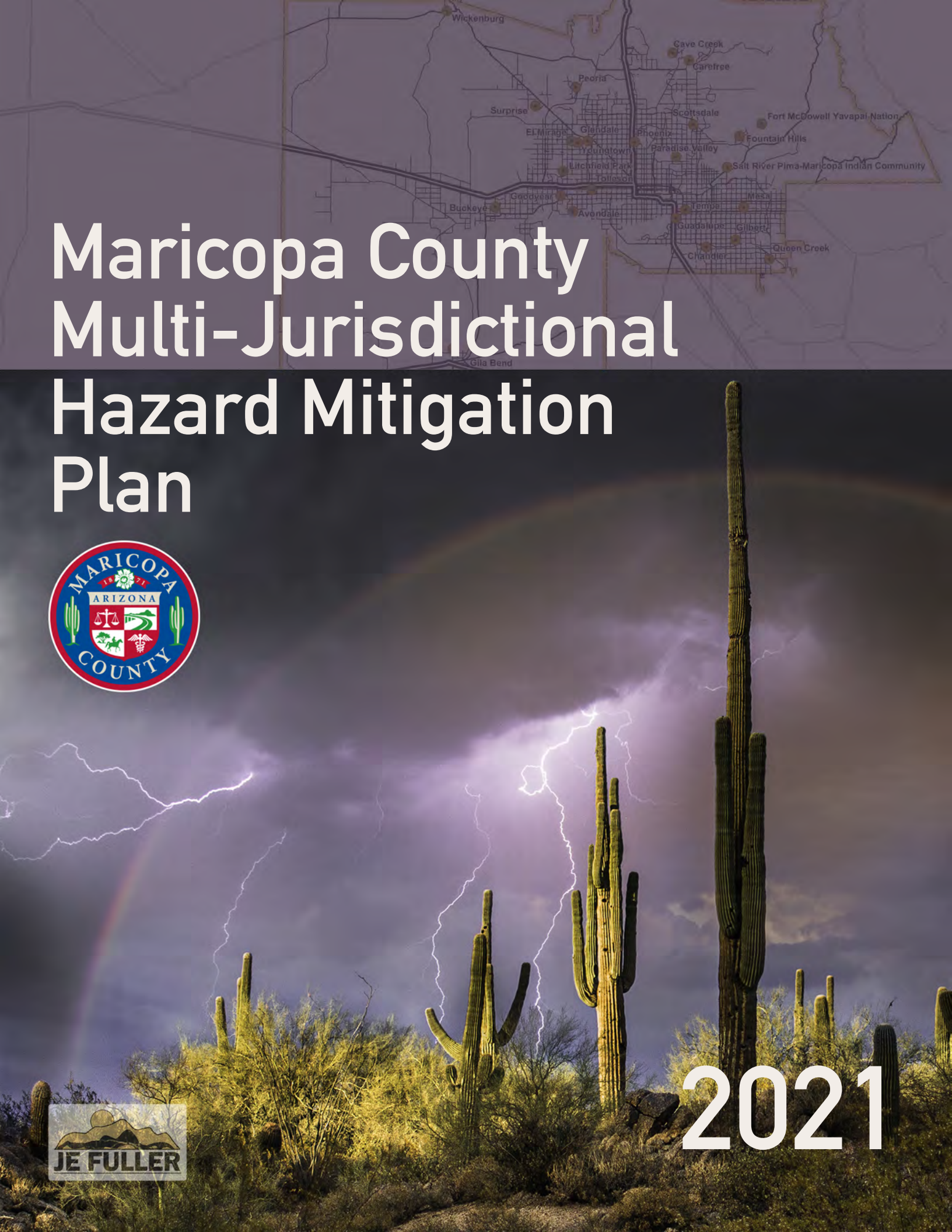

Maricopa County Multi-Jurisdictional Hazard Mitigation Plan

2021

EXECUTIVE SUMMARY

Across the United States, natural and human-caused disasters have led to increasing levels of death, injury, property damage, and interruption of business and government services. The toll on families and individuals can be immense and damaged businesses cannot contribute to the economy. The time, money and effort to respond to and recover from these emergencies or disasters divert public resources and attention from other important programs and problems. With 54 federal or state declarations and a total of 524 other recorded events, the 28 jurisdictions contained within Maricopa County, Arizona and participating in this planning effort recognize the consequences of disasters and the need to reduce the impacts of natural and human-caused hazards. The County and jurisdictions also know that with careful selection, mitigation actions in the form of projects and programs can become long-term, cost effective means for reducing the impact of natural and human-caused hazards.

The elected and appointed officials of Maricopa County and the 27 other participating jurisdictions demonstrated their commitment to hazard mitigation in 2014-2015 by preparing the second update of the Maricopa County Multi-Jurisdictional Hazard Mitigation Plan (2015 Plan). The 2015 Plan covered all 28 participating jurisdictions and was approved by FEMA on December 22, 2015. To remain compliant with the congressional regulations, the county and jurisdictions must perform a full plan update and obtain state and FEMA approval.

In response, the Maricopa County Department of Emergency Management (MCDEM) secured a federal planning grant and hired JE Fuller/ Hydrology and Geomorphology, Inc. to assist the County and participating jurisdictions with the update process. MCDEM reconvened a multi-jurisdictional planning team (MJPT) comprised of veteran and first-time representatives from each participating jurisdiction, and other various county, state, and federal departments and organizations such as the National Weather Service and Arizona Public Service. The MJPT met approximately every six-weeks beginning in July 2020 and finishing December 2020. Subsequent “catch up” meetings were conducted through February 2021 to assist several communities with finalizing assignments and the first draft of the updated 2021 Plan was issued in March 2021. The meetings and MJPT worked in a collaborative effort to review, evaluate, and update the 2015 Plan keeping the single, consolidated multi-jurisdictional plan format and approach. Tribal Plan elements for each of the two participating Indian Tribes, were also updated to address Tribal specific planning requirements. The 2021 Plan will continue to guide the County and participating jurisdictions toward greater disaster resistance in full harmony with the character and needs of the community and region.

The Plan has been prepared in compliance with Section 322 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act (Stafford Act or the Act), 42 U.S. C. 5165, enacted under Sec. 104 the Disaster Mitigation Act of 2000, (DMA 2000) Public Law 106-390 of October 30, 2000, as implemented at 44 CFR §201.6 and §201.7 dated October, 2007. The Plan includes risk assessments for multiple natural hazards, a public outreach effort at two phases of the planning process, and development of a mitigation strategy that incorporates measures intended to eliminate or reduce the effects of future disasters throughout the County. The development of the various 2021 Plan elements was accomplished through a joint and cooperative venture by members of the Maricopa County MJPT, with MCDEM serving as the lead agency and primary point of contact for the planning effort.

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SECTION 1: JURISDICTIONAL ADOPTION AND FEMA APPROVAL

Requirement §201.6(c)(5): *[The local hazard mitigation plan shall include…] Documentation that the plan has been formally adopted by the governing body of the jurisdiction requesting approval of the plan (e.g., City Council, County Commissioner, Tribal Council). For multi-jurisdictional plans, each jurisdiction requesting approval of the plan must document that it has been formally adopted.*

Requirement §201.6(d)(3): *A local jurisdiction must review and revise its plan to reflect changes in development, progress in local mitigation efforts, and changes in priorities, and resubmit it for approval within five (5) years in order to continue to be eligible for mitigation project grant funding.*

Requirement §201.7(a)(1): *Indian tribal governments applying to FEMA as a grantee must have an approved Tribal Mitigation Plan meeting the requirements of this section as a condition of receiving non-emergency Stafford Act assistance and FEMA mitigation grants.*

Requirement §201.7(a)(4): *Multi-jurisdictional plans (e.g. county-wide or watershed plans) may be accepted, as appropriate, as long as the Indian tribal government has participated in the process and has officially adopted the plan. Indian tribal governments must address all the elements identified in this section to ensure eligibility as a grantee or as a sub-grantee.*

1.1 DMA 2000 Requirements

1.1.1 General Requirements

This 2021 update of the Maricopa County Multi-Jurisdictional Hazard Mitigation Plan (Plan) has been prepared in compliance with Section 322 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act of 1988 (Stafford Act), 42 U.S.C. 5165, as amended by Section 104 of the Disaster Mitigation Act of 2000 (DMA 2000) Public Law 106-390 enacted October 30, 2000. The regulations governing the mitigation planning requirements for local mitigation plans are published under the Code of Federal Regulations (CFR) Title 44, Section 201.6 (44 CFR §201.6). Minimum requirements for tribal mitigation plans are published under CFR Title 44, Section 201.7 (44 CFR §201.7). Additionally, a DMA 2000 compliant plan that addresses flooding will also meet the minimum planning requirements for the Flood Mitigation Assistance program as provided for under 44 CFR §78.

DMA 2000 provides requirements for States, Tribes, and local governments to undertake a risk-based approach to reducing risks to natural hazards through mitigation planning[1]. The local mitigation plan is the representation of the jurisdiction's commitment to reduce risks from natural hazards, serving as a guide for decision makers as they commit resources to reducing the effects of natural hazards. Local plans will also serve as the basis for the State to provide technical assistance and to prioritize project funding.

Under 44 CFR §201.6 and §201.7, local and tribal governments must have a Federal Emergency Management Agency (FEMA)-approved local mitigation plan in order to apply for and/or receive project grants as a sub-grantee under the following Hazard Mitigation Assistance (HMA) programs:

- Hazard Mitigation Grant Program (HMGP)

[1] FEMA, 2008, *Local Multi-Hazard Mitigation Planning Guidance*

- Building Resilient Infrastructure and Communities (BRIC) [formerly Pre-Disaster Mitigation (PDM)]
- Flood Mitigation Assistance (FMA)

In addition, Indian Tribal governments applying to FEMA as a grantee must have an approved tribal mitigation plan meeting the requirements of 44 CFR §201.7 as a condition of receiving non-emergency Stafford Act assistance through Public Assistance Categories C through G and the above mentioned HMA program funds.

1.1.2 Update Requirements

DMA 2000 requires that existing plans be updated every five years, with each plan cycle requiring a complete review, revision, and re-approval of the plan at both the state and FEMA level. Maricopa County, the incorporated communities of Avondale, Buckeye, Carefree, Cave Creek, Chandler, El Mirage, Fountain Hills, Gila Bend, Gilbert, Glendale, Goodyear, Guadalupe, Litchfield Park, Mesa, Paradise Valley, Peoria, Phoenix, Queen Creek, Scottsdale, Surprise, Tempe, Tolleson, Wickenburg, and Youngtown, the Fort McDowell Yavapai Nation and Salt River Pima-Maricopa Indian Community, and the Salt River Project are participating jurisdictions in the FEMA approved 2015 Maricopa County Multi-Jurisdictional Hazard Mitigation Plan (2015 Plan). The current Plan is the result of an update process performed by the participating jurisdictions to update the 2015 Plan. The Plan continues to include all tribal required planning elements.

1.2 Official Record of Adoption

Promulgation of the Plan is accomplished through formal adoption of official resolutions by the governing body for each participating jurisdiction in accordance with the authority and powers granted to those jurisdictions by the State of Arizona and/or the federal government. Participating jurisdictions in the Plan include:

Counties	Tribes	Cities	Towns
Maricopa	Fort McDowell Yavapai Nation Salt River Pima-Maricopa Indian Community	Avondale Buckeye Chandler El Mirage Glendale Goodyear Litchfield Park Mesa Peoria Phoenix Scottsdale Surprise Tempe Tolleson	Carefree Cave Creek Fountain Hills Gila Bend Gilbert Guadalupe Queen Creek Wickenburg Youngtown

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It is noted that the Town of Paradise Valley and Salt River Project will not be included in the Plan for this update. For those participating, each jurisdiction will keep a copy of their official resolution of adoption located in Appendix A of their copy of the Plan.

1.3 Tribal Assurances

The Fort McDowell Yavapai Nation (FMYN) and Salt River Pima-Maricopa Indian Community (SRPMIC) will continue to comply with applicable Federal statutes and grant regulations in effect for those periods when one or both tribes receive grant funding per the DMA 2000 requirement §201.7(c)(6). Both FMYN and SRPMIC will amend its Plan whenever necessary to reflect changes in tribal or Federal laws and statutes as required in 44CFR 13.11(d).

1.4 FEMA Approval Letter

The Plan was submitted to the Arizona Division of Emergency Management (ADEM), the authorized state agency, and FEMA, for review and approval. FEMA's approval letter is provided on the following page.

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[Insert FEMA Approval Letter Here]

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SECTION 2: INTRODUCTION

2.1 Plan History

In 2003 and 2004, Maricopa County, two Indian Tribes, and all incorporated cities and towns in Maricopa County, participated in a multi-jurisdictional mitigation planning effort that resulted in the development of a multi-jurisdictional hazard mitigation plan with separate stand-alone annexes that covered each participating jurisdiction. The following is a list of those annexes:

- *Maricopa County Unincorporated Area Hazard Mitigation Plan*
- *City of Avondale Hazard Mitigation Plan*
- *Town of Buckeye Hazard Mitigation Plan*
- *Town of Carefree Hazard Mitigation Plan*
- *Town of Cave Creek Hazard Mitigation Plan*
- *City of Chandler Hazard Mitigation Plan*
- *City of El Mirage Hazard Mitigation Plan*
- *Fort McDowell Yavapai Nation Hazard Mitigation Plan*
- *Town of Fountain Hills Hazard Mitigation Plan*
- *Town of Gila Bend Hazard Mitigation Plan*
- *Town of Gilbert Hazard Mitigation Plan*
- *City of Glendale Hazard Mitigation Plan*
- *City of Goodyear Hazard Mitigation Plan*
- *Town of Guadalupe Hazard Mitigation Plan*
- *City of Litchfield Park Hazard Mitigation Plan*
- *City of Mesa Hazard Mitigation Plan*
- *Town of Paradise Valley Hazard Mitigation Plan*
- *City of Peoria Hazard Mitigation Plan*
- *City of Phoenix Hazard Mitigation Plan*
- *Town of Queen Creek Hazard Mitigation Plan*
- *Salt River Pima-Maricopa Indian Community Hazard Mitigation Plan*
- *City of Scottsdale Hazard Mitigation Plan*
- *City of Surprise Hazard Mitigation Plan*
- *City of Tempe Hazard Mitigation Plan*
- *City of Tolleson Hazard Mitigation Plan*
- *Town of Wickenburg Hazard Mitigation Plan*
- *Town of Youngtown Hazard Mitigation Plan*

Collectively and individually, these plans will be referred to herein as the 2004 Plan(s). The 2004 Plans received official FEMA approval on November 29, 2004. Additional planning was performed with the Fort McDowell Yavapai Nation to upgrade their 2004 Plan to a "state level" plan, which was approved by FEMA and retains the November 29, 2004 approval date.

In October of 2008, Maricopa County Department of Emergency Management (MCDEM) initiated a planning process with local and tribal jurisdictions to consolidate and update the 2004 Plans into a true multi-jurisdictional plan with annexes for the tribal elements

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corresponding to the Fort McDowell Yavapai Nation and the Salt River Pima-Maricopa Indian Community. The resulting 2009 *Maricopa County Multi-Jurisdictional Hazard Mitigation Plan*, complete with tribal annexes and herein referred to as the 2009 Plan, was submitted to FEMA and received official approval on April 30, 2010.

In early 2014, MCDEM worked to successfully secure grant funding to update the 2009 Plan. The planning process was officially kicked off in August 2014 and culminated with receipt of official FEMA approval on December 22, 2015. The 2015 Plan update merged the information provided in the 2009 Tribal Annexes into one complete plan.

In early 2020, MCDEM was again able to secure FEMA grant funding to perform the 5-year update of the 2015 Plan and retained professional consulting and planning services to guide the update planning process and 2021 Plan development. That effort was kicked off in July 2020 and is detailed further below. It is noted that the Salt River Project and the Town of Paradise Valley are no longer participants in the updated Plan.

2.2 Plan Purpose and Authority

The purpose of the Plan is to identify natural hazards that impact the various jurisdictions located within Maricopa County, assess the vulnerability and risk posed by those hazards to community-wide human and structural assets, develop strategies for mitigation of those identified hazards, present future maintenance procedures for the plan, and document the planning process. The Plan is prepared in compliance with DMA 2000 requirements and represents a multi-jurisdictional update of the 2015 Plan.

Maricopa County and all the cities and towns are political subdivisions of the State of Arizona and are organized under Title 9 (cities/towns) and Title 11 of the Arizona Revised Statutes (ARS). The Fort McDowell Yavapai Nation is a federally recognized sovereign nation that was created by Executive Order on September 15, 1903 and is governed by a Tribal Council that is elected by tribal members pursuant to the Tribe's Constitution. The Salt River Pima-Maricopa Indian Community was established by Executive Order on June 14, 1879 and is governed by a community council comprised of a president, vice president and tribal council. As such, each of these entities are empowered to formally plan and adopt the Plan on behalf of their respective jurisdictions.

Funding for the development of the Plan was provided through a PDM planning grant obtained by MCDEM through the State of Arizona from FEMA, with MCDEM providing the matching funds. JE Fuller/ Hydrology and Geomorphology, Inc. (JE Fuller) was retained by MCDEM to provide consulting services in guiding the update process and developing technical risk assessment data.

2.3 General Plan Description

The Plan is generally arranged and formatted to be consistent with the 2018 State of Arizona Multi-Hazard Mitigation Plan (State Plan) and is comprised of the following major sections:

Planning Process – this section summarizes the planning process used to update the Plan, describes the assembly of the planning team and meetings conducted, and summarizes the public involvement efforts.

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Community Description – this section provides an overall description of the participating jurisdictions and the County as a whole.

Risk Assessment – this section summarizes the identification and profiling of natural hazards that impact the County and the vulnerability assessment for each hazard that considers exposure/loss estimations and development trend analyses.

Mitigation Strategy – this section presents a capability assessment for each participating jurisdiction and summarizes the Plan mitigation goals, objectives, actions/projects, and strategy for implementation of those actions/projects.

Plan Maintenance Strategy – this section outlines the proposed strategy for evaluating and monitoring the Plan, updating the Plan in the next 5 years, incorporating plan elements into existing planning mechanisms, and continued public involvement.

Plan Tools – this section includes a list of Plan acronyms and a glossary of definitions.

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SECTION 3: PLANNING PROCESS

> ***§201.6 (b):*** *Planning process. An open public involvement process is essential to the development of an effective plan. In order to develop a more comprehensive approach to reducing the effects of natural disasters, the planning process shall include:*
> *(1) An opportunity for the public to comment on the plan during the drafting stage and prior to plan approval.*
> *(2) An opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, and agencies that have the authority to regulate development, as well as businesses, academia, and other private and non-profit interests to be involved in the planning process; and*
> *(3) Review and incorporation, if appropriate, of existing plans, studies, reports, and technical information.*
>
> ***§201.6(c)(1)****: [The plan shall include…] (1) Documentation of the planning process used to develop the plan, including how it was prepared, who was involved in the process, and how the public was involved.*

This section includes the delineation of various DMA 2000 regulatory requirements, as well as the identification of key stakeholders and planning team members within Maricopa County. In addition, the necessary public involvement meetings and actions that were applied to this process are also detailed.

3.1 Update Process Description

MCDEM applied for and received a PDM planning grant to fund a multi-jurisdictional effort to review and update the 2015 Plan. MCDEM solicited letters of support from all 2015 Plan towns, cities, and Tribes to aid in the preparation of the PDM planning grant application. Once the grant was received, the County then selected JE Fuller to work with the participating jurisdictions and guide the Plan update process. An initial project kick-off meeting between JEF and MCDEM was convened May 29, 2020 to line up the meeting dates and agendas for the coming planning efforts, discuss the plan format and potential changes to the Plan outline and content to address recent FEMA guidelines, request initial data, and other administrative tasks. Four planning team meetings, one tribal only planning meeting, and numerous other individual community outreach meetings were conducted over the period of July 2020 to February 2021, along with all the work required to collect, process, document updated data, and make changes to the Plan. Details regarding updated key contact information and promulgation authorities, the planning team selection, participation, and activities, and public involvement are discussed in the following sections.

3.2 Previous Planning Process Assessment

The first task of preparation for the Plan update, was to evaluate the process used to develop the 2015 Plan. This was initially discussed by MCDEM and JEF in the May 29, 2020 kick-off meeting with the goal of establishing the framework for the planning effort ahead. The 2015 Plan process employed a multi-jurisdictional approach with representation from each participating jurisdiction in larger multi-jurisdictional planning team meetings wherein concepts would be presented and discussed, and work assignments would be made for completion by each jurisdiction. Supplemental follow-up sessions with one or more jurisdictions by both MCDEM and JEF were also employed on an as-needed basis to assist jurisdictions with completing assignments on schedule. MCDEM and JEF agreed to continue with the same approach due to the success of the 2014-2015 planning effort in getting to an approved plan both in time and budget.

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The Plan update process was presented and discussed at the first multi-jurisdictional planning team meeting for comment and concurrence of the Plan jurisdictions. Most of the planning team members were new to the hazard mitigation planning process altogether, so there was very little institutional knowledge of the prior process. Those that were returning team members felt the process worked well and were in favor of using it again.

3.3 Planning Team

3.3.1 General

Continuing the format used for the 2015 Plan, two levels of planning teams were organized for this Plan update. The first was a Multi-Jurisdictional Planning Team (MJPT) that was comprised of one or more representatives from each participating jurisdiction, and predominantly the primary points of contact (PPOC). The second level planning team was the Local Planning Team (LPT).

The role of the MJPT was to work with the planning consultant to perform the coordination, research, and planning element activities required to update the 2015 Plan. Attendance by each participating jurisdiction was required for every MJPT meeting as the meetings were structured to progress through the plan update process. Steps and procedures for updating the 2015 Plan were presented and discussed at each MJPT meeting, and worksheet assignments were normally given. Each meeting built on information discussed and assignments made at the previous meeting. The MJPT representatives also had the responsibility of being the liaison to the LPT, and were tasked with:

- Conveying information and assignments received at the MJPT meetings to the LPT
- Ensuring that all requested worksheets were completed fully and returned on a timely basis
- Arranging for review and official adoption of the Plan

The function and role of the LPT was to:

- Provide support and data
- Assist the MJPT representative in completing each assignment
- Make planning decisions regarding plan update components
- Review the Plan draft documents

3.3.2 Primary Point of Contact

Table 3-1 summarizes the PPOC identified for each participating local jurisdiction and tribe.

3.3.3 Planning Team Assembly

At the beginning of the update planning process, MCDEM organized and identified members for the MJPT by initiating contact with the PPOCs identified in the 2015 Plan, their equivalent, or the emergency manager, for all 24 incorporated towns, cities, the two tribes and the county. It is noted that Salt River Project was invited to

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Table 3-1: List of jurisdictional primary points of contact			
Jurisdiction	Name	Department / Position	Address
Avondale	Larry Rooney	Fire & Medical Department – Assistant Fire Chief & Emergency Manager	1825 N. 107th Ave. Avondale, AZ 85323
Buckeye	Travis Rand	Fire Department – Deputy Chief	21699 W. Yuma Rd., Ste. 101 Buckeye, AZ 85326
Carefree	Dennis Randolph	Code Enforcement Officer	8 Sundial Circle P.O. Box 740 Carefree, AZ 85377
Cave Creek	Adam Stein	Marshal's Office – Town Marshal / Emergency Services Coordinator	37622 N. Cave Creek Rd. Cave Creek, AZ 85331
Chandler	Suzy Vargo	Fire Department – Battalion Chief	151 E. Boston St. Chandler, AZ 85225
El Mirage	Joe Fusco	Fire Department – Fire Chief	13601 N. El Mirage Rd. El Mirage, AZ 85335
Fountain Hills	Mike Winters	Fire Department – Assistant Chief/Fire Marshal	16426 E. Palisades Blvd. Fountain Hills, AZ 85268
Fort McDowell Yavapai Nation	Mark Barnhart	Fire Department – Administrative Captain	10755 N. Fort McDowell Rd., Ste. 4 Fort McDowell, AZ 85264
Gila Bend	Kathy Valenzuela	Administration – Town Manager	644 W. Pima St. P.O. Box A Gila Bend, AZ 85337
Gilbert	Josh Friedman	Fire and Rescue/Police Departments – Fire Investigator, Terrorism Liaison Officer	85 E. Civic Center Dr. Gilbert, AZ 85296
Glendale	Nicole Munson	Fire Department – Emergency Management Coordinator	11550 W. Glendale Ave. Glendale, AZ 85301
Goodyear	Julie Syrmopoulos	Fire Department – Emergency Manager	14455 W. Van Buren St., Ste. E-102 Goodyear, AZ 85338
Guadalupe	Wayne Clement	Fire Department – Fire Chief / Emergency Manager	8413 S. Avenida del Yaqui Guadalupe, AZ 85283
Litchfield Park	Matthew Williams	Community Services & Recreation Department - Assistant City Manager/Director	214 W. Wigwam Blvd. Litchfield Park, AZ 85340
Maricopa County	Rudy Perez	Department of Emergency Management – Emergency Services Planner	5636 E. McDowell Rd. Phoenix, AZ 85008

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Table 3-1: List of jurisdictional primary points of contact			
Jurisdiction	Name	Department / Position	Address
Mesa	Therese Derivan	Fire/Medical Department – Emergency Manager	13 W. 1st Street Mesa, AZ 85201
Peoria	Glenn Jones	Emergency Management – Emergency Management Coordinator	8401 W. Monroe Street Peoria, AZ 85345
Phoenix	Kim Gathers	Office of Homeland Security & Emergency Management – Interim Deputy Director	200 W. Washington Street Phoenix, AZ 85003
Queen Creek	Joe LaFortune	Fire and Medical Department – Emergency Management Coordinator	22358 S. Ellsworth Rd. Queen Creek, AZ 85142
Salt River Pima-Maricopa Indian Community	Terry Nelson	Fire Department-Office of Emergency Management – Emergency Management Coordinator	10005 E. Osborn Rd. Scottsdale, AZ 85256
Scottsdale	Troy Lutrick	City Manager's Office -Emergency Management Division – Emergency Management Coordinator	8401 E. Indian School Rd. Scottsdale, AZ 85251
Surprise	Tracy Montgomery	City Manager's Office – Emergency Manager	16000 W Civic Center Plaza Surprise AZ 85374
Tempe	Michelle Seitz	Fire Medical Rescue Departments – Emergency Manager	P.O. Box 5002 Tempe, AZ 85280 or 1400 E. Apache Blvd. Tempe, AZ 85281
Tolleson	George Good	Fire Department – Fire Chief	203 N. 92nd Ave. Tolleson, AZ 85353
Wickenburg	Amy Sloane	Police Department – Support Services Lieutenant	155 N. Tegner, Ste. C Wickenburg, AZ 85390
Youngtown	Gregory Arrington	Community Development Department – Manager	12030 Clubhouse Sq. Youngtown, AZ 85363

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participate as a jurisdiction for this update but chose not to. In June 2020, MCDEM distributed a kick-off email with a date for the first MJPT meeting to PPOCs announcing the official start of the planning effort.

3.3.4 Planning Team Activities

The MJPT met for the first time on July 16, 2020 to begin the plan update process. Three more MJPT meetings and one extra tribal-only meeting were convened on about a monthly basis to step through the plan review and update process. Due to the COVID 19 pandemic, all meetings were conducted virtually using the Zoom platform, which encouraged greater attendance by more participants than just the PPOCs. At the first meeting, each MJPT member was directed to a digital copy of the 2015 Plan and was requested to have it available for review and reference at every meeting. A full agenda for all the planning team meetings was provided and reviewed so all participants could prepare in advance of each meeting. Following each MJPT meeting, the PPOC for each jurisdiction would coordinate with their LPT to work through the assigned worksheets as needed. There were also several other outreach meetings conducted with individual communities by MCDEM staff and JE Fuller to assist in the development of the plan elements. Table 3-2 provides a list of all MJPT meeting participants and the dates of participation. Individuals in bold text are the identified PPOC for each community. The light-green shaded names are returning individuals from the 2015 Plan team. Table 3-3 summarizes the MJPT and tribal meetings convened, along with a brief list of the agenda items discussed. Detailed meeting notes for the MJPT meetings are provided in Appendix B. There are no details for the LPT meetings.

Table 3-2: Summary of multi-jurisdictional planning team participants

Name	Jurisdiction/Agency/Organization	Planning Team Meeting Nos. and Dates			
		1 07/16/20	2 08/20/20	3 10/08/20	4 11/19/20
Tom Abbott	City of Surprise	x	x	x	x
Mark Ahlstrom	City of Mesa				x
Hector Andrade	Maricopa County		x	x	x
John Bailey	Maricopa County	x			
Mark Barnhart	**Fort McDowell Yavapai Nation**	x	x	x	x
Michael Boule	City of Surprise		x	x	
Kevin Burke	City of Peoria		x	x	
Mark Christian	Coconino County		x	x	
Tony Christofferson	Town of Wickenburg				x
Wayne Clement	**Town of Guadalupe**	x	x	x	x
Lisa Collins	City of Glendale		x	x	
Mike Conlin	City of Glendale	x	x	x	
Kelly Corsette	City of Scottsdale		x	x	
C. Ashley Couch	City of Scottsdale		x	x	

Table 3-2: Summary of multi-jurisdictional planning team participants

Name	Jurisdiction/Agency/Organization	Planning Team Meeting Nos. and Dates			
		1 07/16/20	2 08/20/20	3 10/08/20	4 11/19/20
Marty Crossland	City of Goodyear	x			
Travis Cutright	City of Mesa	x	x	x	x
Mike Davis	City of Mesa	x			
James Delaittre	City of Glendale				x
Therese Derivan	City of Mesa	x	x	x	x
Darrell Duty	City of Tempe	x			
Alan English	City of Peoria			x	
Mary Evans	JE Fuller	x		x	x
Josh Friedman	Town of Gilbert	x	x	x	x
Joe Fusco	**City of El Mirage**	x		x	
Melanie Gall	Arizona State University	x	x	x	x
Kim Gathers	**City of Phoenix**		x	x	x
Brian Gerber	Arizona State University	x	x	x	x
Sheri Gibbons	Arizona State University	x			
Brett Gilliland	City of Buckeye			x	x
George Good	**City of Tolleson**	x			
Bob Goodhue	City of Peoria	x	x	x	x
Mary Goodman	Town of Gilbert	x			
Ken Goucher	City of Scottsdale		x		
Randy Grant	City of Scottsdale		x		
Brad Hartig	City of Scottsdale		x		
Elliot Harwood	Maricopa County			x	x
John Hatler	Maricopa County	x			
David Hondula	Arizona State University				x
Rhonda Humbles	City of Peoria		x	x	
Laura Hyneman	City of Mesa			x	x
Glenn Jones	**City of Peoria**	x	x	x	x
Harry Jones	City of Mesa		x	x	x
Braden Kay	City of Tempe			x	x
Michael Kennedy	City of Mesa	x			
Rob Kidder	City of Mesa		x	x	x
John Kraetz	**Town of Carefree**	x	x	x	x
Joe LaFortune	**Town of Queen Creek**	x	x	x	x
Lee Lambert	City of Surprise		x	x	
Sara Latin	Maricopa County	x			
Bob Lee	**Town of Paradise Valley**	x	x	x	x
Daylynn Little	City of Scottsdale			x	x

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Table 3-2: Summary of multi-jurisdictional planning team participants

Name	Jurisdiction/Agency/Organization	Planning Team Meeting Nos. and Dates			
		1 07/16/20	2 08/20/20	3 10/08/20	4 11/19/20
Grace Logan	Arizona State University	x			
David Luhan	City of Goodyear				x
Troy Lutrick	**City of Scottsdale**	x	x	x	
Richard Manzo	City of Mesa			x	x
Charlie McDermott	Arizona State University				x
Dee McKenzie	City of Mesa			x	
Jeff McMenemy	City of Glendale	x			
Art Miller	City of Peoria		x		
Tracy Montgomery	**City of Surprise**	x	x	x	x
Nicole Munson	**City of Glendale**	x	x	x	x
Tim Murphy	Flood Control District of Maricopa County	x	x	x	x
Scott Myers	Maricopa County	x			
Terry Nelson	**Salt River-Pima Maricopa Indian Community**	x	x	x	x
Dan Nissen	City of Peoria	x	x	x	
Scott Ogden	JE Fuller	x	x	x	x
Brent Olson	City of Phoenix		x		
Patrick O'Toole	Salt River Project	x			
John Padilla	APS	x		x	x
Jared Palacios	City of Avondale		x	x	x
Rich Peel	Maricopa County		x		
Rudy Perez	**Maricopa County**	x	x	x	x
Cape Powers	City of Peoria		x		
Arif Rahman	City of Mesa			x	x
Travis Rand	**City of Buckeye**	x		x	x
Anne Reichman	Arizona State University	x	x		
Jaret Rogers	National Weather Service			x	
Larry Rooney	**City of Avondale**	x	x	x	x
Fred Rustam	City of Mesa			x	
Craig Sears	City of Mesa			x	
Michelle Seitz	**City of Tempe**	x	x	x	x
Nancy Selover	Arizona State Climate Office		x		
Megan Sheldon	City of Glendale	x			
Antonio Shin	City of Phoenix		x	x	x
Amy Sloane	**Town of Wickenburg**			x	
Jana Smith	Maricopa County		x	x	x
Kevin Spirlong	City of Surprise				x
Warren Sprecher	**City of Mesa**	x	x		x

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Table 3-2: Summary of multi-jurisdictional planning team participants

Name	Jurisdiction/Agency/Organization	Planning Team Meeting Nos. and Dates			
		1 07/16/20	2 08/20/20	3 10/08/20	4 11/19/20
Adam Stein	**Town of Cave Creek**	**x**	**x**		**x**
Daren Sweet	Arizona Dept of Emergency & Military Affairs			**x**	
Julie Syrmopoulos	**City of Goodyear**	**x**	**x**	**x**	**x**
Kristin Tytler	City of Surprise		**x**	**x**	**x**
Kathy Valenzuela	**Town of Gila Bend**		**x**	**x**	**x**
Suzy Vargo	**City of Chandler**	**x**	**x**	**x**	**x**
Pete Weaver	**Town of Gilbert**	**x**	**x**	**x**	**x**
Nicole Wiley	City of Surprise		**x**	**x**	**x**
Matthew Williams	**City of Litchfield Park**		**x**	**x**	**x**
Mike Winters	**Town of Fountain Hills**	**x**	**x**	**x**	**x**

Table 3-3: Summary of planning meetings convened as part of the plan update process

Meeting Type, Date, and Location	Meeting Agenda
Pre-Planning Kick-Off Meeting May 29, 2020 Web conference via Zoom	• Discuss schedule of MJPT meetings • Discuss Plan outline and changes required • Strategize the MJPT list • Discuss roles of MCDEM and JEF in the overall planning process

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Table 3-3: Summary of planning meetings convened as part of the plan update process	
Meeting Type, Date, and Location	**Meeting Agenda**
MJPT Meeting No. 1 July 16, 2020 Web conference via Zoom	• **INITIAL INTRODUCTIONS** • **DMA2K OVERVIEW AND UPDATE REQUIREMENTS** o General DMA2K Overview o Update Requirements • **DISCUSSION OF SCOPE AND SCHEDULE** • **PLANNING PROCESS** o Discussion of Last Planning Process o Planning Team Roles and Responsibilities ***** 15-Minute Break ***** • **PUBLIC INVOLVEMENT** o Discuss Past Strategy o Formulate New Strategy o Additional Agency / Organization Invitations • **RISK ASSESSMENT** o Hazard List Identification o Existing Plans, Studies, Reports and Technical Information • **EMAP DISCUSSION** o Purpose o Supplemental Requirements to Regular DMA2000 Plan o Current EMAP Annex for Unincorporated Maricopa County o Go or No-Go Discussion
MJPT Meeting No. 2 August 20, 2020 Web conference via Zoom	• **GENERAL –** Community Description Review • **PLAN MAINTENANCE STRATEGY** o Review/Discuss Maintenance and Monitoring Over Last Plan Cycle o Develop New Monitoring Schedule o Develop Plan Update Schedule • **RISK ASSESSMENT** o Critical Facility Review/Update (worksheet) o Review hazard profile mapping and data for each hazard o CPRI Update (worksheet) o Discuss and Profile Development Trends (worksheet) ▪ Past Plan Cycle ▪ Future Development

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Table 3-3: Summary of planning meetings convened as part of the plan update process	
Meeting Type, Date, and Location	**Meeting Agenda**
MJPT Meeting No. 3 October 8, 2020 Web conference via Zoom	• **MITIGATION STRATEGY** o Existing Mitigation Action/Project Assessment (worksheet) o Capability Assessment (worksheet) ▪ Legal and Regulatory (Codes / Ordinances) ▪ Administrative and Technical Staff Resources ▪ Fiscal Capabilities o Plans / Manuals / Guidelines / Studies Integration and Incorporation (worksheet) ▪ Past Plan Cycle ▪ Future Strategy o NFIP Statistics and Compliance (worksheet)
MJPT Meeting No. 4 November 19, 2020 Web conference via Zoom	• **RISK ASSESSMENT** o Repetitive Loss Properties o Vulnerability Analysis Results Review • **MITIGATION STRATEGY** o Develop/Update Goals o Action/Project Identification (worksheet) o Implementation Strategy (worksheet) • **PLAN MAINTENANCE STRATEGY** o Continued Public Involvement (worksheet) • **PROMULGATION PROCESS**
Tribal Planning Meeting December 15, 2020 Web conference via Zoom	• **Tribal Assurances** • **Definition Of "Public"** • **Plan Integration** • **Pre- and Post-Disaster Capabilities** • **Funding Sources** • **Progress Review and Project Closeout**

3.3.5 Agency/Organization Participation

The planning process used to develop the 2015 Plan included participation from several agencies and organizations which operate within or have jurisdiction over small and large areas of Maricopa County. For this update, a list of known and/or potential stakeholders not already involved in the MJPT was brainstormed and compiled at both the internal kickoff meeting and MJPT Meeting No. 1. Invitations were sent to the identified list via emails with an attached document that explained the DMA 2000 planning process and the request for involvement. A copy of the letter attachment is provided in Appendix C. Personal invitations by MCDEM staff were also extended to the Gila, Pinal, and Yavapai County emergency managers to participate in the planning meetings. The La Paz County emergency manager had recently passed away and the position was not filled as of this planning effort, so no invitation was extended to La

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Paz County. In addition to the personal invitations, a broader invitation to all citizens within and near Maricopa County was indirectly extended via website postings, social media (Facebook, Twitter, and NextDoor), and various newsletters/utility bill inserts, which are discussed more thoroughly in Section 3.5.2. This approach was considered the best way to reach interested non-profits and businesses within the County and provide them an opportunity for participation in the planning process. Table 3-4 represents the list of all entities (except the participating jurisdictions) that were either directly invited or that responded to the public invitations:

Table 3-4: List of agencies and organizations invited or participating in the planning process

Agency / Organization	Contact Position
Inter-Tribal Council of Arizona	Nathan Nixon - Emergency Preparedness Program Coordinator
Bureau of Indian Affairs - Salt River Agency	Alan Sinclair - Fire Management Officer
Arizona Department of Water Resources	Brian Cosson – NFIP Coordinator
Arizona Department of Environmental Quality	Chris Nutter – Emergency Response Coordinator
Arizona State Land - Forestry Division	Dan Colgan - Central District A4S District Manager
Arizona Department of Transportation – Phoenix District	David Egliskis – Emergency Manager
Bureau of Land Management - Phoenix District	Ken Shaver - Fire Prevention Specialist
Bureau of Land Management - Phoenix District	Fritz Mueller - Fire Operations Specialist
National Weather Service - Phoenix Forecast Office	Jaret Rogers - Warning Coordination Meteorologist
USFS - Tonto National Forest	Dave Ramirez - South Zone Fire Management Officer
Arizona State University	Sheri Gibbons - Emergency Manager
ASU State Climatologist Office	Nancy Selover - State Climatologist
Arizona Game and Fish Department	Fred Bloom - Engineering Supervisor
Arizona Geological Survey	Ann Youberg - Research Geologist
Southwest Gas	Carrie Heglund - Engineer
U.S Army Corps of Engineers – LA District – Arizona/Nevada Planning Office	Kim Gavigan – Regional Engineer/Planner

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Table 3-4: List of agencies and organizations invited or participating in the planning process	
Agency / Organization	**Contact Position**
Central Arizona Project	Patrick Kernan - Civil Engineering Division Supervisor
Yavapai County Emergency Management	Ron Sauntman - Emergency Management Coordinator
Pinal County Emergency Management	Chuck Kmet - Emergency Management Officer
Gila County Emergency Management	Carl Melford - Emergency Manager

An integral part of the planning process included coordination with agencies and organizations outside of 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. Much of the information and data that is used in the risk assessment is developed by agencies or organizations other than the participating jurisdictions. In some cases, the jurisdictions may be members of a larger organization that has jointly conducted a study or planning effort like the development of a community wildfire protection plan, participation in an area association of governments, or participation in a FEMA RiskMAP Discovery study. Examples of those data sets include the FEMA floodplain mapping, community wildfire protection plans, severe weather statistics, hazard incident reports, and regional comprehensive plans. The resources obtained, reviewed and compiled into the risk assessment are summarized in Section 3.6 and at the end of each subsection of Section 5.3 of this Plan. Jurisdictions needing these data sets obtained them by requesting them directly from the host agency or organization, downloading information posted to website locations, or engaging consultants.

3.4 Public Involvement

3.4.1 Previous Plan Assessment

The public involvement strategy for the 2015 Plan development included the publishing of public notices in the major newspapers that cover the greater Phoenix area, posting of similar public notices to jurisdiction websites with an included link to the full-time website maintained on the Maricopa County servers. Additional notices inviting public participation were published in local and regional newspapers, jurisdictional newsletters, and flyer inserts to utility bills.

The second opportunity for public input was provided through the normal city/town/tribal council and/or county board of supervisors public meeting process associated with each jurisdiction's formal adoption of the 2015 Plan. The details of the meeting process varied from jurisdiction to jurisdiction, but typically included some form of advertisement of the meeting agenda two to four weeks in advance of the council/board meeting. In most cases, an informal, pre-adoption presentation of the 2015 Plan was made during a working session of the council/board. The final adoption

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of the resolutions was almost unanimously done as part of a consent agenda at a formal council/board meeting. There are no records of any public comment on the 2015 Plan adoption process. Because the process is required for any formal council/board action and has a built-in public notification and comment opportunity, the MJPT chose to continue using this process as one of the post-draft mechanisms for getting the Plan update before the public.

3.4.2 Plan Update

The opportunity for public involvement and input to the plan update process was accommodated using the same general strategy as the 2015 Plan, with several notable additions that included comprehensive English and Spanish language media blasts to social media platforms and the preparation of an on-line survey/questionnaire that was accessible by a link to the base Maricopa County hazard mitigation website hosted on Maricopa County servers. Participating jurisdictions posted public notices to their respective websites that included a link to the base website. A copy of the 2015 Plan was made available on the County website along with contact information for the MJPT PPOC. There were also additional notices published in local newspapers, jurisdictional newsletters, and utility bill inserts.

The community survey/questionnaire was comprised of 10 questions that were constructed to better facilitate an understanding of the level of hazard and mitigation concept awareness on the part of the public. The survey responses were logged for a period of August to December 2020. During that time, the English survey site was accessed a total of 1,188 times. The Spanish version was accessed 8 times. Of those, 524 occurrences fully completed the survey. The following highlight some of the response statistics:

- **Severe Wind** events top the list of hazards that caused negative impacts to respondents. The second was **Extreme Heat**, closely followed by **Drought** and **Flooding**
- The reported zip codes for the respondents were reasonably distributed across the populated areas of the county.
- Approximately 45% of the respondents were aware of the 2015 Plan.
- Less than 8% of the respondents had a home or business located within a FEMA delineated Special Flood Hazard Area (SFHA).
- Preferences for typical structural/infrastructure type improvements and protection of natural buffers was slightly favored over the other types of mitigation actions/projects.
- On average, approximately 13% of the respondents carry some type of flood insurance on their homes. Rental coverage was less than 4% and business coverage was less than 1%.
- The four top-ranked choices for receiving hazard related information and notifications were in order: email, websites, television and social media.

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A second wave of post-draft public notices was posted to jurisdiction websites and a copy of the draft Plan was posted to the County website for review and comment. Interested citizens were also encouraged to participate in the local community adoption process which, depending upon the jurisdiction, included a formal public hearing and in some cases, a prior informal presentation.

Copies of the public outreach materials (notices, web page snips, newspaper notices, survey/questionnaire, etc.) are provided in Appendix C.

3.4.3 Tribal Definitions of "Public"

Pursuant to 44 CFR §201.7(c)(1)(i), each of FMYN and SRPMIC must include "*…a description of how the Indian tribal government defined ''public;''*". Both participating tribes reviewed the definitions provided in the 2015 Plan and had no changes to make. Accordingly, the following statements to define "public" for the purposes of this Plan are defined for each of the participating tribes as:

- FMYN: ***"All FMYN tribal members, community members, and employees."***
- SRPMIC: ***"All enrolled Community members, employees and enterprises."***

3.5 Reference Documents and Technical Resources

Over the course of the update planning process, numerous other plans, studies, reports, and technical information were obtained and reviewed for incorporation or reference purposes. Most sources referenced and researched pertain to the risk assessment and the capabilities assessment. To a lesser extent, the community descriptions and mitigation strategy also included some document or technical information research. Table 3-5 provides a reference listing of the primary documents and technical resources reviewed and used in the Plan. Detailed bibliographic references for the risk assessment are provided at the end of each hazard risk profile in Section 5.3. Other bibliographic references are provided as footnotes throughout the Plan.

Table 3-5: List of resource documents and references reviewed and incorporated in the Plan update process

Referenced Document or Technical Source	Resource Type	Description of Reference and Its Use
Arizona Department of Water Resources	Hazard Data	Source for dam failure, drought, levee and subsidence data
American Society of Civil Engineers	Technical Reference	Source for design wind speed data.
Arizona State University	Hazard Data Technical Reference	Source and co-author for extreme heat data and hazard profile. Host for the SHELDUS database.

Table 3-5: List of resource documents and references reviewed and incorporated in the Plan update process		
Referenced Document or Technical Source	Resource Type	Description of Reference and Its Use
State of Arizona Hazard Mitigation Plan (2018)	Hazard Data Mitigation Data	Some of the hazard data and mitigation information published in the State Plan are used and incorporated into the Plan update.
Arizona Geological Survey	Hazard Data	Source for fissure, landslide and subsidence data
Arizona State Land Department – Forestry Division	Hazard Data	Source for wildfire data associated with State Lands and host for the Arizona Wildfire Risk Assessment Portal (AZWRAP)
Bureau Net (2020)	Website Database	Source for NFIP statistics.
Comprehensive Floodplain Management Plan and Program Report (FCDMC – 2020)	Technical and Planning Resource	The FCDMC's Comprehensive Floodplain Management Plan is a source for flooding data and mitigation strategies envisioned for the areas served by the District.
Discovery Report for Phoenix Metro Valley Watersheds (2013)	Technical and Data Resource	Flood related hazard data, areas of mitigation interest, and mitigation strategies are identified in the Discovery Report and are incorporated as appropriate into the Plan.
InciWeb – Incident Information System (2020)	Wildfire Data	Source wildfire incident information for historical hazard and profile information, specifically for Horseshoe 2 and Monument Fire.
Environmental Working Group's Farm Subsidy Database (2020)	Website Database	Source of disaster related agricultural subsidies. Used in the risk assessment.
Federal Emergency Management Agency	Technical and Planning Resource	Resource for HMP guidance (How-To series), floodplain and flooding related NFIP data (mapping, repetitive loss, NFIP statistics), and historic hazard incidents. Used in the risk assessment and mitigation strategy.
U.S. Global Change Research Program	Technical and Data Resource	Source for National Climate Assessment reports and documentation with discussions on climate change.
HAZUS-MH	Technical Resource	Based data sets within the program were used in the vulnerability analysis.
Maricopa Association of Governments	Technical and Data Resource	Source for current demographic and economic data for the county.

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Table 3-5: List of resource documents and references reviewed and incorporated in the Plan update process

Referenced Document or Technical Source	Resource Type	Description of Reference and Its Use
Maricopa County Multi-Jurisdictional Hazard Mitigation Plan (2015)	Hazard Mitigation Plan	FEMA approved hazard mitigation plan that formed the starting point for the update process.
Maricopa County Community Wildfire Protection Plan (2010)	CWPP	Source for wildfire history and risk data.
Maricopa County Community Wildfire Protection Plan – 5 Year Update (2020)	CWPP	Source for wildfire history and risk data, as well as updated mitigation strategies
National Climatic Data Center	Technical Resource	Online resource for weather related data and historic hazard event data. Used in the risk assessment.
National Integrated Drought Information System (2020)	Technical Resource	Source for drought related projections and conditions. Used in the risk assessment.
National Response Center	Technical Resource	Source of traffic related HAZMAT incidents and rail accidents. Used in the risk assessment.
National Weather Service	Technical Resource	Source for hazard information, data sets, and historic event records. Used in the risk assessment.
National Wildfire Coordination Group (2020)	Technical Resource	Source for historic wildfire hazard information. Used in the risk assessment.
Standard on Disaster/Emergency Management and Business Continuity Programs (2000)	Standards Document	Used to establish the classification and definitions for the asset inventory. Used in the risk assessment.
U.S. Army Corps of Engineers	Dam Inventory	Source for dam locations and characteristics
U.S. Bureau of Land Management	GIS Data	Source for land ownership data
U.S. Census Bureau	Technical Data	TIGER/Line shape file for county census block data was used to obtain block boundaries, population, and housing units
U.S. Forest Service	Technical Data	Source for local wildfire data. Used in the risk assessment.

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Table 3-5: List of resource documents and references reviewed and incorporated in the Plan update process		
Referenced Document or Technical Source	Resource Type	Description of Reference and Its Use
U.S. Geological Survey	Technical Data	Source for geological hazard data and incident data. Used in the risk assessment.
Jurisdictional General Plans	Planning and Hazard Data	General Plans prepared by each of the various jurisdictions summarizes the long-term growth strategies and can provided data regarding development trends.
Western Regional Climate Center	Website Data	Online resource for climate data used in climate discussion of Section 5
Zillow Real Estate Values	Website Reference	Obtained home value indexes for incorporated and unincorporated areas of Maricopa County to use for residential values in vulnerability assessment.

3.6 Plan Integration into Other Planning Mechanisms

Incorporation and/or integration of the Plan into other planning mechanisms, either by content or reference, enhances a community's ability to perform hazard mitigation by expanding the scope of the Plan's influence. It also helps a community to capitalize on all available mechanisms at their disposal to accomplish hazard mitigation and reduce risk.

3.6.1 Past Plan Incorporation/Integration Assessment

A poll of the participating jurisdictions revealed that success of incorporating the 2015 Plan elements into other planning programs has varied over the past planning cycle. Ways in which the 2015 Plan has been successfully incorporated or referenced into other planning mechanisms by each jurisdiction are summarized in Tables 3-6 through 3-32.

3.6.2 Five Year Plan Integration/Incorporation Strategy

With the efficacy of integrating the 2015 Plan during the last cycle in view, the MJPT identified typical ways to use and incorporate the Plan over the next five-year planning cycle, as follows:

- Use of, or reference to, Plan elements in updates/revisions to codes, ordinances, general and/or comprehensive planning documents, and other long-term strategic plans.
- Integration of defined mitigation A/Ps into capital improvement plans and programming.
- Reference to Plan risk assessments during updates or revisions to land use planning and zoning maps.
- Resource for developing and/or updating emergency operations plans, community wildfire protection plans, emergency response plans, etc.

- Reference during grant application processes.
- Use of the Plan as a resource during LEPC meetings.

Specific opportunities for integrating and/or referencing the Plan into other planning mechanisms over the next five years are summarized by jurisdiction in Tables 3-6 to 3-32. In all cases, the jurisdiction's PPOC will take responsibility to ensure that the Plan, risk assessment, goals and mitigation strategies are integrated and/or incorporated into the listed planning mechanism by participating in those efforts as they occur.

Table 3-6: Plan integration history and future strategy for Avondale

Plan Integration Over the Past Plan Cycle:
City of Avondale's existing General Plan 2030, which approved in August 2012, includes a Safety Element that references the County's hazard mitigation plan and specific items related to Avondale. The General Plan is being updated as part of a 10-year update, requiring approval in 2022. The Planning Division is working with various departments to update information in the plan, which would include the Safety Element. There is no other update to the existing information at this time.

Plan Integration Strategy for Next Five Years:

Planning Mechanism	Description of Planning Mechanism Opportunity
General Plan 2030 being updated for approval in 2022	This will include any new information from City departments related to the Safety Element. As of current, no information is available regarding the update.
City Code	Chapter 8, Article I Division 3; Provisions for Flood Hazard Reduction; addresses Flood Plain Management. "Pursuant to ARIZ. REV. STAT. § 48-3610, the City of Avondale (the "City") is authorized to adopt floodplain management regulations in conformance with ARIZ. REV. STAT. §§ 48-3603 and 48-3609 designed to promote the public health, safety and general welfare of its citizenry."

Table 3-7: Plan integration history and future strategy for Buckeye

Plan Integration Over the Past Plan Cycle:
The current Maricopa County Multi-Jurisdictional Hazard Mitigation Plan (MCMJHMP) was reviewed on an annual basis. Staff from the Fire and Medical Department, Public Works Department, and the Development Services Department consulted to update the current list of mitigation actions and projects. The updated document was submitted to the Maricopa County Department of Emergency Management (MCDEM).

Fire and Medical Department staff also would review the list of mitigation actions and projects when the Hazard Mitigation Grant Program (HMGP) guidance was issued annually. This was done to determine if any of the projects would be a viable candidate for submittal to the HMGP.

Plan Integration Strategy for Next Five Years:

Planning Mechanism	Description of Planning Mechanism Opportunity
Emergency Response Plan (EOP)	The City's Emergency Response Plan (EOP) provides a guide to how the community will respond to a disaster incident. The risk data may be utilized as one of the appendices to the EOP.
Community Wildfire Protection Plan (CWPP)	The risk data from the community wildfire protection plan serves as the basis of the hazard mitigation plan and for identifying candidate wildfire mitigation actions and projects.
Capital Improvement Program (CIP)	The hazard mitigation plan will be utilized to inform and guide the submittal and funding of projects on an annual basis. This can occur both in the City's CIP and outside partners such as the Flood Control District of Maricopa County.
Community Risk Assessment	The Fire and Medical Department has developed a Community Risk Assessment to identify all the hazards that may impact the community. The hazards may include train derailments, airplane crashes and natural hazards. The Hazard Mitigation Plan data can be incorporated into this document when it is updated.

Table 3-8: Plan integration history and future strategy for Carefree

Plan Integration Over the Past Plan Cycle:
The town continues to look for integration opportunities when evaluating updates or amendments to the 2012, the Town of Carefree's General Plan. Within the General Plan:

- The Environmental Element focuses on limiting encroachment within delineated floodplains and ensuring desert sensitive design solutions for drainage mitigation.
- The Streets Element outlines that the town should maintain a circulation plan which services the needs of the local residents by implementing measures to improve the safety and efficiency of the network.
- The Open Space Element focuses on preserving floodplains and washes in their natural state.
- The Public Facilities Element focuses on supporting ongoing efforts internally and with external agencies to maintain a reliable, efficient and quality level of public services which includes but is not limited to public safety and emergency services.

The town updated the Emergency Operations Plan in December 2014 to which the 2015 Plan was referred to in its update.

Plan Integration Strategy for Next Five Years:

Planning Mechanism	Description of Planning Mechanism Opportunity
Transportation Planning	Over the next five (5) years, depending upon available funding, the town could explore improvements to numerous washes crossing public streets. If funding becomes available the planning, design and priority will integrate and reference the Plan.
The Emergency Operation Plan	The EOP was recently updated. Any future changes or updates will integrate and/or reference the Plan.
Flood Control District Drainage Area Master Plan	The FCDMC is currently working on a drainage area master plan which bisects the southwestern corner of the town. Such Master Plan should reference the Plan.
Town of Carefree General Plan (2012)	The town's General Plan is intended to guide growth and development within the town and its planning areas. Integration of the Plan with future updates of the General Plan will provide additional input into the identification of problematic growth areas and possible areas of mitigation interest. The Plan will also serve as a reference source during annual amendments to the General Plan.

Table 3-9: Plan integration history and future strategy for Cave Creek

Plan Integration Over the Past Plan Cycle:
The Town of Cave Creek staff incorporates the 2015 Hazard Mitigation plan into our daily activities. During plan reviews staff would typically review the Hazard Mitigation plan to ensure that items identified as hazards within the Hazard Mitigation Plan are addressed within the submitted plans.

Staff would also utilize the 2015 Hazard Mitigation plan as other documents are worked upon and drafted, for example during the updates to the Community Wildfire Protection Plan as well as the 2018 Updates to The Cave Creek Flood Response Plan, the Multi Hazard Mitigation Plan is referenced for pertinent cross reference materials.

The Updates to the Town of Cave Creek Emergency Operations Plan also frequently referred to the Multi Hazard Mitigation Plan during the planning and update process.

Plan Integration Strategy for Next Five Years:

Planning Mechanism	Description of Planning Mechanism Opportunity
Town of Cave Creek General Plan	The Town's General Plan provides the framework for guiding Cave Creek into the next decade. During the development and updates to the 2021 General Plan, staff will refer to the Multi Hazard Mitigation Plan for reference purposes. The 2021 Multi Hazard Mitigation Plan will be incorporated into projects and actions projected for the next ten years.
Storm Water Area Master Plan	The Storm Water Master Plan will refer to the 2021 Multi Hazard Mitigation Plan as it specifically refers to flooding and flood mitigation.
Cave Creek Emergency Operations Plan	The Cave Creek Emergency Operations Plan will refer to the 2021 Multi Hazard Mitigation Plan during the updates process. The Emergency Operations Plan incorporates the hazards identified within the 2021 Multi Hazard Mitigation Plan.
Town of Cave Creek Zoning Ordinance	Cave Creek Planners will utilize the 2021 Multi Hazard Mitigation Plan as they look to update the Zoning Ordinance. The 2021 Multi Hazard Mitigation Plan will be utilized as a reference manual as it pertains to new ordinances that will help address and effect defined hazards.

Table 3-10: Plan integration history and future strategy for Chandler

Plan Integration Over the Past Plan Cycle:
The City of Chandler utilized the prior 2015 Plan as a reference for the development of the Community Wildfire Protection Plan. Additionally, the 2015 Plan was referenced by the Fire Department when completing the Emergency Operations Plan for the City of Chandler, specifically the risk assessment components.

Table 3-10: Plan integration history and future strategy for Chandler	
Plan Integration Strategy for Next Five Years:	
Planning Mechanism	**Description of Planning Mechanism Opportunity**
Emergency Operations Plan	The purpose of this plan is to provide effective emergency operations within the City of Chandler using the existing governmental organization and resources to the maximum extent possible. This includes a comprehensive risk analysis and threat assessment. The EOP is due to be revised in 2021 and should reference the Plan.
Capital Improvement Program	The CIP serves as a multi-year planning instrument used to identify needs and financing sources for public infrastructure improvements. The CIP is revised annually and will continue to reference the Plan.
General Plan	The City of Chandler General Plan serves as an expression of development policies used to guide development decisions. Its purpose is to establish clear direction that spells out public expectations and preferences to sustain a desirable community.

Table 3-11: Plan integration history and future strategy for El Mirage	
Plan Integration Over the Past Plan Cycle: El Mirage has a COOP plan that is currently under revision as well as the 2015 Plan. Capital Improvement Plans (CIP) have been established for mid- to long-range planning for public safety and were developed with reference to the 2015 Plan. Cooperation within the organization has continued to be strong with incorporation of the 2015 Plan into communications between Public Safety and Public Works, on how services can be improved based on the CIP, the COOP plan, and public safety.	
Plan Integration Strategy for Next Five Years:	
Planning Mechanism	**Description of Planning Mechanism Opportunity**
City of El Mirage General Plan, CIP programs, and Council Goals	The El Mirage general plan provides long-term guidance to the Cities growth. Development of the general plan and council goals setting are elements that are informed by either reference or incorporation of the risks, goals and mitigation of the actions within the projects of the hazard mitigation plan.

Table 3-11: Plan integration history and future strategy for El Mirage	
City of El Mirage General Plan, CIP programs, and Council Goals	The City of El Mirage is consciously aware of the future needs that are not limited to the items below. The City of El Mirage has either updated each of these items or are concurrently working towards an update. • Comprehensive or General Plans • Stormwater Master Plans • Capital Improvement Programs • Regional Plans (Transportation, Land Use, etc.) • Emergency Operations/Response Plans • Community Wildfire Protection Plans • Development Plans • Development Guidelines and/or Regulations • Ordinance Updates or Revisions

Table 3-12: Plan integration history and future strategy for Fort McDowell Yavapai Nation	
Plan Integration Over the Past Plan Cycle: The Wildland Fire Management Plan, 2012, was commissioned by the Bureau of Indian Affairs, Salt River Agency on behalf of three tribal Nations, one of which is the Fort McDowell Yavapai Nation. The wildland fire management plan incorporated some of the existing Hazard Mitigation Plan components in the development of the wildfire management plan. The current mitigation plan has also aided in the annual Threat and Hazard Identification and Risk Assessment process. Finally, it has aided the Nation in the development and renewal of our emergency operations plan.	
Plan Integration Strategy for Next Five Years:	
Planning Mechanism	**Description of Planning Mechanism Opportunity**
Capital Projects Five Year plan	The Nation's Capital Projects Five Year Plan elements are potentially affected by the risks, goals, and mitigation actions of the hazard mitigation plan.
Emergency Operations Plan Update	The Nation's Emergency Operations Plan is required to be updated at least every three years. The elements of the Emergency Operations Plan are directly correlated to the risks, hazards, goals, and mitigation actions of the hazard mitigation plan.
Threat and Hazard Identification and Risk Assessment (THIRA)	The THIRA is updated annually and incorporates several elements of the Hazard Mitigation Plan.

Table 3-13: Plan integration history and future strategy for Fountain Hills

Plan Integration Over the Past Plan Cycle:
The 2015 Plan was referenced in the development and implementation of several plans and Capital Improvement Projects including:

- The 2020 Maricopa County Community Wildfire Protection Plan.
- Flood Control Emergency Plans.
- 2020 Town of Fountain Hills Subdivision Ordinance.
- 2020 Fountain Hills Storm Ready Certification.
- Fuels mitigation projects in the Ashbrook and Legend Washes.
- Drainage improvements to the Civic Center and Eagle Mountain Parkway areas.

Plan Integration Strategy for Next Five Years:

Planning Mechanism	Description of Planning Mechanism Opportunity
Capital Improvement Plan	The town's Capital Improvement Program provides project development for drainage improvement projects. As before, the Plan will serve as a reference for the identification of future CIP projects.
Town of Fountain Hills General Plan	The Fountain Hills General Plan – 2020 provides long-term direction for the town's growth. Most of the town's drainage is through preserved natural or re-graded wash areas. The Plan will be referenced with any amendments or updates to the General Plan.
Town of Fountain Hills Emergency Operations Plan	The Town's Emergency Operations Plan specifically addresses flooding in washes and roadways throughout the community. The Hazard Mitigation Plan works in concert with the risk analysis and threat assessment.

Table 3-14: Plan integration history and future strategy for Gila Bend

Plan Integration Over the Past Plan Cycle:
Over the past 5 years the Town of Gila Bend has incorporated the Plan into Capital Improvement Programs and Regional Plans (Transportation, Land Use, etc.), in the update or revision of Economic Development Plans, Guidelines, Regulations, Ordinances and the Town's Emergency Operations and Response Plans. Elements of these planning mechanisms were informed by either reference or incorporation of the risks, goals, and mitigation actions/projects of the Plan.

Plan Integration Strategy for Next Five Years:

Planning Mechanism	Description of Planning Mechanism Opportunity
Capital Improvement Programs Regional Plans (Transportation, Land Use, etc.)	The town's CIP and Regional plans serve as guidance documents for the town's growth and resources. Development of these plan elements are informed by either reference or incorporation of the risks, goals, and mitigation actions/projects of the Plan.

Table 3-14: Plan integration history and future strategy for Gila Bend	
Economic Development Plans Development Guidelines and/or Regulations Ordinance Updates or Revisions	The town's Economic, Development plans, and Ordinances provide long-term guidance to the town's growth and development. Development of these plans and guideline elements are informed by either reference or incorporation of the risks, goals and mitigation actions/projects of the Plan.
Flood Mitigation Master Plan	The Flood Mitigation Master Plan was a multi-jurisdictional effort across various agencies. The town's Flood Mitigation Master Plan provides long-term guidance to the town's growth patterns. Development of the master plan elements are informed by either reference or incorporation of the risks, goals and mitigation actions/projects of the Plan.
Emergency Operations/Response Plans	These plans are being developed/revised and plan elements are informed by either reference or incorporation of the risks, goals and mitigation actions/projects of the Plan.

Table 3-15: Plan integration history and future strategy for Gilbert	
Plan Integration Over the Past Plan Cycle: The 2015 Mitigation plan was referenced with updating the Gilbert Emergency Operations Plan, concentrating specific responses to areas identified within the mitigation plan. The mitigation plan was also taken into consideration during the development of the Gilbert Flood Response Plan adopted by council in 2019. The Mitigation plan was also referenced during our Community Rating System (CRS) reviews, audits and updates.	
Plan Integration Strategy for Next Five Years:	
Planning Mechanism	**Description of Planning Mechanism Opportunity**
Town of Gilbert Emergency Operation Plan update	The Town of Gilbert's Emergency Operation Plan slated for update in 2021, provides direction and guidance to the town's response and recovery efforts in the event of a natural or manmade disaster. The planning process could potentially reference and/or incorporate risks, goals and mitigation actions of the Plan.
Town of Gilbert Flood Response Plan update	The Town of Gilbert's Flood Response Plan slated for review and potential update in 2022, provides direction and guidance to the town's flood response. The planning process could potentially reference and/or incorporate risks, goals and mitigation actions of the Plan.

Table 3-15: Plan integration history and future strategy for Gilbert	
Town of Gilbert Storm Water Management Plan	The Town of Gilbert Storm Water Management Plan slated for update soon. The planning process could potentially reference and/or incorporate risks, goals and mitigation actions of the Plan.

Table 3-16: Plan integration history and future strategy for Glendale

Plan Integration Over the Past Plan Cycle:

The 2015 Maricopa County Multi-Jurisdictional Hazard Mitigation Plan was adopted by the Glendale City Council, demonstrating their continued commitment to hazard mitigation. The plan has been a guide for the City of Glendale as it pursues reducing risks to life and property, limiting the risks to critical infrastructure, and implementing and integrating hazard mitigation planning to other planning efforts.

The Glendale Division of Emergency Management initiated a comprehensive revision of the City's Emergency Operations Plan in 2019. The revision process included a review of the natural hazards that could impact the City and ensuring the related appendices were in place. The revision has not yet been completed due to the shifting of staff responsibilities due to the COVID-19 pandemic.

In 2019-2020, the Water Services Department was required to conduct a Risk and Resilience Assessment and complete an Emergency Response Plan for the drinking water system in accordance with Section 1433 of the Safe Drinking Water Act as amended by Section 2013 of the American Water Infrastructure Act (AWIA). This assessment included natural hazards as listed in the 2015 Hazard Mitigation Plan: extreme heat; flooding; severe wind.

Glendale Water Services Department also maintains various emergency response plans for the drinking water and wastewater system as well as site-specific plans for treatment plants, well sites, reservoirs, etc. For example, Water Services maintains an Emergency Action Plan for the Thunderbird Park Reservoir Dam. These plans provide more specific information and procedures than the Hazard Mitigation Plan.

The City also maintains a Drought Management Plan to comply with the Arizona Department of Water Resources' requirements. The most recent update to this plan was completed in 2016.

Glendale Water Services is currently working on an Integrated Water Master Plan which will consider impacts from drought to water supplies.

Information in the Hazard Mitigation Plan was leveraged during the development of the 2018 City of Glendale Transportation Plan. The hazards that could affect the transportation system were considered during the planning process.

Plan Integration Strategy for Next Five Years:

Table 3-16: Plan integration history and future strategy for Glendale

Planning Mechanism	Description of Planning Mechanism Opportunity
City of Glendale Emergency Operations Plan	The City of Glendale Emergency Operations Plan is currently under revision. Planning efforts will include a review of the Multi-Jurisdictional Hazard Mitigation Plan to ensure that the risks, goals, and objectives of the plan are adequately addressed.
City of Glendale Capital Improvement Program	The City of Glendale CIP plan addresses various projects over a ten-year span. The plan is an outline for creating, maintaining present and future infrastructure needs. Glendale Water Services contributes projects to the City's CIP. Projects include the rehabilitation or replacement of assets to improve redundancy and maintain resiliency. One such project involves the design and installation of additional groundwater wells to improve water supplies when drought impacts surface water supplies.
Integrated Water Master Plan	Glendale Water Services' Integrated Water Master Plan (IWMP) looks at development/population growth, water demand, and water supplies through 2055. The IWMP complements the Hazard Mitigation Plan specific to available water resources, including plans to improve redundancy and resiliency of the City's water system. One component of the IWMP is a stormwater maintenance plan to prevent flooding of the City's storm sewer system.
Drought Management Plan	The City is currently updating our Drought Management Plan (DMP) to reflect recent developments on the Colorado River and the latest data available through SRP. The DMP complements the Hazard Mitigation Plan related to drought response.
Emergency Action Plan for Thunderbird Park Reservoir Dam	Glendale Water Services maintains an emergency action plan in case of a breach of the reservoir/dam. This plan is reviewed each year and updated as needed.
2018 City of Glendale Transportation Plan	The City of Glendale's Transportation Plan outlines the City's involvement in transportation planning at the regional and sub-regional levels to assist in planning and addressing the City's transportation system needs. The Hazard Mitigation Plan will be used as a reference of possible hazards for consideration in the transportation planning process.

Table 3-17: Plan integration history and future strategy for Goodyear	
Plan Integration Over the Past Plan Cycle: Over the past 5 years the Plan has been referenced or integrated into the following planning mechanisms: **THREAT VULNERABILITY ASSESSMENTS:** Threat Vulnerability Assessments: Goodyear's Hazard Mitigation Plan has informed and promoted the process of both Water and Wastewater Threat Vulnerability Study, which in turn informed the priority values and potential CIP funding for both security improvements, as well as the location of additional continuity features, such as generators. **WATER CURTAILMENT PLANNING:** While not directly involved, the City is working to update the Water Curtailment plan, which is a parallel planning document which specifically addresses critical items within the Hazard Mitigation Plan in relation to drought. **TRAINING/EXERCISING:** Several training and a full-scale exercise with the Flood Control District of Maricopa have occurred in the last five year, ensuring that key staff were aware of the Emergency Response Plan for Bullard Wash (flooding), understood actions to be taken, practiced evacuation route planning in coordination with Street closures, public information and mass communication through the CENS system. Real storm activity reinforced the ability to activate WEA during a high wind event. **WILDLAND URBAN INTERFACE:** The Community Wildfire Protection Plan identified the Estrella community in the southern portion of the city, as being within the Wildland Urban Interface (WUI). Mitigation efforts resulted in a debris clean-up day and the community's qualification for Firewise for one year. Program requirement changed, as did HOA leadership, but Goodyear plans to continue to work with the HOA in relation to reducing wildland fire hazards in Corgett Wash. **EXTERNAL COMMUNICATIONS:** Goodyear routinely, either through citywide communications and social media platforms, informs the public of preparedness, weather events, safety information on a variety of hazards within the city. **INTERNAL COMMMUNICATIONS:** Goodyear Emergency Manager is responsible for monitoring forecasts and promoting messages to over 70 key staff regarding incoming weather, implications, and potential actions to mitigate damage (as possible). This communication distribution list (DL) is also used to collect and report storm damage. This can then be used to identify repetitive damage and proactive measures in which to mitigate when and where possible. It is also often used to prompt external communications as noted above. **ORDINANCES:** The City of Goodyear has a weed abatement program which includes an enforcement component. **DEVELOPMENT REVIEW PROCESSES:** Goodyear planning processes include DFIRM maps and the identification of floodway and floodplain for development, as well as the most current building codes.	
Plan Integration Strategy for Next Five Years:	
Planning Mechanism	**Description of Planning Mechanism Opportunity**

Table 3-17: Plan integration history and future strategy for Goodyear	
City of Goodyear General Plan	The City's general plan provides long-term guidance to the City's growth. The Hazard Mitigation will be but one document which will inform the update of the General Plan in terms all types of growth planning, from land use designations to additional CIP projects if appropriate.
Curtailment and Conservation Plan	Currently in the process of update, the Hazard Mitigation plan will also be considered (and ideally referenced) within the plan.
Emergency Operations Plan	A comprehensive Emergency Operations Plan update is due in 2021. The Hazard Mitigation will be featured in the Specific Annex to identify which hazard specific entries are appropriate as well as help identify any which require the development of Emergency Response Plans for development and exercise.
Ordinance and Code updates	The Plan will inform the update of any new land use development and/or building codes being updated contemplated during the next five years. Ideally, consideration of mitigation plans will have a direct impact upon any updates if and as warranted.

Table 3-18: Plan integration history and future strategy for Guadalupe	
Plan Integration Over the Past Plan Cycle: The hazard mitigation plan is referenced and is considered in any ongoing construction for both residential and commercial.	
Plan Integration Strategy for Next Five Years:	
Planning Mechanism	Description of Planning Mechanism Opportunity
Town of Guadalupe Emergency Operation Plan	The Town of Guadalupe's EOP is planning for response to and mitigation to potential disasters.
Building Plan Review	Building plans are reviewed to be compliant with location, elevation, and drainage codes.
Building codes	Building codes are to be review and updated.

Table 3-19: Plan integration history and future strategy for Litchfield Park	
The City of Litchfield Park has incorporated references to hazard mitigation into the General Plan that was reviewed and amended in 2020. The Wildfire protection plan was reviewed and updated to reflect protection to buildings and other properties both municipal and private. The City Emergency Operations Plan was reviewed and the Hazardous Material and mitigation plans were brought into line with the NIMS format. Ground water protection plan was reviewed and is monitored on a monthly basis by an independent engineering firm to make sure our City's groundwater is not being contaminated by a potential source of hazardous waste from a nearby property. This monitoring companies report its findings to the City monthly.	
Plan Integration Strategy for Next Five Years:	
Planning Mechanism	Description of Planning Mechanism Opportunity
City of Litchfield Park General Plan	*The LP General Plan was reviewed and adopted in 2010 and then Amended in 2020.* The plan addressed the need to protect our residents from hazards that would affect the City's environment and community wellbeing. Environmental impacts do not respect municipal boundaries. Nevertheless, local policy should support efforts to improve and achieve a wholesome, healthful environment. Maintaining efforts to protect the City's water supply is paramount to keeping a safe living environment. Clean water, air and land are high priorities for maintaining the community's healthful, outdoor lifestyle. Citizens appreciate serenity, and expect protection from negative impacts on well-being caused by non-compatible land uses, nuisances, hazardous activity, overly bright unshielded lighting, and vehicular noise and congestion. OBJECTIVES • Continue local efforts to maximize opportunities for recycling, hazardous materials disposal, community cleanup events, enhanced property maintenance and dust control. Consider and initiate partnerships with neighboring communities as opportunities are presented. • Monitor external environmental impacts on the community, such as water table contamination and air quality.
City Ordinance Updates	City ordinances are reviewed and amended as needed. Spend time reviewing all ordinances that address Hazardous materials or safety to the community.

Table 3-19: Plan integration history and future strategy for Litchfield Park	
Community Wildfire Protection Plans	Review the Regional Community Wildfire Protection Plans as it pertains to the City of Litchfield Park. Review City ordinances that require grass and weed abatement to reduce fuel sources for fire. This was recently reviewed and revised. Schedule a review every year and amend as needed.
Annual review of Emergency Operations Plan , EOP	Review plan and amend as needed for sections that address all Hazard Mitigation Procedures.

Table 3-20: Plan integration history and future strategy for Maricopa County (Unincorporated)	
Plan Integration Over the Past Plan Cycle: Integration or reference to the 2015 Plan were accomplished with the following efforts. • Update and review of the Flood Control Comprehensive Plan. Completed in 2020. Integration of mitigation projects between the two plans. • Maricopa County has incorporated references to the Hazard Mitigation Plan into its Emergency Operations Plan, which is updated and approved by the Board of Supervisors annually. • The Community Wildfire Protection Plan was reviewed and updated in 2020 with integration of mitigation projects between both plans. • Update and review of the MCDOT Transportation Improvement Plan. Completed in 2017. Plan is updated every 5 years. Integration of mitigation projects between the two plans.	
Plan Integration Strategy for Next Five Years:	
Planning Mechanism	Description of Planning Mechanism Opportunity
Community Wildfire Protection Plan	The CWPP identifies actions that will reduce the risk of wildfires to communities within the wild land urban interface zones. The plan was updated in 2020 and the Plan will be referenced with any future updates.
Emergency Operation Plan	The EOP identifies response and recovery actions in Maricopa County. The EOP is reviewed and updated annually and will include integration of risk assessment data from the Plan.
Transportation Improvement Plan	The TIP identifies transportation related projects within a 5 year plan. The TIP is updated annually and reference to the Plan will be made with each update.
Capital Improvement Plan (Flood, MCDOT, County)	The CIPs for each of the various agencies within the county are typically reviewed and updated annually. Integration of mitigation actions and projects between the CIPs and the Plan will be part of the process.

Table 3-21: Plan integration history and future strategy for Mesa	
Plan Integration Over the Past Plan Cycle: The timing of the Emergency Operations Plan and the general plan do not align optimally. The previous EOP was adopted following the last general plan update, therefore integration and updating of policies and strategies is constrained.	
Plan Integration Strategy for Next Five Years:	
Planning Mechanism	Description of Planning Mechanism Opportunity
General Plan	Per Arizona State Statue, municipalities are required to update their general plans every 10 years. Mesa's 2040 General Plan was adopted in 2014 and is required to be updated by 2024. The plan will include policy and strategies for hazard mitigation, resiliency planning, and public safety. Items identified in the Emergency Operation Plan will be incorporated into these sections and possibly other appropriate places within the general plan.

Table 3-22: Plan integration history and future strategy for Paradise Valley
Paradise Valley is no longer participating in this Plan

Table 3-23: Plan integration history and future strategy for Peoria	
Plan Integration Over the Past Plan Cycle: In the past five years, the City of Peoria has worked with Maricopa County Department of Emergency Management to ensure that the hazard mitigation plan is maintained and updated as necessary. In addition, when possible, the City has worked whenever possible to incorporate the hazard mitigation plan components into our normal business process. These include the review and updating of Codes and Regulations within the City.	
Plan Integration Strategy for Next Five Years:	
Planning Mechanism	Description of Planning Mechanism Opportunity
Flood Response Plan	The City will work with Maricopa County Flood Control to update the Flood response plan
Emergency Operation Plan (EOP)	The Emergency Operation Plan was been updated and will be taken to Council for their approval pending the removal of proclamation number 1 for COVID response.
Departmental Plans	City departments will continue to update any internal plans and/or Public plans as necessary.

Table 3-24: Plan integration history and future strategy for Phoenix

Plan Integration Over the Past Plan Cycle:
The City of Phoenix Emergency Operations Plan (EOP) addresses the City's hazard and threat environment, including natural, technological, and human-caused emergencies or disasters.

The Continuity of Operations Plan establishes policy and guidance to ensure the execution of the essential functions for the City of Phoenix in the event that an emergency threatens or incapacitates operations; and the relocation of selected personnel and functions of any essential facilities are required. Specifically, this plan is designed to ensure that the City of Phoenix is prepared to respond to emergencies, recover from them, and mitigate against their impacts.

The Floodplain Management Plan is an overall strategy of programs, projects and measures aimed at reducing the adverse impacts of flood hazards on the community. This plan identifies flood risks, their impact on the community, and a prioritized action plan for reducing flood risks. The National Flood Insurance Program requires the city to review this plan annually.

Plan Integration Strategy for Next Five Years:

Planning Mechanism	Description of Planning Mechanism Opportunity
City of Phoenix Emergency Operations Plan	The City of Phoenix Emergency Operations Plan (EOP) addresses the City's hazard and threat environment, including natural, technological, and human-caused emergencies or disasters.
Continuity of Operations Plans	The Continuity of Operations Plan establishes policy and guidance to ensure the execution of the essential functions for the City of Phoenix in the event that an emergency threatens or incapacitates operations; and the relocation of selected personnel and functions of any essential facilities are required. Specifically, this plan is designed to ensure that the City of Phoenix is prepared to respond to emergencies, recover from them, and mitigate against their impacts.
Floodplain Management Plan	The Floodplain Management Plan is an overall strategy of programs, projects and measures aimed at reducing the adverse impacts of flood hazards on the community. This plan identifies flood risks, their impact on the community, and a prioritized action plan for reducing flood risks. The National Flood Insurance Program requires the city to review this plan annually.
Capital Improvement Program	The City's capital improvement Program details projects and funding for identified risks, goals, and mitigation efforts referenced in the hazard mitigation plan.

Table 3-25: Plan integration history and future strategy for Queen Creek	
Plan Integration Over the Past Plan Cycle: The current Maricopa County Multi-Jurisdictional Hazard Mitigation Plan (MCMJHMP) was reviewed on an annual basis. Staff from the Fire and Medical Department, Public Works Department, and the Development Services Department consulted to update the current list of mitigation actions and projects. The updated document was submitted to the Maricopa County Department of Emergency Management (MCDEM). Fire and Medical Department staff also would review the list of mitigation actions and projects when the Hazard Mitigation Grant Program (HMGP) guidance was issued annually. This was done to determine if any of the projects would be a viable candidate for submittal to the HMGP.	
Plan Integration Strategy for Next Five Years:	
Planning Mechanism	Description of Planning Mechanism Opportunity
Emergency Response Plan (EOP)	The Town's Emergency Response Plan (EOP) provides a guide to how the community will respond to a disaster incident. The risk data may be utilized as one of the appendices to the EOP.
Community Wildfire Protection Plan (CWPP)	The risk data from the community wildfire protection plan serves as the basis of the hazard mitigation plan.
Capital Improvement Program (CIP)	The hazard mitigation plan can be utilized to inform and guide the submittal and funding of projects on an annual basis. This can occur both in the Town's CIP and outside partners such as Salt River Project (SRP) and the Flood Control District of Maricopa County.
Community Risk Assessment	The Fire and Medical Department has developed a Community Risk Assessment to identify all of the hazards that may impact the community. The hazards may include train derailments, airplane crashes and natural hazards. The Hazard Mitigation Plan data can be incorporated into this document when it is updated.

Table 3-26: Plan integration history and future strategy for Salt River Pima Maricopa Indian Community	
Plan Integration Over the Past Plan Cycle: The Salt River Indian Community incorporated the Emergency Operations Plan and the Tribal Emergency Response Commission planning process to further support hazard mitigation in an All Hazards environment. In addition, other supporting documents such as the Tribal Communities Threat Hazard Identification Risk Assessment (THIRA) and Office of Emergency Communications (OEC) Tribal Communications Profile were utilized to support on-going efforts to further incorporate into the Hazard Mitigation Plan.	
Plan Integration Strategy for Next Five Years:	
Planning Mechanism	Description of Planning Mechanism Opportunity

Table 3-26: Plan integration history and future strategy for Salt River Pima Maricopa Indian Community	
Storm Water Study	Elements of this plan will be integrated into the SRPMIC Storm Water Study and the development of Master Plans for storm water management.
Transportation Plan	The Public Works Department has plans to develop a Tribal Transportation Plan. The Plan components will be a consideration in that plan development.
SRPMIC Tribal Emergency Response Commission (TERC)	The overall governing body for the Emergency Management Program is the SRPMIC TERC. This plan once completed will be reviewed by that Commission so that their planning efforts consider elements of the Plan.
Community Wildfire Protection Plan	Elements of the current plan will be integrated into operations within identified community stakeholder departments to further mitigate wildfire hazards within the Tribal community.
Emergency Operations Plan	Elements of the plan to manage projects in an All-hazard environment will further test capabilities through planning; equipment purchases; and training & exercises. Components of the plan include but are not limited to Mass Care, Volunteer Management, Logistics and Supply Chain Management, Operational Communications, and Public Health.

Table 3-27: Plan integration history and future strategy for Scottsdale	
Plan Integration Over the Past Plan Cycle: The city of Scottsdale continues to strive for all integration of all emergency plans. This integration will allow a multidisciplinary approach to preparing for, responding to, recovery and mitigation efforts from emergency and disaster events. The intent is to create structured effort that minimizes impact and increase efficiency. Coinciding with the update of the 2016 plan is the update of the city's Emergency Operation Plan, Community Wildfire Protection Plan, Continuity of Operations Plan, Local Emergency Planning Committee, and the Storm Water Working group. The goal has been to integrate hazard mitigations strategies into city and functional plans and demonstrate value added into zoning laws and codes.	
Plan Integration Strategy for Next Five Years:	
Planning Mechanism	Description of Planning Mechanism Opportunity
Scottsdale Emergency Operations Plan (EOP)	Scottsdale's "all hazard" approach to dealing with a range of emergencies. Provides the structure and processes that the city utilizes to respond to and initially recover from an event. The Plan identifies for planning purposes key threats known to the City of Scottsdale.

Table 3-27: Plan integration history and future strategy for Scottsdale	
Local Emergency Planning Committee (LEPC)	Under the Emergency Planning and Community Right to Know Act this committee must develop an emergency response plan and provide information about chemicals in the community to citizens. The Plan ties into this planning by identifying Tier 1 and Tier 2 storage of chemicals.
Continuity of Operations Plan (COOP)	The Plan establishes priorities and procedures to sustain vital operations and services during a disaster event. The Plan provides the historical and potential emergencies to be prepared for.
Community Wildfire Protection Plan (CWPP)	The Plan identifies at risk communities within or near the wildland/urban interface. The Plan provides historical evidence for mitigation of fires within the wildland/urban interface.

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Table 3-28: Plan integration history and future strategy for Surprise

Plan Integration Over the Past Plan Cycle:
Public Works Department -
The Public Works Department has incorporated the current hazard mitigation plan into the Municipal Code and the Engineering Development Standards (EDS). Engineering staff uses both the code and the EDS to identify potential hazards and provided comments to development applicants to mitigate potential issues/threats.

Water Resource Management Department-
The recommendations associated with the 2015 Hazard Mitigation Plan were incorporated into the following Council approved documents and policies:

1. Water Resource Capital Improvement Plan
2. Utility Rate Study
3. Water & Wastewater Utility Guidelines and Standards
4. SCADA Guidelines & Standards

Water & Wastewater Site Security Enhancements

Fire Medical Department -
The Surprise Fire-Medical Department (SFMD) utilized information within the 2015 Hazard Mitigation Plan to assist with the creation of the following documents: 2015 Certificate of Necessity (CON), 2019 Standards of Cover / Community Risk Assessment (SOC/CRA), and the 2020 SFMD Strategic Plan.

Each of these documents was presented and approved by the City of Surprise (COS) City Council. Additionally, the 2015 CON was responsible for the newly created ambulance division with the SFMD. Lastly, the 2019 SOC/CRA and the 2020 Strategic Plan were vital to the SFMD becoming an Internationally Accredited Fire Department from the Center for Public Safety Excellence (CPSE). The SFMD became Accredited in early March of 2020.

Community Development Department-
None. While the City's General Plan 2035 incorporates general planning mechanisms and language throughout which is intended to guide the City's safe development, the General Plan 2035 was developed prior to the City's comprehensive hazard mitigation plan and so the hazard mitigation plan is not specifically incorporated into the General Plan, or mentioned by reference. The City's General Plan 2035 is located online at https://www.surpriseaz.gov/DocumentCenter/View/18530/General-Plan-2035?bidId=.

Plan Integration Strategy for Next Five Years:	
Planning Mechanism	Description of Planning Mechanism Opportunity
City of Surprise Capital Improvement Plan (PW)	City staff will research and identify available funding sources for hazard mitigation projects.

Table 3-28: Plan integration history and future strategy for Surprise	
City of Surprise Engineering Development Standards (PW)	The city continually reviews the Engineering Development Standards (EDS) for update opportunities. The EDS provides guidelines to the development community that help mitigate hazard risks.
City of Surprise Municipal Code (PW)	The Public Works Department continually coordinates with the Community Development Department to update the Land Development portion of the Municipal Code. This section of the code specifies regulations that help mitigate hazard risks, such as flooding.
Integrated Water Master Plan Update (WRM)	The Integrated Master Plan Update will include elements identified in the 2021 plan related to the Utility's critical infrastructure.
America's Water Infrastructure Act of 2018 Analysis (WRM)	The City is required to comply with the AWIA Risk Assessments by December 31, 2021. The recommendations identified in the Hazard Mitigation Plan will be implemented into this plan if not previously identified.
Water, Stormwater, Sewer Utility Rate Study (WRM)	If the recommendations of the 2021 identify capital improvements, our 2024 utility rate study would incorporate these projects.
City of Surprise General Plan (CD)	The City's General Plan is the guiding document for the short and long-term development of the City and incorporates planning mechanisms and language throughout which is intended to guide the City's safe development. The plan, which was last revised in 2019, undergoes a major update every 10 years. Future editions will incorporate or contain specific reference to the City's hazard mitigation plan.
General Plan 2035- City of Surprise	The General Plan 2035 provides long term guidance as it relates to the City's expected growth. The general plan references risks unique to the City of Surprise described in the 2021 Hazard Mitigation Plan including wildfire risks, and the high potential for flash flooding in Northern portions of Surprise.
Capital Improvement Plans	Future Capital Improvement Plans created by the SFMD reference will utilized the 2021 Hazard Mitigation Plan as it relates to future growth, fire station placement, needs assessments & managing risk with the COS.
Wildfire Protection Plans	The 2021 Hazard Mitigation Plan (HMP) will assist the SFMD with the creation of Wildfire Protection Plans by identifying areas in Surprise that have experienced rapid residential growth that are located in the urban interface.

Table 3-29: Plan integration history and future strategy for Tempe	
Plan Integration Over the Past Plan Cycle: The City of Tempe Public Works-Engineering/Principal Civil Engineer has completed a Storm Drain Management Study in the past plan cycle. This plan outlines projects based on flood protection. The highest rank projects have been worked on and projects will continue to be programmed into Tempe's 5-year and will be built and constructed as funding is available. The current Emergency Operations Plan updated September 2019 references the MCMJHMP	
Plan Integration Strategy for Next Five Years:	
Planning Mechanism	Description of Planning Mechanism Opportunity
Long-Term Asset Management Plan	The City of Tempe's Long-Term Asset Management Plan addresses the risks, goals and mitigation projects referenced in the hazard mitigation plan. The Well Asset Maintenance and New Production will add new groundwater production and recovery well capacity to the Tempe municipal system for back-up water production, supplemental drought supply water quality blending, and emergency preparedness.
Tempe's Climate Action Plan	The Climate Action Plan recommends that Tempe invest in neighborhood facilities that can act as community hubs as a hazard mitigation measure during emergencies. The EnVision hub will provide Human Services programs 365 days a year and will have the capacity and infrastructure to serve residents with limited incomes as a neighborhood resource during a disaster as part of a whole community-based approach to emergency management.
Urban Forest Master Plan	The Urban Forest Master Plan includes a tree and shade canopy coverage performance measure to mitigate the effects of extreme heat in the City of Tempe. It is the City of Tempe's goal to achieve a citywide 25% tree and shade canopy by 2040.
Tempe's Multi-Year Training and Exercise Plan	The City of Tempe is in the process of completing a comprehensive Hazard Vulnerability Analysis (HVA) to include hazardous materials, human hazards, technological and natural hazards. We will complete the analysis on an annual basis. The top three hazards identified will become the priority focus of our Multi-Year Training and Exercise Plan.

Table 3-30: Plan integration history and future strategy for Tolleson	
Plan Integration Over the Past Plan Cycle: The 2015 Plan was used in the development of plans for the new City Hall building and Aquatic Center, with construction to begin this year. Additionally, the Plan was referenced in the update and revision of City Ordinances, including the recently adopted Fireworks Ordinance.	
Plan Integration Strategy for Next Five Years:	
Planning Mechanism	Description of Planning Mechanism Opportunity
Emergency Operation Plan	Plan to identify response and recovery actions in Tolleson. Annual updates.
Annual Capital Improvement Programs	Plan to fund and implement construction projects to mitigate identified deficiencies in local flood protection, transportation corridors, and emergency operations.
Ordinance Updates or Revisions	Revisions to City Codes, as needed, to mitigate or improve shortcomings in current codes regarding public health, safety, and welfare.

Table 3-31: Plan integration history and future strategy for Wickenburg	
Plan Integration Over the Past Plan Cycle: Over the past 5 years, the plan has been referenced and considered in development activities and in response emergencies throughout the jurisdiction. The Town of Wickenburg also used the 2015 Plan as a reference in updates and amendments to the Emergency Operation Plan, the Town General Plan, Town Codes and Ordinances, and in prioritizing projects within the ICIP.	
Plan Integration Strategy for Next Five Years:	
Planning Mechanism	Description of Planning Mechanism Opportunity
Capital Improvement Project Plans	Provide the information needed from the hazard mitigation standpoint to identify areas where CIP funds may be utilized in projects, i.e. infrastructure repair, transportation issues.
Emergency Operations Plan, Town of Wickenburg	Provide template to larger scale planning, and contacts for other municipalities that may provide assistance in the event the Plan is activated.
Town of Wickenburg General Plan	With updates to the General plan, having the mitigation plan in place as a reference for overall impact of growth to the community
Ordinance Updates or Revisions	As the Town reviews and updates Ordinances, the mitigation plan is used as a reference to inform decisions related to hazard risk and risk mitigation.

Table 3-32: Plan integration history and future strategy for Youngtown

Plan Integration Over the Past Plan Cycle:
The 2015 Plan was either reviewed, referenced and/or integrated with the following planning activities for the Town of Youngtown:

- In 2014, the Youngtown General Plan 2025 was updated and approved by the voters by an overwhelming 70%. The General Plan addressed the following:
  - Circulation & Transportation – This element includes the goals, objectives, and policies for vehicular and non-vehicular mobility throughout Youngtown and between Youngtown and adjacent communities per the Small Area Transportation Study that the town worked with in collaboration with the MAG (Maricopa Association of Governments).
  - Water Resources – Youngtown's location on the east bank of the Agua Fria River provides it with an opportunity to implement the recommendations of the Agua Fria Watercourse Master Plan. The town continues to work with Maricopa County on areas that have potential for flooding within the town.
  - Open Space & Recreation – Town will continue to work with the City of El Mirage, the Flood Control District of Maricopa County and the U.S. Army Corps of Engineers to implement the Agua Fria River Watercourse Master Plan.
  - Environmental Planning – The town has implemented the MAG 1997 PM-10 & Carbon Monoxide Plan and in 1998, added additional measures to reduce PM-10 particulates to continue to meet air quality standards.
- The town has also worked with the Flood Control District of Maricopa County to determine appropriate actions to prevent flooding and development within the Agua Fria 100-year floodplain.

Plan Integration Strategy for Next Five Years:

Planning Mechanism	Description of Planning Mechanism Opportunity
Commercial Development Checklist	Each new development is required to complete a comprehensive review outlining the possible effect on the town's mitigation plan in conjunction with the growth to the community.
Flooding Resilience Planning	The town has identified streets that are prone to flooding and has applied for flood control assistance with Maricopa County in order to prevent street flooding and potential residential flooding.

Table 3-32: Plan integration history and future strategy for Youngtown	
Transportation Planning	The town has developed a transportation policy. The plan includes integration of pedestrian/bicycle non-motorized transportation into existing corridors in a safe manner; determined improvements and developed a plan to address residents' needs, address local and regional mobility, and consider access-management issues, while understanding the values and future transportation needs of our community. Developed a comprehensive transportation master plan, identified a prioritized project list for short-term and long-term investments. Public input meetings, dialogue and involvement in the plan, was received to ensure the policy reflects the vision of the town residents and businesses. Bike/Pedestrian Path was another key component of the study for Youngtown to become a more walkable community.
Ordinances – Updates or Revisions	Ongoing collaboration between town council, town management and staff and the town clerk's office
Design Review Board	The Town of Youngtown provides information on potential development from the hazard mitigation standpoint to identify areas where development may impact infrastructure, transportation issues, etc.

3.6.3 Plan Incorporation Process

Each jurisdiction has particular processes that are followed for officially incorporating and adopting planning documents and tools. Many of the processes and procedures are similar for jurisdictions with comparable government structures.

In general, planning documents prepared by the various departments or divisions of a particular jurisdiction are developed using an appropriate planning process that is overseen and carried out by staff, with the occasional aid of consultants. Each planning process is unique to the plan being developed, but all usually involve the formation of a planning or steering committee, and have some level of interagency/stakeholder coordination within the plan's effective area. Public involvement may also be incorporated when appropriate and depending on the type of plan. New or updated plans are usually developed to a draft stage wherein they are presented to the respective governing body for initial review and comment. Upon resolution and address of all comments, which may take several iterations, the plans are then presented to the governing body for final approval and official adoption.

Integration or reference to the Plan into these various processes will be accomplished by the active participation of the MJPT PPOC representative(s) from each jurisdiction, in the other planning teams or committees to ensure that the Plan risk assessment, goals, and mitigation A/Ps are integrated and/or incorporated into the planning mechanism as appropriate.

Table 3-33 provides a summary of standard operating procedures that each of the participating jurisdictions follow when considering and incorporating official planning mechanisms, and how they apply to integration of the Plan.

Table 3-33: Jurisdictional standard operating procedures for integration of planning mechanisms

Jurisdiction	Description of Plan Integration Standard Operating Procedures
Avondale	The General Plan follows Arizona Revised Statute for public processes, legal notifications, public hearings, and public vote steps to approve a General Plan. The Development & Engineering Services Department's Planning Division manages the General Plan process, update, written documentation, etc. collaborating with various City departments and staff. The proposed updates typically are presented to the City Council in a Work Session and Planning Commission in a Work Session followed by a formal approval process and public ballot vote. The General Plan was adopted in August 2012 and includes a Safety Element with the following information. This information will be updated for the 2022 General Plan update along with the goals and policies related to it. In general, planning documents are prepared by a particular department in the City by staff to a final draft stage and presented to the city council in a study work session for review and comment. Final approval and official adoption of any planning document or mechanism is normally done using a formal resolution process through the City Council.
Buckeye	The Maricopa County Multi-Jurisdictional Hazard Mitigation Plan (MCMJHMP) was developed by City staff through a consultant hired by the Maricopa County Department of Emergency Management (MCDEM). The final draft of the MCMJHMP will be reviewed by the City staff with input from the City Attorney and then placed on a City Council Agenda for their review and discussion. This will occur either during their Work Study Session or Regular Session. The MCMJHMP can be accepted by the City Council through their adoption of a resolution. The MCMJHMP will be distributed to the Public Works and Development Services Departments and utilized in future planning documents where appropriate.
Carefree	The town's General Plan is vetted through a series of public open houses to outline and gain acceptance of all facets of the Plan prior to consideration and deliberation of the Planning and Zoning Commission and town council. The Planning and Zoning Commission typically holds numerous public meetings to further discuss and vet the plan prior to forwarding their recommendation to the town council. Upon recommendation from the commission, the town council considers the General Plan or any proposed update/change to the plan. Throughout this extensive review process, if relevant, additional items related to the Hazard Mitigation Plan can be added.
Cave Creek	The Town of Cave Creek Planners, as well as Department Directors, frequently prepare planning documents that are reviewed at a Department Director level and then are further reviewed by the Town Manager. Many of those documents are further vetted through committees comprised of elected officials and commissioners as well as by town residents. The Final Drafts are then frequently presented to the Town Council for review and adoption often times via resolution. The Maricopa County Multi-Jurisdictional, Hazard Mitigation Plan shall be reviewed and as appropriate it shall be incorporated into future planning documents as it pertains to the Town of Cave Creek. The Town of Cave Creek staff will actively participate in the drafting and updating of planning documents for The Town of Cave Creek.

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Chandler	Planning documents are created through a variety of means, including consultant and internal/ regional committee. The City of Chandler utilizes a process for planning document approval. All documents will have an official council memo and resolution assigned. These documents along with the resolution will be presented to mayor and council during a designated session. Resolution will be adopted or denied based on council vote. Adopted resolutions are then signed by the clerk's office, city attorney, and mayor. The Plan, when completed, will follow the process described above. This will lead to formal city adoption of the plan and ensure the plans' usefulness over the next planning period.
El Mirage	General planning documents prepared by all departments for the City of El Mirage are developed by staff to a final draft stage and presented to the city council in a study work session for review and comment. Final approval and official adoption of any planning document or mechanism is normally done using a formal resolution process through the City Council. The Maricopa County Multi-Jurisdictional Hazard Mitigation Plan will be reviewed and as appropriate, incorporated into future planning documents and mechanism by the active participation of members of the City of El Mirage Mitigation Planning Team members in the development or update of those plans and mechanisms.
Fort McDowell Yavapai Nation	General planning documents in the Nation are prepared by departments and staff members of these departments specific to their area of responsibility and combined into a final document. The planning document is presented to the Tribal Council for discussion and approval. Included in the presentation of the planning document as an Action Item on the council agenda is a formal resolution. The multi-jurisdictional hazard mitigation plan will be reviewed, and as appropriate, incorporated into future planning documents for the Fort McDowell Yavapai Nation by the members of the Nation's Hazard Mitigation Planning team.
Fountain Hills	The Town of Fountain Hills staff researches, develops, and presents its planning documents to the Town Council for discussion, comment, and approval. The Maricopa County Multi-Jurisdictional Hazard Mitigation Plan will be reviewed, and brought before the Town Council, and upon approval, will be incorporated into the Town Planning documents as they are revised.
Gila Bend	General Plans, Capital Improvement Programs and Regional Plans (Transportation, Land Use, etc.), Emergency Operations/Response Plans (utilities, fire, and facilities), and Flood Mitigation Master Plans are developed by staff and outside agencies to a final draft stage and presented to the town council in a study work session for review and comment. Final approval and official adoption of any planning document or mechanism is normally done using a formal ordinance/resolution process through the public hearing and then town council. The Plan will be reviewed and as appropriate, incorporated into future planning documents and mechanism by the active participation of the MJPT PPOC for the town, in the development or update of those plans and mechanisms.
Gilbert	General planning documents prepared by several departments for the Town of Gilbert are developed by staff to a final draft stage and presented to the city council in a study work session for review and comment. Final approval and official adoption of any planning document or mechanism is normally done using a formal resolution process through the Town Council. The Maricopa County Multi-Jurisdictional Hazard Mitigation Plan will be reviewed and as appropriate, incorporated into future planning documents and mechanism by the active participation of members of the Maricopa County Mitigation Planning Team members in the development or update of those plans and mechanisms.

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Glendale	General planning documents are developed by staff and/or consultants to a final draft stage. For both new and updated CIP projects, a CIP Priority Matrix is used which includes questions regarding whether a project is designed to protect life/health/safety and if it is included in a master plan. Projects that meet these conditions are assessed a higher score which helps City management prioritize projects for presentation to City Council and public workshops for consideration. For Water Services projects, in some cases, the information is presented to the Citizen Utility Advisory Commission, then presented to City Council in a study work session for review and comment. Final approval and official adoption of certain planning documents or mechanisms are done using a formal resolution process through the City Council, as appropriate. The transportation planning process includes identifying all potential hazards and creating mitigation measures. The hazard mitigation plan will be used as a guide in this planning process. This process applies to capital transportation projects and operational activities. For capital projects, this is addressed as part of the environmental planning process. For operations, this is part of the ongoing risk mitigation process. Transportation projects and plans are made public for citizen review and input. The approval process involves staff review, Citizen Transportation Oversight Commission review and recommendation that are approved through City Council action. The Multi-Jurisdictional Hazard Mitigation Plan will be reviewed and, as appropriate, incorporated into future planning documents.
Goodyear	General planning documents prepared by all departments for the City of Goodyear are developed by staff to a final draft stage and presented to the city council for review and approval through a formal resolution. Once the FEMA update is completed, this plan will go before the City Council for signatory approval and formal resolution. Once approved locally, copies of the plan will be made available to all Department directors and key staff for incorporation into plans, policies, processes and protocols as appropriate. Additionally, this document will be used to annual for consideration of any Capital Improvement Projects (CIP) or as portions/considerations within other CIP projects as appropriate. This plan will also be used to inform, as appropriate, the update of other large-scale plans within the city, including, but not limited to: General Plan, Community Wildfire Protection Plan, Capital Improvement Plan, Conservation and Curtailment plan, etc. Finally, annual review of the Hazard Mitigation Plan will provide an opportunity to reach out to various departments for reporting and will act, if nothing more, as a reminder of the Hazard Mitigation Plan projects.
Guadalupe	Planning documents are prepared by staff and presented to Town Council as a final draft for review. The Planning documents are approved through resolution by the Town council. Hazard Mitigation plans are then reviewed and updated as directed by program manager from the Maricopa County Department Emergency Management.
Litchfield Park	Planning documents are prepared by the appropriate staff in the department that is proposing the planning document. A review by the City Manager or his designee is made of each document in question. The document is sent to the City Attorney for review and formatting. The document is placed on a City Council Agenda for discussion, public hearing if required, and possible introduction. If the document is introduced by the city council, then it will appear on the next city council agenda for public hearing and adoption.

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Maricopa County (Unincorporated)	General planning documents prepared by all departments within Maricopa County are developed by staff to a final draft stage and presented to the Maricopa County Board of Supervisors for review and final approval. Final approval and official adoption of any planning document is done using a formal resolution process. The Maricopa County Multi-Jurisdictional Hazard Mitigation Plan will be reviewed and as appropriate, incorporated into future planning documents as determined by Maricopa County Leadership, or members of the Maricopa County Mitigation Plan Committee.
Mesa	In general, the "big picture" concepts to be incorporated into planning documents are prepared by staff and shared with the public and city officials during a preliminary planning stage. Through public engagement events and Board and City Council study sessions, staff receives feedback and direction that informs the creation of the official planning document. Once a final draft of planning documents are complete, staff returns to Boards and City Council, via study sessions, to receive confirmation on policy direction. Once final documents are prepared, they are presented to the Planning & Zoning Board for their recommendation to City Council. City Council then takes action on the proposed documents, through the adoption of Resolutions or Ordinance.
Paradise Valley	Paradise Valley is no longer participating in the Plan
Peoria	The City of Peoria plan adoption process includes the following steps. (1) The development and/or updating of the hazard mitigation plan. (2) The plan is reviewed by both the City Attorney Office. (3) The plan is submitted to the City Manager's Office. (4) The plan is then submitted to our City Council for approval and adoption. The Maricopa County (City of Peoria) Multi-jurisdictional hazard mitigation plan will be reviewed by the City of Peoria on an annual basis and more frequently as required. Whereas appropriate the hazard mitigation plan will be used to provide guidance for the development of city-based codes and regulations to reduce the potential damage caused by a disaster such as a flooding event, wild land fire or other incident that hampers the city ability to provide essentials services.
Phoenix	1. Planning documents prepared by various departments for the City of Phoenix are developed by internal staff to a final draft stage and presented to the Mayor and Council in a formal session for review and comment. Final approval and official adoption of any planning document is normally done using a formal resolution process through the City Council. 2. The City of Phoenix Multi-Jurisdictional Hazard Mitigation Plan will be reviewed annually by the local planning team and updated, maintained and/or incorporated into future planning documents by the active participation of this local planning team.
Queen Creek	The Maricopa County Multi-Jurisdictional Hazard Mitigation Plan (MCMJHMP) was developed by Town staff through a consultant hired by the Maricopa County Department of Emergency Management (MCDEM). The final draft of the MCMJHMP will be reviewed by the Town staff with input from the Town Attorney and then placed on a Town Council Agenda for their review and discussion. This will occur either during their Work Study Session or Regular Session. The MCMJHMP can be accepted by the Town Council through their adoption of a resolution. The MCMJHMP will be distributed to the Public Works and Development Services Departments and utilized in future planning documents where appropriate.

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Salt River Pima-Maricopa Indian Community	General planning documents prepared by all departments for the Salt River Indian Community are developed by staff to a final draft stage and presented to the Tribal Council in a study work session for review and comment. Final approval and official adoption of any planning document or mechanism is normally done using a formal resolution process through the Tribal Council. The Plan will be reviewed and as appropriate, incorporated into future planning documents and mechanism by the active participation of members of the SRPMIC Mitigation Planning Team. Team members will be involved in the formal adoption processes described above, as well as the implementation of the plan into their respective department's planning efforts.
Scottsdale	Planning documents and studies are usually initiated at the staff level. New plans are typically studied and developed within the department responsible for the plan. Existing plans are reviewed and updated based on the particular plan's life cycle. Once plans have been developed and edited, they are presented to council for official approval. Wherever appropriate, the plan will be reviewed and incorporated into future planning documents and mechanisms.

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Surprise	Public Works General planning documents are typically generated by the relevant department staff and reviewed by multiple departments and department heads in the city. Depending on the plan type, it may be provided to the general public for input prior to formal adoption by Council. The City of Surprise management and City Council participate in the general planning and development process. The Plan is placed on the council agenda for formal review and approval. The plan is reviewed, and as appropriate, incorporated into future planning processes and documents. (PW) Water Resource Management 1. The preparation of planning documents that will ultimately need the approval of City Council are presented over the duration of the development at work sessions for input and review. The final draft is presented and approved by council via resolution. The 2021 Hazard Mitigation Plan will receive a similar process, keeping Council in the loop at work sessions or other informal meetings. Once the plan is complete, it will be adopted via resolution. Fire Medical Department General planning documents are prepared by city staff in each of the departments within the City of Surprise (COS). Draft documents are reviewed internally by multiple stakeholders. Draft plans are forwarded to the department director for approval and subsequent presentation to the COS City Council. Some documents/plans may also need to be reviewed by the legal department before moving on to the City Council. The general public may have the ability to review and provide input prior to formal adoption by COS City Council, depending on the sensitivity of said plan. The 2021 Hazard Mitigation Plan will follow a similar route and will be formally presented before the COS City Council for formal review and approval. Community Development Department Planning documents are prepared by Community Development's Planning Division staff and/or in close coordination with expert consultants hired to assist with the generation of such documents (ex. City of Surprise General Plan). Planning documents are developed by staff and/or consultants to a final draft and then presented to the City's Planning and Zoning Commission, City Council, or a combination thereof for comments. Final adoption of any final planning documents occurs through a formal resolution of the City Council. The City of Surprise Multi-Jurisdictional Hazard Mitigation Plan will be reviewed and incorporated into future planning documents, as appropriate.
Tempe	General planning documents prepared by all departments for the City of Tempe are developed by staff and outside consultants to a final draft stage and presented to the city council in a study work session for review and comment. Depending on the document, the action of the city council may include: • Council review only, • Council review and formal adoption via a resolution process, or • Council review with a recommendation to promulgate via a general public ballot measure/approval. All planning processes typically require a review of available reference material and plans, which will include but not be limited to the MCMJHMP. Staff serving on the Local Planning Team are often involved in other planning processes and will provide context and a nexus to the MCMJHMP.

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Tolleson	General planning documents developed by city staff are presented to the city council for review and approval. Depending upon the complexity and/or breadth of the document or the plan, work study meetings or public hearings may be incorporated into the process. Final approval and official adoption of any document, policy, or mechanism is normally completed through a formal resolution process of the City council.
Wickenburg	Plans are developed by the department heads with help from other departments, depending on what details are needed within the document. The plan will be reviewed by the Town Manager's office and Town Clerk's office, prior to going to legal department for review. The legal department will provide further guidance and editing, then send plan back to department head for final review and move forward to council. The town council will then adopt the plan as a resolution during a regular council meeting. The plan will then stay on file with the town clerk and appropriate departments.
Youngtown	Each development project is required to go through a formal pre-application process at which time the applicant will receive comments from various departments within the town. The comments generated by staff will include all aspects of development including the Plan as it relates to their perspective project. Comments generated by staff must be included in the design of the project prior to the formal approval. The town's General Plan was formulated with the input of key community stakeholders, which included APS, Southwest Gas, EPCOR Water, Sun City Fire District, El Mirage, Surprise, Phoenix, Peoria, Sun City and Sun City West, the Arizona Commerce Authority and many others. Public meetings were held to provide input from our residents and business community. Planning and Zoning hearing was held and consideration by council, before going to vote in the General Election in November 2014. Voters approved the plan by a vote of 70%.

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SECTION 4: COMMUNITY DESCRIPTIONS

4.1 General

The purpose of this section is to provide updated basic background information on Maricopa County as a whole and includes information on geography, climate, population and economy. Abbreviated details and descriptions are also provided for each participating jurisdiction.

4.2 County Overview

4.2.1 Geography

Maricopa County is located in central Arizona and encompasses 9,224 square miles. Situated in the upper Sonoran Desert and varying in elevation from 436 feet above sea level in the southwest to 7,645 feet at the northeast, the county contains several plant communities. At the lower elevations, desert scrub, punctuated with saguaro cactus, predominate. The higher elevations contain woodlands and sparse forests. Along the rivers, streams, and washes, riparian communities flourish and sustain the majority of the diverse plant and animal life found in the county. The Salt and Verde Rivers enter the county at the northeast quadrant, combine, and continue on a bisecting path at the Salt River until confluencing with the Gila River in the central portion of the county near Avondale. The Gila River then continues bisecting the county as it journeys southwesterly towards the confluence with the Colorado River in Yuma, Arizona. The life-sustaining water this extensive river system brings to the region has defined life in Maricopa County from the earliest Native American settlements to the present day. Maricopa County has one of the most ample water supplies of any desert region in the west. The watershed of the Salt and Verde Rivers is impounded behind the dams of the Salt River Project. The Central Arizona Project canal which brings water from the Colorado River can supply more than a fifth of the total water for the county. In addition to this supply, the metropolitan area is situated over a prolific aquifer. To assure an adequate water supply for future generations, the state legislature adopted the Groundwater Management Act in 1980. This act requires careful water management and conservation measures to ensure water will be available for the influx of people expected in the next 20 years and beyond [2].

Several major roadways support both local and regional transportation needs in Maricopa County. Interstates 10, 17, and 8 all intersect in or near Phoenix, and provide access to surrounding states. Several other state and US highways provide local and regional access throughout Arizona. Sky Harbor International Airport, located in central Phoenix, is one of the busiest air travel facilities in the United States.

Federal and state government entities own 50 percent of Maricopa County land, including the U.S. Bureau of Land Management (28 percent), the U.S. Forest Service

[2] Maricopa County Planning and Development Services, 2002, *Maricopa County Comprehensive Plan, 2020 Eye to the Future*, adopted October 20, 1997, revised August 7, 2002.

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(11 percent), and the State of Arizona (11 percent). An additional 16 percent is publicly owned, and 5 percent is Indian reservation land.

General County features are depicted in Figure 4-1.

4.2.2 Climate

The climate in Maricopa County is characterized by the mild winters and hot summers typical of the upper Sonoran Desert regions. Temperatures and precipitation across the county vary somewhat due to the changes in elevation and orographic influences of local mountains and valleys. Climate statistics for weather stations within the county are produced by the Western Region Climate Center[3] (WRCC) and span records dating back to the early 1900's. Locations for WRCC stations within Maricopa County are shown on Figure 4-1.

Average temperatures within the county range from near freezing during the winter months to over 110 degrees Fahrenheit during the hot 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 northeastern portion of the county are notably different from those for the lower Gila River valley.

Figures 4-2, 4-3, and 4-4 present a graphical depiction of temperature variability and extremes throughout the year for the Carefree (elevation = 2,530 ft), Gila Bend (elevation = 730 ft), and Phoenix Airport Weather Service Forecast Office (WSFO AP) (elevation = 1,110 ft). In general, there is a ten degree reduction in temperatures between the lower and upper elevation stations.

Precipitation throughout the 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 longer duration precipitation events with low intensity rainfall 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 of moisture-laden air, especially along the primary mountain ranges. Thus, the strongest thunderstorms are usually found in the mountainous regions of the central southeastern portions of Arizona. These thunderstorms are often accompanied by strong winds, blowing dust, and infrequent hail storms[4].

[3] http://www.wrcc.dri.edu/CLIMATEDATA.html

[4] Office of the State Climatologist for Arizona, 2004. https://azclimate.asu.edu/

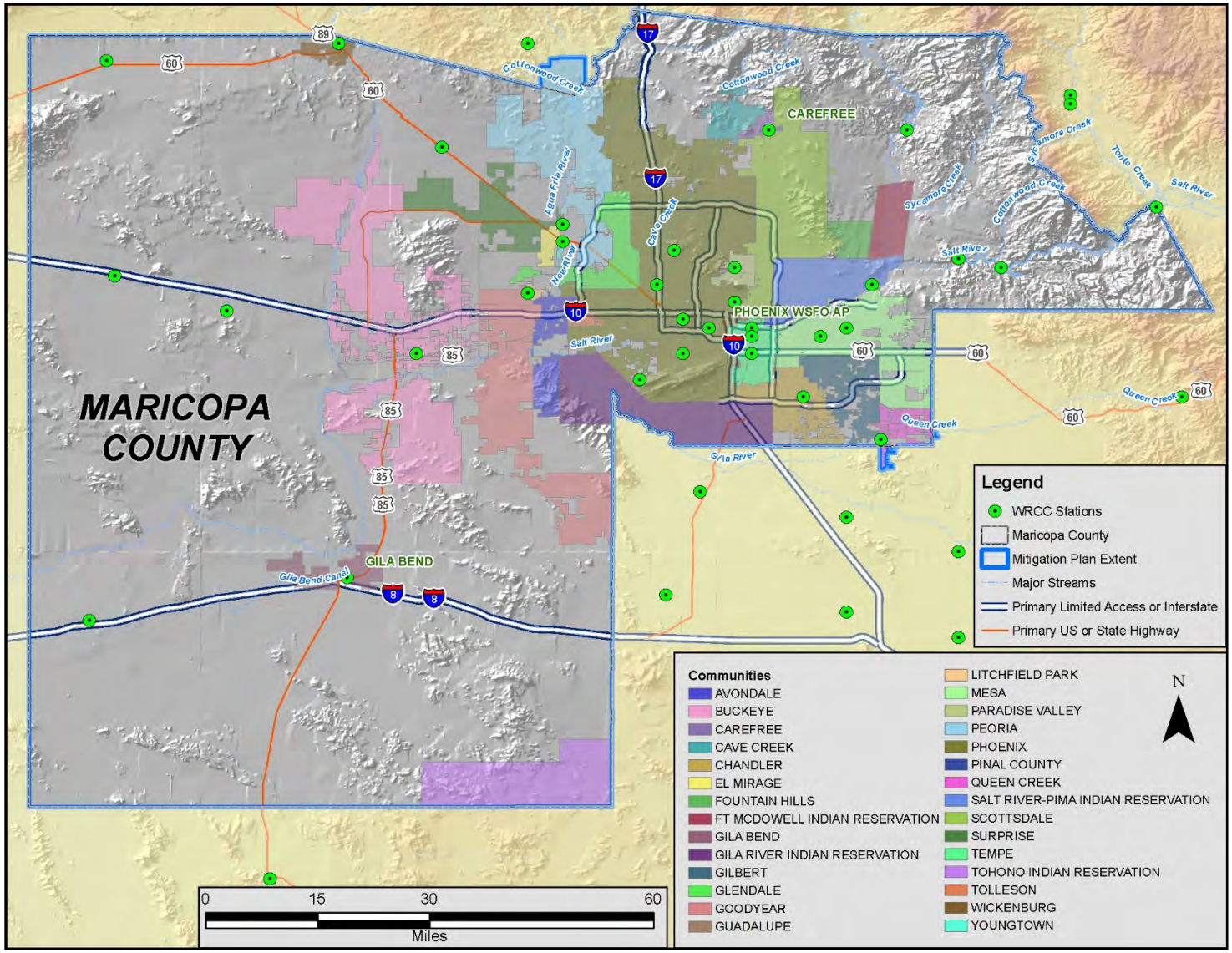

Figure 4-1: Map of general features for Maricopa County

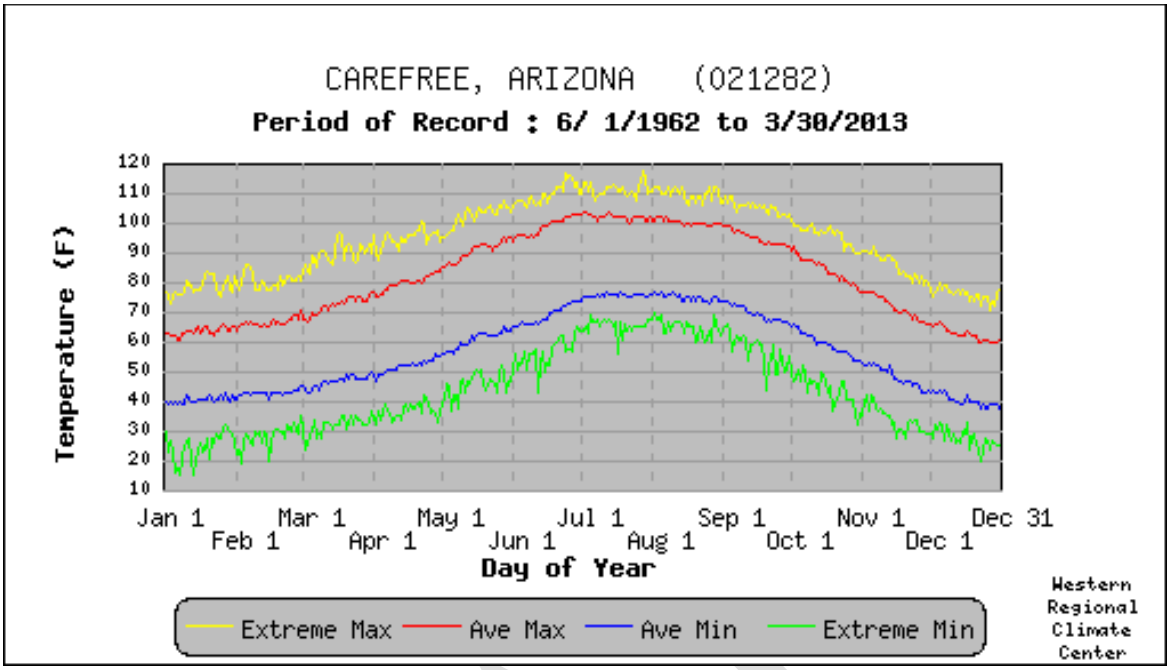

Figure 4-2: Daily Temperatures and Extremes for Carefree Station, Arizona

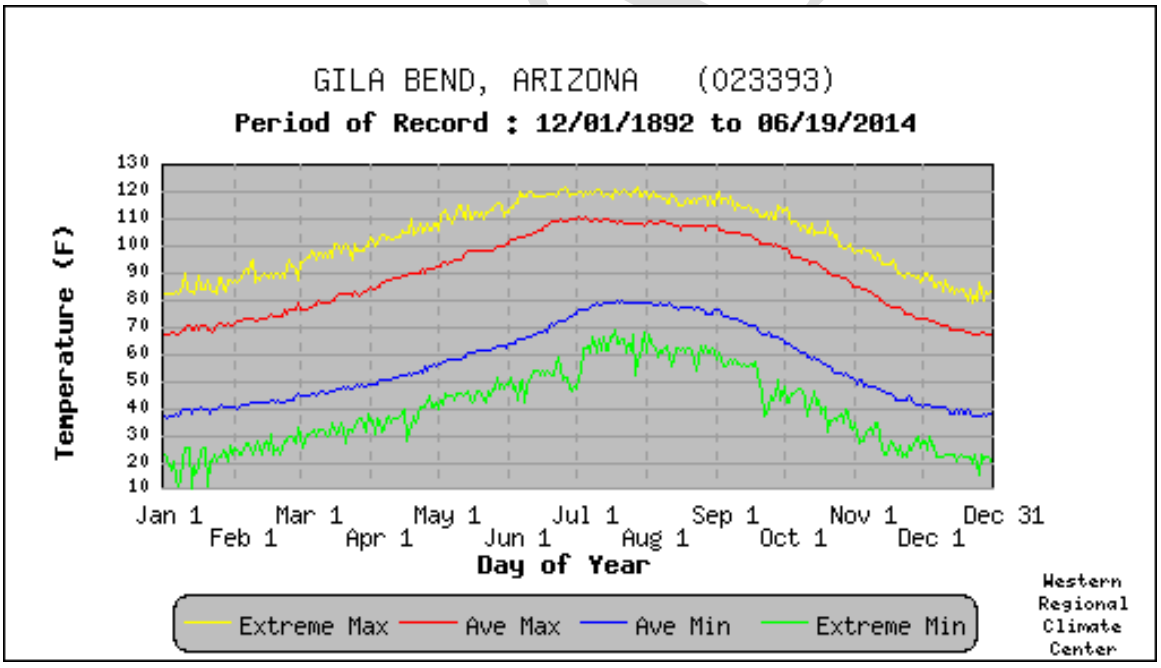

Figure 4-3: Daily Temperatures and Extremes for Gila Bend Station, Arizona

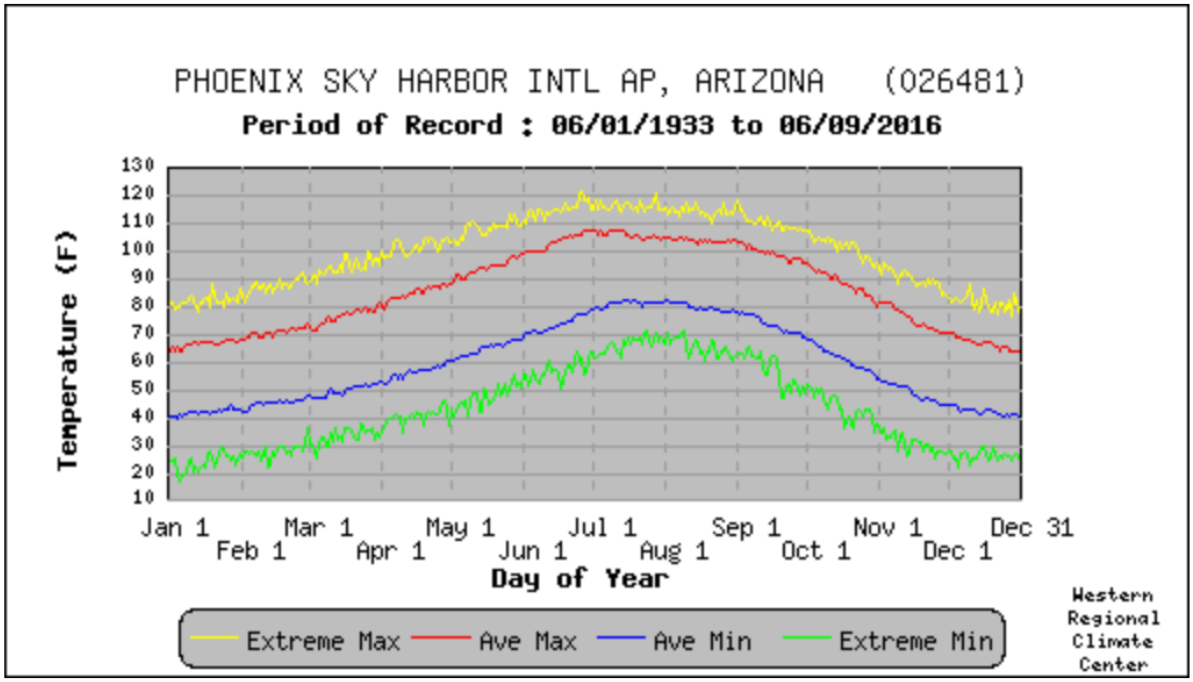

Figure 4-4: Daily Temperatures and Extremes for Phoenix WSFO AP Station, Arizona

Figures 4-5, 4-6, and 4-7 present tabular temperature and precipitation statistics for the Carefree, Gila Bend, and WSFO AP Stations. It is noteworthy that average annual precipitation more than doubles from the lower elevation of the county to the upper regions.

CAREFREE, ARIZONA (021282)

Period of Record Monthly Climate Summary

Period of Record : 6/ 1/1962 to 3/30/2013

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Average Max. Temperature (F)	63.5	66.6	72.2	79.9	90.3	98.7	102.0	100.2	95.0	84.3	71.7	62.6	82.3
Average Min. Temperature (F)	40.7	43.0	46.8	51.8	60.7	69.1	75.7	75.0	69.7	59.6	48.5	40.5	56.8
Average Total Precipitation (in.)	1.49	1.47	1.55	0.56	0.15	0.12	1.15	1.61	1.07	1.09	0.99	1.47	12.71
Average Total SnowFall (in.)	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Average Snow Depth (in.)	0	0	0	0	0	0	0	0	0	0	0	0	0

Percent of possible observations for period of record.
Max. Temp.: 79.5% Min. Temp.: 79.5% Precipitation: 81% Snowfall: 81.7% Snow Depth: 81%
Check Station Metadata or Metadata graphics for more detail about data completeness.

Western Regional Climate Center, wrcc@dri.edu

Figure 4-5: Monthly climate summary for the Carefree Station, Arizona

GILA BEND, ARIZONA (023393)

Period of Record Monthly Climate Summary

Period of Record : 12/01/1892 to 06/19/2014

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Average Max. Temperature (F)	69.1	73.6	80.0	88.1	96.8	106.1	108.9	107.3	103.1	92.1	78.6	69.2	89.4
Average Min. Temperature (F)	38.8	41.8	46.3	51.9	59.8	68.4	78.4	77.1	70.3	57.3	45.4	38.8	56.2
Average Total Precipitation (in.)	0.61	0.62	0.61	0.21	0.13	0.05	0.73	0.99	0.51	0.38	0.50	0.68	6.02
Average Total SnowFall (in.)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Average Snow Depth (in.)						No	Data						

Percent of possible observations for period of record.
Max. Temp.: 83.9% Min. Temp.: 83.7% Precipitation: 90.6% Snowfall: 90.8% Snow Depth: 90.8%
Check Station Metadata or Metadata graphics for more detail about data completeness.

Western Regional Climate Center, wrcc@dri.edu

Figure 4-6: Monthly climate summary for the Gila Bend Station, Arizona

PHOENIX SKY HARBOR INTL AP, ARIZONA (026481)

Period of Record Monthly Climate Summary

Period of Record : 06/01/1933 to 06/09/2016

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Average Max. Temperature (F)	66.2	70.0	76.0	84.5	93.7	103.0	105.7	103.6	99.1	88.3	75.3	66.5	86.0
Average Min. Temperature (F)	41.7	44.5	49.2	55.9	64.3	72.9	80.6	79.4	73.1	61.0	48.5	41.8	59.4
Average Total Precipitation (in.)	0.78	0.76	0.84	0.28	0.13	0.09	0.86	1.02	0.68	0.57	0.55	0.90	7.46
Average Total SnowFall (in.)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Average Snow Depth (in.)	0	0	0	0	0	0	0	0	0	0	0	0	0

Percent of possible observations for period of record.
Max. Temp.: 100% Min. Temp.: 100% Precipitation: 100% Snowfall: 98% Snow Depth: 98%
Check Station Metadata or Metadata graphics for more detail about data completeness.

Western Regional Climate Center, wrcc@dri.edu

Figure 4-7: Monthly climate summary for the Phoenix WSFO AP Station, Arizona

4.2.3 Population

Maricopa County is home to more than half of Arizona's overall population, with the 2019 count estimated at 4.5 million people. In the 1990's, the county was the fastest growing county in the United States, gaining nearly 1 million new residents with a growth rate of 44.8 percent during that decade. Since the economic crash of 2008, growth within the county, in general, slowed significantly, with a moderate 5.0 percent growth over the 2010 to 2014 period. More recently Maricopa County has become the fastest-growing county in the United States, with more than 81,000 people added between July 2017 – 2018. Table 4-1 summarizes 2010 and 2019 jurisdictional population statistics for Maricopa County communities and the county as a whole. The county population is projected to exceed 4.5 million by the year 2020. Figure 4-8 is a map prepared by the Maricopa Association of Governments (MAG) that illustrates 2010 population densities for the county.

Table 4-1: Summary of jurisdictional population estimates for Maricopa County

Jurisdiction	Total Population			Percent Change		Share	
	April 1, 2010 (Census 2010)	July 1, 2019	Change	Overall	Annual	Share of Growth	Share of County
Apache Junction*	294	322	28	9.52%	0.99%	0.01%	0.01%
Avondale	76,238	84,595	8,357	10.96%	1.13%	1.52%	1.94%
Buckeye	50,876	81,624	30,748	60.44%	5.40%	5.58%	1.87%
Carefree	3,363	3,771	408	12.13%	1.25%	0.07%	0.09%
Cave Creek	5,015	5,834	819	16.33%	1.65%	0.15%	0.13%
Chandler^	236,326	266,804	30,478	12.90%	1.32%	5.53%	6.11%
El Mirage	31,797	34,359	2,562	8.06%	0.84%	0.46%	0.79%
Fort McDowell Yavapai Nation	971	1,043	72	7.42%	0.78%	0.01%	0.02%
Fountain Hills	22,489	24,225	1,736	7.72%	0.81%	0.32%	0.55%
Gila Bend	1,922	2,019	97	5.05%	0.53%	0.02%	0.05%
Gila River*	2,994	3,148	154	5.14%	0.54%	0.03%	0.07%
Gilbert^	208,352	259,386	51,034	24.49%	2.40%	9.26%	5.94%
Glendale	226,721	243,262	16,541	7.30%	0.76%	3.00%	5.57%
Goodyear	65,275	88,870	23,595	36.15%	3.39%	4.28%	2.03%
Guadalupe	5,523	6,373	850	15.39%	1.56%	0.15%	0.15%
Litchfield Park	5,476	6,811	1,335	24.38%	2.39%	0.24%	0.16%
Mesa	439,041	497,439	58,398	13.30%	3.60%	10.60%	11.39%
Paradise Valley	12,820	14,134	1,314	10.25%	1.06%	0.24%	0.32%
Peoria*	154,058	180,161	26,103	16.94%	1.71%	4.74%	4.12%
Phoenix^	1,447,128	1,617,344	170,216	11.76%	1.21%	30.89%	37.02%
Queen Creek*	25,912	46,271	20,359	78.57%	6.47%	3.69%	1.06%
Salt River Pima Maricopa Indian	6,289	6,808	519	8.25%	0.86%	0.09%	0.16%
Scottsdale	217,385	247,944	30,559	14.06%	1.43%	5.55%	5.68%
Surprise	117,517	136,194	18,677	15.89%	1.61%	3.39%	3.12%
Tempe	161,719	188,616	26,897	16.63%	1.68%	4.88%	4.32%
Tolleson	6,545	7,085	540	8.25%	0.86%	0.10%	0.16%
Wickenburg	6,363	7,797	625	9.82%	1.02%	0.11%	0.18%
Youngtown	6,156	6,599	443	7.20%	0.75%	0.08%	0.15%
Balance of County^	272,552	299,806	27,524	10.10%	1.04%	5.00%	6.86%
Totals	3,817,117	4,368,644	550,988	14.43%	1.46%	100.00%	100.00%

NOTES:
- Totals may not add due to rounding
- * Maricopa County portion only
- ^ Census 2010 counts adjusted to reflect Census Count Question Resolutions
- Approved by the Maricopa Association of Governments Regional Council, December 4, 2019

Sources:

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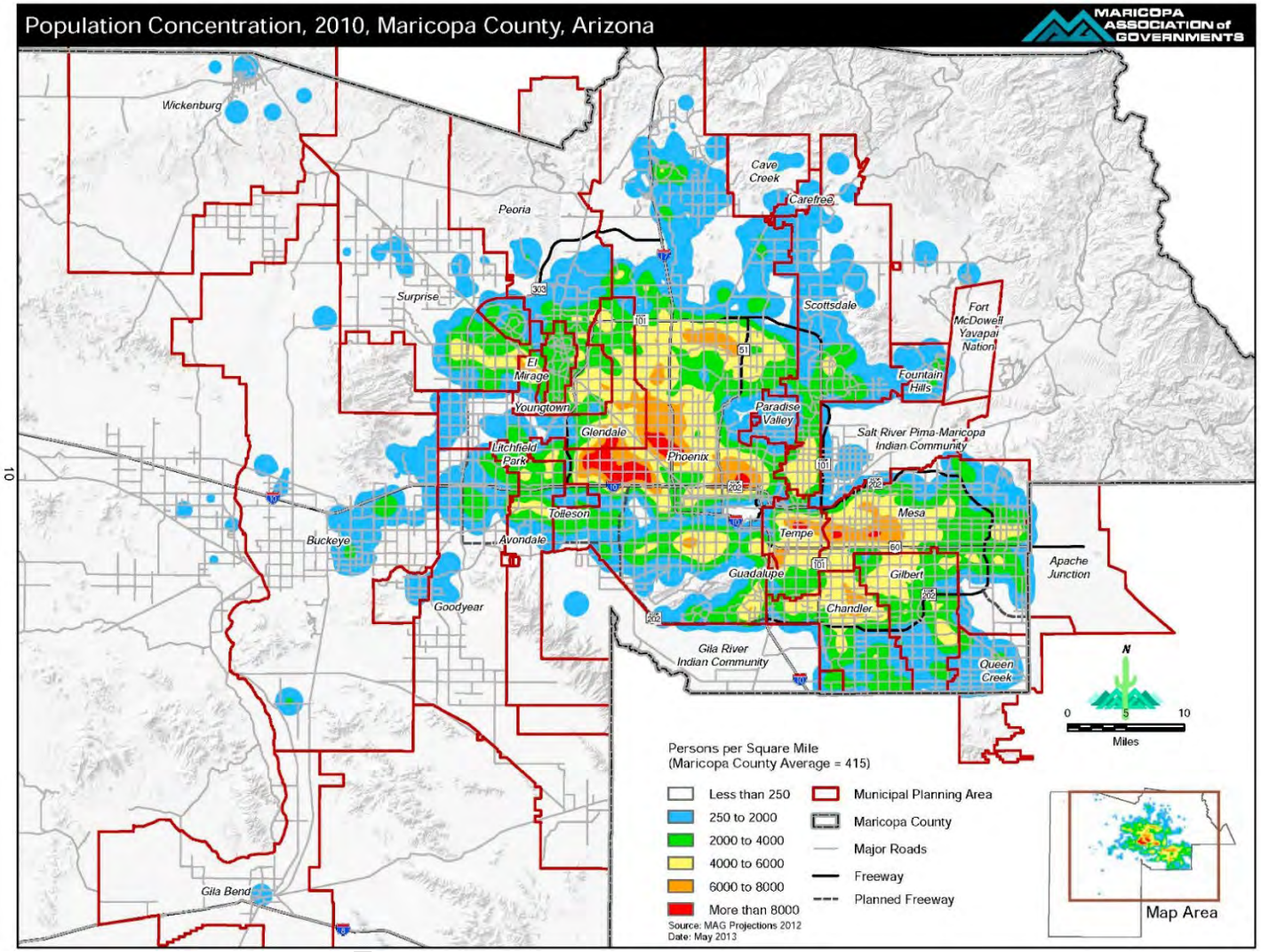

Source: MAG, 2013, *Municipal Planning Area Socioeconomic Profiles Maricopa County, Arizona.*

Figure 4-8: 2010 population density for Maricopa County

4.2.4 Economy

Maricopa County was originally inhabited by Native Americans, who abandoned the area during the 1300's for unexplained reasons. Agriculture was the prominent activity in the region and was reestablished during the 1860's as the first European settlers migrated to the Salt River Valley. Rapid growth and robust development have been the hallmark of Maricopa County ever since. In 1870, the town site of Phoenix was established, and on February 14, 1871, the Territorial Legislature created Maricopa County. By 1872, there were over 700 people in the county with 5,000 acres under cultivation. The arrival of the railroad in 1877 caused a surge in economic activity. In the early 1900s, the larger farm parcels scattered throughout the region were divided into small farm communities such as Chandler, Gilbert, and Tolleson. In 1902—at the request of President Theodore Roosevelt—after a series of devastating floods, Congress passed the Reclamation Act of 1902. Shortly thereafter, the U.S. Bureau of Reclamation started construction on Theodore Roosevelt Dam east of Phoenix. Irrigated agricultural production and population exploded after the completion of Roosevelt Dam in 1912, providing the region with a reliable water supply. Maricopa County quickly became one of the leading agricultural producing counties in the United States. During this period, the County also became a winter haven for tourists.

Growth in the area continued as tourism, automobile travel, military, and industrial activities came to the county. Construction continued on residential developments, highways, and commercial districts, making Maricopa County an increasingly popular place to live. Until the end of World War II, the traditional economic engines of both the State of Arizona and Maricopa County were known as the five "Cs": Cotton, Copper, Cattle, Climate, and Citrus. Newly established wartime industries fueled the monumental growth of the county in the post-war era. By 1960, the population was over 660,000 people, and reached one million residents in the early 1970s. Combined with the general economic expansion of the 1980s and the rush to the Sun Belt, Maricopa County claimed over 2.2 million residents by 1990. Even with economic sluggishness in the early 1990s, the region continued to grow through 2007 at a rate of about four times the national average. U.S. Census (American Community Survey) data indicate median household income for the period of 2015 to 2019 to be $64,468 and per capita income for the same period of $33,279.

As of January, 2021[5], the unemployment rate stands at 6.8 percent with a total non-farm employed labor force of over 2.05 million. Total revenue from sales exceeds $4.67 billion. For 2020, a total of 39,693 residential building permits were issued. Figure 4-9 is a map prepared by MAG that shows employment densities across the county for the year 2010.

[5] University of Arizona – Eller Economic & Business Research Center, 2015, URL at: http://azeconomy.org/data/economic-indicators/maricopa-county/

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4.2.5 Development Trends for Unincorporated Maricopa County

Over the past five years residential development in unincorporated Maricopa County has been very low. The largest development in unincorporated Maricopa County has occurred along the I-17 in the Anthem area, and in western Maricopa County along the recently completed SR303.

Over the next five years development will continue in areas near the SR303 and in northern Maricopa County specifically, the Anthem area.

4.3 Jurisdictional Overviews

The following are brief overviews for each of the participating jurisdictions in the Plan. With this update, the socioeconomic details for each jurisdiction have been modified to include projections into 2030 and clarify the population estimates for the current jurisdictional boundary and the municipal planning area (MPA) which is the geographical limit that the Maricopa Association of Governments (MAG) uses for the housing and employment statistics. Population and employment statistics are obtained from the latest MAG socioeconomic projections report[6]. Housing projections are obtained from comprehensive socioeconomic profiles developed by MAG in 2013[7]. For further socioeconomic details for each jurisdiction, the reader is referred to the MAG website at https://www.azmag.gov/Programs/Maps-and-Data/Community-Profiles. Excerpts from the MAG documents are provided as appropriate. Additionally, updated development trend information provided by each jurisdiction is included in this section.

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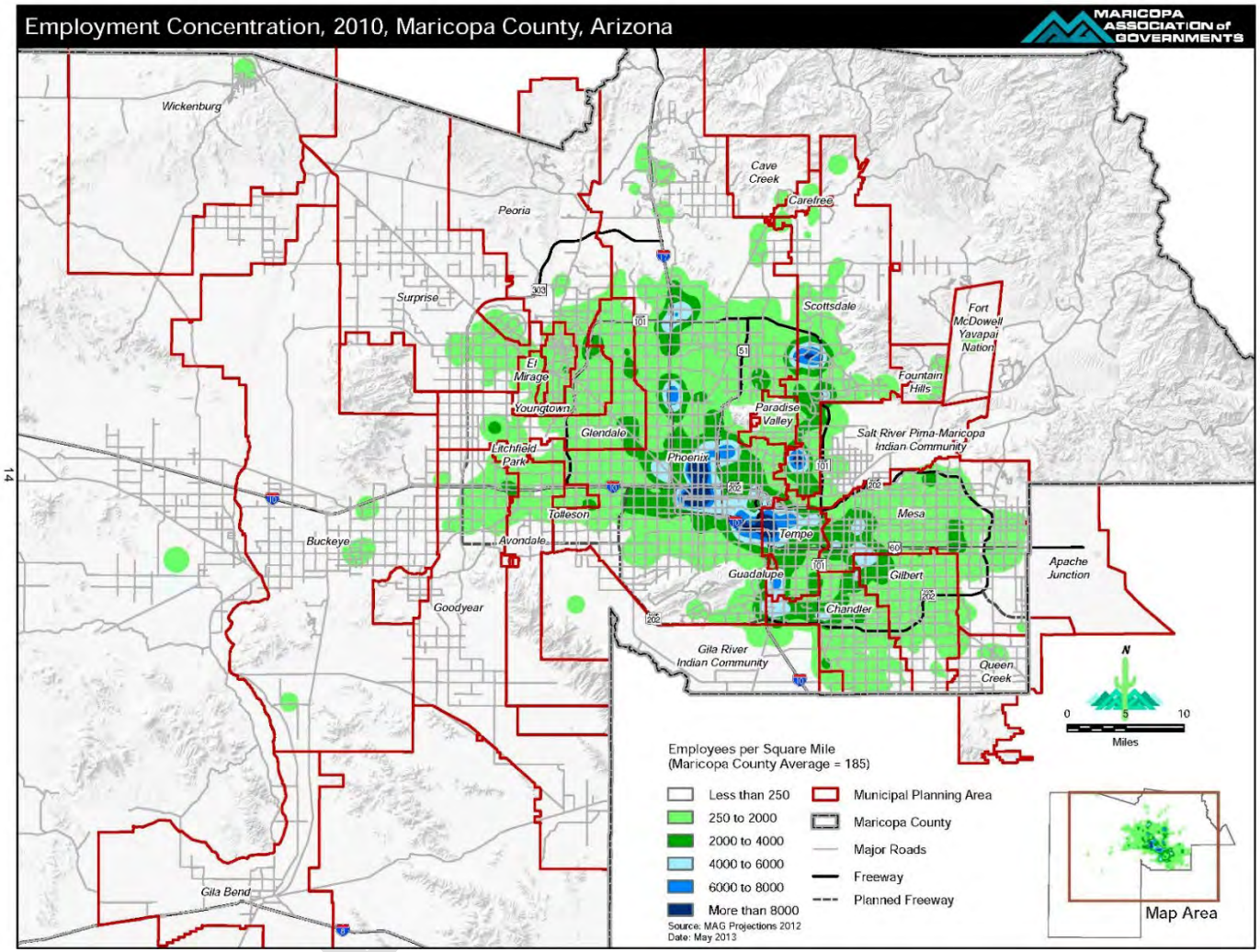
[6] MAG, 2019, *Socioeconomic Projections, Population and Employment by Municipal Planning Area, Jurisdiction and Regional Analysis Zone.* Web access at: https://www.azmag.gov/Portals/0/Documents/MagContent/municipality-population-housing-estimates-2019.pdf

[7] MAG, 2013, *Municipal Planning Area Socioeconomic Profiles Maricopa County, Arizona.*



Source: MAG, 2013, *Municipal Planning Area Socioeconomic Profiles Maricopa County, Arizona.*

Figure 4-9: 2010 employment concentration projections for Maricopa County

4.3.1 Avondale

Situated along Interstate 10 approximately 15 miles west of downtown Phoenix, the City of Avondale lies immediately east of Goodyear and west of Tolleson in the west valley region of Maricopa County, as shown in Figure 4-10.

The Gila River Native American Community is located southeast of the City. Estrella Mountain Park is located in the southern portion of Avondale, and the Agua Fria River bisects the City running north to south before merging with the Salt and Gila Rivers to form the Tres Rios Nature Area.

Avondale was founded in 1900 and was incorporated in 1946. Avondale is governed by a council-manager form of government with a seven-member city council consisting of a mayor and six council members elected at-large for a term of four years. The City Council appoints the City Manager and other officers necessary to produce an orderly administration of the City's affairs.

Like most communities located in the greater metropolitan area, Avondale has experienced rapid growth in both population and land area over the past 30 years. The City of Avondale's population grew from 16,169 in 1990 to an estimated 88,750 in 2020. Population, housing and employment statistics and projections are summarized in Table 4-2. Currently, the City of Avondale Planning Area is 94.4 square miles, whereas in 1990, the Planning Area was 40 square miles. The primary manmade features that influence Avondale's land uses include: Interstate 10, which runs east to west across the City; a Salt River Power transmission line which runs north to south through Avondale and turns east to west in the south-central portion of the city; and the Roosevelt and St. Johns-Sunland Irrigation District Canals which transverse the city's north and south sides, respectively. The City has a well-developed Arterial Road system north of the Estrella Mountains creating a 1-mile intersecting grid of streets.

In 2019, the population of Avondale was 84,595. Population projections for 2020 and 2030 current corporate limits and population, housing, and employment statistics for MPAs for 2010, 2020 and 2030 are summarized in Table 4-2.

Table 4-2: Population, housing and employment statistics for Avondale

Year	Population (Current Limits)	Population (MPA)	Housing (MPA)	Employment (MPA)
2010	76,238	77,900	27,600	14,064
2020	85,000	86,700	31,400	23,200
2030	98,600	101,800	40,000	30,400

Development Trends:

The City has experienced significant land use activity over the preceding five (5) years. During this period, key growth corridors included:

- 99th Avenue from I-10 to Van Buren Street
- McDowell Road from Avondale Blvd to 99th Avenue

- Van Buren Street from the new Fairway Drive freeway exit (near 127th Ave) to 99th Avenue
- Historic Avondale area – approx. Dysart and Buckeye Road
- North Avondale area – north of I-10
- South Avondale area – south of Lower Buckeye Road to the Gila River and Estrella Mountains
- The BLVD live/work/play destination area – The west and east sides of Avondale Blvd from I-10 to Van Buren Street

Citywide, land use development over the past five (5) years has included twelve (12) Single-Family Residential Projects either in review, under construction or approved to develop totaling approximately 8,431 units (platted subdivisions and townhomes); approximately 1,274,635 square feet of Commercial Project (Retail, Restaurant, Entertainment, Office, & Hotel) building area that is built, in review, under construction or approved; approximately 2,844,666 square feet of Employment Projects (Industrial, Business Parks) building area that is built, in review, under construction, or approved; and Seven (7) Multi-Family Residential Projects (apartments, condos) in review, under construction or approved to develop totaling approximately 1,953 units.

Anticipated development over the next five (5) years in Avondale includes the following:

1. Developing "The BLVD" mixed-use area off of I-10 and Avondale Blvd. to be a major destination for Avondale; live, work, play concept. This area is planned for urban residential multi-family densities, office, commercial retail, restaurant, and entertainment uses.

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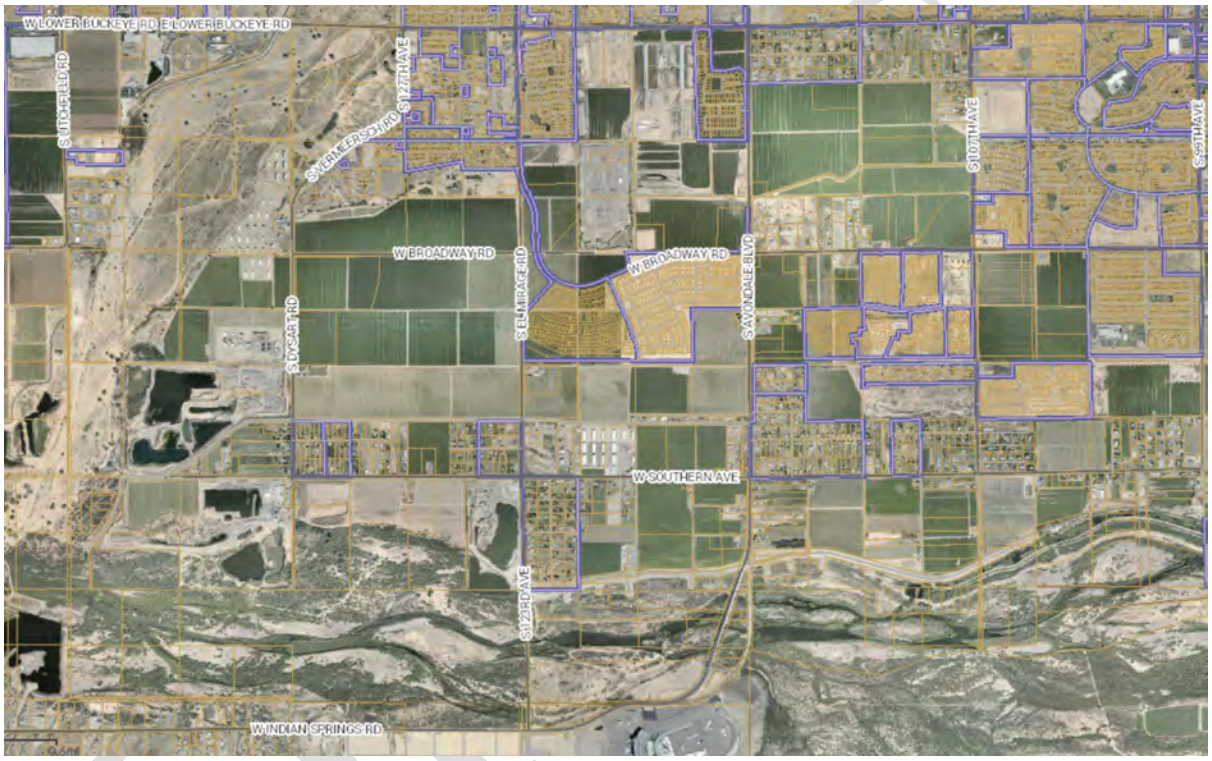
2. Continued development of vacant parcels along the McDowell Road Corridor from Avondale Blvd. to 99th Avenue with healthcare related businesses, office, retail, and restaurant.

3. Developing commercial corners at arterial street intersections with commercial or other land use pending the economic needs of the area for additional commercial.
4. Development opportunities along the planned State Route 30, Gila River, and Rio Reimagined in southern Avondale.

- Focus on economic development and land use goals for new development.
- Finding the right balance of commercial retail, restaurant, and office uses at the proposed interchanges that will transition appropriately to low density residential and recreation areas envisioned for the area.
- Creating linkages between SR-30, recreational areas, and our core community to the north.
- Focus on recreational opportunities along the Gila River as part of the Rio Reimagined project.



5. Developing the land use vision and promote development in the City's planning area south of the Estrella Mountains.

6. Employment/industrial infill development in Old Town along Elise C. Felix Jr. Way, along Van Buren Street from 107th Avenue to 99th Avenue.

All new development will be required to connect to City water and sewer lines, upgrade or install new lines as well as improve rights-of-ways as needed. Development south of the Estrella Mountains will need access to water and sewer infrastructure as none exist in the Avondale planning boundary. The adjacent City of Goodyear and County properties have utilities and rights-of-ways that Avondale may be able to access through a partnership/agreement. City of Goodyear has the nearby Province at Estrella Mountain Ranch Parcel 7 (already built with stubs to utilities and streets) and two to three master planned residential communities in the planning process to the west off Rainbow Valley Road.

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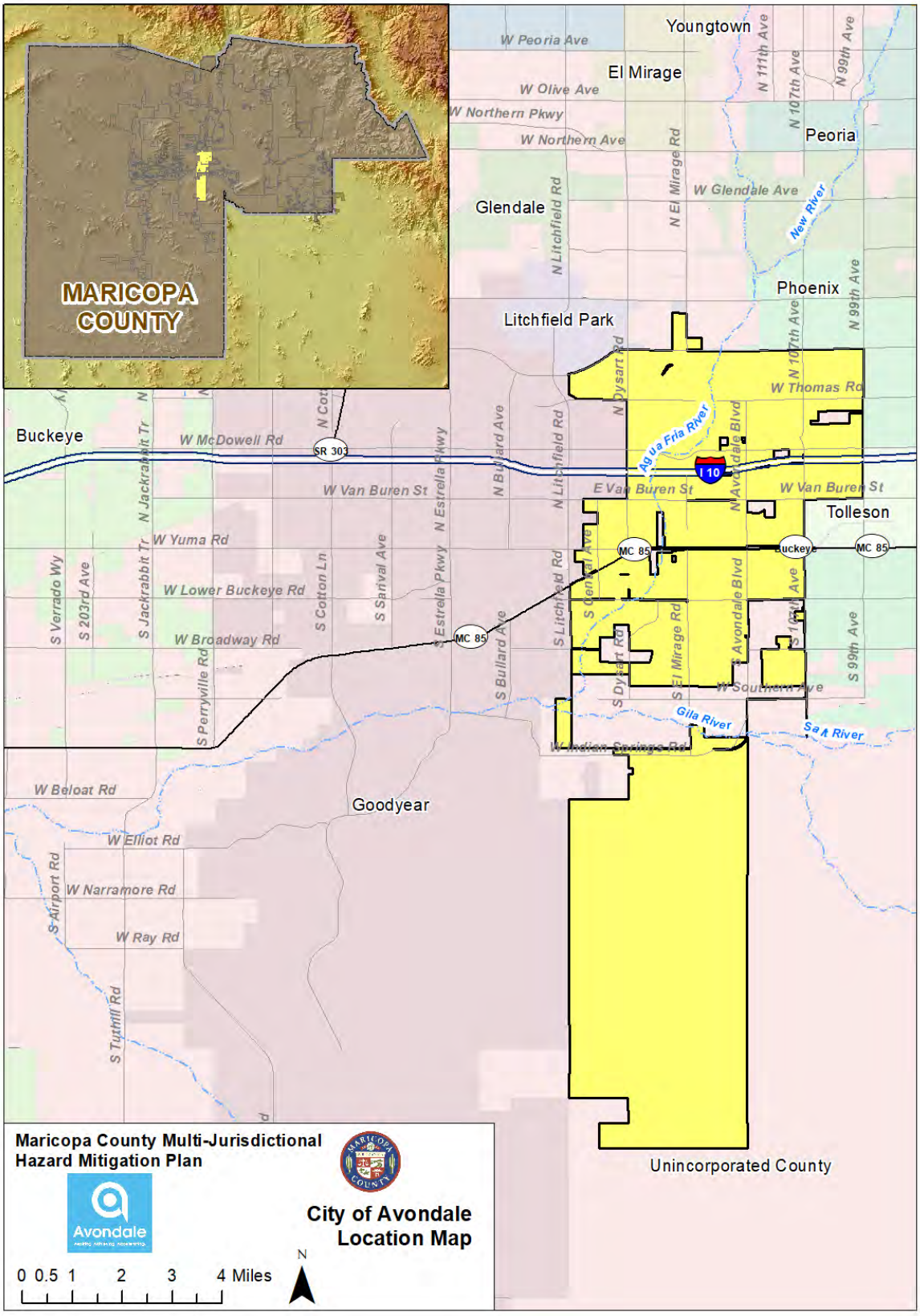

Figure 4-10: Avondale location map

4.3.2 Buckeye

The City of Buckeye is positioned as the Western-most community in the greater metropolitan area, giving the community the unique title of "Western Gateway" for the Salt River Valley. Situated along Interstate 10 approximately 30 miles west of downtown Phoenix, the City of Buckeye lies immediately west of the communities of Goodyear and Surprise, as shown in Figure 4-11. Now encompassing all or portions of the west, south, and east sides of the White Tank Regional Park, Buckeye's historical town center—located four miles south of Interstate 10 near State Route 85—lies many miles away from what is expected to become the city's new growth area to the west of the White Tank Mountains. Like most of the communities located in the greater metropolitan area, Buckeye has been growing steadily for the past several decades. While it was once one of the smallest communities in Maricopa County, recent annexations and growth initiatives have resulted in significant expansion of Buckeye's planning area.

The primary features that influence Buckeye's land uses include: Interstate 10, which bisects the community's south side; the White Tank Mountains, which effectively separate Buckeye from its eastern neighbors, and the Hassayampa River and its tributaries, which influence the north and west sides of Buckeye. Various overhead power lines transect the community's southern half, as does a traditional network of arterial streets. The Sun Valley Parkway, a multi-lane, limited access roadway proceeds north from Interstate 10 through Buckeye and connects with the City of Surprise on the northeast section of the White Tank Regional Park.

Although prominent new growth in Buckeye will contribute steadily to the demographic, economic, and land use climate of the west valley, Buckeye is one of the older "outer ring" suburbs in Maricopa County. Founded in 1888 and incorporated in 1929, Buckeye's rural-residential character is reinforced by its agricultural economic base—Buckeye is still among the largest producers of Pima Cotton in Maricopa County. Buckeye's residents are governed under a council-city manager form of government, which includes a seven-member city council consisting of a mayor and six council members elected at-large for a term of four years. The council appoints the city manager and other officers necessary to produce an administration of the community's affairs.

In 2019, the population of Buckeye was 81,624. Population projections for 2020 and 2030 current corporate limits and population, housing, and employment statistics for MPAs for 2010, 2020 and 2030 are summarized in Table 4-3.

Table 4-3: Population, housing and employment statistics for Buckeye

Year	Population (Current Limits)	Population (MPA)	Housing (MPA)	Employment (MPA)
2010	50,876	62,800	22,500	12,800
2020	84,100	97,700	35,800	26,900
2030	15,200	186,600	65,300	42,900

Development Trends:

Development trends over the last five (5) years have included 12,366 Single Family Residential (SFR) permits issued in the City of Buckeye between January 2015 and October 2020. Figure 4-12 portrays the SFR activity for the past five years in the City of Buckeye. The majority of the SFRs were in the following Communities:

- Verrado, Tartesso, Festival Ranch, Blue Horizons, Sienna Hills, Watson Estates, Sundance,
- Vista de Montana, Crystal Vista, Sonoran Vista, Sonoran Vista, Canyon Views, Arroyo Seco,
- Parkplace at Buckeye, Terra Vista, Encantada Estates, Westpark, Blue Hills, Miller Manor,
- Miller Park and Buckeye Park.

New commercial development in the City of Buckeye was concentrated on Miller Road and Watson Road immediately south of Interstate 10 (I-10). This has included new retail stores, restaurants, car washes and several new hotels. Additional new commercial development occurred along Verrado Way immediately north of Interstate 10 (I-10). This retail development has been primarily restaurants and professional complexes, as well as a storage facility. Commercial development in the City of Buckeye has significantly lagged new residential development due to the lack of rooftops, which drives new commercial development.

The forecast for residential growth in the City of Buckeye is expected to continue in Verrado, Tartesso, Festival Ranch and Westpark as well as development starting in Spurlock Ranch, Douglas Ranch, and in subdivisions along the Apache Road corridor and throughout Central Buckeye.

In the next five (5) years (2021-2026), 2000 Single Family Residential (SFR) permits per year are projected, totaling 10,000 new homes and a population growth of approximately 20,000 to 25,000 new residents. Figure 4-13 portrays the anticipated SFR activity in the next five years in the City of Buckeye.

New commercial, retail and significant industrial development will occur on the Miller Road and Watson Road corridors south of Interstate 10, (I-10) as well as the Verrado Way corridor and the area east and west of Verrado Way and just south of Interstate 10, (I-10). The industrial development will include regional distribution facilities along with logistic centers and manufacturing opportunities.

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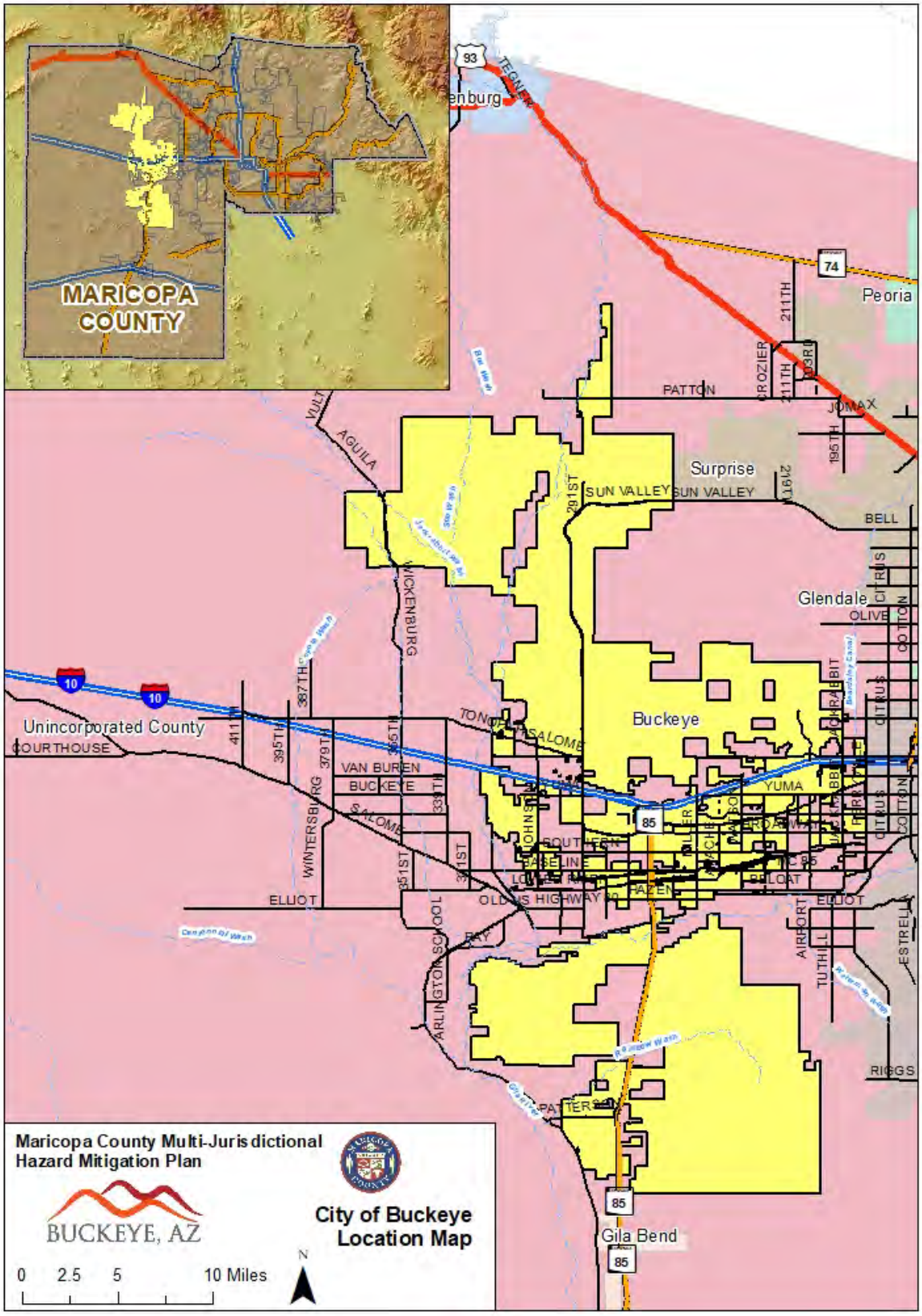

Figure 4-11: Buckeye location map

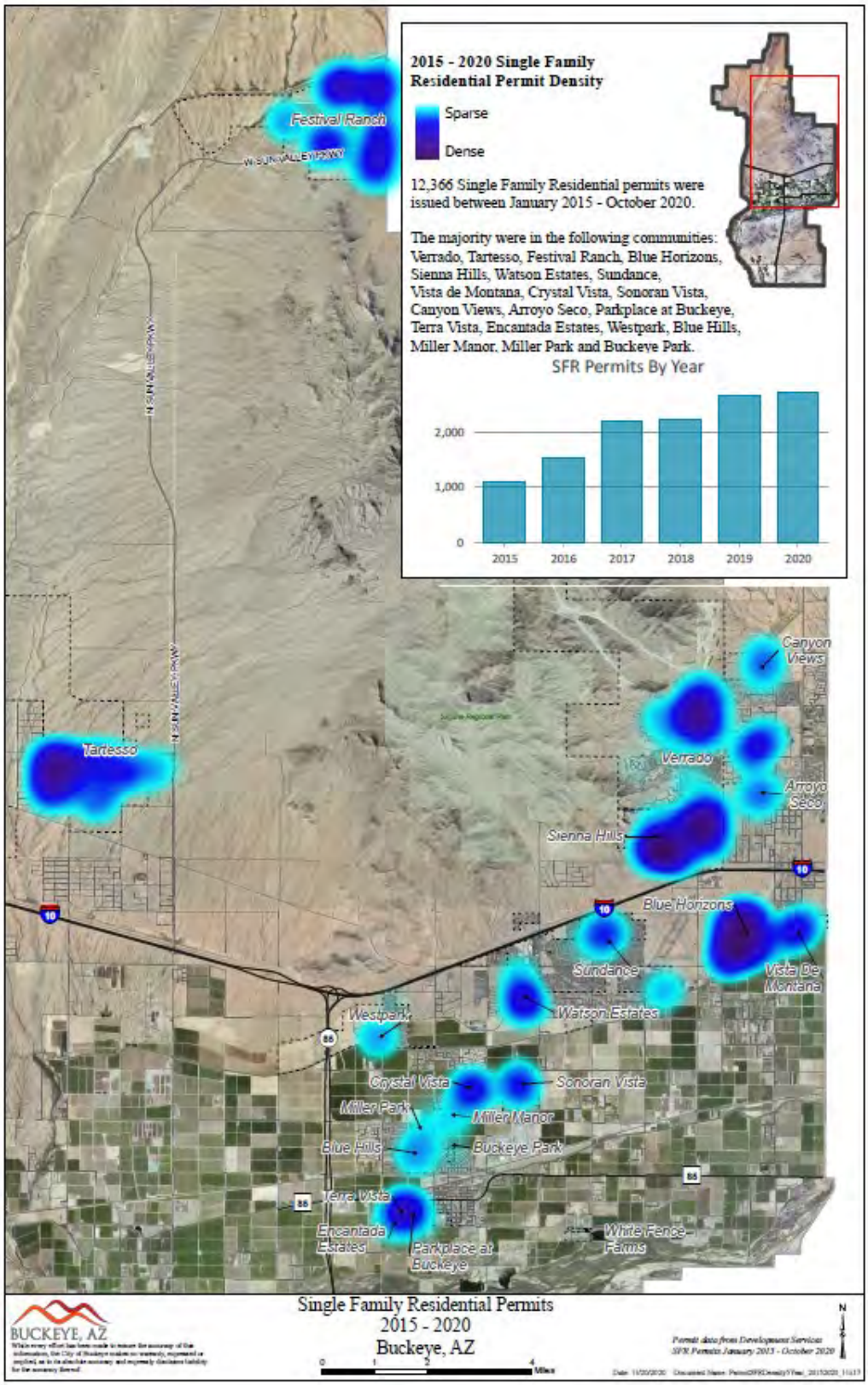

Figure 4-12: Buckeye SFR Activity – Past 5 Years

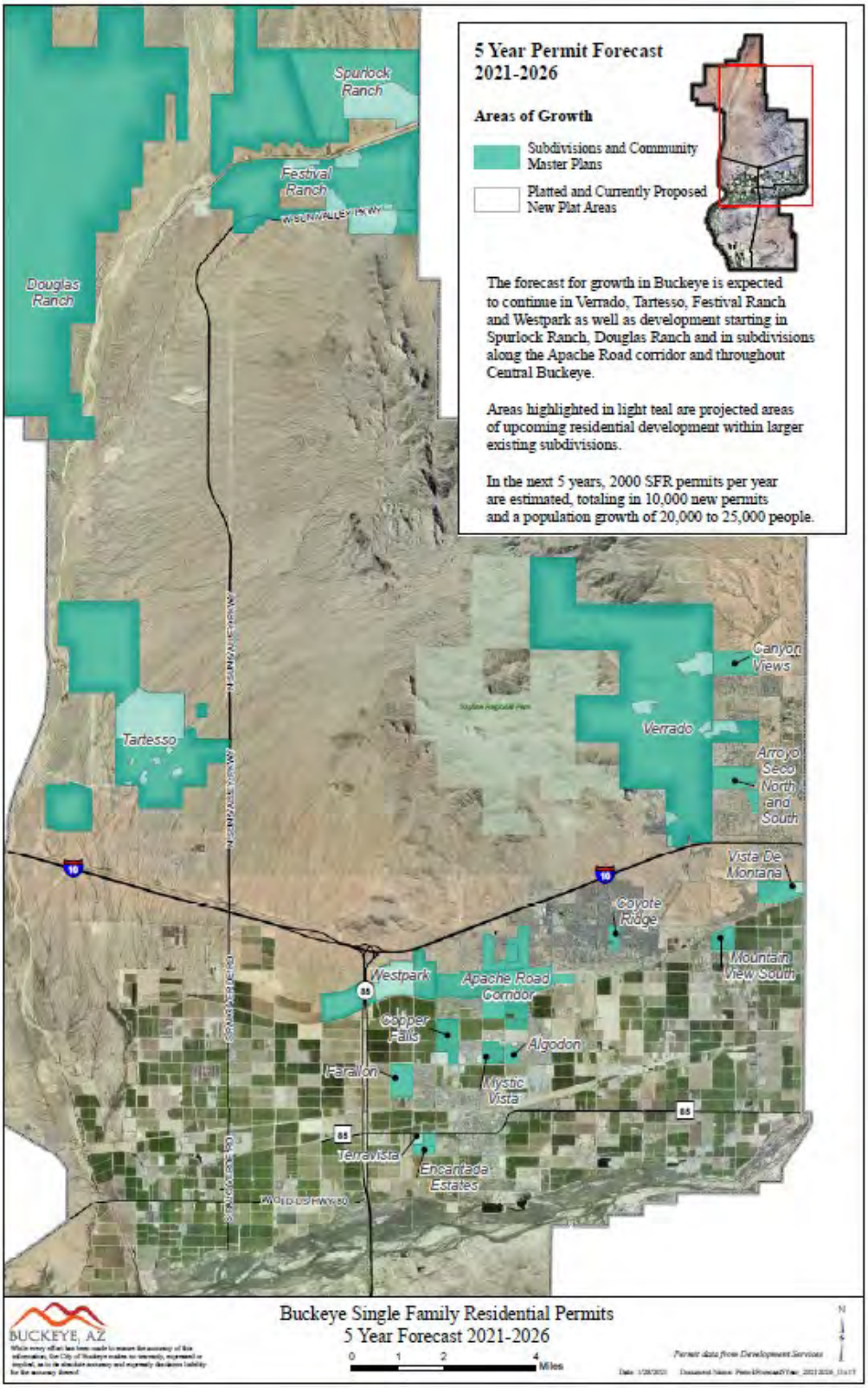

Figure 4-13: Buckeye master planned communities map

4.3.3 Carefree

The Town of Carefree is located in the far northeast portion of the Phoenix Metropolitan Area, approximately 25 miles from downtown Phoenix. To the west, Carefree is bordered for its full length by the Town of Cave Creek. On the south and east, it is bordered by Scottsdale and on the north by unincorporated Maricopa County. The City of Phoenix approaches within a mile from the southwest. Developed as a planned community in the 1950s and incorporated in 1984, the Town of Carefree has become known as a residential town with resort-style living. Historically, the Town of Carefree was master planned to be entirely distinct from the surrounding communities by allowing its small population to preserve a lifestyle that integrates with the surrounding desert environment. On December 4, 1984, the Maricopa County Board of Supervisors declared Carefree a legally incorporated town in the State of Arizona.

Illustrated in Figure 4-14, the primary east-west roadway into the area—the Carefree Highway—has been constructed as a four-lane arterial from Interstate 17 to Cave Creek Road. Other major roadway and infrastructure improvements to the south have been completed or are in the planning stages by the Cities of Scottsdale and Phoenix. Most of the vacant desert that once surrounded the Town of Carefree on the south, east, and west in the 1980's is now developed with semi-rural urban uses. Recent development opportunities to the north of Carefree suggest that growth of the metropolitan area may continue with the potential to surround the town at some point in the future.

Today, Carefree's residents are governed under a council-administrator form of government, which includes a seven-member town council consisting of a mayor and six council members elected at-large for a term of two years. The town council appoints the town administrator and other officers necessary to manage the daily affairs of the town.

In 2019, the population of Carefree was 3,771. Population projections for 2020 and 2030 current corporate limits and population, housing, and employment statistics for MPAs for 2010, 2020 and 2030 are summarized in Table 4-4.

Table 4-4: Population, housing and employment statistics for Carefree

Year	Population (Current Limits)	Population (MPA)	Housing (MPA)	Employment (MPA)
2010	3,363	3,400	2,200	1,400
2020	3,800	3,800	2,600	1,600
2030	4,100	4,100	2,900	2,100

Development Trends:

Over the past five years there have been a couple of new/approved residential developments in Carefree, one near the northwest corner of Cave Creek and Pima Roads and a second townhome development within the Town Center core. The subdivision at the northwest corner contains 39 single-family homes and is complete. The townhome development in the Town Center is under construction and will contain

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20 units when completed. Much of the other residential development within the past five years consists of custom home development on large lots within existing subdivided undeveloped lots. Nonresidential projects included an indoor storage facility which was constructed at the northwest corner of Carefree Highway and Cave Creek Road. Much of the other nonresidential development over the last five years consisted of tenant improvements to existing commercial buildings located within the Town Center.

Over the next five years, Carefree will experience more infill development. Much of the land mass in Carefree has been platted for single-family homes. There remain numerous undeveloped lots within these platted areas that will develop overtime. Additionally, there is a growing trend to redevelop/remodel existing homes to address today's lifestyles and standards. There will also be an emergence in new and redeveloped commercial buildings within the Town Center and on the edges of the community to take advantage of eco-tourism which is becoming a more prominent part of the local economy. To this point, on the northern edges of Carefree, north of Ranchitos del Rey subdivision, remain undeveloped. The Town will continue to work with our land preservation partners, the Desert Foothills Land Trust to secure and build the Town's own desert preserve. It is envisioned that this preserve will be expanded over time to include sections of unincorporated land that will expand up to and around Continental Mountain. If successful, this land preservation will enhance the Town's eco-tourism opportunities and mitigate the introduction of residential areas to areas subject to wildfires and flash floods.

Within the next five years, there are several properties located on the periphery of the community that are well positioned for commercial development. These properties are located at major intersections and across the street from a private airport, SkyRanch. Within the Town Center, there are numerous undeveloped properties fronting Cave Creek Road that are prime to develop as well as the redevelopment of economically obsolete properties within the interior. Any new development will come with enhancement to public infrastructure which would include but not be limited water resources, streets and storm water management.

Figure 4-15 shows a future land use map that is currently published in the town's General Plan.

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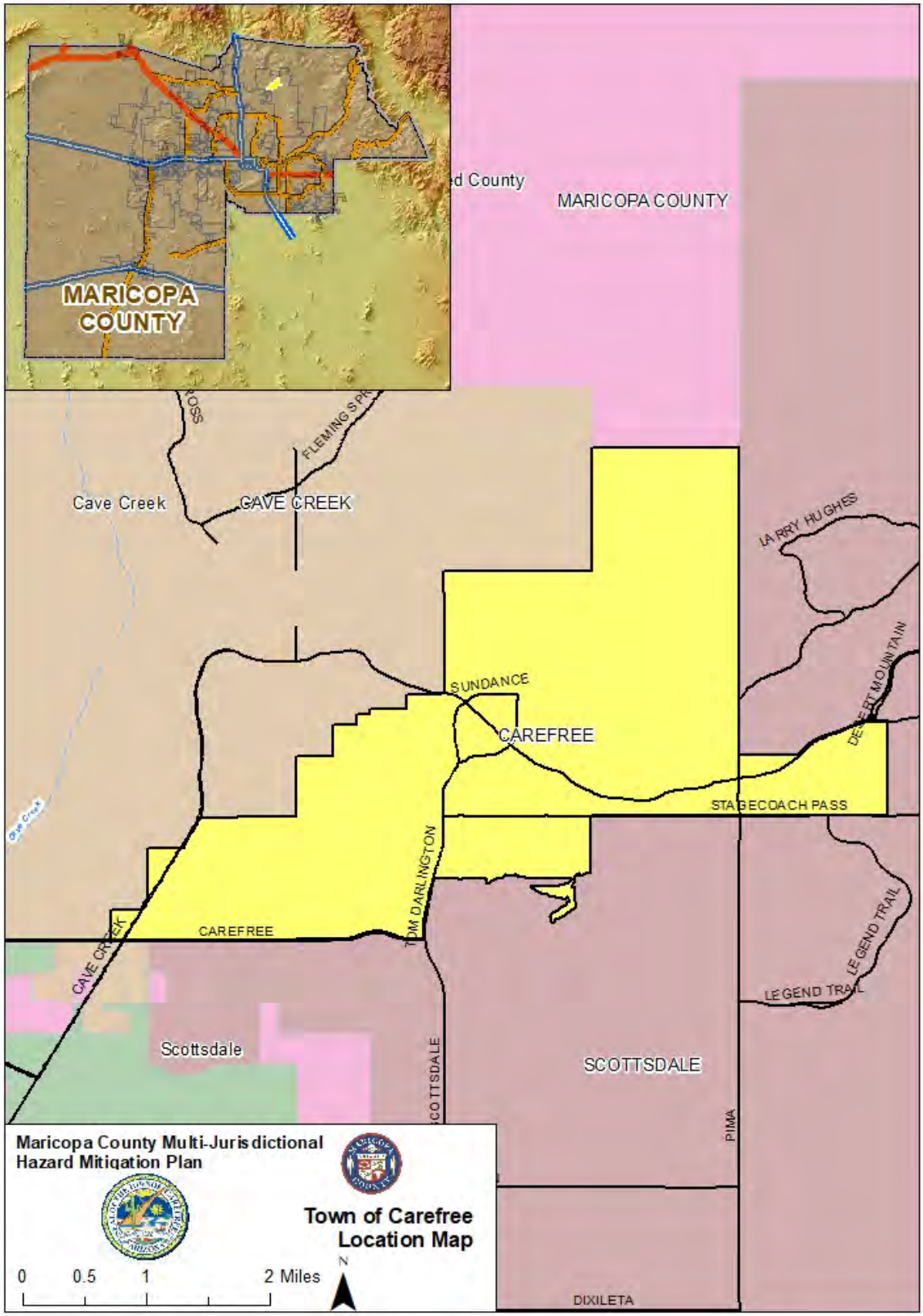

Figure 4-14: Carefree location map

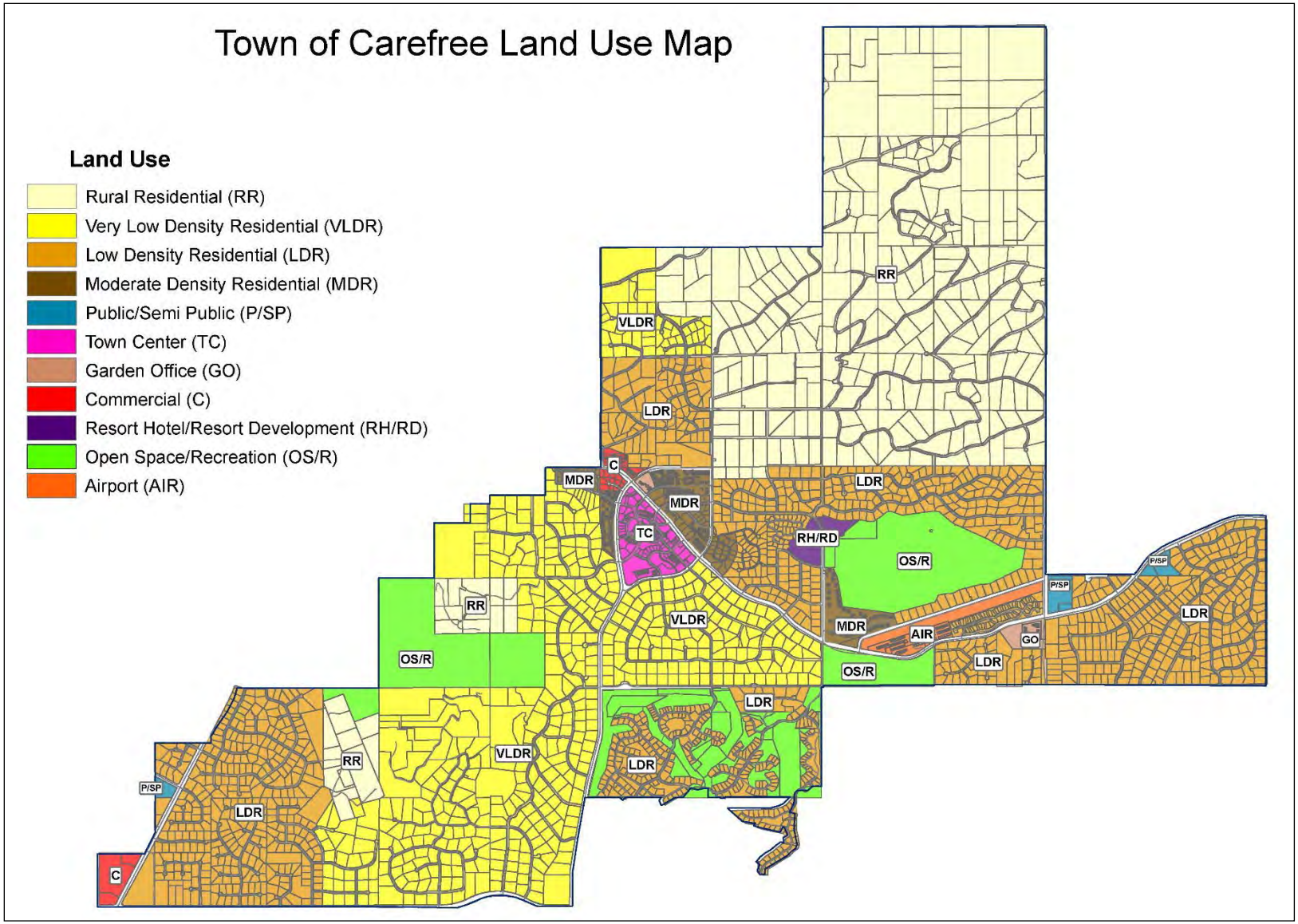

Figure 4-15: Carefree land use planning map

4.3.4 Cave Creek

One of the few communities in Maricopa County that has not experienced a rapid rate of growth, the Town of Cave Creek is located in the far northeast portion of the Greater Metropolitan Area, approximately 25 miles from downtown Phoenix. To the east, the Town of Carefree borders Cave Creek for its full length. On the south, it is bounded by Phoenix and on the north and west by unincorporated Maricopa County. A community more closely associated with a frontier and cowboy image than its "sister community" to the east, Carefree, the Town of Cave Creek exists in and near some of the most scenic country in Maricopa County. The area that now includes the Town of Cave Creek was originally settled in the late 1870s, and quickly became an active mining area during the 1880s. Incorporated in 1986, Cave Creek today is struggling to maintain its rural appearance while existing in a rapidly growing region of Maricopa County.

Illustrated in Figure 4-16, the primary east-west roadway into the area—the Carefree Highway—has been constructed as a four-lane arterial east from Interstate 17. This roadway intersects with the primary north-south access to the area, Cave Creek Road, on the south side of the town and runs north, bisecting the town. Sharing a development pattern that roughly parallels that of Carefree, most of the vacant desert that once surrounded the Town of Cave Creek in the 1980's is now developed with semi-rural urban uses. Complementing the rugged landscape of the area has been a recent effort to preserve these natural amenities. Today the Spur Cross Ranch Conservation Area, Cave Creek Park, and Black Mountain Summit Preserve reflect this movement, and are located on the north, west, and southeast portions of Cave Creek, respectively. Recent development opportunities to the south of Cave Creek, especially in north Phoenix and Scottsdale, suggest that growth of the metropolitan area may continue with the potential to surround the town at some point in the future.

Cave Creek's residents are governed under a council/manager form of government, which includes a seven-member town council consisting of a mayor and six council members elected at-large for a term of two years. The town council appoints the town administrator and other officers necessary to manage the daily affairs of Cave Creeks' residents.

Table 4-5: Population, housing and employment statistics for Cave Creek

Year	Population (Current Limits)	Population (MPA)	Housing (MPA)	Employment (MPA)
2010	5,015	4,900	2,600	1,800
2020	5,900	6,000	3,000	2,400
2030	6,400	6,500	3,900	2,700

In 2019, the population of Cave Creek was 5,834. Population projections for 2020 and 2030 current corporate limits and population, housing, and employment statistics for MPAs for 2010, 2020 and 2030 are summarized in Table 4-5.

Development Trends:

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During the previous five (5) years, the Town of Cave Creek has expanded with commercial development such as retail, drive-up franchise establishments, automobile services, and emergency service. Some examples of recent commercial development include Sprouts Grocery Store, Auto Zone, Tractor Supply Company, Dutch Bros, Sun Devil Auto, Jiffy Lube, Chipotle, Mod Pizza, and a Micro Hospital. Most of the recent commercial development has occurred along Carefree Highway. Additional development over the past five (5) years has included the Windmill Village Multi-Family development approved in 2016. This project included the rezoning of a Desert Rural 89 property to Multi-Family for the development of 24 multi-family residential units and is currently in the planning stages. Development over the last cycle has also included two (2) developments in 2018: the Galloway Ridge Commercial and Single-Family Residential Community located at the NW corner of Cave Creek Road and School House Road which includes a residential community consisting of 70 residential units and 3.5 acres intended for commercial use and the 31 lot Venture at Black Mountain Single-Family Residential Subdivision located at the NE corner of Carefree Highway and 52rd Street on 12.2 acres in a Multi-Family Residential Zone.

Cave Creek anticipates commercial development to occur within the next 5 years. The area where future development will likely occur is along Carefree Highway. Cave Creek will also be working on the possibility of adding an interconnect for fresh water with another jurisdiction over the next five years allowing for the increased availability of potable water.

Figure 4-17 shows a current land use map that is published in the town's General Plan.

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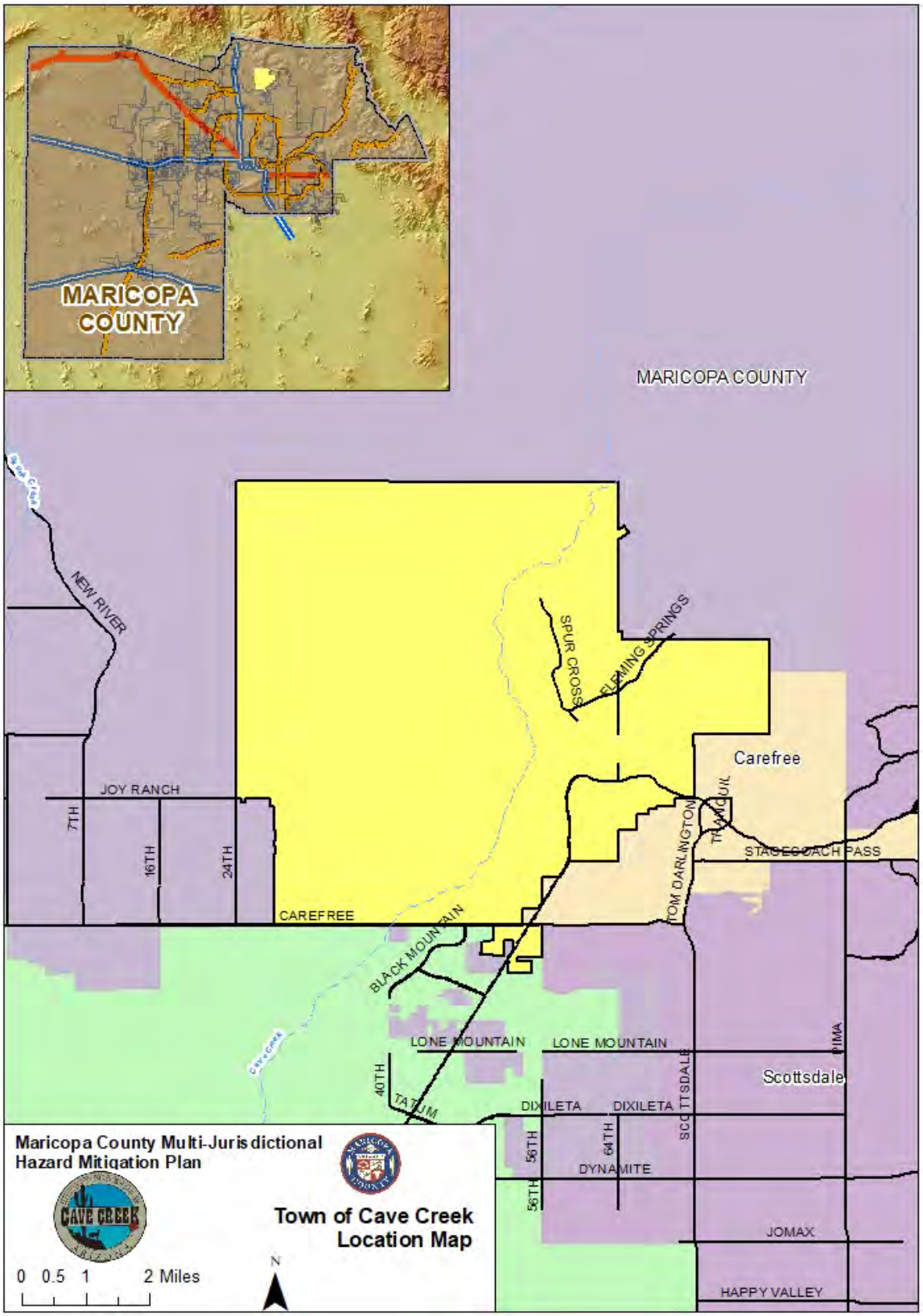

Figure 4-16: Cave Creek location map

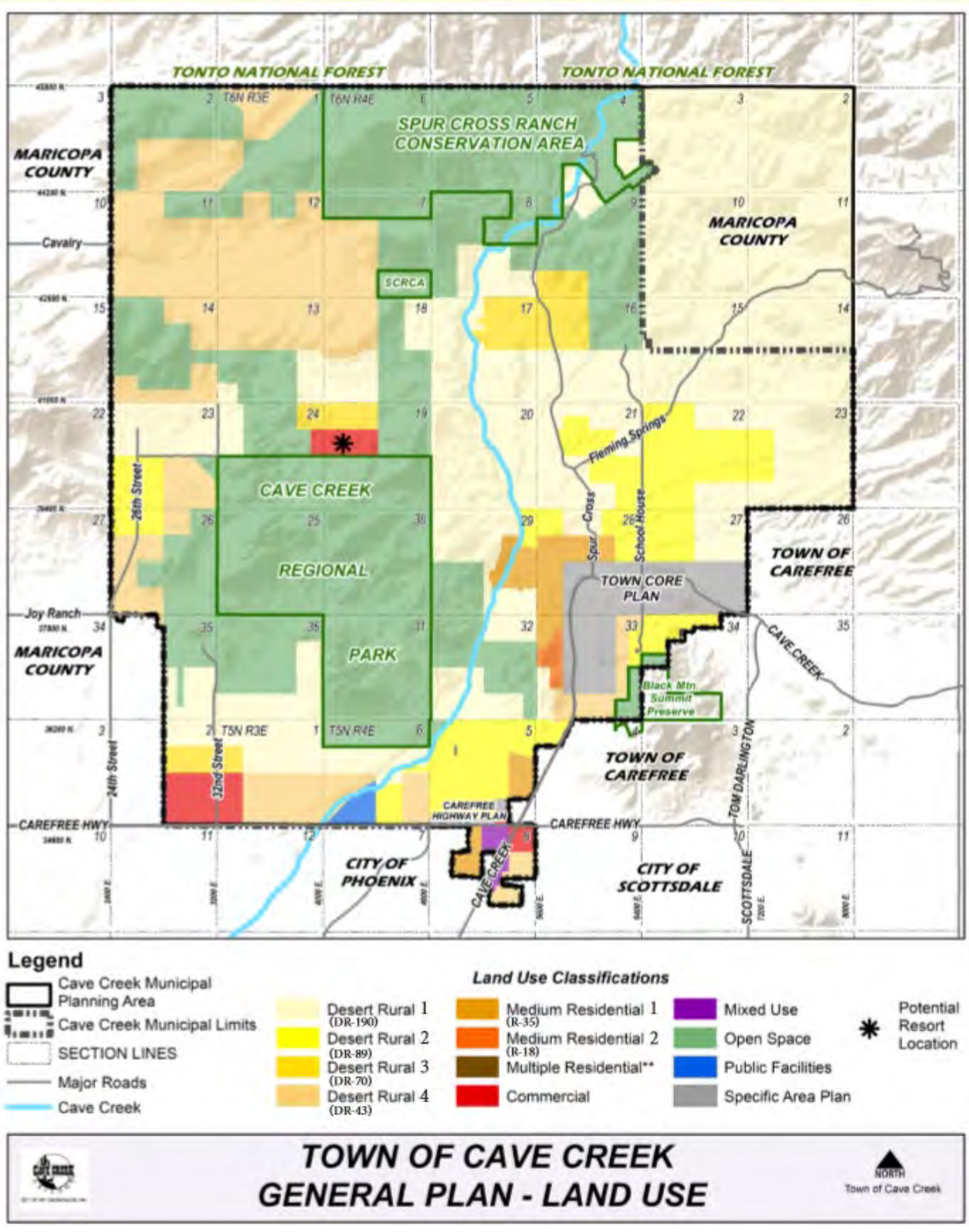

Figure 4-17: Cave Creek land use planning map

4.3.5 Chandler

Located approximately 19 miles east of downtown Phoenix, Chandler is located in the southeast Maricopa County. The City of Chandler was one of the fastest growing cities in Arizona and the United States, having grown 116 percent from 1990 to 2002. Chandler, known as the "Oasis of the Silicon Desert" was once a quiet tree-lined farming community. It has since blossomed into a city that is home to a dynamic high-tech industry. Its incorporated area is 63.6 square miles, and the city's planning area is 71.4 square miles.

Chandler is characterized by a generally flat landscape framed by views of the Santan Mountains to the southeast and the Superstition Mountains to the east as shown in Figure 4-18. The Loop 101 Freeway passes through the west-central portion of the city, the 202 (Santan) Freeway passes through the south-central portion of the city, and the existing State Route 60 provides access just north of the city's northern border. The Town of Gilbert borders the city to the east; Tempe and Mesa border Chandler to the north; Phoenix forms the western border; and the Gila River Indian Community lies to the south.

Incorporated in 1920, today Chandler's residents are governed under a council-manager form of government, which includes a seven-member city council consisting of a mayor and six council members elected at-large for a term of four years. The city council appoints the city manager and other officers necessary to produce an orderly administration of the city's affairs.

In 2019, the population of Chandler was 266,804. Population projections for 2020 and 2030 current corporate limits and population, housing, and employment statistics for MPAs for 2010, 2020 and 2030 are summarized in Table 4-6.

Table 4-6: Population, housing and employment statistics for Chandler

Year	Population (Current Limits)	Population (MPA)	Housing (MPA)	Employment (MPA)
2010	236,123	244,600	98,600	112,900
2020	271,300	279,500	108,200	154,700
2030	298,800	309,100	118,900	182,300

Development Trends:

In the last five years, the city has experienced a steady growth of multi-family projects averaging over 1,000 new units developed per year. The development of single-family homes has declined from 1,200 units built in 2016 to less than 500 units built in 2019. During this time, single family homes were developed at an average rate of 64 homes per month. This is largely attributed to the fact that the city is at a point of its maturity where all of the bigger parcels of land that are attractive to home builders have been developed and most of the remaining undeveloped parcels available for single family development are smaller infill pieces that are more desirable for medium to high density residential projects.

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During the next five years, the city anticipates continued growth of multi-family development in downtown and North Chandler based on recently received zoning entitlements. These include multi-story, urban style apartments as well as single story for rent units. Single family development is expected to continue at a lower growth rate and will be in South Chandler.

In the Retail, Office and Industrial real estate market, Chandler has produced over 1 million square feet in retail, over 2 million square feet in office and over 3 million square feet in industrial real estate over the last five years. Projected deliveries over the next five years in these sectors are viewed has healthy and a repeat of the past five years. Intel had a sizeable delivery with the 900,000 square feet Fab 42 opening in the last year.

Figure 4-19 shows the land use planning map from Chandler's current General Plan[8].

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[8] City of Chandler, http://www.chandleraz.gov/content/GP_FutureLandUsePlan.pdf

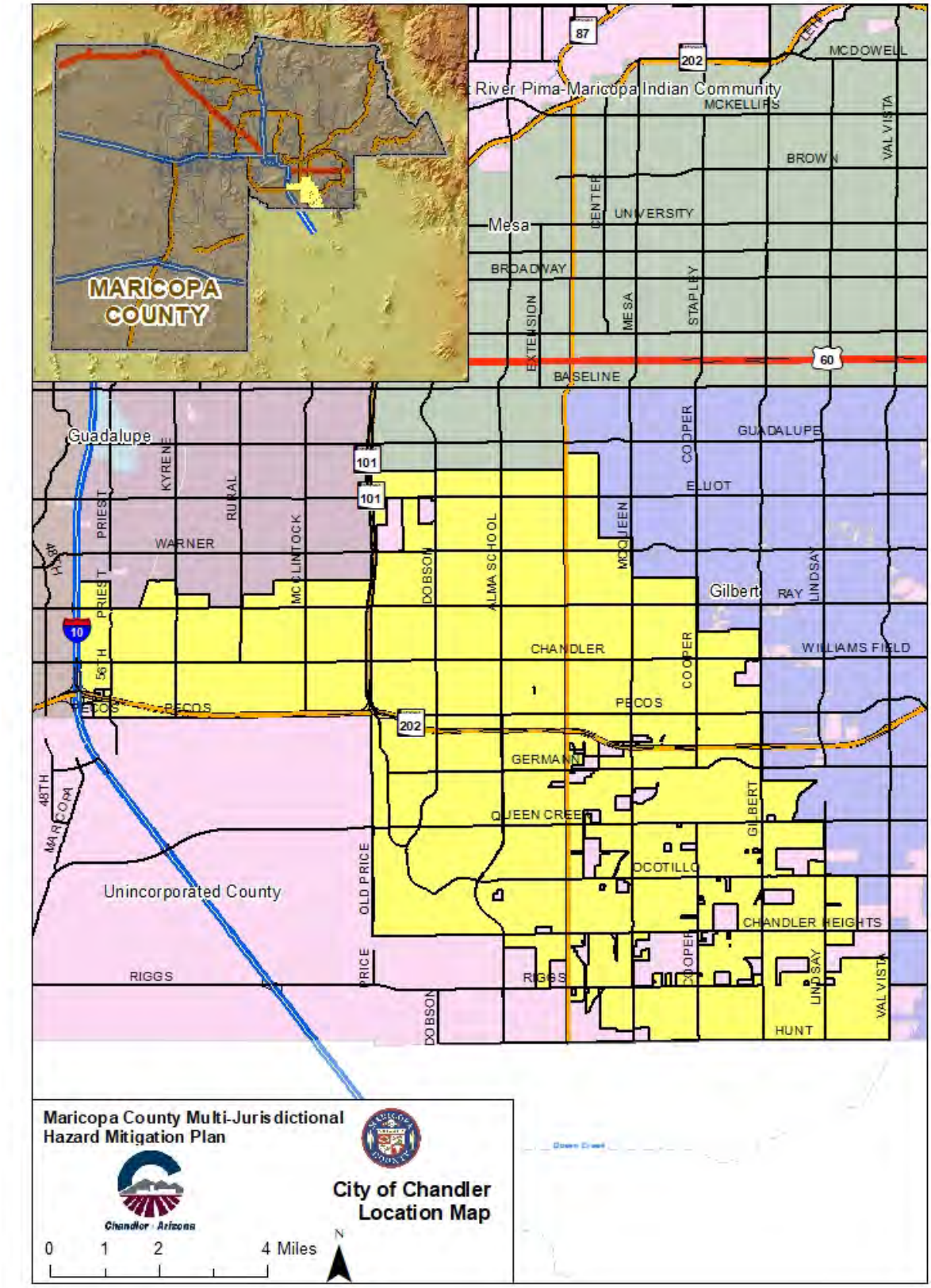

Figure 4-18: Chandler location map

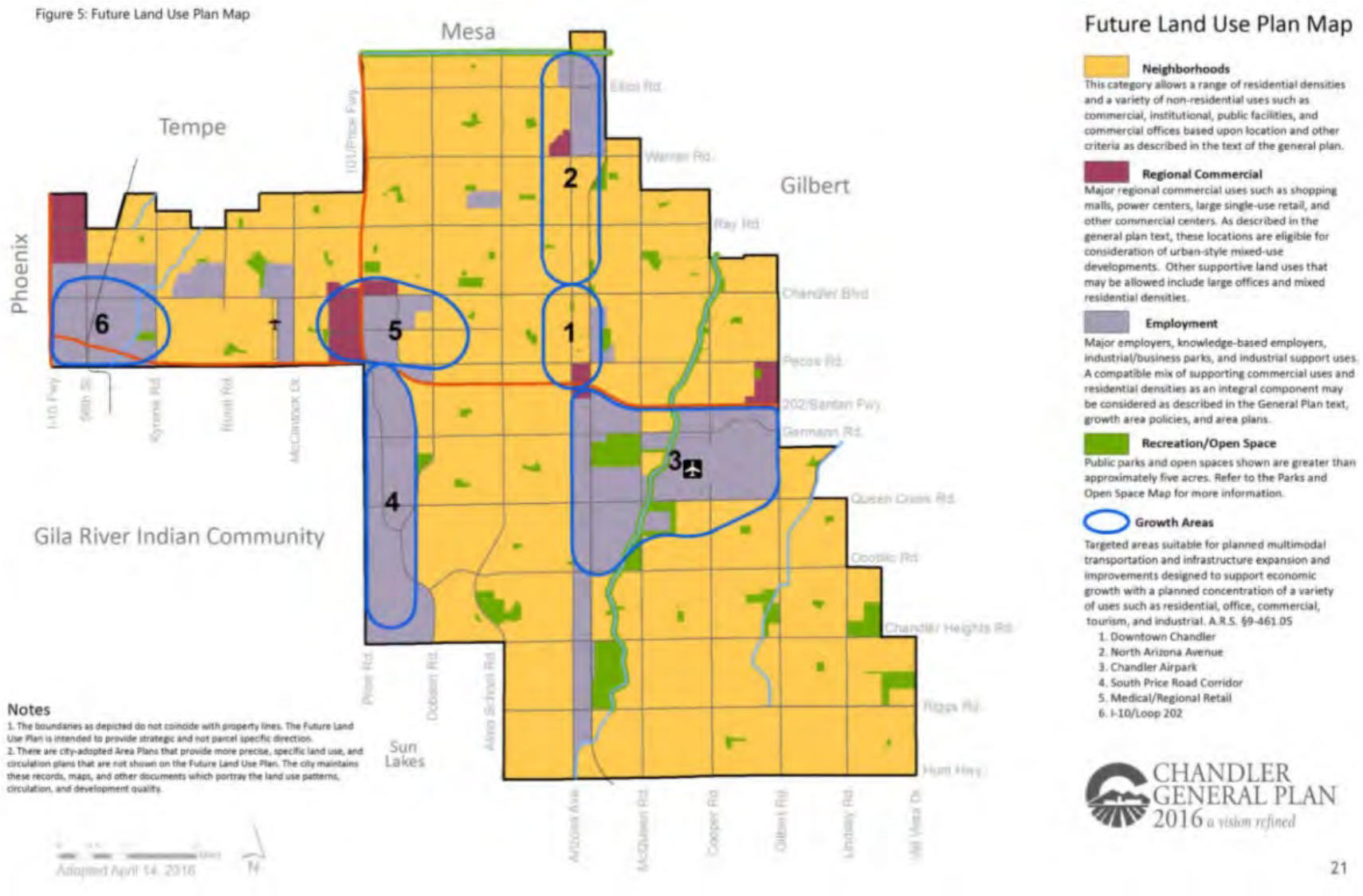

Figure 4-19: Chandler land use planning map

4.3.6 El Mirage

The City of El Mirage is located approximately 15 miles northwest of downtown Phoenix in the western portion of the Phoenix Metropolitan area. South of Peoria Avenue, El Mirage is bordered to the west and south by the City of Glendale. It is enclosed on the west and north by the City of Surprise. On the east, the city is bordered by the Town of Youngtown and unincorporated areas of Maricopa County. El Mirage sits on the west bank of the Agua Fria River, which runs the length of the city's eastern border.

United States Highway 60, Grand Avenue, is a divided four to six lane road that extends from the Town of Wickenburg southeast to Van Buren Street in the City of Phoenix. As shown in Figure 4-20, Highway 60 diagonally traverses the north portion of El Mirage. The Burlington Northern Santa Fe (BNSF) Railroad runs along Grand Avenue's east side through the City of El Mirage. The centerpiece of El Mirage's recreation facilities is Gateway Park, located at the northwest corner of Thunderbird and El Mirage Roads. The Agua Fria River represents the city's largest open space area, entailing 1,120 acres.

Originally a farming community, migrant farm workers founded El Mirage in 1937, and the city was incorporated in 1951. El Mirage's residents are governed under a council-manager form of government, which includes a seven-member city council consisting of a mayor and six council members elected at-large for a term of four years. The city council appoints the city manager and other officers necessary to produce an orderly administration of the city's affairs.

In 2019, the population of El Mirage was 34,359. Population projections for 2020 and 2030 current corporate limits and population, housing, and employment statistics for MPAs for 2010, 2020 and 2030 are summarized in Table 4-7.

Table 4-7: Population, housing and employment statistics for El Mirage

Year	Population (Current Limits)	Population (MPA)	Housing (MPA)	Employment (MPA)
2010	31,797	31,900	11,300	4,300
2020	35,100	35,100	11,800	5,100
2030	36,500	36,500	13,600	6,500

Development Trends:

In the last 5 years, El Mirage has had industrial growth to the southern areas of the city. There has been minor growth with residential homes in the north east section, but most of the growth has been the southern industrial zone. Most growth has come in the form of manufacturing. A data storage facility has also been constructed in the industrial zone.

The current plans for the next 5 years are the continuation of seeking industrial and commercial growth, in the southern parts of El Mirage. There are plans for 3 story residential, multifamily dwellings are being constructed in the north west section of the city. Land was annexed south of the industrial zone for more industrial developments.

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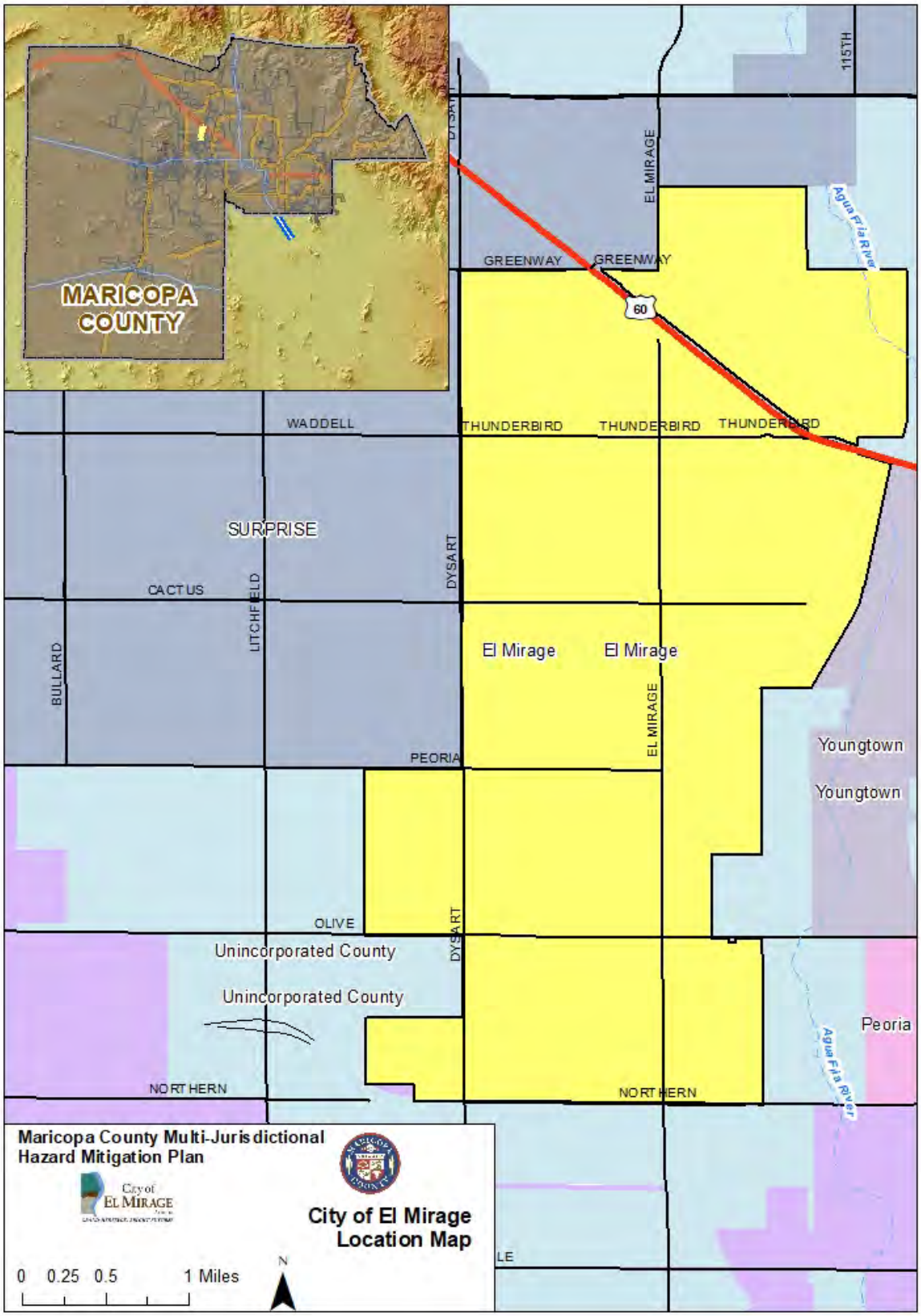

Figure 4-20: El Mirage location map

Figure 4-21 shows the current land use planning map for El Mirage with an overlay of the Luke Air Force Base airport related zoning.

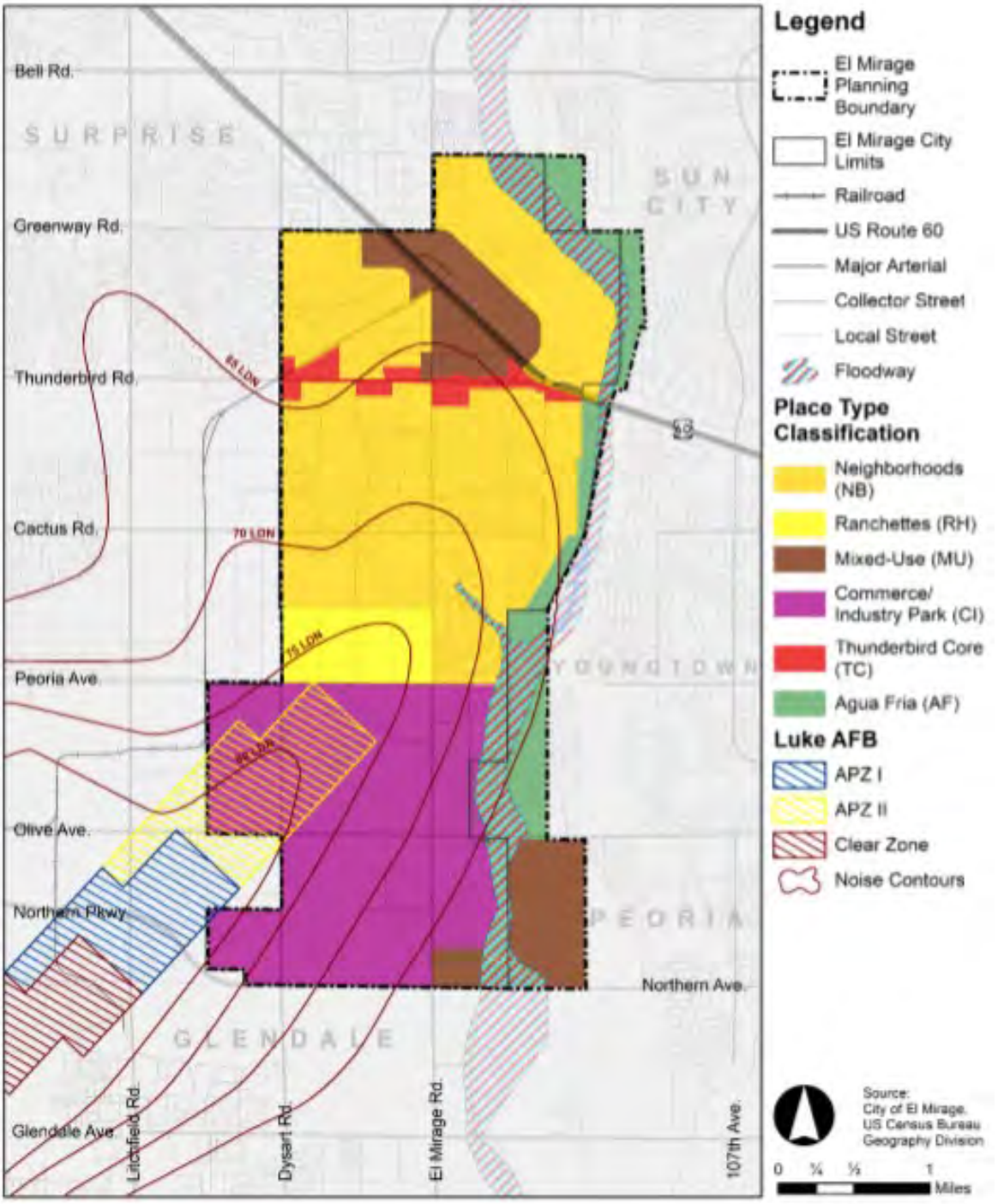

Figure 4-21: El Mirage land use planning map

4.3.7 Fountain Hills

The Town of Fountain Hills lies in the northeast quadrant of Maricopa County approximately 30 miles northeast of central Phoenix. The town's hillside topography in the upper Sonoran Desert on the eastern slope of the McDowell Mountains provides the community with a rugged terrain and rich natural desert vegetation. Separated from much of greater Phoenix, the Town of Fountain Hills lies atop the McDowell Mountains, which create elevations in the Town between 1,510 and 3,170 feet—averaging about 400-500 feet higher than other Phoenix-area communities.

As shown in Figure 4-22, the town is bordered by City of Scottsdale on the west, the Salt River Pima-Maricopa Indian Community on the south, the Fort McDowell Yavapai Nation on the east, the McDowell Mountain Regional Park on the northwest, and State-owned land on the northeast. Major access to Fountain Hills is provided via Shea Boulevard, which is the town's primary connection to the greater metropolitan area to the west. To the east, adjacent to the town boundary, Shea Boulevard intersects State Highway 87 connecting the town to the south and east valley, including the cities of Mesa, Chandler, Gilbert, and north toward the Verde River, the Salt River, and further north to Payson and the Mogollon Rim country.

The proximity of both the Verde River and Fort McDowell, established in the late 1800's, brought attention to a region that rapidly became known for ranching opportunities in the area. In 1968, still a ranching community, a large land holding in the area came into the possession of the McCulloch Oil Corporation. In 1970 this firm directed the development of a 12,000-acre model town, which would become the community of Fountain Hills. Among the many amenities these developers included with this planned development would be the world's tallest fountain, which is still the community's most prominent feature.

In December of 1989, the town was incorporated, and now operates under a council-mayor form of government, including a mayor and six council members elected at-large. Development of Fountain Hills continued steadily throughout the 1990's, with land annexed to the south.

In 2019, the population of Fountain Hills was 24,225. Population projections for 2020 and 2030 current corporate limits and population, housing, and employment statistics for MPAs for 2010, 2020 and 2030 are summarized in Table 4-8.

Table 4-8: Population, housing and employment statistics for Fountain Hills

Year	Population (Current Limits)	Population (MPA)	Housing (MPA)	Employment (MPA)
2010	22,849	22,400	13,200	5,500
2020	24,700	24,700	14,600	7,700
2030	26,200	26,200	15,900	9,100

Development Trends:

Within the Town of Fountain Hills, there is a trend towards increased housing density, particularly multifamily developments in the Town Center. Mixed use development with ground level retail and multifamily above has recently been added

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in Town. A multi-story, mixed use development was recently completed at Avenue of the Fountains and Verde River Dr. A 147-apartment development is underway at Avenue of the Fountains and La Montana. The development of a hospital at Saguaro and Trevino is currently underway. There is an expansion of a major resort property along Eagle Ridge Drive west of Palisades that is currently underway. The majority of development continues to be single family homes. While infills occur in all areas of town, the development of the Adero Canyon area along Eagle Ridge Drive has been the largest single area of development.

Over the next five years, the town expects to continue with significant single family development, primarily in the western and northwestern parts of the Town in Adero Canyon and Eagles Nest. This is likely to include additional multifamily/higher density housing development, particularly in the Town Center and Shea Boulevard corridor. There is a potential for redevelopment or partial redevelopment of commercial properties to include a mix of uses, including high density residential, particularly along the Shea Boulevard corridor. With development of the hospital, the trend could include further medical offices/uses. There is also potential for additional hospitality uses as occupancy rates had been strong Pre-COVID. There is a continued infill and redevelopment in the industrial/heavy commercial areas around Saguaro and Panorama and Saguaro and Technology. The Town has recently processed requests for mini-storage and RV storage in both areas.

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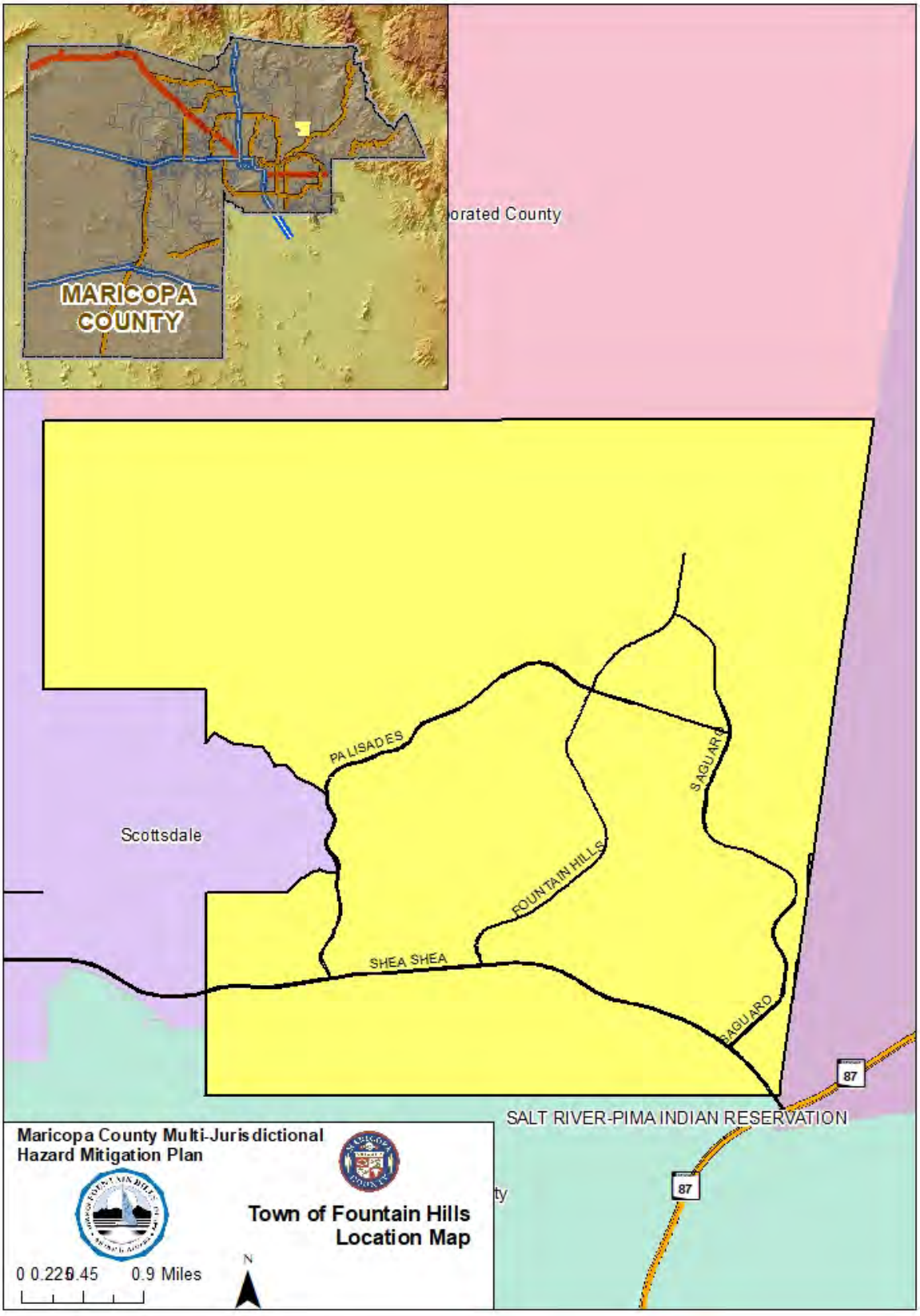

Figure 4-22: Fountain Hills location map

For an overall development picture, Figure 4-23[9] shows that low to mid-density single-family homes predominate throughout the community and tend to follow the ridgelines. A large share of the undeveloped areas of Fountain Hills is devoted to open space, much of which includes the necessary gulches and valleys that facilitate runoff. Following its heritage as a planned community, Fountain Hills includes a concentrated core area that includes residential, commercial, multi-family and some industrial uses. Highway commercial uses are scattered along Shea Boulevard to the south of Fountain Hills' core.

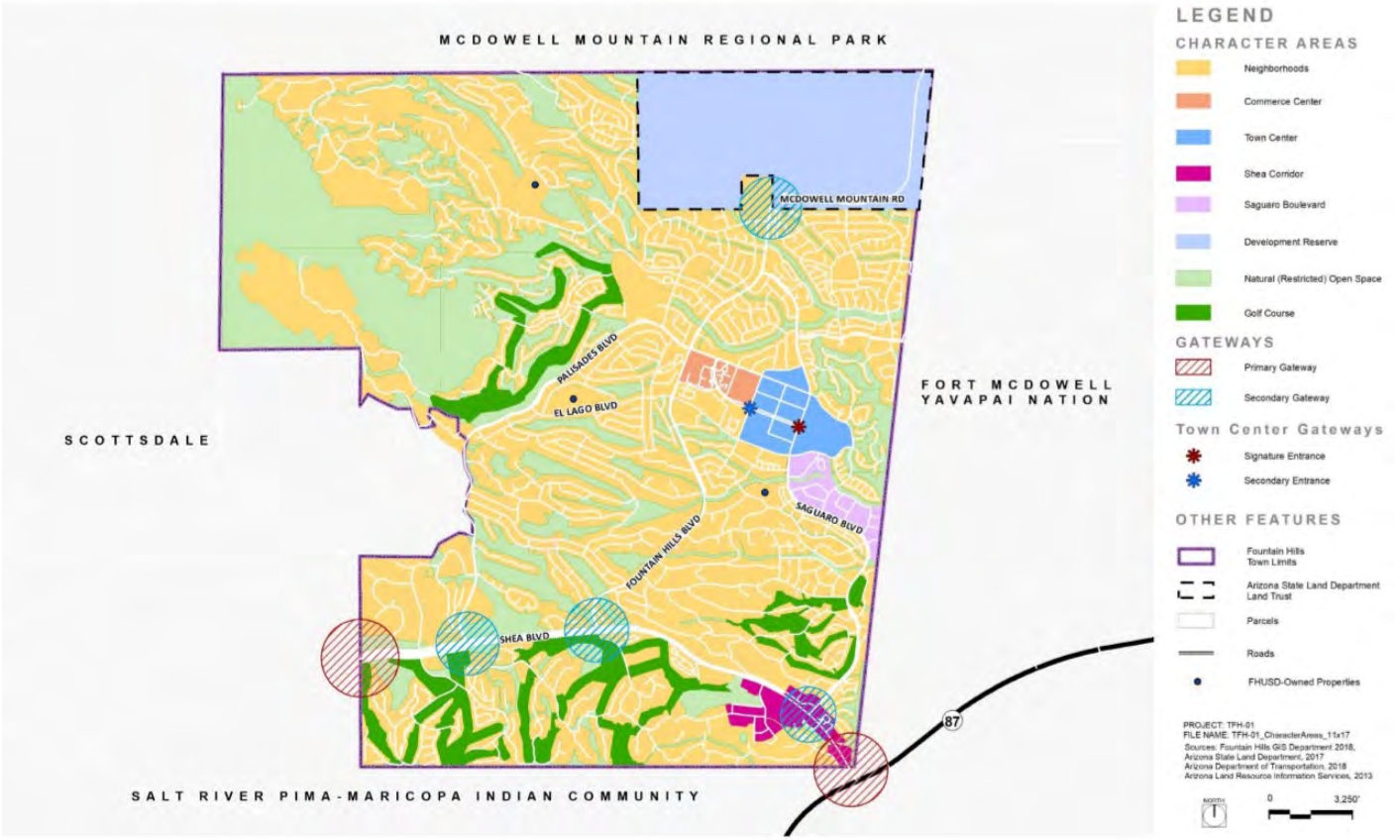

Figure 4-23: Fountain Hills land use planning map

[9] Town of Fountain Hills, 2010, http://www.fh.az.gov/224/Fountain-Hills-General-Plan

4.3.8 Fort McDowell Yavapai Nation

The Fort McDowell Yavapai Nation (FMYN) is located in the east portion of Maricopa County approximately 23 miles northeast of downtown Phoenix. The FMYN lies adjacent to the east side of the Town of Fountain Hills and the McDowell Mountain Park and is linked to the north end of the Salt River Pima-Maricopa Indian Community, as shown in Figure 4-24.

With an average elevation of 1,350 feet, the area's diverse landscape ranges from tree-lined bottomlands to cactus studded rolling hills. This desert landscape is contrasted by the riparian areas of the Verde River and Sycamore Creek. The 40-square mile area is now home to over 600 tribal members, while another 300 live off the reservation.

The FMYN was created by Executive Order on September 15, 1903. The community is governed by a tribal council that is elected by tribal members pursuant to the tribe's constitution.

In 2019, the population of Fort McDowell was 1,043. Population projections for 2020 and 2030 current corporate limits and population, housing, and employment statistics for MPAs for 2010, 2020 and 2030 are summarized in Table 4-9.

Table 4-9: Population, housing and employment statistics for Fort McDowell Yavapai Nation

Year	Population (Current Limits)	Population (MPA)	Housing (MPA)	Employment (MPA)
2010	971	1,000	300	1,500
2020	1,100	1,100	300	2,400
2030	1,100	1,100	400	2,400

Development Trends:

Development in the nation over the last five years has been relatively active. Over the last three years, the major development project has been the new casino. The new casino, scheduled to open in mid to late October 2020, was built immediately west of the existing casino and is attached to the existing hotel. Some existing structures, both residential and governmental have also been involved in remodeling and tenant improvement projects.

There have been seven new housing units built in the last three years. These projects have been constructed in compliance with the development processes. The projects have gone through a planning and review process to ensure the sites being developed are not in a floodplain, have been assessed for any environmental impacts, and cleared for any archeological significance or artifacts. Each of the projects has been inspected and monitored during construction for quality assurance and code compliance. All of these projects have been developed within the approximately 30% area of the southwest portion of the nation which contains existing infrastructure such as water, sewer, and electric services.

Planned development in the next 5 years includes 6 to 7 individual housing units per year until all tribal member residential housing needs are met. These

development projects will occur in pre-designated areas with existing infrastructure, areas that are not located in a floodplain or other hazard zones and will not affect the vulnerability of the nation. One exception to development within the existing infrastructure would be the extension of water, sewer, and electric services to the rodeo grounds in the south end of the nation on the east side of the Verde River.

Open space dominates most of the reservation land mass, with agricultural and very low-density residential uses comprising the next two largest elements.

Existing land use elements for FMYN are indicated on Figure 4-25[10].

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[10] MAG, 2013, *Municipal Planning Area Socioeconomic Profiles Maricopa County, Arizona*

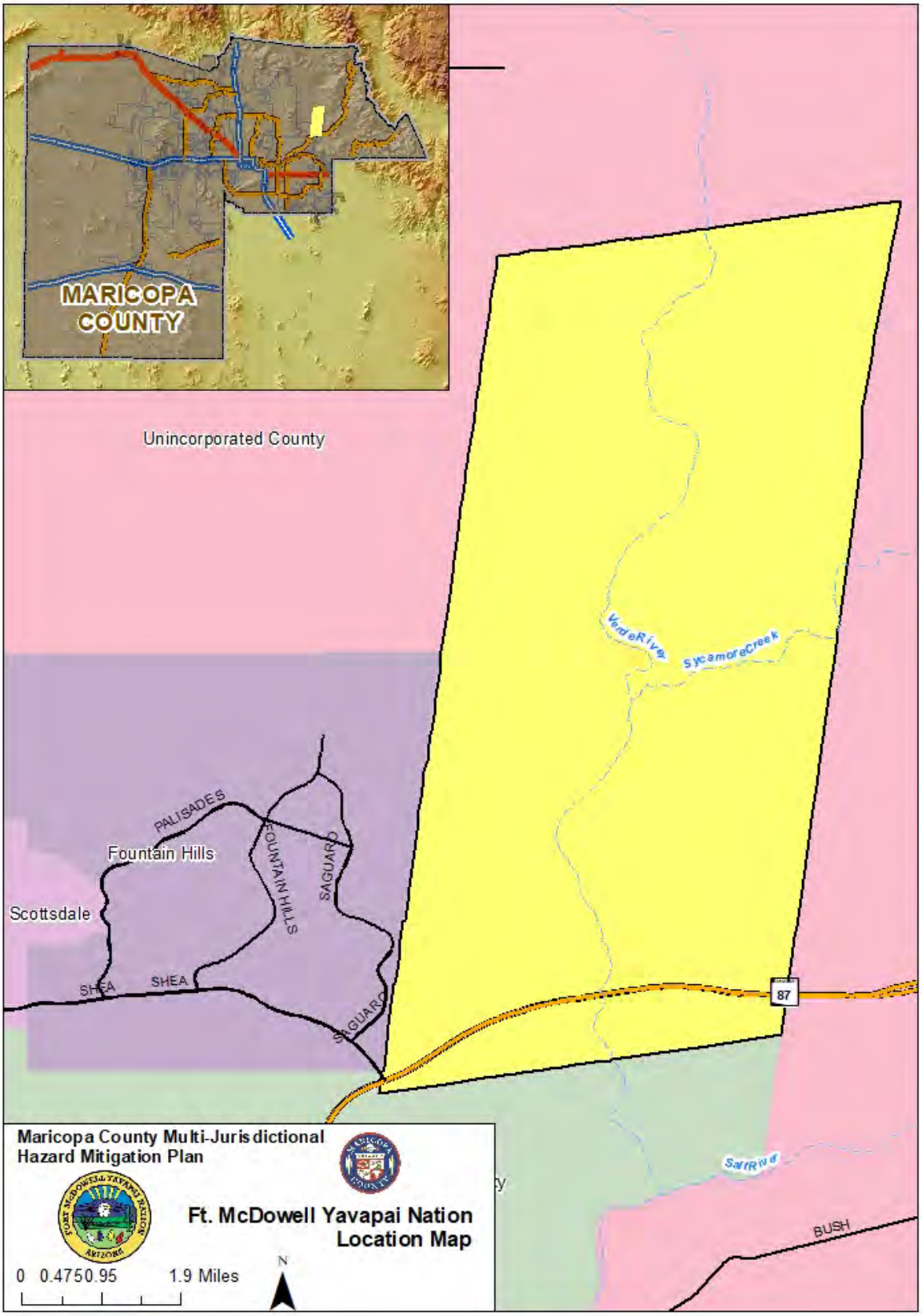

Figure 4-24: Fort McDowell Yavapai Nation location map

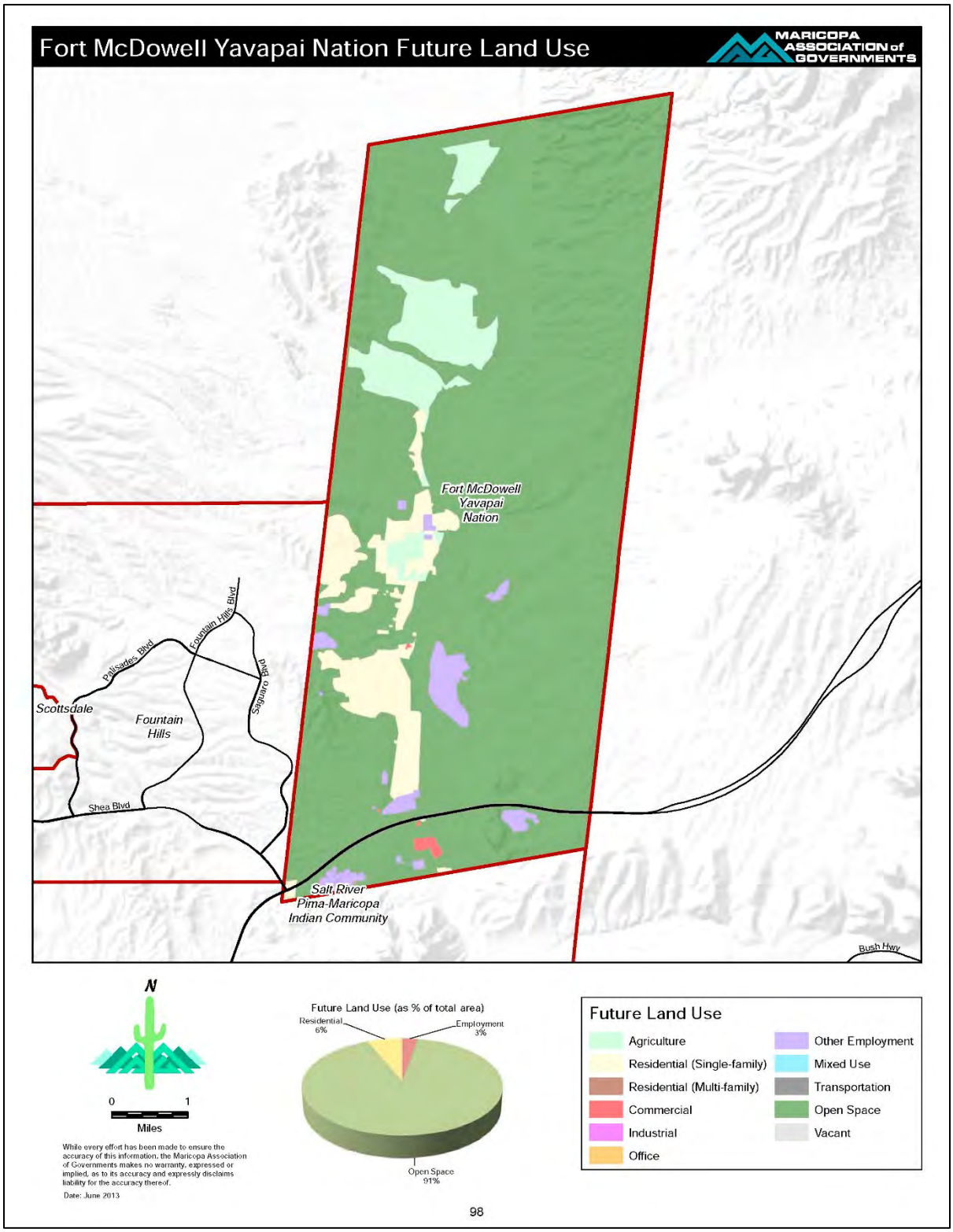

Figure 4-25: Fort McDowell Yavapai Nation land use map

4.3.9 Gila Bend

One of the few Maricopa County communities not adjacent to another municipality, the Town of Gila Bend is located at the intersection of State Highway 85 and Interstate 8 approximately 65 miles southwest of downtown Phoenix, as illustrated through Figure 4-26. Prominent land features that influence Gila Bend include the Woolsey Peak Wilderness approximately ten miles to the northwest, the North Maricopa Mountains Wilderness to the northeast, the South Maricopa Mountains Wilderness to the east, and the Barry M. Goldwater Gunnery Range to the immediate south of the community. The Tohono O'odham Nation's San Lucy District sits adjacent to the town's northern border. Incorporated in 1962, the town is appropriately named for a dramatic bend of the Gila River, which approaches the community from the north before heading west to join the Colorado River. Gila Bend sits at an elevation of 735 feet and includes approximately nine square miles, making the town one of the geographically smallest communities in Maricopa County.

In 2019, the population of Gila Bend was 2,019. Population projections for 2020 and 2030 current corporate limits and population, housing, and employment statistics for MPAs for 2010, 2020 and 2030 are summarized in Table 4-10.

Table 4-10: Population, housing and employment statistics for Gila Bend

Year	Population (Current Limits)	Population (MPA)	Housing (MPA)	Employment (MPA)
2010	1,922	2,500	1,100	800
2020	2,200	2,700	1,200	900
2030	3,200	3,700	2,900	1,200

Development Trends:

Over the past 5 years, Gila Bend has experienced limited growth in the form of industrial, commercial, and institutional developments. Examples include a new industrial development in the proposed industrial complex located along Butterfield Trail near the Gila Bend Municipal Airport and a new $20 million-dollar school constructed by the Gila Bend Unified School District servicing grades K-12, located at 777 Logan Avenue. Commercial developments included a new Pilot Flying-J Fuel Center constructed along Butterfield Trail and a Circle K on Pima Street. No significant residential development occurred over the past 5 years.

Over the next five (5) years, the Town will be actively seeking industrial partners and working to bring light manufacturing facilities to the town. Gila Bend has had several inquiries regarding medical marijuana sites, agricultural industries (specifically shrimp farming), and solar sites. Residential development continues at a modest rate on a single-lot basis. The Town is working to ensure that the necessary water and wastewater infrastructure is in place to attract industry. Gila Bend is also focused on increasing the number of hospitality facilities, specifically hotels, within their community to meet existing demand in addition to rehabilitating the existing historic Scouts Hotel in downtown Gila Bend.

The current land use plan for Gila Bend is shown on Figure 4-27.

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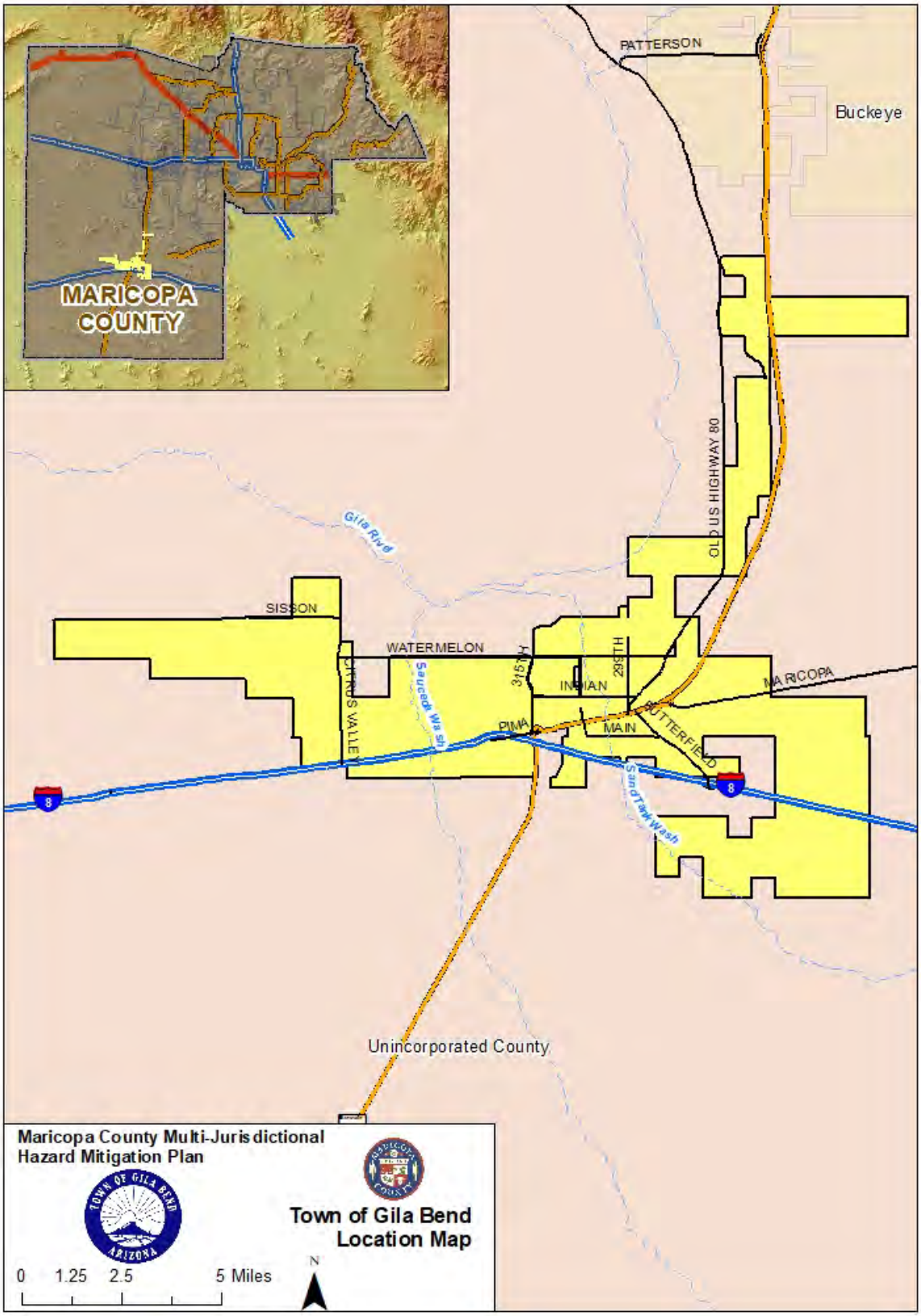

Figure 4-26: Gila Bend location map

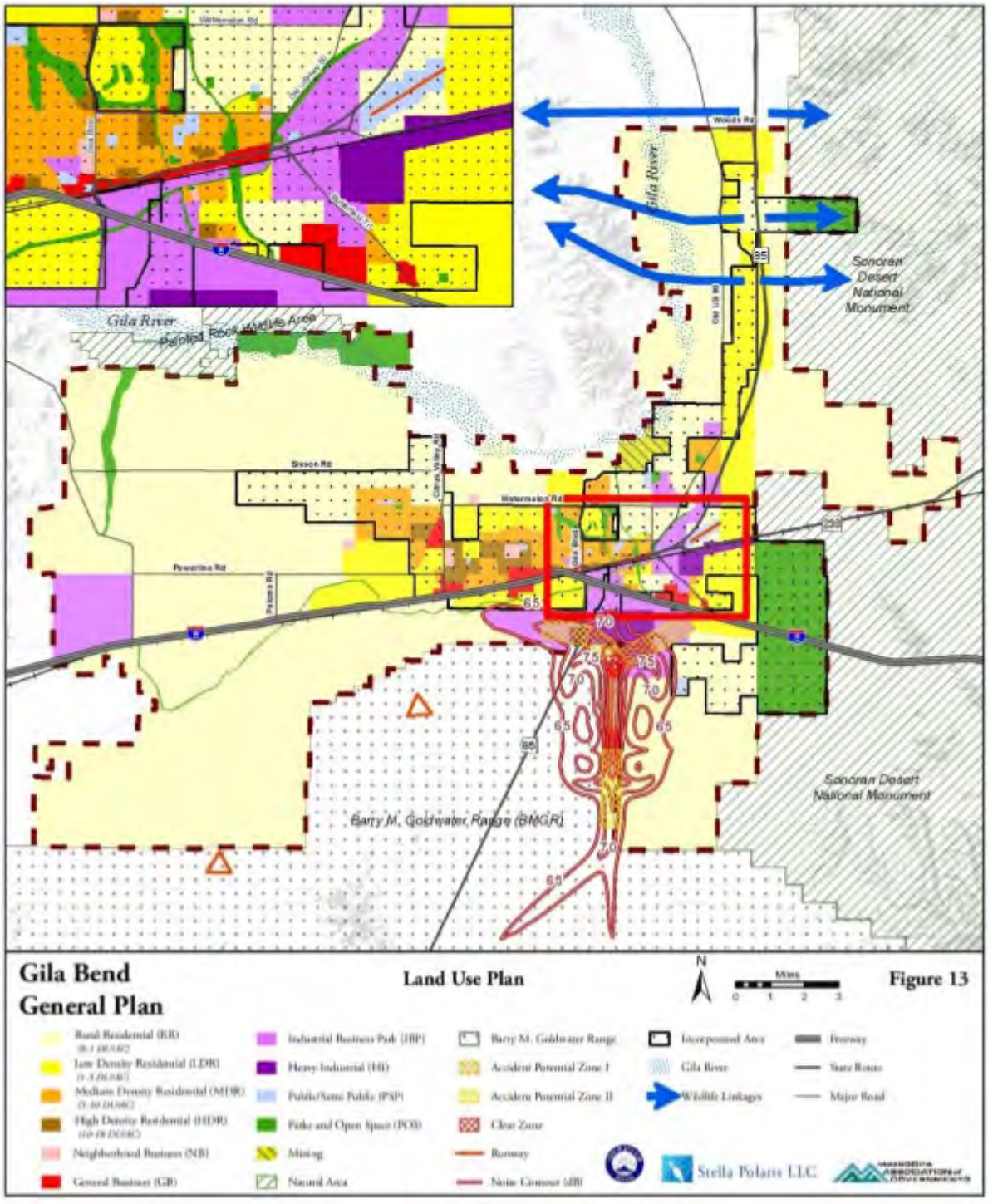

Figure 4-27: Gila Bend land use planning map

4.3.10 Gilbert

The Town of Gilbert, located in the southeast valley, was incorporated in 1920. The original town site of just less than one square mile has grown rapidly today into a 74 square mile planning area in southeast Maricopa County. As shown in Figure 4-28, the town shares boundaries with the City of Mesa, City of Chandler, Town of Queen Creek, the Gila River Indian Community, and Pinal County. A region that is defined more by roadways than natural features, the town's northern boundary is Baseline Road; the eastern boundary is generally along Power Road; the southern boundary is Hunt Highway; and the western boundary is along several roads as it jogs between Arizona Avenue and Val Vista Road. Numerous pockets of unincorporated land dot the planning area, some of which are surrounded by the town.

Like many communities in Maricopa County, Gilbert's origins lie in agriculture. In 1902, the Arizona Eastern Railway established a rail line between the towns of Phoenix and Florence. A rail siding was established on property owned by William "Bobby" Gilbert. The siding, and the town that sprung up around it, eventually became known as Gilbert. The town became an active farming community, fueled by the construction of the Roosevelt Dam and the Eastern and Consolidated Canals. It remained an agricultural town for many years and was known as the "Hay Capital of the World" until the late 1920s. Gilbert began to take its current shape during the 1970s when the town council approved a strip annexation that encompassed 53 square miles of county land.

Today Gilbert's residents are governed under a council-manager form of government, which includes a seven-member town council consisting of a mayor and six council members elected at-large for a term of four years. The council appoints the town manager and other officers necessary to produce an orderly administration of the town's affairs.

In 2019, the population of Gilbert was 259,386. Population projections for 2020 and 2030 current corporate limits and population, housing, and employment statistics for MPAs for 2010, 2020 and 2030 are summarized in Table 4-11.

Table 4-11: Population, housing and employment statistics for Gilbert

Year	Population (Current Limits)	Population (MPA)	Housing (MPA)	Employment (MPA)
2010	208,453	212,400	76,400	74,600
2020	262,300	265,900	90,100	98,600
2030	289,200	293,500	103,800	120,200

Development Trends:

Since 2015 Q2, the Town of Gilbert has added just over 4 million square-feet of new office, retail, and industrial/flex space to the market. Nearly 94% of that growth occurred in one of Gilbert's four employment areas which are shown in Exhibit 1A, with the Central Business District seeing to most growth at just over 2.6 million square feet followed by the Gateway corridor with nearly 500,000 square feet.

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In 2000 there were a total of 37,007 housing units in Gilbert, and by 2010, the housing stock nearly doubled to 74,907. As of 2017, the total number of housing units increased to 87,145. From 2015 to 2019, there have been a total of 9,691 residential building permits issued. Gilbert is a primarily residential community and of the existing housing stock approximately 86.5% of housing in Gilbert is low density, single family, and primarily larger homes. Only 13.5% of Gilbert's existing housing stock is allocated to multi-family development (3 or more units per structure). As shown in Figure 1B, the housing growth patterns have shifted from north to south Gilbert overtime. Since 2015, most of the residential growth has been concentrated in the southern portion of Gilbert, below the 202.

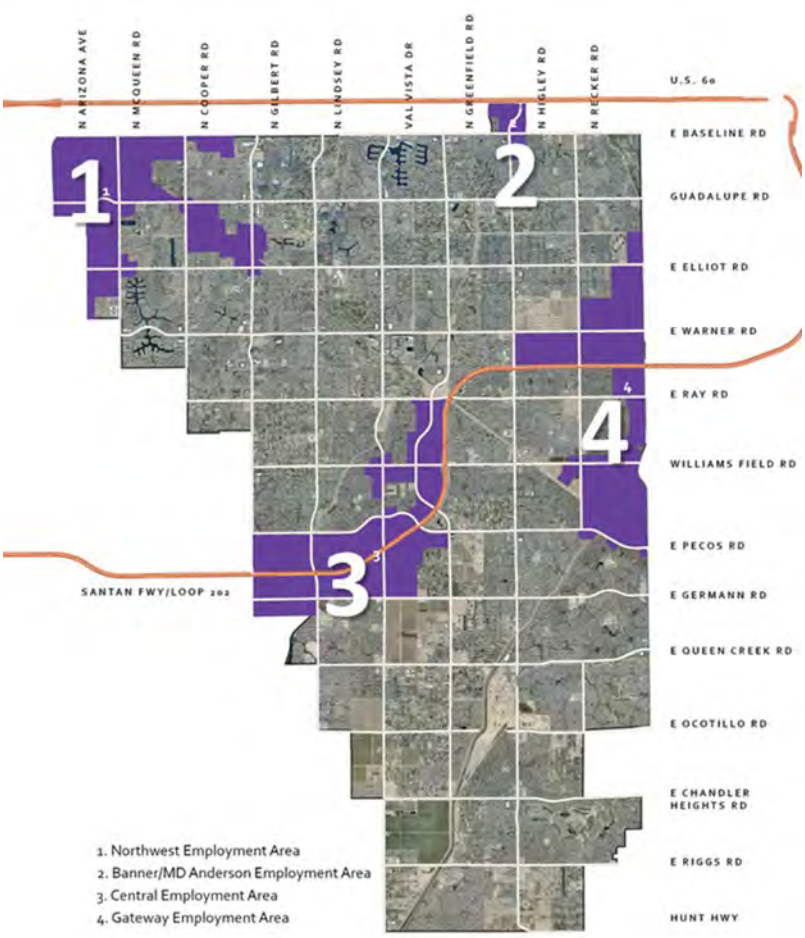

Exhibit 1A. Gilbert Employment Areas
Source: U.S. Census Bureau

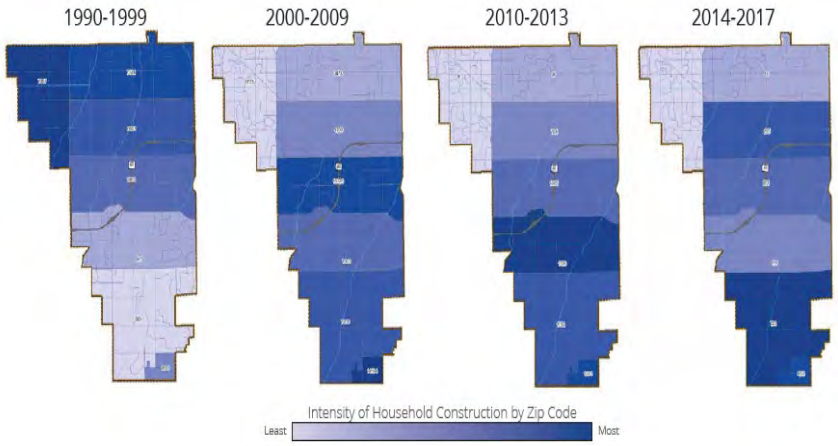

Exhibit 1B. Gilbert Intensity of Household Construction by Zip Code
Source: U.S. Census Bureau

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Over the next 5 years, Gilbert anticipates the largest areas for non-residential development will continue to be the Central Business District and the Gateway employment area. The Central Business District is home to Rivulon, a Nationwide Realty Investors mixed-use development, that covers 250 acres and anticipates over 4 million square feet of office and retail development at full build-out. This corridor will also be the recipient of a new full diamond traffic interchange on the Loop 202 freeway in Fall/Winter 2021. South of the Loop 202, Germann Road serves as a major corridor for several flex and light industrial business parks and will see the widening of Germann Road all the way through to Val Vista Road in 2021. The Gateway employment area is located adjacent to the Phoenix Mesa Gateway Airport and is the location of a 300-acre parcel zoned for employment uses and growth. This area is a target of business development and attraction efforts for the economic development team.

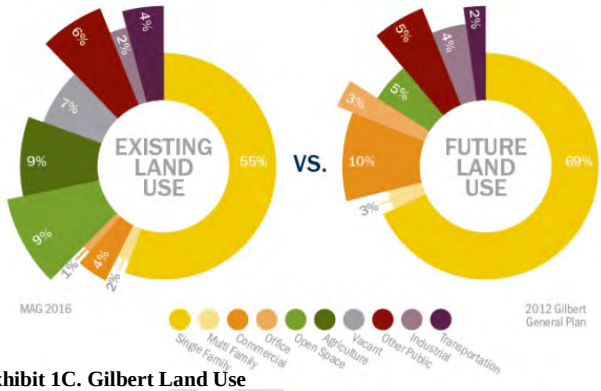

Exhibit 1C. Gilbert Land Use

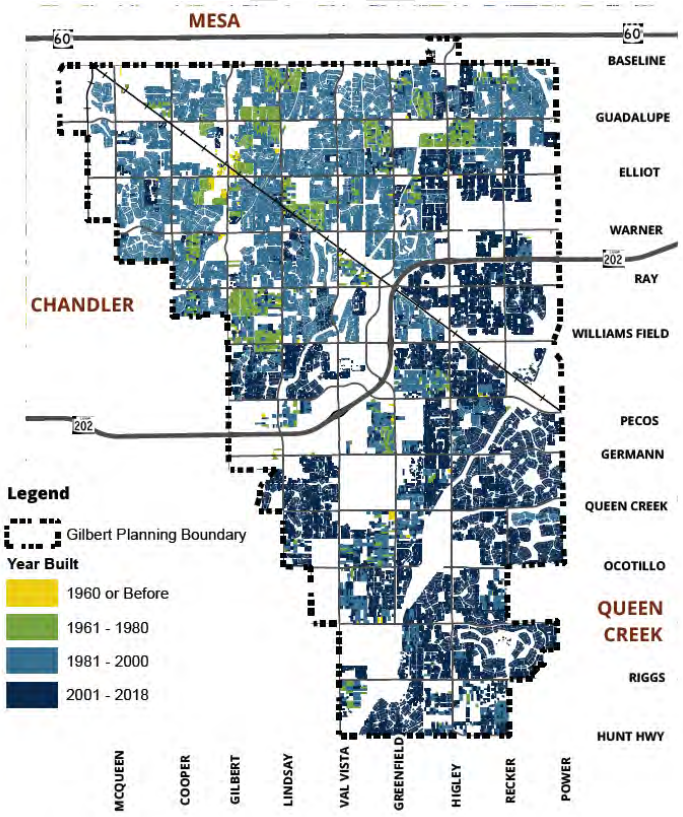

Exhibit 1D. Gilbert Existing Housing Stock

Residential development is projected to steadily increase within the next 5 years. As shown in Figure 1D, the majority of housing stock built between 2000 and 2018 was concentrated below the Loop 202. This trend is expected to continue in the next 5 years. Gilbert's 2012 General Plan includes a growth area map which shows some of these areas and is shown in Figure 4-29[11].

[11] Town of Gilbert, http://www.gilbertaz.gov/departments/development-services/planning-development/general-plan/general-plan-2012

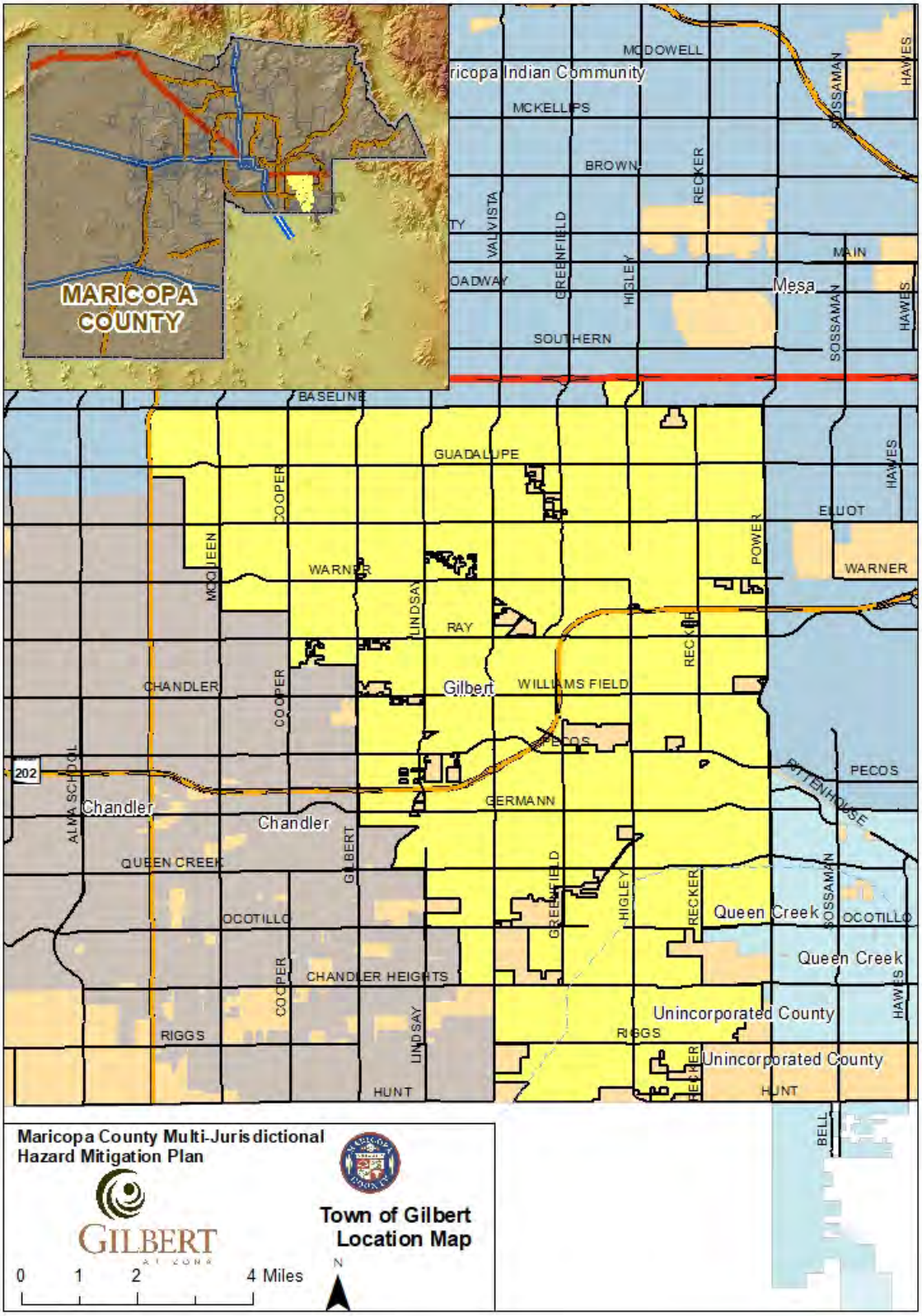

Figure 4-28: Gilbert location map

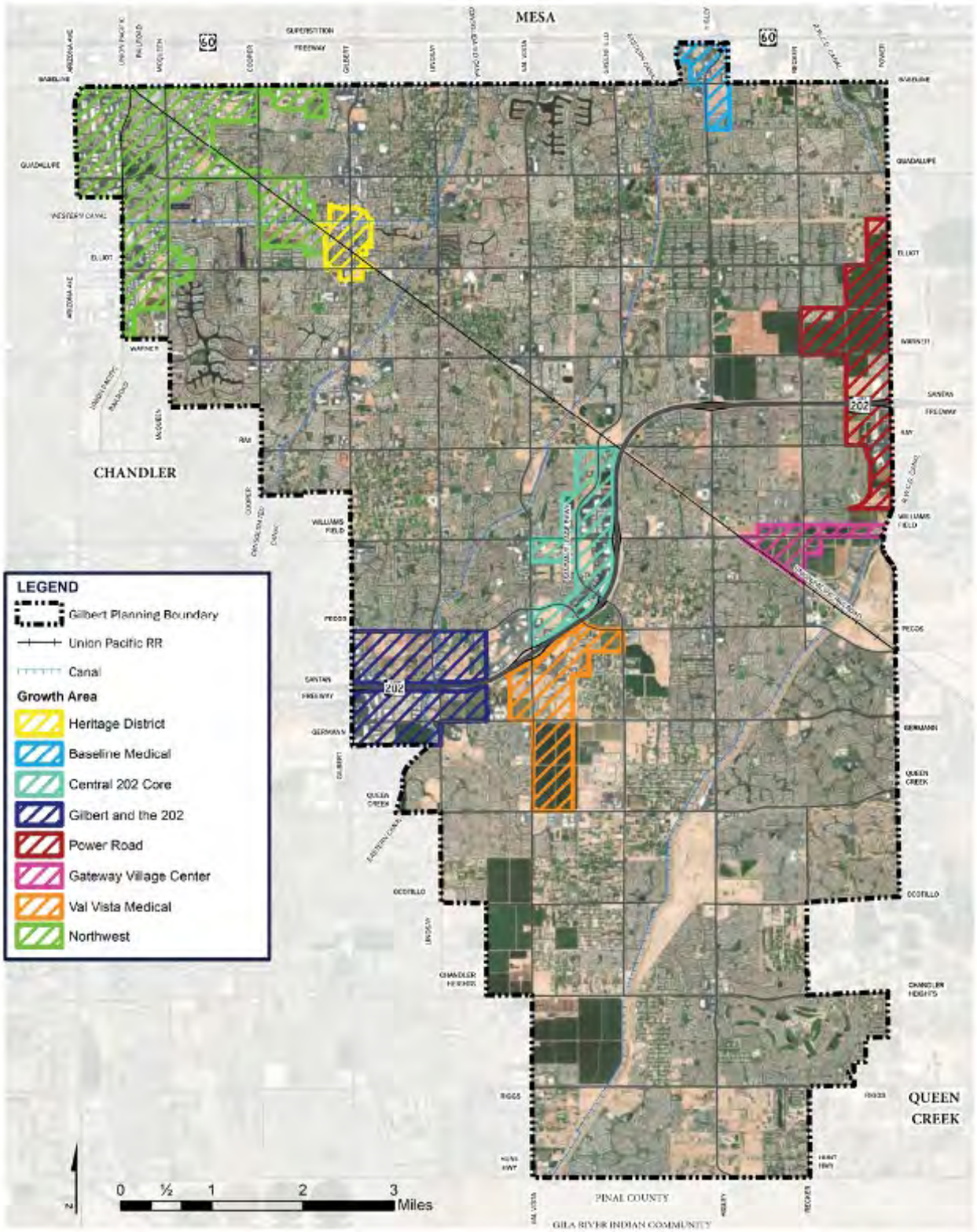

Figure 4-29: Gilbert growth area map

4.3.11 Glendale

Located on the western portion of the greater metropolitan area, Glendale is located approximately 13 miles from downtown Phoenix. Bordered on the east, north, and south by the City of Phoenix, and on the west by the City of Peoria, Glendale is one of the most rapidly growing and diverse cities in Maricopa County. Between 1990 and 2000, Glendale was the 19th fastest-growing large city in the country and stands today as the seventh most populous community in Arizona. Growth projections for this region show that by 2045, over 3 million Arizonans will call the West Valley home; that's nearly one-third of the state's population. Glendale's Sports and Entertainment District is home to major economic drivers including: the Arizona Cardinals (NFL), the Arizona Coyotes (NHL), the Los Angeles Dodgers (MLB), and the Chicago White Sox (MLB) and plays host to numerous mega events such as the Super Bowl and major concerts featuring top recording artists. Glendale is also the location of choice for major employers including Bechtel, Banner Health, Red Bull, White Claw, Honeywell and Lockheed Martin, to name a few. Established in 1892 and incorporated in 1910, the city's planning area now stretches west into unincorporated Maricopa County to an area immediately south of the communities El Mirage and Surprise. As shown in Figure 4-30, major access to Glendale is provided via the Loop 101 Freeway, which enters the city from the north and meets Interstate 10 on the south. Interstate 17 and US Highway 60 (Grand Avenue) provide alternate routes to other communities in the metropolitan area.

Today Glendale's residents are governed under a council-manager form of government, which includes a seven-member city council consisting of a mayor and six council members from various districts within the community who serve four-year terms. The city council appoints the city manager and other officers necessary to produce an orderly administration of the city's affairs.

In 2019, the population of Glendale was 243,262. Population projections for 2020 and 2030 current corporate limits and population, housing, and employment statistics for MPAs for 2010, 2020 and 2030 are summarized in Table 4-12.

Table 4-12: Population, housing and employment statistics for Glendale

Year	Population (Current Limits)	Population (MPA)	Housing (MPA)	Employment (MPA)
2010	226,721	252,800	98,700	78,600
2020	247,800	279,100	106,000	111,400
2030	265,300	306,400	122,600	134,000

Development Trends:

Development trends over the last five years in the City of Glendale have concentrated heavily on smart growth within our targeted industries and strategic districts as defined below.

Targeted Industries:
- Healthcare
- Advanced Business Services (Office/HQs)

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- Aerospace, Aviation and Defense
- Advanced Manufacturing
- Technology/Innovation

Strategic Districts
- Sports and Entertainment District
- New Frontier (Loop 303) District
- Downtown District

Growth in these areas/industries has been accomplished through both significant annexation of land into the city jurisdiction and through infill development in the mostly built out portion of the city.

In the last five years, the annexation of thousands of acres of land predominantly in the New Frontier District, has resulted in a high volume of industrial/manufacturing development.

Additionally, with the continued growth in the Sports and Entertainment District, as well as prime infill opportunities citywide and consistent with market trends, the city has experienced significant residential development activity, both in multifamily projects and new single-family homes.

Recent locates to Glendale include North American manufacturing headquarters for Red Bull, West Coast Manufacturing for White Claw, as well as signature retail in the form of luxury auto dealerships including BMW. Major hospital systems continue to expand citywide, and the city is experiencing its lowest office vacancy rates in the single digits after welcoming large corporations including Alaska USA Federal Credit Union.

The City of Glendale anticipates in the next five years, further development within the city's "New Frontier" will continue at a rapid pace, to include a large increase predominantly in industrial/manufacturing square footage in this area. Important to note that this area of the city is not served by city water/sewer but does have an obligation to ensure the annexed areas are served adequately by public safety.

The City's Sports and Entertainment District contains significant green fields that are anticipated to continue developing over the next five years as well. Development type in this area is expected to be predominantly office, entertainment, experiential retail and multifamily. Infill development is expected to continue citywide with both commercial and residential developments. In the northern portion of the city, Arrowhead, additional luxury auto dealerships will develop and open in the next five years, along with expansions in the healthcare industry. The city is also strategically focused on the development of technology both as an asset/infrastructure and as an industry. These efforts are currently focused in the Sports and Entertainment District with intentions to leverage the strategy citywide. The 2016 General Plan land use map is shown in Figure 4-31[12],

[12] City of Glendale, http://www.glendaleaz.com/planning/documents/GlendaleLandUseMap.pdf

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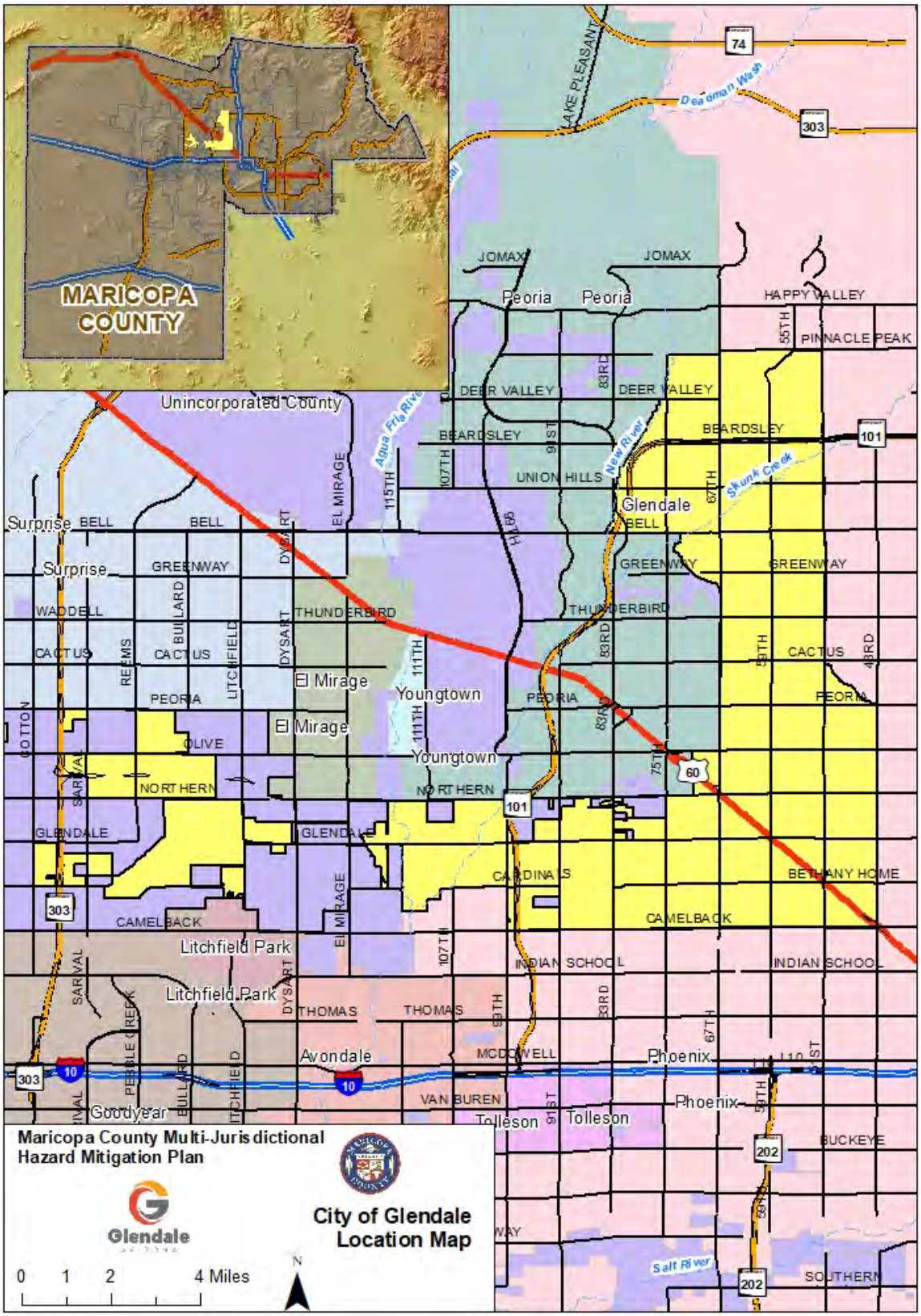

Figure 4-30: Glendale location map

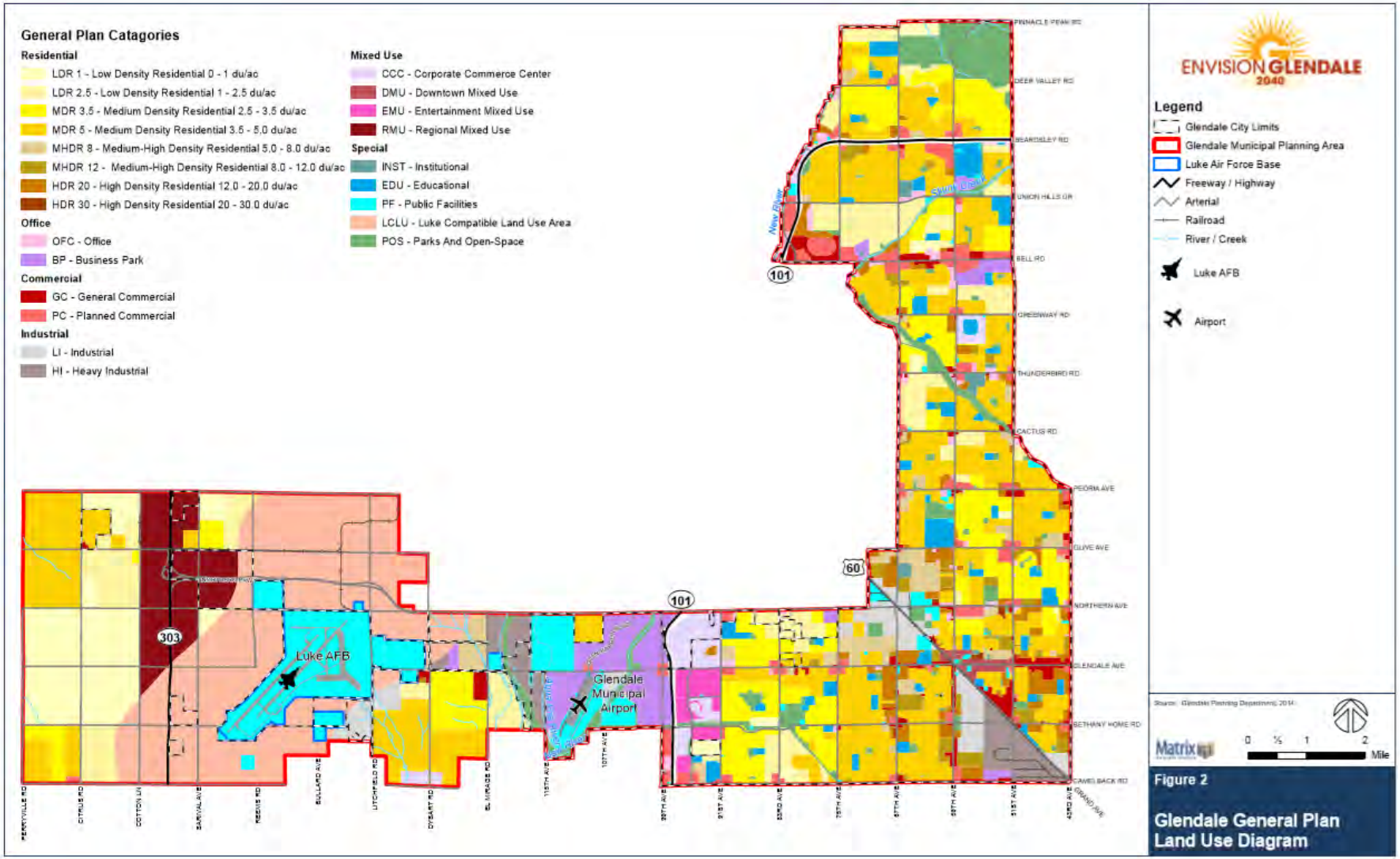

Figure 4-31: Glendale land use planning map

4.3.12 Goodyear

The City of Goodyear, located on the west side of the metropolitan area, was founded in 1916 by the Goodyear Tire and Rubber Company, which grew cotton in the area for use in its tire manufacturing. Later, a naval air station was established in Goodyear and a subsidiary, Goodyear Aircraft, began manufacturing flight decks for Navy seaplanes. Aerospace and food processing industries, and its proximity to California markets, have provided Goodyear with a strong economic base and have contributed to its rapid growth.

As illustrated through Figure 4-32, two major roadways contribute to the economic and residential growth in the city: Interstate 10, which bisects the city's northern region, and Maricopa County Highway 85, which runs through central Goodyear and connects to Interstate 8. The Union Pacific Rail Line also runs through Goodyear, providing industrial sites with rail access. The two primary natural features that affect the City of Goodyear include the Estrella Mountains, which border a portion of Goodyear's east side, and the Gila River watershed, which runs east to west bisecting the community. The incorporated area of Goodyear exhibits an elongated rectangular shape, ranging between 6 and 7 miles from east to west, and 22 miles from north to south. Currently Goodyear's incorporated area contains approximately 117 square miles of land. The majority of its land area exhibits slopes less than 3 percent, draining to the middle of the planning area where the Gila River flows from east to west. The city incorporated on November 19, 1946.

Today Goodyear's residents are governed under a council-manager form of government, which includes a seven-member city council consisting of a mayor who serves a two-year term and six council members elected at-large for a term of four years. The city council appoints the city manager and other officers necessary to produce an orderly administration of the city's affairs.

In 2019, the population of Goodyear was 88,870. Population projections for 2020 and 2030 current corporate limits and population, housing, and employment statistics for MPAs for 2010, 2020 and 2030 are summarized in Table 4-13.

Table 4-13: Population, housing and employment statistics for Goodyear

Year	Population (Current Limits)	Population (MPA)	Housing (MPA)	Employment (MPA)
2010	65,275	68,000	26,000	24,200
2020	89,400	92,100	41,700	37,200
2030	133,700	140,300	64,700	50,600

Development Trends:

Over the past 5 years, the City of Goodyear has seen a significant increase in development, at an average rate of approximately 20% more permits per year. All geographic areas of Goodyear north of the Pecos Road alignment have seen significant development over this time. More specifically, from Pecos Road Alignment to the Gila River, significant amount of residential development and minor commercial

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development has occurred; from the Gila River to I-10, Goodyear has had a significant amount of Residential, Multifamily and Industrial Development, with a moderate amount of Commercial Development occur; and from I-10 to Camelback Road, we have had a significant amount of Industrial Development, with a moderate amount of Residential, Multifamily and Industrial Development realized.

Over the next 5 years, it is anticipated that the current level of new development will occur across the same spectrums and in the same geographical areas included above. If the current trend of development is sustained, it is possible that we will see a small to moderate increase in residential growth south of the Pecos Road alignment, as well. The City population is anticipated to continue increasing in the next five years.

Future planned growth areas for the City are shown in Figure 4-33.

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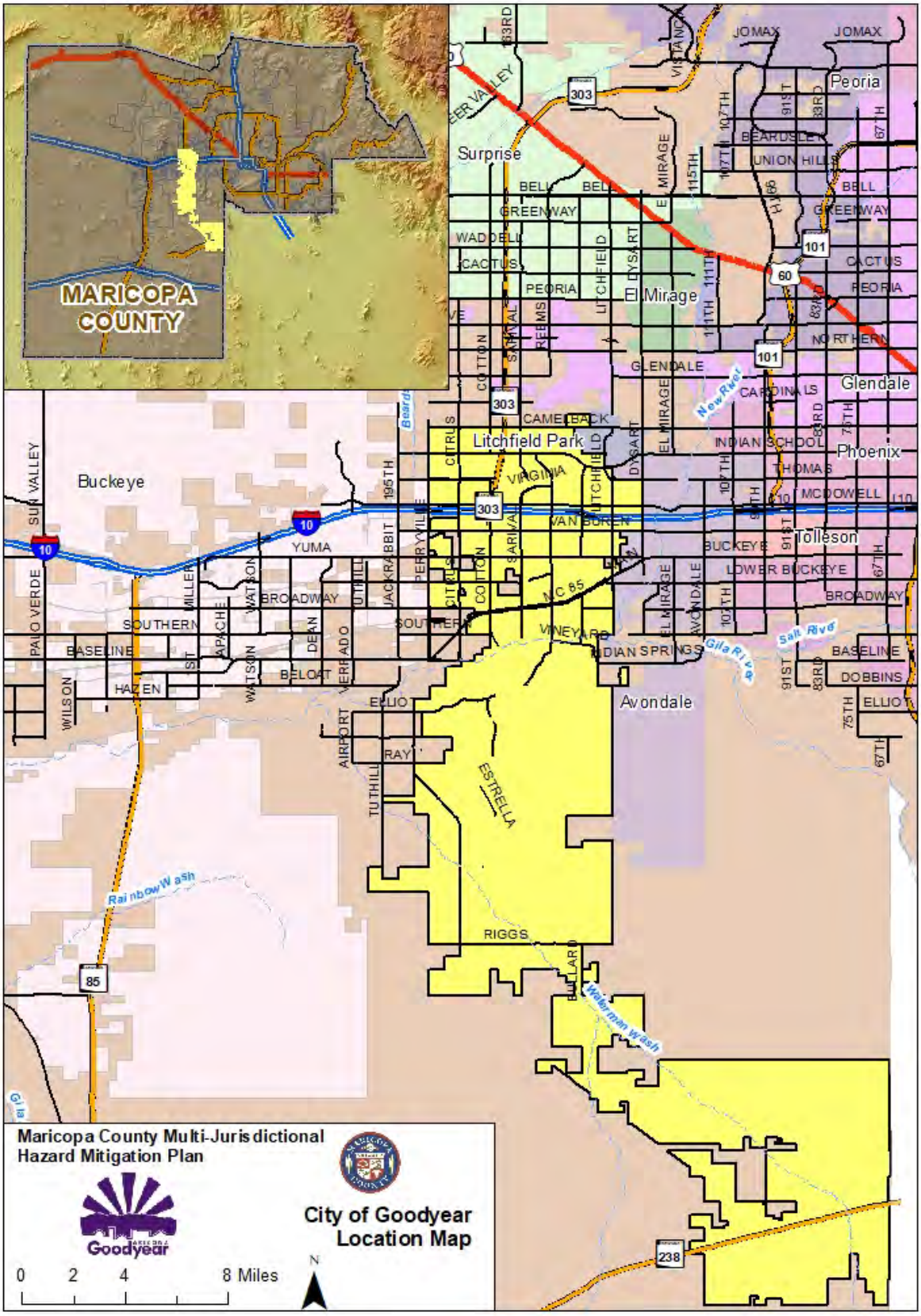

Figure 4-32: Goodyear location map

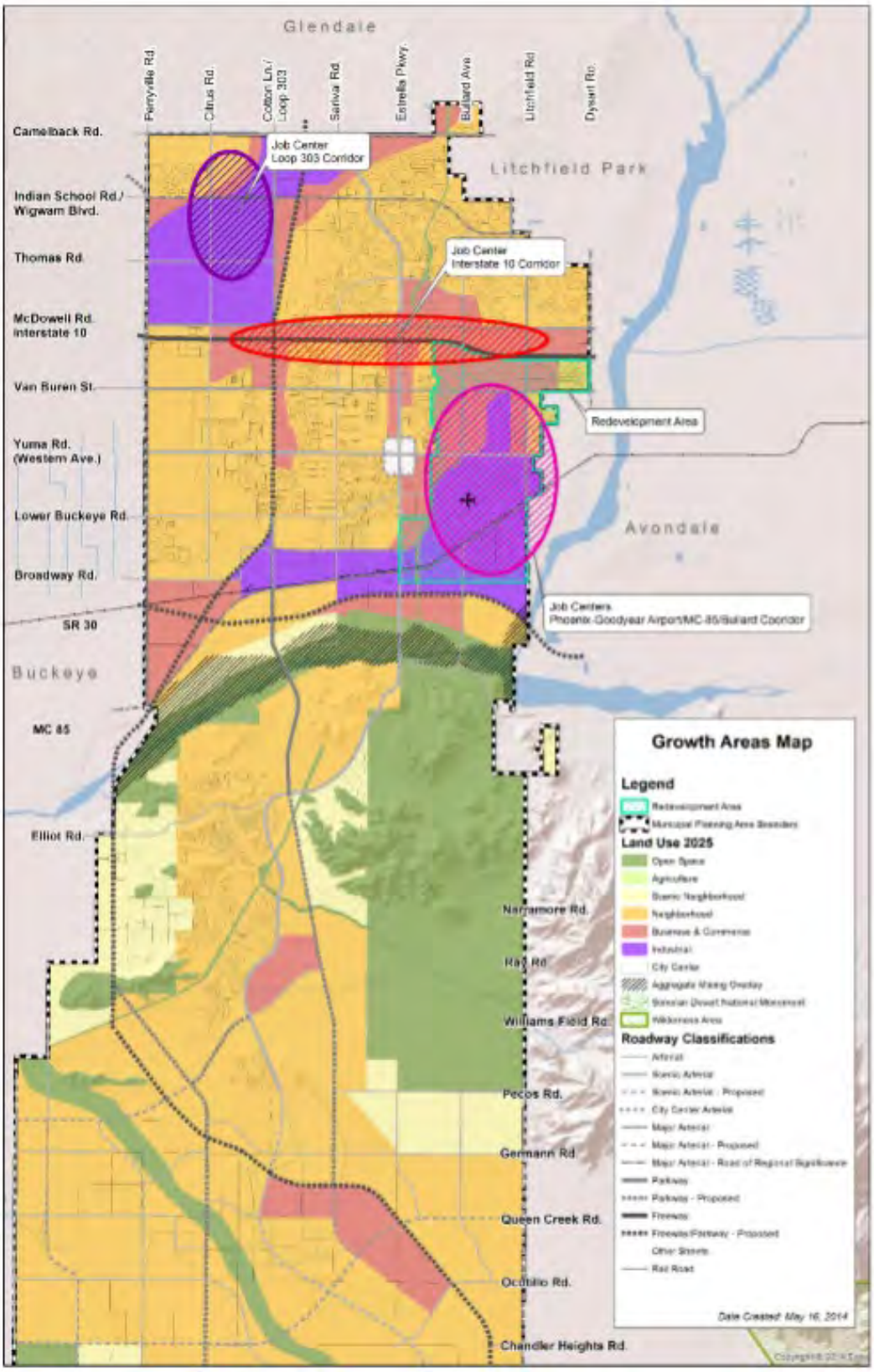

Figure 4-33: Goodyear Growth Areas Map

4.3.13 Guadalupe

One of the smallest towns in Maricopa County, Guadalupe is a Native American and Hispanic community of about 6,000 residents sitting between Phoenix and Tempe at the base of South Mountain. Yaqui Indians founded Guadalupe around the turn of the century and the town proudly maintains a strong cultural and ethnic identity. The Town of Guadalupe was incorporated in 1975 and is approximately one square mile in area. Guadalupe is expected to retain its current shape because it is surrounded by man-made boundaries: Interstate 10 and the City of Phoenix on the west; Baseline Road and the City of Tempe on the North; the City of Tempe on the South; and the Highline Canal on the East. These features are illustrated through Figure 4-34.

The Town was founded in 1914 and today has a council-manager form of government. Municipal services are provided by the town or on a contractual basis, and the Maricopa County Sheriff's Department provides public safety services.

In 2019, the population of Guadalupe was 6,373. Population projections for 2020 and 2030 current corporate limits and population, housing, and employment statistics for MPAs for 2010, 2020 and 2030 are summarized in Table 4-14.

Table 4-14: Population, housing and employment statistics for Guadalupe

Year	Population (Current Limits)	Population (MPA)	Housing (MPA)	Employment (MPA)
2010	5,523	5,500	1,400	1,000
2020	6,400	6,400	1,500	1,300
2030	6,700	6,700	1,700	1,500

Development Trends:

Guadalupe is a land locked community. Development trends continue slowly with infill projects. No major development or geographical changes are forecasted for the next 5 years.

Figure 4-35[13] clearly illustrates the two most prominent land features of Guadalupe, namely, the preponderance of residential land uses and the town's inability to expand beyond its current borders. While residential land uses dominate the built environment of Guadalupe, other commercial and industrial areas along the border with Interstate 10 and in the town's eastern and southern regions also take advantage of the town's proximity to active regional features such as the Arizona Mills Mall and the dynamic retail core areas in Chandler.

[13] MAG, 2013, *Municipal Planning Area Socioeconomic Profiles Maricopa County, Arizona*

Figure 4-34: Guadalupe location map

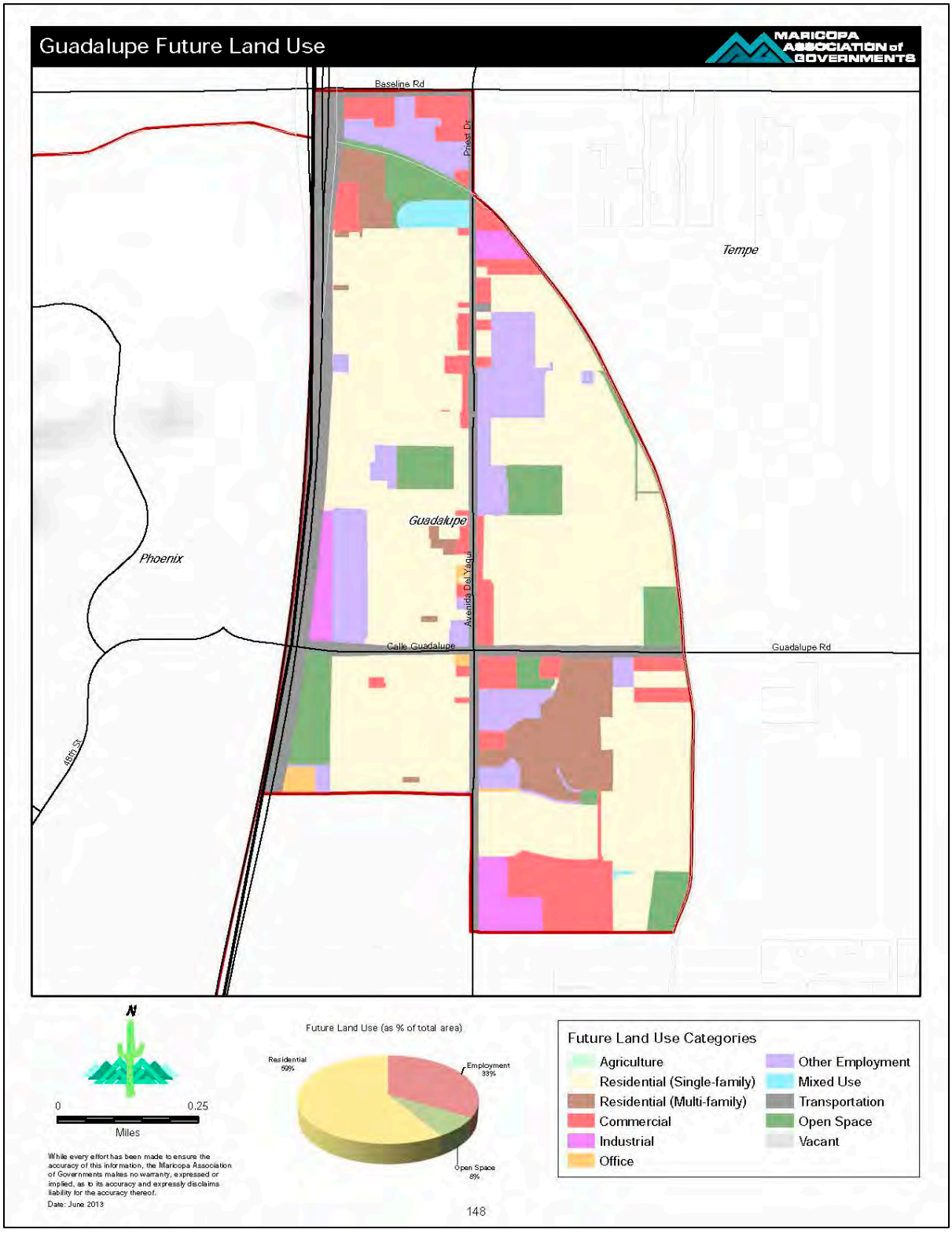

Figure 4-35: Guadalupe land use map

4.3.14 Litchfield Park

Situated north of Interstate 10 approximately 16 miles west of downtown Phoenix, the City of Litchfield Park lies immediately east of Goodyear and north of Avondale in the west valley region of Maricopa County, as shown in Figure 4-36. Litchfield Park is a planned residential community which incorporated in 1987. Litchfield Park began in 1917 when the Goodyear Tire and Rubber Company bought farmland to grow Egyptian long-staple cotton to use in tire cords. Litchfield Park eventually became the headquarters for Goodyear Farms, which had thousands of acres under cultivation. From 1931 to 1944, it was also the test site for Goodyear auto, truck and tractor tires. In the 1960's, Litchfield Park designed a master plan for development including several self-sufficient villages.

In 2019, the population of Litchfield Park was 6,811. Population projections for 2020 and 2030 current corporate limits and population, housing, and employment statistics for MPAs for 2010, 2020 and 2030 are summarized in Table 4-15.

Table 4-15: Population, housing and employment statistics for Litchfield Park

Year	Population (Current Limits)	Population (MPA)	Housing (MPA)	Employment (MPA)
2010	5,476	10,500	4,600	2,000
2020	7,300	14,000	4,900	4,400
2030	8,400	15,400	5,700	5,200

Development Trends:

Over the past 5 years, the City has seen two residential developments start. One development to the north boundary of LP is completed and contains 121 single family dwellings. The second development, centrally located, contains single family, townhouses and condos (163 total units) and is 98% completed. These two areas are indicated in yellow on Figure 4-37.

Development of our remaining commercial sites are in progress. This includes areas along Camelback at Litchfield (NEC), Dysart (SEC) and El Mirage (SWC) Roads. These areas are indicated in pink on Figure 4-37.

The areas along Camelback at Dysart and El Mirage Roads will continue to develop. These are Commercial and Light Industrial zoned. These are shown in pink on Figure 4-37.

The City has plans for developing the City Center to create a larger more vital 'downtown'. The plans include a large central park surrounded by commercial (office, retail, and restaurants) along with the potential inclusion of mixed use and residential units. This area is depicted in green on Figure 4-37.

The final developable land surrounds the existing Sun Health Assisted Living facility. There has been discussion of developing their land which surrounds City owned, historical property. The Sun Health development proposes additional housing, both single and multi-family, additional Assisted and Independent living facilities. This area is shown in cross-hatched green on Figure 4-37.

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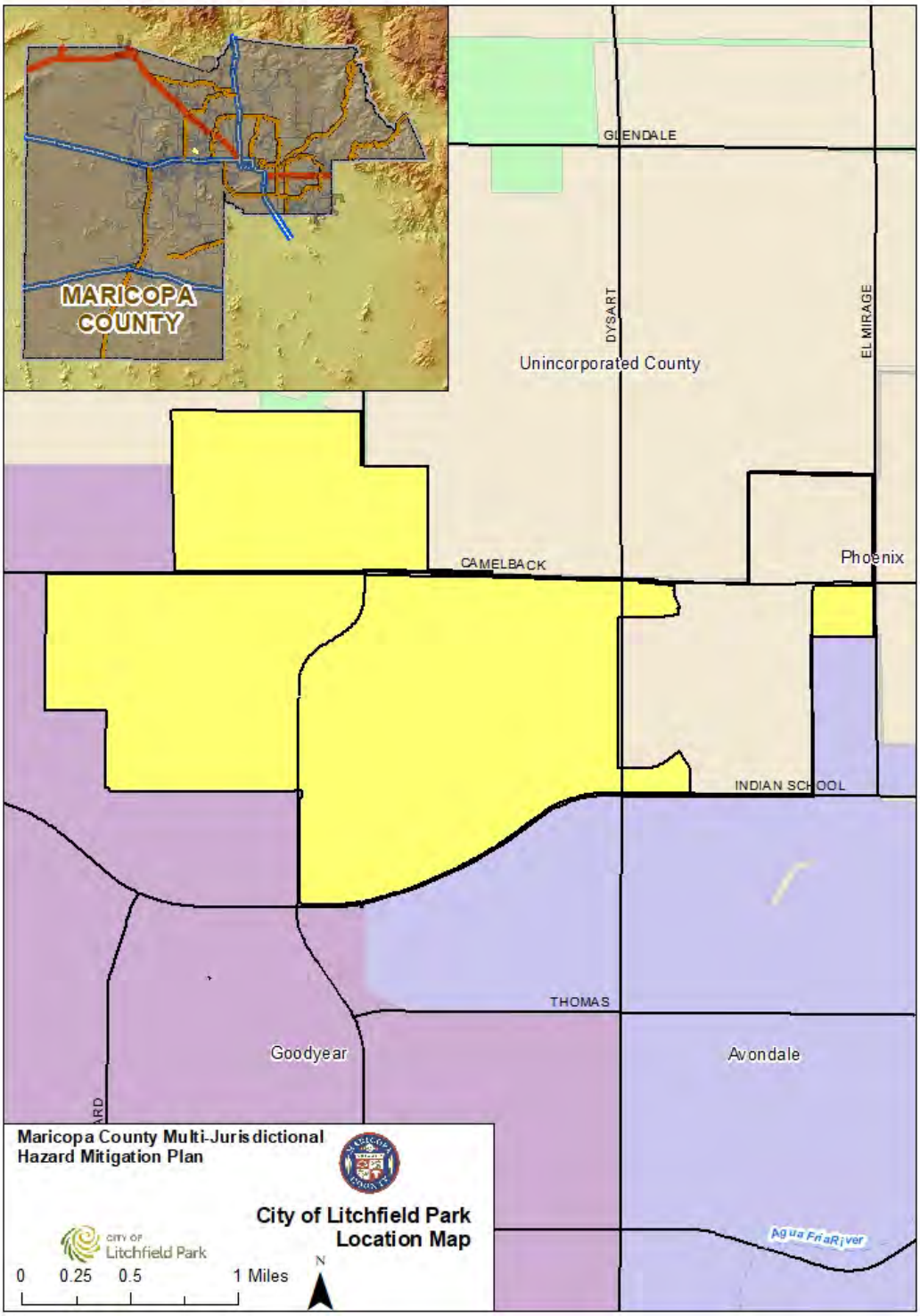

Figure 4-36: Litchfield Park location map

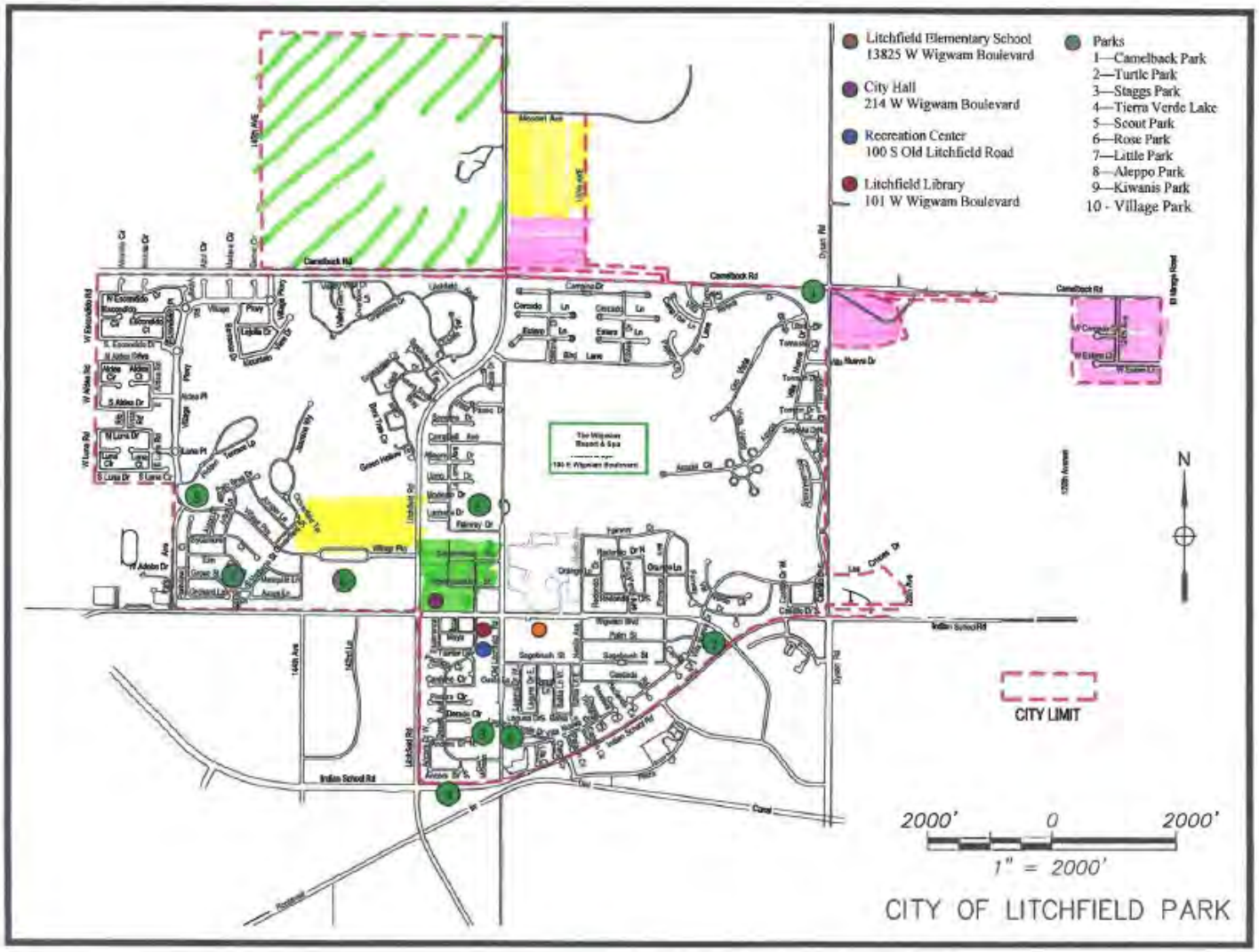

Figure 4-37: Litchfield Park land use map

4.3.15 Mesa

The City of Mesa, located in the southeast Phoenix valley, was incorporated in 1883. As shown in Figure 4-38, the city shares boundaries with the communities of Tempe, Chandler, Gilbert, Queen Creek, and Apache Junction, and with the Salt River Pima-Maricopa Indian Community to the north. A region that is generally defined more by a roadway network than by natural features, the environment of north Mesa is enhanced by the presence of both the Salt River watershed and Red Mountain. Numerous notable pockets of unincorporated land dot the planning area, some of which are entirely surrounded by the city. As part of the greater metropolitan area, Mesa is the third-largest city in Arizona and the nation's 35th-largest city. Just 15 miles east of downtown Phoenix, incorporated Mesa currently includes 129.7 square miles, with a future land area that will include more than 170 square miles.

Since its incorporation over 100 years ago, the City of Mesa has experienced tremendous growth. Mesa's modern history began in 1877 when a group of Mormon colonists arrived in Lehi and built Fort Utah in the north-central portion of Mesa near the Salt River. In 1883, the City of Mesa was officially incorporated and had an estimated 200 residents. By 1980, boundaries had expanded significantly, increasing the city's area to over 66 square miles.

Mesa's early development was triggered partly by the influence of military training in the region. In 1941 two bases were constructed to provide training for World War II pilots. Falcon Field, now Falcon Field Airport, was built for the British Royal Air Force. Williams Field, later Williams Air Force Base, and now Williams Gateway Airport, was built for U.S. pilots. After the war, many military families decided to settle in Mesa. The decade of the 1950's brought more commerce and industry to Mesa, including early aerospace companies. However, until 1960 more than 50 percent of the residents earned their living directly or indirectly from farming, mainly citrus and cotton. The 1960's through 1990's saw more high-technology companies, now over 100 firms. Health facilities grew especially during the 1980's and 1990's to service the larger population.

The City of Mesa has an elected mayor and six city council members that are limited to two consecutive terms. The city operates under a charter form of government, with the mayor and city council setting policy. In 1998, a voter initiative changed the election of the council members from an at-large system to a system of six districts. Council members serve a term of four years, with three members elected every two years. The mayor is elected at-large every four years. The council appoints the city manager and other officers necessary to produce an orderly administration of the city's affairs.

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In 2019, the population of Mesa was 497,439. Population projections for 2020 and 2030 current corporate limits and population, housing, and employment statistics for MPAs for 2010, 2020 and 2030 are summarized in Table 4-16.

Table 4-16: Population, housing and employment statistics for Mesa

Year	Population (Current Limits)	Population (MPA)	Housing (MPA)	Employment (MPA)
2010	439,041	482,500	227,000	160,800
2020	506,600	552,800	241,300	205,900
2030	556,600	607,500	266,600	249,000

Development Trends:

Over the past five years the City of Mesa has seen an increase in residential development, particularly in the southeast area of Mesa. The Eastmark and Cadence master planned communities have consistently platted hundreds of new lots on the old GM Proving Grounds site. The northeast area of Mesa has also seen an increase in single-family residential development with the Mountain Bridge Master Planned Community at Ellsworth Road and McKellips Road and the Lehi Crossing Community at Lindsay Road and McDowell Road. There has been significant multi-residential development both in the Downtown area and the Superstition Freeway Corridor.

The City also has four "Economic Activity Areas" and several "Economic Activity Districts" identified within the General Plan (see Exhibit 2A). New commercial, retail, and employment development has focused around the Falcon Field Area, the Phoenix-Mesa Gateway Airport Area (specifically in the Elliot Road Tech Corridor and the Pecos Road Economic Opportunity Zone), and the Superstition Freeway Corridor, while a significant amount of redevelopment has occurred in Downtown and the Broadway corridor.

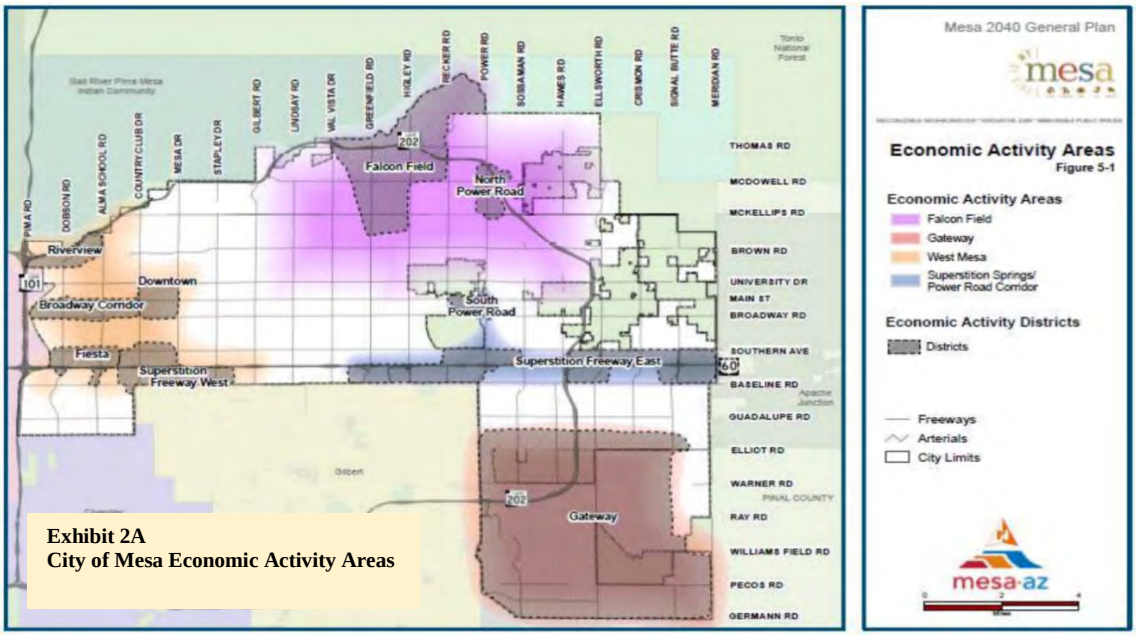
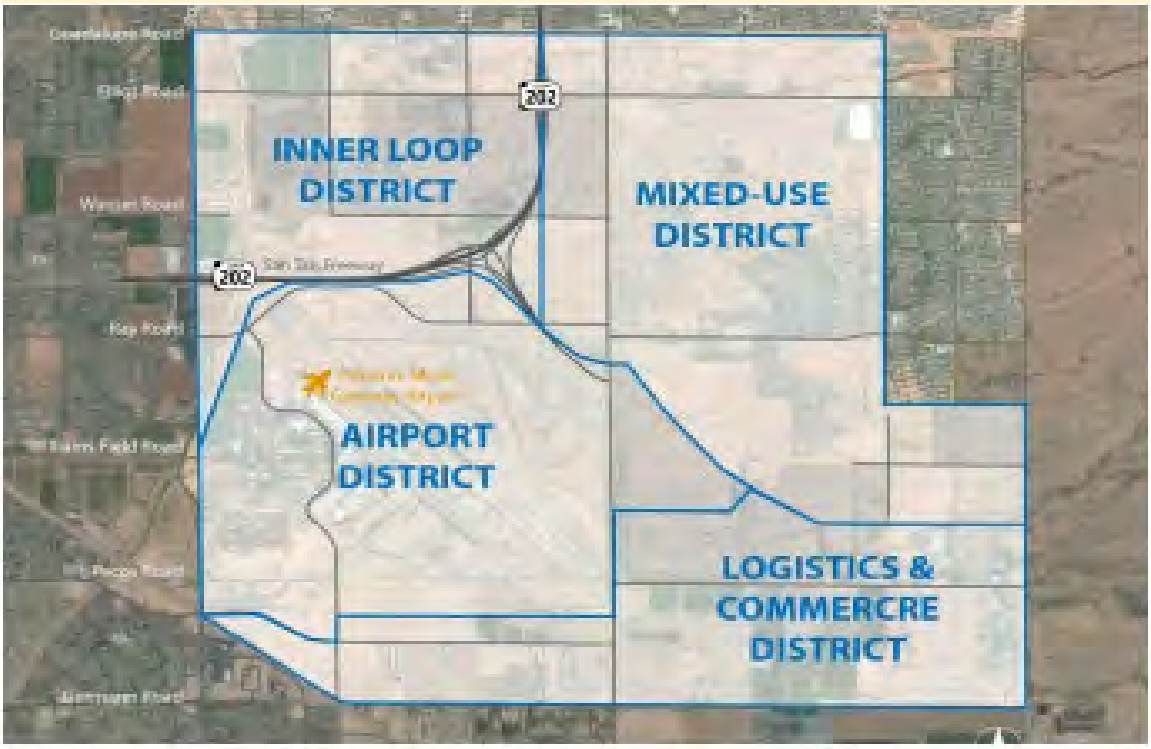


Exhibit 2A
City of Mesa Economic Activity Areas

The City identified four "Growth Areas" within the Mesa 2040 General Plan. These areas include the Falcon Field Area, the Phoenix-Mesa Gateway Area, the Light Rail Corridor along Main Street, and the East Superstition Springs Freeway Corridor as shown in Figure 4-39. The City anticipates continued growth to occur within the specified Growth Areas and Economic Activity Areas in the next five years. Particularly, there is an ample supply of undeveloped land surrounding the Phoenix-Mesa Gateway Airport that is prime for employment and residential growth (see Exhibit 2B). It is anticipated that there will be development activity within the Inner Loop District north of Phoenix-Mesa Gateway Airport. It is also anticipated that significant amounts of redevelopment will occur along Main Street and the Fiesta District.

Exhibit 2A. Mesa Gateway Strategic Plan Districts (Figure 9)



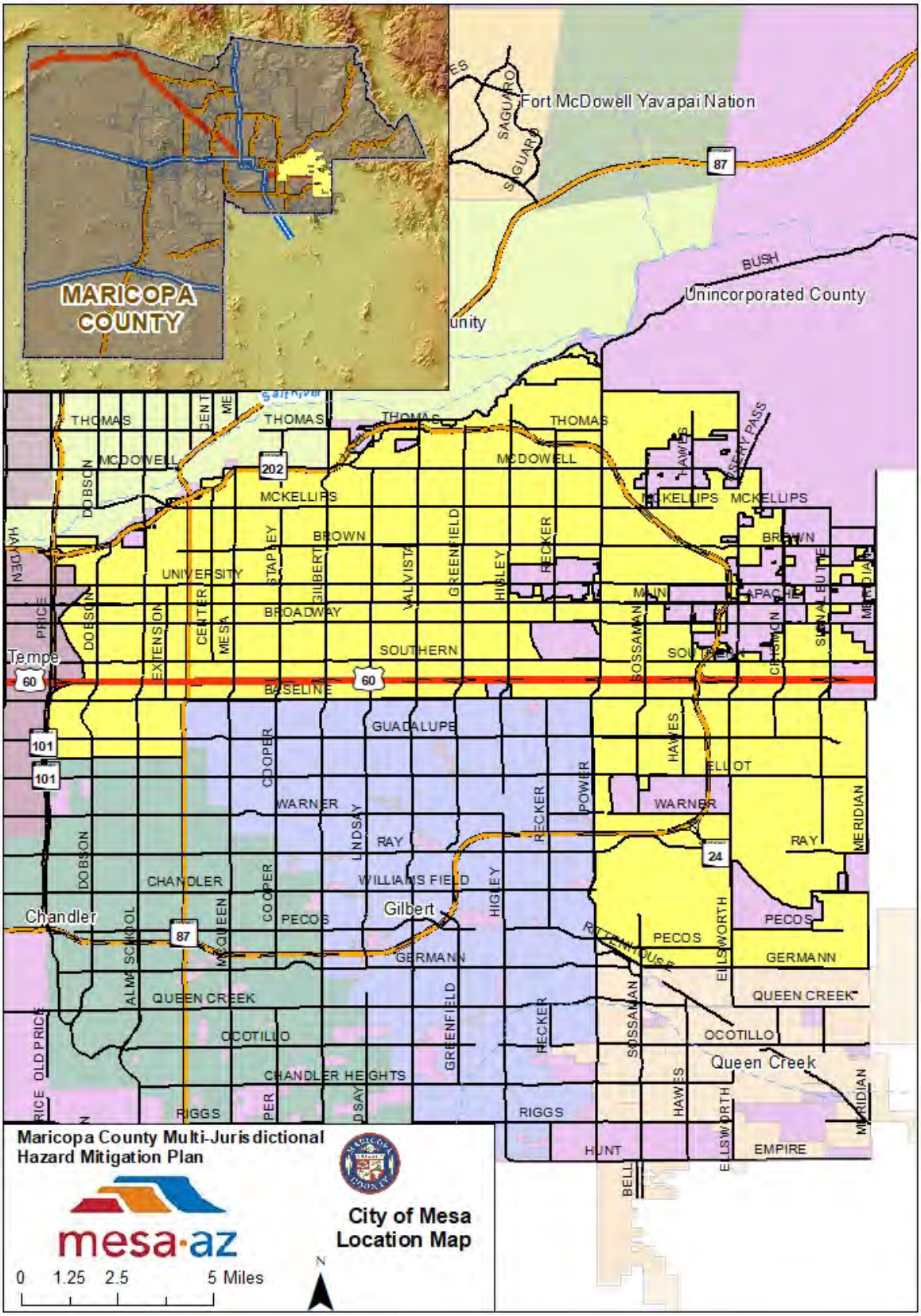


Figure 4-38: Mesa location map

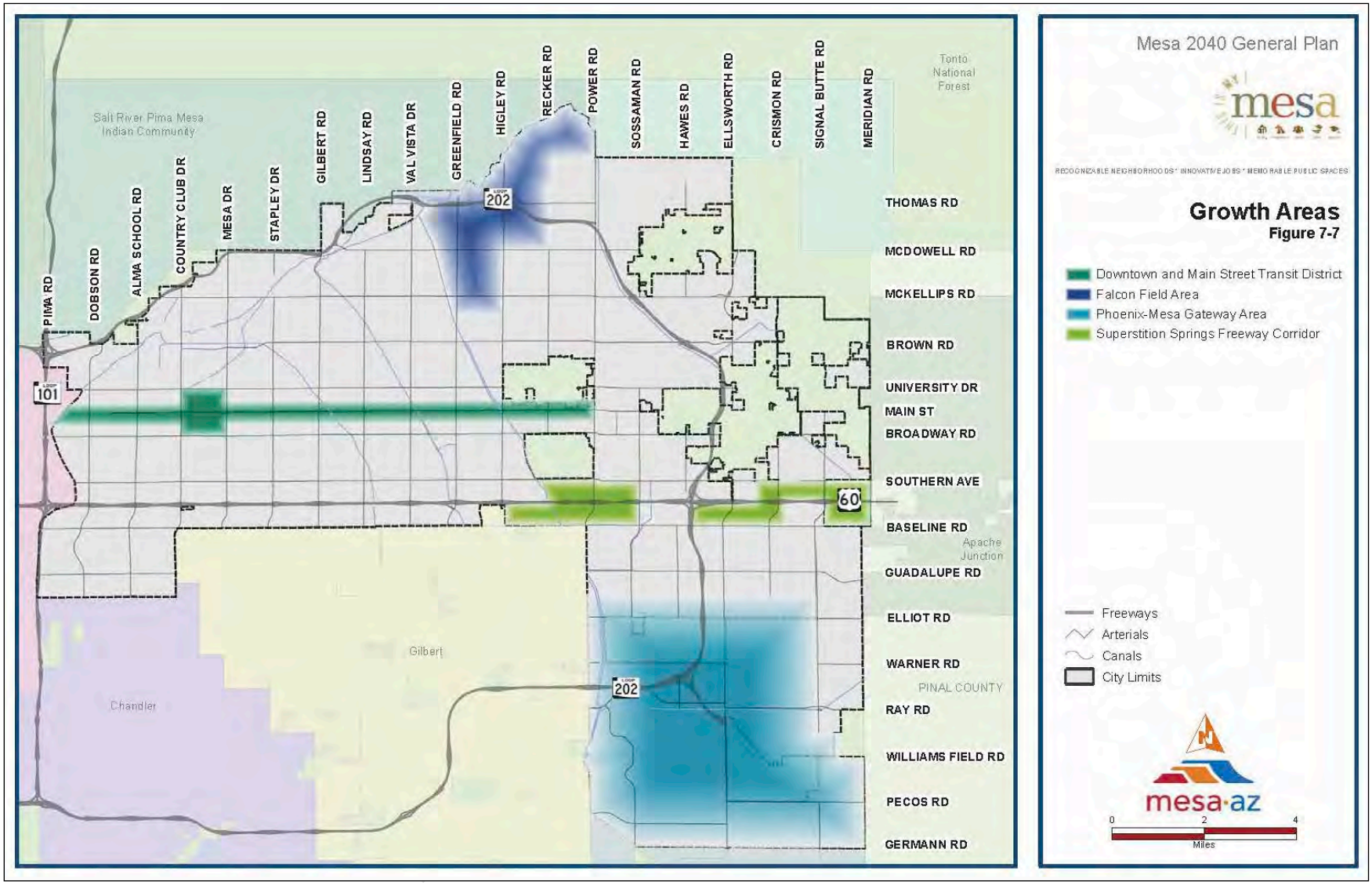


Figure 4-39: Mesa growth area map

4.3.16 Paradise Valley

******NOTE – Paradise Valley is no longer a Plan participant, but the following information is retained to provide context for adjacent communities.***

Located approximately 10 miles northeast of downtown Phoenix, the Town of Paradise Valley lies in the central region of the metropolitan area between the cities of Phoenix and Scottsdale, as shown in Figure 4-40. Incorporated as a community in May of 1961, the town's founders initiated the integration in response to concerns that the relaxed, sparsely populated desert lifestyle of their community was in danger of eroding due to threatened annexation by and the changing density and commercialization of neighboring Phoenix and Scottsdale. The area originally incorporated as the Town included 2.7 square miles. By 1970, Paradise Valley had grown to 13.3 square miles, and the population had reached 6,637 residents. By 1980, the town had a population of approximately 11,000 residents and included roughly 14 square miles. While Paradise Valley reflects a unique focus on low-density, resort style living, the town also has a rugged terrain that compliments the beautiful homes.

Today Paradise Valley's residents are governed under a council-manager form of government, which includes a seven-member town council consisting of a mayor and six council members elected at-large for a term of four years. The town council appoints the mayor and town manager and other officers necessary to produce an orderly administration of the town's affairs.

In 2019, the population of Paradise Valley was 14,143. Population projections for 2020 and 2030 current corporate limits and population, housing, and employment statistics for MPAs for 2010, 2020 and 2030 are summarized in Table 4-17.

Table 4-17: Population, housing and employment statistics for Paradise Valley

Year	Population (Current Limits)	Population (MPA)	Housing (MPA)	Employment (MPA)
2010	12,820	12,800	5,600	4,300
2020	14,100	14,100	5,800	6,300
2030	14,700	14,700	6,100	6,800

Development Trends:

There is no development trend analysis for Paradise Valley in this Plan.

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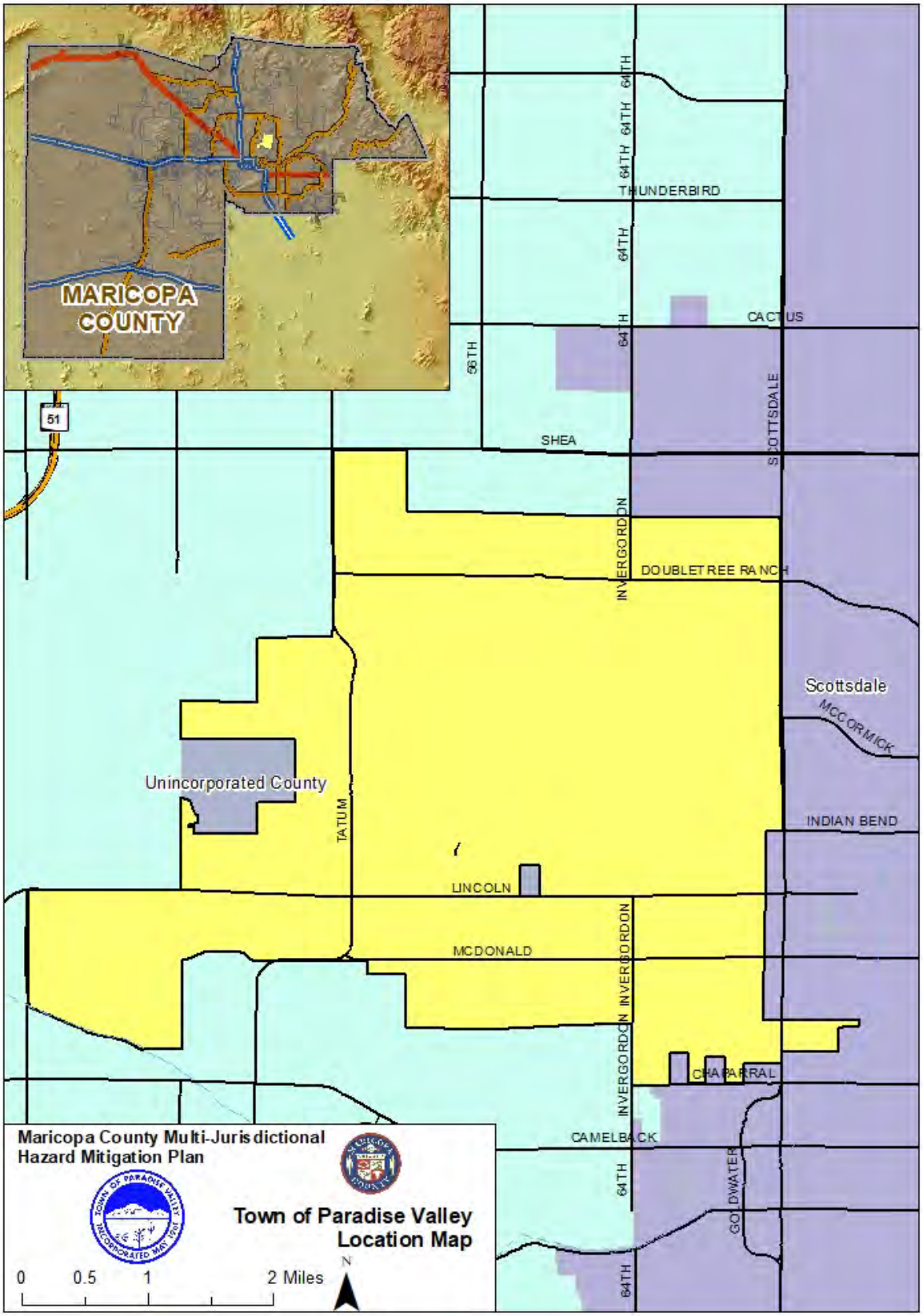

Figure 4-40: Paradise Valley location map

4.3.17 Peoria

The City of Peoria was established in the 1880's when local leader William J. Murphy's vision for the Arizona Canal was completed in 1885. The city was incorporated in 1954, with boundaries covering only one square mile of land. The incorporated area of Peoria covers nearly 176 square miles. Northern Peoria's planning area includes a landscape dominated by the Lake Pleasant Recreational Area. This park is complimented by both the Agua Fria River and New River watersheds, which enter the city from the north and depart to the south. As shown in Figure 4-41, Peoria is provided access through various arterial roadways and major throughways. Most notably, State Route 74 provides access to the city's north end, the Loop 101 Freeway bisects the city's southern region, and the Loop 303 Freeway alignment affords access to the central and northern portion of the city.

Today, Peoria's residents are governed under a council-manager form of government, which includes a seven-member city council consisting of a mayor and six council members elected from six districts within the city for four-year terms. The city council appoints the city manager and other officers necessary to produce an orderly administration of the city's affairs.

In 2019, the population of Peoria was 180,161. Population projections for 2020 and 2030 current corporate limits and population, housing, and employment statistics for MPAs for 2010, 2020 and 2030 are summarized in Table 4-18.

Table 4-18: Population, housing and employment statistics for Peoria

Year	Population (Current Limits)	Population (MPA)	Housing (MPA)	Employment (MPA)
2010	154,065	162,500	68,000	40,900
2020	183,700	196,600	84,400	62,400
2030	214,700	232,400	110,700	73,100

Development Trends:

Over the last five years, development has been focused in the northern and northwestern areas of the City, such as Vistancia and the Lake Pleasant Parkway corridor. Construction codes have been consistently updated to the most recent national codes and standards, to protect health and life safety of the citizens of Peoria.

Over the next five years, building codes and Flood Plain Management will continue to evolve to address natural hazards posing threats to occupied structures and developments. Development activity will continue to migrate to the north, which will increase population densities north of Happy Valley Road and Hwy 303. New development and structures will conform to the most recent national building and construction regulations, minimizing potential property damage and threats to health and life safety. The city's current Land Use Plan is shown on Figure 4-42[14].

[14] City of Peoria, http://www.peoriaaz.gov/NewSecondary.aspx?id=25810

Figure 4-41: Peoria location map

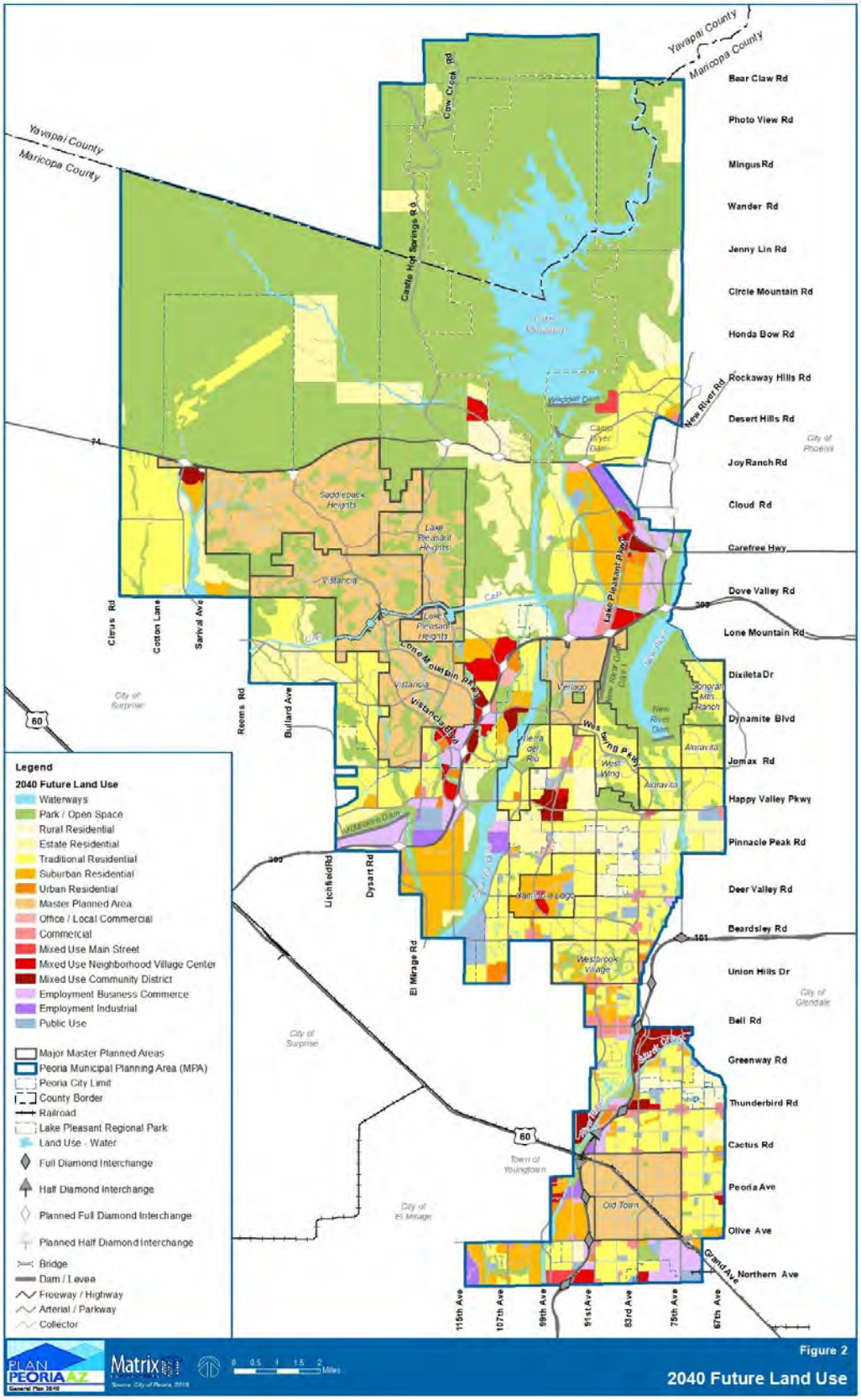

Figure 4-42: Peoria land use map

4.3.18 Phoenix

The City of Phoenix, located in the heart of the greater metropolitan area, dominates the political, economic, and cultural landscape not only of Maricopa County, but also much of Arizona. In 1867, Phoenix founder Jack Swilling formed a canal company and diverted water from the Salt River, helping to capitalize on the region's agricultural value. In 1911, the Roosevelt Dam was completed and water supplies—vital to growth in the region—were stabilized. Strong growth in the region began during World War II when several military airfields were constructed in Maricopa County, and various defense industries followed. Formally incorporated in 1881, today the City of Phoenix includes over 500 square miles and is the nation's fifth most populous city. Phoenix is Arizona's capitol and is located in the County Seat: Maricopa County.

As suggested through Figure 4-43, Phoenix has grown more north-south than east-west since its inception. To the south, Phoenix is bounded by the Gila River Indian Community, and on the north by unincorporated Maricopa County. Many smaller communities, including Tempe, Paradise Valley, and Scottsdale define the city to the east, and Peoria and Glendale form the city's western border. The natural environment of Phoenix is typical of the Sonoran Desert climate. Rugged urban mountain parks, including South Mountain—one of the nation's largest urban parks—and the Phoenix Mountain Preserve create a memorable skyline. The region's catalyst, the Salt River, now runs dry through the center of the city, and is complemented by various smaller watersheds. A massive arterial roadway network and, more recently, the development of a large freeway system, now serve Phoenix. The primary roadway network includes Interstates 17 and 10, with State Highway 51 and the Loop 101 and 202 Freeways also providing transportation service throughout the region. Phoenix and the region are served by Sky Harbor International Airport, located only two miles east of the city's central business district.

The City of Phoenix has an elected mayor and eight city council members that represent various districts within the city. The city operates under a charter form of government, with the mayor and city council setting policy. The mayor and eight council members serve terms of four years. The mayor is elected at-large every four years. The council appoints the city manager and other officers necessary to produce an orderly administration of the city's affairs.

In 2019, the population of Phoenix was 1,617,344. Population projections for 2020 and 2030 current corporate limits and population, housing, and employment statistics for MPAs for 2010, 2020 and 2030 are summarized in Table 4-19.

Table 4-19: Population, housing and employment statistics for Phoenix

Year	Population (Current Limits)	Population (MPA)	Housing (MPA)	Employment (MPA)
2010	1,445,632	1,501,300	611,500	747,700
2020	1,641,100	1,697,700	653,300	937,600
2030	1,816,200	1,881,900	735,100	1,084,000

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Development Trends:

The City of Phoenix Planning and Development Department has tracked development trends over the past five years and reported these trends to city management, the Development Advisory Board and the public. The most prominent development trends include:

Strong growth within the Infill Development District: The City of Phoenix's Infill Development District was created on January 1, 2014. The Infill Development District and associated policies remove some of the barriers to infill development. The goal is to promote growth and development in areas served by light rail and existing public infrastructure. In the last decade, high-rise and luxury apartment projects have fueled a construction boom in central Phoenix. Since 2000 there have been 7,743 housing units built in Downtown Phoenix, thirty percent of those in the past three years. Over 4,000 more are currently under construction or in advanced planning stages.

An increasing population in the central core has led to increased investment in the service and entertainment business environment. Downtown's Roosevelt Row planning district was named one of the nation's best planning concept neighborhoods in 2015 by the American Planning Association. An abundance of nightlife, restaurants and trendy apartment complexes turned this relatively quiet neighborhood into an entertainment destination. Similarly, the Central Ave core in Midtown and Uptown Phoenix have seen significant capital investments in retail, service establishments and housing. The Park Central mall and Uptown Plaza have undergone major renovations, greatly increasing patronage, interest and investment.

Bio-medical and academic expansion: The Arizona State University downtown campus has grown significantly since its creation in 2006. The downtown campus has over 11,000 students with emphasis on Journalism & Mass Communications and Medical, Nursing & Health Innovations. As part of that medical initiative, the University of Arizona has partnered with Arizona State University for the Phoenix Biomedical Campus, taking advantage of the Phoenix Downtown Code Biomedical district zoning entitlements. A few miles away at Midtowns Park Central Mall, Creighton University School of Medicine is nearing completion. The new nine-story, 180,000-square-foot campus will educate nearly 1000 students annually. Located just a few hundred yards away from the Creighton campus, the Barrow Neurological Institute is currently in the process of a major neurology and brain study facility expansion at Dignity Health St Joseph's hospital. The new 130,050-square-foot, five-story building will bring cutting edge technology research and medical innovation for the study of brain injury, stroke and dementia.

In northeast Phoenix, Mayo clinic is in the middle of a major campus expansion. The $650 million expansion will double the size of the facilities and add 1.4 million square feet of building space. The HonorHealth Sonoran Crossing Medical Center is currently under construction in northwest Phoenix on Dove Valley Rd and interstate 17. This 210,00-square-foot medical center will accommodate growing health and wellness needs of north Phoenix and Anthem residents.

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In west Phoenix, Grand Canyon University is experiencing unprecedented growth in student body, land acquisition and infrastructure construction. Due to increased student enrollments, the on-campus student population is currently 19,000. Student population projections at campus buildout are estimated to be 30,000 students. Over $1.2 billion in infrastructure projects and new programs are planned and being implemented.

Traditional Growth Areas: There has been moderate residential construction growth in the southwest growth region. Single family and, increasingly multifamily residential units are reacting to the opening of the Loop 202 South Mountain Freeway and this region is seeing the highest level of single-family development. Southeast Phoenix is nearing build out and has only seen modest growth activity. Northern Phoenix contains the most developable land and will likely take many decades to build out. Most of the property in that area is owned by the State Land Trust and development of land for residential and commercial purposes tends to take place at slower pace due to a complex disposition process. Those areas are also affected by several constraints associated with topography, infrastructure requirements, and the regulatory environment that have made development more challenging. However, the City is working with the State Land Department to address many of these issues, and it is possible that a significant amount of urban growth will take place in remaining vacant lands in the north in the coming decade.

Development trends anticipated by the city over the next five years include:

The current trend of urban infill is expected to continue for the foreseeable future. A decreasing availability of vacant properties has led to the repurposing of existing, under-utilized properties. City staff continues to work with developers, investment groups, the historic preservation community and concerned citizens to strike the most appropriate balance between growth, livability and our history. The continued growth of high-rise residential units is anticipated to slow down, at least in the immediate future. The majority of previous multifamily projects in the infill district in recent years have been rental units. It is anticipated that more owner-occupied units will be planned as inventory has dwindled under recent market conditions.

Light rail expansion will continue to drive growth in the Infill incentive district and beyond. Current light rail construction for the south-central corridor is underway. Anticipated service, retail and multi-family projects are expected as the line moves closer to completion. Further light rail extensions to the north and west are planned to begin within this five-year time horizon. Major redevelopment and renovations are planned to revitalize the Metro center mall district. A major transportation hub has been planned and will be implemented as the rail line is constructed.

Residential growth will continue in the traditional growth areas. Southwest Phoenix will continue to see the most residential development in the next five years. The South Mountain 202 freeway has made thousands of acres of vacant farmland more readily accessible. An increase in multi-family homes is anticipated. The northern growth areas will likely see modest growth because of the limited supply of land being

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brought to market. However, there are a number of projects being proposed or contemplated by the State Land Department and interest on the part of the development community is strong, so there may be significantly more activity towards the end of the five-year period. For example, the Rawhide wash channelization project in northeast Phoenix should be completed in this five-year time horizon. Over 2,000 acres of land will be taken out of the 100-year flood plain. Growth is anticipated as the project nears completion. The State Land Department is working with the City of Phoenix to release 3,500 acres in northwest Phoenix as part of a major technology and industrial hub. There are significant infrastructure requirements to bring this project forward however all parties are focused on streamlining the critical path. Initial project and infrastructure improvements could start within the next two years. Figure 4-44[15] shows the latest version of the city's land use plan.

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[15] City of Phoenix, https://www.phoenix.gov/econdev/Reports-Maps

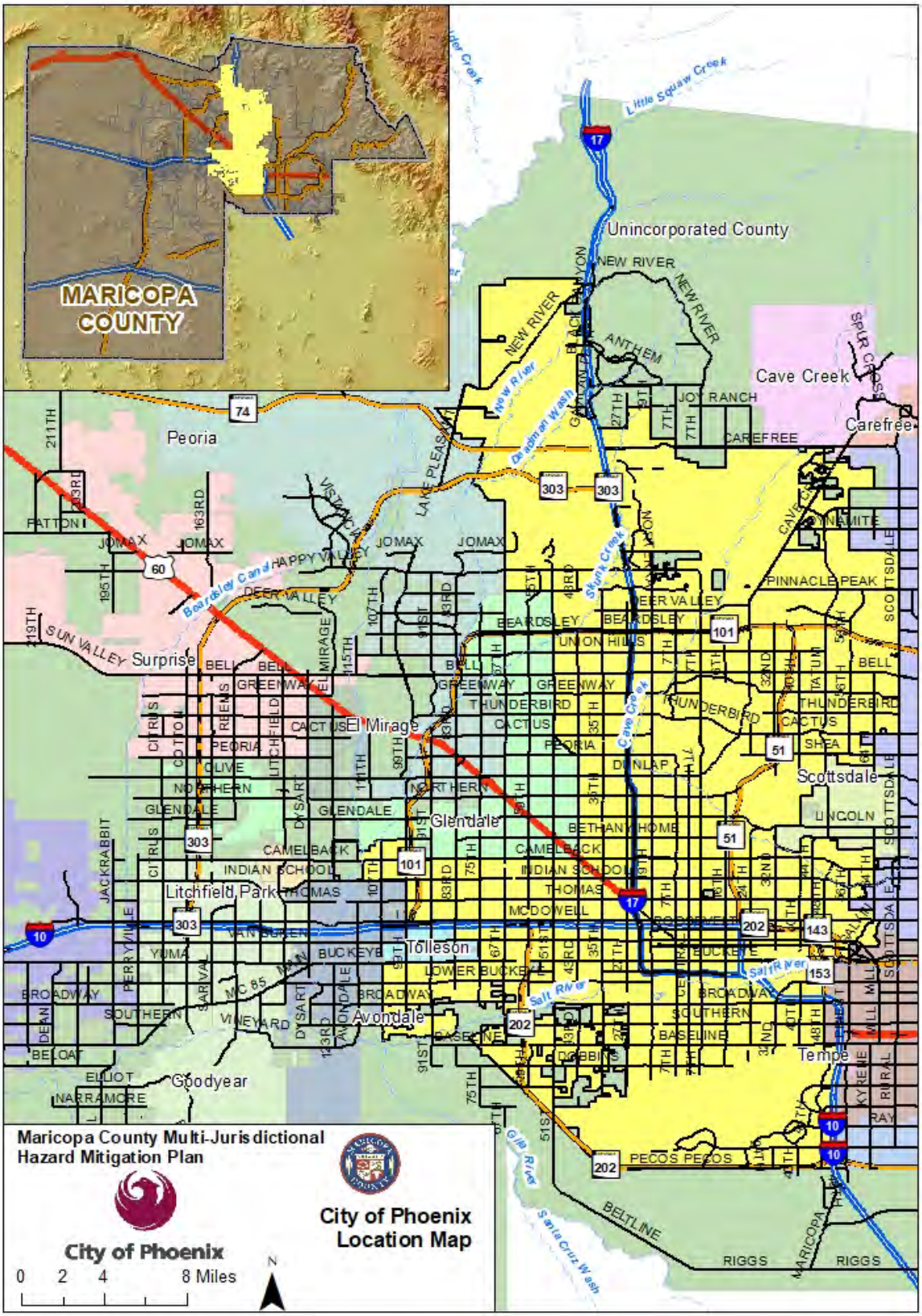

Figure 4-43: Phoenix location map

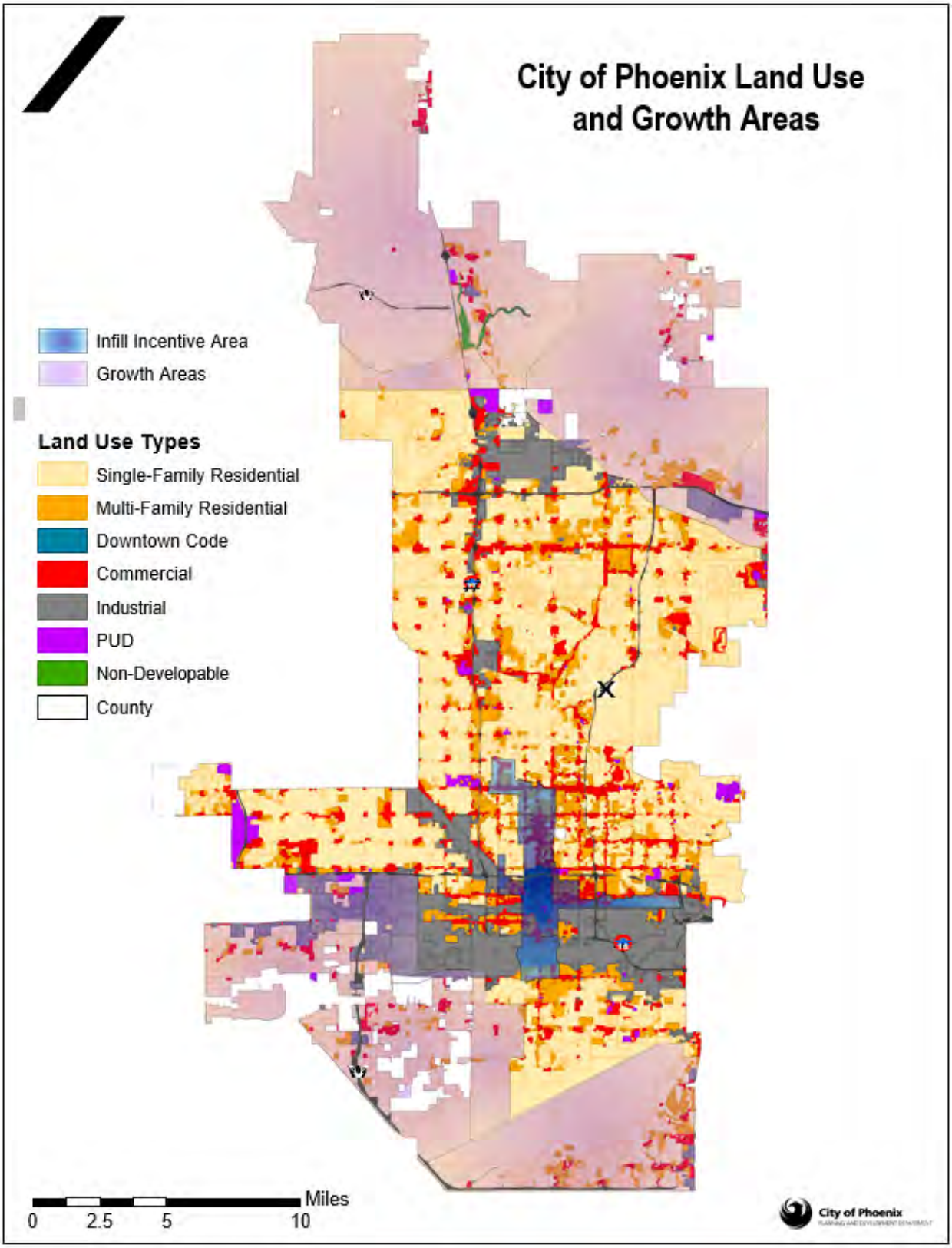

Figure 4-44: Phoenix land use map

4.3.19 Queen Creek

Like most of the communities located in the greater metropolitan area, Queen Creek has experienced rapid growth in both population and land area yet is still known as a very rural community that is rich in agricultural and rustic lifestyles. The Town of Queen Creek is situated in the southeastern corner of Maricopa County and a portion of western Pinal County, as shown in Figure 4-45. The Gila River Indian Community borders the southwest boundary of Queen Creek, the Town of Gilbert lies to the immediate west, and Mesa forms the northern boundary of the town. The San Tan Mountains Regional Park boundary comprises the southern boundary of the planning area. Downtown Mesa is approximately 20 miles north, yet the southernmost border of Mesa is Germann Road, which forms the northern boundary of the Queen Creek planning area. Phoenix-Mesa Gateway Airport, a growing regional facility in Mesa, is only one mile north of the northern boundary of Queen Creek.

The Queen Creek planning area is 64.7 square miles while the current incorporated town area is approximately 26 square miles. Before it became a community, Queen Creek was a home for early Indian communities and the homesteaders who farmed and ranched along Queen Creek. By the time Arizona became a state in 1912, an organized farming town had been formed in the area. The Town of Queen Creek formally incorporated in 1989.

Large farms throughout the area grow a variety of crops including citrus, pecans, cotton, corn, soybeans, wheat, potatoes, and alfalfa. The Union Pacific Railroad runs northwest to southeast through the town. Queen Creek and Sonoqui Wash also traverse the planning area, and periodically convey water flows generally due to flash floods. The San Tan Mountains and Goldmine Mountains are the most dramatic landform in the area and lie immediately to the south. The Superstition Mountains, to Queen Creek's northeast, can be seen from virtually anywhere within the planning area. Major arterials in the town are based on a grid system, with Rittenhouse Road crossing diagonally through the region. The southern section of the Loop 202 Freeway passes through Mesa and Gilbert several miles to the north and will provide primary access to the metropolitan area.

In 2019, the population of Queen Creek was 46,271. Population projections for 2020 and 2030 current corporate limits and population, housing, and employment statistics for MPAs for 2010, 2020 and 2030 are summarized in Table 4-20.

Table 4-20: Population, housing and employment statistics for Queen Creek

Year	Population (Current Limits)	Population (MPA)	Housing (MPA)	Employment (MPA)
2010	26,361	32,200	10,500	5,900
2020	54,000	65,000	15,800	16,400
2030	72,200	90,900	21,700	19,900

Development Trends:

The Town has seen exponential development growth in the last 5 years. The graphic below provides the number of historic single-family permit issuances as of

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September 2021. Below is a list of new residential subdivisions that have begun residential construction in the last five years.

- Gateway Quarter
- Terravella
- Queen Creek Station
- Dorada Estates
- Bellero
- Pecan Lakes
- Whitewing at Whisper Ranch
- Hastings Farms
- Nauvoo Station
- Church Farm (aka Meridian)
- Ovation at Meridian
- Crismon Heights
- Spur Cross
- Ironwood Crossing
- Harvest at Queen Creek
- Encanterra

Building Safety Staff Meeting 10.8.20

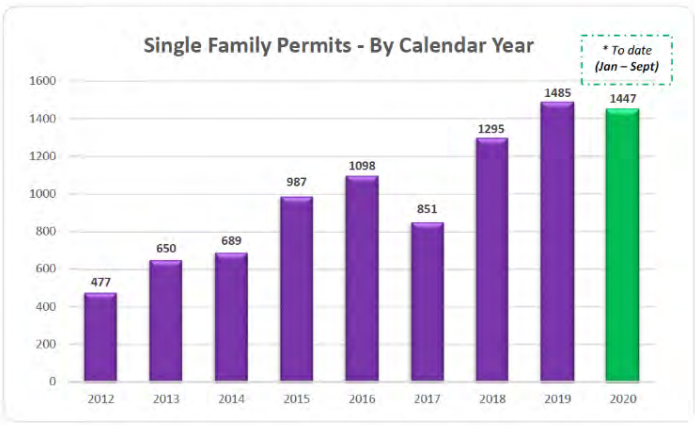

Figure 4-46 identifies the total number of residential lots within the Town** (this includes developed and zoned lots), the total number of lots within subdivisions that are actively constructing (both completed lots and lots available for development), and properties zoned for single-family residential development.

**This excludes the future residential lots within the ASLD boundaries.

Over the next five (5) years, residential developments that are anticipated to begin construction include:

- Jorde Farms North
- Barney Farms
- North Creek
- Madera West
- Madera
- Malone Place Parke
- Jorde Farms South
- Ellsworth Ranch
- ASLD

Additionally, the Town will likely see multi-family develop along Combs Road in between Gantzel and Rittenhouse. The residential developments noted above are generally located on the East side of Town.

Known commercial development within the next 5 years includes:

- Commercial center at the NEC of Ellsworth and Riggs
- Commercial center at the NWC of Ellsworth and Riggs
- Commercial Center at the SWC of Riggs and Gary
- Commercial infill in existing centers
- ASLD

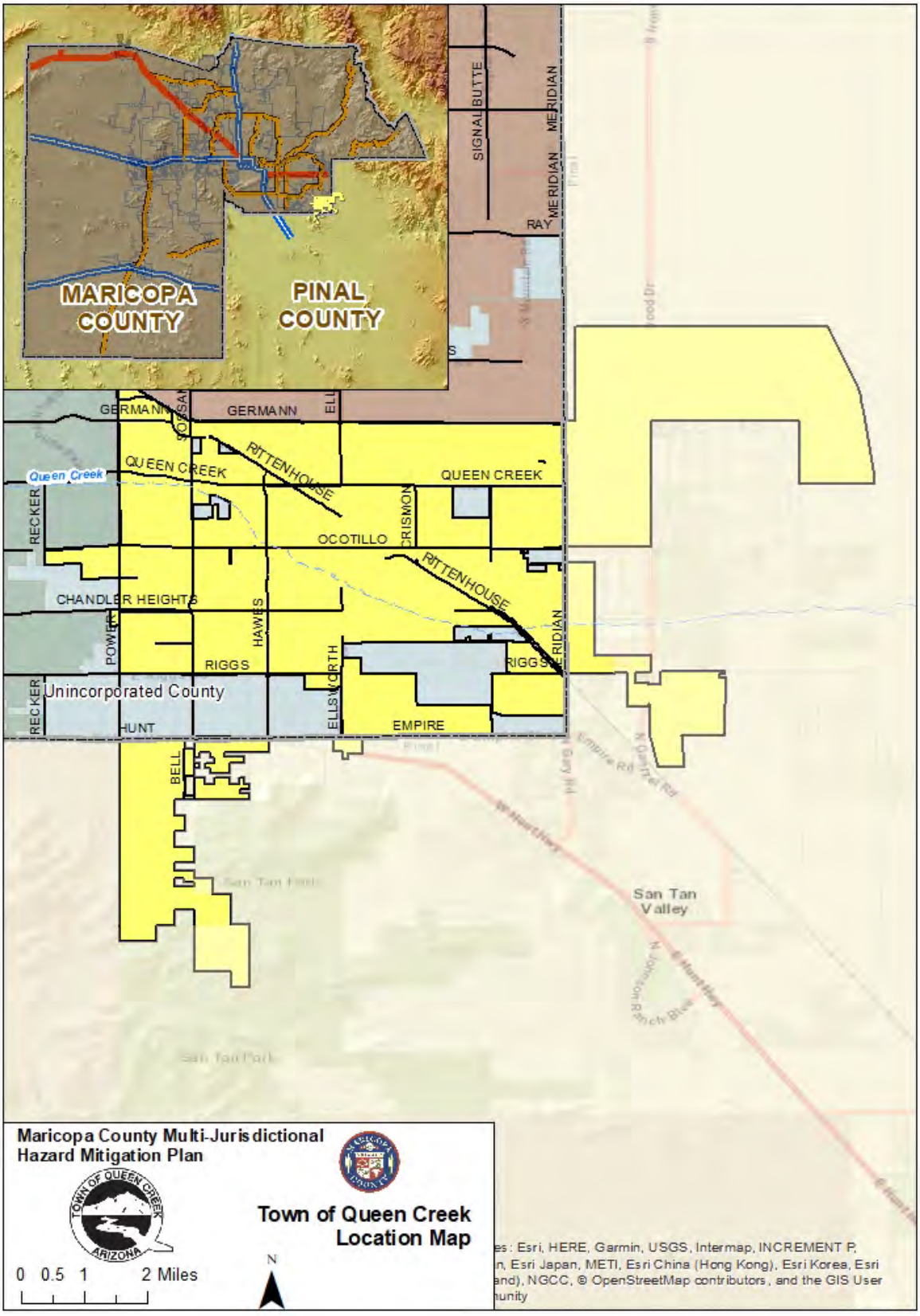

Figure 4-45: Queen Creek location map

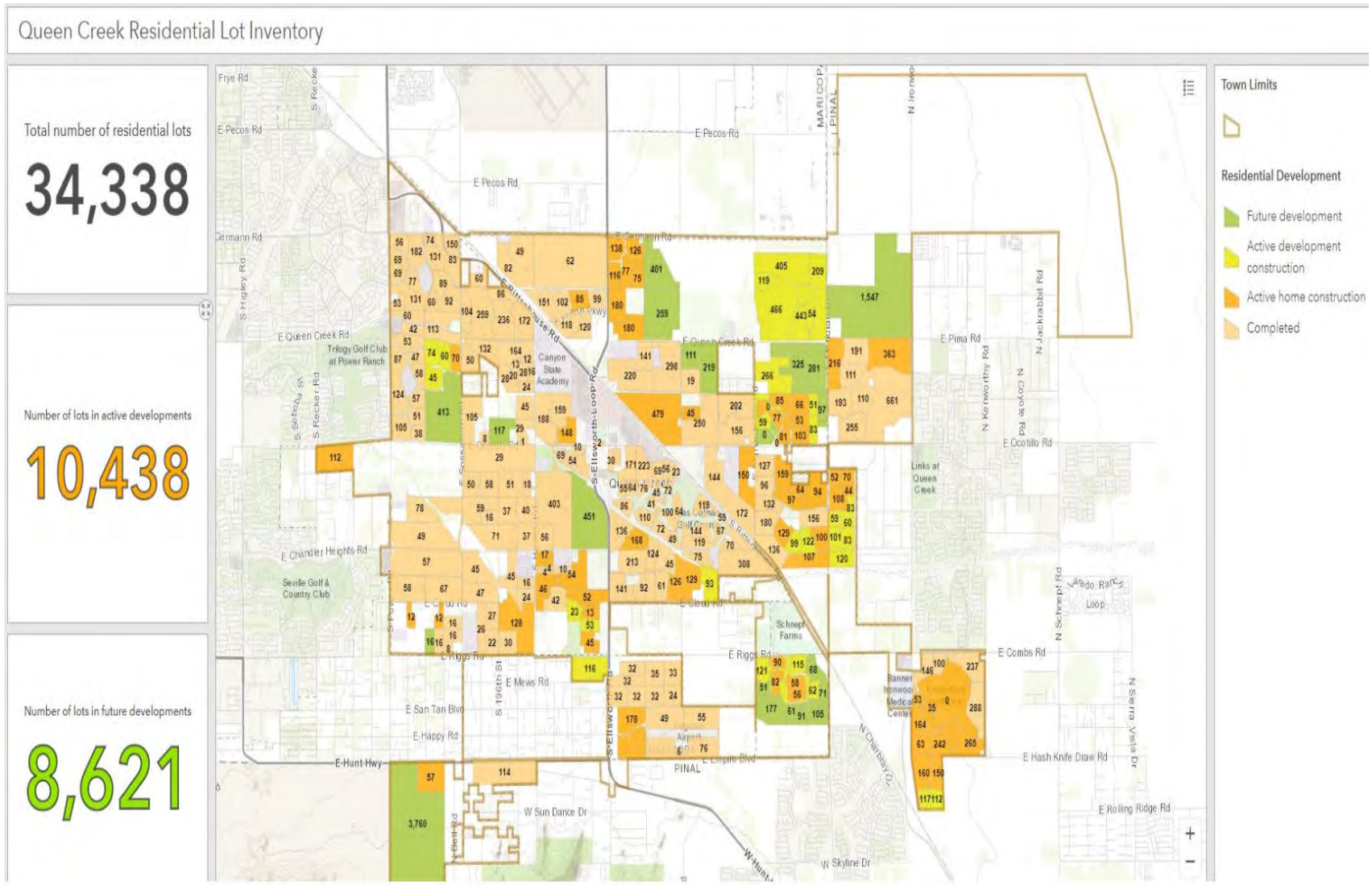

Figure 4-46: Queen Creek growth areas map

4.3.20 Salt River Pima-Maricopa Indian Community

The Salt River Pima-Maricopa Indian Community (SRPMIC) is located approximately 17 miles northeast of Phoenix, Arizona, and is bounded by Scottsdale to the north and west, Mesa and Tempe to the south, and Fountain Hills to the northeast. As a result of the community's location in the Phoenix metropolitan area, it has experienced steady population and economic growth. Primary access to the community is offered through both the Loop 101 and 202 Freeways, and by State Highway 87, which runs north from Mesa to Payson through SRPMIC land. As shown through Figure 4-47, the most visible natural features of the region include the Salt River, which runs along the southern reservation border, and Red Mountain, a feature that exists on the community's east side.

The SRPMIC was established in 1879 by an Executive Order signed by President Rutherford B. Hayes. The Executive Order enabled the Pima and Maricopa people to occupy the same 54,000 acres of fertile agricultural land as their ancestors.

The SRPMIC is governed by the Community Council, which is comprised of the Community President, Community Vice-President, and the Tribal Council. The President and vice-president are elected at large and serve a four-year term. The council members serve a staggered term of four (4) years. The Community President and vice president oversee the management of the comprehensive government development, operations and services including: administration, general counsel, treasury, budgets and records, gaming regulatory office, self-governance, community development, economic development, construction and engineering, education, human resources, community relations, congressional and legislative affairs, cultural and environment, finance, fire, police, health and human services, judicial center, public works, transportation, recreation, museum, purchasing, and learning center.

In 2020, the population of the Salt River Pima Maricopa Indian Community was 6,500. Population housing and employment statistics and projections for Oct 1st, 2020 through Oct 1st, 2025 and 2030 are summarized in Table 4-21.

Table 4-21: Population, housing and employment statistics for Salt River Pima-Maricopa Indian Community

Year	Population of CM's within Community Boundaries	Non-Enrolled Population	Housing	Enrolled Membership	Employment to include Govt, Enterprises and Corridor
2020	6,500	3,500	2,129	10,831	21,000
2025	7,500	3,700	2,691*	11,425	25,000
2030	8,500	2,350**	2,468**	12,150***	28,000

CM – Community Member
* Includes all new rental housing in the queue plus 15 new homeownership homes built annually
** SM Trailer park lease closes in 2026. 573 homes will be removed from count
*** Notes no changes in Constitutional enrollment criteria
Source: SRPMIC

Development Trends:

The Salt River Pima-Maricopa Indian Community (SRPMIC or Community) has experienced a fast paced development effort within the Community's boundaries. In 2010, when the Community opened Talking Stick Resort and Salt River Fields at Talking Stick, a new level of interest in development has been experienced by SRPMIC landowners. Development has included numerous hotels (Great Wolf Lodge, Residence Inn, Staybridge, Home2Suites/Tru) and new entertainment venues to include: iFly, Mavrix, Odysea in the Desert/The Boardwalk and Medieval Times have anchored this intensive development trend. Beyond these hotel and entertainment developments, SRPMIC has opened an auto mall, large headquarters (McKesson and Harkins) and invested in new water, sewer and roadway infrastructure projects. Residential development within SRPMIC is designated for Community Member households only and is based upon scattered site homes throughout the central/non-commercial portion of the lands.

SRPMIC anticipates continued interest and development in commercial aspects of the Community. These could include: restaurants, additional entertainment, urban distribution centers, medical offices/services. There will also be additional housing development specifically built for Community Members. Development will occur in the current Talking Stick Entertainment District and possibly along the Southern Boundary area. It is anticipated that development will bring additional infrastructure efforts to support Community Member and general public needs for public safety. A future land use planning map for the SRPMIC is shown in Figure 4-48[16].

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[16] Salt River Pima Maricopa Indian Community, http://www.srpmic-nsn.gov/economic/

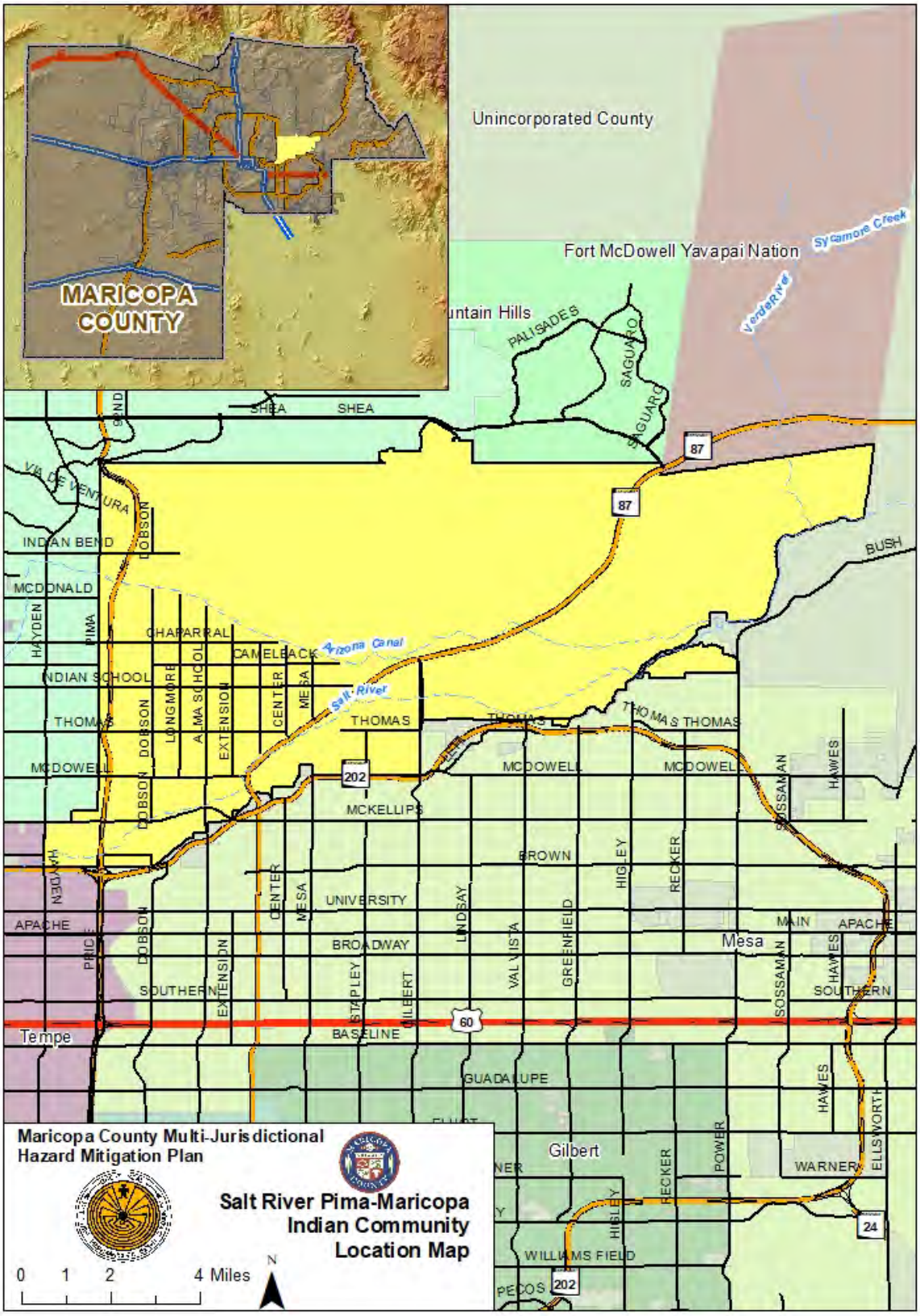


Figure 4-47: Salt River Pima-Maricopa Indian Community location map

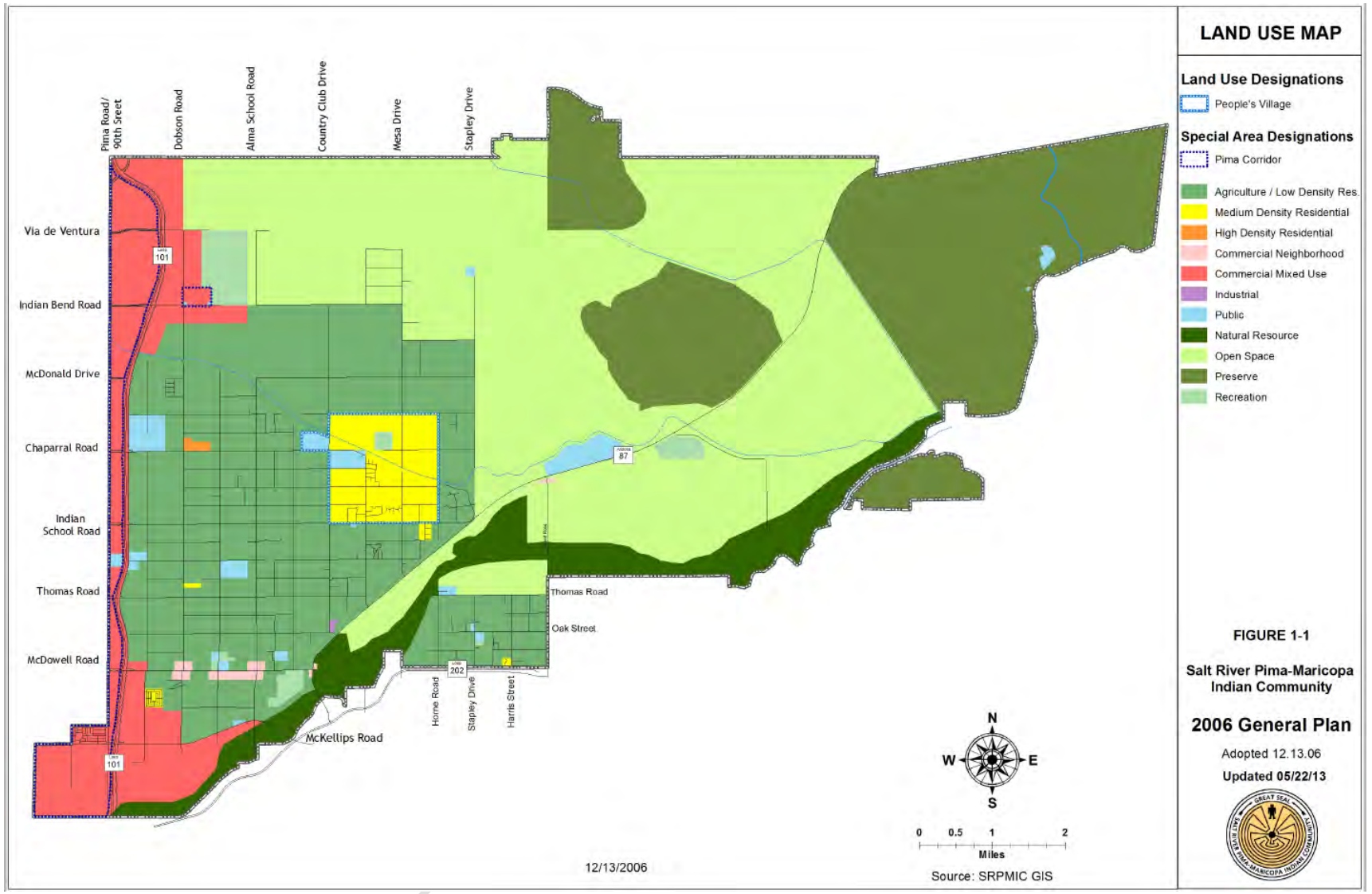


Figure 4-48: Salt River Pima-Maricopa Indian Community land use map

4.3.21 Salt River Project

The Salt River Project is no longer a participating jurisdiction in this Plan.

4.3.22 Scottsdale

Situated in the northeast portion of Maricopa County approximately 15 miles west of downtown Phoenix, the City of Scottsdale is bordered by several communities including Phoenix and Paradise Valley on the west, Tempe on the south, the Salt River Pima-Maricopa Indian Community on the east, and the Tonto National Forest to the north and east, as shown in Figure 4-49. Founded in 1888, Scottsdale has long been known as the "West's Most Western Town". Today the city is an example of a community that combines a rich western heritage with civic culture and a resort lifestyle. Contributing to these influences are several natural features that affect community lifestyle including the McDowell Mountain Park, the McDowell Sonoran Preserve, and the Salt River to the south.

The primary man-made features that influence Scottsdale's land uses include: the Loop 101 Freeway, which runs along the east and north portions of Scottsdale, provides transportation to the rest of the valley, and offers opportunities for commercial growth; and the Scottsdale Road corridor, which runs north-south for the length of the community, and bisects Scottsdale into east and west halves. This roadway intersects the spectrum of Scottsdale land uses, including the Old Town shopping district in the south, the upscale shops and office areas near the Scottsdale Airpark, and the preserved open lands on the city's far north area. These facilities compliment a wide array of resort and golf communities that have strengthened Scottsdale's image as a destination community.

Scottsdale has evolved and grown since its founding in the late 1800's and incorporation in 1951, and currently includes over 185 square miles within its corporate boundary. Starting as a small residential community sprinkled with farms and citrus groves, Scottsdale has become a community that features a variety of land uses. Today, Scottsdale is governed by a council-manager form of government, which includes a mayor and six council members elected at-large for a period of four years.

In 2019, the population of Scottsdale was 247,944. Population projections for 2020 and 2030 current corporate limits and population, housing, and employment statistics for MPAs for 2010, 2020 and 2030 are summarized in Table 4-22.

Table 4-22: Population, housing and employment statistics for Scottsdale

Year	Population (Current Limits)	Population (MPA)	Housing (MPA)	Employment (MPA)
2010	217,385	217,400	124,000	165,800
2020	253,700	253,800	133,300	207,400
2030	281,800	281,900	147,100	235,500

Development Trends:

Over the past five years Scottsdale has seen new development and redevelopment of single-family, multi-family, and mixed-use projects. Although new

single-family development primarily occurred throughout the North Sub-Area (all areas of the city located north of Deer Valley Road), new clusters of such also occurred within the east-Shea area of the Central Sub-Area (all areas of the city located between Indian Bend and Deer Valley Roads). This includes Sienna Hills (124th Street and Shea Boulevard), Sunrise Trail (124th Street and Shea Boulevard), and Whisper Ridge (136th Street and Shea Boulevard) – all of which are located within the X Flood Zone (see the FEMA Flood Zones Map). Multi-family residential development occurred predominantly in the Central and South (all areas of the city south of Indian Bend Road) Sub-Areas. In the Central Sub-Area, new multi-family development such as the View at Cascade (Scottsdale Road and Mayo Boulevard), Chauncy Marketplace (Scottsdale Road and Chauncey Lane), and SOHO Scottsdale (92nd Street and Bahia Drive) occur within the AO Flood Zone, while developments such as Villas Altozano (Bell Road and Thompson Peak Parkway), District at the Quarter (73rdStreet and Greenway-Hayden Loop), and Vitri Apartments (73rd Street and Greenway-Hayden Loop) occur within the X Flood Zone. Commercial and mixed-use development occurred relatively evenly across the Central and South Sub-Areas of the city – typically within the Greater Airpark area (AO and X Flood Zones), Old Town Scottsdale (X Flood Zone), and the Scottsdale Road and McDowell Road corridors, south of Old Town (X Flood Zone).

According to the 2020 City of Scottsdale Development Forecast Update, drafted by Applied Economics, over the next five years (2020-2025) most new development is anticipated to occur in the North and Central Sub-Areas of the community. The North Sub-Area is anticipated to absorb 1,229 +/- acres of development, with most of that acreage composed of Rural Neighborhood development (typically 1 unit per acre, or more, of land area). The majority of the North Sub-Area aligns with the X flood zone. The Central Sub-Area is anticipated to absorb 515 +/- acres of development, composed primarily of a mixture of 242 +/- acres of residential, 103 +/- acres of office, and 73 +/- acres of retail. The Central Sub-Area is primarily composed of the X and AO flood zones. The South Sub-Area, which is the oldest and most developed area of the community, is anticipated to see approximately 143 +/- acres of development of varying land uses. There will continue to be a focus on redevelopment and new infill development within the McDowell Road Corridor, consisting of mixed-use commercial, office, and multi-family. The South Sub-Area is primarily composed of the X flood zone. The city is currently updating its General Plan and has developed a draft map showing anticipated growth areas which is shown in Figure 4-50[17].

[17] City of Scottsdale, http://www.scottsdaleaz.gov/Assets/Public+Website/generalplan/_SGP2035TFRecommended.pdf

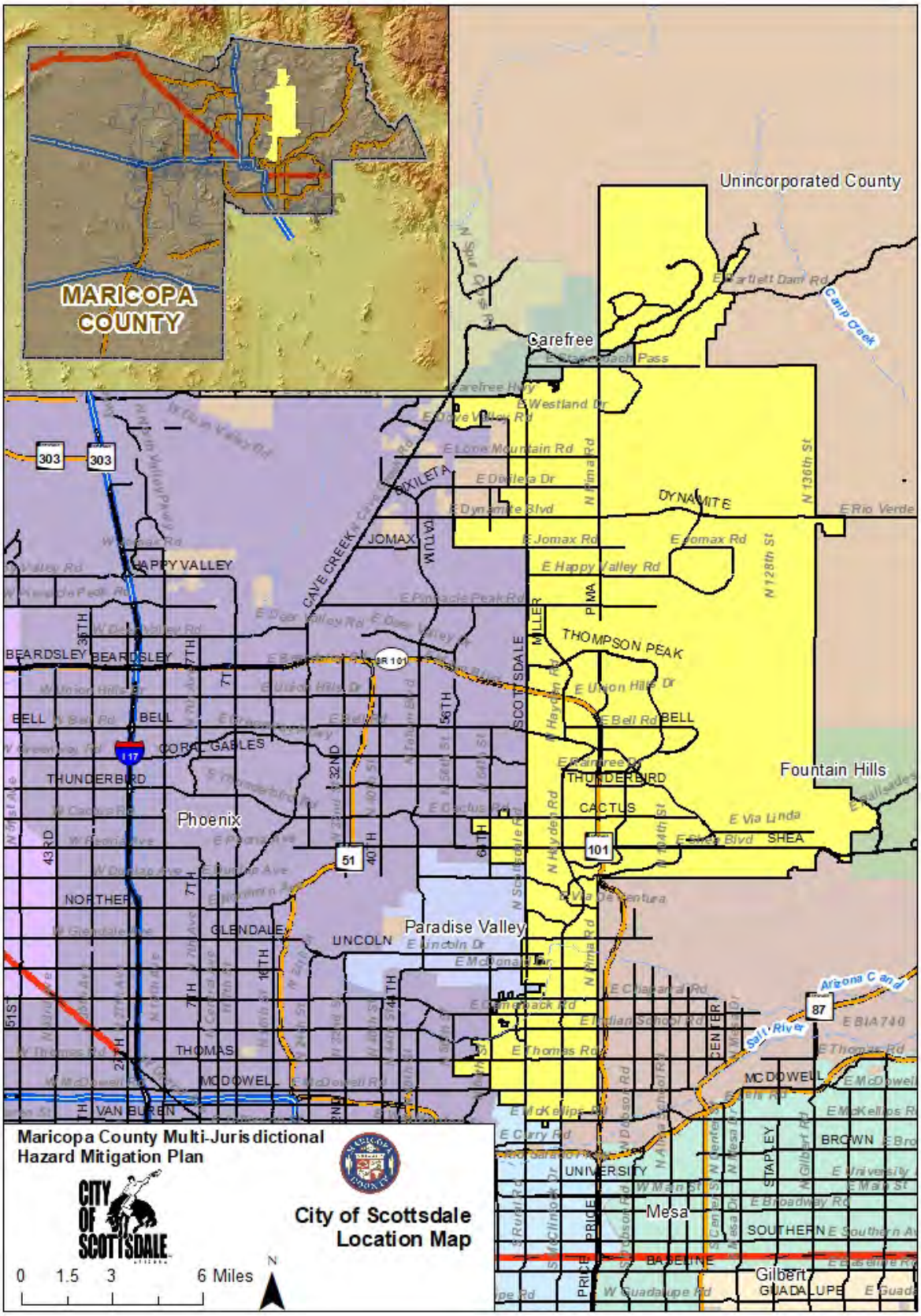
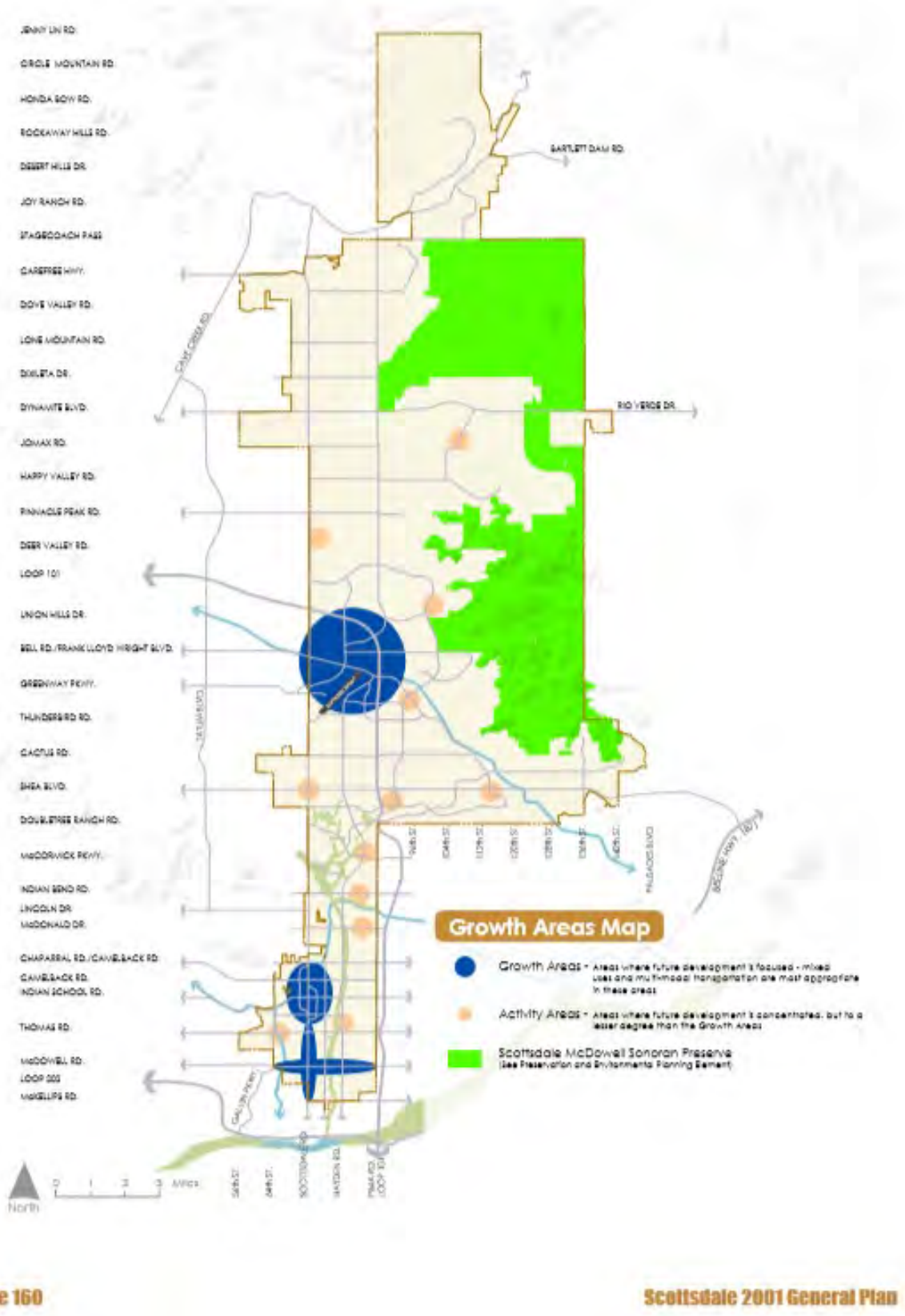


Figure 4-49: Scottsdale location map



Page 160 Scottsdale 2001 General Plan

Figure 4-50: Scottsdale growth area map

4.3.23 Surprise

Surprise is located 25 minutes northwest of downtown Phoenix along US Route 60/State Highway 93 in the northwest valley of the metropolitan area. It is positioned about 13 miles west of Interstate 17, and 18 miles north of Interstate 10. Luke Air Force Base is 2.5 miles south of the Surprise planning area, located in the City of Glendale. As shown in Figure 4-51, the City of Surprise is bordered on the east by the cities of Peoria and El Mirage and on the west by the City of Buckeye. The unincorporated retirement communities of Sun City West and Sun City lie to the east of the City of Surprise, and Glendale lies immediately to the south of Surprise. The White Tank Mountain Regional Park is in the southwest portion of the planning area and Lake Pleasant Regional Park is located approximately ten miles to the northeast.

Surprise became an incorporated town on December 12, 1960 and boasted a population of nearly 1,600 people located on a one square mile site. Today Surprise's residents are governed by a council-manager form of government, which includes a mayor and six council members who are elected from six council districts for four-year terms.

In 2019, the population of Surprise was 136,194. Population projections for 2020 and 2030 current corporate limits and population, housing, and employment statistics for MPAs for 2010, 2020 and 2030 are summarized in Table 4-23.

Table 4-23: Population, housing and employment statistics for Surprise

Year	Population (Current Limits)	Population (MPA)	Housing (MPA)	Employment (MPA)
2010	117,517	127,600	56,900	19,500
2020	138,700	150,300	68,000	36,400
2030	189,200	216,700	99,300	59,500

Development Trends:

Over the last five years the city has experienced residential growth above the state average. A city population of 130,336 in 2015 grew to 141,664 in 2019, or 8.7% compared to 6.6% by the state. Housing units increased from 54,592 in 2015 to 58,036 in 2019 for a 6.3% rise.

Source: CoStar	2015	2019	% Increase
Office	1,599,062 SF	1,670,598 SF	4.5%
Retail	5,250,531 SF	5,542,021 SF	5.6%
Industrial	2,017,125 SF	2,988,861 SF	48.2%

The decade of the 2020s is projecting a 53% increase in population with a 63% expansion of jobs related to office, retail, and industrial development.

Source: MAG	2019	2030	% Increase
Population	141,664	216,700	53%
Jobs	36,400	59,500	63%

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The four development areas the ED department promotes will see the mix of residential and commercial development associated with the growth.

- Loop 303, Bell Road to Peoria Avenue
- City Center, Bell Road and Bullard Avenue
- Surprise Railplex, Cactus Road and Litchfield Road
- North Surprise, US 60 north of Loop 303

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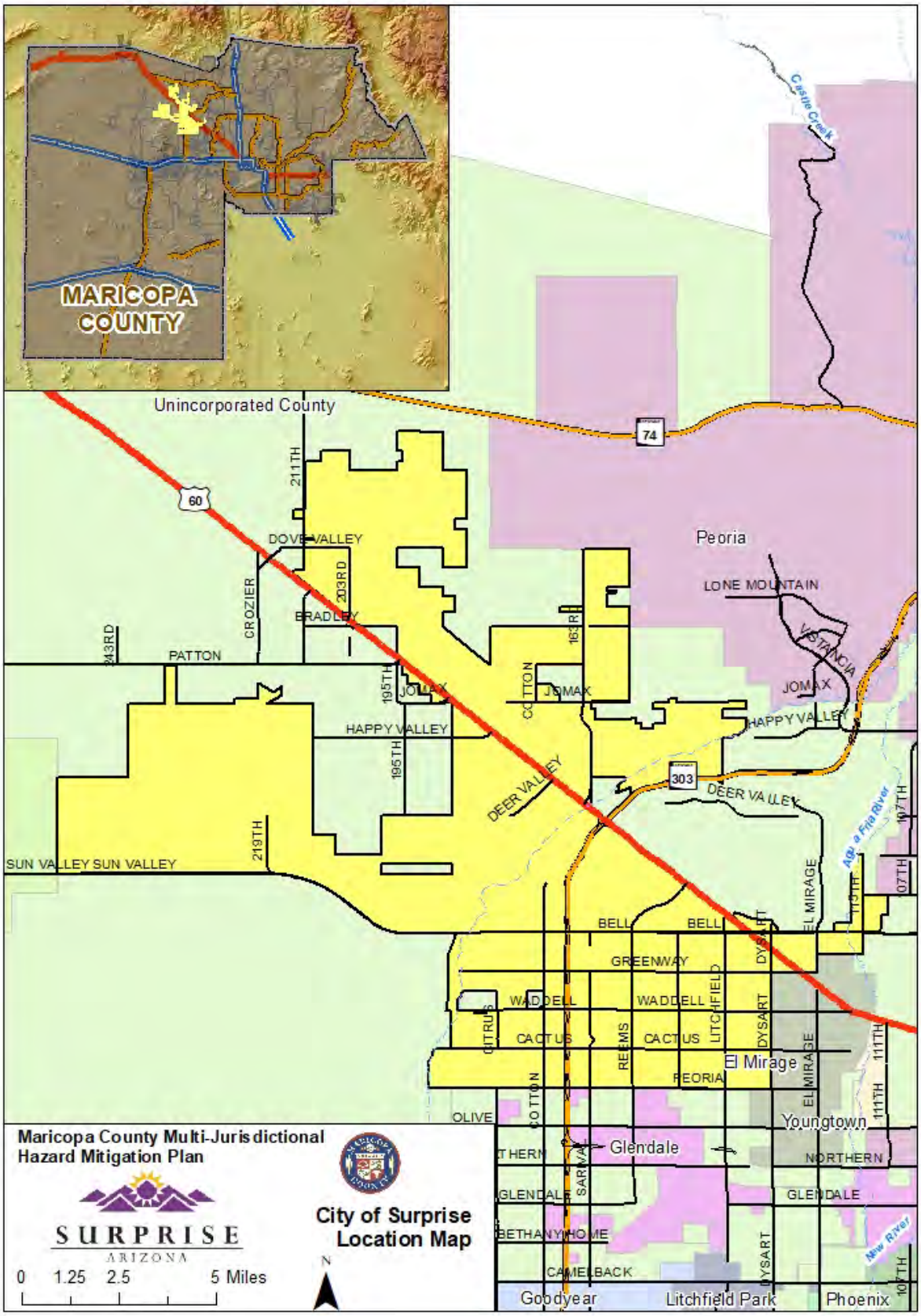

Figure 4-51: Surprise location map

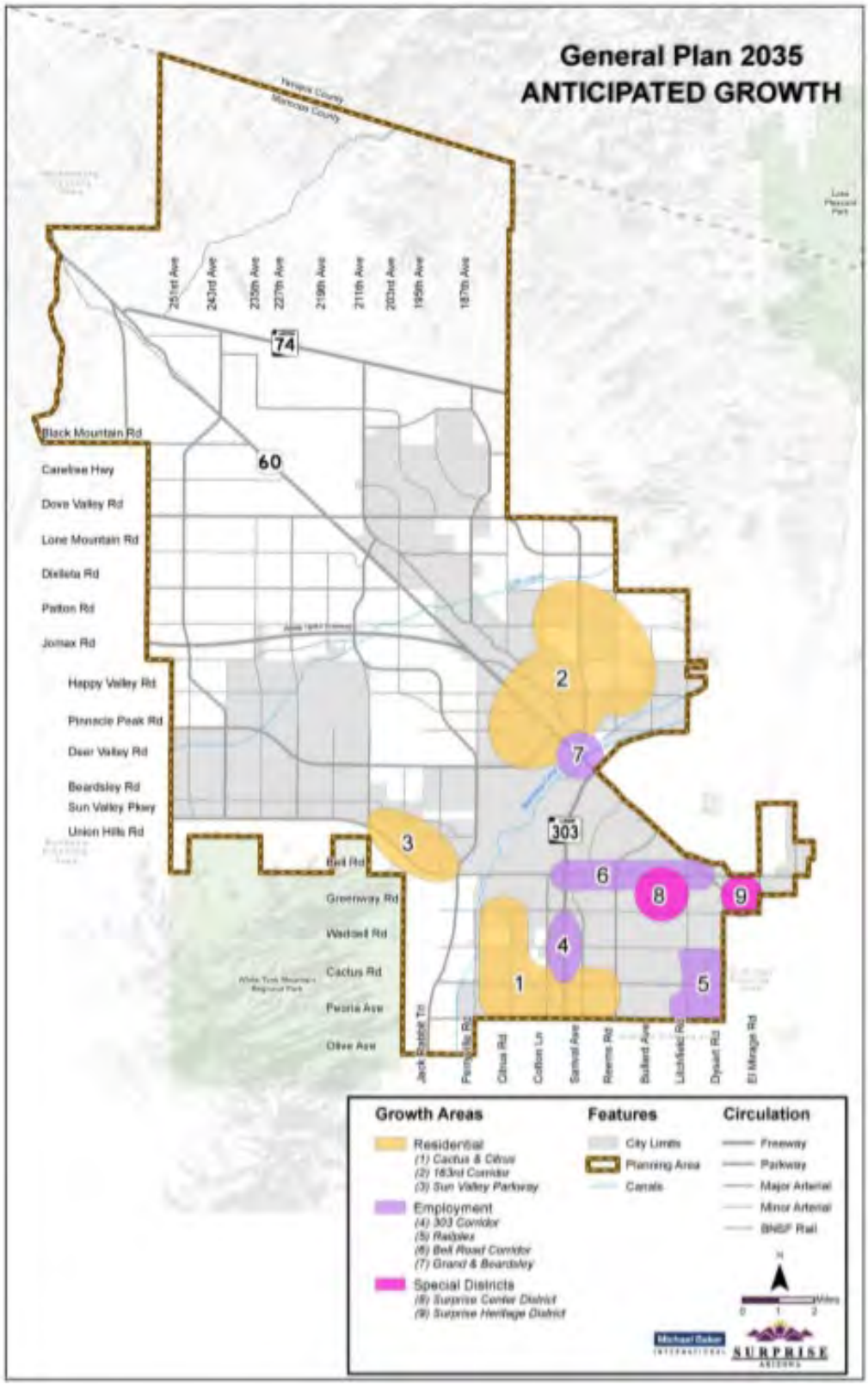

Figure 4-52: Surprise growth area maps

4.3.24 Tempe

The City of Tempe consists of 40 square miles in the heart of the metropolitan area. It straddles the Salt River and is generally bounded on the east and west by freeways, with two additional freeways bisecting the city and running across its northern section. As illustrated through Figure 4-53, the City of Tempe is landlocked on all sides by adjacent communities, Scottsdale to the north, the Salt River Pima-Maricopa Indian Community and Mesa to the east, Chandler to the south, and Guadalupe and Phoenix to the west. Tempe's central location is augmented by its proximity to an intricate freeway network that provides access to and from these surrounding communities. Arizona State University, with a main campus of over 44,000 students, is located in Tempe. Tempe also includes several prominent natural land features including Hayden Butte, Papago Butte and the Tempe Town Lake, which is the only length of the Salt River in the Phoenix area that has a continuous supply of water.

Founded in 1894, Tempe is one of the oldest communities in the valley and historically has been one of the most densely populated. Its position in the region is both advantageous and challenging. Land-locked Tempe falls in the middle of a large transportation commute zone, significantly impacting land use planning, environmental issues and public health and safety. Tempe's planning area is five miles wide by eight miles long, or about forty square miles. Within this area are approximately 24.2 linear miles of freeway, 23 miles of canal, 30 miles of power lines, 14 miles of active railroad lines, and five miles of departure/landing air flight corridor. In spite of these tremendous right-of-way impacts, Tempe has some of the most desirable residential and commercial areas in the valley. Today Tempe is administered by a council-manager form of government that includes a mayor and six council members elected at-large for a period of four years.

In 2019, the population of Tempe was 188,616. Population projections for 2020 and 2030 current corporate limits and population, housing, and employment statistics for MPAs for 2010, 2020 and 2030 are summarized in Table 4-24.

Table 4-24: Population, housing and employment statistics for Tempe

Year	Population (Current Limits)	Population (MPA)	Housing (MPA)	Employment (MPA)
2010	161,719	162,100	73,200	169,100
2020	190,000	190,000	77,300	200,500
2030	217,000	217,100	90,000	231,200

Development Trends:

Over the past 5 years, Tempe has seen a rapid growth of high density residential, new corporate office headquarters and many new retail developments are currently under construction. Due to the limited land available for new development, Tempe has experienced infill redevelopment and the majority of high density residential in small lots. That is of greater interest to the emergency responders as it requires careful design review to ensure that these developments are meeting the requirements of the Fire and Police department. The highest growth is primarily in the north Tempe area, and

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specifically in the downtown area, Tempe Town Lake, the new Novus Innovation Corridor of a master-planned for private development on Arizona State University owned land. Redevelopment also continues to occur along the Valley Metro Light Rail line in and around Apache Boulevard. Location such as new the Loop 101 and Loop 202 interchange, just north of Rio Salado Parkway, and a project on the south side of Broadway Road are also experiencing high growth. Reinvestment and sporadic redevelopment projects still occur throughout the Tempe limits, but it is the Urban Core area, an approximate 6 square mile area that has seen most of the growth for the past decade. The most significant development consists of residential development projects with 45-100 dwelling units per acre. Tempe's infrastructure is also greatly impacted by the new constructions of the Arizona State University campus including the construction such as the new Greek Village, the ISTB7 research and bioresearch building, all of them in very close proximity to downtown Tempe area.

Additionally, some preliminary analysis conducted by Maricopa Association of Governments (MAG) in 2017 also indicated that Tempe's daytime population doubles as compared to actual population of Tempe due to the expansive employment base. This is an important issue as it relates to emergency preparedness.

Tempe - Daytime Population Estimate Trends

Data	*Source*	*2000*	*2010*	*2017***
Nighttime Population Estimate*	Census 2000, 2010	171,790	175,570	190,530
Workers	CTPP 2000, 2006-2010	89,230	87,500	92,100
K12 Students	Census 2000, 2010	22,340	19,160	23,580
PostHS Students	Census 2000, 2010	30,240	38,450	38,720
Employment	MAG Projections***	149,160	169,100	190,420
K12 Enroll	Back-casted****	28,570	24,500	30,160
PostHS Enroll	ASU Factbook(s)	50,370	58,370	64,060
Daytime Population Estimate	Computation	258,080	282,430	320,770

* Includes transient and seasonal population
** All 2017 data from the 2016 MAG Socioeconomic Projections and 2017 Population Estimates
*** For 2000, 2010, and 2017 the following MAG Projections were used respectively: 2003, 2013, 2016
**** "Back-casted" the K12 enrollment using the ratio of K12 students > K12 Enrollment from 2017

The anticipated areas of development or redevelopment in the next 5 years will continue in the same areas as previous development activity. Locations such as along Apache Boulevard and connecting areas where the Valley Metro Light Rail is located, as well as Downtown Tempe with existing Light Rail and the new Modern Streetcar that is under construction, set to be in operation by late 2021. Vacant land and growth for urban development opportunities are still available along the Tempe Town Lake perimeters.

Novus Planning Area:

Significant amount of high density residential and commercial development, along with new roadway system and a new fire station, is projected to occur in the next 20 years within the Arizona State University's Novus Master Plan area, which includes approximately 330 acres of redevelopment area, including the Karsten Golf Club which by itself, is approximately 156 acres. Novus Master Plan area is shown below (outlined in red) in Exhibit 3A:

Exhibit 3A
City of Tempe Novus Master Plan area

Other redevelopment potential for the future:

Tempe will also see opportunities for redevelopment and new business trends in two of the cities industrial-based hubs located south on Broadway Road from Southern, Priest Drive to the Union Pacific Railroad tracks, known as Broadway Maker District. The Smith Industrial Innovation Hub is another up-and-coming area with potential expansion of rapid transit extending on the Rio Salado Parkway area. There are growth opportunities in this corridor and south of Rio Salado, extending to University Drive, and McClintock to Loop 101 freeway.

Proposed annexation:

There are two areas of Tempe where additional residential development may occur if annexation of these properties is approved by City Council. These include:

- Banyan Tempe (yellow highlighted area in Exhibit 3B)
- Priest and Caroline (highlighted in blue in Exhibit 3C)

Finally, projected land use from the current city general plan is shown in Figure 4-54.

:

Exhibit 3B
Banyan Tempe area

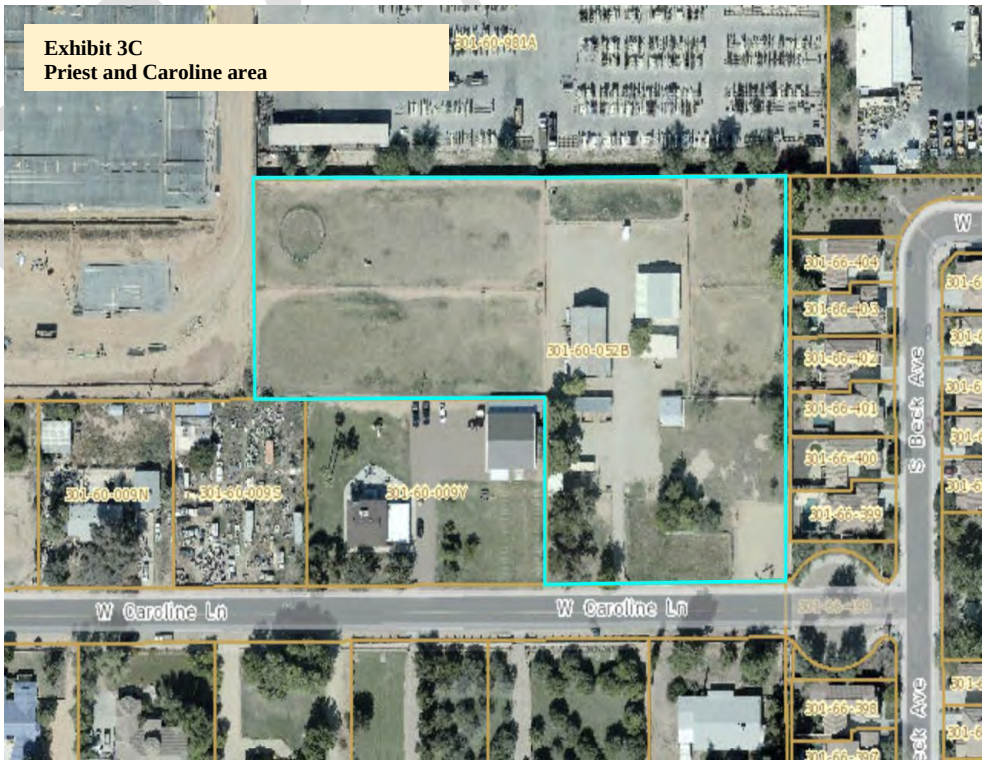

Exhibit 3C
Priest and Caroline area

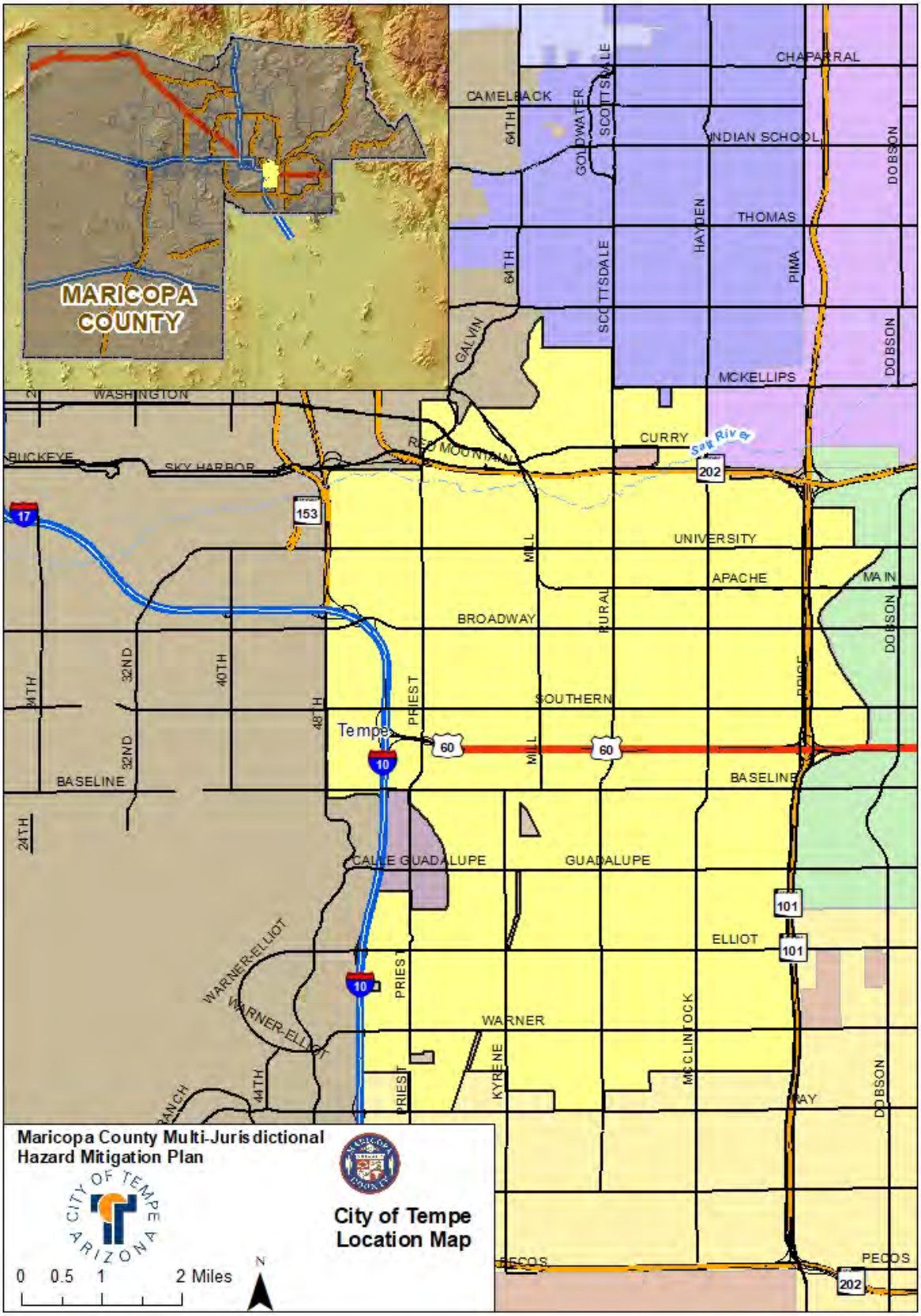

Figure 4-53: Tempe location map

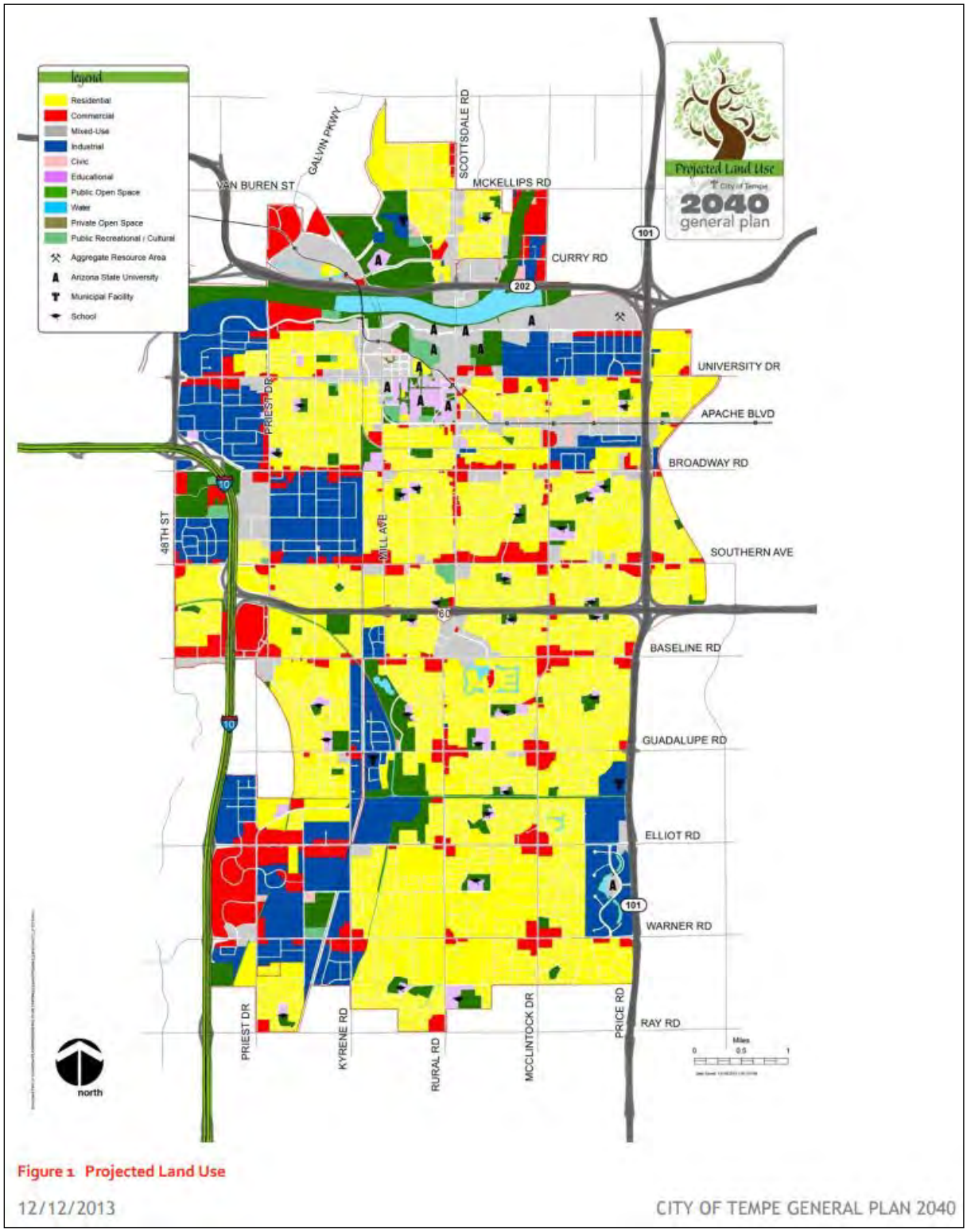

Figure 4-54: Tempe projected land use map

4.3.25 Tolleson

Situated along Interstate 10 approximately 14 miles west of downtown Phoenix, the small community of Tolleson lies in the west valley region of Maricopa County, and is surrounded by the City of Avondale on the west and Phoenix on the north, east, and south, as shown in Figure 4-55. Founded in 1912 and incorporated in 1929, the incorporated boundary of Tolleson measures only about six square miles in area.

Once dependent on agriculture, Tolleson today has a sound commercial and industrial base. Tolleson is served by the Papago Freeway, which is a segment of Interstate 10. Tolleson is also served by the Loop 101, which allows traffic headed toward Flagstaff to bypass downtown Phoenix and connects the city to northeast Phoenix. To the west of Tolleson, Highway 85 intersects Interstate 10 and then runs south to Interstate 8 in Gila Bend. The Union Pacific rail line runs through Tolleson, providing several industrial sites with rail access. Today, Tolleson is administered by a council-manager form of government that includes a mayor and six council members elected at-large to four-year terms.

In 2019, the population of Tolleson was 7,085. Population projections for 2020 and 2030 current corporate limits and population, housing, and employment statistics for MPAs for 2010, 2020 and 2030 are summarized in Table 4-25.

Table 4-25: Population, housing and employment statistics for Tolleson

Year	Population (Current Limits)	Population (MPA)	Housing (MPA)	Employment (MPA)
2010	6,545	6,600	2,200	10,600
2020	7,100	7,100	2,300	18,300
2030	8,600	8,600	2,700	21,200

Development Trends:

Over the past 5 years there have been several developments of small areas previously identified as infill areas, primarily as commercial or residential projects. Growth areas within Tolleson for the next several years are specifically addressed in the 2014 General Plan. Four specific growth areas have been identified: 1) 83rd Avenue Corridor 2) 91st Avenue Gateway 3) CORE District and 4) Industrial Area. The identified growth areas are shown in Figure 4-56, which is taken from the City of Tolleson General Plan 2024.

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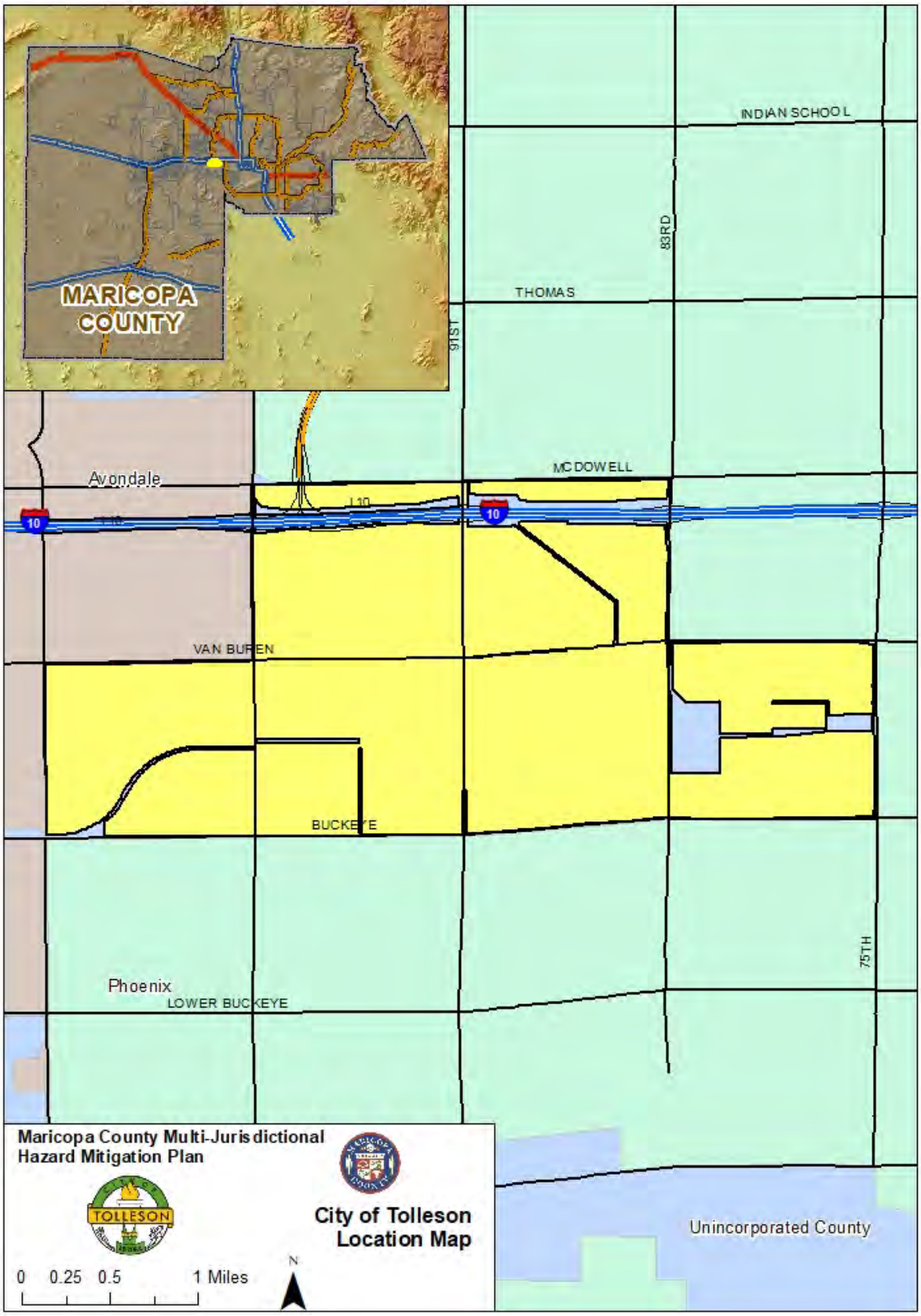

Figure 4-55: Tolleson location map

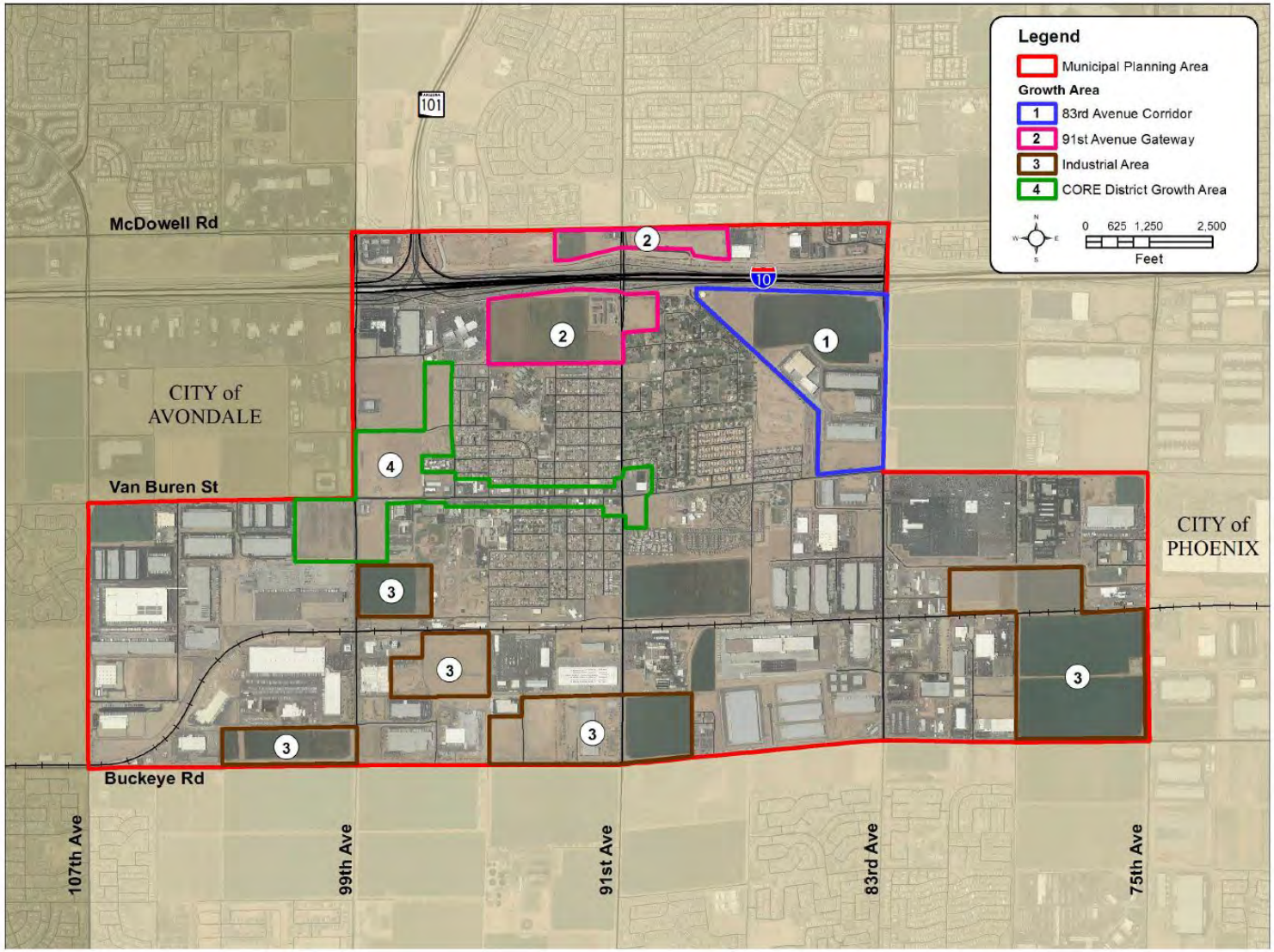

Figure 4-56: Tolleson growth area map

4.3.26 Wickenburg

One of Maricopa County's most historic and scenic communities, the Town of Wickenburg lies in north central Maricopa County on the border with Yavapai County, approximately 60 miles from downtown Phoenix. The Town of Wickenburg is distinct from most of the communities in Maricopa County for its isolation from the greater Phoenix metropolitan area. Illustrated in Figure 4-57, Wickenburg is highlighted by the Hassayampa River and its tributaries, which are protected through the Hassayampa River Canyon Wilderness to the north of Wickenburg in Yavapai County. Wickenburg also serves as a crossroads of various highways in northwest Maricopa County, with US Highway 60 and Arizona Highways 93 and 89 providing access to Los Angeles, Las Vegas, and Prescott, respectively.

Along the town's main historic district, early businesses-built structures that still exist in Wickenburg's downtown area. In the 1900's Wickenburg's clean air and wide-open spaces attracted guest ranches and resorts to the Wickenburg neighborhood. Later, the construction of Highway 60 from Phoenix to California brought even more tourists, making Wickenburg the unofficial dude ranch capital of the world. Today, some of these ranches still offer their unique brand of western hospitality.

Founded in 1863, Wickenburg operates under a council-manager form of government, which includes a seven-member town council consisting of a mayor and six council members elected at-large for a term of four years. In Wickenburg, the town council functions as the legislature, and the town manager administers community policies.

In 2019, the population of Wickenburg was 6,988. Population projections for 2020 and 2030 current corporate limits and population, housing, and employment statistics for MPAs for 2010, 2020 and 2030 are summarized in Table 4-26.

Table 4-26: Population, housing and employment statistics for Wickenburg

Year	Population (Current Limits)	Population (MPA)	Housing (MPA)	Employment (MPA)
2010	6,363	8,000	4,400	3,500
2020	8,200	8,500	5,500	4,600
2030	15,100	9,400	8,400	5,200

Development Trends:

The development over the past five years in the Town of Wickenburg includes the projects listed below:

- Town wide linked trailhead system beginning at Kerkes Trailhead (off Hwy 60)
- The continued development of the Wickenburg Ranch housing subdivisions (currently have 700 residences, 3,100 residences at full capacity)
- Cottonwood housing development
- Jefferson St & Mohave St waterline replacement project
- Continued Public Safety radio issues involving Century Link and Motorola Communications – projected partnership with Regional Wireless Cooperative (RWC) / (additional radio tower sites TBD)

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The town anticipates the continued growth of Wickenburg Ranch home development, projected to grow at a rate of 200 homes per year with 25% growth expected each year. Other developments include Saddle Ridge (144 homes), Wickenburg Vistas (61 homes), Arroya Vistas (37 homes), West Park (42 homes), and Hermosa Ranch (325 homes). Additional development includes an ADOT multi-year project to construct additional roundabouts within Wickenburg police/fire jurisdiction including Hwy 93 & Rincon Rd, Cope Rd, Vulture Mine Rd, Scenic Loop, Hwy 89 junction and Hwy 89 and Wickenburg Ranch (currently the construction entrance).

Wickenburg's General Plan 2025 includes a map of future growth nodes with land use estimates and is shown on Figure 4-58[18].

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[18] Town of Wickenburg, http://www.ci.wickenburg.az.us/41/General-Plan

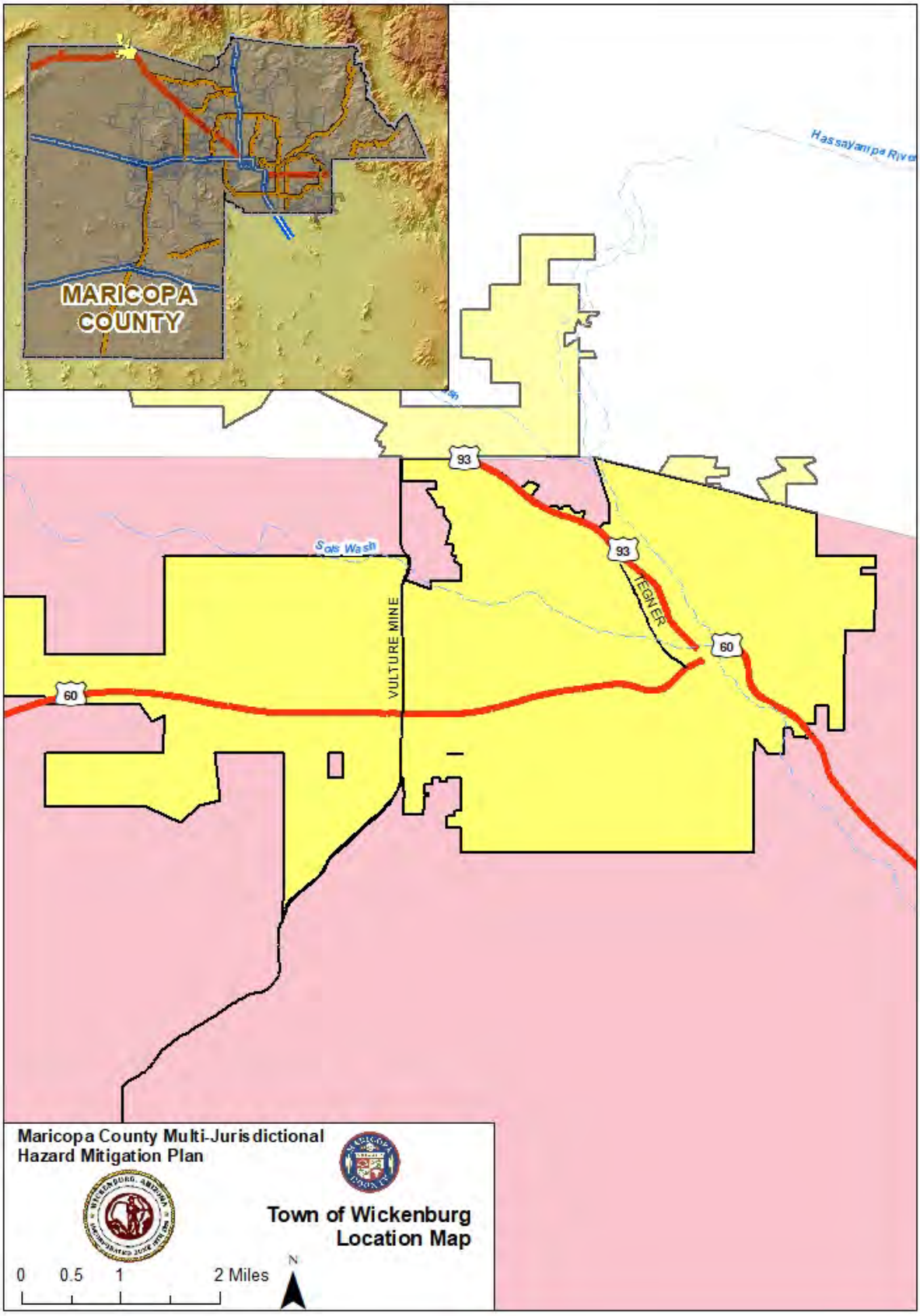

Figure 4-57: Wickenburg location map

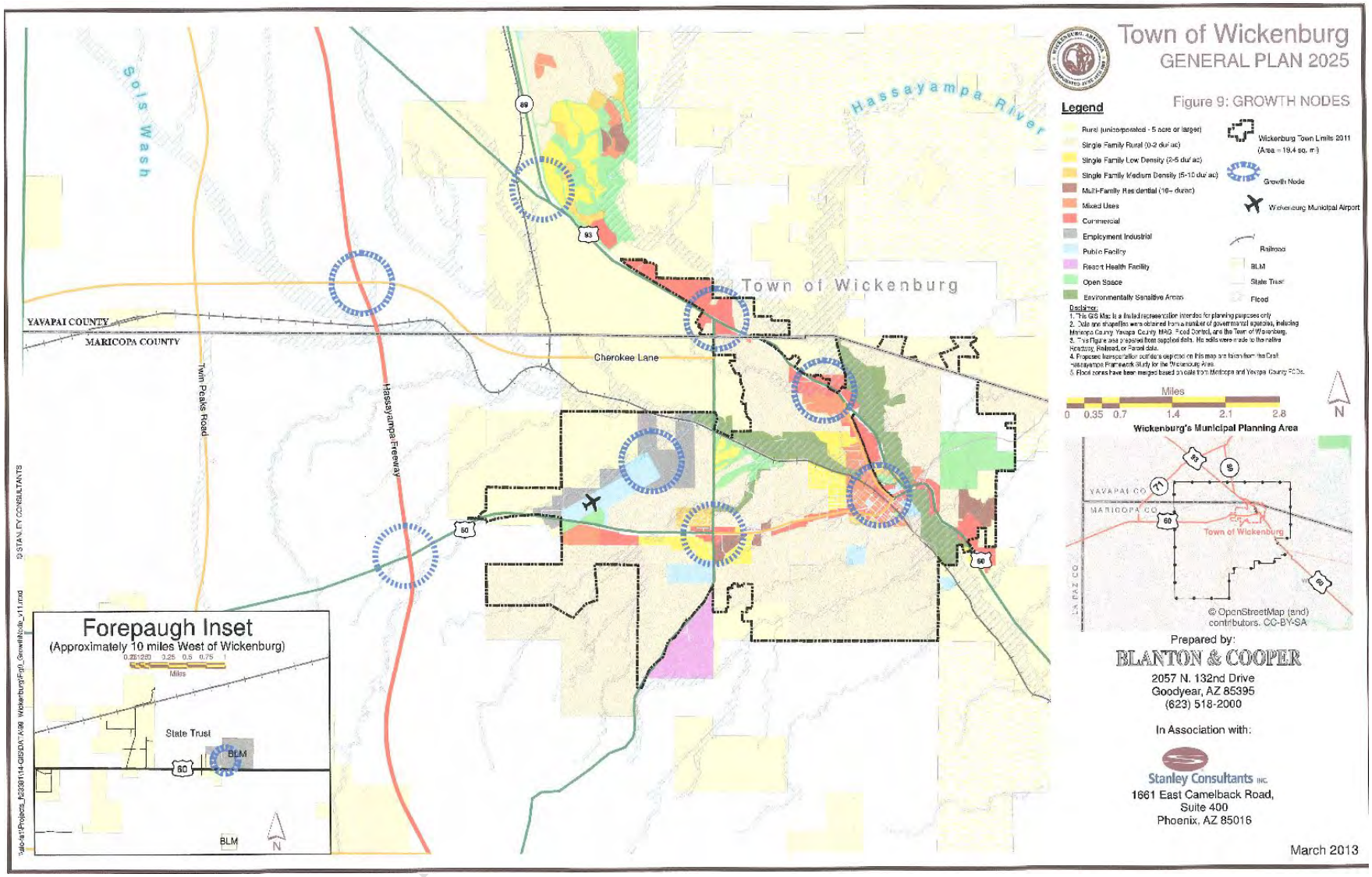

Figure 4-58: Wickenburg growth area map

4.3.27 Youngtown

Situated in the west central portion of the greater metropolitan area approximately 15 miles west of downtown Phoenix, the Town of Youngtown lies on the east bank of the Agua Fria River. Located just south of United States Highway 60, the Town of Youngtown is bordered on the west by El Mirage and on the east by the much larger retirement community of Sun City (Unincorporated Maricopa County), as shown in Figure 4-59. In 1954, real estate broker Ben Schleifer and banker Clarence Suggs bought 320 acres of farmland and built the first master-planned, adult community dedicated exclusively to retirees. It was the first town occupied solely by senior citizens and has the distinction of being designated as Chapter 1 by AARP. It is known for its more mature landscaping and lower housing costs. In 1998, age restrictions were removed allowing all ages to enjoy community life in Youngtown.

Youngtown's residents are governed under a council-manager form of government, which includes a seven-member town council consisting of a mayor and six council members elected at-large for a term of four years. The town council appoints the town manager who oversees all town departments and manages the town's business.

In 2019, the population of Youngtown was 6,599. Population projections for 2020 and 2030 current corporate limits and population, housing, and employment statistics for MPAs for 2010, 2020 and 2030 are summarized in Table 4-27.

Table 4-27: Population, housing and employment statistics for Youngtown

Year	Population (Current Limits)	Population (MPA)	Housing (MPA)	Employment (MPA)
2010	6,156	6,100	2,800	1,300
2020	6,800	6,800	2,900	1,800
2030	7,300	7,300	3,100	2,200

Development Trends:

Over the past 5 years, most development within Youngtown has taken the form of redevelopment of storefronts and new start-ups. There is one new residential development under construction with 129 units south of Peoria Avenue. The town has also created a neighborhood-commercial live-work corridor on N. 111th Avenue.

Over the next 5 years, Youngtown has identified several areas for new development and redevelopment within the Town limits. One redevelopment area exists in the northern portion of the Town, bounded roughly by 111th on the east, 113th avenue on the west, Wisconsin Avenue on the South and Hwy. 60 to the north. The Council has approved a 100+ acre regional park in the Agua Fria river bottom and a $50 million battery storage facility in its commerce park south of Peoria Avenue. Additional development areas have been identified north of Alabama Avenue and South of Peoria Avenue. The Town is also continuing with the Youngtown sidewalk

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improvement programs for the northern portion of the community. Figure 4-60[19] shows the two future development areas on a future land use map.

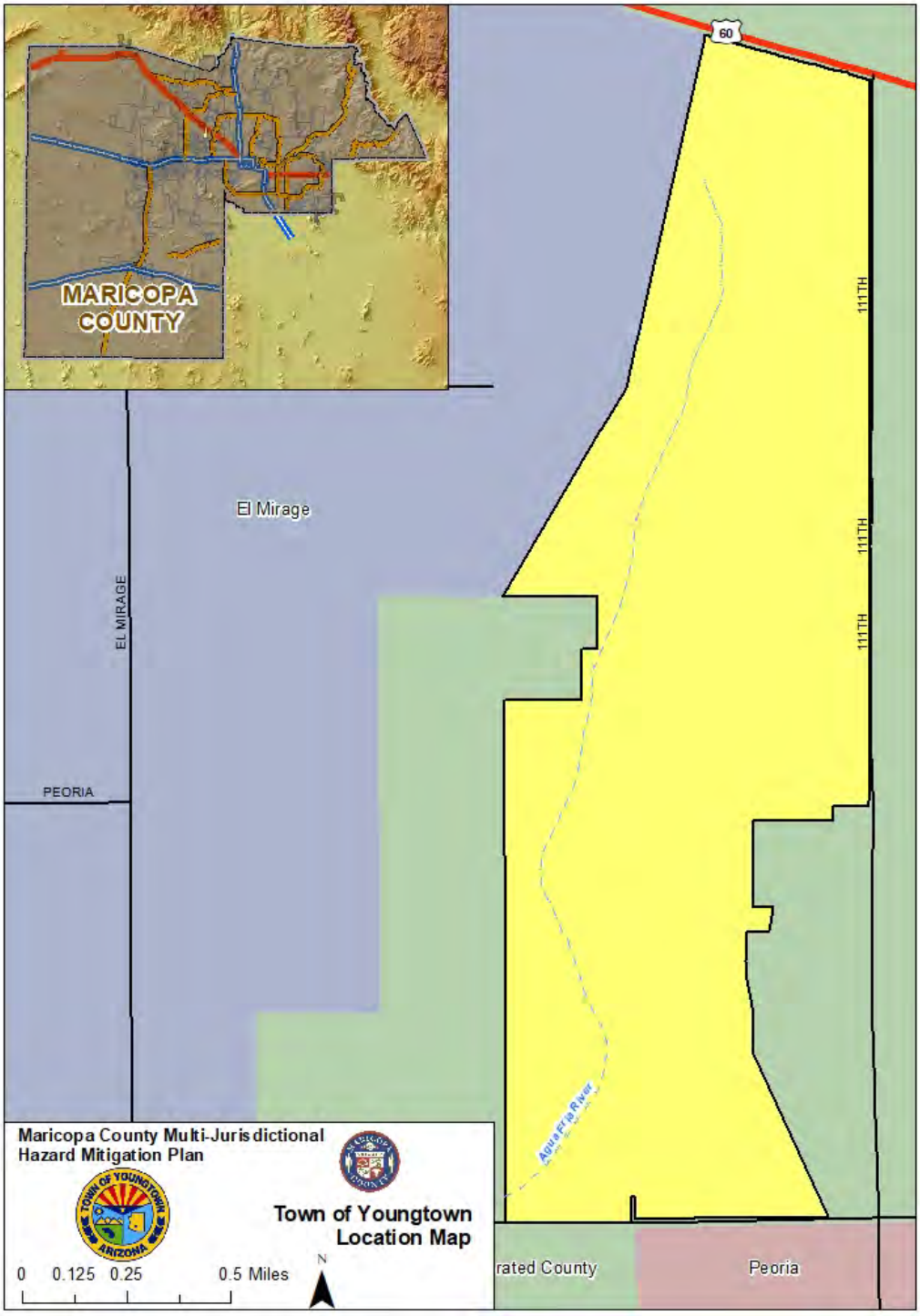

Figure 4-59: Youngtown location map

[19] Town of Youngtown, http://www.youngtownaz.org/vertical/Sites/%7B464715DD-87E9-4AA9-9EEF-3CDF5B7D33D6%7D/uploads/%7BFFC342FE-B7D1-415F-B73F-18097DF4B2E6%7D.PDF

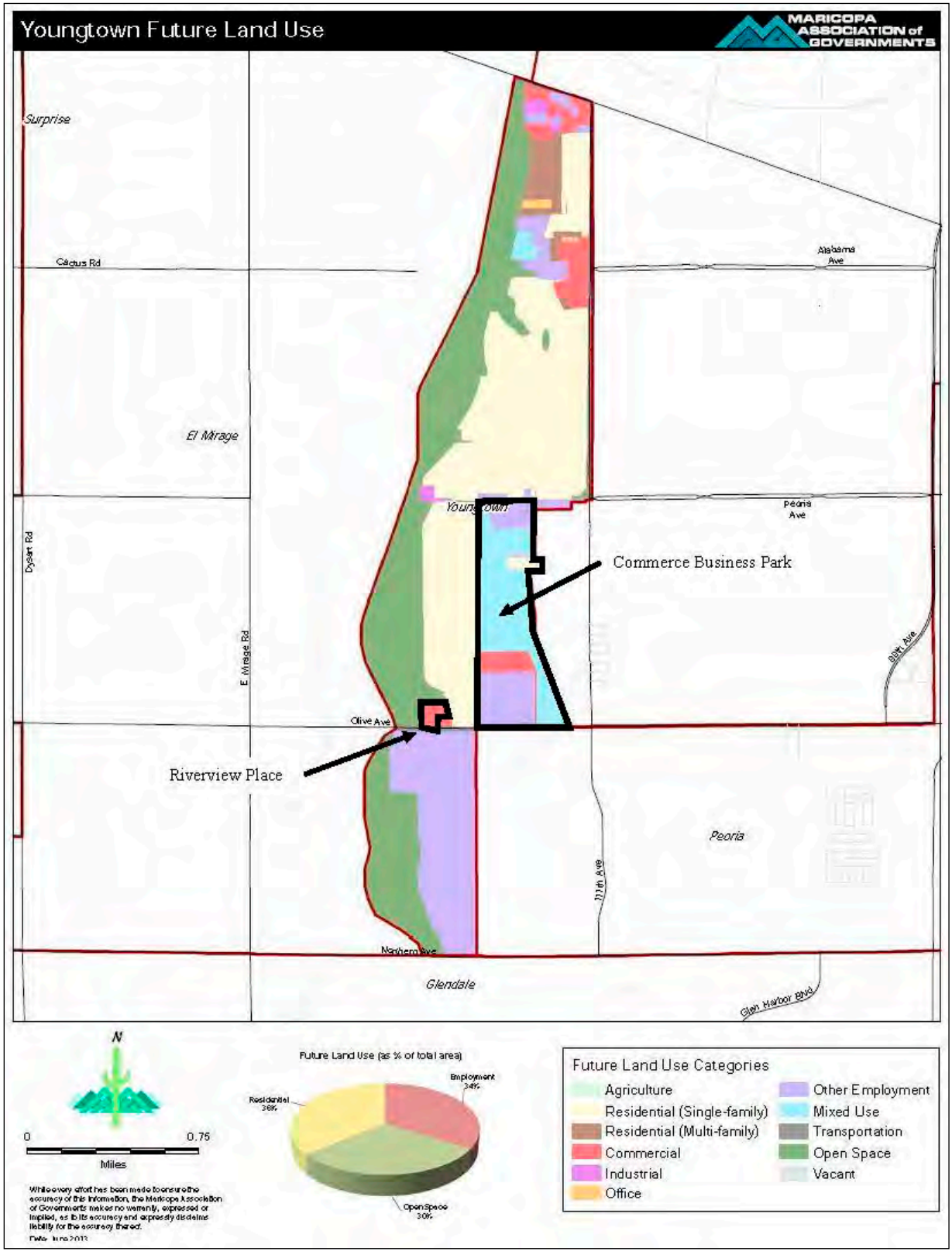

Figure 4-60: Youngtown future land use map

SECTION 5: RISK ASSESSMENT

> ***§201.6(c)(2):*** *[The plan shall include…] (2) A **risk assessment** that provides the factual basis for activities proposed in the strategy to reduce losses from identified hazards. Local risk assessments must provide sufficient information to enable the jurisdiction to identify and prioritize appropriate mitigation actions to reduce losses from identified hazards. The risk assessment shall include:*
> *(i) A description of the type, location, and extent of all natural hazards that can affect the jurisdiction. The plan shall include information on previous occurrences of hazard events and on the probability of future hazard events.*
> *(ii) A description of the jurisdiction's vulnerability to the hazards described in paragraph (c)(2)(i) of this section. This description shall include an overall summary of each hazard and its impact on the community. The plan should describe vulnerability in terms of:*
> *(A) The types and numbers of existing and future buildings, infrastructure, and critical facilities located in the identified hazard areas;*
> *(B) An estimate of the potential dollar losses to vulnerable structures identified in paragraph (c)(2)(i)(A) of this section and a description of the methodology used to prepare the estimate;*
> *(C) Providing a general description of land uses and development trends within the community so that mitigation options can be considered in future land use decisions.*
> *(iii) For multi-jurisdictional plans, the risk assessment section must assess each jurisdiction's risks where they vary from the risks facing the entire planning area.*

One of the key elements to the hazard mitigation planning process is the risk assessment. In performing a risk assessment, a community determines "what" can occur, "when" (how often) it is likely to occur, and "how bad" the effects could be[20]. According to DMA 2000, the primary components of a risk assessment that answer these questions are generally categorized into the following measures:

- ☑ **Hazard Identification and Screening**
- ☑ **Hazard Profiling**
- ☑ **Assessing Vulnerability to Hazards**

The risk assessment for Maricopa County and participating jurisdictions was performed using a county-wide, multi-jurisdictional perspective, with much of the information gathering and development being accomplished by the MJPT. This integrated approach was employed because many hazard events are likely to affect numerous jurisdictions within a consolidated urban area like Maricopa County, and are rarely 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.

5.1 Hazard Identification and Screening

Hazard identification is the process of answering the question; *"What hazards can and do occur in my community or jurisdiction?"* For this update, the list of hazards identified in the 2015 Plan was reviewed by the MJPT, who chose to continue a focus on natural hazards. The MJPT also compared and contrasted the 2015 Plan list to the comprehensive hazard list summarized in the 2018 State Plan[21] to ensure compatibility with the State Plan. Table 5-1 summarizes the 2015 Plan and 2018 State Plan hazard lists.

[20] National Fire Protection Association, 2000, *Standard on Disaster/Emergency Management and Business Continuity Programs*, NFPA 1600.

[21] ADEM, 2018, *State of Arizona Multi-Hazard Mitigation Plan*

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Table 5-1: Summary of Initial Hazard Identification Lists	
2015 Plan Hazard List	**2018 State Plan Hazard List**
• Dam Inundation • Drought • Extreme Heat • Fissures • Flood • Levee Failure • Severe Winds • Subsidence • Wildfire	• Dam Failure • Drought • Earthquake • Extreme Heat • Fissure • Flooding/Flash Flooding • Hazardous Materials Incidents • Landslides/Mudslides • Levee Failure • Severe Wind • Subsidence • Terrorism • Wildfires • Winter Storm

The review included an initial screening process to evaluate each of the listed hazards based on the following considerations:

- Experiential knowledge represented by the MJPT with regard to the relative risk associated with the hazard
- Documented historic context for damages and losses associated with past events (especially events that have occurred during the last plan cycle)
- The ability/desire of MJPT to develop effective mitigation for the hazard under current DMA 2000 criteria
- Compatibility with the state hazard mitigation plan hazards
- Duplication of effects attributed to each hazard

One tool used in the initial screening process was the historic hazard database referenced in the 2015 Plan. With this update, the 2015 Plan database was reviewed and updated to include declared disaster events and significant non-declared events that have occurred during the last plan cycle. Declared event sources included Maricopa County Department of Emergency Management (MCDEM), Arizona Division of Emergency Management (ADEM), Federal Emergency Management Agency (FEMA), and United States Department of Agriculture (USDA). Non-declared sources included Arizona State Land Department (ASLD), National Weather Service (NWS), National Oceanic and Atmospheric Administration (NOAA), National Climatic Data Center (NCDC), United States Geological Survey (USGS), United States Forest Service (USFS), and the Spatial Hazard Events and Losses Database for the United States (SHELDUS) database. The historic hazard database presented in this Plan primarily represent the period of June 1955 to June 2020. Two tables are used in this update to summarize the historic hazard events.

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Table 5-2 summarizes the federal and state disaster declarations that included Maricopa County. Table 5-3 summarizes all non-declared hazard events that meet the following selection criteria:

- 1 or more fatalities
- 1 or more injuries
- Any dollar amount in property or crop damages
- Significant event, as expressed in historical records or according to defined criteria above

Table 5-2: State and Federally Declared Natural Hazard Events That Included Maricopa County – January 1966 to June 2020

Hazard	No. of Declarations	Recorded Losses		
		Fatalities	Injuries	Damage Costs ($)
Drought	20	0	0	$303,000,000
Dam Failure	0	0	0	$0
Earthquake	0	0	0	$0
Extreme Heat/Cold	0	0	0	$0
Fissure	0	0	0	$0
Flooding / Flash Flooding	18	54	115	$623,550,000
Hail	0	0	0	$0
Lightning	0	0	0	$0
Levee Failure	0	0	0	$0
Pandemic	1	3,797 [A]	0	$0
Subsidence	0	0	0	$0
Thunderstorm / High Wind	4	0	0	$0
Tornado / Dust Devil	0	0	0	$0
Tropical Storm / Hurricane	1	0	0	$375,000,000
Wildfire	18	0	0	$0

Notes:
Damage Costs are reported as is and no attempt has been made to adjust costs to current dollar values
A – Total deaths in Maricopa County as of November 14, 2020 (Source: ADHS, 2020)

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Table 5-3: Maricopa County Historic Hazard Events – June 1955 to June 2020				
	No. of	Recorded Losses		
Hazard	Records	Fatalities	Injuries	Damage Costs ($)
Drought	0	0	0	$0
Dam Failure	1	0	0	$0
Earthquake	0	0	0	$0
Extreme Heat/Cold	102	199	9	$122,200,000
Fissure	2	0	0	$2,500
Flooding / Flash Flooding	200	18	8	$129,198,500
Hail	10	1	0	$2,810,048,500
Lightning	15	1	2	$1,334,000
Levee Failure	0	0	0	$0
Subsidence	2	0	0	$4,170,000
Thunderstorm / High Wind	573	11	194	$436,217,500
Tornado / Dust Devil	51	0	58	$37,407,900
Wildfire (2004-2019; over 500 acres))	24	0	6	$5,000,000
Notes: Damage Costs are reported as is and no attempt has been made to adjust costs to current dollar values				

Detailed historic hazard records are provided in Appendix D.

The culmination of the review and screening process by the MJPT resulted in a decision to retain the 2015 Plan hazards for profiling and updating. Accordingly, the 2021 Plan hazard list is:

- **Dam Inundation**
- **Drought**
- **Extreme Heat**
- **Fissure**
- **Flood**
- **Levee Failure**
- **Severe Wind**
- **Subsidence**
- **Wildfire**

Definitions for each hazard are provided in Section 5.3 and in Section 8.2

During the MJPT discussions and evaluation of the Plan hazard list, two recent and significant past events related to the hazard categories of HAZMAT and Infectious Disease / Pandemic were discussed and are briefly summarized below.

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HAZMAT: On July 29, 2020, a Union Pacific train with several cars loaded with hazardous cargo derailed on the bridge spanning the Tempe Town Lake, in Tempe, Arizona, igniting a fire that consumed the bridge and melted the southern abutment. According to the National

Source: azfamily.com

Transportation Safety Board[22] there were no fatalities and one injury due to smoke inhalation by a first responder. The damages were estimated to be between $8 and $10 million. Of the 12 derailed cars (in positions 49 through 60), three tank cars were loaded with the hazardous material cyclohexanone. Two of these tank cars fell from the trestle and one released 2,201 gallons of cyclohexanone. A third tank car partially derailed but was not breached. A small area near the bridge was evacuated as a precautionary measure.

INFECTIOUS DISEASE / PANDEMIC: Coronavirus Disease 2019 (COVID-19) was confirmed to have reached Arizona in January 2020. The first confirmed case of COVID-19 in Arizona was reported on January 26, 2020 in Tempe, Arizona. Arizona Governor Doug Ducey declared a public health emergency on March 12, 2020. On March 20th, ADHS and Maricopa County health officials announced the first death in the state from COVID-19: a Maricopa County man in his 50s with underlying health conditions. On March 30th, Gov. Ducey issued a statewide stay at home order to stop the spread of new coronavirus, barring Arizonans from leaving their residences except for food, medicine, and other essentials. The order took effect at the close of business March 31st. The order expired on May 15th and on June 17th, Governor Ducey announced that local governments would be able to set mask-wearing regulations after previously having blocked local mask wearing requirements. Soon after, many city and county officials began implementing face covering mandates or announcing plans to discuss possible regulations. As

[22] NTSB Preliminary Report: https://www.ntsb.gov/investigations/AccidentReports/Pages/RRD20LR005-preliminary-report.aspx

of November 14, 2020, the Maricopa County death toll stood at 3,797 with 174,957 confirmed cases [23].

The MJPT chose not to add these hazards to the formal list since they are either human-caused or are more formally addressed by other plans. The MJPT, however, wanted to document the occurrences and acknowledge that the hazards do exist and are of concern to the overall health and safety of the county.

5.2 Vulnerability Analysis Methodology

5.2.1 General

The following sections summarize the methodologies used to perform the vulnerability analysis portion of the risk assessment. For this update, the entire vulnerability analysis was either revised or updated to reflect the availability of new hazard and census data. Specific changes are noted below and/or in Section 5.3

For the purposes of this vulnerability analysis, updated hazard profile maps were developed for Dam Inundation, Fissure, Flood, Levee Failure, Subsidence and Wildfire to map the geographic variability of the probability and magnitude risk of the hazards as estimated by the planning team. Hazard profile categories of HIGH, MEDIUM, and/or LOW were used and were subjectively assigned based on the factors discussed in Probability and Magnitude sections below. Within the context of the county limits, the other hazards do not exhibit significant geographic variability and will not be categorized as such.

Unless otherwise specified in this Plan, the general cutoff date for new historic or hazard profile data is October 2020.

5.2.2 Climate Change

In recent years, FEMA and others have taken a harder look at the impacts of climate change on natural hazards and the mitigation planning process. In March 2015, FEMA released state mitigation planning guidance that requires all state hazard mitigation plans to address climate change beginning with all updates submitted after March 2016 [24]. FEMA's National Advisory Council noted that the effects of climate change could manifest as a "threat multiplier". When considering probabilities of hazard events, it is typical to make the implicit assumption that the past is a prologue for the future; however, trending changes to climate related variables may require broader thinking and projections to develop mitigation actions and projects that account for those changes.

The scope and severity of cause and impacts relating to climate change are still difficult to predict and highly debated. There is, however, a growing body of science and research that indicates a few noticeable trends that should be considered when

[23] Arizona Department of Health Services COVID 19 Data Dashboard: https://www.azdhs.gov/preparedness/epidemiology-disease-control/infectious-disease-epidemiology/covid-19/dashboards/index.php

[24] FEMA, 2015, *State Mitigation Plan Review Guide*, released March 2015, effective March 2016, FP 302-094-2

evaluating natural hazard vulnerability and risk. In 1989, the U.S. Global Change Research Program (USGCRP) was established by Presidential Initiative and later mandated by Congress in the Global Change Research Act of 1990 with the stated purpose of assisting "the Nation and the world to understand, assess, predict, and respond to human-induced and natural processes of global change." In May 2014, the USGCRP released the 3rd National Climate Assessment (NCA), which is a comprehensive compilation of the latest body of work and science on the topic of climate change. The NCA results and discussion are divided into regions to focus the discussions and conclusions to a regional perspective. The Southwest region includes the states of Arizona, California, Colorado, Nevada, New Mexico, and Utah. According to Chapter 20 of the NCA[25], the Southwest regional climate change impacts noted in the recent research include increased heat, drought, and insect outbreaks that result in more wildfires, declining water supplies, reduced agricultural yields, health impacts in cities due to heat, and flooding and erosion in coastal areas. In its 2014 report, the NCA released the following "Key Messages" for the Southwest Region:

1. Snowpack and streamflow amounts are projected to decline in parts of the Southwest, decreasing surface water supply reliability for cities, agriculture, and ecosystems. The Southwest produces more than half of the nation's high-value specialty crops, which are irrigation-dependent and particularly vulnerable to extremes of moisture, cold, and heat. Reduced yields from increasing temperatures and increasing competition for scarce water supplies will displace jobs in some rural communities.
2. Increased warming, drought, and insect outbreaks, all caused by or linked to climate change, have increased wildfires and impacts to people and ecosystems in the Southwest. Fire models project more wildfire and increased risks to communities across extensive areas.
3. Flooding and erosion in coastal areas are already occurring even at existing sea levels and damaging some California coastal areas during storms and extreme high tides. Sea level rise is projected to increase as Earth continues to warm, resulting in major damage as wind-driven waves ride upon higher seas and reach farther inland.
4. Projected regional temperature increases, combined with the way cities amplify heat, will pose increased threats and costs to public health in southwestern cities, which are home to more than 90% of the region's population. Disruptions to urban electricity and water supplies will exacerbate these health problems.

FEMA has established that future changes in probabilities and severity of hazard events influenced by climate change should be addressed during mitigation planning. Accordingly, a brief assessment of the potential effects that current climate

[25] Garfin, G., G. Franco, H. Blanco, A. Comrie, P. Gonzalez, T. Piechota, R. Smyth, and R. Waskom, 2014, *Ch. 20: Southwest. Climate Change Impacts in the United States: The Third National Climate Assessment*, J. M. Melillo, Terese (T.C.) Richmond, and G. W. Yohe, Eds., U.S. Global Change Research Program, 462-486. doi:10.7930/J08G8HMN

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change understanding may have on the Plan hazards is provided where appropriate in Section 5.3.

5.2.3 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 using a tool developed by the State of Arizona called the Calculated Priority Risk Index[26] (CPRI). The CPRI value is obtained by assigning varying degrees of risk to four (4) categories for each hazard, and then calculating an index value based on a weighting scheme. Table 5-4 summarizes the CPRI risk categories and provides guidance regarding the assignment of values and weighting factors for each category.

Application of the CPRI is illustrated by the following example. Assume that the project team is assessing the hazard of flooding, and has decided that 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*0.45) + (3*0.30) + (2*0.15) + (1*0.10)] = 2.65

5.2.4 Asset Inventory

With this update, the 2015 Plan detailed asset inventory was reviewed and updated to reflect the current status and replacement cost information. In some cases, jurisdictions expanded or modified their inventory.

The 2018 State Plan defines assets as:

Any natural or human-caused feature that has value, including, but not limited to people; buildings; infrastructure like bridges, roads, and sewer and water systems; lifelines like electricity and communication resources; or environmental, cultural, or recreational features like parks, dunes, wetlands, or landmarks.

The asset inventory 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.

[26] ADEM, 2003, *Arizona Model Local Hazard Mitigation Plan*, prepared by JE Fuller/ Hydrology & Geomorphology, Inc.

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Table 5-4: Summary of Calculated Priority Risk Index (CPRI) categories and risk levels

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

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Following the criteria set forth by the Critical Infrastructure Assurance Office (CIAO), the State of Arizona has adopted eight general categories[27] that define critical facilities and infrastructure:

1. **Communications Infrastructure:** Telephone, data services, and internet communications, cell and radio towers, 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.

Other assets such as public libraries, schools, museums, parks, recreational facilities, historic buildings or sites, churches, residential and/or commercial subdivisions, apartment complexes, and so forth, are classified as non-critical facilities and infrastructure, as they are not necessarily "critical" per the definition set forth in Executive Order 13010. They are, however, still considered by the MJPT to be important facilities and critical and non-critical should not be construed to equate to important and non-important. For each asset, attributes such as name, description, physical address, geospatial position, and estimated replacement cost were identified to the greatest extent possible and entered into a GIS geodatabase.

The updated asset inventory data was developed for each community using existing GIS data sets, on-line mapping utilities, and manual data acquisition by members of the local planning teams. Table 5-5 summarizes the updated facility counts by category for each of the participating jurisdictions in this plan.

[27] Instituted via Executive Order 13010, which was signed by President Clinton in 1996.

Table 5-5: Summary of Critical and Non-Critical Facility counts by category and jurisdiction

Participating Jurisdiction	Critical Facilities and Infrastructure								Non-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	Educational	Cultural	Business	Residential	Recreational
Avondale	0	0	0	0	0	46	7	11	28	0	27	0	12
Buckeye	0	8	0	3	24	46	16	7	12	1	2	0	6
Carefree	0	0	0	0	0	1	4	1	0	0	0	0	0
Cave Creek	0	0	0	0	0	4	0	0	0	0	0	0	0
Chandler	16	24	0	0	1	86	24	17	78	3	0	25	3
El Mirage	0	0	0	0	3	13	3	3	6	0	6	0	0
Fountain Hills	0	0	0	0	0	1	3	2	6	0	0	1	2
Fort McDowell Yavapai Nation	0	0	0	0	0	1	7	2	3	1	9	0	3
Gila Bend	0	0	0	0	0	2	3	1	1	0	0	0	0
Gilbert	103	0	0	88	0	137	54	230	165	0	4284	227	0
Glendale	3	19	1	37	51	69	42	90	185	108	162	360	97
Goodyear	0	0	0	0	0	0	0	0	0	0	0	0	0
Guadalupe	0	0	0	0	0	0	3	1	2	0	0	0	1
Litchfield Park	0	0	0	0	0	0	1	0	2	0	1	0	1
Mesa	44	12	75	0	6	145	38	48	138	8	1	24	11
Paradise Valley	8	2	0	0	0	38	3	7	6	14	13	4	0
Peoria	0	0	0	0	5	155	17	12	37	10	1	33	29
Phoenix	0	6	5	0	22	16	270	113	422	20	0	66	7
Queen Creek	16	0	0	8	11	21	3	6	22	15	10	8	9
Salt River Pima-Maricopa Indian Community	15	3	6	0	3	12	8	10	6	1	11	0	3
Scottsdale	14	1	0	0	0	156	15	33	4	0	0	4	10
Surprise	6	5	0	0	2	67	5	9	0	0	0	0	0
Tempe	0	0	1	0	0	3	17	5	73	2	1	7	2
Tolleson	0	0	0	0	0	2	2	2	4	0	0	0	0
Unincorporated Maricopa County	53	2	5	0	459	1	324	28	46	2	0	0	150
Wickenburg	0	2	1	0	0	0	4	2	5	0	0	0	0
Youngtown	0	0	0	0	0	1	3	0	2	0	1	5	0

Notes:
A – The City of Mesa reports that 32 of the 145 facilities are wastewater related.

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5.2.5 Loss/Exposure Estimations

In the 2015 Plan, economic loss and human exposure estimates for each of the final hazards identified began with an assessment of the potential exposure of critical and non-critical assets and human populations to those hazards. Estimates of exposure to critical and non-critical assets identified by each jurisdiction were accomplished by intersecting the asset inventory with the hazard profiles. Human or population

exposures were estimated by intersecting the same hazards with Census 2010 block level data for estimating the human (population) and residential structure impacts wherever possible.

For this Plan, a similar census block level database compiled by the Arizona Department of Health Services using 2015 population projections and the same 2010 census residential structure statistics was used. As with the 2015 Plan, no industrial or commercial unit estimates are made for this update due to the lack of reliable data at the time of this analysis. It is noted that the next plan update will likely have the 2020 Census data available. The procedures for developing loss estimates for this Plan are discussed below.

Economic and human exposure estimates for each of the final hazards identified in Section 5.1 begins with an assessment of the potential exposure of assets, human populations, and residential structures to those hazards. Asset exposure estimates are accomplished by intersecting the asset inventory with the hazard profiles in Section 5.3 and compiling the exposed facility count and replacement values by jurisdiction. Similarly, human population and residential unit exposures are estimated by intersecting the same hazards with the census block population and residential unit count data sets. Structure and content replacement costs for assets were assigned to each facility by the corresponding jurisdiction. Structure and content replacement costs for the residential housing counts were geographically assigned based on zip code and average housing cost unit values data from the Zillow home value database [28]. Content value for these buildings was assumed to equal 50% of the replacement cost.

Combining the exposure results from the asset inventory and census database provides a comprehensive depiction of the overall exposure of critical facilities, human population, and residential building stock and the two datasets are considered complimentary and not redundant.

Economic loss projections to structures and facilities are not estimated in this Plan unless specifically noted otherwise. It is important to note the following when reviewing the exposure estimate results:

- Potential exposures reported in this Plan represent an inherent assumption that the hazard occurs county-wide to the magnitude shown on the hazard profile map. The results are intended to present a county-wide value and number of exposures. Any single hazard event will likely only impact a portion of the county and the event specific exposure and losses would be some fraction of those estimated herein.
- No attempt has been made at developing annualized loss estimates, unless otherwise noted in Section 5.3.

Several of the hazards profiled in this Plan will not include quantitative exposure and loss estimates. The vulnerability of people and assets associated with some hazards are nearly impossible to evaluate given the uncertainty associated with

[28] Zillow at: https://www.zillow.com/research/data/

attempting to specify a geospatial correlation of the hazard event and loss potential without sufficient data to justify the estimation of geographically varied damages. Instead, a qualitative review of vulnerability will be discussed to provide insight to the nature of losses that are associated with the hazard. For subsequent updates of this Plan, the data needed to evaluate these unpredictable hazards may become refined such that comprehensive vulnerability statements and thorough loss estimates can be made.

5.2.6 Development Trend Analysis

The 2015 Plan development trend analysis will require updating to reflect growth and changes in Maricopa County over the last planning cycle. The updated analysis will focus on the potential risk associated with projected growth patterns and their intersection with the Plan identified hazards.

5.3 Hazard Risk Profiles

The following sections summarize the risk profiles for each of the Plan hazards identified in Section 5.1. For each hazard, the following elements are addressed to present the overall risk profile:

- **Description**
- **History**
- **Probability and Magnitude**
- **Climate Change Impacts**
- **Vulnerability**
  - **CPRI Results**
  - **Loss/Exposure Estimations**
  - **Development Trend Analysis**
- **Sources**
- **Profile Maps (if applicable)**

County-wide profile maps are provided at the end of the section (if applicable) and jurisdiction specific maps are included in the Executive Plan Summary for that jurisdiction. Also, the maps are not included in the pagination count.

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5.3.1 Dam Inundation

Description

There are two primary scenarios of downstream inundation risk associated with dams in Maricopa County: (1) Emergency Spillway Discharges, and (2) Dam Failure, and these were both addressed in the 2015 Plan. For this update, the MJPT chose to continue with the distinction between the downstream inundation risk (emergency spillway discharges versus a dam failure). Accordingly, vulnerability for each scenario will be assessed separately, except for the CPRI evaluation, which will consider the two scenarios blended to one CPRI value.

Dams within or impacting Maricopa County can generally be divided into two groups: (1) storage reservoirs designed to permanently impound water and possibly generate power, and (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. Most dams within, or upstream of, Maricopa County are FRS and are typically earthen structures 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. The risk associated with an emergency spillway discharge is different from a dam failure for several reasons:

- First, dams that are properly designed and maintained are considerably less likely to fail and assets located downstream of them are more likely to be impacted by an emergency spillway discharge than by a dam failure.
- Second, the emergency spillway is at a fixed location(s), and therefore, the downstream inundation limits can be more readily predicted as compared to a dam failure, which could occur anywhere along the structure.
- Lastly, the dynamics of the flood wave associated with an emergency spillway discharge are different than that of a dam failure. A dam failure is an uncontrolled release of water impounded behind a dam through a breach in the dam itself and is usually catastrophically destructive. An emergency spillway discharge usually increases in magnitude gradually, and then decreases gradually as the structure drains.

History

Maricopa County has a limited history of dam failures and emergency spillway discharges that caused damaging inundation of downstream properties, and there have been no events of occurrence during the last plan cycle. The following are historic examples from the records available:

- In January-February 1993, a major statewide precipitation event caused major spillway releases from the Salt and Verde River system of dams, with a peak discharge of nearly 124,000 cfs from Granite Reef Diversion Dam. The unavoidable releases caused major flooding along the Salt and Gila River all

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the way to the county line, with over $38 million in public and private damages reported and the evacuation of over 200 families. The flooding also caused the failure of Gillespie Dam[29] and forced peak spillway discharges of 25,600 cfs at Painted Rock Dam in the southwestern part of the county (USACE, 1994).

- In September 1997, Tropical Storm Nora moved through the western portion of Maricopa County dumping record breaking precipitation along the way. The Narrows Dam located just north of Maricopa County on Centennial Wash, began filling in the early part of the storm with flows reaching a depth of over two feet in the emergency spillway before the dam itself failed by breach in two locations. The peak discharge estimated from the dam spillway was 2,610 cfs (FCDMC, 1997).

Probability and Magnitude

The probability and magnitude of emergency spillway and dam failure discharges vary greatly with each dam. Most of the dams located within Maricopa County function as flood retarding structures (FRS) with a normally dry impoundment area. These FRS are typically designed to store, at a minimum, runoff from the one percent probability storm (100-year) in the flood-pool below the crest of the emergency spillway. Many of the FRS have sufficient capacity to store the 0.2 percent probability storm (500-year) or greater, without emergency spillway operation. Depending on the dam hazard classification, the emergency spillways will usually have capacity to pass the entire Inflow Design Flood (IDF) without any overtopping of the dam itself. The IDF is based on the hazard classification of the dam and is usually the probable maximum flood (PMF) or some fraction thereof. Other dams impacting Maricopa County that impound water on a continuous basis (Salt and Verde River systems for example) are typically equipped with primary and secondary spillways that are closely monitored and operated to provide an optimized level of flood protection, freeboard and reservoir storage for power generation, irrigation, and drinking water supplies. Probabilities and magnitudes of spillway discharge from these systems are dependent on several variables such as available reservoir capacity, time of year, and magnitude of storm causing the spillway discharge.

There are two sources of data that publish hazard ratings for dams impacting Maricopa County that are based on either an assessment of the consequence of failure and/or dam safety considerations. The hazard ratings are not tied to probability of occurrence. The first is the Arizona Department of Water Resources (ADWR) and the second is the National Inventory of Dams (NID).

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

[29] Gillespie Dam was an irrigation diversion structure that was not regulated as a jurisdictional dam by ADWR.

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classification. 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 five safety ratings (listed in increasing severity): no deficiency, safety deficiency, unsafe non-emergency, unsafe non-emergency elevated risk, or unsafe emergency. Examples of safety deficiencies include: lack of an adequate emergency action plan, inability to safely pass the required IDF, embankment erosion, dam stability, etc. Further descriptions of each safety classification are summarized in Table 5-6.

Table 5-6: Summary of ADWR safety categories

ADWR Safety Rating	Definition
No Deficiency	No safety deficiencies found
Safety Deficiency	One or more conditions at the dam that impair or adversely affects the safe operation of the dam
Unsafe Non-emergency	Safety deficiencies in a dam or spillway could result in failure of the dam with subsequent loss of human life or significant property damage. Failure is not considered imminent.
Unsafe Non-emergency Elevated Risk	Safety deficiencies in a dam or spillway could result in failure of the dam with subsequent loss of human life or significant property damage. Concern the dam could fail during a 100-yr or smaller flood.
Unsafe Emergency	The dam is in imminent risk of failure.

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. Dams within the NID database are classified by hazard potential that is based on an assessment of the consequences of failure. Table 5-7 summarizes those classifications and their criteria.

Table 5-7: Summary of NID downstream hazard classifications

Hazard Potential	Loss of Human Life	Economic, Environmental, Lifeline Losses
Low	None expected	Low and generally limited to owner
Significant	None expected	Yes
High	Probable. One or more expected.	Yes (but not necessary for this classification)

Note: The hazard potential classification is an assessment of the consequences of failure, but not an evaluation of the probability of failure.

Source: NID

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 52 dams in the NID database that are in Maricopa County, and 46 of those dams are under ADWR jurisdiction. There are also four more dams located in Pinal County that are owned and operated by the Flood Control District of Maricopa County and have a direct impact on Maricopa County communities. Table 5-8 provides a summary of the hazard and safety classifications by count for both the ADWR and NID databases. The location and hazard classifications for each dam are shown on Maps 1A, 1B, 1C and 2A, 2B, and 2C.

Table 5-8: Summary count of NID and ADWR hazard classification dams

Database Source	High	Significant	Low or Very Low	Safety Deficiency	Unsafe (any sub-category)
NID	39	8	5	N/A	N/A
ADWR	39	2	5	4	1

NOTES:
- The unsafe dam is currently in a rehabilitation process.
- Four of the High hazard dams are located just east of Maricopa County in Pinal County.
- One of the Safety Deficient dams is currently deemed as "out of service"

Source: FCDMC, ADWR (2020) and NID (2014)

The magnitude of impacts due to emergency spillway flows and/or dam failure are usually depicted by mapping the estimated inundation limits based on an assessment of a combination of flow depth and velocity. These limits are typically a critical part of the emergency action plan. Of the 46 dams considered, 42 have emergency action plans.

The MJPT chose to assign profile categories separately for emergency spillway inundation and dam failure inundation, since the perceived probability and magnitude for each is distinctly different. For inundation resulting from emergency spillway flows, two classes of hazard risk are depicted as follows:

HIGH Hazard = Inundation limits due to full emergency spillway flow

LOW Hazard = All other areas outside the inundation limits

For inundation resulting from a dam failure, three classes of hazard are depicted as follows:

HIGH Hazard = Dam failure inundation limits downstream of any dam classified as "Unsafe" by ADWR.

MEDIUM Hazard = Dam failure inundation limits downstream of any dam classified as "Safety Deficient" by ADWR.

LOW Hazard = All other areas.

Extents of the emergency spillway and dam failure inundation hazard areas are shown on Maps 1A-C and 2A-C, respectively. It is duly noted that these hazard areas and maps depicting them continue to be a work in progress and may not reflect every dam spillway inundation or failure limit.

Climate Change Impacts

Climate change impacts to emergency spillway and dam failure inundation hazard are anticipated to occur in relation to the assumed increase in wildfire occurrences. Wildfires typically change a watershed's hydrology with regard to rainfall-runoff processes, causing significant increases in peak discharge and runoff volumes during precipitation events. Dams and FRSs located in the county are typically not designed for post wildfire flooding volumes and flow rates and could pose significant increased risks of emergency spillway operation or failure should a large wildfire occur in the watershed. Other indirect impacts could be linked to increased presence of fissure and subsidence due to increased groundwater withdrawal due to reduced surface water supplies.

Vulnerability – CPRI Results

Dam inundation CPRI results for each community are summarized in Table 5-9.

Table 5-9: Summary of CPRI results by jurisdiction for dam inundation (emergency spillway flow and dam failure)

Participating Jurisdiction	Probability	Magnitude/ Severity	Warning Time	Duration	CPRI Score
Avondale	Unlikely	Critical	< 6 hours	< 24 hours	2.15
Buckeye	Unlikely	Critical	< 6 hours	< 24 hours	2.15
Carefree	Unlikely	Negligible	> 24 hours	< 6 hours	1.00
Cave Creek	Unlikely	Negligible	> 24 hours	< 6 hours	1.00
Chandler	Unlikely	Limited	6 - 12 hours	< 24 hours	1.70
El Mirage	Unlikely	Critical	< 6 hours	< 24 hours	2.15
Fort McDowell Yavapai Nation	Unlikely	Critical	> 24 hours	< 1 week	1.80
Fountain Hills	Unlikely	Critical	< 6 hours	< 24 hours	2.15
Gila Bend	Unlikely	Critical	> 24 hours	< 1 week	1.80
Gilbert	Unlikely	Limited	< 6 hours	< 24 hours	1.85
Glendale	Unlikely	Critical	< 6 hours	< 24 hours	2.15
Goodyear	Unlikely	Critical	< 6 hours	< 24 hours	2.15
Guadalupe	Unlikely	Limited	< 6 hours	< 24 hours	1.85
Litchfield Park	Unlikely	Critical	< 6 hours	< 24 hours	2.15
Unincorporated Maricopa County	Unlikely	Critical	< 6 hours	< 24 hours	2.15
Mesa	Unlikely	Critical	< 6 hours	< 24 hours	2.15
Paradise Valley	Unlikely	Negligible	> 24 hours	< 6 hours	1.00
Peoria	Unlikely	Catastrophic	< 6 hours	< 1 week	2.55
Phoenix	Unlikely	Critical	< 6 hours	< 1 week	2.25
Queen Creek	Unlikely	Catastrophic	< 6 hours	< 24 hours	2.45
Salt River Pima-Maricopa Indian Community	Unlikely	Catastrophic	> 24 hours	< 1 week	2.10
Scottsdale	Unlikely	Critical	< 6 hours	< 24 hours	2.15
Surprise	Unlikely	Catastrophic	< 6 hours	< 24 hours	2.45
Tempe	Unlikely	Catastrophic	< 6 hours	< 1 week	2.55
Tolleson	Unlikely	Limited	< 6 hours	< 24 hours	1.85
Wickenburg	Unlikely	Catastrophic	< 6 hours	< 24 hours	2.45
Youngtown	Unlikely	Critical	< 6 hours	< 24 hours	2.15
				County-wide average CPRI =	**2.01**

Vulnerability – Loss/Exposure Estimations

The estimation of potential exposures due to inundation from either an emergency spillway flow or a dam failure was accomplished by intersecting the human and facility assets with the inundation limits depicted on Maps 1A, 1B, and 1C. Since no common methodology is available for obtaining losses from the exposure values for these types of extreme events, no estimates of economic losses were made for this update. Any storm event, or series of storm events of sufficient magnitude to cause an emergency spillway to operate or 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.

It should be noted that the MJPT recognizes that probability of an emergency spillway flow or dam failure occurring on multiple (or all) structures at the same time is essentially zero. Accordingly, the exposure estimates presented below are intended to serve as a collective evaluation of the potential exposure to high and medium hazard emergency spillway and dam failure inundation events.

Tables 5-10 and 5-11 summarize estimations of exposure to MJPT identified assets for emergency spillway and dam failure inundation hazards. Tables 5-12 and 5-13 summarize census block residential building stock exposure estimates for the emergency spillway and dam failure inundation hazards. Table 5-14 and 5-15 summarize the estimated census block population exposed to emergency spillway and dam failure inundation hazards.

In summary, 1,197, 21 and 3,800 critical and non-critical MJPT identified assets with a cumulative reported replacement cost of $2.84 billion, $23.3 million and $820.6 million are exposed to emergency spillway high hazard and dam failure high and medium hazard inundations, respectively, for the planning area. An additional $72.7 billion, $88.4 million and $38.9 billion of census block residential structures are exposed to emergency spillway high hazard and dam failure high and medium hazard inundations, respectively, for the planning areas. Regarding human vulnerability, a total population of 553,274 people, or 13.37% of the total census planning area population, is potentially exposed to an emergency spillway inundation event. Similarly, total populations of 854 and 331,796 people, or 0.02% and 8.0% of the total census planning area population, are potentially exposed to a high or medium hazard dam failure inundation event. The potential for deaths and injuries are directly related to the warning time and type of event. Given the magnitude of such events, 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).

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Table 5-10: Asset inventory exposure due to emergency spillway inundation

Community	Total Facilities Reported by Community	Impacted Facilities	Percentage of Total Community Facilities Impacted	Total Replacement Value of All Facilities Reported by Community (x $1,000)	Estimated Replacement Value Exposed to Hazard (x $1,000)
County-Wide Totals (Maricopa Only)	**10917**	**1197**	**10.96%**	**$26,024,918**	**$2,839,188**
Avondale	131	0	0.00%	$179,460	$0
Buckeye	125	6	4.80%	$268,667	$10,300
Carefree	6	0	0.00%	$9,000	$0
Cave Creek	4	0	0.00%	$13,258	$0
Chandler	277	0	0.00%	$1,361,072	$0
El Mirage	34	27	79.41%	$285,542	$206,293
Fort McDowell Yavapai Nation	26	0	0.00%	$202,624	$0
Fountain Hills	15	0	0.00%	$411,000	$0
Gila Bend	7	0	0.00%	$36,000	$0
Gilbert	5287	398	7.53%	$0	$0
Glendale	1224	309	25.25%	$4,085,807	$1,381,994
Goodyear	159	30	18.87%	$148,573	$7,800
Guadalupe	7	0	0.00%	$10,800	$0
Litchfield Park	5	0	0.00%	$118,900	$0
Unincorporated Maricopa County	1061	76	7.16%	$3,624,310	$68,220
Mesa	528	38	7.20%	$2,850,466	$118,570
Paradise Valley	95	0	0.00%	$469,300	$0
Peoria	299	56	18.73%	$282,333	$19,247
Phoenix	947	96	10.14%	$7,843,312	$455,408
Queen Creek (Maricopa County Only)	124	112	90.32%	$301,446	$269,511
Salt River Pima-Maricopa Indian Community	78	0	0.00%	$502,493	$0
Scottsdale	237	0	0.00%	$1,094,610	$0
Surprise	94	47	50.00%	$498,810	$289,844
Tempe	111	2	1.80%	$1,373,300	$12,000
Tolleson	10	0	0.00%	$0	$0
Wickenburg	14	0	0.00%	$32,589	$0
Youngtown	12	0	0.00%	$21,247	$0
Gilbert (Pinal County Only)	1	1	100.00%	$0	$0
Mesa (Pinal County Only)	22	7	31.82%	$7,380	$1,730
Queen Creek (Pinal County Only)	5	3	60.00%	$4,697	$1,600
Maricopa County (Pinal County Only)	3	1	33.33%	$707	$37
Maricopa County (Yavapai County Only)	6	0	0.00%	$1,760	$0

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Table 5-11: Asset inventory exposure due to dam failure inundation

Community	Total Facilities Reported by Community	Impacted Facilities	Percentage of Total Community Facilities Impacted	Total Replacement Value of All Facilities Reported by Community (x $1,000)	Estimated Replacement Value Exposed to Hazard (x $1,000)
HIGH HAZARD					
County-Wide Totals (Maricopa Only)	**10917**	**21**	**0.19%**	**$26,024,918**	**$23,335**
Avondale	131	0	0.00%	$179,460	$0
Buckeye	125	16	12.80%	$268,667	$23,335
Carefree	6	0	0.00%	$9,000	$0
Cave Creek	4	0	0.00%	$13,258	$0
Chandler	277	0	0.00%	$1,361,072	$0
El Mirage	34	0	0.00%	$285,542	$0
Fort McDowell Yavapai Nation	26	0	0.00%	$202,624	$0
Fountain Hills	15	0	0.00%	$411,000	$0
Gila Bend	7	0	0.00%	$36,000	$0
Gilbert	5287	0	0.00%	$0	$0
Glendale	1224	0	0.00%	$4,085,807	$0
Goodyear	159	0	0.00%	$148,573	$0
Guadalupe	7	0	0.00%	$10,800	$0
Litchfield Park	5	0	0.00%	$118,900	$0
Unincorporated Maricopa County	1061	5	0.47%	$3,624,310	$0
Mesa	528	0	0.00%	$2,850,466	$0
Paradise Valley	95	0	0.00%	$469,300	$0
Peoria	299	0	0.00%	$282,333	$0
Phoenix	947	0	0.00%	$7,843,312	$0
Queen Creek (Maricopa County Only)	124	0	0.00%	$301,446	$0
Salt River Pima-Maricopa Indian Community	78	0	0.00%	$502,493	$0
Scottsdale	237	0	0.00%	$1,094,610	$0
Surprise	94	0	0.00%	$498,810	$0
Tempe	111	0	0.00%	$1,373,300	$0
Tolleson	10	0	0.00%	$0	$0
Wickenburg	14	0	0.00%	$32,589	$0
Youngtown	12	0	0.00%	$21,247	$0
Gilbert (Pinal County Only)	1	0	0.00%	$0	$0
Mesa (Pinal County Only)	22	0	0.00%	$7,380	$0
Queen Creek (Pinal County Only)	5	0	0.00%	$4,697	$0
Maricopa County (Pinal County Only)	3	0	0.00%	$707	$0
Maricopa County (Yavapai County Only)	6	0	0.00%	$1,760	$0

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Table 5-11: Asset inventory exposure due to dam failure inundation					
Community	**Total Facilities Reported by Community**	**Impacted Facilities**	**Percentage of Total Community Facilities Impacted**	**Total Replacement Value of All Facilities Reported by Community (x $1,000)**	**Estimated Replacement Value Exposed to Hazard (x $1,000)**
MEDIUM HAZARD					
County-Wide Totals (Maricopa Only)	**10,917**	**3,800**	**34.81%**	**$26,024,918**	**$820,612**
Avondale	131	10	7.63%	$179,460	$3,851
Buckeye	125	0	0.00%	$268,667	$0
Carefree	6	0	0.00%	$9,000	$0
Cave Creek	4	0	0.00%	$13,258	$0
Chandler	277	5	1.81%	$1,361,072	$7,658
El Mirage	34	19	55.88%	$285,542	$123,370
Fort McDowell Yavapai Nation	26	0	0.00%	$202,624	$0
Fountain Hills	15	0	0.00%	$411,000	$0
Gila Bend	7	0	0.00%	$36,000	$0
Gilbert	5,287	3,582	67.75%	$0	$0
Glendale	,1224	14	1.14%	$4,085,807	$0
Goodyear	159	40	25.16%	$148,573	$32,110
Guadalupe	7	0	0.00%	$10,800	$0
Litchfield Park	5	0	0.00%	$118,900	$0
Unincorporated Maricopa County	1,061	46	4.34%	$3,624,310	$253,980
Mesa	528	39	7.39%	$2,850,466	$143,920
Paradise Valley	95	0	0.00%	$469,300	$0
Peoria	299	0	0.00%	$282,333	$0
Phoenix	947	0	0.00%	$7,843,312	$0
Queen Creek (Maricopa County Only)	124	7	5.65%	$301,446	$15,915
Salt River Pima-Maricopa Indian Community	78	0	0.00%	$502,493	$0
Scottsdale	237	0	0.00%	$1,094,610	$0
Surprise	94	38	40.43%	$498,810	$239,809
Tempe	111	0	0.00%	$1,373,300	$0
Tolleson	10	0	0.00%	$0	$0
Wickenburg	14	0	0.00%	$32,589	$0
Youngtown	12	0	0.00%	$21,247	$0
Gilbert (Pinal County Only)	1	0	0.00%	$0	$0
Mesa (Pinal County Only)	22	0	0.00%	$7,380	$0
Queen Creek (Pinal County Only)	5	0	0.00%	$4,697	$0
Maricopa County (Pinal County Only)	3	0	0.00%	$707	$0
Maricopa County (Yavapai County Only)	6	0	0.00%	$1,760	$0

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Table 5-12: Residential structures exposed to emergency spillway inundation

Community	Residential Building Count	Residential Building Exposure		Residential Building Replacement Value (x$1,000)	Residential Building Value Exposed	
		Total	Percent		Total (x$1,000)	Percent
County-Wide Totals (Maricopa Only)	**1,639,265**	**218,715**	**13.34%**	**$542,436,633**	**$72,664,531**	**13.40%**
Apache Junction (Maricopa County Portion)	295	291	98.64%	$76,791	$75,619	98.47%
Avondale	26,802	0	0.00%	$7,272,041	$0	0.00%
Buckeye	18,206	1,353	7.43%	$4,946,783	$367,732	7.43%
Carefree	2,242	0	0.00%	$1,922,010	$0	0.00%
Cave Creek	2,498	0	0.00%	$1,628,751	$0	0.00%
Chandler	94,257	0	0.00%	$34,713,265	$0	0.00%
El Mirage	11,307	9,889	87.46%	$2,655,346	$2,322,499	87.47%
Fort McDowell Yavapai Nation	308	0	0.00%	$260,045	$0	0.00%
Fountain Hills	13,105	0	0.00%	$5,944,909	$0	0.00%
Gila Bend	944	0	0.00%	$118,937	$0	0.00%
Gilbert	74,821	8,966	11.98%	$29,339,526	$3,515,983	11.98%
Glendale	90,415	19,942	22.06%	$24,665,480	$13,008,089	52.74%
Goodyear	25,023	6,875	27.47%	$8,326,438	$2,287,555	27.47%
Guadalupe	1,397	0	0.00%	$269,202	$0	0.00%
Litchfield Park	2,616	0	0.00%	$996,356	$0	0.00%
Unincorporated Maricopa County	142,777	16,808	11.77%	$45,530,720	$5,359,869	11.77%
Mesa	201,507	9,191	4.56%	$59,328,380	$2,705,947	4.56%
Paradise Valley	5,621	0	0.00%	$11,738,020	$0	0.00%
Peoria	64,806	17,865	27.57%	$21,410,130	$5,902,113	27.57%
Phoenix	590,476	90,618	15.35%	$167,455,500	$25,698,678	15.35%
Queen Creek	8,422	8,118	96.39%	$2,890,493	$2,786,003	96.39%
Salt River Pima-Maricopa Indian Community	2,680	0	0.00%	$919,777	$0	0.00%
Scottsdale	123,959	0	0.00%	$67,660,310	$0	0.00%
Surprise	52,607	27,050	51.42%	$15,652,750	$8,048,600	51.42%
Tempe	73,603	1,491	2.03%	$24,383,780	$493,819	2.03%
Tolleson	2,165	0	0.00%	$505,455	$0	0.00%
Wickenburg	3,610	258	7.15%	$1,285,212	$92,025	7.16%
Youngtown	2,796	0	0.00%	$540,226	$0	0.00%
Queen Creek (Pinal County Portion)	606	404	66.67%	$207,814	$138,592	66.69%
Peoria (Yavapai County Portion)	5	0	0.00%	$1,321	$0	0.00%
Wickenburg (Yavapai County Portion)	54	0	0.00%	$19,703	$0	0.00%

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Table 5-13: Residential structures exposed to dam failure inundation

Community	Residential Building Count	Residential Building Exposure		Residential Building Replacement Value (x$1,000)	Residential Building Value Exposed	
		Total	Percent		Total (x$1,000)	Percent
HIGH HAZARD						
County-Wide Totals (Maricopa Only)	**1,639,265**	**279**	**0.02%**	**$542,436,633**	**$88,444**	**0.02%**
Apache Junction (Maricopa County Portion)	295	0	0.00%	$76,791	$0	0.00%
Avondale	26,802	0	0.00%	$7,272,041	$0	0.00%
Buckeye	18,206	9	0.05%	$4,946,783	$2,377	0.05%
Carefree	2,242	0	0.00%	$1,922,010	$0	0.00%
Cave Creek	2,498	0	0.00%	$1,628,751	$0	0.00%
Chandler	94,257	0	0.00%	$34,713,265	$0	0.00%
El Mirage	11,307	0	0.00%	$2,655,346	$0	0.00%
Fort McDowell Yavapai Nation	308	0	0.00%	$260,045	$0	0.00%
Fountain Hills	13,105	0	0.00%	$5,944,909	$0	0.00%
Gila Bend	944	0	0.00%	$118,937	$0	0.00%
Gilbert	74,821	0	0.00%	$29,339,526	$0	0.00%
Glendale	90,415	0	0.00%	$24,665,480	$0	0.00%
Goodyear	25,023	0	0.00%	$8,326,438	$0	0.00%
Guadalupe	1,397	0	0.00%	$269,202	$0	0.00%
Litchfield Park	2,616	0	0.00%	$996,356	$0	0.00%
Unincorporated Maricopa County	142,777	270	0.19%	$45,530,720	$86,068	0.19%
Mesa	201,507	0	0.00%	$59,328,380	$0	0.00%
Paradise Valley	5,621	0	0.00%	$11,738,020	$0	0.00%
Peoria	64,806	0	0.00%	$21,410,130	$0	0.00%
Phoenix	590,476	0	0.00%	$167,455,500	$0	0.00%
Queen Creek	8,422	0	0.00%	$2,890,493	$0	0.00%
Salt River Pima-Maricopa Indian Community	2,680	0	0.00%	$919,777	$0	0.00%
Scottsdale	123,959	0	0.00%	$67,660,310	$0	0.00%
Surprise	52,607	0	0.00%	$15,652,750	$0	0.00%
Tempe	73,603	0	0.00%	$24,383,780	$0	0.00%
Tolleson	2,165	0	0.00%	$505,455	$0	0.00%
Wickenburg	3,610	0	0.00%	$1,285,212	$0	0.00%
Youngtown	2,796	0	0.00%	$540,226	$0	0.00%
Queen Creek (Pinal County Portion)	606	0	0.00%	$207,814	$0	0.00%
Peoria (Yavapai County Portion)	5	0	0.00%	$1,321	$0	0.00%
Wickenburg (Yavapai County Portion)	54	0	0.00%	$19,703	$0	0.00%

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Table 5-13: Residential structures exposed to dam failure inundation						
Community	Residential Building Count	Residential Building Exposure		Residential Building Replacement Value (x$1,000)	Residential Building Value Exposed	
		Total	Percent		Total (x$1,000)	Percent
MEDIUM HAZARD						
County-Wide Totals (Maricopa Only)	**1,639,265**	**115,046**	**7.02%**	**$542,436,633**	**$38,886,441**	**7.17%**
Apache Junction (Maricopa County Portion)	295	0	0.00%	$76,791	$0	0.00%
Avondale	26,802	823	3.07%	$7,272,041	$223,241	3.07%
Buckeye	18,206	0	0.00%	$4,946,783	$0	0.00%
Carefree	2,242	0	0.00%	$1,922,010	$0	0.00%
Cave Creek	2,498	0	0.00%	$1,628,751	$0	0.00%
Chandler	94,257	4,483	4.76%	$34,713,265	$1,650,962	4.76%
El Mirage	11,307	9,863	87.22%	$2,655,346	$2,316,165	87.23%
Fort McDowell Yavapai Nation	308	0	0.00%	$260,045	$0	0.00%
Fountain Hills	13,105	0	0.00%	$5,944,909	$0	0.00%
Gila Bend	944	0	0.00%	$118,937	$0	0.00%
Gilbert	74,821	52,126	69.67%	$29,339,526	$20,439,864	69.67%
Glendale	90,415	1,812	2.00%	$24,665,480	$494,443	2.00%
Goodyear	25,023	4,750	18.98%	$8,326,438	$1,580,691	18.98%
Guadalupe	1,397	0	0.00%	$269,202	$0	0.00%
Litchfield Park	2,616	206	7.86%	$996,356	$78,307	7.86%
Unincorporated Maricopa County	142,777	1,660	1.16%	$45,530,720	$529,474	1.16%
Mesa	201,507	10,284	5.10%	$59,328,380	$3,027,751	5.10%
Paradise Valley	5,621	0	0.00%	$11,738,020	$0	0.00%
Peoria	64,806	0	0.00%	$21,410,130	$0	0.00%
Phoenix	590,476	0	0.00%	$167,455,500	$0	0.00%
Queen Creek	8,422	297	3.53%	$2,890,493	$101,942	3.53%
Salt River Pima-Maricopa Indian Community	2,680	0	0.00%	$919,777	$0	0.00%
Scottsdale	123,959	0	0.00%	$67,660,310	$0	0.00%
Surprise	52,607	27,702	52.66%	$15,652,750	$8,242,504	52.66%
Tempe	73,603	0	0.00%	$24,383,780	$0	0.00%
Tolleson	2,165	0	0.00%	$505,455	$0	0.00%
Wickenburg	3,610	0	0.00%	$1,285,212	$0	0.00%
Youngtown	2,796	1,041	37.22%	$540,226	$201,096	37.22%
Queen Creek (Pinal County Portion)	606	0	0.00%	$207,814	$0	0.00%
Peoria (Yavapai County Portion)	5	0	0.00%	$1,321	$0	0.00%
Wickenburg (Yavapai County Portion)	54	0	0.00%	$19,703	$0	0.00%

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Table 5-14: Population sectors exposed to emergency spillway inundation

Community	Total Population	Population Exposed		Total Population Over 65	Population Over 65 Exposed	
		Total	Percent		Total	Percent
County-Wide Totals (Maricopa Only)	**4,136,787**	**553,274**	**13.37%**	**538,166**	**84,203**	**15.93%**
Apache Junction (Maricopa County Portion)	314	307	97.77%	149	146	100.00%
Avondale	79,485	0	0.00%	5,313	0	0.03%
Buckeye	65,452	4,521	6.91%	5,141	286	26.16%
Carefree	3,580	0	0.00%	1,591	0	0.00%
Cave Creek	5,287	0	0.00%	1169	0	0.00%
Chandler	250,334	0	0.00%	23,435	0	0.00%
El Mirage	33,728	29,633	87.86%	2,700	2,319	85.49%
Fort McDowell Yavapai Nation	1017	0	0.00%	85	0	0.00%
Fountain Hills	23,536	0	0.00%	7,318	0	6.94%
Gila Bend	2,012	0	0.00%	193	0	0.00%
Gilbert	239,546	27,549	11.50%	17,960	3,494	19.35%
Glendale	237,327	50,181	21.14%	23,675	6,466	25.06%
Goodyear	78,118	20,317	26.01%	10,094	4,802	47.37%
Guadalupe	6,230	0	0.00%	581	0	0.00%
Litchfield Park	5,980	1	0.02%	1,065	0	0.00%
Unincorporated Maricopa County	290,179	29,122	10.04%	95,187	13,269	15.02%
Mesa	467,657	24,403	5.22%	71,995	3,380	4.05%
Paradise Valley	13,834	0	0.00%	3,365	0	0.00%
Peoria	166,339	41,810	25.14%	25,308	8,367	34.71%
Phoenix	1,561,296	224,541	14.38%	143,448	24,137	17.06%
Queen Creek	35,720	34,408	96.33%	2,094	2,014	94.94%
Salt River Pima-Maricopa Indian Community	6,706	0	0.00%	1,004	0	0.00%
Scottsdale	237,929	0	0.00%	49,963	0	0.00%
Surprise	128,211	62,695	48.90%	26,025	14,761	58.09%
Tempe	176,809	3,191	1.80%	15,264	611	5.20%
Tolleson	6,904	0	0.00%	809	0	0.00%
Wickenburg	6,803	595	8.75%	2,058	151	4.62%
Youngtown	6,454	0	0.00%	1,177	0	0.00%
Queen Creek (Pinal County Portion)	1421	878	61.79%	128	73	0.00%
Peoria (Yavapai County Portion)	7	0	0.00%	2	0	0.00%
Wickenburg (Yavapai County Portion)	206	0	0.00%	32	0	0.00%

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Table 5-15: Population sectors exposed to dam failure inundation

Community	Total Population	Population Exposed		Total Population Over 65	Population Over 65 Exposed	
		Total	Percent		Total	Percent
HIGH HAZARD						
County-Wide Totals (Maricopa Only)	**4,136,787**	**854**	**0.02%**	**538,166**	**60**	**0.01%**
Apache Junction (Maricopa County Portion)	314	0	0.00%	149	0	0.00%
Avondale	79,485	0	0.00%	5,313	0	0.00%
Buckeye	65,452	30	0.05%	5,141	2	0.04%
Carefree	3,580	0	0.00%	1,591	0	0.00%
Cave Creek	5,287	0	0.00%	1169	0	0.00%
Chandler	250,334	0	0.00%	23,435	0	0.00%
El Mirage	33,728	0	0.00%	2,700	0	0.00%
Fort McDowell Yavapai Nation	1017	0	0.00%	85	0	0.00%
Fountain Hills	23,536	0	0.00%	7,318	0	0.00%
Gila Bend	2,012	0	0.00%	193	0	0.00%
Gilbert	239,546	0	0.00%	17,960	0	0.00%
Glendale	237,327	0	0.00%	23,675	0	0.00%
Goodyear	78,118	0	0.00%	10,094	0	0.00%
Guadalupe	6,230	0	0.00%	581	0	0.00%
Litchfield Park	5,980	0	0.00%	1,065	0	0.00%
Unincorporated Maricopa County	290,179	824	0.28%	95,187	58	0.06%
Mesa	467,657	0	0.00%	71,995	0	0.00%
Paradise Valley	13,834	0	0.00%	3,365	0	0.00%
Peoria	166,339	0	0.00%	25,308	0	0.00%
Phoenix	1,561,296	0	0.00%	143,448	0	0.00%
Queen Creek	35,720	0	0.00%	2,094	0	0.00%
Salt River Pima-Maricopa Indian Community	6,706	0	0.00%	1,004	0	0.00%
Scottsdale	237,929	0	0.00%	49,963	0	0.00%
Surprise	128,211	0	0.00%	26,025	0	0.00%
Tempe	176,809	0	0.00%	15,264	0	0.00%
Tolleson	6,904	0	0.00%	809	0	0.00%
Wickenburg	6,803	0	0.00%	2,058	0	0.00%
Youngtown	6,454	0	0.00%	1,177	0	0.00%
Queen Creek (Pinal County Portion)	1421	0	0.00%	128	0	0.00%
Peoria (Yavapai County Portion)	7	0	0.00%	2	0	0.00%
Wickenburg (Yavapai County Portion)	206	0	0.00%	32	0	0.00%

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Table 5-15: Population sectors exposed to dam failure inundation						
Community	Total Population	Population Exposed		Total Population Over 65	Population Over 65 Exposed	
		Total	Percent		Total	Percent
MEDIUM HAZARD						
County-Wide Totals (Maricopa Only)	**4,136,787**	**331,796**	**8.02%**	**538,166**	**36,287**	**6.74%**
Apache Junction (Maricopa County Portion)	314	0	0.00%	149	0	0.00%
Avondale	79,485	2,470	3.11%	5,313	166	3.13%
Buckeye	65,452	0	0.00%	5,141	0	0.00%
Carefree	3,580	0	0.00%	1,591	0	0.00%
Cave Creek	5,287	0	0.00%	1169	0	0.00%
Chandler	250,334	12,193	4.87%	23,435	1,093	4.66%
El Mirage	33,728	29,422	87.23%	2,700	2,376	87.98%
Fort McDowell Yavapai Nation	1017	0	0.00%	85	0	0.00%
Fountain Hills	23,536	0	0.00%	7,318	0	0.00%
Gila Bend	2,012	0	0.00%	193	0	0.00%
Gilbert	239,546	166,477	69.50%	17,960	11,531	64.20%
Glendale	237,327	1,614	0.68%	23,675	9	0.04%
Goodyear	78,118	13,272	16.99%	10,094	2,342	23.20%
Guadalupe	6,230	0	0.00%	581	0	0.00%
Litchfield Park	5,980	516	8.63%	1,065	76	7.17%
Unincorporated Maricopa County	290,179	4,804	1.66%	95,187	481	0.51%
Mesa	467,657	30,101	6.44%	71,995	3,620	5.03%
Paradise Valley	13,834	0	0.00%	3,365	0	0.00%
Peoria	166,339	0	0.00%	25,308	0	0.00%
Phoenix	1,561,296	0	0.00%	143,448	0	0.00%
Queen Creek	35,720	1,280	3.58%	2,094	53	2.51%
Salt River Pima-Maricopa Indian Community	6,706	0	0.00%	1,004	0	0.00%
Scottsdale	237,929	0	0.00%	49,963	0	0.00%
Surprise	128,211	66,853	52.14%	26,025	14,161	54.41%
Tempe	176,809	0	0.00%	15,264	0	0.00%
Tolleson	6,904	0	0.00%	809	0	0.00%
Wickenburg	6,803	0	0.00%	2,058	0	0.00%
Youngtown	6,454	2,795	43.31%	1,177	380	32.27%
Queen Creek (Pinal County Portion)	1421	0	0.00%	128	0	0.00%
Peoria (Yavapai County Portion)	7	0	0.00%	2	0	0.00%
Wickenburg (Yavapai County Portion)	206	0	0.00%	32	0	0.00%

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Vulnerability – Development Trend Analysis

Most of the dams within Maricopa County serve as flood retarding structures (FRS) and typically sit empty for most of their design life. The flood protection afforded by these structures has encouraged development of lands immediately downstream of the structures. In some cases, the FRSs are long linear structures that intercept runoff from multiple washes and have emergency spillways that are not always directed to a regional watercourse. All the larger dams with some level of permanent reservoir storage direct emergency spillway flows to the regional watercourse they are constructed on. Emergency spillway flows from these structures typically coincide with FEMA regulated 100-year floodplains in the downstream watercourse, and are, therefore, not as potentially destructive as an emergency spillway flow from some of the FRS structures. A dam failure in any case, would be catastrophic.

Changes in Development in the Hazard Prone Area

The vulnerability analysis indicates that five to 14% of the county population is situated within the potential downstream inundation limits of an emergency spillway or elevated hazard dam failure. Recent and anticipated changes in development will expand the exposed footprint, with over half of the county population expected to be situated within dam failure inundation limits of some dam. Prohibition of development within those limits is not feasible. Instead, public awareness measures such as notices on final plats and public education on the need for vigilant dam safety measures are mitigation efforts employed by local county and city/town officials. Also, Emergency Action Plans (EAPs) that establish notification procedures and thresholds are also prepared for response to potential dam related disaster events.

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US Army Corps of Engineers, National Inventory of Dams, 2009, https://nid.usace.army.mil/

Profile Maps

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Maps 1A, 1B, and 1C – Dam Spillway Flood Hazard Map

Maps 2A, 2B, and 2C – Potential Dam Failure Flood Hazard Map

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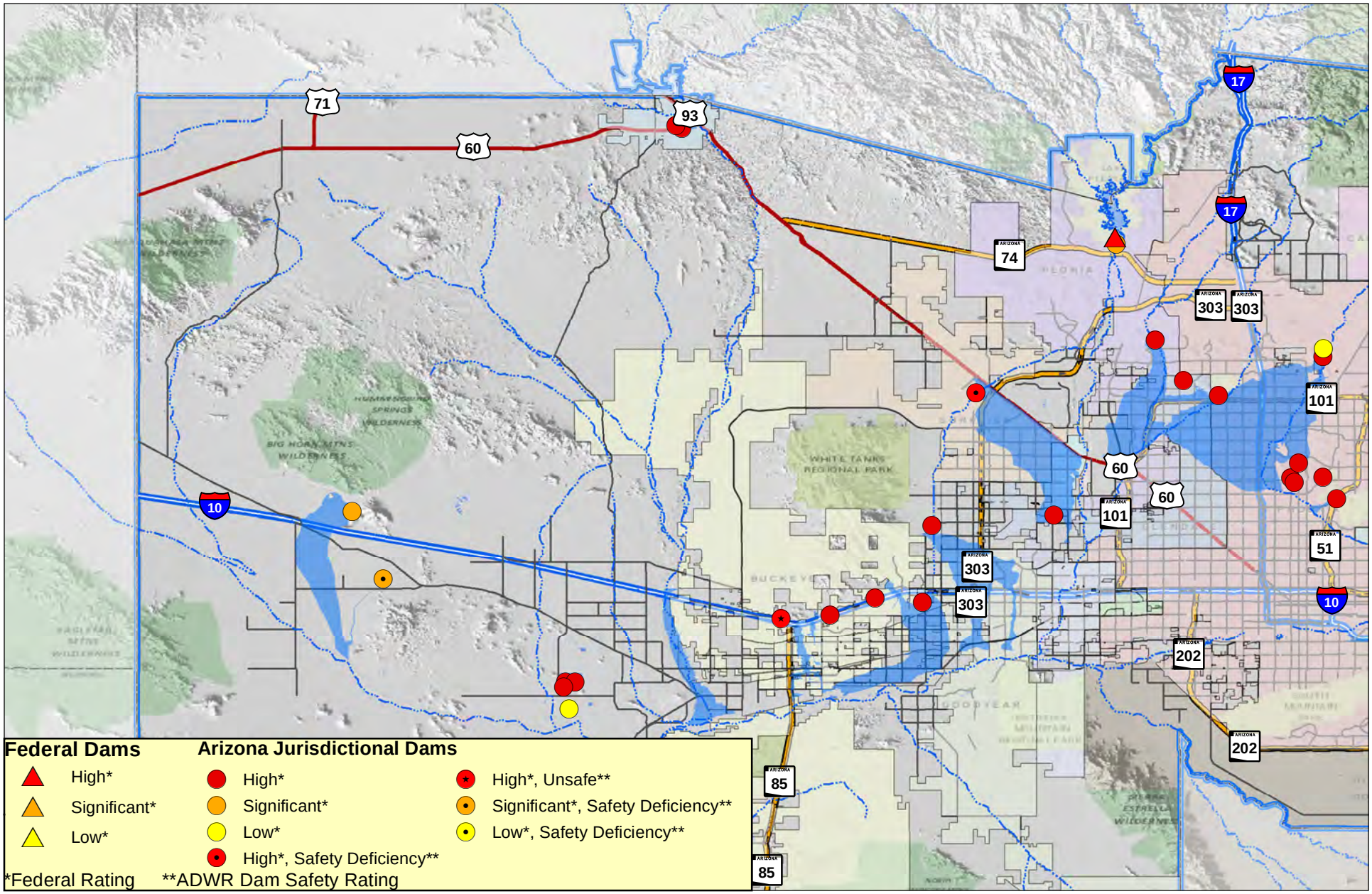


Federal Dams

- High*
- Significant*
- Low*

Arizona Jurisdictional Dams

- High*
- Significant*
- Low*
- High*, Safety Deficiency**
- High*, Unsafe**
- Significant*, Safety Deficiency**
- Low*, Safety Deficiency**

*Federal Rating **ADWR Dam Safety Rating

Legend

- Maricopa County
- Mitigation Plan Extent
- Major Streams

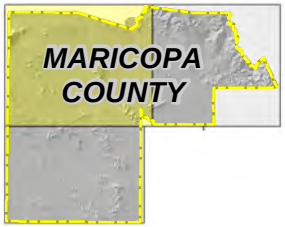
Emergency Spillway Inundation

- High

NOTE: Emergency spillway inundation mapping has not been produced for the all dams impacting the county and the hazard zones depicted are not comprehensive

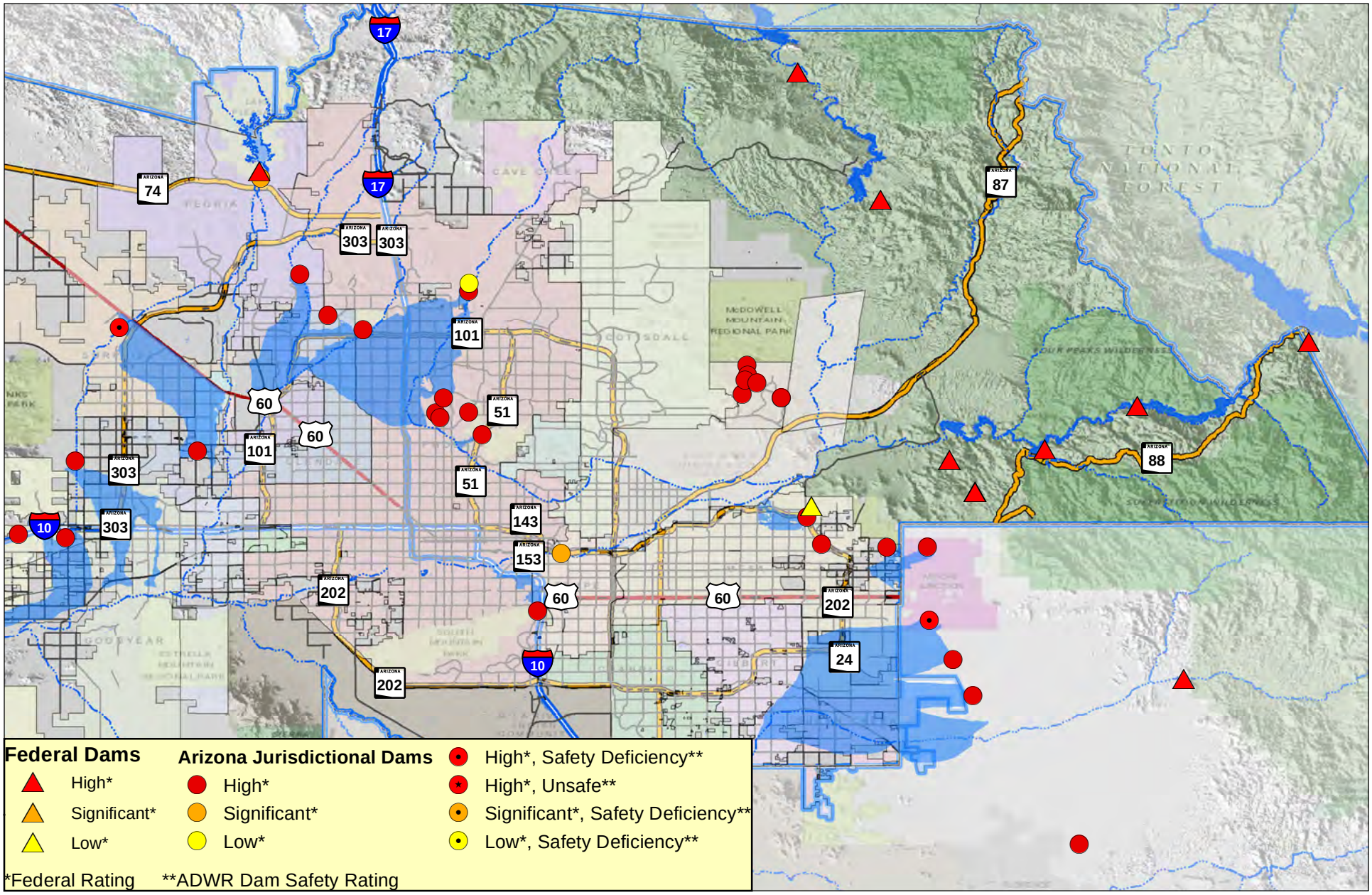
0 37.5 75 150
Miles

Sources: JE Fuller 2020; NID 2020; FCDMC 2020; ADWR 2020; TIGER 2020



Maricopa County Multi-Jurisdictional Hazard Mitigation Plan

Map 1A
Maricopa County Emergency Spillway Flood Hazard Map as of Sept 2020



Legend

- Maricopa County
- Mitigation Plan Extent
- Major Streams

Emergency Spillway Inundation

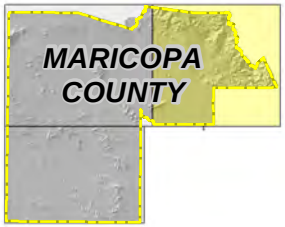
- High

NOTE: Emergency spillway inundation mapping has not been produced for the all dams impacting the county and the hazard zones depicted are not comprehensive

0 37.5 75 150

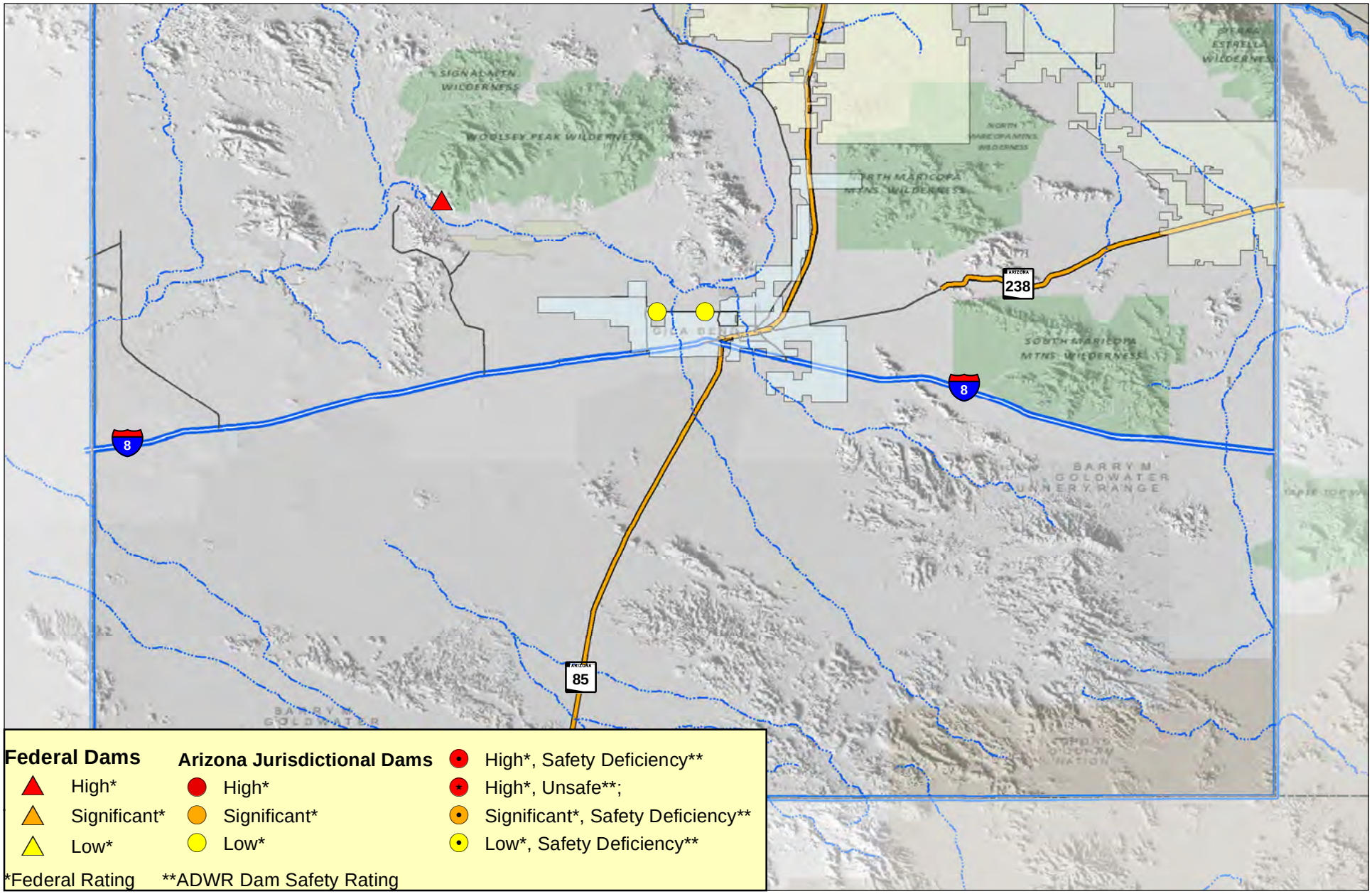
Miles

Sources: JE Fuller 2020; NID 2020; FCDMC 2020; ADWR 2020; TIGER 2020



Maricopa County Multi-Jurisdictional Hazard Mitigation Plan

Map 1B
Maricopa County Emergency Spillway Flood Hazard Map as of Sept 2020



Federal Dams

- High*
- Significant*
- Low*

Arizona Jurisdictional Dams

- High*
- Significant*
- Low*
- High*, Safety Deficiency**
- High*, Unsafe**;
- Significant*, Safety Deficiency**
- Low*, Safety Deficiency**

*Federal Rating **ADWR Dam Safety Rating

Legend

- Maricopa County
- Mitigation Plan Extent
- Major Streams

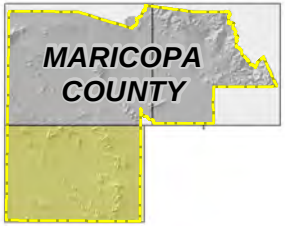
Emergency Spillway Inundation

- High

NOTE: Emergency spillway inundation mapping has not been produced for the all dams impacting the county and the hazard zones depicted are not comprehensive

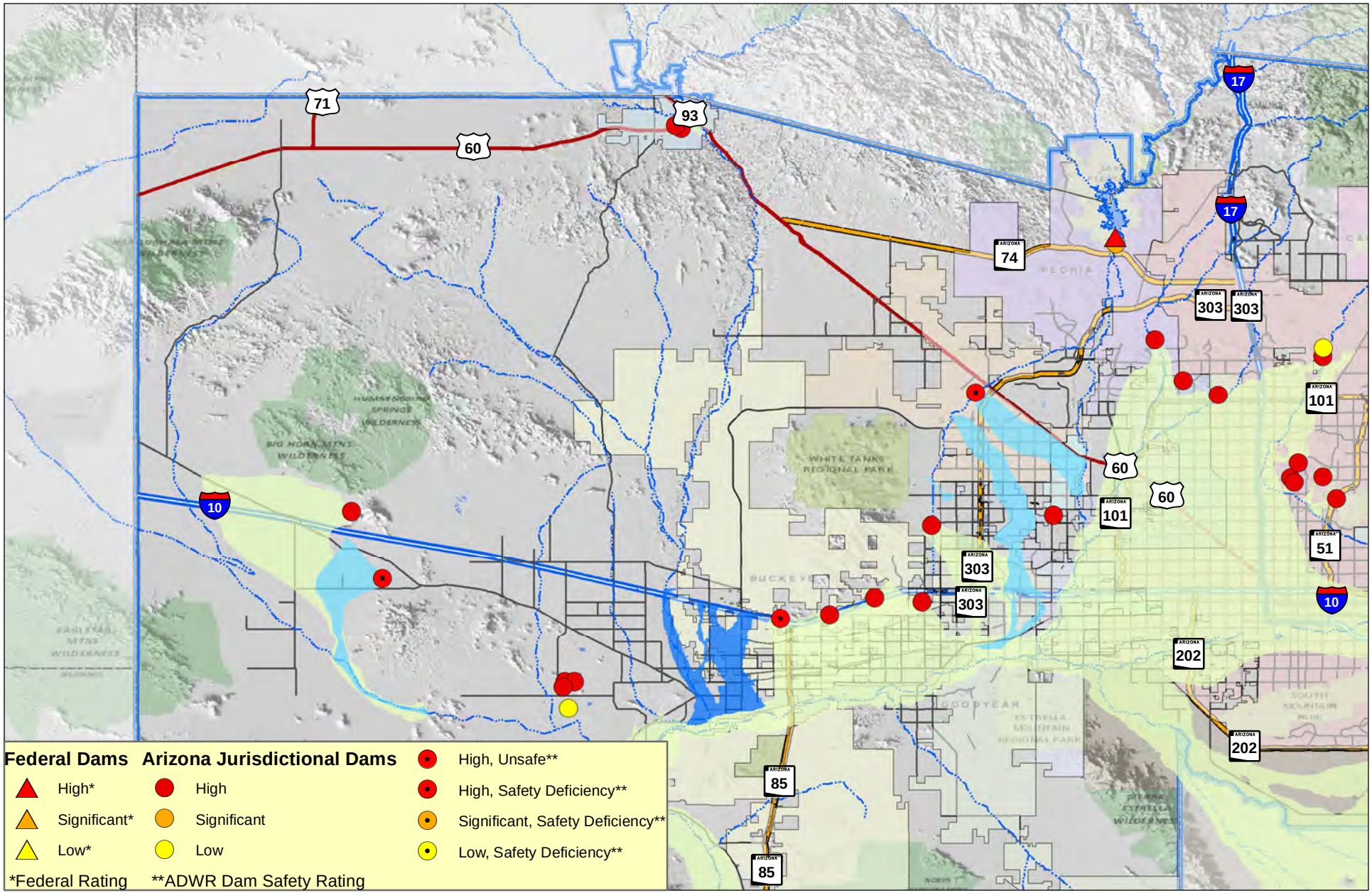
0 37.5 75 150
Miles

Sources: JE Fuller 2020; NID 2020; FCDMC 2020; ADWR 2020; TIGER 2020



Maricopa County Multi-Jurisdictional Hazard Mitigation Plan

Map 1C
Maricopa County Emergency Spillway Flood Hazard Map as of Sept 2020



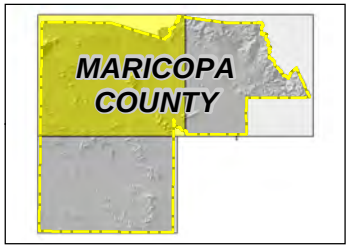
Potential Dam Failure Flooding Hazard Rating

- High
- Medium
- Low

0 37.5 75 150

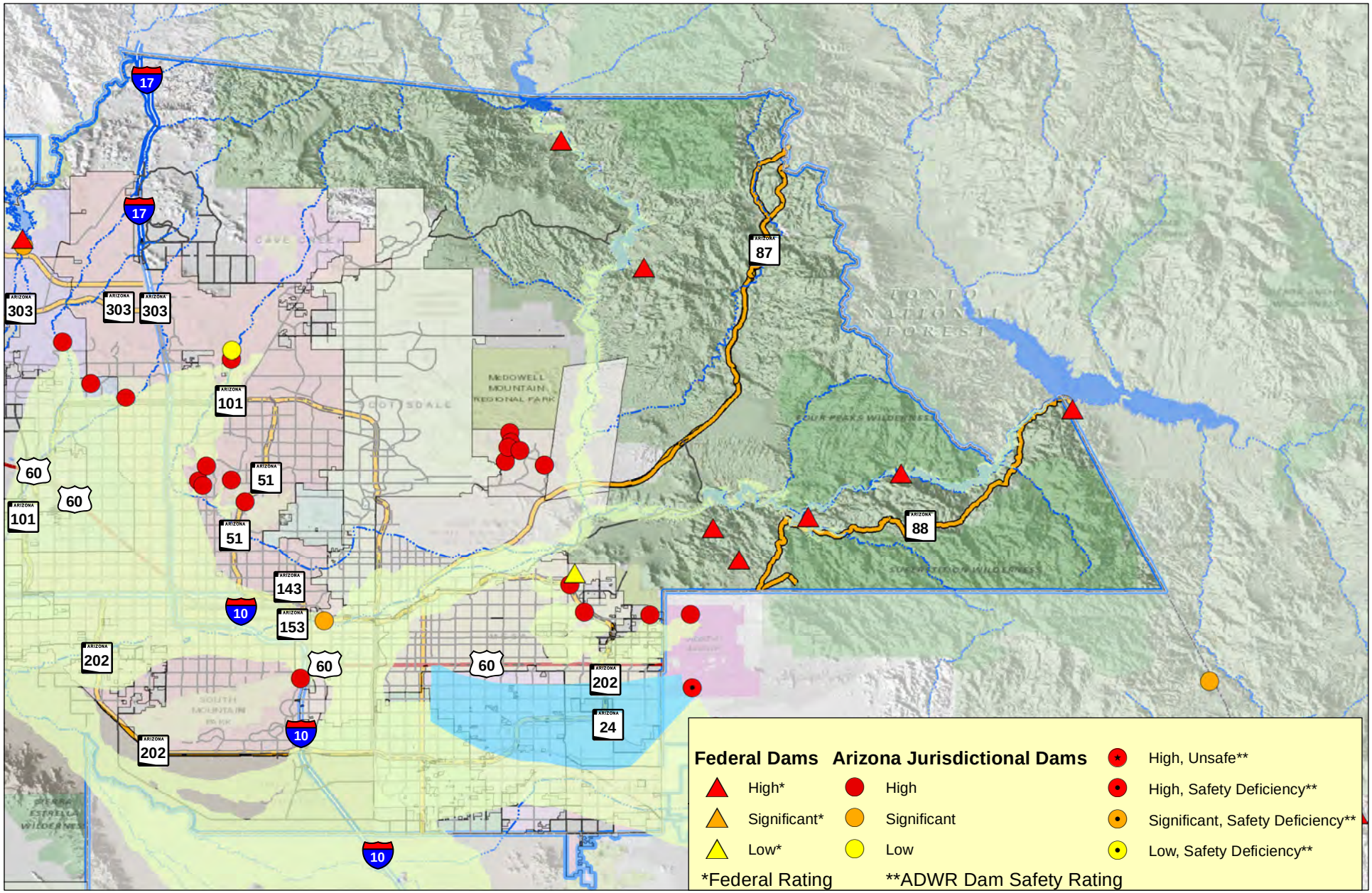
Miles

Sources: JE Fuller 2020; NID 2020; FCDMC 2020; ADWR 2020; TIGER 2020



Maricopa County Multi-Jurisdictional Hazard Mitigation Plan

Map 2A
Maricopa County Potential Dam Failure Flood Hazard Map as of Sept 2020

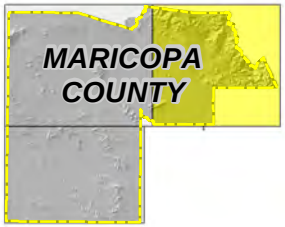


Potential Dam Failure Flooding Hazard Rating

- High
- Medium
- Low

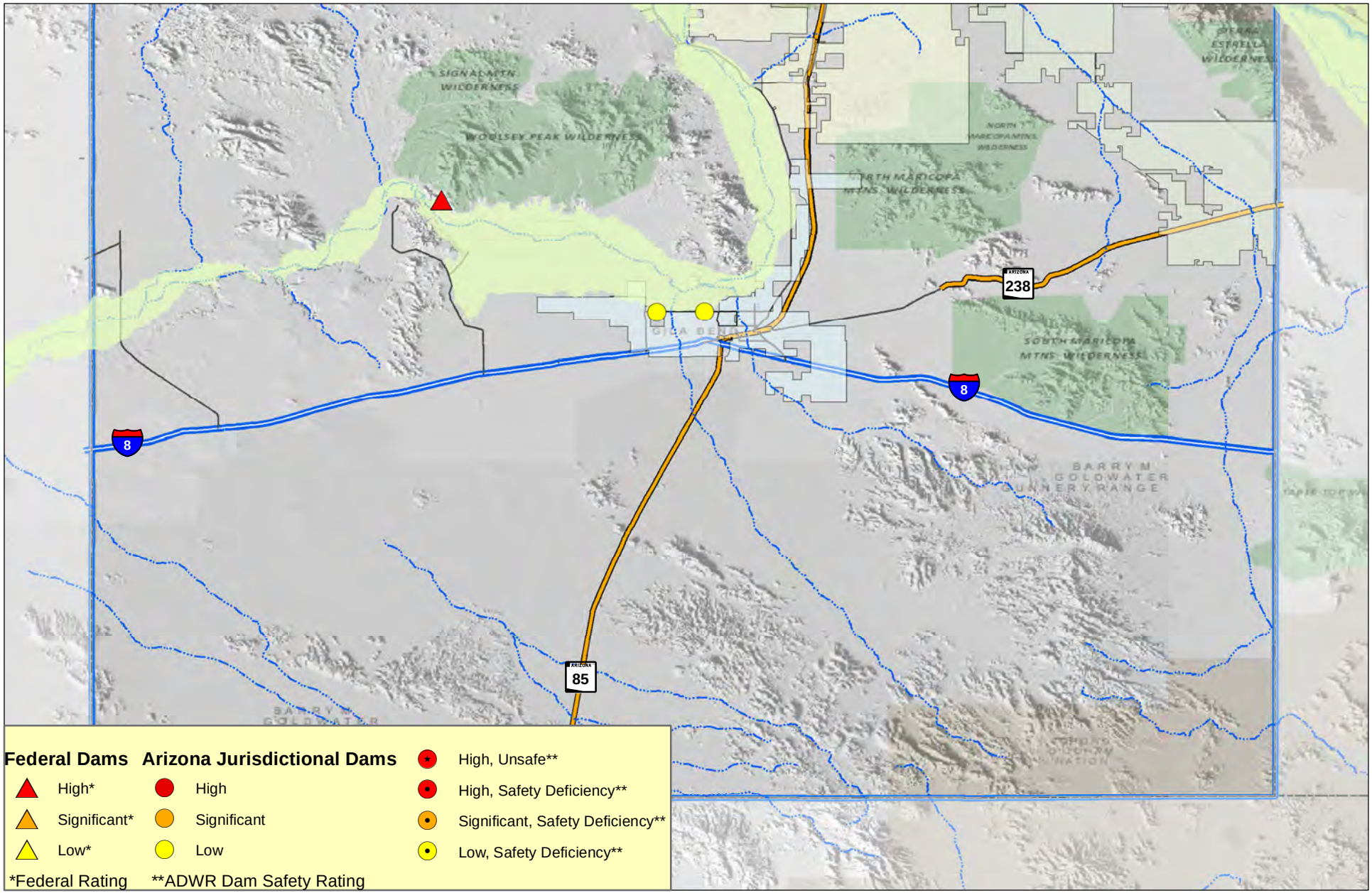
0 37.5 75 150
Miles

Sources: JE Fuller 2020; NID 2020; FCDMC 2020; ADWR 2020; TIGER 2020



Maricopa County Multi-Jurisdictional Hazard Mitigation Plan

Map 2B
Maricopa County
Potential Dam Failure
Flood Hazard Map
as of Sept 2020



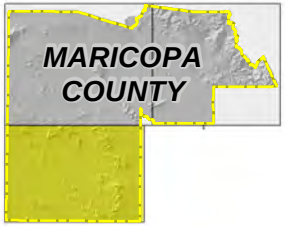
Potential Dam Failure Flooding Hazard Rating

- High
- Medium
- Low

0 37.5 75 150

Miles

Sources: JE Fuller 2020; NID 2020; FCDMC 2020; ADWR 2020; TIGER 2020



Maricopa County Multi-Jurisdictional Hazard Mitigation Plan

Map 2C
Maricopa County
Potential Dam Failure
Flood Hazard Map
as of Sept 2020

5.3.2 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 – drought is 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 – drought is related to the effects of precipitation shortfalls on stream flows and reservoir, lake, and groundwater levels.
- Agricultural – drought is 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 and longer timeframes. 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.

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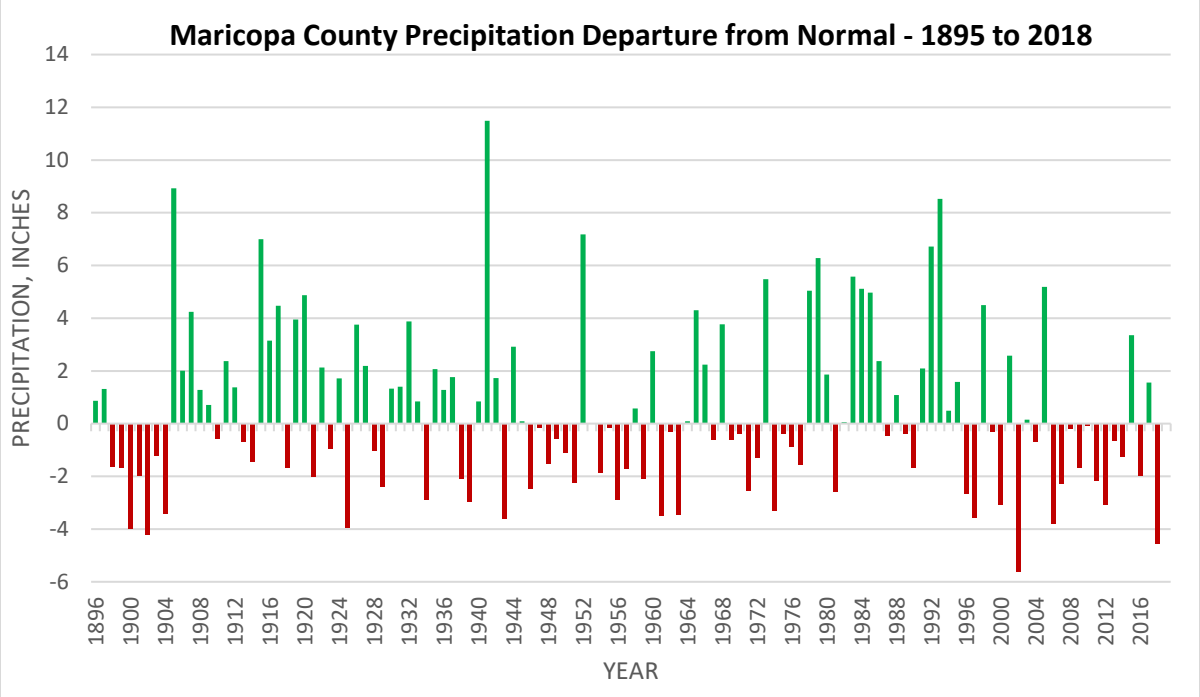
History

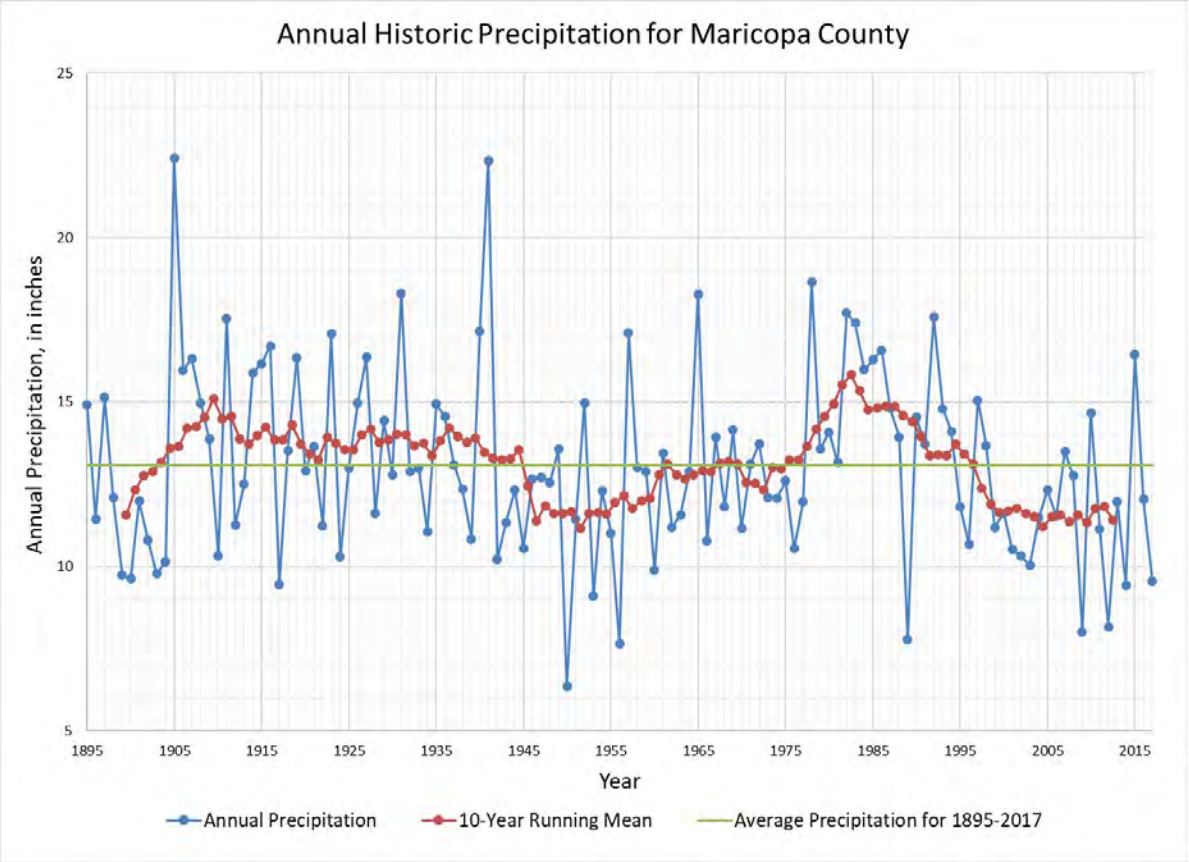
Beginning in June 1999[30], Arizona has been under a continuous Gubernatorial declared drought emergency for 31 years. Over the past plan cycle (2015-2020), Maricopa County has been included as a primary county in USDA Secretarial drought disaster declarations for crop years 2015, 2018, 2019 and 2020. Figures 5-1 and 5-2 depict 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 (NOAA, 2003). Another prolonged drought occurred during the period of 1941 to 1965, during which time there were no spill releases into the Salt River (ADEM, 2001). The period from 1979-1983 appears to have been anomalously wet, while the rest of the historical records shows that dry conditions are most likely the normal condition for Arizona. Between 1998 and 2018, there have been significantly more months with below normal precipitation than months with above normal precipitation, and definite indications of a deficit trend in precipitation.



Source: http://cefa.dri.edu/Westmap/Westmap_home.php

Figure 5-1: Average annual precipitation variance from a normal based on 1895-2018 period for Maricopa County

[30] Via the current declaration, PCA 99006, issued by the Governor in June 1999 and continued by Executive Order 2007-10.

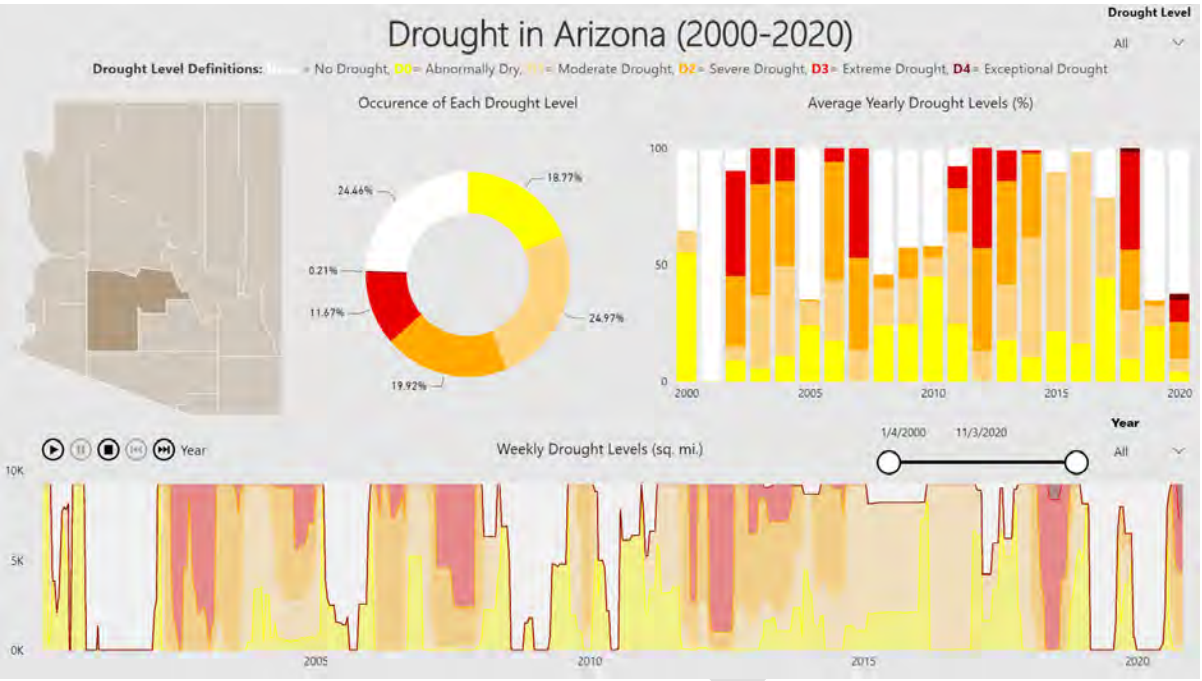


Source: http://cefa.dri.edu/Westmap/Westmap_home.php

Figure 5-2: Annual historic precipitation for Maricopa County from 1896 to 2017

Maricopa County remains in a drought cycle that began in 1995. Drought conditions gradually worsened until 2003, with a brief period of relief occurring during the period of winter 2004 to spring 2005. After that there have been only 3-years of above average precipitation; 2007, 2010, and 2015. Other noteworthy dates include 1951 and 1991, which are the only two times in the Salt River Project's 100-year history that it has rationed water.

Compared to some areas of the state, Maricopa County and its surrounding communities are less affected by drought due to the availability of water supplies from the Central Arizona Project (CAP), the Salt River Project (SRP), significant investments in recharge systems, and ground water sources (Jacobs and Morehouse, June 11-13, 2003). However, according to the Arizona Department of Water Resources' Drought Dashboard illustrated in Figure 5-3, Maricopa County has experienced varying degrees of drought, with recent conditions worsening due to a lack of summer monsoon activity.



Source: https://new.azwater.gov/drought/drought-dashboard

Figure 5-3: Drought in Maricopa County from 2000 to 2020

Probability and Magnitude

There are no commonly accepted return period or non-exceedance probability for defining the risk from drought (such as the 100-year or 1 percent 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 project very near future expected conditions.

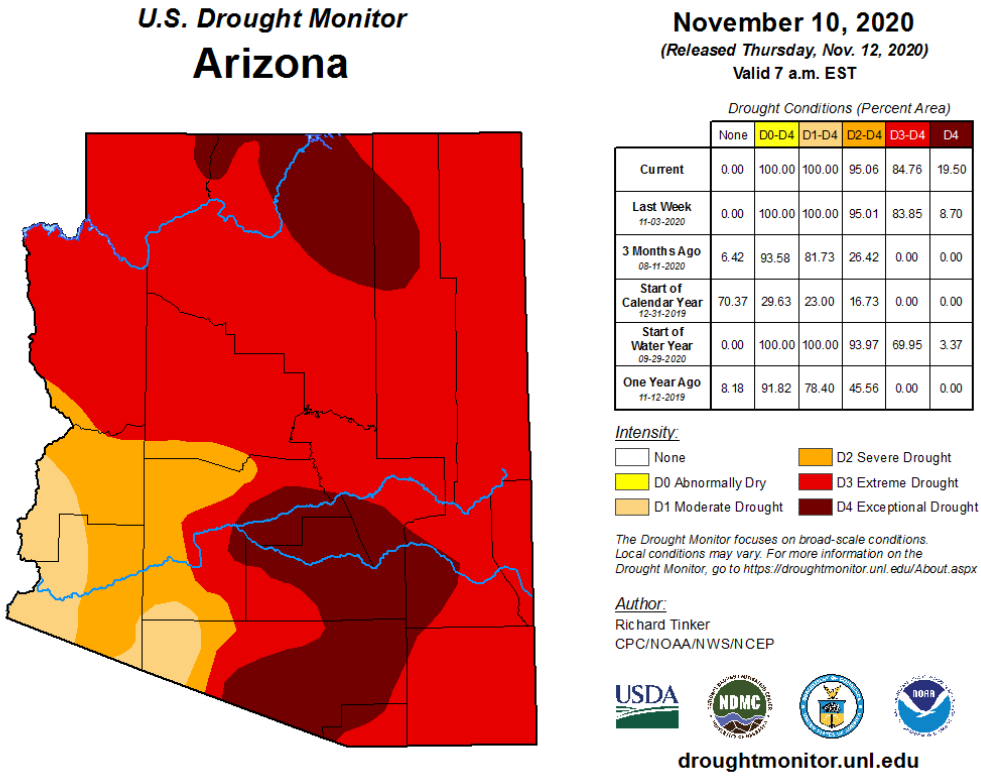
The National Integrated Drought Information System (NIDIS) Act of 2006 (Public Law 109-430) prescribes an interagency approach for drought monitoring, forecasting, and early warning (NIDIS, 2007). The NIDIS maintains the U.S. Drought Portal[31] which is a centralized, web-based access point to several drought related resources including the U.S. Drought Monitor (USDM) and the U.S. Seasonal Drought Outlook (USSDO). The USDM, shown in Figure 5-4, is a weekly map depicting the current status of drought and is developed and maintained by the National Drought Mitigation Center. The USSDO, shown in Figure 5-5, 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 the Palmer Hydrologic Drought Index and the 60-month Palmer Z-index. The Palmer Drought Severity Index (PSDI) 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

[31] NIDIS U.S. Drought Portal website is located at: http://www.drought.gov/portal/server.pt/community/drought.gov/202

drought on a nationwide basis (FEMA, 1997) and neither of the Palmer indices is well suited to the dry, mountainous western United States.

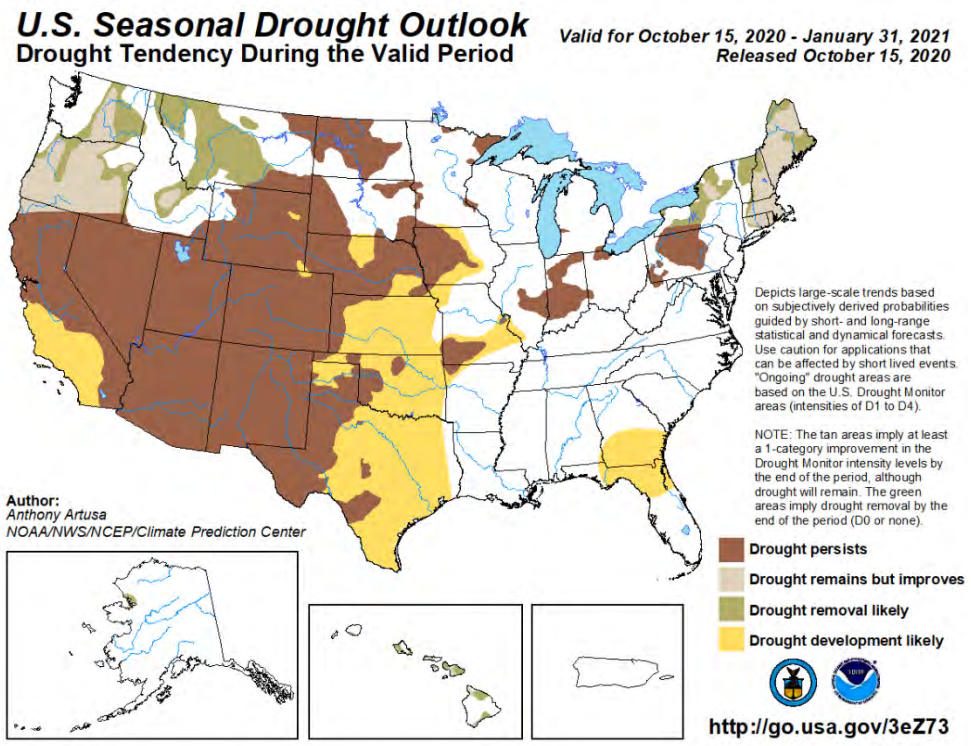
In 2003, Governor Janet Napolitano created the Arizona Drought Task Force (ADTF), led by ADWR, which developed a statewide drought plan. The plan includes criteria for determining both short and long-term drought status for each of the 15 major watersheds in the state using assessments that are based 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 a combination of the Standardized Precipitation Index (SPI) and streamflow records for the long-term drought status. Figure 5-6 presents the most current long term maps available as of the writing of this plan.

Each of the three maps show general agreement and indicate that the majority of Maricopa County currently remains in a drought condition with abnormally dry conditions and expected worsening over the next six months.



Source: http://droughtmonitor.unl.edu/data/pngs/current/current_az_trd.png

Figure 5-4: U.S. Drought Monitor Map for November 10, 2020

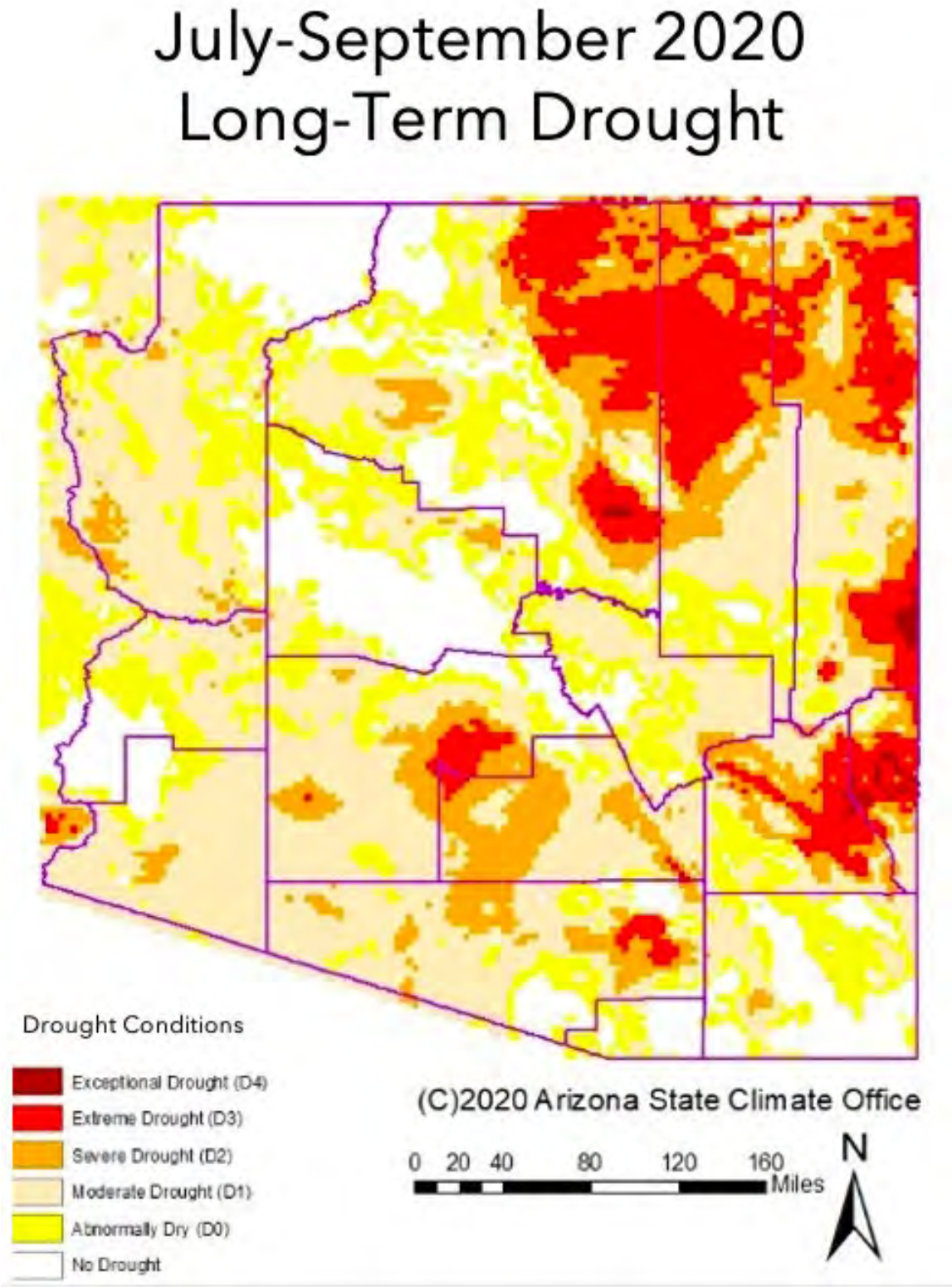


Source: http://www.cpc.ncep.noaa.gov/products/expert_assessment/sdo_summary.html

Figure 5-5: U.S. Seasonal Drought Outlook, October 2020 to January 2021

When attempting to evaluate the probability and magnitude of drought in Maricopa County, it is helpful to remember that potable water in Maricopa County is derived from both surface water and groundwater. Surface water to Maricopa County users comes from two sources, the Colorado River, (through the Central Arizona Project (CAP) Canal), and in-state rivers (including streams and lakes). This surface water is a major renewable resource for the county, but can vary dramatically between years, seasons, and locations due to the state's desert climate. In order to lessen the impact of such variations, water storage reservoirs and delivery systems have been constructed throughout the county, the largest of which are located on the Salt River, Verde River, Gila River, and Agua Fria River.

The other major source of water for Maricopa County is groundwater. This water has been pumped out of large subsurface natural reservoirs known as aquifers. While a significant supply of water remains stored in the aquifers, groundwater has historically been pumped out much more rapidly than it can be replenished through natural recharge, and has led to a condition known as overdraft. In 1980, Arizona implemented the Groundwater Management Code in order to promote conservation and long-range planning of water resources, including reducing reliance on groundwater supplies. Active Management Areas (AMAs) were formed based on groundwater basin areas and Maricopa County is mostly covered under the Phoenix AMA.



Source: https://new.azwater.gov/drought/drought-status

Figure 5-6: Arizona long term drought status map for July September 2020

Reclaimed water, or effluent, is the only increasing source of water in the county, although it constitutes only a small amount of the overall water used. As the regional population grows; increasing amounts of reclaimed water will be available for agricultural, golf course, and landscape irrigation, as well as industrial cooling, and maintenance of wildlife areas.

Climate Change Impacts

Increased severity and duration of drought due to climate change is one of the "Key Messages" of the NCA report (Garfin, et.al., 2014). If current predictions are valid, the increase in drought will only magnify the current drought related challenges faced by the county. Accordingly, drought planning and contingencies for mitigating the impacts of drought should factor in longer than expected durations and possibly more frequent drought cycles.

Vulnerability – CPRI Results

Drought CPRI results for each community are summarized in Table 5-16 below.

Table 5-16: CPRI results by jurisdiction for drought

Participating Jurisdiction	Probability	Magnitude/ Severity	Warning Time	Duration	CPRI Score
Avondale	Likely	Limited	>24 hours	>1 week	2.50
Buckeye	Likely	Limited	>24 hours	>1 week	2.50
Carefree	Highly Likely	Limited	12-24 hours	>1 week	2.95
Cave Creek	Highly Likely	Limited	>24 hours	>1 week	2.95
Chandler	Highly Likely	Limited	>24 hours	>1 week	2.95
El Mirage	Highly Likely	Critical	>24 hours	>1 week	3.25
Fort McDowell Yavapai Nation	Possibly	Limited	>24 hours	>1 week	2.05
Fountain Hills	Likely	Limited	>24 hours	>1 week	2.50
Gila Bend	Unlikely	Negligible	<6 hours	>1 week	1.75
Gilbert	Likely	Limited	>24 hours	>1 week	2.50
Glendale	Likely	Limited	>24 hours	>1 week	2.50
Goodyear	Highly Likely	Limited	>24 hours	>1 week	2.95
Guadalupe	Unlikely	Negligible	<6 hours	<6 hours	1.45
Litchfield Park	Possibly	Negligible	>24 hours	>1 week	1.75
Unincorporated Maricopa County	Highly Likely	Limited	>24 hours	>1 week	2.95
Mesa	Likely	Limited	>24 hours	>1 week	2.50
Paradise Valley	Likely	Limited	>24 hours	<1 week	2.40
Peoria	Highly Likely	Limited	>24 hours	>1 week	2.95
Phoenix	Likely	Limited	>24 hours	>1 week	2.50
Queen Creek	Possibly	Limited	>24 hours	>1 week	2.05
Salt River Pima-Maricopa Indian Community	Likely	Limited	>24 hours	>1 week	2.50
Scottsdale	Likely	Negligible	>24 hours	>1 week	2.20
Surprise	Possibly	Limited	>24 hours	>1 week	2.05
Tempe	Highly Likely	Limited	>24 hours	>1 week	2.95
Tolleson	Likely	Critical	>24 hours	>1 week	2.80
Wickenburg	Highly Likely	Critical	>24 hours	>1 week	3.25
Youngtown	Likely	Critical	>24 hours	>1 week	2.80
				County-wide average CPRI =	**2.54**

Vulnerability – Loss/Exposure 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 Maricopa County. Instead, drought vulnerability is primarily measured by its potential impact to certain sectors of the county economy and natural resources include the following:

- 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 2020, Maricopa County farmers and ranchers received over $20.8 million in disaster related assistance funding from the U.S Department of Agriculture (USDA) for crop and livestock damages[32]. Over $8.7 million of those funds were received from 1999 to 2003, which corresponds to the most severe period of the current drought cycle. According to the USDA, 35 to 55 percent of the disaster assistance money (USDA, 2004) in the last 10 years (1994-2004) can be attributed to drought related losses. Accordingly, at least $5 to $8 million of these losses are likely drought related and $4 to $5 million occurred in the span of 4 years. It is therefore realistic to expect at least $1 to $2 million in agriculture related drought losses in a given year of severe drought conditions. 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 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 increase utility costs.

Vulnerability – Development Trends

Population growth in Maricopa County will also require additional water to meet the thirsty demands of potable, landscape, and industrial uses. All new residential, commercial, and/or industrial developments within the county that are comprised of six or more parcels and at least one parcel less than 36 acres in size, are required to demonstrate an Assured and Adequate Water Supply, as administered by ADWR. All water service providers operating within the Phoenix AMA are required to comply with

[32] EWG Farm Subsidy Database, 2020, http://farm.ewg.org/progdetail.php?fips=04013&progcode=total_dis

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this requirement. 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 Maricopa County will address and/or recognize drought.

Changes in Development in the Hazard Prone Area

Maricopa County and most incorporated jurisdictions within the planning area have experienced moderate to high growth rates over the past 5 years with annual growth rates ranging from 0.75% to 6.47%. It is anticipated that growth will continue over the next 5 years. Some development is converting agricultural land uses to residential/commercial/industrial uses and in some cases, the water rights are transferred to the water provider serving that development. Growth in non-agricultural areas will likely require additional surface and ground water supplies. The anticipated development and conversion of agricultural lands versus non-agricultural lands is about 60% and 40% countywide. As growth occurs, drought vulnerability would likely be impacted as potable water demand faces dwindling supply sources exacerbated by drought.

Sources

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Profile Maps

No profile maps are provided.

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5.3.3 Extreme Heat

Description

Extreme Heat refers to environmental conditions with high air temperatures, often in combination with high shortwave or longwave radiation (sunlight, or heat radiated from buildings and other surfaces) and/or high humidity. Under certain conditions, low or high wind speeds can also increase the risks associated with high heat (Kuras, et.al., 2017; Parsons, 2014). Extreme heat poses threats to the health and well-being of humans, other animals, and plants, as well as critical infrastructure systems including food, water, energy, and transportation. The major human health risks associated with extreme heat are as follows:

- *Heat Cramps:* May occur in people unaccustomed to exercising in the heat and generally ceases to be a problem after acclimatization.
- *Heat Syncope:* This refers to sudden loss of consciousness and is typically associated with people exercising who are not acclimated to warm temperatures. Causes little or no harm to the individual.
- *Heat Exhaustion:* While much less serious than heatstroke, heat exhaustion victims may complain of dizziness, weakness, or fatigue. Body temperatures may be normal or slightly to moderately elevated. The prognosis is usually good with fluid treatment.
- *Heatstroke:* Considered a medical emergency, heatstroke is often fatal. It occurs when the body's responses to heat stress are insufficient to prevent a substantial rise in the body's core temperature. While no standard diagnosis exists, a medical heatstroke condition is usually diagnosed when the body's temperature exceeds 105°F due to environmental temperatures. Rapid cooling is necessary to prevent death, with an average fatality rate of 15 percent even with treatment.

History

Maricopa County faces the highest summer temperatures of any major urbanized area in the United States. The average daily high temperature in the months of June, July, and August exceeds 100°F at Phoenix Sky Harbor Airport, based on official U.S. Climate Normals for the period 1981–2010. Both daytime and nighttime temperatures have steadily increased in urbanized portions Maricopa County since the 1950s. Days with temperatures of 100°F or above have increased at a rate of 5.2 days per decade; nights with temperatures of 85°F or above have increased at a rate of 7.3 days per decade (Figure 5-7) (Hondula, 2020).

Heat exerts a considerable public health burden in Maricopa County. For the period of 2006–2020, there were more than 1,700 confirmed deaths attributed to excessive natural heat in Maricopa County (MCDPH, 2020) (Figure 5-8a). The number of heat-associated deaths reported by the Maricopa County Department of Public Health (MCDPH) has increased each year since 2014. The more than 250 deaths reported in 2020 marked the highest annual total since the county began its heat surveillance program in 2006. The vast majority of heat-associated deaths (85%) occur

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during the hot summer months of June, July and August, with another 13% of cases in the months of May, September, and October. Extreme heat also leads to increases in illnesses that require hospitalizations, emergency department visits, and other medical treatment. Figure 5-8b illustrates the contribution of heat-related emergency room visits to the total emergency room case load in summer 2020; during extreme heat events, heat-related cases can account for more than 1% of total visits.

Probability/Magnitude

During Arizona's hottest months, the NOAA/National Weather Service (NWS) issues weather alerts to notify the public when unusually hot weather is expected. These alerts are intended to raise awareness and prevent heat illness and death from occurring and mitigate financial impacts. When the NWS issues an alert, it should serve as a signal that on that day it is not "business as usual."

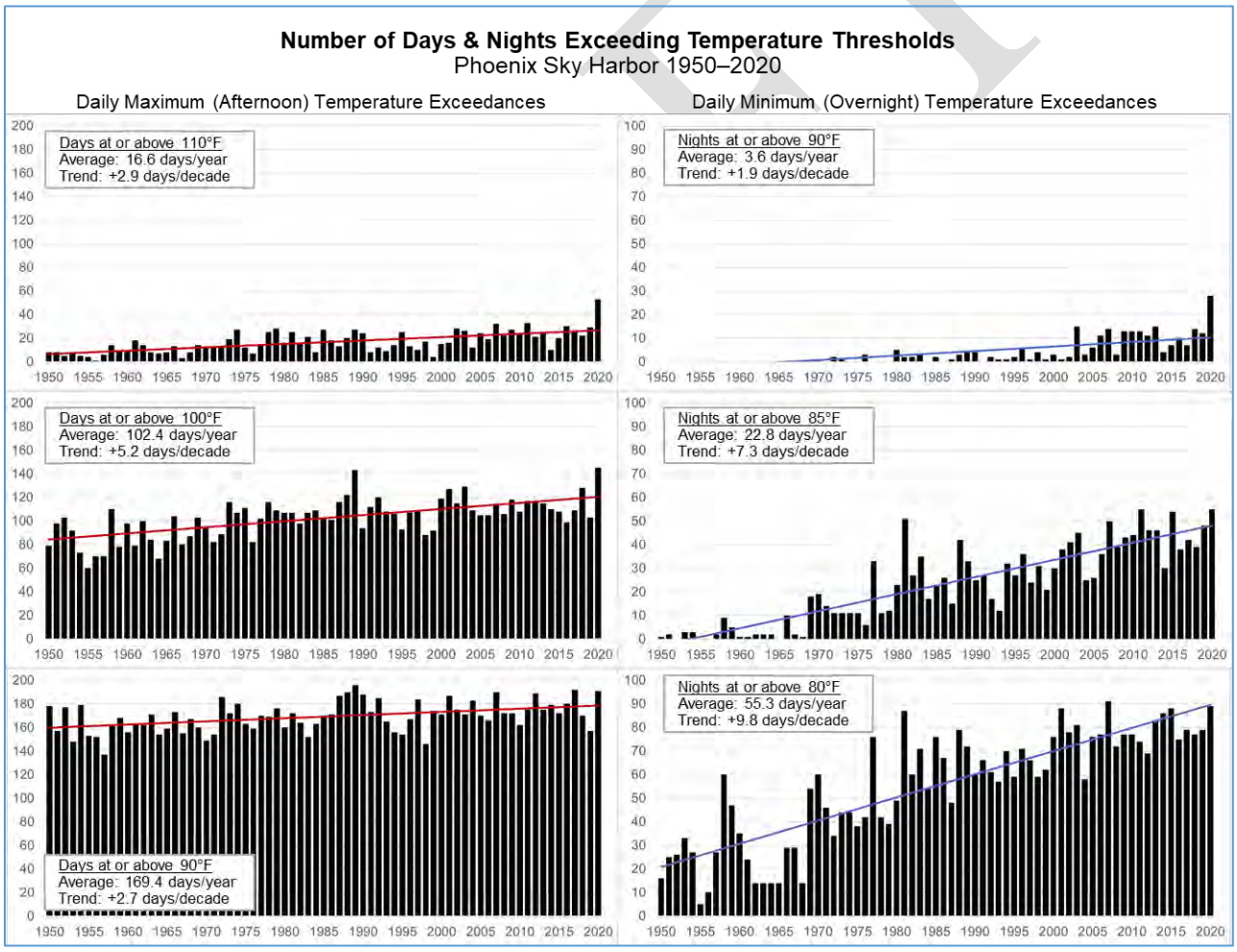


Figure 5-7: Progression of days with maximum temperature over 100°F and minimum temperature over 85°F for Phoenix Sky Harbor from 1950 to 2020

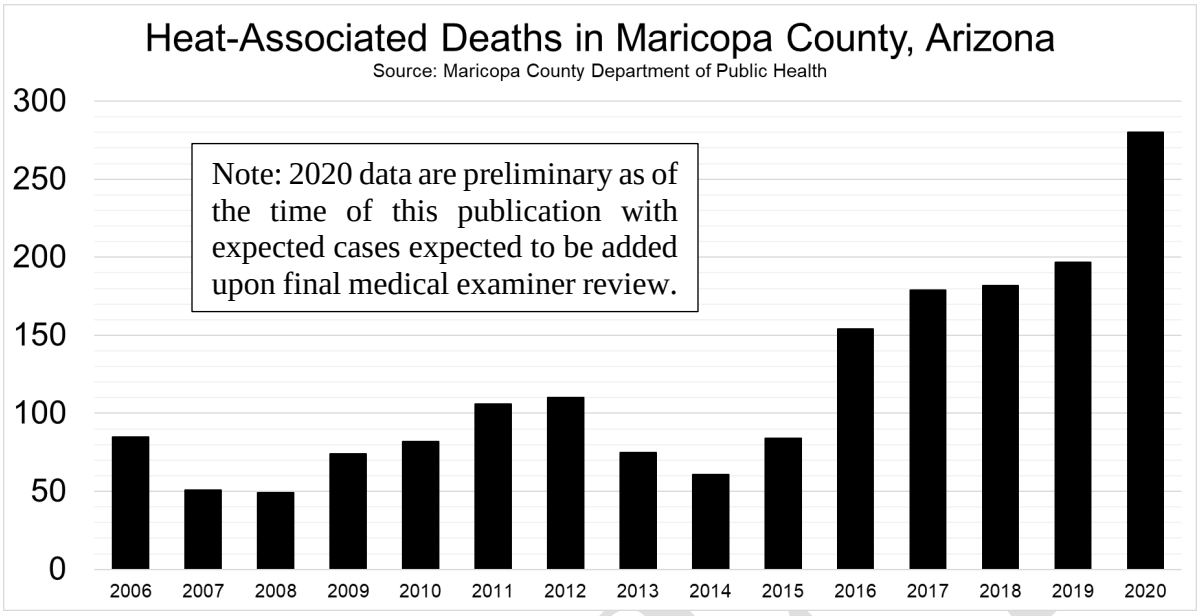
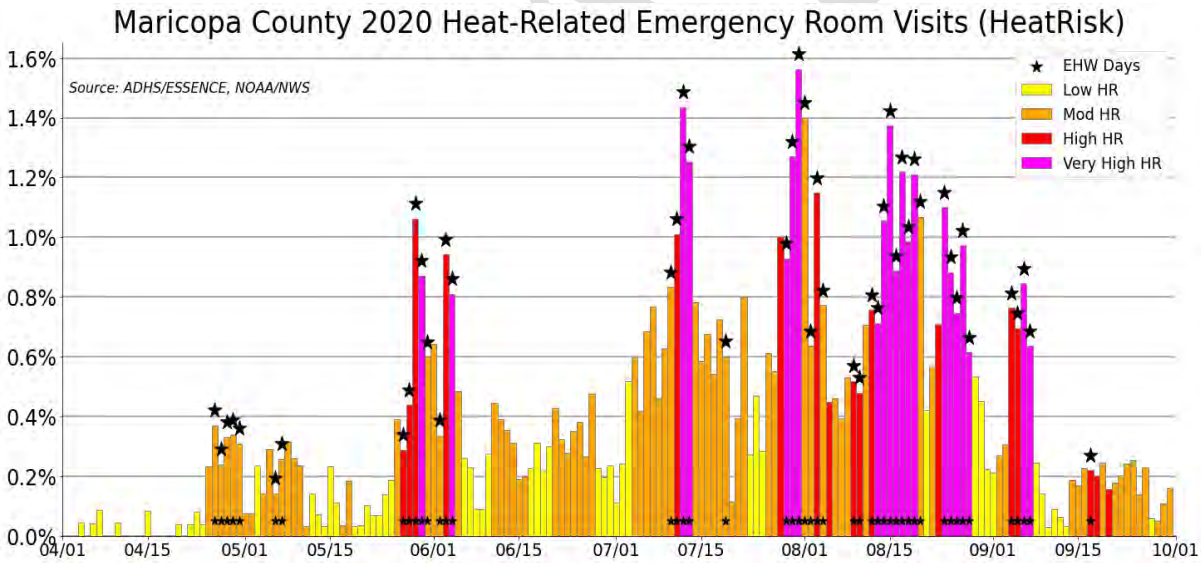


Figure 5-8a: Total heat-associated deaths recorded by the Maricopa County Department of Public Health heat surveillance system, 2006–2020



Note: Bars are shaded by NWS HeatRisk category (determined from the official station at Phoenix Sky Harbor Airport, see description in next session). Stars indicate days when NWS issued an Excessive Heat Warning.

Figure 5-8b: Daily emergency room visits as a percent of all visits by day during the 2020 heat season for Maricopa County

Research from the Centers for Disease Control and Prevention (CDC) and academic institutions shows that heat-associated deaths in Arizona can occur with temperatures in the mid-80s and hotter, with heat-related illnesses beginning to occur at even lower temperatures (Petitti et al. 2016; Vaidyanathan et al. 2019). Research also

shows that our bodies have a greater ability to tolerate heat as the summer wears on. For example, a temperature of 105°F in May, may seem hot and lead to elevated cases of illness and death, whereas the same temperature in June or July will not seem as hot and may not have the same public health consequences, because our bodies have acclimated to the heat. Hence, local forecasters do not use one single, constant temperature used to determine when an alert will be issued. Instead, the NWS HeatRisk product (https://www.wrh.noaa.gov/wrh/heatrisk/) is leveraged to identify unusually hot days for a given time of year. It is noted that other metrics are available and may be commonly used by the public or in specific sectors (e.g. heat index, wet bulb globe temperature) though they are not used in the alerting process for Maricopa County by NWS.

When "High" or "Very High" HeatRisk conditions are forecast, an Excessive Heat Watch (EHA) or Excessive Heat Warning (EHW) will be issued. Both alerts are a way to give public and emergency officials a "heads up" that extreme temperatures are expected. An EHA conveys a moderate (50%) confidence that excessive heat will occur. If confidence increases to a high (80%+) level, an EHW is issued (or an existing EHA is upgraded to an EHW). Alerts are issued by "forecast zones," geographical areas of which 20 cover some portion of Maricopa County. A map is available at https://www.weather.gov/psr/Phoenix_CWA_Zones. (Note that the nine zones that cover most of the Phoenix metro area are generally treated as one for issuing heat watches and warnings.) The typical "lead time" (number of days prior to the weather event) for heat alerts is three to five days. Once an alert is issued, it will continue until conditions abate. Figure 5-8b (above) and Figure 5-8c (below) show that the "HeatRisk" product and EHWs were both strongly correlated with emergency room visits during the historic record-breaking 2020 heat season, with Extreme HeatRisk days having about 10 times greater visits than Low HeatRisk days. In addition, heat impacts occurred on nearly every day from April to September in 2020, including for Low and Medium HeatRisk conditions that fall below EHW criteria. Additional information is available from the NWS at https://www.weather.gov/psr/HeatSafety.

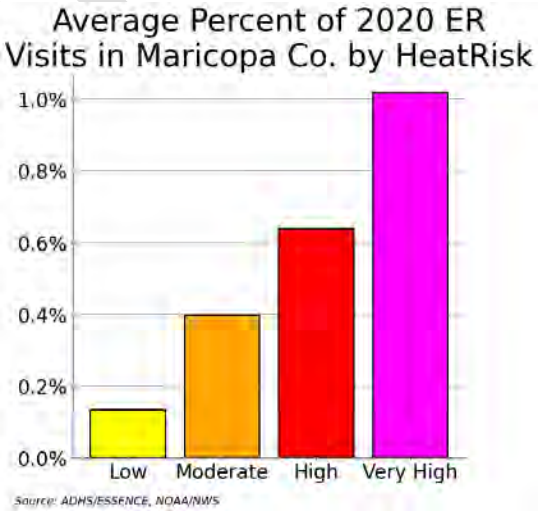


Figure 5-8c: Average percent of emergency room visits in Maricopa County (April-September 2020) due to heat-related illness by HeatRisk category

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Over the period 2008–2020, Excessive Heat Warnings (EHW) were in effect for a total of 263 days (average of 20.2 days per year). The probability of an Excessive Heat Warning being in effect on any given day over that time period varied by month as follows:

- April: 1.3% (5 EHW days)
- May: 3.2% (13 EHW days)
- June: 19.0% (74 EHW days)
- July: 17.1% (69 EHW days)
- August: 22.3% (90 EHW days)
- September: 3.1% (12 EHW days)

No Excessive Heat Warnings have been issued outside of the months April–September in the previous 13 years in Maricopa County.

It is noted that Carefree, Cave Creek, Fountain Hills, and Wickenburg, and the northern extents of Phoenix, Peoria, and Scottsdale, are all located at higher elevations than the rest of the Plan jurisdictions. Accordingly, average maximum temperatures for these jurisdictions tend to be 2-5 °F less than their neighboring communities, with average maximum summertime temperatures that range from 100 to 105 °F. Extreme maximums for these communities occasionally push higher into the 110 to 115 °F range, but with less frequency than the other Plan jurisdictions. Overnight low temperatures outside of the urban area can be significantly cooler (5-15 °F), even during heat events.

Climate Change Impacts

Increased temperatures and durations associated with extreme heat events due to climate change is one of the "Key Messages" of the NCA report (Garfin, et al., 2014). More severe heat is projected for hot summer days in Arizona in climate model simulations that account for lower and higher amounts of future greenhouse gas emissions (Figure 5-9a). Additional warming is expected because of continued urbanization (Georgescu et al., 2014). Figures 5-9b and 5-9c show respective plots of the number days the Phoenix temperatures have exceeded 100°F and 110°F, in contrast to the projected temperatures from climate change models (NWS, 2020). Red dots represent the number of days by year as observed at the NWS official climate station for Phoenix (Sky Harbor Airport), whereas pink bars represent the given decadal average. The gray (black) bars represent the decadal average number of days with high temperatures at-or-above 100 °F in Phoenix, AZ from nineteen CMIP5 climate model projections for the intermediate emission scenario RCP4.5 (high emission scenario RCP8.5). Vertical orange lines represent the 10th to 90th percentile range of values.

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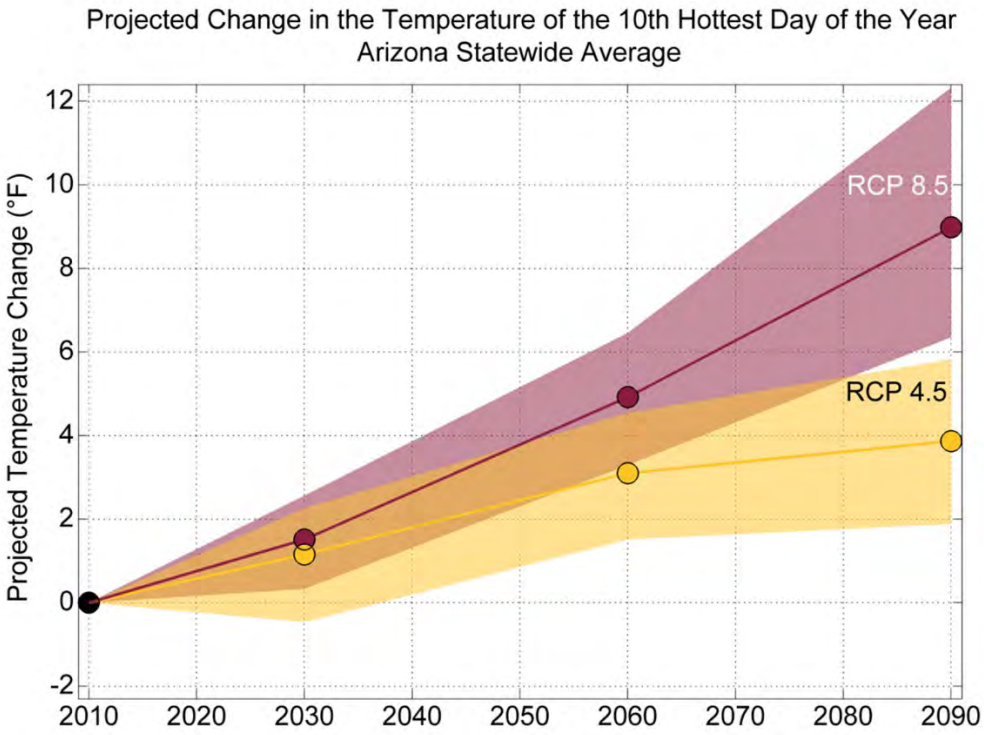

Figure 5-9a: Projected temperature changes for Arizona based on varied future greenhouse gas emission assumptions

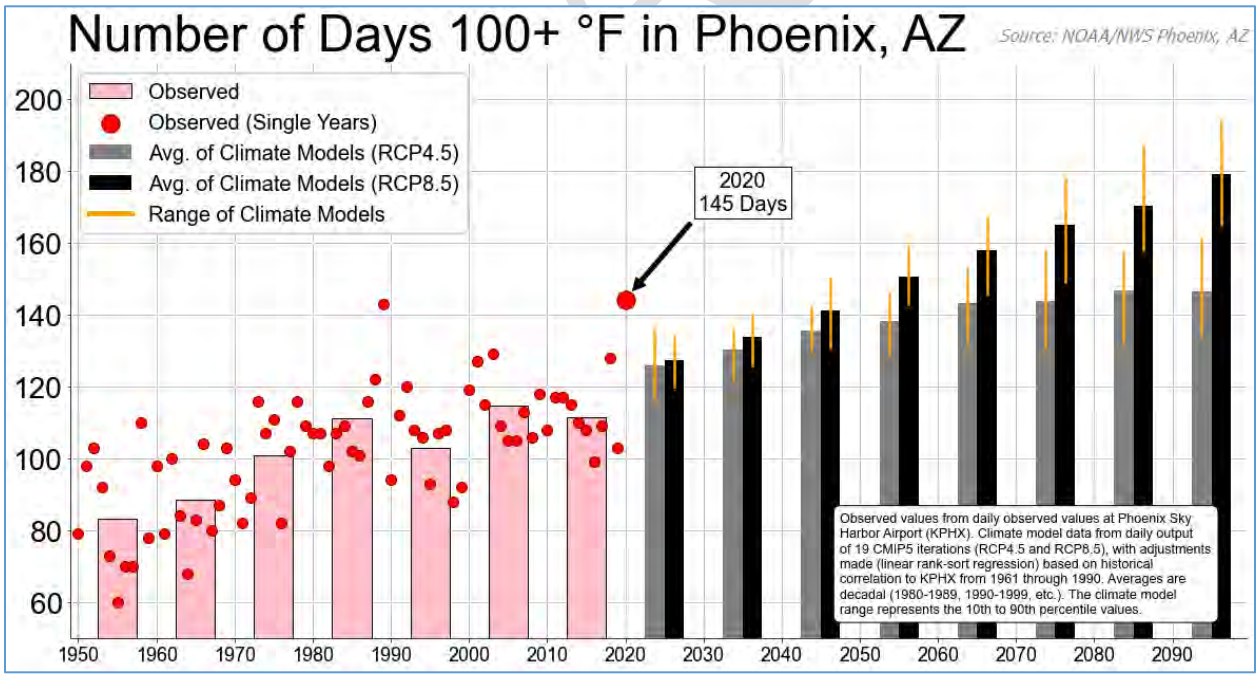

Figure 5-9b: Past and projected number of days in a year with high temperatures in Phoenix, AZ at-or-above 100 °F

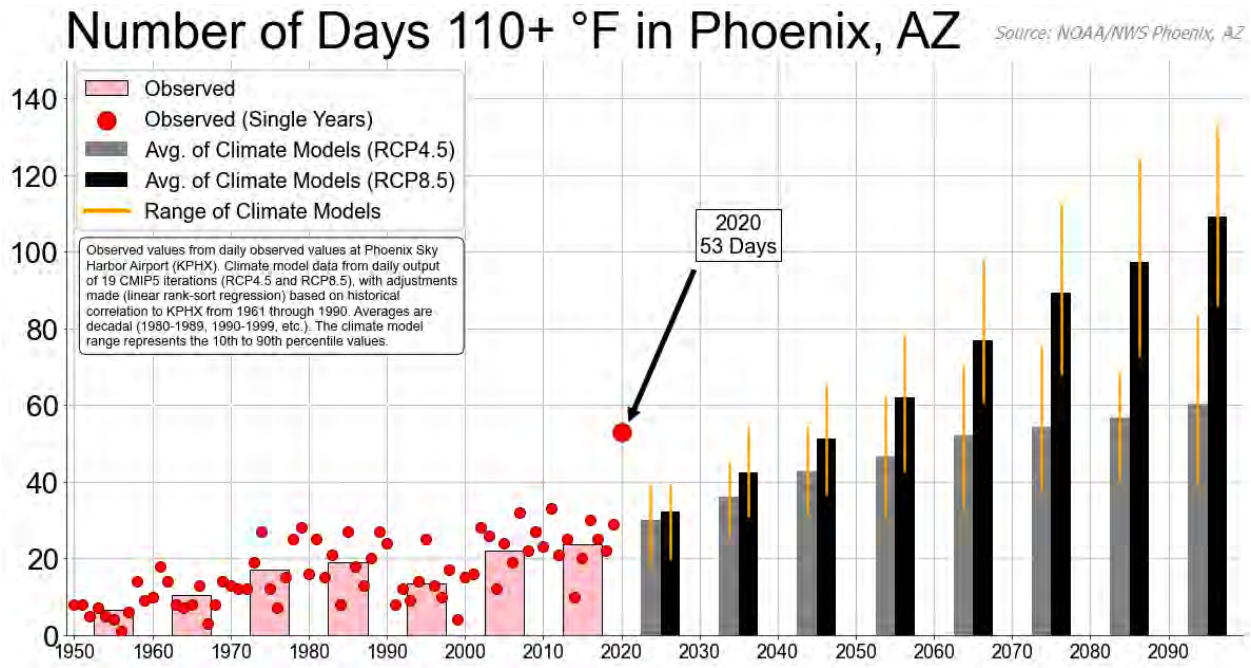

Figure 5-9c: Past and projected number of days in a year with high temperatures in Phoenix, AZ at-or-above 110 °F

If current projections are realized, the increase in both temperature and durations of extreme heat days within the urbanized areas of the county will magnify the current extreme heat related challenges faced by the county and participating jurisdictions. Extreme heat mitigation measures should probably consider that durations of events will be longer, and the overall duration of hot summer temperatures is anticipated to lengthen as well.

Vulnerability – CPRI Results

Extreme Heat CPRI results for each community are summarized in Table 5-17 below.

Table 5-17: CPRI results by jurisdiction for extreme heat

Participating Jurisdiction	Probability	Magnitude/ Severity	Warning Time	Duration	CPRI Score
Avondale	Likely	Critical	> 24 hours	> 1 week	2.80
Buckeye	Highly Likely	Limited	> 24 hours	> 1 week	2.95
Carefree	Highly Likely	Critical	> 24 hours	< 1 week	3.15
Cave Creek	Highly Likely	Limited	> 24 hours	< 1 week	2.85
Chandler	Highly Likely	Critical	> 24 hours	< 1 week	3.15
El Mirage	Highly Likely	Critical	> 24 hours	> 1 week	3.25
Fort McDowell Yavapai Nation	Likely	Limited	> 24 hours	> 1 week	2.50
Fountain Hills	Likely	Limited	> 24 hours	< 1 week	2.40
Gila Bend	Likely	Limited	> 24 hours	> 1 week	2.50
Gilbert	Highly Likely	Limited	> 24 hours	< 1 week	2.85
Glendale	Highly Likely	Critical	> 24 hours	> 1 week	3.25
Goodyear	Highly Likely	Limited	> 24 hours	< 1 week	2.85
Guadalupe	Highly Likely	Limited	> 24 hours	> 1 week	2.95
Litchfield Park	Highly Likely	Limited	> 24 hours	> 1 week	2.95
Unincorporated Maricopa County	Highly Likely	Critical	> 24 hours	< 1 week	3.15

Table 5-17: CPRI results by jurisdiction for extreme heat					
Participating Jurisdiction	**Probability**	**Magnitude/ Severity**	**Warning Time**	**Duration**	**CPRI Score**
Mesa	Likely	Critical	> 24 hours	< 1 week	2.70
Paradise Valley	Highly Likely	Critical	> 24 hours	< 1 week	3.15
Peoria	Highly Likely	Critical	> 24 hours	> 1 week	3.25
Phoenix	Highly Likely	Critical	> 24 hours	< 1 week	3.15
Queen Creek	Likely	Limited	> 24 hours	< 1 week	2.40
Salt River Pima-Maricopa Indian Community	Highly Likely	Limited	> 24 hours	> 1 week	2.95
Scottsdale	Likely	Limited	> 24 hours	< 1 week	2.40
Surprise	Likely	Critical	> 24 hours	< 1 week	2.70
Tempe	Highly Likely	Limited	> 24 hours	> 1 week	2.95
Tolleson	Highly Likely	Critical	> 24 hours	> 1 week	3.25
Wickenburg	Highly Likely	Critical	> 24 hours	< 1 week	3.15
Youngtown	Highly Likely	Critical	> 24 hours	> 1 week	3.25
				County-wide average CPRI =	**2.92**

Vulnerability – Heat Vulnerability Index Assessment

Risk assessment for extreme heat for each jurisdiction requires attention to the social and environmental variables that interactively lead to higher vulnerability for certain populations. Researchers often quantitatively represent vulnerability using indices derived from large-scale data sets. A heat vulnerability index (HVI) used by academic researchers (Reid, et.al., 2009; Harlan, et.al., 2013) has been calculated for all census tracts in Maricopa County (Figures 5-10a and 5-10b). Based on the HVI, approximately 25% of Maricopa County residents (nearly 1,200,000 people) live in census tracts classified as highly or very highly heat vulnerable. The percentage of residents living in vulnerable areas varies highly from jurisdiction to jurisdiction. Based on the most recently available social and environmental data, 100% of the residents of Guadalupe, the Salt River Pima-Maricopa Indian Community, and Wickenburg, all live in census tracts classified as highly or very highly heat vulnerable. Cave Creek, Phoenix, Youngtown, and Unincorporated portions of Maricopa County also have disproportionately higher percentages of residents living in heat vulnerable areas. Twenty-one (21) jurisdictions included in this plan have at least some residents living in census tracts classified as highly heat vulnerable. Importantly, measures of heat vulnerability are only estimates of where impacts are most likely to occur; residents to live outside of the most vulnerable areas are still subject to risk and adverse outcomes if exposed to heat without effective protective measures. Vulnerability indices also do not adequately represent risks facing transient, unsheltered, and undocumented individuals.

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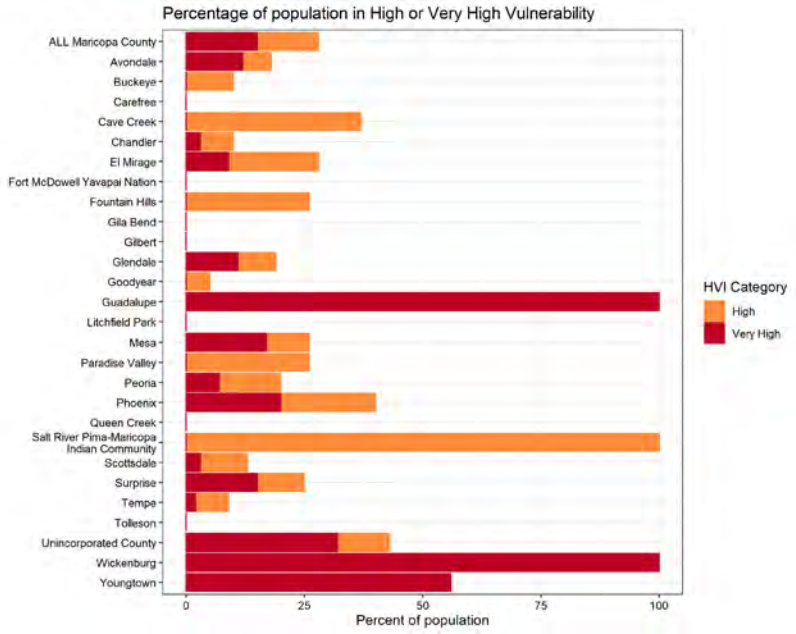

Figure 5-10a: High or very high heat vulnerability index exposure by community and percent population

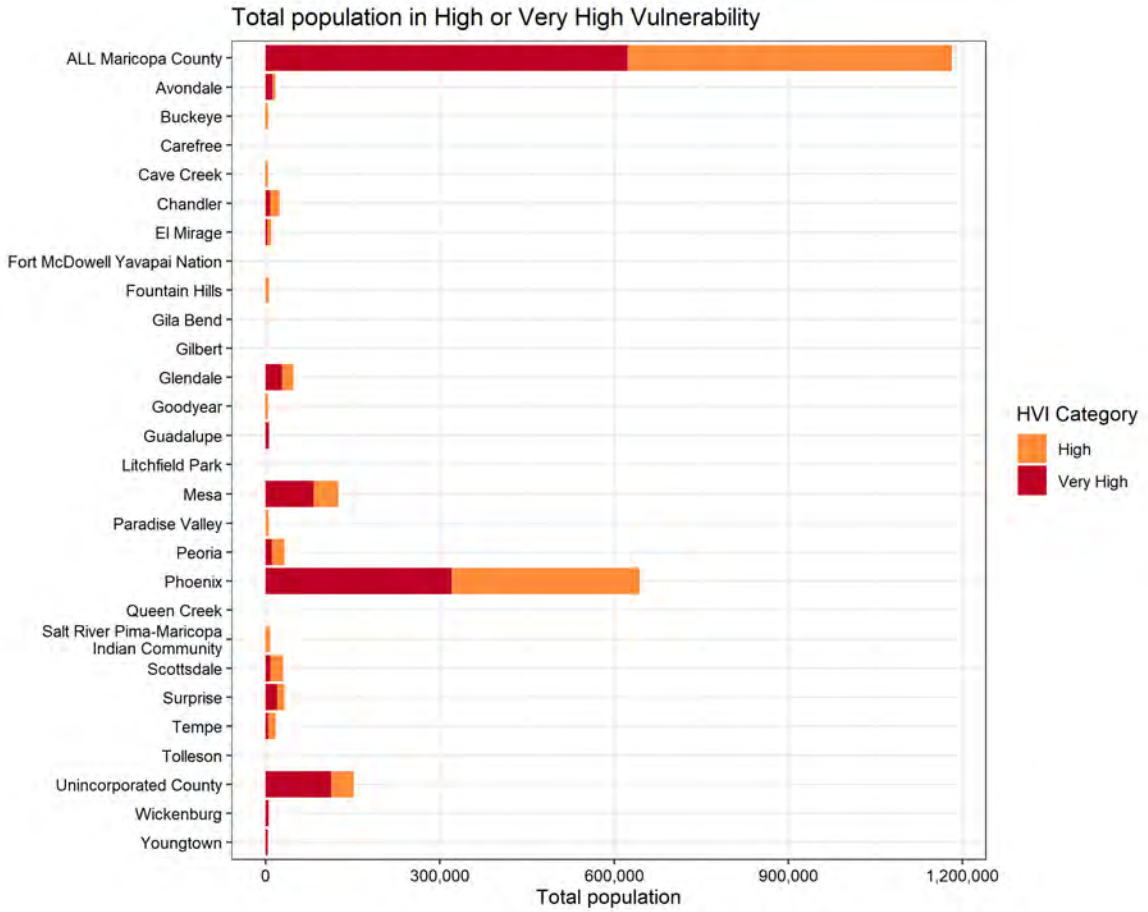

Figure 5-10b: High or very high heat vulnerability index exposure by community and total population

Vulnerability – Loss/Exposure Estimations

Losses due to extreme heat primarily occur in the form of death and illness. The risk of heat-associated deaths and illnesses increases non-linearly as a function of temperature (Figure 5-11). Mean temperatures explain approximately 33% of the variability in the time series of daily heat-associated deaths; mean temperatures are more closely associated with heat-associated deaths than either daily maximum or daily minimum temperatures. On average, one heat-associated death is expected in Maricopa County on days with a mean temperature of 95°F, two deaths are expected on days with a mean temperature of 100°F, and more than four deaths are expected on days with a mean temperature of 105°F.

Although the expected number of heat-associated deaths each day increases as a function of temperature, the total number of heat-associated deaths that occur in the county is higher for more modest temperatures than the highest temperatures, because days with more modest temperatures occur more frequently. A total of 374 heat-associated deaths (20.5% of the total for 2006-2019) occurred on days with mean temperatures of 101°F or above. Higher totals were observed in the five-degree temperature intervals of 91-95°F (387, 26.0%) and 96-100°F (557, 37.4%). Thus, while days with the highest temperatures pose the highest risk, there is a considerable public health burden that accumulates across less severely hot summer days that occur more regularly.

There were 1,491 heat-associated deaths recorded in Maricopa County over the period 2006–2019. The MCDPH operates a rigorous heat-health surveillance program and publishes publicly accessible annual reports identifying a wide range of risk factors and circumstances associated with heat-associated deaths. Over the 14-year period for which data are available:

- Men have accounted for nearly 75% of all cases, dying from heat at a rate nearly three times higher than women
- Almost two-thirds of heat-related deaths have an outdoor place of injury, and slightly more than one-third have an indoor place of injury. The vast majority of cases associated with an indoor place of injury are linked to air conditioning units that were not present, functioning, and/or operational at the time of death.

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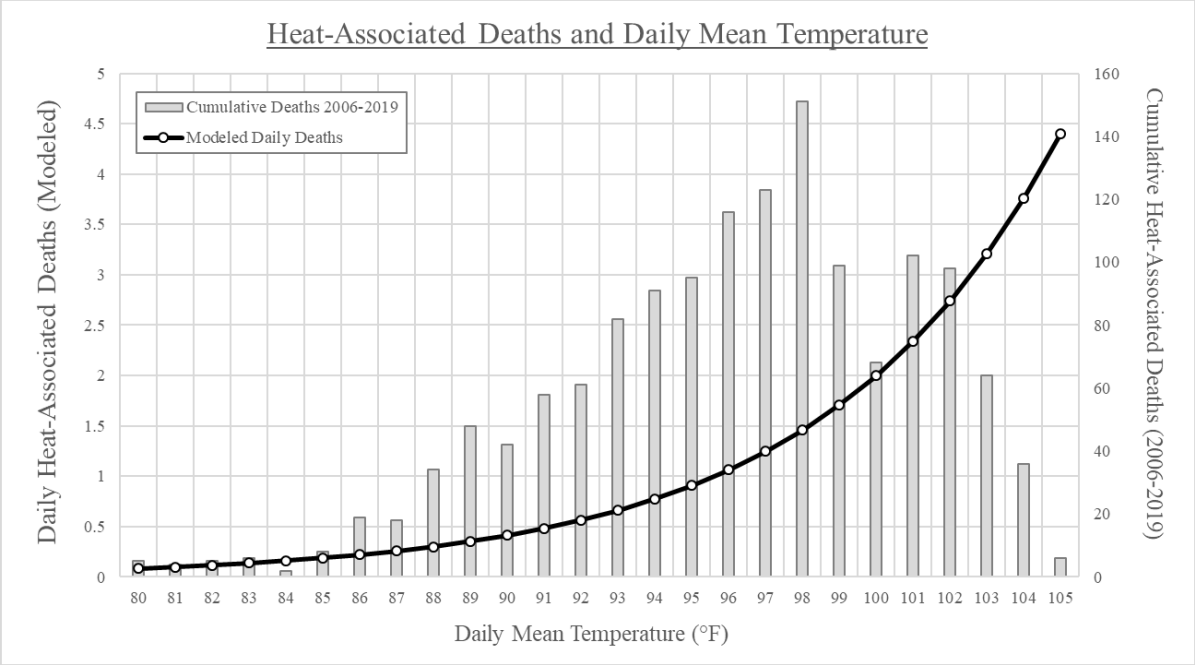

Figure 5-11: Heat associated deaths versus daily mean temperature

- At least 270 unsheltered individuals were among the heat-associated decedents, representing at least 18% of all cases and a significantly disproportionately higher risk than the sheltered population of the county
- 86% of heat-associated decedents were residents of Maricopa County; out-of-state visitors represent less than 10% of all cases
- Substance abuse (drugs or alcohol) was noted in the records for at least 552 decedents, representing at least 37% of all cases
- The heat-associated death rate is highest for those aged 75 and above compared to other age groups, although the total number of heat-associated deaths is highest for the 50-64-year-old age group. In 2019, cases were approximately evenly distributed between the population aged 49 and younger, age 50-64, and age 65 and above.
- African Americans and Native Americans have had the highest heat-associated death rates. Whites, Asian/Pacific Islanders, and Hispanics have had the lowest heat-associated death rates; the rate for those identifying as Hispanic is typically the lowest of any group.
- Compared to other jurisdictions in Maricopa County, relatively high rates of place-of-injury for heat-associated deaths are evident in Gila Bend, Tolleson, Guadalupe, Phoenix, Buckeye, and Wickenburg. Relatively high rates of heat-associated deaths based on decedent residence are evident in Tolleson, Guadalupe, Cave Creek, Glendale, and Phoenix. It is important to note that jurisdictional information about place of injury and/or residence

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of heat-associated decedents is not consistently available from heat surveillance records and calculation of heat-associated death rates is impractical for many jurisdictions with smaller populations and/or case counts. Every jurisdiction in Maricopa County except for Carefree, Salt River Pima-Maricopa Indian Community, and the Unincorporated portions of Maricopa County, is represented with at least one heat-associated death in the MCDPH heat surveillance records for the period 2006–2019.

The total economic valuation of the heat-associated deaths that have occurred in Maricopa County since 2006 is approximately $14,000,000,000 (an average of $1 billion per year), based on the EPA Value of Statistical Life estimate of $7.4 million in 2006, adjusted for inflation to 2020.

The MCDPH and Arizona Department of Health Services (ADHS) also track cases of heat-related illnesses that require emergency department visits and hospitalization. The most recent statistics from the MCDPH cover the period 2006–2017, in which a total of 21,447 hospitalizations (emergency department and in-patient visits) related to heat were recorded. These hospitalizations were associated with an estimated $115,000,000 (nearly $10 million per year) in healthcare costs, applying nationally adjusted mean costs per heat-related illness hospitalization from Schmeltz et al. (2016). Additional healthcare costs are likely borne by residents of Maricopa County for medical treatment related to heat that does not result in in patient or emergency department visits.

There are currently no statistical analyses for projecting heat related deaths in Maricopa County; however, MCDPH continues to track data and monitor the above-mentioned trends and other factors to determine if a statistical significance exists. Recent history would indicate that the County may experience more than 200 heat-related deaths annually in the coming years without enhanced risk mitigation strategies.

Vulnerability – Development Trends

In a metropolitan area, paved surfaces typically absorb and retain the heat of the day and then slowly release that heat back into the atmosphere through the night. When large areas are paved, the metropolitan area will develop an "urban heat island" effect, wherein temperatures in the center of the metropolitan area become much warmer than those on the outskirts of the valley due to the storage of heat during the day.

The metropolitan area of Maricopa County has grown dramatically in size over the last several decades, transforming a significant portion of the once natural desert and/or agricultural farmlands, into concrete and asphalt paved streets, roofs, driveways, sidewalks, parking lots, and other hardscapes. The result has been an intensification of the urban heat island effect and a steady increase in the nighttime low temperature (see Figure 5-7b above). The impacts of this expansion include increased cooling costs for residential, commercial, and industrial sectors, increased evaporation from surface water resources, and greater demand on power resources and strains on electrical infrastructure. According to a 1998 article in the Arizona Republic, the Salt River Project estimated that for every degree increase in temperature, the utility's then 610,000 residential customers paid $3.2 million to $3.8 million extra per month in

cooling costs, or about $5 to $7 per customer per month (Az Republic, 1998). Given inflation since that time, the average cost increase is likely to exceed $15 today.

Changes in Development in the Hazard Prone Area

All of the urbanized areas within Maricopa County and participating jurisdictions have vulnerability to extreme heat. As development and population continue to grow in nearly all jurisdictions, the vulnerability of each community increases to this hazard. Future development in urban areas could affect the frequency of extreme heat events due to the potential for increasing the urban heat island effects. Buildings are not usually directly impacted by extreme heat; therefore, new development will not necessarily increase extreme heat risk. However, population growth associated with new development would raise the overall population exposure and potentially increase the strain on existing utility infrastructure unless sufficient concurrent utility expansions are made.

The use of green design and construction methods and materials can significantly reduce the heat island effects. Examples may include green buildings that require less energy to cool, use of good insulation on pipes and electric wirings, use of reflective roofing materials to avoid the creation of heat sinks, and smart design of walkways, parking structures, pedestrian zones, and landscaping to minimize exposure to extreme heat may help reduce vulnerability of the built environment and the individuals who use it.

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Profile Maps

No profile maps are provided.

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5.3.4 Fissure

Description

Earth fissures are linear cracks, seams, or separations in the ground that extend from the groundwater table 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 is in Pinal County, near 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.

History

In Arizona, fissures were first noted near Picacho in 1927. The number of fissures has increased dramatically since the 1950s because of groundwater depletion, first because of agriculture, and later because of exponential population growth. The risk posed by fissures is also increasing as the population expands into the outlying basin edges and mountain fronts. Several fissure case histories for the Maricopa County area are summarized below.

- San Tan Mountains, Maricopa and Pinal Counties
  - Foothills—undermining at least one home, and crossing several roads; dogs trapped 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 powerlines
- Mesa, Maricopa County
  - Loop 202 (Red Mountain Freeway)—fissure present at least since 1970s; attempted mitigation during construction cost $200,000
  - Sossaman Road and University Drive—fissure runs diagonally through a subdivision along the entrance; fissure known in 1973 and subsequently backfilled

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- Wintersburg, Maricopa County
  - Fissure runs perpendicular to power transmission lines near Palo Verde Nuclear Generating Station; made one road impassable
- Scottsdale, Maricopa County
  - CAP Canal—fissure paralleling the canal opened within a few feet of the lining on the east side in 2003
  - 40th St and Cholla—discovered in 1980s
- 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 1200 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 and compiled the data into a GIS database. The latest update of GIS data published [33] has a version date of June 2019. In order to estimate the areas of immediate risk, the MJPT 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. These areas are indicated on Maps 3A, 3B, and 3C.

Climate Change Impacts

As previously stated, fissure development for most of the county is correlated to overdrafting of local and regional groundwater tables. The NCA report (Garfin, et.al., 2014) notes that one of the anticipated impacts of climate change for the Southwest is a reduction in precipitation and streamflow volumes. This impact could translate into a greater demand for groundwater which could further reduce groundwater levels and increase the formation of subsidence areas and fissure risk. The current management of groundwater withdrawals by the ADWR regulated active management areas (AMA) will likely serve to keep these impacts in check, but consideration for future expansion of fissures and subsidence zones could be warranted.

[33] AZGS Document Repository at: http://repository.azgs.az.gov/uri_gin/azgs/dlio/997

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Vulnerability – CPRI Results

Fissure CPRI results for each community are summarized in Table 5-18 below.

Table 5-18: CPRI results by jurisdiction for fissure hazard

Participating Jurisdiction	Probability	Magnitude/ Severity	Warning Time	Duration	CPRI Score
Avondale	Possibly	Negligible	<6 hours	>1 week	2.20
Buckeye	Unlikely	Negligible	>24 hours	<24 hours	1.10
Carefree	Unlikely	Negligible	>24 hours	<6 hours	1.00
Cave Creek	Unlikely	Negligible	>24 hours	<6 hours	1.00
Chandler	Unlikely	Negligible	>24 hours	<6 hours	1.00
El Mirage	Unlikely	Negligible	>24 hours	<24 hours	1.10
Fort McDowell Yavapai Nation	Unlikely	Negligible	6-12 hours	<24 hours	1.40
Fountain Hills	Possibly	Limited	<6 hours	>1 week	2.50
Gila Bend	Unlikely	Negligible	>24 hours	<6 hours	1.00
Gilbert	Highly Likely	Negligible	<6 hours	>1 week	3.10
Glendale	Likely	Negligible	12-24 hours	>1 week	2.35
Goodyear	Unlikely	Negligible	<6 hours	<6 hours	1.45
Guadalupe	Unlikely	Negligible	<6 hours	<6 hours	1.45
Litchfield Park	Unlikely	Negligible	<6 hours	<6 hours	1.45
Unincorporated Maricopa County	Possibly	Limited	12-24 hours	>1 week	2.20
Mesa	Possibly	Limited	<6 hours	>1 week	2.50
Paradise Valley	Unlikely	Negligible	<6 hours	<1 week	1.65
Peoria	Possibly	Limited	<6 hours	>1 week	2.50
Phoenix	Unlikely	Negligible	<6 hours	>1 week	1.75
Queen Creek	Possibly	Negligible	<6 hours	<6 hours	1.90
Salt River Pima-Maricopa Indian Community	Likely	Limited	>24 hours	>1 week	2.50
Scottsdale	Possibly	Negligible	<6 hours	<6 hours	1.90
Surprise	Possibly	Limited	<6 hours	<6 hours	2.20
Tempe	Possibly	Limited	>24 hours	>1 week	2.05
Tolleson	Unlikely	Negligible	>24 hours	>1 week	1.30
Wickenburg	Likely	Limited	>24 hours	>1 week	2.50
Youngtown	Unlikely	Limited	>24 hours	>1 week	1.60
				County-wide average CPRI =	**1.80**

Vulnerability – Loss/Exposure Estimations

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

Table 1. Hazards Directly Associated with Earth Fissures

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

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

Historic losses in Maricopa County due to fissures are mostly minor and associated with damaged utilities, fences and dirt/gravel roads and driveways. The exception was the death of a horse in the Town of Queen Creek's Planning Area when

a fissure opened up and engulfed the animal during a July 2007 storm. It is therefore very difficult to estimate economic losses due to a lack of an established methodology. Potential exposure of human and facility assets to high hazard fissure zones was estimated instead, and no estimation of economic losses was made. Table 5-19 summarizes the MJPT defined critical and non-critical facilities potentially exposed to a high hazard fissure zone. Table 5-20 summarizes population sectors exposed to the high hazard fissure zones. Residential structures exposed to high hazard fissure zones are summarized in Table 5-21.

In summary, 9 critical and non-critical MJPT identified assets with a cumulative reported replacement cost of $5 million (note: only one facility had a reported replacement cost) are exposed to high hazard fissure zones for the planning area, with a combined exposed value of. An additional $776.3 million of census block residential structures are exposed to a high hazard fissure zone for the planning area. Regarding human vulnerability, a total population of 4,341 people, or 0.10% of the total 2015 census block population is potentially exposed to a high hazard fissure zone for the planning area. The potential for human death and/or injury is possible, although no occurrences have been documented to-date. Short and long-term displacement are also likely should structures become damaged.

Vulnerability – Development Trends

Earth fissures have been part of the landscape of southern and south-central Arizona for at least the past seventy years (ALSG, 2007). As the communities of Maricopa County grow, it is inevitable that expansion into agricultural and undeveloped desert lands will occur, bringing the urban interface into more and more proximity to the geologic hazards related to fissures. In particular, growth areas for Chandler, El Mirage, Goodyear, Litchfield Park, Mesa, and Queen Creek have the most vulnerability. The AZGS and state continue working to provide better reporting and disclosure of fissure hazards, and county and local officials are becoming more aware of the dangers of not addressing them with development.

Changes in Development in the Hazard Prone Area

Within the unincorporated areas of Maricopa County, residential development has been minimal but has mostly been concentrated along I-17 in the Anthem area and in the western portion of the County along SR303. It is anticipated that new development will largely occur in these areas over the next five years. These areas do not lie within identified high hazard fissure areas.

The table below summarizes the changes in development for jurisdictions that are impacted by known fissure hazard areas.

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Jurisdiction	Development Changes
El Mirage	El Mirage is impacted by areas identified to have high hazard of earth fissure on the south end of the community from approximately Olive Rd to Northern Avenue. Limited residential development is being constructed and planned within the northeast and northwest areas of the City. Industrial and commercial development efforts have been focused within the southern portion of El Mirage in the industrial zone. Changes in development within the southern Industrial Zone will impact the City's vulnerability to earth fissure.
Gilbert	Areas identified to have existing hazards associated with fissure exist within the most southern portion of the Town of Gilbert between Riggs Rd. and Hund Rd. Most existing and proposed commercial and industrial developments are focused in the central and northern portions of the Town. The most recent and expected residential developments in Gilbert are located within the central and southern portions of the community. Changes in residential developments within the southernmost area of the Town may increase the vulnerability to fissure within Gilbert.
Glendale	Identified fissure hazard areas within or near Glendale represent the highest concentration of mapped fissures in the west valley. In particular, hazard areas west of SR303 are near or within proximity to the City's "New Frontier" Development District. Development within this district is growing at a rapid pace predominantly in industrial and manufacturing sectors. The area of development is bounded to the north by Peoria Ave, to the south by Camelback Rd, to the east by Dysart Rd, and to the west by 171st Ave.
Goodyear	Small areas with identified fissure hazards are in northernmost and southern portions of the City of Goodyear. There have been no changes in development within the southern portion of Goodyear, but there have been several developments within the northern area of the City, from I-10 to Camelback Rd, including industrial, moderate residential and multi-family projects.
Mesa	Several identified fissure hazard areas exist within the City of Mesa within the eastern area of the City. Changes in development identified by the City are outside of these areas and will not be impacted by the fissure hazard areas.
Phoenix	There is only a small area identified to have a high hazard due to earth fissure with the City of Phoenix. This area is located along East Shaw Butte Dr. between Cactus Rd and Cholla St. Changes in development identified by the City are outside of this area and will not be impacted by the fissure hazard area.
Queen Creek	There are no areas of high hazard due to Fissure located within the Town of Queen Creek. It should be noted that there are several identified fissure areas immediately south of the jurisdictional boundary. Although not currently impacted, the changes in development within the Town boundary should be conducted with an acknowledgment of the nearby hazard.
Scottsdale	There is only a small area identified to have a high hazard due to earth fissure with the City of Scottsdale. This area is located east of the intersection of Cactus Rd. and Frank Lloyd Wright Blvd. Changes in development identified by the City are proposed to occur mostly within the northern and central areas of Scottsdale and are outside of this area and will not be impacted by the fissure hazard area.
Surprise	The City of Surprise contains a small area of identified hazard areas associated with fissure along the southern border near the Hwy 303 alignment. While changes in development have occurred outside of this area, they have no impact on this hazard.

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Sources

Arizona Department of Emergency and Military Affairs, 2018, *State of Arizona Multi-Hazard Mitigation Plan, 2018 Update.*

AZ Geological Survey in partnership with the AZ Dept of Emergency and Military Affairs, Hazards Viewer, http://data.azgs.az.gov/hazard-viewer/

AZ Geologic Survey, Arizona's Earth Fissure Center, http://www.azgs.az.gov/EFC.shtml

Arizona Land Subsidence Group, http://azlandsubsidence.org/

AZ Land Subsidence Group, 2017, *Land Subsidence and Earth Fissures in Arizona, Research and Information Needs for Effective Risk Management.*, AZGS Contributed Report CR-07-C.

Profile Maps

Map 3A, 3B, and 3C – Earth Fissure Hazard Map(s)

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Table 5-19: Asset inventory exposure to high hazard fissure zones

Community	Total Facilities Reported by Community	Impacted Facilities	Percentage of Total Community Facilities Impacted	Total Replacement Value of All Facilities Reported by Community (x $1,000)	Estimated Replacement Value Exposed to Hazard (x $1,000)
County-Wide Totals (Maricopa Only)	**10917**	**9**	**0.08%**	**$26,024,918**	**$5,000**
Avondale	131	0	0.00%	$179,460	$0
Buckeye	125	0	0.00%	$268,667	$0
Carefree	6	0	0.00%	$9,000	$0
Cave Creek	4	0	0.00%	$13,258	$0
Chandler	277	0	0.00%	$1,361,072	$0
El Mirage	34	0	0.00%	$285,542	$0
Fort McDowell Yavapai Nation	26	0	0.00%	$202,624	$0
Fountain Hills	15	0	0.00%	$411,000	$0
Gila Bend	7	0	0.00%	$36,000	$0
Gilbert	5287	2	0.04%	$0	$0
Glendale	1224	2	0.16%	$4,085,807	$0
Goodyear	159	1	0.63%	$148,573	$0
Guadalupe	7	0	0.00%	$10,800	$0
Litchfield Park	5	0	0.00%	$118,900	$0
Unincorporated Maricopa County	1061	2	0.19%	$3,624,310	$0
Mesa	528	1	0.19%	$2,850,466	$5,000
Paradise Valley	95	0	0.00%	$469,300	$0
Peoria	299	0	0.00%	$282,333	$0
Phoenix	947	0	0.00%	$7,843,312	$0
Queen Creek (Maricopa County Only)	124	1	0.81%	$301,446	$0
Salt River Pima-Maricopa Indian Community	78	0	0.00%	$502,493	$0
Scottsdale	237	0	0.00%	$1,094,610	$0
Surprise	94	0	0.00%	$498,810	$0
Tempe	111	0	0.00%	$1,373,300	$0
Tolleson	10	0	0.00%	$0	$0
Wickenburg	14	0	0.00%	$32,589	$0
Youngtown	12	0	0.00%	$21,247	$0
Gilbert (Pinal County Only)	1	0	0.00%	$0	$0
Mesa (Pinal County Only)	22	0	0.00%	$7,380	$0
Queen Creek (Pinal County Only)	5	0	0.00%	$4,697	$0
Maricopa County (Pinal County Only)	3	0	0.00%	$707	$0
Maricopa County (Yavapai County Only)	6	0	0.00%	$1,760	$0

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Table 5-20: Population sectors exposed to high hazard fissure zones

Community	Total Population	Population Exposed		Total Population Over 65	Population Over 65 Exposed	
		Total	Percent		Total	Percent
County-Wide Totals (Maricopa Only)	**4,136,787**	**4,341**	**0.10%**	**538,166**	**1,002**	**0.19%**
Apache Junction (Maricopa County Portion)	314	0	0.00%	149	0	0.00%
Avondale	79,485	0	0.00%	5,313	0	0.00%
Buckeye	65,452	0	0.00%	5,141	0	0.00%
Carefree	3,580	0	0.00%	1,591	0	0.00%
Cave Creek	5,287	0	0.00%	1169	0	0.00%
Chandler	250,334	0	0.00%	23,435	0	0.00%
El Mirage	33,728	0	0.00%	2,700	0	0.00%
Fort McDowell Yavapai Nation	1017	0	0.00%	85	0	0.00%
Fountain Hills	23,536	0	0.00%	7,318	0	0.00%
Gila Bend	2,012	0	0.00%	193	0	0.00%
Gilbert	239,546	470	0.20%	17,960	33	0.18%
Glendale	237,327	2	0.00%	23,675	0	0.00%
Goodyear	78,118	0	0.00%	10,094	0	0.00%
Guadalupe	6,230	0	0.00%	581	0	0.00%
Litchfield Park	5,980	0	0.00%	1,065	0	0.00%
Unincorporated Maricopa County	290,179	917	0.32%	95,187	138	0.14%
Mesa	467,657	2,020	0.43%	71,995	891	1.24%
Paradise Valley	13,834	0	0.00%	3,365	0	0.00%
Peoria	166,339	0	0.00%	25,308	0	0.00%
Phoenix	1,561,296	214	0.01%	143,448	83	0.06%
Queen Creek	35,720	6	0.02%	2,094	1	0.05%
Salt River Pima-Maricopa Indian Community	6,706	0	0.00%	1,004	0	0.00%
Scottsdale	237,929	65	0.03%	49,963	21	0.04%
Surprise	128,211	464	0.36%	26,025	25	0.10%
Tempe	176,809	0	0.00%	15,264	0	0.00%
Tolleson	6,904	0	0.00%	809	0	0.00%
Wickenburg	6,803	0	0.00%	2,058	0	0.00%
Youngtown	6,454	0	0.00%	1,177	0	0.00%
Queen Creek (Pinal County Portion)	1421	73	5.14%	128	8	6.25%
Peoria (Yavapai County Portion)	7	0	0.00%	2	0	0.00%
Wickenburg (Yavapai County Portion)	206	0	0.00%	32	0	0.00%

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Table 5-21: Residential structures exposed to fissure high hazard zones

Community	Residential Building Count	Residential Building Exposure		Residential Building Replacement Value (x$1,000)	Residential Building Value Exposed	
		Total	Percent		Total (x$1,000)	Percent
County-Wide Totals (Maricopa Only)	**1,639,265**	**2,521**	**0.15%**	**$542,436,633**	**$776,318**	**0.14%**
Apache Junction (Maricopa County Portion)	295	0	0.00%	$76,791	$0	0.00%
Avondale	26,802	0	0.00%	$7,272,041	$0	0.00%
Buckeye	18,206	0	0.00%	$4,946,783	$0	0.00%
Carefree	2,242	0	0.00%	$1,922,010	$0	0.00%
Cave Creek	2,498	0	0.00%	$1,628,751	$0	0.00%
Chandler	94,257	0	0.00%	$34,713,265	$0	0.00%
El Mirage	11,307	0	0.00%	$2,655,346	$6	0.00%
Fort McDowell Yavapai Nation	308	0	0.00%	$260,045	$0	0.00%
Fountain Hills	13,105	0	0.00%	$5,944,909	$0	0.00%
Gila Bend	944	0	0.00%	$118,937	$0	0.00%
Gilbert	74,821	143	0.19%	$29,339,526	$56,012	0.19%
Glendale	90,415	1	0.00%	$24,665,480	$185	0.00%
Goodyear	25,023	0	0.00%	$8,326,438	$95	0.00%
Guadalupe	1,397	0	0.00%	$269,202	$0	0.00%
Litchfield Park	2,616	0	0.00%	$996,356	$0	0.00%
Unincorporated Maricopa County	142,777	418	0.29%	$45,530,720	$133,279	0.29%
Mesa	201,507	1,646	0.82%	$59,328,380	$484,646	0.82%
Paradise Valley	5,621	0	0.00%	$11,738,020	$0	0.00%
Peoria	64,806	0	0.00%	$21,410,130	$0	0.00%
Phoenix	590,476	116	0.02%	$167,455,500	$32,842	0.02%
Queen Creek	8,422	2	0.02%	$2,890,493	$724	0.03%
Salt River Pima-Maricopa Indian Community	2,680	0	0.00%	$919,777	$0	0.00%
Scottsdale	123,959	43	0.03%	$67,660,310	$23,267	0.03%
Surprise	52,607	152	0.29%	$15,652,750	$45,262	0.29%
Tempe	73,603	0	0.00%	$24,383,780	$0	0.00%
Tolleson	2,165	0	0.00%	$505,455	$0	0.00%
Wickenburg	3,610	0	0.00%	$1,285,212	$0	0.00%
Youngtown	2,796	0	0.00%	$540,226	$0	0.00%
Queen Creek (Pinal County Portion)	606	27	4.46%	$207,814	$9,394	4.52%
Peoria (Yavapai County Portion)	5	0	0.00%	$1,321	$0	0.00%
Wickenburg (Yavapai County Portion)	54	0	0.00%	$19,703	$0	0.00%

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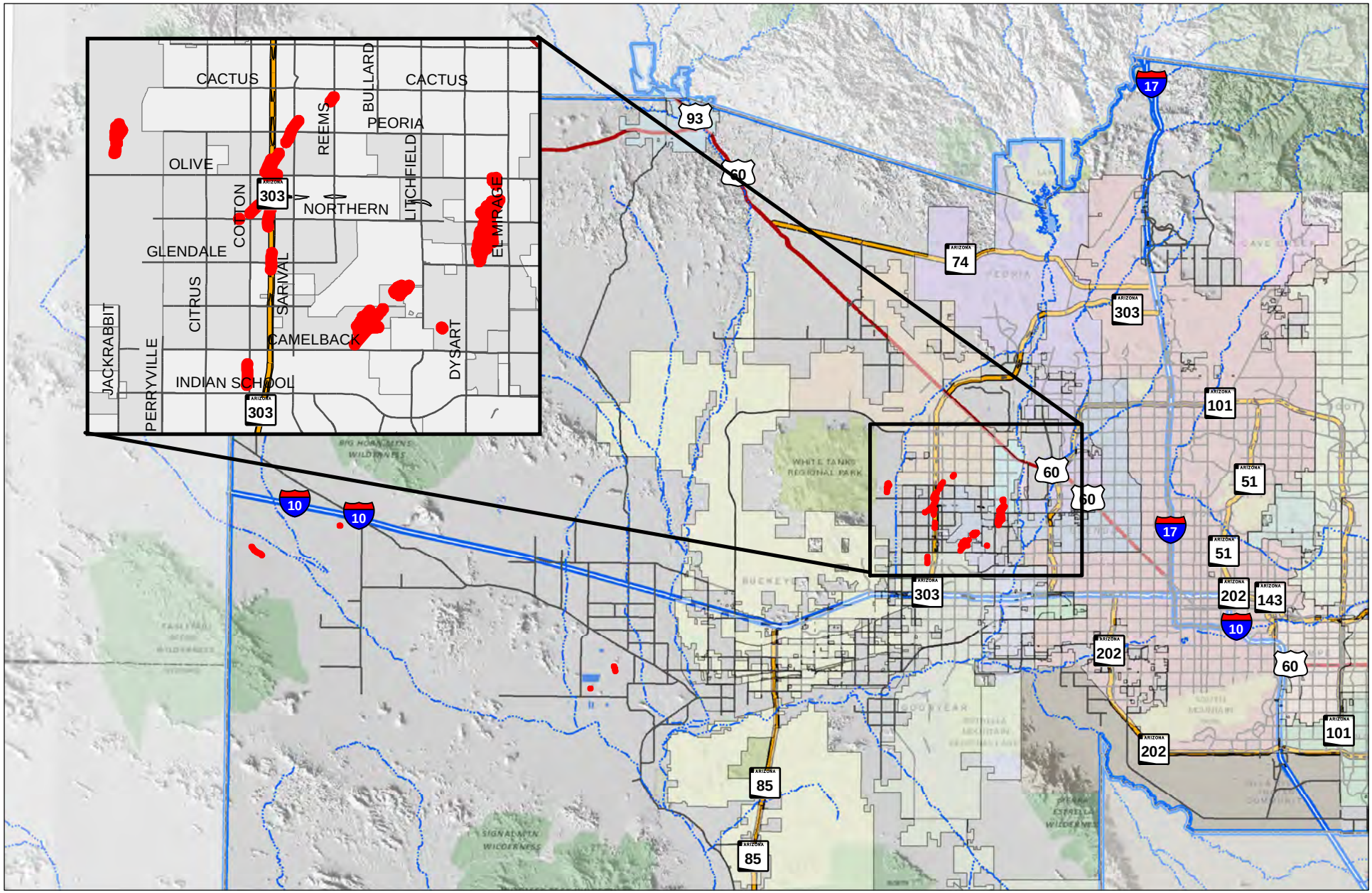


Legend

- Maricopa County
- Mitigation Plan Extent
- Major Streams

Earth Fissure Hazard Rating

- High

0 37.5 75 150

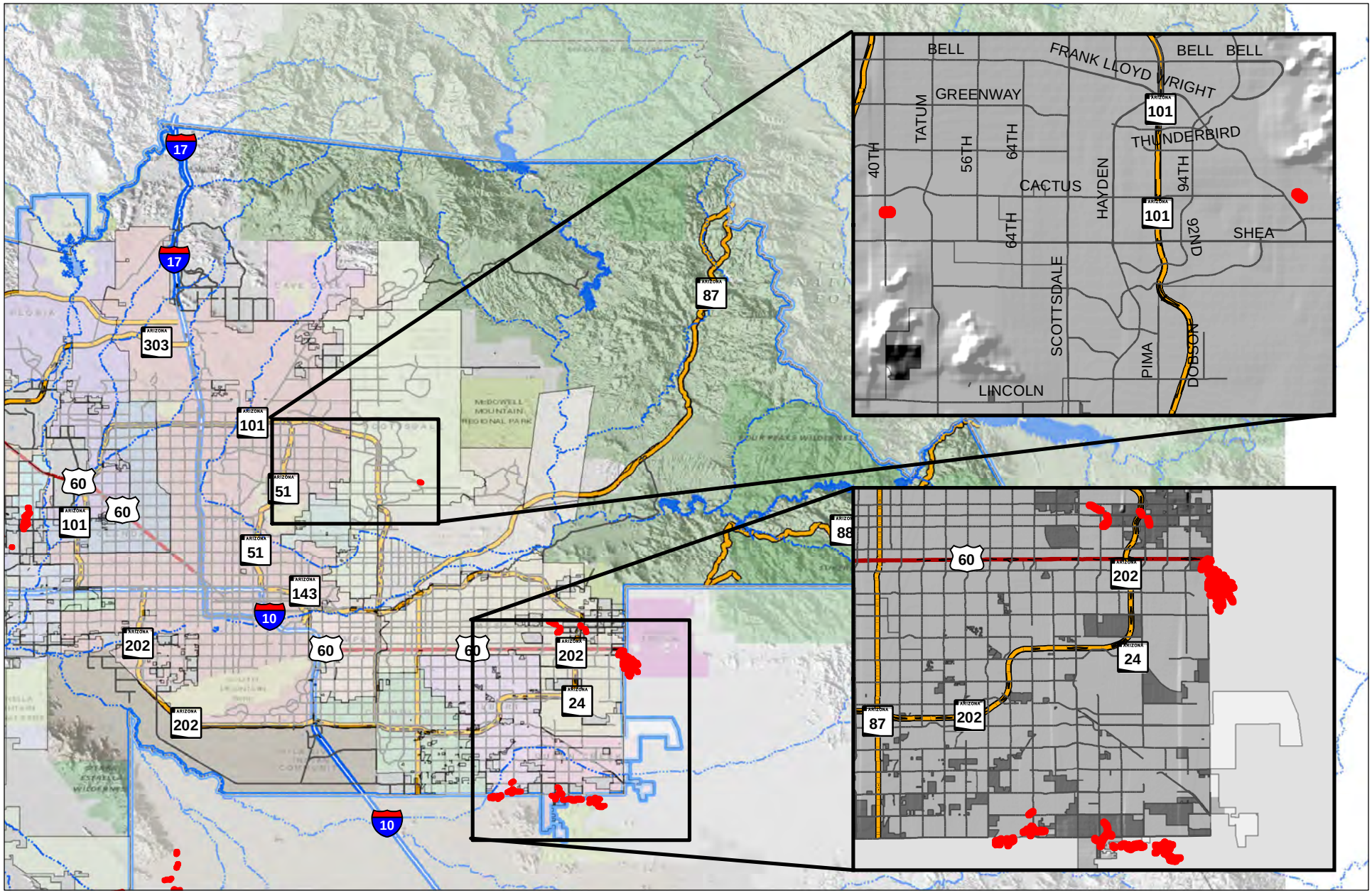
Miles

Source: JE Fuller 2020; ALRIS 2006; AZGS 2020; TIGER 2020; MAG 2020

MARICOPA COUNTY

Maricopa County Multi-Jurisdictional Hazard Mitigation Plan

Map 3A
Maricopa County Earth Fissure Hazard Map as of Sept 2020



Legend

- Maricopa County
- Mitigation Plan Extent
- Major Streams

Earth Fissure Hazard Rating

- High

0 37.5 75 150

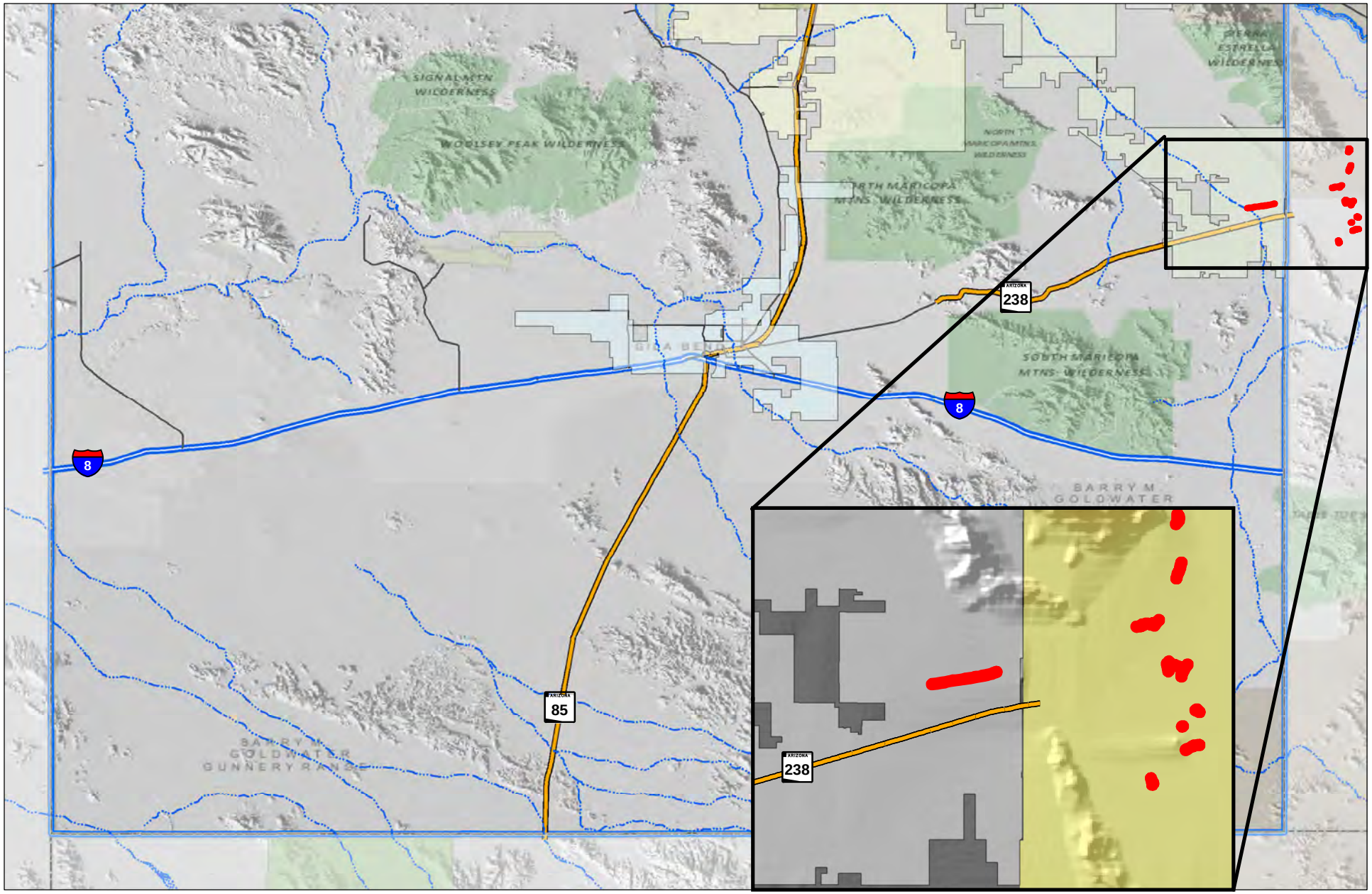
Miles

Source: JE Fuller 2020; ALRIS 2006; AZGS 2020; TIGER 2020; MAG 2020

MARICOPA COUNTY

Maricopa County Multi-Jurisdictional Hazard Mitigation Plan

Map 3B
Maricopa County Earth Fissure Hazard Map as of Sept 2020



Legend

- Maricopa County
- Mitigation Plan Extent
- Major Streams

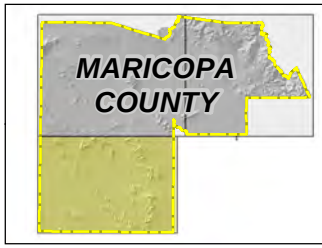
Earth Fissure Hazard Rating

- High

0 37.5 75 150

Miles

Source: JE Fuller 2020; ALRIS 2006; AZGS 2020; TIGER 2020; MAG 2020



Maricopa County Multi-Jurisdictional Hazard Mitigation Plan

Map 3C
Maricopa County
Earth Fissure
Hazard Map
as of Sept 2020

5.3.5 Flood / Flash Flood

Description

For the purpose of this Plan, the hazard of flooding addressed in this section will pertain to floods that result from precipitation/runoff related events. Other flooding due to dam and levee failures are addressed separately. The three seasonal atmospheric events that tend to trigger floods in Maricopa 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 can cause extensive flooding and erosion, particularly when combined with snowmelt.
- *Summer Monsoons*: A third atmospheric condition that brings flooding to Arizona is the annual summer monsoon. 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 very localized and cause significant flooding of local watercourses.

Damaging floods in the county can be primarily categorized as either riverine, sheet flow, or local area flows. Riverine flooding occurs along established watercourses when the bank full capacity of a wash is exceeded by storm runoff and the overbank areas become inundated. There are also areas within the county where the watercourse is broad and generally shallow with ill-defined low flow paths and broad sheet flooding. Local area flooding is often the result of poorly designed or planned development wherein natural flow paths 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 Maricopa County as shown in Tables 5-2 and 5-3. Maricopa County has been part of 18 presidential disaster declarations for flooding and there have been at least 200 other reported flooding incidents that met the thresholds outlined in Section 5.1.

Over the past plan cycle, flooding was mostly limited to smaller, localized events and no major flooding events occurred. Two of the localized flood events are discussed below.

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- In July 2017, Scattered monsoon thunderstorms developed across much of the greater Phoenix area spanning a week's time and causing significant flooding across several areas in Maricopa County. There were no injuries of fatalities and damages were less than $100,000. Flooding did require one swift water rescue (NCDC, 2020).
- In March 2020, a powerful Pacific low pressure system spread deep moisture into the central deserts causing scattered to numerous showers and thunderstorms to develop during the afternoon and evening hours. Moderate to heavy rain fell with many of the storms, affecting areas to the southwest of central Phoenix. There were no injuries of fatalities and damages were less than $100,000. Flooding did require one swift water rescue (NCDC, 2020).

The following incidents represent older examples of major flooding that has impacted the county:

- In March 1978, a general winter storm centered over the mountains north and east of Phoenix, 35 miles north at Rock Springs. Extrapolation of intensity-probability data for one measurement of 5.73 inches of precipitation in a 24 hour period equates to a 400 year storm. The main source of flooding was due to Verde River runoff volume exceeding reservoir storage capacity above Bartlett Dam. Flooding also occurred along irrigation canals on the north side of the Phoenix metro area, and along tributaries of the Gila River and Queen Creek. There was one death countywide and $37 million in total damages (USACE, 1978). Presidential Disaster Declaration 550-DR.
- In December 1978, a second major storm for the year hit hard with total precipitation that ranged from less than 1 inch in the northeastern and far southwestern portions of Arizona to nearly 10 inches in the Mazatzal Mountains northeast of Phoenix. A large area of the central mountains received over 5 inches. The main stems of the Gila, Salt, Verde, Agua Fria, Bill Williams, and Little Colorado Rivers, as well as a number of major tributaries, experienced especially large discharges. There were 4 deaths, $16.3 million-public and $5 million-agriculture losses estimated for Maricopa County (USACE, 1979). Presidential Disaster Declaration 570-DR.
- In February 1980, severe flooding in central Arizona set record discharges (later broken in 1993) in the Phoenix metro area on the Salt, Verde, Agua Fria and Gila Rivers, as well as on Oak Creek in north central Arizona. The Phoenix metro area was nearly cut in half with only two bridges remaining open over the Salt River. It took hours for people to move between Phoenix and the east valley using either the Mill Avenue or Central Avenue bridges. Even the Interstate 10 bridge was closed for fear that it had been damaged. Precipitation during this period at Crown King in the Bradshaw Mountains was 16.63 inches. Three people died statewide and damages were estimated at $63,700,000 for Phoenix Metro Area (USACE, 1980). Presidential Disaster Declaration 614-DR.
- In January and February 1993, flooding damage occurred from winter storms associated with the El Nino phenomenon. These storms flooded watersheds

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throughout Arizona by dumping excessive rainfall amounts that saturated soils and increased runoff. Warm temperature snowmelt exacerbated the situation over large areas. Erosion caused tremendous damage and some communities along normally dry washes were devastated. Stream flow velocities and runoff volumes exceeded historic highs. Many flood prevention channels and retention reservoirs were filled to capacity and water was either diverted to the emergency spillways or the reservoirs were breached, causing extensive damage in some cases (e.g., Painted Rock Reservoir spillway). The new Mill Avenue Bridge and a large landfill in Mesa were washed away by the raging Salt River. The Gillespie Dam west of Phoenix was damaged as high water spread throughout low-lying areas. Many roads were closed and motorists were stranded by flooded dips and washes. Phoenix alone sustained at least $4.2 million in damages from this prolonged period of heavy rains. County-wide, $38 million in property and agricultural losses were estimated (USACE, 1993). Presidential Disaster Declaration 977-DR.

- In 1997, flooding from the remnants of Hurricane Nora resulted in the breaching of Narrows Dam. The calculated 24-hour, 100-year rainfall amount in NW Maricopa County exceeded at six ALERT measuring sites led to flash flooding in portions of NW Maricopa County. Two earthen dams gave way in Aguila and caused widespread flooding. One dike was located seven miles east of Aguila and the second in the center of the Martori Farms complex. Half of the cotton crop was lost at Martori Farms, as well as 300 to 500 acres of melons. Up to five feet of water filled Aguila. About 40 people were evacuated from the hardest hit area of the town. Water flowing down the Sols Wash was so high that the Sols Wash Bridge in Wickenburg was closed for more than two hours. There was some flooding below Sols Wash in the streets around Coffinger Park. Several houses in the area were also flooded. Highway 71 west of Wickenburg and Highway 95 north were closed due to high water from the storm.

- In October 2000, a large low pressure area dumped four to six inches of rain over parts of eastern LaPaz and western Maricopa County. This caused flash flooding in the upper part of the Centennial Wash between the Harcuvar and Harquahala mountain ranges. The heavy runoff flowed into the town of Wenden where water ran over the highway 60 bridge. At its peak, the wash was about 3/8ths of a mile wide and 12 feet deep. The resulting high water surged through the town of Wenden, with at least 400 residents evacuated. There was extensive damage to the town and for many miles downstream. The reported flow was in excess of 20,000 cfs. When the flood hit Wenden, it inundated some mobile homes, causing them to lift off their foundations and float down the wash. An estimated 125 mobile homes were affected. One migrant worker was killed when flood waters swept through the town during the early morning hours. Additional heavy rainfall hit this area several days later and complicated relief efforts for many of the homeless. A spotter in Wickenburg reported that route 93 was closed north of Wickenburg due to high water. Sols Wash was out of its banks and flooded Coffinger Park as well as nearby homes. The Vulture Mine road was closed and motorists had to be rescued. Flood water produced considerable damage to melon and cotton crops in northwest Maricopa County. The roads around Aguila were closed for several hours. A total

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of $10.2 million in structure and crop damages was estimated (NCDC, 2008). Presidential Disaster Declaration 1347-DR.

- In late July – early August 2005, one of the heaviest rainfall events of the 2005 season struck the greater Phoenix metropolitan. Almost three inches of rain fell at many locations in the metro, causing roofs to collapse and streets to flood quickly. Up to 120 residents at the Crystal Creek Apartments in Phoenix were evacuated after 83 apartment units were damaged by flood waters. Additional roof damage was reported at the Scottsdale Community College, and Osco Drug store in Mesa, and a Fry's grocery store in Tempe. In the Wickenburg area, very heavy rainfall caused flooding of low spots and washes. The peak flow in Hartman Wash was reported as 1,200 cfs. Major damage occurred at Bear Cat Manufacturing where a large robotic welding building was destroyed by the flood. Losses were estimated at over $4 million (NCDC, 2009).
- In September 2014, heavy rainfall caused by the remnants of Hurricane Norbert resulted in extensive flooding throughout the state and especially in LaPaz, Maricopa and Pinal Counties. The Phoenix area experienced its wettest day in history, surpassing a record set in 1939. Preliminary damages assessments exceeded $18 million. Among other impacts, major sections of freeways were closed, canals and flood control systems were overwhelmed, and two individuals perished in separate flash flood incidents. Several valley locations received rainfall that exceeded 500-year storm estimates. State search and rescue teams spent considerable resources performing numerous rescues of stranded drivers and residents, in addition to services provided during flooding from two other hurricane remnants (Hurricane Lowell and Hurricane Odile), all of which impacted Arizona within a two-month period. The state received a presidential disaster declaration (DR-4203) for Maricopa and La Paz Counties in November 2014.

Numerous other flood related incidents are summarized in the historic hazard database provided in Appendix D.

Probability and Magnitude

For the purposes of this Plan, the probability and magnitude of flood hazard for Maricopa County jurisdictions are based on the one percent probability floodplains delineated on FEMA Flood Insurance Rate Maps (FIRMs), plus any provisional floodplain delineations used for in-house purposes by participating jurisdictions. FEMA and participating agencies and departments of Maricopa County jurisdictions have recently completed a map modernization program to update the FIRMs for the county into a digital FIRM (DFIRM) format and re-delineate a few select areas. The latest maps became effective in October 2013 and are the basis for flood hazard depictions in this Plan. Floodplain limits and GIS base files were provided by the FCDMC and National Flood Hazard Layer (NFHL) data from FEMA.

Two designations of flood hazard are used, with HIGH hazard areas being any "A" zone and MEDIUM flood hazard being 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 percent (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.

Maps 4A, 4B, and 4C present the high flood hazard areas for Maricopa County. When viewing the maps, the following should be noted:

- Neither the Fort McDowell Yavapai Nation or Salt River Pima-Maricopa Indian Community participate in the National Flood Insurance Program (NFIP). Consequently, neither of the tribes has FEMA mapped floodplains for their reservation boundaries except for Sycamore Creek and the Verde and Salt Rivers. The Local Planning Team for each tribe met and discussed identifying supplemental delineations of on reservation floodplains, and the results are indicated on the hazard profile maps.
- With the 2013 DFIRM update, a decision was made county-wide to map most of the non- Zone A areas as Shaded Zone X without the benefit of supporting hydrologic and hydraulic analysis. Obvious mountain and steep hillslope areas were excluded. For the sake of map clarity, only the high flood hazard areas are shown.

Climate Change Impacts

The NCA report (Garfin, et.al., 2014) notes that one of the anticipated impacts of climate change for the Southwest is a reduction in average annual precipitation and streamflow volumes. The report and supporting documents also indicate that winter storm intensities are anticipated to increase, which may lead to increased event-based flooding. This could be exacerbated by watersheds with reduced vegetation due to climate change induced drought or wildfire. Collectively these impacts could result in more severe winter season flooding and warrant mitigation efforts that design to less frequent storm events such as the 250- or 500-year (0.4 or 0.2% probability) recurrence intervals in anticipation of the impacts. Executive Order 13690[34], titled "Federal Flood Risk Management Standard", is a first step by the federal government in implementing requirements to look at less frequent storm events when establishing finished floor and flood elevation design standards for certain federally identified or funded facilities that are located with special flood hazard areas. Expansion of these policies to all floodplain development and flood mitigation may be warranted under the current climate change thinking.

Vulnerability – CPRI Results

Flooding CPRI results for each community are summarized in Table 5-22 below.

[34] FEMA website access at: https://www.fema.gov/federal-flood-risk-management-standard-ffrms

Table 5-22: CPRI results by jurisdiction for flooding hazard					
Participating Jurisdiction	**Probability**	**Magnitude/ Severity**	**Warning Time**	**Duration**	**CPRI Score**
Avondale	Likely	Limited	12-24 hours	<24 hours	2.45
Buckeye	Possibly	Critical	<6 hours	<24 hours	2.60
Carefree	Highly Likely	Limited	12-24 hours	<24 hours	2.90
Cave Creek	Highly Likely	Limited	6-12 hours	<6 hours	2.95
Chandler	Likely	Negligible	>24 hours	<24 hours	2.00
El Mirage	Highly Likely	Critical	12-24 hours	<24 hours	3.20
Fort McDowell Yavapai Nation	Possibly	Limited	6-12 hours	<24 hours	2.15
Fountain Hills	Possibly	Critical	6-12 hours	<1 week	2.55
Gila Bend	Possibly	Limited	<6 hours	<24 hours	2.30
Gilbert	Highly Likely	Limited	>24 hours	<1 week	2.85
Glendale	Likely	Limited	12-24 hours	>1 week	2.65
Goodyear	Highly Likely	Limited	6-12 hours	<24 hours	3.05
Guadalupe	Possibly	Limited	<6 hours	<6 hours	2.20
Litchfield Park	Likely	Limited	12-24 hours	<24 hours	2.45
Unincorporated Maricopa County	Highly Likely	Critical	<6 hours	<24 hours	3.50
Mesa	Highly Likely	Limited	6-12 hours	<1 week	3.15
Paradise Valley	Possibly	Critical	12-24 hours	<24 hours	2.30
Peoria	Highly Likely	Critical	<6 hours	<24 hours	3.50
Phoenix	Likely	Critical	12-24 hours	<24 hours	2.75
Queen Creek	Highly Likely	Limited	12-24 hours	<24 hours	2.90
Salt River Pima-Maricopa Indian Community	Highly Likely	Critical	<6 hours	<1 week	3.60
Scottsdale	Likely	Limited	<6 hours	<6 hours	2.65
Surprise	Highly Likely	Limited	<6 hours	<6 hours	3.10
Tempe	Highly Likely	Critical	6-12 hours	<1 week	3.45
Tolleson	Likely	Limited	12-24 hours	<24 hours	2.45
Wickenburg	Highly Likely	Catastrophic	<6 hours	<24 hours	3.80
Youngtown	Highly Likely	Catastrophic	<6 hours	<24 hours	3.80
				County-wide average CPRI =	**2.86**

Vulnerability – Loss/Exposure Estimations

The estimation of potential exposure to high and medium flood hazards was accomplished by intersecting the human, residential and asset facilities with the flood hazard limits depicted on Maps 4A, 4B, and 4C. No loss estimations were made for this update. Only exposure of the human, residential and asset facilities are reported. Table 5-23 summarizes the MJPT identified critical and non-critical facilities potentially exposed to high hazard floods. Table 5-24 summarizes population sectors exposed to the high hazard flood areas. Residential structure exposures to high hazard flood areas are summarized in Table 5-25.

In summary, 500 critical and non-critical MJPT identified assets with a cumulative reported replacement cost of $1.6 billion are exposed to high hazard flood areas for the planning area. An additional $19.0 billion of census block residential structures are located in high hazard flood areas for the planning area. Regarding human vulnerability, a total population of 104,120 people, or 2.73% of the total census block population, is potentially exposed to a high hazard flood area for the planning area. 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.

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Table 5-23: Asset inventory exposure to high hazard flood zones

Community	Total Facilities Reported by Community	Impacted Facilities	Percentage of Total Community Facilities Impacted	Total Replacement Value of All Facilities Reported by Community (x $1,000)	Estimated Replacement Value Exposed to Hazard (x $1,000)
County-Wide Totals (Maricopa Only)	**10917**	**500**	**4.58%**	**$26,024,918**	**$1,596,365**
Avondale	131	6	4.58%	$179,460	$7,000
Buckeye	125	11	8.80%	$268,667	$24,838
Carefree	6	0	0.00%	$9,000	$0
Cave Creek	4	0	0.00%	$13,258	$0
Chandler	277	5	1.81%	$1,361,072	$20,434
El Mirage	34	2	5.88%	$285,542	$47,500
Fort McDowell Yavapai Nation	26	0	0.00%	$202,624	$0
Fountain Hills	15	0	0.00%	$411,000	$0
Gila Bend	7	2	28.57%	$36,000	$9,000
Gilbert	5287	119	2.25%	$0	$0
Glendale	1224	35	2.86%	$4,085,807	$4,011
Goodyear	159	22	13.84%	$148,573	$0
Guadalupe	7	0	0.00%	$10,800	$0
Litchfield Park	5	0	0.00%	$118,900	$0
Unincorporated Maricopa County	1061	238	22.43%	$3,624,310	$1,071,063
Mesa	528	3	0.57%	$2,850,466	$5,800
Paradise Valley	95	1	1.05%	$469,300	$1,000
Peoria	299	5	1.67%	$282,333	$1,395
Phoenix	947	15	1.58%	$7,843,312	$111,523
Queen Creek (Maricopa County Only)	124	7	5.65%	$301,446	$24,500
Salt River Pima-Maricopa Indian Community	78	1	1.28%	$502,493	$13,366
Scottsdale	237	24	10.13%	$1,094,610	$224,035
Surprise	94	3	3.19%	$498,810	$30,000
Tempe	111	0	0.00%	$1,373,300	$0
Tolleson	10	0	0.00%	$0	$0
Wickenburg	14	1	7.14%	$32,589	$900
Youngtown	12	0	0.00%	$21,247	$0
Gilbert (Pinal County Only)	1	0	0.00%	$0	$0
Mesa (Pinal County Only)	22	0	0.00%	$7,380	$0
Queen Creek (Pinal County Only)	5	0	0.00%	$4,697	$0
Maricopa County (Pinal County Only)	3	0	0.00%	$707	$0
Maricopa County (Yavapai County Only)	6	0	0.00%	$1,760	$0

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Table 5-24: Population sectors exposed to high hazard flood zones

Community	Total Population	Population Exposed		Total Population Over 65	Population Over 65 Exposed	
		Total	Percent		Total	Percent
County-Wide Totals (Maricopa Only)	**4,136,787**	**104,120**	**2.52%**	**538,166**	**11,003**	**2.04%**
Apache Junction (Maricopa County Portion)	314	0	0.00%	149	0	0.00%
Avondale	79,485	1,327	1.67%	5,313	98	1.84%
Buckeye	65,452	1104	1.69%	5,141	96	1.87%
Carefree	3,580	237	6.62%	1,591	100	6.29%
Cave Creek	5,287	436	8.25%	1169	109	9.32%
Chandler	250,334	3,793	1.52%	23,435	197	0.84%
El Mirage	33,728	2044	6.06%	2,700	617	22.85%
Fort McDowell Yavapai Nation	1017	54	5.31%	85	5	5.88%
Fountain Hills	23,536	740	3.14%	7,318	204	2.79%
Gila Bend	2,012	447	22.22%	193	44	22.80%
Gilbert	239,546	4,780	2.00%	17,960	391	2.18%
Glendale	237,327	3,567	1.50%	23,675	308	1.30%
Goodyear	78,118	1,618	2.07%	10,094	232	2.30%
Guadalupe	6,230	145	2.33%	581	11	1.89%
Litchfield Park	5,980	70	1.17%	1,065	13	1.22%
Unincorporated Maricopa County	290,179	26,322	9.07%	95,187	3,553	3.73%
Mesa	467,657	3,307	0.71%	71,995	617	0.86%
Paradise Valley	13,834	774	5.59%	3,365	162	4.81%
Peoria	166,339	2,906	1.75%	25,308	455	1.80%
Phoenix	1,561,296	34,577	2.21%	143,448	2,701	1.88%
Queen Creek	35,720	414	1.16%	2,094	28	1.34%
Salt River Pima-Maricopa Indian Community	6,706	313	4.67%	1,004	45	4.48%
Scottsdale	237,929	21,875	9.19%	49,963	4,361	8.73%
Surprise	128,211	1,822	1.42%	26,025	509	1.96%
Tempe	176,809	1110	0.63%	15,264	57	0.37%
Tolleson	6,904	426	6.17%	809	40	4.94%
Wickenburg	6,803	1,164	17.11%	2,058	300	14.58%
Youngtown	6,454	643	9.96%	1,177	94	7.99%
Queen Creek (Pinal County Portion)	1421	45	3.17%	128	4	3.13%
Peoria (Yavapai County Portion)	7	0	0.00%	2	0	0.00%
Wickenburg (Yavapai County Portion)	206	0	0.00%	32	0	0.00%

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Table 5-25: Residential structures exposed to high hazard flood zones

Community	Residential Building Count	Residential Building Exposure		Residential Building Replacement Value (x$1,000)	Residential Building Value Exposed	
		Total	Percent		Total (x$1,000)	Percent
County-Wide Totals (Maricopa Only)	**1,639,265**	**49,562**	**3.02%**	**$542,436,633**	**$18,990,906**	**3.50%**
Apache Junction (Maricopa County Portion)	295	0	0.00%	$76,791	$0	0.00%
Avondale	26,802	448	1.67%	$7,272,041	$121,641	1.67%
Buckeye	18,206	360	1.98%	$4,946,783	$97,749	1.98%
Carefree	2,242	165	7.36%	$1,922,010	$141,641	7.37%
Cave Creek	2,498	215	8.61%	$1,628,751	$140,434	8.62%
Chandler	94,257	1,269	1.35%	$34,713,265	$467,257	1.35%
El Mirage	11,307	1275	11.28%	$2,655,346	$299,436	11.28%
Fort McDowell Yavapai Nation	308	19	6.17%	$260,045	$16,007	6.16%
Fountain Hills	13,105	439	3.35%	$5,944,909	$199,003	3.35%
Gila Bend	944	268	28.39%	$118,937	$33,709	28.34%
Gilbert	74,821	1,560	2.08%	$29,339,526	$611,868	2.09%
Glendale	90,415	2,711	3.00%	$24,665,480	$739,539	3.00%
Goodyear	25,023	562	2.25%	$8,326,438	$186,928	2.24%
Guadalupe	1,397	32	2.29%	$269,202	$6,149	2.28%
Litchfield Park	2,616	30	1.15%	$996,356	$11,320	1.14%
Unincorporated Maricopa County	142,777	10,181	7.13%	$45,530,720	$3,246,766	7.13%
Mesa	201,507	1,526	0.76%	$59,328,380	$449,284	0.76%
Paradise Valley	5,621	488	8.68%	$11,738,020	$1,019,575	8.69%
Peoria	64,806	1,341	2.07%	$21,410,130	$443,113	2.07%
Phoenix	590,476	11,833	2.00%	$167,455,500	$3,355,733	2.00%
Queen Creek	8,422	98	1.16%	$2,890,493	$33,465	1.16%
Salt River Pima-Maricopa Indian Community	2,680	90	3.36%	$919,777	$31,051	3.38%
Scottsdale	123,959	11,914	9.61%	$67,660,310	$6,503,151	9.61%
Surprise	52,607	969	1.84%	$15,652,750	$288,441	1.84%
Tempe	73,603	635	0.86%	$24,383,780	$210,364	0.86%
Tolleson	2,165	127	5.87%	$505,455	$29,567	5.85%
Wickenburg	3,610	695	19.25%	$1,285,212	$247,462	19.25%
Youngtown	2,796	312	11.16%	$540,226	$60,253	11.15%
Queen Creek (Pinal County Portion)	606	18	2.97%	$207,814	$6,345	3.05%
Peoria (Yavapai County Portion)	5	1	20.00%	$1,321	$306	23.16%
Wickenburg (Yavapai County Portion)	54	0	0.00%	$19,703	$0	0.00%

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It is duly noted that the 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 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.

Vulnerability – Repetitive Loss Properties

Repetitive Loss (RL) properties are NFIP-insured properties that, since 1978, have experienced multiple flood losses. FEMA tracks RL properties with a particular interest in identifying 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. RL properties are also important to the NFIP, since structures that flood frequently put a strain on the National Flood Insurance Fund. FEMA records dated March 3, 2021 indicate that there are 223 identified RL properties in Maricopa County, 119 of which have been mitigated. The total payments made for building and contents for the record period is over $8.6 million. Table 5-26 summarizes the RL property characteristics by jurisdiction. If a jurisdiction is not listed, then there are no RL properties for that jurisdiction.

Table 5-26: Repetitive loss property statistics for Maricopa County jurisdictions

Jurisdiction	No. of Properties	No. of Properties Mitigated	Total Payments
Avondale	1	0	$9,865
Buckeye	6	0	$156,463
Glendale	5	4	$118,108
Goodyear	1	0	$210,035
Unincorporated Maricopa County	68	50	$2,368,122
Mesa	5	1	$153,614
Paradise Valley	5	0	$651,563
Phoenix	102	43	$3,990,687
Scottsdale	6	4	$264,427
Tempe	4	2	$194,648
Tolleson	12	11	$291,388
Wickenburg	5	1	$165,375

Vulnerability – Development Trends

For most Maricopa County jurisdictions, adequate planning and regulatory tools are in place to regulate future development. The FCDMC is very proactive in delineating floodplains ahead of development in the less populated areas of the county and works cooperatively with all incorporated jurisdictions to update and refine existing floodplain mapping as needed. As such, it is anticipated that any new development or growth in the unincorporated county will be required to adhere to the county's drainage and flood control requirements.

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Changes in Development in the Hazard Prone Area

Within the unincorporated areas of Maricopa County, residential development has been minimal but has been concentrated along I-17 in the Anthem area and in the western portion of the County along SR303. It is anticipated that new development will largely occur in these areas over the next five years. Portions of these areas do lie within identified high hazard flooding areas and can potentially impact the flooding hazard if development is located within the designated floodplains. Development in 1% flood hazard areas is regulated through compliance with the NFIP by the County and municipalities.

The table below summarizes the changes in development within all other participating jurisdictions in relation to known flood hazard areas within the County.

Jurisdiction	Development Changes
All Jurisdictions	Changes in development are regulated through each community's Floodplain Management Ordinance or similar, and individual drainage review processes will minimize the exposure to high flood hazards.
Avondale	A portion of the areas identified for development along the planned State Route 30, Gila River, and Rio Reimagined in southern Avondale will have the greatest exposure to flood risk.
Buckeye	Development of areas generally north of I-10 and bordering the Gila River have greatest exposure to high hazard flood zones. Over half of the 12,366 permits issued in Buckeye are in subdivisions north of I-10. All these areas have master drainage plans with well-defined flood conveyance facilities. Continued development within these areas will follow the same standards.
Carefree	Changes in development are anticipated to occur on a parcel-by-parcel basis with a focus on the Town center, SkyRanch area, and Cave Creek Road. Most of these areas are outside of a designated high hazard area. Any new development will come with enhancement to public infrastructure which would include storm water management.
Cave Creek	All the identified high hazard flood areas are located within well-defined watercourses and anticipated development changes will be required to avoid and preserve those conveyances through adherence to local drainage regulations and flood control measures.
Chandler	Small areas mostly in the eastern portion of Chandler, along the upstream side of irrigation canals, are designated as high hazard flood zones. Changes in development of these areas is not anticipated and many are preserved as permanent open space.
El Mirage	Small areas mostly in the eastern portion of the El Mirage Community, east of El Mirage Rd, are designated as high hazard flood zones and are typically well-defined drainage corridors. Changes in development expected in the northeast and southern regions of the City are not within the high hazard flood zones.
Fountain Hills	All the identified high hazard flood areas are located within well-defined watercourses and anticipated development changes will be required to avoid and preserve those conveyances through adherence to local drainage regulations and flood control measures.

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Jurisdiction	Development Changes
Fort McDowell Yavapai Nation	Fort McDowell Yavapai Nation is bisected by a high hazard flood area running north to south along the Verde River with a tributary flood zone contributing from the east. Development changes on the nation are closely regulated and controlled to be outside of flood hazard areas and existing watercourses are preserved for conveyance.
Gila Bend	Flood hazard areas in Gila Bend are primarily located along watercourses entering the Town from the south and draining to the Gila River. Development changes within or near these zones are anticipated to be minimal. Any new development will be required to enhance public infrastructure to provide effective storm water management.
Gilbert	Small areas of flood zones along the upstream side of irrigation canals or along developed flood control channels are designated as high hazard flood zones in the Town. Anticipated development changes are located outside of these areas.
Glendale	High hazard flood zones in Glendale are primarily contained within defined flood control corridors such as the New River, Agua Fria River, ACDC, and Skunk Creek. Projected development changes are not expected to occur within the areas being targeted by the City.
Goodyear	High hazard flood zones in Goodyear, north of the Gila River are primarily limited to the Bullard Wash alignment. Anticipated areas of development change are all located outside of currently identified high flood hazard areas.
Guadalupe	High flood hazard areas within the Town are solely contained within improved drainage facilities and the Town does not anticipate any meaningful development changes near these areas.
Litchfield Park	High hazard flood areas within Litchfield Park are primarily located in ponding zones upstream of an irrigation canal and are contained within golf course, park, and lake areas. None of the development changes are located in the high hazard flood zones.
Mesa	High hazard flood zones within the City are primarily located along the upstream side of irrigation canals or along developed flood control facilities. Anticipated areas of development change are located outside of these areas.
Peoria	High hazard flood zones throughout Peoria are primarily located along established watercourses, conveyance corridors and flood control facilities. Development changes in the northern portion of the City will likely increase population densities north of Happy Valley Road and Hwy 303. Portions of these areas contain high flood hazard areas that will be regulated per the City's floodplain management ordinance and drainage design policies.
Phoenix	High hazard flood zones throughout Phoenix are primarily located along established watercourses, conveyance corridors, canals, and flood control facilities. Development changes anticipated for the northwest part of the City include a new industrial development at the northwest corner of Loop 303 and I-17. Continued active commercial and residential development in the northeast areas of the City are currently located within an alluvial fan flood zone that is planned for mitigation in the next planning cycle. Other new development throughout the City will be regulated per the City's floodplain management ordinance and drainage design policies.
Queen Creek	High flood hazard areas within Queen Creek are primarily located along the Sonoqui Wash, Queen Creek, and the Rittenhouse corridors. The recently annexed lands in Pinal County have just received a LOMR removing the relic flood hazard zones from those areas. Development changes are generally located outside of the designated high hazard areas.

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Jurisdiction	Development Changes
Salt River Pima-Maricopa Indian Community	The area along the southern border of the Salt River Pima-Maricopa Indian Community that follows the Salt River is designated as a high hazard flood zone. The corridor along the Verde River is similarly delineated. Development changes are anticipated for areas outside of these zones.
Scottsdale	High hazard flood zones within Scottsdale primarily follow established watercourses and flood control facilities. Two alluvial fan zones exist in north of the CAP Canal and account for most of the City's hazard exposure. Both areas are in past and anticipated development change areas and will continue to be regulated per the City's floodplain management ordinance and drainage design guidelines. The City is also working to provide mitigation infrastructure that will greatly reduce the flood hazard footprint.
Surprise	High hazard flood zones within Surprise are primarily located north (upstream) of the McMicken Dam and Outlet Channel. Anticipated development (primarily residential) changes are anticipated in some of these areas and particularly the areas north of Loop 303 and east of U.S. 60. Hazard areas generally follow established watercourses will be regulated per the City's floodplain management ordinance and drainage design guidelines.
Tempe	High hazard flood zones in Tempe are generally limited the Salt River, Indian Bend Wash, and minor ponding along an irrigation canal. Most of the development change for Tempe is through re-development and those areas are outside of the delineated high hazard areas.
Tolleson	The majority of high hazard flood areas in Tolleson are located along the upstream side of a regional railroad and within flood control facilities along the north side of I-10. Development changes are anticipated to continue in the same areas for several industrial areas are anticipated along the rail line and will be impacted by the flood hazard area. The City will regulate these developments per the City's floodplain management ordinance and drainage design guidelines.
Wickenburg	High flood hazard zones within Wickenburg follow major watercourses draining through the Town. Development changes along these corridors will likely be a continuation of recent development. In all cases, watercourse corridors are preserved to contain the flood hazard, and the Town will continue to regulate the areas per the Town's floodplain management ordinance and drainage design guidelines.
Youngtown	High flood hazard areas in Youngtown follow the Agua Fria River. Anticipated development changes within the hazard zone include improvement of a 100+ acre park in the river bottom. All other development changes are located outside of the flood hazard areas.

Sources

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FEMA, 2001, Understanding Your Risks; Identifying Hazards and Estimating Losses, FEMA Document No. 386-2.

U.S. Army Corps of Engineers, Los Angeles District, 1978, Flood Damage Report, 28 February-6 March 1978 on the storm and floods in Maricopa County, Arizona, FCDMC Library #802.024.

U.S. Army Corps of Engineers, Los Angeles District, 1979, Flood Damage Report, Phoenix Metropolitan Area, December 1978 Flood, FCDMC Library #802.027.

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U.S. Army Corps of Engineers, Los Angeles District, 1980, Phoenix Flood Damage Survey, FCDMC Library #802.029.

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

Profile Maps

Maps 4A, 4B, and 4C – Flood Hazard Maps

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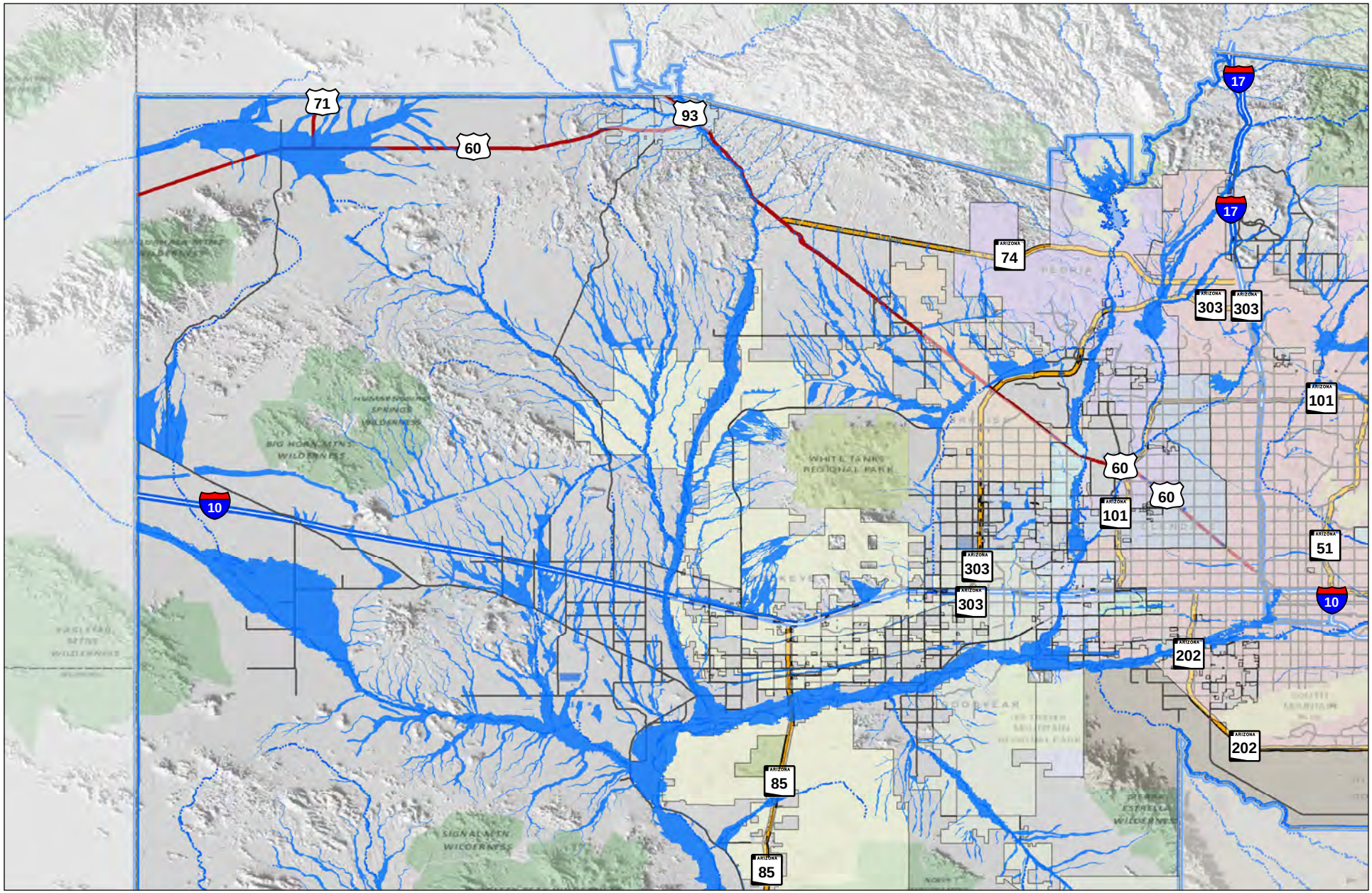


Legend

- Maricopa County
- Mitigation Plan Extent
- Major Streams

Flood Hazard Rating

- High

0 37.5 75 150

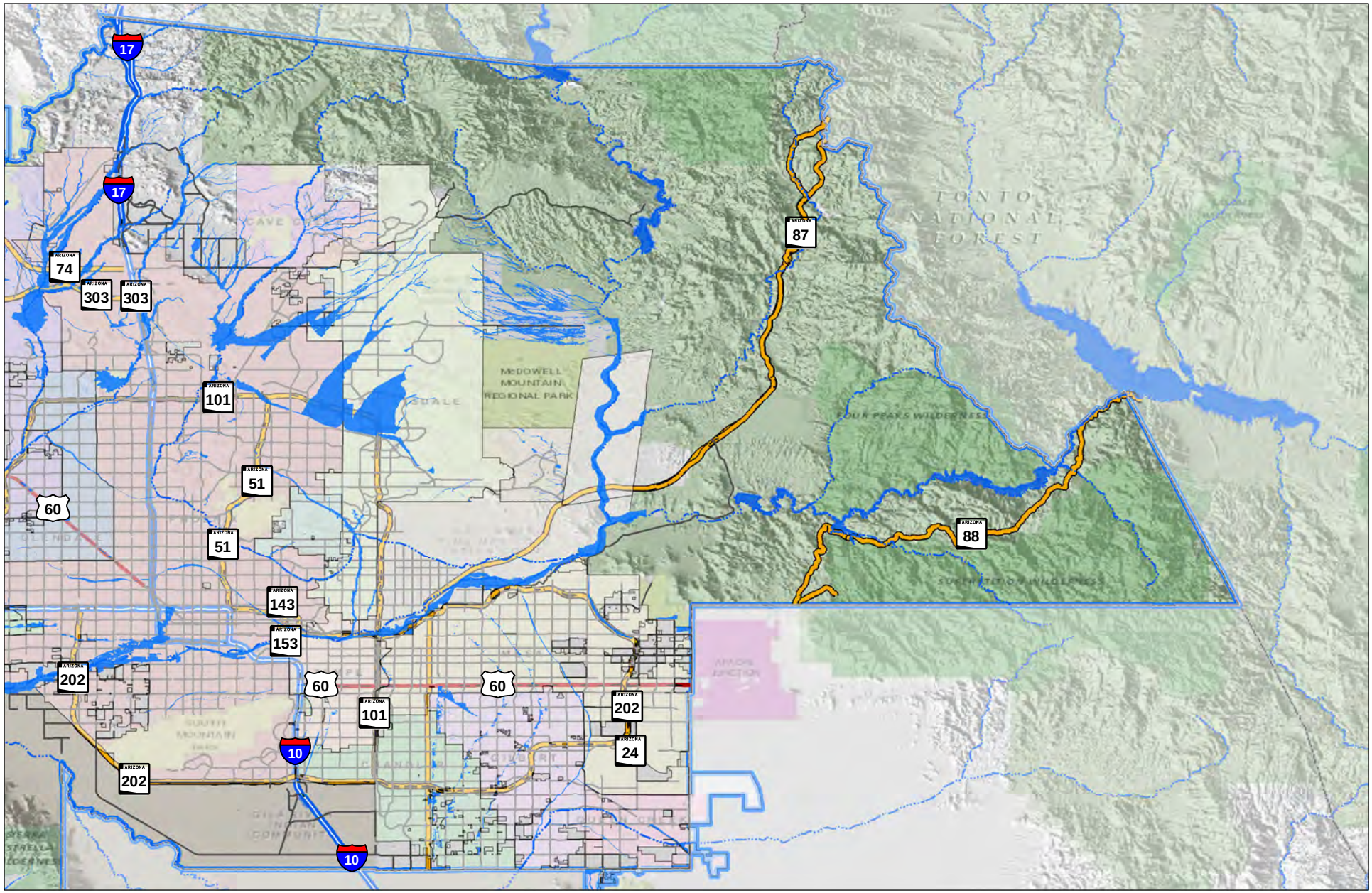
Miles

Source: JE Fuller 2020; FEMA 2020; FCDMC 2020, MAG 2020; TIGER 2020

MARICOPA COUNTY

Maricopa County Multi-Jurisdictional Hazard Mitigation Plan

Map 4A
Maricopa County
Flood Hazard Map
as of Sept 2020



Legend

NAME

- Maricopa County
- Mitigation Plan Extent
- Major Streams

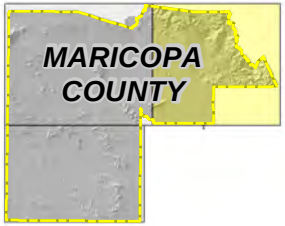
Flood Hazard Rating

- High

0 37.5 75 150

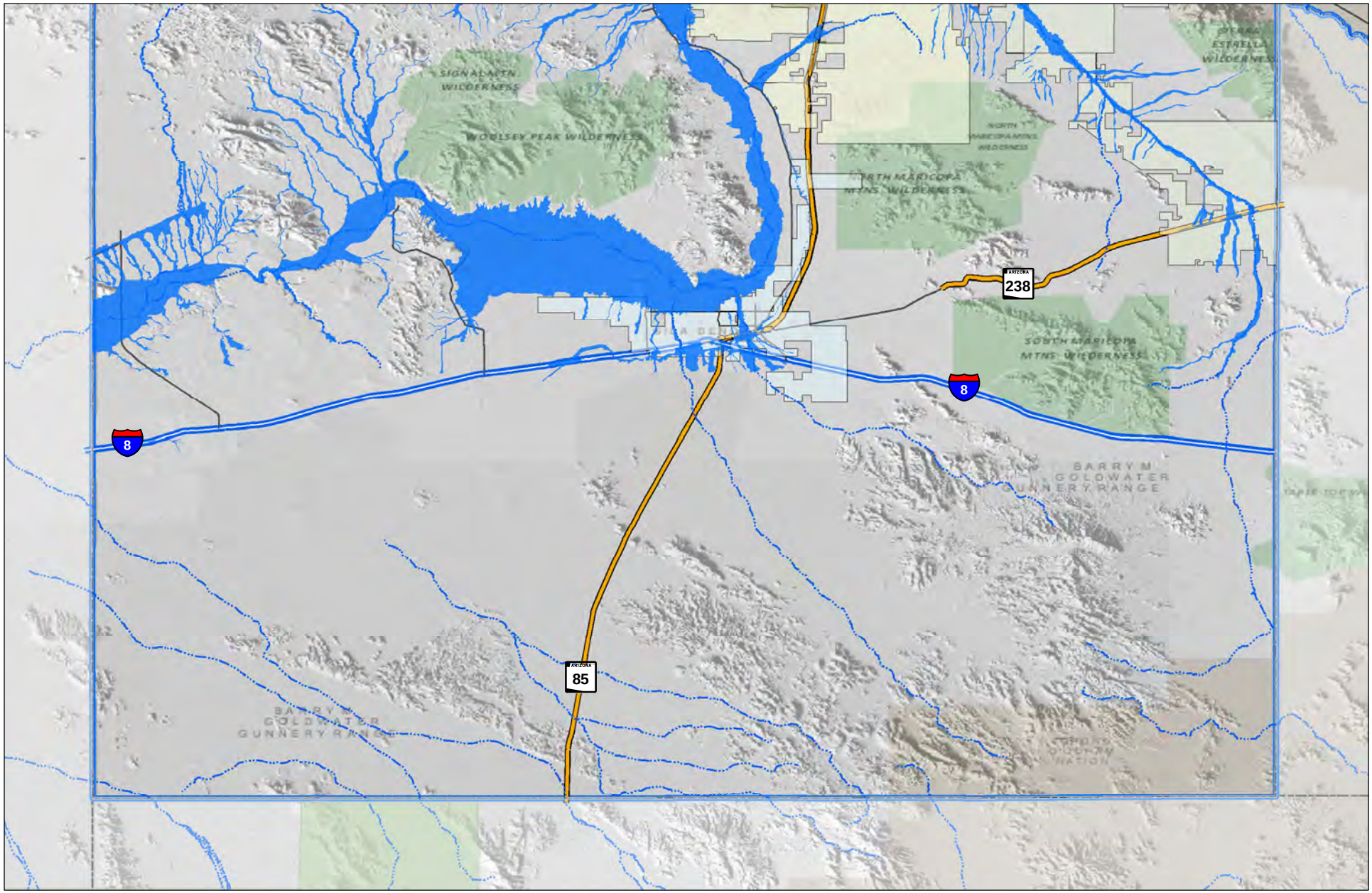
Miles

Source: JE Fuller 2020; FEMA 2020; FCDMC 2020, MAG 2020; TIGER 2020



Maricopa County Multi-Jurisdictional Hazard Mitigation Plan

Map 4B
Maricopa County
Flood Hazard Map
as of Sept 2020



Legend

- Maricopa County
- Mitigation Plan Extent
- Major Streams

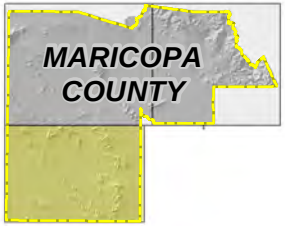
Flood Hazard Rating

- High

0 37.5 75 150

Miles

Source: JE Fuller 2020; FEMA 2020; FCDMC 2020, MAG 2020; TIGER 2020



Maricopa County Multi-Jurisdictional Hazard Mitigation Plan

Map 4C
Maricopa County
Flood Hazard Map
as of Sept 2020

5.3.6 Levee Failure

Description

Levees are man-made structures that impound water above the natural prevailing grade or natural conveyance of a watercourse, creating an artificially constrained floodway. Areas protected by a levee, referred to as leveed areas, become the areas at-risk during a levee failure event. Levees are usually artificial structures comprised of earthen, cement stabilized aggregate (CSA) or roller compacted concrete (RCC) embankments, or structural concrete or steel walls. A levee is typically constructed parallel and adjacent to an existing watercourse and serves to augment or contain flood flows to a specified corridor. In some cases, the levee will function as a diversion structure that will re-direct flood-waters along an alignment that allows for positive flow along the levee to the intended outlet. All the levees within Maricopa County are designed for flood control.

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 so as to provide protection from temporary flooding (FEMA, 2009). 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 Maricopa County, these might be comprised of features such as elevated roadway and railway embankments, canals, irrigation ditches and drains, and agricultural dikes.

In November 2017, Governor Ducey received a letter from the notifying the Governor of the Congressional authorization of USACE to work with interested states and levee owners/operators to conduct and inventory and review of levees across the nation. The purpose of the action is to work with Arizona agencies to inventory, review and assess critical information for levees within Arizona, with a particular focus on levees not currently identified to be within USACE authority. The collected information will be included in the USACE's National Levee Database (NLD), which is publicly available and used to promote awareness of the benefits and flood risks associated with levees.

In recent years, the United States Army Corps of Engineers (USACE) has been working with Arizona to assess and update the USACE's National Levee Database (NLD), which is publicly available and used to promote awareness of the benefits and flood risks associated with levees. The Arizona Department of Water Resources (ADWR) will serve as the state's lead agency for levee safety. By participating in the USACE project and coordinating with FEMA through the Cooperating Technical Partnership (CTP) program, ADWR will work with FEMA, USACE and local officials to better inspect, maintain, and track levees within their communities.

Levee failures result in an uncontrolled release of water to the leveed areas, with potentially catastrophic impacts. Failures may be attributed to a variety of modes and

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causes. The three most common are: 1) foundation leakage and piping, 2) overtopping, and 3) embankment erosion. Deep rooted vegetation growth and animal boroughs along levees can also initiate piping failure pathways and compromise the structural integrity of walls and footings.

History

Levees (certified or not) have been used in Maricopa County for over a hundred years to protect communities and agricultural assets, 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 cement stabilized aggregate embankments lining both sides of a river. 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 Maricopa County, nor are there any documented records of non-levee embankment failures.

Probability and Magnitude

There are no established probability or magnitude criteria regarding levee failure due to variability in levee design and maintenance. For flood protection credit under the NFIP, FEMA has established certain design criteria that are based on the 1 percent (100-year) storm event. Federally constructed levees are usually designed for larger, more infrequent events that equate to 250 to 500 year events. All FEMA certified levees within Maricopa County are designed to safely convey the 100-year event, with a factor of safety provided by a minimum additional freeboard of three (3) or more feet.

The Flood Control District of Maricopa County (FCDMC) has been active over the last planning cycle in delineating levee failure zones for levees managed by FCDMC. In addition, FEMA's National Flood Hazard Layer (NFHL) data for Maricopa County has been updated to include several more Shaded Zone X - Areas Protected by Levee areas. Both data sets have been compiled and a HIGH hazard rating. All other areas are defined as LOW.

Climate Change Impacts

The climate change impacts to levee failure are nearly identical to those discussed in the Flooding section (see Section 5.3.5). Increases in winter flood intensities, combined with the effects of reduced watershed vegetation due to drought and/or wildfire, could elevate the probability of levee failures in the county, and especially for levees that were not designed to convey/contain flows greater than the 100-year (1% probability) standard. Most federally sponsored levee design and construction will use, or have used, discharges that exceed the 100-year standard, but not all. Mitigation activities should consider using the 500-year event as the minimum design standard to anticipate the impacts of climate change.

Vulnerability – CPRI Results

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Levee Failure CPRI results for each community are summarized in Table 5-27 below.

Table 5-27: CPRI results by jurisdiction for levee failure

Participating Jurisdiction	Probability	Magnitude/ Severity	Warning Time	Duration	CPRI Score
Avondale	Possibly	Negligible	<6 hours	<24 hours	2.00
Buckeye	Unlikely	Negligible	<6 hours	<6 hours	1.45
Carefree	Unlikely	Negligible	>24 hours	<6 hours	1.00
Cave Creek	Unlikely	Negligible	<6 hours	<6 hours	1.45
Chandler	Unlikely	Negligible	>24 hours	<6 hours	1.00
El Mirage	Unlikely	Negligible	>24 hours	<6 hours	1.00
Fort McDowell Yavapai Nation	Unlikely	Negligible	<6 hours	<24 hours	1.55
Fountain Hills	Unlikely	Negligible	<6 hours	<24 hours	1.55
Gila Bend	Unlikely	Negligible	<6 hours	<24 hours	1.55
Gilbert	Possibly	Limited	<6 hours	<24 hours	2.30
Glendale	Unlikely	Limited	<6 hours	<24 hours	1.85
Goodyear	Unlikely	Negligible	<6 hours	<6 hours	1.45
Guadalupe	Unlikely	Negligible	<6 hours	<6 hours	1.45
Litchfield Park	Unlikely	Negligible	<6 hours	<6 hours	1.45
Unincorporated Maricopa County	Unlikely	Critical	<6 hours	<1 week	2.25
Mesa	Unlikely	Limited	<6 hours	<1 week	1.95
Paradise Valley	Possibly	Limited	<6 hours	<24 hours	2.30
Peoria	Possibly	Limited	<6 hours	<24 hours	2.15
Phoenix	Unlikely	Critical	6-12 hours	<6 hours	1.90
Queen Creek	Possibly	Negligible	<6 hours	<24 hours	1.85
Salt River Pima-Maricopa Indian Community	Possibly	Critical	<6 hours	<24 hours	2.60
Scottsdale	Unlikely	Negligible	<6 hours	<6 hours	1.45
Surprise	Unlikely	Negligible	<6 hours	<24 hours	1.55
Tempe	Possibly	Limited	<6 hours	<1 week	2.40
Tolleson	Unlikely	Negligible	>24 hours	<1 week	1.20
Wickenburg	Possibly	Limited	<6 hours	<6 hours	2.20
Youngtown	Unlikely	Critical	<6 hours	<6 hours	2.45
				County-wide average CPRI =	**1.75**

Vulnerability – Loss/Exposure Estimations

The estimation of potential exposure to high hazard levee failure areas was accomplished by intersecting the human and facility assets with the levee failure hazard limits depicted on Maps 5A, 5B, and 5C. Table 5-28 summarizes the MJPT identified critical and non-critical facilities potentially exposed to high hazard levee failure areas. Table 5-29 summarizes population sectors exposed to the high hazard levee failure areas. Residential structure exposures to high hazard levee failure areas are summarized in Table 5-30.

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Table 5-28: Asset inventory exposure to high hazard levee failure areas

Community	Total Facilities Reported by Community	Impacted Facilities	Percentage of Total Community Facilities Impacted	Total Replacement Value of All Facilities Reported by Community (x $1,000)	Estimated Replacement Value Exposed to Hazard (x $1,000)
County-Wide Totals (Maricopa Only)	**10917**	**104**	**0.95%**	**$26,024,918**	**$367,826**
Avondale	131	18	13.74%	$179,460	$75,000
Buckeye	125	0	0.00%	$268,667	$0
Carefree	6	0	0.00%	$9,000	$0
Cave Creek	4	0	0.00%	$13,258	$0
Chandler	277	0	0.00%	$1,361,072	$0
El Mirage	34	0	0.00%	$285,542	$0
Fort McDowell Yavapai Nation	26	0	0.00%	$202,624	$0
Fountain Hills	15	0	0.00%	$411,000	$0
Gila Bend	7	0	0.00%	$36,000	$0
Gilbert	5287	36	0.68%	$0	$0
Glendale	1224	2	0.16%	$4,085,807	$24,950
Goodyear	159	0	0.00%	$148,573	$0
Guadalupe	7	0	0.00%	$10,800	$0
Litchfield Park	5	0	0.00%	$118,900	$0
Unincorporated Maricopa County	1061	14	1.32%	$3,624,310	$7,843
Mesa	528	1	0.19%	$2,850,466	$2,000
Paradise Valley	95	0	0.00%	$469,300	$0
Peoria	299	10	3.34%	$282,333	$11,001
Phoenix	947	6	0.63%	$7,843,312	$37,463
Queen Creek (Maricopa County Only)	124	0	0.00%	$301,446	$0
Salt River Pima-Maricopa Indian Community	78	4	5.13%	$502,493	$54
Scottsdale	237	8	3.38%	$1,094,610	$155,515
Surprise	94	0	0.00%	$498,810	$0
Tempe	111	5	4.50%	$1,373,300	$54,000
Tolleson	10	0	0.00%	$0	$0
Wickenburg	14	0	0.00%	$32,589	$0
Youngtown	12	0	0.00%	$21,247	$0
Gilbert (Pinal County Only)	1	0	0.00%	$0	$0
Mesa (Pinal County Only)	22	0	0.00%	$7,380	$0
Queen Creek (Pinal County Only)	5	0	0.00%	$4,697	$0
Maricopa County (Pinal County Only)	3	0	0.00%	$707	$0
Maricopa County (Yavapai County Only)	6	0	0.00%	$1,760	$0

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Table 5-29: Population sectors exposed to high hazard levee failure areas						
		Population Exposed		Total Population Over 65	Population Over 65 Exposed	
Community	Total Population	Total	Percent		Total	Percent
County-Wide Totals (Maricopa Only)	**4,136,787**	**25,425**	**0.61%**	**538,166**	**4,417**	**0.82%**
Apache Junction (Maricopa County Portion)	314	0	0.00%	149	0	0.00%
Avondale	79,485	18,563	23.35%	5,313	1003	18.88%
Buckeye	65,452	0	0.00%	5,141	0	0.00%
Carefree	3,580	0	0.00%	1,591	0	0.00%
Cave Creek	5,287	0	0.00%	1169	0	0.00%
Chandler	250,334	0	0.00%	23,435	0	0.00%
El Mirage	33,728	0	0.00%	2,700	0	0.00%
Fort McDowell Yavapai Nation	1017	0	0.00%	85	0	0.00%
Fountain Hills	23,536	0	0.00%	7,318	0	0.00%
Gila Bend	2,012	0	0.00%	193	0	0.00%
Gilbert	239,546	1520	0.63%	17,960	86	0.48%
Glendale	237,327	2	0.00%	23,675	0	0.00%
Goodyear	78,118	0	0.00%	10,094	0	0.00%
Guadalupe	6,230	0	0.00%	581	0	0.00%
Litchfield Park	5,980	0	0.00%	1,065	0	0.00%
Unincorporated Maricopa County	290,179	6,603	2.28%	95,187	2,654	2.79%
Mesa	467,657	69	0.01%	71,995	42	0.06%
Paradise Valley	13,834	0	0.00%	3,365	0	0.00%
Peoria	166,339	19,258	11.58%	25,308	2,852	11.27%
Phoenix	1,561,296	12,915	0.83%	143,448	299	0.21%
Queen Creek	35,720	0	0.00%	2,094	0	0.00%
Salt River Pima-Maricopa Indian Community	6,706	0	0.00%	1,004	0	0.00%
Scottsdale	237,929	28268	11.88%	49,963	5248	10.50%
Surprise	128,211	0	0.00%	26,025	0	0.00%
Tempe	176,809	3897	2.20%	15,264	180	1.18%
Tolleson	6,904	0	0.00%	809	0	0.00%
Wickenburg	6,803	32	0.47%	2,058	1	0.05%
Youngtown	6,454	0	0.00%	1,177	0	0.00%
Queen Creek (Pinal County Portion)	1421	0	0.00%	128	0	0.00%
Peoria (Yavapai County Portion)	7	0	0.00%	2	0	0.00%
Wickenburg (Yavapai County Portion)	206	0	0.00%	32	0	0.00%

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Table 5-30: Residential structures exposed to high hazard levee failure areas

Community	Residential Building Count	Residential Building Exposure		Residential Building Replacement Value (x$1,000)	Residential Building Value Exposed	
		Total	Percent		Total (x$1,000)	Percent
County-Wide Totals (Maricopa Only)	**1,639,265**	**42,588**	**2.60%**	**$542,436,633**	**$16,533,182**	**3.05%**
Apache Junction (Maricopa County Portion)	295	0	0.00%	$76,791	$0	0.00%
Avondale	26,802	6,634	24.75%	$7,272,041	$1,800,089	24.75%
Buckeye	18,206	0	0.00%	$4,946,783	$0	0.00%
Carefree	2,242	0	0.00%	$1,922,010	$0	0.00%
Cave Creek	2,498	0	0.00%	$1,628,751	$0	0.00%
Chandler	94,257	0	0.00%	$34,713,265	$0	0.00%
El Mirage	11,307	0	0.00%	$2,655,346	$0	0.00%
Fort McDowell Yavapai Nation	308	0	0.00%	$260,045	$0	0.00%
Fountain Hills	13,105	0	0.00%	$5,944,909	$0	0.00%
Gila Bend	944	0	0.00%	$118,937	$0	0.00%
Gilbert	74,821	384	0.51%	$29,339,526	$150,602	0.51%
Glendale	90,415	1	0.00%	$24,665,480	$182	0.00%
Goodyear	25,023	0	0.00%	$8,326,438	$0	0.00%
Guadalupe	1,397	0	0.00%	$269,202	$0	0.00%
Litchfield Park	2,616	0	0.00%	$996,356	$0	0.00%
Unincorporated Maricopa County	142,777	3,663	2.57%	$45,530,720	$1,168,204	2.57%
Mesa	201,507	30	0.01%	$59,328,380	$8,850	0.01%
Paradise Valley	5,621	0	0.00%	$11,738,020	$0	0.00%
Peoria	64,806	9,422	14.54%	$21,410,130	$3,112,648	14.54%
Phoenix	590,476	6,050	1.02%	$167,455,500	$1,715,769	1.02%
Queen Creek	8,422	0	0.00%	$2,890,493	$0	0.00%
Salt River Pima-Maricopa Indian Community	2,680	0	0.00%	$919,777	$48,581	5.28%
Scottsdale	123,959	14419	11.63%	$67,660,310	$7,870,090	11.63%
Surprise	52,607	0	0.00%	$15,652,750	$0	0.00%
Tempe	73,603	1966	2.67%	$24,383,780	$651,398	2.67%
Tolleson	2,165	0	0.00%	$505,455	$0	0.00%
Wickenburg	3,610	19	0.53%	$1,285,212	$6,769	0.53%
Youngtown	2,796	0	0.00%	$540,226	$0	0.00%
Queen Creek (Pinal County Portion)	606	0	0.00%	$207,814	$0	0.00%
Peoria (Yavapai County Portion)	5	0	0.00%	$1,321	$0	0.00%
Wickenburg (Yavapai County Portion)	54	0	0.00%	$19,703	$0	0.00%

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In summary, 104 critical and non-critical MJPT identified assets with a cumulative reported replacement cost of $367.8 million are exposed to high hazard levee failure areas, for the planning area. An additional $16.5 billion of census block residential structures are exposed to high hazard levee failure areas for the planning area. Regarding human vulnerability, a total population of 24,525 people, or 0.67% of the total census block population for the planning area, is potentially exposed to a high hazard levee failure. 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.

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

With the new focus on residual downstream risk for the land-side of levees and a general refocusing of national levee regulation and policy, 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. The expansion of defined levee failure risk zones by FEMA and FCDMC will continue to raise the exposure for previously unstudied areas. New developments located in or around these areas should be evaluated to determine if mitigation actions are necessary. The most effective mitigation is regular maintenance and inspections of levee structures.

Changes in Development in the Hazard Prone Area

Within the unincorporated areas of Maricopa County, residential development has been minimal but has been concentrated along I-17 in the Anthem area and in the western portion of the County along SR303. It is anticipated that new development will largely occur in these areas over the next five years. These areas do not lie within identified high hazard areas associated with levee failure.

The table below summarizes the changes in development for jurisdictions with known levee failure hazard areas.

Jurisdiction	Development Changes
Avondale	The City contains levee failure hazard areas associated with the Agua Fria River with bisects the community from north to south. Development changes within Avondale Key Growth Corridors, identified as Van Buren Street from the new Fairway Drive freeway exit (near 127th Ave) to 99th Avenue, Historic Avondale Area (approx. Dysart and Buckeye Road), North Avondale Area (North of I-10) and the south Avondale Area (South of Lower Buckeye Road to the Gila River) will potentially impact areas of levee failure hazard.

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Jurisdiction	Development Changes
Gilbert	The southern portion of the Town of Gilbert is impacted with a Levee Failure Hazard area associated with the Roosevelt Canal, roughly bounded by Val Vista on the west, Higley on the east and Ocotillo on the north. The bulk of new and expected commercial and industrial development within Gilbert is anticipated to occur in the northern portion of the Town. The majority of new residential projects are anticipated to occur within the southern portion, however none of the projected areas are located within the levee failure hazard area.
Glendale	Levee failure hazard areas within Glendale are concentrated around the confluence of the Agua Fria River and New River. The only area of new and proposed development potentially impacted by the identified Levee Failure Hazard is located west of Hwy 101 between Northern Avenue and Camelback Road. However, given the limited extent of the levee failure hazard in this area, no impacts due to changes in development are anticipated.
Goodyear	There are no areas of high hazard due to levee failure located within the City of Goodyear. While changes in development have occurred, they have no impact on this hazard.
Guadalupe	The Community of Guadalupe does not anticipate significant changes in development and is not impacted by areas of increased levee failure hazard.
Litchfield Park	There are no areas of high hazard due to levee failure located within the City of Litchfield. While changes in development have occurred, they have no impact on this hazard.
Mesa	There are only minimal areas of high hazard due to levee failure located within the City of Mesa. While changes in development have occurred, they have no impact on this hazard.
Peoria	Peoria is impacted by areas of levee failure hazard associated with New River from the intersection of Hwy 101 and 60 to the southern City limits. Recent development has occurred in the northern and northwestern areas of the City and is anticipated to continue to migrate northward. Changes in development are not anticipated to impact areas of levee failure hazard.
Phoenix	The City contains levee failure hazard areas associated with Skunk Creek to the north, New River to the west and the Salt River to the east. The majority of new development within the City of Phoenix is associated with infill development and residential development within the southwest area of the City. As the development efforts do not lie within areas of levee failure hazard, development changes will not impact this hazard.
Queen Creek	There are no areas of high hazard due to levee failure located within the Town of Queen Creek. While changes in development have occurred, they have no impact on this hazard.
Salt River Pima-Maricopa Indian Community	The SRPMIC is impacted with a levee failure hazard area associated with the Salt River on the westernmost portion of the Community, west of Hwy 101. No development changes are currently proposed within this area.
Scottsdale	The City of Scottsdale is impacted by the levee failure hazard area associated with Indian Bend Wash on the southernmost portion of the community from Indian Bend Rd to the southern boundary. The majority of new residential and commercial development is anticipated to occur within the northern and central sub-areas of the City and will not be impacted by the levee failure hazard area. Limited development has occurred within the southern sub-area, however the area impacted by the levee is fully developed and will not experience substantial changes in development.
Surprise	There are no areas of high hazard due to levee failure located within the City of Surprise. While changes in development have occurred, they have no impact on this hazard.

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Jurisdiction	Development Changes
Tempe	Levee failure hazard areas are present within the City of Tempe along the Hwy 202 alignment in association with the Salt River. The highest rates of growth within the City are located in the northern portions of the City, specifically in the downtown area, Tempe Town Lake, and the new Novus Innovation Corridor. These areas of development will be impacted by the identified levee failure hazard areas.
Tolleson	There are no areas of high hazard due to levee failure located within the City of Tolleson. While changes in development have occurred, they have no impact on this hazard.
Wickenburg	A small portion of levee failure hazard area associated with Hassayampa River is located within the Town of Wickenburg along Hwy 93. However, no changes in development exist or have been proposed within this area.
Youngtown	There are no areas of high hazard due to levee failure located within the Town of Youngtown. While changes in development have occurred, they have no impact on this hazard.

Sources

Arizona Department of Emergency and Military Affairs, 2018, *State of Arizona Multi-Hazard Mitigation Plan, 2018 Update.*

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FEMA, 2009, Web page at URL: http://www.fema.gov/plan/prevent/fhm/lv_intro.shtm#3

FCDMC, 2020, Dam and Levee Safety group

USACE National Levee Database, 2020, website access at: https://levees.sec.usace.army.mil/#/

Profile Maps

Maps 5A, 5B, and 5C – Potential Levee Failure Flood Hazard Map(s)

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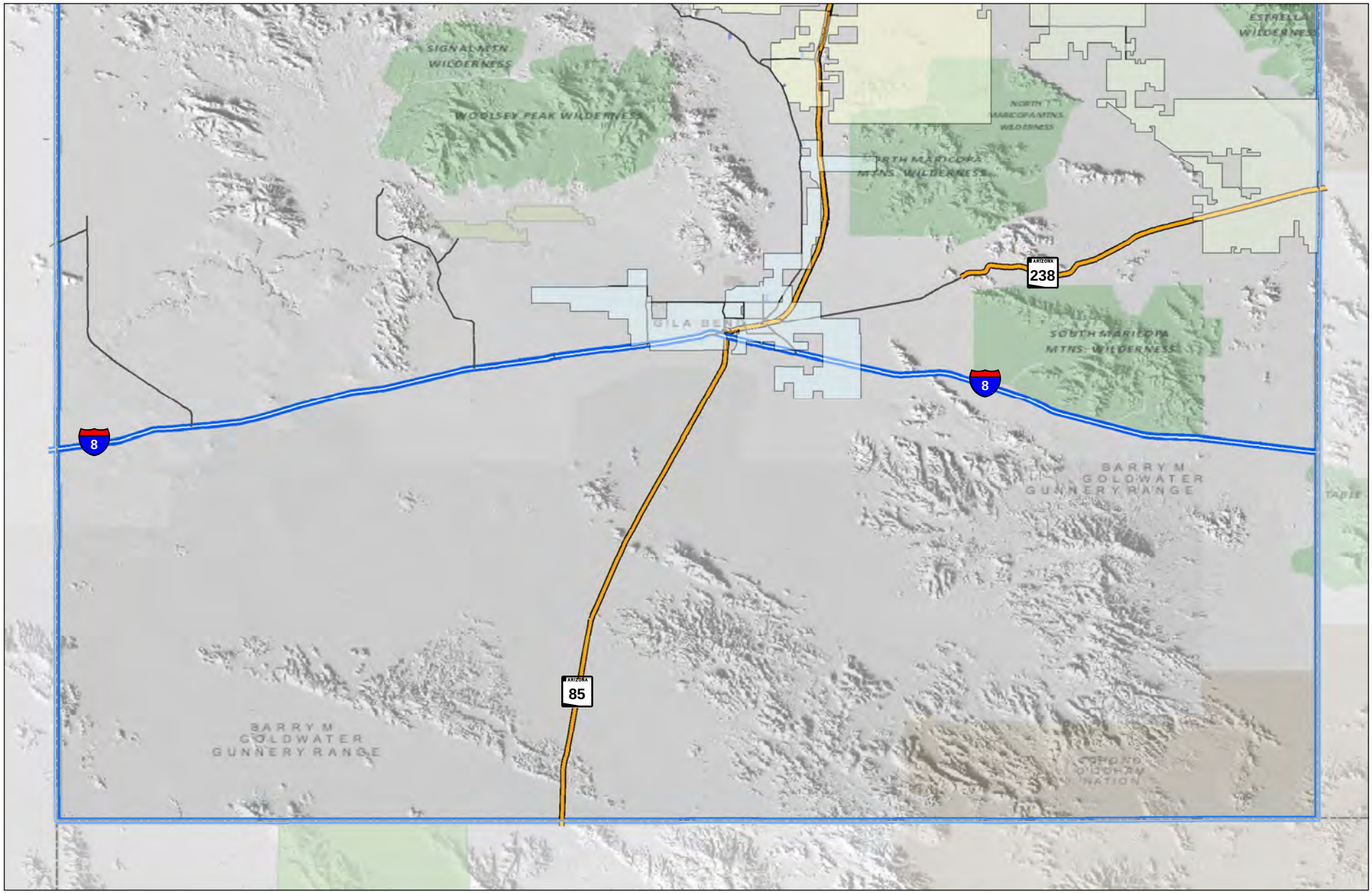


Legend

- Maricopa County
- Mitigation Plan Extent
- FCDMC Levees
- FEMA NFHL Levees

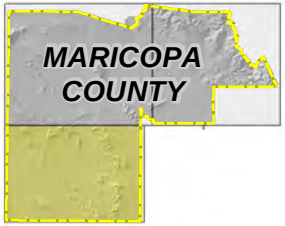
Potential Levee Failure Flood Hazard Rating

- Levee Failure

0 37.5 75 150

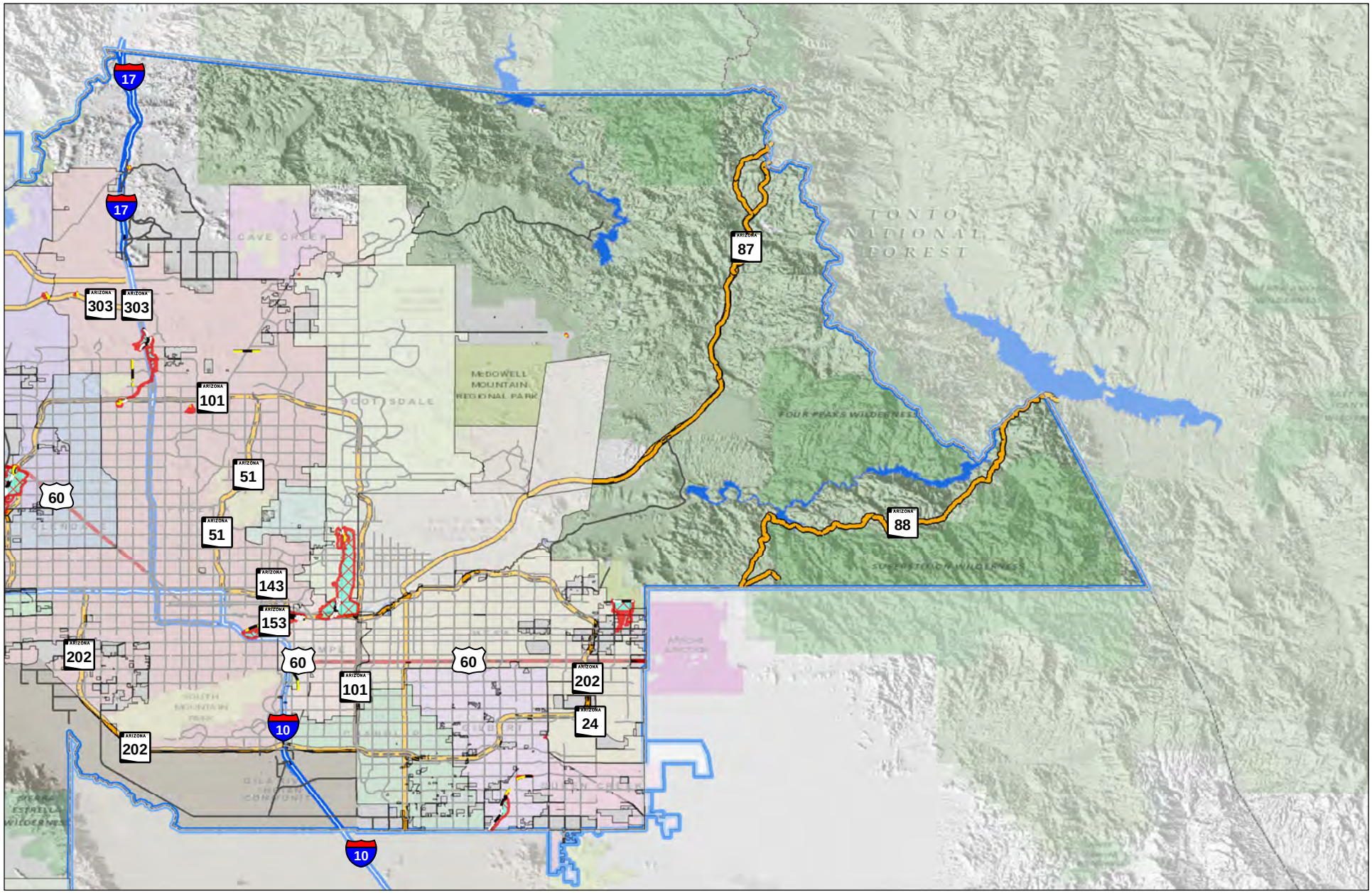
Miles

Source: JE Fuller 2020; FEMA 2020; FCDMC 2020; MAG 2020; TIGER 2020



Maricopa County Multi-Jurisdictional Hazard Mitigation Plan

Map 5C
Maricopa County Potential Levee Failure Flood Hazard Map as of Sept 2020



Legend

- Maricopa County
- Mitigation Plan Extent
- FCDMC Levees
- FEMA NFHL Levees

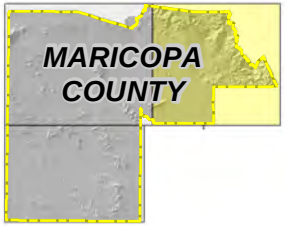
Potential Levee Failure Flood Hazard Rating

- Levee Failure

0 37.5 75 150

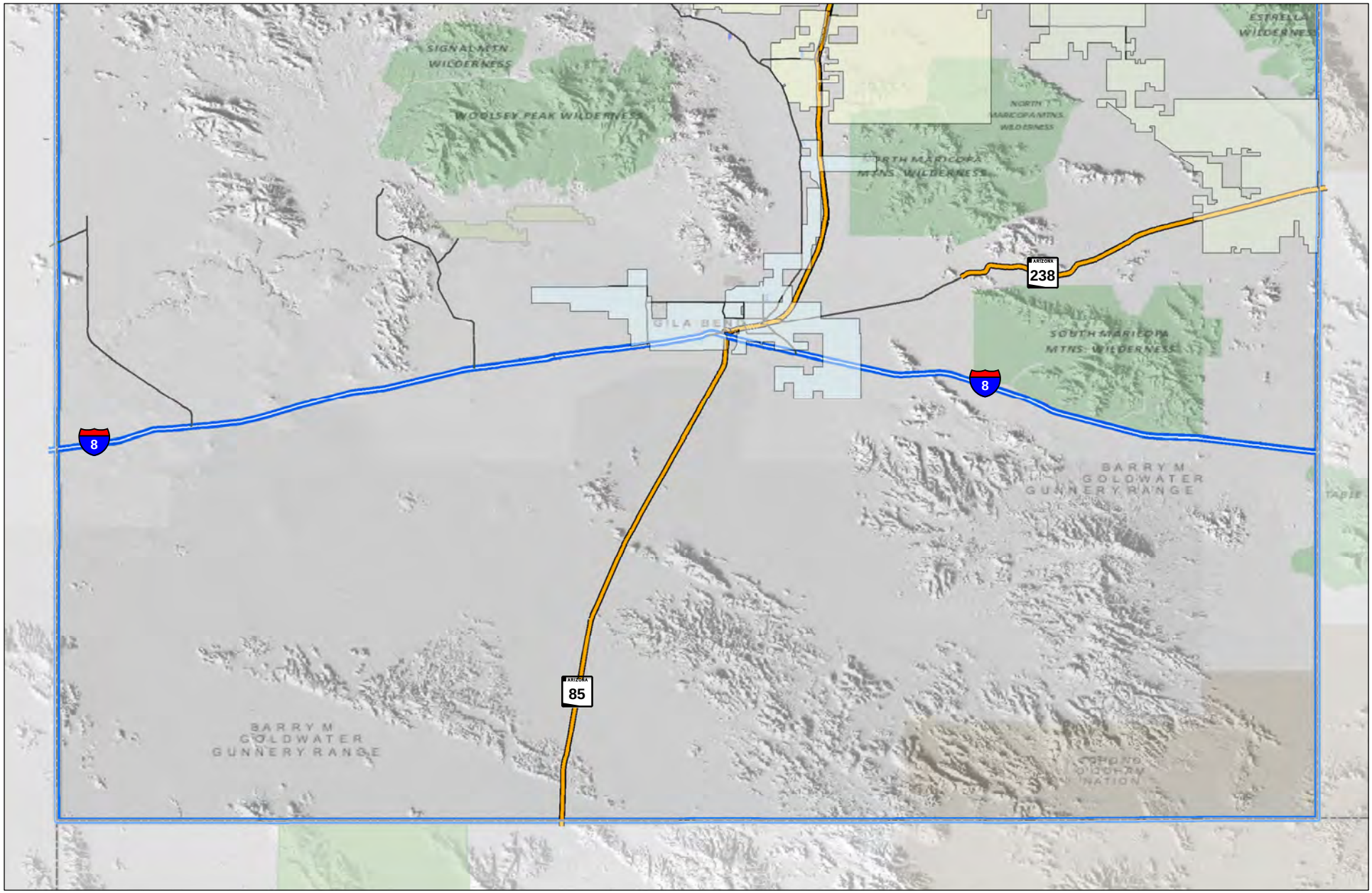
Miles

Source: JE Fuller 2020; FEMA 2020; FCDMC 2020; MAG 2020; TIGER 2020



Maricopa County Multi-Jurisdictional Hazard Mitigation Plan

Map 5B
Maricopa County
Potential Levee Failure
Flood Hazard Map
as of Sept 2020



Legend

- Maricopa County
- Mitigation Plan Extent
- FCDMC Levees
- FEMA NFHL Levees

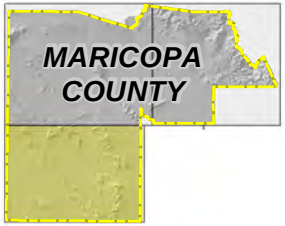
Potential Levee Failure Flood Hazard Rating

- Levee Failure

0 37.5 75 150

Miles

Source: JE Fuller 2020; FEMA 2020; FCDMC 2020; MAG 2020; TIGER 2020



Maricopa County Multi-Jurisdictional Hazard Mitigation Plan

Map 5C
Maricopa County Potential Levee Failure Flood Hazard Map as of Sept 2020

5.3.7 Severe Wind

Description

For this Plan, the hazard of Severe Wind encompasses all climatic events that produce damaging winds. For Maricopa County, severe winds usually result from either extreme pressure gradients that usually occur in the spring and early summer months, or from thunderstorms. Occasionally, tropical storm activity (remnant hurricanes) can be accompanied by severe winds, but the wind speeds usually dissipate by the time the tropical storm front approaches the county. 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; 1) downbursts, 2) straight line winds, and infrequently, 3) tornadoes.

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

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

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

History

According to Tables 5-2 and 5-3, Maricopa County has been included in four state and/or federal disaster declarations involving thunderstorms. There are also an additional 573 thunderstorm/high wind events, and 51 tornadoes, with a combined loss of approximately $470 million to structures and agriculture, 11 deaths, and over 252

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injuries. The following are examples of documented events that have occurred during the last Plan cycle.

- In January 1993, a category F2 tornado moved through Scottsdale damaging 18 homes, four with major damage, and damaging many trees and signs. The most damage occurred when the tornado moved east from 59th and Clinton to 72nd and Cholla. Controllers from the nearby Scottsdale Airport watched the tornado move through this north Scottsdale residential area. Damages were estimated to exceed $5 million (NCDC, 2009).
- In August 1993, strong winds from nearby thunderstorms exceeded 50 mph in many areas of the valley. Homes and businesses sustained damage, trees were uprooted and power lines were downed. Arizona Public Service reported 10,000 customers without power. An 8-year-old boy in Avondale was severely injured just after 1800 MST when a window burst and glass cut his jugular vein. The roof of a convenience store was blown off, and damage occurred to a church and an elementary school. A 1-mile section of a 69,000-volt power line near Perryville was knocked down. High winds blew tree limbs onto power poles and took shingles off several homes. Damages were estimated to exceed $5 million (NCDC, 2009).
- In September 1994, a microburst struck a school building at the Littleton Elementary School in the community of Cashion, two miles SW of Tolleson. The roof was torn from about eight classrooms with one teacher and eight children being injured. A National Weather Service Storm Survey Team estimated winds of 100 mph. A teacher reported the ground covered with hail, some golf ball-size. A weather spotter at 75th Avenue and Camelback Road reported 1.25 inch hail. A mile long stretch of power poles were downed near 107th Avenue and Interstate 10. Damage to the school was estimated in excess of $500,000 and storm wide estimates exceeded $5 million (NCDC, 2009).
- In September 1996, a massive thunderstorm moved through the western half of the Phoenix Metropolitan Area, with nearly every west valley community reporting some damage. The hardest hit areas were in northwest Phoenix, Glendale, and Peoria. Other towns that sustained damage were Sun City, Surprise, El Mirage, Tolleson, Avondale, Goodyear, and Buckeye. Approximately 400 power poles were knocked down throughout these towns, 100 owned by SRP and 300 owned by APS. There were from 70,000 to 75,000 homeowner claims for about $100 million in damage (NCDC, 2009).
- In August 2001, a large thunderstorm complex developed over northwest Maricopa County and moved to the south and southwest. The thunderstorm induced gust front, at times over 60 miles long, west to east, caused widespread electric power outages in the Gila Bend area south to Ajo in west Pima County. In the immediate Gila Bend area, thirty-eight 230kv poles downed, and thirty-nine 69kv poles were downed. A substation was damaged as well as telephone lines. The reported wind gust of 66 knots was recorded at the Gila Bend municipal airport at 0245. As the gust front moved further to the south and southwest, a total of 140 power poles

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were blown over as reported by the Arizona Public Service. Electric power services were disrupted up to 5 days. State PCA No. 22001 (ADEM, 2009).

- In July 2006, several cities throughout the central portion of Maricopa County had major wind damage as a series of thunderstorms and microbursts moved across the area. According to SRP, an estimated 65 power poles were blown down in parts of Scottsdale, Tempe and Mesa. At one point, about 20,000 customers were without power. APS reported about 8,000 customers were without power. At Phoenix Sky Harbor Airport, the official peak wind gust was 59 mph. However, winds at Williams Gateway Airport gusted to 86 mph and flipped a small twin-engine plane atop another aircraft. In Mesa, 35 schools reported damages due to the storm. Storm wide losses were estimated to exceed $150 million.
- In August 2008, several waves of severe thunderstorms moved westward across the central and eastern portions of Maricopa County with wind gusts estimated to exceed 85 mph. In Tempe, an 18 year-old man was injured by a falling tree. Winds on the ASU campus were measured at 69 mph and severely damaged the indoor football practice facility. At 16th St and Thomas, widespread damage occurred to homes and businesses, and windows were knocked out in at least one Phoenix high-rise. Numerous power poles were downed and many trees uprooted. Some damage also occurred at the Arizona State Capitol in Phoenix. Trees were uprooted at 48th street and McDowell and nearby homes were damaged. Microburst winds hit Chandler Airport and flipped at least two planes. Over $26 million in losses were reported Valley-wide (NCDC, 2009).
- In January 2010, severe wind gusts in Scottsdale destroyed a large tent at the Russo Steele Auction near Mayo Blvd and Scottsdale Rd and blew it onto nearby State Highway Loop 101 when winds collapsed the tent onto many classic cars. There was also damage to facilities at the nearby Barrett Jackson Auction. Three minor injuries were reported and damages were in excess of $1.5 million.
- In September 2014, a severe squall line moved across the greater Phoenix valley causing major damage to trees, power poles, roofs, cars, and small aircraft at several valley airports. Gusts exceeding 70 mph were measured and reported damages exceeded $200,000 (NCDC, 2015).
- In August 2015, numerous thunderstorms developed during the evening hours of August 31st across the greater Phoenix metropolitan producing gusty and damaging winds more than 60 mph. There were widespread reports of wind damage in the form of downed trees and power poles, and damaged structures and roofs.; No injuries were reported, and damages were estimated to exceed $836,000 (NCDC, 2020).
- In July 2018, a series of monsoon thunderstorms spanning a 5-day period produced gusty and damaging down burst winds across much of the greater Phoenix metropolitan area. A Safeway grocery store in Glendale suffered wind and water damage which contributed to a building fire that almost destroyed the store. No injuries were reported, and damages were estimated at $2.4 million over the five-day period (NCDC, 2020).

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- In early September 2019, isolated monsoon thunderstorms developed across the central deserts to the west of Phoenix during the early evening hours on September 4th. One of the more powerful storms produced a strong micro burst with wind speeds estimated to be as high as 70 mph. Local law enforcement reported that downburst winds blew over 6 semi-trailer trucks on Interstate 10 west of Tonopah and 11 miles east of Centennial. Damages were estimated at $75,000 and there was one person injured and one fatality (NCDC, 2020).
- In November 2019, a strong cold front moved across the greater Phoenix metropolitan area during the early morning hours on November 29th. Due to high levels of wind shear and instability, the front generated several small EF0 and EF1 tornadoes. According to the NWS, the tornados resulted in moderate damage, downing several trees and power poles and damaging roofs, small auxiliary structures, and vehicles. No fatalities or injuries were reported. Total damages were estimated at $320,000 valley wide (NCDC, 2020).

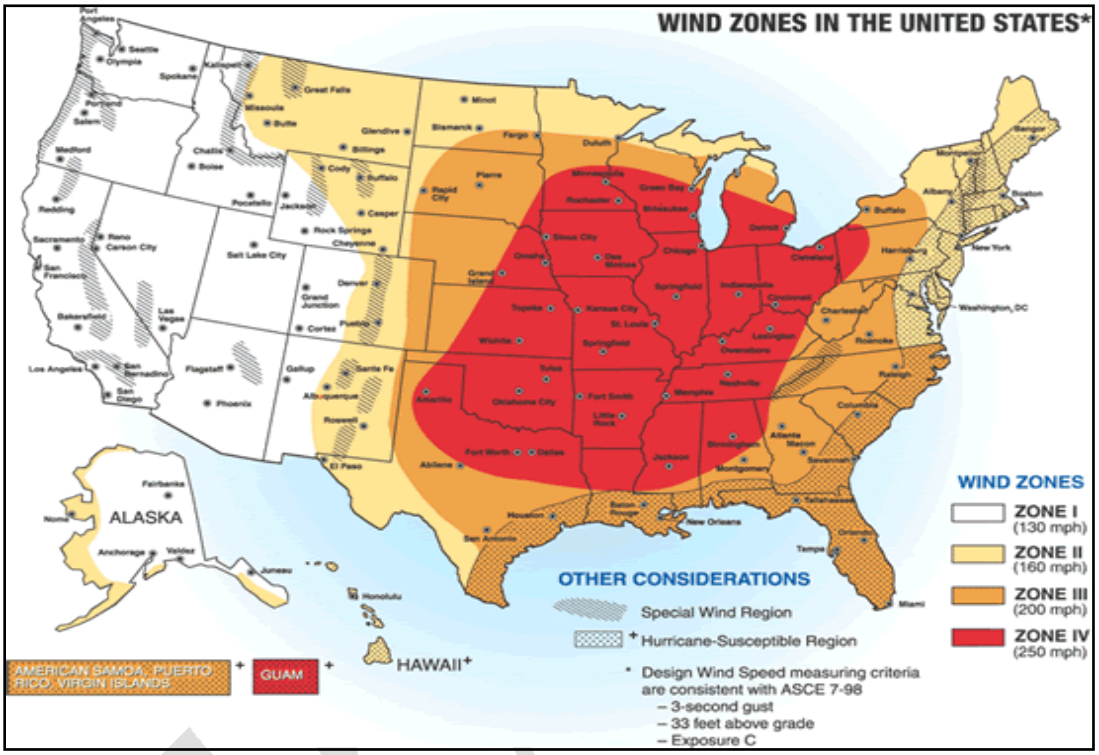
Probability and Magnitude

For thunderstorm winds, the probability of a severe thunderstorm occurring with high velocity winds increases as the average duration and number of thunderstorm events increases. According to NCDC, 321 separate thunderstorm wind events reporting wind speeds exceeding 60 knots have been reported for Maricopa County over the past 30 year period ending in August 2020 (NCDC, 2020). Of those events, 228 were reported as damaging with a total of approximately $310 million in estimated losses, two deaths and 46 injuries. It is very likely that on average, over 10 severe wind events have occurred per year and approximately two-thirds of those events will cause damage.

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. All of the 290 storms that were documented over the last 30 years would qualify as a severe thunderstorm.

The American Society of Civil Engineers (ASCE) has identified a 3-second wind gust speed as the most accurate measure for identifying the potential for damage to structures. The 3-second wind gust criteria is recommended as a normal wind loading design standard. All of Maricopa County is designated with a standard design 3-second gust wind speed of 90 mph, indicating relatively low levels of risk from severe winds when compared to other regions of the country (ASCE, 1999). FEMA has taken

the work from ASCE and further identified wind speed zones for use in designing community shelters and safe-rooms that can withstand tornado and hurricane winds. Maricopa County is entirely located in Zone I, as illustrated in Figure 5-12. In these zones, a design wind speed of 130 mph is recommended for the design and construction of community shelters.



Source: FEMA Website at the following URL: http://www.fema.gov/plan/prevent/saferoom/tsfs02_wind_zones.shtm

Figure 5-12: Illustration of FEMA Wind Zones

The Beaufort Wind Scale, indicated by Table 5-31 shown below, provides a measure of wind magnitude versus expected damages. The Beaufort scale is useful because it specifically addresses wind effects over land based on wind speed. Wind speeds in the Beaufort Number 10-11 range annually impact the county. On rare occasions, wind gusts in the county can creep into the low end of the Beaufort Number 12 category.

Tornado damage severity is measured by the Enhanced Fujita Tornado Scale, which assigns a numerical value of 0 to 5 based on wind speeds and damage potential, as shown in Table 5-32, with the letter EF preceding the number (e.g., EFO, EF1, EF2). Table 5-32 also provides reference to the older Fujita Scale. 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 in length. The width of a tornado may range from tens of yards to more than a quarter of a mile.

Table 5-31: Beaufort Wind Scale

Beaufort Number	Wind Speed mph	Description	Land Conditions
0	0	Calm	Calm. Smoke rises vertically.
1	1-3	Light air	Wind motion visible in smoke.
2	4-7	Light breeze	Wind felt on exposed skin. Leaves rustle.
3	8-12	Gentle breeze	Leaves and smaller twigs in constant motion.
4	13-18	Moderate breeze	Dust and loose paper rises. Small branches begin to move.
5	19-24	Fresh breeze	Smaller trees sway.
6	25-31	Strong breeze	Large branches in motion. Whistling heard in overhead wires. Umbrella use becomes difficult.
7	32-38	Near gale	Whole trees in motion. Effort needed to walk against the wind.
8	39-46	Gale	Twigs broken from trees. Cars veer on road.
9	47-54	Strong gale	Light structure damage.
10	55-63	Storm	Trees uprooted. Considerable structural damage.
11	64-73	Violent storm	Widespread structural damage.
12	73-95	Hurricane	Considerable and widespread damage to structures.

Source: New Mexico Natural Hazard Mitigation Plan

Table 5-32: Enhanced Fujita Tornado Scale

Fujita Scale		Enhanced Fujita Scale		
ID	Wind Speed*	ID	Wind Speed*	Damage Description
F0	45-78	EF0	65-85	**Minor or no damage**. Peels surface off some roofs; some damage to gutters or siding; branches broken off trees; shallow-rooted trees pushed over. Confirmed tornadoes with no reported damage (i.e., those that remain in open fields) are always rated F0 or EF0.
F1	79-117	EF1	86-110	**Moderate damage.** Roofs severely stripped; mobile homes overturned or badly damaged; loss of exterior doors; windows and other glass broken.
F2	118-161	EF2	111-135	**Considerable damage.** Roofs torn off well-constructed houses; foundations of frame homes shifted; mobile homes completely destroyed; large trees snapped or uprooted; light-object missiles generated; cars lifted off the ground.

Table 5-32: Enhanced Fujita Tornado Scale

Fujita Scale		Enhanced Fujita Scale		Damage Description
ID	Wind Speed*	ID	Wind Speed*	
F3	162-209	EF3	136-165	**Severe damage.** Entire stories of well-constructed houses destroyed; severe damage to large buildings such as shopping malls; trains overturned; trees debarked; heavy cars lifted off the ground and thrown; structures with weak foundations are badly damaged.
F4	210-261	EF4	166-200	**Extreme damage.** Well-constructed and whole framed houses completely leveled; cars and other large objects thrown and small missiles generated.
F5	262-317	EF5	>200	**Total Destruction of Buildings** Strong-framed, well-built houses leveled off foundations are swept away; steel-reinforced concrete structures are critically damaged; tall buildings collapse or have severe structural deformations; some cars, trucks, and train cars can be thrown approximately 1 mile.

* - Wind speeds in mph, 3-second gust
Source: DEMA, 2018 and National Weather Service

The probability of tornadoes occurring is much less frequent than thunderstorm winds. For the 30-year period ending August 2020, there have been 29 tornado events with one injury and $5.7 million in reported damages. Four of the tornados were EF1 (F1) and one is EF2 (F2). According the NCDC, there has been only one EF3 (F3) tornado recorded in the history of Maricopa County on August 4, 1957.

Climate Change Impacts

The NCA report (Garfin, et.al., 2014) is silent regarding the impact of climate change on severe wind events in the Southwest. A study by Luong (Luong, et al., 2015) notes that monsoon thunderstorms in the Central and Southern Regions of Arizona have become more intense over a recent 20-year period (1991-2010) when compared to events recorded in the past (1950-1970). The study concludes that the trend will likely continue as the temperatures rise and provide more moisture storage capacity in the lower atmosphere. The increased thunderstorm intensities may correlate to increased wind intensities, and especially if the thunderstorm cells are stronger and larger. There are no further references specific to Arizona tornados and climate change impacts.

Vulnerability – CPRI Results

Severe Wind CPRI results for each community are summarized in Table 5-33 below.

Table 5-33: CPRI results by jurisdiction for severe wind					
Participating Jurisdiction	**Probability**	**Magnitude/ Severity**	**Warning Time**	**Duration**	**CPRI Score**
Avondale	Likely	Limited	<6 hours	<6 hours	2.65
Buckeye	Highly Likely	Critical	<6 hours	<6 hours	3.40
Carefree	Highly Likely	Limited	12-24 hours	<1 week	3.00
Cave Creek	Highly Likely	Limited	12-24 hours	<6 hours	2.80
Chandler	Highly Likely	Negligible	6-12 hours	<6 hours	2.65
El Mirage	Highly Likely	Critical	>24 hours	<1 week	3.15
Fort McDowell Yavapai Nation	Highly Likely	Limited	12-24 hours	<6 hours	2.80
Fountain Hills	Likely	Critical	6-12 hours	<1 week	3.00
Gila Bend	Possibly	Limited	<6 hours	<24 hours	2.30
Gilbert	Highly Likely	Limited	<6 hours	<24 hours	3.20
Glendale	Highly Likely	Limited	<6 hours	<6 hours	3.10
Goodyear	Highly Likely	Negligible	12-24 hours	<24 hours	2.60
Guadalupe	Possibly	Limited	<6 hours	<24 hours	2.30
Litchfield Park	Highly Likely	Limited	<6 hours	<24 hours	3.20
Unincorporated Maricopa County	Highly Likely	Critical	<6 hours	<6 hours	3.40
Mesa	Highly Likely	Limited	<6 hours	<1 week	3.30
Paradise Valley	Highly Likely	Limited	6-12 hours	<24 hours	3.05
Peoria	Highly Likely	Critical	<6 hours	<24 hours	3.50
Phoenix	Highly Likely	Negligible	<6 hours	<6 hours	2.80
Queen Creek	Likely	Limited	<6 hours	<6 hours	2.65
Salt River Pima-Maricopa Indian Community	Highly Likely	Critical	6-12 hours	<1 week	3.45
Scottsdale	Likely	Limited	12-24 hours	<6 hours	2.35
Surprise	Highly Likely	Limited	<6 hours	<6 hours	3.10
Tempe	Highly Likely	Critical	<6 hours	<24 hours	3.50
Tolleson	Likely	Limited	12-24 hours	<24 hours	2.45
Wickenburg	Highly Likely	Critical	<6 hours	<6 hours	3.40
Youngtown	Highly Likely	Critical	<6 hours	<24 hours	3.50
			County-wide average CPRI =		**2.99**

Vulnerability – Loss/Exposure Estimations

Exposure to severe wind events is generally the same across the county, although communities situated close to the mountains like Carefree, Cave Creek, and Fountain Hills, may not be as susceptible to tornadoes as other communities within the county. Based on the historic record over the last 30 years, it is feasible to expect average annual losses of $11 million (county-wide). It is difficult to estimate losses for individual jurisdictions within the county due to the lack of discrete 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 is probably the best way to mitigate against losses.

Changes in Development in the Hazard Prone Area

There have been no major changes since the last plan update regarding development impacted by severe wind within the planning area. All of the urbanized areas within Maricopa County and participating jurisdictions have vulnerability to severe wind. As development and population continue to grow in nearly all jurisdictions, changes to development will impact the vulnerability of each community to this hazard.

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U.S. Dept of Commerce, NOAA National Weather Service, Storm Prediction Center, SVRGIS database, accessed at the following URL: http://www.spc.noaa.gov/gis/svrgis/

U.S. Dept of Commerce, NOAA National Weather Service, Storm Prediction Center, Fujita Scale information at the following URL: http://www.spc.noaa.gov/faq/tornado/ef-scale.html

Profile Maps

No profile maps provided.

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5.3.8 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 hydro compaction. Of these causes, hydro compaction and mine collapse tend to be localized events, while fluid removal may occur either locally or regionally. The main cause for subsidence in Maricopa 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 can cause regional drainage patterns to change. Impacts include unexpected flooding, storm drain backwater, reversal of channel drainage patterns, and damages to infrastructure both in the subsurface (water and electric lines, well casings, etc.) and surface (roads, canals, drainages, surveyed benchmarks, etc.). Subsidence also can be accompanied by the development of fissures, which are discussed in Section 5.3.4.

History

Over the past plan cycle, minor changes in subsidence activity have been noted in the way of expansions of active subsidence areas and five more years of data. Active subsidence has been occurring in certain areas of Maricopa County for over 60 years and is primarily due to groundwater overdraft and reduced recharge due to drought. By 1980, ground-water levels had declined at least 100 feet county-wide and between 300 and 500 feet in some areas (Carpenter, 1999). These groundwater declines have resulted in areas of significant subsidence, as summarized in the following examples:

- Luke Air Force Base – by 1992, ground-water level declines of more than 300 feet generated land subsidence of as much as 18 feet about 20 miles west of Phoenix on and near Luke Air Force Base (Carpenter, 1999).
- Queen Creek – by 1977, an area of almost 230 square miles had subsided more than 3 feet(Carpenter, 1999).
- Harquahala Plain – subsidence of about 0.6 feet occurred in response to about 300 feet of water-level decline (Carpenter, 1999).
- East Mesa/Apache Junction – a total of 5.2 feet of subsidence was measured along the CAP near the Superstition Freeway, for the period of 1971 to 2001 (AMEC, 2006).
- Paradise Valley – between 1965 and 1982, over 5 feet subsidence occurred (Carpenter, 1999).
- Scottsdale/CAP – canal subsided about 1 foot since construction (Carpenter, 1999).

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The following are two examples of documented damages that are directly attributable to subsidence:

- Dysart Drain Flow Reversal – Subsidence near Luke Air Force Base led to flow reversal in a portion of the Dysart Drain, which is an engineered flood conveyance channel. In 1992, surface runoff from four inches of precipitation caused the sluggish Dysart Drain to spill over flooding the base runways, damaging more than 100 homes, and forcing the base to close for 3 days. Total damage was on the order of $3 million (ALSG, 2007).
- Central Arizona Project Canal Repair – sections of the CAP canal in Scottsdale traverse an area that has subsided up to 1.5 feet over a 20-year period, threatening the canal's maximum flow capacity. In response, CAP raised the canal lining 3 feet over a one-mile segment of affected area at a cost of $350,000. A second and much larger subsidence area was later identified near the Scottsdale Airpark. Plans for raising the canal lining will cost an estimated $820,000. Recently, a third subsidence area has been identified east of the Scottsdale Airpark in the Scottsdale West World area which will likely require further repair (ALSG, 2007).

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 Maricopa County, ADWR monitors 8 geographical areas using InSAR, the limits of which are shown on the hazard profile maps at the end of this section.

Probability and Magnitude

There are no statistical probability estimates for subsidence. The magnitudes of severity depend on many factors including geography, geology, rates of groundwater withdrawals, and others. ADWR (Conway, 2013) generally mapped the cumulative worst-case subsidence depths for several known areas of the state (Figure 5-13). The four most prominent areas within Maricopa County have exhibited between 6 and 20 feet of lowering. The MJPT 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. The high hazard subsidence zones are presented on Maps 6A, 6B, and 6C.

Climate Change Impacts

As previously stated, active subsidence for most of the county is correlated to over drafting of local and regional groundwater tables. The NCA report (Garfin, et.al., 2014) notes that one of the anticipated impacts of climate change for the Southwest is a reduction in precipitation and streamflow volumes. This impact could translate into a greater demand for groundwater which could further reduce groundwater levels and

increase the formation of subsidence areas and fissure risk. The current management of groundwater withdrawals by the ADWR regulated active management areas (AMA) will likely serve to keep these impacts in check, but consideration for future expansion of subsidence zones and fissures could be warranted.

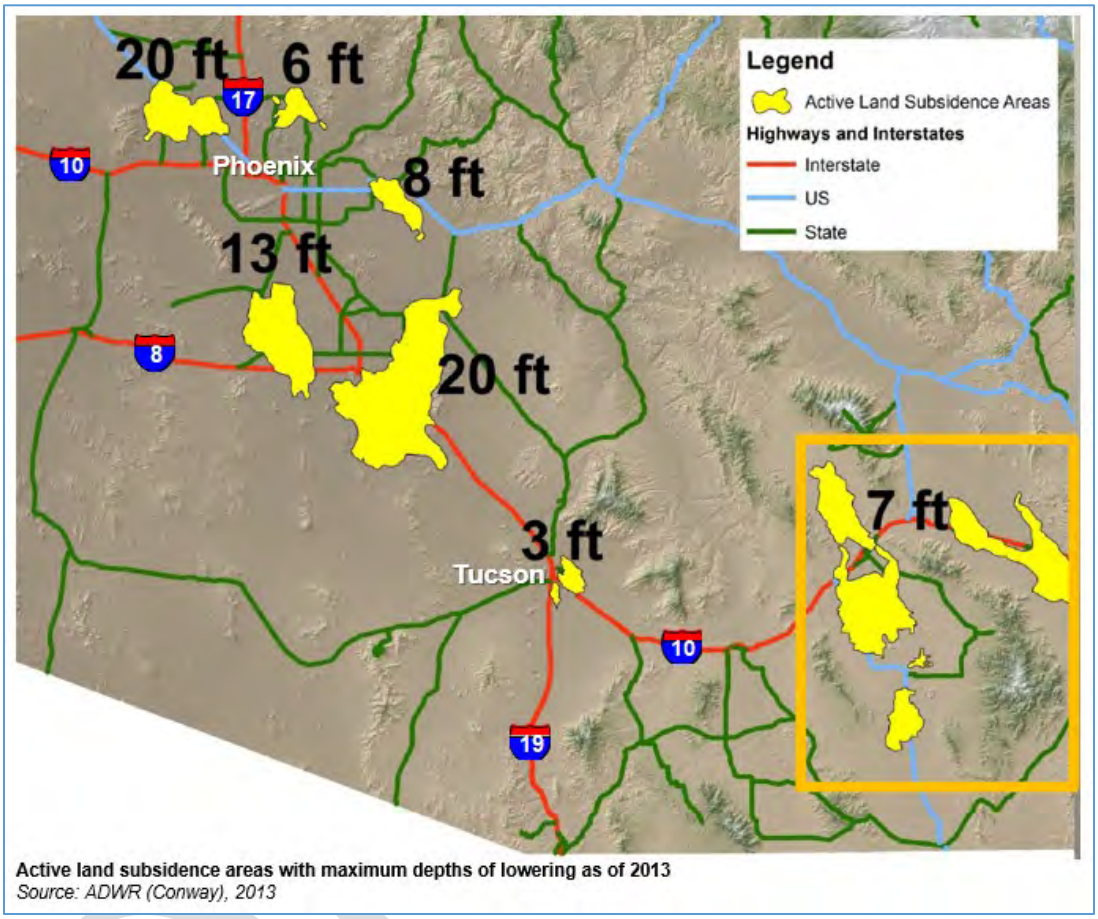

Figure 5-13: Map of Maximum Subsidence Depths for Arizona

Vulnerability – CPRI Results

Subsidence CPRI results for each community are summarized in Table 5-34 below.

Table 5-34: CPRI results by jurisdiction for subsidence

Participating Jurisdiction	Probability	Magnitude/ Severity	Warning Time	Duration	CPRI Score
Avondale	Possibly	Limited	<6 hours	<6 hours	2.50
Buckeye	Unlikely	Negligible	>24 hours	<6 hours	1.00
Carefree	Unlikely	Negligible	>24 hours	<6 hours	1.00
Cave Creek	Unlikely	Negligible	>24 hours	<6 hours	1.0
Chandler	Unlikely	Negligible	>24 hours	<6 hours	1.00
El Mirage	Possibly	Limited	>24 hours	<6 hours	1.75
Fort McDowell Yavapai Nation	Unlikely	Negligible	>24 hours	>1 week	1.30
Fountain Hills	Possibly	Limited	<6 hours	>1 week	2.50
Gila Bend	Unlikely	Negligible	>24 hours	<6 hours	1.00

Table 5-34: CPRI results by jurisdiction for subsidence					
Participating Jurisdiction	**Probability**	**Magnitude/ Severity**	**Warning Time**	**Duration**	**CPRI Score**
Gilbert	Highly Likely	Limited	>24 hours	<1 week	2.85
Glendale	Possibly	Limited	>24 hours	>1 week	2.05
Goodyear	Unlikely	Negligible	<6 hours	<6 hours	1.45
Guadalupe	Unlikely	Negligible	<6 hours	<6 hours	1.45
Litchfield Park	Unlikely	Negligible	<6 hours	<6 hours	1.45
Unincorporated Maricopa County	Possibly	Limited	12-24 hours	>1 week	2.20
Mesa	Likely	Limited	< 6 hours	>1 week	2.95
Paradise Valley	Unlikely	Negligible	<6 hours	<1 week	1.65
Peoria	Unlikely	Limited	<6 hours	<6 hours	1.75
Phoenix	Unlikely	Limited	<6 hours	<6 hours	1.75
Queen Creek	Possibly	Negligible	<6 hours	<6 hours	1.90
Salt River Pima-Maricopa Indian Community	Possibly	Critical	<6 hours	>1 week	2.80
Scottsdale	Unlikely	Negligible	<6 hours	<6 hours	1.45
Surprise	Possibly	Limited	>24 hours	>1 week	2.05
Tempe	Possibly	Limited	<6 hours	>1 week	2.50
Tolleson	Possibly	Negligible	>24 hours	<1 week	1.65
Wickenburg	Highly Likely	Limited	>24 hours	>1 week	2.95
Youngtown	Highly Likely	Negligible	<6 hours	>1 week	2.65
				County-wide average CPRI =	**1.87**

Vulnerability – Loss/Exposure Estimations

The estimation of potential exposure to high hazard subsidence areas was accomplished by intersecting the human and facility assets with the subsidence high hazard limits depicted on Maps 6A, 6B, and 6C. No losses are estimated for facilities located within the high hazard subsidence areas due to lack of appropriate loss-to-exposure data. Table 5-35 summarizes the MJPT identified critical and non-critical facilities potentially exposed to high hazard subsidence areas. Table 5-36 summarizes population sectors exposed to the high hazard subsidence areas. Residential structures exposed to high hazard subsidence areas are summarized in Table 5-37.

In summary, 7,434 critical and non-critical MJPT identified assets with a reported $9.9 billion in replacement costs, are located within high hazard subsidence areas. An additional $232.5 billion of census block residential structures are located within high hazard subsidence areas across the planning area. Regarding human vulnerability, a total population of 1.72 million people, or 41.6% of the total census block population areas across the planning area, are located within a high hazard subsidence area. It is unlikely that death and injury might be the direct result of subsidence. Other likely negative impacts such as fissures, flooding due to slope reversal, and flow reversal in gravity sewer mains may occur.

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 gravity sewer mains should always refer to the maps in this plan to determine the need for special design considerations that address subsidence.

Changes in Development in the Hazard Prone Area

Within the unincorporated areas of Maricopa County, residential development has been minimal but has been concentrated along I-17 in the Anthem area and in the western portion of the County along SR303. It is anticipated that new development will largely occur in these areas over the next five years. These areas do not lie within identified subsidence high hazard areas.

The table below summarizes the jurisdictions with changes in development located in known subsidence hazard areas.

Jurisdiction	Development Changes
Avondale	The northern portion of Avondale lies within an area identified to have high risk of subsidence. A significant portion of the areas identified for future development within the community lie within the area of subsidence hazard. Key growth corridors identified within this area include the North Avondale area (north of I-10), the Historic Avondale area and the BLVD live/work/play destination area.
Buckeye	The City of Buckeye has several designated high subsidence hazard areas along and south of the I-10 alignment. Over the next 5 years most anticipated growth will occur north of I-10 in the City of Buckeye outside of the subsidence hazard areas. The proposed Vista De Montana, Mountain View South, Westpark, Copper Falls, Farallon, Terravista, and Encantada Estates Subdivisions are located within areas identified to have high subsidence hazard.
Chandler	The northeast portion of the City of Chandler lies within an area impacted by subsidence. The City has experienced steady growth of multi-family projects over the past five years and anticipates growth in this area will continue though at a slower rate. Residential development is expected to occur in downtown and north Chandler and could impact subsidence hazards in the northern portion of the City. Commercial and industrial development is also projected continue at a steady rate. Locating these types of development within the northeast portion of the City will likely increase hazards due to subsidence.
El Mirage	The City of El Mirage lies entirely within an area identified to have high subsidence hazard. Most of the recent and anticipated development within the City has consisted of industrial developments within the southern industrial zone. There has been minor growth with residential homes in the northeast section and there are plans for 3 additional residential projects to be constructed within the northwest portion of the City. All development within the community will impact the hazard associated with land subsidence.
Gila Bend	The majority of the northern portion of the Town of Gila Bend is located within an area at increased risk of subsidence. The Town has experienced limited growth in the form of industrial, commercial, and institutional developments and is actively seeking industrial partners in an effort to bring light manufacturing facilities to town. Residential development continues at a modest rate on a single lot basis. Most development has occurred along Butterfield Trail and does not lie within the designated hazard area for subsidence, with the exception of a new school located on Logan Avenue and a Circle K located on Pima Street. These developments are located adjacent to the I-8 corridor and fall within an identified hazard for subsidence.
Gilbert	Most of the Town of Gilbert falls within an area identified to have high hazard for subsidence. The northern and central portions of the community are impacted by this designation, while the southern portion (South of Queen Creek Rd.) lies outside of the subsidence zone. Based upon development trends over the past 5 years, it is anticipated that commercial and industrial

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	development will continue to expand within the northern and central portions of the Town and will fall within areas designated to have high hazard associated with subsidence. Most residential development is anticipated to occur within the southern portion of the community and falls outside of the defined hazard area for subsidence.
Glendale	Apart from small sections on the far east and north side of the City, Glendale lies within an identified subsidence hazard area. The City anticipates large increases in industrial and manufacturing development in the "New Frontier" District (located along SR303 near its intersection with Northern Ave), additional residential development within infill areas of the community and commercial and retail developments within the Sports and Entertainment (located along Hwy 101 at intersection with W. Glendale Ave) and Downtown (located along Glendale Ave. between Myrtle Ave and Lamar Rd.) Districts. All targeted areas for growth lie within the areas designated as subsidence hazard areas.
Goodyear	Approximately the northern third of the City of Goodyear lies within a designated subsidence hazard area. The city has experienced significant increases in development over the past 5 years, at an average rate of 20% more permits per year, and anticipates new development to occur at the current rate over the next 5 years. The majority of this development, including residential, commercial and industrial, has occurred north of the Pecos Rd alignment and south of the Camelback Road alignment. This area is roughly defined as northern half of the City and portions of the development experienced within this region will lie within the subsidence hazard area.
Litchfield Park	The City of Litchfield lies entirely within an identified subsidence hazard area. As such, all development within the City will be impacted by subsidence hazard. Currently, The City has experienced residential development of 2 projects in the northern and central areas of the community of 121 and 163 units, respectively. This is in addition to commercial and light industrial developments along the Camelback Rd. alignment at Litchfield, Dysart, and El Mirage Roads, which is anticipated to continue over the next five years.
Mesa	Substantial portions of the City of Mesa on the west side are located within an identified subsidence hazard area, in addition to a smaller area along the easter boundary of the community. These hazard areas will impact proposed development within the community within the Gateway, West Mesa, and Superstition Springs/Power Road Corridor Development Areas. Proposed and existing development within these areas consists of residential and employment growth.
Peoria	The City of the Peoria is impacted by an identified subsidence hazard area in the southern portion of the community, mostly to the south of the Hwy 101 alignment. Most development within the City has occurred in the northern and northwestern areas of the incorporated limits, including the Vistancia and the Lake Pleasant Parkway Corridors. It is anticipated that development will continue to migrate north over the next five years. As a result, it is not anticipated the future development within Peoria will impact the hazard associated with subsidence. T
Phoenix	A small portion of eastern Phoenix is located within an identified subsidence hazard area, roughly bounded by Interstate 17 on the east, Broadway Rd to the south, and Camelback Rd to the North. The majority of the properties within this area are fully developed with small pockets of agricultural lands. The changes in development will occur outside of the subsidence hazard area.
Queen Creek	A small portion of the Town of Queen Creek is impacted by areas of increased subsidence hazard. The area is located within the northwestern corner of the community boundary and is roughly bounded to the South by Queen Creek Rd and to the north by Rittenhouse Rd. This area of the community is not

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	anticipated to experience changes in development and will not impact the hazard due to subsidence.
Salt River Pima-Maricopa Indian Community	The western half of the Salt River Pima-Maricopa Indian Community is located within an identified subsidence hazard area. As the majority of existing and proposed development lies within the western portion of the community, along the Hwy 101 alignment, changes in development will continue to be impacted by the subsidence hazard area.
Scottsdale	Subsidence hazard areas exist within the City along the western portion of central Scottsdale and along the eastern portion of southern Scottsdale. The majority of development within Scottsdale is anticipated to occur within the Northern and Central Sub-Areas. The Northern Sub-Area is located north of Deer Valley Road and is not impacted by identified subsidence hazard areas, while the Central Sub-Area is impacted by subsidence along the Hwy 101 alignment.
Surprise	The southern portion of the City of Surprise lies within a subsidence hazard area and the four development areas identified and targeted by the City all lie within this hazard area. Future development within these areas is anticipated to consist of residential and commercial applications and lie to the south of the Bell Road alignment.
Tempe	The City of Tempe is largely unimpacted by subsidence hazard areas, with only eastern portion along Hwy 101 lying within an identified hazard area. Over the past 5 years, Tempe has seen a rapid growth of high density residential, new corporate office headquarters and many new retail developments are currently under construction. The City anticipates that future development and redevelopment will continue to be focused in the areas currently being developed. These areas are primarily located in the north Tempe area, and specifically in the downtown area, Tempe Town Lake, and the new Novus Innovation Corridor. Of the areas targeted for future development, the Novus Innovation Corridor, developments around the Loop 101 and Loop 202 interchange, and Tempe Town Lake are likely to impact the Community's subsidence hazard in the future.
Tolleson	The entirety of the City of Tolleson lies within a subsidence hazard area and all changes in development will impact the subsidence hazard of the community. Currently, the City has noted several small residential and commercial developments within identified infill areas and anticipates that development will continue along the same trajectory in the near future, though potentially slowing as available properties are limited.
Youngtown	The Town of Youngtown is entirely located within an area of increased subsidence hazard. The community added a 129-unit residential development south of Peoria Avenue and a new neighborhood-commercial live-work corridor on N. 111th Avenue over the past 5 years and has identified several areas for development/redevelopment within the town limits of the next 5 years. Anticipated development includes a redevelopment area in the northern portion of the Town, bounded roughly by 111th Avenue on the east, 113th Avenue on the west, Wisconsin Avenue to the South, and Hwy 60 to the north; a new 100+acre regional park in the Agua Fria river bottom; a new battery storage facility in the Town's commerce park south of Peoria Avenue; and new development areas identified north of Alabama Avenue and South of Peoria Avenue. All changes in development within the Town will impact the hazard associated with subsidence.

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Table 5-35: Asset inventory exposure to high hazard subsidence areas

Community	Total Facilities Reported by Community	Impacted Facilities	Percentage of Total Community Facilities Impacted	Total Replacement Value of All Facilities Reported by Community (x $1,000)	Estimated Replacement Value Exposed to Hazard (x $1,000)
County-Wide Totals (Maricopa Only)	**10917**	**7434**	**68.10%**	**$26,024,918**	**$9,864,465**
Avondale	131	124	94.66%	$179,460	$123,010
Buckeye	125	8	6.40%	$268,667	$13,214
Carefree	6	0	0.00%	$9,000	$0
Cave Creek	4	0	0.00%	$13,258	$0
Chandler	277	124	44.77%	$1,361,072	$515,030
El Mirage	34	34	100.00%	$285,542	$285,542
Fort McDowell Yavapai Nation	26	0	0.00%	$202,624	$0
Fountain Hills	15	0	0.00%	$411,000	$0
Gila Bend	7	7	100.00%	$36,000	$36,000
Gilbert	5287	4820	91.17%	$0	$0
Glendale	1224	969	79.17%	$4,085,807	$3,360,191
Goodyear	159	125	78.62%	$148,573	$121,773
Guadalupe	7	0	0.00%	$10,800	$0
Litchfield Park	5	5	100.00%	$118,900	$118,900
Unincorporated Maricopa County	1061	284	26.77%	$3,624,310	$488,280
Mesa	528	350	66.29%	$2,850,466	$2,229,168
Paradise Valley	95	1	1.05%	$469,300	$6,000
Peoria	299	208	69.57%	$282,333	$257,329
Phoenix	947	113	11.93%	$7,843,312	$552,191
Queen Creek (Maricopa County Only)	124	5	4.03%	$301,446	$11,650
Salt River Pima-Maricopa Indian Community	78	71	91.03%	$502,493	$482,480
Scottsdale	237	63	26.58%	$1,094,610	$634,679
Surprise	94	81	86.17%	$498,810	$424,130
Tempe	111	18	16.22%	$1,373,300	$182,300
Tolleson	10	10	100.00%	$0	$0
Wickenburg	14	2	14.29%	$32,589	$1,350
Youngtown	12	12	100.00%	$21,247	$21,247
Gilbert (Pinal County Only)	1	0	0.00%	$0	$0
Mesa (Pinal County Only)	22	1	4.55%	$7,380	$470
Queen Creek (Pinal County Only)	5	0	0.00%	$4,697	$0
Maricopa County (Pinal County Only)	3	0	0.00%	$707	$0
Maricopa County (Yavapai County Only)	6	0	0.00%	$1,760	$0

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Table 5-36: Population sectors exposed to high hazard subsidence areas

Community	Total Population	Population Exposed		Total Population Over 65	Population Over 65 Exposed	
		Total	Percent		Total	Percent
County-Wide Totals (Maricopa Only)	**4,136,787**	**1,722,580**	**41.64%**	**538,166**	**202,165**	**37.57%**
Apache Junction (Maricopa County Portion)	314	73	23.25%	149	32	21.48%
Avondale	79,485	76,152	95.81%	5,313	5,098	95.95%
Buckeye	65,452	2,692	4.11%	5,141	159	3.09%
Carefree	3,580	0	0.00%	1,591	0	0.00%
Cave Creek	5,287	0	0.00%	1169	0	0.00%
Chandler	250,334	108,585	43.38%	23,435	9,121	38.92%
El Mirage	33,728	33,728	100.00%	2,700	2,700	100.00%
Fort McDowell Yavapai Nation	1017	0	0.00%	85	0	0.00%
Fountain Hills	23,536	0	0.00%	7,318	0	0.00%
Gila Bend	2,012	1,832	91.05%	193	180	93.26%
Gilbert	239,546	212,513	88.71%	17,960	14,492	80.69%
Glendale	237,327	188,227	79.31%	23,675	18,563	78.41%
Goodyear	78,118	67,071	85.86%	10,094	8,951	88.68%
Guadalupe	6,230	0	0.00%	581	0	0.00%
Litchfield Park	5,980	5,980	100.00%	1,065	1,065	100.00%
Unincorporated Maricopa County	290,179	116,769	40.24%	95,187	46,340	48.68%
Mesa	467,657	350,244	74.89%	71,995	44,785	62.21%
Paradise Valley	13,834	90	0.65%	3,365	15	0.45%
Peoria	166,339	125,812	75.64%	25,308	19,954	78.84%
Phoenix	1,561,296	314,904	20.17%	143,448	19,862	13.85%
Queen Creek	35,720	2,112	5.91%	2,094	75	3.58%
Salt River Pima-Maricopa Indian Community	6,706	6,567	97.93%	1,004	969	96.51%
Scottsdale	237,929	91,598	38.50%	49,963	18,377	36.78%
Surprise	128,211	114,640	89.42%	26,025	18,794	72.22%
Tempe	176,809	30,936	17.50%	15,264	3,199	20.96%
Tolleson	6,904	6,904	100.00%	809	809	100.00%
Wickenburg	6,803	0	0.00%	2,058	0	0.00%
Youngtown	6,454	6,454	100.00%	1,177	1,177	100.00%
Queen Creek (Pinal County Portion)	1421	0	0.00%	128	0	0.00%
Peoria (Yavapai County Portion)	7	0	0.00%	2	0	0.00%
Wickenburg (Yavapai County Portion)	206	0	0.00%	32	0	0.00%

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Table 5-37: Residential structures exposed to high hazard subsidence areas

Community	Residential Building Count	Residential Building Exposure		Residential Building Replacement Value (x$1,000)	Residential Building Value Exposed	
		Total	Percent		Total (x$1,000)	Percent
County-Wide Totals (Maricopa Only)	**1,639,187**	**712,279**	**43.45%**	**$542,436,633**	**$232,493,210**	**42.86%**
Apache Junction (Maricopa County Portion)	295	56	18.98%	$76,791	$14,566	18.97%
Avondale	26,802	25,854	96.46%	$7,272,041	$7,014,883	96.46%
Buckeye	18,206	818	4.49%	$4,946,783	$222,243	4.49%
Carefree	2,242	0	0.00%	$1,922,010	$0	0.00%
Cave Creek	2,498	0	0.00%	$1,628,751	$0	0.00%
Chandler	94,257	40,602	43.08%	$34,713,265	$14,952,484	43.07%
El Mirage	11,307	11,307	100.00%	$2,655,346	$2,655,345	100.00%
Fort McDowell Yavapai Nation	308	0	0.00%	$260,045	$0	0.00%
Fountain Hills	13,105	0	0.00%	$5,944,909	$0	0.00%
Gila Bend	944	871	92.27%	$118,937	$109,679	92.22%
Gilbert	74,821	66,193	88.47%	$29,339,526	$25,955,892	88.47%
Glendale	90,415	71,773	79.38%	$24,665,480	$19,579,778	79.38%
Goodyear	25,023	21,298	85.11%	$8,326,438	$7,086,794	85.11%
Guadalupe	1,397	0	0.00%	$269,202	$0	0.00%
Litchfield Park	2,616	2,616	100.00%	$996,356	$996,355	100.00%
Unincorporated Maricopa County	142,777	62,923	44.07%	$45,530,720	$20,065,864	44.07%
Mesa	201,507	145,468	72.19%	$59,328,380	$42,829,263	72.19%
Paradise Valley	5,621	37	0.66%	$11,738,020	$78,156	0.67%
Peoria	64,806	50,138	77.37%	$21,410,130	$16,564,087	77.37%
Phoenix	590,476	95,185	16.12%	$167,455,500	$26,993,987	16.12%
Queen Creek	8,422	426	5.06%	$2,890,493	$146,219	5.06%
Salt River Pima-Maricopa Indian Community	2,602	2,604	100.08%	$919,777	$893,106	97.10%
Scottsdale	123,959	49,657	40.06%	$67,660,310	$27,104,031	40.06%
Surprise	52,607	45,168	85.86%	$15,652,750	$13,439,282	85.86%
Tempe	73,603	14,324	19.46%	$24,383,780	$4,745,515	19.46%
Tolleson	2,165	2,165	100.00%	$505,455	$505,455	100.00%
Wickenburg	3,610	0	0.00%	$1,285,212	$0	0.00%
Youngtown	2,796	2,796	100.00%	$540,226	$540,226	100.00%
Queen Creek (Pinal County Portion)	606	0	0.00%	$207,814	$0	0.00%
Peoria (Yavapai County Portion)	5	0	0.00%	$1,321	$0	0.00%
Wickenburg (Yavapai County Portion)	54	0	0.00%	$19,703	$0	0.00%

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Sources

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Profile Maps

Maps 6A, 6B, and 6C – Subsidence Hazard Map(s)

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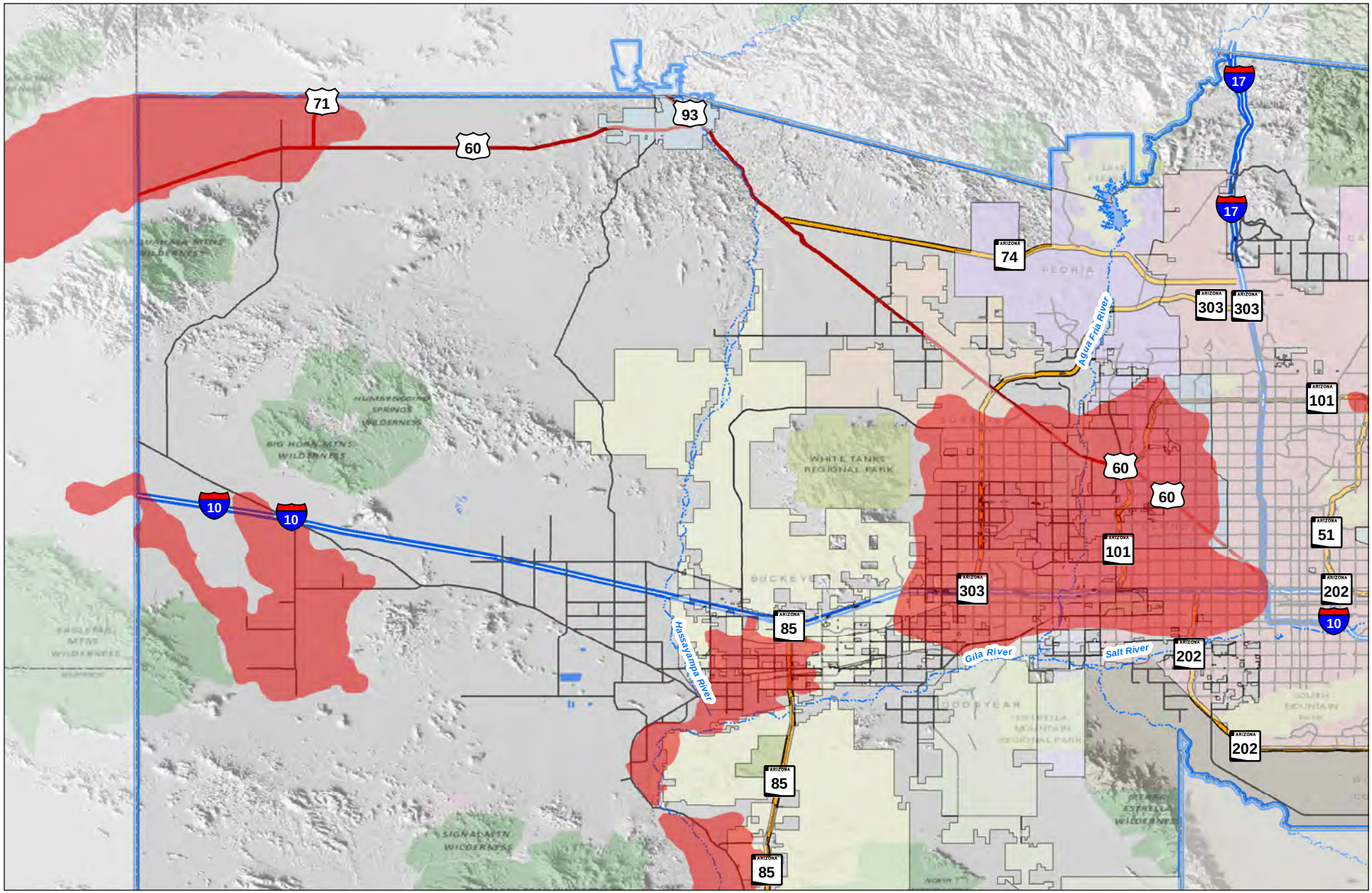


Legend

- Maricopa County
- Mitigation Plan Extent
- Major Streams

Subsidence Hazard Rating

- Subsidence

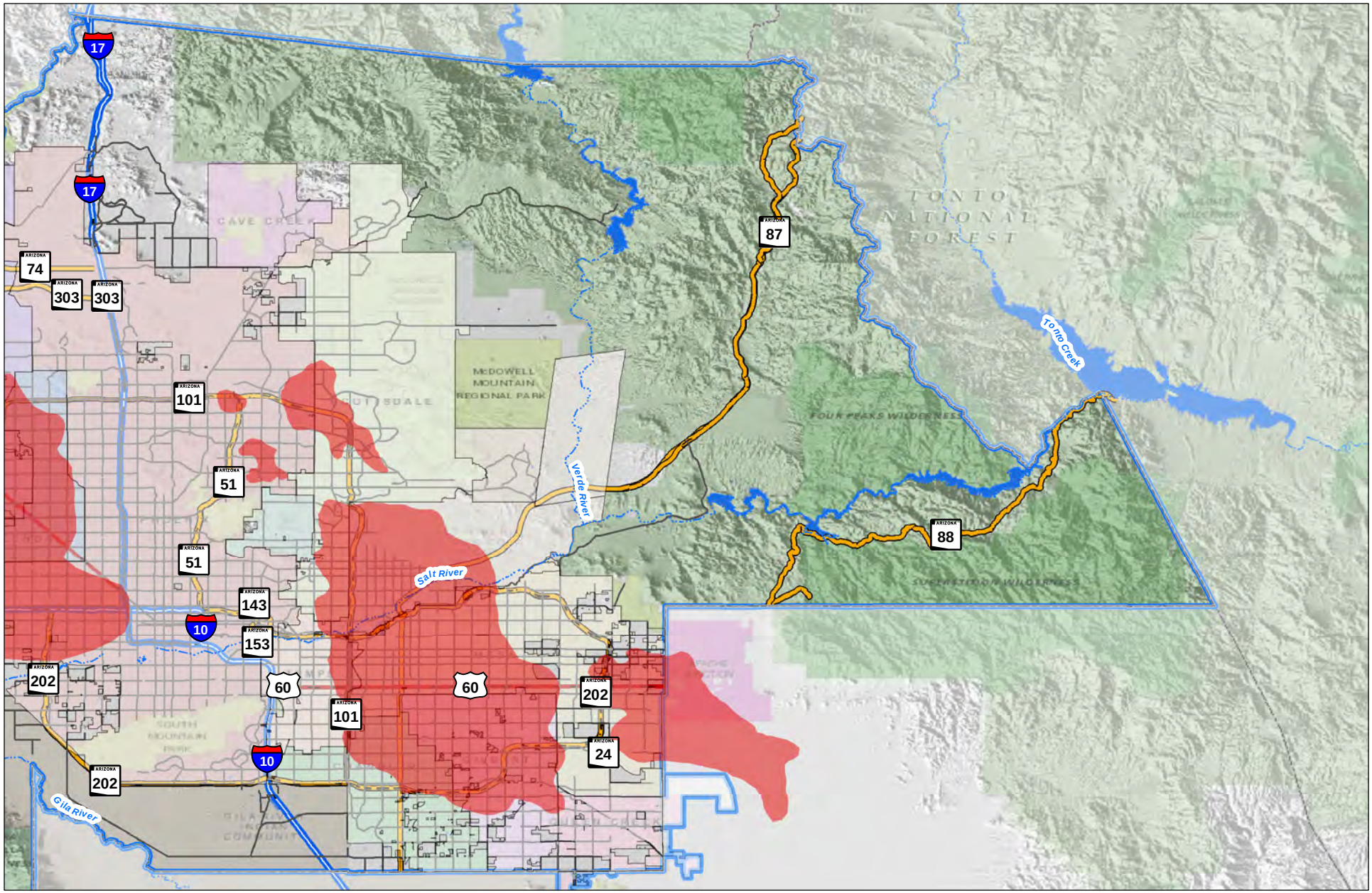
0 37.5 75 150
Miles

Source: JE Fuller 2020; ADWR 2020; MAG 2020; TIGER 2020; AZGS 2020

MARICOPA COUNTY

Maricopa County Multi-Jurisdictional Hazard Mitigation Plan

Map 6A
Maricopa County Subsidence Hazard Map as of Sept 2020



Legend

- Maricopa County
- Mitigation Plan Extent
- Major Streams

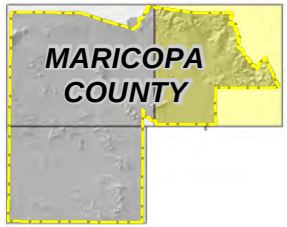
Subsidence Hazard Rating

- Subsidence

0 37.5 75 150

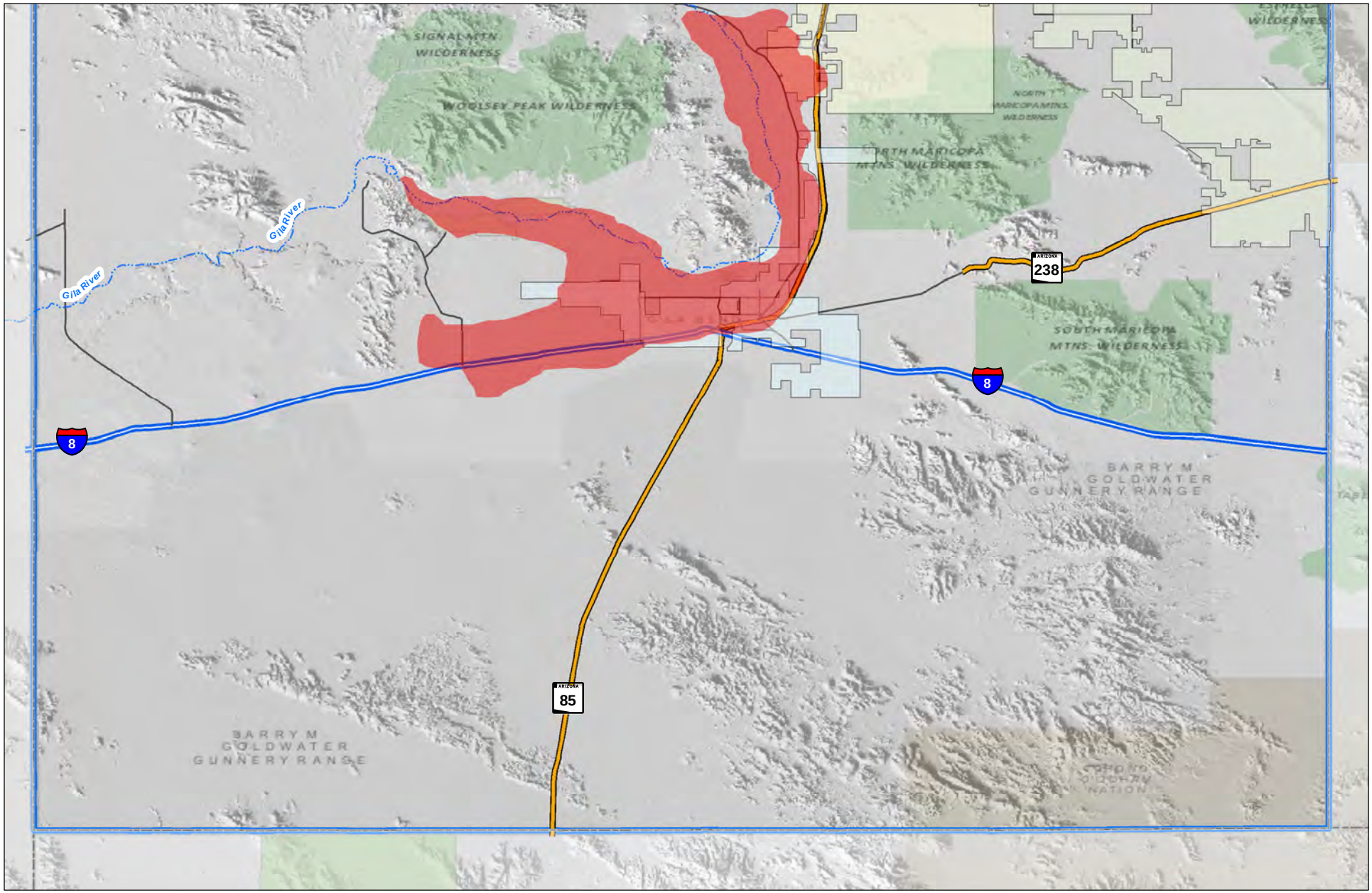
Miles

Source: JE Fuller 2020; ADWR 2020; MAG 2020; TIGER 2020; AZGS 2020



Maricopa County Multi-Jurisdictional Hazard Mitigation Plan

Map 6B
Maricopa County Subsidence Hazard Map as of Sept 2020



Legend

- Maricopa County
- Mitigation Plan Extent
- Major Streams

Subsidence Hazard Rating

- Subsidence

0 37.5 75 150

Miles

Source: JE Fuller 2020; ADWR 2020; MAG 2020; TIGER 2020; AZGS 2020

MARICOPA COUNTY

Maricopa County Multi-Jurisdictional Hazard Mitigation Plan

Map 6C
Maricopa County Subsidence Hazard Map as of Sept 2020

5.3.9 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

The Sonoran desert vegetation typically found in the majority of Maricopa County is less dense than other areas of the state. That fact, combined with relative density of urban area, makes wildfire risk within the county relatively low when compared to the more densely forested areas of the state. However, the risk of wildfire still exists within Maricopa County and can pose a real threat to those who live and/or work within the wildland urban interface. Historic events that have occurred during the last Plan cycle included:

- In March 2004, The Citris Fire located west of Gila Bend burned over 5,700 acres along the Gila River, which included state, private and federal lands.
- In June 2005, lightning touched off the Cave Creek Complex Fire in the northern part of Maricopa County about 5 miles northeast of Carefree. The fire threatened 440 homes in the Tonto Hills and Camp Creek areas, as well as major power lines serving Phoenix. There were damages reported to 11 residences and 3 out-buildings in Camp Creek (USFS, 2009).
- In June 2008, lightning touched off the Ethan Brush Fire in the heavily vegetated Gila River bed south of Laveen. Approximately 50 residents of 18 homes were evacuated overnight and allowed to return their undamaged homes the next day. The fire ultimately consumed about 7,000 acres (AZ Republic, 2008).
- In August 2008, the Robins Butte Fire burned about 500 acres of the Gila River bottom located four miles west of State Route 85, south of Palo Verde Road, and near Buckeye (AZ Republic, 2008).
- In June 2010, the Sycamore Fire, located in northern Maricopa County near MP209 on Highway 87, burned 187 acres and forced a temporary closure of the main

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thoroughfare between Phoenix and Payson while fire crews battled the blaze. There were no reported damages, injuries or deaths and fire suppression costs were estimated to exceed $146K (NWCG, 2014).

- In May 2012, the Sunflower Fire, located in northern Maricopa County approximately 30 miles north of Mesa, burned 17,446 acres. There were 6 reported firefight related injuries and no reported deaths. The fire threatened 2 residences, 2 out-buildings, the Cross F Ranch, and an APS 345 KV power line, but firefighters were able to protect assets in the area. Fire suppression costs were estimated to exceed $600K (NWCG, 2014).
- In May 2020, two separate fires burned in the hillside areas of Cave Creek. The East Desert Fire started Sunday, May 17, off Desert Hills Drive in the Cave Creek-area. Due to dry vegetation and wind gusts, the human caused fire spread rapidly over the course of a few hours consuming 1,492 acres. Crews provided structure protection to roughly 120 homes and were able to protect all primary structures. Two weeks later on May 30th, the Ocotillo Fire started at near Ocotillo Road about 1.3 miles NW of Cave Creek. The human caused fire consumed 980 acres and destroyed 20 buildings, eight of them homes. The fire also tore through an iconic business, Johnny Ringo's Carefree Adventures. Damages from the Ocotillo Fire exceeded $5 million.
- In June 2020, the Bush Fire located in the northwest quadrant of Maricopa County and extending into Gila County, consumed 794,000 acres and caused a closure of the SR 87. The human caused fire threatened several homes, a major electric transmission line, and caused significant damage to roadside guardrails along SR 87. Many of the steep burn areas will require close monitoring over the next several years during storm events that have very high debris flow potential.

Probability and Magnitude

The probability and magnitude of wildfire incidents for Maricopa 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 of wildfire hazard data were used by the MJPT to develop a composite hazard profile for the county. The first and primary data source is the recently updated Maricopa County Community Wildfire Protection Plan (LSDI, 2010 and MCDEM, 2020) and the second is a regional fire risk coverage provided by the Arizona State Forestry Office. Each of these is discussed below.

In 2009, Maricopa County communities, tribes, and state and federal officials tasked with managing wildfires within the county came together to develop the Maricopa County Community Wildfire Protection Plan (CWPP). The CWPP (LSDI, 2010) was developed in response to the Healthy Forests Restoration Act of 2003 (HFRA) for the at-risk communities and unincorporated areas in Maricopa County, Arizona, located in and around public lands administered by the US Department of the Interior Bureau of Land Management (USDI BLM) Phoenix District Office, the Tonto National Forest (TNF), and State Trust Lands (STL). Two core teams were formed to

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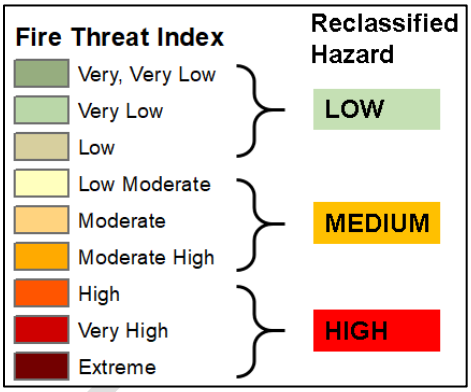
implement the agency and public collaboration necessary to develop a CWPP compliant with HFRA: the Eastern Core Team includes all identified at-risk communities in Maricopa County located east of Interstate 17 (I-17) and east of Interstate 10 (I-10), and the Western Core Team includes all identified at-risk communities west of I-17 and I-10. The Core Teams identified 44 communities and analyzed 3,103,370 acres for potential risk from catastrophic wildland fire within Maricopa County. The CWPP has been updated in both 2014 and in early 2020, however the base hazard data developed in the 2010 CWPP remained unchanged with both updates.

The Maricopa County CWPP established the Wildland Urban Interface (WUI) areas for the county and mapped various wildfire risk elements such as vegetative fuels and densities, topographical slope and aspect, previous burn areas and ignition points, and prior treatment areas, etc. One product of the CWPP work was the development of a county-wide wildland fuel hazard coverage for both a typical fire season and extraordinary rainfall years. Components considered in the development of the wildland fuel hazard coverage included vegetation type and density, previously burned areas, and terrain slope and aspect. The composite coverage resulted in a raster grid categorized as High, Medium, or Low hazard. The procedures used by the CWPP planning team to develop the hazard designation are documented in the CWPP. The MJPT chose to use the typical fire season data set to best represent the wildland fuel hazard for the county.

Following the State of Arizona's lead, the 2003/04 Arizona Wildland Urban Interface Assessment (AWUIA) project (Fisher, 2004) used in the 2015 Plan has been replaced with an updated regional dataset used to depict the threat of wildfire in Arizona as a part of the West Wide Wildfire Risk Assessment (WWWRA) (Sanborn Map Company, 2013) for the western U.S. The data and assessment results are hosted by the Arizona State Forestry and Fire Management Department on its website[35]. The wildfire hazards are derived from the Fire Threat Index (FTI) data distributed with the WWWRA. The FTI reflects the likelihood of one acre burning if a fire started at a specific grid location. The calculation process integrates the probability of an acre igniting and the expected final fire size into a single measure of wildland fire susceptibility. The assessed fire size is based on the rate of spread in four weather percentile categories. The key inputs used in the wildfire model to produce the FTI wildfire hazard layer are:

[35] Arizona Wildfire Risk Assessment Portal (AZWRAP), accessed at: https://arizonawildfirerisk.com/

- Probability of fire occurrence, derived from:
  - Historic fire locations and fire occurrence areas
  - Weather influence zones (historic weather observations)
- Fire behavior (rate of spread) derived from:
  - Surface fuels
  - Canopy closure
  - Canopy characteristics
  - Topography
- Fire suppression effectiveness, derived from:
  - Historic fire sizes
  - Historic protection organization



For the purposes of this Plan, the nine FTI categories were reclassified into three generalized categories, Low, Medium and High wildfire hazard and applied as appropriate to compliment or augment the CWWP coverages.

One final adjustment to the wildfire hazard layers for this Plan update was to modify the hazards for areas that have recently burned in the past 6-years. Wildfire perimeters were obtained from the National Interagency Fire Center (NIFC, 2020) and are illustrated on the wildfire hazard maps. Hazard ratings within the burn perimeters were set to Low to account for the previous fire effects and reduced fuels. These areas will need to be re-evaluated at the next 5-year update.

The combination of these three data sets provides a complete geospatial hazard coverage for the planning area.

Climate Change Impacts

One of the "Key Messages" from the NCA report (Garfin, et.al., 2014) is the projection that wildfire risk and incidents within the Southwest region will likely increase due to climate change. Reduced precipitation, increased temperatures and longer, more severe periods of drought all factor into the assessment. Response to this amplification of current wildfire risk will likely include a greater need for vegetation management planning and greater enforcement of wildland urban interface best building practices. Incorporation of climate change impacts into the CWPP is also something the county and participating jurisdictions should consider.

Vulnerability – CPRI Results

Wildfire CPRI results for each community are summarized in Table 5-38 below.

Table 5-38: CPRI results by jurisdiction for wildfire

Participating Jurisdiction	Probability	Magnitude/ Severity	Warning Time	Duration	CPRI Score
Avondale	Likely	Limited	<6 hours	<1 week	2.85
Buckeye	Likely	Limited	<6 hours	<24 hours	2.75
Carefree	Highly Likely	Critical	6-12 hours	>1 week	3.55
Cave Creek	Likely	Critical	<6 hours	<1 week	3.15

Table 5-38: CPRI results by jurisdiction for wildfire					
Participating Jurisdiction	**Probability**	**Magnitude/ Severity**	**Warning Time**	**Duration**	**CPRI Score**
Chandler	Possibly	Negligible	<6 hours	<6 hours	1.90
El Mirage	Possibly	Limited	6-12 hours	<6 hours	2.05
Fort McDowell Yavapai Nation	Possibly	Limited	<6 hours	<1 week	2.40
Fountain Hills	Likely	Critical	<6 hours	<1 week	3.15
Gila Bend	Unlikely	Negligible	<6 hours	<6 hours	1.45
Gilbert	Possibly	Limited	<6 hours	<6 hours	2.20
Glendale	Possibly	Negligible	<6 hours	<24 hours	1.80
Goodyear	Likely	Negligible	<6 hours	<24 hours	2.45
Guadalupe	Unlikely	Negligible	<6 hours	<6 hours	1.45
Litchfield Park	Possibly	Limited	<6 hours	<24 hours	3.20
Unincorporated Maricopa County	Highly Likely	Critical	<6 hours	>1 week	3.70
Mesa	Highly Likely	Limited	<6 hours	<1 week	3.30
Paradise Valley	Possibly	Critical	>24 hours	<1 week	2.25
Peoria	Likely	Critical	<6 hours	<6 hours	2.95
Phoenix	Unlikely	Negligible	<6 hours	<6 hours	1.45
Queen Creek	Possibly	Limited	<6 hours	>1 week	2.50
Salt River Pima-Maricopa Indian Community	Likely	Critical	<6 hours	<1 week	3.25
Scottsdale	Likely	Limited	<6 hours	<24 hours	2.75
Surprise	Possibly	Limited	<6 hours	<24 hours	2.30
Tempe	Unlikely	Negligible	<6 hours	<6 hours	1.45
Tolleson	Unlikely	Negligible	>24 hours	<6 hours	1.00
Wickenburg	Highly Likely	Critical	<6 hours	<1 week	3.60
Youngtown	Unlikely	Critical	<6 hours	<1 week	2.25
				County-wide average CPRI =	**2.49**

Vulnerability – Loss/Exposure 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 Maps 7A, 7B, and 7C. No loss estimations were made for this update. Only exposure of the human, residential and asset facilities are reported. Table 5-39 summarizes the MJPT identified critical and non-critical facilities potentially exposed to high wildfire hazard areas. Tables 5-40 and 5-41 summarize the population sectors and residential structures exposed to the high wildfire hazard areas.

In summary, 368 critical and non-critical MJPT identified assets with a cumulative reported replacement cost of $1.6 billion are located within high hazard wildfire areas. An additional $20.9 billion of census block residential structures are located within high hazard wildfire areas across the planning area. Regarding human vulnerability, a total population of 47,856 people, or 1.16% of the total census block population areas across the planning area, are located within a high hazard wildfire area. Typically, deaths and injuries not related to firefighting activities are rare. However, it is feasible to assume that at least one death and/or injury may be plausible. There is also a high probability of population displacement during a wildfire event, especially in the urban wildland interface areas.

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Table 5-39: Asset inventory exposure to high hazard wildfire areas

Community	Total Facilities Reported by Community	Impacted Facilities	Percentage of Total Community Facilities Impacted	Total Replacement Value of All Facilities Reported by Community (x $1,000)	Estimated Replacement Value Exposed to Hazard (x $1,000)
County-Wide Totals (Maricopa Only)	**10917**	**368**	**3.37%**	**$26,024,918**	**$1,615,024**
Avondale	131	7	5.34%	$179,460	$56,000
Buckeye	125	1	0.80%	$268,667	$0
Carefree	6	0	0.00%	$9,000	$0
Cave Creek	4	0	0.00%	$13,258	$0
Chandler	277	1	0.36%	$1,361,072	$1,037
El Mirage	34	2	5.88%	$285,542	$52,700
Fort McDowell Yavapai Nation	26	0	0.00%	$202,624	$0
Fountain Hills	15	0	0.00%	$411,000	$0
Gila Bend	7	1	14.29%	$36,000	$2,000
Gilbert	5287	45	0.85%	$0	$0
Glendale	1224	22	1.80%	$4,085,807	$195,508
Goodyear	159	2	1.26%	$148,573	$0
Guadalupe	7	0	0.00%	$10,800	$0
Litchfield Park	5	0	0.00%	$118,900	$0
Unincorporated Maricopa County	1061	108	10.18%	$3,624,310	$36,743
Mesa	528	29	5.49%	$2,850,466	$48,220
Paradise Valley	95	42	44.21%	$469,300	$94,300
Peoria	299	31	10.37%	$282,333	$2,697
Phoenix	947	37	3.91%	$7,843,312	$954,617
Queen Creek (Maricopa County Only)	124	0	0.00%	$301,446	$0
Salt River Pima-Maricopa Indian Community	78	3	3.85%	$502,493	$0
Scottsdale	237	25	10.55%	$1,094,610	$95,255
Surprise	94	11	11.70%	$498,810	$75,947
Tempe	111	0	0.00%	$1,373,300	$0
Tolleson	10	1	10.00%	$0	$0
Wickenburg	14	0	0.00%	$32,589	$0
Youngtown	12	0	0.00%	$21,247	$0
Gilbert (Pinal County Only)	1	0	0.00%	$0	$0
Mesa (Pinal County Only)	22	1	4.55%	$7,380	$0
Queen Creek (Pinal County Only)	5	0	0.00%	$4,697	$0
Maricopa County (Pinal County Only)	3	0	0.00%	$707	$0
Maricopa County (Yavapai County Only)	6	1	16.67%	$1,760	$155

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Table 5-40: Population sectors exposed to high hazard wildfire areas

Community	Total Population	Population Exposed		Total Population Over 65	Population Over 65 Exposed	
		Total	Percent		Total	Percent
County-Wide Totals (Maricopa Only)	**4,136,790**	**47,856**	**1.16%**	**538,166**	**4,412**	**0.82%**
Apache Junction (Maricopa County Portion)	314	0	0.00%	149	0	0.00%
Avondale	79,485	2014	2.53%	5,313	139	2.62%
Buckeye	65,452	3	0.00%	5,141	0	0.00%
Carefree	3,580	319	8.91%	1,591	122	7.67%
Cave Creek	5,287	724	13.69%	1169	126	10.78%
Chandler	250,334	288	0.12%	23,435	25	0.11%
El Mirage	33,728	593	1.76%	2,700	144	5.33%
Fort McDowell Yavapai Nation	1017	2	0.20%	85	0	0.00%
Fountain Hills	23,536	0	0.00%	7,318	0	0.00%
Gila Bend	2,012	0	0.00%	193	0	0.00%
Gilbert	239,546	1842	0.77%	17,960	76	0.42%
Glendale	237,327	715	0.30%	23,675	101	0.43%
Goodyear	78,118	319	0.41%	10,094	45	0.45%
Guadalupe	6,230	0	0.00%	581	0	0.00%
Litchfield Park	5,980	13	0.22%	1,065	1	0.09%
Unincorporated Maricopa County	290,179	23,881	8.23%	95,187	3116	3.27%
Mesa	467,657	6,203	1.33%	71,995	1904	2.64%
Paradise Valley	13,834	5778	41.77%	3,365	1465	43.54%
Peoria	166,339	7,984	4.80%	25,308	533	2.11%
Phoenix	1,561,296	61,284	3.93%	143,448	6,079	4.24%
Queen Creek	35,720	5	0.01%	2,094	0	0.00%
Salt River Pima-Maricopa Indian Community	6,709	15	0.22%	1,004	5	0.50%
Scottsdale	237,929	4,939	2.08%	49,963	789	1.58%
Surprise	128,211	10077	7.86%	26,025	3308	12.71%
Tempe	176,809	1377	0.78%	15,264	49	0.32%
Tolleson	6,904	53	0.77%	809	7	0.87%
Wickenburg	6,803	0	0.00%	2,058	0	0.00%
Youngtown	6,454	38	0.59%	1,177	5	0.42%
Queen Creek (Pinal County Portion)	1421	0	0.00%	128	0	0.00%
Peoria (Yavapai County Portion)	7	0	0.00%	2	0	0.00%
Wickenburg (Yavapai County Portion)	206	0	0.00%	32	0	0.00%

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Table 5-41: Residential structures exposed to high hazard wildfire areas

Community	Residential Building Count	Residential Building Exposure		Residential Building Replacement Value (x$1,000)	Residential Building Value Exposed	
		Total	Percent		Total (x$1,000)	Percent
County-Wide Totals (Maricopa Only)	**1,639,265**	**52,732**	**3.22%**	**$542,436,633**	**$20,904,932**	**3.85%**
Apache Junction (Maricopa County Portion)	295	0	0.00%	$76,791	$0	0.00%
Avondale	26,802	779	2.91%	$7,272,041	$202,527	2.79%
Buckeye	18,206	1	0.01%	$4,946,783	$318	0.01%
Carefree	2,242	157	7.00%	$1,922,010	$134,254	6.99%
Cave Creek	2,498	292	11.69%	$1,628,751	$190,410	11.69%
Chandler	94,257	118	0.13%	$34,713,265	$43,297	0.12%
El Mirage	11,307	277	2.45%	$2,655,346	$64,992	2.45%
Fort McDowell Yavapai Nation	308	1	0.32%	$260,045	$435	0.17%
Fountain Hills	13,105	0	0.00%	$5,944,909	$38	0.00%
Gila Bend	944	2	0.21%	$118,937	$215	0.18%
Gilbert	74,821	528	0.71%	$29,339,526	$207,205	0.71%
Glendale	90,415	245	0.27%	$24,665,480	$66,776	0.27%
Goodyear	25,023	115	0.46%	$8,326,438	$38,351	0.46%
Guadalupe	1,397	0	0.00%	$269,202	$0	0.00%
Litchfield Park	2,616	3	0.11%	$996,356	$1,202	0.12%
Unincorporated Maricopa County	142,777	9,064	6.35%	$45,530,720	$2,890,566	6.35%
Mesa	201,507	2,996	1.49%	$59,328,380	$882,029	1.49%
Paradise Valley	5,621	2485	44.21%	$11,738,020	$5,190,276	44.22%
Peoria	64,806	2,730	4.21%	$21,410,130	$901,847	4.21%
Phoenix	590,476	24,895	4.22%	$167,455,500	$7,060,152	4.22%
Queen Creek	8,422	1	0.01%	$2,890,493	$379	0.01%
Salt River Pima-Maricopa Indian Community	2,680	6	0.22%	$919,777	$2,227	0.24%
Scottsdale	123,959	2,458	1.98%	$67,660,310	$1,341,589	1.98%
Surprise	52,607	4704	8.94%	$15,652,750	$1,399,528	8.94%
Tempe	73,603	846	1.15%	$24,383,780	$280,194	1.15%
Tolleson	2,165	16	0.74%	$505,455	$3,648	0.72%
Wickenburg	3,610	0	0.00%	$1,285,212	$0	0.00%
Youngtown	2,796	13	0.46%	$540,226	$2,477	0.46%
Queen Creek (Pinal County Portion)	606	0	0.00%	$207,814	$0	0.00%
Peoria (Yavapai County Portion)	5	0	0.00%	$1,321	$0	0.00%
Wickenburg (Yavapai County Portion)	54	0	0.00%	$19,703	$0	0.00%

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It is duly noted that the exposure numbers presented above represent a comprehensive evaluation of the county as a whole. It is unlikely that wildfires would burn county-wide 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 communities push further out, more WUI is created. The current CWPP provides a comprehensive approach to reducing wildfire risk through targeted activities and projects that are designed to establish a baseline for effective mitigation against wildfire damages in the WUI of Maricopa County.

Changes in Development in the Hazard Prone Area

Within the unincorporated areas of Maricopa County, residential development has been minimal but has been concentrated along I-17 in the Anthem area and in the western portion of the County along SR303. It is anticipated that new development will largely occur in these areas over the next five years. Some of these areas are near the County's WUI boundary and are identified as having medium and high wildfire hazard ratings. Future development in these areas should consult the CWPP and this Plan for guidance on sound development practices and wildfire risk reduction measures.

The table below summarizes the changes in development within all other participating jurisdictions in relation to known wildfire hazard areas within the County.

Jurisdiction	Development Changes
Avondale	Avondale does not lie within proximity to the designated WUI but contains areas of medium and high wildfire hazard within the southern half of the City and to a lesser extent within the northern half, as well. Most of the key growth identified by the City lie adjacent to I-10 and no further south than Lower Buckeye Road and will not significantly impact the Community's vulnerability to wildfire. The South Avondale Growth Area, located between Lower Buckeye Road to the Estrella Mountains could impact the wildfire vulnerability of the City, due to the widespread medium and high wildfire hazard designation in that area.
Buckeye	The City of Buckeye is bounded to the south, north and west by the designated WUI and contains several areas of medium and high wildfire hazard. New and existing commercial development within the City is concentrated on Miller and Watson Road immediately south of I-10 outside of the significant areas of increased wildfire hazard. The City's forecasted residential developments are located along the south and north sides of I-10 and along the west and north boundaries of the community north of I-10. Of the anticipated development changes, only the residential development identified as Douglas Ranch lies within an area of substantial wildfire hazard.
Carefree	The Town of Carefree is mostly located within areas of medium and high wildfire hazard but is not located along the designated WUI. Most residential and commercial development over the past five years and anticipated over the next 5 years occurs in designated infill areas of the Town in the northwest and central area. These areas are located with areas of elevated wildfire hazard.

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Jurisdiction	Development Changes
Cave Creek	The Town of Cave Creek is entirely composed of areas of medium and high wildfire hazard and is bounded to the north by the designated WUI. Changes in development include several single family and multi-family residential developments and commercial developments along the Carefree Highway. Commercial development along the Carefree Highway is anticipated to continue over the next five years. The development described will change the community's vulnerability to wildfire.
Chandler	The City of Chandler is bordered to the south by the designated WUI but does not contain substantial areas of medium and high wildfire hazard. Most development is anticipated to occur in central and northern Chandler in the form of large lot residential, commercial, and industrial. Given the location of these developments, they will not impact the community's vulnerability to wildfire.
El Mirage	The City of El Mirage is not bordered by the defined WUI but is impacted by areas of medium and high wildfire hazard along the eastern community border. Most current and proposed development has taken the form of manufacturing projects located in the southern portions of the City. Minor growth of residential projects has occurred in the northeast section and a 3-story residential, multifamily project is being constructed in the northwest section of the City. Most of the proposed and existing developments described could impact the community's vulnerability to wildfire as the southern and northeastern sections of the City contain identified wildfire hazard areas.
Fort McDowell Yavapai Nation	The Fort McDowell Yavapai Nation contains areas of medium and high wildfire hazard, mostly following the alignments of the Verde River and Sycamore Creek and is bounded on the east by the defined WUI. Existing and planned developments are located approximately within the 30% of the southwest portion of the Nation and are not located within elevated wildfire hazard areas, nor will they affect the vulnerability of the Nation.
Fountain Hills	Most of the Town of Fountain Hills lies within areas identified to have medium wildfire hazard but is not proximal to the WUI boundary. The Town expects to continue with significant single-family development, primarily on the western and northwestern parts of down in Adero Canyon and Eagles Nest. While the western portion of the community does not lie within an area of elevated wildfire hazard, development in the northwestern portion of the Town will impact the community's vulnerability to wildfire.
Gila Bend	The Town of Gila Bend is bounded on all sides by the identified WUI for Maricopa County and contains several pockets of medium and high wildfire hazard areas. The Town has seen limited growth over the past 5 years and anticipates that this trend will continue over the next 5 years. This development has occurred largely along the Pima St. and Butterfield Trail in the form of commercial and industrial projects. Developments within these may impact the community's vulnerability to wildfire as identified pockets of medium wildfire hazard areas exist along those alignments.

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Jurisdiction	Development Changes
Gilbert	Gilbert does not lie within proximity to the WUI boundary and is minimally impacted by areas of medium and high wildfire hazard from State Highway 202 to the southern boundary. Development within Gilbert has been focused within the Northwest Employment area located in the northwest corner of the Town, in the Banner/MD Anderson Employment Area north of Baseline Roade, the Central Employment Area located along State Highway 202 on the west boundary of the Town, and the Gateway Employment Area along State Highway 202 on the east boundary of the Town. The Town anticipates that the largest areas for development will continue to be the Central Business District and Gateway Employment Area in the future. The areas identified for development are not significantly impacted by area of medium and high wildfire hazard.
Glendale	The City of Glendale is impacted by areas of medium and high wildfire hazard areas mostly between the alignments of El Mirage Rd. and Hwy 101 and in the northeast corner of the City. Most areas targeted for development within the community lie outside of these areas of elevated wildfire risk, however development within the Sports & Entertainment District located around the intersection of Glendale Avenue and Hwy 101 will partially fall within areas of high wildfire hazard. Development in this area is expected to be predominantly office, entertainment, experiential retail and multifamily.
Goodyear	The City of Goodyear is impacted by medium and high wildfire hazard areas, particularly in the central portion of the community, and is bounded by the WUI to the south and west. In relation to the areas of medium and high wildfire hazard increased residential and commercial development have occurred in the area bounded by Pecos Rd. to the South and the Gila River to the north. Lesser amounts of development have occurred in the area bounded by the Gila River to the south and Camelback Rd. to the north. It is anticipated that development will continue at a 20% year on year increase in these areas over the next 5 years. Development located between Pecos Rd. and the Gila River may impact the community's vulnerability to wildfire.
Guadalupe	The Community of Guadalupe does not anticipate significant changes in development, is not impacted by areas of increased wildfire hazard, and does not lie within proximity to the WUI boundary.
Litchfield Park	While Litchfield Park continues to develop, the City is not impacted by areas of increased wildfire hazard and does not lie within proximity to the WUI boundary.
Mesa	The City of Mesa is bounded by the WUI boundary on the northwest and has significant areas of medium and high wildfire hazard in the northern and southern portions of the City. Over the past 5 years growth has occurred in the Falcon Field area to the north, along the Downtown and Main Street Transit District, along the Superstition Springs Freeway Corridor, and within the Phoenix Mesa Gateway Area. Development has included increased residential and commercial development. This development is anticipated to continue within the growth areas identified with particular emphasis in the area surrounding the Phoenix-Mesa Gateway Airport. Of these areas, the Falcon Field area to the north and Phoenix Mesa Gateway area to the south are located within areas at increased risk of wildfire.
Peoria	The City of Peoria is largely impacted by medium and high wildfire hazard areas and is bordered to the north by the WUI boundary. Development has occurred and will continue to occur in the northern and central areas of the jurisdiction and will continue to migrate north over time. Future development in these areas will potentially impact wildfire risk within Peoria as these areas lie within medium and high hazard area and within proximity to the WUI.

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Jurisdiction	Development Changes
Phoenix	The northern and southern portions of the City of Phoenix are significantly impacted by medium and high wildfire hazard areas and is bounded by the WUI boundary to the north. Changes in development within the City are largely contained within the Infill Development District and the Southwest Growth Region. Anticipated commercial and residential growth within the Infill will be concentrated in the downtown area, which lies outside of the identified wildfire hazard areas. Residential development within the Southwest Growth Region, which contains significant areas of high wildfire hazard, will impact the City's vulnerability to wildfire.
Queen Creek	Queen Creek has experienced residential and commercial development predominantly within the eastern portion of the Town and anticipates that development will continue over the next 5 years. The Town is not located within proximity to the WUI boundary and has few areas of medium risk wildfire hazard within the incorporated area. For this reason, there are no impacts to wildfire hazard anticipated.
Salt River Pima-Maricopa Indian Community	The SRPMIC is bordered by the Maricopa County WUI boundary to the east and is designated to have medium and high wildfire hazard areas along the northern and southern boundary of the community. Development has occurred in the community at a fast pace over the past five years and anticipates continued growth in the commercial sector over the next five years, while residential is limited as housing is only available to Community Members. Most recent existing and proposed development is located outside of areas with elevated wildfire risk; however, the Community is considering development along the Southern Boundary of the Community, which would potentially be at a higher risk to wildfire.
Scottsdale	A significant portion of the community of Scottsdale is in areas of medium to high wildfire hazard risk and is bounded by the WUI boundary to the northeast. Development is continuing within the North Sub-Area of the City, north of Deer Valley Road, but is also occurring within the East-Shea area of the Central Sub-Area located between Deer Valley and Indian Bend Road. Residential, Commercial, and mixed-use development is expected to continue in these areas over the next 5 years. Development occurring between Scottsdale Road and Pima Freeway will be outside areas of increased wildfire risk, while development east or west of their alignments would be at an increased risk of wildfire.
Surprise	Surprise is closely bordered by the WUI boundary to the northwest and contains several areas designated with medium to high wildfire hazard. Over the past 5 years the City has experienced a residential growth rate above the state average and is anticipating continued growth of 53% in population and 63% in jobs related to office, retail, and industrial development by 2030. The city is targeting several areas for the growth, of which the Loop 303 Development and Railplex Foreign Trade Zone are impacted by areas designated to have medium and high wildfire hazard.
Tempe	Tempe is not within proximity of the WUI boundary and contains limited areas of high and medium wildfire hazard risk, mostly along the Salt River running east to west within the northern portion of the City. Tempe has seen rapid growth of high density residential, new corporate office headquarters and many new retail developments. A significant amount of this development has occurred in the downtown area, Tempe Town Lake, which lies with the designated high and medium fire hazard area. New developments within this area will increase the population and assets potentially impacted by wildfire.

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Jurisdiction	Development Changes
Tolleson	Tolleson has experienced a few small residential and commercial developments over the past 5 years and has designated specific areas to be targeted for development in the future. These areas are infill areas within the jurisdictional boundary. The community has limited medium and high rated hazard areas for wildfire but is not located in an area impacted by the WUI. Future growth within the community is limited and will not impact the wildfire hazard.
Wickenburg	Wickenburg is in northern Maricopa County and is bordered to the north, west, and south by the defined WUI. Pockets identified to have a medium wildfire hazard rating exist along Highway 93 which intersects the east side of the community from north to south. Development over the past 5 years and anticipated over the next 5 years has been largely residential and outside of areas with known wildfire hazards, with the exception of the proposed Arroyo Vistas development (37 homes) which lies, at least in part within an area designated to have a medium hazard rating.
Youngtown	Youngtown is not located within proximity to the defined WUI boundary. Small pockets of high and medium wildfire hazard risk do exist within the incorporated limits of the community. However, these areas are located along the Agua Fria River and further west. Most development within the community over the past 5 years and anticipated in the next 5-year cycle is characterized by infill and redevelopment of areas east of the Agua Fria River alignment. The Town's Council has approved a 100+ acre regional park in the Agua Fria river bottom which will further limit development within areas at risk to wildfire.

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MCDEM, 2020, Maricopa County Community Wildfire Protection Plan Update

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Profile Maps

Maps 7A, 7B, and 7C – Wildfire Hazard Map(s)

Maps 7A-2, 7B-2, and 7C-2 – Fire Threat Index Map(s)

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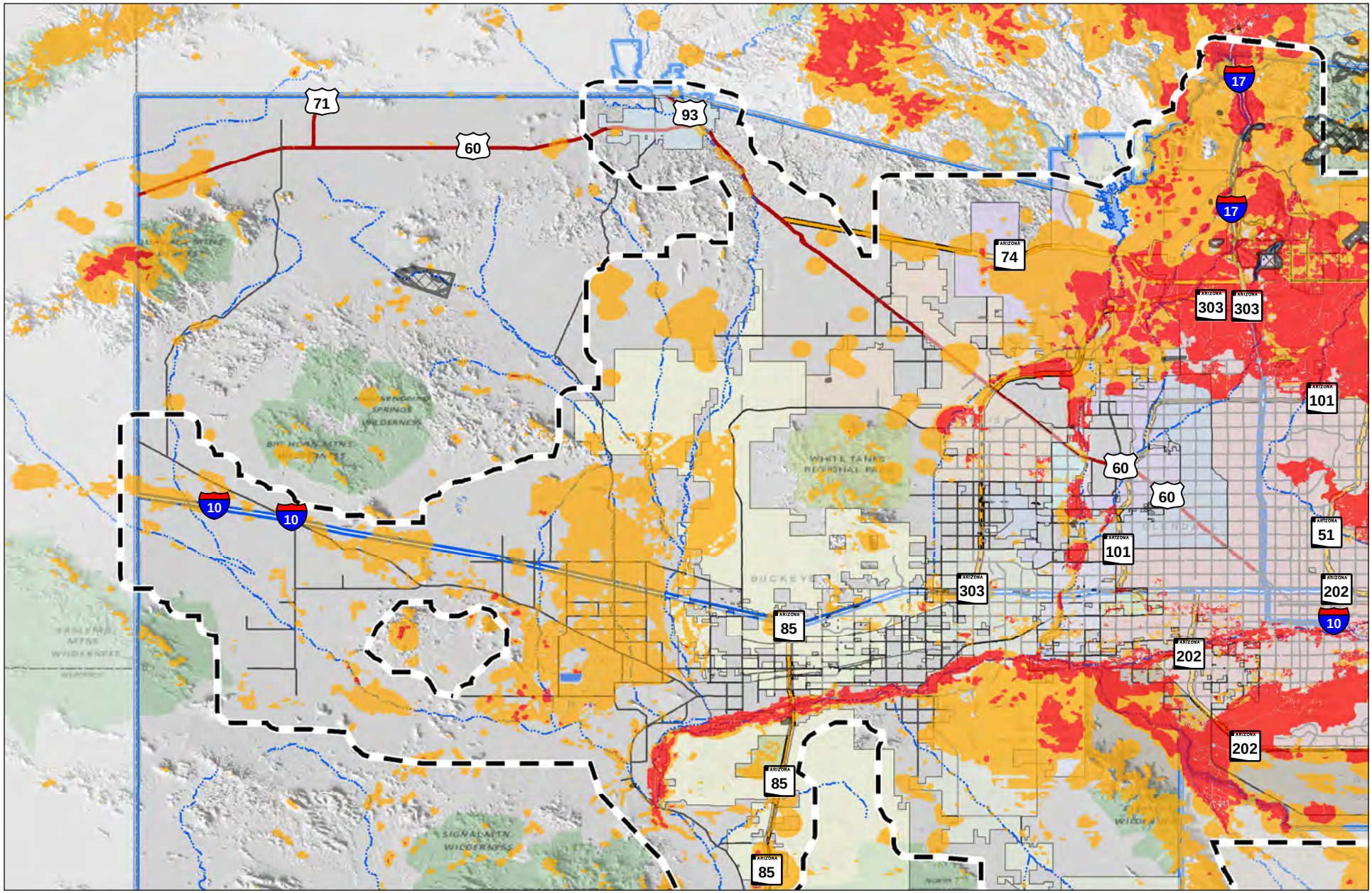


Legend

- Maricopa County
- Mitigation Plan Extent
- Major Streams
- Interagency Perimeters
- NIFS Perimeters
- WUI

Wildfire Hazard Rating

- High
- Medium

0 37.5 75 150

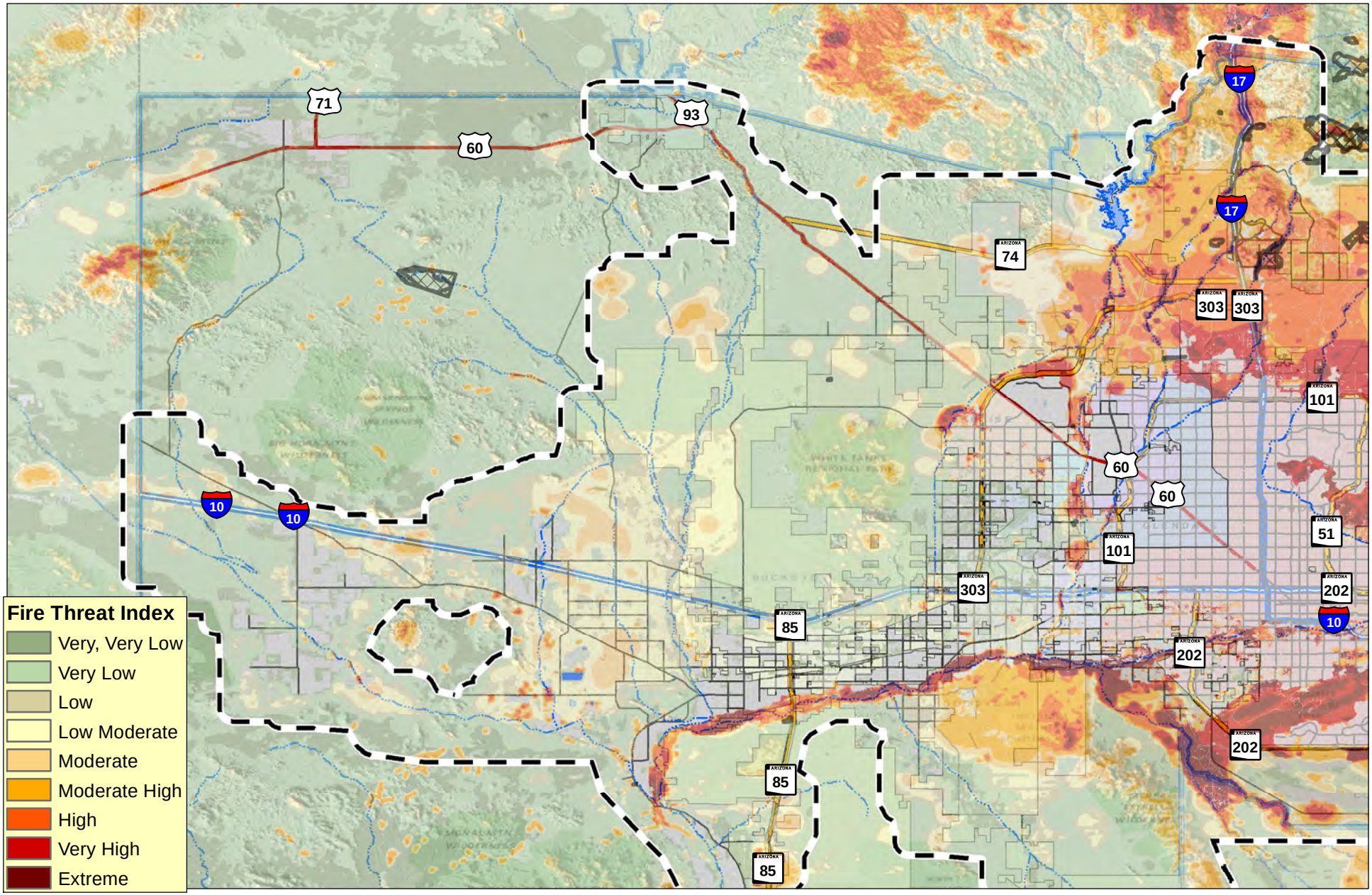
Miles

Source: JE Fuller 2020; MAG 2020: MCCWPP 2020; TIGER 2020; LSD 2020; AWUIA 2004; USGS 2020

MARICOPA COUNTY

Maricopa County Multi-Jurisdictional Hazard Mitigation Plan

Map 7A
Maricopa County
Wildfire Hazard Map
as of Sept 2020



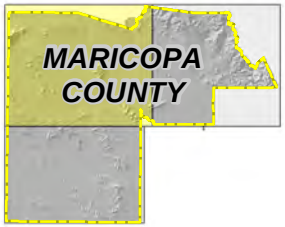
Legend

- Maricopa County
- Mitigation Plan Extent
- Major Streams
- Interagency Perimeters
- NIFS Perimeters
- WUI

0 37.5 75 150

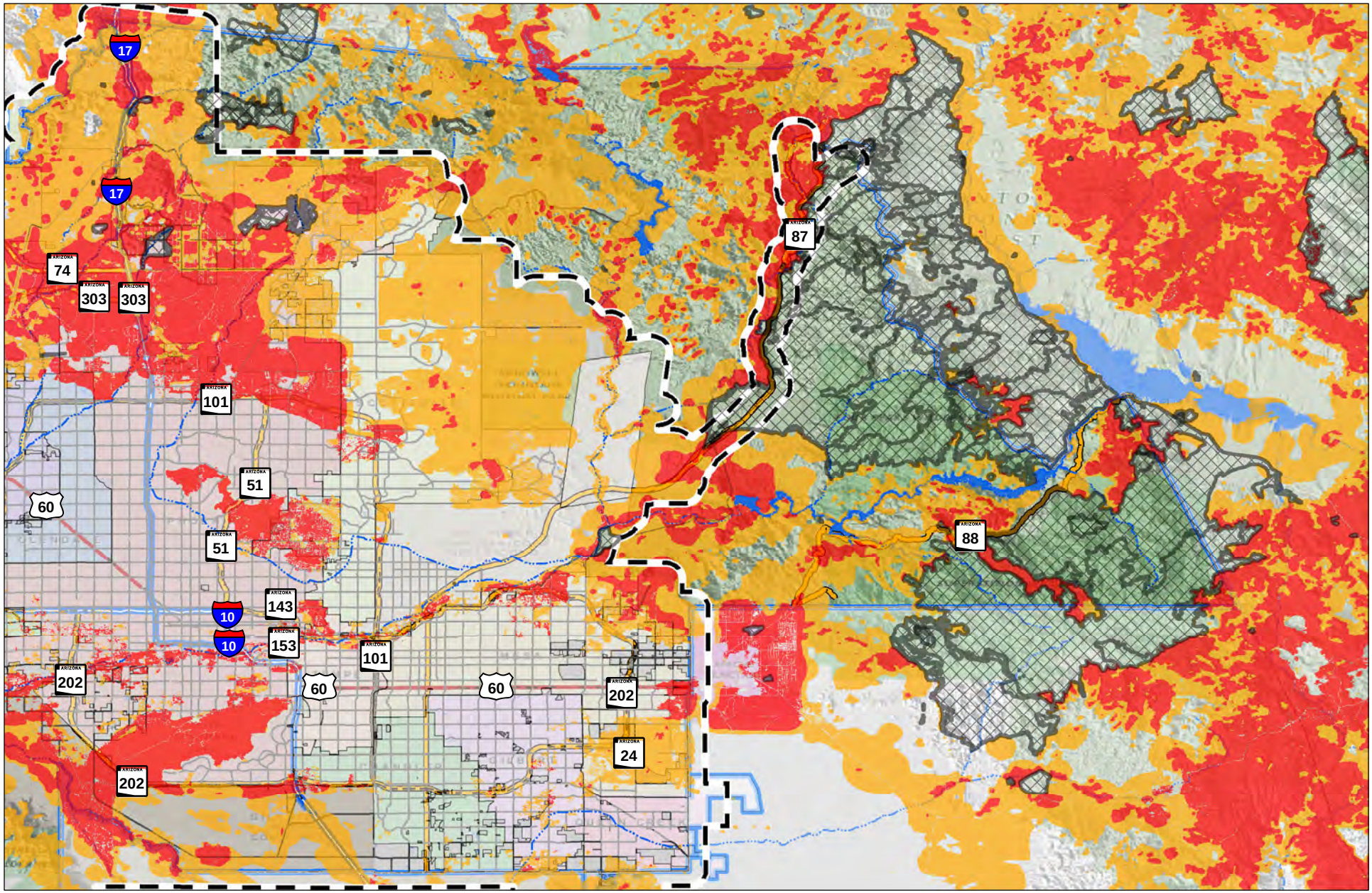
Miles

Source: JE Fuller 2020; MAG 2020: MCCWPP 2020; TIGER 2020; LSD 2020; AWUIA 2004; USGS 2020



Maricopa County Multi-Jurisdictional Hazard Mitigation Plan

Map 7A-2
Maricopa County
Wildfire Hazard Map
as of Sept 2020



Legend

- Maricopa County
- Mitigation Plan Extent
- Major Streams
- Interagency Perimeters
- NIFS Perimeters
- WUI

Wildfire Hazard Rating

- High
- Medium

0 37.5 75 150

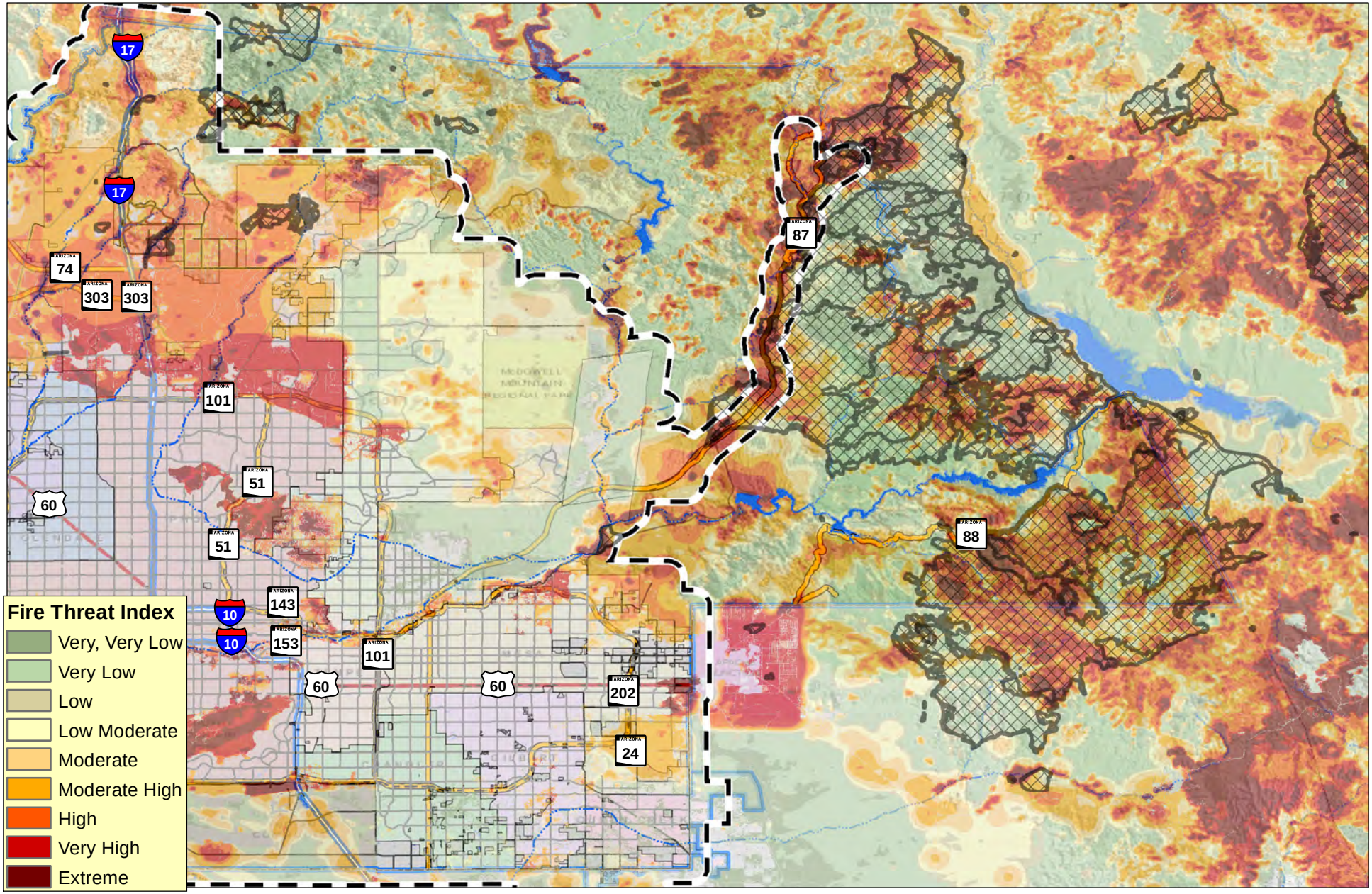
Miles

Source: JE Fuller 2020; MAG 2020: MCCWPP 2020; TIGER 2020; LSD 2020; AWUIA 2004; USGS 2020

MARICOPA COUNTY

Maricopa County Multi-Jurisdictional Hazard Mitigation Plan

Map 7B
Maricopa County
Wildfire Hazard Map
as of Sept 2020



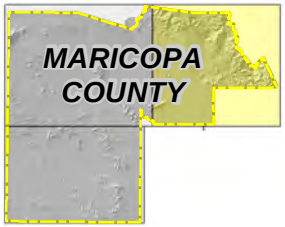
Legend

- Maricopa County
- Mitigation Plan Extent
- Major Streams
- Interagency Perimeters
- NIFS Perimeters
- WUI

0 37.5 75 150

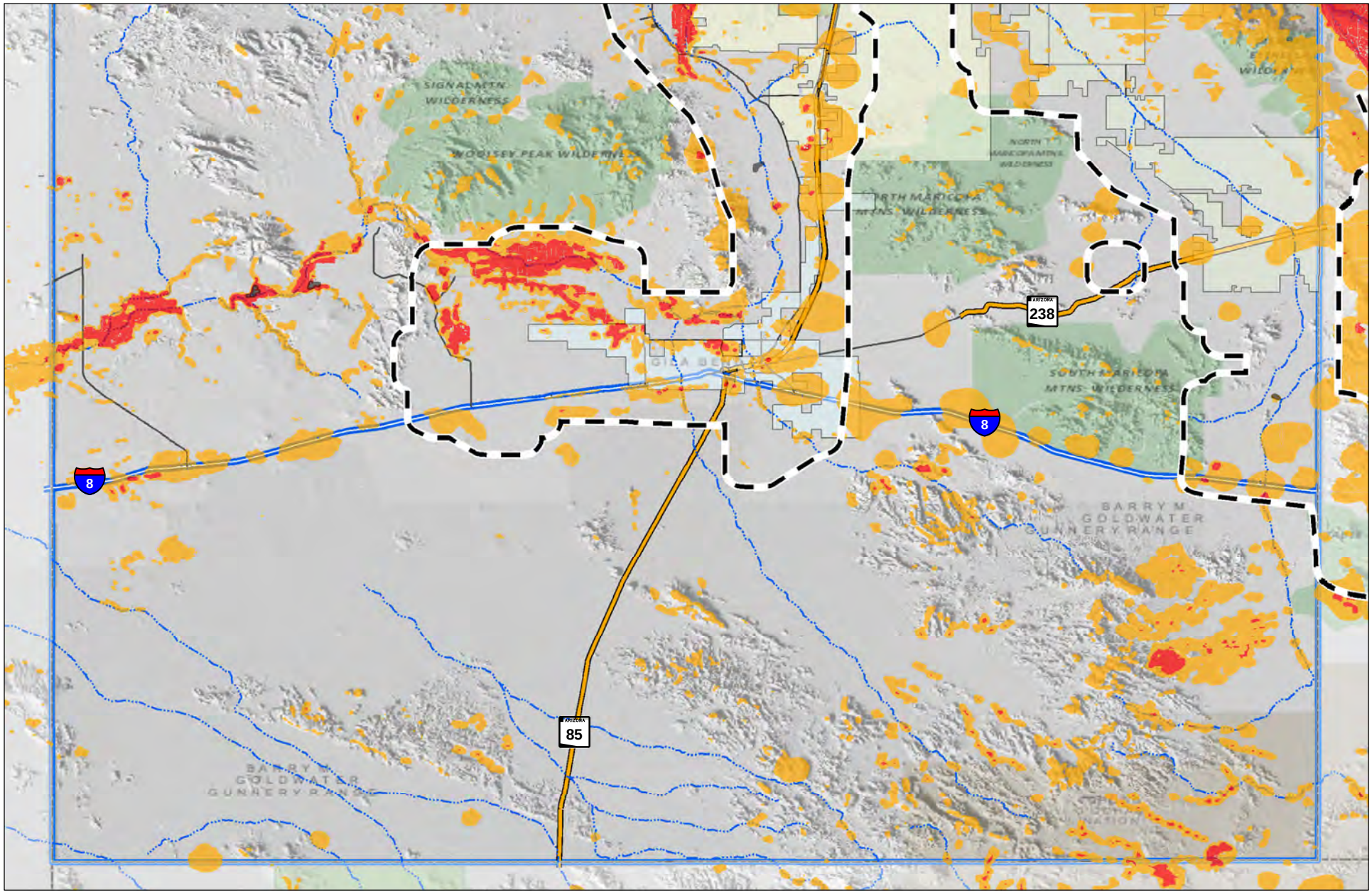
Miles

Source: JE Fuller 2020; MAG 2020: MCCWPP 2020; TIGER 2020; LSD 2020; AWUIA 2004; USGS 2020



Maricopa County Multi-Jurisdictional Hazard Mitigation Plan

Map 7B-2
Maricopa County
Wildfire Hazard Map
as of Sept 2020



Legend

- Interagency Perimeters
- Major Streams
- Maricopa County
- Mitigation Plan Extent
- NIFS Perimeters
- WUI

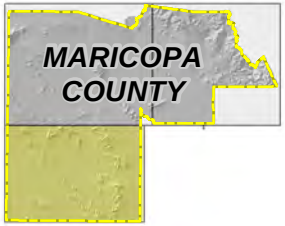
Wildfire Hazard Rating

- High
- Medium

0 37.5 75 150

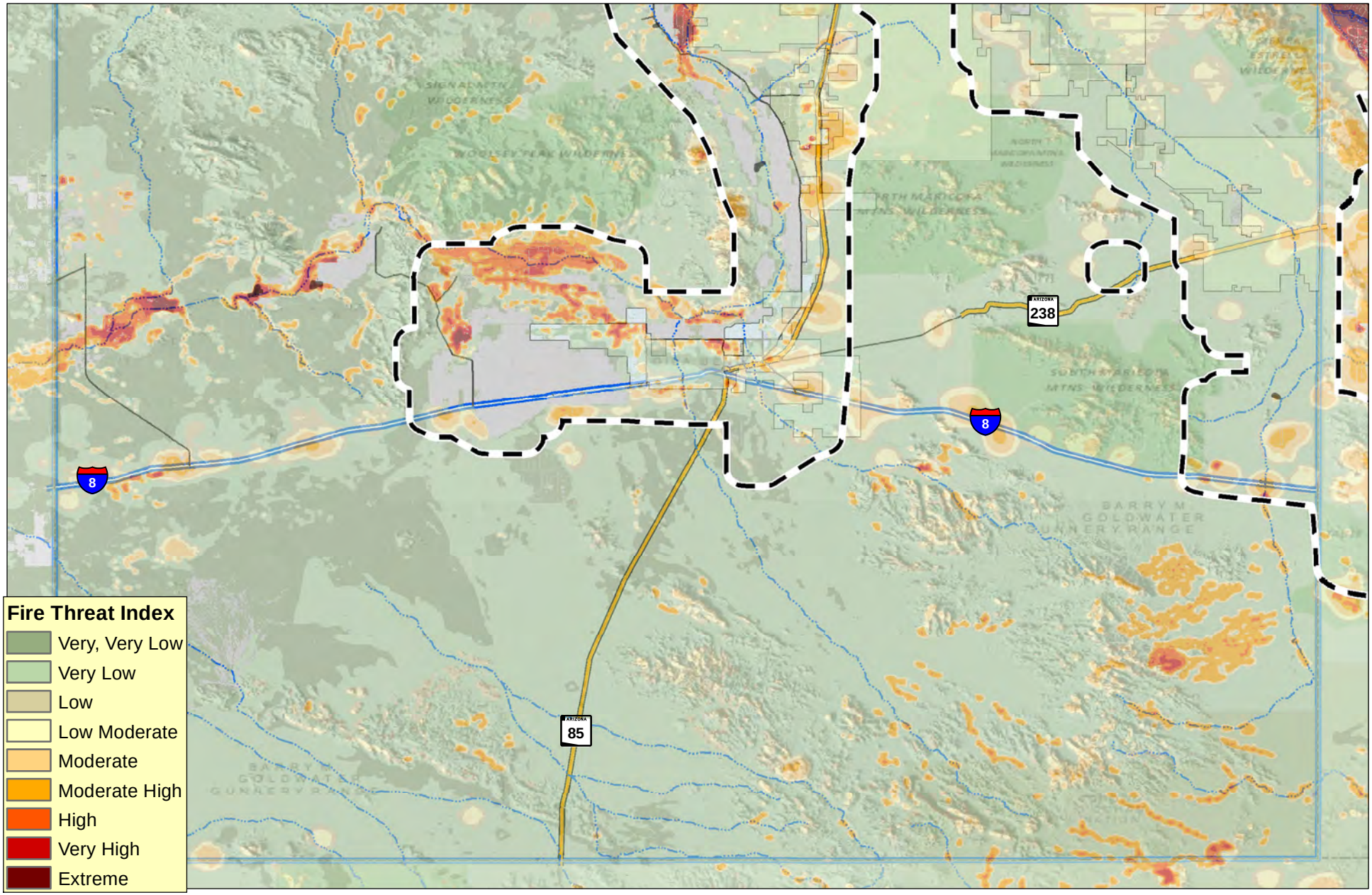
Miles

Source: JE Fuller 2020; MAG 2020: MCCWPP 2020; TIGER 2020; LSD 2020; AWUIA 2004; USGS 2020



Maricopa County Multi-Jurisdictional Hazard Mitigation Plan

Map 7C
Maricopa County
Wildfire Hazard Map
as of Sept 2020



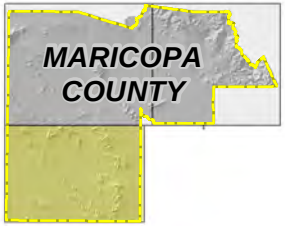
Legend

- Interagency Perimeters
- Major Streams
- Maricopa County
- Mitigation Plan Extent
- NIFS Perimeters
- WUI

0 37.5 75 150

Miles

Source: JE Fuller 2020; MAG 2020: MCCWPP 2020; TIGER 2020; LSD 2020; AWUIA 2004; USGS 2020



Maricopa County Multi-Jurisdictional Hazard Mitigation Plan

Map 7C-2
Maricopa County
Wildfire Hazard Map
as of Sept 2020

5.4 Risk Assessment Summary

The jurisdictional variability of risk associated with each hazard assessed in Section 5.3 is demonstrated by the various CPRI and hazard exposure results. Accordingly, each jurisdiction has varying levels of need regarding the hazards to be mitigated and may not consider all the hazards as posing a great risk to their individual communities. Table 5-42 summarizes the hazards selected for mitigation by each jurisdiction and will be the basis for each jurisdiction's mitigation strategy.

Table 5-42: Summary of hazards to be mitigated by each participating jurisdiction

Jurisdiction	Dam Inundation	Drought	Extreme Heat	Fissure	Flood	Levee Failure	Severe Wind	Subsidence	Wildfire
Avondale	NV	M	M	NV	M	M	M	M	M
Buckeye	M	M	M	NV	M	NV	M	M	M
Carefree	NV	M	NH	NV	M	NV	M	NV	M
Cave Creek	NV	M	M	NV	M	NV	M	NV	M
Chandler	NV	M	M	NV	M	NV	M	M	NH
El Mirage	M	M	M	NV	M	NV	M	M	NH
Fort McDowell Yavapai Nation	NV	M	NH	NV	M	NV	M	NV	M
Fountain Hills	M (1)	M	NH	NV	M	NV	M	NV	M
Gila Bend	NV	M	M	NV	M	NV	M	M	M
Gilbert	M	M	M	M	M	M	M	M	NH
Glendale	M (1)	M	M	M	M	M	M	M	M
Goodyear	M	M	M	NV	M	NV	M	M	M
Guadalupe	NV	M	M	NV	M	NV	M	NV	NV
Litchfield Park	NV	M	M	NV	M	NV	M	M	NH
Unincorporated Maricopa County	M	M	M	M	M	M	M	M	M
Mesa	M	M	M	M	M	M	M	M	M
Paradise Valley	NV	M	M	NV	M	NV	M	M	M
Peoria	M	M	M	NV	M	M	M	M	M
Phoenix	M (1)	M	M	M	M	M	M	M	M
Queen Creek	M	M	M	M	M	NV	M	NH	M
Salt River Pima-Maricopa Indian Community	NV	M	M	NV	M	NV	M	M	M
Scottsdale	NV	M	M	M	M	M	M	M	M
Surprise	M	M	M	M	M	NV	M	M	M
Tempe	M	M	M	NV	M	M	M	M	NH
Tolleson	NV	M	M	NV	M	NV	M	M	NH
Wickenburg	M	M	M	NV	M	M	M	NV	M
Youngtown	M	M	M	NV	M	NV	M	M	M

M – Mitigation A/Ps will be identified
NH – Nuisance hazard - no mitigation is warranted
NV – Jurisdiction is not vulnerable to hazard – no mitigation is warranted
(1) – The Town of Fountain Hills and City of Phoenix own and maintain several dams and will continue to mitigate risk by maintaining the dams to ADWR dam safety standards.

SECTION 6: MITIGATION STRATEGY

> ***§201.6(c)(3):*** *[The plan shall include…] (3) A **mitigation strategy** that provides the jurisdiction's blueprint for reducing the potential losses identified in the risk assessment, based on existing authorities, policies, programs and resources, and its ability to expand on and improve these existing tools. This section shall include:*
> *(i) A description of mitigation goals to reduce or avoid long-term vulnerabilities to the identified hazards.*
> *(ii) A section that identifies and analyzes a comprehensive range of specific mitigation actions and projects being considered to reduce the effects of each hazard, with particular emphasis on new and existing buildings and infrastructure.*
> *(iii) An action plan describing how the actions identified in paragraph (c)(3)(ii) of this section will be prioritized, implemented, and administered by the local jurisdiction. Prioritization shall include a special emphasis on the extent to which benefits are maximized according to a cost benefit review of the proposed projects and their associated costs.*
> *(iv) For multi-jurisdictional plans, there must be identifiable action items specific to the jurisdiction requesting FEMA approval or credit of the plan.*

The mitigation strategy provides the "what, when, and how" of actions that will reduce or possibly remove the community's exposure to hazard risks. According to DMA 2000, the primary components of the mitigation strategy are generally categorized into the following:

- ☑ **Goals and Objectives**
- ☑ **Capability Assessment**
- ☑ **Mitigation Actions/Projects and Implementation Strategy**

The entire 2015 Plan mitigation strategy was reviewed and updated by the MJPT, including the section describing National Flood Insurance Program (NFIP) compliance. Specifics of the changes and updates are discussed in the subsections below.

6.1 Hazard Mitigation Goals and Objectives

The 2015 Plan goals and objectives were reviewed by the MJPT alongside the 2018 State Plan goals, and were determined to be adequate and current with the overall mitigation planning goals of all the participating jurisdictions. No changes were made. Accordingly, one goal and four clear objectives will be carried forward for the Plan 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 in the incorporated, unincorporated, and tribal jurisdictions within Maricopa County.
  - **Objective 2:** Reduce risk to critical facilities and infrastructure from natural hazards.
  - **Objective 3:** Promote hazard mitigation throughout the incorporated, unincorporated, and tribal jurisdictions within Maricopa County.
  - **Objective 4:** Increase public awareness of hazards and risks that threaten the incorporated, unincorporated, and tribal jurisdictions within Maricopa County.

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6.2 Capability Assessment

An important component of the Mitigation Strategy is a review of each participating jurisdiction's resources in order to identify, evaluate, and enhance the capacity of local resources to mitigate the effects of hazards. The capability assessment is comprised of several components:

- ✓ Legal and Regulatory Review – a review of the legal and regulatory capabilities, including ordinances, codes, plans, manuals, guidelines, and technical reports that address hazard mitigation activities.
- ✓ Technical Staff and Personnel – this assessment evaluates and describes the administrative and technical capacity of the jurisdiction's staff and personnel resources.
- ✓ Fiscal Capability – this element summarizes each jurisdiction's fiscal capability to provide the financial resources to implement the mitigation strategy.
- ✓ National Flood Insurance Program (NFIP) Participation – the NFIP contains specific regulatory measures that enable government officials to determine where and how growth occurs relative to flood hazards. Participation in the NFIP is voluntary for local governments, but the program is promoted by FEMA as a basic first step for implementing and sustaining an effective flood hazard mitigation program and is a key indicator for measuring local capability as part of this assessment.

For this update, the MJPT reviewed the information provided in Section 6.2 of the 2015 Plan and updated data in the tables of Section 6.2.1 as appropriate.

6.2.1 Jurisdictional Capabilities

Tables 6-1-1 through 6-1-28 summarize the legal and regulatory mitigation capability for each jurisdiction. Information provided includes a brief listing of current codes, mitigation relevant ordinances, plans, and studies/reports. Tables 6-2-1 through 6-2-28 summarize the staff and personnel resources employed by each jurisdiction that serve as a resource for hazard mitigation. Tables 6-3-1 through 6-3-28 summarize the fiscal capability and budgetary tools available to each participating jurisdiction. Each of these three tables are listed below by jurisdiction.

Each jurisdiction performs regular evaluations and assessments of the policies and programs listed in the following tables and will adjust and revise as the need arises. Each jurisdiction will review their respective policies and programs as a part of the Plan maintenance listed in Section 7.1.2 and also as they related to integrating the Plan into other planning documents and activities as discussed in Section 3.6.2.

The last row of each of the Tables 6-1-xx, 6-2-xx and 6-3-xx includes an evaluation and discussion of areas and gaps in existing capabilities considered by each of the jurisdictions for expansion and improvement, that will result in more effective mitigation.

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Table 6-1-1: Legal and regulatory capabilities for Avondale		
Regulatory Tools for Hazard Mitigation	**Description**	**Responsible Department/Agency**
CODES	• 2018 International Building Code • 2018 International Residential Code • 2018 International Mechanical Code • 2018 International Plumbing Code • 2018 International Energy Conservation Code • 2017 National Electrical Code • January 2012 International Fire Code	• Building Official • Code Enforcement • Fire Marshal
ORDINANCES	• City of Avondale Ordinances (as Adopted) & Weed Abatement Ordinance/Planning • International Property Maintenance Code (IPMC) - 302.4 • Subdivision/Zoning Ordinance • Zoning Ordinance and Subdivision Regulations 2006 – Chapter 5 Planned Area Development District	• Code Enforcement • Planning & Zoning
PLANS, MANUALS, and/or GUIDELINES	• General Plan/City Ordinance • Capital Improvement Project Plan • Development Guidelines and Policies • City Emergency Operations Plan • Pandemic Preparedness and Response Plan • Flood Control and Response Plan (McMicken Dam) • Nation Response Framework • State and Local Mitigation Plan (as adopted)	• Planning & Zoning • Building Official • Fire • Code Enforcement • Safety/Risk
STUDIES	• Maricopa County Mass Evacuation Planning Group	• Fire
Opportunities for Expansion/Improvement: Building, planning and zoning codes could be improved to better accommodate flooding, extreme heat, and poor air quality. In a city like Avondale where the current cost of construction is high, any additional regulations will need to be carefully studied to understand potential impacts to both the housing costs and impacts to residents and local business.		

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Table 6-2-1: Technical staff and personnel capabilities for Avondale		
Staff/Personnel Resources	☑	**Department/Agency - Position**
Planner(s) or engineer(s) with knowledge of land development and land management practices	☑	Development & Engineering Services
Engineer(s) or professional(s) trained in construction practices related to buildings and/or infrastructure	☑	Development & Engineering Services
Planner(s) or engineer(s) with an understanding of natural and/or human-caused hazards	☑	Development & Engineering Services
Floodplain Manager	☑	Development & Engineering Services
Surveyors		
Staff with education or expertise to assess the community's vulnerability to hazards	☑	Development & Engineering Services
Personnel skilled in GIS and/or HAZUS	☑	Information Technology / GIS
Scientists familiar with the hazards of the community		
Emergency manager	☑	Fire & Medical Department
Grant writer(s)	☑	Finance Department
Others		

Opportunities for Expansion/Improvement:

Wherever possible and appropriate city staff could implement programs that educate the community on creating defensible spaces to reduce the impact of uncontrolled wildland fire. City staff, where appropriate, could provide information to homeowners and local business on potential natural and human caused hazards.

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Table 6-3-1: Fiscal capabilities for Avondale		
Financial Resources	**Accessible or Eligible to Use (Yes, No, Don't Know)**	**Comments**
Community Development Block Grants	Yes	
Capital Improvements Project funding	Yes	
Authority to levy taxes for specific purposes	Yes	
Fees for water, sewer, gas, or electric service	Yes	Fees for water and sewer services
Impact fees for homebuyers or new developments/homes	Yes	
Incur debt through general obligation bonds	Yes	
Incur debt through special tax bonds	Yes	
Opportunities for Expansion/Improvement: The City of Avondale, working in conjunction with Maricopa County, can consider expanding pursuit of FEMA mitigation grants through development of a programmed approach to identifying CIP and cost-beneficial projects three to four years in advance of the desired implementation, preparing appropriate grant application information and submitting for funding.		

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Table 6-1-2: Legal and regulatory capabilities for Buckeye		
Regulatory Tools for Hazard Mitigation	**Description**	**Responsible Department/Agency**
CODES	• 2018 International Building Code • 2018 International Residential Code • 2018 International Mechanical Code • 2018 International Plumbing Code • 2017 National Electrical Code • 2012 International Fuel Gas Code • 2018 International Energy Conservation Code • 2018 International Property Maintenance Code • 2018 International Existing Building Code • 2012 International Fire Code	• Development Services • Fire Department
ORDINANCES	• Floodplain Management (Ord. No. 27-11, § 2, 7-19-2011) • Airport (Ord. No. 5-11, § 2, 3-1-2011) • Procurement (Ord. No. 2-11, § 2, 2-15-2011) • Health and Sanitation (Ord. No. 15-13, § 3, 9-17-2013)	• Public Works • Engineering
PLANS, MANUALS, and/or GUIDELINES	• 2007 Airport Master Plan • Development Code Update • Site Plan Review Requirements • Capital Improvements Plan • Engineering Design Standards	• Public Works • Engineering • Development Services • Construction and Contracting
STUDIES	• City of Buckeye Economic Development Action Agenda • Part 150 Noise Compatibility Study (Airport) • 2012 Downtown Storm Drain Improvement Plan • Transportation Master Plan • ITS Strategic Plan • Bike and Pedestrian Master Plan • Buckeye Area Drainage Master Plan • Sun Valley Area Drainage Master Plan • 2020 General Plan	• Engineering • Development Services • Economic Development • Public Works

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Table 6-1-2: Legal and regulatory capabilities for Buckeye		
Regulatory Tools for Hazard Mitigation	**Description**	**Responsible Department/Agency**
Opportunities for Expansion/Improvement: The City of Buckeye has a list of planning documents, master plans and codes that support our mitigation efforts. Often times these documents are developed with a specific goal in-mind while perhaps not appreciating the impacts to other published/ adopted plans. In the future, all of our mitigation planning efforts and policies could be enhanced by ensuring a collaborative peer review process within Development Services and Engineering Departments. Continuous use of the UBC and IFC in the Fire Department will also allow us to review plans prior to being permitted by the city.		

Table 6-2-2: Technical staff and personnel capabilities for Buckeye		
Staff/Personnel Resources	☑	**Department/Agency - Position**
Planner(s) or engineer(s) with knowledge of land development and land management practices	☑	Planning – Planners Development Services – Planners Engineering - Engineers
Engineer(s) or professional(s) trained in construction practices related to buildings and/or infrastructure	☑	Engineering – Engineers Public Works - Engineers
Planner(s) or engineer(s) with an understanding of natural and/or human-caused hazards	☑	Engineering, Water Resources, Development Services, and Public Works Depts
Floodplain Manager	☑	Engineering - City Engineer Public Works - Engineers
Surveyors	☑	Water Resources and Engineering Depts.
Staff with education or expertise to assess the community's vulnerability to hazards	☑	Human Services, Emergency Management, Development Services, Fire, Police, Public Works, Engineering, Water Resources Depts
Personnel skilled in GIS and/or HAZUS	☑	ITD, Fire Dept, Police Dept
Scientists familiar with the hazards of the community	☑	Police Dept, Water Resources Dept, Fire Dept
Emergency manager	☑	Fire Dept, Fire Chief
Grant writer(s)	☑	Police Dept for Police, Fire, and Public Works Depts.
Others		

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Table 6-2-2: Technical staff and personnel capabilities for Buckeye		
Staff/Personnel Resources	☑	**Department/Agency - Position**

Opportunities for Expansion/Improvement:

The City of Buckeye could benefit from a dedicated Emergency Manager. Currently, the role is filled by the Fire Department which works with the city on hazard awareness. Our city has quarterly and annual hazard exercises in our EOC, which is facilitated by the Fire Department. We normally focus on storm, flood, and power outage scenarios in which we have members from, LE, Public Works, Water Department, Community Services, IT, and city officials who participate to find gaps in our EOP/ERP plans and identify areas of mitigation interest. Continued expansion of the use of social media to provide regular updates for seasonal hazards and tips to make it safer.

Table 6-3-2: Fiscal capabilities for Buckeye		
Financial Resources	**Accessible or Eligible to Use (Yes, No, Don't Know)**	**Comments**
Community Development Block Grants	Yes	
Capital Improvements Project funding	Yes	
Authority to levy taxes for specific purposes	Yes	
Fees for water, sewer, gas, or electric service	Yes	Water, Sewer, Solid Waste, Airport Services
Impact fees for homebuyers or new developments/homes	Yes	
Incur debt through general obligation bonds	Yes	
Incur debt through special tax bonds	Yes	

Opportunities for Expansion/Improvement:

The City of Buckeye has funding efforts through multiple grants that are specific to certain hazards. City does put a certain amount of monies into the annual budget for smaller projects and departments apply for larger CIP monies for larger projects.
We must educate the City Council and Finance Department, so they fully understand the specifics of our hazard mitigation needs. This could be done with presentations, tours, report, etc. Maintaining a current HMP with the County assures us of being eligible for Federal and State grants as needed.

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Table 6-1-3: Legal and regulatory capabilities for Carefree		
Regulatory Tools for Hazard Mitigation	**Description**	**Responsible Department/Agency**
CODES	• 2003 International Building Code • 2002 National Electrical Code • 2003 International Mechanical Code • 1994 International Plumbing Code • 2003 International Residential Code	• Building Department (all)
ORDINANCES	• Abatement Ordinance Town Code 6-1 2006 • Adult Oriented Business Town Zoning Ordinance 2006 • Dark Sky Ordinance Town Building Code 2003 • Noise Ordinance Town Code 6-2(P-23) 2006 • Town Zoning Ordinance 2003	• Zoning Administrator • Town Marshal • Town Engineer
REGULATIONS	• Zoning and Planning Addressing Regulations • Flood Control District • Dust Abatement Regulations • Town Subdivision Regulations • MS4 Regulations	• Zoning Administrator • Town Engineer

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Table 6-1-3: Legal and regulatory capabilities for Carefree		
Regulatory Tools for Hazard Mitigation	**Description**	**Responsible Department/Agency**
PLANS, MANUALS, and/or GUIDELINES	• Town Plan for Area Land Use In 2002 General Plan • 2008 Town Transportation Plan • Comprehensive Planning Amendments • Guidelines included in 2002 General Plan • Planning and Development included in 2002 General Plan and 2006 Carefree Zoning Ordinances • Development Master Plan Guidelines included in Carefree 2002 General Plan • Area Drainage Master Plan completed via 2004 Flood Control District of Maricopa County • Watercourse Master Plan completed via 2004 Flood Control District of Maricopa County	• Zoning Administrator • Town Engineer
STUDIES	• Dam Safety Studies / Emergency Action Plans 2006 • Area Drainage Master Studies • Corridor Studies 2007 Traffic Study • Emergency Routes Evaluation 2008	• Zoning Administrator • Town Engineer
Opportunities for Expansion/Improvement: Building codes could be updated / improved to: •2018 International Building Code • 2018 International Residential Code • 2018 International Plumbing Code • 2018 International Mechanical Code • 2018 International Fire Code • 2017 National Electric Code • 2018 Energy Conservation Code Updating the codes and ordinances will provide the town with modern and needed regulatory tools to enhance future mitigation efforts for drought, flood, severe wind, wildfire and other hazards.		

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Table 6-2-3: Technical staff and personnel capabilities for Carefree		
Staff/Personnel Resources	☑	**Department/Agency - Position**
Planner(s) or engineer(s) with knowledge of land development and land management practices	☑	Planning and Development - Planners Environmental Services – Inspectors
Engineer(s) or professional(s) trained in construction practices related to buildings and/or infrastructure	☑	Planning and Development - Planners Environmental Services – Inspectors
Planner(s) or engineer(s) with an understanding of natural and/or human-caused hazards	☑	Planning and Development - Planners Emergency Management - Planners
Floodplain Manager		None on Staff
Surveyors	☑	Planning and Development - Planners Transportation – Engineer Emergency Management – Planners
Staff with education or expertise to assess the community's vulnerability to hazards	☑	Planning and Development – GIS Staff Emergency Management – GIS Staff Sheriff's Office – Marshal Elections – Town Clerk/GIS Staff Environmental Services – GIS Staff Air Quality – GIS Staff
Personnel skilled in GIS and/or HAZUS	☑	Contract On Staff – Hydrologist
Scientists familiar with the hazards of the community	☑	Emergency Management - Director/Marshal/Planners
Emergency manager	☑	Emergency Management – Fire Chief Fire Department – Grant writer Water Department - Manager
Grant writer(s)	☑	Planning and Development - Planners Environmental Services – Inspectors
Others		
Opportunities for Expansion/Improvement: The town could expand its mitigation capacity through the addition of two (2) staff in the Public Works and Engineering Department to reduce the current workload, due to rapid development.		

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Table 6-3-3: Fiscal capabilities for Carefree		
Financial Resources	**Accessible or Eligible to Use (Yes, No, Don't Know)**	**Comments**
Community Development Block Grants	Yes	
Capital Improvements Project funding	Yes	
Authority to levy taxes for specific purposes	Yes	
Fees for water, sewer, gas, or electric service	Yes	
Impact fees for homebuyers or new developments/homes	Yes	
Incur debt through general obligation bonds	Yes	
Incur debt through special tax bonds	Yes	

Opportunities for Expansion/Improvement:

The town can expand its mitigation capacity through additional sales tax revenue resulting from increased economic development. The additional revenues could enhance future mitigation efforts by providing extra resources for the town to implement some of the actions and projects identified as priorities for the town. Additional staff in the areas of building inspections and code enforcement will enhance the town's abilities to ensure future development meets the town's mitigation goals and regulatory requirements.

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Table 6-1-4: Legal and regulatory capabilities for Cave Creek		
Regulatory Tools for Hazard Mitigation	**Description**	**Responsible Department/Agency**
CODES	• 2018 International Building Code • 2018 International Residential Code • 2018 International Plumbing Code • 2018 International Mechanical Code • 2018 International Fire Code • 2017 National Electric Code • 2018 Energy Conservation Code	• Chief Building Official & Cave Creek Fire Official
ORDINANCES	• 2012 Cave Creek Zoning Ordinance • 2011 Cave Creek Sub-Division Ordinance • 2005 Town of Cave Creek General Plan (updates to be voted on in 2021) • 2012 Town of Cave Creek Town Core and Implementation Plan	• Planning and Zoning Administrator
PLANS, MANUALS, and/or GUIDELINES	• 2008 Town of Cave Creek DMP Flood Response Plan • 2020 Storm Water Area Master Plan • 2008 Town of Cave Creek Master Drainage Plan • 2009 Town of Cave Creek Multi-Hazard Mitigation Plan (currently being updated) • 2009 Town of Cave Creek Emergency Operations Plan • 2013 Town of Cave Creek Master Water Plan • 2008 Town of Cave Creek Water Emergency Operations Plan • Grading and Drainage Technical Design Guidelines • 2009 Trails Technical Design Guidelines • 2009 Transportation Technical Guidelines	• Maricopa County Flood Control • Town of Cave Creek Engineer • Town Marshal • Town Utilities Manager

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Table 6-1-4: Legal and regulatory capabilities for Cave Creek		
Regulatory Tools for Hazard Mitigation	**Description**	**Responsible Department/Agency**
STUDIES	• 2020 Pedestrian Transportation Study • 2016 Development Fee Study • 2020 Water Rate Study • 2020 Sewage Rate Study • 2014 Carefree / Cave Creek Transportation Framework Study • Cave Creek Carefree Bike Lane Study • Development Fee and Capacity Study	• Town Engineer • Town Manager • Town Council
Opportunities for Expansion/Improvement: The Town of Cave Creek is researching / planning updating our Current International Building Codes from 2018 version to the updated 2021 International Building Codes. Enhancing these codes will help ensure more stringent safety updates and will help mitigate damage from adverse weather as well as enhance fire codes.		

Table 6-2-4: Technical staff and personnel capabilities for Cave Creek		
Staff/Personnel Resources	☑	**Department/Agency - Position**
Planner(s) or engineer(s) with knowledge of land development and land management practices	☑	Planning and Zoning Staff, Town Engineer, Town Manager, Town of Cave Creek Building Official
Engineer(s) or professional(s) trained in construction practices related to buildings and/or infrastructure	☑	Town of Cave Creek Building Official, Town Engineer, Town Utilities Manager
Planner(s) or engineer(s) with an understanding of natural and/or human-caused hazards	☑	Planning and Zoning Staff, Town Engineer, Town Manager, Town of Cave Creek Building Official
Floodplain Manager	☑	Town of Cave Creek Engineer
Surveyors		Out Sourced
Staff with education or expertise to assess the community's vulnerability to hazards	☑	Town Marshal
Personnel skilled in GIS and/or HAZUS	☑	Town Engineer
Scientists familiar with the hazards of the community	☑	Utilities Manager
Emergency Manager	☑	Town Building Official
Grant writer(s)	☑	Town Planning Staff

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Table 6-2-4: Technical staff and personnel capabilities for Cave Creek		
Staff/Personnel Resources	☑	**Department/Agency - Position**
Opportunities for Expansion/Improvement: The Town of Cave Creek is looking to enhance our Fire / Medical Services and to also bring on additional Fire Management resources to help mitigate Wild Land Fire dangers as well as all hazard mitigation within the town.. Cave Creek intends to join the Automatic Aid System within Maricopa County Fire Services to add a more robust response network and strengthen our commitment to our community. Our Town Engineering staff will be working on flood mitigation throughout the year to help manage monsoon flooding and to help mitigate flooded roadways and loss of property due to severe soil erosion from monsoon floods.		

Table 6-3-4: Fiscal capabilities for Cave Creek		
Financial Resources	**Accessible or Eligible to Use (Yes, No, Don't Know)**	**Comments**
Community Development Block Grants	Yes	
Capital Improvements Project funding	Yes	
Authority to levy taxes for specific purposes	Yes	
Fees for water, sewer, gas, or electric service	Yes	
Impact fees for homebuyers or new developments/homes	Yes	
Incur debt through general obligation bonds	Yes	
Incur debt through special tax bonds	Yes	
Opportunities for Expansion/Improvement: The Town of Cave Creek staff is always looking to increase our efforts to secure FEMA mitigation grants as well as to seek all levels of grants to help mitigate hazards. The Town of Cave Creek Fire and Medical services ability to provide effective wildfire mitigation through fuels reduction and wildfire education can be enhanced with FEMA FMGP funds.		

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Table 6-1-5: Legal and regulatory capabilities for Chandler		
Regulatory Tools for Hazard Mitigation	**Description**	**Responsible Department/Agency**
CODES	• 2018 International Building Code • 2017 National Electrical Code • 2018 International Plumbing Code • 2018 International Mechanical Code • 2018 International Residential Code • 2018 International Fuel Gas Code • 2018 International Energy Conservation Code • 2018 International Fire Code • 2018 International Existing Building Code • Chandler Code of Ordinances (Municode.com)	• Development Services • Fire Department • City Clerk
ORDINANCES	• Chandler Code of Ordinances (Municode.com): Floodplain Administration Ord. No. 3311 Weed Abatement Ord No. 3879 Land Use Zoning Ord. No. 3063	• Development Services
PLANS, MANUALS, and/or GUIDELINES	• Engineering Standard Details and Specifications • Technical Design Manuals • Stormwater Prevention Plan • Flood Control District Floodplain Maps • Stormwater Master Plan	• Development Services
STUDIES	• Chandler\Gilbert Floodplain Delineation Study - Ph 1 Eastern Canal • Chandler\Gilbert Floodplain Delineation Study - Ph 2 Consolidated Canal • Chandler\Gilbert Floodplain Delineation Study - Ph 3 Union Pacific RR and Arizona Av • Higley Area Drainage Master Plan	• Development Services • Flood Control District of Maricopa County

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Table 6-1-5: Legal and regulatory capabilities for Chandler		
Regulatory Tools for Hazard Mitigation	**Description**	**Responsible Department/Agency**
Opportunities for Expansion/Improvement: An opportunity for the City to increase its future mitigation efforts is regular updates to the City codes. The City's codes have recently been updated and will continue to update to model codes with minor amendments. Additional measures for flooding, and other natural disasters can be implemented within the model codes to allow easier and standardized adoption to increase future mitigation efforts. When the plans are amended or updated in their various cycles it would be beneficial to have the appropriate people available to consult on changes to make the codes more adapted to the mitigation needs.		

Table 6-2-5: Technical staff and personnel capabilities for Chandler		
Staff/Personnel Resources	☑	**Department/Agency - Position**
Planner(s) or engineer(s) with knowledge of land development and land management practices	☑	Development Services– Planners
Engineer(s) or professional(s) trained in construction practices related to buildings and/or infrastructure	☑	Development Services – Engineers
Planner(s) or engineer(s) with an understanding of natural and/or human-caused hazards	☑	Public Works - Municipal Utilities – planners and engineers
Floodplain Manager	☑	Development Services
Surveyors		
Staff with education or expertise to assess the community's vulnerability to hazards	☑	Fire Department
Personnel skilled in GIS and/or HAZUS	☑	Information technology, Development Services, Police, Fire
Scientists familiar with the hazards of the community	☑	Public Works - Municipal Utilities
Emergency manager	☑	Fire Department
Grant writer(s)	☑	All Departments
Opportunities for Expansion/Improvement: The Fire Department can conduct more outreach to educate the public in hazard mitigation. They could talk about the main issues we regularly experience from severe wind to extreme heat. They can address the issues that people normally ignore as we do not see large amounts of rainfall in a sustained period.		

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Table 6-3-5: Fiscal capabilities for Chandler		
Financial Resources	**Accessible or Eligible to Use (Yes, No, Don't Know)**	**Comments**
Community Development Block Grants	Yes	
Capital Improvements Project funding	Yes	
Authority to levy taxes for specific purposes	Yes	
Fees for water, sewer, gas, or electric service	Yes	
Impact fees for homebuyers or new developments/homes	Yes	
Incur debt through general obligation bonds	Yes	
Incur debt through special tax bonds	Yes	

Opportunities for Expansion/Improvement:

The city can and will continue to regularly pursue grants and other programs to fund future mitigation actions and projects that address the city's hazard liabilities. The grant funds can be used to match with mitigation priorities planned into the city's capital improvements program and other city departmental public outreach budgets. The city will also continue the use of creative public and private sponsorships and partnerships (e.g. – IGA's, MOUs, etc.) that can also assist in funding future mitigation needs, actions and projects, and especially those that require a regional, multi-jurisdictional approach (area drainage master plans for example).

Table 6-1-6: Legal and regulatory capabilities for El Mirage		
Regulatory Tools for Hazard Mitigation	**Description**	**Responsible Department/Agency**
CODES	• El Mirage City Code • 2006 International Building Code • 2006 International Fire Code • 2005 National Electric Code • 1997 Dangerous Building Code • 2006 International Fuel Gas Code • 2006 International Energy Conservation Code • 1997 Uniform Administrative Code	• City Clerk • Building Department • Fire Department • City Clerk

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Table 6-1-6: Legal and regulatory capabilities for El Mirage		
Regulatory Tools for Hazard Mitigation	**Description**	**Responsible Department/Agency**

ORDINANCES	• Chapter 19 - Off Site Construction
	• Chapter 30.28 - Emergency Purchases
	• Chapter 30.65-30.70 - Civil Preparedness and Disaster
	• Chapter 33 - City Court
	• Chapter 34 - Police and Fire Department
	• Chapter 50 - Water Supply System
	• Chapter 51 - Sewers
	• Chapter 52 - Sanitation
	• Chapter 53 - Storm Water Quality Protection
	• Chapter 90 - Nuisance and Neighborhood Preservation
	• Chapter 94 - Air Pollution Regulations; Dust Control
	• Chapter 96 - International Fire Code and Alarm Systems
	• Chapter 150 - Building Code – 2006; International Plumbing Code – 2006; National Electrical Code – 2005; International Mechanical Code – 2006; Dangerous Building Code – 1997; Mobile and Manufactured Housing Standards; International Energy Conservation Code – 2006; International Fuel Gas Code – 2006; Uniform Administrative Code- 1997.
	• Chapter 153 - Floodplain Management
	• Chapter 154 - Zoning Code
	  • Section 21-5-13 Floodway overlay
	  • Section 21-5-14 Floodplain overlay
	  • Section 21-5-15 Airfield Impact overlay
	• Chapter 155 - Subdivisions
		• Engineering
		• Finance
		• City Manager
		• Municipal Judge
		• Police Department
		• Public Works
		• Code Compliance
		• Fire Department

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Table 6-1-6: Legal and regulatory capabilities for El Mirage		
Regulatory Tools for Hazard Mitigation	**Description**	**Responsible Department/Agency**
PLANS, MANUALS, and/or GUIDELINES	• 2003 General Plan • 2008 Emergency Action Plan for El Mirage Employees • El Mirage Emergency Operations Plan • Engineering General Notes & Guidelines • Maricopa Association of Governments (MAG) Standards • District Flood Control Standard	• Planning Department • Human Resources • Fire Department • Engineering • Maricopa Association of Governments • Maricopa County Flood Control
STUDIES	• Flood Insurance Study by Flood Control District of Maricopa County • Floodplain Study by Flood Control District of Maricopa County • Dam Safety Study by Flood Control District of Maricopa County	• Maricopa County
Opportunities for Expansion/Improvement: The City of El Mirage has a comprehensive master plan as well as local codes the assist in our mitigation efforts. Our mitigation efforts could be enhanced by working with surrounding jurisdictions to assist on regional mitigation hazards. We could also utilize internal peer review to assess the mitigation plan and needs.		

Table 6-2-6: Technical staff and personnel capabilities for El Mirage		
Staff/Personnel Resources	☑	**Department/Agency - Position**
Planner(s) or engineer(s) with knowledge of land development and land management practices	☑	Community Development Director, City Engineer, City Planner
Engineer(s) or professional(s) trained in construction practices related to buildings and/or infrastructure	☑	City Engineer, Engineering Technicians, Building Official
Planner(s) or engineer(s) with an understanding of natural and/or human-caused hazards	☑	City Engineer, Building Official, Fire Chief
Floodplain Manager	☑	City Engineer
Surveyors	☑	City Engineering & Public Works staff
Staff with education or expertise to assess the community's vulnerability to hazards	☑	City Engineer, Building Official, Fire Chief,

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Table 6-2-6: Technical staff and personnel capabilities for El Mirage		
Staff/Personnel Resources	☑	**Department/Agency - Position**
Personnel skilled in GIS and/or HAZUS	☑	City GIS Technician, Information Technology Director
Scientists familiar with the hazards of the community		
Emergency manager	☑	Fire Chief, Police Chief
Grant writer(s)	☑	City Grants Coordinator

Opportunities for Expansion/Improvement:
The City of El Mirage could enhance the Emergency Management Division by creating a budget to provide a full time Emergency Manager. This would allow a full time effort to address and constantly review the mitigation needs.

Table 6-3-6: Fiscal capabilities for El Mirage		
Financial Resources	**Accessible or Eligible to Use (Yes, No, Don't Know)**	**Comments**
Community Development Block Grants	Yes	
Capital Improvements Project funding	Yes	
Authority to levy taxes for specific purposes	Yes	
Fees for water, sewer, gas, or electric service	Yes	
Impact fees for homebuyers or new developments/homes	Yes	
Incur debt through general obligation bonds	Yes	
Incur debt through special tax bonds	Yes	
Other		

Opportunities for Expansion/Improvement:
The City of El Mirage can pursue FEMA mitigation grants and other grant programs to fund future mitigation actions and projects that address hazards impacting the city. The grant funds can be used to match with mitigation priorities planned into the city's capital improvements program and other city departmental public outreach budgets. The city will also continue the use of creative public and private sponsorships and partnerships (e.g. – IGA's, MOUs, etc.) that can also assist in funding future mitigation needs, actions and projects, and especially those that require a regional, multi-jurisdictional approach (area drainage master plans for example).

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Table 6-1-7: Legal and regulatory capabilities for Fort McDowell Yavapai Nation		
Regulatory Tools for Hazard Mitigation	**Description**	**Responsible Department/Agency**
TRIBAL CODES	• 2012 International Building Code • 2012 National Electrical Code • 2012 International Mechanical Code • 2012 International Plumbing Code • 2012 International Fire Code	• Planning/Development Dept. • Fire Department
TRIBAL ORDINANCES	• Floodplain Management • Hazard Abatement • Subdivision • Noise	• Planning/Development Dept. • Emergency Manager • License & Property Use Dept. • Environmental Department
TRIBAL REGULATIONS	• Wildfire Prevention • Addressing • Drainage/Stormwater • Site Plan Reviews • Land Use Restrictions	• Fire Department • Planning/Development Dept. • License & Property Use Dept
PLANS, MANUALS, GUIDELINES, and/or STUDIES	• Wildland Fire Management (2012) • Fuels Management Plan (2012) • Maricopa County Wildfire Protection Plan (2020) • All, as required by Tribal Council. (SEE TRIBAL ANNEX)	• Bureau of Indian Affairs, Salt River Agency • Community and Economic Development Division. (SEE TRIBAL ANNEX)
Opportunities for Expansion/Improvement: An official building/fire code could be adopted by the Nation to better ensure standards are being met and upheld in public and residential structures. Wildland fuel mitigation plans can be enhanced to focus on thinning fuels in known problematic areas. Utility infrastructure planning in the area can be enhanced to develop solutions that decrease the impact of Monsoons on current utility systems.		

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Table 6-2-7: Technical staff and personnel capabilities for Fort McDowell Yavapai Nation		
Staff/Personnel Resources	☑	**Department/Agency - Position**
Planner(s) or engineer(s) with knowledge of land development and land management practices	☑	Planning and Development - Planners/ Planning and Building - Committee Environmental Services - Inspectors/Analysts General Managers office – General Manager Land Use - Manager Housing - Manager
Engineer(s) or professional(s) trained in construction practices related to buildings and/or infrastructure	☑	Planning and Development - Building Inspectors Flood Control - Engineers Transportation - Engineers/Consultants Environmental Services - Air/Water Quality Testers /Analysts Fire Department- Fire Inspectors
Planner(s) or engineer(s) with an understanding of natural and/or human-caused hazards	☑	Planning and Development - Planners Emergency Management - Fire Chief, Police Chief, Environmental Director, Public Works Director
Floodplain Manager	☑	Planning and Development – Director and Engineers
Surveyors		
Staff with education or expertise to assess the community's vulnerability to hazards	☑	Planning and Development – Planners, Engineers Transportation – Engineers, Police Chief, Fire Chief, Emergency Manager Emergency Management – Police Chief, Fire Chief, Emergency Manager, Planners
Personnel skilled in GIS and/or HAZUS	☑	Planning and Development –Staff Emergency Management –Staff Police Department–Staff Fire Department - Staff Environmental Services –Staff
Scientists familiar with the hazards of the community		
Emergency manager	☑	Emergency Management - General Manager, Fire Chief, FD Administrative Captain
Grant writer(s)	☑	All Departments – Grants and Contracts Administrator
Opportunities for Expansion/Improvement: Fire/Medical services could implement programs to educate the community on creating defensible spaces to protect against wildfires in the urban interface. Community and economic development could implement home inspection services to examine wiring and structural integrity. Public works could implement a sandbag filling station and education in order to protect against flash flooding in the area.		

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Table 6-3-7a: Fiscal capabilities for Fort McDowell Yavapai Nation		
Financial Resources	**Accessible or Eligible to Use (Yes, No, Don't Know)**	**Comments**
Community Development Block Grants	Yes	Accessible but historically not obtained
Capital Improvements Project funding	Yes	Tribal Capital Improvement Programs funded by tribal enterprise revenue
Authority to levy taxes for specific purposes	Yes	Eligible to impose direct assessments for use of tribal lands
Fees for water, sewer, gas, or electric service	Yes	Eligible to assess Water, Sewer, Solid Waste, and Transfer station fees.
Impact fees for homebuyers or new developments/homes	Yes	Limited Use
Incur debt through general obligation bonds	Yes	
Incur debt through special tax bonds	Yes	
Other: Grants, Inter-governmental Agreements and Specific Planning and Project Grants	Yes	Eligible for federal, state, tribal directed grants and IGA's
Opportunities for Expansion/Improvement: The Nation could consider expanding pursuit of FEMA mitigation grants by developing a scheduled 5-to-10-year project list based on cost-benefit, hazard and scope of work. The nation could identify a committee to work together to create and prioritize this list and submit for funding.		

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Table 6-3-7b: Funding source assessment for Fort McDowell Yavapai Nation
Building on Table 6-3-7a, the following summarize existing and potential funding sources that have either been utilized by FMYN for implementing hazard mitigation actions and projects in the past 5-years, or are considered potential sources for future hazard mitigation actions and projects.
Existing/Past Funding Sources Used: • Tribal Revenue • FEMA THSGP • BIA funding • Insurance funding
Potential Funding Sources: • CDBG • FEMA HMGP grants • FEMA BRIC grants

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Table 6-1-8: Legal and regulatory capabilities for Fountain Hills		
Regulatory Tools for Hazard Mitigation	**Description**	**Responsible Department/Agency**
CODES	• 2018 IBC, IRC, IPC, IMC, IECC, IFC. 2005 NEC. 97 UCADB	• Building Safety • Fire Department
ORDINANCES	• Amendments to the IBC,IRC,IFC • Including fire sprinklers in all structures	• Building Safety • Fire Department
PLANS, MANUALS, and/or GUIDELINES	• 2020 General Plan • 2020 Stormwater Management Plan • 1996 – Fountain Hills Area Drainage Master Plan • 1997 - Fountain Hills Area Drainage Master Plan, Emergency Access Plan and Routes Evaluation • 2001 - Emergency Action Plan for Golden Eagle Park Dam Modifications • Check lists and minimum mandatory submittal documents and specifications, updated 2020 with Erosion Control Guidance for construction.	• Planning and Zoning • Development Services
STUDIES	• 1994 - Fountain Hills North Floodplain Delineation Study • 1994 - Fountain Hills South Floodplain Delineation Study • 1996 - Fountain Hills Retardation Structure Emergency Action Plan • 1997 - Town of Fountain Hills, Dam Break Analysis for Golden Eagle Park Dam, Hesperus Wash Dam, Aspen Dam, North Heights Dam, Sun Ridge Canyon Dam • ISO rating for building safety	• Development Services • Building Safety
Opportunities for Expansion/Improvement: Building, planning, and zoning codes could be enhanced to better facilitate the management and/or development of open space that could be considered hazardous due to the accumulation of brush and trees that are in poor health.		

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Table 6-2-8: Technical staff and personnel capabilities for Fountain Hills		
Staff/Personnel Resources	☑	**Department/Agency - Position**
Planner(s) or engineer(s) with knowledge of land development and land management practices	☑	Public Works/Town Engineer
Engineer(s) or professional(s) trained in construction practices related to buildings and/or infrastructure	☑	Public Works/Town Engineer
Planner(s) or engineer(s) with an understanding of natural and/or human-caused hazards	☑	Public Works/Director
Floodplain Manager	☑	Public Works/Town Engineer
Surveyors		Public Works/Town Engineer
Staff with education or expertise to assess the community's vulnerability to hazards	☑	None
Personnel skilled in GIS and/or HAZUS	☑	Public Works/Director
Scientists familiar with the hazards of the community		CAD Services/GIS Tech
Emergency manager	☑	None
Grant writer(s)	☑	Fire Chief/Public Works/ Director
Opportunities for Expansion/Improvement: Additional staffing in the Building Inspection Department to reduce the current work load, due to rapid development. An additional Community Risk Reduction position in Public Safety would help with wildland fire reduction projects, or community safety enhancement programs.		

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Table 6-3-8: Fiscal capabilities for Fountain Hills		
Financial Resources	**Accessible or Eligible to Use (Yes, No, Don't Know)**	**Comments**
Community Development Block Grants	No	
Capital Improvements Project funding	Yes	
Authority to levy taxes for specific purposes	Yes	Requires citizen vote
Fees for water, sewer, gas, or electric service	No	
Impact fees for homebuyers or new developments/homes	Yes	
Incur debt through general obligation bonds	Yes	Requires citizen vote
Incur debt through special tax bonds	Yes	Requires citizen vote
Opportunities for Expansion/Improvement: The Town can consider aggressively pursuing fuels reduction monies that may be available to assist with the clearing and maintenance of its many washes/arroyos. The availability of additional funding could reduce the wash maintenance frequency from its current five year interval schedule, to two or three year intervals.		

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Table 6-1-9: Legal and regulatory capabilities for Gila Bend		
Regulatory Tools for Hazard Mitigation	**Description**	**Responsible Department/Agency**
CODES	• International Building Code	• Community Development Services • Public Works & Engineering
ORDINANCES	• Floodplain Management Ordinance • Subdivision/Zoning Ordinance	• Community Development Services • Public Works & Engineering
PLANS, MANUALS, and/or GUIDELINES	• General Plan • CIP Plan • Airport Master plan	• Community Development Services • Public Works & Engineering
STUDIES	• Water, streets, sewer studies • Maps (FEMA, Effective date of September 2005) • Gila Bend Aquifer Study	• Community Development Services • Public Works & Engineering • Flood Control District of Maricopa County
Opportunities for Expansion/Improvement: Regular updates to the Town's codes are one way the Town increases its future mitigation capacity. Building and planning codes could be improved to better accommodate flooding, drought, and extreme heat. Additional policies to the long-term plan could allow for improved standards and guidance to protect natural drainage areas and options for low impact development strategies. Additional measures for flooding, and other natural disasters can be implemented within the model codes to allow easier and standardized adoption to increase future mitigation efforts.		

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Table 6-2-9: Technical staff and personnel capabilities for Gila Bend		
Staff/Personnel Resources	☑	**Department/Agency - Position**
Planner(s) or engineer(s) with knowledge of land development and land management practices	☑	Town Engineer
Engineer(s) or professional(s) trained in construction practices related to buildings and/or infrastructure		Contract personnel
Planner(s) or engineer(s) with an understanding of natural and/or human-caused hazards		Contract personnel
Floodplain Manager		Managed by FCDMC
Surveyors		Contract personnel
Staff with education or expertise to assess the community's vulnerability to hazards	☑	Public Works Director Fire Chief EMS
Personnel skilled in GIS and/or HAZUS		Contract personnel
Scientists familiar with the hazards of the community		Contract personnel
Emergency manager	☑	Public Works Director Fire Chief EMS Chief Town Engineer
Grant writer(s)		Contract personnel
Opportunities for Expansion/Improvement: Wherever possible and appropriate, town staff could implement programs that educate the community on creating defensible spaces to reduce the impact of uncontrolled wildland fire, as well as a general augmentation of efforts to provide information to homeowners and local business on potential natural and human caused hazards.		

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Table 6-3-9: Fiscal capabilities for Gila Bend		
Financial Resources	**Accessible or Eligible to Use (Yes, No, Don't Know)**	**Comments**
Community Development Block Grants	Yes	Potable water related project
Capital Improvements Project funding	Yes	WIFA, HURF, Rural Development
Authority to levy taxes for specific purposes	Yes	
Fees for water, sewer, gas, or electric service	Yes	Water, trash and sewer fees
Impact fees for homebuyers or new developments/homes	Yes	
Incur debt through general obligation bonds	Yes	
Incur debt through special tax bonds	Yes	
Other	Yes	WIFA, Rural Development

Opportunities for Expansion/Improvement:

The Town can and will continue to regularly participate in grant programs and other programs to fund mitigation of its hazard liabilities and programs. The use of creative sponsorship and partnerships can also assist in mitigation funding for future increased mitigation needs. The Town can pursue partnerships with county-level agencies such as the Flood Control District of Maricopa County, neighboring municipalities, and the private sector when developing CIP projects that mitigate area wide drainage issues to reduce flood risks.

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Table 6-1-10: Legal and regulatory capabilities for Gilbert		
Regulatory Tools for Hazard Mitigation	**Description**	**Responsible Department/Agency**
CODES	• 1996 Code Town of Gilbert, Arizona *There have been revisions and amendments since original adoption date • 2012 International Fire Code • 2012 International Building Code • 2012 International Residential Code • 2012 International Mechanical Code • 2012 International Plumbing Code • 2012 International Fuel Gas Code • 2012 International Energy Conservation Code • 2011 National Electrical Code *The Bldg & Fire codes adopted and amended through the Building and Construction Regulations Code of the Town of Gilbert, Arizona- 2013 Edition. • The Arizonans with Disabilities Act & Implementing Rules	• Developmental Services • Fire Department
ORDINANCES	• 2005 Town of Gilbert Land Development Code* * There have been revisions and amendments since original adoption date • 1987 The Flood Damage Prevention Ordinance of the Town of Gilbert, Arizona • 2013 Town of Gilbert Amendments to Chapter 34 Floodplain Management Ordinance 245 is Chapter 34 of Town Code	• Development Services

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Table 6-1-10: Legal and regulatory capabilities for Gilbert		
Regulatory Tools for Hazard Mitigation	**Description**	**Responsible Department/Agency**
PLANS, MANUALS, and/or GUIDELINES	• 2003 Town of Gilbert Storm Water Management Program • 2003 Gilbert Water Supply Reduction Management Plan • 2015-2019 Capital Improvement Plan • 2016 Town of Gilbert Emergency Operation Plan (revision in progress) • 2019 Town of Gilbert Flood Response Plan • 2012 General Plan Town of Gilbert • 2015 Town of Gilbert Multi-Hazard Mitigation Plan (currently being updated) • 200 Town of Gilbert Land Development Code Ordinance No. 1625 Latest Revision: June 1, 2014 • 2009 Town of Gilbert Public Works and Engineering Standards and Details	• Public Works • Fire Department • Development Services • Management Office

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Table 6-1-10: Legal and regulatory capabilities for Gilbert		
Regulatory Tools for Hazard Mitigation	**Description**	**Responsible Department/Agency**
STUDIES	• 2005 Chandler/Gilbert Floodplain Delineation Study Phase 1 "Eastern Canal Watershed" Revised 2007. • 2008 Chandler/Gilbert Floodplain Delineation Study Phase 2 "Consolidated Canal Watershed". • 2009 Chandler/Gilbert Floodplain Delineation Study Phase 3 "UPRR/Arizona Avenue Watershed". • 2013 Flood Insurance Study for "Maricopa County, Arizona and Unincorporated Areas" Volumes 1 thru 23. • FEMA Flood Insurance Rate Maps (FEMA, Effective date of October 2013) • 2013 San Tan West Area Drainage Master Study (ADMS) • 2018 San Tan West Area Drainage Master Plan Update • 2020 San Tan West Area Drainage Master Study/Plan Update • East Mesa Area Drainage Master Plan • 2008 Earth Fissure Map of the Chandler Heights Study Area: Pinal and Maricopa Counties County (Includes Gilbert Area) Per Ariz. Rev. Stat. § 27-152.01(3) September 21, 2006	• Public Works/Floodplain Administrator
Opportunities for Expansion/Improvement: Regular updates to the Town's codes are one way the Town increases its future mitigation capacity. The Town has recently updated its codes and will continue to update to model codes with minor amendments. Additional measures for flooding, and other natural disasters can be implemented within the model codes to allow easier and standardized adoption to increase future mitigation efforts. When the plans are amended or updated in their various cycles it would be beneficial to have the appropriate people available to consult on changes to make the codes more adapted to the mitigation needs.		

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Table 6-2-10: Technical staff and personnel capabilities for Gilbert		
Staff/Personnel Resources	**☑**	**Department/Agency - Position**
Planner(s) or engineer(s) with knowledge of land development and land management practices	☑	Development Services Department - Planner, Business Development Manager, Business Development Specialists
Engineer(s) or professional(s) trained in construction practices related to buildings and/or infrastructure	☑	Development Services Department – Buildings – Plan Review & Inspection Manager, Building/Fire Inspection Administrator, Senior Building Inspectors, Building Inspector II's, Building Inspector I's, Fire Inspectors, Senior Building Plans Examiners, Building Plans Examiner. Development Services Department -Infrastructure – Engineering/Planning Inspection Administrator, Engineering Inspector II's, Engineering/Planning Plan Review Administrator, Senior Engineering Plans Examiner, Engineering Plans Examiner. Public Works – Engineering Services Manager, Assistant Town Engineer, Town Engineer, Utility Field Supervisors, Water Manager, Senior Utility Workers, Utility Workers, Utility Electrician, Instrumentation Technician, Water Treatment Plant Mechanic, Well Technician, Lift Station Technicians, and Instrumentation Technicians
Planner(s) or engineer(s) with an understanding of natural and/or human-caused hazards	☑	Development Services - Associate Engineer Public Works Department - Public Works Director Fire Department - Emergency Management Coordinator
Floodplain Manager	☑	Public Works Department - Engineer
Surveyors		
Staff with education or expertise to assess the community's vulnerability to hazards	☑	Gilbert Fire Department - Emergency Management Coordinator Gilbert Public Works Department - Public Works Director
Personnel skilled in GIS and/or HAZUS	☑	Support Services Department - GIS Technician I and II GIS Database Analysis, GIS Administrator
Scientists familiar with the hazards of the community	☑	Public Works Department - Water Quality Supervisor/Chemist
Emergency manager	☑	Town Managers Office - Emergency Management Coordinator

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Table 6-2-10: Technical staff and personnel capabilities for Gilbert		
Staff/Personnel Resources	☑	**Department/Agency - Position**
Grant writer(s)	☑	Police Department - Police Plan and Research Coordinator

Opportunities for Expansion/Improvement:
The Fire Department Community Division can conduct more classes and educate the public in hazard mitigation. They could talk about the main issues we regularly experience from flooding to severe wind to extreme heat. They can address the issues that people normally ignore as we do not see large amounts of rainfall in a sustained period.

Table 6-3-10: Fiscal capabilities for Gilbert		
Financial Resources	**Accessible or Eligible to Use (Yes, No, Don't Know)**	**Comments**
Community Development Block Grants	Yes	
Capital Improvements Project funding	Yes	
Authority to levy taxes for specific purposes	Yes	
Fees for water, sewer, gas, or electric service	Yes	Gas and electric are private/public utilities
Impact fees for homebuyers or new developments/homes	Yes	
Incur debt through general obligation bonds	Yes	
Incur debt through special tax bonds	Yes	

Opportunities for Expansion/Improvement:
The Town can and will continue to regularly pursue grants and other programs to fund future mitigation actions and projects that address the city's hazard liabilities. The grant funds can be used to match with mitigation priorities planned into the town's capital improvements program and other city departmental public outreach budgets. The town will also continue the use of creative public and private sponsorships and partnerships (e.g. – IGA's, MOUs, etc.) that can also assist in funding future mitigation needs, actions and projects, and especially those that require a regional, multi-jurisdictional approach (area drainage master plans for example).

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Table 6-1-11: Legal and regulatory capabilities for Glendale		
Regulatory Tools for Hazard Mitigation	**Description**	**Responsible Department/Agency**
CODES	• 2018 International Building Code • 2018 International Residential Code • 2018 International Mechanical Code • 2018 International Existing Building Code • 2017 National Electrical Code • 2010 Americans with Disabilities Act Accessibility Guidelines and the City Code. • Fair Housing Accessibility Guidelines • 2018 International Fuel Gas Code • 2018 International Plumbing Code • 2018 International Energy Conservation Code • 2018 International Fire Code • 2018 International Property Maintenance Code • City of Glendale Sound Attenuation Standards • Maricopa Association of Governments Fireplace Standards	• Building Safety • Engineering • Fire Marshalls Office
ORDINANCES	• City of Glendale Zoning Ordinance and associated PAD and PRD documents • Landscape Ordinance • Floodplain Ordinance • Grading and Drainage Ordinance • Sub-Division Ordinance	• Building Safety • Engineering • Planning

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Table 6-1-11: Legal and regulatory capabilities for Glendale		
Regulatory Tools for Hazard Mitigation	**Description**	**Responsible Department/Agency**
PLANS, MANUALS, and/or GUIDELINES	• City Department SOP's • City of Glendale Emergency Operations Plan • Multi-Jurisdictional Mitigation Plan • General Plan 2040 • North Valley Specific Area Plan • Glendale Centerline • Western Area Plan • West Glendale Avenue Development Plan • Commercial and Industrial Design Guidelines • Residential Design & Development Manual • Adopted State Erosion Standard • Engineer Design and Construction Standards • Middle New River Master Plan • Glendale/Peoria Drainage Master Plan Update (2011)	• Emergency Management • Engineering • Planning • Water Services
STUDIES	• 2020 MAF 2040 Regional Transportation Plan Update • 2016 Envision Glendale 2040 General Plan • 2018 Glendale Transportation Plan	• Transportation • Planning
Opportunities for Expansion/Improvement: The Water Services Department is updating its Drought Management Plan, including an evaluation of available tools and technologies to support water reduction measures for residential and non-residential customers. The plan update also involves a review of the Drought Management Ordinance (Sections 33-81 through 33-85 of City Code) for improved clarity in requirements and enforcement.		

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Table 6-2-11: Technical staff and personnel capabilities for Glendale		
Staff/Personnel Resources	☑	**Department/Agency - Position**
Planner(s) or engineer(s) with knowledge of land development and land management practices	☑	Planning, Planners Engineering, Engineers Community Services
Engineer(s) or professional(s) trained in construction practices related to buildings and/or infrastructure	☑	Engineering, Engineers Architecture, Architects Building Safety – Structural Engineers and Architects Community Services
Planner(s) or engineer(s) with an understanding of natural and/or human-caused hazards	☑	Planning, Engineering, Water Services, Building Safety
Floodplain Manager	☑	Engineering Dept.
Surveyors	☑	Engineering
Staff with education or expertise to assess the community's vulnerability to hazards	☑	Community Services, Emergency Management, Building Safety, Fire Dept, Police Dept, Public Works, Transportation, Engineering, Architecture, Water Services
Personnel skilled in GIS and/or HAZUS	☑	IT Department, Fire Dept, Police Dept
Scientists familiar with the hazards of the community	☑	Police Dept, Fire Dept, Water Services, Engineering
Emergency manager	☑	Fire Dept
Grant writer(s)	☑	All Depts
Opportunities for Expansion/Improvement: The Water Services Department recently updated its asset management program. As part of this process, information on stormwater assets was verified. Procedures for inspection and maintenance of those assets will be enhanced to continue to mitigate flooding. Emergency Management, in coordination with the Fire Department, could enhance public information and outreach on preparedness and mitigation activities related to flooding, extreme heat, and wildfires to educate the community.		

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Table 6-3-11: Fiscal capabilities for Glendale		
Financial Resources	**Accessible or Eligible to Use (Yes, No, Don't Know)**	**Comments**
Community Development Block Grants	Yes	Community Services
Capital Improvements Project funding	Yes	Budget and Finance
Authority to levy taxes for specific purposes	Yes	Function of Legislation (see COG website-Appendix 18 FAQ under levy taxes)
Fees for water, sewer, gas, or electric service	Yes	Water Services Department. Budget and Finance Department
Impact fees for homebuyers or new developments/homes	Yes	Budget and Finance, Development Services
Incur debt through general obligation bonds	Yes	Budget and Finance
Incur debt through special tax bonds	Yes	Budget and Finance

Opportunities for Expansion/Improvement:

Glendale will continue to evaluate the rate structures for water, sewer, storm water, and urban irrigation service as part of the annual budget process. The rate structure considers investments to support reliable access to existing water supplies as well as future conditions (population growth; drought). The City's Capital Improvement Program includes projects to ensure a reliable water supply during drought. Also, in the next few years, projects may be added for enhancements to the storm water system to mitigate flooding. In addition, the City of Glendale can consider pursuing FEMA mitigation grants for CIP and cost-beneficial projects that have been identified as having a high potential of being funded. A review of proposed projects would occur a few years in advance of the project implementation to determine the likelihood of being funded.

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Table 6-1-12: Legal and regulatory capabilities for Goodyear		
Regulatory Tools for Hazard Mitigation	**Description**	**Responsible Department/Agency**
CODES	• International Building Code, 2006 • International Residential Code, 2006 • International Mechanical Code, 2006 • International Property Maintenance Code, 2006 • International Energy Conservation Code, 2006 • NFPA 70, The National Electrical Code including Annex A – G, 2015 • NFPA 99, Health Care Facilities, 2015 • ICC/ANSI A117.1 Accessible and Usable Buildings and Facilities, 2003 • 2010 ADA Standards for Accessible Design • International Residential Code, 2006 • International Fire Code Appendix B,D,E,F and G 2006	• Fire Building and Life Safety
ORDINANCES	• Flood Damage Prevention Ordinance, 2005 • Zoning Ordinance, 2013 • Subdivision Regulations, 2012 • Engineering Design Standards and Policies Manual, 2012	• Engineering
PLANS, MANUALS, and/or GUIDELINES	• General Plan, 2014 • General Plan Amendments, 2004 through 2009 • Design Guidelines, 2008 • City Center Specific Plan, 2009 • Storm Water Management Plan – Amended, 2014	• Community Development
STUDIES	• Sonoran Valley Planning Area document, 2007 • White Tank Area Drainage Master Plan, 2003 • Waterman Wash Floodplain Delineation Study, 2006 • Rainbow Valley Area Drainage Master Plan, in progress, 2010	• Community Development

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Table 6-1-12: Legal and regulatory capabilities for Goodyear		
Regulatory Tools for Hazard Mitigation	**Description**	**Responsible Department/Agency**
Opportunities for Expansion/Improvement: The General Plan, Zoning Ordinance and Building Code could be strengthened to include additional consideration for flooding potential and/or wildfire potential within the platting process. As construction costs are extremely high and the city has already implemented the requirement for fire sprinklers in residential development greater than 5,000 sq. ft, care will need to be taken to ensure that housing costs or other impacts do not create other issues for residents which cannot be mitigated.		

Table 6-2-12: Technical staff and personnel capabilities for Goodyear		
Staff/Personnel Resources	☑	**Department/Agency - Position**
Planner(s) or engineer(s) with knowledge of land development and land management practices	☑	Community Development – Director Engineering – City Engineer
Engineer(s) or professional(s) trained in construction practices related to buildings and/or infrastructure	☑	Community Development - Director Fire Department - Chief Building Official Engineering – City Engineer
Planner(s) or engineer(s) with an understanding of natural and/or human-caused hazards	☑	Fire Department - Chief Community Development - Director Fire Department – Chief Building Official Engineering – City Engineer Contract out as needed
Floodplain Manager	☑	Engineering – City Engineer
Surveyors		Contract out as needed
Staff with education or expertise to assess the community's vulnerability to hazards	☑	Fire Department - Chief Community Development - Director Fire Department – Chief Building Official Engineering – City Engineer Contract out as needed
Personnel skilled in GIS and/or HAZUS	☑	Engineering – City Engineer Engineering – GIS Coordinator Contract out as needed
Scientists familiar with the hazards of the community		Contract out as needed
Emergency manager	☑	Fire Department - Chief
Grant writer(s)	☑	City Administration – Grants Administrator

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Table 6-2-12: Technical staff and personnel capabilities for Goodyear		
Staff/Personnel Resources	☑	**Department/Agency - Position**
Opportunities for Expansion/Improvement: Since beginning the writing of this update, the City has hired an Environmental Manager to develop Emergency Response Plans in relation to surface waters and the potential of contamination. Additional, Public Works has hired an Emergency Coordinator to assist with securing water supply and treatment with more thorough continuity plans, as well as response plans. The Fire Department is working to expand its efforts at communicating defensible space opportunities, specifically with the EMR community near Corgett Wash.		

Table 6-3-12: Fiscal capabilities for Goodyear		
Financial Resources	**Accessible or Eligible to Use (Yes, No, Don't Know)**	**Comments**
Community Development Block Grants	Yes	Water, sewer, and building rehabilitation projects
Capital Improvements Project funding	Yes	Annual CIP Budget Five-year CIP IGAs with FCDMC, MCDOT
Authority to levy taxes for specific purposes	Yes	Improvement Districts Community Facilities Districts
Fees for water, sewer, gas, or electric service	Yes	Adopted water and sewer connection fees and utility usage fees
Impact fees for homebuyers or new developments/homes	Yes	Adopted impact fees for water, sewer, reclaimed water, water resources, library, parks and recreation, fire, police, public works, general government, arterial streets, and regional transportation
Incur debt through general obligation bonds	Yes	Sell G.O. Bonds
Incur debt through special tax bonds	Yes	Sell Revenue Bonds, Improvement District Bonds, and Community Faculties Bonds
Cooperative Agreement Grants and Specific Planning and Project Grants	Yes	FEMA, NRCS, State Land, etc.
Opportunities for Expansion/Improvement: The City could consider expanding pursuit of FEMA mitigation grants by first forming a group of key individuals, Emergency Manager, Fire Chief, City Engineer, etc., to determine if there are opportunities within the city which qualify for mitigation and then programming those efforts into the respective operational plans.		

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Table 6-1-13: Legal and regulatory capabilities for Guadalupe		
Regulatory Tools for Hazard Mitigation	**Description**	**Responsible Department/Agency**
CODES	• 2012 Uniform Building Code • 2012 Plumbing Code • 2012 Mechanical Code • 2012 Fire Code • 2010 Town Code of Guadalupe	• Town Council • Town Inspector • Town Fire Department • Legal Council
ORDINANCES	• 2010 Town of Guadalupe Planning & Zoning Ordinance • 2010 Town of Guadalupe Subdivision Regulations	• Town Council • Town Manager • Legal Council
PLANS, MANUALS, and/or GUIDELINES	• 2015 Town of Guadalupe Multi-Hazard Mitigation Plan (in process) • 2010 Town of Guadalupe 5-year Consolidated Plan (in process) • 2018 Town of Guadalupe Emergency Operation Plan • 2018 Capital Improvement Program • 2010 Guadalupe Master Plan	• Community Development Director • Town Manager • Fire Chief / EM • Legal Council
STUDIES	• 2015Town of Guadalupe Environmental Study • 2018 Town of Guadalupe Floodplain Housing Study • 2008 ADOT Guadalupe Rd. Pedestrian Bridge & Pathway from South Mountain Park to Tempe City Line • Town Flood Control Management and Plan	• Town Manager • Community Development Director • Town Engineer • Flood Control District of Maricopa County
Opportunities for Expansion/Improvement: Building and planning codes could be updated to better accommodate mitigation of flooding, extreme heat, drought and severe wind events. The Town is currently reviewing and preparing to adopt 2015 building and fire code which will be an update to the currently used 2012 series.		

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Table 6-2-13: Technical staff and personnel capabilities for Guadalupe		
Staff/Personnel Resources	☑	**Department/Agency - Position**
Planner(s) or engineer(s) with knowledge of land development and land management practices	☑	Town Manager Consultant (Dibble Engineering)
Engineer(s) or professional(s) trained in construction practices related to buildings and/or infrastructure		Consultant (Dibble Engineering)
Planner(s) or engineer(s) with an understanding of natural and/or human-caused hazards	☑	Guadalupe Fire Department Consultant (Dibble Engineering)
Floodplain Manager		Consultant (Dibble Engineering)
Surveyors		Consultant (Dibble Engineering)
Staff with education or expertise to assess the community's vulnerability to hazards	☑	Town Manager Fire Chief
Personnel skilled in GIS and/or HAZUS	☑	Guadalupe Fire Department Consultant (Dibble Engineering)
Scientists familiar with the hazards of the community		NA
Emergency manager	☑	Fire Chief
Grant writer(s)	☑	Community Development Guadalupe Fire Department Consultant/ Contractor
Opportunities for Expansion/Improvement: The Town could employ additional inspectors to enhance code enforcement and permitting activities related to hazard mitigation and structural integrity. The Town also can continue to improve leveraging other county and state partners to enhance flood and severe wind mitigation design and implementation.		

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Table 6-3-13: Fiscal capabilities for Guadalupe		
Financial Resources	**Accessible or Eligible to Use (Yes, No, Don't Know)**	**Comments**
Community Development Block Grants	Yes	
Capital Improvements Project funding	Yes	
Authority to levy taxes for specific purposes	Yes	
Fees for water, sewer, gas, or electric service	Yes	Water
Impact fees for homebuyers or new developments/homes	No	
Incur debt through general obligation bonds	No	
Incur debt through special tax bonds	No	
Other	No	

Opportunities for Expansion/Improvement:

The town can consider expanding pursuit of FEMA mitigation grants or regional grant/partnerships through development of a programmed approach to identifying CIP and cost-beneficial projects three to four years in advance of the desired implementation, preparing appropriate grant application information and submitting for funding. This could be done on an annual rolling basis and would only flag projects with a high potential of being funded.

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Table 6-1-14: Legal and regulatory capabilities for Litchfield Park		
Regulatory Tools for Hazard Mitigation	**Description**	**Responsible Department/Agency**
CODES	• 2006 International Building Code • 2006 International Residential Code • 2006 International Plumbing Code • 2006 International Mechanical Code • 2003 International Fire Code • 2005 National Electric Code • 2006 International Energy Conservation Code • 2006 International Fuel Gas Code • 2008 Litchfield Park City Code update as needed	• Building Department • City Clerk/ City Council
ORDINANCES	• City of Litchfield Park Zoning Code Ordinances • Weed Abatement Ordinance • Public Nuisance Ordinance • Property Maintenance Ordinance • Hazardous Material Storage and Disposal Ordinance	• Planning & Zoning • City Clerk/ City Council
PLANS, MANUALS, and/or GUIDELINES	• Handbook for Arizona Communities, Floodplain Management • Storm Water Management Plan • 2012 Emergency Management Response Guidebook • 2009 Litchfield Park General Plan	• Planning & Zoning • City Manager's Office, Emergency Management
STUDIES	• 2009 Flood Emergency Action Plan Ex	• City Manager's Office, Emergency Management
Opportunities for Expansion/Improvement: The City of Litchfield Park would benefit from the development of a storm water management plan (SWMP) to better map flood hazards and identify areas of mitigation interest. The SWMP would serve as a guide to enhance future flood mitigation opportunities in the city. The city will also benefit from continued participation in the future updates to the Maricopa County Community Wildfire Protection Plan through identification of wildfire hazards and mitigation strategies along the city's wildland urban interface.		

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Table 6-2-14: Technical staff and personnel capabilities for Litchfield Park		
Staff/Personnel Resources	☑	**Department/Agency - Position**
Planner(s) or engineer(s) with knowledge of land development and land management practices	☑	Planning, Planners
Engineer(s) or professional(s) trained in construction practices related to buildings and/or infrastructure	☑	Engineering, Engineers, Building, Building Inspectors
Planner(s) or engineer(s) with an understanding of natural and/or human-caused hazards	☑	Planning, Engineers
Floodplain Manager	☑	Engineering, Engineers
Surveyors		Contract Surveyors
Staff with education or expertise to assess the community's vulnerability to hazards		Contract Staff through MCSO and Rural Metro Fire
Personnel skilled in GIS and/or HAZUS		Contract Emergency Services
Scientists familiar with the hazards of the community		Contract Emergency Services
Emergency manager	☑	City Manager, Assistant City Manager
Grant writer(s)	☑	All Departments, Individuals within each Dept.
Opportunities for Expansion/Improvement: Previously Maricopa County Sherriff Department and Rural Metro Fire Department were our contracted Fire/Police. However, we have a newly contracted police and fire. Avondale PD and Goodyear Fire Department are Litchfield Parks newly appointed services. That being said with both departments taking on a newly appointed areas with more of an added population, we feel like both departments could use an increase in training for future mitigation due to the fact of increased coverage.		

Table 6-3-14: Fiscal capabilities for Litchfield Park		
Financial Resources	**Accessible or Eligible to Use (Yes, No, Don't Know)**	**Comments**
Community Development Block Grants	No	No area of the city meets the basic requirements due to income
Capital Improvements Project funding	Yes	CIP City Budget

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Table 6-3-14: Fiscal capabilities for Litchfield Park		
Financial Resources	**Accessible or Eligible to Use (Yes, No, Don't Know)**	**Comments**
Authority to levy taxes for specific purposes	Yes	Requires a vote of the people
Fees for water, sewer, gas, or electric service	No	All of these services are privately owned
Impact fees for homebuyers or new developments/homes	Yes	Impact fees not currently required of developers/builders. Sales tax on developments are collected
Incur debt through general obligation bonds	Yes	This would be hard for us at this time because we do not have a bond rating
Incur debt through special tax bonds	Yes	

Opportunities for Expansion/Improvement:

The city would benefit from partnering with neighboring municipalities on regional mitigation efforts to leverage financial resources and cost-sharing in identifying hazards and implementing regional mitigation actions and projects. In particular, regional flood control efforts necessitate multi-jurisdictional participation, and working with agencies like the Flood Control District of Maricopa County (FCDMC) can enhance the city's ability to accomplish in-city flood mitigation through cost sharing and leveraging the FCDMC resources via an inter-governmental agreement (IGA).

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Table 6-1-15: Legal and regulatory capabilities for Mesa		
Regulatory Tools for Hazard Mitigation	**Description**	**Responsible Department/Agency**
CODES	• 2018 International Building Code • 2018 International Fire Code • 2017 National Electric Safety Code • 2017 National Electric Code	• Development Services • Fire/Medical Department
ORDINANCES	• City of Mesa Charter and Ordinances 2020 • Maricopa County Flood Control Standards and Requirements	• City Council • Engineering (Floodplain Mgr.)
PLANS, MANUALS, and/or GUIDELINES	• American Public Power Association • American Gas Association • COM Operations, Maintenance, Construction Practice & Emergency Plan Manual • Code of Federal Regulations Title 49 Part 192 • City of Mesa Detailed Electrical Standards • 2019 City of Mesa Engineering & Design Standards • Uniform Standard Specifications & Details for Public Works Construction 2020 • 2019 Mesa Standards, Details and Specifications	• Energy Resources (Electric) • Engineering • Energy Resources (Gas) • Water Resources (Water and Wastewater)
STUDIES	• City of Mesa Electrical Master Plan • City of Mesa Storm Drain Master Plan 2010 • City of Mesa Water System Master Plan Update 2018 • City of Mesa Wastewater Master Plan Update 2018 • City of Mesa Gas Master Plan	• Energy Resources (Electric) • Engineering • Water Resources (Water and Wastewater) • Energy Resources (Gas)

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Table 6-1-15: Legal and regulatory capabilities for Mesa		
Regulatory Tools for Hazard Mitigation	**Description**	**Responsible Department/Agency**
Opportunities for Expansion/Improvement: The City of Mesa codes are regularly updated and will continue to be reviewed with minor amendments as needed on scheduled cycles. Additional measures for flooding, extreme heat and other natural disasters, should be implemented within the model codes to make room for easier and more standardized adoption. This would increase future mitigation efforts. It would be helpful to have the appropriate people available to consult on changes to make the codes more adjusted to the mitigation needs, in the event plans are updated or amended in their various cycles.		

Table 6-2-15: Technical staff and personnel capabilities for Mesa		
Staff/Personnel Resources	☑	**Department/Agency - Position**
Planner(s) or engineer(s) with knowledge of land development and land management practices	☑	Development Services
Engineer(s) or professional(s) trained in construction practices related to buildings and/or infrastructure	☑	Engineering Water Resources Transportation
Planner(s) or engineer(s) with an understanding of natural and/or human-caused hazards	☑	Assistant City Engineer
Floodplain Manager	☑	Engineering
Surveyors	☑	Engineering
Staff with education or expertise to assess the community's vulnerability to hazards	☑	Police (Homeland Defense), Fire/Medical (Terrorism Liaison Officers), Energy Resources
Personnel skilled in GIS and/or HAZUS	☑	GIS Supervisor GIS Manager GIS Specialist
Scientists familiar with the hazards of the community		N/A
Emergency manager	☑	Emergency Management Coordinator Assistant Chief Emergency Management
Grant writer(s)	☑	Grant Coordinators Office

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Table 6-2-15: Technical staff and personnel capabilities for Mesa		
Staff/Personnel Resources	☑	**Department/Agency - Position**

Opportunities for Expansion/Improvement:

The Emergency Management Department could work with the Community Outreach Program on targeted efforts to increase community preparedness. These efforts could focus on some of the largest hazards facing the community as identified in the hazard mitigation plan: extreme heat, wildfires, and flooding. The program could educate the public on what preemptive steps they can take to protect themselves, their property, and their community. These steps would include creating defensible space around structures, landscaping with potential flooding in mind, how to prevent heat related illness, and more. Fire Prevention is not able to complete all inspections for low to medium hazard occupancies. According to NFPA standards, two additional inspectors could increase productivity. Increasing inspections of this type of occupancies would enable the department to identify specific hazards and work to mitigate them.

Table 6-3-15: Fiscal capabilities for Mesa		
Financial Resources	**Accessible or Eligible to Use (Yes, No, Don't Know)**	**Comments**
Community Development Block Grants	Yes	May be done in conjunction with Floodplain Master Plans
Capital Improvements Project funding	Yes	May include funding for new or existing city infrastructure
Authority to levy taxes for specific purposes	Yes	Through city council approval
Fees for water, sewer, gas, or electric service	Yes	As necessary , through city council approval
Impact fees for homebuyers or new developments/homes	Yes	Impact Fees provide revenue to cover added public services
Incur debt through general obligation bonds	Yes	CIP Bonds, storm drains, parks, streets, fire, police
Utility revenue bonds	Yes	CIP Bonds - utilities
Incur debt through special tax bonds	Yes	Urban Area Security Initiative , Proposition 202 (Gaming)

Opportunities for Expansion/Improvement:

City of Mesa regularly seeks new and additional grant opportunities and other programs to support its mitigation needs. These efforts focus on mitigation of occurring hazards as well as preparing against potential hazards. Where possible, the city will continue to work in partnership with community stakeholders to identify additional sources of funding to enhance the city's abilities to implement more mitigation actions and projects, and particularly those involving innovative local partnerships/sponsorships.

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Table 6-1-16: Legal and regulatory capabilities for Paradise Valley		
Regulatory Tools for Hazard Mitigation	**Description**	**Responsible Department/Agency**
CODES	Paradise Valley is no longer participating in the Plan	
ORDINANCES		
PLANS, MANUALS, and/or GUIDELINES		
STUDIES		

Table 6-2-16: Technical staff and personnel capabilities for Paradise Valley		
Staff/Personnel Resources	☑	**Department/Agency - Position**
Planner(s) or engineer(s) with knowledge of land development and land management practices	Paradise Valley is no longer participating in the Plan	
Engineer(s) or professional(s) trained in construction practices related to buildings and/or infrastructure		
Planner(s) or engineer(s) with an understanding of natural and/or human-caused hazards		
Floodplain Manager		
Surveyors		
Staff with education or expertise to assess the community's vulnerability to hazards		
Personnel skilled in GIS and/or HAZUS		
Scientists familiar with the hazards of the community		
Emergency manager		
Grant writer(s)		

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Table 6-3-16: Fiscal capabilities for Paradise Valley		
Financial Resources	**Accessible or Eligible to Use (Yes, No, Don't Know)**	**Comments**
Community Development Block Grants	Paradise Valley is no longer participating in the Plan	
Capital Improvements Project funding		
Authority to levy taxes for specific purposes		
Fees for water, sewer, gas, or electric service		
Impact fees for homebuyers or new developments/homes		
Incur debt through general obligation bonds		
Incur debt through special tax bonds		
Other		

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Table 6-1-17: Legal and regulatory capabilities for Peoria		
Regulatory Tools for Hazard Mitigation	**Description**	**Responsible Department/Agency**
CODES	• 2012 International Building Code • 2012 International Residential Code • 2012 International Fire Code • 2012 International Mechanical Code • 2012 International Property Maintenance Code • 2011 National Electrical Code • 2012 International Plumbing Code • 2012 International Fuel Gas Code	• Planning & Zoning • Public Works • Utilities Division • Fire • Emergency Management
ORDINANCES	• Zoning Ordinance • Floodplain Ordinance • Grading & Drainage Ordinance	• Planning & Zoning • Emergency Management • Development and Engineering Department • Economic Development

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Table 6-1-17: Legal and regulatory capabilities for Peoria		
Regulatory Tools for Hazard Mitigation	**Description**	**Responsible Department/Agency**
PLANS, MANUALS, and/or GUIDELINES Standard Operating Procedures (SOP)	• Process Safety Management – Risk Management/Emergency Response Plan • Drought Protection Plan • Public Water System Emergency Operations Plan (ADEQ-04-07-520-Revised 9/4/13) • New River Interconnection Operation (PW-UT PLT Ops-OP005) Revised Date 5/7/13 • Pyramid Peak Emergency Shutdown (PW-UT Admin-PL022) Revised Date 7/15/13 • B204 Jomax-In-Line Booster Station Zone 4E (PW-UT FLD Ops 054) Revised Date 2/5/13 • Utilities Emergency Generators and Power Supply Transformers Maintenance Plan (11-2012) • Capacity, Management, Operations and Maintenance Program (CMOM-6-2003) • Peoria Engineering Standards Manual • Maricopa County Drainage Design Manual • Maricopa Association of Governments (MAG) Standards and Specifications for Public Works Construction • FEMA DFIRMS • Manual on Uniform Traffic Control Devices (MUTCD) • AASHTO Green Book • City's Circulation Plan & Street Classification Map	• Utilities Division • Development and Engineering Department • Economic Development
STUDIES	• Vulnerability Assessment • Storm Drain Master Plans • Water Course Master Plans	• Utilities Division • Development and Engineering Department • Economic Development

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Table 6-1-17: Legal and regulatory capabilities for Peoria		
Regulatory Tools for Hazard Mitigation	**Description**	**Responsible Department/Agency**
Opportunities for Expansion/Improvement: Building, planning and zoning codes could be improved to better accommodate flooding, extreme heat, and poor air quality. These codes are created through a national consensus and nationally recognized performance standards. The city has the ability to amend the codes to make them more restrictive. Our current amendments are common with local jurisdictions to provide uniformity and predictability for the building industry, while preserving health and life safety standards for the public. In a city like Peoria where the current cost of construction is high, any additional regulations will need to be carefully studied to understand potential impacts to both the housing costs and impacts to residents and local business.		

Table 6-2-17: Technical staff and personnel capabilities for Peoria		
Staff/Personnel Resources	☑	**Department/Agency - Position**
Planner(s) or engineer(s) with knowledge of land development and land management practices	☑	Planning – Planners; Development and Engineering – City Engineer, Staff Engineers, Engineering Inspector
Engineer(s) or professional(s) trained in construction practices related to buildings and/or infrastructure	☑	Development and Engineering – Engineers, Engineering Inspector; Architecture – Architects
Planner(s) or engineer(s) with an understanding of natural and/or human-caused hazards	☑	Planning – Planners; Development and Engineering – City Engineer, Staff Engineers, Engineering Inspector, Utilities Dept,
Floodplain Manager	☑	Development and Engineering – City Engineer, Staff Engineers
Surveyors	☑	Development and Engineering – City Engineer, Staff Engineers; Finance Dept using Contract Services
Staff with education or expertise to assess the community's vulnerability to hazards	☑	Neighborhood Services Dept, Human Services, Emergency Management, Fire Dept, Police Dept, Public Works, Streets, Development and Engineering, Architecture, Utilities Dept;
Personnel skilled in GIS and/or HAZUS	☑	ITD, Fire Dept, Police Dept
Scientists familiar with the hazards of the community	☑	Police Dept, Utilities Dept, Fire Dept
Emergency manager	☑	City Manager's Office, Emergency Manager
Grant writer(s)	☑	Every dept is responsible

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Table 6-2-17: Technical staff and personnel capabilities for Peoria		
Staff/Personnel Resources	☑	**Department/Agency - Position**

Opportunities for Expansion/Improvement:
Wherever possible and appropriate, city staff could implement programs that educate the community on creating a defensible space to reduce the impact of uncontrolled wildland fire, and especially for areas along the wildland urban interface. Where appropriate, city staff, with approval from our elected body, can amend city codes to provide better clarification and enhanced life safety requirements. Many of our current amendments are common with the City of Phoenix, to provide uniformity and predictability for the building industry, while preserving health and life safety standards for the public. In addition, city code amendments that address unique conditions within Peoria are also considered.

Table 6-3-17: Fiscal capabilities for Peoria		
Financial Resources	**Accessible or Eligible to Use (Yes, No, Don't Know)**	**Comments**
Community Development Block Grants	Yes	
Capital Improvements Project funding	Yes	
Authority to levy taxes for specific purposes	Yes	
Fees for water, sewer, gas, or electric service	Yes	
Impact fees for homebuyers or new developments/homes	Yes	
Incur debt through general obligation bonds	Yes	
Incur debt through special tax bonds	Yes	

Opportunities for Expansion/Improvement:
The City of Peoria working in conjunction with Maricopa County, can consider expanding pursuit of FEMA mitigation grants through development of a programmed approach to identifying CIP and cost-beneficial projects three to four years in advance of the desired implementation, preparing appropriate grant application information and submitting for funding.

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Table 6-1-18: Legal and regulatory capabilities for Phoenix		
Regulatory Tools for Hazard Mitigation	**Description**	**Responsible Department/Agency**
CODES	• 2016 ASME • 2017 National Electrical Code • 2018 International Building Code Administrative Provisions • 2018 International Building Code • 2018 International Energy Conservation Code • 2018 International Existing Building Code • 2018 International Fire Code • 2018 International Fuel Gas Code • 2012 International Green Construction Code • 2018 International Mechanical Code • 2018 International Residential Code • 2018 International and Uniform Plumbing Codes • Arizona Administrative Code, Title 12, Chapter 15 (AAR-R12-15-1206/1219) • Phoenix City Code, Chapter 32A (Grading & Drainage), 32B (Floodplains), and 32C (Stormwater Quality Protection)	• Fire • Planning & Development • Public Works • Street Transportation • Water Services
ORDINANCES	• Phoenix City Codes & Ordinances	• Law • Planning & Development

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Table 6-1-18: Legal and regulatory capabilities for Phoenix		
Regulatory Tools for Hazard Mitigation	**Description**	**Responsible Department/Agency**
PLANS, MANUALS, and/or GUIDELINES	• 2015 Phoenix General Plan (Scheduled for completion in Spring 2015) • 2009 City of Phoenix Major Emergency Response and Recovery Plan • 2015 Maricopa County Regional Multi-Hazard Mitigation Plan • 2013 Water Services Department Design Standards Manual for Water and Wastewater Systems • 2013 Street Transportation Department Storm Water Policies and Standards (3rd Edition) • 2019 Aviation Department Multi-Sector General Permit Stormwater Pollution Prevention Plan • Aviation Department Wildlife Management Plan • Aviation Department Rules and Regulations • Greater Phoenix Metro Area GSI/LID Handbook • Metro Phoenix Area Drainage Master Plan • Hohokam Area Drainage Master Plan • Water Services Facility Stormwater Management Plans • Water Services Facility Stormwater Pollution Prevention Plans	• Aviation • Office of Homeland Security and Emergency Management • Office of Environmental Programs • Planning Development • Public Works • Water Services • Street Transportation

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Table 6-1-18: Legal and regulatory capabilities for Phoenix		
Regulatory Tools for Hazard Mitigation	**Description**	**Responsible Department/Agency**
STUDIES	• 2015 City of Phoenix Threat and Hazard Identification and Risk Assessment • 7R/25L Runway Safety Area Environmental Assessment – Conditional Letter of Map Revision • Dam Safety Studies and Emergency Action Plans • FEMA DFIRM Maps • Flood Insurance Studies (FIS) • Levee Studies and Recertification • Recommendations for Integrating Green Infrastructure into the Maricopa County Multi-jurisdictional Hazard Mitigation Plan	• Aviation • Office of Environmental Programs • Office of Homeland Security and Emergency Management • Public Works • Street Transportation
Opportunities for Expansion/Improvement: Building and planning codes could be improved to better accommodate flooding, drought, and extreme heat. Incentives for green stormwater infrastructure/low impact development approaches to construction could make these options more attractive and provide increased protection for the most vulnerable population. Additional policies to the long-term plan could allow for improved standards and guidance to protect natural drainage areas and options for low impact development strategies.		

Table 6-2-18: Technical staff and personnel capabilities for Phoenix		
Staff/Personnel Resources	☑	**Department/Agency - Position**
Planner(s) or engineer(s) with knowledge of land development and land management practices	☑	Street Transportation Dept. – Deputy Director, Special Projects Administrator, Principal Planner, Civil Engineers, Project Manager, Principal Engineering Technicians, Chief Engineering Technicians; Public Works Dept. – Assistant Director, Civil Engineer III
Engineer(s) or professional(s) trained in construction practices related to buildings and/or infrastructure	☑	Street Transportation Dept. – Deputy Director, Special Projects Administrator; Public Works Dept. – Assistant Director, Civil Engineer III; Planning & Development Department – Deputy Directors, Building Official, Plans Engineers

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Table 6-2-18: Technical staff and personnel capabilities for Phoenix		
Staff/Personnel Resources	☑	**Department/Agency - Position**
Planner(s) or engineer(s) with an understanding of natural and/or human-caused hazards	☑	Street Transportation – Deputy Director, Special Projects Administrator, Principal Planner, Civil Engineer II; Office of Emergency Management – Director, Deputy Director, Planner; Public Works Dept. – Assistant Director, Civil Engineer III
Floodplain Manager	☑	Street Transportation Dept. – Principal Planner, Civil Engineer II, Senior Engineering Technician, Principal Engineering Technician; Public Works Dept. – Assistant Director, Civil Engineer III
Surveyors	☑	Street Transportation Dept. – Survey Teams
Staff with education or expertise to assess the community's vulnerability to hazards	☑	Office of Emergency Management – Director, Deputy Director, Planner; Planning and Development Dept. – Deputy, Planner III, Planner II, Planner I; Fire Dept. - Batalion Chief, Captain, Fire Fighter
Personnel skilled in GIS and/or HAZUS	☑	Information Technology Services – Info Tech Analyst/Programmers and Info Tech Specialists Fire Dept. – Fire Protection Engineer Planning Development Dept. – Senior GIS Technician Police Dept. – Senior User Technology Specialist Street Transportation Dept. - Info Tech Analyst/ Programmer II and Senior GIS Technician Water Services Dept. – GIS and Senior GIS Technicians
Scientists familiar with the hazards of the community	☑	City Manager's Office, Office of Environmental Programs – Environmental Programs Coordinators and Environmental Quality Specialists
Emergency manager	☑	City Manager's Office - Emergency Management Director
Grant writer(s)	☑	Aviation Department – Planner II Fire Dept. – Volunteer Coordinator and Fire Captains Planning Development Dept. – Principal Planner, Planner III, Village Planner & Planner II Police Dept. – Police Research Analysts Public Transit Dept Office of Emergency Management – Management Assistant, Fire Dept. – Management Assistant II, Street Transportation Dept. – Management Services, Public Works Dept.

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Table 6-2-18: Technical staff and personnel capabilities for Phoenix		
Staff/Personnel Resources	☑	**Department/Agency - Position**
Opportunities for Expansion/Improvement: Emergency Management, Street Transportation and Public Works could implement joint programs that educate the community on floodplain preparedness-living in a floodplain area; how to prepare, what to do to minimize the effects, when to take necessary steps; and flood insurance to protect your assets. Emergency Management, Human Services, Neighborhood Services, Fire/Medical, Office of Sustainability, and Housing could implement programs that educate the community on A/C maintenance and temperature control and provide A/C inspections for the most vulnerable populations to ensure operability prior to extreme heat season.		

Table 6-3-18: Fiscal capabilities for Phoenix		
Financial Resources	**Accessible or Eligible to Use (Yes, No, Don't Know)**	**Comments**
Community Development Block Grants	Yes	Housing, Neighborhood Services, and Water Services projects
Capital Improvements Project funding	Yes	
Authority to levy taxes for specific purposes	Yes	
Fees for water, sewer, gas, or electric service	Yes	Water, Sewer, and Solid Waste Fees/Rates
Impact fees for homebuyers or new developments/homes	Yes	For new developments inside impact fee areas-zones only. The Impact Fees are charged to new developments.
Incur debt through general obligation bonds	Yes	This excludes the Water Services and Aviation Departments
Incur debt through special tax bonds	Yes	Excise (sales) taxes
Other	Yes	FAA and Arizona Dept of Transportation grants to the Aviation Department Water resources fees, Environmental fees, Improvement Districts

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Opportunities for Expansion/Improvement:

The city can increase its focus on grant applications through FEMA mitigation grants by implementing a hazard mitigation program that identifies priority projects three years in advance and incorporates the grant application process into the annual review of the hazard mitigation plan. This would allow proper time to collaborate amongst the various departments and gather information needed for a successful grant application on an annual basis and determine if specific projects qualify for other grant funding to ensure adequate funding to meet the highest need.

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Table 6-1-19: Legal and regulatory capabilities for Queen Creek		
Regulatory Tools for Hazard Mitigation	**Description**	**Responsible Department/Agency**
CODES	• Town Code of the Town of Queen Creek • 2012 International Building Code • 2012 International Residential Code • 2012 Uniform Plumbing Code • 2012 International Mechanical Code • 2012 International Fire Code • 2012 International Property Maintenance Code • 2012 International Existing Building Code • 2012 International Energy Conservation Code • 2012 International Urban-Wildland Interface Code • 2011 National Electrical Code	• Development Services • Fire & Medical Department • Town Clerk
ORDINANCES	• Abatement Ordinance • Adult Oriented Business • Dark Sky Ordinance • Military Airport Zoning Ordinance • Noise Ordinance • Zoning Ordinance • Subdivision Ordinance • Floodplain Ordinance	• Development Services
PLANS, MANUALS, and/or GUIDELINES	• Addressing Regulations • Drainage Regulations • Dust Abatement Regulations • Subdivision Regulations • HUD Consolidated Planning Regulations • Floodplain Regulations	• Development Services • Public Works • Flood Control District

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Table 6-1-19: Legal and regulatory capabilities for Queen Creek		
Regulatory Tools for Hazard Mitigation	**Description**	**Responsible Department/Agency**
STUDIES	• Town of Queen Creek General Plan 2018 • Area Land Use Plan • Comprehensive Plans: Planning & Development • Transportation Plan • Desert Foothills Plan • Comprehensive Planning Amendments Guidelines • Development Master Plan Guidelines • Area Drainage Master Plan • Watercourse Master Plan	• Development Services • Public Works • Flood Control District
Opportunities for Expansion/Improvement: The Town is currently operating under the 2012 edition of the International Building Code. The Town could evaluate, provide a recommendation, and obtain Town Council approval to update the codes to the 2021 edition of the International Building Code to enhance future mitigation capacity.		

Table 6-2-19: Technical staff and personnel capabilities for Queen Creek		
Staff/Personnel Resources	☑	**Department/Agency - Position**
Planner(s) or engineer(s) with knowledge of land development and land management practices	☑	Development Services – Planners/Engineers Public Works – Engineers
Engineer(s) or professional(s) trained in construction practices related to buildings and/or infrastructure	☑	Development Services – Planners/Engineers/Inspectors Fire & Medical Department – Fire Marshal/Plans Examiner Public Works – Engineers
Planner(s) or engineer(s) with an understanding of natural and/or human-caused hazards	☑	Development Services – Planners/Engineers/Inspectors Fire & Medical Department – Emergency Mgmt Coordinator Public Works – Engineers
Floodplain Manager	☑	Development Services – Floodplain Administrator/Engineers/Inspectors
Surveyors		N/A

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Table 6-2-19: Technical staff and personnel capabilities for Queen Creek		
Staff/Personnel Resources	☑	**Department/Agency - Position**
Staff with education or expertise to assess the community's vulnerability to hazards	☑	Development Services – Planners/Engineers/Inspectors Fire & Medical Department – Emergency Mgmt Coordinator Public Works – Engineers
Personnel skilled in GIS and/or HAZUS	☑	Workforce & Technology – GIS Staff
Scientists familiar with the hazards of the community		N/A
Emergency manager	☑	Town Manager – Director Fire & Medical Department – Emergency Mgmt Coordinator
Grant writer(s)	☑	Communications & Marketing – Management Assistant Fire & Medical Department – Emergency Mgmt Coordinator Parks Division – Management Assistant Public Works – Engineers/Project Managers
Opportunities for Expansion/Improvement: The Town is developing a dedicated CIP department. The new department will include personnel drawn from the Public Works, Utility Services, Finance, and Economic Development Departments. CIP projects will be developed across disciplines and can include additional mitigation elements.		

Table 6-3-19: Fiscal capabilities for Queen Creek		
Financial Resources	**Accessible or Eligible to Use (Yes, No, Don't Know)**	**Comments**
Community Development Block Grants	No	
Capital Improvements Project funding	Yes	Town CIP
Authority to levy taxes for specific purposes	Yes	• Fire/EMS/Law Enforcement Property Tax • Improvement Districts • Direct Assessment Special District
Fees for water, sewer, gas, or electric service	Yes	Water and sewer service
Impact fees for homebuyers or new developments/homes	Yes	• Wastewater • Parks, Trails, & Open Space

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		• Town Buildings and Vehicles • Transportation • Library • Public Safety • Fire
Incur debt through general obligation bonds	Yes	
Incur debt through special tax bonds	Yes	
Other - Cooperative Agreement Grants and Specific Planning and Project Grants	Yes	
Opportunities for Expansion/Improvement: The Town can pursue partnerships with county-level agencies such as the Flood Control District of Maricopa County, neighboring municipalities, and the private sector when developing CIP projects that mitigate area wide drainage issues to reduce flood risks.		

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Table 6-1-20: Legal and regulatory capabilities for Salt River Pima-Maricopa Indian Community		
Regulatory Tools for Hazard Mitigation	**Description**	**Responsible Department/Agency**
TRIBAL CODES	• 2015 International Building Codes • 2015 International Fire Codes	• Engineering Construction Services • Fire Department
TRIBAL ORDINANCES	• Salt River Pima-Maricopa Indian Comm Ordinance • 1981 Zoning Ordinance	• SRPMIC Administration • Tribal Council • Community Development
TRIBAL REGULATIONS, PLANS, MANUALS, GUIDELINES, and/or STUDIES	• Emergency Operations Plan • Tribal Emergency Response Commission Guidelines • 2006 General Use Plan • Maricopa County Multi-Jurisdictional Hazard Mitigation Plan	• Fire Department • Tribal Emergency Response Commission • Community Development
Opportunities for Expansion/Improvement: An update to 2021 ICC codes with local amendments could improve safeguards from hazards associated with the built environment. Additionally, property maintenance code enforcement can increase neighborhood resilience to flood hazards by minimizing intrusion of trash and debris in neighborhood and regional drainage and agricultural conveyances. It may be beneficial to investigate participation in NFIP to improve flood resilience and build contiguous flood hazard mapping across jurisdictional boundaries. Flood hazard mapping will enable conditional regulatory requirements that improve conditions for assets at the highest risk.		

Table 6-2-20: Technical staff and personnel capabilities for Salt River Pima-Maricopa Indian Community		
Staff/Personnel Resources	☑	**Department/Agency - Position**
Planner(s) or engineer(s) with knowledge of land development and land management practices	☑	Engineering and Construction Services (ECS), Community Development Department (CDD)
Engineer(s) or professional(s) trained in construction practices related to buildings and/or infrastructure	☑	ECS, Fire Department, Public Works
Planner(s) or engineer(s) with an understanding of natural and/or human-caused hazards	☑	ECS, Environment Protection of Natural Resources(EPNR), CDD, Public Works, Fire Department/Emergency Manager
Floodplain Manager	☑	ECS, Public Works, CDD

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Table 6-2-20: Technical staff and personnel capabilities for Salt River Pima-Maricopa Indian Community		
Staff/Personnel Resources	☑	**Department/Agency - Position**
Surveyors	☑	Public Works, ECS,
Staff with education or expertise to assess the community's vulnerability to hazards	☑	Police, Fire, Emergency Management, ECS, CDD, Public Works
Personnel skilled in GIS and/or HAZUS	☑	ECS, CDD, EPNR
Scientists familiar with the hazards of the community	☑	Public Works, CDD, EPNR, ECS
Emergency manager	☑	Fire Department
Grant writer(s)	☑	Grants and Contracts

Opportunities for Expansion/Improvement:
GIS staff to map flood hazard delineations to improve awareness to flood prone areas throughout the community and develop a plan to work within those areas to mitigate water intrusion to residential structures. Residential code compliance staff to issue reports and provide recommendations on improvements to residential structures could improve the documentation process and streamline efforts to mitigate any hazards associated with code findings. Surveyors and mappers to analyze river environment mining activities and provide for enforcement of Community regulations related to excavation limits in active river channels. To enhance the mitigation efforts around floods within the community the use of additional Public Works staff to maintain drainage structures could be improved. In addition, positions to include drainage engineers to design and implement studies on structures could assist in future planning with stakeholders to mitigate associated hazards.

Table 6-3-20a: Fiscal capabilities for Salt River Pima-Maricopa Indian Community		
Financial Resources	**Accessible or Eligible to Use (Yes, No, Don't Know)**	**Comments**
Community Development Block Grants	Yes	
Capital Improvements Project funding	Yes	
Authority to levy taxes for specific purposes	Yes	
Fees for water, sewer, gas, or electric service	Yes	
Impact fees for homebuyers or new developments/homes	Yes	Unlikely, since water/sewer not owned by town. Also, town does not have primary property tax.
Incur debt through general obligation bonds	Yes	Unlikely, since water/sewer not owned by town. Also, town does not have primary property tax.

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Incur debt through special tax bonds	Yes	
Governance – Self Determination	Yes	Title 5 Construction Agreement

Opportunities for Expansion/Improvement:
The Tribal community stakeholders with major projects could consider familiarizing themselves with grant programs offered by federal partners such as the hazard mitigation grant through FEMA; the wildland fuels reduction grants through the County; and/or the Assistance to Firefighters Grant through FEMA. Depending on the award period or performance projects associated with current hazards could potentially be mitigated through these efforts.

Table 6-3-20b: Funding source assessment for Salt River Pima-Maricopa Indian Community

Building on Table 6-3-20, the following summarize existing and potential funding sources available to SRPMIC for implementing past and future hazard mitigation actions and projects.

Existing/Past Funding Sources Used:

- FEMA Emergency Management Program Grant
- Governance Self Determination Funds
- Tribal Capital Improvement Funds
- Tribal Development Impact Fee Fund
- Title V Construction Project Agreement between SRPMIC and Indian Health Services

Potential Funding Sources:

- CDBG Funds
- FEMA HMGP grants
- FEMA BRIC grants
- BIA Fire Assistance grants

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Table 6-1-22: Legal and regulatory capabilities for Scottsdale		
Regulatory Tools for Hazard Mitigation	**Description**	**Responsible Department/Agency**
CODES	• 2015 International Fire Code • 2015 International Building Code • 2015 International Mechanical Code • 2015 International Plumbing Code • 2015 National Electric Code • 2015 International Energy Conservation Code • International Residential Code • Public Nuisance and Property Maintenance Code • Uniform Code for the Abatement of Dangerous Buildings • Uniform Housing Code • City Code • International Green Construction Code	• Fire Department • Public Works • Water Resources • Planning and Development Services • Economic Vitality
ORDINANCES	• Stormwater and Floodplain Management • Zoning • Dust Control • Environmentally Sensitive Lands • Foothills Overlay Zoning District • Hillside Zoning District • Historic Preservation • Land Divisions • Native Plant • Protection of Archaeological Resources • McDowell Sonoran Preserve – 2000 • Noise Ordinance	• Economic Vitality • Planning and Development Services • Public Works and Water Resources

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Table 6-1-22: Legal and regulatory capabilities for Scottsdale		
Regulatory Tools for Hazard Mitigation	**Description**	**Responsible Department/Agency**
PLANS, MANUALS, and/or GUIDELINES	• Design Standards and Policies Manual • Scottsdale General Plan 2001 • Green Building Program • Transportation/Mobility Plans • Streetscapes Guidelines • Scenic Corridor Policy/Design Guidelines • Old Town Scottsdale Urban Design and Architectural Guidelines • Adopted Character Area Plans • Neighborhood Plans • Neighborhood Assemblage Policy • Infill Incentive District • Citywide Design Guidelines • Greater Phoenix Metro Green Infrastructure Handbook • Desert Parks Design Guidelines • Parks Recreation Master Plan • Public Art Master Plan • Historic Preservation • Sensitive Design • 2015 SFD – Standard of Coverage Evaluation • Community Wildfire Protection Plan (CWPP) 2019 • Airport Master Plan • Economic Development Strategic Plan • Housing and Human 5-Year Consolidated Plan • Integrated Water Master Plan • Stormwater Master Plan • Tourism Strategic Plan • WestWorld Master Plan	• Planning and Development Services • Transportation and Streets • Community Services • Economic Vitality • Water Resources
Opportunities for Expansion/Improvement: Flood mitigation within the city could be enhanced through the development of a city-wide Stormwater Master Plan and a Floodplain Management Plan to better define flood risks, mitigation strategies and floodplain management. Funding for the master plan will require city council action and approvals.		

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Table 6-2-22: Technical staff and personnel capabilities for Scottsdale		
Staff/Personnel Resources	☑	**Department/Agency - Position**
Planner(s) or engineer(s) with knowledge of land development and land management practices	☑	Planning & Development Services – Planners, Engineers
Engineer(s) or professional(s) trained in construction practices related to buildings and/or infrastructure	☑	Capitol Project Management-City Engineer; Planning and Development Services – Building Official, Development Engineering Manager, Stormwater Manager, Drainage and Flood Control Program Manager; Water Resources; Fire Department; Transportation/Traffic Engineer
Planner(s) or engineer(s) with an understanding of natural and/or human-caused hazards	☑	Capital Project Management-City Engineer; Planning and Development Services – Building Official, Development Engineering Manager, Stormwater Manager, Drainage and Flood Control Program Manager; Water Resources; Fire Department; Transportation/Traffic Engineer
Floodplain Manager	☑	Stormwater Management
Surveyors	☑	Water Resources, Planning and Development Services
Staff with education or expertise to assess the community's vulnerability to hazards	☑	Neighborhood Services, Human Services, Emergency Management, Development Services, Fire Department, Police Department, Public Works, Streets, Engineering, Architecture, Water Resources, Stormwater Management
Personnel skilled in GIS and/or HAZUS	☑	IT Department, Fire Department, Police Department, Stormwater Management; Planning GIS Staff
Scientists familiar with the hazards of the community	☑	Police Department, Water Resources, Fire Department, Stormwater Management
Emergency Manager	☑	City Manager's Office, Fire Department,
Grant writer(s)	☑	Office of Emergency Manager
Opportunities for Expansion/Improvement: Flood and other related hazard mitigation within the city could be enhanced through the hire of another Stormwater Engineer to assist with our extremely heavy workload in the Stormwater Management Department. The extra staff will enable the city to be more responsive to flood management requests for review and enforcement of the city's floodplain ordinance.		

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Table 6-3-22: Fiscal capabilities for Scottsdale		
Financial Resources	**Accessible or Eligible to Use (Yes, No, Don't Know)**	**Comments**
Community Development Block Grants	Yes	Community Assistance Programs
Capital Improvements Project funding	Yes	May include funding for new or existing infrastructure
Authority to levy taxes for specific purposes	Yes	Requires City Council approval and citizen vote
Fees for water, sewer, gas, or electric service	Yes	Water, sewer and solid waste fees approved by City Council. Gas and electric are private/public utilities
Impact fees for homebuyers or new developments/homes	Yes	Water and sewer; one-time payments to fund construction of public facilities needed to accommodate new development
Incur debt through general obligation bonds	Yes	Requires City Council approval and citizen vote
Incur debt through special tax bonds	Yes	Can sell bonds issued by Municipal Property Corporation often supported by excise (sales) tax
Other	Yes	Expenditures are subject to state-imposed expenditure limitation law
Opportunities for Expansion/Improvement: The stormwater fee on Scottsdale potable water bills could be increased and this additional revenue could be budgeted as a dedicated funding source for the city's Drainage and Flood Control CIP. This additional funding could also leverage matching funds from the Flood Control District of Maricopa County, which typically funds 50% of project costs.		

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Table 6-1-23: Legal and regulatory capabilities for Surprise		
Regulatory Tools for Hazard Mitigation	**Description**	**Responsible Department/Agency**
CODES	• International Series of Codes: • 2018 Building, Plumbing, Electrical • 2018 Fire	• Community Development Department • Fire Medical Department
ORDINANCES	• COS Municipal Codes: Surprise Unified Development Code, Chapter 122 • COS Municipal Codes: Buildings and Regulations, Chapter 105 • COS Municipal Codes: Storm Water Management, Chapter 117 • Emergency Management and Emergency Services, Chapter 18 • NFIP Reference Flood Insurance Study, Flood Insurance Rate Maps and Floodplain Management Regulations Ordinance 2016-15	• Community Development Department • City Administration • Public Works Department • Police Department • Fire Medical Department • Water Resources Management Department
REGULATIONS	• Addressing Regulations • Drainage Regulations • Dust Control Regulations • Subdivision Regulations	• Community Development Department • Public Works Department • City Administration

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Table 6-1-23: Legal and regulatory capabilities for Surprise		
Regulatory Tools for Hazard Mitigation	**Description**	**Responsible Department/Agency**
PLANS, MANUALS, and/or GUIDELINES	• General Plan 2035 • Area Land Use Plan • Surprise Unified Development Code • Area Drainage Master Plan • Engineering Development Standards • Maricopa Association of Governments Standards • 2015 Hazard Mitigation Plan Update • 2017 City of Surprise Emergency Operations Plan (currently under revision for 2021) • 2020 Continuity of Operations Plans (COOP's) for all City of Surprise Departments Including Water Resource Management and Public Works • 2020 City of Surprise Continuity of Government (COG) Plan • 2020 Maricopa County Department of Emergency Management Emergency Operations Plan (MCEOP) Annex C – "Severe Storms and Flood"	• Community Development Department • Public Works Department • City Manager's Office – Emergency Manager
STUDIES	• Flood Insurance Studies • Floodplain Delineation Studies • Area Drainage Master Studies • Transportation Studies • Integrated Water Master Plan	• Community Development Department • Public Works Department
Opportunities for Expansion/Improvement: The City of Surprise has a comprehensive list of planning documents, master plans and codes that support our mitigation efforts. Often these documents are developed with a specific goal in-mind while perhaps not appreciating the impacts to other published/ adopted plans. In the future, all our mitigation planning efforts and policies could be enhanced by ensuring a collaborative peer review process. This will ensure consistency and improve our levels of service.		

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Table 6-2-23: Technical staff and personnel capabilities for Surprise		
Staff/Personnel Resources	☑	**Department/Agency - Position**
Planner(s) or engineer(s) with knowledge of land development and land management practices	☑	Planning and Development – Planners, Long Range Planners, Planning Manager Public Works – Development Engineering Manager; Plan Reviewers
Planner(s) or engineer(s) with knowledge of land development and land management practices	☑	Planning and Development – Planners, Long Range Planners, Planning Manager Public Works Department – Development Engineering Manager; Plan Reviewers
Engineer(s) or professional(s) trained in construction practices related to buildings and/or infrastructure	☑	Public Works Department– Development Engineering Manager, Traffic Engineer, Capital Program Manager, Construction Inspection Supervisor Community Development Dept. - Building Official
Planner(s) or engineer(s) with an understanding of natural and/or human-caused hazards	☑	Planning and Development Dept. - Planners Public Works Department - Engineers
Floodplain Manager	☑	Flood Control District of Maricopa County is Floodplain Administrator Public Works Department - City Engineer – Certified Floodplain Managers on staff
Surveyors	☑	Public Works – Registered Land Surveyor
Staff with education or expertise to assess the community's vulnerability to hazards	☑	Planning and Development - Planners Public Works Department - Staff Police Department – Staff Fire Department – Staff City Manager's Office – Emergency Manager
Personnel skilled in GIS and/or HAZUS	☑	Community Development Department - GIS Staff Public Works Department - Survey Staff Information Technology Department - GIS Division
Scientists familiar with the hazards of the community		None
Emergency manager	☑	City Manager's Office – Emergency Manager
Grant writer(s)	☑	Parks Department – Staff Police – Staff Public Works Department – Staff Fire Medical Department – Staff Finance Department – Senior Accountant
Opportunities for Expansion/Improvement: Each of the City departments do a great job of advocating for community hazard awareness. This could be enhanced by finding opportunities for the Fire/Medical, Public Works and the Water Department to engage the community with via joint education opportunities. These may also be enhanced by programming community events solely focuses on hazard awareness.		

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Table 6-3-23: Fiscal capabilities for Surprise		
Financial Resources	**Accessible or Eligible to Use (Yes, No, Don't Know)**	**Comments**
Community Development Block Grants	Yes	A Five-year Consolidated Plan is prepared with the public adoption of an Annual Action Plan.
Capital Improvements Project funding	Yes	City General Fund CIP, Regional Transportation Plan; HURF funding; Grant Funding
Authority to levy taxes for specific purposes	Yes	City council
Fees for water, sewer, gas, or electric service	Yes	Solid Waste, Water, Sewer, and stormwater
Impact fees for homebuyers or new developments/homes	Yes	Impact fees for the costs associated with the development of applicable infrastructure.
Incur debt through general obligation bonds	Yes	Through bond elections regulated by the state
Incur debt through special tax bonds	Yes	Through elections initiated by the city or developers. Subject to review and approval by council.
Other	Yes	FEMA, NRCS, State Land, etc.

Opportunities for Expansion/Improvement:

The funding efforts associated with future mitigation efforts could be enhanced by the following:

1. Local, State and Federal grant pursuits.
2. Partnering with neighboring agencies on regional mitigation efforts.
3. Conducting pre-design studies to verify or identify cost-benefit ratios.
4. Ensuring the City Council and Finance Department fully understand the specifics of our hazard mitigation needs. This could be done with presentations, tours, report, etc.

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Table 6-1-24: Legal and regulatory capabilities for Tempe		
Regulatory Tools for Hazard Mitigation	**Description**	**Responsible Department/Agency**
CODES	• 2018 International Building code and International Fire Code	• Fire Department
ORDINANCES	• Weed Abatement Ordinance	• Public Works • Development Services
PLANS, MANUALS, and/or GUIDELINES	• Tempe Emergency Operations Plan Revised October 2019 • Capital Improvement Plan, 2020-21 • Economic Development Plan • Infrastructure Improvement Plan • Urban Forest Plan • Tempe Fire Medical Rescue Operational Guide 2020-21 • Long-Term Asset Management Plan	• Fire Department • Financial Services • Community Development • Public Works • Emergency Management
STUDIES	• Fire Medical Rescue Fire Station Location Study • Tempe Drainage Master Study • Floodplain Delineation Study	• Fire Department • Public Works • Development Services • Community Development
Opportunities for Expansion/Improvement: The City of Tempe's Capital Improvement Plan and Infrastructure Plan could be improved to address our heat mitigation needs. Whether that is developing structures to be used for cooling centers for our community members or structuring our bus stops using cooler materials and improving the number of shaded areas. As we educate our City departments on the importance of heat mitigation, we plan to collaborate with them in the development of future Capital Improvement Plans and Infrastructure Plans to ensure they include measures to reduce heat exposure and assist our low-income and vulnerable populations with heat relief.		

Table 6-2-24: Technical staff and personnel capabilities for Tempe		
Staff/Personnel Resources	☑	**Department/Agency - Position**
Planner(s) or engineer(s) with knowledge of land development and land management practices	☑	Public Works/Engineering, Planning
Engineer(s) or professional(s) trained in construction practices related to buildings and/or infrastructure	☑	Public Works/Engineering Community Development/Building Safety

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Table 6-2-24: Technical staff and personnel capabilities for Tempe		
Staff/Personnel Resources	☑	**Department/Agency - Position**
Planner(s) or engineer(s) with an understanding of natural and/or human-caused hazards	☑	Public Works/Engineering Public Works/Water Utilities Division
Floodplain Manager	☑	Public Works/Engineering
Surveyors	☑	Public Works/Engineering Public Works/Water Utilities Division
Staff with education or expertise to assess the community's vulnerability to hazards	☑	Fire Department, Police Department, Emergency Manager, Community Development, Public Works/Engineering, Streets Public Works/Water Utilities Division
Personnel skilled in GIS and/or HAZUS	☑	Public Works/Engineering, Field Operations, Information Technology Department, Fire Department, Police Department, Emergency Manager, public Works/Water Utilities Division
Scientists familiar with the hazards of the community		Fire Department Public Works/Water Utilities Division
Emergency manager	☑	City of Tempe
Grant writer(s)	☑	All City Departments

Opportunities for Expansion/Improvement:
Emergency Management and Human Services can work together to increase our heat messaging to our residents. We are currently working on the building of a Resiliency Hub that will be used by our vulnerable populations not only for heat relief, but education on heat mitigation, community resilience and an array of social service programs. As this Hub will become a trusted and safe environment for our residents, it will also become a place to educate our community members on emergency preparedness and mitigation efforts. As we have plans to develop more Hubs throughout our City, we will continue to increase our community resilience to heat and other hazards.

Table 6-3-24: Fiscal capabilities for Tempe		
Financial Resources	**Accessible or Eligible to Use (Yes, No, Don't Know)**	**Comments**
Community Development Block Grants	Yes	
Capital Improvements Project funding	Yes	
Authority to levy taxes for specific purposes	Yes	Authorized through City Vote
Fees for water, sewer, gas, or electric service	Yes	

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Impact fees for homebuyers or new developments/homes	Yes	
Incur debt through general obligation bonds	Yes	Authorized through City Vote
Incur debt through special tax bonds	Yes	

Opportunities for Expansion/Improvement:

The City of Tempe can further collaborate with Arizona State University (ASU) and apply for the HeatReady Cities Program. The HeatReady program is intended to serve as a resource for cities seeking to evaluate, showcase, and improve how they are managing and responding to extreme heat. It is a progressive certification program that is supported by the University's Healthy Urban Environments Initiative. We can also look for available grants from areas such as Climate Program Grants and Funding Opportunities through Oceanic and Atmospheric Research (OAR), National Oceanic and Atmospheric Administration (NOAA), and the Department of Commerce.

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Table 6-1-25: Legal and regulatory capabilities for Tolleson		
Regulatory Tools for Hazard Mitigation	**Description**	**Responsible Department/Agency**
CODES	• 2018 International Fire Code • 2018 National Fire Code & Standards • 2018 International Building Code • 2018 International Mechanical Code • 2018 International Electrical Code • 2018 National Electrical Code • Tolleson City Code • 2018 International Residential Code • 2018 International Plumbing Code • 2018 International Property Maintenance Code • 2018 International Fuel Gas Code	• Fire Department • Building Department • City Clerk's Office • Engineering Department
ORDINANCES	• 2211 N.S. Amending the Tolleson City Code Chapter 7 relating to fire codes • 2014 Tolleson City Ordinances • 2014 Dust and Airborne Particulate Control • 2014 Zoning Code • 2014 Storm Water Runoff Pollution/Prevention	• Fire Department • Building Department
PLANS, MANUALS, and/or GUIDELINES	• Fire Protection Handbook, 18th edition • ANSI/IIAR 2-1999, Equipment Design, and Installation of Ammonia Mechanical Refrigerating Systems • Fire Department Plan Review Guidelines as adopted by Ordinance 463 N.S. • 2014 Tolleson General Plan • 2018 City of Tolleson Codes	• Fire Department • Building Department • City Clerk's Office • City Council / Staff
STUDIES	•	• All City Departments

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Table 6-1-25: Legal and regulatory capabilities for Tolleson		
Regulatory Tools for Hazard Mitigation	**Description**	**Responsible Department/Agency**
Opportunities for Expansion/Improvement: The future update and adoption of City of Tolleson's General Plan can enhance the city's ability to provide effective mitigation through the formulation of zoning in undeveloped property and urban interface areas that incorporates hazard avoidance and reduction and mitigates the community's exposure to the impacts of future hazard events with development of those areas.		

Table 6-2-25: Technical staff and personnel capabilities for Tolleson		
Staff/Personnel Resources	☑	**Department/Agency - Position**
Planner(s) or engineer(s) with knowledge of land development and land management practices	☑	City Engineering
Engineer(s) or professional(s) trained in construction practices related to buildings and/or infrastructure	☑	Engineering, Building Departments
Planner(s) or engineer(s) with an understanding of natural and/or human-caused hazards	☑	Engineering, Fire Department, Police Department, Field Operations
Floodplain Manager	☑	City Engineering
Surveyors	☑	City Engineering
Staff with education or expertise to assess the community's vulnerability to hazards	☑	Street Department, Field Operations, City Engineering, Building Department, Fire Department
Personnel skilled in GIS and/or HAZUS	☑	I.T. Department
Scientists familiar with the hazards of the community		Police Department, Water Services, Fire Department
Emergency manager	☑	Fire Department
Grant writer(s)	☑	Each Individual City Department
Opportunities for Expansion/Improvement: The city's future ability to mitigate hazards can be enhanced through more communication and input to hazard mitigation planning by the Building and Field Operations Departments to leverage their expertise as subject matter experts in identifying hazard areas, shortfalls in the city's capabilities, and development of meaningful mitigation actions and projects. Future involvement of these departments would be implemented as a part of the Local Planning Team and participation would be welcomed during the annual plan review and 5-year updates.		

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Table 6-3-25: Fiscal capabilities for Tolleson		
Financial Resources	**Accessible or Eligible to Use (Yes, No, Don't Know)**	**Comments**
Community Development Block Grants	Yes	
Capital Improvements Project funding	Yes	
Authority to levy taxes for specific purposes	Yes	
Fees for water, sewer, gas, or electric service	Yes	
Impact fees for homebuyers or new developments/homes	Don't Know	
Incur debt through general obligation bonds	Yes	
Incur debt through special tax bonds	No	

Opportunities for Expansion/Improvement:

Funding for the city's future mitigation efforts can be enhanced through supplementing the City of Tolleson's General Funds with mitigation grant funds from federal, state, and local resources such as FEMA, FCDMC, AzDEMA, MCDEM, etc. The grant funds can be used to match with mitigation priorities planned into the city's capital improvements program and other city departmental public outreach budgets. The city will also continue the use of creative public and private sponsorships and partnerships (e.g. – IGA's, MOUs, etc.) that can also assist in funding future mitigation needs, actions and projects, and especially those that require a regional, multi-jurisdictional approach (area drainage master plans for example).

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Table 6-1-26: Legal and regulatory capabilities for Unincorporated Maricopa County		
Regulatory Tools for Hazard Mitigation	**Description**	**Responsible Department/Agency**
CODES	• 2012 International Building Code • 2012 National Electrical Code • 2012 International Mechanical Code • 2012 International Plumbing Code • 2012 International Residential Code • 2012 International Green Construction Code (optional) • 2012 International Energy Conservation Code (optional)	• Planning and Development
ORDINANCES	• Abatement Ordinance (P-11) • Adult Oriented Business (P-10) • Dark Sky Ordinance • Military Airport Zoning Ordinance (P-16) • Noise Ordinance (P-23) • Zoning Ordinance (P-18)	• Planning and Development
REGULATIONS	• Addressing Regulations • Drainage Regulations • Dust Abatement Regulations • Subdivision Regulations • HUD Consolidated Planning Regulations • Floodplain Regulations	• Planning and Development • Air Quality • Transportation • Community Development • Flood Control District
PLANS, MANUALS, and/or GUIDELINES	• Area Land Use Plan • Comprehensive Plan • Transportation Plan • Scenic Corridors • Comprehensive Planning Amendments Guidelines • Development Master Plan Guidelines • Area Drainage Master Plan • Watercourse Master Plan • Flood Response Plan/Emergency Actions Plan • Comprehensive Report & Program 2015	• Planning and Development • Transportation • Environmental Services • Flood Control District

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Table 6-1-26: Legal and regulatory capabilities for Unincorporated Maricopa County		
Regulatory Tools for Hazard Mitigation	**Description**	**Responsible Department/Agency**
STUDIES	• Flood Insurance Studies • Floodplain Delineation Studies • Dam Safety Studies • Area Drainage Master Studies • Corridor Studies • Emergency Routes/Mass Evacuation • Fissure / Subsidence Risk Studies • Air Quality Planning Area Maps	• Planning and Development • Environmental Services • Flood Control District • Transportation • Emergency Management • AZ Geological Survey • Air Quality
Opportunities for Expansion/Improvement: Building, planning and zoning codes could be improved to better accommodate flooding, extreme heat, and poor air quality. Additional measures for flooding, and other natural disasters can be implemented within the model codes to allow easier and standardized adoption to increase future mitigation efforts.		

Table 6-2-26: Technical staff and personnel capabilities for Unincorporated Maricopa County		
Staff/Personnel Resources	☑	**Department/Agency - Position**
Planner(s) or engineer(s) with knowledge of land development and land management practices	☑	Planning and Development – Planners Flood Control District – Engineers/Planners Transportation – Engineers/Planners Environmental Services – Inspectors
Engineer(s) or professional(s) trained in construction practices related to buildings and/or infrastructure	☑	Planning and Development – Planners Flood Control District – Engineers/Inspectors Transportation – Engineers/Surveyors Environmental Services – Inspectors Air Quality – Inspectors Facilities Management -Engineers/Inspectors
Planner(s) or engineer(s) with an understanding of natural and/or human-caused hazards	☑	Planning and Development – Planners Flood Control District - Engineers Transportation – Engineers/Planners Emergency Management - Planners
Floodplain Manager	☑	Flood Control District – Engineers
Surveyors	☑	Flood Control District – Surveyors Transportation – Surveyors

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Table 6-2-26: Technical staff and personnel capabilities for Unincorporated Maricopa County		
Staff/Personnel Resources	☑	**Department/Agency - Position**
Staff with education or expertise to assess the community's vulnerability to hazards	☑	Planning and Development – Planners Flood Control District - Engineers Transportation - Engineers Emergency Management – Planners Public Health - Planners
Personnel skilled in GIS and/or HAZUS	☑	Planning and Development – GIS Staff Flood Control District – GIS Staff Transportation – GIS Staff Emergency Management – GIS Staff Assessor's Office – GIS Staff Sheriff's Office – GIS Staff Elections – GIS Staff Environmental Services – GIS Staff Air Quality – GIS Staff Office of Enterprise Technology – GIS Staff
Scientists familiar with the hazards of the community	☑	Flood Control District – Hydrologist Flood Control District- Meteorologist Risk Management-Risk Control & Loss Prevention Specialist
Emergency manager	☑	Emergency Management - Director/Planners
Grant writer(s)	☑	Emergency Management – Administrative Manager Parks –Grant writer Sheriff's Office – Grant writer Community Development – Grant writer Human Services – Grant writer Transportation - Grant writer/Fed. Aid Coordinator Flood Control District – CIP Manager Air Quality – Grants Program Coordinator
Opportunities for Expansion/Improvement: Maricopa County Department of Emergency Management can conduct more classes and educate the public in hazard mitigation. They could talk about the main issues we regularly experience from flooding to severe wind to extreme heat. They can address the issues that people normally ignore as we do not see large amounts of rainfall in a sustained period. Wherever possible and appropriate county staff could implement programs that educate the community on creating defensible spaces to reduce the impact of uncontrolled wildland fire. County staff whereas appropriate could provide information to homeowners and local business on potential natural and human caused hazards.		

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Table 6-3-26: Fiscal capabilities for Unincorporated Maricopa County		
Financial Resources	**Accessible or Eligible to Use (Yes, No, Don't Know)**	**Comments**
Community Development Block Grants	Yes	A Five-year Consolidated Plan is prepared with the public adoption of an Annual Action Plan
Capital Improvements Project funding	Yes	• FCD's CIP • County General Fund CIP • Transportation Improvement Program • Regional Transportation Plan
Authority to levy taxes for specific purposes	Yes	Improvement District, Direct Assessment Special District
Fees for water, sewer, gas, or electric service	No	Solid Waste only: Transfer station and waste tire collection fees
Impact fees for homebuyers or new developments/homes	Yes	Limited Use
Incur debt through general obligation bonds	Yes	Lease Revenue Bonds
Incur debt through special tax bonds	Yes	
Other: Cooperative Agreement Grants and Specific Planning and Project Grants	Yes	FEMA, NRCS, USACE, State Land, etc.
Opportunities for Expansion/Improvement: Maricopa County can and will continue to regularly participate in grant programs and other programs to fund mitigation of its hazard liabilities and programs. The use of creative sponsorship and partnerships can also assist in mitigation funding for future increased mitigation needs. Maricopa County can consider expanding pursuit of FEMA mitigation grants through development of a programmed approach to identifying CIP and cost-beneficial projects three to four years in advance of the desired implementation, preparing appropriate grant application information and submitting for funding.		

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Table 6-1-27: Legal and regulatory capabilities for Wickenburg		
Regulatory Tools for Hazard Mitigation	**Description**	**Responsible Department/Agency**
CODES	• 2006 International Building Code • 2005 National Electrical Code • 2006 International Mechanical Code • 2006 International Plumbing Code • 2006 International Residential Code	• Community Development • Public Works
ORDINANCES	• Dark Sky Ordinance • Noise Ordinance (P-23) • Zoning Ordinance (P-18)	• Community Development • Public Works • Manager's Office
PLANS, MANUALS, and/or GUIDELINES	• Addressing Regulations • Drainage Regulations • Dust Abatement Regulations • Subdivision Regulations	• Community Development • Public Works • Manager's Office
STUDIES	• Area Land Use Plan • Flood Response Plan • Development Master Plan Guidelines • Area Drainage Master Plan • Watercourse Master Plan	• Community Development • Public Works
Opportunities for Expansion/Improvement: Wildland urban interface/firewise training and mitigation could be improved to better accommodate the extreme fire seasons and fire activity throughout the region. Additional planning and mitigation can also be done to accommodate future flooding events.		

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Table 6-2-27: Technical staff and personnel capabilities for Wickenburg		
Staff/Personnel Resources	☑	**Department/Agency - Position**
Planner(s) or engineer(s) with knowledge of land development and land management practices	☑	Planning and Development – Planners Public Works – Engineer
Engineer(s) or professional(s) trained in construction practices related to buildings and/or infrastructure		Contract
Planner(s) or engineer(s) with an understanding of natural and/or human-caused hazards	☑	Planning and Development - Planners Emergency Management - Planners
Floodplain Manager		Contract with Flood Control District – Engineers
Surveyors		Contract
Staff with education or expertise to assess the community's vulnerability to hazards	☑	Planning and Development - Planners Public Works – Staff Police Dept – Staff Fire Dept - Staff Emergency Management – Coordinator
Personnel skilled in GIS and/or HAZUS	☑	Planning and Development – GIS Staff
Scientists familiar with the hazards of the community		None
Emergency manager	☑	Emergency Management - Coordinator
Grant writer(s)	☑	Emergency Management - Coordinator Parks –Grant writer Police – Grant writer Public Works – Grant writer Fire Dept – Grant writer
Opportunities for Expansion/Improvement: Fire Services could establish programs to educate the community on creating defensible space. Planning and building inspectors can ensure that flooding concerns are part of their inspections as well as educating the public on defensible space during their interactions. Parks/Public Works/ Fire Departments could team up to identify high risk areas throughout the Town of Wickenburg and mitigate those risks as needed.		

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Table 6-3-27: Fiscal capabilities for Wickenburg		
Financial Resources	**Accessible or Eligible to Use (Yes, No, Don't Know)**	**Comments**
Community Development Block Grants	No	A Five-year Consolidated Plan is prepared with the public adoption of an Annual Action Plan
Capital Improvements Project funding	Yes	Town General Fund CIP Regional Transportation Plan
Authority to levy taxes for specific purposes	Yes	Town council
Fees for water, sewer, gas, or electric service	Yes	Solid Waste, Water, Sewer, Electric
Impact fees for homebuyers or new developments/homes	No	
Incur debt through general obligation bonds	Yes	Town council
Incur debt through special tax bonds	Yes	Town council
Other: Cooperative Agreement Grants and Specific Planning and Project Grants	Yes	FEMA, NRCS, State Land, BLM, ACF
Opportunities for Expansion/Improvement: The town can enhance mitigation capacity by pursuing additional grants that are available for flood mitigation and fuel mitigation. Also consider the use of CIP funds to fund mitigation efforts for all high risk hazards identified as needed.		

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Table 6-1-28: Legal and regulatory capabilities for Youngtown		
Regulatory Tools for Hazard Mitigation	**Description**	**Responsible Department/Agency**
CODES	• 2012 International Building Code • 2012 International Residential Code • 2012International Plumbing Code • 2012 International Mechanical Code • 2012 International Fire Code • 2012 International Existing Building Code • 2011 National Electric Code • Town Code of the Town of Youngtown • Adopted 2012 version of codes in January of 2014 • Town adopted various local zoning and building codes	• Building Safety Division • Code Compliance Division • Public Works Department
ORDINANCES	• 2008 Town of Youngtown Planning & Zoning Ordinance • Town of Youngtown Floodplain Ordinance • Various Town of Youngtown Weed & Debris Abatement ordinances • 2008 Town of Youngtown Subdivision Zoning Regulations • Debris Ordinances adopted	• Building Safety Division • Public Works Department • Town Clerk's Office
PLANS, MANUALS, and/or GUIDELINES	• 2025 General Plan and Comprehensive Plan adopted • 2014 Town of Youngtown Emergency Operations Plan (currently being updated) • Community Wildfire Protection Plan (Adopted by SCFD)	• Public Works Department • Public Safety Department • Fire Department (Town is a member of Sun City Fire District)
STUDIES	• 2013 Flood Insurance Studies • 2012 Floodplain Delineation Studies	• Public Works Department
Opportunities for Expansion/Improvement: The Town of Youngstown's building, planning, and zoning codes can potentially be improved to better accommodate flooding, extreme heat, and poor air quality. In the Town of Youngtown, as is the case currently throughout the Valley, the current cost of construction is high. Any additional regulations will need to be carefully studied to understand potential impacts to both the housing costs and impacts to low-income owners, renters and local business.		

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Table 6-2-28: Technical staff and personnel capabilities for Youngtown		
Staff/Personnel Resources	☑	**Department/Agency - Position**
Planner(s) or engineer(s) with knowledge of land development and land management practices	☑	Community Development - Manager
Engineer(s) or professional(s) trained in construction practices related to buildings and/or infrastructure	☑	Town Engineer and Building Inspector/Plans Reviewer, Community Development – Manager Public Works - Manage
Planner(s) or engineer(s) with an understanding of natural and/or human-caused hazards	☑	Community Development – Manager and Public Works – Manager
Floodplain Manager	☑	Town Engineer by Ordinance
Surveyors	☑	Town Engineer's Staff
Staff with education or expertise to assess the community's vulnerability to hazards	☑	Town Engineer; Public Works/Emergency Services Manager; Public Safety Manager; various Staff Members
Personnel skilled in GIS and/or HAZUS		
Scientists familiar with the hazards of the community		
Emergency Manager	☑	Public Works Manager/Emergency Services Manager; Public Safety/Manager
Grant writer(s)	☑	Town Engineer; Public Works Manager; Public Safety Manager, Town Manager; various Staff Members
Opportunities for Expansion/Improvement: Wherever possible and appropriate, Town staff and Town contracted services can implement programs that educate the community on appropriate flood mitigation. Town staff and Town contracted services whereas appropriate could provide information to homeowners and local business on potential natural and human caused hazards.		

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Table 6-3-28: Fiscal capabilities for Youngtown		
Financial Resources	**Accessible or Eligible to Use (Yes, No, Don't Know)**	**Comments**
Community Development Block Grants	Yes	Member of MCCD/CDAC Small Cities
Capital Improvements Project funding	Yes	Local Funds & MAG
Authority to levy taxes for specific purposes	Yes	
Fees for water, sewer, gas, or electric service	No	Utilities, including water/sewer owned by private providers
Impact fees for homebuyers or new developments/homes	**No**	.
Incur debt through general obligation bonds	Yes	Unlikely, since water/sewer not owned by town. Also, town does not have primary property tax.
Incur debt through special tax bonds	Yes	Unlikely, since water/sewer not owned by town. Also, town does not have primary property tax.
Opportunities for Expansion/Improvement: The Town of Youngtown working in conjunction with Maricopa County can consider expanding pursuit of FEMA mitigation grants through the development of a programmed approach to identify CIP and cost-beneficial projects two to three years in advance of the desired implementation, preparing appropriate grant application information and submit for funding.		

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6.2.2 Fort McDowell Yavapai Nation Pre- and Post-Disaster Hazard Management

In addition to Tables 6-1-7, 6-2-7 and 6-3-7, FMYN is required to summarize and evaluate pre- and post-disaster hazard management practices to satisfy the requirements at 44 CFR §201.7(c)(3)(iv). Accordingly, Table 6-4-1 summarizes hazard mitigation and pre- and post-disaster hazard management practices and roles that are currently accomplished through various FMYN departments and programs.

Table 6-4-1: Fort McDowell Yavapai Nation departments or entities with hazard mitigation responsibilities

Department or Agency	Hazard Mitigation Activities
Fire Department	Training first responders to Operational level. Review and update of emergency plans for facilities handling hazmat. Provided emergency response guidebooks to fire and law enforcement personnel. Follow MCDOT/ADOT guidelines. Responsible for wildfire mitigation other than weed abatement (e.g. – thinning/fuels reduction, creation of fire breaks, buffers, etc.)
Economic Development	Ensuring building codes are enforced. Performing assessments of infrastructure. Limiting development along river and in floodplains.
Environmental Dept.	Supervising abatement, prevention and investigations of public health nuisance conditions, illegal dumping activities and the storage and handling of potentially infections material.
Emergency Management	Coordinating involvement of industry, fire, law enforcement and other key players with the Tribal Emergency Response Committee (TERC). Providing WMD training for all employees. Supporting Urban Area Security Initiative. Promoting programs aimed at family preparedness. Responsible for review and maintenance of hazard mitigation plan.
Health Department	Coordinating training, planning, and communications to provide the community with information to combat the effects of infestations and diseases. Developing capabilities to respond to and support a chemical, biological or radiological events.
Public Works Dept.	Creating access, and mapping access to high-risk areas. Providing weed abatement services in high risk areas. Planning, design, construction and maintenance of drainage facilities.
FMYN Tribal Council	Ultimate authority for all FMYN hazard management and mitigation activities and funding.

As is summarized in Tables 6-1-7, 6-2-7 and 6-3-7 and 6-4-1, FMYN has many good programs, policies and regulations in-place to provide for effective hazard mitigation. An evaluation of the capabilities listed in these tables was performed by the FMYN LPT and the following mitigation related gaps and opportunities were identified:

- A need for increased understanding of available mitigation grant programs.
- Building and fire codes are slightly outdated and should be evaluated for the need to update to current consensus.
- Identified a need for better floodplain and wildfire hazard mapping across the Nation, and especially in the upland areas that are not part of the Verde River floodplain.

Upon receipt of a presidential disaster declaration, the Nation will work with FEMA to develop two post-disaster hazard management tools as follows:

- Public Assistance Administration Plan
- Hazard Mitigation Grant Program Administration Plan.

Both plans will be used by the Nation to identify the roles and responsibilities of the Nation in administering the FEMA Public Assistance (PA) and Hazard Mitigation Grant Programs (HMGP), and to outline staffing requirements and the policies and procedures to be used. A result of developing these plans will be to further focus Nation resources on the importance of hazard management and mitigation planning.

6.2.3 Salt River Pima Maricopa Indian Community Pre- and Post-Disaster Hazard Management

SRPMIC is also required to summarize and evaluate pre- and post-disaster hazard management practices to satisfy the requirements at 44 CFR §201.7(c)(3)(iv). Tables 6-1-20, 6-2-20, and 6-3-20 above, and Table 6-4-2 below summarize the SRPMIC hazard mitigation and pre- and post-disaster hazard management practices and roles that are currently accomplished through various SRPMIC departments and programs.

Table 6-4-2: Salt River Pima Maricopa Indian Community departments or entities with hazard mitigation responsibilities

Department or Agency	Hazard Mitigation Activities
Community Development	• Develop and maintain General Plan • Regulate land use • Responsibility for development or revisions to codes and ordinances
Fire	• Emergency management responsibility • Maintenance of the hazard mitigation plan • Ensuring the completion of mitigation projects • Mitigation grant liaison
Engineering Construction Services	• Responsible for construction of mitigation projects • Identification of future mitigation projects
Administration, Legal, and Finance	• Approve grant applications • Maintains CIP for mitigation projects • Identifies funding sources for mitigation projects • Process the approval of mitigation Plan through council • Manage mitigation grants once awarded.
Tribal Council	• Promulgation authority for mitigation plan • Approval of funding/budget for mitigation projects
Environmental Protection and Natural Resources	• Ensures protection of cultural, sacred and natural resources
Transportation	• Maintenance of transportation related critical facilities
Public Works	• Maintain and protect the critical infrastructure

Since the 2015 Plan, SRPMIC has continued to support and fund a full time Emergency Manager position. The support of this position has allowed SRPMIC to significantly enhance its Emergency Management Program as a whole, including the

area of mitigation. Training of staff, plans updated and developed, improved internal and regional coordination in emergency management are just some of the examples of significant enhancements to the program. Policies towards building within known hazard prone areas has adhered to strict guidelines that have been in place since before the 2015 Plan and have not changed for the Community. The General Development Plan, codes and ordinances remain in place to prevent development in hazard prone areas.

As is summarized in Tables 6-1-20, 6-2-20, 6-3-20, 6-4-2, SRPMIC has many good programs, policies, and regulations in-place to provide for effective hazard mitigation. An evaluation of the capabilities listed in those tables was performed by the SRPMIC LPT and the following mitigation related gaps and opportunities were identified:

- A need for increased understanding of available mitigation grant programs.
- Building codes are slightly outdated and should be updated soon.
- A distinct absence of flooding related considerations in the current general plan.
- An identified need for better floodplain and wildfire hazard mapping across the Community, and especially in the upland areas that are not part of the Verde and Salt River floodplains.

Upon receipt of a presidential disaster declaration, SRPMIC will work with FEMA to develop two post-disaster hazard management tools as follows:

- Public Assistance Administration Plan
- Hazard Mitigation Grant Program Administration Plan.

Both plans will be used by SRPMIC to identify the roles and responsibilities of the SRPMIC in administering the FEMA Public Assistance (PA) and Hazard Mitigation Grant Programs (HMGP), and to outline staffing requirements and the policies and procedures to be used. A result of developing these plans will be to further focus SRPMIC resources on the importance of hazard management and mitigation planning.

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6.2.4 National Flood Insurance Program Participation

Participation in the NFIP is a key element of any community's local floodplain management and flood mitigation strategy. Maricopa County and all 24 incorporated jurisdictions participate in the NFIP at varying levels. The Fort McDowell Yavapai Nation and Salt River Pima-Maricopa Indian Community do not currently 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. Maricopa County and some other communities, have adopted standards that are more stringent than the federal minimum to ensure better flood mitigation practices. As a participant in the NFIP, communities also benefit from having Flood Insurance Rate Maps (FIRM) that map identified flood hazard areas and can be used to assess flood hazard risk, regulate construction practices and set flood insurance rates. FIRMs are also an important source of information to educate residents, government officials and the private sector about the likelihood of flooding in their community. Table 6-4 summarizes the NFIP status and statistics for each of the jurisdictions participating in this Plan.

Table 6-5: NFIP status and statistics for Maricopa County and participating jurisdictions

Jurisdiction	Community ID	NFIP Entry Date	Current Effective Map Date	Number of Policies	Amount of Coverage (x $1,000)	Floodplain Management Role
Maricopa County (via FCDMC)	040037	7/2/1979	9/18/2020	2,658	$698,945	Provides floodplain management for the Unincorporated County and the City/Towns noted below
Avondale	040038	6/15/1979	9/18/2020	40	$11,988	Provides in-house floodplain management
Buckeye	040039	2/15/1980	9/18/2020	73	$20,790	Floodplain management provided by the Flood Control District of Maricopa County
Carefree	040126	7/2/1979	10/16/2013	34	$11,050	Floodplain management provided by the Flood Control District of Maricopa County
Cave Creek	040129	6/9/1988	10/16/2013	36	$10,838	Floodplain management provided by the Flood Control District of Maricopa County

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Table 6-5: NFIP status and statistics for Maricopa County and participating jurisdictions

Jurisdiction	Community ID	NFIP Entry Date	Current Effective Map Date	Number of Policies	Amount of Coverage (x $1,000)	Floodplain Management Role
Chandler	040040	7/16/1980	11/4/2015	290	$90,236	Floodplain management provided by the Flood Control District of Maricopa County
El Mirage	040041	12/1/1978	9/18/2020	10	$2,915	Floodplain management provided by the Flood Control District of Maricopa County
Fountain Hills	040135	2/10/1994	10/16/2013	34	$8,620	Provides in-house floodplain management
Gila Bend	040043	12/4/1979	11/4/2015	11	$2,391	Floodplain management provided by the Flood Control District of Maricopa County
Gilbert	040044	1/16/1980	11/4/2015	399	$131,176	Provides in-house floodplain management
Glendale	040045	4/16/1979	9/18/2020	185	$58,036	Provides in-house floodplain management
Goodyear	040046	7/16/1979	9/18/2020	179	$51,443	Provides in-house floodplain management
Guadalupe	040111	4/1/1994	9/18/2020	5	$758	Floodplain management provided by the Flood Control District of Maricopa County
Litchfield Park	040128	8/19/1988	9/18/2020	10	$2,222	Floodplain management provided by the Flood Control District of Maricopa County
Mesa	040048	5/15/1980	9/18/2020	381	$111,625	Floodplain management provided by the Flood Control District of Maricopa County
Paradise Valley	040049	5/1/1980	9/18/2020	174	$58,901	Provides in-house floodplain management
Peoria	040050	11/17/1978	9/18/2020	259	$84,185	Provides in-house floodplain management
Phoenix	040051	12/4/1979	9/18/2020	4,521	$1,212,020	Provides in-house floodplain management
Queen Creek	040132	7/22/1992	10/16/2013	44	$14,050	Floodplain management provided by the Flood Control District of Maricopa County
Scottsdale	045012	9/21/1973	9/18/2020	6,027	$1,710,712	Provides in-house floodplain management

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Table 6-5: NFIP status and statistics for Maricopa County and participating jurisdictions

Jurisdiction	Community ID	NFIP Entry Date	Current Effective Map Date	Number of Policies	Amount of Coverage (x $1,000)	Floodplain Management Role
Surprise	040053	12/15/1978	11/04/2015	211	$62,728	Floodplain management provided by the Flood Control District of Maricopa County
Tempe	040054	8/15/1980	9/18/2020	171	$55,436	Provides in-house floodplain management
Tolleson	040055	1/16/1980	9/18/2020	33	$9,573	Floodplain management provided by the Flood Control District of Maricopa County
Wickenburg	040056	1/5/1978	9/18/2020	41	$9,047	Floodplain management provided by the Flood Control District of Maricopa County
Youngtown	040057	11/15/1978	9/18/2020	3	$658	Floodplain management provided by the Flood Control District of Maricopa County
Fort McDowell Yavapai Nation			Not a participant in the NFIP			
Salt River Pima-Maricopa Indian Community			Not a participant in the NFIP			

Source: Policy & NFIP Statistics - https://nfipservices.floodsmart.gov//reports-flood-insurance-data (Accessed: 10/11/2020)

Each of the participating jurisdictions performed an overall assessment of their participation in the NFIP program by responding to the following questions:

Question 1: Describe your jurisdiction's current floodplain management / regulation process for construction of new or substantially improved development within your jurisdiction.

Question 2: Describe the status and/or validity of the current floodplain hazard mapping for your jurisdiction.

Question 3: Describe any community assistance activities (e.g. – help with obtaining Elevation Certificates, flood hazard identification assistance, flood insurance acquisition guidance, public involvement activities, etc.)

Question 4: Describe identified needs in your floodplain management program. This could include things like updating the floodplain management code/regulation, establishing written review procedures, modifying or adding flood hazard area mapping, etc.

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Responses were provided by all jurisdictions regardless of their participation status in the NFIP program. Table 6-6 summarizes the responses provided by each of the currently participating jurisdictions.

Table 6-6: NFIP program assessment for Maricopa County and participating jurisdictions		
Participating Jurisdiction	**Responses to Questions 1-4**	
Avondale	Q1	Our City Engineer is a certified floodplain manager. As the floodplain manager he works with floodplain zones, answers resident and business owner's questions, assists realtors, and maintains documentation for future reference. Any construction that takes place involving a permit is evaluated and tracked in regard to location of floodplains to proposed construction area. This data is maintained electronically in the Engineering Department. City Engineer/Floodplain Manager also participate in audits of the program as requested.
	Q2	Floodplain maps and DFIRMS for the city were recently updated as a part of the overall county update.
	Q3	The Engineering department assists residents and businesses with questions they may have in regard to property contained within the floodplain. In some instances when FIRM maps are not accurate, Engineering Department assists property owner with an appeal to have a re-determination done to re-evaluate the property. In some instances physical map revisions are made in coordination with Flood Control District of Maricopa County and FEMA.
	Q4	Having more floodplain information including mapping available on the website.

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Buckeye	Q1	The following procedures are used in coordination with the Flood Control District of Maricopa County for structures that require Floodplain Use Permits as well as City of Buckeye (COB) Building Permits. 1) The applicant applies for a building permit. City's Floodplain Administrator or his/her designee checks FIRM Map to determine if property is within a 100-year Floodplain. 2) Property is in a 100-year Floodplain. a) Buckeye staff informs applicant property is in a floodplain and requires a Floodplain Use Permit from the Flood Control District of Maricopa County (FCDMC). b) (Buckeye staff will proceed with normal requirements to obtain a building permit.) c) Buckeye staff instructs Applicant to set up an appointment with the FCDMC. Applicant is instructed to take Buckeye Building Permit to FCDMC and obtain a Floodplain Use Permit. d) Applicant returns to the COB with approved Floodplain Use Permit with stipulations for Building Permit. Floodplain Use Permit shall be attached to the Building Permit and paper work for inspectors. Place in COB Project File: • Application Form • Stipulations – states floodplain requirements, e.g., lowest floor elevation, elevation certificate form completed by the Applicant's Arizona Registered Professional Engineer (P.E.) or Surveyor (R.L.S.), etc. • Disclaimer Form • Copy of Elevation Certificate with owner's name, property address, base flood elevation and FIRM map information for Engineer or Surveyor to complete. 3) COB staff issues Building Permit and appoints an inspector to insure NFIP compliance. 4) Applicant hires surveyor to place "temporary bench mark" for builder to know where to set lowest floor above grade. 5) The applicant applies for a building permit. City's Floodplain Administrator or his/her designee checks FIRM Map to determine if property is within a 100-year Floodplain. 6) Applicant's Surveyor completes "Under Construction" FEMA Elevation Certification and faxes to the FCDMC. The FCDMC will fax a copy of the Elevation Certificate to COB stating it is okay to pass stem. Applicant calls COB for stem inspection. Before the stem inspection can be given a pass, the

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Table 6-6: NFIP program assessment for Maricopa County and participating jurisdictions		
Participating Jurisdiction	**Responses to Questions 1-4**	
		FCDMC must have a copy of the Elevation Certificate completed by the Applicant's P.E. or R.L.S to determine that the elevation requirements are being met. (COB inspector must fail the stem inspection if the certificate has not been completed.) 7) Applicant calls COB for final inspection. Before the final inspection can be given a pass, the Applicant's P.E. or R.L.S. must complete FEMA Elevation Certificate for "Finished Construction". 8) COB Inspector assigned to assure NFIP compliance will: i) Prior to construction activity beginning, notify the FCDMC that construction will begin within the regulatory floodplain. ii) Complete the Floodplain Management Field Inspection Checklist to assure all work has been done in compliance with NFIP and county regulations. iii) Assure that the FEMA Elevation Certificate is completed and has been approved by the COB Inspector. iv) Assure that the permit file has copies of all appropriate forms required. (1) FEMA Elevation Certificate – fully completed. (2) Final Inspection/Compliance Checklist. (3) Variance information, if any. (4) Flood proofing, if any. (5) Substantial Improvement Calculations, if any. (6) Floodway Encroachment "No Rise" analysis, if any (7) NFIP Compliance Field Inspector's Checklist. 9) COB issues a Certificate of Occupancy to applicant and mails a copy of the Building Permit, finished construction Elevation Certificate and the Certificate of Occupancy to the FCDMC. NOTE: FCDMC Inspectors will visit construction sites at their discretion per Arizona Senate Bill 1598.
	Q2	The countywide update of FEMA mapped floodplains in 2013 encompasses the jurisdictional limits of the City of Buckeye. An additional study has also been completed for the Gila River floodplain that has not yet been submitted to FEMA for consideration.

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Table 6-6: NFIP program assessment for Maricopa County and participating jurisdictions		
Participating Jurisdiction	**Responses to Questions 1-4**	
	Q3	The City of Buckeye is not currently providing additional formal community assistance activities, but rather relies on the FCDMC for these items.
	Q4	With current staffing levels there are not additional items planned for the program. Procedures were developed in 2014 for the following potential floodplain use permit related development scenarios: • Substantial Damage and substantial improvements • Commercial, Industrial and School development • Residential Structures • Residential Subdivisions • Other man-made development • Variance requests
Carefree	Q1	The Town of Carefree is in full compliance and is in good standing with the National Flood Insurance Program (NFIP). In accordance with this program, all new development and substantial improvement to existing structures are reviewed for compliance with federal, state, county, and town drainage and flood control regulations and guidelines. This includes checking for a development's encroachment into any Federal Emergency Management Agency (FEMA) designated Special Flood Hazard Area (SFHA). In order to streamline this assessment, the town requires a Flood Insurance Rate Map (FIRM) Information Block on all plans. This information block identifies critical flood zone information for the property, including the FIRM Panel number, FIRM Panel date, flood zone designation(s) that apply to the property, and base flood elevation (BFE), if applicable. Any new development or substantial improvement to an existing structure that is identified as being fully or partially within a SFHA is routed to the Flood Control District of Maricopa County (FCDMC) for Floodplain Use Permit review. The FCDMC provides floodplain management for the town and the town has adopted the county's Floodplain Regulations by Ordinance. The FCDMC's Floodplain Use Permit review assures compliance with all applicable floodplain regulations within the Town of Carefree.

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Table 6-6: NFIP program assessment for Maricopa County and participating jurisdictions		
Participating Jurisdiction	**Responses to Questions 1-4**	
	Q2	The FIRM's for Maricopa County (county-wide maps) were recently updated and reissued on October 16, 2013. These revised maps have been adopted by the Town of Carefree via the town's Floodplain Management Ordinance (Ordinance No. 2007-03). The revised maps include the best available technical information for all SFHA's and include newly identified SFHA's within the eastern portion of the town.
	Q3	The town responds to all drainage and flood control inquiries at the appropriate level. The Town Administrator, Town Engineer, and Town Planner all provide assistance to citizens in obtaining this input and guidance. Where needed, the Town Engineer and Town Planner perform site visits to assist citizens in flood hazard identification and drainage issue mitigation. Citizens are also directed, as appropriate, to other resources, such as the FCDMC, for flood zone determinations, flood insurance assistance, and Elevation Certificate guidance.
	Q4	All of the Town of Carefree's floodplain management tools and regulations are working well. Because of limited funding sources (the town has no property tax), resources are limited as far as identifying and implementing drainage and flood control projects. The following are some investigations that would be helpful to the Town in identifying needs and unmet funding requirements: • Emergency access planning and improvement study. • Detailed local area master drainage plans.
Cave Creek	Q1	Currently, the Town of Cave Creek defers to the Flood Control District of Maricopa County as part of the review and approval of any permit which may impact an existing / recognized floodplain and or floodway.
	Q2	The Town of Cave Creek receives its mapping data from Maricopa County.
	Q3	The Town of Cave Creek directs questions and concerns related to floodway / floodplain to the appropriate agency. The Town of Cave Creek actively communicates with the Flood Control District of Maricopa County Inspector.
	Q4	None

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Table 6-6: NFIP program assessment for Maricopa County and participating jurisdictions		
Participating Jurisdiction	**Responses to Questions 1-4**	
Chandler	Q1	Our floodplain management is provided by the Flood Control District of Maricopa County. They are responsible to identity areas susceptible to 100-year flooding, review permit applications for proposed uses within the floodplain, identify floodplain violations, and protect the natural and beneficial function of the floodplain. The District is required by law to take all reasonable action to inform county residents and property owners of the location of flood hazard areas. The city participates in the National Flood Insurance Program (NFIP) and has adopted floodplain management regulations consistent with federal criteria. City Code Section 43-5 states the statutory authority (vested in the Flood Control District) and duties and responsibilities of the Floodplain Administrator (City Engineer). These duties include ensuring all construction permit requests within floodplains are promptly forwarded to the Flood Control District and that no permits are issued by any agent of the city until a valid floodplain use permit is obtained by the applicant
	Q2	Updated Countywide Federal Insurance Rate Map (FIRM) Panels became effective on October 16, 2013. Currently, these maps, in addition to Letters of Map Change (LOMC) may be used to determine if a particular piece of property is located in a 100-year floodplain. A new FIRM update is underway and tentatively planned to be effective August 2016. The purpose of this map revision is to incorporate several large floodplain delineation studies onto the FIRMs that were too large to be incorporated under FEMA's traditional Letter of Map Revision (LOMR) process. In addition to incorporating these larger studies, the FIRM panels included in the revision will be updated for local LOMRs, updated community limits, and in certain locations, the FIRM panels will have new identification numbers and be printed at a closer scale.
	Q3	Guidance is always provided to customer inquiries. The Flood Control District of Maricopa County website is the primary resource for customer assistance including links and instructions pertaining to Elevations Certificates, when and how to obtain flood insurance, map applications to view current and pending 100-Year effective floodplains, general questions and answers and contact information.
	Q4	Currently our floodplain management code is up-to-date. The city promptly adopts updates to FIRM's ensuring compliance with the NFIP.

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Table 6-6: NFIP program assessment for Maricopa County and participating jurisdictions		
Participating Jurisdiction	**Responses to Questions 1-4**	
El Mirage	Q1	The City Engineer/Floodplain Administrator reviews development permits to ensure they are complete, accurate and all other necessary permits are in place. A floodplain use permit is required before construction or development begins within any area of special flood hazard.
	Q2	The Floodplain Administrator ensures that any development that changes the water course within the floodplain is communicated to Flood Control District of Maricopa County, to ensure available information is accurate and current. The Administrator participates in the CLOMR/LOMR process is followed.
	Q3	The Floodplain administrator maintains records of flood proofing and elevation certificates for public review. Flood hazard identification is included in the development review process.
	Q4	The floodplain management program needs to establish public involvement activities.
Fort McDowell Yavapai Nation	Q1	New development and construction as well as substantial improvement of existing structures and facilities within the exterior boundaries of the Fort McDowell Yavapai Nation are required to obtain a permit from the Community Economic Development Division. The permitting process includes a review of the location and proximity to the existing floodplain.
	Q2	The Community Economic Development Division functions of the Land Use and License Manager and Planning Project Manager utilize GIS software applications to map floodplain areas with data acquired through Maricopa County.
	Q3	There is not currently any community assistance activities for flood insurance.
	Q4	The Nation needs to establish written procedures to review and update the floodplain management functions.

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Table 6-6: NFIP program assessment for Maricopa County and participating jurisdictions		
Participating Jurisdiction	**Responses to Questions 1-4**	
Fountain Hills	Q1	The town's floodplain regulations are contained in Town Code Chapter 14 "Flood Damage Prevention", which is from ADWR's Model Ordinance. Nearly all of the town's regulatory floodplain areas are contained within town-owned properties, and/or are within a platted (or granted) Drainage Easement on other properties. Town-owned washes are further restricted against development, transfer, or alienation by the "Watercourse Preservation and Habitat Ordinance" (Town Code Article 9-3). The town has an extensive vegetation maintenance/control program, and annually allocates funds to remove non-native, invasive, and channel-obstructing vegetation in its "Wash Management Program" from selected watercourses and other town-owned property. Regulatory floodplains are mapped on the town's GIS system. Private development reviews verify that no infringement occurs within the floodplain (or that infringement is appropriately mitigated within that project).
	Q2	Floodplain/floodway areas have been mapped, with those areas shown on Maricopa County's FIRM maps. The FIRM was approved by FEMA in 2011.
	Q3	The town provides community assistance on an as-needed basis.
	Q4	Remapping of the Ashbrook Wash floodplain (East Town boundary to Golden Eagle Park Dam) was needed, due to past safety modifications to the Golden Eagle Park Dam, upstream development, and the upcoming enlarged culvert construction at Saguaro Blvd. and at Bayfield Drive. A joint project of the Flood Control District and the Town to remap this segment of the Ashbrook Wash floodplain was completed in 2018.
Gila Bend	Q1	In the Town of Gila Bend a development permit shall be obtained before construction or development begins within any area of special flood hazard established in § 153.07 of the Town Code. Certification by a registered professional engineer or architect that the flood proofing methods, elevation of the lowest floor (relations to Mean Sea Level), and description as to what extent any watercourse will be altered or relocated as a result of the development and its impact to the adjacent areas. The town engineer reviews all drainage, earth movement (larger than 1 acre), and construction of utilities and roadways for compliance with all town, state, county, and federal regulations. The Town Manager has authority to approve or deny any permit.

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Table 6-6: NFIP program assessment for Maricopa County and participating jurisdictions		
Participating Jurisdiction	**Responses to Questions 1-4**	
	Q2	The Town and Maricopa County have partnered to review the flood water impacts to the town residents. Flood Control District of Maricopa County has presented the town with alternatives for the current flooding issues. It is believed that the study has been reviewed by staff and the costs associated with the plan have prevented implementation.
	Q3	The town received Assistance from Flood Control District of Maricopa County identifying floodplain limits and areas of significant impact.
	Q4	The Town of Gila Bend needs assistance with the following: • Ground control so as to locate the limits of the floodplain in prone areas. Assistance with aerial mapping to correspond with GIS information for each affected parcel within the town. • Revision of the Town's Code for floodplain management along with revised maps. • Finding sources to assist with financing any proposed projects within the scope provided by Flood Control District of Maricopa County. • Installation of recommended control devices to reduce flooding.
Gilbert	Q1	The Town of Gilbert participates in the National Flood Insurance Program (NFIP) through the Department of Homeland Security's Federal Emergency Management Agency (FEMA). As a participant of the NFIP, the town adopted Floodplain Management Ordinance 2454 and has established development requirements within the Land Development & Municipal Codes for projects within the Special Flood Hazard Areas (SFHA). These requirements protect and regulate new or substantially improved development within flood prone areas in the town.
	Q2	The current floodplain hazard maps (Flood Insurance Rate Maps) went into effect on October 16, 2013 – and will remain in effect until the latest "preliminary FIRM maps" are approved as the new effective maps by FEMA. These preliminary maps, which were released for public comment in September 2014, are based on the results of the *Chandler / Gilbert Floodplain Delineation Study*.

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Table 6-6: NFIP program assessment for Maricopa County and participating jurisdictions		
Participating Jurisdiction	**Responses to Questions 1-4**	
	Q3	We are presently working with the Flood Control District of Maricopa County to determine how we can partner to provide Elevation Certificates for properties that will be in the 100-year flood zone as a result of the latest preliminary FIRM mapping. We are also developing a strategy and timeline to notify property owners affected by the latest preliminary FIRM mapping (i.e., properties that are being added to the 100-year floodplain, and properties that will no longer be in the 100-year floodplain).
	Q4	About 18 months ago, the town substantially improved our floodplain management program by developing web tools that can be used to quickly find Elevation Certificates and LOMR's affecting properties within Gilbert. Going forward, we would like to strengthen and improve our scores in the Community Rating System (presently we are rated "8" – and would like to bring this number down to "6" or perhaps "5"). This is an on-going process, and we will continue to annually look at opportunities to improve this score.
Glendale	Q1	We are currently a Class 7 NFIP CRS community. New and substantially improved developments within the City of Glendale are reviewed by Engineering and Building Safety for conformance with the 2015 Engineering Design and Construction Standards, Chapter 17 Floodplain Management of the Glendale Code of Ordinances and the 2018 International Building, Residential, Mechanical, Plumbing and Fuel Codes. When a development is submitted through the Electronic Plan Review to Development Services staff, and all or some portion of the property is located in the SFHA, it is tagged in our tracking system (Hansen). Once a development is tagged, the application is sent to both Engineering and Building for review. This lets staff know that the development must comply with Glendale's ordinances as they relate to NFIP.

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Table 6-6: NFIP program assessment for Maricopa County and participating jurisdictions		
Participating Jurisdiction	**Responses to Questions 1-4**	
	Q2	We currently use the September 18, 2020 FIS and FIRM's and DFIRM's in the review process of applicable developments with all or some portion of the property that is in the SFHA and to make Flood Zone Determinations, when requested. All CLOMR's / LOMR's etc. are kept on file in Engineering for community use in addition to the availability of the current FIS, FIRM's and access to DFIRM's on FEMA's website. We have ensured that when improvements are made that impact the floodplain that LOMR's are processed with FEMA and the FIRM is updated to reflect the improvements. Accordingly, we feel the floodplains as they are mapped on the current FIRM are accurate and valid.
	Q3	We require Elevation Certificate's on developments with all or some portion of the property in the SFHA. Staff provides Flood Hazard Determinations upon request. Information is provided to residents regarding flood determination articles in The Connection, information on flood insurance and residential drainage solutions as part of Glendale's CRS program and public involvement activities as part of Glendale's Hazard Mitigation Plan.
	Q4	During the 2020 Community Assistance Contact (CAC) conference call, staff at Arizona Department of Water Resources (ADWR) discussed the City's floodplain management program, including the City's floodplain ordinance. In conjunction with ADWR, the City's ordinance will be revised and adopted.
Goodyear	Q1	New or substantially improved development within the City of Goodyear is reviewed for conformance to the Engineering Design Standards and the Flood Damage Prevention Ordinance. While the City of Goodyear is responsible for floodplain administration within its jurisdiction, Engineering will obtain general floodplain information and guidance from the Flood Control District of Maricopa County whenever necessary in order to properly regulate construction within the city.
	Q2	Floodplain hazard mapping is current through the most recent FIRMs that have been made available from FEMA. The maps are available on the city's internal website for use by city staff for reviewing new proposed construction and providing floodplain determinations to the public upon request.

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Table 6-6: NFIP program assessment for Maricopa County and participating jurisdictions		
Participating Jurisdiction	**Responses to Questions 1-4**	
	Q3	The city's Engineering Department is responsible for maintaining documentation of elevation certificates, providing floodplain determinations, and providing assistance and answering questions from property owners who are impacted by proposed modifications to the special flood hazard zones. They also provide general information regarding flood insurance acquisition.
	Q4	The city will review and establish updated written review procedures for new construction and update the floodplain management code/regulations based on information that is received from ADEQ.
Guadalupe	Q1	Floodplain management provided by the Flood Control District of Maricopa County. New construction and redevelopment is managed through a building permit and plan review process by contracted engineering firm. All building permits follow currently adopted codes.
	Q2	Floodplain mapping is current and valid.
	Q3	No current community floodplain assistance activities.
	Q4	Continue annual review of floodplain management and mapping in conjunction with Flood Control District of Maricopa County.
Litchfield Park	Q1	We follow the floodplain maps provided by the Flood Control District of Maricopa County. Our floodplain maps were updated in 2013. All construction plans and property improvements, within our jurisdiction, are subjected to the city review and approval process which includes Engineering reviews and Building Plan Department review to ensure compliance with said floodplain and other ordinances as required by City of Litchfield Park municipal code.
	Q2	The Flood Control District of Maricopa County provides updates: as those are provided, City Engineers and other required personnel review updates and make revisions or addendums as necessary to city processes and procedures. New dry wells and drainage plans have continued to alleviate ponding and street flooding issues and new plan reviews take such drainage into consideration.
	Q3	The City Engineer provides input for plans review and existing property owners are referred to the Flood Control District of Maricopa County if assistance with flood insurance is required. If a proposed development falls within a floodplain the city will require the developer to apply for and receive a floodplain use permit from the Flood Control District of Maricopa County.

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Table 6-6: NFIP program assessment for Maricopa County and participating jurisdictions		
Participating Jurisdiction	**Responses to Questions 1-4**	
	Q4	Only a small portion of the city falls into an identified flood hazard zone. Our floodplain administrator is the Maricopa County Floodplain Administrators. We do not believe we need any more assistance than we are already receiving.
Mesa	Q1	The City of Mesa is a participating community under the National Flood Insurance Program (NFIP) administered through FEMA. In accordance with the Arizona revised statutes 48-3610, the Flood Control District of Maricopa County is responsible for administration of the NFIP in the City of Mesa. A process is put in place for regulation/floodplain management of new construction of substantially improved development as follows: 1. The building process does not allow accepting a building permit within a Special Flood Hazard Area without an approved floodplain use permit from the FCDMC. Mesa has automated this process to flag any and all properties partially or fully located within an SFHA. 2. All new/proposed subdivisions, construction, and improved development are immediately directed to the Flood Control District of Maricopa County for review of the plans and improvements within the SFHA. City Planning Division sends all subdivision review cases to the FCDMC for Flood Zone determinations. Not until a floodplain use permit is allocated by the FCDMC will the building permit process move forward. 3. Plan Reviews include the City Floodplain Manager to review all subdivisions, commercial developments, land splits, rezoning and Design Review Board cases. 4. Mesa regularly trains staff that handle permits on flood zone requirements. 5. The City of Mesa utilizes the FCDMC "Floodplain Regulations for Maricopa County", amended January 17, 2018, which defines the rules for usage, development restrictions and permitting requirements necessary to protect the environmental and flood control qualities of floodplains.
	Q2	The City of Mesa holds all development to the Arizona revised statutes for mapping floodplains within new development. We also work regularly with the FCDMC to identify studies of areas within the City of Mesa that may require analysis and delineation of areas that aren't otherwise mapped in the floodplain.

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Table 6-6: NFIP program assessment for Maricopa County and participating jurisdictions		
Participating Jurisdiction	**Responses to Questions 1-4**	
	Q3	The City of Mesa is a "county dependent" municipality and defers to the FCDMC regarding floodplains, designation, and regulatory floodplain elevations and performance of any inspections relating to the Elevation Certificate or the Floodplain Use Permit.
	Q4	Mesa regularly revisits our floodplain ordinance document with ADWR and works closely with the FCDMC on floodplain regulatory matters/management. If anything, more regular trainings would be beneficial for city staff.
Paradise Valley	Q1	Paradise Valley is no longer participating in the Plan
	Q2	
	Q3	
	Q4	
Peoria	Q1	As property proceeds thru the development process an early step to the review is to apply the floodplain ordinance. This activity is performed by a representative to the Floodplain Administrator reporting directly to the Floodplain Administrator. Special Flood Hazard Properties are "tagged" in our GIS system to identify an added review and approval required by the Floodplain Administrator.
	Q2	Acknowledge DFIRM's effective date October 16, 2013 which covers the whole city limits, and maintains all subsequent LOMC's in-house. Flood Control District of Maricopa County hosts updated and currently effective flood mapping including our community's subsequent LOMC's on their public GIS site.
	Q3	Peoria is presently performing in accordance with a Corrective Action Plan as a result of the latest Community Assistance Visit. The Corrective Action Plan includes adoption of a NFIP compliant Floodplain Ordinance, new Elevation Certificates and documentation and publication of procedures.
	Q4	Added floodplain mapping of undeveloped area within the city.

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Phoenix	Q1	The National Flood Insurance Act of 1968, as amended in 1973, provides for a federally subsidized National Flood Insurance Program (NFIP) conditioned on active management and regulation of floodplain development by state and local governments. FEMA administers the NFIP as a part of its overall responsibilities in preventing and responding to natural events that damage private and public property and any life-threatening natural event including floods. The NFIP provides flood insurance at affordable rates through federal subsidy of the insurance offered by licensed insurance agents. This insurance is designed to provide an insurance alternative to disaster assistance to meet the escalating costs of repairing damage to buildings and their contents caused by floods. Participation in the NFIP is based on an agreement between local communities and the federal government. This agreement states if a community will adopt and enforce a floodplain management ordinance to reduce future flood risks to new construction in Special Flood Hazard Areas, the federal government will make flood insurance available within the community as a financial protection against flood losses. Availability of the subsidized flood insurance is contingent upon the development of a floodplain management system by the local municipality. Prevention of floods and resultant property damage is achieved through the delineation of property subject to flood events and the establishment of specific rules concerning development within these designated areas. FEMA publishes Flood Insurance Rate Maps (FIRM's) for certain flood prone areas that delineate different special flood hazard areas. The City of Phoenix participates in the NFIP and has adopted floodplain regulations and ordinances so that its citizens have access to the subsidized insurance. The role of the community is to enact and implement floodplain regulations required for participation in the NFIP. FEMA has regulations pertaining to floodplain management that must be followed in order for the city to continue as a member of the NFIP. The City of Phoenix has local policies to manage floodplains in a uniform and consistent manner. These policies are categorized as being FEMA related and non-FEMA related in nature. The policies strictly adhere to federal regulations governing floodplains and drainage design. The City of Phoenix Storm Water Policies and Standards Manual, 3rd Edition, December 2013, lists all applicable floodplain management regulations and policies for construction of new and substantially improved development projects within the city jurisdiction,

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Table 6-6: NFIP program assessment for Maricopa County and participating jurisdictions		
Participating Jurisdiction	**Responses to Questions 1-4**	
	Q2	The City of Phoenix Flood Insurance rate Maps and Flood Insurance Studies are dated October 16, 2013
	Q3	Elevation Certificates – If available with the city, a copy of the Elevation Certificate is provided free of charge to the owner of the property. Staff also helps guide residents to hire an appropriate professional assistance to create and develop an Elevation Certificate when one is not available. Flood Hazard Identification Assistance – Floodplain Management staff help identify hazard zones for an existing and/or proposed structure within the vicinity of a flood hazard area. The city also works very closely with the regional entity, Flood Control District of Maricopa County (FCDMC), for future identification of flood hazard areas within the jurisdiction. Flood Insurance Acquisition – Floodplain Management staff help distribute several brochures and other available information for residents to purchase flood insurance policies. Public Involvement Activities – Throughout the year, several Public Open House Meetings are held within the city, to educate the public on flood hazard areas, and rules and regulations for development activities within the flood hazard areas. These meetings are coordinated with the Flood Control District of Maricopa County (FCDMC) and the Master Planning efforts under their lead role.

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Table 6-6: NFIP program assessment for Maricopa County and participating jurisdictions		
Participating Jurisdiction	**Responses to Questions 1-4**	
	Q4	The City of Phoenix is planning to update the Floodplain Management Plan for the City of Phoenix. Current Floodplain Management plan is dated, December 1992, and is in a great need to be updated. The City of Phoenix has applied for a grant through the Arizona Department of Emergency Management (ADEM) to fund the study. On June 30, 2012, the City of Phoenix code, Chapter 32B, Floodplains, was updated following the Arizona Department of Water Resources (ADWR) guidelines as published in their model ordinances for the communities within the state. As a result of Area Drainage master Studies (ADMS), which are primarily done by the Flood Control District of Maricopa County (FCDMC), areas subject to development activities are identified with current or future flood hazard zones. These proactive steps help reduce the risk of loss of life and livestock within the flood-prone areas in the city.
Queen Creek	Q1	The Flood Control District of Maricopa County provides the floodplain management for the town. The town, as floodplain administrator, requires all applications for proposed new or substantially improved development that falls within FEMA special flood hazard areas to comply with the Maricopa County Floodplain Regulations and National Flood Insurance Program.
	Q2	The floodplain hazard maps for the town's jurisdiction were updated in October 2013. The current maps reflect the best available information at the time of the update.
	Q3	The town, as floodplain administrator, has assisted customers who need help in obtaining elevation certificates as well as assist customers who have questions about flood hazard areas or how to interpret the FEMA flood insurance rate maps (FIRM). The town has also worked with customers in removing flood hazard areas through the formal FEMA CLOMR/LOMR processes.
	Q4	Establish more local GIS functionality to better assist the town in local floodplain administration and management.

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Table 6-6: NFIP program assessment for Maricopa County and participating jurisdictions		
Participating Jurisdiction	**Responses to Questions 1-4**	
Salt River Pima-Maricopa Indian Community	Q1	The Salt River Pima-Maricopa Indian Community (SRPMIC) is not a participant in the NFIP. SRPMIC has exercised its right as a sovereign nation to not be a participant in NFIP. In addition, SRPMIC is a self-governance tribe which manages its own federal programs and services. SRPMIC has however tried to meet the intent of the NFIP through its management of its Floodplain Program. Some of those efforts are addressed in the answers to the following questions. 1) New construction or substantially improved development within the community is reviewed based upon the SRO §Chapter 17.5 – Floodplain and Drainage Ordinance. A few highlights are mentioned below: a) Building finished floor elevations must be elevated a minimum of 14-inches above the lot outfall. b) Storm water runoff from post-developed conditions cannot exceed the pre-developed conditions. c) Underground storage must be requested as a Waiver to the Floodplain and Drainage Ordinance.
	Q2	The SRPMIC does not participate in the NFIP because of community sovereignty so mapping through the NFIP specific for SRPMIC is not available. There are FEMA FIRM maps available for areas near the community's borders that are utilized. Most of these maps indicate that the community is in Zone D. More detailed FIRM maps are available along the Salt River as these are utilized as needed.
	Q3	The community provides civil engineering services for SHRRP and other home building project. The community assists in answering floodplain related questions for ECS-Compliance, for Public Works, and also for the Salt River Financial Services Institution. Approximately 20 residential driveways were improved to provide access during recent flood events.
	Q4	Needs in this area are as follows: • Update the SRPMIC Floodplain and Drainage Ordinance. • A floodplain plan review checklist would be helpful. One is currently being developed but not yet completed. • The community regularly participates in floodplain seminars and webinars to stay aware of current NFIP regulations. Notification and support for tribes to attend these trainings would be helpful.

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Table 6-6: NFIP program assessment for Maricopa County and participating jurisdictions		
Participating Jurisdiction	**Responses to Questions 1-4**	
Salt River Project	Q1	Salt River Project is a political subdivision of the state, power and water provider to customers, primarily in Maricopa County, AZ and is not required to participate in the National Flood Insurance Program. The municipalities cover the NFIP for citizens in their communities. If SRP owns facilities that are in known floodplains where coverage is necessary SRP procures catastrophic flood coverage through the commercial insurance marketplace that does not specifically exclude locations that may be in a federal flood zone.
	Q2	Not applicable.
	Q3	Not applicable.
	Q4	Not applicable.
Scottsdale	Q1	The City of Scottsdale requires applicants to submit drainage reports, improvement plans, and grading & drainage plans to the city's one-stop shop. These items are reviewed by the city's Stormwater Management Department for compliance with Chapter 37 of Scottsdale Revised Code, Stormwater and Floodplain Management. Our Stormwater and Floodplain Management Ordinance has been reviewed and approved by FEMA and the Arizona Department of Water Resources as compliant with the provisions of the National Flood Insurance Program. All review staff are Certified Floodplain Managers. A permit is not issued for construction until the city has approved the development proposal.
	Q2	The City of Scottsdale and the Flood Control District of Maricopa County engage in new flood insurance studies as funds allow to keep the Flood Insurance Rate Maps updated. Quite a few developers have prepared applications for Letters of Map Revision, which were approved by the city and FEMA.
	Q3	The city's Records Department assists customers in obtaining Elevation Certificates on record and completes flood hazard determination forms upon request. The city's Stormwater Management Department recommends the purchase of flood insurance to all residents.
	Q4	The city needs to continue to conduct flood insurance studies to keep the DFIRMS up-to-date. The city needs funding to continue to embark on capital improvement projects to mitigate existing flood hazards.

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Table 6-6: NFIP program assessment for Maricopa County and participating jurisdictions		
Participating Jurisdiction	**Responses to Questions 1-4**	
Surprise	Q1	The City of Surprise participates in the National Flood Insurance Program (NFIP) through the Department of Homeland Security's Federal Emergency Management Agency (FEMA). As a participant of the NFIP, the city has adopted Floodplain Management Ordinances within chapter 122 of the City of Surprise Unified Development Code. These requirements protect and regulate new or substantially improved development within flood prone areas in the city. The city is dependent on FCDMC for floodplain management and permitting for properties located in a SFHA.
	Q2	The current floodplain hazard maps (Flood Insurance Rate Maps) went into effect on October 16, 2013 – and will remain in effect until the latest "preliminary FIRM maps" are approved as the new effective maps by FEMA. These preliminary maps, which were released for public comment in September 2014, are based on the results of the Wittman Surprise Floodplain Delineation Study. The city is also engaged in confirming and finalizing Conditional Letter of Map Revisions that were started in the mid-2000s and not completed.
	Q3	The city is actively engaged in flood mitigation efforts on a variety of levels. The city currently has a 10 year Capital Improvement Program (CIP) that identifies numerous flood control improvement projects that seek to relieve property and roadway flooding. On an annual basis the city seeks grant funding from a number of agencies to assist in funding these projects. The city's survey crew assists in providing elevation certificates. In coordination with the Flood Control District of Maricopa County, the city hosts public outreach events for homeowners and businesses to learn more about existing floodplains/ways, flood insurance, and upcoming flood control improvements.
	Q4	The City of Surprise would like to strengthen and improve our scores in the Community Rating System.
Tempe	Q1	We have few developable areas in Special Flood Hazard Areas (SFHA/100-yr floodplain) with the City of Tempe. When a new or substantial improvement project is submitted to Community Development (CD), they determine if it within a SFHA. If it is, our floodplain management section has SOPs and works with CD to assure the project follows our City's Floodplain Codes.
	Q2	The Flood Control District of Maricopa County (FCDMC) has completed Area Drainage Master Studies covering the city. They confirm the locations of current SFHAs and confirm locations of flood hazards which have experienced flooding in the past.

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Table 6-6: NFIP program assessment for Maricopa County and participating jurisdictions		
Participating Jurisdiction	**Responses to Questions 1-4**	
	Q3	The City of Tempe participates in FEMA's National Flood Insurance Program (NFIP), Community Rating System with a rating of Class 6. We provide a number of floodplain assistance services to the public. They Include: • We maintain the current and historic FIRMs (Flood Insurance Rate Maps) • We maintain records of Elevation Certificates we receive and provide directions on obtaining one • We provide completed Floodplain Determination Forms for property owners and direct them to the FEMA Map Service Center • We advise owners to purchase flood insurance if they are in the SFHA or not • We will visit home owner's properties to advise on flood protecting their properties. • We advertise our services to property owners on our services on our website and in the "Tempe Today" news letter which goes to every home.
	Q4	We recently had our FY2020 Community Assistance Contact visit from ADWR. They have reviewed our City Code and are in the process of revising it to match their recommendation. They also review our procedures and processes, which we adjust to improve. We have completed a Storm Drain Management Plans which outlines future storm drain improvements to address deficiencies into the future. Our first project will be designed this year and funded next. The major need is to obtain continual funding to complete these projects.
Tolleson	Q1	All plans are run through the Building Department for Engineering to review and ensure all is in compliance with the Maricopa County Flood Plan. City of Tolleson relies on the County Flood Plan for reviews.
	Q2	The countywide update of FEMA mapped floodplains in 2020 encompasses the jurisdictional limits of the City of Tolleson.
	Q3	The City of Tolleson is not currently providing additional formal community assistance activities, but rather relies on the FCDMC for these items.
	Q4	Tolleson relies on Flood Control District of Maricopa County for floodplain management.

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Table 6-6: NFIP program assessment for Maricopa County and participating jurisdictions		
Participating Jurisdiction	**Responses to Questions 1-4**	
Unincorporated Maricopa County	Q1	• The applicant submits a complete and accurate application to the One Stop Shop at Planning and Development (P&D) for a Building Permit and pays the appropriate building permit fee. If the property has floodplain on it they are required to obtain a Floodplain Use Permit. Review comments for the Floodplain Use Permit will be sent as part of the combined packet from P&D. • The applicant will be contacted when the Floodplain Use Permit is ready for issuance. ✓ If an owner wishes to grant an agent, contractor or consultant authority to make decisions on their behalf, and has not already submitted a notarized Property Owner Authorization form, the form must be submitted at this time. ✓ Applicant reviews the Floodplain Use Permit, Applicant's Responsibilities, Warning and Disclaimer of Liability and Elevation Certificate, if required, with staff. ✓ Submit the required fee. ✓ Applicant signs the Floodplain Use Permit, Applicant's Responsibilities and Warning and Disclaimer of Liability. ✓ Permit issued. • If an Elevation Certificate was required, a complete and accurate Elevation Certificate must be submitted at final construction for staff to determine if the building complies with the Floodplain Use Permit requirements prior to a final inspection. • Per state statutes, the District must enforce the requirement of a Floodplain Use Permit for development in a floodplain. Violations are also pursued to assure compliance with the permit requirements and for the lack of obtaining a permit prior to building in a floodplain.
	Q2	• Maricopa County refers to the Flood Insurance Rate Maps (FIRMs) by FEMA to determine if a particular parcel is in the Special Flood Hazard Area (SFHA). • When implementing floodplain development regulations, the District, on behalf of the County, uses FEMA's SFHA as well as newly identified floodplains based on delineation studies. • The District continues to perform floodplain delineation studies to identify new areas in the 1% chance annual floodplain.

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Table 6-6: NFIP program assessment for Maricopa County and participating jurisdictions		
Participating Jurisdiction	**Responses to Questions 1-4**	
	Q3	• FEMA conducted a Community Assistance Visit with the District in February 2010, but it is not yet closed. • An audit for the Community Rating System was conducted in February 2011. The District was awarded a Class 4 rating which is an improvement from the previous Class 5 rating. • The most recent audit was started in April 2015 and is currently under review. • The District provides assistance to the public in areas such as the identification of flooding hazards and flood zones, elevation certificate and flood insurance guidance, conducts outreach meetings to educate the public on various studies, flood hazard areas and updates and maintains an extensive GIS for the public's use. • Provide jurisdictions with guidance and support during their Community Assistance Visits. • Elevation certificates are required for all new and substantially improved buildings in the regulatory floodplain.
	Q4	• Development of a Floodplain Management Plan for unincorporated Maricopa County commenced in 2015 and is currently in-progress. • The Comprehensive Report and Program, per ARS, was adopted on June 10, 2015. • The Floodplain Regulations for Maricopa County were most recently amended on June 24, 2014. • The Floodprone Properties Assistance Program (FPAP) has been approved for limited funding and the District is also pursuing grants for additional funding. • Continuation of floodplain delineation studies and updates.
Wickenburg	Q1	The Town of Wickenburg turned over floodplain management authority to the Flood Control District of Maricopa County and Yavapai County Flood Control District in August 2014. All floodplain related reviews and actions are deferred to those entities as appropriate.
	Q2	The current mapping was last updated and released in October 2013 and is currently adequate. The town will work with FCDMC and YCFCD to identify and update mapping as needed.

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Table 6-6: NFIP program assessment for Maricopa County and participating jurisdictions		
Participating Jurisdiction	**Responses to Questions 1-4**	
	Q3	None at this time. All floodplain related inquiries or requests are deferred to the FCDMC and YCFCD.
	Q4	The lack of current staffing capacity forced the town to relinquish floodplain management duties to the FCDMC and YCFCD. Additional staffing would be required to bring the floodplain management duties back under the town.
Youngtown	Q1	Management responsibility for flood control has been delegated to the Flood Control District of Maricopa County as provided for in A.R.S. 48-2610. The Town Engineer is appointed as the National Flood Insurance Program Floodplain Coordinator for the town and is responsible for coordinating with the Flood Control District of Maricopa County.
	Q2	The town has on file the revised Flood Insurance Study (FIS) for Maricopa County, Arizona and incorporated areas prepared by the Department of Homeland Security's Federal Emergency Management Agency (FEMA). Documents include: • Revised Flood Insurance Rate map (FIRM) Panel • Revised Firm Index • Revised FIS report
	Q3	Town staff is available to review Flood Insurance Maps, Index and provide guidance and requirements for raising designated parcels above the floodplain.
	Q4	Staff was provided with revised material (2013 updates) in 2014 to share with citizens and the community.

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6.3 Mitigation Actions/Projects and Implementation Strategy

Mitigation actions/projects (A/P) are those activities identified by a jurisdiction that, when implemented, will have the effect of reducing the community's exposure and risk to the particular hazard or hazards being mitigated. The implementation strategy addresses the "*how, when, and by whom?*" questions related to implementing an identified A/P.

The update process for defining the new list of mitigation A/Ps for the Plan was accomplished in three steps. First, an assessment of the actions and projects specified in Section 6 of the 2015 Plan was performed, wherein each jurisdiction reviewed and evaluated their jurisdiction specific list. Second, a new list of A/Ps for the Plan was developed by combining the carry forward results from the assessment with new A/Ps. Third, an implementation strategy for the combined list of A/Ps was formulated. Details of each step and the results of the process are summarized in the following sections.

6.3.1 Previous Mitigation Actions/Projects Assessment

The MJPT and LPT for each jurisdiction reviewed and assessed their jurisdiction's actions and projects listed in Tables 6-8-1 through 6-8-28 of the 2015 Plan. The assessment included evaluating and classifying each of the previously identified A/Ps based on the following criteria:

STATUS		***DISPOSITION***	
Classification	Explanation Requirement:	Classification	Explanation Requirement:
"***No Action***"	Reason for no progress	***"Keep"***	None required
"***In Progress***"	What progress has been made	***"Revise"***	Revised components
"***Complete***"	Date of completion and final cost of project (if applicable)	***"Delete"***	Reason(s) for exclusion.

Any A/P with a disposition classification of "Keep" or "Revise" was carried forward to become part of the new A/P list for the Plan. All A/Ps identified for deletion were removed and are not included in this updated plan. The results of the assessment for each of the 2015 Plan A/Ps are summarized by jurisdiction in Tables 6-7-1 through 6-7-28 in Appendix B.

6.3.2 New Mitigation Actions / Projects and Implementation Strategy

The first step in developing new mitigation actions/projects for the participating jurisdictions was to conduct a brainstorming session during Planning Team Meeting No. 4. Using the goals, results of the vulnerability analysis and capability assessment, the Planning Team's institutional knowledge of hazard mitigation needs in the county and jurisdictions, and the previous list developed for the 2015 Plan, the MJPT brainstormed to develop a comprehensive list of potential mitigation A/Ps that address the various hazards identified. The results of that brainstorming effort are summarized below. It is noted and acknowledged that several of the A/Ps listed are not purely mitigation and may not qualify as creditable mitigation A/Ps, but the MJPT chose to keep them anyway.

GENERAL MULTI-HAZARD:
Install early warning sirens in select strategic locations as a part of a comprehensive emergency notification system to inform citizens of impending hazards such as dam failure, severe weather conditions, and severe wind events (particularly tornados). ****Addresses: Dam Failure, Flood, Severe Wind, Wildfire* ****
Use newsletters, flyers, utility bill inserts, website notices, radio and television announcements, social media and newspaper articles to educate the public about hazards impacting the county and how to be prepared in the case of a disaster event. ****Addresses: Dam Failure, Drought, Flood, Severe Wind, Wildfire* ****
Provide links on the community's website to sources of hazard mitigation educational materials (e.g. – www.fema.gov) encouraging private citizens to be prepared for hazard emergencies. ****Addresses: Dam Failure, Drought, Flood, Severe Wind, Wildfire* ****
Review and assess building and residential codes currently in use to determine if newer, more up-to-date codes are available or required ****Addresses: Dam Failure, Drought, Flood, Severe Wind, Wildfire* ****
Promote the use of weather radios, especially in schools, hospitals and other locations where people congregate to inform them of the approach of severe weather events. ****Addresses: Extreme Heat, Flood, Severe Wind, Wildfire****
Include conservation areas, bioretention and other site appropriate green stormwater infrastructure/low impact development in mitigation actions and education. ****Addresses: Drought, Extreme Heat, Flooding****
DAM FAILURE:
Analyze and identify dam failure inundation limits to identify evacuation routes.
Participate/Conduct occasional table top exercises to identify potential mitigation measures for increasing response effectiveness, such as evacuation route marking and permanent protection measures for intended shelters.
Conduct annual dam safety inspections and reporting per Arizona Department of Water Resources guidelines and required schedule.
Annually coordinate with federal, state, and local dam owners to get updates on any changes in dam safety conditions and emergency action plan information.
Work with state and federal agencies to provide a disclosure to all potential buyers of real estate that are located within dam failure or emergency spillway inundation limits of an upstream dam or dams.
Develop or update the inundation mapping for the emergency action plan for [name dam] in order to identify population and critical facilities and infrastructure at risk, and to determine the need for potential mitigation.
DROUGHT:
Public education of water conservation best practices through newsletter, flyers, social media and website notices.
Develop and/or update an ordinance requiring strategic watering times and volumes during times of drought.
Mandate/Encourage/Incentivize the use of drought resistant landscaping through ordinance development and/or enforcement.
Coordinate with State Drought Task Force to perform drought management at the local/tribal level.
Develop/Update a local Drought Management Plan to define various levels of conservation requirements that are based on drought severity triggers and enforced through utility billing structures and ordinance.

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Implement a water harvesting program through the location, design and construction of dual functioning stormwater retention facilities with enhanced recharge elements designed into the basin. ****Addresses both Drought and Flood****
EXTREME HEAT:
Identify, stock and communicate locations within the community that can serve as cooling stations during times of extreme heat.
Perform a public information campaign at the onset of the extreme heat season to help educate the general public on ways to remain safe during periods of extreme heat.
Partner with NGO's (e.g. – The Salvation Army, church organizations, homeless shelters, etc.) to provide respite care and hydration stations to mitigate loss of life during extreme temperature events.
Investigate and develop an implementation strategy for using "cool roofs" on any new or major roof rehabilitation projects of tribal/county/city/town owned buildings to lower the urban heat island effects.
Investigate and develop an implementation strategy for using "cool pavements" on road resurfacing projects to lower urban heat island effects
Conduct feasibility, vulnerability, and prioritization studies to identify at-risk places and populations and effective solutions to reduce heat exposure
Add and maintain trees and other green infrastructure to provide shade and/or cooling
Develop an urban forestry master plan to as a part of an overall strategy for maintaining heat reducing green infrastructure
Increase the availability of shade structures at outdoor gathering places including transit stops, parks and playgrounds, schools, and recreation centers
Revise municipal building and zoning codes to reduce the use of materials that contribute to the urban heat island effect
Coordinate with other municipalities, county, regional, and state authorities, academic institutions, NGOs, and other partners to share information resources, best practices, community needs, and technical expertise related to management of heat and heat impacts
Promote and expand programs that provide energy assistance to low income residents during the summer
Adopt and enforce adjusted activity schedules and protocols for sports, recreation, and other outdoor programs when days exceed locally-relevant thresholds for heat-health risks
Install and maintain new water fountains and water bottle filling stations at public places
Extend hours for cooling centers and water distribution sites during extreme heat events
Hire personnel with dedicated responsibilities for management of heat risks, and/or assign specific responsibilities to existing personnel
Conduct cross-department and cross-agency training and coordination meetings for aligning programming and resources related to heat
Generate quantitative and qualitative assessment of community heat risks and impacts through surveys, interviews, focus groups, and other social science and public health research methods
FLOOD:
Implement a water harvesting program through the location, design and construction of dual functioning stormwater retention facilities with enhanced recharge elements designed into the basin. ****Addresses both Drought and Flood****
Develop a community-wide, stormwater management plan that will analyze and identify problem flooding areas and propose long-term mitigation alternatives designed to reduce or eliminate the flood problems.
Review, update and/or augment flood control ordinances to provide a greater level of protection than the minimum required by the NFIP.

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Identify and map flood hazards in areas expected to grow or develop in the foreseeable future.
Develop/augment a county/city/town wide GIS program that is integrated into Public Works, Development Services, Police, Fire/Rescue and Emergency Management to help prevent development in flood prone regions.
Install automated flood barriers at low water crossings to discourage motorists from entering flooded road crossings.
Install stream depth indicators at low water crossings to communicate the risk of entering flooded roadway crossings and provide a visual warning to motorists of flood conditions at the crossing location.
FISSURE:
Include addressing fissure risk as a regular part of the land development and public works projects review and permitting.
Provide links to the Arizona Geologic Service website as a part of a public campaign to raise awareness to the hazards and locations of fissures.
Coordinate with state and federal agencies (USGS, AZGS, ADWR, etc.) to study and map fissure activity in critical or key areas of the community so that effective mitigation or avoidance strategies can be implemented.
Include geologic hazards in the next General or Comprehensive Plan update to inform land use decision making and zoning efforts. ****Addresses: Earthquake, Fissure, Landslide/Mudslide, Subsidence****
Develop/Increase/Enhance groundwater recharge to mitigate expansion of fissures and subsidence areas. ****Addresses: Drought, Fissure, Subsidence****
LEVEE FAILURE: (look for nexus with Dam Failure)
Perform regular inspection and maintenance of existing levees to mitigate potential failure.
Perform public outreach to citizens located within levee failure flood risk areas to provide awareness of potential increase in flood elevations with a levee failure.
SEVERE WIND:
Encourage homeowners to use tie-down straps and/or anchors to secure ancillary buildings and metal awnings or porches to mitigate the potential for flying debris during severe wind events.
Retrofit sub-standard roofs of key critical facilities and infrastructure to meet modern building code standards and mitigate damages and impacts of severe wind events.
Maintain/Install backup generators at key critical facilities such as fire and police stations, water pumping stations, sewer lift stations, etc., to provide emergency power for critical operations during power failures caused by severe wind events.
SUBSIDENCE:
Include addressing subsidence risk as a regular part of the land development and public works projects review and permitting.
Provide links to the Arizona Department of Water Resources website as a part of a public campaign to raise awareness to the hazards and locations of active subsidence.
Establish survey monuments and monitor elevations in critical or key areas of the community to measure impacts and trends of subsidence, with the goal of determining long term mitigation strategies to reduce the damage and losses that may yet be experienced.
WILDFIRE:
Develop and/or enforce a weed abatement ordinance.
Educate public on proper fuels thinning, setbacks, and water storage for wildfire mitigation using Firewise type of programs and guidance documents.
Conduct Fire safety education programs in local public schools.
Enact and enforce burn and fireworks bans as needed during extraordinarily dry and extreme wildfire conditions / seasons to mitigate possible, unintended wildfire starts.

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Perform, or encourage the performance of, routine roadside vegetation control to mitigate wildfire starts within the right-of-way areas along roadways and highways.
Clear vegetation and wildfire fuels to create a defensible space around critical or key structures within the community and along perimeter areas of the wildland urban interface.

Upon completion of the assessment summarized in Section 6.3.1, each jurisdiction's LPT met and developed a new list of A/Ps using the goals and objectives, results of the vulnerability analysis and capability assessment, the above list of seed ideas, and the planning team's institutional knowledge of hazard mitigation needs in their community. The A/Ps can be generally classified as either structural or non-structural. Structural A/Ps typify a traditional "bricks and mortar" approach where physical improvements are provided to affect the mitigation goals. Examples may include channels, culverts, bridges, detention basins, dams, emergency structures, and structural augmentations of existing facilities. Non-structural A/Ps deal more with policy, ordinance, regulation and administrative actions or changes, buy-out programs, and legislative actions. For each A/P, the following elements were identified:

- **ID No.** – a unique alpha-numeric identification number for the A/P.
- **Description** – a brief description of the A/P including a supporting statement that tells the "what" and "why" reason for the A/P.
- **Hazard(s) Mitigated** – a list of the hazard or hazards mitigated by action.
- **Community Assets Mitigated** – a brief descriptor to qualify the type of assets (existing, new, or both) that the proposed mitigation A/P addresses.
- **Estimated Costs** – concept level cost estimates that may be a dollar amount or estimated staff time.

Once the full list of A/Ps was completed to the satisfaction of the LPT, the team then set to work developing the implementation strategy for those A/Ps. The implementation strategy addresses the *"priority, how, when, and by whom?"* questions related to the execution and completion of an identified A/P. Specific elements identified as part of the implementation strategy included:

- **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.
- **Planning Mechanism(s) for Implementation** – where applicable, a list of current planning mechanisms or processes under which the A/P will be implemented. Examples could include CIPs, General Plans, Area Drainage Master Plans, etc.

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- **Anticipated Completion Date** – a realistic and general timeframe for completing the A/P. Examples may include a specific target date, a timeframe contingent upon other processes, or recurring timeframes.
- **Primary Agency and Job Title Responsible for Implementation** – this would be the agency, department, office, or other entity and corresponding job title that will have responsibility for the A/P and its implementation.
- **Funding Source** – the source or sources of anticipated funding for the A/P.

Tables 6-8-1 through 6-8-28 summarize the updated mitigation A/P and implementation strategy for each participating Plan jurisdiction. Projects listed in *italics font* are recognized as being more response and recovery oriented, but are considered to be a significant part of the overall hazard management goals of the community.

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Table 6-8-1: Mitigation actions and projects and implementation strategy for Avondale

Mitigation Action/Project					Implementation Strategy				
ID No.	Description	Hazard(s) Mitigated	Community Assets Mitigated (Ex/New)	Estimated Cost	Priority Ranking	Planning Mechanism(s) for Implementation	Anticipated Completion Date	Primary Agency / Job Title Responsible for Implementation	Funding Source(s)
1	Review building permits for compliance with Floodplain Ordinance and NFIP regulations.	Flood	Both	Staff Time	High	Building and Zoning Permitting	Ongoing	Building Safety, Development and Eng. services / Emergency Management	General Fund
2	Conduct and/or participate in occasional table top exercises to identify potential mitigation measures for increasing response effectiveness, such as evacuation route marking and permanent protection measures for intended shelters.	Dam Inundation	New	Staff Time	Medium	N/A	Annually	Emergency Management	General Fund
3	Annually coordinate with federal, state and local dam owners to get updates on any changes in dam safety conditions and emergency action plan information.	Dam Inundation	Both	Staff Time	Medium	N/A	Annually	Emergency Management/ Public Works Dept.	General Fund
4	Mandate, encourage and incentivize the use of drought resistant landscaping through Ordinance development and/or enforcement.	Drought	New	Staff Time	High	N/A	Annually	Emergency Management / Water Resources City Clerk	General Fund
5	Provide the public with educational information that lists water conservation best practices through newsletters, flyers, and website notices.	Drought	Existing	$3,000 + Staff Time	Medium	Annual Community Outreach Publication	Bi-Annually	Emergency Management / Community Relations Dept.	General Fund
6	Partner with local NGO's (local shelters, church organizations, salvation army, etc.) to provide respite care and hydration stations to mitigate loss of like during extreme temperature events.	Extreme Heat	New	Staff Time	High	N/A	Annually	Emergency Management / Fire Department	General Fund
7	Develop a community-wide, storm water management plan that will analyze and identify problem flooding areas and propose long-term mitigation alternatives designed to reduce or eliminate the flood problems. Utilize city interns to complete routine inspections of storm water drains to ensure no blockage in the case of a flood.	Flood	Both	$250,000	High	N/A	July 2024	Public Works Dept. / Emergency Management	Grants / General Fund

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Table 6-8-1: Mitigation actions and projects and implementation strategy for Avondale

Mitigation Action/Project					Implementation Strategy				
ID No.	Description	Hazard(s) Mitigated	Community Assets Mitigated (Ex/New)	Estimated Cost	Priority Ranking	Planning Mechanism(s) for Implementation	Anticipated Completion Date	Primary Agency / Job Title Responsible for Implementation	Funding Source(s)
8	Promote the use of weather radios, especially in schools, hospitals and other locations where people congregate to inform them of the approach of severe weather events.	Severe Wind	New	Staff Time	High	Annual Community Outreach Publication	July 2024	Community Relations / Emergency Management	General Fund
9	Include addressing subsidence risk as a regular part of the land development and public works projects review and permitting processes.	Subsidence	New	Staff Time	High	Building and Zoning Permitting	July 2024	Development and Eng. services / Emergency Management	General Fund
10	Maintain backup generators at key critical facilities such as fire and police stations, water pumping stations, sewer lift stations, etc., to provide emergency power for critical operations during power failures caused by severe wind events.	Severe Wind	New	Staff Time	High	N/A	Annually	Facilities Emergency Management	General Fund
11	Perform a public information campaign at the onset of the extreme heat season to help educate the public on ways to remain safe during periods of extreme heat.	Extreme Heat	New	Staff Time	Medium	Annual Community Outreach Publication	Annually	Community Relations / Emergency Management	General Fund
12	Perform public outreach to citizens located within levee failure flood risk areas to provide awareness of potential increase in flood elevations with a levee failure.	Levee Failure	New	Staff Time	Medium	Annual Community Outreach Publication	Annually	Community Relations / Emergency Management	General Fund
13	Conduct and/or participate in occasional table top exercises to identify potential mitigation measures for increasing response effectiveness, such as evacuation route marking and permanent protection measures for intended shelters.	Levee Failure	New	Staff Time	Medium	N/A	Annually	Emergency Management	General Fund
14	Provide links to the Arizona Department of Water Resources website as a part of a public campaign to raise awareness to the hazards and locations of active subsidence.	Subsidence	New	Staff Time	Medium	Annual Community Outreach Publication	Annually	Community Relations / Emergency Management	General Fund

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Table 6-8-1: Mitigation actions and projects and implementation strategy for Avondale

Mitigation Action/Project					Implementation Strategy				
ID No.	Description	Hazard(s) Mitigated	Community Assets Mitigated (Ex/New)	Estimated Cost	Priority Ranking	Planning Mechanism(s) for Implementation	Anticipated Completion Date	Primary Agency / Job Title Responsible for Implementation	Funding Source(s)
15	Perform, or encourage the performance of, routine roadside vegetation control to mitigate wildfire starts within the right-of-way areas along roadways and highways.	Wildfire	New	Staff Time	Medium	N/A	Annually	Fire Marshall / Emergency Management	General Fund
16	Clear vegetation and wildfire fuels to create a defensible space around critical or key structures within the community and along perimeter areas of the wildland urban interface.	Wildfire	New	Staff Time	Medium	N/A	Annually	Facilities / Fire Marshall / Emergency Management	General Fund

Table 6-8-2: Mitigation actions and projects and implementation strategy for Buckeye

Mitigation Action/Project					Implementation Strategy				
ID No.	Description	Hazard(s) Mitigated	Community Assets Mitigated (Ex/New)	Estimated Cost	Priority Ranking	Planning Mechanism(s) for Implementation	Anticipated Completion Date	Primary Agency / Job Title Responsible for Implementation	Funding Source(s)
1	Review building permits for compliance with Floodplain Ordinance and NFIP regulations.	Flood	Both	Staff Time	Medium	NFIP and Floodplain Ordinance	Ongoing	Emergency Management / Emergency Manager / Engineering; City Engineer	General Fund
2	Conduct annual life safety inspections regarding the management wildland fire fuels and wildfire risk along the WUI boundary	Wildfire	New	Staff Time	High	CWPP	Ongoing	Fire; Emergency Management / Fire Chief; Emergency Manager	General Fund / Grants

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Table 6-8-2: Mitigation actions and projects and implementation strategy for Buckeye

Mitigation Action/Project					Implementation Strategy				
ID No.	Description	Hazard(s) Mitigated	Community Assets Mitigated (Ex/New)	Estimated Cost	Priority Ranking	Planning Mechanism(s) for Implementation	Anticipated Completion Date	Primary Agency / Job Title Responsible for Implementation	Funding Source(s)
3	Enhance communication of City mitigation needs at the County and State level by establishing liaison positions from city to State legislature, State Fusion Centers, MCDEM, Water fusion group, MAG and other multi-jurisdictional task force work groups	Flood, Wildfire, Severe Wind	New	Staff Time	High	EOP	Ongoing	Fire; Emergency Management, Mayor's Office / Fire Chief; Emergency Manager, Mayor	General Fund / Grants
4	Continue to support the Hazard Mitigation Plan by making sure the City is represented on related committees.	All Hazards	Both	Staff Time	Medium	City Engineering Sub-committee	Ongoing	Emergency Management / Emergency Manager	General Fund
5	Provide/improve water drainage systems	Flood	Both	Staff Time	Medium	Current and updated City of Buckeye Engineering Design Standards	Ongoing	Engineering, City Engineer/Public Works; Public Works Director	General Fund / Grants
6	Enforce Fire codes, require compliance	Wildfire	Both	Staff Time	High	CWPP	Ongoing	Fire Code Enforcement / Code Enforcement Officer	General Fund
7	Participate with Maricopa County and other jurisdictions in the update of the Community Wildfire Protection Plan (CWPP)	Wildfire	Both	Staff Time	High	CWPP	Ongoing	Fire; Emergency Management / Fire Chief; Emergency Manager	General Fund
8	Continue to perform public education of water conservation best practices and thunderstorm wind safety through the City's social media and website resources.	Drought, Severe Wind	Both	Staff Time	High		Ongoing	Fire; Emergency Management / Fire Chief; Emergency Manager; Public Works Dept; PW Director / Development Services Dept; DS Director	General Fund

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Table 6-8-2: Mitigation actions and projects and implementation strategy for Buckeye

Mitigation Action/Project					Implementation Strategy				
ID No.	Description	Hazard(s) Mitigated	Community Assets Mitigated (Ex/New)	Estimated Cost	Priority Ranking	Planning Mechanism(s) for Implementation	Anticipated Completion Date	Primary Agency / Job Title Responsible for Implementation	Funding Source(s)
9	Review and assess building and plumbing codes currently in use to determine if newer, more up-to-date codes are available for elevating standards for low water use fixtures and appliances, and wind loading requirements for roofs and awnings	Drought, Severe Wind	Both	Staff Time	High	Building Codes	Ongoing	Public Works Dept; PW Director / Development Services Dept; DS Director	General Fund
10	Annually coordinate with federal, state, and local dam owners to get updates on any changes in dam safety conditions and emergency action plan information.	Dam Failure	Both	Staff Time	Medium	Maricopa County Flood Control District annual assessment	Annually	Fire; Emergency Management / Public Works Dept; PW Director	General Fund
11	Work with state and federal agencies to provide a disclosure to all potential buyers of real estate that are located within dam failure or emergency spillway inundation limits of an upstream dam or dams.	Dam Failure	Both	Staff Time	Medium	Ensure data is in public report, including FEMA flood zone determination	Annually	Fire; Emergency Management / Public Works Dept; PW Director / Development Services Dept; DS Director	General Fund
12	Continue to identify, stock and communicate locations within the community that can serve as cooling stations during times of extreme heat.	Extreme Heat	Both	Staff Time	Medium	In cooperation with county CERT	Seasonal and Annually	Fire; Emergency Management / City PIO	CERT Funds
13	Perform a public information campaign at the onset of the extreme heat season to help educate the general public on ways to remain safe during periods of extreme heat.	Extreme Heat	Both	Staff Time	Medium	Via social media posts	Seasonal and Annually	City PIO	General Funds
14	Continue to provide links to the Arizona Department of Water Resources website as a part of a public campaign to raise awareness to the hazards and locations of active subsidence.	Subsidence	Both	Staff Time	Low	Work with PIO to link City Website to ADWR webpage	Ongoing	Public Works Dept; PW Directors / City PIO	General Funds
15	Include addressing subsidence risk as a regular part of the land development and public works projects review and permitting.	Subsidence	New	Staff Time	Low	Development Review Process	Ongoing	Development Services; DS Director / Engineering; City Engineer	General Funds

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Table 6-8-3: Mitigation actions and projects and implementation strategy for Carefree

Mitigation Action/Project					Implementation Strategy				
ID No.	Description	Hazard(s) Mitigated	Community Assets Mitigated (Ex/New)	Estimated Cost	Priority Ranking	Planning Mechanism(s) for Implementation	Anticipated Completion Date	Primary Agency / Job Title Responsible for Implementation	Funding Source(s)
1	Review building permits for compliance with Floodplain Ordinance and NFIP regulations.	Flood	Both	Staff time	High	Staff training, Floodplain regulations	Annual-Ongoing	FCDMC / Floodplain Mgmt and Services Division / Floodplain Administrator / Building Official	General Fund
2	Continue development of water storage, treatment and delivery systems to provide adequate water during times of drought	Drought	Both	Specific project dependent	High	Carefree Water Company and Governing Board	Annual – Ongoing	Manager of Carefree Water Company	Water Company budget and available grants
3	Maintain backup generators located at critical facilities (ex. Fire station, well sites, etc.) to provide emergency power for critical operations during power failures caused by severe wind events.	Severe Wind	Existing	$5,000.00	High	Public Works	Annual - Ongoing	Public Works	General Fund
4	Clear vegetation and wildfire fuels to create a defensible space around critical or key structures within the Town of Carefree.	Wildfire	Both	Staff time	High	Building and site surveys, Staff conferences	Annual – Ongoing	Public Works / Fire Chief	General Fund
5	Hold an annual citizens wildfire mitigation conference in the springtime each year.	Wildfire	Both	Staff time	High	CWPP	Annual – ongoing	Town Fire Chief	General fund
6	Encourage bridge or culvert construction where roads are in locations susceptible to flooding.	Flood	Both	Staff time and studies unless actual project developed and then costs are to be determined per project	Medium	Staff conferences. Study drainage issues. Make recommendation for projects. Implement projects as funded.	Annual – Ongoing	Town Engineer	General Fund, Permit Fess, Grants if available.

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Table 6-8-3: Mitigation actions and projects and implementation strategy for Carefree

Mitigation Action/Project					Implementation Strategy				
ID No.	Description	Hazard(s) Mitigated	Community Assets Mitigated (Ex/New)	Estimated Cost	Priority Ranking	Planning Mechanism(s) for Implementation	Anticipated Completion Date	Primary Agency / Job Title Responsible for Implementation	Funding Source(s)
7	Site and install additional signage for wash crossings as well as sand bags to warn and discourage vehicular movements through these areas during flooding events	Flood	Both	$20,000.00	Medium	Public Works	Less than five years with funding	Public Works	General Fund
8	Perform regular brush cutting and median maintenance with town right-of-way to mitigate fuel sources for wildfire.	Wildfire	Both	$10,000.00	Medium	Public Works	Annual – Ongoing	Public Works	General Fund
9	Require all new construction to follow recognized and adopted building codes to mitigate damages and impacts of severe wind events.	Severe Wind	New	Staff time	Medium	Staff conferences	Annual - Ongoing	Town Engineer / Building Official	General Fund
10	Create a public education program describing water conservation best practices to be delivered to residents in their monthly water bill. In addition, provide water conservation related material through the town's COINS system.	Drought	Existing	Staff time	Medium	Staff conferences	Annual – Ongoing	Manager of Carefree Water Company / Staff	General Fund
11	Identify, stock and communicate locations within the Town of Carefree that can serve as cooling stations during times of extreme heat.	Extreme Heat	Both	Staff time / $500.00	Medium	Staff conferences	Annual during extreme heat season	Fire Chief, Town staff	General Fund
12	Perform a public information campaign at the onset of the extreme heat season to help educate the general public on ways to remain safe during periods of extreme heat.	Extreme Heat	Both	Staff time	Medium	Staff conferences	Annual	Town staff	General Fund
13	Review and update the town's Drainage Master Plan on an on-going basis to identify potential drainage and flooding hazards.	Flood	Both	Staff time	Medium	Staff conferences. Make recommendations for potential projects and implement those projects as funding becomes available.	Annual – ongoing	Town engineer / Building official	General fund, Permit fees, Grants
14	Continue to review and update the town's Mass Evacuation plan for the Town of Carefree.	All hazards	Both	Staff time	Medium	Staff / Agency conferences	Annual – ongoing	Carefree Emergency Manager / American Red Cross / Town Fire Chief	General fund

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Table 6-8-4: Mitigation actions and projects and implementation strategy for Cave Creek

Mitigation Action/Project					Implementation Strategy				
ID No.	Description	Hazard(s) Mitigated	Community Assets Mitigated (Ex/New)	Estimated Cost	Priority Ranking	Planning Mechanism(s) for Implementation	Anticipated Completion Date	Primary Agency / Job Title Responsible for Implementation	Funding Source(s)
1	Review building permits for compliance with Floodplain Ordinance and NFIP regulations.	Flood	Both	Staff Time	High	Staff Continuing Education	Ongoing	Town Engineer	General Fund
2	Ensure building codes for construction are enforced to prevent roof damage from high winds.	Severe Wind	Both	Staff Time	High	Staff review and field inspections.	Ongoing	Chief Building Official	General Fund
3	Town Fire Marshal shall perform routine commercial structures inspections to identify and communicate code violations. Routinely inspect commercial structures.	Flood, Severe Wind, Wildfire	Both	Staff Time	High	Fire Safety Inspections.	Ongoing	Chief Building Official. Fire Marshal	General Fund
4	Public Information Campaign to get more residents to subscribe to the CodeRed Extreme Weather Alert System.	Flood, Severe Wind, Extreme Heat	Both	Staff time	High	Notices on Town's Website. Pamphlets at town hall. Reminders at council meetings and in utility bills.	Ongoing	Town Marshal	General Fund
5	Continuous Public Information Campaign to advise residents and visitors alike of risks from Wildfire.	Wildfire	Both	$12,000	High	Fixed Signage advising of risks on main roadways in town. Handouts available at public facilities, identifying risks and ways to avoid Wildfires. Bulk clean up to help residents remove fuel loads from around residences.	Ongoing	Town Marshal / Building Safety	General Fund
6	Continue to perform public education of water conservation best practices through newsletter, flyers, social media and website notices.	Drought	Both	Staff Time	High	Drought Management Program	Ongoing – annual	Utilities Department	General Fund

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Table 6-8-4: Mitigation actions and projects and implementation strategy for Cave Creek

Mitigation Action/Project					Implementation Strategy				
ID No.	Description	Hazard(s) Mitigated	Community Assets Mitigated (Ex/New)	Estimated Cost	Priority Ranking	Planning Mechanism(s) for Implementation	Anticipated Completion Date	Primary Agency / Job Title Responsible for Implementation	Funding Source(s)
7	Research the feasibility to either start a Town of Cave Creek Fire Department or form a Fire District and have a Fire Department provide Emergency services (Fire / EMS) with the geographical boundaries of the incorporated Town of Cave Creek. The forming of a Town of Cave Creek Fire entity verses the current subscription-based services, would increase Fire Safety and Wild Fire fighting capabilities drastically.	Wildfire	Both	$2 Million	High		2023	Cave Creek Fire Chief	General Fund
8	Perform a Public Information Campaign to help educate the general public on ways to remain safe during periods of extreme heat.	Extreme Heat	Both	Staff Time	Medium	Post Notices on Town Website.	Ongoing	Town Marshal	General Fund
9	Review the existing Cave Creek general plan and zoning ordinance to determine how these documents help limit development in hazard areas. Modify with additional guidelines, regulations, and land use techniques as necessary within the limits of state statutes, while also respecting private property rights.	Flooding	Both	Staff Time	Medium	Staff review.	Ongoing	Planning and Zoning	General Fund
10	Review and update the local Drought Management Plan to ensure it is current with the Town's drought management goals and current water conservation needs.	Drought	Both	Staff Time	Medium	Drought Management Program	Completed	Engineering Department / Town Engineer	General Fund

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Table 6-8-5: Mitigation actions and projects and implementation strategy for Chandler

Mitigation Action/Project					Implementation Strategy				
ID No.	Description	Hazard(s) Mitigated	Community Assets Mitigated (Ex/New)	Estimated Cost	Priority Ranking	Planning Mechanism(s) for Implementation	Anticipated Completion Date	Primary Agency / Job Title Responsible for Implementation	Funding Source(s)
1	Review building permits for compliance with Floodplain Ordinance and NFIP regulations.	Flood	Both	Staff time	High	Staff Training/ Floodplain Regulations	Annual-Ongoing	Development Services / City Engineer	General Fund
2	Maintain the currency of the safety element of the Chandler General Plan.	Drought, Extreme Heat, Flood, Severe Wind	Both	Staff time plus consultant cost for update of GP	High	Review and Update General Plan	Annual-Ongoing	Planning Manager	General Fund
3	Continue to ensure through proper planning, zoning and building codes that all safety measures are in place for new building construction and placement. The city will coordinate with the county flood control district.	Flood, Severe Wind	New	Staff time	High	Continue to update codes to newest versions and add amendments were appropriate	Annual-Ongoing	Development Services / Building Official	General Fund
4	Continue to maintain a diverse water portfolio which includes surface water from Salt, Verde and Colorado River watersheds and groundwater. Minimize any reductions to existing supplies by protecting and securing existing water rights, and meeting environmental requirements of water supplies. Maximize the use of existing assets to ensure adequate water supply is available from over 30 groundwater wells, two surface water treatment plants, use of recharged water, and encourage the use of reclaimed water for appropriate purposes. Continue to implement the city's Drought Plan.	Drought	Both	Staff time	High	Continue to maintain a diverse city water portfolio by reviewing and updating current and future needs on a regular basis	Annual-Ongoing	Public Works and Utilities Director	Enterprise Fund
5	Each city department will be encouraged to rank the vulnerability of existing assets, with assistance from the Emergency Management Workgroup, and implement protection plans as needed, with the highest vulnerability being implemented first.	Drought, Extreme Heat, Flood, Severe Wind	Both	Staff time	Medium	Emergency Management Group Meetings	Annual-Ongoing	Fire Department	General Fund

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Table 6-8-5: Mitigation actions and projects and implementation strategy for Chandler

Mitigation Action/Project					Implementation Strategy				
ID No.	Description	Hazard(s) Mitigated	Community Assets Mitigated (Ex/New)	Estimated Cost	Priority Ranking	Planning Mechanism(s) for Implementation	Anticipated Completion Date	Primary Agency / Job Title Responsible for Implementation	Funding Source(s)
6	Continue to ensure that the City of Chandler Drought Management Plan is updated to meet the needs of the city to mitigate drought severity.	Drought	Both	Staff time	Medium	Continue to review and update the plan as appropriate	Ongoing	Public Works and Utilities Director	Enterprise Fund
7	Annually coordinate with federal, state, and local dam owners to get updates on any changes in dam safety conditions and emergency action plan information.	Dam Failure	Both	Staff time	Medium	Attend informational meetings	Annual	Fire Department	General Fund
8	Provide links to the Arizona Department of Water Resources website as a part of a public campaign to raise awareness to the hazards and locations of active subsidence.	Subsidence	Both	Staff time	Medium	Maintain current webpage links	Ongoing	Communications and Public Affairs Department	General Fund
9	Include addressing subsidence risk as a regular part of the land development and public works projects review and permitting.	Subsidence	Both	Staff time	Medium	Maintain a robust zoning and planning evaluation process	Ongoing	Development Services Department	General Fund

Table 6-8-6: Mitigation actions and projects and implementation strategy for El Mirage

Mitigation Action/Project					Implementation Strategy				
ID No.	Description	Hazard(s) Mitigated	Community Assets Mitigated (Ex/New)	Estimated Cost	Priority Ranking	Planning Mechanism(s) for Implementation	Anticipated Completion Date	Primary Agency / Job Title Responsible for Implementation	Funding Source(s)
1	Review building permits for compliance with Floodplain Ordinance and NFIP regulations.	Flood	Both	Staff Time	High	Permit Review	Ongoing	City of EL Mirage FBLS, Building Official	General Fund

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Table 6-8-6: Mitigation actions and projects and implementation strategy for El Mirage

Mitigation Action/Project					Implementation Strategy				
ID No.	Description	Hazard(s) Mitigated	Community Assets Mitigated (Ex/New)	Estimated Cost	Priority Ranking	Planning Mechanism(s) for Implementation	Anticipated Completion Date	Primary Agency / Job Title Responsible for Implementation	Funding Source(s)
2	Review zoning ordinances prohibiting new development in 100-year floodplain on an annual basis.	Flood	Both	Staff Time	High	None	Ongoing	Planning & Zoning / Director	General Fund
3	Take active role in multi-agency plan and actions for flood mitigation (pro-active).	Flood	Both	Staff Time	High	MCMJHMP	Ongoing	Engineering/Fire/ Public Works / Depth heads	General Fund
4	Develop plan to design and install man-made flood protection devices where needed.	Flood	Both	Staff Time/UNK	High	None	Ongoing	City of El Mirage City Engineering/Fire/ Public Works / Dept heads	General Fund/UNK
5	Educate the public on actions and resources to protect residents that do not have adequate ways to cool their homes in the event of an Extreme Heat Event through website notices and other social media alerts	Extreme Heat	Existing	Staff Time	High	Anticipate the event and advise community through social media and other, means	Seasonally and as needed.	City of El Mirage/Fire/PD	General Fund
6	Review annually and update as needed, existing building codes to manage new and existing construction practices and provide mitigation for Drought, Flood, and Severe Wind.	Drought, Flood, Severe Wind	New	Staff Time	High	Permitting and Plan Review	Annually	FBLS / City Building Official	General Fund

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Table 6-8-6: Mitigation actions and projects and implementation strategy for El Mirage

Mitigation Action/Project					Implementation Strategy				
ID No.	Description	Hazard(s) Mitigated	Community Assets Mitigated (Ex/New)	Estimated Cost	Priority Ranking	Planning Mechanism(s) for Implementation	Anticipated Completion Date	Primary Agency / Job Title Responsible for Implementation	Funding Source(s)
7	Maintain collaboration efforts and interconnected water system with other water purveyors to ensure the community water supply in the event of a drought.	Drought	Both	Staff Time	High	The City of El Mirage has interconnects with the City of Surprise as well as working with EPCOR to add an additional one.	Ongoing	Public Works / Director	General fund
8	*Participate in multi-agency coordination efforts to ensure cooperative plans.*	*Multi-Hazard*	*Both*	*Staff Time*	*Medium*	*Through continuing auto and mutual aids agreements.*	*Ongoing*	*Fire Department / Fire Chief / Emergency Manager*	*General fund*
9	*Train First Responders and other select city staff in hazard materials mitigation.*	*HAZMAT*	*Existing*	*Staff Time plus Training Cost*	*Medium*	*NIMS certification*	*Ongoing*	*Human Resources/department heads*	*General fund*
10	Recharge groundwater with CAP water to ensure the community water supply in the event of a drought.	Drought	Both	$100,000	Medium	City of El Mirage has a CAP subcontract and recharges CAP water.	On-going	Public Works / Director	General fund
11	Continue to implement a conservation education program to ensure the community water supply in the event of a drought.	Drought	Both	Staff Time	Medium	Automated Water Meter Program	Ongoing	Public Works / Director	General fund, utility payments
12	Provide cool potable water to citizens during extreme heat waves. Dissemination of public information regarding hydration station and resource locations will be provided via website notices and social media	Extreme heat	Existing	$2,000	Medium	None	Seasonally and as needed.	City of El Mirage Fire / Fire Chief	Fire Dept Budget

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Table 6-8-6: Mitigation actions and projects and implementation strategy for El Mirage

Mitigation Action/Project					Implementation Strategy				
ID No.	Description	Hazard(s) Mitigated	Community Assets Mitigated (Ex/New)	Estimated Cost	Priority Ranking	Planning Mechanism(s) for Implementation	Anticipated Completion Date	Primary Agency / Job Title Responsible for Implementation	Funding Source(s)
13	Coordinate mitigation efforts with other local agencies that include but are not limited to: Luke AFB, Dysart School District, FCDMC and others, to I.D. problem areas and plans for mitigation	Multi hazard	Both	Staff Time	Low	None	Ongoing	Fire Department / Emergency Manager	General fund
14	Educate the public on suspected and imminent wind shear dangers from microburst and other natural wind threats through website notices and social media alerts.	Severe Wind	Both	Staff Time	Low	None	Annually During Monsoon Season	Homeland Security / Safety and Emergency Management Officer	General Fund
15	Provide citizens with warnings and escape routes from severe flooding or expected flooding.	Dam Failure	Existing	Staff time	Low	McMicken Dam EAP, Waddell Dam EAP	When necessary	City of El Mirage Fire/ PD and Public Works.	General fund
16	Participate/Conduct occasional tabletop exercises to identify potential mitigation measures for increasing response effectiveness, such as evacuation route marking, and permanent protection measures for intended shelters.	Dam Failure	Both	Staff time	Low	McMicken Dam EAP, Waddell Dam EAP	At least once over the next five years	City of El Mirage Fire/ PD and Public Works / Dept heads	General Fund
17	Provide links to the Arizona Department of Water Resources subsidence website and the Arizona Geologic Survey website as a part of a public campaign to raise awareness to the hazards and locations of active fissure and subsidence locations within the city.	Fissure, Subsidence	Both	Staff Time	Low	None	FY2021	City of El Mirage / City Engineer	General Fund

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Table 6-8-6: Mitigation actions and projects and implementation strategy for El Mirage

Mitigation Action/Project					Implementation Strategy				
ID No.	Description	Hazard(s) Mitigated	Community Assets Mitigated (Ex/New)	Estimated Cost	Priority Ranking	Planning Mechanism(s) for Implementation	Anticipated Completion Date	Primary Agency / Job Title Responsible for Implementation	Funding Source(s)
18	Annually coordinate with Federal, State and local dam owners to update any changes in dam safety conditions on emergency action plan information.	Dam Failure	Both	Staff Time	Low	McMicken Dam EAP, Waddell Dam EAP	On-going	City of El Mirage Fire / Fire Chief and Public Works / Director	General Fund
19	Work with state and Federal agencies to provide disclosure information to all potential buyers of real estate that are located within the dam failure or emergency spillway inundation limits of an upstream dam or dams	Dam Failure	Both	Staff Time	Low	City of El Mirage and community development	On-Going	City of El Mirage Fire / Fire Chief / City Engineer and Community Development / Director	General Fund
20	land development and public works projects will be reviewed for subsidence risk as a regular part of the review and permitting process.	Subsidence	Both	Staff Time	Low	El Mirage Community Development	On-Going	Public Works, City Engineer	General Fund

Table 6-8-7: Mitigation actions and projects and implementation strategy for Fort McDowell Yavapai Nation

Mitigation Action/Project					Implementation Strategy				
ID No.	Description	Hazard(s) Mitigated	Community Assets Mitigated (Ex/New)	Estimated Cost	Priority Ranking	Planning Mechanism(s) for Implementation	Anticipated Completion Date	Primary Agency / Job Title Responsible for Implementation	Funding Source(s)
1	Prohibit building in floodplain and river area to maintain channel and protect riparian area.	Flood	Both	Staff time for plan review- $15,000 annually	High	Staff training and cooperation with Army Corp of Engineers and County Flood Control District.	Annual/ Recurring	Community and Economic Development Division/Planning Manager	Tribal General Revenue Funds

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Table 6-8-7: Mitigation actions and projects and implementation strategy for Fort McDowell Yavapai Nation

Mitigation Action/Project					Implementation Strategy				
ID No.	Description	Hazard(s) Mitigated	Community Assets Mitigated (Ex/New)	Estimated Cost	Priority Ranking	Planning Mechanism(s) for Implementation	Anticipated Completion Date	Primary Agency / Job Title Responsible for Implementation	Funding Source(s)
2	Conduct fuels reduction and establish fuel breaks in dense vegetation areas.	Wildfire	Both	Staff costs - $,5000,	High	Cooperative efforts between BIA Fire Management Officer, Fire Department, Emergency Manager, Public Works Director	Annual/ Recurring	Fire Department/ Emergency Manager	Tribal General Revenue Funds, PDMG and AFG grants
3	Pro-actively pursue pre-disaster and hazard mitigation grants to supplement tribal expenses associated with mitigation activities.	All Hazards	Both	Determined by required matching funds. $10,000 annually	Medium	Contract and Grants Administrator oversight.	Annual/ Recurring	All Department Directors	Matching funds from Tribal General Revenue Funds
4	Publish suggested mitigation actions through print media and community website to reduce potential for wildfire and heat related medical emergencies.	Drought, Extreme Heat, Wildfire	Both	Staff time, $2,500 annually	Medium	Timely information distribution through social media, newsletter, website	Annual/ Recurring	Fire Department/Emergency Manager	Tribal General Revenue Funds
5	Limit development along river to protect wetlands, threatened species habitat and protect businesses from flooding.	Flood	Both	Staff time for plan review and Enterprise equipment and labor, $50,000 annually	Medium	Cooperative effort with Tribal Environmental Department, Enterprise employees, and others.	Annual/ Recurring	Environmental Department/ Environmental Manager	Tribal General Revenue Funds
6	Create and map access to high-risk wildfire areas. Provide weed abatement services in high risk areas to reduce risk of wildland fire.	Wildfire	Existing	Staff time and $30,000 annually	Medium	Cooperative effort by MCDOT, Tribal Public Works Department, Fire Department and BIA FMO	Annual/ Recurring	MCDOT and FMYN Public Works Department/ Public Works Manager, Fire Chief, BIA Fire Management Officer (FMO)	MCDOT and Tribal General Revenue Funds, PDMG and AFG grants

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Table 6-8-7: Mitigation actions and projects and implementation strategy for Fort McDowell Yavapai Nation

Mitigation Action/Project					Implementation Strategy				
ID No.	Description	Hazard(s) Mitigated	Community Assets Mitigated (Ex/New)	Estimated Cost	Priority Ranking	Planning Mechanism(s) for Implementation	Anticipated Completion Date	Primary Agency / Job Title Responsible for Implementation	Funding Source(s)
7	Review existing building codes, modify or adopt codes to prevent development in hazard areas.	Drought, Flood, Severe Wind, Wildfire	New	Staff time, $5,000 annually	Medium	Collaborative effort with Community Economic Development Division, Fire Department, Legal Office	Annual/ Recurring	Community and Economic Development Division/Planning Project Manager / Fire Chief	Tribal General Revenue Funds
8	Identify and mitigate hazards associated with new and existing developments through plan reviews to ensure plan/code compliance, including incorporation of drought tolerant or xeriscape landscapes on new developments.	Drought, Flood, Severe Wind, Wildfire	Both	Staff time, $5,000	Medium	Cooperative efforts with Fire Department, , IT Department, Emergency Manager, MAG PSAP group	Annual/ Recurring	Community and Economic Development Division/License and Property Use Manager / Fire Chief	Tribal General Revenue Funds
9	Ensure building codes addressing wind loading are enforced to prevent damage from high winds.	Severe Wind	Both	Staff costs - $3,500	Medium	Collaborative effort with Community Economic Development Division, Fire Department, Legal Office	Annual/ Recurring	Community and Economic Development Division/Chief Building Inspector	Tribal General Revenue Funds
10	Develop a drought emergency plan with criteria and triggers for drought-related actions.	Drought	Both	Staff time, $15,000	Medium	Cooperative efforts with Public Works, Water System Manager, Emergency Manager, Planning Projects Manager	October 2021	Community Economic Development Division/ Emergency Manager	Tribal General Revenue Funds
11	Analyze and map extensions of the dam failure inundation limits for Town of Fountain Hills owned dams, through FMYN lands to their confluence with the Verde River.	Dam Failure	Both	$10,000	Medium	Coordination with Town of Fountain Hills and FCDMC	FY2021	Fire Department/ Emergency Manager	Tribal General Revenue Funds

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Table 6-8-7: Mitigation actions and projects and implementation strategy for Fort McDowell Yavapai Nation

Mitigation Action/Project					Implementation Strategy				
ID No.	Description	Hazard(s) Mitigated	Community Assets Mitigated (Ex/New)	Estimated Cost	Priority Ranking	Planning Mechanism(s) for Implementation	Anticipated Completion Date	Primary Agency / Job Title Responsible for Implementation	Funding Source(s)
12	Annually coordinate with Federal, State, and local dam owners to get updates on any changes in dam safety conditions and emergency action plan information	Dam Failure	Both	Staff time	Low	Coordination with Salt River Project and USBR	Annual	Fire Department/ Emergency Manager	Tribal General Revenue Funds
13	Coordinate training, planning, and communications to provide the community with information to combat the effects of infestations and diseases.	Disease, Infestation, Pandemic.	Both	Staff time for Medical Clinic personnel	Low	Public Health surveillance and timely information distribution through newsletter, social media, and website.	Annual/ Recurring	Medical Director, Clinic staff	Tribal General Revenue Funds, IHS funds

Table 6-8-8: Mitigation actions and projects and implementation strategy for Fountain Hills

Mitigation Action/Project					Implementation Strategy				
ID No.	Description	Hazard(s) Mitigated	Community Assets Mitigated (Ex/New)	Estimated Cost	Priority Ranking	Planning Mechanism(s) for Implementation	Anticipated Completion Date	Primary Agency / Job Title Responsible for Implementation	Funding Source(s)
1	Maintain washes in Town by removing excessive brush and trim trees to reduce the threat of wildfire and flooding due to blockages	Flood, Wildfire	Both	$150K/yr	High	Ongoing	Annually	Environmental Supervisor	General Fund
2	Channel and Storm Drain Development	Flood	Both	$1.5M	High	Ongoing	Ongoing	Town Engineer	CIP
3	Perform a public information campaign at the onset of the extreme heat season to help educate the general public on ways to remain safe during periods of extreme heat.	Extreme Heat	Both	Staff Time	High	Ongoing	Ongoing	Fire Department	General Fund
4	Continuing use of recycled water for turf irrigation in Town parks and golf courses	Drought	Both	$100K/yr	High	Ongoing	Ongoing	Parks	General Fund

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Table 6-8-8: Mitigation actions and projects and implementation strategy for Fountain Hills

Mitigation Action/Project					Implementation Strategy				
ID No.	Description	Hazard(s) Mitigated	Community Assets Mitigated (Ex/New)	Estimated Cost	Priority Ranking	Planning Mechanism(s) for Implementation	Anticipated Completion Date	Primary Agency / Job Title Responsible for Implementation	Funding Source(s)
5	Provide free wildland fire risk inspections to Town residents to identify areas on properties that need to have brush thinned or removed.	Wildfire	Both	Staff Time	High	Ongoing	Ongoing	Fire Marshal	General Fund
6	Analyze and identify dam failure inundation limits to identify/modify evacuation routes.	Dam Failure	Ex	Staff Time	Medium	Ongoing	Ongoing	Town Engineer	General Fund
7	Conduct bi-annual dam safety inspections and reporting per Arizona Department of Water Resources guidelines and required schedule.	Dam Failure	Both	Staff Time	Medium	Bi-annual	Ongoing	Town Engineer	General Fund
8	Enforce Building Codes to prevent roof damage from high winds.	Severe Winds	Both	Staff Time	Medium	Ongoing	Ongoing	Building Official	General Fund
9	Review General Plan and Ordinances for mitigating hazards and opportunities to incorporate Plan risk assessment and mitigation strategy.	Flood, Severe Wind, Drought, Extreme Heat	Both	Staff Time	Medium	Ongoing	Ongoing	Development Director	General Fund
10	Review building permits for compliance with Floodplain Ordinance and NFIP regulations.	Flood	Both	Staff Time	Medium	Ongoing	Annually	Town Engineer	General Fund

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Table 6-8-9: Mitigation actions and projects and implementation strategy for Gila Bend

Mitigation Action/Project					Implementation Strategy				
ID No.	Description	Hazard(s) Mitigated	Community Assets Mitigated (Ex/New)	Estimated Cost	Priority Ranking	Planning Mechanism(s) for Implementation	Anticipated Completion Date	Primary Agency / Job Title Responsible for Implementation	Funding Source(s)
1	Review building permits for compliance with Floodplain Ordinance and NFIP regulations.	Flood	Both	Staff Time	High	Town Code	ongoing	Town Planner/Engineer	Town Funds
2	Pursue a mutual aid compact with county and state agencies to assist the town with hazard mitigation.	Flood, Severe Winds, Wildfire	Both	Staff Time	High	Town, State, County, FEMA	Ongoing	Town Manager, Finance Director, Public Works Director	Town, State, County
3	Develop a public awareness campaign to educate town residents about natural hazards impacting the community.	Flood, Severe Winds, Wildfire	Both	Staff Time	High	Town/Maricopa County Flood Control	Ongoing	Town, Maricopa County Flood Control	Town, FEMA, County
4	Develop and construct measures to mitigate flooding along Sand Tank and Scott Avenue Washes.	Flood	Both	$12 million	Low	FEMA, Army Corps of Engineers, Maricopa County Flood Control, Town	2027	FEMA, Army Corps of Engineers, Maricopa County Flood Control, Town	FEMA, Army Corps of Engineers, Maricopa County Flood Control, Town, USDA, WIFA
5	Develop a plan to implement aquifer recharge per the recommendations of the recently completed aquifer study performed by The Global Institute of Sustainability (GIOS) at Arizona State University (ASU).	Drought	Both	$90,000	Medium	The Global Institute of Sustainability (GIOS) at Arizona State University (ASU)	2026	Town Manager	FEMA, County, State, Town, USDA, WIFA
6	Restrict water usage for irrigation during times of drought.	Drought	Both	N/A	High	Town Code	Ongoing	Town Manager, Public Works Director	Town Funds
7	Establish and staff a “cooling” station at the local community center	Extreme Heat	Both	N/A	High	Social Services	Ongoing	Social Services Director, Town Manager	Town Funds
8	Maintain and provide access to the public swimming pool during times of extreme heat to provide a means for cooling off.	Extreme Heat	Both	Staff Time	High	Town Parks and Recreation	Ongoing	Town Manager, Parks & Recreation Director	Town Funds

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Table 6-8-9: Mitigation actions and projects and implementation strategy for Gila Bend

Mitigation Action/Project					Implementation Strategy				
ID No.	Description	Hazard(s) Mitigated	Community Assets Mitigated (Ex/New)	Estimated Cost	Priority Ranking	Planning Mechanism(s) for Implementation	Anticipated Completion Date	Primary Agency / Job Title Responsible for Implementation	Funding Source(s)
9	Design and evaluate the concept of constructing a flood control reservoir, or series of reservoirs to intercept and store storm runoff. The concept would provide both flood control benefits but also could be a source for groundwater recharge.	Drought, Flood	Both	$2 million	Low	FEMA, Army Corps of Engineers, Maricopa County Flood Control, Town, USDA, WIFA	2027	FEMA, Army Corps of Engineers, Maricopa County Flood Control, Town, USDA, WIFA	FEMA, Army Corps of Engineers, Maricopa County Flood Control, Town, USDA, WIFA
10	Perform investigational analyses to determine if removal of a substandard levee will provide more benefit through restoring local flood control currently blocked by levee and remove the threat of a levee failure.	Levee Failure	Both	$700,000	Medium	FEMA, Army Corps of Engineers, Maricopa County Flood Control, Town	2027	FEMA, Army Corps of Engineers, Maricopa County Flood Control, Town	FEMA, Army Corps of Engineers, Maricopa County Flood Control, Town
11	Work with FCDMC and town forces (Fire, EMS, Streets, Parks, and Sheriff) to identify and plan for evacuation routes should the local levee fail	Levee Failure	Both	N/A	Medium	Town and County	2022	Town / Town Engineer	Town Funds
12	The Town will include potential subsidence in freeboard calculations for buildings in flood prone areas that are known to be active subsidence areas as well	Flood, Subsidence	New	Staff Time	Medium	N/A	As-Needed	Town / Town Engineer	Town Funds
13	The Town will use permeable driveways and paved pedestrian surfaces to reduce runoff and promote groundwater recharge to mitigate the effects of groundwater withdrawal on subsidence in the area.	Flood, Subsidence	New	$50,000	Low	N/A	As-Identified	Town / Town Engineer	Town Funds
14	Encourage the use of green infrastructure and low impact development measures to decrease paved surfaces that store and release heat	Drought, Extreme Heat	New	Staff Time	Low		As Needed	Town / Town Engineer	Town Funds
15	Perform public information campaign using social media and webpages during the hot summer months to educate citizens on the potential health hazards associated with extreme heat events,	Extreme Heat	Both	Staff Time	Low		Seasonally	Social Services Director, Town Manager	Town Funds

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Table 6-8-10: Mitigation actions and projects and implementation strategy for Gilbert

Mitigation Action/Project					Implementation Strategy				
ID No.	Description	Hazard(s) Mitigated	Community Assets Mitigated (Ex/New)	Estimated Cost	Priority Ranking	Planning Mechanism(s) for Implementation	Anticipated Completion Date	Primary Agency / Job Title Responsible for Implementation	Funding Source(s)
1	Review building permits for compliance with Floodplain Ordinance and NFIP regulations to reduce risks.	Flood	Both	Staff time	High	Staff Training Floodplain Regulations	Annual-Ongoing	Floodplain Administrator/ Plans Review and Inspection Manager	General Fund Permit Fees
2	Proactive adoption of applicable master plans, land uses and developmental agreements to reduce risks.	Flood	New	Staff Time	High	Coordination with County Flood Control & Chapter 34 of Town Code	Ongoing	Engineering// Planning Service Manager	General Fund
3	Implement the appropriate stage of the Water Supply Reduction Management Plan as adopted (May 2003) to reduce water use.	Extreme Heat/Drought	Both	Staff Time	High	Coordination with Salt River Project, the Arizona Project, & AZ Department of Water Resources.	Ongoing	Water Resource Manager & Town Manager	General Fund
4	Gilbert will continue to participate in the Community Rating System (CRS) program and get credit for the various activities that assist property owners in receiving reduced insurance premiums.	Flood	Both	Staff Time	High	Coordination with Flood Control District of Maricopa County	Ongoing	Floodplain Administrator	General Fund
5	Work closely with FCDMC – Dam Safety to stay abreast of current mitigation efforts and timelines at Powerline FRS including the proposed Powerline Channel.	Flood/Fissure	Both	Staff Time	High	Coordination with Flood Control District -Dam Safety	Ongoing	Floodplain Administrator/ Emergency Management Coordinator	General Fund
6	Provide pertinent weather and hazard mitigation information to the public to raise awareness of local hazards by providing local weather service and Maricopa County Hazard Mitigation links from Town of Gilbert Home page.	Extreme Heat/Flood/ Severe Wind	Both	Staff Time	Medium	Work with webmaster identify links	Ongoing	Emergency Management Coordinator/ Webmaster	General Fund

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Table 6-8-10: Mitigation actions and projects and implementation strategy for Gilbert

Mitigation Action/Project					Implementation Strategy				
ID No.	Description	Hazard(s) Mitigated	Community Assets Mitigated (Ex/New)	Estimated Cost	Priority Ranking	Planning Mechanism(s) for Implementation	Anticipated Completion Date	Primary Agency / Job Title Responsible for Implementation	Funding Source(s)
7	Participate in occasional tabletop exercises to identify potential mitigation measures for increasing response effectives such as evacuation and shelter functions.	Dam Inundation/ Levee Failure/Flood	Both	Staff Time	High	Coordination with Maricopa County Emergency Management and Flood Control	Ongoing	Emergency Management Coordinator	General Fund
8	Promote the use of weather radios, especially in schools, hospitals and other locations where people congregate to inform them of the approach of severe weather.	Extreme Heat/Flood/ Severe Wind	Both	Staff Time	Medium	Coordinate with stakeholders and use of website and social media.	Ongoing	Emergency Management Coordinator/ Communication Office	General Fund
9	Use website and social media to encourage citizens to be prepared in case of a disaster event to raise awareness and participation.	Dam Inundation/ Levee Failure/Flood/ Drought	Both	Staff Time	High	Coordinate messaging with Communication Office for delivery	Ongoing	Emergency Manager/ Communications Office	General Fund
10	Review building permits in high risk and/or mapped fissure areas and require engineering evaluation prior to development to reduce impacts.	Fissure	New	Staff Time	High	Development Services coordination with Town Engineers utilizing AZ Geographical Survey Maps	Ongoing	Town Engineer Permit & Plans Review and Inspection Manager	General Fund
11	Monitor ADWR Subsidence Monitoring Program's satellite imagery for local trends and impacts with the goal of determining strategies to reduce damage and losses.	Subsidence	Both	Staff Time	High	Coordinate with ADWR	Ongoing	Water Resource Manager	General Fund
12	Provide link to the Arizona Department of Water Resource website as part of a public campaign to raise awareness to the hazards and locations of active subsidence.	Subsidence	Both	Staff Time	High	Coordinate with ADWR and webmaster	Ongoing	Water Resource Manager and Webmaster	General Fund
13	Study and potential improvements to Vaughn Avenue Basin area to reduce potential of overtopping.	Flooding	Both	$300,000	High	Coordinate with stakeholders	Within 2 years of receiving grant funding	Engineering/ Streets Manager/Public Works Director	General Funds/ Grants

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Table 6-8-10: Mitigation actions and projects and implementation strategy for Gilbert

Mitigation Action/Project					Implementation Strategy				
ID No.	Description	Hazard(s) Mitigated	Community Assets Mitigated (Ex/New)	Estimated Cost	Priority Ranking	Planning Mechanism(s) for Implementation	Anticipated Completion Date	Primary Agency / Job Title Responsible for Implementation	Funding Source(s)
14	Improvement to Gilbert Road and Williams Field Road Intersection Drainage to reduce local flooding.	Flooding	Both	$750,000	High	Coordinate with stakeholders	Within 2 years of receiving grant funding	Engineering/ Streets Manager/Public Works Director	General Funds/ Grants
15	Study and potential improvement to 170th Street and San Tan Drainage to reduce local flooding.	Flooding	Both	$300,000	High	Coordinate with stakeholders	Within 2 years of receiving grant funding	Engineering/ Streets Manager/Public Works Director	General Funds/ Grants
16	Improvement to Commerce Area Drainage to reduce local flooding.	Flooding	Both	$1,156,000	High	Coordinate with stakeholders	Within 2 years of receiving grant funding	Engineering/ Streets Manager/Public Works Director	General Funds/CIP/ Grants
17	Study and potential improvement to 172nd Street south of Flintlock, implement design to protect roadway and underground utilities from future collapse and ensure rain water is diverted away from fissure area.	Flooding/ Fissure	Both	$300,000	High	Coordinate with stakeholders	Ongoing	Engineering/ Streets Manager/Public Works Director	General Funds/ Grants
18	Perform an Area Drainage Master Study (ADMS) for San Tan area to identify flood risks and potential areas of mitigation interest.	Flooding	Both	Staff Time		Coordination with Flood Control District of Maricopa County	Within 2 years of receiving funding	Floodplain Administrator	FCDMC
19	Perform an Area Drainage Master Study (ADMS) for the Queen Creek / East Mesa / and Southeast Gilbert areas to identify flood risks and potential areas of mitigation interest.	Flooding	Both	Staff Time		Coordination with Flood Control District of Maricopa County	Within 2 years of receiving funding	Floodplain Administrator	FCDMC

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Table 6-8-11: Mitigation actions and projects and implementation strategy for Glendale

Mitigation Action/Project					Implementation Strategy				
ID No.	Description	Hazard(s) Mitigated	Community Assets Mitigated (Ex/New)	Estimated Cost	Priority Ranking	Planning Mechanism(s) for Implementation	Anticipated Completion Date	Primary Agency / Job Title Responsible for Implementation	Funding Source(s)
1	In partnership with The Salvation Army, provide respite care and dehydration stations. This effort mitigates loss of life during extreme temperature.	Extreme Heat	Existing	Staff time	High	N/A	On-going	Emergency Management	Donations
2	Perform a public information campaign in coordination with the City of Glendale Marketing Department and Fire Department to educate and inform citizens of safety during periods of extreme heat.	Extreme Heat	Existing	Staff time	High	N/A	On-going	Fire Department and Public Affairs / Public Information Officer	GDEM/FD Budget
3	Ordinance compliance and maintenance of property (weed/brush abatement)	Wildfire	Existing	Staff time	High	City Code	On-going	Code Compliance	General Fund Budget
4	Reduce the risk of fires to communities located against a wildland interface through participation with Maricopa County and other local jurisdictions in the development of a Community Wildfire Protection Plan (CWPP)	Wildfire	Both	Staff time	High	Healthy Forests Restoration Act of 2003 (HFRA)	2025	Emergency Management / Emergency Management Coordinator	General Fund Budget
5	Maintenance of Emergency Action Plan (EAP) of covered municipal water storage reservoir with a capacity of 12 million gallons. (Thunderbird Reservoir)	Dam Failure	Existing	Staff time	High	Regulatory Requirement	On-going	Water Services / Water Facilities Supervisor	Water Services Budget
6	Participation in the Annual ADWR inspection and survey of the Thunderbird Reservoir.	Dam Failure	Existing	Staff time	High	Regulatory Requirement	Annually	Water Services / Water Facilities Supervisor	Water Services Budget
7	Participation in annual EAP drills and tabletop exercises.	Dam Failure	Existing	Staff time	High	Regulatory Requirement	Annually	Water Services / Water Facilities Supervisor	Water Services Budget
8	Water Conservation Office conducting educational outreach to the public on best practices, via classes, flyers, website, social media	Drought	Existing	Staff time	High	Municipal Conservation Program Requirement	On-going	Water Services / Environmental Programs Administrator	Water Services Budget

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Table 6-8-11: Mitigation actions and projects and implementation strategy for Glendale

Mitigation Action/Project					Implementation Strategy				
ID No.	Description	Hazard(s) Mitigated	Community Assets Mitigated (Ex/New)	Estimated Cost	Priority Ranking	Planning Mechanism(s) for Implementation	Anticipated Completion Date	Primary Agency / Job Title Responsible for Implementation	Funding Source(s)
9	Encourage permanent reduction in amount of water used for landscaping purposes through Landscape Rebate up to $750 for residential and $3,000 for non-residential.	Drought	New	Staff time	High	Municipal Conservation Program Requirement	On-going	Water Services / Environmental Programs Administrator	Water Services Budget/Grant
10	Update Drought Management Plan (2016) to assist in management of operations when a drought is declared.	Drought	Existing	Staff time	High	Regulatory Requirement	On-going	Water Services / Environmental Programs Administrator	Water Services Budget
11	Conduct landscape classes (promote xeriscape) to encourage use of drought-resistant landscaping	Drought	Existing	Staff time	High	Municipal Conservation Program Requirement	On-going	Water Services / Environmental Programs Administrator	Water Services Budget
12	Citywide plan to control stormwater, including identification of problem areas (drainage issues, illicit discharges, etc.). The City's Stormwater Management Plan is reviewed annually and updated as needed.	Flood	Existing	Staff time	High	Regulatory Requirement	On-going Submitted to ADEQ in 2014	Engineering / Engineering Project Manager Water Services / Environmental Program Manager	City and Water Services Budget
13	Maintain emergency generators at water and wastewater plants, water booster stations, and wastewater lift stations.	Severe Wind	Existing	Staff time	High	N/A	On-going	Water Services / Water Services Supervisor	Water Services Budget
14	Maintain emergency generators at public safety facilities, including police stations, fire stations and Glendale Regional Public Safety Training Center.	Severe Wind	Existing	Staff time	High	N/A	On-going	Various Departments	Fire Budget
15	Work with federal and state agencies, and local coalition to evaluate awareness of fissure risk zones and the problems caused by fissures.	Fissures	Existing	Staff time	High	Development Services/Planning	On-going	Planning	City Budget
16	Geological hazards addressed in General Plan and will be incorporated in the planning process for the next General Plan.	Fissures	Existing	Staff time	High	Development Services/Planning	On-going	Planning	City Budget

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Table 6-8-11: Mitigation actions and projects and implementation strategy for Glendale

Mitigation Action/Project					Implementation Strategy				
ID No.	Description	Hazard(s) Mitigated	Community Assets Mitigated (Ex/New)	Estimated Cost	Priority Ranking	Planning Mechanism(s) for Implementation	Anticipated Completion Date	Primary Agency / Job Title Responsible for Implementation	Funding Source(s)
17	Utilization of Development Services plans and procedures to survey and monitor elevations in the City of Glendale to determine and establish long term mitigation strategies.	Subsidence	Existing	Staff time	High	Development Services/ Engineering	On-going	Planning	City Budget
18	Development Services has utilized the risk as a regular risk of development and public work projects. The lands used for such projects are inspected for subsidence issues prior to projects starting.	Subsidence	Existing	Staff time	High	Development Services/Field Ops	On-going	Planning	City Budget
19	Inform citizens of risks associated with flood risk areas, specifically parks multi-use pathways.	Levee Failure	Existing	Staff time	High	Public Facilities, Recreation & Special Events	On-going	Public Facilities, Recreation & Special Events	City Budget
20	Work with Flood Control District of Maricopa County to determine potential effects of levee failure	Levee Failure	Existing	Staff time	High	Emergency Action Plans	On-gong	Emergency Manager and Emergency Services Coordinator / Emergency Management	City Budget
21	Participate in annual Flood Control District of Maricopa County Drill/Exercises	Levee Failure	Existing	Staff time	High	N/A	Annually	Emergency Manager and Emergency Services Coordinator / Emergency Management	City Budget
22	Enforce currently adopted building codes (2018 IBC and IRC) to mitigate damages due to severe wind events.	Severe Wind	New	Staff time	High	Building Codes / Development Review and Building Inspection Processes	On-going as needed	Building Safety	City Budget

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Table 6-8-11: Mitigation actions and projects and implementation strategy for Glendale

Mitigation Action/Project					Implementation Strategy				
ID No.	Description	Hazard(s) Mitigated	Community Assets Mitigated (Ex/New)	Estimated Cost	Priority Ranking	Planning Mechanism(s) for Implementation	Anticipated Completion Date	Primary Agency / Job Title Responsible for Implementation	Funding Source(s)
23	Encourage homeowners to use tie-down straps and/or anchors to secure ancillary buildings and metal awnings or porches to mitigate the potential for flying debris during severe wind events.	Severe Wind	Both	Staff time	High	Building Codes / Development Review and Building Inspection Processes	On-going as needed	Building Safety	City Budget
24	Use website and social media sources to raise public awareness to the impacts of flood and severe winds associated with monsoon season.	Flood, Severe Wind	Both	Staff time	High	N/A	On-going and seasonal	Emergency Management	City Budget

Table 6-8-12: Mitigation actions and projects and implementation strategy for Goodyear

Mitigation Action/Project					Implementation Strategy				
ID No.	Description	Hazard(s) Mitigated	Community Assets Mitigated (Ex/New)	Estimated Cost	Priority Ranking	Planning Mechanism(s) for Implementation	Anticipated Completion Date	Primary Agency / Job Title Responsible for Implementation	Funding Source(s)
1	Review building permits for compliance with Floodplain Ordinance and NFIP regulations.	Flood	Both	Staff time	High	Staff training floodplain regulations	Annual – Ongoing	City Engineer, Development Services Director	General Fund Fees
2	Use newsletters, flyers, utility bill inserts, website notices, radio and television announcements, social media and newspaper articles to educate the public about hazards impacting Goodyear and how to be prepared in case of an emergency or disaster event.	All Hazards	Both	Staff Time	High	Staff training Department/ Division coordination	Annual-Ongoing	Digital Communications PIOs Emergency Manager Dispatch Community Risk Reduction	General Fund
3	Enforce the City of Goodyear's weed abatement ordinance.	Wildfire	Both	Staff time/ Volunteers	High	Code Compliance	Annual-Ongoing	Building Official	General Fund
4	Educate the public on proper fuels thinning, setbacks, and water storage for wildfire mitigation using Firewise type of programs and guidance documents.	Wildfire	Both	Staff time	High	Fire Department/EM coordination	Annual-Ongoing	Fire Chief/Emergency Manager	Grant Funding and General Fund

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Table 6-8-12: Mitigation actions and projects and implementation strategy for Goodyear

Mitigation Action/Project					Implementation Strategy				
ID No.	Description	Hazard(s) Mitigated	Community Assets Mitigated (Ex/New)	Estimated Cost	Priority Ranking	Planning Mechanism(s) for Implementation	Anticipated Completion Date	Primary Agency / Job Title Responsible for Implementation	Funding Source(s)
5	Conduct wildfire safety education programs in the local schools through the Community Risk reduction program.	Wildfire	Both	Staff time/ Volunteers	High	Community Risk Reduction Division/EM coordination	Seasonal and as schools permit time	Emergency Manager Community Risk Reduction	General Fund and Grant Funding where available
6	Perform an information campaign at the onset of the extreme heat season to help educate the general public on ways to remain safe during periods of extreme heat.	Extreme Heat	Both	Staff time/ Volunteers	High	EM Division/ Community Risk Reduction Division coordination	Seasonal	Emergency Manager	General Fund
7	Identify and communicate locations within the community that can serve as cooling stations during times of extreme heat.	Extreme Heat	Both	Staff time/ Volunteers Interfaith community	High	EM Division/ Community Risk Reduction Division coordination	As needed given population densities and heat events	Emergency Manager	General Fund
8	Participate in the Flood Control District of Maricopa County annual county-wide flood exercises to identify areas of mitigation interest regarding vulnerable critical infrastructure, emergency access and routes issues.	Flood	Both	Staff time	High	Flood Control District/ MCDEM/EM coordination	Bi-Annual	Emergency Manager	General Fund
9	Provide severe weather information to the City of Goodyear first responders and other employees that work outdoors for them to be aware to wear the proper personal protection equipment.	Extreme Heat, Flood, Severe Wind and Weather	Both	Staff time	High	NWS/ EM Division coordination	Annual-Ongoing	Emergency Manager	General Fund
10	Work with the Flood Control District of Maricopa County to develop and update flood response plans as they pertain to the City of Goodyear and surrounding areas.	Flood	Both	Staff time	High	Flood Control/ EM Division	Annual-Ongoing	Emergency Manager	General Fund
11	Install backup generators at key critical facilities such as fire and police stations, water pumping stations, sewer lift stations, etc., to provide emergency power for critical operations during power failures caused by severe wind events.	Severe Wind and Weather	Both	Varies Department CIPs	High	Public Works	Ongoing	Public Works	Enterprise Funds and General Fund

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Table 6-8-12: Mitigation actions and projects and implementation strategy for Goodyear

Mitigation Action/Project					Implementation Strategy				
ID No.	Description	Hazard(s) Mitigated	Community Assets Mitigated (Ex/New)	Estimated Cost	Priority Ranking	Planning Mechanism(s) for Implementation	Anticipated Completion Date	Primary Agency / Job Title Responsible for Implementation	Funding Source(s)
12	Provide links on the community's website to sources of hazard mitigation educational materials encouraging residents of Goodyear to be prepared for hazard emergencies.	All Hazards	Both	Staff Time	Medium	EM division Digital Communications Community Risk Reduction	Annual-Ongoing	Emergency Manager	General Fund
13	Participate in occasional dam failure exercises to identify mitigation measures for increasing response effectiveness, such as evacuation planning and coordinated intended shelters.	Dam Inundation	Both	Staff time	Medium	Maricopa County EM/Police/Fire	Bi-Annual	Emergency Manager	General Fund
14	Mandate, encourage or incentivize the use of drought resistant landscaping through ordinance development and/or enforcement.	Drought	Both	Staff time	Medium	Staff training Department/ Division coordination	Annual-Ongoing	Right of Way Development Services Director	General Fund
15	Develop, update and maintain a local Drought Management Plan to define various levels of conservation or curtailment requirements that are based on drought severity triggers, system impacts, and enforced through utility billing structures and ordinance.	Drought	Both	Staff time	Medium	Inter-Departmentally updated & vetted	Annual-Ongoing	Public Works / Water Resources Division	General Fund
16	Include addressing subsidence risk as a regular part of the land development and public works projects review and permitting processes.	Subsidence	Both	Staff time	Medium	Staff training department/ Division coordination	Annual-Ongoing	City Engineer, Development Services Director	General Fund
17	Encourage/incentivize homeowners to use tie-down straps and/or anchors to secure metal awnings or porches to mitigate the potential for flying debris during severe wind events.	Severe Wind	Both	Staff time/ Volunteers	Medium	Community Risk Reduction	Annual-Ongoing	Emergency Manager	General Fund
18	Provide links to Arizona Department of Water Resources website as part of a public campaign to raise awareness to the hazards and locations of active subsidence.	Subsidence	Both	Staff time	Medium	EM Division/ Communications Division coordination	Q4, FY 21	Emergency Manager	General Fund

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Table 6-8-13: Mitigation actions and projects and implementation strategy for Guadalupe

Mitigation Action/Project					Implementation Strategy				
ID No.	Description	Hazard(s) Mitigated	Community Assets Mitigated (Ex/New)	Estimated Cost	Priority Ranking	Planning Mechanism(s) for Implementation	Anticipated Completion Date	Primary Agency / Job Title Responsible for Implementation	Funding Source(s)
1	Perform a public campaign at the onset of the extreme heat season to help educate the general public on ways to remain safe during periods of extreme heat.	Extreme Heat	Both	Staff time	Medium	Extreme Heat Plan	Ongoing	Fire Dept – Public Information Officer (PIO)	General fund
2	Identify, stock, and communicate locations within the community that can serve as cooling stations during times of extreme heat.	Extreme Heat	Both	Staff time	Medium	Extreme Heat Plan	Ongoing	Fire Dept Emergency manager	General fund
3	Review building permits for compliance with Floodplain Ordinance and NFIP regulations.	Flood	Both	Staff time	Low	Town General Plan/Code Review	Ongoing	Building Inspector/ Contractor	General fund
4	Implement the education and mitigation actions as outlined in the town's Stormwater Management Plan.	Flood	Both	Staff time	Low	Stormwater Management Plan	Ongoing	Building Inspector/ Contractor	General fund
5	Establish periodic monitoring and review of the Town of Guadalupe's general plan and zoning ordinance to determine effectiveness at preventing and mitigating hazards. Based on the results, amend as necessary.	Multi-Hazard	Both	Staff time	Low	Town General Plan	Ongoing	Town Manager or designee	General fund
6	Participate in occasional table top exercises to identify potential mitigation measures for increasing response effectiveness, such as evacuation route marking and permanent protection measures for intended shelters.	Dam Inundation	Existing	Staff time	Low	Flood Control Plan/ Emergency Operations Plan	2022	Emergency Manager/Flood Control District	General fund
7	Develop or update the inundation mapping for the emergency action plan for Guadalupe Retention Dam in order to identify population and critical facilities and infrastructure at risk, and to determine the need for potential mitigation.	Dam Inundation	Existing	Staff time	Low	Flood control Plan	Ongoing	Flood Control District	General fund
8	Public education of water conservation best practices through newsletter, flyers, social media and website notices.	Drought	Both	Staff time	Low	Drought Management Plan	Ongoing	Community Development	General fund

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Table 6-8-13: Mitigation actions and projects and implementation strategy for Guadalupe

Mitigation Action/Project					Implementation Strategy				
ID No.	Description	Hazard(s) Mitigated	Community Assets Mitigated (Ex/New)	Estimated Cost	Priority Ranking	Planning Mechanism(s) for Implementation	Anticipated Completion Date	Primary Agency / Job Title Responsible for Implementation	Funding Source(s)
9	Develop a local Drought Management Plan to define various levels of conservation requirement that are based on drought severity triggers.	Drought	Both	Staff time	Low	Drought Management Plan	Ongoing	Community Development	General fund
10	Review and update stormwater management plan that will analyze and identify problem flooding areas and propose long-term mitigation alternatives designed to reduce or eliminate the flood problems.	Flood	Both	Staff time	Low	Storm water management plan	Ongoing	Building Inspector/ Contractor	General fund
11	Work with Flood Control District of Maricopa County to review, update, and/or augment flood control ordinances to provide a greater level of protection than the minimum required by the NFIP.	Flood	Both	Staff time	Low	Storm water management plan	Ongoing	Building Inspector/ Contractor	General fund
12	Review existing buildings, evaluate any substandard construction issues and implement repair and upgrade plan for future wind damage.	Severe Wind	Existing	Staff time	Low	Hazard mitigation Plan	Ongoing	Building Inspector/ Contractor	General fund
13	Encourage homeowners to use tie-down straps and/or anchors to secure ancillary buildings and metal awnings or porches to mitigate the potential for flying debris during severe wind events.	Severe Wind	Both	Staff time	Low	Hazard Mitigation Plan	Ongoing	Emergency manager	General fund

Table 6-8-14: Mitigation actions and projects and implementation strategy for Litchfield Park

Mitigation Action/Project					Implementation Strategy				
ID No.	Description	Hazard(s) Mitigated	Community Assets Mitigated (Ex/New)	Estimated Cost	Priority Ranking	Planning Mechanism(s) for Implementation	Anticipated Completion Date	Primary Agency / Job Title Responsible for Implementation	Funding Source(s)
1	Review building permits for compliance with Floodplain Ordinance and NFIP regulations.	Flood	Both	Staff Time	High	NFIP/Staff Training/Floodplain Regulations	Annual-Ongoing	City Engineer	General Fund/Permit Fees

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Table 6-8-14: Mitigation actions and projects and implementation strategy for Litchfield Park

Mitigation Action/Project					Implementation Strategy				
ID No.	Description	Hazard(s) Mitigated	Community Assets Mitigated (Ex/New)	Estimated Cost	Priority Ranking	Planning Mechanism(s) for Implementation	Anticipated Completion Date	Primary Agency / Job Title Responsible for Implementation	Funding Source(s)
2	Annually coordinate with federal, state, and local dam owners to get updates on any changes in dam safety conditions and emergency action plan information.	Dam Inundation	Both	Staff Time	High	Coordination with Flood Control District -Dam Safety	Annually	Flood Control District of Maricopa County	General Fund
3	*Review Emergency Operations Plan for areas that can be updated in accordance with current warning measures that are now available through the national Weather Bureau and the Maricopa County Emergency Services.*	*All Hazards*	*Both*	*Staff Time*	*High*	*Emergency Management Coordinator tasks*	*Annual-Ongoing*	*Goodyear Fire / Maricopa County Sheriff, EM Coordinator, Public Works*	*General Fund*
4	Encourage city staff to become members of regional organizations that have hazard mitigation as a mission, to share in regional efforts and solutions to local and regional problems.	All Hazards	Both	Staff Time	High	Staff Training	Annual-Ongoing	Emergency Management Coordinator	General Fund
5	Provide links on the community's website to sources of hazard mitigation educational materials (e.g. – http://www.ready.gov/ and http://do1thing.com/) encouraging private citizens to be prepared for hazard emergencies.	All Hazards	N/A	Staff Time	Medium	Emergency Management Coordinator tasks and coordination with Fire and LE partners	Ongoing - Monthly	Emergency Management Coordinator	General Fund
6	Perform a public information campaign at the onset of the extreme heat season to help educate the general public on ways to remain safe during periods of extreme heat.	Extreme Heat	N/A	Staff Time	Medium	Staff	Ongoing-Seasonal	Emergency Management Coordinator/PIO	General Fund
7	Review building permits for compliance with International Building Code for structure compliance to endure severe winds and electrical strikes, use drought resistant plumbing fixtures, and flood proofing.	Drought, Flood, Severe Wind, Lightning Strike	Both	Staff Time	Medium	IBC/Staff Training	Annual-Ongoing	Public Works / City Engineer	General Fund
8	Include addressing subsidence risk as a regular part of the land development and public works projects review and permitting.	Subsidence	Both	Staff Time	Low	Engineering Review	Ongoing	City Engineer	General Fund

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Table 6-8-15: Mitigation actions and projects and implementation strategy for Mesa

Mitigation Action/Project					Implementation Strategy				
ID No.	Description	Hazard(s) Mitigated	Community Assets Mitigated (Ex/New)	Estimated Cost	Priority Ranking	Planning Mechanism(s) for Implementation	Anticipated Completion Date	Primary Agency / Job Title Responsible for Implementation	Funding Source(s)
~~1~~	Maintain continuous water supply by continuing to install/replace water distribution system throughout the City of Mesa	Drought	Both	$5-10M /yr.	High	5yr-CIP	Ongoing	Water Resources & Engineering Dept.	Bond Funding
2	CAP (Signal Butte WTP) Phase II, expansion of water treatment plant at Elliot and Signal Butte	Drought	Both	$92M	High	5yr-CIP	2024-2025 (estimated)	Water Resources & Engineering Dept.	Bond Funding (future)
3	Future Reclaimed Water Line and pump stations to convey Northwest Water Reclamation Plant effluent to Gila River Indian Community in exchange of CAP water	Drought	Both	$70-80M	High	5-yr CIP	2024	Water Resources & Engineering Dept.	Bond Funding (future)
4	Add potable water wells and/or redrill and equip existing wells	Drought	Both	~ $ 2 M /yr.	High	5-yr-CIP	Ongoing	Water Resources & Engineering Dept.	Bond Funding (future)
5	Review building permits for compliance with Floodplain Ordinance and NFIP regulations.	Flood	Both	Staff time	High	Building Permit Process	Ongoing	Development Services, Engineering Dept.	General Fund, Permit Fees
6	Update Storm Drain Master Plan	Flood	Both	$500,000	High	City of Mesa Storm Drain Master Plan.	Ongoing	Engineering Dept.	General Fund, Grants & future CIP budget.
7	Perform public information campaign at the start of the extreme heat season to educate the public.	Extreme Heat	Both	Staff time & cost of supplies	High	On-going operations	At the extreme event	Fire/Medical Dept. & Public Information office.	General Fund
8	Partner with NGO's (e.g. – The Salvation Army, church organizations, shelters, etc.) to provide respite care and hydration stations to mitigate loss of life during extreme temperature events.	Extreme Heat	Both	Staff time & cost of supplies	High	City of Mesa Emergency Operations Plan	At the extreme event	Fire/Medical Dept. & Public Information Office.	General Fund

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Table 6-8-15: Mitigation actions and projects and implementation strategy for Mesa

Mitigation Action/Project					Implementation Strategy				
ID No.	Description	Hazard(s) Mitigated	Community Assets Mitigated (Ex/New)	Estimated Cost	Priority Ranking	Planning Mechanism(s) for Implementation	Anticipated Completion Date	Primary Agency / Job Title Responsible for Implementation	Funding Source(s)
9	Provide links on the City of Mesa Website to sources of hazard mitigation educational materials encouraging private citizens to be prepared for hazard emergencies.	Dam Failure, Levee Failure	Both	Staff time	Low	City of Mesa Emergency Operations Plan	On-going	Fire/Medical Dept. & Public Information Office.	General Fund
10	Participate/Conduct tabletop exercises to identify potential mitigation measures for increasing response effectiveness in the event of a dam failure.	Dam Failure, Levee Failure	Both	Staff time	Low	City of Mesa Emergency Operations Plan	Ongoing	Development Services & Engineering Dept.	General Fund
11	Clear vegetation & wildfire fuels to create a clear space around critical structures.	Wildfire	Both	Staff time	Medium	Code enforcement & Fire Dept.	Ongoing prior & during the dry season	Fire/Medical Dept. & Development Services	General Fund
12	Enforce burn & fireworks bans as needed during dry season. Enforce weed abatement ordinance.	Wildfire	Both	Staff time	Medium	Code enforcement & Fire Dept.	Ongoing prior & during the dry season	Fire/Medical Dept. & Development Services	General Fund
13	Maintain/install back-up generators at critical facilities such as Fire & Police Stations, water pumping stations, sewer lift stations, etc., to provide emergency power for critical operations during power failures caused by severe wind events.	Severe Wind	Both	$2M + staff time.	High	Fire Department Emergency Management Division	Ongoing	Water Resources, Engineering, Development Services, Parks Recreation and Community Facilities	General Fund and CIP budget
14	Distribution Pole Maintenance & Replacement/Vegetation Management Programs	Severe Wind	Both	$500,000	High	Annual CIP	Ongoing	Energy Resources Electric	Bond Funding (future)
15	Include the subsidence and fissure risk as a regular part of development & public works projects review.	Fissure, Subsidence	Both	Staff time	Medium	Engineering and Design Standards	Ongoing	Development Services & Engineering Dept.	General Fund
16	Provide links to ADWR and AZGS websites on City website to raise awareness to locations of active fissure and subsidence.	Fissure, Subsidence	Both	Staff time	Medium	Engineering and Design Standards	Ongoing	Development Services & Engineering Dept.	General Fund

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Table 6-8-15: Mitigation actions and projects and implementation strategy for Mesa

Mitigation Action/Project					Implementation Strategy				
ID No.	Description	Hazard(s) Mitigated	Community Assets Mitigated (Ex/New)	Estimated Cost	Priority Ranking	Planning Mechanism(s) for Implementation	Anticipated Completion Date	Primary Agency / Job Title Responsible for Implementation	Funding Source(s)
17	The City of Mesa provides information to the public using the Community Emergency Notification System (CENS), also called Reverse 9-1-1. If an event occurs the 9-1-1 dispatch center in Mesa will call and provide information and/or instruction to subscribers.	Levee Failure, Dam Failure	Both	Staff time	Low	City of Mesa Communications (9-1-1 Emergency System	Ongoing	City of Mesa Communications	General Fund

Table 6-8-16: Mitigation actions and projects and implementation strategy for Paradise Valley

Paradise Valley is no longer participating in the Plan.

Table 6-8-17: Mitigation actions and projects and implementation strategy for Peoria

Mitigation Action/Project					Implementation Strategy				
ID No.	Description	Hazard(s) Mitigated	Community Assets Mitigated (Ex/New)	Estimated Cost	Priority Ranking	Planning Mechanism(s) for Implementation	Anticipated Completion Date	Primary Agency / Job Title Responsible for Implementation	Funding Source(s)
1	Review building permits for compliance with Floodplain Ordinance and NFIP regulations.	Flood	Both	Staff Time	High	Staff training Floodplain regulations	Annual -On going	Development and Engineering	General Funds Permit Fees
2	Assist with the revision of a water conservation plan for mitigating the impact of a drought on the public water supply.	Drought	Both	Staff Time	High	Plan development	Annual	Public Works	General funds
3	Work with the Flood Control District of Maricopa County to determine potential effects of a flash flood or flood affecting the city. Also provide sandbags and sand as required.	Flooding	Both	Staff Time	High	Plan development	Annual	Public Works, City Engineering and Emergency Management	Enterprise funds

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Table 6-8-17: Mitigation actions and projects and implementation strategy for Peoria

Mitigation Action/Project					Implementation Strategy				
ID No.	Description	Hazard(s) Mitigated	Community Assets Mitigated (Ex/New)	Estimated Cost	Priority Ranking	Planning Mechanism(s) for Implementation	Anticipated Completion Date	Primary Agency / Job Title Responsible for Implementation	Funding Source(s)
4	Work with the Flood Control District of Maricopa County to determine potential effects of a levee failure.	Levee Failure	Both	Staff Time	High	Plan development	Annual	Public Works, City Engineering and Emergency Management	General funds
5	Encourage a fire buffer along wild land-urban interface areas.	Wildfire	New	Staff Time	Medium	Building regulations and public awareness	Annual	Public Works, City Engineering and Fire Department	General funds
6	Incorporate hazard profile data into city's GIS for mapping of floodways, high wind areas, subsidence areas, hazardous materials, etc.	All Hazards	Both	Staff Time	High	Plan development	On going	IT Department and Emergency Management	General funds
7	*Train key city staff on appropriate actions based on the Emergency Operations Plan.*	*All*	*New*	*Staff Time*	*High*	*Staff training*	*On going*	*Emergency Management*	*General funds*
8	*Participate in regional training opportunities as well as Emergency Operations Command exercises within city to prepare for emergencies.*	*All*	*Both*	*Staff Time*	*Medium*	*Staff training*	*On going*	*Emergency Management and most city departments*	*General funds*
9	*All Fire Department personnel should be trained at Operations level, currently command staff are trained at Operations – rest of personnel are trained at awareness level.*	*All*	*Existing*	*Staff Time*	*Medium*	*Staff training*	*On going*	*Fire Department*	*General funds*
10	*Police Department personnel should be trained at Operations level, currently command staff are trained at Operations – rest of personnel are trained at awareness level.*	*All Hazards*	*Existing*	*Staff Time*	*Medium*	*Staff training*	*On going*	*Police Department*	*General funds*
11	Control development in flood areas	Flood	Existing	Staff Time	High	Floodplain regulations	Annual	Planning and Zoning, Development and Engineering	General funds

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Table 6-8-17: Mitigation actions and projects and implementation strategy for Peoria

Mitigation Action/Project					Implementation Strategy				
ID No.	Description	Hazard(s) Mitigated	Community Assets Mitigated (Ex/New)	Estimated Cost	Priority Ranking	Planning Mechanism(s) for Implementation	Anticipated Completion Date	Primary Agency / Job Title Responsible for Implementation	Funding Source(s)
12	Encourage flood-proof measures through building design	Flood	Existing	Staff Time	High	Floodplain regulations and public awareness	Annual	Development and Engineering and Economic Development	General funds
13	Utilize Public Service Announcements (PSAs) broadcast on Channel 11 to communicate hazard risk and emergency information. Produce corresponding flyers to be distributed to residents via utility bill mailings	All Hazards	Existing	Staff Time	Medium	Staff training	On going	Office of Communications, Public Works and Emergency Management	General funds
14	Research identified data limitations affecting the relative vulnerability of assets to drought	Drought	Existing	Staff Time	High	Plan development	Annual	Public Works and GIS	General funds
15	The City of Peoria will use newsletters, website notices, social media and newspaper articles to educate the public about hazards impacting the city and how to be prepared in the case of a disaster.	All Hazards	New	Staff time	Medium	Public awareness	On going	Office of Emergency Management and the Office of Communications	General Funds
16	The City of Peoria will provide links on the emergency management webpage for sources of hazard mitigation educational materials such as www.fema.gov encouraging private citizens to be prepared for hazard emergencies.	All Hazards	New	Staff time	Medium	Public awareness	On going	Office of Emergency Management and the Office of Communications	General Funds
17	The City of Peoria will review and assess building and residential codes currently in use to determine if newer, more up-to-date codes are available or required related to hazard mitigation.	All Hazards	New	Staff time	Medium	Plan development	On going	Development and Engineering and Economic Development	General Funds
18	The city will continue to promote the Storm Ready program and the use of weather radios, especially in schools, hospitals and other locations where people congregate to inform them of the approach of severe weather events.	Flood, Extreme	New	Staff time	Medium	Public awareness	On going	Office of Emergency Management and the Office of Communications	General Funds

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Table 6-8-17: Mitigation actions and projects and implementation strategy for Peoria

Mitigation Action/Project					Implementation Strategy				
ID No.	Description	Hazard(s) Mitigated	Community Assets Mitigated (Ex/New)	Estimated Cost	Priority Ranking	Planning Mechanism(s) for Implementation	Anticipated Completion Date	Primary Agency / Job Title Responsible for Implementation	Funding Source(s)
19	The City of Peoria working with Flood Control District of Maricopa County will continue to analyze and identify dam failure inundation limits to identify evacuation routes.	Dam Failure	Both	Staff Time	High	Plan development	Annual	Public Works, City Engineering and Emergency Management	General funds
20	The City of Peoria will participate/conduct occasional table top exercises to identify potential mitigation measures for increasing response effectiveness, such as evacuation route marking and permanent protection measures for intended shelters.	Dam Failure	New	Staff time	Medium	Public awareness	On going	Office of Emergency Management	General Funds
21	The City of Peoria working with the Flood Control District of Maricopa County will update the inundation mapping for the emergency action plan for Lake Pleasant in order to identify population and critical facilities and infrastructure at risk, and to determine the need for potential mitigation.	Dam Failure	existing	Staff time	High	Floodplain regulations and public awareness	Annual	The Office of Emergency management and various City Departments	General funds
22	The City of Peoria will conduct public education of water conservation best practices through a variety of media such as newsletter, flyers, social media and website notices.	Drought	Existing	Staff Time	High	Plan development	Annual	Public Works and Office of Communications	Enterprise funds
23	The City of Peoria encourages the use of drought resistant landscaping through ordinance development and/or enforcement.	Drought	Existing	Staff Time	High	Plan development	Annual	Public Works and GIS	Enterprise funds
24	The City of Peoria will continue to develop/update our local Drought Management Plan to define various levels of conservation requirements that are based on drought severity triggers.	Drought	Existing	Staff Time	High	Plan development	Annual	Public Works and GIS	Enterprise funds
25	The City of Peoria as practical will continue to use reclaimed water to irrigate city owned landscape or other operations such as our truck washing station.	Drought	Existing	Staff Time	High	Plan development	Annual	Public Works, Community Services & Economic Development	General funds

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Table 6-8-17: Mitigation actions and projects and implementation strategy for Peoria

Mitigation Action/Project					Implementation Strategy				
ID No.	Description	Hazard(s) Mitigated	Community Assets Mitigated (Ex/New)	Estimated Cost	Priority Ranking	Planning Mechanism(s) for Implementation	Anticipated Completion Date	Primary Agency / Job Title Responsible for Implementation	Funding Source(s)
26	City of Peoria will continue to identify and communicate locations within the community that can serve as cooling stations during times of extreme heat.	Extreme Heat	New	Staff time	High	Public awareness	Ongoing	Office of Emergency Management and the Office of Communications	General Funds
27	Perform a public information campaign at the onset of the extreme heat season to help educate the general public on ways to remain safe during periods of extreme heat.	Extreme Heat	New	Staff time	Medium	Floodplain regulations and public awareness	Ongoing	Office of Emergency Management and the Office of Communications	General Funds
28	The City of Peoria will review, update and/or augment flood control ordinances to provide a greater level of protection than the minimum required by the NFIP.	Flood	Existing	Staff time	Medium	Floodplain regulations and public awareness	June 2021	Development and Engineering, City Admin Office	General funds
29	Identify and map flood hazards in areas expected to grow or develop in the foreseeable future.	Flood	New	Staff time	Medium	Floodplain regulations and public awareness	Ongoing	GIS	General funds
30	The City of Peoria will continue to develop/augment a citywide GIS program that is integrated into Public Works, Development Services, Police, Fire/Rescue and Emergency Management to help prevent development in flood prone regions.	Flood	New	Staff time	Medium	Public awareness	Ongoing	Office of Emergency Management and various City Departments	General Funds
31	Perform public outreach to citizens located within levee failure flood risk areas to provide awareness of potential increase in flood elevations with a levee failure.	Levee Failure	New	Staff time	Medium	Public awareness	Ongoing	The Office of Emergency management and various City Departments	General funds
32	Encourage homeowners to use tie-down straps and/or anchors to secure ancillary buildings and metal awnings or porches to mitigate the potential for flying debris during severe wind events.	Severe Wind	New	Staff time	Medium	Public awareness	Ongoing	The Office of Emergency management and various City Departments	General funds

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Table 6-8-17: Mitigation actions and projects and implementation strategy for Peoria

Mitigation Action/Project					Implementation Strategy				
ID No.	Description	Hazard(s) Mitigated	Community Assets Mitigated (Ex/New)	Estimated Cost	Priority Ranking	Planning Mechanism(s) for Implementation	Anticipated Completion Date	Primary Agency / Job Title Responsible for Implementation	Funding Source(s)
33	Retrofit sub-standard roofs of key critical facilities and infrastructure to meet modern building code standards and mitigate damages and impacts of severe wind events.	Severe Wind	New	Staff time	Medium	Plan development	Ongoing	Development and Engineering, Economic Development	General funds
34	Include addressing subsidence risk as a regular part of the land development and public works projects review and permitting.	Subsidence	New	Staff time	Medium	Public awareness	Ongoing	Public Works, City Engineering, Building Safety	General funds
35	Provide links to the Arizona Department of Water Resources website as a part of a public campaign to raise awareness to the hazards and locations of active subsidence.	Subsidence	New	Staff time	Medium	Public awareness	Ongoing	Public Works, City Engineering & Building Safety	General funds
36	Establish survey monuments and monitor elevations in critical or key areas of the community to measure impacts and trends of subsidence, with the goal of determining long term mitigation strategies to reduce the damage and losses that may yet be experienced.	Subsidence	New	Staff time	Medium	Public awareness	Ongoing	Public Works, City Engineering & Building Safety	Grant funding
37	Develop and/or enforce a weed abatement ordinance.	Wildfire	New	Staff time	Medium	Plan development and Public awareness	Ongoing	Code Enforcement	General funds
38	Educate public on proper fuels thinning, setbacks, and water storage for wildfire mitigation using Firewise type of programs and guidance documents.	Wildfire	New	Staff time	Medium	Public awareness	Ongoing	Fire Department	General Funds/grants
39	The Peoria Fire Department will conduct Fire safety education programs where appropriate such as Peoria and Deer Valley Schools as well as other educational facility and public events such as G.A.I.N. night.	Wildfire	New	Staff time	Medium	Public awareness	Ongoing	Fire Department	General Funds/grants
40	Enact and enforce burn and fireworks bans as needed during extraordinarily dry and extreme wildfire conditions / seasons to mitigate possible, unintended wildfire starts.	Wildfire	New	Staff time	Medium	Public awareness	Ongoing	Fire Department	General Funds/grants

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Table 6-8-18: Mitigation actions and projects and implementation strategy for Phoenix

Mitigation Action/Project					Implementation Strategy				
ID No.	Description	Hazard(s) Mitigated	Community Assets Mitigated (Ex/New)	Estimated Cost	Priority Ranking	Planning Mechanism(s) for Implementation	Anticipated Completion Date	Primary Agency / Job Title Responsible for Implementation	Funding Source(s)
1	Review building permits for compliance with Floodplain Ordinance and NFIP regulations.	Flood, Dam Inundation,	Both	Staff Time	High	Staff Training, Plan Review	Annual-Ongoing	Public Works / Floodplain Manager	General Funds
2	Continue to include in the General Plan policies that protect the natural flow regime of washes, designate areas for Open Space and Preserves, and when fiscally possible support the use of green stormwater infrastructure/low impact development to address multiple risks.	Flood, Dam Inundation, Extreme Heat, Drought	Both	Staff time	High	Land acquisition and natural resource protection	Annual - ongoing	Parks and Recreation / PPPI Administrator	Phoenix Parks Preserves Initiative; General Fund; Bonds
3	Storm Drain CIP Program. Construct drainage facilities to mitigate flooding hazard to residents of the city.	Flood, Levee Failure	Both	Variable	High	Staff Training, Plan Review, Design and Construction	Ongoing	Street Transportation Department/ Deputy Street Transportation Director	Bonds/Impact Fees
4	Coordinate review and approval of development projects located within flood hazard areas with PDD and Floodplain Management.	Flood, Extreme Heat	Both	Staff time	High	GIS	Annual - ongoing	Planning and Development Department / Planning Researcher	Enterprise
5	Summer Respite regional program to network with faith-based organizations to provide heat relief, hydration and respite with wellness checks. Program services are provided for the affected populations.	Extreme Heat	N/A - people	Donations totaling $70,000 annually	High	Heat Relief Network	Annual - ongoing	Human Services/Family Advocacy Director	Corporate, Community, and faith-based contributions
6	Maintain and execute the Drought Response Plan (Revision in Draft - No Ordinance Change)	Drought	Both	Staff Time	Medium	Master Plan Update and Water Resource Plan Update	Ongoing	Water	WSD Operating Budget

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Table 6-8-18: Mitigation actions and projects and implementation strategy for Phoenix

Mitigation Action/Project					Implementation Strategy				
ID No.	Description	Hazard(s) Mitigated	Community Assets Mitigated (Ex/New)	Estimated Cost	Priority Ranking	Planning Mechanism(s) for Implementation	Anticipated Completion Date	Primary Agency / Job Title Responsible for Implementation	Funding Source(s)
7	Maintain and execute a water use awareness outreach program.	Drought	Both	Staff Time	Medium	Master Plan Update, Water Resource Plan Update, Drought Response Plan	Ongoing	Water	WSD Operating Budget
8	Revise and ratify the General Plan every ten years.	Flood	Both	Staff time	Medium	State statute; Smart Growth Requirement	Ongoing	Planning and Development Department/ Planning Manager	General Fund
9	Update and adopt a revised building code.	Flood, Severe Wind, Excessive Heat	Both	Staff time; Materials	Medium	Staff training; Community Outreach; Plan review	Annual - ongoing	Planning and Development Department / Assistant Director	Permit fees
10	Continue to ensure zoning stipulations are met before construction permits are issued, and zoning is compatible with the zoning ordinance.	Flood, Excessive Heat	Both	Staff time	Medium	Zoning Ordinance; Staff training; Plan review	Annual - ongoing	Planning and Development Department / Deputy Director	Permit fees
11	Dam/Levee Safety Program – Operate and Maintain Dams/Levees to mitigate flooding hazard to the residents of the city.	Flood, Dam Inundation, Levee Failure	Both	Staff Time, Materials	Medium	Staff Training, Plan Review	Annual - Ongoing	Street Transportation Department / Deputy Street Transportation Director	General Funds
12	Continue to provide links on the Phoenix.gov/Office of Emergency Management website to sources of hazard mitigation educational materials such as FEMA.gov and Ready.gov	Dam Inundation, Drought, Flood, Severe Wind, Wildfire	Both	Staff Time	Medium	N/A	Annual - ongoing	Office of Homeland Security and Emergency Management, City of Phoenix IT	General Funds

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Table 6-8-18: Mitigation actions and projects and implementation strategy for Phoenix

Mitigation Action/Project					Implementation Strategy				
ID No.	Description	Hazard(s) Mitigated	Community Assets Mitigated (Ex/New)	Estimated Cost	Priority Ranking	Planning Mechanism(s) for Implementation	Anticipated Completion Date	Primary Agency / Job Title Responsible for Implementation	Funding Source(s)
13	Continue to adhere to the City of Phoenix Building Standards and Review Process, which are regularly updated. The Building and Review Process requires site assessment for presence of, among other conditions, subsidence and fissures.	Subsidence, Fissure	Both	Staff Time	Medium	Staff Training, Plan Review, Design and Construction	Annual - ongoing	Street Transportation Department: Design and Construction Management	General Funds
14	Enforce City Ordinance 39-7D, which addresses overgrown vegetation, dead trees, brush and weeds or other conditions that present a health, fire or safety hazard.	Wildfire	Both	Staff Time	Medium	Staff Training, Zoning Ordinance with Neighborhood Preservation Ordinance	Annual – Ongoing	Neighborhood Services Department: Deputy Director, Preservation Division	General Funds, Community Development Block Grant
15	Coordinate with private companies and public agencies to study and map subsidence and fissure activity in critical or key areas of the community so that effective mitigation or avoidance strategies can be implemented.	Subsidence, Fissure	Both	Staff Time	Low	Staff Training, Plan Review, Design and Construction	Annual - ongoing	Street Transportation Department: Design and Construction Management	General Funds
16	Design and construct Rio Salado Oeste in Salt River (19th Ave-83rd Ave), including low flow channel improvements and riparian/xeri-riparian vegetation to improve flow conveyance and increase native vegetation/habitat.	Flooding and extreme heat	Both	Staff time, design and construction expenses	High	Rio Reimagined, land acquisition, design and construction	2030	Parks and Recreation Department/Natural Resource Division Deputy Director	TBD; anticipated USACE Civil Works project funds and local city match
17	The “Take a Hike do it Right” Outreach Program aims to educate the general public, including visitors and resort/hotel staff, on hike/trail selection and hiking safety to avoid heat related illnesses.	Extreme heat	Both	Staff time	High	Reincorporate original marketing strategies and enhance effort to wider audience	On going	Parks and Recreation Department/Natural Resource Division Deputy Director	TDB: Grants and possible funding from tourism related sources

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Table 6-8-18: Mitigation actions and projects and implementation strategy for Phoenix

Mitigation Action/Project					Implementation Strategy				
ID No.	Description	Hazard(s) Mitigated	Community Assets Mitigated (Ex/New)	Estimated Cost	Priority Ranking	Planning Mechanism(s) for Implementation	Anticipated Completion Date	Primary Agency / Job Title Responsible for Implementation	Funding Source(s)
18	Provide shade coverage at all City of Phoenix Bus Stops to shelter riders from excessive sunlight and extreme heat. Of the 4050 bus stops in Phoenix, 1500 of them still require shading structure. The T2050 plan will also implement a new bus shelter design to improve shading options for mitigating heat/sun issues for west-facing bus stops.	Extreme Heat	Both	$20M (additional $1M per year for maintenance and repair)	High	Public Transit Department's T2050 Plan	2025	Public Transit Department/Facilities Deputy Director	T2050
19	Increase frequency of bus routes around vulnerable communities (highest ridership, low income, minority) to minimize exposure to extreme heat while waiting for public transit.	Extreme Heat	Both	$270M for Operating Service; $55M for the additional buses and replacement buses	High	Public Transit Department's T2050 Plan	2025	Public Transit Department/Facilities Deputy Director	T2050
20	Implement a notification system for Downtown Phoenix businesses to raise hazard awareness and provide advanced warning of potential threats in the area.	All Hazards	Both	TBD, plan to put out RFP Q2 2021	High	Downtown Phoenix Business Master Plan	2022	Downtown Phoenix Partnership/ Strategy and Community Affairs	TBD

Table 6-8-19: Summary of mitigation actions and projects and implementation strategy for Queen Creek

Mitigation Action/Project					Implementation Strategy				
ID No.	Description	Hazard(s) Mitigated	Community Assets Mitigated (Ex/New)	Estimated Cost	Priority Ranking	Planning Mechanism(s) for Implementation	Anticipated Completion Date	Primary Agency / Job Title Responsible for Implementation	Funding Source(s)
1	Review building permits for compliance with Floodplain Ordinance and NFIP regulations.	Flood	Both	Staff time	High	Staff Training Floodplain Regulations	Ongoing	Development Services/ Floodplain Administrator	General Fund Permit Fees

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Table 6-8-19: Summary of mitigation actions and projects and implementation strategy for Queen Creek

Mitigation Action/Project					Implementation Strategy				
ID No.	Description	Hazard(s) Mitigated	Community Assets Mitigated (Ex/New)	Estimated Cost	Priority Ranking	Planning Mechanism(s) for Implementation	Anticipated Completion Date	Primary Agency / Job Title Responsible for Implementation	Funding Source(s)
2	Annually coordinate with county to obtain updates on any changes in dam safety conditions and emergency action plans.	Dam Inundation	Both	Staff time	Low	Emergency Action Plan for Powerline, Vineyard Road & Rittenhouse FRS	Ongoing	Fire & Medical Dept./Emergency Mgnt. Coord.	Emergency Services Fund
3	Educate and inform residents about dam safety through the Town's website and links to the Flood Control District of Maricopa County.	Dam Inundation	Both	Staff time	Medium	N/A	Ongoing	Fire & Medical Dept./Emergency Mgnt. Coord.	Emergency Services Fund
4	Educate and inform residents about water conservation through newsletters, social media, inserts, new customer packets, water wise workshops, high use notifications, regularly scheduled meter change outs and the Town's website.	Drought	Both	Staff time	Medium	ADEQ Required Best Management Practices (BMPs)	Ongoing	Utilities Services Dept./Water Conservation Spec.	Utilities Services Fund
5	Maintain the Town's Integrated Emergency and Drought Response Plan (ERDP).	Drought	Both	Staff time	High	Integrated Emergency and Drought Response Plan (ERDP)	Ongoing	Utilities Services Dept./Water Division	Utilities Services Fund
6	Educate and inform residents about extreme heat through newsletters, social media, inserts and/or the Town's website.	Extreme Heat	Both	Staff time	Medium	N/A	Ongoing	Fire & Medical Dept./Emergency Mgnt. Coord.	Emergency Services Fund
7	Incorporate respite care and hydration stations into the CERT Shelter Management Continuing Education (CE) Program	Extreme Heat	Both	Staff time	Low	CERT Continuing Education (CE) Program	Ongoing	Fire & Medical Dept./Emergency Mgnt. Coord.	Emergency Services Fund
8	Educate and inform residents about fissures through the Town's website and links to the Arizona Geologic Service website.	Fissure	Both	Staff time	Low	N/A	Ongoing	Development Services Dept.	General Fund
9	Reviews permit submittals for proximity to Earth Fissure Map that may require additional geological report.	Fissure Subsidence	New	Staff time	Medium	Staff Training Earth Fissure Map of the Chandler Heights Study Area	Ongoing	Development Services Dept./Engineering	General Fund Permit Fees
10	Install backup generators with the construction of Fire Station 412 and Fire Station 415.	Severe Wind	New	TBD	High	CIP/Design-Build project	FY23	Fire & Medical Dept./Deputy Fire Chief (Resources)	TBD for FY22

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Table 6-8-19: Summary of mitigation actions and projects and implementation strategy for Queen Creek

Mitigation Action/Project					Implementation Strategy				
ID No.	Description	Hazard(s) Mitigated	Community Assets Mitigated (Ex/New)	Estimated Cost	Priority Ranking	Planning Mechanism(s) for Implementation	Anticipated Completion Date	Primary Agency / Job Title Responsible for Implementation	Funding Source(s)
11	Identify opportunities to underground 12Kv power lines to mitigate power failures caused by severe wind events.	Severe Wind	Existing	TBD	Medium	CIP	Ongoing	Public Works CIP Division/CIP Project Manager	SRP Aesthetic Funds General Fund
12	Encourage fire buffer zones around the north face of the San Tan Mountains to prevent entry into the Box Canyon Area.	Wildfire	Both	Staff time	Medium	Maricopa County Community Wildfire Protection Plan	Ongoing	Fire & Medical Department	Emergency Services Fund
13	Preform annual fuel thinning in the Queen Creek and Sonoqui Washes.	Wildfire	Both	Staff time	Medium	N/A	Ongoing	Public Works Grounds Division/Grounds Superintendent	General Fund

Table 6-8-20: Mitigation actions and projects and implementation strategy for Salt River Pima-Maricopa Indian Community

Mitigation Action/Project					Implementation Strategy				
ID No.	Description	Hazard(s) Mitigated	Community Assets Mitigated (Ex/New)	Estimated Cost	Priority Ranking	Planning Mechanism(s) for Implementation	Anticipated Completion Date	Primary Agency / Job Title Responsible for Implementation	Funding Source(s)
1	Community Relations in coordination with Emergency Management to conduct public outreach/education on all hazards mitigation and emergency preparedness for community members. Community members that are educated on what to do before and during a disaster will reduce the loss of life and property in a disaster.	All Hazards	Both	Staff Time	High	TERC	Ongoing	Emergency Management/ Community Relations Office	General Fund
2	Replace existing Health and Human Services building with a newly designed building to be named River People Health Center to mitigate flooding of old building	Flood	Both	$98.4 million	High	CIP	2025	ECS/ Construction Division	Title 5 / CIP

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Table 6-8-20: Mitigation actions and projects and implementation strategy for Salt River Pima-Maricopa Indian Community

Mitigation Action/Project					Implementation Strategy				
ID No.	Description	Hazard(s) Mitigated	Community Assets Mitigated (Ex/New)	Estimated Cost	Priority Ranking	Planning Mechanism(s) for Implementation	Anticipated Completion Date	Primary Agency / Job Title Responsible for Implementation	Funding Source(s)
3	Conduct Master Drainage Study north of Arizona Canal to reduce flooding and develop water retention restore methods.	Flood Drought Subsidence	Both	$875,000	High	CIP	2025	ECS/Design Division	CIP
4	Conduct Fuel reduction project of light fuels in river bottom and community recreation areas to minimize the rapid spread of fire in this area.	Wildfire	Existing	$80,000	High	Fire Management Plan	Ongoing	ECS/ Construction Division	General Fund
5	Participate/conduct occasional table top exercises to identify potential mitigation measures for increasing response effectiveness, such as evacuation route marking and permanent protection measures for intended shelters.	Dam Failure	Both	Staff Time	High	EMPG Work Plan	2025	Emergency Management/ Emergency Manager	EMPG Grant
6	Annually coordinate with federal, state, and local dam owners to get updates on any changes in dam safety conditions and emergency action plan information so that they can be integrated into SRPMIC response plans.	Dam Failure	Both	Staff Time	High	Federal Dam Safety Inspection Program	2025	Public Works/ Assistant Director	General Fund
7	Implement a water harvesting program through the location, design and construction of dual functioning stormwater retention facilities with enhanced recharge elements designed into the basin.	Drought Flood Subsidence	Both	$50,000	Medium	General Plan	2025	ECS/ Design Division	CIP
8	Encourage homeowners to use tie-down straps and/or anchors to secure ancillary buildings and metal awnings or porches to mitigate the potential for flying debris during severe wind events.	Severe Wind	Both	Staff Time	Medium	Code of Ordinance	2025	Public Works/ ECS	General Fund
9	Maintain inventory, train response staff and continue communications on the locations within the community that serve as cooling stations and shelters during times of extreme heat.	Extreme Heat	Existing	Staff Time	Medium	EMPG Work Plan	Ongoing	Emergency Management/ Emergency Manager	EMPG Grant / General Fund

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Table 6-8-20: Mitigation actions and projects and implementation strategy for Salt River Pima-Maricopa Indian Community

Mitigation Action/Project					Implementation Strategy				
ID No.	Description	Hazard(s) Mitigated	Community Assets Mitigated (Ex/New)	Estimated Cost	Priority Ranking	Planning Mechanism(s) for Implementation	Anticipated Completion Date	Primary Agency / Job Title Responsible for Implementation	Funding Source(s)
10	Perform a public information campaign at the onset of the extreme heat season to help educate the general public on ways to remain safe during periods of extreme heat.	Extreme Heat	Existing	Staff Time	Medium	TERC	Ongoing	Emergency Management/ Community Relations Office	General Fund
11	Improve redundant communication systems through expansion of the current system for the Public Safety community.	All Hazards	Both	$15,000	Medium	IT Plan	2025	Information Technology	General Fund
12	Improve communications infrastructure through tower installs for partners within the Tribal community.	All Hazards	Both	$140,000	Medium	IT Plan	2021	Information Technology	CIP
13	Perform a public information campaign at the onset of severe winds created during monsoon seasons to help educate the general public on ways to remain safe from impacts related to the identified hazard.	Severe Wind	Both	Staff Time	Low	EM Programmatic Initiative	2025	Emergency Management / Community Relations Office	General Fund

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Table 6-8-21: Mitigation actions and projects and implementation strategy for Scottsdale

Mitigation Action/Project					Implementation Strategy				
ID No.	Description	Hazard(s) Mitigated	Community Assets Mitigated (Ex/New)	Estimated Cost	Priority Ranking	Planning Mechanism(s) for Implementation	Anticipated Completion Date	Primary Agency / Job Title Responsible for Implementation	Funding Source(s)
1	GRANITE REEF WATERSHED PHASE 2 FLOOD HAZARD MITIGATION PROJECT: Construct channel improvements, storm drain improvements, and stormwater storage basins to provide 100-year flood protection for hundreds of structures in the vicinity of Granite Reef Road between the Arizona Canal and the Salt River, then remap the floodplain to reflect these improvements, saving an estimated $1 million in flood insurance premiums annually.	Flood	Existing	$51,055,600	High	Drainage and Flood Control Capital Improvement Plan and Granite Reef Watershed Phase 2 Plan	June 30, 2026	Stormwater Management and Capital Project Management	Bond 2000 + Stormwater Fees + FCDMC + SRPMIC
2	RAWHIDE WASH FLOOD HAZARD MITIGATION PROJECT: Raise and/or strengthen existing floodwalls, improve scour protection for existing floodwalls, construct new floodwalls, including scour protection, and construct flood gates, from 1/3 mile north of Happy Valley Road to Pinnacle Peak Road, to provide 100-year flood protection for 850 properties in Scottsdale, then remap floodplain to reflect these improvements, saving an estimated $500,000 in flood insurance premiums in Scottsdale annually. Project also provides benefits to Phoenix by reducing drainage infrastructure costs downstream.	Flood	Existing	$16,000,000	High	Drainage and Flood Control Capital Improvement Plan, Pinnacle Peak West Area Drainage Master Study/Plan, and Rawhide Wash Alternatives Analysis	December 31, 2024	Stormwater Management and FCDMC	Stormwater Fees + FCDMC + City of Phoenix
3	REATA WASH FLOOD CONTROL PROJECT: Construct channel and levee improvements from Pinnacle Peak Road to WestWorld, to provide 100-year flood protection for 4600 properties, then remap floodplain to reflect these improvements, saving nearly $3 million in flood insurance premiums annually.	Flood	Existing and New	$35,000,000	High	Drainage and Flood Control Capital Improvement Plan, Pinnacle Peak South Area Drainage Master Study, and Reata Wash Flood Control Plan	June 30, 2026	Stormwater Management and Capital Project Management	Stormwater Fees + FCDMC

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Table 6-8-21: Mitigation actions and projects and implementation strategy for Scottsdale

Mitigation Action/Project					Implementation Strategy				
ID No.	Description	Hazard(s) Mitigated	Community Assets Mitigated (Ex/New)	Estimated Cost	Priority Ranking	Planning Mechanism(s) for Implementation	Anticipated Completion Date	Primary Agency / Job Title Responsible for Implementation	Funding Source(s)
4	PIMA ROAD DRAINAGE CHANNEL: Construct a drainage channel on the east side of Pima Road from Happy Valley Road to Pinnacle Peak Road to provide 100-year flood protection to 56 structures and reduce the frequency and severity of flooding for an additional 73 structures.	Flood	Existing	$8,500,000	High	Drainage and Flood Control Capital Improvement Plan	December 31, 2022	Stormwater Management and Capital Project Management	Stormwater Fees + FCDMC
5	Continue expanding our WebEOC software system to track incidents and resources in the event of an emergency.	All Hazards	Existing	Staff Time	High	None	Ongoing	Fire Department	General Fund
6	Promote the use of various cellphone warning systems and, weather radios, especially in schools, hospitals, and other locations where people congregate to inform them of the approach of severe weather events.	Dam Inundation, Extreme Heat, Flood, Levee Failure, Severe Wind	Existing	Staff Time	High	None	Ongoing	Fire Department	General Fund
7	Perform a public information campaign at the onset of the extreme heat season to help educate the public on ways to remain safe during periods of extreme heat.	Extreme Heat	Existing	Staff Time	High	Community Emergency Response Team (CERT) program.	Ongoing	Fire Department	General Fund
8	Identify, stock, and communicate locations within the community that can serve as cooling stations during times of extreme heat.	Extreme Heat	Existing	Staff Time	High	Community Emergency Response Team (CERT) program.	Ongoing	Fire Department	General Fund
9	Review and evaluate current weed control ordinance to ensure adequate provisions are in place to protect properties along the wild land urban interface.	Wildfire	Existing	Staff Time	High	Weed Control Ordinance	Ongoing	Fire Department	General Fund
10	Encourage fire buffer zones along wild land urban interface areas to mitigate damages due to wildfire.	Wildfire	Existing	Staff Time	High	None	Ongoing	Fire Department	General Fund

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Table 6-8-21: Mitigation actions and projects and implementation strategy for Scottsdale

Mitigation Action/Project					Implementation Strategy				
ID No.	Description	Hazard(s) Mitigated	Community Assets Mitigated (Ex/New)	Estimated Cost	Priority Ranking	Planning Mechanism(s) for Implementation	Anticipated Completion Date	Primary Agency / Job Title Responsible for Implementation	Funding Source(s)
11	Perform Hazardous Material Response Team & Fire Code Inspection on occupancies with Hazardous Materials to ensure safe storage and use of those HAZMATS.	Hazardous Materials	Existing	Staff Time	High	None	Ongoing	Fire Department	General Fund
12	Develop partnerships to locate and operate hydration stations during extreme heat events to reduce the risk to Scottsdale citizens.	Drought	Existing	Staff Time	High	Drought Management Plan	Ongoing	Fire Department	General Fund
13	Review/Update the city's Drought Management Plan's conservation requirements to evaluate drought severity triggers and their enforcement.	Drought	Existing	Staff Time	High	Drought Management Plan	Ongoing	Fire Department	General Fund
14	Use newsletters, flyers, utility bill inserts, website notices, radio and television announcements, social media and newspaper articles to educate the public about hazards impacting the county and city, and how to be prepared in the case of a disaster event.	All Hazards	Existing	Staff Time	High	None	Ongoing	Fire Department	General Fund
15	Update Flood Insurance Rate Maps as necessary.	Flood	Existing and New	Staff Time + Variable Costs for Consultants	Medium	Stormwater and Floodplain Management Ordinance, NFIP regulations, and Area Drainage Master Studies	Ongoing	Stormwater Management	Stormwater Storage In-Lieu Fees + FCDMC
16	ROOSEVELT DRIVE STORM DRAIN: Construct a storm drain system to reduce structural flood hazards for nearly 100 properties in Scottsdale and Tempe.	Flood	Existing	$7,520,000	Medium	Drainage and Flood Control Capital Improvement Plan	June 30, 2026	Stormwater Management and FCDMC	Stormwater Fees + FCDMC + City of Tempe

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Table 6-8-21: Mitigation actions and projects and implementation strategy for Scottsdale

Mitigation Action/Project					Implementation Strategy				
ID No.	Description	Hazard(s) Mitigated	Community Assets Mitigated (Ex/New)	Estimated Cost	Priority Ranking	Planning Mechanism(s) for Implementation	Anticipated Completion Date	Primary Agency / Job Title Responsible for Implementation	Funding Source(s)
17	CROSSROADS EAST PHASE 2 DRAINAGE IMPROVEMENTS: Construct a drainage channel along the east side of Pima Road from just north of Hualapai Drive to Legacy Blvd., then west to the Loop 101 Detention Basin.	Flood	Existing and New	$8,800,000	Medium	Drainage and Flood Control Capital Improvement Plan and Crossroads East Drainage Master Plan	June 30, 2027	Stormwater Management and Capital Project Management	Stormwater Fees
18	Prepare a Stormwater Master Plan.	Flood	Existing and New	$1,200,000	Medium	N/A	June 30, 2029	Stormwater Management	General Fund and possibly FCDMC
19	Prepare a Floodplain Management Plan consistent with the requirements of the Community Rating System, which may result in lower flood insurance premiums city-wide.	Flood	Existing and New	$100,000	Medium	N/A	June 30, 2027	Stormwater Management	Stormwater Storage In-Lieu Fees and FEMA
20	Include addressing subsidence and fissure risk as a regular part of the land development and public works projects review and permitting.	Fissure, Subsidence	Both	Staff Time	Low	Development Review	Ongoing	Planning and Development Services and Public Works	General Fund
21	Coordinate with state and federal agencies (USGS, AZGS, ADWR, etc.) to study and map fissure activity in critical or key areas of the community so that effective mitigation or avoidance strategies can be implemented.	Fissure, Subsidence	Both	Staff Time	Low	None	Ongoing	Planning and Development Services and Public Works	General Fund

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Table 6-8-22: Mitigation actions and projects and implementation strategy for Surprise

Mitigation Action/Project					Implementation Strategy				
ID No.	Description	Hazard(s) Mitigated	Community Assets Mitigated (Ex/New)	Estimated Cost	Priority Ranking	Planning Mechanism(s) for Implementation	Anticipated Completion Date	Primary Agency / Job Title Responsible for Implementation	Funding Source(s)
1	Continue to collaborate with Maricopa County Flood Control District, neighboring cities, state, and local agencies to educate and encourage participation in the Wittmann Area Drainage Master Study to identify flood and drainage hazards within the designated study area, which includes a portion of northwest Surprise. Surprise will help promote study related meetings and share outreach materials with residents and businesses to encourage participation through press releases, website posts, social media posts, and presentations at public meetings (city council, board of supervisors, study, etc.)	Flood	Both	Staff Time	High	Wittmann Area Drainage Master Study	Ongoing	Marketing and Communications Department – PIO, Public Works, and Water Resource Management Department	General Capital
2	Develop program and coordinate actions with FCDMC to access, mitigate, upgrade and redesign flood facilities.	Flood	Both	Staff Time	High	N/A	Annually	Public Works/ City Engineer	General Capital
3	Public education of water conservation best practices through newsletter, flyers, social media and website notices.	Drought	Both	$25,000	High	Integrated Water Master Plan; Drought Plan	Annually Ongoing	Water Resource Management/Director	Water Enterprise
4	Develop a local Drought Management Plan to define various levels of conservation requirement that are based on drought severity triggers and integrate with the City of Surprise Integrated Water Master Plan identifies numerous action plans in the event that we have drought conditions.	Drought	Both	$50,000	High	COS Integrated Water Master Plan; Drought Plan	Ongoing	Water Resource Management/Director	Water Enterprise
5	Enforce City ordinances governing the improvements within a floodplain.	Flood	New	Staff Time	High	Engineering Development Standards & Muni. Code	Ongoing	Public Works/City Engineer & Building Official	General Capital

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Table 6-8-22: Mitigation actions and projects and implementation strategy for Surprise

Mitigation Action/Project					Implementation Strategy				
ID No.	Description	Hazard(s) Mitigated	Community Assets Mitigated (Ex/New)	Estimated Cost	Priority Ranking	Planning Mechanism(s) for Implementation	Anticipated Completion Date	Primary Agency / Job Title Responsible for Implementation	Funding Source(s)
6	Reduce the risk of fires to communities within wildland-interface zones by participating in the development of a community wildfire protection plan.	Wildfire	Both	$150,000	Medium	Fire Master Plan & 5-yr CIP	July 2021	Fire Department/ Administrative Chief	General Capital
7	Develop program that identifies bridge and culvert construction in flood susceptible areas	Flood	Both	$250,000	Medium	5-yr CIP	July 2025	Public Works/ City Engineer	General Capital
8	Research and identify available funding sources for pre-disaster hazard mitigation actions and projects.	All Hazards	Both	Staff Time	Medium	Council Strategic Plan	Ongoing	Public Works/ City Engineer Fire Department	General Capital
9	Facilitate appropriate wildfire fuel reduction through prioritization of hazardous fuel management areas (FMA) to assist land managers and fire departments in focusing future efforts towards the areas of highest concern from both an ecological and fuel management perspective.	Wildfire	Both	$25,000	Medium	Fire Master Plan	Annually	Fire Department/ Administrative Chief	General Capital
10	Promote wildfire awareness and education in the community through the use of website, social media, and printed materials. Awareness combined with education helps to reduce the risk of accidental human ignitions.	Wildfire	Both	Staff Time	Medium	Fire Master Plan	Annually	Fire Department/ Administrative Chief City Marketing and Communications Department - PIO	General Capital

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Table 6-8-22: Mitigation actions and projects and implementation strategy for Surprise

Mitigation Action/Project					Implementation Strategy				
ID No.	Description	Hazard(s) Mitigated	Community Assets Mitigated (Ex/New)	Estimated Cost	Priority Ranking	Planning Mechanism(s) for Implementation	Anticipated Completion Date	Primary Agency / Job Title Responsible for Implementation	Funding Source(s)
11	Enhance the capabilities of the fire departments by providing a foundation for pre-attack planning. Rapidly and easily accessing individual home pre-plans and district infrastructure adds efficiency and safety to fire department response and prescribed fire planning.	Wildfire	New	Staff Time	Medium	Fire Master Plan	Annually	Fire Department/ Administrative Chief & Fire Marshal City Marketing and Communications Department - PIO	General Capital
12	Ensure that City Staff, residences, businesses and visitors have access to the McMicken Dam Emergency Action Plan. This plan was prepared in December 2013 by the Flood Control District of Maricopa County. This plan is available on the City's website.	Dam Inundation	Both	Staff Time	Medium	Fire Master Plan	Annually/ Ongoing	Emergency Manage City Engineer City Marketing and Communications Department - PIO	General Capital
13	Participate in the McMicken Dam Rehabilitation study and construction.	Dam Inundation	Both	Staff Time	Medium	General Plan	Annually Ongoing	Public Works/City Engineer	Flood Control

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Table 6-8-22: Mitigation actions and projects and implementation strategy for Surprise

Mitigation Action/Project					Implementation Strategy				
ID No.	Description	Hazard(s) Mitigated	Community Assets Mitigated (Ex/New)	Estimated Cost	Priority Ranking	Planning Mechanism(s) for Implementation	Anticipated Completion Date	Primary Agency / Job Title Responsible for Implementation	Funding Source(s)
14	Identify, stock, and communicate locations within the community that can serve as cooling stations during times of extreme heat.	Extreme Heat	Both	$15,000	Medium	5-year CIP	Ongoing/ Annually	Fire Department/ Administrative Chief City Human Service and Community Vitality Department City Manager's Office - Emergency Manager City Marketing and Communications Department - PIO	General Capital
15	Review and update stormwater management plan that will analyze and identify problem flooding areas and propose long-term mitigation alternatives designed to reduce or eliminate the flood problems.	Flood	Both	$50,000	Medium	Stormwater Management Plan	Ongoing/ Annually	Water Resource Management/Director	Water Enterprise
16	Participate in occasional tabletop exercises to identify potential mitigation measures for increasing response effectiveness, such as evacuation route marking and permanent protection measures for intended shelters.	Dam Inundation	Both	Staff Time	Low	Fire Master Plan	Annually/ Ongoing	Fire Department/ Administrative Chief	General Capital

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Table 6-8-22: Mitigation actions and projects and implementation strategy for Surprise

Mitigation Action/Project					Implementation Strategy				
ID No.	Description	Hazard(s) Mitigated	Community Assets Mitigated (Ex/New)	Estimated Cost	Priority Ranking	Planning Mechanism(s) for Implementation	Anticipated Completion Date	Primary Agency / Job Title Responsible for Implementation	Funding Source(s)
17	Perform a public campaign at the onset of the extreme heat season to help educate the general public on ways to remain safe during periods of extreme heat.	Extreme Heat	Both	Staff Time	Low	Fire Master Plan	Ongoing/ Annually	Fire Department/ Administrative Chief City Human Service and Community Vitality Department City Manager's Office - Emergency Manager City Marketing and Communications Department - PIO	General Capital
18	Work with Flood Control District of Maricopa County to review, update, and/or augment flood control ordinances to provide a greater level of protection than the minimum required by the NFIP.	Flood	Both	Staff Time	Low	Engineering Development Standards	Ongoing/ Annually	Public Works/City Engineer	General Capital
19	Review existing City owned buildings, evaluate any substandard construction issues and implement repair and upgrade plan to mitigate future wind damage.	Severe Wind	Existing	Staff Time	Low	City Facility Standards and Guidelines	Ongoing	Public Works/City Engineer	General Capital
20	Encourage homeowners to use tie-down straps and/or anchors to secure ancillary buildings and metal awnings or porches to mitigate the potential for flying debris during severe wind events.	Severe Wind	Both	Staff Time	Low	International Building Codes	Ongoing	Community Development/	General Capital

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Table 6-8-22: Mitigation actions and projects and implementation strategy for Surprise

Mitigation Action/Project					Implementation Strategy				
ID No.	Description	Hazard(s) Mitigated	Community Assets Mitigated (Ex/New)	Estimated Cost	Priority Ranking	Planning Mechanism(s) for Implementation	Anticipated Completion Date	Primary Agency / Job Title Responsible for Implementation	Funding Source(s)
21	The City of Surprise will continue to inventory and monitor all of the known fissures within the current and future city boundary. These fissures will be surveyed on a regular basis to monitor for change. Areas with active fissures have been identified in the General Plan as regional, natural, open space areas for passive recreation.	Fissure	Both	Staff Time	Low	COS General Plan; Benchmark Study	Ongoing	Public Works/City Engineer & Land Surveyor	General Capital
22	Cooperate with the Flood Control District of Maricopa County in the monitoring of fissures and subsidence impacting McMicken Dam and coordinate in any required updates to the McMicken Dam Emergency Action plan, wherein the earth fissures and subsidence concerns are discussed in great detail.	Dam Inundation; Fissure; Subsidence	Both	Staff Time	Low	McMicken Dam Emergency Action Plan	Ongoing	Public Works/City Engineer & Land Surveyor	General Capital
23	The City of Surprise will continue to monitor subsistence with the placement of benchmarks at all of the City owned well sites. Subsidence due to groundwater pumping will continue to be monitored on an annual basis.	Subsidence	Both	Staff Time	Low	Geodetic Survey Control Map/ Database	Ongoing	Public Works/City Engineer & Land Surveyor	General Capital

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Table 6-8-23: Mitigation actions and projects and implementation strategy for Tempe

Mitigation Action/Project					Implementation Strategy				
ID No.	Description	Hazard(s) Mitigated	Community Assets Mitigated (Ex/New)	Estimated Cost	Priority Ranking	Planning Mechanism(s) for Implementation	Anticipated Completion Date	Primary Agency / Job Title Responsible for Implementation	Funding Source(s)
1	Review building permits for compliance with Floodplain Ordinance and NFIP regulations.	Flood	Both	Staff Time	High	Building Code	Ongoing	Community Development and Public Works Engineering/ Deputy Director and Principal Civil Engineer	General Fund
2	Maintain Emergency Management Plan	All Hazards	Both	Staff Time	High	City Wide Emergency Operations Plan	Annual	Tempe Fire / Assistant Chief	General Fund
3	Maintain Hazardous Materials Response Team and First Responder Training and conduct Fire Code Inspections on Occupancies with hazardous materials.	All Hazards	Both	Staff Time City Resources	High	N/A	Ongoing	Tempe Fire / Assistant Chief & Public Works / Hazardous Waste Compliance Supervisor	General Fund
4	Utilization of Tempe Social Media platforms to educate the general public about the hazards of extreme heat, including Facebook and Twitter releases, and updates to the city website.	Extreme Heat	Both	Staff time	High	N/A	Ongoing / Seasonal	City manager's office / public Information Officer	General fund
5	Provide continued maintenance and exercise of early warning sirens in select strategic locations as a part of a comprehensive emergency notification system to inform citizens of impending hazards such as dam failure, severe weather conditions, and severe wind events.	Dam Failure, Flood, Severe Wind	Both	$5K/yr	High	N/A	Yearly	PW/WU	General Fund
6	Water Utilities Division will continue to operate municipal water wells to maintain compliance with ADWR Active Management Area requirements to mitigate drawdown related issues caused by over pumping of groundwater, including subsidence.	Subsidence	Both	Staff time	High	Water Resources Master Plan	Ongoing	Public Works – Water Utilities / Water Resources Manager	Water Enterprise
7	Stormwater Outfall Inspection –activities for both condition and capacity of outfall locations to regional waterways.	Flooding	Both	$150,000 / Staff Time	High	N/A	Ongoing	Public Works – Engineering and Water / Principal. Civil Engineer/ Env. Compliance Supv.	Water Enterprise

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Table 6-8-23: Mitigation actions and projects and implementation strategy for Tempe

Mitigation Action/Project					Implementation Strategy				
ID No.	Description	Hazard(s) Mitigated	Community Assets Mitigated (Ex/New)	Estimated Cost	Priority Ranking	Planning Mechanism(s) for Implementation	Anticipated Completion Date	Primary Agency / Job Title Responsible for Implementation	Funding Source(s)
8	Develop a water infrastructure master plan which discusses water resources and identifies vulnerabilities to long-term water supply. This plan will determine what additional water resources may be available (CAP / Reclaimed / Adjudication) to offset long-term shortage.	Drought	Both	$1,5000,000	High	Water Infrastructure Master Plan	Q1 2022	Public Works – Water Utilities / Principal Engineer	Water Enterprise
9	Transit shelters constructed in areas with high ridership, heat islands and/or higher poverty levels in order to address heat vulnerability.	Extreme Heat	Both	$22,000 per shelter	High	Capital Improvement Plan and Transportation Plan	Ongoing	Engineering and Transportation Equity and Inclusion Manager Sustainability	General Fund and HURF
10	Create regional cooling utility that pays for urban forestry, cool material and green infrastructure across Maricopa County	Extreme Heat	Both	$100,000,000 per year	High	Climate Action Plan Update	Ongoing	Sustainability Intergovernmental Officer	Regional tax (proposed)
11	Maintain a regional resilience collaborative to develop resilience to extreme heat solution	Extreme Heat	Both	$100,000 a year	High	Climate Action Plan Update	Ongoing	Sustainability Intergovernmental Officer	Grants
12	Create a regional extreme heat and racial equity task force to address the impacts of extreme heat on communities of color.	Extreme Heat	Both	$50,000 a year	High	Climate Action Plan Update	Ongoing	Sustainability Equity and Inclusion Manager Emergency Manager	Grants
13	IGCC adoption w/ shade and cool material additions that ensure new buildings are more resilient to extreme heat	Extreme Heat	New	$100,000 annually	High	Climate Action Plan	2025	Community Services	General Fund
14	Implementation of Urban Forestry Master Plan to support trees and shade in public and private landscapes	Extreme Heat	Both	$4,000,000	High	Urban Forestry Master Plan	Ongoing	Community Services-Parks and Recreation	General Fund
15	Adoption of Green infrastructure standards that promote widespread use of bioswales, curb cuts and other stormwater capture technologies in line with the City of Tucson, which also developed a Green Infrastructure Fund to support projects that follow their standards.	Extreme Heat	Both	$100,000	High	Climate Action Plan	Ongoing	Engineering and Transportation Civil Engineer Community Development Sustainability	General Fund

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Table 6-8-23: Mitigation actions and projects and implementation strategy for Tempe

Mitigation Action/Project					Implementation Strategy				
ID No.	Description	Hazard(s) Mitigated	Community Assets Mitigated (Ex/New)	Estimated Cost	Priority Ranking	Planning Mechanism(s) for Implementation	Anticipated Completion Date	Primary Agency / Job Title Responsible for Implementation	Funding Source(s)
16	Provide door-to-door energy assistance, weatherization, and energy savings training.	Extreme Heat	Both	$200,000	High	Climate Action Plan	Ongoing	Human Services Sustainability Engineering and Transportation	General Fund
17	Investment in microgrids/solar/local storage in order to provide energy resilience during outages and extreme heat events.	Extreme Heat	Both	$2,000,000 per solar and battery investment	High	Climate Action Plan	Ongoing	Transportation and Engineering Energy Coordinator Sustainability	General fund
18	Retrofit public buildings and private residences to improve energy efficiency and air conditioning in order to provide heat relief .	Extreme Heat	Both	$200,000 per public building and $20,000 per residential building	High	Water Resources Master Plan	Ongoing	Public Works – Water Utilities / Water Resources Manager	Water Enterprise
19	Develop and operate Resilience hubs and/or ENVISION hubs to provide community resilience opportunities for all Tempe residents. Some of these buildings will be in city buildings and some will be community operated in privately owned buildings.	Extreme Heat	Both	$500,000	High	Climate Action Plan	First one in 2022 and then ongoing	Human Services Emergency Manger Sustainability	Grants and General Fund
20	Develop Extreme Heat Action Plan that includes mapping/lists of vulnerable residents, language capabilities, policy assessment + review to ensure prioritization.	Extreme Heat	Both	$800,000	High	Climate Action Plan and Right to Breathe	Ongoing	Sustainability Emergency Manager	Grants
21	Develop Climate Youth Councils in the Cool Kids program and build a culture of youth-driven, indigenous informed and arts-enhanced urban cooling.	Extreme Heat	Both	$50,000	High	Climate Action Plan	Ongoing	Sustainability Emergency Manager Community Services Human Services	Grants
22	Research into cool materials efficacy – feasibility study/pilot testing + technical assistance/scenario analysis.	Extreme Heat	Both	$600,000	High	Climate Action Plan	Ongoing	Engineering and Transportation Sustainability	Grants and General Fund
23	Conduct policy work to ensure city and its residents receive federal and state resources, including LIHEAP and energy block grants. Include technical assistance to document impacts of policy, burden, level of need so non-profits and advocates have data to advocate for resources.	Extreme Heat	Both	$100,000	High	Climate Action Plan	Ongoing	Sustainability Intergovernmental Officer Strategic Management and Diversity	General Fund

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Table 6-8-23: Mitigation actions and projects and implementation strategy for Tempe

Mitigation Action/Project					Implementation Strategy				
ID No.	Description	Hazard(s) Mitigated	Community Assets Mitigated (Ex/New)	Estimated Cost	Priority Ranking	Planning Mechanism(s) for Implementation	Anticipated Completion Date	Primary Agency / Job Title Responsible for Implementation	Funding Source(s)
24	Staff training for heat safety.	Extreme Heat	Both	$50,000	High	N/A	Ongoing	Risk Management Sustainability Emergency Manager	Grants
25	The City of Tempe Water Utilities Division has a comprehensive set of planning documents that outline future water systems operations, including specific drought contingency plans and water system operations during drought cycles. Planning documents include the 1997 Tempe Water Resources Plan (updated in 2002), the 1999 Tempe Integrated Water System Master Plan, and the 2002 Drought Management Strategy Plan. Tempe has implemented a number of measures from these plans to diversify the city's water resources and to lessen the impact of drought on our community. Tempe will continue to develop additional groundwater storage and recovery programs to significantly reduce potential drought impacts. These efforts include storing, CAP water and reclaimed water in aquifers for future recovery (over 85,000 acre-feet stored since the mid-1990s), and capital improvement projects to add new municipal wells and increase recovery well pumping capacity.	Drought	Both	Staff Time	Medium	Water Utilities Business Plan / Water Resources Master Plan	Ongoing	Water Utilities Division / Water Resources Manager	Water Enterprise
26	Work with the Flood Control District of Maricopa to maintain and monitor the levee protection along the Salt River.	Flood, Levee Failure	Both	Staff Time	Medium	N/A	Ongoing	FCDMC with Tempe Public Works - Engineering / Principal Civil Engineer	Outside agencies / General fund
27	Miscellaneous Flood Control and Storm Drainage Projects to improve drainage and reduce flooding potential in various locations.	Flood	Both	Staff Time	Medium	N/A	Ongoing	Public Works - Engineering / Principal. Civil Engineer	General Fund

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Table 6-8-23: Mitigation actions and projects and implementation strategy for Tempe

Mitigation Action/Project					Implementation Strategy				
ID No.	Description	Hazard(s) Mitigated	Community Assets Mitigated (Ex/New)	Estimated Cost	Priority Ranking	Planning Mechanism(s) for Implementation	Anticipated Completion Date	Primary Agency / Job Title Responsible for Implementation	Funding Source(s)
28	Maintain CERT Program	All Hazards	Both	4000	Medium	N/A	Ongoing	Fire Department	Grants
29	Indian Bend Wash Levee Repairs – perform repairs identified during the last annual inspection on the levees bounding Indian Bend Wash to mitigate failure with the owner the FCDMC.	Flooding, Levee Failure	Existing	Staff Time	Medium	N/A	Ongoing	Public Works - Engineering and Field Operations/ Principal. Civil Engineer and Parks Manager	General Fund
30	Ongoing project work in cooperation with ADOT to identify and mitigate flooding related to freeway systems.	Flooding	Existing	Unknown	Medium	N/A	Ongoing	Public Works - Engineering / Principal. Civil Engineer	General Fund
31	Continued maintenance of Tempe Town Lake dam and flow control structures per ADWR and other agency guidelines / best practices.	Dam Inundation	Both	Unknown	Medium	O&M Plan	Ongoing	Public Works - Engineering sr. Civil Engineer	General Fund
32	Use the TFMR Newsletter to inform homeowners to use tie-down straps and/or anchors to secure ancillary buildings and metal awnings or porches to mitigate damages and impacts of severe wind events.	Severe Wind	Both	Staff Time	Medium	TFMR Quarterly Newsletter	Yearly	Emergency Manager	General Fund
33	Provide Links to the Arizona Department of Water Resources website as part of a public campaign to raise awareness to hazards and locations of active subsidence	Subsidence	Both	Staff Time	Medium	City of Tempe Website-Emergency Preparedness Section	Yearly	Emergency Manager	General Fund
34	Create heat data monitoring for indoor heat monitoring and special events (WiFi, sensor system, deploy).	Extreme Heat	Both	$50,000	Medium	Climate Action Plan	Ongoing	Sustainability Information Technology Human Services Community Services	Grants
35	Maintain databases and inventories and regularly conduct impact assessments on how extreme heat is affecting operations.	Extreme Heat	Both	$200,000	Medium	Climate Action Plan	Ongoing	Sustainability Information Technology	General Fund
36	Perform coordination with faith-based organizations to develop cooperative strategies to minimizing the impacts of extreme heat.	Extreme Heat	Both	$50,000	Medium	N/A	Ongoing	Sustainability Emergency Manager Human Services	N/A

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Table 6-8-23: Mitigation actions and projects and implementation strategy for Tempe

Mitigation Action/Project					Implementation Strategy				
ID No.	Description	Hazard(s) Mitigated	Community Assets Mitigated (Ex/New)	Estimated Cost	Priority Ranking	Planning Mechanism(s) for Implementation	Anticipated Completion Date	Primary Agency / Job Title Responsible for Implementation	Funding Source(s)
37	Mountain rescue equipment – PPE for personnel (cool clothing) for first responders that conduct rescues in the extreme heat.	Extreme Heat	Both	$10,000,000	Medium	TFMR Quarterly Newsletter	Yearly	Emergency Manager	General Fund
38	Develop and maintain cooling center(s) across the city to provide refuge areas for heat relief.	Extreme Heat	Both	$100,000	Medium	City of Tempe Website-Emergency Preparedness Section	Yearly	Emergency Manager	General Fund
39	Investments in hub or islands that allow for a systems of refuge areas that include Cool parks/park islands/right of way that are densely shaded.	Extreme Heat	Both	$20,000,000	Medium	Parks and Recreation Master Plan and Urban Forestry Master Plan	Ongoing	Community Services: Parks and Recreation	General Fund
40	Multi-use + canal path improvements and streetscapes that include shelters, tree shade and cool materials.	Extreme Heat	Both	$4,000,000	Medium	Capital Improvement Plan and Transportation Plan	Ongoing	City Engineer and Transportation and Engineering	General Fund and HURF
41	Adoption of new zoning code such as a walkable urban code that supports shade, elimination of surface parking lots and green infrastructure	Extreme Heat	Both	$100,000	Medium	Urban Core Master Plan, Character Area Plans and General Plan	Ongoing	FCDMC with Tempe Public Works - Engineering / Principal Civil Engineer	General Fund
42	Green infrastructure pilot projects (fire station, Rio Salado, ASU Tempe Campus) that demonstrate use of stormwater to supplement potable water. These landscapes tend to be more resilient to drought while addressing extreme heat.	Extreme Heat and Drought	Both	$25,000 to $100,000 a year	Medium	Climate Action Plan, Engineering standards and private development standards	Ongoing	Community Development Engineering and Transportation Civil Engineer Sustainability	Grant funding
43	Maintain CERT Program and add heat vulnerability and heat relief training including how to staff cooling centers and resilience hubs	Extreme Heat	Both	$20,000	Medium	Climate Action Plan and Emergency Management Plan	Ongoing	Fire Department	Grants
44	Design and construct streetscape projects that prioritizes shade and cooling.	Extreme Heat	Both	$2,000,000	Medium	Transportation Master Plan and Climate Action Plan	Ongoing	Engineering and Transportation Civil Engineer Sustainability	General Fund and HURF

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Table 6-8-23: Mitigation actions and projects and implementation strategy for Tempe

Mitigation Action/Project					Implementation Strategy				
ID No.	Description	Hazard(s) Mitigated	Community Assets Mitigated (Ex/New)	Estimated Cost	Priority Ranking	Planning Mechanism(s) for Implementation	Anticipated Completion Date	Primary Agency / Job Title Responsible for Implementation	Funding Source(s)
45	Installation of artificial shade structures in heat islands to support pedestrians and customers of local businesses.	Extreme Heat	Both	$400,000	Medium	Transportation Master Plan	Ongoing	Community Development Engineering and Transportation Civil Engineer Sustainability	General Fund
46	Use of mobile generators and air conditioning units in case of extreme heat emergencies.	Extreme Heat	Existing	$250,000	Medium	N/A	Ongoing	Fire Department Emergency Manager	General Fund
47	Public education (incl about clothing), heat safety (everyday life) + signage.	Extreme Heat	Both	$50,000	Medium	N/A	Ongoing	Public Works - Engineering sr. Civil Engineer	General Fund
48	Heat relief for special events including training, communications materials, mobile water stations, protocols and heat relief plans.	Extreme Heat	Both	$500,000	Medium	N/A	Ongoing	Special Events Task Force Emergency Manager Risk Management Sustainability	Grants
49	Support Medical Examiner office with resources and equipment.	Extreme Heat	Both	$50,000	Medium	N/A	Ongoing	Emergency Manager	Grants
50	Construct additional splash pads to provide heat relief for youth.	Extreme Heat	Both	$500,000	Medium	Parks and Recreation Master Plan	Ongoing	Community Services	General Fund
51	Participate with outside agencies to distribute bottled water and provide education about hazards associated with extreme heat.	Extreme Heat	Both	$1,000	Low	N/A	Ongoing	Fire Department	Grants
52	Tempe Town Lake warning system to ensure residents at the lake are aware of heat warnings through a nighttime lighting system.	Extreme Heat	Both	$250,000	Low	N/A	Ongoing	Municipal Utility Emergency Manager	General Fund
53	Develop cool clothing partnerships, distribution with non-profits such as FABRIC so that residents especially youth and those experiencing homeless have access to clothing that supports heat relief.	Extreme Heat	Both	$100,000	Low	N/A	Yearly	Economic Development	General Fund
54	Support amenities for pools (showers, shelters) for heat relief.	Extreme Heat	Both	$500,000	Low	Parks and Recreation Master Plan	Ongoing	Community Services	General Fund

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Table 6-8-23: Mitigation actions and projects and implementation strategy for Tempe

Mitigation Action/Project					Implementation Strategy				
ID No.	Description	Hazard(s) Mitigated	Community Assets Mitigated (Ex/New)	Estimated Cost	Priority Ranking	Planning Mechanism(s) for Implementation	Anticipated Completion Date	Primary Agency / Job Title Responsible for Implementation	Funding Source(s)
55	Seek funds for workshops and conferences, including National Incident Management System and Arizona Emergency Management Association Conferences.	All Hazards	Both	$3,000	Low	N/A	Ongoing	Fire Department	Grants

Table 6-8-24: Mitigation actions and projects and implementation strategy for Tolleson

Mitigation Action/Project					Implementation Strategy				
ID No.	Description	Hazard(s) Mitigated	Community Assets Mitigated (Ex/New)	Estimated Cost	Priority Ranking	Planning Mechanism(s) for Implementation	Anticipated Completion Date	Primary Agency / Job Title Responsible for Implementation	Funding Source(s)
1	Review building permits for compliance with Floodplain Ordinance and NFIP regulations.	Flood	Both	Staff Time	High	Regular Plan Reviews	On-going	City Engineer and Building Department	General Fund
2	Install more storm drains and retention areas to reduce impact of flooding on the community. Goes along with new and better codes.	Flood	Both	Unknown without estimates at the time	High	As needed and as new plans and permits are requested	On-going	City Engineer and Building Department	General Fund and Permit Fees
3	Provide sand and bags at different locations around the city for citizens to pick up and use to mitigate flooding damages.	Flood	Both	App. $100 per ton for sand and unknown for price of bags	High	As needed	On-going	Field Operations	General Fund
4	Educate public officials on the need of the mitigation plan.	Flood, Severe Wind, Drought, Extreme Heat, Subsidence	Both	Staff Time	Medium	Annually	Upon adoption & on-going as needed.	Emergency Manager	N/A

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Table 6-8-24: Mitigation actions and projects and implementation strategy for Tolleson

Mitigation Action/Project					Implementation Strategy				
ID No.	Description	Hazard(s) Mitigated	Community Assets Mitigated (Ex/New)	Estimated Cost	Priority Ranking	Planning Mechanism(s) for Implementation	Anticipated Completion Date	Primary Agency / Job Title Responsible for Implementation	Funding Source(s)
5	Continue to review plans and update codes and ordinances.	Flood, Severe Wind	Both	Staff Time	High	As Needed	On-going	City Engineer and Building Department, Fire Department, Police Department	N/A
6	By using the local websites, mailers, social media and other forms of local communication, try to educate the public about water conservation.	Drought	Both	Staff Time and minimal costs	High	Periodic through the year	Spring and Summer Periods	City Public Information Officer	General Fund
7	Continue to work with the waste water department to use reclaimed water for multiple uses.	Drought	Both	Staff Time	High	Education all individuals and other City departments involved	Continuous	Water/Wastewater Departments	N/A
8	Provide water stations when needed for individuals during the extreme heat periods.	Extreme Heat	Both	Cost of bottled water and Staff Time	High	Active areas of refuge as needed	As Needed	Fire Department & Police Department	General Funds and Donations
9	Continue working with local school systems for relief areas if individuals were displaced due to the extreme heat.	Extreme Heat	Both	Staff Time	High	General Plan, Emergency Operations Plan	On-going	Senior City Staff, Emergency Manager	If needed General Funds, possible Grants
10	Educate homeowners and businesses to tie down or not leave loose items around during severe wind periods.	Severe Wind	New	Staff Time and possible publication costs	Medium	By using current social media that is available.	Periodic	City Public Information Officer	General Funds
11	Maintain the installed backup generators at the police and fire departments and City Hall. Make sure new backup generators are in the plans for any new critical facilities.	Severe Wind, Extreme Heat	Both	$10,000 per year plus Staff Time	High	Continual review of maintenance programs and quarterly checks	Quarterly	Field Operations Department	General Funds
12	Include addressing subsidence risk as a regular part of the land development and public works projects review and permitting.	Subsidence	New	Staff Time	Medium	Continual review of Plans and Permits	On-going	City Engineer and Building Department	General Funds

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Table 6-8-24: Mitigation actions and projects and implementation strategy for Tolleson

Mitigation Action/Project					Implementation Strategy				
ID No.	Description	Hazard(s) Mitigated	Community Assets Mitigated (Ex/New)	Estimated Cost	Priority Ranking	Planning Mechanism(s) for Implementation	Anticipated Completion Date	Primary Agency / Job Title Responsible for Implementation	Funding Source(s)
13	Provide links to the AZ Department of Water Resources website as a part of a public campaign to raise the awareness to the hazards and locations of active subsidence. This will be done through all social media.	Subsidence	New	Staff Time	Medium	As needed and available time	On-going	City Public Information Officer	General Funds

Table 6-8-25: Mitigation actions and projects and implementation strategy for Unincorporated Maricopa County

Mitigation Action/Project					Implementation Strategy				
ID No.	Description	Hazard(s) Mitigated	Community Assets Mitigated (Ex/New)	Estimated Cost	Priority Ranking	Planning Mechanism(s) for Implementation	Anticipated Completion Date	Primary Agency / Job Title Responsible for Implementation	Funding Source(s)
1	Educate/advise Maricopa County resident on wildfire preparedness activities to include defensible spaces	Wildfire	New	Staff Time	Medium	Website update, Continuous, throughout the year	Annual Ongoing	MC Emergency Management	General Funds
2	Perform, or encourage the performance of, routine roadside vegetation control to mitigate wildfire starts within the right-of-way areas along roadways and highways.	Wildfire	New	$1 million	High	Transportation Plan	Annual Ongoing	MCDOT	HURF
3	Continue to provide drought/water conservation information/links on the Maricopa.gov/emergency management website	Drought	New	Staff Time	Medium	Website update, Continuous, throughout the year	Annual Ongoing	MC Emergency Management	General Funds
4	Encourage drought-tolerant landscaping where landscaping is required for commercial and industrial developments	Drought	New	Staff Time	High	Standard P&D procedure	Annual Ongoing	MC Planning & Development	General Funds

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Table 6-8-25: Mitigation actions and projects and implementation strategy for Unincorporated Maricopa County									
5	Continue to provide information/links on the Maricopa.gov/emergency management website to sources of hazard mitigation educational materials.	Extreme Heat, Flood, Severe Winds, Wildfires	New	Staff Time	Medium	Website update, Continuous, throughout the year	Annual Ongoing	MC Emergency Management	General Funds
6	Inspect and monitor all structures (bridges and box culverts) under their control on a semi-annual basis.	Flood	Both	$150,000	High	Transportation Plan	Annual Ongoing	MCDOT	HURF
7	Encourage bridge or culvert construction where roads are in locations susceptible to flooding.	Flood	New	$7,000,000	High	Transportation Plan	Annual Ongoing	MCDOT	HURF
8	Review building permits to ensure that unincorporated Maricopa County residents are safe from flooding by meeting the NFIP requirements for development within a Special Flood Hazard Area through enforcement of Floodplain Regulations.	Flood	Both	On-going	High	Floodplain Regulations for Maricopa County	Ongoing	FCDMC / Floodplain Administrator	Flood Control Secondary Property Tax
9	Update Community Protection plan to include; identify actions that will reduce the risk of wildfires to communities within wildland-urban interface zones	Wildfire	Both	$150,000	High	CWPP 5-Year Update	Ongoing/ 5 year updates	MC Emergency Management	BLM/CWPP Grant
10	Complete and start Area Drainage Master Studies/Plans to identify flooding hazards, mitigation solutions and provide notice to interested parties.	Flood	Both	Project-Dependent	High	Comprehensive Report	Ongoing	FCDMC / Director	Flood Control Secondary Property Tax
11	Complete and start delineations/re-delineations to identify flooding hazards and the means to share information.	Flood	Both	Project-Dependent	High	Comprehensive Report	Ongoing	FCDMC / Director	Flood Control Secondary Property Tax
12	Operate and maintain flood control structures operated and maintained by FCDMC in order to prevent structural failure and to maintain their primary function.	Dam Inundation, Levee Failure, Flood	Both	Project-Dependent	High	Comprehensive Report	Ongoing	FCDMC / Director	Flood Control Secondary Property Tax
13	Update the Flood Control District's Comprehensive Report 2015, and separately the 2015 Floodplain Management Plan for Unincorporated Maricopa County to set the framework for mitigating flood hazards.	Flood	Both	Staff Time	High	Comprehensive Report	February 2021	FCDMC / Director	Flood Control Secondary Property Tax

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Table 6-8-25: Mitigation actions and projects and implementation strategy for Unincorporated Maricopa County									
14	Construct the Oak Street Basin and Storm Drain project to mitigate flooding hazards to existing and future homes.	Flood	Both	$4.5-Million	High	5-year CIP	Ongoing/ Funding-Dependent	FCDMC / Director	Flood Control Secondary Property Tax
15	Continue the Flood Control District's Capital Improvement Program in order to construct facilities that mitigate flooding hazards throughout Maricopa County.	Flood	Both	$40M-year	High	5-year CIP	Ongoing	FCDMC / Director	Flood Control Secondary Property Tax
16	Design and construct new bridge and scour protection at Gilbert Road over the Salt River.	Flood	Existing	$45.65 million	High	5 Year CIP	June 2025	MCDOT	Federal Funds, STP, HURF
17	Continue the Floodprone Properties Assistance Program so that were appropriate property can be acquired and residents relocated from flood hazard areas, or floodproofing methods can be implement to reduce the flooding hazard.	Flood	Both	Project-Dependent	Medium	Floodprone Properties Assistance Program	Ongoing	FCDMC / Director	Flood Control Secondary Property Tax
18	Review existing building codes to determine if they adequately protect new development in hazard areas. Where feasible and necessary, modify codes to help mitigate hazards imposed on such development within the limits of state statutes, while also respecting private property rights.	Flood, Severe Wind	New	Staff Time	High	Standard P&D procedure	Ongoing	Planning and Development Department	General fund
19	Continue public education program to assist residents in recognizing potential flooding and erosion hazards and inform them on how to reduce risk to life and property.	Flood	Both	Staff Time	Medium	Comprehensive Report, and Floodplain Management Plan	Ongoing	FCDMC / Director	Flood Control Secondary Property Tax
20	Work with federal and state agencies, and local coalitions to elevate awareness of fissure risk zones and the problems fissures may cause.	Fissure	Both	Staff Time	High	Standard P&D procedure	Ongoing	Planning and Development Department	General fund
21	Continue to operate and maintain a flood warning system to alert communities and the public to flooding events.	Dam Inundation, Levee Failure, Flood	Both	$1.5M-year	High	Comprehensive Report	Ongoing	FCDMC / Director	Flood Control Secondary Property Tax
22	Develop and maintain Flood Response Plans and Emergency Action Plans to identify actions to be taken at specific locations for certain conditions during flooding events.	Dam Inundation, Levee Failure, Flood	Both	$400K-year	High	Comprehensive Report	Ongoing	FCDMC / Director	Flood Control Secondary Property Tax

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Table 6-8-25: Mitigation actions and projects and implementation strategy for Unincorporated Maricopa County									
23	Maintain participation in NFIP's Community Rating System to further inform and enhance public safety, protect the environment and reduce losses and damages to public and private property through continued outreach and various programs.	Flood, Dam Inundation, Levee Failure	Both	Staff Time	High	Comprehensive Report, and Floodplain Management Plan	Ongoing	FCDMC / Director	Flood Control Secondary Property Tax
24	Investigate incorporating GI/LID and similar methods as part of flood and stormwater management facilities in order to reduce the amount of potable water needed to irrigate landscape areas, the impact on groundwater recharge and effects on reducing flood problems. Where appropriate these methods can be used to retrofit existing facilities (including the Durango Campus and maintenance yards) and be incorporated into the design of new facilities.	Drought, Flood	Both	Project-Dependent	Medium	Comprehensive Report	Ongoing	FCDMC / Director	Flood Control Secondary Property Tax
25	Conduct public outreach to educate the residents about water conservation within the community via website, social media, mailers, and any other communication methods.	Drought	Both	Staff Time and minimal cost	High	Periodic through the year	Spring and Summer Periods	MC Public Information Officer	General Funds
26	Educate/advise subdivision developers about County subdivision regulations that outline and highlight the provisions for renewable water uses.	Drought	New	Staff Time	High	Educate all individuals and other County Departments involved	Continuous	MC Planning/ Development	General Funds
27	Continue to provide extreme heat information/links on the Maricopa.gov/emergency management website.	Extreme Heat	New	Staff Time	High	Periodic throughout the year	Spring and Summer Periods	MC Emergency Management	General Funds
28	Provide public education/outreach to County citizens by updating the County website to address subsidence & fissures.	Fissure, Subsidence	Both	Staff Time, Printing Cost, (minimal)	Medium	Website update, Continuous, throughout the year	Continuous	MC Planning/ Development, Emergency Management	General Funds
29	Provide public education/outreach to developers by raising awareness to subsidence and fissure hazards during pre-construction and re-zoning permitting processes.	Fissure, Subsidence	New	Staff Time, Printing Cost, (minimal)	Medium	MC Permit Review Process	Continuous	MC Planning/ Development	General Funds

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Table 6-8-26: Mitigation actions and projects and implementation strategy for Wickenburg

Mitigation Action/Project					Implementation Strategy				
ID No.	Description	Hazard(s) Mitigated	Community Assets Mitigated (Ex/New)	Estimated Cost	Priority Ranking	Planning Mechanism(s) for Implementation	Anticipated Completion Date	Primary Agency / Job Title Responsible for Implementation	Funding Source(s)
1	Coordinate review of building permits for compliance with the Floodplain Ordinance and NFIP regulations with FCDMC.	Flood	Both	Staff Time	High	Council approval/ordinance of FCMDC administrating regulations	Ongoing	Planning department	General Fund
2	Remove vegetation in washes that bisect streets within town limits to reduce wildfire hazard and improve stormwater conveyance capacities.	Flood, Wildfire	Existing	Staff Time	Medium	CWPP	Ongoing	Fire/ Public Works	General Fund/Grants when applicable
3	Scheduling local drainage clean out and inventory	Flood	Existing	Staff Time	Medium	As needed/ Annually at minimum	Ongoing	Public Works	General Fund
4	Review Flood Hazard mitigation plan, identify areas prone to flood in the heavy rain events	Flood	Existing	Staff Time	Medium	Annually	ongoing	Public Works/Fire/PD	General Fund
5	Fuel Reduction program COOP with BLM. Identify Hazard areas, set up work group days with BLM crews and WFD crews for fuels work in and around the Hassayampa River areas Highest prone to fire.	Wildfire	Existing	Staff Time	High	Work Agreement with BLM	ongoing	Fire/BLM	Fuel Reduction Grant/
6	Wickenburg Ranch/Martinez Creek Flood Hazards. Work on new amendment to Flood Plan from Yavapai County regarding the new developed area around Martinez creek	Flood	New	UNK	Medium	Plan amendments	Ongoing as development occurs	Planning/Building department. Emergency Mgt.	General Fund/ Developer Funding
7	Public education on the dangers of living in the southwest Arizona desert where extreme temperatures are common in the summer months	Extreme Heat	New	Staff Time	Medium	Media outlets	annual	Fire/EMS	General Fund
8	Provide water via the station or duty engine to individuals that present symptoms of heat related illness	Extreme Heat	Existing	Staff Time	High	Regular duties as engine company	daily	Fire/EMS	General Fund/Donations

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Table 6-8-26: Mitigation actions and projects and implementation strategy for Wickenburg

Mitigation Action/Project					Implementation Strategy				
ID No.	Description	Hazard(s) Mitigated	Community Assets Mitigated (Ex/New)	Estimated Cost	Priority Ranking	Planning Mechanism(s) for Implementation	Anticipated Completion Date	Primary Agency / Job Title Responsible for Implementation	Funding Source(s)
9	Review temporary structure permits for proper tie down and anchor methods.	Severe Wind	New	Staff Time	Medium	Review IBC/IFC	ongoing	Planning department	General Fund
10	Perform training and education for PW and PD crews regarding public safety actions that can be taken to mitigate the risk of damage and injury to the public on a pre-event, during, and post-event basis for severe wind storms.	Severe Wind	Both	Staff Time	Medium	Training for first responders for severe weather incidents.	ongoing	Fire and PW	General Fund
11	Review FHRP, in reference to Sunnycove and Cassandra Dam areas, on an annual basis to determine if adjustments are necessary due to changes in areas downstream of dams	Dam Inundation	Both	Staff Time	High	Review plan with PW and Planning	ongoing	Fire/Emergency operations	General Fund
12	Sols Wash evaluation and development of projects for brush clearing and correction of deficiencies in existing bank protection measures.	Levee Failure	Existing	Staff time	High	Annual and as needed	ongoing	Public Works/Fire	General Fund
13	Public outreach to areas impacted in heavy flood events thru social media and the Public Relations Office to communicate the residual risk of areas protected by these structures	Dam Inundation, Levee Failure	Existing	Staff time	Medium	Emergency Operations	Annual or as needed	Public Works/ Emergency Mgt.	General Fund/ community grant
14	Work with ADOT on Hwy 93 bank protection evaluation to ensure clearing of primary vegetation and correction of deficiencies are being done on a regular basis	Levee Failure	Existing	Staff time	High	Current IGA with ADOT	As needed	Public Works	General Fund
15	Perform public education of water conservation best practices through newsletter, flyers, social media and website notices.	Drought	Both	Staff time	Medium	N/A	Annual	Water and Wastewater Dept	General Fund
16	Continue to review plans and update codes and ordinances.	Drought, Severe Wind	New	Staff time	Medium	N/A	ongoing	Planning Department	General Fund

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Table 6-8-27: Mitigation actions and projects and implementation strategy for Youngtown

Mitigation Action/Project					Implementation Strategy				
ID No.	Description	Hazard(s) Mitigated	Community Assets Mitigated (Ex/New)	Estimated Cost	Priority Ranking	Planning Mechanism(s) for Implementation	Anticipated Completion Date	Primary Agency / Job Title Responsible for Implementation	Funding Source(s)
1	Review building permits for compliance with Floodplain Ordinance and NFIP regulations through ongoing coordination with FCDMC and compliance with current floodplain ordinance.	Flood	Both	Staff Time	High	None	Ongoing	Public Works Dept./Building Inspector	General Government Budget
2	Encourage the use of weather radios, especially in schools, rest homes, convalescent homes, retirement centers and other locations where people congregate to inform them of the approach of severe weather.	Extreme Heat, Flood, Severe Wind, Wildfire	Both	Staff Time	Medium	Program is reviewed yearly and is ongoing	Ongoing	Emergency Services Manager/Town Webmaster	General Government Budget
3	Provide town leadership role in support of efforts to limit development in the departure and approach corridors for Luke Air Force base.	Transport-ation Accident	Both	Staff Time	Medium	Flight/noise patterns are reviewed with each new development	Ongoing	Mayor/Town Manager/Public Works Manager/Town Management	General Government Budget
4	Promote the availability of hazard mitigation information from county webpage by providing a notice of the Maricopa County Hazard Mitigation Plan posted on town's website with link back to Maricopa County Emergency Management for additional information.	All Hazards	Both	Staff Time	Low	None	Ongoing	Emergency Services Manager/Town Webmaster	General Government Budget
5	Participate/ conduct occasional table top exercises to identify potential mitigation measures for increasing response effectiveness, such as evacuation route marking and permanent protection measures for indented shelters.	Dam Inundation, Flood	Both	Staff Time	Low	None	Ongoing	Public Works Department/ Maricopa County	General Government Budget

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Table 6-8-27: Mitigation actions and projects and implementation strategy for Youngtown

Mitigation Action/Project					Implementation Strategy				
ID No.	Description	Hazard(s) Mitigated	Community Assets Mitigated (Ex/New)	Estimated Cost	Priority Ranking	Planning Mechanism(s) for Implementation	Anticipated Completion Date	Primary Agency / Job Title Responsible for Implementation	Funding Source(s)
6	Provide public education of water conservation best practices through newsletter, flyers, social media and website notices.	Drought	Both	Staff Time	High	None	Ongoing	Public Works Department in collaboration with EPCOR Water	General Government Budget
7	Perform a public information campaign at the onset of the extreme heat season to help educate the general public on ways to remain safe during periods of extreme heat.	Extreme Heat	Both	Staff Time	High	None	Ongoing	Public Safety Department in collaboration with the Salvation Army	General Government Budget
8	Develop a community-wide, storm water management plan that will analyze and identify problem flooding areas and propose long-term mitigation alternatives designed to reduce or eliminate the flood problems.	Flood	Both	Staff Time	Medium	EOP	Ongoing	Public Works Department, ADEQ & FCDMC	General Government Budget
9	Maintain/install backup generators at key critical facilities such as fire and police stations, water pumping stations, sewer lift stations, etc., to provide emergency power for critical operations during power failures caused by severe wind events.	Severe Wind	Both	Staff Time	High	EOP	Ongoing	Public Works Department/APS	General Government Budget
10	Provide links to the Arizona Department of Water Resources website as part of a public campaign to raise awareness to the hazards and locations of active subsidence.	Subsidence	Both	Staff Time	Medium	None	Ongoing	Public Works Department and Arizona Department of Water Resources	General Government Budget
11	Develop and/or enforce a weed abatement ordinance. Conduct fire safety education programs in local public schools. Enact and enforce burn and fireworks bans as needed during extraordinarily dry and extreme wildfire conditions & seasons to mitigate possible, unintended wildfire starts. Perform, or encourage the performance of routine, roadside vegetation control to mitigate wildfire starts within the right of way areas along roadways and highways.	Wildfire	Both	Staff Time	Medium	None	Ongoing	Public Works Department, Code Enforcement, Sun City Fire District	General Government Budget

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Table 6-8-27: Mitigation actions and projects and implementation strategy for Youngtown

Mitigation Action/Project					Implementation Strategy				
ID No.	Description	Hazard(s) Mitigated	Community Assets Mitigated (Ex/New)	Estimated Cost	Priority Ranking	Planning Mechanism(s) for Implementation	Anticipated Completion Date	Primary Agency / Job Title Responsible for Implementation	Funding Source(s)
12	Annually coordinate with Federal, State, and local dam owners to get updates on any changes in dam safety conditions and emergency action plan information	Dam Failure	Both	Staff Time	Low	None	Annually	Public Safety / Emergency Services Manager	General Government Budget
13	Work with state and Federal agencies to provide disclosure information to all potential buyers of real estate that are located within the dam failure or emergency spillway inundation limits of an upstream dam or dams.	Dam Failure	Both	Staff Time	Low	None	Ongoing	Public Safety / Emergency Services Manager	General Government Budget

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SECTION 7: PLAN MAINTENANCE PROCEDURES

> ***§201.6(c)(4):*** *[The plan shall include…] (4) A **plan maintenance process** that includes:*
> *(i) A section describing the method and schedule of monitoring, evaluating, and updating the mitigation plan within a five-year cycle.*
> *(ii) A process by which local governments incorporate the requirements of the mitigation plan into other planning mechanisms such as comprehensive or capital improvement plans, when appropriate.*
> *(iii) Discussion on how the community will continue public participation in the plan maintenance process.*
>
> ***§201.6(d)(3):*** *Plans must be reviewed, revised if appropriate, and resubmitted for approval within five years in order to continue to be eligible for HMGP project grant funding.*

According to the DMA 2000 requirements, each plan must define and document processes or mechanisms for maintaining and updating the hazard mitigation plan within the established five-year planning cycle. Elements of this plan maintenance section include:

- ☑ **Monitoring and Evaluating the Plan**
- ☑ **Updating the Plan**
- ☑ **Continued Public Participation**

The following sections provide a description of the past plan maintenance procedures and activities, and documents the proposed procedures and schedule for the next planning cycle.

7.1 Monitoring and Evaluation

7.1.1 Past Plan Cycle

Maricopa 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. Section 7.1 of the 2015 Plan outlined a schedule of specific activities for annual evaluations of the 2015 Plan. A poll of the MJPT regarding the past execution of the plan maintenance strategy was taken and the following tasks were accomplished:

- The Town of Gilbert performed the annual reviews for years 2016 through 2019.
- MCDEM sent an email to all the 2015 Plan participating jurisdictions on two occasions in November and December 2017, requesting an annual review per the requirements of Section 7.1.2 of the 2015 Plan. Most jurisdictions replied with some kind response.

Challenges to meeting the stated review schedule primarily included:

- Staff turnover and lack of continuity to original planning team.
- Lack of communicating plan maintenance responsibilities to successors during staff changes.

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MJPT discussed ways to improve on the Plan review and maintenance process over the next five years. The results of those discussions are outlined in the following sections.

7.1.2 Proposed Schedule and Scope

Having a multi-jurisdictional plan can aid in the plan monitoring and evaluation through the consolidation of information for all participating jurisdictions into one document. The MJPT reviewed the current DMA 2000 rules and October 2011 FEMA guidance document and discussed a strategy for performing the required monitoring and evaluation of the Plan over the next 5-year cycle. The MJPT has established the following monitoring and evaluation procedures:

- **Schedule** – The Plan shall be reviewed on at least an annual basis. MCDEM will take the lead to send out an email request to each jurisdiction via the MJPT on or around the month of May.
- **Review Content** – Within the email request distributed by MCDEM, each of the jurisdictions will be requested to provide responses to the following questions:
  - ***Hazard Identification:*** *Have the risks and hazards changed?*
  - ***Goals and Objectives:*** *Are the goals and objectives still able to address current and expected conditions?*
  - ***Policy and Program Review:*** *Are updates or revisions necessary for the policies and programs listed in Tables 6-1-xx?*
  - ***Mitigation Projects and Actions:*** *For each mitigation action/project summarized in Section 6.3.2:*
    - *Has there been activity on the project – Yes or No?*
    - *If Yes, briefly describe what has been done and the current status of the action/project.*
- **Documentation** – Each jurisdiction will review and evaluate the Plan as it relates to their community and document responses to the above questions in the form of an email. MCDEM will archive email responses in a digital format and store with the Plan for incorporation during the next Plan update. Any hard copies will be included in Appendix E.

A formal presentation of the review material will be presented to a jurisdiction's council or board only if a major update to the Plan is proposed prior to the next five year update.

7.2 Plan Update

According to DMA 2000, the Plan requires updating and re-approval from FEMA every five years. The plan update will adhere to that set schedule using the following procedure:

- ✓ One year prior to the plan expiration date, the MJPT will re-convene to review and assess the materials accumulated in Appendix E.

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- ✓ The MJPT will update and/or revise the appropriate or affected portions of the plan and produce a revised plan document.
- ✓ The revised plan document will be presented before the respective councils and boards for an official concurrence/adoption of the changes.
- ✓ The revised plan will be submitted to DEMA and FEMA for review, comment and approval.

7.3 Continued Public Involvement

Maricopa County and participating jurisdictions are committed to keeping the public informed about hazard mitigation planning efforts, actions and projects. Continued public involvement activities pursued by the Plan jurisdictions over the 2015 Plan cycle are summarized in Table 7-1.

Table 7-1: Continued public involvement activities performed by jurisdictions during the 2015 Plan cycle

Jurisdiction	Public Involvement Activity or Opportunity
ALL Participating Jurisdictions	• Centralized posting of Plan was maintained on the MCDEM website with most of the participating jurisdictions maintaining web-link to the MCDEM website on their local website.
Avondale	• Closed Roads due to flooding or trees down due to monsoons or other major storms. • Christmas trees and cooking oil recycle events to prevent sewer blockages. • Firework safety • COVID-19 updates • Weather watcher courses • Police Citizen Academy • Volunteers in Police Services (VIPS) • Landscaping/Watering Tips • Multiple seasonal posts regarding hazards for certain seasons/time of year i.e. Monsoon season, heat related posts during summer months, winter advisory posts in colder months. • Phoenix Raceway • Holiday posts to include event posts and holiday specific hazard posts (Thanksgiving cooking etc)

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Table 7-1: Continued public involvement activities performed by jurisdictions during the 2015 Plan cycle	
Jurisdiction	**Public Involvement Activity or Opportunity**
Buckeye	• Identified, published and update as needed cooling station locations on city website and in news releases. • Post on various social media channels, electronic newsletters and new releases on seasonal weather related information (extreme heat, freeze warnings, flooding, etc.) • Provide link to ADWR's website on several city webpages (Fire, Public Works, Water Resources) • Surveyed residents on the city's Hazard Mitigation Plan through social media, electronic newsletters, news releases and city website.
Carefree	• The town of Carefree maintained an information program on it's COINS email platform to keep residents aware of noted hazards and how they impact the town residents. This platform goes out to the majority of the residents. In addition, public workshops were conducted at the council chambers covering specific topics (i.e. wildfire safety) at appropriate times throughout each year.
Cave Creek	• The Town of Cave Creek has posted a notice on our website seeking public input in our Multi Hazard Mitigation plan. We shall continue to post this notice throughout the planning phase. We have also posted a notice in our utility bill seeking public input.
Chandler	• Maintained the Emergency Preparedness section of the Department's website; including pages for various emergency situations, CENS, and Chandler CERT Basic Training. The page includes helpful links to a variety of county, state and federal agencies, including MCDEM. • Used social media to post emergency preparedness tips, holiday safety tips, and responses to events or incidents reported in the news. • Conducted open house events for the public that are held at a different fire station each time. This includes an annual Public Safety Open House conducted in partnership with the Chandler Police Department. • Conducted an annual Drowning Prevention Campaign that includes volunteers walking door-to-door delivering water safety information to residents in selected neighborhoods. The campaign is promoted through media releases, social media sites, the City's cable TV channel, citywide newsletters, and public appearances.

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Table 7-1: Continued public involvement activities performed by jurisdictions during the 2015 Plan cycle	
Jurisdiction	**Public Involvement Activity or Opportunity**
El Mirage	• In the last 5 years, The city has posted the MJHMP and seasonal information that pertains to emergency preparation information on the Cities web site as well as the departments Facebook page and Twitter account. The El Mirage PIO has been actively involved with information sharing to the community with the Covid-19 situation. In addition, the information is sent to local newspapers. The City Council is notified annually about the progress, changes, and intentions of Emergency Management..
Fountain Hills	• Provided information to the community regarding seasonal risks (wildland fire, severe storms, flooding, etc.) on a regular basis via social media and newspaper articles. • Hazard brochures have been placed in all public buildings containing information regarding preparedness and mitigation of local hazards. • The Maricopa County Hazard Mitigation Plan is posted on the Town website. • The Town attained Storm Ready certification from the National Weather Service. • Provided wildland fire risk inspections to residents.
Fort McDowell Yavapai Nation	• Fort McDowell Yavapai Nation (FMYN) has utilized social media platforms and newsletters to communicate potential risks during wildfire, monsoon, excessive heat and other hazards that present during different times of the year. Additionally, FMYN provides printed materials to increase public awareness of potential hazards specific to the Nation.
Gila Bend	• Made presentations as needed to the council regarding the status of the Plan and in particular, successful implementation of actions/projects. As projects, particularly those funded by grants, are undertaken and completed, the departments responsible for implementation provide updates and presentations to the Town Council. • Provided materials that elevate the public awareness of the hazards that may pose a risk to the community via website and social media. For example, the Town's social media and website platforms were utilized to inform the public regarding a water safety issue and mitigation measures they could take.
Gilbert	• Provided local hazard information on Gilbert Fire/Emergency Management website and maintained links to the 2015 Plan hosted on the County's website. • Used social media to inform public of seasonal weather hazards and forecasts.

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Table 7-1: Continued public involvement activities performed by jurisdictions during the 2015 Plan cycle	
Jurisdiction	**Public Involvement Activity or Opportunity**
Glendale	• The Glendale Division of Emergency Management, in coordination with the Glendale Fire Department Public Information Officer, has leveraged social media channels to provide public awareness and education for a variety of hazards (i.e. extreme heat; wildfire; flooding). Additionally, information was posted to the Glendale Division of Emergency Management's website regarding flood and monsoon safety. Outreach related to Drought was communicated through Water Services using the City's website and social media.
Goodyear	• Particularly, the Fire Department Community Education social media account includes routine messaging regarding wild fire potential, heat, winter weather, flooding, emergency preparedness, and other mitigation topics on a regular basis through the year. These messages are often picked up and retweeted by @goodyearaz and @goodyearpolice. • Goodyear host a variety of presentations in city venues throughout the year. Printed information on mitigation (specifically wildfire) and other emergency topics is routinely offered. • CERT classes are held annually (with the exception of 2020 due to the pandemic) wherein mitigation efforts are discussed in the context of preparedness and response. • Presentation to employees regarding emergency preparedness and the types of hazards faced in Goodyear are included in the "brown bag" series and offered to all employees. • The LEAD program has offered a class on hazards and preparedness (offered as an elective). The LEAD program consists of citizenry in a program regarding how the city operates and how they can become involved.
Guadalupe	• Use social media to post season hazards safety messages. • Provide Hazard awareness safety information at community events.
Litchfield Park	• Block Watch – Education and Outreach, advise of plan and location. • Website: Hazard mitigation plan on the City website for public access.
Mesa	• The City of Mesa through the Mesa Fire/Medical Department Emergency Management Division has provided links to FEMA, and ADEM, as well as a downloadable Emergency Preparation Guide and information on how to prepare for an emergency.

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Table 7-1: Continued public involvement activities performed by jurisdictions during the 2015 Plan cycle	
Jurisdiction	**Public Involvement Activity or Opportunity**
Paradise Valley	Paradise Valley is no longer participating in the Plan
Peoria	• The City of Peoria Office of Communications has used their social media accounts, website newsroom and with media and residents.
Phoenix	• The City of Phoenix utilized the communication office resources to inform and educate the community on different important hazard mitigation efforts. It increased social media presence by expanding its social media platforms. (Instagram, Twitter and Facebook) and continued preparing the City of Phoenix employee newsletter (City Connection) • The City of Phoenix implemented Resilient PHX, conducting workshops and educating the community on specific hazards and mitigation strategies identified in the hazard mitigation plan
Queen Creek	• Seek public input on Hazard Mitigation Plan utilizing website. • Used social media to inform public of seasonal weather hazards and forecasts. • Used the town's water bill insert to discuss monsoon hazards and preparedness tips. • Presentations to small groups and clubs concerning local hazards. • Partnered with the National Weather Service (NWS) to host the SkyWarn Storm Spotter course. • Provide Community Emergency Response Team (CERT) training.
Salt River Pima-Maricopa Indian Community	• Quarterly Tribal Emergency Response Commission Meetings that are open to the public meetings and have "call to public" on the agenda. This meeting enables tribal members to hear updates on community hazards and mitigation efforts, as well as give them the opportunity to provide input into these efforts. • Community Relations in coordination with Emergency Management conducts public outreach/education on all hazards mitigation and emergency preparedness for community members. Community members were educated on what to do before and during disasters to reduce the loss of life and property in a disaster. • Salt River Fire Department in Coordination with Emergency Management organized a Volunteer Organizations Active in Disasters (SR-VOAD) and re implemented the Salt River Community Emergency Response Team (SR-CERT) into the community to further disaster mitigation, preparedness, response, and recovery education and training.

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Table 7-1: Continued public involvement activities performed by jurisdictions during the 2015 Plan cycle	
Jurisdiction	**Public Involvement Activity or Opportunity**
Scottsdale	• The City of Scottsdale is dedicated to the continued coordination and collaboration with internal (city) and external partners relating to the implementation or actions towards hazard mitigation. • Public education events such as community forums, mass mailing and local cable television about flooding hazards and wildfire hazards have been done in the previous five years. • Internal coordination which has included stormwater management, public works and emergency management agencies highlighting and coordinating mitigation efforts with emphasis on National Flood Insurance program impact has also been done in the last five years. • Scottsdale has participated in public involvement meetings regarding the Rawhide Wash Flood Hazard Mitigation Project, the Reata Wash Flood Control Project, the Granite Reef Watershed Flood Hazard Mitigation Project, the Desert Mountain Area Drainage Master Study, the Lower Indian Bend Wash Area Drainage Master Study/Plan, and the Arizona Canal and Fans 5 and 6 Floodplain Redelineation Projects.

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Surprise	**Marketing and Communications Dept.** The Marketing and Communications Department has supported the following departments in community communication strategies for Monsoon, Flooding, Wind, Extreme Heat and Cold, and Wildfire dangers. They have also supported directed campaigns to engage the community in preparedness planning and mitigation efforts ("Ready, Set, Go" evacuation planning, and "Ready.Gov Planning tool for families.") Their efforts include: • June Monsoon - In coordination with the National Weather Service Monsoon awareness month, M&C developed the June Monsoon cartoon character and amplified NWS 4-phase messaging to the community through website, press release, and social media to prepare residents for Monsoon season storms and flooding. • Ready.maricopa.gov - In September 2020, the Emergency Manager worked with M&C to create messaging on the City of Surprise website for the four phases of Readiness Month and to encourage community members to download the Ready.maricopa.gov app, or go to the ready.maricopa.gov website and download family emergency preparedness plans. • Amplification of the County's messaging on the annual Palo Verde Drill and Siren tests - The city shared Maricopa County's social media posts and messaging (Facebook and Twitter) regarding the annual Palo Verde Drill and Siren tests. • Amplification of the NWS messaging of predicted weather events - In an effort to amplify and notify Surprise residents about predicted weather events, Marketing and Communications shared messaging via Facebook and Twitter from the US National Weather Service Phoenix Arizona channels, as well as sent press releases when necessary. • Amplification of flooding threats including messaging regarding sand bag stations and flood protection – Utilizing weather forecasts provided by the National Weather Service – Phoenix, the city shared sand and bag information with residents when estimated rainfall was anticipated to be significant or above average. Communication mediums used to share sand and bag information included press release, web post, and social media (Facebook, Twitter, NextDoor) • Amplification of any heat related weather warnings - In an effort to amplify and notify Surprise residents about heat-related warnings, Marketing and Communications shared messaging via Facebook, Twitter, and NextDoor from the US National Weather Service Phoenix Arizona channels. **Here are some additional events and ways Marketing and Communications shared/shares information:**

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	• Ready.gov National Preparedness Month (annual) – press release, website posts, social media posts • Southwest Monsoon (annual) – press release, website posts, social media posts • National Weather Service – Phoenix (annual) weather hazard messaging (excessive heat, flood, flash floods, etc.) – press release, website posts, social media posts • Stormwater Awareness Month (annual) – press release, website posts, social media posts • Wildfire Prevention - social media posts • 5-year hazard mitigation plan including website and social media notifications as well as placing information regarding the collection of community comments in the monthly water billing for Surprise residents. **Emergency Manager** • Applied for and obtained National Weather Service (NWS) Storm Ready Certification, affirming specific criteria were met in preparation for hazardous storm mitigation and response efforts. • Each year the Emergency Manager requests a Mayoral Proclamation from the Mayor of Surprise claiming July as Monsoon Awareness Month. This proclamation is made at a City Council Meeting and is also broadcast to the City of Surprise residents and highlights Monsoon season threats and reminds residents to get prepared for Monsoon Season storms. • Coordinated messaging with the Marketing and Communication Department regarding heat, rain, and flooding events within the city. • Coordinated annual awareness messaging regarding the Palo Verde Nuclear Plant annual siren test and WEA notification. • Partnered with the Phoenix office of the National Weather Service to coordinate location specific weather reports for major incidents and events. • Appeared on local KTAR Radio Station Podcast “Silent Witness 5.0 Info” to discuss Ready.gov website and the family emergency planning app. **Water Resource Management Dept.** • Implemented ‘My Surprise’ interactive web application to report issues and events throughout the city. This application allows users to report potholes, flooding, water & sewer issues, safety hazards, etc. • Constructed and activated 5 digital message boards throughout the city. These boards allow the city and other agencies to communicate regional updates.

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Table 7-1: Continued public involvement activities performed by jurisdictions during the 2015 Plan cycle	
Jurisdiction	**Public Involvement Activity or Opportunity**
	Public Works Department (In coordination with Marketing and Communications Department) • Amplified Maricopa County Flood Control District Public announcements and requests for public input regarding planning documents through Surprise social media. • Provided real time updates of flooding incidents and road closures via social media. • Provided updates regarding seasonal weather and sandbag (flood mitigation) locations so they could be announced via social media any time rainy weather is predicted. • Public Works Department actively participated in GAIN (Getting AZ Involved in Neighborhoods) Safety Night Program to educate the public about safety tips associated with flooding, household hazard mitigation, and preparation. • Utilized social media, website, and water billing flyers to seek public input in the development of the Capital Improvement Budget and Development Impact Fees that incorporate major projects that contribute to strategies associated with the Hazard Mitigation Plan. **Community Development Department** • Regularly sought public input on development projects and approval of those projects by the Planning and Zoning Commission or City Council; all of which are televised public meetings. **Fire Medical Department** • The Fire Medical Department engaged in public messaging through website, and social media at the onset of wildfire season with tips on prevention, evacuation, and creation of a family plan to minimize the risk of suffering injury in a wildfire. • The Fire Medical Department along with the Human Services and Community Vitality Department utilized various websites and social media to message heat related survival strategies, as well as heat warnings and locations for heat relief stations and water distribution stations. • The Fire Medical Department held an Emergency Preparedness Fair to make residents aware of common threats including wildfires, extreme heat, flooding and flash flooding.

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Table 7-1: Continued public involvement activities performed by jurisdictions during the 2015 Plan cycle	
Jurisdiction	**Public Involvement Activity or Opportunity**
Tempe	• Tempe Fire Medical Rescue has a newsletter that it sent out every quarter. We add information on flooding, Monsoons, high winds and extreme heat as well to keep our community engaged and prepared. • We work through our community centers to reach our neighborhoods. We teach preparedness and hand out brochures at different times of the year that relate to weather.
Tolleson	• Periodic emergency response updates to city council via the City Manager's update to council • Maintenance of a city webpage whereby any prepared plans may be posted along with local contact(s) for more information. • Provided periodic hazard mitigation outreach via City's social media platforms, to include Facebook, Instagram, and Twitter, along with citywide newsletter and local media.
Unincorporated Maricopa County	• Maricopa County through Maricopa County Department of Emergency Management and the Flood Control District of Maricopa County has provided season specific postings on social media reminding the public of the potential risks for hazards that may be prevalent at the time. This has allowed the public to provide feedback and ask questions. • Sought public input on Hazard Mitigation Plan utilizing the Maricopa County Department of Emergency Management website, social media and a public survey. • Maintained an interactive webpage providing a brief description and access to the Hazard Mitigation Plan. • Presentations to small groups and clubs concerning local hazards, handouts at community fairs and events.
Wickenburg	• Every fire season the fire department handed out and gave public presentation on fuel reduction projects and will assisted in surveying property to provide information and consultation on hazard reduction for homeowners. • Using social media, local newspaper, and radio, the Town provided annual public outreach to inform community of monsoon season hazards, mitigation measures and available assistance.
Youngtown	• Provided materials that elevate the public awareness of the hazards that may pose a risk to the community via safety fairs, county fairs, special celebrations, etc. • Maintained an interactive county/city/town webpage providing a brief description of the Plan with a link to the county's website where the Plan is posted and a local contact for anyone with questions.

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Table 7-2 summarizes activities for public involvement and dissemination of information that shall be pursued whenever possible and appropriate by the Plan jurisdictions.

Table 7-2: Continued public involvement activities or opportunities identified by each participating jurisdiction

Jurisdiction	Public Involvement Activity or Opportunity
ALL Participating Jurisdictions	• Centralize posting of Plan to the MCDEM website with each participating jurisdiction providing a brief note and link to the county's website on their local website, as appropriate. • LEPC meetings – regular announcement of hazard mitigation information and availability of the Plan for review and reference. • Presentation of mitigation actions/projects as they are implemented, to boards, councils, and/or trustees, as appropriate.
Avondale	• Use season-specific postings on social media reminding the public of the potential risks for hazards that may be prevalent at the time. • Provide content in City Magazine (RAVE) to elevate the public awareness of the hazards that may pose a risk prevalent at the time.
Buckeye	• Continue to increase awareness on seasonal potential hazards by posting regularly on the city's various social media channels • Update city webpages regularly with current and specific information on potential hazards • Include timely, seasonal safety tips in bi-weekly electronic newsletters • Provide educational materials describing the various potential risks to the community at the city's special events and water conservation presentations
Carefree	• The Town of Carefree will continue to use it's COINS email information platform to provide information to the residents of Carefree concerning relevant aspects of the plan. This will include information on cooling center locations, wildland fire safety, flood warnings and safety, etc. In addition the town will provide water conservation materials and drought related information in monthly water bills to each residence. During the next five years of the plan, the town will hold a wildfire safety workshop at town hall in the late part of April. This will give the town an additional opportunity to explain to residents relevant portions of the plan. The last piece will be a request for public input prior to the next five year plan update.

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Table 7-2: Continued public involvement activities or opportunities identified by each participating jurisdiction	
Jurisdiction	**Public Involvement Activity or Opportunity**
Cave Creek	• The Town of Cave Creek always appreciates citizen input whenever we are working on plans that will benefit the town and our residents. The Town of Cave Creek will continue to post a link upon our website seeking public input as it pertains to the Multi-Hazard Mitigation plan. The Town also provides lists of some common hazards within the town limits from drought to wildfire to name a few. This literature is made available throughout the town's buildings and is available for the public. Cave Creek also frequently discusses hazards at public meetings throughout the calendar year and at these meetings we remind the public that handouts are available at town hall. Cave Creek pro-actively alerts our residents to extreme risks such as wildfires and droughts.
Chandler	• Continue to use season specific postings on social media reminding the public of the potential risks for hazards that may be prevalent at the time. • Continue to host open house events for the Public. • Continue to conduct the annual Drowning Prevention Campaign.
El Mirage	• To continue public involvement, the social media such as web postings will be utilized. Additional methods will and can include mailings, local newspaper, and other means of social media. The public may give feedback by emailing the department, the City, social media such as Facebook and a link to the county website has been provided on the City web page. The MJHMP has been posted with a link for citizen feedback.
Fountain Hills	• Provide presentations to community groups regarding hazards that may impact the Town. • Continued use of social media and print media to inform citizens of hazards that may impact the Town. • Continue to provide wildland fire risk inspections to residents.
Fort McDowell Yavapai Nation	• Fort McDowell Yavapai Nation plans to continue to present information to the community via social media, newsletter and in person as needed for specific annual hazards such as wildfire, flooding, heat and monsoon season. Information is shared through the Fire Department, Events, Health Clinic and other departments to members of the Nation.

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Table 7-2: Continued public involvement activities or opportunities identified by each participating jurisdiction	
Jurisdiction	**Public Involvement Activity or Opportunity**
Gila Bend	• Making presentations as needed to the council regarding the status of the Plan and in particular, successful implementation of actions/projects. As projects, particularly those funded by grants, are undertaken and completed, the departments responsible for implementation provide updates and presentations to the Town Council. Additionally, the Plan update will go before the Town Council for adoption upon completion of the update process. • Provide materials that elevate the public awareness of the hazards that may pose a risk to the community via website and social media. These platforms are used to notify the public of the hazards associated with extreme heat events, monsoon season, severe wind events, wildfire potential, air quality, drought conditions and the steps they can take to mitigate their risk.
Gilbert	• Maintain an inter-active Town of Gilbert webpage providing a brief description of the Plan with a link to the County's website where the Plan is posted and a local contact for anyone with questions. • Continue to leverage social media outlets to communicate seasonal weather hazards, forecasts, and possible mitigation measures.
Glendale	• The Glendale Division of Emergency Management will conduct information sessions with departments throughout the City of Glendale to provide them with awareness of the Hazard Mitigation Plan, as well as to increase inter-departmental communication regarding hazard mitigation. Public awareness and education regarding natural hazards will continue to occur through social media channels and via information posted to the Glendale Division of Emergency Management's website. Outreach related to Drought will continue to be communicated through Water Services using the City's website and social media platforms.

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Table 7-2: Continued public involvement activities or opportunities identified by each participating jurisdiction	
Jurisdiction	**Public Involvement Activity or Opportunity**
Goodyear	• The Fire Department Community Education will continue creating unique and interesting social media messaging to engage the residents of goodyear on a variety of hazards they may face and how they can best mitigate, prepare and/or respond. The City has a strong social media following. To augment this, the City will provide Preparedness Tips in their once monthly publication (In Focus) regarding mitigation efforts of the city and what they can do to reduce hazards. Finally, the Emergency Management Division will continue to respond to requests for information, speakers and materials on risk reduction. During plan maintenance, residents will be queried on social media and directed to the existing plan which is posted on Goodyear's website.
Guadalupe	• Continue to use social media to post season hazards safety messages. • Provide Hazard awareness safety information at community events. • Post the hazard mitigation plan on town web site for public information.
Litchfield Park	• City admin meets regularly with neighborhood block programs. City staff and Council meets publicly with the community thru State of the City address and hazard mitigation is part of that presentation. • Website: Encourage citizens to sign up for emergency notifications thru Maricopa County. Hazard Mitigation plans available on website. • Social media posts about seasonal dangers in community such as extreme heat or monsoons.

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Table 7-2: Continued public involvement activities or opportunities identified by each participating jurisdiction	
Jurisdiction	**Public Involvement Activity or Opportunity**
Mesa	• The City of Mesa provides information to the public using the Community Emergency Notification System (CENS), also called Reverse 9-1-1. If an event, incident, disaster or emergency meeting the CENS activation criteria occurs, the 9-1-1 dispatch center in Mesa will call and provide information and/or instruction to subscribers. A website is provided for potential subscribers that provide information, frequently asked questions, and registration information. • The City of Mesa through the Mesa Fire/Medical Department Emergency Management Division will continue to maintain an inter-active city webpage providing a brief description of the Maricopa County Hazard Mitigation Plan with a link to the county's website where the Plan is posted and a local contact for anyone with questions and feedback. Links to FEMA, and ADEM are provided, as well as a downloadable Emergency Preparation Guide and information on how to prepare for an emergency. • The City of Mesa through the Mesa Fire/Medical Department Public Information Office will continue to provide season specific postings on social media reminding the public of the potential risks for hazards that may be prevalent at the time. This has allowed the public to provide feedback and ask questions. • The City of Mesa through the Mesa Fire/Medical Department will work with local communities to support their wildland fire mitigation efforts.
Peoria	• During the last five years, the Office of Emergency Management has promoted the Hazard Mitigation plan both internally with departmental accreditation programs and external during public events such as GAIN Night and Homeowner Association meetings.

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Table 7-2: Continued public involvement activities or opportunities identified by each participating jurisdiction	
Jurisdiction	**Public Involvement Activity or Opportunity**
Phoenix	• Develop and maintain an E-mail distribution list for continuous feedback from the community, it will include community members, businesses, non-profits, City departments, etc. that will help the City of Phoenix distribute surveys and questioners on an annual basis. • Continue utilizing social media platforms to inform the community of upcoming community events, hazards in the area and how to prepare for them. • Distribute brochures and flyers to the community, to maintain public awareness on hazards in the area and encourage feedback from the community. • Present to governing boards summarizing the plan, give status on mitigation projects and request feedback. • Utilize workshops to educate and help develop mitigation efforts for individual risks. Educate on hazard mitigation process and mitigation projects.
Queen Creek	• Continue to make presentations to local groups concerning local hazards. • Continue to raise public awareness of monsoon hazards, preparedness tips and other weather related events utilizing Town social media, website and other tools as available and appropriate. • Continue to offer training through Town resources and partnerships including the CERT and Skywarn programs. • Investigate the requirements of the NWS StormReady Program and evaluate how appropriate it is to implement for the Town.

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Table 7-2: Continued public involvement activities or opportunities identified by each participating jurisdiction	
Jurisdiction	**Public Involvement Activity or Opportunity**
Salt River Pima-Maricopa Indian Community	• Quarterly Tribal Emergency Response Commission Meetings that are open to the public meetings and have "call to public" on the agenda. This meeting enables tribal members to hear updates on community hazards and mitigation efforts, as well as give them the opportunity to provide input into these efforts. • Community Relations in coordination with Emergency Management conducts public outreach/education on all hazards mitigation and emergency preparedness for community members. Community members were educated on what to do before and during disasters to reduce the loss of life and property in a disaster. • Salt River Fire Department in Coordination with Emergency Management organized a Volunteer Organizations Active in Disasters (SR-VOAD) and re implemented the Salt River Community Emergency Response Team (SR-CERT) into the community to further disaster mitigation, preparedness, response, and recovery education and training.
Scottsdale	• The plan and proposed changes will be posted on the city's Emergency Management website and will contain an email address and phone number to which people can direct comments and concerns. • A public meeting will be held after each annual evaluation or when deemed necessary by the Office of Emergency Management. The meetings will offer a forum for concerns, opinions, or ideas about the plan. The Office of Emergency Management will be responsible for using city resources to publicize the annual public meeting and for maintaining public involvement through Scottsdale City Cable (Channel 11), the City's Emergency Management webpage, appropriate City of Scottsdale social media accounts and local newspapers. • At least one public involvement meeting will be held regarding the Granite Reef Wash Phase 2 Flood Hazard Mitigation Project and associated Floodplain Redelineations after Phase 1 and Phase 2. At least one public involvement meeting will be held regarding the Reata Wash Flood Control Project.

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Surprise	**Marketing and Communications Dept.** • Surprise will continue to collaborate with the Flood Control District of Maricopa County, neighboring cities, state and local agencies to educate and encourage participation in the Wittman Area Drainage Master Study. The purpose of the study is to identify flood and drainage hazards within the designated study area, which includes a portion of northwest Surprise. During the course of the study, Surprise will help promote study related meetings and share outreach materials with residents and businesses to encourage participation. Outreach channels will include press releases, website posts, social media posts, and presentations at public meetings (city council, board of supervisors, study, etc.) • In September of each year, the Emergency Manager and M&C will deliver messaging on the City of Surprise website for the four phases of Readiness Month and to encourage community members to download the Ready.maricopa.gov app, or go to the ready.maricopa.gov website and download family emergency preparedness plans. • Every June, in coordination with the National Weather Service Monsoon awareness month, M&C will amplify NWS 4-phase messaging to the community through website and social media to prepare residents for Monsoon season storms and flooding. • The Marketing and Communications Department will continue to support departments in their efforts to involve the public in various messaging while proactively initiating messaging regarding local hazards and threats to the community including extreme weather, Monsoon Season storms and flooding, wildfires, and other threats. **Emergency Manager** • Will perform planning maintenance to maintain the City's National Weather Service (NWS) Storm Ready Certification, re-affirming specific criteria were met in preparation for hazardous storm mitigation and response efforts. • Continue to author and request a Mayoral Proclamation from the Mayor of Surprise claiming July as Monsoon Awareness Month. This proclamation will be made at a City Council Meeting and will be broadcast to the City of Surprise residents and will highlight Monsoon season threats and remind residents to get prepared for Monsoon Season storms. • Coordinate messaging with the Marketing and Communication Department regarding heat, rain, and flooding events within the city.

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	• Coordinate annual awareness messaging regarding the Palo Verde Nuclear Plant annual siren test and WEA notification. • Partner with the Phoenix office of the National Weather Service to coordinate location specific weather reports for major incidents and events. **Water Resource Management Dept.** • The Water Resource Management Department will be engaging in an update to our Integrated Water Infrastructure Improvement Plan. As part of this update there will be public participation in a variety of forums such as City Council Work Sessions, Department Hosted Open House events (in-person or virtual), and Key Stakeholder Engagement at their Public Meetings (Epcor Water, MWD, HOAs, El Mirage). **Public Works Department** • Continue various efforts to seek public input in the development of the Capital Improvement Budget and Development Impact Fees that incorporate projects that seek to fulfil the intent of the Hazard Mitigation Plan. • Conduct annual council presentations from various departments requesting the authority to apply for grants that seek to gain funding for projects that will mitigate the identified hazards. • Advertise Flood Control District public announcements and requests for public input regarding planning documents through social media. • Continue to provide updates regarding seasonal weather and sandbag (flood mitigation) locations via social media any time rainy weather is predicted. • Public Works Department will continue to actively participate in GAIN (Getting AZ Involved in Neighborhoods) Safety Night Program to educate the public about safety tips associated with flooding, household hazard mitigation, and preparation. • Utilizing social media, website, and water billing flyers, Public Works will continue to seek public input in the development of the Capital Improvement Budget and Development Impact Fees that incorporate major projects that contribute to strategies associated with the Hazard Mitigation Plan. **Community Development Department** • Community Development Department will be updating the City's General Plan, which is the guiding document for the City's long and short-term development. It is an intensive process that involves lengthy public outreach and opportunities for input, and presents opportunities to educate

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Table 7-2: Continued public involvement activities or opportunities identified by each participating jurisdiction	
Jurisdiction	**Public Involvement Activity or Opportunity**
	the community regarding hazard mitigation efforts in development projects. **Fire Medical Department** • During the next 5 years, the SFMD will continue to partner with the Marketing and Communications Department and Surprise Channel 11 (TV station) to create and distribute effective messaging to the residents and visitors of Surprise Arizona to include: o Wildfire Danger: Information for Surprise residents in the growing urban interface. o Hydration Stations: Utilizing neighborhood Fire Stations to distribute water to the homeless. o Monsoon Awareness: Don't be caught by surprise in Surprise. o Flash Flooding: Avoid Low Water Crossings during rainstorms.
Tempe	• Tempe will continue to reach out to our community centers in the next 5 years. We plan to bring in our CERT team, also partnering with ASU to pass out water and teach about extreme heat. Including updated links on relevant city websites. • Tempe will continue to post on social media about the severe heat and other weather implications for our community members. • Tempe's CERT team plans to set up booths at safety fairs and various public events for community members to take in order to prepare themselves for flooding, high-winds and extreme heat.
Tolleson	• Periodic emergency response updates to city council via the City Manager's update to council • Maintenance of a city webpage whereby any prepared plans may be posted along with local contact(s) for more information. • Provide hazard mitigation information at Citywide health and safety fair • Provide periodic hazard mitigation outreach via City's social media platforms, to include Facebook, Instagram, and Twitter, along with citywide newsletter and local media.

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Table 7-2: Continued public involvement activities or opportunities identified by each participating jurisdiction	
Jurisdiction	**Public Involvement Activity or Opportunity**
Unincorporated Maricopa County	• Maricopa County through Maricopa County Department of Emergency Management will continue to maintain a dedicated webpage hosting a copy of the Plan and providing a mechanism for submitting comments or questions regarding the Plan and hazard mitigation in general. • Maricopa County will continue to remain active on Twitter, Facebook and Nextdoor to continually engage the public in ways to mitigate and prepare for emergencies. • Maricopa County will continue to keep the residents informed and educated on project and improvement within their county. We will strive to increase our public involvement and outreach via current and future communication tools. • Maricopa County will post all county approved plans on the respective department's websites, as appropriate. Informed residents are prepared residents. • Maricopa County Department of Emergency Management will continue to make presentations to local groups concerning local hazards.
Wickenburg	• Every fire season the fire department will out and give public presentation on fuel reduction projects and will assist in surveying property to provide information and consultation on hazard reduction for homeowners. • Using social media, local newspaper, and radio, the Town provides annual public outreach to inform community of monsoon season hazards, mitigation measures and available assistance. • The Town will leverage the newly created Public Relations office to disseminate hazard mitigation information through the Town's website and social media platforms. • Use the Civic Ready messaging system, which utilizes both email and text messaging to inform the public of predicted or occurring hazards within the jurisdiction.
Youngtown	• Provide materials that elevate the public awareness of the hazards that may pose a risk to the community via safety fairs, county fairs, special celebrations, etc. • Maintain an interactive county/city/town webpage providing a brief description of the Plan with a link to the county's website where the Plan is posted and a local contact for anyone with questions.

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7.4 Monitoring of Tribal Mitigation Activities

The following sections describe the FMYN's and SRPMIC's strategy for reviewing and assessing the progress of the mitigation goals and actions/projects identified in the Plan. The strategy below is similar to the 2015 Plan, but updated to include additional detail in the form of a table format for use in the annual progress assessment of the defined mitigation actions/projects (A/P). Details are summarized in the following subsections.

7.4.1 Goals Achievement

Unless otherwise directed or warranted, the goals and objectives review will coincide with the annual overall Plan review and update schedule presented in Section 7.1.2. Goals will be assessed using a subjective approach and a summary of the assessment will be included in the annual review memorandum.

7.4.2 Actions/Projects Progress

Tables 6-8-7 and 6-8-20 summarize the implementation strategy for each of the A/Ps identified in the FMYN and SRPMIC mitigation strategies. For each annual review and plan update, the respective LPT will coordinate with the agency or agencies identified as the lead for each A/P, to assess the implementation status of the identified action/project and generate a brief memorandum summarizing the status of each project using the format below. Tables 6-7-7 and 6-7-20 summarize the assessments of the 2015 Plan mitigation A/Ps performed by the LPT for this update.

Project ID and Description	Lead Agency and Contact Info	Current Status of Action/Project	Project Disposition	Explanation
Include the ID and description of project as included in Table 6-8-7	*Provide the name, agency affiliation, and contact information (phone and email) of person or persons contacted*	*Assign one of the following status descriptors as appropriate:* • *NO ACTION* • *IN-PROGRESS* • *COMPLETED*	*Provide a descriptor of either KEEP or DROP to identify future disposition of action/project.*	*Provide a description of the current project status including date of implementation, challenges faced, percent completed, funding sources used, etc..*

7.4.3 Project Closeouts

Once an A/P is implemented, its progress will be monitored by the LPT on at least an annual basis as described in Section 7.4.2. For FEMA supported projects, progress reports will be required on a quarterly basis throughout the project duration. The degree of quarterly reporting will be dependent upon the type of A/P, its funding source, and the associated requirements. At a minimum, the quarterly report shall address:

- ✓ Project Completion Status
- ✓ Project Challenges/Issues (If any)
- ✓ Budgetary Considerations (Cost Overruns or Underruns)
- ✓ Detailed Documentation of Expenditures

Upon completion of projects, a member of the LPT will visit the project location to view the final results. A closed project will also change status to "Completed" and

will then be monitored for effectiveness in the intended mitigation. FEMA supported project closeouts will include an audit of the A/P financials as well as other guidelines/requirements set forth under the funding or grant rules, and any attendant administrative plans developed by FMYN and/or SRPMIC.

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SECTION 8: PLAN TOOLS

8.1 Acronyms

A/P .....Mitigation Action/Project
ADEM .....Arizona Division of Emergency Management
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
AZDEQ .....Arizona Department of Environmental Quality
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 Maricopa County
FEMA .....Federal Emergency Management Agency
FMA.....Flood Mitigation Assistance Grant Program
FMYN.....Fort McDowell Yavapai Nation
GIS .....Geographic Information System
HAZMAT .....Hazardous Material
HAZUS-MH .Hazards United States Multi-Hazard
HMA.....Hazard Mitigation Assistance
IFCI .....International Fire Code Institute
LEPC .....Local Emergency Planning Committee
MCDEM .....Maricopa County Department of Emergency Management
MCDOT.....Maricopa County Department of Transportation
MJHMP .....Multi-Jurisdictional Hazard Mitigation Plan
MMI .....Modified Mercalli Intensity
NCA.....National Climate Assessment
NCDC .....National Climate Data Center
NDMC .....National Drought Mitigation Center

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NESDIS .....National Environmental Satellite, Data and Information Service
NFHL .....National Flood Hazard Layer
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
NWS .....National Weather Service
PDSI .....Palmer Drought Severity Index
RL .....Repetitive Loss
SARA .....Superfund Amendments and Reauthorization Act
SRLP .....Severe Repetitive Loss Properties
SRL .....Severe Repetitive Loss
SRP .....Salt River Project
SRPMIC.....Salt River Pima Maricopa Indian Community
UBC .....Uniform Building Code
USACE .....United States Army Corps of Engineers
USDA .....United States Department of Agriculture
USFS .....United States Forest Service
USGCRP.....U.S. Global Change Research Program
USGS .....United States Geological Survey
VA.....Vulnerability Analysis
WUI .....Wildland Urban Interface

8.2 Definitions

The following terms and definitions are provided for reference and are a slight modification of the list originally presented by the State of Arizona in the 2013 State of Arizona Hazard Mitigation Plan.

ARIZONA HAZARDS

Dam Failure

A dam failure is a catastrophic type of failure characterized by the sudden, rapid and uncontrolled release of impounded water. Dam failures are typically due to either overtopping or piping and can result from a variety of causes including natural events such as floods, landslides or earthquakes, deterioration of foundation or compositional materials, penetration by vegetative roots or animal burrows, fissures or improper design and construction. Such a failure presents a significant potential for a disaster as significant loss of life and property would be expected in addition to the possible loss of power and water resources.

Drought

A drought is a deficiency of precipitation over on extended period of time, resulting in water shortage for some activity, group or environmental sector. "Severe" to "extreme" drought

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conditions endanger livestock and crops, significantly reduce surface and ground water supplies, increase the potential risk for wildland fires, increase the potential for dust storms, and cause significant economic loss. Humid areas are more vulnerable than arid areas. Drought may not be constant or predictable and does not begin or end on any schedule. Short term droughts are less impacting due to the reliance on irrigation and groundwater in arid environments.

Earthquake

An earthquake is a naturally-induced shaking of the ground, caused by the fracture and sliding of rock within the Earth's crust. The magnitude is determined by the dimensions of the rupturing fracture (fault) and the amount of displacement that takes place. The larger the fault surface and displacement, the greater the energy. In addition to deforming the rock near the fault, this energy produces the shaking and a variety of seismic waves that radiate throughout the Earth. Earthquake magnitude is measured using the Richter Scale and earthquake intensity is measured using the Modified Mercalli Intensity Scale.

Extreme Heat

Extreme Heat refers to environmental conditions with high air temperatures, often in combination with high shortwave or longwave radiation (sunlight, or heat radiated from buildings and other surfaces) and/or high humidity. Under certain conditions, low or high wind speeds can also increase the risks associated with high heat. Extreme heat poses threats to the health and well-being of humans, animals, and plants, as well as critical infrastructure systems including food, water, energy, and transportation. The major human health risks associated with extreme heat are as follows:

- Heat Cramps: May occur in people unaccustomed to exercising in the heat and generally ceases to be a problem after acclimatization.
- Heat Syncope: This refers to sudden loss of consciousness and is typically associated with people exercising who are not acclimated to warm temperatures. Causes little or no harm to the individual.
- Heat Exhaustion: While much less serious than heatstroke, heat exhaustion victims may complain of dizziness, weakness, or fatigue. Body temperatures may be normal or slightly to moderately elevated. The prognosis is usually good with fluid treatment.
- Heatstroke: Considered a medical emergency, heatstroke is often fatal. It occurs when the body's responses to heat stress are insufficient to prevent a substantial rise in the body's core temperature. While no standard diagnosis exists, a medical heatstroke condition is usually diagnosed when the body's temperature exceeds 105°F due to environmental temperatures. Rapid cooling is necessary to prevent death, with an average fatality rate of 15 percent even with treatment.

Fissure

Earth fissures are tension cracks that open as the result of subsidence due to severe overdrafts (i.e., pumping) of groundwater, and occur about the margins of alluvial basins, near exposed or shallow buried bedrock, or over zones of differential land subsidence. As the ground slowly settles, cracks form at depth and propagate towards the surface, hundreds of feet above. Individual fissures range in length from hundreds of feet to several miles, and from less than an inch to several feet wide. Rainstorms can erode fissure walls rapidly causing them to widen and lengthen suddenly and dangerously, forming gullies five to 15- feet wide and tens of feet deep.

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Flooding

Flooding is an overflowing of water onto normally dry land and is one of the most significant and costly of natural disasters. Flooding tends to occur in Arizona during anomalous years of prolonged, regional rainfall (typical of an El Nino year), and is typified by increased humidity and high summer temperatures.

Flash flooding is caused by excessive rain falling in a small area in a short time and is a critical hazard in Arizona. Flash floods are usually associated with summer monsoon thunderstorms or the remnants of a tropical storm. Several factors contribute to flash flooding: rainfall intensity and duration, topography, soil conditions, and ground cover. Most flash flooding is caused by slow-moving thunderstorms or thunderstorms repeatedly moving over the same area and can occur within a few minutes or hours of excessive rainfall, or a quick release from a dam or levee failure. Thunderstorms produce flash flooding, often far from the actual storm and at night when natural warnings may not be noticed.

Landslide / Mudslide

Landslides like avalanches are massive downward and outward movements of slope-forming materials. The term landslide is restricted to movement of rock and soil and includes a broad range of velocities. Slow movements, although rarely a threat to life, can destroy buildings or break buried utility lines. A landslide occurs when a portion of a hill slope becomes too weak to support its own weight. The weakness is generally initiated when rainfall or some other source of water increases the water content of the slope, reducing the shear strength of the materials. A mud slide is a type of landslide referred to as a flow. Flows are landslides that behave like fluids: mud flows involve wet mud and debris.

Levee Failure / Breach

Levee failures are typically due to either overtopping or erosive piping and can result from a variety of causes including natural events such as floods, hurricane/tropical storms, or earthquakes, deterioration of foundation or compositional materials, penetration by vegetative roots or animal burrows, fissures, or improper design, construction and maintenance. A levee breach is the opening formed by the erosion of levee material and can form suddenly or gradually depending on the hydraulic conditions at the time of failure and the type of material comprising the levee.

Severe Wind

Thunderstorms are characterized as violent storms that typically are associated with high winds, dust storms, heavy rainfall, hail, lightning strikes, and/or tornadoes. The unpredictability of thunderstorms, particularly their formation and rapid movement to new locations heightens the possibility of floods. Thunderstorms, dust/sand storms and the like are most prevalent in Arizona during the monsoon season, which is a seasonal shift in the winds that causes an increase in humidity capable of fueling thunderstorms. The monsoon season in Arizona typically is from late-June or early-July through mid-September.

Tornadoes are violently rotating columns of air extending from a thunderstorm to the ground. The most violent tornadoes are capable of tremendous destruction with wind speeds in excess of 250 mph. Damage paths can exceed a mile wide and 50 miles long. The damage from tornadoes is due to high winds. The Fujita Scale of Tornado Intensity measures tornado / high wind intensity and damage.

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Tropical Storms are storms in which the maximum sustained surface wind ranges from 39-73 mph. Tropical storms are associated with heavy rain and high winds. High intensity rainfall in short periods is typical. A tropical storm is classified as a hurricane when its sustained winds reach or exceed 74 mph. These storms are medium to large in size and are capable of producing dangerous winds, torrential rains, and flooding, all of which may result in tremendous property damage and loss of life, primarily in coastal populated areas. The effects are typically most dangerous before a hurricane makes landfall, when most damage occurs. However, Arizona has experienced a number of tropical storms that caused extensive flooding and wind damage.

Subsidence

Land subsidence in Arizona is primarily attributed to substantial groundwater withdrawal from aquifers in sedimentary basins. As the water is removed, the sedimentary layers consolidate resulting in a general lowering of the corresponding ground surface. Subsidence frequently results in regional bowl-shaped depressions, with loss of elevation greatest in the center and decreasing towards the perimeter. Subsidence can measurably change or reverse basin gradients causing expensive localized flooding and adverse impacts or even rupture to long-baseline infrastructure such as canals, sewer systems, gas lines and roads. Earth fissures are the most spectacular and destructive manifestation of subsidence-related phenomena.

Wildfire

Wildfire is a rapid, persistent chemical reaction that releases heat and light, especially the exothermic combination of a combustible substance with oxygen. Wildfires present a significant potential for disaster in the southwest, a region of relatively high temperatures, low humidity, low precipitation, and during the spring moderately strong daytime winds. Combine these severe burning conditions with people or lightning and the stage is set for the occurrence of large, destructive wildfires.

Winter Storm

Winter storms bring heavy snowfall and frequently have freezing rain and sleet. Sleet is defined as pellets of ice composed of frozen or mostly frozen raindrops or refrozen partially melted snowflakes. These pellets of ice usually bounce after hitting the ground or other hard surfaces. Freezing rain begins as snow at higher altitudes and melts completely on its way down while passing through a layer of air above freezing temperature, then encounters a layer below freezing at lower level to become super cooled, freezing upon impact of any object it then encounters. Because freezing rain hits the ground as a rain droplet, it conforms to the shape of the ground, making one thick layer of ice. Snow is generally formed directly from the freezing of airborne water vapor into ice crystals that often agglomerates into snowflakes. Average annual snowfall in Arizona varies with geographic location and elevation, and can range from trace amounts to hundreds of inches. Severe snow storms can affect transportation, emergency services, utilities, agriculture and basic necessities supply to isolated communities. In extreme cases, snow loads can cause significant structural damage to under-designed buildings.

GENERAL PLAN TERMS

Actions/Projects

Specific actions or projects that help achieve goals and objectives.

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Asset
Any natural or human-caused feature that has value, including, but not limited to people; buildings; infrastructure like bridges, roads, and sewer and water systems; lifelines like electricity and communication resources; or environmental, cultural, or recreational features like parks, dunes, wetlands, or landmarks.

Building
A structure that is walled and roofed, principally above ground and permanently affixed to a site. The term includes a manufactured home on a permanent foundation on which the wheels and axles carry no weight.

Critical Facilities and Infrastructure
Systems or facilities whose incapacity or destruction would have a debilitating impact on the defense or economic security of the nation. The Critical Infrastructure Assurance Office (CIAO) defines eight categories of critical infrastructure, as follows:

Telecommunications infrastructure: Telephone, data services, and Internet communications, which have become essential to continuity of business, industry, government, and military operations.

Electrical power systems: Generation stations and transmission and distribution networks that create and supply electricity to end-users.

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.

Banking and finance institutions: Banks, financial service companies, payment systems, investment companies, and securities/commodities exchanges.

Transportation networks: Highways, railroads, ports and inland waterways, pipelines, and airports and airways that facilitate the efficient movement of goods and people.

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.

Government services: Capabilities at the federal, state, and local levels of government required to meet the needs for essential services to the public.

Emergency services: Medical, police, fire, and rescue systems.

Disaster Mitigation Act of 2000 (DMA2K)
A law signed by the President on October 30, 2000 that encourages and rewards local and state pre-disaster planning, promotes sustainability as a strategy for disaster resistance, and is intended to integrate state and local planning with the aim of strengthening statewide mitigation planning.

Emergency Preparedness and Response (EPR) Directorate
One of five major Department of Homeland Security Directorates which builds upon the formerly independent Federal Emergency Management Agency (FEMA). EPR is responsible for preparing for natural and human-caused disasters through a comprehensive, risk-based

emergency management program of preparedness, prevention, response, and recovery. This work incorporates the concept of disaster-resistant communities, including providing federal support for local governments that promote structures and communities that reduce the chances of being hit by disasters.

Emergency Response Plan
A document that contains information on the actions that may be taken by a governmental jurisdiction to protect people and property before, during, and after a disaster.

Federal Emergency Management Agency (FEMA)
Formerly independent agency created in 1978 to provide a single point of accountability for all Federal activities related to disaster mitigation and emergency preparedness, response and recovery. As of March 2003, FEMA is a part of the Department of Homeland Security's Emergency Preparedness and Response (EPR) Directorate.

Flood Insurance Rate Map (FIRM)
Map of a community, prepared by FEMA that shows the special flood hazard areas and the risk premium zones applicable to the community.

Frequency
A measure of how often events of a particular magnitude are expected to occur. Frequency describes how often a hazard of a specific magnitude, duration, and/or extent typically occurs, on average. Statistically, a hazard with a 100-year recurrence interval is expected to occur once every 100 years on average, and would have a 1% chance – its probability – of happening in any given year. The reliability of this information varies depending on the kind of hazard being considered.

Geographic Information Systems (GIS)
A computer software application that relates physical features on the earth to a database to be used for mapping and analysis.

Goals
General guidelines that explain what you want to achieve. Goals are usually broad statements with long-term perspective.

Hazard
A source of potential danger or adverse condition. Hazards include both natural and human-caused events. A natural event is a hazard when it has the potential to harm people or property and may include events such as floods, earthquakes, tornadoes, tsunami, coastal storms, landslides, and wildfires that strike populated areas. Human-caused hazard events originate from human activity and may include technological hazards and terrorism. Technological hazards arise from human activities and are assumed to be accidental and/or have unintended consequences (e.g., manufacture, storage and use of hazardous materials). While no single definition of terrorism exists, the Code of Federal Regulations defines terrorism as "…unlawful use of force and violence against persons or property to intimidate or coerce a government, the civilian population, or any segment thereof, in furtherance of political or social objectives."

Hazard Event
A specific occurrence of a particular type of hazard.

Hazard Identification

The process of identifying hazards that threaten an area.

Hazard Mitigation
Cost effective measures taken to reduce or eliminate long-term risk associated with hazards and their effects.

Hazard Profile
A description of the physical characteristics of hazards and a determination of various descriptors including magnitude, duration, frequency, probability, and extent.

HAZUS
A GIS-based nationally standardized earthquake, flood and high wind event loss estimation tool developed by FEMA.

Implementation Strategy
A comprehensive strategy that describes how the mitigation actions will be implemented.

Mitigate
To cause to become less harsh or hostile; to make less severe or painful. Mitigation activities are actions taken to eliminate or reduce the probability of the event, or reduce its severity of consequences, either prior to or following a disaster/emergency.

Mitigation Plan
A systematic evaluation of the nature and extent of vulnerability to the effects of natural hazards typically present in a defined geographic area, including a description of actions to minimize future vulnerability to hazards.

Objectives
Defined strategies or implementation steps intended to attain the identified goals. Objectives are specific, measurable, and have a defined time horizon.

100-Hundred Year Floodplain
Also referred to as the Base Flood Elevation (BFE) and Special Flood Hazard Area (SFHA). An area within a floodplain having a 1% or greater chance of flood occurrence in any given year.

Planning
The act or process of making or carrying out plans; the establishment of goals, policies, and procedures for a social or economic unit.

Probability
A statistical measure of the likelihood that a hazard event will occur.

Promulgation
To make public and put into action the Hazard Mitigation Plan via formal adoption and/or approval by the governing body of the respective community or jurisdiction (i.e. – town or city council, county board of directors, etc.).

Q3 Data
The Q3 Flood Data product is a digital representation of certain features of FEMA's Flood Insurance Rate Map (FIRM) product, intended for use with desktop mapping and Geographic Information Systems technology. The digital Q3 Flood Data are created by scanning the effective FIRM paper maps and digitizing selected features and lines. The digital Q3 Flood

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Data are designed to serve FEMA's needs for disaster response activities, National Flood Insurance Program activities, risk assessment, and floodplain management.

Repetitive Loss Property
A property that is currently insured for which two or more National Flood Insurance Program losses (occurring more than ten days apart) of at least $1,000 each have been paid within any 10 year period since 1978.

Risk
The estimated impact that a hazard would have on people, services, facilities, and structures in a community; the likelihood of a hazard event resulting in an adverse condition that causes injury or damage. Risk is often expressed in relative terms such as a high, moderate, or low likelihood of sustaining damage beyond a particular threshold due to a specific type of hazard event. It also can be expressed in terms of potential monetary losses associated with the intensity of the hazard.

Substantial Damage
Damage of any origin sustained by a structure in a Special Flood Hazard Area whereby the cost of restoring the structure to its before-damaged condition would equal or exceeds 50% of the market value of the structure before the damage.

Vulnerability
Describes how exposed or susceptible to damage an asset is. Vulnerability depends on an asset's construction, contents, and the economic value of its functions. Like indirect damages, the vulnerability of one element of the community is often related to the vulnerability of another. For example, many businesses depend on uninterrupted electrical power–if an electric substation is flooded, it will affect not only the substation itself, but a number of businesses as well. Often, indirect effects can be much more widespread and damaging than direct effects.

Vulnerability Analysis
The extent of injury and damage that may result from a hazard event of a given intensity in a given area. The vulnerability analysis should address impacts of hazard events on the existing and future built environment.

Vulnerable Populations
Any segment of the population that is more vulnerable to the effects of hazards because of things such as lack of mobility, sensitivity to environmental factors, or physical abilities. These populations can include, but are not limited to, senior citizens and school children.

GENERAL HAZARD TERMS

Fujita Scale of Tornado Intensity
Rates tornadoes with numeric values from F0 to F5 based on tornado winds peed and damage sustained. An F0 indicates minimal damage such as broken tree limbs or signs, while an F5 indicates severe damage sustained.

Liquefaction
The phenomenon that occurs when ground shaking (earthquake) causes loose soils to lose strength and act like viscous fluid. Liquefaction causes two types of ground failure: lateral spread and loss of bearing strength.

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Modified Mercalli Intensity Scale

The Modified Mercalli Intensity Scale is commonly used in the United States by seismologists seeking information on the severity of earthquake effects. Intensity ratings are expressed as Roman numerals between I at the low end and XII at the high end. The Intensity Scale differs from the Richter Magnitude Scale in that the effects of any one earthquake vary greatly from place to place, so there may be many Intensity values (e.g.: IV, VII) measured from one earthquake. Each earthquake, on the other hand, should have just one Magnitude, although the several methods of estimating it will yield slightly different values (e.g.: 6.1, 6.3).

Monsoon

A monsoon is any wind that reverses its direction seasonally. In the Southwestern U.S., for most of the year the winds blow from the west/northwest. Arizona is located on the fringe of the Mexican Monsoon which during the summer months turns the winds to a more south/southeast direction and brings moisture from the Pacific Ocean, Gulf of California, and Gulf of Mexico. This moisture often leads to thunderstorms in the higher mountains and Mogollon Rim, with air cooled from these storms often moving from the high country to the deserts, leading to further thunderstorm activity in the desert. A common misuse of the term monsoon is to refer to individual thunderstorms as monsoons.

Richter Magnitude Scale

A logarithmic scale devised by seismologist C.F. Richter in 1935 to express the total amount of energy released by an earthquake. While the scale has no upper limit, values are typically between 1 and 9, and each increase of 1 represents a 32-fold increase in released energy.

Urban Heat Island Effect

The EPA defines Urban Heat Islands (UHI) as urbanized areas that experience higher temperatures than outlying areas. Structures such as buildings, roads, and other infrastructure absorb and re-emit the sun's heat more than natural landscapes such as forests and water bodies. Urban areas, where these structures are highly concentrated and greenery is limited, become "islands" of higher temperatures relative to outlying areas. Daytime temperatures in urban areas are about 1–7°F higher than temperatures in outlying areas and nighttime temperatures are about 2-5°F higher.

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Appendix A

Official Resolution of Adoption

Appendix B

Planning Process Documentation

Scott Ogden

From: Rudy Perez (EMG) <Rudy.Perez@Maricopa.Gov>
Sent: Friday, August 28, 2020 4:42 PM
To: nathan.nixon@itcaonline.com; alan.sinclair@bia.gov; Dan Colgan; kshaver@blm.gov; fmueller@blm.gov; Jaret Rogers; Dave.Ramirez@usda.gov; selover@asu.edu; fbloom@azgfd.gov; ann.youberg@azgs.az.gov; Carrie Heglund; 'Ptrick Kernan, P.E (pkernan@cap-az.com)'; 'Ron.Sauntman (Ron.Sauntman@yavapai.us)'; 'Charles Kmet'; cmelford@gilacountyaz.gov; Kim.M.Gavigan@usace.army.mil; btcosson@azwater.gov; degliskis@azdot.gov; 'Chris Nutter (nutter.chris@azdeq.gov)'
Cc: Hector Andrade (EMG)
Subject: Maricopa County Hazard Mitigation Plan 2021
Attachments: MCMJHMP 2021_Organization Invitation Letter Text.docx

All,

Maricopa County and our jurisdiction partners have started the update process for our Hazard Mitigation Plan. See the attached letter for additional information on the plan. If you are interested in participating in the planning team meetings or attend as an observer, please let me know.

Give me a call at 602-273-1411 if you have questions.

Thank you,

Rudy Perez

Senior Planner

Maricopa County Emergency Management

5630 E. McDowell Rd Phoenix, AZ 85008

O: 602.273.1411 | C: 602.509.6135

MARICOPA COUNTY MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN - 2021 UPDATE

DATE: August 28, 2020

TO: Interested Agencies and Organizations Within or Near Maricopa County

FROM: The Maricopa County Multi-Jurisdictional Hazard Mitigation Plan – Multi-Jurisdictional Planning Team

RE: Invitation of Participation

In 2004, and again in 2010 and 2015, Maricopa County and 27 other jurisdictions comprised of tribes, cities, towns, and other governmental organizations substantially located within the county boundaries, developed and/or updated a multi-jurisdictional hazard mitigation in compliance with federal regulations set forth by the Disaster Mitigation Act of 2000 (DMA 2000). The DMA 2000 legislation requires local, county, tribal and state governments to develop a multi-hazard mitigation plan for their respective jurisdiction in order to be eligible to receive certain hazard mitigation and public assistance funds. The last 2015 Plan was submitted to the Federal Emergency Management Agency (FEMA) and approved in late 2015. The 2015 Plan will expire in December of 2020 and requires a full update and re-approval with the Arizona Department of Emergency and Military Affairs (AzDEMA) and FEMA to maintain compliance with the DMA 2000 legislation.

The goal of mitigation planning is to reduce or eliminate long-term risk to life and property from natural hazard events. Mitigation is not how we respond to natural disasters like floods and wildfires, but rather how we as a community can lessen or prevent the impact of such things in the first place. The mitigation planning process involves identifying and profiling the natural hazards most likely to occur in a community, assessing vulnerability to these hazards, and establishing goals, actions, and projects that mitigate the associated risks. The development of this mitigation plan will also ensure continued eligibility on the part of the county, tribes and communities for non-emergency, federal hazard mitigation grants. Each participating jurisdiction is a stakeholder in the Plan and the updated document will ultimately be resubmitted to AzDEMA and FEMA for review and approval, and formally adopted by each jurisdiction.

Maricopa County and the 26 participating jurisdictions have organized a multi-jurisdictional planning team and have begun an effort to review and update the 2015 Plan. As a prominent agency and/or organization in or near Maricopa County, you are invited to attend the upcoming planning team meetings as a subject matter expert and/or representative of the community at large. Public and agency/organization input on the mitigation planning process is important to the planning team. Residents and interested agencies/organizations are encouraged to educate themselves about the existing plan and offer comments on the update. The planning team anticipates having an updated plan draft by February 2021, at which time the public will be provided the opportunity to review the plan and comment.

If you are interested in attending the planning team meetings as a participant or just as an observer, please contact the following for additional information and schedules. Please note that during this season of COVID19 restrictions, the planning process will be performed in a fully digital environment using web-based meeting tools.

Rudy Perez – Senior Planner

Maricopa County Emergency Management

602-273-1411

Rudy.Perez@Maricopa.Gov

MEETING DATE: July 16, 2020

MEETING TIME: 9:00AM – 1:00PM

MEETING LOCATION: via Zoom

DISTRIBUTION: Meeting Attendees

FROM: W. Scott Ogden, P.E. – JE Fuller

RE: Maricopa County Multi-Jurisdictional Hazard Mitigation Plan 2021 Update

ATTENDEES:

Name	Jurisdiction/Agency/Organization
Tom Abbott	City of Surprise
Hector Andrade	Maricopa County
John Bailey	Maricopa County
Mark Barnhart	Fort McDowell Yavapai Nation
Wayne Clement	Town of Guadalupe
Michael Conlin	City of Glendale
Marty Crossland	City of Goodyear
Travis Cutright	City of Mesa
Mike Davis	City of Mesa
Therese Derivan	City of Mesa
Darrell Duty	City of Tempe
Mary Evans	JE Fuller
Josh Friedman	Town of Gilbert
Joe Fusco	City of El Mirage
Melanie Gall	Arizona State University
Brian Gerber	Arizona State University
Sheri Gibbons	Arizona State University
George Good	City of Tolleson
Bob Goodhue	City of Peoria
Mary Goodman	Town of Gilbert
John Hatler	Maricopa County
Glenn Jones	City of Peoria
Michael Kennedy	City of Mesa
John Kraetz	Town of Carefree
Joe LaFortune	Town of Queen Creek
Sara Latin	Maricopa County

Name	Jurisdiction/Agency/Organization
Bob Lee	Town of Paradise Valley
Grace Logan	Arizona State University
Troy Lutrick	City of Scottsdale
Jeff McMenemy	City of Glendale
Tracy Montgomery	City of Surprise
Nicole Munson	City of Glendale
Tim Murphy	Flood Control District of Maricopa County
Scott Myers	Maricopa County
Terry Nelson	Salt River-Pima Maricopa Indian Community
Dan Nissen	City of Peoria
Scott Ogden	JE Fuller
Patrick O'Toole	Salt River Project
John Padilla	APS
Rudy Perez	Maricopa County
Travis Rand	City of Buckeye
Anne Reichman	Arizona State University
Larry Rooney	City of Avondale
Megan Sheldon	City of Glendale
Warren Sprecher	City of Mesa
Adam Stein	Town of Cave Creek
Julie Syrmopoulos	City of Goodyear
Suzy Vargo	City of Chandler
Pete Weaver	Town of Gilbert
Mike Winters	Town of Fountain Hills

AGENDA

1. **INITIAL INTRODUCTIONS**
2. **DMA2K OVERVIEW AND UPDATE REQUIREMENTS**
    a. **General DMA2K Overview**
    b. **Update Requirements**
3. **DISCUSSION OF SCOPE AND SCHEDULE**
4. **PLANNING PROCESS**
    a. **Discussion of Last Planning Process**
    b. **Planning Team Roles and Responsibilities**
5. **PUBLIC INVOLVEMENT**
    a. **Discuss Past Strategy**
    b. **Formulate New Strategy**
    c. **Additional Agency / Organization Invitations**
6. **RISK ASSESSMENT**

a. **Hazard List Identification**
b. **Existing Plans, Studies, Reports and Technical Information**

7. **EMAP DISCUSSION**
   a. **Purpose**
   b. **Supplemental Requirements to Regular DMA2000 Plan**
   c. **Current EMAP Annex for Unincorporated Maricopa County**
   d. **Go or No-Go Discussion**

DISCUSSION

Agenda Item 1:

- Rudy Perez opened the meeting and made a few introductory remarks regarding the plan update process. He then introduced Scott Ogden of JE Fuller as the returning contractor and turned the rest of the meeting over to him.
- Introductions were made by all via a roll call of Zoom attendees, with each person noting whether they were a returning multi-jurisdictional planning team (MJPT) member from the last planning cycle.
- It is noted that the following jurisdictions were not represented at the meeting: El Mirage, Gila Bend, Litchfield Park, Phoenix, Wickenburg, and Youngtown. Rudy Perez and others from MCDEM will follow up with each of the jurisdictions.

Agenda Item 2:

- S. Ogden presented an overview of the scope and update elements for the project.
- It was noted that the current Plan expires December 22, 2020, and that the update process will need to be prioritized to complete the Plan update and minimize the period of the Plan being expired.
- S. Ogden outlined a summary of the DMA 2000 process and FEMA grant programs that are eligibility impacted.
- S. Ogden briefly discussed the FEMA 2011 Local Plan review guidance document and noted the major areas in the plan that will require extra attention or detail to meet some of the requirements outlined in the guidance document. He did the same with the newer 2017 Tribal Plan guidance document.

Agenda Item 3:

- Five virtual meetings using the Zoom platform are planned for the update process, with the fifth meeting being optional. The following dates were set for meetings 2, 3, and 4:
  - Mtg No. 2 – August 20, 2020 – 9am to Noon
  - Mtg No. 3 – October 8, 2020 – 9am to Noon
  - Mtg No. 4 – November 19, 2020 – 9am to Noon
  - Mtg No. 5 – TBD and only if needed

- JE Fuller will also plan for separate tribal meetings to update the tribal planning elements and coordinate those directly with each Tribe.

Agenda Item 4a:

- Those returning members of the previous cycle MJPT were asked to provide feedback on the previous planning effort and process used to update the plan. Approximately one-third of the meeting attendees were involved in the prior plan update. In general, the returning members expressed satisfaction with the process used during the last cycle and felt that the effort was effective and efficient.

Agenda Item 4b:

- S. Ogden presented a discussion on the various levels of communication and planning team roles and responsibilities. The overall planning process will be accomplished using three levels of contact.
    - Rudy Perez of MCDEM will function as the primary point of contact (PPOC) for the plan update effort and will have the responsibility of overall administration for the planning effort. Primary duties will include scheduling meeting facilities, general contact with the planning team, consultant contract management, and liaison between the planning team and DEMA/FEMA.
    - Each jurisdiction will appoint at least one jurisdictional point of contact (JPOC). The JPOC will be responsible for attendance at the MJPT meetings, ensuring task assignments are completed, and coordination with the local planning team in their own jurisdiction.
    - The local planning team is comprised staff and others that meet at the jurisdictional level to discuss and complete assignments given at the MJPT meetings. This is where the primary work of updating the various Plan elements will occur.
- In general, JE Fuller will communicate with the MJPT through the JPOCs. JE Fuller will plan to use their Citrix Sharefile site for distribution and collection of documents. Links and access credentials will be provided to each JPOC in a future email. Any jurisdiction that is unable to use the Sharefile site, will need to work out separate arrangements with JE Fuller or MCDEM.

Agenda Item 5:

- S. Ogden presented an overview of the past plan cycle public involvement strategy and led the MJPT in a discussion evaluating the effectiveness of the effort. There were only a few comments and feedback received from the public at large during the last plan cycle. The MJPT was mixed on satisfaction with the responses to the past effort and discussed new options for reaching out. COVID19 challenges make any type of face-to-face public engagements difficult if not prohibitive. Other options including the use of online questionnaires, more social media, and direct contact utility bill inserts, and other methods were discussed.
- JE Fuller will work with a few select members of the planning team to prepare a 2 to 3-page questionnaire that can be made available both online and via direct

distribution measures. All responses will be directed to the PPOC for review and tallying.

- Other public involvement strategies for the 2021 Plan update will employ agency social media accounts and online presence (websites, Facebook, Twitter, NextDoor, etc.), local newspaper notices, bulletins and flyers in community newsletters and utility bill inserts.
- JE Fuller will work members of the Arizona State University (ASU), MCDEM and other MJPT members to draft a questionnaire. Melanie Gall of ASU volunteered to convert the questionnaire to a format for implementing online through Qualtrics.
- S. Ogden will provide template documents and language suitable for use by each jurisdiction in their individual efforts. MCDEM will take responsibility for updating the county website that hosts the current plan and for placing the public notices in the regional newspapers. Each jurisdiction will provide website notices that direct the public to the county website, as well as develop notices to post in municipal buildings, in local newspapers, bulletins and utility bill inserts, etc., as they see fit.
- S. Ogden worked with the MJPT to develop a list of other agencies and/or organizations that may have an interest in the mitigation planning for the county and developed a contact list. JE Fuller will work with the MJPT and MCDEM to get contact information and the invitations sent out before the next meeting.

Agenda Item 6:

- The MJPT discussed the current list of hazards assessed in the Plan and compared/contrasted that list with the list of hazards discussed in the 2018 State of Arizona Hazard Mitigation Plan. There was significant discussion of the recent COVID19 pandemic and whether the team wanted to include Disease or something related to the Plan. The conclusion was no based-on questions about being able to come up with reasonable mitigation actions and projects and the consensus that any actions would be more along the lines of preparedness and response.
- No other hazards not in the current plan, were identified for inclusion and the final team consensus was to keep the hazard list the same for the update.

Agenda Item 7:

- Rudy Perez gave a brief overview of the Emergency Management Accreditation Program (EMAP) and the County's purpose and intent to participate. The EMAP program's risk assessment and mitigation elements can be significantly satisfied with the MJHMP but will still require some additional work and the addition of human-caused hazards and related mitigation actions. The extra elements for the Unincorporated County will be provided in an Annex to the MJHMP.
- The MJPT was polled to see if any other jurisdictions were interested in preparing an EMAP annex as a part of pursuing EMAP accreditation as a jurisdiction. No other MJPT members responded, so only Unincorporated Maricopa County will be preparing the annex.

MEETING SUMMARY:

- S. Ogden reviewed the action items and initial assignments for the MJPT.
- JE Fuller will prepare and send an email with the Sharefile link and other instructions
- Next Meeting:

  Date: August 20, 2020
  Time: 9am to Noon
  Place: via Zoom (calendar invite with links to be distributed)

ACTION ITEM SUMMARY:

ITEM NO.	DESCRIPTION	RESPONSIBILITY [DUE DATE]
1-1	Review and become familiar with the 2015 MCMJHMP	All Jurisdictions [8/20/20]
1-2	JE Fuller to provide template public involvement materials for use by the MJPT.	JE Fuller [7/23/20]
1-3	JE Fuller work with ASU, MCDEM and others to prepare a questionnaire for obtaining public feedback and responses to hazard related questions. The final version will be converted by ASU into an online form.	JE Fuller, ASU, MCDEM, etc. [8/20/20]
1-4	Use the public involvement template documents provided by JE Fuller to develop and post website notices and develop newsletters, fliers, utility inserts, and public notices for publishing in local newspapers, social media, and others.	All Jurisdictions [8/20/20]

MEETING DATE: August 20, 2020

MEETING TIME: 9:00AM – 12:00PM

MEETING LOCATION: via Zoom

DISTRIBUTION: Meeting Attendees

FROM: W. Scott Ogden, P.E. – JE Fuller

RE: Maricopa County Multi-Jurisdictional Hazard Mitigation Plan 2021 Update

ATTENDEES:

Name	Jurisdiction/Agency/Organization
Tom Abbott	City of Surprise
Hector Andrade	Maricopa County
Mark Barnhart	Fort McDowell Yavapai Nation
Michael Boule	City of Surprise
Kevin Burke	City of Peoria
Mark Christian	Coconino County
Wayne Clement	Town of Guadalupe
Lisa Collins	City of Glendale
Mike Conlin	City of Glendale
Kelly Corsette	City of Scottsdale
C. Ashley Couch	City of Scottsdale
Travis Cutright	City of Mesa
Therese Derivan	City of Mesa
Josh Friedman	Town of Gilbert
Melanie Gall	Arizona State University
Kim Gathers	City of Phoenix
Brian Gerber	Arizona State University
Bob Goodhue	City of Peoria
Ken Goucher	City of Scottsdale
Randy Grant	City of Scottsdale
Brad Hartig	City of Scottsdale
Rhonda Humbles	City of Peoria
Glenn Jones	City of Peoria
Harry Jones	City of Mesa
Rob Kidder	City of Mesa
John Kraetz	Town of Carefree

Name	Jurisdiction/Agency/Organization
Joe LaFortune	Town of Queen Creek
Lee Lambert	City of Surprise
Bob Lee	Town of Paradise Valley
Troy Lutrick	City of Scottsdale
Art Miller	City of Peoria
Tracy Montgomery	City of Surprise
Nicole Munson	City of Glendale
Tim Murphy	Flood Control District of Maricopa County
Terry Nelson	Salt River-Pima Maricopa Indian Community
Dan Nissen	City of Peoria
Scott Ogden	JE Fuller
Brent Olson	City of Phoenix
Jared Palacios	City of Avondale
Rich Peel	Maricopa County
Rudy Perez	Maricopa County
Cape Powers	City of Peoria
Anne Reichman	Arizona State University
Larry Rooney	City of Avondale
Michelle Seitz	City of Tempe
Nancy Selover	Arizona State Climate Office
Antonio Shin	City of Phoenix
Jana Smith	Maricopa County
Warren Sprecher	City of Mesa
Adam Stein	Town of Cave Creek
Julie Syrmopoulos	City of Goodyear
Kristin Tytler	City of Surprise
Kathy Valenzuela	Town of Gila Bend
Suzy Vargo	City of Chandler
Pete Weaver	Town of Gilbert
Nicole Wiley	City of Surprise
Matthew Williams	City of Litchfield Park
Mike Winters	Town of Fountain Hills

AGENDA

1. **INTRODUCTIONS / ROLL CALL**
2. **TASK ASSIGNMENT STATUS REVIEW**
3. **GENERAL – Community Description Review**
4. **PLAN MAINTENANCE STRATEGY**
    a. **Review/Discuss Maintenance and Monitoring Over Last Plan Cycle**

b. Develop New Monitoring Schedule
c. Develop Plan Update Schedule

5. RISK ASSESSMENT
a. Critical Facility Review/Update
b. Review hazard profile mapping and data for each hazard
c. CPRI Update
d. Discuss and Profile Development Trends
i. Past Plan Cycle
ii. Future Development

DISCUSSION

Agenda Item 1:

- Rudy Perez opened the meeting and made a few introductory remarks regarding the process and status of the planning effort.
- Scott Ogden of JE Fuller led the team through a roll-call of each jurisdiction and attending agency.
- It is noted that the following jurisdictions were not represented at the meeting: Buckeye, El Mirage, Tolleson, Wickenburg, and Youngtown. Rudy Perez and others from MCDEM will follow up with each of the non-attending jurisdictions.

Agenda Item 2:

- A quick review of the Mtg No. 1 action items and assigned tasks was conducted.
- Several communities have started the public outreach through postings to websites and other community forums.
- MCDEM, ASU, FCDMC and JE Fuller worked to modify and refine the hazard mitigation questionnaire and ASU converted the text forms to an online format using Qaultrics. All responses will copied to a database which can be downloaded and summarized as needed.
- The MJPT agreed to keep the questionnaire live at least until the draft plan is published.
- MCDEM also worked with ASU to translate the questionnaire into Spanish and that version will also be posted.
- The team requested that Spanish versions of the other notification materials be made available. MCDEM, ASU and the City of Surprise will work together to get the templates translated.

Agenda Item 3:

- Review and update of the community description sections was discussed and assigned as work tasks as follows for each jurisdiction:
    - Review and update first section of text as needed

  - Review and verify jurisdictional boundaries shown on the location maps provided
  - Verify logos being used.

- JE Fuller will prepare a worksheet in MSWord for each jurisdiction and provide to the JPOCs via an email. Edits and requested changes will be communicated to JE Fuller via a return email with a deadline of Oct 8th (Mtg No. 3).

Agenda Item 4a:

- The MJPT reviewed Section 7.1 of the 2015 Plan and discussed past monitoring and evaluation efforts over the last plan cycle. Each jurisdiction was asked to provide a bullet list of specific activities they performed during the last plan cycle in the form of an email to JE Fuller.

Agenda Item 4b:

- The MJPT reviewed and decided to retain the monitoring and review strategy outlined in Section 7.1.2 for the next plan cycle.

Agenda Item 4c:

- The MJPT reviewed and decided to retain the plan update strategy outlined in Section 7.2 for the next plan cycle.

Agenda Item 5a:

- The MJPT reviewed the definitions and summaries of the critical facilities and infrastructure (CFI) outlined in Section 5.2.4 of the 2015 Plan.
- JE Fuller will prepare a review package of currently identified CFI for each jurisdiction and provide to each JPOC for review and update. Included in the package will be a spreadsheet, GIS shapefile and KMZ file for use in Google Earth. Updates will be provided to JE Fuller before Oct 8th (Mtg No. 3).
- The MJPT had discussions regarding securing the CFI data. The group was reminded that the data and resulting vulnerabilities are only summarized in the plan and are not mapped or detailed. The detailed data will be secured and not shared outside the MJPT. It will be the responsibility of the MJPT to keep the data secured at the jurisdictional level.

Agenda Item 5b:

- Profile information for each of the plan hazards was reviewed by the MJPT. Highlights of that review are noted by the bullets below:
  - Dam failure profile mapping is still in progress. JE Fuller requested data from the City of Phoenix. Kim G. will request the data and get back to JE Fuller.
  - Levee failure profile mapping is in progress and waiting on final data-sets from FCDMC.
  - Drought - Nancy S. noted that new graphs showing historic drought levels are now available through the U.S. Drought Monitor website.

- Extreme Heat – ASU will be assisting with the review and update of the extreme heat profile and sharing research on mitigation.
- Wildfire – recent wildfires will have an impact on the risk moving forward in the next plan cycle. The 2015 Plan profile information will be evaluated and adjusted accordingly.
- Subsidence – several of the active subsidence zones have expanded since the last plan cycle and are correlated with the continuing strong drought.
- Flood, Fissure, and Severe Wind will be similar to the 2015 Plan profiles and no significant changes are anticipated.

Agenda Item 5c:

- The CPRI section and purpose was reviewed by the MJPT. Each jurisdiction's planning team was tasked with reviewing their values in the 2015 Plan for each hazard and responding with any desired adjustments by the Oct 8th meeting.

Agenda Item 5d:

- The current planning requirements for addressing the development trends was reviewed by the MJPT. JE Fuller will provide a worksheet for each jurisdiction to complete that discusses the development activity of the past plan cycle and the anticipated development trends for the next plan cycle. The worksheets will be due by the Oct 8th meeting.

MEETING SUMMARY:

- S. Ogden reviewed the action items and assignments for the MJPT for Meeting number 2.
- JE Fuller will prepare and send the various worksheets discussed to each jurisdiction for completion by the next meeting scheduled for October 8th.
- Next Meeting:

  Date: October 8, 2020
  Time: 9am to Noon
  Place: via Zoom (calendar invite with links has been distributed)

ACTION ITEM SUMMARY:

ITEM NO.	DESCRIPTION	RESPONSIBILITY [DUE DATE]
Mtg 1	See Mtg No. 1 Notes for prior action items.	All Jurisdictions [8/20/20]
2-1	Develop and distribute worksheet packages discussed during meeting	JE Fuller [NLT 8/28/20]
2-2	Review and provide edits for Community Description worksheet package via a return email to JE Fuller	All Jurisdictions [10/8/20]

ACTION ITEM SUMMARY:

ITEM NO.	DESCRIPTION	RESPONSIBILITY [DUE DATE]
2-3	Review and edit Critical Facility and Infrastructure list as needed and return edited spreadsheet via email to JE Fuller	All Jurisdictions [10/8/20]
2-4	Review and edit CPRI for each hazard as desired. Communicate any changes via an email to JE Fuller	All Jurisdictions [10/8/20]
2-5	Complete Development Trend worksheet and return to JE Fuller via an email	All Jurisdictions [10/8/20]

MEETING DATE: October 8, 2020

MEETING TIME: 9:00AM – 11:15AM

MEETING LOCATION: via Zoom

DISTRIBUTION: Meeting Attendees

FROM: W. Scott Ogden, P.E. – JE Fuller

RE: Maricopa County Multi-Jurisdictional Hazard Mitigation Plan 2021 Update

ATTENDEES:

Name	Jurisdiction/Agency/Organization
Tom Abbott	City of Surprise
Heather Allemang	
Hector Andrade	Maricopa County
Mark Barnhart	Fort McDowell Yavapai Nation
Michael Boule	City of Surprise
Kevin Burke	City of Peoria
Mark Christian	Coconino County
Wayne Clement	Town of Guadalupe
Lisa Collins	City of Glendale
Mike Conlin	City of Glendale
Kelly Corsette	City of Scottsdale
C. Ashley Couch	City of Scottsdale
Travis Cutright	City of Mesa
Therese Derivan	City of Mesa
Alan English	City of Peoria
Mary Evans	JE Fuller
Josh Friedman	Town of Gilbert
Joe Fusco	Town of El Mirage
Melanie Gall	Arizona State University
Kim Gathers	City of Phoenix
Brian Gerber	Arizona State University
Brett Gilliland	City of Buckeye
Bob Goodhue	City of Peoria
Elliot Harwood	Maricopa County
Rhonda Humbles	City of Peoria
Laura Hyneman	City of Mesa

Name	Jurisdiction/Agency/Organization
Glenn Jones	City of Peoria
Harry Jones	City of Mesa
Braden Kay	City of Tempe
Rob Kidder	City of Mesa
John Kraetz	Town of Carefree
Joe LaFortune	Town of Queen Creek
Lee Lambert	City of Surprise
Bob Lee	Town of Paradise Valley
Daylynn Little	City of Scottsdale
Mike Luecker	U.S. Army Corps of Engineers
Troy Lutrick	City of Scottsdale
Richard Manzo	City of Mesa
Dee McKenzie	City of Mesa
Tracy Montgomery	City of Surprise
Nicole Munson	City of Glendale
Tim Murphy	Flood Control District of Maricopa County
Terry Nelson	Salt River-Pima Maricopa Indian Community
Kyle Nicholson	City of Mesa
Dan Nissen	City of Peoria
Scott Ogden	JE Fuller
Carlos Padilla	
Jared Palacios	City of Avondale
Rudy Perez	Maricopa County
Arif Rahman	City of Mesa
Travis Rand	City of Buckeye
Jaret Rogers	National Weather Service
Larry Rooney	City of Avondale
Fred Rustam	City of Mesa
Craig Sears	City of Mesa
Michelle Seitz	City of Tempe
Antonio Shin	City of Phoenix
Amy Sloane	Town of Wickenburg
Jana Smith	Maricopa County
Daren Sweet	Az DEMA
Julie Syrmopoulos	City of Goodyear
Kristin Tytler	City of Surprise
Kathy Valenzuela	Town of Gila Bend
Suzy Vargo	City of Chandler
Pete Weaver	Town of Gilbert

Name	Jurisdiction/Agency/Organization
Nicole Wiley	City of Surprise
Matthew Williams	City of Litchfield Park
Mike Winters	Town of Fountain Hills

AGENDA

1. **INTRODUCTIONS / ROLL CALL**
2. **TASK ASSIGNMENT STATUS REVIEW**
3. **MITIGATION STRATEGY**
    a. **Existing Mitigation Action/Project Assessment**
    b. **Capability Assessment**
        i. **Legal and Regulatory (Codes / Ordinances)**
        ii. **Administrative and Technical Staff Resources**
        iii. **Fiscal Capabilities**
    c. **Plans / Manuals / Guidelines / Studies Integration and Incorporation**
        i. **Past Plan Cycle**
        ii. **Future Strategy**
    d. **NFIP Statistics and Compliance**
4. **OTHER DISCUSSION**

DISCUSSION

Agenda Item 1:

- Scott Ogden of JE Fuller led the team through a roll-call of each jurisdiction and attending agency.
- It is noted that the following jurisdictions were not represented at the meeting: Cave Creek, Tolleson, and Youngtown. Rudy Perez and others from MCDEM will follow up with each of the non-attending jurisdictions.

Agenda Item 2:

- A quick review of the Mtg No. 1 and action items and assigned tasks was conducted.
- Most communities have either started or completed the public outreach through postings to websites and other community forums.
- Other assigned tasks are in various stages of completion. A status report of assignments through October 8, 2020 is appended to end of these notes.

Agenda Item 3a:

- A review of the requirements for assessing and evaluating the 2015 Plan mitigation actions and projects (A/Ps) was presented and discussed. The planning team (PT) reviewed 2015 Plan's assessment of the 2010 A/Ps for context and will use the same process for this update.

- The worksheet format for preparing the updated assessment of the 2015 Plan A/Ps was reviewed and discussed. JE Fuller will distribute the worksheets to each jurisdiction for completion by the next meeting.

Agenda Item 3b:

- An overview of the Capability Assessment (CA) was presented and discussed and the CA summarized in the 2015 Plan was reviewed.
- Each jurisdiction was tasked with reviewing and editing their jurisdiction-specific tables in the 2015 Plan and providing edits and/or updates to JE Fuller by the next meeting.

Agenda Item 3c:

- The planning team reviewed and discussed the Plan Integration and Incorporation section of the 2015 Plan and the current FEMA plan review guidance.
- JE Fuller reviewed a worksheet for summarizing the updated elements that will be distributed for use by the jurisdictions. Once completed, JE Fuller will merge the edits into the 2021 Plan. Each jurisdiction will need to complete each of the sections.
- If the standard operating procedure for a jurisdiction is unchanged from the 2015 Plan entry, the worksheet box can be noted as such.
- Worksheets are due by the next meeting date.

Agenda Item 3d:

- The planning team reviewed and discussed the NFIP Compliance section of the 2015 Plan.
- JE Fuller will provide an updated Table 6-5
- Each jurisdiction shall review the responses to questions 1 through 4 in Section 6.2.4 of the 2015 Plan and provide updates to JE Fuller.

Agenda Item 4:

- The planning team revisited the discussions from Mtg No. 1 regarding the inclusion of Pandemic and HAZMAT as hazards in the Plan, and especially in regard to recent incidents of each.
- JE Fuller noted that both were included in the 2015 EMAP Annex
- Concerns were raised by some team members regarding the effectiveness of having the analyses with 5-years before an update.
- The planning team concluded that some form of recognition of the two hazards should be included in the risk assessment, but not carried out to a full hazard profile and vulnerability analysis. JE Fuller will add a few paragraphs to acknowledge the recent events.

MEETING SUMMARY:

- S. Ogden reviewed the action items and assignments for the MJPT for Meeting number 3.

- JE Fuller will prepare and send the various worksheets discussed to each jurisdiction for completion by the next meeting scheduled for November 19th.
- Next Meeting:

  Date: November 19, 2020
  Time: 9am to Noon
  Place: via Zoom (calendar invite with links has been distributed)

ACTION ITEM SUMMARY (ALL MEETINGS):

ITEM NO.	DESCRIPTION	RESPONSIBILITY [DUE DATE]
Mtg 1	See Mtg No. 1 Notes for prior action items.	All Jurisdictions [8/20/20]
2-1	Develop and distribute worksheet packages discussed during meeting	JE Fuller [NLT 8/28/20]
2-2	Review and provide edits for Community Description worksheet package via a return email to JE Fuller	All Jurisdictions [10/8/20]
2-3	Review and edit Critical Facility and Infrastructure list as needed and return edited spreadsheet via email to JE Fuller	All Jurisdictions [10/8/20]
2-4	Review and edit CPRI for each hazard as desired. Communicate any changes via an email to JE Fuller	All Jurisdictions [10/8/20]
2-5	Complete Development Trend worksheet and return to JE Fuller via an email	All Jurisdictions [10/8/20]
3-1	Complete the Existing Mitigation A/P Assessment Worksheet	All Jurisdictions [11/19/20]
3-2	Review and edit as needed the jurisdiction-specific Capability Assessment tables in the 2015 Plan and providing edits and/or updates to JE Fuller	All Jurisdictions [11/19/20]
3-3	Complete the Plan Integration and Incorporation worksheet provided and return to JE Fuller.	All Jurisdictions [11/19/20]
3-4	Review and edit as needed the NFIP Compliance responses to Questions 1 through 4 in Section 6.2.4 of the 2015 Plan and provide edits and/or updates to JE Fuller	All Jurisdictions [11/19/20]

ACTION ITEM NO FROM MEETING NOTES:	1-3 &1-4	2-2	2-3	2-4	2-5
Jurisdiction	PI Website Postings, Newspaper Notice, etc. DUE 08/20/20	Community Description worksheet (text, boundary, logo) DUE 10/08/20	Review and Update Critical Facility List as needed DUE 10/08/20	CPRI Review. Edits to JE Fuller via an email DUE 10/08/20	Complete Development Trends worksheet and provide to JEF DUE 10/08/20
MARICOPA COUNTY (UNINC)	Completed		EDITS Provided	EDITS Provided	Completed
AVONDALE	Completed	EDITS Provided	EDITS Provided	NO EDITS Required	Completed
BUCKEYE	Completed		EDITS Provided		Not Complete
CAREFREE	Completed	EDITS Provided			Completed
CAVE CREEK	Not Complete				Not Complete
CHANDLER	Completed				Not Complete
EL MIRAGE	Not Complete				Not Complete
FT McDOWELL YAVAPAI NATION	Completed		EDITS Provided	NO EDITS Required	Completed
FOUNTAIN HILLS	Completed		EDITS Provided	NO EDITS Required	Completed
GILA BEND	Not Complete				Not Complete
GILBERT	Completed	EDITS Provided	EDITS Provided	EDITS Provided	Completed
GLENDALE	Not Complete		EDITS Provided	EDITS Provided	Completed
GOODYEAR	Completed				Not Complete
GUADALUPE	Not Complete		EDITS Provided		Completed
LITCHFIELD PARK	Not Complete				Not Complete
MESA	Completed		EDITS Provided	EDITS Provided	Completed
PARADISE VALLEY	Completed	NO EDITS Required	EDITS Provided	NO EDITS Required	Not Complete
PEORIA	Completed		EDITS Provided		Completed
PHOENIX	Not Complete		EDITS Provided		Not Complete
QUEEN CREEK	Not Complete				Not Complete
SALT RIVER PIMA-MARICOPA I.C.	Completed	EDITS Provided	EDITS Provided		Completed
SCOTTSDALE	Completed	EDITS Provided		EDITS Provided	Completed
SURPRISE	Completed	NO EDITS Required	EDITS Provided		Completed
TEMPE	Completed	EDITS Provided			Completed
TOLLESON	Not Complete				Not Complete
WICKENBURG	Not Complete				Completed
YOUNGTOWN	Not Complete				Not Complete

MEETING DATE: November 19, 2020

MEETING TIME: 9:00AM – 11:25AM

MEETING LOCATION: via Zoom

DISTRIBUTION: Meeting Attendees

FROM: W. Scott Ogden, P.E. – JE Fuller

RE: Maricopa County Multi-Jurisdictional Hazard Mitigation Plan 2021 Update – MJPT Meeting No. 4

ATTENDEES:

Name	Jurisdiction/Agency/Organization
Tom Abbott	City of Surprise
Marc Ahlstrom	City of Mesa
Hector Andrade	Maricopa County
Mark Barnhart	Fort McDowell Yavapai Nation
Tony Christofferson	Town of Wickenburg
Wayne Clement	Town of Guadalupe
Travis Cutright	City of Mesa
James Delaittre	City of Glendale
Theresa Derivan	City of Mesa
Mary Evans	JE Fuller
Josh Friedman	Town of Gilbert
Melanie Gall	Arizona State University
Kim Gathers	City of Phoenix
Brian Gerber	Arizona State University
Brett Gilliland	City of Buckeye
Bob Goodhue	City of Peoria
Elliot Harwood	Arizona State University
David Hondula	Arizona State University
Laura Hyneman	City of Mesa
Glenn Jones	City of Peoria
Harry Jones	City of Mesa
Braden Kay	City of Tempe
Rob Kidder	City of Mesa
John Kraetz	Town of Carefree
Joe LaFortune	Town of Queen Creek
Bob Lee	Town of Paradise Valley

Name	Jurisdiction/Agency/Organization
Daylynn Little	City of Scottsdale
David Luhan	City of Goodyear
Richard Manzo	City of Mesa
Charlie McDermott	Arizona State University
Tracy Montgomery	City of Surprise
Nicole Munson	City of Glendale
Tim Murphy	Flood Control District of Maricopa County
Terry Nelson	Salt River-Pima Maricopa Indian Community
Scott Ogden	JE Fuller
Carlos Padilla	City of Mesa
Jared Palacios	City of Avondale
Rudy Perez	Maricopa County
Arif Rahman	City of Mesa
Travis Rand	City of Buckeye
Jake Rhoades	
Larry Rooney	City of Avondale
Michelle Seitz	City of Tempe
Antonio Shin	City of Phoenix
Jana Smith	Maricopa County
Kevin Spirlong	City of Surprise
Warren Sprecher	City of Mesa
Adam Stein	Town of Cave Creek
Julie Syrmopoulos	City of Goodyear
Kristin Tytler	City of Surprise
Kathy Valenzuela	Town of Gila Bend
Suzy Vargo	City of Chandler
Pete Weaver	Town of Gilbert
Nicole Wiley	City of Surprise
Matthew Williams	City of Litchfield Park
Mike Winters	Town of Fountain Hills

AGENDA

1. **INTRODUCTIONS / ROLL CALL**
2. **TASK ASSIGNMENT STATUS REVIEW**
3. **RISK ASSESSMENT**
    a. **Repetitive Loss Properties**
    b. **Vulnerability Analysis Results Review**
4. **MITIGATION STRATEGY**
    a. **Develop/Update Goals**
    b. **Action/Project Identification**
    c. **Implementation Strategy**
5. **PLAN MAINTENANCE STRATEGY**
    a. **Continued Public Involvement**
6. **PROMULGATION PROCESS**

DISCUSSION

Agenda Item 1:

- Scott Ogden of JE Fuller led the team through a rollcall of each jurisdiction and attending agency.
- It is noted that the following jurisdictions were not represented at the meeting: El Mirage, Gila Bend, Tolleson, and Youngtown. Rudy Perez and others from MCDEM will follow up with each of the non-attending jurisdictions.

Agenda Item 2:

- A quick review of the progress of action items and assigned tasks for Mtg Nos. 1-3 was performed
- Several communities have substantially completed all the assignments with several others at various stages of progress. A few communities are substantially behind.
- Status report amended with post-meeting edits is attached at the end of these notes.

Agenda Item 3a:

- FEMA has recently created a new process by which outside entities may request repetitive loss data. JE Fuller has prepared the necessary data request letter and will update the RL plan information when the data is received.

Agenda Item 3b:

- JE Fuller has completed the vulnerability analysis (VA). The results will documented in an updated draft of the Plan Section 5. Highlights included:
    - Substantially new Extreme Heat section thanks to Arizona State University (ASU) and National Weather Service (NWS) contributions
    - All hazard profile maps have been updated

  - Critical facility and infrastructure (CFI), population and residential building exposures have all been updated
  - Population exposures are based on using 2015 population estimates that have been aggregated at the Census Block level by the Arizona Department of Health Services.

- The updated DRAFT of Section 5 of Plan will be provided to the MJPT on or before the end of November.

Agenda Item 4a:

- The planning team reviewed and discussed the 2015 Plan goals along with the 2018 State Plan goals. Some discussion regarding adding the "human-caused" to the references to hazards was had. The group concluded that the since the MJPT opted to not include human-caused hazards, adding the phrase "human caused" to the Plan goal statements would not be appropriate.
- The MJPT opted to keep the 2015 Plan goals and carry them forward to the new Plan.

Agenda Items 4b and 4c:

- The planning team reviewed and discussed the process for developing the new set of Plan mitigation actions/projects (A/P) and the implementation strategy for those new A/Ps.
- The team reviewed the various categories and types of mitigation A/Ps and updated the comprehensive list of potential A/Ps summarized in beginning of the 2015 Plan Section 6.3.2. It was noted that ASU participants had provided several new entries for extreme heat. Several other A/Ps were edited or added to the list.
- JE Fuller will provide each community with a pre-loaded worksheet table to use as their starting point for developing the new list of A/Ps. The 2015 Plan A/Ps identified to be carried forward will also be populated into the worksheet. Preparation of the worksheets is predicated on receiving the Item 3-1 worksheet, so all communities that have not submitted that worksheet were encouraged to do so ASAP.

Agenda Items 5a:

- The planning team reviewed requirements for performing continued public involvement after the Plan was adopted and reviewed the responses provided in the 2015 Plan.
- Each community was tasked with updating the continued public involvement section and was provided with a worksheet to aid in the effort.

Agenda Items 6:

- JE Fuller reviewed the promulgation process and schedule for the rest of the planning effort. Key dates and milestones included:
  - Targeted Draft Plan submittal to MJPT for review and comment by mid-January 2021. It was noted that this date is contingent upon JE Fuller receiving all the required assignments and worksheets by no later than January 8, 2021.

- Target Draft Plan submittal to DEMA is end of January 2021
- Target Final Draft Plan submittal to FEMA through DEMA is end of February 2021.
- Target Approvable Pending Adoption (APA) letter from FEMA by early May 2021.
- Official Resolutions of Adoption will begin after receipt of APA letter from FEMA.

MEETING SUMMARY:

- S. Ogden reviewed the action items and assignments for the MJPT for Meeting number 4.
- JE Fuller will schedule the special Tribal meetings with Fort McDowell Yavapai Nation and Salt River Pima-Maricopa Indian Community for the second week of December.
- JE Fuller will prepare and send the various worksheets discussed to each jurisdiction for completion by no later than January 8, 2021.

ACTION ITEM SUMMARY (ALL MEETINGS):

ITEM NO.	DESCRIPTION	RESPONSIBILITY [DUE DATE]
Mtg 1	See Mtg No. 1 Notes for prior action items.	All Jurisdictions [8/20/20]
2-1	Develop and distribute worksheet packages discussed during meeting	JE Fuller [NLT 8/28/20]
2-2	Review and provide edits for Community Description worksheet package via a return email to JE Fuller	All Jurisdictions [10/8/20]
2-3	Review and edit Critical Facility and Infrastructure list as needed and return edited spreadsheet via email to JE Fuller	All Jurisdictions [10/8/20]
2-4	Review and edit CPRI for each hazard as desired. Communicate any changes via an email to JE Fuller	All Jurisdictions [10/8/20]
2-5	Complete Development Trend worksheet and return to JE Fuller via an email	All Jurisdictions [10/8/20]
3-1	Complete the Existing Mitigation A/P Assessment Worksheet	All Jurisdictions [11/19/20]
3-2	Review and edit as needed the jurisdiction-specific Capability Assessment tables in the 2015 Plan and providing edits and/or updates to JE Fuller	All Jurisdictions [11/19/20]
3-3	Complete the Plan Integration and Incorporation worksheet provided and return to JE Fuller.	All Jurisdictions [11/19/20]

ACTION ITEM SUMMARY (ALL MEETINGS):

ITEM NO.	DESCRIPTION	RESPONSIBILITY [DUE DATE]
3-4	Review and edit as needed the NFIP Compliance responses to Questions 1 through 4 in Section 6.2.4 of the 2015 Plan and provide edits and/or updates to JE Fuller	All Jurisdictions [11/19/20]
4-1	Review, edit and complete the New Mitigation A/P worksheet and provide to JE Fuller.	All Jurisdictions [01/08/21]
4-2	Complete the continuing public involvement worksheet and provide to JE Fuller.	All Jurisdictions [01/08/21]
4-3	Review the draft plan when provided and respond with comments in 2-weeks.	All Jurisdictions [Tentatively 01/31/21]

ACTION ITEM NO FROM MEETING NOTES:	1-3 &1-4	2-2	2-4	2-5	3-1	3-2	3-3	3-4	4-1	4-2
Jurisdiction	PI Website Postings, Newspaper Notice, etc. DUE 08/20/20	Community Description worksheet (text, boundary, logo) DUE 10/08/20	CPRI Review. Edits to JE Fuller via an email DUE 10/08/20	Complete Development Trends worksheet and provide to JEF DUE 10/08/20	Existing Mitigation A/P Assessment Wksheet DUE 11/19/20	Review, edit, update Capability Assessment Tables as needed DUE 11/19/20	Plan Integration and Incorporation Wksht DUE 11/19/20	Review, edit, update NFIP Compliance - Q1 thru Q4 as needed DUE 11/19/20	New Mitigation A/P Wksht DUE 1/8/21	Continued Public Involvement Wksht DUE 1/8/21
MARICOPA COUNTY (UNINC)	Completed	NO EDITS Provided	EDITS Provided	Completed	Completed		Completed	EDITS Provided	Not Complete	Not Complete
AVONDALE	Completed	EDITS Provided	NO EDITS Required	Completed	Not Complete	EDITS Provided	Completed		Not Complete	Not Complete
BUCKEYE	Completed	NO EDITS Provided	NO EDITS Provided	Not Complete	Not Complete	EDITS Provided	Not Complete		Not Complete	Not Complete
CAREFREE	Completed	EDITS Provided	NO EDITS Required	Completed	Completed	EDITS Provided	Completed	NO EDITS Required	Not Complete	Not Complete
CAVE CREEK	Not Complete	NO EDITS Provided	NO EDITS Provided	Not Complete	Completed	EDITS Provided	Not Complete		Not Complete	Completed
CHANDLER	Completed	NO EDITS Provided	NO EDITS Provided	Not Complete	Not Complete		Not Complete		Not Complete	Not Complete
EL MIRAGE	Not Complete	NO EDITS Provided	NO EDITS Provided	Not Complete	Not Complete		Not Complete		Not Complete	Not Complete
FT McDOWELL YAVAPAI NATION	Completed	NO EDITS Provided	NO EDITS Required	Completed	Completed	EDITS Provided	Completed	NO EDITS Required	Not Complete	Not Complete
FOUNTAIN HILLS	Completed	NO EDITS Required	NO EDITS Required	Completed	Completed	EDITS Provided	Completed	EDITS Provided	Not Complete	Not Complete
GILA BEND	Not Complete	NO EDITS Provided	NO EDITS Provided	Not Complete	Not Complete		Not Complete		Not Complete	Not Complete
GILBERT	Completed	EDITS Provided	EDITS Provided	Completed	Not Complete	EDITS Provided	Completed		Not Complete	Not Complete
GLENDALE	Not Complete	EDITS Provided	EDITS Provided	Completed	Completed	EDITS Provided	Completed	EDITS Provided	Not Complete	Not Complete
GOODYEAR	Completed	NO EDITS Provided	NO EDITS Provided	Not Complete	Not Complete		Not Complete		Not Complete	Not Complete
GUADALUPE	Completed	NO EDITS Required	EDITS Provided	Completed	Completed	EDITS Provided	Completed	NO EDITS Required	Not Complete	Not Complete
LITCHFIELD PARK	Completed	NO EDITS Provided	NO EDITS Provided	Completed	Not Complete		Not Complete		Not Complete	Not Complete
MESA	Completed	EDITS Provided	EDITS Provided	Completed	Completed	EDITS Provided	Not Complete	EDITS Provided	Not Complete	Not Complete
PARADISE VALLEY	Completed	NO EDITS Required	NO EDITS Required	Not Complete	Not Complete		Not Complete		Not Complete	Not Complete
PEORIA	Completed	NO EDITS Required	NO EDITS Required	Completed	Completed		Completed		Not Complete	Not Complete
PHOENIX	Not Complete	EDITS Provided	EDITS Provided	Not Complete	Not Complete		Not Complete		Not Complete	Not Complete
QUEEN CREEK	Not Complete	NO EDITS Provided	NO EDITS Provided	Not Complete	Not Complete		Not Complete		Not Complete	Not Complete
SALT RIVER PIMA-MARICOPA I.C.	Completed	EDITS Provided	NO EDITS Provided	Completed	Completed	EDITS Provided	Completed	NO EDITS Required	Not Complete	Not Complete
SCOTTSDALE	Completed	EDITS Provided	EDITS Provided	Completed	Completed	EDITS Provided	Completed	EDITS Provided	Not Complete	Not Complete
SURPRISE	Completed	NO EDITS Required	NO EDITS Required	Completed	Completed	EDITS Provided	Completed		Not Complete	Not Complete
TEMPE	Completed	EDITS Provided	NO EDITS Provided	Completed	Completed	EDITS Provided	Completed	EDITS Provided	Not Complete	Not Complete
TOLLESON	Not Complete	NO EDITS Provided	NO EDITS Provided	Not Complete	Not Complete		Not Complete		Not Complete	Not Complete
WICKENBURG	Not Complete	NO EDITS Provided	NO EDITS Provided	Completed	Not Complete		Not Complete		Not Complete	Not Complete
YOUNGTOWN	Not Complete	NO EDITS Provided	NO EDITS Provided	Not Complete	Not Complete		Not Complete		Not Complete	Not Complete

Table 6-7-1: Avondale assessment of previous plan cycle mitigation actions/projects

ID	Description	• Lead Agency • Proposed Cost • Proposed Comp Date	Status	Disposition	Explanation
1	Review building permits for compliance with Floodplain Ordinance and NFIP regulations.	• Building Safety, Development and Eng. Services / Emergency Management • Staff time • Ongoing	In Progress	Keep	City Engineer serves as the City's Floodplain Manager to ensure the Engineering Division, and in partnership with Public Works, is meeting these standards.
2	Conduct and/or participate in occasional table top exercises to identify potential mitigation measures for increasing response effectiveness, such as evacuation route marking and permanent protection measures for intended shelters.	• Emergency Management/ Public Works Dept. • Staff Time • December 15	No Action	Keep	The City is planning to conduct future tabletop exercises to identify potential mitigation measures increasing response effectiveness
3	Annually coordinate with federal, state and local dam owners to get updates on any changes in dam safety conditions and emergency action plan information.	• Emergency Management/ Public Works Dept • Staff Time • December 15	In Progress	Keep	The City of Avondale does not contain any dams within the City limits. The Maricopa County Flood Control District provides updates to the City of Avondale on upstream Dam safety conditions as necessary.
4	Mandate, encourage and incentivize the use of drought resistant landscaping through Ordinance development and/or enforcement.	• Emergency Management/ Water Resources City Clerk • Staff Time • July 15	In Progress	Keep	https://www.avondaleaz.gov/government/departments/public-works/water/water-conservation https://www.avondaleaz.gov/home/showdocument?id=14730 Landscape code Section 12 Drought Ordinance
5	Provide the public with educational information that lists water conservation best practices through newsletters, flyers, and website notices.	• Emergency Management/ Community Relations Dept • $3,000 + Staff Time • March 16	In Progress	Keep	Led by Water Staff support by Marketing as needed. No cost for Marketing using ongoing marketing tools. Cost for workshops incorporated into Water Dept. Outreach. Education and campaigns shared in RAVE 3x yearly, ongoing Spring & Fall workshops, weekly social posts, website information updates.
6	Partner with local NGO's (local shelters, church organizations, salvation army, etc.) to provide respite care and hydration stations to mitigate loss of like during extreme temperature events.	• Emergency Management / Fire Department • Staff Time • September 15	In Progress	Keep	City of Avondale participates in the Heat Relief Network coordinated by Maricopa Association of Governments (MAG) each summer between May 1st and Sept 30th. Avondale's two (2) heat relief sites provided cold water and heat refuge M-F 8am – 5pm

Table 6-7-1: Avondale assessment of previous plan cycle mitigation actions/projects

ID	Description	• Lead Agency • Proposed Cost • Proposed Comp Date	Status	Disposition	Explanation
7	Identify, stock and communicate locations within the community that can serve as cooling stations during times or extreme heat. Ensure that on-hand drinking water supplies are sufficient enough to provide to the whole community.	• Emergency Management / Public Works Dept. • Minimal + Staff Time • June 15	Complete	Delete	Heat relief sites are a seasonal activity. Neighborhood and Family Services staff will begin planning and generating resources in March for a May1st start date. City of Avondale participates in the Heat Relief Network coordinated by Maricopa Association of Governments (MAG) each summer between May 1st and Sept 30th. Avondale's two (2) heat relief sites provided cold water and heat refuge M-F 8am – 5pm
8	Develop a community-wide, storm water management plan that will analyze and identify problem flooding areas and propose long-term mitigation alternatives designed to reduce or eliminate the flood problems. Utilize city interns to complete routine inspections of storm water drains to ensure no blockage in the case of a flood.	• Public Works Dept. / Emergency Management • • September 15	In Progress	Keep	A Stormwater Management Plan (SWMP) was developed for the City of Avondale in compliance with Small Municipal Separate Storm System (Small MS4) Permit number AZG2016-002. The SWMP was issued on September 30, 2016. Inspection and maintenance of City Storm Drains is performed by a City Contractor through an annual contract.
9	Identify and map flood hazards in areas expected to grow or develop in the foreseeable future.	• Public Works Dept • Staff Time • July 15	Complete	Delete	Floodplain maps are retained by the City Engineer, who is also the City's Floodplain Manager. Any development within a mapped floodplain requires a Floodplain Use Permit, and these are reviewed with ADWR during our 5-year Audits. The largest growth in the City is expected in the southern portion of the City and flood hazards, as they are identified, will be closely monitored.
10	Identify and create an organizational chart or roster with lists or maps of important project features to prevent a levee failure. Complete an annual review of evacuation routes and emergency shelter locations in order to determine if they fulfill the evacuation and sheltering needs of the community.	• Public Works Dept. / Emergency Management • Staff Time • September 15	Complete	Delete	The Maricopa County Flood Control District performs levee inspections and maintenance regularly. The City of Avondale follows the same protocol as Maricopa County, and once a hazard is understood and projected impact area determined, first responders will decide on the safest routes to use for evacuation and which locations to open as a shelter, if needed.
11	Identify and maintain a list or annotated map that describes each project feature and areas of concern during a flood event. Develop and maintain a detailed table of project features that may need to be closed, such as floodgates, flap gates, etc.	• Public Works Dept. / Emergency Management • Staff Time • September 15	Complete	Delete	Maricopa County maintains a list of roads within the Avondale City limits that are of concern during a flood event (i.e. Lower Buckeye Rd and El Mirage Rd) requiring road closure using traffic barriers. County forces typically install and remove the barriers as needed. City Public Works staff is on-hand to provide flood relief at localized flooding areas using vacuum equipment.

Table 6-7-1: Avondale assessment of previous plan cycle mitigation actions/projects

ID	Description	• Lead Agency • Proposed Cost • Proposed Comp Date	Status	Disposition	Explanation
12	Encourage homeowners to use tie-down straps and/or anchors to secure ancillary buildings and metal awnings or porches to mitigate the potentials for flying debris during severe wind events.	• Building Safety, Community Relations / Emergency Management • Staff Time • October 15	Complete	Delete	Annual Building Safety month media release and social media posts during that month (May). No cost to Marketing
13	Promote the use of weather radios, especially in schools, hospitals and other locations where people congregate to inform them of the approach of severe weather events.	• Community Relations / Emergency Management • Staff Time • October 15	In Progress	Keep	Annual Weather watcher training information shared via media release and social. Weather warning, sandbag distribution, monsoon safety details shared on social seasonal or based on current conditions. Lead direction by Public Safety, supplemental from Public Works based on weather related clean up
14	Include addressing subsidence risk as a regular part of the land development and public works projects review and permitting processes.	• Development and Eng. Services / Emergency Management • Staff Time • December 15	In Progress	Keep	Engineering Division in Development & Engineering Services reviews projects for compliance codes.
15	Provide links to the Arizona Department of Water Resources website as a part of a public campaign to raise awareness to the hazards and locations of active subsidence.	• Water Resources / Community Relations • Staff Time • June 15	Complete	Delete	https://new.azwater.gov/hydrology/field-services/land-subsidence-arizona https://new.azwater.gov/
16	Use newsletters, flyers, utility bill inserts, website notices, radio and television announcements, and newspaper articles to educate the public about hazards impacting the county and how to be prepared in the case of a disaster event.	• Community Relations / Emergency Management • No incremental costs • March 16	Complete	Delete	Direction shared from County Emergency Services sites, unless otherwise directed by fire staff. Annual Emergency Preparedness Month (Sept) media release, and social share. Rave public education as directed by Fire on topics.
17	Conduct Fire Safety education programs in local public schools and community organizations within the city.	• Fire Department / Emergency Management • Staff Time • October 15	Complete	Delete	Annual commodities cost of $10,000 and FTE is provided from the general fund. Programs are delivered a variety of ways including in-person and virtual at schools, fire stations, community events, etc.

Table 6-7-2: Buckeye assessment of previous plan cycle mitigation actions/projects

ID	Description	• Lead Agency • Proposed Cost • Proposed Comp Date	Status	Disposition	Explanation
1	Review building permits for compliance with Floodplain Ordinance and NFIP regulations.	• Emergency Management / Emergency Manager • Staff Time • Ongoing	Ongoing	Keep	Development Services and Engineering are lead in reviewing plans and permits per the adopted flood plain ordinance.
2	Meet with flood control and state land to develop cut Wildfire breaks at key locations in the Gila River	• Fire; Emergency Management; Public Works / Directors • Staff Time • Ongoing	Complete	Delete	Completed in 2017 from Office of the State Forestry Grant #WFHF15B-315.
3	Develop water conservation plan.	• Engineering / City Engineer • Staff Time • Ongoing	Complete	Delete	City Water Conservation is published on City Website: https://www.buckeyeaz.gov/residents/water-resources/water-conservation
4	Conduct annual life safety inspections regarding the management wildland fire fuels and wildfire risk along the WUI boundary	• Fire; Emergency Management/ Fire Chief; Emergency Manager • Staff Time • Ongoing	Ongoing	Keep	Working on inspections of fire fuels annually.

Table 6-7-2: Buckeye assessment of previous plan cycle mitigation actions/projects

ID	Description	• **Lead Agency** • **Proposed Cost** • **Proposed Comp Date**	Status	Disposition	Explanation
5	Enhance communication of City mitigation needs at the County and State level by establishing liaison positions from city to State legislature, State Fusion Centers, MCDEM, Water fusion group, MAG and other multi-jurisdictional task force work groups	• Fire; Emergency Management, Mayor's Office / Fire Chief; Emergency Manager, Mayor • Staff Time • Ongoing	In Progress	Keep	Involved liaison with MCDEM and other jurisdictions/organizations.
6	Continue to support the Hazard Mitigation Plan by making sure the City is represented on related committees.	• Emergency Management / Emergency Manager • Staff Time • Ongoing	Ongoing	Keep	Development and planning departments will continue to utilize plans for future development.
7	*Implement Sever Wind deployment protection procedures (local)*	• *Fire; Emergency Management; Public Works / Directors* • *Staff Time* • *Ongoing*	Complete	Delete	In City of Buckeye 2020 EOP under Annex C – Severe Storms and Floods.
8	Provide/improve water drainage systems	• Engineering, City Engineer • Staff Time • Ongoing	In Progress	Keep	City's stormwater system is continually being mapped as part of the City's MS4 permit. Example here: https://buckeyearizona.maps.arcgis.com/apps/opsdashboard/index.html#/d0965135ce7c4f98916d4bc9da8841f9

Table 6-7-2: Buckeye assessment of previous plan cycle mitigation actions/projects

ID	Description	• Lead Agency • Proposed Cost • Proposed Comp Date	Status	Disposition	Explanation
9	Enforce Fire codes, require compliance	• Fire Code Enforcement / Code Enforcement Officer • Staff Time • Ongoing	In Progress	Keep	Adopted July 2014, IFC 2012 with Amendments.
10	Participate with Maricopa County and other jurisdictions in the update of the Community Wildfire Protection Plan (CWPP)	• Fire; Emergency Management / Fire Chief; Emergency Manager • Staff Time • Ongoing	In Progress	Keep	Updated CWPP Plan 1/2020.
11	Annually coordinate with federal, state, and local dam owners to get updates on any changes in dam safety conditions and emergency action plan information.	• Fire; Emergency Management / Public Works Dept; PW Director • Staff Time • Annually	In Progress	Keep	Annual meetings with state and local owners.

Table 6-7-2: Buckeye assessment of previous plan cycle mitigation actions/projects

ID	Description	• Lead Agency • Proposed Cost • Proposed Comp Date	Status	Disposition	Explanation
12	Work with state and federal agencies to provide a disclosure to all potential buyers of real estate that are located within dam failure or emergency spillway inundation limits of an upstream dam or dams.	• Fire; Emergency Management / Public Works Dept; PW Director / Development Services Dept; DS Director • Staff Time • Annually	No Action	Keep	The Gillespie Dam is in incorporated Maricopa County within the City of Buckeye Municipal Planning Area (MPA). As development occurs in this area that annexes into Buckeye, these cautions should be placed in the public report. Engineering works with developments downstream of spillways, requiring them to provide modeling of the PMF for the spillway also requiring an emergency action plan in the case of a spillway event.
13	Continue to identify, stock and communicate locations within the community that can serve as cooling stations during times of extreme heat.	• Fire; Emergency Management / City PIO • Staff Time • Seasonal and Annually	Ongoing	Keep	The activity has been performed annually since 2016 and was included in public information campaign for extreme heat. In City of Buckeye EOP 2020 Annex – C Excessive Heat Emergencies.
14	Perform a public information campaign at the onset of the extreme heat season to help educate the general public on ways to remain safe during periods of extreme heat.	• City PIO • Staff Time • Seasonal and Annually	Ongoing	Keep	The activity has been performed annually since 2016 and included news releases, web pages, social media reminders and e-newsletter notifications.
15	Provide links to the Arizona Department of Water Resources website as a part of a public campaign to raise awareness to the hazards and locations of active subsidence.	• Public Works Dept; PW Directors / City PIO • Staff Time • FY 2020	In Progress	Revise	Have sent the link that speaks to the three areas in Buckeye that are mapped by ADWR including West Valley, Buckeye and Gila Bend subsidence maps. https://new.azwater.gov/hydrology/field-services/land-subsidence-arizona

Table 6-7-2: Buckeye assessment of previous plan cycle mitigation actions/projects

ID	Description	• Lead Agency • Proposed Cost • Proposed Comp Date	Status	Disposition	Explanation
16	Include addressing subsidence risk as a regular part of the land development and public works projects review and permitting.	• Development Services; DS Director • Staff Time • FY 2020	Ongoing	Keep	There have been no active fissures identified in the Buckeye MPA. There is only mapping of areas of potential subsidence. All development is required to do their due diligence on subsidence.

Table 6-7-3: Carefree assessment of previous plan cycle mitigation actions/projects

ID	Description	• Lead Agency • Proposed Cost • Proposed Comp Date	Status	Disposition	Explanation
1	Review building permits for compliance with Floodplain Ordinance and NFIP regulations.	• Floodplain Mgmt and Services Division / Floodplain Administrator / Building Official • Staff time • Annual-Ongoing	On-going	Keep	Over the past 5 years, the Maricopa County Flood Control District has reviewed all building permits for compliance. At the time of this review we were unable to get an accurate count as to how many reviews the district has performed over the past five years.
2	Review and update the town's Drainage Master Plan that will identify potential drainage hazards, solutions, budgets and prioritization.	• Town Engineer / Building Official • Staff Time • Annual-Ongoing	Completed	Delete	The Town's Drainage Master Plan has been reviewed and updated. The plan is on record at Town Hall.
3	Continue development of water storage, treatment and delivery systems to provide adequate water during times of drought	• Manager of Carefree Water Company • Specific project dependent • Annual-Ongoing	On-going	Keep	The Town is working towards consolidating all water resources located within the Town under the Carefree Water company and further enhancing storage capacity.

Table 6-7-3: Carefree assessment of previous plan cycle mitigation actions/projects

ID	Description	• Lead Agency • Proposed Cost • Proposed Comp Date	Status	Disposition	Explanation
4	Encourage bridge or culvert construction where roads are in locations susceptible to flooding.	• Town Engineer • Staff time and studies unless actual project developed and then costs are to be determined per project • Annual-Ongoing	On-going	Keep	The Town has an annual inspection program to ensure unobstructed flows. This program is administered and performed by the Town's Streets and Maintenance Dept., and has been a continuing program during the past five years of the plan cycle.
5	*Review and update the town's Mass Evacuation strategy for the Town of Carefree.*	• *Carefree Emergency Manager / American Red Cross Town Fire Chief* • *Staff time* • *Annual-Ongoing*	Completed	Delete	The Mass Evacuation Plan for the Town of Carefree was reviewed, updated and included in the Town's 2014 Emergency Operations Plan.
6	Site and install additional signage for wash crossings as well as sand bags to warn and discourage vehicular movements through these areas during flooding events	• Public Works • $20,000.00 • Less than five years with funding	On-going	Keep	The Town has posted signage during the monsoon seasons and during other adverse weather events each of the past five years.
7	Perform regular brush cutting and median maintenance with town right-of-way to mitigate fuel sources for wildfire.	• Public Works • $10,000.00 • Annual-Ongoing	On-going	Keep	The Town purchased a brush chipper to aid in the removal of encroaching brush along the Town's rights-of-way. This is performed as needed throughout the year by the Town's Streets and Maintenance Dept. This program has been in effect throught the past plan cycle.
8	Maintain backup generators located at critical facilities (ex. Fire station, well sites, etc.) to provide emergency power for critical operations during power failures caused by severe wind events.	• Public Works • $5,000.00 • Annual-Ongoing	On-going	Keep	The Town has an annual contract through a third-party vendor to service, maintain, and repair all Town owned back-up generators. This has been an on-going program for the past five years.
9	Require all new construction to follow recognized and adopted building codes to mitigate damages and impacts of severe wind events.	• Town Engineer / Building Official • Staff time • Annual-Ongoing	On-going	Keep	This function is overseen by the Town's Building Dept.
10	Create a public education program describing water conservation best practices to be delivered to residents in their monthly water bill. In addition, provide water conservation related material through the town's COINS system.	• Manager of Carefree Water Company / Staff • Staff time • Annual-Ongoing	On-going	Keep	The Carefree Water Company promoted water conservation through it's rate structure and messaging within it's water bills during the previous plan cycle.

Table 6-7-3: Carefree assessment of previous plan cycle mitigation actions/projects

ID	Description	• Lead Agency • Proposed Cost • Proposed Comp Date	Status	Disposition	Explanation
11	Clear vegetation and wildfire fuels to create a defensible space around critical or key structures within the Town of Carefree.	• Public Works / Fire Chief • Staff time • Annual-Ongoing	On-going	Keep	This has been a continuous program performed throughout the past five years by the Town's Streets and Maintenance Dept.
12	Identify, stock and communicate locations within the Town of Carefree that can serve as cooling stations during times of extreme heat.	• Fire Chief, Town staff • Staff time / $500.00 • Annual during extreme heat season	On-going	Keep	The fire station has served as a cooling station throughout the past five years and always continues to be stocked with bottled water and electrolyte beverages.
13	Perform a public information campaign at the onset of the extreme heat season to help educate the general public on ways to remain safe during periods of extreme heat.	• Town staff • Staff time • Annual	On-going	Keep	The Town has and continues to distribute notifications to the community through it's digital newsletter information about extreme heat education.

Table 6-7-4: Cave Creek assessment of previous plan cycle mitigation actions/projects

ID	Description	• Lead Agency • Proposed Cost • Proposed Comp Date	Status	Disposition	Explanation
1	Review building permits for compliance with Floodplain Ordinance and NFIP regulations.	• Town Engineer • Staff Time • Ongoing	Ongoing	Keep	Town Engineer utilizes Floodplain ordinance as well as NFIP regulation during plan reviews.
2	Ensure building codes for construction are enforced to prevent roof damage from high winds.	• Chief Building Official • Staff Time • Ongoing	Ongoing	Keep	The Town of Cave Creek Building Official reviews all site plans for compliance. Cave Creek Building Inspector conducts field inspections for compliance with applicable Building Codes.
3	Town Fire Marshal shall perform routine commercial structures inspections to identify and communicate code violations. Routinely inspect commercial structures.	• Chief Building Official, Fire Marshal • Staff Time • Ongoing	Ongoing	Keep	Cave Creek's Fire Official conducts routine commercial business inspections for compliance with the IFC.

Table 6-7-4: Cave Creek assessment of previous plan cycle mitigation actions/projects

ID	Description	• Lead Agency • Proposed Cost • Proposed Comp Date	Status	Disposition	Explanation
4	Perform a Public Information Campaign to help educate the general public on ways to remain safe during periods of extreme heat.	• Town Marshal • Staff Time • Ongoing	Ongoing	Keep	The Town of Cave Creek frequently posts heat index warnings during times of extreme heat.
5	Review the existing Cave Creek general plan and zoning ordinance to determine how these documents help limit development in hazard areas: Modify with additional guidelines, regulations, and land use techniques as necessary within the limits of state statutes, while also respecting private property rights.	• Planning and Zoning • Staff Time • Ongoing	Ongoing	Keep	The Town of Cave Creek is currently attempting to have an updated General Plan adopted. Planning staff frequently refers to the General Plan.
6	Public Information Campaign to get more residents to subscribe to the CodeRed Extreme Weather Alert System	• Town Marshal • Staff time • 10/2015	Ongoing	Keep	In May of 2020 the Town of Cave Creek initiated an add campaign to increase awareness to the CODERED Emergency Alert System to include Weather Alerts at no additional costs to residents.
7	Continuous Public Information Campaign to advise residents and visitor alike the risks from Wildfire.	• Town Marshal • Staff Time, Printed Materials • Ongoing	Ongoing	Keep	The Town of Cave Creek averages 6-9 Public Information adds or notices to include frequently mentioning Wildfire Awareness and precautions within Cave Creek. Cave Creek also actively maintains a Fire Risk Index posted prominently as visitors and residents enter town.
8	Continue to perform public education of water conservation best practices through newsletter, flyers, social media and website notices.	• Engineering Department / Town Engineer • Staff Time $1,000 per year • Ongoing-annual	Ongoing	Keep	The Town of Cave Creek Utilities staff frequently speaks to residents on ways to conserve water. Handouts are available at Town Hall regarding water conservation tips.
9	Review and update the local Drought Management Plan to ensure it is current with the Town's drought management goals and current water conservation needs.	• Engineering Department / Town Engineer • Staff Time • FY 2017	Completed	Keep	In September of 2019 The Town of Cave Creek Utilities Department updated the Town of Cave Creek Drought Contingency Plan.

Table 6-7-5: Chandler assessment of previous plan cycle mitigation actions/projects

ID	Description	• Lead Agency • Proposed Cost • Proposed Comp Date	Status	Disposition	Explanation
1	Review building permits for compliance with Floodplain Ordinance and NFIP regulations.	• Development Services/City Engineer • Staff time • Annual-Ongoing	Ongoing	Keep	The City of Chandler is continuing to review building permits for compliance.
2	Maintain the currency of the safety element of the Chandler General Plan.	• Planning Manager • Staff time-consultant cost for update of GP • Annual-Ongoing	Ongoing	Keep	The City of Chandler is in the process to revise the General Plan in 2020. Safety elements will be included into the planning process.
3	Continue to ensure through proper planning, zoning and building codes that all safety measures are in place for new building construction and placement. The city will coordinate with the county flood control district.	• Development Servicest/Building Official • Staff time • Annual-Ongoing	Ongoing	Keep	The City of Chandler completed the posting of the Hazard Mitigation Plan to civic and private groups though the Chandler website
4	Continue to maintain a diverse water portfolio which includes surface water from Salt, Verde and Colorado River watersheds and groundwater. Minimize any reductions to existing supplies by protecting and securing existing water rights and meeting environmental requirements of water supplies. Maximize the use of existing assets to ensure adequate water supply is available from over 30 groundwater wells, two surface water treatment plants, use of recharged water, and encourage the use of reclaimed water for appropriate purposes. Continue to implement the city's Drought Plan.	• Public Works and Utilities Director • Staff time • Annual-Ongoing	Ongoing	Keep	The City of Chandler will continue to maximize the use of finite water resources in all phases of city operations and planning. The Integrated Water, Wastewater and Reclaimed Master Plan project was most recently updated in 2018 and is updated every four to six years.
5	Each city department will be encouraged to rank the vulnerability of existing assets, with assistance from the Emergency Management Workgroup, and implement protection plans as needed, with the highest vulnerability being implemented first.	• Fire Department • Staff time • Annual-Ongoing	Ongoing	Keep	Several internal departments have completed a vulnerability assessment; however, there are remaining assessments which have not been completed but are in progress. The City of Chandler will continue towards completion of this task.
6	Continue to ensure that the City of Chandler Drought Management Plan is updated to meet the needs of the city to mitigate drought severity.	• Public Works and Utilities Director • Staff time • Ongoing	Ongoing	Keep	The City of Chandler will continue to maintain a current Integrated Water, Wastewater and Reclaimed Master Plan, understanding the potential impact of a sever drought.
7	Annually coordinate with federal, state, and local dam owners to get updates on any changes in dam safety conditions and emergency action plan information.	• Fire Department • Staff time • Annual	Ongoing	Keep	The City of Chandler will continue to coordinate with federal, state, and local dam owners to get updates on any changes in dam safety conditions and emergency action plan information.

Table 6-7-5: Chandler assessment of previous plan cycle mitigation actions/projects

ID	Description	• Lead Agency • Proposed Cost • Proposed Comp Date	Status	Disposition	Explanation
8	Analyze and identify dam failure inundation limits to identify and/or update evacuation routes.	• Fire Department/Public Works and Utilities Department • Staff time • Ongoing	No Action	Delete	The City is no longer within a dam inundation hazard zone and does not own any dams.
9	Provide links to the Arizona Department of Water Resources website as a part of a public campaign to raise awareness to the hazards and locations of active subsidence.	• Communications and Public Affairs Department • Staff time • Ongoing	Ongoing	Keep	The City of Chandler will continue its public campaign to raise awareness to the hazards and locations
10	Include addressing subsidence risk as a regular part of the land development and public works projects review and permitting.	• Development Services Department • Staff time • Ongoing	Ongoing	Keep	Chandler requires a geo-technical report to be submitted for all new development projects. The issue of subsidence risk is not a specific checklist item when reviewing the plans and reports, but the geo-technical engineer evaluates all soil types and properties on-site and addresses any items of concern. In addition, the geo-tech provides specifications for proper construction techniques, such as soil compaction.

Table 6-7-6: El Mirage assessment of previous plan cycle mitigation actions/projects

ID	Description	• Lead Agency • Proposed Cost • Proposed Comp Date	Status	Disposition	Explanation
1	Review building permits for compliance with Floodplain Ordinance and NFIP regulations.	• City of El Mirage FBLS, Building Official • Staff Time • Ongoing	Ongoing	Keep	Plans are reviewed once they are submitted through TAC and engineering review. Work in the floodplain requires MCFCD input.
2	Review zoning ordinances prohibiting new development in 100-year floodplain on an annual basis.	• Planning & Zoning / Director • Staff Time • Ongoing	Ongoing	Keep	El Mirage City Code chapter 153 addresses floodplain management. Developments in floodplains adhere to MCFCD rules.

Table 6-7-6: El Mirage assessment of previous plan cycle mitigation actions/projects

ID	Description	• Lead Agency • Proposed Cost • Proposed Comp Date	Status	Disposition	Explanation
3	Take active role in multi-agency plan and actions for flood mitigation (pro-active).	• Engineering/Fire/Public Works / Dept heads • Staff Time • Ongoing	Ongoing	Keep	The City of El Mirage works with MCFCD on flood mitigation
4	Develop plan to design and install man-made flood protection devices where needed.	• City of El Mirage City Engineering/Fire/Public Works / Dept heads • Staff Time/UNK • Ongoing	Ongoing	Keep	City staff reviews project opportunities to install flood mitigation devices whenever available.
5	Construct flood control measures as a part of the El Mirage Road project to mitigate flooding by the El Mirage Wash. El Mirage Road project will elevate the roadway section by the Lower EL Mirage Wash area to mitigate flooding.	• Engineering / City Engineer • Staff Time • Undetermined at this point	Complete	Delete	This was completed as a CIP project
6	Recharge groundwater with CAP water to ensure the community water supply in the event of a drought.	• Public Works / Director • $100,000 • Ongoing	Ongoing	Keep	This was purchased in October and the water recharge has been completed. This is done annually.
7	Review annually and update as needed, existing building codes to manage new and existing construction practices and provide mitigation for Drought, Flood, and Severe Wind.	• FBLS / City Building Official • Staff Time • Annually	Completed	Keep	This annual review has been completed.
8	*Participate in multi-agency coordination efforts to ensure cooperative plans.*	• *Fire Department / Fire Chief* • *Staff Time* • *Ongoing*	Ongoing	Keep	Participation with the Life Safety Council and the Regional Operational Consistency Committee.
9	*Train First Responders and other select city staff in hazard materials mitigation.*	• *Fire department / department heads* • *Staff Time plus Training Cost* • *Ongoing*	Ongoing	Keep	City staff trained in NIMS, first responders completed. New hires and elected officials or required to completed the needed training.
10	Coordinate efforts with other local agencies that include but are not limited to: Luke AFB, Dysart School District, FCDMC and others, to I.D. problem areas and plans for mitigation	• Fire Department / Fire Chief • Staff Time • Ongoing	Complete	Keep	Multiple meetings have been completed, and or are in the coordinating phase

Table 6-7-6: El Mirage assessment of previous plan cycle mitigation actions/projects

ID	Description	• Lead Agency • Proposed Cost • Proposed Comp Date	Status	Disposition	Explanation
11	Maintain collaboration efforts and interconnected water system with other water purveyors to ensure the community water supply in the event of a drought.	• Public Works / Director • Staff Time • Ongoing	Complete	Keep	El Mirage is interconnected with the City of Surprise.
12	Continue to implement a conservation education program to ensure the community water supply in the event of a drought.	• Public Works / Director • Staff Time • Ongoing	Complete	Keep	These are sent out in water bills and on the City web page.
13	Educate the public on suspected and imminent wind shear dangers from micro burst and other natural wind threats through website notices and social media alerts.	• Homeland Security / Safety and Emergency Management Officer • Staff Time • Annually During Monsoon Season	Ongoing	Keep	This is provided on the City web page as well as the Maricopa County Emergency Broadcast System to cell phones, radio stations and local TV channels.
14	Educate the public on actions and resources to protect residents that do not have adequate ways to cool their homes in the event of an Extreme Heat Event through website notices and other social media alerts	• City of El Mirage/Fire/PD • Staff Time • Seasonally and as needed.	Ongoing	Keep	This is provided on the City web page and social media.
15	Provide cool potable water to citizens during extreme heat waves. Dissemination of public information regarding hydration station and resource locations will be provided via website notices and social media	• City of El Mirage Fire / Fire Chief • $2,000 • Seasonally and as needed	Complete	Keep	The City utilizes bottled water, in coolers, around the City. The locations are posted on the City web page.
16	Provide citizens with warnings and escape routes from severe flooding or expected flooding.	• City of El Mirage Fire/PD and Public Works. • Staff time • When necessary	Ongoing	Keep	The City has no designated escape routes. The City provides warnings and portable sings during an event.
17	Participate/Conduct occasional table top exercises to identify potential mitigation measures for increasing response effectiveness, such as evacuation route marking and permanent protection measures for intended shelters.	• City of El Mirage Fire/PD and Public Works / Dept heads • Staff time • At least once over the next five years	Ongoing	Keep	Departments participate in meetings to go over these measures.

Table 6-7-6: El Mirage assessment of previous plan cycle mitigation actions/projects

ID	Description	• Lead Agency • Proposed Cost • Proposed Comp Date	Status	Disposition	Explanation
18	Coordinate with state and federal agencies (USGS, AZGS, ADWR, etc.) to study and map fissure and subsidence activity in critical or key areas of the city so that effective mitigation or avoidance strategies can be implemented.	• City of El Mirage Fire/ PD and Public Works / Dept heads • Staff Time • At least once over the next five years	Complete	Delete	Multi agency meeting covered this in this fiscal year.
19	Provide links to the Arizona Department of Water Resources subsidence website and the Arizona Geologic Survey website as a part of a public campaign to raise awareness to the hazards and locations of active fissure and subsidence locations within the city.	• City of El Mirage Fire / Fire Chief • Staff Time • FY2016	Complete	Keep	Completed in 2016 and posted on the City web page.
20	Annually coordinate with Federal, State and local dam owners to update any changes in dam safety conditions on emergency action plan information.	• City of El Mirage Fire / Fire Chief and Public Works / Director • Staff Time • On-going	Complete	Keep	The City of El Mirage Engineer participates in this annually.
21	Work with state and Federal agencies to provide disclosure information to all potential buyers of real estate that are located within the dam failure or emergency spillway inundation limits of an upstream dam or dams	• City of El Mirage Fire / Fire Chief and Community Development / Director • Staff Time • On-Going	Ongoing	Keep	This is ongoing for the City of El Mirage.

Table 6-7-7: Fort McDowell Yavapai Nation assessment of previous plan cycle mitigation actions/projects

ID	Description	• Lead Agency • Proposed Cost • Proposed Comp Date	Status	Disposition	Explanation

Table 6-7-7: Fort McDowell Yavapai Nation assessment of previous plan cycle mitigation actions/projects

ID	Description	• Lead Agency • Proposed Cost • Proposed Comp Date	Status	Disposition	Explanation
1	Prohibit building in floodplain and river area to maintain channel and protect riparian area.	• Community and Economic Development Division/Planning Manager • Staff time for plan review- $15,000 annually • Annual/Recurring	In Progress	Keep	This is an annual/recurring action/project.
2	Pro-actively pursue pre-disaster and hazard mitigation grants to supplement tribal expenses associated with mitigation activities.	• All Department Directors • Determined by required matching funds. $10,000 annually • Annual/Recurring	No Action	Keep	This is an annual/recurring action/project.
3	Publish suggested mitigation actions through print media and community website to reduce potential for wildfire and heat related medical emergencies.	• Fire Department/Emergency Manager • Staff time, $2,500 annually • Annual/Recurring	In Progress	Keep	This is an annual/recurring action/project.
4	Limit development along river to protect wetlands, threatened species habitat and protect businesses from flooding.	• Environmental Department/Environmental Manager • Staff time for plan review and Enterprise equipment and labor, $50,000 annually • Annual/Recurring	In Progress	Keep	This is an annual/recurring action/project.
5	Create and map access to high-risk wildfire areas. Provide weed abatement services in high risk areas to reduce risk of wildland fire.	• MCDOT and FMYN Public Works Department/Public Works Manager, Fire Chief, BIA Fire Management Office (FMO) • Staff time and $30,000 annually • Annual/Recurring	In Progress	Keep	This is an annual/recurring action/project.

Table 6-7-7: Fort McDowell Yavapai Nation assessment of previous plan cycle mitigation actions/projects

ID	Description	• Lead Agency • Proposed Cost • Proposed Comp Date	Status	Disposition	Explanation
6	Coordinate training, planning, and communications to provide the community with information to combat the effects of infestations and diseases.	• Medical Director, Clinic staff • Staff time for Medical Clinic personnel • Annual/Recurring	In Progress	Keep	This is an annual/recurring action/project.
7	Install diesel powered emergency generator in critical facilities identified as sheltering locations	• Fire Department/Emergency Manager • Staff time - $5,000, equipment cost - $112,000 • November 2016	Complete	Delete	Diesel powered generator was installed at sheltering location and completed 2020.
8	Implement and exercise an area-wide telephone Emergency Notification System. (Reverse 9-1-1)	• Fire Department/Emergency Manager • Staff time-$15,000, Reverse 9-1-1- system use costs - $2,500 • Annual/Recurring	Complete	Delete	The Nation has contracted with Rave communications to provide area-wide telephone Emergency Notification System. This system has been utilized and exercised multiple times. Adopted in 2017.
9	Review existing building codes, modify or adopt codes to prevent development in hazard areas.	• Community and Economic Development Division/Planning Project Manager / Fire Chief • Staff time, $5,000 annually • Annual/Recurring	In Progress	Keep	This is an annual/recurring action/project.
10	Identify and mitigate hazards associated with new and existing developments through plan reviews to ensure plan/code compliance, including incorporation of drought tolerant or xeriscape landscapes on new developments.	• Community and Economic Development Division/License and Property Use Manager / Fire Chief • Staff time, $5,000 • Annual/Recurring	In Progress	Keep	This is an annual/recurring action/project.
11	Ensure building codes addressing wind loading are enforced to prevent damage from high winds.	• Community and Economic Development Division/Chief Building Inspector • Staff costs - $3,500 • Annual/Recurring	In Progress	Keep	This is an annual/recurring action/project.

Table 6-7-7: Fort McDowell Yavapai Nation assessment of previous plan cycle mitigation actions/projects

ID	Description	• Lead Agency • Proposed Cost • Proposed Comp Date	Status	Disposition	Explanation
12	Develop a drought emergency plan with criteria and triggers for drought-related actions.	• Community Economic Development Division/Emergency Manager/Water Resource Administrator • Staff time, $15,000 • August 2018	No Action	Revise	Completion date should be revised to October 2021.
13	Conduct fuels reduction and establish fuel breaks in dense vegetation areas.	• Fire Department/Emergency Manager • Staff costs - $5,000 • Annual/Recurring	In Progress	Keep	This is an annual/recurring action/project.
14	Annually coordinate with Federal, State, and local dam owners to get updates on any changes in dam safety conditions and emergency action plan information	• Fire Department/Emergency Manager • Staff time • Annual	In Progress	Keep	This is an annual/recurring action/project.
15	Analyze and map extensions of the dam failure inundation limits for Town of Fountain Hills owned dams, through FMYN lands to their confluence with the Verde River.	• Fire Department/Emergency Manager/Water Resource Administrator • $10,000 • FY2019	Revise	Keep	Completion date should be revised to FY2021

Table 6-7-8: Fountain Hills assessment of previous plan cycle mitigation actions/projects

ID	Description	• Lead Agency • Proposed Cost • Proposed Comp Date	Status	Disposition	Explanation
1	Review building permits for compliance with Floodplain Ordinance and NFIP regulations.	• Town Engineer/Plans Reviewer • Staff Time • Annually	Ongoing/In Progress	Keep	Commercial, residential, and Public Works projects are reviewed by either Town Engineer and/or Assistant Town Engineer for Floodplain encroachment. Coordination with either FEMA or MCFCD is performed where for compliance.

Table 6-7-8: Fountain Hills assessment of previous plan cycle mitigation actions/projects

ID	Description	• Lead Agency • Proposed Cost • Proposed Comp Date	Status	Disposition	Explanation
2	Maintain washes in Town by removing excessive brush and trim trees to reduce the threat of wildfire and flooding due to blockages	• Environmental Supervisor • $150K/yr • Annually	Ongoing/In Progress	Keep	Managed by Town Staff and 25% of the washes are cleared on an annual basis. Washes are on a rotation schedule.
3	Enforce Building Codes to prevent roof damage from high winds.	• Building Official • Staff Time • Ongoing	Ongoing/In Progress	Keep	Process is through our building permit application and plan review.
4	Review General Plan and Ordinances for mitigating hazards.	• Development Director • Staff Time • Ongoing	Ongoing/In Progress	Keep	Updates to Plan and Ordinances includes consideration hazard mitigation in the review process.
5	Channel and Storm Drain Development	• Town Engineer • $1.5M • Ongoing	Ongoing/In Progress	Keep	Annual assessment of existing Town storm drains and infrastructure are reviewed for erosion and necessary improvements. New storm drain and channel improvements within undeveloped regions of the Town are reviewed by the Town Engineer and Engineering Consultants for capacity and compliance.
6	Analyze and identify dam failure inundation limits to identify evacuation routes.	• Town Engineer • Staff Time • Ongoing	Ongoing/In Progress/ Completed (Emergency Evacuation Routes)	Keep	Dam Failure inundation limits not determined to date. Emergency Evacuation routes have been established by the Emergency Operations plan.
7	Conduct bi-annual dam safety inspections and reporting per Arizona Department of Water Resources guidelines and required schedule.	• Town Engineer • Staff Time • Ongoing	Ongoing/In Progress	Keep	ADWR performs annual assessments for the Town
8	Perform a public information campaign at the onset of the extreme heat season to help educate the general public on ways to remain safe during periods of extreme heat.	• Fire Department • Staff Time • Ongoing	Ongoing/In Progress	Keep	This is an annual campaign to inform residents of the dangers of excessive heat.

Table 6-7-9: Gila Bend assessment of previous plan cycle mitigation actions/projects

ID	Description	• Lead Agency • Proposed Cost • Proposed Comp Date	Status	Disposition	Explanation
1	Review building permits for compliance with Floodplain Ordinance and NFIP regulations.	• Town Planner/Engineer • N/A • Ongoing	In Progress	Keep	Building permits are reviewed for compliance with the Floodplain Ordinance and NFIP Regulation by the Town Engineer.
2	Pursue a mutual aid compact with county and state agencies to assist the town with hazard mitigation.	• Town Manager, Finance Director, Public Works Director • N/A • Ongoing	In Progress	Keep	Coordination with surrounding entities with regards to emergency management, while ongoing, has increased significantly largely due to the pandemic.
3	Develop a public awareness campaign to educate town residents about natural hazards impacting the community.	• Town, Maricopa County Flood Control • $5,000 • Ongoing	In Progress	Keep	The Town provides hazard information and mitigation measures to the public via social media at logical times throughout the year (i.e. monsoon season, fire season, etc.) but can expand this effort.
4	Develop and construct measures to mitigate flooding along Sand Tank and Scott Avenue Washes.	• FEMA, Army Corps of Engineers, Maricopa County Flood Control, Town • $12 million • 2022	In Progress	Keep	A plan for mitigation of flooding has be developed. Funding for construction is needed.
5	Develop a plan to implement aquifer recharge per the recommendations of the recently completed aquifer study performed by The Global Institute of Sustainability (GIOS) at Arizona State University (ASU).	• Town Manager • $90,000 • 2016	No Action	Keep	Limited funding has impeded the Town's ability to complete this project, but it remains a priority.
6	Restrict water usage for irrigation during times of drought.	• Town Manager, Public Works Director • N/A • Ongoing	In Progress	Keep	The Town continues to limit water usage for irrigation during times of drought.
7	Establish and staff a "cooling" station at the local community center	• Social Services Director, Town Manager • N/A • Ongoing	In Progress	Keep	The Town typically runs the cooling station out of the community center from May to September and will continue this effort.
8	Maintain and provide access to the public swimming pool during times of extreme heat to provide a means for cooling off.	• Town Manager, Parks & Recreation Director • $5,000 • Ongoing	In Progress	Keep	The town will continue to operate the public swimming pool and provide access to the public when restrictions of the pandemic are lifted.

Table 6-7-9: Gila Bend assessment of previous plan cycle mitigation actions/projects

ID	Description	• Lead Agency • Proposed Cost • Proposed Comp Date	Status	Disposition	Explanation
9	Design and evaluate the concept of constructing a flood control reservoir, or series of reservoirs to intercept and store storm runoff. The concept would provide both flood control benefits but also could be a source for groundwater recharge.	• FEMA, Army Corps of Engineers, Maricopa County Flood Control, Town, USDA, WIFA • $2 million • 2018	No Action	Keep	Limited funding has impeded the Town's ability to complete this project, but it remains a priority.
10	Perform investigational analyses to determine if removal of a substandard levee will provide more benefit through restoring local flood control currently blocked by levee, and remove the threat of a levee failure.	• FEMA, Army Corps of Engineers, Maricopa County Flood Control, Town • $700,000 • 2018	No Action	Keep	Limited funding has impeded the Town's ability to complete this project, but it remains a priority.
11	Work with MCDEM and town forces (Fire, EMS, Streets, Parks, and Sheriff) to identify and plan for evacuation routes should the local levee fail	• Town / Town Engineer • N/A • 2016	No Action	Keep	Significant staff turnover has led to a lack of progress for this action.
12	The Town will include potential subsidence in freeboard calculations for buildings in flood prone areas that are known to be active subsidence areas as well	• Town / Town Engineer • Staff Time • As Needed	In Progress	Keep	Town Engineer evaluates the freeboard associated with buildings in flood prone areas on a case by case basis and includes potential subsidence in that consideration.
13	The Town will use permeable driveways and paved pedestrian surfaces to reduce runoff and promote groundwater recharge to mitigate the effects of groundwater withdrawal on subsidence in the area.	• Town / Town Engineer • $50,000 • As Identified	In Progress	Keep	This activity will continue on a case by case basis as projects arise.

Table 6-7-10: Gilbert assessment of previous plan cycle mitigation actions/projects

ID	Description	• Lead Agency • Proposed Cost • Proposed Comp Date	Status	Disposition	Explanation

Table 6-7-10: Gilbert assessment of previous plan cycle mitigation actions/projects

ID	Description	• Lead Agency • Proposed Cost • Proposed Comp Date	Status	Disposition	Explanation
1	Review building permits for compliance with Floodplain Ordinance and NFIP regulations to reduce risks.	• Floodplain Administrator/Plans Review and Inspection Manager • Staff time • Annual-Ongoing	In Progress	Revise	Revise description to reflect on-going occurrence
2	Proactive adoption of applicable master plans, land uses and developmental agreements to reduce risks.	• Engineering / Planning Service Manager • Staff Time • Ongoing	In Progress	Revise	Revise description to reflect on-going occurrence
3	Implement the appropriate stage of the Water Supply Reduction Management Plan as adopted (May 2003) to reduce water use.	• Water Resource Manager & Town Manager • Staff Time • Ongoing	In Progress	Revise	Revise description to reflect on-going occurrence
4	Gilbert will continue to participate in the Community Rating System (CRS) program and get credit for the various activities that assist property owners in receiving reduced insurance premiums.	• Floodplain Administrator • Staff Time • Ongoing	In Progress	Revise	Revise description to reflect on-going occurrence
5	Work closely with FCDMC – Dam Safety to stay abreast of current mitigation efforts and timelines at Powerline FRS (two safety deficiencies)	• Floodplain Administrator/Emergency Management Coordinator • Staff Time • Ongoing	In Progress	Keep	The "Unsafe Dam – with Elevated Risk of Failure" designation for the Powerline FRS has been removed after the Flood Control District of Maricopa County completed the IDSM project (as noted in letter from Engineering Manager Ravi Murphy, dated 11.25.14). However, deficiencies for foundation concerns remain. Therefore ADWR currently has a Safety Deficiency assigned to the dam. FCDMC is currently working with engineering consultants to replace the Powerline FRS with a channel. The design has advanced past the 60% level. Completed work with Flood Control District of Maricopa County on a Gilbert Flood Response Plan (FRP). Town Council adopted and Mayor signed on 08/15/2019.
6	Provide pertinent weather and hazard mitigation information to the public to raise awareness of local hazards by providing local weather service and Maricopa County Hazard Mitigation links from Town of Gilbert Home page.	• Emergency Management Coordinator / Webmaster • Staff Time • Ongoing	In Progress	Revise	Revise description to reflect on-going occurrence. Weather information linked to Emergency Mgt. web page, ongoing.

Table 6-7-10: Gilbert assessment of previous plan cycle mitigation actions/projects

ID	Description	• Lead Agency • Proposed Cost • Proposed Comp Date	Status	Disposition	Explanation
7	Participate in occasional table top exercises to identify potential mitigation measures for increasing response effectives such as evacuation and shelter functions.	• Emergency Management Coordinator • Staff Time • December 2015	In Progress	Revise	Revise description to reflect on-going occurrence. Continue to participate in regional exercises, training and drills to improve response capabilities
8	Promote the use of weather radios, especially in schools, hospitals and other locations where people congregate to inform them of the approach of severe weather.	• Emergency Management Coordinator/Communication Office • Staff Time • Ongoing	In Progress	Revise	Revise description to reflect on-going occurrence Continue to participate in regional exercises, training and drills to improve response capabilities to include
9.	Use website and social media to encourage citizens to be prepared in case of a disaster event to raise awareness and participation.	• Emergency Manager/Communications Office • Staff Time • Ongoing	In Progress	Revise	Revise description to reflect on-going occurrence Ongoing. Continue to deliver personal and family preparedness messaging, including during National Preparedness Month, to include the Manager's Update, and other social media educational spotlights.
10	Review building permits in high risk fissure areas and require engineering evaluation prior to development to reduce impacts.	• Town Engineer Permit & Plans Review and Inspection Manager • Staff Time • Ongoing	In Progress	Revise	Revise description to reflect on-going occurrence
11	Monitor ADWR Subsidence Monitoring Program's satellite imagery for local trends and impacts with the goal of determining strategies to reduce damage and losses.	• Water Resource Manager • Staff Time • Ongoing	In Progress	Revise	Revise description to reflect on-going occurrence.
12	Provide link to the Arizona Department of Water Resource website as part of a public campaign to raise awareness to the hazards and locations of active subsidence.	• Water Resource Manager and Webmaster • Staff Time • Ongoing	In Progress	Revise	Revise description to reflect on-going occurrence. Subsidence is relatively stable in Gilbert. Water Resource Manager monitors yearly ADWR data for changes or concerns.
13	Improvement to Vaughn Avenue Basin to reduce potential of overtopping.	• Engineering/Streets Manager/Public Works Director • $30,000 • Within 2 years of receiving grant funding	No Action	Keep	No progress, ongoing.

Table 6-7-10: Gilbert assessment of previous plan cycle mitigation actions/projects

ID	Description	• Lead Agency • Proposed Cost • Proposed Comp Date	Status	Disposition	Explanation
14	Improvement to Gilbert Road and Williams Field Road Intersection Drainage to reduce local flooding.	• Engineering/Streets Manager/Public Works Director • $750,000 • Within 2 years of receiving grant funding	No Action	Keep	No progress, ongoing.
15	Improvement to 170th Street and San Tan Drainage to reduce local flooding.	• Engineering/Streets Manager/Public Works Director • $40,000 • Within 2 years of receiving grant funding	No Action	Keep	No progress, ongoing.
16	Improvement to Coldwater Boulevard Drainage to reduce local flooding.	• Engineering/Streets Manager/Public Works Director • $60,000 • Within 2 years of receiving grant funding	Complete	Delete	This project was completed several years ago, with a partnership with FCDMC (Small Project Assistance).
17	Improvement to Powerline Trail Drainage at Holliday Farms to reduce local flooding.	• Engineering/Streets Manager/Public Works Director • $213,000 • Within 2 years of receiving grant funding	Complete	Delete	CIP completed this project in 2015.
18	Improvement to Commerce Area Drainage to reduce local flooding.	• Engineering/Streets Manager/Public Works Director • $1,156,000 • Within 2 years of receiving grant funding	No Action	Keep	No progress, ongoing.
19	Improvement to 172nd Street south of Flintlock, implement design to protect roadway and underground utilities from future collapse and ensure rain water is diverted away from fissure area.	• Engineering/Streets Manager/Public Works Director • $100,000 • Ongoing	No Action	Keep	Geotech study completed, no other progress, ongoing.

Table 6-7-11: Glendale assessment of previous plan cycle mitigation actions/projects

ID	Description	• Lead Agency • Proposed Cost • Proposed Comp Date	Status	Disposition	Explanation
1	In partnership with The Salvation Army, provide respite care and dehydration stations. This effort mitigates loss of life during extreme temperature.	• Emergency Management • Staff time • On-going	In Progress	Keep	Annual efforts undertaken in coordination with Community Services staff to provide respite care and hydration stations in locations throughout the city.
2	Perform a public information campaign in coordination with the City of Glendale Marketing Department and Fire Department to educate and inform citizens of safety during periods of extreme heat.	• Fire Department Emergency Management Marketing • Staff time • On-going	In Progress	Keep	Public information has been provided via social media channels to educate and inform citizens of ways to stay safe during periods of extreme heat.
3	Ordinance compliance and maintenance of property (weed/brush abatement)	• Code Compliance • Staff time • On-going	In Progress	Keep	Code Compliance continually enforces weed/brush abatement ordinance compliance through regular inspections or response to complaints.
4	Conduct regular inspections of washes and take corrective action by enforcing existing ordinances to prevent a corridor for wildfires.	• Building Safety and Public Safety • Staff time • On-going	No Action	Delete	Status/Disposition explanation: Many of the washes located in the City of Glendale are under the jurisdiction of the state or federal entities; therefore, the City of Glendale does not have enforcement jurisdiction.
5	Maintenance of Emergency Action Plan of Covered municipal water storage reservoir with a capacity of 12 million gallons. (Thunderbird Reservoir).	• Water Services • Staff time • On-going	In Progress	Revise	Change Description to read: Maintenance of Emergency Action Plan (EAP) of covered municipal water storage reservoir with a capacity of 12 million gallons. (Thunderbird Reservoir) Status explanation: Water Services continues to maintain the Emergency Action Plan as required by the Arizona Department of Water Resources' (ADWR) Dam Safety program.
6	Participation in the Annual ADWR inspection and survey of the Thunderbird Reservoir.	• Water Services • Staff time • On-going	In Progress	Keep	Water Services complies with the requirements of the Arizona Department of Water Resources' Dam Safety program.
7	Participation in the bi-monthly EAP drills and table top exercises.	• Water Services • Staff time • On-going	In Progress	Revise	Change Description to read: Participation in annual EAP drills and tabletop exercises. Status explanation: Water Services' staff participate in scheduled EAP drills and tabletop exercises.

Table 6-7-11: Glendale assessment of previous plan cycle mitigation actions/projects

ID	Description	• Lead Agency • Proposed Cost • Proposed Comp Date	Status	Disposition	Explanation
8	Water Conservation Office conducting educational outreach to the public on best practices, via classes, flyers, website, social media	• Water Services • Staff time • On-going	In Progress	Keep	Water Services' staff provide classes, flyers and other information on water efficiency ahead of and during drought conditions
9	Encourage permanent reduction in amount of water used for landscaping purposes through Landscape Rebate up to $750.00 for residential and $3000 for non-residential.	• Water Services • Staff time • On-going	In Progress	Revise	Change Description to read: Encourage permanent reduction in amount of water used for landscaping purposes through Landscape Rebate up to $750 for residential and $3,000 for non-residential. Status explanation: Water Services' staff provide landscape consultations and rebates ahead of and during drought conditions
10	Update Drought Management Plan (2004) to assist in management of operations when a drought is declared.	• Water Services • Staff time • On-going	In Progress	Revise	Change Description to read: Update Drought Management Plan (2016) to assist in management of operations when a drought is declared. Status explanation: The Drought Management Plan was updated in 2016 and is currently under review for additional updates.
11	Conduct landscape classes (promote xeriscape) to encourage use of drought-resistant landscaping	• Water services • Staff time • On-going	In Progress	Keep	Water Services' staff provide classes, flyers and other information on xeriscape ahead of and during drought conditions.
12	Manage storm-water at its source to reduce water used for landscaping and prevent flooding. Funded in part by a grant from Water Infrastructure Finance Authority of Arizona, to develop a toolkit of low impact development options.	• Water Services / Engineering • Staff time • On-going	Complete	Delete	The low-impact development toolkit was completed in April 2015.
13	City-wide plan to control stormwater pollution, including identification of problem areas (drainage issues, illicit discharges, etc.).	• Engineering • Staff time • On-going Submitted to ADEQ for review/approval in 2014	In Progress	Revise	Change Description to read: Citywide plan to control stormwater, including identification of problem areas (drainage issues, illicit discharges, etc.). The City's Stormwater Management Plan is reviewed annually and updated as needed.

Table 6-7-11: Glendale assessment of previous plan cycle mitigation actions/projects

ID	Description	• Lead Agency • Proposed Cost • Proposed Comp Date	Status	Disposition	Explanation
14	Maintain emergency generators at water and wastewater plants, water pumping station and wastewater lift stations	• Various Departments • Staff time • On-going	In Progress	Revise	Change Description to read: Maintain emergency generators at water and wastewater plants, water booster stations, and wastewater lift stations. Status explanation: Water Services continues to maintain emergency generators for treatment plants, booster stations and wastewater lift stations
15	Maintain emergency generators at fire stations and Glendale Regional Public Safety Training Center.	• Various Departments • Staff time • On-going	In Progress	Revise	Change Description to read: Maintain emergency generators at public safety facilities, including police stations, fire stations and Glendale Regional Public Safety Training Center. Status explanation: The City continues to maintain generators at public safety facilities. Annual maintenance and inspections are conducted. There are also several portable generators available at Fire Resource Management should they be necessary.
16	Work with federal and state agencies, and local coalition to evaluate awareness of fissure risk zones and the problems caused by fissures.	• Development Services • Staff time • On-going	In Progress	Revise	Change Lead Agency to Planning
17	Geological hazards addressed in General Plan and will be incorporated in the planning process for the next General Plan.	• Development Services • Staff time • On-going	In Progress	Revise	Change Lead Agency to Planning
18	Utilization of Development Services plans and procedures to survey and monitor elevations in the City of Glendale to determine and establish long term mitigation strategies.	• Development Services • Staff time • On-going	In Progress	Revise	Change Lead Agency to Planning
19	Development Services has utilized the risk as a regular risk of development and public work projects. The lands used for such projects are inspected for subsidence issues prior to projects starting.	• Development Services • Staff time • On-going	In Progress	Revise	Change Lead Agency to Planning

Table 6-7-11: Glendale assessment of previous plan cycle mitigation actions/projects

ID	Description	• Lead Agency • Proposed Cost • Proposed Comp Date	Status	Disposition	Explanation
20	Educate the public through publication partnering with the Community Services Department and Parks and Recreation to inform citizens of risks associated to flood risks areas (parks multi-use pathways).	• Community Services Department • Staff time • On-going	In Progress	Revise	Change Description to read: Inform citizens of risks associated with flood risk areas, specifically parks multi-use pathways. Change Lead Agency to Public Facilities, Recreation & Special Events
21	Work with Flood Control District of Maricopa County to determine potential effects of levee failure	• Emergency Management • Staff time • On-going	In Progress	Keep	Emergency Management Staff has met with Flood Control District of Maricopa County to review and discuss revised Emergency Action Plans for levees that have impact to the City of Glendale.
22	Participate in annual Flood Control District of Maricopa County Drill/Exercises	• Emergency Management • Staff time • On-going	In Progress	Keep	Emergency Management staff participates in the annual drills/exercises conducted by the Flood Control District of Maricopa County.
23	Enforce currently adopted building codes (2012 IBC and IRC) to mitigate damages due to severe wind events.	• Development Services • Staff time • On-going as needed	In Progress	Revise	Change Description to read: Enforce currently adopted building codes (2018 IBC and IRC) to mitigate damages due to severe wind events. Change Lead Agency to Building Safety
24	Encourage homeowners to use tie-down straps and/or anchors to secure ancillary buildings and metal awnings or porches to mitigate the potential for flying debris during severe wind events.	• Development Services • Staff time • On-going as needed	In Progress	Revise	Change Lead Agency to Building Safety
25	Use website and social media sources to raise public awareness to the impacts of flood and severe winds associated with monsoon season.	• Emergency Management • Staff time • On-going and seasonal	In Progress	Keep	Emergency Management maintains information on the website regarding monsoon and flood safety. Additionally, in partnership with the Fire Department, public awareness information is shared via social media channels.

Table 6-7-12: Goodyear assessment of previous plan cycle mitigation actions/projects

ID	Description	• Lead Agency • Proposed Cost • Proposed Comp Date	Status	Disposition	Explanation
1	Review building permits for compliance with Floodplain Ordinance and NFIP regulations.	• City Engineer, Development Services Director • Staff time • Annual - Ongoing	Complete	Keep	Ongoing practice with each building permit submittal
2	Promote and share mitigation programs with state, county, local jurisdictions, and private, civic, and non-profit organizations.	• Fire Chief / Emergency Manager • Staff Time • Annual-Ongoing	No Action	Delete	Uncertain of action
3	Use newsletters, flyers, utility bill inserts, website notices, radio and television announcements, social media and newspaper articles to educate the public about hazards impacting Goodyear and how to be prepared in case of an emergency or disaster event.	• Communications Division / PIOs / Emergency Manager • Staff Time • Annual - Ongoing	Complete	Keep	Messaging is continual and season appropriate. Will begin to implement the "Ready, Set Go" evacuation program.
4	Provide links on the community's website to sources of hazard mitigation educational materials encouraging residents of Goodyear to be prepared for hazard emergencies.	• Emergency Manager • Staff Time • Annual-Ongoing	Complete	Keep	Maintained this plan, along with the CWPP plan on the Emergency Management Division website through redesign. Will use these links in social media as discussed above.
5	Participate in occasional dam failure tabletop exercises to identify mitigation measures for increasing response effectiveness, such as evacuation route marking and permanent protection measures for intended shelters.	• Emergency Manager • Staff time • Annual-Ongoing	Complete	Keep	Held Flood TTX with unified command leadership staff and staff from various departments. Will continue to rotate in Flooding TTX, especially as related to Bullard Wash as development continues.
6	Mandate, encourage or incentivize the use of drought resistant landscaping through ordinance development and/or enforcement.	• City Engineer, Development Services Director • Staff time • Annual-Ongoing	Complete	Keep	The City Water department promotes xeriscaping, water conservation and use reduction on a regular basis. This year's campaign calls for a resident created tagline. This program and messaging will continue in the future.
7	Develop, update and maintain a local Drought Management Plan to define various levels of conservation or curtailment requirements that are based on drought severity triggers, system impacts, and enforced through utility billing structures and ordinance.	• Water Resources Division • Staff time • Annual-Ongoing	Complete	Keep	City of Goodyear has both a Conservation Plan and a Curtailment (both currently being updated) which are based on demand as a percentage of our supply. There is considerable public information and campaigns regarding about water conservation that have occurred and will continue.
8	Partner with NGO's to provide respite care and hydration stations to mitigate loss of life during extreme temperature events.	• Emergency Manager • Staff time • Annual-Ongoing	No action	Delete	Goodyear has participated in a water drive to assist nearby jurisdictions with hydration stations supplies. Goodyear takes a different approach based largely on development patterns. PD maintains a homeless outreach team which serves somewhat in this capacity.

Table 6-7-12: Goodyear assessment of previous plan cycle mitigation actions/projects

ID	Description	• Lead Agency • Proposed Cost • Proposed Comp Date	Status	Disposition	Explanation
9	Perform an information campaign at the onset of the extreme heat season to help educate the general public on ways to remain safe during periods of extreme heat.	• Emergency Manager • Staff time/Volunteers • Annual-Ongoing	Complete	Keep	Heat warnings, weather alerts and other Heat related material are regularly communicated throughout the year and will continue to be. Additional communication channels could be sought to assist with this messaging.
10	Identify and communicate locations within the community that can serve as cooling stations during times of extreme heat.	• Emergency Manager • Staff time / Volunteers • Annual-Ongoing	In Progress	Keep	Cooling center was established during two-day power outage. An update with locations and the Red Cross is appropriate at this time.
11	Provide links to the Arizona Geologic Service website as a part of a public campaign to raise awareness to the hazards and locations of fissures.	• Emergency Manager • Staff time • Q3, 2015	No Action	Delete	No mapped fissures in the potential development area for the next 5-10 years.
12	Include addressing fissure and subsidence risk as a regular part of the land development and public works projects review and permitting processes.	• City Engineer, Development Services Director • Staff time • Annual-Ongoing	No Action	Revise	Remove reference to fissures and keep subsidence only
13	Participate in the Flood Control District of Maricopa County annual county-wide flood exercises to identify areas of mitigation interest regarding vulnerable critical infrastructure, emergency access and routes issues.	• Emergency Manager • Staff time • Annual-Ongoing	Complete	Keep	Participation in past exercises and will continue to participate with next cycle
14	Provide severe weather information to the City of Goodyear first responders and other employees that work outdoors for them to be aware to wear the proper personal protection equipment.	• Emergency Manager • Staff time • Annual-Ongoing	Complete	Keep	The Emergency Manager has developed a distribution list within the city which is used to warn of pending weather which can impact operations and personnel. It is also used to gather damage information from storms. It has proven quite effective at ensuring staff is keep cool and that water pipes in outlying areas don't freeze.
15	Work with the Flood Control District of Maricopa County to develop and update flood response plans as they pertain to the City of Goodyear and surrounding areas.	• Emergency Manager • Staff time • Annual-Ongoing	Complete	Keep	The Bullard Wash Response Plan was complete in 2012. Since that time the plan has been updated and Goodyear will continue to work with the Flood Control District to ensure updates and subsequent protocols are kept current.
16	Encourage/incentivize homeowners to use tie-down straps and/or anchors to secure metal awnings or porches to mitigate the potential for flying debris during severe wind events.	• Emergency Manager • Staff time / Volunteers • Annual-Ongoing	No action	Keep	Goodyear will place more emphasize on this in the future.

Table 6-7-12: Goodyear assessment of previous plan cycle mitigation actions/projects

ID	Description	• Lead Agency • Proposed Cost • Proposed Comp Date	Status	Disposition	Explanation
17	Install backup generators at key critical facilities such as fire and police stations, water pumping stations, sewer lift stations, etc., to provide emergency power for critical operations during power failures caused by severe wind events.	• Public Works • $60k-$100k • EOY 2015	In Progress	Keep	A Threat Vulnerability Assessment has been completed by the Water/Waste Water Division, where in key locations were identified for generators/hot taps, etc. These improvements are now imbedded within their CIP. Additionally, all fire stations have generators, as does Telecommunications. The bulk of secondary fuel delivery for the city is also serviced by generators.
18	Provide links to Arizona Department of Water Resources website as part of a public campaign to raise awareness to the hazards and locations of active subsidence.	• Emergency Manager • Staff time • Q3, 2015	No progress	Keep	Emergency Management will ensure the that Water Waste Water Division is utilizing this in their water saving campaigns and social media messaging.
19	Enforce the City of Goodyear's weed abatement ordinance.	• Building Official • Staff time / Volunteers • Annual-Ongoing	Complete	Keep	This is an ongoing Code compliance matter. General messaging is usually sent out in the late Spring when weeds are becoming fire hazards.
20	Educate the public on proper fuels thinning, setbacks, and water storage for wildfire mitigation using Firewise type of programs and guidance documents.	• Fire Chief / Emergency Manager • Staff time • Annual-Ongoing	Complete	Keep	The Goodyear Fire Department assisted five plats of the Estrella Mountain Community in qualifying for the FireWise Program, which includes another fuel reduction event in Corgett Wash. Since that time, program qualifications have increased significantly and management at the HOA has turned over. The Fire Department intends to recoup the program in the future and once re-established, turn it over the HOA for continued projects along Corgett Wash.
21	Conduct wildfire safety education programs in the local schools through the Community Risk reduction program.	• Emergency Manager • Staff time / Volunteers • Annual-Ongoing	No action	Keep	Emergency Management will work with Community Education regarding embedding the wildfire safety message, specifically the Ready, Set, Go evacuation program, into the school programs where and when possible.

Table 6-7-13: Guadalupe assessment of previous plan cycle mitigation actions/projects

ID	Description	• Lead Agency • Proposed Cost • Proposed Comp Date	Status	Disposition	Explanation

Table 6-7-13: Guadalupe assessment of previous plan cycle mitigation actions/projects

ID	Description	• Lead Agency • Proposed Cost • Proposed Comp Date	Status	Disposition	Explanation
1	Review building permits for compliance with Floodplain Ordinance and NFIP regulations.	• Building Inspector / Contractor • Staff time • Ongoing	Ongoing	Open ended	Ongoing review of plans to be Flood control compliant
2	Implement the education and mitigation actions as outlined in the town's Stormwater Management Plan.	• Building Inspector / Contractor • Staff time • Ongoing	Ongoing	Open ended	Ongoing Community education outreach
3	Establish periodic monitoring and review of the Town of Guadalupe's general plan and zoning ordinance to determine effectiveness at preventing and mitigating hazards. Based on the results, amend as necessary.	• Town Manager or designee • Staff time • Ongoing	Ongoing	Open ended	General Plan and zoning ordinance review to assess hazard reduction
4	Participate in occasional table top exercises to identify potential mitigation measures for increasing response effectiveness, such as evacuation route marking and permanent protection measures for intended shelters.	• Emergency Manager • Staff time • 2018	Annual	Open ended	Flood Control Plan/ Emergency operations plan review
5	Develop or update the inundation mapping for the emergency action plan for Guadalupe Retention Dam in order to identify population and critical facilities and infrastructure at risk, and to determine the need for potential mitigation.	• Flood Control District • Staff time • Ongoing	Ongoing	Open ended	Maricopa County Flood Control District
6	Public education of water conservation best practices through newsletter, flyers, social media and website notices.	• Community Development • Staff time • Ongoing	Ongoing	Open ended	Continue community outreach
7	Develop a local Drought Management Plan to define various levels of conservation requirement that are based on drought severity triggers.	• Community Development • Staff time • Ongoing	Ongoing	Open ended	Community Water use review
8	Perform a public campaign at the onset of the extreme heat season to help educate the general public on ways to remain safe during periods of extreme heat.	• Fire Dept – Public Information Officer (PIO) • Staff time • Ongoing	Ongoing	Open ended	Annual using social media

Table 6-7-13: Guadalupe assessment of previous plan cycle mitigation actions/projects

ID	Description	• Lead Agency • Proposed Cost • Proposed Comp Date	Status	Disposition	Explanation
9	Identify, stock, and communicate locations within the community that can serve as cooling stations during times of extreme heat.	• Fire Dept Emergency Manager • Staff time • Ongoing	Ongoing	Open ended	Rehydration locations established
10	Review and update stormwater management plan that will analyze and identify problem flooding areas and propose long-term mitigation alternatives designed to reduce or eliminate the flood problems.	• Building Inspector / Contractor • Staff time • Ongoing	Ongoing	Open ended	Part of the storm water management plan
11	Work with Flood Control District of Maricopa County to review, update, and/or augment flood control ordinances to provide a greater level of protection than the minimum required by the NFIP.	• Building Inspector / Contractor • Staff time • Ongoing	Ongoing	Open Ended	Part of the storm water management plan
12	Review existing buildings, evaluate any substandard construction issues and implement repair and upgrade plan for future wind damage.	• Building Inspector / Contractor • Staff time • Ongoing	Ongoing	On hold	Pending funding
13	Encourage homeowners to use tie-down straps and/or anchors to secure ancillary buildings and metal awnings or porches to mitigate the potential for flying debris during severe wind events.	• Emergency Manager • Staff time • Ongoing	Ongoing	Open ended	Annual social media outreach

Table 6-7-14: Litchfield Park assessment of previous plan cycle mitigation actions/projects

ID	Description	• Lead Agency • Proposed Cost • Proposed Comp Date	Status	Disposition	Explanation
1	Review building permits for compliance with Floodplain Ordinance and NFIP regulations.	• City Engineer • Staff Time • Annual-Ongoing	Ongoing	Keep	Reviews continue as plans are submitted

Table 6-7-14: Litchfield Park assessment of previous plan cycle mitigation actions/projects

ID	Description	• Lead Agency • Proposed Cost • Proposed Comp Date	Status	Disposition	Explanation
2	Annually coordinate with federal, state, and local dam owners to get updates on any changes in dam safety conditions and emergency action plan information.	• Flood Control District of Maricopa County • Staff Time • Annually	Ongoing	Keep	Annual updates
3	*Review Emergency Operations Plan for areas that can be updated in accordance with current warning measures that are now available through the national Weather Bureau and the Maricopa County Emergency Services.*	• *Goodyear Fire / Maricopa County Sheriff, EM Coordinator, Public Works* • *Staff Time* • *Annual-Ongoing*	Ongoing	Keep	Staff attends DEMA meetings regularly, and is aware of on-going issues.
4	Encourage city staff to become members of regional organizations that have hazard mitigation as a mission, to share in regional efforts and solutions to local and regional problems.	• Emergency Management Coordinator • Staff Time • Annual-Ongoing	Ongoing	Keep	Emergency Management Coordinator-ACM carries these duties.
5	*Develop a policy to replace the use of hazardous materials with other products as soon as a safe, reliable source is available and proven to be as effective.*	• *Public Works / Director* • *Staff Time* • *Ongoing*	Implemented	Delete-completed	Non-hazardous materials are used whenever possible.
6	Provide links on the community's website to sources of hazard mitigation educational materials (e.g. – http://www.ready.gov/ and http://do1thing.com/) encouraging private citizens to be prepared for hazard emergencies.	• Emergency Management Coordinator • Staff Time • Ongoing-Monthly	Completed	Keep	Provided on website
7	Perform a public information campaign at the onset of the extreme heat season to help educate the general public on ways to remain safe during periods of extreme heat.	• Emergency Management Coordinator / PIO • Staff Time • Ongoing - Seasonal	Ongoing-annually	Keep	Provided annually thru City social media
8	Include addressing subsidence risk as a regular part of the land development and public works projects review and permitting.	• City Engineer • Staff Time • Ongoing	Ongoing	Keep	Ongoing thru permitting process

Table 6-7-14: Litchfield Park assessment of previous plan cycle mitigation actions/projects

ID	Description	• Lead Agency • Proposed Cost • Proposed Comp Date	Status	Disposition	Explanation
9	Review building permits for compliance with International Building Code for structure compliance to endure severe winds and electrical strikes, use drought resistant plumbing fixtures, and flood proofing.	• Public Works / City Engineer • Staff Time • Annual-Ongoing	Ongoing	Keep	Ongoing as plans are reviewed

Table 6-7-15: Mesa assessment of previous plan cycle mitigation actions/projects

ID	Description	• Lead Agency • Proposed Cost • Proposed Comp Date	Status	Disposition	Explanation
1	Maintain continuous water supply by continuing to install/replace water distribution system throughout the City of Mesa	• Water Resources & Engineering Dept. • $120 M • 2018	In Progress	Keep	City of Mesa Water Resources continue to install/replace water distribution system components (including pipeline, pumps, wells etc.) as part of its Capital Improvement project. Water Resources maintains an annual budget for installation and replacement of facilities to maintain the existing water system based on needs.
2	CAP (Signal Buttes WTP), future treatment plant at Elliot and Ellsworth	• Water Resources & Engineering Dept. • $130 M • 2019	Complete	Delete	Signal Butte WTP was completed in June 2018 and has been in service since, providing water to Southeast part of the City. Phase II design has started, which is addition to the original scope.
3	Review building permits for compliance with Floodplain Ordinance and NFIP regulations.	• Development Services, Engineering Dept. • Staff time • On-going	On-Going	Keep	The City building permit process requires all properties within the Maricopa County Flood Control District to obtain a permit from the District and submit it to the City to receive a building permit from the City.
4	Construct remaining elements of the Storm Drain Master Plan	• Engineering Dept. • $108 M • On-going	In Progress	Keep	Engineering regularly evaluates projects to incorporate storm drain improvements as outlined in the Storm Drain Master Plan.

Table 6-7-15: Mesa assessment of previous plan cycle mitigation actions/projects

ID	Description	• Lead Agency • Proposed Cost • Proposed Comp Date	Status	Disposition	Explanation
5	Perform public information campaign at the start of the extreme heat season to educate the public.	• Fire /Medical Dept & Public Information Office • Staff time & cost of supplies • At the extreme event	In Progress	Keep	•Monsoon season educational campaigns on various city websites, social media posts, and media alerts to news agency in which we offer interviews and visuals examples. •Summer heat warnings with regards to outdoor activities, older adults, hot vehicles, etc. on social media, weblinks, new media advisories. •Hydration donation campaign to assist the unsheltered and homeless during the summer months; press conference, social media posts, weblinks. Campaign messaging and visuals on Facebook, Twitter, and Instagram @MesaFireDept
6	Partner with NGO's (e.g. – The Salvation Army, church organizations, shelters, etc.) to provide respite care and hydration stations to mitigate loss of life during extreme temperature events.	• Fire/Medical Dept & Public Information Office • Staff time & cost of supplies • At the extreme event	In Progress	Keep	Prior to the start of the extreme heat season, contact those agencies in Mesa, and develop plans as to how we support each other.

Table 6-7-15: Mesa assessment of previous plan cycle mitigation actions/projects

ID	Description	• Lead Agency • Proposed Cost • Proposed Comp Date	Status	Disposition	Explanation
7	Provide links on the City of Mesa Website to sources of hazard mitigation educational materials encouraging private citizens to be prepared for hazard emergencies.	• Fire/Medical Dept & Public Information Office • Staff time • On-going	In Progress	Keep	•https://www.mesaaz.gov/residents/fire-medical/fire-life-safety-education/heat-related-illness •https://www.mesaaz.gov/residents/emergencies-power-outages •https://www.mesaaz.gov/residents/emergencies-power-outages/sandbags-storm-preparation •https://www.mesaaz.gov/residents/emergencies-power-outages/family-preparedness-guide •Hydration donation campaign to assist the unsheltered and homeless during the summer months: https://www.mesaaz.gov/things-to-do/volunteer/hydration-donation •Monsoon ready virtual flyer: https://www.mesaaz.gov/home/showdocument?id=21991 (source: https://www.mesaaz.gov/residents/streets-transportation/safety-education) On Facebook, Twitter, and Instagram @MesaFireDept
8	Participate/Conduct tabletop exercises to identify potential mitigation measures for increasing response effectiveness in the event of a dam failure.	• Development Services & Engineering Dept. • Staff time • On-going	On-Going	Keep	This effort is led by the County and other stakeholders. The City participates when invited.
~~9~~	Address fissure risk as a regular part of development & public works projects review.	• Development Services & Engineering Dept. • Staff time • On-going	In Progress	Delete	Per Development Services & Engineering, this is encompassed in item 14

Table 6-7-15: Mesa assessment of previous plan cycle mitigation actions/projects

ID	Description	• Lead Agency • Proposed Cost • Proposed Comp Date	Status	Disposition	Explanation
10	Clear vegetation & wildfire fuels to create a clear space around critical structures.	• Fire/Medical Dept & Development Services • Staff time • On-going prior & during the dry season	In Progress	Keep	The City of Mesa follows the 2018 International Fire Code Section 304 as it relates to wildfires: Combustible Waste Material 304.1 Waste accumulation prohibited. Combustible waste material creating a fire hazard shall not be allowed to accumulate in buildings or structures or upon premises. 304.1.1 Waste material. Accumulations of wastepaper, wood, hay, straw, weeds, litter or combustible or flammable waste or rubbish of any type shall not be permitted to remain on a roof or in any court, yard, vacant lot, alley, parking lot, open space, or beneath a grandstand, bleacher, pier, wharf, manufactured home, recreational vehicle or other similar structure. 304.1.2 Vegetation. Weeds, grass, vines or other growth that is capable of being ignited and endangering property, shall be cut down and removed by the owner or occupant of the premises. Vegetation clearance requirements in urban-wildland interface areas shall be in accordance with the International Wildland-Urban Interface Code.

Table 6-7-15: Mesa assessment of previous plan cycle mitigation actions/projects					
ID	**Description**	• **Lead Agency** • **Proposed Cost** • **Proposed Comp Date**	**Status**	**Disposition**	**Explanation**
11	Enforce burn & fireworks bans as needed during dry season. Enforce weed abatement ordinance.	• Fire/Medical Dept & Development Services • Staff time • On-going prior & during the dry season	In Progress	Keep	ARS 36-1601 restricts use of fireworks. We enforce the following regarding open burning: 2018 International Fire Code Section 307 as it relates to burn & fireworks bans - Open Burning, Recreational Fires And Portable Outdoor Fireplaces; 307.1 General. A person shall not kindle or maintain or authorize to be kindled or maintained any open burning unless conducted and approved in accordance with Sections 307.1.1 through 307.5. 307.1.1 Prohibited open burning. Open burning shall be prohibited when atmospheric conditions or local circumstances make such fires hazardous. Exception: Prescribed burning for the purpose of reducing the impact of wildland fire when authorized by the fire code official. 307.2 Permit required. A permit shall be obtained from the fire code official in accordance with Section 105.6 prior to kindling a fire for recognized silvicultural or range or wildlife management practices, prevention or control of disease or pests, or a bonfire. Application for such approval shall only be presented by and permits issued to the owner of the land on which the fire is to be kindled. 307.2.1 Authorization. Where required by state or local law or regulations, open burning shall only be permitted with prior approval from the state or local air and water quality management authority, provided that all conditions specified in the authorization are followed.
12	Maintain/install back-up generators at critical facilities such as Fire & Police Stations, water pumping stations, sewer lift stations, etc., to provide emergency power for critical operations during power failures caused by severe wind events.	• Water Resources, Engineering, Development Services, Facilities Maintenance • $2 M + staff time • 2019	In Progress	Keep	PRCF-Facilities Maintenance continue to maintain emergency generators at critical facilities. However, most of these units do not provide full backup functions for the facility. It will only backup the safety items in the facility. The total estimated cost to add new generators for a full backup of all Fire Stations and PD sites will be $10,850,000. Water Resources - Back-up generator and reliability of pumping station, lift station and plants are an integral part of WR Capital Improvement Program Water Resources and Facilities Maintenance Departments continually evaluate facilities for the need of new of upgraded generators. Projects are initiated once a need is identified.

Table 6-7-15: Mesa assessment of previous plan cycle mitigation actions/projects

ID	Description	• Lead Agency • Proposed Cost • Proposed Comp Date	Status	Disposition	Explanation
13	Include the subsidence risk as a regular part of development & public works projects review.	• Development Services & Engineering Dept. • Staff time • On-going	On-Going	Keep	Building permit applications are required to submit soils investigations that would identify issues with subsidence and/or fissures. Public Works projects typically include a geotechnical study that evaluates a project site for fissure and subsidence risks.
14	Provide links to ADWA website to raise awareness to locations of active subsidence.	• Development Services & Engineering Dept. • Staff time • On-going	In Progress	Keep	Development Services will add the links to their website for instructions for Residential and Commercial Construction. Engineering will add the links to the Engineering and Design Standards.
15	Provide links to Arizona Geologic Service website to raise awareness to the hazard & locations of fissures.	• Development Services & Engineering Dept. • Staff time • On-going	In Progress	Delete	Per Development Services & Engineering, this is encompassed in item 14
16	The City of Mesa provides information to the public using the Community Emergency Notification System (CENS), also called Reverse 9-1-1. If an event occurs the 9-1-1 dispatch center in Mesa will call and provide information and/or instruction to subscribers.	• City of Mesa Communications • Staff time • On-going	In Progress	Keep	Item description is self-explanatory. Will only be utilized in the event of a life/safety emergency.

Table 6-7-16: Paradise Valley assessment of previous plan cycle mitigation actions/projects

ID	Description	• Lead Agency • Proposed Cost • Proposed Comp Date	Status	Disposition	Explanation
1	Review building permit applications for compliance with Floodplain Ordinance and NFIP regulations.	• Engineering Department • Staff time • Annual-Ongoing	***	***	Paradise Valley is no longer participating in the Plan

Table 6-7-16: Paradise Valley assessment of previous plan cycle mitigation actions/projects

ID	Description	• Lead Agency • Proposed Cost • Proposed Comp Date	Status	Disposition	Explanation
4	Continue the under grounding project for existing utilities on major roads thereby eliminating utility poles.	• Engineering Department • $3,800,000 • 2014	"	"	"
2	Adopt the 2009 International Codes (Building, Residential, Mechanical, Plumbing & Electrical) for use by the town.	• Building Safety Division • Staff time & $2,000 for books • July 1, 2010	"	"	"
3	Conduct regular inspections of washes to ensure that they are maintained in a debris free condition.	• Building Safety & Public Works Departments • Staff time • Annual-Ongoing	"	"	"
5	Conduct regular inspections of washes and take corrective action by enforcing existing ordinances to prevent a corridor for wildfires.	• Building Safety & Public Works Departments • Staff time • Annual-Ongoing	"	"	"
6	*Update the current Emergency Operations Plan.*	• *Building Safety Division, Emergency Management Unit* • *Staff time* • *Ongoing*	"	"	"
8	Maintain effective communications with state, county and local government agencies by the various town departments within their respective responsibility.	• All Departments • Staff time • Ongoing	"	"	"
7	Educate and inform residents, businesses and visitors by conducting a media campaign, via local newspaper to publicize ways to mitigate disasters including steps that they can protect themselves.	• Building Safety Department • Staff time • Annual-Ongoing	"	"	"

Table 6-7-17: Peoria assessment of previous plan cycle mitigation actions/projects

ID	Description	• **Lead Agency** • **Proposed Cost** • **Proposed Comp Date**	Status	Disposition	Explanation
1	Review building permits for compliance with Floodplain Ordinance and NFIP regulations.	• Planning and Zoning • Staff Time • Annual-Ongoing	Ongoing	Delete	This is an ongoing process required under the Floodplain Management Ordinance and enforced by the Floodplain Administrator for the City of Peoria. If possible would like to remove as a mitigation project.
2	Assist with the revision of a water conservation plan for mitigating the impact of a drought on the public water supply.	• Public Works • Staff Time • Annual	Ongoing	Revise	Review and update Water Conservation plan as necessary.
3	Work with the Flood Control District of Maricopa County to determine potential effects of a flash flood or flood affecting the city. Also provide sandbags and sand as required.	• Public Works, City Engineering and Emergency Management • Staff Time • Annual	Ongoing	Keep	This program will be part of an annual campaign.
4	Work with the Flood Control District of Maricopa County to determine potential effects of a levee failure.	• Public Works, City Engineering and Emergency Management • Staff Time • Annual	Ongoing	Keep	Coordinate Levee Emergency Action Plans and Levee Accreditations with FCDMC
5	Encourage a fire buffer along wild land-urban interface areas.	• Public Works, City Engineering and Fire Department • Staff Time • Annual	Ongoing	Keep	This program will be part of an annual campaign.
6	Incorporate hazard profile data into city's GIS for mapping of floodways, high wind areas, subsidence areas, hazardous materials, etc.	• Public Works, City Engineering and Emergency Management • Staff Time • Ongoing	Ongoing	Keep	City has a Flood/Storm GIS Layer. Do not see other GIS layers.
7	*Train key city staff on appropriate actions based on the Emergency Operations Plan.*	• *Emergency Management* • *Staff time* • *Ongoing*	Ongoing	Delete	This is an ongoing process for the City of Peoria. If possible would like to remove as a mitigation project. I agree. Training needs to be scheduled
8	*Participate in regional training opportunities as well as Emergency Operations Command exercises within city to prepare for emergencies.*	• *Emergency Management and most city departments* • *Staff Time* • *Ongoing*	Ongoing	Delete	This is an ongoing process for the City of Peoria. If possible would like to remove as a mitigation project.
9	*All Fire Department personnel should be trained at Operations level, currently command staff are trained at Operations – rest of personnel are trained at awareness level.*	• *Fire Department* • *Staff Time* • *Ongoing*	Ongoing	Delete	This is an ongoing process for the City of Peoria. If possible would like to remove as a mitigation project.

Table 6-7-17: Peoria assessment of previous plan cycle mitigation actions/projects

ID	Description	• Lead Agency • Proposed Cost • Proposed Comp Date	Status	Disposition	Explanation
10	*Police Department personnel should be trained at Operations level, currently command staff are trained at Operations – rest of personnel are trained at awareness level.*	• *Police Department* • *Staff Time* • *Ongoing*	Ongoing	Delete	This is an ongoing process for the City of Peoria. If possible would like to remove as a mitigation project.
11	Control development in flood areas	• Planning and Zoning • Staff Time • Annual	Ongoing	Keep	Supported through city codes, regulations and permitting process
12	Encourage flood-proof measures through building design	• Building safety and Economic Development • Staff Time • Annual	Ongoing	Keep	Supported through city codes, regulations and permitting process
13	Utilize Public Service Announcements (PSAs) broadcast on Channel 11 to communicate hazard risk and emergency information. Produce corresponding flyers to be distributed to residents via utility bill mailings	• Office of Communications, Public Works and Emergency Management • Staff Time • Ongoing	Ongoing	Keep	This program will be supported through the Office of Communications in support from city stakeholders.
14	Research identified data limitations affecting the relative vulnerability of assets to drought	• Public Works and GIS • Staff Time • Annual	Ongoing	Keep	This program will be part of an annual process.
15	The City of Peoria will use newsletters, website notices, social media and newspaper articles to educate the public about hazards impacting the city and how to be prepared in the case of a disaster.	• Office of Emergency Management and the Office of Communications • Staff time • Ongoing	Ongoing	Keep	This program will be part of an annual campaign.
16	The City of Peoria will provide links on the emergency management webpage for sources of hazard mitigation educational materials such as www.fema.gov encouraging private citizens to be prepared for hazard emergencies.	• Office of Emergency Management and the Office of Communications • Staff time • Ongoing	Ongoing	Keep	This program will be part of an annual campaign.
17	The City of Peoria will review and assess building and residential codes currently in use to determine if newer, more up-to-date codes are available or required related to hazard mitigation.	• Building safety and Economic Development • Staff time • Ongoing	Ongoing	Delete	This is an ongoing process for the City of Peoria. If possible would like to remove as a mitigation project. I agree. This City also works with ADWR to keep the Floodplain Management Ordinance updated to meet State and FEMA requirements

Table 6-7-17: Peoria assessment of previous plan cycle mitigation actions/projects

ID	Description	• Lead Agency • Proposed Cost • Proposed Comp Date	Status	Disposition	Explanation
18	The city will continue to promote the Storm Ready program and the use of weather radios, especially in schools, hospitals and other locations where people congregate to inform them of the approach of severe weather events.	• Office of Emergency Management and the Office of Communications • Staff time • Ongoing	Ongoing	Keep	This program will be part of an annual campaign with a three year renewal cycle with the Phoenix NOAA office. Can we link to the FCDMC Survive the Storm webpage?
19	The City of Peoria working with Flood Control District of Maricopa County will continue to analyze and identify dam failure inundation limits to identify evacuation routes.	• Public Works, City Engineering and Emergency Management • Staff Time • Annual	Ongoing	Keep	This program will be part of an annual process and revised as growth continues within the city. Continue to coordinate with FCDMC to update the EAPs
20	The City of Peoria will participate/conduct occasional table top exercises to identify potential mitigation measures for increasing response effectiveness, such as evacuation route marking and permanent protection measures for intended shelters.	• Office of Emergency Management • Staff time • Ongoing	Ongoing	Keep	
21	The City of Peoria working with the Flood Control District of Maricopa County will update the inundation mapping for the emergency action plan for Lake Pleasant in order to identify population and critical facilities and infrastructure at risk, and to determine the need for potential mitigation.	• The Office of Emergency Management and various City Departments • Staff time • Annual	Ongoing	Keep	This program will be part of an annual campaign.
22	The City of Peoria will conduct public education of water conservation best practices through a variety of media such as newsletter, flyers, social media and website notices.	• Public Works and Office of Communications • Staff Time • Annual	Ongoing	Keep	This program will be part of an annual campaign.
23	The City of Peoria encourages the use of drought resistant landscaping through ordinance development and/or enforcement.	• Public Works and GIS • Staff Time • Annual	Ongoing	Keep	This program will be part of an annual campaign.
24	The City of Peoria will continue to develop/update our local Drought Management Plan to define various levels of conservation requirements that are based on drought severity triggers.	• Public Works and GIS • Staff Time • Annual	Ongoing	Keep	Review and update Water Conservation plan as necessary.
25	The City of Peoria as practical will continue to use reclaimed water to irrigate city owned landscape or other operations such as our truck washing station.	• Public Works, Community Services & Economic Development • Staff Time • Annual	Ongoing	Keep	Review and update Water Conservation plan as necessary. Update City Code and Engineering Standards to require new development to extend, deliver and connect to the City's reclaimed water system and establish a priority of delivery.

Table 6-7-17: Peoria assessment of previous plan cycle mitigation actions/projects

ID	Description	• Lead Agency • Proposed Cost • Proposed Comp Date	Status	Disposition	Explanation
26	City of Peoria will continue to identify and communicate locations within the community that can serve as cooling stations during times of extreme heat.	• Office of Emergency Management and the Office of Communications • Staff time • Ongoing	Ongoing	Keep	This program will be supported through the Office of Communications in support from city stakeholders
27	Perform a public information campaign at the onset of the extreme heat season to help educate the general public on ways to remain safe during periods of extreme heat.	• Office of Emergency Management and the Office of Communications • Staff time • Ongoing	Ongoing	Keep	This program will be supported through the Office of Communications in support from city stakeholders
28	The City of Peoria will review, update and/or augment flood control ordinances to provide a greater level of protection than the minimum required by the NFIP.	• The Office of Emergency Management and various City Departments • Staff time • Ongoing	Ongoing	Keep	Supported through city codes, regulations and permitting process. The Development and Engineering Department is in the process of completing the ADWR - Community Assistance Visit (CAV). As part of the CAV, ADWR is reviewing the City's Floodplain Management Code. As ADWR findings and recommendations are forwarded to Development and Engineering Dept and CAO the City Code will be updated.
29	Identify and map flood hazards in areas expected to grow or develop in the foreseeable future.	• GIS • Staff time • Ongoing	Ongoing	Keep	Supported through city codes, regulations and permitting process Flood hazards will be identified as updated drainage studies are completed. The City is currently partnering with FCDMC to update the Wittmann ADMP/S and North Peoria ADMP/S. In 2019 the City coordinate with FCDMC to update the Floodplain Management Plan.
30	The City of Peoria will continue to develop/augment a citywide GIS program that is integrated into Public Works, Development Services, Police, Fire/Rescue and Emergency Management to help prevent development in flood prone regions.	• Office of Emergency Management and various City Departments • Staff time • Ongoing	Ongoing	Keep	Supported through city codes, regulations and permitting process
31	Perform public outreach to citizens located within levee failure flood risk areas to provide awareness of potential increase in flood elevations with a levee failure.	• The Office of Emergency Management and various City Departments • Staff time • Ongoing	Ongoing	Keep	This program will be supported through the Office of Communications in support from city stakeholders
32	Encourage homeowners to use tie-down straps and/or anchors to secure ancillary buildings and metal awnings or porches to mitigate the potential for flying debris during severe wind events.	• The Office of Emergency Management and various City Departments • Staff time • Ongoing	Ongoing	Keep	Supported through city codes, regulations and permitting process. The CAV identified a flaw in the city's Floodplain Management Ordinance related to Mobile Home Parks. ADWR will work with City to update ordinance.

Table 6-7-17: Peoria assessment of previous plan cycle mitigation actions/projects

ID	Description	• Lead Agency • Proposed Cost • Proposed Comp Date	Status	Disposition	Explanation
33	Retrofit sub-standard roofs of key critical facilities and infrastructure to meet modern building code standards and mitigate damages and impacts of severe wind events.	• Building Safety and Economic Development • Staff time • Ongoing	Ongoing	Keep	Supported through city codes, regulations and permitting process
34	Include addressing subsidence risk as a regular part of the land development and public works projects review and permitting.	• Public Works, City Engineering, Building Safety • Staff time • Ongoing	Ongoing	Keep	Supported through city codes, regulations and permitting process. Do not see this in City Code or Engineering Standards.
35	Provide links to the Arizona Department of Water Resources website as a part of a public campaign to raise awareness to the hazards and locations of active subsidence.	• Public Works, City Engineering & Building Safety • Staff time • Ongoing	Ongoing	Delete	This is an ongoing process for the City of Peoria. If possible would like to remove as a mitigation project. Do not see this in the City Code
36	Establish survey monuments and monitor elevations in critical or key areas of the community to measure impacts and trends of subsidence, with the goal of determining long term mitigation strategies to reduce the damage and losses that may yet be experienced.	• Public Works, City Engineering & Building Safety • Staff time • Ongoing	Ongoing	Delete	This is an ongoing process for the City of Peoria. If possible would like to remove as a mitigation project. The City has a benchmark system which is updated every 5 years. Not sure who coordinates the subsidence issue.
37	Develop and/or enforce a weed abatement ordinance.	• Code Enforcement • Staff time • Ongoing	Ongoing	Keep	Supported through city codes, regulations and permitting process
38	Educate public on proper fuels thinning, setbacks, and water storage for wildfire mitigation using Firewise type of programs and guidance documents.	• Fire Department • Staff time • Ongoing	Ongoing	Delete	This is an ongoing process for the City of Peoria. If possible would like to remove as a mitigation project.
39	The Peoria Fire Department will conduct Fire safety education programs where appropriate such as Peoria and Deer Valley Schools as well as other educational facility and public events such as G.A.I.N. night.	• Fire Department • Staff time • Ongoing	Ongoing	Delete	This is an ongoing process for the City of Peoria. If possible would like to remove as a mitigation project.
40	Enact and enforce burn and fireworks bans as needed during extraordinarily dry and extreme wildfire conditions / seasons to mitigate possible, unintended wildfire starts.	• Fire Department • Staff time • Ongoing	Ongoing	Delete	This is an ongoing process for the City of Peoria. If possible would like to remove as a mitigation project.

Table 6-7-18: Phoenix assessment of previous plan cycle mitigation actions/projects

ID	Description	• Lead Agency • Proposed Cost • Proposed Comp Date	Status	Disposition	Explanation
1	Review building permits for compliance with Floodplain Ordinance and NFIP regulations.	• Public Works / Floodplain Manager • Staff Time • Annual-Ongoing	In Progress	Revise	Public Works updated the City's Floodplain Management Plan in 2016. The next update is scheduled for 2021.
2	Continue to include in the General Plan policies that protect the natural flow regimes of washes and designate areas for Open Space and Preserves.	• Parks and Recreation / PPPI Administrator • Staff time • Annual-ongoing	In Progress	Revise	Public Works updated the City's Floodplain Management Plan in 2016. The next update is scheduled for 2021. • Public Works worked with SRP to ensure that tailwater in their canal systems would not increase during monsoon season.
3	Storm Drain CIP Program. Construct drainage facilities to mitigate flooding hazard to residents of the city.	• Street Transportation Department / Deputy Street Transportation Director • Variable • Ongoing	In Progress	Revise	Public Works updated the City's Floodplain Management Plan in 2016. The next update is scheduled for 2021.
4	Coordinate data sharing and development communication within city departments through documentation in GIS	• Planning and Development Department / Planning Researcher • Staff time • Annual-ongoing	In Progress	Revise	• Yes, it reduced risks because it helped staff be aware of the project being developed in floodplain or flood hazard areas • Please change Description to the following: Coordinate review and approval of development projects located within flood hazard areas with PDD and Floodplain Management. (funding source changes to Enterprise)
5	Summer Respite regional program to network with faith-based organizations to provide heat relief, hydration and respite with wellness checks. Program services are provided for the affected populations.	• Human Services / Homeless Services Deputy Director • Donations totaling $70,000 annually • Annual-ongoing	In Progress	Revise	Emergency sheltering and heat respite cooling opportunities for vulnerable populations. Extreme Heat – Native Vegetation • Power failures • Short and long-term mitigation efforts • Tree planting campaign – long term mitigation effort (Office of Sustainability) • Reduce surface temperature / pavement, roofs – long term mitigation (PDD and Streets) • Identify current vegetation – shade/cooling areas • Add shade to all bus stop locations o More accessible shaded areas

Table 6-7-18: Phoenix assessment of previous plan cycle mitigation actions/projects

ID	Description	• Lead Agency • Proposed Cost • Proposed Comp Date	Status	Disposition	Explanation
6	Maintain and execute the Drought Response Plan (Revision in Draft - No Ordinance Change)	• Water • Staff Time • Ongoing	In Progress	Revise	• Avoid the use of portable water and add green infrastructure. • Bio soil (gather rainwater) • Add green infrastructure that utilizes less water. Support native vegetation. • Education – Community Outreach.
7	Maintain and execute a water use awareness outreach program.	• Water • Staff Time • Ongoing	Complete	Keep	This program will be sustained and maintained. https://www.phoenix.gov/waterservices/resourcesconservation
8	Revise and ratify the General Plan every ten years.	• Planning and Development Department / Planning Manager • Staff time • Ongoing	In Progress	Revise	Severe Winds • Structural damage, tree issues. Education is important. • 2015 General Plan: contains goals and policies related to different efforts throughout the city. The plan was approved by the voters in 2015. We are currently working on an update report and plan to update the entire plan in 2025 per state statute. https://www.phoenix.gov/pddsite/Documents/PZ/PlanPhx%20Draft%20General%20Plan%20Update.pdf
9	Update and adopt a revised building code.	• Planning and Development Department / Deputy Director-Building Official • Staff time; Materials • Annual-ongoing	In Progress	Keep	Code cycles including local amendments and ordinances are updated every 3 years. The next “update” in 2021, should be a soft update. The last “hard” update was 2012 to 2018 codes which is what PDD is under now. Hard updates are generally every 6 years. PDD skips a code cycle generally and only has a “partial/ soft” adoption which will more than likely be the case for 2021 codes. https://www.phoenix.gov/pdd/codes-ordinances

Table 6-7-18: Phoenix assessment of previous plan cycle mitigation actions/projects

ID	Description	• Lead Agency • Proposed Cost • Proposed Comp Date	Status	Disposition	Explanation
10	Continue to ensure zoning stipulations are met before construction permits are issued, and zoning is compatible with the zoning ordinance.	• Planning and Development Department / Deputy Director • Staff time • Annual-ongoing	In Progress	Revise	The current trend of urban infill is expected to continue for the foreseeable future. A decreasing availability of vacant properties has led to the repurposing of existing, under-utilized properties. City staff continues to work with developers, investment groups, the historic preservation community and concern citizen to strike the most appropriate balance between growth, livability and our history. The City of Phoenix Planning and Development Department has tracked development trends over the past five years and reported these trends to city management, the Development Advisory Board and the public. The most prominent development trends include: • Strong growth within the Infill Development District • Bio-medical and academic expansion • Traditional Growth Areas City of Phoenix Planning and Development (2020, July) Department -Infrastructure and Growth-Source KIVA database
11	Dam/Levee Safety Program – Operate and Maintain Dams/Levees to mitigate flooding hazard to the residents of the city.	• Street Transportation Department / Deputy Street Transportation Director • Staff Time, Materials • Annual-ongoing	In Progress	Revise	Dam Inundation – Inspection / clear vegetation / Update regulation / EAP (response oriented) Education • Maricopa County Flood Control – Notification when water is released, lock crossings • Codes – Flood plain ordinance was updated last year • Certifications depend on the system • Look into new dams as mitigation efforts • Notification system to inform the community
12	Continue to provide links on the Phoenix.gov/Office of Emergency Management website to sources of hazard mitigation educational materials such as FEMA.gov and Ready.gov	• Office of Homeland Security and Emergency Management, City of Phoenix IT • Staff Time • Annual-ongoing	In Progress	Revise	Incorporate updated/complete plan into OHSEM website • OHSEM manages Sand Program in every Council District

Table 6-7-18: Phoenix assessment of previous plan cycle mitigation actions/projects

ID	Description	• Lead Agency • Proposed Cost • Proposed Comp Date	Status	Disposition	Explanation
13	Continue to adhere to the City of Phoenix Building Standards and Review Process, which are regularly updated. The Building and Review Process requires site assessment for presence of, among other conditions, subsidence and fissures.	• Street Transportation Department: Maintenance Division • Staff Time • Annual-ongoing	In Progress	Revise	Fissure – Locate and inform community (awareness) • Subsidence • Flooding/Flash flooding – Protection of natural channels (Clean Water Act) • Development Community - home builders. Update city flood plain, gather input from the community. • Bond Program
14	Enforce City Ordinance 39-7D, which addresses overgrown vegetation, dead trees, brush and weeds or other conditions that present a health, fire or safety hazard.	• Neighborhood Services Department/Neighborhood Preservation Division • Staff Time • Annual-ongoing	In Progress	Keep	Wildfire – Community education • Vegetation regulation for homes. • Community workshops and seminars
15	Coordinate with private companies and public agencies to study and map subsidence and fissure activity in critical or key areas of the community so that effective mitigation or avoidance strategies can be implemented.	• Street Transportation Department: Design and Construction Management • Staff Time • Annual-ongoing	In Progress	Revise	Fissure – Locate and inform community (awareness) • Subsidence • Flooding/Flash flooding – Protection of natural channels (Clean Water Act) • Development Community - home builders. Update city flood plain, gather input from the community. • Bond Program

Table 6-7-19: Queen Creek assessment of previous plan cycle mitigation actions/projects

ID	Description	• Lead Agency • Proposed Cost • Proposed Comp Date	Status	Disposition	Explanation

Table 6-7-19: Queen Creek assessment of previous plan cycle mitigation actions/projects

ID	Description	• Lead Agency • Proposed Cost • Proposed Comp Date	Status	Disposition	Explanation
1	Review building permits for compliance with Floodplain Ordinance and NFIP regulations.	• Development Services / Floodplain Administrator • Staff time • Ongoing	In Progress	Keep	Project is an ongoing activity.
2	Construct Box Culvert at Ocotillo Road and Queen Creek between Power and Recker Roads.	• Public Works CIP Division / CIP Project Manager • $400,000 • 2015	Completed	Delete	Project was mislabeled. Queen Creek Wash should be Sonoqui Wash. Completed June 2016.
3	Annually coordinate with county to obtain updates on any changes in dam safety conditions and emergency action plans.	• Fire & Medical Dept / Emergency Mgmt Coord • Staff time • Ongoing	In Progress	Keep	Project is an ongoing activity.
4	Educate and inform residents about dam safety through the town's website and links to the Flood Control District of Maricopa County.	• Fire & Medical Dept / Emergency Mgmt Coord • Staff time • Ongoing	No Action	Keep	Project was placed on hold. Responsible staff was reassigned to a new department and assigned new duties.
5	Educate and inform residents about water conservation through newsletters, social media, inserts, new customer packets, water wise workshops, high use notifications, regularly scheduled meter change outs and the town's website.	• Utilities Services Dept / Water Conservation Spec. • Staff time • Ongoing	In Progress	Keep	Ongoing for all activities. See Town website page – Water Conservation
6	Maintain the town's Integrated Emergency and Drought Response Plan (ERDP).	• Utilities Services Dept / Water Division • Staff time • Ongoing	No Action	Keep	No Activity. Utility Services staff is reviewing their update process.
7	Educate and inform residents about extreme heat through newsletters, social media, inserts and/or the Town's website.	• Fire & Medical Dept / Emergency Mgmt Coord • Staff time • Ongoing	In Progress	Keep	Ongoing activity for newsletters and social media. Town website still needs to be updated

Table 6-7-19: Queen Creek assessment of previous plan cycle mitigation actions/projects

ID	Description	• Lead Agency • Proposed Cost • Proposed Comp Date	Status	Disposition	Explanation
8	Incorporate respite care and hydration stations into the CERT Shelter Management Continuing Education (CE) Program	• Fire & Medical Dept / Emergency Mgmt Coord • Staff time • Ongoing	No Action	Keep	CERT Continuing Education (CE) program has been on hold until 2019 when a citizen volunteer was added to the program to assist with organizational details. Program was placed on hold for 2020 due to COVID-19 Pandemic.
9	Educate and inform residents about fissures through the town's website and links to the Arizona Geologic Service website.	• Development Services Dept • Staff time • Ongoing	In Progress	Keep	Ongoing. See Town website page - Earth Fissures
10	Review permit submittals for proximity to Earth Fissure Map that may require additional geological report.	• Development Services Dept / Engineering • Staff time • Ongoing	In Progress	Keep	Project is an ongoing activity.
11	Complete an agreement with the Roosevelt Water Conservation District (RWCD) for the exchange of the town's reclaimed effluent for CAP credits.	• Utilities Services Department • Staff time $300,000 • Winter 2015	Complete	Delete	The agreement was completed and approved by the Town Council in November 2015.
12	Install backup generators with the construction of Fire Station 411 and the Public Safety Administration Building.	• Fire & Medical Department • TBD • Fall 2016 and Spring 2017	Complete	Delete	Fire Station 411 completed March 2017. Law Enforcement Building (formerly Public Safety Administration Building) completed September 2017. Additional project: Fire Station 413 completed August 2017.
13	Identify opportunities to underground 12Kv power lines to mitigate power failures caused by severe wind events.	• Public Works CIP Division / CIP Project Manager • $945,000 • Ongoing	In Progress	Keep	Ongoing. Projects completed in 2016-2017 Ocotillo Road Loop to Loop; Ocotillo Road Crossing at Union Pacific Railroad; Ocotillo Road - Power to Recker Roads. All future CIP projects include a power line mitigation component.
14	Encourage fire buffer zones around the north face of the San Tan Mountains to prevent entry into the Box Canyon Area.	• Fire & Medical Department • Staff time • Ongoing	No Action	Keep	No Activity.

Table 6-7-19: Queen Creek assessment of previous plan cycle mitigation actions/projects

ID	Description	• Lead Agency • Proposed Cost • Proposed Comp Date	Status	Disposition	Explanation
15	Conduct a Community Hazard Risk Assessment and include the evaluation of wildfire hazard.	• Fire & Medical Department • Staff time • Winter 2015	Complete	Delete	The Community Hazard Risk Assessment was completed in August 2015.

Table 6-7-20: Salt River Pima – Maricopa Indian Community assessment of previous plan cycle mitigation actions/projects

ID	Description	• Lead Agency • Proposed Cost • Proposed Comp Date	Status	Disposition	Explanation
1	Community Relations in coordination with Emergency Management to conduct public outreach/education on all hazards mitigation and emergency preparedness for community members. Community members that are educated on what to do before and during a disaster will reduce the loss of life and property in a disaster.	• Emergency Management / Community Relations Office • 0 • Ongoing	In Progress	Keep	This remains an EM / Community Relations project which will continue within the next planned period. Measures to integrate newspaper and social media tool along with community functions has been an on-going effort toward completing this project.
2	Conduct fuel mitigation project of heavy fuels/large trees in the Preserve to mitigate wildland fire damages and spread.	• Fire / Fire Chief • $3,000/ac • 2018	No Action	Delete	On-going planning efforts within the Tribal community ceased due to contractual shortfalls with funding agency.
3	Replace existing Health and Human Services building with one designed to not flood due to having basement and older type construction	• ECS / Construction Division • $30 million • 2020	In Progress	Revise	Former Salt River Clinic building was demolished and new construction on new IHS funded building is currently underway. To be named River People Health Center.
4	Conduct Master Drainage Study north of Arizona Canal to reduce flooding and develop water retention restore methods.	• ECS / Design Division • $500,000 • 2025	In Progress	Revise	85% completion on the Western side 50% completion on the Eastern side. This project was broken into two projects during the previous planned period.
5	Conduct Fuel reduction project of light fuels in River bottom and Community recreation areas to minimize the rapid spread of fire in this area.	• ECS / Construction Division • $75-$80,000 • 2016	In Progress	Revise	This project will continue throughout the next planned period. This project was expanded during the previous planned period by hiring additional 1-Full-time Employee and 3-Temporary Employees tasked with performing selective thinning near identified areas in the community.

Table 6-7-20: Salt River Pima – Maricopa Indian Community assessment of previous plan cycle mitigation actions/projects

ID	Description	• Lead Agency • Proposed Cost • Proposed Comp Date	Status	Disposition	Explanation
6	Implement a water harvesting program through the location, design and construction of dual functioning stormwater retention facilities with enhanced recharge elements designed into the basin.	• ECS / Design Division • $50,000 • 2025	In Progress	Revise	The drainage study data is the driver toward identifying development of infrastructure to support this project. New guidelines indicate the project will move toward building smaller water harvesting basins to reduce the need for large retention basin along watershed.
7	Complete process of Maintain/Install backup generators at key critical facilities such as fire and police stations, water pumping stations, sewer lift stations, etc., to provide emergency power for critical operations during power failures caused by severe wind events	• Public Works / Facility Management Division • $100,000 • 2017	Complete	Delete	It was reported by the Community's Public Works that all the projects were completed within the planned period.
8	Encourage homeowners to use tie-down straps and/or anchors to secure ancillary buildings and metal awnings or porches to mitigate the potential for flying debris during severe wind events.	• Public Works / ECS • Staff Time • 2025	In Progress	Revise	It was reported through ECS that new recommendations will be made into code for Tribal Council approval outside of developing a Code of Ordinance. Currently, plans have been developed and have been implemented to support reduction of hazards by ECS performing inspections, providing permits, giving recommendations on foundations for primary residences but do not include ancillary buildings.
9	Participate/conduct occasional table top exercises to identify potential mitigation measures for increasing response effectiveness, such as evacuation route marking and permanent protection measures for intended shelters.	• Emergency Management / Emergency Manager • Staff Time • 2025	In Progress	Revise	EM continues to provide ongoing training and exercises to further develop Mass Care Shelter operations within the Community to further reduce impacts to this hazard.
10	Annually coordinate with federal, state, and local dam owners to get updates on any changes in dam safety conditions and emergency action plan information so that they can be integrated into SRPMIC response plans.	• Public Works / Assistant Director • Staff Time • 2025	In Progress	Revise	SRPMIC continues to engage stakeholders annually to provide updated information to update Tribal plans.
11	Maintain inventory, train response staff and continue communications on the locations within the community that serve as cooling stations and shelters during times of extreme heat.	• Emergency Management / Emergency Manager • Staff Time • 2025	In Progress	Revise	During the planning period Mass Care shelters plans have been developed; staff have been trained; equipment has been purchased and exercises have been conducted to further mitigate this hazard within the Community.

Table 6-7-20: Salt River Pima – Maricopa Indian Community assessment of previous plan cycle mitigation actions/projects

ID	Description	• Lead Agency • Proposed Cost • Proposed Comp Date	Status	Disposition	Explanation
12	Perform a public information campaign at the onset of the extreme heat season to help educate the general public on ways to remain safe during periods of extreme heat.	• Emergency Management / Community Relations Office • Staff Time • 2025	In Progress	Revise	EM and Community relations currently utilize the Community newspaper and social media to provide information to the public on measures to take to reduce the impact and respond to extreme heat events.
13	Further develop planning and coordination with Tribal community and local stakeholders involved in Evergreen wash public information mitigation and response efforts to reduce the impacts of personal life safety due to water releases through the Tribal community.	• Emergency Management / Salt River Police • Staff Time • 2025	In Progress	Revise	This project is intended to mitigate the hazard of Flooding/Flash flooding.
14	Improve redundant communication systems through expansion of the current system for the Public Safety community.	• Information Technology • 2025	In Progress	Revise	Information Technology will be working toward further developing the Moto Turbo System to include additional partners such as Senior Services, Tribal DOT, Courts, Emergency Management, and Education/Schools. This is an All Hazards mitigation project.
15	Improve communications infrastructure through tower installs for partners within the Tribal community.	• Information Technology • 2021	In Progress	Revise	Information Technology will be working toward installing new tower(s) within the Tribal community to support Education with Schools. This is an All-Hazards mitigation project.
16	Perform a public information campaign at the onset of severe winds created during monsoon seasons to help educate the general public on ways to remain safe from impacts related to the identified hazard.	• Emergency Management / Community Relations Office • Staff Time • 2025	In Progress	Revise	EM and Community relations currently utilize the Community newspaper and social media to provide information to the public on measures to take to reduce the impact and respond to severe wind events.

Table 6-7-21: Scottsdale assessment of previous plan cycle mitigation actions/projects

ID	Description	• Lead Agency • Proposed Cost • Proposed Comp Date	Status	Disposition	Explanation

Table 6-7-21: Scottsdale assessment of previous plan cycle mitigation actions/projects

ID	Description	• Lead Agency • Proposed Cost • Proposed Comp Date	Status	Disposition	Explanation
1	Review, update and/or augment flood control ordinances to provide a greater level of protection than the minimum required by the NFIP.	• Planning and Development Services • Staff Time • Ongoing	Ongoing	Keep	Ordinance update completed and adopted by the Scottsdale City Council in 2016. Reviews are conducted annually.
2	Identify and map flood hazards in areas expected to grow or develop in the foreseeable future.	• Planning and Development Services • Staff Time • Ongoing	Ongoing	Keep	This is an ongoing project. Several areas in the north and central regions of the City of Scottsdale have been evaluated and have been re-delineated to more accurately reflect current conditions.
3	Implement a water harvesting program through the location, design and construction of dual functioning stormwater retention facilities with enhanced recharge elements designed into the basin, as a part of maintaining a Drought Management Plan in conjunction with SRP & APS to lessen the impact of drought.	• Water Resources • $6,442,200 • Ongoing	No Action	Delete	In 2016 this project was studied and determined to be not feasible. Project to be deleted from plan.
4	UPPER CAMELBACK WASH WATERSHED Construct channel improvements, storm drains, stormwater storage basins, and culverts to provide 100-year structural flood protection to nearly 500 structures in the vicinity of 92nd St to 96th St from Shea Blvd. to Sweetwater Ave.	• Planning and Development Services and Public Works • $19,189,269 • April 2015	Complete	Delete	This project is 100% completed, and in maintenance phase.
5	GRANITE REEF WATERSHED Construct channel improvements, storm drain improvements, and stormwater storage basins to provide 100-year flood protection to hundreds of structures in the vicinity of Granite Reef Road between the Arizona Canal and the Salt River. .	• Planning and Development Services and Public Works • $51,055,600 • June 30, 2021	In Progress	Keep	This project is in its first phase of implementation, with two phases, and several sub-phases. Phases 1A and 1B are complete. Phase 1C is under construction. Phase 2A is in final design phase. Phases 2B and 2C will move into final design phase in FY 22/23 and FY 24/25, respectively, and these phases will move into construction in FY 23/24 and FY 25/26, respectively. Its anticipated completion date has been moved to June 30, 2026. Information about this project can be found at: https://www.scottsdaleaz.gov/construction/project-list/granite-reef-watershed-drainage-and-flood-control-improvement
6	CROSSROADS EAST PHASE 1: Drainage projects and transportation repair projects.	• Planning and Development Services and Public Works • $15,094,034 • June 30, 2020	In Progress	Keep	This project is under construction.

Table 6-7-21: Scottsdale assessment of previous plan cycle mitigation actions/projects

ID	Description	• Lead Agency • Proposed Cost • Proposed Comp Date	Status	Disposition	Explanation
7	As a part of the Automated Flood Warning System, install automated flood barriers at low water crossings to discourage motorists from entering flooded road crossings.	• Planning and Development Services, Emergency Services, and Public Works • Staff Time • Ongoing	No Action	Keep	No activity. This project has been discussed and public/private partnerships have been considered to implement automated system. To date no funding has been allocated to accomplish this so the project has not moved forward as of this update.
8	As a part of the Automated Flood Warning System, install stream depth indicators at low water crossings to communicate the risk of entering flooded roadway crossings and provide a visual warning to motorists of flood conditions at the crossing location.	• Planning and Development Services, Emergency Services, and Public Works • Staff Time • Ongoing	Ongoing	Keep	There are depth indicators installed in multiple flood-prone roadways throughout the City of Scottsdale. There may be additional opportunities to enhance the deployment of these features and will need to be further assessed to determine the most appropriate locations.
9	Review and evaluate current weed control ordinance to ensure adequate provisions are in place to protect properties along the wild land urban interface.	• Fire Department • Staff Time • Ongoing	Ongoing	Keep	The Weed Control Ordinance was last updated and enacted in 2016. This remains an ongoing project to assess the impact and effectiveness of the ordinance.
10	Encourage fire buffer zones along wild land urban interface areas to mitigate damages due to wildfire.	• Fire Department • Staff Time • Ongoing	Ongoing	Keep	This is being accomplished through the active FireWise Program implemented within Scottsdale. This is an ongoing project in place by the Scottsdale Fire Department, and reported through the Community Wildfire Protection Plan
11	Perform Hazardous Material Response Team & Fire Code Inspection on occupancies with Hazardous Materials to ensure safe storage and use of those HAZMATS.	• Fire Department • Ongoing	Ongoing	Keep	Scottsdale Fire Department has an active and credentialed Hazardous Materials Team and conducts HazMat inspections through its Fire and Life Safety Division
12	Develop partnerships to locate and operate hydration stations during extreme heat events to reduce the risk to Scottsdale citizens.	• Fire Department • Ongoing	Ongoing	Keep	Partnerships have been developed with the Scottsdale Parks and Recreation Division to open and operate cooling centers within the Community Centers. These centers will be activated when needed during times of extreme conditions warranting opening of such a center.
13	Review/Update the city's Drought Management Plan's conservation requirements to evaluate drought severity triggers and their enforcement.	• Fire Department • Ongoing	Ongoing	Keep	The City of Scottsdale Drought Management Plan was adopted by the Scottsdale City Council in 2015 and is on an annual review cycle.

Table 6-7-21: Scottsdale assessment of previous plan cycle mitigation actions/projects

ID	Description	• Lead Agency • Proposed Cost • Proposed Comp Date	Status	Disposition	Explanation
14	Use newsletters, flyers, utility bill inserts, website notices, radio and television announcements, social media and newspaper articles to educate the public about hazards impacting the county and city, and how to be prepared in the case of a disaster event.	• Fire Department • Ongoing	Ongoing	Keep	Since 2011 the City of Scottsdale has conducted Community Emergency Response Team (CERT) training for Scottsdale residents. This program consists of a 21-hours training course following FEMA CERT Basic Training curriculum to help residents become better prepared and more resilient should disaster strike. This training has been traditionally offered two times per year. Beginning the 3rd quarter of 2018 the Office of Emergency Management implemented a 2-hour Ready Scottsdale program to help educate Scottsdale residents in the identified threats and hazards existing in the city and discuss how to become better prepared. This training has been offered monthly and has been well-accepted by the residents.
15	*Continue expanding our WebEOC software system to track incidents and resources in the event of an emergency.*	• *Fire Department* • *Ongoing*	Ongoing	Keep	The City of Scottsdale currently uses WebEOC Disaster Information Management System as a means for maintaining information in the Emergency Operations Center. In the past year the Scottsdale Office of Emergency Management has expanded the use of WebEOC by developing a Department Operating Center (DOC) concept of use. Currently the single DOC using WebEOC is Scottsdale Water, who has trained with the system, and has used it during a joint EOC / DOC functional exercise.
16	Promote the use of weather radios, especially in schools, hospitals and other locations where people congregate to inform them of the approach of severe weather events.	• Fire Department • Ongoing	Ongoing	Keep	Continue to advocate for purchase and use of NOAA Weather Radios, and currently equipped the Scottsdale Police Dispatch Center and Emergency Operations Center with S.A.M.E Weather Radio / All-Hazard Alert Radios. The Scottsdale Office of Emergency Management has included information about and advocating the use of NOAA Weather Radios during Community Emergency Response Team and Ready Scottsdale training events.
17	Perform a public information campaign at the onset of the extreme heat season to help educate the general public on ways to remain safe during periods of extreme heat. Maintain and continue expanding our community emergency response team (CERT) training.	• Fire Department • Ongoing	Ongoing	Keep	The Scottsdale Office of Emergency Management has included information about extreme heat issues during Community Emergency Response Team and Ready Scottsdale training events.

Table 6-7-21: Scottsdale assessment of previous plan cycle mitigation actions/projects

ID	Description	• Lead Agency • Proposed Cost • Proposed Comp Date	Status	Disposition	Explanation
18	Identify, stock and communicate locations within the community that can serve as cooling stations during times of extreme heat.	• Fire Department • Ongoing	Ongoing	Keep	These centers have been identified in the City of Scottsdale Emergency Operations Plan. This plan was activated during an excessive heat event coupled with a power outage during the summer of 2015.
19	Include addressing subsidence and fissure risk as a regular part of the land development and public works projects review and permitting.	• Planning and Development Services and Public Works • Staff • Ongoing	Ongoing	Keep	This is an ongoing endeavor and has been positively impacted by Scottsdale Water in their selective pumping from wells in the city.
20	Coordinate with state and federal agencies (USGS, AZGS, ADWR, etc.) to study and map fissure activity in critical or key areas of the community so that effective mitigation or avoidance strategies can be implemented.	• Planning and Development Services and Public Works • Staff • Ongoing	Ongoing	Keep	The only fissure area in the City of Scottsdale is near Taliesin West and Ancala. There is no active development activity in that area, nor is any anticipated. Moreover, starting quite a few years ago, we have a net zero groundwater budget in Scottsdale. What that means is that the amount of groundwater withdrawn in Scottsdale is, on average, replenished by a combination of infiltration of precipitation and injection of treated wastewater into the ground. Therefore, the water table in Scottsdale should be relatively stable over time, although it would be subject to regular fluctuations due to natural drought and wet cycles.
21	As a part of the Neighborhood Stormwater Management Improvements program, develop a community-wide, stormwater management plan that will analyze and identify problem flooding areas and propose long-term mitigation alternatives designed to reduce or eliminate the flood problems. The program will also identify and map flood hazards in areas expected to grow or develop in the foreseeable future.	• Planning and Development Services and Public Works • $200,000 • Ongoing 5-year CIP	In Progress	Keep	The Drainage and Flood Control Program Manager has developed a multi-year Stormwater Master Plan that has been proposed to city management. Additionally, the Drainage and Flood Control Program Manager has several projects outlined, with area maps, outlining potential problem areas and proposing mitigation measures to alleviate the threat. The Drainage and Flood Control Program Manager has also approved a scope and fee for an on-call stormwater engineering consultant to develop a CRS-compliant Floodplain Management Plan that will supplement the current Multi-Jurisdictional Hazard Mitigation Plan. A notice-to-proceed will be given as soon as Scottsdale City Council approves funding. The Drainage and Flood Control Program Manager has discussed financial participation in the development of a Floodplain Management Plan with FEMA, who is generally supportive of funding $75,000 toward the total cost of $100,000. The Drainage and Flood Control Program Manager will ask FEMA to budget and program its funding as soon as the Scottsdale City Council approves $25,000 of funding for its share.

Table 6-7-22: Surprise assessment of previous plan cycle mitigation actions/projects

ID	Description	• Lead Agency • Proposed Cost • Proposed Comp Date	Status	Disposition	Explanation
1	Reduce the impact of flooding in Section 10 (Martin Acres) area of City of Surprise. Construct a new conveyance channel from south of U.S. 60 to provide drainage away from Martin Acres.	• Public Works / City Engineer • $1,700,000 • September 2015	In Progress	Delete	The City Collaborated with the Flood Control District of Maricopa County to receive a SPAP grant to help with flooding mitigation in this area. In the design process, it became apparent that the scope and necessary budget was much larger than initially anticipated, therefore the project was put on hold until additional funding becomes available.
2	Reduce the risk of fires to communities within wildland-interface zones by participating in the development of a community wildfire protection plan.	• Fire Department / Administrative Chief • $150,000 • July 2020	In Progress	Keep	The city has previously looked into this, due to limited staffing nothing has been formalized. As staffing allows the FD will work with the city's EM to ensure all the urban interface needs are addressed.
3	Develop program and coordinate actions with FCDMC to access, mitigate, upgrade and redesign flood facilities.	• Public Works / City Engineer • Staff Time • Annually	In Progress	Revise	The city remains available to collaborate with FCDMC to upgrade or re-design existing flood facilities on as needed basis. There are currently no identified needs at the time.
4	Develop program that identifies bridge and culvert construction in flood susceptible areas	• Public Works / City Engineer • $250,000 • July 20 25	In Progress	Revise	FCDMC is in the process of updating the Whitman ADMP. This update will provided updated information as to where flooding issues may exist to help identify flood susceptible areas. The city is also in the process of creating a Transportation Development Impact Fee (DIF), where regional roadway needs are identified. Drainage infrastructure associated with these roadways will be included in the DIF. These two items will be key in the development of this bridge/culvert program.
5	Research and identify available funding sources for pre-disaster hazard mitigation actions and projects.	• Public Works / City Engineer Fire Department • Staff Time • Ongoing	In Progress	Keep	The city continues to search for and identify available funding sources for pre-disaster hazard mitigation actions and projects. Planning for these projects is incorporated into our annual CIP.

Table 6-7-22: Surprise assessment of previous plan cycle mitigation actions/projects

ID	Description	• Lead Agency • Proposed Cost • Proposed Comp Date	Status	Disposition	Explanation
6	Original Town Site Overall Drainage Master Plan	• Public Works / City Engineer • $250,000 • TBD	Complete	Delete	The Original Town Site Overall Drainage Master Plan was completed in the late 1990's. In 2019 the City hired a consultant firm to re-evaluate the flooding potential identified in the original master plan. The results of this plan incorporated updated drainage standards, revised rainfall factors, constructed draining improvements and historic flooding instances. The report concluded that the areas previously identified have a lower likelihood of flooding and the costs associated with the improvements are not in alignment with the expected benefits. The City will continue to monitor this area and incorporate our current drainage standards for development within the Original Town Site.
7	Participate in occasional table top exercises to identify potential mitigation measures for increasing response effectiveness, such as evacuation route marking and permanent protection measures for intended shelters.	• Fire Department / Administrative Chief • Staff Time • Annually / Ongoing	In Progress	Keep	These efforts are ongoing. The Surprise FD participates in almost all of the regional exercises that take place. The FD also hosted a tabletop and a full scale deployment exercise for the central region UASI groups that targeted mobilization, communication and deployment of resources and staff.
8	Ensure that City Staff, residences, businesses and visitors have access to the McMicken Dam Emergency Action Plan. This plan was prepared in December 2013 by the Flood Control District of Maricopa County. This plan is available on the City's website.	• Emergency Manger & City Engineer • City Marketing and Communications Department - PIO • Staff Time • Annually / Ongoing	In Progress	Keep	Since the creation of the last plan, the City of Surprise created an Emergency Manager position. This position will support the City Engineer to communicate this information with support from the City PIO..
9	Participate in the McMicken Dam Rehabilitation study and construction.	• Public Works / City Engineer • Staff Time • 2020	In Progress	Keep	City of Surprise staff remains available to provide review and input to FCDMC as needed for this project.

Table 6-7-22: Surprise assessment of previous plan cycle mitigation actions/projects

ID	Description	• Lead Agency • Proposed Cost • Proposed Comp Date	Status	Disposition	Explanation
10	Public education of water conservation best practices through newsletter, flyers, social media and website notices.	• Water Resource Management / Director • $25,000 • Ongoing	In Progress	Keep	This is an ongoing annual task accomplished by our Water Conservation Specialist. N/A
11	Develop a local Drought Management Plan to define various levels of conservation requirement that are based on drought severity triggers and integrate with the City of Surprise Integrated Water Master Plan identifies numerous action plans in the event that we have drought conditions.	• Water Resource Management / Director • $50,000 • Ongoing	Complete	Keep	This plan was completed in December of 2020. This plan is required to be updated every 5 years. N/A
12	Perform a public campaign at the onset of the extreme heat season to help educate the general public on ways to remain safe during periods of extreme heat.	• Fire Department / Administrative Chief • City Human Service and Community Vitality Department • City Manager's Office - Emergency Manager • City Marketing and Communications Department - PIO • Staff Time • Ongoing / Annually	In Progress	Keep	This is an ongoing mitigation effort. The FD partners with its regional partners to get the extreme heat messages out to the public. The FD also designates 2 water stations for members of the public to obtain water if they are unable to provide for themselves.

Table 6-7-22: Surprise assessment of previous plan cycle mitigation actions/projects

ID	Description	• Lead Agency • Proposed Cost • Proposed Comp Date	Status	Disposition	Explanation
13	Identify, stock, and communicate locations within the community that can serve as cooling stations during times of extreme heat.	• Fire Department / Administrative Chief • City Human Service and Community Vitality Department • City Manager's Office – Emergency Manager • City Marketing and Communications Department - PIO • $15,000 • Ongoing / Annually	In Progress	Keep	Surprise Fire Medical Department and the City Emergency Manager will partner with Surprise Human Service and Community Vitality Department to continue to identify the best locations to serve the largest populations of community members impacted by the heat. These locations are and will continue to be shared with the community through various methods of communication.
14	Review and update stormwater management plan that will analyze and identify problem flooding areas and propose long-term mitigation alternatives designed to reduce or eliminate the flood problems.	• Water Resource Management / Director • $50,000 • Ongoing / Annually	In Progress	Keep	The Water Department in coordination with the Public Works Department is continually studying regional and localized flooding issues and implementing solution in coordination with the Flood Control District.
15	Work with Flood Control District of Maricopa County to review, update, and/or augment flood control ordinances to provide a greater level of protection than the minimum required by the NFIP.	• Public Works / City Engineer • Staff Time • Ongoing / Annually	In Progress	Keep	The Engineering Department ensures the flood control ordinance is kept up to date and coordinates with FCDMC when updates are necessary. The FCDMC is the city's floodplain administrator.
16	Enforce City ordinances governing the improvements within a floodplain.	• Public Works / City Engineer & Building Official • Staff Time • Ongoing	In Progress	Keep	Code Enforcement (CE) unit enforces violations of all City Ordinances as they become aware of them. CE staff will continue to work with Public Works and other departments regarding this ongoing/continuing enforcement.
17	Review existing City owned buildings, evaluate any substandard construction issues and implement repair and upgrade plan to mitigate future wind damage.	• Public Works / City Engineer • Staff Time • Ongoing	In Progress	Keep	The city is currently in the RFQ process to select a consultant for the upcoming City-Wide Building Condition Assessment. The assessment is anticipated to be completed by 6-30-2021.

Table 6-7-22: Surprise assessment of previous plan cycle mitigation actions/projects

ID	Description	• Lead Agency • Proposed Cost • Proposed Comp Date	Status	Disposition	Explanation
18	Encourage homeowners to use tie-down straps and/or anchors to secure ancillary buildings and metal awnings or porches to mitigate the potential for flying debris during severe wind events.	• Community Development • Staff Time • Ongoing	In Progress	Keep	All buildings, ancillary buildings, awnings and porches require a permit. Through the permitting process, staff check to ensure the foundation/tie down mechanism/s meet the standards for lift during a severe weather event.
19	The City of Surprise will continue to inventory and monitor all of the known fissures within the current and future city boundary. These fissures will be surveyed on a regular basis to monitor for change. Areas with active fissures have been identified in the General Plan as regional, natural, open space areas for passive recreation.	• Public Works / City Engineer & Land Surveyor • Staff Time • Ongoing	In Progress	Keep	The City Survey Department continues to keep track of subsidence related issues on a regular basis.
20	Cooperate with the Flood Control District of Maricopa County in the monitoring of fissures and subsidence impacting McMicken Dam and coordinate in any required updates to the McMicken Dam Emergency Action plan, wherein the earth fissures and subsidence concerns are discussed in great detail.	• Public Works / City Engineer & Land Surveyor • Staff Time • Ongoing	In Progress	Keep	City of Surprise staff remains available to provide review and input to the FCDMC as needed for this project.
21	The City of Surprise will continue to monitor subsistence with the placement of benchmarks at all of the City owned well sites. Subsidence due to groundwater pumping will continue to be monitored on an annual basis.	• Public Works / City Engineer & Land Surveyor • Staff Time • Ongoing	In Progress	Keep	The City of Surprise continues to monitor subsidence with the placement of benchmarks at all of the City owned well sites. Subsidence due to groundwater pumping will continue to be monitored on an annual basis.
22	Facilitate appropriate wildfire fuel reduction through prioritization of hazardous fuel management areas (FMA) to assist land managers and fire departments in focusing future efforts towards the areas of highest concern from both an ecological and fuel management perspective.	• Fire Department / Administrative Chief • $25,000 • Annually	In Progress	Keep	This effort is ongoing. This project has been reviewed multiple times, and although the city has a relatively small fuel load, there are a few remaining areas that should be targeted for cleaning. This will require a project manager be assigned and will likely take multiple fiscal years to complete.

Table 6-7-22: Surprise assessment of previous plan cycle mitigation actions/projects

ID	Description	• Lead Agency • Proposed Cost • Proposed Comp Date	Status	Disposition	Explanation
23	Promote wildfire awareness and education in the community through the use of website, social media, and printed materials. Awareness combined with education helps to reduce the risk of accidental human ignitions.	• Fire Department / Administrative Chief • City Marketing and Communications Department - PIO • Staff Time • Annually	In Progress	Keep	This is an ongoing effort. The FD does utilize all the communications mediums listed in the description. In addition, the FD has posted a "Wildfire Danger" sign at one of our newest location to keep the public up to date on the current threats. The FD is also looking at future funding opportunities to purchase LED display boards to communicate with the public as well.
24	Enhance the capabilities of the fire departments by providing a foundation for pre-attack planning. Rapidly and easily accessing individual home pre-plans and district infrastructure adds efficiency and safety to fire department response and prescribed fire planning.	• Fire Department / Administrative Chief & Fire Marshal • Community Development Department • Staff Time • Annually	In Progress	Keep	This is an ongoing project the FD manages well. Recently the Fire Marshal instituted a new code (901.2.1 – Fire Pre-incident Plan) that requires a new building to provide a pre-fire plan layer in the plans that can be uploaded for first responders to utilize when an event happens at their location. This update will greatly enhance the quality of the plans available and also help the FD stay current with its building stock.

Table 6-7-23: Tempe assessment of previous plan cycle mitigation actions/projects

ID	Description	• Lead Agency • Proposed Cost • Proposed Comp Date	Status	Disposition	Explanation
1	Review building permits for compliance with Floodplain Ordinance and NFIP regulations.	• Community Development and Public Works Engineering / Deputy Director and Principal Civil Engineer • Staff Time • Ongoing	Ongoing	Keep	Staff is continuing to work together on this item, we are working with IT to get all permits flagged automatically for parcels in the SFHAs. AZDWR recently reviewed Tempe City Code as part of our FEMA Community Assistance Contact. Revisions will be going to City Council to align our Code with FEMA's latest direction.

Table 6-7-23: Tempe assessment of previous plan cycle mitigation actions/projects

ID	Description	• Lead Agency • Proposed Cost • Proposed Comp Date	Status	Disposition	Explanation
2	The City of Tempe Water Utilities Division has a comprehensive set of planning documents that outline future water systems operations, including specific drought contingency plans and water system operations during drought cycles. Planning documents include the 1997 Tempe Water Resources Plan (updated in 2002), the 1999 Tempe Integrated Water System Master Plan, and the 2002 Drought Management Strategy Plan. Tempe has implemented a number of measures from these plans to diversify the city's water resources and to lessen the impact of drought on our community. Tempe will continue to develop additional groundwater storage and recovery programs to significantly reduce potential drought impacts. These efforts include storing, CAP water and reclaimed water in aquifers for future recovery (over 85,000 acre-feet stored since the mid-1990s), and capital improvement projects to add new municipal wells and increase recovery well pumping capacity.	• Water Utilities Division / Water Resources Manager • Staff Time • Ongoing	In Process	Keep	• Working toward goal of increasing City owned well capacity to equivalent to average annual daily water demand (~43 MGD), current capacity is approximately 26 MGD (City owned), approximately 43 MGD with available SRP well capacity. • In the process of purchasing 1 new non-member land well. • In the process of re-drilling 1 well and converting the existing well into a potable water recharge well. • Plans for drilling 1 additional non-member land well. • In the process of drilling and equipping 1 new recharge well and plans for the addition of at least 1 additional recharge well at the Ken McDonald Golf Course. • Plans for restarting Kyrene Reclamation Facility by 2025 to increase recharge.
3	Maintain Emergency Management Plan	• Tempe Emergency Manager • Staff Time • Annual	Ongoing	Keep	As we have experienced a variety of real-life incidents here in Tempe, we have captured lessons learned and best practices in the development of our After-Action Reports/Improvement Plans. Tempe's Emergency Operation Plan (EOP) reflects the knowledge we have gained in response to these events. We consider the EOP a dynamic plan that will continue to capture and document lessons learned in future exercises and real-life emergencies.
4	Maintain Hazardous Materials Response Team and First Responder Training and conduct Fire Code Inspections on Occupancies with hazardous materials.	• Tempe Fire / Assistant Chief & Public Works Hazardous Waste Compliance Supervisor • Staff Time City Resources • Ongoing	Ongoing	Keep	With the ever-increasing utilization of chemicals, the extensive amount of high-tech research, and the educational and industrial activity in the City of Tempe, hazardous materials response continues to be one of Tempe's strategic priorities. In the years to come we plan to maintain minimum staffing at 75% for each hazmat company, continually evaluate the effectiveness of our program and evaluate new equipment to improve safety and maintain industry standards as set forth in the Special Operations Regional Operations and Consistency Committee.

Table 6-7-23: Tempe assessment of previous plan cycle mitigation actions/projects

ID	Description	• Lead Agency • Proposed Cost • Proposed Comp Date	Status	Disposition	Explanation
5	Work with the Flood Control District of Maricopa to maintain and monitor the levee protection along the Salt River.	• FCDMC with Tempe Public Works – Engineering / Principal Civil Engineer • Staff Time • Ongoing	Ongoing	Keep	We work in conjunction with the Flood Control District of Maricopa County in review and permitting of all new developments along the Salt River and Indian Bend Wash to maintain access and levee integrity. Quarterly Coordination meeting are held to discuss outstanding issues.
6	Miscellaneous Flood Control and Storm Drainage Projects to improve drainage and reduce flooding potential in various locations.	• Public Works – Engineering / Principal Civil Engineer • Staff Time • Ongoing	Ongoing	Keep	The City has completed a Storm Drain Management Study which outlines our highest priority CIP projects based on flood protection. The highest rank projects are and will continue to be programmed into Tempe's 5-Year and will be built and constructed as funding is available.
7	Maintain CERT Program	• Fire Department • 4000 • Ongoing	Ongoing	Keep	Currently revised the CERT Strategic Plan. The priority areas for 2020-2023 are as follows: ▪ Neighborhood Outreach, Education and Communication Strategy ▪ Collaboration with Partners ▪ Recruitment and Training ▪ Incident Response and Event Support ▪ Funding
8	Participate with outside agencies to distribute bottled water and provide education about hazards associated with extreme heat.	• Fire Department • 1000 • Ongoing	Ongoing	Keep	The City of Tempe opens Cooling Centers, distributes bottled water and provides education about extreme heat to community members. The City of Tempe is working closely with ASU to combine emergency management and the city's sustainability programs to align community resilience with preparedness for extreme heat events.
9	Seek funds for workshops and conferences, including National Incident Management System and Arizona Emergency Management Association Conferences.	• Fire Department • 3000 • Ongoing	Ongoing	Keep	Tempe's emergency management will continue to seek funds for workshops and conferences so that we can continually learn the latest in emergency preparedness, response and recovery efforts and collaborate with others in the field.

Table 6-7-23: Tempe assessment of previous plan cycle mitigation actions/projects

ID	Description	• Lead Agency • Proposed Cost • Proposed Comp Date	Status	Disposition	Explanation
10	Indian Bend Wash Levee Repairs – perform repairs identified during the last annual inspection on the levees bounding Indian Bend Wash to mitigate failure with the owner the FCDMC.	• Public Works – Engineering and Field Operations / Principal Civil Engineer and Parks Manager • Staff Time • Ongoing	Ongoing	Delete	The FCDMC recently completed projects along the IBW to correct inlet pipes (outfalls) as determined by the inspection provided by the Tempe identified below.
11	Stormwater Outfall Inspection –activities for both condition and capacity of outfall locations to regional waterways.	• Public Works – Engineering and Water / Principal Civil Engineer / Env. Compliance Supv. • $150,000 / Staff Time • Ongoing	Completed	Report provided to FCDMC per USACE requirements Delete	U.S. Army Corps of Engineers (USACE) periodically inspects structures in the Rehabilitation Program (RP) to ensure continued flooding protection. A Periodic Inspection Report (PIR) is created to document the results of the Corps work. The report identified the need for a condition assessment of the inlet pipes. This CA report was completed by the City of Tempe and the repair projects identified were completed as noted above.
12	Ongoing project work in cooperation with ADOT to identify and mitigate flooding related to freeway systems.	• Public Works - Engineering / Principal Civil Engineer • Unknown • Ongoing	Ongoing	Keep	This project has been on hold, but it is intended to be taken on within the 2021-2022-time frame.
13	Develop a water infrastructure master plan which discusses water resources and identifies vulnerabilities to long-term water supply. This plan will determine what additional water resources may be available (CAP / Reclaimed / Adjudication) to offset long-term shortage.	• Public Works – Water Utilities / Principal Engineer • $1,500,000 • Q1 2016	On-going	keep	A Master Plan was completed in 2016, funding is available to update the plan by 2025, as needed.
14	Replacement of Western Tempe Town Lake Dam. This allows for the city to reliably mitigate high flow events on the Salt River, including upstream dam failure, while maintaining long-term operational functionality of the Town Lake.	• PW / Engineering • $40,000,000 • 1Q 2016	Complete	Delete	The Replacement of the Western Tempe Town Lake Dame has been completed.
15	Develop dam inundation response plan for new Town Lake operations. Tempe is taking over operational responsibility for the Tempe Town Lake Dam and flow control structures from Salt River Project in CY 2016.	• Public Works – Engineering / Sr. Civil Engineer • Staff Time • 1Q 2016	Complete	Delete	The existing dam inundation response plan was reviewed and revised. This plan is reviewed on an annual basis. The City of Tempe has taken over responsibility for the Tempe Town Lake Dam and flow control structures.

Table 6-7-23: Tempe assessment of previous plan cycle mitigation actions/projects

ID	Description	• Lead Agency • Proposed Cost • Proposed Comp Date	Status	Disposition	Explanation
16	Continued maintenance of Tempe Town Lake dam and flow control structures per ADWR and other agency guidelines / best practices.	• Public Works – Engineering Sr. Civil Engineer • Unknown • 1Q 2016	On-going	Keep	Maintenance continues on the Tempe Town Lake dam and flow control structures.
17	Utilization of Tempe Social Media platforms to educate the general public about the hazards of extreme heat, including Facebook and Twitter releases, and updates to the city website.	• City Manager's Office / Public Information Officer • Staff time • Ongoing/Seasonal	On-going	Delete	Social Medical platforms are used to educate the general public on the hazards of extreme heat. This includes Facebook and Twitter releases as well as continued updates to the city website. As we have began to open Cooling Center in the City there have been information and locations provided to the public as well.
18	Maintain/Install backup generators at key critical facilities such as fire and police stations, water pumping stations, sewer lift stations, etc., to provide emergency power for critical operations during power failures caused by severe wind events.	• Public Works – Water Utilities / Plant Electrician • $1,500,000 • Ongoing	Complete	Delete	We have installed and maintain through quarterly PMs generators for key critical facilities. These facilities include: 525, Apache PD, City Hall, Fire Stations 1,2,3,4,6 & 7, Fleet North, Library, Main PD, PD Courts, South PD and TPAC
19	Provide continued maintenance and exercise of early warning sirens in select strategic locations as a part of a comprehensive emergency notification system to inform citizens of impending hazards such as dam failure, severe weather conditions, and severe wind events.	• PW / WU • $5K/yr • Yearly	On-going	Keep	There are warning sirens located in the Tempe Dam location that can be used and heard by the general public for 2 miles. There has been discussion on the potential to use this in the case of emergencies and this discussion will continue into the next year 2021.
20	Provide links to the Arizona Department of Water Resources website as a part of a public campaign to raise awareness to the hazards and locations of active subsidence.	• City Manager's Office / Public Information Officer • Staff Time • Q3 2015	Complete	Delete	The links have been provided and used for awareness and education to the public on the hazards and location of active subsidence.
21	Water Utilities Division will continue to operate municipal water wells to maintain compliance with ADWR Active Management Area requirements to mitigate drawdown related issues caused by over pumping of groundwater, including subsidence.	• Public Works – Water Utilities / Water Resources Manager • Staff time • Ongoing	Ongoing	Keep	This is an ongoing effort to reduce groundwater use for operational water quality needs. Additional water treatment plant process improvements are currently under construction and others are planned to minimize groundwater use and are expected to be in place by 2030.

Table 6-7-23: Tempe assessment of previous plan cycle mitigation actions/projects

ID	Description	• Lead Agency • Proposed Cost • Proposed Comp Date	Status	Disposition	Explanation
22	Enforce currently adopted building codes (2006 IBC) to mitigate damages due to severe wind events.	• Community Development / Deputy Community Development Director • Staff time • Ongoing – As Needed	Complete	Delete	Enforces the adopted building codes (2006 IBC) have become routine and will continue to be included and enforced in building codes for the City of Tempe.
23	Use website and social media sources to raise public awareness to the impacts of flood and severe winds associated with monsoon season.	• City Manager's Office / Public Information Officer • Staff time • Ongoing and Seasonal	Complete	Delete	This is a continued effort on a yearly basis to educate the general public on the impacts of flood and severe weather associated with monsoon season. It will continue to be done on an annual basis as a reminder during the season.

Table 6-7-24: Tolleson assessment of previous plan cycle mitigation actions/projects

ID	Description	• Lead Agency • Proposed Cost • Proposed Comp Date	Status	Disposition	Explanation
1	Review building permits for compliance with Floodplain Ordinance and NFIP regulations.	• City Engineer and Building Department • Staff Time • Ongoing	In Progress	Keep	Building permit review for compliance with the Floodplain Ordinance and NFIP regulations is an on-going task that will continue over the next 5 year cycle.
2	Install more storm drains and retention areas to reduce impact of flooding on the community. Goes along with new and better codes.	• City Engineer and Building Department • Unknown without estimates at the time • Ongoing	In Progress	Keep	Retention areas are required with all new developments within the community.
3	Provide sand and bags at different locations around the city for citizens to pick up and use to mitigate flooding damages.	• Field Operations • App. $100 per ton for sand and unknown for price of bags • Ongoing	In Progress	Keep	Sandbags provided for periods of expected rain at appropriate citywide locations and public notification is accomplished via social media.

Table 6-7-24: Tolleson assessment of previous plan cycle mitigation actions/projects

ID	Description	• Lead Agency • Proposed Cost • Proposed Comp Date	Status	Disposition	Explanation
4	Educate public officials on the need of the mitigation plan.	• Senior City Staff • Staff Time • Annually	In Progress	Keep	City Council is advised at time of adoption of the need for the Plan.
5	Continue to review plans and update codes and ordinances within the city limits.	• City Engineer and Building Department, Fire Department, Police Department • Staff Time • Ongoing	In Progress	Keep	Major review and adoption is completed every three years, with minor review and adoption completed on an as needed basis.
6	Conduct table top exercises that would involve a dam failure to measure the emergency response procedures.	• Emergency Manager • Staff Time • Annually	No Action	Remove	Tolleson is not vulnerable to Dam Failure and no mitigation is warranted.
7	Work with all agencies to provide disclosures to all buyers of real estate that would be affected by a dam failure.	• City Engineer and Building Department • N/A • Ongoing	No Action	Remove	Tolleson is not vulnerable to Dam Failure and no mitigation is warranted.
8	By using the local websites, mailers, social media and other forms of local communication, try to educate the public about water conservation.	• City Public Information Officer • Staff Time and minimal costs • Spring and Summer Periods	In Progress	Keep	Utilities Department provides water conservation information to customers through social media platforms and directly, through water bills.
9	Continue to work with the waste water department to use reclaimed water for multiple uses.	• Water / Wastewater Departments • Staff Time • Continuous	In Progress	Keep	City provides reclaimed water to the Palo Verde Nuclear Powerplant.
10	Provide water stations when needed for individuals during the extreme heat periods.	• All City Staff • Cost of bottled water and Staff Time • As Needed	In Progress	Keep	City continues to provide a water station at the Fire Department for individuals in need during periods of extreme heat.
11	Continue working with local school systems for relief areas if individuals were displaced due to the extreme heat.	• Senior City Staff, Emergency Manager • Staff Time • Annually	In Progress	Keep	The Tolleson High School is a designated emergency shelter.

Table 6-7-24: Tolleson assessment of previous plan cycle mitigation actions/projects

ID	Description	• Lead Agency • Proposed Cost • Proposed Comp Date	Status	Disposition	Explanation
12	Educate homeowners and businesses to tie down or not leave loose items around during severe wind periods.	• City Public Information Officer • Staff Time and possible publication costs • Periodic	In Progress	Keep	This is accomplished through the City's social media platforms.
13	Maintain the installed backup generators at the police and fire departments. Make sure new backup generators are in the plans for any new critical facilities.	• Field Operations Department • $10,000 per year plus Staff Time • Quarterly	In Progress	Keep	Monthly checks and annual maintenance are provided for the police and fire department generators. The new City Hall will have a backup generator.
14	Include addressing subsidence risk as a regular part of the land development and public works projects review and permitting.	• City Engineer and Building Department • Staff Time • Ongoing	In Progress	Keep	Accomplished during plan review process, as necessary.
15	Provide links to the AZ Department of Water Resources website as a part of a public campaign to raise the awareness to the hazards and locations of active subsidence. This will be done through all the local social media.	• City Public Information Officer • Staff Time • Ongoing	No Action	Keep	

Table 6-7-25: Unincorporated Maricopa County assessment of previous plan cycle mitigation actions/projects

ID	Description	• Lead Agency • Proposed Cost • Proposed Comp Date	Status	Disposition	Explanation

Table 6-7-25: Unincorporated Maricopa County assessment of previous plan cycle mitigation actions/projects

ID	Description	• Lead Agency • Proposed Cost • Proposed Comp Date	Status	Disposition	Explanation
1	Inspect and monitor all structures (bridges and box culverts) under their control on a semi-annual basis.	• MCDOT • $150,000 • Annual Ongoing	Ongoing	Keep	This is an ongoing process
2	Encourage bridge or culvert construction where roads are in locations susceptible to flooding.	• MCDOT • $7,000,000 • Annual Ongoing	Ongoing	Keep	This is an ongoing process
3	Review building permits to ensure that unincorporated Maricopa County residents are safe from flooding by meeting the NFIP requirements for development within a Special Flood Hazard Area through enforcement of Floodplain Regulations.	• FCDMC / Floodplain Administrator • Ongoing • Ongoing	On-going	Keep	This is a continuous and ongoing activity for the Flood Control District.
4	Develop a Community Wildfire Protection Plan to identify actions that will reduce the risk of wildfires to communities within wildland-urban interface zones.	• MCDEM • $150,000 • Ongoing / 5-year updates	Ongoing	Keep	The CWPP was last updated in 2020 and Maricopa County will continue to review and update its CWPP on a five year basis.
5	Complete and start Area Drainage Master Studies/Plans to identify flooding hazards, mitigation solutions and provide notice to interested parties.	• FCDMC / Chief Engineer & GM • Project-Dependent • Ongoing	On-going	Keep	This is a continuous and ongoing activity for the Flood Control District.
6	Complete and start delineations/re-delineations to identify flooding hazards and the means to share information.	• FCDMC / Chief Engineer & GM • Project – Dependent • Ongoing	On-going	Keep	This is a continuous and ongoing activity for the Flood Control District.

Table 6-7-25: Unincorporated Maricopa County assessment of previous plan cycle mitigation actions/projects

ID	Description	• Lead Agency • Proposed Cost • Proposed Comp Date	Status	Disposition	Explanation
7	Operate and maintain flood control structures operated and maintained by FCDMC in order to prevent structural failure and to maintain their primary function.	• FCDMC / Chief Engineer & GM • Project-Dependent • Ongoing	On-going	Keep	This is a continuous and ongoing activity. The Flood Control District recently implemented a major maintenance program to make repairs and updates to projects that can't be accomplished by the normal maintenance process.
8	Update the Flood Control District of Maricopa County 2009 Comprehensive Floodplain Management Plan and Program to set the framework in mitigating flood hazards.	• FCDMC / Chief Engineer & GM • Staff Time • 2015	On-going	Keep	The District updated the Comprehensive Report in 2015 (https://www.maricopa.gov/DocumentCenter/View/24742/Comprehensive-Report-and-Program---2015), the next update is scheduled to be adopted by the end of 2020. The Floodplain Management Plan for Unincorporated Maricopa County was updated in 2015, and the next update is scheduled to be adopted by the end of calendar year 2020 (https://www.maricopa.gov/5423/Floodplain-Management-Plan-2020-Update).
9	Sonoqui Wash Channelization (Main Branch). Channelize an existing wash to contain flood flows and protect existing homes.	• FCDMC / Chief Engineer & GM • $14 Million • Ongoing / Funding Dependent	Complete	Delete	The project has been completed and this no longer needs to be tracked. The last phase (IIIB) was completed in September 2016, and the Letter of Map Revision (LOMR) became effective August 11, 2017.
10	Oak Street Basin and Storm Drain. Construct a basin and storm drain to mitigate flooding hazards to existing and future homes.	• FCDMC / Chief Engineer & GM in partnership with City of Mesa • $4.5 Million • Ongoing / Funding Dependent	On-going	Keep	The Flood Control District is working on getting this project going and construction could start before the end of FY 2021.

Table 6-7-25: Unincorporated Maricopa County assessment of previous plan cycle mitigation actions/projects

ID	Description	• Lead Agency • Proposed Cost • Proposed Comp Date	Status	Disposition	Explanation
11	Flood Control Capital Improvement Program. Construct facilities to mitigate flooding hazards to residents of Maricopa County.	• FCDMC / Chief Engineer & GM • $80M-year • Ongoing	On-going	Keep	Between FY 21 and FY 25 the Flood Control District is scheduled to invest $400 million in CIP projects in unincorporated and incorporated areas of Maricopa County. Many of these projects will be done in cooperation with project partners.
12	Design and construct new bridge and scour protection at Gilbert Road over the Salt River.	• MCDOT • $43.95 million • June 2018	Ongoing	Keep	Construction start date December 2022
13	Floodprone Properties Assistance Program. Acquire property and relocate residents from flood hazard areas or protect homes from flooding hazards through floodproofing.	• FCDMC / Chief Engineer & GM • Project-Dependent • Ongoing	On-going	Keep	While this program isn't widely used, it does continue to be a potential alternative for reducing flood risks to individual homes. (https://www.maricopa.gov/550/Floodprone-Property-Assistance-Program)
14	Review existing building codes to determine if they adequately protect new development in hazard areas. Where feasible and necessary, modify codes to help mitigate hazards imposed on such development within the limits of state statutes, while also respecting private property rights.	• Planning and Development Department • Staff Time • Ongoing	On-going	Keep	Building codes are continually reviewed and updated via the Local Additions and Addenda where changes are needed.
15	Continue public education program to assist residents in recognizing potential flooding and erosion hazards and inform them on how to reduce risk to life and property.	• FCDMC / Chief Engineer & GM • Staff Time • Ongoing	On-going	Keep	As part of the CRS Program the Flood Control District sends an annual newsletter to properties in the SFHA and located in areas protected by a levee. Letters are send to areas that have been identified has Repetitive Loss Areas. The District also uses traditional media and social media to publicize flood awareness and safety messages.
16	Work with federal and state agencies, and local coalitions to elevate awareness of fissure risk zones and the problems fissures may cause.	• Planning and Development Department • Staff Time • Ongoing	On-going	Revise	This has not been implemented yet and in general this would be something more likely to be led by Emergency Management as opposed to P&D.

Table 6-7-25: Unincorporated Maricopa County assessment of previous plan cycle mitigation actions/projects

ID	Description	• Lead Agency • Proposed Cost • Proposed Comp Date	Status	Disposition	Explanation
17	Continue to operate and maintain a flood warning system to alert communities and the public to flooding events.	• FCDMC / Chief Engineer & GM • $1.5M-year • Ongoing	On-going	Keep	This is a continuous and ongoing activity for the Flood Control District. The information is share with other county agencies and communities. Many of the television and radio stations use the information in their reports.
18	Develop and maintain Flood Response Plans and Emergency Action Plans to identify actions to be taken at specific locations for certain conditions during flooding events.	• FCDMC / Chief Engineer & GM • $400K-year • Ongoing	On-going	Keep	The Flood Control will continue to develop and maintain EAPs and FRPs. Between 2016 and 2019 13 EAPs for dams were updated, completed EAPs for most of the levees, and 2 FRPs were updated.
19	Maintain participation in NFIP's Community Rating System to further inform and enhance public safety, protect the environment and reduce losses and damages to public and private property through continued outreach and various programs.	• FCDMC / Chief Engineer & GM • Staff Time • Ongoing	On-going	Keep	The Flood Control District will continue to participate in CRS.
20	Conduct public outreach to educate the residents about water conservation within the community via website, social media, mailers, and any other communication methods.	• MC Public Information Officer • Staff Time and minimal cost • Spring and Summer Periods	On-going	Revise	Maricopa County will continue its on-going public outreach education for drought.
21	Educate/advise subdivision developers about County subdivision regulations that outline and highlight the provisions for renewable water uses.	• MC Planning / Development • Staff Time • Continuous	On-going	Keep	Staff advise developers of subdivisions regulations throughout the entitlement process. ADWR is notified of submission documents so that they may comment on a proposal. Staff suggests that CAP water is utilized whenever available.

Table 6-7-25: Unincorporated Maricopa County assessment of previous plan cycle mitigation actions/projects

ID	Description	• Lead Agency • Proposed Cost • Proposed Comp Date	Status	Disposition	Explanation
22	Review county plans and procedures to open and operate cooling centers throughout the county.	• MC Emergency Management • Staff Time • Spring and Summer Periods	Completed	Delete	Completed
23	Work with Partners & Municipalities throughout the community to ensure resources are available.	• MC Emergency Management • Staff Time • Spring and Summer Periods	On-going	Keep	Will continue to work with community partners to ensure resources are available during extreme heat events.
24	Provide public education/outreach to County citizens by updating the County website to address subsidence & fissures.	• MC Planning / Development Emergency Management • Staff Time, Printing Cost (minimal) • Continuous	On-going	Keep	An online brochure about subsidence is present on the website at this link: https://www.maricopa.gov/5145/Other-Natural-Hazards.
25	Provide public education/outreach to developers by raising awareness to subsidence and fissure hazards during pre-construction and re-zoning permitting processes.	• MC Planning / Development Emergency Management • Staff Time, Printing Cost (minimal) • Continuous	On-going	Keep	Areas of potential subsidence have been identified and mapped by Maricopa County. This information is often available through Plan Net. When Staff are aware of potential subsidence, Staff will require geotechnical analysis work on the site as a part of the conditions of approval for any entitlement to be completed prior to being able to receive construction permits.

Table 6-7-26: Wickenburg assessment of previous plan cycle mitigation actions/projects

ID	Description	• Lead Agency • Proposed Cost • Proposed Comp Date	Status	Disposition	Explanation
1	Coordinate review of building permits for compliance with the Floodplain Ordinance and NFIP regulations with FCDMC.	• Planning department • NA • Ongoing	In Progress	Keep	This is an ongoing effort that will continue into the future as new developments occur.
2	Remove vegetation in washes that bisect streets within town limits to reduce wildfire hazard and improve stormwater conveyance capacities.	• Fire / Public Works • NA • Ongoing	In Progress	Keep	This is an ongoing effort that will continue into the future.
3	Scheduling local drainage clean out and inventory	• Public Works • NA • Ongoing	In Progress	Keep	Efforts are ongoing, typically before and after monsoon season, and will continue.
4	Review Flood Hazard mitigation plan, identify areas prone to flood in the heavy rain events	• Public Works / Fire / PD • NA • Ongoing	In Progress	Keep	Review is completed as needed to prepare for flooding events or to provide information to incoming personnel.
5	Fuel Reduction program COOP with BLM. Identify Hazard areas, set up work group days with BLM crews and WFD crews for fuels work in and around the Hassayampa River areas Highest prone to fire.	• Fire / BLM • NA • Ongoing	In Progress	Keep	Ongoing effort completed annually prior to fire season.
6	Wickenburg Ranch/Martinez Creek Flood Hazards. Work on new amendment to Flood Plan from Yavapai County regarding the new developed area around Martinez creek	• Planning / Building Department Emergency Mgmt • UNK • Depends on growth rate. NA	In Progress	Keep	As new phases of development come in, the Town is coordinating with Yavapai County to ensure that developments are safe from flooding.
7	Public education on the dangers of living in the southwest Arizona desert where extreme temperatures are common in the summer months	• Fire / EMS • N/A • Annual	In Progress	Keep	Continue outreach efforts through the Public Relations Office in coordination with the Fire Department.
8	Provide water via the station or duty engine to individuals that present symptoms of heat related illness	• Fire / EMS • NA • Daily	In Progress	Keep	Continue to provide water to the community during periods of extreme heat.
9	Review temporary structure permits for proper tie down and anchor methods.	• Planning Department • NA • Ongoing	In Progress	Keep	Continue to provide review of temporary structure permits to ensure proper tie down and anchor methods.

Table 6-7-26: Wickenburg assessment of previous plan cycle mitigation actions/projects

ID	Description	• Lead Agency • Proposed Cost • Proposed Comp Date	Status	Disposition	Explanation
10	Perform training and education for PW and PD crews regarding public safety actions that can be taken to mitigate the risk of damage and injury to the public on a pre-event, during, and post-event basis for severe wind storms.	• Fire and PW • Staff Time • Ongoing	In Progress	Keep	This is an ongoing effort undertaken as necessary to mitigate damage and injury caused by severe wind storms.
11	Review FHRP, in reference to Sunnycove and Cassandra Dam areas, on an annual basis to determine if adjustments are necessary due to changes in areas downstream of dams	• Fire / Emergency Operations • Staff Time • Ongoing	In Progress	Keep	In partnership with Maricopa County Flood Control District, continue to review to determine if adjustments are necessary.
12	Sols Wash survey and schedule work maintenance projects for brush clearing and inspection of existing bank protection measures.	• Public Works / Fire • UNK. Staff time • Ongoing	In Progress	Keep	Continue to inspect and maintain the wash as necessary.
13	Public outreach to areas impacted in heavy flood events thru community meetings to communicate the residual risk of areas protected by these structures	• Public Works / Emergency Mgt. • Staff time • Annual or as needed	In Progress	Revise	While public outreach to impacted areas will continue, the Town will provide this effort through Social Media Campaign and the Public Relations Office.
14	Work with ADOT on Hwy 93 bank protection maintenance to ensure maintenance clearing of primary vegetation is being done on a regular basis	• Public Works • Staff time • As needed	In Progress	Keep	Ongoing effort to ensure bank protection is maintained.
15	Perform public education of water conservation best practices through newsletter, flyers, social media and website notices.	• Water and Wastewater Dept • Staff time • Annual	In Progress	Keep	Ongoing effort that will be emphasized through the Public Relations Office.
16	Encourage and incentivize the use of drought resistant landscaping through ordinance development and/or enforcement.	• Water and Wastewater Dept • Staff time • 2020	Complete	Delete	Town Code 14-19 was created in 2020 to include landscape irrigation and vegetation requirement for residential and commercial new construction.

Table 6-7-27: Youngtown assessment of previous plan cycle mitigation actions/projects

ID	Description	• Lead Agency • Proposed Cost • Proposed Comp Date	Status	Disposition	Explanation
1	Review building permits for compliance with Floodplain Ordinance and NFIP regulations through ongoing coordination with FCDMC and compliance with current floodplain ordinance.	• Public Works Dept / Building Inspector • Staff Time • Ongoing	In Progress	Keep	All building permits are reviewed for compliance with NFIP regulations. Town coordinates with FCDMC to ensure compliance with floodplain ordinance.
2	Encourage the use of weather radios, especially in schools, rest homes, convalescent homes, retirement centers and other locations where people congregate to inform them of the approach of severe weather.	• Emergency Services Manager / Town Webmaster • Staff Time • Ongoing	In Progress	Keep	Weather Stations, manned by local volunteers, have been located within the Town campus.
3	Provide town leadership role in support of efforts to limit development in the departure and approach corridors for Luke Air Force base.	• Mayor / Town Manager / Public Works Manager / Town Management • Staff Time • Ongoing	In Progress	Keep	All building permits are reviewed for compliance within the Luke Air Force flight zone.
4	Promote the availability of hazard mitigation information from county webpage by providing a notice of the Maricopa County Hazard Mitigation Plan posted on town's website with link back to Maricopa County Emergency Management for additional information.	• Emergency Services Manager / Town Webmaster • Staff Time • Ongoing	In Progress	Keep	Town provide information regarding the HMP and links to County Emergency Management on their site.
5	Participate/ conduct occasional table top exercises to identify potential mitigation measures for increasing response effectiveness, such as evacuation route marking and permanent protection measures for indented shelters.	• Public Works Department / Maricopa County • Staff Time • Ongoing	In Progress	Keep	Conducted table-top exercise with Fire, Public Works, and County to discuss best practices in the event of an incident at the battery storage facility.
6	Provide public education of water conservation best practices through newsletter, flyers, social media and website notices.	• Public Works Department in collaboration with EPCOR Water • Staff Time • Ongoing	In Progress	Keep	Provide water conservation information on best practices via Town website and local newspaper.

Table 6-7-27: Youngtown assessment of previous plan cycle mitigation actions/projects

ID	Description	• Lead Agency • Proposed Cost • Proposed Comp Date	Status	Disposition	Explanation
7	Perform a public information campaign at the onset of the extreme heat season to help educate the general public on ways to remain safe during periods of extreme heat.	• Public Safety Department in collaboration with the Salvation Army • Staff Time • Ongoing	In Progress	Keep	Provide public information through the Town website at the onset of extreme heat season.
8	Develop a community-wide, storm water management plan that will analyze and identify problem flooding areas and propose long-term mitigation alternatives designed to reduce or eliminate the flood problems.	• Public Works Department, ADEQ & FCDMC • Staff Time • Ongoing	In Progress	Keep	The Public Works Director has developed a storm water management plan which has been approved by ADEQ.
9	Maintain/install backup generators at key critical facilities such as fire and police stations, water pumping stations, sewer lift stations, etc., to provide emergency power for critical operations during power failures caused by severe wind events.	• Public Works Department / APS • Staff Time • Ongoing	In Progress	Keep	Backup generators installed at Life Stream Elderly Care Facility, & Public Works Facility, and Emergency Operation Command Center. Backup generators are maintained biannually by Public Works Department.
10	Provide links to the Arizona Department of Water Resources website as part of a public campaign to raise awareness to the hazards and locations of active subsidence.	• Public Works Department and Arizona Department of Water Resources • Staff Time • Ongoing	In Progress	Keep	Link is provided on Town website.
11	Develop and/or enforce a weed abatement ordinance. Conduct fire safety education programs in local public schools. Enact and enforce burn and fireworks bans as needed during extraordinarily dry and extreme wildfire conditions & seasons to mitigate possible, unintended wildfire starts. Perform, or encourage the performance of routine, roadside vegetation control to mitigate wildfire starts within the right of way areas along roadways and highways.	• Public Works Department, Code Enforcement, Sun City Fire District • Staff Time • Ongoing	In Progress	Keep	Coordinated with the Codes Enforcement, Fire and Medical Departments. The weed abatement ordinance was adopted in 2012, updated 2018 model codes to be adopted June 2021.
12	Annually coordinate with Federal, State, and local dam owners to get updates on any changes in dam safety conditions and emergency action plan information	• Public Safety / Emergency Services Manager • Staff Time • Annually	In Progress	Keep	Public Works department coordinates annually with Federal, State and local dam owners.

Table 6-7-27: Youngtown assessment of previous plan cycle mitigation actions/projects

ID	Description	• Lead Agency • Proposed Cost • Proposed Comp Date	Status	Disposition	Explanation
13	Work with state and Federal agencies to provide disclosure information to all potential buyers of real estate that are located within the dam failure or emergency spillway inundation limits of an upstream dam or dams.	• Public Safety / Emergency Services Manager • Staff Time • Ongoing	In Progress	Keep	

Appendix C

Public Involvement Records

Appendix C files are housed and stored at the Maricopa County Department of Emergency Services and can be obtained upon request by contacting:

Rudy Perez
Phone: 602.273.1411
Email: Rudy.Perez@Maricopa.gov

Appendix D

Detailed Historic Hazard Records

Appendix D files are housed and stored at the Maricopa County Department of Emergency Services and can be obtained upon request by contacting:

Rudy Perez
Phone: 602.273.1411
Email: Rudy.Perez@Maricopa.gov

Appendix E

Plan Maintenance Review Reports