hours	2.75
<b>Eloy</b>	Highly Likely	Limited	< 6 hours	> 24 hours	3.30
<b>Florence</b>	Likely	Negligible	> 24 hours	< 1 week	2.10
<b>Kearny</b>	Likely	Critical	< 6 hours	< 24 hours	3.05
<b>Mammoth</b>	Highly Likely	Limited	< 6 hours	> 24 hours	3.30
<b>Maricopa</b>	Likely	Critical	6-12 hours	> 1 week	3.10
<b>Superior</b>	Likely	Limited	< 6 hours	> 24 hours	2.85
<b>Unincorporated Pinal Co</b>	Highly Likely	Limited	12-24 hours	< 1 week	3.00
<b>County-wide average CPRI =</b>					<b>3.00</b>

**Vulnerability – Loss Estimations**

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. Using the FEMA tables, 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.

There is \$37.9M and \$2.0M 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 9,488 people, or 5.3% of the total population, is potentially exposed to a high hazard flood event. A total population

of 31,342 people, or 17.4% 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.

It is duly noted that the loss and exposure numbers presented above represent a comprehensive evaluation of the County as a whole. It is unlikely that a storm event would occur that would flood all of the delineated high and medium flood hazard areas at the same time. Accordingly, actual event based losses and exposure are likely to be only a fraction of those summarized above. Furthermore, it should be noted that any flood event that exposes assets or population to a medium hazard will also expose assets and populations to the high hazard flood zone. That is, the 100-year floodplain would be entirely inundated during a 500-year flood.

Community	Total Facilities Reported by Community	Impacted Facilities	Percentage of Total Community Facilities Impacted	Estimated Replacement Cost (x \$1000)	Estimated Structure Loss (x \$1000)
<b>HIGH</b>					
<b>County-Wide Totals</b>	<b>945</b>	<b>133</b>	<b>14.07%</b>	<b>\$189,307</b>	<b>\$37,861</b>
Apache Junction	54	3	5.56%	\$2,000	\$400
Casa Grande	71	4	5.63%	\$0	\$0
Coolidge	43	0	0.00%	\$0	\$0
Eloy	180	50	27.78%	\$43,274	\$8,655
Florence	89	13	14.61%	\$5,455	\$1,091
Kearny	38	3	7.89%	\$430	\$86
Mammoth	14	4	28.57%	\$4,880	\$976
Maricopa	143	24	16.78%	\$27,356	\$5,471
Superior	44	4	9.09%	\$0	\$0
Unincorporated Pinal Co	269	28	10.41%	\$105,912	\$21,182
<b>MEDIUM</b>					
<b>County-Wide Totals</b>	<b>945</b>	<b>107</b>	<b>11.32%</b>	<b>\$40,921</b>	<b>\$2,046</b>
Apache Junction	54	40	74.07%	\$17,935	\$897
Casa Grande	71	1	1.41%	\$0	\$0
Coolidge	43	0	0.00%	\$0	\$0
Eloy	180	0	0.00%	\$0	\$0
Florence	89	1	1.12%	\$0	\$0
Kearny	38	1	2.63%	\$100	\$5
Mammoth	14	3	21.43%	\$1,577	\$79
Maricopa	143	34	23.78%	\$15,400	\$770
Superior	44	0	0.00%	\$0	\$0
Unincorporated Pinal Co	269	27	10.04%	\$5,909	\$295

Community	Total Population	Population Exposed	Percent of Population Exposed	Total Population Over 65	Population Over 65 Exposed	Percent of Population Over 65 Exposed
<b>HIGH</b>						
<b>County-Wide Totals</b>	<b>179,776</b>	<b>9,488</b>	<b>5.28%</b>	<b>29,040</b>	<b>1,278</b>	<b>4.40%</b>
Apache Junction	31,851	894	2.81%	8,279	236	2.85%
Casa Grande	27,298	1,493	5.47%	3,840	361	9.40%
Coolidge	8,810	149	1.70%	1,239	25	2.04%
Eloy	10,659	1,068	10.02%	627	80	12.73%
Florence	17,487	2,227	12.74%	1,420	50	3.50%

<b>Table 4-39: Estimated Population Exposed to High &amp; Medium Hazard Flooding</b>						
<b>Community</b>	<b>Total Population</b>	<b>Population Exposed</b>	<b>Percent of Population Exposed</b>	<b>Total Population Over 65</b>	<b>Population Over 65 Exposed</b>	<b>Percent of Population Over 65 Exposed</b>
Kearny	2,392	159	6.64%	351	27	7.75%
Mammoth	1,757	132	7.54%	190	14	7.21%
Maricopa	1,874	124	6.64%	148	9	6.26%
Superior	3,238	414	12.78%	661	87	13.15%
Unincorporated Pinal Co	64,057	2,787	4.35%	11,785	386	3.28%
<b>MEDIUM</b>						
<b>County-Wide Totals</b>	<b>179,776</b>	<b>31,342</b>	<b>17.43%</b>	<b>29,040</b>	<b>6,659</b>	<b>22.93%</b>
Apache Junction	31,851	24,307	76.31%	8,279	5,864	70.83%
Casa Grande	27,298	442	1.62%	3,840	104	2.71%
Coolidge	8,810	40	0.46%	1,239	4	0.32%
Eloy	10,659	1	0.01%	627	0	0.00%
Florence	17,487	216	1.23%	1,420	5	0.32%
Kearny	2,392	31	1.28%	351	5	1.39%
Mammoth	1,757	703	40.01%	190	77	40.55%
Maricopa	1,874	32	1.71%	148	2	1.36%
Superior	3,238	36	1.12%	661	8	1.22%
Unincorporated Pinal Co	64,057	5,534	8.64%	11,785	590	5.01%

	Residential		Commercial		Industrial		Summary		
Pinal County HAZUS Summary	Building Count	Potential Economic Impact (x\$1000)	Building Count	Potential Economic Impact (x\$1000)	Building Count	Potential Economic Impact (x\$1000)	Total of All Potential Economic Impact (x\$1000)	Loss-to-Exposure Ratio	Total Estimated Loss (x\$1000)
<b>County-Wide Totals</b>	<b>82,409</b>	<b>\$10,712,985</b>	<b>2,616</b>	<b>\$2,202,612</b>	<b>715</b>	<b>\$557,141</b>	<b>\$13,472,739</b>		
High Hazard Exposure	3,455	\$434,111	127	\$96,595	39	\$37,577	\$568,284	20%	\$113,657
Medium Hazard Exposure	16,383	\$1,974,636	407	\$290,856	109	\$113,070	\$2,378,563	5%	\$118,928
Pinal County HAZUS Summary	% Building Count	% Potential Economic Impact	% Building Count	% Potential Economic Impact	% Building Count	% Potential Economic Impact			
High Hazard Exposure	04.19%	04.05%	04.85%	04.39%	05.45%	06.74%			
Medium Hazard Exposure	19.88%	18.43%	15.54%	13.21%	15.31%	20.29%			

	Residential		Commercial		Industrial		Summary		
Apache Junction HAZUS Summary	Building Count	Potential Economic Impact (x\$1000)	Building Count	Potential Economic Impact (x\$1000)	Building Count	Potential Economic Impact (x\$1000)	Total of All Potential Economic Impact (x\$1000)	Loss-to-Exposure Ratio	Total Estimated Loss (x\$1000)
<b>Community-Wide Totals</b>	<b>19,216</b>	<b>\$2,012,133</b>	<b>463</b>	<b>\$301,822</b>	<b>140</b>	<b>\$73,412</b>	<b>\$2,387,367</b>		
High Hazard Exposure	573	\$59,577	19	\$11,467	7	\$2,937	\$73,981	20%	\$14,796
Medium Hazard Exposure	13,648	\$1,538,221	332	\$236,254	88	\$44,708	\$1,819,183	5%	\$90,959
Apache Junction HAZUS Summary	% Building Count	% Potential Economic Impact	% Building Count	% Potential Economic Impact	% Building Count	% Potential Economic Impact			
High Hazard Exposure	02.98%	02.96%	04.16%	03.80%	05.08%	04.0%			
Medium Hazard Exposure	71.02%	76.45%	71.70%	78.28%	62.79%	60.90%			

	Residential		Commercial		Industrial		Summary		
Casa Grande HAZUS Summary	Building Count	Potential Economic Impact (x\$1000)	Building Count	Potential Economic Impact (x\$1000)	Building Count	Potential Economic Impact (x\$1000)	Total of All Potential Economic Impact (x\$1000)	Loss-to-Exposure Ratio	Total Estimated Loss (x\$1000)
<b>Community-Wide Totals</b>	<b>11,076</b>	<b>\$1,780,401</b>	<b>572</b>	<b>\$562,479</b>	<b>137</b>	<b>\$158,896</b>	<b>\$2,501,776</b>		
High Hazard Exposure	671	\$87,626	35	\$36,347	10	\$8,841	\$132,814	20%	\$26,563
Medium Hazard Exposure	184	\$29,460	5	\$3,714	1	\$181	\$33,355	5%	\$1,668
Casa Grande HAZUS Summary	% Building Count	% Potential Economic Impact	% Building Count	% Potential Economic Impact	% Building Count	% Potential Economic Impact			
High Hazard Exposure	06.06%	04.92%	06.11%	06.46%	07.65%	05.56%			
Medium Hazard Exposure	01.67%	01.65%	0.89%	0.66%	0.80%	0.11%			

	Residential		Commercial		Industrial		Summary		
Coolidge HAZUS Summary	Building Count	Potential Economic Impact (x\$1000)	Building Count	Potential Economic Impact (x\$1000)	Building Count	Potential Economic Impact (x\$1000)	Total of All Potential Economic Impact (x\$1000)	Loss-to-Exposure Ratio	Total Estimated Loss (x\$1000)
<b>Community-Wide Totals</b>	<b>3,889</b>	<b>\$452,027</b>	<b>139</b>	<b>\$96,995</b>	<b>22</b>	<b>\$21,642</b>	<b>\$570,664</b>		
High Hazard Exposure	51	\$6,910	1	\$246	0	\$0	\$7,156	20%	\$1,431
Medium Hazard Exposure	16	\$1,410	1	\$258	1	\$8,388	\$10,056	5%	\$503
Coolidge HAZUS Summary	% Building Count	% Potential Economic Impact	% Building Count	% Potential Economic Impact	% Building Count	% Potential Economic Impact			
High Hazard Exposure	01.30%	01.53%	0.50%	0.25%	0.0%	0.0%			
Medium Hazard Exposure	0.41%	0.31%	0.72%	0.27%	04.51%	38.76%			

	Residential		Commercial		Industrial		Summary		
Eloy HAZUS Summary	Building Count	Potential Economic Impact (x\$1000)	Building Count	Potential Economic Impact (x\$1000)	Building Count	Potential Economic Impact (x\$1000)	Total of All Potential Economic Impact (x\$1000)	Loss-to-Exposure Ratio	Total Estimated Loss (x\$1000)
<b>Community-Wide Totals</b>	<b>3,371</b>	<b>\$364,555</b>	<b>113</b>	<b>\$66,278</b>	<b>23</b>	<b>\$22,017</b>	<b>\$452,850</b>		
High Hazard Exposure	379	\$33,917	19	\$10,334	6	\$11,519	\$55,770	20%	\$11,154
Medium Hazard Exposure	0	\$18	1	\$564	0	\$0	\$581	5%	\$29
Eloy HAZUS Summary	% Building Count	% Potential Economic Impact	% Building Count	% Potential Economic Impact	% Building Count	% Potential Economic Impact			
High Hazard Exposure	11.25%	09.30%	17.21%	15.59%	28.07%	52.32%			
Medium Hazard Exposure	0.01%	0.0%	0.46%	0.85%	0.0%	0.0%			

	Residential		Commercial		Industrial		Summary		
Florence HAZUS Summary	Building Count	Potential Economic Impact (x\$1000)	Building Count	Potential Economic Impact (x\$1000)	Building Count	Potential Economic Impact (x\$1000)	Total of All Potential Economic Impact (x\$1000)	Loss-to-Exposure Ratio	Total Estimated Loss (x\$1000)
<b>Community-Wide Totals</b>	<b>4,180</b>	<b>\$675,616</b>	<b>54</b>	<b>\$119,579</b>	<b>9</b>	<b>\$3,058</b>	<b>\$798,252</b>		
High Hazard Exposure	75	\$48,212	2	\$7,887	0	\$19	\$56,118	20%	\$11,224
Medium Hazard Exposure	25	\$5,698	0	\$679	0	\$0	\$6,377	5%	\$319
Florence HAZUS Summary	% Building Count	% Potential Economic Impact	% Building Count	% Potential Economic Impact	% Building Count	% Potential Economic Impact			
High Hazard Exposure	01.78%	07.14%	03.16%	06.60%	01.28%	0.61%			
Medium Hazard Exposure	0.60%	0.84%	0.86%	0.57%	0.0%	0.0%			

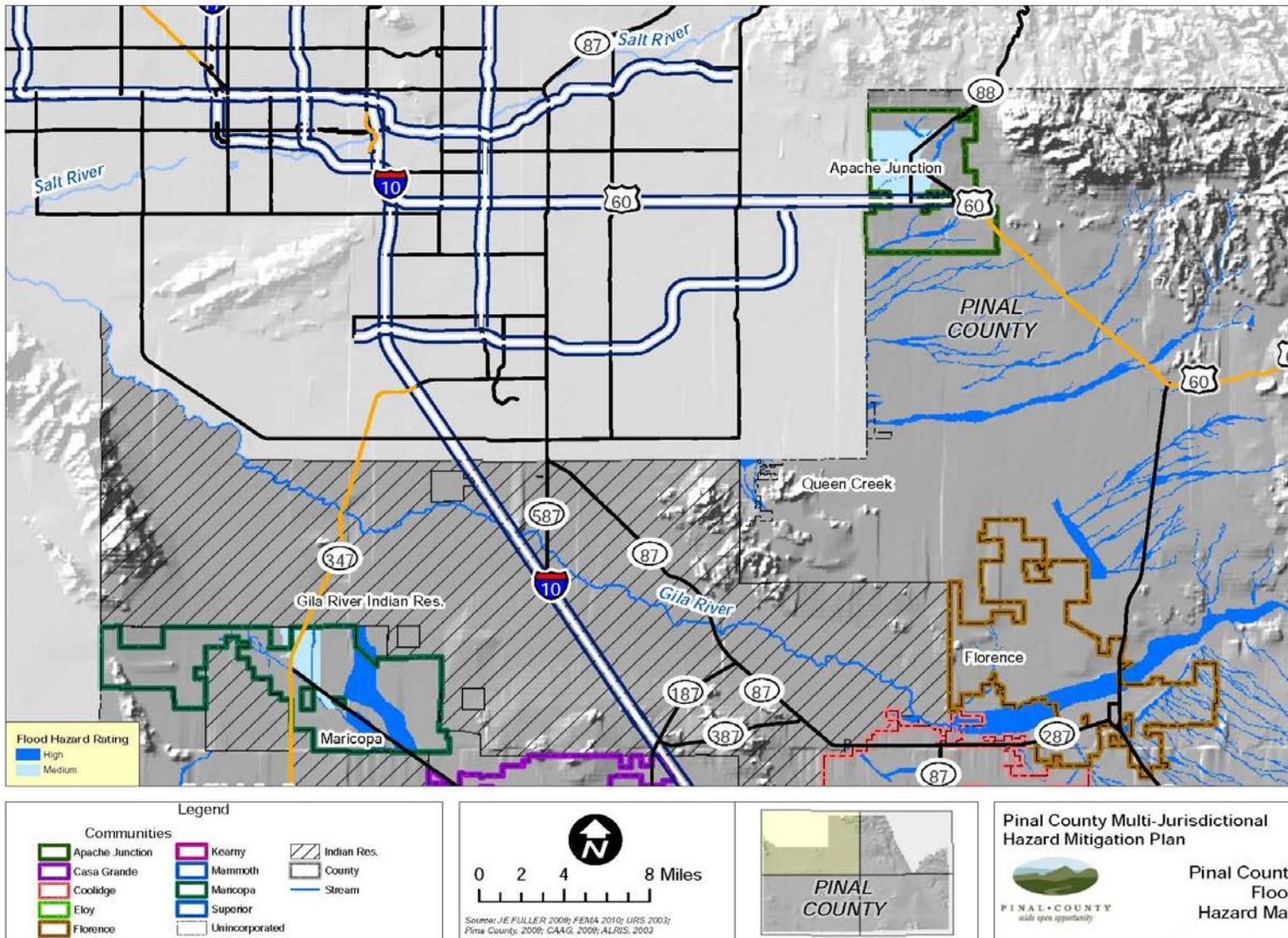
	Residential		Commercial		Industrial		Summary		
Kearny HAZUS Summary	Building Count	Potential Economic Impact (x\$1000)	Building Count	Potential Economic Impact (x\$1000)	Building Count	Potential Economic Impact (x\$1000)	Total of All Potential Economic Impact (x\$1000)	Loss-to-Exposure Ratio	Total Estimated Loss (x\$1000)
<b>Community-Wide Totals</b>	<b>970</b>	<b>\$174,690</b>	<b>24</b>	<b>\$20,823</b>	<b>1</b>	<b>\$258</b>	<b>\$195,772</b>		
High Hazard Exposure	97	\$10,019	7	\$6,757	0	\$2	\$16,778	20%	\$3,356
Medium Hazard Exposure	12	\$1,835	1	\$771	0	\$0	\$2,606	5%	\$130
Kearny HAZUS Summary	% Building Count	% Potential Economic Impact	% Building Count	% Potential Economic Impact	% Building Count	% Potential Economic Impact			
High Hazard Exposure	10.02%	05.74%	27.56%	32.45%	0.37%	0.63%			
Medium Hazard Exposure	01.24%	01.05%	04.41%	03.70%	0.0%	0.0%			

	Residential		Commercial		Industrial		Summary		
Mammoth HAZUS Summary	Building Count	Potential Economic Impact (x\$1000)	Building Count	Potential Economic Impact (x\$1000)	Building Count	Potential Economic Impact (x\$1000)	Total of All Potential Economic Impact (x\$1000)	Loss-to-Exposure Ratio	Total Estimated Loss (x\$1000)
<b>Community-Wide Totals</b>	<b>791</b>	<b>\$78,637</b>	<b>21</b>	<b>\$10,926</b>	<b>5</b>	<b>\$3,850</b>	<b>\$93,413</b>		
High Hazard Exposure	73	\$7,081	3	\$1,400	0	\$257	\$8,739	20%	\$1,748
Medium Hazard Exposure	315	\$30,725	8	\$3,211	5	\$3,591	\$37,527	5%	\$1,876
Mammoth HAZUS Summary	% Building Count	% Potential Economic Impact	% Building Count	% Potential Economic Impact	% Building Count	% Potential Economic Impact			
High Hazard Exposure	09.18%	09.0%	11.89%	12.82%	04.38%	06.68%			
Medium Hazard Exposure	39.77%	39.07%	38.53%	29.39%	95.55%	93.28%			

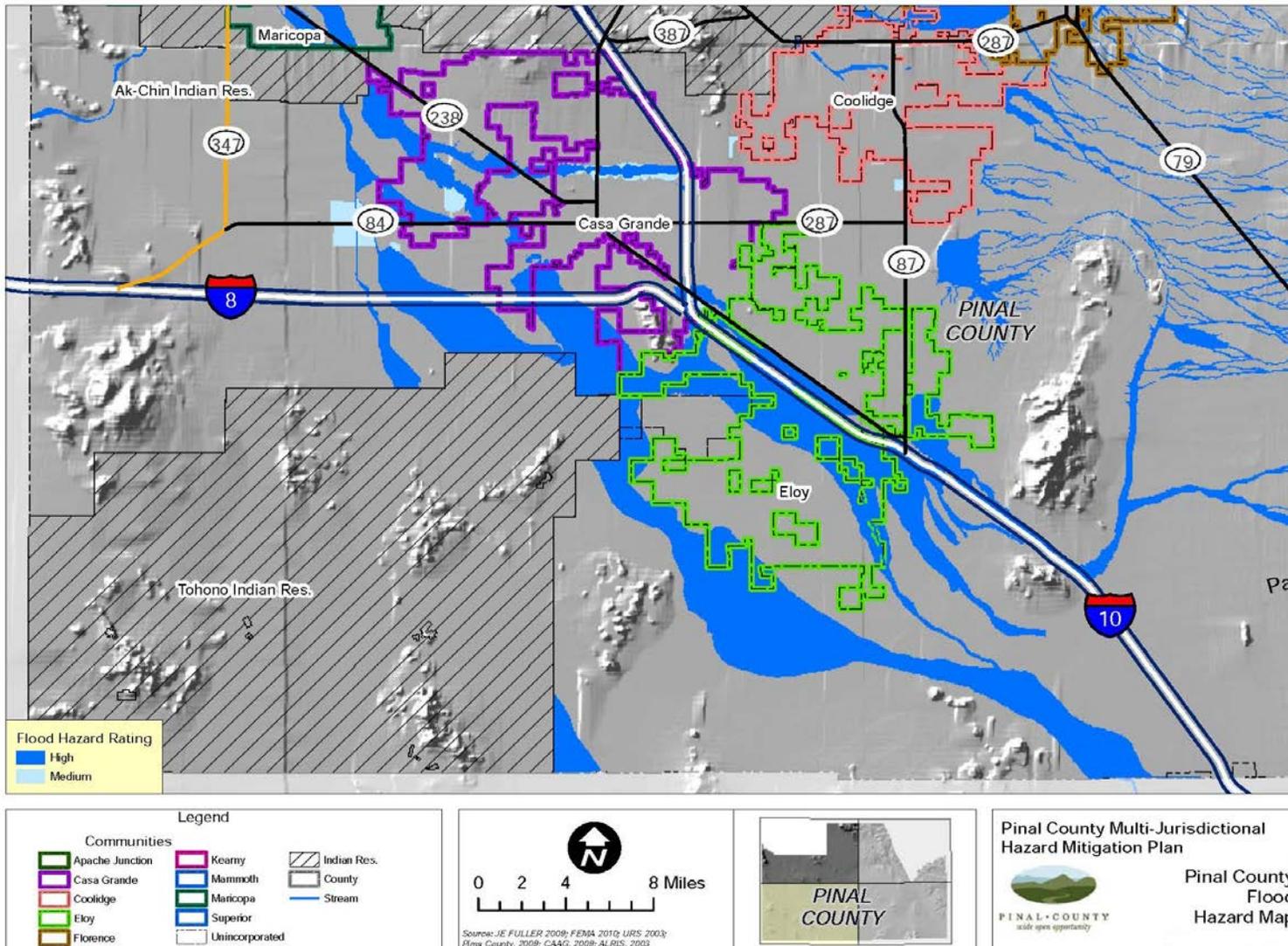
	Residential		Commercial		Industrial		Summary		
Maricopa HAZUS Summary	Building Count	Potential Economic Impact (x\$1000)	Building Count	Potential Economic Impact (x\$1000)	Building Count	Potential Economic Impact (x\$1000)	Total of All Potential Economic Impact (x\$1000)	Loss-to-Exposure Ratio	Total Estimated Loss (x\$1000)
<b>Community-Wide Totals</b>	<b>797</b>	<b>\$59,759</b>	<b>55</b>	<b>\$35,469</b>	<b>9</b>	<b>\$12,357</b>	<b>\$107,585</b>		
High Hazard Exposure	58	\$3,790	6	\$3,009	2	\$5,396	\$12,195	20%	\$2,439
Medium Hazard Exposure	22	\$1,093	6	\$5,980	1	\$194	\$7,267	5%	\$363
Maricopa HAZUS Summary	% Building Count	% Potential Economic Impact	% Building Count	% Potential Economic Impact	% Building Count	% Potential Economic Impact			
High Hazard Exposure	07.30%	06.34%	11.08%	08.48%	19.37%	43.67%			
Medium Hazard Exposure	02.81%	01.83%	11.40%	16.86%	14.68%	01.57%			

	Residential		Commercial		Industrial		Summary		
Superior HAZUS Summary	Building Count	Potential Economic Impact (x\$1000)	Building Count	Potential Economic Impact (x\$1000)	Building Count	Potential Economic Impact (x\$1000)	Total of All Potential Economic Impact (x\$1000)	Loss-to-Exposure Ratio	Total Estimated Loss (x\$1000)
<b>Community-Wide Totals</b>	<b>1,552</b>	<b>\$186,666</b>	<b>40</b>	<b>\$16,334</b>	<b>11</b>	<b>\$11,096</b>	<b>\$214,096</b>		
High Hazard Exposure	179	\$22,849	5	\$2,207	4	\$4,550	\$29,606	20%	\$5,921
Medium Hazard Exposure	17	\$2,192	0	\$19	0	\$343	\$2,554	5%	\$128
Superior HAZUS Summary	% Building Count	% Potential Economic Impact	% Building Count	% Potential Economic Impact	% Building Count	% Potential Economic Impact			
High Hazard Exposure	11.52%	12.24%	12.77%	13.51%	33.85%	41.0%			
Medium Hazard Exposure	01.12%	01.17%	0.19%	0.12%	01.03%	03.09%			

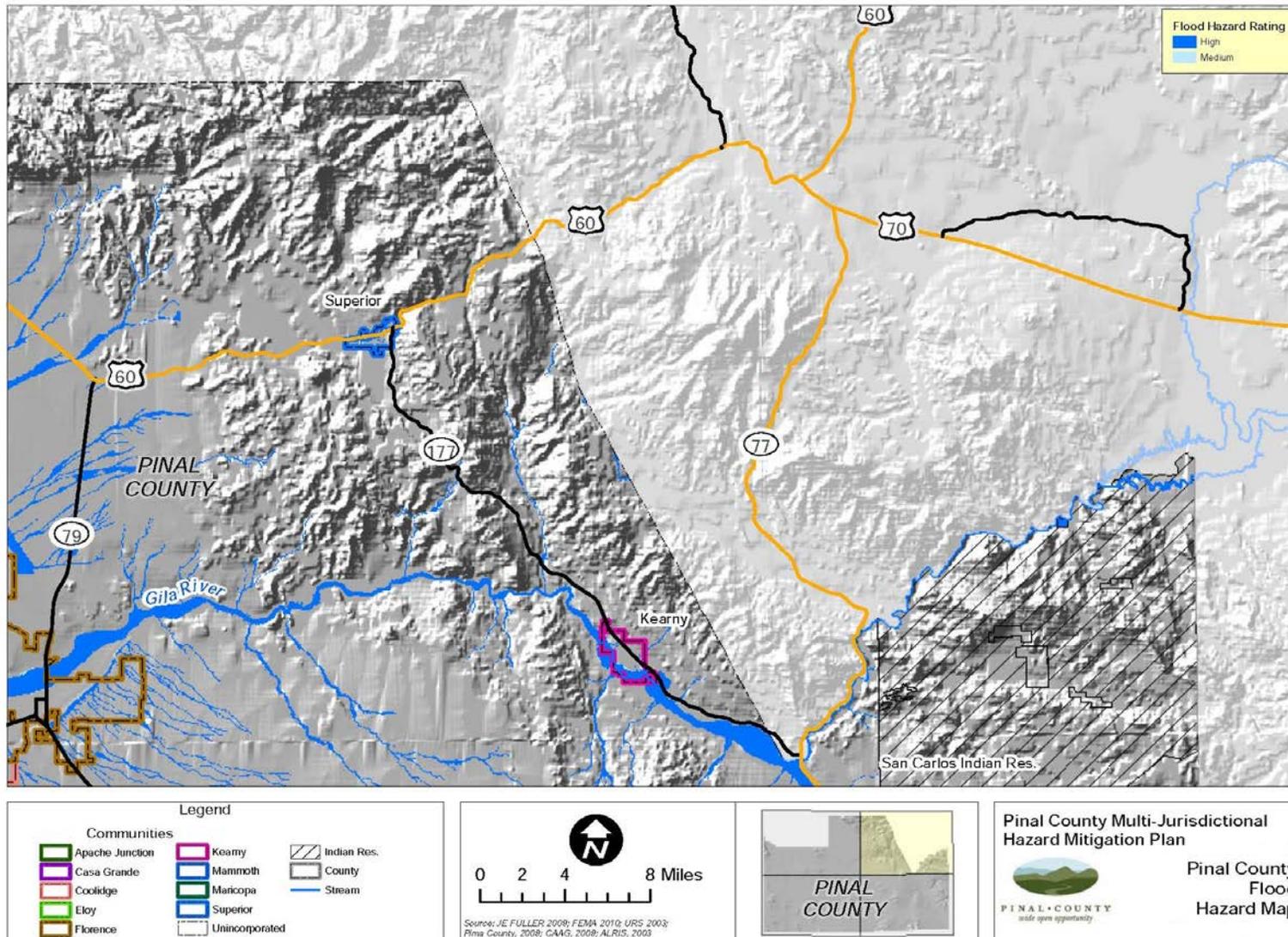
<b>Table 4-50: Uninc Pinal Co Estimated Building Exposure to Flooding</b>									
	<b>Residential</b>		<b>Commercial</b>		<b>Industrial</b>		<b>Summary</b>		
<b>Unincorporated Pinal County HAZUS Summary</b>	<b>Building Count</b>	<b>Potential Economic Impact (x\$1000)</b>	<b>Building Count</b>	<b>Potential Economic Impact (x\$1000)</b>	<b>Building Count</b>	<b>Potential Economic Impact (x\$1000)</b>	<b>Total of All Potential Economic Impact (x\$1000)</b>	<b>Loss-to-Exposure Ratio</b>	<b>Total Estimated Loss (x\$1000)</b>
<b>Community-Wide Totals</b>	<b>33,447</b>	<b>\$4,591,973</b>	<b>997</b>	<b>\$592,560</b>	<b>345</b>	<b>\$246,968</b>	<b>\$5,431,500</b>		
High Hazard Exposure	1,284	\$152,358	29	\$16,608	8	\$3,785	\$172,751	20%	\$34,550
Medium Hazard Exposure	2,143	\$363,985	52	\$39,403	13	\$55,664	\$459,053	5%	\$22,953
<b>Unincorporated Pinal County HAZUS Summary</b>	<b>% Building Count</b>	<b>% Potential Economic Impact</b>	<b>% Building Count</b>	<b>% Potential Economic Impact</b>	<b>% Building Count</b>	<b>% Potential Economic Impact</b>			
High Hazard Exposure	03.84%	03.32%	02.95%	02.80%	02.40%	01.53%			
Medium Hazard Exposure	06.41%	07.93%	05.23%	06.65%	03.74%	22.54%			



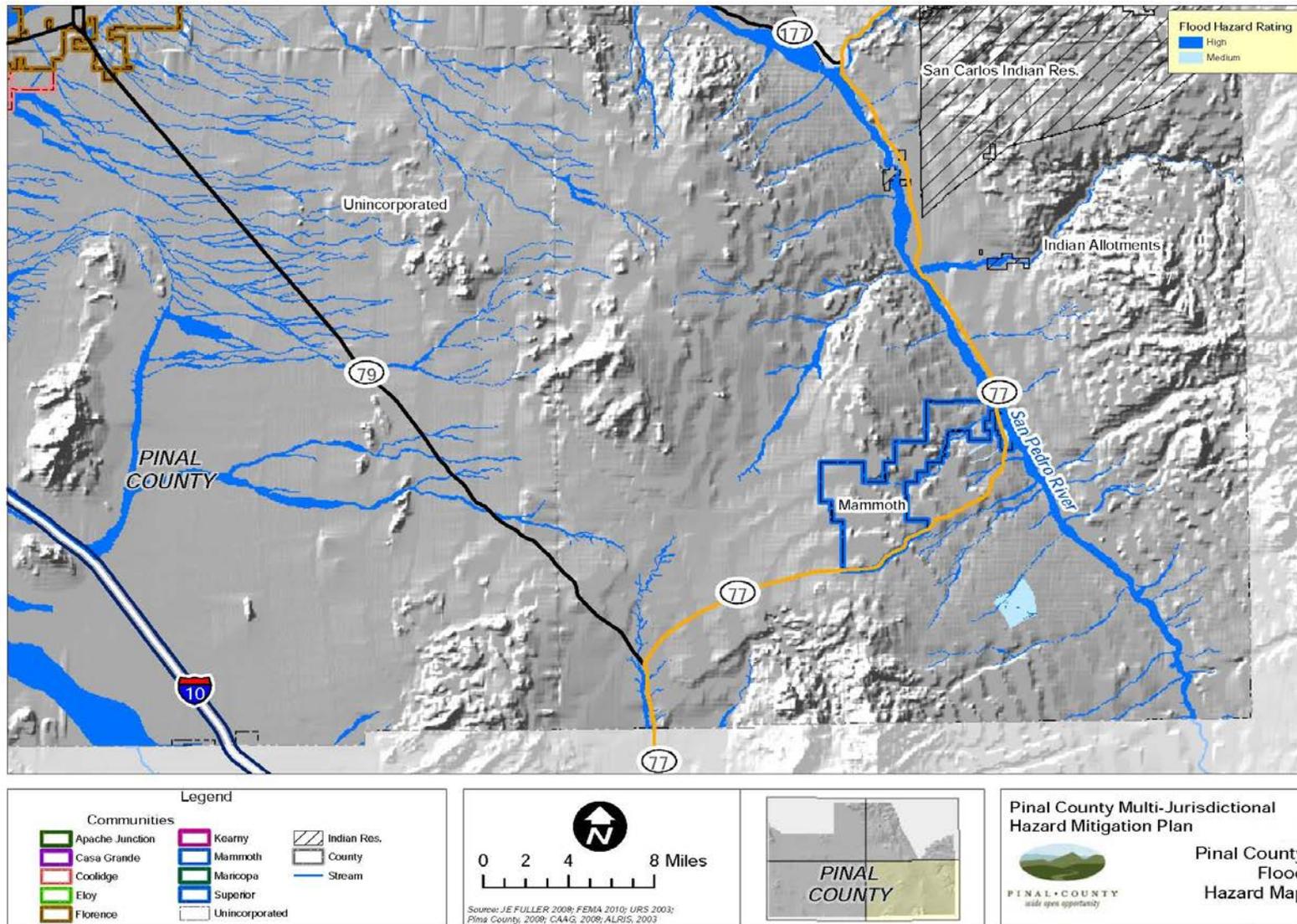
Map 4-15: Pinal County Flood Hazard Area (1)



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.

<b>Table 4-51: RL Properties in Pinal County</b>			
<b>Jurisdiction</b>	<b>No. of Properties</b>	<b>No. of Properties Mitigated</b>	<b>Total Payments</b>
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.

<b>Table 4-52: NFIP Statistics for Pinal County as of Feb 2016</b>				
<b>Jurisdiction</b>	<b>Current Effective Map Date</b>	<b>Number of Policies</b>	<b>Amount of Coverage (x \$1,000)</b>	<b>Floodplain Management Role</b>
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 4-52: NFIP Statistics for Pinal County as of Feb 2016**

<b>Jurisdiction</b>	<b>Current Effective Map Date</b>	<b>Number of Policies</b>	<b>Amount of Coverage (x \$1,000)</b>	<b>Floodplain Management Role</b>
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 May 2014, only Casa Grande participates in the program and their class rating is 8.

**Vulnerability – Development Trends**

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.

**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 borrows, 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 in the past six months include at least four documented breach or piping failures which resulted in flooding of and damages to downstream agricultural fields, irrigation ditches and a correctional facility.



##### 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.

**Vulnerability**

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	Negligible	> 24 hours	< 6 hours	1.00
Superior	Unlikely	Negligible	< 6 hours	< 6 hours	1.45
<b>Unincorporated Pinal Co</b>	Possibly	Limited	< 6 hours	< 1 week	2.40
<b>County-wide average CPRI =</b>					<b>1.71</b>

**Vulnerability – Loss Estimations**

The following tables summarize critical and non-critical facilities, population and buildings exposed to high hazard levee failure zones. In summary, \$66.6 million in county-wide assets are 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. Regarding human vulnerability, a total population of 2,777 people, or 1.54% of the total county-wide population, is potentially exposed to a high hazard levee failure event. Should a levee structure fail suddenly, it is plausible that death and injury might occur. It can also be expected that a substantial portion of the exposed population is subject to displacement depending on the event magnitude.

Community	Facilities Reported by Community	Impacted Facilities	Percent of Community Facilities Impacted	Estimated Replacement Cost (x \$1000)	Estimated Structure Loss (x \$1000)
<b>HIGH</b>					
<b>County-Wide Totals</b>	<b>945</b>	<b>72</b>	<b>7.62%</b>	<b>\$66,630</b>	<b>\$0</b>
Apache Junction	54	0	0.00%	\$0	\$0
Casa Grande	71	6	8.45%	\$13,361	\$0
Coolidge	43	0	0.00%	\$0	\$0

**Table 4-55: Estimated Losses Due to Levee Failure**

Community	Facilities Reported by Community	Impacted Facilities	Percent of Community Facilities Impacted	Estimated Replacement Cost (x \$1000)	Estimated Structure Loss (x \$1000)
Eloy	180	0	0.00%	\$0	\$0
Florence	89	0	0.00%	\$0	\$0
Kearny	38	0	0.00%	\$0	\$0
Mammoth	14	0	0.00%	\$0	\$0
Maricopa	143	54	37.76%	\$39,804	\$0
Superior	44	0	0.00%	\$0	\$0
Unincorporated Pinal Co	269	12	4.46%	\$13,465	\$0

**Table 4-56: Estimated Population Exposed to Levee Failure**

Community	Total Population	Population Exposed	Percent of Population Exposed	Total Population Over 65	Population Over 65 Exposed	Percent of Population Over 65 Exposed
<b>HIGH</b>						
<b>County-Wide Totals</b>	<b>179,776</b>	<b>2,777</b>	<b>1.54%</b>	<b>29,040</b>	<b>301</b>	<b>1.04%</b>
Apache Junction	31,851	0	0.00%	8,279	0	0.00%
Casa Grande	27,298	371	1.36%	3,840	47	1.22%
Coolidge	8,810	0	0.00%	1,239	0	0.00%
Eloy	10,659	0	0.00%	627	0	0.00%
Florence	17,487	0	0.00%	1,420	0	0.00%
Kearny	2,392	0	0.00%	351	0	0.00%
Mammoth	1,757	0	0.00%	190	0	0.00%
Maricopa	1,874	742	39.60%	148	57	38.67%
Superior	3,238	0	0.00%	661	0	0.00%
Unincorporated Pinal Co	64,057	1,659	2.59%	11,785	197	1.67%

	Residential		Commercial		Industrial		Summary		
Pinal County HAZUS Summary	Building Count	Potential Economic Impact (x\$1000)	Building Count	Potential Economic Impact (x\$1000)	Building Count	Potential Economic Impact (x\$1000)	Total of All Potential Economic Impact (x\$1000)	Loss-to-Exposure Ratio	Total Estimated Loss (x\$1000)
<b>County-Wide Totals</b>	<b>82,409</b>	<b>\$10,712,985</b>	<b>2,616</b>	<b>\$2,202,612</b>	<b>715</b>	<b>\$557,141</b>	<b>\$13,472,739</b>		
High Hazard Exposure	1,036	\$80,121	41	\$34,259	15	\$21,085	\$135,466	N/A	\$0
Pinal County HAZUS Summary	% Building Count	% Potential Economic Impact	% Building Count	% Potential Economic Impact	% Building Count	% Potential Economic Impact			
High Hazard Exposure	01.26%	0.75%	01.56%	01.56%	02.06%	03.78%			

	Residential		Commercial		Industrial		Summary		
Apache Junction HAZUS Summary	Building Count	Potential Economic Impact (x\$1000)	Building Count	Potential Economic Impact (x\$1000)	Building Count	Potential Economic Impact (x\$1000)	Total of All Potential Economic Impact (x\$1000)	Loss-to-Exposure Ratio	Total Estimated Loss (x\$1000)
<b>Community-Wide Totals</b>	<b>19,216</b>	<b>\$2,012,133</b>	<b>463</b>	<b>\$301,822</b>	<b>140</b>	<b>\$73,412</b>	<b>\$2,387,367</b>		
High Hazard Exposure	0	\$0	0	\$0	0	\$0	\$0	N/A	\$0
Apache Junction HAZUS Summary	% Building Count	% Potential Economic Impact	% Building Count	% Potential Economic Impact	% Building Count	% Potential Economic Impact			
High Hazard Exposure	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%			

	Residential		Commercial		Industrial		Summary		
Casa Grande HAZUS Summary	Building Count	Potential Economic Impact (x\$1000)	Building Count	Potential Economic Impact (x\$1000)	Building Count	Potential Economic Impact (x\$1000)	Total of All Potential Economic Impact (x\$1000)	Loss-to-Exposure Ratio	Total Estimated Loss (x\$1000)
<b>Community-Wide Totals</b>	<b>11,076</b>	<b>\$1,780,401</b>	<b>572</b>	<b>\$562,479</b>	<b>137</b>	<b>\$158,896</b>	<b>\$2,501,776</b>		
High Hazard Exposure	135	\$16,542	7	\$3,948	7	\$14,145	\$34,634	N/A	\$0
Casa Grande HAZUS Summary	% Building Count	% Potential Economic Impact	% Building Count	% Potential Economic Impact	% Building Count	% Potential Economic Impact			
High Hazard Exposure	01.22%	0.93%	01.25%	0.70%	05.34%	08.90%			

	Residential		Commercial		Industrial		Summary		
Coolidge HAZUS Summary	Building Count	Potential Economic Impact (x\$1000)	Building Count	Potential Economic Impact (x\$1000)	Building Count	Potential Economic Impact (x\$1000)	Total of All Potential Economic Impact (x\$1000)	Loss-to-Exposure Ratio	Total Estimated Loss (x\$1000)
<b>Community-Wide Totals</b>	<b>3,889</b>	<b>\$452,027</b>	<b>139</b>	<b>\$96,995</b>	<b>22</b>	<b>\$21,642</b>	<b>\$570,664</b>		
High Hazard Exposure	0	\$0	0	\$0	0	\$0	\$0	N/A	\$0
Coolidge HAZUS Summary	% Building Count	% Potential Economic Impact	% Building Count	% Potential Economic Impact	% Building Count	% Potential Economic Impact			
High Hazard Exposure	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%			

	Residential		Commercial		Industrial		Summary		
Eloy HAZUS Summary	Building Count	Potential Economic Impact (x\$1000)	Building Count	Potential Economic Impact (x\$1000)	Building Count	Potential Economic Impact (x\$1000)	Total of All Potential Economic Impact (x\$1000)	Loss-to-Exposure Ratio	Total Estimated Loss (x\$1000)
<b>Community-Wide Totals</b>	<b>3,371</b>	<b>\$364,555</b>	<b>113</b>	<b>\$66,278</b>	<b>23</b>	<b>\$22,017</b>	<b>\$452,850</b>		
High Hazard Exposure	0	\$0	0	\$0	0	\$0	\$0	N/A	\$0
Eloy HAZUS Summary	% Building Count	% Potential Economic Impact	% Building Count	% Potential Economic Impact	% Building Count	% Potential Economic Impact			
High Hazard Exposure	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%			

	Residential		Commercial		Industrial		Summary		
Florence HAZUS Summary	Building Count	Potential Economic Impact (x\$1000)	Building Count	Potential Economic Impact (x\$1000)	Building Count	Potential Economic Impact (x\$1000)	Total of All Potential Economic Impact (x\$1000)	Loss-to-Exposure Ratio	Total Estimated Loss (x\$1000)
<b>Community-Wide Totals</b>	<b>4,180</b>	<b>\$675,616</b>	<b>54</b>	<b>\$119,579</b>	<b>9</b>	<b>\$3,058</b>	<b>\$798,252</b>		
High Hazard Exposure	0	\$0	0	\$0	0	\$0	\$0	N/A	\$0
Florence HAZUS Summary	% Building Count	% Potential Economic Impact	% Building Count	% Potential Economic Impact	% Building Count	% Potential Economic Impact			
High Hazard Exposure	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%			

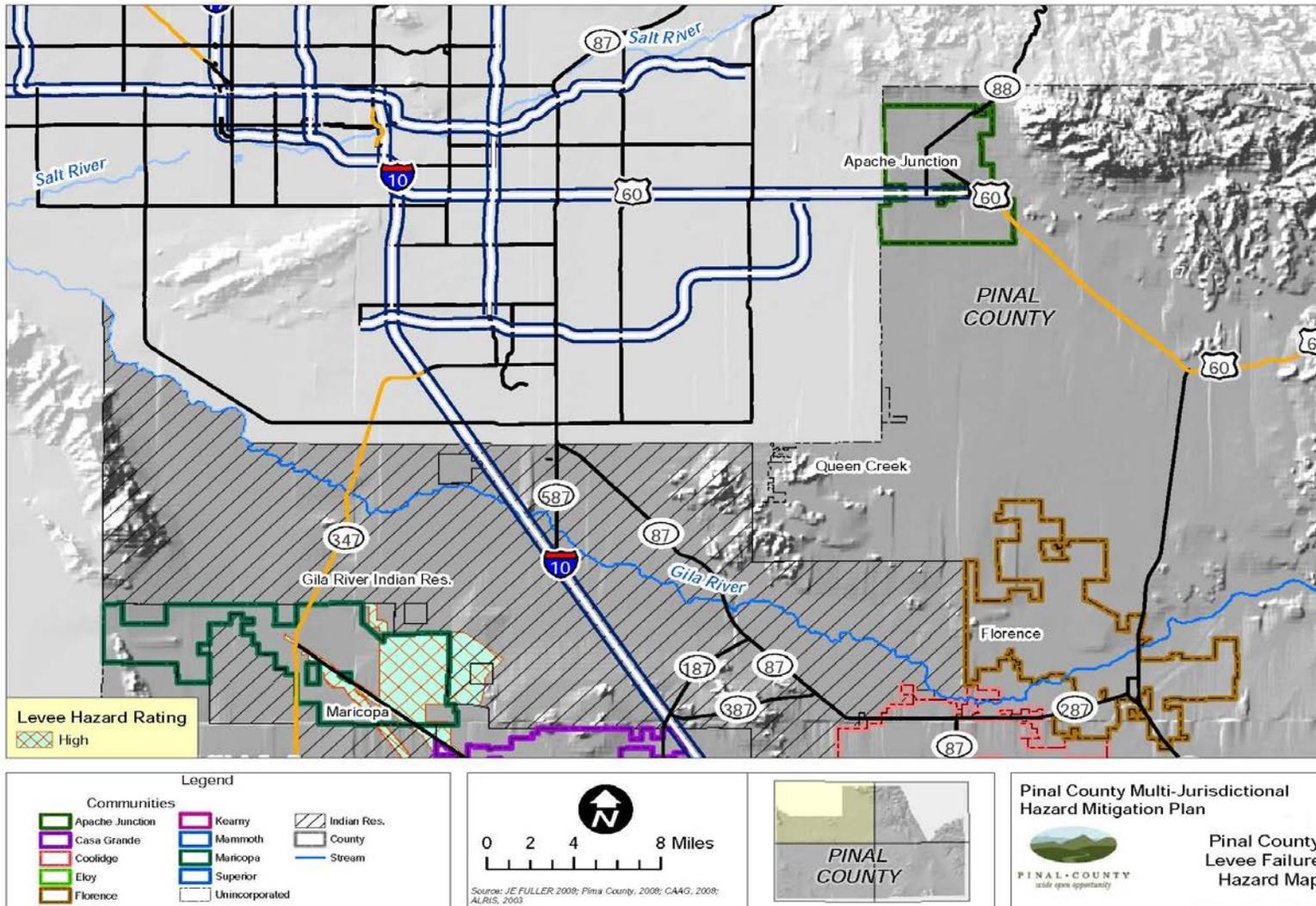
<b>Table 4-63: Kearny Estimated Building Exposure to Levee Failure</b>									
	<b>Residential</b>		<b>Commercial</b>		<b>Industrial</b>		<b>Summary</b>		
<b>Kearny HAZUS Summary</b>	<b>Building Count</b>	<b>Potential Economic Impact (x\$1000)</b>	<b>Building Count</b>	<b>Potential Economic Impact (x\$1000)</b>	<b>Building Count</b>	<b>Potential Economic Impact (x\$1000)</b>	<b>Total of All Potential Economic Impact (x\$1000)</b>	<b>Loss-to-Exposure Ratio</b>	<b>Total Estimated Loss (x\$1000)</b>
<b>Community-Wide Totals</b>	<b>970</b>	<b>\$174,690</b>	<b>24</b>	<b>\$20,823</b>	<b>1</b>	<b>\$258</b>	<b>\$195,772</b>		
<b>High Hazard Exposure</b>	0	\$0	0	\$0	0	\$0	\$0	N/A	\$0
<b>Kearny HAZUS Summary</b>	<b>% Building Count</b>	<b>% Potential Economic Impact</b>	<b>% Building Count</b>	<b>% Potential Economic Impact</b>	<b>% Building Count</b>	<b>% Potential Economic Impact</b>			
<b>High Hazard Exposure</b>	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%			

<b>Table 4-64: Mammoth Estimated Building Exposure to Levee Failure</b>									
	<b>Residential</b>		<b>Commercial</b>		<b>Industrial</b>		<b>Summary</b>		
<b>Mammoth HAZUS Summary</b>	<b>Building Count</b>	<b>Potential Economic Impact (x\$1000)</b>	<b>Building Count</b>	<b>Potential Economic Impact (x\$1000)</b>	<b>Building Count</b>	<b>Potential Economic Impact (x\$1000)</b>	<b>Total of All Potential Economic Impact (x\$1000)</b>	<b>Loss-to-Exposure Ratio</b>	<b>Total Estimated Loss (x\$1000)</b>
<b>Community-Wide Totals</b>	<b>791</b>	<b>\$78,637</b>	<b>21</b>	<b>\$10,926</b>	<b>5</b>	<b>\$3,850</b>	<b>\$93,413</b>		
<b>High Hazard Exposure</b>	0	\$0	0	\$0	0	\$0	\$0	N/A	\$0
<b>Mammoth HAZUS Summary</b>	<b>% Building Count</b>	<b>% Potential Economic Impact</b>	<b>% Building Count</b>	<b>% Potential Economic Impact</b>	<b>% Building Count</b>	<b>% Potential Economic Impact</b>			
<b>High Hazard Exposure</b>	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%			

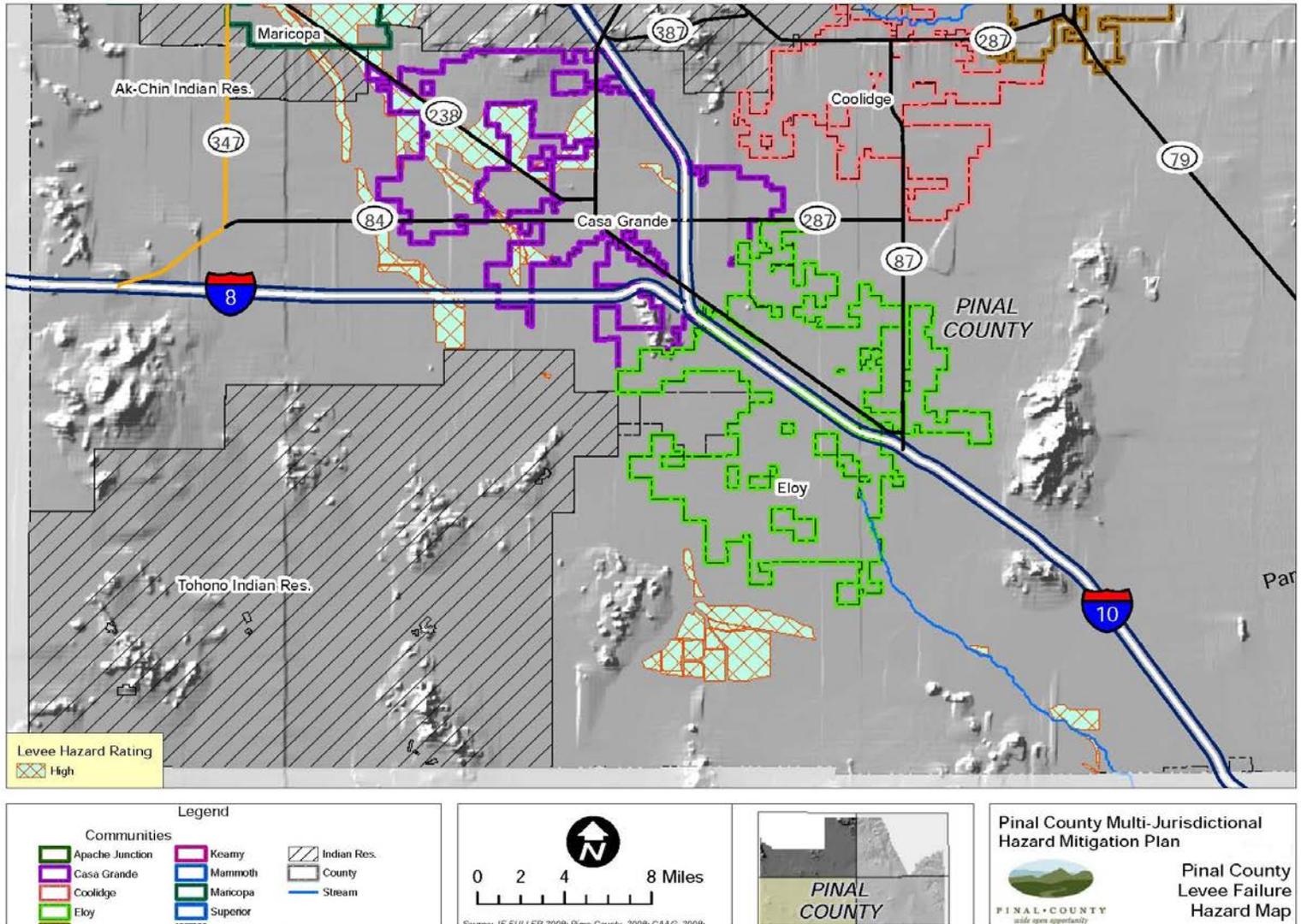
	Residential		Commercial		Industrial		Summary		
Maricopa HAZUS Summary	Building Count	Potential Economic Impact (x\$1000)	Building Count	Potential Economic Impact (x\$1000)	Building Count	Potential Economic Impact (x\$1000)	Total of All Potential Economic Impact (x\$1000)	Loss-to-Exposure Ratio	Total Estimated Loss (x\$1000)
<b>Community-Wide Totals</b>	<b>797</b>	<b>\$59,759</b>	<b>55</b>	<b>\$35,469</b>	<b>9</b>	<b>\$12,357</b>	<b>\$107,585</b>		
High Hazard Exposure	296	\$22,100	16	\$12,535	2	\$4,763	\$39,398	N/A	\$0
Maricopa HAZUS Summary	% Building Count	% Potential Economic Impact	% Building Count	% Potential Economic Impact	% Building Count	% Potential Economic Impact			
High Hazard Exposure	37.07%	36.98%	29.02%	35.34%	18.53%	38.54%			

	Residential		Commercial		Industrial		Summary		
Superior HAZUS Summary	Building Count	Potential Economic Impact (x\$1000)	Building Count	Potential Economic Impact (x\$1000)	Building Count	Potential Economic Impact (x\$1000)	Total of All Potential Economic Impact (x\$1000)	Loss-to-Exposure Ratio	Total Estimated Loss (x\$1000)
<b>Community-Wide Totals</b>	<b>1,552</b>	<b>\$186,666</b>	<b>40</b>	<b>\$16,334</b>	<b>11</b>	<b>\$11,096</b>	<b>\$214,096</b>		
High Hazard Exposure	0	\$0	0	\$0	0	\$0	\$0	N/A	\$0
Superior HAZUS Summary	% Building Count	% Potential Economic Impact	% Building Count	% Potential Economic Impact	% Building Count	% Potential Economic Impact			
High Hazard Exposure	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%			

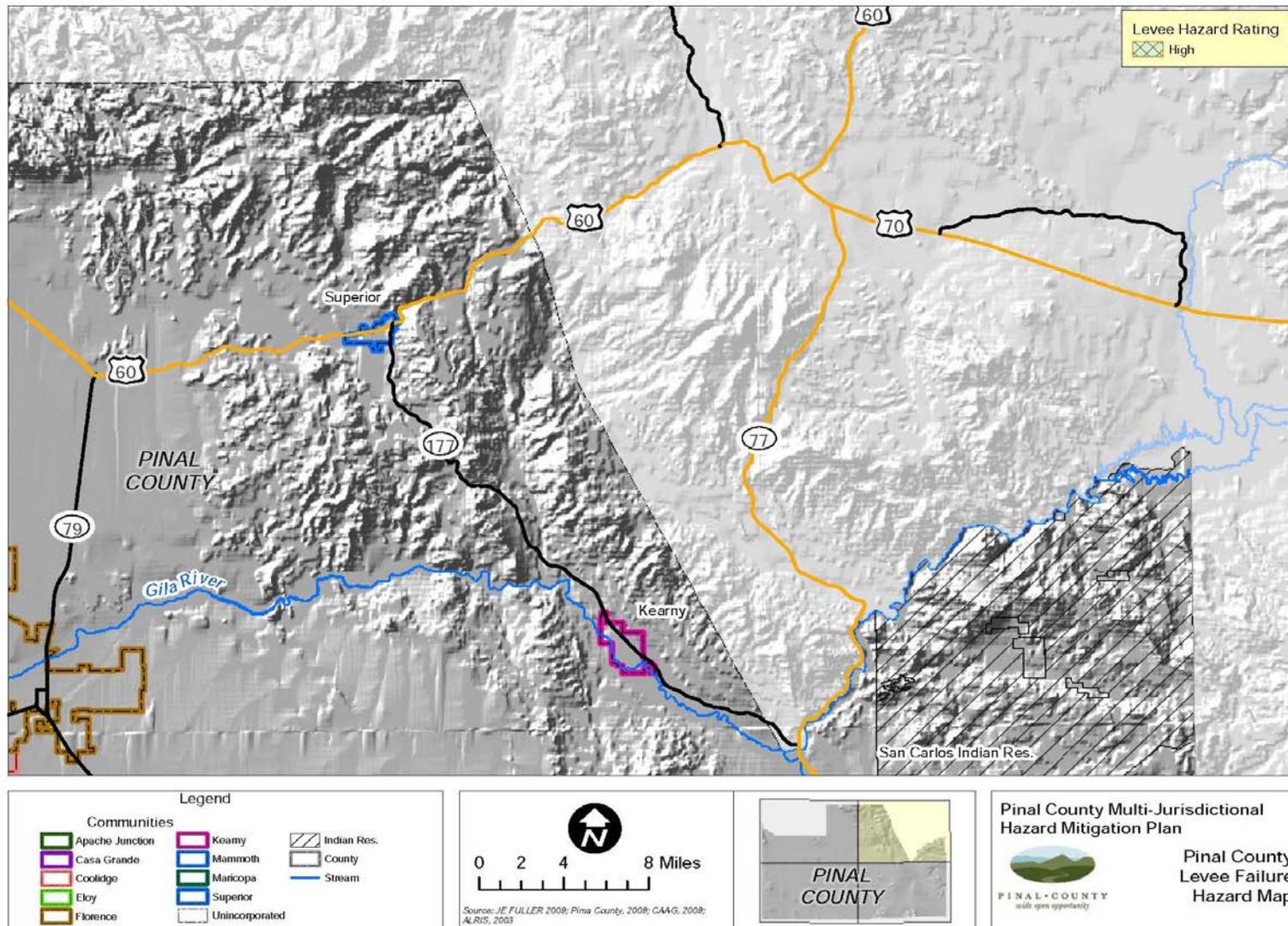
<b>Table 4-67: Uninc Pinal County Estimated Building Exposure to Levee Failure</b>									
	<b>Residential</b>		<b>Commercial</b>		<b>Industrial</b>		<b>Summary</b>		
<b>Unincorporated Pinal County HAZUS Summary</b>	<b>Building Count</b>	<b>Potential Economic Impact (x\$1000)</b>	<b>Building Count</b>	<b>Potential Economic Impact (x\$1000)</b>	<b>Building Count</b>	<b>Potential Economic Impact (x\$1000)</b>	<b>Total of All Potential Economic Impact (x\$1000)</b>	<b>Loss-to-Exposure Ratio</b>	<b>Total Estimated Loss (x\$1000)</b>
<b>Community-Wide Totals</b>	<b>33,447</b>	<b>\$4,591,973</b>	<b>997</b>	<b>\$592,560</b>	<b>345</b>	<b>\$246,968</b>	<b>\$5,431,500</b>		
<b>High Hazard Exposure</b>	596	\$41,043	16	\$17,280	5	\$2,030	\$60,352	N/A	\$0
<b>Unincorporated Pinal County HAZUS Summary</b>	<b>% Building Count</b>	<b>% Potential Economic Impact</b>	<b>% Building Count</b>	<b>% Potential Economic Impact</b>	<b>% Building Count</b>	<b>% Potential Economic Impact</b>			
<b>High Hazard Exposure</b>	01.78%	0.89%	01.65%	02.92%	01.36%	0.82%			



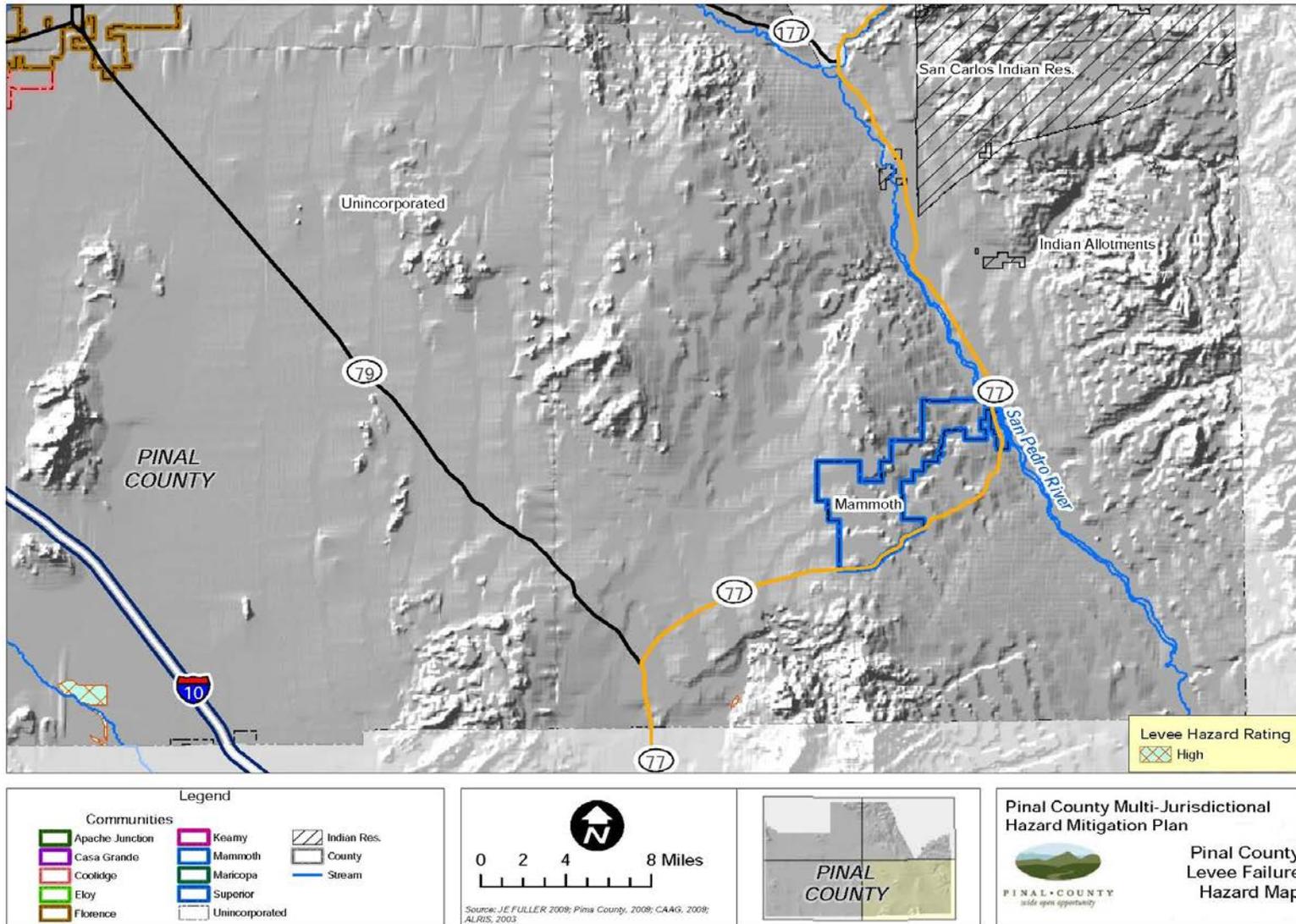
Map 4-19: Pinal County Levee Failure Hazard Area (1)



Map 4-20: Pinal County Levee Failure Hazard Area (2)



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



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

It is duly noted that the loss and exposure numbers presented above represent a comprehensive evaluation of the County as a whole. It is unlikely that a storm event would occur that would fail all of the levees at the same time. Accordingly, actual event based losses and exposure are likely to be only a fraction of those summarized above.

**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.

**Sources**

AZ Division of Emergency Management, 2009, 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](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 and 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.

- 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.

<b>Table 4-68: Fujita Tornado Scale</b>		
<b>Category</b>	<b>Wind Speed</b>	<b>Description of Damage</b>
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

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
<b>County-wide average CPRI =</b>					<b>2.80</b>

**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 – Loss Estimations

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 over the last five years, 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.

**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

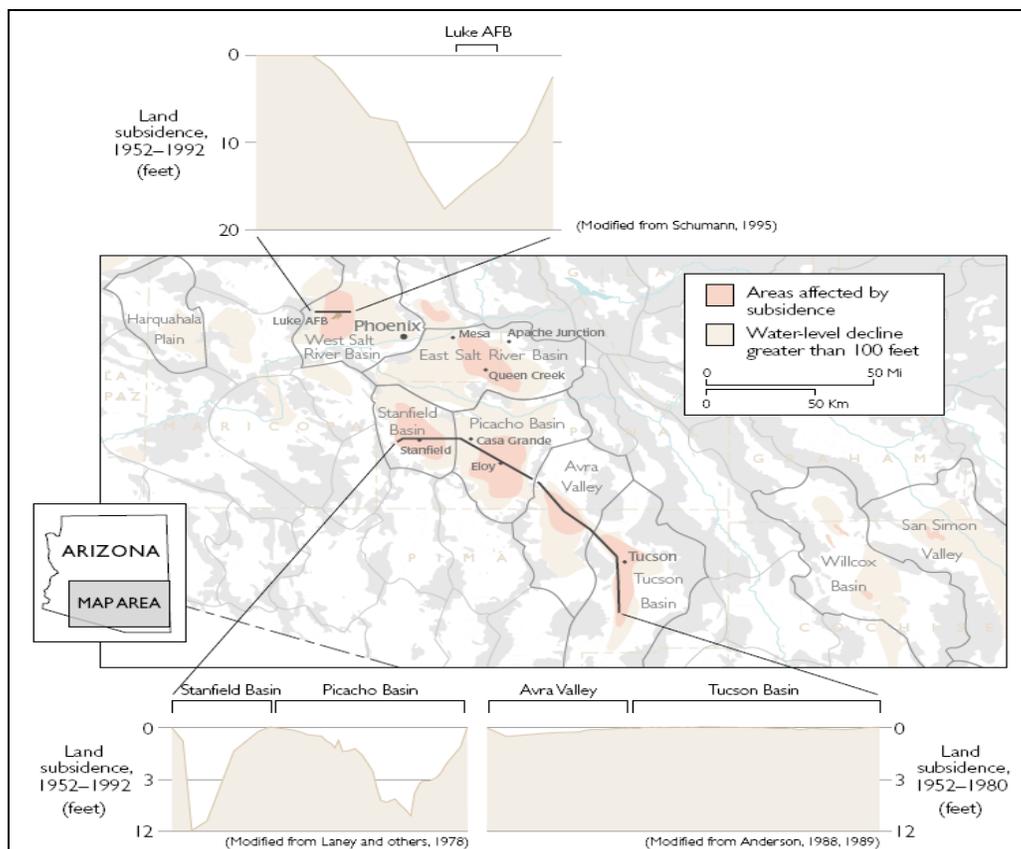
Subsidence occurs when the original land surface elevation drops due to changes in the subsurface. Causes of subsidence include, but are not limited to, removal of fluids (water, oil, gas, etc.), mine collapse, and hydrocompaction. Of these causes, hydrocompaction and mine collapse tend to be localized 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**

<b>Jurisdiction</b>	<b>Probability</b>	<b>Magnitude/ Severity</b>	<b>Warning Time</b>	<b>Duration</b>	<b>Rating</b>
Apache Junction	Unlikely	Negligible	> 24 hours	> 1 week	1.30
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	.55
Maricopa	Unlikely	Negligible	< 6 hours	< 6 hours	1.45
Superior	Unlikely	Negligible	> 24 hours	< 6 hours	.55
<b>Unincorporated Pinal Co</b>	Highly Likely	Negligible	> 24 hours	? 1 week	2.65
<b>County-wide average CPRI =</b>					<b>1.55</b>

**Vulnerability – Loss Estimations**

No losses are estimated for facilities located within the high hazard subsidence areas due to lack of appropriate loss-to-exposure data.

In summary, \$619 million in identified critical and non-critical facilities County-wide are exposed to high hazard subsidence areas. Additionally \$3.4 billion in HAZUS defined residential, commercial, and industrial facilities is exposed to high hazard subsidence areas for the planning area. Regarding human vulnerability, 49,406 people, or 27.5% 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.

<b>Table 4-71: Estimated Population Exposed to Subsidence</b>						
<b>Community</b>	<b>Total Population</b>	<b>Population Exposed</b>	<b>Percent of Population Exposed</b>	<b>Total Population Over 65</b>	<b>Population Over 65 Exposed</b>	<b>Percent of Population Over 65 Exposed</b>
<b>HIGH</b>						
<b>County-Wide Totals</b>	<b>179,776</b>	<b>49,406</b>	<b>27.48%</b>	<b>29,040</b>	<b>9,118</b>	<b>31.40%</b>
Apache Junction	31,851	18,482	58.03%	8,279	4,917	59.39%
Casa Grande	27,298	111	0.41%	3,840	8	0.21%
Coolidge	8,810	8,400	95.35%	1,239	1,177	95.03%
Eloy	10,659	10,659	99.99%	627	627	99.99%
Florence	17,487	0	0.00%	1,420	0	0.00%
Kearny	2,392	0	0.00%	351	0	0.00%
Mammoth	1,757	0	0.00%	190	0	0.00%
Maricopa	1,874	304	16.22%	148	19	12.56%
Superior	3,238	0	0.00%	661	0	0.00%
Unincorporated Pinal Co	64,057	11,095	17.32%	11,785	2,352	19.96%

	Residential		Commercial		Industrial		Summary		
Pinal County HAZUS Summary	Building Count	Potential Economic Impact (x\$1000)	Building Count	Potential Economic Impact (x\$1000)	Building Count	Potential Economic Impact (x\$1000)	Total of All Potential Economic Impact (x\$1000)	Loss-to-Exposure Ratio	Total Estimated Loss (x\$1000)
<b>County-Wide Totals</b>	<b>82,409</b>	<b>\$10,712,985</b>	<b>2,616</b>	<b>\$2,202,612</b>	<b>715</b>	<b>\$557,141</b>	<b>\$13,472,739</b>		
High Hazard Exposure	24,556	\$2,829,522	650	\$468,212	149	\$108,027	\$3,405,761	%	\$0
Pinal County HAZUS Summary	% Building Count	% Potential Economic Impact	% Building Count	% Potential Economic Impact	% Building Count	% Potential Economic Impact			
High Hazard Exposure	29.80%	26.41%	24.83%	21.26%	20.87%	19.39%			

	Residential		Commercial		Industrial		Summary		
Apache Junction HAZUS Summary	Building Count	Potential Economic Impact (x\$1000)	Building Count	Potential Economic Impact (x\$1000)	Building Count	Potential Economic Impact (x\$1000)	Total of All Potential Economic Impact (x\$1000)	Loss-to-Exposure Ratio	Total Estimated Loss (x\$1000)
<b>Community-Wide Totals</b>	<b>19,216</b>	<b>\$2,012,133</b>	<b>463</b>	<b>\$301,822</b>	<b>140</b>	<b>\$73,412</b>	<b>\$2,387,367</b>		
High Hazard Exposure	10,902	\$1,297,206	265	\$208,189	73	\$44,261	\$1,549,656	%	\$0
Apache Junction HAZUS Summary	% Building Count	% Potential Economic Impact	% Building Count	% Potential Economic Impact	% Building Count	% Potential Economic Impact			
High Hazard Exposure	56.73%	64.47%	57.32%	68.98%	52.27%	60.29%			

	Residential		Commercial		Industrial		Summary		
Casa Grande HAZUS Summary	Building Count	Potential Economic Impact (x\$1000)	Building Count	Potential Economic Impact (x\$1000)	Building Count	Potential Economic Impact (x\$1000)	Total of All Potential Economic Impact (x\$1000)	Loss-to-Exposure Ratio	Total Estimated Loss (x\$1000)
<b>Community-Wide Totals</b>	<b>11,076</b>	<b>\$1,780,401</b>	<b>572</b>	<b>\$562,479</b>	<b>137</b>	<b>\$158,896</b>	<b>\$2,501,776</b>		
High Hazard Exposure	68	\$5,683	4	\$3,415	3	\$1,157	\$10,255	%	\$0
Casa Grande HAZUS Summary	% Building Count	% Potential Economic Impact	% Building Count	% Potential Economic Impact	% Building Count	% Potential Economic Impact			
High Hazard Exposure	0.61%	0.32%	0.63%	0.61%	02.55%	0.73%			

	RESIDENTIAL		COMMERCIAL		INDUSTRIAL		SUMMARY		
Coolidge HAZUS Summary	Building Count	Potential Economic Impact (x\$1000)	Building Count	Potential Economic Impact (x\$1000)	Building Count	Potential Economic Impact (x\$1000)	Total of All Potential Economic Impact (x\$1000)	Loss-to-Exposure Ratio	Total Estimated Loss (x\$1000)
<b>Community-Wide Totals</b>	<b>3,889</b>	<b>\$452,027</b>	<b>139</b>	<b>\$96,995</b>	<b>22</b>	<b>\$21,642</b>	<b>\$570,664</b>		
High Hazard Exposure	3,701	\$431,276	132	\$85,057	20	\$20,955	\$537,289	%	\$0
Coolidge HAZUS Summary	% Building Count	% Potential Economic Impact	% Building Count	% Potential Economic Impact	% Building Count	% Potential Economic Impact			
High Hazard Exposure	95.17%	95.41%	94.79%	87.69%	91.41%	96.83%			

	Residential		Commercial		Industrial		Summary		
Eloy HAZUS Summary	Building Count	Potential Economic Impact (x\$1000)	Building Count	Potential Economic Impact (x\$1000)	Building Count	Potential Economic Impact (x\$1000)	Total of All Potential Economic Impact (x\$1000)	Loss-to-Exposure Ratio	Total Estimated Loss (x\$1000)
<b>Community-Wide Totals</b>	<b>3,371</b>	<b>\$364,555</b>	<b>113</b>	<b>\$66,278</b>	<b>23</b>	<b>\$22,017</b>	<b>\$452,850</b>		
High Hazard Exposure	3,370	\$364,529	113	\$66,278	23	\$22,017	\$452,824	%	\$0
Eloy HAZUS Summary	% Building Count	% Potential Economic Impact	% Building Count	% Potential Economic Impact	% Building Count	% Potential Economic Impact			
High Hazard Exposure	99.97%	99.99%	100.0%	100.0%	100.0%	100.0%			

	Residential		Commercial		Industrial		Summary		
Florence HAZUS Summary	Building Count	Potential Economic Impact (x\$1000)	Building Count	Potential Economic Impact (x\$1000)	Building Count	Potential Economic Impact (x\$1000)	Total of All Potential Economic Impact (x\$1000)	Loss-to-Exposure Ratio	Total Estimated Loss (x\$1000)
<b>Community-Wide Totals</b>	<b>4,180</b>	<b>\$675,616</b>	<b>54</b>	<b>\$119,579</b>	<b>9</b>	<b>\$3,058</b>	<b>\$798,252</b>		
High Hazard Exposure	0	\$0	0	\$0	0	\$0	\$0	N/A	\$0
Florence HAZUS Summary	% Building Count	% Potential Economic Impact	% Building Count	% Potential Economic Impact	% Building Count	% Potential Economic Impact			
High Hazard Exposure	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%			

<b>Table 4-78: Kearny Estimated Building Exposure to Subsidence</b>									
	<b>Residential</b>		<b>Commercial</b>		<b>Industrial</b>		<b>Summary</b>		
<b>Kearny HAZUS Summary</b>	<b>Building Count</b>	<b>Potential Economic Impact (x\$1000)</b>	<b>Building Count</b>	<b>Potential Economic Impact (x\$1000)</b>	<b>Building Count</b>	<b>Potential Economic Impact (x\$1000)</b>	<b>Total of All Potential Economic Impact (x\$1000)</b>	<b>Loss-to-Exposure Ratio</b>	<b>Total Estimated Loss (x\$1000)</b>
<b>Community-Wide Totals</b>	<b>970</b>	<b>\$174,690</b>	<b>24</b>	<b>\$20,823</b>	<b>1</b>	<b>\$258</b>	<b>\$195,772</b>		
<b>High Hazard Exposure</b>	0	\$0	0	\$0	0	\$0	\$0	N/A	\$0
<b>Kearny HAZUS Summary</b>	<b>% Building Count</b>	<b>% Potential Economic Impact</b>	<b>% Building Count</b>	<b>% Potential Economic Impact</b>	<b>% Building Count</b>	<b>% Potential Economic Impact</b>			
<b>High Hazard Exposure</b>	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%			

<b>Table 4-79: Mammoth Estimated Building Exposure to Subsidence</b>									
	<b>Residential</b>		<b>Commercial</b>		<b>Industrial</b>		<b>Summary</b>		
<b>Mammoth HAZUS Summary</b>	<b>Building Count</b>	<b>Potential Economic Impact (x\$1000)</b>	<b>Building Count</b>	<b>Potential Economic Impact (x\$1000)</b>	<b>Building Count</b>	<b>Potential Economic Impact (x\$1000)</b>	<b>Total of All Potential Economic Impact (x\$1000)</b>	<b>Loss-to-Exposure Ratio</b>	<b>Total Estimated Loss (x\$1000)</b>
<b>Community-Wide Totals</b>	<b>791</b>	<b>\$78,637</b>	<b>21</b>	<b>\$10,926</b>	<b>5</b>	<b>\$3,850</b>	<b>\$93,413</b>		
<b>High Hazard Exposure</b>	0	\$0	0	\$0	0	\$0	\$0	N/A	\$0
<b>Mammoth HAZUS Summary</b>	<b>% Building Count</b>	<b>% Potential Economic Impact</b>	<b>% Building Count</b>	<b>% Potential Economic Impact</b>	<b>% Building Count</b>	<b>% Potential Economic Impact</b>			
<b>High Hazard Exposure</b>	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%			

<b>Table 4-80: Maricopa Estimated Building Exposure to Subsidence</b>									
	Residential		Commercial		Industrial		Summary		
Maricopa HAZUS Summary	Building Count	Potential Economic Impact (x\$1000)	Building Count	Potential Economic Impact (x\$1000)	Building Count	Potential Economic Impact (x\$1000)	Total of All Potential Economic Impact (x\$1000)	Loss-to-Exposure Ratio	Total Estimated Loss (x\$1000)
<b>Community-Wide Totals</b>	<b>797</b>	<b>\$59,759</b>	<b>55</b>	<b>\$35,469</b>	<b>9</b>	<b>\$12,357</b>	<b>\$107,585</b>		
High Hazard Exposure	146	\$8,576	7	\$4,379	1	\$3,226	\$16,180	%	\$0
Maricopa HAZUS Summary	% Building Count	% Potential Economic Impact	% Building Count	% Potential Economic Impact	% Building Count	% Potential Economic Impact			
High Hazard Exposure	18.30%	14.35%	13.34%	12.34%	14.54%	26.11%			

<b>Table 4-81: Superior Estimated Building Exposure to Subsidence</b>									
	Residential		Commercial		Industrial		Summary		
Superior HAZUS Summary	Building Count	Potential Economic Impact (x\$1000)	Building Count	Potential Economic Impact (x\$1000)	Building Count	Potential Economic Impact (x\$1000)	Total of All Potential Economic Impact (x\$1000)	Loss-to-Exposure Ratio	Total Estimated Loss (x\$1000)
<b>Community-Wide Totals</b>	<b>1,552</b>	<b>\$186,666</b>	<b>40</b>	<b>\$16,334</b>	<b>11</b>	<b>\$11,096</b>	<b>\$214,096</b>		
High Hazard Exposure	0	\$0	0	\$0	0	\$0	\$0	N/A	\$0
Superior HAZUS Summary	% Building Count	% Potential Economic Impact	% Building Count	% Potential Economic Impact	% Building Count	% Potential Economic Impact			
High Hazard Exposure	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%			

	Residential		Commercial		Industrial		Summary		
Unincorporated Pinal County HAZUS Summary	Building Count	Potential Economic Impact (x\$1000)	Building Count	Potential Economic Impact (x\$1000)	Building Count	Potential Economic Impact (x\$1000)	Total of All Potential Economic Impact (x\$1000)	Loss-to-Exposure Ratio	Total Estimated Loss (x\$1000)
<b>Community-Wide Totals</b>	<b>33,447</b>	<b>\$4,591,973</b>	<b>997</b>	<b>\$592,560</b>	<b>345</b>	<b>\$246,968</b>	<b>\$5,431,500</b>		
High Hazard Exposure	6,239	\$708,982	107	\$77,041	26	\$15,788	\$801,812	%	\$0
Unincorporated Pinal County HAZUS Summary	% Building Count	% Potential Economic Impact	% Building Count	% Potential Economic Impact	% Building Count	% Potential Economic Impact			
High Hazard Exposure	18.65%	15.44%	10.71%	13.0%	07.41%	06.39%			

### **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 to determine the need for special design considerations that address subsidence.

### **Sources**

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AZ Dept of Water Resources,

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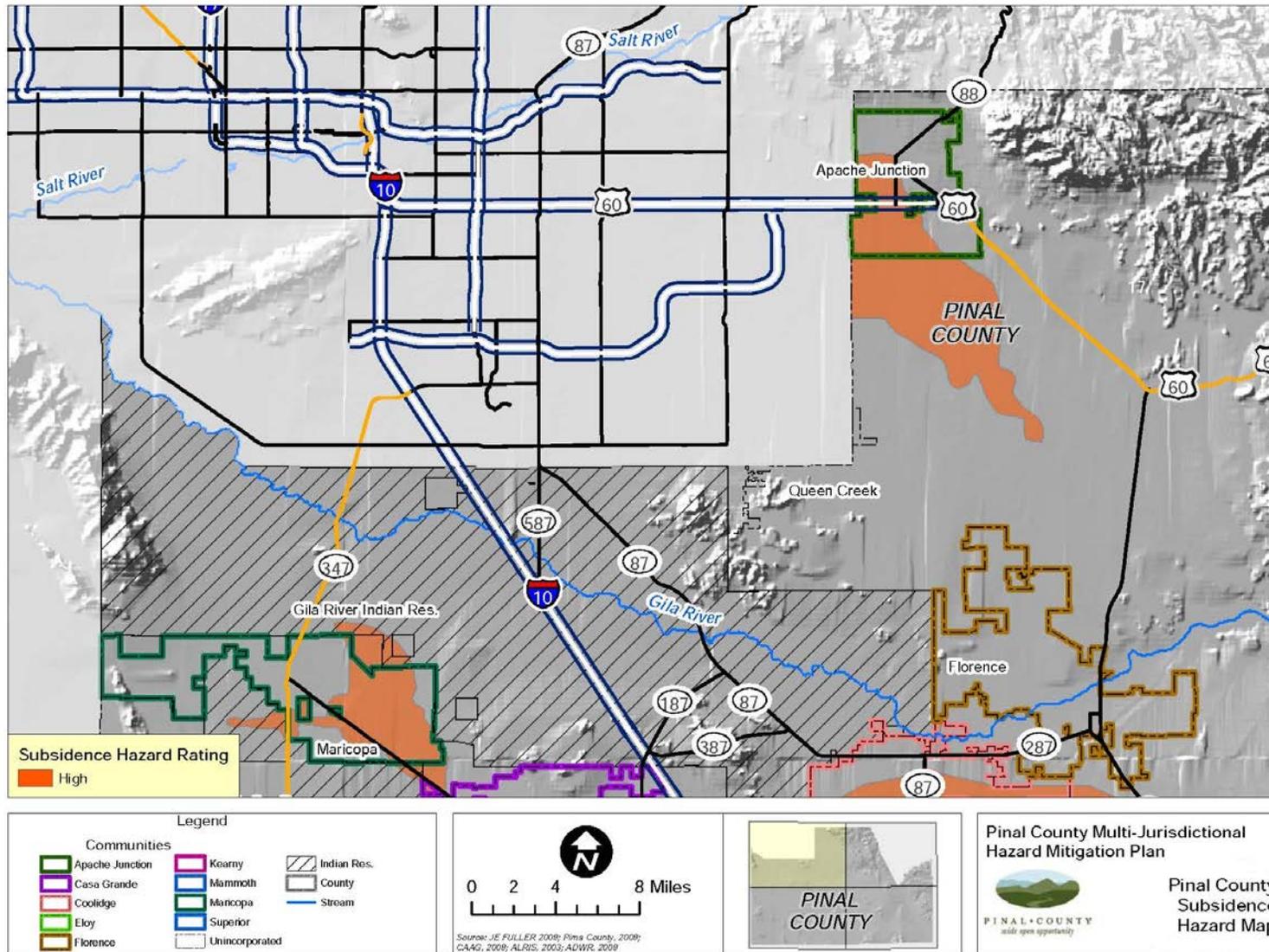
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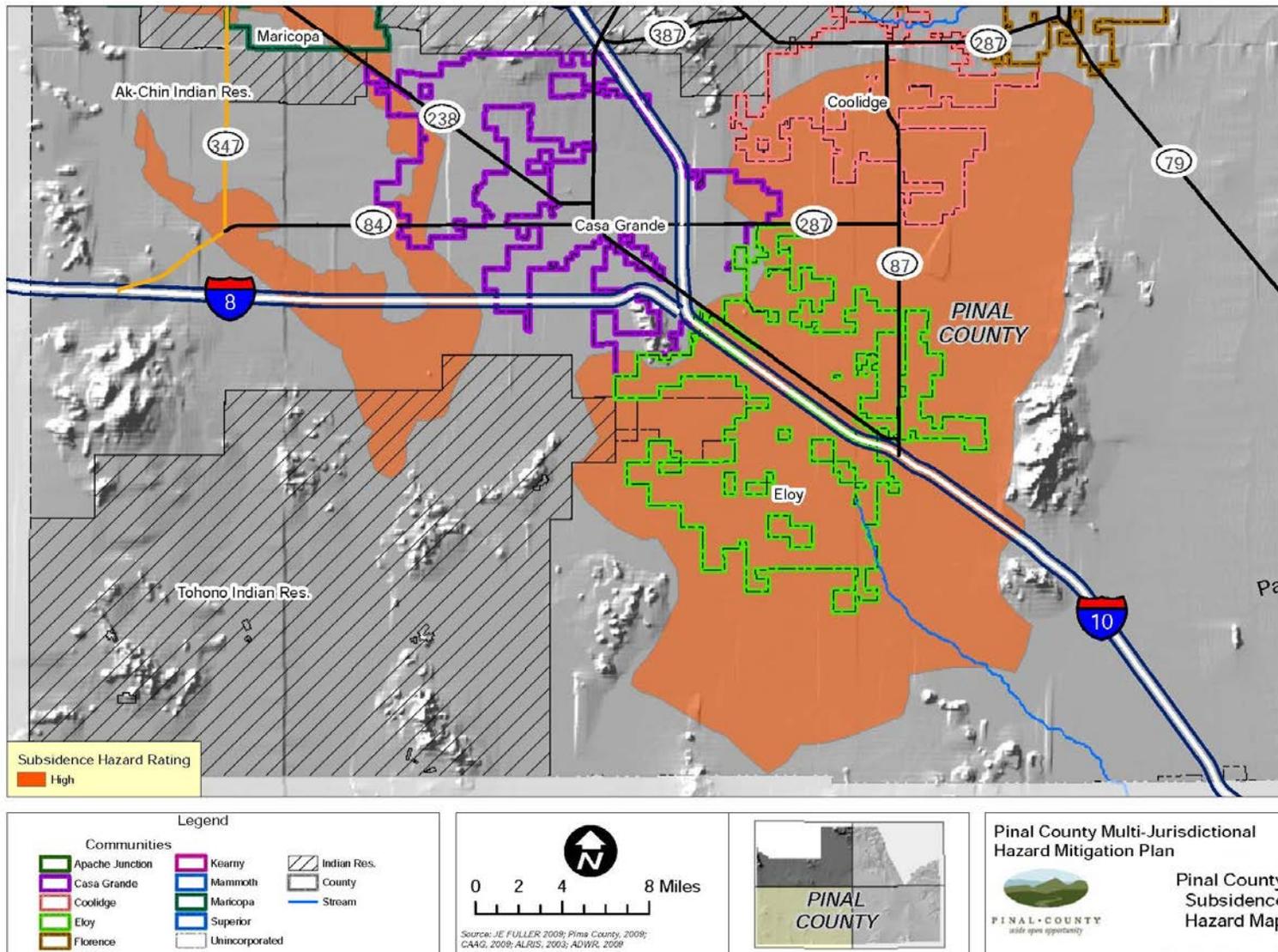
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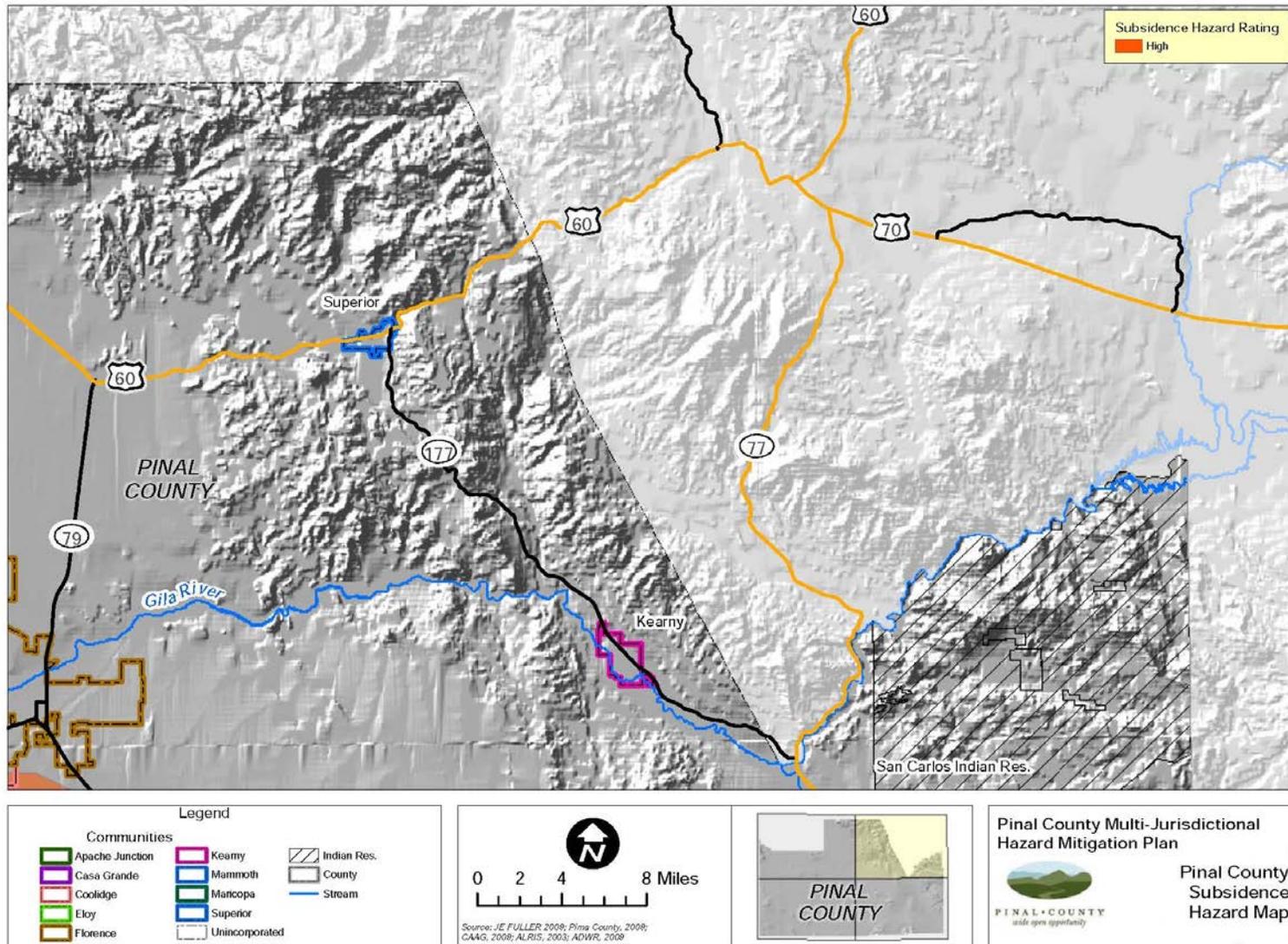
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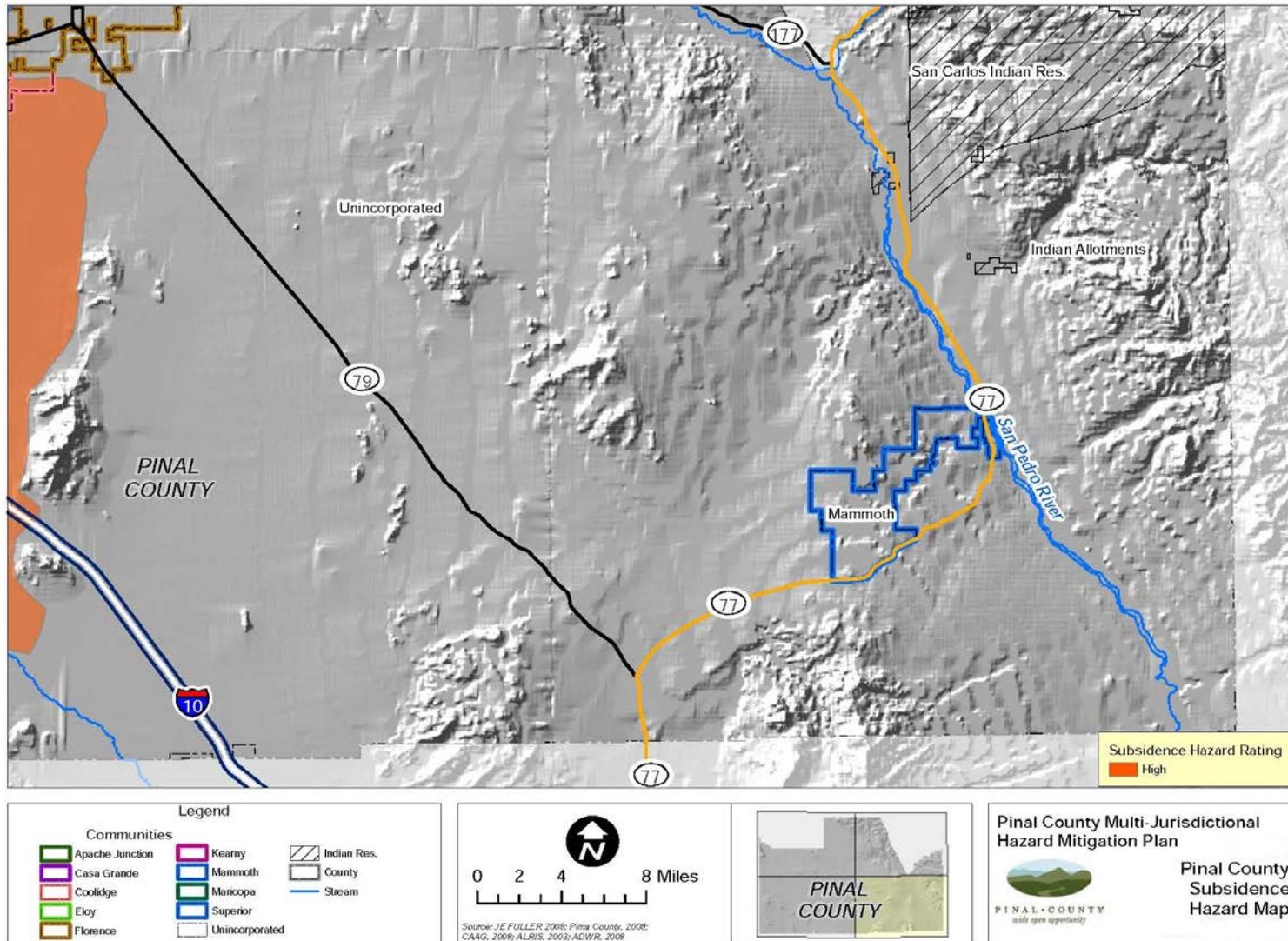
Map 4-23: Pinal County Subsidence Hazard Area (1)



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)

#### 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 2008, data compiled by the Arizona State Forestry Division for the 2010 State Plan update indicates that at least 220 wildfires greater than 100 acres in size, have occurred in all of Pinal County (this includes the San Carlos Apache Tribe). 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 2<sup>nd</sup> and was controlled May 5<sup>th</sup>. 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 17<sup>th</sup> 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 5<sup>th</sup>. 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.

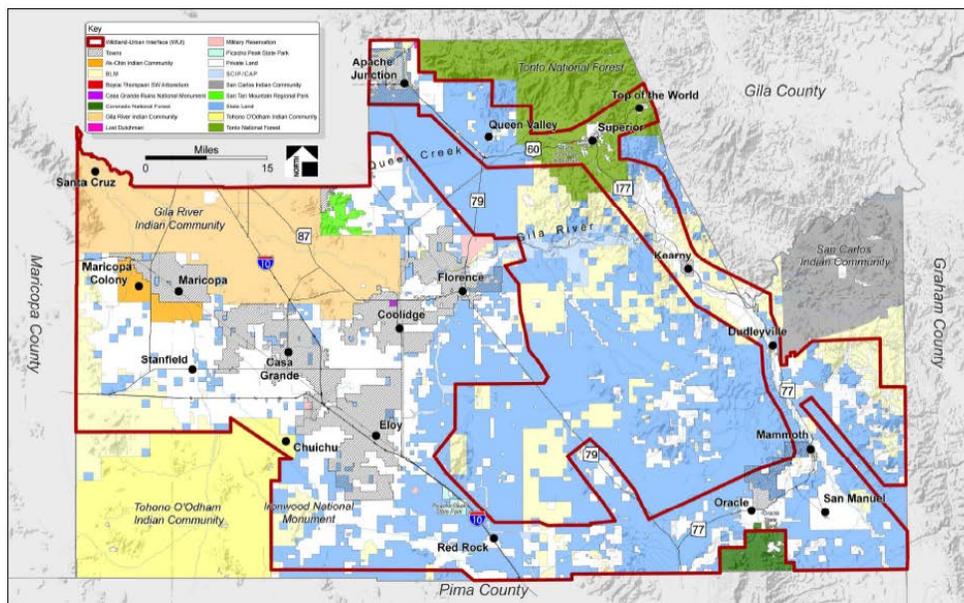
- May of 2002, the Bullock Fire started on the 19<sup>th</sup> in the Reddington Pass area of the Coronado National Forest, Santa Catalina Ranger District. The fire spread to threaten homes and communications resources on top of Mt. Lemmon. There were two residences and five outbuildings destroyed and 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.

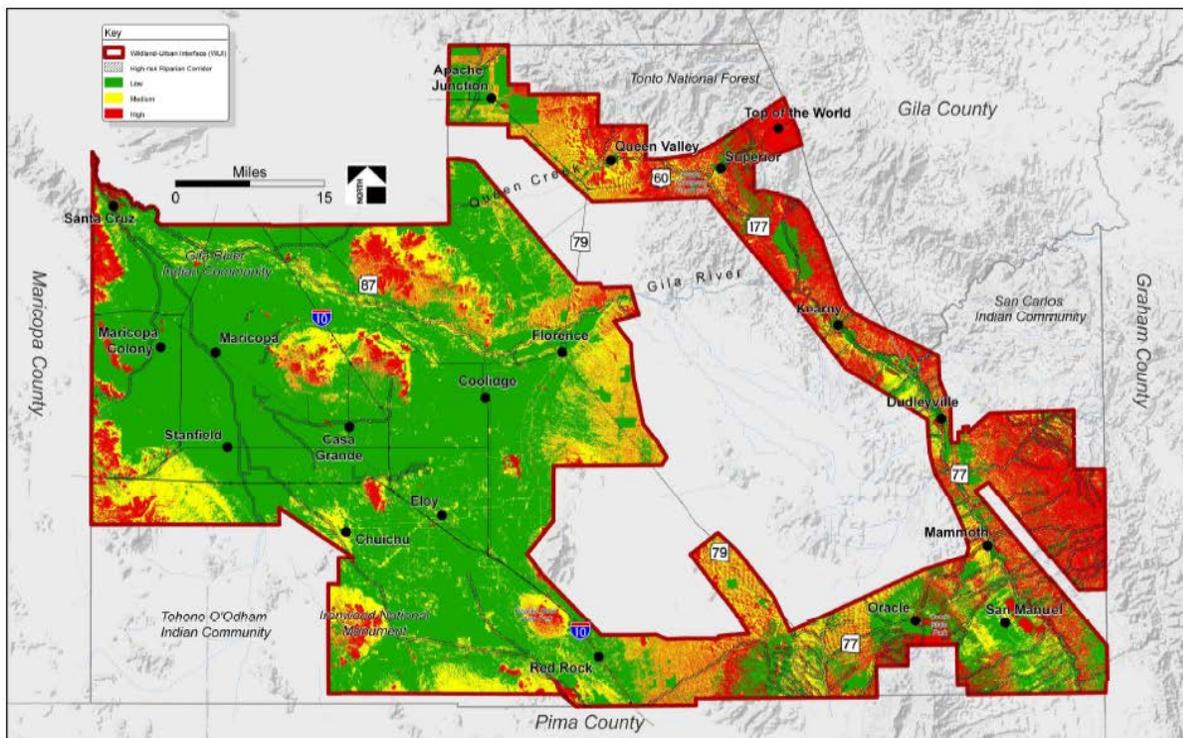


**Map 4-27: Pinal County Wildland Urban Interface Area**

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:

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

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 <sup>a</sup>	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			

<sup>a</sup>Dudleyville 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**

Jurisdiction	Probability	Magnitude/ Severity	Warning Time	Duration	Rating
Apache Junction	Possibly	Negligible	< 6 hours	< 24 hours	2.00
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	2.15
<b>Florence</b>	Likely	Negligible	6-12 hours	< 24 hours	2.30
<b>Kearny</b>	Unlikely	Limited	< 6 hours	< 1 week	1.95
Mammoth	Highly Likely	Limited	< 6 hours	> 24 hours	2.70
Maricopa	Unlikely	Negligible	> 24 hours	< 6 hours	1.00
<b>Superior</b>	Likely	Limited	< 6 hours	< 1 week	2.25
<b>Unincorporated Pinal Co</b>	Highly Likely	Limited	< 6 hours	> 1 week	3.40
<b>County-wide average CPRI =</b>					<b>2.24</b>

**Vulnerability – Loss Estimations**

The estimation of potential exposure to high and medium wildfire hazards was accomplished by intersecting the human and facility assets with the wildfire hazard limits depicted on this section’s maps. Loss to exposure ratios of 0.20 (20%) and 0.05 (5%) were assumed to estimate losses for all facilities located within the high and medium wildfire hazard areas, respectively.

<b>Table 4-84: Estimated Asset Exposure to High &amp; Medium Hazard Wildfire</b>					
<b>Community</b>	<b>Total Facilities Reported by Community</b>	<b>Impacted Facilities</b>	<b>Percentage of Total Community Facilities Impacted</b>	<b>Estimated Replacement Cost (x \$1000)</b>	<b>Estimated Structure Loss (x \$1000)</b>
<b>HIGH</b>					
<b>County-Wide Totals</b>	<b>945</b>	<b>3</b>	<b>0.32%</b>	<b>\$465</b>	<b>\$93</b>
Apache Junction	54	0	0.00%	\$0	\$0
Casa Grande	71	0	0.00%	\$0	\$0
Coolidge	43	0	0.00%	\$0	\$0
Eloy	180	1	0.56%	\$125	\$25
Florence	89	0	0.00%	\$0	\$0
Kearny	38	0	0.00%	\$0	\$0
Mammoth	14	2	14.29%	\$340	\$68
Maricopa	143	0	0.00%	\$0	\$0
Superior	44	0	0.00%	\$0	\$0
Unincorporated Pinal County	269	0	0.00%	\$0	\$0
<b>MEDIUM</b>					
<b>County-Wide Totals</b>	<b>945</b>	<b>97</b>	<b>10.26%</b>	<b>\$111,195</b>	<b>\$5,560</b>
Apache Junction	54	13	24.07%	\$4,170	\$209
Casa Grande	71	3	4.23%	\$0	\$0
Coolidge	43	0	0.00%	\$0	\$0
Eloy	180	22	12.22%	\$31,693	\$1,585
Florence	89	29	32.58%	\$115	\$6
Kearny	38	3	7.89%	\$3,390	\$170
Mammoth	14	4	28.57%	\$2,485	\$124
Maricopa	143	3	2.10%	\$0	\$0
Superior	44	2	4.55%	\$320	\$16
Unincorporated Pinal County	269	18	6.69%	\$69,022	\$3,451

<b>Table 4-85: Estimated Population Exposed to High and Medium Hazard Wildfire</b>						
<b>Community</b>	<b>Total Population</b>	<b>Population Exposed</b>	<b>Percent of Population Exposed</b>	<b>Total Population Over 65</b>	<b>Population Over 65 Exposed</b>	<b>Percent of Population Over 65 Exposed</b>
<b>HIGH</b>						
<b>County-Wide Totals</b>	<b>179,776</b>	<b>1,701</b>	<b>0.95%</b>	<b>29,040</b>	<b>407</b>	<b>1.40%</b>
Apache Junction	31,851	0	0.00%	8,279	0	0.00%
Casa Grande	27,298	6	0.02%	3,840	1	0.03%
Coolidge	8,810	0	0.00%	1,239	0	0.00%
Eloy	10,659	16	0.15%	627	0	0.06%
Florence	17,487	1	0.01%	1,420	0	0.02%
Kearny	2,392	16	0.69%	351	3	0.90%
Mammoth	1,757	4	0.24%	190	1	0.35%
Maricopa	1,874	1	0.03%	148	0	0.04%
Superior	3,238	0	0.00%	661	0	0.00%
Unincorporated Pinal Co	64,057	1,628	2.54%	11,785	401	3.40%
<b>MEDIUM</b>						
<b>County-Wide Totals</b>	<b>179,776</b>	<b>14,604</b>	<b>8.12%</b>	<b>29,040</b>	<b>1,667</b>	<b>5.74%</b>
Apache Junction	31,851	208	0.65%	8,279	60	0.72%
Casa Grande	27,298	293	1.07%	3,840	65	1.70%
Coolidge	8,810	16	0.18%	1,239	4	0.33%
Eloy	10,659	841	7.89%	627	30	4.84%
Florence	17,487	4,966	28.40%	1,420	222	15.60%
Kearny	2,392	163	6.81%	351	24	6.79%
Mammoth	1,757	67	3.79%	190	8	4.01%
Maricopa	1,874	13	0.68%	148	1	0.78%
Superior	3,238	57	1.76%	661	12	1.88%
Unincorporated Pinal Co	64,057	6,469	10.10%	11,785	1,163	9.87%

	Residential		Commercial		Industrial		Summary		
Pinal County HAZUS Summary	Building Count	Potential Economic Impact (x\$1000)	Building Count	Potential Economic Impact (x\$1000)	Building Count	Potential Economic Impact (x\$1000)	Total of All Potential Economic Impact (x\$1000)	Loss-to-Exposure Ratio	Total Estimated Loss (x\$1000)
<b>County-Wide Totals</b>	<b>82,409</b>	<b>\$10,712,985</b>	<b>2,616</b>	<b>\$2,202,612</b>	<b>715</b>	<b>\$557,141</b>	<b>\$13,472,739</b>		
High Hazard Exposure	866	\$134,811	15	\$12,504	4	\$1,058	\$148,372	20%	\$29,674
Medium Hazard Exposure	4822	\$711,695	173	\$123,023	52	\$24,916	\$859,634	5%	\$42,982
Pinal County HAZUS Summary	% Building Count	% Potential Economic Impact	% Building Count	% Potential Economic Impact	% Building Count	% Potential Economic Impact			
High Hazard Exposure	01.05%	01.26%	0.59%	0.57%	0.62%	0.19%			
Medium Hazard Exposure	05.85%	06.64%	06.63%	05.59%	07.31%	04.47%			

	Residential		Commercial		Industrial		Summary		
Apache Junction HAZUS Summary	Building Count	Potential Economic Impact (x\$1000)	Building Count	Potential Economic Impact (x\$1000)	Building Count	Potential Economic Impact (x\$1000)	Total of All Potential Economic Impact (x\$1000)	Loss-to-Exposure Ratio	Total Estimated Loss (x\$1000)
<b>Community-Wide Totals</b>	<b>19,216</b>	<b>\$2,012,133</b>	<b>463</b>	<b>\$301,822</b>	<b>140</b>	<b>\$73,412</b>	<b>\$2,387,367</b>		
High Hazard Exposure	0	\$0	0	\$5	0	\$0	\$5	20%	\$1
Medium Hazard Exposure	209	\$23,355	11	\$6,284	4	\$2,486	\$32,125	5%	\$1,606
Apache Junction HAZUS Summary	% Building Count	% Potential Economic Impact	% Building Count	% Potential Economic Impact	% Building Count	% Potential Economic Impact			
High Hazard Exposure	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%			
Medium Hazard Exposure	01.09%	01.16%	02.45%	02.08%	02.97%	03.39%			

Table 4-88: Casa Grande Estimated Building Exposure to Wildfire									
	Residential		Commercial		Industrial		Summary		
Casa Grande HAZUS Summary	Building Count	Potential Economic Impact (x\$1000)	Building Count	Potential Economic Impact (x\$1000)	Building Count	Potential Economic Impact (x\$1000)	Total of All Potential Economic Impact (x\$1000)	Loss-to-Exposure Ratio	Total Estimated Loss (x\$1000)
<b>Community-Wide Totals</b>	<b>11,076</b>	<b>\$1,780,401</b>	<b>572</b>	<b>\$562,479</b>	<b>137</b>	<b>\$158,896</b>	<b>\$2,501,776</b>		
High Hazard Exposure	3	\$620	0	\$141	0	\$188	\$949	20%	\$190
Medium Hazard Exposure	176	\$21,972	8	\$16,274	2	\$3,663	\$41,909	5%	\$2,095
Casa Grande HAZUS Summary	% Building Count	% Potential Economic Impact	% Building Count	% Potential Economic Impact	% Building Count	% Potential Economic Impact			
High Hazard Exposure	0.03%	0.03%	0.02%	0.02%	0.10%	0.12%			
Medium Hazard Exposure	01.59%	01.23%	01.47%	02.89%	01.82%	02.31%			

Table 4-89: Coolidge Estimated Building Exposure to Wildfire									
	Residential		Commercial		Industrial		Summary		
Coolidge HAZUS Summary	Building Count	Potential Economic Impact (x\$1000)	Building Count	Potential Economic Impact (x\$1000)	Building Count	Potential Economic Impact (x\$1000)	Total of All Potential Economic Impact (x\$1000)	Loss-to-Exposure Ratio	Total Estimated Loss (x\$1000)
<b>Community-Wide Totals</b>	<b>3,889</b>	<b>\$452,027</b>	<b>139</b>	<b>\$96,995</b>	<b>22</b>	<b>\$21,642</b>	<b>\$570,664</b>		
High Hazard Exposure	0	\$1	0	\$0	0	\$0	\$1	20%	\$0
Medium Hazard Exposure	8	\$733	0	\$155	0	\$2	\$890	5%	\$44
Coolidge HAZUS Summary	% Building Count	% Potential Economic Impact	% Building Count	% Potential Economic Impact	% Building Count	% Potential Economic Impact			
High Hazard Exposure	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%			
Medium Hazard Exposure	0.22%	0.16%	0.21%	0.16%	0.06%	0.01%			

	Residential		Commercial		Industrial		Summary		
Eloy HAZUS Summary	Building Count	Potential Economic Impact (x\$1000)	Building Count	Potential Economic Impact (x\$1000)	Building Count	Potential Economic Impact (x\$1000)	Total of All Potential Economic Impact (x\$1000)	Loss-to-Exposure Ratio	Total Estimated Loss (x\$1000)
<b>Community-Wide Totals</b>	<b>3,371</b>	<b>\$364,555</b>	<b>113</b>	<b>\$66,278</b>	<b>23</b>	<b>\$22,017</b>	<b>\$452,850</b>		
High Hazard Exposure	1	\$312	0	\$58	0	\$2	\$373	20%	\$75
Medium Hazard Exposure	192	\$23,891	6	\$3,738	2	\$850	\$28,479	5%	\$1,424
Eloy HAZUS Summary	% Building Count	% Potential Economic Impact	% Building Count	% Potential Economic Impact	% Building Count	% Potential Economic Impact			
High Hazard Exposure	0.02%	0.09%	0.05%	0.09%	0.02%	0.01%			
Medium Hazard Exposure	05.69%	06.55%	05.20%	05.64%	09.05%	03.86%			

	Residential		Commercial		Industrial		Summary		
Florence HAZUS Summary	Building Count	Potential Economic Impact (x\$1000)	Building Count	Potential Economic Impact (x\$1000)	Building Count	Potential Economic Impact (x\$1000)	Total of All Potential Economic Impact (x\$1000)	Loss-to-Exposure Ratio	Total Estimated Loss (x\$1000)
<b>Community-Wide Totals</b>	<b>4,180</b>	<b>\$675,616</b>	<b>54</b>	<b>\$119,579</b>	<b>9</b>	<b>\$3,058</b>	<b>\$798,252</b>		
High Hazard Exposure	0	\$41	0	\$1	0	\$1	\$43	20%	\$9
Medium Hazard Exposure	173	\$102,397	3	\$4,074	1	\$609	\$107,080	5%	\$5,354
Florence HAZUS Summary	% Building Count	% Potential Economic Impact	% Building Count	% Potential Economic Impact	% Building Count	% Potential Economic Impact			
High Hazard Exposure	0.01%	0.01%	0.0%	0.0%	0.02%	0.05%			
Medium Hazard Exposure	04.14%	15.16%	06.08%	03.41%	16.12%	19.91%			

**Table 4-92: Kearny Estimated Building Exposure to Wildfire**

	Residential		Commercial		Industrial		Summary		
Kearny HAZUS Summary	Building Count	Potential Economic Impact (x\$1000)	Building Count	Potential Economic Impact (x\$1000)	Building Count	Potential Economic Impact (x\$1000)	Total of All Potential Economic Impact (x\$1000)	Loss-to-Exposure Ratio	Total Estimated Loss (x\$1000)
<b>Community-Wide Totals</b>	<b>970</b>	<b>\$174,690</b>	<b>24</b>	<b>\$20,823</b>	<b>1</b>	<b>\$258</b>	<b>\$195,772</b>		
High Hazard Exposure	6	\$626	1	\$1,697	0	\$5	\$2,328	20%	\$466
Medium Hazard Exposure	72	\$12,322	3	\$2,269	0	\$61	\$14,651	5%	\$733
Kearny HAZUS Summary	% Building Count	% Potential Economic Impact	% Building Count	% Potential Economic Impact	% Building Count	% Potential Economic Impact			
High Hazard Exposure	0.59%	0.36%	05.77%	08.15%	01.21%	02.05%			
Medium Hazard Exposure	07.37%	07.05%	11.91%	10.90%	13.89%	23.57%			

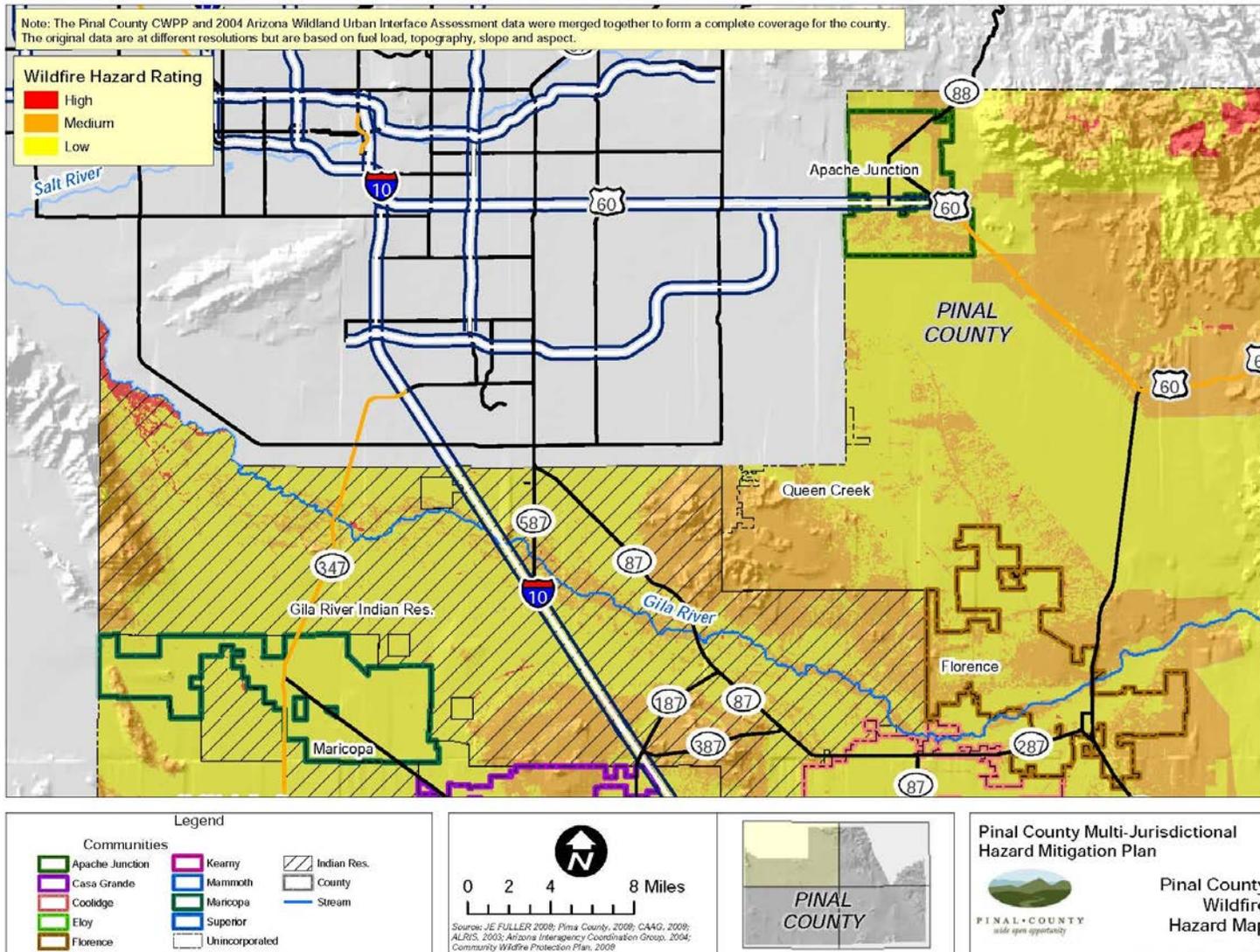
**Table 4-93: Mammoth Estimated Building Exposure to Wildfire**

	Residential		Commercial		Industrial		Summary		
Mammoth HAZUS Summary	Building Count	Potential Economic Impact (x\$1000)	Building Count	Potential Economic Impact (x\$1000)	Building Count	Potential Economic Impact (x\$1000)	Total of All Potential Economic Impact (x\$1000)	Loss-to-Exposure Ratio	Total Estimated Loss (x\$1000)
<b>Community-Wide Totals</b>	<b>791</b>	<b>\$78,637</b>	<b>21</b>	<b>\$10,926</b>	<b>5</b>	<b>\$3,850</b>	<b>\$93,413</b>		
High Hazard Exposure	2	\$245	0	\$183	0	\$0	\$428	20%	\$86
Medium Hazard Exposure	38	\$3,424	1	\$625	0	\$1	\$4,050	5%	\$203
Mammoth HAZUS Summary	% Building Count	% Potential Economic Impact	% Building Count	% Potential Economic Impact	% Building Count	% Potential Economic Impact			
High Hazard Exposure	0.29%	0.31%	0.82%	01.68%	0.0%	0.0%			
Medium Hazard Exposure	04.75%	04.35%	03.69%	05.72%	0.05%	0.03%			

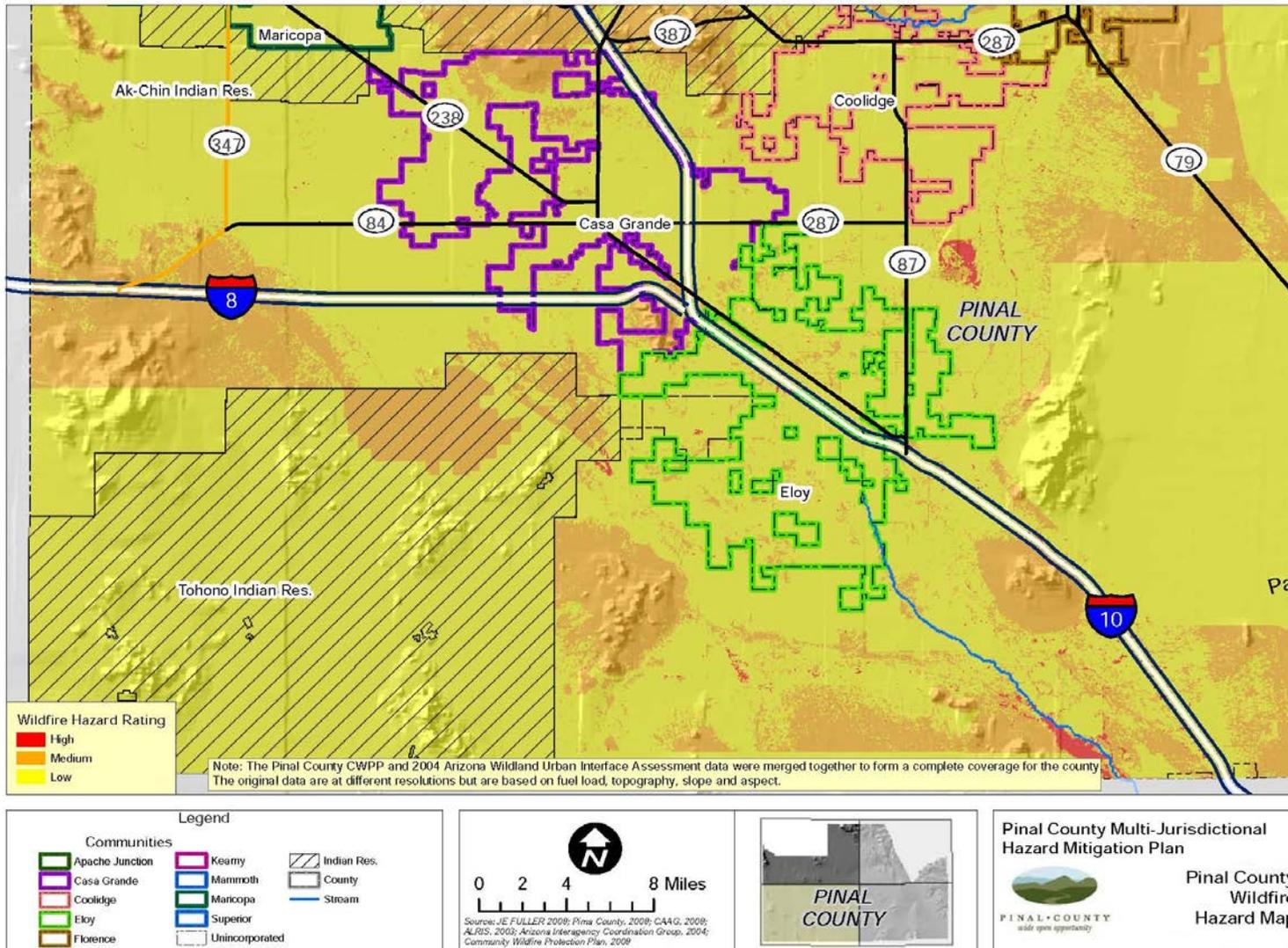
	Residential		Commercial		Industrial		Summary		
Maricopa HAZUS Summary	Building Count	Potential Economic Impact (x\$1000)	Building Count	Potential Economic Impact (x\$1000)	Building Count	Potential Economic Impact (x\$1000)	Total of All Potential Economic Impact (x\$1000)	Loss-to-Exposure Ratio	Total Estimated Loss (x\$1000)
<b>Community-Wide Totals</b>	<b>797</b>	<b>\$59,759</b>	<b>55</b>	<b>\$35,469</b>	<b>9</b>	<b>\$12,357</b>	<b>\$107,585</b>		
High Hazard Exposure	0	\$26	0	\$1	0	\$0	\$27	20%	\$5
Medium Hazard Exposure	6	\$557	0	\$221	0	\$27	\$806	5%	\$40
Maricopa HAZUS Summary	% Building Count	% Potential Economic Impact	% Building Count	% Potential Economic Impact	% Building Count	% Potential Economic Impact			
High Hazard Exposure	0.05%	0.04%	0.0%	0.0%	0.0%	0.0%			
Medium Hazard Exposure	0.81%	0.93%	0.65%	0.62%	01.19%	0.22%			

	Residential		Commercial		Industrial		Summary		
Superior HAZUS Summary	Building Count	Potential Economic Impact (x\$1000)	Building Count	Potential Economic Impact (x\$1000)	Building Count	Potential Economic Impact (x\$1000)	Total of All Potential Economic Impact (x\$1000)	Loss-to-Exposure Ratio	Total Estimated Loss (x\$1000)
<b>Community-Wide Totals</b>	<b>1,552</b>	<b>\$186,666</b>	<b>40</b>	<b>\$16,334</b>	<b>11</b>	<b>\$11,096</b>	<b>\$214,096</b>		
High Hazard Exposure	0	\$0	0	\$0	0	\$0	\$0	20%	\$0
Medium Hazard Exposure	20	\$3,356	0	\$90	0	\$58	\$3,503	5%	\$175
Superior HAZUS Summary	% Building Count	% Potential Economic Impact	% Building Count	% Potential Economic Impact	% Building Count	% Potential Economic Impact			
High Hazard Exposure	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%			
Medium Hazard Exposure	01.28%	01.80%	0.55%	0.55%	0.73%	0.52%			

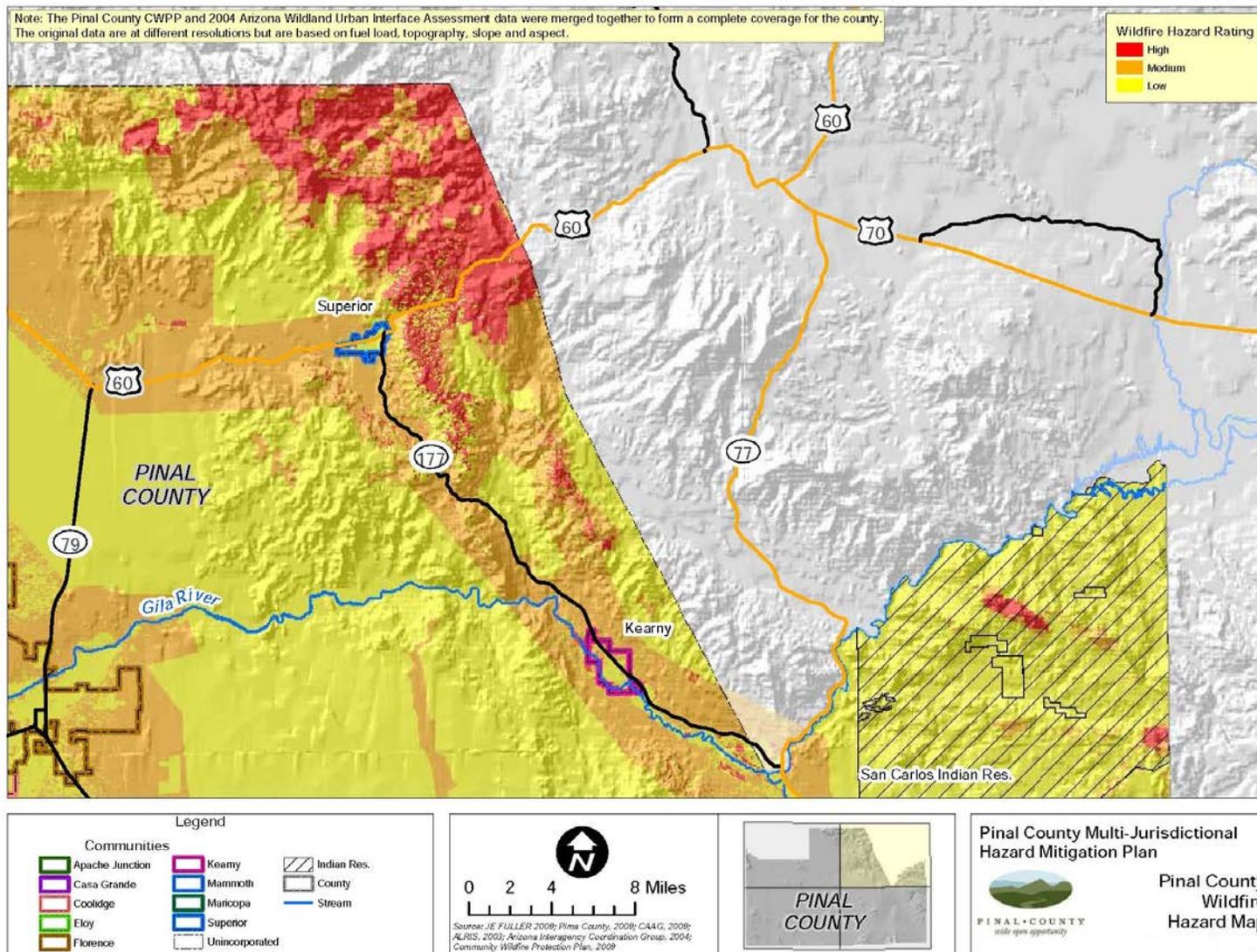
<b>Table 4-96: Uninc Pinal Co Estimated Building Exposure to Wildfire</b>									
	<b>Residential</b>		<b>Commercial</b>		<b>Industrial</b>		<b>Summary</b>		
<b>Unincorporated Pinal County HAZUS Summary</b>	<b>Building Count</b>	<b>Potential Economic Impact (x\$1000)</b>	<b>Building Count</b>	<b>Potential Economic Impact (x\$1000)</b>	<b>Building Count</b>	<b>Potential Economic Impact (x\$1000)</b>	<b>Total of All Potential Economic Impact (x\$1000)</b>	<b>Loss-to-Exposure Ratio</b>	<b>Total Estimated Loss (x\$1000)</b>
<b>Community-Wide Totals</b>	<b>33,447</b>	<b>\$4,591,973</b>	<b>997</b>	<b>\$592,560</b>	<b>345</b>	<b>\$246,968</b>	<b>\$5,431,500</b>		
High Hazard Exposure	849	\$132,032	14	\$10,390	4	\$857	\$143,280	20%	\$28,656
Medium Hazard Exposure	3,496	\$469,097	127	\$81,071	39	\$16,407	\$566,576	5%	\$28,329
<b>Unincorporated Pinal County HAZUS Summary</b>	<b>% Building Count</b>	<b>% Potential Economic Impact</b>	<b>% Building Count</b>	<b>% Potential Economic Impact</b>	<b>% Building Count</b>	<b>% Potential Economic Impact</b>			
High Hazard Exposure	02.54%	02.88%	01.37%	01.75%	01.25%	0.35%			
Medium Hazard Exposure	10.45%	10.22%	12.79%	13.68%	11.45%	06.64%			



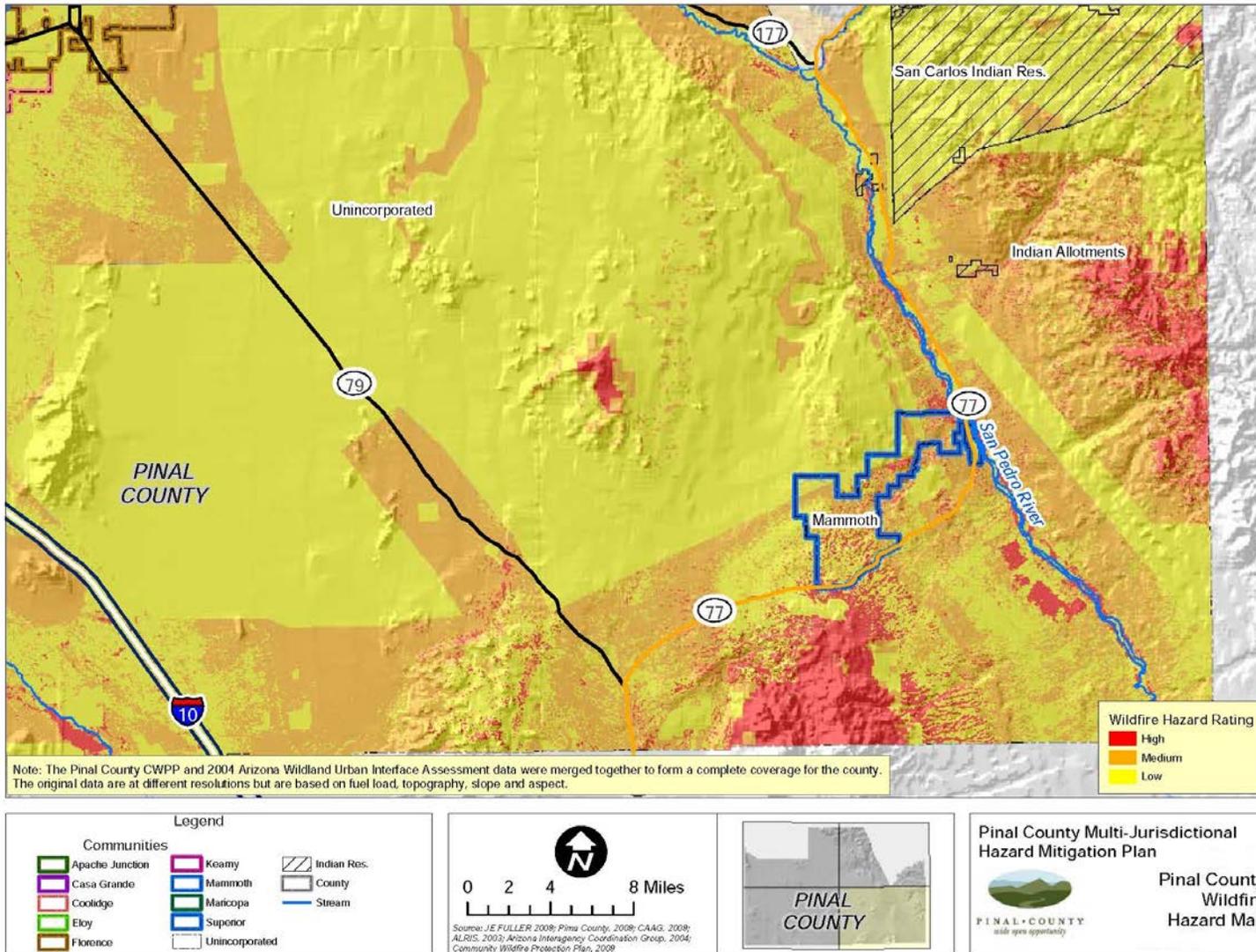
Map 4-29: Pinal County Wildfire Hazard Map (1)



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)

In summary, \$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 1,701 and 14,604 people, or 0.95% and 8.12% of the total, is potentially exposed to a high and medium hazard wildfire event, respectively. 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, and especially in the urban wildland interface areas.

It is duly noted that the loss and exposure numbers presented 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. Accordingly, actual event based losses and exposure are likely to be only a fraction of those summarized above.

### **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.

Fisher, M., AZ Wildland Urban Interface Assessment, prepared for the AZ Interagency Coordination Group.

<http://www.azsf.az.gov/UserFiles/PDF/Arizona%20Wildland%20Urban%20Interface%20Assessment%2005MAR04.pdf>

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

National Wildfire Coordination Group, Historical ICS 209 reports [http://fam.nwccg.gov/fam-web/hist\\_209/report\\_list\\_209](http://fam.nwccg.gov/fam-web/hist_209/report_list_209)

White, Seth, Bridging the Worlds of Fire Managers and Researchers: Lessons and Opportunities from the Wildland Fire Workshops, USDA Forest Service, General Technical Report PNW-GTR-599

## SECTION 5: 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.

The mitigation strategy discusses the actions that will reduce or possibly remove the community's exposure to hazard risks in the primary components:

#### **Goals and Objectives**

#### **Capability Assessment**

#### **Mitigation Strategy**

### 5.2 Hazard Mitigation Goals

The 2010 Plan goal and objectives were reviewed and determined by the Planning there are 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.

<b>Table 5-1: Capability Assessment for Pinal County</b>		
<b>PLANNING and REGULATORY</b>		
<b>PLANS</b>	<b>Yes/No Year</b>	<b>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?</b>
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
<b>BUILDING CODES, PERMITTING, INSPECTIONS</b>	<b>Yes/No</b>	<b>What type of codes? Are codes adequately enforced?</b>
Building Codes	Yes	County Ordinance. Yes.
Site plan review requirements	Yes	Site Plan Review Process. Yes.
<b>LAND USE PLANNING &amp; ORDINANCES</b>	<b>Yes/No</b>	<b>Is the ordinance effective for reducing hazard impacts? Is the ordinance adequately administered and enforced?</b>
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.
<b>How can capabilities be expanded and improved to reduce risk?</b> Increase enforcement on some ordinances through fines, hearing office process.		
<b>ADMINISTRATIVE and TECHNICAL</b>		
<b>ADMINISTRATION</b>	<b>Yes/No</b>	<b>Describe capability. Is coordination effective?</b>
Mutual aid agreements	Yes	AZMAC Signatory as well as most jurisdictions within County are signatory
Planning Commission	Yes	Regular Planning Commission meetings occur.
<b>TECHNICAL STAFF</b>	<b>Yes/No FT/PT</b>	<b>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?</b>
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
<b>How can capabilities be expanded and improved to reduce risk?</b> Continue training for all aspects of Emergency Management and include additional stakeholders. Ensure adequate staffing levels.		
<b>FINANCIAL</b>		
<b>FINANCIAL</b>	<b>Yes/No</b>	<b>Has the funding resource been used in past and for what type of activities? Could the resource be used to fund future mitigation actions?</b>
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.
<b>How can capabilities be expanded and improved to reduce risk?</b> Providing funding source options allows the County to continue with mitigation projects without waiting upon grant funding or other sources.		
<b>EDUCATION and OUTREACH</b>		
<b>PROGRAM / ORGANIZATION</b>	<b>Access / Eligibility (Yes/No)</b>	<b>Describe program/organization and how it relates to disaster resilience and mitigation. Could the program/organization help implement future mitigation activities?</b>
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

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		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.
<b>How can capabilities be expanded and improved to reduce risk?</b> Increase public education and outreach to include new business enterprises with the "Return" motto – "Return to work, Return to school, Return to home."		

<b>Table 5-2: Capability Assessment for Apache Junction</b>		
<b>PLANNING and REGULATORY</b>		
<b>PLANS</b>	<b>Yes/No Year</b>	<b>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?</b>
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).
<b>BUILDING CODES, PERMITTING, INSPECTIONS</b>	<b>Yes/No</b>	<b>What type of codes? Are codes adequately enforced?</b>
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.
<b>LAND USE PLANNING &amp; ORDINANCES</b>	<b>Yes/No</b>	<b>Is the ordinance effective for reducing hazard impacts? Is the ordinance adequately administered and enforced?</b>
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.
<b>How can capabilities be expanded and improved to reduce risk?</b> Research and development of processes to address on-site (private property) alterations of stormwater conveyance would extend capabilities and reduce flood risks.		
<b>ADMINISTRATIVE and TECHNICAL</b>		
<b>ADMINISTRATION</b>	<b>Yes/No</b>	<b>Describe capability. Is coordination effective?</b>
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., SMCDFD, and AJUSD.
<b>TECHNICAL STAFF</b>	<b>Yes/No FT/PT</b>	<b>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?</b>
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	
<b>How can capabilities be expanded and improved to reduce risk?</b> 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.		
<b>FINANCIAL</b>		
<b>FINANCIAL</b>	<b>Yes/No</b>	<b>Has the funding resource been used in past and for what type of activities? Could the resource be used to fund future mitigation actions?</b>
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.
<b>How can capabilities be expanded and improved to reduce risk?</b> Future policy discussions with City Council for staff to explore/implement alternative revenues for further hazard mitigation projects are possible.		
<b>EDUCATION and OUTREACH</b>		
<b>PROGRAM / ORGANIZATION</b>	<b>Access / Eligibility (Yes/No)</b>	<b>Describe program/organization and how it relates to disaster resilience and mitigation. Could the program/organization help implement future mitigation activities?</b>
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.
<b>How can capabilities be expanded and improved to reduce risk?</b> Increase private partnerships for the planning and readiness activities for the community.		

<b>Table 5-3: Capability Assessment for Casa Grande</b>		
<b>PLANNING and REGULATORY</b>		
<b>PLANS</b>	<b>Yes/No Year</b>	<b>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?</b>
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
<b>BUILDING CODES, PERMITTING, INSPECTIONS</b>	<b>Yes/No</b>	<b>What type of codes? Are codes adequately enforced?</b>
Building Codes	Yes	IBC, Yes
Site plan review requirements	Yes	Ordinances, Yes
<b>LAND USE PLANNING &amp; ORDINANCES</b>	<b>Yes/No</b>	<b>Is the ordinance effective for reducing hazard impacts? Is the ordinance adequately administered and enforced?</b>
Floodplain ordinance	Yes	Yes, Yes
Subdivision ordinance	Yes	Yes, Yes
Zoning ordinance	Yes	Yes, Yes
<b>How can capabilities be expanded and improved to reduce risk?</b> Collaboration among staff members and open communication.		
<b>ADMINISTRATIVE and TECHNICAL</b>		
<b>ADMINISTRATION</b>	<b>Yes/No</b>	<b>Describe capability. Is coordination effective?</b>
Mutual aid agreements	Yes	Fire, Law Enforcement and Equipment resource sharing. Yes
Planning Commission	Yes	Full Planning Commission Membership. Yes, very effective coordinating staff.
<b>TECHNICAL STAFF</b>	<b>Yes/No FT/PT</b>	<b>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?</b>
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
<b>How can capabilities be expanded and improved to reduce risk?</b> Collaboration within departments and inter-agencies. Regular updates of plan.		
<b>FINANCIAL</b>		
<b>FINANCIAL</b>	<b>Yes/No</b>	<b>Has the funding resource been used in past and for what type of activities? Could the resource be used to fund future mitigation actions?</b>
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
<b>EDUCATION and OUTREACH</b>		
<b>PROGRAM / ORGANIZATION</b>	<b>Access / Eligibility (Yes/No)</b>	<b>Describe program/organization and how it relates to disaster resilience and mitigation. Could the program/organization help implement future mitigation activities?</b>
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.
<b>How can capabilities be expanded and improved to reduce risk?</b> Community involvement – Education and Training - Funding		

<b>Table 5-4: Capability Assessment for City of Coolidge</b>		
<b>PLANNING and REGULATORY</b>		
<b>PLANS</b>	<b>Yes/No Year</b>	<b>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?</b>
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	
<b>BUILDING CODES, PERMITTING, INSPECTIONS</b>	<b>Yes/No</b>	<b>What type of codes? Are codes adequately enforced?</b>
Building Codes	Yes	2006 ICC (IBC, IFB, IRC, IMC, IPC, IEBC, IECC, IFGC, & IPMC) 2005 NEC
Site plan review requirements	Yes	Zoning Ordinance
<b>LAND USE PLANNING &amp; ORDINANCES</b>	<b>Yes/No</b>	<b>Is the ordinance effective for reducing hazard impacts? Is the ordinance adequately administered and enforced?</b>
Floodplain ordinance	No	Coolidge recognizes the Pinal County Flood Plain Ordinance
Subdivision ordinance	Yes	
Zoning ordinance	Yes	
<b>ADMINISTRATIVE and TECHNICAL</b>		
<b>ADMINISTRATION</b>	<b>Yes/No</b>	<b>Describe capability. Is coordination effective?</b>
Mutual aid agreements	Yes	Fire is a signer on the Pinal County Mutual Aid Agreement
Planning Commission	Yes	
<b>TECHNICAL STAFF</b>	<b>Yes/No FT/PT</b>	<b>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?</b>
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	
<b>FINANCIAL</b>		
<b>FINANCIAL</b>	<b>Yes/No</b>	<b>Has the funding resource been used in past and for what type of activities? Could the resource be used to fund future mitigation actions?</b>
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	
<b>EDUCATION and OUTREACH</b>		
<b>PROGRAM / ORGANIZATION</b>	<b>Access / Eligibility (Yes/No)</b>	<b>Describe program/organization and how it relates to disaster resilience and mitigation. Could the program/organization help implement future mitigation activities?</b>
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	
<b>How can capabilities be expanded and improved to reduce risk?</b> Most of the short comings are financially based issues.		

<b>Regulatory Tools for Hazard Mitigation</b>	<b>Description</b>	<b>Responsible Department/Agency</b>
CODES	<ul style="list-style-type: none"> <li>• 1997 Uniform Administrative Code</li> <li>• 2003 International Building Code</li> <li>• 2003 International Residential Code</li> <li>• 2003 International Property Maintenance Code</li> <li>• 2003 International Plumbing Code</li> <li>• 1994 Uniform Plumbing Code</li> <li>• 2003 International Mechanical Code</li> <li>• 2003 International Fire Code</li> <li>• 2002 National Electric Code</li> <li>• 1997 Uniform Sign Code</li> <li>• 1997 Uniform Code for Abatement of Dangerous Buildings</li> <li>• 28 CFR Part 35 &amp; 28 CFR 36: The Arizonans with Disabilities Act.</li> </ul>	Community Development Dept Building Safety Division
ORDINANCES	<ul style="list-style-type: none"> <li>• 2004 City of Eloy Zoning Ordinance</li> <li>• 2004 City of Eloy Subdivision Ordinance</li> <li>• 1991 City of Eloy Water Service Administration Ordinance</li> <li>• 1987 City of Eloy Industrial Wastewater Ordinance</li> <li>• 1993 City of Eloy Backflow Prevention and Cross Connection Ordinance</li> <li>• 2001 Eloy adoption of Pinal Co Floodplain Management Ordinance</li> <li>• 2001 Ordinance transfer of Eloy Floodplain Management to Pinal Co Flood Control District</li> </ul>	Community Development Dept Public Works Dept
PLANS, MANUALS, and/or GUIDELINES	<ul style="list-style-type: none"> <li>• 2007 Eloy Potable Water System Master Plan</li> <li>• 2007 Eloy Wastewater Master Plan</li> <li>• 2006 Eloy Airport Overlay Plan</li> <li>• 2007 CAAG Water Quality Management Plan</li> <li>• National Flood Insurance Program</li> <li>• 2004 Eloy General Plan</li> <li>• 2004 Eloy General Plan (currently being updated)</li> <li>• 2009 Eloy Water Conservation Plan</li> <li>• 1997 Eloy Emergency Response &amp; Recovery Plan</li> <li>• 2008 Eloy Emergency Operations Plan</li> <li>• 2009 Eloy Multi-Hazard Mitigation Plan</li> </ul>	Community Development Dept Public Works Dept
STUDIES	<ul style="list-style-type: none"> <li>• 2004 Eloy General Plan Study Area (currently being updated.</li> <li>• 2009 Eloy Landfill Master Plan (currently being developed</li> <li>• FEMA DFIRM Maps</li> </ul>	Community Development Dept Public Works Dept

<b>Technical Staff and Personnel Capabilities for Eloy</b>		
<b>Staff/Personnel Resources</b>	<input checked="" type="checkbox"/>	<b>Department/Agency - Position</b>

<b>Technical Staff and Personnel Capabilities for Eloy</b>		
<b>Staff/Personnel Resources</b>	<input checked="" type="checkbox"/>	<b>Department/Agency - Position</b>
Planner(s) or engineer(s) with knowledge of land development and land management practices	<input checked="" type="checkbox"/>	<ul style="list-style-type: none"> <li>• Community Development – Director/Planner</li> <li>• Public Works – City Engineer</li> </ul>
Engineer(s) or professional(s) trained in construction practices related to buildings and/or infrastructure	<input checked="" type="checkbox"/>	<ul style="list-style-type: none"> <li>• Community Development – Director/Planner</li> <li>• Building Safety – Chief Building Official</li> <li>• Public Works – City Engineer</li> </ul>
Planner(s) or engineer(s) with and understanding of natural and/or human-caused hazards	<input checked="" type="checkbox"/>	<ul style="list-style-type: none"> <li>• Community Development – Director/Planner</li> <li>• Building Safety – Chief Building Official</li> <li>• Public Works – City Engineer</li> </ul>
Floodplain Manager	<input checked="" type="checkbox"/>	<ul style="list-style-type: none"> <li>• Pinal County Flood Control District – Floodplain Administrator</li> </ul>
Surveyors		
Staff with education or expertise to assess the community’s vulnerability to hazards	<input checked="" type="checkbox"/>	<ul style="list-style-type: none"> <li>• Community Development – Director/Planner</li> <li>• Building Safety – Chief Building Official</li> <li>• Public Works – City Engineer</li> </ul>
Personnel skilled in GIS and/or HAZUS		
Scientists familiar with the hazards of the community		
Emergency Manager		
Grant writer(s)	<input checked="" type="checkbox"/>	<ul style="list-style-type: none"> <li>• Finance Department – Grants Coordinator</li> </ul>

<b>Fiscal Capabilities for Eloy</b>		
<b>Financial Resources</b>	<b>Accessible or Eligible to Use (Yes, No, Don’t Know)</b>	<b>Comments</b>
Community Development Block Grants	Yes	Grants Coordinator
Capital Improvements Project funding	Yes	5-Year CIP cycle
Authority to levy taxes for specific purposes	Yes	
Fees for water, sewer, gas, or electric service	No	Water and Sewer
Impact fees for homebuyers or new developments/homes	Yes	Municipal Facilities Water – Sewer Police Parks and Recreation Library
Incur debt through general obligation bonds	Yes	Voter approval required
Incur debt through special tax bonds	Yes	

<b>Table 5-6: Capability Assessment for Florence</b>		
<b>PLANNING and REGULATORY</b>		
<b>PLANS</b>	<b>Yes/No Year</b>	<b>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?</b>
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
<b>BUILDING CODES, PERMITTING, INSPECTIONS</b>	<b>Yes/No</b>	<b>What type of codes? Are codes adequately enforced?</b>
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
<b>LAND USE PLANNING &amp; ORDINANCES</b>	<b>Yes/No</b>	<b>Is the ordinance effective for reducing hazard impacts? Is the ordinance adequately administered and enforced?</b>
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
<b>ADMINISTRATIVE and TECHNICAL</b>		
<b>ADMINISTRATION</b>	<b>Yes/No</b>	<b>Describe capability. Is coordination effective?</b>
Mutual aid agreements	Yes	Coordination is effective when applied.
Planning Commission	Yes	Staffing
<b>TECHNICAL STAFF</b>	<b>Yes/No FT/PT</b>	<b>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?</b>
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
<b>FINANCIAL</b>		

<b>FINANCIAL</b>	<b>Yes/No</b>	<b>Has the funding resource been used in past and for what type of activities? Could the resource be used to fund future mitigation actions?</b>
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
<b>EDUCATION and OUTREACH</b>		
<b>PROGRAM / ORGANIZATION</b>	<b>Access / Eligibility (Yes/No)</b>	<b>Describe program/organization and how it relates to disaster resilience and mitigation. Could the program/organization help implement future mitigation activities?</b>
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

<b>Table 5-7: Capability Assessment for Kearny</b>		
<b>PLANNING and REGULATORY</b>		
<b>PLANS</b>	<b>Yes/No Year</b>	<b>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?</b>
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	
<b>BUILDING CODES, PERMITTING, INSPECTIONS</b>	<b>Yes/No</b>	<b>What type of codes? Are codes adequately enforced?</b>
Building Codes	Yes	Pinal County handles our building codes
Site plan review requirements	No	
<b>LAND USE PLANNING &amp; ORDINANCES</b>	<b>Yes/No</b>	<b>Is the ordinance effective for reducing hazard impacts? Is the ordinance adequately administered and enforced?</b>
Floodplain ordinance	Yes/2007	
Subdivision ordinance	Yes/2006	
Zoning ordinance		
<b>ADMINISTRATIVE and TECHNICAL</b>		
<b>ADMINISTRATION</b>	<b>Yes/No</b>	<b>Describe capability. Is coordination effective?</b>
Mutual aid agreements	Yes	
Planning Commission	No	
<b>TECHNICAL STAFF</b>	<b>Yes/No FT/PT</b>	<b>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?</b>
Building Official	No	
Community Planner	No	
Emergency Manager	Yes	
Engineer	Yes	
Floodplain Manager/Administrator	Yes	

GIS/HAZUS Coordinator	Yes	
Grant writer	Yes	
<b>FINANCIAL</b>		
<b>FINANCIAL</b>	<b>Yes/No</b>	<b>Has the funding resource been used in past and for what type of activities? Could the resource be used to fund future mitigation actions?</b>
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	
<b>EDUCATION and OUTREACH</b>		
<b>PROGRAM / ORGANIZATION</b>	<b>Access / Eligibility (Yes/No)</b>	<b>Describe program/organization and how it relates to disaster resilience and mitigation. Could the program/organization help implement future mitigation activities?</b>
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: Legal and Regulatory Capabilities for Mammoth**

<b>Regulatory Tools for Hazard Mitigation</b>	<b>Description</b>	<b>Responsible Department/Agency</b>
CODES	<ul style="list-style-type: none"> <li>Town has IGA with Pinal Co for Building, Masonry, Concrete, Electrical, and Plumbing Code enforcement and compliance.</li> <li>Electrical inspection and coded compliance provided by BIA/San Carlos Irrigation Project</li> <li>Mammoth Land Use and Development Codes 2003</li> </ul>	<ul style="list-style-type: none"> <li>Public Works</li> <li>Planning &amp; Zoning</li> <li>Pinal Co Development Services</li> </ul>
ORDINANCES	<ul style="list-style-type: none"> <li>Pinal Co Floodplain Management Ordinance 2006</li> <li>Zoning Ordinance per General Plan</li> </ul>	<ul style="list-style-type: none"> <li>Public Works</li> <li>Pinal Co Flood Control District</li> </ul>
PLANS, MANUALS, and/or GUIDELINES	<ul style="list-style-type: none"> <li>Mammoth General Plan (1999)</li> <li>Mammoth Emergency Response and Recovery Plan (2007)</li> <li>Pinal Co Community Wildfire Protection Plan, 2005</li> <li>Pinal Co Drainage Manual, 2004</li> </ul>	<ul style="list-style-type: none"> <li>Planning &amp; Zoning</li> <li>Police Dept</li> <li>Fire Dept</li> <li>Pinal Co</li> </ul>
STUDIES	<ul style="list-style-type: none"> <li>Tucson Wash Gaging Study, 2006</li> <li>FEMA DFIRM Maps</li> </ul>	<ul style="list-style-type: none"> <li>Public Works</li> <li>Pinal Co Flood Control District</li> </ul>

**Technical Staff and Personnel Capabilities for Mammoth**

<b>Staff/Personnel Resources</b>	<input checked="" type="checkbox"/>	<b>Department/Agency - Position</b>
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	<input checked="" type="checkbox"/>	Police Department – Police Chief (currently unfilled)
Grant writer(s)	<input checked="" type="checkbox"/>	Administration – Town Clerk

<b>Fiscal Capabilities for Mammoth</b>		
<b>Financial Resources</b>	<b>Accessible or Eligible to Use (Yes, No, Don't Know)</b>	<b>Comments</b>
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

<b>Table 5-9: Capability Assessment for Maricopa</b>		
<b>PLANNING and REGULATORY</b>		
<b>PLANS</b>	<b>Yes/No Year</b>	<b>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?</b>
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
<b>BUILDING CODES, PERMITTING, INSPECTIONS</b>	<b>Yes/No</b>	<b>What type of codes? Are codes adequately enforced?</b>
Building Codes	IBC 2012	Building Codes; yes
Site plan review requirements	Zoning Code, Section 505	Zoning Code; yes
<b>LAND USE PLANNING &amp; ORDINANCES</b>		<b>Is the ordinance effective for reducing hazard impacts? Is the ordinance adequately administered and enforced?</b>
Floodplain ordinance	Ordinance 14-01	Yes, Yes
Subdivision ordinance	2006	Yes, Yes
Zoning ordinance	Adopted Nov. 5, 2014	Yes, Yes
<b>ADMINISTRATIVE and TECHNICAL</b>		
<b>ADMINISTRATION</b>	<b>Yes/No</b>	<b>Describe capability. Is coordination effective?</b>
Mutual aid agreements	Yes	
Planning Commission	Yes	Yes, Yes
<b>TECHNICAL STAFF</b>	<b>Yes/No FT/PT</b>	<b>Is staff trained on hazards and mitigation? Is coordination between agencies and staff effective?</b>

		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
<b>FINANCIAL</b>		
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.
<b>EDUCATION and OUTREACH</b>		
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		
StormReady certification		
Citizen groups focused on emergency preparedness, environmental protection, etc.		
Public education/information programs (fire safety, household preparedness, responsible water use, etc)	Yes	
Public-private partnership initiatives addressing disaster-related issues		

<b>Table Capability Assessment for Superior</b>		
<b>PLANNING and REGULATORY</b>		
<b>PLANS</b>	<b>Yes/No Year</b>	<b>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?</b>
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	
<b>BUILDING CODES, PERMITTING, INSPECTIONS</b>	<b>Yes/No</b>	<b>What type of codes? Are codes adequately enforced?</b>
Building Codes	Yes	Pinal County does this and No
Site plan review requirements	Yes	Town reviews zoning codes and Yes
<b>LAND USE PLANNING &amp; ORDINANCES</b>	<b>Yes/No</b>	<b>Is the ordinance effective for reducing hazard impacts? Is the ordinance adequately administered and enforced?</b>
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
<b>How can capabilities be expanded and improved to reduce risk?</b> 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.		
<b>ADMINISTRATIVE and TECHNICAL</b>		
<b>ADMINISTRATION</b>	<b>Yes/No</b>	<b>Describe capability. Is coordination effective?</b>
Mutual aid agreements	Yes	With Pinal County and yes
Planning Commission	No	
<b>TECHNICAL STAFF</b>	<b>Yes/No FT/PT</b>	<b>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?</b>
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
<b>How can capabilities be expanded and improved to reduce risk?</b> The town cannot expand its capabilities at this time.		
<b>FINANCIAL</b>		
<b>FINANCIAL</b>	<b>Yes/No</b>	<b>Has the funding resource been used in past and for what type of activities? Could the resource be used to fund future mitigation actions?</b>
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	
<b>How can capabilities be expanded and improved to reduce risk?</b> Nothing to expand at this time.		
<b>EDUCATION and OUTREACH</b>		
<b>PROGRAM / ORGANIZATION</b>	<b>Access / Eligibility (Yes/No)</b>	<b>Describe program/organization and how it relates to disaster resilience and mitigation. Could the program/organization help implement future mitigation activities?</b>
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	
<b>How can capabilities be expanded and improved to reduce risk?</b> 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" was carried forward to become part of the A/P list for this Plan. 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.

##### New 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

<b>Table 5-11: Mitigation Strategy for Pinal County</b>						
<b>Project Name Description</b>	<b>Hazard(s) Mitigated</b>	<b>Estimated Cost</b>	<b>Project Primary or Lead</b>	<b>Potential Funding Source(s)</b>	<b>Status</b> • No Progress • In Progress • Complete	<b>Explanation or brief description of work so far or reason for 'no progress'</b>
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.
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	Oracle Fire is only FireWise community so revise project to get other jurisdictions on board.
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.
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
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
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.
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. Construction on some of the plan is underway. There is more in the plan we could implement.

<b>Table 5-11: Mitigation Strategy for Pinal County</b>						
<b>Project Name Description</b>	<b>Hazard(s) Mitigated</b>	<b>Estimated Cost</b>	<b>Project Primary or Lead</b>	<b>Potential Funding Source(s)</b>	<b>Status</b> <ul style="list-style-type: none"> <li>• No Progress</li> <li>• In Progress</li> <li>• Complete</li> </ul>	<b>Explanation or brief description of work so far or reason for 'no progress'</b>
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
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 June 2016	Pinal Co OEM	General Fund	In Progress	Finalize shelter plan; get schools to sign AZMAC; retrofit schools for generator power
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

**Table 5-12: Mitigation Strategy 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	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	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 2020	AJPW	MAG or PCFCD	No Progress	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 2020	AJPW	Local	In Progress	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 2020	AJWD	FIWA & AJWD	In Progress	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) 2018	AJPW	Local	In Progress	Estimated completion 2016.
Research reclaimed water use strategies and develop implementation guidelines for future developments.	Drought	\$10,000 (Staff Time) 2018	AJWD/DSD	Local	No Progress	No progress due to limited resources.
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	No progress due to no funding yet.
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	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 <sup>th</sup> Ave. to Palm Wash.	Flood	\$2.0M 2017	AJPW	STP/PCFCD	In Progress	In final design scheduled for completion in late 2015.

<b>Table 5-12: Mitigation Strategy for Apache Junction</b>						
<b>Description</b>	<b>Hazard(s) Mitigated</b>	<b>Estimated Cost &amp; Completion Date</b>	<b>Project Primary or Lead</b>	<b>Potential Funding Source(s)</b>	<b>Status</b> <ul style="list-style-type: none"> <li>• No Progress</li> <li>• In Progress</li> <li>• Complete</li> </ul>	<b>Explanation or brief description of work so far or reason for 'no progress'</b>
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	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 2020	AJPW	None	No Progress	No progress due to no funding yet.
Broadway Road Detention Basin, Stormwater Master Plan Project No. 6	Flood	\$100K 2020	AJPW	None	No Progress	No progress due to no funding yet.
Update 2002 Stormwater Master Plan.	Flood	\$100K 2017	AJPW	None	No Progress	
FEMA Risk Map Study.	Flood, Drought	\$150K 2016	AJPW	FEMA Grant	In Progress	
Inventory of stormwater outfalls and public drainage easements citywide.	Flood	\$20,000 (Staff Time) 2016	AJPW	HURF	In Progress	
Update Emergency Response and Recovery Plan	All	\$20,000 (Staff Time) 2016	AJPW, AJPD, SFMD	Various	In Progress	
Emergency back-up power supply for select city buildings and water facilities.	Severe Wind	\$400K 2018	AJPW, AJPD, AJWD	General Fund	In Progress	Some sites complete.
GIS Mapping and inventory of city owned critical infrastructure.	Flood, HazMat, Severe Wind, Levee Failure,	\$100,000 (Staff Time) 2018	AJPW, DSD, IT	General Fund, District Fund, and HURF	In Progress	

<b>Table 5-12: Mitigation Strategy for Apache Junction</b>						
<b>Description</b>	<b>Hazard(s) Mitigated</b>	<b>Estimated Cost &amp; Completion Date</b>	<b>Project Primary or Lead</b>	<b>Potential Funding Source(s)</b>	<b>Status</b> <ul style="list-style-type: none"> <li>• No Progress</li> <li>• In Progress</li> <li>• Complete</li> </ul>	<b>Explanation or brief description of work so far or reason for 'no progress'</b>
Construct potable water treatment plant.	Drought, Severe Wind	\$14.5M 2016	AJWD	District Fund	In Progress	

**Table 5-13: Mitigation Strategy 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	Explanation or brief description of work so far or reason for 'no progress'
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.
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.
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
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.
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	
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**

Description	Hazard(s) Mitigated	Estimated Cost & Completion Date	Project Primary or Lead	Potential Funding Source(s)	Status • No Progress • In Progress • Complete	Explanation or brief description of work so far or reason for 'no progress'
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
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
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

**Table 5-14: Mitigation Strategy for Coolidge**

Description	Hazard(s) Mitigated	Estimated Cost & Completion Date	Primary Agency or Lead	Potential Funding Source(s)	Status • No Progress • In Progress • Complete	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	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	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	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	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	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	Ongoing, modify as technology improves
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

<b>Table 5-14: Mitigation Strategy for Coolidge</b>						
<b>Description</b>	<b>Hazard(s) Mitigated</b>	<b>Estimated Cost &amp; Completion Date</b>	<b>Primary Agency or Lead</b>	<b>Potential Funding Source(s)</b>	<b>Status</b> <ul style="list-style-type: none"> <li>• No Progress</li> <li>• In Progress</li> <li>• Complete</li> </ul>	<b>Explanation or brief description of work so far or reason for 'no progress'</b>
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
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
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

**Table 5-15: Mitigation Strategy for Florence**

Description	Hazard(s) Mitigated	Estimated Cost & Completion Date	Project Primary or Lead	Potential Funding Source(s)	Status • No Progress • In Progress • Complete	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 2017	Development Services / Building Official	General Fund	In Progress	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 2017	Pinal Co Flood Control District / Section Chief	Flood Control District Levy	In Progress	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 2018	Administration/ Town Clerk	General Fund	Progress	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	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	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	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	Public awareness bulletin issued by PIO.
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 5-15: Mitigation Strategy for Florence**

Description	Hazard(s) Mitigated	Estimated Cost & Completion Date	Project Primary or Lead	Potential Funding Source(s)	Status • No Progress • In Progress • Complete	Explanation or brief description of work so far or reason for 'no progress'
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
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
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
GIS Upgrade and continued support.	All	Staff Time On-going	Administration IT Director	General Fund Utilities / HURF Fund	In Progress	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	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	Identify areas and notify public with new areas
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
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

<b>Table 5-15: Mitigation Strategy for Florence</b>						
<b>Description</b>	<b>Hazard(s) Mitigated</b>	<b>Estimated Cost &amp; Completion Date</b>	<b>Project Primary or Lead</b>	<b>Potential Funding Source(s)</b>	<b>Status</b> <ul style="list-style-type: none"> <li>• No Progress</li> <li>• In Progress</li> <li>• Complete</li> </ul>	<b>Explanation or brief description of work so far or reason for 'no progress'</b>
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
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
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
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
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
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	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	Ongoing work
Upgrade Hydrants: Fire hydrant upgrades to include water distribution systems.	All	\$150,000 2020	Public Works Director	Water Fund	In Progress	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 2020	Public Works Director	Water Fund	In Progress	Ongoing work/ New well installed and lines

<b>Table 5-15: Mitigation Strategy for Florence</b>						
<b>Description</b>	<b>Hazard(s) Mitigated</b>	<b>Estimated Cost &amp; Completion Date</b>	<b>Project Primary or Lead</b>	<b>Potential Funding Source(s)</b>	<b>Status</b> <ul style="list-style-type: none"> <li>• No Progress</li> <li>• In Progress</li> <li>• Complete</li> </ul>	<b>Explanation or brief description of work so far or reason for 'no progress'</b>
Replace Valves: Valve replacement program on water systems.	All	\$190,000 On-going	Public Works Director	Water Fund	In Progress	Ongoing work
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
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
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
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

**Table 5-16: Mitigation Strategy for Kearny**

<b>Project Name Description</b>	<b>Hazard(s) Mitigated</b>	<b>Estimated Cost &amp; Completion</b>	<b>Primary or Lead Agency</b>	<b>Funding Source(s)</b>	<b>Status</b> • No Progress • In Progress • Complete	<b>Explanation or brief description of work so far or reason for 'no progress'</b>
Water Conservation Plan Review - Water conservation plan is currently under development and at draft stage.	Drought	Staff Time June 2017	Town Manager	General Fund, Utilities	No Progress	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 2020	Town Manager, Police Chief	General Fund, Bond	No Progress	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 2018	Town Manager	General Fund	In Progress	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 On-going	Town Manager	General Fund	In Progress	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 On-going	Police Chief	Grants, Bonds	In Progress	This is reviewed on an annual basis.
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.

<b>Table 5-16: Mitigation Strategy for Kearny</b>						
<b>Project Name Description</b>	<b>Hazard(s) Mitigated</b>	<b>Estimated Cost &amp; Completion</b>	<b>Primary or Lead Agency</b>	<b>Funding Source(s)</b>	<b>Status</b> • No Progress • In Progress • Complete	<b>Explanation or brief description of work so far or reason for 'no progress'</b>
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.
Perform tree/brush thinning on Gila River.	Wildfire	\$50,000 On-going	Fire Chief	Grants	No Progress	No progress due to no funding yet.

<b>Table 5-: Mitigation Strategy for Superior</b>						
<b>Project Name Description</b>	<b>Hazard(s) Mitigated</b>	<b>Estimated Cost &amp; Completion</b>	<b>Primary or Lead Agency</b>	<b>Funding Source(s)</b>	<b>Status</b> • No Progress • In Progress • Complete	<b>Explanation or brief description of work so far or reason for 'no progress'</b>
Update Fire Department 5-year plan	Fire & HazMat	\$5,000 Staff Time June 2010	Fire Dept	General Fund	In progress	Revised every year
Abatement of Vacant or Abandoned Buildings	Fire, Crime & Public Nuisance	\$1.2M FY 2015	Public Safety Dept & Building Safety Dept	CDBG	No progress	CDBG funding 3yrs in future
Mary Drive/All Weather Crossing	Flood	\$500,000 Staff Time FY 2015	Public Works	CDBG, HURF, General Fund	No progress	No funding

## 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 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 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:

<b>Pinal County</b>	<ul style="list-style-type: none"> <li>• The Plan mitigation strategy was used by the Pinal County Flood Control District in the preparation and prioritization of flood control projects.</li> <li>• 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.</li> <li>• The Plan risk assessment data was incorporated into the revision of the County Emergency Operations Plan.</li> <li>• Used for the Community Rating System (CRS) certification.</li> <li>• Used for creating the Community Wildfire Protection Plan (CWPP).</li> </ul>
<b>Apache Junction</b>	<ul style="list-style-type: none"> <li>• The Plan was referenced for long range CIP projects.</li> </ul>
<b>Casa Grande</b>	<ul style="list-style-type: none"> <li>• The Plan was used for the City of Casa Grande’s General Plan.</li> <li>• The Plan was used for long range CIP projects.</li> <li>• The Plan was referenced for implementation of Building Code Ordinance updates.</li> </ul>
<b>Coolidge</b>	<ul style="list-style-type: none"> <li>• The Plan has been used in the update to the city’s comprehensive plan.</li> </ul>
	<ul style="list-style-type: none"> <li>• The Plan mitigation strategy was incorporated into the city’s capital improvement planning.</li> </ul>
	<ul style="list-style-type: none"> <li>• The Plan risk assessment was used to update the emergency operations plan.</li> </ul>
<b>Eloy</b>	<ul style="list-style-type: none"> <li>• Used to update building code ordinances.</li> </ul>
<b>Florence</b>	<ul style="list-style-type: none"> <li>• 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.</li> <li>• Planning and Zoning Dept used elements of the Plan with the General Plan Update.</li> </ul>
<b>Kearny</b>	<ul style="list-style-type: none"> <li>• The Plan mitigation strategy was referred to by the Town during each annual review and update of the Town’s Capital Improvement Program.</li> <li>• The Plan risk assessment was referenced during a review of the Town’s current Drought Management Plan.</li> <li>• Was used to develop the Community Wildfire Protection Plan (CWPP).</li> </ul>
<b>Mammoth</b>	<ul style="list-style-type: none"> <li>• Was used for the CIP program</li> <li>• Used it for building codes.</li> </ul>
<b>Maricopa</b>	<ul style="list-style-type: none"> <li>• Used it to update Emergency Response Plan and Community Action Plan.</li> </ul>
<b>Superior</b>	<ul style="list-style-type: none"> <li>• The Plan was used to update the capital improvement plan.</li> <li>• The Plan was used for the emergency operations plan.</li> </ul>

Obstacles to further incorporation of the 2005 Plan for some communities were tied to a lack of awareness of the Plan by departments outside the emergency management community.

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

<b>Pinal County</b>	<ul style="list-style-type: none"> <li>• To update the county emergency and response and recovery plan.</li> <li>• To develop the County’s first Multi-Year Training and Exercise Plan (MYTEP) plan.</li> <li>• For revising long range cap improvement plan.</li> </ul>
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	<ul style="list-style-type: none"> <li>• To use risk assessment data to revise the County Emergency Operations Plan.</li> <li>• To develop a County air quality plan</li> <li>• To revise Community Wildfire Protection Plan (CWPP).</li> <li>• To develop a regional transportation plan.</li> </ul>
<b>Apache Junction</b>	<ul style="list-style-type: none"> <li>• To update capital improvement plan</li> <li>• To update emergency operations plan</li> </ul>
<b>Casa Grande</b>	<ul style="list-style-type: none"> <li>• To update general plan</li> <li>• To develop public works flood control plan</li> <li>• To develop economic development plan</li> </ul>
<b>Coolidge</b>	<ul style="list-style-type: none"> <li>• To update capital improvement plan.</li> <li>• To develop flood control and wastewater plans.</li> </ul>
	<ul style="list-style-type: none"> <li>• The risk assessment will be used to update the city’s emergency operations plan.</li> </ul>
<b>Eloy</b>	<ul style="list-style-type: none"> <li>• For updating the general plan and emergency operations plan.</li> </ul>
<b>Florence</b>	<ul style="list-style-type: none"> <li>• To update capital improvement plan, emergency operations plan and develop an economic development plan.</li> </ul>
<b>Kearny</b>	<ul style="list-style-type: none"> <li>• To update the response and recovery plan.</li> <li>• To update the drought management plan</li> <li>• The mitigation strategy will be referred to during annual reviews and updates of the Town’s Capital Improvement Program.</li> </ul>
<b>Mammoth</b>	<ul style="list-style-type: none"> <li>• To develop a community development plan.</li> <li>• To update the emergency operations plan.</li> <li>• To update the capital improvement plan.</li> </ul>
<b>Maricopa</b>	<ul style="list-style-type: none"> <li>• To update the community action plan.</li> <li>• To update the general plan,</li> <li>• To update the emergency operations plan.</li> </ul>
<b>Superior</b>	<ul style="list-style-type: none"> <li>• To update the emergency operations plan.</li> <li>• To create an economic development plan.</li> <li>• To update the capital improvement plan.</li> </ul>

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

USFS .....United States Forest Service  
USGS .....United States Geological Survey  
VA .....Vulnerability Analysis  
WUI .....Wildland Urban Interface

**APPENDIX A: 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@pinalcountyz.gov](mailto:maria.rojas@pinalcountyz.gov) by Friday, May 1<sup>st</sup> 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.pinalcountyz.gov](http://www.pinalcountyz.gov)



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**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



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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@CASAGRANDEAZ.GOV
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STEVEN SUTHER	<del>ASST. CHIEF</del>	<del>PHOENIX PD</del>	SSuthe@phoenixaz.gov
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Kelly Waddell	ASST CHIEF	Eloy Fire Dept	KWaddell@Eloyfire.org
Kore Redden	PHMP COORDINATOR	Pinal County Public Health	kore.redden@ pinalcountiaz.gov
Shane Kiesow	PLW Manager	City of AZ	skiesow@ajcity.net

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

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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 PUW	BENJAMIN.COCKER@PINALCOUNTY.AZ.GOV
Kent Taylor	Director Operations	Pinal County	KentTaylor@pinalcountyaz.gov
Mike Simpson	Administrator	PCOEM	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 Boothe	Emergency manager	AK-Chin Indian Community	gboothe@ak-chin.nsn.ms
MARK NIPP	CHIEF OF POLICE	SUPERIOR POLICE	MARK.NIPP@PINALCOUNTY.AZ.GOV 480.415.6010
Margaret Gaston	Town Manager	Town of Superior	MARGARET.GASTON@SUPERIOR-ARIZONA.COM 530-639-5752
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  
Hazard Mitigation Planning Mtg #1  
May 7, 2015



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Name (Please Print)	Title	Agency/Org	Email and/or Phone
JAMES HUBBBS	Police Commander	CITY OF MARIKOP	JAMES.HUBBS@MARIKOP-97.GOV
MELISSA TATLOCK	Police SERGEANT	TOWN OF FLORENCE	MELISSA.TATLOCK@TOWNOFFLORENCE.GOV
ROB JARVIS	FIRE CHIEF	CITY OF COOLIDGE	RJARVIS@COOLIDGEAZ.GOV
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Anna Flores	Town Manager	TOWN OF KEARNY	aflores@townoffloreny.com
John Kemp	Battalion Chief	Town of Florence	John.Kemp@FlorenceAZ.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



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### **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	GAE CARE	CASA GRANDE F.D.	SMILLER@CASAGRANDEAZ.GOV
Petro Apodaca	Street Superintendent	City of Casa Grande	Papodaca@casa.grandaz.gov
Morris Taylor	Supervisor	Town of Florence	Morris.Taylor@Florenceaz.gov BENJAMIN.CAIKIE@PINALCOUNTY.AZ.GOV
BENJAMIN CAKIE	GIS ANALYST	PC PUBLIC WORKS	520-866-6985
Mike Simpson	Administrator	PCPD - Fire Dept	520-251-2392
William Fitch	SENIOR	Florence Police	William.Fitch@FlorenceAZ.gov
Shane Kriesow	PLU Manager	City of Akchewet.	SKriesow@ajcity.net
Ken Markin	PLU Director	City of Eloy	Kmarkin@eloyaz.gov
Jose Martinez	Building Inspector	City of Eloy	smartinez@eloyaz.gov
Rob Jarvis	FIRE CHIEF	CITY OF COOLIDGE	jarvis@coolidgeaz.gov
Eddie Rodriguez	Deputy Fire Marshal	Maricopa Fire	eddie.rodriguez@maricopa.gov
Cindy Perez	Admin.	Pinal County Emergency Mgt.	Cindy.Perez@pinalcountyaz.gov



P I N A L • C O U N T Y  
*Wide open opportunity*

**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 B: PUBLIC & STAKEHOLDER INVOLVEMENT RECORDS**

Hazard Mitigation Plannin x

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](mailto: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.

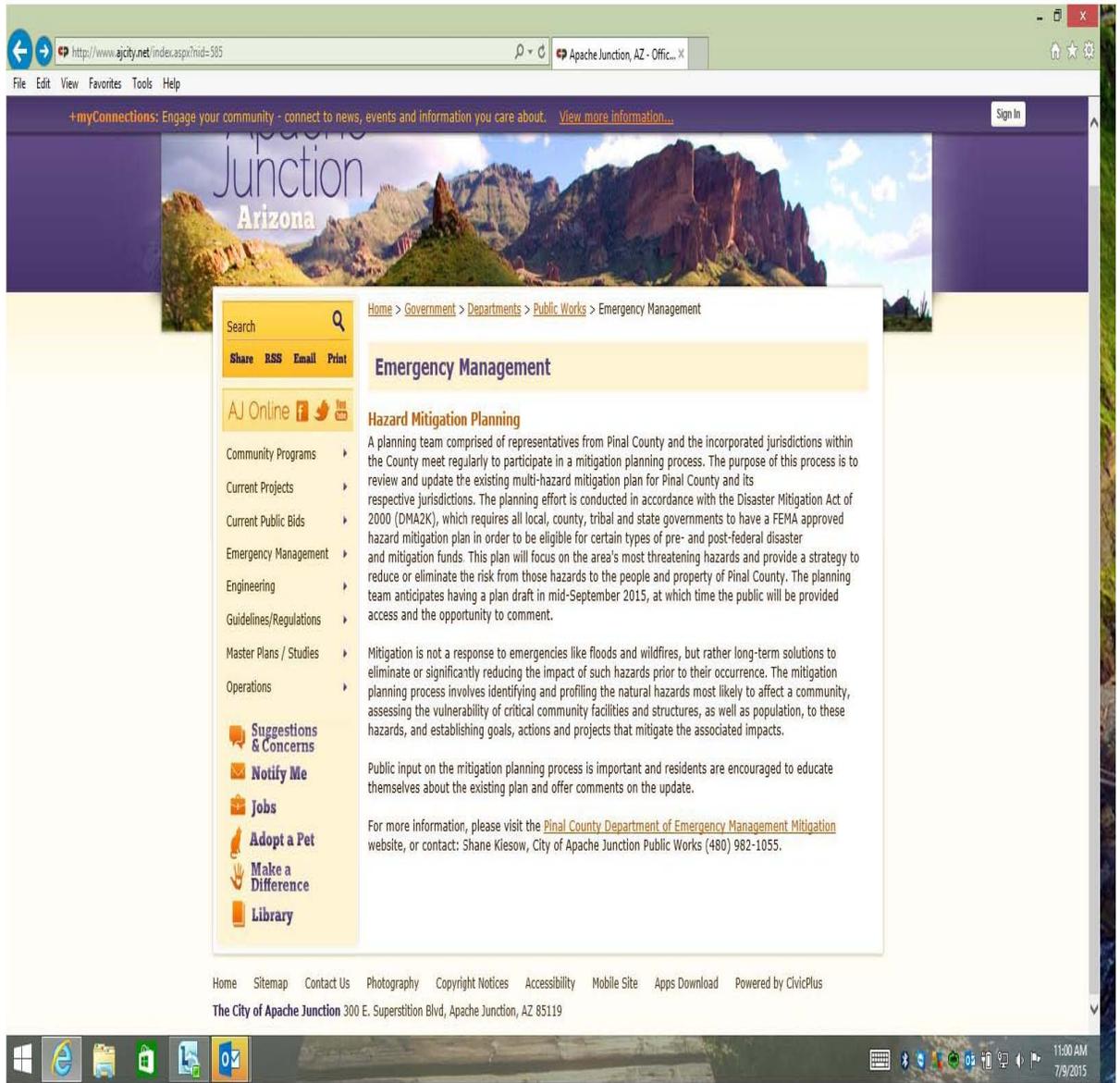
Mitigation is not a response to emergencies like floods and wildfires, but rather long-term solutions to eliminate or significantly reducing the impact of such hazards prior to their occurrence. The mitigation planning process involves identifying and profiling the natural hazards most likely to affect 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.

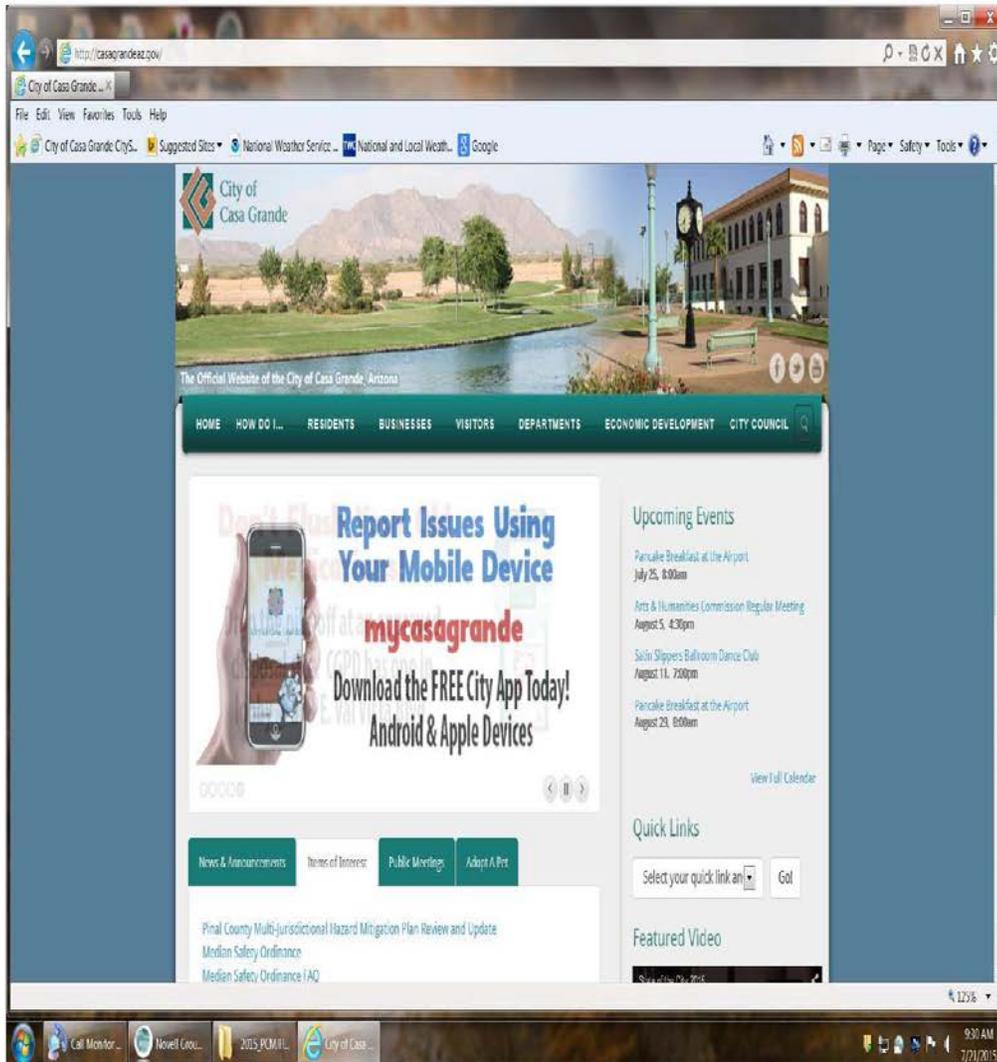
Public input on the mitigation planning process is important and residents are encouraged to educate themselves about the existing plan and offer

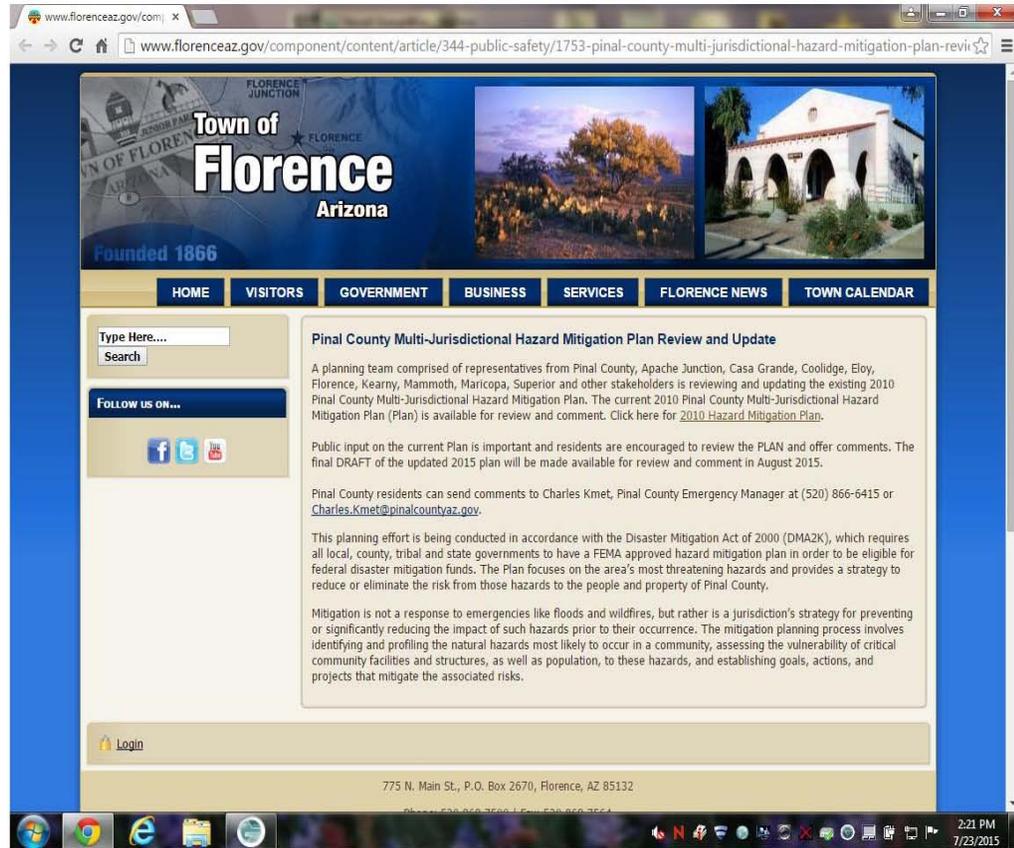
comments on the update.

To review the plan and comment, please visit the Pinal County Department of Emergency Management Mitigation website:  
[www.pinalcountyyaz.gov/emergencymanagement/pages/mitigation.aspx](http://www.pinalcountyyaz.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 C: PREVIOUS MITIGATION STRATEGY STATUS**

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

2016

<b>Assessment of Previous Plan's Actions &amp; Project for Pinal County</b>							
<b>Description</b>	<b>Hazard(s) Mitigated</b>	<b>Estimated Cost</b>	<b>Project Primary or Lead</b>	<b>Funding Source(s)</b>	<b>Status No Progress In Progress Complete</b>	<b>Disposition Keep Delete Keep, revise</b>	<b>Explanation or brief description of work so far or reason for 'no progress'</b>
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 InSAR coverage

Assessment of Previous Plan's Actions & Project for Pinal County							
Description	Hazard(s) Mitigated	Estimated Cost	Project Primary or Lead	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'
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
Emergency Operations Center Assessment	Flood	\$30,000+ Staff Time Dec 2011	Pinal Co OEM	General Fund	Complete	Delete	Will replace with new project

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

2016

<b>Assessment of Previous Plan's Actions &amp; Project for Pinal County</b>							
<b>Description</b>	<b>Hazard(s) Mitigated</b>	<b>Estimated Cost</b>	<b>Project Primary or Lead</b>	<b>Funding Source(s)</b>	<b>Status No Progress In Progress Complete</b>	<b>Disposition Keep Delete Keep, revise</b>	<b>Explanation or brief description of work so far or reason for 'no progress'</b>
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

<b>Previous Plan's Actions &amp; Projects Assessment for Apache Junction</b>							
<b>Description</b>	<b>Hazard(s) Mitigated</b>	<b>Estimated Cost &amp; Completion Date</b>	<b>Project Primary Lead</b>	<b>Potential Funding Source(s)</b>	<b>Status No Progress In Progress Complete</b>	<b>Disposition Keep Delete Keep, revise</b>	<b>Explanation or brief description of work so far or reason for 'no progress'</b>
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 2010	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) 2010	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 <sup>th</sup> Ave to ADOT detention basin.	Flood	\$2.3M 2017	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.

<b>Previous Plan's Actions &amp; Projects Assessment for Apache Junction</b>							
<b>Description</b>	<b>Hazard(s) Mitigated</b>	<b>Estimated Cost &amp; Completion Date</b>	<b>Project Primary Lead</b>	<b>Potential Funding Source(s)</b>	<b>Status No Progress In Progress Complete</b>	<b>Disposition Keep Delete Keep, revise</b>	<b>Explanation or brief description of work so far or reason for 'no progress'</b>
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 <sup>th</sup> Ave. to Palm Wash.	Flood	\$2.0M 2017	AJPW	STP/PCFCD	In Progress	Keep	In final design scheduled for completion in late 2015.
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 2018	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.

Assessment of Previous Plan's Actions & Project for Casa Grande							
Description	Hazard(s) Mitigated	Estimated Cost & Completion Date	Project Primary or Lead	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 & Project for Casa Grande							
Description	Hazard(s) Mitigated	Estimated Cost & Completion Date	Project Primary or Lead	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 & Project for Coolidge							
Description	Hazard(s) Mitigated	Estimated Cost & Completion Date	Primary Agency	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

<b>Assessment of Previous Plan's Actions &amp; Project for Coolidge</b>							
<b>Description</b>	<b>Hazard(s) Mitigated</b>	<b>Estimated Cost &amp; Completion Date</b>	<b>Primary Agency</b>	<b>Funding Source(s)</b>	<b>Status No Progress In Progress Complete</b>	<b>Disposition Keep Delete Keep, revise</b>	<b>Explanation or brief description of work so far or reason for 'no progress'</b>
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 & Project for Florence							
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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	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.

Assessment of Previous Plan's Actions & Project for Florence							
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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 & Project 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	Completed	Delete	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

Assessment of Previous Plan's Actions & Project 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 & Project 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

Assessment of Previous Plan's Actions & Project for Kearny							
Description	Hazard(s) Mitigated	Estimated Cost & Completion	Primary or Lead Agency	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 & Project for Kearny							
Description	Hazard(s) Mitigated	Estimated Cost & Completion	Primary or Lead Agency	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 & Project for Superior							
Description	Hazard(s) Mitigated	Estimated Cost	Primary Agency	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

Assessment of Previous Plan's Actions & Project for Superior							
Description	Hazard(s) Mitigated	Estimated Cost	Primary Agency	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'
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