TOWN OF PINETOP-LAKESIDE

RESOLUTION NO. 24-1721

A RESOLUTION OF THE MAYOR AND TOWN COUNCIL OF THE TOWN OF PINETOP-LAKESIDE, ARIZONA, ADOPTING THE 2024 NAVAJO COUNTY MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN.

WHEREAS, the Mayor and Town Council of the Town of Pinetop-Lakeside from time to time are requested to approve regional planning documents; and

WHEREAS, the Town of Pinetop-Lakeside participated in the 2024 Multi-Jurisdictional Hazard Mitigation "Plan" update with Navajo County and other participating jurisdictions; and

WHEREAS, this Plan was prepared to guide hazard mitigation to better protect people, property, community assets and land from the effects of hazards; and

WHEREAS, this Plan demonstrates Navajo County and participating communities' commitment to reducing risks from hazards and serves as a tool to help decision makers direct mitigation activities and resources; and

WHEREAS, this Plan was also developed to ensure the participants' eligibility for certain Federal disaster assistance and hazard mitigation grant funding; and

WHEREAS, the 2024 Navajo Multi-Jurisdictional Hazard Mitigation Plan is attached hereto and (Exhibit A); and

WHEREAS, the U.S. Department of Homeland Security's Federal Emergency Management Agency (FEMA) has reviewed and determined that this Plan is eligible for final approval pending adoption by Navajo County, the Town of Pinetop-Lakeside and all other participating jurisdictions.

NOW, THEREFORE, BE IT RESOLVED, by the Mayor and Town Council of the Town of Pinetop-Lakeside, Arizona, hereby adopts the 2024 Navajo Multi-Jurisdictional Hazard Mitigation Plan this 1st day of August, 2024.

PASSED AND ADOPTED by a majority vote of the Mayor and Town Council of the Town of Pinetop-Lakeside in an open meeting on this 1st day of August 2024.

SEAL OF THE TOWN OF PINETOP-LAKESIDE
PINETOP LAKESIDE
Celebrate the Seasons
1984
ARIZONA

TOWN OF PINETOP-LAKESIDE

Stephanie Irwin

Stephanie Irwin, Mayor

ATTEST:

Kristi Salskov

Kristi Salskov, CMC, Town Clerk

APPROVED AS TO FORM:

William J. Sims

William J. Sims, III Town Attorney

EXHIBIT A

2024 Navajo Multi-Jurisdictional Hazard Mitigation Plan

NAVAJO COUNTY MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN

2024

Table of Contents

Cooperators

This plan was developed in cooperation with:

Navajo County

City of Holbrook

Town of Pinetop-Lakeside

City of Show Low

Town of Snowflake

Town of Taylor

City of Winslow

SECTION 1: INTRODUCTION

1.1 Purpose

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

1.2 Background and Scope

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

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

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

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

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

identifies the strategy that will be used to decrease vulnerability and increase resiliency and sustainability.

This Plan was prepared pursuant to the requirements of the Disaster Mitigation Action of 2000 and the implementing regulations set forth in the Federal Register (hereafter, these requirements will be referred to as the DMA2K). While the act emphasized the need for mitigation plans and coordinated mitigation planning and implementation efforts, the regulations established the requirements that hazard mitigation plans must meet in order to be eligible for certain Federal disaster assistance and hazard mitigation funding under the Robert T. Stafford Disaster Relief and Emergency Act.

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

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

- Navajo County
- Holbrook
- Pinetop-Lakeside
- Show Low
- Snowflake
- Taylor
- Winslow

1.3 Assurances

1.3.1 General Requirements

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

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

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

- Hazard Mitigation Grant Program (HMGP)
- Hazard Mitigation Grant Program Post Fire Assistance
- Building Resilient Infrastructure Communities (BRIC) Program [Formerly known as pre-disaster mitigation (PDM)]
- Flood Mitigation Assistance (FMA)
- Repetitive Flood Claims Program (RFC)

SECTION 2: COMMUNITY OVERVIEWS

2.1 Navajo County

Navajo County was formed on March 21, 1895, as the final act of the Territorial Assembly before it adjourned at midnight. What is now Navajo County was first included in Yavapai County, but in 1879, the area was added to the newly formed Apache County. Today, Navajo County covers 9,959 square miles, 55% of which is tribal reservation. The county seat is Holbrook. Navajo County is located in the northeastern portion of the State of Arizona.

Major roadway transportation routes through the county include Interstate 40, U.S. Highways 60, 160, and 163, State Routes 73, 77, 87, 99, 260, 264, 277, 377, and 564, and Indian Routes 6 and 15. Railways include the Burlington Northern Santa Fe Railway, Apache Railway and AMTRAK.

Navajo County is divided into two distinct parts by the Mogollon Rim. The high country in the northern part of the county is considered Colorado Plateau Shrublands and is characterized by arid, desert-like conditions with mesas and plateaus. The southern part is considered Arizona Mountain Forests and is characterized by rugged mountain area, heavily wooded with pinon, juniper and ponderosa pine.

The geographical characteristics of Navajo County have been mapped into two terrestrial ecoregions2, which are described below:

- **Arizona Mountain Forests** – this ecoregion contains a mountainous landscape, with moderate to steep slopes. Elevations in this zone range from approximately 6,000 to 7,100 feet, resulting in comparatively cool summers and cold winters. Vegetation in these areas is largely heavily wooded with pinon, juniper and ponderosa pine forests, high altitude grasses, shrubs, and brush.

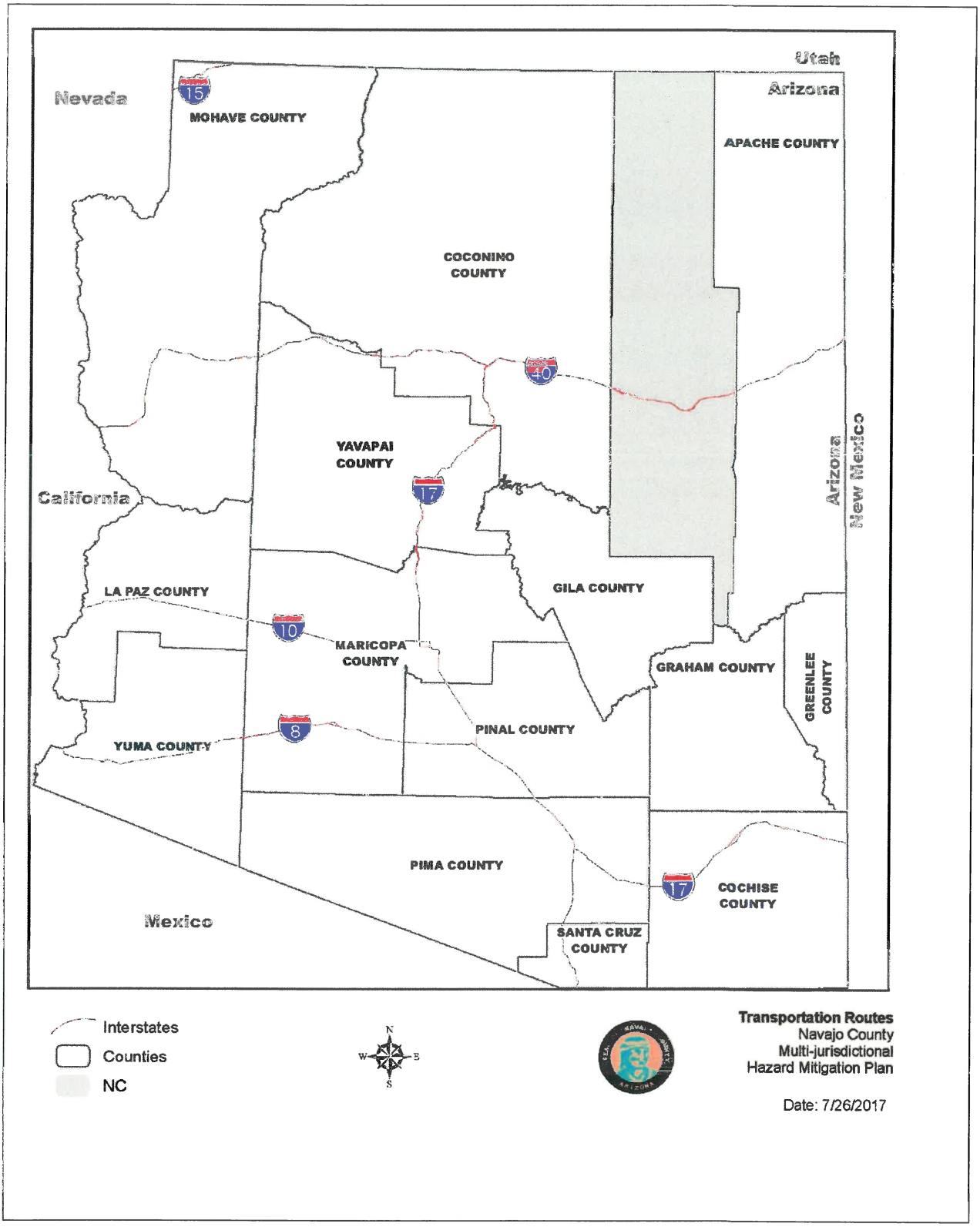
- **Colorado Plateau Shrublands** – this ecoregion covers the northern portion of the county and makes up the majority of the county with elevations that average around 5,000 to 7,500 feet. Vegetation in this ecoregion is comprised mainly of Plains Grassland and Great Basin Desert scrub. Temperatures can vary widely in this zone, with comparatively warm summers and cold winters. The high country in the northern part of the county is arid and desert-like with mesas and plateaus.

Sources

Arizona Department of Commerce, 2004, Community Profile for Navajo County.

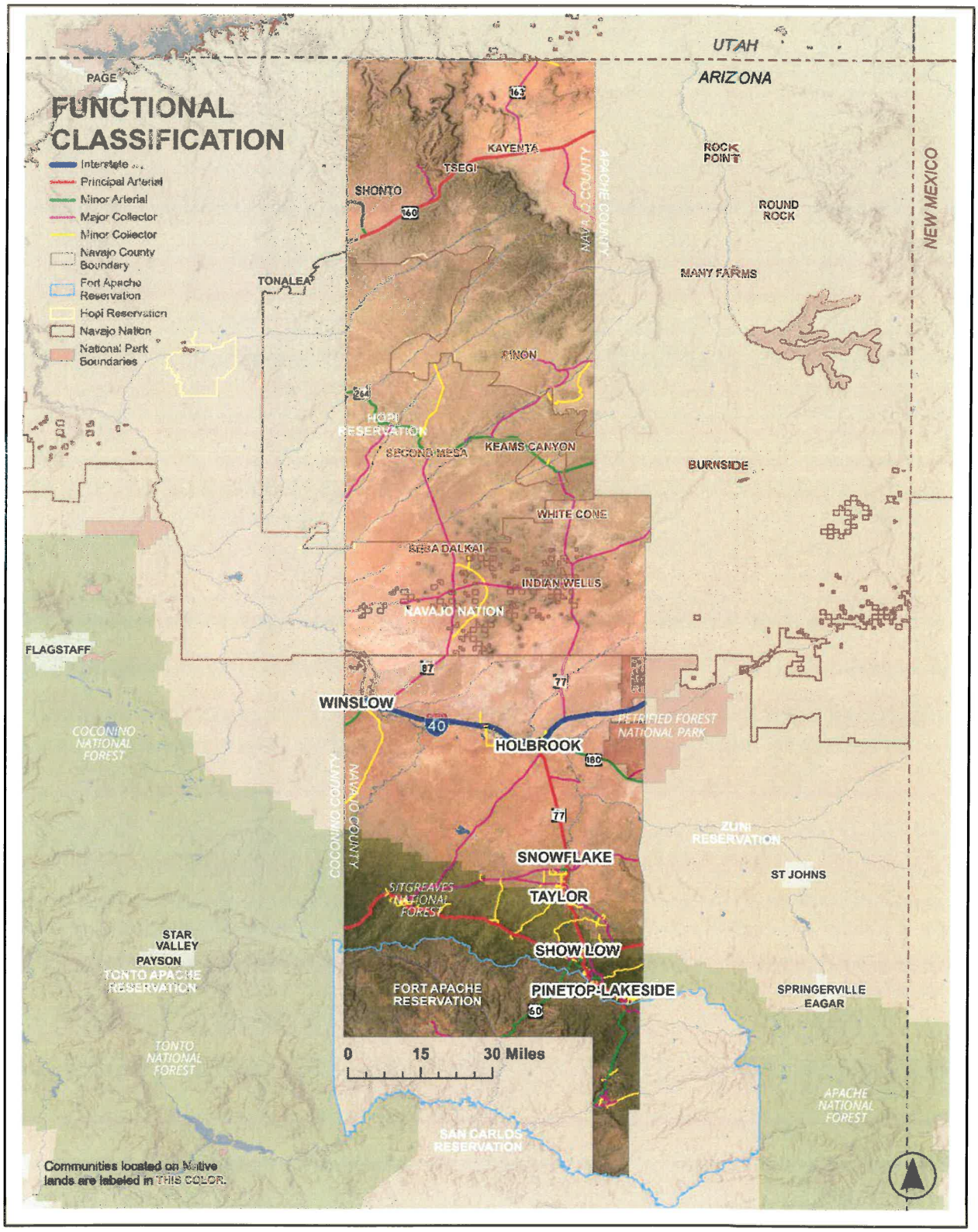
State of Arizona All Hazard Mitigation Plan, 2023.

Map 2-1: Vicinity Map



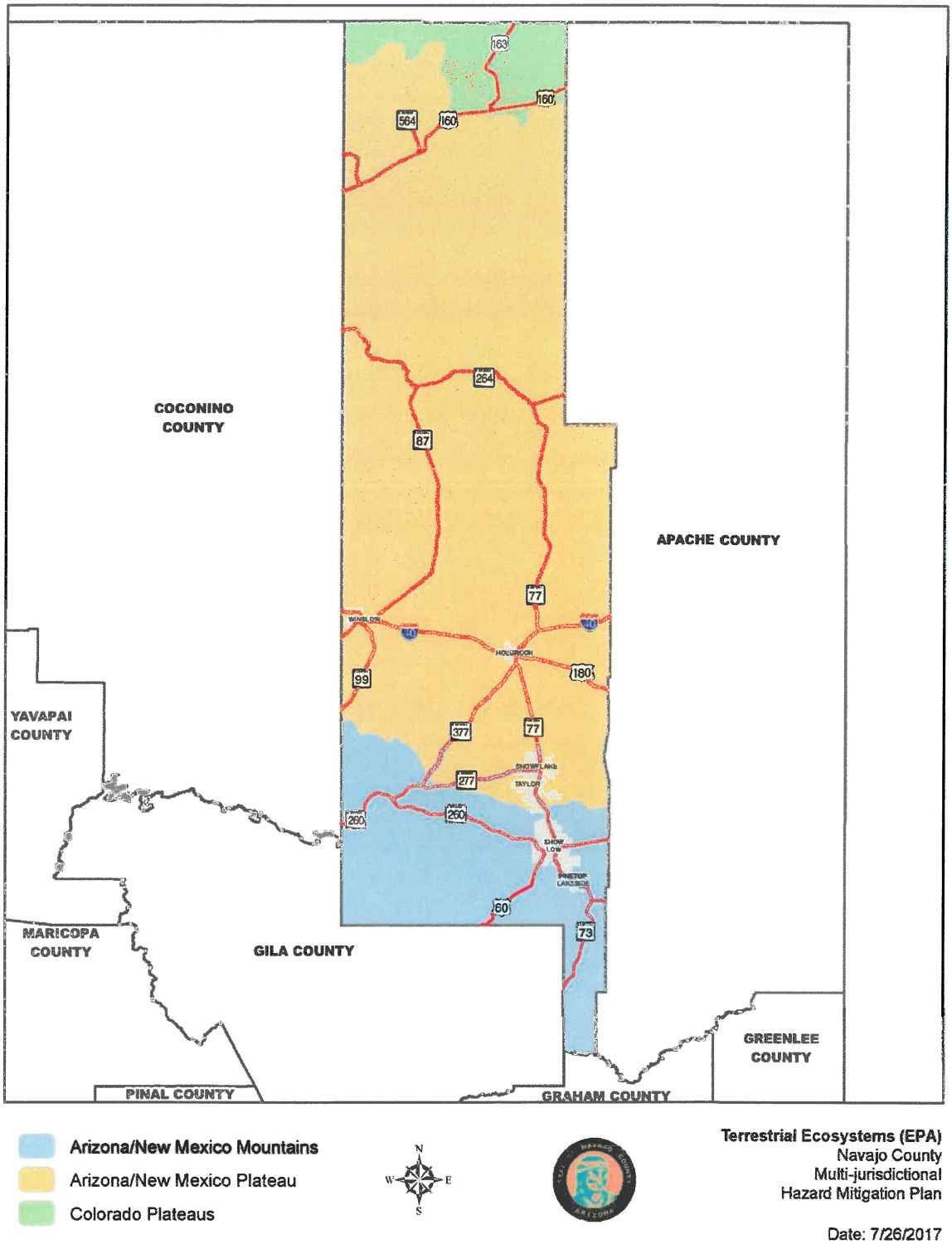
(No changes to the map for the 2024 plan update.)

Map 2-2: Transportation Routes



*Navajo County Comprehensive Plan 2024 Existing Conditions Figure 8

Map 2-3: Terrestrial Ecoregions



(No changes to the map for the 2024 plan update.)

CLIMATE LOCATION: SHOW LOW AIRPORT

Month	MAX TEMP (°F)	MIN TEMP (°F)	AVG TEMP (°F)	PRECIP (IN)	SNOW (IN)
Jan	46.0	23.6	34.8	1.35	4.0
Feb	51.0	26.8	38.9	1.16	3.8
Mar	58.0	31.3	44.7	0.91	2.3
Apr	64.9	36.8	50.9	0.57	1.6
May	73.6	44.5	59.0	0.62	0.0
Jun	83.9	53.7	68.8	0.42	0.0
Jul	85.3	59.2	72.2	2.35	0.0
Aug	82.8	57.7	70.2	2.97	0.0
Sep	78.3	52.0	65.1	1.44	0.0
Oct	68.1	40.6	54.3	1.35	0.4
Nov	56.4	31.0	43.7	1.19	1.9
Dec	45.8	23.4	34.6	1.37	5.4

Population

Navajo County is home to 108,650 residents, with the majority of the population living on reservations and incorporated communities of Navajo County. All incorporated cities and towns are geographically located in the southern portion of the County. There are 46 unincorporated communities scattered across the county, with many being comprised of only one structure or a prominent landmark. The majority of these unincorporated communities is also located on the tribal reservations and will be addressed in separate tribal reservation hazard mitigation plans. Within Navajo County, the US Forest Service, US Bureau of Land Management, and State Land combined, constitute nearly 15% of land ownership. Tribal land makes up over 66% of the county and the other 18% is held privately.

Table 2-1 Population Estimates for Navajo County

Jurisdiction	2023 Estimates
Unincorporated Navajo County	68,509
Holbrook	4,883
Pinetop-Lakeside	4,118
Show Low	12,294
Snowflake	7,127
Taylor	4,308
Winslow	8,596
Source: Arizona Office of Economic Opportunity	
https://oeo.az.gov/population/estimates	

Climate

The majority of Navajo County can be classified as Colorado Plateau Shrubland and Arizona Mountain Forest. The elevation range for these two ecoregions in Navajo County is from approximately 5,000 to 7,500 feet. Climatic statistics for weather stations within Navajo County are produced by the Western Region Climate Center and span records dating back to the early 1900's

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

CLIMATE LOCATION: WINSLOW MUNICIPAL AIRPORT

Month	MAX TEMP (°F)	MIN TEMP (°F)	AVG TEMP (°F)	PRECIP (IN)
Jan	49.8	22.0	35.9	0.51
Feb	56.2	25.9	41.0	0.42
Mar	64.5	31.8	48.2	0.49
Apr	71.9	37.9	54.9	0.25
May	81.2	46.2	63.7	0.30
Jun	92.3	55.2	73.8	0.14
Jul	94.6	63.7	79.1	0.89
Aug	91.7	62.5	77.1	1.16
Sep	85.6	53.8	69.7	0.87
Oct	73.8	40.4	57.1	0.51
Nov	60.3	28.9	44.6	0.48
Dec	48.7	21.7	35.2	0.50

Economy

Navajo County was formed on March 21, 1895, as the final act of the Territorial Assembly before it adjourned at midnight, with the County Seat established in Holbrook. By the time it became Navajo County, the area was developed. The railroad had crossed the County for more than a decade, and North America's third largest ranch, the Aztec Land and Cattle Company near Holbrook, had been established. Backed by Easterners, Aztec bought 1 million acres of land from the railroad at 50 cents an acre. The company, known as the Hashknife Outfit because of its brand, brought 33,000 longhorn cattle and 2,200 horses into northern Arizona from Texas. Holbrook, the county seat, was founded in 1871.

Economic diversity also characterizes Navajo county. The tribal reservations in the northern half of the county comprise one segment. Kayenta, founded in 1909 as a trading post, is now the gateway to the Navajo Tribal Park at Monument Valley and a thriving Navajo community. Members of the Hopi nation, which is completely surrounded by the Navajo Reservation, depend upon cattle and sheep production and tourism. The Hopi pueblo of Oraibi is one of the oldest continuously inhabited settlements in the United States.

The Interstate 40 corridor communities of Holbrook and Winslow in the county's center are areas of growth tied to the cross-country transportation route. The county's southern half is characterized by dynamic growth related to tourism and an increased demand for housing.

Major communities in the south are Pinetop-Lakeside, Show Low, Snowflake, and Taylor. Both central and southern portions of the county enjoy relatively low unemployment.

2.2 Holbrook

The City of Holbrook is located in the central portion of Navajo County in northeastern Arizona. Holbrook is one of six incorporated communities in Navajo County and serves as the County seat. The city is located on a high desert plateau with low sandstone cliffs. Holbrook is on the banks of the Little Colorado River and along Interstate 40. The present incorporated City limits occupy approximately 16.5 square miles.

The major roadway through the city is Interstate 40. State Routes 77, 377, and U.S. Highway 180 come together in a junction in the southern portion of the city. The Burlington Northern Santa Fe (BNSF) railroad parallels Interstate 40 and passes through the city. The city operates an airport within the city limits.

The Little Colorado River is the primary watercourse located within the city. Other major watercourses include the Puerco River, Leroux Wash, Porter Tank Draw, and Five Mile Wash. The remaining watercourses are primarily small ephemeral washes.

In 1881-82 railroad tracks were laid and a railroad station was built in the community. The community was then named Holbrook in honor of the first chief engineer of the Atlantic and Pacific Railroad. The railroad is now BNSF and Holbrook has since been a transportation hub and service center for northeast Arizona. Holbrook is also on Historic Route 66 and is the gateway city to the Petrified Forest National Park. A colorful cowboy history also helps to make Holbrook an interesting tourist community. Holbrook is the county seat of Navajo County.

2.3 Pinetop-Lakeside

The Town of Pinetop-Lakeside is located in the southern portion of Navajo County in east-central Arizona. Pinetop-Lakeside is one of six incorporated communities in Navajo County. The Town is located in the White Mountains of Arizona in the tall pines of the Apache Sitgreaves National Forest. State Route 260 (also referred to as White Mountain Boulevard) traverses directly through the middle of Pinetop-Lakeside. The City of Show Low shares Pinetop-Lakeside's northern boundary. The present incorporated Town limits occupy approximately 10.7 square miles.

The major roadway through the Town is State Route 260. State Route 260 intersects with State Route 77 (also referred to as Penrod and Porter Mountain Road; USFS Road 45; Penrod/Porter Mountain Road Extension) in the central portion of the Town. U.S. Highway 60 is in close proximity to the Town.

Four primary water courses are located within the Town: Billy Creek, Porter Creek, Show Low Creek, and Walnut Creek. The remaining watercourses are primarily small ephemeral washes.

Pinetop-Lakeside incorporated in 1984 merging two communities Pinetop and Lakeside. Pinetop-Lakeside is known for its extensive tourism and recreational activities, proximity to the world's largest stand of Ponderosa pine, and for an outstanding quality of life. Hiking, biking and horseback riding are popular activities on the 200 miles of developed trails, which are part of the White Mountains Trail System. Cross-country skiing, sledding, snowmobiling and ice fishing can be enjoyed during the winter. Excellent downhill skiing is 45 minutes away at Sunrise Park Resort. Hunting and fishing are popular, and picnic and camping facilities available.

The major industries significant to the economy of Pinetop-Lakeside include Trade and Services geared toward the recreation opportunities within the Town and surrounding area, Navopache Electric Cooperative, Inc., Arizona Water Co., education, medical and light manufacturing, and Government Services.

2.4 Show Low

The City of Show Low is located in the southern portion of Navajo County in northeastern Arizona. Show Low is one of six incorporated communities in Navajo County. The city is located on the edge of the White Mountains. Show Low is located on U.S. Route 60. The present incorporated City limits occupy approximately 34 square miles.

The major roadway through the city is U.S. Highway 60. State Routes 77 and 260 also traverse through the city. The city operates an airport within the city limits.

The City's primary perineal water course is Show Low Creek. Show Low Creek feeds two reservoirs; Show Low Lake and Fools Hollow Lake.

The major industries significant to the economy of Show Low include education, medical and light manufacturing, Government Services, and Retail Trade and Services. Tourism and recreation are the foundations of the economy of Show Low. Due to its size and location, the community serves as a regional trade and services center for southern Navajo County and portions of southern Apache County. It is also an entry point for visitors to the White Mountains.

Show Low was established in 1870 and incorporated in 1953. It received its name when C.E. Cooley and Marion Clark decided there was not enough room for both of them in their settlement. The two men agreed to let a game of cards decide who was to move. According to the story, Clark said "If you can show low, you win." Cooley turned up the deuce of clubs and replied, "Show Low it is."

2.5 Snowflake

The Town of Snowflake is located in the southern portion of Navajo County in east-central Arizona. Snowflake is one of six incorporated communities in Navajo County. The Town is located in a broad, flat valley on the banks of Silver Creek. Snowflake is located at the intersection of State Route 77 and State Route 277. The Town of Taylor shares Snowflake's southern boundary. The present incorporated Town limits occupy approximately 32.8 square miles.

The major roadway through the Town is State Route 77. State Routes 77, 277, and 5020 all intersect within the corporate boundaries of Snowflake.

Silver Creek is the primary water course located within the Town. Other major watercourses include Cottonwood Wash, The Canal, and Concho Flat Wash. The remaining watercourses are primarily small ephemeral washes. The Town of Snowflake is located completely within the Colorado Plateau Shrub lands zone.

Snowflake is in east central Arizona 30 miles south of Holbrook on State Route 77. The Mogollon Rim and the White Mountains, south and west of Snowflake, form an almost continuous barrier protecting the community from severe winters and creating a semi-arid climate. Founded in 1878, Snowflake was named after its founders, Erastus Snow, an apostle of The Church of Jesus Christ of Latter-day Saints and land agent William Flake. Snowflake is at an elevation of 5,600 feet.

Snowflake lies in an area of great contrast - barren desert to the north and mountain ranges to the south. One of the nation's most unique parks lies north of Snowflake, the Petrified Forest National Park, which includes not only the Petrified Forest, but the Painted Desert and Navajo Indian Reservation with attractions such as Monument Valley and Oraibi, the oldest continually occupied village in the U.S.

To the south and west of Snowflake are high mountains and forests, including the White Mountains, Sitgreaves National Forest, and the Mogollon Rim. Many small lakes, perfect for trout fishing and swimming, are scattered throughout these mountains. The Sunrise Park Ski Resort is located 65 miles south of Snowflake on the Fort Apache Indian Reservation.

The major industries significant to the economy of Snowflake include significant livestock production (32,000 head of cattle have grazed annually in the county, many of them in the Snowflake/Taylor area), significant hog production (250,000 head annually), medical marijuana production, education, medical and light manufacturing, government services, and retail trade and services.

2.6 Taylor

The Town of Taylor is located in the southern portion of Navajo County in ea st-central Arizona. Taylor is one of six incorporated communities in Navajo County. The Town is located in a broad, flat valley on the banks of Silver Creek. Taylor is on State Route 77 just south of the intersection with State Route 277 the town of Snowflake shares Taylor's northern boundary. The present incorporated Town limits occupy approximately 28 square miles.

The major roadway through the Town is State Route 77. State Route 918 intersects with State Route 77 at the southern end of the Town and State Route 277 intersects State Route 77 within the incorporated limits of the Town of Snowflake to the north. The Town operates an airport within the Town limits.

Silver Creek is the primary water course located within the Town. Other major water courses include Cottonwood Wash, Dodson Wash, and Show Low Creek. The remaining watercourses are primarily small ephemeral washes.

The Town of Taylor is located almost completely within the Colorado Plateau Shrublands zone. Only a small portion of the southern boundary is touched by the Arizona Mountain Forests zone.

The major industries significant to the economy of Taylor include livestock production, education, medical and light manufacturing, government services, and retail trade and services.

Taylor, on the banks of Silver Creek, is in a broad, flat valley in east-central Arizona. To the south and west, the Mogollon Rim and White Mountains form an almost continuous barrier protecting Taylor from severe winters and creating a semi-arid climate. Taylor was settled by James Pearce and named after John Taylor, English-born president of the Church of Jesus Christ of Latter-day Saints. Taylor has seven sites listed on the National Register.

Taylor lies in an area of great contrasts – barren desert to the north and mountain ranges to the south. The Petrified Forest National Park is one of the nation's most unique parks. Within the Petrified Forest are the Painted Desert and Navajo Indian Reservation with such attractions as Monument Valley and Oraibi, the oldest continually occupied village in the U.S. To the south and west of Taylor are high mountains and forests, including the White Mountains, Sitgreaves National Forest, and the Mogollon Rim. Many small lakes, perfect for trout fishing and swimming, are scattered throughout these mountains. The Sunrise Park Ski Resort is located 65 miles south of Taylor on the Fort Apache Indian Reservation.

2.7 Winslow

The City of Winslow is in the west-central portion of Navajo County in northeastern Arizona. Winslow is one of six incorporated communities in Navajo County. The city is located on the western edge of Navajo County. Winslow is on Interstate 40. The present incorporated City limits occupy approximately 12.2 square miles. The major roadway through the city is Interstate 40. State Routes 99 and 87 along with Historic Route 66 traverse the city. The city operates an airport within the city limits.

The city is located on the banks of the Little Colorado River, which serves as the City's primary watercourse. Other major water courses within the vicinity of Winslow are Clear Creek, Cottonwood Wash, and Jacks Canyon. The remaining watercourses are primarily small ephemeral washes. The city is located completely within the Colorado Plateau Shrub lands zone.

The major industries significant to the economy of Winslow include transportation, tourism, manufacturing, trade, retail, education, medical, and government services.

Winslow, which became a division point for the BNSF Railway, is on Interstate 40 on the western border of Navajo County in the high plateau country of northeastern Arizona. The community lies in the Little Colorado River Valley (the river skirts the city's eastern edge) and is 58 miles east of Flagstaff. Famed Route 66 was the major east-west route through Winslow before I-40 replaced it. The first settler, in 1880, was reputed to have been a hotel man who lived in and did business from a tent. Two years later, in January 1882, a U.S. Post Office was established. The city is said to have been named for Edward Winslow, a railroad company president.

SECTION 3: PLANNING PROCESS

3.1 Primary Point of Contact

The graph below provides the primary point of contact for each of the participating jurisdictions.

Table 3-1: Jurisdictional Points of Contact

Jurisdiction	Title/Position
Navajo County	Emergency Manager
City of Holbrook	Safety Officer
Town of Pinetop- Lakeside	Public Works Director
City of Show Low	Public Works Director
Town of Snowflake	Assistant Town Manager
Town of Taylor	Assistant to the Town Manager
City of Winslow	Public Works Director

3.2 Planning Team and Activities

The Arizona Department of Emergency and Military Affairs Mitigation Branch supported Navajo County with the update of the Navajo County Multi-Jurisdiction Hazard Mitigation Plan. An initial project kick-off meeting for the Hazard Mitigation Planning Team (the Team) was convened on November 3, 2022, to begin the planning process, outline the plan objectives, outline the planning process, and to discuss other administrative tasks. Individuals invited to participate on the Planning Team included all the communities within Navajo County, neighboring Native American Tribes, Department of Transportation, Game and Fish Department, Department of Public Safety, AZ Public Service (APS), Burlington Northern Santa Fe (BNSF) Railway, local fire departments/districts and law enforcement departments, and the Department of Environmental Quality.

The next Team meeting was held on December 15, 2022, to review the goals and mitigation actions from the 2017 plan. Materials were sent ahead of the meeting to the Team to prepare the team for the planned discussion. This meeting reviewed the mitigation Goals, Risk Hazard Review, Capabilities, Previous Mitigation Actions, and Discussed New Mitigation Actions.

The third Team meeting was held on February 9, 2023, to continue to review Assignment 2. The team also updated and reviewed the plan maintenance procedures and discussed what maintenance actions have been utilized since the last update.

A fourth Team meeting was held on April 6, 2023, to discuss Assignment #3 in the Hazard Plan. The meeting attendees reviewed the Mitigation Goals, updated the CPRI index, reviewed the new mitigation actions, and updated capabilities for the participating jurisdictions. The team also discussed plans for ongoing public outreach and plan updates. The decision to meet annually in June each year to discuss changes and updates was agreed upon by the planning team.

The meeting documentation is included in this Plan's Appendix.

3.3 Planning Team

The planning team included members from each of the incorporated communities who attended meetings and provided information through the Planning Team Lead, Catrina Jenkins.

The role of the Team was to work with DEMA to perform the coordination, research, and planning element activities required to update the 2024 Plan. Attendance by each participating jurisdiction was required for every planning team meeting as the meetings were structured to progress through the planning process. Steps and procedures for updating the 2024 plan were presented and discussed at each planning team meeting, and assignments to review and provide input/updates to the plan were normally given. Each meeting built on information discussed and assignments given at the previous meeting. The function of the team was to provide support and data; assist in community-specific updates; make planning decisions regarding plan components; and review the plan draft documents.

Planning Team Assembly

At the beginning of this planning process, Navajo County organized and identified members for the Planning Team by initiating contact with and extending invitations to, all incorporated communities within the county limits, as well as the Arizona Department of Emergency and Military Affairs (DEMA). Other entities that were subsequently invited to participate are discussed in this section. The participating members of the planning team are summarized below and returning members are highlighted.

Table 3-2: Planning Team

Name Title	Jurisdiction / Organization	Role and Contribution
Catrina Jenkins Emergency Manager	Navajo County/County Government	Subject matter expert
Mark Sweeney Grants Coordinator	Navajo County/County Government	Admin for updates, scheduling, and initiating planning meetings
William Flake Navajo County Engineer	Navajo County/County Government	Subject matter expert
Don Perkins Flood Control Manager	Navajo County/County Government	Subject matter expert

Tim Kelley Levee Superintendent	City of Holbrook	Subject matter expert
Matt Patterson Public Works Director	Town of Pinetop-Lakeside	Subject matter expert
Bill Kopp Public Works Director	City of Show Low	Subject matter expert
Joe Jarvis	Contractor	Contract support for jurisdictions

Navajo County recognizes that the planning team was not comprehensive of all stakeholders. After the first Planning Team meeting on November 3, 2022, additional agencies/organizations were invited to participate in the 2024 update of the plan through verbal discussion and email to the members of the Local Emergency Planning Committee (LEPC) and the Natural Resources Working Group (NRWG) at their respective meetings.

LEPC membership is made up of, at a minimum, from groups or organizations specified in Section 301, EPCRA, and ARS 49-124.

1. Local and regional agencies involved in hazard mitigation activities: Local fire departments, municipal governments.

2. Agencies that have the authority to regulate development: Planning and zoning departments within the county and local municipalities.

3. Neighboring communities: Apache County, Navajo Nation, Hopi Tribe

4. Representatives of business, academia and other private organizations: Local school districts, UniSource Natural Gas company, Arizona Department of Environmental Quality, US Forest Service

5. Representatives of nonprofit organizations, including community-based organizations, that work directly with and/or provide support to underserved communities and socially vulnerable populations among others: American Red Cross and The Salvation Army-White Mountain Unit.

Invitations for participation were extended in the form of LEPC and NRWG meeting discussions and emails. Planning meetings were held to discuss update needs, future mitigation activities, changes in policies, codes, and ordinances, and to identify information that is no longer accurate since the last review.

Table 3-3: Planning Team Resources

Name/Title	Agency	Contribution
Tony Merriman Warning Coordination Meteorologist	National Weather Service	Climate information

William Flake Navajo County Engineer	Navajo County Public Works	Engineer, flood control information
Donald Perkins Flood Control Manager	Navajo County Flood Control	Levee and flood control information
Ryan Taylor GIS	Navajo County GIS	Map information
Brad Provost Chief of Police	City of Show Low Police	Emergency Management, Communications
Randy Chevalier Fire Chief	Timber Mesa Fire and Medical District	Emergency response, management
Haley Nicoll Grant Manager	Apache County Emergency Management	Emergency Management, Review, and assessment of hazards.

3.4 Public and Stakeholder Outreach/Involvement

Public involvement and input to the planning process was encouraged cooperatively among all of the participating jurisdictions using several venues throughout the course of the pre-draft planning. The planning team discussed various options for public involvement including using the public service announcements, and general public announcements, council/board briefings, web page postings, and social media posts. The following strategy was formulated and implemented:

- Each participating jurisdiction was to include a similar notice on their webpage or social media page with a link pointing to the county's webpage for more information. On the county website, contact information was provided for comments. Additionally, city and town postings also included contact information for the Planning Team representative for their community. Comments received by towns or cities are to be routed to the Planning Team Primary Point of Contact for addressing.

- The standard open meeting processes used by the County and each jurisdiction for their respective board /council adoption process.

In addition to the above activities, the jurisdictions sought out opportunities to keep the public and their stakeholders aware of the Plan and related mitigation and hazard-related efforts/activities. These activities are summarized below.

Table 3-4: Public/Stakeholder Involvement Activities	
Navajo County	• A copy of the current Plan posted on County website, allow for comment, respond to inquiries andcomment on development plans as well as other mitigation efforts • Make available the mitigation brochures and other information produced and provided DEMA atthe Navajo Co Complex and other related offices throughout Navajo County • Participation in, and distribution of, hazard mitigation planning materials at: volunteer meetings,city/town council meetings, and at the annual Navajo County Fair • Adopted the 2016 Sitgreaves and Central Navajo Community Wildfire Protection Plans • Applied for Western Bark Beetle and Wildland Hazardous Fuel grant programs • Conducted site surveys with homeowners in Pinetop-Lakeside and homeowner associations inOvergaard for inclusion in the Nationally recognized Fire Adapted Communities program • Became a Storm Ready Ambassador and Storm Ready Community achieving the highest level ofpreparedness for extreme weather • Annual presentation to the Board of Supervisors summarizing annual review findings on the hazardmitigation plan and summarizing noteworthy mitigation activities
Holbrook	• Make available the mitigation brochures and other information produced and provided DEMA atthe City offices and public events • Promoted Ready Navajo County emergency notification system at public events within Holbrook
Pinetop-Lakeside	• Town staff participates in trainings/meetings; disseminates information regarding the dangers cited in the Plan, especially during inclement weather events (snow, high wind, etc.); and participates in wildfire trainings and information dissemination and emergency management • The 2017 Plan is available on the Town's website www.pinetoplakesideaz.gov • Town transitioned and encouraged citizens and the general public to join Ready Navajo County Notification System https://member.everbridge.net/index/453003085612436#/login. The Town places applicable information on the Town's website and Facebook regarding hazards cited in the plan and provides brochures seasonally. The Town has direct links to Timber Mesa Fire and Medical District, Pinetop Fire District. • Town participate in the White Mountain Fire Coordination Group.
Show Low	• Adopted the 2016 Sitgreaves and Central Navajo Community Wildfire Protection Plans • Televised presentations to City Council regarding fire restrictions • Social media postings regarding public safety and fire hazards. Facebook, Instagram, YouTube, Twitter • Televised Aps presentation to City Council regarding wildfire preparedness
Snowflake	• Jointly participated in an Emergency Preparedness Fair held in August with the Town of Taylor Adopted the 2016 Central Navajo Community Wildfire Protection Plan • Snowflake-Taylor CERT team participated in numerous public events promoting the Ready Navajo County emergency notification system to the public

Taylor	• Jointly participated in an Emergency Preparedness Fair held in September with Snowflake • Adopted the 2016 Central Navajo Community Wildfire Protection Plan
Winslow	• Winslow conducted public meetings with the release of the new DFIRMs and the de-certification of the Winslow Levee. • The plan was accessible to all residents, for a copy was kept at Town Hall and posting a link to Navajo County's website (where the plan is accessible) on the Town's website.

3.5 Reference Documents & Technical Resources

Over the course of the update planning process, numerous other plans, studies, reports, and technical information were obtained and reviewed for incorporation or reference purposes. The majority of sources referenced and researched pertain to the risk assessment and the capabilities assessment. To a lesser extent, the community descriptions and mitigation strategy also included some document or technical information research. The table below provides a reference listing of the primary documents and technical resources reviewed and used in the Plan.

Table 3-5: Resources Reviewed for Plan Incorporation/Reference

Document or Technical Source	Resource Type	Reference and Its Use
Arizona Department of Commerce	Website Data and Community Profiles	Reference for demographic and economic data for the county. Usedfor community descriptions.
AZ Dept of Emergency & Military Affairs	Data and Planning Resource	Resource for state and federal disaster declaration information forArizona. Also, a resource for hazard mitigation planning guidanceand documents.
AZ Dept of Water Resources	Technical Resource	Resource for data on drought conditions and statewide drought management (AzGDTF), and dam safety data. Used in risk assessment.
AZ Emergency Response Commission	Technical Resource	Resource for HAZMAT facility and commodity flow studies.
AZ State Land Dept	Data Source	Source for statewide GIS coverage (ALRIS) and statewide wildfire hazard profile information (Division of Forestry). Used in the risk assessment.
AZ Wildland Urban Interface Assessment	Report	Source of wildfire hazard profile data and urban interface at risk communities. Used in the risk assessment.
Arizona Workforce Informer	Website	Source for employment statistics in Arizona.
Bureau Net	Website Database	Source for NFIP statistics for Arizona.
Central Navajo County Community Wildfire Protection Plan	Community Wildfire Protection Plan	Source of wildfire hazard profile data for hazard mapping and risk assessment

Table 3-5: Resources Reviewed for Plan Incorporation/Reference		
City of Holbrook General Plan	General Plan	Source for history, demographic and development trend data.
City of Show Low General Plan (2007)	General Plan	Source for history, demographic and development trend data.
City of Winslow General Plan (2002)	General Plan	Source for history, demographic and development trend data.
Environmental Working Group's Farm Subsidy Database (2009)	Website Database	Source of disaster related agricultural subsidies. Used in the risk assessment.
Federal Emergency Management Agency	Technical and Planning Resource	Resource for HMP guidance (How-To series), floodplain and flooding related NFIP data (mapping, repetitive loss, NFIP statistics), and historic hazard incidents. Used in the risk assessment and mitigation strategy.
HAZUS-MH	Technical Resource	Based data sets within the program were used in the vulnerability analysis.
National Climatic Data Center	Technical Resource	Online resource for weather related data and historic hazard event data. Used in the risk assessment.
National Integrated Drought Information System	Technical Resource	Source for drought related projections and conditions. Used in the risk assessment.
National Inventory of Dams	Technical Resource	Database used in the dam failure hazard profiling. Used in the risk assessment.
National Response Center	Technical Resource	Source of traffic related HAZMAT incidents and rail accidents. Used in the risk assessment.
National Weather Service	Technical Resource	Source for hazard information, data sets, and historic event records. Used in the risk assessment.
National Wildfire Coordination Group	Technical Resource	Source for historic wildfire hazard information. Used in the risk assessment.
Navajo County Flood Control District	Technical Resource	Resource for floodplain, levee, and dam failure data. Used in the risk assessment.
Navajo County Comprehensive Plan	Comprehensive Plan	Source for history, demographic and development trend data for the county.
Standard on Disaster/Emergency Management and Business Continuity Programs (2000)	Standards Document	Used to establish the classification and definitions for the asset inventory. Used in the risk assessment.
State of Arizona SHMP	State Hazard Mitigation Plan	Used a source of hazard information and the state identified hazards were used as a starting point in the development of the risk assessment.

Table 3-5: Resources Reviewed for Plan Incorporation/Reference		
Town of Pinetop-Lakeside General Plan	General Plan	Source for history, demographic and development trend data.
Town of Snowflake General Plan	General Plan	Source for history, demographic and development trend data.
Town of Taylor General Plan	General Plan	Source for history, demographic and development trend data.
USACE Flood Damage Report	Technical Data	Source of historic flood damages for 1978 flood. Used in the risk assessment.
USACE Flood Damage Report	Technical Data	Source of historic flood damages for 1993 flood. Used in the risk assessment.
U.S. Forest Service	Technical Data	Source for local wildfire data. Used in the risk assessment.
U.S. Geological Survey	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 of Section 4
World Wildlife Fund	GIS Data	Terrestrial ecoregions database used in the general county description.

SECTION 4: HAZARD IDENTIFICATION/RISK ASSESSMENT

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

- Hazard Identification
- Hazard Profiling
- Assessing Vulnerability

The risk assessment for Navajo County was performed using a county-wide, multi-jurisdictional perspective, with much of the information gathering and development being 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 in a way such that the results reflect vulnerability of an individual jurisdiction.

4.1 Hazard Identification

For this Plan, the list of hazards identified in the 2017 Plan was reviewed with the goal of refining the list to reflect the hazards that pose the greatest risk to the jurisdictions represented by this Plan. The hazards identified in the 2017 Plan are:

- Dam Failure
- Drought
- Flood/Flash Flood
- Hazardous Materials Incidents
- Levee Failure
- Severe Wind
- Wildfires
- Winter Storm

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

- Experiential knowledge of the planning team with regard to the relative risk associated with the hazard

- Documented historic information of damages and losses associated with past events (especially events that have occurred during the last plan cycle)
- Duplication of effects attributed to each hazard

One tool used in the initial screening process was the historic hazard database referenced in the 2017 Plan. Declared event sources included the Navajo County Department of Emergency Management, AZ Dept of Emergency and Military Affairs (DEMA), Federal Emergency Management Agency (FEMA), and US Dept of Agriculture (USDA).

Table 4-1: Declared Hazard Events - Feb 1966-June 2017

Hazard	Declared Events That IncludedNavajo County Jan 1966 – June 20		
	No. of Events	Total Expenditures	
		State	Federal
Drought	4	$ 254,344	$ 0
Dam Failure	1	$ 0	$ 0
Levee Failure	1	$	$
Flooding / Flash Flooding	11	$ 40,233,075	$ 322,023,270
Severe Wind	1	$ 5,551	$ 0
Wildfire	19	$ 7,381,208	$ 4,500,000
Winter Storm	5	$ 4,284,874	$ 5,109,724

Notes: Damage Costs are reported as is and no attempt has been made to adjust costs to current dollar values.
- Only a portion of the reported expenditures were spent in the subject county.
- Nothing to report for Earthquake, Extreme Heat, Fissure, Landslide/Mudslide, and Subsidence hazards.
- Source: DEMA 2017

The culmination of the review by the Planning Team did not result in any changes and the plan hazards remain the same as the 2017 hazards.

4.2 Vulnerability Analysis Methodology

General

For the purposes of this vulnerability analysis, hazard profile maps were developed for Dam Failure, Flooding, HazMat, Levee Failure, and Wildfire to map the geographic variability of the probability and magnitude risk of the hazards as estimated by the Planning Team. Hazard profile categories of High, Medium, and/or Low were used and were subjectively assigned based on the factors discussed in the Probability and Magnitude sections below. Within the context of the county limits, the other hazards do not exhibit significant geographic variability and will not be categorized as such.

The Changing Climate

In recent years, FEMA and others have begun to take a harder look at the impacts of climate change on natural hazards and the mitigation planning process. According to the State of Arizona Hazard Mitigation plan, FEMA has required that all Mitigation Plans include verbiage pertaining to climate change and the impacts that it has. FEMA's National Advisory Council noted that the effects of climate change could

manifest as a "threat multiplier". When considering probabilities of hazard events, it is typical to make the implicit assumption that the past is a prologue for the future; however, trending changes to climate-related variables may require broader thinking and projections to develop mitigation actions and projects that account for those changes.

The scope and severity of cause and impacts relating to climate change are still difficult to predict and highly debated. There is, however, a growing body of science and research that indicates a few noticeable trends that should be considered when evaluating natural hazard vulnerability and risk. In 1989, the U.S. Global Change Research Program (USGCRP) was established by Presidential Initiative and later mandated by Congress in the Global Change Research Act of 1990 with the stated purpose of assisting "the Nation and the world to understand, assess, predict, and respond to human-induced and natural processes of global change." In May 2014, the USGCRP released the 3rd National Climate Assessment (NCA), which is a comprehensive compilation of the latest body of work and science on the topic of climate change. The NCA results and discussion are divided into regions to focus the discussions and conclusions to a regional perspective. The Southwest region includes the states of Arizona, California, Colorado, Nevada, New Mexico, and Utah. According to Chapter 20 of the NCA5, the Southwest regional climate change impacts noted in the recent research include increased heat, drought, and insect outbreaks that result in more wildfires, declining water supplies, reduced agricultural yields, health impacts in cities due to heat, and flooding and erosion in coastal areas. In its 2014 report, the NCA released the following "Key Messages" for the Southwest Region:

1. Snowpack and stream flow amounts are projected to decline in parts of the Southwest, decreasing surface water supply reliability for cities, agriculture, and ecosystems. The Southwest produces more than half of the nation's high-value specialty crops, which are irrigation-dependent and particularly vulnerable to extremes of moisture, cold, and heat. Reduced yields from increasing temperatures and increasing competition for scarce water supplies will displace jobs in some rural communities.

2. Increased warming, drought, and insect outbreaks, all caused by or linked to climate change, have increased wildfires and impacts to people and ecosystems in the Southwest. Fire models project more wildfire and increased risks to communities across extensive areas.

3. Flooding and erosion in coastal areas are already occurring even at existing sea levels and damaging some California coastal areas during storms and extreme high tides. Sea level rise is projected to increase as Earth continues to warm, resulting in major damage as wind-driven waves ride upon higher seas and reach farther inland.

4. Projected regional temperature increases, combined with the way cities amplify heat, will pose increased threats and costs to public health in southwestern cities, which are home to more

than 90% of the region's population. Disruptions to urban electricity and water supplies will exacerbate these health problems.

Calculated Priority Risk Index (CPRI) Evaluation

The Planning Team assessed the perceived overall risk for the plan hazards using the Calculated Priority Risk Index (CPRI). Table 4-2 summarizes the CPRI risk categories and provides guidance regarding the assignment of values and weighting factors for each category.

Table 4-2: CPRI Categories and Risk Levels

CPRI Category	Degree of Risk			Assigned Weighting Factor
	Level ID	Description	Index Value	
Probability	Unlikely	Extremely rare with no documented history of occurrences or events; Annual probability of less than .001.	1	45%
	Possible	Rare occurrences with at least one documented or anecdotal historic event; Annual probability that is between .01 and 0.001.	2	
	Likely	Occasional occurrences with at least two or more documented historic events; Annual probability that is between 0.2 and 0.01.	3	
	Highly Likely	Frequent events with a well-documented history of occurrence; Annual probability that is greater than 0.1.	4	
Magnitude/Severity	Negligible	Negligible property damage (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 Shite down of critical facilities for less than 24 hours.	1	30%
	Limited	Slight property damage (greater than 5% and less than 25% of critical and non-critical facilities and infrastructure). Injuries or illnesses do not result in permanent disability and there are no deaths. Moderate quality of life lost. Shut down of critical facilities for more than 1 day and less than 1 week.	2	
	Critical	Moderate property damage (greater than 25% and less than 50% of critical and non-critical facilities and infrastructure). Injuries or illnesses result in permanent disability and at least one death. Shute down of	3	

Magnitude/Severity		critical facilities for more than 1 week and less than 1 month.		
	Catastrophic	Severe property damages (greater than 50% of critical and non-critical facilities and infrastructure). Injuries or illnesses result in permanent disability and multiple deaths. Shut down of critical facilities for more than 1 month.	4	
Warning Time	Less than 6 hours	Self-explanatory.	4	15%
	6 to 12 hours	Self-explanatory.	3	
	12 to 24 hours	Self-explanatory.	2	
	More than 24 hours	Self-explanatory.	1	
Duration	Less than 6 hours	Self-explanatory.	1	10%
	Less than 24 hours	Self-explanatory.	2	
	Less than 1 week	Self-explanatory.	3	
	More than 1 week	Self-explanatory.	4	

The Planning Team used their historical experience and subject matter knowledge to assign values to different CPRI Category for every type of hazard, based on Table 4-2. After that, the score is computed as a weighted sum by multiplying the score of CPRI category by the corresponding assigned weighting factor. The CPRI results for the identified hazards are presented in Section 4.3.

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

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

The CPRI for would then be: CPRI = [(3*0.45) + (3*0.30) + (2*0.15) + (1*0.10)] CPRI = 2.65

4.3 Hazard Risk Profiles

The following sections summarize the risk profiles for each of the Plan hazards identified. The following elements are addressed to present the overall risk profile:

- Description
- History
- Extent
- Impacts
- Probability of Future Events
- Climate Change Impacts
- Vulnerability
- Narrative
- Changes in Development in the Hazard Area

The 2024 Plan data has been reviewed and updated and/or revised to reflect current conditions where necessary. County-wide and jurisdiction-specific profile maps are provided at the end of the section (if applicable).

4.3.1 Dam Failure

Description

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

History

- There have not been any reports of dam failure for the County during the previous plan cycle.
- There have been no significant recent hazard events at Jaques Dam.
- There have not been any reports of dam failure for the City of Holbrook during the previous plan cycle.
- There have not been any reports of dam failure for the Town of Snowflake during the previous plan cycle.

Probability/Extent

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

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

The probability of dam failure in Arizona is low. However, it is recognized that a single failure event can result in catastrophic losses depending on the location, size, and storage capacity of the dam, and the downstream population and infrastructure. The state classifies hazard potential for each state regulated dam using downstream hazard and dam safety ratings. The tables below summarize the hazard classes and dam safety ratings used for Arizona-regulated dams. Federally owned dams not regulated by the state use similar hazard classes and are all high-hazard dams.

Table 4.3.1-1 Hazard Potential

Hazard Potential Classification	Loss of Human Life	Economic, Environmental, Lifeline Losses	EAP Required
Very Low	Not Likely	Limited to Owner or 100-year floodplain	No
Low	Not Likely	Low and generally limited to owner	No
Significant	Not Likely	Yes	Yes
High	Likely	Yes (not necessary for this classification)	Yes

Note: The hazard potential classification is an assessment of the consequences of failure, but not an evaluation of the probability of failure. *Sources: ADWR and USACE (NID)*

Table 4.3.1-2 Dam Safety Categories

Safety Rating	Definition
No Deficiency	No safety deficiency determined.
Safety Deficiency	One or more conditions exist at the dam that impair or adversely affect the safe operation of the dam.
Unsafe Categories	
Category 1: Unsafe Dams with Elevated Risk of Failure	These dams have confirmed safety deficiencies for which there is concern they could fail during a 100-year or smaller flood event. There is an urgent need to repair or remove these dams.
Category 2: Unsafe Dams Requiring Rehabilitation or Removal	These dams have confirmed safety deficiencies and require either repair or removal.

Category 3: Unsafe Dams with Uncertain Stability during Extreme Events (Requiring Study)	Non-earthen dams that have been reclassified as high hazard potential and lack the necessary documentation demonstrating that it meets or exceeds standard stability criteria for high hazard dams during extreme overtopping and seismic events. The dam is classified as unsafe pending the results of required studies. Upon completion of these studies, the dams are either removed from the list of unsafe dams or moved to Category 2 and prioritized for repair or removal.
Category 4: Unsafe Dams Pending Evaluation of Flood- Passing Capacity (Requiring Study)	Dams that should be evaluated using updated methods to confirm their safety status. Upon completion of these evaluations, they are either removed from the list of unsafe dams or moved to Category 2 and prioritized for repair or removal.

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

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

Table 4.3.1-3: Downstream Hazard Potential Classes for State Regulated Dams

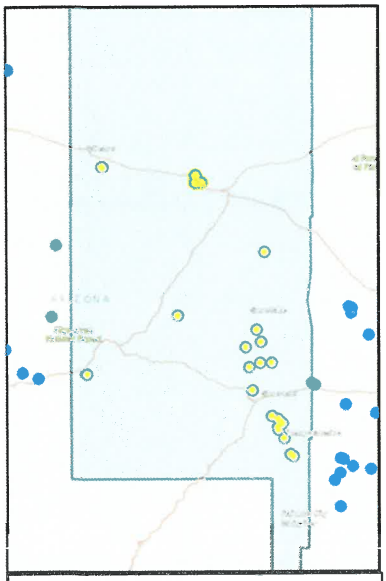
Hazard Potential	Loss of Human Life	Economic, Environmental,Lifeline Losses
Very Low	Not Likely	Limited to Owner or 100-year Floodplain
Low	Not Likely	Low
Significant	Not Likely	Low to High
High	Likely	Low to High
Source: ADWR 2024		

The NID database includes dams that are either:

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

- Low hazard potential class dams that exceed 50 acre-feet storage and 6 feet height.

There are over 50 dams in Navajo County based on the two databases. Thirty-six (36) of the dams are low hazard dams with 30 of those existing on the Navajo and Hopi Indian Reservations and 21 are under ADWR jurisdiction. The table below provides a summary of the high and significant hazard dams in both the ADWR and NID databases, located in Navajo County.



NC Dams identified. NID 2024

The magnitude of impacts due to dam failure are usually depicted by mapping the estimated downstream inundation limits based on an assessment of a combination of flow depth and velocity. These limits are typically a critical part of the emergency action plan. Of the dams considered, only seven (7) emergency action plans showing downstream dam failure inundation limits were readily available. For inundation resulting from dam failure, the following two classes of hazard risk are depicted:

High Hazard = Inundation limits due to dam failure

Low Hazard = All other areas outside the inundation limits

Table 4.3.1-4: NID & ADWR Dams by Hazard Classification

Hazard Class	SID	NID	Dam Name	ADWR Safety Types	EAP	Inundation Mapping	Nearest Downstream Development	Distance in Miles
High	09.07	AZ00059	Millett Swale	Unsafe Dams Requiring Rehabilitation or Removal	Outdated(1997)	Yes	Taylor & Shumway	4
	09.09	AZ00012	Lone Pine	Unsafe Dams Requiring Rehabilitation or Removal	Outdated(1994)	No	Schoens Dam	6.5
	09.11	AZ00013	Daggs	Safety Deficiency	Outdated(1997)	No	Taylor	8
	09.13	AZ00023	Jaques	Unsafe Dams PendingEvaluation of Flood-Passing Capacity	Yes	Yes	Show Low	4
	09.18	AZ00044	Woodland	Safety Deficiency	Draft	Draft	Pinetop & Lakeside	3
	09.19	AZ00051	Fool Hollow	Unsafe Dams PendingEvaluation of Flood- Passing Capacity (Requiring Study)	Yes	Yes	Taylor	14

	09.20	AZ00042	Black Canyon	Unsafe Dams Requiring	Yes	Yes	Heber & Overgaard	9.9
	09.27	AZ00178	Cholla BottomAsh Pond	No Deficiency	Yes	Yes	Joseph City	5
	09.28	AZ00179	Cholla Fly Ash Pond	No Deficiency	Yes	Yes	Joseph City	5
	09.33	AZ00207	Schoens	No Deficiency	Yes	Yes	Taylor	6
	N/A	AZ10415	Bootleg	N/A	Yes	Yes	Amos Ranch	4
	N/A	AZ10416	Cooley	N/A	Yes	Yes	Amos Ranch	4
Significant	09.14	AZ00056	Scott	Safety Deficiency	No	No	Jaques Dam &Show Low	5
	09.16	AZ00024	Lakeside	Safety Deficiency	No	No	Show Low	7
	09.29	AZ00180	Cholla CoolingPond	No Deficiency	Yes	Yes	Joseph City	5
	09.30	AZ00181	Trophy Lake	No Deficiency	Yes	Yes	Taylor	9
	09.34	AZ00208	Jacques Marsh	No Deficiency	Yes	Yes	Show Low	4
Sources: NID, ADWR Dam Safety Database								

Vulnerability

Table 4.3.1-5: CPRI Rating for Dam Failure

Participating Jurisdiction	Probability	Magnitude/ Severity	Warning Time	Duration	CPRI Score
Holbrook	Unlikely	Negligible	> 24 hours	< 6 hours	1.00
Pinetop-Lakeside	Unlikely	Limited	> 24 hours	< 6 hours	1.00
Show Low	Unlikely	Catastrophic	< 6 hours	< 24	2.45
Snowflake	Possibly	Catastrophic	< 6 hours	> 1 week	3.10
Taylor	Possibly	Critical	6 - 12 hours	> 1 week	2.65
Winslow	Possibly	Limited	6 - 12 hours	< 24	2.15
Unincorporated Navajo	Possibly	Limited	12 - 24 hours	> 1 week	2.20

Any storm event, or series of storm events of sufficient magnitude to cause an overtopping dam failure scenario, would have potentially catastrophic consequences in the inundation area. Most "sunny day" failures will also be equally devastating due to the sudden release of very large volumes of water. Flood waves from these types of events travel very fast and possess tremendous destructive energy. Area downstream of dams is significantly vulnerable to flood inundation and such inundation could occur with little warning and with high loss levels. Impacted structures can be considered lost and significant damage to infrastructure such as stream crossings, utilities, and roads can be expected. It should be noted that the Planning Team recognizes that the probability of a dam failure occurring at multiple (or all) locations at the same time is essentially null. The potential for deaths

and injuries are directly related to the warning time and type of event. Given the magnitude of such an event(s), it is realistic to anticipate at least one death and several injuries. There is also a high probability of population displacement for most of the inhabitants. within the inundation limits downstream of some of the dam(s).

Impacts

The chart below outlines the various impacts for each jurisdiction of this hazard.

Table 4.3.1-6: Impacts from Flooding	
Unincorporated Navajo County	House damage/destruction Erosion Loss of Infrastructure Potential loss of life Damage to roadways, drainages
City of Holbrook	House damage/destruction Erosion Loss of Infrastructure Potential loss of life Damage to roadways, drainages
Town of Pinetop-Lakeside	House damage/destruction Erosion Loss of Infrastructure Potential loss of life Damage to roadways, drainages
City of Show Low	House damage/destruction Erosion Loss of Infrastructure Potential loss of life Damage to roadways, drainages
Town of Snowflake	House damage/destruction Erosion Loss of Infrastructure Potential loss of life Damage to roadways, drainages
Town of Taylor	House damage/destruction Erosion Loss of Infrastructure Potential loss of life Damage to roadways, drainages
Town of Winslow	House damage/destruction Erosion Loss of Infrastructure Potential loss of life Damage to roadways, drainages

Development Trend Analysis

The flood protection afforded by dams in Navajo County has encouraged development of downstream lands and it is reasonable to expect additional development within these areas. Public awareness measures such as notices on final plats and public education on dam safety are ways that the county and local city and town officials can mitigate the potential impact of a dam failure.

Navajo County

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

The Schoens' Dam is arguably the most notable dam which influences a portion of the County including Shumway, Snowflake and Taylor. A flood wave from a catastrophic failure of the dam would move rapidly along Silver Creek/ Show Low Creek and would be immediately life-threatening to the first residents located downstream, including the jurisdictions of Navajo County /Shumway, Taylor and Snowflake in that order.

In addition to dam failure, it is also important to consider emergency spillway discharges when assessing risk (although not considered in the CPRI). Development located downstream of a dam is more likely to be impacted by an emergency spillway discharge than by a dam failure. The dynamics of the flood wave associated with an emergency spillway discharge are different from that of a dam failure. A dam failure is an uncontrolled release of water impounded behind a dam through a breach in the dam itself and is usually catastrophically destructive. An emergency spillway discharge usually increases in magnitude gradually, and then decreases gradually as the structure drains. As an example, in 1993, water from the Schoens' dam was released because storage capacity merited opening of the head gate which caused significant flows. Although no water was released through the spill way and the dam did not fail, a fully open head gate did cause flows that caused some infrastructure disruption.

Any storm event, or series of storm events of sufficient magnitude to cause an overtopping dam failure scenario, would have potentially catastrophic consequences in the inundation area. Most "sunny day" failures will also be equally devastating due to the sudden release of very large volumes of water. Flood waves from these types of events travel very fast and possess tremendous destructive energy. Area downstream of dams is significantly vulnerable to flood inundation and such inundation could occur with little warning and with high loss levels. Impacted structures can be considered lost and significant damage to infrastructure such a stream crossing, utilities, and roads can be expected. It should be noted that the Planning Team recognizes that the probability of a dam failure

occurring at multiple (or all) locations at the same time is essentially null. The potential for deaths and injuries are directly related to the warning time and type of event. Given the magnitude of such an event(s), it is realistic to anticipate at least one death and several injuries. There is also a high probability of population displacement for most of the inhabitants within the inundation limits downstream of some of the dam(s).

Show Low

Since the last update, the area downstream of Jaques dam has seen the construction of a hotel. The building is located outside of the mapped flood hazard area (100 yr.) however it may be in the inundation area of a dam breach. There are also other buildings in this area including another hotel, a bank, and office buildings.

Holbrook

Changes in population patterns for the City of Holbrook have largely remained the same since the 2010 census. Holbrook has seen a decrease in its population from down from 5,053 to 4,842. Within the City of Holbrook, the land use and development has not seen any significant changes in the last five years.

Snowflake and Taylor

The greatest vulnerability to the community is that a Dam failure occurrence could result in significant damage to critical public infrastructure (streets), bridges, residential and commercial property in the more densely populated portion of the towns through Taylor, Snowflake and county community Shumway, access routes, and primarily citizen safety.

Climate Change

Climate is a major driver of our weather and influences the severity of cascading effects we confront as Emergency Managers. The quantity and intensity of disasters continues to increase. As such, it is important to increase awareness and understanding of climate change as a compounding threat and existing and future vulnerabilities as well as potential solutions. In recent years, FEMA and others have begun to take a harder look at the impacts of climate change on natural hazards and the mitigation planning process. In March 2016, FEMA released new state mitigation planning guidance that will require all state hazard mitigation plans to address climate change beginning with all updates submitted after March 20161. FEMA's National Advisory Council noted that the effects of climate change could manifest as a "threat multiplier". When considering probabilities of hazard events, it is typical to make the implicit assumption that the past is a prologue for the future; however, trending changes to climate related variables may require broader thinking and projections to develop mitigation actions and projects that account for those changes.

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

noticeable trends that should be considered when evaluating natural hazard vulnerability and risk. In 1989, the U.S. Global Change Research Program (USGCRP) was established by Presidential Initiative and later mandated by Congress in the Global Change Research Act of 1990 with the stated purpose of assisting "the Nation and the world to understand, assess, predict, and respond to human-induced and natural processes of global change." In 2018, the USGCRP released the 4th National Climate Assessment (NCA), which is a comprehensive compilation of the latest body of work and science on the topic of climate change. The NCA results and discussion are divided into regions to focus the discussions and conclusions from a regional perspective. The Southwest region includes the states of Arizona, California, Colorado, Nevada, New Mexico, and Utah. According to Chapter 25 of the NCA3, the Southwest regional climate change impacts noted in the recent research include increased heat, drought, and insect outbreaks that result in more wildfires, declining water supplies, reduced agricultural yields, health impacts in cities due to heat, and flooding and erosion in coastal areas. In its 2018 report, the NCA released the following "Key Messages" for the Southwest Region.

Water for people and nature in the Southwest has declined during droughts, due in part to climate change. Intensifying droughts and occasional large floods, combined with critical water demands from a growing population, deteriorating infrastructure, and groundwater depletion, suggest the need for flexible water management techniques that address changing risks over time, balancing declining supplies with greater demands.

- The integrity of Southwest forests and other ecosystems and their ability to provide natural habitat, clean water, and economic livelihoods have declined as a result of recent droughts and wildfire due in part to human-caused climate change. Greenhouse gas emissions reductions, fire management, and other actions can help reduce future vulnerabilities of ecosystems and human well-being.
- Many coastal resources in the Southwest have been affected by sea level rise, ocean warming, and reduced ocean oxygen—all impacts of human-caused climate change—and ocean acidification resulting from human emissions of carbon dioxide. Homes and other coastal infrastructure, marine flora and fauna, and people who depend on coastal resources face increased risks under continued climate change.
- Traditional foods, natural resource-based livelihoods, cultural resources, and spiritual wellbeing of Indigenous peoples in the Southwest are increasingly affected by drought, wildfire, and changing ocean conditions. Because future changes would further disrupt the ecosystems on which Indigenous peoples depend, tribes are implementing adaptation measures and emissions reduction actions.
- The ability of hydropower and fossil fuel electricity generation to meet growing energy use in the Southwest is decreasing as a result of drought and rising temperatures. Many renewable energy sources offer increased electricity reliability, lower water intensity of energy generation, reduced greenhouse gas emissions, and new economic opportunities.
- Food production in the Southwest is vulnerable to water shortages. Increased drought, heat waves, and reduction of winter chill hours can harm crops and livestock; exacerbate competition for water among agriculture, energy generation, and municipal uses; and increase future food insecurity.

- Heat-associated deaths and illnesses, vulnerabilities to chronic disease, and other health risks to people in the Southwest result from increases in extreme heat, poor air quality, and conditions that foster pathogen growth and spread. Improving public health systems, community infrastructure, and personal health can reduce serious health risks under future climate change.

Sources:
AZ Dept of Water Resources, https://www.azwater.gov/dam-safety/faq
AZ Dept of Emergency and Military Affairs, State of Arizona Multi-Hazard Mitigation Plan
US Army Corps of Engineers, National Inventory of Dams, 2024, https://nid.sec.usace.army.mil/#/

4.3.2 Drought

Description

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

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

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

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

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

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

History

Arizona has experienced several drought periods affecting multiple years between 1849 and 1905, the most prolonged period of drought conditions in 300 years occurred in Arizona (Jacobs, 2003). Another prolonged drought occurred during the period of 1941-1965. The period from 1979-1983 appears to have been anomalously wet, while the rest of the historical records shows that dry conditions are most likely the normal condition for Arizona. During 1998-2007, there have been more months with below normal precipitation than months with above normal precipitation. Arizona has been in a long-term drought since 1994.Water Year 2023 marked the 30th year of Arizona's latest long-term drought, in which 20 of the last 30 water years have been dry.

The 2017 Arizona Drought Preparedness Annual Report indicates Navajo County as one of the driest areas with a 16% forage loss as of September 2017. Due to the forage loss and lack of water storage in rangeland

catchments ranchers have reported 10-25% reduced carrying capacities on rangelands. The outlook from the National Weather Service indicates above normal temperatures and below normal precipitation for this winter season. Due to the continuing drying conditions, we ask that the Board pass an emergency resolution declaring a drought emergency in Navajo County.

- February 13, 2018, Navajo County BOS adopted resolution 02-18, declaring an emergency due to extreme drought conditions.

Probability/Extent

Short-term drought in Navajo County is advancing, with 46% of the county now in Moderate (D1) drought. Abnormally Dry (D0) conditions (currently 89% of the county) is not considered to be in drought. Long-term drought in Navajo County has also advanced , with approximately 1-2% of the county in Severe (D2) long-term drought, and approximately 30% of the county in Moderate (D1) long-term drought.

The current drought maps are in general agreement that Navajo County is currently experiencing a moderate to severe drought condition for the short term and in a moderate drought condition for the long term.

Figure 4.3.2-1: Drought Status June 2024

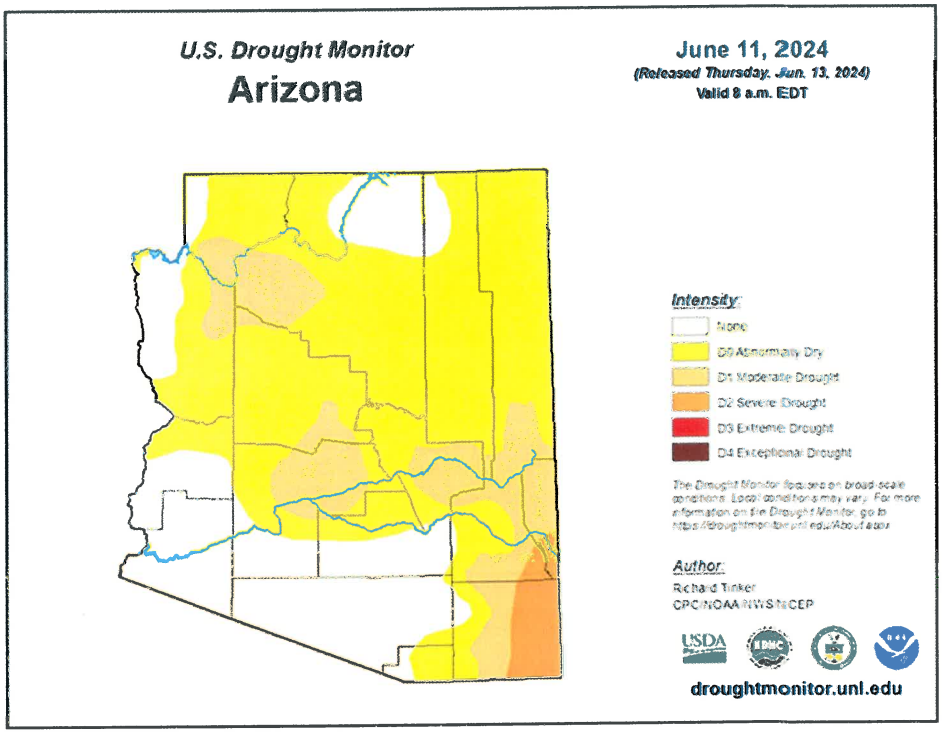
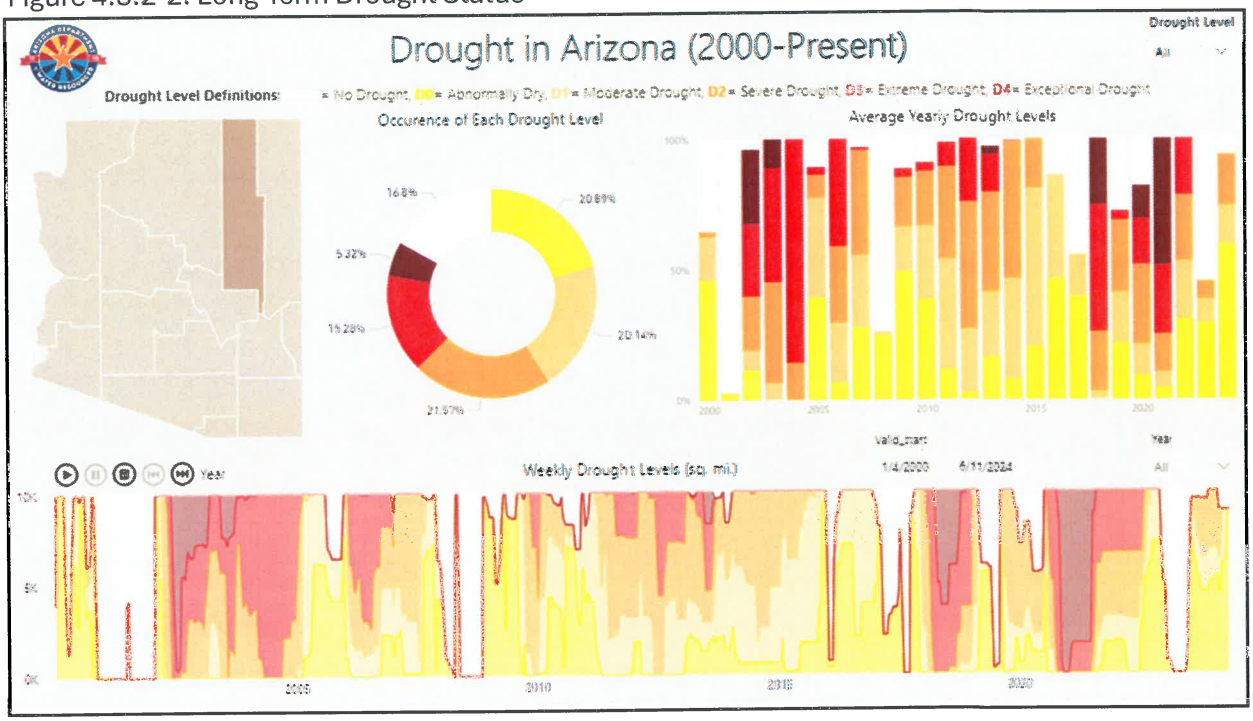


Figure 4.3.2-2: Long-Term Drought Status



Source: ADWR, Navajo County 2024 as accessed at: https://www.azwater.gov/drought/drought-data-dashboard

Impacts

The information in the figure below is a list of past State Impacts for drought from the U.S Drought Monitor.

Figure 4.3.2-3: Long-Term Drought Impacts

State Impacts | U.S. Drought Monitor

Start Date	Seasons	Weeks in Drought	Historically observed impacts
2022-03-31	spring	0	Fewer Arizona wildflowers in 2022
2022-01-01	winter	0	Arizona farmers adjust to receiving less Colorado River water
2020-05-12	spring	0	Fire restrictions in Arizona
2019-10-06	fall	0	Dry monsoon cut into mushroom production in Arizona's forests
2017-10-01	fall	0	Dry weather led to altered prescribed burn schedule in Arizona's Coconino National Forest
2017-10-01	fall	0	More fire activity near Flagstaff, Arizona, Coconino National Forest
2010-06-23	summer	0	Fire restrictions in the Coconino, Kaibab, and Prescott National Forests
2010-06-11	summer	0	Fire restrictions for the Tonto National Forest
2010-05-03	spring	0	Yuma desalting plant to provide water for Mexico
2009-05-14	spring	0	Fire restrictions for Tonto National Forest
2009-05-09	spring	0	New Pearce Ferry Rapid
2009-04-15	spring	0	Whitewater rafting on the Salt River ended early

Short-term drought in Navajo County is advancing, with 33% of the county now in Moderate (D1) drought. Abnormally Dry (D0) conditions (currently 63% of the county) is not considered to be in drought. Long-term drought in Navajo County has also advanced slightly, with approximately 1-2% of the county in Severe (D2) long-term drought, and approximately 30% of the county in Moderate (D1) long-term drought.

The chart below outlines the various impacts for each jurisdiction of this hazard.

Table 4.3.2-1: Impacts from Drought	
Unincorporated Navajo County	Loss of income from taxes Loss of Infrastructure Potential loss of life Increase wildfire danger
City of Holbrook	Potential loss of life Increase wildfire danger
Town of Pinetop-Lakeside	Loss of Infrastructure Potential loss of life Increase wildfire danger
City of Show Low	Loss of Infrastructure Potential loss of life
Town of Snowflake	Loss of Infrastructure Potential loss of life
Town of Taylor	Loss of Infrastructure Potential loss of life
Town of Winslow	Loss of Infrastructure Potential loss of life

Vulnerability

Table 4.3.2-2: CPRI Rating for Drought					
Jurisdiction	Probability	Magnitude/ Severity	WarningTime	Duration	CPRI Score
Holbrook	Highly Likely	Limited	> 24 hours	> 1 week	2.95
Pinetop-Lakeside	Likely	Limited	> 24 hours	> 1 week	2.50
Show Low	Highly Likely	Critical	> 24 hours	> 1 week	3.25
Snowflake	Highly Likely	Critical	> 24 hours	> 1 week	3.25
Taylor	Highly Likely	Limited	> 24 hours	> 1 week	3.25
Winslow	Highly Likely	Critical	12 - 24 hours	> 1 week	3.40
Unincorporated Navajo County	Highly Likely	Limited	> 24 hours	> 1 week	2.95
*No change in CPRI for 2024 plan cycle					

No standardized methodology exists for estimating losses due to drought and drought does not generally have a direct impact on 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 including crop and livestock agriculture; municipal and industrial water supply; recreation/tourism; and wildlife and wildlife habitat.

The county farming and ranching industries are directly affected by extended drought conditions. The primary source of water for irrigated farming is groundwater and some surface water tributaries to the Little Colorado River such as Silver Creek. Rangeland ranching is dependent upon groundwater and captured rainfall runoff via stock tanks and rain catchments. Extended drought conditions reduce rangeland grasses and other fodder. Stock tank water levels and replenishment are also significantly reduced. This forces ranchers to feed more hay and to truck in water to sustain their rangeland herds. The expense of these activities forces ranchers to drastically reduce herd sizes, flooding the markets with excess animals and tumbling livestock prices. Then supplies in following years are drastically reduced due to lack of rangeland and water and prices soar. These expenses are translated into the County economy as a two-fold hardship. One is an economic hardship for merchants and retailers that provide goods and services to the ranching community. Second is increased cost due to a reduced supply of ranching commodities.

From 1995-2014, the County farmers and ranchers received $6.7 million in disaster related assistance funding from the U.S Dept of Agriculture (EWG, 2014). The majority of those funds were received during the time period of 2001 to 2011 and are associated with livestock assistance and aid. The 2001- 2011 time period also corresponds to the most severe period of the recent drought cycle for Navajo County. Other direct impacts associated with 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 significant but very difficult to estimate due to a lack of documentation. There are also the intangible costs associated with lost tourism revenues and impacts to wildlife habitat and animals. Typically, these impacts are translated into the general economy in the form of higher food and agricultural goods prices and increased utility costs.

Sustained drought conditions will also have secondary impacts by increasing risks associated with hazards such as fissures, flooding, subsidence and wildfire. Extended drought may weaken and dry the grasses, shrubs, and trees of wildfire areas, making them more susceptible to insect infestation and 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 recharging from normal rainfall.

Climate Change

According to the Climate Science Special Report as part of the fifth National Climate Assessment, temperatures across the Southwest have increased by 2.5 degrees Fahrenheit since 1895. These increases in temperature contribute to aridification in the Southwest by increasing evapotranspiration, lowering soil moisture, reducing snow cover and impacting snowmelt.

Looking to the future, temperatures in the Southwest are projected to increase by the end of the century by around 5 degrees if carbon dioxide emissions follow a lower path and up to 9 degrees if emissions follow a much higher path. Increasing temperatures can make soils even drier, amplifying drought.

According to the same report, the region is experiencing more intense precipitation events, including atmospheric rivers, which contribute to increased flooding. Precipitation projections for the future are less certain. In a high emission of greenhouse gas scenario, decreases in seasonal precipitation across all

seasons in the Southwest are projected to mostly be smaller than the natural variations in the climate, making any clear signal difficult.

Regardless, dealing with a climate changed future in Arizona is a lot like dealing with issues today. It is all about how water resources are managed.

Source: https://www.climate.gov/news-features/event-tracker/western-drought-2021-spotlight-arizona

Assets:

- Ranches and farms
- Water production and delivery infrastructure
- Recreation activities that include boating and fishing
- Residential and Commercial Buildings

Development Trends

It is unlikely that significant growth will occur in the ranching and farming sectors given the current constraints on water rights, grazing rights, and available range land. However, drought planning will continue to be a critical component of any domestic water system expansions or land development planning. The ADTF is also working cooperatively with water providers within the State to develop System Water Plans that are comprised of three components:

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

The combination of these requirements will work to ensure that future development in Navajo County will recognize drought as a potential constraint.

Sources

Arizona Department of Water Resources, 2024, Drought Program website :
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http://www.drought.gov/portal/server.pt/community/drought.gov/202
NOAA, NWS, Climate Prediction Center 2010, website located at:
http://www.cpc.ncep.noaa.gov/products/expert_assessment/seasonal_drought.html
High Plains Regional Climate Center at: http://www.hprcc.unl.edu/maps.php?map=ACISClimateMaps

4.3.3 Flood / Flash Flood Description

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

- Tropical Storm Remnants: Some of the worst flooding tends to occur when the remnants of a hurricane that has been downgraded to a tropical storm or tropical depression enter the State. These events occur infrequently and mostly in the early autumn and usually bring heavy and intense precipitation over large regions causing severe flooding.

- Winter Rains: Winter brings the threat of low intensity; but long duration rains covering large areas that cause extensive flooding and erosion, particularly when combined with snowmelt.

- Summer Monsoons: A third atmospheric condition that brings flooding to Arizona is the annual summer monsoon. In mid to late summer the monsoon winds bring humid subtropical air into the State. Solar heating triggers afternoon and evening thunderstorms that can produce extremely intense, short duration bursts of rainfall. The thunderstorm rains are mostly translated into runoff and in some instances, the accumulation of runoff occurs very quickly resulting in a rapidly moving flood wave referred to as a flash flood. Flash floods tend to be localized and cause significant flooding of local watercourses.

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

Another major flood hazard comes as a secondary impact of wildfires in the form of dramatically increased runoff from ordinary rainfall events that occur on newly burned watersheds. Denuding of the vegetative canopy and forest floor vegetation, and development of hydrophobic soils are the primary factors that contribute to the increased runoff. Canopy and floor level brushes and grasses intercept and store a significant volume of rainfall during a storm event. They also add to the overall watershed roughness which generally attenuates the ultimate peak discharges. Soils in a wildfire burn area can be rendered hydrophobic, which according the NRCS is the development of a thin layer of nearly impervious soil at or below the mineral soil surface that is the result of a waxy substance derived from plant material burned during a hot fire. The waxy substance penetrates into the soil as a gas and solidifies after it cools, forming a waxy coating around soil particles. Hydrophobic soils, in combination with a denuded watershed, will significantly increase the runoff potential, turning a routine annual rainfall event into a raging flood with drastically increased potential for soil erosion and mud and debris flows.

History

Navajo County has been part of several disaster declarations for flooding. From September 2010 to September 2016, according to the NCDC, there were 17 flooding events in the County causing $40K in property damages. The following incidents represent examples of major flooding that has impacted the County:

- July 23, 2021, a major monsoon storm started in the Show Low area and flowed down through Rocky Arroyo and washed out the roadway -including the culvert- that flowed into White Mountain Lake and Mexican Lake caused the lake to rise 14 feet in 12 hours. The estimated for repair of the damage was over $69,000.

Probability/Extent

The force of a flash flood can roll boulders, rip trees out of the ground, and destroy buildings and bridges. True to their name, flash floods occur suddenly – within a few minutes or hours. Rapidly rising water can reach heights of 30 feet or more, and to make matters worse, the same rains that produce flash floods can also trigger catastrophic mudslides. The magnitude or strength of floods is measured in rainfall intensity, depth, and velocity. Within Navajo County, rainfall intensity above 1.5 inches per hour is the first warning system trigger at which dry washes flow bank to bank and may create flash floods or road closures. Overbank floods may occur when these rainfall intensity rates are sustained over several hours. Predetermined flow depth and velocity readings expressed as cubic feet per second from streamflow gages are then used to trigger additional warning and response.

Existing developments that were built before the floodplain standards were enacted remain vulnerable to regular flooding.

Populations that experience flooding are often faced with difficult physical, mental, and economic concerns. As demonstrated by Arizona's past flood events, the impact to the general public is typically property damage and loss, injury, and in some cases, death. Flood events can often force populations to relocate until the floodwaters recede as their homes are impacted by the flood waters. Even after the water recedes, homes can be unlivable until they are repaired and cleaned of mud, debris, and potential mold. Often these floods result in the loss of personal possessions that cannot be salvaged after they are damaged by flood waters.

Several of the deaths, injuries, and rescues associated with flooding often took place when citizens attempted to drive across high or moving waters. Potential dangers include electrical hazards, carbon monoxide exposure, musculoskeletal hazards, heat or cold stress, motor vehicle-related dangers, fire, drowning, and exposure to hazardous materials. Other factors in flood-related injuries, illness, and death include disease as a result of unhygienic conditions and water-borne diseases. A review of flood-related fatalities from 13 flood events in the United States and Europe, found that 68% of the deaths from flooding were due to drowning, 12% trauma, and 6% heart attack among other causes[14].

In addition to physical injuries, flooding victims suffer the psychological impacts of flooding. A recent study of flood victims in the United Kingdom found that 27% of flood victims met the criteria for symptoms associated with Post Traumatic Stress Disorder and over 35% had symptoms of depression.

Recovery and rebuilding costs, a decline in tourism, food shortages, lack of infrastructure, and the effects on local economies are a few of the contributing factors to economic hardship for the County due to flooding. Businesses impacted by flooding may face the loss of income during the flood, combined with the cost of rebuilding. These issues may cause some businesses in a community to permanently relocate from the area. Agricultural losses due to flooding are also significant and can harm rural areas. Some areas may be isolated as flood waters can damage the transportation infrastructure. It may take significant time and resources for a community to restore full access.

Impacts

The table below lists the impacts for flood/flash flood for each of the jurisdictions listed in the plan.

Table 4.3.3-1: Impacts from Flood/Flash Flood	
Unincorporated Navajo County	Damage to roadways, drainages, and homes Loss of Infrastructure Potential loss of life Increase wildfire danger
City of Holbrook	House damage/destruction Erosion Loss of Infrastructure Potential loss of life Damage to roadways, drainages
Town of Pinetop-Lakeside	House damage/destruction Erosion Loss of Infrastructure Potential loss of life Damage to roadways, drainages
City of Show Low	House damage/destruction Erosion Loss of Infrastructure Potential loss of life Damage to roadways, drainages
Town of Snowflake	House damage/destruction Erosion Loss of Infrastructure Potential loss of life Damage to roadways, drainages
Town of Taylor	House damage/destruction Erosion Loss of Infrastructure Potential loss of life Damage to roadways, drainages
Town of Winslow	House damage/destruction Erosion Loss of Infrastructure Potential loss of life Damage to roadways, drainages

Vulnerability

Table 4.3.3-2: CPRI Rating for Flooding					
Jurisdiction	Probability	Magnitude/ Severity	Warning Time	Duration	CPRI Score
Holbrook	Likely	Limited	6 - 12 hours	< 24 hours	2.60
Pinetop-Lakeside	Likely	Limited	6 - 12 hours	< 24 hours	2.60
Show Low	Highly	Catastrophic	< 6 hours	< 24 hours	3.80
Snowflake	Highly	Critical	< 6 hours	< 1 week	3.60
Taylor	Highly	Critical	< 6 hours	< 24 hours	3.50
Winslow	Likely	Critical	6 - 12 hours	< 24 hours	3.10
Unincorporated Navajo County	Highly	Critical	12 - 24 hours	< 1 week	3.30

For the purposes of this Plan, the probability and extent of flood hazards in Navajo County jurisdictions are primarily based on the 1% (100-year) and 0.2% (500-year) probability floodplains delineated on FEMA Flood Insurance Rate Maps (FIRMs), plus any provisional floodplain delineations used for in-house purposes by participating jurisdictions or Planning Team delineated areas. The effective date for the new DFIRM maps is September 26, 2008. DFIRM floodplain GIS base files were obtained from FEMA and are the basis for the flood hazard depictions in this Plan. Therefore, the vulnerability analysis results in this plan are likely conservative.

Two designations of flood hazard are used. Any "A" zone is designated as a high hazard area. Medium flood hazard areas are all "Shaded X" zones. All "A" zones (e.g. – A, A1-99, AE, AH, AO, etc.) represent areas with a 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. High and medium hazard designations were also assigned to the non-FEMA areas by the Planning Team based on the anticipated level of flood hazard posed.

The potential exposure to high and medium flood hazards can be estimated using the flood mapping that follows. In areas of high current development or in areas where future development is likely the threat of flooding has been determined by FEMA.

Based on the historic record, multiple deaths and injuries are plausible and a substantial portion of the exposed population is subject to displacement depending on the event magnitude. It is unlikely that a storm event would occur that would flood all of the delineated high and medium flood hazard areas at the same time. Furthermore, it should be noted that any flood event that exposes assets or population to a medium hazard will also expose assets and populations to the high hazard flood zone. That is, the 100-year floodplain would be entirely inundated during a 500-year flood. All Navajo County Communities in this Plan are flood prone and are vulnerable to flooding. Flood damage can be immediate to infrastructure such as transportation, residential and commercial structures and critical facilities. However long-term impacts include population relocation, economic hardships as business are impacted and a disruption to the community as a whole.

The City of Holbrook is at risk of flooding according to the FEMA mapping. The majority of the community is protected by a levee on the Little Colorado River, which is the primary flooding Source. However localized heavy rain and flows in the river that exceed the levee design pose a threat to the community population of 5,094 citizens. The current FEMA mapping includes the levee and depicts the protection. If the levee were to fail Holbrook would be subject to inundation which would damage or destroy roads, homes, sewage pumping stations, and businesses in the inundation zone on the south side of Holbrook. Damage to the

sewage pumping systems would cause a severe threat to public health. The Holbrook Senior Center, several retail businesses, restaurants, movie theater, local radio station and two banks are among the values at risk in this community. Disruption of tourism and retail sales due to road and business closures would seriously impact the economic health of the city. The flooding of the Senior Center would result in loss of vital public services for congregate meal and meals on wheels clients. The local schools, Park Elementary, Hulet Middle School, Holbrook Junior and High schools would be closed due to their proximity to the inundation zone and possible damage from flooding. The Navajo County Historic Courthouse built in the late 1800's is also at risk of damage due to a major flood event. The Navajo County fairgrounds lie just north of the railroad tracks and would be impacted from major flooding and the annual county fair event could be at risk if flooding were to occur in the Mid-September timeframe. Navajo County Sheriff's emergency dispatch is located just north of Hopi Blvd and would be subject to flooding thus jeopardizing the ability to conduct law enforcement activities and 911 dispatch out of the facility. Rail service would be disrupted, and Amtrak passenger transportation would be delayed or disrupted due to a major flooding event. Without detailed analysis the complete extent of risk is unknown however the city can expect direct damage from the flood water to residential structures, critical facilities, utilities and transportation. The rail line could be damaged. Interstate 40 runs parallel to the Little Colorado River in Holbrook and could be damaged or closed due to flooding. Such an occurrence would make Holbrook vulnerable to impacts from the road closure such as sheltering stranded motorists, and increased traffic. Navajo Blvd., which is part of Route 77, crosses the Little Colorado River in Holbrook. Increased flow could damage or destroy this facility which is the main route south out of Holbrook.

The primary drainage that poses a flood hazard in Show Low is the Show Low Creek. The stream is crossed by State Route 60 in the commercial district of the Town. Several smaller drainages are also flood-prone and are in residential areas. Flooding impact to State Route 60 could cut the main transportation route through the community and impact tourism and commuting, as well as the local businesses. Values at risk in the inundation zones include residential, retail businesses, medical facilities, hotels, financial institutions, and restaurants. Summit Regional Medical Center is located on State Route 260 so severe flooding would cause delays in transporting patients to the hospital. State Route 260 is also vulnerable since it parallels Show Low Creek for much of its run through the community. Flooding in the residential areas will impact homes and could result in evacuations and displaced citizens. The Fool Hollow Lake drains away from town and does pose a small threat to local residential areas from flooding. Heavy rains from monsoonal flooding during the summer tourist season will impact the economic balance of Show Low causing retail business to suffer losses thus reducing the sales tax revenue for the city.

On July 22nd, 2021, a high-intensity monsoon storm hit the downtown Show Low area. The storm delivered 2.49 inches of rainfall in less than 1 hour. This exceeded the 1% probability 1-hour event (100-year storm). This storm also exceeded the 1% probability 12-hour event of 3.98 inches. The storm caused substantial damage to several businesses both in and outside of the mapped floodplain. Public drainage facilities and roadways were also damaged. During this same event, residential properties north of City Park experienced flooding. The main area of concern was a drainage ditch that runs along the backyards of homes in the area. This is a known problem area but there is no existing drainage easement and thus no way to maintain the ditch. After some reconnaissance in the neighborhood, it was also observed that many roadside culverts and ditches had been filled by the homeowners. This contributed to the flooding. To remedy this situation city crews and private contractors restored the roadway drainage. The city has also hired an engineering consultant to design a regional detention facility upstream of the problem area to help mitigate storm flows.

There are designated Special Flood Hazard Areas along Walnut Creek and Billy Creek in Pinetop-Lakeside. The flooding areas are narrow and occur in residential areas and undeveloped areas. Hwy 260 parallels

Billy Creek and could experience damage in high flows. Several businesses including restaurants, a bank, the senior center, and a supermarket are close to the floodplain and are vulnerable and loss of service will result in lost sales tax revenue and vital public services. Rainbow Lake is outside the community boundary, however, if it were to fail portions of the community would be vulnerable including a road crossing for Hwy 260 and a resort. Blue Ridge Middle School located on Porter Mountain Road lies due east of Billy Creek, flooding along the creek will hamper the transportation of students by bus and the walking path from the Billy Creek area to the school would be inaccessible. Navopache Electric Cooperative owns the property along the corner of State Route 260 and maintains a storage yard with high-value equipment along Billy Creek. Losses of this high-value equipment are highly likely should Billy Creek flood its banks and impact to the customers of this electric commodity supplier would be impacted should electric service be compromised.

Silver Creek and its main tributaries have been identified FEMA Special Flood Hazard Areas. In Snowflake the floodplain is largely used for farming with some mixed residential areas and a golf course community that is built around the tributary stream bed. Portions of the downtown area and immediately surrounding residential areas are within the FEMA Special Flood Hazard Area. These areas are on the fringe but are flood prone. Vulnerabilities include displaced citizens and disruption to travel and commerce. Route 77, Main Street in Snowflake crosses Cottonwood wash at the northern limit of the community, just south of the Silver Creek Confluence. This crossing is vulnerable to damage and closure due to flooding. Third Street crosses Cottonwood Wash as part of route 277 and is the main east thoroughfare in the community and is also vulnerable to damage or closure. Impacts to the community are closure and damage of State Route 277 and Snowflake Blvd. Excessive amounts of silt and debris will change the flow pattern of Silver Creek. Severe flooding and topping of the bridge on Silver Creek and Snowflake Blvd could result in damage and closure to this bridge crossing. There are two mobile home parks that are adjacent to Cottonwood Wash and are at risk of losses due to severe flooding. Copperstate Farms is a medical marijuana cultivation facility that lies west of Cottonwood Wash. Copperstate Farms, the Apache Railroad and several other businesses located in the industrial zone would be impacted due to severe flooding.

The FEMA Special Flood Hazard Areas for Taylor are shown on the same map as Snowflake due to their close proximity to one another. Silver Creek and Cottonwood Wash are the primary flood hazards in the community. Much of the floodplain is used for agriculture and with residential mixed in. The main commercial district abuts the floodplain and may be at risk of higher flows. State Route 77 parallels Silver Creek in Taylor and could be damaged in high flows. The area surrounding the intersection of Main Street (State Route 77) and Center Street has residential and commercial structures in and near the floodplain, these structures are vulnerable to flood and could result in economic distress and displaced residents. Additionally, Taylor Elementary school is at risk from flooding. This building is a valuable asset to the community for both education and potentially as a shelter. The Silver Creek Senior Center, Our Lady of the Snow Catholic church and multipurpose building, Washington Academy Charter School, Northland Pioneer College, motels, restaurants, Walmart and several other retail businesses lie along the western edge of the Silver Creek from Belly Button to Taylor. Severe flooding events would impact these areas by disrupting retail sales, the delivery of vital services for congregates and Meals on Wheels clients and disrupting the ability of emergency vehicles to reach residents in low-lying and flooded areas. Agriculture in the area would suffer losses with excessive flooding of seasonal crops such as alfalfa, sweet corn, and silage.

The Little Colorado River is the primary flood hazard for Winslow. The FEMA Special Flood Hazard Area does not account for the levee as it has been decertified by FEMA and shows a considerable part of the city at risk of flooding. Notable roads that may be vulnerable to flooding are I-40, the Frontage Road, East 3rd

Street, and N. Park Drive. I-40 abuts the river directly, making it susceptible to damage from erosion or inundation. Road closures would impact the community directly and could result in traffic diversions, heavy traffic, stranded motorists and long-term damage and repair to the road systems. Much of the north Eastern section of the city is vulnerable to flooding. These areas are municipal, residential, and commercial and include two hospitals, Winslow High School Walmart, a new car dealership, hotels and restaurants, and retail businesses. Winslow's sewage collection system is a gravity system with five lift stations that pump sewage from lower to higher elevations. All five pumps are within the Special Flood Hazard Area and could be compromised if a significant flood event occurred. Raw sewage poses a serious health hazard to the population. If flooding were to occur the impact to the community could be extensive, displace residents, and damage several critical facilities such as Little Colorado Medical Center and Indian Health Services. Loss of revenue due to disruption in retail sales and services would adversely affect the sales tax base and affect the financial health of the businesses and the city. Winslow is not equipped to provide temporary housing for displaced residents thus the economic structure of the community would be jeopardized. Interstate 40 being the main thoroughfare for interstate travel across the country from east to west would disrupt the timely delivery of goods and services and affect tourism which the City of Winslow relies upon for sales tax revenue. Tourism along Historic Route 66 would be impacted within the city limits.

Flood vulnerabilities within the county's unincorporated areas are found predominantly in the Northern two-thirds of the county. These areas are lower and are subject to flooding from the mountain areas to the North. The Little Colorado River is the largest flood hazard in the community. Relatively low population density reduces the overall vulnerability of flooding in the non-incorporated areas. However, the development is often clustered around potential flooding sources. Flooding along the Silver Creek will impact Taylor and Snowflake while flooding of the Little Colorado will impact both Holbrook and Winslow. These hazards will have county-wide impacts, including the major transportation corridors, commercial districts, emergency and critical life safety facilities and services and residential areas.

Climate Change Impacts

In addition to damage to properties, flooding can also cut off access to utilities, emergency services, transportation, and may impact the overall economic well-being of an area. Overall, Navajo County has a moderate risk of flooding over the next 30 years, which means flooding is likely to impact day-to-day life within the community. This is based on the level of risk the properties face rather than the proportion of properties with risk. While this risk is expected to remain constant over the next 30 years, this type of event has a 26% chance of occurring at least once over the life of a 30-year mortgage.

NFIP and Repetitive Loss Properties

Flooding is the most common natural hazard in the United States. For much of history, the Nation dealt with the flood hazards ineffectively, and the brunt of the resulting property losses was borne by the American taxpayer. Finally, in 1968, Congress passed the National Flood Insurance Act, which eventually led to the creation of the National Flood Insurance Program (NFIP). The NFIP provided relief to taxpayers by transferring the cost of flood losses to the properties with the highest risk of flooding via flood insurance premiums. The program also provided these owners with financial aid post-flood, encouraged development outside of flood hazard zones, and required new and improved buildings to be constructed to be more resilient to flooding.

The NFIP offers flood insurance to communities that comply with minimum standards for floodplain management. The NFIP's Community Rating System (CRS) recognizes those community efforts to comply

with the minimum standards. The CRS is a voluntary incentive program that recognizes and encourages community floodplain management activities that exceed the minimum NFIP requirements.

Communities participating in the CRS receive discounted flood insurance premium rates to reflect the reduced flood risk resulting from actions meeting the three goals of the CRS: reduce flood damage to insurable property; strengthen and support the insurance aspects of the NFIP; and encourage a comprehensive approach to floodplain management.

Navajo County and its respective jurisdictions are all actively participating in the NFIP, and the following also participate in the CRS Program: Navajo County (class 8), Holbrook (class 7), and Show Low (class 8). The jurisdictions in this Plan are committed to continuing their participation in the NFIP by integrating and complying with the program requirements and actively mitigating the flood hazard.

As of February 16, 2023, Navajo County has 68 policies in force with 1 total in losses and total payments of approximately $7,658.

Table 4.3.3-3: NFIP Statistics						
Jurisdiction	**Community ID**	**NFIP Entry Date**	**Current Effective Map Date**	**Number of Policies**	**Amount of Coverage**	**Floodplain Management Role**
Unincorporated Navajo County	040066	05/01/2008	03/02/2016	68	$14,757,300	Provides floodplain management for the district
City of Holbrook	040067	09/30/1983	08/17/2015	30	$1,599	Provides floodplain management for the city
Town of Pinetop-Lakeside	040127	09/22/1988	08/17/2015	12	$3,202,000	Provides floodplain administration for the town
City of Show Low	040069	02/03/1982	08/17/2015	29	$7,845,000	Provides floodplain administration for the town
Town of Snowflake	040070	03/01/1982	09/26/2008 Rev. 10/3/2011	15	$2.558M	Provides floodplain administration for the town
Town of Taylor	004071	02/03/1982	9/26/2008	27	$6,503,000	Provides floodplain administration for the town
City of Winslow	040072	05/01/2008	03/02/2016	138	$26,024,000	Provide Flood Pain Management for the city

The participating jurisdictions performed an overall assessment of their participation in the NFIP program by providing the following information:

1. Adoption of NFIP minimum floodplain management criteria via local regulation
2. Adoption of the latest effective Flood Insurance Rate Map, if applicable
3. Implementation and enforcement of local floodplain management regulations to regulate and permit development in SFHAs.
4. Appointment of a designee or agency to implement the addressed commitments and requirements of the NFIP.
5. Description of how participants implement the substantial improvement/substantial damage provisions of their floodplain management regulations after an event.

Responses were provided by all jurisdictions regardless of their participation status in the NFIP program. The table below summarizes the responses provided by each of the currently participating jurisdictions.

Table 4.3.3-4: NFIP Program Assessment

Jurisdiction		Responses to Requests for Information
Navajo County	1	Navajo County adopted the latest version of their Flood Damage Prevention Ordinance which was revised on 01-26-2016 and adopted the Drainage Policy adopted January 1969 with the latest revised version 04-27-2024.
	2	Navajo County as a community uses the most current maps on the FEMA website for unincorporated Navajo County, minus the tribal lands.
	3	Navajo County enforces NFIP regulations and the Arizona Department of Water Resources with the adopted and ratified Flood Damage Prevention Ordinance and the Drainage Policy. All development must be approved through the Flood Control District which enforces codes for development in SFHA. Permits cannot be issued without approval from the Flood Control District and permits within SFHA must have inspections and approval if an elevation certificate is required and subsequent building inspections cannot be approved until approval is given by the Flood Control District.
	4	The Flood Control District team implements all commitments and requirements of NFIP and ADWR
	5	Navajo County reviews all SFHA developments for Substantial Improvements and Substantial Damage (SI/SD) and holds each development to the 50% rule using the guidelines in NFIP for SI/SD. Appraisals are required by a contractor or a certified appraiser for a breakdown of costs to compare to the value of the building and asses if it meets or exceeds the 50% rule.
City of Holbrook	1	The City of Holbrook updated Chapter 8 of the State of Arizona Floodplain Management Code with Ordinance 24-01 on May 8, 2024.
	2	The City of Holbrook has updated maps that are reviewed regularly.

Table 4.3.3-4: NFIP Program Assessment		
	3	The City of Holbrook enforces NFIP regulations and Arizona Department of Water Resources through our Ordinances, Code Enforcement, and Building permit processes. Permits will not be issued unless criteria are met.
	4	The City of Holbrook has a team of code enforcement and building permit personnel that implements the review process.
	5	The City of Holbrook would engage with a Chief Engineer and follow the latest recommendations.
Town of Pinetop-Lakeside	1	The Town adopted Floodplain Regulations in Title 15, Chapter 15.12 of the Town Code. Earlier this year, the Town overhauled the entire code to capture the intent of the State Floodplain Regulations more accurately. The Town worked closely with the Office of the State Floodplain Manager to coordinate our Floodplain Management regulations per (Ord. 23-458 § 2 (Exh. B); Res. 23-1657 (Exh. A)).
	2	The Town's FIRM is current and effective. The Town has property with an active LOMR under review by FEMA for partial removal from the floodplain. The Town is on their third revision of the effective maps.
	3	Every new development is subject to the NFIP regulations. Each building permit is checked against the effective FIRM panels to ensure that all NFIP regulations are executed appropriately.
	4	Community Development Director, is a licensed Professional Civil Engineer and Certified Floodplain Manager.
	5	The running totals of all permits for areas impacted by flooding are tabulated. When a property surpasses the 50% valuation total for damages, it would be required to implement all NFIP regulations.
City of Show Low	1	City of Show Low Code Chapter 13 contains regulations for Floodplain management. The Code is based on the AZ state model ordinance. Some minor revisions to the Code may take place once or twice per year. Major revisions happen less frequently – about every 5 years. The Code was written to be in compliance with the minimum NFIP floodplain management criteria.
	2	Currently using the 9/26/08 & 8/17/15 Flood Insurance Rate Maps. Some of the maps were updated in 2015. The City of Show Low works with FEMA every 5 years when we update our Community Rating System documentation. The City of Show Low works with ADWR to review maps and codes about every 5 years.
	3	City of Show Low Code Chapter 13 (https://showlow.municipal.codes/Code/13) contains regulations for Floodplain management. The City of Show Low is enrolled in the NFIP Community Rating System. Show Low currently holds a rating of 9. The City of Show Low includes information about FEMA on their website, to help the public remain informed of the System and regulations. The City of Show Low regulates development with SFHAs by reviewing the plans for compliance with the applicable codes and requiring compliance with the codes.
	4	The City's engineering department administers floodplain matters. There are currently two Certified Floodplain Managers employed at the City of Show Low. The review of floodplain

Table 4.3.3-4: NFIP Program Assessment		
		matters occurs during the building permit application process. This includes reviewing site plans for compliance with the codes.
	5	The City's software tracks the status of permits and inspections of substantial improvements. The City of Show Low does not track other actions pertaining to this question.
Town of Snowflake	1	In A.R.S. section 48-3610, the Arizona State Legislature enabled the town of Snowflake, Arizona, to assume the powers and duties for floodplain management and adopt regulations in conformance with A.R.S. section 48-3609 designed to promote the public health, safety, and general welfare of its citizenry. This was incorporated with the adoption of Ordinance 10-329 by the Town Council in 2010. With the adoption of the ordinance, the language was added to the Town Code and is enforced by Town staff.
	2	Navajo County as a community uses the most current maps on the FEMA website for unincorporated Navajo County, minus the tribal lands.
	3	Navajo County enforces NFIP regulations and the Arizona Department of Water Resources with the adopted and ratified Flood Damage Prevention Ordinance and the Drainage Policy. All development must be approved through the Flood Control District which enforces codes for development in SFHA. Permits cannot be issued without approval from the Flood Control District and permits within SFHA must have inspections and approval if an elevation certificate is required and subsequent building inspections cannot be approved until approval is given by the Flood Control District.
	4	The Flood Control District team implements all commitments and requirements of NFIP and ADWR
	5	Navajo County reviews all SFHA developments for Substantial Improvements and Substantial Damage (SI/SD) and holds each development to the 50% rule using the guidelines in NFIP for SI/SD. Appraisals are required by a contractor or a certified appraiser for a breakdown of costs to compare to the value of the building and asses if it meets or exceeds the 50% rule.
Town of Taylor	1	The Town adopted Floodplain Regulations in Title 15, Chapter 15.12 of the Town Code. Earlier this year, the Town overhauled the entire code to capture the intent of the State Floodplain Regulations more accurately. The Town worked closely with the Office of the State Floodplain Manager to coordinate our Floodplain Management regulations per (Ord. 23-458 § 2 (Exh. B); Res. 23-1657 (Exh. A)).
	2	The Town's FIRM is current and effective. The Town has property with an active LOMR under review by FEMA for partial removal from the floodplain. The Town is on their third revision of the effective maps.
	3	Every new development is subject to the NFIP regulations. Each building permit is checked against the effective FIRM panels to ensure that all NFIP regulations are executed appropriately.
	4	Community Development Director, is a licensed Professional Civil Engineer and Certified Floodplain Manager.

Table 4.3.3-4: NFIP Program Assessment		
	5	The running totals of all permits for areas impacted by flooding are tabulated. When a property surpasses the 50% valuation total for damages, it would be required to implement all NFIP regulations.
City of Winslow	1	The City of Winslow has adopted Chapter 15.16 "Flood Damage Prevention" by Ordinance 1211part, 2013 https://www.codepublishing.com/AZ/Winslow/ . Ordinance language was submitted to and approved by ADWR for compliance with the NFIP requirements.
	2	The City of Winslow is currently using the FIRM maps revised March 2, 2016. These maps were revised from the original FEMA maps by the reevaluation of the FEMA mapping by the city contract engineers. These revisions were presented and approved by FEMA resulting in a reduction of the SFHA. The city is currently working with representatives from Navajo County, the State of Arizona, FEMA and the Core of Engineers to evaluate what is needed to recertify the Little Colorado Levee located to the east of Winslow.
	3	The requirements for developments in the SFHA are addressed with the applicants in both the pre-development and Development Review Board meetings. Both the city engineers and the Community Development Department address and enforce the regulations at the above meetings and again during the plan review and construction process.
	4	Both the City Engineer and Community Development/ Building Department review for compliance with the City Flood Plain Ordinance. The process for implementing NFIP guidelines is as follows. For developments the NFIP requirements are discussed at a pre-Development meeting. The applicant is informed, at this meeting, that the property is in a SFHA and what the requirements will be for construction in a SFHA. Later in the application process a Development Review Board is held. The project is again reviewed for compliance with the city Flood Plain Ordinance for construction in a SFHA. Then again Durning the Permitting process the plans are checked for compliance with the Flood Plain Ordinance. For the construction of new single family and duplex units or additions or remodels compliance with the flood plain ordinance is checked during permitting. Plan review comments are given to the applicant notifying them that the property is in SFHA. For new construction a FEMA Elevation Certificate form is provided to the applicant and the requirements of the finish floor height is discussed. For additions and remodels the cost of construction is checked against the Market Value to determine if there is a Substantial Improvement. The applicant is then notified of what will be required to bring compliance with the Flood Plain Ordinance.
	5	The County's assessed value or a current appraisal would be used to determine the Market Value of the building. This value would be compared to the contractors itemized construction cost. If the Contractors cost is greater than 50% of the Market Value substantial improvement / substantial damage would exist and compliance with the applicable flood plain ordinance would be required.

Repetitive Loss (RL) properties are those NFIP-insured properties that since 1978 have experienced multiple flood losses. FEMA tracks RL property statistics, and in particular to identify Severe RL (SRL) properties. RL properties demonstrate a track record of repeated flooding for a certain location and are one

element of the vulnerability analysis. RL properties are also important to the NFIP, since structures that flood frequently put a strain on the National Flood Insurance Fund. FEMA records (provided by DEMA) indicate that there is one identified RL property in unincorporated Navajo County, with a total of over $7,658 in associated building and contents value payments.

Table 4.3.3-5: Repetitive Loss Property Statistics

Jurisdiction	No. of Properties	Properties Mitigated	Total Payments	Property Type
Navajo County	1	0	$7,658	Residential (Single Family)
Source: FEMA Region IX, (data as of February 2023)				

Navajo County Flood Warning System

The Navajo County Flood Warning System is made up of 29 sensors. These include rain and stream gages. Navajo County in cooperation with JE Fuller Engineering, has built a web application that displays the locations of the sensors and reports past and current conditions and total rainfall accumulation. The Navajo County Flood Warning System allows County personnel to monitor in real-time the risk of a flooding event. The sensors are placed upstream of most of the hazards the county is aware of. In the event of excessive rainfall, the county can mobilize resources and place them at critical road crossings, assist with sandbags, and clear debris from culverts.

- The Navajo County Flood Warning System allows County personnel to monitor in real-time the risk of a flooding event.
- The sensors are placed upstream of most of the hazards the county is aware of.

In the event of excessive rainfall, the county can mobilize resources and place them at critical road crossings, assist with sandbags, and clear debris from culverts.

Development Trends

Most flood prone properties in Navajo County pre-date the planning jurisdictions' entry into the NFIP and were constructed prior to current floodplain management practices. The development of new properties or substantial re-development of existing structures is now subject to regulatory review procedures implemented by each jurisdiction. New development, adequate planning and regulatory tools are in place to regulate future development. For many areas within the county, challenges for the management of new growth include the need for master drainage planning and additional floodplain delineations to identify and map the flood hazards within the growth areas where no mapping currently exists.

Sources

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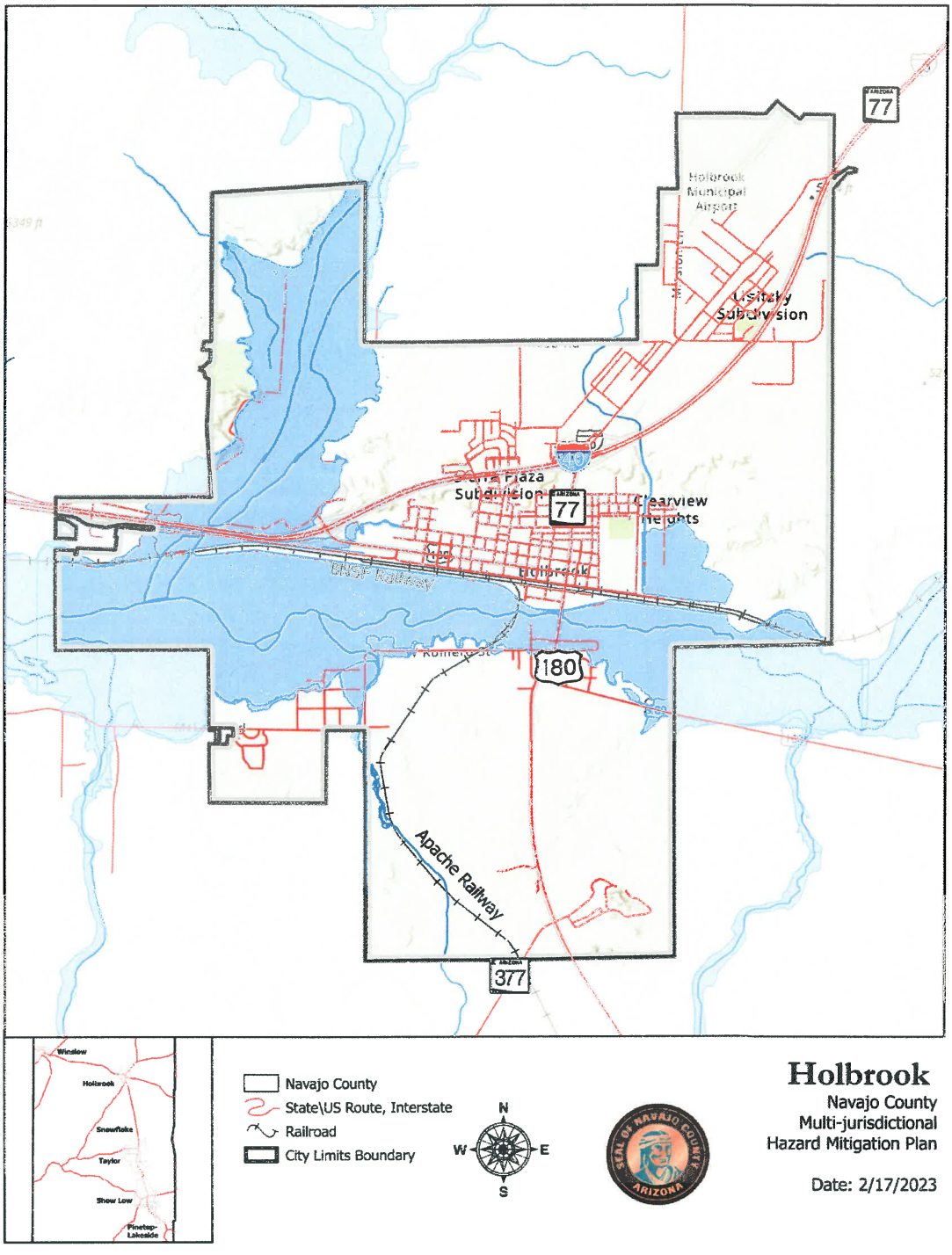
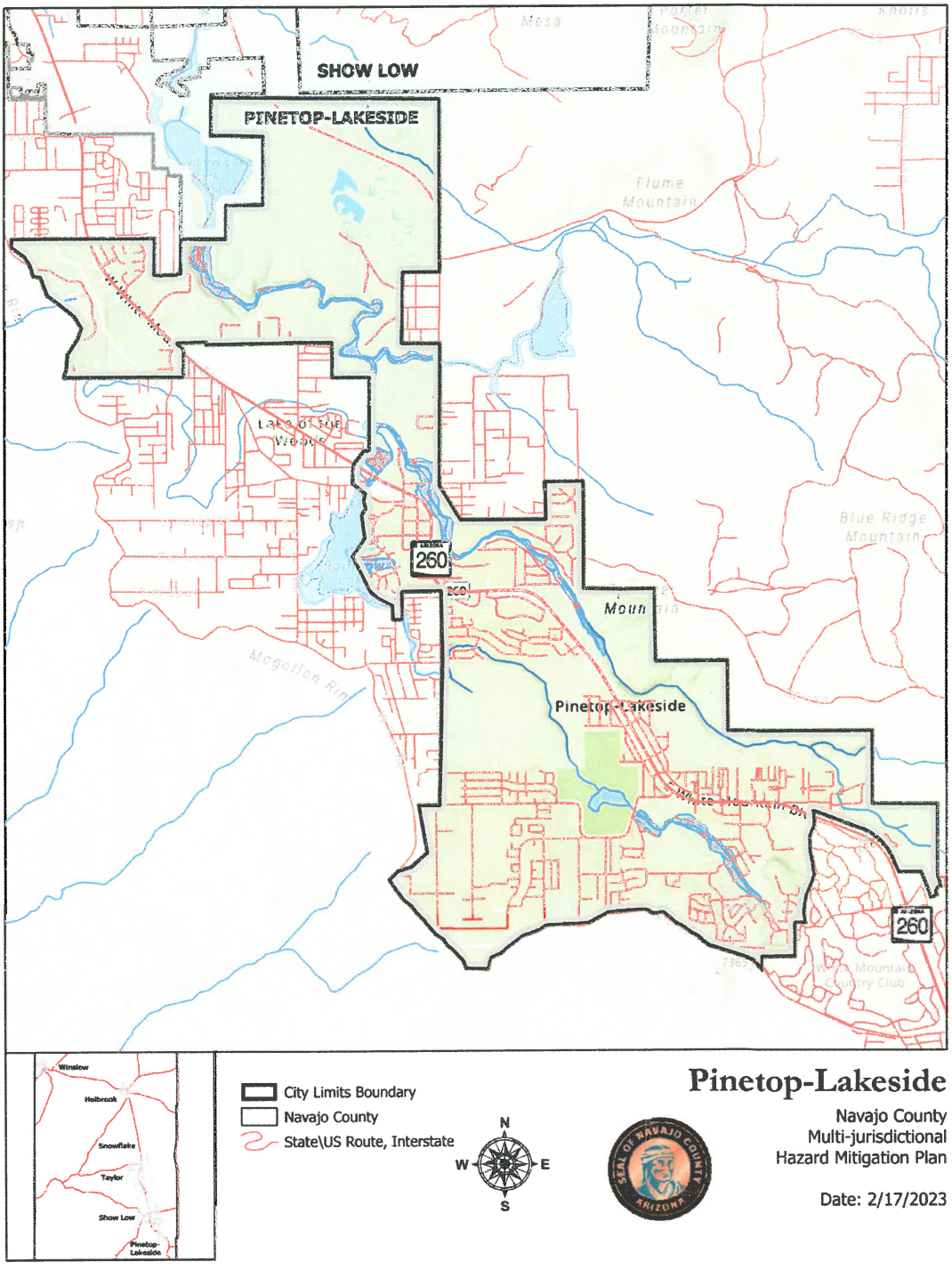
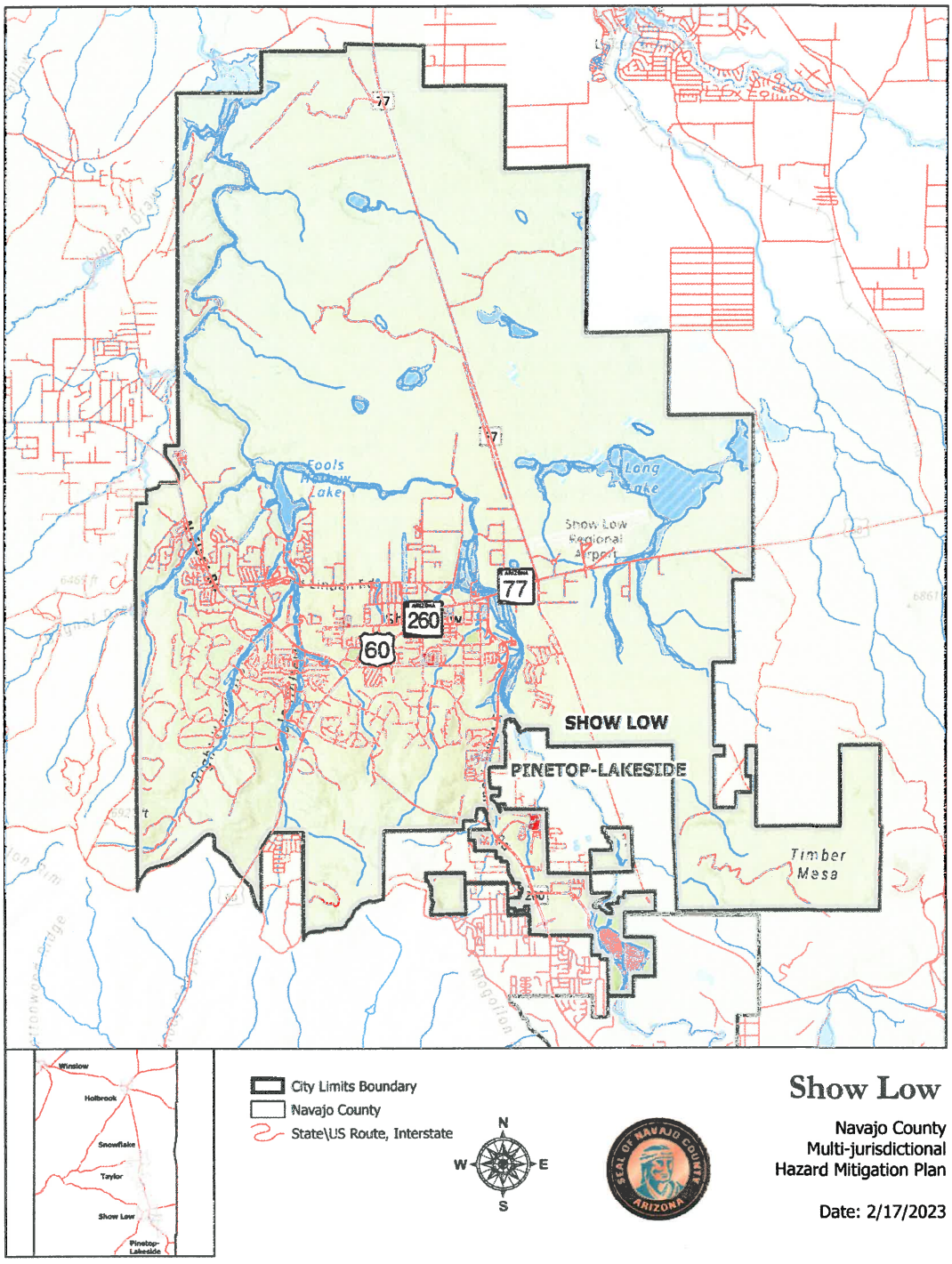


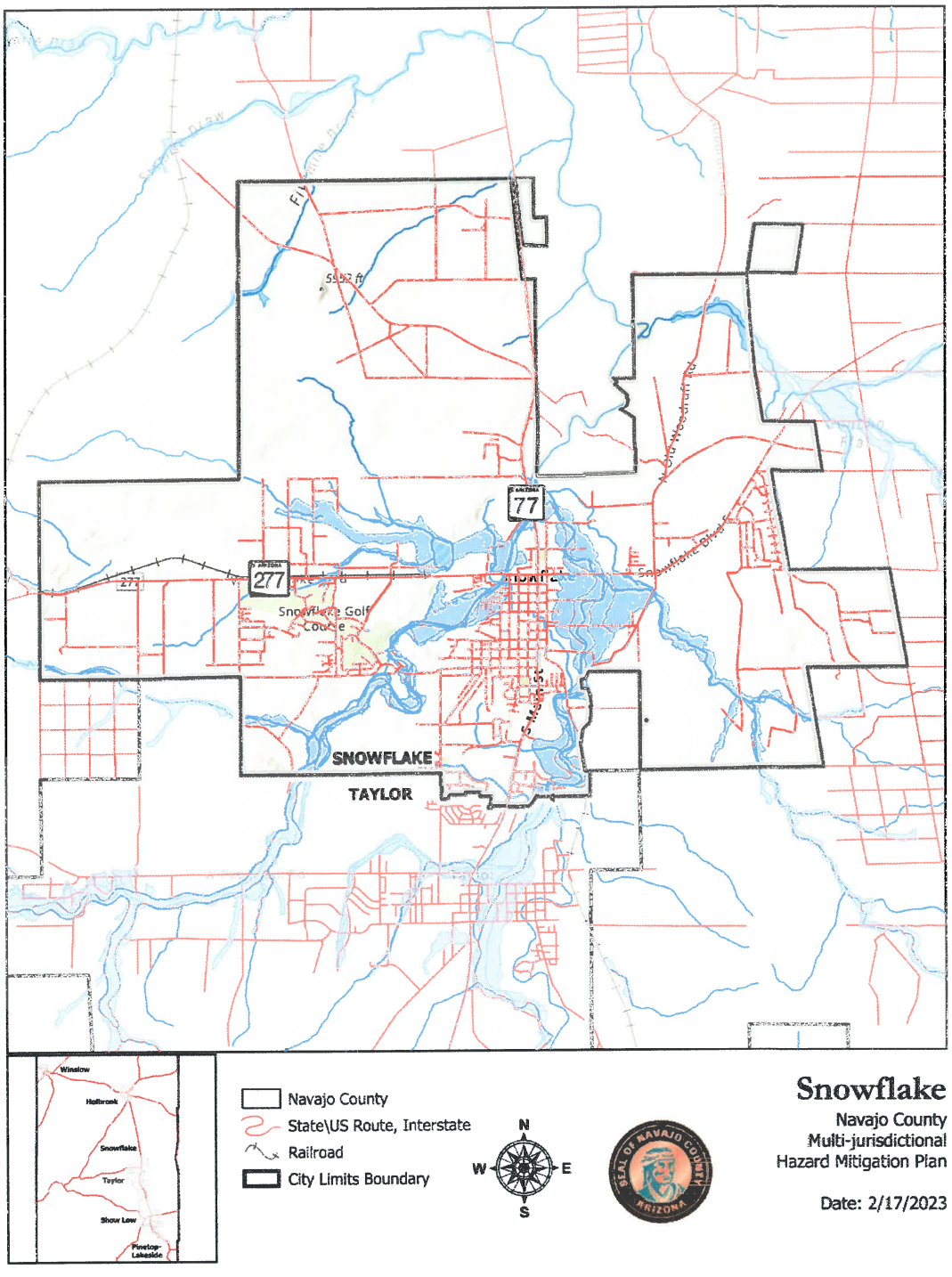
Map 4.3.3-1: Flood Hazard Areas, Holbrook



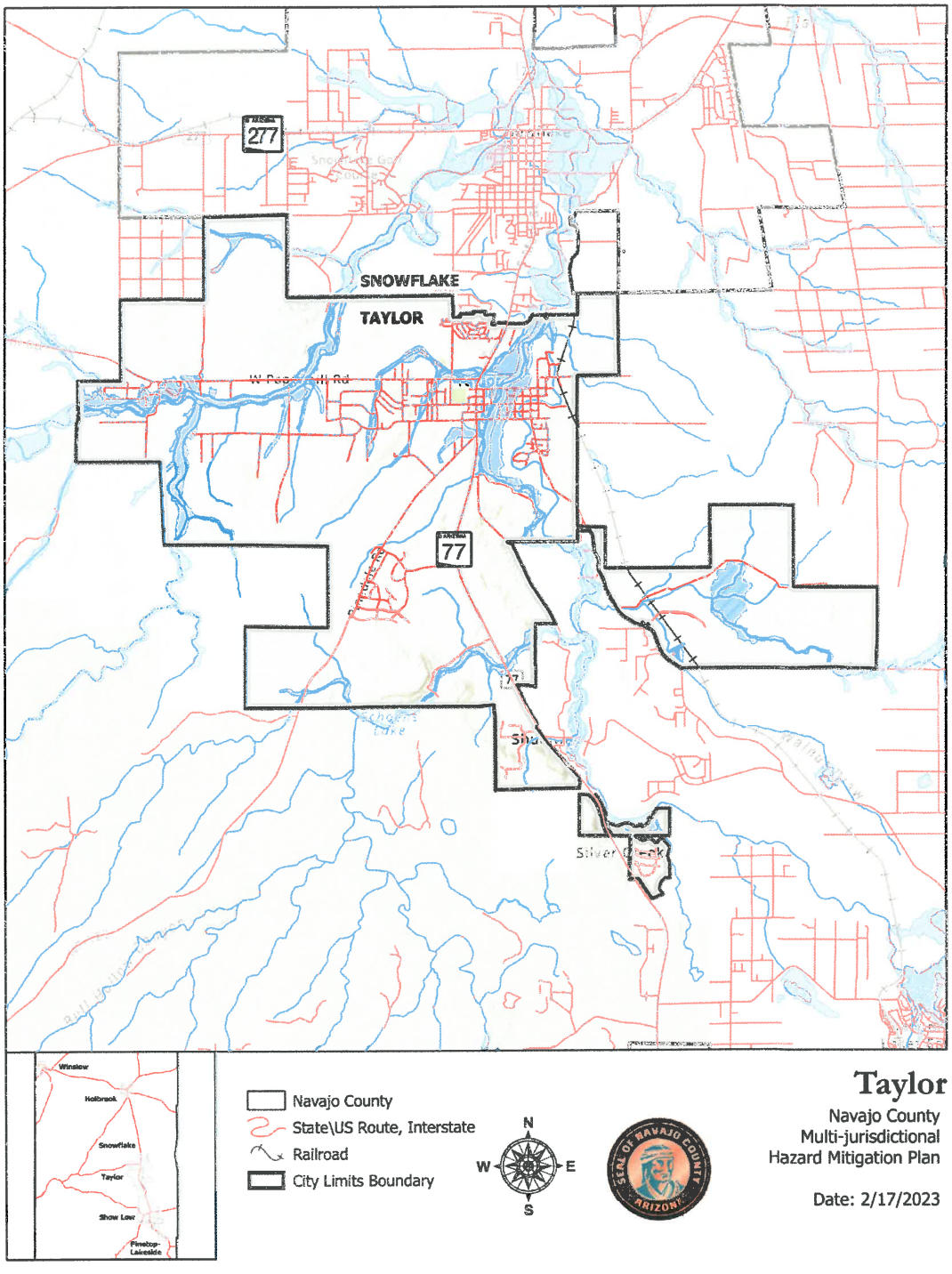
Map 4.3.3-2: Flood Hazard Areas, Pinetop-Lakeside



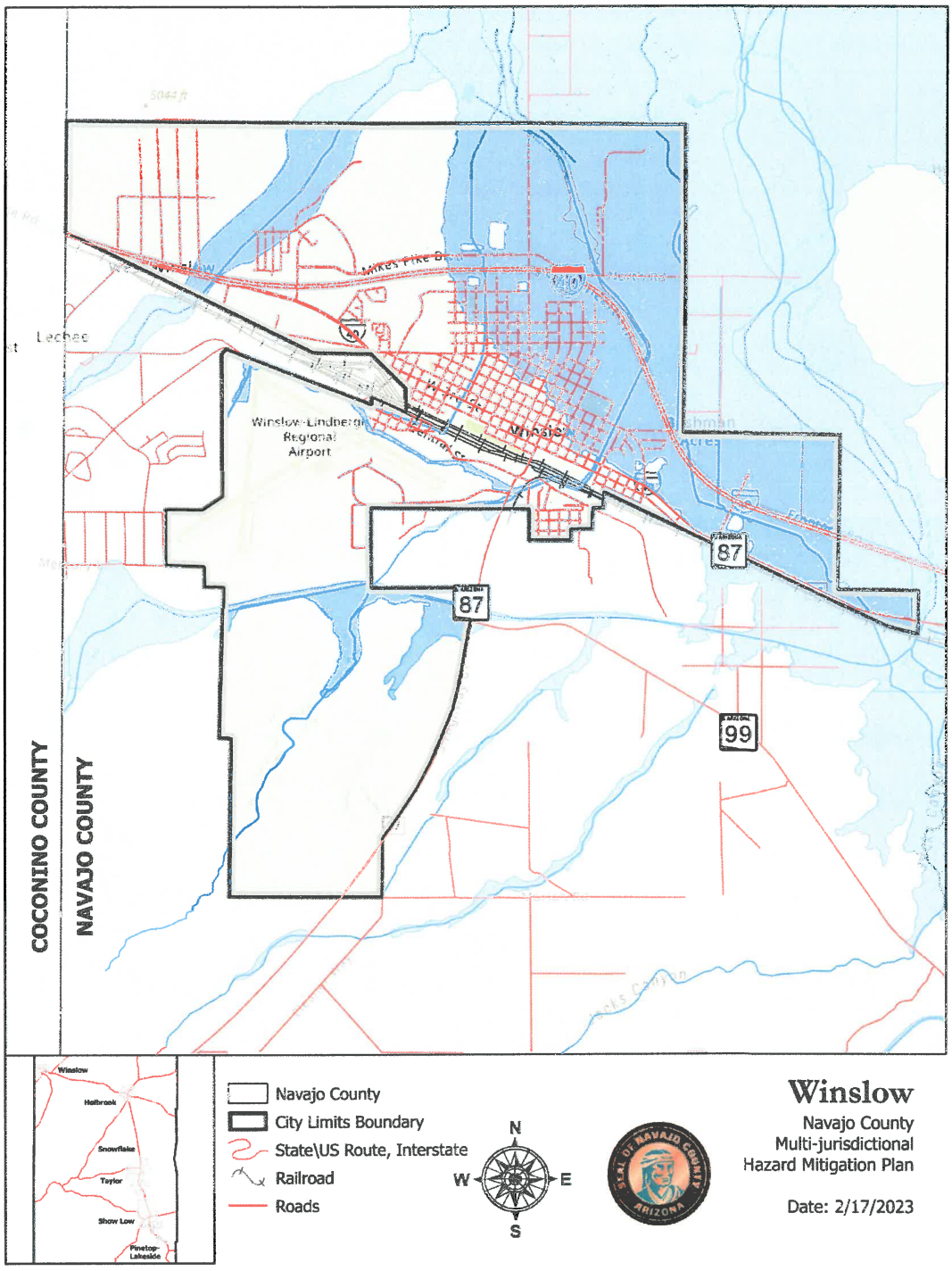
Map 4.3.3-3: Flood Hazard Areas, Show Low



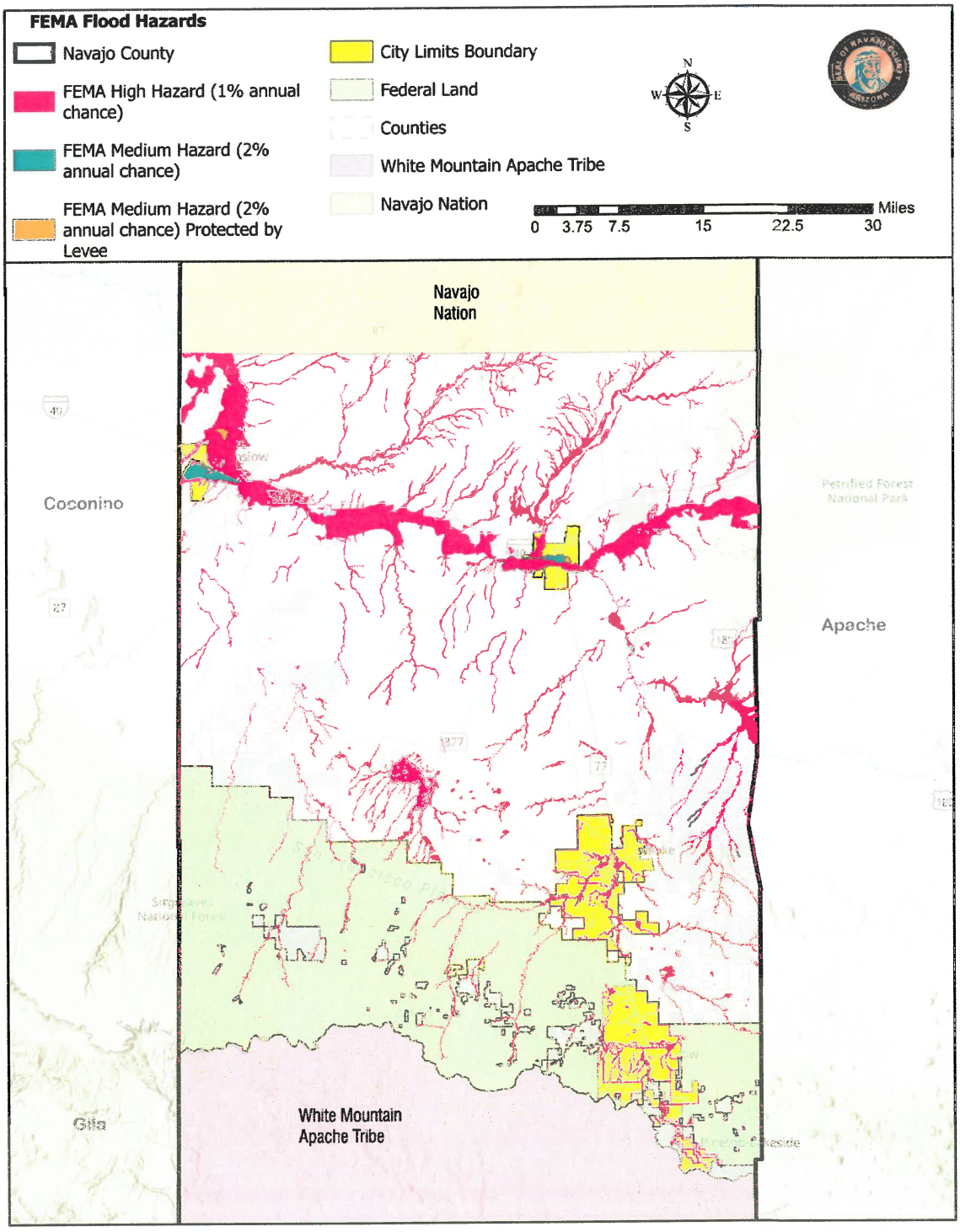
Map 4.3.3-4: Flood Hazard Areas, Snowflake



Map 4.3.3-5: Flood Hazard Areas, Taylor



Map 4.3.3-6: Flood Hazard Areas, Winslow



Map 4.3.3-7: Flood Hazard Areas, Navajo County

4.3.4 Hazardous Materials Incidents

Description

The threat of exposure to hazardous materials (HazMat) in our modern society is prevalent nationwide and throughout Navajo County. HazMat incidents can occur from either point source spills or from transportation related accidents. In Navajo County, the primary areas of risk associated with hazardous materials incidents are located near or along Tier II facilities, major roads and rail lines, and pipelines that transport hazardous substances. These substances may be highly toxic, reactive, corrosive, flammable, explosive, radioactive or infectious, with potential to contaminate air, soil, and water resources and pose a serious risk to life, health, environment and property. HazMat incidents can result in the evacuation of a few people, a specific facility, or an entire neighborhood(s) depending on the size and magnitude of the release and environmental conditions.

The Arizona State Emergency Response Commission (AZSERC), established by Arizona Law (Arizona Revised Statutes-Title 26, Chapter 2, Article 3) is tasked with the implementation of the Emergency Planning and Community Right to Know Act (EPCRA) in Arizona. Local Emergency Planning Committees (LEPC) are appointed by AZSERC, as required by EPCRA, first to design, then to regularly review and update a comprehensive emergency plan for an emergency planning district. There are 15 LEPC's in Arizona - one in each county.

State statutes and Sections 311 and 312 of EPCRA set forth hazardous chemical storage reporting requirements and thresholds for facilities possessing hazardous materials. The legislation requires that facilities storing or producing hazardous materials in quantities that exceed a defined Threshold Planning Quantity (TPQ), submit an annual chemical inventory report (Tier II Hazardous Chemical Inventory Form) to AZSERC, the appropriate LEPC, and local fire department, by March 1 of each year. Facilities holding an Extremely Hazardous Substance (EHS) at quantities exceeding the Threshold Planning Quantities (TPQ) must provide the notifications as well as a representative to participate in the county emergency planning process.

For the purposes of this Plan, the Planning Team chose to focus only on those HazMat facilities and chemicals that are classified by the Environmental Protection Agency (EPA) as extremely hazardous substances (EHS) Typical EHS materials transported and stored routinely in the county include chlorine gas, sulfuric acid, and hydrogen fluoride.

History

There have been several non-declared HazMat incidents reported in Navajo County resulting in minimal injuries and damage. The National Response Center (NRC) received several dozens of calls regarding HazMat spills in Navajo County for fixed sites, mobile, rail lines, pipelines and aircraft. Recent incidents have been minor and primarily due to fuel or gasoline spills as a result of vehicle accidents.

Probability/Extent

There are no known probability statistics regarding HazMat incidents for Navajo County. The I-40 Commodity Flow Study (AMEC, 2004) identifies types and amounts of HazMat materials that are transported along the I-40 corridor by road and rail. No statistics were developed with this study, however.

Typically, the magnitude of impact from a Hazmat incident can be projected by using models such as ALOHA and CAMEO with assumed incident characteristics such as chemical type and source amount, spill location and amount, release time and rate, surface type, temperature, humidity, wind direction and speed, chemical stability factors. Those modeling efforts, however, are beyond the scope of this Plan.

Impacts

The table below lists the impacts for hazardous materials incidents for each of the jurisdictions listed in the plan.

Table 4.3.4-1: Impacts from Hazardous Materials Incidents	
Unincorporated Navajo County	Loss of Infrastructure Potential loss of life Damage to roads, right of ways
Town of Holbrook	Loss of Infrastructure Potential loss of life Damage to roads, right of ways
Town of Pinetop-Lakeside	Potential loss of life Damage to roads, right of ways
City of Show Low	Loss of Infrastructure Potential loss of life Damage to roads, right of ways
Town of Snowflake	Loss of Infrastructure Potential loss of life Damage to roads, right of ways
Town of Taylor	Loss of Infrastructure Potential loss of life Damage to roads, right of ways
Town of Winslow	Loss of Infrastructure Potential loss of life Damage to roads, right of ways

Vulnerability

Table 4.3.4-2: CPRI Rating for HazMat					
Jurisdiction	Probability	Magnitude/ Severity	Warning Time	Duration	CPRI Score
Holbrook	Likely	Catastrophic	< 6 hours	< 24 hours	3.55
Pinetop-Lakeside	Possibly	Critical	< 6 hours	< 24 hours	2.70
Show Low	Possibly	Critical	< 6 hours	< 24 hours	2.60
Snowflake	Possibly	Critical	< 6 hours	< 1 week	2.70
Taylor	Possibly	Limited	< 6 hours	< 24 hours	2.30
Winslow	Likely	Catastrophic	6 - 12 hours	> 1 week	3.40
Unincorporated Navajo County	Likely	Critical	< 6 hours	< 24 hours	3.05
**No change in CPRI for the 2024 Plan*					

The 2011 plan calculated loss estimation utilizing HAZUS. In summary, $2.2 billion and $38 million in county-wide assets are exposed for High and Medium HazMat hazards, for all the participating jurisdictions in Navajo County. An additional $5.3 billion and $888 million in High and Medium exposure to HAZUS defined residential, commercial, and industrial facilities is estimated for all participating Navajo County jurisdictions. Regarding human vulnerability, 64% of the total population is potentially exposed to a High hazard HazMat event. A total population of 10,228 people, or 10.5% of the total population, is potentially exposed to a medium hazard HazMat event. It is recognized that EHS incidents typically occur in a single localized area and do not impact an entire county or community at one time. These numbers are intended to represent the collective community or county-wide exposure. Actual losses for an individual incident are likely to be only a fraction of the numbers presented here. Because of the nature of this hazard, structural damage is highly unlikely and decontamination costs related to replacements cost would only be a small fraction.

Residential, commercial and municipal properties are located in close proximity to the BNSF rail lines. A

HazMat incident involving rail car tankers could affect the residents by putting them at risk for potential health hazards or evacuation, close businesses that are in close proximity to the incident, hamper the ability of the County and municipalities to conduct business at the normal service locations.

Development Trends

As the vulnerability analysis indicates, much of Navajo County is exposed to some level of EHS threat and this is primarily due to the fact that populations are generally located along the same major road and rail corridors that transport HAZMAT. That exposure will only worsen as development increases. It may be advantageous to pursue designating certain roadways as EHS corridors to limit the exposure and establish buffer zones along corridors known to be frequent EHS transport routes. Development of high- density population land uses such as schools, nursing homes, apartment complexes, etc., should be discouraged within these zones.

EHS facilities that have potential for critical or catastrophic HAZMAT releases should be located on flat topography and take advantage of positive airflow and protect against negative climate and microclimate conditions; utilize shading from excessive sun in warm climate and/or other best management practices.

Sources

AMEC Earth & Environmental, Inc., 2004, Hazardous Material Commodity Flow Study, I-40 Corridor, Arterial Highways and Railway, Mohave, Coconino, Navajo and Apache Counties, Arizona.

AZ Dept of Emergency and Military Affairs (DEMA) 2013, State of Arizona Hazard Mitigation Plan.

4.3.5 Levee Failure

Description

FEMA defines levees as man-made structures (usually earthen embankments) that are designed and constructed in accordance with sound engineering practices to contain, control or divert the flow of water so as to provide protection from temporary flooding (FEMA, 2009). National flood policy now recognizes the term "levee" to mean only those structures which were designed and constructed according to sound engineering practices, have up-to-date inspection records and current maintenance plans, and have been certified as to their technical soundness by a professional engineer or certain federal agencies. FEMA has classified all other structures that impound, divert, and/or otherwise impede the flow of runoff as "non-levee embankments". In Navajo County, these "non-levee embankments" might be comprised of features such as non-certified levees, roadway and railway embankments, canals, irrigation ditches and drains, and agricultural dikes. Currently there is no State or Federal Levee Safety Program and no official state or federal levee inventory. It is anticipated that FEMA will institute a National Levee Safety Program in the near future.

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

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

History

Levees (certified or not) have been used in Navajo County for many years to protect communities and agricultural assets from flooding, as well as to facilitate the delivery and removal of irrigation water. These levees range from simple earthen embankments pushed up by small equipment to large, engineered embankments lining one or both sides of a watercourse. The structural integrity of levees with regard to flood protection and policy has been discussed at a national level since the early 1980s but was elevated to a high priority after the collapse and breach of New Orleans' levees after Hurricane Katrina in 2005. In 2009, a draft report was issued to Congress by the National Committee on Levee Safety (NCLS, 2009) summarized recommendations and a strategic plan for implementation of a National Levee Safety Program.

Millet Swale Breach 2021. Source: Navajo County staff

The following is the documented flooding events in which a breached dike or levee was involved:

- July 25, 2021 – Millet Swale dam breached during a monsoon rain event. The breach appeared to start as a leak along a defect

through the embankment and enlarged in size until a full-depth breach developed. This dam was previously classified as high hazard potential and unsafe by the Arizona Department of Water Resources. The dam breached under a relatively low reservoir level, and according to Navajo County officials, downstream road closures and evacuations were already in place because of the flooding from the monsoon storm and unrelated to the release from the reservoir. As a result, no fatalities or injuries were reported, and property damage from the dam breach was not significant.

Probability/Extent

There are varied probability or magnitude criteria regarding levee failure due to variability in levee design, ownership and maintenance. For flood protection credit under the NFIP, FEMA has established certain deterministic design criteria that are based on the 1% (100-year) storm event and corresponding minimum freeboard requirements. Federally constructed levees are usually designed for larger, more infrequent events such as the 0.04% and 0.02% probability (250 to 500 year) events plus freeboard. Recent recertification procedures proposed by U.S. Army Corps of Engineers, require that a certifiable levee have at least a 90% assurance of providing protection from overtopping by the 1% chance exceedance flood for all reaches of a levee system with a design freeboard height of at least three feet. For levees with more than three feet of design freeboard, the assurance is increased to 95%, and no certification will be made for levees with less than two feet of freeboard unless approved via a waiver process. This assurance is only for containment (overtopping failure) and does not include probability of failure by other modes such as piping (USACE, 2007).

As of the writing of this Plan, the only FEMA-certified levees within Navajo County are the Holbrook Levee along the Little Colorado River in Holbrook. The Ruby Wash Diversion Levee in Winslow has been decertified by the USACE. As of the writing of this Plan, planning and engineering efforts are underway to restore the levee, with construction planned to begin within the next 3-5 years. The landside of the levee is delineated as a Shaded Zone X (500-year) and was chosen by the Planning Team to represent the high-hazard levee failure limits. The currently identified high-hazard levee failure zones in Holbrook and Winslow are shown on the map at the end of this profile.

Table 4.3.5-1: CPRI Rating for Levee Failure

Jurisdiction	Probability	Magnitude/ Severity	Warning Time	Duration	CPRI Score
Holbrook	Possibly	Catastrophic	6 - 12 hours	> 1 week	2.95
Pinetop-Lakeside	Unlikely	Negligible	< 6 hours	< 6 hours	1.45
Show Low	Unlikely	Negligible	< 6 hours	< 6 hours	1.45
Snowflake	Unlikely	Critical	6 - 12 hours	< 1 week	2.10
Taylor	Possibly	Limited	< 6 hours	< 1 week	2.40
Winslow	Highly Likely	Catastrophic	6 - 12 hours	> 1 week	3.85
Unincorporated Navajo	Likely	Critical	12 - 24 hours	> 1 week	2.95

Impacts

The table below lists the impacts for Levee Failure incidents for each of the jurisdictions listed in the plan.

Table 4.3.5-2: Impacts from Hazardous Materials Incidents	
Unincorporated Navajo County	House damage/destruction Erosion Loss of Infrastructure Potential loss of life Damage to roadways, drainages
Town of Holbrook	House damage/destruction Erosion Loss of Infrastructure Potential loss of life Damage to roadways, drainages
Town of Pinetop-Lakeside	House damage/destruction Erosion Loss of Infrastructure Potential loss of life Damage to roadways, drainages
City of Show Low	House damage/destruction Erosion Loss of Infrastructure Potential loss of life Damage to roadways, drainages
Town of Snowflake	House damage/destruction Erosion Loss of Infrastructure Potential loss of life Damage to roadways, drainages
Town of Taylor	House damage/destruction Erosion Loss of Infrastructure Potential loss of life Damage to roadways, drainages
Town of Winslow	House damage/destruction Erosion Loss of Infrastructure Potential loss of life Damage to roadways, drainages

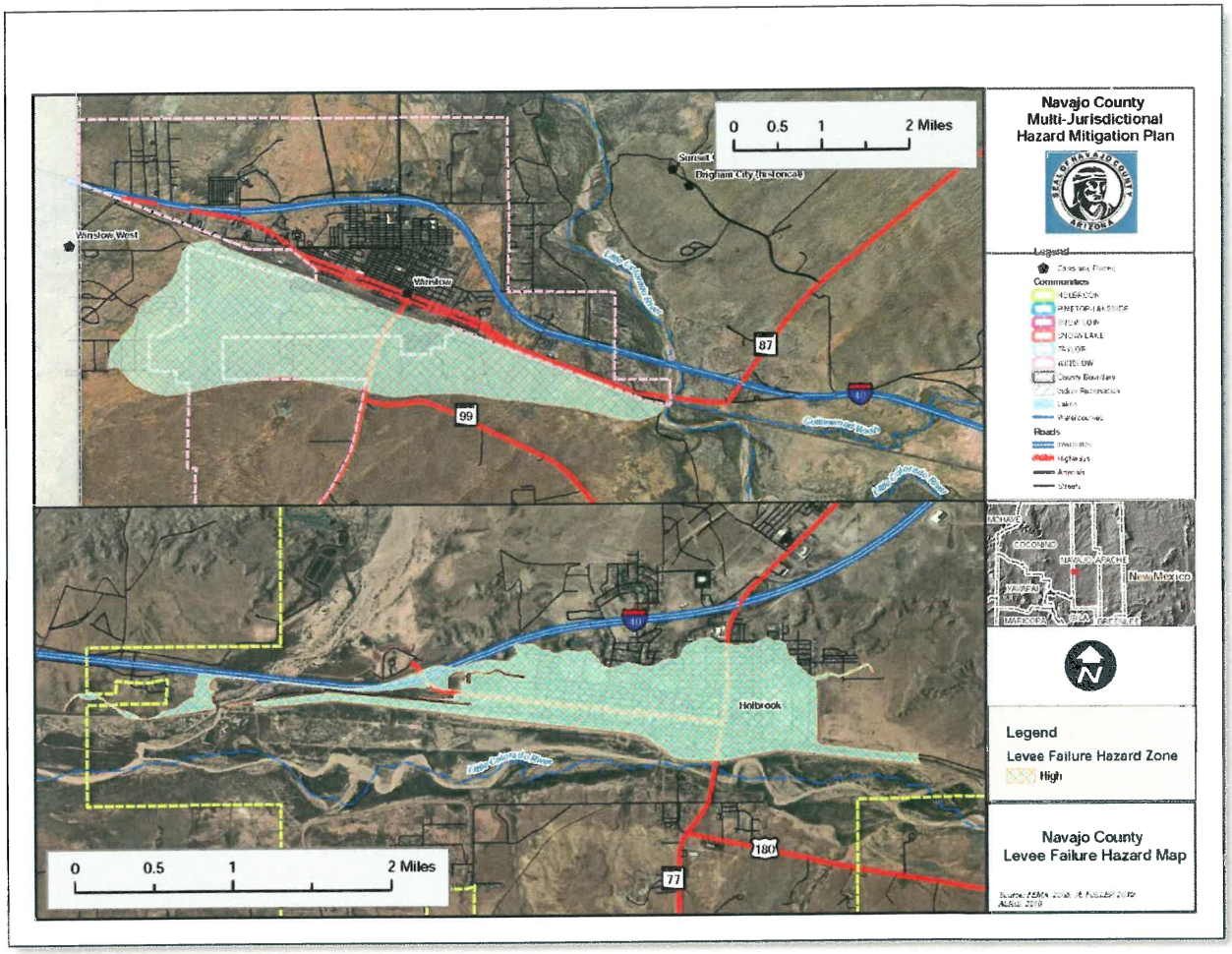
Vulnerability

There are no commonly accepted methods for estimating potential levee-related losses. Many variables including storm size and duration, as well as size, speed, and timing at which a levee breach forms, all contribute to the potential for human and economic losses. Accordingly, no estimates of loss are made in this Plan. It is unlikely that a storm event would occur that would fail all of the levees at the same time. Vulnerabilities for each community protected by levees within Navajo County include damage and destruction of commercial and residential areas. Holbrook and Winslow have waste treatment operations that are located in the inundation zones which would pose serious public health hazards if damaged. Damage and destruction of roads and bridges would affect navigation and traffic delays and detours. Tourism would be affected and would impact on the local economy of both Holbrook and Winslow. Values at risk are hospitals, schools, municipal infrastructure, utilities, roads and bridges, historic sites and buildings. Displacement of residents would disrupt business operations as many of the local commercial businesses are operated by local residents.

Development Trend Analysis

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

New development in the areas protected by the Holbrook and Winslow levees will be limited; however, redevelopment of the area is possible. The best mitigation for this area is for structure owners to carry flood insurance and for the Holbrook and Winslow to perform routine maintenance and inspection of the existing levee facilities. Critical infrastructure facilities should not be dependent on Levees for protection. New facilities should be built away from the flood hazard, and existing facilities retrofitted with elevation or flood proofing.



Map 4.3.5-1: Levee Failure Hazard for Navajo County (Winslow/Holbrook)

Sources

AZ Dept of Emergency and Military Affairs 2013, State of AZ Multi-Hazard Mitigation Plan
FEMA, 2001, Understanding Your Risks; Identifying Hazards and Estimating Losses, FEMA Doc. 386-2. FEMA, 2009, Web page at URL: http://www.fema.gov/plan/prevent/fhm/lv_intro.shtm#3
National Committee on Levee Safety, 2009, Draft Recommendation for a National Levee Safety Program.
NWS – Tucson FO, web page at URL: http://www.wrh.noaa.gov/twc/hydro/floodhis.php
USACE, 2007, Certification of Levee Systems for the National Flood Insurance Program (NFIP) – DRAFT, ETL 1110-2-570.

4.3.6 Severe Wind

Description

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

Three types of damaging wind related features typically accompany a thunderstorm: 1) downbursts, 2) straight line winds, and infrequently, 3) tornadoes.

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

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

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

History

On February 22, 2023, a severe winter storm with 60+ mph winds caused widespread, hours long power outages in the City of Show Low. The power outages affected several sewer lift stations. Because these lift stations do not have a redundant power source, crews manually pumped the wet wells to prevent overflows. The lift station came very close to overflowing several times during the storm. The result of an overflow could have created a health hazard.

Probability/Extent

The potential for damage from high-speed wind can be difficult to communicate ahead of a major storm, and so rating systems were developed by experts so that the public would be able to better understand how to harden against, prepare for, and respond to hurricanes and tornadoes.

Navajo County has a minimal wind factor, which means there is a very low likelihood that hurricane, tornado or severe storm winds will impact this area.

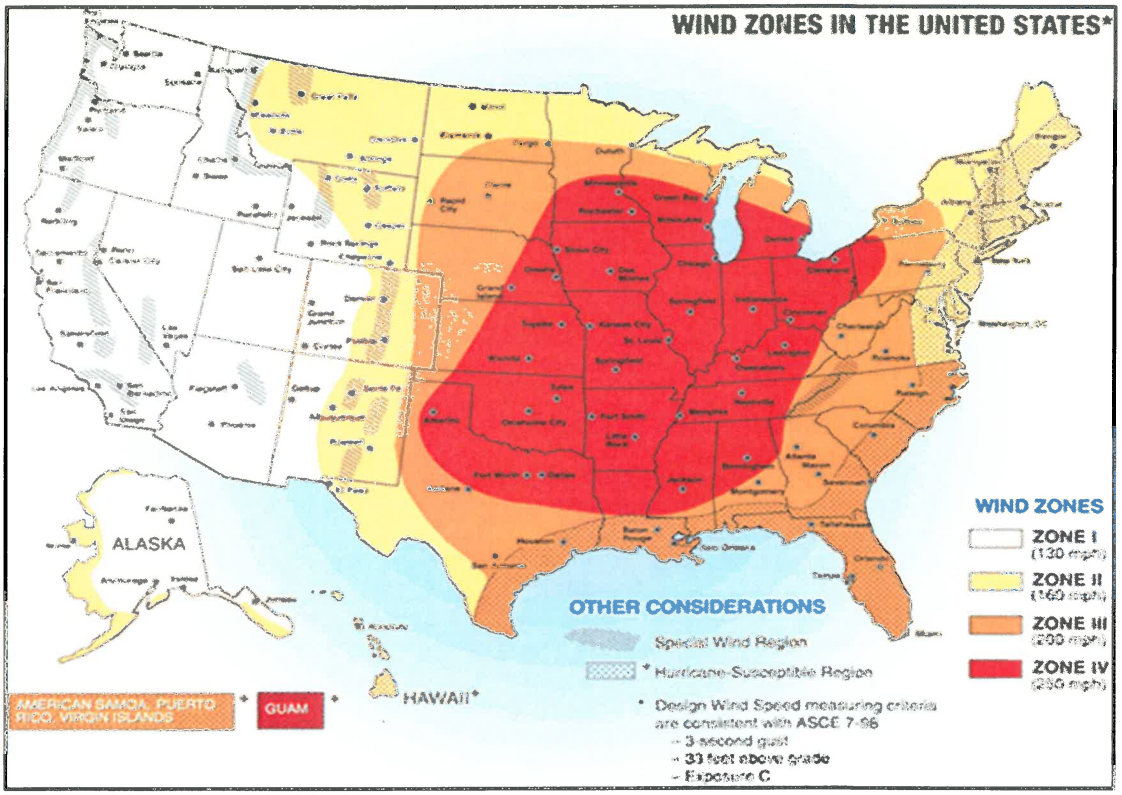


Figure 4.3.6-1: FEMA Wind Zones

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

Table 4.3.6-1: Fujita Tornado Scale		
Category	Wind Speed (MPH)	Description of Damage
F0	40-72	Light damage. Some damage to chimneys; break branches off trees; push overshallow-rooted trees; damage to sign boards.
F1	73-112	Moderate damage. The lower limit is the beginning of hurricane speed. Roof surfaces peeled off; mobile homes pushed off foundations or overturned; movingautos pushed off roads.
F2	113-157	Considerable damage. Roofs torn off frame houses; mobile homes demolished;boxcars pushed over; large trees snapped or uprooted; light-object missiles generated.
F3	158-206	Severe damage. Roofs and some walls torn off well-constructed houses; trainsoverturned; most trees in forest uprooted; cars lifted off ground and thrown.
F4	207-260	Devastating damage. Well-constructed houses leveled; structures with weak foundations blown off some distance; cars thrown, and large missiles generated.
F5	261-318	Incredible damage. Strong frame houses lifted off foundations and carried considerable distance to disintegrate; automobile-sized missiles fly through theair in excess of 100-yards; trees debarked.
Source: FEMA, 1997.		

Table 4.3.6-2: CPRI Rating for Severe Wind					
Jurisdiction	Probability	Magnitude/ Severity	Warning Time	Duration	CPRI Score
Holbrook	Highly Likely	Critical	> 6 hours	< 6 hours	3.40
Pinetop-Lakeside	Highly Likely	Critical	> 6 hours	< 6 hours	3.40
Show Low	Highly Likely	Critical	> 6 hours	< 6 hours	3.40
Snowflake	Highly Likely	Critical	> 6 hours	< 6 hours	3.40
Taylor	Highly Likely	Critical	> 6 hours	< 6 hours	3.40
Winslow	Highly Likely	Critical	> 6 hours	< 6 hours	3.40
Unincorporated Navajo County	Highly Likely	Critical	> 6 hours	< 6 hours	3.40
*No change in CPRI for 2024 Plan					

Vulnerability

Navajo County has been subject to numerous severe wind events in the last 20 years. In that same period, no deaths or injuries were reported throughout the County. In reality, severe wind events occur on a significantly more frequent basis throughout the county, but do not always have reported damage associated with every event. Because of the rural nature of Navajo County many wind events go unnoticed and do not pose a hazard, however the random nature of high wind events pose a danger to populated areas in the County.

Impacts

The impact of serve wind events is consistent across the region. Since most thunderstorms produce some straight-line winds as a result of outflow generated by the thunderstorm downdraft, anyone living in thunderstorm-prone areas of the world is at risk for experiencing this hazard. People living in mobile homes are especially at risk for injury and death. Even anchored mobile homes can be seriously damaged when winds gust over 80 mph. Many of the homes in the Plan area are manufactured and mobile homes.

The table below lists the impacts for Sever Wind incidents for each of the jurisdictions listed in the plan.

Table 4.3.6-3: Impacts from Severe Wind	
Unincorporated Navajo County	House damage/destruction Erosion Loss of Infrastructure Potential loss of life
Town of Holbrook	House damage/destruction Erosion Potential loss of life
Town of Pinetop-Lakeside	House damage/destruction Loss of Infrastructure Potential loss of life Erosion
City of Show Low	House damage/destruction Potential loss of life Erosion
Town of Snowflake	House damage/destruction Erosion Potential loss of life
Town of Taylor	House damage/destruction Potential loss of life Erosion
Town of Winslow	House damage/destruction Erosion Potential loss of life

Development Trend Analysis

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

Sources

AZ Dept of Emergency and Military Affairs (DEMA), 2004, 2010 and 2013 State of Arizona Hazard Mitigation Plan.

Changnon, Jr. S., 1988, Climatology of Thunder Events in the Conterminous U.S., Part I: Temporal Aspects and Part II: Spatial Aspects, Journal of Climate, Vol. 1, No. 4, pp. 389-405.

U.S. Dept. of Commerce, National Climatic Data Center, 2010, Storm Events Database, accessed via the following URL: http://www4.ncdc.noaa.gov/cgi-win/wwcgi.dll?wwevent~storms

Risk Factor: https://riskfactor.com/county/navajo-county/4017_fsid/wind

NOAA : https://www.nssl.noaa.gov/education/svrwx101/wind/

FEMA:: http://www.fema.gov/plan/prevent/saferoom/tsfs02_wind_zones.shtm

4.3.7 Wildfire

Description

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

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

History

For this planning period of 2017-2024, there has only been one 'significant' (over 5,000 acres) wildfires in Navajo County or near enough to potentially impact Navajo County residents.

- The Wyrick Fire started by lightning on June 19, 2021, 12.5 miles northwest of Heber-Overgaard and burned 7,592 acres.

The Planning Team recognized that the disaster and historic hazard data collected and summarized in this Plan does not adequately reflect the true cost of a wildfire particularly the cost of wildfire suppression efforts. Furthermore, the County, State, Forest Service, and other agencies spend millions of dollars every year on wildfire mitigation in fuel treatment projects. Exactly 22 years ago the Rodeo-Chedeski erupted and at that point was the largest wildfire in the state of Arizona until the Wallow Fire happened in 2011. Below are the details describing the impact of the Rodeo-Chedeski Fire.

- June 19, 2002, the Governor proclaimed an emergency for Navajo and Apache Counties for damages due to the Rodeo Fire. The Rodeo Fire ignited in Navajo County near the Town of Cibecue on the Fort Apache Indian Reservation June 18, 2002. Federal and State fire suppression resources responded, numerous homes and public infrastructure were threatened. On July 1, 2002, the Governor amended her proclamation to include Gila and Coconino Counties due to the Chediski Fire. The Chediski Fire ignited in Navajo County near the Chediski Mountain on the Fort Apache Indian Reservation June 20, 2002, endangering up to 4,500 homes and causing the evacuation of more than 2,000 people. The Presidential disaster declaration was received on June 25, 2002. Apache and Navajo Counties were declared for Public Assistance, as well as the Fort Apache Indian Reservation. Apache, Coconino, Gila and Navajo Counties were given Individual Assistance. Mitigation Assistance was granted statewide. The Rodeo-Chediski fire burned 468,640 acres and destroyed more than 450 houses in Navajo, Apache, Coconino and Gila counties and the Fort Apache Indian Reservation. Disaster aid to Arizona in the wake of the massive Rodeo-Chediski fire has topped $26 million. To date, 8,204 Arizonans have registered for assistance through FEMA's toll-free registration line. Help Centers have seen 5,720 people seeking information about disaster aid, including answers to questions about their applications for assistance. (NICC, 2010) The state costs were $1,418,717 and the federal costs were $1,093,574.

Probability/Extent

The probability and magnitude of wildfire incidents for Navajo County are influenced by numerous factors including vegetation densities, previous burn history, hydrologic conditions, climatic conditions such as temperature, humidity, and wind, ignition source (human or natural), topographic aspect and slope, and remoteness of area. Wildland Urban Interface (WUI) maps were developed as part of this Plan to highlight areas where the greatest risk in terms of development is located.

Navajo County and various cooperating stakeholders collaborated to update and merge the Sitgreaves and Central Community Wildfire Protections Plans into one plan now called the Navajo County Community Wildfire Protection Plan in 2023-24. The plan verified the Wildland Urban Interface (WUI) areas for Navajo County study area and mapped various wildfire risk elements such as vegetative fuels and densities, topographical slope and aspect, previous burn areas and ignition points, and prior treatment areas.

Navajo County, Apache-Sitgreaves National Forest, Arizona Department of Forestry and Fire Management, and local Fire Departments and Districts, are very proactive in forest mitigation and thinning. This has been extremely beneficial in the last 5+ years as Navajo County has only seen one significant wildfire. We attribute the lack of major, long-term wildfires to the thinning efforts of our partners as well as other forms of treatment including prescribed burning.

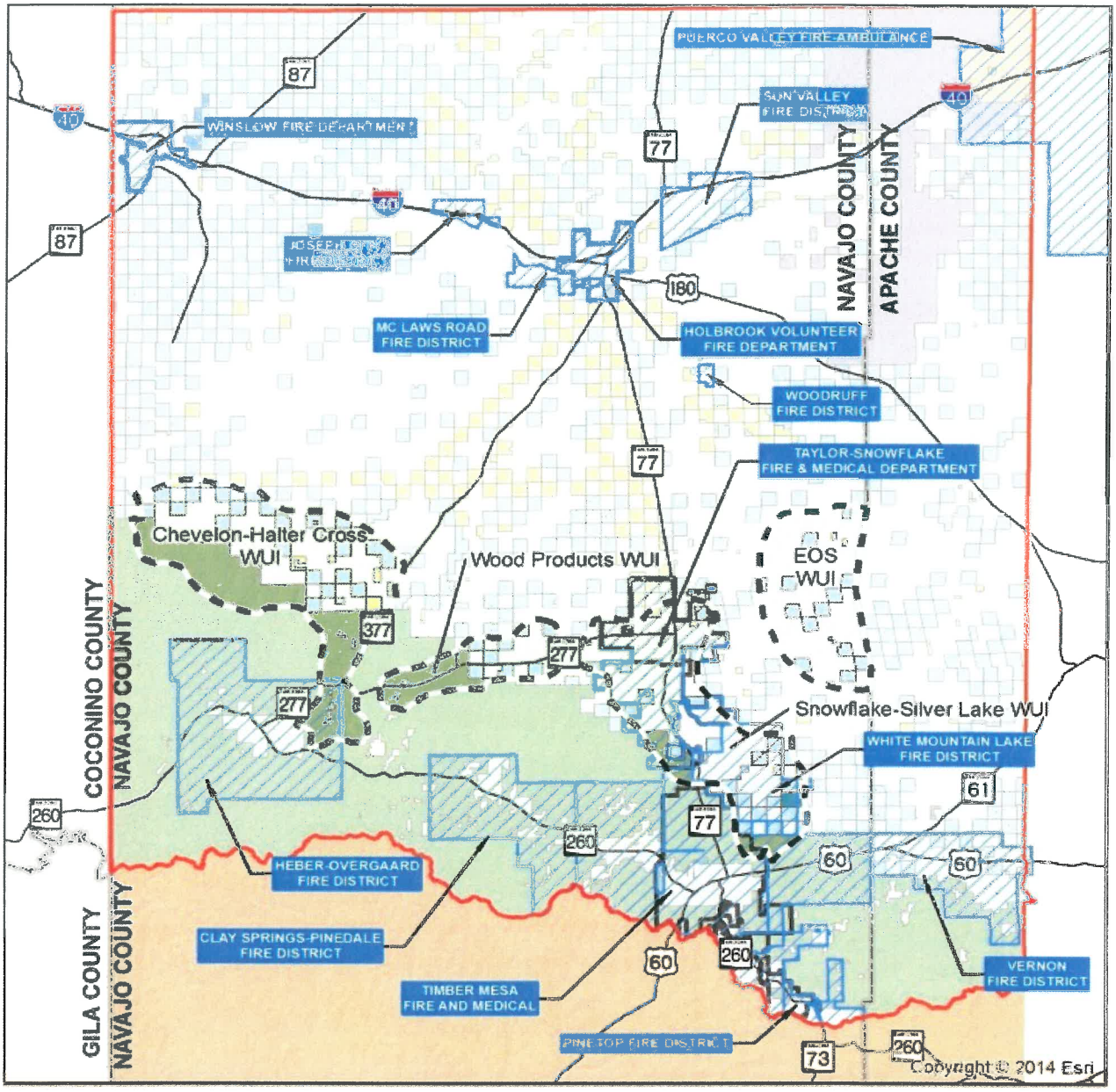
Table 4.3.7-1: Impacts from Wildfire

Unincorporated Navajo County	Home and building damage Loss of natural resources Potential loss of life Loss of air quality Possibility of post-fire flooding Smoke impacts due to prevailing winds
City of Holbrook	Destruction of homes Potential loss of life Displacement Possibility of post-fire flooding Smoke impacts due to prevailing winds
Town of Pinetop-Lakeside	Destruction of homes Potential loss of life Displacement Possibility of post-fire flooding Smoke impacts due to prevailing winds
Town of Show Low	Destruction of homes Potential loss of life Displacement Possibility of post-fire flooding Smoke impacts due to prevailing winds
Town of Snowflake	Destruction of homes Potential loss of life Displacement Possibility of post-fire flooding Smoke impacts due to prevailing winds
Town of Taylor	Destruction of homes Potential loss of life Displacement Possibility of post-fire flooding

Table 4.3.7-1: Impacts from Wildfire	
	Smoke impacts due to prevailing winds
City of Winslow	Destruction of homes Potential loss of life Displacement Possibility of post-fire flooding Smoke impacts due to prevailing winds

Climate Change Impacts

Fire is a critical ecosystem process across the western US. In recent decades, wildfires in the western United States have become larger, hotter, and more destructive and deadly due to a suite of factors, including climate change. Prior to federal policy to suppress wildfires, natural wildfire and Indigenous burning ensured that landscapes benefited from regular fires for millennia. Nineteenth- and early-20th-century land-use practices, followed by a policy of fire elimination, led to vegetation fuel buildup in low-elevation fire-adapted western forests, and livestock grazing promoted highly flammable annual grass dominance in rangelands. Development in the last 50 years has greatly expanded the wildland–urban interface and increased human-caused ignitions, jeopardizing people, property, and infrastructure.6,7 In recent years, climate change has contributed to very large and severe fires. While low- and moderate-severity fires with small patches of high severity can have important ecological benefits large, high-severity fires often have profoundly negative long-term ecological, social, and economic consequences.



Map 4.3.7-1: Land Status, Navajo County

(No significant changes to the above map for the 2024 plan update)

Vulnerability

Table 4.3.7-2: CPRI Rating for Wildfire					
Jurisdiction	Probability	Magnitude/ Severity	Warning Time	Duration	CPRI Score
Holbrook	Possibly	Limited	< 6 hours	> 1 week	2.50
Pinetop-Lakeside	Highly Likely	Catastrophic	< 6 hours	> 1 week	4.00
Show Low	Highly Likely	Catastrophic	< 6 hours	> 1 week	4.00
Snowflake	Possibly	Limited	< 6 hours	> 1 week	2.50
Taylor	Possibly	Limited	< 6 hours	> 1 week	2.50
Winslow	Possibly	Limited	< 6 hours	> 1 week	2.50
Unincorporated Navajo County	Highly Likely	Catastrophic	< 6 hours	> 1 week	3.85
**No significant change in the CPRI for this planning cycle*					

The 2011 plan estimated loss at $126.2 and $13 million in asset related losses are estimated for high and medium wildfire hazards, for all the participating jurisdictions in Navajo County. An additional $783 and

$106.9 million in high and medium hazard wildfire losses to residential, commercial, and industrial facilities is estimated for all participating Navajo 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 wildfire fighter crew costs about $1 million per day.

Regarding human vulnerability, a county-wide percentage population 35.51% and 37.20%, is potentially exposed to a high and medium hazard wildfire event, respectively. Typically, deaths and injuries not related to firefighting activities are rare. However, it is feasible to assume that at least one death and/or injury may be plausible. There is also a high probability of population displacement during a wildfire event, and especially in the urban wildland interface areas. Vulnerability to the communities in Navajo County includes the displacement of year-round residents and seasonal visitors due to the threat of wildfire. Wildfire season occurs at the height of tourism season in Navajo County therefore a significant wildfire affects the economic health of the communities. The communities of White Mountain Lakes, Clay Springs, Pinedale, Heber-Overgaard, Show Low, Pinetop-Lakeside, and many communities within the White Mountain Apache Reservation are the most vulnerable to wildfire. The adverse health effects from smoke and ash from a wildfire can affect other communities not in the direct path of the wildfire. Many communities have limited ingress and egress so evacuations can be problematic during a swiftly moving wildfire. The prevailing winds tend to push the fires from the southwest to the northeast and in past occurrences such as the Rodeo-Chedeski Fire limited the major highway evacuation routes. In some of the WUI areas there is a high density of homes and businesses that may be difficult to defend against wildfire due to the lack of infrastructure, overly dense vegetation and steep terrain. The Ponderosa Pine forests in Navajo County are a natural resource that draws visitors escaping the summer heat of the Phoenix metropolitan valley and are also a major industry to the White Mountain Apache Tribe. The recent Cedar Fire in June 2016 threatened a large commercial timber sale south of Pinetop-Lakeside. The burn scars from major wildfires also increase the risk of post fire flooding to residents, businesses and infrastructure downstream and can disrupt or destroy the natural watershed. The devastating effects of a major wildfire can be felt for many years after by the obliteration of a pristine pine forest.

Development Trend Analysis

The WUI represents the fringe of urban development as it intersects with the natural environment. As previously discussed, wildfire risks are significant for a sizeable portion of the county. Any future development will only increase the WUI areas and expand the potential exposure of structures to wildfire hazards. The Navajo County Community Wildfire Protection Plan (formerly the Central Navajo Community and Sitgreaves Communities Wildfire Protection Plans) addresses mitigation opportunities for expanding WUI areas and provide recommended guidelines for safe building and land-use practices in wildfire hazard areas. Reducing the risk within the WUI's is a major concern for local fire agencies and establishing Fire Adapted Communities is a priority for these agencies when working with private land owners to protect their properties by engaging in Firewise activities. In addition, the Navajo County Comprehensive Plan being revised in 2024 will incorporate WUI considerations for future development, planning and zoning and building codes.

Sources

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4.3.8 Winter Storm

Description

Severe winter storms 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 State Roads 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 winter storms 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 snow storms 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 winter storms.

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 the snowflakes don't 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.

History

Winter snows are the lifeblood of water supplies for most of Navajo County. They can also, however, be a deadly hazard. For this update, there have been no reported incidents of severe winter storms for Navajo County.

The following are highlights of the more prominent snow storm events impacting Navajo County:

- January 2010 a Winter Storm Emergency was declared: About 10 inches of snow occurred in Northern Greenlee County around Rose Peak and Hannagan Meadow. A strong Pacific winter storm produced moderate valley rain and mountain snow to much of southeast Arizona. Heavy snow combined with strong winds to produce significant blowing and drifting at the higher elevations. Strong gusty winds also affected many valley locations during the evening hours of the 19th and the early morning hours of the 20th. Heavy snow fell along the Eastern Mogollon Rim. Snowfall totals for this one storm include: Clints Well 16 inches, Heber 13 inches, Clay Springs 14-15 inches, and Forest Lakes 16 inches. The second in a series of strong Pacific storms moved across northern Arizona with widespread heavy precipitation. The snow level dropped down to 5,000-5,500 feet elevation as the storm moved east. The Governor declared an emergency and released $200,000 for emergency responses and

recovery expenses from the weather events. Declared that a State of Emergency in Apache, Coconino, Gila, Greenlee, La Paz, Maricopa, Mohave, Navajo, and Yavapai Counties due to the 2010 Winter Storm beginning January 21, 2010. The President approved the request for Emergency Declaration in support of life and property- saving operations on Hopi Tribe and Navajo Nation lands within Apache, Coconino and Navajo counties. Isolation of some communities and rough terrain, compounded with snow accumulations, has complicated delivery of assistance like fuel, food and medical provisions. An additional $1 million was approved by the Governor to cover state-share costs. Response efforts for the Hopi Tribe and Navajo Nation were named Operation Winter Storm and pooled the resources of federal, state and local agencies. Over nine days, 42,500 meals, 21,780 gallons of water, 279 cots, and 5,475 blankets and over 800 wood bundles were delivered by air and ground transport. (ADEM, 2010, FEMA, 2010)

- February 2005 a severe winter storm and flood occurred which on February 16, 2005, the Governor declared a state of emergency due to the February 2005 Winter Storms and Flooding throughout central and eastern Arizona. Gila, Graham, Greenlee, Pinal and Yavapai Counties and the Town of Wickenburg (Maricopa County) were all declared and were included in the Governor's declaration. On March 8, 2005, the declaration was amended to include all of Maricopa County and Mohave County.

- January 1997, one the largest snow storms of the decade brought heavy snow to most of northern Arizona. Heavy snow fell from early Sunday morning, the 12th and through the 14th. Four deaths from exposure occurred during, or immediately after the storm, on the Navajo Nation Reservation and were directly related to this catastrophic winter storm. Following the storm, National Guard trucks and helicopters were needed to evacuate people on the Navajo Nation who required medical attention due to chronic medical problems and who were unable to obtain needed medication. National Guard helicopters also dropped food to people and livestock who were stranded for several days following the storm. Unofficial snow accumulations up to 6 feet were reported along the Mogollon Rim in extreme southeastern Coconino County and western Navajo County. Very strong winds created drifts as high as 10 feet at many wind-prone areas across northern Arizona. Numerous trees fell on cars, houses and roads causing power outages and property damage. Hundreds of miles of major highways were closed mainly along the Mogollon Rim and the White Mountains area. Interstate 40 from Winslow to Ashfork were closed from noon Monday, Jan. 13 through 6 am MST, Wednesday, Jan. 15. Over 200 vehicles were stranded on these two highways. The heavy snow in Flagstaff caused Northern Arizona University to close for the first time in 20 years. Flagstaff public schools were closed for five days. This was the 12th biggest snow storm in Flagstaff's 100 years of weather records. (ADEM, 2009; NCDC, 2010)

- December 1967 to January of 1968, the worst winter storm to impact Navajo County occurred paralyzing northern Arizona and brought snow to much of the state. It was actually two storms, with the second following closely on the heels of the first. However, at that time, most perceived it as one storm. On December 14, a state record of 38.0 inches fell at the Heber Ranger Station. Snowfall totals of the Rim Country included 102.7 inches at Hawley Lake, 99 inches at Greer, and

9.5 inches at the Heber Ranger Station, The Navajo Nation was extremely hard hit as two to three feet of snow fell across the community. Window Rock measured 33.5 inches. People on the reservation were instructed to use ashes from their stoves to write distress signals in the snow that could be spotted from the air. Eight people died of exposure. The total disaster cost to the State of Arizona was $466,470. (DEMA, 2010)

Probability/Extent

Communities located in Navajo County can expect an annual snowfall of at least 22 inches at elevations above 6,000 feet. Snowfall totals increase when the El Nino weather pattern is present such was the case in January 2010 when Pinetop-Lakeside received over 51 inches, Heber-Overgaard received over 47 inches and Show Low received over 32 inches. Since the El Nino weather pattern is cyclical the probability of a severe weather event occurring in the future is highly likely.

The extent of the Winter storms can also be determined by a number of factors: temperature, the rate of snowfall, wind speeds for visibility, and how long the storm will last. All of these factors are provided by the National Weather Service multiple days before the storm, allowing people to prepare for an upcoming storm. In Navajo County, the higher elevations are more susceptible to winter storms as they experience colder temperatures and orographic lifting, which results in higher accumulation amounts in those areas.

The weather conditions determine the alert that is issued by the National Weather Service. Below is a table describing the criteria for each type of alert related to winter weather.

Table 4.3.8-1: National Weather Service Winter Weather Criteria	
Product	**Criteria**
Winter Storm Warning	Snow 8+" at 5000 ft. and above. Snow 4+" below 5000 ft., or A combination of snow, blowing snow, etc. meeting or exceeding local criteria.
Snow Squall Warning	An organized/persistent snow band is observed, and A Winter Storm or Blizzard Warning is not in effect for the observed band, and The snow squall is affecting at least one major roadway or a populated community, and Rapidly accumulating snow or visibility of ¼ mile or less in heavy and/or blowing snow is expected for 20+ minutes.
Blizzard Warning	Sustained wind or frequent gusts ≥ 35 mph, and Visibility < ¼ mile in falling and/or blowing snow, and Conditions prevail for ≥ 3 consecutive hours.
Wind Chill Warning	Wind chill temperature ≤ -20°F, and Wind ≥ 10 mph, and Conditions prevail for ≥ 3 consecutive hours.
Ice Storm Warning	Freezing rain/drizzle (not sleet) resulting in ice accumulation of ≥ ¼ inch.
Winter Weather Advisory	Snow 4-8" at 5000 ft. and above. Snow 1-2" below 5000 ft., or Freezing rain/drizzle (not sleet) resulting in ice accumulation of < ¼ inch. A combination of snow, blowing snow, freezing rain, etc. meeting or exceeding local criteria.
Winter Storm Watch	Issued for the second, third, or fourth forecast period when the chance of a hazardous weather event meeting or exceeding local criteria is ≥ 50 percent. *For forecast blizzard conditions, use this product. The Blizzard Watch product no longer exists.*
Wind Chill Watch	Issued for the second, third, or fourth forecast period when the chance of a wind chill event meeting or exceeding local criteria is ≥ 50 percent.

Impacts

The table below shows the impacts for the participating jurisdictions for this hazard.

Table 4.3.8-2: Impacts from Winter Storms	
Unincorporated Navajo County	Home and building damage Vehicle accidents Potential loss of life Roadways blocked/closed Loss of utilities
City of Holbrook	Downed powerlines and/or trees Delayed emergency response Potential loss of life Interface with utility services Inability to use Municipal Airport for Emergency transport
Town of Pinetop-Lakeside	Downed powerlines and/or trees

	Delayed emergency response Potential loss of life Interface with utility services
City of Show Low	Downed powerlines and/or trees Delayed emergency response Potential loss of life Interface with utility services Inability to use Municipal Airport for Emergency transport
Town of Snowflake	Downed powerlines and/or trees Delayed emergency response Potential loss of life Interface with utility services
Town of Taylor	Downed powerlines and/or trees Delayed emergency response Potential loss of life Interface with utility services
City of Winslow	Downed powerlines and/or trees Delayed emergency response Potential loss of life Interface with utility services Inability to use Municipal Airport for Emergency transport

Vulnerability

Table 4.3.8-3: CPRI Rating for Winter Storm

Jurisdiction	Probability	Magnitude/ Severity	Warning Time	Duration	CPRI Score
Holbrook	Possibly	Limited	6 - 12 hours	< 1week	1.95
Pinetop-Lakeside	Highly	Critical	6 - 12 hours	< 1 week	3.45
Show Low	Highly	Critical	6 - 12 hours	< 1 week	3.45
Snowflake	Possibly	Limited	6 - 12 hours	< 1 week	2.25
Taylor	Possibly	Limited	> 24 hours	< 1 week	1.65
Winslow	Possibly	Limited	12 - 24 hours	< 1 week	2.85
Unincorporated Navajo	Highly	Catastrophic	12 - 24 hours	< 1 week	3.85
**No change in CPRI for the 2024 Plan*					

Vulnerability to communities affected by a major snowfall event includes power outages. Power outages are common during major winter storms and can put citizens at risk of health hazards due to exposure to freezing conditions. Citizens can be trapped in their homes due to excessive snowfall and while the County provides plowing to recognized county roads, many residents live on primitive or non-maintained roads and have to wait for the snow to melt or clear the roads using private parties. Emergency services are affected by severe winter weather trying to respond to calls for assistance. Calls for assistance may take longer due to poor driving conditions and access due to excessive snowfall. Public Works Departments and Arizona Department of Transportation work extended hours when severe weather strikes costing additional overtime wages. Business owners have to compete for limited private snow plow contractors to clear parking lots so retail services can be impacted in delayed opening of their establishments. Traffic accidents are prevalent during winter storms due to black ice and severe driving conditions. Supplies coming from the valley are often delayed during major winter storms due to hazardous driving conditions. Due to

snowfall, icy roads and high winds Interstate 40 is subject to closure thus stranding freight haulers and motorists. In January 2010 during the major snowstorm a freight hauler hauling cattle had to be diverted to Holbrook fairgrounds to stage the cattle while the Interstate was closed. School closures or delays and temporary business closures are common during severe winter storms. Roof damage and collapse to structures occurs during severe winter storms due to heavy snow loads. Older structures within the county may not meet current building codes and are subject to collapse from heavy snowfall. Many of the residents living in these types of structures do not have adequate property insurance which can affect the ability to rebuild and would displace the residents long-term. In January 2010 the cost of the three-day winter storm exceeded $728,000 in road repairs and emergency protective measures. Many communities experienced weeks of reconstructive roadwork to repair the damage caused by the extreme snowfall.

Development Trend Analysis

Future development will expand the exposure of life and property to the hazard of winter storm events. Enforcement and/or implementation of modern building codes to regulate new developments in conjunction with public education on how to respond to hazardous winter conditions is probably the best way to mitigate such losses.

Sources

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SECTION 5: RISK ASSESSMENT SUMMARY

The jurisdictional variability of risk associated with each hazard assessed is demonstrated by the various ratings in the preceding hazard profiles. Accordingly, each jurisdiction has varying levels of need regarding the hazards to be mitigated and may not consider all of the hazards as posing a great risk to their individual communities. This table summarizes the mitigation actions selected for mitigation by each jurisdiction.

Table 5-1: Hazards to be Mitigated by Jurisdiction

Jurisdiction	Dam Failure	Drought	Flooding	HazMat	Levee Failure	Severe Wind	Wildfire	Winter Storm
Unincorporated Navajo County	X	X	X	X	X	X	X	X
Holbrook		X	X	X	X	X	X	
Pinetop-Lakeside		X	X	X		X	X	X
Show Low	X	X	X	X		X	X	X
Snowflake	X	X	X	X		X	X	
Taylor	X	X	X			X	X	
Winslow		X	X	X	X	X	X	X

SECTION 6: MITIGATION STRATEGY

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

Goals and Objectives
Capability Assessment
Mitigation Strategy

The entire 2017 Plan mitigation strategy was reviewed and updated by the Planning Team. Specifics of the changes and updates are discussed in the subsections below.

6.1 Hazard Mitigation Goals and Objectives

The goal and objectives for this update were developed after reviewing the previous Plan's goals and objectives. Jurisdictions were given the opportunity to comment and edit the goals to fit the mitigation vision for their community.

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

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

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

Objective 3: Promote hazard mitigation throughout Navajo County communities.

Objective 4: Increase public awareness of hazards and risks that threaten Navajo County communities.

6.2 Capability Assessment

This section describes the capabilities and resources available to the communities in order to aid in the implementation of this Plan's mitigation measures. The jurisdictions have the power to adopt and implement regulations for land use, zoning, and historic preservation and to adopt standards of construction and modifications of land and structures. Since the 2017 Plan the jurisdictions have made progress in updating ordinances, plans and adopting more current building codes. The jurisdictions within Navajo County have populations ranging from just under 11,000 in Show Low to under 4,200 in Taylor. Most of the county's residents live in the unincorporated areas of the county. Over 60% of the County is comprised of Indian Reservation land. There is limited new development and growth in the area, therefore less regulatory restrictions than one might see in larger populated areas.

Here are some of the capabilities that may aid in the implementation of the mitigation strategy:

Table 6.2-1: Programs, Plans & Policies – Navajo County		
Navajo County Emergency Operations Plan	Purpose	Provides a whole community overview of the County's emergency management structure and the responsibilities assigned to various county departments, non-governmental agencies, and the private sector, during emergency incidents and disasters.
	Responsible Agency	Navajo County Emergency Management
	Hazards	All Hazards
	Effect on Mitigation Efforts	Outlines Navajo County's response to incidents to include the NIMS, ICS and ESF structure to limit hazard impacts related to FEMA Community Lifelines. County Department ESF incident response protocols are designed to mitigate impacts to public health, property and the environment.
	Opportunities for Enhancement	Periodic review and updates are critical to enhance operational coordination, reduce future losses, and assist with mitigating the community's exposure to the impacts of future hazard incidents.
Sitgreaves Community Wildfire Protection Plan (2016)	Purpose	Identifies and prioritizes areas at risk and areas for hazardous fuel reduction treatments. It also recommends the types and methods of treatment.
	Responsible Agency	Coordination led by Navajo County Emergency Management
	Hazards	Wildfire
	Effect on Mitigation Efforts	Creation/Update and utilization of the CWPP is also an effective way to outline fire preparedness and planning, helping communities prioritize high-risk projects and to expedite overall project planning and solicit acquire federal funding.
	Opportunities for Enhancement	Identify funding to support comprehensive plan update.
Central Community Wildfire Protection Plan (2016)	Purpose	Identifies and prioritizes areas at risk and areas for hazardous fuel reduction treatments. It also recommends the types and methods of treatment.
	Responsible Agency	Navajo County Emergency Management

	Hazards	Wildfire
	Effect on Mitigation Efforts	Creation/Update and utilization of the CWPP is also an effective way to outline fire preparedness and planning, helping communities prioritize high-risk projects and to expedite overall project planning and solicit acquire federal funding.
	Opportunities for Enhancement	Identify funding to support comprehensive plan update.
Continuity of Operations Plan	Purpose	Assists in ensuring that essential government services are provided or quickly reestablished to the public when the County is affected by an emergency or disaster.
	Responsible Agency	Navajo County Emergency Management
	Hazards	All
	Effect on Mitigation Efforts	The provision of essential government services is critical to effective emergency and disaster response and recovery efforts.
	Opportunities for Enhancement	Continued involvement in updates and revisions by all departments.
Community Rating System program	Purpose	A voluntary incentive program that recognizes and encourages community floodplain management activities that exceed the minimum NFIP requirements. CRS participants are offered flood insurance premium rates at a discount to reflect the community actions meeting the goals of the CRS.
	Responsible Agency	Navajo County Flood Control District
	Hazards	Dam Failure, flood/flash flood, levee failure
	Effect on Mitigation Efforts	Medium. The program requires outreach and education, as well as enhanced regulation over flood prone areas: they do prioritize the acquisition of hazard-prone lands for facilities.
	Opportunities for Enhancement	Target property owners in high-risk areas for public awareness and homeowner outreach efforts to inform them about the steps that they can take to reduce their vulnerability to land in hazard-prone areas.
Comprehensive Plan	Purpose	To guide and accomplish a coordinated, adjusted, and harmonious development of the area pursuant to the present and future needs of the county.
	Responsible Agency	Navajo County Public Works

	Hazards	Dam Failure, Drought, Flood/Flash Flood, Hazardous Materials Incidents, Levee Failure, Severe Wind, Wildfire, Winter Storm
	Effect on Mitigation Efforts	Medium. The plan is not a regulatory document, and it is developed to conserve the resources of the county, ensure efficient expenditure of public monies, and promote the health, safety, convenience, and general welfare of the public
	Opportunities for Enhancement	Integration of hazard mitigation and community resilience goals into the plan can increase the likelihood that future development will meet these goals.

Table 6.2-2: Financial Resources – Navajo County		
Community Development Block Grants	Purpose	Funding for projects that benefit residents within specific income levels.
	Responsible Agency	Arizona Department of Housing with Northern Arizona Council of Governments with the Town.
	Hazards	All
	Effect on Mitigation Efforts	The effect will be based on the specific project that is completed. In general, completed projects may reduce the probability of neighboring properties being impacted by the hazards identified in the study.
	Opportunities for Enhancement	The County could use this funding source to pay for mitigation efforts.
Capital Improvement Project Funding	Purpose	Fund capital projects for the municipality
	Responsible Agency	Navajo County
	Hazards	All
	Effect on Mitigation Efforts	The effect will be based on the specific project that is completed. In general, completed projects may reduce the probability of neighboring properties being impacted by the hazards identified in the study.
	Opportunities for Enhancement	The County could plan for and fund a capital project to mitigate future hazardous events.
Levee additional taxes	Purpose	Increase tax rates
	Responsible Agency	Navajo County
	Hazards	All
	Effect on Mitigation Efforts	The effect will be based on the specific project that is completed. In general, completed projects may reduce the probability of neighboring properties being impacted by the hazards identified in the study.
	Opportunities for Enhancement	The County could levee additional taxes to fund mitigation projects.
	Purpose	Incur debt for a specific purpose.

Incur debt through general obligation or special tax bonds	Responsible Agency	Town
	Hazards	All
	Effect on Mitigation Efforts	The effect will be based on the specific project that is completed. In general, completed projects may reduce the probability of neighboring properties being impacted by the hazards identified in the study.
	Opportunities for Enhancement	The County could ask their voters for authority to incur debt to fund mitigation projects.

Table 6.2-3: Personnel Resources – Navajo County

Staff/Personnel Resources Department/Agency	**Involvement**	**Opportunity to Expand.**
Board of Supervisors	Consider the adoption of policies and modifications to existing policies	The Board could discuss how the county could respond to, prepare for, and mitigate hazards.
Planning and Zoning Commission	Discuss potential changes to governing documents and requests for special permits, zoning changes, and variances.	The Commission could consider the plan and make recommendations to the City Council.
County Manager	May operate as the default flood manager, building official, and zoning administrator.	The Manager could propose administrative actions and budget allocations to respond to, prepare for, and mitigate hazards.
Sheriff	Serves as the top local law enforcement officer. Will lead his staff to enforce applicable laws during the time of an emergency.	The Sheriff could propose administrative actions and budget allocations to respond to, prepare for, and mitigate hazards.
Public Works Director	Maintains, improves, and expands the City's utility systems.	The Director could propose administrative actions and budget allocations to respond to, prepare for, and mitigate hazards.
Building Official	Enforces the building code and reviews building plans for compliance.	The Official could propose administrative actions and budget allocations to respond to, prepare for, and mitigate hazards.
Planning and Zoning Administrator	Enforces the planning and zoning code and reviews development for their compliance.	The Administrator could propose administrative actions and budget allocations to respond to, prepare for, and mitigate hazards.

Table 6.2-4 Codes & Regulations – City of Holbrook		
* City Code 2006 UPC 2006 UEC 2006 UBC 2006 UMC	Purpose	To uphold information and regulations and provide rules to govern the safety and protocol for the city and the community.
	Responsible Agency	City Manager / City Clerk
	Hazards	All
	Effect on Mitigation Efforts	Allows town to assess as necessary to ensure health and safety of residents.
	Opportunities for Enhancement	Keep codes consistent and upgraded when needed.

Table 6.2-5 Financial Resources – City of Holbrook		
Community Development Block Grants	Purpose	To cover costs for city wide improvements
	Responsible Agency	City Manager
	Hazards	All
	Effect on Mitigation Efforts	Would slow the process of city improvements
	Opportunities for Enhancement	Enhance upgrades to buildings and abatement.
Capital Improvements Project funding	Purpose	Provides a working plan for sustaining and improving the city's infrastructure.
	Responsible Agency	City Manager
	Hazards	All
	Effect on Mitigation Efforts	Hazards could slow improving systems.
	Opportunities for Enhancement	Safer and more efficient infrastructure systems.
Authority to levy taxes for specific purposes	Purpose	To assist funding for emergency services.
	Responsible Agency	City Manager
	Hazards	Levee, Flood

	Effect on Mitigation Efforts	Aid in supporting levee maintenance
	Opportunities for Enhancement	Provide awareness to the citizens the levee protects.
Fees for water and sewer	Purpose	Provides needed extra funding for equipment and infrastructure replacement and or upgrades.
	Responsible Agency	City Manager
	Hazards	All
	Effect on Mitigation Efforts	Would slow the process of upgrades and replacements
	Opportunities for Enhancement	Better operations to water and sewer systems for the city.

Table 6.2-6: Personnel Resources – City of Holbrook

Staff/Personnel Resources **Department/Agency**	**Involvement**	**Opportunity to Expand.**
Planner(s) or engineer(s)	For knowledge of land development and land management practices	City Manager
Engineers	For construction practices related to buildings and/or infrastructure	Contracted engineer
Floodplain Manager	For knowledge of city drainage, flood, and water way systems	Levee Superintendent
Surveyors	To assist with the mapping and layout of the city and surrounding area. (city Limits)	Public Works/Contractor
Staff with education or expertise to assess the community's vulnerability to hazards	To help ensure the safety of the community in such case as a hazard situation.	Public Works Dept./ Emergency Services/ City of Holbrook
Personnel skilled in GIS and/or HAZUS	Aid in planning, mapping and information gathering	Navajo County
Emergency Manager	To ensure safety and order for the community. Assist in emergency protocol.	Police Dept/ City of Holbrook

Table 6.2-7: Programs & Policies – Town of Pinetop-Lakeside		
General Plan	Purpose	To provide general guidance on how the land within the Town is to be developed.
	Responsible Agency	Town Council, Planning & Zoning Commission, Town Departments
	Hazards	All
	Effect on Mitigation Efforts	Provides general guidance
	Opportunities for Enhancement	During the next General Plan review, specifically analyze how the plan can be modified to address hazards.

Table 6.2-8: Codes & Regulations – Town of Pinetop-Lakeside		
2018 International Building Codes	Purpose	Dictates the building standards for remodels and new buildings.
	Responsible Agency	Building Official, Town Manager
	Hazards	All
	Effect on Mitigation Efforts	New buildings are constructed above the flood plain. All inspected construction is built to the standard of the code.
	Opportunities for Enhancement	Continue to catch non-compliant construction, while educating the community about the standards of the code.
Town Code-Planning and Zoning	Purpose	Dictates how land, within the Town, is to be developed.
	Responsible Agency	Planning & Zoning Commission, Town Manager, Assigned staff
	Hazards	All
	Effect on Mitigation Efforts	Allows town to assess as necessary to ensure health and safety of residents.
	Opportunities for Enhancement	Maintenance of code language

Table 6.2-8: Financial Resources - Town of Pinetop-Lakeside		
Community Development Block Grants	Purpose	Funding for projects that benefit residents within specific income levels.
	Responsible Agency	Arizona Department of Housing with Northern Arizona Council of Governments with the Town.
	Hazards	All
	Effect on Mitigation Efforts	Based on the funded project.
	Opportunities for Enhancement	The Town could use this funding source to pay for mitigation efforts.

Capital Improvement Project Funding	Purpose	Fund capital projects for the municipality
	Responsible Agency	Town
	Hazards	All
	Effect on Mitigation Efforts	Based on the funded project
	Opportunities for Enhancement	The Town could plan for and fund a capital project to mitigate future hazardous events.
Levee additional taxes	Purpose	Increase tax rates
	Responsible Agency	Town
	Hazards	All
	Effect on Mitigation Efforts	Based on the funded project
	Opportunities for Enhancement	The Town could levee additional taxes to fund mitigation projects.
Fees on utilities	Purpose	Pay for the operations of the utility
	Responsible Agency	Town
	Hazards	All
	Effect on Mitigation Efforts	Based on the funded project
	Opportunities for Enhancement	The Town could increase the fees to fund mitigation projects.
Incur debt through general obligation or special tax bonds	Purpose	Incur debt for a specific purpose.
	Responsible Agency	Town
	Hazards	All
	Effect on Mitigation Efforts	Based on the funded project
	Opportunities for Enhancement	The Town could ask their voters for authority to incur debt to fund mitigation projects.

Table 6.2-9: Staff/Personnel Resources - Town of Pinetop-Lakeside

Department/Agency	Involvement	Opportunity to Expand.
Town Council	Consider the adoption of policies and modifications to existing policies	The Council could discuss how the Town could respond to, prepare for, and mitigate hazards.
Planning and Zoning Commission	Discuss potential changes to governing documents and requests for special permits, zoning changes, and variances.	The Commission could consider the plan and make recommendations to the Town Council.
Town Manager	May operate as the default flood manager, building official, and zoning administrator.	The Manager could propose administrative actions and budget allocations to respond to, prepare for, and mitigate hazards.
Police Chief	Serves as the top local law enforcement officer. Will lead his staff to enforce applicable laws during the time of an emergency.	The Chief could propose administrative actions and budget allocations to respond to, prepare for, and mitigate hazards.

Public Works Director	Maintains, improves, and expands the Town's utility systems.	The Director could propose administrative actions and budget allocations to respond to, prepare for, and mitigate hazards.
Building Official	Enforces the building code and reviews building plans for compliance.	The Official could propose administrative actions and budget allocations to respond to, prepare for, and mitigate hazards.
Community Development Director	Enforces the planning and zoning code and reviews development for their compliance. They also serve as the flood plain manager.	The Director could propose administrative actions and budget allocations to respond to, prepare for, and mitigate hazards.

Table 6.2-10: Programs & Policies – City of Show Low		
Wildfire Public Education	Purpose	To expand Education Activities
	Responsible Agency	City of Show Low Community Development, Timber Mesa Fire and Medical District
	Hazards	Wildfire
	Effect on Mitigation Efforts	To educate the public about what they can do to reduce the impacts of a wildfire on their property.
	Opportunities for Enhancement	Community outreach at public events, public service announcements, public access TV, website, continue to pursue funding.
Neighborhood Wildfire Assessment	Purpose	To provide accurate wildfire information to residents and motivate them to implement personal and neighborhood mitigation measures.
	Responsible Agency	City of Show Low Community Development, Timber Mesa Fire and Medical District
	Hazards	Wildfire
	Effect on Mitigation Efforts	To motivate property owners to take an active role in implementing mitigation measures.
	Opportunities for Enhancement	Community outreach at public events, public service announcements, public access TV, website, continue to pursue funding.
Drainage Master Plan	Purpose	To promote and protect the health, peace, safety, comfort, convenience, and general welfare of the residents within the jurisdictional area of Show Low, Arizona; to minimize public and private losses due to flooding; and to enable its residents to participate in the National Flood Insurance Program (NFIP), receive federal disaster assistance, obtain flood insurance, and reduce the cost of flood insurance.
	Responsible Agency	City of Show Low Public Works
	Hazards	Flooding

	Effect on Mitigation Efforts	Provide guidance to policy makers and guide the construction projects for staff.
	Opportunities for Enhancement	Prioritize smaller drainage projects as budget allows.
Small Diameter Wood Business Recruitment	Purpose	To conduct outreach and attract sustainable, small-diameter wood-based businesses
	Responsible Agency	City of Show Low Community Development, Sitgreaves Forest
	Hazards	Wildfire, Drought
	Effect on Mitigation Efforts	These businesses could decrease the impacts of wildfire and reduce water consumption by the forest, thus decreasing the demand on water resources.
	Opportunities for Enhancement	Expand production capacity of Fuel Pellet operation.
Drought Mitigation Plan	Purpose	To promote and protect the health, peace, safety, comfort, convenience, and general welfare of the residents within the jurisdictional area of Show Low, Arizona; to minimize public and private losses due to drought.
	Responsible Agency	City of Show Low Public Works
	Hazards	Drought
	Effect on Mitigation Efforts	Decrease the effect of the existing drought.
	Opportunities for Enhancement	Secure funding to develop a Drought Mitigation Plan
Show Low Lake Dam	Purpose	Improve Show Low Lake Dam so it is not classified as an unsafe dam
	Responsible Agency	City of Show Low Public Works
	Hazards	Flood/ Flash Flooding
	Effect on Mitigation Efforts	Improve and maintain infrastructure designed to mitigate the potential for flooding.
	Opportunities for Enhancement	Seek funding to implement recommended improvements from the PMF study.
State Land Department Firefighting	Purpose	To provide a multi-jurisdictional firefighting base at Show Low Airport and train firefighters on wildfires
	Responsible Agency	City of Show Low Public Works, BIA, Forest Service and Local Fire Districts
	Hazards	Wildfire
	Effect on Mitigation Efforts	Increase training to combat and respond to wildfires.
	Opportunities for Enhancement	Seek funding and partners for fire base.

Table 6.2-11: Codes & Regulations – City of Show Low

Zoning and Building Code Ordinances	Purpose	Reduce the effects of drought, flood, thunderstorm/high wind, and other hazards on new buildings and infrastructure.
	Responsible Agency	City of Show Low Development Services, Planning and Zoning, and Building Safety Departments
	Hazards	All
	Effect on Mitigation Efforts	Increase public education and increase the resilience of constructed/ remodeled structures.
	Opportunities for Enhancement	Continue to enforce zoning and building codes through current site plan, subdivision, and building permit review processes.
Fire Resistant Building Code	Purpose	To reduce risk of fire in new construction/ remodels of commercial construction
	Responsible Agency	City of Show Low Building Department
	Hazards	Wildfire
	Effect on Mitigation Efforts	Increase the resilience of constructed/ remodeled structures.
	Opportunities for Enhancement	Adopt the Fire-Resistant Building Code through Council
HAZMAT	Purpose	To increase enforcement of HAZMAT transportation codes and regulations
	Responsible Agency	City of Show Low Public Works
	Hazards	Hazardous Materials Incidents
	Effect on Mitigation Efforts	Reduce the probability of incidents.
	Opportunities for Enhancement	Coordinate among law enforcement and transportation departments.

Table 6.2-12: Financial Resources- City of Show Low		
Community Development Block Grants	Purpose	Funding for projects that benefit residents within specific income levels.
	Responsible Agency	Arizona Department of Housing with Northern Arizona Council of Governments with the City.
	Hazards	All
	Effect on Mitigation Efforts	Based on the funded project.
	Opportunities for Enhancement	The City of Show Low could use this funding source to pay for mitigation efforts.
Capital Improvement Project Funding	Purpose	Fund capital projects for the municipality
	Responsible Agency	City of Show Low
	Hazards	All
	Effect on Mitigation Efforts	Based on the funded project

	Opportunities for Enhancement	The City of Show Low could plan for and fund a capital project to mitigate future hazardous events.
Levee additional taxes	Purpose	Increase tax rates
	Responsible Agency	City of Show Low
	Hazards	All
	Effect on Mitigation Efforts	Based on the funded project
	Opportunities for Enhancement	The City of Show Low could levee additional taxes to fund mitigation projects.
Fees on utilities	Purpose	Pay for the operations of the utility
	Responsible Agency	City of Show Low
	Hazards	All
	Effect on Mitigation Efforts	Based on the funded project
	Opportunities for Enhancement	The City of Show Low could increase the fees to fund mitigation projects.
Incur debt through general obligation or special tax bonds	Purpose	Incur debt for a specific purpose.
	Responsible Agency	City of Show Low
	Hazards	All
	Effect on Mitigation Efforts	Based on the funded project
	Opportunities for Enhancement	The City of Show Low could ask their voters for authority to incur debt to fund mitigation projects.

Table 6.2-13: Staff/Personnel Resources – City of Show Low

Department/Agency	Involvement	Opportunity to Expand
City Planner	Land development and land management practices; construction practices related to buildings and/or infrastructure	The Planner could present changes to how land is developed to mitigate future hazards.
Public Works Director	Land development and land management practices; construction practices related to buildings and/or infrastructure; understanding of hazards; emergency management	The Director could present changes to how land is developed to mitigate future hazards.
Planning & Zoning Director	Land development and land management practices; construction practices related to buildings and/or infrastructure; understanding of hazards.	The Director could present changes to how land is developed to mitigate future hazards.

Public Works Operations Manager	Construction practices related to buildings and/or infrastructure	The Manager could present changes related to buildings and infrastructure that could mitigate future hazards.
Construction Inspector	Construction practices related to buildings and/or infrastructure	The Inspector could present changes related to buildings and infrastructure that could mitigate future hazards.
Chief Building Official	Construction practices related to buildings and/or infrastructure understanding of hazard.	The Official could present changes related to buildings and infrastructure that could mitigate future hazards.
Building Inspector	Construction practices related to buildings and/or infrastructure	The Inspector could present changes related to buildings and infrastructure that could mitigate future hazards.
Engineer	Understanding of hazards; Floodplain manager; asses the community's vulnerability to hazards	The Engineer could present changes to the development of the City of Show Low that could mitigate future hazards.
Police Chief	Asses the community's vulnerability to hazards; Emergency Manager	The Chief could present changes to the development of the City of Show Low that could mitigate future hazards.
Geographic Information Systems Manager	Skilled in GIS and/or HAZUS	The Manager could present changes to the development of the City of Show Low that could mitigate future hazards.
Grant Coordinator	Grant writing	The Writer could research and apply for grants that help the City of Show Low mitigate hazards.
City Manager	Emergency Manager	The Manager could propose administrative actions and budget allocations to respond to, prepare for, and mitigate hazards.

Table 6.2-14: Programs & Policies – Town of Snowflake		
General Plan	Purpose	To provide general guidance on how the land within the Town is to be developed.
	Responsible Agency	Town Council, Planning & Zoning Commission, Town Departments
	Hazards	All
	Effect on Mitigation Efforts	Provides general guidance

	Opportunities for Enhancement	During the next General Plan review, specifically analyze how the plan can be modified to address hazards

Table 6.2-15: Codes & Regulations – Town of Snowflake		
2018 International Building Codes	Purpose	Dictates the building standards for remodels and new buildings
	Responsible Agency	Building Official, Town Manager
	Hazards	All
	Effect on Mitigation Efforts	New buildings are constructed above the flood plain. All inspected construction is built to the standard of the code.
	Opportunities for Enhancement	Continue to catch construction non-compliant construction, while educating the community about the standards of the code.
Town Code-Planning and Zoning	Purpose	Dictates how land, within the Town, is to be developed.
	Responsible Agency	Planning & Zoning Commission, Town Manager, Assigned staff
	Hazards	All
	Effect on Mitigation Efforts	Not defined
	Opportunities for Enhancement	Maintenance of code language

Table 6.2-16: Financial Resources - Town of Snowflake		
CDBG	Purpose	Provide funding to groups for different projects.
	Responsible Agency	Community Development
	Hazards	All
	Effect on Mitigation Efforts	Funds can be used to mitigate areas of hazard concern
Capital improvements	Purpose	Provide funding yearly for different large projects/purchases
	Responsible Agency	Finance, Community development, PW, Manager, Clerk
	Hazards	All
	Effect on Mitigation Efforts	Reduction in hazards in selected areas
Fees for services	Purpose	Used for continued maintenance/updates
	Responsible Agency	Finance, Community Development, PW
	Hazards	All
	Effect on Mitigation Efforts	Continued updates prevent breakdown within services from hazards
Grants	Purpose	Outside funding used to complete projects at a faster pace than with general funds
	Responsible Agency	Finance, Community Development
	Hazards	All
	Effect on Mitigation Efforts	Allows mitigation projects to move forward/be completed without relying solely on town funds.

Table 6.2-17: Staff/Personnel Resources – Town of Snowflake		
Department/Agency	**Involvement**	**Opportunity to Expand.**
Town Council	Consider the adoption of policies and modifications to existing policies	The Council could discuss how the Town could respond to, prepare for, and mitigate hazards.
Planning and Zoning Commission	Discuss potential changes to governing documents and requests for special permits, zoning changes, and variances.	The Commission could consider the plan and make recommendations to the Town Council.
Town Manager	May operate as the default flood manager, building official, and zoning administrator.	The Manager could propose administrative actions and budget allocations to respond to, prepare for, and mitigate hazards.
Police Chief	Serves as the top local law enforcement officer. Will lead his staff to enforce applicable laws during the time of an emergency.	The Chief could propose administrative actions and budget allocations to respond to, prepare for, and mitigate hazards.

Public Works Director	Maintains, improves, and expands the Town's utility systems.	The Director could propose administrative actions and budget allocations to respond to, prepare for, and mitigate hazards.
Building Official	Enforces the building code and reviews building plans for compliance.	The Official could propose administrative actions and budget allocations to respond to, prepare for, and mitigate hazards.
Planning and Zoning Administrator	Enforces the planning and zoning code and reviews development for their compliance.	The Administrator could propose administrative actions and budget allocations to respond to, prepare for, and mitigate hazards.
Fire Chief	Serves as the top local fire/emergency response officer. Will lead his staff to respond to emergency situations.	The Chief could propose administrative actions and budget allocations to respond to, prepare for, and mitigate hazards.

Table 6.2-18: Programs & Policies – Town of Taylor		
General Plan	Purpose	To provide general guidance on how the land within the Town is to be developed.
	Responsible Agency	Town Council, Planning & Zoning Commission, Town Departments
	Hazards	All
	Effect on Mitigation Efforts	Provides general guidance
	Opportunities for Enhancement	During the next General Plan review, specifically, analyze how the plan can be modified to address hazards.

Table 6.2-19: Codes & Regulations – Town of Taylor		
2018 International Building Codes	Purpose	Dictates the building standards for remodels and new buildings
	Responsible Agency	Building Official, Town Manager
	Hazards	All
	Effect on Mitigation Efforts	New buildings are constructed above the floodplain. All inspected construction is built to the standard of the code.
	Opportunities for Enhancement	Continue to catch non-compliant construction while educating the community about the standards of the code.
Town Code-Planning and Zoning	Purpose	Dictates how land within the Town is to be developed.
	Responsible Agency	Planning & Zoning Commission, Town Manager, Assigned staff