



COUNTY OF COCONINO
MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN (MJHMP) 2021

DRAFT v5.0
Last updated: April 2021

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Section 1: Hazard Mitigation Program and Requirements

Coconino County (County) alongside the cities/towns of Flagstaff, Fredonia, Page, Tusayan, and Williams (Planning Team) have prepared the 2021 Multi-Jurisdiction Hazard Mitigation Plan (MJHMP) to assess the natural and human caused risks to the planning area so as to reduce the potential impact of the hazards by creating mitigation strategies. The 2021 MJHMP represents all the jurisdictions' commitment to create safer, more resilient communities by taking actions to reduce risk and by committing resources to lessen the effects of hazards on people and property.

This plan complies with the Federal Disaster Mitigation Act (2000), Federal Register 44 CFR Parts 201 and 206, which modified the Robert T. Stafford Disaster Relief and Emergency Assistance Act by adding a new section, 322 - Mitigation Planning. This law, as of November 1, 2004, requires local governments to develop and submit hazard mitigation plans as a condition of receiving Hazard Mitigation Grant Program (HMGP) and other mitigation project grants. The Planning Group has coordinated preparation of the MJHMP in cooperation with the State of Arizona, other jurisdictions, the County's and city/towns' departments, community stakeholders, partner agencies, and members of the public.

This section of the MJHMP provides a brief description of hazard mitigation planning, local mitigation plan requirements, and an outline of the 2021 MJHMP. There is also an overview of Federal Emergency Management Agency (FEMA) programs and grants related to hazard mitigation.

1.1 Hazard Mitigation Planning

Hazard mitigation is any sustained action taken to reduce or eliminate the long-term risk to human life and property from hazards. In general, hazard mitigation is work done to minimize the impact of a hazard event before it occurs, with the goal of reducing losses from future disasters. 44 CFR § 201.1(b) describes the purpose of mitigation planning is for local governments to identify the hazards that impact them, to identify actions and activities to reduce losses from those hazards, and to establish a coordinated process to implement the plan, taking advantage of a wide range of resources. For the Planning Team, hazard mitigation planning is a process that will:

- Identify and profile hazards that affect the planning area;
- Analyze the population and facilities at risk from those hazards;
- Develop mitigation strategies and actions to lessen or reduce impact of profiled hazards;
- Implement the strategy and actions that may involve planning, policy changes, programs, projects, and other activities.

The Planning Team's implementation of mitigation actions, which may be short-term or long-term strategies, is the primary objective of the planning process. This type of planning will supplement the other comprehensive planning and emergency management programs.

1.2 Local Mitigation Planning Requirements

Hazard mitigation planning is governed by the Stafford Act, as amended by the Disaster Mitigation Act of 2000 (DMA 2000), and by federal regulations implementing the Stafford Act. DMA 2000 revised the Stafford Act to require state, local, and tribal governments to develop and submit to FEMA a mitigation plan that outlines processes for identifying the natural hazards, risks, and vulnerabilities of the jurisdiction. Plan approval by FEMA is a prerequisite to receiving federal hazard mitigation grant funds (see 42 USC § 5165(a)).

To implement the mitigation planning requirements of the Stafford Act, FEMA promulgated 44 CFR Part 201, the federal regulations governing the planning process, plan content, and the process for obtaining approval of the plan from FEMA. The planning requirements set forth in the CFR are identified throughout this plan mirroring the order of the FEMA Regulation Checklist in the Local Mitigation Plan Review Tool.

FEMA has produced a *Local Mitigation Plan Review Tool*, which has been tailored by FEMA Region IX as an appendix to the *Local Mitigation Planning Handbook (2013)*, to demonstrate how the mitigation plan meets the regulation in 44 CFR § 201.6 and offers State and FEMA Mitigation Planners an opportunity to provide feedback to the jurisdiction. The Plan Review Tool has a regulation checklist that provides a summary of FEMA’s evaluation of whether the plan has addressed all requirements. Local planners can also use the checklist prior to submitting the plan for approval to ensure they have addressed all the requirements. The Local Mitigation Plan Review Tool Regulation Checklist is provided in **Appendix A** of this document.

1.3 Hazard Mitigation Plan Description

The 2021 MJHMP consists of the sections and appendices described below:

Table 1-1: Plan Sections, Appendices, and Descriptions

<p>Section 1: Hazard Mitigation Program and Requirements</p>	<p>Includes background on hazard mitigation planning, lists the MJHMP planning requirements, provides a description of the plan, and discusses grants related to hazard mitigation.</p>
<p>Section 2: Introduction and Planning Process</p>	<p>Introduces the update to the MJHMP and describes the planning process for the 2021 MJHMP, including an overview of how the MJHMP was prepared, identification of the MJHMP Planning Team, involvement of outside agencies and communities, the inclusion of related plans, reports and information, and stakeholder and public outreach activities.</p>
<p>Section 3: Planning Area Description</p>	<p>Includes a description of the natural and built out state of the Planning Team, including climate, geography, demographics, and economic conditions.</p>
<p>Section 4: Capability Assessment</p>	<p>Identifies and evaluates the resources available to participating jurisdictions for hazard mitigation in the County.</p>
<p>Section 5: Hazard Analysis and Risk Assessment</p>	<p>Provides a list of the hazards identified in the 2021 MJHMP, a profile of each hazard and hazard summary, and a risk assessment of the planning area.</p>
<p>Section 6: Mitigation Strategy</p>	<p>Identifies and evaluates the current, ongoing, and completed mitigation projects and programs of the participating jurisdictions and lists their mitigation strategies for reducing potential losses.</p>
<p>Section 7: Plan Maintenance Procedures</p>	<p>Describes procedures for updating the MJHMP to keep it current and for continuance of public engagement in the planning process.</p>

Section 8: Plan Approval and Adoption	Includes documentation of AZ DEMA and FEMA review process and documentation of MJHMP adoption by the elected leadership of each participating jurisdiction.
Appendix A	Contains the FEMA Local Mitigation Plan Review Tool, which documents compliance with the MJHMP planning requirements of 44 CFR Part 201.
Appendix B	Contains documentation of the planning process for the Planning Team, including meetings, presentations, emails, etc.
Appendix C	Contains documentation of the planning process including meetings, presentations held for the stakeholders and public, and other stakeholder/public outreach efforts.
Appendix C	Lists acronyms and abbreviations used in the 2021 MJHMP.

1.4 Grant Programs with Mitigation Plan Requirements

Currently, four FEMA grant programs provide funding to local entities that have a FEMA-approved local mitigation plan that meets federal hazard mitigation plan requirements. Two of the grant programs are authorized under the Stafford Act. The remaining two programs are authorized under the National Flood Insurance Act and the Bunning-Bereuter-Blumenauer Flood Insurance Reform Act.

1.4.1 Stafford Act Grant Programs

Funding is provided to state, local, and tribal governments that have an approved MJHMP through the following programs.

Hazard Mitigation Grant Program (HMGP)

The HMGP provides grants to implement long-term hazard mitigation measures after declaration of a major disaster. Its purpose is to reduce the loss of life and property due to natural disasters and to enable mitigation measures to be implemented during the immediate recovery from a disaster. To qualify for HMGP funding, projects must provide a long-term solution to a problem and the project's potential savings must exceed the cost of implementing the project.

HMGP Funds may be used to protect either public or private property or to purchase property that has been subjected to, or is in danger of, repetitive damage. The amount of funding available for the HMGP under a particular disaster declaration is limited. Under the program, the federal government may provide a state or tribe with up to 20% of the total disaster grants awarded by FEMA and may provide up to 75% of the cost of projects approved under the program.

The Building Resilient Infrastructure and Communities (BRIC) Program

The new BRIC grant program is for pre-disaster mitigation activities and replaces FEMA's existing Pre-Disaster Mitigation program. The BRIC priorities are to:

- Incentivize public infrastructure projects;
- Incentivize projects that mitigate risk to one or more lifelines;
- Incentivize projects that incorporate nature-based solution;
- Incentivize the adoptions and enforcement of modern building codes.

BRIC will support states, local communities, tribes, and territories as they undertake hazard mitigation projects, reducing the risks they face from disasters and natural hazards. The BRIC program guiding principles are supporting communities through capability and capacity-building, encouraging and enabling innovation, promoting partnerships, enabling large projects, maintaining flexibility, and providing consistency. The federal government provides up to 75% of the cost of projects approved under the program.

1.4.2 National Flood Insurance Act Grant Programs

Flood Mitigation Assistance Program

The goal of the Flood Mitigation Assistance (FMA) Grant Program is to reduce or eliminate flood insurance claims under the National Flood Insurance Program (NFIP). This program emphasizes mitigating repetitive loss (RL) properties. The primary source of funding for the FMA program is the National Flood Insurance Fund. Grant funding is available for planning, project, and technical assistance. Project grants are awarded to local entities to apply mitigation measures to reduce flood losses to properties insured under the NFIP. In FY 2014, FMA funding totaled \$89 million. The cost-share for this grant is 75% federal and 25% nonfederal. However, a cost-share of 90% federal and 10% nonfederal is available in certain situations to mitigate severe repetitive loss (SRL) properties.

Repetitive Flood Claims Program

The Repetitive Flood Claims (RFC) Program provides funding to reduce or eliminate the long-term risk of flood damage to residential and non-residential structures insured under the NFIP. Structures considered for mitigation must have had one or more claim payments for flood damages. All RFC grants are eligible for up to 100% federal assistance.

Section 2: Introduction and Planning Process

The requirements for documentation of the MJHMP planning process are described below. This section summarizes the Planning Team's hazard mitigation planning efforts in 2020-2021. In addition, the section describes public and stakeholder outreach efforts as part of the MJHMP planning process. The section also summarizes the review and incorporation of existing plans, studies, and reports used to develop the MJHMP. Documentation of the 2021 MJHMP planning process for the Planning Team is provided in Appendix B and documentation of the planning process for the public and stakeholders is found in Appendix C. These appendices document the planning meetings and outreach, and include meeting agendas, presentation, materials, and other documentation used to conduct the planning process.

FEMA REGULATION CHECKLIST: PLANNING PROCESS

Documentation of the Planning Process

44 CFR § 201.6(c)(1): The plan shall include 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.

Elements

- A1.** Does the Plan document the planning process, including how it was prepared and who was involved in the process for each jurisdiction? 44 CFR § 201.6(c)(1).
- A2.** Does the Plan document an opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, agencies that have the authority to regulate development as well as other interests to be involved in the planning process? 44 CFR 201.6(b)(2)
- A3.** Does the Plan document how the public was involved in the planning process during the drafting stage? 44 CFR 201.6(b)(1) and 201.6(c)(1)
- A4.** Does the Plan document the review and incorporation of existing plans, studies, reports, and technical information? 44 CFR 201.6(b)(3)

Source: FEMA, *Local Mitigation Planning Handbook Review Tool*, March 2013.

The planning process began with the Planning Team establishing the planning area and inviting stakeholders within the area to participate in the process. In addition, the Planning Team identified the financial and technical resources required to update the MJHMP. Once all the Planning Team's financial and technical resources were identified, the Planning Team established a schedule for the process.

2.1 Plan History

This version of the MJHMP is an update to the 2015 MJHMP. It contains the updated status of previous mitigation activities plus the new mitigation actions identified by each of the six participating jurisdictions, includes new capabilities, and updates the risk assessment and vulnerability analysis. This effort updated the 2015 plan and added a "Pandemic" hazard.

Note the following: The County will list the original nine hazards from the 2015 MJHMP. These include Dam Failure, Drought, Earthquake, Flood, Hazardous Materials Incidents, Severe Wind, Transportation Accidents, Wildland Fire, and Winter Storm. In light of the current and very impactful COVID-19 pandemic, the County has added the additional hazard of Public Health related incidents inclusive of "Pandemic," bringing the primary County identified hazards to a total of ten.

The additional hazards of Aviation Accident, Climate Change, Extended Power Outage, Excessive Heat, and Terrorism were identified by the remaining five participating jurisdictions of Flagstaff, Page, Williams, Tusayan, and Fredonia as their unique nature of location and

circumstances lends necessity to consider these additional hazards and the impact to their individual jurisdictions.

These additional hazards ARE NOT considered part of this Plan for the formal hazard mitigation review process. The County wishes to acknowledge these hazards that the five other participating jurisdictions have identified. However, the County realizes they are mostly manmade and therefore not eligible for mitigation funding.

2.2 Plan Background, Purpose and Authority

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

Hazard mitigation is defined by FEMA as “any sustained action taken to reduce or eliminate long-term risk to human life and property from a hazard event.” A 2019 cost-benefit analysis on hazard mitigation, the most in-depth available to date, concluded that adopting the latest building code requirements is affordable and saves \$11 per \$1 invested, above-code design could save \$4 per \$1 cost, private-sector building retrofit projects could save \$4 per \$1 cost, lifeline retrofit saves \$4 per \$1 cost, and Federal grants save \$6 per \$1 cost. The findings provide evidence that mitigation activities are highly cost-effective, in addition to saving lives and preventing injuries.¹

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

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

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

This MJHMP was prepared pursuant to the requirements of the Disaster Mitigation Act of 2000 and the implementing regulations set forth in the Federal Register (hereafter, these requirements will be referred to

¹ National Institute of Building Science Multi-Hazard Mitigation Council, 2019, Natural Hazard Mitigation Saves: 2019 Report

collectively as the DMA 2000). While the act emphasized the need for mitigation plans and more coordinated mitigation planning and implementation efforts, the regulations established the requirements that hazard mitigation plans must meet in order to be eligible for certain Federal disaster assistance and hazard mitigation funding under the Robert T. Stafford Disaster Relief and Emergency Act.

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

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

- Coconino County;
- Flagstaff;
- Fredonia;
- Page;
- Tusayan;
- Williams.

2.3 Planning Process Description

In September 2020, the planning process for the 2021 MJHMP began. Select staff from the Planning Group were invited to participate on the MJHMP Planning Team for the purpose of developing the 2021 MJHMP in addition to representation from AZ DEMA. A solicitation was also sent to other interested agencies through an email sent by the County. During the plan review phase, feedback was requested from adjacent counties via email. See **Appendix B** for documentation of this engagement.

2.4 Planning Team

The role of the Planning Team was to perform the review, coordination, research, and planning element activities required to update the 2015 MJHMP. Attendance by each participating jurisdiction was required at the Planning Team meetings as they were structured to progress through the planning process. Steps and procedures for updating the MJHMP were presented and discussed at each Planning Team meeting, and assignments for data collection were provided. Each meeting built on information discussed and assignments given at the previous meeting. Members of the Planning Team also had the responsibility of:

- Providing supporting data;
- Conveying information and assignments received at the Planning Team meetings to other involved parties within their respective jurisdictions such as those involved in public engagement;
- Ensuring that requested assignments were completed and returned on a timely basis;
- Reviewing the draft MJHMP;
- Coordinating official adoption of the MJHMP.

Prior to the planning process, the County identified members for the Planning Team by initiating contact with as much of the previous Planning Team as possible. Others invited included Arizona Department of Emergency and Military Affairs (DEMA), state universities, Arizona Geological Survey, National Weather Service (NWS), and community groups. Contact was made by sending invitations to participate on the Planning Team via email and via personal contacts. The invitation explained the importance of the Plan to build resilience and make communities safer.

Prior to the beginning of the plan update process, DEMA delivered a presentation that provided a full review of the current MJHMP and detailed the update process. The target audience was the agencies/individuals invited to participate on the Planning Team. The purpose was to provide an understanding of the Plan, explain its purpose and its benefits, as well as to provide detailed and realistic expectations of the Plan update process.

Members of the MJHMP Planning Team are listed in **Table 2-1**, below. To ensure manageable meeting sizes, each jurisdiction sent a limited number of representatives to MJHMP Planning Team meetings. The remainder supported the planning process through the data collection and informal planning efforts of their given jurisdiction.

Table 2-1: MJHMP Planning Team Members

Jurisdiction	Organization	Name	Key Role
Federal	National Weather Service	Brian Klimowski	Provided information on meteorological hazards and climate change.
Federal	National Weather Service	Tony Merriman	Provided information on meteorological hazards and climate change.
Arizona	Arizona Department of Emergency and Military Affairs	Daren Sweet	Provided guidance/assistance in plan update and meeting requirements.
Arizona	Arizona Department of Emergency and Military Affairs	Dustin Kirk	Represented DEMA from the state's perspective.
Arizona	Arizona Department of Emergency and Military Affairs	Sue Austin	Provided guidance/assistance in plan update and meeting requirements.
Arizona	Arizona State University	Nancy Selover	Provided information on meteorological hazards and climate change.
Bellemont	Camp Navajo	Anthony Brutto	Provided guidance and input from a regional perspective as it pertains to Camp Navajo and regional response.
Flagstaff	Emergency Management	Jerry Bills	Provided guidance and input on jurisdiction's emergency management priorities, hazards, challenges, stakeholders, and resources
Flagstaff	Conference and Planning	Sara Dechter	Provided guidance on planning and development.
Flagstaff	Engineering Section	Rick Barrett	Provided input on capability assessment. Provided guidance on capital projects funding and execution.
Flagstaff	Fire Department	Mark Gaillard	Provided jurisdiction specific information.
Flagstaff	Fire Department	Paul Oltrogge	Provided guidance on wildland fire and mitigation efforts.
Flagstaff	Grants and Contracts	Stacey Brechler-Knaggs	Planning Team participant.

Jurisdiction	Organization	Name	Key Role
Flagstaff	Police Department	Lt. Frank Higgins	Provided jurisdiction specific information.
Flagstaff	Sustainability Management	Nicole Antonopoulos	Planning Team participant.
Flagstaff	Utilities Division	Ed Schenk	Provided input on capability assessment. Provided guidance on stormwater related information.
Flagstaff	Utilities Division	Monica Rabb	Provided input on capability assessment. Provided guidance on stormwater related information.
Flagstaff	Water Services	Mark Richardson	Provided jurisdiction specific information.
Page	Fire Department	Erin Harris	Provided jurisdiction specific information.
Page	Fire Department	Jeff Reed	Provided jurisdiction specific information.
Page	Police Department	Lt. Tim Lange	Provided jurisdiction specific information.
Page	Police Department	Sgt. Cody Miller	Provided jurisdiction specific information.
Page	Public Works	Kyle Christiansen	Provided input and information on the city's hazards.
Page	Water Resources Department	Matt Wood	Provided guidance and information related to flooding.
Williams	Emergency Services, Police Department	Theresa Johnson	Provided jurisdiction specific information.
Williams	Police Department	Lt. John Romero	Provided jurisdiction specific information.
Williams	Public Works	Tim Pettit	Provided jurisdiction specific information.
Coconino County	Community Development	JD Brice	Provided flood related information.
Coconino County	County GIS	Helen Costello	Provided mapping/planning capabilities.
Coconino County	County GIS	Scott Carey	Provided mapping/planning capabilities.
Coconino County	County Manager's Office	Lucinda Andreani	Planning Team participant.
Coconino County	Community Development	Adam Hicks	Planning Team participant.
Coconino County	Emergency Management Department	Mark Christian	Coordinated the collection of updated data/info from jurisdictions.
Coconino County	Emergency Management Department	Wes Dison	Provided County specific information.

Jurisdiction	Organization	Name	Key Role
Coconino County	Emergency Management Department	Tim Carter	Provided County specific information.
Coconino County	Engineering Department	Christopher Tressler	Planning Team participant.
Coconino County	Engineering Department	Nick Hall	Provided hazard relation information.
Coconino County	Health and Human Services	Ben Wilson	Provided County HHS specific information.
Coconino County	Health and Human Services	Blake Scott	Provided County HHS specific information.
Coconino County	Public Works	Sam Beckett	Provided jurisdiction specific information.
Coconino County	Sheriff's Office	Brett Axlund	Provided County regional information.
Coconino County	Sheriff's Office	Gerritt Boeck	Provided County regional information.
Private / Coconino County	Northern Arizona University (NAU)	Robert Church	NAU Emergency Manager; provided NAU specific information and planning capabilities.
Ponderosa Fire District	Fire Department	Kent Ofstie	Provided wildland fire related information/data.
Ponderosa Fire District	Fire Department	Lee Antonides	Provided wildland fire related information/data.
Summit Fire District	Fire Department	Jerry Bills	Provided jurisdiction specific information and coordination.
Fredonia	Fire Department	Don Johnson	Provided assistance in identifying mitigation activities for the town's community hazards.
Fredonia	Town Manager's Office	Bayden Grover	Town Manager; provided jurisdiction information.
Tusayan	Fire Department	Greg Brush	Provided input on the community's data/information for plan.
Tusayan	Town Manager's Office	Charlie Hendrix	Provided jurisdiction specific information.

2.4.1 Planning Team Activities

Four meetings were held with the Planning Team. Representatives from the County and cities/towns shared the responsibility of chairing the Planning Team. The Coconino County Emergency Management Department also copied documents for review and sent out meeting notices. **Table 2-2** lists milestone Planning Team activities. A full description of Planning Team activities with documentation is contained in **Appendix B**.

Table 2-2: Planning Activities

Date	Activity/Meeting	Purpose
Sep 4, 2020	MJHMP Planning Team Kickoff Meeting	Introduction of Planning Team members, discussion of update process, and review of critical tasks necessary for the planning effort.
Nov 19, 2020	MJHMP Planning Team Meeting #1	Review project management plan, align expectations, review potential hazards and select those that pose risks, distribute data collection tools.
Dec 15, 2020	MJHMP Planning Team Meeting #2	Review prior mitigation action status, develop mitigation goals, and generate new mitigation actions.
Jan 12, 2021	Coconino County Mitigation Action Planning Meeting	Focused planning meeting to review County's prior mitigation actions and detail new mitigation actions for inclusion in the plan.
Jan 22, 2021	MJHMP Planning Team Meeting #3	Review of outstanding information requirements, plan review and approval processes, and steps for finalizing the draft plan.

2.4.2 Other Jurisdictions Agency / Organizational Participation

Multiple additional organizations were engaged as part of the planning process, with several participating in Planning Team meetings. They were invited by emails sent via an MS Outlook calendar invitation to the meetings. **Appendix B**, Planning Team meetings notes, documents their engagement. **Table 2-3** includes a list of the organizations and attendees.

Copies of the draft MJHMP were provided to the Planning Team, AZ DEMA, regional utilities, and neighboring counties/jurisdictions for review, as documented in **Appendix C**. The organizations and jurisdictions engaged outside of the Planning Team in this review process are also listed in **Table 2-3**.

Table 2-3: Other Organization/Jurisdictional Participants

Organization	Staff	Engagement
JE Fuller	Joe Loverich	Planning Team Invitee/Participant
Arizona State University	Nancy Selover	Planning Team Invitee/Participant
Camp Navajo	Anthony Brutto	Planning Team Invitee/Participant
Navajo County	Catrina Jenkins	Draft MJHMP Review
Yavapai County, AZ	Randolph Clark	Draft MJHMP Review
Yavapai County, AZ	R.C. Helton	Draft MJHMP Review
Mohave County, AZ	Mike Browning	Draft MJHMP Review
Gila County, AZ	Michael O'Driscoll	Draft MJHMP Review
Kane County, UT	Lt. Alan Alldredge	Draft MJHMP Review
San Juan County, UT	Tammy Gallegos	Draft MJHMP Review
City of Sedona	Jon Trautwein	Draft MJHMP Review
City of Sedona	Justin Clifton	Draft MJHMP Review
Arizona Public Service Electric	Janet Dean	Draft MJHMP Review

Arizona Public Service Electric	Rachel Mure	Draft MJHMP Review
Kinder Morgan	Joseph Simonsen	Draft MJHMP Review
Energy Transfer	Brad Monell	Draft MJHMP Review
AZ Dept. of Forestry and Fire Management	Rick Miller	Draft MJHMP Review
USFA – Coconino National Forest	Laura Jo West	Draft MJHMP Review
USDA - New Kaibab National Forest	Heather Provencio	Draft MJHMP Review
NPS – Grand Canyon National Park	Andrew Fitzgerald	Draft MJHMP Review

2.5 Community Engagement

Once the planning process commenced, the Planning Team provided public notification through their websites, Facebook, and/or Twitter accounts. Additionally, online surveys were conducted to solicit input on the hazards that their communities face and the types of mitigation activities the MJHMP participating jurisdictions should undertake. The draft MJHMP was placed on the Planning Team websites for public review and comment. The MJHMP was adopted by the Coconino County Board of Supervisors and participating jurisdictions of Flagstaff, Page, Williams, Tusayan, and Fredonia. The Plan is now available for viewing on the jurisdictions’ respective websites.

The public survey input from the 518 responders was used to select hazards and rank their affects. Fire (Wildland Urban Interface) and Drought Events were ranked as the two top hazards. This input was also used to inform the Calculated Priority Risk Indices (CPRI) contained in Section 5. Finally, survey input was used to select mitigation actions. Input from posting the draft MJHMP was used to refine the MJHMP and prepared it for submission for review. **Appendix C** provides documentation of community engagement efforts and public participation.

2.6 Incorporation into Other Planning Mechanisms

The MJHMP planning process provided the Planning Team with an opportunity to review and expand on policies contained in other plans such as County or City General/Comprehensive Plans. The Planning Team views their general plans and the MJHMP as complementary documents that work together to reduce risk exposure to their residents. Many of the ongoing recommendations identified in the MJHMP are programs recommended in the various General Plan Safety Elements.

The Planning Team will additionally incorporate the MJHMP’s hazards, risks, recommendations, and mitigations included into the following planning mechanism documents as seen in **Table 2-4**, as appropriate.

Incorporation of action items and processes from the 2021 MJHMP into various planning documents will be completed as other plans are updated and when new plans are developed. These efforts may coincide with the Plan Maintenance Method and Schedule Activities listed in Section 7. Additional action items may be implemented through the creation of new public educational programs, continued interagency coordination, and public input and participation.

Table 2-4: Other Planning Mechanism Documents

Jurisdiction	Planning Documents
Coconino	<ul style="list-style-type: none"> • Coconino County Comprehensive Plan • Coconino County Area Plans • Coconino County Roads Capital Improvement Plan • Coconino County Economic Development Plan • Northern Arizona Council of Governments (NACOG) Operations and Funding Opportunities for Economic Development • Blue Ridge Area and Mogollon Rim Ranger District of the Coconino National Forest Community Wildfire Protection Plan • Four Forest Restoration Initiative Strategic Plan
Flagstaff	<ul style="list-style-type: none"> • Flagstaff Capital Improvements • Flagstaff Regional 2030 Plan • Greater Flagstaff Area Community Wildfire Protection Plan • Flagstaff Watershed Protection Project Implementation Plan • Flagstaff Coordinated Public Transit - Human Services Transportation Plan • Flagstaff Regional Transportation Plan 2040 • Flagstaff Climate Action and Adaptation Plan • Picture Canyon Natural and Cultural Preserve Management Plan
Fredonia	<ul style="list-style-type: none"> • Fredonia General Plan • Fredonia Emergency Operations Plan
Page	<ul style="list-style-type: none"> • City of Page General Plan • Page Strategic Plan for Community and Economic Development
Tusayan	<ul style="list-style-type: none"> • Tusayan General Plan • Tusayan Multimodal Transportation Action Plan • Tusayan Community Wildfire Protection Plan
Williams	<ul style="list-style-type: none"> • Williams General Plan • Williams Capital Improvement Plan • Greater Williams Area Community Wildfire Protection Plan • Williams Strategic Plan Economic Development Plan • Williams Stormwater Master Plan • Williams Post Wildfire Flood Disaster Operations Plan

2.7 References and Documents

In updating the MJHMP, the Planning Team used a large number of resource documents and references. **Table 2-5** contains a comprehensive list of guidance and tools incorporated to create the current Plan.

Table 2-5: Guidance and Tools

Referenced Document or Technical Source	Resource Type	Description of Reference and Its Use
Greater Williams Area Community Wildfire Protection Plan	Plan	Wild land fire risk, infrastructure risk, strategic goals, and other data for the Greater Williams Area.
Tusayan General Plan	Plan	Tusayan's comprehensive plan including transportation, land use, impacts on land, and housing.
Tusayan Community Wildfire Protection Plan	Plan	Comprehensive wildland fire planning resource for the City of Tusayan.
City of Page General Plan	Plan	Page's General plan including land use, economic development and demographics.
Fredonia General Plan	Plan	Fredonia's comprehensive plans and future goals.
Flagstaff Regional Plan 2030	Plan	Flagstaff's plan for future sustainability and regional policy.
Coconino County Emergency Operations Plan	Plan	Information on Coconino's response in the event of an emergency.
Flagstaff Climate Action and Adaptation Plan	Plan	A plan outlining Flagstaff's response to rising temperatures, increased wildland fires, and other threats.
Climate Profile for Coconino County	Report	Examination of Coconino's historical climate and projected climate in the future.
State of Arizona Hazard Mitigation Plan	Plan	A resource for disaster resistance and mitigation in the State of Arizona.
Arizona Commerce Authority	Website data and community profiles	Demographic and economic data for the County. Used for community descriptions.
Arizona Department of Emergency and Military Affairs	Data and planning resource	Statewide disaster declaration information and hazard mitigation planning guidance
Arizona Department of Water Resources	Technical resource	Data on drought conditions and statewide drought management (AzGDTF), and dam safety data. Used in risk assessment.
Arizona State Land Department	Data source	Statewide GIS coverage (ALRIS) and wildland fire hazard profile information (Division of Forestry). Used in the risk assessment.

Referenced Document or Technical Source	Resource Type	Description of Reference and Its Use
Arizona Wildland Urban Interface Assessment	Report	Wildland fire hazard profile data and urban interface at risk communities. Used in the risk assessment.
Arizona State Climate Office	Website reference	Weather and climate data for the State of Arizona. Information on operational, educational, planning, and research endeavors. Used for community descriptions.
Northern Arizona University Ecological Restoration Institute (NAU ERI)	Technical resource	Research and implementation strategies supporting ecological restoration and climate adaptation in western forest landscapes.
Federal Emergency Management Agency	Technical and planning resource	Resource for MJHMP 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.
HAZUS-MH	Technical resource	Based data sets within the program were used in the vulnerability analysis.
National Centers for Environmental Information	Technical resource	Resource for weather related data and historic hazard event data used in risk assessment.
National Integrated Drought Information System (2020)	Technical resource	Source for drought related projections and conditions. Used in the risk assessment.
National Inventory of Dams (2018)	Technical resource	Database used in the dam failure hazard profiling. Used in the risk assessment.
National Weather Service	Technical resource	Source for hazard information, data sets, and historic event records used in risk assessment.
United States Geological Survey (2018). Earthquake Hazards Program.	Technical data	Source for geological hazard data and incident data. Used in the risk assessment.
Western Regional Climate Center	Website data	Online resource for climate data used in climate discussion.

Section 3: Planning Area Description

This section includes detailed descriptions of the County and the five participating cities/towns that form the Planning Team for the MJHMP. **Section 3.1** addressed the overall County.

3.1 Location and Geography

The County is the second largest county in the country, second to only San Bernardino County (California). It is a topographically diverse area with a wide range of climatic conditions, vegetation, and wildlife. Located in north-central Arizona, the County is larger than many states and encompasses over 18,600 square miles. The County is characterized by deep canyons and rugged mountains with elevations that range from 1,350 feet at the bottom of the Grand Canyon to 12,633 feet at the top of the San Francisco Peaks. The majority of the county is located between 5,000 and 7,000 feet in elevation. The County limits generally lie between longitudes 110.75 to 113.35° west and latitudes 34.26 to 37.01° north.

The terrestrial land characteristics of the County are quite diverse, ranging from sparsely vegetated shrublands to dense pine forests, with small areas of desert scrub at the lowest altitude levels of the County.² The land and ecological characteristics of the County have been mapped into three terrestrial ecoregions described below.

- **Arizona Mountain Forests** – Contains a mountainous landscape, including the Mogollon Rim and the San Francisco Mountains, and covers approximately 40% of the County. The forested regions are located along the southern border of the county running diagonally from southeast to northwest, and along the upper regions of the North Kaibab Plateau. Elevations in this zone range from approximately 4,000 to just under 13,000 feet, resulting in comparatively cool summers and cold winters. Vegetation in this ecoregion is comprised largely of a mix of Scrub Grassland, Mogollon Chaparral Scrubland, Great Basin Conifer Woodland, Rocky Mountain Conifer Forest, and Plains Grassland.
- **Colorado Plateau Shrublands** – Covers approximately 55% of the County with elevations that average around 4,000-5,000 feet. Vegetation in this ecoregion is comprised mainly of Plains Grassland and Great Basin Desert scrub. Temperatures can vary widely in this zone, with comparatively warm summers and cool winters.
- **Mojave Desert** – Covers a small part of the western-central County, with elevations that range from 1,500 - 4,000 feet on some mountain locations. Typically, the climate in this ecoregion is very hot and dry during the summer and comparatively warm during the winter.

The County's landscape is comprised mainly of two fire adapted ecosystem types and regimes. Naturally occurring wildland fires play an important role in our ecosystem, however, long-term mismanagement has altered the type and frequency of fires, therefore creating unnaturally hazardous fire conditions across much of our landscape. The fire adapted ecosystem types are described as follows:

Moderately frequent fire regimes

In shrublands or forests containing plants with seeds that require fire to germinate, moderately frequent fires allow the growth from those fire-dependent seeds to eventually return the vegetation to the pre-fire condition. These ecosystems are also resilient to fire, but if fire returns before the new vegetation matures and produces more seeds, the vegetation could be replaced by a different type such as grass.

² DEMA, November 2007, State of Arizona Multi-Hazard Mitigation Plan

Fires in these systems could increase in frequency for a variety of reasons, including more human activity in the area leading to accidental fire starts, or invasive plants which dry out and burn readily before the re-growing vegetation can reach maturity. Public awareness, invasive species management, or strategic fire suppression strategies can reduce the frequency of fire and increase resilience in such systems.

High frequency, predominantly low severity fire regimes

Fire occurs, or historically occurred, frequently in some ecosystems, such as Ponderosa pine or mixed-conifer forests. When fire burns through the understory, the resilience of these forests depends on the survival of the adult trees with thick bark (i.e. a fire-adapted trait). If fire is excluded from these forests, fuel in the understory can accumulate to significant amounts. When fire eventually returns, it may be so severe that it kills the mature trees.

Promoting resilience in such forests after an extended period without fire, often made worse by extended periods of drought, generally involves reducing the fuel load through thinning, prescribed fire under suitable weather conditions, and other means. Once much of the fuel is removed, fire is more likely to burn with low severity and most adult trees will not be killed. Because these forests are adapted to frequent fire, long-term resilience can only be maintained by allowing fire to burn frequently enough that fuels are adequately reduced.³

3.2 Rivers and Watersheds

The County is characterized by many watercourses. The more prominent perennial watercourses include the Colorado River, Oak Creek, Chevelon Creek, Kanab Creek, West and East Clear Creek, and Coconino Wash. There are also numerous ephemeral watercourses that drain into the more prominent watercourses. The County is also populated by several natural and man-made lakes that serve as critical water supply sources for both humans and wildlife.

3.3 Climate

The climate in the County varies with location and elevation. Summer characteristics across the county range from hot and dry at the bottom of the Grand Canyon to moderate temperatures within the forested areas. Winter temperatures range from just above freezing to single digit temperatures in the upper mountain areas. Climatic statistics for weather stations within the County are produced by the Western Region Climate Center (WRCC) and span records dating back to the early 1900's. Statistics for the Flagstaff WSO AP, Page, and Phantom Ranch Stations are provided in the following discussions.

Average temperatures within the County vary widely depending upon location and elevation. County-wide, temperatures range from well below freezing during the winter months to nearly 100°F during the summer months. Average extreme temperatures can exceed either end of the spectrum by as much as 10-15°F.

Annual precipitation across the County varies significantly with both location and elevation. Also, for most of the county, precipitation comes in the forms of rain, snow, hail, or sleet. In general, average rainfall across the county ranges from six to 25 inches (6"-25"). Average annual snowfall totals can range from zero to 100 inches (0"-100") and greater for locations above 7,000 feet.

From November to March, storm systems from the Pacific Ocean cross the state as broad winter storms that produce mild precipitation events and snowstorms at 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 (i.e. Gulf of California) and aloft from the southeast (i.e. Gulf of Mexico). This shift in wind direction, termed the North American Monsoon, produces summer rains as thunderstorms that result

³ U.S. Forest Service, General strategies for promoting resilience to wildfire

largely from excessive heating of land surface and subsequent lift of moisture-laden air, especially in the primary mountain ranges. Thunderstorms are often accompanied by strong winds, blowing dust, and / or hailstorms.

Arizona climate can also be largely impacted by the opposite extreme weather events known as El Niño and La Niña, or El Niño/Southern Oscillation (ENSO). ENSO refers to strong variations in sea-surface temperatures, rainfall, surface air pressure, and atmospheric circulation from the Pacific Ocean year-to-year.⁴ El Niño represents the warm phase of the ENSO cycle, while La Niña represents the cold phase. ENSO affects weather patterns across the Southwest, causing wetter winter seasons due to El Niño’s influence on tropical storms and subsequent higher than average precipitation, and dryer winters during La Niña events, when the pattern is reversed.⁵ The recorded weather patterns in the Flagstaff from 1970—2000 found nearly double the average of snowfall from El Niño events to La Niña events and about triple the average of precipitation.⁶

Table 3-1: Average Climate Data for Flagstaff

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Avg High (F)	43	45	50	58	67	77	81	78	73	63	52	43
Avg Precipitation (Inches)	2.12	2.33	2.26	1.27	0.62	0.42	2.38	3.47	2.56	1.89	1.81	2.03
Avg Snowfall (Inches)	18	17	15	7	0	0	0	0	0	2	7	11

Source: U.S. Climate Data website, January 2021

3.4 History

According to archeological records and tribal historical sources, the County has been inhabited by a variety of native tribes for over 12,000 years – with some estimates ranging as far as 16,000 years.⁷ The name Coconino is believed to originate from the Hopi name for the inhabitants of the Grand Canyon area – the Havasupai and Yavapai.⁸ Today, the County remains home to six tribal nations: Navajo, Hopi, Havasupai, Hualapai, Kaibab-Paiute, and San Juan Southern Paiute. Each operates as a sovereign nation with its own unique culture, history, and relationship with the land.⁹

The County was crossed by Spanish expeditions during the 16th, 17th, and 18th centuries, and by fur trappers and traders in the 1820s and 1830s. Cattle and sheep ranching was started in the 1870s, and when the railroad began serving the area a decade later, the lumber industry boomed.

The County was carved out of Yavapai County by the 16th Territorial Assembly in 1891. That same year, an election was held to determine the permanent county seat. Flagstaff, which had been designated the

⁴ National Oceanic and Atmospheric Administration, [What are La Niña and El Niño and why do they matter?](#)
⁵ The University of Arizona Climate Assessment for the Southwest (CLIMAS), [How does ENSO affect SW weather patterns?](#)
⁶ National Weather Service, [La Niña, El Niño and Northern Arizona Weather](#)
⁷ Visit Arizona, [American Indian Tribal Lands](#); Williams News, [Native Americans from five tribes come together to discuss Grand Canyon's indigenous history](#)
⁸ Coconino National Forest, [Frequently asked questions](#)
⁹ Coconino County, 2017, [Coconino County Comprehensive Plan](#)

temporary County seat, won out over Williams by a vote of 419 to 97. In 1891, the population of the County was 4,000. Flagstaff remains the County seat, and the original County courthouse is still in use.

3.5 Government

The County elects five members to the Board of Supervisors by district for four-year terms. The Board establishes administrative policy and direction for the County and maintains budgetary oversight over all County departments to ensure funds are expended within given guidelines. The duties, responsibilities, and authority of the Board of Supervisors are expressly provided in the Constitution and/or laws of the state.

The County Manager is responsible for the daily management of County government under the policy direction of the Board of Supervisors. The County Manager's responsibilities include:

- Implement and administer policies established by Board of Supervisors, including County budget;
- Interact with County-elected officials, governmental agencies, and community groups;
- Provide support for Board of Supervisors' initiatives and programs;
- Supervise appointed department heads.

With six tribal nations under tribal jurisdiction, totaling over 7,000 square miles within the County, the County works closely with them to identify and implement joint solutions to issues of mutual interest.

Figure 3.1 below delineates the locations of the participating Planning Team jurisdictions within the County. **Figure 3.2** includes the tribal land locations in the County.

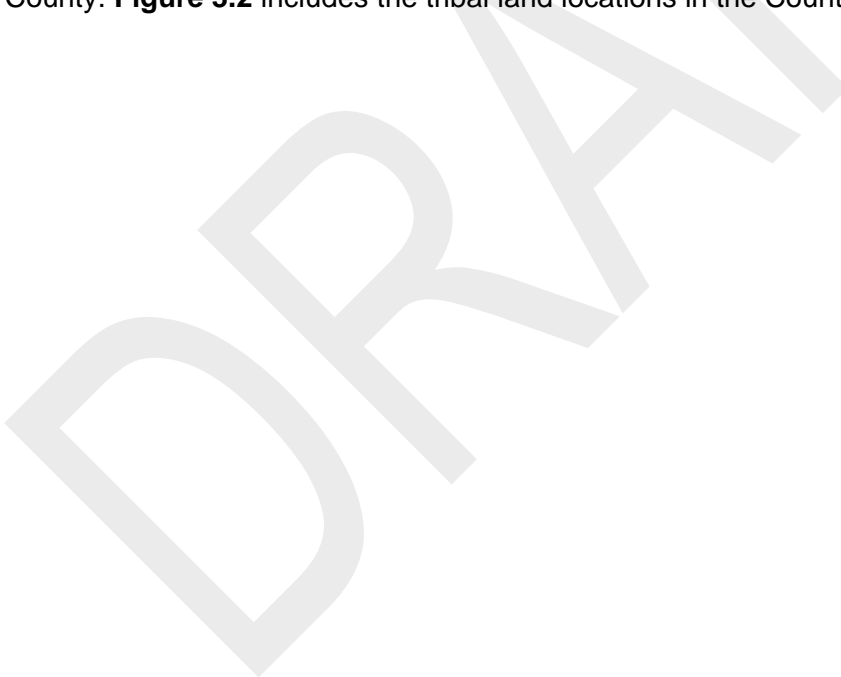


Figure 3.1: Coconino County Overview

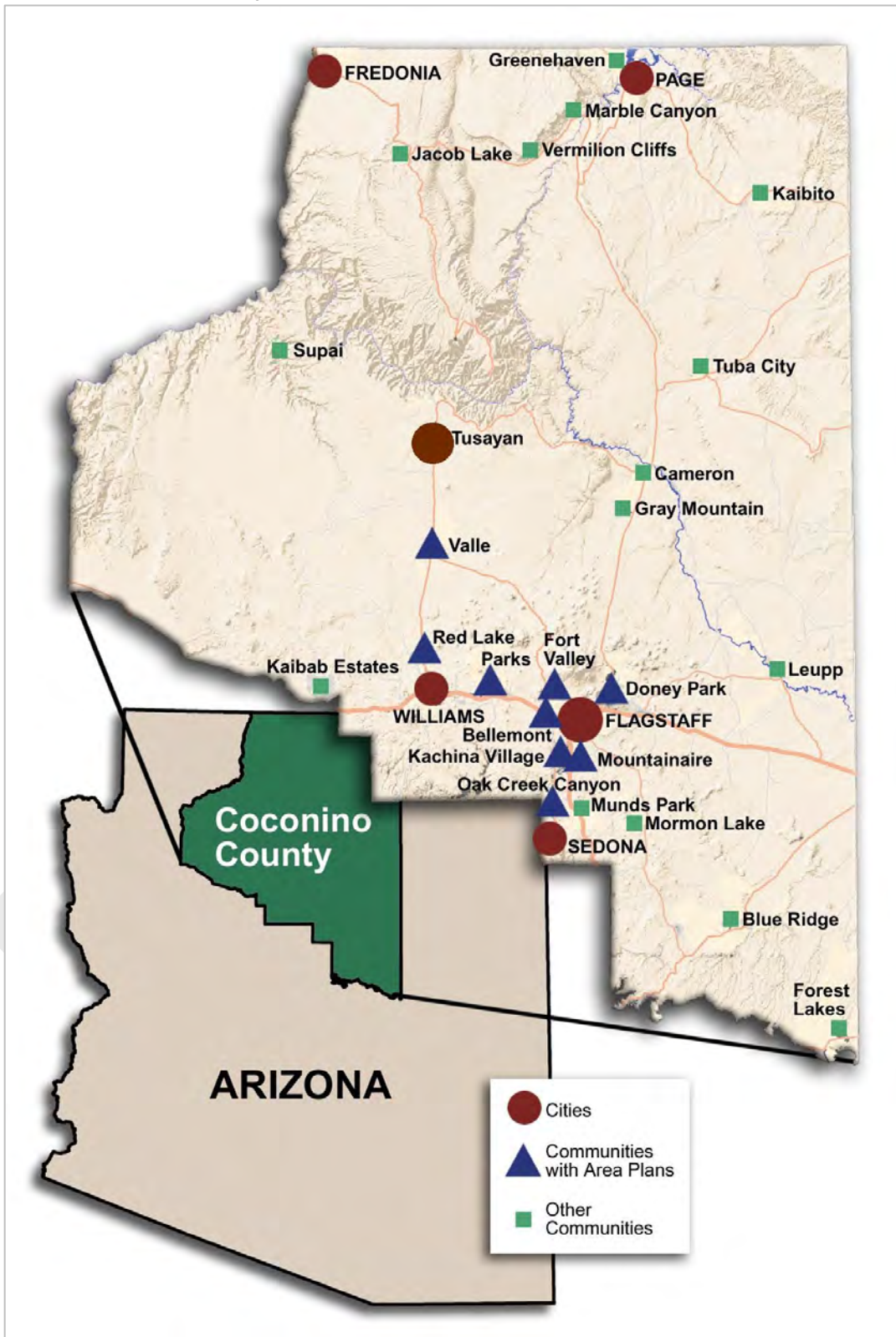


Figure 3.2: Tribal Nations in Coconino County¹⁰



¹⁰ [Inter-Tribal Council of Arizona Maps](#)

Figure 3.3: Coconino County Geographic Features and Transportation Routes

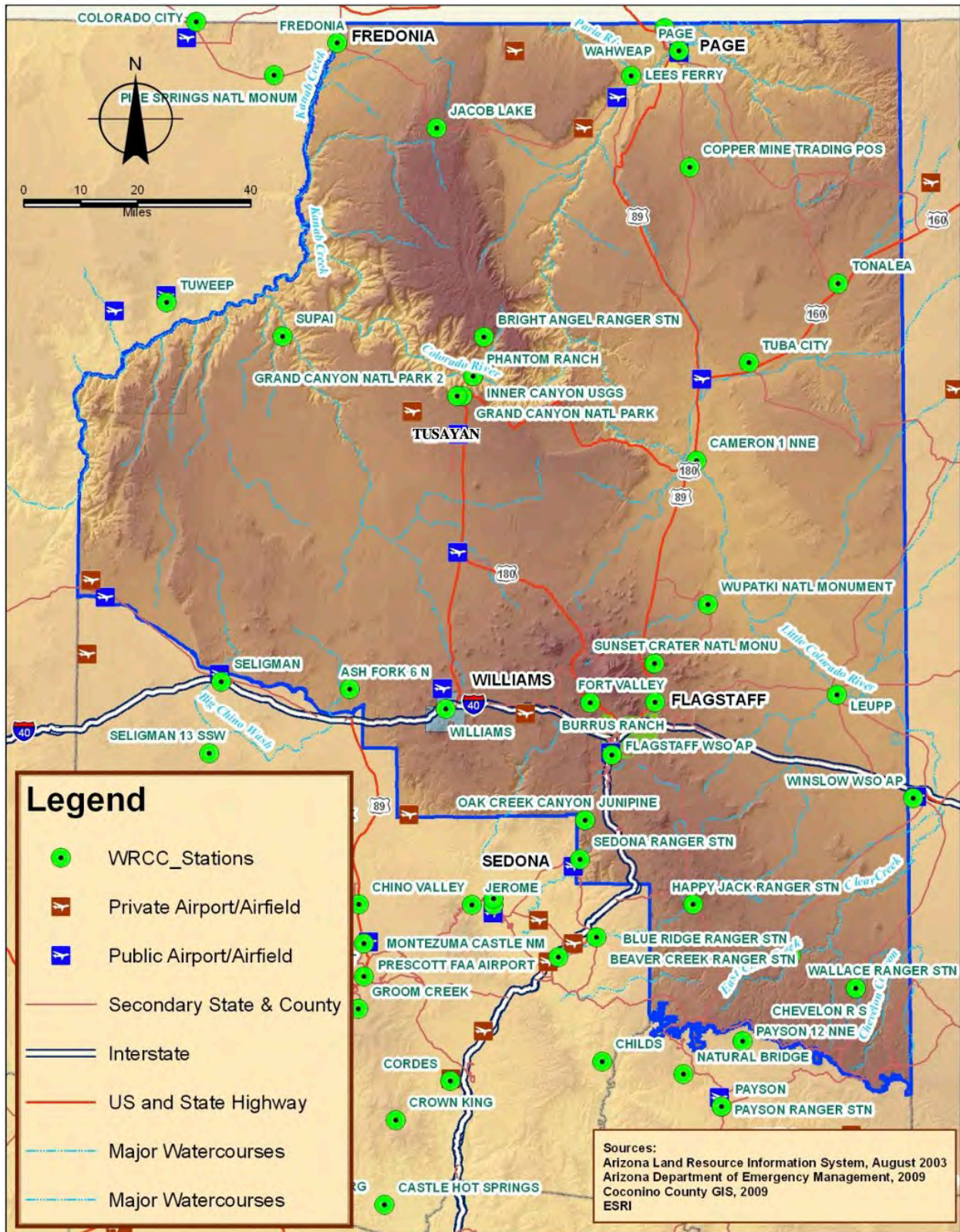
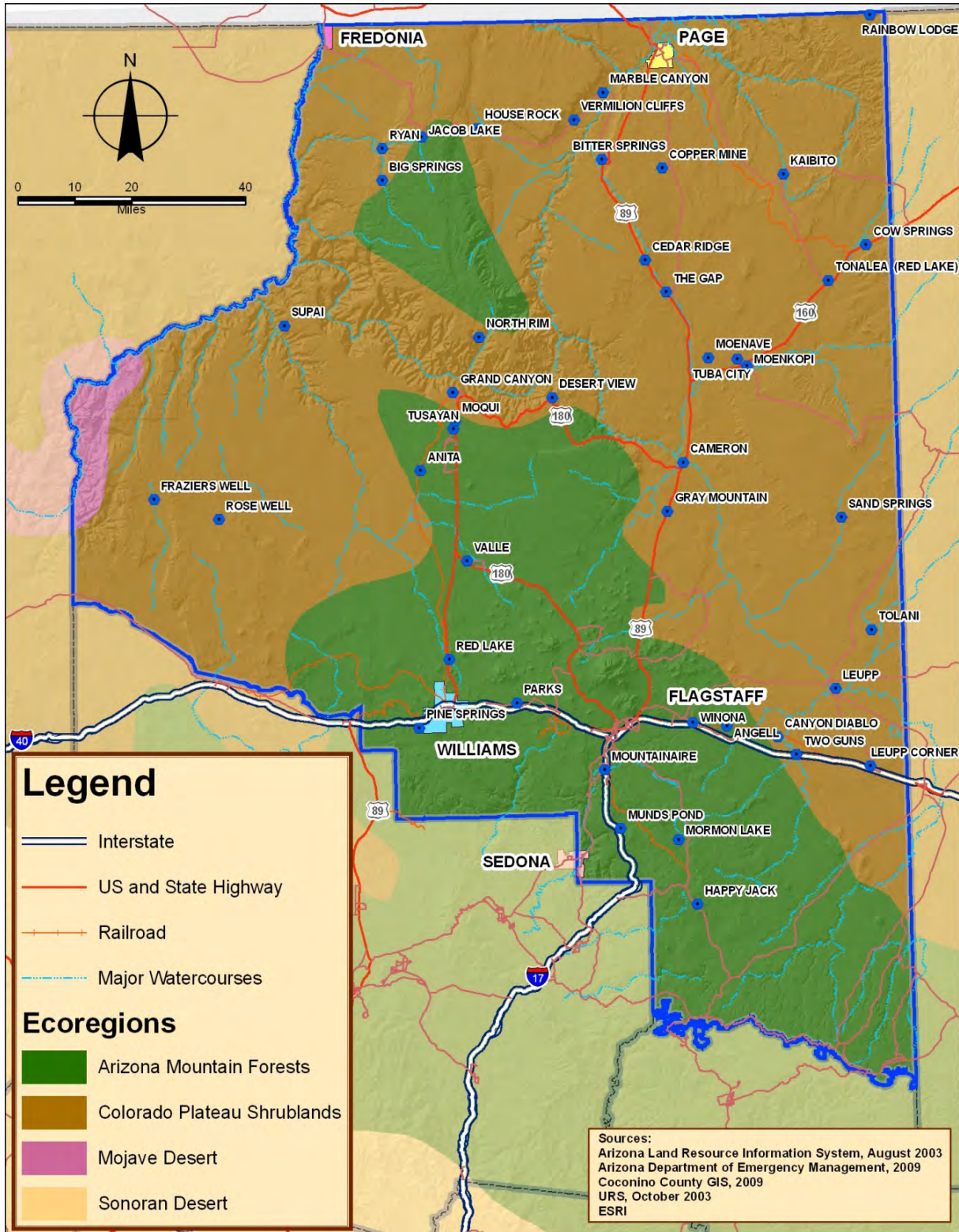


Figure 3.4: Coconino County Terrestrial Ecoregions

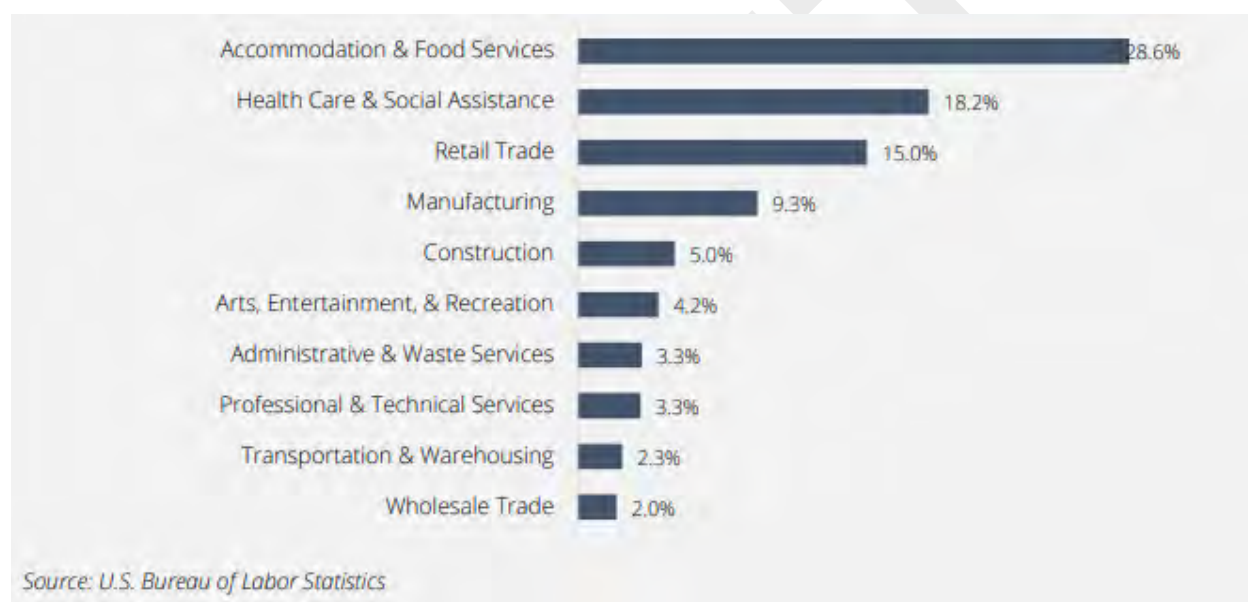


3.6 Economy

The County's civilian labor force and unemployment rate have been significantly affected by the COVID-19 pandemic, whose economic impacts were first detected in Arizona as early as March 2020. Between February and April 2020, Coconino County's labor force fell from 78,431 to 71,547 - ultimately decreasing to 68,447 by December 2020 (a total decrease of 12.7%). At the same time, the unemployment rate increased from 5.3% to 17.9% - settling at a steady 9.4% in December 2020.¹¹ It can be expected that the ongoing pandemic will cause additional fluctuations as the situation develops in 2021.

As of December 2020, the County's labor force was down 14.2% from December 2019 (78,173) and down 5.5% from December 2014 (72,242). The County's unemployment rate was up 4.2 percentage points from December 2019 (5.2%) and up 2.7 percentage points from December 2014 (6.7%).¹²

Figure 3.5: Coconino County Top Ten Employment Sectors



The County's major employment sectors are depicted in **Figure 3.5**. The chief employment sector is significantly fueled by tourism, as the County is a gateway to attractions such as Grand Canyon National Park, Oak Creek Canyon, Sunset Crater National Monument, Snowbowl Ski Area, Lake Powell, and Native American ruins at Wupatki, Walnut Canyon, and Navajo National Monument. The County is also home to Northern Arizona University, located in the City of Flagstaff, and one community college.

The seat of the County is the City of Flagstaff, the only Standard Metropolitan Statistical Area (SMSA) in the County.¹³ Flagstaff serves as a hub of economic activity as the largest city in the County, making up approximately 56% of the labor workforce and 45% of the County population.¹⁴ The major industries of the city are government, education, transportation, tourism, services, and retail trade.

In recent years, Flagstaff has experienced moderate growth and development. [The Flagstaff Regional Plan 2030](#) identifies several policies and regulations to guide economic development within Flagstaff. These

¹¹ Arizona Commerce Authority: <https://www.azcommerce.com/oeo/labor-market/unemployment>

¹² Arizona Commerce Authority: <https://www.azcommerce.com/oeo/labor-market/unemployment>

¹³ National Longitudinal Surveys, [U.S. Bureau of Labor Statistics](#)

¹⁴ Arizona Commerce Authority, [County Profile for Coconino County](#)

policies and regulations emphasize the preservation of regional ecological resources such as: washes, canyons, mountains, steeply sloped hillsides and mesas, riparian areas, volcanic cinder cones and calderas, and protective buffers. Efforts to preserve these features often coincide, or parallel, hazard mitigation efforts. The strategies developed to address this policy includes increasing public awareness, hazard identification, design for public safety, redevelopment plans, cooperative planning efforts, limit development in hazard areas, structural hazard mitigation, and wildland fire fuel reduction among other strategies.

3.7 Population and Demographics

The County includes six incorporated communities: Flagstaff, Fredonia, Tusayan, Page, Sedona, and Williams. All or portions of the Navajo Nation, Hopi Indian Tribe, Hualapai Tribe, Kaibab-Paiute Tribe, San Juan Southern Paiute, and all of the Havasupai Tribe are also located within the County boundaries. A total of 45 unincorporated communities are scattered across the County, with many being comprised of only one structure or a prominent landmark. 12.27% of the land in the County, or 2,326 square miles, is owned by individuals or corporations. About three-fourths of the private land is in large ranches held by about 10 owners. Tribal lands comprise 39.11%, Forest Service 27.19%, Bureau of Land Management 5.09%, National Park Service 6.87%, and state 9.42%. As seen in **Table 3-4**, the population density of the unincorporated areas of the County is significantly smaller than that of the incorporated jurisdictions.

Table 3-2 Coconino County Demographics

County Demographics	2019
Population	147, 275
White	65.7%
Black or African American	1.5%
American Indian or Alaska Native	27.4%
Native Hawaiian or Other Pacific Islander	.2%
Asian	2.1%
Two or More Races	3.1%
Hispanic or Latino	14.3%
White, non-Hispanic or Latino	54.1%

County Demographics	2019
Foreign born persons	4.4%
Median household income	\$59,460
In civilian labor force age 16+	62.6%
Persons with a disability under 65	9.1%
Mean travel time to work (minutes)	18.6
Persons in poverty	15.9%
Households with Internet	78.2%
Language other than English spoken at home	24%
Source: U.S. Census Bureau	

Table 3-3: Population Estimates for Coconino County

Jurisdiction	1990	2000	2010	2019	2030
Coconino County	96,591	116,320	134,679	147,275	154,380
Flagstaff	45,857	52,894	65,985	76,338	81,994
Fredonia	1,207	1,036	1,312	1,313	1,307
Page	6,598	6,809	7,253	7,686	8,110
Sedona (pop. in Coconino)	7,720	10,192	11,629	7,489	13,776
Tusayan	N/A	562	558	589	550
Williams	2,532	2,842	3,032	3,352	3,139

Source: [Arizona Commerce Authority](#)

Table 3-4: Estimated Population Densities of Coconino County

Jurisdiction	Land Area (square miles)	Population Density (persons per square mile)
Coconino County (unincorporated area)	18,619 (18,465)	7.2 (2.9)
Flagstaff	64	1029.2
Fredonia	7	187.7
Page	17	426.3
Sedona	6	473.7
Tusayan	17	33.2
Williams	43	70.3

Based on 2010 Census and [Coconino County Comprehensive Plan](#)

3.8 Transportation

Major transportation corridors that pass through the County include Interstates 17 and 40 and the Burlington-Northern Santa Fe (BNSF) Railway. AMTRAK operates on the BNSF line and maintains depots in Flagstaff and Williams. Other major roadways include U.S. Highways 160 and 180, State Routes 64, 66, 67, 87, 89, 89A, 98, 99, 260, and 264, and Indian Routes 2, 15 and 18. Flagstaff operates the Flagstaff-Pulliam Airport (FLG) – the largest commercial airport in the County. Other commercial airports are the Grand Canyon National Park Airport (GCN) located in Tusayan and Page Municipal Airport (PGA). Smaller, general aviation airports are Tuba City (TBC), H.A. Clark Memorial Field (KCMR) in Williams, and Valle (VLE) in Williams.

3.9 Land Use and Development Trends

The County desires to ensure that policies, plans, and land use regulations accommodate the various needs of people, households, and businesses, and also acknowledges relevant trends influencing how business and industry will utilize land and buildings in the future. A strong economy is vital to the future of the County and quality of life for County residents. Land use regarding economic development is important.

The County recognizes that limitations on development related to service and infrastructure may exist within the County. In the unincorporated areas of the County, limited infrastructure presents challenges to economic development in regard to new development of roads, water sources, and wastewater systems. Economic conditions are taken into account to help identify strengths and weaknesses and identify strategies for diversifying development to enhance a resilient and vital economy for future generations.

The County takes an active role to encourage new commercial and industrial development regarding the coordination of land use, including the formation of public-private partnerships. The Bellemont area provides opportunities for industrial economic development. Infrastructure improvements to roads, water, and wastewater would be necessary to fully develop industrial-zoned land parcels. Rezoning can be used to expand commercial and industrial uses when tied to viable development projects. The Interstate 40 corridor east of Flagstaff toward Winslow is one such example. In Williams and Fredonia, land suitable for new commercial and industrial activity underwent annexation to provide infrastructure and capture tax benefits for the municipalities. The County encourages adaptive reuse of vacant buildings and underutilized properties which serves several purposes. Adaptive reuse makes good economic sense and an effective style of development for communities with a limited supply of private land.

The County's transportation corridors are an obvious place for continued development because of their location along shipping routes, providing potential for distribution hubs. Much of the existing commercial and industrial zoning and development in the County is found along such corridors. The County supports development near these corridors but opposes strip-style development which can impede traffic, impact view sheds, and limits opportunities for multimodal transportation. Instead, clustered commercial and industrial development with access to major corridors is preferred.

State Trust lands, especially around Flagstaff, are a possible source development land to increase the availability of private land. Denser zoning for residential development may also allow for more economic use of the existing private lands. Allowance of more agriculture on properties so families can reduce their food expenditures may contribute to lower cost of living expenses. Outlying areas around Flagstaff face similar needs. The Coconino County Comprehensive Plan notes that the practice of developing residential properties in the rural areas, most commonly created by splitting ranchlands into 40 acre lots that are subdivided into 10-acre parcels without utilities, water, or reliable road maintenance, is not an efficient method of providing residential uses and results in greater impacts on County resources.

Locating residential housing in closer proximity to commercial area can reduce travel times and dependency on single-occupancy commutes. With changing times and needs, many households today have two or more residents traveling to workplace locations far removed from their immediate residential area. Future development opportunities have been studied and presented in completed multi-modal studies for Kachina Village and Doney Park. Another study is underway for the Bellemont area.

In the County, the opportunity for mixed uses exists, with the desire to support development that avoids creating large areas or communities that are exclusively residential, commercial, or industrial. Proactive land use planning combined with sound mitigation concepts can lessen the impact of natural disasters and hazards experienced by the County.

3.11 Participating Jurisdictions

The city/town planning area descriptions are contained below. Location and geography, rivers and watersheds, transportation and climate are addressed in the overall County planning area description.

3.11.1 Flagstaff

Flagstaff is located at 35°11' 53.8224" N 111°39'4.6764"W. The city lies near the southwestern edge of the Colorado Plateau within the San Francisco volcanic field, along the western side of the largest contiguous ponderosa pine forest in the continental United States. The city sits at around 7,000 feet and is next to Mount Elden, just south of the San Francisco Peaks, the highest mountain range in the state of Arizona. The city occupies 66.08 square miles.

History

Flagstaff has a rich Native American history with early tribes, such as the Sinagua and Anasazi tribes inhabiting the land over 800 years ago. Since then, many indigenous peoples have called this land home, including the Navajo, Hopi, Havasupai, Kaibab-Paiute, and Hualapai peoples.¹⁵

According to the [City of Flagstaff's website](#), in 1855 Lieutenant Beale, in surveying a road from the Rio Grande River in New Mexico to Fort Tejon in California, passed over the spot where Flagstaff now stands. While camping at the Eastern extremity of the present town, the lieutenant had his men cut the limbs from a straight pine tree to fly the United States flag.

The city's first recognized permanent settler, Thomas F. McMillan, arrived in 1876 and built a cabin at the base of Mars Hill. Flagstaff drew its name from a very tall pine tree made into a flagpole in 1876 to celebrate our nation's centennial. During the 1880's, Flagstaff began to grow, opening its first post office and welcoming the booming railroad industry. The town shipped timber, sheep and cattle as exports. By 1886, Flagstaff was the biggest city on the main railroad line between Albuquerque and the West Coast.

In 1894, Dr. Percival Lowell chose Flagstaff, due to its great visibility, as the site for the Lowell Observatory. Thirty-six years later, Pluto was discovered through the observatory's telescopes. The Arizona Teacher's College was founded in 1899, later becoming Northern Arizona University in 1966. Route 66 was built through Flagstaff during the 1920's making it a popular tourist stopover. Flagstaff was incorporated as a city in 1928.

Government

Flagstaff is the County seat. The city government is organized under a council-manager form of government. Regular meetings of the city council are held on the first and third Tuesday of every month.

Economy

In its early days, the city's economic base comprised the lumber, railroad, and ranching industries. Today, that has largely been replaced by tourism, education, government, and transportation. Some of the larger employers in Flagstaff are Northern Arizona University, the Flagstaff Medical Center, and the Flagstaff Unified School District. Tourism is a large contributor to the economy with over five million visitors per year.

Scientific and high-tech research and development operations are in the city, including Lowell Observatory, Northern Arizona University, the United States Naval Observatory Flagstaff Station (NOFS) and the United States Geological Survey's (USGS) Flagstaff campus. Research is involved in observations of near-Earth phenomena such as asteroids and comets. In 2012 the observatory commissioned its Lowell Discovery Telescope, a 4.3-meter telescope with an instrument cube that can hold five instruments at once. Lowell

¹⁵ Discover Flagstaff, [Culture & Heritage](#)

Observatory and NOFS also are collaborators on the Navy Precision Optical Interferometer, on nearby Anderson Mesa. NOFS is heavily involved with the science of star catalogs and astrometry or the positions and distances of stars and celestial objects.

There are five industrial parks in the city, situated near I-40 and I-17. Major manufacturers in Flagstaff include Coca Cola, the beverage manufacturer; W. L. Gore & Associates, widely known as the maker of Gore-Tex; Nestlé Purina PetCare, a manufacturer of pet food; SenesTech, a biotechnology research lab and manufacturer; SCA Tissue, a major tissue paper producer; and Joy Cone, a manufacturer of ice cream cones. Major employer industries in 2018 are noted in the **Table 3-5** below.¹⁶

Table 3-5: City of Flagstaff Major Employment Industries

Industry	Count	Percentage of Workforce
Educational services	6,584	17.8%
Accommodation & food services	5,974	16.1%
Retail trade	4,554	12.3%
Healthcare & social assistance	4,408	11.9%
Manufacturing	2,767	7.47%
Public administration	1,843	4.97%
Professional, scientific, & technical services	1,830	4.94%
Construction	1,524	4.11%

Key Critical Infrastructure Facilities and Community Assets

Flagstaff maintains several key critical infrastructure sites and facilities. Facilities include the Flagstaff Pulliam Airport and its facilities, the public works campus, city hall, the city courthouse, fire stations, Northern Arizona Health-Flagstaff Medical Center, and the law enforcement administration building. The city is also home to several critical facilities that provide services to vulnerable populations. Key assets in this area include Flagstaff Shelter Services, Flagstaff Family Food Center, Siler Homes and SHAC, Clark Homes, Brannen Homes and Boys and Girls Club, Flagstaff Senior Meadows, Sandstone Highlands Senior Living, The Peaks Senior Living, and several mobile home parks.

In addition to these facilities, Flagstaff is home to several community assets. Educational assets include South Beaver School, a national historic site of cultural importance to the Hispanic and African American community, and Haven Montessori, a historic Catholic school of cultural importance to the Hispanic community. Religious buildings, communities, and sites of historic importance include the Nativity of Blessed Virgin Mary Chapel, Our Lady of Guadalupe National Landmark, Harbert Chapel AME Church, Spring Hill Baptist Church, First Missionary Baptist Church, Riverside Church of God in Christ, and Chabad Jewish Community Center. The city is home to several historic districts including the Southside Neighborhood, Downtown Flagstaff, North End Neighborhood, Old Main (NAU campus), and Townsite Neighborhood. The city is home

¹⁶ Data USA, Flagstaff, AZ

to several historic sites including Ft. Tuthill, Elden Pueblo, The Arboretum at Flagstaff, and McAllister Ranch.

Population and Demographics

Flagstaff has a population of 72,402 residents with a median household income of \$58,748 and a poverty rate of 17.5%.¹ The median age is 25.2 years, with 82.1% of residents aged 18 years and older, and 8.4% of residents aged 65 years and older.

The racial demographics of the city as reported by the U.S. Census Bureau are found below:

- White alone: 78.3%;
- American Indian and Alaska Native alone: 7.8%;
- Two or more races: 5.3%;
- Some other race alone: 3.2%;
- Asian alone: 3.1%;
- Black or African American alone: 2.0%;
- Native Hawaiian and Other Pacific Islander alone: 0.3%.

Land Use and Development Trends

[The Flagstaff Regional Plan 2030](#) is a policy guide, serving as the general plan for the city and an amendment to the Coconino County Comprehensive Plan. As mandated by state law, the plan covers a range of topics with information on current conditions and development vision for the future. In addition, the plan outlines carefully developed goals and policies to realize the future vision.

The Flagstaff Regional Plan emphasizes reinvestment and compact, infill development. This strategy combined with resource protection and management of slopes, forest and floodplain areas ensure as parcels are redeveloped existing hazardous conditions are eliminated and best practices can be implemented. Higher density and intensities are encouraged in urbanized areas, while low density single family uses within the wildland urban interface are properly mitigated utilizing forest management and appropriate construction materials.

3.11.2 Fredonia

The incorporated Town of Fredonia is located at 36°56'44"N 112°31'36" W and encompasses an area of approximately 4,400 acres in the extreme north-western part of the County, four miles south of the Arizona-Utah border and north of the Grand Canyon. The elevation for Fredonia is 4,625 feet.

History

The current site of Fredonia was originally inhabited by the Kaibab Paiute tribe. This tribe can trace their ancestry of living in the desert to over 10,000 years ago.¹⁷ The town was settled in 1885 by Mormon pioneers from southern Utah who capitalized on the available water in Kanab Creek to establish a small agricultural and ranching community. Timber logging, sawmill and mining industries induced modest population growth from about 500 in the mid 1950's to 1040 by 1980. The shutdown of mining activities in the area and a dramatic decline in the logging industry impacted the community with a loss of more than 300 jobs.

¹⁷ Northern Arizona University, [Kaibab Piute](#)

Government

The town has a town manager/town council government with two elected council members and a mayor and vice mayor. The council meets monthly.

Economy

Primary occupations are retail, manufacturing, accommodation and travel, and construction. Prior to the COVID-19 pandemic, the unemployment rate was 11.6%. The median household income is \$42,197 annually. Major employer industries in 2018 are noted in the **Table 3-6** below.¹⁸

Table 3-6: City of Fredonia Major Employment Industries

Industry	Count	Percentage of Workforce
Other services, except public administration	124	23.4%
Construction	100	18.8%
Retail trade	84	15.8%
Accommodation & food services	78	14.7%
Educational services	33	6.21%

Key Critical Infrastructure Facilities and Community Assets

Critical infrastructure and facility sites in Fredonia include the town hall, treatment facilities for water and sewage, a power substation, and the Fredonia Fire Station. The town is home to several community assets, including the Fredonia Moccasin Unified School District 6, the Church of Jesus Christ of Latter-Day Saints, Trinity Church, and the Fredonia Public Library, all of which also serve as emergency shelters for the town.

Population and Demographics

Fredonia has a population of 7,531 residents with a median household income of \$65,321 and a poverty rate of 17.2%.² The median age is 45.1 years, with 81.9% of residents aged 18 years and older, and 19.7% of residents aged 65 years and older.

The racial demographics of the town as reported by the U.S. Census Bureau are found below:

- White alone: 75.3%;
- American Indian and Alaska Native alone: 12.8%;
- Two or more races: 7.2%;
- Some other race alone: 4.7%.

Land Use and Development Trends

After experiencing a population decline in the 1980's, Fredonia has had a stable population over the past 10 years. There has been little development or change in land use.

¹⁸ Data USA, Fredonia, AZ

3.11.3 Page

Page is located at 36°54'51"N 111°27'35"W with a total area of 16.6 square miles. The city's elevation is 4,117 feet.

History

The City of Page was originally home to the Kaibab Paiute and Navajo tribes.

Unlike other cities in the area, Page was founded in 1957 as a housing community for workers and their families during the construction of nearby Glen Canyon Dam on the Colorado River. The city's 17 square mile (44 km²) site was obtained in a land exchange with the Navajo Nation. The city is perched atop Manson Mesa at an elevation of 4,300 feet above sea level and 600 feet above Lake Powell.

The city was originally called Government Camp, but was later named for John C. Page, commissioner of the Bureau of Reclamation. After the dam was completed in the 1960s the city was officially incorporated on March 1, 1975. It grew steadily to today's population of over 7,000 residents. The city has become the gateway to the Glen Canyon National Recreation Area and Lake Powell, attracting over three million visitors per year. Additionally, the city sits adjacent to Navajo Nation – the largest remaining Native American tribe.¹⁹

Government

The city government is organized under a city council-city manager form of government with seven council members. The Mayor and Vice Mayor are council members. Regular meetings of the city council are held on the second and fourth Tuesday of every month.

Economy

Tourism, hospitality, a thriving industrial park, the federal government, Lake Powell, and public facilities are major contributors to Page's economy. The city's workforce is skilled in education, health care, trades, and artistry. Scenic attractions include Lake Powell which has two marinas less than 15 minutes from the city. Other attractions include the John Wesley Powell Museum, Carl Hayden Visitor Center and Glen Canyon Dam. Page has a community center, a modern library, a recreation center and six parks. Banner Hospital and four local medical clinics support health needs. Major employer industries in 2018 are noted in the **Table 3-7** below.²⁰

Table 3-7: City of Page Major Employment Industries

Industry	Count	Percentage of Workforce
Accommodation & food services	811	22.6%
Educational services	474	13.2%
Retail trade	438	12.2%
Other services, except public administration	341	9.49%
Manufacturing	279	7.77%
Administrative & support & waste management services	260	7.24%

¹⁹ City of Page, [City of Page History](#)

²⁰ Data USA, Page, AZ

Industry	Count	Percentage of Workforce
Utilities	253	7.04%
Public administration	151	4.2%

Key Critical Infrastructure Facilities and Community Assets

Critical infrastructure and facility sites in Page include the city hall, hospital, facilities dedicated to the treatment and provision of water to the city, and power substation and generators to deliver power to the community. Page is also home to several community assets, including facilities that care for vulnerable populations including Beehive Assisted Living and Page Care Age. Assets include cultural buildings such as a museum, the Navajo Cultural Center, and educational facilities such as the Page Unified Campus. In addition to these facilities, Horseshoe Bend and Rim View Trail are both environmental community assets that serve as popular locations for visitors.

Population and Demographics

Page has a population of 1,040 residents with a median household income of \$42,197 and a poverty rate of 11.6%.³ The median age is 28.4 years, with 68.7% of residents aged 18 years and older, and 6.4% of residents aged 65 years and older.

The racial demographics of the city as reported by the U.S. Census Bureau are found below:

- American Indian and Alaska Native alone: 56.6%;
- White alone: 35.2%; Some other race alone: 3.7%;
- Two or more races: 3.0%;
- Asian alone: 0.9%;
- Black or African American alone: 0.6%.

Land Use and Development Trends

Page is currently planning development for areas south of the mesa along Highway 89 and southeast along the Highway 98 corridor. The [2006 City General Plan](#) states that expected overall population growth over the next 20 years would be approximately 10%.

3.11.4 Tusayan

Tusayan is located at 35°58'32"N 112°7'45"W. As an incorporated town, Tusayan has a land area of 144 acres making it the smallest town in Arizona by area.

History

Some of the earliest inhabitants of Tusayan were the Ancestral Puebloans, who are believed to be the ancestors of the Hopi, Zuni, and other Puebloan tribes. Tree-ring dating shows that the town of Tusayan was inhabited by 1185 CE and potentially earlier.²¹

Due to its close proximity to the Grand Canyon, George Reed, a Forest Service ranger working in the then-called Tusayan Forest Reserve settled a homestead and vegetable farm in the Coconino Wash. A new

²¹ Arizona State University, [Tusayan Ruin and Museum](#)

highway in 1928 connecting the Grand Canyon to nearby Williams brought new population growth, and Tusayan became a community.²² Tusayan incorporated in 2010 after 20 years of voter review/elections.

Government

The government consists of a town council and city manager. The five-member council directs the course of local governance through its power to pass ordinances, levy taxes, award contracts, and appoint certain town officers (such as the town manager, town attorney, and members of town committees and commissions). The mayor, who is elected directly, is a member of the council and acts as the official head of the town at public and ceremonial occasions. Regular town council meetings are held on the second Wednesday of the month.

The city is uniquely situated in that it does not have an emergency services department, but rather, a set of contracts for all major emergency services (i.e. fire, EMS, and police). The town manager’s office coordinates these emergency management functions with internal and external partners such as the Tusayan Police Department (TPD), Coconino County Sheriff’s Office (CCSO), Coconino County Emergency Management (CCEM), and Arizona Department of Transportation (ADOT). Additionally, Tusayan Fire District is a separate municipal district from the town which was established in 1996 at the request of the Grand Canyon National Park.²³ Utilities are contracted with regional partners such as Tusayan Sanitation District and Arizona Department of Transportation.

Economy

The economy of the town is almost exclusively based on tourism-related retail businesses. The town encompasses more than 1,000 hotel rooms with restaurants, gift shops, and entertainment establishments like an IMAX Theater. A number of tour operators offer unique jeep and horseback trips while aircraft companies provide exclusive plane and helicopter sightseeing experiences of the Grand Canyon. The town’s proximity to alpine and Nordic skiing facilities provides winter economic activity. The National Park Service and National Forest Service are major employers in this area. Additionally, a couple of cattle ranching enterprises contribute to the area’s economy. Major employer industries in 2018 are noted in the **Table 3-8** below.²⁴

Table 3-8: City of Tusayan Major Employment Industries

Industry	Count	Percentage of Workforce
Accommodation & food services	153	55%
Transportation & warehousing	18	6.47%
Public administration	17	6.12%
Healthcare & social assistance	16	5.76%
Educational services	15	5.4%
Administrative & support & waste management services	15	5.4%
Agricultural, forestry, fishing & hunting	14	5.04%

²² Town of Tusayan, [Tusayan Then and Now](#)

²³ Tusayan Fire Department

²⁴ Data USA, Tusayan, AZ

Industry	Count	Percentage of Workforce
Construction	12	4.32%

Key Critical Infrastructure Facilities and Community Assets

Critical infrastructure and facility sites in Tusayan include the town hall, the Tusayan Fire Department, Sanitation District, and the ADOT Airport. The town is serviced by APS Power, which is the only power feed for the town and surrounding populated areas such as Grand Canyon Village, Valle, Phantom Ranch, and Desert View. Tusayan is home to several hotels, restaurants, businesses, residences, and a gas station among other community assets. It is the largest concentration of tourist services for the entire Grand Canyon, including 1,100 hotel rooms. The forest surrounding the town includes several important visitor attractions for hunting, camping, hiking, and day use. The environment provides a major source of revenue for the town.

Population and Demographics

Tusayan has a population of 297 residents with a median household income of \$53,438 and a poverty rate of 20.9%.⁴ The median age is 42.3 years, with 97.6% of residents aged 18 years and older, and 10.1% of residents aged 65 years and older.

The racial demographics of the town as reported by the U.S. Census Bureau are found below:

- White alone: 62.6%;
- American Indian and Alaska Native alone: 15.2%;
- Some other race alone: 10.1%;
- Asian alone: 8.4%;
- Black or African American alone: 2.4%;
- Two or more races: 1.3%.

Land Use and Development Trends: Most of the land in the town is owned by federal or state government. Approximately 84% of land is comprised of the Kaibab National Forest. The Arizona Department of Transportation owns approximately 964 acres comprised of the Grand Canyon National Park Airport and the right-of way for State Highway 64. The Grand Canyon Unified School District owns 80 acres on the west side of the core area of town. The South Grand Canyon Sanitary District owns eight acres, also in the western portion of the core area. Most of the rest of the property is privately owned, including the Kotzin Ranch and Ten X Ranch parcels which together total approximately 355 acres.²⁵

The town has both benefited and been constrained by its position in the Kaibab National Forest. The forest provides a beautiful natural setting but limits the ability of the town to expand. There are few properties left in the core area of town with access appropriate for commercial or multi-family use. Ownership opportunity is also limited in the town due to the control of most of the land by only a few entities.

3.11.5 Williams

Williams is located at 35°14'58"N 112°11'24"W at 6,800 feet in elevation. Bill Williams Mountain rises to an elevation of 9,256 feet just south of Williams.

²⁵ [Tusayan General Plan 2024](#)

History

The City of Williams sits on land that was inhabited for thousands of years by several Native American tribes including the Yavapai, Hualapai, and Havasupai.²⁶

Founded in 1881, the city was named for William Sherley "Old Bill" Williams, a famous trapper, trader, scout and mountain man, who often trapped in the area. A statue of "Old Bill" stands in Monument Park, located on the west side of the city. The city was incorporated on July 9, 1901.

Williams was the last city whose section of Route 66 was bypassed, due to lawsuits that kept the last section of Interstate 40 in Arizona from being built around the city. After settlements called for the state to build three Williams exits, the suits were dropped, and I-40 was completed. On October 13, 1984, Interstate 40 was opened around the town and newspapers the next day reported the essential end of US 66. The following year, Route 66 was decommissioned. The Williams Historic Business District and Urban Route 66, Williams were added to the National Register of Historic Places in 1984 and 1989, respectively.

Government

The city has a city council/city manager form of government. The city council is the legislative body. The seven-member council oversee the operations of the city government and sets policy by approving programs, appropriating funds, enacting laws and appointing the city manager and other officers such as the city attorney. The mayor serves a two year term and council members serve overlapping four year terms. The city manager is appointed by, and serves at the pleasure of, the city council and is responsible for directing the city's daily operations.

Economy

Prior to the COVID-19 pandemic, Williams had an unemployment rate of 6.5%. The average median household income in the city is approximately \$44,375.²⁷ Major occupational industries include tourism and food service, retail trade, and transportation as delineated in **Table 3-9** below.²⁸

Table 3-9: City of Williams Major Employment Industries

Industry	Count	Percentage of Workforce
Accommodation & food services	271	18.8%
Retail trade	170	11.8%
Transportation & warehousing	143	9.9%
Healthcare & social assistance	120	8.3%
Public administration	114	7.89%
Agricultural, forestry, fishing & hunting	101	6.99%
Educational services	98	6.78%

²⁶ Legends of America, [Williams, Arizona – Gateway to the Grand Canyon](#)

²⁷ U.S. Census Bureau, [2019 American Community Survey 5-Year Estimates](#)

²⁸ Data USA, Williams, AZ

Key Critical Infrastructure Facilities and Community Assets

Critical infrastructure and facility sites in Williams include the city's water plant and distribution center, which provides clean and filtered water to the city, and the wastewater plant, which cleans city sewage and water for its return to the environment. Williams is home to community assets including Williams High School, which also acts as an emergency shelter for the community.

Population and Demographics

Williams has a population of 3,176 residents with a median household income of \$44,375 and a poverty rate of 24.9%.⁵ The median age is 42.1 years, with 73.1% of residents aged 18 years and older, and 19.6% of residents aged 65 years and older.

The racial demographics of the city as reported by the U.S. Census Bureau are found below:

- White alone: 75.7%;
- Some other race alone: 11.8%;
- American Indian and Alaska Native alone: 5.5%;
- Black or African American alone: 3.6%;
- Two or more races: 2.7%;
- Asian alone: 0.6%.

Land Use and Development Trends

Williams has an area of approximately 48 square miles, or 28,800 acres. Nearly 90% of the community's area is federal land. 25,600 acres of the Kaibab National Forest are within the municipal boundaries, surrounding the developed portions of the community. Currently, developed land use concentrates in a compact core area of approximately 3,200 acres or 11% of the city. There are a variety of uses in that limited area ranging from commercial enterprises to housing.

The [city general plan](#) projects development that will:

- Emphasize economic development opportunities on prime sites;
- Focus on scenic and historic qualities to increase tourism;
- Encourage strategically placed homebuilding for the local workforce;
- Keep an open mind for creative, innovative development proposals.

Section 4: Hazard Analysis and Risk Assessment

The risk assessment for the County and participating jurisdictions was performed using a County-wide, multi-jurisdictional process, with much of the information gathering and analysis accomplished by the Planning Team. This integrated approach was employed because many hazard events are likely to affect numerous jurisdictions within the County and are not often relegated to a single jurisdictional boundary. The vulnerability analysis was performed to reflect vulnerability at an individual jurisdictional level, and at a County-wide level.

4.1 Emergency and Disaster Declaration History

The Planning Team was able to identify the chronology of past hazard events. **Table 4.1** contains a history of State and Federal Disaster Declarations in the County (2010-Present).

Table 4-1: State and Federal Disaster Declarations for Coconino County (2010-Present)

Disaster Declaration	Hazard	Date	Details
Arizona Severe Winter Storms and Flooding DR-1888-AZ	Snowstorm/ Flooding	January 2010	The state declared an emergency during a severe winter storm lasting January 18 – January 22, 2010. This was followed by a major disaster declaration on March 18, 2010.
Arizona Hardy Fire FM-2845-AZ	Fire	June 2010	An FMA Declaration was issued for the Arizona Hardy Fire during the incident period of June 20 – June 26, 2010.
Arizona Schultz Fire FM-2846-AZ	Fire	June 2010	An FMA Declaration was issued for the Arizona Schultz Fire during the incident period of June 19 – June 30, 2010.
Arizona Severe Storms and Flooding FM-1940-DR-AZ	Storms/ Flooding	October 2010	Severe storms and flooding caused a post-fire flooding emergency due to significant amounts of rainfall on the burn area of the Schultz Fire. This prompted the state to issue a major disaster declaration on July 21st for the period of July 20 – August 7, 2010. The President declared a major disaster on October 4, 2010.
Arizona Severe Storms and Flooding DR-1950-AZ	Storms/ Flooding	November 2010	The Governor of Arizona requested a major disaster declaration due to flash flooding for the Sovereign Tribal Nation of the Havasupai Tribe. The President of the United States declared a major disaster in December, making additional support available.
Same as above	Storms/ Flooding	December 2010	Severe storms and flooding throughout the state prompted the State to declare a major disaster for the period of October 3 – October 6, 2010.
Campbell Avenue Flooding 73006	Flooding	September 2011	Heavy rainfall near the Schultz Fire burn area caused significant flooding on Campbell Avenue, prompting an emergency declaration.
Operation Winter Freeze 73013	Winter freeze	February 2013	A period of extreme sub-freezing temperatures began on January 12, 2013 in much of Northern Arizona, including all of the Hopi and Navajo Nation. The Navajo Nation requested a major disaster declaration due to a severe freeze. The President of the United States declared that a major disaster exists in the lands associated with the Navajo Nation, making additional support available.
Highway 89 Collapse 73014	Landslide	February 2013	A landslide caused significant portions of Highway 89 to collapse, prompting the state to issue an emergency declaration.

Disaster Declaration	Hazard	Date	Details
Arizona Slide Fire FM-5083-AZ	Fire	May 2014	An FMA Declaration was issued for the Arizona Slide Fire during the incident period of May 20 through June 4, 2014.
Arizona Severe Storms & Flooding DR- 4203-AZ	Storms/ Flooding	November 2014	Severe storms and flooding prompted the state to declare a major disaster for the period of September 7 – 9, 2014.
Tinder Fire FM-5236-AZ	Fire	April 2018	The Governor of Arizona declared a State of Emergency in response to the Tinder Fire in the County.
Coconino County Flooding EM-73048-AZ	Flooding	July 2018	The Governor of Arizona declared a State of Emergency due to severe flooding in the County, making state resources for support available.
Havasupai Tribe Severe Storms, Flooding, And Landslides DR-4389-AZ	Storms/ Flooding/ Landslides	August 2018	The Havasupai Tribe declared a major disaster due to severe floods, storms, and landslides and requested assistance. The President of the United States declared a major disaster in the Sovereign Nation of the Havasupai tribe, making support available.
Emergency Disaster Declaration EM-73052-AZ	Snowstorm	February 2019	The Coconino County Board of Supervisors affirmed a State of Emergency Declaration due to a major snowstorm. A major disaster declaration was issued on May 21, 2019 covering the incident period of February 21 – 24, 2019.
Arizona Museum Fire FM-5284-AZ	Fire	July 2019	An FMA Declaration was issued for the Arizona Museum Fire during the incident period of July 22, 2019 to present.
Tropical Storm Lorena Flooding SD2003	Flooding	October 2019	Heavy rains caused by remnants of Tropical Storm Lorena caused severe flooding in the County.
Natural Disaster Area Designation	Drought	November 2019	The US Agriculture Secretary designated the County as a natural disaster area due to drought conditions.
Arizona Covid-19 EM-3442-AZ	Pandemic	March 2020	The County Board of Supervisors declared a State of Emergency due to the outbreak of COVID-19.
Arizona Covid-19 Pandemic DR-4524-AZ	Pandemic	April 2020	The President of the United States approved the state's request for a Presidential Major Disaster Declaration due to the outbreak of COVID-19 in the state.
Records of Disaster Declarations found at: FEMA Disaster Information , Arizona Department of Military Affairs			

4.2 Hazard Identification

For this MJHMP, the list of hazards identified in the 2015 MJHMP was reviewed by the Planning Team with the goal of refining the list to reflect the hazards that pose the greatest risk. This update provides an all-hazards approach. Hazard identification included an initial Planning Team screening process to evaluate potential hazards based on the following considerations:

- Knowledge on behalf of the Planning Team about risk associated with each hazard;
- Past events (especially events that have occurred during the last plan cycle);
- The ability/desire of Planning Team to develop effective mitigation actions for hazard.

To support hazard identification, the 2015 MJHMP disaster events were reviewed and updated.

Table 4-2: State and Federally Declared Disasters Including Coconino County (1967-2020)

Hazard	Number of Declarations	Fatalities	Damage Costs (\$)
Dam Failure	1	0	Not Available
Drought	4	0	\$303,000,000
Earthquake	2	0	Not Available
Flooding / Flash Flooding	12	23	\$889,650,000
Severe Wind	1	0	Not Available
Snowstorm	7	12	\$14,960,904
Transportation Accident	2	25	Not Available
Wildland Fire	25	0	\$34,070,000

Source: DEMA Operations Branch

The Planning Team reviewed hazards from the 2015 MJHMP and several potential new hazards (many specifically identified by the local jurisdictions) including Aviation Accident, Climate Change, Extended Power Outage, Excessive Heat, Public Health Outbreak/Pandemic, and Terrorism. Additionally, the Planning Team greatly emphasized and expanded the scope of Flooding Hazards to include specific considerations for both Wildland Fire and Post-Wildfire Flooding and Debris Flows. The hazard titles for Earthquake and Transportation Accident were also updated for greater accuracy, as seen in **Table 4-4**.

The risk for each of these hazards was analyzed using a Calculated Priority Risk Index (CPRI). The CPRI examines four criteria for each hazard (probability, magnitude/severity, warning time, and duration), detailed in **Table 4-3**. The process for conducting the CPRI analysis is described below.

Calculated Priority Risk Index (CPRI) Analysis Process

1. Hazards are rated 1 to 4 in whole numbers for each CPRI category using definitions in **Table 4-3**;
2. Each category is weighted by a percentage (see **Table 4-3**). Ratings and their weighted scores (weight x rating) are captured for each hazard;
3. The weighted scores for each hazard are summed to create a cumulative weighted score. This score represents the comparative risk posed by a hazard where 1–1.9 is low risk (L), 2–2.9 is moderate risk (M), 3–3.9 is high risk (H), and 4 is severe risk (S).

The results of the County CPRI are in **Table 4-4** and provide an overall summary for the planning area. The results for all other jurisdictions are summarized in the vulnerability element of each hazard description.

It is to be emphasized that the County recognizes the four new manmade hazards that were compiled by the five remaining individual jurisdictions – Aviation Accident, Climate Change, Extended Power Outage, and Terrorism. However, they are NOT included in the County’s ten principal hazards for purposes of the new MJHMP. For clarity, these hazards have been separated in **Table 4-4**.

Table 4-3: Calculated Priority Risk Index

CPRI Category	Degree of Risk Chart			Assigned Weight
	Level ID	Description	Index Rating	
Probability	Unlikely	Extremely rare with no documented history of occurrences or events. Annual probability less than 0.001.	1	45%
	Possible	Rare occurrences with at least one documented or anecdotal historic event. Annual probability of between 0.01 and 0.001.	2	
	Likely	Occasional occurrence with at least two or more documented historical events. Annual probability of between 0.1 and 0.01.	3	
	Highly Likely	Frequent events with a well-documented history of occurrence. Annual probability of 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 (between 5% and 25%) of critical and non-critical facilities and infrastructure). Injuries and 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 one day and less than one week.	2	
	Critical	Moderate property damages (between 25% and 50%) of critical and non-critical facilities and infrastructures). Injuries or illnesses result in permanent disability and at least one death. Shut down of critical facilities for more than one week and less than one month.	3	
	Catastrophic	Severe property damages (>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 one month.	4	
Warning Time	> than 24 hours	Population receives greater than 24 hours of warning.	1	15%
	12 to 24 hours	Population receives between 12 and 24 hours of warning.	2	
	6 to 12 hours	Population receives between six and 12 hours of warning.	3	
	< than 6 hours	Population receives less than six hours of warning.	4	
Duration	< than 6 hours	Disaster event will last less than six hours.	1	10%
	6 to 24 hours	Disaster event will last between six and 24 hours.	2	
	24 hrs. to 1 week	Disaster event will last between 24 hours and one week.	3	
	> than 1 week	Disaster event will last more than one week.	4	

Table 4-4: CPRI Results

Hazard	Category and Weight					Cumulative Weighted Score	Risk Level
	Probability	Magnitude/Severity	Warning Time	Duration			
<i>Index Rating (R) Weighted Score (WS)</i>	45%	30%	15%	10%			
Wildland Fire	R	4	4	4	4	4.0	S
	WS	1.8	1.2	.6	.4		
Flood / Flash Flood and Post Wildfire Flood / Debris Flows	R	4	3	4	4	3.9	H
	WS	1.8	.9	.6	.4		
Drought	R	4	4	1	4	3.55	H
	WS	1.8	1.2	.15	.4		
Public Health Outbreak / Pandemic	R	2	4	4	4	3.55	H
	WS	1.35	1.2	.6	.4		
Excessive Heat	R	4	3	1	4	3.25	H
	WS	1.8	.9	.15	.4		
HAZMAT / Pipeline Failure / Transport Accident	R	4	2	4	2	3.2	H
	WS	1.8	.6	.6	.2		
Winter Storm	R	4	4	1	3	3.15	H
	WS	1.8	.9	.15	.3		
Dam Failure	R	1	4	3	4	2.5	M
	WS	.45	1.2	.45	.4		
Earthquake and Seismic Hazards	R	3	1	4	2	2.45	M
	WS	1.35	.3	.6	.2		
High Winds / Tornado	R	2	3	3	2	2.45	M
	WS	.9	.9	.45	.2		
Climate Change	R	4	4	1	4	3.55	H
	WS	1.8	1.2	.15	.4		
Extended Power Outage	R	2	3	4	4	2.8	M
	WS	.9	.9	.6	.4		
Aviation Accident	R	1	4	4	2	2.45	M
	WS	.45	1.2	.6	.2		
Terrorism/Active-Shooter	R	1	4	4	1	2.35	M
	WS	.45	1.2	.6	.1		

Table 4-5: CPRI Hazard Risk Scoring

Risk Level	Severe	High	Moderate	Low
Rank Score	4.0	3.0 – 3.9	2 – 2.9	1 – 1.9

Each jurisdiction considered which of the analyzed hazards posed a significant enough risk to their specific community to warrant mitigation efforts. Below is a summary of the hazards selected for mitigation by each jurisdiction. These selections are the basis for each jurisdictions’ mitigation strategy. Final hazard selection was based on the individual jurisdiction CPRI, input provided during Planning Team meetings, and follow-up mitigation activity development.

Table 4-6: Hazards by Jurisdiction

Jurisdiction/ Hazard	Aircraft Accident	Climate Change	Dam Failure	Drought	Earthquake/ Seismic Hazards	Extended Power Outage	Excessive Heat	Flood / Flash Flood / Debris Flow	HAZMAT / Pipeline / Transport Accident	High Winds / Tornado	Public Health Outbreak	Terrorism	Wildland Fire	Winter Storm
Coconino County	*	**	X	X	X	*	X	X	X	X	X	*	X	X
Flagstaff	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Fredonia		X	X		X	X	X	X	X				X	X
Page			X	X	X		X	X	X	X	X	X	X	
Tusayan	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Williams		X	X	X	X	X	X	X	X	X	X	X	X	X

* Coconino County acknowledges the risk posed by these man-made and technological hazards to the jurisdiction. However, in alignment with DMA 2000, it has selected to address these hazards through other planning mechanisms and initiatives.

** Coconino County acknowledges the risk posed by climate change. For the purposes of this plan, it has elected to address this risk through mitigation of the natural hazards known to be exacerbated by climate change, as outlined in the hazard descriptions that follow.

4.3 Hazard Risk Profiles

The requirements for hazard profiles are stipulated in DMA 2000 and its implementing regulations. The hazards that the hazard mitigation team selected for the 2021 MJHMP have been profiled using federal, state, regional, and local resources that have mapped, documented, or reported on hazards. Both natural and man-made hazards are included. The hazard profiles consist of describing the nature of each hazard and include the following:

- Description;
- History;
- Location;
- Extent;
- Regulatory context (as applicable);
- Probability of future events;
- Vulnerability;
- Loss estimates.

The sources of information used to prepare this section of the MJHMP are cited as footnotes and integrated as hyperlinks throughout the document.

4.3.1 Aviation Accident

Description

The National Transportation Safety Board defines an airplane accident as an occurrence associated with the operation of an aircraft that takes place between the time any person boards the aircraft with the intention of flight and all such persons have disembarked, and in which any person suffers death or serious injury, or in which the aircraft receives substantial damage (see 49 CFR 830).

History

The County has had at least ten aviation accidents in the past 25 years. The majority of these accidents were minor and resulted in no injuries or fatalities. However, there have been significant historical aviation accidents resulting in loss of life involving the county. An example is the historic 1956 aviation crash over the Grand Canyon. On June 30, 1956, a Trans World Airline flight collided with a United Air Lines flight in mid-air due to failed safety systems. This resulted in 128 fatalities.

Recent examples of aviation accidents in the county include the following:

- **February 8, 2019** – A Kitfox plane crash landed on a dirt road in Page, Arizona while on route to Buckeye Municipal Airport. No injuries were sustained;
- **November 14, 2018** – A Beechcraft plane from KCMR airport in Williams, Arizona struck the tree line near the airport fence on takeoff. The plane crash-landed and minor injuries were sustained;
- **August 2, 2016** – A Piper PA-34-200T Seneca II plane was destroyed upon impact with trees and terrain shortly after taking off from Flagstaff Pulliam Airport. The airline transport pilot received fatal injuries.

Location

- **Flagstaff Pulliam Airport (FLG)** – [FLG](#) is a commercial airport offering flights to/from Denver, Phoenix, and Dallas. The airport covers 763 acres with one runway, 3/21 measuring 8,800 ft x 150 ft of asphalt.
- **Grand Canyon National (GCN)** – [GCN](#) is the only state-owned airport in Arizona located in Tusayan, Arizona. The airport covers 859 acres and has one runway, 3/21 measuring 8,999 ft x 150 ft of asphalt.
- **Page Municipal Airport (PGA)** – [PGA](#) is a commercial service airport with daily flights to Las Vegas and Phoenix. The airport covers 536 acres and has two runways, 15/33 measuring 5,950 ft x 150 ft, and 07/25 measuring 2,200 ft x 75 ft.
- **H. A. Clark Memorial Field Airport (KCMR)** – [KCMR](#) is a public-use airport located in Williams, Arizona that covers 303 acres and servicing one runway, 18/36 which measures 6,000 ft x 100 ft.

Extent

In aviation, an accident is defined by the Convention on International Civil Aviation Annex 13 as an occurrence associated with the operation of an aircraft, which takes place from the time any person boards the aircraft with the intention of flight until all such persons have disembarked, and in which a) a person is fatally or seriously injured, b) the aircraft sustains significant damage or structural failure, or c) the aircraft goes missing or becomes completely inaccessible. Annex 13 defines an incident as an occurrence, other than an accident, associated with the operation of an aircraft that affects or could affect the safety of operation. A hull loss occurs if an aircraft is destroyed, damaged beyond repair, lost, or becomes completely inaccessible.

Although a crash by aircraft operated from a County Airport would be traumatic for the immediate impact area, it is not expected that this would have a long-term impact on service operations within the vicinity. The crash of a major airliner within a city would be catastrophic. A large area would be affected with plane wreckage, burning fuel, destroyed buildings, and casualties beyond the capability of local fire and emergency medical services personnel. Media attention would be overwhelming. Any air accident will involve coordination among federal, state, and local agencies to provide the necessary resources to manage such an event. Mass casualty transportation accidents typically require these agencies to establish a unified command post; activate disaster mortuary teams; set up medical stations; and develop a plan for moving patients and resources.

Regulatory Context

14 CFR Part 139 requires the FAA to issue airport operating certificates to airports that:

- Serve scheduled and unscheduled air carrier aircraft with more than thirty (30) seats;
- Serve scheduled air carrier operations in aircraft with more than nine seats but less than 31 seats
- The FAA Administrator requires to have a certificate.

This part does not apply to airports at which air carrier passenger operations are conducted only because the airport has been designated as an alternate airport.

Airport Operating Certificates serve to ensure safety in air transportation. To obtain a certificate, an airport must agree to certain operational and safety standards and provide for such things as firefighting and rescue equipment. These requirements vary depending on the size of the airport and the type of flights available. FAA Circular 150 Series provides detailed guidance on airport operations and management.

Probability of Future Events

Based upon hazard history, an aviation accident is likely to occur at least once in an average of 2.5 years.

Vulnerability

Table 4-7 contains an analysis of Planning Team jurisdiction vulnerability to aviation incident.

Table 4-7: CPRI Rating for Aviation Accident

Jurisdiction	Probability	Magnitude/ Severity	Warning Time	Duration	CPRI Score
Coconino County	.45	1.2	.6	.2	2.45
Flagstaff	1.35	1.2	.6	.2	3.35
Fredonia	.45	.3	.6	.2	1.55
Page	.9	.9	.6	.2	2.6
Tusayan	1.35	.9	.6	.2	3.05
Williams	.9	.6	.6	.2	2.3
County-wide average CPRI =					2.55
<i>Jurisdictions in bold print indicate they will be assessing the hazard and including mitigation activities for it.</i>					
<i>Note: Maximum CPRI score is 4.00.</i>					

Loss Estimates

Loss estimates for aviation accidents are difficult to predict. Most aviation accidents involve small, non-commercial aircraft with limited passengers and crew. Large passenger aircraft may have as many as a few hundred passengers and crew. Buildings and facilities at or near crash sites are also potentially at risk although few crashes have resulted in extensive damage to ground facilities or casualties of people on the ground.

Development Trend Analysis

Due to the continuing expansion of metropolitan areas within the County, such as Flagstaff, and the popularity of local tourist destinations such as Grand Canyon National Park, there is steady growth in both air traffic and the size of nearby urbanized areas. This inherently increases the risk of aviation accidents affecting the broader Coconino population. However, since most airports are located well outside densely populated areas, the increase in risk caused by the described increase in risk exposure is minimal on average and geographically specific.

4.3.2 Climate Change

Description

The earth's climate is changing. The state has warmed about two degrees Fahrenheit (°F) in the last century. Throughout the southwestern United States, heat waves are becoming more common, and snow is melting earlier in spring. In the coming decades, changing climate is likely to decrease the flow of water in the Colorado River, threaten the health of livestock, increase the frequency and intensity of wildland fire, and convert some rangelands to desert.

Our climate is changing because the earth is warming. People have increased the amount of carbon dioxide in the air by 40% since the late 1700s. Other heat-trapping greenhouse gases are also increasing. These gases have warmed the surface and lower atmosphere of our planet about one degree during the last 50 years. Evaporation increases as the atmosphere warms, which increases humidity, average rainfall, and the frequency of heavy rainstorms in many places, but contributes to drought in others. Greenhouse gases are also changing the world's oceans and ice cover. Carbon dioxide reacts with water to form carbonic acid, so the oceans are becoming more acidic. The surface of the ocean has warmed about one degree during the last 80 years.

The U.S. Environmental Protection Agency (EPA) describes climate change as "any significant change in the measures of climate lasting for an extended period of time. In other words, climate change includes major changes in temperature, precipitation, or wind patterns, among other effects, that occur over several decades or longer."

Many people confuse climate change with global warming, the recent and ongoing rise in global average temperatures near earth's surface. However, global warming represents only one aspect of climate change. The earth's average temperature has risen by 1.4°F over the past century and is projected to rise another 2°F to 11.5°F over the next hundred years. Rising global temperatures have been accompanied by changes in weather and climate. Many places have seen changes in rainfall resulting in more floods, droughts, or intense rain, as well as more frequent and severe heat waves. The planet's oceans and glaciers have also experienced changes. Oceans are warming and becoming more acidic, ice caps are melting, and sea levels are rising. The effects of these indicators include:

- **Greenhouse Gases** – Human activities have increased the emissions of greenhouse gases. As a result of the increase in emissions, average concentrations of heat-trapping gases in the atmosphere are also increasing.

- **Weather and Climate** – Average U.S. and global temperatures are increasing, while attributes of weather and climate, such as precipitation, drought, and tropical cyclone activity, are changing.
- **Oceans** – Average oceanic temperatures are increasing. Sea levels are rising around the world due to thermal expansion and increases from ice melt, and waters are becoming more acidic.
- **Snow and Ice** – Glaciers in the U.S. and around the world are generally shrinking, while snowfall and snow cover in the U.S. have decreased overall. The extent of the Arctic Sea ice is declining.
- **Health and Society** – Warmer temperatures and later fall frosts allow ragweed plants to produce pollen later into the year, potentially prolonging allergy season. The length of ragweed pollen season has increased at ten out of eleven (10/11) locations studied in the central U.S. and Canada since 1995. The change becomes more pronounced from south to north.
- **Ecosystems** – Many areas are experiencing earlier spring events, such as peak stream runoff and flower blooms. Bird migration patterns are changing, and wildland fire zone size has increased.

History

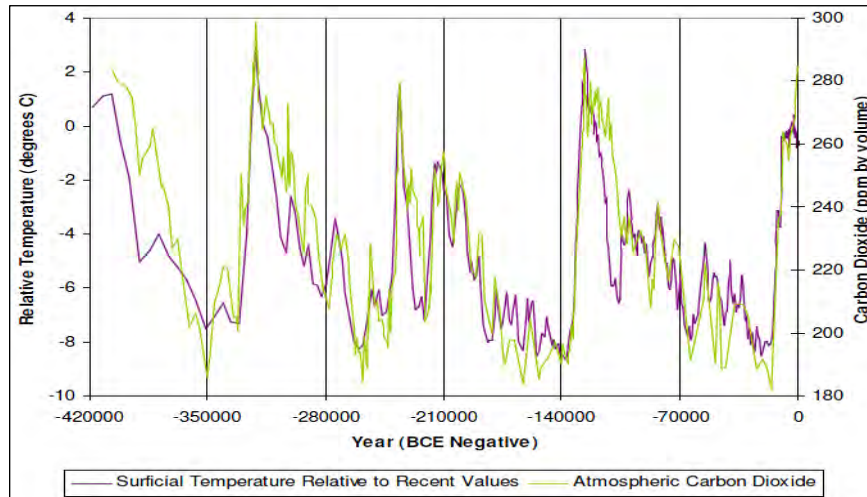
Climate change has occurred throughout the history of the planet. Due to variations in the earth's inclination to the sun, volcanic activity, and other factors such as asteroid impacts, the amount of solar radiation reaching the earth's surface rises and falls. The temperature of the planet correlates to the amount of solar radiation arriving at the surface and with it the climate.

In relatively recent history, the last glacial period, popularly known as the Ice Age, occurred from c. 110,000 to 12,000 years ago. This most recent glacial period is part of a larger pattern of glacial and interglacial periods known as the Quaternary glaciation (c. 2,588,000 years ago to present). From this point of view, scientists consider this "ice age" to be merely the latest glaciation event in a much larger ice age, one that dates back over two million years and is still ongoing.

During this last glacial period, there were several changes between glacier advance and retreat. The Last Glacial Maximum, the maximum extent of glaciation within the last glacial period, was approximately 22,000 years ago. While the general pattern of global cooling and glacier advance was similar, local differences in the development of glacier advance and retreat make it difficult to compare the details from continent to continent. Generally, the pattern of temperature variation and glaciation has lagged atmospheric carbon dioxide (CO₂) content. **Figure 4.1** depicts global variations during the past 400,000 years as a correlation between temperature and atmospheric CO₂ content in part per million.²⁹

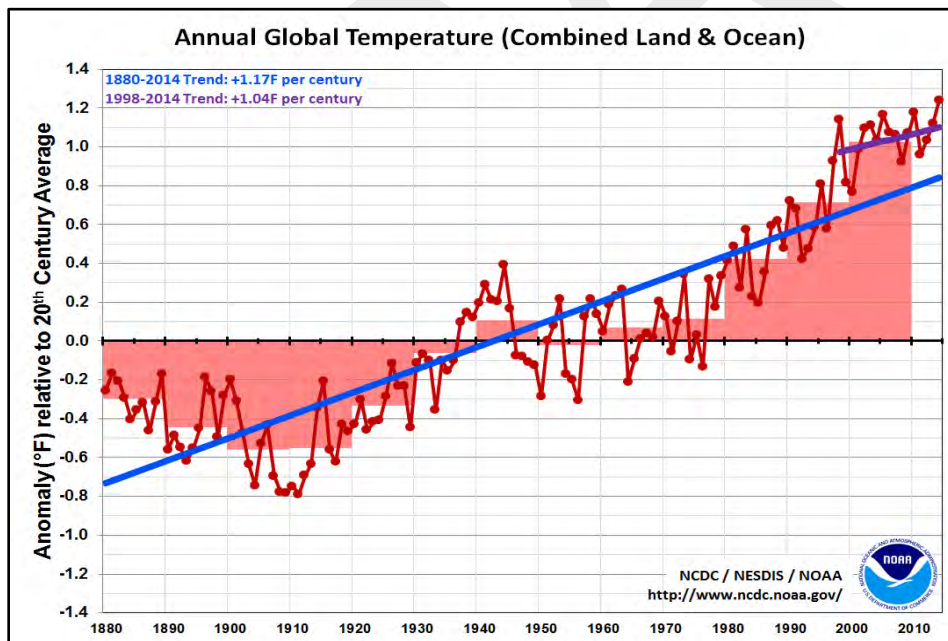
²⁹ Hogg, A.M., 2008, Glacial cycles and carbon dioxide: A conceptual model. *Geophysical Research Letters*, 35, L01701

Figure 4.1: Temperature and Atmospheric CO2 Variation Past 400,000 Years



Starting 22,000 years ago, the planet has slowly warmed and the glaciers retreated to high northern latitudes and mountains. In the last several decades of this period, human activity has likely led to a rapid increase in atmospheric CO₂ and a matching rise in global temperature. The result has been that climate change may be accelerating. **Figure 4.2** provides a graphical depiction of the history of temperature rise.³⁰

Figure 4.2: Annual Global Temperature



³⁰ NOAA, 2010, Global Climate Report

Location

Warming and climate change are occurring globally with wide variations based on location and latitude. The polar regions have experienced particularly rapid changes in climate with increased ice melt and more sea-ice free days. Climate change affects the entire planning area.

Extent

Climate change is likely to affect the entire earth's population. More widespread drought and associated crop failure, movement of invasive species, more frequent wildland fire, increased energy emergencies, and more intense climate events such as storms and extreme heat will occur throughout the County. Specific likely impacts the County include:

- **Agriculture** – Increasing droughts and higher temperatures are likely to affect top agricultural products, cattle and lumber. Hot temperatures threaten cows' health and cause them to eat less, grow more slowly, and produce less milk. Livestock operations could also be impaired by fire, the lack of water, and changes in the landscape from grassland to woody shrubs more typical of a desert. Reduced availability of water would also create challenges for irrigated farms.
- **Wildland fires and Changing Landscapes** – Higher temperatures and drought are likely to increase the severity, frequency, and extent of wildland fire, which could harm property, livelihoods, and human health. On average, more than two percent of the land in Arizona has burned per decade since 1984. Wildland fire smoke can reduce air quality and increase medical visits for chest pains, respiratory problems, and heart problems. The combination of more fires and drier conditions may expand deserts and otherwise change parts of the County's landscape. Many plants and animals living in arid lands are already near the limits of what they can tolerate. A warmer and drier climate would generally extend deserts to higher elevations and expand their geographic ranges. In some cases, native vegetation may persist and delay or prevent expansion of the desert. In other cases, fires or livestock grazing may accelerate conversion of grassland to desert in response to a changing climate. For similar reasons, some forests may change to desert or grassland.
- **Pests** – Warmer and drier conditions make forests more susceptible to pests. Drought reduces the ability of trees to mount a defense against attacks from pests such as bark beetles, which have infested 100,000s of acres in Arizona. Temperature controls the life cycle and winter mortality rates of many pests. With higher winter temperatures, some pests can persist year-round, and new pests and diseases may become established.
- **Human Health** – Hot days can be unhealthy, even deadly. Certain people are especially vulnerable, including children, the elderly, the sick, and the poor. High air temperatures can cause heat stroke and dehydration, and affect people's cardiovascular, respiratory, and nervous systems. Higher temperatures are amplified in urban settings where paved and other surfaces tend to store heat. Construction crews may have to increasingly operate on altered time schedules to avoid the heat of the day.
- **Air Quality** – Rising temperatures can increase the formation of ground-level ozone, a key component of smog. Ozone has a variety of health effects, aggravates lung diseases such as asthma, and increases the risk of premature death from heart or lung disease. U.S. EPA and the Arizona Department of Environmental Quality (ADEQ) have been working to reduce ozone concentrations. As the climate changes, continued progress toward clean air will be more difficult.

Regulatory Context

Table 4-8 contains state-wide regulations and guidance for climate change.

Table 4-8: Statewide Climate Guidance

Resource Name	Sector(s) Covered	Date
Arizona Climate and Health Adaption Plan 2017	Public health	April 2017
Arizona Extreme Weather, Climate, and Health Profile Report	Public health, frontline communities	March 2015
Preliminary Study of Climate Adaption for the Statewide Transportation System in Arizona	Emergency preparedness, land use and built environment, transportation	March 2013

In 2018, Flagstaff adopted its own [Climate Action and Adoption Plan](#).

Probability of Future Events

Climate change is an ongoing occurrence. Essentially, it has occurred, is occurring and will continue to occur for several decades, centuries or longer. Climate change is ongoing. While individual impacts of climate change may be seen as discreet events such as drought or excessive heat, climate change is a continuous process.

Vulnerability

Table 4-9 provides an analysis of the vulnerability of the Planning Team’s jurisdictions to climate change.

Table 4-9: CPRI Rating for Climate Change

Jurisdiction	Probability	Magnitude/ Severity	Warning Time	Duration	CPRI Score
Coconino County	1.8	1.2	.15	.4	3.55
Flagstaff	1.8	1.2	.15	.4	3.55
Fredonia	1.35	.6	.6	.3	2.85
Page	.45	.3	.6	.4	1.3
Tusayan	1.8	1.2	.15	.4	3.55
Williams	1.8	.9	.15	.4	3.25
County-wide average CPRI =					3.01
<i>Jurisdictions in bold print indicate they will be assessing the hazard and including mitigation activities for it.</i>					
<i>Note: Maximum CPRI score is 4.00.</i>					

Loss Estimates

Losses from climate change are difficult to separate from the hazards that it exacerbates, drought, wildland fire and extreme heat. Losses associated with climate change induced severity and occurrence of these hazards can run into the millions of dollars and result in injuries and fatalities.

Developmental Trends

Climate change is accelerating. The effects of climate change will become more pronounced as the amount of atmospheric greenhouse gasses increases and global temperatures continue to rise. Programs to reduce greenhouse gas emissions have had only a small impact in slowing the quickening pace of gasses release annually. Additionally, the warming effect of greenhouse gasses lags the actual increase in the

amount released, meaning that a return to cooler temperatures will occur long after the maximum concentration of gasses takes place and at a slower pace than the increase.

4.3.3 Dam Failure

Description

A dam failure is the structural collapse of a dam that releases the water stored in the impounded reservoir. Dam failures usually result due to the age of the structure, inadequate spillway capacity used in construction, or structural damage caused by an earthquake or flood. When a dam fails, large quantities of water may be suddenly released with a great potential to cause human casualties, economic loss, and environmental damage. This type of disaster is especially dangerous because it can occur suddenly, providing little warning or evacuation time for the downstream communities. The flows resulting from dam failure generally are much larger than the capacity of the downstream channels and therefore lead to extensive flooding. Flood damage occurs as a result of the momentum of the torrent caused by the sediment-laden water flooding over the channel banks and the impact of debris carried by the flow.

History

The County has a limited history of dam failures that caused damaging inundation of downstream properties. The only recorded dam failure recorded was a cattle water tank impounded by what is known as the Redlands Dam.

During August 16, 2008, heavy rain from thunderstorms over the Cataract Creek and Havasu Creek drainages caused flash flooding that started in the Village of Supai at approximately 11:30 PM MST. The flooding lasted several days and caused damage to homes in the Village of Supai. There was extensive damage to Havasu Canyon and the campground below the village. Many campers were stranded during the night in trees and on picnic tables. Approximately 426 people were evacuated by helicopter and there was significant damage to the landscape.³¹ The Redlands Dam on Cataract Creek miles upstream of the Village of Supai breached and was initially assumed to have been the cause of flooding in Supai. However, the breach was later determined to be of little consequence to flooding in Supai. The National Weather Service stated they were alerted that the dam collapsed three hours after the major flood caused damage to the nearby campground.³²

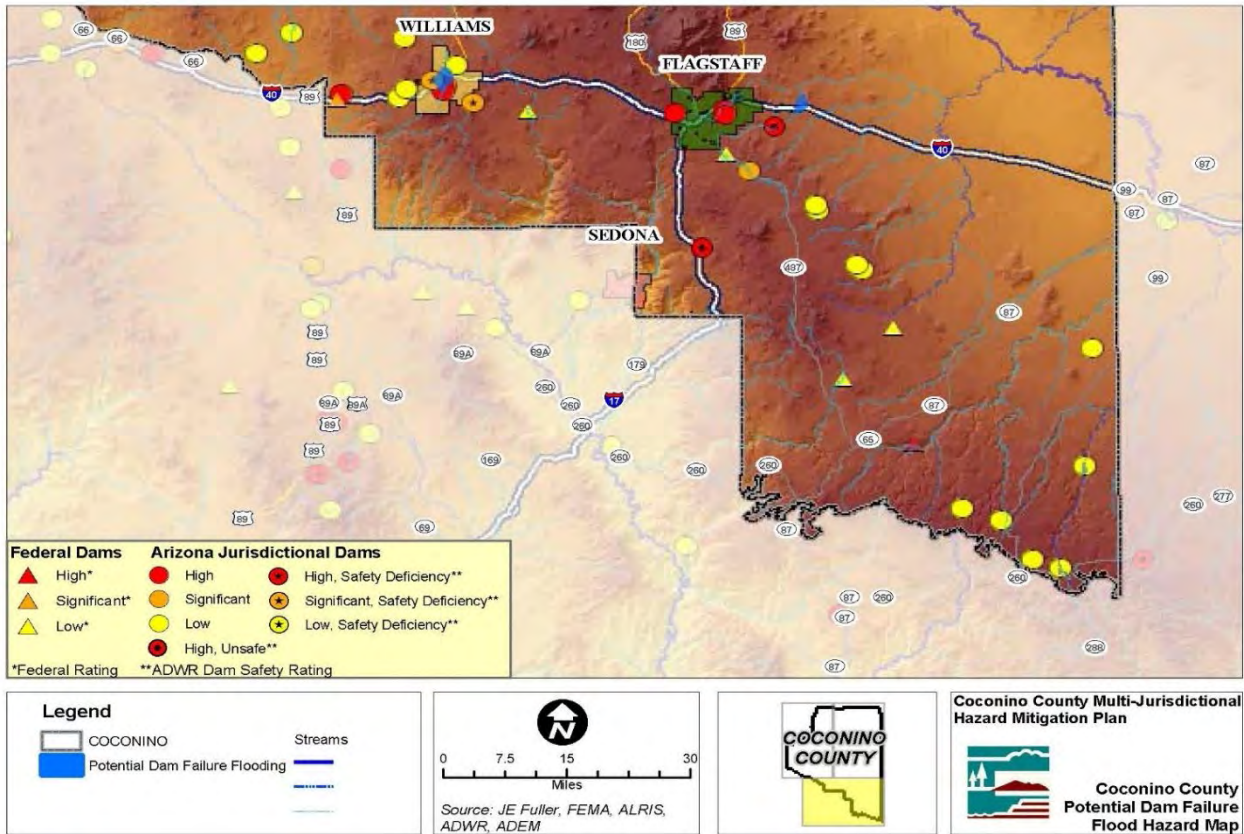
Location

Based on the National Inventory of Dams (NID) database, there are 45 dams in the County. Of the 45 dams, 13 are under federal jurisdiction. **Figures 4.3** through **Figure 4.5** provide the location of the dams.

³¹ FEMA, July 2013, [Federal Guidelines for Inundation Mapping of Flood Risks Associated with Dam Incidents and Failures](#)

³² New York Times, September 2, 2008, [New Interest in Warning System After Grand Canyon Flood](#)

Figure 4.3: Potential Dam Failure Flood Hazard 1



DRAFT

Figure 4.4: Potential Dam Failure Flood Hazard 2

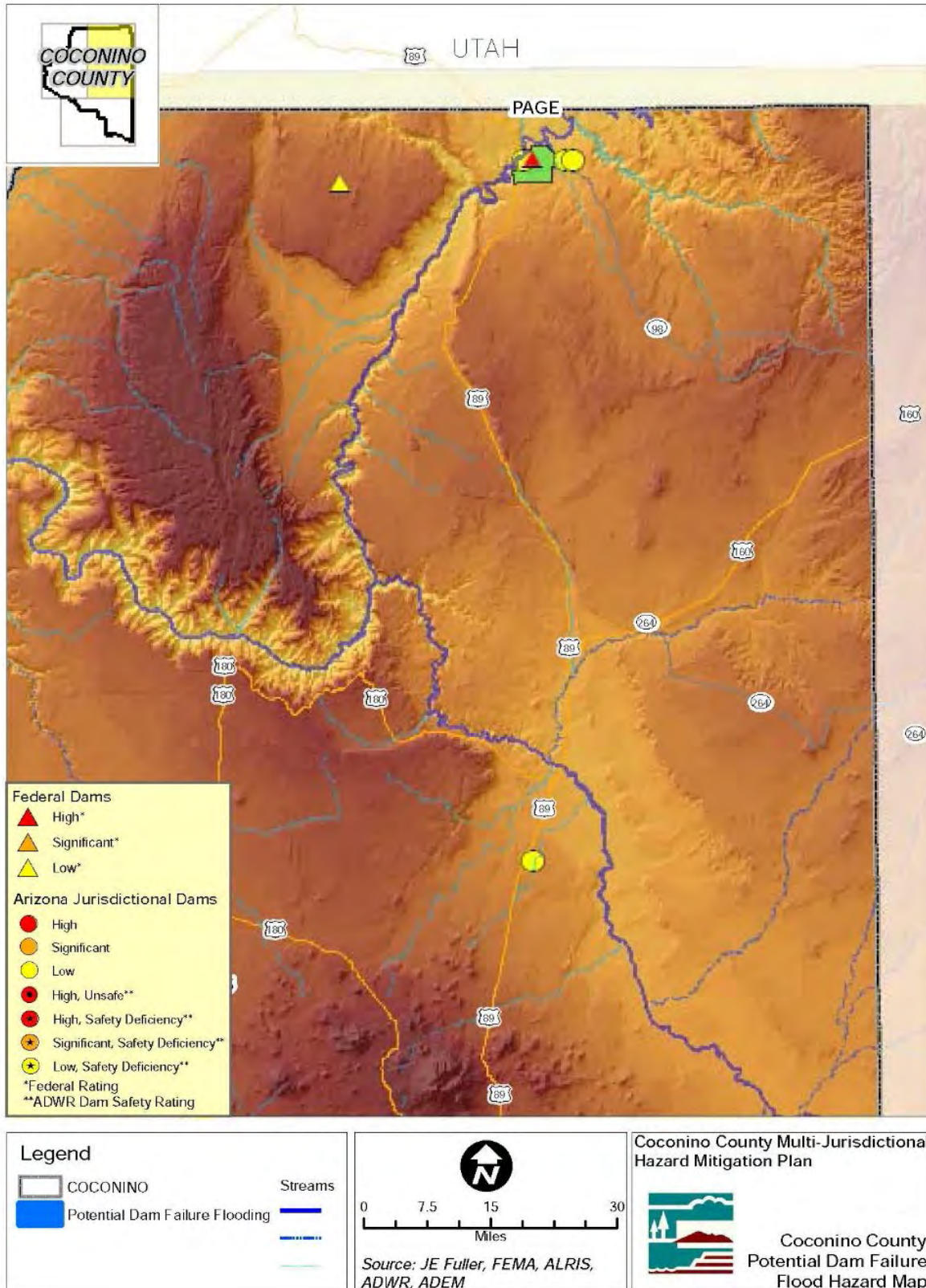
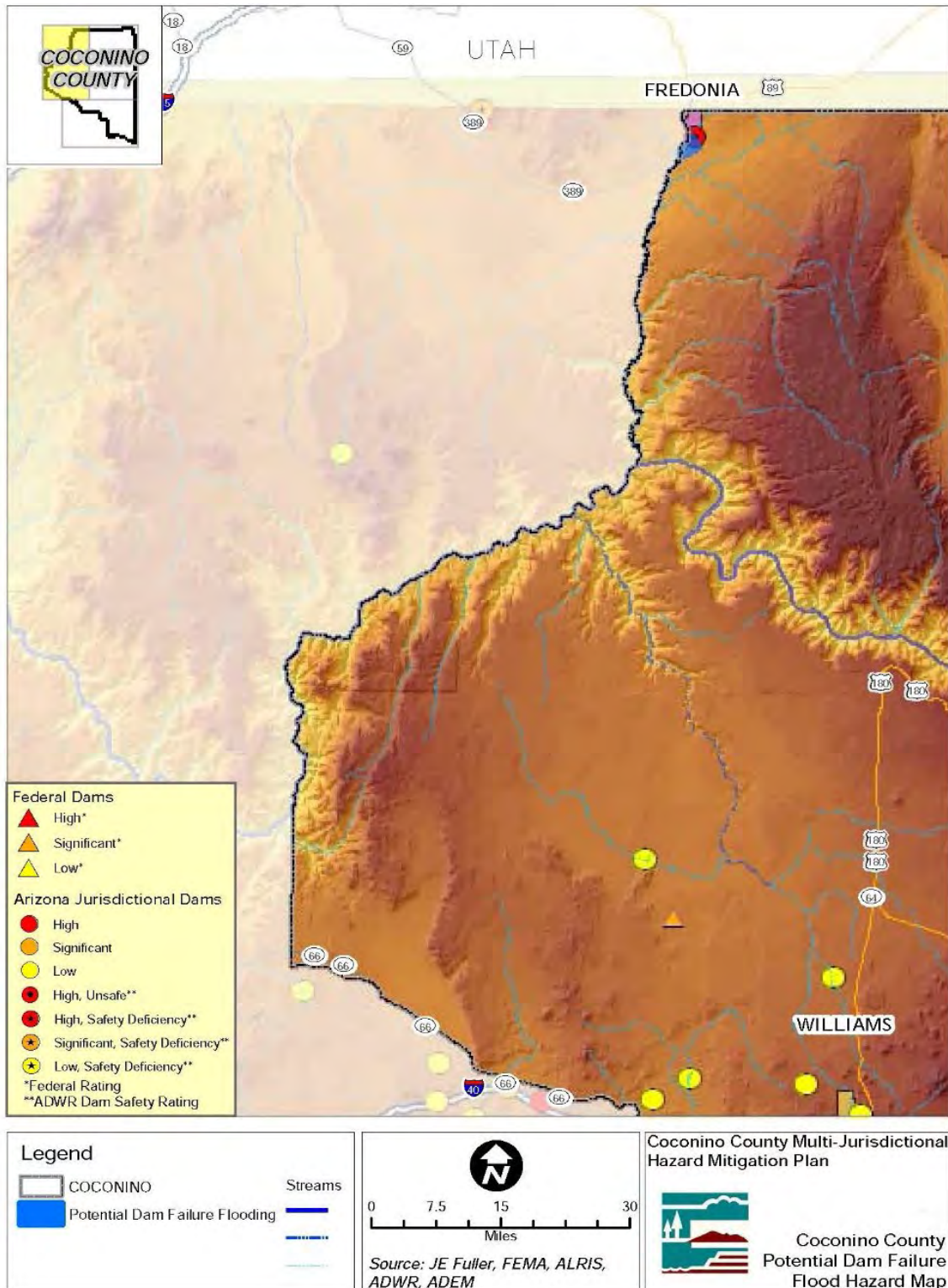


Figure 4.5: Potential Dam Failure Flood Hazard 3



Extent and Regulatory Context

ADWR has regulatory jurisdiction over the non-federally owned and/or dams that do not produce hydro-electric power. They conduct field investigations and participating in flood mitigation programs with the goal of minimizing the risk to loss of life and property. ADWR jurisdictional dams are inspected regularly according to downstream hazard potential classification. High hazard dams are inspected annually, significant hazard dams every three years, and low hazard dams every five years. During these inspections, ADWR identifies safety deficiencies requiring correction and assigns each dam one of five safety ratings (listed in increasing severity): 1) no deficiency, 2) safety deficiency, 3) unsafe non-emergency, 4) unsafe non-emergency elevated risk, or 5) unsafe emergency. Examples of safety deficiencies include lack of an adequate emergency action plan (EAP), inability to safely pass the required Inflow Design Flood (IDF), embankment erosion, dam stability, etc. Further descriptions of each safety classification are summarized below.

Table 4-10: ADWR Dam 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.
<i>Source: ADWR, 2009.</i>	

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, 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 4-11: NID Downstream Hazard Classifications

Hazard Potential Classification	Loss of Human Life	Economic, Environmental, Lifeline Losses
Low	None expected	Low and generally limited to owner
Significant	None expected	Yes
High	Probable. One or more expected.	Yes (but not necessary for this classification)
<i>Note: Hazard potential classification is an assessment of the consequences of failure, but not an evaluation of the probability of failure. Source: NID</i>		

The NID database includes dams that are either:

- High or significant hazard potential dams or;
- Low hazard potential dams that exceed 25 feet in height and 15 acre-feet storage or;
- Low hazard potential dams that exceed 50 acre-feet storage and six feet height.

Table 4-12 provides a summary of the hazard classifications of dams in the County.

Table 4-12: NID Hazard Classification of Dams

Database Source	High	Significant	Low
NID	13	3	29
<i>Source: US Army Corps of Engineers National Inventory of Dams (NID), 2020.</i>			

Based on the NID Coconino County summary report, of the 45 dams in the County, 36% meet the “high” or “significant” hazard classification. State regulated dams with this level of hazard are required to have an Emergency Action Plan (EAP). In the County, 88% of those with a “high” or “significant” hazard rating have an EAP.³³ **Table 4-13** details the potential hazard level classification for each dam in Coconino County as estimated by NID. Location of these dams can be found in **Figure 4.6**.

Table 4-13 NID Hazard Classification and Inspection Date of Coconino Dams

Dam Name	Location	Inspection Date	NID Hazard Potential
CITY	Williams	November 14, 2017	High
LOWER LAKE MARY	Flagstaff*	November 5, 2013	High
SANTA FE	Williams	November 14, 2017	High
CONTINENTAL #1	Flagstaff	August 22, 2017	High
CONTINENTAL #2	Flagstaff	August 22, 2017	High
MASONRY #2	Ash Fork*	September 14, 2017	High
FREDONIA	Fredonia	May 22, 2018	High
ODELL	Munds Park	July 26, 2017	High
WALNUT CANYON	Winona	October 25, 2017	High
GLEN CANYON	Lees Ferry	September 29, 2016	High
PASTURE CANYON	Moenkopi	-	High
RAILROAD TANK DAM	Parks*	November 12, 2013	High
CC CRAGIN	Kinder Crossing	June 22, 2017	High
UPPER LAKE MARY	Flagstaff*	June 16, 2015	Significant
WEST CATARACT CREEK	Williams	October 26, 2016	Significant
DOGTOWN	Williams*	October 26, 2016	Significant

³³ National Inventory of Dams (NID), Summary for Coconino County

Dam Name	Location	Inspection Date	NID Hazard Potential
KINNIKINICK	Two Guns	July 13, 2012	Low
KNOLL	Winslow	May 17, 2012	Low
WOODS CANYON	Winslow	May 9, 2018	Low
COCONINO	Sunrise	June 13, 2012	Low
CHEVELON CANYON	Winslow	May 17, 2012	Low
ASHURST LAKE	Sunrise	June 13, 2012	Low
WILLOW SPRINGS	Winslow	May 9, 2018	Low
TREMAINE RESERVOIR	Two Guns	May 27, 2010	Low
KAIBAB	Williams*	November 14, 2017	Low
STEEL DAM	Ash Fork*	August 23, 2011	Low
MORTON	Two Guns	June 13, 2012	Low
BEAR CANYON	Winslow	May 17, 2012	Low
MCLELLAN	Ash Fork*	October 7, 2011	Low
NAVAJO EVAP POND 60-2	Page*	May 30, 2012	Low
NUMBER 10 TANK	Flagstaff*	August 19, 2011	Low
PAGE EFFLUENT PONDS 2A & 2B	Page*	May 31, 2012	Low
28 TANK	Supai Village	April 12, 2012	Low
SWEETWOOD (K4)	Williams*	October 14, 2011	Low
BROKEN TANK	Flagstaff*	April 24, 2013	Low
TOM TANK	Williams*	April 12, 2012	Low
LONG POINT DAM	Williams*	September 26, 2006	Low
BIG SUPAI TANK	Williams*	April 8, 2010	Low
BIG ASO	Ash Fork*	November 14, 2012	Low
FOXBORO LAKE DAM	Indian Gardens	April 25, 2013	Low
SOLDIER ANNEX DAM	Two Guns	August 4, 2009	Low
WHITEHORSE DAM	Clarkdale	May 30, 2012	Low
SCHOLZ DAM	Clarkdale	May 30, 2012	Low
J. D. DAM	Cottonwood	June 24, 2011	Low
RUSSELL TANK DAM	Supai	April 23, 2013	Low

*Available data was taken from the National Inventory of Dams (NID). Locations with no data recorded by the NID were supplemented by the interactive dam locator provided by the NID and approximated using the closest definable location.

Figure 4.6: USACE NID 2018 Dam Hazard Potential Map for Coconino County

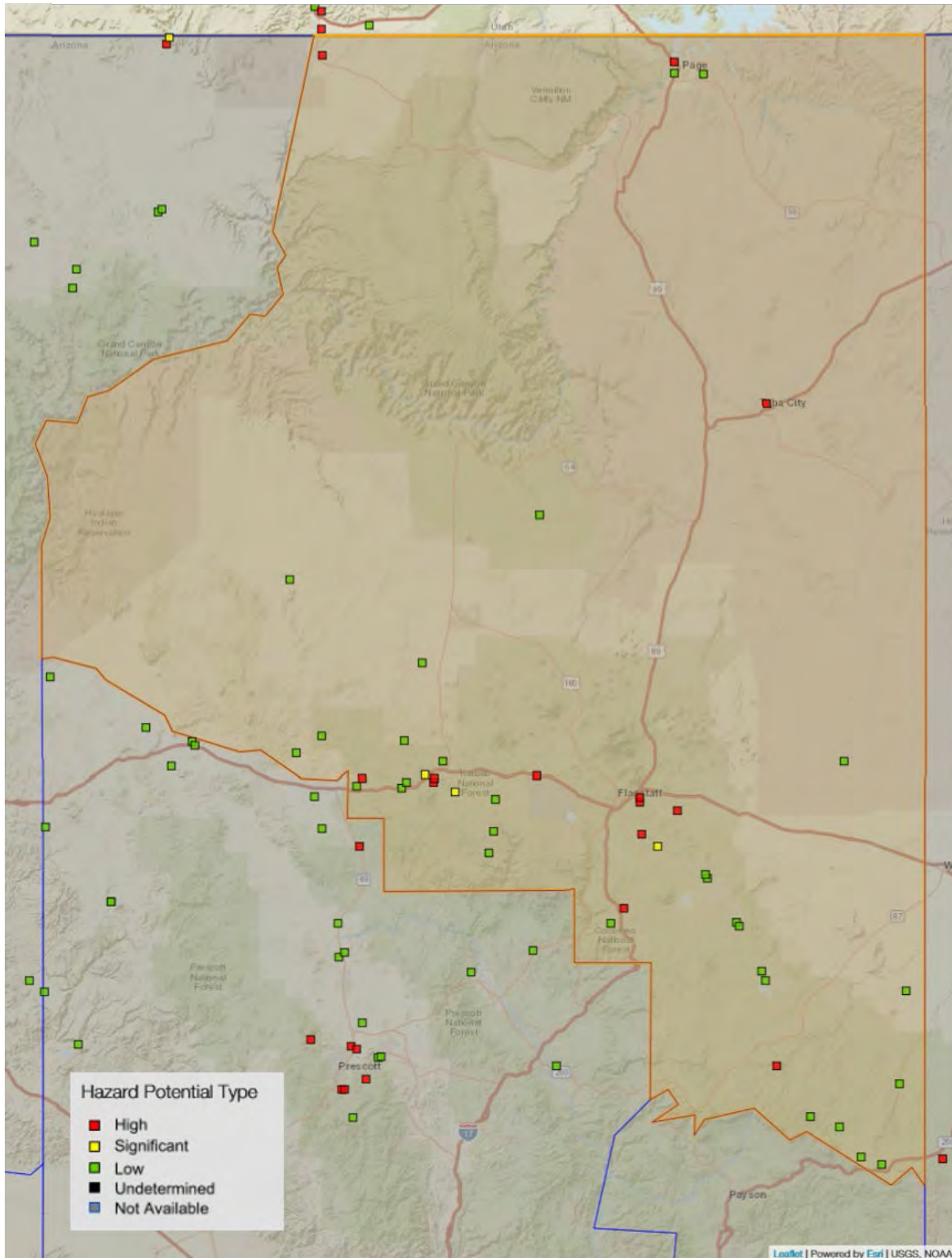


Table 4-14 summarizes the change in NID rated High and Significant hazard dams from 2009 to 2020 and the corresponding change in dams with EAPs.

Table 4-14: NID Rating

Dam Rating	Dams with EAPs (Full, Draft, and/or Outdated)	Dams without EAPs	Total Dams with Hazard Potential Classification
High in 2009	7	1	8
High in 2020	11	2	13
Significant in 2009	3	0	3
Significant in 2020	3	0	3

Sources: ADWR Dam Safety Database (May 2013); NID 2020

The magnitude of impacts due to dam failure are usually depicted by mapping the estimated downstream inundation limits based on an assessment of a combination of flow depth and velocity. The anticipated flooding expected from a dam failure within Coconino County can be viewed on the previously provided maps **Figure 4-3 to 4-5**.

Probability of Future Events

Dam failure is a rare event with the likelihood of occurring of less than one percent annually.

Vulnerability

Table 4-15 provides an analysis of the vulnerability of Planning Team jurisdictions to dam failure.

Table 4-15: CPRI Rating for Dam Failure

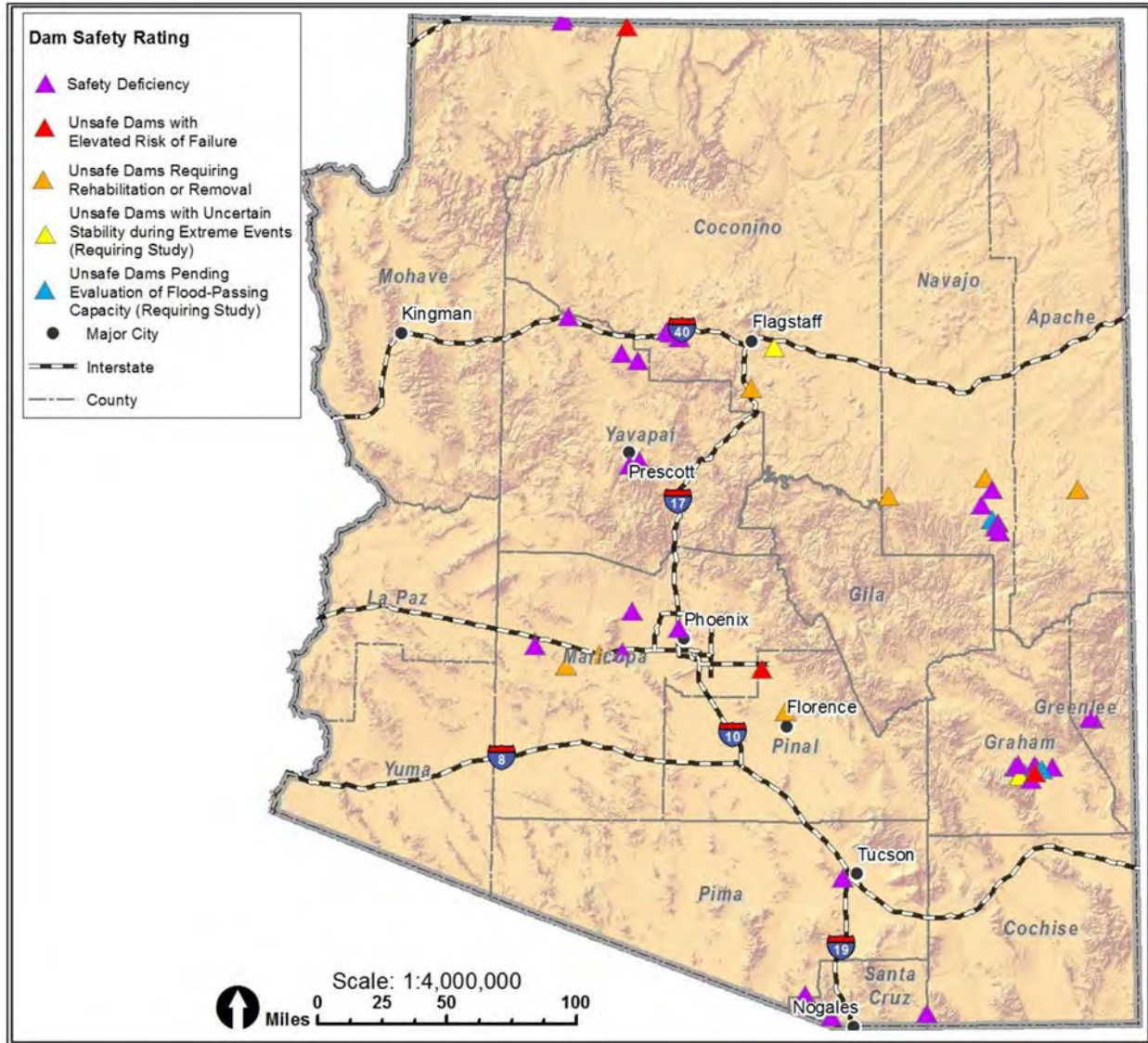
Jurisdiction	Probability	Magnitude/Severity	Warning Time	Duration	CPRI Score
Coconino County	.45	1.2	.45	.4	2.5
Flagstaff	.45	1.2	.45	.4	2.5
Fredonia	.45	.9	.6	.3	2.25
Page	.45	.30	.6	.4	2.65
Tusayan	.45	1.2	.45	.4	2.5
Williams	1.35	.90	.15	.4	2.8
County-wide average CPRI =					2.53

*Jurisdictions in bold print indicate they will be assessing the hazard and including mitigation activities for it.
 Note: Maximum CPRI score is 4.00.*

The safety ratings of Arizona dams in 2009, reported in the State of Arizona Hazard Mitigation Plan, identified several Coconino County dams with elevated risks. Based on the placement of these dams in **Figure 4.7**, it is assumed that the following dams are those most likely to have the listed safety deficiency levels. Three dams were identified as safety deficient, these were most likely Santa Fe Dam (or Railroad Dam), City Dam, and West Cataract Creek Dam. The Fredonia Dam was labeled as unsafe with elevated risk of failure. The Odell Dam was identified as unsafe requiring rehabilitation or removal. Since 2009, all of

these dams, with the exception of City Dam, have been studied for safety and the viability of repair or removal projects.³⁴

Figure 4.7: State Regulated Dams with Unsafe/Safety Deficient Classifications as of 2013



Loss Estimates

14 of the 45 dams in the County are classified as having "High or Significant Hazard Potential" and have EAPs. 29 of the 45 dams in the County are not required to have an EAP due to low classification potential for hazard. While the total number of dams in the high and significant category have increased from 11 to 16 since 2009, the dams in the County continue, for the most part, to remain in compliance with EAP regulation. However, two of the 45 dams, Walnut Canyon Dam and Railroad Tank Dam, could pose

³⁴ Northern Arizona University. 2014. [Odell Dam Safety Analysis – Final Presentation](#)

significant risk and do not have EAPs.³⁵ In 2015, only four dams had a delineated inundation limit downstream of the dam associated with a dam failure. Based on this information, the results of this analysis are expected to underestimate the vulnerability of people and infrastructure within the County.

For example, no dam failure inundation limits were provided for Glen Canyon Dam (GCD) on the Colorado River near Page. However, a failure of the GCD would be catastrophic. The flood wave from such an event would likely cause the Hoover Dam downstream to fail and flood thousands of properties on its way down to the Gulf of California. To replace both GCD and the Hoover Dam would cost in excess of \$36 billion and the economic losses as a result of lost water and power to the states benefitting from the Colorado River Storage Project would have a significant impact on the economy of the nation.³⁶ In the immediate aftermath of such a failure, communities surrounding GCD would experience severe endangerment of potable water supplies due to the proximity of GCD to the potable water pipeline, which runs from Roaring Springs to Grand Canyon Village. This would add additional pressure to surrounding jurisdictions such as Tusayan if an event requires water assistance provision.

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

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

In 2015, \$4.2 million in asset related losses were estimated for dam failure inundation for all the participating jurisdictions in the County. An additional \$52.2 million in losses to HAZUS defined residential, commercial, and industrial facilities was estimated for all participating jurisdictions. With inflation and the inevitable increase in development in Coconino, this number has likely increased. Regarding human vulnerability, it had previously been calculated that 1.96% of the total County projected population is potentially exposed to a dam failure inundation event. Given the steady increase in County population projections from 2015-2019, this estimate has risen from 2,744 people (2015) to 2,812 people (2019). The potential for deaths and injuries are directly related to the warning time and type of event. Given the magnitude of such an event(s), it is realistic to anticipate at least one death and several injuries. There is also a high probability of population displacement for inhabitants within the downstream inundation limits of the dam(s).

Development Trend Analysis

Dam failure places downstream populations at risk. In addition to the flow of water released from the reservoir, the inundation stream picks up large debris which results in a scouring effect that compounds damage. The flood protection afforded by dams in the County has encouraged development of lands immediately downstream of the structures. However, prohibition of development in these areas is not feasible. Instead, public awareness measures such as notices on final plats and public education on dam safety are mitigation efforts employed by local county and city/town officials. Also, EAPs that establish potential dam failure inundation limits, notification procedures, and thresholds are also prepared for response to potential dam related disasters.

³⁵ National Inventory of Dams (NID), Summary for Coconino County

³⁶ TriData, 2005

4.3.4 Drought

Description

Drought is an extended period of years when a region is deficient in its water supply or consistently receives below average precipitation. Drought patterns in the West are related to large-scale climate patterns in the Pacific and Atlantic oceans, such as the El Niño–Southern Oscillation in the Pacific, and the Atlantic Multidecadal Oscillation in the Atlantic. As these large-scale ocean climate patterns vary in relation to each other, drought conditions in the U.S. shift from region to region. Drought produces a variety of impacts that span many sectors of the economy such as reduced crops, rangeland, and forest productivity; increased fire hazard; reduced water levels; increased livestock and wildlife mortality; and rationing are a few examples of direct impacts. These problems can result in reduced income for farmers and agribusiness, increased prices for food and lumber, unemployment, reduced tax revenues, increased crime, migration and foreclosures on bank loans to farmers and businesses.

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.

Drought is a complex natural hazard which is reflected in the 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 streamflows 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. These characteristics have hindered the preparation of drought contingency or mitigation plans by many governments.

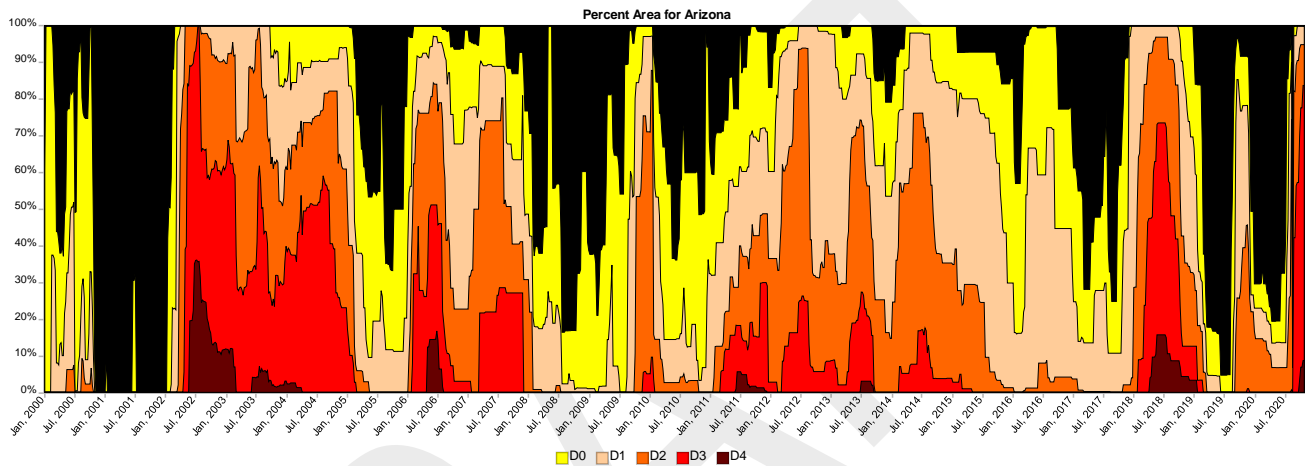
History

Arizona has experienced several droughts declared as drought disasters/emergencies. A prolonged drought occurred during the period of 1941-1965. The period from 1979-1993 appears to have been anomalously wet, while the rest of the historical records shows that dry conditions are most likely the normal

situation for Arizona. From 1994-2015, there have been more months and years with below normal precipitation than months or years with above normal precipitation. Currently, there is a standing state governor issued declaration on drought.³⁷ The Governor’s Drought Interagency Coordinating Group has continuously recommended to the governor to extend the drought declaration originally issued in June of 1999.

Since 2000, the longest duration of drought (D1-D4) in Arizona lasted 512 weeks beginning on August 18, 2009 and ending on June 4, 2019. The most intense period of drought occurred the week of July 9, 2002 where D4 affected 36.15% of Arizona land. **Figure 4.8** depicts the duration and severity of droughts from 2000 through 2020.

Figure 4.8: Arizona Drought History (2000-2020)



The maps below show the extent of drought nationwide for mid-January 2021, 2016, and 2011.

³⁷Arizona Department of Water Resources. 2019. <https://new.azwater.gov/news/articles/2019-22-11>

Figure 4.9: Arizona Drought Monitor (2021)

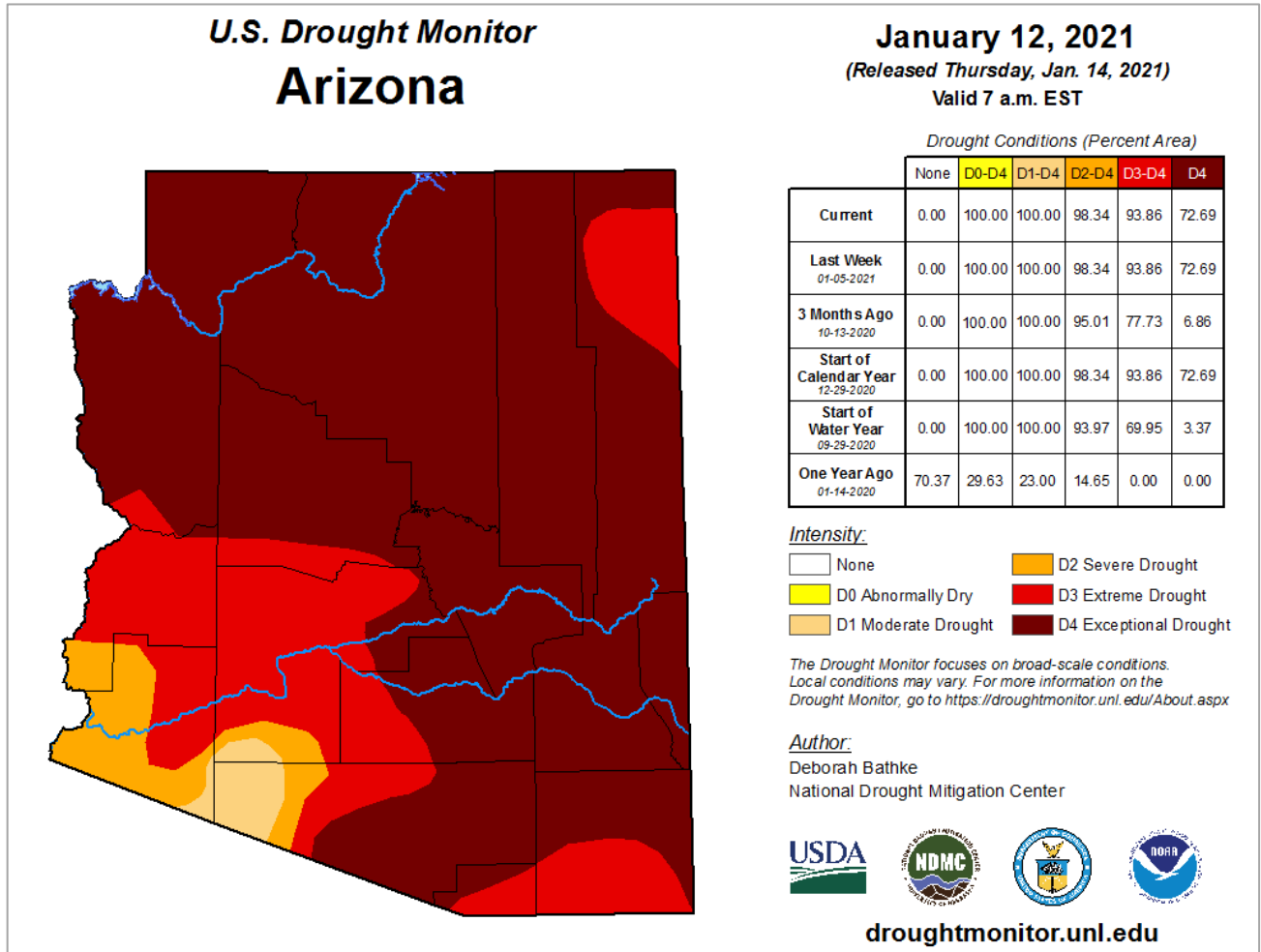
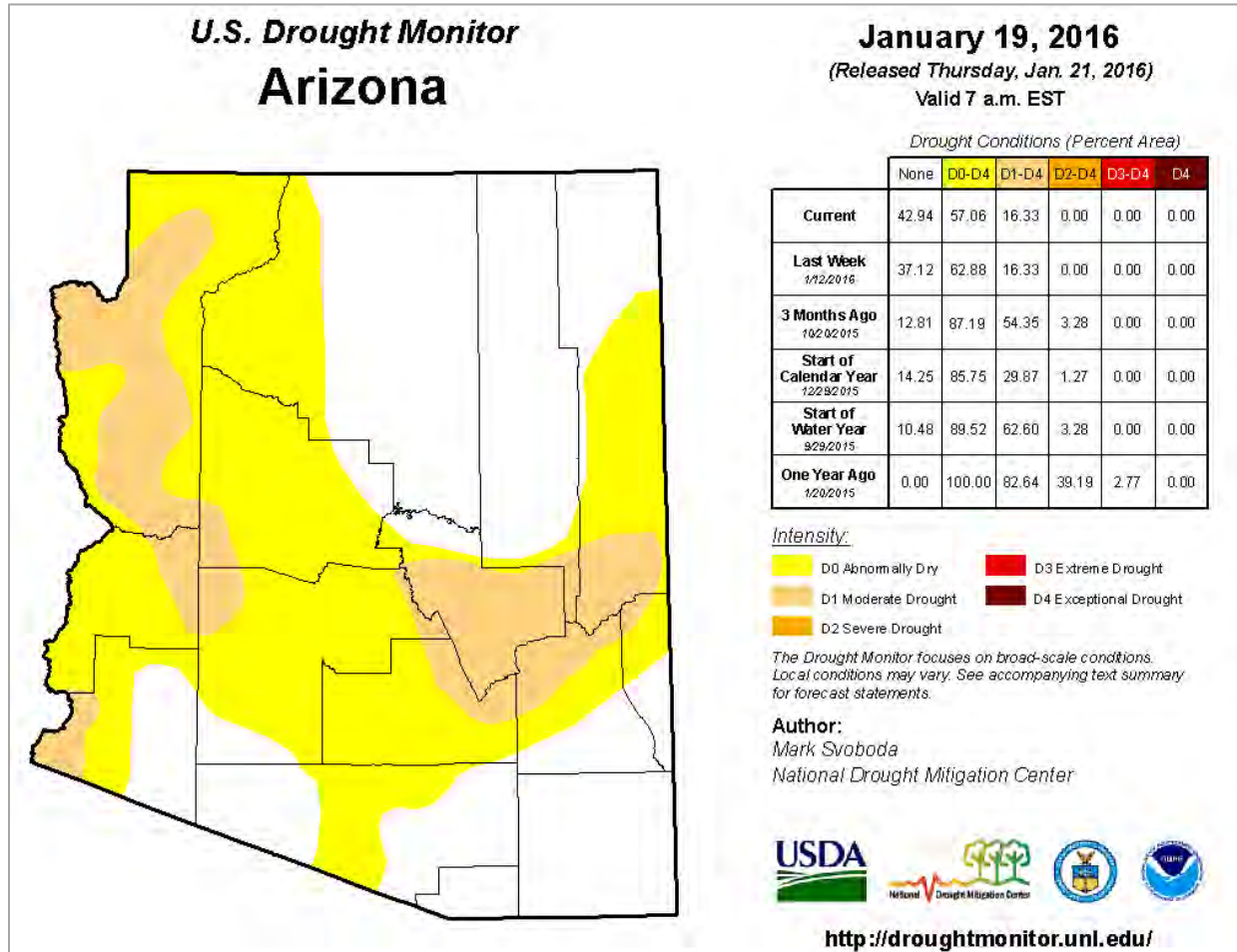
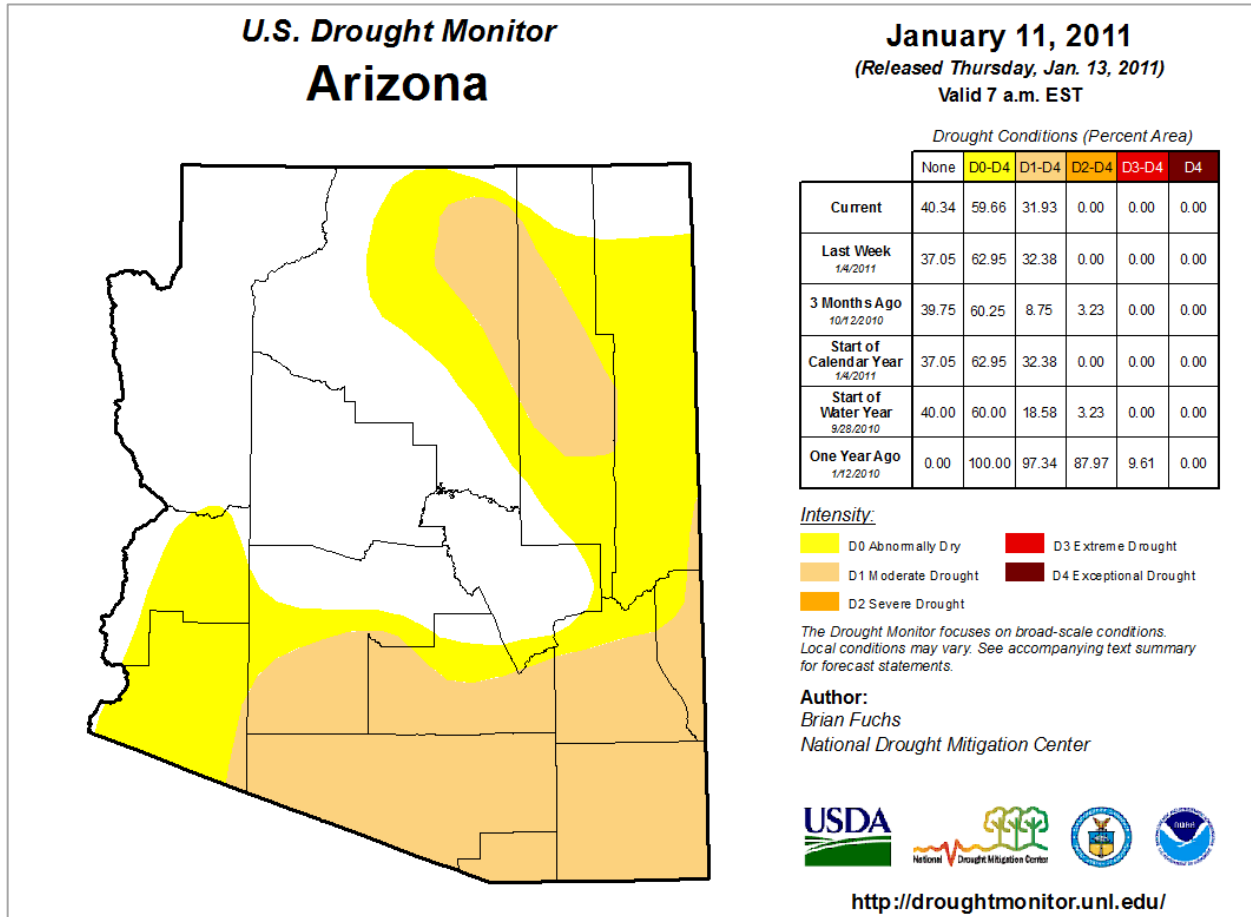


Figure 4.10: Arizona Drought Monitor (2016)



DRAFT

Figure 4.11: Arizona Drought Monitor (2011)



Location

All of the County is susceptible to drought. Current drought conditions from [U.S. Drought Monitor](#) are depicted in **Figure 4.11**.

Extent

Drought is classified by a variety of indices and categories. **Figure 4.12** below depicts three that are widely used. It contains severity classification ranges for each indicator for each dryness level. Because the ranges of the various indicators often do not coincide, the final drought category tends to be based on what the majority of the indicators show and on local observations.

Figure 4.12: Drought Severity Classifications

Drought Severity	Return Period (years)	Description of Possible Impacts	Drought Monitoring Indices		
			Standardized Precipitation Index (SPI)	NDMC* Drought Category	Palmer Drought Index
Minor Drought	3 to 4	Going into drought; short-term dryness slowing growth of crops or pastures; fire risk above average. Coming out of drought; some lingering water deficits; pastures or crops not fully recovered.	-0.5 to -0.7	D0	-1.0 to -1.9
Moderate Drought	5 to 9	Some damage to crops or pastures; fire risk high; streams, reservoirs, or wells low, some water shortages developing or imminent, voluntary water use restrictions requested.	-0.8 to -1.2	D1	-2.0 to -2.9
Severe Drought	10 to 17	Crop or pasture losses likely; fire risk very high; water shortages common; water restrictions imposed.	-1.3 to -1.5	D2	-3.0 to -3.9
Extreme Drought	18 to 43	Major crop and pasture losses; extreme fire danger; widespread water shortages or restrictions.	-1.6 to -1.9	D3	-4.0 to -4.9
Exceptional Drought	44+	Exceptional and widespread crop and pasture losses; exceptional fire risk; shortages of water in reservoirs, streams, and wells creating water emergencies.	less than -2	D4	-5.0 or less

*NDMC - National Drought Mitigation Center

Additionally, The Palmer Drought Severity Index (PDSI) uses readily available temperature and precipitation data to estimate relative dryness. It is a standardized index that generally spans -10 (dry) to +10 (wet). Maps of operational agencies like NOAA typically show a range of -4 to +4, but more extreme values are possible. The PDSI has been reasonably successful at quantifying long-term drought. The drought map in the location section above is a PDSI product.

Probability of Future Events

Figure 4.12 above provides estimated return periods for various severity levels of drought. An extreme, multiyear drought could impact the region with little warning. Climate change is likely to result in longer and more frequently occurring drought.

There is no commonly accepted return period or non-exceedance probability for defining the risk from drought (such as the 100-year or 1% annual chance of flood). The magnitude of drought is usually measured in time and the severity of the hydrologic deficit. There are several resources available to evaluate drought status and even project 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](#) 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 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 drought on a nationwide basis ³⁸ 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, 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 provided the framework for the Drought Interagency Coordinating 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. The counties use the drought status reports to implement drought actions within their drought plans. The State Drought Monitoring Technical Committee uses the Standardized Precipitation Index (SPI) for the short-term drought status and a combination of the SPI and streamflow for the long-term drought status.

The County has experienced drought ranging from abnormally dry to extreme drought over the past five years as winter storms sweep across the northern third of the state one year then stay north of the state in other years, leaving large precipitation deficits. While the current 21-year drought is longer than the 16-year wet period that preceded it, it is still shorter than the 37-year drought of the mid-20th century. There are no trends or other indicators that the drought will end soon. Drought in northern Arizona is generally characterized by extreme variability in precipitation from year-to-year. However, the most recent four years have been the second driest 48-month period since the 1950s and extended dry periods have negative impacts on wildland fires and water resources. Drought is likely to continue, as will the extreme variability in precipitation, both summer and winter.

When attempting to evaluate the probability and magnitude of drought in the County, it is helpful to remember that potable water in the County is derived from both surface water and groundwater. Surface water to the County usually comes from several sources such as the Colorado River, (stored in Lake Powell near Page), small lakes in the Lake Mary area serving the Flagstaff area, and Cataract Creek in Williams. 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.

Groundwater is the other primary water source in the County obtained by drilling wells and pumping from 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. Furthermore, ground water depths on the Colorado Plateau range from 2,000 feet to over a mile deep.

Reclaimed water, or effluent, is another source of water in the County and 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

³⁸ FEMA, 1997.

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.

Vulnerability

Combinations of low precipitation and unusually high temperatures could occur over several consecutive years. Intensified by such conditions, extreme wildland fires could break out throughout the County, increasing the need for water. Surrounding communities, also in drought conditions, could increase their demand for water supplies relied upon by the planning partnership, causing social and political conflicts. If such conditions persisted for several years, the economy of the County could experience declines, especially in water-intensive industries such as agriculture. **Table 4-16** provides the CPRI for the planning area.

Table 4-16: CPRI Rating for Drought

Jurisdiction	Probability	Magnitude/ Severity	Warning Time	Duration	CPRI Score
Coconino County	1.8	1.2	.15	.4	3.55
Flagstaff	1.8	1.2	.15	.4	3.55
Fredonia	.9	.3	.15	.4	1.75
Page	1.8	.6	.15	.4	2.95
Tusayan	1.8	1.2	.15	.4	3.55
Williams	1.8	1.2	.15	.4	3.55
County-wide average CPRI =					3.15
<i>Jurisdictions in bold print indicate they will be assessing the hazard and including mitigation activities for it. Note: Maximum CPRI score is 4.00.</i>					

Loss Estimates

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 the County. Instead, drought vulnerability is primarily measured by its potential impact to certain sectors of the County economy and natural resources to include:

- 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 wildland fire. Extended drought may weaken and dry the grasses, shrubs, and trees of wildland fire 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, County farmers and ranchers received \$18 million in disaster related assistance funding from the U.S Department of Agriculture (USDA) for crop and livestock damages. Of this, \$13.1 million of those funds were received from 2014 to 2020, corresponding with the recent drought cycle for the

County. It is therefore realistic to expect at \$250,000 to \$500,000 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 to estimate due to a lack of documentation. There are also the intangible costs associated with lost tourism revenues and impacts to wildlife habitat and animals. Typically, these impacts are translated into the general economy in the form of higher food and agricultural goods prices and increase utility costs.

Developmental Trends

The entire state of Arizona is susceptible to drought at any time and recent climate modeling studies have indicated that mega-droughts are likely to occur in the future. Additionally, as was mentioned previously, climate change is accelerating, and its effects will become more pronounced over time. The increase in average temperature will likewise lead to drier conditions in the West and Southwest of the United States. Even if precipitation does not decrease in the future, higher temperatures increase the risk that evaporation of standing water will occur more rapidly, decreasing local supply. At the same time, it is projected that the region's population will continue to increase, thus increasing demand for water. As availability decreases and demand increases, there will be a heightened risk for drought in areas that have traditionally been irrigated or relied on local water sources.³⁹

4.3.5 Earthquake / Seismic Hazards

Description

Ground shaking, landslides, liquefaction, and amplification are the specific hazards associated with earthquakes. The severity of these hazards depends on several factors, including soil and slope conditions, proximity to the fault, earthquake magnitude and depth, and the type of earthquake:

- **Ground Shaking** – Ground shaking is the motion felt on the earth's surface caused by seismic waves from an earthquake. It is the primary cause of earthquake damage. The strength of ground shaking depends on the magnitude of the earthquake, the type of fault, and distance from the epicenter. Buildings on poorly consolidated and thick soils will typically see more damage than buildings on consolidated soils and bedrock.
- **Amplification** – Soils and soft sedimentary rocks near the earth's surface can modify ground shaking caused by earthquakes. One of these modifications is amplification. Amplification increases the magnitude of the seismic waves generated by the earthquake. The amount of amplification is influenced by the thickness of geologic materials and their physical properties. Buildings and other structures built on soft and unconsolidated soils can face greater risk. Amplification can also occur in areas with deep sediment-filled basins and ridge tops.
- **Earthquake-Induced Landslides** – Earthquake-induced landslides are secondary earthquake hazards that occur from ground shaking. They can destroy the roads, buildings, utilities, and other critical facilities necessary to respond and recover from an earthquake and are common in areas with steep slopes.
- **Liquefaction** – Liquefaction, a secondary earthquake hazard, occurs when ground shaking causes wet granular soils to change from a solid state to a liquid state. This results in the loss of soil strength and the soil's ability to support weight. Buildings and their occupants are at risk when the ground can no longer support these buildings and structures. In some cases, this ground may be

³⁹ Arizona State Hazard Mitigation Plan. 2013. https://dema.az.gov/sites/default/files/EM-PLN_2013%20State%20Hazard%20Mitigation%20PlanFINAL_0.pdf

subject to liquefaction, depending on the depth of the water table. Liquefaction occurs primarily in saturated and loose, fine- to medium-grained soils, in areas where the groundwater table lies within 50 feet of the ground surface. Liquefaction is known to occur in southern and western Arizona.

The Richter scale is often used to rate the strength of an earthquake and is an indirect measure of seismic energy released. The scale is logarithmic, with each one-point increase corresponding to a ten-fold increase in the amplitude of the seismic shock waves generated by the earthquake. However, in actual energy released, each one-point increase on the Richter scale corresponds to about a 32-fold increase in energy released. Therefore, a magnitude (M) 7.0 earthquake is 100 times (10x10) more powerful than an M5 earthquake and releases 1,024 times (32x32) the energy.

The Modified Mercalli Intensity (MMI) scale, as shown in **Table 4-17**, quantifies the intensity of ground shaking. Intensity in this scale is a function of distance from the epicenter (the closer a site is to the epicenter, the greater the intensity at that site), ground acceleration, duration of ground shaking, and degree of structural damage. The MMI rates earthquake severity by the amount of damage and perceived shaking.

Table 4-17: Modified Mercalli Intensity Scale

MMI Value	Shaking Severity	Summary Damage	Description
I	Micro	Little to none	Not felt except by few under especially favorable conditions.
II	Minor	Little to none	Felt only by a few persons at rest, especially on upper floors of buildings. Delicately suspended objects may swing.
III	Minor	Hanging objects move	Felt quite noticeably by persons indoors, especially on upper floors of buildings. Many people do not recognize it as an earthquake. Standing motor cars may rock slightly. Vibration similar to the passing of a truck. Duration estimated.
IV	Light	Hanging objects move	Felt indoors by many, outdoors by few during the day. At night, some awakened. Dishes, windows, doors disturbed. Walls make cracking sound. Sensation like heavy truck striking building. Standing motor cars rocked noticeably.
V	Light	Pictures move	Felt by nearly everyone. Many awakened. Some dishes, windows broken. Unstable objects overturned. Pendulum clocks may stop.
VI	Moderate	Objects fall	Felt by all, many frightened. Some heavy furniture moved. Few instances of fallen plaster. Damage slight.
VII	Strong	Nonstructural damage	Damage negligible in buildings of good design and construction, slight to moderate in well-built ordinary structures. Considerable damage in poorly built or badly designed structures. Some chimneys broken.
VIII	Very strong	Moderate damage	Damage slight in specially designed structures. Considerable damage in ordinary buildings with partial collapse. Damage great in poorly built structures. Fall of chimneys, walls, factory stacks, columns, monuments. Heavy furniture overturned.
X	Very violent	Extreme damage	Damage considerable in specially designed structures. Well-designed frame structures thrown out of plumb. Damage great in substantial buildings, with partial collapse. Buildings shifted off foundations.

XI	Very violent	Extreme damage	Some well-built wooden structures destroyed. Most masonry and frame structures destroyed with foundations. Rails bent.
XII	Very violent	Total damage	Few, if any (masonry) structures remain standing. Bridges destroyed. Rails bent greatly.

Source: United States Geological Survey, 2016.

History

Records of earthquakes occurred in the County chronicle seismic incidents since the early 1900s. None have resulted in deaths or injuries. The first damaging earthquake known to have occurred within Arizona's borders ruptured on January 25, 1906 causing a violent shock within Flagstaff. A tremor on August 18, 1912 damaged homes in Williams. In January 1935, an earthquake at the Grand Canyon awakened sleepers, causing a distinct subterranean rumble, movement of their homes, and cracked walls. In 1993 another earthquake caused minor damage at the Grand Canyon Village.⁴⁰ And in June 2011, one local source reported that "...the Arizona Integrated Seismic Network detected notable earthquakes in three areas in the County near Parks and Tusayan, and just south of Flagstaff."⁴¹

On November 30, 2014 an earthquake occurred near the Oak Creek fault zone. USGS confirmed a 4.7 magnitude on the Richter scale. The epicenter was determined to be roughly seven miles north of Sedona and sixteen miles south-southwest of Flagstaff. It was 3.1 miles below the surface of the Earth.⁴² In the early morning hours of October 31, 2009, the 2009 Halloween "earthquake swarm" occurred near Sunset Crater, Arizona, 15 miles northeast of Flagstaff. Approximately 120 small magnitude earthquakes, (M2.0 or smaller), occurred during a six-hour period with the largest being a M2.9 tremor. Not all earthquakes are caused by moving tectonic plates. In Northern Arizona in particular, many are caused by magma moving through cracks deep in the crust. There have been 12 earthquake incidents since 2015 with the largest incident, a M3.6 event occurring December 28, 2020.

Location

Figure 4.13, on the following page, depicts the location of historic earthquakes in or near Coconino County.

Extent

All of the County is subject to major earthquakes. The magnitude of any earthquake is directly related to the length of the rupture of the earthquake producing fault. Length of the fault does not predict the measure of ground movement. Ground movement and resulting shaking is determined by the depth of the earthquake hypocenter, directionality of the rupture propagation and amplifying or dampening effects of the geomorphology of soils of the affected region. The relatively small M6.3 earthquake that struck Christchurch, New Zealand in 2011 resulted in severe damage and loss of life due to its very shallow hypocenter. Distance from the fault lessens potential ground shaking subject to the factors previously cited.

The USGS maintains an Earthquake Scenario Tool that supports modeling an earthquake for a specific area. The tool provides shake maps of ground acceleration. **Figure 4.14** is a Tool product that predicts ground acceleration for a M7.2 earthquake at a depth of 11.9 kilometers on the Big Chino-Little Chino Fault. The map depicts light to moderately heavy damage in the parts of the planning area for this scenario.

⁴⁰ Arizona Geological Survey, [Earthquakes Threaten Arizona](#)

⁴¹ Arizona Geology Magazine, 2011, [Notable Arizona Seismicity](#)

⁴² The Arizona Geological Survey, December 2014, M 4.7 earthquake rocks Sedona – Flagstaff, Arizona

Figure 4.13: Historic Earthquakes in Arizona

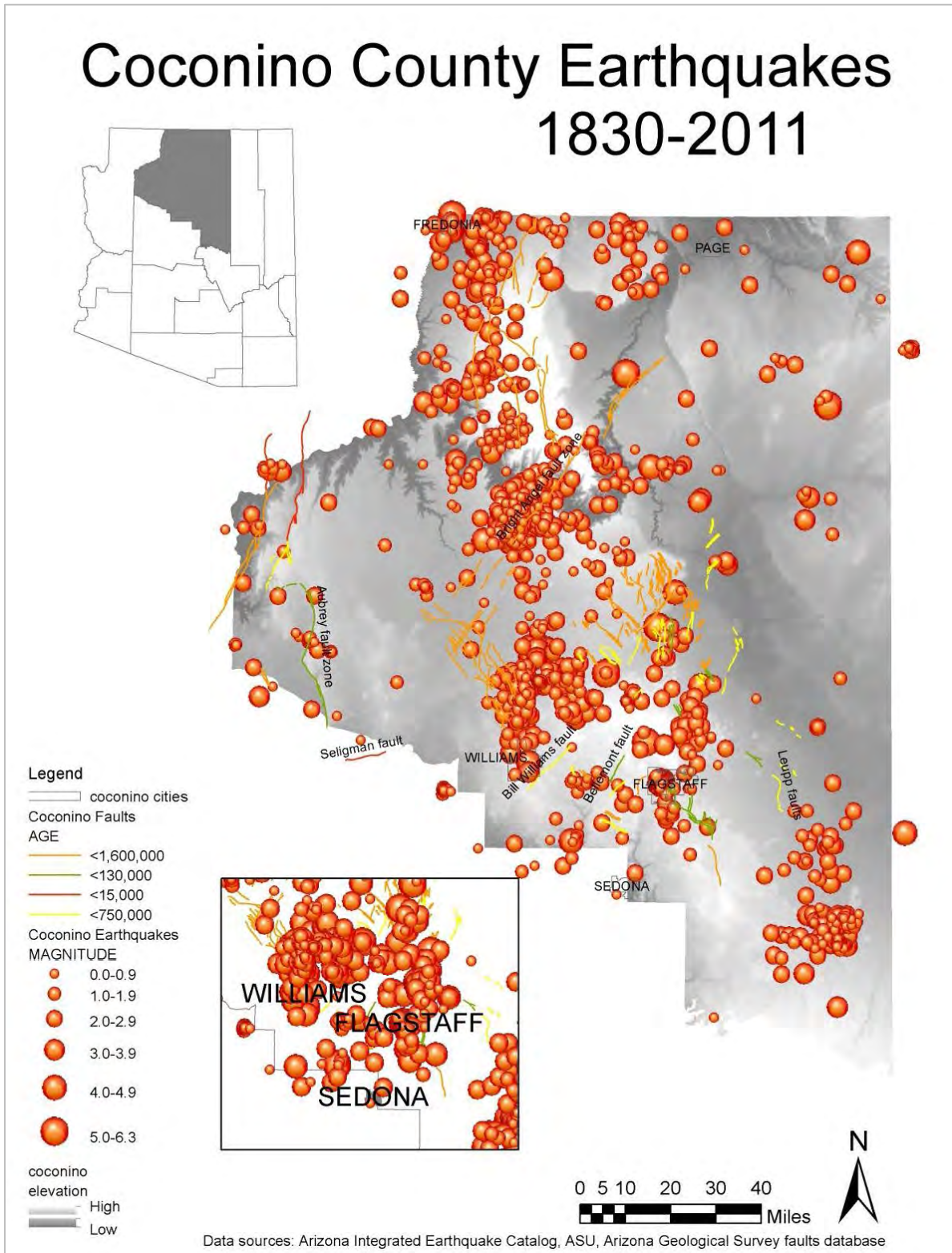
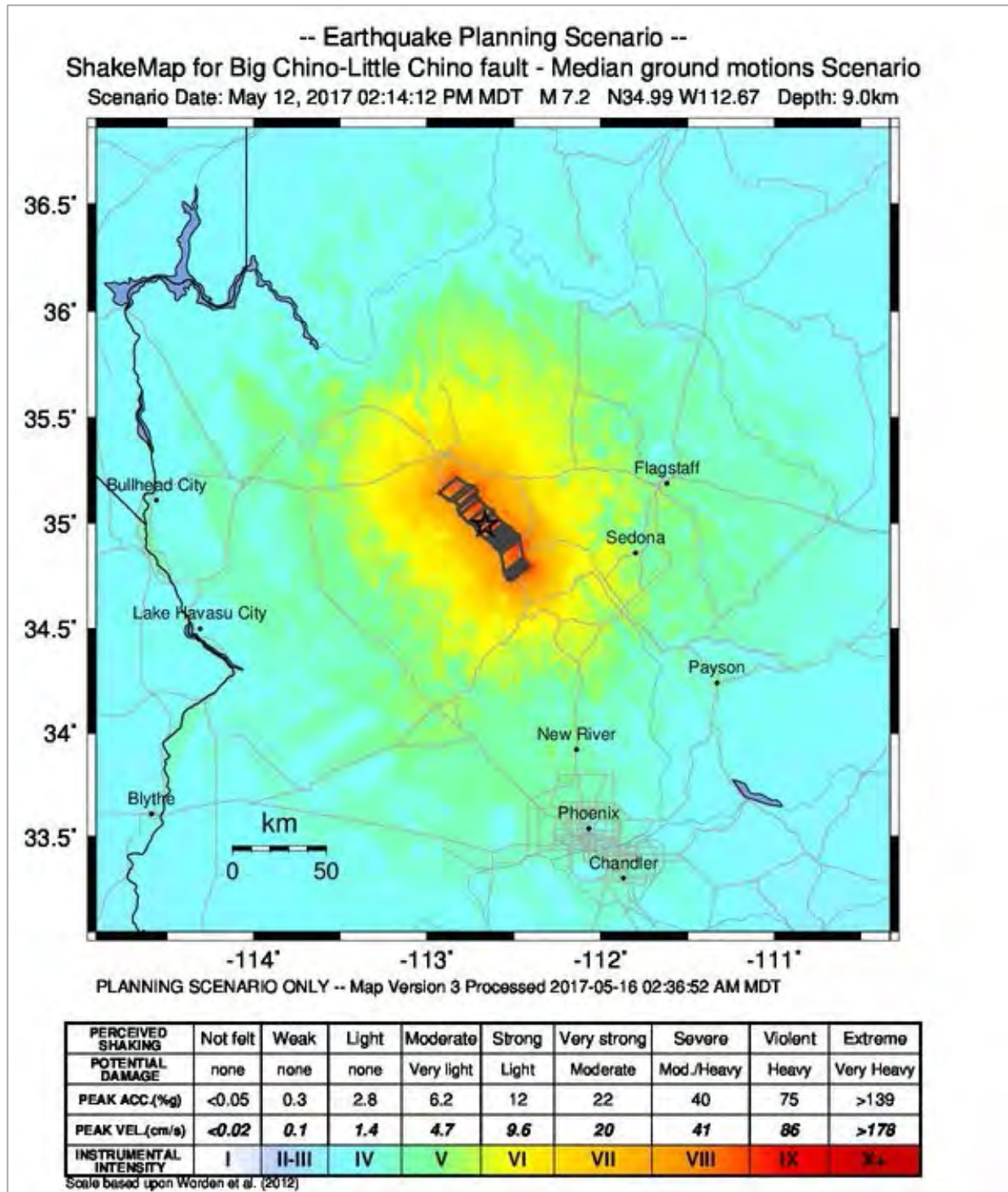


Figure 4.14: Arizona Earthquake Planning Scenario



Regulatory Context

While Arizona does not have specific regulations related to seismic hazards, State Administrative Code Title 7, Education Chapter 6, Section 760. Laws and Building Codes states: To the extent required by law, school buildings shall be in compliance with federal, state and local building and fire codes and laws that are applicable to the particular building. At a minimum, the 1997 Uniform Building Code (UBC) is required to be met for new school facility construction and as required, for building renovations in existing schools.

Probability of Future Events

The USGS database predicts that there is a 37.18% chance of a major earthquake (greater than M5.0) within 50 kilometers of the County within the next 50 years.

Vulnerability

All of the County is vulnerable to seismic incidents. The map below depicts that most of the County is at moderately to low risk.

Figure 4.15: Risk of Seismic Incidents

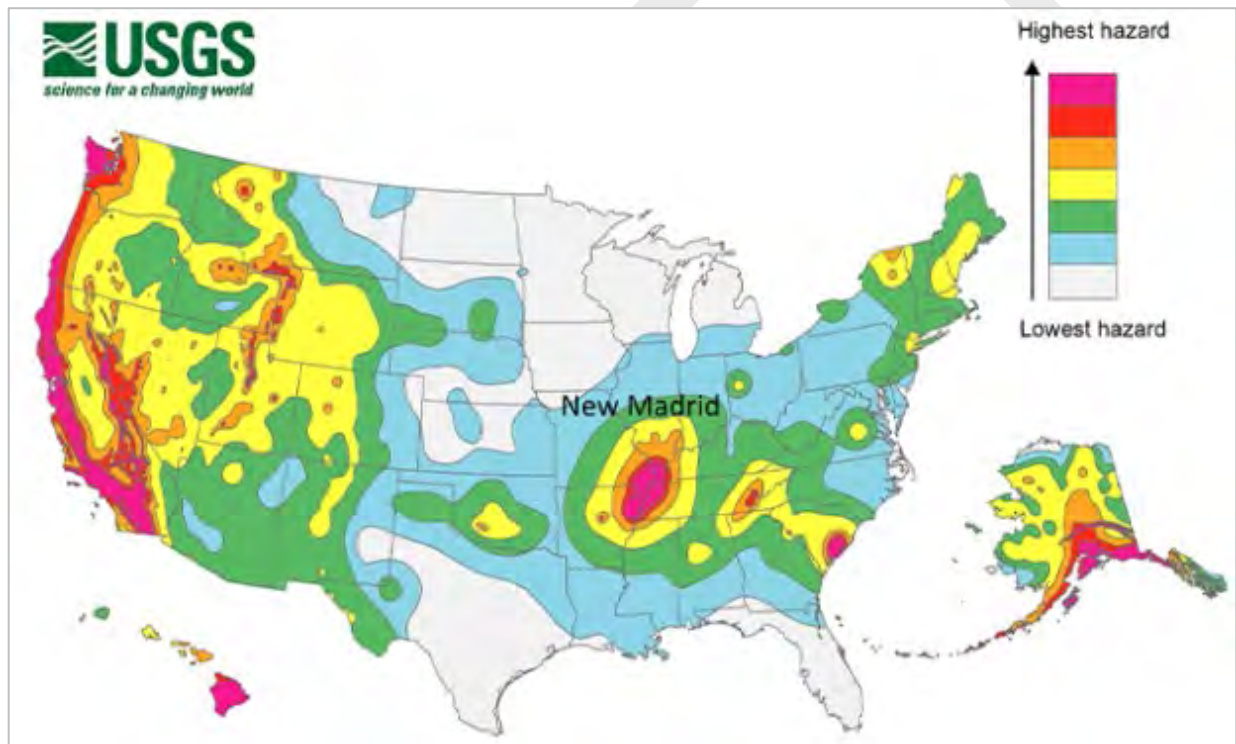


Table 4-18 below provides the CPRI ratings earthquake.

Table 4-18: CPRI Rating for Earthquake and Seismic Hazards

Jurisdiction	Probability	Magnitude/Severity	Warning Time	Duration	CPRI Score
Coconino County	1.35	.3	.6	.2	2.45
Flagstaff	1.35	.3	.6	.2	2.45
Fredonia	.9	.3	.6	.3	2.1
Page	1.8	.6	.15	.4	2.1

Jurisdiction	Probability	Magnitude/Severity	Warning Time	Duration	CPRI Score
Tusayan	1.35	.3	.6	.2	2.45
Williams	.9	.6	.6	.2	2.3
County-wide average CPRI =					2.31
<i>Jurisdictions in bold print indicate they will be assessing the hazard and including mitigation activities for it.</i>					
<i>Note: Maximum CPRI score is 4.00.</i>					

Loss Estimates

Earthquakes could potentially disrupt major transportation routes in the County. These include Interstates 17 and 40, U.S. Highways 160 and 180, State Routes 64, 66, 67, 87, 89, 89A, 98, 99, 260, and 264, and Indian Routes 2, 15, and 18. Burlington-Northern Santa Fe (BNSF) Railway runs through the middle of the county. Hazardous material cargo includes numerous TIER II reportable products and the highly volatile Bakken crude product. AMTRAK passenger trains also operate on the BNSF lines with depots located in Flagstaff and Williams. Air traffic in Flagstaff, Grand Canyon National Park, Williams, Page, Tuba City, and Valle could also be impacted.

Utility disruption due to earthquakes is a potential risk as well. Arizona Public Service (APS) is the predominant provider of electricity to the County except on the Navajo Nation which has its own electricity supplier, Navajo Tribal Utility Authority. Natural gas and propane disruption to cities and areas throughout the County could be a possibility.

Loss of water and sewer service is another possibility. Most incorporated areas within the County have their own water system and wastewater or sewer system. Water for the City of Flagstaff comes from over forty (40) wells. Surface water is stored in Lake Mary and a spring from the Inner Basin in the San Francisco Peaks. The City of Williams’ water supply comes from wells or lakes and reservoirs. After treatment, water is distributed to storage tanks and then gravity fed to customers. Page receives all of their water from Lake Powell. After being treated at their city plant, it is distributed directly to their customers. Outside of these areas, residents receive their water piped from private water companies, hire commercial water haulers, or haul the water themselves.

Privately owned wells exist in many parts of the County, but many residents rely on hauled water. Although the incorporated areas may have wastewater systems, most residents outside the cities have septic systems for sewer.

Developmental Trends

The County is geographically located in a general area of numerous seismic zones, and the potential exists for damage to critical infrastructure and facilities, and perhaps loss of life. As population growth continues, potential impacts to local economies will increase.

4.3.6 Excessive Heat

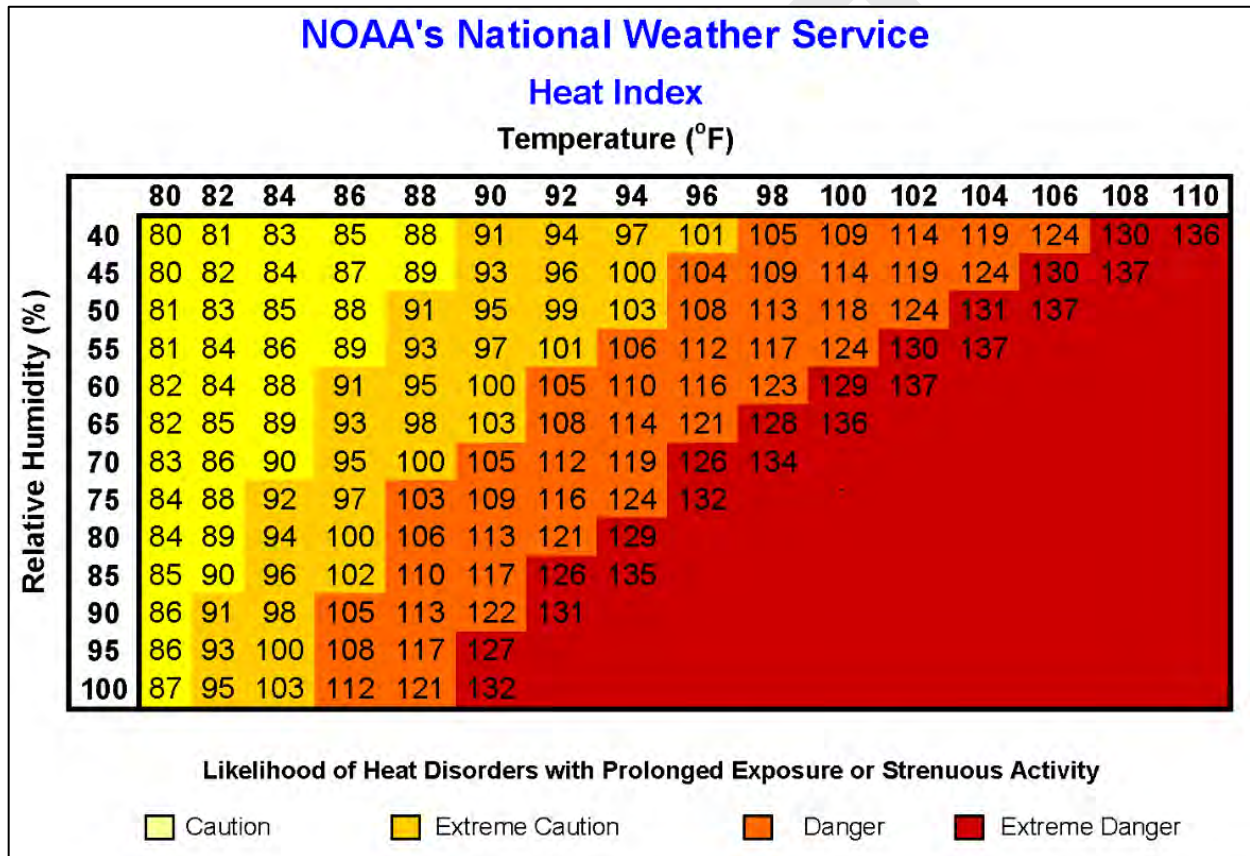
Description

Excessive heat is a period of high heat and humidity with temperatures above 90°F for at least two to three days. In extreme heat conditions the human body works extra hard to maintain a normal temperature, which can lead to death. This hazard is responsible for the most annual fatalities from weather-related hazards.

- Extreme heat can occur quickly and without warning;
- Older adults, children, and sick or overweight individuals are at greater risk to it;
- Humidity increases the feeling of heat as measured by a heat index.

The Heat Index in **Figure 4.16** also known as the Apparent Temperature, is a subjective measure of what it feels like to the human body when relative humidity is factored into the actual air temperature. Relative humidity is a measure of the amount of water in the air compared with the amount of water that air can hold at the current temperature. In short, it is a measure of how close the air is to being saturated with moisture. The body cools itself through the evaporation of perspiration or sweat. However, when the relative humidity is high, the increased moisture content in the air decreases the evaporation of perspiration or sweat. Therefore, the body feels warmer when it is humid. For example, in the heat index chart below, a hot and very humid air mass with a temperature of 94°F and a relative humidity of forty-five percent (45%) yields an apparent temperature of 100°F. Holding the temperature constant and increasing the relative humidity to sixty percent (60%) yields an apparent temperature of 110°F.

Figure 4.16: National Weather Service Heat Index

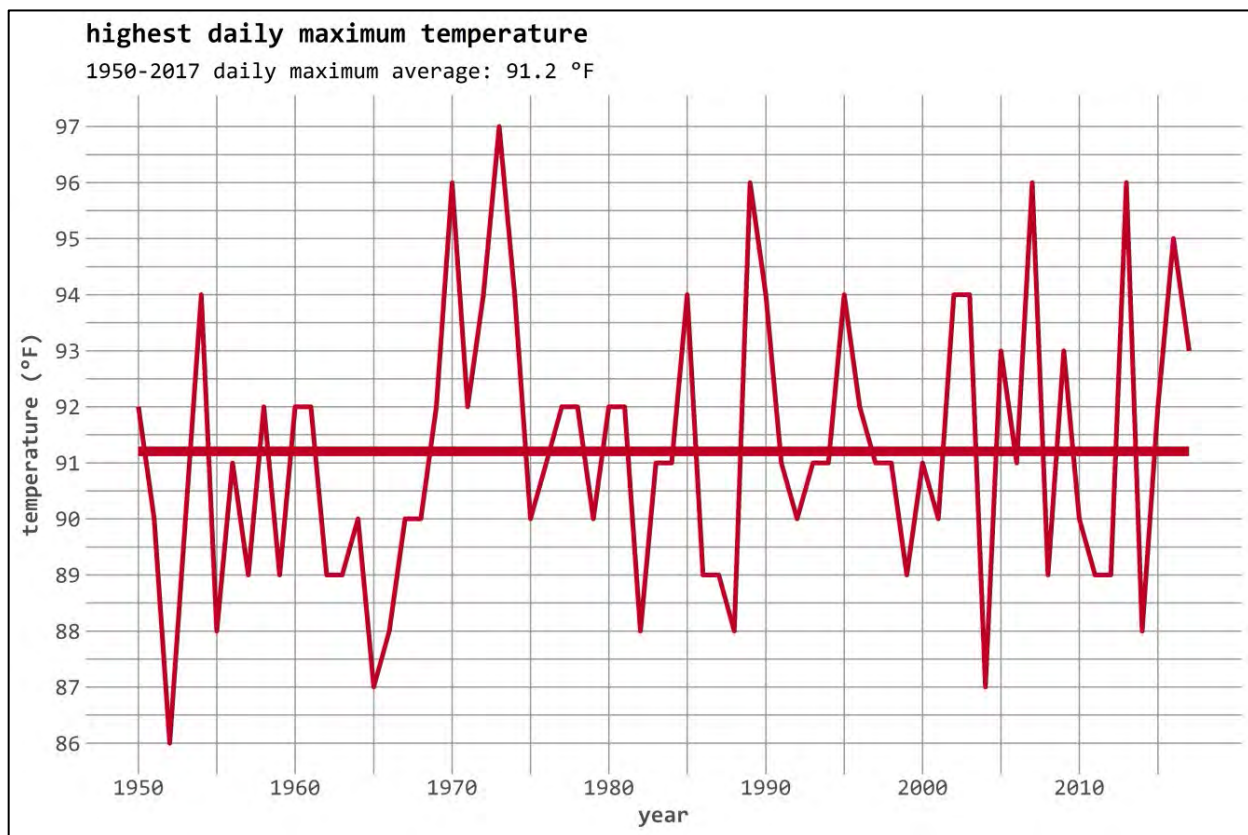


History

Since the early 20th century, average surface temperatures worldwide have risen at an average rate of 0.15°F per decade (1.5°F per century). In the U.S. average surface temperatures have risen more quickly since the late 1970s (0.36 to 0.55°F per decade), with eight (8) of the top ten (10) warmest years on record since 1880. Scientists predict that over the next century, global temperatures will increase between 2.5°F and 10.4°F.

Figure 4.17 below shows the annual, daily high temperature for Flagstaff from 1950 to 2017. It should be noted the high temperature of 97°F on August 17, 2020 tied the 1973 record.

Figure 4.17: Highest Daily Maximum Temperature



Source: University of Arizona, 2018

Location

Excessive heat occurs most frequently at the County's lower elevations. Fredonia and Page experience excessive heat more frequently than Flagstaff, Tusayan, or Williams. The Southwest is experiencing more rapid temperature rise than the rest of the nation. As temperatures rise, excessive heat will become more common at higher elevations.

Extent

The National Weather Service issues the following excessive heat products:

- **Hazardous Weather Outlook for Excessive Heat** – Period of excessive heat is possible within the next three to five days. A heat advisory or excessive heat warning may eventually be needed.
- **Heat Advisory** – Period of excessive heat is expected. The combination of hot temperatures and high humidity will create a situation in which heat related illnesses are possible.
- **Excessive Heat Watch** – Prolonged period of dangerous excessive heat possible within 48 hours.
- **Excessive Heat Warning** – Prolonged period of dangerous excessive heat is expected within 24 hours. The combination of hot temperatures and high humidity will create a dangerous situation in which heat related illnesses are likely. An Excessive Heat Warning is issued when heat indices are expected to reach at least 105°F for more than three hours per day for two consecutive days, or heat index more than 115°F for any period of time.

All of the County, except the highest elevations, may experience excessive heat.

Regulatory Context

There are few regulatory mechanisms related to heat. OSHA does not have a specific standard that covers working in hot environments. Nonetheless, under the OSH Act, employers have a duty to protect workers from recognized serious hazards in the workplace, including heat-related hazards. OSHA has cited employers for injuries related to excessive heat.

Probability of Future Events

While the number of days that excessive heat will occur on an annual basis is difficult to predict, it nearly certain to occur within the County on an annual basis. As global temperatures rise, more days of excessive heat will occur yearly.

Vulnerability

Contrary to common perception, heat is the number one weather-related killed in the United States. According to data from the Center for Disease Control and Prevention (CDC) heat-related deaths numbered 8,081 in the United States from 1999 to 2010. On average, more people are killed by heat in the U.S. than are by tornadoes, hurricanes, floods, and lightning combined.

Groups within communities that are more vulnerable to excessive heat, than the general population include:

- The elderly;
- Young children;
- Persons with chronic health conditions
- Outdoor workers;
- Athletes;
- Persons with low income;
- Persons experiencing homelessness.

Table 4-19 below provides the CPRI ratings excessive heat.

Table 4-19: CPRI Rating for Excessive Heat

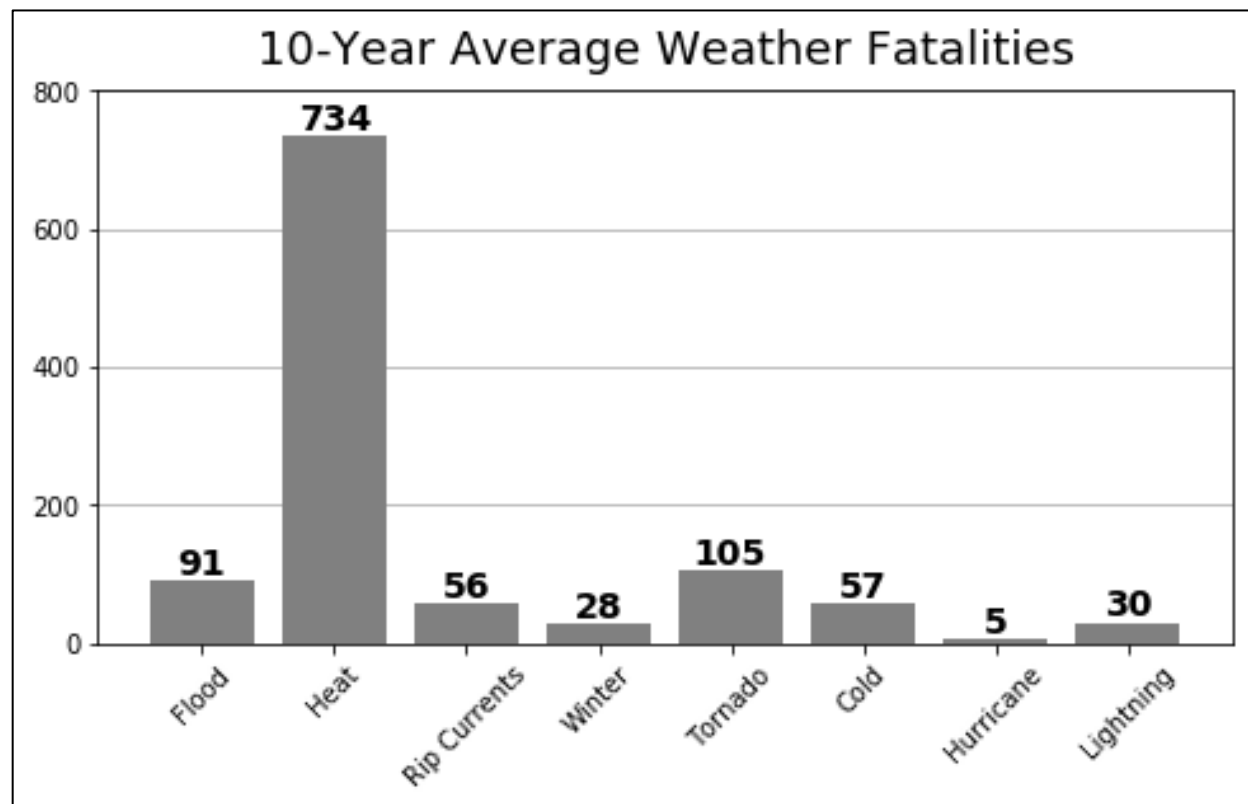
Jurisdiction	Probability	Magnitude/ Severity	Warning Time	Duration	CPRI Score
Coconino County	1.8	.9	.15	.4	3.25
Flagstaff	1.8	.9	.15	.4	3.25
Fredonia	1.35	.3	.15	.3	2.1
Page	1.8	.3	.15	.4	2.65
Tusayan	1.8	.9	.15	.4	3.25
Williams	1.35	.6	.15	.4	2.5
County-wide average CPRI =					2.83
<i>Jurisdictions in bold print indicate they will be assessing the hazard and including mitigation activities for it. Note: Maximum CPRI score is 4.00.</i>					

Loss Estimates

In Arizona, heat-related deaths are by far the number one weather-related killer. The Arizona Department of Health Service reported that in the County, between 2008 and 2018, 30 people died of heat-related illnesses, including eight in 2017. Neighboring Maricopa County reported 1,078 heat-related deaths during that 10-year period.⁴³

⁴³ Arizona Department of Health Services, [Heat-Caused and Heat-Associated Deaths in Arizona by Year \(2008-2018\)](#)

Figure 4.18: Arizona Weather Fatalities



Source: NOAA, CDC

Developmental Trends

As the population in the County continues to grow and as the general climate becomes warmer, more people will be exposed to excessive heat which will occur more frequently.

4.3.7 Extended Power Outage

Description

A power outage is the loss of the electricity supply to an area. In addition to natural hazards, power failure can result from a defect in a power station, damage to a power line or other part of the distribution system, a short circuit, or the overloading of electricity mains.

A power outage may be referred to as a blackout if power is lost completely or as a brownout if some power supply is retained, but the voltage level is below the minimum level specified for the system, and a short circuit indicates a loss of power for a short amount of time (usually seconds). Some brownouts, called voltage reductions, are made intentionally to prevent a full power outage.

Power failures may also be intentionally induced due to high power demand that exceeds supply or due to actions taken by utility companies to de-energize power lines when there is the possibility of energized power lines being downed during fire Red Flag warnings and causing fires.

Power outages can significantly disrupt all forms of critical infrastructure and have cascading effects that threaten public safety and health – particularly through the disruption of public safety, environmental health, and life support systems.

History

Significant examples of planned and unplanned power outages include:

- **July 2020** – Three consecutive unplanned outages in east Flagstaff left 3,500 residents without power. One outage was due to an above-ground power line failure; the second was due to an underground line failure; the third was due to an operator error.⁴⁴
- **November 2019** – Heavy snow in Tusayan and Flagstaff caused a power outage, forcing the town of Tusayan to declare an emergency.⁴⁵
- **March 2017** – Unplanned power outage affecting Williams and 3,000 residents.⁴⁶
- **October 2016** – A temporary power outage was scheduled along the Kachina Trail to repair a damaged utility line.⁴⁷

Location

Power outages can occur throughout the County and affect the entire region. Though impacts can be severe throughout affected areas, extreme weather conditions can pose a significant threat to the health and safety of the population. Severe winter storms, high winds, and flooding can all cause significant disruptions to power supplies in the County, especially for jurisdictions with limited power feeds such as Tusayan, which is serviced by one feed and has experienced power outages during severe weather events. Additionally, the heat island effect in urban areas during the summer months and extreme cold during winter storm events in rural and reservation communities can exacerbate the felt effects of a power outage.

Extent

Power outages are typically measured by the number of customers without power. This number is two to three times lower than the number of people affected.

Vulnerability

Table 4-20 provides an analysis of the vulnerability of the Planning Team’s jurisdictions to extended power outages.

Table 4-20: CPRI Rating for Extended Power Outage

Jurisdiction	Probability	Magnitude/ Severity	Warning Time	Duration	CPRI Score
Coconino County	.9	.9	.6	.4	2.8
Flagstaff	.9	.9	.6	.4	2.8
Fredonia	.9	.6	.6	.3	2.4
Page	.45	.3	.6	.1	1.45
Tusayan	1.8	.3	.6	.2	2.9
Williams	1.35	.6	.6	.2	2.75
County-wide average CPRI =					2.52
<i>Jurisdictions in bold print indicate they will be assessing the hazard and including mitigation activities for it.</i>					
<i>Note: Maximum CPRI score is 4.00.</i>					

⁴⁴Arizona Daily Sun, July 2020, [Repeated power outages hit east Flagstaff neighborhood](#)

⁴⁵Associated Press, November 2019, [Snowy Grand Canyon Town Declares Emergency](#)

⁴⁶12 News, March 2017, [Northern Arizona power outages stretches from Grand Canyon to Williams](#)

⁴⁷Coconino County Arizona, October 2016, [Temporary power outage scheduled along the Kachina Trail](#)

Probability of Future Events

While the location, duration, and number of residents impacted by power outages is not able to be predicted for the County, the probability of a future power outage is increasing due to increasing demand for power, climate change, technological/cybersecurity threats, and ageing infrastructure. In turn, this increases the vulnerability of economic, communication, health, and public safety infrastructure to other hazard events (such as HAZMAT or Transportation Accident).

Developmental Trends

One developmental trend that may affect an increased likelihood of an extended power outage is the increase in cyberattacks. While recent federal assessments indicate that cyberattacks could cause widespread power outages in the United States, the scale of power outages that may result from a cyberattack is uncertain due to limitations in those assessments.⁴⁸ It remains critical resilient power plans for public and private facilities are created to keep critical systems operational when there is a temporary or extended power outage. In 2019, the U.S. Government Accountability Office (GAO) proposed recommendations for actions needed to address significant cybersecurity risks facing the electric grid. This included a recommendation to the U.S. Department of Energy (DOE) to develop plans aimed at implementing the federal cybersecurity strategy for the grid and ensure that the plan addresses the national strategy's key elements, including a full assessment of cybersecurity risks to the grid.

Climate change has the potential to cause an increase in severe weather events resulting in hazard impacts to the local electrical grid. Climate Central updated an analysis of national power outage data, which shows a 67% increase in major power outages from weather-related events since 2000⁴⁹. Two-thirds of states, including Arizona, experienced an increase in outages caused by extreme weather. Combined with aging County's infrastructure, this means power outages will increase unless mitigative actions are taken to increase electrical grid resilience.

Trends in employment and the adoption of technology-based services across the County and the country should also be taken into consideration. The impact of a major, long-term power outage will impact more services and economies than it would have even a decade ago, as remote work relying on internet connectivity and power becomes more common, though the Coconino County Workforce Development Plan from 2020 identified the lack of broadband infrastructure in the County as the "largest weakness to effective delivery of workforce development services."⁵⁰ Rural communities throughout Coconino County have less access to broadband services and power than many urban communities, which may make them more resilient to power outage events compared with other jurisdictions. Many residents throughout Coconino County already are heavily self-reliant on generators, solar, and other backup power sources as a result of "living off the grid" and previous experience with disasters. Still, the Coconino County Workforce Development Board is actively working to find solutions to increase access to broadband services and technology throughout Coconino County, which will only increase future power dependence.

Healthcare facilities are also more dependent now on technology (e.g., electronic health records) and utilities (refrigeration, heating, and cooling) during severe weather events, making power a critical commodity. The size of the County and the long distances that some clients must travel to receive healthcare services already limits access to healthcare countywide, this distance can be disastrously increased by power outage disruptions of transport, health, and safety infrastructure.

⁴⁸ United States Government Accountability Office, [GAO-19-332 Action Needed to Address Significant Cybersecurity Risks Facing the electric Grid](#).

⁴⁹ Kenward and Raja. Climate Central. "Blackout: Extreme Weather, Climate Change, and Power Outages." 2014.

⁵⁰ Coconino County Workforce Development Board. [Local Workforce Development 2020-2023 Plan. Arizona At Work. 2020](#).

4.3.8 Flood / Flash Flood / Post-Wildfire Flooding / Debris Flows

Description

For the purpose of this MJHMP, the hazard of flooding will pertain to floods that result from precipitation / runoff related events. Flooding due to dam failures is addressed separately. The three seasonal atmospheric events that tend to trigger floods in the 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. In particular rain-on-snow events can be devastating due to the rapid snowmelt and frozen ground conditions that lead to increased run-off and flooding. If Arizona experiences a regular increase of rainy winters instead of snow, this could potentially be a challenge for the limited capacity of reservoirs and could create dangerous road conditions and heavier-than-usual snow and slush on buildings causing roof collapses. Rain-on-snow events in the Western U.S. are most common from October-May.⁵¹
- **Summer Monsoons** – A third atmospheric condition that brings flooding to Arizona is the annual summer monsoon. In mid to late summer the southerly monsoon circulation brings 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 or local area flows. Riverine flooding occurs along established watercourses when the bank full capacity of a wash is exceeded by storm runoff or snowmelt and the overbank areas become inundated. Local area flooding can be the result of poorly designed or planned development wherein natural flow paths are altered, blocked or obliterated, and localized ponding and conveyance problems result. In some cases, adequately designed and planned developments may experience flooding as a result of wildland fire damage due to the new lack of vegetation available to soak up rainwater. Erosion is also often associated with damage due to floods.

Warmer ocean and atmosphere temperatures over the past 20 years have led to an increase in atmospheric moisture available for precipitation, resulting in some heavier rain- and snowfall events than the average in northern Arizona. Recent years have had fewer cold winter storms, resulting in warmer winter conditions. Warmer temperatures can lead to fewer winter snow events, and more winter rain events, but more importantly for flooding, more rain-on-snow events. So far, the climate division record for Coconino, Navajo, and Apache Counties shows significant warming over the last 20 years. But there is no clear trend in the frequency of extreme precipitation, though the record shows extreme annual variation.

Precipitation during the monsoon season can be particularly heavy for short durations, and when these heavy rains fall on burn areas the flash flooding includes large debris flows. The warmer eastern Pacific Ocean waters also increase the potential for eastern Pacific hurricane formation off the coast of central America and Mexico, which bring additional moisture to the monsoon events in August and September, even if the tropical storms dissipate before reaching Arizona.

⁵¹ Gregory J. McCabe, Martyn P. Clark, and Lauren E. Hay, 2007, Rain-on-Snow Events in the Western United States

Three tropical storms in late summer of 2014 reached Arizona causing significant flooding statewide, including the County.

Post-Wildfire Flooding / Debris Flows

Debris flows are hazard that may occur after large wildland fires. Wildland fire can significantly alter the hydrologic response of a watershed to the extent that even modest rainstorms can produce dangerous flash floods and debris flows. The USGS conducts post-fire debris-flow hazard assessments for select fires in the western United States. It uses geospatial data related to basin morphometry, burn severity, soil properties, and rainfall characteristics to estimate the probability and volume of debris flows that may occur in response to a design storm.

Wildfire-related flooding and increased runoff may continue for several years in a burn area, but it is unusual for post-fire debris flows to occur beyond the second rainy season. Some of the largest debris-flow events happen during the first post-fire storm season. It takes much less rainfall to trigger debris flows from burned basins than from unburned areas. Any storm that has intensities greater than about 0.4 inches per hour poses the risk of producing debris flows.

While multiple factors can affect debris-flow occurrence, post-fire debris flows generally are triggered by one of two processes: 1) surface erosion caused by rainfall runoff, and 2) landslides caused by rainfall seeping into the ground. Surface-erosion runoff processes are by far the most prevalent contributors to debris flows. This is because fires commonly reduce the rate at which water can seep into the soil. Landslide processes are much less common causes of fire-related debris flow, but prolonged heavy rains may increase soil moisture even after a wildland fire. The wetted soil can then fail, producing infiltration-triggered landslides, which may be shallow or deep-seated landslides (greater than 10'-15' deep).

History of Events

Between 1967 and 2020, Coconino County was involved in 12 state and/or federally declared flooding-based disaster declarations. These have been accompanied by numerous seasonal events – often affecting areas impacted by recent wildfire events. The following list of incidents provide a representative samples of major flooding events that have impacted the County:

- **February 3, 2019** – Oak Creek in Sedona rose 7 feet between 6:15 AM and 8:30 AM. Numerous low water crossings in Oak Creek Canyon were flooded. The creek dropped below bank full by 7:00 PM on February 4 in Sedona. The river gauge at Page Springs rose 9 feet between noon and 2:30 PM. At the peak of the flooding at the Page Springs RV Park, a foot of water was flowing through the park. at the peak of the flooding. One large tree and several small trees came down. Red mud was deposited throughout the RV park. The water continued to flow downstream from Sedona into the Verde River where it was no longer a flood issue.⁵²
- **July 11-12, 2018** – Deep monsoon moisture over northern Arizona allowed strong thunderstorms to develop into a 1000-year rainfall event. Heavy rain from thunderstorms caused flash flooding in the northern drainages of the Schultz Fire scar and created two flood waves which impacted the Supai area. A total of 172 visitors in the Supai campground were evacuated, campers were displaced, and 15 campers were stranded on high ground as tents and belongings were swept away.⁵³ Rainfall in the affected area was recorded between 5.35 inches to 5.94 inches of rain in

⁵² National Centers for Environmental Information (NCEI) formerly NCDC

⁵³ [National Weather Service](#), Flagstaff

under two hours.⁵⁴ The County road crews spent up to two weeks removing debris, mud, and rocks from water channels and roads.⁵⁵

- **February-March 2015** – Oak Creek rose above all low water crossings for several days due to heavy rains in the area and upstream. This is a normal event but one of significance when considering the potential for post fire flooding as a result of the Slide Fire.
- **July 2014** – The event of July 8th was one of the largest urban flood events ever recorded for the City of Flagstaff. The storm event that led to flooding was a very rare event. Estimates indicate that the storm event was one that would be expected to occur once every 100 years (i.e. 1% chance of occurring in any given year) and possibly only once every 500 years (i.e. .2% chance of occurring in any given year) based on an approximately 100-year climate record. Several residential structures were evacuated during debris removal and cleanup.⁵⁶
- **2013** – Record monsoon activity contributed to flooding incidents in Kaibab Estates West, McCann Estates in the Doney Park area, and Havasupai Village. Some homes in McCann estates sustained significant damage. It is important to note this particular flooding of McCann estates was unrelated to the Schultz Burn impacts but was the result of three significant rainfalls on the watershed areas above McCann Estates. The water treatment facility in Havasupai was temporarily disabled and potable water and sandbags were flown in by helicopter.
- **2011-2014** – Additional post-fire flooding related to the Schultz Burn contributed to property damage, debris flows, and damage to utilities, roads, and some structures.
- **July 2010** – Heavy rain from thunderstorms over the Schultz Burn area of the San Francisco Peaks near Flagstaff Arizona caused severe post fire flooding and loss of a child's life in the residential areas inclusive of Doney Park, and Timberline-Fernwood. The aftermath of the largest wild land fire in Arizona in 2010 and subsequent sediment and ash-laden floods caused extensive damage to homes, property, and infrastructure up to four miles from the burn. The Schultz Fire caused significant impact to portions of several watersheds.⁵⁷
- **August 2008** – Heavy rain from thunderstorms over the Cataract Creek and Havasu Creek drainages caused flash flooding that started in the Village of Supai. Radar estimated between three to four inches of rain over several square miles in the Cataract Creek drainage during the afternoon. Additional heavy rain from thunderstorms on August 17 contributed heavy runoff into the canyon. Cataract Canyon/Creek becomes Havasu Canyon/Creek at Havasu Springs about a mile upstream from the Village of Supai. The flooding lasted several days and caused damage to a few homes in the Village of Supai.⁵⁸
- **July 30, 2006** – Heavy rain caused three debris slides over Highway 89A in Oak Creek Canyon near Sedona. One slide was 100 feet wide and covered the road four feet deep. This area was below the Brins Fire scar area.
- **August 24, 2006** – Heavy rain caused at least three rockslides on Highway 89A through Oak Creek Canyon below the area impacted by the 2006 Brins Fire. The Highway was closed until the slides could be cleared.

⁵⁴ [Coconino County](#), Press Release, July 20, 2018

⁵⁵ National Centers for Environmental Information

⁵⁶ Weather.gov, July 2014, Month in Review for Northern Arizona

⁵⁷ Arizona Hydrological Society Annual symposium, 2011, Field Trip Guide to the 2010 Schultz Burn Area

⁵⁸ National Climatic Data Center, 2008

- **December 2004** – A strong Pacific storm system moved across Arizona December 28th and 29th with heavy rainfall. The governor declared a state of emergency for Coconino and Yavapai Counties which provided \$200,000 aid for relief efforts. The heavy rain and melting snow resulted in excessive runoff in many areas from Williams to Flagstaff to Winslow and south to Prescott and Black Canyon City. High water, mudslides, and rockslides resulted in numerous road closures and evacuations in the area. Many creeks experienced significant rises. Some storm total rainfall amounts were: Flagstaff 3.83 inches, Crown King 4.73 inches, Sedona 4.06 inches, Winslow 0.54 inches, Payson 2.88 inches. Flagstaff received its second largest calendar day precipitation on record. 70 people were evacuated in southwest Flagstaff when water over-topped an earthen flood control dam. A 14-mile section of Highway 89 between Flagstaff and Sedona was closed because of rockslides. Preliminary counts indicate that as many as 150 homes may have sustained damages up to approximately \$1 million. Roads and bridges sustained an additional \$1 million in damage.⁵⁹

Location - Flooding / Flash Flooding

Flooding is the most common hazard in the state of Arizona. All of the planning area is susceptible to both flooding and flash flooding. The maps in **Figures 4.19 – 4.21** indicate potential flood zones in the County. High and medium flood risks indicated in the maps are primarily the river and stream beds that compose the regions watershed.

⁵⁹ National Climactic Data Center, 2008

Figure 4.19: Flood Hazard 1

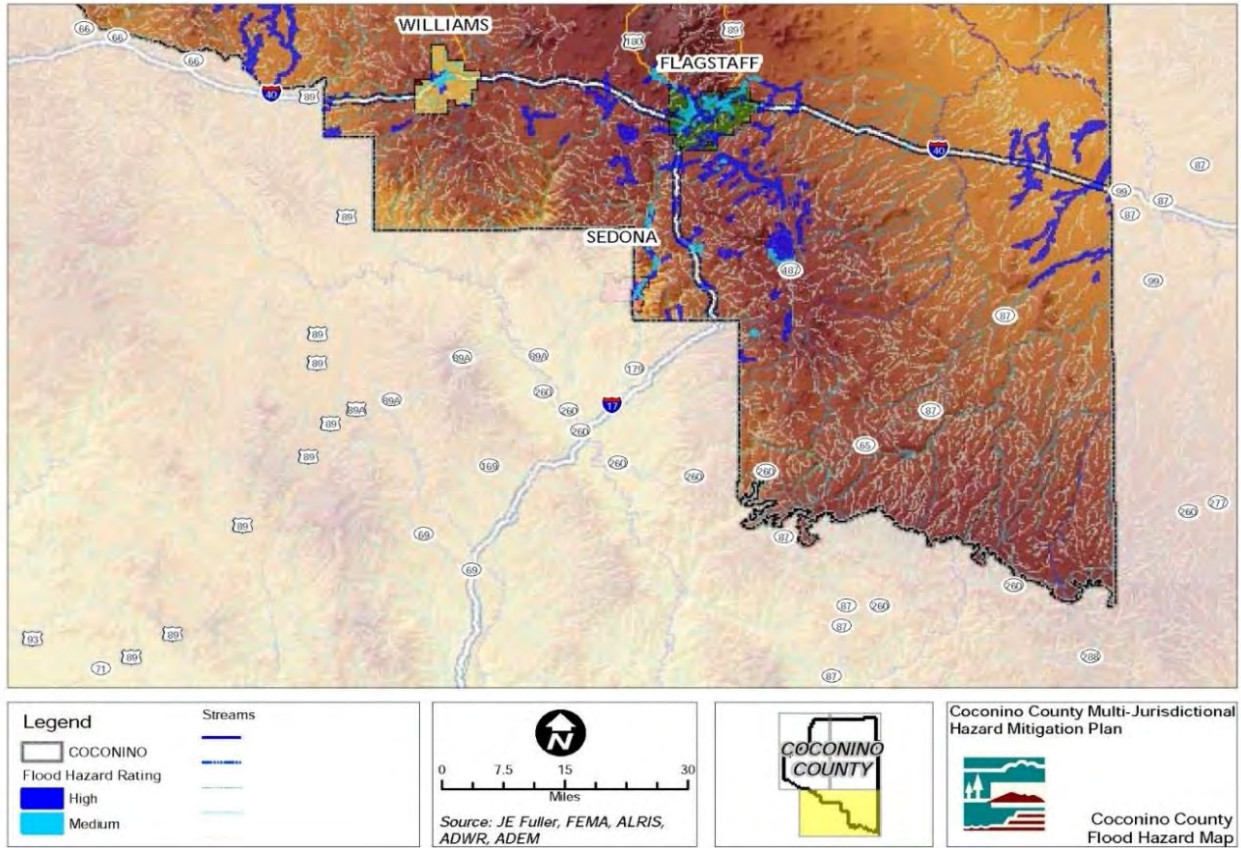


Figure 4.20: Flood Hazard 2

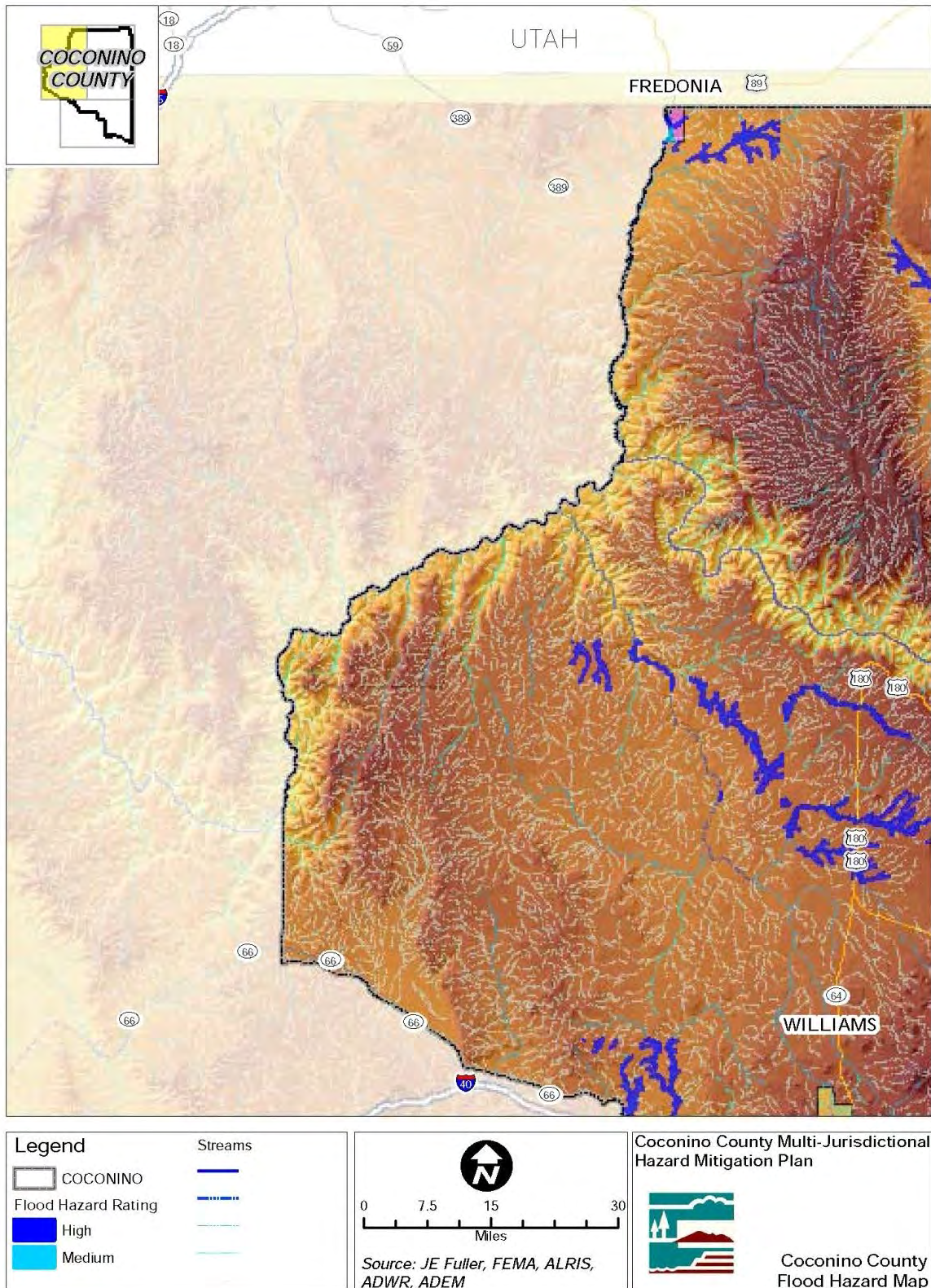
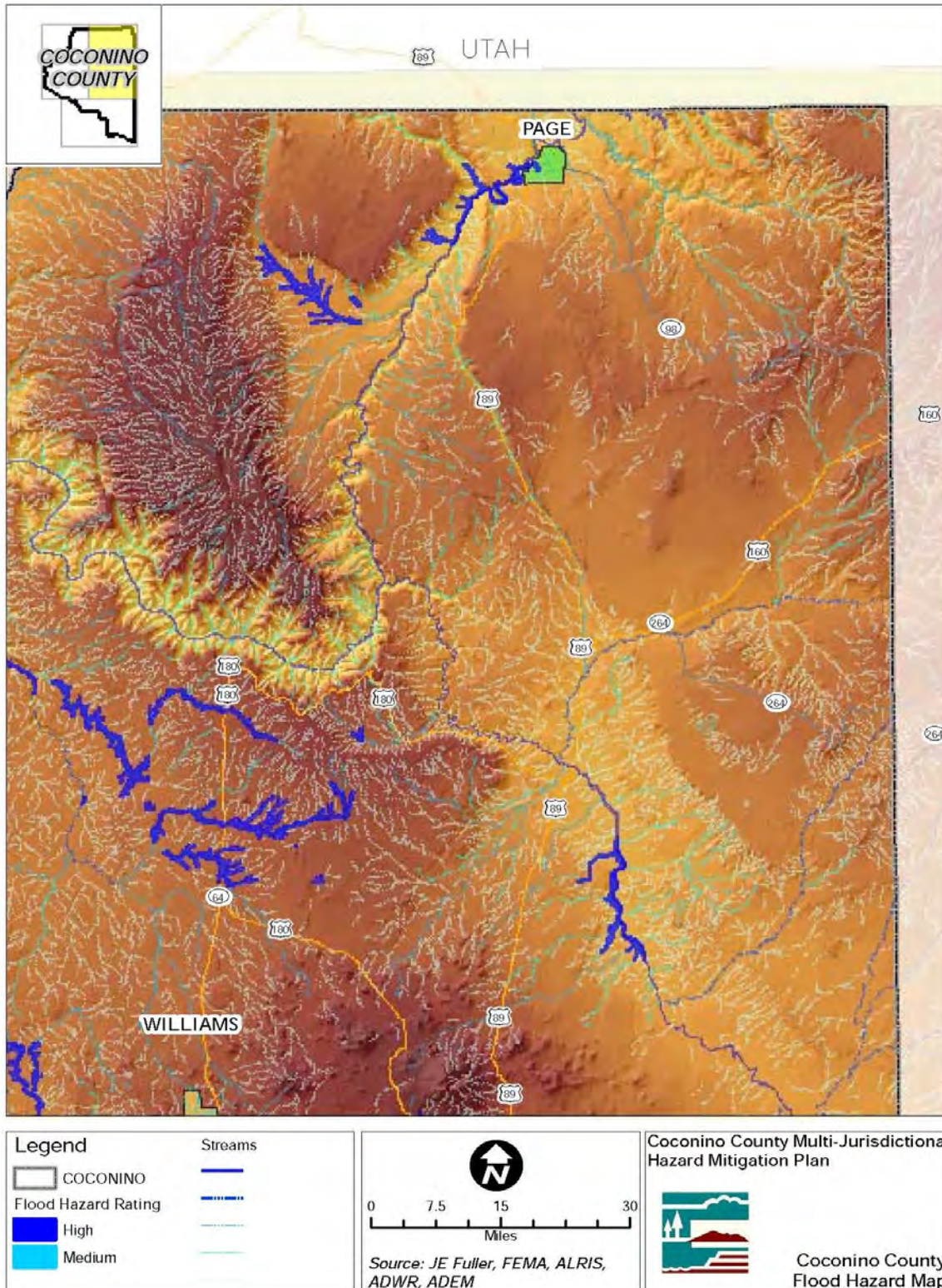


Figure 4.21: Flood Hazard 3



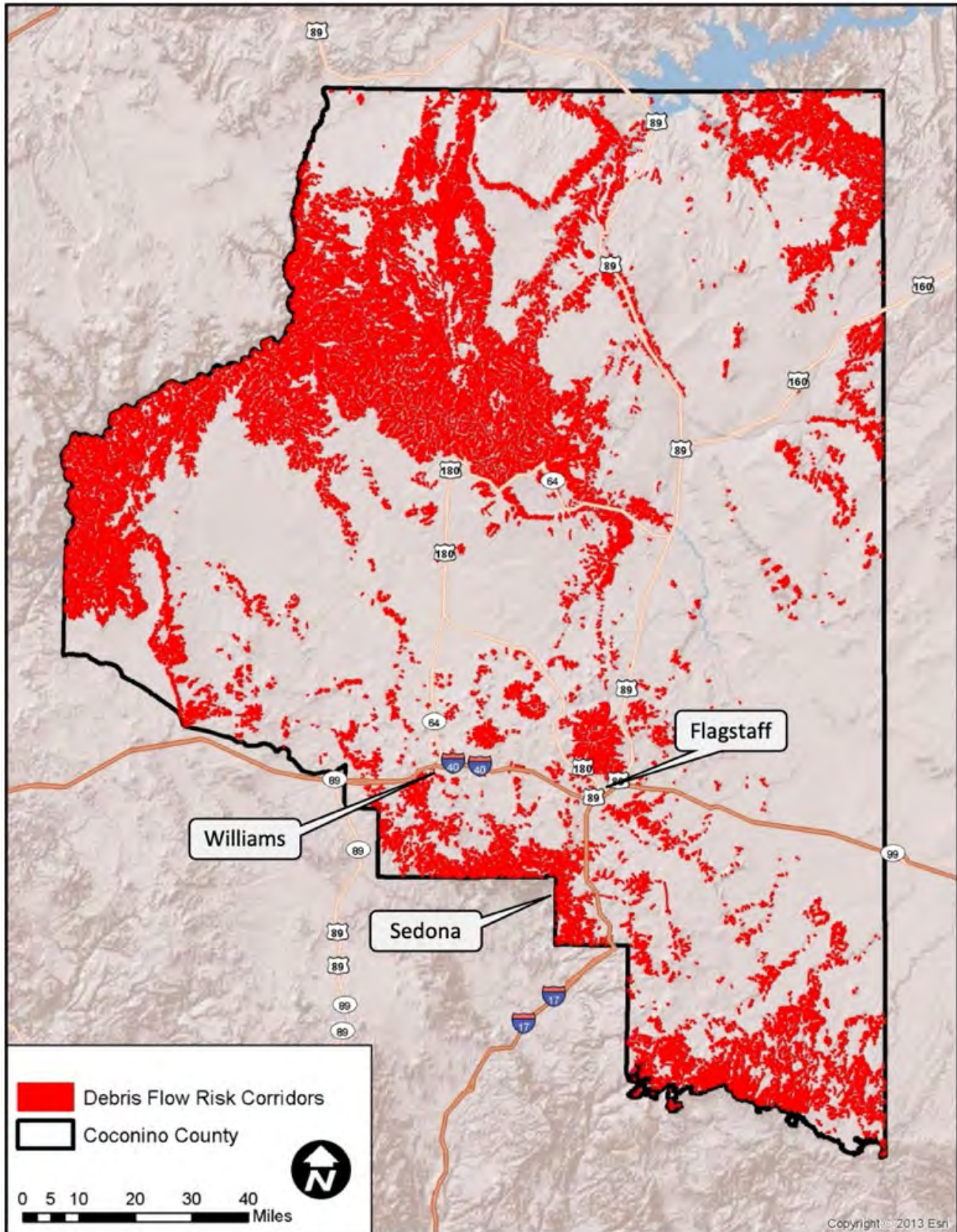
Location – Post-Wildfire Flooding / Debris Flows

The [USGS conducts post-fire debris-flow hazard assessments](#) for select fires in the western United States. They use geospatial data related to basin morphometry, burn severity, soil properties, and rainfall characteristics to estimate the probability and volume of debris flows that may occur in response to a design storm. The assessment provides a map of potential debris flows.

In addition to the USGS debris-flow hazard assessments mentioned above, previous work has been done in Coconino County to identify potential debris-flow risk corridors. In 2017, the Arizona Geological Survey at the University of Arizona produced a [Post-Wildfire Debris Flow & Flooding Assessment for Coconino County](#). The Assessment identified areas that are at risk for flooding and debris flows in the aftermath of a wildland fire. The study consisted of a countywide reconnaissance-level evaluation and two pilot study areas in Fort Valley and Williams. The results were based on field investigations, state-of-the-art two-dimensional FLO2D pre- and post-wildfire flood computer modeling, LAHARZ debris flow computer modeling, and GIS terrain and geographic modeling. The study concluded that up to 34% of the buildings, and up to 26% of the critical facilities in the County are at some level of increased risk of post-fire flooding, if not actions are taken to reduce the risk of severe wildland fires. As many as 593 homes in the County, as well as 13 dams and other critical facilities, may be impacted by post-fire debris flows. However, the study also concluded that forest health initiatives can effectively mitigate as much as 58% of the post-fire flood and debris flow risk.

Recommended risk mitigation actions from the Assessment include implementation of development guidelines to prevent new development from repeating past mistakes, creation of emergency action plans to streamline post-fire recovery efforts, and community awareness and public education activities to build support for safe development and mitigation efforts. The County was further encouraged to continue partnering with the Arizona Department of Forestry and Fire Management via their Prevention Programs to educate the public on the wildland-urban interface.

Figure 4.22: Post-Wildfire Debris Flow Corridors



Extent

The magnitude of flooding that is used as the standard for floodplain management in the U.S. is a flood with a probability of occurrence of one percent in any given year. This flood is also known as the 100-year flood or base flood. The most readily available source of information regarding the 100-year flood, as well as the 500-year flood (i.e. 0.2% probability of occurrence in any given year), is the system of Flood Insurance Rate Maps (FIRMs) prepared by FEMA. These maps are used to support the NFIP.

The USGS and other agencies refer to the percent chance of occurrence as an Annual Exceedance Probability (AEP). An AEP is always a fraction of one. A 0.2 AEP flood has a twenty percent (20%) chance of occurring in any given year, and this corresponds to a five-year recurrence-interval flood. Recurrence-interval terminology tends to be more understandable for flood intensity comparisons but may be misleading because a 100-year flood can occur two years in a row.

Probability of Future Events – Flood / Flash Flood

The probability and magnitude of flood hazards in the County jurisdictions are based on the 1% probability floodplains delineated on FEMA Flood Insurance Rate Maps (FIRMs), plus any provisional floodplain delineations used for in-house purposes by participating jurisdictions. As of April 2009, the maps are in draft form and have not been formally approved by the County. The April 2009 draft DFIRM floodplain GIS base files were provided by the Coconino County Engineering Division and are the basis for the flood hazard depictions in the MJHMP.

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

Probability of Future Events – Post-Wildfire Flooding / Debris Flows

In the Arizona Geological Survey Assessment mentioned previously, the two pilot studies that were conducted utilized modeling to predict debris flow probability and volumes based on three burn scenarios – treated, treated to 8200 elevation, and untreated. An emphasis of the study was to understand and quantify the impact of increased forest health due to forest treatments (e.g. thinning, control burns, etc.) on downstream flood risk. The two pilot studies were conducted for Fort Valley and the City of Williams. The probabilities determined are outlined in the tables below. The report determined that treatment can effectively reduce post-fire discharges by 58%.

Table 4-21: Fort Valley Debris Flow Probability

Modeled Scenario	Probability of Debris Flow in a 1-Year Event	Basin Hazard Class Ranking
Treated All	45% - 77%	Moderate to High
Treated to 8200 Elevation	66% - 99%	Moderate to High
Untreated	77% - 99%	High

Table 4-22: Williams Debris Flow Probability

Modeled Scenario	Probability of Debris Flow in a 1-Year Event	Basin Hazard Class Ranking
Treated	38% - 94%	Low to High
Untreated	66% - 99%	Moderate to High

Vulnerability

Table 4-23 provides an analysis of the vulnerability of the Planning Team jurisdictions to flooding.

Table 4-23: CPRI Rating for Flooding / Flash Flood and Post-Wildfire Flood / Debris Flows

Jurisdiction	Probability	Magnitude/ Severity	Warning Time	Duration	CPRI Score
Coconino County	1.8	.9	.6	.2	3.5
Flagstaff	1.8	.9	.6	.2	3.5
Fredonia	.9	.6	.6	.3	2.4
Page	1.35	.6	.45	.2	2.6
Tusayan	.9	.9	.6	.3	2.7
Williams	1.8	.9	.6	.1	3.4
County-wide average CPRI =					3.02
<i>Jurisdictions in bold print indicate they will be assessing the hazard and including mitigation activities for it. Note: Maximum CPRI score is 4.00.</i>					

Although Fredonia has not experienced significant flooding since the 1960's, the community understands that a 100-year flooding event or worse could have a devastating effect on them. Due to lack of recent documented history for either Fredonia or Tusayan, it is difficult to fully understand the likelihood of such an event and the potential damages. However, it is safe to say a significant event could result in property damage, loss of utilities, road damage and injury or loss of life which in turn could force evacuations and further disrupt everyday life in the community. Nearly year round in Tusayan there is an added exposure concern created by visitors to the area. Visitors comprise the largest Town population sector of approximately 1,000 in the area hotels. There is also visitor traffic on Highway 64 traveling to and from the Grand Canyon.

Regulatory Context

The Legislature of the State of Arizona has in ARS 48-3601 through 48-3628 delegated responsibility to each County Flood Control District to adopt regulations designed to promote the public health, safety, and general welfare of its citizenry, and as such the Board of Directors of the Flood Control District of Coconino County, Arizona have defined Coconino County zoning ordinances to minimize public and private losses due to flood conditions in specific areas.

In May 2018, the Coconino County Flood Control District Board of Directors affirmed the boundaries of the Flood Control District (FCD) to ensure the District was established according to Arizona Revised Statutes.⁶⁰ This review also found that the Flood Control District tax must be levied on all taxable properties within the County including the municipalities of Flagstaff, Fredonia, and Page that manage their own floodplain administration responsibilities. As of May 2018, Coconino County is now taxing all private properties within all municipalities consistent with Arizona's other counties.

Loss Estimates

Potential damages from a catastrophic wildland fire and the resulting post-fire flooding have been estimated to be between \$379 million and \$694 million specifically for the City of Williams and Bill Williams watershed in one report, which is only a fraction of the areas of the County vulnerable to flooding and debris flows.⁶¹

⁶⁰ Coconino County Flood Control District Website. 2018. "[FCD Tax Fact Sheet.](#)"

⁶¹ Coconino County Flood Control District. 2018. "[The Economic Impact of Post Fire Flooding: Bill Williams Mountain.](#)"

The report utilized the 2010 Schultz Fire as a proxy to estimate costs incurred due to post-fire flooding for the local area. From the 2010 Schultz Fire alone, property values were estimated to fall overall by 12% in Flagstaff, and 13.4% in the county overall when adjusted for overall market decline.⁶² Residents in a survey administered by the County estimated property loss from the Schultz Fire and Flood at approximately 30%.⁶³ There is also a high likelihood that severe flooding and debris flows could damage the I-40 and result in transportation delays, resulting in another estimated loss of \$4,280,000 per day of lost accessibility for the County. There are additional estimated economic impacts due to impacts to the water supply, impacts to local wildlife, loss of communications infrastructure, loss of tourist revenue, and loss of business revenue in flooding-affected areas.

Developmental Trends

Climate change has the potential to cause more frequent and more damaging flood incidents by increasing the rate and severity of rainstorm events. The warmer weather and increased moisture in storm systems can be further exacerbated by atmospheric rivers, which can create flooding throughout Arizona. The resulting deluges from these events can increase the frequency and size of major flooding events that approach or exceed the 100 and 500-year floodplains. Since historical and ongoing developments are generally permitted based on historical 100-year floodplain data, the risk of flooding events to existing and new developments is substantial.

This risk is magnified regarding debris flows. There is an ongoing trend of high-value residential development in rural areas that are in, or adjacent to, regions of heightened wildland fire risk. As wildland fires become larger and more frequent, they are priming wider areas for debris flow events at more frequent intervals. Heavier rainfall events will subsequently trigger these events more frequently at scale. These events can deliver major secondary impacts to communities recovering from wildland fire, but also significantly expand the breadth of the disaster affected area / population. However, the risk growth is moderated by the lower population density in affected areas.

4.3.9 High Winds / Tornado

Description

The hazard of severe wind encompasses all climatic events that produce damaging winds. For the County, severe winds usually result from either extreme pressure gradients that usually occur in the spring and early summer months, or from thunderstorms. Thunderstorms can occur year-round and are usually associated with cold fronts in the winter, monsoonal activity in the summer, and tropical storms in the late summer or early fall. Three types of damaging wind features typically accompany thunderstorms: 1) downbursts, 2) straight line winds, and 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 eighty miles per hour (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.

⁶² [NAU Ecological Restoration Institute](#), "A Full Cost Accounting of the 2010 Schultz Fire," May 2013.

⁶³ [NAU Ecological Restoration Institute](#), "A Full Cost Accounting of the 2010 Schultz Fire," May 2013.

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 foundations, block walls and fences blown down, and porches and awnings blown off homes.

Straight line winds develop similarly to downbursts but are usually sustained for greater periods when a thunderstorm reaches the mature stage. They travel parallel to the ground surface at speeds of 75 miles per hour (mph) or higher. These winds are frequently responsible for generating dust and sandstorms, 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 the County, tornadoes are the least common severe wind to accompany a thunderstorm.

Warming temperatures across the southwest are not expected to change the severe wind climatology. The current regime of severe winds, primarily from thunderstorms, should not change in the future as there is no evidence of an increase of pressure gradients or other forcing factors.

Downbursts from summer thunderstorms will continue to be the primary source, but there is no evidence to indicate an increase in frequency or intensity. There is no evidence of a trend of increased frequency or severity of tornadoes in the state, though there were eight tornadoes on October 6, 2010, with the strongest being an EF3.

History

During the 50 years prior to 2010, the County had been subject to severe wind events with a combined loss of over \$146,000 to structures and agriculture, two deaths, and 30 injuries. Historically, the County experiences severe wind events more than twenty-four (24) times per year and up to 80 thunderstorms. The following are examples of significant documented past events:

- **May 9, 2019** – An EF0 tornado touched down in Moenave causing no injuries or damage.⁶⁴
- **August 18 and October 21, 2018** – EF0 tornadoes touched down. The first was in Walnut Canyon and the second was in Meteor City. They caused no injuries or damage.⁶⁵
- **October 6, 2010** – 11 tornadoes touched down in the County. Of the 11 tornadoes, two were EF-3, four were EF-2, two were EF-1, and three were EF-0.⁶⁶ Seven people were injured, and 101 homes suffered various levels of damage. The area of Bellemont Arizona was the hardest hit. The Flagstaff Meadows subdivision had three homes completely destroyed, nine homes had major damage, and fifteen homes experienced minor damage. I-40 and the BNSF rail line run east and west parallel and next to the Flagstaff Meadows housing area. Several vehicles along the I-40 corridor were flipped over, and the BNSF railroad experienced a 20 rail car derailment.⁶⁷
- **April 2010** – Strong winds and blowing dust closed a stretch of Interstate 40 between Meteor Crater rest area and Winslow for several hours twice during the month. Blowing dust reduced visibility so much so, that the Arizona Department of Transportation closed the 17 mile stretch of interstate.

⁶⁴ National Centers for Environmental Information

⁶⁵ National Centers for Environmental Information

⁶⁶ National Weather Service Flagstaff Office

⁶⁷ [US National Weather Service Flagstaff Arizona Facebook page](#)

Strong, gusting sustained southwest winds of 30-40 mph, with gusts of 45-55 mph, were recorded.⁶⁸

- **September 2000** – A strong dust devil at the Coconino County Fairgrounds caused property damage and personal injuries. The dust devil ripped shingles off two roofs, blew down four large tents, blew over a ticket booth and split the supporting beams on a permanent structure. Two people sustained minor scrapes and bruises and one person reported a back injury.⁶⁹
- **June 1995** – Very strong north to northeast winds caused significant damage and combined with cold temperatures to produce extremely cold wind chills above 9,000 feet in the San Francisco Peaks area north of Flagstaff. The highest wind gust of 105 mph was recorded by the Arizona Snowbowl ski area at 3:00 P.M. MST at an elevation of 10,800 feet. Winds blew down approximately 80 trees in the Arizona Snowbowl. One fallen tree caused several thousand dollars damage to a ski lift. Communication lines and power were down also for several hours on the morning of June 18.⁷⁰

Additional areas of notable historic impact include the Glen Canyon Recreation Area / Lake Powell, where severe wind events transform the lake's water surface into dangerous waves that have proven to be fatal and extremely damaging to the surrounding marinas.

Location

All of the County is subject to high winds and potentially tornadoes. Thunderstorms with associated macro and micro-bursts occur more frequently at higher altitudes while tornadoes occur most often at lower elevations.

Extent

Powerful tornadoes can leave a path of near total destruction several hundred yards in width and several miles long. They often occur in clusters that include more than a single destructive funnel. They have the potential to cause extensive damage to dozens or even hundreds of city blocks. The Fujita Scale is used to categorize tornadoes. **Figure 4.23** lists scale values with their affects.

⁶⁸ Arizona Daily Sun, April 2010

⁶⁹ National Climatic Data Center, 2008

⁷⁰ National Climatic Data Center, 2008

Figure 4.23: Fujita Scale and Effects

Damage f scale	Little Damage	Minor Damage	Roof Gone	Walls Collapse	Blown Down	Blown Away	
	f0	f1	f2	f3	f4	f5	
Windspeed F scale	17 m/s	32	50	70	92	116	142
	40 mph	73	113	158	207	261	319
To convert f scale into F scale, add the appropriate number							
Weak Outbuilding	-3	f3	f4	f5	f5	f5	f5
Strong Outbuilding	-2	f2	f3	f4	f5	f5	f5
Weak Framehouse	-1	f1	f2	f3	f4	f5	f5
Strong Framehouse	0	F0	F1	F2	F3	F4	F5
Brick Structure	+1	-	f0	f1	f2	f3	f4
Concrete Building	+2	-	-	f0	f1	f2	f3

Fig. 2.4-1 The Fujita tornado scale (F scale) pegged to damage-causing windspeeds. The extent of damage expressed by the damage scale (f scale) varies with both windspeed and the strength of structures.

Wind events, other than tornadoes, are measured on the Beaufort Scale, shown in **Table 4-24** below.

Table 4-24: Beaufort Scale

Force	Wind (Knots)	WM Classification	Appearance of Wind Effects	
			On the Water	On Land
0	Less than 1	Calm	Sea surface smooth and mirror-like.	Calm, smoke rises vertically.
1	1-3	Light Air	Scaly ripples, no foam crests.	Smoke drift indicates wind direction and still wind vanes.
2	4-6	Light Breeze	Small wavelets, crests glassy, no breaking.	Wind felt on face, leaves rustle, and vanes begin to move.
3	7-10	Gentle Breeze	Large wavelets, crests begin to break, scattered whitecaps.	Leaves and small twigs constantly moving and light flags extended.
4	11-16	Moderate Breeze	Small waves 1-4 feet becoming longer, numerous whitecaps.	Dust, leaves, and loose paper lifted; small tree branches move.
5	17-21	Fresh Breeze	Moderate waves 4-8 feet taking longer form, many whitecaps, some spray.	Small trees in leaf begin to sway.

6	22-27	Strong Breeze	Larger waves 8-13 feet, whitecaps common, more spray.	Larger tree branches moving and whistling in wires.
7	28-33	Near Gale	Sea heaps up, waves 13-19 feet, white foam streaks off breakers.	Whole trees moving and resistance felt walking against wind.
8	34-40	Gale	Moderately high (18-25 feet) waves of greater length, edges of crests begin to break into spindrift, foam blown in streaks.	Twigs breaking off trees and generally impedes progress.
9	41-47	Strong Gale	High waves (23-32 feet), sea begins to roll, dense streaks of foam, spray may reduce visibility.	Slight structural damage occurs, slate blows off roofs.
10	48-55	Storm	Very high waves (29-41 feet) with overhanging crests, sea white with densely blown foam, heavy rolling, lowered visibility.	Seldom experienced on land, trees broken or uprooted, and considerable structural damage.

Regulatory Context

[City and County building codes](#) include regulations for structural design to resist wind damage.

Vulnerability

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 a three-fourths inch in diameter, winds 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.

Vulnerabilities for the County and cities/towns are provided in **Table 4-25** below.

Table 4-25: CPRI Rating for High Wind / Tornado

Jurisdiction	Probability	Magnitude/ Severity	Warning Time	Duration	CPRI Score
Coconino County	.90	.90	.45	.20	2.45
Flagstaff	.90	.90	.45	.20	2.45
Fredonia	.45	.30	.60	.20	1.55
Page	.90	.90	.45	.20	2.45
Tusayan	.90	.90	.45	.20	2.45
Williams	1.35	.90	.30	.10	2.65
County-wide average CPRI =					2.33
<i>Jurisdictions in bold print indicate they will be assessing the hazard and including mitigation activities for it.</i>					
<i>Note: Maximum CPRI score is 4.00.</i>					

Probability of Future Events

High winds may be expected to occur in the County, several times a year. Tornadoes occur less frequently. Other than the 2010 incident during which 11 funnels touched down, tornadoes occur approximately once every five years.

Loss Estimates

The 2010 tornado incident resulted in seven injuries and over \$1 million in damages. Similar, or greater losses can be expected in the future.

Developmental Trends

Strong wind and tornado activity do not appear to be changing in occurrences or strength. As more structures are built to accommodate development, additional amounts of damage can be expected.

4.3.10 HAZMAT / Pipeline Failure / Transport Accident Release

Description

A hazardous material is defined as any material that, due to its quantity, concentration, or physical or chemical characteristics, poses a significant present or potential hazard to human health and safety or to the environment if released. Hazardous materials include but are not limited to hazardous substances, hazardous wastes, and any material that a business or local implementing agency has a reasonable basis to believe would be injurious to the health and safety of persons or would be harmful to the environment if released. Effects of exposure may be felt over seconds, minutes, or hours (i.e. short-term effects) or not emerge until days, weeks, or even years after (i.e. long-term effects). Some substances are harmful after a single exposure of short duration, but others require long episodes of exposure or repeated exposure over time to cause harm.

Hazardous material releases can occur from industrial facilities at fixed sites or along transportation corridors such as rail and roadways. Past hazardous material releases are contained in the history section. Hazards from releases cause include fire, explosion, toxicity, corrosiveness, and asphyxiation. These releases may cause long-term impacts to both individuals affected by the initial release and the surrounding environment or personal property, and can result in short-term or long-term evacuations, depending on the size and scale of the incident.

Mobile incidents include those that occur on a roadway or a railroad. These incident-related releases are dangerous because they can occur anywhere, including near human populations, critical facilities, or environmentally sensitive areas. Mobile incident-related releases can also be more difficult to mitigate because of the great area over which any given incident might occur and the potential distance of the incident site from response resources.

The release of hazardous substances from stationary sources such as storage facilities or manufacturing plants can be caused by human error, equipment failure, intentional dumping, acts of terrorism, or natural phenomena. Earthquakes pose a particular risk because they can damage or destroy facilities containing hazardous substances. The threat posed by a hazardous-material event can be amplified by restricted access, reduced fire suppression and spill containment capability, and cutoff of response resources.

History

Although pipelines are the safest and most reliable way to transport natural gas, crude oil, liquid petroleum products, and chemical products, there is still an inherent risk due to the nature of hazardous materials. While no significant pipeline failures have occurred within the County, past events include:

- **Flagstaff, August 2020** – An overturned tanker truck released 1,000 gallons of gasoline onto the ground. The gasoline flowed into a storm drain and an unnamed creek;
- **Page, September 2018** – A storage tank experienced a transfer line rupture, causing a spill of materials into secondary containment;
- **Flagstaff, March 2018** – A natural gas explosion occurred along a distribution line at a private residence. The occupant sustained burns to the hand and face;
- **Page, September 2017** – A storm caused a houseboat to tip over onto the beach and rocks, causing a discharge of fuel into the water. Nineteen people were on board, and three people suffered injuries;
- **Flagstaff, August 2015** – A one-car freight train derailment occurred with no injuries.
- **Bellemont, October 2000** – On Halloween night, October 31, 2000, two west bound trains on the BNSF rail line collided in Bellemont Arizona, a community of approximately 1000 people, and approximately ten miles from Flagstaff. A large quantity of diesel fuel was released from one locomotive and caught fire. Atmospheric conditions were favorable for smoke dissipation for public safety and the diesel fuel was allowed to burn as it was released to avoid water table and soil contamination. This collision caused the closure of east bound and west bound I-40 and evacuation of local residents throughout the night. There was one crewmember fatality.

According to the United States Coast Guard National Response Center (USCG NRC), there have been 84 hazardous materials releases in Coconino County, and 67 events took place in jurisdictions named in this plan between 2015 through 2020. A count of reports between 2015 and 2020 is in the **Table 4-26** below.

Table 4-26: USCG NRC Reports by Jurisdiction

Jurisdiction	Incidents Reported 2015-2020
Page	22
Flagstaff	40
Fredonia	1
Williams	4

Location

The largest concentration of extremely hazardous substances storage and facilities are in Flagstaff, followed by the unincorporated areas, then Page, and finally Williams. A review of the State of Arizona Tier Two Chemical Inventory Reporting as reported in 2015 shows the following County-wide risks:

Table 4-27: Hazardous Materials Storage Facilities

Facilities with Reportable Risks	Number of Facilities in the County
Organizations with reportable tier two chemical quantities	72
Physical addresses with reportable quantities (some addresses have more than one chemical in reportable quantities)	187
Reportable quantities County-wide for all chemical	393

Facilities with Reportable Risks	Number of Facilities in the County
Reportable quantities within municipal jurisdictions	216 of 393 locations (54.96%)
Reportable quantities in un-incorporated areas	177 of 393 locations (45%)
Extremely hazardous substance (EHS) reports	75 of 393 (19%)

The top three hazardous commodities at fixed facilities are shown to be sulfuric acid, chlorine, and lead. The probable locations of hazardous materials are:

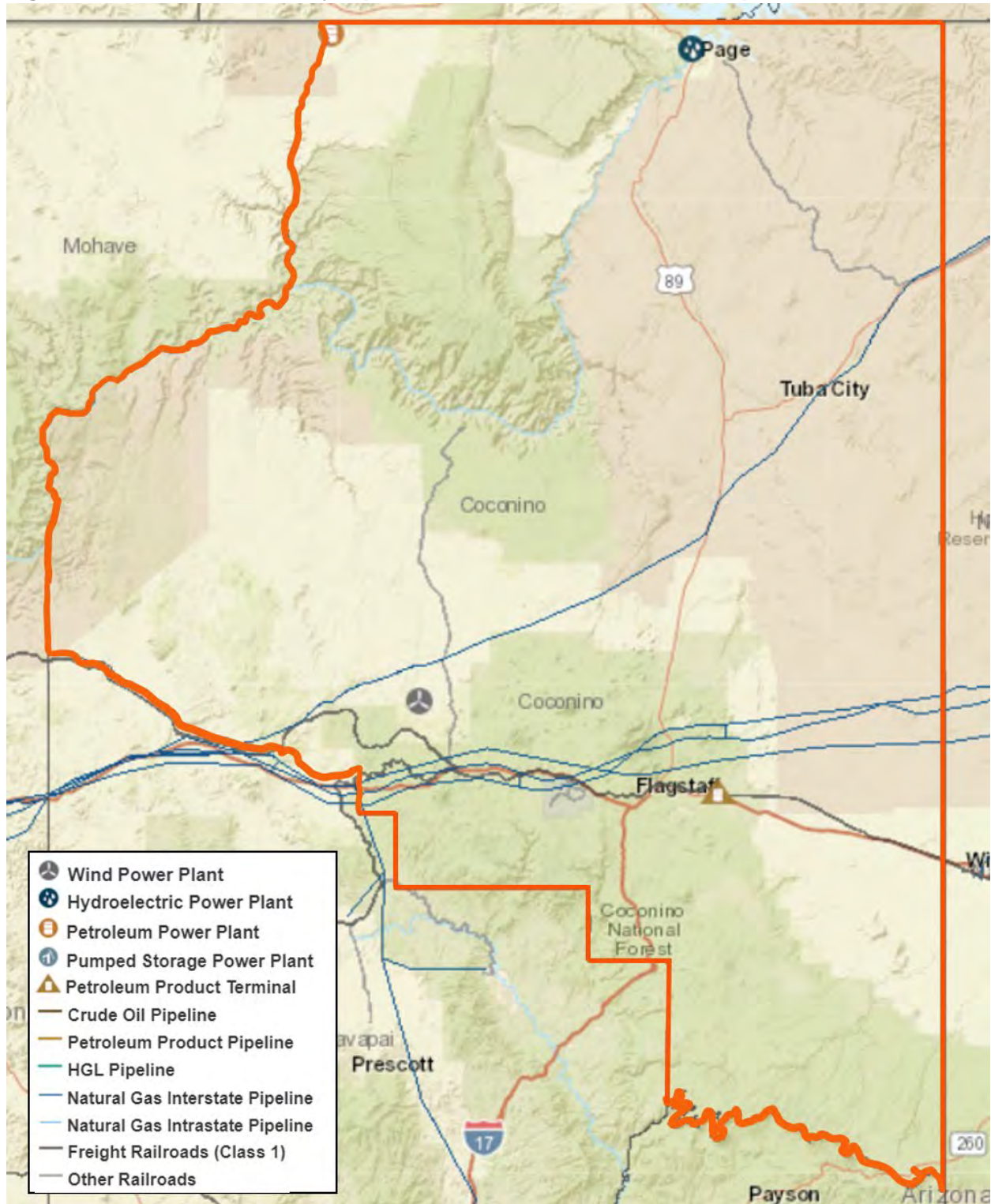
- Transport routes for Extremely Hazardous Substances (EHS) as identified by facilities subject to Emergency Planning and Community Right-to-Know Act (EPCRA) Reporting;
- Facilities with EHS in quantities in excess of Threshold Planning Quantities (TPQ), as identified through EPCRA reporting;
- Facilities that employ, process, and/or store radioactive materials.

Specific facilities known to the County are:

- Airports in Flagstaff, Grand Canyon, Page, Tuba City, and Williams;
- Enterprise Products (13625 Winora Road) – Underground natural gas storage site near Winslow;
- Other industrial sites in Flagstaff and Doney Park/Winona;

Additional hazardous materials risks for the County stem from pipelines that flow through the jurisdiction. The interstate pipeline delivering Arizona’s natural gas flows directly East to West through the Navajo Nation and Hopi Reservations into the County. These major pipelines run parallel to I-40 and underneath Flagstaff.

Figure 4.24: Coconino County Pipeline and Related HAZMAT Transport Routes⁷¹



⁷¹ U.S. Energy Information Administration (EIA) Maps for Coconino County, AZ. <https://www.eia.gov/state/?sid=AZ>

Transportation corridors can pose a significant threat with risks of spills and accidents. The I-40 corridor runs East and West through the county from the Navajo Nation through Flagstaff and to Seligman. The BNSF Railway takes a similar path. North and South through the County Grand Canyon Railway runs from Grand Canyon to Congress.⁷² Approximately 85 trains per day, with an average of 70 cars per train, travel through Coconino County and 100 of which can include significant amounts of hazardous materials in their contents. Each of these heavily traveled lines runs through densely populated areas, including downtown Flagstaff and Williams. As with railroads, its strategic location makes the County region a hub for local, regional, and national cargo shipments by tractor trailers and smaller trucks. The I-40/I-17 highway system sees an average of 12,000 – 17,000 vehicles per day, with 45% of those vehicles being commercial trucks. An estimated 300 – 450 trucks per day travel this highway system with hazardous materials.⁷³ Based on past event data, the most likely cause of hazardous material release incidents in the County has historically been due to spills and accidents on transportation corridors or vehicles.

Transportation routes with the highest probability of hazardous materials incidents include:

- Interstate 40;
- Interstate 17;
- US Highway 89;
- US Highway 89A;
- State Route 98;
- State Route 180;
- State Route 87;
- State Route 99;
- State Route 64;
- Business 40 (Santa Fe Avenue through Flagstaff);
- Lake Mary Road (FH 3);
- Leupp Road (County Road 127, Flagstaff to Leupp);
- Burlington Northern Santa Fe Railway.

The County has uranium mines and mining claims near the Grand Canyon which pose an environmental and health threat. Particular concern has been raised in the Navajo Nation's reservation and remediation efforts are underway. A five-year plan (2014-2018) was drafted by six federal agencies included the EPA to address elevated uranium contamination levels in the Navajo Nation due to a history of uranium mining since the 1940s on Navajo land. Assessment and cleanup of contaminated structures and sites will continue, and Coconino County has continued to ask for continued federal support to prioritize uranium cleanup and remediation as an environmental justice issue.⁷⁴

In addition, the Arizona Army National Guard Camp Navajo site has been identified as a hazardous materials waste site requiring additional cleanup efforts. Contaminants of concern include perchlorate, explosives, nitrate, semi-volatile organics, and heavy metals. A post-closure permit was issued in January

⁷² Arizona Department of Transportation Railway Map, 2012.

⁷³ Coconino County Emergency Operations Plan, 2011.

⁷⁴Coconino County Uranium Cleanup Fact Sheet.

<https://www.coconino.az.gov/DocumentCenter/View/21881/Coconino---Uranium-Cleanup-Fact-Sheet->

2017 to establish a 30-year monitoring period for groundwater and surface water bodies near Camp Navajo.⁷⁵ Corrective actions for site cleanup are ongoing.

Extent

The extent of a hazardous material spill may vary from significant impacts causing injuries and evacuation to minor impacts requiring cleanup. Hazardous material releases can be harmful in the following ways:

- Chemical, biological, and radiological agents can cause significant health risks to those exposed to them; biological agents can be additionally dangerous if they are infectious. Flammable and explosive materials pose life safety concerns when exposed to heat.
- Oil spills can present an immediate fire hazard and can contaminate drinking water supplies. Any release of hazardous material requires a thorough clean-up of the site and decontamination of those exposed. Clean-up and recovery are time and cost consuming.
- Delays caused by hazardous materials releases and the ensuing evacuation and cleanup processes could lead to significant economic losses due to traffic delays (i.e. mobile releases) or operational shut-down (i.e. fixed facilities).

Overall, hazardous materials can cause death, serious injury, long-lasting health effects, and damage to buildings, the environment, homes, and other property.

Regulatory Environment

The Hazardous Materials Transportation Act (HMTA), enacted in 1975, is the principal federal law regulating the transportation of hazardous materials. Its purpose is to "protect against the risks to life, property, and the environment inherent in the transportation of hazardous material in intrastate, interstate, and foreign commerce." Implementation is under the authority of the U.S. Secretary of Transportation. The Act was passed as a means to improve the uniformity of existing regulations for transporting hazardous materials and preventing the spills and illegal dumping endangering the public and the environment – a problem exacerbated by uncoordinated and fragmented regulations.

Regulations are enforced through four key provisions encompassing federal standards under Title 49 of the United States Code:

- Procedures and policies;
- Material designations and labeling;
- Packaging requirements;
- Operational rules.

In 1990, Congress enacted the Hazardous Materials Transportation Uniform Safety Act (HMTUSA) to clarify the maze of conflicting state, local, and federal regulations. Like the HMTA, the HMTUSA requires the Secretary of Transportation to promulgate regulations for the safe transport of hazardous material in intrastate, interstate, and foreign commerce. The Secretary also retains authority to designate materials as hazardous when they pose unreasonable risks to health, safety, or property. The statute includes provisions to encourage uniformity among different state and local highway routing regulations, to develop criteria for the issuance of federal permits to motor carriers of hazardous materials, and to regulate radioactive material transport.

⁷⁵ Arizona Department on Environmental Quality. January 2019. "Arizona Army National Guard Camp Navajo Hazardous Waste Site." <https://azdeq.gov/node/4884>

Originally published in 1973 under the authority of §311 of the Clean Water Act, the Oil Pollution Prevention regulation sets forth requirements for prevention of, preparedness for, and response to oil discharges at specific non-transportation-related facilities. To prevent oil from reaching navigable waters and adjoining shorelines and to contain discharges of oil, the regulation requires these facilities to develop and implement Spill Prevention, Control, and Countermeasure (SPCC) Plans and establishes procedures, methods, and equipment requirements (Subparts A, B, and C). In 1990, the Oil Pollution Act (OPA) amended the Clean Water Act to require some oil storage facilities to prepare Facility Response Plans (FRP). On July 1, 1994, the EPA finalized the revisions that direct facility owners or operators to prepare and submit plans for responding to a worst-case discharge of oil.

Federal

- **Resource Conservation and Recovery Act** – At the federal level, the principal agency regulating the generation, transport, and disposal of hazardous substances is the EPA, under the authority of the Resource Conservation and Recovery Act (RCRA). The RCRA established an all-encompassing federal regulatory program for hazardous substances that is administered by the EPA. Under the act, the EPA regulates the generation, transportation, treatment, storage, and disposal of hazardous substances.
- **Hazardous Materials Transport Regulations** – The U.S. Department of Transportation (USDOT) regulates the transportation of hazardous materials between states. The USDOT Federal Railroad Administration enforces the Hazardous Materials Regulations promulgated by the Pipeline and Hazardous Materials Safety Administration for rail transportation. These regulations include requirements that railroads and other transporters of hazardous materials, as well as shippers, have and adhere to security plans and also train employees involved in offering, accepting, or transporting hazardous materials on both safety and security matters.
- **Comprehensive Environmental Response, Compensation, and Liability Act** – Congress enacted this Act, commonly known as Superfund, in 1980. It established prohibitions and requirements concerning closed and abandoned hazardous waste sites, provided for liability of persons responsible for hazardous waste release at sites, and established a trust fund to pay for cleanup when no responsible party could be identified.
- **Regulation of Polychlorinated Biphenyls and Lead-Based Paint** – The Toxic Substances Control Act of 1976 (Title 15, United States Code, Section 2605) banned the manufacture, processing, distribution, and use of polychlorinated biphenyls (PCB) in enclosed systems. The EPA Region 9 PCB Program regulates the remediation of polychlorinated biphenyls in several states, including California. The Residential Lead-Based Paint Hazard Reduction Act of 1992 amended the Toxic Substances Control Act to include Title IV, Lead Exposure Reduction. The EPA regulates renovation activities that could create lead-based paint hazards in target housing and child-occupied facilities and has established standards for lead-based paint hazards and lead dust cleanup levels in most pre-1978 housing and child-occupied facilities.

State

Arizona Administrative Code Rules 17-5-209 list regulations applicable to hazardous materials transportation within Arizona, which is managed by the Arizona Department of Transportation (ADOT) and the Arizona Department of Public Safety Highway Patrol Division. Arizona has adopted the federal hazardous materials regulations as they apply to the transportation and storage of hazardous materials. ADOT and Highway Patrol administer and enforce the hazardous materials transportation rules. The Arizona Department of Environmental Quality (ADEQ), under the RCRA along with state statutes and codes, has the authority to monitor and direct businesses that may generate, transport, or dispose of

hazardous waste in Arizona. Finally, the Arizona State Fire Marshal, ADEQ, and the Arizona Department of Agriculture (AZDA) Environmental Services Division are responsible for state regulations of hazardous materials storage.

Applicable Arizona Administrative Code Rules:

- Aboveground storage tanks (ASTs): Uniform Fire Code (UFC), [Arizona Revised Statutes \(AZ Rev. Stat.\) 41-2146\(C\)](#) and [Arizona Administrative Code Rules](#) (AZ Admin. Code R) 4-36-201 *et seq.*
- Hazardous materials transportation regulations: [AZ Admin. Code R 17-5-209](#)
- Hazardous substance release: [AZ Rev. Stat. 26-348](#)
- Hazardous underground storage tanks (USTs): [AZ Admin. Code R 18-12-240](#) to [18-12-242](#)
- Hazardous substance dry wells: [AZ Admin. Code R 18-9-C301](#)
- Pesticide storage: [AZ Admin. Code R 3-3-308](#)

Local

The County adopted the Coconino County Health and Human Services Unified Health Code in December of 2019. Chapter 4 of the Code provides minimum standards for the protection of the health of people in the County including incorporated and unincorporated areas with regard to the storage, collection, transportation, and disposal of refuse and other objectionable waste. The Code prevents the creation or maintenance of unhealthful, unsanitary conditions or public health nuisances, including potentially hazardous waste.

Vulnerability

Vulnerabilities for the County and cities/towns are provided in **Table 4-28** below.

Table 4-28: CPRI Rating for HazMat / Pipeline Failure / Transportation Accident

Jurisdiction	Probability	Magnitude/ Severity	Warning Time	Duration	CPRI Score
Coconino County	1.8	.6	.6	.2	3.2
Flagstaff	1.8	.6	.6	.2	3.2
Fredonia	.45	.3	.6	.2	1.55
Page	.9	.6	.6	.2	2.3
Tusayan	.45	.6	.15	.2	1.4
Williams	.9	.6	.6	.4	2.5
County-wide average CPRI =					2.36
<i>Jurisdictions in bold print indicate they will be assessing the hazard and including mitigation activities for it.</i>					
<i>Note: Maximum CPRI score is 4.00.</i>					

Probability of Future Events

While safety programs aim to prevent hazardous material releases, accidents occur due to equipment failures or human error. Additionally, a large earthquake could rupture piping and other containment systems and derange controls, causing releases, fires and public health incidents. There is a high probability of future hazardous releases from refineries and chemical plants that could affect the County. Based on previous events, the likelihood of small hazardous materials releases is high and can occur at any time.

Loss Estimates

If released, hazardous materials may cause harm to people, the environment, critical infrastructure, and property. Their potential for harm exists regardless of whether they are released by accident, malicious actor, fire, or weather-related event. These incidents affect a range of stakeholders in the whole community. Workers in facilities who regularly use or handled hazardous materials, transportation carriers, nearby residents and students, first responders, and first receivers are all at risk of health impacts from hazardous materials.⁷⁶ Loss estimates can be difficult to predict for hazardous material incidents, but modeling programs such as those available through the Interagency Modeling and Atmospheric Assessment Center (IMAAC) can assist first responders in utilizing plume modeling to predict exposure risk.⁷⁷

Developmental Trends

The danger of a hazmat incident or release in the County will continue to pose a threat based on existing transportation corridors, traffic, severe weather incidents, and potential future development and construction. Future expansion of highways and new roads will encourage an increase in traffic and the percentage of commercial trucks carrying hazardous materials. In addition, the increased likelihood of severe weather incidents such as flooding, wildland fires, and severe heat may further increase the likelihood of a railway or vehicle crash and spill, or facility damage resulting in a release. Though, with the 2014 implementation by voters of Proposition 403 in the County, implementing a road maintenance sales tax, improved road conditions may help to curb future accidents and improve road safety when hazardous materials are being transported. Additionally, according to the U.S. Department of Transportation, the number of railroad incidents that involve hazardous materials in the U.S. has been generally decreasing over the last decade, from about 750 in 2010 to about 570 in 2017, and 500 in 2018. In Arizona, the number of incidents also has been decreasing over the last five years. In 2016, there were 13 incidents, while these numbers dropped to nine and five in 2017 and 2018, respectively. In 2019, there were only three railroad incidents related to hazardous materials.⁷⁸ This indicates overall improvement in railway safety that can be expected to continue.

4.3.11 Public Health Outbreak and Pandemic

Description

Human health hazards include transmittable diseases and environmental hazards, such as adverse weather. The following sections describe commonly recognized human health hazards.

- **Corona Viruses / SARS** –Coronaviruses cause a large percentage of colds and upper respiratory infections. Severe Acute Respiratory Syndrome (SARS) is a viral respiratory disease caused by a SARS-associated coronavirus. It was first identified on November 16, 2002 during an outbreak that emerged in China and spread to four other countries. It was quickly given the formal name of SARS due to its primary symptoms, and the CDC issued their first health alert on March 15, 2003.⁷⁹ The current (2020) COVID-19 pandemic is spread by a coronavirus.
- **Influenza** – Flu epidemics and pandemics occur routinely, typically in the fall and winter. Because flu seasons fluctuate in length and severity, a single estimate cannot be used to summarize

⁷⁶ FEMA. Hazardous Materials Incidents: Guidance for State, Local, Tribal, Territorial, and Private Sector Partners. August 2019. <https://www.fema.gov/sites/default/files/2020-07/hazardous-materials-incidents.pdf>

⁷⁷ <https://www.fema.gov/emergency-managers/practitioners/hazardous-response-capabilities/imaac>

⁷⁸ Arizona State University. "ASU professor details hazardous materials risks in incidents like Tempe Lake Bridge Derailment." August 2020. <https://news.asu.edu/20200804-arizona-impact-asu-professor-details-hazardous-materials-risks-incidents-tempe-lake-bridge>

⁷⁹ Centers for Disease Control, [CDC SARS Response Timeline](https://www.cdc.gov/sars/coronavirus/2019-ncov/timeline/index.html)

influenza-associated deaths. The U.S. Centers for Disease Control and Prevention (CDC) estimates that from the 1976-1977 flu season to the 2006-2007 season, flu-associated deaths ranged from a low of about 3,000 to a high of about 49,000.

- **Insect / Tick-Borne Disease** – Insects such as mosquitos and ticks can transmit a variety of diseases. Diseases that can be contracted through a tick bite include Colorado tick fever; Ehrlichiosis; Lyme disease; Rocky Mountain spotted fever; Tularemia. Diseases that mosquitoes carry include: Eastern equine encephalitis; Malaria; West Nile virus; Zika virus.
- **Plague** – Caused by the bacteria *Yersinia pestis*, a zoonotic bacterium usually found in small mammals and their flea, the plague is transmitted between animals and humans by the bite of infected fleas, direct contact with infected tissues, and inhalation of infected respiratory droplets. There are two primary clinical forms of plague infection: bubonic and pneumonic. Bubonic plague is the most common form and is characterized by painful swollen lymph nodes or 'buboes.' Plague can be a very severe disease in people, with a case-fatality ratio of thirty to sixty percent (30%-60%) for the bubonic type and is always fatal for the pneumonic kind when left untreated.
- **Anthrax** – Anthrax is a serious infectious disease caused by gram-positive, rod-shaped bacteria known as *Bacillus anthracis*. Although it is rare, people can get sick with anthrax if they come in contact with infected animals or contaminated animal products. Anthrax has the potential for and has been used as a biological weapon.
- **Hemorrhagic Fevers** – Viral hemorrhagic fevers are a group of illnesses caused by several distinct families of viruses. In general, the term “viral hemorrhagic fever” is used to describe a severe multisystem syndrome. Characteristically, the overall vascular system is damaged, and the body’s ability to regulate itself is impaired. These symptoms are often accompanied by hemorrhage. However, the bleeding is itself rarely life-threatening. While some types of hemorrhagic fever viruses can cause relatively mild illnesses, many of these viruses cause severe, life-threatening disease. Hemorrhagic fevers include Ebola and Yellow Fever.

History

Pandemics have occurred throughout history. Some of the largest scale public health and pandemic incidents include:

- **COVID-19 (2019-Present)** – Beginning in December 2019, in the region of Wuhan, China, a new (“novel”) coronavirus appeared and rapidly spread. COVID-19, a shortened form of “coronavirus disease of 2019,” has affected every nation on the planet. It is the largest pandemic since the 1918-1919 Spanish Influenza.
- **HIV/AIDS (1976-Present, peak at 2005-2012)** – HIV/AIDS was first identified in the Democratic Republic of the Congo in 1976. HIV/AIDS is a global pandemic, having killed more than 36 million people since 1981. Currently, there are between 31 and 35 million people living with HIV infections.
- **H3N2 Flu (1968)** – A category 2 Flu pandemic, the 1968 flu pandemic was caused by the H3N2 strain of the Influenza A virus. Within three months, it had spread to the Philippines, India, Australia, Europe, and the U.S. While the 1968 pandemic had a comparatively low mortality rate (.5%), it still resulted in the deaths of more than a million people, including 500,000 residents of Hong Kong; approximately 15% of its population at the time.
- **H2N2 Flu (1956-1958)** – The Asian Flu was a pandemic outbreak of Influenza A of the H2N2 subtype that originated in China in 1956 and lasted until 1958. In its two year infectious duration, it resulted in approximately two million deaths worldwide and 69,800 in the U.S.

- **H1N1 Flu (1918-1920)** – A strain of H1N1 influenza resulted in a deadly outbreak that tore across the globe, infecting over a third of the world’s population and ending the lives of 20 to 50 million people. Of the 500 million people infected in the 1918 infection wave, mortality rates were estimated at 10% to 20%, with up to 25 million deaths in the first 25 weeks alone.
- **Plague (1346 to 1353)** – The Black Death was an outbreak of Bubonic Plague that ravaged Europe, Africa, and Asia, with an estimated death toll between 75 and 200 million people. Thought to have originated in Asia, the pandemic most likely jumped continents via the fleas living on the rats found aboard merchant ships.

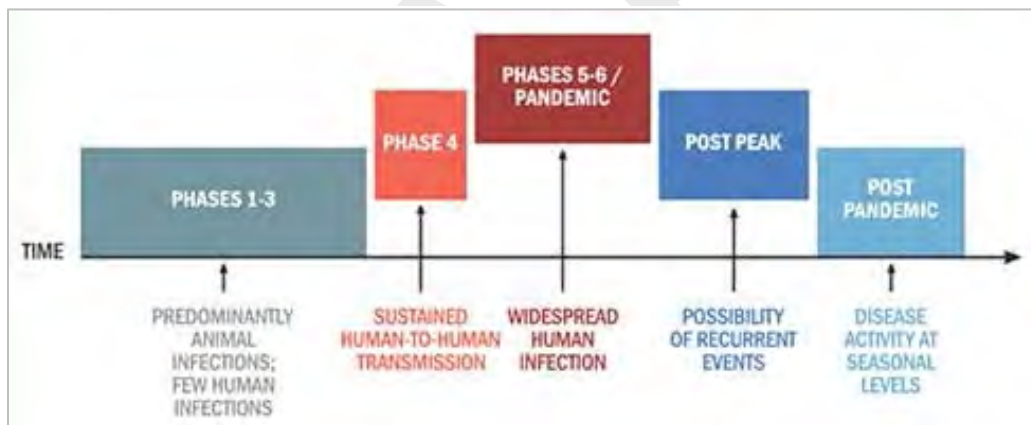
Location

Pandemics occur worldwide. Smaller-scale public health incidents or epidemics may be localized, such as the Ebola outbreak in a region of Africa. All locations are susceptible to pandemics and local public health hazard incidents.

Extent

The [County COVID 19 weekly update site](#) provides current data on the ongoing pandemic. The World Health Organization currently uses the Pandemic Influenza Phases to characterize pandemics as shown in **Figure 4.25**.

Figure 4.25: WHO Pandemic Influenza Phases (2009)



Influenza viruses circulate naturally and continuously among animals, especially birds. Even though such viruses might theoretically develop into pandemic viruses, in **Phase 1** no viruses circulating among animals have been reported to cause infections in humans.

In **Phase 2** an animal influenza virus circulating among domesticated or wild animals is known to have caused infection in humans and is, therefore, considered a potential pandemic threat.

In **Phase 3**, an animal or human-animal influenza reassortant virus has caused sporadic cases or small clusters of disease in people but not human-to-human transmission sufficient to sustain community-level outbreaks. Limited human-to-human transmission may occur under some circumstances, for example, when there is close contact between an infected person and an unprotected caregiver. However, limited transmission under such restricted circumstances does not indicate that the virus has gained the transmissibility necessary to cause a pandemic.

Phase 4 is characterized by verified human-to-human transmission of an animal or human-animal influenza reassortant virus able to cause “community-level outbreaks.” The ability to cause sustained disease outbreaks in a community marks a significant upwards shift in the risk for a pandemic. Any country that

suspects or has verified such an event should urgently consult with WHO so that the situation can be jointly assessed, and a decision made by the affected country if implementation of a rapid pandemic containment operation is warranted. Phase 4 indicates a significant increase in the risk of a pandemic but does not necessarily mean a pandemic will occur.

Phase 5 is characterized by human-to-human spread of the virus into at least two countries in one WHO region. While most countries will not be affected at this stage, the declaration of Phase 5 is a strong signal that a pandemic is imminent and that the time to finalize the organization, communication, and implementation of the planned mitigation measures is short.

Phase 6, the pandemic phase, is characterized by community-level outbreaks in at least one other country in a different WHO region in addition to the criteria defined in Phase 5. Designation of this phase will indicate that a global pandemic is underway.

Regulatory Context

There are numerous regulatory organizations that provide public health direction and guidance. The County Board of Supervisors may declare a State of Emergency for public health incidents. The formal declaration provides extraordinary power to regulate businesses, schools, houses of worship and general public activity, as well as provide financial authority to procure resources and deliver emergency protective measures. The state has similar authority to declare a state-wide emergency with comparable power to address an incident such as a pandemic. The federal government may also declare an emergency and/or a disaster under the provision of the Stafford Act. Federal declarations are done state by state. The COVID-19 pandemic has resulted in a federal emergency declaration and disaster declaration for every state and territory.

Vulnerability

Localized public health emergencies may occur, such as contaminated drinking water in a single city or water district, or a localized infectious disease.

The entire population of the County is vulnerable to a pandemic. The nature of the population that is most susceptible varies from one event to another. During the 1918-1919 influenza pandemic, young, healthy adults were most likely to be fatalities. The COVID-19 pandemic results in disproportionate severe cases and deaths in older adults.

Most public health and pandemics affect disadvantaged communities to a greater degree. This is due to more frequent, underlying health conditions among this population, less access to health care / health insurance and living in more densely occupied housing.

Table 4-29: CPRI Rating for Public Health/Pandemic

Jurisdiction	Probability	Magnitude/ Severity	Warning Time	Duration	CPRI Score
Coconino County	1.35	1.2	.6	.4	3.55
Flagstaff	1.35	1.2	.6	.4	3.55
Fredonia	.9	.3	.15	.4	1.75
Page	.9	1.2	.15	.4	2.65
Tusayan	.9	1.2	.15	.4	2.65
Williams	1.8	.9	.15	.4	3.25
County-wide average CPRI =					2.9
<i>Jurisdictions in bold print indicate they will be assessing the hazard and including mitigation activities for it. Note: Maximum CPRI score is 4.00.</i>					

Probability of Future Events

The intervals between future public health emergencies and epidemics/pandemics are difficult to predict. Many of the diseases such as typhoid, diphtheria and cholera that caused past health care emergencies have been largely eliminated due to vaccines and better public health practices. However, it is nearly certain that public health emergencies and epidemics/pandemic will occur. This is due to continuous mutation of existing pathogens, the development of new pathogens and the likelihood of human induced incidents such as terrorism or poor health practices.

Loss Estimates

There are no models for loss estimates for public health emergencies and epidemics / pandemics. The 1918-1919 influenza incident resulted in up to 50 million deaths world-wide with over 500,000 in the U.S. and severe disruption of economies. The COVID-19 pandemic may not result in as many fatalities but has had an acute impact on the economy of the County and nation.

Developmental Trends

Much like estimating the interval between public health emergencies and epidemics/pandemics, determining developing trends for them is difficult. Improved public health measures, real time, scientific analysis of data and more rapid development of vaccines may reduce the duration and lethality of public health emergencies and epidemics/pandemics. While the COVID-19 pandemic has proven to be more likely to spread quickly in densely populated urban areas, it has also had a devastating impact on rural communities.

4.3.12 Terrorism / Active Shooter-Hostile Event

Description

The definition of terrorism by the U.S. Federal Bureau of Investigation (FBI) is “the unlawful use of force or 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.” The FBI defines cyberterrorism as the use of computer network tools to shut down critical national infrastructures (e.g. energy, transportation, government operations) or to coerce or intimidate a government or civilian population.

Terrorists may use one or more of the following types of weapons: chemical, biological, incendiary, radiological, or explosives. In addition to large-scale attacks, a full range of assault styles must be considered, including simple bombings, active shooter, assassinations with small arms, major bombings, and others. The use of explosive devices remains the weapon of choice for terrorist activity. Related activities include bomb threats that disrupt the normal operations of transit systems, government, or corporate facilities. Primary locations likely to be targeted include airports, mass transit targets, government facilities, and high population density locations, although so-called “soft targets” such as schools, local entertainment facilities, etc., are at risk. The potential for nuclear, biological, or chemical terrorism is also a concern. These types of emergencies would necessitate detailed contingency planning and preparation of emergency responders to protect their communities.

Weapons of mass destruction (WMD) typically used by terrorists are categorized by an acronym that lists the types of materials/weapons: CBRNE stands for chemical, biological, radiological, nuclear, and explosives; BNICE stands for biological, nuclear, incendiary, chemical, and explosives. The nature of each category of weapon is described briefly below:

- **Chemical** – These include blood and choking agents, nerve agents, blister agents, and toxic industrial chemicals. The advantages of using chemical weapons include being easy to make, readily available, inexpensive, having an immediate effect, and that they are easily spread. The

disadvantages are that they require significant quantities for a mass effect, and that the production and deployment are potentially hazardous to the terrorist. Some chemical agents are odorless and tasteless and are difficult to detect, while others have distinct odors. They can have an immediate effect (i.e. a few seconds to a few minutes) or a delayed effect (i.e. several hours to several days). Routes of exposure for chemical weapons are inhalation, ingestion, absorption, and injection. Unlike many of the biological weapons, first responders can take self-protective measures by wearing personal protective equipment. First-aid measures and effective medical interventions are available, and chemical agent exposures can be decontaminated, and agents neutralized.

- **Biological** – These are defined as bacteria, viruses, or toxins used to produce illness or death in people, animals, or plants. The advantages of biological weapons include being easy to make, readily available, and relatively inexpensive. The disadvantages include delayed effects and potential deployment hazards to the terrorist. Routes of exposure for biological weapons are inhalation, ingestion, absorption, and injection. Biological agents can be dispersed as airborne particles or aerosols on food items or in water, or through an injection. Terrorists may use biological weapons because the agents are odorless, tasteless, and extremely difficult to detect.
- **Radiological / Nuclear** – These are typically in the form of a traditional fission device such as an atom bomb, a radiological dispersal device (i.e. often called a dirty bomb), or a conventional explosion at a nuclear facility. The advantages of radiological or nuclear weapons include availability of materials, devastating effects, and a great psychological impact on the population. The disadvantages include delayed effects, deployment is hazardous to the terrorists, and it is extremely expensive — in the millions of dollars for a nuclear weapon. Radiation cannot be detected by human senses. Consequences may include death, severe health risks to the public, damage to the environment, and extraordinary loss of, or damage to, property. The health effects of radiological or nuclear materials include radiation burns, fragmentation wounds, acute radiological poisoning, and long-term effects, such as cancers and birth defects.
- **Explosives** – These are most terrorists' weapon of choice. 86% of domestic terrorist incidents involve the use of explosives. Explosives are readily available and have dramatic results, are low risk, require few skills to build and use, are easy to execute, allow for remote attacks, and do not require many people to execute. There are low explosives and high explosives. The effects include blast pressure, both positive and negative, fragmentation, and thermal. There are pipe bombs or bombs that can be easily concealed into a backpack, box, vehicles, or virtually any type of container, with numerous trigger mechanisms to set off the bomb. Bombings account for up to fifty percent of worldwide terrorist attack patterns.
- **Cyberterrorism** – According to the FBI, cyberterrorism is any "premeditated, politically motivated attack against information, computer systems, computer programs, and data which results in violence against non-combatant targets by sub-national groups or clandestine agents." As nations and critical infrastructure become more dependent on computer networks for their operations, new vulnerabilities are created. A cyberterrorist attack is designed to cause physical violence or extreme financial harm. Possible cyberterrorist targets include the banking industry, military installations, power plants, air traffic control centers, and water systems but could be against any facility that relies on computers, computer systems, and programs for their operations.
- **Active shooter** – The U.S. Department of Homeland Security defines the active shooter as "an individual actively engaged in killing or attempting to kill people in a confined and populated area; in most cases, active shooters use firearms, and there is no pattern or method to their selection of victims." Active shooters may also use explosive devices during assaults to increase the likelihood of casualties or to commit suicide. Most incidents occur at locations in which the killers find little

impediment in pressing their attack. Locations are generally described as soft targets that have limited security measures to protect members of the public. In most instances, shooters commit suicide, are shot by police, or surrender when confrontation with responding law enforcement is unavoidable.

- **Contamination** – Contamination of food and water supplies are an infrequent method of terrorism. In 1984, members of the Rajneeshee religious cult contaminated a city water supply tank in Dalles, Oregon, using Salmonella and infected 750 people. In 1992 The Kurdistan Workers' Party (PKK) put lethal concentrations of potassium cyanide in the water tanks of a Turkish Air Force compound in Istanbul. Contamination has the potential to injure large numbers of people and disrupt critical commodity supplies. Under the Environmental Protection Agency America's Water Infrastructures Act, water system operators are required to conduct a risk and resiliency assessment and develop an emergency response plan.

History

No data exists to show that the County has experienced acts of terrorism. The history of terrorism on U.S. soil includes the large-scale attacks of September 11, 2001, on the World Trade Center in New York and the Pentagon in Washington, DC, and the ensuing anthrax attacks, the 1995 bombing of the Alfred P. Murrah Federal Building in Oklahoma City, and the earlier bombing of the World Trade Center in 1993. There have been numerous smaller-scale shootings, bombings, and fires that have been labeled as terrorist incidents.

Location

The form and locations of many natural hazards are identifiable and, even in some cases, predictable. However, there is no defined geographic boundary for terrorism. Based on previous events, it is presumed that critical facilities and services and large gatherings of people are at higher risk. Public transportation facilities have been a repeated target of terrorists. This is due to the open nature of the facilities, the large numbers of people that use them, and the paralyzing effects that terrorist attacks have on communities' ability to provide transportation for daily life. Terrorist attacks on transportation systems thus have an impact that is much greater than to loss of human life and injuries and the damage done to infrastructure. By shutting down vital services and requiring increased security, they have a disproportionate economic cost.

Extent

The damage caused by a terror attack is dependent on the method of attack. Large bomb attacks could destroy major infrastructure, kill many people, and disrupt regional functioning for a significant time. Cyberterrorism would cause very different types of damage, possibly severely hampering local government operations and local businesses with no direct injuries or loss of life. In addition to direct physical damage, terrorist attacks breed fear. Even an unsuccessful attempt to attack the region would seriously impact the comfort of residents and affect local businesses.

Regulatory Environment

There are numerous laws and regulations that relate to terrorism both at the state and federal levels. Key laws that are particularly applicable to the County are:

- [18 United States Code Title 113B Section 2323f](#) which describes prohibitions for bombings of places of public use, government facilities, public transportation, and infrastructure facilities;
- [The Critical Infrastructure Information Act of 2002](#) (CII Act) facilitates greater sharing of critical infrastructure information among the owners and operators of the critical infrastructures and

government entities with infrastructure protection responsibilities, thereby reducing the nation's vulnerability to terrorism.

Probability of Future Occurrences

The time and place of individual terrorist acts cannot be forecast with great accuracy. However, anti-terrorist organizations such as local law enforcement, the Arizona Counter Terrorism Information Center (ACTIC), and federal agencies work collaboratively to detect, deter, and disrupt potential terrorist activity. Terrorists can strike not just large cities but in any community of any size. While no amount of planning and mitigation can remove 100% of the risk from terrorism, hazard mitigation, and preparedness can help reduce the risk. Given the lack of information on observed historical damages, frequency of occurrence, intensity, and damage parameters, no estimate is available for the probability of a future occurrence of a terrorist event.

It is not possible to estimate the probability of a terrorist attack. The approach experts use to prioritize mitigation and preparedness efforts is to identify critical sites and assess the vulnerability of these sites to terrorist attacks. Vulnerability of these sites is determined subjectively by considering factors such as visibility (e.g. does the public know this facility exists in this location?), accessibility (e.g. is it easy for the public to access this site?), and occupancy (e.g. is there a potential for mass casualties at this site?).

Vulnerability

Table 4-30: CPRI Rating for Terrorism

Jurisdiction	Probability	Magnitude/ Severity	Warning Time	Duration	CPRI Score
Coconino County	.45	1.2	.6	.1	2.35
Flagstaff	.45	1.2	.6	.1	2.35
Fredonia	.45	.6	.6	.2	1.85
Page	.45	1.2	.6	.1	2.35
Tusayan	.45	1.2	.6	.1	2.35
Williams	1.35	.9	.6	.1	2.95
County-wide average CPRI =					2.37
<i>Jurisdictions in bold print indicate they will be assessing the hazard and including mitigation activities for it. Note: Maximum CPRI score is 4.00.</i>					

Loss Estimates

There are no defined methods for estimating the losses from terrorism. Individual terrorist incidents, such as the 9/11 World Trade Center attack, have caused the loss of thousands of lives and resulted in billions of dollars in damage. Within the County, losses from terrorist attacks could be devastating.

Developmental Trends

Terrorist attacks will continue into the future. They are likely to become more sophisticated, and potentially, more deadly. As terrorists increasingly target information technology systems through cyberattacks, critical infrastructure, finance, health, and transportation systems are at risk.

4.3.13 Wildland Fire

Description

A wildland fire (or wildfire) is an uncontrolled fire spreading through wild land vegetative fuels and/or urban interface areas where fuels may include structures. They often begin unnoticed, spread quickly, and may be signaled by dense smoke that may fill the area for miles around. Wildland fires 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, wildland fires may grow into an emergency or disaster. Even small fires can threaten lives, resources, and destroy improved properties.

The indirect effects of wildland fires 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 debris flows and landslide hazards.

To the extent that wildland fires are a cascading effect of drought or warmer temperatures, wildfire risk will likely increase somewhat in the future. Due to the effects of climate change, deserts may have more extreme temperature swings, meaning days can reach extremely high temperatures in the summer. These high temperatures will result in increased numbers of low humidity hot days, which can lead to excess dry brush and optimal conditions for fires to ignite.

History

The mountainous regions of the County offer significant sources of fuel and topography favorable to wildland fire. The intersection of environmental and economic sectors versus historically natural fire patterns and seasons, has left much of the forested areas in a prime condition to experience extremely destructive fires. In addition, compounded hazards such as bark beetle infestations as a result of extended severe drought conditions only exasperate the wildfire hazard. According to the Planning Team, wildland fire is the number one hazard in the County. Numerous wildland fires have impacted the County as demonstrated by the following recent events:

- **July 21, 2019 – The Museum Fire** began approximately four miles north of Flagstaff on July 21st at approximately 11:15 AM MST. The fire grew to 1,962 acres in the Dry Lake Hills area. The burn severity was 12% high, 28% moderate, 48% low, and 12% very low. Much of this area drains into the Spruce Wash which runs into several communities of Flagstaff.⁸⁰ To guard against post-wildfire flooding and debris flows, the community made over 600,000 sandbags, and placed 500,000 of them. In addition, 5,000 feet of concrete barriers and a 300-foot water barrier were constructed to mitigate the impacts of flooding. Fire investigators determined that the wildfire was likely caused by an excavator striking a rock during routine restoration work operations.⁸¹
- **April 28-30, 2018 – The Tinder Fire** was first seen by Moqui Tower lookout on April 27th, 11:43 AM MDT. Investigators determined that the fire originated in the East Clear Creek drainage approximately one mile downstream from Forest Road 95. Forest Road 95 runs north-south and is located approximately 1.5 miles east of C.C. Cragin (Blue Ridge) Reservoir. The cause of the fire

⁸⁰ National Centers for Environmental Information

⁸¹ United States Department of Agriculture Forest Service: <https://www.fs.usda.gov/detail/coconino/news-events/?cid=FSEPRD662372>

was an abandoned illegal campfire. The fire burned 16,309 acres, 33 primary residences, and 54 minor structures.⁸²

- **May 20, 2014 – The Slide Fire** was a human caused fire that scorched 21,227 acres in Oak Creek Canyon north of Sedona. Approximately 100 homes were evacuated and Highway 89A was closed from Pine Flats campground north to the overlook at the top of the switchbacks. Fire suppression costs are listed at \$10.1 million.⁸³ Post fire flooding in Oak Creek Canyon was immediately recognized as a great potential. The Oak Creek Canyon Interagency Emergency Operations Flood Plan was produced at a cost of \$42,000.00 to aid responding emergency resources to an Oak Creek Canyon Post Slide Fire Flood event.
- **June 20, 2010 – The Schultz Fire** ignited from an abandoned campfire near Schultz Tank and Elden Trail and consumed 15,000 acres of the San Francisco Peaks. This fire was driven by high winds across the steep terrain of the eastern slope. The fire caused the evacuation of more than 1,000 residents and was contained on June 30th. Post fire flooding from heavy rains from the fourth wettest monsoon on record in Flagstaff resulted in numerous debris flows, significant erosion, and substantial flooding of the residential areas on both sides of Highway 89 North inclusive of Timberline-Fernwood and traveling north past Wupatki Trails subdivision.⁸⁴
- **June 19, 2010 – The Hardy Fire** was ignited by a camper dumping hot ashes and embers from a camp stove onto the ground. The resulting fire burned 3,026 acres southeast of downtown Flagstaff. Over 200 homes and the Coconino Humane Association animal shelter had to be evacuated. There were no injuries and no structure damage.
- **June 11, 2010 – The Eagle Rock Fire** on the Kaibab National Forest began approximately 11 miles northwest of Williams. The presumed lightning caused fire consumed 3,400 acres and caused the evacuation of several residents.
- **July 6, 2007 – The Birdie Fire** near Mormon Lake was lightning caused and burned approximately 5,018 acres. No structures were lost or damaged.
- **June, 2006 – The Brins Fire** ignited in the Coconino National Forest near the communities of Sedona and Oak Creek Canyon burning 4,317 acres. Most of Oak Creek Canyon was evacuated. Fire suppression resources responded from federal, state and local governments. The situation necessitated the activation of the AZ211 call center and the Governor declared an emergency on June 19, 2006. The fire started within three miles of Sedona on June 18th from an abandoned campfire. The fire was located in the rugged terrain to the west of Oak creek Canyon and north of the town of Sedona. The close proximity to these communities created a serious threat to hundreds of residents, homes and businesses. The previous winter had been extremely dry with little or no snow at the higher elevations. The effects of the drought, coupled with the rugged and broken topography within the vicinity of the fire, made for difficult suppression. This was a serious threat to hundreds of homes and structures and infrastructures valued at well over \$85 million, including Sedona and Oak Creek Canyon, well known tourist attractions. Oak Creek Canyon was evacuated and remained closed to residents, businesses and visitors for six days. The urban interface was the priority for fire suppression and structure protection activities. Suppression costs were estimated at \$6.4 million.⁸⁵

⁸² National Centers for Environmental Information

⁸³ Inciweb, 2014

⁸⁴ Arizona Hydrological Society Annual symposium, 2011, Field Trip Guide to the 2010 Schultz Burn Area

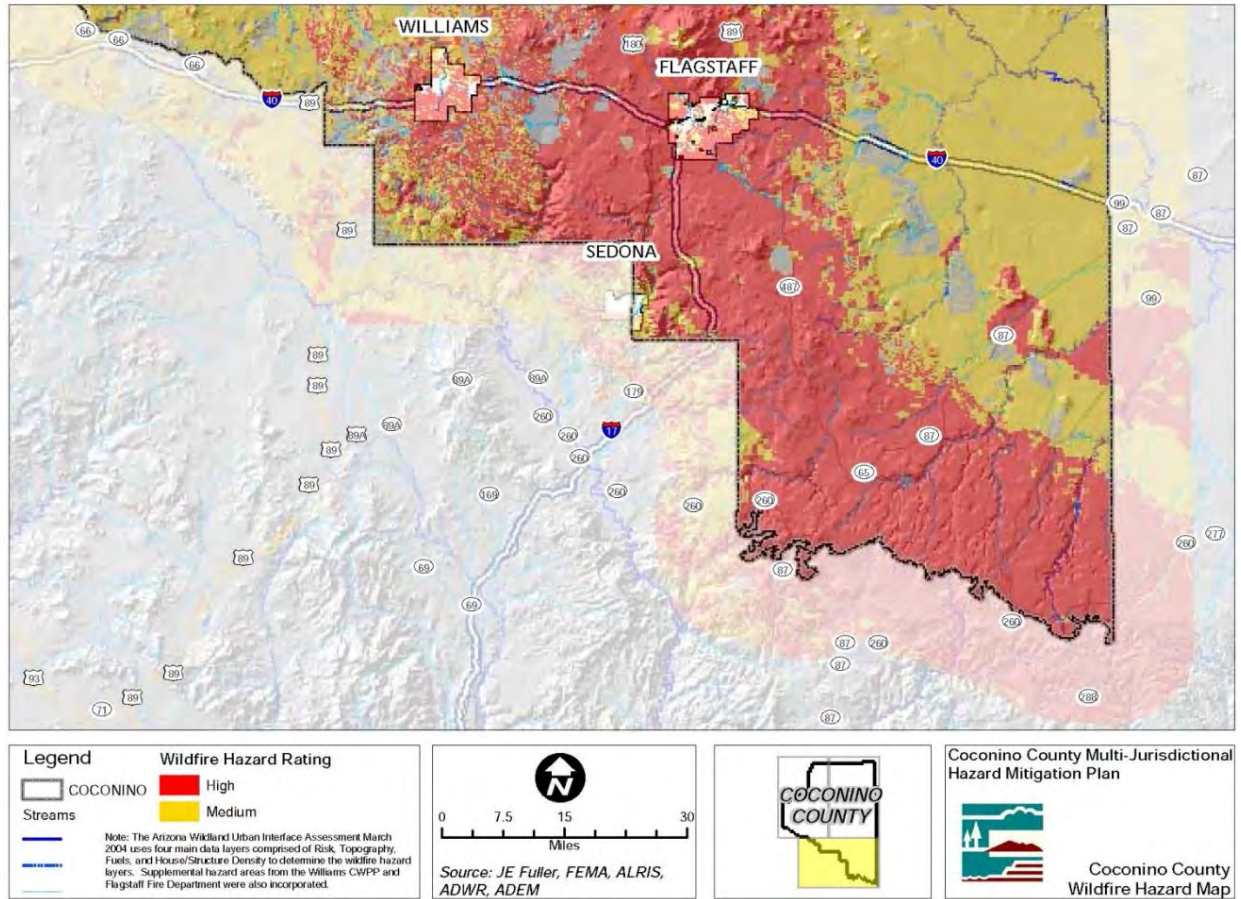
⁸⁵ Coconino County, 2009

- **June 2006 – The Woody Fire** started from sparks of a blown tire along Interstate 40. The fire burned approximately 110 acres in West Flagstaff and threatened multiple neighborhoods. Hundreds of people were evacuated, and some were placed in community shelters.⁸⁶

Location

Wildland fires may occur throughout the County. The maps below depict the fire danger zones for the County's communities.

Figure 4.26: Wildland Fire Hazard 1



⁸⁶ Coconino County and Flagstaff Fire Department, 2009

Figure 4.27: Wildland Fire Hazard 2

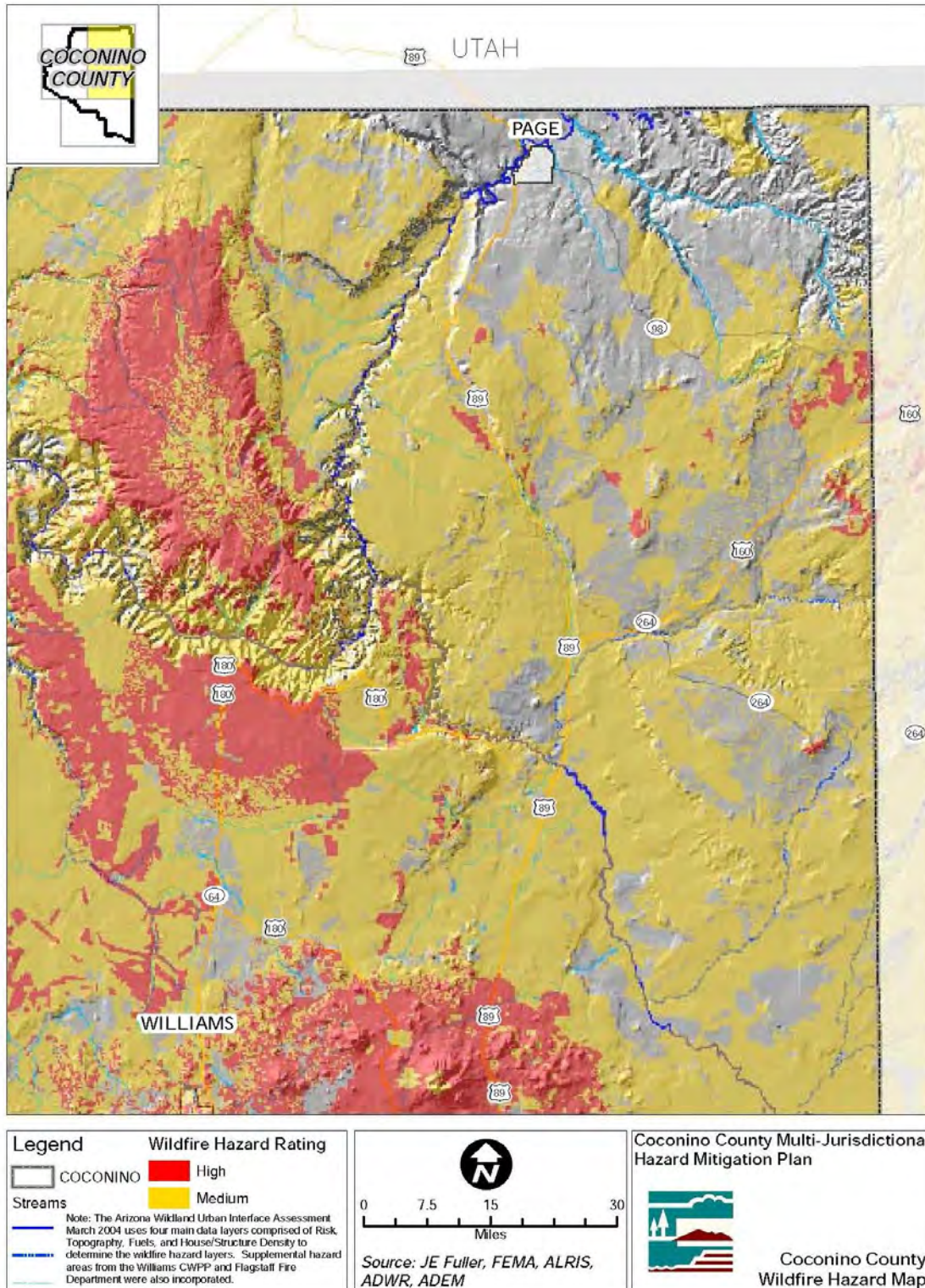
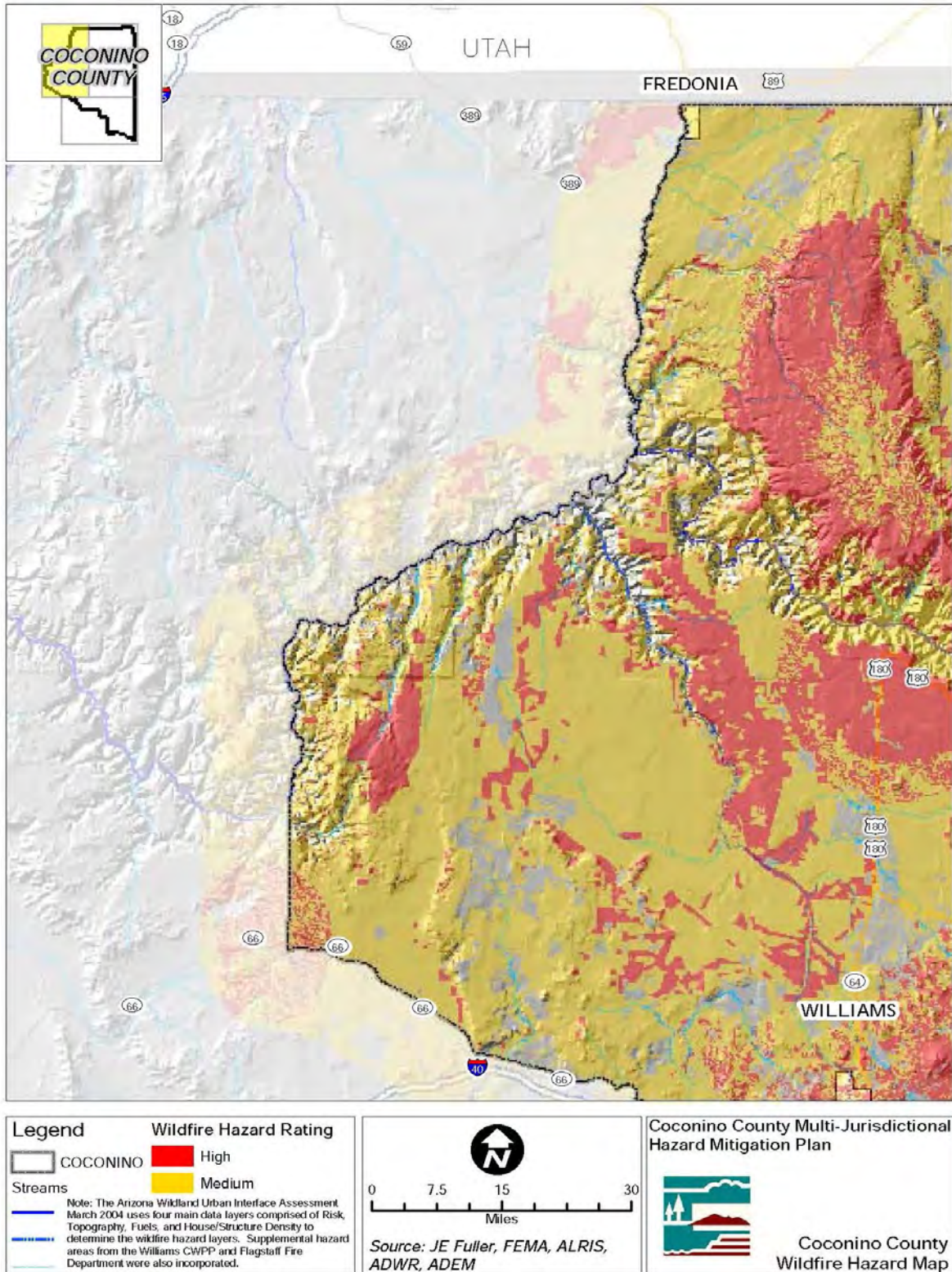


Figure 4.28: Wildland Fire Hazard



Extent

Wildland fires are a cascading effect of drought and warmer temperatures. Wildfire risks will likely increase in the future, perhaps dramatically. Extreme variability of precipitation across the southwest, combined with the trend of increasing temperatures, has led to extremely dry conditions within the forest and grasslands of the County, even in the absence of a prolonged drought.

Potential fire conditions are described by the warnings issued by the NWS, as shown in **Table 4-31**.

Table 4-31: NWS Wildland Fire Warnings

Warning Type	Warning Criteria	Zones Affected
Red Flag Warning	Combination of weather and fuels conditions for any three hours or more in a 12-hour period. Criteria may include: <ul style="list-style-type: none"> • Frequent gusts of 25 mph or greater; • Relative humidity of 15% or less; • Dry thunderstorms with 15% coverage or more, constituting an LAL 6. Additional criteria include: <ul style="list-style-type: none"> • Haines Index of 5 or 6, indicating a moderate or high potential for large, plume-dominated fire growth; • Wind shifts associated with frontal passages; • First significant lightning event (wet or dry) after an extended hot and dry period; • Poor relative humidity recovery overnight (40% or lower) ; • Any combination of weather and fuel moisture conditions which, to the judgement of the forecaster, would cause extensive wildland fire occurrences. 	A warning may be issued for all or portions of a fire weather zone or region. Zones impacted by the event will be listed within the Red Flag Warning product.
Fire Weather Watch	Alerts land management agencies to the high potential for development of the above Red Flag criteria in the next 12-72 hours.	A watch may be issued for all or portions of a fire weather zone or region. Zones impacted by the event will be listed within the Red Flag Warning

Source: [The National Weather Service.](#)

The NWS produces [fire danger maps](#) that depict current fire weather across the U.S. The [U.S. Forest Service Wildland Fire Assessment System \(USFS-WFAS\)](#) also provides daily potential wildfire conditions throughout the Country.

Regulatory Context

The County passed Ordinance 2021-01, repealing an earlier ordinance, that directs restrictions on activities that cause wildland fires. The ordinance describes various levels for restricting open fires, campfires, and fireworks among other provisions.

The [Community Wildfire Protection Plan for Flagstaff and Surrounding Communities \(Flagstaff CWPP\)](#), [Greater Williams Area Community Wildfire Protection Plan \(Williams CWPP\)](#), [Blue Ridge Fire District Community Wildfire Protection Plan \(CWPPBR\)](#), and [Tusayan Community Wildfire Protection Plan](#)

[\(Tusayan CWPP\)](#) are four community wildfire protection plans that cover various urbanized areas of the County.

The Greater Flagstaff Forests Partnership (GFFP) and Ponderosa Fire Advisory Council (PFAC) collaborated to prepare the Flagstaff CWPP and is the largest planning area covered by the three plans, including a significant portion of the forested areas around Flagstaff and Sedona. In the pages that follow, there is an excerpt from each of the community wildfire protection plans that show the limits of the study area and the extent of communities identified to be within wildland/urban interface areas.

Probability of Future Events

Wildland fire is the most threatening of the hazards within the County. It will occur with near certainty on an annual basis. While the number of deaths, amount of property and other losses and the acreage burnt, is difficult to predict, the likelihood of substantial economic cost is extremely high.

Vulnerability

Table 4-32 below shows the Planning Team’s jurisdictions vulnerability to wildland fire.

Table 4-32: CPRI Rating for Wildland Fire

Jurisdiction	Probability	Magnitude/ Severity	Warning Time	Duration	CPRI Score
Coconino County	1.8	1.2	.6	.3	3.9
Flagstaff	1.8	1.2	.6	.4	4
Fredonia	1.35	.9	.45	.2	2.9
Page	.45	1.2	.6	.2	2.45
Tusayan	1.8	1.2	.6	.3	3.9
Williams	1.35	.9	.6	.3	3.15
County-wide average CPRI =					3.38
<i>Jurisdictions in bold print indicate they will be assessing the hazard and including mitigation activities for it.</i>					
<i>Note: Maximum CPRI score is 4.00.</i>					

Fredonia and Tusayan perceive wildland fire as a threat to their communities and are actively exploring ways to prevent disasters due to this hazard.

Fredonia has experienced a couple of wildland fires on the outskirts of town, about five miles out. Therefore, wildland fire is not considered a high-level threat. However, the community understands that if one did get close to or into the town, there may be substantial loss of property.

The danger of wildfire exists for virtually all areas of Tusayan. While there has been history of wildfire within Tusayan, there have been no resulting evacuations. The town is very small and has limited resources which would make evacuation and fire suppression challenging and would most likely require outside support.

Loss Estimates

The estimation of potential exposure to high and medium wildfire hazards was accomplished by intersecting the human and facility assets with the wildland fire hazard limits depicted on the flowing hazard maps. Loss to exposure ratios of 20% and 5% were assumed to estimate losses for all facilities located within the high and medium wildfire hazard areas, respectively.

In summary, \$9.6 million and \$2.0 million in asset related losses are estimated for high and medium wildland fire hazards, for all the participating jurisdictions in the County. An additional \$704 and \$102 million in high and medium hazard wildland fire losses to HAZUS defined residential, commercial, and industrial facilities, is estimated for all participating County jurisdictions. It should be noted that these exposure dollar amounts

do not include the cost of wildfire suppression which can be substantial. For example, a Type 1 wildland firefighter IMT costs about \$1 million per day.

The indirect effects of wildland fires 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 debris flows and landslide hazards.

Developmental Trends

Wildland fires throughout the western United States have become, larger, hotter, and more deadly over the past years. This is due to record drought which has resulted in 100's of millions of dead trees, hotter temperatures and forest management programs that left very high fuel loads in place. As the County's population grows and more development occurs at the urban/wildland interface, loss of life and property are likely to increase.

4.3.14 Winter Storm

Description

Severe snowstorms affect many aspects of life in the County, including transportation, emergency services, utilities, agriculture and the supply of basic subsistence to isolated communities. Interstates 40 and 17 have produced numerous fatal multi-car accidents due to heavy winter snowfall and icy road conditions. Heavy snowfalls can also leave motorists stranded in their vehicles with potentially disastrous results like hypothermia and carbon-monoxide poisoning. Significant snowstorms can also hinder both ground and air emergency services vehicles from responding to accidents or other emergencies. Remote areas and communities can be easily cut-off from basic resources such as food, water, electricity, and fuel for extended periods during a heavy storm. Extremely heavy snowstorms can produce excessive snow loads that can cause structural damage to under-designed buildings. Agricultural livestock can also be vulnerable to exposure and starvation during heavy snowstorms.

Freezing rain is formed as snow falls through a warm zone in the atmosphere completely melting the snow. The melted snow then passes through another zone of cool air "super cooling" the rain below freezing temperature while still in a liquid state. The rain then instantly freezes when it comes in contact with the ground or other solid object. Because freezing rain hits the ground as a rain droplet, it conforms to the shape of the ground, making one thick layer of ice. Sleet is similar to hail in appearance but is formed through atmospheric conditions more like freezing rain. The difference is that the snowflakes do not completely thaw through the warm zone and then freeze through the cool air zone closer to the ground. Sleet typically bounces as it hits a surface similar to hail. Sleet is also informally used to describe a mixture of rain and snow and is sometimes used to describe the icy coating on trees and power lines.

Sleet and freezing rain can cause slippery roadway surfaces and poor visibility leading to traffic accidents and can leave motorists stranded in their vehicles with potentially disastrous results like hypothermia and carbon monoxide poisoning. Heavy sleet or freezing rain can produce excessive ice-loads on power lines, telecommunication lines and other communication towers, tree limbs, and buildings causing power outages, communication disruptions, and other structural damage to under-designed facilities.

The warmer oceans and atmosphere observed in the recent past lead to increased evaporation and increased water vapor in the atmosphere. The higher water vapor values translate directly into greater perceptible water – the amount of liquid water found in a column of air, if all the water were squeezed out of the column of air. Increased atmospheric moisture can result in more extreme precipitation events, both rain and snow events. For the County, there is a possibility of higher intensity winter storms, though there

is no clear trend, but rather an increase in variability of winter storms, including both higher snowfall events and months with no winter storms at all.

History

Although winter snows are the lifeblood of water supplies for most of the County, they are also the County's deadliest natural hazard. There have been at least three fatalities and 10 injuries in the County as a result of snowstorms during the last 50 years. The following highlights the more prominent winter snow events:

- **November 29, 2019** – A major winter storm impacted northern Arizona over the Thanksgiving holiday, bringing very heavy wet snow and causing significant travel disruptions, road closures, and power outages. The combination of heavy snow and strong winds caused multiple power outages, most notably in Tusayan and the Grand Canyon. Over 30 inches of snow was reported near Hwy 180. Power was lost to portions of the northwestern areas of the County along Old Route 66. A State of Emergency was declared for Tusayan.⁸⁷
- **February 20-22, 2019** – A cold, strong, intensifying low pressure system spread a blanket of snow over a majority of central and northern Arizona. As a result of the heavy snowfall, major roadways were closed, trees were downed, and power was lost in local communities. Snowfall recorded at NWS Flagstaff and Flagstaff Pulliam Airport was 40.8 inches throughout the storm. State of Emergencies were declared by all counties along with some cities and reservations in central and northern Arizona.⁸⁸
- **January 18-23, 2010** – A series of three low pressure systems tracked across the state during a 6 day period. These systems brought heavy snowfall to the higher elevations of northern Arizona, record flooding to lower elevation locations, and strong winds area-wide. The third and most intense system resulted in record low pressure readings. Several snow and rainfall records were set throughout the week, with estimates of over 90 inches on the highest peaks of northern Arizona and liquid precipitation amounts exceeding 10 inches in some areas. Snowfall resulted in numerous roof collapses in Flagstaff, widespread power outages for several days along the Eastern Mogollon Rim and White Mountains, severely hampered services across the Navajo and Hopi reservations, and impassable roads due to limited powering services. Two homes were damaged in Williams due to a fallen tree.⁸⁹
- **December 12-20, 1967** – A series of snowstorms caused substantial disruption to communities in northern Arizona and shattered snowfall records. Measurements taken at the Flagstaff Pulliam Airport totaled the snowfall at 86 inches. The storm caused road closures, power outages, and devastating impacts for residents seeking basic necessities such as food, water, and shelter. Navajo tribal lands experienced significant hardship, requiring airlifted food and livestock feed.⁹⁰

Location

All of the County is susceptible to winter storms. Unincorporated County land, and the cities of Flagstaff and Tusayan experience heavier winter storm precipitation.

Extent

The NWS produces several notifications about potential winter storm events.

⁸⁷ [National Weather Service, Flagstaff AZ Weather Forecast Office](#)

⁸⁸ [National Weather Service, Flagstaff AZ Weather Forecast Office](#)

⁸⁹ [National Weather Service, Flagstaff AZ Weather Forecast Office](#)

⁹⁰ [Arizona Central](#), "Extreme Weather: The Snowiest Storm in Arizona History," December 23, 2015

Table 4-33: Winter Storm Warnings Issued by the NWS

Warning Type	Warning Criteria	Zones Affected
Winter Storm Watch	Issued when there is potential for significant and hazardous winter weather within 48 hours. Criteria includes: <ul style="list-style-type: none"> • Five inches or more of snow/sleet within a 12-hour period; • Seven inches or more of snow/sleet within a 24-hour period; • Eight inches or more within a 24-hour period; • Life-threatening or damaging combination of snow and/or ice accumulation with wind. 	Advisory may vary from area to area.
Blizzard Warning	Issued when the following conditions are occurring or expected within 12-18 hours. Criteria includes: <ul style="list-style-type: none"> • Snow and/or blowing snow reducing visibility to a quarter mile or less for three hours or longer; • Sustained winds of 35 mph or greater; • Frequent gusts to 35 mph or greater. There is no temperature requirement to achieve blizzard conditions.	Advisory may vary from area to area.
Winter Storm Warning	Issued when a significant combination of hazardous winter weather is occurring or imminent. Criteria includes: <ul style="list-style-type: none"> • Five inches or more of snow/sleet within a 12-hour period AND/OR; • Seven inches or more of snow/sleet within a 24-hour period AND/OR; • Enough ice accumulation to cause damage to trees or powerlines AND/OR; • Life-threatening or damaging combination of snow and/or ice accumulation with wind. 	Advisory may vary from area to area.
Ice Storm Warning	Issued when an ice storm event is expected to meet or exceed local ice storm warning criteria in the next 12-36 hours. Criteria includes: <ul style="list-style-type: none"> • Ice that is ½ inch or more over at least 50% of the zone or encompassing most of the population 	Advisory may vary from area to area.
Heavy Snow Warning	Issued when snowfall meets the following criteria: <ul style="list-style-type: none"> • Snowfall of 6 inches or more in a 12-hour period is imminent or occurring; • 8 inches or more in a 24-hour period is imminent or occurring 	Advisory may vary from area to area.
Snow Advisory	Issued when a low pressure system produces snow that may cause significant inconveniences, but do not meet warning criteria and if caution is not exercised, could lead to life-threatening situations.	Advisory may vary from area to area
Blowing Snow Advisory	Issued when wind-driven snow reduces surface visibility, possibly, hampering traveling. Blowing snow may be falling snow, or snow that has already accumulated but is picked up and blown by strong winds.	Advisory may vary from area to area.

Source: [The National Weather Service](#).

NOAA's National Centers for Environmental Information produces the Winter Storm Severity Index (WSSI) to provide NWS partners and the public with an indication of winter precipitation (snow and ice) severity and its potential related societal impacts. The WSSI does not depict official warnings and should always be used in context with official NWS forecasts and warnings.

Table 4-34: NOAA WSSI Potential Winter Storm Impact Scale

Color Code	Severity Level	Definition
	No Impacts	Impacts not expected
	Limited Impacts	Rarely a direct threat to life and property. Typically results in little inconveniences
	Minor Impacts	Rarely a direct threat to life and property. Typically results in an inconvenience to daily life
	Moderate Impacts	Often threatening to life and property. Some damage unavoidable. Typically results in disruptions to daily life.
	Major Impacts	Extensive property damage likely and lifesaving actions needed. Will likely result in major disruptions to way of life
	Extreme Impacts	Extensive and widespread severe property damage and life saving actions will be needed. Results in extreme disruptions to daily life

Regulatory Context

There few statutory requirements related to winter storms. City ordinances about snow removal, like this one from [Flagstaff, AZ](#) where owners, lessees, or residents are required to remove snow from public walkways that border the property within 24 hours.

[OSHA's Hazard Alert, Snow Removal: Know the Hazards Pamphlet](#), and [winter weather webpages](#) provide guidance to employers on how to prevent serious injuries and fatalities. Employers should consider options to avoid working on roofs or elevated heights, plan ahead for safe snow removal and must:

- Provide required fall protection and training when working on the roof or elevated heights;
- Ensure ladders are used safely (e.g. clearing snow and ice from surfaces);
- Use extreme caution when working near power lines;
- Prevent harmful exposure to cold temperatures and physical exertion.

Probability of Future Events

Snow level measurements are recorded daily across the United States and can be used to estimate the probability and frequency of severe winter storms. Extremes can occur in Arizona with a much higher chance in the County and can have serious impacts.

The NCEI compiled snow climatology statistics using historic record data from statewide NWS cooperative observer sites for 1948 to 1996. Each station in Arizona and the nearest stations in California, Nevada, Utah, Colorado, and New Mexico were queried from this data set to establish maps showing statistical projections of the snow depths for various recurrence intervals. According to the data, most of the County could experience a 100-year, three-day snow depth of over 14 inches with some communities receiving well over two or three feet of snow.

Vulnerability

Winter storms usually begin to impact the County and especially the northern areas beginning in the fall (October / November) and can continue through April and portions of May. The higher elevations of the County will feel the immediate impacts first. However, as snow elevations drop and precipitation amounts (both rain and snow) increase, lower elevations will begin to experience severe weather impacts including but not limited to flooding, hazardous road conditions, and potential structural damage. Winter storm post event rain and water runoff due to melting snow can lead to flooding impacts in many populated areas of the County. These areas include Flagstaff and the immediate surrounding area, and potentially areas several miles from Flagstaff.

The storms experienced in the high country can cripple transportation corridors, shut down air traffic, create health related issues and strand motorists on highways. They contribute to traffic accidents and adversely impact first responder operations (including ground and air transportation) regarding safe response to others in need. Remote areas and communities can be easily cut-off from basic resources such as food, water, electricity, and fuel for extended periods during a heavy storm. These could include the Navajo Reservation lands, Page, Sedona-Oak Creek, the Mogollon Rim area, and the areas inclusive of and surrounding Williams.

Winter storms occur frequently and have a disproportionate effect on Flagstaff's vulnerable populations. Flagstaff's population experiencing homelessness is particularly at-risk during winter storm events. **Table 4-35** displays the CPRI for winter storms.

Table 4-35: CPRI Rating for Winter Storms

Jurisdiction	Probability	Magnitude/ Severity	Warning Time	Duration	CPRI Score
Coconino County	1.8	.9	.15	.3	3.15
Flagstaff	1.8	.9	.15	.3	3.15
Fredonia	1.35	.6	.15	.3	2.40
Page	.9	.3	.15	.3	1.65
Tusayan	1.8	.6	.15	.3	2.85
Williams	1.8	1.2	.15	.2	3.35
County-wide average CPRI =					2.76
<i>Jurisdictions in bold print indicate they will be assessing the hazard and including mitigation activities for it. Note: Maximum CPRI score is 4.00.</i>					

Loss Estimates

For the County, there is a 10% probability that a heavy snow warning could be issued in any given year. All of the County population and assets are exposed to winter storm. Historic records indicate an estimated annual loss of \$500,000 could be expected. At least one fatality and multiple injuries will result likely occur yearly.

Developmental Trends

The NCEI database indicates that winter storms are occurring less frequently in the 21st century than they did in the 20th century. This is likely due to warmer weather and a shift in snowfall patterns due to global warming.

Section 5: Mitigation Strategy

5.1 Hazard Mitigation Statement

The 2021 MJHMP represents the County’s and participating jurisdiction’s commitment to create safer, more resilient communities by taking actions to reduce risk and by committing resources to lessen the effects of hazards on the people and property.

5.2 Hazard Mitigation Goals and Objectives

Mitigation goals are guidelines that represent what the community wants to accomplish through the mitigation plan. Goals are broad statements that represent a long-term, community-wide vision. The Planning Team reviewed the goals and objectives from the previous MJHMP and determined which best met their jurisdiction’s mitigation requirements. The result was a new streamlined set of unified hazard mitigation goals listed in **Table 5-1**. The goals support addressing the hazards in the General Plans and reflect input provided by stakeholders and the public. The jurisdictions worked with their Planning Departments to align these goals, and their mitigation strategies, with their General Plan Safety Elements.

Table 5-1: Hazard Mitigation Goals

2021 Goals
Goal 1: Protect life, property, and reduce potential injuries from natural, technological, and human-caused disasters – with particular emphasis on reducing the threat and impacts of wildland fires and post-wildfire flooding/debris flows.
Goal 2: Improve public understanding of, and support for, hazard mitigation measures
Goal 3: Promote disaster resistance for the natural, existing, and future built environment.
Goal 4: Strengthen partnerships and collaboration to implement hazard mitigation activities.
Goal 5: Enhance the ability of the County, and the jurisdictions within it, to effectively and immediately respond to disasters.

5.3 Capabilities

Federal regulations require local hazard mitigation plans identify goals for reducing long-term vulnerabilities to the identified hazards in the planning area (Section 201.6(c)(3)(i)). Elements of this requirement include a description of capabilities that support mitigation activities.

<p>FEMA REGULATION CHECKLIST: CAPABILITY ASSESSMENT</p> <p>44 CFR § 201.6(c)(3): – The plan must include mitigation strategies based on the jurisdiction’s “existing authorities, policies, programs and resources, and its ability to expand on and improve these existing tools.”</p> <p>Elements</p> <p>C1. Does the plan document the jurisdiction’s existing authorities, policies, programs and resources, and its ability to expand on and improve these existing policies and programs? 44 CFR § 201.6(c)(3).</p> <p>C2. Does the Plan address the jurisdiction’s participation in the NFIP and continued compliance with NFIP requirements, as appropriate? 44 CFR § 201.6(c)(3)(ii).</p> <p>Source: FEMA, <i>Local Mitigation Planning Handbook Review Tool</i>, March 2013.</p>

A capability assessment was conducted of the MJHMP participating jurisdictions’ authorities, policies, programs, and resources. From the assessment, goals and mitigation actions were developed. Capabilities for the County and other participating jurisdictions are described in detail below. The Yes/No column denotes if a particular jurisdiction has that specific capability.

5.3.1 Planning and Regulatory Capabilities

These include local ordinances, policies and laws to manage growth and development. Examples include land use plans, capital improvement plans, transportation plans, emergency preparedness and response plans, building codes and zoning ordinances. Based upon the specific authorities contained in each of these planning and regulatory capabilities, they may be used to support mitigation activities.

Table 5-2: Planning and Regulatory Capability Assessment for Coconino County

PLANS	Yes/No Year	Does the plan address hazards? Does the plan ID project to include in the mitigation strategy? Can the plan be used to implement mitigation actions?
Capital Improvements Plan	Yes	2015. Yes, it addresses all hazards, identifies projects and includes mitigation strategies, and can be used to implement mitigation actions.
Community Wildfire Protection Plan	Yes	Yes, these plans address hazards, and provide for identification of values, risks and threats, identify projects to include in the mitigation strategy, community preparedness and protection capability, and implementation and monitoring actions. CWPP's currently exist for Tusayan (2013), Blue Ridge area and Mogollon Rim, Greater Flagstaff Area. This plan also covers communities in the Coconino and Kaibab National Forests of Coconino County.
Comprehensive/Master Plan	Yes	Yes, it addresses all hazards, identifies projects and includes mitigation strategies, and can be used to implement mitigation actions. It is currently being updated.
Continuity of Operations Plan	Yes	Yes, it addresses all hazards and is always in a state of being updated.
Economic Development Plan	Yes	No, the plan does not address hazards. However, the plan includes Action Initiative Items, including a Land and Natural Environment category to which mitigation actions can be added.
Emergency Operations Plan	Yes	Yes, it addresses all hazards. Yes, it can be used to implement mitigation actions via application of applicable ESF Annexes.
Stormwater Management Plan	Yes	Yes, it addresses all hazards, identifies projects in the mitigation strategy, and can be used to implement mitigation actions. This is included in County ordinances.
Transportation Plan	Yes	Yes, it addresses all hazards, identifies projects and includes mitigation strategies, and can be used to implement mitigation actions.
How can these capabilities be expanded and improved to reduce risk?		Plan reviews and updates will include consideration of the hazards identified in the MJHMP including new hazards in the 2021 update.
BUILDING CODES, PERMITTING, INSPECTIONS	Yes/No	What type of codes? Are codes adequately enforced?
Building Codes	Yes	The 2012 IBC Code Suite. Yes, codes are adequately enforced.
Site plan review requirements	Yes	Yes, codes are adequately enforced.

How can these capabilities be expanded and improved to reduce risk?		Codes and requirements will be reviewed based on developing trends in identified hazards and mitigation measures that can make them more effective at preventing losses.
LAND USE PLANNING & ORDINANCES	Yes/No	Is the ordinance effective for reducing hazard impacts? Is the ordinance adequately administered and enforced?
Floodplain ordinance	Yes	Yes, 2013 updated 2019.
Subdivision ordinance	Yes	Yes, 2013 updated 2018.
Zoning ordinance	Yes	Yes, 2015 Updated 2019.
How can capabilities be expanded and improved to reduce risk?		Planning and land use regulations will be reviewed based on developing trends in identified hazards and mitigation measures that can make them more effective at preventing losses.

Table 5-3: Planning and Regulatory Capability Assessment for Flagstaff

PLANS	Yes/No Year	Does the plan address hazards? Does the plan ID projects to include in the mitigation strategy? Can the plan be used to implement mitigation actions?
Capital Improvements Plan	Yes/Five (5) year plan updated annually	Yes to all.
(Greater Flagstaff Area) Community Wildfire Protection Plan	Yes/Updated in 2012	Yes to all.
Comprehensive/Master Plan (Flagstaff Regional Plan)	Yes/2018	Yes, No, No
Continuity of Operations Plan	Yes/2021	Yes, Yes, Yes
Economic Development Plan	Yes/2014	Yes, No, No
Emergency Operations Plan	Yes/2013	Yes, No, Yes
Stormwater Management Plan	Yes/Annually	Yes to all.
Transportation Plan	Yes/2014	Yes to all.
How can these capabilities be expanded and improved to reduce risk?		Plan reviews and updates will include consideration of the hazards identified in the MJHMP including new hazards in the 2021 update.
BUILDING CODES, PERMITTING, INSPECTIONS	Yes/No	What type of codes? Are codes adequately enforced?

Building Codes	Yes	2018 International Building Code, 2018 International Plumbing Code, 2018 Int'l Fuel Gas Code, 2018 International Residential Code, 2018 International Mechanical Code, 2018 International Existing Building Code, 2018 International Energy Conservation Code, 2018 International Swimming Pool & Spa Code, 2018 International Solar Energy Provisions, 2017 NFPA70/National Electric Code, ICC A117.1-2017 Accessible and Usable Buildings & Facilities, 1997 Uniform Code for the Abatement of Dangerous Buildings, 1997 Uniform Administrative Code, 1997 Uniform House Code. Codes are adequately and appropriately enforced through the Code Enforcement Section.
Site plan review requirements	Yes	
COF Wildland Urban Interface Code	Yes	Yes, codes adopted by the city council in 2008
How can these capabilities be expanded and improved to reduce risk?		Codes and requirements will be reviewed based on developing trends in identified hazards and mitigation measures that can make them more effective at preventing losses.
LAND USE PLANNING & ORDINANCES	Yes/No	Is the ordinance effective for reducing hazard impacts? Is the ordinance adequately administered and enforced?
Floodplain ordinance	Yes	Yes to both.
Subdivision ordinance	Yes	Yes to both.
Zoning ordinance	Yes	Yes to both.
How can these capabilities be expanded and improved to reduce risk?		Plan reviews and updates will include consideration of the hazards identified in the MJHMP including new hazards in the 2021 update.

Table 5-4: Planning and Regulatory Capability Assessment for Fredonia

PLANS	Yes/No Year	Does the plan address hazards? Does the plan ID projects to include in the mitigation strategy? Can the plan be used to implement mitigation actions?
Capital Improvements Plan	No	N/A
Community Wildfire Protection Plan	No	N/A
Comprehensive/Master Plan	Yes, 1994	General Plan is in process of being updated.
Continuity of Operations Plan	No	N/A
Economic Development Plan	No	N/A
Emergency Operations Plan	Yes, 1986	Yes to all
Stormwater Management Plan	No	N/A
Transportation Plan	No	N/A

How can these capabilities be expanded and improved to reduce risk?		Plan reviews and updates will include consideration of the hazards identified in the MJHMP including new hazards in the 2021 update.
BUILDING CODES, PERMITTING, INSPECTIONS	Yes/No	What type of codes? Are codes adequately enforced?
Building Codes	Yes	Town Code Chapter 151.
Site plan review requirements	Yes	Town Code Chapter 153.
How can these capabilities be expanded and improved to reduce risk?		Codes and requirements will be reviewed based on developing trends in identified hazards and mitigation measures that can make them more effective at preventing losses.
LAND USE PLANNING & ORDINANCES		Is the ordinance effective for reducing hazard impacts? Is the ordinance adequately administered and enforced?
Floodplain ordinance	Yes	Yes to both.
Subdivision ordinance	Yes	Yes to both.
Zoning ordinance	Yes	Yes to both.
How can these capabilities be expanded and improved to reduce risk?		Plan reviews and updates will include consideration of the hazards identified in the MJHMP including new hazards in the 2021 update.

Table 5-5: Planning and Regulatory Capability Assessment for Page

PLANS	Yes/No Year	Does the plan address hazards? Does the plan ID projects to include in the mitigation strategy? Can the plan be used to implement mitigation actions?
Capital Improvements Plan	Yes	No, No, No
Community Wildfire Protection Plan	No	N/A
Comprehensive/Master Plan	No	N/A
Continuity of Operations Plan	Yes	Yes, No, Yes
Economic Development Plan	Yes	No, No, No
Emergency Operations Plan	Yes	Yes, No, Yes
Stormwater Management Plan	Yes	No, No, No
Transportation Plan	Yes	No, No, No
How can these capabilities be expanded and improved to reduce risk?		Plan reviews and updates will include consideration of the hazards identified in the MJHMP including new hazards in the 2021 update.
BUILDING CODES, PERMITTING, INSPECTIONS	Yes/No	What type of codes? Are codes adequately enforced?

Building Codes	Yes	2018 IBC, IRC, IPC, IMC, IFC, 2017 National Electric Code, 2020 City Code, Yes
Site plan review requirements	Yes	Planning and Zoning Ordinance, Yes
How can these capabilities be expanded and improved to reduce risk?		Codes and requirements will be reviewed based on developing trends in identified hazards and mitigation measures that can make them more effective at preventing losses.
LAND USE PLANNING & ORDINANCES	Yes/No	Is the ordinance effective for reducing hazard impacts? Is the ordinance adequately administered and enforced?
Floodplain ordinance	Yes	Yes to both.
Subdivision ordinance	Yes	Yes to both.
Zoning ordinance	Yes	Yes to both.
How can these capabilities be expanded and improved to reduce risk?		Plan reviews and updates will include consideration of the hazards identified in the MJHMP including new hazards in the 2021 update.

Table 5-6: Planning and Regulatory Capability Assessment for Tusayan

PLANS	Yes/No Year	Does the plan address hazards? Does the plan ID projects to include in the mitigation strategy? Can the plan be used to implement mitigation actions?
Capital Improvements Plan	Yes	Yes to all. Capital Improvements budget that addresses drainage and street improvements, as well as monies to assist with grant for wildland fire mitigation.
Community Wildfire Protection Plan	Yes, 2014	Yes to all. Tusayan Fire District.
Comprehensive/Master Plan	Yes, 2014	Yes to all. The town adopted a General Plan in 2014 (due for updates).
Continuity of Operations Plan	No	N/A
Economic Development Plan	No	Policies noted in General Plan.
Emergency Operations Plan	Yes	Yes to all. Included within the current Coconino County Emergency Operations Plan.
Stormwater Management Plan	Yes	Yes to all. Included within the current County and the Grand Canyon National Park Airport operated by ADOT, has a storm water management plan unique to the airport facility.
Transportation Plan	Yes	General Plan has a transportation element which can be used to aid in mitigation actions, but no plan to address specific hazards (due for updates).
BUILDING CODES, PERMITTING, INSPECTIONS	Yes/No	What type of codes? Are codes adequately enforced?
Building Codes	No	Yes to all. Current application of IBC 2006, and in the process of updating to the 2012 IBC's.
Site plan review requirements	Yes	Yes to all. Willdan & Woodson Engineering Firms fulfill these needs.

LAND USE PLANNING & ORDINANCES		Is the ordinance effective for reducing hazard impacts? Is the ordinance adequately administered and enforced?
Floodplain ordinance	Yes	Tusayan is included in the Coconino County ordinance of 2013.
Subdivision ordinance	No	N/A
Zoning ordinance	Yes	Adopted on December 5, 2012 and in the process of updating.
How can capabilities be expanded and improved to reduce risk?		Town staff will review and draft policies, plans and other documents (to better address hazard mitigation strategies) and present to leadership for review. Town staff will identify areas within their regulations to increase a greater level of enforcement and to implement projects and practices to reduce risks for hazards.

Table 5-7: Planning and Regulatory Capability Assessment for Williams

PLANS	Yes/No Year	Does the plan address hazards? Does the plan ID projects to include in the mitigation strategy? Can the plan be used to implement mitigation actions?
Capital Improvements Plan	Yes 2008	Yes, it addresses all hazards, identifies projects and includes mitigation strategies, and can be used to implement mitigation actions.
Community Wildfire Protection Plan	Yes	WFAC
Comprehensive/Master Plan	Yes	Yes, it addresses all hazards, identifies projects and includes mitigation strategies, and can be used to implement mitigation actions. It is currently being updated.
Continuity of Operations Plan	No	N/A
Economic Development Plan	Yes/2013	
Emergency Operations Plan	No	Uses the County Emergency Operations Plan.
Stormwater Management Plan	Yes/2009	Yes, it addresses all hazards, identifies projects in the mitigation strategy, and can be used to implement mitigation actions. This is included in county ordinances.
Transportation Plan	Yes/2008	Yes, it addresses all hazards, identifies projects and includes mitigation strategies, and can be used to implement mitigation actions.
How can these capabilities be expanded and improved to reduce risk?		Plan reviews and updates will include consideration of the hazards identified in the MJHMP including new hazards in the 2021 update.
BUILDING CODES, PERMITTING, INSPECTIONS	Yes/No	What type of codes? Are codes adequately enforced?
Building Codes	Yes/2008	2008, IBC, IRC, NEC, IFC, Yes
Site plan review requirements	Yes	Yes, codes are adequately enforced.

How can these capabilities be expanded and improved to reduce risk?		Codes and requirements will be reviewed based on developing trends in identified hazards and mitigation measures that can make them more effective at preventing losses.
LAND USE PLANNING & ORDINANCES		Is the ordinance effective for reducing hazard impacts? Is the ordinance adequately administered and enforced?
Floodplain ordinance	Yes/2008	Yes to both.
Subdivision ordinance	Yes/2008	Yes to both.
Zoning ordinance	Yes/2008	Yes
How can these capabilities be expanded and improved to reduce risk?		Plan reviews and updates will include consideration of the hazards identified in the MJHMP including new hazards in the 2021 MJHMP update.

5.3.2 Administrative and Technical Capabilities

These capabilities include community (public and private) staff and their skills and tools which can be used for mitigation planning and implementation. This capability includes engineers, planners, emergency managers, GIS analysts, building inspectors, grant writers, and floodplain managers. Small communities may rely on other government entities such as counties or special districts for resources. Based upon the specific expertise contained in each of these administrative and technical capabilities, they may be used to support mitigation activities.

Table 5-8: Administrative and Technical Capability Assessment for Coconino County

ADMINISTRATION	Yes/No	Describe capability. Is coordination effective?
Mutual aid agreements	Yes	Yes, the County participates in the AZMAC (Arizona Mutual Aid Compact).
Planning Commission	Yes	They are effective in communication with the Board of Supervisors.
TECHNICAL STAFF	Yes/No FT/PT	Is staff trained on hazards and mitigation? Is coordination between agencies and staff effective? Have skills/expertise been used to assess/mitigate risk in the past?
Building Official	Yes	Yes, to all.
Community Planner	Yes	Yes, to all.
Emergency Manager	Yes	Yes, to all.
Engineer	Yes	Yes, to all.
Floodplain Manager/Administrator	Yes	Yes, to all.
GIS/HAZUS Coordinator	Yes	Yes, to all.

How can capabilities be expanded and improved to reduce risk?	By continuing to utilize and seek improved methods for including the necessary technical and planning staff in the development and updates of emergency operations plans, financial planning and mitigation planning efforts. An important component is the use of trained grant writers with the knowledge and skill sets to research and apply for federal funding opportunities.
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Table 5-9: Administrative and Technical Capability Assessment for Flagstaff

ADMINISTRATION	Yes/No	Describe capability. Is coordination effective?
Mutual aid agreements	Yes	Agreements are in place with multiple Jurisdictions; The COF joined AZMAC and revised the Greater Flagstaff Fire Service Mutual Aid IGA. Agreements are effective in assisting with mitigation.
Planning (and Zoning) Commission	Yes	Advisory board to the council on matters related to growth and physical development of the city; conducts public hearings on amendments to the zoning map, and public meetings on preliminary subdivision plans.
Board of Adjustment	Yes	Hears and decides appeals of staff determinations of the Zoning Code.
TECHNICAL STAFF	Yes/No FT/PT	Is staff trained on hazards and mitigation? Is coordination between agencies and staff effective? Have skills/expertise been used to assess/mitigate risk in the past?
Building Official	Yes/FT	Yes to all.
Planning Director (and Staff)	Yes/FT	Yes to all.
Emergency Manager	Yes/PT	Yes to all.
City Engineer (and Staff)	Yes/FT	Yes to all.
Floodplain Manager/Administrator	Yes/FT	Yes to all.
GIS/HAZUS Coordinator	Yes/FT	No, Yes, Yes
Grant writer	Yes/FT	Yes to all. (Disaster Recovery Management also)
Firewise Specialist	Yes/FT	Yes to all.
How can capabilities be expanded and improved to reduce risk?		Additional training of staff in hazard mitigation and financial resources to pursue mitigation projects.

Table 5-10: Administrative and Technical Capability Assessment for Fredonia

ADMINISTRATION	Yes/No	Describe capability. Is coordination effective?
Mutual aid agreements	Yes	With Kane county, help when needed.
Planning Commission	Yes	Planning and Zoning meet monthly to ensure Code is followed for building and land usage.

TECHNICAL STAFF	Yes/No FT/PT	Is staff trained on hazards and mitigation? Is coordination between agencies and staff effective? Have skills/expertise been used to assess/mitigate risk in the past?
Building Official	Yes/ PT	Trained, has skills.
Community Planner	No	Town manager, trained, good coordination, has skills.
Emergency Manager	Yes/ft	Town Manager/ Deputy Marshal, trained, coordination effective, has skills.
Engineer	No	Public Works Director, coordination is effective, has training, has skills.
Floodplain Manager/Administrator	Yes/ FT	Public Works Director, coordination is effective, has training, has skills.
GIS/HAZUS Coordinator	No	N/A
Grant writer	Yes	No mitigation training, coordination is effective, no.
How can capabilities be expanded and improved to reduce risk?		Additional training of staff in hazard mitigation and financial resources to pursue mitigation projects.

Table 5-11: Administrative and Technical Capability Assessment for Page

ADMINISTRATION	Yes/No	Describe capability. Is coordination effective?
Mutual aid agreements	Yes	Provide assistance to local agencies. Yes/
Planning Commission	Yes	Voting and public input. Yes.
TECHNICAL STAFF	Yes/No FT/PT	Is staff trained on hazards and mitigation? Is coordination between agencies and staff effective? Have skills/expertise been used to assess/mitigate risk in the past?
Building Official	FT	Yes to all.
Community Planner	FT	Yes to all.
Emergency Manager	FT	Yes to all.
Engineer	FT	Yes to all.
Floodplain Manager/Administrator	Yes	Yes to all.
GIS/HAZUS Coordinator	No	N/A
Grant writer	No	N/A
How can capabilities be expanded and improved to reduce risk?		Additional training of staff in hazard mitigation and financial resources to pursue mitigation projects.

Table 5-12: Administrative and Technical Capability Assessment for Tusayan

ADMINISTRATION	Yes/No	Describe capability. Is coordination effective?
Mutual aid agreements	Yes	Coconino County, Kaibab National Forest, National Park Service, ADOT and others.
Planning and Zoning Commission	Yes	Planning Commission established in 2012 with Zoning Ordinance
TECHNICAL STAFF	Yes/No FT/PT	Is staff trained on hazards and mitigation? Is coordination between agencies and staff effective? Have skills/expertise been used to assess/mitigate risk in the past?
Building Official	Yes	Yes to all. Willdan performs building services under the direction of the Interim Town Engineer
Community Planner	Yes	Yes to all. Willdan performs planning functions under the direction of the Interim Town Engineer.
Emergency Manager	Yes	Yes to all. The town manager works in consultation with the County Emergency Management.
Engineer	Yes	Yes to all. Interim town engineer.
Floodplain Manager/Administrator	Yes	Yes to all. Tusayan included within the County agreement.
GIS/HAZUS Coordinator	Yes	Yes to all. Included within the County agreement.
Grant writer	Yes	Yes to all. Town manager and clerk perform grant writing functions.
How can capabilities be expanded and improved to reduce risk?		Making leadership and employees aware of the town's Hazard Mitigation Plan and having employees take advantage of County and state training. Address the CERT team concept with the County Sherriff's Office to assist community with any hazard.

Table 5-13: Administrative and Technical Capability Assessment for Williams

ADMINISTRATION	Yes/No	Describe capability. Is coordination effective?
Mutual aid agreements	Yes	Communications, Inner OP, DPS, SO (EOC), Yes
Planning Commission	Yes	Implement new ordinances, yes
TECHNICAL STAFF	Yes/No FT/PT	Is staff trained on hazards and mitigation? Is coordination between agencies and staff effective? Have skills/expertise been used to assess/mitigate risk in the past?
Building Official	Yes/FT	Yes to all.
Community Planner	Yes/FT	Yes to all.
Emergency Manager	Yes/FT	Yes to all.
Engineer	Yes	Off site.

Floodplain Manager/Administrator	Yes/FT	Yes to all.
GIS/HAZUS Coordinator	No	N/A
Grant writer	Yes/No	Williams PD, not the city.
How can capabilities be expanded and improved to reduce risk?		By continuing to utilize and seek improved methods for including the necessary technical and planning staff in the development and updates of emergency operations plans, financial planning and mitigation planning efforts. An important component is the use of trained grant writers with the knowledge and skill sets to research and apply for federal funding opportunities.

5.3.3 Financial Capabilities

Table 5-14 contains a list of administrative and financial capabilities available to the Coconino County. Based upon procedures for each resource, these financial capabilities may be used to support mitigation activities.

Table 5-14: Financial Capability Assessment for Coconino County

FINANCIAL	Yes/No	Has the funding resource been used in past and for what type of activities? Could the resource be used to fund future mitigation actions?
Hazard Mitigation Grant Program (HMPG)	Yes	
Pre-Disaster Mitigation grant program (PDM)	Yes	
Flood Mitigation Assistance grant program (FMA)	Yes	
Capital improvements project funding	Yes	Funding source has been used in past for roads and flood control and could be used for future mitigation actions.
Community Development Block Grant	Yes	This source has been used for low income housing rehabilitation and could be used for future mitigation actions.
Authority to levy taxes for specific purposes	Yes	Yes, examples include the recently passed Proposition 403 (road maintenance sales tax), Flood Control Tax was upgraded in 2011, and the 2012 Public Health District tax. These sources of revenue could be used for future mitigation actions.
Impact fees for new development	No	N/A
Incur debt through special tax bond	Yes	Yes, an example is the use by facilities for courthouse remodel. This source could be used for future mitigation actions.
Incur debt through general obligation bonds	Yes	This has not been used in the past but that is a possibility for future needs.
How can capabilities be expanded and improved to reduce risk?		Apply for FEMA program grants. Develop new and creative ways to acquire funding such as new legislation proposals to open the doors for improved funding opportunities.

Table 5-15: Financial Capability Assessment for Flagstaff

FINANCIAL	Yes/No	Has the funding resource been used in past and for what type of activities? Could the resource be used to fund future mitigation actions?
Hazard Mitigation Grant Program (HMPG)	Yes	
Pre-Disaster Mitigation grant program (PDM)	Yes	
Flood Mitigation Assistance grant program (FMA)	Yes	
Capital improvements project funding	Yes	Yes, transportation improvement projects, Stormwater/winter storm drainage projects, water supply and storage protection, fire prevention/protection, Yes
Community Development Block Grant	Yes	No, Possibly
Authority to levy taxes for specific purposes	Yes	Yes, Yes
Impact fees for new development	Yes	Yes, Limited to public safety Equipment and facilities, No
Incur debt through special tax bond	Yes	Yes, public safety radio system bond, Flagstaff Watershed Protection Program (FWPP) bond, road repair and street safety tax, Yes
Incur debt through general obligation bonds	Yes	Yes, forest fuels treatments, \$16.5M in street/utility improvements, \$42M for municipal services maintenance facility, Yes
How can capabilities be expanded and improved to reduce risk?		Apply for FEMA program grants. Develop new and creative ways to acquire funding such as new legislation proposals to open the doors for improved funding opportunities.

Table 5-16: Financial Capability Assessment for Freedonia

FINANCIAL	Yes/No	Has the funding resource been used in past and for what type of activities? Could the resource be used to fund future mitigation actions?
Hazard Mitigation Grant Program (HMPG)	Yes	
Pre-Disaster Mitigation grant program (PDM)	Yes	
Flood Mitigation Assistance grant program (FMA)	Yes	
Capital improvements project funding	Yes	Funding sources previously used for infrastructure could be used for mitigation.
Community Development Block Grant	Yes	Infrastructure, possibly.
Authority to levy taxes for specific purposes	No	No town property tax.
Impact fees for new development	Yes	No impact fees currently, just hookup fees for utilities.
Incur debt through special tax bond	No	N/A
Incur debt through general obligation bonds	Yes	Not in use currently.

How can capabilities be expanded and improved to reduce risk?	Apply for FEMA program grants. Develop new and creative ways to acquire funding such as new legislation proposals to open the doors for improved funding opportunities.
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Table 5-17: Financial Capability Assessment for Page

FINANCIAL	Yes/No	Has the funding resource been used in past and for what type of activities? Could the resource be used to fund future mitigation actions?
Hazard Mitigation Grant Program (HMPG)	Yes	
Pre-Disaster Mitigation grant program (PDM)	Yes	
Flood Mitigation Assistance grant program (FMA)	Yes	
Capital improvements project funding	Yes	Yes, capital needs of the city, primarily Airport; yes, with council approval.
Community Development Block Grant	Yes	Yes, various community needs; no, usually the funding cycle is every four (4) years and funds are specifically allocated from the beginning of the cycle.
Authority to levy taxes for specific purposes	Yes	Yes, to pay off existing bond debt; with council approval and direction.
Impact fees for new development	No	N/A
Incur debt through special tax bond	Yes	Yes, to construct city facilities; yes, with council direction.
Incur debt through general obligation bonds	No	N/A
How can capabilities be expanded and improved to reduce risk?		Apply for FEMA program grants. Develop new and creative ways to acquire funding such as new legislation proposals to open the doors for improved funding opportunities.

Table 5-18: Financial Capability Assessment for Tusayan

FINANCIAL	Yes/No	Has the funding resource been used in past and for what type of activities? Could the resource be used to fund future mitigation actions?
Capital improvements project funding	Yes	Yes to both questions. Town does have a capital improvements budget
Community Development Block Grant	No	N/A
Authority to levy taxes for specific purposes	Yes	Yes to both questions.
Impact fees for new development	No	N/A
Incur debt through special tax bond	No	N/A
Incur debt through general obligation bonds	No	N/A
How can capabilities be expanded and improved to reduce risk?		Continue to identify and budget for specific improvements listed in the MJHMP as well as those identified by the community in future planning efforts.

Table 5-19: Financial Capability Assessment for Williams

FINANCIAL	Yes/No	Has the funding resource been used in past and for what type of activities? Could the resource be used to fund future mitigation actions?
Hazard Mitigation Grant Program (HMPG)	Yes	
Pre-Disaster Mitigation grant program (PDM)	Yes	
Flood Mitigation Assistance grant program (FMA)	Yes	
Capital improvements project funding	Yes	Yes, flood mitigation
Community Development Block Grant	Yes	Water infrastructure, housing
Authority to levy taxes for specific purposes	No	N/A
Impact fees for new development	No	N/A
Incur debt through special tax bond	No	N/A
Incur debt through general obligation bonds	No	N/A
How can capabilities be expanded and improved to reduce risk?		Apply for FEMA program grants. Increase of city financial resources, IGA's.

5.3.4 Education and Outreach Capabilities

Table 5-20 lists financial and public outreach capabilities. These capabilities include programs such as fire safety programs, hazard awareness campaigns, public information or communications offices. Education and outreach capabilities can be used to inform the public on current and potential mitigation activities.

Table 5-20: Education and Outreach Capability Assessment for Coconino County

PROGRAM / ORGANIZATION	Access / Eligibility (Yes/No)	Describe program/organization and how it relates to disaster resilience and mitigation. Could the program/organization help implement future mitigation activities?
County Website and Social Media (PIO/PAO Programming)	Yes	The County maintains a website and accounts with Facebook , Instagram , Twitter , and YouTube . County libraries, law enforcement, and fire/rescue agencies also maintain social media accounts. These resources are regularly used to convey hazard mitigation and disaster-related information to the public, as well as develop awareness of in-person and online events. They can be used to support future mitigation activities.
Firewise Communities certification	Yes	The Flagstaff Fire Dept and the individual Fire Depts/Districts within the County work in their respective communities to establish disaster resilience. These communities include Pine Canyon, Stoneman Lake, Sherwood Forest, Munds Park, Starlight Pines, The Meadows, Lockett Ranches, Sunset Vista, Flagstaff Ranch, Continental, Linwood Heights, Kachina Village, and Forest Highland. The Community Wildfire Protection Plans also serve to establish future mitigation projects and actions to support disaster resilience.

Storm Ready certification	Yes	The County Storm Ready Certification issued through the National Weather Service is current and due for renewal in July 2021 (i.e. applies to all of the County).
Citizen groups focused on emergency preparedness, environmental protection, etc.	Yes	CERT (Community Emergency Response Team), MRC (Medical Reserve Corps), ARES (Amateur Radio Emergency Services), Faith Based organizations such as the First Baptist support group, Salvation Army, and United Way of Northern Arizona. These organizations provide First Responder Support and Emergency Management and EOC support to local communities and local government during times of disaster and preparedness training for local needs.
Public education/information programs (fire safety, household preparedness, responsible water use, etc.)	Yes No (for water use)	The County frequently addresses public information needs through a variety of mechanisms. The local government organizations utilize a well-developed and coordinated PIO group with partners from all levels of government including city, county departments, and federal and state offices. This is especially effective during times of disaster. Coconino County Emergency Management utilizes public presentations and media outlets (e.g. radio, print) to provide public outreach on emergency preparedness. The County website is a primary tool for dissemination of public information.
Public-private partnership initiatives addressing disaster-related issues	Yes	Examples of organizations for this effort include VOAD (Volunteer Organizations Active in Disaster), LEPC (Local Emergency Planning Committee) for addressing hazardous materials issues, and PFAC (Ponderosa Fire Advisory Council) which brings together local, state, and federal fire resources to enhance efforts in pursuit of a Common Operating Picture for community fire protection.
How can capabilities be expanded and improved to reduce risk?		This can be accomplished by including the organizations in our public outreach, planning, training and overall preparedness efforts and real time events.

Table 5-21: Education and Outreach Capability Assessment for Flagstaff

PROGRAM / ORGANIZATION	Access / Eligibility (Yes/No)	Describe program/organization and how it relates to disaster resilience and mitigation. Could the program/organization help implement future mitigation activities?
City Website and Social Media (PIO/PAO Programming)	Yes	The city maintains a website and accounts with Facebook and Twitter . Local libraries, law enforcement, and fire/rescue agencies also maintain social media accounts. These resources are regularly used to convey hazard mitigation and disaster-related information to the public, as well as develop awareness of in-person and online events. They can be used to support future mitigation activities.
Firewise (Fire-Adapted) Communities certification	Yes	Develops fire adapted communities; Yes, the County has 13 Firewise Communities (Pine Canyon, Stoneman Lake, Sherwood Forest, Munds Park, Starlight Pines, The Meadows, Lockett Ranches, Sunset Vista, Flagstaff Ranch, Continental, Linwood Heights, Kachina Village, and Forest Highlands)
Storm Ready certification	No	The County as a whole is certified; renewal is in July 2021
Citizen groups focused on emergency preparedness, environmental protection, etc.	Yes	Red Cross, Woods Watch, Emergency Operations Center Volunteers, Yes

Public education/information programs (fire safety, household preparedness, responsible water use, etc.)	Yes	Emergency notification system, stormwater public outreach, water conservation program, Firewise, city has a budget performance measurement the priority of “resiliency and preparedness efforts,” Yes
Public-private partnership initiatives addressing disaster-related issues	Yes	Red Cross, Pipeline Companies, FWPP, BNSF Railroad, Northern Arizona University, Purina companies, United Way of No Arizona, and various other non-profit agencies, Flagstaff Unified School District, Flagstaff Fire Occupancy Inspection Program.
How can capabilities be expanded and improved to reduce risk?		This can be accomplished by including the organizations in our public outreach, planning, training and overall preparedness efforts and real time events.

Table 5-22: Education and Outreach Capability Assessment for Fredonia

PROGRAM / ORGANIZATION	Access / Eligibility (Yes/No)	Describe program/organization and how it relates to disaster resilience and mitigation. Could the program/organization help implement future mitigation activities?
Town Website and Social Media (PIO/PAO Programming)	Yes	The town maintains a website and a Facebook account. Local libraries, law enforcement, and fire/rescue agencies also maintain social media accounts. These resources are regularly used to convey hazard mitigation and disaster-related information to the public, as well as develop awareness of in-person and online events. They can be used to support future mitigation activities.
Firewise Communities certification	No	N/A
StormReady certification	No	N/A
Citizen groups focused on emergency preparedness, environmental protection, etc.	Yes	Local faith-based groups are involved with education for emergency preparedness and organizing volunteers when needed.
Public education/information programs (fire safety, household preparedness, responsible water use, etc.)	Yes	Marshal’s Office and Fire Department offer education on emergency preparedness, Fire Safety.
Public-private partnership initiatives addressing disaster-related issues	No	None currently.
How can capabilities be expanded and improved to reduce risk?		This can be accomplished by including the organizations in our public outreach, planning, training and overall preparedness efforts and real time events.

Table 5-23: Education and Outreach Capability Assessment for Page

PROGRAM / ORGANIZATION	Access / Eligibility (Yes/No)	Describe program/organization and how it relates to disaster resilience and mitigation. Could the program/organization help implement future mitigation activities?
City Website and Social Media (PIO/PAO Programming)	Yes	The city maintains a website , as well as Facebook and YouTube accounts. Local libraries, law enforcement, and fire/rescue agencies also maintain social media accounts. These resources are

		regularly used to convey hazard mitigation and disaster-related information to the public, as well as develop awareness of in-person and online events. They can be used to support future mitigation activities.
Firewise Communities certification	No	N/A
Storm Ready certification	No	N/A
Citizen groups focused on emergency preparedness, environmental protection, etc.	No	N/A
Public education/information programs (fire safety, household preparedness, responsible water use, etc.)	Yes	Fire and life safety education, fire extinguisher training, Emergency preparedness. Yes.
Public-private partnership initiatives addressing disaster-related issues	No	N/A
How can capabilities be expanded and improved to reduce risk?		This can be accomplished by including the organizations in our public outreach, planning, training and overall preparedness efforts and real time events.

Table 5-24: Education and Outreach Capability Assessment for Tusayan

PROGRAM / ORGANIZATION	Access / Eligibility (Yes/No)	Describe program/organization and how it relates to disaster resilience and mitigation. Could the program/organization help implement future mitigation activities?
Town Website and Social Media (PIO/PAO Programming)	Yes	The town maintains a website and a Facebook account. Local libraries, law enforcement, and fire/rescue agencies also maintain social media accounts. These resources are regularly used to convey hazard mitigation and disaster-related information to the public, as well as develop awareness of in-person and online events. They can be used to support future mitigation activities.
Firewise Communities certification	No	N/A
Storm Ready certification	Yes	The County EOP and participant in NFIP. Yes, will aid in future mitigation activity.
Citizen groups focused on emergency preparedness, environmental protection, etc.	No	N/A
Public education/information programs (fire safety, household preparedness, responsible water use, etc.)	Yes	The town performs certain public information, outreach, and training programs. Tusayan Fire District performs community outreach with the schools and pre-school education and works with businesses/community groups and with entities delineated in the County EOP.
Public-private partnership initiatives addressing disaster-related issues	Yes	The town has facilitated opportunities with partners such as Coconino Emergency Management. Examples include after action response exercises, evaluating communication assets, and stakeholder training and exercises related to regional disaster related issues.
How can capabilities be expanded and improved to reduce risk?		Participating in the Update of the MJHMP has helped identify areas where the Tusayan community can improve safety and mitigate possible hazards. This will aid in identifying specific projects and

	areas. Exercise and training will enhance partnerships, support and coordination and involvement with local resources (local state and federal). Targeted capital improvements will be essential as well.
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Table 5-25: Education and Outreach Capability Assessment for Williams

PROGRAM / ORGANIZATION	Access / Eligibility (Yes/No)	Describe program/organization and how it relates to disaster resilience and mitigation. Could the program/organization help implement future mitigation activities?
City Website and Social Media (PIO/PAO Programming)	Yes	The city maintains a website . Local libraries, law enforcement, and fire/rescue agencies also maintain social media accounts. These resources are regularly used to convey hazard mitigation and disaster-related information to the public, as well as develop awareness of in-person and online events. They can be used to support future mitigation activities.
Firewise Communities certification	No	N/A
Storm Ready certification	Yes	County MJHMP
Citizen groups focused on emergency preparedness, environmental protection, etc.	No	N/A
How can capabilities be expanded and improved to reduce risk?		This can be accomplished by including the organizations in our public outreach, planning, training, and overall preparedness efforts and real time events.

5.3.5 National Flood Insurance Program Participation

Joining the NFIP requires the adoption of a floodplain management ordinance by jurisdictions and following established minimum standards set forth by FEMA and the State of Arizona, when developing in the floodplain. These standards require that all new buildings and substantial improvements to existing buildings will be protected from damage by the 100-year flood, and that new floodplain development will not aggravate existing flood problems or increase damage to other properties. As a participant in the NFIP, communities also benefit from having Flood Insurance Rate Maps (FIRM) that map identified flood hazard areas and can be used to assess flood hazard risk, regulate construction practices and set flood insurance rates.

If a community adopts and enforces a floodplain management ordinance to reduce future flood risk to new construction in floodplains, the Federal Government will make flood insurance available within the community as a financial protection against flood losses. This insurance is designed to provide an insurance alternative to disaster assistance to reduce the escalating costs of repairing damage to buildings and their contents caused by floods.

The County and four of the five incorporated jurisdictions currently participate in the NFIP. **Table 5-26** summarizes their NFIP status and statistics.

Table 5-26: NFIP Status for Coconino County

Jurisdiction	Comm ID	NFIP Entry Date	Map Date (DFIRM)	# of Policies	Total Coverage	Floodplain Management Role
Coconino County	040019	11/16/1983	09/03/2010	361	\$110,901,100	Provides floodplain management for the Unincorporated County. Participant in the Coconino County Flood Control District (CCFCD).
Flagstaff	040020	1/19/1983	09/03/2010	648	\$185,592,000	Provides in-house floodplain management. Participant of the CCFCD.
Fredonia	040021	05/17/1982	09/03/2010	3	\$675,000	Provides in-house floodplain management. Participant of the CCFCD.
Page	040113	07/11/2011	09/03/2010	1	\$210,000	Provides in-house floodplain management. Participant of the CCFCD.
Tusayan	N/A	N/A	09/03/2010	N/A	N/A	Relinquished to CCFCD in 2019.
Williams	040027	12/15/1983	09/03/2010	32	\$9,753,100	Provides in-house floodplain management. Participant of the CCFCD

FEMA NFIP Policy Information by State and Community, 12/31/2020. https://nfipservices.floodsmart.gov/sites/default/files/NFIP_Policy-Information-by-State_20201231.xlsx
 Participation – FEMA’s Community Status Book Report, 9/3/2020. Policy statistics (current as of 11/11/2020) <http://www.fema.gov/policy-claim-statistics-flood-insurance/policy-claim-statistics-flood-insurance/policy-claim-13>
 Town of Tusayan, Arizona Ordinance No. 2019-02. <https://tusayan-az.gov/wp-content/uploads/2019/12/Ordinance-2019-02.pdf>

Continued compliance with NFIP requirements is listed for each jurisdiction>

Coconino County: County Code [SECTION 13.6: FPM--FLOODPLAIN MANAGEMENT OVERLAY ZONE](#) - The Special Flood Hazard Areas identified by the Federal Insurance Administration (FIA) of the Federal Emergency Management Agency (FEMA) in a scientific and engineering report entitled “The Flood Insurance Study (FIS) for Coconino County, dated September 3, 2010 with accompanying Flood Insurance Rate Maps (FIRMs), dated September 3, 2010 and all subsequent amendments and/or revisions, are hereby adopted by reference and declared to be a part of this Ordinance.

This Flood Insurance Study and attendant mapping is the minimum area of applicability of this Ordinance and may be supplemented by studies for other areas which allow implementation of this Ordinance and which are recommended to the Floodplain Board by the Floodplain Administrator. The Board, within its area of jurisdiction shall delineate (or may by rule require developers of land to delineate) for areas where development is ongoing or imminent, and thereafter as development becomes imminent, Floodplains consistent with the criteria developed by the Federal Emergency Management Agency and the Director of Water Resources. The FIS and FIRMs are on file at the Department of Community Development, 2500 N. Fort Valley Road, Flagstaff

Flagstaff: City Code [CHAPTER 12-01 FLOOD PLAIN REGULATIONS](#) - These floodplain management regulations of the City of Flagstaff are hereby amended by the addition thereto of the regulations of the National Flood Insurance Program as they may from time to time be amended.

In accordance with 44 CFR Ch. 1, Part 60, Subpart A, any state or local floodplain management regulations, including the regulations set forth in these regulations, which are more restrictive than the minimum criteria set forth in 44 CFR shall take precedence.

Fredonia: City Code 150.01 [FLOOD DAMAGE PREVENTION REGULATIONS ADOPTED BY REFERENCE](#)

Page: City Code CHAPTER 153: [FLOODPLAIN MANAGEMENT](#)

The areas of special flood hazard identified by the Federal Emergency Management Agency in a scientific and engineering report entitled “The Flood Insurance Study (FIS) for Coconino County, Arizona and Incorporated Areas” dated September 3, 2010, with accompanying Flood Insurance Rate Maps (FIRMs) dated September 3, 2010, and all subsequent amendments and/or revisions, are hereby adopted by reference and declared to be a part of this chapter.

This FIS and attendant mapping is the minimum area of applicability of this chapter and may be supplemented by studies for other areas which allow implementation of this chapter and which are recommended to the Floodplain Board by the Floodplain Administrator. The Floodplain Board, within its area of jurisdiction, shall delineate (or may, by rule, require developers of land to delineate) for areas where development is ongoing or imminent, and thereafter as development becomes imminent, floodplains consistent with the criteria developed by the Federal Emergency

Management Agency and the Director of the Arizona Department of Water Resources. The FIS and FIRM panels are on file at the city hall.

Williams: City Code CHAPTER 155: [FLOOD DAMAGE PREVENTION](#)

The areas of special flood hazard identified by the Federal Emergency Management Agency in a scientific and engineering report entitled “The Flood Insurance Study (FIS) for Coconino County”, dated 9-29-2006, with accompanying Flood Insurance Rate Maps (FIRMs) dated 9-29-2006, and all subsequent amendments and/or revisions, are hereby adopted by reference and declared to be a part of this chapter.

This FIS and attendant mapping are the minimum area of applicability of this chapter and may be supplemented by studies for other areas which allow implementation of this chapter and which are recommended to the Floodplain Board by the Floodplain Administrator. The Floodplain Board, within its area of jurisdiction, shall delineate (or may, by rule, require developers of land to delineate) for areas where development is ongoing or imminent, and thereafter as development becomes imminent, floodplains consistent with the criteria developed by the Federal Emergency Management Agency and the Director of the state’s Department of Water Resources.

Repetitive Loss Properties:

According to FEMA, there are 17 repetitive loss (RL) properties are located in the planning area. Of these, 12 are single family dwellings. The remainder are non-residential. Fifteen of the properties are located in Sedona.

These NFIP-insured properties have experienced multiple flood losses since 1978. 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.

5.4 Mitigation Actions/Projects and Implementation Strategy

The following section contains the status of mitigation actions from the previous MJHMP. It also provides for ongoing mitigation actions from the 2015 plan and the new mitigation action for this MJHMP.

5.4.1 Previous Mitigation Actions / Projects Assessment

FEMA REGULATION CHECKLIST: PLAN REVIEW AND REVISION

Progress in Local Mitigation Efforts

44 CFR § 201.6(c)(d)(3): “A local jurisdiction must review and revise its plan to reflect . . . progress in local mitigation efforts”

Element

D2. Was the Plan revised to reflect progress in local mitigation efforts? 44 CFR § 201.6(d)(3).

Source: FEMA, Local Mitigation Plan Review Tool, March 2013.

The 2015 MJHMP contained mitigation actions for the County and each participating jurisdiction. Many of the mitigation actions were completed or carried out to some degree or are considered ongoing. Some of the mitigation actions were duplicative, some were better categorized as emergency preparedness or recovery activities, and others were either not addressed during the time period or were not feasible to accomplish. The tables below describe the current status of mitigation action from the previous plan.

Table 5-27: Coconino County Current Status of Previous Plan’s Mitigation Actions

#	Mitigation Action	Status	Additional Details	POC/Dept.
1	Greater Flagstaff Forests Partnership: A community-based collaborative of environmental, business, land-management, emergency response, and regulatory agencies whose objectives include 1) forest restoration, 2) community protection from wildland fire, 3) sustainable, small-diameter wood utilization, and 4) adaptive management. The focus involves a multi-jurisdiction area of 180,000 acres surrounding Flagstaff, but the area of interest extends to include the nearly 900,000-acre area encompassed by the Greater Flagstaff Community Wildfire Protection Plan.	Ongoing	In 2019, GFFP’s work and accomplishments were focused on the Four Forest Restoration Initiative (4FRI), Fire Adapted Communities Learning Network (FACLN), Arizona Fire Adapted Communities (AZFAC) and in cost-share grant programs that encourage and fund on-the-ground forest restoration treatments on private and non-federal land, adjacent to and complimenting project treatment areas on federal land, like the Flagstaff Watershed Protection Project (FWPP) in the Coconino National Forest. For detailed project information and annual reports for the GFFP and the 4FRI please consult: www.gffp.org/annual-reports & fs.usda.gov/4fri	Greater Flagstaff Forests Partnership; includes the 4FRI (Four Forest Restoration Initiative)
2	Flagstaff Fire Dept Wildland Fire Management Program: Housed within the Prevention Bureau, the staff lead and manage a program focused on 1) prevention, 2) preparedness, 3) hazard mitigation, 4) response, and 5) recovery. Efforts are centered on education, engineering, enforcement, and ecosystem. The Flagstaff Wildland-Urban Interface Fire Code was adopted in 2008.	Ongoing	Neil Chapman & Paul Oltrogge of the Flagstaff Fire Department oversee this very broad scoped and year-round process. Paul Oltrogge’s focus is on Operations while Neil Chapman focuses on the water shed and Prevention side. This program serves to protect the watershed resources and is funded via Water Services Protection Fees.	Flagstaff Fire Department
3	Floodplain re-mapping, including any local requests for map updates to	Ongoing	Floodplain re-mapping, including any local requests for map updates to provide the community	County PW/ Flood Control

#	Mitigation Action	Status	Additional Details	POC/Dept.
	provide the community with a regulatory tool to reduce the losses to property and people for Munds Park and Kachina/Mountaineire.		with a regulatory tool to reduce the losses to property and people for Ft. Valley; Doney Park; Munds Park.	District/County Engineer
4	Develop neighborhood wildland fire assessment and rank at-risk neighborhoods with the goal to provide residents with accurate wildland fire information and motivate them to implement personal and neighborhood mitigation measures.	Ongoing	This action ties into PFAC. The County is seeking grant funding through the Building Resilience Infrastructure and Communities (BRIC) program to enhance this mitigation effort.	PFAC/County Public Works
5	Conduct roadside thinning along Forest Highway 3 (Lake Mary Road), Perkinsville Road, Old Munds Hwy, Garland Prairie, and Spring Valley Rd to reduce vulnerability to wildland fire.	Ongoing	This action ties into PFAC. The County is seeking grant funding through the Building Resilience Infrastructure and Communities (BRIC) program to enhance this mitigation effort.	PFAC/County Public Works
6	Enforcement of floodplain management requirements in accordance with the NFIP, including regulating all and substantially improved construction in floodplains to reduce losses to property and people.	Ongoing	None	County Engineer/Community Development
7	Develop additional GIS data layers including Sedona and Winona areas to facilitate future revisions of the greater Flagstaff area Community Wildfire Protection Plan	Ongoing	Project in development.	PFAC/CCPW/USFS Grants
8	Rural Communities Fuel Management Partnerships: An informal multi-agency alliance has been created to work with landowners to reduce fuel hazards on their property in two (2) communities located in the County. Initial complementary work was conducted on the Kaibab National Forest adjacent to the communities of Sherwood Forest Estates and Parks. Additional grant funds are continually being sought to continue the fuels reduction work on private property in other local communities including Doney Park and Williams. The Blue Ridge community is now included.	Paused	The County is now applying for new funding through the BRIC grant. Project continuation is pending additional grant funding.	Kaibab National Forest/Arizona State Land Department/University of Arizona/County Cooperative Extension/County fire districts
9	Establish and maintain a county component of the state GIS mapping system documenting forest treatments, hazard data, grants, etc.	Pending Further Review	This is pending further review and coordination with County GIS.	County EM

#	Mitigation Action	Status	Additional Details	POC/Dept.
10	Winter Weather Preparedness Campaign and brochures developed for public/PSA/webpage input.	Ongoing	Winter Weather Preparedness classes are conducted as available. Community Outreach remains a high priority for the County.	County EM/ County PW
11	Educational programs and outreach to outlying areas of the County that are not currently served by any organized fire protection system with the goal to assist in organizing districts.	Pending	Pending due to lack of funding.	All fire agencies
12	Flash Flood Early Warning System for hikers in Havasupai Canyon to alert campers of life-threatening event in canyon. Feasibility study and implementation.	Partially Complete	NWS installed Weather Station upstream at well site in Supai Village Havasupai Canyon in October 2016 and then moved to well site in 2017. The Supai weather instrument has not reported since January 28, 2019, likely due to comms failure with the internet. Frequent emails with Supai facilities have not rectified the communications issue. The instrument is still physically at the well site but is not transmitting the data online.	County EM/ DEMA/NWS/ Tribal EM
13	Expand education activities to include Northern Arizona Home Show, public service announcements, public access TV, and website.	Ongoing	County Emergency Management Home Page is continually updated. EM participated in 2018 Health Fair at the Flagstaff Aquatic Center. Public Service announcements conducted for events such as the Oak Creek Canyon Siren Tests in 2017, 2018, 2019, and 2020. In the spring of 2020, Coconino County Emergency Management worked with the NAU School of Communications to develop a multimodal plan for community outreach education and engagement.	County EM
14	Commodity flow study for State Hwy 89 from Utah Boundary to Flagstaff.	Not Started	Instead, the County is currently part of a Commodity Flow Study coordinated and paid for through the Arizona State Emergency Response Commission (AZSERC) that addresses the portions of Highway 260 in the County.	County EM/ AZSERC

Table 5-28: Flagstaff Current Status of Previous Plan's Mitigation Actions

#	Mitigation Action	Status	Additional Details	POC/Dept.
1	Red Gap Ranch Study: This is underway to evaluate the future pumping for Red Gap Ranch and potential impacts on regional stream depletion rates.	Complete	Southwest Ground Water, Inc. completed this groundwater computer modeling study in 2015.	Flagstaff Water Services Division
2	Flagstaff Well Field & Pipeline Evaluation: The city purchased Red Gap Ranch and has drilled ten (10) wells for the purpose of future water supply. The city is currently negotiating a Right of Water with ADOT along 1-40 and is performing the first phase of a feasibility study.	In progress	JACOBS Engineering is completing the Pipeline Feasibility Study. The study should be completed by the end of 2020, pending USFS approvals. The city and ADOT entered into an Intergovernmental Agreement in 2016 to establish the process and requirements necessary to obtain permits from Arizona Department of Transportation which would allow the city to place a waterline in the right-of-way of Interstate 4.	Flagstaff Water Services Division
3	Flagstaff Watershed Protection Project (also referred to as County & Dry Hills Watershed Protection Project): Approved by the voters, this project is being pursued to ensure the viability of this surface reservoir and stormwater runoff through forest treatments.	In progress	The project is 56% complete. Remaining work includes Picture Canyon, Orion Task Order, Dry Lake Hills Stewardship Contract and Shultz Tank Timber Sale (2,348 acres). All other DLH, Observatory Mesa and State Land acres are completed (5,755 acres.) Mormon Mtn/Upper Lake Mary Watershed workplans and funding TBD (2,573 acres).	Flagstaff Fire & Water Services Division
4	Upgrade existing conservation measures to provide for water during periods of drought. The city depends on surface reservoirs and groundwater for domestic water supply. Conservation efforts expand the capacity of this limited resource.	Ongoing	The Flagstaff Watershed Protection Program is underway and reclaimed water is required for large area irrigation and lawn watering restrictions are in place. A water harvesting rebate program started in 2012. Water conservation outreach was presented to all students at the fourth (4th) grade level.	Water Services Department/ Conservation Manager
5	Enhance flood mitigation efforts through channelization and detention. Due to drainage patterns and topography many areas of the city are subject to periodic flooding during snow melts and monsoon periods.	Complete	The Clay Avenue Wash Basin flood mitigation dam was completed. The Linda Vista/Rainer Street and drainage project was completed. Additional major flood reduction projects at Lockett Road, Fanning Wash, and Zuni Drive have been completed. The Road Repair and Street Safety initiative (RRSS) will address many additional flood improvements over the next few years. The Stormwater CIP budget will continue indefinitely to construct smaller flood reduction projects.	Stormwater Manager

#	Mitigation Action	Status	Additional Details	POC/Dept.
6	Plan and conduct forest treatments to reduce severity and impact of unwanted wildland fire both within and adjacent to the community. The Flagstaff area is ranked as the #1 wildland fire threatened area in the state.	Ongoing	Hazard mitigation (e.g. selective thinning, debris disposal, prescribed fire, hazard trees), response and recovery efforts – both internal city stand-alone work as well as collaborative efforts with our partners (e.g. Four Forest Restoration Initiative, Ponderosa Fire Advisory Council, Greater Flagstaff Forests Partnership, others).	Fire Department/ Wildland Fire Management Officer
7	Provide equipment and human resources sufficient to handle comprehensive road, air, and railway hazmat and mass casualty incidents. Nearly 120 trains travel through the city boundaries each day. I-40 and I-17 generate truck traffic that carry hazardous materials through the city each day.	Ongoing	Flagstaff Fire Department continues to train, equip, and respond to transportation and fixed site emergencies throughout Northern Arizona.	Fire Department/ Training Chief
8	Educate the local and regional community (including tourists) about the potential and consequences of catastrophic wildland fire and actions necessary to mitigate the risk/threat.	Complete	Prevention and preparedness programs are in place: Firewise Neighborhood and Fire-Adapted-Community programs, Annual Restrictions & Closure Plan, Annual Wildfire Preparedness Day, Flagstaff Wildland-Urban Interface Fire Code, and general outreach efforts and events.	Fire Department/ Firewise Coordinator
9	The Rio DeFlag Project is a major flood control initiative designed to remove 1,500 structures from the flood plain. The downtown area is prone to flooding. This effort will both reduce the threat and enable further economic development in this area.	In progress	This project has received funding from the Army Corps of Engineers, and is progressing in the property acquisitions, engineering design, outreach and developing agreements with impacted parties (BNSF, ADOT),	Capital Improvements/ Rio DeFlag Project Manager
10	Install generators for water wells vulnerable to losing power during wildland fires. More than 60% of the water supply is pumped from underground wells. Many of these are subject to wildland fire threats that disrupt power.	Complete	Five diesel-powered, trailer mounted, portable generators have been purchased and manual transfer switches installed at four critical water production facilities. The final step in completion was installing “shore power” for the five portable gensets at two locations.	Water Services/ Division Head
11	Flagstaff Stormwater Public Outreach: Public awareness program on topic of flooding and dam risks.	Ongoing	These efforts are required to be repeated annual per FEMA requirements	Water Services
12	County emergency notification system	Ongoing	System has been deployed. Working on public engagement and increasing participation.	Coconino County EM

#	Mitigation Action	Status	Additional Details	POC/Dept.
13	Building code adoption: Maintain current building standards for seismic protection.	Complete	None	Community Development
14	Building code adoption: Maintain building standards for snow loading.	Complete	None	Community Development
15	Building code adoption: Maintain building standards for wind shear.	Complete	None	Community Development
16	Fire prevention inspection: Perform building inspections to prevent exceeding snow load limits.	Complete	These efforts are required to be repeated periodically.	Fire Department
17	Fire prevention patrols: Fire prevention patrols by law enforcement including fly-overs to discover illegal transient camps and illegal fires within the city limits.	Complete	These are ongoing efforts.	Flagstaff Police Dept
18	Pulliam Airport Security Screening: Armed police officers are present at airport screenings prior to boarding to ensure passenger safety.	Complete	Continue to have local police officers at airport screenings funded in part by TSA.	Flagstaff Fire Dept
19	Clay Avenue Wash Detention (Dam) Basin Emergency Action Plan. A plan to address how to warn the public in the event of dam failure or flood.	In progress	City is waiting for finalized plan.	Stormwater
20	Construct and equip a multi-agency EOC to coordinate disasters. The area is subject to periodic disasters. On an annual basis the EOC is activated two to three (2-3) times each year.	In progress	The Gemini EOC (formerly known as the alternate EOC) is located 2201 North Gemini. It is the primary EOC. It is to be completed when funding becomes available.	Fire Department/ Fire Chief
21	Floodplain identification and mapping, including any local requests for map updates to provide the community with a regulatory tool to reduce the losses to property and people.	Complete	All Flood Insurance Rate Maps (FIRM) have been updated and converted to Digital Flood Insurance Rate Maps (D-FIRM), to help enforce flood plain regulations. We completed the Northeast Area Master Drainage Study, to conceptually identify and mitigate major flooding in northeast Flagstaff.	Stormwater/ Stormwater Manager

Table 5-29: Fredonia Current Status of Previous Plan's Mitigation Actions

#	Mitigation Action	Status	Additional Details	POC/Dept.
1	Replacing existing dike to a levy.	Seeking funding	Estimate \$11 million for construction.	Public Works
2	Replace existing backwash basin at the water ponds. Repair pumps in the wells.	Completed	Backwash Basin replaced and wells were repaired	Public Works

#	Mitigation Action	Status	Additional Details	POC/Dept.
3	Hold annual community meeting in September with all residents and churches to educate residents about 72-hour kits and food storage.	Ongoing	None	Town Manager/ Marshall's Office
4	Conduct fire department training for a hazardous fires and spills.	Ongoing	Department trains weekly with HAZMAT training quarterly	Fire Department
5	Conduct severe wind community outreach through newsletter in the spring and fall, reminding residents to put outdoor belongings away.	Ongoing	None	Town Clerk's Office
6	Enforce speed limits and training.	Ongoing	Speed enforcement conducted daily	Marshall's Office
7	Fire department training and community outreach (through annual community meeting, with specifics being prepared).	Ongoing	None	Fire Department/ Town Clerk
8	Quarterly outreach to the community through the town, discussing what to do in the event of an earthquake.	Ongoing	None	Marshall's Office/ Town Clerk
9	Conduct feasibility study for curb and gutters to determine cost.	Not started	None	Public Works/ Town Manager

Table 5-30: Page Current Status of Previous Plan's Mitigation Actions

#	Mitigation Action	Status	Additional Details	POC/Dept.
1	Provide equipment and other resources sufficient to provide initial response to major road, air, hazardous materials and mass casualty incidents.	In progress	None	Fire Department
2	The city will develop a plan and mutual aid agreement with the State, County, Navajo Nation, National Park Service and other governmental entities as necessary to implement mitigation actions.	In progress	None	Community Development, Building Official
3	Page Fire Department will develop a public awareness program. Handouts and presentations will be developed and presented at area clubs, schools, and other public gatherings. Goals shall include increasing public support for funding disaster preparation, educating the public on what to do in a disaster, and increasing public awareness of how public safety agencies respond in a disaster.	Ongoing	None	Fire Department
4	Design and construct drainage structures for problem flood areas throughout the city to prevent flooding of properties and buildings.	Ongoing	None	Engineering/Public Works

#	Mitigation Action	Status	Additional Details	POC/Dept.
5	Water supply system upgrade: This project is to upgrade the current pumping units and possibly identify an alternative lower-level intake with a new pumping system and a separate pipeline to deliver water to the water treatment plant. This will allow for dependability and a backup to the current system. It will also provide water if the lake level drops below the current intake levels.	In progress	Preliminary design stages.	Engineering and Utility Department/ City Engineer
6	Construction mitigation from drainage study for Letter of Map Revision (LOMR): Construct any channels, berms, bank stabilization, etc. indicated by drainage study.	Completed	None	Engineering Department/City Engineer
7	The city will develop a plan and pamphlets and implement a public information program that will identify the following: Who can apply? What types of emergencies can be applied for? Where to apply.	Ongoing	None	Risk Management/ Human Resources/ Public Information Officer
8	Train fire department and school personnel to set up and operate a medical countermeasure point of dispensing site for residents and visitors.	Partially Complete	Project designed to provide open points of dispensing in the event of a public health emergency or pandemic. Training was provided by Coconino County Health and Human Services for City of Page and Page Unified School District employees.	Fire Department
9	Enforcement and/or implementation of modern building codes to regulate new development to mitigate against loss.	Completed/ Ongoing	None	Community Development/ Building and Engineering Department

Table 5-31: Tusayan Current Status of Previous Plan's Mitigation Actions

#	Mitigation Action	Status	Additional Details	POC/Dept.
1	Tusayan Fire Department (TFD) Digital Newsletter: Explain hazards of smoke/CO, fireplaces, chimneys, cleaning, and fire hazards. Regularly scheduled cleaning of chimneys. Smoke/CO detector maintenance program (as a follow up to the previous month's safety topic). Smoke and CO detectors use and maintenance.	Completed and ongoing	Through TFD Newsletter: Statistics for fires due to heating. Chimney cleaning reminders. TFD/Red Cross program provided free smoke detectors and installation in the area. The TFD Newsletter messages were replaced by the Facebook	Tusayan Fire District

#	Mitigation Action	Status	Additional Details	POC/Dept.
	Explanation of two (2) types of detectors. Regularly scheduled replacement of batteries and testing.		TFD page. These reminders will continue through the Facebook page.	
2	Tusayan Fire Department Digital Newsletter: Publish links and email brochures and topics for [the County's website] emergency kits, Winter Preparation and Safety Brochure, additional tips from the County.	Completed and ongoing	Through TFD Newsletter: Links for County Emergency Preparation shared. Car stocking tips for winter travel provided. The TFD Newsletter messages were replaced by the Facebook TFD page. These reminders will continue through the Facebook page.	Tusayan Fire District
3	Tusayan Fire Department Digital Newsletter: Storm roof loading education. For preparation of 2016 winter, educated residents of online resources and building considerations for the town.	Completed and ongoing	Through TFD Newsletter: FEMA Snow Load Safety Guide promoted, warning signs of roof collapse, and online link for snow-load safety. The TFD Newsletter messages were replaced by the Facebook TFD page. These reminders will continue through the Facebook page.	Tusayan Fire District
4	Perform Initial Engineering Assessment and Hydrologic Analysis, coordinate with County for drainage improvements work plan and perform various projects identified in this plan.	Ongoing	The town has invested more than \$465,000 towards these efforts since 2015. It continues to work with the County as the Town's flood plain administrator.	Town Administration
5	Partner with the County to use its emergency notification system to improve warning and evacuation systems during hazmat incidents.	Ongoing	The town is in the process of registering residents in the County's emergency notification system and providing educational opportunities to the entire community.	Town Administration and Sheriff's Office
6	Support Tusayan Fire District in wildland fire mitigation activities through Reduction of Hazardous Fuels Grant program.	Ongoing	Forest service continues to work on the reduction of forest fuels through thinning and burn-pile.	Tusayan Fire, Kaibab NF, and Arizona State Forestry
7	Promote and enforce water conservation through cooperative programs with water company.	Ongoing	The town is providing education through the facilitation of tabletop exercises, the development of a website and other educational opportunities.	Town Administration

#	Mitigation Action	Status	Additional Details	POC/Dept.
8	Work with ADOT to replace and add signage along Highway 64, including crosswalk blinker signs for pedestrian safety.	Partially Complete	The town has added and maintained signage along Highway 64.	Maintenance Division
9	Implement plan for snow removal throughout the town, including for severe storms. Maintain snow removal equipment and have list of contractors available for severe incidents.	Ongoing	The town has implemented a plan for snow removal throughout the town, based on after action response from a severe storm. The town maintains snow removal equipment. In the summer of 2020, the town issued a new RFQ for snow removal service and elected to choose a local contractor to assist in severe incident response.	Maintenance Division
10	Educate public with links and/or information available from the Arizona Geological Survey.	Ongoing	The town is working with a third-party contractor to develop an educational webpage that will contain links to this information.	Town Administration
11	Assist with educating the public about impacts associated with severe wind hazard in this region.	Ongoing	The town is providing education through the facilitation of tabletop exercises, the development of a website, and other educational opportunities.	Town Administration and Sheriff Office

Table 5-32: Williams Current Status of Previous Plan's Mitigation Actions

#	Mitigation Action	Status	Additional Details	POC/Dept.
1	Perform public outreach and education campaign with informational booklets from the Arizona Geological Survey.	Completed and ongoing	Williams Police Department Facebook page, city webpage	Williams Police/ Fire Public Works Director
2	Partnering with the County to use its emergency notification system to better warn and evacuate citizens during HazMat events.	Completed and ongoing	City uses County's emergency notification system	Williams Police/ Fire
3	Working with NACOG to update, replace, and add signage on the roads in Williams that meet current standards, add reflectivity, and increase driver awareness.	Completed and ongoing	None	Williams Police/ Fire/ Public Works/Streets
4	Enforcement of floodplain management requirements, including regulating all and substantially improved construction in floodplains to reduce the losses to property and people.	Completed and ongoing	City Ordinance #858 Flood Ordinance	Planning and Building Code Enforcement/ Building Official
5	Continue to enforce zoning and building codes through current site plan, subdivision, and building	Completed and ongoing	Adopted in 2015; will update in 2021	Planning and Building Code Enforcement/

	permit review processes to reduce the effects of drought, flood, severe wind, wildland fire, and other hazards on new buildings and infrastructure.			Building Official
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#	Mitigation Action	Status	Additional Details	POC/Dept.
6	Perform fuel thinning around water treatment plant to create a wildland fire defensible space perimeter and install exterior sprinkler system on the structures and site perimeter.	Completed and ongoing	City Ordinance #843 Defensible Space Ordinance; regulates city and private infrastructures	Public Works/ Director
7	Annual Inspections and maintenance work on five (5) existing city dams. Continued monitoring by the city water department in cooperation with ADEQ.	Completed and ongoing	ADEQ and Arizona Department Water Resources inspected annually	Public Works/ Director
8	Continued planning as part of the annual Snow Removal Plan. This planning effort continues annually in advance of the winter season and includes inventorying and maintenance of existing snow removal vehicles, plows, cutting edges, chains, and other equipment. The city also contacts local contractors to identify resources in the event of a major snowstorm.	Completed and ongoing	City of Williams Snow Removal Plan; if overwhelmed, have contractor list to remove snow	Public Works/ Director
9	Continued tree and shrub pruning around power lines, telephone lines, and other infrastructure as part of regular city maintenance.	Completed and ongoing	Evaluation done by APS 3-5-year survey.	Public Works/ Director
10	Enforcement of the newly adopted Defensible Space Ordinance for the protection of future and existing structures within the wildland urban interface.	Completed and ongoing	City of Williams Defensible Space Ordinance #843; regulates city and private Infrastructures	Planning and Building Code Enforcement/ Building Official
11	Perform public outreach activities, including fliers, town hall meetings, safety fairs, and others to educate the public on wildland fire protection activities and best management practices.	Planning phase and ongoing	Due to COVID-19, no public outreach meetings are being held.	Public Works/ Director
12	Create new storage facilities for effluent to be used for irrigation and emergency wildland fire protection.	Planning phase and ongoing	Five (5) Year Capital Improvement Plan; effluent irrigates city golf course	Public Works/ Director
13	Bill Williams Mountain Steep Slope forest restoration treatments to reduce threat from catastrophic wildland fires and post-wildfire flooding.	300 acres completed; ongoing	Identified 1,200 acres of steep slopes on Bill Williams Mountain to complete forest restoration treatments on to reduce the risk of catastrophic wildland fire and post-wildfire flooding	Flood Control District Administrator/ Forest Restoration Director

			that would critically impact the city of Williams infrastructure, public lives, and regional economy.	
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5.4.2 New Mitigation Actions

Mitigation actions are specific activities or projects that serve to meet the goals that the community has identified. Mitigation actions and projects are more specific than goals or objectives, and often include a mechanism, such as an assigned time period, to measure the success and ensure the actions are accomplished. The Planning Team conducted a review of the mitigation actions and strategies from the 2015 MJHMP. With information from the risk assessment, capability assessment, and status of the actions implemented since the 2015 MJHMP, the Planning Team developed a variety of new mitigation actions and projects to reduce the effects of hazard, with emphasis on new and existing buildings and infrastructure.

Mitigation actions reflected the revised priorities of addressing the new hazards of aviation accident, climate change, public excessive heat, health outbreak and pandemic, extended power outage and terrorism. This action was based upon the results of developing the CPRI for each jurisdiction and applying them across the jurisdiction relevant hazards.

Based upon the updated priorities, each jurisdiction subsequently selected and developed their own mitigation actions as listed in the following tables.

Table 5-33 lists the County’s potential mitigation actions developed by the Planning Team. For each mitigation action, the following information is listed: mitigation goal, mitigation action description, mitigation type, hazard(s) addressed, and potential implementing city / town organizations.

Table 5-33: County New Mitigation Activities

Goal	Action Item #	Action Description	Mitigation Type	Related Hazards	Implementing Organizations
Goal 1: Protect life, property, and reduce potential injuries from natural caused hazards.	1.1	Maintain evaluations for structural integrity of County and non-County facilities identified as potential shelter sites. This can be performed via application of the 2018 International Building Codes and 2017 National Electric Codes.	Structure and infrastructure projects	Dam failure, earthquake, excessive heat, power outage, flood, high winds, hazmat, terrorism, wildland fire, winter storm	Community Development
	1.2	Identify and pursue funding opportunities to develop and implement local mitigation activities (all hazards).	Natural systems protection	All	All County departments
Goal 2: Improve public understanding, support and need for hazard mitigation measures.	2.1	Coordinate with local stakeholders and partners for the enhancement of public outreach and awareness regarding regional hazards and mitigation actions community members can implement for self-reliance	Education	All	All County departments, and local stakeholders

Goal	Action Item #	Action Description	Mitigation Type	Related Hazards	Implementing Organizations
		and protection to property and life safety.			
	2.2	Increase public awareness of the natural, human-caused, and technological hazards to residents and businesses as a means to reduce the potential impacts through education and outreach.	Education	All	Emergency Management, Public Affairs, County Public Works
	2.3	Partner with local insurance agencies to hold workshops for property owners to educate about the Flood Insurance Programs and its requirements. Community Development performs this function through NEIPA and the Engineering Division.	Education	Flood	Community Development
	2.4	Increase public awareness of dam failure hazards and identify mitigation measures to address those hazards.	Education	Dam failure	Emergency Management, Public Affairs,
	2.5	In light of the current COVID-19 pandemic and past public health related challenges: County will seek to improve upon/enhance community outreach and coordination of information to stress the importance of nonpharmaceutical interventions to help slow the spread of infectious diseases.	Education	Pandemic	Public Health
	2.6	Expand and maintain public education activities to include events like the North Arizona Home Show, public service announcements, public access television and County website.	Education	All	Emergency Management, Public Affairs,
	2.7	Continue to maintain a resource center of information accessible to the public at key government facilities, providing informational brochures and information on	Education	All	Emergency Management, Public Affairs, County Public Works

Goal	Action Item #	Action Description	Mitigation Type	Related Hazards	Implementing Organizations
		government websites and social media.			
Goal 3: Promote disaster resistance for the natural, existing, and future built environment.	3.1	Seek any opportunities to enhance the implementation and monitoring of the code regulated design criteria in relation to the adopted 2018 International Codes and the 2017 National Electrical Code for the protection of life and property and reduce the impacts of natural and manmade hazards.	Local plans and regulations	Earthquake, flood, high winds, wildland fire, winter storm	Community Development
	3.2	Integrate appropriate items from the MJHMP into the Safety Element of the General Plan and other regulatory documents as deemed appropriate. This function is ongoing through adopted codes and ordinances and improves policy capabilities.	Local plans and regulations, structure and infrastructure projects, natural systems protection, and education	All	Community Development
	3.3	Coordinate with the utility companies and vendors to strengthen, safeguard, or take other appropriate measures such as providing supplemental services, to protect and secure high-voltage lines, water, sewer, natural gas and petroleum pipelines, and trunk electrical and telephone conduits from hazards via County adherence to the International Codes and the 2017 National Electric Code.	Structure and infrastructure projects, natural	Earthquake, excessive heat, extended power outage, flood, high winds, terrorism, wildland fire, winter storm	Public Works
	3.4	Implement and develop the county Resilient Community Program.	Structure and infrastructure projects	Climate change, drought, earthquake, flood, high winds, wildland fire, winter storm	Public Works
	3.5	Post Wildfire Mt Elden Flood Mitigation Project.	Structure and infrastructure projects	Flood	County Flood Control District and City of Flagstaff
Goal 4: Strengthen partnerships and collaboration to	4.1	Partner with local insurance agencies to hold workshops for property owners to educate about the Flood Insurance Programs and its	Natural systems protection	Flood	Community Development

Goal	Action Item #	Action Description	Mitigation Type	Related Hazards	Implementing Organizations
implement hazard mitigation activities.		requirements. Community Development performs this function through NEIPA and the Engineering Division for flood only.			
	4.2	Regarding flood plain needs, continue partnership with County and local stakeholders to improve hazard assessment information and identify recommendations for avoiding new development in high hazard areas and encourage preventative measures for existing development in areas vulnerable to flooding/ flash flooding.	Natural systems protection	Flood	Community Development
	4.3	Continue to develop mutual aid agreements and memorandum of understanding with agencies to serve emergency and disaster purposes – notably by encouraging additional signatories to the Arizona Mutual Aid Compact.	Local plan and regulations	All	Emergency Management
	4.4	Continue County partnership and support with local government, NGO and non-profits to maintain and build upon our cadre of committed, trained, volunteers to augment disaster response and recovery efforts in compliance with Arizona Disaster Service Worker program guidance (e.g. shelter workers, animal rescue and care, Community Emergency Response Team, communications staff, medical and health, and human service providers).	Capability enhancement; provides surge capacity for medical response	All	Emergency Management / County Sheriff
	4.5	Facilitate integration of Northern Arizona university into the County MJHMP as a participating jurisdiction via annual MJHMP review and update process.	Natural systems protection; structure and infrastructure projects	All	Emergency Management / Northern Arizona University
	4.6	Continue to push for mutual aid agreements and memorandum of understanding (MOU) with	Natural systems protection; structure and	All	Emergency Management / County Sheriff

Goal	Action Item #	Action Description	Mitigation Type	Related Hazards	Implementing Organizations
		agencies to serve emergency and disaster purposes – notably by encouraging additional signatories to the Arizona Mutual Aid Compact.	infrastructure projects		
Goal 5: Enhance the County’s ability to effectively and immediately respond to disasters.	5.1	Secure funding and strategic partnerships necessary to develop County Medical Reserve Corps capability.	Capability enhancement; provides surge capacity for medical response	All	Public Health
	5.2	Post wildland fire early monitoring and flood warning system for areas impacted by catastrophic fires.	Natural systems protection; structure and infrastructure projects	Wildland fire, flood	County Flood Control District

Flagstaff:

Table 5-34 lists Flagstaff’s potential mitigation actions developed by the Planning Team. For each mitigation action, the following information is listed: mitigation goal, mitigation action description, mitigation type, hazard(s) addressed, and potential implementing city organizations.

Table 5-34: Flagstaff New Mitigation Activities

Goal	Action Item #	Action Description	Mitigation Type	Related Hazards	Implementing Organizations
Goal 1: Protect life, property, and reduce potential injuries from natural caused hazards.	1.1	Identify and pursue funding opportunities to develop and implement local mitigation activities.	Natural systems protection	All	Emergency Services/ Public Works
	1.2	Enhance resiliency to natural hazards and climate change by integrating government and community programs and building institutional capacity.	Natural systems protection	Climate change, earthquake, flood, high winds, terrorism, wildland fire, winter storm	Sustainability
	1.3	Reduce the impacts of natural hazards and climate change with forward-looking policies, plans, and regulations.	Structure and infrastructure projects	Climate change, earthquake, flood, high winds, terrorism, wildland fire, winter storm	Sustainability
	1.4	Understand vulnerabilities and risks and develop immediate and long-term risk reduction strategies for current and future conditions using the best available science.	Structure and infrastructure projects	Climate change, earthquake, flood, high winds, terrorism,	Sustainability

Goal	Action Item #	Action Description	Mitigation Type	Related Hazards	Implementing Organizations
				wildland fire, winter storm	
	1.5	Develop greenhouse gas mitigation strategies that address multiple objectives, including damage reduction, environmental enhancement, historic preservation, tourism/recreation, economic recovery/development, and building community resilience to climate variance.	Structure and infrastructure projects	Climate change, earthquake, flood, high winds, terrorism, wildland fire, winter storm	Sustainability
Goal 2: Improve public understanding, support and need for hazard mitigation measures.	2.1	Develop a public outreach and awareness program about regional hazards and mitigation actions community members can do in their homes.	Education	All	Emergency Services/PIO
	2.2	Increase public awareness of the natural, human-caused, and technological hazards to businesses as a means to reduce the potential damage from each hazard through educational and outreach. Maintain a resource center accessible to the public at key government facilities. Provide information on government websites and social media accounts.	Education	Earthquake, flood	Emergency Services/City PIO
	2.3	Provide information on tools, partnership opportunities, and funding resources for business and philanthropical organizations to assist in implementing mitigation activities.	Education	All	Community Development
	2.4	Place more stress on the risks associated with natural and manmade hazards in public awareness campaigns conducted by various County/city departments.	Education	All	All
	2.5	Advance education programs to increase awareness and mitigation impacts of climate change.	Education	Climate change	Sustainability Section

Goal	Action Item #	Action Description	Mitigation Type	Related Hazards	Implementing Organizations
Goal 3: Promote disaster resistance for the natural, existing, and future built environment.	3.1	Identify water resources management and conservation opportunities.	Natural systems protection	Drought, climate change	Public Works and Public Utility Easements
	3.2	Improve hazard assessment information to make recommendations for avoiding new development in high hazard areas and encouraging preventative measures for existing development in areas vulnerable to natural, man-made, and technological hazards.	Structure and infrastructure projects	Earthquake, flood, high winds, terrorism, wildland fire, winter storm	Building & Safety/ Planning
	3.3	Integrate appropriate items from the MJHMP into the Safety Element of the General Plan and other regulatory documents as appropriate.	Structure and infrastructure projects	All	Building & Safety/ Planning/ Community Development
	3.4	Coordinate with the utility companies and vendors to strengthen, safeguard, or take other appropriate measures such as providing supplemental services, to protect and secure high-voltage lines, water, sewer, natural gas and petroleum pipelines, and trunk electrical and telephone conduits from hazards.	Structure and infrastructure projects	All	Public Works
	3.5	Continue to invest in up-sizing drainage ways, improving floodplain flood mitigations, and enhancing streams and washes to convey design storms.	Natural systems protection	Flood	Floodplain Manager
	3.6	Continue to collect rain and stream gauge information and provide new hydraulic models to better inform development and maintenance of local and regional storm water facilities.	Natural systems protection	Flood	Floodplain Manager

Goal	Action Item #	Action Description	Mitigation Type	Related Hazards	Implementing Organizations
Goal 4: Strengthen partnerships and collaboration to implement hazard mitigation activities.	4.1	Partner with local insurance agencies to hold workshops for property owners to educate about the Flood and Earthquake Insurance Programs and its requirements.	Natural systems protection	Flood	Stormwater
	4.2	The city will develop a plan and mutual aid agreement with the state, County, Navajo Nation, National Park Service, and other governmental entities as necessary to implement mitigation actions.	Local plans and regulations	All	Legal/ City Manager
	4.3	Continue to develop mutual aid agreements and memorandum of understanding with agencies to serve emergency and disaster purposes – notably by encouraging additional signatories to the Arizona Mutual Aid Compact.	Local plans and regulations	All	Emergency Services
	4.4	Continue County partnership and support with local government, NGO and non-profits to maintain and build upon our cadre of committed, trained volunteers to augment disaster response and recovery efforts in compliance with Arizona Disaster Service Worker program guidance (e.g. shelter workers, animal rescue and care, Community Emergency Response Team, communications staff, medical and health, and human service providers).	Capability enhancement; provides surge capacity for emergency response	All	Emergency Services
Goal 5: Enhance the ability to effectively and immediately respond to disasters.	5.1	Develop a disaster debris plan.	Preparedness	Dam failure, earthquake, flood, high winds, terrorism, wildland fire, winter storm	Emergency Service/ Public Works
	5.2	Budget for maintenance and replacement of County/city owned fire and police stations.	Structure and infrastructure projects	All	Public Works

Goal	Action Item #	Action Description	Mitigation Type	Related Hazards	Implementing Organizations
	5.3	Maintain cloud storage for vital records and data to allow access, if government servers are disrupted.	Structure and infrastructure projects	Dam failure, earthquake, flood, high winds, terrorism, wildland fire, winter storm	IT

Fredonia:

Table 5-35 lists the Fredonia’s potential mitigation actions developed by the Planning Team. For each mitigation action, the following information is listed: mitigation goal, mitigation action description, mitigation type, hazard(s) addressed, and potential implementing town organizations.

Table 5-35: Fredonia New Mitigation Activities

Goal	Action Item #	Action Description	Mitigation Type	Related Hazards	Implementing Organizations
Goal 1: Protect life, property, and reduce potential injuries from natural caused hazards.	1.1	Evaluate facilities identified as potential shelter sites for structural integrity.	Structure and infrastructure projects	Dam failure, earthquake, excessive heat, power outage, flood, high winds, hazmat, terrorism, wildland fire, winter storm	Emergency Services and Building-Safety
	1.2	Identify and pursue funding opportunities to develop and implement local mitigation activities.	Natural systems protection	All	Emergency Services/Public Works
	1.3	Integrate appropriate items from the MJHMP into the Safety Element of the General Plan and other regulatory documents as appropriate.	Structure and infrastructure projects; natural systems protection	All	Manager/ Planning/ Community Development
Goal 2: Improve public understanding, support and need for hazard mitigation measures.	2.1	Increase public awareness of dam failure hazards and mitigations to address them.	Education	Dam failure	Emergency Services
	2.2	Develop a public outreach and awareness program about regional hazards and mitigation actions community members can do in their homes.	Education	All	Town Manager/Fire Department/ Town Marshal/ Library

Goal	Action Item #	Action Description	Mitigation Type	Related Hazards	Implementing Organizations
	2.3	Increase public awareness of the natural, human-caused, and technological hazards to businesses as a means to reduce the potential damage from each hazard through education and outreach. Maintain a resource center accessible to the public at key government facilities. Provide information on government websites and social media.	Education	All	Town Manager/Fire Department/ Town Marshal/ Library
Goal 3: Promote disaster resistance for the natural, existing, and future built environment.	3.1	Identify water resources management and conservation opportunities.	Natural systems protection	Drought, climate change	PUE/Public Works
	3.2	Coordinate with the utility companies and vendors to strengthen, safeguard, or take other appropriate measures such as providing supplemental services, to identify, repair, protect and secure high-voltage lines, water, sewer and trunk electrical and telephone conduits from hazards.	Structure and infrastructure projects	Dam failure, earthquake, excessive heat, power outage, flood, high winds, hazmat, terrorism, wildland fire, winter storm	Public Works
Goal 4: Strengthen partnerships and collaboration to implement hazard mitigation activities.	4.1	Partner with local insurance agencies to hold workshops for property owners to educate about the Flood and Earthquake Insurance Programs and its requirements. Community Development performs this function through NEIPA and the Engineering Division for flood only.	Natural systems protection	Earthquake Flood	Community Development
Goal 5: Enhance the ability to effectively and immediately respond to disasters.	5.1	Build a cadre of committed, trained volunteers to augment disaster response and recovery efforts in compliance with Arizona Disaster Service Worker program guidance (e.g. shelter workers, animal rescue and care, Community Emergency Response Team, communications staff, medical and health, and human services) during and after a disaster.	Education	All	Emergency Service

Page:

Table 5-36 lists Page’s potential mitigation actions developed by the Planning Team. For each mitigation action, the following information is listed: mitigation goal, mitigation action description, mitigation type, hazard(s) addressed, and potential implementing city organizations.

Table 5-36: Page New Mitigation Activities

Goal	Action Item #	Action Description	Mitigation Type	Related Hazards	Implementing Organizations
Goal 1: Protect life, property, and reduce potential injuries from natural caused hazards.	1.1	Evaluate city/County and non-city/County facilities identified as potential shelter sites for structural integrity.	Structure and infrastructure projects	Dam failure, earthquake, excessive heat, power outage, flood, high winds, hazmat, terrorism, wildland fire, winter storm	Emergency Services and Building-Safety
	1.2	Identify and pursue funding opportunities to develop and implement local mitigation activities.	Natural systems protection	All	Emergency Services/ Public Works
	1.3	Enforcement and/or implementation of modern building codes to regulate new development to mitigate against loss	Local plans and regulations	Dam failure, earthquake, excessive heat, power outage, flood, high winds, hazmat, terrorism, wildland fire, winter storm	Community Development/ Building and Engineering Department
Goal 2: Improve public understanding, support and need for hazard mitigation measures.	2.1	Coordinate with local stakeholders and partners for the enhancement of public outreach and awareness regarding regional hazards and mitigation actions community members can implement for self- reliance and protection to property and life safety.	Education	All	All departments and local stakeholders
	2.2	Place more stress on the risks associated with natural and manmade hazards in public awareness campaigns conducted by various County/City departments (i.e. partner with local insurance agencies to hold workshops for property owners to educate about the Flood and Earthquake Insurance Programs and its requirements).	Education	Earthquake, flood	All

Goal	Action Item #	Action Description	Mitigation Type	Related Hazards	Implementing Organizations
	2.3	Develop a public awareness program. Handouts and presentations will be developed and presented at area clubs, schools, and other public gatherings. Goals of the project shall include increasing public support for funding disaster preparation, educating the public what to do in case of a disaster, and increasing public awareness as to how public safety agencies will respond in a disaster	Education	All	Emergency Services/PIO
	2.4	The city will develop a plan and pamphlets and implement a public information program that will identify the following: Who can apply? What types of emergencies can be applied for? Where to apply.	Education	All	Risk Management/Human Resources/ Public Information Officer
Goal 3: Promote disaster resistance for the natural, existing, and future built environment.	3.1	Identify water resources management and conservation opportunities.	Natural systems protection	Drought, climate change	PUE/Public Works
	3.2	Design and construct drainage structures for problem flood areas throughout the city to prevent flooding of properties and buildings.	Structure and infrastructure projects	Flood	Engineering/Public Works
	3.3	Water supply system upgrade. This project is to upgrade the current pumping units and possibly identify an alternative lower level intake with a new pumping system and a separate pipeline to deliver water to the water treatment plant. This will allow for dependability and a backup to the current system. It will also provide water if the lake level drops below the current intake levels.	Structure and infrastructure projects	Drought	Engineering/ Utility Department/ City Engineer
	3.4	Construction mitigation from drainage study for (LOMR). Construct any channels, berms, bank stabilization, etc. which arise from the drainage study.	Structure and infrastructure projects	Flood	Engineering/ Utility Department/ City Engineer

Goal	Action Item #	Action Description	Mitigation Type	Related Hazards	Implementing Organizations
Goal 4: Strengthen partnerships and collaboration to implement hazard mitigation activities.	4.1	Partner with local insurance agencies to hold workshops for property owners to educate about the Flood Insurance Programs and its requirements. Community Development performs this function through NEIPA and the Engineering Division for flood only.	Natural systems protection	Flood	Community Development
	4.2	The city will develop a plan and mutual aid agreement with the state, County, Navajo Nation, National Park Service, and other governmental entities as necessary to implement mitigation actions.	Local plans and regulations	All	Legal/City Manager
	4.3	Continue to develop mutual aid agreements and memorandum of understanding with agencies to serve emergency and disaster purposes – notably by encouraging additional signatories to the Arizona Mutual Aid Compact.	Local plans and regulations	All	Emergency Services
	4.4	Continue County partnership and support with local government, NGO and non-profits to maintain and build upon our cadre of committed, trained, volunteers to augment disaster response and recovery efforts in compliance with Arizona Disaster Service Worker program guidance (e.g. shelter workers, animal rescue and care, Community Emergency Response Team, communications staff, medical and health, and human service providers).	Capability enhancement; provides surge capacity for emergency response	All	Emergency Services
Goal 5: Enhance the ability to effectively and immediately respond to disasters.	5.1	Develop a disaster debris plan	Preparedness	Dam failure, earthquake, flood, high winds, terrorism, wildland fire, winter storm	Emergency Service/Public Works
	5.2	Budget for maintenance and replacement of County/city owned fire and police stations.	Structure and infrastructure projects	All	Public Works

Goal	Action Item #	Action Description	Mitigation Type	Related Hazards	Implementing Organizations
	5.3	Build a cadre of committed, trained volunteers to augment disaster response and recovery efforts in compliance with Arizona Disaster Service Worker program guidance (e.g. shelter workers, animal rescue and care, CERT, communications staff, medical and health, and human services) during and after a disaster.	Education	All	Emergency Service

Tusayan:

Table 5-37 lists the Tusayan’s potential mitigation actions developed by the Planning Team. For each mitigation action, the following information is listed: mitigation goal, mitigation action description, mitigation type, hazard(s) addressed, and potential implementing town organization/s.

Table 5-37: Tusayan New Mitigation Activities

Goal	Action Item #	Action Description	Mitigation Type	Related Hazards	Implementing Organizations
Goal 1: Protect life, property, and reduce potential injuries from natural caused hazards.	1.1	Evaluate facilities identified as potential shelter sites for structural integrity.	Structure and infrastructure projects	Dam failure, earthquake, flood, high winds, terrorism, wildland fire, winter storm	Facilities & Grounds
	1.2	Identify and pursue funding opportunities to develop and implement local mitigation activities.	Structure and infrastructure projects	Dam failure, earthquake, flood, high winds, terrorism, wildland fire, winter storm	Town Manager/ Management and Support
Goal 2: Improve public understanding, support and need for hazard mitigation measures.	2.1	Develop a public outreach and awareness program about regional hazards and mitigation actions community members can do in their homes.	Education	All	Town Manager/ PIO/ Management and Support
	2.2	Increase public awareness of the natural, human-caused, and technological hazards to businesses as a means to reduce the potential damage from each hazard through educational and outreach. Maintain a resource center accessible to the public at key government facilities.	Education	All	Town Manager/PIO/ Tusayan Fire Department

Goal	Action Item #	Action Description	Mitigation Type	Related Hazards	Implementing Organizations
	2.3	Place more stress on the risks associated with natural and manmade hazards in public awareness campaigns conducted by various County/city departments.	Education	All	All Departments
	2.4	Increase public awareness of dam failure hazards and mitigation measures to address them.	Education	Dam Failure	Town Manager
Goal 3: Promote disaster resistance for the natural, existing, and future built environment.	3.1	Seek to implement codes, standards, and policies that will protect life and property from the impacts of hazards.	Structure and infrastructure projects	Dam failure, earthquake, flood, high winds, terrorism, wildland fire, winter storm	Planning & Zoning
	3.2	Integrate appropriate items from the MJHMP into the Safety Element of the General Plan and other regulatory documents as appropriate.	Structure and infrastructure projects, Natural systems protection	All	Mayor Council/ Manager Support
	3.3	Maintain cloud storage for vital records and data to allow access, if government servers are disrupted.	Structure and infrastructure projects	Dam failure, earthquake, flood, high winds, terrorism, wildland fire, winter storm	Manager Support
	3.4	Coordinate with the utility companies and vendors to strengthen, safeguard, or take other appropriate measures such as providing supplemental services, to protect and secure high-voltage lines, water, sewer, natural gas and petroleum pipelines, and trunk electrical and telephone conduits from hazards. Collaborate with partners/service providers to identify and implement water resource management and conservation opportunities as applicable.	Structure and infrastructure projects	Dam failure, earthquake, flood, high winds, terrorism, wildland fire, winter storm	Facilities
Goal 4: Strengthen partnerships and collaboration to implement hazard mitigation activities.	4.1	Continue to develop mutual aid agreements and memorandum of understanding with agencies to serve emergency and disaster purposes.	Structure and infrastructure projects, Natural systems protection	All	City Attorney/ Town Manager

Goal	Action Item #	Action Description	Mitigation Type	Related Hazards	Implementing Organizations
Goal 5: Enhance the ability to effectively and immediately respond to disasters.	5.1	Collaborate with partners and service providers to identify and implement water resource management and conservation opportunities as applicable.	Natural systems protection	Climate change, drought	Facilities and Maintenance
	5.2	Build a cadre of committed, trained volunteers to augment disaster response and recovery efforts in compliance with Arizona Disaster Service Worker program guidance (e.g. shelter workers, animal rescue/care, CERT, medical, communication, and health, and human services) during and after a disaster.	Education	All	Town Manager/ Parks and Rec/ Manager Support
	5.3	Develop an emergency preparedness network for community members (and visitors) to access food, water, communications, warming/cooling stations in times of emergent need.	Preparedness	All	Manager Support/ Public Safety

Williams:

Table 5-38 lists the Williams’ potential mitigation actions developed by the Planning Team. For each mitigation action, the following information is listed: mitigation goal, mitigation action description, mitigation type, hazard(s) addressed, and potential implementing city organization/s.

Table 5-38: Williams New Mitigation Activities

Goal	Action Item #	Action Description	Mitigation Type	Related Hazards	Implementing Organizations
Goal 1: Protect life, property, and reduce potential injuries from natural caused hazards.	1.1	Evaluate city/County and non-city/County facilities identified as potential shelter sites for structural integrity.	Structure and infrastructure projects	Dam failure, earthquake, excessive heat, power outage, flood, high winds, hazmat, terrorism, wildland fire, winter storm	Building & Safety/ Planning
	1.2	Identify and pursue funding opportunities to develop and implement local mitigation activities.	Natural systems protection	All	Emergency Services

Goal	Action Item #	Action Description	Mitigation Type	Related Hazards	Implementing Organizations
Goal 2: Improve public understanding, support and need for hazard mitigation measures.	2.1	Increase public awareness of dam failure hazards and mitigation measures to address them.	Education	Dam failure	Emergency Services
Goal 3: Promote disaster resistance for the natural, existing, and future built environment.	3.1	Coordinate with the utility companies and vendors to strengthen, safeguard, or take other appropriate measures such as providing supplemental services, to identify, repair, protect and secure high-voltage lines, water, sewer and trunk electrical and telephone conduits from hazards.	Structure and infrastructure projects	Dam failure, earthquake, excessive heat, power outage, flood, high winds, hazmat, terrorism, wildland fire, winter storm	Public Works
Goal 4: Strengthen partnerships and collaboration to implement hazard mitigation activities.	4.1	Continue to develop mutual aid agreements and memorandum of understanding with agencies to serve emergency and disaster purposes.	Preparedness	All	City Attorney/ Emergency Services

5.4.3 Mitigation Action Plans

The mitigation action plan developed by the Planning Team includes the action items that the County and cities / towns intend to implement during the next five years, assuming funding availability. The action plans, shown in **Table 5-38** through **Table 5-43** include the implementing department, an estimate of the timeline for implementation, and potential funding sources. The individual mitigation activities in the Action Plan include the new mitigation actions listed in **Table 5-32** through **Table 5-37** and the mitigation actions from the 2015 MJHMP that are ongoing or not completed that are still applicable.

The new mitigation actions include a broad range of approaches to hazard mitigation such as retrofitting, code enforcement, development of new regulations, public education, development of redundant facilities, and others. Measures are included to mitigate risks to existing buildings and infrastructure, as well as new buildings and infrastructure. The mitigation action plan assigns primary responsibility for each of the action items to an implementing department. The implementing department is the controlling department that will assign funding and oversee activity implementation, monitoring, and evaluation.

The Planning Team does not presume the expertise to prescribe which projects will be implemented. The prioritization of projects in the MJHMP is a means to provide a basis for implementing the mitigation strategies, but all new mitigation actions and projects will be formally prioritized and selected by the implementing department. This will accommodate the project funding, schedule of the department, staff requirements, and ability to integrate the new project into existing and ongoing projects. Departments will take into account the funding source, the cost effectiveness of the project, alternative projects, the compatibility of the new project with ongoing projects, the extent to which the project addresses the risks assessed in Section 4, and the potential of economic and social damage.

The final mitigation action plans identify desired mitigation actions for each participating jurisdiction pending future funding – they are not obligations or funding commitments.

Prioritization

To assist with implementing the mitigation action plan, the Planning Team used the following ranking process to provide a method to prioritize the projects for the Action Plan. Designations of High, Medium, and Low priorities have been assigned to each action using the following criteria.

- Does the action:**
- Solve the problem?
 - Address vulnerability assessment?
 - Reduce the exposure or vulnerability to the highest priority hazard?
 - Address multiple hazards?
 - Offer benefits that equal or exceed costs?
 - Implement a goal, policy, or project identified in the General Plan or Capital Improvement Plan?
- Can the action:**
- Be implemented with existing funds?
 - Be implemented by existing state or federal grant programs?
 - Be completed within the five (5) year life cycle of the HMP?
- Will the action:**
- Be implemented with currently available technologies?
 - Be accepted by the community?
 - Be supported by community leaders?
 - Adversely affect segments of the population or neighborhoods?
 - Require a change in local ordinances or zoning laws?
 - Result in positive or neutral impact on the environment?
 - Comply with all local, state, and federal environmental laws and regulations?
- Is there:**
- Sufficient staffing to undertake the project?
 - Existing authority to undertake the project?

Each positive response is equal to one point. Answers to the criteria above determined the priority according to the following scale:

1–6 = Low priority

7–12 = Medium priority

13–18 = High priority

Using the criteria above, the Planning Team employed the STAPLEE method to rank actions in the mitigation action plan. The results are contained in **Appendix D**.

Benefit-Cost Analysis

FEMA provides detailed guidance for analyzing the economic feasibility of mitigation activities. Benefit-Cost Analysis (BCA) is the method by which the future benefits of a hazard mitigation project are determined and compared to its costs. The end result is a Benefit-Cost Ratio (BCR), which is calculated by a project's total benefits divided by its total costs. The BCR is a numerical expression of the "cost-effectiveness" of a project. A project is considered to be cost effective when the BCR is 1.0 or greater, indicating the benefits of a prospective hazard mitigation project are sufficient to justify the costs.

FEMA requires a BCA to validate cost effectiveness of proposed hazard mitigation projects prior to funding. There are two drivers behind this requirement: 1) the Office of Management and Budget’s (OMB) [Circular A-94 Revised](#), “Guidelines and Discount Rates for Benefit-Cost Analysis of Federal Programs” and 2) the [Stafford Act](#).

Conducting BCA for a mitigation activity can assist the County in determining whether a project is worth undertaking now, in order to avoid disaster related damages later. Cost-effectiveness analysis evaluates how to best spend a given amount of money to achieve a specific goal. Determining the economic feasibility of mitigating hazards can provide decision makers with an understanding of the potential benefits and costs of an activity, as well as a basis for comparing alternative projects. Additional information on BCA is available on the [FEMA BCA website](#).

Funding

The funds required to implement the mitigation action plan will come from a variety of sources including: Federal Hazard Mitigation Grants, city/town budgets, bonds, fees and assessments, and others. Some projects are (or will be) included in capital improvement budgets, while some, especially ongoing projects, are included in department operating budgets.

Prior to beginning a project or when federal funding is involved, the implementing department will use a FEMA approved benefit/cost analysis approach to identify the actual costs and benefits of implementing these mitigation actions. For non-structural projects, implementing departments will use other appropriate methods to weigh the costs and benefits of each action item, and then develop a prioritized list.

Implementation

Mitigation projects were assigned one of three categories as a tentative schedule for implementation, short-range, mid-range, and long-range. Projects that are currently being implemented by various departments are assigned to the ongoing category. Implementation of short-range projects will typically begin within the next three years. Mid-range projects will require some planning and likely require funding beyond what is currently allocated to the various departments in the County and city / towns’ general funds. Projects in the mid-range category will generally begin implementation in the next three to five years. Long range projects will require great planning and funding and will generally begin implementation within five years and beyond.

Table 5-39: County Mitigation Action Plan

Action Item #	Priority	Action Description	Timeline	Funding Source	Estimated Cost	Implementing Department	Related Hazards
1.1	High	Maintain evaluations for structural integrity of County and non-County facilities identified as potential shelter sites can be performed seamlessly via application of 2018 International Codes and 2017 National Electric Code.	Ongoing	General Fund	Requires further study	Community Development	Dam failure, earthquake, excessive heat, power outage, flood, high winds, wildland fire, winter storm
1.2	High	Identify and pursue funding opportunities to develop and implement local mitigation activities.	Ongoing	Grant: BRIC FMA CDBG	Variable per project	All County departments	All

Action Item #	Priority	Action Description	Timeline	Funding Source	Estimated Cost	Implementing Department	Related Hazards
2.1	High	Coordinate with local stakeholders and partners for the enhancement of public outreach and awareness regarding regional hazards and mitigation actions community members can implement for self-reliance and protection to property and life safety.	Ongoing	General Fund	\$25,000 annually	All County departments and local stakeholders	All
2.2	High	Increase public awareness of the natural, human-caused, and technological hazards to residents and businesses as a means to reduce the potential impacts through education and outreach. Continue to maintain a resource center of information accessible to the public at key government facilities, providing informational brochures and information on government websites and social media.	Ongoing	General Fund	\$25,000 annually	Emergency Management Department /Public Affairs/ County Public Works	All
2.3	High	Partner with local insurance agencies to hold workshops for property owners to educate about the Flood Insurance Programs and its requirements. Community Development performs this function through NEIPA and the Engineering Division for flood only.	Ongoing	General Fund	N/A	Community Development	Flood

Action Item #	Priority	Action Description	Timeline	Funding Source	Estimated Cost	Implementing Department	Related Hazards
2.4	High	Increase public awareness of dam failure hazards and identify mitigation measures to address those hazards.	1-3 Years	General Fund	\$20,000	Emergency Management/ Coconino County Flood Control District	Dam failure
2.5	High	In light of the current COVID-19 pandemic and past public health related challenges, the County will seek to improve upon and enhance community outreach and coordination of information to stress the importance of nonpharmaceutical interventions to help slow the spread of infectious diseases.	1 Year	General Fund	\$50,000	Public Health	Pandemic
2.6	High	Expand and maintain public education activities to include events like the Northern Arizona Home Show, public service announcements, public access television and county website.	Ongoing	General Fund	\$20,000 annually	Emergency Management/ Public Affairs	All
2.7	High	Enhance winter weather preparedness campaign including brochures, Public Service Announcements and County webpage content development for public awareness.	Ongoing	General Fund	\$20,000 annually	Emergency Management/ Public Affairs	Winter storm
2.8	High	Deliver educational programs and outreach to outlying areas of county that are not currently served by any organized fire protection system, with the goal to assist organizing districts.	Ongoing	General Fund	\$10,000 annually	Emergency Management/ Public Affairs	Fire

Action Item #	Priority	Action Description	Timeline	Funding Source	Estimated Cost	Implementing Department	Related Hazards
2.9	High	Continue to maintain a resource center of information accessible to the public at key government facilities, providing informational brochures and information on government websites and social media.	Ongoing	General Fund Grant EMPG	Requires further study	Emergency Management/ Public Affairs/ County Public Works	All
3.1	Med	Seek any opportunities to enhance the implementation and monitoring of the code regulated design criteria in relation to the adopted 2018 International codes and the 2017 National Electrical Code for the protection of life and property and reduce the impacts of natural and manmade hazards.	Ongoing	General Fund	\$10,000 annually	Community Development	Earthquake, flood, high winds, wildland fire, winter storm
3.2	High	Integrate appropriate items from the MJHMP into the Safety Element of the General Plan and other regulatory documents as appropriate. This function is ongoing through adopted codes and ordinances.	1 year	General Fund	\$10,000 annually	Community Development	All
3.3	High	Coordinate with the utility companies and vendors to strengthen, safeguard, or take other appropriate measures such as providing supplemental services, to protect and secure high-voltage lines, water, sewer, natural gas and petroleum pipelines, and trunk electrical and telephone conduits from hazards	Ongoing	General Fund	N/A	Public Works/ Community Development	Earthquake, excessive heat, extended power outage, flood, high winds, terrorism, wildland fire, winter storm

Action Item #	Priority	Action Description	Timeline	Funding Source	Estimated Cost	Implementing Department	Related Hazards
		via County adherence to International Codes and 2017 National Electric Code.					
3.4	High	Implement and develop the County Resilient Community Program.	2 years	Grant: BRIC	\$75,000	Public Works	All
3.5	High	Establish and maintain a County component of the state GIS mapping system documenting forest treatment, hazard data, and grant funding sources to monitor our wildland fire threat.	Ongoing	General Fund Grant: BRIC	\$50,000 annually	Emergency Management/ GIS	Wildland Fire
3.6	High	Conduct floodplain re-mapping for reducing losses to Munds Park and Kachina/ Mountaineire.*	2 years	Grant: FMA	\$120,000	Public Works/ Flood Control District/County Engineer/GIS	Flood
3.7	High	Develop Neighborhood Wildfire Assessment, at-risk neighborhood ranking, and provide risk information to residents.*	1-3 years	General Fund Grant: BRIC	\$200,000	PFAC, Public Works	Fire
3.8	High	Conduct roadside thinning along Forest HWY 3, Perkinsville Rd, Old Munds Hwy, Garland Prairie, and Spring Valley Rd.*	1-3 years	General Fund Grant: BRIC	\$100,000	PFAC, County Public Works	Fire/ County Public Works
3.9	High	Enforce floodplain management requirements in accordance with NFIP, including regulating all substantially improved construction in floodplain.*	Ongoing	General Fund	\$25,000 annually	Community Development	Flood
3.10	High	Continue support for Flagstaff Fire Department Fire Management Program to mitigate wildland fire hazards to watershed resources through prevention, preparedness, hazard mitigation, response,	Ongoing	General Fund, Grant: BRIC	\$125,000 annually	Coconino County EM/ Flagstaff Fire Department Prevention Bureau	Fire

Action Item #	Priority	Action Description	Timeline	Funding Source	Estimated Cost	Implementing Department	Related Hazards
		and recovery efforts – with an emphasis on education engineering, enforcement, and ecosystems.*					
3.11	High	Continue participation in Rural Communities Fuel Management Partnership – an informal multi-agency alliance created to work with landowners to reduce fuel hazards on their property in two communities located in Coconino Co. Areas of interest include the communities of Doney Park, Williams, and Blue Ridge.	Ongoing	General Fund	\$10,000 annually	Kaibab National Forest/State Land Department/ University of Arizona/ Coconino County Cooperative Extension/ Coconino County Fire Districts	Fire
4.1	High	Partner with local insurance agencies to hold workshops for property owners to educate about the Flood Insurance Programs and its requirements. Community Development performs this function through NEIPA and the Engineering Division for flood only.	Ongoing	N/A	N/A	Community Development	Flood
4.2	High	Regarding flood plain needs, continue partnership with County and local stakeholders to Improve hazard assessment information and identify recommendations for avoiding new development in high hazard areas and encourage preventative measures for existing development in areas vulnerable to flooding/flash flooding.	Ongoing	N/A	N/A	Community Development	Flood

Action Item #	Priority	Action Description	Timeline	Funding Source	Estimated Cost	Implementing Department	Related Hazards
4.3	High	Continue to develop mutual aid agreements and memorandum of understanding with agencies to serve emergency and disaster purposes – notably by encouraging additional signatories to the Arizona Mutual Aid Compact.	Ongoing	N/A	N/A	Emergency Management	All
4.4	High	Continue County partnership and support with local government, NGO and non-profits to maintain and build upon our cadre of committed, trained volunteers to augment disaster response and recovery efforts in compliance with Arizona Disaster Service Worker program guidance (e.g. shelter workers, animal rescue and care, CERT, communications staff, medical and health, and human service providers).	1-3 years	General Fund, Grant: EMPG	\$150,000	Emergency Management	All
4.5	High	Facilitate integration of Northern Arizona university into the County MJHMP as a participating jurisdiction via annual MJHMP review and update process.	Present - 1 year	Public Health District	Requires further Study	Emergency Management / Northern Arizona University	All
4.6	High	Continue to push for mutual aid agreements and memorandum of understanding (MOU) with agencies to serve emergency and disaster purposes – notably by encouraging additional signatories to the Arizona Mutual Aid Compact.	1-3 years	General Fund	Requires further study	Emergency Management	All

Action Item #	Priority	Action Description	Timeline	Funding Source	Estimated Cost	Implementing Department	Related Hazards
5.1	High	Secure funding and strategic partnerships necessary to develop County Medical Reserve Corps capability.	2-3 years	Grant: HHS ASPR	\$250,000	Public Health	Pandemic
5.2	High	Provide support and coordination as requested (and as funding is available) toward the deployment and maintenance of the Flash Flood Early Warning System in Havasupai Canyon.	2 years	Grant: FMA	Requires design study	Emergency Management	Flood
5.3	High	Post Wildfire Mt. Elden Flood Mitigation Project.	2-5 years	General Fund, Grant: EMPG	\$2.5 million	County Flood Control District and City of Flagstaff	Flood
5.4	High	Post wildland fire early monitor flood warning system for areas impacted by catastrophic fires.	1-5 years	General Fund, Grant: EMPG	\$500,000	County Flood Control District	Flood

*Action from 2015

Flagstaff

Table 5-40 lists the Flagstaff's potential mitigation actions developed by the Planning Team. For each mitigation action, the following information is listed: mitigation goal, mitigation action description, mitigation type, hazard(s) addressed, and potential implementing city organization/s.

Table 5-40: Flagstaff Mitigation Action Plan

Action Item #	Priority	Action Description	Timeline	Funding Source	Estimated Cost	Implementing Department	Related Hazards
1.1	High	Upgrade existing conservation measures to provide for water during periods of drought. The city depends on surface reservoirs and groundwater for domestic water supply. Conservation efforts expand the capacity of this limited resource.*	Ongoing	General Fund, Grant: EMPG	Requires further study	Flagstaff Water Services Division	Drought

Action Item #	Priority	Action Description	Timeline	Funding Source	Estimated Cost	Implementing Department	Related Hazards
1.2	Med	Plan and conduct forest treatments to reduce severity and impact of unwanted wildland fire both within and adjacent to the community. The Flagstaff area is ranked as the #1 wildland fire threatened are in Arizona.*	Ongoing	Grant: EMPG	Requires further study	Fire Department/ Wildland Fire Management Officer	Fire
1.3	High	Maintain evaluations for structural integrity of facilities identified as potential shelter sites. This can be performed seamlessly via application of the 2018 International Building Codes and 2017 National Electric Codes.	1-3 Years	General Fund	Requires further study	Emergency Services/ Public Works	All
1.4	High	Identify and pursue funding opportunities to develop and implement local mitigation activities.	1-3 years	General Fund	Requires further study	Sustainability	Climate change, earthquake, flood, high winds, terrorism, wildland fire, winter storm
1.5	High	Develop greenhouse gas mitigation strategies that address multiple objectives, including damage reduction, environmental enhancement, historic preservation, tourism/ recreation, economic recovery /development, and building community resilience to climate variance.	2-5 years	General Fund Grant: BRIC	Requires further study	Sustainability	Climate change, earthquake, flood, high winds, terrorism, wildland fire, winter storm

Action Item #	Priority	Action Description	Timeline	Funding Source	Estimated Cost	Implementing Department	Related Hazards
1.6	High	Flagstaff Well Field & Pipeline Evaluation. The city purchased Red Gap Ranch and has drilled ten (10) wells for the purpose of future water supply. The city is currently negotiating a Right of Water with ADOT along 1-40 and is performing the first phase of a feasibility study.*	1-3 years	Water Service Fees	Feasibility Study in progress	Flagstaff Water Services Division	Drought
1.7	High	Flagstaff Watershed Protection Project (also referred to as County & Dry Hills Watershed Protection Project): Approved by the voters, this project is being pursued to ensure the viability of this surface reservoir and stormwater runoff through forest treatments.*	1-3 years FWPP is 56%	City bond	Requires further study	Flagstaff Water Services Division	Drought
2.1	High	Develop a public outreach and awareness program about regional hazards and mitigation actions community members can do in their homes	Ongoing	General fund	\$35,000 annually	Emergency Services/PIO	All
2.2	High	Increase public awareness of the natural, human-caused, and technological hazards to businesses as a means to reduce the potential damage from each hazard through educational and outreach. Maintain a resource center accessible to the public at key government facilities. Provide information on government websites and social media accounts.	Ongoing	General fund	\$35,000 annually	Emergency Services/City PIO	Earthquake, flood

Action Item #	Priority	Action Description	Timeline	Funding Source	Estimated Cost	Implementing Department	Related Hazards
2.3	High	Provide information on tools; partnership opportunities, and funding resources for business and philanthropical organizations to assist in implementing mitigation activities.	Ongoing	General fund	\$25,000 annually	Community Development	All
2.4	High	Place more stress on the risks associated with natural and manmade hazards in public awareness campaigns conducted by various County/city departments.	Ongoing	General fund	\$40,000 annually	All	All
2.5	High	Advance education programs to increase awareness and mitigation impacts of climate change	Ongoing	General fund	\$100,000 annually	Climate Change	Sustainability Section
2.6	High	Flagstaff Stormwater Public Outreach: Public awareness program on topic of flooding and dam risks.*	Ongoing	General fund	\$40,000 annually	Stormwater	Dam failure, flood
3.1	High	Identify water resources management and conservation opportunities.	Ongoing	Water fees	Requires further study	Building & Safety/ Planning	Earthquake, flood, high winds, terrorism, wildland fire, winter storm
3.2	Med	Improve hazard assessment information to make recommendations for avoiding new development in high hazard areas and encouraging preventative measures for existing development in areas vulnerable to natural, man-made, and technological hazards.	Ongoing	General fund	Requires further study	Building & Safety/ Planning/ Community Development	All

Action Item #	Priority	Action Description	Timeline	Funding Source	Estimated Cost	Implementing Department	Related Hazards
3.3	Med	Integrate appropriate items from the MJHMP into the Safety Element of the General Plan and other regulatory documents as appropriate.	1 year	General fund	Requires further study	Public Works	All
3.4	High	Coordinate with the utility companies and vendors to strengthen, safeguard, or take other appropriate measures such as providing supplemental services, to protect and secure high-voltage lines, water, sewer, natural gas and petroleum pipelines, and trunk electrical and telephone conduits from hazards.	Ongoing	General Fund	Requires further study	Floodplain Manager	Flood
3.5	High	Continue to invest in up-sizing drainage ways, improving floodplain flood mitigations, and enhancing streams and washes to convey design storms.	1-5 years	Grant FMA	Requires further study	Floodplain Manager	Flood
3.6	Med	The Rio DeFlag Project is a major flood control initiative designed to remove 1500 structures from the flood plain. The downtown area is prone to flooding and this effort will reduce the flood threat and enable further economic development in this area.*	Ongoing	Grant FMA	Requires further study	PUE and Public Works	Drought, climate change

Action Item #	Priority	Action Description	Timeline	Funding Source	Estimated Cost	Implementing Department	Related Hazards
4.1	Med	Partner with local insurance agencies to hold workshops for property owners to educate about the Flood and Earthquake Insurance Programs and its requirements.	Ongoing	General Fund	Requires further study	Stormwater	Flood
4.2	High	The city will develop a plan and mutual aid agreement with the state, County, Navajo Nation, National Park Service, and other governmental entities as necessary to implement mitigation actions.	1-3 years	General Fund	Requires further study	Legal City Manager	All
4.3	High	Continue to develop mutual aid agreements and memorandum of understanding with agencies to serve emergency and disaster purposes – notably by encouraging additional signatories to the Arizona Mutual Aid Compact.	Ongoing	General Fund	Requires further study	Emergency Services	All
4.4	High	Continue County partnership and support with local government, NGO and non-profits to maintain and build upon our cadre of committed, trained, volunteers to augment disaster response and recovery efforts in compliance with Arizona Disaster Service Worker program guidance (e.g. shelter workers, animal rescue and care, CERT, communications staff, medical and health, and human service providers), during and after a disaster.	Ongoing	General Fund Grant BRIC	Requires further study	Emergency Services	All

Action Item #	Priority	Action Description	Timeline	Funding Source	Estimated Cost	Implementing Department	Related Hazards
5.1	High	Develop a disaster debris plan.	1-3 years	Grant BRIC	Requires further study	Emergency Service/Public Works	Dam failure, earthquake flood, high winds, winter storm terrorism, wildland fire
5.2	High	Budget for maintenance and replacement of County/city owned fire and police stations.	Ongoing	General Fund	Requires further study	Public Works	All
5.3	High	Maintain cloud storage for vital records and data to allow access, if government servers are disrupted.	Ongoing	General Fund	Requires further study	IT	Dam failure, earthquake, flood, high winds, terrorism, wildland fire, winter storm
5.4	High	Provide equipment and human resources sufficient to handle comprehensive road, air, and railway hazmat and mass casualty incidents. Nearly 120 trains travel through the city boundaries each day. I-40 and I-17 generate truck traffic that carry hazardous materials through the city each day.*	Ongoing	General Fund	Requires further study	Fire Department/ Training Chief	Hazmat, transport accident
5.5	High	Clay Avenue Wash Detention (Dam). Basin Emergency Action Plan. A plan to address how to warn the public in the event of a pending dam failure or flooding.*	1-3 years	Grant BRIC	Requires further study	Stormwater	Dam failure, flood
5.6	High	Construct and equip a multi-agency EOC to coordinate disasters. The area is subject to periodic disasters. On an annual basis the EOC is activated 2-3 times each year.*	1-3 years	Grant BRIC	Requires further study	Fire Department/ Fire Chief	All

*Action from 2015

Fredonia

Table 5-41 lists Fredonia’s potential mitigation actions developed by the Planning Team. For each mitigation action, the following information is listed: mitigation goal, mitigation action description, mitigation type, hazard(s) addressed, and potential implementing town organization/s.

Table 5-41: Town of Fredonia Mitigation Action Plan

Action Item #	Priority	Action Description	Timeline	Funding Source	Estimated Cost	Implementing Department	Related Hazards
1.1	Med	Evaluate city/county and non-city/county facilities identified as potential shelter sites for structural integrity.	Ongoing	General Fund	\$65,000 Request bids	Emergency Services and Building-Safety	Dam failure, earthquake, excessive heat, power outage, flood, high winds, hazmat, terrorism, wildland fire, winter storm
1.2	High	Identify and pursue funding opportunities to develop and implement local mitigation activities.	Ongoing	Grant HMGP FMA BRIC CDBG	N/A	Emergency Services/ Public Works	All
1.3	Med	Integrate appropriate items from the MJHMP into the Safety Element of the General Plan and other regulatory documents as appropriate.	1 year	General fund	\$10,000	Manager/ Planning/ Community Development	All
1.4	High	Replacing existing dike with a levy.	3-5 years	Grant HMPG FMA	\$11 million	Public Works	Flood
2.1	High	Increase public awareness of dam failure hazards and mitigation measures to address them	Ongoing	General Fund	\$20,000 annually	Emergency Services	Dam failure
2.2	High	Develop a public outreach and awareness program about regional hazards and mitigation actions community members can do in their homes.	Ongoing	General Fund	\$20,000 annually	Town Manager/Fire Department/ Town Marshal/ Library	All

Action Item #	Priority	Action Description	Timeline	Funding Source	Estimated Cost	Implementing Department	Related Hazards
2.3	High	Increase public awareness of the natural, human-caused, and technological hazards to businesses as a means to reduce the potential damage from each hazard through education and outreach. Maintain a resource center accessible to the public at key government facilities. Provide information on government websites and social media accounts.	Ongoing	General Fund	\$15,000 annually	Town Manager/Fire Department/ Town Marshal/ Library	All
2.4	High	Hold annual community meeting in September with all residents and churches to educate residents about seventy-two (72) hour kits and food storage.	Ongoing	General Fund	\$12,000 annually	Town Manager/ Marshal's Office	All
2.5	High	Conduct severe wind community outreach through newsletter in the spring and fall, reminding residents to put outdoor belongings away.	Ongoing	General Fund	\$5,000 annually	Town Clerk's Office	High winds/ tornado
2.6	High	Enforce speed limits and conduct driver safety training.	Ongoing	General Fund	\$20,000 annually	Marshal's Office	Hazmat releases, transport accident
2.7	High	Conduct Fire Department training during community outreach (through annual community meeting, with specifics being prepared).	Ongoing	General Fund	\$10,000 annually	Fire Department/ Town Clerk's Office	All

Action Item #	Priority	Action Description	Timeline	Funding Source	Estimated Cost	Implementing Department	Related Hazards
2.8	High	Conduct outreach to the community, quarterly, through the town discussing what to do in the event of an earthquake.	Ongoing	General Fund	\$15,000 annually	Marshal's Office/Town Clerk's Office	Earthquake
3.1	High	Identify water resources management and conservation opportunities.	Ongoing	General Fund	Needs study	PUE/Public Works	Drought, climate change
3.2	High	Coordinate with the utility companies and vendors to strengthen, safeguard, or take other appropriate measures such as providing supplemental services, to identify, repair, protect and secure high-voltage lines, water, sewer and trunk electrical and telephone conduits from hazards.	Ongoing	General Fund	N/A	Public Works	Dam failure, earthquake, excessive heat, power outage, flood, high winds, hazmat, terrorism, wildland fire, winter storm
3.3	High	Conduct feasibility study for curb and gutters to determine cost.	1-3 years	General Fund CIP	\$32,500	Public Works/Town Manager	Flood
4.1	High	Partner with local insurance agencies to hold workshops for property owners to educate about the Flood and Earthquake Insurance Programs and its requirements. Community Development performs this function through NEIPA and the Engineering Division for flood only.	Ongoing	General Fund	N/A	Emergency Services	Earthquake, flood

Action Item #	Priority	Action Description	Timeline	Funding Source	Estimated Cost	Implementing Department	Related Hazards
5.1	High	Build a cadre of committed, trained volunteers to augment disaster response and recovery efforts in compliance with Arizona Disaster Service Worker program guidance (e.g. shelter workers, animal rescue and care, CERT, medical, communications staff, and health, and human services), during and after a disaster	Ongoing	General Fund	\$50,000 annually	Emergency Services	All
5.2	High	Conduct Fire Department training for a hazardous fires and spills.	Ongoing	General Fund	\$27,000 annually	Fire Department	Fire, hazardous material release

*Action from 2015

Page

Table 5-42 lists the Page’s potential mitigation actions developed by the Planning Team. For each mitigation action, the following information is listed: mitigation goal, mitigation action description, mitigation type, hazard(s) addressed, and potential implementing city organizations.

Table 5-42: Page Mitigation Action Plan

Action Item #	Priority	Action Description	Timeline	Funding Source	Estimated Cost	Implementing Department	Related Hazards
1.1	Med	Evaluate city/County and non-city/County facilities identified as potential shelter sites for structural integrity.	1 year	General fund	\$50,000	Emergency Services and Building-Safety	Dam failure, earthquake, excessive heat, power outage, flood, high winds, hazmat, terrorism, wildland fire, winter storm
1.2	High	Identify and pursue funding opportunities to develop and implement local mitigation activities.	Ongoing	General fund	Requires study	Emergency Services/ Public Works	All

Action Item #	Priority	Action Description	Timeline	Funding Source	Estimated Cost	Implementing Department	Related Hazards
1.3	High	Enforcement and/or implementation of modern building codes to regulate new development to mitigate against loss.*	Ongoing	General fund	Requires study	Community Development/ Building and Engineering Department	Dam failure, earthquake, excessive heat, power outage, flood, high winds, hazmat, terrorism, wildland fire, winter storm
2.1	High	Coordinate with local stakeholders and partners for the enhancement of public outreach and awareness regarding regional hazards and mitigation actions community members can implement for self-reliance and protection to property and life safety.	Ongoing	General Fund	\$3,000 annually	All departments and local stakeholders	All
2.2	High	Place more stress on the risks associated with natural and manmade hazards in public awareness campaigns conducted by various County/city departments (i.e. partner with local insurance agencies to hold workshops for property owners to educate about the Flood and Earthquake Insurance Programs and its requirements).	Ongoing	N/A	N/A	All	Earthquake, flood

Action Item #	Priority	Action Description	Timeline	Funding Source	Estimated Cost	Implementing Department	Related Hazards
2.3	High	Develop a public awareness program. Handouts and presentations will be developed and presented at area clubs, schools, and other public gatherings. Goals of the project shall include increasing public support for funding disaster preparation, educating the public what to do in case of a disaster, and increasing public awareness as to how public safety agencies will respond in a disaster.*	Ongoing	General fund	\$2,500 annually	Emergency Services/ Public Information Officer	All
2.4	High	The city will develop a plan and pamphlets and implement a public information program that will identify the following: Who can apply? What types of emergencies can be applied for? Where to apply.*	Ongoing	General fund	\$2,000 annually	Risk Management/ Human Resources/ Public Information Officer	All
3.1	High	Identify water resources management and conservation opportunities.	3 – 5 years	General fund/PU E	\$100,000	Page Utility Enterprises /Public Works	Drought, climate change
3.2	High	Design and construct drainage structures for problem flood areas throughout the city to prevent flooding of properties and buildings.*	Ongoing	PUE Grant FMA	Requires study	Engineering/ Public Works	Flood

Action Item #	Priority	Action Description	Timeline	Funding Source	Estimated Cost	Implementing Department	Related Hazards
3.3	High	Water supply system upgrade. This project is to upgrade the current pumping units and possibly identify an alternative lower level intake with a new pumping system and a separate pipeline to deliver water to the water treatment plant. This will allow for dependability and a backup to the current system. It will also provide water if lake level drops below current intake levels.*	1-3 years	PUE	Requires study	Engineering/ Utility Department/ City Engineer	Drought
3.4	High	Maintain cloud storage for vital records and data to allow access if government servers are disrupted.	Ongoing	General fund	\$3,500 annually	IT	All
4.1	High	Partner with local insurance agencies to hold workshops for property owners to educate about Flood Insurance Programs and its requirements. Community Development performs this function through NEIPA and the Engineering Division for flood only	3-5 years	General fund	Requires study	Community Development	Flood
4.2	High	The city will develop a plan and mutual aid agreement with the state, County, Navajo Nation, National Park Service, and other governmental entities as necessary to implement mitigation actions.*	In progress	General fund	Requires study	Legal/City Manager	All

Action Item #	Priority	Action Description	Timeline	Funding Source	Estimated Cost	Implementing Department	Related Hazards
4.3	High	Continue County partnership and support with local government, NGO and non-profits to maintain and build upon our cadre of committed, trained, volunteers to augment disaster response and recovery efforts in compliance with Arizona Disaster Service Worker program guidance (e.g. shelter workers, animal rescue and care, Community Emergency Response Team, communications staff, medical and health, and human service providers).	2-3 years	General fund	Requires study	Emergency Services	All
5.1	High	Develop a disaster debris plan.	1-2 years	General fund	\$50,000	Emergency Service/Public Works	Dam failure, earthquake, flood, high winds, terrorism, wildland fire, winter storm
5.2	High	Budget for maintenance and replacement of County/city owned fire and police stations.	Ongoing	General fund/ Grants	Requires study	Public Works	Dam failure, earthquake, flood, high winds, terrorism, wildland fire, winter storm
5.3	High	Build a cadre of committed, trained volunteers to augment disaster response and recovery efforts in compliance with Arizona Disaster Service Worker program guidance (e.g. shelter workers, animal rescue and care, CERT,	2 – 3 years	General fund	Requires study	Emergency Service	All

Action Item #	Priority	Action Description	Timeline	Funding Source	Estimated Cost	Implementing Department	Related Hazards
		communications staff, medical, and health, and human services), during and after a disaster.					
5.4	High	Provide equipment and other resources sufficient to provide initial response to major road, air, HAZMAT, and mass casualty incidents.*	1 Year	General fund	Requires study	Fire Department	All

*Action from 2015

Tusayan

Table 5-43 lists Tusayan’s potential mitigation actions developed by the Planning Team. For each mitigation action, the following information is listed: mitigation goal, mitigation action description, mitigation type, hazard(s) addressed, and potential implementing city organizations.

Table 5-43: Tusayan Mitigation Action Plan

Action Item #	Priority	Action Description	Timeline	Funding Source	Estimated Cost	Implementing Department	Related Hazards
1.1	Med	Evaluate town/County and non-town/County facilities identified as potential shelter sites for structural integrity.	1-3 years	General Fund	\$500	Facilities & Grounds	Dam failure, earthquake, flood, high winds, terrorism, wildland fire, winter storm
1.2	High	Identify and pursue funding opportunities to develop and implement local mitigation activities.	1-3 years	General Fund	\$1,000	Management and Support	Dam failure, earthquake, flood, high winds, terrorism, wildland fire, winter storm
2.1	High	Develop a public outreach and awareness program about regional hazards and mitigation actions community members can do in their homes.	Ongoing	N/A	N/A	PIO/ Management and Support	All

Action Item #	Priority	Action Description	Timeline	Funding Source	Estimated Cost	Implementing Department	Related Hazards
2.2	High	Increase public awareness of the natural, human-caused, and technological hazards to businesses as a means to reduce the potential damage from each hazard through educational and outreach. Maintain a resource center accessible to the public at key government facilities. Provide information on government websites and social media accounts.	Ongoing	General Fund	\$2,500 annually	Manager Support/Town Manager/PIO	All
2.3	High	Place more stress on the risks associated with natural and manmade hazards in public awareness campaigns conducted by various County/town departments.	Ongoing	General Fund	\$500 annually	All departments	All
2.4	High	Increase public awareness of dam failure hazards and mitigation measures to address them	Ongoing	General Fund	\$500 annually	Manager Support	Dam failure
2.5	High	Tusayan Fire Department Digital Newsletter: Explain hazards of smoke/carbon dioxide (CO2), fireplaces, chimneys, cleaning, and fire hazards. Regularly scheduled cleaning of chimneys. Smoke/CO2 detector maintenance program (as a follow up to the previous month's safety topic). Smoke and CO2 detectors use	Annually	General Fund	\$500 annually	Tusayan Fire Department	Wildland Fire

Action Item #	Priority	Action Description	Timeline	Funding Source	Estimated Cost	Implementing Department	Related Hazards
		and maintenance. Explanation of two (2) types of detectors. Regularly scheduled replacement of batteries and testing.*					
2.6	High	Publish key preparedness information and links via town website and Tusayan Fire Department (TFD) digital newsletter to include information on emergency kits, winter preparation and safety, and relevant tips/guidance from the County.	Annually	General Fund	\$500 annually	Tusayan Fire Department / Manager Support	Winter storm
2.7	High	Utilize town website and TFD digital newsletter to educate residents on winter hazards – with a particular focus on storm roof loading and other relevant building safety considerations.	Annually	General Fund	\$500 annually	Tusayan Fire Department / Manager Support	High winds/ tornado, winter storm
3.1	High	Seek to implement codes, standards, and policies that will protect life and property from the impacts of hazards.	Ongoing	General Fund	\$5,000	Planning & Zoning / Manager Support	Dam failure, earthquake, flood, high winds, terrorism, wildland fire, winter storm
3.2	Med	Integrate appropriate items from the MJHMP into the Safety Element of the General Plan and other regulatory documents as appropriate.	1-3 years	General Fund	N/A	Mayor Council/ Manager Support	All

Action Item #	Priority	Action Description	Timeline	Funding Source	Estimated Cost	Implementing Department	Related Hazards
3.3	High	Maintain cloud storage for vital records and data to allow access if government servers are disrupted.	Ongoing	General Fund	\$500 annually	Manager Support	Dam failure, earthquake, flood, high winds, terrorism, wildland fire, winter storm
3.4	High	Coordinate with the utility companies and vendors to strengthen, safeguard, or take other appropriate measures such as providing supplemental services, to protect and secure high-voltage lines, water, sewer, natural gas and petroleum pipelines, and trunk electrical and telephone conduits from hazards.*	Ongoing	N/A	N/A	Facilities	Dam failure, earthquake, flood, high winds, terrorism, wildland fire, winter storm
3.5	High	Finalize the ongoing Engineering Assessment and Hydrological Analysis for the drainage improvements work plan in coordination with the County and implement related projects as appropriate.*	Ongoing	General Fund/ Grant FMA	Requires further study	Town Administration	Flood
4.1	High	Continue to develop mutual aid agreements and memorandum of understanding with agencies to serve emergency and disaster purposes.	Ongoing	N/A	N/A	City Attorney/ Manager Support / Tusayan Fire Department	All
5.1	High	Collaborate with partners and service providers to identify and implement water resource management and conservation opportunities as applicable.	Ongoing	General Fund	Requires further study	Facilities and Maintenance	Climate change, drought

Action Item #	Priority	Action Description	Timeline	Funding Source	Estimated Cost	Implementing Department	Related Hazards
5.2	High	Build a cadre of committed, trained volunteers to augment disaster response and recovery efforts in compliance with Arizona Disaster Service Worker program guidance (e.g. shelter workers, animal rescue and care, Community Emergency Response Team, communications staff, medical and health, and human services), during and after a disaster.	1-3 years	General Fund/ Grant HMGP/ EMPG	\$2,000	Parks & Rec/ Manager Support/ Tusayan Fire Department	All
5.3	High	Develop an emergency preparedness network for community members (and visitors) to access food, water, communications, warming/cooling stations in times of emergent need.	1 year	General Fund	Conduct study, get bids	Manager Support/ County Sheriff's Office	All

*Action from 2015

Williams

Table 5-44 lists the Williams's potential mitigation actions developed by the Planning Team. For each mitigation action, the following information is listed: mitigation goal, mitigation action description, mitigation type, hazard(s) addressed, and potential implementing city organizations.

Table 5-44: Williams Mitigation Action Plan

Action Item #	Priority	Action Description	Timeline	Funding Source	Estimated Cost	Implementing Department	Related Hazards
1.1	Med	Evaluate city/County and non-city/County facilities identified as potential shelter sites for structural integrity.	1 year	General Fund	\$1,500	Building & Safety/ Planning	Dam failure, earthquake, excessive heat, power outage, flood, high winds, hazmat, terrorism, wildland fire, winter storm

Action Item #	Priority	Action Description	Timeline	Funding Source	Estimated Cost	Implementing Department	Related Hazards
1.2	High	Identify and pursue funding opportunities to develop and implement local mitigation activities.	Ongoing	General Fund	Further Study Required	Emergency Services	All
1.3	High	Enforcement of floodplain management requirements, including regulating all and substantially improved construction in floodplains to reduce the losses to property and people.	Ongoing	General Fund	Further Study Required	Planning and Building Code Enforcement/ Building Official	Flood
1.4	High	Continue to enforce zoning and building codes through current site plan, subdivision, and building permit review processes to reduce the effects of drought, flood, severe wind, wildland fire, and other hazards on new buildings and infrastructure.	Ongoing	General Fund	Further Study Required	Planning and Building Code Enforcement/ Building Official	Dam failure, earthquake, excessive heat, power outage, flood, high winds, hazmat, terrorism, wildland fire, winter storm
1.5	High	Enforcement of the newly adopted Defensible Space Ordinance for the protection of future and existing structures within the wildland urban interface.	Ongoing	General Fund	Further Study Required	Planning and Building Code Enforcement/ Building Official	Wildland fire
2.1	High	Increase public awareness of dam failure hazards and mitigation measures to address them.	Ongoing	General Fund	Further Study Required	Emergency Services	Dam failure

Action Item #	Priority	Action Description	Timeline	Funding Source	Estimated Cost	Implementing Department	Related Hazards
3.1	High	Coordinate with the utility companies and vendors to strengthen, safeguard, or take other appropriate measures such as providing supplemental services, to identify, repair, protect and secure high-voltage lines, water, sewer and trunk electrical and telephone conduits from hazards.	Ongoing	General Fund	Further Study Required	Public Works	Dam failure, earthquake, excessive heat, power outage, flood, high winds, hazmat, terrorism, wildland fire, winter storm
3.2	High	Perform fuel thinning around water treatment plant to create a wildland fire defensible space perimeter and install exterior sprinkler system on the structures and site perimeter.	Ongoing	General Fund	Further Study Required	Public Works	Wildland Fire
3.3	High	Annual inspections and maintenance work on five (5) existing city dams. Continued monitoring by the City Water Department in cooperation with ADEQ.	Annually	General Fund	Further Study Required	Public Works	Dam failure
3.4	High	Bill Williams Mountain Steep Slope forest restoration treatments to reduce threat from catastrophic wildland fires and post-wildfire flooding.	Ongoing	General Fund/ Grant/ HMPG	Further Study Required	Coconino County Flood Control District Administrator / Coconino County Forest Restoration Director	Flooding, Wildland Fire

Action Item #	Priority	Action Description	Timeline	Funding Source	Estimated Cost	Implementing Department	Related Hazards
4.1	High	Continue to develop mutual aid agreements and memorandum of understanding with agencies to serve emergency and disaster purposes.	Ongoing	General Fund	Further Study Required	City Attorney/ Emergency Services	All
5.1	Med	Create new storage facilities for effluent to be used for irrigation and emergency wildland fire protection.	Ongoing	General Fund/ Grant/ BRIC	Further Study Required	Public Works	Wildland Fire

**Action from 2015*

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Section 6: Maintenance Procedures

Elements of this section include:

- Monitoring, evaluating, and updating the MJHMP;
- Incorporation into existing plans and procedures;
- Continued public participation.

FEMA REGULATION CHECKLIST: PLANNING PROCESS

Documentation of the Planning Process

44 CFR § 201.6(c)(1): The plan shall include 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.

Elements

A5. Is there discussion on how the community will continue public participation in the plan maintenance process?
44 CFR 201.6(c)(4)(iii)

A6. Is there a description of the method and schedule for keeping the plan current (monitoring, evaluating and updating the mitigation plan within a 5-year cycle)? 44 CFR 201.6(c)(4)(i)

Source: FEMA, *Local Mitigation Planning Handbook Review Tool*, March 2013.

Implementation and maintenance of the MJHMP is critical to the overall success of hazard mitigation planning. This section details the process that the County and cities / towns will use to monitor, update, and evaluate the plan within the five year cycle of the plan's revision to ensure the MJHMP remains an active and relevant document. The format of the plan aligns with the regulation checklist and is divided into sections of information. When it is time to maintain or revise the MJHMP, data can be easily located and incorporated, resulting in an easy method to keep the plan current and relevant.

The Planning Team represents County and city/town staff from and other stakeholders that contributed to the development of the 2021 MJHMP. The Planning Team oversaw the development of the MJHMP, and made recommendations on key elements of the MJHMP, including the maintenance strategy.

It was important that all members of the Planning Team be given the opportunity to provide input during MJHMP maintenance. This philosophy will be continued for future plan revisions through evaluations, maintenance, and updates of data, processes, and programs. The Planning Team will convene annually to perform annual reviews of the MJHMP and its implementation. The Planning Team will include representation from residents, citizen groups, and stakeholders within the planning area.

If Planning Team members can no longer serve on the Planning Team, the appropriate department director will assign another staff person to be on the Planning Team so that every County, city / town department is represented.

Although formal annual evaluations were not completed every year, the MJHMP was indirectly reviewed on a frequent basis. The lack of review was primarily due to:

- The MJHMP maintenance requirements were not effectively communicated when changes in personnel occurred;
- A general lack of understanding regarding the importance and requirements of the maintenance element;

A period of several significant hazard events and heavy mitigation efforts, resulting in the lack of resources or time to perform the plan maintenance tasks.

6.1 Monitoring and Evaluation

The MJHMP includes a range of action items to reduce losses from hazard events. Together, the action items provide a framework for activities that the County and cities/towns can choose to implement over the next five years. The effectiveness of the MJHMP depends on the incorporation of the action items into other existing plans, policies, and programs. Although County Administrator and City/Town Manager Offices will have primary department responsibility for the MJHMP's continual review, coordination, and promotion, plan implementation and evaluation will be a shared responsibility among all departments and agencies that contributed to the mitigation action plan.

The Planning Team will be jointly responsible for the MJHMP's implementation and maintenance through existing programs. Department managers will be responsible for implementing mitigation strategies and actions specific to their department operations. The County Emergency Manager will assume responsibility for facilitating plan maintenance and Planning Team coordination.

Each April, the Planning Team will begin the process of reviewing the MJHMP and the implementation of mitigation actions to develop an annual progress report. This process can also assist the budget review process by providing information on mitigation projects and activities that have been completed or implemented. An annual progress report process will serve to align annual reviews of the MJHMP to incorporate information. As updates to the MJHMP are completed, the public will be made aware of the changes to the MJHMP and make recommendations or comments.

The Planning Team will monitor the hazard mitigation strategies during the year and at a meeting held in January of each year, Planning Team members will provide information for the evaluation of the progress of the 2021 MJHMP. This evaluation will include:

- A summary of any hazard events that occurred during the prior year and their impact on the planning area;
- A review of successful mitigation initiatives identified in the 2021 MJHMP;
- A brief discussion about the targeted strategies that were not completed;
- A re-evaluation of the action plan to determine if the timeline for identified projects needs to be amended, and the reason for the amendment (e.g. funding issues);
- Any recommendations for new projects;
- Any changes in or potential for new funding options (e.g. grant opportunities);
- Any impacts of County planning programs or initiatives that involve hazard mitigation.

The Planning Team will write a progress report that will be provided to the County and cities / towns' budget Planning Team for review and incorporation in the budget process as mitigation projects are completed or implemented. The hazard mitigation plan progress report will also be posted on the County and city / town websites on the page dedicated to the MJHMP, provided to the local media through a press release, and presented in the form of a report to the County Supervisors and City/Town Councils. The Planning Team will strive to complete the progress report process by March of each year.

6.2 Plan Update

Section 201.6.d.3 of 44CFR requires that MJHMPs be reviewed, revised as appropriate, and resubmitted for approval in order to remain eligible for benefits awarded under the Disaster Mitigation Act. The County and cities/towns intend to update its MJHMP on a five year cycle.

Based on needs identified by the Planning Team, the update will, at a minimum, include the following elements:

- The hazard risk assessment will be reviewed and updated using the most recent information and technologies;
- The action plan will be reviewed and revised to account for any initiatives completed, dropped, or changed and to account for changes in the risk assessment;
- Any new policies identified under other planning mechanisms, as appropriate;
- The draft MJHMP will be sent to appropriate agencies and organizations for comment;
- The public will have an opportunity to comment on the updated version prior to adoption;
- The County Board and City/Town Councils will adopt the updated plan.

At a minimum of nine months prior to the expiration date of the 2021 MJHMP, the Planning Team will implement a revision schedule to formally update the plan. The MJHMP will be revised using the latest FEMA hazard mitigation guidance documents, such as the Mitigation Planning Tool and Regulation Checklist to ensure compliance with current mitigation planning regulations.

6.3 Continued Public Involvement

The overall success of the MJHMP is through implementation of the hazard mitigation strategy and activities to reduce the effects of hazards, protect people and property, and improve efforts to respond to and recover from disasters. Members of the public and the County and cities / towns will ultimately benefit from the implementation of the MJHMP and must be given the opportunity to provide input to the continuous cycle of MJHMP planning.

Jurisdictions participating in the MJHMP will strive to keep the public aware of hazard mitigation projects that take place as a result of the plan. Public information will be released through press releases, website announcements, public hearings, board, council and commission meetings, and social media.

Projects that mitigate hazards are included in each jurisdiction's annual budget planning process. Workshops are held, meetings are convened, and the public is made aware of the planning through County Board and City / Town Council meetings, open workshop sessions, and press releases during this time. The budget planning process will serve as an annual opportunity to conduct outreach to the public on updates to the hazard mitigation planning process.

A survey can be developed to gather input on how the community feels about the progress being made on MJHMP activities. The County and each city / town will also provide press releases and information about hazard mitigation projects to the public on a regular basis, but at a minimum, the public will be engaged to learn about current MJHMP activities and given the opportunity to provide comments and information on an annual basis to update and maintain the MJHMP. The County and city / town emergency managers are responsible for ensuring the public is included and involved in the annual public plan update and outreach.

Below is a sample list of additional public engagement efforts utilized by the participating jurisdictions to engage the public in hazard mitigation efforts and gather input.

- Coconino County Emergency Management Department participates in annual events such as the Coconino County Fair, other public events, and public outreach. It manages a booth at annual Home Shows, providing information on emergency preparedness and hazard awareness, as well as a booth at the Coconino County Fair.
- The Flagstaff Fire Department provides outreach to the public and developers in the fuel management arena utilizing multiple mediums. The Fire Department hosts a booth at the Coconino County Fair and during the Greater Flagstaff Home Show and provides information including suggested construction practices, materials, and other safety efforts. Flagstaff works with the Greater Flagstaff Forest Partnership in providing mail-outs, inserts in pizza boxes, and short promotional messages during movie intermissions, etc. In addition, the city provides presentations to civic groups and homeowners groups on fire safety and fuel management efforts. The city hosts workshops with the various forest thinning contractors regarding code requirements and the permitting process. The Flagstaff Water Utilities Department provides information and outreach to the public regarding water conservation measures and flooding. The city council-appointed Water Commission has public meetings on a monthly basis to convey these messages. The city has an annual public open house, during which outreach is done and written information regarding the various mitigation efforts taking place throughout the city is provided.
- Williams maintains a website with a hazard mitigation link to the County's website. The city hosts an annual meeting for all agencies and the public involved with the city's efforts to protect the community from natural disasters.
- Various departments within Page establish booths at public events to distribute hazard awareness information appropriate to the event. Appropriate items will also be released to the local media as opportunities arise. These activities will be on a continuous basis and will involve all city departments. The city holds public meetings, makes public announcements, and distributes public safety brochures.

When the time comes to begin revising the 2021 MJHMP, the plan update process will be implemented, which will include continued public involvement and input through attendance at designated public meetings, web postings, through press releases to local media, community fairs and events, and surveys. As part of this effort, a series of public meetings will be held, and public comments will be solicited on the revisions to the MJHMP according to the five year cycle.

Table 6-1 summarizes successful public involvement efforts previously conducted by participating jurisdictions and proposes activities for public involvement and dissemination of information. These shall be pursued whenever possible and appropriate.

Table 6-1: Public Involvement Activity or Opportunity

Departments	Past	Proposed
All	<ul style="list-style-type: none"> Participate in annual public events such as annual fairs, home shows, and festivals to distribute information on emergency preparedness and hazards. Conduct multi-medium public communications efforts to deliver critical information on hazards, mitigation programs, available resources, and best practices. Mediums can include mail-outs, pizza box inserts, brochures, social media campaigns, dedicated websites, outreach to community groups, and promotional messages during movie intermissions. Deliver training, workshops, and presentations to help citizens and businesses comply with regulations, learn how to take advantage of existing programs, or benefit from relevant practices 	<ul style="list-style-type: none"> Place more emphasis on the risks associated with natural and manmade hazards at public awareness campaigns conducted by various city/town departments. Consider developing and distributing public education materials for natural hazards. Continue to expand collaboration with educational institutions to deliver hazard and preparedness information, engage youth and young adults in relevant programming, and convey relevant knowledge to families. Continue to expand support for multi-lingual and multi-cultural communication tools and engagement methods – including but not limited to documents, surveys, social media posts, and in-person events.
Administration	MJHMP survey conducted online.	Conduct annual surveys online and at the annual Public Safety Event.
Human Resources		Procure funding, staff, and develop CERT program as appropriate and facilitate participation in formal emergency and disaster management programs by government staff and the public.
Utilities and Public Works	Development and delivery of public information products on conservation methods and flooding.	Integrate methods for modifying billing and invoicing tools to inform, empower, and incentivize conservation among customers/users.
Law Enforcement, Fire/Rescue, Administration	City/Town agencies, such as law enforcement and human resources, and federal and congressional officials have conducted training events (e.g. first aid and CPR, active shooter drills, school lockdown drills, emergency alert notification, American Red Cross training and smoke alarm distribution) as ways to educate the public and community leaders in responding to circumstances and situations.	<ul style="list-style-type: none"> Increase public awareness of the natural, human-caused, and technological hazards to businesses as a means to reduce the potential damage from each hazard through educational and outreach. Place more stress on the risks associated with natural and manmade hazards at public awareness campaigns conducted by various city/town departments. Consider developing and distributing public education materials for natural hazards.

Section 7: Plan Approval and Adoption

NOTE: Approval resolution will be input here after AZ DEMA/FEMA review and County adoption

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Appendices:

Appendix A: Local Mitigation Plan Review Tool and Adoption Documentation

NOTE: Will be added once AZ DEMA and FEMA have completed their review

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Appendix B: Planning Process Documentation

Appendix B contains documentation of the planning process for the MJHMP Planning Team, including meetings, presentations, emails, etc. Each jurisdiction conducted additional, informal, planning efforts to support the MJHMP Planning Team. This was primarily due to the operational requirements of the ongoing COVID-19 response. Only one of these supplementary efforts was conducted formally. It is documented herein.

Meeting Date	Meeting Title	Meeting Handouts, Presentation Included in MJHMP
Sep 4, 2020	MJHMP Planning Team Kickoff Meeting	<ul style="list-style-type: none"> - Presentation (cover only) - Meeting notes with attendance sheet
Nov 19, 2020	MJHMP Planning Team Meeting #1	<ul style="list-style-type: none"> - Invitation to stakeholders - Sign-in sheet - Agenda - Presentation (cover only) - Meeting notes
Dec 15, 2020	MJHMP Planning Team Meeting #2	<ul style="list-style-type: none"> - Invitation to stakeholders - Stakeholders invitation list - Sign-in sheet - Presentation (cover only) - Meeting notes
Jan 12, 2021	Coconino County Mitigation Action Planning Meeting	<ul style="list-style-type: none"> - Invitation to stakeholders - Sign-in sheet - Presentation (cover only) - Meeting notes
Jan 22, 2021	MJHMP Planning Team Meeting #3	<ul style="list-style-type: none"> - Invitation to stakeholders - Sign-in sheet - Presentation (cover only) - Meeting notes



1. Project Kickoff Meeting

Date/Time: September 4, 2020 @ 10:00AM-11:00AM MST

Location: GoToWebinar (virtual meeting)

Presentation:



Coconino County Hazard Mitigation Plan Update Meeting 1



Ready, Responsive, Reliable

1

Meeting notes (with attendance sheet):

Hazard Mitigation Planning Meeting Minutes September 3, 2020

The attendees included:

Susan Austin
DEMA Daren
Sweet DEMA
Wes Dison Coconino County Emergency Mgmt.
Mark Christian Coconino County Emergency
Mgmt. Sam Beckett Coconino Co. Public Works
John D Brice Coconino Co Public
Works Brett Axlund Coconino Co.
Sheriff Off. Gerritt Boeck Coconino
Co Sheriff Off. Scott Carey Coconino
Co GIS
Helen Costello Coconino Co GIS
Ben Wilson PHEP Coconino Co Health and Human
Services Blake Scott Planner Coconino Co Health and
Human Service Eric Peterson Coconino Co Public
Relations
Brian Klimowski National Weather
Service Tony Merriman National
Weather Service Lee Antonides
Ponderosa Fire Department Mike
Greenwalt Highlands Fire Department
Paul Oltrogge Flagstaff Fire Department (Wildland Fire Mgmt.
Officer) Greg Brush Tusayan Fire Department
Jeff Reed Page Fire Department
Erin Harris Page Fire
Department
Matt Wood City of Page (Utilities)
Bayden Grover Fredonia (Town Marshall and primary
contact) Frank Higgins Flagstaff police Department
Mark Richardson City of Flagstaff Water
Services Sara Dechter City of Flagstaff
Jim Janacek City of Flagstaff
Stormwater Monica Rabb City of
Flagstaff Stormwater
Ed Schenk City of Flagstaff Stormwater (utilities
division) Rick Barrett City of Flagstaff Engineer
Theresa Johnson City of Williams (Emergency
Manager) John Romero City of Williams (Primary
Point of Contact)

Hazard mitigation meeting 9/3/2020

Recorded meeting began at 0800.

Wes Dison provided opening remarks: Thanked attendees for their participation, and reminded the group there will be future asks for their input, the goal is to keep plan as simple as possible. Advised participants that session was recorded. Wes also mentioned the proposed use of a vendor to assist in plan construction.

Sue Austin is the presenter:

Overview: mitigation-plan review

Sue had released a “cleaned up” version of the 2016 to prepare it for the 2021 updates.

Provided a definition of Mitigation which included actions that are taken to reduce or eliminate risk before, during, or after an incident.

Plan Purpose: The Plan acts as a guide to make safer communities, reduces disaster impact. We can't stop hazards, but we need to reduce the impact. A Hazard Mitigation Plan facilitates eligibility for grants. We should implement and use the plan in alignment with other County/Jurisdiction plans.

Planning Process:

We should expect to have three (3) of these meetings.

1. 1st meeting September 3rd 2020
2. 2nd meeting Sept.-Oct. To be Determined. Sue proposed end of September to early October.
3. 3rd meeting Oct.-Nov. To be Determined

DEMA will put information into the updated plan as new information is received from Mark C. If we move quickly we could see a draft by January.

The draft Plan 2021 will be made ready for Plan Team review and changes, then forwarded to FEMA by DEMA. (Jan-February)

Review of the FEMA Process:

All individual jurisdictions must adopt the plan.

Review of Plan requirements:

Per FEMA there are 36 Requirements for the plan and all jurisdictions must meet each of the 36 elements. FEMA will use the “Review Tool” to assure all elements have been met.

The old (outgoing) plan of 2015 should be made available for public viewing/comments. This is the plan that was approved March 2016.

Plan Structure:

The Plan consists of four (4) main sections: Planning Process
Risk Assessment Mitigation Strategies Plan Maintenance

Information Collection & Taskings:

Plan Point of Contact is Mark Christian Coconino County Emergency Management (CCOEM). Mark will assign taskings and review those items when received from the jurisdictions. Mark will forward that information to Daren Sweet for review. If changes are needed it is returned to Mark Christian for updates. If changes are unnecessary, Daren will include in the Plan.

Points of Contact:

County-Mark Christian
Flagstaff- City Emergency Mgr. Jerry Bills (Flagstaff Fire Department Deputy Chief & Summit Fire Chief) Fredonia- Bayden Grover -Town Marshall
Page- Jeff Reed Page fire Chief Tusayan Fire Chief Greg Brush
Williams- Lt. Joe Romero Williams police Department

Jurisdictional Overviews:

Brief discussion: Mark has been working with jurisdictions to move these updates forward. If no changes are needed that is okay. It is important to recognize and include changes respective to each jurisdiction.

Public Involvement Decision Point:

Important piece. How will you meet the Public Involvement requirements?
Eric Peterson: public relations will post links for viewing and survey/comments, and will also utilize press and social media.
Sue recommends we take "snapshots" of local jurisdiction web pages showing each jurisdiction webpage bearing information on the hazard Mitigation Plan process.

We should collect copies of all community outreach efforts for the community outreach narrative description in the plan. Jurisdictions need to "link" to the county or do their own public outreach activities. Jurisdictions must document that County link on their respective homepage. Must document that the public was given a chance to get involved and document any feedback obtained.

Risk Assessment:

Document any events with significant enough impact that it warrants mention. Do not necessarily have to be from a declared emergency. Manmade disasters do not to be included (Hazmat incidents, transportation accidents).

Asset: is not required

Loss Estimations: not required.

What are the impact and severity of hazards? History of hazards.

Probability and Magnitude of the hazard Sue asks that we "brush up" on these a little.

We must look at incident/ hazards from 2015 moving forward.

Hazard profile updates:

Hazard Profile updates are up to the Planning Team. Who will be the leader for this?
Mark Christian will serve as point of contact for individuals working on the profiles and forwarding that completed information to Vendor (Constant Associates) and DEMA for inclusion into the hazard risk profile updates.

Risk Assessment (note this is Section 4 in the 2015 Plan CPRI (Calculated Priority Risk Index) was mentioned with the need to make a decision today regarding the inclusion of Loss Estimation tables. Apparently, these tables are not required. Sue presented the option of maintaining the Table format or inclusion of a narrative explanation of losses. Many Counties have been taking these out and opting for the narrative explanations. Emergency Manager Wes Dison wants to eliminate the table and go with the simplified narrative explanation.

Hazard Identification:

We currently have nine (9) identified hazards.

Sue asked if want HHPD Grant eligibility (High Hazard Potential Dams). this was regarding the Dam Failure hazard. Jim Janacek is interested in further discussion of this topic and mentioned the Clay Avenue Detention Basin and related Emergency Action Plan.

Blake Scott wants to add health related hazards. This discussion was generated due to earlier comments that we intend to add a "Pandemic" hazard to our existing list. Sue A stated that any new hazards will need to be accompanied with a "Hazard Profile". Sue asked Blake for the list of health-related hazards and if any of our health-related hazards are currently addressed in other County documents/plans. Sue provided the option of listing one new "Health" related hazard and within that one new listing address several related hazards as opposed to individually listing several health hazards.

Wes Dison wants to follow DEMA's recommendation of listing one additional hazard to be added to plan for Coconino County.

Mark Christian will be the lead and is assigned to find the "leads" for updating each hazard profile. Wes Dison commented that our Contractor (Constant Associates) will take the lead for the Hazard Profile updates and will be assisting the Contractor for that purpose.

Sue A. confirmed that Hazard Profile updates are now in the County's hands.

Mitigation Measures:

Regarding updates we will work with only the right 2 columns for the new information. Do not change any other portions as FEMA will want to see the original descriptions and the changes over the five- year period. Sue is requesting more specific information on the mitigation measures.

I asked Sue to send the power point presentation for today to me for information purposes.

Section 5: Things needed to help implement Mitigation Measures.
Mention was made of FEMA Regulatory requirements

On page 128 of our current hazard Mitigation Plan for Administrative and Technical information, and subsequent pages regarding capability assessments: Sue can offer a much "cleaner" way to present the information. Wes Dison agreed and would like to simplify this information.

Mark C. needs to continue checking in with Points of Contact, and DEMA will be in the background with Mark and Wes. We can adjust for further meetings to be determined.

Jim Janacek is interested in further discussion regarding removal of the asset tables and new ways of assessing each jurisdiction's capability.

Sue A. and Daren S. and mark C will stay in contact with Daren as main point of contact. Sue A. clarified that jurisdictions are being asked for a "piece by piece" update of their respective sections of the Hazard Mitigation Plan, and we are not asking for the jurisdictions to make adjustments to the whole plan.

Meeting ended at 0945 9/3/2020.

Please use the below listed link to review the entire meeting of 9/ 3/ 2020 in detail.

Link to video: <https://youtu.be/ROrpdqmHV04>

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2. Project Planning Team Meeting #1

Date/Time: November 19, 2020 @ 10:00AM – 12:00PM MST

Location: GoToWebinar (virtual meeting)

Invitation:

Subject: Coconino MJHMP Update Planning Meeting #1 - Registration Information
Date: Monday, November 2, 2020 at 9:36:28 AM Pacific Standard Time
From: Janlia Riley <Janlia@constantassociates.com>
To: Jerry Bills <jbills@flagstaffaz.gov>, Bayden Grover <bgroverfmo@fredonia.net>, Jromero@williamsaz.gov <Jromero@williamsaz.gov>, Theresa Johnson <tjohnson@williamsaz.gov>, hnixon@williamsaz.gov <hnixon@williamsaz.gov>, Jeff Reed <firechief@cityofpage.org>, Erin Harris <eharris@pageaz.gov>, 'Charlie Hendrix' <tusayantownmanager@tusayan-az.gov>, Greg Brush <gbrush.tfdgc@outlook.com>, tusayanasst@tusayan-az.gov <tusayanasst@tusayan-az.gov>, Lee Rosenberg <lee@constantassociates.com>, Amanda Ozaki-Laughon <Amanda@constantassociates.com>, Christian, Mark <mchristian@coconino.az.gov>, Andreani, Lucinda <landreani@coconino.az.gov>, Dison, Wes <wdison@coconino.az.gov>, Wilson, Benjamin <bewilson@coconino.az.gov>, 'Carter, Tim' <tcarter@coconino.az.gov>
BCC: Evan Koepke <evan@constantassociates.com>, Amanda Ozaki-Laughon <Amanda@constantassociates.com>, lee <lee.rosenberg@navigatingpreparedness.com>
Attachments: image001.jpg

Good Morning,

Your presence is requested for the **Coconino MJHMP Update Planning Meeting #1**. Please see the meeting details and link to register below. Registering prior to the meeting time is recommended. Please remember that it is imperative that an authorized representative from each jurisdiction to be present so that key planning decisions can be made

Date: Thursday, November 19th, 2020

Time: 10:00 AM – 12:00 PM

Registration Link: <https://attendee.gotowebinar.com/register/6384269597353174284>

Dial in #: +1 (951) 384-3421

Attendee PIN: 240-634-290

(Once registered, you will receive your unique [audio PIN](#) to enable self mute/unmute functions via phone dial-in. You can also use your computer's audio functions.)

Best regards,

Janlia Riley
Operations Analyst

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Direct: (424) 320-2583

Email: janlia@constantassociates.com

www.constantassociates.com

Sign-in sheet:

Coconino County
 Hazard Mitigation Plan Update Project 2020
 Planning Meeting 1 – Attendance Sheet



Attendance Sheet

Planning Meeting 1


Location: Virtual Meeting on GoToWebinar
Date: Thursday, November 19, 2020
Time: 10:00am-12:00pm MST
Dial-In: GoToWebinar
Participant Pin: Received upon registration
Webinar Link: <https://attendee.gotowebinar.com/register/6384269597353174284>

#	Name	Organization/ Department	Telephone	Email	Attendance
1.	Erin Harris	City of Page Fire Department		eharris@papeaz.gov	Present
2.	John Romero	City of Williams Police Department		jromero@williamsaz.gov	Present
3.	Wes Dison	Coconino County Emergency Management		wdison@coconino.az.gov	Present
4.	Evan Kopke	Constant Associates		evan@constantassociates.com	Present
5.	Lee Rosenberg	Constant Associates		lee@constantassociates.com	Present
6.	Jerry Bills	Summit Fire District		jbills@flagstaffaz.gov	Present

1

Agenda:

Coconino County
Hazard Mitigation Plan Update Project 2020
Planning Meeting 1 - Agenda




COCONINO
COUNTY ARIZONA

Meeting Agenda


Planning Meeting 1

Location: Virtual Meeting on ~~GoToWebinar~~
Date: Thursday, November 19, 2020
Time: 10am-12pm MST
Dial-In: ~~GoToWebinar~~
Participant Pin: Received upon registration
Webinar Link: <https://global.gotowebinar.com/join/6384269597353174284/661855202>

- I. Welcome & Agenda
 - a. Meeting Purpose
 - b. Administration
 - c. Introductions
- II. Project Status and Plan Update
 - a. Project Status
 - b. Project Plan
 - c. Schedule
- III. Outstanding Data Requirements
- IV. Hazard Identification and Prioritization
 - a. Historical Hazards
 - b. Hazard List and Prioritization
 - c. Hazard Selection
- V. Action Items & Next Steps
- VI. Questions & Discussion
- VII. Adjourn



CONSTANT
ASSOCIATES



Presentation (cover only):



Planning Meeting 1

COCONINO COUNTY

2020 COUNTY HAZARD MITIGATION PLAN UPDATE

November 19, 2020


Presented by: Evan Koepke, Lee Rosenberg, & Amanda Ozaki-Laughon

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Meeting notes:

Coconino County
 Hazard Mitigation Plan Update Project 2020
 Planning Meeting 1 – Meeting Minutes



Meeting Minutes

Planning Meeting 1

Location: Virtual Meeting on GoToWebinar
Date: Thursday, November 19, 2020
Time: 10am-12pm MST
Dial-In: GoToWebinar
Participant Pin: Received upon registration
Webinar Link: <https://global.gotowebinar.com/join/6384269597353174284/661855202>

Table 1: Action Items



#	Deliverable	Responsible	Due
1.	Finalize and share meeting minutes within 5 business days	CONSTANT	11/24/2020
2.	Conduct risk assessment	CONSTANT	TBD
3.	Analyze public survey results	CONSTANT	TBD
4.	Send planning team guidance for review of mitigation actions	CONSTANT	11/27/2020
5.	Send poll to planning team and schedule next planning meeting for week of December 14	CONSTANT	12/4/2020
6.	Collect and deliver remaining data requirements (see pages 3-4)	Planning Team	12/11/2020
7.	Complete CPRI worksheet for your jurisdiction	Planning Team	12/4/2020
8.	Review mitigation strategy/actions from 2015 MJHMP	Planning Team	12/11/2020
9.	Identify desired mitigation goals and actions (pages 4-7)	Planning Team	12/11/2020

I. Welcome

- a. Evan Koepke reviewed the meeting’s purpose (listed on slide 2 of the presentation), reviewed the meeting materials/ handouts provided through GoToWebinar for download (Agenda, Meeting Presentation, and CPRI Worksheet), and discussed meeting administration. He subsequently led the group in a round of introductions.

II. Project Status and Plan Update

- a. Actions Taken and Tasks Completed
 - i. Evan reviewed the list of completed actions on slide 4 of the meeting presentation. He highlighted the deployment of the hazard mitigation survey and the provision of pre-built

communications materials to participating jurisdictions, noting that the consulting team is awaiting substantiation from several jurisdictions.

- ii. Tim Carter added that the hazard mitigation survey was sent via the County's notification system to all registered citizens.
- iii. Evan noted that Constant Associates (CONSTANT) has received updated community descriptions from all participating jurisdictions, and the community capabilities inventory from most.

b. Challenges and support needs

- i. Evan stated that there are several outstanding data requirements for conducting the risk assessment that will be reviewed in detail in a subsequent section.
- ii. Evan noted that the CONSTANT team is available to provide technical support regarding research and hazard identification via Mark Christianson. However, while Mark is out on vacation, the consulting team is directly available to help problem-solve and answer questions as they arise.

c. Next Steps

- i. Evan state that the next steps for the project will be to finalize the list of hazards, use the CPRI Worksheet to prioritize those hazards for each participating community, and conduct a risk assessment to inform mitigation planning efforts.

d. Schedule

- i. Evan reviewed the planning schedule and the condensed planning approach being used due to the limited time available to execute the project.
 - 1. Planning will take place during two planning meetings. This is the first of two.
 - 2. The second meeting will assist in defining the mitigation strategy and weave together specific implementation information that FEMA requires.
 - 3. Planning Meeting 1 (This meeting): Hazards and risk assessment. During the risk assessment process, it will be key to evaluate the risks presented to your community.
 - 4. Planning Meeting 2: Mitigation planning. This meeting will result in a solid action plan, which will be brought together with the previous risk analysis portion of the plan. You will then receive a full draft of the plan for your review and approval.
 - 5. After planning team review and approval, the draft MJHMP will be released for public review. Feedback from public review will be incorporated and a brief second round of reviews will occur internally to ensure planning team agree with the final product.
 - 6. After public review, the plan will be sent for state and federal review. The final product will be packaged for County adoption and for adoption by each individual community.

III. Project Plan: Roles and Responsibilities

- a. Evan reviewed the roles and responsibilities of the project's stakeholders
 - i. CONSTANT will:
 - 1. Coordinate planning meetings and data collection
 - 2. Develop the MJHMP

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3. Support the approval process
 4. Act as a resource for the entire planning team
 5. Will provide timely requests for information and provide adequate time to review draft documents
 6. Evan asked if two weeks of review time is adequate.
 - A. Jerry Bills says yes
 - B. Ben Wilson says yes
 - C. John Romero says yes
 - D. Wes Dison says yes
 - E. No comment from other participants
 - F. Evan confirmed that two weeks will be the target review period for documents
 2. Evan asked if CONSTANT can assume assent if feedback is not received by communicated review deadlines?
 - A. Jerry Bills says yes
 - B. Ben Wilson defers to Wes Dison
 - C. John Romero says yes
 - D. Wes Dison says yes
 - E. No comment from other participants
 - F. Evan confirmed that assent will be assumed if no feedback is received. He caveated that it will be only be used as a final resort – particularly if attempts to make contact / get feedback directly are unsuccessful
- ii. Jurisdictional representatives will:
1. Ensure consistent attendance at planning meetings
 2. Compile requested information and send to CONSTANT
 3. Ensure consistent review and feedback delivered, with open communication
 4. Assist with public engagement, especially boosting community participation via the survey and public release of final draft

IV. Outstanding Data Requirements

- a. Evan noted that the planning team has received requests for information organized into three categories via Mark Christian prior to this meeting. This information is critical to completing the hazard identification and risk assessment elements of the project, as well as starting the mitigation planning process.
 - i. The Community Capabilities Inventory (form provided)
 1. Regulatory and Planning: Listing of jurisdiction's ordinances and laws relevant to reducing disaster risk.
 2. Administrative and Technical: Capabilities of each individual community
 3. Education and Outreach Programs: Activities which seek to reduce hazard risk and increase public safety. All activities with community partners and community programs are considered education and outreach programs.



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4. Mitigation Programs: CONSTANT needs any mitigation programs in place.
- ii. Hazard Assessment Questionnaire (form provided)
 1. CONSTANT needs answers to the Hazard Assessment Questionnaire for each community. Information needed includes:
 - A. Prior disaster declarations.
 - B. National Flood Insurance Program (NFIP) participation information, especially prior damage to insured structures. FEMA requires this to assess if there are NIFP insured structures at risk of flood that have been previously impacted
 - C. Hazards of Concern for each community
 - D. A listing of Critical Infrastructure for each community – these include facilities and systems that are critical lifelines. These should be accompanied by some economic valuation.
 - E. A listing of Community Assets – including key cultural, economic, and/or environmental assets. These may include major religious sites, registered historical locations, etc.
 2. Mitigation Action Status – CONSTANT needs each community to designate each mitigation action from 2015 with a status. A worksheet and additional guidance will be provided to support the collection of this information.

V. Hazard Identification and Prioritization

- a. Evan handed off facilitation to Lee Rosenberg, who proceeded to review historical hazards, present the CPRI approach, and CONSTANT's Calculated Priority Risk Index (CPRI) analysis for Coconino County
- b. Historical Hazards
 - i. Lee shared data analysis of federal and state declarations of disasters from 1966-2020. Coconino County has, like every county, experienced its fair share of disasters. CONSTANT will go through each of these one at a time to give a quantitative risk score. The list of historical hazards came from government sources at the federal, state, and county level.
 - ii. Lee detailed the graph of federal and county disaster declarations, and the graph of County hazard events since 2015 (as seen on slide nine of the meeting presentation). He asked if any were missing, none were mentioned.
- c. Hazard Identification and Prioritization
 - i. Lee provided an overview of the CPRI categorization matrix
 - ii. The matrix goes through each hazard as presented by the 2015 MJHMP as well as additional hazard identified by the consulting team. Each hazard is rated between one and four based on the probability of the hazard occurring, the severity of the hazard, warning time, and the hazard's duration. Specific definitions for these ratings can be found in the meeting presentation.
 - iii. The CPRI matrix in the presentation is CONSTANT's initial analysis for Coconino County as a whole, and feedback is encouraged.
 - iv. Each City will need to complete their own risk analysis to evaluate the hazards in their community using the CPRI Worksheet that will be provided after the meeting.



- v. Lee proceeded to review each hazard listed in the CPRI matrices on presentation slides 12 and 13, soliciting participants for feedback on ratings and questions. He noted that the hazard identified on slide 12 are directly correlated or modified from the 2015 MJHMP, while those on slide 13 are new.
1. Dam Inundation: While there was at least one recorded dam collapse, the probability is low and not likely. Severity of the event would be very high and cause significant damage. The Northwestern part of Coconino County includes a large dam. Warning time could fluctuate but is usually substantial if it is a precipitation event including collapsed spillways. Duration of recovery results in months-long recovery timeframe.
 - A. No feedback given, hazard assessment accepted.
 2. Earthquakes: While earthquakes are experienced in Coconino County, they are not usually over a 4.0 M rating, nor do they cause significant damage.
 - A. Erin Harris stated no one could recall any damage caused due to earthquakes in the community.
 - B. Jerry Bills stated the same.
 2. Flood/Flash Flood: This hazard has a high probability and is ranked as a medium-high threat. Flash floods usually have very little warning time. Duration of floods are usually moderate. This was given a 3.5 rating and a high-risk level.
 - A. No feedback given, hazard assessment accepted.
 3. High Winds/Tornadoes: This hazard was given a moderate severity. Tornadoes are not as common in the county, which means warning time can be shorter. The National Weather Service can often predict and issue high wind warnings accurately. Duration is usually a few hours, not for many days.
 - A. No feedback given, hazard assessment accepted.
 4. Pipeline Failure/Transportation: Was given a high-risk level, given the amount of commerce in the area.
 - A. No feedback given, hazard assessment accepted.
 5. Wildfire: Highest risk hazard due to location and environment. Probability and severity are very high. Duration can be many days, but usually less than 1 week.
 - A. No feedback given, hazard assessment accepted.
 6. Winter Storm: Due to the altitude of Coconino County, snowfall is common and can result in power outages and isolation of communities due to inaccessible roads. Warning times are usually given with advance notice. The National Weather Service puts out those warnings and they may last for several days.
 - A. No feedback given, hazard assessment accepted.
 7. Earthquakes: Lee recommended that Earthquakes to be removed from hazardous list due to their low assessed risk level and because leaving it in would require inclusion of mitigation actions which may not provide significant benefit to the county. However, he noted that he would check with FEMA Region 9 to ensure that this could be viably done. The group assented.
 8. Aviation accidents: Due to the proximity to airports, accidents do occur. The probability of this hazard is low, warning time is usually none, and magnitude can be

significant. Event can last a few hours to a few days, would likely result in a low weighted score.

- A.** Jerry Bills says yes, would like this hazard listed and to attempt developing mitigating activities. They have had a few accidents over the years, and it would be good for the County to include.
- 9.** Lee reminded participants that not every jurisdiction needs to have the same hazards or weighted score overall. Each jurisdiction will need to conduct their own CPRI using the provided worksheet to capture specific risk profiles.
- 10.** Climate Change: Lee stated that FEMA often requires this hazard be listed. Rising sea levels, growing numbers of hurricanes, excessive heat, drought, and wildfires can all be attributed to change in climate. Warning time has been significant, has a very high magnitude.
- 11.** Excessive heat: This would be a new hazard. Arizona is already in a dry and hot climate. Warning time is usually significant and issued by the National Weather Service. Advisories on heat can last up to or over a week. This would be ranked at a high-risk level.
- 12.** Public Health and Pandemic Event: Probability of this event is fairly high given other pandemics have taken place such as HIV and influenza. Over 250,000 fatalities in the United States due to current pandemic. Pandemics usually extend for several weeks or month before the pandemic begins as a community spreading event and could last for months or years.
 - A.** Ben Wilson stated that Coconino wants to keep the pandemic event in there. This is where they focus efforts developing relationships and ensuring there is visibility and capability, surveillance systems to keep tabs on diseases that could become pandemics. Also, notes that title should be adjusted to “public health outbreak AND pandemics,” since outbreaks can be local/regional, and pandemic implies international.
- 13.** Extended Power Outages: In other states, programs from publicly owned utility companies called Public Safety Power Shutoffs can occur and cause extended power outages. Warning time is short, and the event can last for 20 hours or more.
 - A.** Lee asked if Arizona has a PSPS program in place?
 - B.** Jerry Bills said he is not aware of one.
- 14.** Terrorism: Lee stated that Coconino County is likely not high on the list of terrorist targets, and probability is low. However, terrorism can be extremely disruptive. Warning time is negligible and duration is usually short. This definition may include active shooter events and domestic terrorism, as well as cyber terrorism.
 - A.** Ben Wilson asked if the term terrorism can include active shooter. The County has recently been impacted by cyber terrorism, so recommends the hazard is added.
 - B.** Erin Harris stated that the Glen Canyon Dam is defined as a major terrorist threat and is ranked as one of the major locations under threat of a terrorist attack. Given that Page is a smaller and isolated community, such an event would be devastating and needs to be planned for.

- C. Jerry Bills suggested that ASHER (Active Shooter Hostile Event Response) could be used as an alternate title to capture active shooter style events
- D. Lee recommended that each jurisdiction use the CPRI worksheet to define their perceived risk to this hazard type.

b. Hazard Selection

- i. Based on the group discussion and the proposed hazards for the 2020 MJHMP, the following list of hazards will be included in the plan:
 - 1. Dam Inundation
 - 2. Drought
 - 3. Earthquake and Seismic Hazards (Tentatively Removed)
 - 4. Flood/Flash Flood
 - 5. High Winds/Tornado
 - 6. Pipeline Failure/Transport Accident/HAZMAT Release
 - 7. Wildfire
 - 8. Winter Storms
 - 9. Aviation Accidents
 - 10. Climate Change
 - 11. Excessive Heat
 - 12. Public Health Outbreak and Pandemic Events
 - 13. Extended Power Outage (Public Safety Power Shutoff tentatively removed)
 - 14. Terrorism (Term may be modified to better reflect active shooter type threats – one participant recommended the term ASHER incidents)
- ii. Evan noted that this is not a final decision, and that a gap period of a week will be provided for participants, and planning team members who could not attend, to provide further input once the meeting minutes are released.

VI. Action Items & Next Steps

- a. Evan reviewed action items for CONSTANT and the Planning Team, highlighted the timing and process for scheduling the next planning meeting, and solicited the group for final questions.
- b. CONSTANT
 - i. Finalize and share meeting minutes within five business days.
 - ii. Conduct risk assessment, analyze public survey results, and update working draft with provided data
 - iii. Provide planning team tool for jurisdictions to select hazards and adjust their CPRI ratings
 - iv. Send planning team guidance for reviewing
- c. Planning Team
 - i. Collect and deliver remaining data requirements
 - ii. Complete CPRI worksheet by December 4 as practicable
 - iii. Review mitigation strategy and mitigation actions from 2015 MJHMP prior to next meeting.

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 Planning Meeting 1 – Meeting Minutes



- iv. Provide status of mitigation actions from the previous plan. Incomplete status is fine, ongoing is fine as well. CONSTANT will address each on an individual basis. This will assist in developing new mitigation actions with concrete, actionable mitigation activities to address a known hazard, protect the community, and provide an estimated cost that can be completed within the next five years. Concrete actions are preferred (retrofitted buildings, defensible spaces in high fire areas, etc.).
- v. Identify desired mitigation goals, actions, and how they should be implemented
- d. Next Meeting:
 - i. Week of December 14
 - ii. Will include similar time frame
 - iii. Date and time will be determined via a Doodle Poll
 - iv. The meeting will take up to two hours due to volume of content covered.
- e. Questions & Discussion
 - i. Evan asked if the Coconino County has recently conducted a HAZUS assessment.
 - 1. Ben Wilson and Wes Dison stated that they are unaware of one. Tim Carter would know for sure and can be contacted via email.

VII. Adjourn

Table 2: Meeting Attendees

#	Name	Organization/Department	Email
1.	Erin Harris	City of Page Fire Department	eharris@pageaz.gov
2.	John Romero	City of Williams Police Department	jromero@williamsaz.gov
3.	Wes Dison	Coconino County Emergency Management	wdison@coconino.az.gov
4.	Evan Koepke	Constant Associates	evan@constantassociates.com
5.	Lee Rosenberg	Constant Associates	lee@constantassociates.com
6.	Jerry Bills	Summit Fire District	jbills@flagstaffaz.gov
7.	Tim Carter	Coconino County Emergency Management	tcarter@coconino.az.gov
8.	Benjamin Wilson	Coconino County Public Health	bwilson@coconino.az.gov
9.	Amanda Ozaki-Laughon	Constant Associates	amanda@constantassociates.com

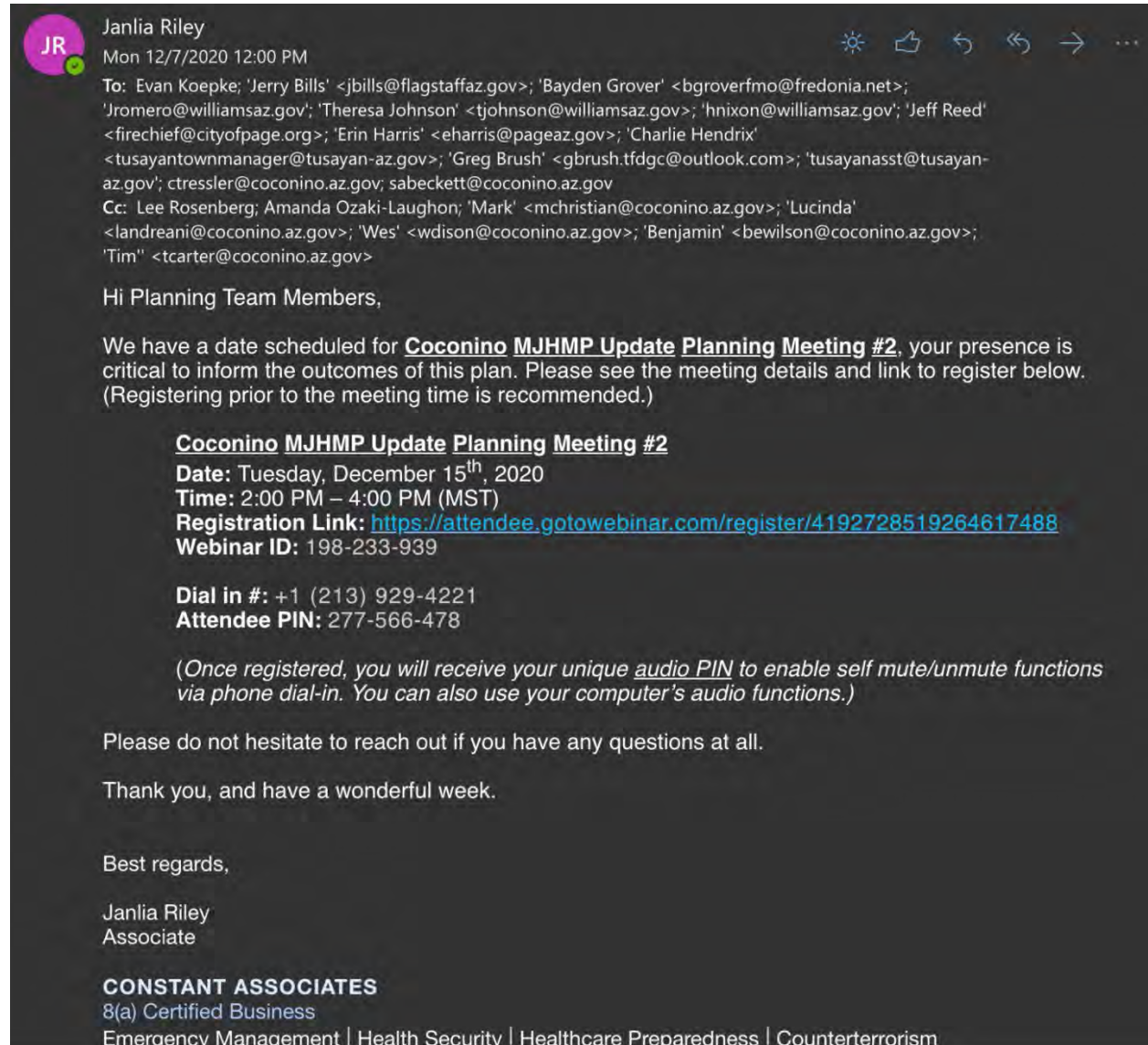


3. Project Planning Team Meeting #2

Date/Time: December 15, 2020 @ 2:00PM – 3:00PM MST

Location: GoToWebinar (virtual meeting)

Invitation:



The image is a screenshot of an email invitation. At the top left, there is a circular profile picture with the initials 'JR' and a green status indicator. To the right of the profile picture, the sender's name 'Janlia Riley' and the time 'Mon 12/7/2020 12:00 PM' are displayed. On the far right of the email header, there are icons for settings, thumbs up, reply, reply all, and forward. The main body of the email contains a list of recipients in the 'To:' field and a list of names in the 'Cc:' field. The body text begins with 'Hi Planning Team Members,' followed by a paragraph explaining the purpose of the meeting and providing a link to register. Below this, the meeting details are listed: 'Coconino MJHMP Update Planning Meeting #2', 'Date: Tuesday, December 15th, 2020', 'Time: 2:00 PM – 4:00 PM (MST)', 'Registration Link: <https://attendee.gotowebinar.com/register/4192728519264617488>', and 'Webinar ID: 198-233-939'. Further down, the dial-in information is provided: 'Dial in #: +1 (213) 929-4221' and 'Attendee PIN: 277-566-478'. A note in italics states: '(Once registered, you will receive your unique audio PIN to enable self mute/unmute functions via phone dial-in. You can also use your computer's audio functions.)'. The email concludes with 'Please do not hesitate to reach out if you have any questions at all.', 'Thank you, and have a wonderful week.', and 'Best regards,'. The sender's name 'Janlia Riley' and title 'Associate' are listed at the bottom. Finally, the logo for 'CONSTANT ASSOCIATES' is shown, along with their certifications and services: '8(a) Certified Business', 'Emergency Management | Health Security | Healthcare Preparedness | Counterterrorism'.

Janlia Riley
Mon 12/7/2020 12:00 PM

To: Evan Koepke; 'Jerry Bills' <jbills@flagstaffaz.gov>; 'Bayden Grover' <bgroverfmo@fredonia.net>; 'Jromero@williamsaz.gov'; 'Theresa Johnson' <tjohnson@williamsaz.gov>; 'hnixon@williamsaz.gov'; 'Jeff Reed' <firechief@cityofpage.org>; 'Erin Harris' <eharris@pageaz.gov>; 'Charlie Hendrix' <tusayantownmanager@tusayan-az.gov>; 'Greg Brush' <gbrush.tfdgc@outlook.com>; 'tusayanasst@tusayan-az.gov'; ctressler@coconino.az.gov; sabeckett@coconino.az.gov

Cc: Lee Rosenberg; Amanda Ozaki-Laughon; 'Mark' <mchristian@coconino.az.gov>; 'Lucinda' <landreani@coconino.az.gov>; 'Wes' <wdison@coconino.az.gov>; 'Benjamin' <bewilson@coconino.az.gov>; 'Tim' <tcarter@coconino.az.gov>

Hi Planning Team Members,

We have a date scheduled for **Coconino MJHMP Update Planning Meeting #2**, your presence is critical to inform the outcomes of this plan. Please see the meeting details and link to register below. (Registering prior to the meeting time is recommended.)

Coconino MJHMP Update Planning Meeting #2
Date: Tuesday, December 15th, 2020
Time: 2:00 PM – 4:00 PM (MST)
Registration Link: <https://attendee.gotowebinar.com/register/4192728519264617488>
Webinar ID: 198-233-939

Dial in #: +1 (213) 929-4221
Attendee PIN: 277-566-478

(Once registered, you will receive your unique audio PIN to enable self mute/unmute functions via phone dial-in. You can also use your computer's audio functions.)

Please do not hesitate to reach out if you have any questions at all.

Thank you, and have a wonderful week.

Best regards,

Janlia Riley
Associate

CONSTANT ASSOCIATES
8(a) Certified Business
Emergency Management | Health Security | Healthcare Preparedness | Counterterrorism

Stakeholders invitation list:


Coconino MJHMP Update Planning Meeting 2 Invitee List.pdf

Individuals with () by their name were invited afterward at request of Wes Dyson or Mark Christian*

#	Name	Organization/Department	Email
1.	Bayden Grover	Marshall, Fredonia	bgroverfmo@fredonia.net
2.	Benjamin Wilson	Coconino County Public Health	bewilson@coconino.az.gov
3.	Charlie Hendrix	Town Manager, Tusayan	tusayantownmanager@tusayanaz.gov
4.	Christian Tressler	County Engineer, Coconino County	ctressler@coconino.az.gov
5.	Erin Harris	Page Fire Department	eharris@pageaz.gov
6.	Greg Brush	Fire Chief, Tusayan	Gbrush.tfdgc@outlook.com
7.	Herman Nixon	Williams Police Department	hnixon@williamsaz.gov
8.	Jeff Reed	Fire Chief, City of Page	firechief@cityofpage.org
9.	Jerry Bills	Summit Fire District	jbills@flagstaffaz.gov
10.	John Romeo	Williams Police Department	jromeo@williamsaz.gov
11.	Junjun Liang	Tusayan Town Clerk	tusyanasst@tusayan-az.gov
12.	Lucinda Andreani	Coconino Deputy County Manager	Landreani@coconino.az.gov
13.	Mark Christian	Program Coordinator, Emergency Management, Coconino County	mchristian@coconino.az.gov
14.	Sam Beckett	Public Works Response Coordinator	sabeckett@coconiono.az.gov
15.	Theresa Johnson	Emergency Management, Williams	tjohnson@williamsaz.gov
16.	Tim Carter	Coconino County Emergency Management	tcarter@coconino.az.gov
17.	Wes Dison	Emergency Manager, Coconino County	wdison@coconino.az.gov
18.	Daren Sweet *	AZ Dept of Emergency & Military Affairs	daren.sweet@azdema.gov
19.	Tim Carter *	Emergency Management Specialist, Coconino County	tcarter@coconino.az.gov

Sign-in sheet:

Coconino County
 Hazard Mitigation Plan Update Project 2020
 Planning Meeting 2 – Attendance Sheet



COCONINO
 COUNTY ARIZONA

Attendance Sheet

Planning Meeting 2

Location: Virtual Meeting on GoToWebinar
Date: Tuesday, December 15, 2020
Time: 2:00pm-3:00pm MST
Dial-In: GoToWebinar
Participant Pin: Received upon registration
Webinar Link: <https://attendee.gotowebinar.com/register/4192728519264617488>

#	Name	Organization/ Department	Telephone	Email	Attendance
1.	Erin Harris	City of Page Fire Department		eharris@pageaz.gov	Present
2.	John Romero	City of Williams Police Department		jromeo@williamsaz.gov	Present
3.	Wes Dison	Coconino County Department of Emergency Management		wdison@coconino.az.gov	Present
4.	Evan Koepke	Constant Associates		evan@constantassociates.com	Present
5.	Lee Rosenberg	Constant Associates		lee@constantassociates.com	Present
6.	Jerry Bills	Summit Fire Department		jbills@flagstaffaz.gov	Present

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Coconino County
 Hazard Mitigation Plan Update Project 2020
 Planning Meeting 2 – Attendance Sheet



7.	Tim Carter	Coconino County Department of Emergency Management		tcarter@coconino.az.gov	Present
8.	Benjamin Wilson	Coconino County Department of Health and Human Services		bewilson@coconino.az.gov	Present
9.	Amanda Ozaki-Laughon	Constant Associates		amanda@constantassociates.com	Present
10.	Daren Sweet	Arizona Department of Emergency Management		Daren.sweet@azdema.gov	Present
11.	Mark Christian	Coconino County Department of Emergency Management		mchristian@coconino.az.gov	Present
12.	Greg Brush	Town of Tusayan Fire Department		Gbrush.tfdgc@outlook.com	Present
13.	Bayden Grover	Town of Fredonia		bgroverfmo@fredonia.net	Present
14.	Jeff Reed	City of Page Fire Department		jirechief@cityofpage.org	Present

Presentation (cover only):



Planning Meeting 2

COCONINO COUNTY

2020 COUNTY HAZARD MITIGATION PLAN UPDATE

December 15, 2020

Presented by: Evan Koepke, Lee Rosenberg, & Amanda Ozaki-Laughon

Resilience is CONSTANT™

DRAFT

Meeting notes:

Coconino County
 Hazard Mitigation Plan Update Project 2020
 Planning Meeting 2 – Meeting Minutes



Meeting Minutes

Planning Meeting 2

Location: Virtual Meeting on GoToWebinar
 Date: Tuesday, December 15, 2020
 Time: 2:00pm-3:00pm MST
 Dial-In: GoToWebinar
 Participant Pin: Received upon registration
 Webinar Registration Link:
<https://attendee.gotowebinar.com/register/4192728519264617488>

Table 1: Action Items

#	Deliverable	Responsible	Due
1.	Finalize and share meeting minutes within 5 business days	CONSTANT	12/22/2020
2.	Continue hazard and risk assessment, analyze public survey results, update working draft with provided data	CONSTANT	1/22/2021
3.	Support Planning Team in collecting necessary information, completing worksheets, and developing mitigation actions	CONSTANT	1/22/2021
4.	Build and share new mitigation action worksheet	CONSTANT	ASAP
5.	Resend planning team the hazard assessment questionnaire	CONSTANT	12/22/2020
6.	Identify a date for follow-up planning meeting in the new year via Doodle Poll and send registration link	CONSTANT	ASAP
7.	Post community hazard survey to city webpages if not complete and provide substantiation if not complete	Planning Team	ASAP
8.	Collect and deliver remaining data requirements	Planning Team	ASAP
9.	Identify additional mitigation actions and build out specifications to the mitigation actions identified	Planning Team	1/22/2020
10.	Review mitigation strategy/actions from 2015 MJHMP	Planning Team	Prior to next planning meeting



I. Welcome

- i. Evan Koepke reviewed the purpose of the planning meeting, found on page two of the slide deck. He subsequently led the group in a round of introductions.

II. Project Status and Plan Update

i. Actions Taken and Tasks Completed

- 1. Evan Koepke reviewed the actions taken and tasks completed by CONSTANT and the Coconino County planning team, found on page four of the slide deck. He thanked the planning team for their hard work during a very busy time.
- 2. Evan Koepke walked the planning team through outstanding data requirements, found on page 6 of the slide deck.
- 3. Evan asked if everyone had a copy of the hazard assessment questionnaire and if there were any outstanding issues or questions.
 - A. Jerry Bills requested Evan Koepke to identify the proper form.
 - B. Evan Koepke gave a description of the hazard questionnaire and offered to resend the questionnaire if necessary.
 - C. Jerry Bills affirmed.
 - D. Evan followed up and asked if any other planning team members needed forms sent to them

- ii. Hearing no additional requests, Evan Koepke continued through the outstanding data requirements.

- 1. Lee Rosenberg advised that infrastructure departments often keep data on critical infrastructure property values, which planning team members can forward along to the CONSTANT team.

- iii. Evan Koepke asked if planning members had any technical questions. Hearing none, he asked Lee Rosenberg to lead the group through brainstorming new mitigation goals.

III. Mitigation Goals

- i. Lee Rosenberg walked the planning team through the proposed mitigation goals (found on page eight of the slide deck). He asked the planning team for thoughts on the mitigation goals.

- 1. Wes Dison stated that Coconino County requires specific language referring to wildfires and post-fire flooding to be included in the mitigation goals.
- 2. Lee Rosenberg stated that language will be included as hazards and will include post-fire debris flows as well.
- 3. Wes Dison emphasized the county has a specific recognition of those two hazards.
- 4. Lee Rosenberg agreed and affirmed they will be included.
- 5. Lee Rosenberg opened the discussion for any additional thoughts on the mitigation goals. Hearing none, he continued.

- ii. Lee Rosenberg walked the planning team through the mitigation action overview found on page nine of the slide deck. He emphasized each jurisdiction does not need to have the same hazards and mitigation actions.

- iii. Lee Rosenberg stated that the goal of this documentation is to create a mitigation plan for the next five years, allowing each jurisdiction to request grant funding. He stated the next step is for the planning team to submit new mitigation actions.

IV. New Mitigation Actions

- i. Evan Koepke gave an overview for the new mitigation actions procedure the planning meeting may utilize. He asked Lee Rosenberg to begin the new mitigation action brainstorming process.
- ii. Lee Rosenberg began first with Coconino County, and asked Coconino County planning team members to identify new mitigation actions that may be incorporated into the new plan. He stated these can be broad actions that have been used before.
 - 1. Wes Dison inquired if representatives from Public Works were on the call.
 - 2. Evan Koepke checked the attendee lists and verified that they were not. He additionally verified that the identified representatives from each jurisdiction had received invitations to the meeting.
 - 3. Mark Christian stated that an offline conversation with Evan Koepke can be held with Public Works.
 - 4. County representatives and Constant staff discussed the value of continuing discussion of mitigation actions without additional county stakeholders present from Public Works and Engineering. It was generally concurred that additional identification of mitigation actions at the County level was not practicable without additional stakeholders present.
- ii. The group weighed the value of continuing the meeting and Evan asked attendees if any had brought mitigation actions that they could discuss.
 - 1. Several participants stated they were unsure if their jurisdiction had identified new mitigation actions and did not have new mitigation actions to discuss.
 - 2. Jeff Reed concurred and stated that his jurisdiction's Public Works department may be better suited to identify new mitigation actions.
- iii. Evan Koepke affirmed responses and asked for any other feedback.
 - 1. Jerry Bills asked if the planning team could review previous mitigation actions beforehand.
 - 2. Evan Koepke affirmed this should occur.
 - 3. Jerry Bills asked for the slides to be shared so that their jurisdiction can brainstorm new mitigation actions.
 - 4. Evan Koepke agreed and stated that the slides will be shared with the planning team.
- iv. Lee Rosenberg asked if it would be helpful to continue with an abbreviated overview of the slides, to allow the planning team to see the process of brainstorming new mitigation actions.
 - 1. The group affirmed.
- v. Lee Rosenberg assented and continued with an overview of what new mitigation actions should entail found on slides 10-15.
- iii. Lee Rosenberg asked if anyone had any questions. Hearing none, he asked if any jurisdictions had their own water districts.
 - 1. Jerry Bills affirmed for the City of Flagstaff.

Coconino County
 Hazard Mitigation Plan Update Project 2020
 Planning Meeting 2 – Meeting Minutes



- 2. Mark Christian affirmed the County has its own water district.
- 3. Lee Rosenberg asked if there are any other water districts. Hearing none, he turned the closing of the meeting over to Evan Koepke.
- iv. Evan Koepke went over action items found on page 16 of the slide deck.
- v. Wes Dison affirmed the plan to hold an additional meeting in the new year in light of the approaching deadline and recommended adding additional invitees.
- vi. Evan affirmed and ended the meeting.

V. Adjourn

Table 2: Meeting Attendees

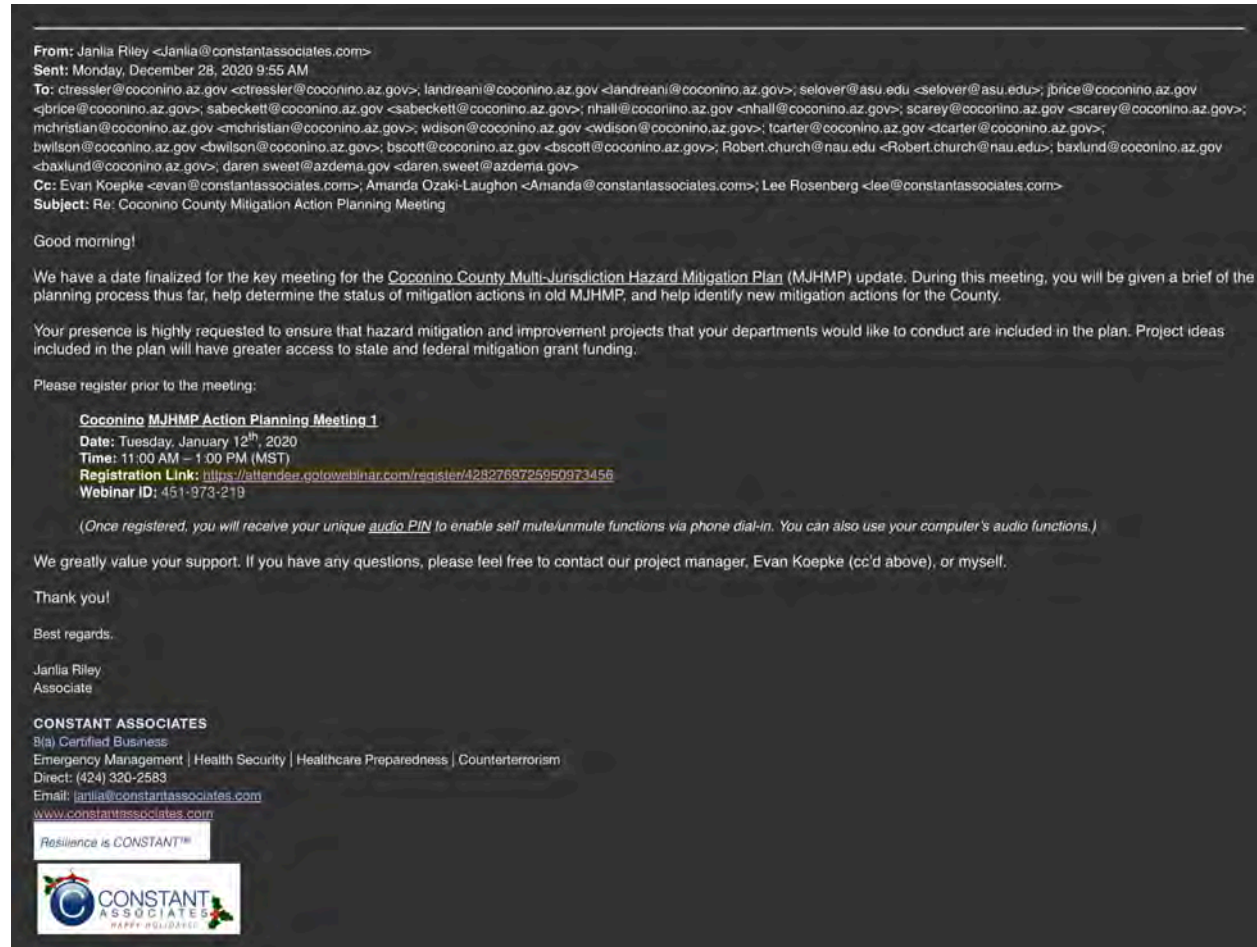
#	Name	Organization/Department
1.	Erin Harris	City of Page Fire Department
2.	John Romero	City of Williams Police Department
3.	Wes Dison	Coconino County Department of Emergency Management
4.	Evan Koepke	Constant Associates
5.	Lee Rosenberg	Constant Associates
6.	Jerry Bills	Summit Fire Department
7.	Tim Carter	Coconino County Department of Emergency Management
8.	Benjamin Wilson	Coconino County Department of Health and Human Services
9.	Amanda Ozaki-Laughon	Constant Associates
10.	Daren Sweet	Arizona Department of Emergency Management
11.	Mark Christian	Coconino County Department of Emergency Management
12.	Greg Brush	Town of Tusayan Fire Department
13.	Bayden Grover	Town of Fredonia
14.	Jeff Reed	City of Page Fire Department

4. Project Planning Team Mitigation Action Planning Meeting

Date/Time: January 12, 2021 @ 2:00PM – 3:00PM MST

Location: GoToWebinar (virtual meeting)

Invitation:



From: Janlia Riley <Janlia@constantassociates.com>
Sent: Monday, December 28, 2020 9:55 AM
To: ctressler@coconino.az.gov <ctressler@coconino.az.gov>; landreani@coconino.az.gov <landreani@coconino.az.gov>; selover@asu.edu <selover@asu.edu>; jbrice@coconino.az.gov <jbrice@coconino.az.gov>; sabeckett@coconino.az.gov <sabeckett@coconino.az.gov>; nhall@coconino.az.gov <nhall@coconino.az.gov>; scarey@coconino.az.gov <scarey@coconino.az.gov>; mchristian@coconino.az.gov <mchristian@coconino.az.gov>; wdison@coconino.az.gov <wdison@coconino.az.gov>; tcarter@coconino.az.gov <tcarter@coconino.az.gov>; bwilson@coconino.az.gov <bwilson@coconino.az.gov>; bscott@coconino.az.gov <bscott@coconino.az.gov>; Robert.church@nau.edu <Robert.church@nau.edu>; baxlund@coconino.az.gov <baxlund@coconino.az.gov>; daren.sweet@azdema.gov <daren.sweet@azdema.gov>
Cc: Evan Koepke <evan@constantassociates.com>; Amanda Ozaki-Laughon <Amanda@constantassociates.com>; Lee Rosenberg <lee@constantassociates.com>
Subject: Re: Coconino County Mitigation Action Planning Meeting

Good morning!

We have a date finalized for the key meeting for the Coconino County Multi-Jurisdiction Hazard Mitigation Plan (MJHMP) update. During this meeting, you will be given a brief of the planning process thus far, help determine the status of mitigation actions in old MJHMP, and help identify new mitigation actions for the County.

Your presence is highly requested to ensure that hazard mitigation and improvement projects that your departments would like to conduct are included in the plan. Project ideas included in the plan will have greater access to state and federal mitigation grant funding.

Please register prior to the meeting:

Coconino MJHMP Action Planning Meeting 1
Date: Tuesday, January 12th, 2020
Time: 11:00 AM – 1:00 PM (MST)
Registration Link: <https://attendee.gotowebinar.com/register/4282768725950973456>
Webinar ID: 451-973-219

(Once registered, you will receive your unique audio PIN to enable self mute/unmute functions via phone dial-in. You can also use your computer's audio functions.)

We greatly value your support. If you have any questions, please feel free to contact our project manager, Evan Koepke (cc'd above), or myself.


Thank you!

Best regards,

Janlia Riley
Associate


CONSTANT ASSOCIATES
B(a) Certified Business
Emergency Management | Health Security | Healthcare Preparedness | Counterterrorism
Direct: (424) 320-2583
Email: janlia@constantassociates.com
www.constantassociates.com

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Sign-in sheet:

Coconino County
Hazard Mitigation Plan Update Project 2020
 Planning Meeting 2 – Attendance Sheet



Attendance Sheet

Planning Meeting 2

Location: Virtual Meeting on GoToWebinar
Date: Tuesday, January 12, 2020
Time: 11:00am-1:00pm MST
Dial-In: GoToWebinar
Participant Pin: Received upon registration
Webinar Link: <https://register.gotowebinar.com/register/6217741965557827344>

#	Name	Organization/ Department	Telephone	Email	Attendance
1.	Adam Hicks	Coconino County Department of Building Safety			Present
2.	Amanda Ozaki-Laughon	Constant Associates		amanda@constantassociates.com	Present
3.	Blake Scott	Coconino County Public Health Emergency Preparedness			Present
4.	Daren Sweet	Arizona Department of Emergency Management		Daren.sweet@azdema.gov	Present
5.	Evan Koepke	Constant Associates		evan@constantassociates.com	Present
6.	Gerrit Boeck	Coconino County Sheriff's Office			Present

1



Coconino County
 Hazard Mitigation Plan Update Project 2020
 Planning Meeting 2 – Attendance Sheet



7.	John Brice II	Coconino County Department of Building and Safety			Present
8.	Lee Rosenberg	Constant Associates		lee@constantassociates.com	Present
9.	Mark Christian	Coconino County Department of Emergency Management		mchristian@coconino.az.gov	Present
10.	Nancy Selover	Arizona State University			Present
11.	Robert Church	Northern Arizona University			Present
12.	Samuel Beckett	Coconino County Public Works			Present
13.	Tim Carter	Coconino County Department of Emergency Management		tcarter@coconino.az.gov	Present
14.	Wes Dison	Coconino Department of Emergency Management		wdison@coconino.za.gov	Present

Presentation (cover only):



Coconino County Mitigation Action Planning Meeting

COCONINO COUNTY

2020 COUNTY HAZARD MITIGATION PLAN UPDATE

January 12, 2020

Presented by: Evan Koepke, Lee Rosenberg, & Amanda Ozaki-Laughon

Resilience is CONSTANT™

DRAFT

Meeting notes:

Coconino County
 Hazard Mitigation Plan Update Project 2020
 Mitigation Action Planning Meeting – Meeting Minutes



Meeting Minutes

Mitigation Action Planning Meeting

Location: Virtual Meeting on GoToWebinar
 Date: Tuesday, January 12, 2021
 Time: 11:00am-1:00pm MST
 Dial-In: GoToWebinar
 Participant Pin: Received upon registration
 Webinar Registration Link: <https://register.gotowebinar.com/register/6217741965557827344>

Table 1: Action Items

#	Deliverable	Responsible	Due
1.	Finalize and share meeting minutes within 7 business days	CONSTANT	1/21/2021
2.	Build and share updated mitigation action worksheet with Mark, who will share with Coconino County Planning Team	CONSTANT	ASAP
3.	Send relevant mitigation planning documents to Robert Church	CONSTANT	1/22/2021
4.	Identify additional mitigation actions (as necessary) and define the specifications for the mitigation actions assigned to your department – document in new mitigation action worksheet and send to Mark Christian	Coconino County Planning Team	1/22/2021
5.	Identify an expanded list of partner agencies to substantiate Action 5.3	Coconino County Planning Team	1/29/2021
6.	Provide feedback on Draft MJHMP when released for initial review. Expected by February 1	Coconino County Planning Team	TBD
7.	Send the NAU CPRI to the CONSTANT team at: evan@constantassociates.com	Robert Church	ASAP
8.	Follow-up with Daren Sweet to discuss utility of CPRI “roll-up.”	Wes Dison	1/29/2021
9.	Identify any existing mutual aid agreement with DFFM outside of AZMAC and follow-up with Sam Beckett and CONSTANT	Mark Christian	1/29/2021

I. Welcome

- a. Evan Koepke reviewed the purpose of the action planning meeting, found on page two of the slide deck. He and Amanda Ozaki-Laughon conducted a brief roll call. Evan received confirmation that all necessary participants were present.



II. Project Status and Plan Update

- a. Evan led the Coconino County planning team through an overview of the project, found on slide 4. He emphasized the truncated timeline of the project and the importance of staying on schedule. He provided an overview of actions taken thus far in the project.
- b. Evan updated the planning team on the project timeline, found on slide 5 and asked if the planning team had any questions. Hearing none, he proceeded.

III. Historical Hazard Events in the County

- a. Evan handed the presentation over to Lee Rosenberg. Lee gave a brief overview of historical hazard events in Coconino County, found on slide six.
- b. Lee asked if there were any questions regarding the historical hazard events.
 - i. Mark Christian emphasized that while wildfires are listed as a threat, there is great interest in listing post-fire flooding into the plan.
 - ii. Lee acknowledged this and stated that FEMA categorizes post-fire flooding as a flood/flash flood event. A detailed write-up will be included in the plan for that category.
 - iii. Wes Dison stated that inclusion is appreciated and that Daren Sweet and their contact Sue Austin at DEMA can be made available to help with that process.
 - iv. Lee stated that the CONSTANT team can draft mitigation activities associated with post-fire debris flows and flooding.
 - v. Wes affirmed those actions would be an excellent value add.
- c. Lee asked if there were any additional questions or feedback from the team on historical hazard events. Hearing none, he proceeded.

IV. Hazard ID & Prioritization

- a. Lee briefly led the team through an overview of hazard identification and prioritization conducted by the CPRI process. He highlighted the flood/flash flood and wildfire categories to further emphasize the ways post-fire flooding will be incorporated into the MJHMP. He asked the team if there were any questions.
 - i. Robert Church stated in the chat that Northern Arizona University's CPRI could be made available to the CONSTANT team. Amanda gave him Evan's email to facilitate the exchange of information.
- b. Hearing no additional questions, Lee proceeded.

V. Hazard Selection

- a. Lee led the group through the hazards identified in the 2015 plan and the new hazards selected for the 2020 plan, found on slide nine. He asked the group if there were any questions regarding hazard selection.
 - i. Wes asked Blake Scott if the term "Pandemic" was acceptable from a public health perspective.
 - ii. Blake stated that he would use terminology highlighting "Public Health/Pandemic."
 - iii. Lee stated they would use the same terminology across the entire plan.
 - iv. Evan stated that the term "Public Health Emergency" was suggested by Ben Wilson.

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- v. Lee stated that they would defer to Public Health with terminology, and Evan agreed that the terminology can be edited depending on their preference.
- vi. Lee asked if there were any other questions. Hearing none, he continued to discuss mitigation goals.

VI. Mitigation Goals

- a. Lee provided a brief overview of the five overarching goals of hazard mitigation, found on slide 10.
 - i. Mark asked for clarification, stating that the mitigation goals are the overarching goals, and that the team was required to provide a mitigation activity for each hazard
 - ii. Lee affirmed that was correct and explained the process of creating a matrix of mitigation activities which will include a description, timeframe, cost, associated agency/agencies, and a prioritization.
 - iii. Mark noted that in the worksheet provided by CONSTANT for creating future mitigation actions there were sample actions listed and asked if that was correct.
 - iv. Lee stated that was correct and that CONSTANT is available to assist with other examples.

VII. Mitigation Actions

- a. Lee proceeded with an overview of mitigation actions. Process details can be found on slide 11.
- b. Lee stated the focus for this meeting will be to create mitigation activities for the county, preferably one for each of the hazards listed. He noted that FEMA maintains a large list of potential mitigating activities in its handbook.
 - i. Blake inquired about the possibility of conducting a roll-up of the CPRI scores. He stated in the 2015 plan, CPRI scores showed certain agencies/jurisdictions at higher risks for certain hazards than others. He asked if the CPRI would be a standalone number, or if there could be a roll-up of scores.
 - ii. Lee stated that was a good question, and that it is up to the county. He stated the plan could take the highest risk number for each hazard if that is desired.
 - iii. Blake clarified that the plan could have a standalone number, but also include the separate number for jurisdictions with a higher risk for a certain hazard. He acknowledged the issue is nuanced and that it was a question that came up with the 2015 plan.
 - iv. Lee stated that their preference could be taken.
 - v. Blake stated he would defer to emergency management.
 - vi. Lee affirmed and said that the answer is likely subjective.
 - vii. Wes stated he would hesitate to take the highest number for each hazard due to the size of the county. He would take direction from Daren Sweet and Sue Austin. He stated he would follow-up with Daren offline.
 - viii. Lee stated the county will have the opportunity to see the overall data and can make a judgement from there.
 - ix. Lee asked if there were any additional questions. Hearing none, he proceeded.
- c. Lee led the group through a list of ongoing mitigation actions from the previous plan. He explained these actions would be incorporated into the current plan. He asked if anyone could validate that these mitigation actions are ongoing.
 - i. Mark asked if the team was looking for a detailing of actions taken.

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- ii. Evan emphasized they were looking for validation that these should be included in the updated plan and that detailed descriptions are available.
 - iii. Mark clarified that the actions listed are a combination of the ongoing activities and asked if they were taken from the county review sheet.
 - iv. Lee affirmed that they came from the previous plan. Evan re-emphasized that they would like to confirm the ongoing mitigation actions are captured appropriately and receive validation on that end.
 - v. Mark stated they appeared accurate.
 - vi. Sam stated he also did not see any errors.
 - vii. Wes stated he would defer to Sam.
- d. Lee moved to the second slide of ongoing mitigation actions on slide 13.
- i. Mark stated that the action, “Deploy and maintain/repair Flash Flood Early Warning System in Havasupai Canyon” may need to be updated.
 - ii. Wes asked if Mark was in contact with the DEMA tribal liaison.
 - iii. Mark stated he contacted the liaison but has not heard back. The action as listed is correct.
 - iv. Wes stated the “implementing agency” for that action should be “DEMA Tribal EM.”
 - v. Lee noted the change and stated the language would remain consistent.
 - vi. Lee asked if there were any additional questions. Hearing none, he proceeded.

VIII. New Mitigation Actions

- a. Lee transitioned the team into a session to create new mitigation actions for each goal. He stated CONSTANT had provided generic actions and emphasized they were not specific.
- b. Goal 1: Protect life, property, and reduce potential injuries from natural caused hazards
 - i. Evan asked if there were any ideas offhand from the planning team for new mitigation actions for this goal.
 - ii. Sam asked Wes if he believed the Resilience Community Program should be included as a mitigation action here, since much of the funding for the program will be grant-related.
 - iii. Lee emphasized that if grant funding will be associated with the program, states and territories will be receiving funding through COVID-19 disaster declarations, and he encouraged the team to put anything for which they may apply for a grant in the plan.
 - iv. Sam stated including the Resilience Community Program will likely be necessary.
 - v. Lee encouraged the team to also include the grant that took the place of the Pre-Disaster Mitigation Grant (PDM) as a funding source.
 - vi. Sam stated that upgrading a communications system for the county is a goal, but it is a large undertaking. He asked if it would be too early to add that as a mitigation action.
 - vii. Lee stated that the upgrade can be included in goal one or goal five, including upgrades to the community system, new applications, etc.
 - viii. Wes agreed with Sam’s suggestion, but asked if there is a rate against including the upgrade in the mitigating actions due to the high cost and the lasting impact COVID-19 presents to budgetary constraints.
 - ix. Lee stated the rate against it is neutral. He suggested turning the upgrade into smaller mitigation actions and putting them in different places.

- x. Evan stated there is no penalty to including this large endeavor and clarified that future substantiations of the plan can break the upgrade down further if needed.
- xi. Wes agreed it would be a good initiative to include but emphasized caution on the language.
- c. Goal 2: Improve public understanding of, and support for, hazard mitigation measures
 - i. Actions 2.1 and 2.2:
 - 1. Wes asked if specific mentions of post-fire flooding, wildfires, and pandemic events can be included under actions 2.1 and/or 2.2 since they weigh heavily with the public.
 - 2. Lee agreed.
 - ii. Robert stated that he and Tim Carter had a partnership with Northern Arizona University communications students last year regarding creating messaging campaigns for real-world hazard mitigation experiences. COVID-19 halted partnership, but he would like to renew it.
 - iii. Wes emphasized interest in that partnership.
 - iv. Lee stated that a mitigation activity could be included to reinvigorate the partnership with the university.
 - v. Lee stated that flood insurance awareness could be included as a mitigation action here to be in alignment with the post-fire flooding concerns mentioned earlier.
 - vi. Evan asked if there were other ideas for Goal 2. Hearing none, Lee transitioned to Goal 3.
- d. Goal 3: Promote disaster resistance to natural, existing, and future built environment.
 - i. Lee reviewed the five generic actions that the planning team can refine to match local needs and context.
 - ii. Action 3.4:
 - 1. Sam stated under action 3.4, the implementing agency would likely be the flood control district because they hold the most authority. They also aren't labeled an agency, but as the district.
 - 2. Lee affirmed.
 - iii. Lee asked if there were any additional ideas for Goal 3. Hearing none, he moved to Goal 4.
- e. Goal 4: Strengthen partnerships and collaboration to implement mitigation activities
 - i. Lee asked the group for any mutual aid agreements or pre-existing partnerships and stated a list of those existing or new partnerships would be helpful for the plan.
 - ii. Evan asked the group to provide any additional partnerships they want to include.
 - iii. Action 4.1:
 - 1. Mark stated they may want to examine the current signatories of the Arizona Mutual Aid Compact (AZMAC) to see if there are missing any key players or stakeholders.
 - 2. Wes agreed and asked for clarification if this was the agreement under DEMA.
 - 3. Mark affirmed and cited as an example that the Havasupai tribal government is still not a signatory to the agreement.
 - 4. Lee stated they could reframe Action 4.1 to say verbiage such as, "conduct a review of AZMAC and encourage any that have not joined the pact to do so."
 - iv. Lee asked if there were any additional mutual aid projects such as with USDA or firefighting.

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Hazard Mitigation Plan Update Project 2020
Mitigation Action Planning Meeting – Meeting Minutes



- v. Sam asked the group if there was a mutual aid agreement with Coconino Department of Forestry and Fire Management (DFFM).
- vi. Mark affirmed but stated the planning team should check into the agreement in order to be very specific because the mutual aid may be solidified with AZMAC. Mark stated he would make some contacts and follow up with both Sam and CONSTANT on this.
- vii. Lee asked if there were any additional ideas for this goal. Hearing none, he proceeded.
- f. Goal 5: Enhance the ability to effectively and immediately respond to disasters
 - i. Lee asked the team for new mitigation action ideas.
 - ii. Action 5.1:
 - 1. Lee asked if Action 5.1 regarding cloud storage should be included.
 - 2. Wes stated that their IT department has cloud storage covered.
 - 3. Lee stated that it can be removed if not valuable.
 - 4. Wes stated he would prefer to leave the action in the plan to maintain systems.
 - iii. Lee agreed and moved to Action 5.2.
 - 1. Wes stated the county has strong relationships with its utility companies and vendors.
 - 2. Mark asked the group what other agencies would be beneficial to list.
 - 3. Sam stated he did not know offhand, and Mark followed up that the planning team may desire to strengthen the agency sources for this action.
 - 4. Adam Hicks offered the inclusion of the Community Development, Building Division because they conduct final checks.
 - 5. Sam agreed with this inclusion and stated he prefers to loop in Sue Austin. Adam stated he would link up with her and see what they are able to contribute.
 - iv. Lee moved to Action 5.3.
 - 1. Mark stated the county maintains a close working relationship with United Way, law enforcement agencies providing CERT, and search and rescue. He stated the planning team can broaden the list of implementing agencies.
 - 2. Lee asked for that list to be provided.
 - 3. Sam asked to revisit the language of “build.” The county agreement with United Way was intended to keep the county from being required to take on oversee management. He stated public health took the initiative on that agreement.
 - 4. Blake agreed and stated that volunteer management is conducted through United Way to allow more effective use of volunteer time. Logistics and legal requirements are fulfilled through this agreement.
 - 5. Mark asked if the county would need to run or develop volunteers when using the language, “build a cadre.”
 - 6. Lee stated that the wording could be changed to, “support a cadre.” He also stated a mitigation action specific to the United Way agreement could be included.
 - 7. Lee asked if there are any additional agreements outside of the United Way umbrella, such as CERT teams or a medical reserve corps.
 - 8. Blake stated the medical reserve corps are supposed to be a county function, but there is no substantial funding attached to it.

Coconino County
Hazard Mitigation Plan Update Project 2020
Mitigation Action Planning Meeting – Meeting Minutes



9. Lee stated grant funding may be an opportunity if that is included as a mitigation action, and that the team will work to parse this out.
10. Blake stated that the funding is supposed to be present to pay for medical reserve corps volunteers under public health emergency preparedness, homeland security funding, and other sources.
- v. Lee offered additional explanation of disaster cadre, public servants and government workers. Required by law to provide services doing a disaster. Include volunteer orgs that are managed by the county as support during an incident
 1. Wes stated that volunteer management is run by the United Way of Northern Arizona.
 2. Wes asked for clarification of what “emergency services” includes in Action 5.3.
 3. Lee stated it is a broad category covering any personnel, staff, or resources used to respond to an incident or disaster.
 4. Wes agreed with this category.
 5. Lee asked if there were additional questions or actions. Hearing none, he proceeded.
- vi. Lee handed the presentation over to Evan to close out the meeting.

IX. Meeting Conclusion

- a. Evan reviewed action items on slide 20 and opened up the presentation to any remaining questions from the planning team.
 - i. Mark asked if the new mitigation action review sheets were the documents forwarded to other jurisdictions by Bill Pepler. He asked of those mitigation action review sheets are being forwarded to Mark or to CONSTANT.
 - ii. Evan stated yes, those are the correct documents. He stated they may be a mixture of both methods, but that he will ensure Mark receives copies of all paperwork being sent.
 - iii. Robert asked the CONSTANT team to ensure he receives the worksheets. Evan affirmed.
 - iv. Wes offered a thank you to the CONSTANT team and the Coconino County planning team.

X. Adjourn.

Coconino County
 Hazard Mitigation Plan Update Project 2020
 Mitigation Action Planning Meeting – Meeting Minutes



Table 2: Meeting Attendees

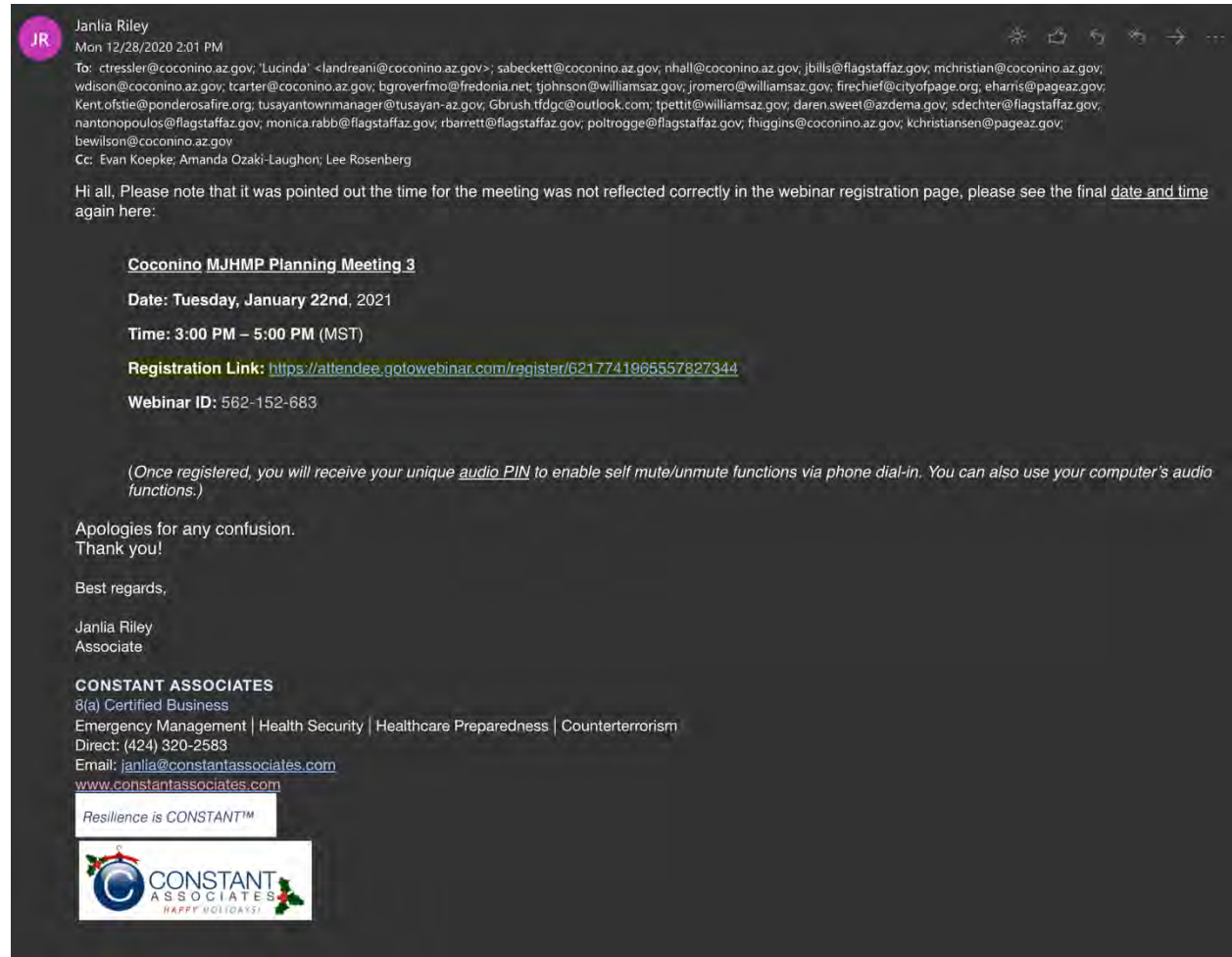
#	Name	Organization/Department
1.	Adam Hicks	Coconino County Department of Building and Safety
2.	Amanda Ozaki-Laughon	Constant Associates
3.	Blake Scott	Coconino County Public Health Emergency Preparedness
4.	Daren Sweet	Arizona Department of Emergency and Military Affairs
5.	Evan Koepke	Constant Associates
6.	Gerrit Boeck	Coconino County Sherriff's Office
7.	John Brice II	Coconino County Department of Building and Safety
8.	Lee Rosenberg	Constant Associates
9.	Mark Christian	Coconino County Department of Emergency Management
10.	Nancy Selover	Arizona State University
11.	Robert Church	Northern Arizona University
12.	Samuel Beckett	Coconino County Public Works
13.	Tim Carter	Coconino County Department of Emergency Management
14.	Wes Dison	Coconino County Department of Emergency Management

5. Project Planning Team Meeting #3

Date/Time: January 22, 2021 @ 2:00PM – 3:00PM MST

Location: GoToWebinar (virtual meeting)

Invitation:



JR Janlia Riley
Mon 12/28/2020 2:01 PM

To: ctressler@coconino.az.gov; 'Lucinda' <landreani@coconino.az.gov>; sabeckett@coconino.az.gov; nhall@coconino.az.gov; jbillis@flagstaffaz.gov; mchristian@coconino.az.gov; wdison@coconino.az.gov; tcarter@coconino.az.gov; bgroverfmo@fredonia.net; tjohnson@williamsaz.gov; jromero@williamsaz.gov; firechief@cityofpage.org; eharis@pageaz.gov; Kent.ofstie@ponderosafire.org; tusayantownmanager@tusayan-az.gov; Gbrush.tfdgc@outlook.com; tpettit@williamsaz.gov; daren.sweet@azdema.gov; sdechter@flagstaffaz.gov; nantonopoulos@flagstaffaz.gov; monica.rabb@flagstaffaz.gov; rbarrett@flagstaffaz.gov; poltrogge@flagstaffaz.gov; fhiggins@coconino.az.gov; kchristiansen@pageaz.gov; bewilson@coconino.az.gov

Cc: Evan Koepke; Amanda Ozaki-Laughon; Lee Rosenberg

Hi all, Please note that it was pointed out the time for the meeting was not reflected correctly in the webinar registration page, please see the final date and time again here:

Coconino MJHMP Planning Meeting 3

Date: Tuesday, January 22nd, 2021

Time: 3:00 PM – 5:00 PM (MST)

Registration Link: <https://attendee.gotowebinar.com/register/6217741965557827344>

Webinar ID: 562-152-683

(Once registered, you will receive your unique audio PIN to enable self mute/unmute functions via phone dial-in. You can also use your computer's audio functions.)


Apologies for any confusion.
Thank you!

Best regards,

Janlia Riley
Associate


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Email: janlia@constantassociates.com
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Sign-in sheet:

Coconino County
 Hazard Mitigation Plan Update Project 2020
 Planning Meeting 3 – Attendance Sheet



COCONINO
 COUNTY ARIZONA

Attendance Sheet

Planning Meeting 3

Location: Virtual Meeting on GoToWebinar
Date: Friday, January 22, 2021
Time: 3:00PM-4:15PM MST / 2:00PM-3:15PM PST
Dial-In: GoToWebinar
Participant Pin: Received upon registration
Webinar Registration Link: <https://attendee.gotowebinar.com/register/6217741965557827344>

#	Name	Organization/ Department	Telephone	Email	Attendance
1.	Bill Pepler	Constant Associates		Bill.pepler@constantassociates.com	Present
2.	Erin Harris	City of Williams Police Department			Present
3.	Evan Koepke	Constant Associates		evan@constantassociates.com	Present
4.	Greg Brush	Town of Tusayan Fire Department			Present
5.	John Romero	City of Williams Police Department			Present
6.	Lee Rosenberg	Constant Associates		lee@constantassociates.com	Present

1

Coconino County
Hazard Mitigation Plan Update Project 2020
 Planning Meeting 3 – Attendance Sheet



7.	Mark Christian	Coconino County Department of Emergency Management			Present
8.	MJ Yoon	Constant Associates		mj@constantassociates.com	Present
9.	Monica Rabb	City of Flagstaff Utilities Division		mchristian@coconino.az.gov	Present
10.	Nicole Antonopoulos	City of Flagstaff Sustainability Manager			Present
11.	Paul Oltrogge	City of Flagstaff Fire Department			Present
12.	Samuel Beckett	Coconino County Public Works			Present
13.	Stacey Brechler-Knaggs	City of Flagstaff Grants and Contracts Manager			Present
14.	Susan Austin	AZ Department of Emergency Management/Military Affairs			Present
15.	Wes Dison	Coconino County Department of Emergency Management		wdison@coconino.az.gov	

Presentation (cover only):



Planning Meeting 3

COCONINO COUNTY

2020 COUNTY HAZARD MITIGATION PLAN UPDATE

January 22, 2021


Presented by: Evan Koepke, Lee Rosenberg, Bill Pepler, MJ Yoon

Resilience is CONSTANT™

DRAFT

Meeting notes:

Coconino County
 Hazard Mitigation Plan Update Project 2020
 Mitigation Action Planning Team Meeting #3 – Meeting Minutes



Meeting Minutes

Planning Team Meeting #3


Location: Virtual Meeting on GoToWebinar
 Date: Friday, January 22, 2021
 Time: 3:00PM-4:15PM MST / 2:00PM-3:15PM PST
 Dial-In: GoToWebinar
 Participant Pin: Received upon registration
 Webinar Registration Link: <https://attendee.gotowebinar.com/register/6217741965557827344>


Table 1: Action Items

#	Deliverable	Responsible	Due
1.	Finalize and share meeting minutes within 7 business days.	CONSTANT	2/2
2.	Send Constant the Flagstaff Disaster Recovery team information (i.e. names, contact info) as relevant to the MJHMP planning process.	Stacey Brechler-Knaggs	2/3
3.	Confirm total number of Dam Emergency Action Plans.	Mark Christian	2/3
4.	Update 2018 data on USDA drought assistance funding provided to farmers and ranchers is still accurate (i.e. is this still occurring and what are the updated dollar amounts?).	Wes Dison/Evan Koepke	2/3
5.	Coordinate provision of updated flood maps by County GIS.	Mark Christian	2/3
6.	Remove two (2) tables of wildfire hazard risk that were included in the 2015 MJHMP (i.e. Constant is unable to find replicate/data for).	Lee Rosenberg	2/3
7.	Provide a finalized list of hazards to be included in the 2020 MJHMP update.	Wes Dison/Mark Christian	1/29

I. Welcome

- a. Evan Koepke opened the meeting by going over the meeting's agenda:
 - i. Provide project status update;
 - ii. Discuss outstanding data requirements;
 - iii. Brief approach to expediently review Draft LHMP;
 - iv. Presentation will be sent with meeting minutes.
- b. MJ Yoon performed the roll call.





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II. Project Status Update

- a. Evan went over the actions taken and tasks completed:
 - i. Finalizing hazard identification, risk assessment, and public outreach survey analysis;
 - ii. Developed working draft of MJHMP as of this last week; only a few sections remain to be filled in with the new mitigation actions.
- b. Evan went over the remaining challenges and support needs:
 - i. Aiming to send first draft for the team to review during the first week of February;
 - ii. Requested feedback from the team within a week to a week and a half;
 - iii. Finalize draft for a public review that will be for two (2) weeks;
 - 1. Need the team's coordination to publish a copy of the plan for the public to review on the website(s);
 - 2. Team will need to collect substantiations that will be included in the MJHMP such as screenshots from website and screenshots of any invitations sent to the public via email, social media, press releases, etc.;
 - 3. Constant will provide draft content that can be cut-and-pasted with the plan and public survey attached to expedite the public review process.
- c. Evan discussed the next steps:
 - i. Integrate all feedback and conduct reviews;
 - ii. Package final draft plan for submission to DEMA and FEMA;
 - iii. Keep in mind that adjustments may need to be made per FEMA review comments during the approval process.

III. Project Schedule Status

- a. Evan stated that we are looking to finalize the project by late April/early May;
 - i. However, review time for MJHMPs is highly variable due to the FEMA approval process that typically takes a month and a half to two months;
 - ii. Constant will keep the team updated with any changes and developments.
- b. Wes stated that he would like Sue to check to make sure the timeline works.
- c. Sue confirmed that the time line is feasible and that her department can do a day or two turnaround if needed.

IV. Contents Gaps/Troubleshooting

- a. Evan stated that Constant will need substantiations from the team that include copies of emails that were sent out to facilitate the organization of the cities' planning team;
 - i. Stacey (Flagstaff Disaster Recovery Manager) stated that her team has been putting plans together on the recovery side if it is helpful to Constant;
 - ii. Evan stated that if a planning team was created specifically for the HMP or some sort of communication was made to formally move the HMP forward, a copy of the formalized email may be helpful;

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- iii. Lee stated that if the team was included in the reviewing of the plan, we can add their names; requested from Stacey to send a list of names;
- iv. Stacey stated that she will send her contacts' info.
- b. Evan stated that Constant has identified a total of four (4) Dam Emergency Action Plans and wants to confirm if this number is accurate;
 - i. Mark stated that he will make arrangements to scan and sent information to Constant next week with all of the hard copy information;
 - ii. Evan stated that the total number is needed and what they associated with, not any additional information;
 - iii. Lee confirmed that Constant does work on dam EAPs and the number of EAPs would suffice.
- c. Evan asked if the data in 2018 on USDA drought assistance funding provided to farmers and ranchers is still accurate (i.e. is this still occurring and what are the updated dollar amounts?)
 - i. Wes stated that the information is not readily available; will work on getting it;
 - ii. Evan stated that he will send a follow-up email to keep it on the radar.
- d. Evan asked if there are updated flood maps from County GIS;
 - i. Looking to see if there is a recent run with County GIS and if the jurisdictions have built out any of their plans on regular maintenance;
 - ii. Wes stated that he will go back to the GIS department to confirm;
 - iii. Lee stated that DEMA might have information as far as state-wide flood plain mapping;
 - iv. Sue stated that it is not something her department performs at the state level;
 - 1. 2015 plan was from JE Fuller or the county itself;
 - 2. The county would probably be the best since they know the ins and outs;
 - 3. DEMA cannot provide that information.
- e. Evan stated that the 2015 MJHMP includes two (2) tables of wildfire hazard risk that Constant is unable to replicate/find data for;
 - i. Where did the data come from and is it critical to keep this information?
 - ii. Sue stated that those are probably old or created by the county and that the data is not required;
 - 1. Data driven vulnerability or estimates are not required by FEMA;
 - 2. Can express it in narrative form in the plans, but do not need to identify which assets are exposed;
 - iii. Lee agreed and stated that if the information is not up-to-date, we only need to add minimal information with no maps or tables;
 - iv. Sue stated that as of now and moving five (5) years ahead, the data would not be accurate;
 - v. Lee agreed to take the information out;
 - vi. Wes agreed with Sue's assessment and to remove the content.
- f. Evan stated that the planning team will need to verify listing of key City and County reference documents during their review of the draft plan itself;

- i. Need to confirm that the list includes all of the natural hazards and that they are comprehensively covered;
- ii. Lee confirmed that he is looking to make the HMP as comprehensive as possible, giving the team the opportunity to include all the details they want;
- iii. Wes stated that he spoke with Mark earlier today and wants to talk about the list of hazards that has gotten very long; concerned with the length and wants to resolve it today.

V. Hazards Selection Discussion for the 2020 HMP

- a. Lee stated that Constant went through a fairly standard process using the FEMA local hazard mitigation planning guide to assess the potential hazards;
 - i. Had the planning team review the hazards; planning team included which ones to include in the plan (county and individual jurisdictions);
 - ii. FEMA planning guide only requires addressing natural hazards; manmade hazards can be deleted/not added;
- b. Wes stated that they agreed to add pandemic and wants to recognize the different topography and climates of each individual jurisdiction, but he is concerned with the number of hazards being addressed;
- c. Evan stated that the MJHMP includes a table that indicates which hazards each community is effected by, additionally the CPRI for each jurisdiction is appended in each section to clearly demonstrate the difference in hazard threat/effects across the jurisdictions;
- d. Sue stated that the only hazards that are required in FEMA are natural hazards that adversely affect the communities because they are the only ones that FEMA for grant funding;
 - i. No grant funding is given by FEMA for manmade accidents such as aviation accident, HAZMAT, extended power outage/PSPS;
 - ii. When communities want to add additional hazards, it is good to address if this is covered somewhere else (i.e. different planning mechanism) since some can end up being duplicates of what other agencies, private entities, and organizations are already trying to mitigate;
 - iii. Some HMPs result in operational or response type of mitigation methods that will not be counted towards FEMA's requirements for mitigation actions for hazards, so the jurisdictions have to be careful as to which type of mitigation measures are included in the plan;
 - iv. Aviation accident, for example, would not have recourse for FEMA funding;
 - v. Climate change, for example, is not perceived as a hazard; it is a condition of other hazards (i.e. drought);
 - 1. At the state-level, it is not required in local plans; in state-level, it is addressed under each profile of a corresponding hazard to discuss the impacts on that specific hazard;
 - vi. Excessive heat, need to ask if the jurisdictions consider this a real hazard and if they can really mitigate it;
 - vii. Public health/Pandemic is included in the state plan, with the caveat that it will not receive FEMA grant funding; but it is included because it is a big concern, especially now, and including it in the plan is a great way to create attention and public awareness;

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- viii. Extended power outage/PSPS are cascading effects of other hazards (i.e. high winds) and are human-caused;
- ix. Terrorism is human caused and not required by FEMA; can respond to it, but not really mitigate it.
- e. Lee agreed with Sue and stated that it is up to the communities if they want to include this in their local plans;
- f. Wes stated that he wants to add public health/pandemic for sure; does not mind if the additional ones to the new plan appear as an addendum, but not as primary hazard selections;
- g. Nicole stated that we need a clearer definition when we are talking about broad spectrum issues such as climate change that have cascading impacts;
- h. Evan stated that this is a broader conversation for the county and cities to have since the group chose the current list of hazards during Planning Meeting 1. He added that its important to ensure that all stakeholders' needs are covered and that they are open to amendments.
- i. Lee stated that there are many variations of organizing the content that are possible;
 - i. Need to include what changes have occurred since the last plan and developmental issues;
 - ii. Climate change is so broad and overarching, it does not hurt include information about what it is, how it occurs, and causes/fixes;
 - iii. Constant already has this information ready to go, so it can be taken out if needed; would not really slow the completion process down;
- j. Wes asked if there would be anything detrimental if this information were included in the plan in some other content, but not as principle hazards;
- k. Sue stated that the information is not bad to have, but she suggested having a clear plan that lists just the top hazards;
 - i. Ask the stakeholders who ultimately have the choice, but focus on what is the benefit of having these extra hazards to the plan;
 - ii. Think forward in five (5) years since the plan will need to be updated again; more hazards will require more updates;
 - iii. As reference, there are only fifteen (15) included for the state plan;
- l. Wes suggested taking the discussion offline with Mark and having further conversations with the local jurisdictions to finalize answers;
- m. Erin Harris asked if it would make sense to take several and put them under a climate change umbrella while extrapolating what is needed per community;
- n. Nicole agreed and stated that it would be a benefit if there were an umbrella for climate change;
- o. Lee cautioned that from the point-of-view of receiving FEMA grant approval, not all issues with drought, flood, wildfire are solely driven by climate change (i.e. they are exacerbated by it);
 - i. FEMA would come back that climate change was not the precipitant cause of an incident;
 - ii. It would take some time to realign hazards under the climate change umbrella;
- p. Lee stated that with high winds and tornadoes, they have to be individually addressed with past locations and probabilities;
 - i. Individual hazards and lumping them under climate change will be difficult to sell to FEMA;
 - ii. Can eliminate aviation accident, extended power outage/PSPS, and other manmade events

- q. Sue stated that the team may need to look at how things are titled in lieu of creating umbrellas;
 - i. In the state plan, it is titled severe wind in lieu of high winds/tornado;
 - ii. HAZMAT incidents instead of Pipeline Failure/Transport Accident/HAZMAT Release;
- r. Evan cautioned that significant revisions would increase the amount of time/work it takes to finish the draft MJHMP;
 - i. Sections can be subtracted and renamed quickly, but if more significant changes need to be made, it could push the schedule back a week or more;
- s. Wes stated that he will take it offline and get back to Constant with an answer shortly through Mark within the next few days.

VI. Review Guide Briefing (Overview)

- a. Evan stated that the final plan will be approximately 300 pages;
- b. Keep a close look on the tables and the content specific to each stakeholder's jurisdiction;
- c. Section 3 Outline: Planning Area Description;
 - i. Requested for the team to take a closer look at the end sections that have specific detailed information for each jurisdictions to verify accuracy;
 - ii. Was created using content from public sources and information the team provided;
 - iii. Take a close look a jurisdiction demographics and land use data;
- d. Section 4 Outline: Capabilities Assessment;
 - i. Consolidated content from capability assessment worksheets and open source research;
 - ii. Jurisdiction specific data split among section titles;
 - iii. Important to review NFIP content for accuracy; particularly regarding repeat damage on facilities;
 - iv. View the tables for accuracy;
- e. Section 5 Outline: Hazard Analysis and Risk Assessment;
 - i. Read first two (2) sections to verify accuracy;
 - ii. County CPRI captured in section 3; verify accuracy;
 - iii. Skim hazard risk profiles, focusing on history, location, and extent sections that usually contain the most locally specific information;
 - iv. Review vulnerability and risk assessment in detail;
 - v. Important tables to view include critical facilities, hazard susceptibility of city-owned facilities, potential losses;
- f. Section 6 Outline: Hazard Mitigation Strategy;
 - i. Review content thoroughly to ensure the status of prior mitigation actions and the specifications for new actions is correct;
 - ii. Note that the information is jurisdiction-specific and distributed between sections;
 - iii. Last chance to provide mitigation actions;
 - iv. Review important tables;
- g. Appendix Outline;

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- i. Largest portion of the plan because it contains substantiation documentations to show FEMA that we have done all of the required steps needed for approval;
- ii. Carefully rview the STAPLEE table the Mitigation Action Prioritization.

VII. Action Items

- a. Evan viewed the ongoing responsibilities to be carried out by Constant;
 - i. Constant will finalize meeting minutes;
 - ii. Final outreach for data collection;
 - iii. Develop the first draft of the MJHMP with a target date of the first week of Feb;
 - iv. Aiming for the planning team to review all information within a week to keep on schedule;
 - v. Develop draft website copy for publishing draft plan for public review and sending to neighboring jurisdictions;
 - 1. Constant will need a copy of the email sent and will include this in the meeting minutes as an action item;
 - vi. Facilitate messaging to neighboring jurisdictions (including draft language);
- b. Evan reviewed the ongoing responsibilities to be carried out by the planning team;
 - i. Provide any data to complete draft plan;
 - ii. Schedule time to review draft plan;
 - iii. Prep to post on website for public review during the second week of February; posting will be for a two (2) week period;
 - iv. Create list of surrounding jurisdictions /PICS not involved in plan for review;
- c. Lee stated that if feedback from neighboring jurisdictions is provided, the planning team will need to document it and provide the information to Constant;
 - i. Constant will then forward information on how to address it;
- d. Wes reiterated that in the hazards, pandemic will definitely be added, but the additional hazards in the 2020 plan will need to be addressed first before confirmation.

VIII. Adjourn

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Table 2: Meeting Attendees

#	Name	Organization/Department
1.	Bill Pepler	Constant Associates
2.	Erin Harris	City of Williams Police Department
3.	Evan Koepke	Constant Associates
4.	Greg Brush	Town of Tusayan Fire Department
5.	John Romero	City of Williams Police Department
6.	Lee Rosenberg	Constant Associates
7.	Mark Christian	Coconino County Department of Emergency Management
8.	MJ Yoon	Constant Associates
9.	Monica Rabb	City of Flagstaff Utilities Division
10.	Nicole Antonopoulos	City of Flagstaff Sustainability Manager
11.	Paul Oltrogge	City of Flagstaff Fire Department
12.	Samuel Beckett	Coconino County Public Works
13.	Stacey Brechler-Knaggs	City of Flagstaff Grants and Contracts Manager
14.	Susan Austin	AZ Department of Emergency Management/Military Affairs
15.	Wes Dison	Coconino County Department of Emergency Management

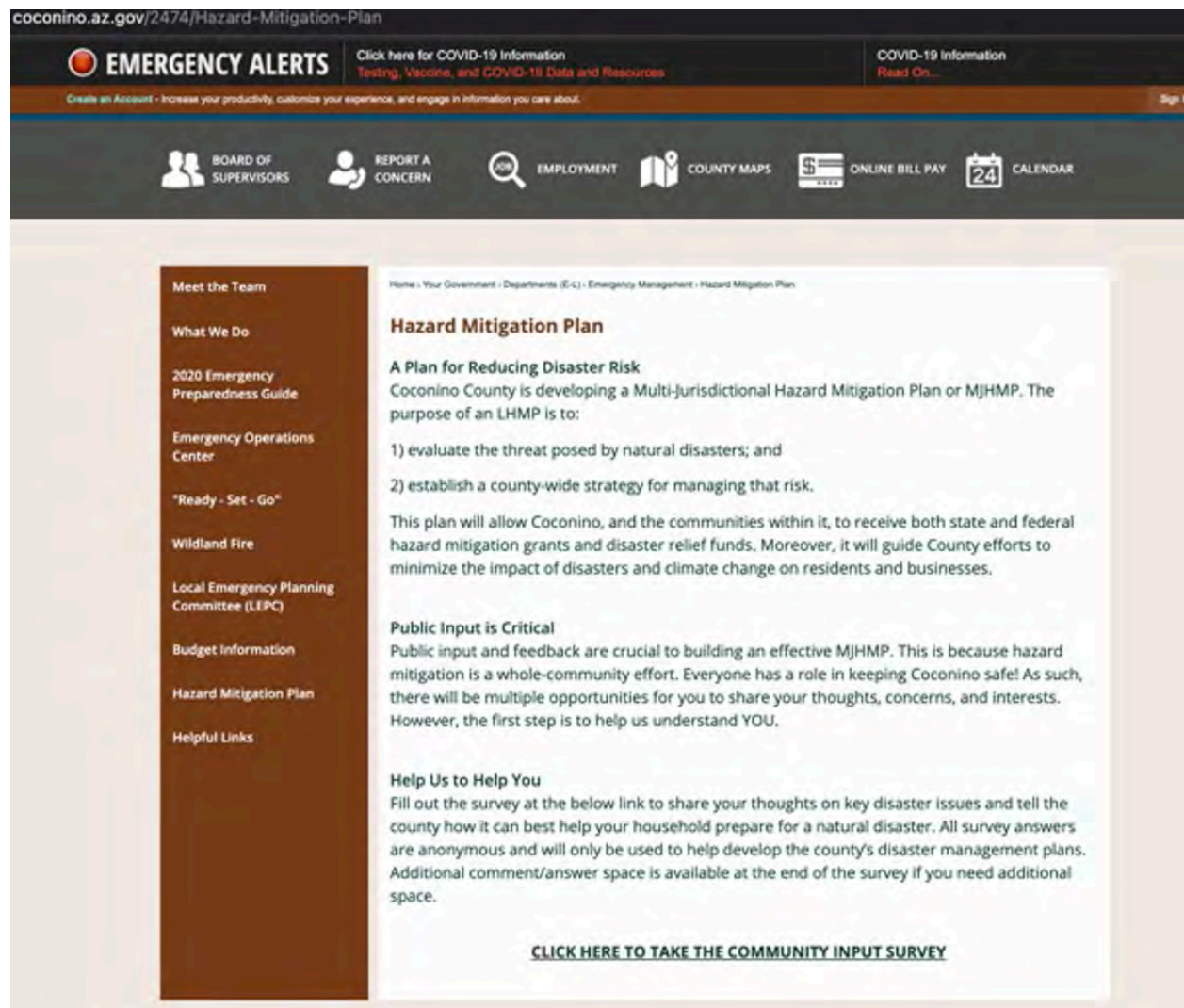
Appendix C. Public Engagement Documentation

Appendix C contains documentation of stakeholder engagement and outreach. It includes survey format and results, webpage and social media account postings, and public notification material.

Dates	Event Activity	Documentation
Oct 29, 2020 – Dec 31, 2020	Media Campaign	<ul style="list-style-type: none"> • Posts on County, city/town, fire department, university websites • Posts on County, city/town, fire department, university Facebook, Instagram, and Twitter • County press release • County emergency notification system
Oct 29, 2020 – Dec 31, 2020	Public Engagement Survey and Results	<ul style="list-style-type: none"> • Survey questions, data analysis, and results report
March 17, 2021 – April 2-8, 2021 <i>NOTE: Ending date varies due to variable initial posting date of participating jurisdictions</i>	Public and Neighboring Jurisdiction Review Public draft MJHMP posted on County and cities' websites and sent to the following neighboring jurisdictions for review and comment.	<ul style="list-style-type: none"> • Posts on County and city/town websites (with select social media posts supporting outreach). • Email to neighboring jurisdictions and utilities <i>NOTE: No substantive feedback was received from the public, neighboring jurisdictions, or utility organizations engaged in the review process.</i>

Media Campaign

County: Website



The screenshot shows the Coconino County website page for the Hazard Mitigation Plan. The URL is coconino.az.gov/2474/Hazard-Mitigation-Plan. The page features a dark navigation bar with an "EMERGENCY ALERTS" button and links for COVID-19 information. Below the navigation bar is a utility menu with icons for Board of Supervisors, Report a Concern, Employment, County Maps, Online Bill Pay, and Calendar. The main content area has a left sidebar with a menu of links including "Meet the Team", "What We Do", "2020 Emergency Preparedness Guide", "Emergency Operations Center", "Ready - Set - Go", "Wildland Fire", "Local Emergency Planning Committee (LEPC)", "Budget Information", "Hazard Mitigation Plan", and "Helpful Links". The main content area is titled "Hazard Mitigation Plan" and includes the following text:

Home » Your Government » Departments (5-4) » Emergency Management » Hazard Mitigation Plan

Hazard Mitigation Plan

A Plan for Reducing Disaster Risk
Coconino County is developing a Multi-Jurisdictional Hazard Mitigation Plan or MJHMP. The purpose of an LHMP is to:

- 1) evaluate the threat posed by natural disasters; and
- 2) establish a county-wide strategy for managing that risk.

This plan will allow Coconino, and the communities within it, to receive both state and federal hazard mitigation grants and disaster relief funds. Moreover, it will guide County efforts to minimize the impact of disasters and climate change on residents and businesses.

Public Input is Critical
Public input and feedback are crucial to building an effective MJHMP. This is because hazard mitigation is a whole-community effort. Everyone has a role in keeping Coconino safe! As such, there will be multiple opportunities for you to share your thoughts, concerns, and interests. However, the first step is to help us understand YOU.

Help Us to Help You
Fill out the survey at the below link to share your thoughts on key disaster issues and tell the county how it can best help your household prepare for a natural disaster. All survey answers are anonymous and will only be used to help develop the county's disaster management plans. Additional comment/answer space is available at the end of the survey if you need additional space.

[CLICK HERE TO TAKE THE COMMUNITY INPUT SURVEY](#)

County: Facebook (October 29, 2020)



Coconino County Emergency Management
October 29, 2020

WE NEED YOUR HELP! Coconino County is updating its Multi-Jurisdictional Hazard Mitigation Plan. Part of this update relies heavily on input from our citizens! Please take five minutes to complete the online survey!
<https://coconinocounty.gov/2020/10/29/updates-to-hazard-mitigation-plan>

FOR IMMEDIATE RELEASE October 29, 2020
FOLLOW US ON: [Facebook icon] [Twitter icon] [Instagram icon]

County Seeks Community Input for Disaster Planning

LEAVITT, Ariz. – Natural disasters and climate change impacts are increasing in both frequency and impact nationwide. To meet this challenge, Coconino County is updating its Multi-Jurisdictional Hazard Mitigation Plan (MJHMP) – a plan that guides county-wide efforts to reduce the risk of hazards such as fires and floods. However, for this planning effort to be successful, the county needs input from the people who work and live within its boundaries. To start collecting this input, the county has released a Hazard Mitigation Planning survey on its website, which can be accessed at <https://coconinocounty.gov/2020/10/29/updates-to-hazard-mitigation-plan>.

Public participation is a key part of hazard mitigation planning. It provides planners insight into public preferences and access to community knowledge about the county. It also allows planners to ensure that the needs of vulnerable populations, those who may be disproportionately affected by disasters, are accounted for. For these reasons, Coconino County will be providing several opportunities for public participation.

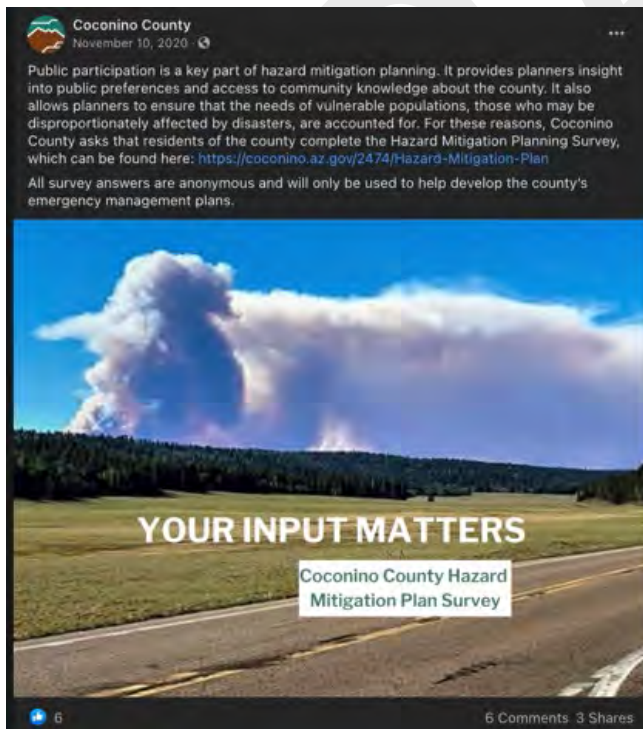
Investing in the creation of quality hazard mitigation plans provides communities with multiple benefits. First, they allow the county to take a comprehensive approach towards reducing the likelihood and impact of disaster events. Second, these plans are the principal qualification for localities to receive state and federal hazard mitigation and disaster relief funds. Hazard mitigation funds can be applied to risk management projects such as brush or drainage clearing to reduce wildfire and flooding risk. Moreover, disaster relief funding helps communities pay the immense costs inherent in responding to and recovering from disasters. Ultimately, these reduce the likelihood and impact of disasters, while maintaining the disruption and suffering that they cause.

To lead these efforts, the county has hired Comitant Associates, an emergency management consulting firm. The project is expected to be complete by May 31, 2021.

County: Facebook (November 7, 2020)



County: Facebook (November 10, 2020)



County: Facebook (November 13, 2020)



County: Instagram (November 7, 2020)



County: Instagram (November 10, 2020)




County: Twitter (November 13, 2020)



County Emergency Management Notification System Email

Email distributed through Emergency Notification System (unformatted)


Message Content



From Coconino County Emergency Management


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[Click here to sign up for Coconino County Emergency Notifications and alerts at Coconino.az.gov/ready.](https://coconino.az.gov/ready)



Distribution summary report

Email Msgs



Status	Percentage
Succeeded	92.0%
Failed	8.0%
Exp. / Can.	0.0%
Pending Send	0.0%

Flagstaff

Flagstaff: Survey posted on city website (December 4, 2020)



Flagstaff: Facebook (November 14, 2020)



Fredonia

Fredonia: Survey posted on town website

News & Announcements

From Coconino County AZ
County Seeks Community Input for Disaster Planning
<https://coconino.az.gov/2474/Hazard-Mitigation-Plan>

Coconino County Hazard Mitigation Plan
You can access the County's Hazard Mitigation Plan by clicking on the following link:
www.coconino.az.gov/hazardmitigationplan

Fredonia Historical DVD Now Available
The Fredonia Historical Society is proud to present a remarkable centennial collection of historical black and white photographs. The DVD is only \$25 and is available at the library and Town Office. Also available is the History of Fredonia book for only \$10. There is also a Cookbook available!
[read more ...](#)

Page

Page: Survey posted on town website (November 16, 2020)



Jeff Reed
Fire Chief
(928) 645-4344
jreed@pageaz.gov

November 16, 2020

FOR IMMEDIATE RELEASE
FOLLOW US ON   

County Seeks Community Input for Disaster Planning

PAGE, Ariz. – Natural disasters and climate change impacts are increasing in both frequency and impact nationwide. To meet this challenge, Coconino County is updating its Multi-jurisdictional Hazard Mitigation Plan (MJHMP) – a plan that guides county-wide efforts to reduce the risk of hazards such as fires and floods. However, for this planning effort to be successful, the county needs input from the people who work and live within its boundaries. To start collecting this input, the county has released a Hazard Mitigation Planning Survey on its website, which can be accessed at <https://coconino.az.gov/2474/Hazard-Mitigation-Plan>.

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Page: Facebook (November 16, 2020)



Page: Instagram (November 16, 2020)



Tusayan

Tusayan: Survey posted on town website (December 15, 2020)



County Seeks Help with Hazard Mitigation Plan

IN DEC 2020 • NO COMMENT(S) f t g in @

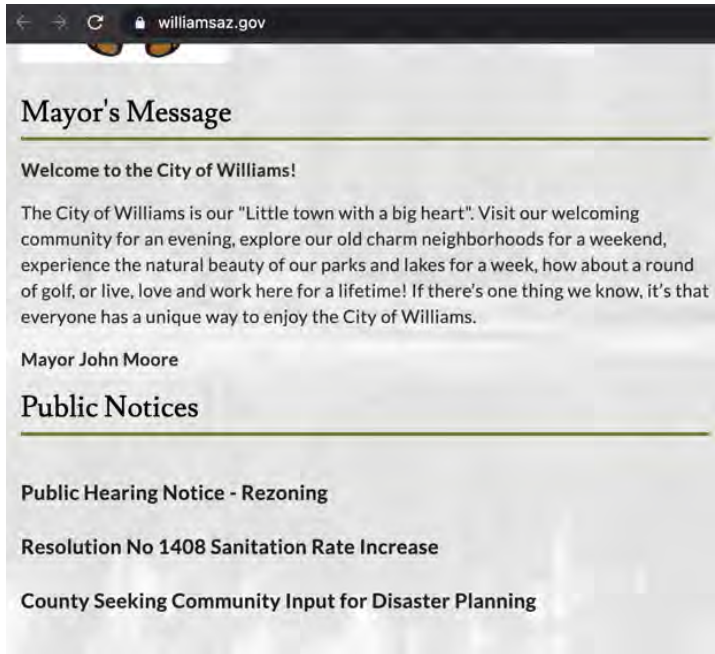
Coconino County seeks input from community members regarding the Hazard Mitigation Plan. This plan will be used in Tusayan (and countywide) to address risks from natural disasters, such as fires and floods. Please visit the link below to learn ways that you can provide input. <https://coconino.az.gov/2474/Hazard-Mitigation-Plan>

 Helpful Links
Forms & Documents
Employment
Trail Info
Contact Us

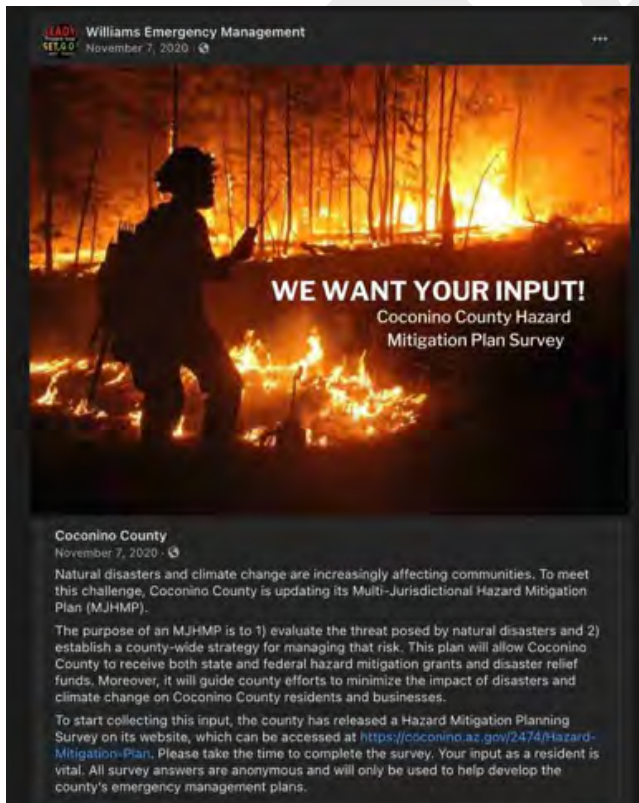
(928) 638 - 9909
Town of Tusayan
P.O. Box 709 | 845 Mustang Drive
Tusayan, AZ 86023

Williams

Williams: Survey posted on city website



Williams: Facebook (November 7, 2020)



Highlands Fire Department

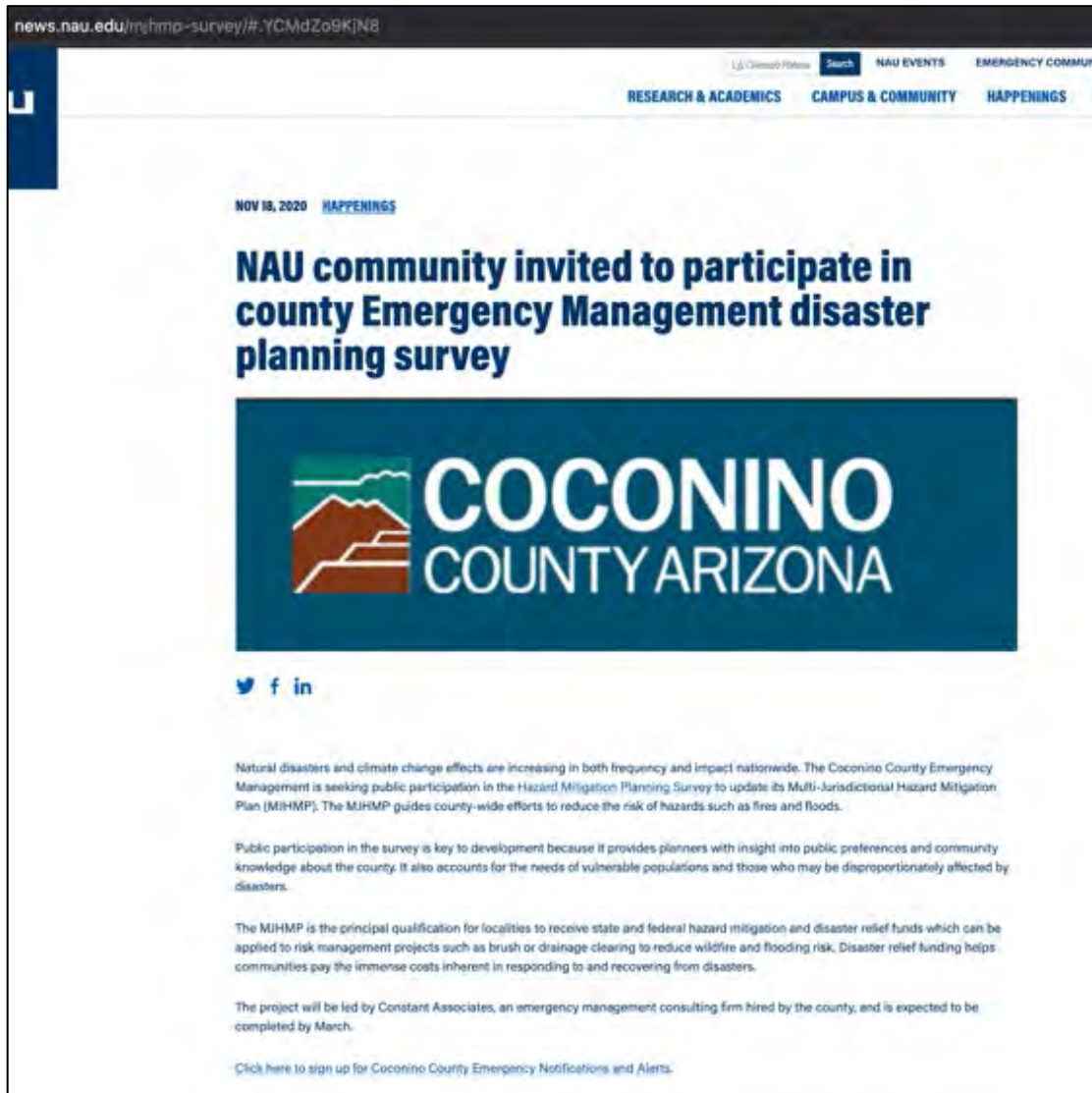
Highlands: Survey posted on department website



The screenshot shows the Highlands Fire District website. At the top left is the logo for Highlands Fire District, featuring a stylized 'H' and 'D' with a fire flame. To the right of the logo are navigation links: ABOUT US, ADMINISTRATION, OPERATIONS, COMMUNITY SERVICES, and JOIN US. Below the navigation is a prominent red-bordered box with a circular icon of a flame. The text inside this box reads: "Stage One Fire Restrictions" followed by "Building, maintaining, amending, or using a fire, campfire, charcoal, coal, or woodstove is prohibited." Below this box, the text "County Fire Ban Remains in Effect" is centered, with a link "More information here" underneath. Further down, there is a section with the Coconino County Arizona logo on the left. The main heading for this section is "Coconino County Seeks Community Input for Disaster Planning". The text below the heading states: "Natural disasters and climate change impacts are increasing in both frequency and impact nationwide. To meet this challenge, Coconino County is updating its Multi-Jurisdictional Hazard Mitigation Plan (MJHMP) – a plan that guides county-wide efforts to reduce the risk of hazards such as fires and floods. However, for this planning effort to be successful, the county needs input from the people who work and live within its boundaries. To start collecting this input, the county has released a Hazard Mitigation Planning Survey on its website." At the bottom of this section is a button labeled "Learn More".

Northern Arizona University (NAU)

NAU: Survey posted on university website



The screenshot shows a news article on the Northern Arizona University website. The URL is news.nau.edu/mjhmp-survey/#.YCMdZo9KJN8. The article is dated November 18, 2020, and is categorized under 'HAPPENINGS'. The main headline reads: 'NAU community invited to participate in county Emergency Management disaster planning survey'. Below the headline is a large blue banner with the Coconino County Arizona logo, which features a stylized mountain range and the text 'COCONINO COUNTY ARIZONA'. Underneath the banner are social media sharing icons for Twitter, Facebook, and LinkedIn. The article text explains that natural disasters and climate change effects are increasing, and the Coconino County Emergency Management is seeking public participation in a Hazard Mitigation Planning Survey to update its Multi-Jurisdictional Hazard Mitigation Plan (MJHMP). It states that public participation is key to development because it provides planners with insight into public preferences and community knowledge. The MJHMP is the principal qualification for receiving state and federal hazard mitigation and disaster relief funds. The project will be led by Constant Associates, an emergency management consulting firm hired by the county, and is expected to be completed by March. A link is provided to sign up for Coconino County Emergency Notifications and Alerts.

Survey Questions and Results (Data Analysis)

Coconino County
 Hazard Mitigation Plan Update Project 2020
 Planning Meeting 2 – Meeting Minutes

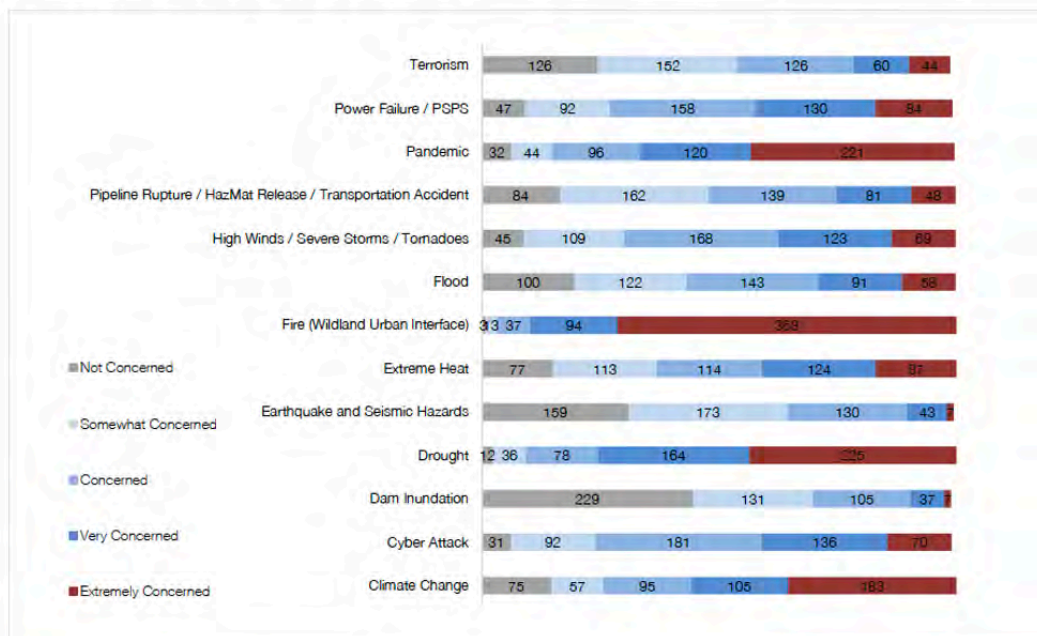


Coconino County Local Hazard Mitigation Plan Survey

Data Analysis Report

To inform the update of the Coconino County Multi-Jurisdictional Hazard Mitigation Plan (MJHMP), a survey was conducted measuring citizen level of concern for various hazards and their general level of preparedness. This electronic survey was conducted from October 2, 2020 and was closed January 4, 2021. The survey was made available to the public using the Coconino County public alert system, jurisdictional websites, and social media channels. In total, 518 residents of Coconino County responded to the survey.

Question 1: Coconino County residents and businesses may encounter a variety of hazards and/or disasters. How concerned are you about the following hazards impacting you, your business and Coconino County? (Check one response for each hazard)



Coconino County
 Hazard Mitigation Plan Update Project 2020
 Planning Meeting 2 – Meeting Minutes

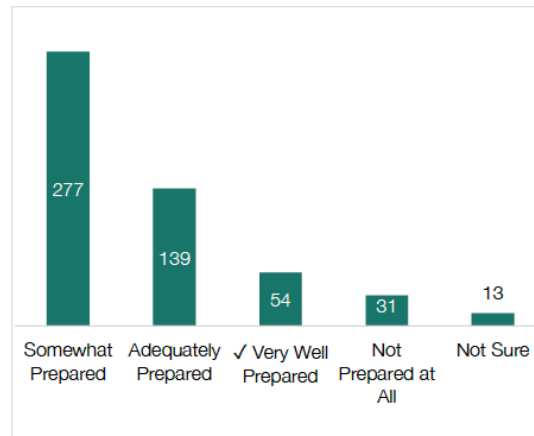


Survey respondents to this question highlighted fires (wildland and urban interface), drought, pandemic, and climate change as being of extreme concern, with 368 respondents (71%) being extremely concerned of fire events, 225 respondents (44%) being extremely concerned with drought events, 221 respondents (43%) being extremely concerned with pandemic events, and 183 respondents (36%) extremely concerned with climate change events.

The hazards of least concern to respondents were dam inundation, earthquake and seismic hazards, terrorism, and flood events. 229 respondents (45%) stated they were not concerned about dam inundation, 159 respondents (31%) stated they were not concerned with earthquake and seismic hazards, 126 respondents (25%) stated they were not concerned by terrorism, and 100 respondents (19%) stated they were not concerned by flood events.

Question 2: How prepared is your household to cope with a hazard event?

Respondents were asked to rate their preparedness for their household if confronted with a hazardous event. They were asked to select one answer rating their current preparedness, ranging from very well prepared, adequately prepared, somewhat prepared, not prepared at all, and unsure. 436 respondents completed this question.



Overall, 277 respondents (54%) stated they were somewhat prepared for a hazardous event. This answer is the second to last level of preparedness, indicating that more training and resources regarding household preparedness may be needed to bring city residents to satisfactory levels of preparedness.

Question 3: Which of the following steps has your household taken to prepare for hazardous events?

Respondents were asked to indicate which actions their households have taken to prepare for hazardous events. These questions allow the county to recognize common strengths in preparedness among households in different jurisdictions and identify gaps they may need to address and add to response efforts during emergency response.

There were 16 options for respondents to choose from, ranging from no steps taken by the household to preparing a disaster supply kit. The full list of categories can be seen in the corresponding tale.

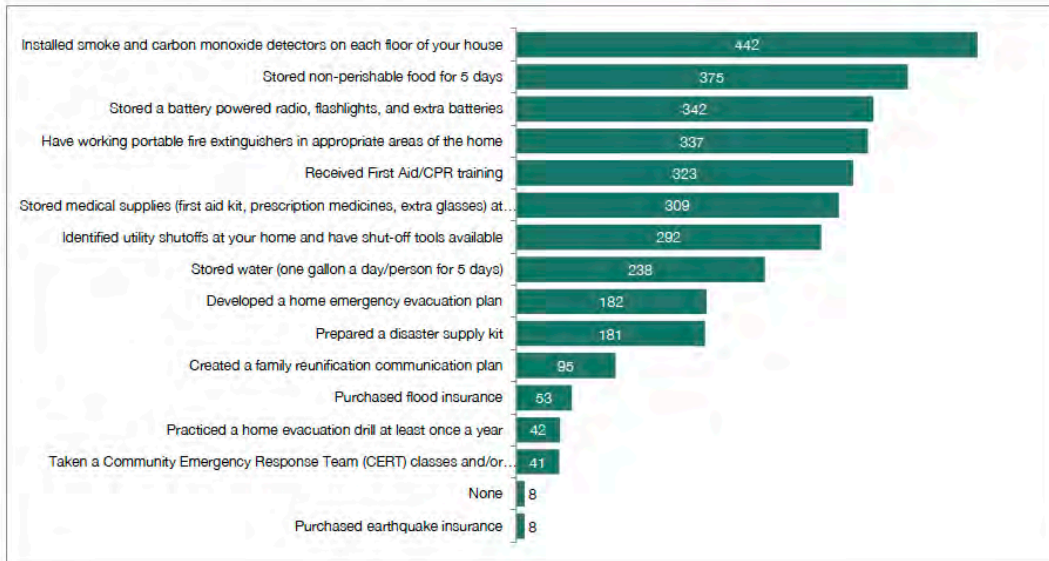
Out of the 518 respondents in total to the electronic survey, 4 respondents skipped this question for a total of 514 responses. The most common steps taken by households in the county included the installation of smoke and carbon monoxide detectors on each floor of the home, with 442 respondents (86%) indicating they have taken this step. The two next most common steps included storing non-perishable food for five days with 375 respondents (73%) stating they have taken this step, and storing a battery powered radio, flashlights, and extra batteries with 342 respondents (67%) stating they have taken this step. Finally, the

Coconino County
Hazard Mitigation Plan Update Project 2020
 Planning Meeting 2 – Meeting Minutes



fourth most popular step completed was the possession of working portable fire extinguishers in appropriate areas of the home, with 337 (66%) stating they have taken this step.

The preparedness steps with the lowest completion rates by respondents included practicing a home evacuation drill at least once a year, with 42 respondents (8%) stating they have taken this step, taking a Community Emergency Response Team (CERT) class and/or joining a CERT team, with only 41 respondents (8%) indicating they have completed this step, and the purchase of earthquake insurance, with only 8 respondents (2%) indicating they have taken this step. Only 8 respondents (2%) indicated they have taken no preparedness steps.

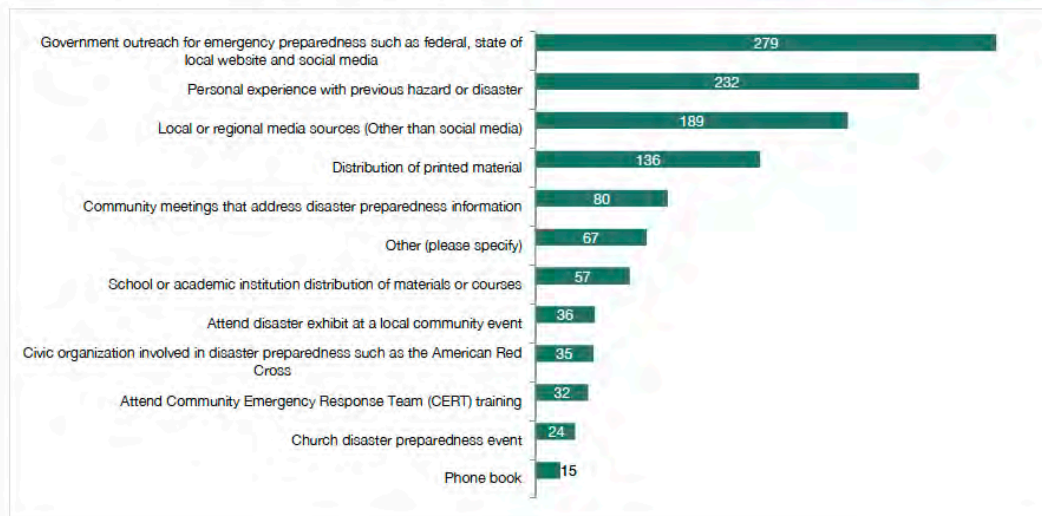


Coconino County
Hazard Mitigation Plan Update Project 2020
 Planning Meeting 2 – Meeting Minutes



**Question 4: Which of the following sources of information have helped you to prepare for hazardous events?
 (Check all that apply)**

This question assists the county and each jurisdiction in identifying strengths in community engagement regarding preparation for hazardous events, as well as identifying gaps in increasing community-wide preparedness and education surrounding such events.



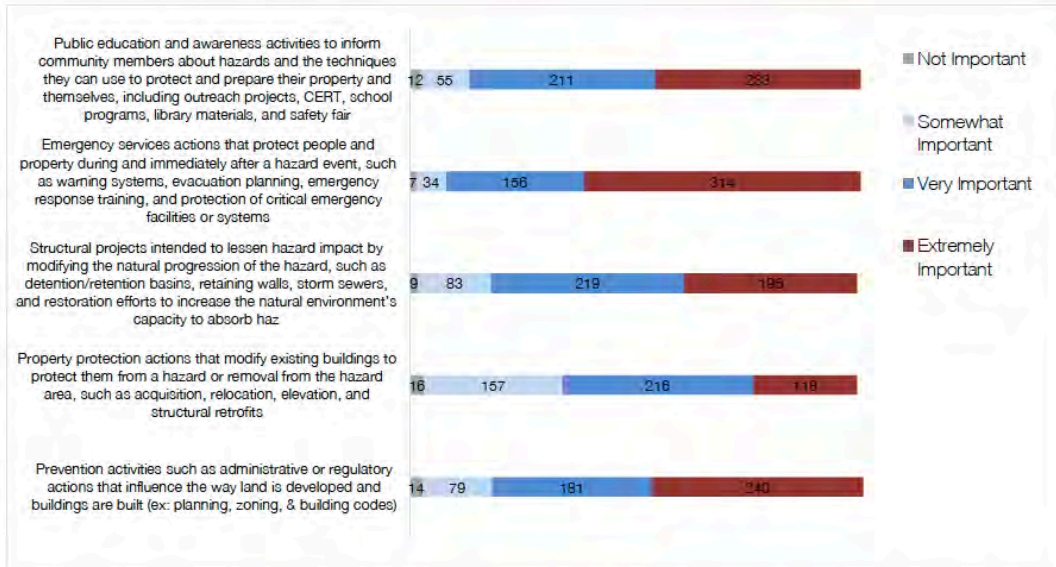
From the 436 respondents that answered this question, 279 respondents (64%) identified government outreach for emergency preparedness such as federal, state, or local websites and social media as their primary source of information for preparation. This category was followed by personal experience with previous hazards or disasters (53% of respondents) and local or regional media sources (43% of respondents).

The categories identified the least by respondents as sources of primary information included civic organizations (8% of respondents), attending a Community Emergency Response Team (CERT) training (7% of respondents), church disaster preparedness events (6% of respondents), and the phone book (3% of respondents).

Question 5: How important do you find the following community-wide actions or activities that may reduce the risks of hazards in Coconino County?

This question asks respondents to identify the importance of community-wide actions and activities to increase preparedness and reduce the risks of hazards in Coconino County.

Coconino County
 Hazard Mitigation Plan Update Project 2020
 Planning Meeting 2 – Meeting Minutes

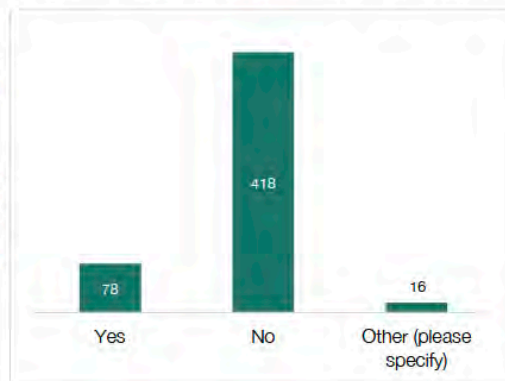


314 of the 514 respondents, or 61% of the answers to this question identified emergency services actions as extremely important. Additionally, 240 respondents (47%) identified prevention activities such as administrative or regulatory actions as extremely important, and 233 of the 514 respondents (46%) identified public education and awareness activities as extremely important.

Question 6: Do you or anyone in your household have disabilities and/or access and functional needs and would you be interested in early warning notifications or specialized response to evacuate during disasters?

This question allows the county a top-level look at the needs of their community in order to recognize areas where access and functional needs may surface during a hazards event response.

Of the 512 respondents to this question, 78 individuals (15% of respondents) answered yes, that they do have additional access and functional needs and would be interested in early warning notifications or specialized response to evacuate during disasters.

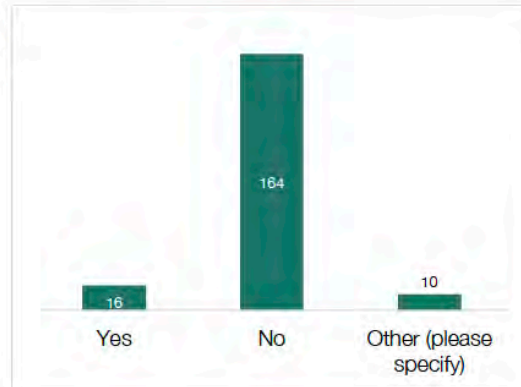


Coconino County
Hazard Mitigation Plan Update Project 2020
Planning Meeting 2 – Meeting Minutes



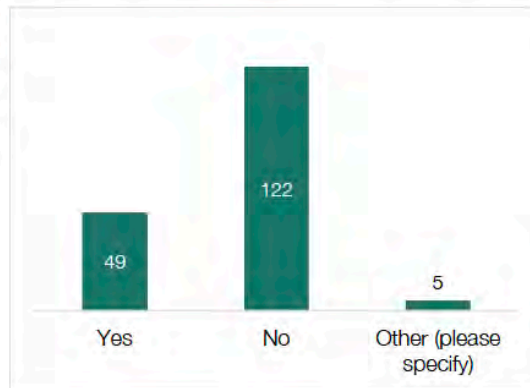
Question 7: If you answered yes to Question 6, do you have a certified service animal that you would be interested in evacuating with you or a household member to a shelter during a disaster?

Of the respondents that answered Question 6, 16 (8% of respondents) indicated that they do have a certified service animal that may evacuate with their household to a shelter during a disaster response.



Question 8: If you answered yes to Question 6, would you be interested in more information about Disaster Assistance for people with disabilities and/or access and functional needs?

Of the respondents that answered question 6, 49 (28% of respondents) indicated that they would be interested in more information about Disaster Assistance for people with disabilities and/or access and functional needs.



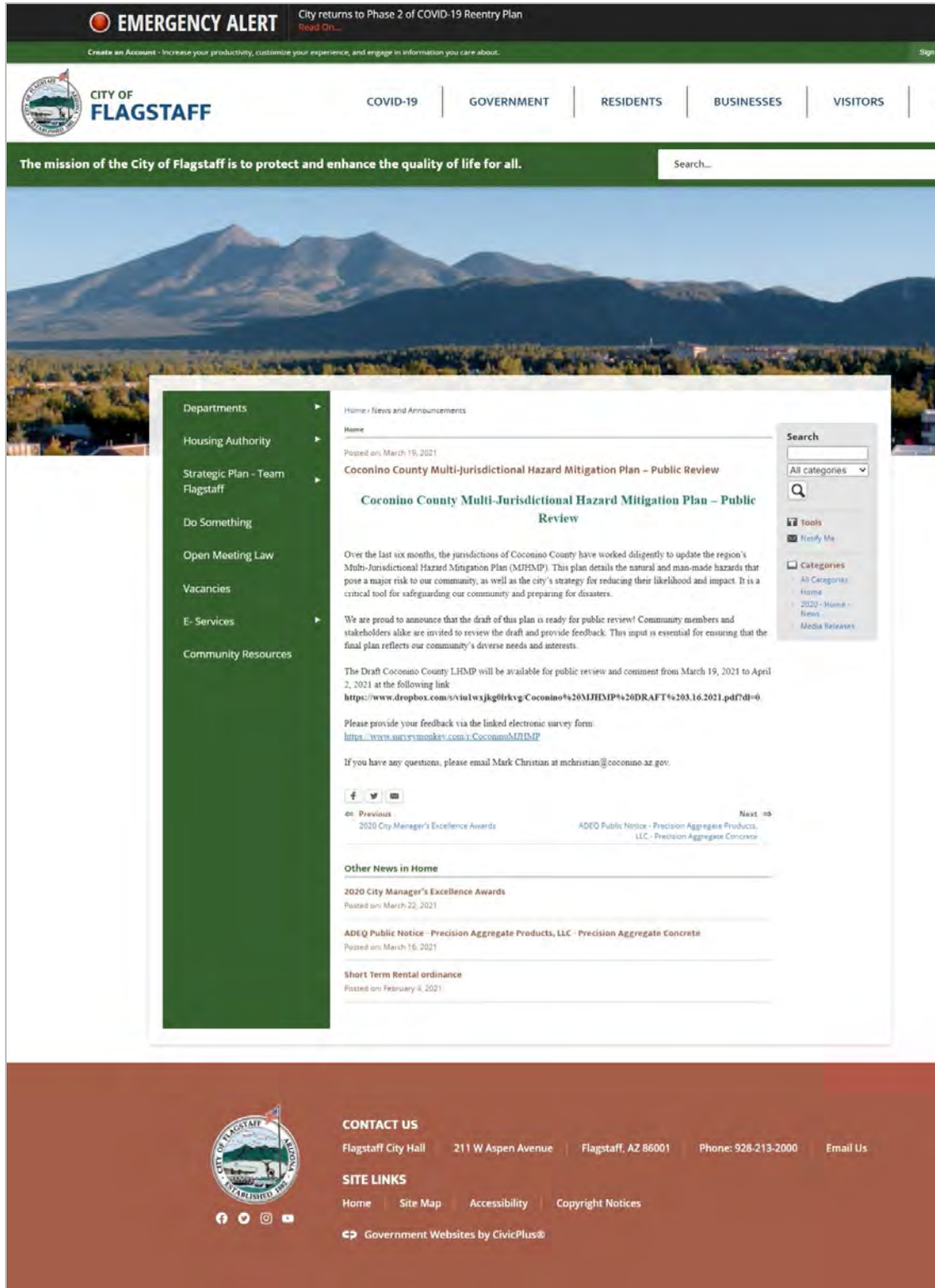
Public and Neighboring Jurisdiction / Utility Review

County: Website



The screenshot shows a website page with a dark brown sidebar on the left containing navigation links: Emergency Notification System, Hazard Mitigation Plan, Meet the Team, What We Do, 2020 Emergency Preparedness Guide, Emergency Operations Center, "Ready - Set - Go", Wildland Fire, Local Emergency Planning Committee (LEPC), and Helpful Links. The main content area has a breadcrumb trail: Home > Your Government > Departments (24) > Emergency Management > Hazard Mitigation Plan. The page title is "2021 Hazard Mitigation Plan". Below the title is the sub-header "Coconino County Multi-Jurisdictional Hazard Mitigation Plan – Public Review". The main text states: "Over the last six months, the jurisdictions of Coconino County have worked diligently to update the region's Multi-Jurisdictional Hazard Mitigation Plan (MJHMP). This plan details the natural and man-made hazards that pose a major risk to our community, as well as the County's strategy for reducing their likelihood and impact. It is a critical tool for safeguarding our community and preparing for disasters." It then announces: "We are proud to announce that the draft of this plan is ready for public review! Community members and stakeholders alike are invited to review the draft and provide feedback. This input is essential for ensuring that the final plan reflects our community's diverse needs and interests." A paragraph follows: "The Draft Coconino County Multi-Jurisdictional Hazard Mitigation Plan (MJHMP) will be available for public review and comment from March 17, 2021 to April 2, 2021." Below this is a call-to-action: "CLICK HERE TO REVIEW THE PLAN!" with a button that features a circular image of a desert canyon at sunset and the Coconino County logo. At the bottom of the page, it says "Please provide your feedback by clicking the electronic survey link below:" followed by a green button with a blue checkmark icon and the text "WE VALUE YOUR FEEDBACK" with a right-pointing arrow.

Flagstaff: Website



EMERGENCY ALERT City returns to Phase 2 of COVID-19 Reentry Plan
[Read On...](#)

Create an Account - Increase your productivity, customize your experience, and engage in information you care about. Sign In

CITY OF FLAGSTAFF COVID-19 | GOVERNMENT | RESIDENTS | BUSINESSES | VISITORS

The mission of the City of Flagstaff is to protect and enhance the quality of life for all. Search...

Departments
Housing Authority
Strategic Plan - Team Flagstaff
Do Something
Open Meeting Law
Vacancies
E- Services
Community Resources

Home - News and Announcements
Name
Posted on: March 19, 2021
Coconino County Multi-Jurisdictional Hazard Mitigation Plan – Public Review
Coconino County Multi-Jurisdictional Hazard Mitigation Plan – Public Review

Over the last six months, the jurisdictions of Coconino County have worked diligently to update the region's Multi-Jurisdictional Hazard Mitigation Plan (MJHMP). This plan details the natural and man-made hazards that pose a major risk to our community, as well as the city's strategy for reducing their likelihood and impact. It is a critical tool for safeguarding our community and preparing for disasters.

We are proud to announce that the draft of this plan is ready for public review! Community members and stakeholders alike are invited to review the draft and provide feedback. This input is essential for ensuring that the final plan reflects our community's diverse needs and interests.

The Draft Coconino County MJHMP will be available for public review and comment from March 19, 2021 to April 2, 2021 at the following link:
<https://www.dropbox.com/s/vi1w5jkg0rkvg/Coconino%20MJHMP%20DRAFT%203.16.2021.pdf?dl=0>

Please provide your feedback via the linked electronic survey form:
<https://www.surveymonkey.com/r/CoconinoMJHMP>

If you have any questions, please email Mark Christian at mchristian@coconino.az.gov.

Previous: 2020 City Manager's Excellence Awards | Next: ADEQ Public Notice - Precision Aggregate Products, LLC - Precision Aggregate Concrete

Other News in Home

2020 City Manager's Excellence Awards
Posted on: March 22, 2021

ADEQ Public Notice - Precision Aggregate Products, LLC - Precision Aggregate Concrete
Posted on: March 16, 2021

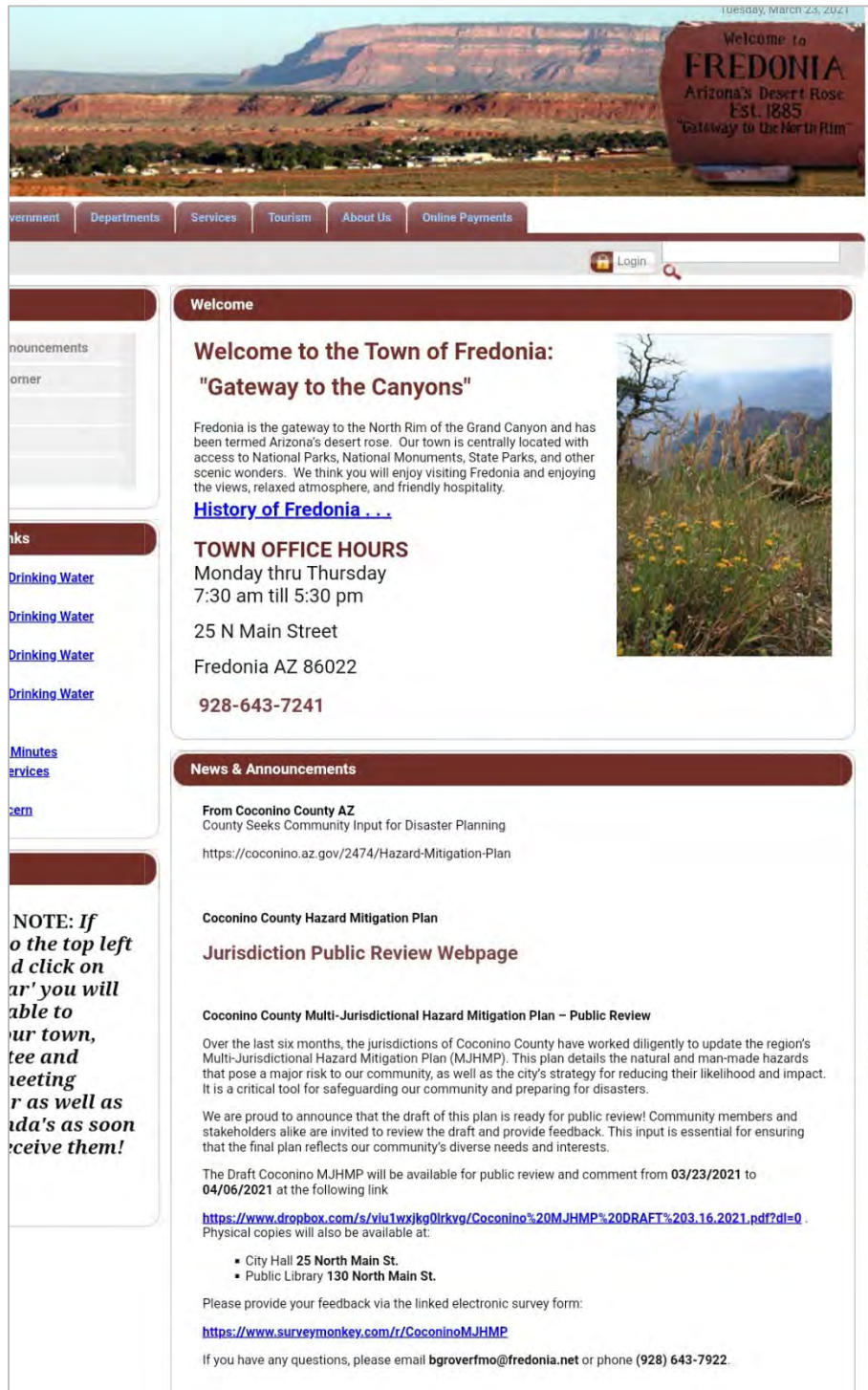
Short Term Rental ordinance
Posted on: February 9, 2021

CONTACT US
Flagstaff City Hall | 211 W Aspen Avenue | Flagstaff, AZ 86001 | Phone: 928-213-2000 | Email Us

SITE LINKS
Home | Site Map | Accessibility | Copyright Notices

Government Websites by CivicPlus®

Fredonia: Website



The screenshot shows the homepage of the Town of Fredonia website. At the top, there is a banner image of a desert landscape with a sign that reads "Welcome to FREDONIA Arizona's Desert Rose Est. 1885 'Gateway to the North Rim'". Below the banner is a navigation menu with links for "Government", "Departments", "Services", "Tourism", "About Us", and "Online Payments". A "Login" button is also visible. The main content area is divided into several sections:

- Welcome:** A section titled "Welcome to the Town of Fredonia: 'Gateway to the Canyons'" with a sub-image of a desert landscape. It includes a paragraph about Fredonia's location and a link to "History of Fredonia...".
- TOWN OFFICE HOURS:** A section listing office hours as "Monday thru Thursday 7:30 am till 5:30 pm" and the address "25 N Main Street Fredonia AZ 86022" with the phone number "928-643-7241".
- News & Announcements:** A section containing a link to "From Coconino County AZ County Seeks Community Input for Disaster Planning" and a link to "Coconino County Hazard Mitigation Plan Jurisdiction Public Review Webpage".

On the left side of the page, there is a sidebar with various links and a note:

NOTE: If you click on the top left of the page, you will be able to view our town, meeting minutes as well as agenda's as soon as we receive them!

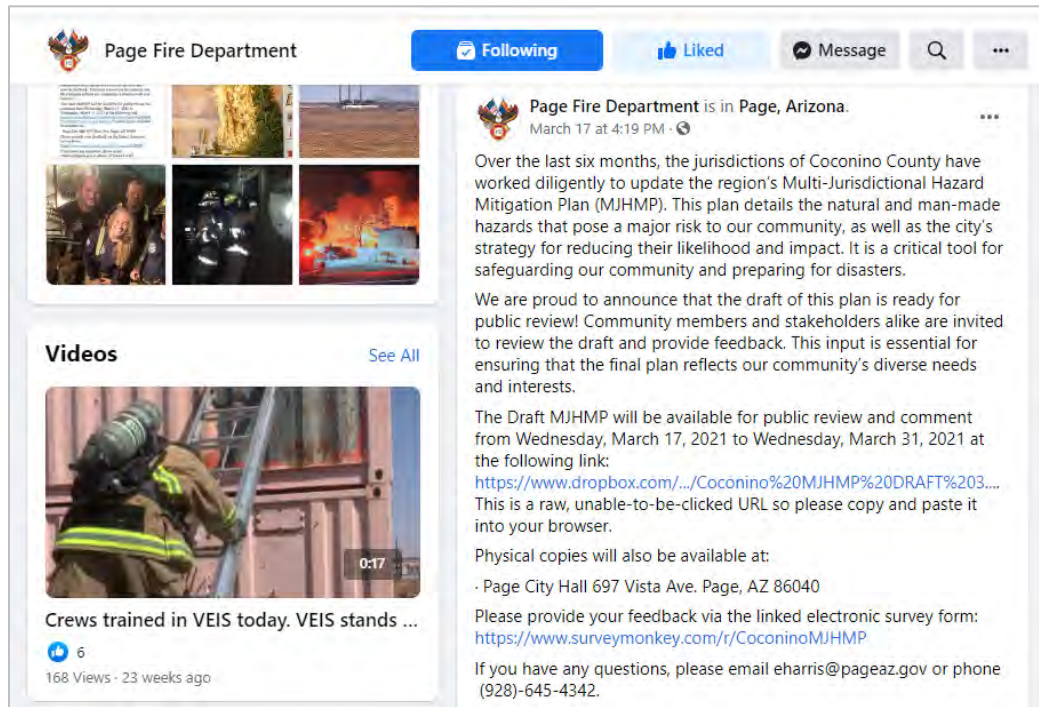
Page: Website

NOTE: Weblink in left toolbar redirects to Coconino County webpage shown previously



DRAFT

Page: Facebook and Instagram Posts



Page Fire Department Following Liked Message

Page Fire Department is in Page, Arizona.
 March 17 at 4:19 PM

Over the last six months, the jurisdictions of Coconino County have worked diligently to update the region's Multi-Jurisdictional Hazard Mitigation Plan (MJHMP). This plan details the natural and man-made hazards that pose a major risk to our community, as well as the city's strategy for reducing their likelihood and impact. It is a critical tool for safeguarding our community and preparing for disasters.

We are proud to announce that the draft of this plan is ready for public review! Community members and stakeholders alike are invited to review the draft and provide feedback. This input is essential for ensuring that the final plan reflects our community's diverse needs and interests.

The Draft MJHMP will be available for public review and comment from Wednesday, March 17, 2021 to Wednesday, March 31, 2021 at the following link:
<https://www.dropbox.com/.../Coconino%20MJHMP%20DRAFT%203...>
 This is a raw, unable-to-be-clicked URL so please copy and paste it into your browser.

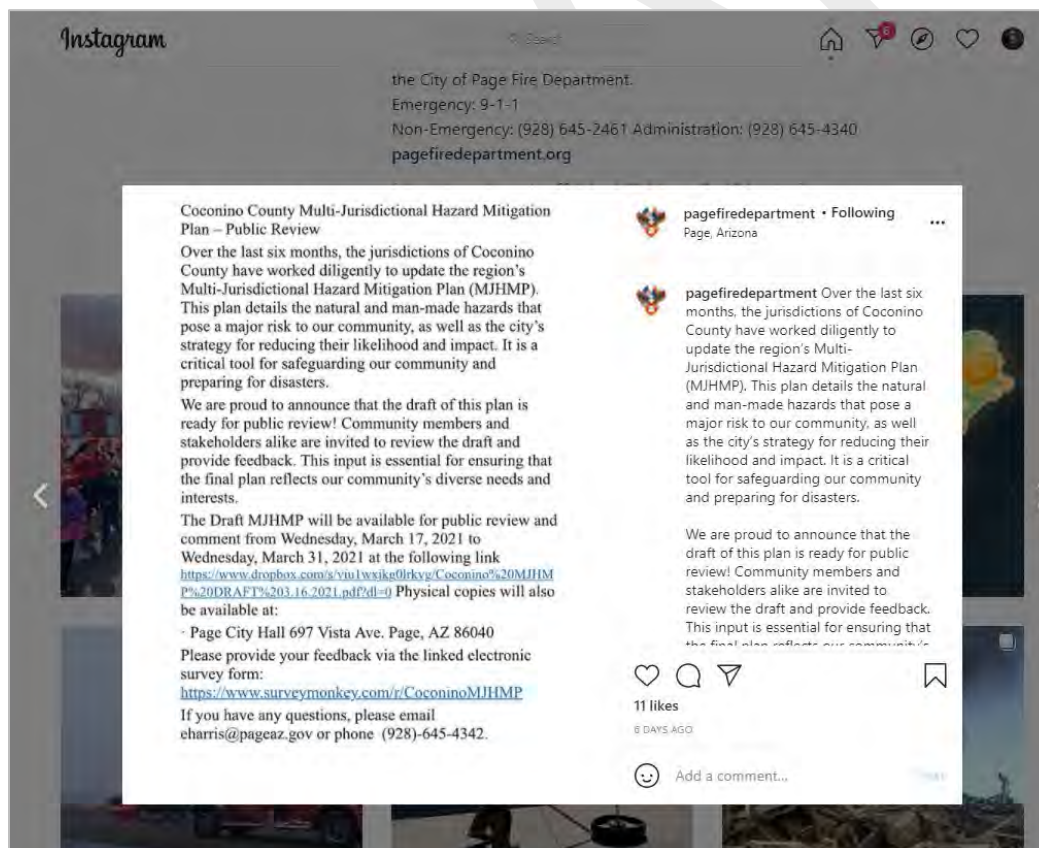
Physical copies will also be available at:
 - Page City Hall 697 Vista Ave. Page, AZ 86040

Please provide your feedback via the linked electronic survey form:
<https://www.surveymonkey.com/r/CoconinoMJHMP>

If you have any questions, please email eharris@pageaz.gov or phone (928)-645-4342.

Videos See All

Crews trained in VEIS today. VEIS stands ...
 6
 168 Views · 23 weeks ago



Instagram

the City of Page Fire Department.
 Emergency: 9-1-1
 Non-Emergency: (928) 645-2461 Administration: (928) 645-4340
pagefiredepartment.org

pagefiredepartment • Following Page, Arizona

pagefiredepartment Over the last six months, the jurisdictions of Coconino County have worked diligently to update the region's Multi-Jurisdictional Hazard Mitigation Plan (MJHMP). This plan details the natural and man-made hazards that pose a major risk to our community, as well as the city's strategy for reducing their likelihood and impact. It is a critical tool for safeguarding our community and preparing for disasters.

We are proud to announce that the draft of this plan is ready for public review! Community members and stakeholders alike are invited to review the draft and provide feedback. This input is essential for ensuring that the final plan reflects our community's diverse needs and interests.

The Draft MJHMP will be available for public review and comment from Wednesday, March 17, 2021 to Wednesday, March 31, 2021 at the following link:
<https://www.dropbox.com/s/yu1w3ike0lrkyg/Coconino%20MJHMP%20DRAFT%203.16.2021.pdf?dl=0> Physical copies will also be available at:
 - Page City Hall 697 Vista Ave. Page, AZ 86040

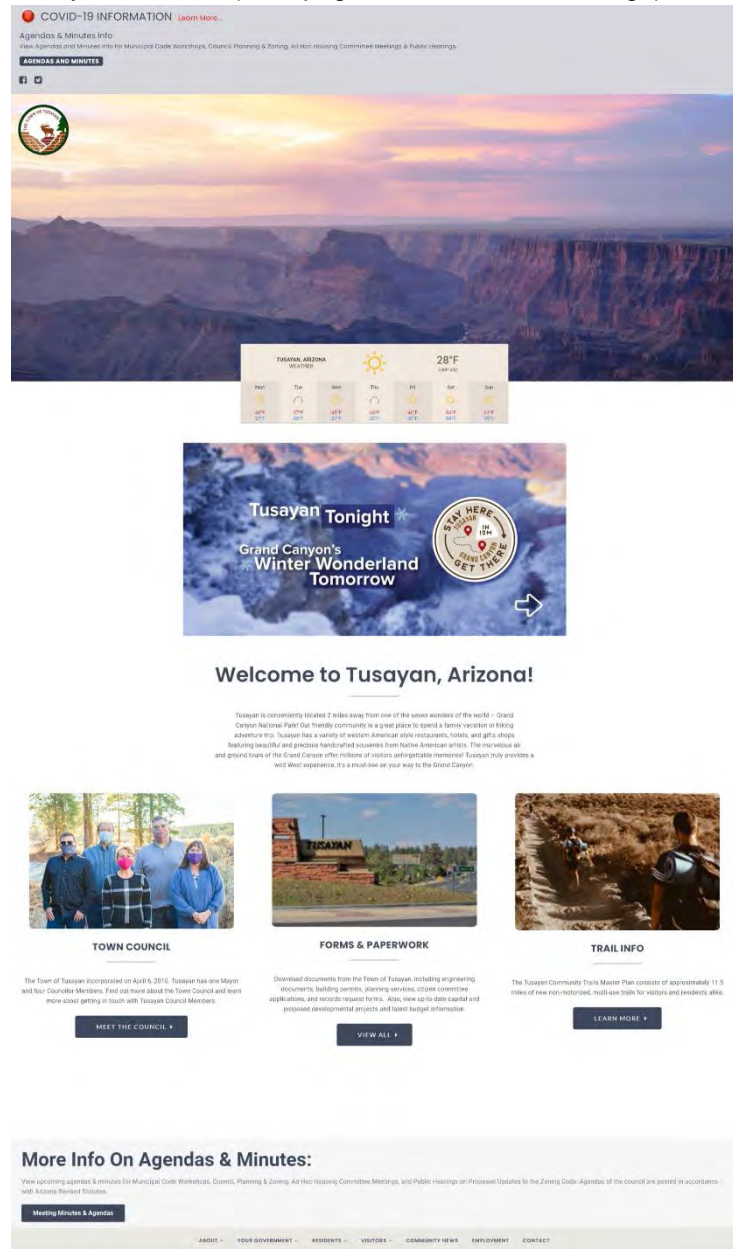
Please provide your feedback via the linked electronic survey form:
<https://www.surveymonkey.com/r/CoconinoMJHMP>

If you have any questions, please email eharris@pageaz.gov or phone (928)-645-4342.

11 likes
 8 DAYS AGO

Add a comment...

Tusayan: Website (Frontpage - link at bottom of image)



Tusayan: Website 2 (frontpage link destination page)

ABOUT | YOUR GOVERNMENT | RESIDENTS | VISITORS | COMMUNITY NEWS | EMPLOYMENT | CONTACT

Draft Hazard Mitigation Plan Now Available for Public Comment

22 MAR 2021 • NO COMMENT(S) [f](#) [t](#) [8](#) [in](#) [@](#)

The Draft Coconino County Hazard Mitigation Plan has been updated and is ready for public review and comment. Below is a link to the plan and brief a survey to answer once you have reviewed the plan. Please complete the survey before April 6, 2021.

<https://www.dropbox.com/s/vlu1wxjkg0lrkv/Coconino%20MJHMP%20DRAFT%203.16.2021.pdf?dl=0>

<https://www.surveymonkey.com/r/CoconinoMJHMP>




Helpful Links
Forms & Documents
Employment
Trail Info
Contact Us

(928) 638 - 9909
Town of Tusayan
P.O. Box 709 | 845 Mustang Drive
Tusayan, AZ 86023

DRAFT

Williams: Website

Note: weblink on this page connected with the Coconino County webpage shown previously



The screenshot shows the homepage of the City of Williams website. At the top, there is a navigation menu with options: Page, Page Options, Advanced Options, Tools, Site Admin, and a help icon. Below the menu is a large image of a wooden sign that says "WELCOME" with a person on a horse in the background. The main content area is titled "Mayor's Message" and includes a welcome message from Mayor John Moore. Below this is a section for "Public Notices" with several links to recent news items, including a resolution on sanitation rates, disaster planning input, COVID-19 vaccine information, and public hearing notices. The page footer contains the URL and a page number "2/3".

3/17/2021 Find Things to Do in Williams, AZ - City of Williams, AZ

Design Mode

Page Page Options Advanced Options Tools Site Admin ?

WELCOME

Mayor's Message

Welcome to the City of Williams!

The City of Williams is our "Little town with a big heart". Visit our welcoming community for an evening, explore our old charm neighborhoods for a weekend, experience the natural beauty of our parks and lakes for a week, how about a round of golf, or live, love and work here for a lifetime! If there's one thing we know, it's that everyone has a unique way to enjoy the City of Williams.

Mayor John Moore

Public Notices

[Resolution No 1408 Sanitation Rate Increase](#)

[County Seeking Community Input for Disaster Planning](#)

[COVID- 19 Vaccine Information](#)

[Public Hearing Notice - Young](#)

[Public Hearing Notice - Lessnick](#)

[Coconino County Multi-Jurisdictional Hazard Mitigation Plan – Public Review](#)

PROCLAMATION OF THE MAYOR

[Williams Historic Business District Design Guide](#)

[Recreation Center closed for the 2020-2021 season](#)

[City Council Statement Regarding Social Distancing](#)

[COVID-19 Press Release](#)

<https://williamsaz.hosted.chiclive.com/cms/One.aspx?portalId=9450766&pageId=9450774>

2/3

Adjacent Jurisdiction / Utility Review Message

From: Dison, Wes <wdison@coconino.az.gov>
Sent: Wednesday, March 24, 2021 11:18
To: catrina.jenkins@navajocountyaz.gov; Randolph.clark@yavapai.us; Rc.helton@yavapai.us; mike.browning@mohavecounty.us; modriscoll@gilacountyaz.gov; aaldredgekco@kanab.net; tgallegos@sanjuancounty.org; jtrautwein@sedonaaz.gov; jclifton@sedonaaz.gov; janet.dean@aps.com; rachel.mure@aps.com; joseph.simonsen@kindermorgan.com; brad.monell@energytransfer.com; rmiller@dffm.az.gov; laurajo.west@usfa.gov; heather.provencio@usda.gov; andrew_p_fitzgerald@nps.gov
Cc: Christian, Mark; Evan Koepke; Wilson, Benjamin
Subject: Coconino County Multi-Jurisdictional Hazard Mitigation Plan (MJHMP):
Categories: CC Me

Good morning, I hope this email finds you well.

Coconino County is the in the final stages of our MJHMP FEMA required 5 year renewal and we wanted to share our plan with you for your awareness. Please know we have no ask of you at this time. We are currently in the Public View/Comment stage and as our neighboring jurisdictions you are all key partners. Our planning effort this year was framed as an "update" to our last edition (2015), but in working with our contractor, Constant Associates, the update was very thorough.

The major change to our plan is the addition of a "Public Health Outbreak/Pandemic" hazard, bringing our official MJHMP County list of hazards to 10. We have also worked to recognize some of the local hazards that do not fit precisely within the intent of the MJHMP (natural caused & eligible for mitigation efforts/funding), but remain very high priorities for our five incorporated jurisdictions.

Again, there is no action necessary on your part. We appreciate our partnerships and relationships with each of you and information sharing is critical to meeting mission.

Link to view our plan:

<https://www.dropbox.com/s/viu1wxjkg0lrkvg/Coconino%20MJHMP%20DRAFT%203.16.2021.pdf?dl=0>

V/r

Wes J. Dison

Director, Coconino County Office of Emergency Management,

Covid-19 Incident Management Team, Deputy Incident Commander, Emergency Manager

(928) 606-1286 (Cell)

(928) 679-7133 (Ofc.)

(928) 679-8606 (24/7 Duty Officer)

wdison@coconino.az.gov | www.coconino.az.gov



"Leadership is the art of accomplishing more than the science of management says is possible."

General Colin Powell, Retired

Appendix D: Mitigation Plan Prioritization

These worksheets follow the FEMA State and Local Mitigation Planning How-To Guide: Developing the Mitigation Plan – Identifying Mitigation Actions and Implementation Strategies published by FEMA in 2003.

Coconino County

STAPLEE Prioritization Tool (Scoring: “+” = 1 point, “-” = -1 point, “n/a” = 0 point, “u/k” = unknown)																								
Mitigation Action	S Social		T Technical			A Administrative			P Political			L Legal			E Economic				E Environmental				Priority Total (net)	
	Community Acceptance	Effect on Segment of Population	Technical Feasibility	Long-Term Solution	Secondary Impacts	Staffing	Funding Allocated	Maintenance/Operations	Political Support	Local Champion	Public Support	State Authority	Existing Local Authority	Potential Legal Challenge	Benefit of Action	Cost of Action	Contributes to Economic Goals	Outside Funding Required	Effect on Land/Water	Effect on Endangered Species	Effect on HAZMAT/Waste Sites	Consistent with Comm. Environmental Goals		Consistent with Federal Environmental Laws
1.1 Maintain evaluations for structural integrity of County and non-County facilities identified as potential shelter sites can be performed seamlessly via application of 2018 International Codes and 2017 National Electric Code.	+	+	+	+	+	N/A	U/K	+	+	+	+	+	+	0	+	N/A	0	N/A	0	0	N/A	+	+	14
1.2 Identify and pursue funding opportunities to develop and implement local mitigation activities.	+	+	+	+	+	0	0	+	+	+	+	+	+	U/K	+	N/A	+	N/A	U/K	U/K	U/K	+	+	15

Mitigation Action	Community Acceptance	Effect on Segment of Population	Technical Feasibility	Long-Term Solution	Secondary Impacts	Staffing	Funding Allocated	Maintenance/Operations	Political Support	Local Champion	Public Support	State Authority	Existing Local Authority	Potential Legal Challenge	Benefit of Action	Cost of Action	Contributes to Economic Goals	Outside Funding Required	Effect on Land/Water	Effect on Endangered Species	Effect on HAZMAT/Waste Sites	Consistent with Comm. Environmental Goals	Consistent with Federal Environmental Laws	Priority Total (net)
2.1 Coordinate with local stakeholders and partners for the enhancement of public outreach and awareness regarding regional hazards and mitigation actions community members can implement for self-reliance and protection to property and life safety.	+	+	+	+	+	0	0	N/A	+	+	+	+	+	+	+	N/A	+	N/A	U/K	U/K	U/K	+	+	15
2.2 Increase public awareness of the hazards to residents and businesses as a means to reduce the potential impacts through education and outreach. Continue to maintain a resource center of information accessible to the public at key government facilities.	+	+	+	+	+	0	0	0	+	+	+	+	+	0	+	-	+	0	0	0	+	+	+	14

Mitigation Action	Community Acceptance	Effect on Segment of Population	Technical Feasibility	Long-Term Solution	Secondary Impacts	Staffing	Funding Allocated	Maintenance/Operations	Political Support	Local Champion	Public Support	State Authority	Existing Local Authority	Potential Legal Challenge	Benefit of Action	Cost of Action	Contributes to Economic Goals	Outside Funding Required	Effect on Land/Water	Effect on Endangered Species	Effect on HAZMAT/Waste Sites	Consistent with Comm. Environmental Goals	Consistent with Federal Environmental Laws	Priority Total (net)
2.3 Partner with local insurance agencies to hold workshops for property owners to educate about the Flood Insurance Programs and its requirements. Community Development performs this function through NEIPA and the Engineering Division for flood only.	+	+	+	+	+	0	0	0	+	+	+	+	+	0	+	0	+	0	0	0	+	+	+	15
2.4 Increase public awareness of dam failure hazards and identify mitigation measures to address those hazards.	+	+	+	+	+	0	0	0	+	+	+	+	+	0	+	0	+	0	0	0	N/A	+	+	14
2.5 In light of the current COVID-19 pandemic and past public health related challenges, the County will seek to improve upon and enhance community outreach and coordination of information to stress the importance of nonpharmaceutical interventions to help slow the spread of infectious diseases.	+	+	+	+	+	+	0	0	+	+	+	+	+	-	+	0	0	0	0	0	0	+	+	13

Mitigation Action	Community Acceptance	Effect on Segment of Population	Technical Feasibility	Long-Term Solution	Secondary Impacts	Staffing	Funding Allocated	Maintenance/Operations	Political Support	Local Champion	Public Support	State Authority	Existing Local Authority	Potential Legal Challenge	Benefit of Action	Cost of Action	Contributes to Economic Goals	Outside Funding Required	Effect on Land/Water	Effect on Endangered Species	Effect on HAZMAT/Waste Sites	Consistent with Comm. Environmental Goals	Consistent with Federal Environmental Laws	Priority Total (net)
2.6 Expand and maintain public education activities to include events like the Northern Arizona Home Show, public service announcements, public access television and county website.	+	+	+	+	+	0	+	0	+	+	+	+	+	0	+	0	+	0	0	0	0	+	+	15
2.7 Enhance winter weather preparedness campaign including brochures, Public Service Announcements and County webpage content development for public awareness.	+	+	+	+	+	+	+	0	+	+	+	+	+	0	+	0	+	0	0	0	0	+	+	16
2.8 Deliver educational programs and outreach to outlying areas of county that are not currently served by any organized fire protection system, with the goal to assist organizing districts.	+	+	+	+	+	+	+	0	+	+	+	+	+	0	+	0	+	0	0	0	0	+	+	16
2.9 Continue to maintain a resource center of information accessible to the public at key government facilities, providing informational brochures and information on government websites and social media.	+	+	+	+	+	+	+	0	+	+	+	+	+	0	+	0	+	0	0	0	0	+	+	16

Mitigation Action	Community Acceptance	Effect on Segment of Population	Technical Feasibility	Long-Term Solution	Secondary Impacts	Staffing	Funding Allocated	Maintenance/Operations	Political Support	Local Champion	Public Support	State Authority	Existing Local Authority	Potential Legal Challenge	Benefit of Action	Cost of Action	Contributes to Economic Goals	Outside Funding Required	Effect on Land/Water	Effect on Endangered Species	Effect on HAZMAT/Waste Sites	Consistent with Comm. Environmental Goals	Consistent with Federal Environmental Laws	Priority Total (net)	
3.1 Seek any opportunities to enhance the implementation and monitoring of the code regulated design criteria in relation to the adopted 2018 International codes and the 2017 National Electrical Code for the protection of life and property and reduce the impacts of natural and manmade hazards.	0	+	+	+	0	0	+	0	+	+	0	+	+	-	+	-	0	+	+	0	+	+	+	12	
3.2 Integrate appropriate items from the MJHMP into the Safety Element of the General Plan and other regulatory documents as appropriate. This function is ongoing through adopted codes and ordinances.	+	+	+	+	+	0	+	0	+	+	+	+	+	0	+	0	0	0	0	0	0	0	+	+	14

Mitigation Action	Community Acceptance	Effect on Segment of Population	Technical Feasibility	Long-Term Solution	Secondary Impacts	Staffing	Funding Allocated	Maintenance/Operations	Political Support	Local Champion	Public Support	State Authority	Existing Local Authority	Potential Legal Challenge	Benefit of Action	Cost of Action	Contributes to Economic Goals	Outside Funding Required	Effect on Land/Water	Effect on Endangered Species	Effect on HAZMAT/Waste Sites	Consistent with Comm. Environmental Goals	Consistent with Federal Environmental Laws	Priority Total (net)
3.3 Coordinate with the utility companies and vendors to strengthen, safeguard and provide measures such as providing supplemental services, to protect and secure high-voltage lines, water, sewer, natural gas and petroleum pipelines, and trunk electrical and telephone conduits from hazards via County adherence to International Codes and 2017 National Electric Code.	+	+	+	+	+	+	+	+	+	+	+	+	+	0	+	0	+	0	0	0	0	+	+	17
3.4 Implement and develop the County Resilient Community Program.	+	+	+	+	+	0	0	0	+	+	+	+	+	0	+	-	+	0	+	0	+	+	+	15
3.5 Establish and maintain a County component of the state GIS mapping system documenting forest treatment, hazard data, and grant funding sources to monitor our wildland fire threat.	+	+	+	+	+	+	+	+	+	+	+	+	+	0	+	0	+	0	0	0	0	+	+	17
3.6 Conduct floodplain re-mapping for reducing losses to Munds Park and Kachina/Mountaineer.	+	+	+	+	+	0	0	0	+	+	+	+	+	-	+	0	+	0	+	0	0	+	+	14

Mitigation Action	Community Acceptance	Effect on Segment of Population	Technical Feasibility	Long-Term Solution	Secondary Impacts	Staffing	Funding Allocated	Maintenance/Operations	Political Support	Local Champion	Public Support	State Authority	Existing Local Authority	Potential Legal Challenge	Benefit of Action	Cost of Action	Contributes to Economic Goals	Outside Funding Required	Effect on Land/Water	Effect on Endangered Species	Effect on HAZMAT/Waste Sites	Consistent with Comm. Environmental Goals	Consistent with Federal Environmental Laws	Priority Total (net)
3.7 Develop Neighborhood Wildfire Assessment, at-risk neighborhood ranking, and provide risk information to residents.	+	+	+	+	+	+	+	0	+	+	+	+	+	0	+	-	+	0	0	0	0	+	+	15
3.8 Conduct roadside thinning along Forest HWY 3, Perkinsville Rd, Old Munds Hwy, Garland Prairie, and Spring Valley Rd.*	+	+	+	+	+	0	+	0	+	+	+	+	+	0	+	0	+	0	0	0	0	+	+	15
3.9 Enforce floodplain management requirements in accordance with NFIP, including regulating all substantially improved construction in floodplain.	+	+	+	+	+	0	+	0	+	+	+	+	+	0	+	0	+	0	0	0	0	+	+	15
3.10 Continue support for Flagstaff Fire Department Fire Management Program to mitigate wildland fire hazards to watershed resources with an emphasis on education engineering, enforcement, and ecosystems.	+	+	+	+	+	+	+	0	+	+	+	+	+	0	+	0	+	0	+	+	0	+	+	19

Mitigation Action	Community Acceptance	Effect on Segment of Population	Technical Feasibility	Long-Term Solution	Secondary Impacts	Staffing	Funding Allocated	Maintenance/Operations	Political Support	Local Champion	Public Support	State Authority	Existing Local Authority	Potential Legal Challenge	Benefit of Action	Cost of Action	Contributes to Economic Goals	Outside Funding Required	Effect on Land/Water	Effect on Endangered Species	Effect on HAZMAT/Waste Sites	Consistent with Comm. Environmental Goals	Consistent with Federal Environmental Laws	Priority Total (net)
3.11 Continue participation in Rural Communities Fuel Management Partnership – an informal multi-agency alliance created to work with landowners to reduce fuel hazards on their property in two communities located in Coconino Co. Areas of interest include the communities of Doney Park, Williams, and Blue Ridge.	+	+	+	+	+	0	+	0	+	+	+	+	+	0	+	0	+	0	0	0	0	+	+	19
4.1 Partner with local insurance agencies to hold workshops for property owners to educate about the Flood Insurance Programs and its requirements. Community Development performs this function through NEIPA and the Engineering Division for flood only.	+	+	+	+	+	0	+	0	+	+	+	+	+	0	+	0	+	0	0	0	0	+	+	15

Mitigation Action	Community Acceptance	Effect on Segment of Population	Technical Feasibility	Long-Term Solution	Secondary Impacts	Staffing	Funding Allocated	Maintenance/Operations	Political Support	Local Champion	Public Support	State Authority	Existing Local Authority	Potential Legal Challenge	Benefit of Action	Cost of Action	Contributes to Economic Goals	Outside Funding Required	Effect on Land/Water	Effect on Endangered Species	Effect on HAZMAT/Waste Sites	Consistent with Comm. Environmental Goals	Consistent with Federal Environmental Laws	Priority Total (net)
4.2 Continue partnership with County and local stakeholders to Improve floodplain hazard assessment information and identify recommendations for avoiding new development in high hazard areas and encourage preventative measures for existing development.	+	+	+	+	+	0	+	0	+	+	+	+	+	0	+	0	+	0	+	+	0	+	+	17
4.3 Continue to develop mutual aid agreements and memorandum of understanding with agencies to serve emergency and disaster purposes – notably by encouraging additional signatories to the Arizona Mutual Aid Compact.	+	+	+	+	+	+	+	+	+	+	+	+	+	0	+	0	+	0	0	0	0	+	+	17

Mitigation Action	Community Acceptance	Effect on Segment of Population	Technical Feasibility	Long-Term Solution	Secondary Impacts	Staffing	Funding Allocated	Maintenance/Operations	Political Support	Local Champion	Public Support	State Authority	Existing Local Authority	Potential Legal Challenge	Benefit of Action	Cost of Action	Contributes to Economic Goals	Outside Funding Required	Effect on Land/Water	Effect on Endangered Species	Effect on HAZMAT/Waste Sites	Consistent with Comm. Environmental Goals	Consistent with Federal Environmental Laws	Priority Total (net)
4.4 Continue County partnership and support with local government, NGO and non-profits to maintain and build upon our cadre volunteers to augment efforts in compliance with Arizona Disaster Service Worker program guidance (e.g., shelter workers, animal rescue and care, CERT, communications staff, medical and health, and human service providers).	+	+	+	+	+	0	+	0	+	+	+	+	+	0	+	-	+	0	0	0	0	+	+	14
4.5 Facilitate integration of Northern Arizona University into the County MJHMP as a participating jurisdiction via annual MJHMP review and update process.	+	+	+	+	+	0	0	0	+	+	+	+	+	0	+	0	+	0	0	0	0	+	+	14
4.6 Continue to push for mutual aid agreements and memorandum of understanding (MOU) with agencies to serve emergency and disaster purposes – notably by encouraging additional signatories to the Arizona Mutual Aid Compact.	+	+	+	+	+	0	+	+	+	+	+	+	+	0	+	0	+	0	0	0	0	+	+	16

Mitigation Action	Community Acceptance	Effect on Segment of Population	Technical Feasibility	Long-Term Solution	Secondary Impacts	Staffing	Funding Allocated	Maintenance/Operations	Political Support	Local Champion	Public Support	State Authority	Existing Local Authority	Potential Legal Challenge	Benefit of Action	Cost of Action	Contributes to Economic Goals	Outside Funding Required	Effect on Land/Water	Effect on Endangered Species	Effect on HAZMAT/Waste Sites	Consistent with Comm. Environmental Goals	Consistent with Federal Environmental Laws	Priority Total (net)
5.1 Secure funding and strategic partnerships necessary to develop County Medical Reserve Corps capability.	+	+	+	+	+	+	+	+	+	+	+	+	+	0	+	0	+	-	0	0	0	+	+	16
5.2 Provide support and coordination as requested (and as funding is available) toward the deployment and maintenance of the Flash Flood Early Warning System in Havasupai Canyon.	+	+	+	+	+	0	-	+	+	+	+	+	+	0	+	0	+	0	0	0	0	+	+	15
5.3 Post Wildfire Mt. Elden Flood Mitigation Project.	+	+	+	+	+	0	+	0	+	+	+	+	+	0	+	0	+	0	0	0	0	+	+	15
5.4 Post wildland fire early monitoring flood warning system for areas impacted by catastrophic fires.	+	+	+	+	+	0	+	+	+	+	+	+	+	0	+	0	+	0	0	0	0	+	+	16

Flagstaff

STAPLEE Prioritization Tool (Scoring: “+” = 1 point, “-” = -1 point, “n/a” = 0 point, “u/k” = unknown)																								
Mitigation Action	S Social		T Technical			A Administrative			P Political			L Legal			E Economic				E Environmental				Priority Total (net)	
	Community Acceptance	Effect on Segment of Population	Technical Feasibility	Long-Term Solution	Secondary Impacts	Staffing	Funding Allocated	Maintenance/Operations	Political Support	Local Champion	Public Support	State Authority	Existing Local Authority	Potential Legal Challenge	Benefit of Action	Cost of Action	Contributes to Economic Goals	Outside Funding Required	Effect on Land/Water	Effect on Endangered Species	Effect on HAZMAT/Waste Sites	Consistent with Comm. Environmental Goals		Consistent with Federal Environmental Laws
1.1 Upgrade existing conservation measures to provide for water during periods of drought. The city depends on surface reservoirs and groundwater for domestic water supply. Conservation efforts expand the capacity of this limited resource.	+	+	+	+	+	N/A	N/K	+	+	+	+	N/A	N/A	N/A	+	N/A	+	N/A	+	+	N/A	+	+	15
1.2 Plan and conduct forest treatments to reduce severity and impact of unwanted wildland fire both within and adjacent to the community.	N/K	+	+	+	+	-	-	+	+	+	+	+	+	-	+	-	+	-	+	+	+	+	+	12

Mitigation Action	Community Acceptance	Effect on Segment of Population	Technical Feasibility	Long-Term Solution	Secondary Impacts	Staffing	Funding Allocated	Maintenance/Operations	Political Support	Local Champion	Public Support	State Authority	Existing Local Authority	Potential Legal Challenge	Benefit of Action	Cost of Action	Contributes to Economic Goals	Outside Funding Required	Effect on Land/Water	Effect on Endangered Species	Effect on HAZMAT/Waste Sites	Consistent with Comm. Environmental Goals	Consistent with Federal Environmental Laws	Priority Total (net)
1.3 Maintain evaluations for structural integrity of facilities identified as potential shelter sites. This can be performed seamlessly via application of the 2018 International Building Codes and 2017 National Electric Codes.	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	-	+	N/A	N/A	N/A	+	+	+	18
1.4 Identify and pursue funding opportunities to develop and implement local mitigation activities.	+	+	+	+	+	-	N/A	+	+	+	+	+	+	N/A	+	-	+	-	N/A	N/A	N/A	+	+	13
1.5 Develop greenhouse gas mitigation strategies that address multiple objectives, including damage reduction, environmental enhancement, historic preservation, tourism/recreation, economic recovery /development, and building community resilience to climate variance.	+	+	+	+	+	N/A	-	+	+	+	+	+	+	U/K	+	-	+	U/K	+	+	N/A	+	+	15

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1.6 Flagstaff Well Field & Pipeline Evaluation. The city purchased Red Gap Ranch and has drilled ten (10) wells for the purpose of future water supply. The city is currently negotiating a Right of Water with ADOT along 1-40 and is performing the first phase of a feasibility study.	+	+	+	+	+	N/A	+	+	+	+	+	+	+	-	+	-	+	N/A	+	U/K	N/A	+	+	15
1.7 Flagstaff Watershed Protection Project (also referred to as County & Dry Hills Watershed Protection Project): Approved by the voters, this project is being pursued to ensure the viability of this surface reservoir and stormwater runoff through forest treatments.	N/K	+	+	+	+	-	+	+	+	+	+	+	+	-	+	-	+	-	+	+	+	+	+	14
2.1 Develop a public outreach and awareness program about regional hazards and mitigation actions community members can do in their homes	+	+	+	+	+	0	0	0	+	+	+	+	+	0	+	-	+	0	0	0	+	+	+	14

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2.2 Increase public awareness of the natural, human-caused, and technological hazards to businesses as a means to reduce the potential damage from each hazard through educational and outreach. Maintain a resource center accessible to the public at key government facilities. Provide information on government websites and social media accounts.	+	+	+	+	+	0	0	0	+	+	+	+	+	0	+	-	+	0	0	0	+	+	+	14
2.3 Provide information on tools; partnership opportunities, and funding resources for business and philanthropical organizations.	+	+	+	+	+	0	0	0	+	+	+	+	+	0	+	-	+	0	0	0	+	+	+	14
2.4 Place more stress on the risks associated with natural and manmade hazards in public awareness campaigns conducted by various County/city departments.	+	+	+	+	+	0	0	0	+	+	+	+	+	0	+	-	+	0	0	0	+	+	+	14

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2.5 Advance education programs to increase awareness and mitigation impacts of climate change	+	+	+	+	+	0	0	0	+	+	+	+	+	0	+	-	+	0	0	0	+	+	+	14
2.6 Flagstaff Stormwater Public Outreach: Public awareness program on topic of flooding and dam risks.	+	+	+	+	+	0	0	0	+	+	+	+	+	0	+	0	+	0	0	0	+	+	+	15
3.1 Identify water resources management and conservation opportunities.	+	+	+	+	+	N/A	N/K	+	+	+	+	N/A	N/A	N/A	+	N/A	+	N/A	+	+	N/A	+	+	15
3.2 Improve hazard assessment information to make recommendations for avoiding new development in high hazard areas and encouraging preventative measures for existing development in areas vulnerable to natural, man-made, and technological hazards.	0	+	+	+	+	0	0	0	+	+	+	+	+	-	+	-	+	0	0	0	+	+	+	12
3.3 Integrate appropriate items from the MJHMP into the Safety Element of the General Plan and other regulatory documents as appropriate.	0	+	+	+	+	0	0	0	+	+	+	+	+	-	+	-	+	0	0	0	+	+	+	12

Mitigation Action	Community Acceptance	Effect on Segment of Population	Technical Feasibility	Long-Term Solution	Secondary Impacts	Staffing	Funding Allocated	Maintenance/Operations	Political Support	Local Champion	Public Support	State Authority	Existing Local Authority	Potential Legal Challenge	Benefit of Action	Cost of Action	Contributes to Economic Goals	Outside Funding Required	Effect on Land/Water	Effect on Endangered Species	Effect on HAZMAT/Waste Sites	Consistent with Comm. Environmental Goals	Consistent with Federal Environmental Laws	Priority Total (net)
3.4 Coordinate with the utility companies and vendors to strengthen, safeguard, or take other appropriate measures such as providing supplemental services, to protect and secure high-voltage lines, water, sewer, natural gas and petroleum pipelines, and trunk electrical and telephone conduits from hazards.	+	+	+	+	+	N/A	N/A	+	+	+	+	+	+	+	+	-	+	N/A	N/A	N/A	N/A	+	+	15
3.5 Continue to invest in up-sizing drainage ways, improving floodplain flood mitigations, and enhancing streams and washes to convey design storms.	+	+	+	+	+	+	-	0	+	+	+	+	+	0	+	-	+	0	+	0	+	+	+	16
3.6 The Rio DeFlag Project is a major flood control initiative designed to remove 1500 structures from the flood plain. The downtown area is prone to flooding and this effort will reduce the flood threat and enable further economic development in this area.	-	+	+	+	+	N/A	-	+	-	+	U/K	+	+	+	+	-	+	-	+	+	+	+	+	11

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4.1 Partner with local insurance agencies to hold workshops for property owners to educate about the Flood and Earthquake Insurance Programs and its requirements.	+	+	+	+	+	0	N/A	0	+	+	+	+	+	0	+	N/A	+	0	N/A	N/A	N/A	0	0	12
4.2 The city will develop a plan and mutual aid agreement with the state, County, Navajo Nation, National Park Service and other agencies to implement mitigation actions.	+	+	+	+	+	+	0	0	+	+	+	+	+	0	+	0	+	0	0	0	+	+	+	16
4.3 Continue to develop mutual aid agreements and memorandum of understanding with agencies to serve emergency and disaster purposes – notably by encouraging additional signatories to the Arizona Mutual Aid Compact.	+	+	+	+	+	+	0	0	+	+	+	+	+	0	+	0	+	0	0	0	+	+	+	16

Mitigation Action	Community Acceptance	Effect on Segment of Population	Technical Feasibility	Long-Term Solution	Secondary Impacts	Staffing	Funding Allocated	Maintenance/Operations	Political Support	Local Champion	Public Support	State Authority	Existing Local Authority	Potential Legal Challenge	Benefit of Action	Cost of Action	Contributes to Economic Goals	Outside Funding Required	Effect on Land/Water	Effect on Endangered Species	Effect on HAZMAT/Waste Sites	Consistent with Comm. Environmental Goals	Consistent with Federal Environmental Laws	Priority Total (net)
4.4 Continue City partnership and support with NGOs and non-profits to maintain and build a cadre of trained, volunteers to augment disaster response and recovery efforts in compliance with Arizona Disaster Service Worker program guidance (e.g., shelter workers, animal rescue and care, CERT, communications staff, medical and health, and human service providers),	+	+	+	+	+	-	0	+	+	+	+	+	+	+	+	0	-	0	0	0	+	+	+	15
5.1 Develop a disaster debris plan.	+	+	+	+	+	0	0	0	+	+	+	+	+	0	+	-	+	0	+	0	+	+	+	15
5.2 Budget for maintenance and replacement of County/city owned fire and police stations.	+	+	+	+	+	0	-	+	+	+	+	+	+	0	+	-	+	0	0	0	+	+	+	14
5.3 Maintain cloud storage for vital records and data to allow access, if government servers are disrupted.	+	+	+	+	+	0	0	+	+	+	+	+	+	0	+	0	+	0	0	0	+	+	+	16

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5.4 Provide equipment and human resources sufficient to handle comprehensive road, air, and railway hazmat and mass casualty incidents. Nearly 120 trains travel through the city boundaries each day. I-40 and I-17 generate truck traffic that carry hazardous materials through the city each day.	+	+	+	+	+	0	-	+	+	+	+	+	+	0	+	-	+	0	0	0	+	+	+	14
5.5 Clay Avenue Wash Detention (Dam). Basin Emergency Action Plan. A plan to address how to warn the public in the event of a pending dam failure or flooding.	+	+	+	+	+	0	-	+	+	+	+	+	+	0	+	-	+	0	0	0	+	+	+	14
5.6 Construct and equip a multi-agency EOC to coordinate disasters. The area is subject to periodic disasters. On an annual basis, the EOC is activated 2-3 times each year.	+	+	+	+	+	0	-	+	+	+	+	+	+	0	+	-	+	0	0	0	+	+	+	14

Fredonia

STAPLEE Prioritization Tool (Scoring: “+” = 1 point, “-” = -1 point, “n/a” = 0 point, “u/k” = unknown)																								
Mitigation Action	S Social		T Technical			A Administrative			P Political			L Legal			E Economic				E Environmental				Priority Total (net)	
	Community Acceptance	Effect on Segment of Population	Technical Feasibility	Long-Term Solution	Secondary Impacts	Staffing	Funding Allocated	Maintenance/Operations	Political Support	Local Champion	Public Support	State Authority	Existing Local Authority	Potential Legal Challenge	Benefit of Action	Cost of Action	Contributes to Economic Goals	Outside Funding Required	Effect on Land/Water	Effect on Endangered Species	Effect on HAZMAT/Waste Sites	Consistent with Comm. Environmental Goals		Consistent with Federal Environmental Laws
1.1 Evaluate city/county and non-city/county facilities identified as potential shelter sites for structural integrity	+	+	+	+	+	0	-	+	+	+	+	+	+	0	+	-	0	0	0	0	0	0	0	12
1.2 Identify and pursue funding opportunities to develop and implement local mitigation activities.	+	+	+	+	+	0	0	+	+	+	+	+	+	0	+	0	+	0	0	0	+	+	+	16
1.3 Integrate appropriate items from the MJHMP into the Safety Element of the General Plan and other regulatory documents as appropriate.	+	+	+	+	+	0	-	0	+	+	+	+	+	0	+	-	0	0	0	0	+	+	+	12
1.4 Replacing existing dike with a levy.	+	+	+	+	+	0	-	+	+	+	+	+	+	0	+	-	+	0	1	0	+	+	+	15
2.1 Increase public awareness of dam failure hazards and mitigation measures to address them	+	+	+	+	+	0	0	+	+	+	+	+	+	0	+	0	+	0	0	0	+	+	+	16

Mitigation Action	Community Acceptance	Effect on Segment of Population	Technical Feasibility	Long-Term Solution	Secondary Impacts	Staffing	Funding Allocated	Maintenance/Operations	Political Support	Local Champion	Public Support	State Authority	Existing Local Authority	Potential Legal Challenge	Benefit of Action	Cost of Action	Contributes to Economic Goals	Outside Funding Required	Effect on Land/Water	Effect on Endangered Species	Effect on HAZMAT/Waste Sites	Consistent with Comm. Environmental Goals	Consistent with Federal Environmental Laws	Priority Total (net)
2.2 Develop a public outreach and awareness program about regional hazards and mitigation actions community members can do in their homes.	+	+	+	+	+	0	-	+	+	+	+	+	+	0	+	-	+	0	0	0	+	+	+	14
2.3 Increase public awareness of hazards to businesses as a means to reduce the potential damage from each hazard through education and outreach. Maintain a resource center accessible to the public. Provide information on government websites and social media accounts.	+	+	+	+	+	0	-	+	+	+	+	+	+	0	+	-	+	0	0	0	+	+	+	14
2.4 Hold annual community meeting in September with all residents and churches to educate residents about seventy-two (72) hour kits and food storage.	+	+	+	+	+	+	+	+	+	+	+	+	+	0	+	0	+	0	0	0	+	+	+	17
2.5 Conduct severe wind community outreach through newsletter in the spring and fall.	+	+	+	+	+	0	0	+	+	+	+	+	+	0	+	0	+	0	0	0	+	+	+	16

Mitigation Action	Community Acceptance	Effect on Segment of Population	Technical Feasibility	Long-Term Solution	Secondary Impacts	Staffing	Funding Allocated	Maintenance/Operations	Political Support	Local Champion	Public Support	State Authority	Existing Local Authority	Potential Legal Challenge	Benefit of Action	Cost of Action	Contributes to Economic Goals	Outside Funding Required	Effect on Land/Water	Effect on Endangered Species	Effect on HAZMAT/Waste Sites	Consistent with Comm. Environmental Goals	Consistent with Federal Environmental Laws	Priority Total (net)
2.6 Enforce speed limits and conduct driver safety training.	+	+	+	+	+	0	0	+	+	+	+	+	+	0	+	+	+	0	0	0	+	+	+	16
2.7 Conduct Fire Department training during community outreach (through annual community meeting).	+	+	+	+	+	+	+	+	+	+	+	+	+	0	+	0	+	0	0	0	+	+	+	17
2.8 Conduct outreach to the community, quarterly, through the town discussing what to do in the event of an earthquake.	+	+	+	+	+	+	+	+	+	+	+	+	+	0	+	0	+	0	0	0	+	+	+	17
3.1 Identify water resources management and conservation opportunities.	+	+	+	+	+	+	-	+	+	+	+	+	+	0	+	0	+	0	0	0	+	+	+	16
3.2 Coordinate with the utility companies and vendors to strengthen, safeguard, or take other appropriate measures such as providing supplemental services, to identify, repair, protect and secure high-voltage lines, water, sewer and trunk electrical and telephone conduits from hazards.	+	+	+	+	+	+	+	+	+	+	+	+	+	0	+	0	+	0	0	0	+	+	+	17

Mitigation Action	Community Acceptance	Effect on Segment of Population	Technical Feasibility	Long-Term Solution	Secondary Impacts	Staffing	Funding Allocated	Maintenance/Operations	Political Support	Local Champion	Public Support	State Authority	Existing Local Authority	Potential Legal Challenge	Benefit of Action	Cost of Action	Contributes to Economic Goals	Outside Funding Required	Effect on Land/Water	Effect on Endangered Species	Effect on HAZMAT/Waste Sites	Consistent with Comm. Environmental Goals	Consistent with Federal Environmental Laws	Priority Total (net)	
3.3 Conduct feasibility study for curb and gutters to determine cost.	+	+	+	+	+	+	-	+	+	+	+	+	+	0	+	-	0	0	0	0	0	0	+	+	13
4.1 Partner with local insurance agencies to hold workshops for property owners to educate about the Flood and Earthquake Insurance Programs and its requirements. Community Development performs this function through NEIPA and the Engineering Division for flood only.	+	+	+	+	+	+	0	+	+	+	+	+	+	0	+	0	+	0	0	0	0	+	+	+	17
5.1 Build a cadre of volunteers to augment disaster response and recovery efforts in compliance with Arizona Disaster Service Worker program guidance (e.g., shelter workers, animal rescue and care, CERT, medical, communications staff services), during and after a disaster	+	+	+	+	+	+	0	+	+	+	+	+	+	0	+	-	+	0	0	0	0	+	+	+	16
5.2 Conduct Fire Department training for a hazardous fires and spills.	+	+	+	0	+	+	+	+	+	+	+	+	+	0	+	-	-	0	0	0	0	+	+	+	14

Page

STAPLEE Prioritization Tool (Scoring: “+” = 1 point, “-” = -1 point, “n/a” = 0 point, “u/k” = unknown)																									
Mitigation Action	S Social		T Technical			A Administrative			P Political			L Legal			E Economic				E Environmental				Priority Total (net)		
	Community Acceptance	Effect on Segment of Population	Technical Feasibility	Long-Term Solution	Secondary Impacts	Staffing	Funding Allocated	Maintenance/Operations	Political Support	Local Champion	Public Support	State Authority	Existing Local Authority	Potential Legal Challenge	Benefit of Action	Cost of Action	Contributes to Economic Goals	Outside Funding Required	Effect on Land/Water	Effect on Endangered Species	Effect on HAZMAT/Waste Sites	Consistent with Comm. Environmental Goals		Consistent with Federal Environmental Laws	
1.1 Evaluate city/County and non-city/County facilities identified as potential shelter sites for structural integrity.	+	+	+	+	+	0	-	+	+	+	+	+	+	0	+	-	0	0	0	0	0	0	+	+	12
1.2 Identify and pursue funding opportunities to develop and implement local mitigation activities.	+	+	+	+	+	0	0	+	+	+	+	+	+	0	+	0	+	0	0	0	+	+	+	16	
1.3 Enforcement and/or implementation of modern building codes to regulate new development to mitigate against loss.	+	+	+	+	+	+	0	+	+	+	+	+	+	0	+	0	+	0	0	0	+	+	+	17	

Mitigation Action	Community Acceptance	Effect on Segment of Population	Technical Feasibility	Long-Term Solution	Secondary Impacts	Staffing	Funding Allocated	Maintenance/Operations	Political Support	Local Champion	Public Support	State Authority	Existing Local Authority	Potential Legal Challenge	Benefit of Action	Cost of Action	Contributes to Economic Goals	Outside Funding Required	Effect on Land/Water	Effect on Endangered Species	Effect on HAZMAT/Waste Sites	Consistent with Comm. Environmental Goals	Consistent with Federal Environmental Laws	Priority Total (net)
2.1 Coordinate with local stakeholders and partners for the enhancement of public outreach and awareness regarding regional hazards and mitigation actions community members can implement for self-reliance and protection to property and life safety.	+	+	+	+	+	+	+	0	+	+	+	+	+	0	+	0	0	0	0	0	0	+	+	15
2.2 Place more stress on the risks associated with natural and manmade hazards in public awareness campaigns (i.e., partner with local insurance agencies to hold workshops for property owners to educate about the Flood and Earthquake Insurance Programs and its requirements).	+	+	+	+	+	0	0	+	+	+	+	+	+	0	+	0	+	0	0	0	+	+	+	16

Mitigation Action	Community Acceptance	Effect on Segment of Population	Technical Feasibility	Long-Term Solution	Secondary Impacts	Staffing	Funding Allocated	Maintenance/Operations	Political Support	Local Champion	Public Support	State Authority	Existing Local Authority	Potential Legal Challenge	Benefit of Action	Cost of Action	Contributes to Economic Goals	Outside Funding Required	Effect on Land/Water	Effect on Endangered Species	Effect on HAZMAT/Waste Sites	Consistent with Comm. Environmental Goals	Consistent with Federal Environmental Laws	Priority Total (net)	
2.3 Develop a public awareness program. To increase public support for funding disaster preparation, educating the public what to do in case of a disaster, and increasing public awareness as to how public safety agencies will respond in a disaster.	+	+	+	+	+	+	+	0	+	+	+	+	+	0	+	0	0	0	0	0	0	0	+	+	15
2.4 The city will develop a plan and pamphlets and implement a public information program that will identify the following: Who can apply? What types of emergencies can be applied for? Where to apply.	+	+	+	0	0	0	0	+	0	+	+	+	+	0	+	0	+	0	0	0	+	+	+	13	
3.1 Identify water resources management and conservation opportunities.	+	+	+	+	+	+	0	+	+	+	+	+	+	0	+	0	+	0	+	+	+	0	+	18	
3.2 Design and construct drainage structures for problem flood areas throughout the city to prevent flooding of properties and buildings.	+	+	+	+	+	0	-	+	+	+	+	+	+	0	+	-	+	-	+	0	0	+	+	13	

Mitigation Action	Community Acceptance	Effect on Segment of Population	Technical Feasibility	Long-Term Solution	Secondary Impacts	Staffing	Funding Allocated	Maintenance/Operations	Political Support	Local Champion	Public Support	State Authority	Existing Local Authority	Potential Legal Challenge	Benefit of Action	Cost of Action	Contributes to Economic Goals	Outside Funding Required	Effect on Land/Water	Effect on Endangered Species	Effect on HAZMAT/Waste Sites	Consistent with Comm. Environmental Goals	Consistent with Federal Environmental Laws	Priority Total (net)
3.3 Water supply system upgrade. This project is to upgrade the current pumping units and possibly identify an alternative lower-level intake with a new pumping system and a separate pipeline to deliver water to the water treatment plant. This will allow for dependability and a backup to the current system. It will also provide water if lake level drops below current intake levels.	+	+	+	+	+	0	0	+	+	+	+	+	+	0	+	-	+	0	0	U/K	+	+	+	15
3.4 Maintain cloud storage for vital records and data to allow access if government servers are disrupted.	+	+	+	+	+	0	0	+	+	+	+	+	+	0	+	-	+	0	0	0	0	+	+	14
4.1 Partner with local insurance agencies to hold workshops for property owners to educate about Flood Insurance Programs and its requirements. Community Development performs this function through NEIPA and the Engineering Division for flood only	+	+	+	+	+	0	0	0	+	+	+	+	+	0	+	0	+	0	0	0	0	+	+	14

Mitigation Action	Community Acceptance	Effect on Segment of Population	Technical Feasibility	Long-Term Solution	Secondary Impacts	Staffing	Funding Allocated	Maintenance/Operations	Political Support	Local Champion	Public Support	State Authority	Existing Local Authority	Potential Legal Challenge	Benefit of Action	Cost of Action	Contributes to Economic Goals	Outside Funding Required	Effect on Land/Water	Effect on Endangered Species	Effect on HAZMAT/Waste Sites	Consistent with Comm. Environmental Goals	Consistent with Federal Environmental Laws	Priority Total (net)
4.2 The city will develop a plan and mutual aid agreement with the state, County, Navajo Nation, National Park Service, and other governmental entities to implement mitigation actions.	+	+	+	+	+	0	0	U/K	+	+	+	+	+	U/K	+	0	0	0	0	0	+	+	+	14
4.3 Continue County partnership and support with local government, NGO and non-profits to maintain and build upon our cadre of committed, trained, volunteers to augment disaster response and recovery efforts in compliance with Arizona Disaster Service Worker program guidance (e.g., shelter workers, animal rescue and care, Community Emergency Response Team, communications staff, medical and health, and human service providers).	+	+	+	+	+	0	-	+	+	+	+	+	+	0	+	-	+	0	0	0	0	+	+	13
5.1 Develop a disaster debris plan.	+	+	+	+	+	0	-	+	+	+	+	+	+	0	+	-	+	0	0	0	+	+	+	14

Mitigation Action	Community Acceptance	Effect on Segment of Population	Technical Feasibility	Long-Term Solution	Secondary Impacts	Staffing	Funding Allocated	Maintenance/Operations	Political Support	Local Champion	Public Support	State Authority	Existing Local Authority	Potential Legal Challenge	Benefit of Action	Cost of Action	Contributes to Economic Goals	Outside Funding Required	Effect on Land/Water	Effect on Endangered Species	Effect on HAZMAT/Waste Sites	Consistent with Comm. Environmental Goals	Consistent with Federal Environmental Laws	Priority Total (net)
5.2 Budget for maintenance and replacement of County/city owned fire and police stations.	+	+	+	+	+	0	-	+	+	+	+	+	+	0	+	-	0	0	0	0	+	+	+	13
5.3 Build a cadre of committed, trained volunteers to augment disaster response and recovery efforts in compliance with Arizona Disaster Service Worker program guidance (e.g. shelter workers, animal rescue and care, CERT, communications staff, medical, and health, and human services), during and after a disaster.	+	+	+	+	+	0	0	+	+	+	+	+	+	0	+	0	+	0	0	0	+	+	+	16
5.4 Provide equipment and other resources sufficient to provide initial response to major road, air, HAZMAT, and mass casualty incidents.	+	+	+	+	+	+	-	+	+	+	+	+	+	0	+	-	+	0	0	0	+	+	+	15

Tusayan

STAPLEE Prioritization Tool (Scoring: “+” = 1 point, “-” = -1 point, “n/a” = 0 point, “u/k” = unknown)																									
Mitigation Action	S Social		T Technical			A Administrative			P Political			L Legal			E Economic				E Environmental				Priority Total (net)		
	Community Acceptance	Effect on Segment of Population	Technical Feasibility	Long-Term Solution	Secondary Impacts	Staffing	Funding Allocated	Maintenance/Operations	Political Support	Local Champion	Public Support	State Authority	Existing Local Authority	Potential Legal Challenge	Benefit of Action	Cost of Action	Contributes to Economic Goals	Outside Funding Required	Effect on Land/Water	Effect on Endangered Species	Effect on HAZMAT/Waste Sites	Consistent with Comm. Environmental Goals		Consistent with Federal Environmental Laws	
1.1 Evaluate town/County and non-town/County facilities identified as potential shelter sites for structural integrity.	+	+	+	+	+	0	-	+	+	+	+	+	+	0	+	-	0	0	0	0	0	0	+	+	12
1.2 Identify and pursue funding opportunities to develop and implement local mitigation activities.	+	+	+	+	+	0	0	+	+	+	+	+	+	0	+	0	+	0	0	0	+	+	+	+	16
2.1 Develop a public outreach and awareness program about regional hazards and mitigation actions community members can do in their homes.	+	+	+	+	+	0	-	+	+	+	+	+	+	0	+	-	+	0	0	0	+	+	+	+	14

Mitigation Action	Community Acceptance	Effect on Segment of Population	Technical Feasibility	Long-Term Solution	Secondary Impacts	Staffing	Funding Allocated	Maintenance/Operations	Political Support	Local Champion	Public Support	State Authority	Existing Local Authority	Potential Legal Challenge	Benefit of Action	Cost of Action	Contributes to Economic Goals	Outside Funding Required	Effect on Land/Water	Effect on Endangered Species	Effect on HAZMAT/Waste Sites	Consistent with Comm. Environmental Goals	Consistent with Federal Environmental Laws	Priority Total (net)
2.2 Increase public awareness of the natural, human-caused, and technological hazards to businesses as a means to reduce the potential damage from each hazard through educational and outreach. Maintain a resource center accessible to the public at key government facilities. Provide information on government websites and social media accounts.	+	+	+	+	+	+	0	0	0	+	+	+	+	+	0	+	-	+	0	0	0	+	+	14
2.3 Place more stress on the risks associated with natural and manmade hazards in public awareness campaigns conducted by various County/town departments.	+	+	+	+	+	0	0	+	+	+	+	+	+	0	+	0	+	0	0	0	+	+	+	16
2.4 Increase public awareness of dam failure hazards and mitigation measures to address them	+	+	+	+	+	0	0	+	+	+	+	+	+	0	+	0	+	0	0	0	+	+	+	16

Mitigation Action	Community Acceptance	Effect on Segment of Population	Technical Feasibility	Long-Term Solution	Secondary Impacts	Staffing	Funding Allocated	Maintenance/Operations	Political Support	Local Champion	Public Support	State Authority	Existing Local Authority	Potential Legal Challenge	Benefit of Action	Cost of Action	Contributes to Economic Goals	Outside Funding Required	Effect on Land/Water	Effect on Endangered Species	Effect on HAZMAT/Waste Sites	Consistent with Comm. Environmental Goals	Consistent with Federal Environmental Laws	Priority Total (net)
2.5 Tusayan Fire Department Digital Newsletter: Explain hazards of smoke/carbon dioxide (CO2), fireplaces, chimneys, cleaning, and fire hazards. Regularly scheduled cleaning of chimneys. Smoke/CO2 detector maintenance program (as a follow up to the previous month's safety topic). Smoke and CO2 detectors use and maintenance. Explanation of two (2) types of detectors. Regularly scheduled replacement of batteries and testing.	+	+	+	+	+	+	0	+	+	+	+	+	+	0	+	0	+	0	0	0	+	+	+	17
2.6 Publish key preparedness information and links via town website and Tusayan Fire Department (TFD) digital newsletter to include information on emergency kits, winter preparation and safety, and relevant tips/guidance from the County.	+	+	+	+	+	+	0	+	+	+	+	+	+	0	+	0	+	0	0	0	+	+	+	17

Mitigation Action	Community Acceptance	Effect on Segment of Population	Technical Feasibility	Long-Term Solution	Secondary Impacts	Staffing	Funding Allocated	Maintenance/Operations	Political Support	Local Champion	Public Support	State Authority	Existing Local Authority	Potential Legal Challenge	Benefit of Action	Cost of Action	Contributes to Economic Goals	Outside Funding Required	Effect on Land/Water	Effect on Endangered Species	Effect on HAZMAT/Waste Sites	Consistent with Comm. Environmental Goals	Consistent with Federal Environmental Laws	Priority Total (net)
2.7 Utilize town website and TFD digital newsletter to educate residents on winter hazards – with a particular focus on storm roof loading and other relevant building safety considerations.	+	+	+	+	+	+	0	+	+	+	+	+	+	0	+	0	+	0	0	0	+	+	+	17
3.1 Seek to implement codes, standards, and policies that will protect life and property from the impacts of hazards.	+	+	+	+	+	+	0	+	+	+	+	+	+	0	+	0	+	0	0	0	+	+	+	17
3.2 Integrate appropriate items from the MJHMP into the Safety Element of the General Plan and other regulatory documents as appropriate.	+	+	+	+	+	0	-	0	+	+	+	+	+	0	+	-	0	0	0	0	+	+	+	12
3.3 Maintain cloud storage for vital records and data to allow access if government servers are disrupted.	+	+	+	+	+	0	0	+	+	+	+	+	+	0	+	-	+	0	0	0	0	+	+	14

Mitigation Action	Community Acceptance	Effect on Segment of Population	Technical Feasibility	Long-Term Solution	Secondary Impacts	Staffing	Funding Allocated	Maintenance/Operations	Political Support	Local Champion	Public Support	State Authority	Existing Local Authority	Potential Legal Challenge	Benefit of Action	Cost of Action	Contributes to Economic Goals	Outside Funding Required	Effect on Land/Water	Effect on Endangered Species	Effect on HAZMAT/Waste Sites	Consistent with Comm. Environmental Goals	Consistent with Federal Environmental Laws	Priority Total (net)
3.4 Coordinate with the utility companies and vendors to strengthen, safeguard, or provide supplemental services, to protect and secure high-voltage lines, water, sewer, natural gas and petroleum pipelines, and trunk electrical and telephone conduits from hazards.	+	+	+	+	+	+	+	+	+	+	+	+	+	0	+	0	+	0	0	0	+	+	+	17
3.5 Finalize the ongoing Engineering Assessment and Hydrological Analysis for the drainage improvements work plan in coordination with the County and implement related projects as appropriate.	+	+	+	+	+	0	0	+	+	+	+	+	+	0	+	0	+	0	+	0	0	+	+	16
4.1 Continue to develop mutual aid agreements and memorandum of understanding with agencies to serve emergency and disaster purposes.	+	+	+	+	+	+	0	0	+	+	+	+	+	0	+	0	+	0	0	0	+	+	+	16

Mitigation Action	Community Acceptance	Effect on Segment of Population	Technical Feasibility	Long-Term Solution	Secondary Impacts	Staffing	Funding Allocated	Maintenance/Operations	Political Support	Local Champion	Public Support	State Authority	Existing Local Authority	Potential Legal Challenge	Benefit of Action	Cost of Action	Contributes to Economic Goals	Outside Funding Required	Effect on Land/Water	Effect on Endangered Species	Effect on HAZMAT/Waste Sites	Consistent with Comm. Environmental Goals	Consistent with Federal Environmental Laws	Priority Total (net)
5.1 Collaborate with partners and service providers to identify and implement water resource management and conservation opportunities as applicable.	+	+	+	+	+	+	0	+	+	+	+	+	+	0	+	0	+	0	+	+	+	0	+	18
5.2 Build a cadre of volunteers to augment disaster response and recovery efforts in compliance with Arizona Disaster Service Worker program guidance (e.g., shelter workers, animal rescue and care, Community Emergency Response Team, communications staff, medical and health, and human services), during and after a disaster.	+	+	+	+	+	+	0	+	+	+	+	+	+	0	+	-	+	0	0	0	+	+	+	16
5.3 Develop an emergency preparedness network for community members (and visitors) to access food, water, communications, warming/cooling stations in times of emergent need.	+	+	+	+	+	+	0	+	+	+	+	+	+	0	+	-	+	0	0	0	+	+	+	16

Williams

STAPLEE Prioritization Tool (Scoring: “+” = 1 point, “-” = -1 point, “n/a” = 0 point, “u/k” = unknown)																								
Mitigation Action	S Social		T Technical			A Administrative			P Political			L Legal			E Economic				E Environmental				Priority Total (net)	
	Community Acceptance	Effect on Segment of Population	Technical Feasibility	Long-Term Solution	Secondary Impacts	Staffing	Funding Allocated	Maintenance/Operations	Political Support	Local Champion	Public Support	State Authority	Existing Local Authority	Potential Legal Challenge	Benefit of Action	Cost of Action	Contributes to Economic Goals	Outside Funding Required	Effect on Land/Water	Effect on Endangered Species	Effect on HAZMAT/Waste Sites	Consistent with Comm. Environmental Goals		Consistent with Federal Environmental Laws
1.1 Evaluate city/County and non-city/County facilities identified as potential shelter sites for structural integrity.	+	+	+	+	+	0	-	+	+	+	+	+	+	0	+	-	0	0	0	0	0	+	+	12
1.2 Identify and pursue funding opportunities to develop and implement local mitigation activities.	+	+	+	+	+	0	0	+	+	+	+	+	+	0	+	0	+	0	0	0	+	+	+	16
1.3 Enforcement of floodplain management requirements, including regulating all and substantially improved construction in floodplains to reduce the losses to property and people.	+	+	+	+	+	0	+	0	+	+	+	+	+	0	+	0	+	0	0	0	0	+	+	15

Mitigation Action	Community Acceptance	Effect on Segment of Population	Technical Feasibility	Long-Term Solution	Secondary Impacts	Staffing	Funding Allocated	Maintenance/Operations	Political Support	Local Champion	Public Support	State Authority	Existing Local Authority	Potential Legal Challenge	Benefit of Action	Cost of Action	Contributes to Economic Goals	Outside Funding Required	Effect on Land/Water	Effect on Endangered Species	Effect on HAZMAT/Waste Sites	Consistent with Comm. Environmental Goals	Consistent with Federal Environmental Laws	Priority Total (net)
1.4 Continue to enforce zoning and building codes through current site plan, subdivision, and building permit review processes to reduce the effects of drought, flood, severe wind, wildland fire, and other hazards on new buildings and infrastructure.	+	+	+	+	+	+	0	+	+	+	+	+	+	0	+	0	+	0	0	0	+	+	+	17
1.5 Enforcement of the newly adopted Defensible Space Ordinance for the protection of future and existing structures within the wildland urban interface.	+	+	+	+	+	+	0	0	+	+	+	+	+	0	+	0	+	0	0	0	+	+	+	16
2.1 Increase public awareness of dam failure hazards and mitigation measures to address them.	+	+	+	+	+	+	0	+	+	+	+	+	+	0	+	0	+	0	0	0	+	+	+	17

Mitigation Action	Community Acceptance	Effect on Segment of Population	Technical Feasibility	Long-Term Solution	Secondary Impacts	Staffing	Funding Allocated	Maintenance/Operations	Political Support	Local Champion	Public Support	State Authority	Existing Local Authority	Potential Legal Challenge	Benefit of Action	Cost of Action	Contributes to Economic Goals	Outside Funding Required	Effect on Land/Water	Effect on Endangered Species	Effect on HAZMAT/Waste Sites	Consistent with Comm. Environmental Goals	Consistent with Federal Environmental Laws	Priority Total (net)
3.1 Coordinate with the utility companies and vendors to strengthen, safeguard, or take other appropriate measures such as providing supplemental services, to identify, repair, protect and secure high-voltage lines, water, sewer and trunk electrical and telephone conduits from hazards.	+	+	+	+	+	+	+	+	+	+	+	+	+	0	+	0	+	0	0	0	+	+	+	17
3.2 Perform fuel thinning around water treatment plant to create a wildland fire defensible space perimeter and install exterior sprinkler system on the structures and site perimeter.	+	+	+	+	+	+	-	+	+	+	+	+	+	0	+	0	+	0	+	0	0	+	+	16
3.3 Perform annual inspections and maintenance work on five (5) existing city dams. Continued monitoring by the City Water Department in cooperation with ADEQ.	+	+	+	+	+	+	+	+	+	+	+	+	+	0	+	0	+	0	+	0	0	+	+	17

Mitigation Action	Community Acceptance	Effect on Segment of Population	Technical Feasibility	Long-Term Solution	Secondary Impacts	Staffing	Funding Allocated	Maintenance/Operations	Political Support	Local Champion	Public Support	State Authority	Existing Local Authority	Potential Legal Challenge	Benefit of Action	Cost of Action	Contributes to Economic Goals	Outside Funding Required	Effect on Land/Water	Effect on Endangered Species	Effect on HAZMAT/Waste Sites	Consistent with Comm. Environmental Goals	Consistent with Federal Environmental Laws	Priority Total (net)
3.4 Bill Williams Mountain Steep Slope forest restoration treatments to reduce threat from catastrophic wildland fires and post-wildfire flooding.	+	+	+	+	+	+	-	+	+	+	+	+	+	0	+	-	+	+	+	0	0	+	+	16
4.1 Continue to develop mutual aid agreements and memorandum of understanding with agencies to serve emergency and disaster purposes.	+	+	+	+	+	+	+	+	+	+	+	+	+	0	+	0	+	0	0	0	0	+	+	17
5.1 Create new storage facilities for effluent to be used for irrigation and emergency wildland fire protection.	0	+	+	+	+	+	-	+	+	+	0	+	+	0	+	-	+	0	0	0	0	+	+	12

Appendix E: Acronyms

4FRI	Four Forest Restoration Initiative
ACTIC	Arizona Counter Terrorism Information Center
ADEQ	Arizona Department of Environmental Quality
ADOT	Arizona Department of Transportation
ADWR	Arizona Department of Water Resources
AEP	Annual Exceedance Probability
ALRIS	Arizona Land Resource Information System
APS	Arizona Public Service
ARES	Amateur Radio Emergency Services
AST	Aboveground storage tanks
AZ DEMA	Arizona Department of Emergency and Military Affairs
AZDA	Arizona Department of Agriculture
AZFAC	Arizona Fire Adapted Communities
AZGDTF	Arizona Governor's Drought Task Force
AZMAC	Arizona Mutual Aid Compact
AZSERC	Arizona State Emergency Response Commission
BCA	Benefit-Cost Analysis
BCR	Benefit-Cost Ratio
BNSF	Burlington-Northern Santa Fe Railway
BRIC	Building Resilient Infrastructure and Communities Program
CBRNE	Chemical, Biological, Radiological, Nuclear, and Explosive
CCEM	Coconino County Emergency Management
CCFCD	Coconino County Flood Control District
CCSO	Coconino County Sheriff's Office
CDC	Center for Disease Control and Prevention
CERT	Community Emergency Response Team
CII	Critical Information Act of 2002
COF	City of Flagstaff

CPRI	Calculated Priority Risk Index
CWPP	Community Wildfire Protection Plan
DFIRM	Digital Flood Insurance Rate Maps
DMA	Disaster Mitigation Act
DOE	United States Department of Energy
EAP	Emergency Action Plan
EHS	Extremely hazardous substances
ENSO	El Niño/Southern Oscillation
EOC	Emergency Operations Center
EOP	Emergency Operations Plan
EPA	Environmental Protection Agency
EPCRA	Emergency Planning and Community Right-to-Know Act
ERI	Ecological Restoration Institute
FACLN	Fire Adapted Communities Learning Network
FBI	Federal Bureau of Investigation
FCD	Flood Control District
FEMA	Federal Emergency Management Agency
FIRMS	Flood Insurance Rate Maps
FLG	Flagstaff-Pulliam Airport
FMA	Fire Management Assistance
FMA	Flood Mitigation Assistance
FRP	Facility Response Plans
FWPP	Flagstaff Watershed Protection Project
FY	Financial Year
GAO	United States Government Accountability Office
GCD	Glen Canyon Dam
GCN	Grand Canyon National Park Airport
GFFP	Greater Flagstaff Forests Partnership
GIS	Geographic Information System
HAZMAT	Hazardous Materials

HMGP	Hazard Mitigation Grant Program
HMTA	Hazardous Materials Transportation Act
HMTUSA	Hazardous Materials Transportation Uniform Safety Act
IDF	Inflow Design Flood
IGA	Inter-governmental Agreement
IMAAC	Interagency Modeling and Atmospheric Assessment Center
KCMR	H.A. Clark Memorial Field
LEPC	Local Emergency Planning Committee
LOMR	Letter of Map Revision
MJHMP	Multi-Jurisdictional Hazard Mitigation Plan
MMI	Modified Mercalli Intensity Scale
MOU	Memorandum of Understanding
MRC	Medical Reserve Corps
NACOG	Northern Arizona Council of Governments
NAU	Northern Arizona University
NFIP	National Flood Insurance Program
NID	National Inventory of Dams
NIDIS	National Integrated Drought Information System
NOAA	National Oceanic and Atmospheric Administration
NOFS	United States Naval Observatory Flagstaff Station
NWS	National Weather Service
OPA	Oil Pollution Act
PAO	Public Affairs Officer
PCB	Polychlorinated biphenyls
PDM	Pre-Disaster Mitigation Grant Program
PDSI	Palmer Drought Severity Index
PFAC	Ponderosa Fire Advisory Council
PGA	Page Municipal Airport
PIO	Public Information Officer
RCRA	Resource Conservation and Recovery Act

RFC	Repetitive Flood Claims
RL	Repetitive Loss
RRSS	Road Repair and Street Safety Initiative
SARS	Severe Acute Respiratory Syndrome
SMSA	Standard Metropolitan Statistical Area
SPCC	Spill Prevention, Control, and Countermeasures
SPI	Standardized Precipitation Matrix
SRL	Severe Repetitive Loss
TBC	Tuba City Airport
TFD	Tusayan Fire Department
TPD	Tusayan Police Department
TPQ	Threshold Planning Quantities
UBC	Uniform Building Code
UFC	Uniform Fire Code
USACE	US Army Corps of Engineers
USCG NRC	United States Coast Guard National Response Center
USDA	United States Department of Agriculture
USDM	United States Drought Monitor
USDOT	United States Department of Transportation
USFS	United States Forest Service
USGS	United States Geological Survey
USSDO	United States Seasonal Drought Outlook
UST	Underground storage tanks
VLE	Valle Airport
VOAD	Volunteer Organizations Active in Disaster
WFAS	Wildland Fire Assessment System
WMD	Weapons of mass destruction
WRCC	Western Region Climate Center
WSSI	Winter Storm Severity Index