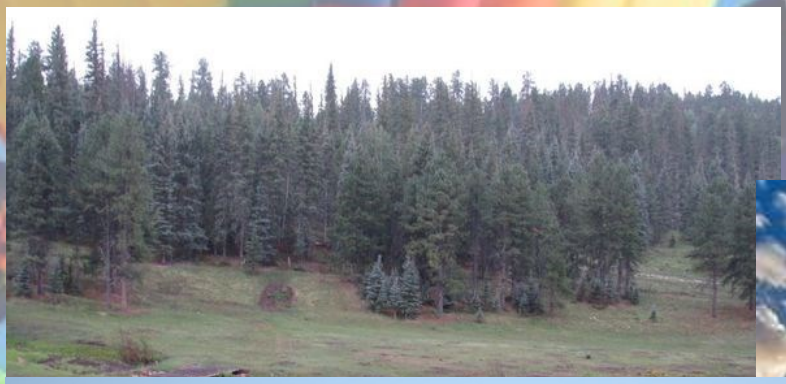
Sandoval County Natural Hazards Mitigation Plan



SEPTEMBER 2019

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EXECUTIVE SUMMARY

Across the United States, natural and human-caused disasters have led to increasing levels of death, injury, property damage, and interruption of business and government services. The toll on families and individuals can be immense and damaged businesses cannot contribute to an already declining economy. The time, money and effort involved with response to and recovery from these emergencies or disasters divert public resources and attention from other important programs and problems. Since 2000, Sandoval County citizens have endured fourteen disaster declarations. The jurisdictions that participated in this planning effort, recognize the consequences of disasters and the need to reduce the impacts of natural and human-caused hazards. The County and jurisdictions also know that with careful selection, mitigation actions in the form of projects and programs can become long-term, cost effective means for reducing the impact of natural and human-caused hazards.

The elected and appointed officials of Sandoval County, Bernalillo, Corrales, Jemez Pueblo, Jemez Springs, Rio Rancho, San Ysidro, Sandia Pueblo, Santo Domingo Tribe, and the Southern Sandoval County Arroyo Flood Control Authority demonstrated their commitment to hazard mitigation in 2018 by preparing the *Hazard Mitigation Plan, Sandoval County, New Mexico* (2019 Plan). The 2014 Plan was approved by FEMA on March 12, 2014, and will expire on the same day five years later. FEMA requires that all local and tribal hazard mitigation plans be fully updated and resubmitted to the State and FEMA for approval.

In response, the Sandoval County Fire Department's Office of Emergency Management has coordinated with multiple agencies and jurisdictions for guidance and assistance with the planning process and Plan development. Through this effort a multi-jurisdictional planning team that was comprised of veteran and first-time representatives from each participating jurisdiction, various county and local jurisdiction departments and organizations, the New Mexico Department of Homeland Security and Emergency Management, local Indian Tribes, and several other private, local, and state agencies was created. The planning team met nine times during the period of September 2018 to January 2018 in a collaborative effort to review, evaluate, and update the 2014 Plan.

The resulting *Sandoval County Hazard Mitigation Plan* will continue to guide the county and participating jurisdictions toward greater disaster resistance in full harmony with the character and needs of the community and region.

This Plan has been prepared in compliance with Section 322 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act (Stafford Act or the Act), 42 U.S. C. 5165, enacted under Sec. 104 the Disaster Mitigation Act of 2000, (DMA 2000) Public Law 106-390 of October 30, 2000, as implemented at CFR 201.6 dated October, 2007. The Plan summarizes the overall planning process, risk assessment results for selected natural hazards, and mitigation measures intended to eliminate or reduce the effects of future disasters throughout the county. The Plan was developed in a joint and cooperative venture by the members of the Sandoval County Hazard Mitigation Plan planning team.

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SECTION 1: INTRODUCTION

1.1 DMA 2000 Requirements

1.1.1 General Requirements

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

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

Under 44 CFR §201.6, local governments must have a Federal Emergency Management Agency (FEMA)-approved local mitigation plan in order to apply for and/or receive project grants under the following hazard mitigation assistance programs:

- Hazard Mitigation Grant Program (HMGP)
- Pre-Disaster Mitigation (PDM)
- Flood Mitigation Assistance (FMA)
- Severe Repetitive Loss (SRL)

FEMA, at its discretion, may also require a local mitigation plan under the Repetitive Flood Claims (RFC) program as well.

1.1.2 Update Requirements

DMA 2000 requires that local plans be updated every five years, with each plan cycle requiring a complete review, revision, and approval of the plan at both the state and FEMA levels. Sandoval County, the incorporated communities of Cochiti Lake, Corrales, Jemez Springs, Rio Rancho and San Ysidro, and the Southern Sandoval County Arroyo Flood Control Authority were all adopting jurisdictions of the current hazard mitigation plan entitled: *Hazard Mitigation Plan, Sandoval County, New Mexico* (2014 Plan).

This Plan is the result of a multi-jurisdictional hazard mitigation planning update process performed by Sandoval County, the incorporated communities of Bernalillo, Corrales, Jemez Springs, Rio Rancho and San Ysidro, the Southern Sandoval County Arroyo Flood Control Authority, and the Pueblos of Jemez, Sandia, and Santo Domingo. The result of the hazard mitigation planning process is a single, multi-jurisdictional plan that will replace the 2014 Plan.

[1] FEMA, 2013, *Local Mitigation Planning Handbook*

1.2 Official Jurisdiction Participation and Record of Adoption and Approval

Adoption of the Plan is accomplished by the governing body for each participating jurisdiction in accordance with the authority and powers granted to those jurisdictions by the State of New Mexico or the federal government. The officially participating jurisdictions in the Plan include:

County	Cities, Towns, Villages	Indian Tribes	Other Agencies
• Sandoval County	• Bernalillo, Town of • Corrales, Village of • Jemez Springs, Village of • Rio Rancho, City of • San Ysidro, Village of	• Jemez, Pueblo of • Sandia, Pueblo of • Santo Domingo, Pueblo of	• Southern Sandoval County Arroyo Flood Control Authority

The following jurisdictions are not official participants, but they did either attend planning team meetings or initially expressed an interest in being part of the plan. Reasons for their exclusion are provided.

- Village of Cuba – Coordination was performed with the Village, but no information or data for the plan was provided.
- Pueblo of San Felipe – Will be developing their own Hazard Mitigation Plan.
- Pueblo of Cochiti – Will be developing their own Hazard Mitigation Plan which will also include the Town of Cochiti Lake.
- Pueblo of Zia – Will be developing their own Hazard Mitigation Plan.
- Pueblo of Santa Ana – Will be developing their own Hazard Mitigation Plan.

No other eligible jurisdictions within Sandoval County expressed an interest in being an official participant in the Plan.

The Plan was submitted to the New Mexico Department of Homeland Security and Emergency Management (NMDHSEM) and to FEMA for review and approval. FEMA's approval letter is included in Appendix E.

A copy of the Official Resolution of Adoption from each participating jurisdiction is located in Appendix E of the Plan.

1.3 Plan Purpose and Authority

The purpose of the Plan is to identify natural hazards that impact the various jurisdictions located within Sandoval County, assess the vulnerability and risk posed by those hazards to community-wide human and structural assets, develop strategies for mitigation of those identified hazards, present future maintenance procedures for the plan, and document the planning process. The Plan is prepared in compliance with DMA 2000 requirements and represents a complete revision of the 2014 Plan. The State and FEMA review of this Plan was based on the criteria for a plan revision.

Sandoval County, the City of Rio Rancho, the Town of Bernalillo, the Villages of Corrales, the Village of Jemez Springs, the Village of San Ysidro, and the Southern Sandoval County Arroyo Flood Control Authority (SSCAFCA) are all political subdivisions of the State of New Mexico and are organized under 2011 NMSA 1978 (unannotated) / NMSA 1978 (unannotated) / Chapter 3 Municipalities, Chapter 4 Counties, and/or Chapter 73 Special Districts. The Town of Cochiti Lake is a charter organized under lease to the Cochiti Pueblo. All of the Pueblos within Sandoval County are all federally recognized Indian Tribes and are sovereign entities. As such, all of these jurisdictions are empowered to formally plan and adopt the Plan on behalf of their respective jurisdictions.

1.4 Plan Description

1.4.1 2014 Plan History

The 2014 Plan was a result of a process that included a section by section review and evaluation of the 2004 plan. Each participant was given a digital copy of the 2004 plan to update and with each meeting the Planning Team reviewed each section. The planning team agreed that the 2004 plan should be rearranged to comport with the, then recent, FEMA guidelines and crosswalk. Accordingly the format of the 2004 plan was dropped and the new sections of the 2014 Plan were rearranged to reflect what the format of the plan is currently. Sandoval County took the lead in the planning process and a planning team was formed where several meetings were convened to prepare the various plan elements. The 2014 Plan received official FEMA approval on March 12, 2014 and will be expired on March 12, 2019.

1.4.2 General Content and Arrangement

The Plan is generally arranged and formatted to facilitate its review based on the review guidelines published by FEMA [2] and is comprised of the following major sections:

Section 1: Introduction – this section provides an overall introduction to the requirements, scope, and authority of the Plan, as well as some introductory information about the County and participating jurisdictions.

Section 2: Planning Process – this section summarizes the planning process used to update the Plan, describes the assembly of the Planning Team and meetings conducted, and summarizes the public involvement efforts. Throughout the planning process it was determined that there were no increases or decreases to the vulnerability of communities due to developments that have taken place over the past five years.

Section 3: Risk Assessment – this section summarizes the identification and profiling of natural and human-caused hazards that impact the County and the vulnerability assessment for each hazard that considers exposure/loss estimations and development trend analyses.

Section 4: Mitigation Strategy – this section presents a capability assessment for each participating jurisdiction and summarizes the Plan mitigation goals, objectives, actions/projects, and strategy for implementation of those actions/projects.

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

Appendices – appendices are provided for documenting various elements of and details of the planning process.

Annexes – The Pueblos that participated have their plans listed here.

This Plan is the result of a thorough update process that included a section by section review and evaluation of the 2014 Plan by the Planning Team participants. At the onset, each participating jurisdiction was provided a digital copy of the 2014 Plan and was encouraged to print a working copy for use during the update process. With each meeting, the Planning Team systematically reviewed each section of the 2014 Plan. More discussion regarding this process is summarized in Section 2 of this Plan. In general, the 2019 Plan was compiled into sections according to the FEMA "Local Mitigation

[2] 2013, FEMA, Local Mitigation Plan Review Guide. Accessed September 2018 from: https://www.fema.gov/media-library-data/20130726-1910-25045-9160/fema_local_mitigation_handbook.pdf

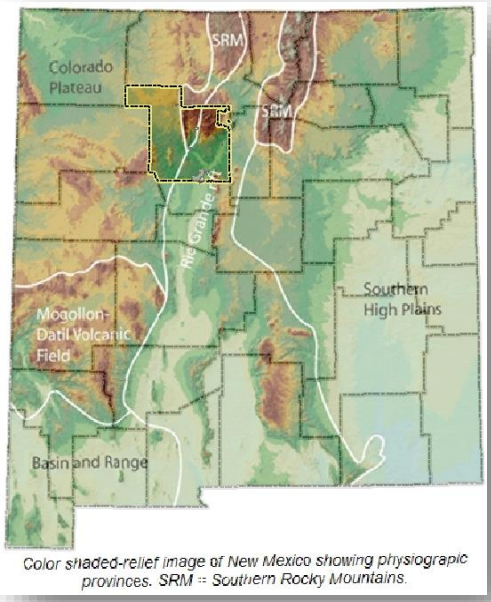
Planning Handbook" (March 2013) to meet the DMA 2000 requirements. It was agreed that the 2019 Plan should be arranged in accord with the 2014 plan to comply with the FEMA review guidelines.

1.5 County Overview

1.5.1 History

According to the County's website[3], Sandoval County was a thriving area centuries before Don Francisco de Coronado explored the area and camped near present-day Bernalillo in 1540. Prehistoric artifacts in many areas of the County date back thousands of years, with archaeological finds suggesting that Sandia Man lived and hunted in the area thousands of years ago.

Sandoval County is one of 33 counties in the state of New Mexico. The area consisting of modern-day Sandoval County was included in one of two partidos, or districts, created in the New Mexico territory. It became part of Santa Ana County, one of seven political subdivisions created in 1852. Sandoval County was first established as a separate entity on March 10, 1903, nine years before New Mexico's statehood. The area that forms Los Alamos County was separated from Sandoval County in 1949.



Color shaded-relief image of New Mexico showing physiographic provinces. SRM = Southern Rocky Mountains.

1.5.2 Geography

The County encompasses 3,716 square miles in north-central New Mexico as depicted in Figure 1-1. The County shares its boundary with Cibola, McKinley, and San Juan Counties on the west, Rio Arriba County on the north, Los Alamos and Santa Fe Counties on the east, and Bernalillo County on the south. The County limits generally extend from longitude 106.24 to 107.63 degrees west and latitude 35.21 to 36.22 degrees north.

The county is topographically diverse with average elevations that range from approximately 5,000 feet along the southern edge of the Rio Grande Valley to over 11,000 feet at Redondo Peak within the Valles Caldera National Preserve at the northeastern quadrant. As illustrated by the figure above, the County is located at the southern tip of the Southern Rocky Mountains physiographic province with the rest being split between the Colorado Plateau (western half) and Rio Grande Rift (eastern half) provinces.[4]

The Jemez and Nacimiento Mountain ranges are located in northern Sandoval County. A small portion of the Sandia Mountain range extends into the southeastern corner of the County. Other topographic characteristics include rolling foothills, small and large river valleys, arroyos, and large flat areas of high elevation desert scrub. The Rio Puerco (western county), Jemez River (central county), and Rio Grande (eastern county) comprise the three largest river in systems in the County. The Rio Puerco, an intermittent river, traverses the west-central portion of the County. The Jemez River emanates from the Jemez and Nacimiento Mountains flowing through the north half of the central County until it's confluence with the Rio Grande. The Rio Grande runs through the eastern portion of the County within

[3] Sandoval County, 2018, URL at: http://www.sandovalcountynm.gov

[4] NM Bureau of Geology and Mineral Resources website at: http://geoinfo.nmt.edu/tour/provinces/home.html (*Accessed September 2018*)

the Rio Grande Rift, and is the largest of the three rivers. The broad floodplain of the Rio Grande contains flood-irrigated agricultural fields crisscrossed with acequias, or irrigation ditches. There are also numerous other perennial, intermittent, and ephemeral (arroyo) watercourses within the County.

The northern and western portions of the County lie within the Colorado Plateau area, which is comprised of high desert vegetation species such as sagebrush, chamisa, four-wing saltbush, and juniper scattered among grasses such as Indian rice and galleta grass. The vegetation of the Colorado Plateau is well adapted to the cold winters, hot summers, and dry climate.

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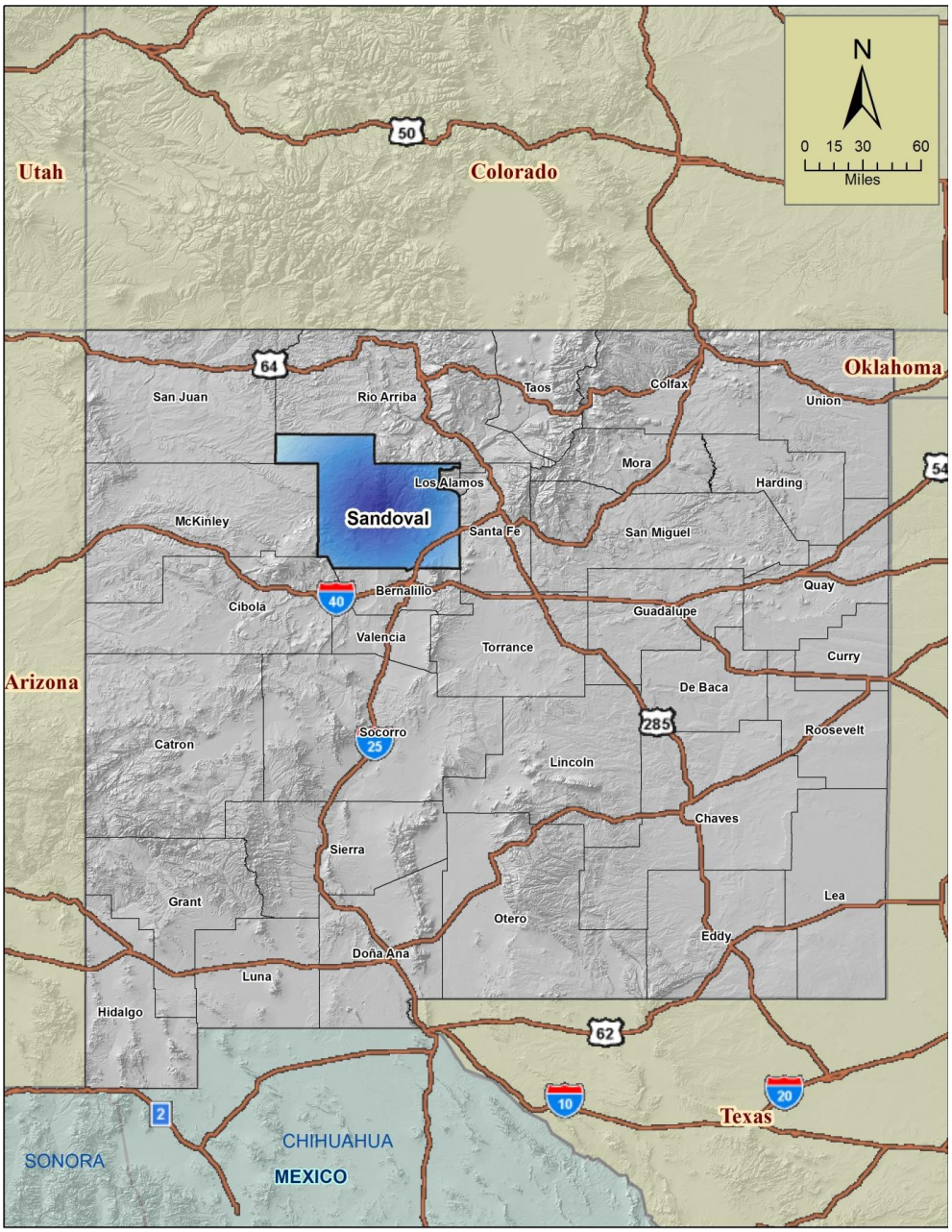

Figure 1-1: Vicinity Map

1.5.3 Transportation

Interstate 25 (I-25) cuts across the southeast corner of the County providing easy access to the metropolitan areas of Albuquerque and Santa Fe from the communities of Bernalillo, Placitas, and Algodones. U.S. Highway 550 extends diagonally across the county connecting the northwestern and southeastern portions of the County and intersects with I-25 in the Town of Bernalillo. New Mexico Highway 4 at San Ysidro provides access for the Jemez area to U.S. 550 as well as to NM 285 to the northeast. NM 16 and NM 22 provide access to I-25 for Cochiti Pueblo, the Town of Cochiti Lake, and Santa Domingo Pueblo.

The Middle Rio Grande Council of Governments owns the rail lines that cross Sandoval County for approximately 31 miles beginning at the southern County line just southeast of Corrales, and continuing north-northeast to Santo Domingo Pueblo where it then follows Interstate 25 approximately 6 miles east to the County line. These rail lines are utilized by Amtrak, Burlington Northern Santa Fe (BNSF), and the New Mexico Rail Runner Express, a local commuter service that runs between Santa Fe, NM and Belen, NM.

There are no major airports within Sandoval County, but several general aviation airports are located within 10 miles of the county's southern and eastern borders. Albuquerque International Sunport is the closest commercial airport and it is located approximately 22 miles south of the Town of Bernalillo.

Figure 1-2 Transportation Routes Map, shows all the major transportation routes and the airports near Sandoval County.

1.5.4 Climate

Climatic statistics for weather stations within Sandoval County are produced by the Western Region Climate Center[5] and span records dating back to the early 1900's. Four climate stations representing geographically different areas of Sandoval County are shown on Figures 1-3, 1-4, 1-5, and 1-6. These figures present graphical depictions of temperature variability and extremes throughout the year for the Corrales, Jemez Springs, and Cuba Stations, respectively. In general, average temperatures within Sandoval County range from below freezing during the winter months to over 90 degrees Fahrenheit during the hot summer months. The severity of temperatures in either extreme is highly dependent upon the location, and more importantly the altitude, within the County.

Precipitation throughout Sandoval County is governed to a great extent by elevation and season of the year. Average annual precipitation for most of the County ranges between less than 10 inches to over 20 inches. According to the New Mexico Climate Center (NMCC, 2012)[6] , summer rains fall almost entirely during brief, but frequently intense thunderstorms, which are often accompanied by strong winds, blowing dust, and hail storms. The general southeasterly circulation from the Gulf of Mexico brings moisture for these storms into New Mexico, and strong surface heating combined with orographic lifting

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[5] Most of the data provided and summarized in this Plan are taken from the WRCC website beginning at the following URL: https://wrcc.dri.edu/narratives/NEWMEXICO.htm (*Accessed September 2018*)

[6] New Mexico Climate Center, 2018, *Climate of New Mexico*. New Mexico State University, Las Cruces: https://weather.nmsu.edu/climate/about/ (*Accessed September 2018*)

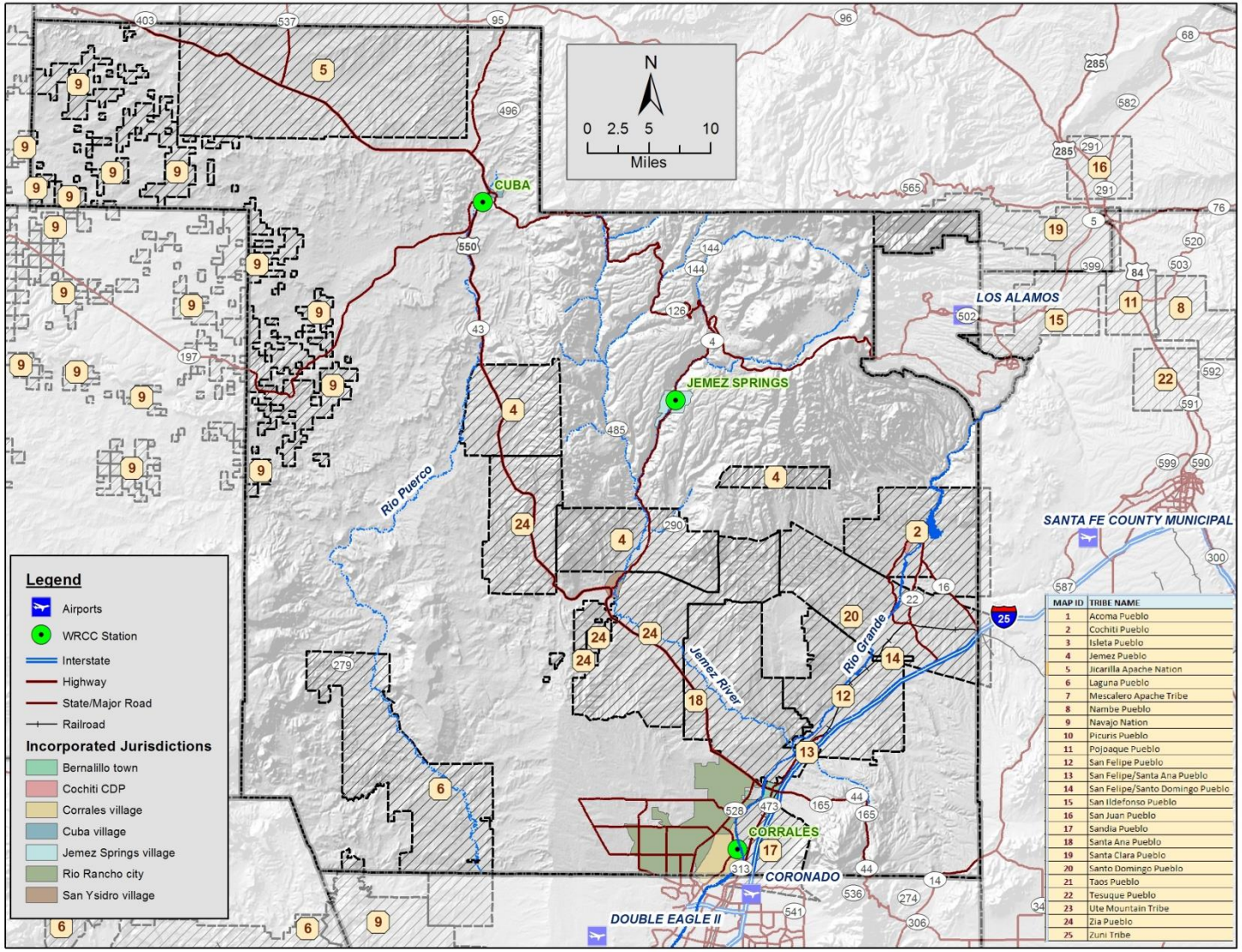


Figure 1-2: Transportation Routes Map

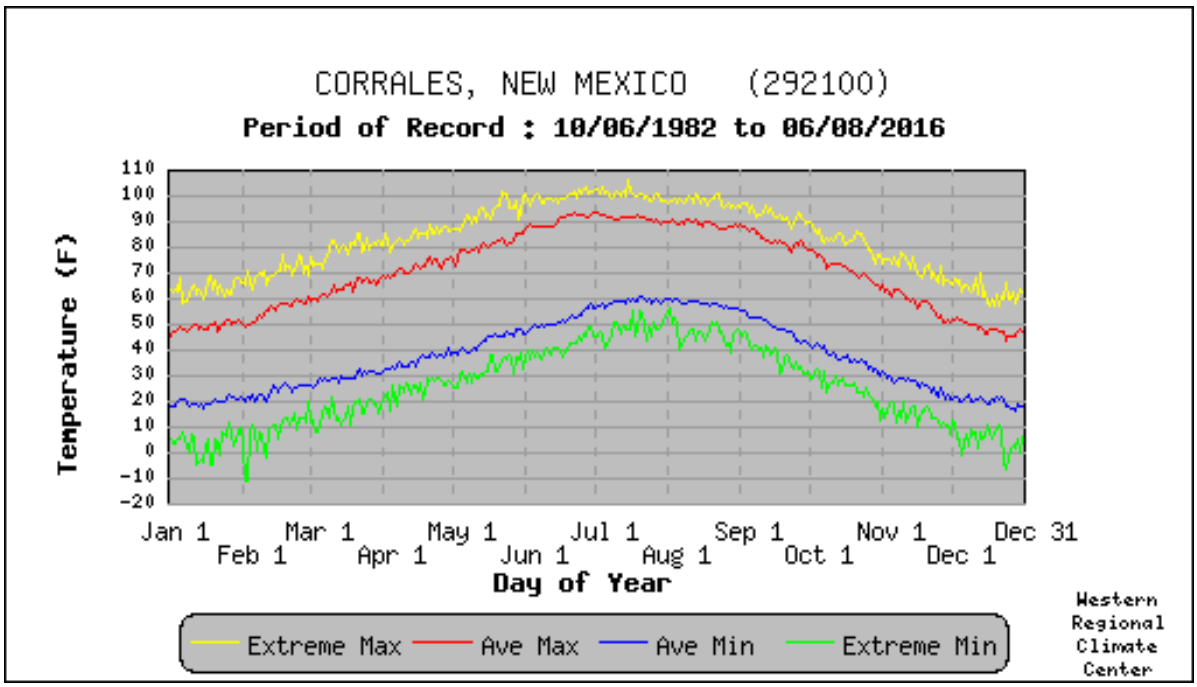


Figure 1-3: Daily Temperatures and Extremes for Corrales Station, New Mexico
(*Accessed September 2018*)

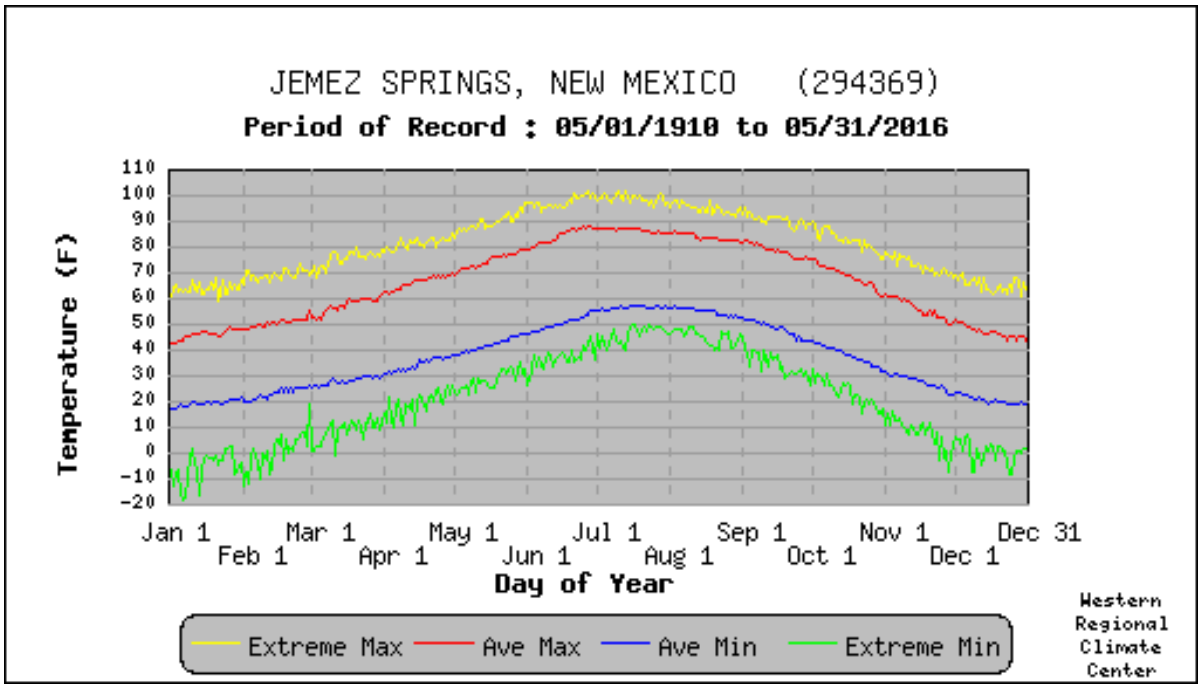


Figure 1-4: Daily Temperatures and Extremes for Jemez Springs Station, New Mexico
(*Accessed September 2018*)

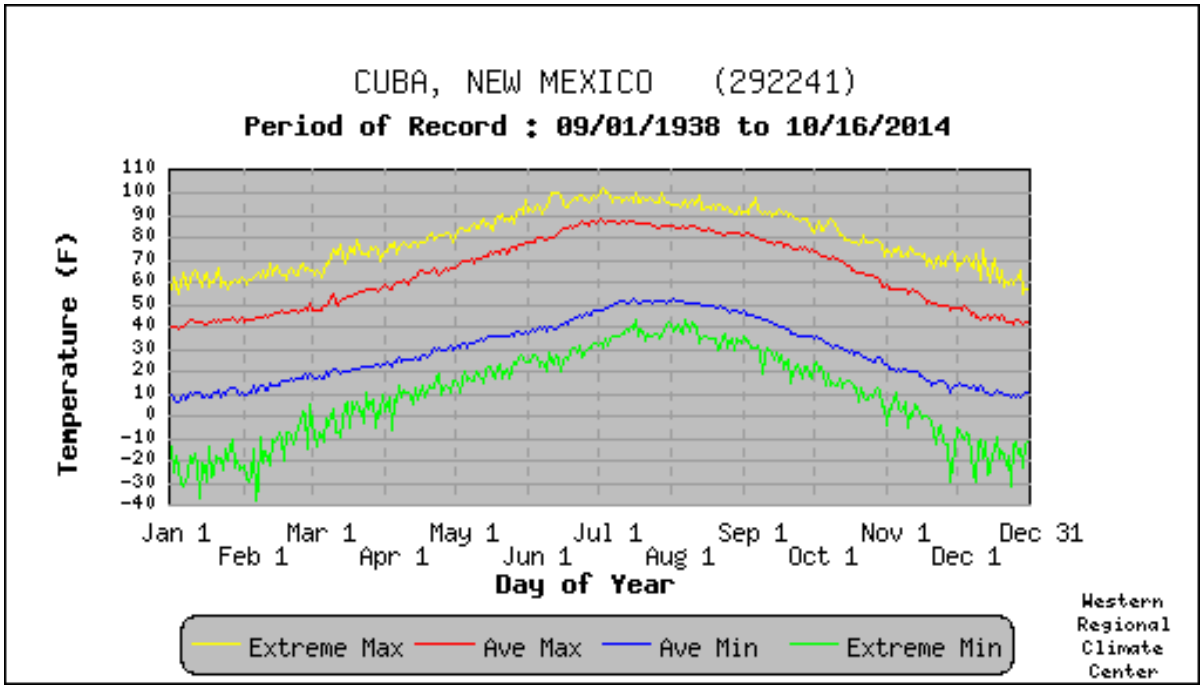


Figure 1-5: Daily Temperatures and Extremes for Cuba Station, New Mexico
(*Accessed September 2018*)

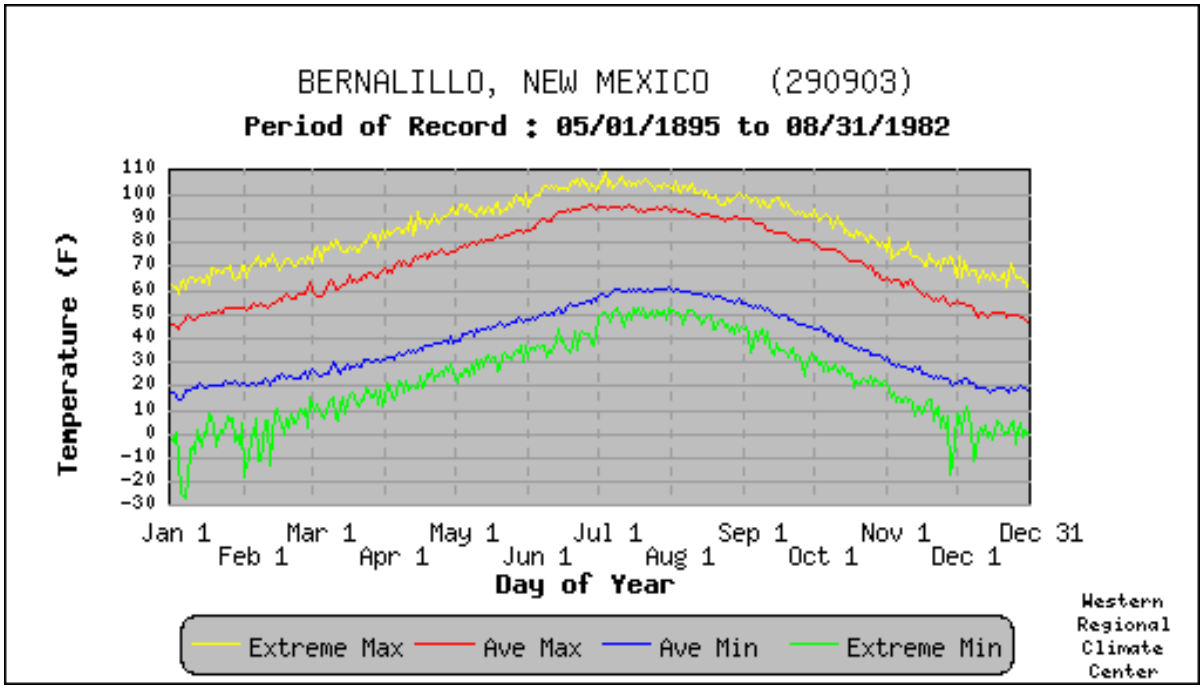


Figure 1-6: Daily Temperatures and Extremes for Bernalillo Station, New Mexico
(*Accessed September 2018*)

As the air moves over higher terrain causes air currents and condensation. July and August are the rainiest months, with from 30 to 40 percent of the year's total moisture falling at that time. During the warmest 6 months of the year (May through October) total precipitation averages around 60 percent.

Winter precipitation is caused mainly by frontal activity associated with the general movement of Pacific Ocean storms across the country from west to east. As these storms move inland, much of the moisture is precipitated over the coastal and inland mountain ranges of California, Nevada, Arizona, and Utah. Much of the remaining moisture falls on the western slope of the Continental Divide and over northern and high central mountain ranges. For much of the County, winter is the driest season for the portion west of the Continental Divide and the higher elevation areas, where most of the winter precipitation falls as snow. In the lower elevations winter precipitation may occur as either rain or snow.

Figures 1-3, 1-4, 1-5, and 1-6 show tabular temperature and precipitation statistics for the Corrales, Jemez Springs, Cuba Stations, and Bernalillo respectively. Statistics for other stations within the County and surrounding area may be viewed by accessing the WRCC website.

1.5.5 Population

As of July 2011, the total population estimated for Sandoval County was 134,259. Table 1-1 summarizes 2000 and 2010 Census population statistics for the incorporated cities/towns/villages and Indian Pueblos within the County. A review of Table 1-1 indicates a 46.3% increase in population for the 2000-2010 period. The majority of this increase is located within or near the City of Rio Rancho, Town of Bernalillo and Village of Corrales. Populations in Jemez Springs and San Ysidro actually decreased over that decennial period.

Table 1-1: Population estimates for Sandoval County jurisdictions and Indian Pueblos

Jurisdiction	2000	2010
Sandoval County – TOTAL	89,908	131,564
Sandoval County – Unincorporated	22,995	26,220
Cities, Towns and Villages		
Bernalillo, Town of	6,611	8,320
Cochiti Lake, Town of (Cochiti Lake CDP)	N/A	569
Corrales, Village of	8,329	8,549
Cuba, Village of	590	731
Jemez Springs, Village of	375	250
Rio Rancho, City of	51,765	87,521
San Ysidro, Village of	230	193
Indian Pueblos		
Cochiti Pueblo	1,482	1,424
Jemez Pueblo	1,958	1,918
Sandia Pueblo	4,436	5,471
San Felipe Pueblo	3,185	3,241
Santa Ana Pueblo	514	935
Santa Domingo Pueblo	3,145	3,169
Zia Pueblo	578	901

Census estimation numbers retrieved September 2018 from:
https://factfinder.census.gov/faces/nav/jsf/pages/community_facts.xhtml?src=bkmk

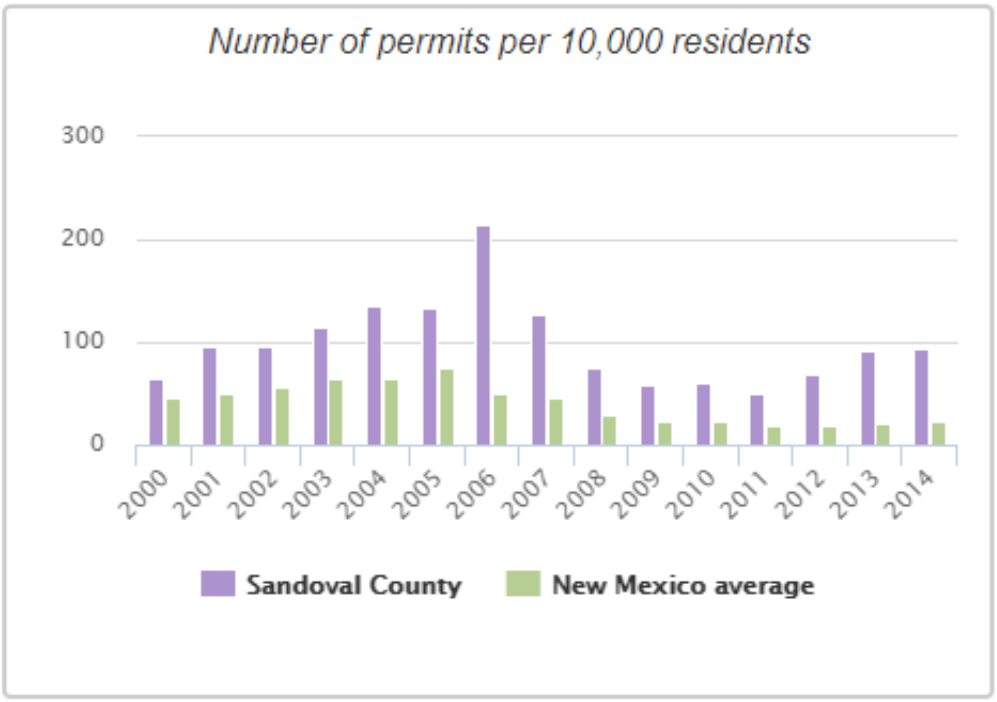
The Mid-Region Council of Governments of New Mexico (MRCOG) is a multi-county governmental agency that provides planning services in the areas of transportation, agriculture, workforce development, employment growth, land-use, water, and economic development, to Bernalillo, Valencia, Torrance, and Sandoval Counties. According to MRCOG, Sandoval County population projections for 2015 and 2040 were estimated at 138,928 and 213,929, and represent a 53.98% increase in population for the county[7]. Figure 1-7 presents a graphic depiction of population increase projections for 2025 using 2008 projections as a base.

1.5.6 Economy

The Sandoval County economy is primarily fueled by retail and wholesale sales, manufacturing and tourism, with all of the other additional industries growing to keep up. As indicated by Table 1-1, growth in Sandoval County on a whole has been extreme with over 46% population growth over the period of 2000 to 2010. This rapid growth has fueled Sandoval County's economy and has attracted many large companies.

Figure 1-8 presents an estimate of the number of building permits issued for Sandoval County during the period of 2000 to 2014, as compiled by City-data.com. For the entire period, county permits have outpaced the state average by nearly double. Since the peak in 2006, the trend was one of a general decline, but is trending back up and is still well above the statewide average in building permits issued since the housing boom of the 2005-2006 timeframe.

According to MRCOG, the top employers in the County include Intel Corporation, Safelite, Alliance Data, Rio Rancho Public Schools, Pueblo of Santa Ana, Bernalillo Public Schools, City of Rio Rancho, and Walmart.



Source: City-data.com, 2018 as accessed at: http://www.city-data.com/county/Sandoval_County-NM.html

Figure 1-7: Building permits for Sandoval County from 2000 to 2014

[7] Mid-Region Council of Governments, Five Year Comprehensive Economic Development Strategy (CEDS) *Accessed September 2018*: https://www.mrcog-nm.gov/economic-development/five-year-economic-development-strategy-ceds

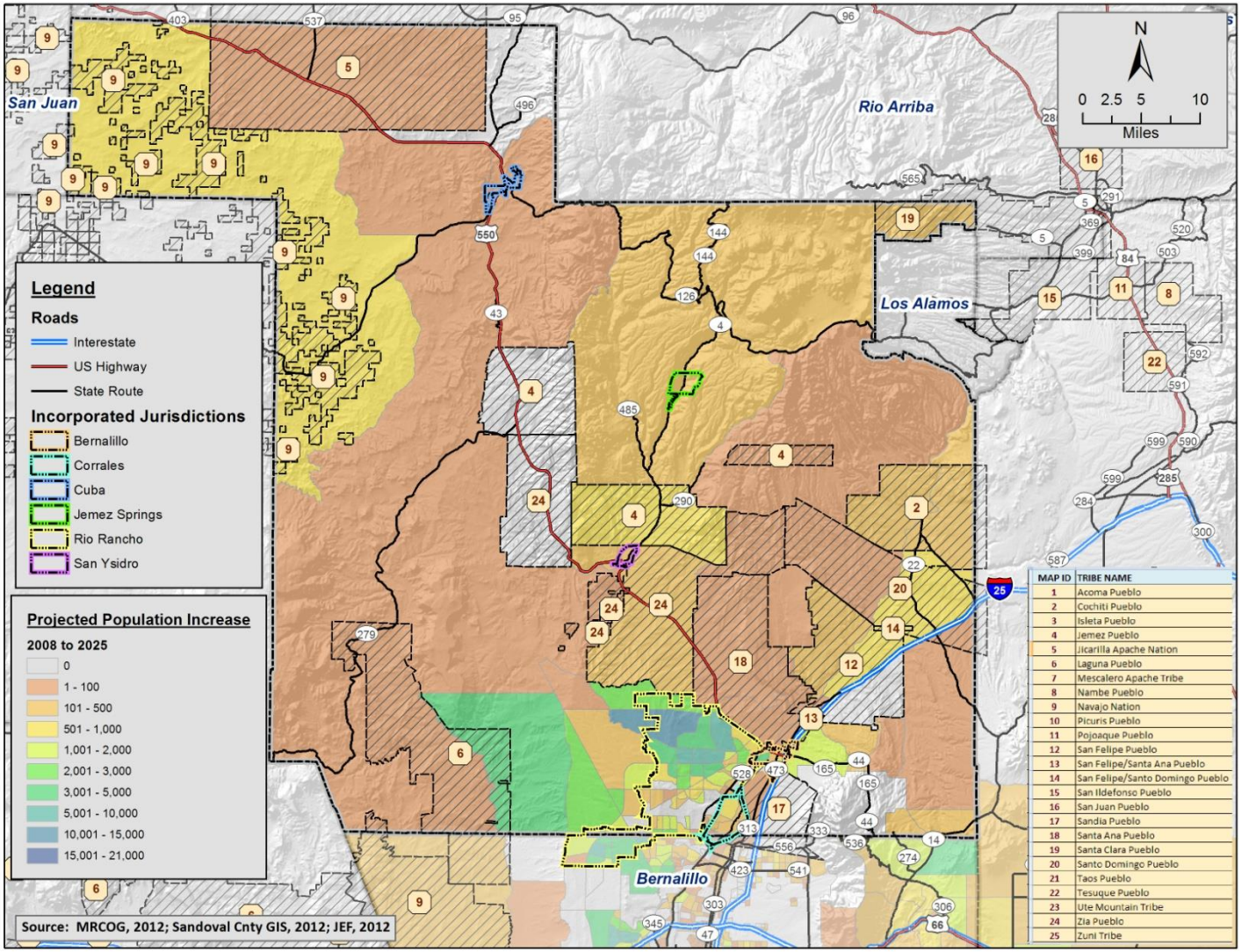


Figure 1-8: 2008 to 2025 Population Increase Projections for Sandoval County

As of December of 2017, the estimated Labor Force for Sandoval County is 63,918 with an unemployment rate of approximately 6.2%[8]

Table 1-2 provides a listing of gross receipts for fiscal year 2017 as reported by the New Mexico Taxation and Revenue Department.[9]

Table 1-2: 2017 Gross receipts for Sandoval County

Category	Number of Receipts	2017 Gross Receipts
Agriculture, Forestry, Fishing and Hunting	82	$ 2,182,277.00
Mining and Oil and Gas Extraction	47	$ 2,274,543.00
Utilities	179	$ 34,410,352.00
Construction	2480	$ 82,002,176.00
Manufacturing	797	$ 42,356,094.00
Wholesale Trade	910	$ 44,017,152.00
Retail Trade	3220	$ 190,907,880.00
Transportation and Warehousing	122	$ 3,956,786.00
Information and Cultural Industries	1218	$ 34,567,469.00
Finance and Insurance	157	$ 3,902,119.00
Real Estate and Rental and Leasing	969	$ 16,213,059.00
Professional, Scientific and Technical Services	1912	$ 27,155,038.00
Management of Companies and Enterprises	25	$ 1,257,676.00
Admin and Support, Waste Mgt and Remed.	895	$ 10,090,849.00
Educational Services	211	$ 2,984,223.00
Health Care and Social Assistance	933	$ 39,742,330.00
Arts, Entertainment and Recreation	223	$ 2,177,534.00
Accommodation and Food Services	520	$ 42,783,083.00
Other Services (except Public Admin)	2809	$ 40,065,700.00
Public Administration	10	$ 74,755.00
Unclassified Establishments	227	$ 625,284,594.00
Totals	**17,946**	**$1,248,405,689.00**

[8] New Mexico Department of Workforce Solutions, Labor Analysis Statistics and Economic Research website, URL at: https://www.jobs.state.nm.us/vosnet/analyzer/results.aspx?enc=HofuwY22SoLTS/uC+bpmizGZkm52zV+sR+lKAe/bUj0= (*Accessed September 2018*)

[9] New Mexico Taxation and Revenue Department website, URL at: http://www.tax.newmexico.gov/gross-receipts-taxes.aspx (*Accessed September 2018*)

1.5.7 Land Ownership/Management

According to 2018 Bureau of Land Management records, land ownership/management within Sandoval County is comprised of approximately 34.5% Indian/Tribal, 19.9% Private, 3.5% State, and 42.1% Federal interests. Table 1-3 summarizes the general land ownership statistics for Sandoval County and Figure 1-9 (*next page)* depicts the geographic distribution of the holdings.

Ownership / Management Agency or Entity	Land Area (Sq. Miles)	Percent of Sandoval County
Indian/Tribal	1,300.8	34.0%
National Park Service	176.2	5.0%
New Mexico State Game and Fish	4.9	0.5%
New Mexico State Park	0.6	0.1%
Other Federal Agency	3.7	0.2%
Private	740.5	20.0%
State of New Mexico	118.0	3.0%
US Bureau of Land Management	778.7	21.0%
US Department of Defense	3.4	0.2%
USDA Forest Service	593.1	16.0%
Source: U.S. Bureau of Land Management, 2018; Sandoval County GIS Department, September 2018		

1.5.8 Unincorporated Area Growth Trends

Development activity over the last five years in the unincorporated area of Sandoval County has focused mainly in Placitas and west of Rio Rancho. In Placitas, the Petroglyph Trails Master Planned area is beginning to come to fruition. This includes residential development of differing densities plus some commercial and light industrial. The areas to the west of Rio Rancho is a slowly developing residential area with scattered land ownership.

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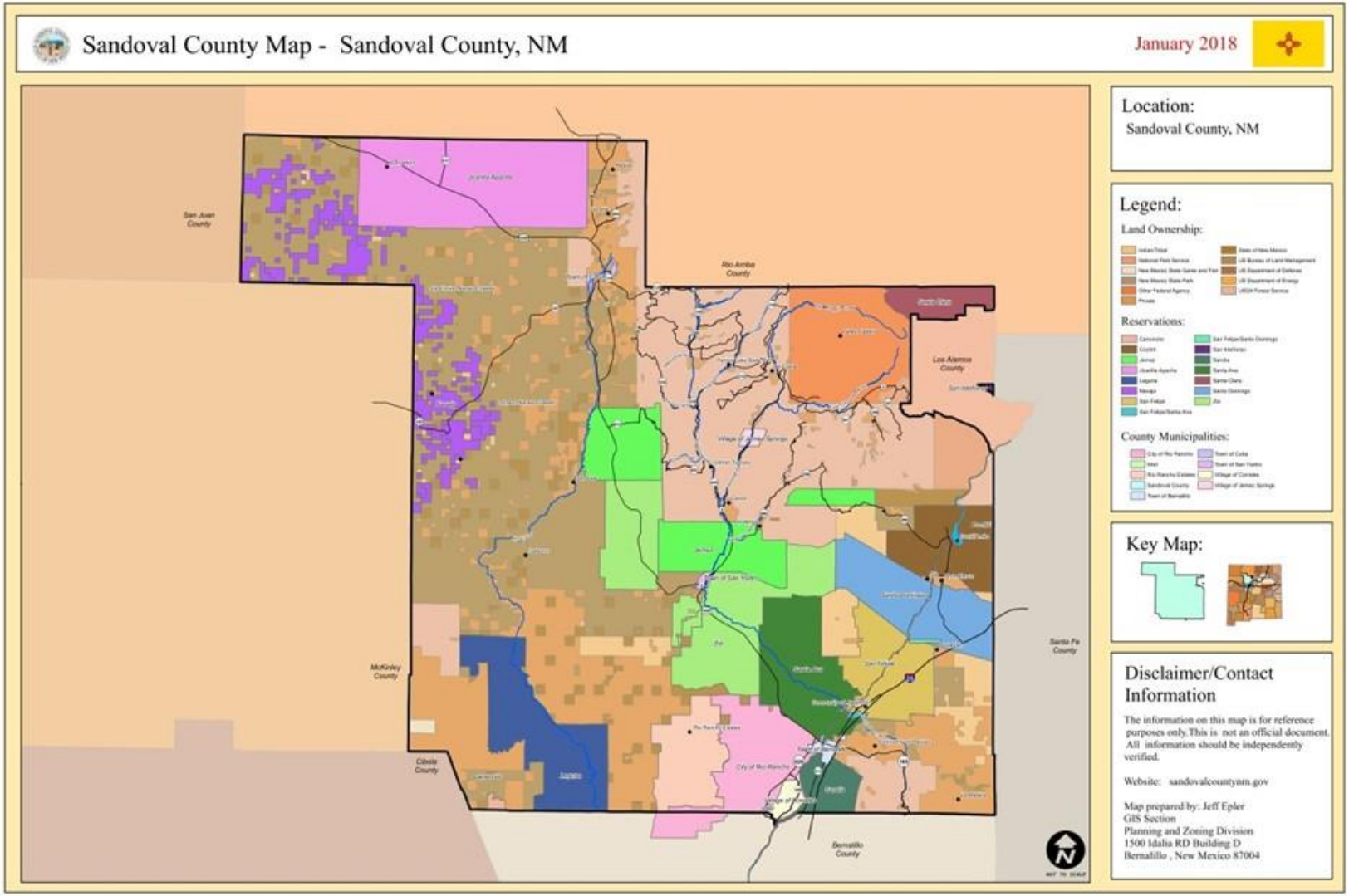


Figure 1-9: Land Ownership/Management within Sandoval County
(*Accessed September 2018 from http://www.sandovalcountynm.gov/wp-content/uploads/2018/01/SandovalCountyMap.pdf*)

1.6 Jurisdictional Overviews

The following are brief overviews for each of the participating jurisdictions in the Plan.

1.6.1 Bernalillo, Town of

History – The Town of Bernalillo, once called Las Cocinitas (the little kitchens) was founded near the Rio Grande in 1695 by Don Diego de Vargas. The Town boasts being the historical center of the State of New Mexico with occupation reaching back almost a thousand years. By the end of the 1700's, Bernalillo had progressed from a string of haciendas along the river to a commercial trade center among the pueblos and Mexican settlers. Bernalillo is the colonial heart of the County and serves as the current county seat.

Geography – The Town of Bernalillo is located in the southeastern quadrant of Sandoval County. At an elevation of 5,052 feet, the Town is situated within the Rio Grande Valley, with the Rio Grande passing north to south through the heart of the Town. The Town occupies approximately 5.3 square miles of land with its geographic centroid at latitude 35.31 degrees north, longitude 106.55 degrees west. Interstate 25 runs north and south along the Town's eastern boundary. U.S. Highway 550 begins at I-25 and passes westerly through the Town. Other major roads include NM 313 and 473 through the eastern portion of Bernalillo and NM 528 through the western portion of Bernalillo. The Burlington Northern Santa Fe Railroad also passes through the Town on a north-south alignment near NM 313.

The Rio Grande passes from north to south through the heart of the Town. The Arroyo Venada and another smaller unnamed arroyo pass from west to east through the western side of Town until their confluence with the Rio Grande. The Bernalillo and Sandia Acequias pass through the eastern portion of Town roughly parallel to the Rio Grande, delivering irrigation water. No other major watercourses are located in the City.

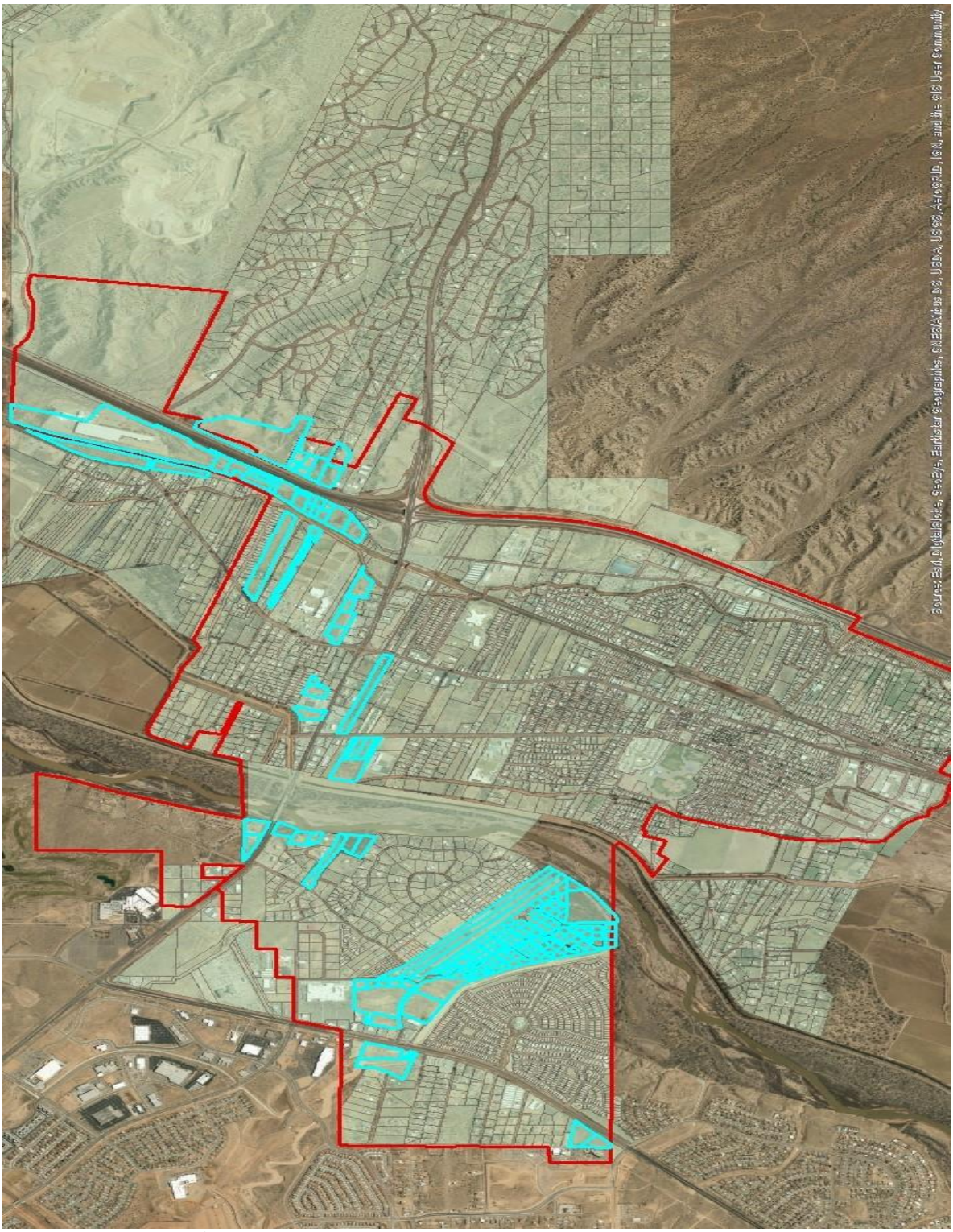
Most of the land within the City boundaries is privately held, except for the State owned Coronado State Monument and State Park, and a portion of Sandia Pueblo Reservation.

Economy – The 2018 gross receipts for Bernalillo are estimated at $6.5 million[10] and account for almost 11% of the total gross receipts for the County. The 2018 top producing industries for the City were retail trade, construction, and manufacturing. A significant portion of the Town's economy is provided by tourism, as the Town is the site of the Fiestas de San Lorenzo in August and the Mountain West Beer Fest in September. The Town also contains the Abenecio Salazar Historic District and the historic Our Lady of Sorrows Church and Convent. The New Mexico Rail Runner Express commuter rail line connects Bernalillo with Albuquerque and Santa Fe has helped to create a demand for residential development and associated retail and service needs. As of February 2018, the unemployment rate for the Albuquerque Metropolitan Statistical Area, which includes Bernalillo, was 4.8%.

Growth Trends – Over the last five years, the Town of Bernalillo has experienced the majority of its residential growth on the west side of the Rio Grande, in the Santiago housing development and along Sheriff's Posse Road. The majority of commercial development has been along Highway 550 in the form of restaurants, a car wash, a large storage facility, and several buildings at MCT.

Presently, there are talks of a large development called "At Rio" that will connect the new Bosque Brewery site to development on the south side of Highway 550 with a walking path that leads under the bridge. There are also many lots available for development in the Venada Plaza near Walmart and along Highway 528 south of the Chili's restaurant.

[10] New Mexico Taxation and Revenue Department, *op. cit.*



Source: Town of Bernalillo

Figure 1-10: Growth Areas for the Town of Bernalillo

1.6.2 Corrales, Village of

History – The Village of Corrales has a history that extends as far back as 500 A.D. when the ancestors of the present-day Indian Pueblos lived within the fertile Rio Grande valley. The Village has been a farming area since before the Spanish Colonial period and the Village leaders have aggressively strived to retain a rural lifestyle to this day by enacting policies to protect their existing rural residential environment. The Village was incorporated September 17, 1971 and in January 1, 2005, the Sandoval County limits were changed to include all of the incorporated area within Sandoval County.

Geography – The Village is bordered on the east by the Rio Grande and across the river by the Sandia Indian Reservation. To the south is the City of Albuquerque while to the west and north is the City of Rio Rancho. The Village occupies approximately 9.7 square miles of land with its geographic centroid at approximately at latitude 35.24 degrees north, longitude 106.62 degrees west. NM 448 passes through the center of the village, parallel to the Rio Grande, with connection to NM 528 at the north and south ends of the village.

The majority of Corrales is located within the geologic floodplain of the Rio Grande, with the western edges of the village located along the terrace slope. The Village is protected from Rio Grande flooding by the Upper Corrales Riverside Drain Levee. Approximately 2/3 of the Village of Corrales lies east of the Corrales Main Canal, constructed in 1936 by the Middle Rio Grande Conservancy District (US Bureau of Reclamation) as part of a modern farmland irrigation facility. The Corrales Main Canal delineates an ancient river bench, with land to the west of it rising steeply to the municipal boundary commonly referred to as "the escarpment"—another river bench.

Land lying east of the Main Canal is protected by an earthen levee constructed by the United States Corps of Engineers in 1998. Most of the properties lying east of the Corrales Main Canal are designated X(shaded) referring to an area of shallow flooding of 12" or less in a 100 year storm event; some areas are designated X, an area in the 500 year event flood zone. There are properties in the northern portion of Corrales that lie in AO or AH flood zones, primarily in proximity to the Harvey Jones and Ducelina Curtis Channels, and areas bounded by the flood control facilities.

Properties in the steep sandhills of western Corrales are protected from flooding by Southern Sandoval County Flood Control Authority storm water control facilities—a collection of dams, detention ponds, hard piping, flood control desilting ponds and channels. However the steep terrain presents challenges to terrain and storm water control during typical highly localized storm events. The soil is highly erodible, requiring careful storm water management, detention of storm water, and both public and private construction to affect protection

According to BLM, all land within the Village is privately held. The Village of Corrales owns scattered properties, used for municipal purposes such as recreational facilities, public safety and administration, fire and emergency response, public library, and drainage facilities. The Middle Rio Grande Conservancy District owns a ten-mile long swath of land – approximately 1,000 acres) serving as a buffer between the Rio Grande and the developed areas of the Village. The Middle Rio Grande Conservancy District manages the "Bosque" in cooperation with the US Corps of Engineers and the Village.

Economy – The 2017 gross receipts by the Corrales were estimated at $2.2 million. The 2011 top producing industries for the Village were professional, scientific, and technical services, retail trade, and construction. According to the BBER, Corrales is a wealthy residential community with a very small economic base. In 2007, over 80 percent of the residents worked outside of the Village and the BBER estimated that about one of every five dollars spent by residents and businesses, was spent in

Corrales. As of February 2018, the unemployment rate for the Albuquerque Metropolitan Statistical Area, which includes Corrales, was 4.8%.[11]

Growth Trends – Corrales has had no major development in the last four to five years, due to the struggling economy. The Village has had one new commercial building constructed and some residential construction, with the majority of permits being issued for remodels and additions.

For the next five years, the Village anticipates the addition of water tank at Salce Park North on Sagebrush, and at the top of Angel Road. Funding for the engineering and design of the water tank at Angel Hill has been secured in the amount of $85,000. The village is also planning to continue to seek funding for extension of fire suppression water lines and hydrants off of Village owned fire suppression water tanks.

Corrales also has plans to add a fire substation at 2200 Loma Larga. The Village purchased property on Double S Road and is working to create a public works yard and transform the home on the property in to a Village. In the Village of Corrales at Don Julio Road, NM 528 and Northern Boulevard, in Rio Rancho, has commercially zoned property but no development has started in the commercial area. Corrales will continue to seek funding to improved flood drainage and retention to help lower the risk of damaging floods. Corrales currently has HMPG funding to improve the Salce Basin flood area and work should be completed by December 2019. Corrales is also seeking funding for generators for the Village Municipal Complex and the fire substation. Neither of this buildings have any back up power supply. Corrales has added a waste water system along Corrales Road from Dixon Road south to Albuquerque. This is to help assist commercial and residential properties as Corrales has no domestic drinking water system. Citizens still have a septic tank on this system but can vacate their leach fields. Corrales will continue to seek funding to expand the waste water system. Figure 1-11 shows the land use for the Village of Corrales.

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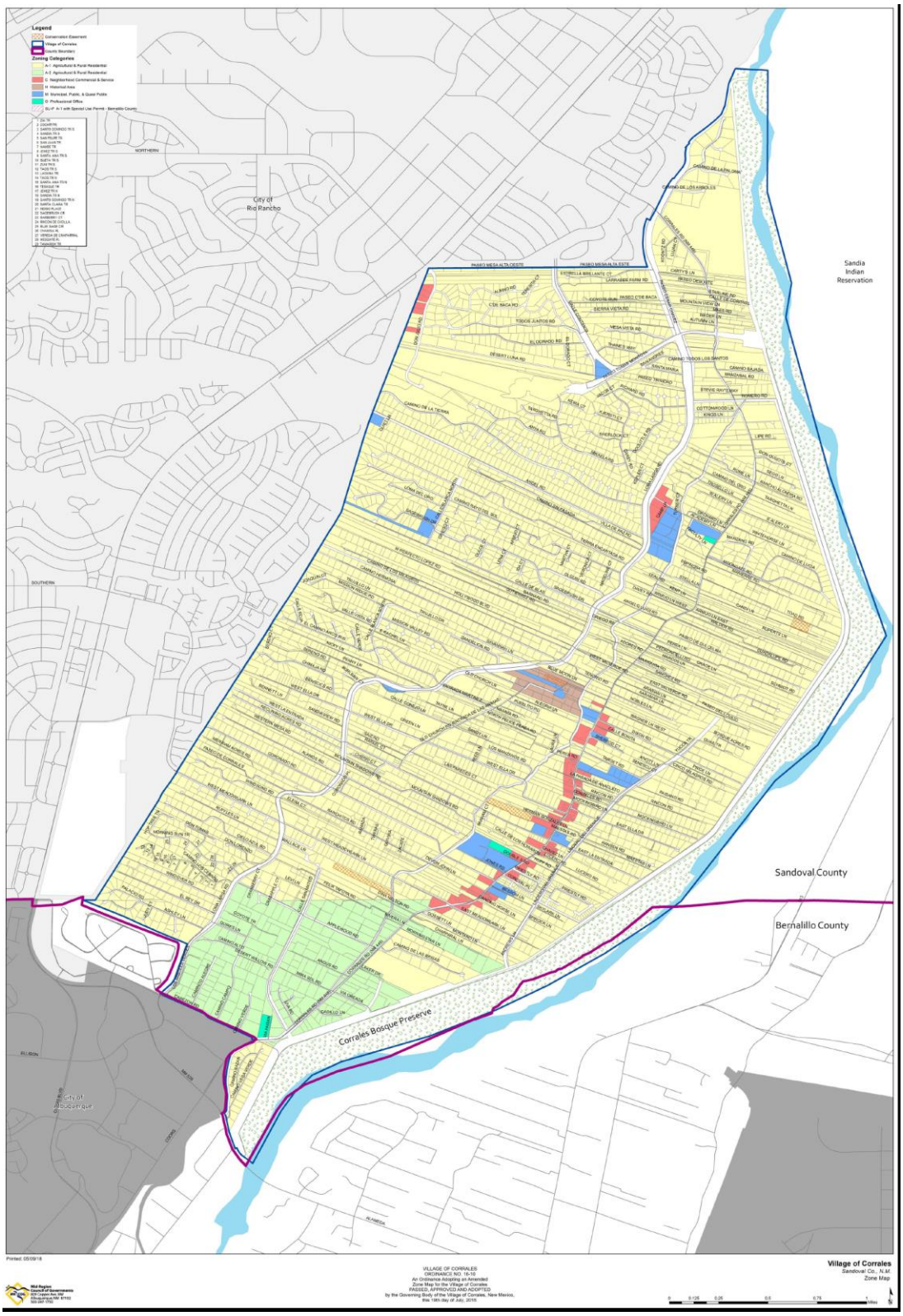
[11] Shaleen, Tracy., 2016 *Going: Local Unemployment Rates for New Mexico Municipalities*, accessed September 2018, at: www.dws.state.nm.us/Portals/0/DM/LMI/Going_Local_Unemployment_Rates_for_NM_Municipalities.pdf



Source: Village of Corrales

Figure 1-11: Land Use for the Village of Corrales

1.6.3 Jemez, Pueblo of

History – The Pueblo of Jemez (pronounced "Hay-mess" or traditionally as "He-mish") is one of the 19 pueblos located in New Mexico. It is a federally recognized American Indian tribe with 3,400 tribal members, most of whom reside in a village that is known as "'Walatowa" (a Towa word meaning "this is the place"). Having originated from a place called "Hua-na-tota," our ancestors, the Jemez Nation, migrated to the "Canon de San Diego Region" from the four-corners area in the late 13th century. By the time of European contact in the year 1541, the Jemez Nation was one of the largest and most powerful of the pueblo cultures, occupying numerous pueblo villages that were strategically located on the high mountain mesas and the canyons that surround the present pueblo of Walatowa.

Running, an old Jemez pastime and ceremonial activity grew even more popular than it had been before World War II. Prior to the advent of television at Jemez, tales of running feats had been a major form of entertainment on winter nights. Races continued to hold their ceremonial place as the years passed, their purpose being to assist the movement of the sun and moon or to hasten the growth of crops, for example. At the same time, they became a popular secular sport. The year 1959 saw the first annual Jemez All-Indian Track and Field Meet, won by runners from Jemez seven times in the first ten years. A Jemez runner, Steve Gachupin, won the Pikes Peak Marathon six times, in 1968, setting a record by reaching the top in just 2 hours, 14 minutes, 56 seconds.

As much as 70% of the 1,890 Jemez people were living on their reservation lands in the early 1970s. Though by then an increasing number were switching to wage-earning work rather than agriculture, the residents continued to raise chile peppers, corn, and wheat, to speak their native language, and to maintain customary practices.

Geography – The Pueblo of Jemez is located in Sandoval County in north-central New Mexico approximately 55 miles north of Albuquerque and 75 miles west of Santa Fe. The pueblo is situated along the Jemez River at the southern end of the Canon de San Diego. The majority of the tribal members live in the village of Walatowa. The Jemez tribal trust lands consist of four non-adjoining land parcels totaling approximately 89,645 acres. The main arterial highways serving the Pueblo of Jemez lands are New Mexico State Road 4, U.S. 550; and State Road 290. Predominant land uses at the pueblo are for agriculture and livestock. There are approximately 2,100 acres of irrigated cropland and 6,500 acres for grazing. Pueblo of Jemez parcels are bordered by Zia Pueblo, BLM land and the Santa Fe National Forest. Jemez Pueblo are coordinates 35°36'38.0"N 106°43'39.0"W

Economy – The Pueblo of Jemez owns and operates several thriving enterprises, through the Jemez Community Development Cooperation. Established in 2012, Walatowa Timber Industries is a majority native owned enterprise of the Jemez Pueblo in partnership with Terry Conley Company. Walatowa Timber Industries strives to provide economic opportunities for the Jemez Pueblo members and local communities while sustainably harvesting timber from area forest-restoration projects located in the Santa Fe National Forest, Valles Caldera National Preserve and Jemez Pueblo Tribal Lands. The manufacturing facility located in the Jemez Pueblo has grown to include multiple milling operations along with processing plants for vigas, latillas, corbels, firewood, landscaping mulch and animal bedding. The newest addition is a wood pellet plant that produces between 10 and 20 tons of wood pellets a day. Other enterprises include the High Performance Adobe Production Facility (HPA), the Convenience Store, Visitor's Center and Walatowa Museum.

Growth Trends – The Pueblo of Jemez has been actively developing several areas over the last five years. Specific development includes a new subdivision, a new recreational center, and an addition to the Walatowa Timber Industries "The wood pellet plant", and the High Performance Adobe Production Facility (HPA). Over the next five years The Pueblo of Jemez has several other projects in the planning stage now but the growth trends are hard to anticipate due to the dependency on grants and other sources of funding. The Jemez Pueblo Governor and Tribal Council continue to be

interested in pursuing opportunities which will benefit both the economic viability of the Pueblo and the wellbeing and Safety of the Jemez Pueblo community.

1.6.4 Jemez Springs, Village of

History –The Village of Jemez Springs, historically known as, "Ojo Caliente", is nestled in the Jemez Valley, which is believed to have been inhabited for the last 4,500 years. The Spanish came to the valley in the mid 1500's and reported multiple Native American pueblos (villages), in the valley. The Franciscan mission church San José de los Jemez was built just to the north of the current village in 1621 but was abandoned around the 1640s. Today the ruins are the site of Jemez State Monument. Following the Pueblo Revolt the Jemez people began converging at the current Pueblo of Jemez. In the nineteenth century the valley was given over to mostly agrarian and pastoral uses. Jemez Springs' post office opened in 1907. In 1942, Jemez Springs was considered for the location of the Los Alamos National Laboratory, but Los Alamos was chosen instead. In 1947 two Roman Catholic retreats were founded nearby, the Congregation of the Servants of the Paraclete and the Handmaids of the Precious Blood. The Village was incorporated in 1955.

Geography – The Village is located in the north-central portion of Sandoval County. At an elevation of 6,196 feet, the Village is entirely bounded by the Santa Fe National Forest. The Jemez Pueblo is located approximately seven miles south of the Village. The Village occupies approximately 4.3 square miles of land with its geographic centroid at approximately at latitude 35.78 degrees north, longitude 106.69 degrees west. NM 4 passes through the center of the village, parallel to the Jemez River, providing a connection to US Highway 550 to the south.

Jemez Springs is located within the Jemez Mountains, along the Jemez River at the valley floor of Canon de San Diego. The Valle Caldera is located north and east of the Village.

According to BLM, the majority of land within the Village is privately held except for few small areas of Santa Fe National Forest land.

Economy – The primary economic driver for Jemez Springs is tourism, with many small businesses (restaurants, bed and breakfasts, galleries, shops, hot spring spas, etc.) that serve the touring public. The Village is the site of the Jemez State Monument Heritage Area, which includes the stone ruins of a 500 year old Indian village and the San José de los Jemez church dating to 1610. The Jemez Ranger District is also headquartered at the Village. The 2017 gross receipts for Jemez Springs are estimated[12] and account for less than one percent of the total gross receipts for the County. The top producing industries for the Village are retail trade, construction, and accommodation and food services.

Growth Trends – Jemez Springs has not experienced any growth in the last five years and anticipates no significant growth in foreseeable future.

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[12] New Mexico Taxation and Revenue Department, *op. cit.*

1.6.5 Rio Rancho, City of

History – According to the City's website[13], the City of Rio Rancho began with an AMREP Corporation purchase of 55,000 acres of land on the outskirts of Albuquerque, New Mexico in the early 1960s. The development was originally called Rio Rancho Estates. AMREP marketed the area to residents in the Midwest and eastern states. When home building began in 1962, many of the first residents were middle-income retirees. In 1966, the 100th family moved to Rio Rancho and by 1977 the population had grown to 5,000. In 1971, AMREP purchased and platted an additional 35,000 acres, which expanded Rio Rancho Estates to a size of 92,000 acres and geographically larger than the city of Albuquerque. On February 23, 1981, Rio Rancho was incorporated with a total population of 10,208 residents. Several years later a new financing program offering low interest home loans, changed Rio Rancho from a retirement community to a community attracting young families. Today, Rio Rancho offers cultural diversity within its current population.

Geography – The City of Rio Rancho is located on the southern boundary of Sandoval County. At an elevation of 5,679 feet, the City is located west of the Rio Grande and shares a common boundary with Corrales, Bernalillo and the Sandia Pueblo on the eastern boundary. The Santa Ana and Zia Pueblos bound the City on the north and most of its southern border with Albuquerque. The City occupies approximately 104.2 square miles of land with its geographic centroid at latitude 35.29 degrees north, longitude 106.69 degrees west. Interstate 25 passes to the east of the City with connections primarily by NM 528 and US Highway 550. Unser Boulevard is also a major arterial through the City.

The City is located within the Middle Rio Grande Valley and is part of the Rio Grande Rift. The majority of the City is located on a geologic terrace of the Rio Grande Valley and is characterized by moderate terrain with numerous ephemeral arroyos that collect and convey storm water runoff to the Rio Grande. According to the City's comprehensive plan [14], there are nine major watersheds in the City of Rio Rancho that are managed by the Southern Sandoval County Arroyo Flood Control Authority (SSCAFCA) – Black Arroyo Watershed, Calabacillas Arroyo Watershed, La Barranca Arroyo Watershed, Montoyas Arroyo Watershed, NM 528 Watershed, Rio Rancho Urban Watershed, Sierra Blanca- Willow Creek Watershed, Venada Arroyo Watershed, Zia Arroyo Watershed, and an unnamed watershed near New Mexico HWY 528 and Idalia Road.

According to BLM, the majority of land within the City boundary is privately held except for a few State of New Mexico parcels.

Economy – Rio Rancho is the economic heart of Sandoval County. The 2017 gross receipts for the Sandoval County portion of Rio Rancho are estimated at $24,226,747[15] and account for almost 56% of the total gross receipts for the County. The 2017 top producing industries for the City were retail trade, construction, utilities, and manufacturing. Major employers include Intel Corporation and Contractors, Rio Rancho Public Schools, Bank of America, City of Rio Rancho, Alliance Data, BRYCON Construction, Presbyterian Rust Medical Center, Sandoval Regional Medical Center, Hewlett Packard, and Sandoval County.[16] As of February 2018, the unemployment rate for the Albuquerque Metropolitan Statistical Area, which includes Rio Rancho, was 4.7%.

Growth Trends – Development over the last five years in the City of Rio Rancho has focused heavily on the "city center" that is located in the northern portion of Rio Rancho. One hospital, within the last two years, expanded their facility by adding over 100 beds and a new wing. Commercial development

[13] City of Rio Rancho website, Accessed October 2018: https://rrnm.gov/337/City-History-General-Information

[14] City of Rio Rancho, 2017, *City of Rio Rancho Comprehensive Plan, November 2017*

[15] New Mexico Taxation and Revenue Department, *op. cit.*

[16] City of Rio Rancho, 2017, *op. cit.*

has been the focus which is contrary to previous development trends that focused more on single family home development. Some of this development included a large retail center, an assisted living center that includes a senior living section and a hospice section, and two memory care centers.

Over the next several years, the City anticipates further development within the city center. The areas around the new hospitals are also locations of anticipated growth for the City. Growth trends are hard to anticipate due to large amounts of parceled land that is privately owned within the jurisdiction. Figure 1-12 is a map from the City of Rio Rancho showing growth within the community over the past five years.

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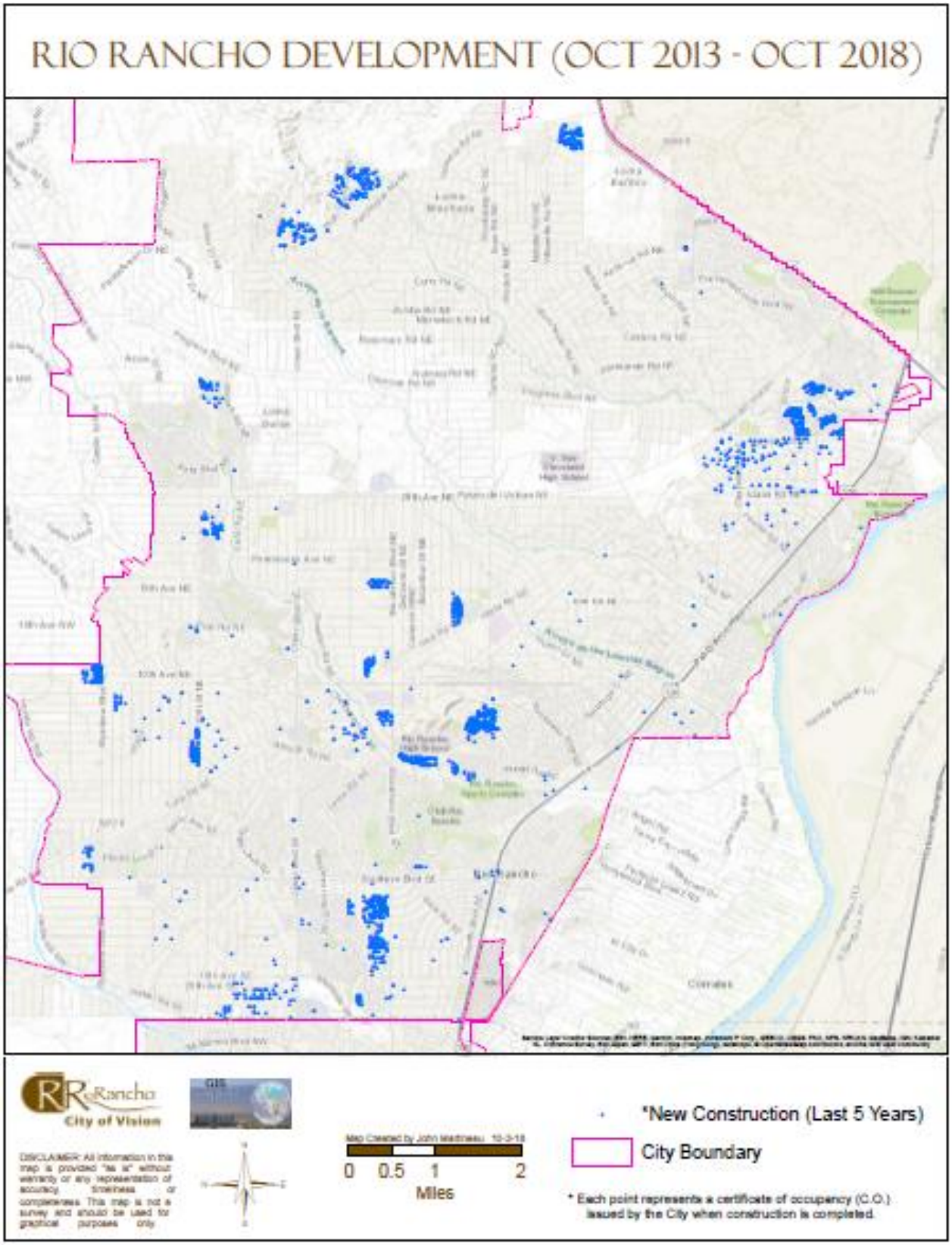

Figure 1-12: Growth Areas for the City of Rio Rancho

1.6.6 San Ysidro, Village of

History – The Village of San Ysidro has been a farming community since 1699 when Juan Trujillo established a settlement named for San (Saint) Ysidro, the Farmer. The Village was incorporated in 1967.

Geography – San Ysidro is located in central Sandoval County and is bounded on the north by the Jemez Pueblo Reservation, on the east by the Zia Pueblo Reservation, and on the south and west by BLM land. At an average elevation of 5,466 feet, the Village is located within Jemez Valley, just north of the Rio Salado and Jemez River confluence, with the Jemez River flowing through the village from north to south. The Village occupies approximately 2.0 square miles of land with its geographic centroid at latitude 35.56 degrees north, longitude 106.77 degrees west. The intersection of US Highway 550 and NM 4 is located at the southern end of the Village.

The majority of San Ysidro is located within the geologic floodplain of the Jemez and Rio Salado Rivers and is primarily comprised of agricultural land. Flows from the surrounding hillside areas are generally intercepted and routed to either the Jemez or Rio Salado River via acequias or other earthen ditches.

According to the BLM, the entirety of San Ysidro is privately owned.

Economy – San Ysidro is located at the junction of US 550 and NM 4. Travelers on these routes provide the Village with one of its major industries, highway commercial retail. In 2016, the weekday average traffic on US 550 south of the Village was 8,400 vehicles. Agriculture, especially cattle ranching, is still an important activity in the surrounding area. Other employment in the area includes a gypsum mine just south of the Village and a maintenance/construction yard for the State Highway and Transportation Department. [17]

Growth Trends – San Ysidro has not experienced any growth in last five years. Over the next fifteen years, the Village anticipates development of land currently owned by BLM on both sides of US 550 along the western border of the Village, as shown in Figure 1-13. Anticipated facilities on the north side of US 550 include a new public safety building that will house police, fire, EMS and the municipal court, a medical clinic to the west of public safety building, a set of trails to provide recreation, and a cemetery for the Jemez Valley. A new bio mass facility is proposed for BLM land south of US 550. Acquisition of the BLM owned lands will require Congressional action and the application process has begun.

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[17] MRCOG, data accessed September 2018 at: https://www.mrcog-nm.gov/region-a-people/regional-profiles/san-ysidro

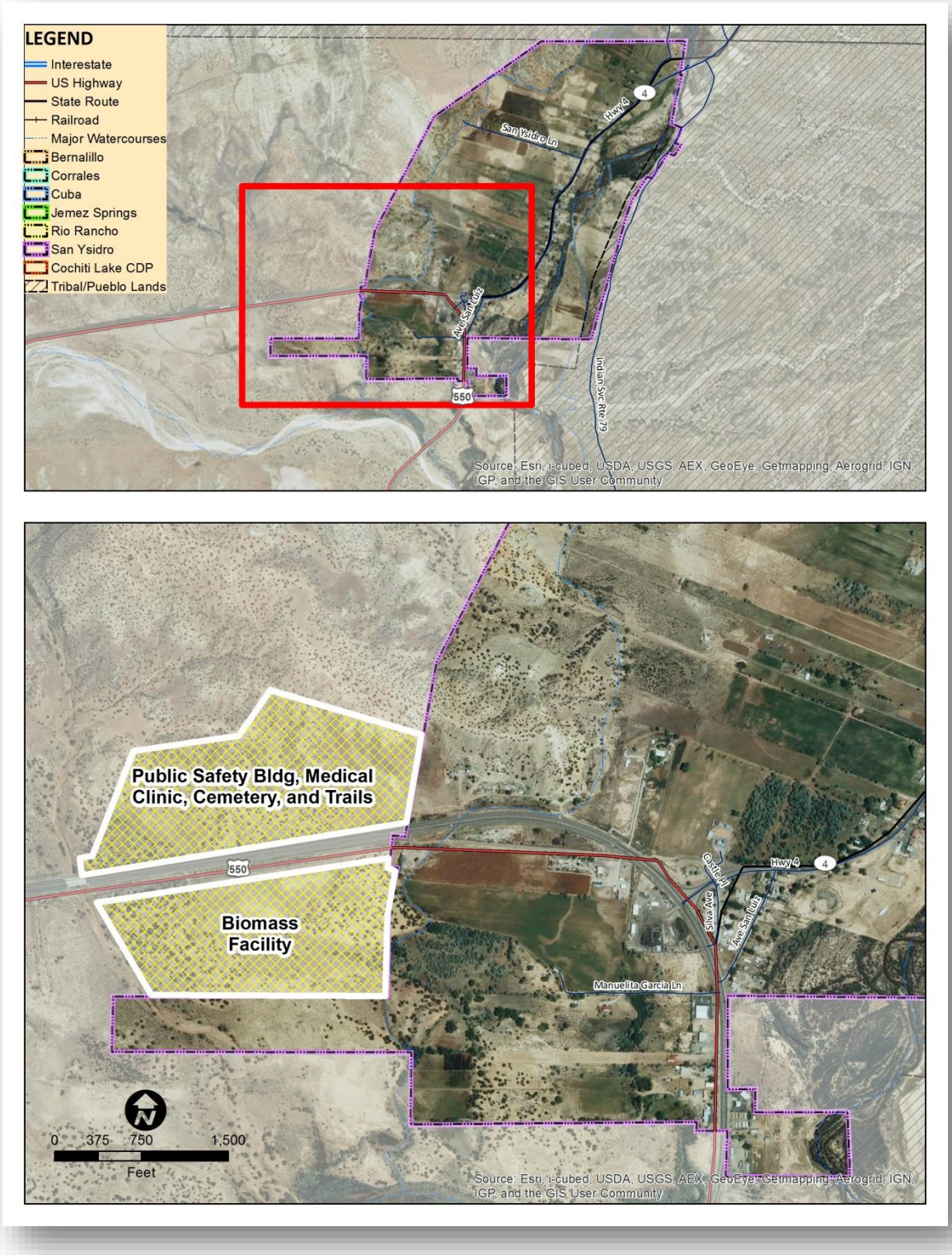

Figure 1-13: Growth Areas for the Village of San Ysidro

1.6.7 Sandia, Pueblo of

History – Sandia Pueblo is one of 19 pueblos located throughout New Mexico. The Sandia people are members of the pre-Columbian Tiwa language group who once dominated the Albuquerque area and their lineage can be traced back to the Aztec civilization that later migrated to the New Mexico region.[18] The Sandia Pueblo has resided in its current location since the 14th century numbering 3,000 at the time of the arrival of Coronado in 1539 As a result of wars with Spanish conquistadors and raids from neighboring indigenous nations, the Sandia Pueblo diminished, numbering 350 by 1748, and dwindling to 74 by 1900. Electricity first came to Sandia in 1952, followed shortly by natural gas, indoor plumbing, and automobiles.[19]

Geography – The Sandia Pueblo is located on the east side of the Rio Grande River and its traditional name, "Tuf Shur Tia" or "Green Reed Place," refers to the green valley fed by the Rio Grande River. The reservation boundaries are located within both Sandoval and Bernalillo Counties and are generally bordered by Corrales, Rio Rancho, and Bernalillo on the west, Unincorporated Sandoval County on the north, U.S. Forest Service lands on the east and Albuquerque on the south. At an average elevation of 5,050 feet, the majority of the Sandia Pueblo population and residential/governmental infrastructure is located along the eastern edge of the Rio Grande Valley, west of Interstate 25, with the Rio Grande generally forming the pueblo's western border. The eastern edge of the pueblo extends onto Sandia Mountain with elevations as high as 8,000 feet. The reservation covers 22,877 acres of land with its geographic centroid at latitude 35.26 degrees north, longitude 106.55 degrees west. Interstate 25 bisects the reservation north to south and NM 556 is passes through the reservation east to west along the southern edge.

Economy – The Pueblo of Sandia owns and operates several thriving enterprises including the Sandia Resort and Casino, Bien Mur Indian Market and Travel Center, Sandia Lakes Recreation Area, and the Bobcat Ranch. In addition, the pueblo maintains its agricultural heritage with farming activities along the fertile Rio Grande Valley. The Pueblo of Sandia employs over 2,000 residents of the Albuquerque area including both Indians and Non-Indians.

Growth Trends – The Pueblo of Sandia has been actively developing key areas over the last five years. Specific developments included the Desert Willows Subdivision, an aquatics center, a church, a relief route road, a waste water treatment plant, a new police department, new roads on Roy/Tramway, a new railway station, the NM 313/Roy roundabout, and storm water retention/detention ponds. The location for these recent facilities is located on Figure 1-14.

While the Pueblo of Sandia's Governing Council is interested in pursuing development opportunities which will benefit both the economic viability of the Tribe and the health and welfare of the community, it would be premature to forecast development trends at this time.

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[18] Pueblo of Sandia, website accessed October 2018 at: https://sandiapueblo.nsn.us/

[19] New Mexico Office of the State Historian, website accessed at: http://newmexicohistory.org/places/sandia-pueblo

1.6.8 Santo Domingo, Pueblo of

History – Santo Domingo Pueblo or Khe-wa as it is known to its residents is recognized in Pueblo country as perhaps the most conservative of the Pueblos, with some of the richest traditions. At the time of Oñate's entry into New Mexico in 1598, several Pueblo communities rested near or directly on the route that would become the Camino Real. Oñate's journal recounts the expedition's visits to several Native communities, including the Village of Santo Domingo. This pueblo would become one of several headquarters of the Spanish colonial mission system in the newly established province of New Mexico and a significant location of Pueblo resistance against Spanish hegemony during the Pueblo Revolt and during the Re-conquest.

The Franciscans attempted to convert Native peoples to Catholicism and proceeded to direct the construction of missions at a number of villages. In 1607 under Franciscan head Friar Juan de Escalona, the Franciscans and Indian laborers built a mission at Santo Domingo. The original mission was one of the largest in New Mexico, but was destroyed by a devastating flood which swept through the village in the late 1800s. Residents attempted to save the mission, but each year the river continued to encroach on the heavily damaged adobe building until the foundation finally crumbled in 1886.

With western American settlement the village of Santo Domingo was again touched by the expanding reach of another foreign nation. The Atchison, Topeka and Santa Fe Railroad reached New Mexico in the 1880s and together with other entrepreneurs promoted Pueblo peoples in its advertising, bringing attention to the arts and crafts, and the culture of villages like Santo Domingo. Soon trains let off passengers near Santo Domingo. The nearby Domingo station, a branch of the Bernalillo Mercantile Company served as a trading center for surrounding pueblo villages. By the 1920s Santo Domingo had become a major tourist destination and was as close to Indian country as many tourists could get. Organizers of one of the foremost tourist draws during that era, the Santa Fe Fiesta, encouraged tourists to partake in Santo Domingo's traditional corn dance during the village's annual August 4th feast day.

Geography – The Pueblo of Santo Domingo is located approximately 30 miles north-northwest of Albuquerque, in the east-central portion of the county. A small portion of the pueblo lands extend east into Santa Fe County. Interstate 25 and NM 16 and 22 serve as the major roads for the Pueblo. The Burlington Northern Santa Fe (BNSF) Railroad crosses through the Pueblo east of Rio Grande. The Rio Grande flows from north to south, bisecting the Pueblo. At an average elevation of 5,200 feet, the majority of the Santo Domingo Pueblo population and residential/governmental infrastructure is located approximately 4.5 miles west of I-25 just off of NM 22, as well as along NM 22 between the village and I-25. The northwestern corner of the Pueblo extends onto the foothills of the Jemez Mountains with elevations as high as 6,500 feet. The reservation covers 68,054 acres with its geographic centroid at latitude 35.53 degrees north, longitude 106.38 degrees west.

Economy – Contributions to the economy of the Santo Domingo Pueblo include jewelry and pottery making and trade, tourism, agriculture and other tribal enterprises. The Santo Domingo Pueblo is nationally famous for its jewelry and especially the fine heishi of turquoise and other stones and silver. Traditional festivals and dances attract many visitors throughout the year.

Growth Trends – In the past five years Santo Domingo Pueblo has added a subdivision within the Domingo area of about 25 homes, rebuilt the Santo Domingo Pueblo Elementary/Middle School and updated their gym. The Tribe has also re-established the Native Emergency Youth Shelter Program.

Potential future development may include a new 300 home development on the east side of I-25, as well as a new community center and Governor's office. These plans may or may not take place within the next five years dependent upon funding.

1.6.9 Southern Sandoval County Arroyo Flood Control Authority

Purpose – As implied by its name, the Southern Sandoval County Arroyo Flood Control Authority's (SSCAFCA) primary focus and purpose is related to the control of flooding and flood related issues. The stated goals of SSCAFCA are to: [20]

- Provide flood protection up to the 100 year storm for the public health, safety and welfare of residents and properties within its boundaries.
- Recognize the value of land purchased or controlled for floodways as areas with multi-use potential.
- Reduce sediment and erosion within the boundaries of the flood control authority.
- Assist in the coordination of flood control with other entities for the common good of the public.

SSCAFCA works with its partner communities of Bernalillo, Corrales, Rio Rancho, and Sandoval County to achieve the stated goals and provides flood control related planning, design, construction, maintenance, and regulatory oversight for all development within its jurisdictional boundaries. SSCAFCA develops and uses a hierarchy of drainage management plans to establish the flood related priorities for each watershed and drainage facility.

History –SSCAFCA was established by the New Mexico Legislature in 1991. The district generally covers Corrales and Rio Rancho, a small portion of Bernalillo, and southern Sandoval County. The Legislature directed that a flood control system be developed by an Authority. In 1992, voters in the covered area approved a bond issue that allowed the Authority to begin operation.

Geography – The geographic service area of SSCAFCA is generally based on watershed boundaries of areas located west of the Rio Grande and east of the Rio Puerco Escarpment impacting Corrales, Rio Rancho, and the western portion of Bernalillo, as depicted by Figure 1-16 on the following page.

Economy – SSCAFCA is authorized by State law to levy and collect general ad valorem taxes on all property subject to property taxation within its boundaries. Revenue thus generated is budgeted for two purposes: 1) general operations and 2) debt service (principal and interest payments) on outstanding bonds. The tax levy or rate for general operations is limited to one mill ($1.00 for each $1,000) on the total net taxable value of property subject to such taxation. The tax rate for debt service is set annually by the Board of Directors at a level sufficient to pay principal and interest coming due in the next year on all outstanding bonds.

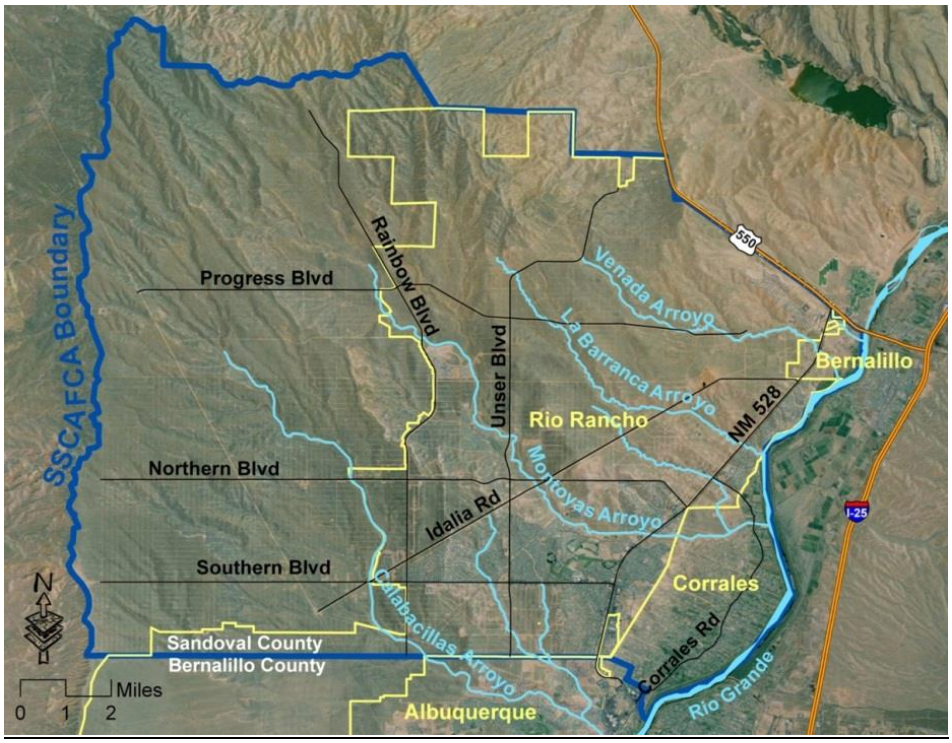
The accounts are maintained on the basis of funds or account groups in conformance with generally accepted accounting principles as applicable to governmental units. As such, SSCAFCA maintains its General Fund, Debt Service Fund and Capital Projects Fund, each with its own revenues, expenditures and fund balance. Annually, these funds are collectively audited by an independent public accounting firm and reviewed by the State Auditor.

State law provides that SSCAFCA may issue general obligation bonds in amounts approved by voters in a general or special election. Bonds are then issued (sold) via a competitive process where the bonds are sold to the bidder submitting the bid to purchase the bonds at the lowest total interest cost to SSCAFCA.

Growth Trends – Growth trends within the SSCAFCA boundary are generally tied to growth and development by each of the jurisdictions served by SSCAFCA. Past and future growth of Bernalillo, Corrales, Rio Rancho, and Unincorporated Sandoval County are anticipated within the drainage

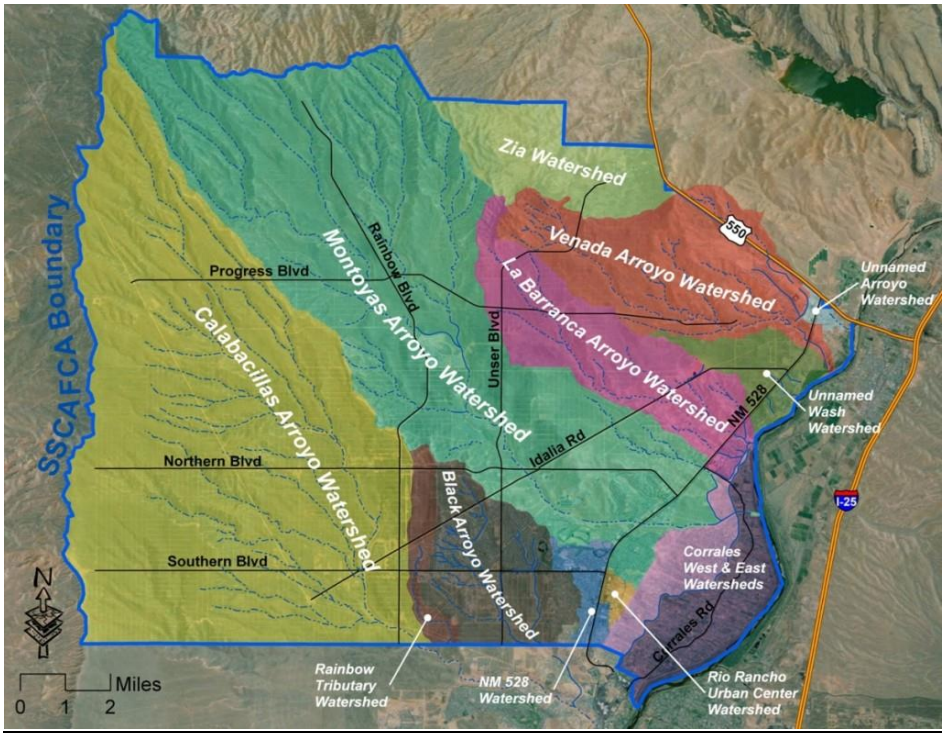
[20] SCCAFCA website accessed September 2018: http://www.sscafca.org/cms.php/about/

management plans developed by SSCAFCA and the programming of projects to provide the needed drainage protection.



Accessed September 2018

Figure 1-14: SSCAFCA Boundary



Accessed September 2018

Figure 1-15: SSCAFCA Watersheds

SECTION 2: PLANNING PROCESS

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

2.1 Planning Process Description

The Sandoval County Fire Department (SCFD) hired their new Emergency Manager in the middle August of 2018 and they were tasked with updating the 2014 Sandoval County All Hazards Mitigation Plan. Initial project discussions occurred via phone and email communication between the Sandoval County Office of Emergency Management and personnel listed as part of the 2014 HMP planning team. The team initially convened to review the scope of work, establish communication protocols for the planning effort, outline the plan objectives, outline the anticipated meeting agendas, and to discuss the new Plan format and other administrative tasks. The first Planning Team meeting was convened on September 6, 2018 and a total of eight planning team meetings were conducted over the period of September 2018 through December 2018. Throughout that period and for a few weeks afterward, all the work required to collect, process, and document updated data and prepare the draft of the 2019 Plan was performed. Details regarding key contact information and promulgation authorities, the Planning Team selection, participation, and activities, and public involvement are discussed in the following sections.

2.2 Previous Planning Process Assessment

The Sandoval County Fire Department (SCFD) applied for and received Title III Secure Rural School Funding monies to conduct a multi-jurisdictional review and update of the 2004 Plan, as well as updates to the County's emergency operations plan, emergency response guide, and the 2008 community wildfire protection plan. The Title III monies were authorized under the Secure Rural Schools and Community Self-Determination Act and are administered by the U.S. Forest Service. Following a 45 day period where the public was invited to comment on the use of the Title III funds, the SCFD issued a request for proposals and selected the Tectonic/JEFuller team to work with the participating jurisdictions and guide the planning process.

Initial project discussions via phone and email communication between SCFD and Tectonic were convened to review the scope of work, establish communication protocols for the planning effort, outline the plan objectives, outline the anticipated meeting agendas, and to discuss the new Plan format and other administrative tasks. The first Planning Team meeting was convened on February 28, 2012 and a total of four planning team meetings and one webinar were conducted over the period of February 2012 through July 2012. Additional community work sessions were convened during October and December 2012 to complete the various Plan elements. Throughout that period and for several weeks afterward, all the work required to collect, process, and document updated data and prepare the draft of the Plan was performed.

2.3 Planning Team

The process used to update the 2014 Plan included the use of a two tiered planning team. The first tier was a multi-jurisdictional planning team (Planning Team) that is comprised of one or more representatives from each participating jurisdiction, plus other interested and invited agencies and organizations. The second tier was the local planning team, which was comprised of jurisdiction/community specific individuals involved in assisting their Planning Team representative with the completion of task assignment and worksheets. Typically, most local planning team members did not attend any of the multi-jurisdictional Planning Team meetings.

The role of the Planning Team was to work to perform the coordination, research, and planning element activities required to update the 2014 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 2014 Plan were presented and discussed at each Planning Team meeting, and task assignments were given. Each meeting's content and discussions built on information discussed and assigned at the previous meeting, creating a stepwise and systematic process for preparing the updated Plan. The Planning Team also had the responsibility of liaison to the local planning team, and was tasked with:

- Conveying information and assignments received at the Planning Team meetings to the Local Planning Team for discussion and completion.
- Ensuring that all requested assignments and worksheets were completed fully and returned on a timely basis.
- Arranging for review and official adoption of the Plan.

The function and role of the local planning teams were to:

- Provide support and data.
- Assist their Planning Team representative(s) in completing each assignment and the associated worksheets.
- Make planning decisions regarding Plan components.
- Review the Plan draft documents

2.3.1 Points of Contact

Primary points of contact has been established for each participating jurisdiction. These people or positions were invited to attend all the Planning Team meetings and was the POC for information regarding the hazard mitigation planning for their jurisdiction. Table 2-1 and the "key" on page 40, summarizes the points of contact identified for each participating jurisdiction or agency and their role in the development of plan.

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Table 2-1 ***2019 Sandoval County Hazard Mitigation Plan Roles***

SEE KEY	Jurisdiction	Name	Department	Position	Address	Phone	Email	Participating	Committee	SME	Stakeholder
3	Bernalillo County	Richard Clark	Emergency Management	Director	6840 2nd St. NW Albuquerque, NM 87102	505-468-1301	rclark@bernco.gov				X
1	Bernalillo, Town of	Joseph Benney	Floodplain Management	Certified Floodplain Manager	829 Camino del Pueblo Bernalillo, NM 87004	505-771-5852	jbenny@townofbernalillo.org	X	X	X	X
1	Bernalillo, Town of	Mike Carroll	Fire Department	Fire Chief	829 Camino del Pueblo Bernalillo, NM 87004	505-771-7135	mcarroll@townofbernalillo.org	X			X
3	Cibola County	Dustin Middleton	Fire Department	Emergency Manager	515 West High St Grants, NM 87020	505-285-2558	dmiddleton@co.cibola.nm.us				X
1	Corrales, Village of	Tanya Lattin	Fire Department	Emergency Manager	4920 Corrales Rd Corrales, NM 87048	505-898-7501	tlattin@corrales-nm.oeg	X	X	X	X
1	Coronado Soil and Water Conservation District	Patricia Bolton	CSWCD	Member	PO Box 69 Bernalillo, NM 87004	505-867-2853	pabolton41@gmail.com			X	
1	Coronado Soil and Water Conservation District	Alfred Baca	CSWCD	Supervisor	PO Box 69 Bernalillo, NM 87004	505-867-2853	albacaswcd@gmail.com			X	
2	E. Sandoval County Area Flood Control Authority	Larry Blair	ESCAFCA	Executive Engineer	829 Camino Del Pueblo Bernalillo, NM 87004	505-249-1035	blairylar@hotmail.com			X	
1	Enterprise Products	Robert North	Pipeline	Pipeline Supervisor	3621 East Main St Farmington, NM 87402	505-599-2895	rnorth@eprod.com			X	
1	Jemez Springs, Village of	Felix Nunez	Police Department	Chief	090 Jemez Springs Plaza Jemez Springs, NM 87025	575-829-3345	police@jemezsprings-nm.gov	X	X	X	X
3	Los Alamos County	Beverley Simpson	Police Department	Emergency Manager	2500 Trinity Dr. Suite A Los Alamos, NM 87544	505-662-8283	beverley.simpson@lacnm.us				X

1	Marathon Petroleum Corporation	Joshua Williams	Emergency Preparedness	Contingency Planning Spec	6700 Jefferson St., Bld A Albuquerque, NM 87109	505-716-2654	joshua.e.williams@andeavor.com			X	
3	McKinley County	Susan Mahooty	Emergency Management	Emergency Manager	2221 Boyd Avenue Gallup, NM 87305	505-722-4248	smahooty@co.mckinley.nm.us				X
3	Middle Rio Grande Conservancy District	Yasmeen Najmi	Planning	Lead Planning	PO Box 581 Albuquerque, NM 87103	505-247-0234	yasmeen@mrgcd.us				X
3	National Weather Service	Kerry Jones	Albuquerque NWS	Meteorologist In Charge	2341 Clark Carr Loop Albuquerque, NM 87106	505-243-0702	kerry.jones@noaa.gov			X	X
1	New Mexico Department of Homeland Security and Emergency Management	Jeremy Cuddeback	NM DHSEM	Area 5 LPC	PO Box 27111 Santa Fe, NM 87502	505-476-0607	jeremy.cuddeback@state.nm.us			X	X
1	New Mexico Department of Homeland Security and Emergency Management	Nicole Martinez	NM DHSEM	Area 5 LPC	PO Box 27111 Santa Fe, NM 87502	505-476-9681	nicole.martinez2@state.nm.us			X	X
1	New Mexico Department of Homeland Security and Emergency Management	Sara Gerlitz	NM DHSEM	Mitigation Specialist	PO Box 27111 Santa Fe, NM 87502	505-476-9682	sara.gerlitz@state.nm.us			X	X
1	New Mexico Department of Homeland Security and Emergency Management	Wendy Blackwell	NM DHSEM	State Hazard Mitigation Officer	PO Box 27111 Santa Fe, NM 87502	505-476-9676	wendy.blackwell@state.nm.us			X	X
3	Pueblo of Cochiti	Phillip Trujillo	Emergency Management	Emergency Manager	PO Box 70 Cochiti Pueblo, NM 87072	505-465-2500	phillip.trujillo@cochiti.org				X
1	Pueblo of Jemez	Dave Ryan	Emergency Management	Director	PO Box 100 Jemez Pueblo, NM 87024	575-834-7628	dave.ryan@jemezpueblo.us	X	X	X	X

1	Pueblo of Jemez	Jerry Lazzari	Emergency Management	Emergency Manager	PO Box 100 Jemez Pueblo, NM 87024	575-834-7628	jerry.lazzari@jemezpueblo.us	X	X	X	X
3	Pueblo of San Felipe	Gary Gum	Health and Wellness	Clinical Srvcs Administrator	Indian Service Route 386 Algodones, NM 87001	505-867-2739	ggum@sfpueblo.com				X
1	Pueblo of Sandia	Tanya Allen	Emergency Management	Emergency Manager	10600 Apache Plume Dr. Albuquerque, NM 87113	505-890-1428	tallen@sandiapueblo.nsn.us	X	X	X	X
3	Pueblo of Santa Ana	Nathan Tsosie	Emergency Management	Emergency Manager	02 Dove Road Santa Ana Pueblo, NM 87004	505-867-3301	nathan.tsosie@santaana-nsn.gov				X
1	Pueblo of Santo Domingo	Josh Schraeder	Fire Department	Fire Chief / Emergency Manager	75 West Highway 22 Santo Domingo Pueblo, NM 87052	505-270-8925	jschraeder@kewa-nsn.us	X	X	X	X
3	Pueblo of Zia	Deborah Anyaibe	Environmental Resources	Director	135 Capitol Square Dr. Zia Pueblo, NM 87053	505-337-2145	danyaibe@ziapueblo.org				X
3	Pueblo of Zia	J.T. Daniels	Police Department	Chief	135 Capitol Square Dr. Zia Pueblo, NM 87053	505-867-3304	jdaniels@ziapueblo.org				X
3	Rio Arriba County	Alfredo Montoya	Emergency Management	Emergency Manager	1122 Industrial Park Rd. Espanola, NM 87532	505-747-1941	aamontoya@rio-arriba.org				X
2	Rio Metro (RRNMX)	Stephanie Paiz	Rail Runner Express	Program Support Coordinator	809 Copper Avenue NW Albuquerque, NM 87102	505-414-1308	spaiz@mrcog-nm.gov			X	X
1	Rio Rancho, City of	Dyane Sonier	Parks, Recreation, and Community Services	Resource Development Manager	3200 Civic Center Circle Rio Rancho, NM 87144	505-896-8728	dsonier@rrnm.gov	X		X	
1	Rio Rancho, City of	Jim Arrowsmith	Development Services	P&Z Division Manager	3200 Civic Center Circle Rio Rancho, NM 87144	505-891-5005	jarrowsmith@rrnm.gov	X		X	
1	Rio Rancho, City of	John Martineau	Public Works	Records and GIS Manager	3200 Civic Center Circle Rio Rancho, NM 87144	505-891-5054	jmartineau@rrnm.gov	X		X	
1	Rio Rancho, City of	Rose Martinez	Fire Department	Emergency Management Sp. Projects Coordinator	1526 Stephanie Road Rio Rancho, NM 87124	505-891-5856	romartinez@rrnm.gov	X	X	X	X

1	Rio Rancho, City of	Steve Gallegos	Utilities Department	Deputy Director	3200 Civic Center Circle Rio Rancho, NM 87144	505-891-5046	sgallegos@rrnm.gov	X		X	
1	Rio Rancho, City of	Theresa Greeno	Fire Department	Emergency Manager	1526 Stephanie Road Rio Rancho, NM 87124	505-891-5855	tgreeno@rrnm.gov	X	X	X	X
2	S. Sandoval County Area Flood Control Authority	Chuck Thomas	SSCAFCA	Executive Engineer	1041 Commercial Dr. SE Rio Rancho, NM 87124	505-892-7246	cthomas@sscafca.com	X	X	X	X
2	S. Sandoval County Area Flood Control Authority	Dave Gatterman	SSCAFCA	Facilities Operations Director	1041 Commercial Dr. SE Rio Rancho, NM 87124	505-892-7246	dgatterman@sscafca.com	X	X	X	X
3	San Juan County	Mike Mestas	Emergency Management	Emergency Manger	209 South Oliver Aztec, NM 87410	505-334-7700	mmestas@sjcounty.net				X
1	San Ysidro, Village of	Danny White	Law Enforcement	Marshal	PO Box 28 San Ysidro, NM 87053	575-834-7481	d.white@sanysidronm.us	X	X	X	X
1	Sandoval County	Gary Pals	Administration	GIS Analyst	1500 Idalia Road, Building D Bernalillo, NM 87004	505-404-5897	gpals@sandovalcountynm.gov	X			X
1	Sandoval County	James Maxon	Fire Department	Fire Chief	314 Melissa Road Bernalillo, NM 87004	505-867-0245	jmaxon@sandovalcountynm.gov	X			X
1	Sandoval County	Jeff Epler	Planning and Zoning	GIS Administrator	1500 Idalia Road, Building D Bernalillo, NM 87004	505-867-7540	jepler@sandovalcountynm.gov	X			X
1	Sandoval County	Melissa Perez	Administration	Public Information Officer	1500 Idalia Road, Building D Bernalillo, NM 87004	505-867-7640	mperez@sandovalcountynm.gov	X			X
1	Sandoval County	Brad Stebleton	Planning and Zoning	Floodplain Manager	1500 Idalia Road, Building D Bernalillo, NM 87004	505-867-7628	bstebleton@sandovalcountynm.gov	X		X	X
1	Sandoval County	Seth Muller	Fire Department	Emergency Manager	314 Melissa Road Bernalillo, NM 87004	505-771-7197	smuller@sandovalcountynm.gov	X	X	X	X
3	Santa Fe County	Martin Vigil	Fire Department	Assistant Chief / EM	35 Camino Justicia Santa Fe, NM 87508	505-992-3072	mavigil@santafecountynm.gov				X
	KEY:										
	1 - Local/Regional Agency involved in hazard mitigation activities										
	2 - Agency that has the authority to regulate development										
	3 - Neighboring Communities										

2.3.2 Planning Team Assembly

At the beginning of the planning process, the SCFD OEM organized and identified members for the Planning Team by initiating contact with, and extending invitations to, the following jurisdictions that potentially could be part of the plan:

- All incorporated municipalities (Bernalillo, Corrales, Cuba, Jemez Springs, Rio Rancho and San Ysidro) and the Chartered Town of Cochiti Lake
- The Pueblos within the boundaries of Sandoval County (Cochiti, Jemez, Sandia, San Felipe, Santa Ana, Santo Domingo, and Zia)
- Eastern Sandoval County Arroyo Flood Control Authority (ESCAFCA)
- Southern Sandoval County Arroyo Flood Control Authority (SSCAFCA)
- Coronado Soil and Water Conservation District
- New Mexico Department of Homeland Security and Emergency Management
- All surrounding Counties (Bernalillo, Cibola, Los Alamos, McKinley, Rio Arriba, San Juan, Santa Fe)

2.3.3 Planning Team Activities

The Planning Team met for the first time on September 6, 2018 to begin the planning process. Seven more meetings were convened over the next three months, to step through the plan review and update process. A final round of community visits and work sessions were convened to wrap up the remaining planning elements. Planning Team members used copies of the 2014 Plan for review and reference during each meeting. Following each Planning Team meeting, the Point of Contact for each jurisdiction would coordinate with their local officials and associates (the local planning team) as needed to work through the assignments and generate the necessary Plan elements pertinent to that jurisdiction. The sign-in sheets in Appendix B document the attendance at the meetings.

2.3.4 Agency/Organizational Participation

Invitations to participate in the planning process were extended to multiple key agencies and organizations throughout and adjacent to Sandoval County, that were determined by the Planning Team to possibly have an interest in the hazard mitigation planning efforts. A letter was developed explaining the intention of Sandoval County and the participating jurisdictions to conduct a hazard mitigation planning process and completely update the 2014 Plan, and was distributed to all of the potentially interested entities via email. These agencies are in addition to those listed in Table 2-1. A copy of that letter and email is provided in Appendix B and the following is a list of all entities that were sent the email letter:

[*This Space is Blank on Purpose*]

Agency / Organization	Contact Position
American Red Cross	• Regional Director of Emergency Services
Bernalillo Public Schools	• Superintendent
Greater Sandoval County Chamber of Commerce	• Board of Directors, Chairwoman
Cochiti Lake, Town of	• Administration – Town Administrator
Cuba, Village of	• Administration – Village Administrator • Fire Department – Fire Chief
Eastern Sandoval County Arroyo Flood Control Authority	• Director
Enterprise Products Partners	• NGL Pipelines & Services – Safety Coordinator
Intel, Inc.	• Emergency Management – Executive Security Manager
Jemez Springs, Village of	• Police Department – Police Chief / Emergency Manager
LEPC for Sandoval County	• Members
Marathon Petroleum	• Lead Contingency Planning Specialist
National Weather Service	• Meteorologist in Charge Albuquerque NWS Office
New Mexico, State of	• Department of Homeland Security and Emergency Management: ○ HAZMAT Coordinator • Office of the State Engineer – State Engineer • Department of Public Safety – State Police Officer • Public Regulation Commission – Pipeline Safety Bureau Chief • Public Regulation Commission – District 2 and 3 Commissioners • Department of Health – Emergency Preparedness Specialist • Department of Public Education – SAFE School Coordinator
New Mexico State University	• Sandoval County Extension Agent
Rio Rancho Public Schools	• Superintendent • Director of Safety and Security
Rio Rancho Regional Chamber of Commerce	• President/CEO
Rust Medical Center	• Hospital Administrator
Sandoval County	• Board of County Commissioners • County Manager • Public Works – Director • Detention Department – Director • IT Department - Director
Sandoval Regional Medical Center	• Emergency Management – Emergency Manager
U.S. Army Corps of Engineers	• Albuquerque District

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2.4 Public Involvement

2.4.1 Previous Plan Assessment

The pre- and post-draft public involvement strategy for the 2014 Plan included three public information meetings convened at various locations throughout the county, a press release announcing the draft plan availability for review and comment, and presentation of the final plan to the local governance authorities (commissions, boards, and councils) for final approval and adoption. A questionnaire was also distributed at the public information meetings to solicit public input regarding hazard risks and mitigation opportunities.

The Planning Team discussed the prior public involvement actions and concluded that the effort was adequate and provided sufficient opportunity for public input to the planning process, however, the public turn-out was disappointing, there were very few questionnaires completed and returned, and the meeting attendees were mainly comprised of planning team members. The Planning Team concluded that the expense and time involved in the 2019 Plan effort was not worth repeating. Instead, the Planning Team chose to continue with announcements in the local news media (press releases and news articles) and also concluded that web-based technology should be used for the update process to leverage that tool as much as possible. Also, since any formal council/board action has a built-in public notification and comment opportunity, the Planning Team chose to continue using this process as one of the post-draft mechanisms for getting the Plan before the public.

2.4.2 Plan Update Strategy

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. Typically, public notification for county-wide activities within Sandoval County is accomplished through website announcements, social media posts, and press releases to the media outlets. Citizens within the county are accustomed to looking to these sources for news and announcements of public events and government activities, and especially those that are county-wide and include all Sandoval County jurisdictions.

The Planning Team jointly issued an announcement of wanting Public Comment on the ninth of November 2018 and the timeline for Public Input was as follows:

- Post the DRAFT 2019 Plan on the Sandoval County website, along with a survey for public input, from November 09, 2018 – November 30, 2018
- A link on the website and within social media accounts were used to take members of the public to the Hazard Mitigation Plan survey.
- At the December 5, 2018 Planning Meeting all responses were reviewed by the planning team and it was determined that there was not any substantive or new information provided for input with the development of the plan revision.

The link was shared on Facebook by the Village of Corrales and the Rio Rancho Observer with screenshots of those posts provided in Appendix D.

Copies of the web notices and social media announcements are provided in Appendix D. Email contact information for the Sandoval County Office of Emergency Management was provided on the County website and the county press release and any comments received from these notices were to be routed to the Sandoval County Office of Emergency Management. We had a total of 186 responses to the public input survey and a breakdown of responses can be found in Appendix D. All hardcopies of responses are printed and maintained by the Sandoval County Office of Emergency Management.

All of the notices, postings, and articles encouraged review and comment of the draft Plan by the public. Interested citizens were also encouraged to participate in the local community adoption process which, depending upon the jurisdiction, may include a public meeting and a formal public hearing.

2.5 Reference Documents and Technical Resources

An integral part of the planning process included coordination with agencies and organizations outside of the participating jurisdiction's governance to obtain information and data for inclusion into the Plan. 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. Much of the information and data that is used in the risk assessment is developed by agencies or organizations other than the participating jurisdictions. In some cases, the jurisdictions may be members of a larger organization that has jointly conducted a study or planning effort like the development of a community wildfire protection plan or participation in an area association of governments. Examples of those data sets include the FEMA floodplain mapping, community wildfire protection plans, severe weather statistics, hazard incident reports, and regional comprehensive plans. Jurisdictions needing these data sets obtained them by requesting them directly from the host agency or organization, downloading information posted to website locations, or engaging consultants to assist with the data acquisition and processing.

The resources obtained, reviewed, compiled and incorporated into various sections of this Plan are summarized at the end of each subsection of Section 3.3 of this Plan. Detailed bibliographic references for the documents and data sets used in the risk assessment are provided at the end of each hazard risk profile in Section 3.3. Other bibliographic references are provided as footnotes throughout the Plan.

2.6 Plan Integration into Other Planning Mechanisms

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

2.6.1 Past Plan Incorporation/Integration Assessment

Ways in which the 2014 Plan has been successfully incorporated or referenced into other planning mechanisms are summarized below. If a participating jurisdiction is not listed below, then no specific plan incorporation/integration activity has occurred over the last five years for those jurisdictions.

County-wide Planning Mechanisms (All Jurisdictions):

- Referenced the 2014 Plan in the 2015 update and revision of the Sandoval County Emergency Operations Plan.
- Will reference the 2019 Plan in the update, currently being revised, of the 2012 Sandoval County Community Wildfire Protection Plan.

Town of Bernalillo:

- Coordinated and referenced the 2014 Plan mitigation actions/projects with the jurisdiction's Capital Improvements Program (CIP) over the past 5 years.

Village of Corrales, City of Rio Rancho and SSCAFCA:

- Coordinated and referenced the 2014 Plan mitigation actions/projects with the jurisdiction's Capital Improvements Program (CIP) over the past 5 years.

In all of the above instances, the 2014 Plan was found to be beneficial, and especially with regard to the risk assessment and mitigation strategy information. Other benefits of incorporating the 2014 Plan identified by the Planning Team included:

- Continued FEMA mitigation grant funding eligibility
- EOP Update – basis for identifying known hazards, hazard annex creations, provided more staff awareness of hazards.

Challenges to incorporating the 2014 Plan discussed and identified by the Planning Team included:

- Continual changes to staff within the County and a lack of communicating of responsibilities within the plan to new staff.
- Lack of major disaster situations across the county and state.

2.6.2 Five Year Plan Integration/Incorporation Strategy

With the effectiveness of integrating the 2014 Plan during the last cycle in view, the Planning Team identified typical ways to use and incorporate the Plan over the next five-year planning cycle, as follows:

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

Specific opportunities for integrating and/or referencing the Plan into other planning mechanisms over the next five years are summarized below for each participating jurisdiction. The jurisdiction Planning Team representative will take responsibility to ensure that the Plan, risk assessment, goals and mitigation A/Ps are integrated and/or incorporated into the listed planning mechanism by participating in those efforts as they occur.

Sandoval County:

- ***Sandoval County Infrastructure and Capital Improvement Plan (ICIP)*** – Used by the County to formulate and prioritize use of funding to improve County infrastructure. Projects identified in the Plan shall be coordinated with the ICIP.
- ***Sandoval County All Hazards Emergency Operations Plan*** – The EOP is updated every three years. Risk assessment elements of the Plan will be referenced and incorporated as appropriate with the next EOP update.
- ***Sandoval County Flood Damage Protection Ordinance*** – The operation of an overall program of corrective and preventive measures for reducing flood damage, including, but not limited to, emergency preparedness plans, flood control works and floodplain management regulations. Flood risk portions of the Plan are used in reviews and/or updates of ordinance, as needed.

- ***Sandoval County Community Wildland Protection Plan (CWPP)*** – Collaboration with all stakeholders to identify and prioritize hazardous fuel reduction areas for proper addressing of structural ignitability within the CWPP area. In coordination with this Plan the CWPP helps to identify areas within the Wildland Urban Interface (WUI) with mitigation needs.

Bernalillo, Town of:

- ***Infrastructure Capital Improvement Plan (ICIP)*** – Used by the Town to formulate and prioritize use of funding to improve Town infrastructure. Projects identified in the Plan shall be coordinated with the ICIP.
- ***Stormwater Master Plan*** – Upon receiving an EPA MS-4 permit, the Town will be drafting a master plan in conjunction with East Sandoval County Arroyo Flood Control Authority, SSCAFCA, Corrales, and Sandoval County. Areas of flood risk identified in the Plan shall be included and evaluated in the Stormwater Master Plan.

Corrales, Village of:

- ***Emergency Operations Plan –*** The EOP is updated every three years. Risk assessment elements of the Plan will be referenced and incorporated as appropriate with the next EOP update.
- ***Community Wildfire Protection Plan –*** Collaboration with all stakeholders to identify and prioritize hazardous fuel reduction areas for proper addressing of structural ignitability within the CWPP area. In coordination with this Plan the CWPP helps to identify areas within the WUI with mitigation needs.
- ***Animal Evacuation Plan –*** Plan to help citizens with animal evacuation and the locations for evacuees. Reference to the Plan to help identify best locations for shelters based of mitigation efforts and activities that are taking place.
- ***Infrastructure and Capital improvement Plan (ICIP)*** – Used by the Village to formulate and prioritize use of funding to improve Village infrastructure. Projects identified in the Plan shall be coordinated with the ICIP.
- ***Fire Department Strategic Plan / Five Year Update –*** Assess the needs of the Village and in coordination with the Plan ensure the Department is moving towards the goals of the Village and mitigation efforts listed within.
- ***Westside Drainage Study; 2010 Salce Basin Evaluation (SSCAFCA) –*** Working with SSCAFCA with this study and the development/update of EAP's for the dams.
- ***Codified Ordinances of the Village of Corrales Land Use Regulations; Chapter 18, Section IV Flood Hazard Prevention –*** This ordinance is reviewed and updated as needed, or following a major flood disaster, by the Village. The flood risk portions of the Plan will also be referenced in those updates.
- ***Codified Ordinances of the Village of Corrales Land Use Regulations; Chapter 18, Section V Terrain and Storm Water Management –*** This ordinance is reviewed and updated as needed, or following a major flood disaster, by the Village. The flood risk portions of the Plan will also be referenced in those updates.
- ***Grant Applications –*** The Village regularly applies for many grants and will reference the appropriate sections of the Plan as needed in preparation of the grant applications.

Jemez, Pueblo of:

- ***Emergency Operations Plan –*** Hazard profile and risk assessment data from the Plan can be used to further develop the EOP at the next update.
- ***Threat and Hazard Identification and Risk Assessment (THIRA) –*** when the THIRA is developed the Hazard Mitigation Plan will be referenced.

- ***2018 Long Range Transportation Plan (LRTP / Transportation Safety Plan (TSP)* –** The transportation plan describes reservation roads that are prone to hazards such as flooding. The Plan will be referred to during the update of the transportation plan to include any roads not already addressed.
- ***Tribal Transportation Improvement Plan (TTIP)* –** Updates of the TTIP will include reference to the Plan
- ***2014-2020 Jemez Comprehensive Plan* –** Updates of the Jemez Comprehensive Plan will include reference to the plan.
- ***Capital Improvement Plan* –** Development of projects for inclusion to the CIP will include a reference to elements and mitigation actions developed in the Plan.
- ***Dams – Emergency Action Plan* –** The EAP outlines procedures in case of dam failures that are located around the Pueblo of Jemez. Updates to this EAP will include reference to the Plan risk assessment information.
- ***Master Drainage Study* –** Updates of the master drainage study will reference the Plan in identifying future areas of flood risk.
- ***Jemez Valley Area Plan* -** The purpose of the Jemez Valley Area Plan is to develop a long range land use plan that reflects the unique characteristics, constraints, and growth pressures of the community.
- ***Economic Development Plan* –** Information from the Plan can be used in and referenced in the next update of the tribe's Economic Development Plan by providing guidance in selecting areas for economic development that are not high risk zones.

Jemez Springs, Village of:

- ***Jemez Valley Area Plan***— To develop a long range land use plan that reflects the unique characteristics, constraints, and growth pressures of the community. Based on the Sandoval County ICIP and Hazard Mitigation Plan.
- ***Village of Jemez Springs Comprehensive Land Use Plan*** – This Plan will be used, referenced, and incorporated in future revisions of the Comprehensive Land Use Plan.

Rio Rancho, City of:

- ***Floodplain Ordinance Update*** – This ordinance is reviewed and updated annually, or following a major flood disaster, by the City. The flood risk portions of the Plan will also be referenced for those updates.
- ***Emergency Operations Plan (EOP)*** – The EOP is updated every three years. Risk assessment elements of the Plan will be referenced and incorporated as appropriate with the next EOP update.
- ***Grant Applications*** – the City regularly applies for many grants and will reference the appropriate sections of the Plan as needed for preparation of the grant applications.

San Ysidro, Village of:

- ***Comprehensive Plan for the Village of San Ysidro*** – Plan will be used and referenced at the next five year revision of the comprehensive plan.
- ***LEPC Meetings*** – Plan information and risk assessment data will be used for planning purposes and emergency response exercises.
- ***Emergency Response Plan*** – Plan information will be used to aide in identification of at-risk residences and facilities for ERP updates.
- ***Capital Improvements to Water System*** – Plan information will be used during the construction document planning and preparations of the new water system to identify and avoid high risk areas or provide adequate design for mitigation.

- ***Grant Applications*** – Plan information will be used as a resource, whenever possible, for development of grant applications.
- ***Regional Transportation Planning Organization*** – Plan information will be referenced and incorporated as appropriate during the rural transportation planning conducted by the Middle Rio Grande Council of Governments.

Sandia, Pueblo of:

- ***2012 20-Year Long Range Transportation Plan*** – The transportation plan describes reservation roads that are prone to hazards such as flooding. The Plan will be referred to during the update of the transportation plan to include any roads not already addressed.
- ***Southern Border Economic Development Plan*** – The update of this economic development plan will include a reference to the Plan.
- ***Pueblo of Sandia Village Plan*** – The update of this economic development plan will include a reference to the Plan.
- ***Capital Improvement Plan*** – Development of projects for inclusion to the CIP will include a reference to elements and mitigation A/Ps developed in the Plan.
- ***Sandia Pueblo Dams – Emergency Action Plan*** – The EAP outlines procedures in case of dam failures that are located around the Pueblo Sandia Village and the Southern Border area. Updates to this EAP will include reference to the Plan risk assessment information.
- ***2010 Master Drainage Study*** – Updates of the master drainage study will reference the Plan in identifying future areas of flood risk.

Santo Domino, Pueblo of:

- ***Emergency Operations Plan*** – Hazard profile and risk assessment data from the Plan can be used to further develop the EOP at the next update.
- ***Economic Development Plan*** – Information from the Plan can be used in and referenced in the next update of the tribe's Economic Development Plan by providing guidance in selecting areas for economic development that are not high risk zones.

Southern Sandoval County Arroyo Flood Control Authority:

- ***Emergency Action Plan Updates*** – The Plan will be referenced during regular updates of the OSE plan as required every 2-5 years for high hazard dams.
- ***Grants Application Process*** – The Plan will be routinely referenced and evaluated when applying for FEMA and other grants.
- ***LEPC Meeting Resource Material*** – Reference Plan in preparation for LEPC updates following rainfall events measuring 0.5 inches or more.
- ***Watershed Management Plan Updates*** – The Plan will be referenced as a resource in identifying and prioritizing flood risk areas as candidates for watershed management plans.
- ***Facility Plan Updates*** – Plan will be referenced as a resource for information to identify and prioritize facility plans that provide the greatest mitigation of flood risk.

2.6.3 Plan Incorporation Process

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

In general, planning documents prepared by the various departments or divisions of a particular jurisdiction are developed using an appropriate planning process that is overseen and carried out by staff, with the occasional aide of consultants. Each planning process is unique to the plan being developed, but all usually involve the formation of a steering/planning committee and have some level

of interagency/stakeholder coordination within the plan's effective area. Public involvement may also be incorporated depending on the type of plan when appropriate. New or updated plans are usually developed to a draft stage wherein they are presented to the respective governing body for initial review and comment. Upon resolution and address of all comments, which may take several iterations, the plans are then presented to the governing body for final approval and official adoption.

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

Table 2-5 provides a summary of standard operating procedures that each of the participating jurisdictions follow when considering and incorporating official planning mechanisms, and how they apply to integration of the Plan.

Table 2-5: Jurisdictional standard operating procedures for integration of planning mechanisms

Jurisdiction	Description of Plan Integration Standard Operating Procedures
Sandoval County	Identify projects in plans, Commission approval, locate and secure funding, budget approval by Commission, bring stakeholders together, possible public comment/meetings, integrate possible changes, implement project with regular update meetings for stakeholders.
Bernalillo, Town of	Identify projects in plans, Council approval, locate and secure funding, budget approval by Council, possible public comment/meetings, integrate possible changes, implement project with regular update meetings for stakeholders.
Corrales, Village of	Identify projects in plans, Council approval, locate and secure funding, budget approval by Council, possible Department of Finance approval, possible public comment/meetings, integrate possible changes, implement project with regular update meetings for stakeholders.
Jemez, Pueblo of	Identify projects in plans, Tribal Council approval, locate and secure funding, budget approval by Tribal Council, possibly coordinate with Federal, State and County governments, implement project with regular update meetings for stakeholders as needed.
Jemez Springs, Village of	Identify projects in plans, Council approval, locate and secure funding, budget approval by Council, coordinate with Federal, County, State and Pueblo governments, possible Department of Finance approval, possible public comment/meetings, integrate possible changes, implement project with regular update meetings for stakeholders.
Rio Rancho, City of	Identify projects in plans, Council approval, locate and secure funding, budget approval by Council, possible Department of Finance approval, possible public comment/meetings, integrate possible changes, implement project with regular update meetings for stakeholders.
San Ysidro, Village of	Identify projects in plans, Council approval, locate and secure funding, budget approval by Council, coordinate with Federal, State, County and Pueblo governments, possible Department of Finance approval, possible public comment/meetings, integrate possible changes, implement project with regular update meetings for stakeholders.
Sandia, Pueblo of	Identify projects in plans, Tribal Council approval, locate and secure funding, budget approval by Tribal Council, possibly coordinate with Federal, State and County governments, implement project with regular update meetings for stakeholders as needed.
Santo Domingo, Pueblo of	Identify projects in plans, Tribal Council approval, locate and secure funding, budget approval by Tribal Council, possibly coordinate with Federal, State and County governments, implement project with regular update meetings for stakeholders as needed.
Southern Sandoval County Arroyo Flood Control Authority	Identify projects in plans, Board approval, locate and secure funding, budget approval by Board, coordinate with Federal, County, State and Municipal governments, possible Department of Finance approval, possible public comment/meetings, integrate possible changes, implement project with regular update meetings for stakeholders.

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SECTION 3: 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[21]. According to DMA 2000, the primary components of a risk assessment that answer these questions are generally categorized into the following measures:

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

The risk assessment for Sandoval County and participating jurisdictions was performed using a county-wide, multi-jurisdictional perspective, with much of the information gathering and development being accomplished by the 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 at an individual jurisdictional level, and at a county-wide level. For all information in Section 3: Risk Assessment information that pertains to the participating Pueblos can be found in their respective Annex to this plan.

3.1 Hazard Identification and Screening

Hazard identification is the process of answering the question; *"What hazards can and do occur in my community or jurisdiction?"* For this Plan, the list of hazards identified in the 2014 Plan were reviewed by the Planning Team with the goal of refining the list to reflect the hazards that pose the greatest risk to the jurisdictions represented by this Plan. The Planning Team also compared and contrasted the 2014 Plan list to the comprehensive hazard list summarized in the 2018 State Plan[22] to ensure compatibility with the State Plan. Table 3-1 summarizes the 2014 Plan and 2018 State Plan hazard lists.

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

- Experiential knowledge on behalf of the Planning Team with regard to the relative risk associated with the hazard.
- Documented historic context for damages and losses associated with past events with a focus on events that have occurred during the last plan cycle.
- The ability/desire of the jurisdictions represented by the Planning Team to develop effective mitigation actions/projects for the hazard under current DMA 2000 criteria.
- Consideration of, and compatibility with, the 2018 State Plan hazards.
- Duplication of effects attributed to each hazard.
- Focus on natural hazards.

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

[22] NMDHSEM, 2018, *New Mexico Natural Hazard Mitigation Plan*

Table 3-1: Initial hazard identification lists	
2014 Plan Hazard List	**2018 State Plan Hazard List**

• Dam Failure
• Drought
• Earthquake
• Flash Floods
• Human Caused
  ○ HAZMAT
  ○ Nuclear/Radiological Accidents
  ○ Terrorism
• Landslides / Land Subsidence
• Severe Weather
  ○ Hail
  ○ High Winds
  ○ Lightning
  ○ Thunderstorms
  ○ Tornado
  ○ Winter Storms
• Volcanoes
• Wildfires
	• Dam Failure
	• Drought
	• Earthquake
	• Extreme Heat
	• Expansive Soils
	• Flood/Flash Floods
	• High Wind
	• Land Subsidence
	• Landslides
	• Severe Winter Storms
	• Thunderstorms
	  ○ Lightning
	  ○ Hail
	• Tornadoes
	• Volcanoes
	• Wildland/WUI Fires

One tool used in the initial screening process was a historic hazard database prepared as a part of the plan update. Historic data compiled into this database includes both declared and undeclared events. Sources for declared events included: Sandoval County, New Mexico Department of Homeland Security & Emergency Management (NMDHSEM), Federal Emergency Management Agency (FEMA), and United States Department of Agriculture (USDA). Non-declared sources include: Local Jurisdictions, New Mexico Energy, Minerals, and Natural Resources Department (NMEMNRD), National Weather Service (NWS), National Oceanic and Atmospheric Administration (NOAA), National Climatic Data Center (NCDC), United States Geological Survey (USGS), and United States Forest Service (USFS), National Wildfire Coordination Group (NWCG), and others. If a hazard is not listed, then no documentation of a historic event was found

The Planning Team arrived at a final list of Plan hazard by using the hazards that were listed in the Sandoval County All Hazards Mitigation Plan 2014. The Planning Team also discussed the FEMA requirement that each jurisdiction develop a comprehensive range of mitigation actions/projects for all of the hazards identified in the Plan.

The culmination of the review and screening process by the Planning Team resulted in the following list of hazards that will be carried forward for profiling and mitigation with this Plan:

- **Dam Failure**
- **Drought**
- **Flood**
- **Severe Weather (see below)**
- **Severe Winds (see below)**
- **Wildfire**

The Planning Team chose to keep the **Severe Weather** category from the 2014 Plan as revised from the 2004 Plan with the hazards being grouped together to include Extreme Temperatures, Hail, Lightning, and Winter Storm. This decision was due to the fact that individually, the hazards do not pose a significant risk to the County, but collectively they are considered important enough to keep. The Planning Team also chose to group all wind-based hazard events (e.g. - High Wind, Tornado, Microburst, Macroburst, Gustnadoes, etc.) into a single category called **Severe Wind**.

Rationale for grouping hazards, or excluding and/or dropping hazards that were listed in either the 2014 Plan or the 2018 State Plan are summarized below:

- **Earthquake** was given consideration by the Planning Team and based off the decision by the 2014 Planning Team to focus energies on more hazards that can attain a least a 'low' hazard risk and drop Earthquake nuisance from the list along with the lack of any significant historic events and no damages reported, earthquake remains off the list within this plan.
- **Expansive Soils, Land Subsidence, Landslides, and Volcanoes -** the Planning Team chose to drop these hazards from further consideration due to the lack of historic damages and no perceived risk.
- **Extreme Heat** – the Planning Team recognizes that temperatures, on occasion, extend into the extreme ranges, but recurrence of such events is very infrequent and does not warrant special consideration. Instead, Extreme Temperatures (includes Extreme Heat) was added to the Severe Weather category.
- **High Winds and Tornadoes** – For Sandoval County, the occurrence of tornados is rare, but not unheard of. None of the historically recorded tornados were very severe and most were classified as F0. High Winds associated with extreme pressure gradients, thunderstorms, and tropical storms are more common. In all cases, the Steering Committee concluded that mitigation of these wind related conditions would be similar and chose to collectively treat all wind related hazards as a single category to be called Severe Wind (see below).
- **Human Caused** – the Planning Team chose to drop all human caused hazards from the Plan and focus on only natural hazards.
- **Lightning and Hail** – both of these hazards were discussed at length by the Planning Team and are recognized as hazards that have a history of damages and occurrence in the County, but are worth individual attention regarding mitigation needs. Accordingly, the Planning Team chose to include these hazards in the Severe Weather group category.
- **Severe Weather** – the 2014 Plan included a Severe Weather category that grouped many different hazards that are weather related, with Winter Storm, Thunderstorms, Lightning, Hail, and Tornado hazards being considered the most prominent. The Planning Team chose to keep this hazard category and limit the grouped hazard list to *Extreme Temperatures, Hail, Lightning,* and *Winter Storm*. The rest of the weather related hazards are either addressed individually or are considered nuisance hazards.
- **Severe Wind** - The Planning Team chose to group all wind-based hazard events (e.g. - High Wind, Tornado, Microburst, Macroburst, Gustnadoes, etc.) into a single category called Severe Wind.

3.2 Vulnerability Analysis Methodology

3.2.1 General

The following sections summarize the methodologies used to perform the vulnerability analysis portion of the risk assessment. For this Plan, vulnerability analysis was either revised or updated to reflect the new hazard categories, the availability of new data, or differing loss estimation methodology. Specific changes are noted below and/or in Section 3.3, as appropriate.

For the purposes of this vulnerability analysis, hazard profile maps were developed, as appropriate, to map the geographic variability of the risk posed by the Plan hazards selected by the Planning Team. For some hazards, profile categories of EXTREME, HIGH, MEDIUM, and/or LOW were used and were subjectively assigned based on the factors discussed in the Probability and Magnitude sections.

These terms are defined as:

- EXTREME
    - An event whose occurrence will greatly and severely impact the jurisdiction and its neighboring jurisdictions with possible termination to some of the economic base.
- HIGH
    - An event whose occurrence will cause significant cost and/or damage to the affected jurisdiction and possibly surrounding jurisdictions.
- MEDIUM
    - An event whose occurrence will cause noticeable cost and/or damage to the affected jurisdiction and possibly affect the neighboring jurisdictions.
- LOW
    - An event whose occurrence will cause small cost and/or damage to the affected jurisdiction with very minimal impact, if any, to the surrounding jurisdictions.

Within the context of the county limits, the other hazards do not exhibit significant geographic variability and will not be categorized as such.

3.2.2 Calculated Priority Risk Index (CPRI) Evaluation

The first step in the vulnerability analysis (VA) is to assess the perceived overall risk for each of the plan hazards using a tool developed by the State of Arizona called the Calculated Priority Risk Index[23] (CPRI). The CPRI value is obtained by assigning varying degrees of risk to four (4) categories for each hazard, and then calculating an index value based on a weighting scheme. Table 3-3, on next page, summarizes the CPRI risk categories and provides guidance regarding the assignment of values and weighting factors for each category.

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

Table 3-2: Calculated Priority Risk Index (CPRI) categories and risk levels

CPRI Category	Degree of Risk			Assigned Weighting Factor
	Level ID	Description	Index Value	
Probability	Unlikely	▪ Extremely rare with no documented history of occurrences or events. ▪ Annual probability of less than 0.001.	1	45% (0.45)
	Possible	▪ Rare occurrences with at least one documented or anecdotal historic event. ▪ Annual probability that is between 0.01 and 0.001.	2	
	Likely	▪ Occasional occurrences with at least two or more documented historic events. ▪ Annual probability that is between 0.1 and 0.01.	3	
	Highly Likely	▪ Frequent events with a well-documented history of occurrence. ▪ Annual probability that is greater than 0.1.	4	
Magnitude/ Severity	Negligible	▪ Negligible property damages (less than 5% of critical and non-critical facilities and infrastructure). ▪ Injuries or illnesses are treatable with first aid and there are no deaths. ▪ Negligible quality of life lost. ▪ Shut down of critical facilities for less than 24 hours.	1	30% (0.30)
	Limited	▪ Slight property damages (greater than 5% and less than 25% of critical and non-critical facilities and infrastructure). ▪ Injuries or illnesses do not result in permanent disability and no deaths. ▪ Moderate quality of life lost. ▪ Shut down of critical facilities for more than 1 day and less than 1 week.	2	
	Critical	▪ Moderate property damages (greater than 25% and less than 50% of critical and non-critical facilities and infrastructure). ▪ Injuries or illnesses result in permanent disability and at least 1death. ▪ Shut down of critical facilities for more than 1 week and less than 1 month.	3	
	Catastrophic	▪ Severe property damages (greater than 50% of critical and non-critical facilities and infrastructure). ▪ Injuries or illnesses result in permanent disability and multiple deaths. ▪ Shut down of critical facilities for more than 1 month.	4	
Warning Time	< than 6 hours	Self-explanatory.	4	15% (0.15)
	6 to 12 hours	Self-explanatory.	3	
	12 to 24 hours	Self-explanatory.	2	
	> than 24 hours	Self-explanatory.	1	
Duration	< than 6 hours	Self-explanatory.	1	10% (0.10)
	< than 24 hours	Self-explanatory.	2	
	< than one week	Self-explanatory.	3	
	> than one week	Self-explanatory.	4	

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 the flooding hazard would then be:

CPRI = [(3*0.45) + (3*0.30) + (2*0.15) + (1*0.10)]
CPRI = 2.65

3.2.3 Critical Facilities and Infrastructure

A Critical facilities and infrastructure (CFI) database was established for the 2014 mitigation planning process and vulnerability assessment. For the purpose of this Plan, the Planning Team used the same assessment process to establish a working definition for what qualifies as a critical facility or critical infrastructure:

Any systems, structures and/or infrastructure within a community whose incapacity or destruction would:

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

Following the criteria set forth by the Critical Infrastructure Assurance Office (CIAO), the following eight general categories[24] were used by the Planning Team to classify CFI:

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

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

Other facilities such as public libraries, schools, businesses, museums, parks, recreational facilities, historic buildings or sites, churches, residential and/or commercial structures, apartment complexes, and so forth, are typically not classified as CFI unless they serve a secondary function to the community during a disaster emergency (e.g. - emergency housing or evacuation centers). Ultimately, complete discretion was given to each community to determine what qualified as CFI in their community using the working definition as a basis for their decision. For example, a local business that employs a major segment of the community's workforce might be considered as a CFI to that community. Accordingly, each community made the final decision regarding what is, or is not a CFI for their jurisdiction.

Linear CFI such as major highways and roads, pipelines, utility lines, transmission lines, etc. were also evaluated for vulnerability, as appropriate and depending on the hazard type.

Tools used to compile the CFI database and attributes included: GIS data sets, on-line mapping utilities, insurance pool information, county assessor's data, and manual data acquisition. Table 3-4 summarizes the CFI counts for facilities that can be represented by a point on a map, as provided by the participating jurisdictions in this Plan. The Planning Team chose to not include the detailed CFI data with this Plan as maps and location descriptions are considered sensitive information. Specific Pueblo information can be found in their respective Annex to this plan.

Table 3-3: Critical facility and infrastructure counts by category and jurisdiction as of September 2018

Jurisdiction	Communications Infrastructure	Electrical Power Systems	Gas and Oil Facilities	Banking and Finance Institutions	Transportation Networks	Water Supply Systems	Government Services	Emergency Services	Educational	Shelter and Evacuation	Business	Flood Control	Recreational Facilities	Senior Residential
Sandoval County	4	0	0	0	0	0	4	12	0	0	0	0	0	0
Bernalillo, Town of	4	2	4	3	3	5	1	3	5	0	4	0	2	1
Corrales, Village of	1	0	1	1	0	8	6	4	4	0	0	1	6	0
Jemez Springs, Village of	1	1	0	0	1	2	2	2	0	0	0	0	0	0
Rio Rancho, City of	2	0	189	36	1	88	5	11	22	4	0	1	8	0
San Ysidro, Village of	0	0	0	0	0	6	1	1	0	0	0	0	0	0
SSCAFCA	0	0	0	0	0	0	0	0	0	0	0	74	0	0

It should be noted that the facility counts summarized in Table 3-4 do not represent a comprehensive inventory of all the category facilities that exist within the County. The CFI listed under these categories have been determined to be critical per the definition of this Plan by the corresponding jurisdiction. They do however represent the facilities inventoried to-date and are considered to be a work-in-progress that is anticipated to be expanded and augmented with each plan cycle.

3.2.4 Loss Estimations

In the 2014 Plan, loss estimates reflected current hazard map layers, an updated CFI database, and the use of Census 2010 block level data for estimating the human and residential structure impacts wherever possible. No industrial or commercial unit estimates are made, due to the lack of data at this

time. The procedures for developing loss estimates are discussed below. Loss estimations for this version of the plan followed the system utilized during the development of the 2014 Plan.

Economic loss and human exposure estimates for each of the final hazards identified in Section 3.1 begins with an assessment of the potential exposure of CFI, human populations, and residential structures to those hazards. CFI exposure estimates are accomplished by intersecting the CFI inventory with the hazard profiles in Section 3.3 and compiling the exposed facility count and replacement values by jurisdiction. Similarly, human population and residential unit exposures are estimated by intersecting the same hazards with the 2010 Census block population and residential unit count data sets. Structure and content replacement costs for CFI were assigned to each facility by the corresponding jurisdiction. Structure and content replacement costs for the residential housing counts were geographically assigned based on census data places and average housing unit values data from the Sandoval County Assessor's database and 2018 mean home values published online by City-Data.com. Average residential home replacement costs are about $175,000 with a few areas having significantly higher estimates due to the number of custom homes (Corrales and Placitas areas). Content value for these buildings was assumed to equal 50% of the replacement cost.

Combining the exposure and/or loss results from the CFI and 2010 Census database provides a comprehensive depiction of the overall exposure of critical facilities, human population, and residential building stock and the two datasets are considered complimentary and not redundant.

Economic losses to structures and facilities are estimated by multiplying the exposed facility replacement cost estimates by an assumed loss to exposure ratio for the hazard. It is important to note the following when reviewing the loss estimate results:

- The loss to exposure ratios is subjective and the estimates are solely intended to provide an understanding of relative risk from the hazards and potential magnitude of losses.
- Potential losses reported in this Plan represent an inherent assumption that the hazard occurs county-wide to the magnitude shown on the hazard profile map. The results are intended to present a county-wide loss potential. Any single hazard event will likely only impact a portion of the county and the actual losses would be some fraction of those estimated herein.

It is also noted that uncertainties are inherent in any loss estimation methodology due to:

- Incomplete scientific knowledge concerning hazards and our ability to predict their effects on the built environment;
- Approximations and simplifications that are necessary to perform a comprehensive analysis economically; and,
- Lack of detailed data necessary to implement a viable statistical approach to loss estimations.

Several of the hazards profiled in this Plan will not include quantitative exposure and loss estimates. The vulnerability of people and assets associated with some hazards are nearly impossible to evaluate given the uncertainty associated with attempting to specify a geospatial correlation of the hazard event and loss potential without sufficient data to justify the estimation of geographically varied damages. Instead, a qualitative review of vulnerability will be discussed to provide insight to the nature of losses that are associated with the hazard. For subsequent updates of this Plan, the data needed to evaluate these unpredictable hazards may become refined such that comprehensive vulnerability statements and thorough loss estimates can be made.

3.2.5 Development Trend Analysis

The 2014 Plan development trend analysis required updating to reflect growth and changes in Sandoval County and jurisdiction boundaries over the last planning cycle. The updated analysis process focused

on the potential risk associated with projected growth patterns and their intersection with the Plan identified hazards. Refer to Section 1.6 for general growth and development trend discussions for each jurisdiction.

3.3 Hazard Risk Profiles

The following sections summarize the risk profiles for each of the Plan hazards identified in Section 3.1. For each hazard, the following elements are addressed to present the overall risk profile:

- **Description**
- **History**
- **Probability and Magnitude**
- **Vulnerability**
- **Sources**
- **Profile Maps (if applicable)**

County-wide and jurisdiction specific profile maps are provided at the end of the section (as applicable) to enhance the understanding of geographic limits to hazard impacts.

3.3.1 Dam Failure

Description A dam is defined as a barrier constructed across a watercourse for the purpose of storage, control, or diversion of water. Dams typically are constructed of earth, rock, concrete, or mine tailings. A dam impounds water in the upstream area, or reservoir, and the volume of storage is usually measured in acre-feet (the volume of water that covers an acre of land to a depth of 1 foot).

Cochiti Dam
Source: Google Earth, 2018

The primary risk associated with dam failure in Sandoval County is the inundation of downstream facilities and population by the resulting flood wave. Dams within or impacting Sandoval County can generally be divided into two groups: (1) water storage reservoirs designed to impound and store water, provide flood protection, and possibly generate power, and (2) single purpose flood retarding structures (FRS) designed to attenuate or reduce flooding by impounding stormwater for relatively short durations of time during flood events. There are also numerous small stock tanks and ponds scattered throughout the County.

Most dams and FRS are equipped with an emergency spillway, which provides a designed and protected outlet to convey runoff volumes exceeding the dam's storage capacity during extreme or back-to-back storm events. Dam failures may be caused by a variety of reasons including: seismic events, extreme wave action, leakage and piping, overtopping, material fatigue and spillway erosion.

The New Mexico Office of the State Engineer (NMOSE) Dam Safety Bureau ensures that dams in New Mexico are designed, constructed, operated, and maintained safely to prevent dam failures. Dams that equal or exceed 25 feet in height and 15 acre-feet of storage; or dams that equal or exceed 50 acre-feet storage and six (6) feet in height; are under the jurisdiction of the State Engineer. In addition, a permit is required from the State Engineer for the construction of any dam that exceeds 10 feet in height and/or 10 acre-feet of water storage, regardless of the regulatory eligibility. Dams that do not meet the

regulatory requirements and are 10 feet or less in height and/or store 10 acre-feet or less, are generally not regulated and are considered non-jurisdictional dams.

Federal dam owners are required to obtain a permit for a new dam; however, the NMOSE Dam Safety Bureau by law does not regulate federal dams. However, if a federal or non-jurisdictional dam threatens life and property due to an unsafe condition, the state engineer can issue a safety order to the owner requiring action to remove the threat.

History

There is no documented history of a major dam failure within Sandoval County.

Probability and Magnitude

The probability of dam failures is difficult to quantify due to numerous factors that may cause a dam to fail. The magnitude of a dam failure is normally an estimate of discharge and can vary greatly with each dam. Factors impacting the probability and magnitude of dam failure are directly influenced by the type and age of the dam, its operational purpose, storage capacity and height, downstream conditions, hydrologic conditions at the time of failure, and many other factors.

There are two sources of data that publish hazard ratings for dams impacting Sandoval County. The first is the NMOSE Dam Safety Bureau and the second is the National Inventory of Dams (NID). Hazard ratings from each source are based on either an assessment of the consequence of failure and/or dam safety considerations, and they are not tied to probability of occurrence.

The NMOSE Dam Safety Bureau stated purpose is to ensure that dams in New Mexico are designed, constructed, operated, and maintained safely to prevent dam failures. The responsibilities of the NMOSE Dam Safety Bureau include:

- Inspecting existing dams to verify they are operated and maintained in a safe condition.
- Review plans and specifications for new dams, as well as modifications and repairs to existing dams, to ensure compliance with State Engineer design criteria.
- Inspection of dam construction to verify the dams are built or repaired in accordance with the plans on file with the State Engineer.

The NMOSE Dam Safety Bureau assigns a hazard potential rating and dam safety classification to each jurisdictional dam. The hazard rating is based on the potential consequences of failure and the corresponding loss of life, damage to property and environmental damage that is likely to occur in the event of dam failure. No allowances for evacuation or other emergency actions by the population are considered and the hazard potential classification is not a reflection of the condition of the dam. The three hazard ratings used are:

- **LOW**: Dams assigned the low hazard potential classification are those dams where failure or improper operation results in no probable loss of life and low economic or environmental losses. Losses are principally limited to the dam owner's property.
- **SIGNIFICANT**: Dams assigned the significant hazard potential classification are those dams where failure or improper operation results in no probable loss of human life but can cause economic loss, environmental damage, disruption of lifeline facilities, or can impact other concerns. Significant hazard potential classification dams are often located in predominantly rural or agricultural areas but could be located in populated areas with significant infrastructure.
- **HIGH**: Dams assigned the high hazard potential classification are those dams where failure or improper operation will probably cause loss of human life.

The dam safety categories used by NMOSE Dam Safety Bureau are:

- **SATISFACTORY** – No existing or potential dam safety deficiencies are recognized. Acceptable performance is expected under all loading conditions in accordance with state engineer's rules and regulations for dams or tolerable risk guidelines.
- **FAIR** – No existing dam safety deficiencies are recognized for normal loading conditions. Rare or extreme hydrologic and/or seismic events may result in a dam safety deficiency. Risk may be in the range to take further action.
- **POOR** – A dam safety deficiency is recognized for loading conditions, which may realistically occur. Remedial action is necessary. A poor condition is used when uncertainties exist as to critical analysis parameters, which identify a potential dam safety deficiency. Further investigations and studies are necessary.
- **UNSATISFACTORY** – A dam safety deficiency is recognized that requires immediate or emergency remedial action for problem resolution.

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. As of September 2018, there are currently seven dams within Sandoval County, listed below, that are jurisdictional and regulated by the NMOSE Dam Safety Bureau. (*Max Storage/Discharge numbers are in Acre Feet)*

Dam Name	Maximum Storage	Maximum Discharge	Hazard Rating	Dam Safety Category
Fenton Lake Dam	721	23,000	High	Poor
Lower Vallecito Dam	80	362	High	Poor
Corrales Heights Dam	107	1,695	High	Satisfactory
Enchanted Hills Dam	154.6	4,368	High	Satisfactory
Sportsplex Dam	316	102,500	High	Satisfactory
Sandia Mountain Site No. 1 Dam	383	21,190	High	Satisfactory
Source: NMOSE Dam Safety Bureau, Accessed September 2018; http://www.ose.state.nm.us/DS/dsIndex.php				

Federal dams are not regulated by NMOSE Dam Safety Bureau, but are maintained and inspected by the constructing agency. The two primary federal dams impacting Sandoval County are Cochiti Dam (*Max Storage – 722,000 / Max Discharge – 136,360*) and Jemez Canyon Dam (*Max Storage – 264, 700 / Max Discharge – 319,300*). Both are owned, maintained and operated by the U.S. Army Corps of Engineers and both are considered to be high hazard dams. The complete list of dam info from the New Mexico Office of the State Engineer, Dam Safety Bureau can be found in Appendix F. This list also shows which dams have not completed or updated their EAP, which creates a data deficiency for the community in which it is located and for the Sandoval County Office of Emergency Management. Lack of information makes it difficult to properly mitigate against a failure and know what everyone should be preparing for in the event of a partial or complete failure of the dam.

The NID database contains information on approximately 84,000 dams in the 50 states and Puerto Rico, with approximately 30 characteristics reported for each dam, such as: name, last inspection date, owner information, height, storage capacity, primary purpose, construction type, river, and nearest community. The NID database shows there are 492 dams within New Mexico which include federal, state, local, private and utility owned dams and each is classified as either low, significant, or high hazard based on the potential for loss of life and damage to property should the dam fail (listed in increasing severity). Currently, the NID database shows a total of 20 dams within the County as follows:

Dam Name	Owner	Purpose	Location	River
Bear Paw Lake No. 7 Dam	Private; Bear Paw Lake	Recreation	Regina	San Jose Creek
Cochiti Lake	Federal: CESPA	Flood Control, Recreation	Cochiti Pueblo	Rio Grande
Corrales Heights Dam	Local; SSCAFCA	Flood Control	Corrales	Rio Grande
Enchanted Hills Detention Dam 1	Local; SSCAFCA	Flood Control	Bernalillo	Venada Arroyo
Enchanted Hills Detention Dam 2	Local; SSCAFCA	Flood Control	Bernalillo	Venada Arroyo
Fenton Lake Dam	State; NM DG&F	Recreation	Gilman	Rio Cebolla
Hatch Reservoir Dam	Private; MDANAT	Recreation	Regina	San Jose
Jemez Canyon Dam	Federal; CESPA	Flood Control	Bernalillo	Jemez River
Lower Vallecito Dam	Local; Ponderosa Ditch Association	Irrigation	Ponderosa	Vallecito Creek
Montoyas Arroyo Sportsplex Dam	Local; SSCAFCA	Flood Control	Rio Rancho	Arroyo de los Montoyas
Ponderosa Irrigation Reservoir 2	Local; Ponderosa Irrigation Commission	Irrigation	Ponderosa	Vallecito Creek
Rio Rancho Urban Pond #4 Dam	Local; SSCAFCA	Flood Control	Corrales	Rio Grande
San Francisco	Federal; BIA	Flood Control	*Not Listed*	Arroyo de San Francisco
Sandia Mountain Site #1 Dam (aka the Piedra Liza Dam)	Local; Coronado Soil & Water Conservation	Flood Control	Bernalillo	Piedra Liza
Sandia Pueblo 82-1	Federal; BIA	Flood Control	Sandia Pueblo	Unnamed Wash; Rio Grande
Sandia Pueblo 82-2	Federal; BIA	Flood Control	Sandia Pueblo	Unnamed Wash; Rio Grande
Sandia Pueblo 82-3	Federal; BIA	Flood Control	Sandia Pueblo	Unnamed Wash; Rio Grande
Sandia Pueblo 82-4	Federal; BIA	Flood Control	Sandia Pueblo	Unnamed Wash; Rio Grande
Santa Ana	Federal; BIA	*Not Listed*	*Not Listed*	Unnamed Wash; Rio Grande
Tree Farm Pond A Dam	Local; SSCAFCA	Flood Control	Corrales	Rio Grande
Source: NID, Accessed September 2018; http://nid.usace.army.mil/cm_apex/f?p=838:1:0::NO				

The magnitude of impacts due to dam failure are usually summarized in a dam's emergency action plan (EAP), wherein downstream inundation limits are mapped based on an assumed dam failure scenario. The magnitude of the assumed failure event is usually based on a dam's hazard classification and size, and often reflects worst-case hydrologic scenarios such as Probable Maximum Flood (PMF) conditions. For smaller dams, 100-year flood based failures may be assessed and mapped. For this Plan, the dam failure inundation limits were available for Cochiti Dam, Corrales Heights Dam No. 1, Enchanted Hills Dam No. 1, Jemez Canyon Dam, Lower Vallecito Dam, Montoyas Arroyo Sportsplex Dam, San Francisco Dam, Water Tank Dam, and Sandia Pueblo Dams 82-1, 82-2, 82-3, and 82-4. All other dams have no data available on their inundation limits and having this unknown creates a data deficiency for the planning team.

The available dam failure limits were compiled into a single data set that was then used in the vulnerability analysis. All of the dam failure inundation limits are classified herein as a HIGH hazard area. All other areas are classified as a LOW hazard, although it is clearly understood by the Planning Team that there are potentially HIGH hazard inundation limits downstream of all dams that are either not identified in the NMOSE Dam Safety Bureau or NID databases, or are not currently mapped with downstream inundation limits.

Maps 1A through 1D depict the location of identified dams within the County to provide a perspective of the potential areas downstream that may be impacted by a dam failure. Dam symbols are attributed to indicate their NMOSE Dam Safety Bureau hazard classification and jurisdictional status, if available. Maps 1E through 1J are jurisdiction specific maps showing the dam failure hazard areas at a greater level of detail. Specific Pueblo information can be found in their respective Annex to this plan.

Vulnerability – CPRI Results

Dam failure CPRI results for each jurisdiction are summarized in Table 3-5. A summary of all hazards, including dam failure, is provided on page 167 (Table 3-21).

Specific Pueblo information can be found in their respective Annex to this plan.

Table 3-4: CPRI results by jurisdiction for dam failure

Participating Jurisdiction	Probability	Magnitude/ Severity	Warning Time	Duration	CPRI Score
Bernalillo, Town of	Possible	Critical	< 6 hours	< 24 hours	2.60
Corrales, Village of	Possible	Critical	< 6 hours	< 24 hours	2.60
Jemez Springs, Village of	Unlikely	Negligible	< 6 hours	< 6 hours	1.45
Rio Rancho, City of	Possible	Catastrophic	< 6 hours	> 1 week	3.10
San Ysidro, Village of	Unlikely	Negligible	< 6 hours	< 6 hours	1.45
SSCAFCA	Possible	Catastrophic	< 6 hours	> 1 week	3.10
Unincorporated Sandoval County	Unlikely	Critical	6-12 hours	< 1 week	2.10
				County-wide average CPRI =	**2.34**

Vulnerability – Loss Estimations

The estimation of potential losses due to inundation from a dam failure was accomplished by intersecting the human and facility assets with the inundation limits shown in Maps 1A through 1D. As stated previously, delineated dam failure inundation limits were not available for all of the known dams within the County, therefore, the results of this analysis are expected to underestimate the exposure of people and infrastructure to dam failure within Sandoval County.

Since no common methodology is available for obtaining losses from the exposure values, estimates of the loss-to-exposure ratios were assumed based on the perceived potential for damage. Any sunny day failure, or storm event of sufficient magnitude to cause a dam failure scenario, would have potentially catastrophic consequences in the inundation area. Flood waves from these types of events travel very fast and possess tremendous destructive energy. Accordingly, an average event based loss-to-exposure ratio for the inundation areas with a HIGH hazard rating are estimated to be 0.50 or a 50% loss. Low rated areas are zero.

Table 3-5 summarizes exposure and loss estimations for dam failure by jurisdiction. In summary, $56.5 million in CFI related losses are estimated for dam failure inundation for all the participating jurisdictions in Sandoval County. An additional $1.39 billion in losses to Census 2010 estimated residential structures is estimated for all participating Sandoval County jurisdictions (Pueblo information can be found in their respective Annexes to this plan). Regarding human vulnerability, a total population of 18,481 people, or 14.05% of the total Sandoval County population, is potentially exposed to a dam failure inundation event. The potential for deaths and injuries are directly related to the warning time and type of event. Given the magnitude of such an event(s), it is realistic to anticipate at least one death and several injuries. There is also a high probability of population displacement for most of the inhabitants within the inundation limits downstream of the dam(s).

Table 3-5: Sandoval County jurisdictional exposure and loss estimates due to dam failure

DAM FAILURE HAZARD EXPOSURE / LOSS	Bernalillo	Corrales	Jemez Springs	Rio Rancho	San Ysidro	SSCAFCA	Sandoval County (U)	Total
Total Critical Facilities	**34**	**27**	**9**	**122**	**8**	**74**	**16**	**268**
Estimated Replacement Cost	**$0**	**$24,000,000**	**$10,275,000**	**$342,234,000**	**$2,550,000**	**$294,657,000**	**$56,850,000**	**$795,656,000**
Facilities Exposed to High Hazard	22	27	0	3	0	3	2	60
Percentage of Total Facilities	64.71%	100.00%	0.00%	2.46%	0.00%	4.05%	12.50%	41.10%
Estimated Replacement Cost	$0	$24,000,000	$0	$10,868,000	$0	$46,490,000	$1,250,000	$113,055,000
Estimated Structure Loss	$0	$12,000,000	$0	$5,434,000	$0	$23,245,000	$625,000	$56,528,000
Total Population	**8,307**	**8,231**	**278**	**87,444**	**165**	**N/A**	**14,140**	**131,564**
Population Exposed to High Hazard	7,221	6,568	0	1,087	19	N/A	574	18,481
Percent Exposed	86.93%	79.80%	0.00%	1.24%	11.28%	N/A	4.06%	14.05%
Population Over 65	**1,113**	**1,600**	**83**	**9,437**	**30**	**N/A**	**2,353**	**15,880**
Population Over 65 Exposed to High Hazard	961	1,215	0	112	4	N/A	63	2,641
Percent Exposed	86.39%	75.94%	0.00%	1.18%	13.33%	N/A	2.69%	16.63%
Residential Building Count Totals)	**3,215**	**3,765**	**174**	**33,927**	**83**	**N/A**	**7,486**	**49,665**
Estimated Replacement Cost	**$622,530,000**	**$2,222,247,000**	**$40,712,000**	**$10,178,234,000**	**$18,694,000**	**N/A**	**$2,799,780,000**	**$16,073,849,000**
Residential Bldgs. Exposed to High Hazard	2,821	2,944	0	416	10	N/A	217	7,172
Percentage of Total Residential Bldgs.	87.75%	78.19%	0.00%	1.23%	12.53%	N/A	2.90%	14.44%
Estimate Exposed Replacement Cost	$525,860,000	$1,936,325,000	$0	$124,745,000	$2,343,000	N/A	$50,265,000	$2,780,443,000
Estimated Residential Structure Losses	$262,930,000	$968,162,000	$0	$62,373,000	$1,171,000	N/A	$25,133,000	$1,390,222,000

Vulnerability – Development Trend Analysis

In general, new development within known dam failure inundation zones should be carefully evaluated by each jurisdiction to ensure that overland pathways are maintained through developments for potential breach flows or emergency spillway releases. It is not unusual for development to encroach downstream of flood retarding structures due to the reduction in flood flows and the perception that no protection is needed. Specific trend analyses for each jurisdiction (Pueblo information can be found in their respective Annexes to this plan) are summarized below:

Bernalillo – With no plans for annexation or major redevelopment, the town's vulnerability to dam failure will likely remain unchanged over the next five years.

Corrales – Approximately 80% of the village is located within a high hazard dam failure area (see Map 1F). As previously discussed, the probability of a dam failure is low given the pro-active maintenance and monitoring activities of the USACE and SSCAFCA. Most of the facilities identified as potential growth over the next 5 years will be located within a high hazard dam failure area.

Jemez Springs – Although the Village is not located within any known or mapped Dam Failure inundation limits, they have identified several mitigation actions that also mitigate against Dam Failure were one to occur.

Rio Rancho – Only a very small portion of Rio Rancho is located within a high hazard dam failure area, and the majority of that exposure is over areas dedicated for drainage conveyance or owned by SSCAFCA. None of the areas identified for future development are located within dam failure hazard areas. Accordingly, there is effectively no vulnerability to the areas identified for future development.

San Ysidro – The dam failure high hazard limits primarily coincide with natural floodplain of the Jemez River. The growth areas identified by the village are located outside of the dam failure hazard area limits and are therefore not vulnerable.

SSCAFCA – SSCAFCA continues to develop facilities primarily focusing on protecting existing development and infrastructure. Since the 2014 Plan, SSCAFCA has constructed one non-jurisdictional dam (Campus Dam), and several facilities focusing primarily on removing sediment from stormwater flows to ensure the proper functioning of existing infrastructure.

Unincorporated County – Development activity over the last five years in the unincorporated area of Sandoval County has focused mainly in Placitas and Rio Rancho Estates. In Placitas, the Petroglyph Trails Master Planned area continues to grow. This includes residential development of differing densities plus some commercial and light industrial. The Rio Rancho Estates area is a slowly developing residential area with scattered land ownership.

We anticipate further development within Petroglyph Trails. There will likely be further development interest near Highway 550 and Highway 528 following the reconstruction of that interchange. It is also anticipated that development activity will likely increase in the Rio Rancho area.

Vulnerability – Jurisdictional Summary

Most of the participating jurisdictions are exposed, to varying degrees, to a Dam Failure. The vulnerability of each jurisdiction varies depending on the percentage of population and infrastructure that is located within a dam failure inundation limit. Each jurisdiction's overall vulnerability to Dam Failure is summarized in the crosswalk of Table 3-6.

Specific Pueblo information can be found in their respective Annex to this plan.

Table 3-6: Dam Failure Vulnerability Rating Crosswalk			
Jurisdiction	**Vulnerability Rating**	**Mitigation Priority?**	**Notes**
Bernalillo, Town of	High	Yes	The majority of the Town is located within the Cochiti and/or Jemez Dam inundation limits, plus a small footprint from the Enchanted Hills Dam No. 1. Given the high percentage of population and infrastructure exposure to a Dam Failure, the overall vulnerability for the Town is considered to be High.
Corrales, Village of	High	Yes	Corrales is exposes to multiple Dam Failure inundation limits including Cochiti, Jemez, Corrales Heights No. 1, and Montoyas Arroyo Sportsplex Dams. Given the high percentage of population and infrastructure exposure to a Dam Failure, the overall vulnerability for the Village is considered to be High.
Jemez Springs, Village of	Moderate	Yes	Although the Village is not located within any known or mapped Dam Failure inundation limits, they have identified several mitigation actions that also mitigate against Dam Failure were one to occur.
Rio Rancho, City of	Moderate	Yes	Only a very small part of Rio Rancho is located within a defined Dam Failure inundation limit, therefore, the City's exposure and vulnerability to Dam Failure is at a Moderate level.
San Ysidro, Village of	Moderate	Yes	A portion of San Ysidro is located within the Dam Failure inundation limits of the Lower Vallecito Dam. The High hazard inundation limits are generally constrained to the Jemez River floodplain and adjacent agricultural fields, and only a few structures primarily located along the east side of NM 4. Accordingly, the overall vulnerability to Dam Failure for San Ysidro is Moderate.
SSCAFCA	Moderate	Yes	SSCAFCA owns and maintains several small dams and storage ponds within its jurisdiction. Drainage facilities downstream of those dams and ones located within the Dam Failure inundation limits of Cochiti and Jemez Dams, are vulnerable to damage should a dam failure occur. Strictly from vulnerability view, SSCAFCA has a Moderate vulnerability to Dam Failure. However, maintenance and operation of SSCAFCA owned dams and ponds is part of SSCAFCA's mandate and are an integral part of the organization's mitigation strategy.
Unincorporated Sandoval County	Moderate	Yes	A portion of the population and facilities within the unincorporated county area are located within delineated Dam Failure inundation limits. Most of these are located near incorporated communities and along either the Rio Grande or Jemez River corridors. The exposure of these areas puts the County's overall vulnerability at a Moderate level.

Sources

Bohannan Huston, Inc., *Montoyas Arroyo Sportsplex Dam Emergency Action Plan*, Appendix E, Evacuation Map, prepared for SSCAFCA.

Huit-Zollars, 2012, E*nchanted Hills Dam #1 Inundation Map*, Appendix H, prepared for SSCAFCA.

URS Corporation, 2012, GIS Shapefiles for Lower Vallecito Dam Inundation Study.

U.S. Army Corps of Engineers, Albuquerque District, 2009, *Jemez Dam Inundation Map*, Plates 1-3.

U.S. Department of Interior, Bureau of Indian Affairs, 2012, *Dam Failure Inundation Study, San Francisco Dam & Water Tank Dam, Pueblo of San Felipe, New Mexico*.

U.S. Department of Interior, Bureau of Indian Affairs, 2012, *Recommended Evacuation Zone, Sandia Pueblo Dams, Sandia Pueblo, New Mexico*.

W.H. Pacific, 2011, *Corrales Heights Dam No. 1, Scenario 'B' PMF Breach Inundation Map*, Figure 15, Page 46, prepared for SSCAFCA.

Profile Maps

Maps 1A through 1D – Dam Inundation Hazard Maps – Countywide.

Maps 1E through 1J – Bernalillo, Corrales, Jemez Springs, Rio Rancho, San Ysidro, and SSCAFCA Dam Inundation Hazard Maps. Specific Pueblo information can be found in their respective Annex to this plan.

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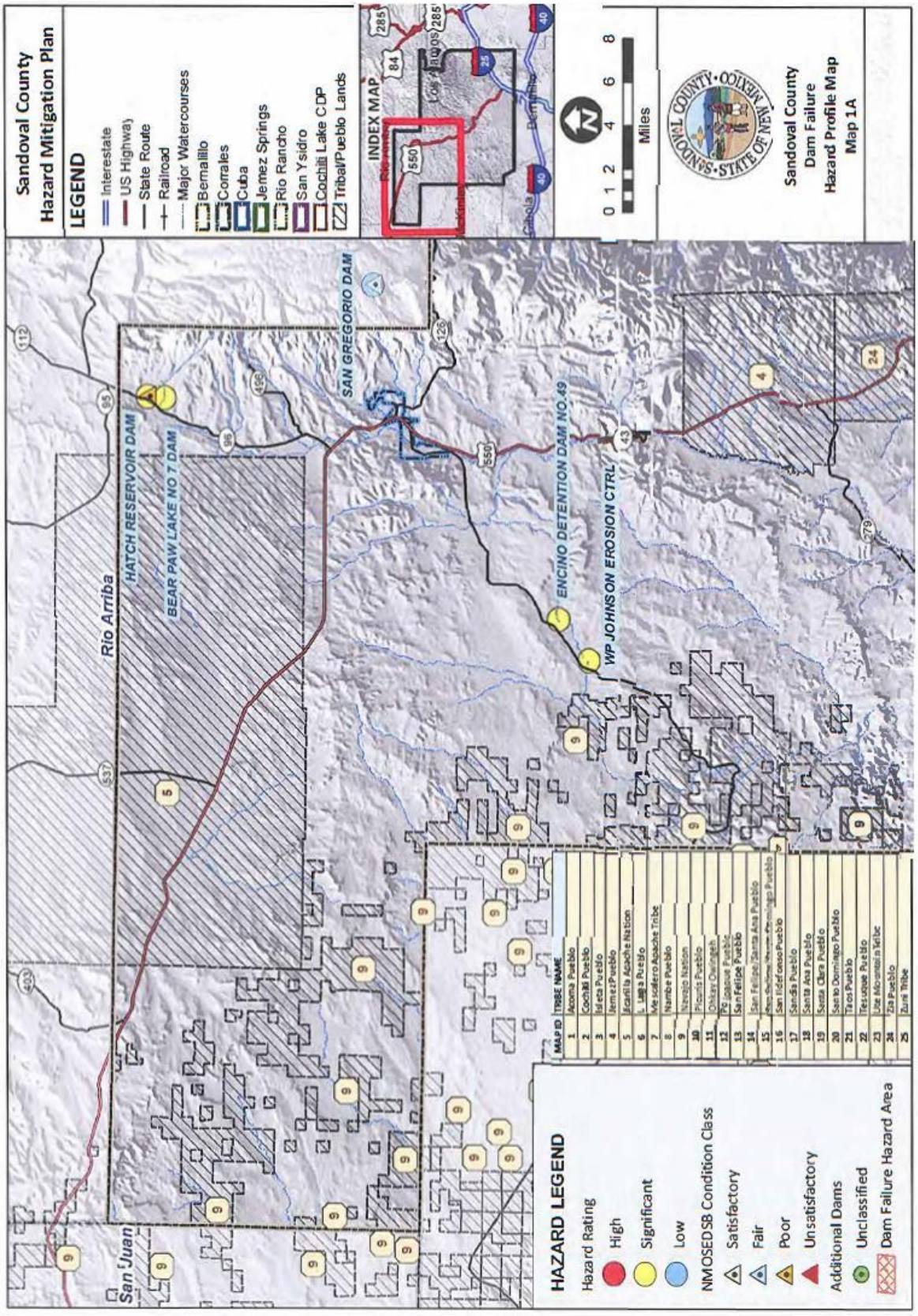
Sandoval County
Hazard Mitigation Plan
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SAN GREGORIO DAM
ENCINO DETENTION DAM NO.49
WP JOHNSON EROSION CTRL
Rio Arriba
San Juan
HAZARD LEGEND
Hazard Rating
High
Significant
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3 Isleta Pueblo
4 Jemez Pueblo
5 Jicarilla Apache Nation
6 Laguna Pueblo
7 Mescalero Apache Tribe
8 Nambe Pueblo
9 Navajo Nation
10 Picuris Pueblo
11 Ohkay Owingeh
12 Pojoaque Pueblo
13 San Felipe Pueblo
14 San Ildefonso Pueblo
15 San Juan Pueblo
16 Sandia Pueblo
17 Santa Ana Pueblo
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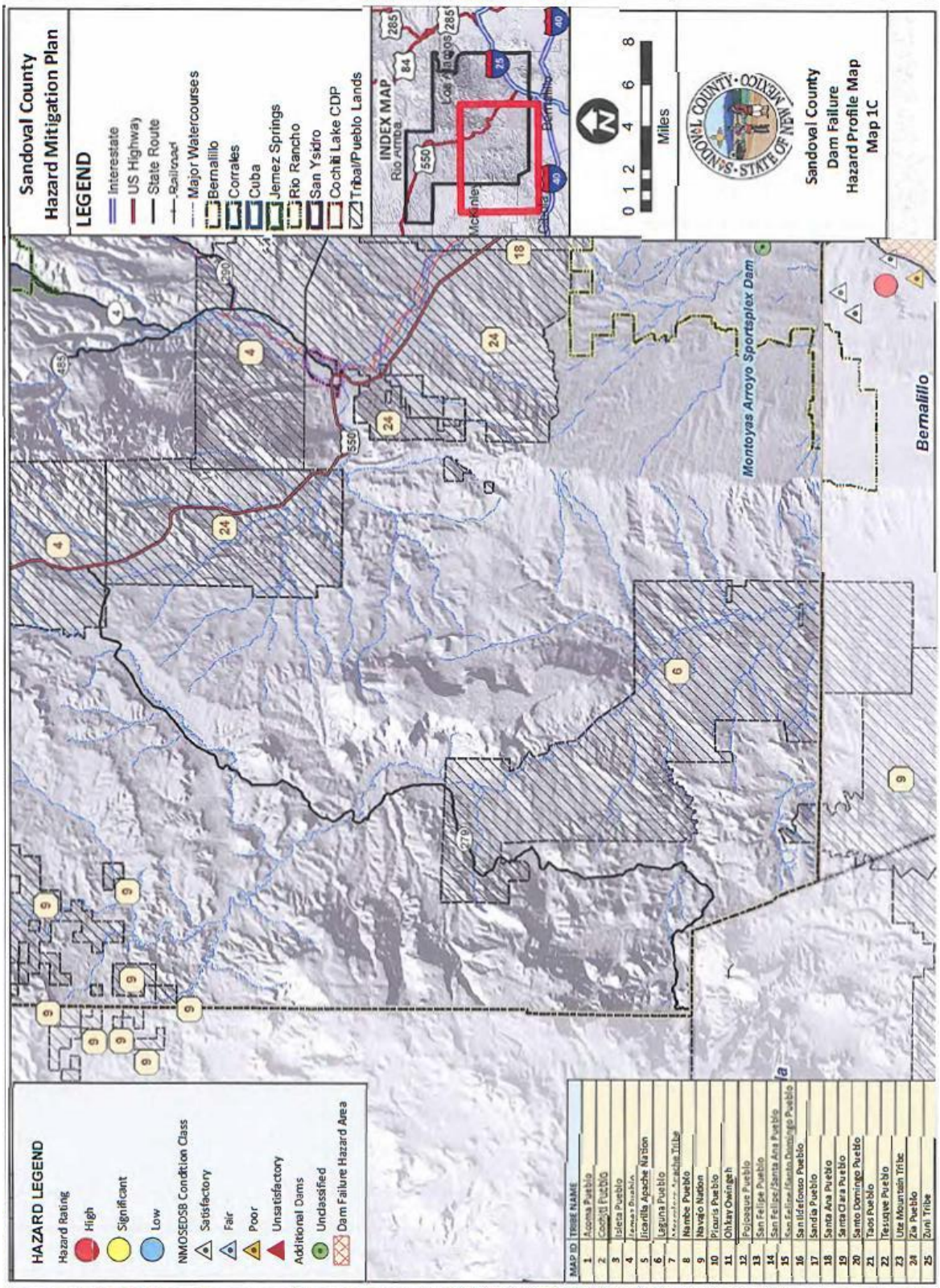
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HAZARD LEGEND
Hazard Rating
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Significant
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NMOSE/DSB Condition Class
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Unsatisfactory
Additional Dams
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Dam Failure Hazard Area
MAP ID
TRIBE NAME
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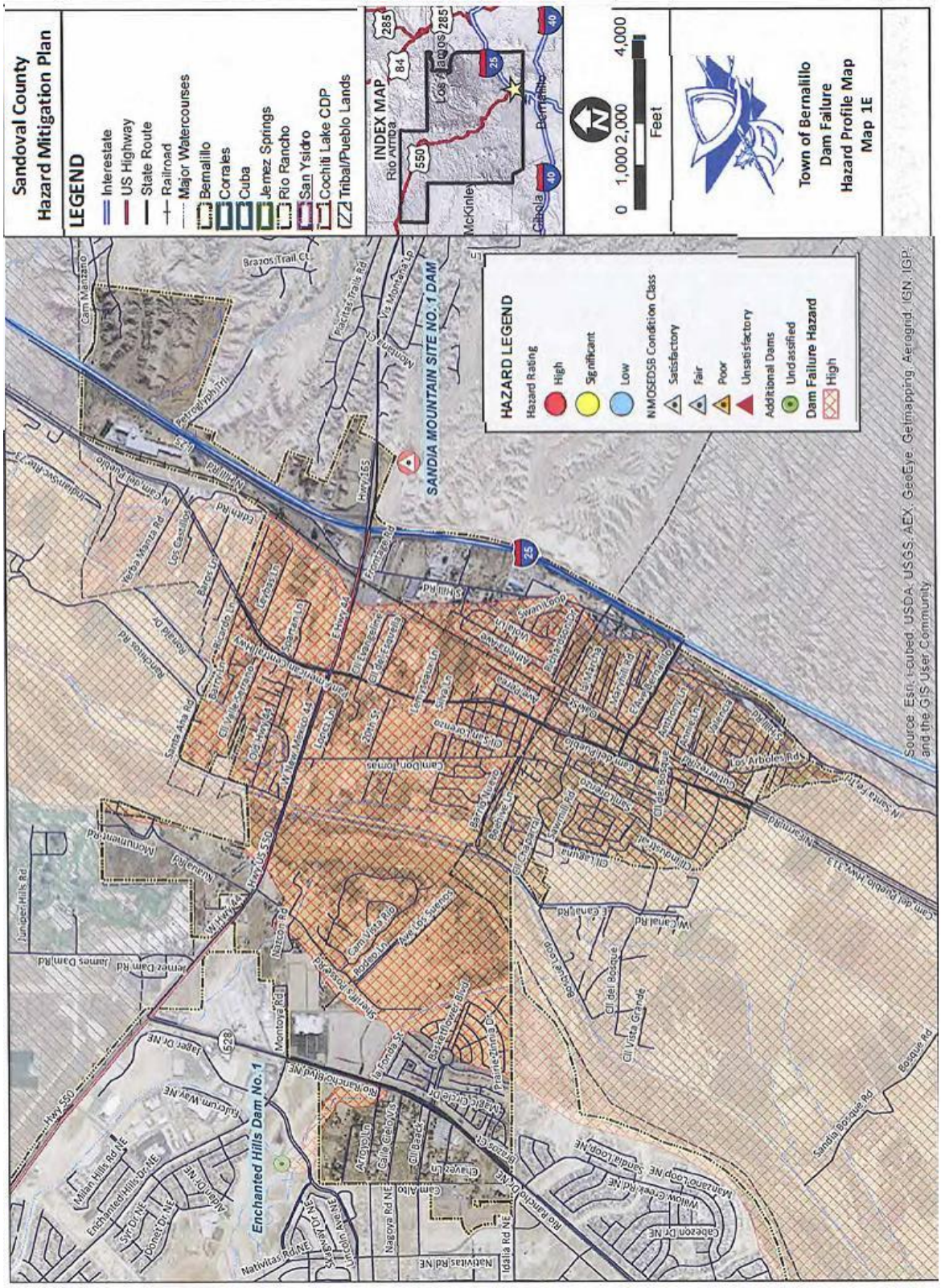
3 Isleta Pueblo
4 Jemez Pueblo
5 Jicarilla Apache Nation
6 Laguna Pueblo
7 Navajo Nation
8 Nambe Pueblo
9 Navajo Nation
10 Picuris Pueblo
11 Ohkay Owingeh
12 Pojoaque Pueblo
13 San Felipe Pueblo
14 Santa Ana Pueblo
15 San Ildefonso Pueblo
16 Sandia Pueblo
17 Santa Ana Pueblo
18 Santa Clara Pueblo
19 Santo Domingo Pueblo
20 Taos Pueblo
21 Tesuque Pueblo
22 Ute Mountain Tribe
23 Zia Pueblo
24 Zuni Tribe
Montoyas Arroyo Sportsplex Dam
Bernalillo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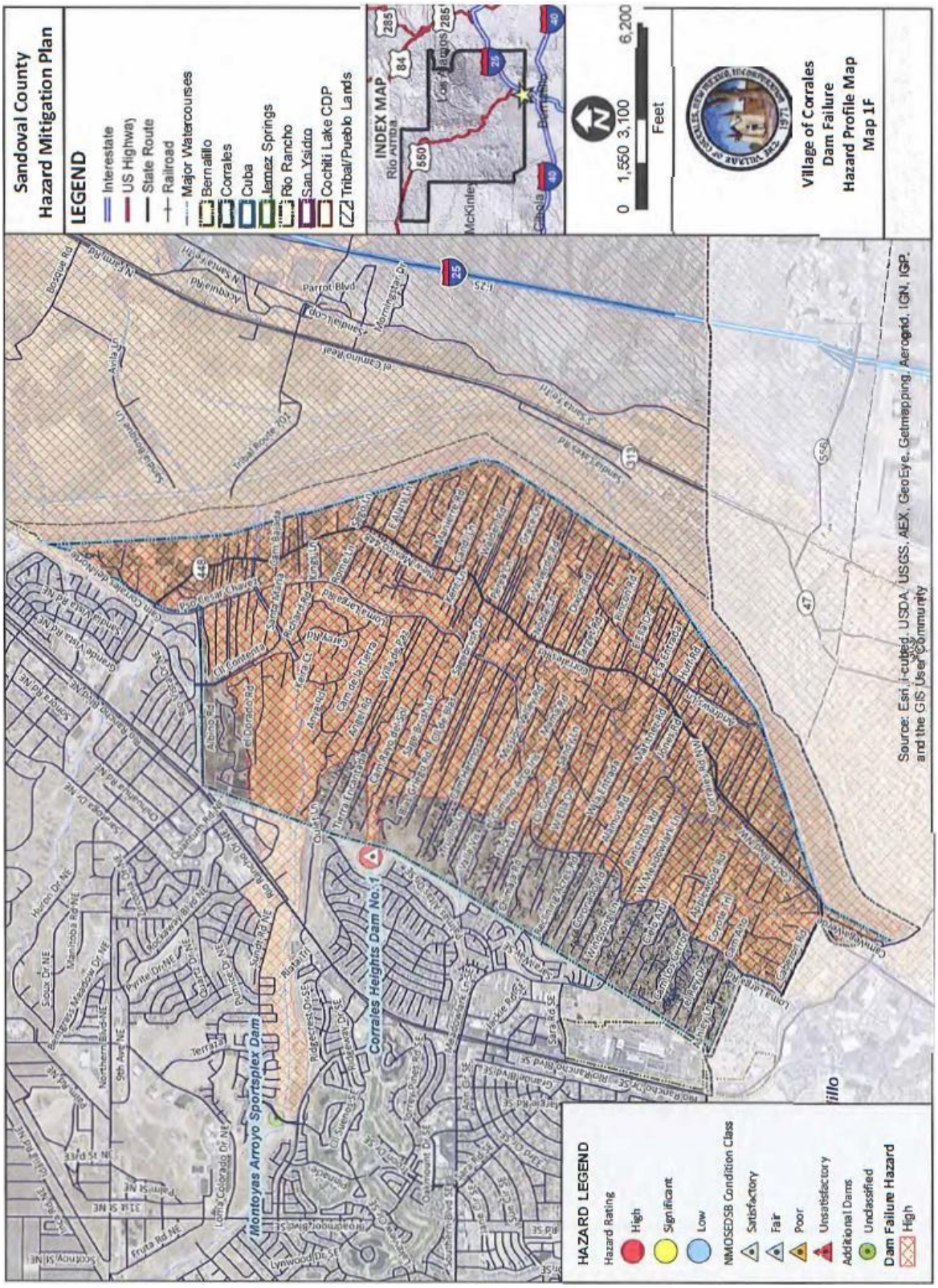
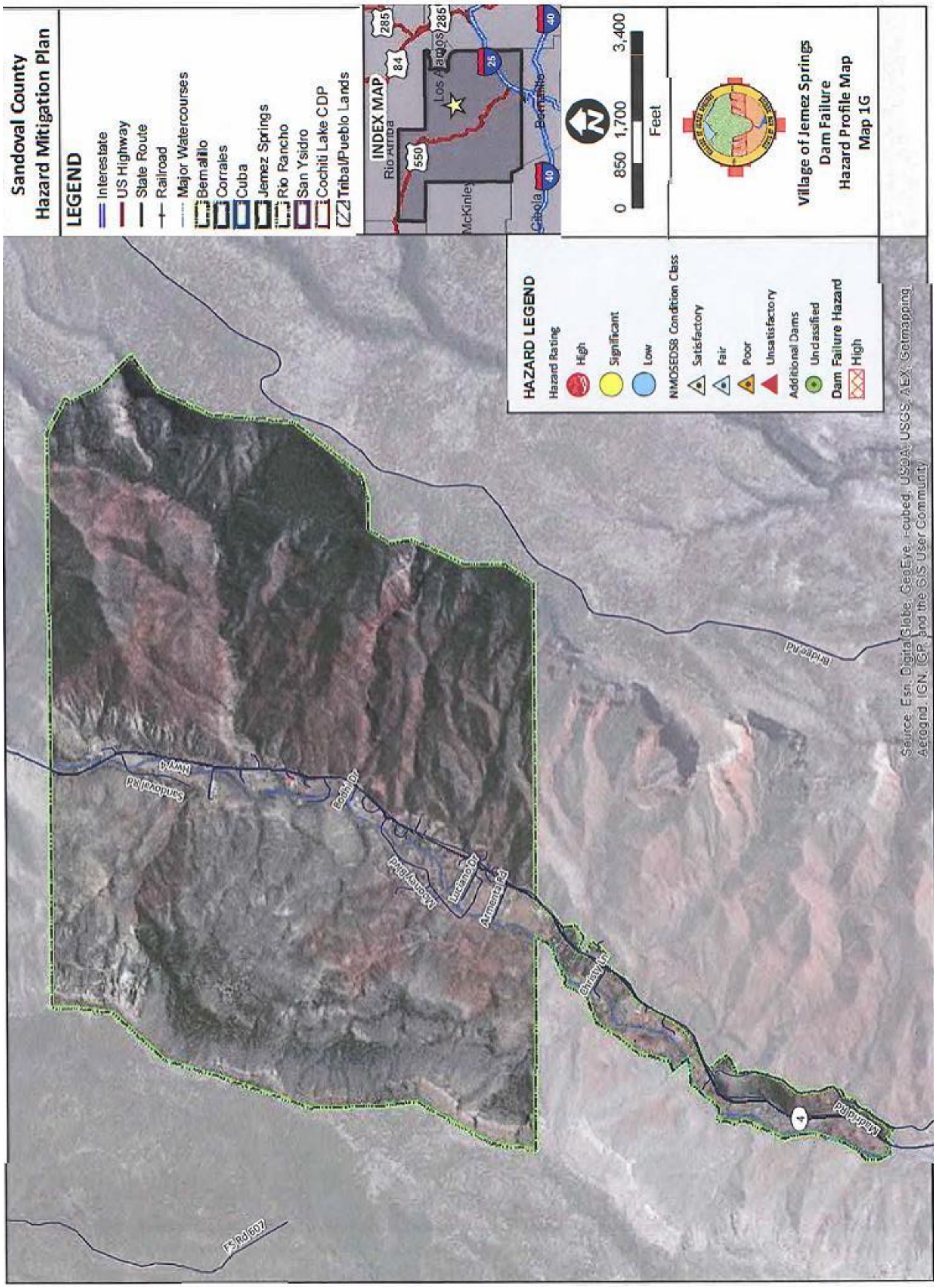
HAZARD LEGEND
Hazard Rating
High
Significant
Low
NMOSEDSB Condition Class
Satisfactory
Fair
Poor
Unsatisfactory
Additional Dams
Undassified
Dam Failure Hazard
High
SANDIA MOUNTAIN SITE NO. 1 DAM
Enchanted Hills Dam No. 1
Source: Esri, i-cubed, USDA, USGS, AEX, GeoEye, Getmapping, Aerogrid, IGN, IGP, and the GIS User Community


Sandoval County
Hazard Mitigation Plan
LEGEND
Interstate
US Highway
State Route
Railroad
Major Watercourses
Bernalillo
Corrales
Cuba
Jemez Springs
Rio Rancho
San Ysidro
Cochiti Lake CDP
Tribal/Pueblo Lands
INDEX MAP
Rio Arriba
Los Alamos
McKinley
Cibola
Bernalillo
0 1,550 3,100 6,200
Feet
Village of Corrales
Dam Failure
Hazard Profile Map
Map 1F
Montoyas Arroyo Sportsplex Dam
Corrales Heights Dam No.1
Source: Esri, i-cubed, USDA, USGS, AEX, GeoEye, Getmapping, Aerogrid, IGN, IGP, and the GIS User Community
HAZARD LEGEND
Hazard Rating
High
Significant
Low
NMOSE/DSB Condition Class
Satisfactory
Fair
Poor
Unsatisfactory
Additional Dams
Undassified
Dam Failure Hazard
High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Hazard Mitigation Plan
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Interstate
US Highway
State Route
Railroad
Major Watercourses
Bernalillo
Corrales
Cuba
Jemez Springs
Rio Rancho
San Ysidro
Cochiti Lake CDP
Tribal/Pueblo Lands
INDEX MAP
0 850 1,700 3,400
Feet
Village of Jemez Springs
Dam Failure
Hazard Profile Map
Map 1G
HAZARD LEGEND
Hazard Rating
High
Significant
Low
NMOSEDSB Condition Class
Satisfactory
Fair
Poor
Unsatisfactory
Additional Dams
Unclassified
Dam Failure Hazard
High
Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, and the GIS User Community
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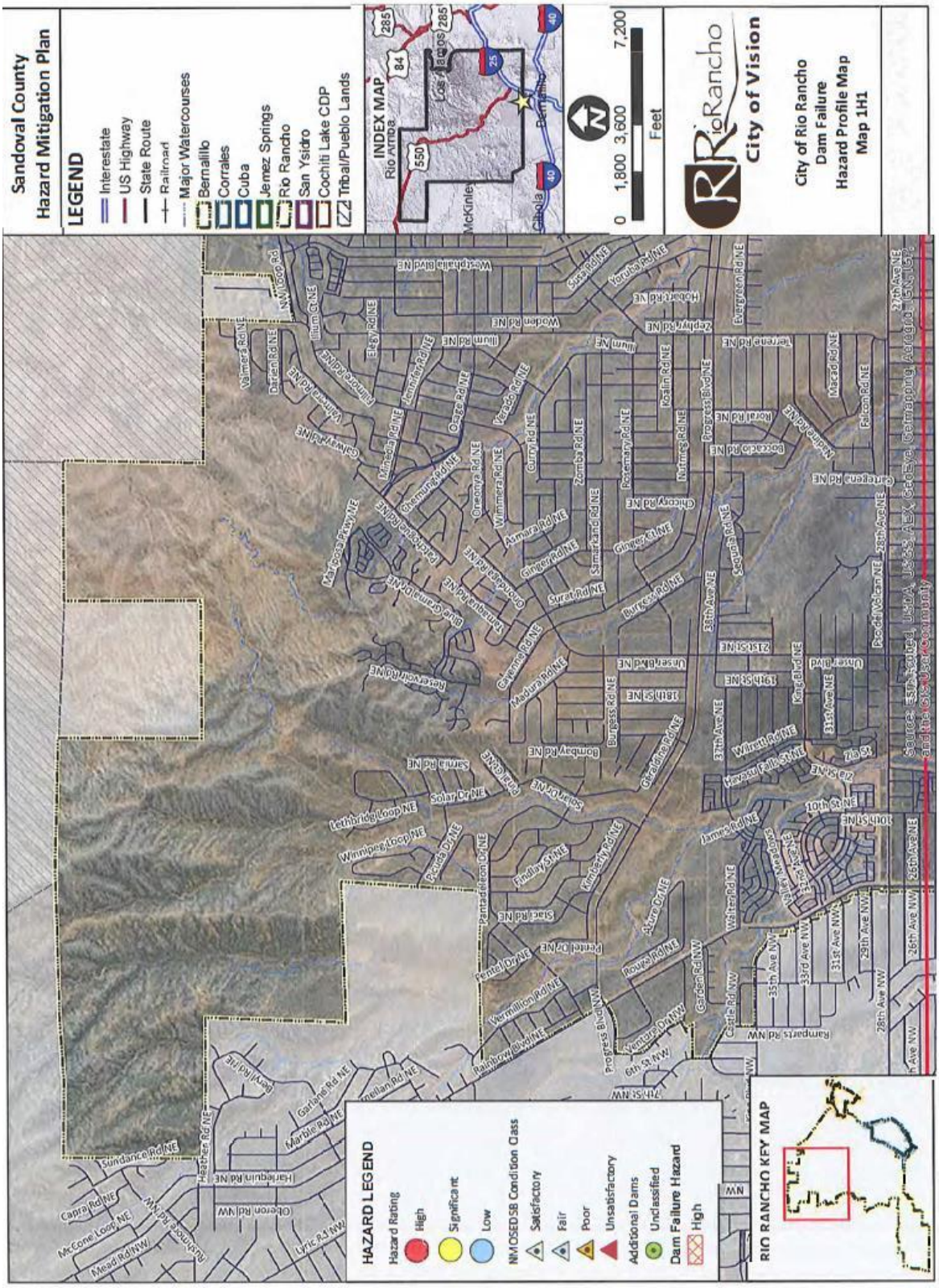
Hwy 4
Bosha Dr
Luciano Dr
Armenta Rd
Christy Ln
Madrid Rd
Bridge Rd
FS Rd 607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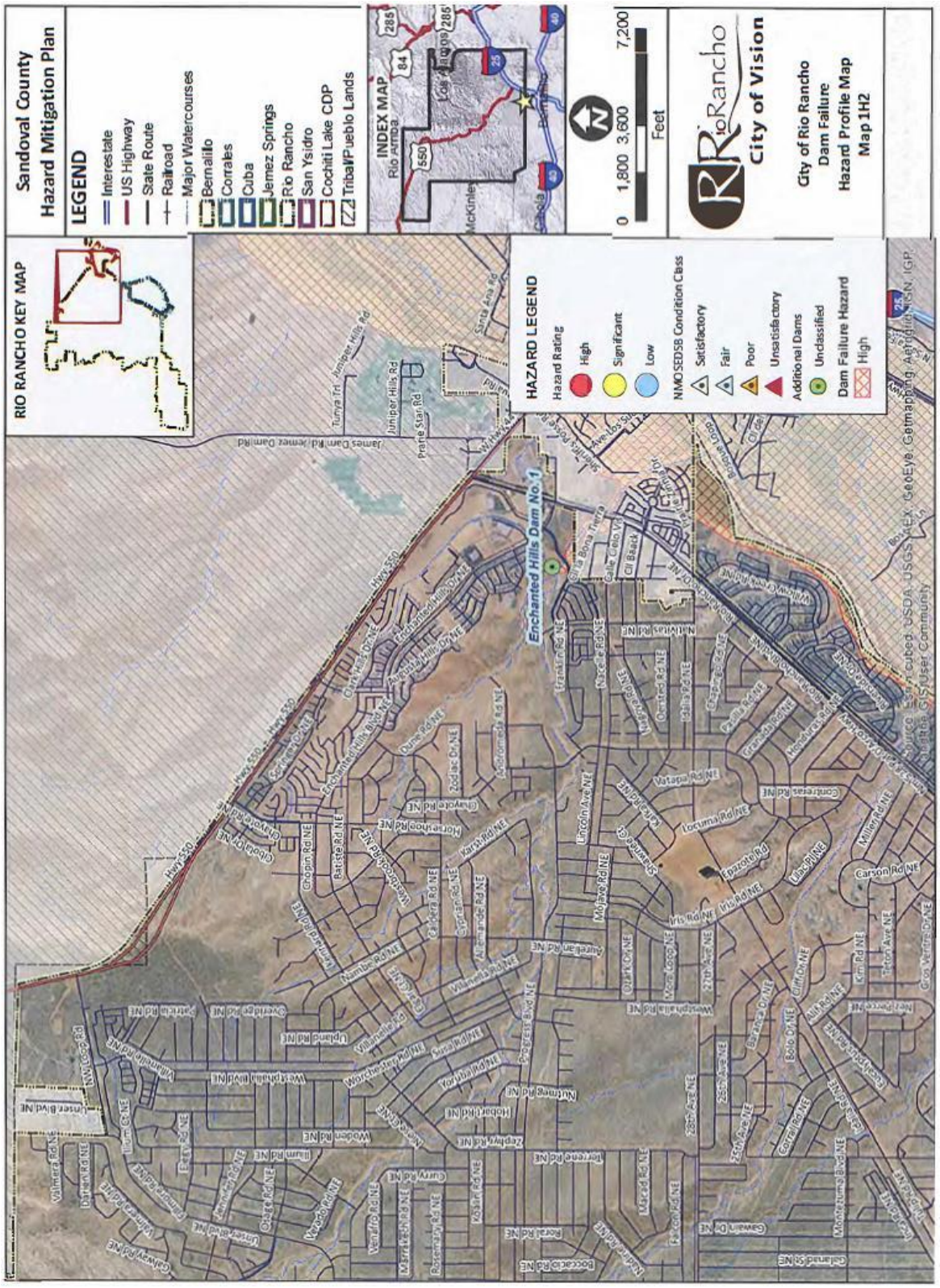
Cuba
Jemez Springs
Rio Rancho
San Ysidro
Cochiti Lake CDP
Tribal/Pueblo Lands
INDEX MAP
Rio Arriba
Los Alamos
Bernalillo
McKinley
Cibola
0 1,800 3,600 7,200
Feet
City of Rio Rancho
Dam Failure
Hazard Profile Map
Map 1H1
City of Vision
HAZARD LEGEND
Hazard Rating
High
Significant
Low
NMOSE/DSB Condition Class
Satisfactory
Fair
Poor
Unsatisfactory
Additional Dams
Unclassified
Dam Failure Hazard
High
RIO RANCHO KEY MAP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Corrales
Cuba
Jemez Springs
Rio Rancho
San Ysidro
Cochiti Lake CDP
Tribal/Pueblo Lands
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Rio Arriba
Los Alamos
Taos
McKinley
Cibola
Sandoval
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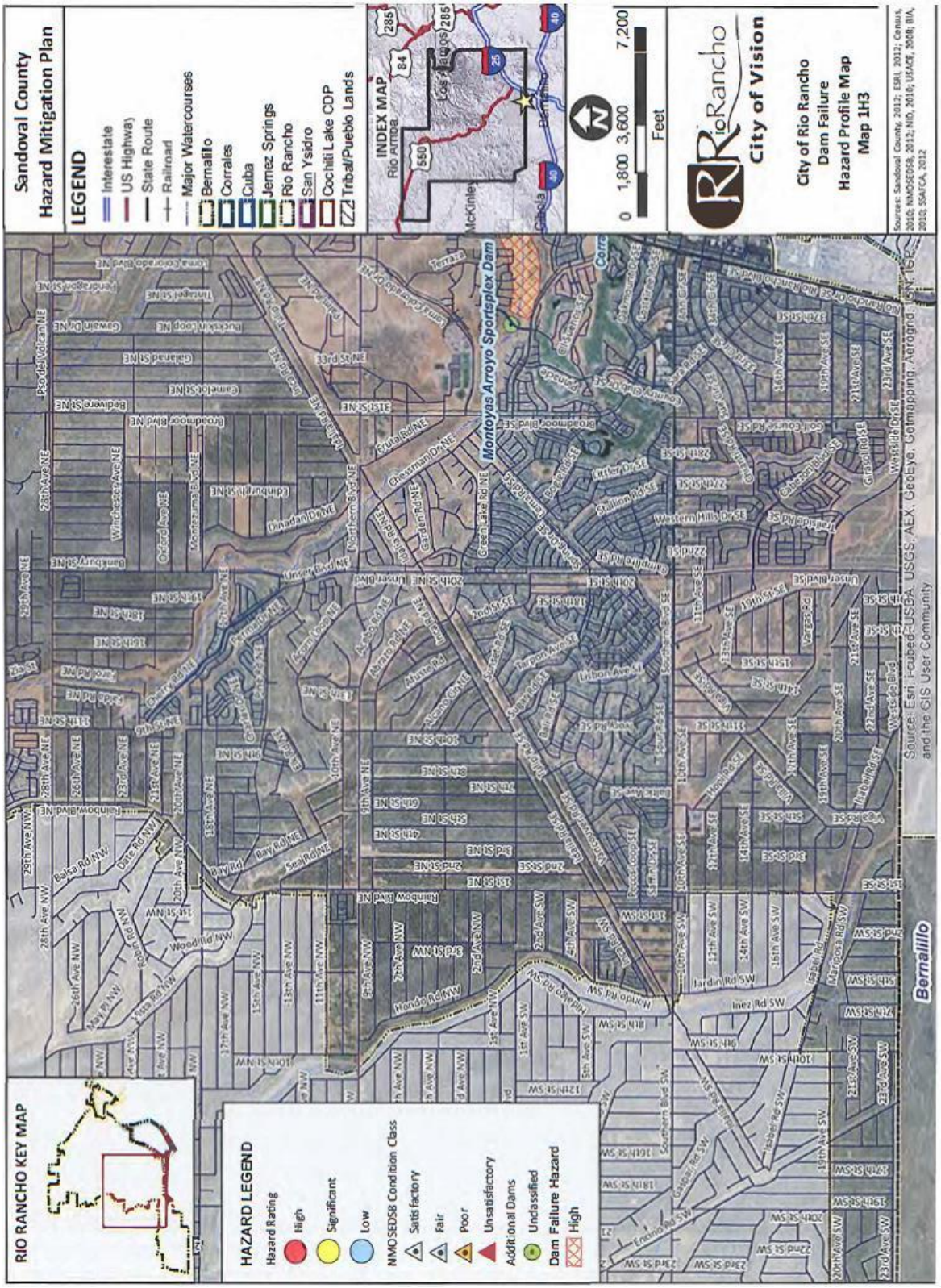
Feet
City of Rio Rancho
City of Vision
City of Rio Rancho
Dam Failure
Hazard Profile Map
Map 1H2
RIO RANCHO KEY MAP
HAZARD LEGEND
Hazard Rating
High
Significant
Low
NMOSEDSB Condition Class
Satisfactory
Fair
Poor
Unsatisfactory
Additional Dams
Undassified
Dam Failure Hazard
High
Enchanted Hills Dam No. 1
Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community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Rio Rancho
San Ysidro
Cochiti Lake CDP
Tribal/Pueblo Lands
INDEX MAP
Rio Arriba
Los Lunas
Bernalillo
McKinley
Cibola
0 1,800 3,600 7,200
Feet
RioRancho
City of Vision
City of Rio Rancho
Dam Failure
Hazard Profile Map
Map 1H3
Montoyas Arroyo Sportsplex Dam
RIO RANCHO KEY MAP
HAZARD LEGEND
Hazard Rating
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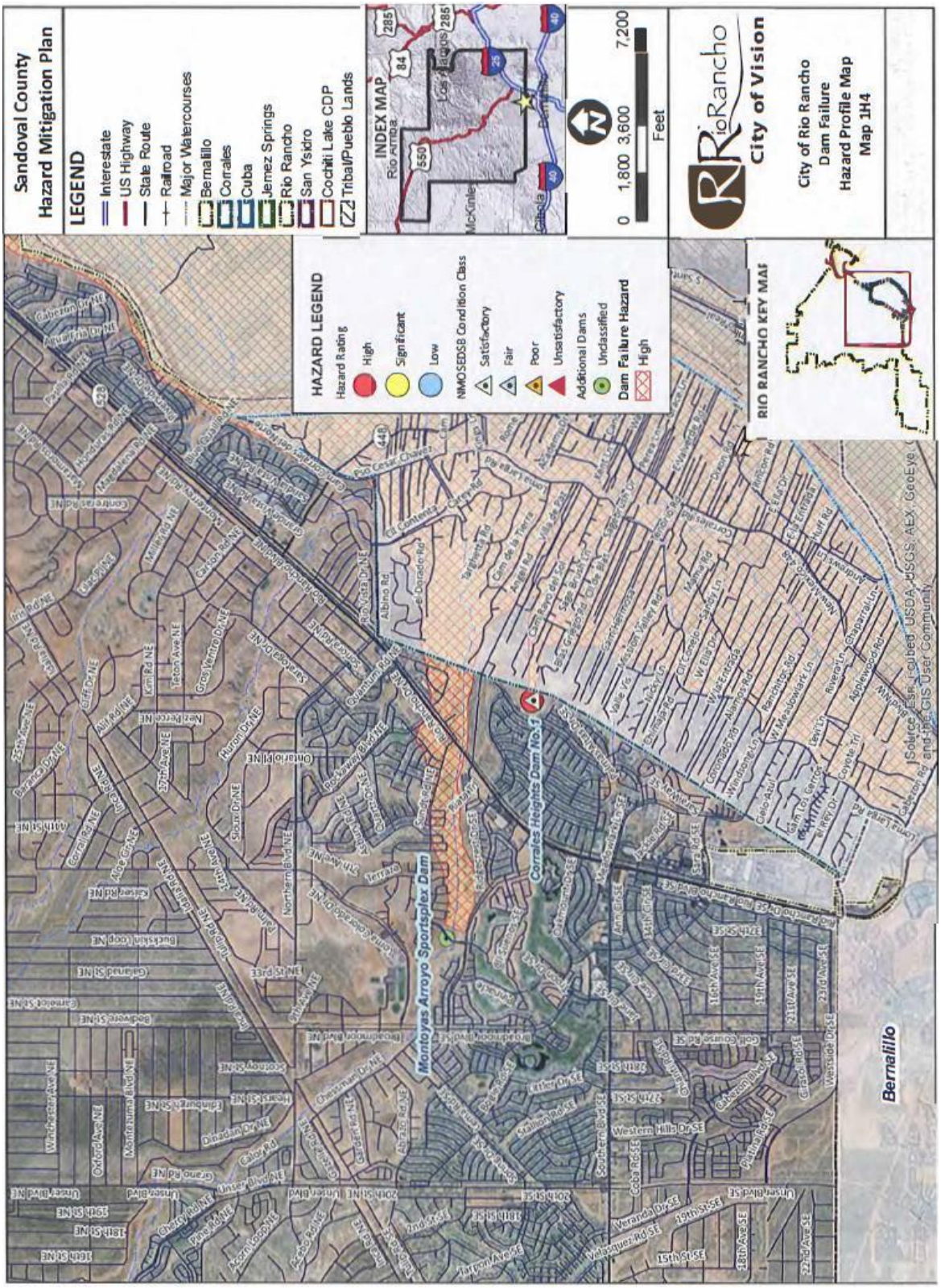
Significant
Low
NMOSE/DSB Condition Class
Satisfactory
Fair
Poor
Unsatisfactory
Additional Dams
Undassified
Dam Failure Hazard
High
Bernalillo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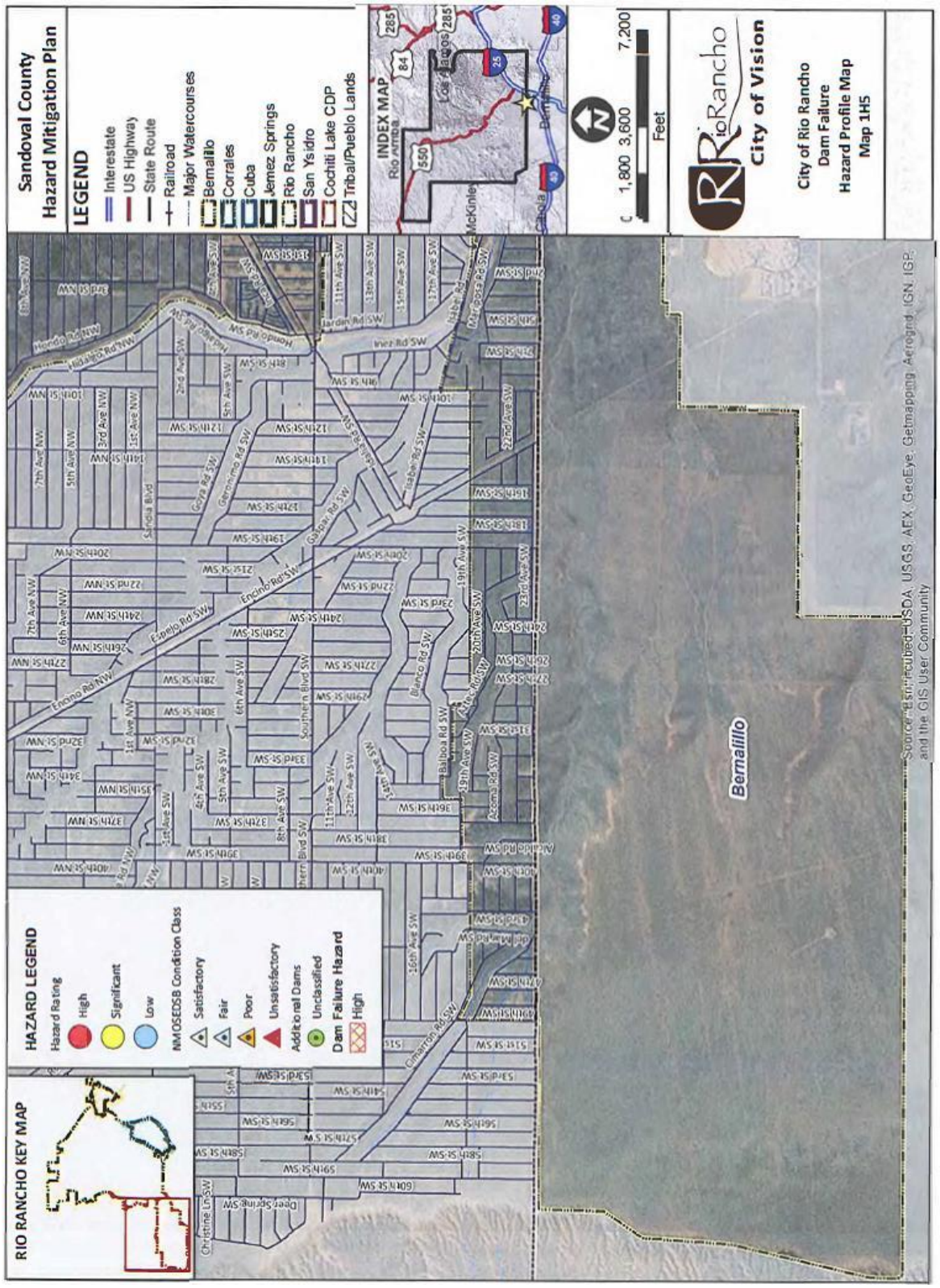
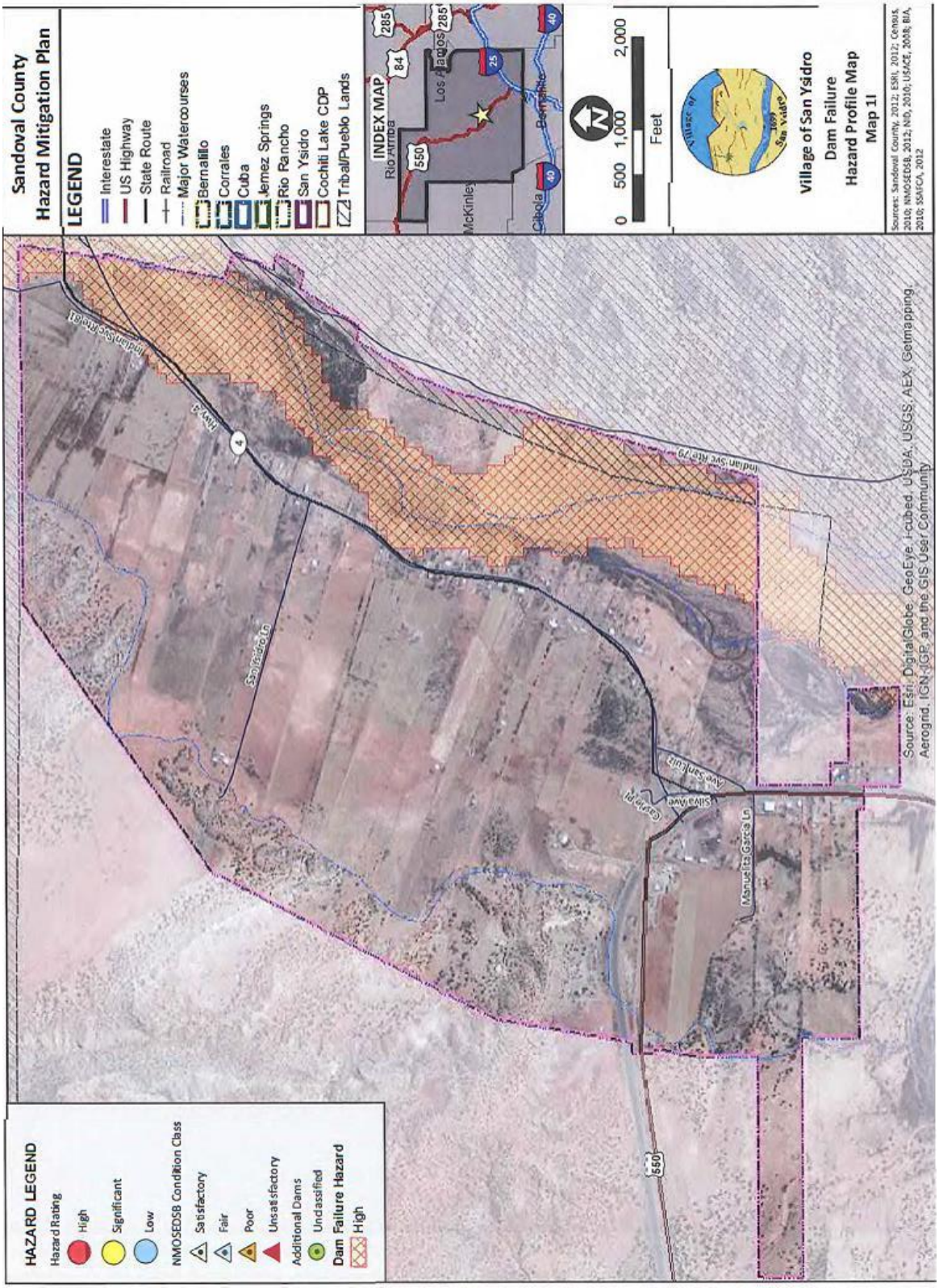
Rio Rancho
San Ysidro
Cochiti Lake CDP
Tribal/Pueblo Lands
INDEX MAP
Rio Arriba
Los Alamos
McKinley
Cibola
Torrance
0 1,800 3,600 7,200
Feet
RioRancho
City of Vision
City of Rio Rancho
Dam Failure
Hazard Profile Map
Map 1H4
HAZARD LEGEND
Hazard Rating
High
Significant
Low
NMOSEDSB Condition Class
Satisfactory
Fair
Poor
Unsatisfactory
Additional Dams
Unclassified
Dam Failure Hazard
High
RIO RANCHO KEY MAP
Montoyas Arroyo Sportsplex Dam
Corrales Heights Dam No.1
Bernalillo
Source: Esri, i-cubed, USDA, USGS, AEX, GeoEye, and the GIS User Community


Sandoval County
Hazard Mitigation Plan
LEGEND
Interestate
US Highway
State Route
Railroad
Major Watercourses
Bernalillo
Corrales
Cuba
Jemez Springs
Rio Rancho
San Ysidro
Cochiti Lake CDP
Tribal/Pueblo Lands
INDEX MAP
Rio Arriba
McKinley
Cibola
Los Lunas
Bernalillo
1,800 3,600 7,200
Feet
City of Rio Rancho
Dam Failure
Hazard Profile Map
Map 1H5
HAZARD LEGEND
Hazard Rating
High
Significant
Low
NMOSEDSB Condition Class
Satisfactory
Fair
Poor
Unsatisfactory
Additional Dams
Unclassified
Dam Failure Hazard
High
RIO RANCHO KEY MAP
Bernalillo
Source: Esri, i-cubed, USDA, USGS, AEX, GeoEye, Getmapping, Aerogrid, IGN, IGP, and the GIS User Community


Sandoval County
Hazard Mitigation Plan
LEGEND
Interestate
US Highway
State Route
Railroad
Major Watercourses
Bernalillo
Corrales
Cuba
Jemez Springs
Rio Rancho
San Ysidro
Cochiti Lake CDP
Tribal/Pueblo Lands
INDEX MAP
Rio Arriba
Los Alamos
McKinley
Cibola
Torrance
0 500 1,000 2,000
Feet
Village of San Ysidro
Dam Failure
Hazard Profile Map
Map 1I
Sources: Sandoval County, 2012; ESRI, 2012; Census, 2010; NMOSEDSB, 2012; NID, 2010; USACE, 2008; BIA, 2010; SSAFCA, 2012
HAZARD LEGEND
Hazard Rating
High
Significant
Low
NMOSEDSB Condition Class
Satisfactory
Fair
Poor
Unsatisfactory
Additional Dams
Undassified
Dam Failure Hazard
High
Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, and the GIS User Community
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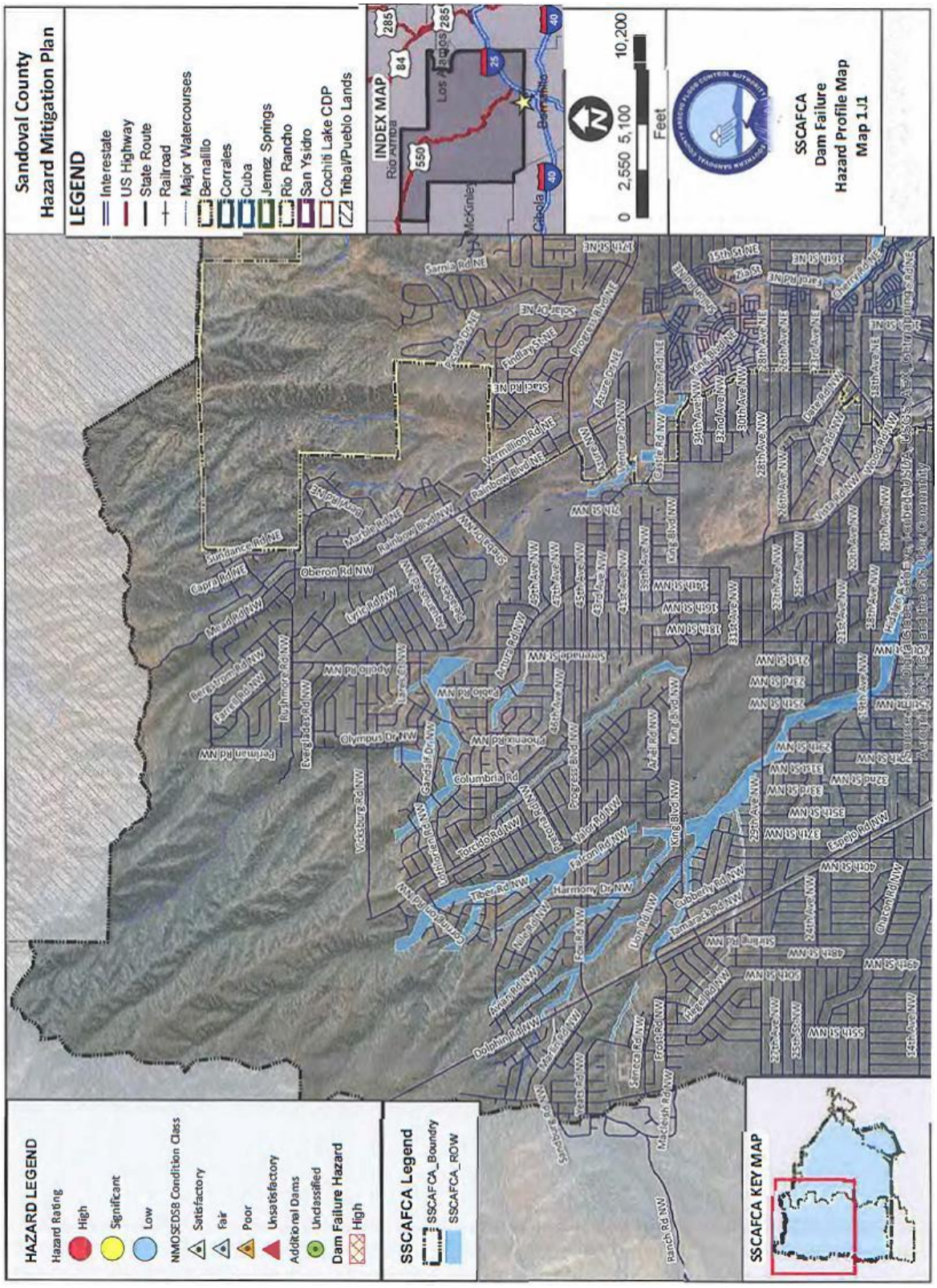
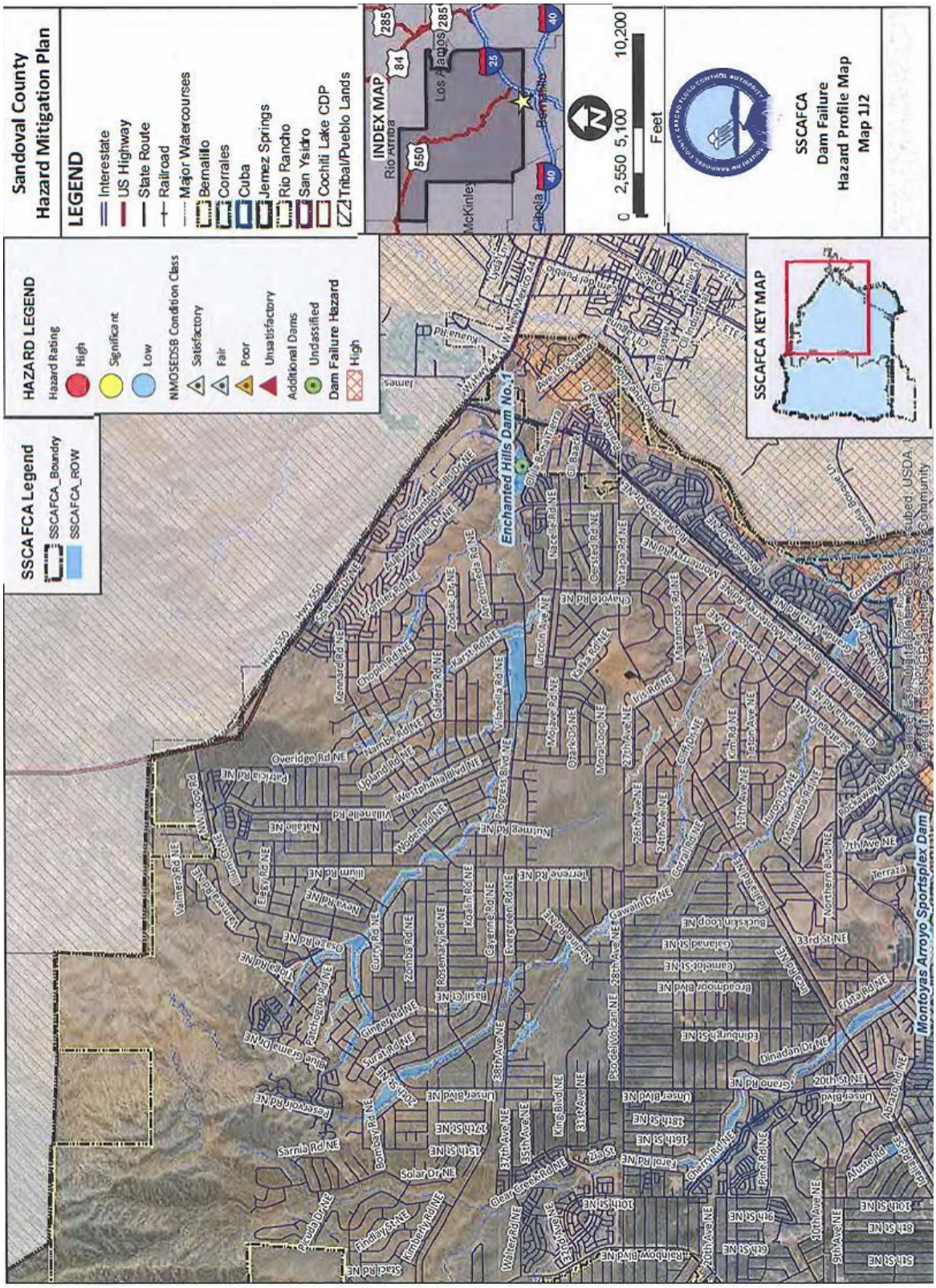
Indian Svc Rte 279
San Pedro Ln
Ave Sanchez
Silva Ave
Garcia Ln
Manuelita Garcia Ln
4
550


Sandoval County
Hazard Mitigation Plan
LEGEND
Interestate
US Highway
State Route
Railroad
Major Watercourses
Bernalillo
Corrales
Cuba
Jemez Springs
Rio Rancho
San Ysidro
Cochiti Lake CDP
Tribal/Pueblo Lands
INDEX MAP
Rio Arriba
Los Alamos
McKinley
Cibola
Bernalillo
0 2,550 5,100 10,200
Feet
SSCAFCA
Dam Failure
Hazard Profile Map
Map 1.11
HAZARD LEGEND
Hazard Rating
High
Significant
Low
NMOSEDSB Condition Class
Satisfactory
Fair
Poor
Unsatisfactory
Additional Dams
Undassified
Dam Failure Hazard
High
SSCAFCA Legend
SSCAFCA_Boundry
SSCAFCA_ROW
SSCAFCA KEY MAP


Sandoval County
Hazard Mitigation Plan
LEGEND
Interestate
US Highway
State Route
Railroad
Major Watercourses
Bernalillo
Corrales
Cuba
Jemez Springs
Rio Rancho
San Ysidro
Cochiti Lake CDP
Tribal/Pueblo Lands
INDEX MAP
Rio Arriba
Los Alamos
McKinley
Cibola
Bernalillo
0 2,550 5,100 10,200
Feet
SSCAFCA
Dam Failure
Hazard Profile Map
Map 1/2
SSCAFCA KEY MAP
HAZARD LEGEND
Hazard Rating
High
Significant
Low
NMOSEDSB Condition Class
Satisfactory
Fair
Poor
Unsatisfactory
Additional Dams
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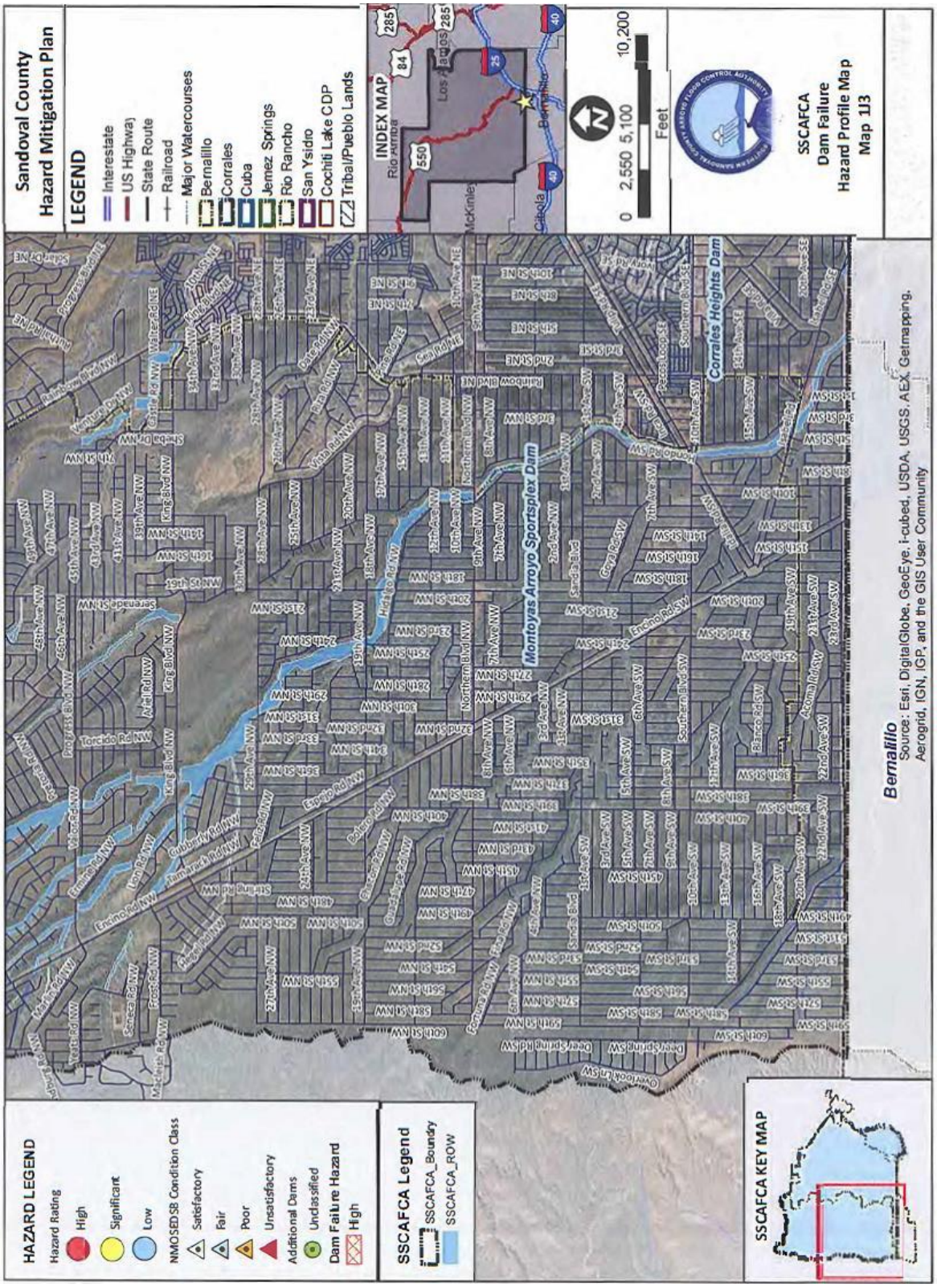
Dam Failure Hazard
High
SSCAFCA Legend
SSCAFCA_Boundry
SSCAFCA_ROW
Enchanted Hills Dam No.1
Montoyas Arroyo Sportsplex Dam


Sandoval County
Hazard Mitigation Plan
LEGEND
Interestate
US Highway
State Route
Railroad
Major Watercourses
Bernalillo
Corrales
Cuba
Jemez Springs
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San Ysidro
Cochiti Lake CDP
Tribal/Pueblo Lands
INDEX MAP
Rio Arriba
Los Alamos
Bernalillo
McKinley
Cibola
0 2,550 5,100 10,200
Feet
SSCAFCA
Dam Failure
Hazard Profile Map
Map 1J3
Montoyas Arroyo Sportsplex Dam
Corrales Heights Dam
Bernalillo
Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, and the GIS User Community
HAZARD LEGEND
Hazard Rating
High
Significant
Low
NMOSEDSB Condition Class
Satisfactory
Fair
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Additional Dams
Undassified
Dam Failure Hazard
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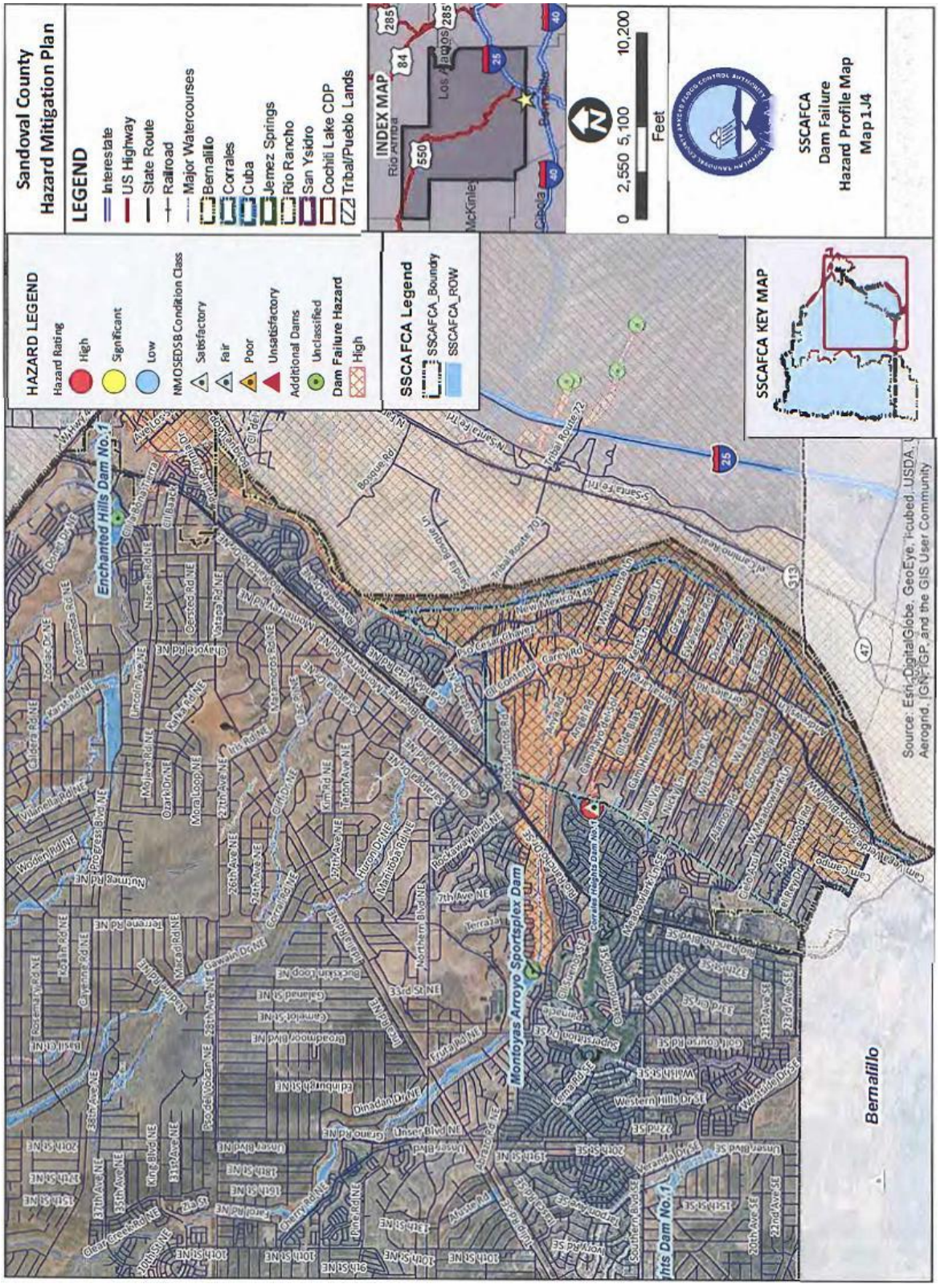
SSCAFCA Legend
SSCAFCA_Boundry
SSCAFCA_ROW
SSCAFCA KEY MAP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Major Watercourses
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San Ysidro
Cochiti Lake CDP
Tribal/Pueblo Lands
INDEX MAP
Rio Arriba
Los Alamos
McKinley
Cibola
0 2,550 5,100 10,200
Feet
SSCAFCA
Dam Failure
Hazard Profile Map
Map 1J4
HAZARD LEGEND
Hazard Rating
High
Significant
Low
NMOSEDSB Condition Class
Satisfactory
Fair
Poor
Unsatisfactory
Additional Dams
Unclassified
Dam Failure Hazard
High
SSCAFCA Legend
SSCAFCA_Boundry
SSCAFCA_ROW
SSCAFCA KEY MAP
Enchanted Hills Dam No.1
Montoyas Arroyo Sportsplex Dam
Bernalillo
Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, Aerogrid, IGN, IGP, and the GIS User Community

3.3.2 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 impacting many facets of life and environment, as reflected in the following four definitions commonly used to describe it (NMDHSEM 2018, pgs. 56-57):

- **Meteorological** drought is defined by a period of substantially diminished precipitation duration and/or intensity. The commonly used definition of meteorological drought is an interval of time, generally on the order of months or years, during which the actual moisture supply at a given place consistently falls below the climatically appropriate moisture supply.
- **Agricultural** drought occurs when there is inadequate soil moisture to meet the needs of a particular crop at a particular time. Agricultural drought usually occurs after or during meteorological drought, but before hydrological drought and can affect livestock and other dry-land agricultural operations.
- **Hydrological** drought refers to deficiencies in surface and subsurface water supplies. It is measured as stream flow, snow pack, and as lake, reservoir, and groundwater levels. There is usually a delay between lack of rain or snow and less measurable water in streams, lakes, and reservoirs. Therefore, hydrological measurements tend to lag behind other drought indicators.
- **Socio-economic** drought occurs when physical water shortages start to affect the health, well-being, and quality of life of the people, or when the drought starts to affect the supply and demand of an economic product.

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, aquatic habitat 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, forest products and aquatic habitat, undernourished wildlife and livestock, lower land values, and higher unemployment.

History

Between 2003 and 2017, there was one state declared disasters for effects related to drought (NMDHSEM HMP 2018, pgs. 78-80). The total cost for the 2012 State declared drought event was $500,000. In the State of New Mexico, there were no Presidential Disaster Declarations for drought from 2003 through 2017. From 2012 to 2018, there were 70 USDA Secretarial Disaster designations due to drought in New Mexico, the ones that affect Sandoval County are listed below:

DATE	DESIGNATION NUMBER(S)
01/01/2012 – continuing	S3260, S3267, S3282, S3284, S3288
05/22/2012 – continuing	S3295
06/12/2012 – 08/06/2012	S3331
10/01/2012 – continuing	S3461
01/01/2013 – continuing	S3455, S3490, S3494
10/01/2013 – continuing	S3630
01/01/2014 – continuing	S3651, 3653, S3781
01/28/2014 – N/A	S3645
10/01/2014 – N/A	S3788
01/01/2015 – N/A	S3783, S3798, S3802
01/30/2018 – N/A	S4300
03/01/2018 – N/A	S4316
03/27/2018 – N/A	S4306
04/10/2018 – N/A	S4310

Figures 3-1 and 3-2 depict precipitation data from the Western Regional Climate Center's (WRCC) WestMap Application showing annual county-wide precipitation variances from normal and a running mean for a period of 1895 to 2018. Over the last 10 years of data, the average precipitation has been significantly below normal for the majority of the period.

Probability and Magnitude

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

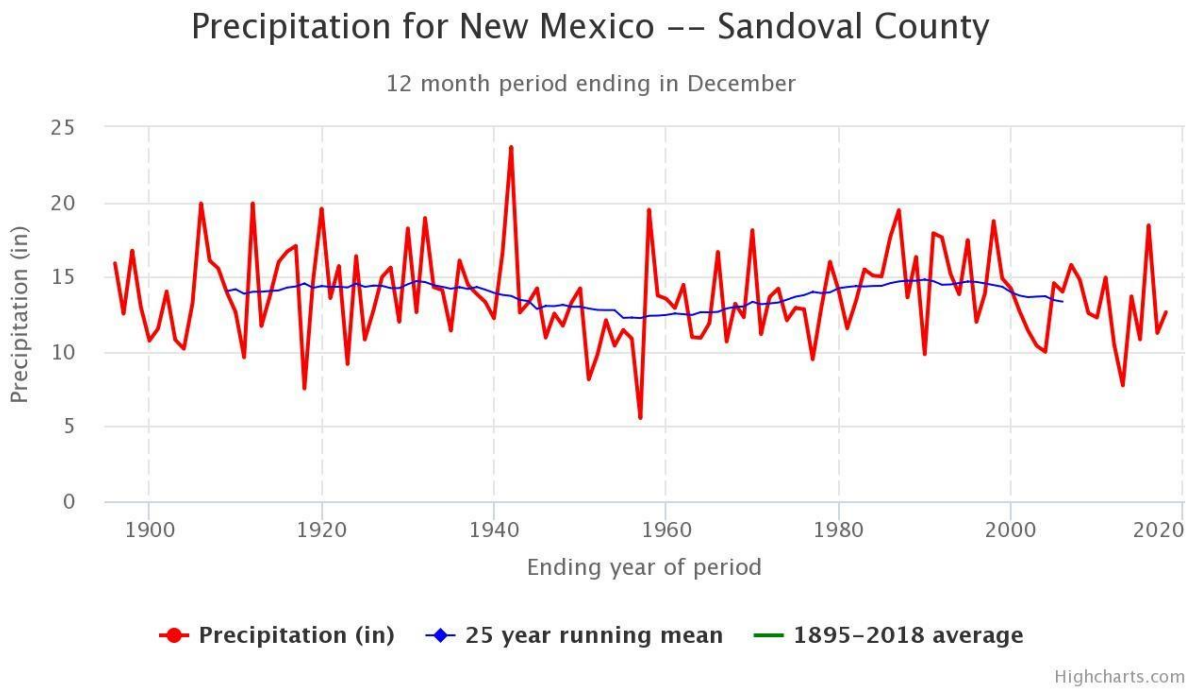
The National Integrated Drought Information System (NIDIS) Act of 2006 (Public Law 109-430) prescribes an interagency approach for drought monitoring, forecasting, and early warning (NIDIS, 2007). The NIDIS maintains the U.S. Drought Portal[25] which is a centralized, web-based access point to several drought related resources including the U.S. Drought Monitor (USDM) and the U.S. Seasonal Drought Outlook (USSDO).

The USDM, shown in Figure 3-3, is a weekly map depicting the current status of drought and is developed and maintained by the National Drought Mitigation Center. Drought intensity for the County is estimated to be a D4 or Exceptional Drought across the northern portion, a D3 or Extreme Drought through the middle portion and the southern portion is estimated to be a D2 or Severe Drought.

The USSDO, shown in Figure 3-4, is a six month projection of potential drought conditions developed by the National Weather Service's Climate Prediction Center, which anticipates some improvement of

[25] NIDIS U.S. Drought Portal website, Accessed October 2018, is located at: https://www.drought.gov/drought/

drought conditions for the entire County. The Western U.S. primary indicators for these maps are the Palmer Hydrologic Drought Index and the 60-month Palmer Z-index.



Source: WRCC, August 2018, URL at: http://www.cefa.dri.edu/Westmap/Westmap_home.php?page=timeseries.php

Figure 3-1: Precipitation variances average and running mean.

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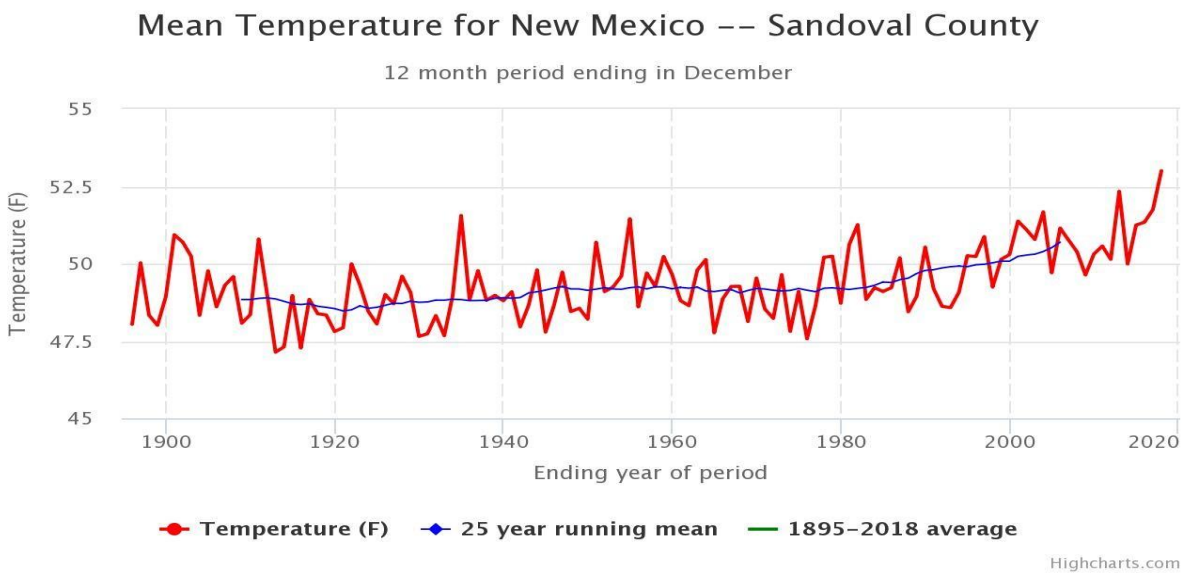
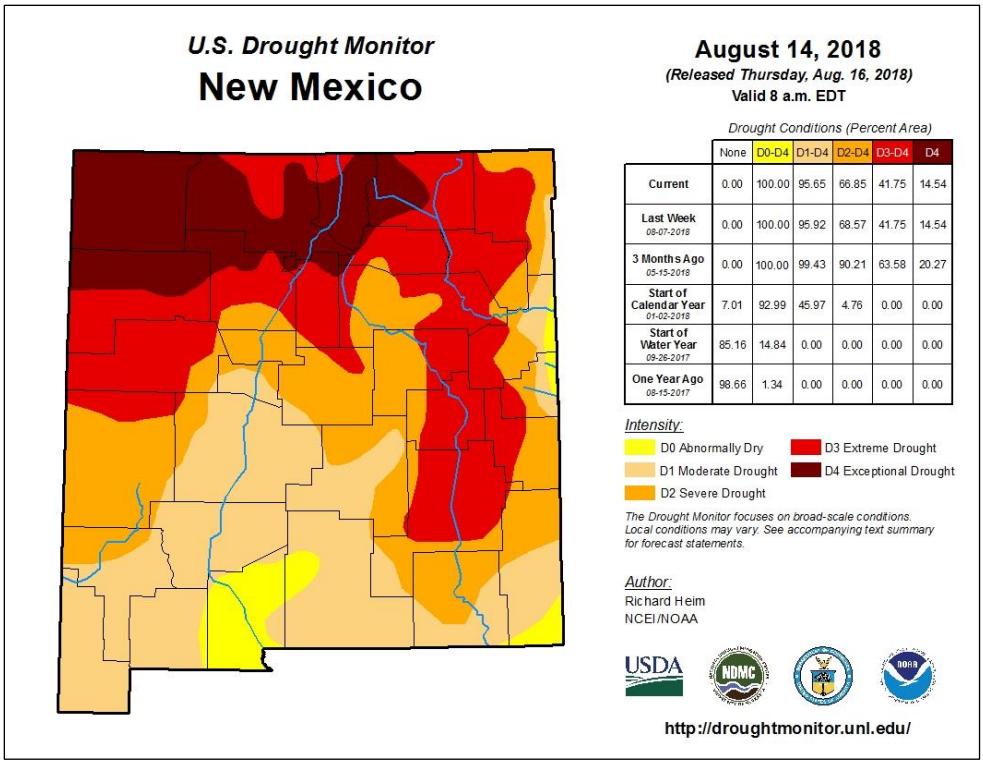


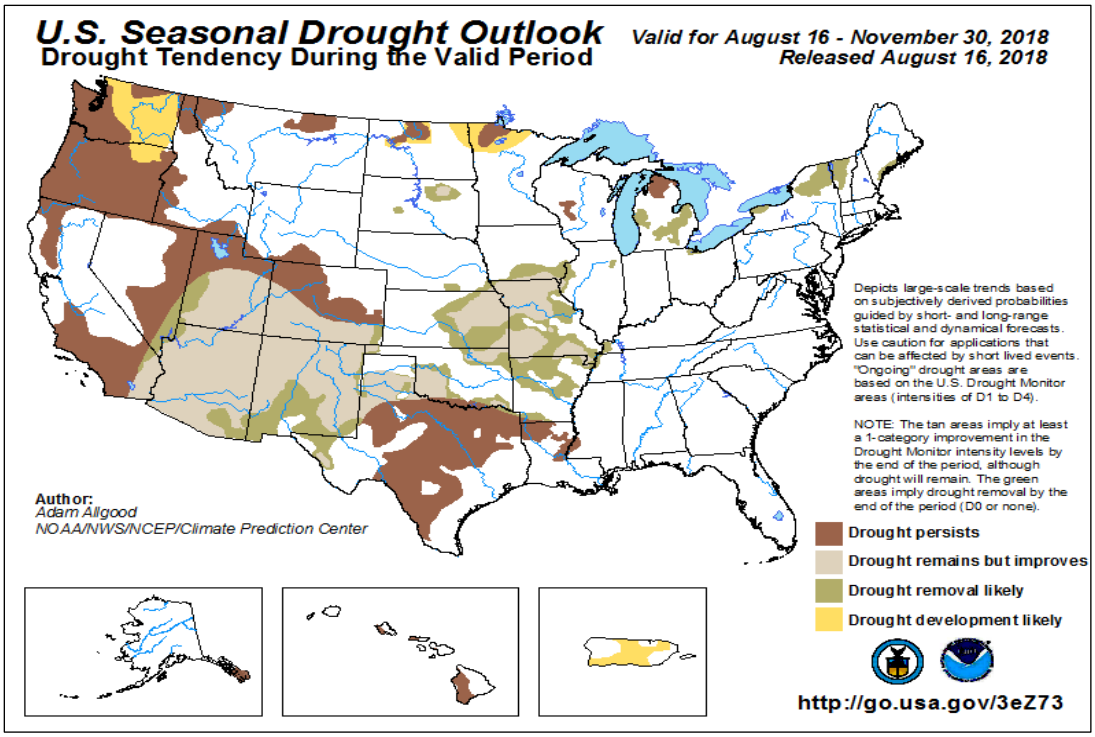
Data Source: WRCC, August 2018, URL at: http://www.cefa.dri.edu/Westmap/Westmap_home.php?page=timeseries.php

Figure 3-2: Temperature variances average and running mean.



Source: http://www.drought.gov/portal/server.pt/gateway/PTARGS_0_2_693_208_0_43/http%3B/droughtmonitor.unl.edu/DM_state.htm?NM,W

Figure 3-3: U.S. Drought Monitor Map



Source: http://www.cpc.ncep.noaa.gov/products/expert_assessment/seasonal_drought.html, *August 2018*

Figure 3-4: U.S. Seasonal Drought Outlook Map

The Palmer Drought Severity Index (PSDI) is a commonly used index that measures the severity of drought for agriculture and water resource management. It is calculated from observed temperature and precipitation values and estimates soil moisture. However, the Palmer Index is not considered to be consistent enough to characterize the risk of drought on a nationwide basis (FEMA, 1997) and neither of the Palmer indices are well suited to the dry, mountainous western United States.

Due to the extreme drought of the 2012 season, the Governor established a Drought Task Force, comprised of representatives from multiple State agencies, including the Office of the State Engineer, Interstate Stream Commission, Environment Department, Economic Development Department, Department of Health, Tourism Department, Department of Agriculture, Finance Authority, Department of Finance and Administration, Homeland Security and Emergency Management, Energy Minerals and Natural Resources Department, and the Office of the Governor. The most recent Drought Executive Order was signed by Governor Martinez on July 11, 2018 (Executive Order 2018-031). This order summarizes the current drought conditions in New Mexico and declared a state of emergency State-wide. The Executive Order also directs the following actions:

- A review of the New Mexico Drought Plan and revisions as needed including an assessment of current conditions, evaluation of drought impacts and recommendations for response and mitigation actions to be taken.
- The New Mexico State Drought Task Force to review and recommend actions to the Governor and to other governing bodies in the State.
- For the New Mexico State Drought Task Force to recommend to the Governor recipients and objects of emergency funding.

- Firework bans and other reasonable fire prevention measures were to be implemented by local governing bodies.

Vulnerability – CPRI Results

Drought CPRI results for each community are summarized in Table 3-7 below. Specific Pueblo information can be found in their respective Annex to this plan.

Table 3-7: CPRI results by jurisdiction for drought

Participating Jurisdiction	Probability	Magnitude/ Severity	Warning Time	Duration	CPRI Score
Bernalillo, Town of	Likely	Negligible	> 24 hours	> 1 week	2.20
Corrales, Village of	Highly Likely	Critical	> 24 hours	> 1 week	3.25
Jemez Springs, Village of	Highly Likely	Critical	> 24 hours	> 1 week	3.25
Rio Rancho, City of	Highly Likely	Limited	> 24 hours	> 1 week	2.95
San Ysidro, Village of	Highly Likely	Critical	> 24 hours	> 1 week	3.25
SSCAFCA	Highly Likely	Critical	> 24 hours	> 1 week	3.25
Unincorporated Sandoval County	Likely	Limited	> 24 hours	< 1 week	2.50
				County-wide average CPRI =	**2.95**

Vulnerability – Loss Estimations

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

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

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

Other direct costs such as increased pumping costs due to lowering of groundwater levels and costs to expand water infrastructure to compensate for reduced yields or to develop alternative water sources, are a significant factor but very difficult to estimate due to a lack of documentation. There are also the intangible costs associated with lost tourism revenues, and impacts to wildlife habitat and animals. Typically, these impacts are translated into the general economy in the form of higher food and agricultural goods prices and increased utility costs.

Vulnerability – Development Trends

Population growth in Sandoval County will also require additional water to meet the thirsty demands of potable, landscape, and industrial uses. Water rights and adjudication within the area, both for surface and groundwater, are such that there are no unclaimed sources of water to augment current supplies except very deep, brackish aquifers. That means that in order to provide additional water for domestic use to meet the demands of a growing population, existing water rights will have to be reallocated from traditional agricultural uses to municipal and potable needs, and expensive treatment alternatives for the brackish groundwater sources will need to be developed. Sustained drought

conditions will only make this exercise more difficult and should be carefully considered with any planned growth.

Vulnerability – Jurisdictional Summary

There is very little geographic variation in the severity of drought conditions across the County and the overall drought intensity is in the Moderate range. The overall vulnerability to drought is essentially the same county-wide and is considered to be Moderate. The economic impacts of drought may directly impact certain sectors such as agriculture and potable water production due to increased pumping costs and the ripple effect of those impacts will ultimately touch every sector of the County. Secondary effects include increased wildfire hazard and potential subsidence issues should groundwater depletion become a factor. Accordingly, the mitigation of Drought is equally a priority for all participating jurisdictions.

Sources

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Profile Maps

See Figures 3-3 and 3-4 for depictions of the current and anticipated drought conditions for the county. Specific Pueblo information can be found in their respective Annex to this plan.

3.3.3 Flooding

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 Sandoval County are:

- *Heavy Winter Rain on Snowpack*: Winter and early spring (February to April) flooding are possible and typically occur as a result of heavy, regional rainfall on dense snow pack that covers a large portion of the major watersheds within the county. These events are infrequent and usually impact those portions of the county that are above 7,500 feet.
- *Tropical Storm Remnants*: Significant flooding can occur when the remnants of a hurricane that has been downgraded to a tropical storm or tropical depression enter the State. These infrequent events occur mostly in the early autumn and usually bring heavy and intense precipitation over large regions causing severe flooding.
- *Summer Monsoons*: In mid to late summer the monsoon winds bring humid subtropical air into the State. Solar heating triggers afternoon and evening thunderstorms that can produce extremely intense, short duration bursts of rainfall. The thunderstorm rains are mostly translated into runoff and in some instances, the accumulation of runoff occurs very quickly resulting in a rapidly moving flood wave referred to as a flash flood. Flash floods tend to be very localized and cause significant flooding of local watercourses.

In New Mexico generally and Sandoval County in particular, seasonal and topographical differences greatly influence the causes of floods. About half of the annual precipitation in the County falls between June and September at elevations below 7,500 feet, but in the higher mountainous elevations a greater percentage of precipitation falls as snow during the winter. Most of the summer floods and flash flooding are due to monsoon thunderstorms, where intensely heavy, short duration rains falls on impervious desert soils or previously saturated soils. Many of these "toad stranglers" produce flash floods, especially in steep and narrow watercourses.

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

Erosion is a damaging element that often accompanies flooding and flash flooding, and especially in the natural arroyos that drain much of the lower elevation areas of the County. Extensive erosion damage can occur with major flooding, resulting in access disruption, road closures, driving hazards, drainage facility damage and blockage, and sedimentation. Often, the most damaging element of a flood is the erosion and not inundation by floodwaters. Accelerated soil erosion has created problems ranging from loss of productive agricultural soil, displacement or destruction of structures and infrastructure, and sediment buildup in water reservoirs.

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 duff, 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 significant volumes 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 Natural Resource Conservation Service (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

Flooding is clearly a major hazard in Sandoval County as shown in table below. Sandoval County has been a declared county in six flood related disaster declarations (01/2000 – 08/2018) as follows:

Disaster	Declaration Date	Incident Type	Incident Period
FEMA-DR-1659	August 30, 2006	Severe Storms / Flooding	07/26/2006 – 09/18/2006
FEMA-DR-4047	November 23, 2011	Flooding	08/19/2011 – 08/24/2011
FEMA-DR-4079	August 24, 2012	Flooding	06/22/2012 – 07/12/2012
FEMA-DR-4148	September 30, 2013	Severe Storms / Flooding	07/23/2013 – 07/28/2013
FEMA-DR-4152	October 29, 2013	Severe Storms / Flooding / Mudslides	09/09/2013 – 09/22/2018
FEMA-DR-4197	October 6, 2014	Severe Storms / Flooding	07/27/2014 – 08/05/2014

Probability and Magnitude

For the purposes of this Plan, the probability and magnitude of flood hazards in Sandoval County jurisdictions are primarily based on the 1% (100-year/HIGH) and 0.2% (500-year/MEDIUM) probability floodplains delineated on FEMA Flood Insurance Rate Maps (FIRMs), the Calculated Priority Risk Index (CPRI), *see table 3-2*, and any provisional floodplain delineations used for in-house purposes by participating jurisdictions or Planning Team delineated areas. The planning team also used the CPRI to calculate the probability for the jurisdictions (i.e. Table 3-8), whereas the 1%/High and .02%/Medium floodplains identify specific locations within each jurisdiction that are susceptible to flooding (i.e. the maps). FEMA has recently completed a map modification program to update the FIRMs for the County into a digital FIRM (DFIRM) format. The effective date of the mapping presented herein is March 18, 2008.

Two designations of flood hazard are used. Any FEMA "A" zone, which are commonly known as Special Flood Hazard Areas (SFHA) 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.

Maps 2A through 2D show the flood hazard areas for the entire county. Maps 2E through 2J show the flood hazard areas for Bernalillo, Corrales, Jemez Springs, Rio Rancho, San Ysidro, Sandia Pueblo,

Santo Domingo Pueblo, and SSCAFCA. Specific Pueblo information can be found in their respective Annex to this plan.

Vulnerability – CPRI Results

Flooding CPRI results for each community are summarized in Table 3-8 below. Specific Pueblo information can be found in their respective Annex to this plan.

Table 3-8: CPRI results by jurisdiction for flood

Participating Jurisdiction	Probability	Magnitude/ Severity	Warning Time	Duration	CPRI Score
Bernalillo, Town of	Highly Likely	Critical	12-24 hours	< 1 week	3.30
Corrales, Village of	Likely	Critical	< 6 hours	< 1 week	3.15
Jemez Springs, Village of	Possible	Critical	< 6 hours	< 6 hours	2.50
Rio Rancho, City of	Highly Likely	Limited	< 6 hours	< 6 hours	3.10
San Ysidro, Village of	Possible	Critical	< 6 hours	< 6 hours	2.50
SSCAFCA	Possible	Critical	< 6 hours	> 1 week	2.80
Unincorporated Sandoval County	Likely	Limited	< 6 hours	< 6 hours	2.65
				County-wide average CPRI =	**2.87**

Vulnerability – Loss Estimations

The estimation of potential exposure to HIGH and MEDIUM flood hazards was accomplished by intersecting the human and facility assets with the flood hazard limits depicted on the profile maps. Loss estimates to all facilities located within the HIGH and MEDIUM flood hazard areas were made based on the loss estimation tables published by FEMA (FEMA, 2001). Most of the assets located within HIGH hazard flood areas will be subject to three feet or less of flooding. Using the FEMA tables, it is assumed that all structural assets located within the HIGH hazard areas will have a loss-to-exposure ratio of 0.20 (or 20%). A loss to exposure ratio of 0.05 (5%) is assumed for assets located in the MEDIUM hazard areas. Table 3-9 summarizes the critical facility, population, and residential housing unit exposure and loss estimates for the HIGH and MEDIUM flood hazards. Estimates are reported by jurisdiction and county-wide.

In summary, $93.4 million and $1.0 million in critical facility related losses are estimated for HIGH and MEDIUM flood hazards, for all the participating jurisdictions in Sandoval County. An additional $148.7 million and $59.6 million in HIGH and MEDIUM flood losses to 2010 Census residential housing units is estimated for all participating Sandoval County jurisdictions. Regarding human vulnerability, a total population of 7,794 people, or 5.92% of the total population, is potentially exposed to a HIGH hazard flood event. A total population of 4,005 people, or 3.04% of the total population, is potentially exposed to a MEDIUM hazard flood event. Based on the historic record, multiple deaths and injuries are plausible and a substantial portion of the exposed population is subject to displacement depending on the event magnitude.

It is duly noted that the loss and exposure numbers presented above represent a comprehensive evaluation of the County as a whole. It is unlikely that a storm event would occur that would flood all of the delineated HIGH and MEDIUM flood hazard areas at the same time. Accordingly, actual event based losses and exposure are likely to be only a fraction of those summarized above. Furthermore, it should be noted that all MEDIUM flood exposure and loss numbers reported herein are incremental to the numbers reported for the HIGH hazard flood (e.g. – should a full 500 year event occur, the anticipated losses would be approximated by the HIGH plus MEDIUM values). That is, the 100-year floodplain would be entirely inundated during a 500-year flood.

Vulnerability – Repetitive Loss Properties

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 and SRL 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. Currently there are no RL/SRL properties located within Sandoval County.

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Table 3-9: Sandoval County jurisdictional exposure and loss estimates due to flooding

FLOOD HAZARD EXPOSURE / LOSS	Bernalillo	Corrales	Jemez Springs	Rio Rancho	San Ysidro	SSCAFCA	Sandoval County (U)	Total
Total Critical Facilities	**34**	**27**	**9**	**122**	**8**	**34**	**16**	**268**
Estimated Replacement Cost	**$0**	**$24,000,000**	**$10,275,000**	**$342,234,000**	**$2,550,000**	**$201,820,000**	**$56,850,000**	**$795,656,000**
Facilities Exposed to High Hazard	14	2	0	0	0	9	1	26
Percentage of Total Facilities	41.18%	7.41%	0.00%	0.00%	0.00%	26.47%	6.25%	17.81%
Estimated Replacement Cost	$0	$1,000,000	$0	$0	$0	$91,660,000	$750	$93,410,000
Estimated Structure Loss	$0	$200,000	$0	$0	$0	$18,332,000	$150	$18,682,000
Facilities Exposed to Medium Hazard	0	21	0	0	0	0	0	21
Percentage of Total Facilities	0.00%	77.78%	0.00%	0.00%	0.00%	0.00%	0.00%	14.38%
Estimated Replacement Cost	$0	$19,000,000	$0	$0	$0	$0	$0	$19,000,000
Estimated Structure Loss	$0	$950,000	$0	$0	$0	$0	$0	$950,000
Total Population	**8,307**	**8,231**	**278**	**87,444**	**165**	**n/a**	**14,140**	**131,564**
Population Exposed to High Hazard	4,822	161	52	1,337	22		758	7,794
Percent Exposed	58.05%	1.95%	18.72%	1.53%	13.42%		5.36%	5.92%
Population Exposed to Medium Hazard	192	3,702	3	78	0		29	4,005
Percent Exposed	2.31%	44.98%	1.23%	0.09%	0.00%		0.21%	3.04%
Population Over 65	**1,113**	**1,600**	**83**	**9,437**	**30**	**n/a**	**2,353**	**15,880**
Population Over 65 Exposed to High Hazard	597	29	14	121	4		122	958
Percent Exposed	53.65%	1.81%	16.33%	1.29%	13.27%		5.18%	6.04%
Population Over 65 Exposed to Medium Hazard	30	719	1	10	0		6	765
Percent Exposed	2.69%	44.92%	0.69%	0.10%	0.00%		0.24%	4.81%
Residential Building Count Totals	**3,215**	**3,765**	**174**	**33,927**	**83**	**n/a**	**7,486**	**52,287**
Estimated Replacement Cost	**$622,530,000**	**$2,222,247,000**	**$40,712,000**	**$10,178,234,000**	**$18,694,000**	**n/a**	**$2,799,780,000**	**$16,073,849,000**
Residential Bldgs. Exposed to High Hazard	1,897	77	30	515	12	n/a	406	3,123
Percentage of Total Residential Bldgs.	59.02%	2.05%	17.27%	1.52%	14.14%	n/a	5.42%	6.29%
Estimate Exposed Replacement Cost	$353,907,000	$42,998,000	$6,776,000	$154,649,000	$2,643,000	n/a	$149,005,000	$743,376,000
Estimated Residential Structure Loss	$70,781,000	$8,600,000	$1,355,000	$30,930,000	$529,000,000	n/a	$29,801,000	$148,675,000

Table 3-9: Sandoval County jurisdictional exposure and loss estimates due to flooding

FLOOD HAZARD EXPOSURE / LOSS	Bernalillo	Corrales	Jemez Springs	Rio Rancho	San Ysidro	SSCAFCA	Sandoval County (U)	Total
Residential Bldgs. Exposed to Medium Hazard	79	1,693	2	29	0	n/a	13	1,816
Percentage of Total Residential Bldgs.	2.46%	44.96%	1.00%	0.09%	0.00%	n/a	0.18%	3.66%
Estimated Exposed Replacement Cost	$14,688,000	$1,160,113,000	$391,000	$8,766,000	$0	n/a	$8,683,000	$1,192,641,000
Estimated Residential Structure Loss	$734,000	$58,006,000	$20,000	$438,000	$0	n/a	$434,000	$59,632,000

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Vulnerability – Development Trends

Many of the flood prone properties in Sandoval 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 throughout the entire county. For most of the jurisdictions, management of new growth generally involves enforcing current floodplain ordinance requirements and maintaining NFIP compliant practice and procedures. Challenges to the management of new growth include the need for converting approximate floodplain delineations into detailed delineations to better mitigate against flood risks, or to establish additional floodplain delineations to identify and map the flood hazards within the growth areas where no mapping currently exists. Jurisdiction specific growth area vulnerabilities are discussed below.

Bernalillo – With no plans for annexation or major redevelopment, the town's vulnerability to flooding will likely remain unchanged over the next five years.

Corrales – About two-thirds of the village is protected from Rio Grande flooding by a levee constructed along the river's west bank. All of the areas and facilities identified as potential growth areas over the next 5 years will be located outside of any flood hazard zone. Accordingly, the vulnerability to flooding within Corrales will remain unchanged with the identified growth areas. However, the portion of the Village located west of the Corrales Main Canal—referred to as the sand hills—remains vulnerable to erosion and damage to structures in localized storm events.

Jemez Springs – With no anticipated growth, the vulnerability of the village is not expected to change from existing conditions.

Rio Rancho – The anticipated growth areas for the city in the next five years are either not located within known flood hazard areas, or are part of regional drainage master plans administered by SSCAFCA. In either case, the anticipated future development for the city is not expected to increase the overall vulnerability to flood hazards.

San Ysidro – The flood hazard limits primarily coincide with the natural floodplain of the Jemez River and a small unnamed wash draining to the Rio Salado. The two areas identified by the village for future development currently are located outside of any known flood hazard areas. Accordingly, anticipated future development for the village is not anticipated to increase the vulnerability to flooding.

SSCAFCA – Future facilities constructed by SSCAFCA will be for mitigation of flood hazards and are therefore expected to only decrease vulnerability to flood hazards.

Unincorporated County – Any future development in unincorporated areas of the County will be subject to Planning and Zoning approval, using the Comprehensive Plan, the Comprehensive Zoning Ordinance and the Subdivision regulations. Part of this review is by the Flood Plain Manager, using the Flood Damage Prevention Ordinance. Future development is expected in several areas. Any flood protection structures will be the burden of the developer as prescribed by Planning and Zoning and enforced by County development, whether they are private or public.

Vulnerability – Jurisdictional Summary

All of the participating jurisdictions have varying levels of vulnerability to Flood hazards. All jurisdictions have designated Flood as a mitigation priority.

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Profile Maps

Maps 2A through 2D – County-Wide Flood Hazard Maps

Maps 2E through 2J– Bernalillo, Corrales, Jemez Springs, Rio Rancho, San Ysidro, and SSCAFCA Flood Hazard Maps. Specific Pueblo information can be found in their respective Annex to this plan.

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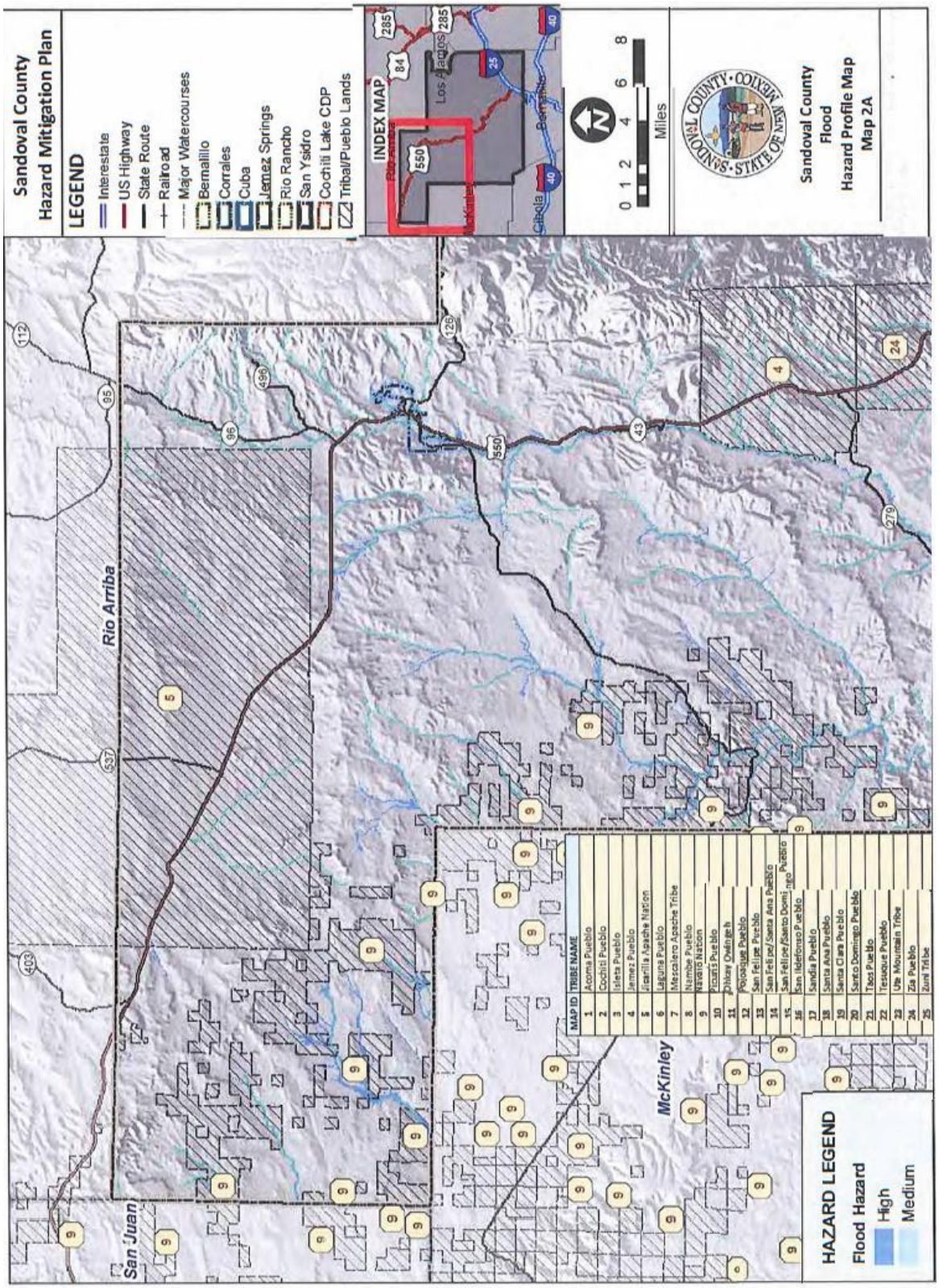
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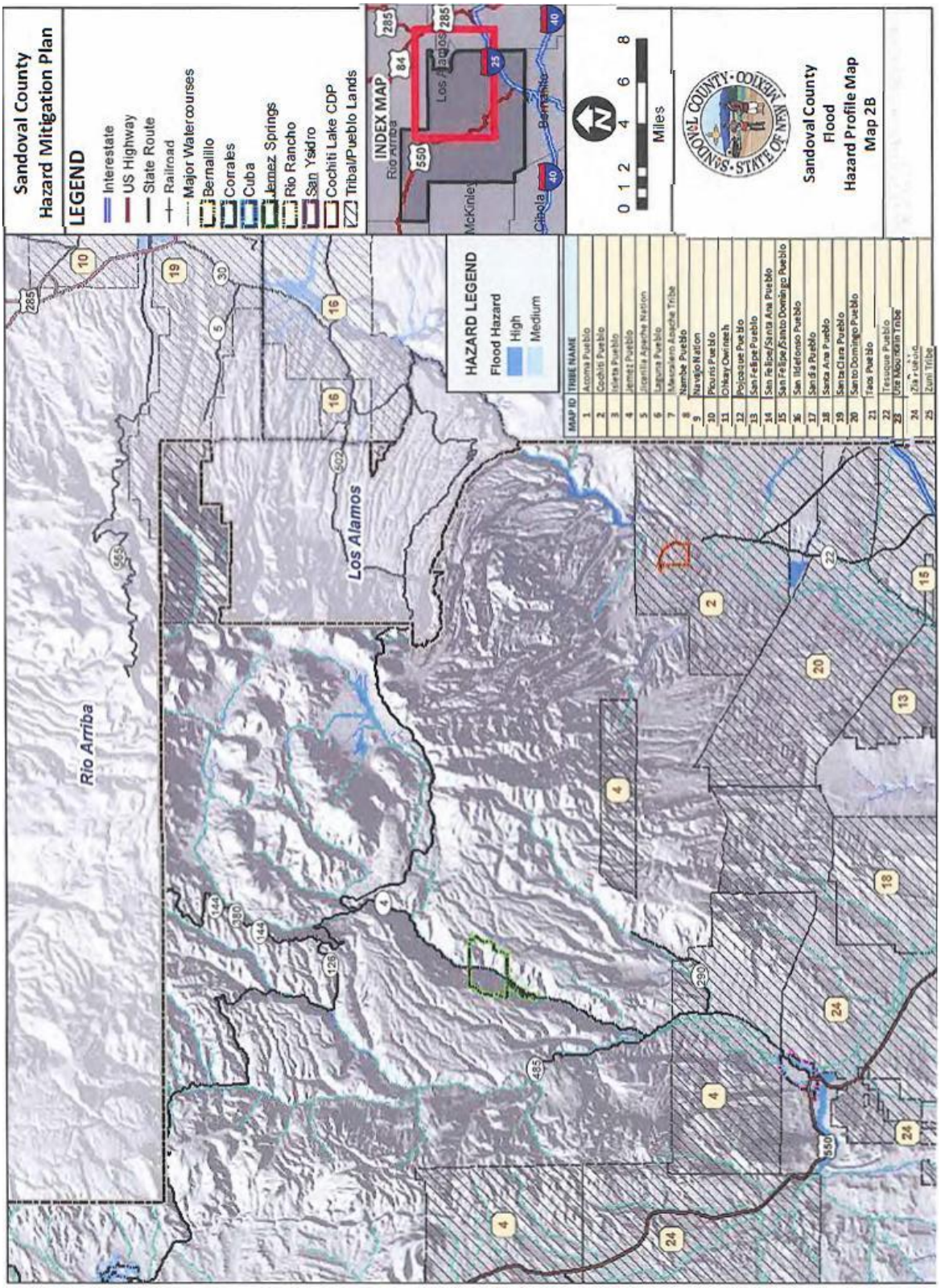
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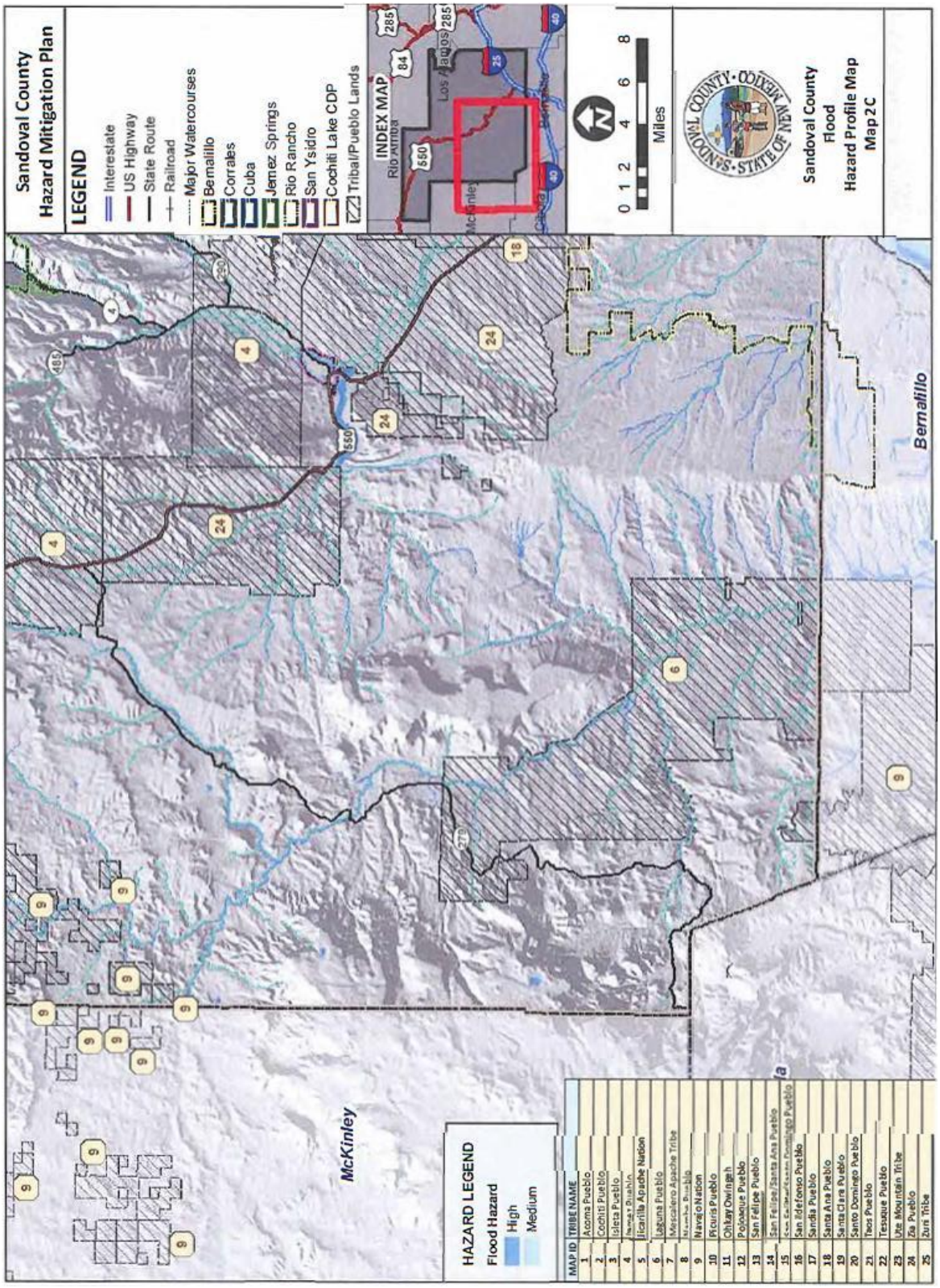
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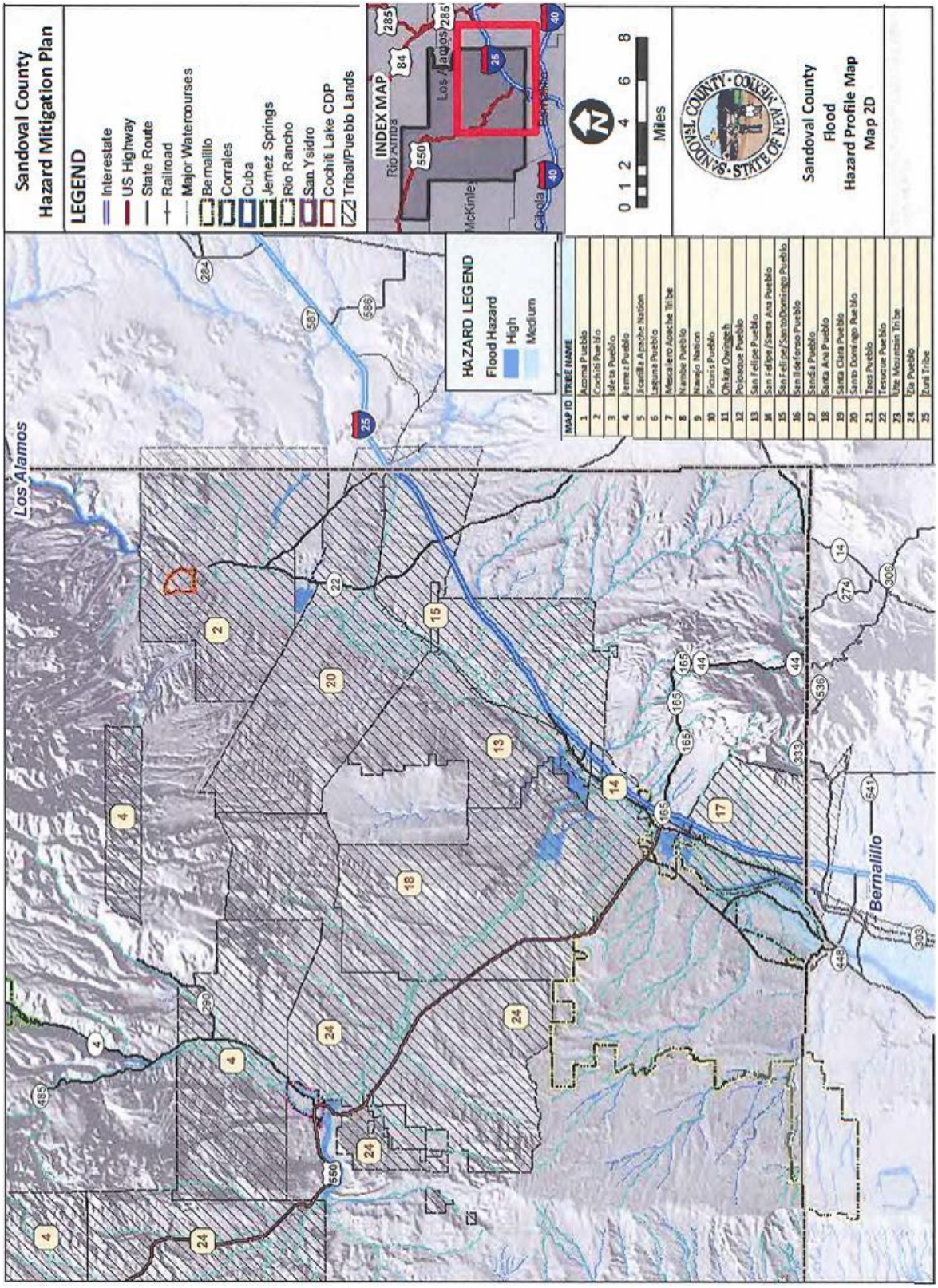
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11 Ohkay Owingeh
12 Poloeque Pueblo
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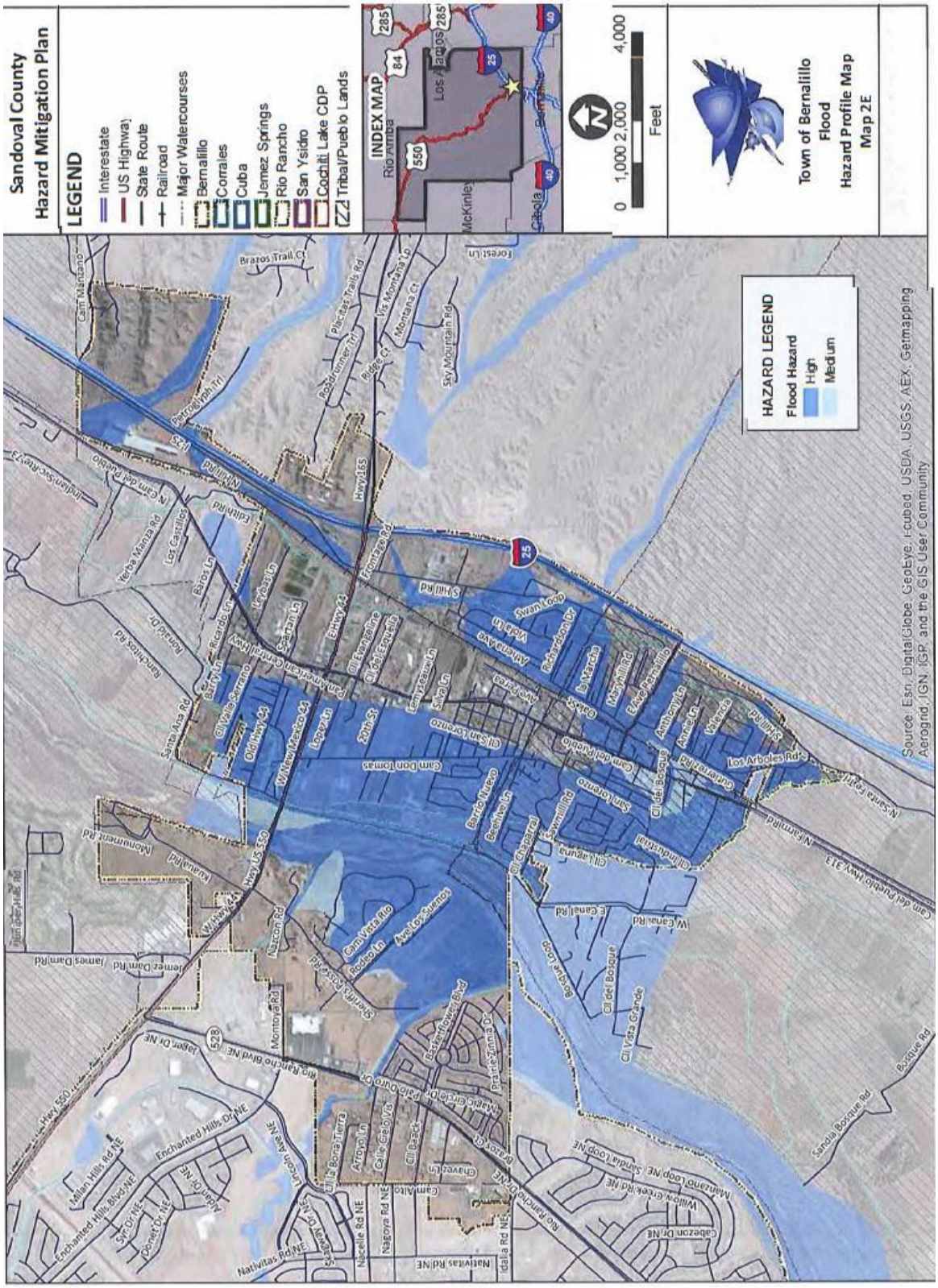
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Major Watercourses
Bernalillo
Corrales
Cuba
Jemez Springs
Rio Rancho
San Ysidro
Cochiti Lake CDP
Tribal/Pueblo Lands
INDEX MAP
Rio Arriba
Los Alamos
McKinley
Cibola
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Feet
Town of Bernalillo
Flood
Hazard Profile Map
Map 2E
HAZARD LEGEND
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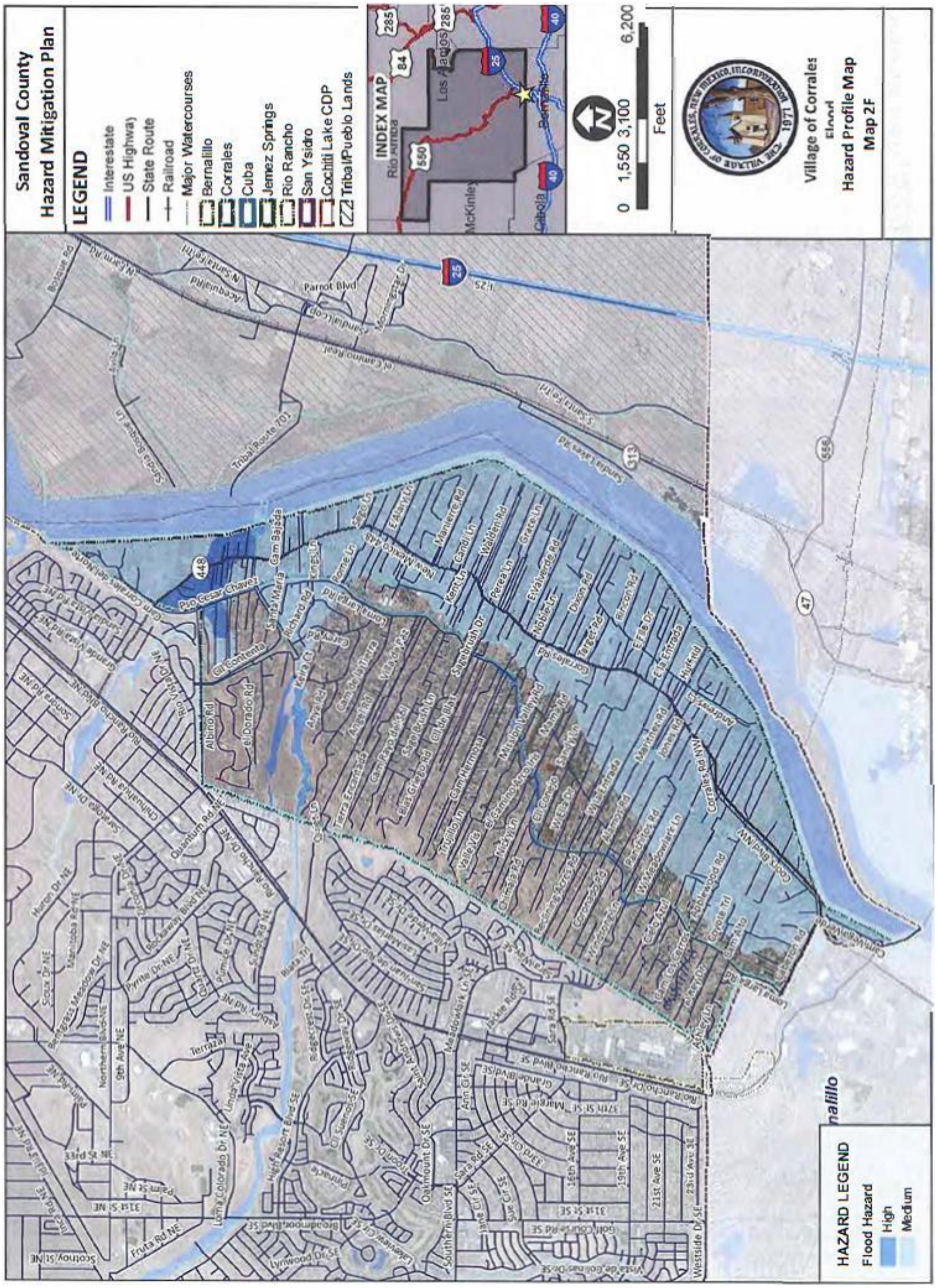
Aerogrid, IGN, IGP, and the GIS User Community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Cochiti Lake CDP
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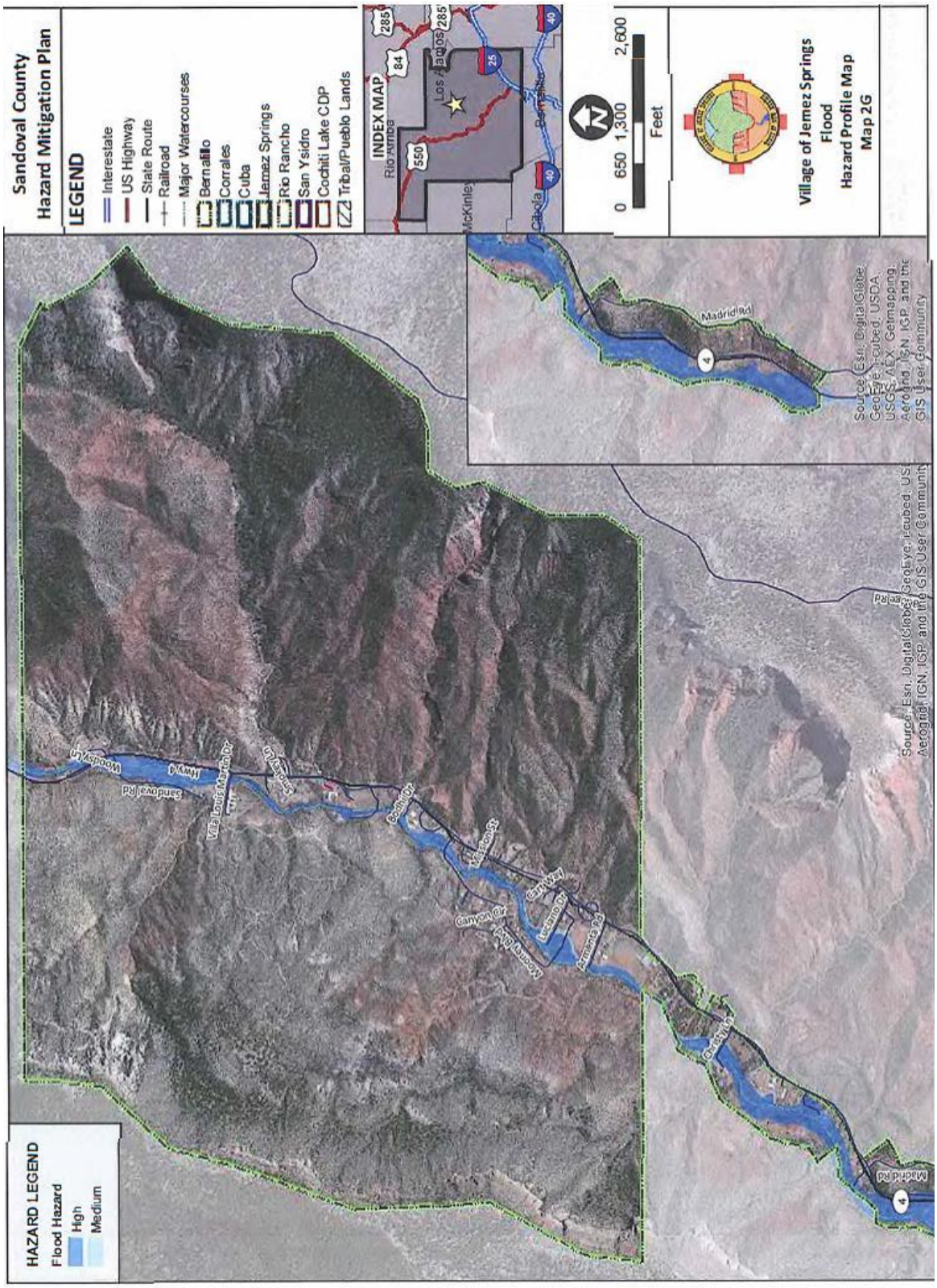
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San Ysidro
Cochiti Lake CDP
Tribal/Pueblo Lands
INDEX MAP
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Los Alamos
McKinley
Cibola
Bernalillo
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Feet
Village of Jemez Springs
Flood
Hazard Profile Map
Map 2G
HAZARD LEGEND
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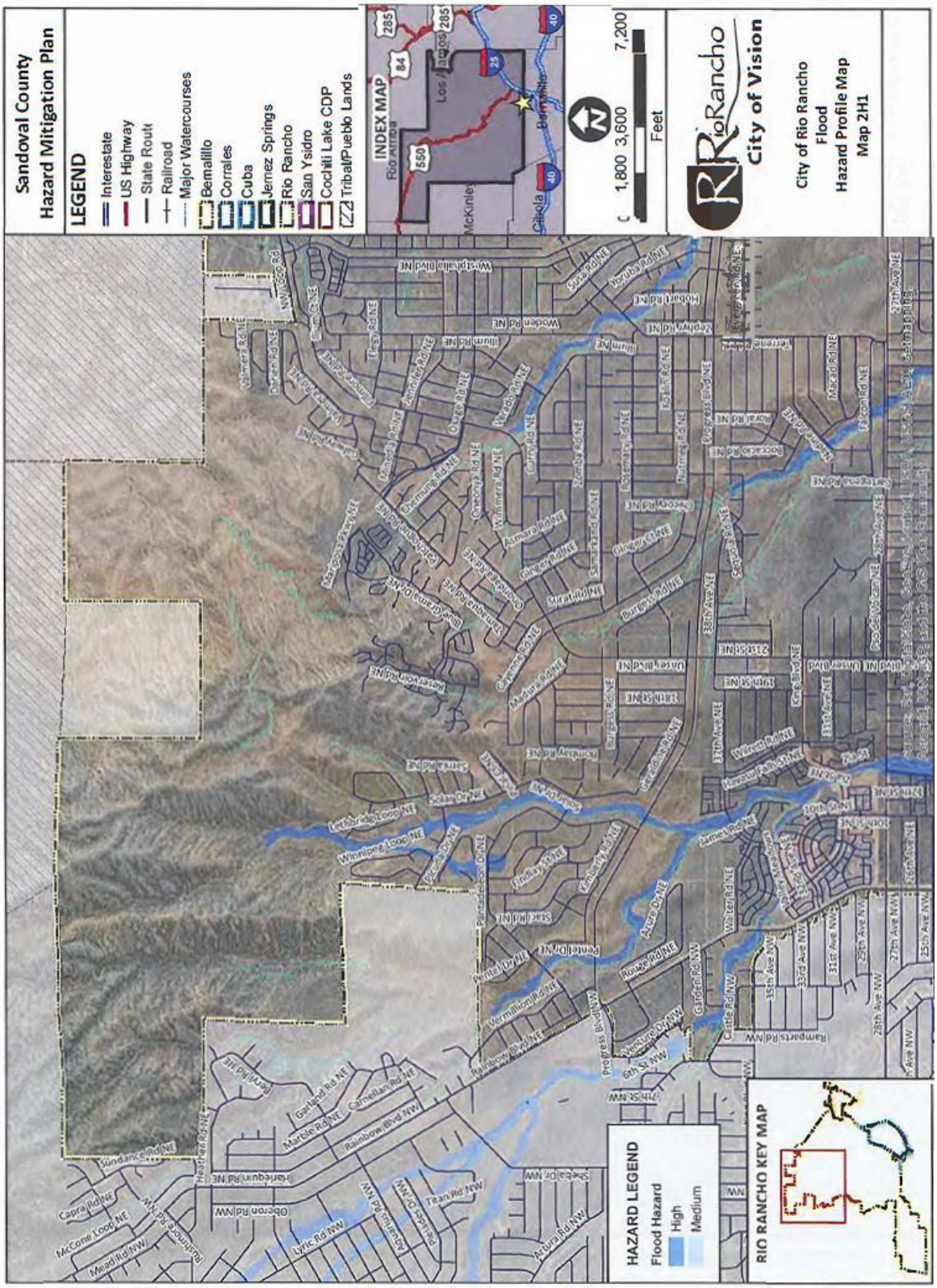
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San Ysidro
Cochiti Lake CDP
Tribal/Pueblo Lands
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1,800 3,600 7,200
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HAZARD LEGEND
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High
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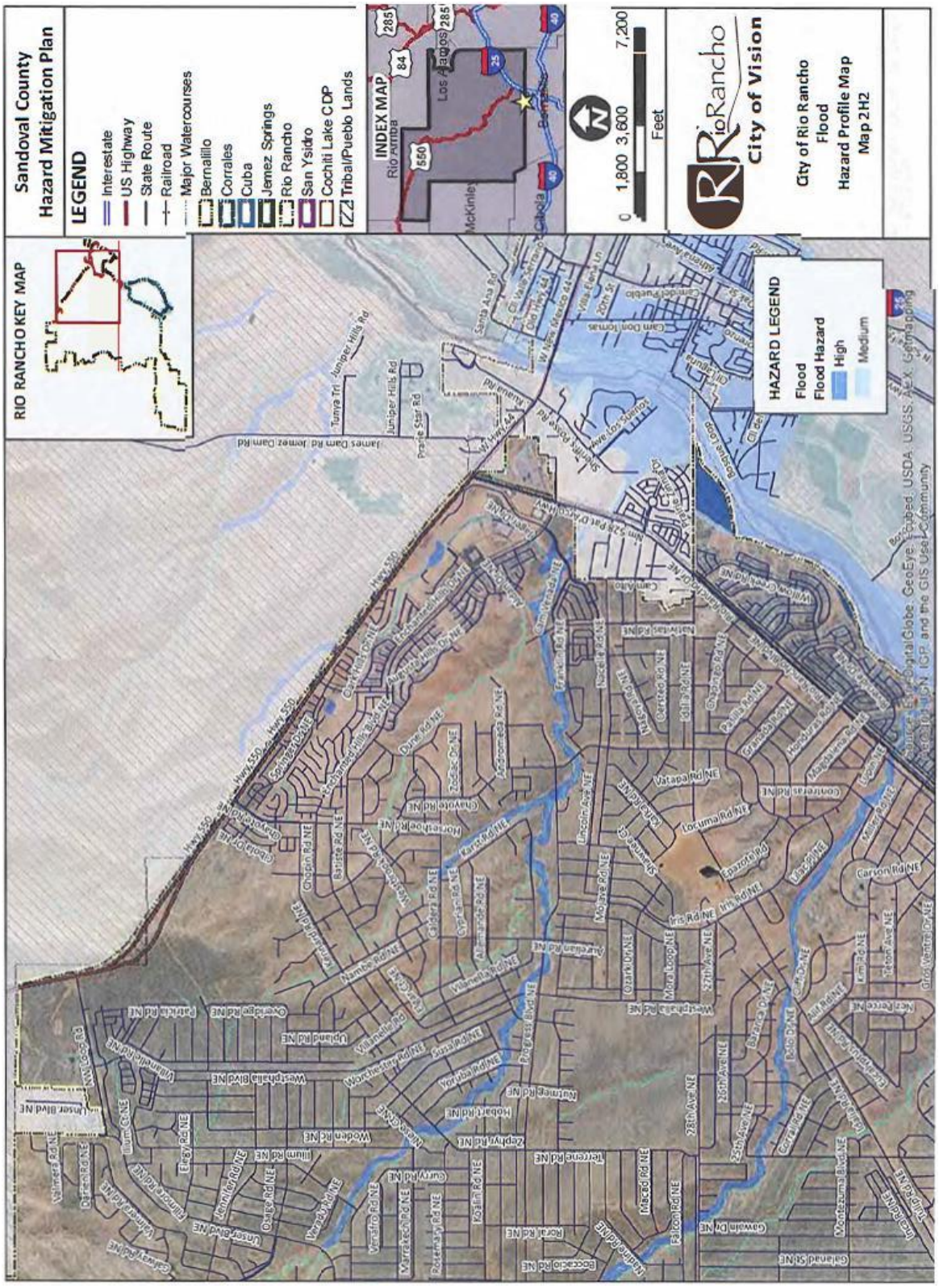
RIO RANCHO KEY MAP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San Ysidro
Cochiti Lake CDP
Tribal/Pueblo Lands
INDEX MAP
RIO RANCHO KEY MAP
HAZARD LEGEND
Flood
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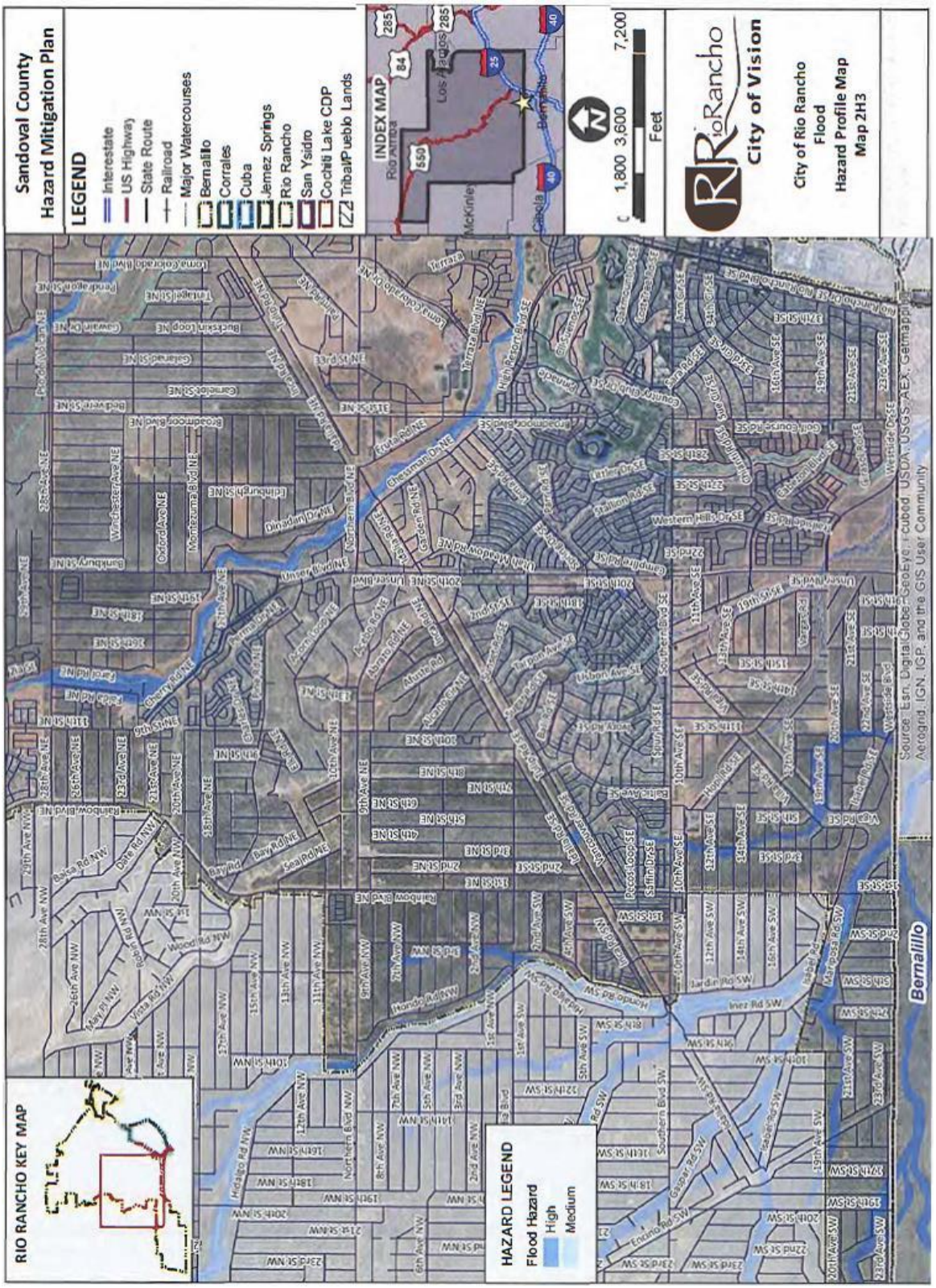
City of Vision
City of Rio Rancho
Flood
Hazard Profile Map
Map 2H2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Tribal/Pueblo Lands
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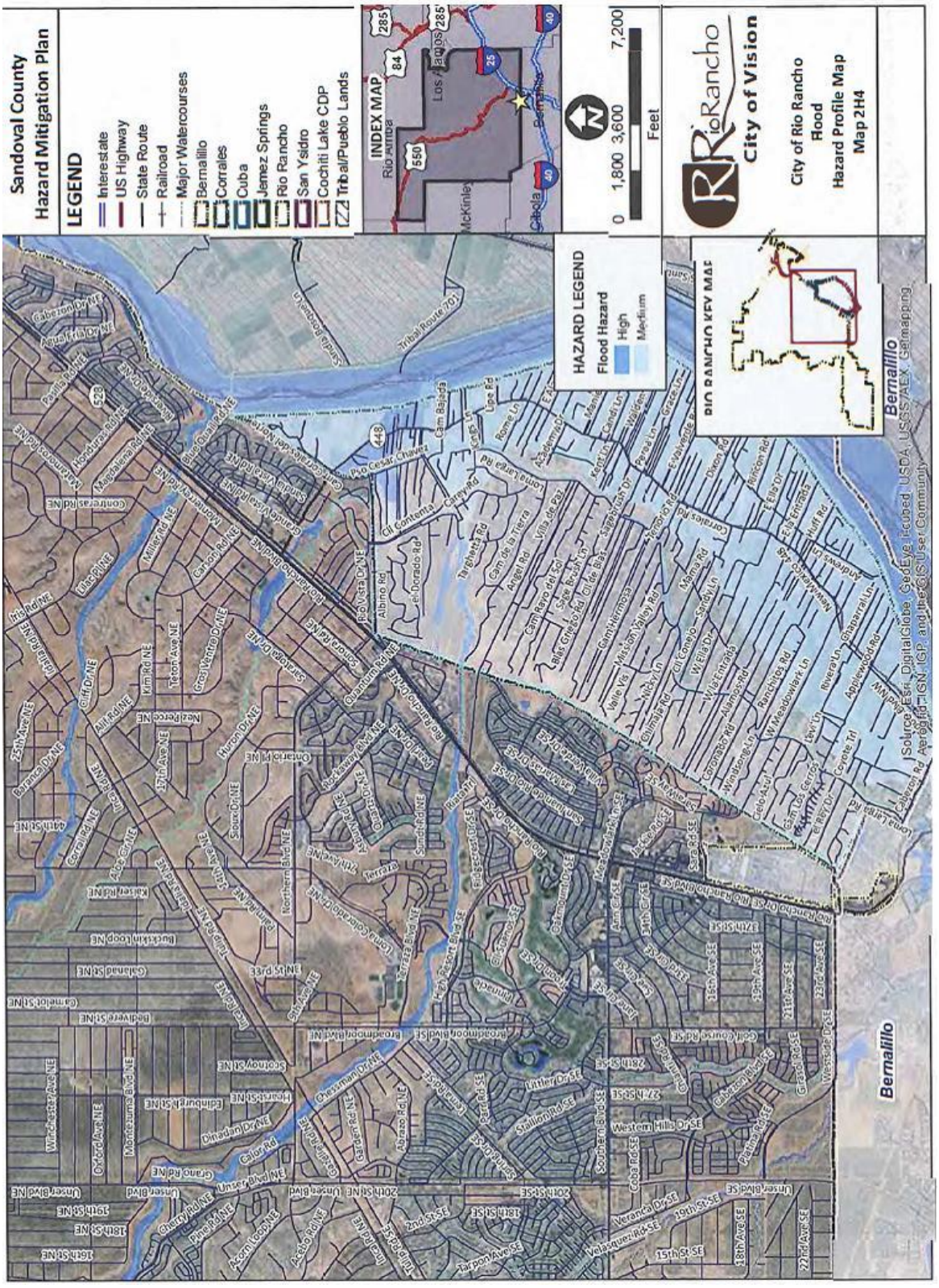
Rio Arriba
Los Alamos
Santa Fe
McKinley
Cibola
1,800 3,600 7,200
Feet
RioRancho
City of Vision
City of Rio Rancho
Flood
Hazard Profile Map
Map 2H3
RIO RANCHO KEY MAP
HAZARD LEGEND
Flood Hazard
High
Medium
Bernalillo
Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, and the GIS User Community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Tribal/Pueblo Lands
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Los Alamos
Bernalillo
McKinley
Cibola
0 1,800 3,600 7,200
Feet
HAZARD LEGEND
Flood Hazard
High
Medium
RIO RANCHO KEY MAP
Rio Rancho
City of Vision
City of Rio Rancho
Flood
Hazard Profile Map
Map 2H4
Bernalillo
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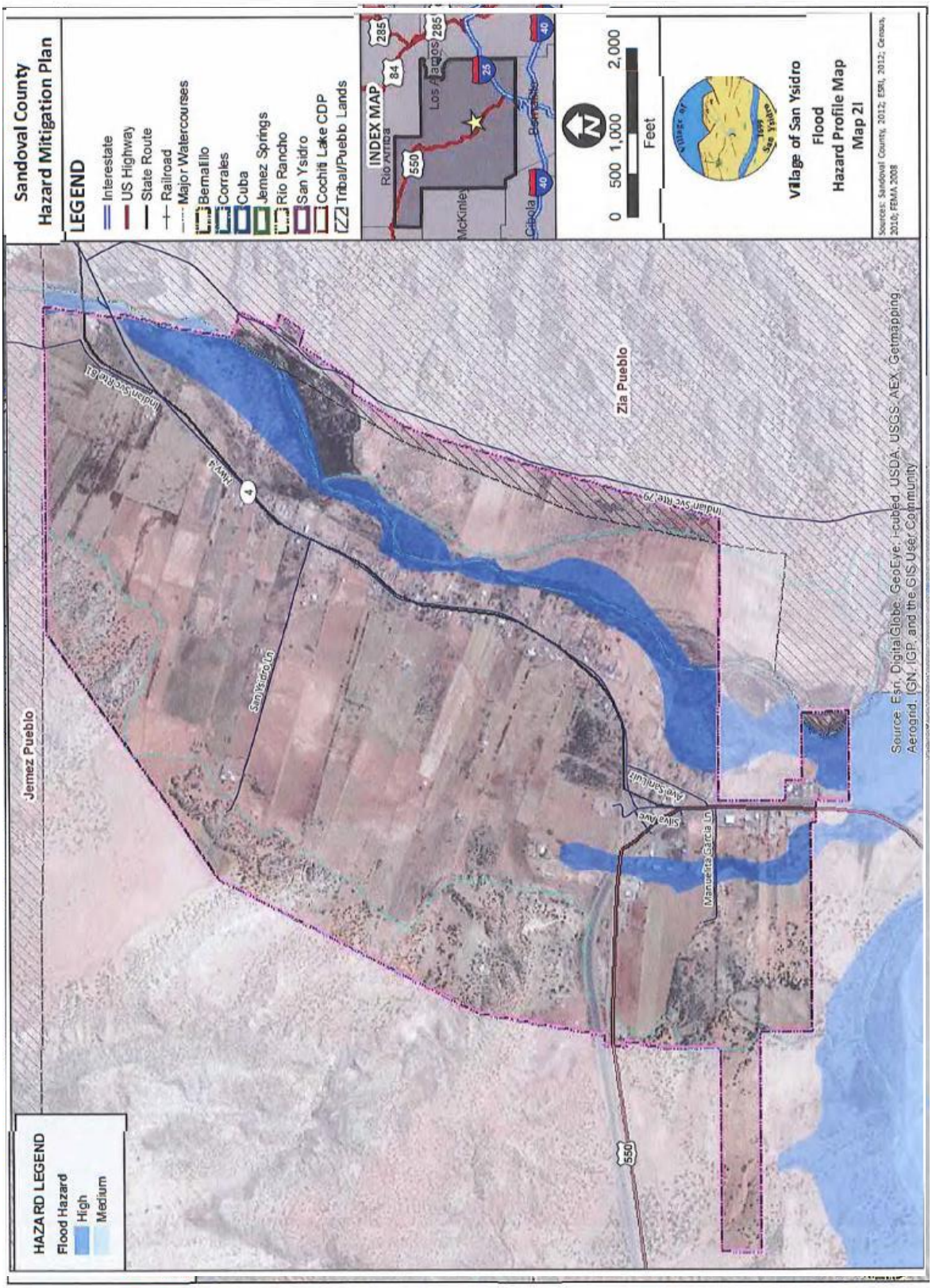
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San Ysidro
Cochiti Lake CDP
Tribal/Pueblo Lands
INDEX MAP
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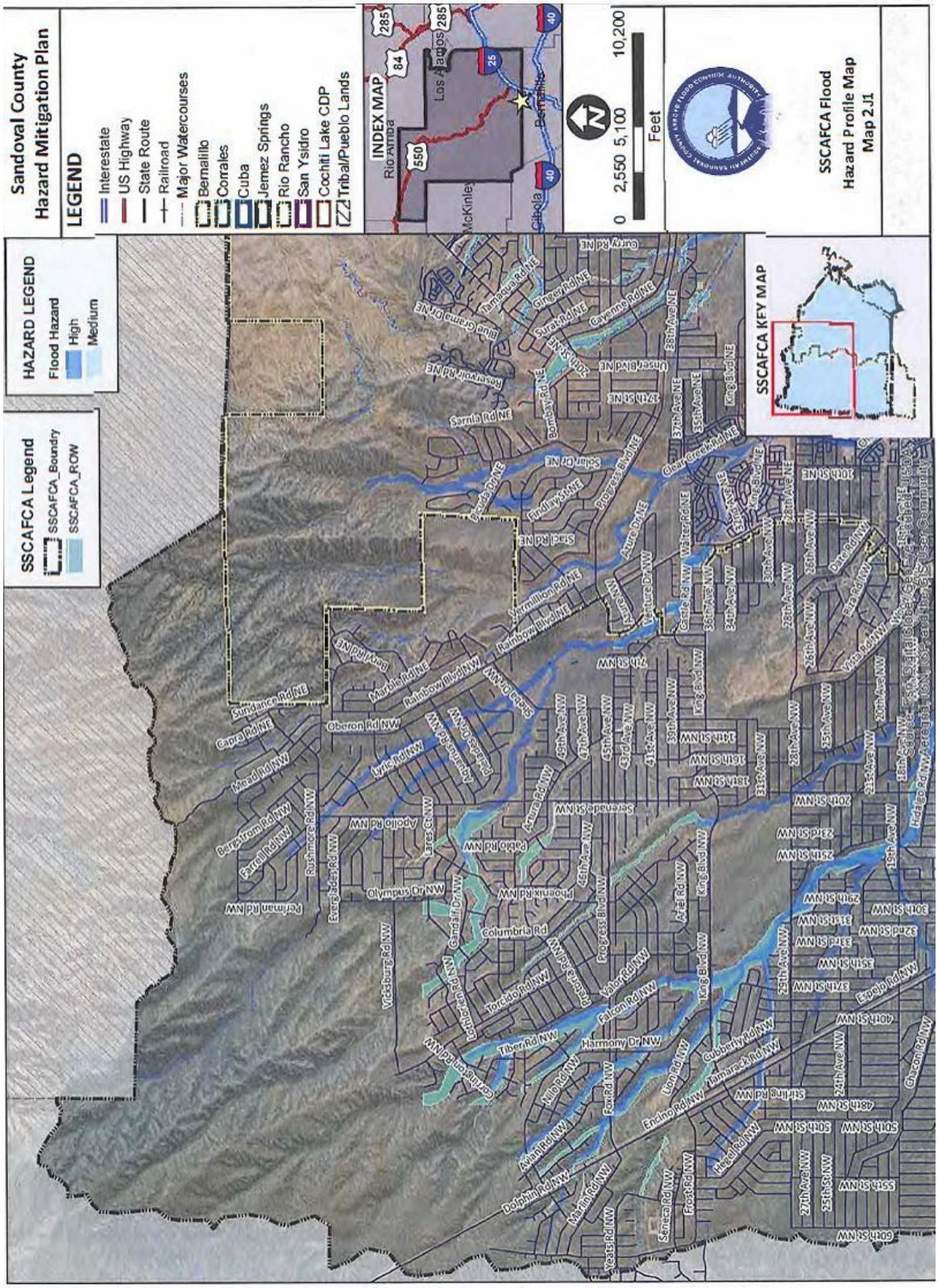
Los Alamos
McKinley
Cibola
Torrance
0 500 1,000 2,000
Feet
Village of San Ysidro
Flood
Hazard Profile Map
Map 21
Sources: Sandoval County, 2012; ESRI, 2012; Census, 2010; FEMA 2008
HAZARD LEGEND
Flood Hazard
High
Medium
Jemez Pueblo
Zia Pueblo
Indian Service Rte 81
Indian Service Rte 79
NM 4
San Ysidro Ln
Ave Sandoval
Silva Ave
Marcelita Garcia Ln
550
Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, and the GIS User Community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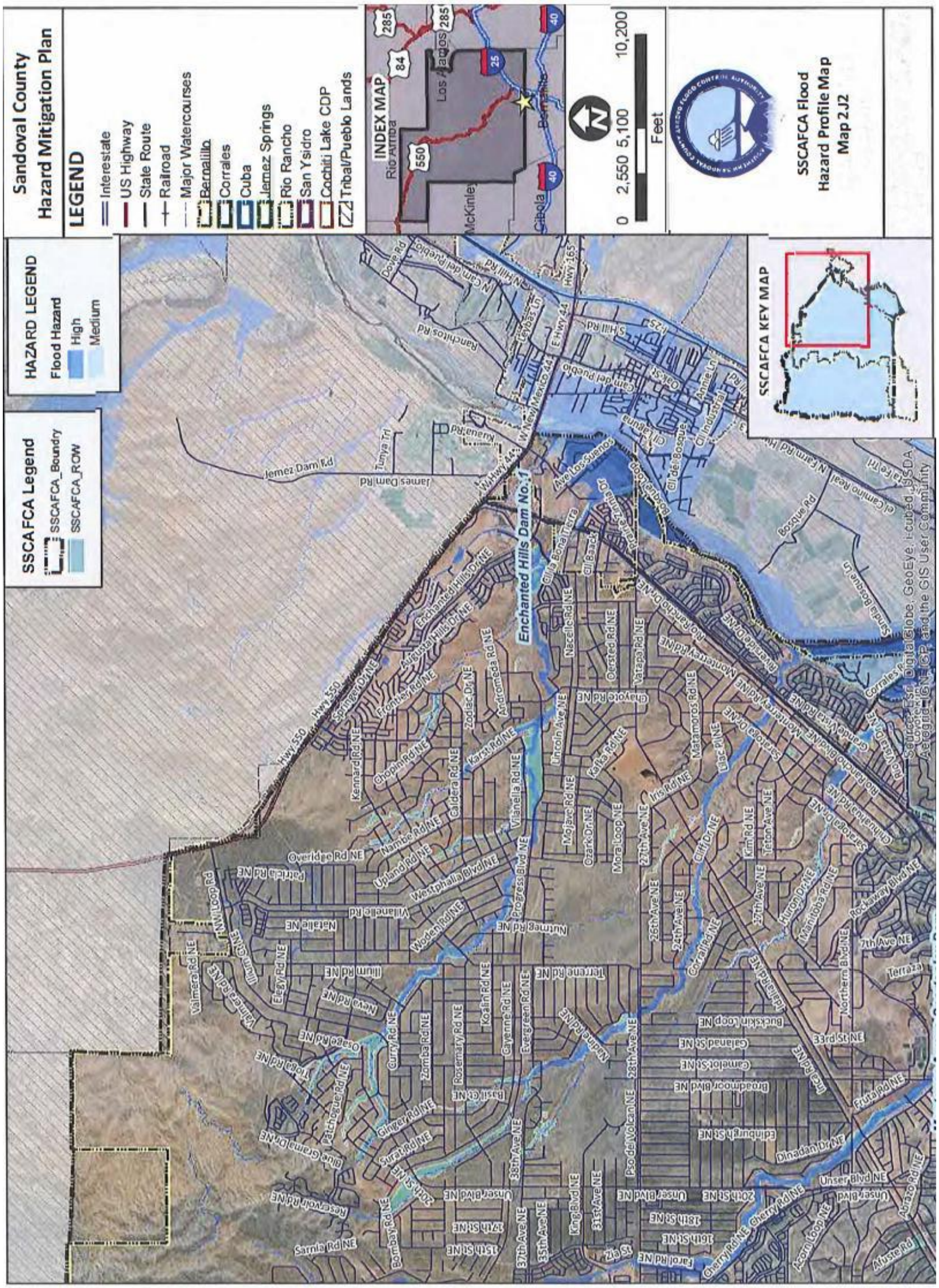
Rio Rancho
San Ysidro
Cochiti Lake CDP
Tribal/Pueblo Lands
HAZARD LEGEND
Flood Hazard
High
Medium
SSCAFCA Legend
SSCAFCA_Boundry
SSCAFCA_ROW
INDEX MAP
Rio Arriba
Los Alamos
Bernalillo
McKinley
Cibola
0 2,550 5,100 10,200
Feet
SSCAFCA Flood
Hazard Profile Map
Map 2.J1
SSCAFCA KEY MAP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Rio Rancho
San Ysidro
Cochiti Lake CDP
Tribal/Pueblo Lands
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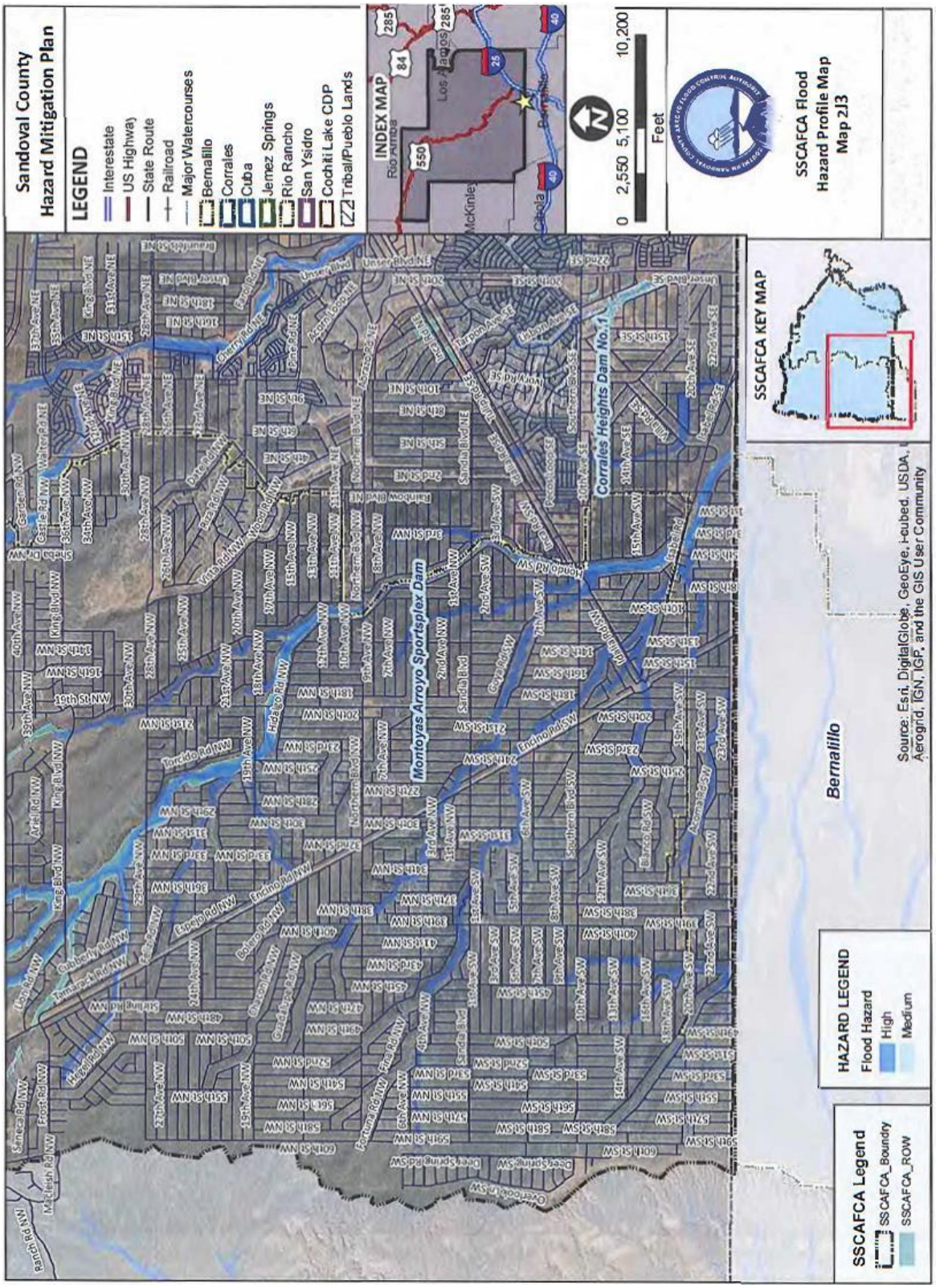
Feet
SSCAFCA Flood
Hazard Profile Map
Map 2J2
HAZARD LEGEND
Flood Hazard
High
Medium
SSCAFCA Legend
SSCAFCA_Boundry
SSCAFCA_ROW
SSCAFCA KEY MAP
Enchanted Hills Dam No.1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Los Lunas
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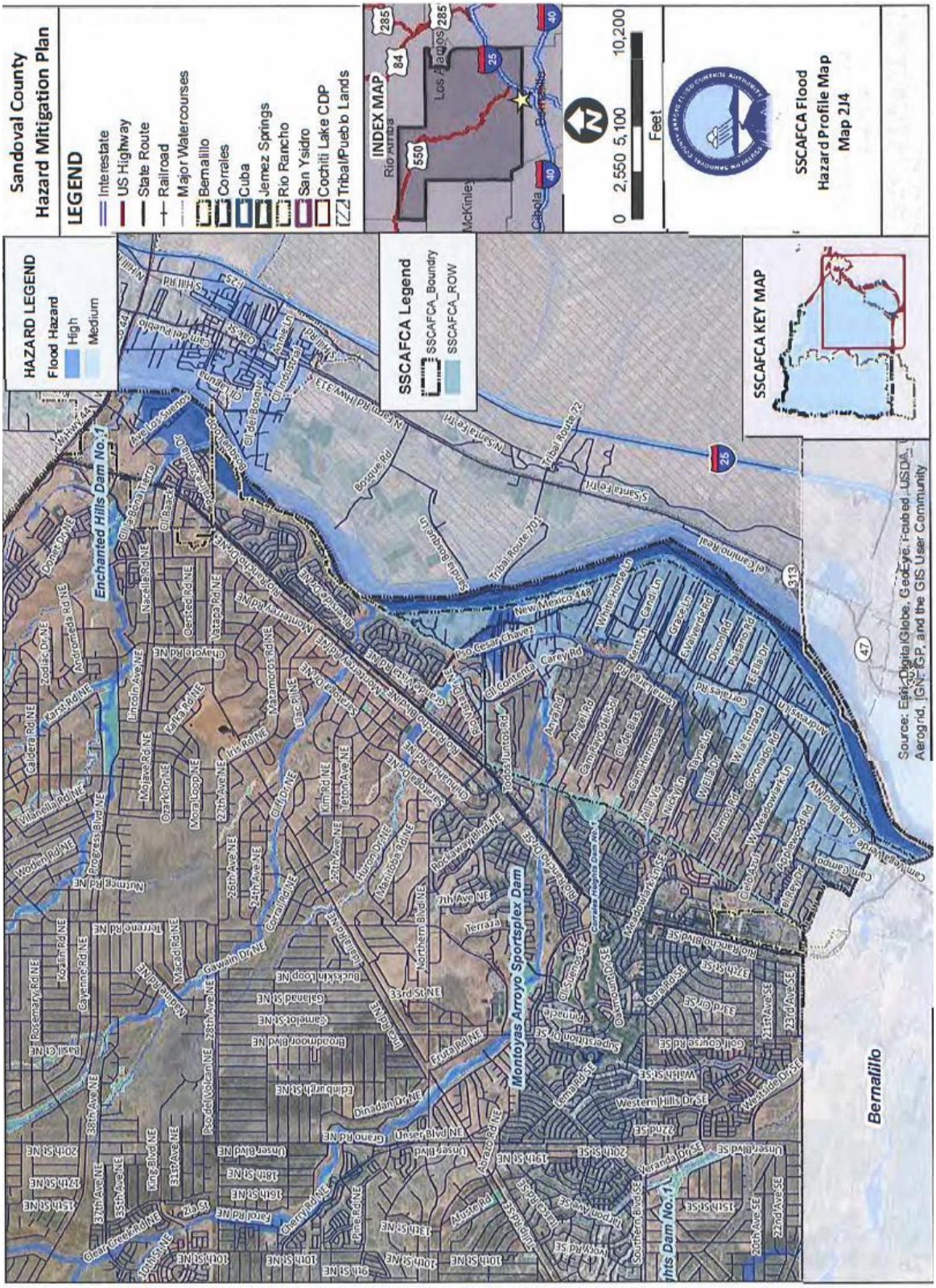
Feet
SSCAFCA Flood
Hazard Profile Map
Map 2J3
SSCAFCA KEY MAP
Montoyas Arroyo Sportsplex Dam
Corrales Heights Dam No.1
Bernalillo
Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, Aerogrid, IGN, IGP, and the GIS User Community
HAZARD LEGEND
Flood Hazard
High
Medium
SSCAFCA Legend
SSCAFCA_Boundry
SSCAFCA_ROW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Los Alamos
McKinley
Cibola
Bernalillo
0 2,550 5,100 10,200
Feet
SSCAFCA Flood
Hazard Profile Map
Map 2J4
SSCAFCA KEY MAP
SSCAFCA Legend
SSCAFCA_Boundry
SSCAFCA_ROW
HAZARD LEGEND
Flood Hazard
High
Medium
Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, Aerogrid, IGN, IGP, and the GIS User Community
Enchanted Hills Dam No.1
Montoyas Arroyo Sportsplex Dam
Bernalillo

3.3.4 Severe Weather

Description

Severe Weather is actually a grouping of several weather related hazards that are known to impact Sandoval County and pose varying degrees of risk to the County's population and infrastructure. Each of the hazards within this category are not severe enough to warrant an independent evaluation and assessment, but collectively are considered by the Planning Team to warrant attention and some level of profiling. The individual hazards collectively referred to as Severe Weather include: *Extreme Temperatures*, *Hail*, *Lightning*, and *Winter Storm*. The entire planning area is at risk from a Severe Weather event.

Extreme Temperatures on either the cold or hot side of the thermometer can occur within any area and can often have adverse impacts on the health and welfare of a community or region. These extreme temperatures can impact people, pets, plants and infrastructure such as power lines and above and below-ground utility lines throughout the area. What constitutes an extreme temperature is relative to what is considered to be normal for the area of interest, or temperatures that if sustained for long enough periods, will have a negative impact on the health, safety and resources of an area.

Hail ranks as one of the most frequent type of severe weather events in the county and is responsible for a considerable percentage of property and crop damage. Damaging or severe hail (0.75 inches and larger) is most common in May and June, although a significant number of hail reports also occur from July through September.

Lightning usually occurs as a result of thunderstorms that move through the area during the summer months, with peak lightning strikes occurring in July and August. Lightning does not normally cause significant damage to property; however, it is responsible for numerous power outages and is also the leading cause of weather-related injuries and fatalities in New Mexico. It is also a major source of wildfire ignitions.

Winter Storms begin as low-pressure systems that move through the county following the jet stream. These storms may include heavy snowstorms, sleet storms, ice storms, blizzards, and severe blizzards. Major winter storms and occasional blizzard conditions bring bursts of heavy snow accumulating three to six inches in short periods or one to two feet in 12 to 24 hours. Blizzard conditions develop with winds over 35-mph. Freezing rain and drizzle will create a coating of ice that is hazardous to walk or drive on. Unusually heavy ice accumulations can damage trees, power lines and other utilities, and buildings.

History

Descriptions of significant Severe Weather events that have occurred over the past 10 years are summarized below:

- In July 2009, a brief thunderstorm dampened holiday activities when lightning struck seven people at Loma Colorado Park. All were transported to local hospitals. One person died, one was in critical condition, and there were five others with minor injuries. (City or Rio Rancho, 2012)
- In December 2009, widespread snow amounts of 2 inches or greater coated the northwest highlands. The greatest amounts were near Lindrith, where 8 inches of snow was reported. The heavy snow resulted in one fatality, where a Jemez Pueblo resident was driving southbound on US 550 in southeast San Juan County, lost control, slid into the northbound lanes, and was struck by an oncoming vehicle. (NCDC, 2012)
- In October 2010, the Kewa Pueblo, formerly known as Santa Domingo Pueblo, received golf ball sized hail which accumulated six to eight inches deep. This caused several roofs on the

Pueblo to cave in and weakened some walls. The combination of heavy rain and accumulated hail also resulted in some roads being washed out. A lone severe thunderstorm also developed near San Felipe Pueblo and moved east-southeast along the foot of the mountains. Hail up to 2 inches in diameter fell and devastated trees, roofs, windshields and windows across the area. Approximately $2.0 million in property and crop damages were estimated. (NCDC, 2012).

- In February 2011, a monster artic storm stretching from Arizona to New England engulfed the state. Approximately 3 to 7 inches of snow fell and temperatures plunged to new record lows that were as much as 10 degrees below zero and lasted for several days. With wind chill, no location in New Mexico was above zero on February 3rd. Record natural gas demand forced shutdown of service to 12 communities including Bernalillo, Placitas and Santa Ana Pueblo. Literally hundreds of local homes lost water due to frozen pipes and thousands state-wide. State and federal disaster declarations followed (FEMA-DR-1962), however, Sandoval County was not one of the designated counties. (Rio Rancho, 2012)
- In August 2012, a backdoor cold front that made its way into the state the previous night was the main focus for thunderstorm development. Abundant low and mid-level monsoonal moisture and instability with precipitable water values of 100 to 125 percent of normal further enhanced convective activity. Locally heavy rainfall was observed with radar estimated rainfall rates up to 5 inches per hour. Numerous locations within Sandoval and Santa Fe counties reported strong gusty winds, large hail, and flash flooding. The New Mexico Rail Runner was stranded near Pena Blanca as significant flash flooding developed beneath a rail bridge and within nearby low lying areas. (NWS, 2018)
- In July 2013, an upper level disturbance pushed southeast across northern New Mexico and interacted with a stationary frontal boundary in the Rio Grande Valley. The combination of abundant moisture and instability and northwest flow aloft produced repeated rounds of heavy rainfall across areas in northern as well as central portions of the state including the Las Conchas burn scar and the Albuquerque Metro Area. Rainfall amounts of 1 to 3 inches were reported with these storms. Flooding initially occurred in north-central NM during the afternoon and evening hours before training cells developed in northern Bernalillo County during the overnight hours. The Interstate 25 corridor around Bernalillo into north Albuquerque was one of the hardest hit. Widespread flooding was reported in Bernalillo due to the heavy rainfall and a breached acequias. Up to 5 feet of water was reported in one home in Bernalillo. Frequent cloud to ground lightning strikes created numerous power outages across Santa Fe with nearly 30,000 customers out in Albuquerque. Lightning was reported to have hit Sandia Casino shortly after midnight. (NWS, 2018)
- In September 2013, a vigorous, fast-moving upper level low pressure system and associated potent surface cold front interacted with abundant moisture still in place over New Mexico to produce strong to severe thunderstorms and heavy rainfall. Several lines of thunderstorms quickly moved east across the area dumping more rainfall and adding to a record September for many areas. Several reports of large hail were received. (NWS, 2018)
- In May 2015, strong south to southeast upslope flow combined with an upper level disturbance within southwest flow to create widespread showers and thunderstorms across New Mexico. Strong instability over the eastern plains led to a few severe thunderstorms with up to quarter size hail during the afternoon and overnight hours. (NWS, 2018)
- In June 2015, a disturbance within that northerly flow kicked off early morning showers and thunderstorms along and east of the central mountains, moving slowly to the south. Rainfall amounts between half an inch and an inch were common with these storms, with up to 2.2 inches recorded in the Ute Park area. A second round of storms developed by the early

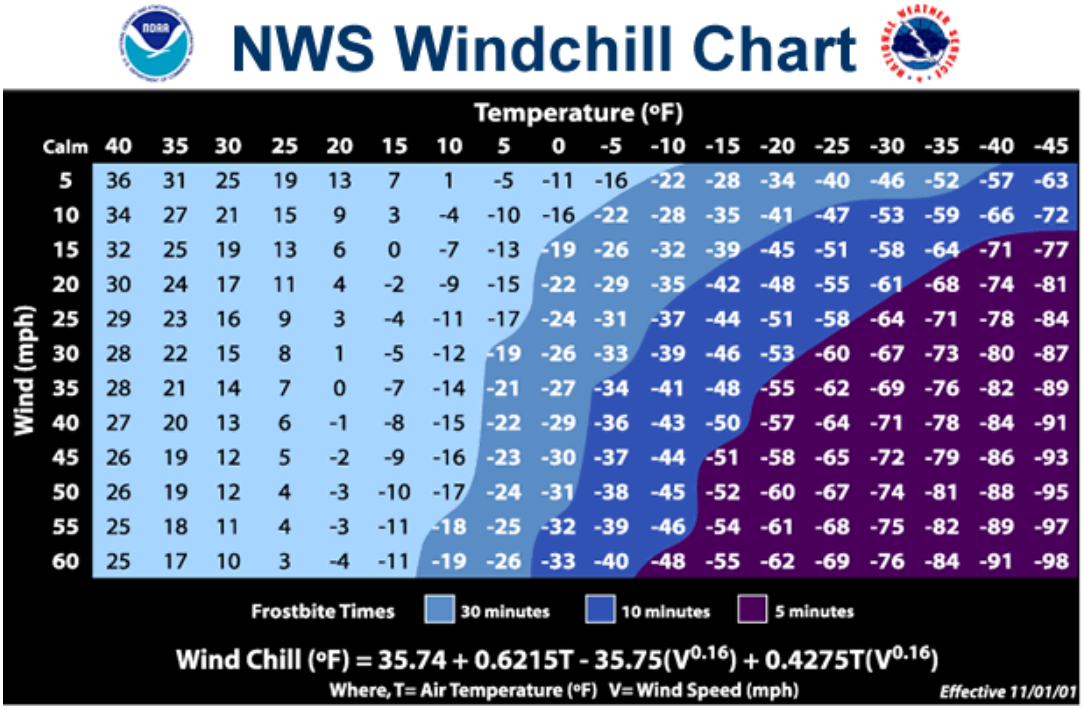
afternoon, mainly along and west of the central mountain chain. A couple storms became severe near Jemez Springs, producing up to half dollar size hail. (NWS, 2018)

- In July 2015, Dominant high pressure over the Great Basin increased mid-level moisture over northern New Mexico within its northerly flow, while a backdoor cold front at the surface increased low level moisture with southerly to southeasterly flow. The moisture increase plus decent environmental shear and daytime heating led to strong and severe thunderstorms over northern New Mexico. The strongest storm developed over the Jemez Mountains and moved slowly to the west-southwest, producing quarter sized hail near Cuba. (NWS, 2018)
- In August 2016, a strong thunderstorm that rolled off the Valles Caldera produced nickel size hail at the Trail's End RV Park near La Cueva Lodge. (NWS, 2018)
- In May 2017, a major hailstorm pummeled the area around San Felipe and Kewa pueblos and Interstate 25. Hail accumulated to several inches deep and strong winds with the hail produced damage to roofs, windows, and several vehicles. Hail up to the size of pennies was reported at La Cueva. More storms firing up around the Albuquerque metro area produced nickel to quarter size hail from Rio Rancho north into the Jemez Mountains. (NWS, 2018)
- In September 2017, dime to nickel size hail was reported at Jemez Pueblo, hail up to the size of pennies was reported in Rio Rancho, hail up to the size of slightly larger than a quarter was reported on the northwest edge of Enchanted Hills, and up to the size of pennies was reported near Northern and Rockaway in Rio Rancho. (NWS, 2018)
- In May 2018, a deep fetch of moisture surged north and west into New Mexico ahead of an upper level low pressure system approaching from Arizona. The combination of strong afternoon heating and moist instability allowed showers and thunderstorms to develop along the Continental Divide during the mid to late morning hours. Hail, high winds, and funnel clouds were reported along the Continental Divide before spreading northeastward into the Rio Grande Valley during the early afternoon which produced penny size hail near Southern Boulevard and Unser Boulevard in Rio Rancho. (NWS, 2018)
- In July 2018, Torrential rainfall near San Felipe and Kewa pueblos produced a flash flood that completely washed a section of track off a Rail Runner bridge and service was halted for a few days. Thunderstorms merged into the Albuquerque metro area and produced torrential rainfall, flash flooding, intense cloud to ground lightning strikes, and strong outflow winds. Several trees and at least one home were damaged by lightning strikes. (NWS, 2018)
- In July 2018, a back door cold front that surged southwest across New Mexico recharged low level moisture westward into the Rio Grande Valley. A dry slot rounding the northern periphery of the upper level high center over eastern Arizona forced much drier air into the northwest corner of the state. Significant moist instability within the Rio Grande Valley along the dryline-like boundary set the stage for thunderstorms over the Albuquerque metro area. The first storm developed around Santa Ana Pueblo and moved southeast across Placitas into the Albuquerque Foothills. Heavy rainfall, strong winds, and nickel to quarter size hail was reported with this storm. A second storm developed over Rio Rancho and moved southeast across the Albuquerque Valley producing significant amounts of penny to half dollar size hail. Also reported was nickel size hail at the Tamaya Resort. Another storm produced hail the size of quarters that fell in the area around La Cueva Lodge, hail up to the size of golf balls that slammed the area around Jemez Springs and Jemez Pueblo, and hail up to the size of quarters at Zia Pueblo. (NWS, 2018)

Probability and Magnitude

All of the Severe Weather hazards addressed in this section typically occur multiple times during any given year, although the frequency of damaging events may not be as often.

Extreme Temperatures – Extreme cold temperatures, if sustained, can prove to be dangerous and damaging, and especially when the thermometer starts dipping into the sub-zero range. Economic losses due to frozen crops, downed power lines, burst pipelines, and facility closures can be significant. Sustained conditions of freezing temperatures can also pose a dangerous health risk to people and their animals, and especially when overtaxed utility service providers go offline. Exposure to cold can cause frostbite or hypothermia and become life-threatening. When extreme cold temperatures are coupled with blowing winds, windchill effects are introduced that further increase the risk. The following chart, provided by the NWS, provides a way to adjust cold temperatures for the effects of wind chill:



On the other end of the spectrum, extreme heat is the result of very high temperatures that may or may not be coupled with exceptionally humid conditions, with their combined effect exceeding regionally based indices for perceived risk. According to the National Weather Service, heat is the leading weather-related killer in the United States and has killed more people than lightning, tornadoes, floods and hurricanes combined in the last 10 years. The major human risks associated with extreme heat are as follows:

- Heat Cramps: May occur in people unaccustomed to exercising in the heat and generally ceases to be a problem after acclimatization.
- Heat Syncope: This refers to sudden loss of consciousness and is typically associated with people exercising who are not acclimated to warm temperatures. Causes little or no harm to the individual.
- Heat Exhaustion: While much less serious than heatstroke, heat exhaustion victims may complain of dizziness, weakness, or fatigue. Body temperatures may be normal or slightly to moderately elevated. The prognosis is usually good with fluid treatment.

- Heatstroke: Considered a medical emergency, heatstroke is often fatal. It occurs when the body's responses to heat stress are insufficient to prevent a substantial rise in the body's core temperature. While no standard diagnosis exists, a medical heatstroke condition is usually diagnosed when the body's temperature exceeds 105°F due to environmental temperatures. Rapid cooling is necessary to prevent death, with an average fatality rate of 15% even with treatment.

One indicator of the degree of danger associated with extreme heat is the Heat Index (HI) or the "Apparent Temperature". According the NWS, the HI is an accurate measure of how hot it really feels when the Relative Humidity (RH) is added to the actual air temperature. The figure below is a quick reference chart published by the NWS that shows the HI based on current temperature and relative humidity, and levels of danger for HI values. It should be noted that the HI values were devised for shady, light wind conditions and that exposure to full sunshine can increase HI values by up to 15°F. Also, strong winds, particularly with very hot, dry air, can be deceivingly dangerous due to the rapid dehydration caused through the body's natural sweating process.

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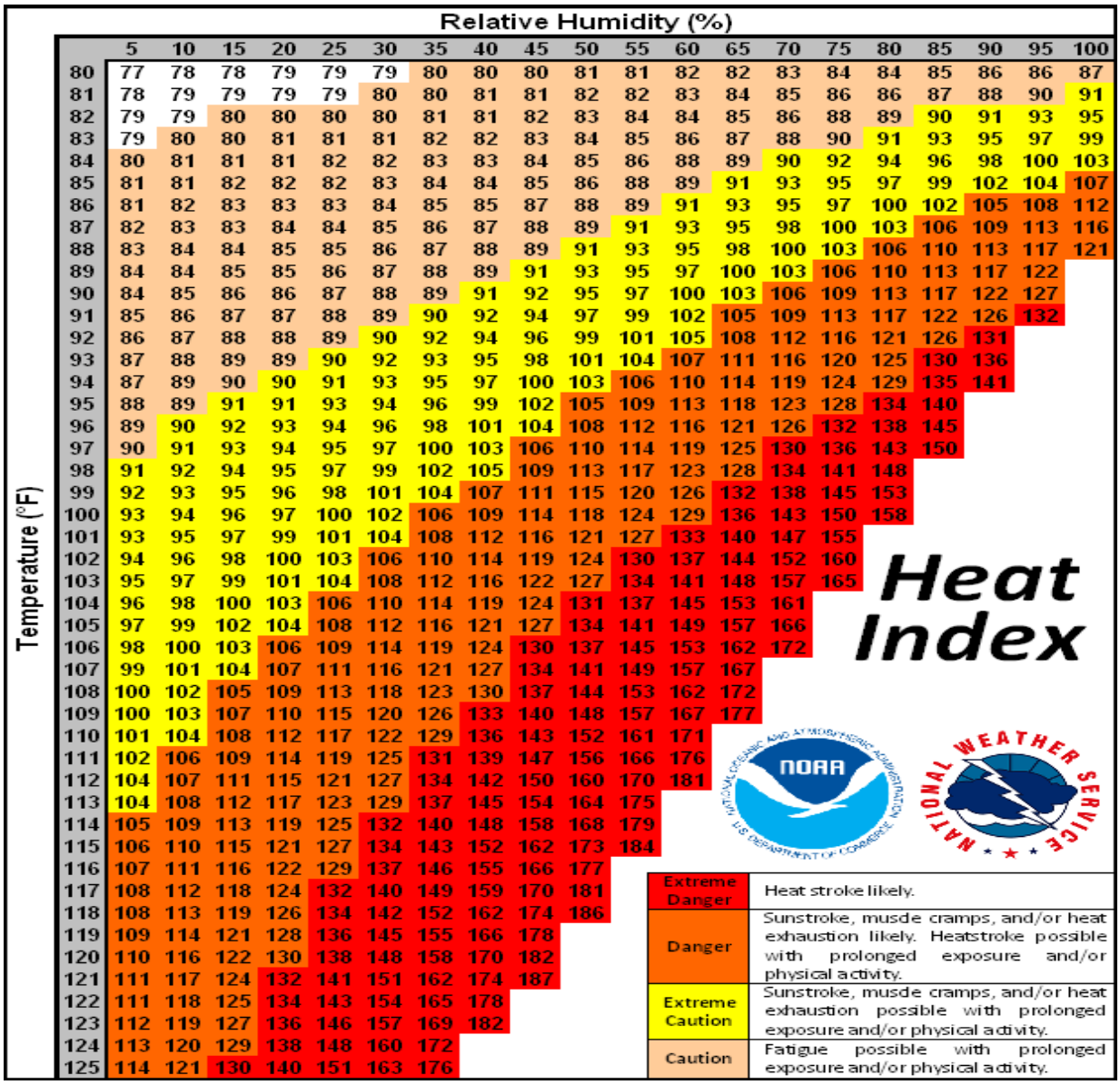

Temp (°F)	RH 5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100
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82	79	79	80	80	80	80	81	81	82	83	84	84	85	86	88	89	90	91	93	95
83	79	80	80	81	81	81	82	82	83	84	85	86	87	88	90	91	93	95	97	99
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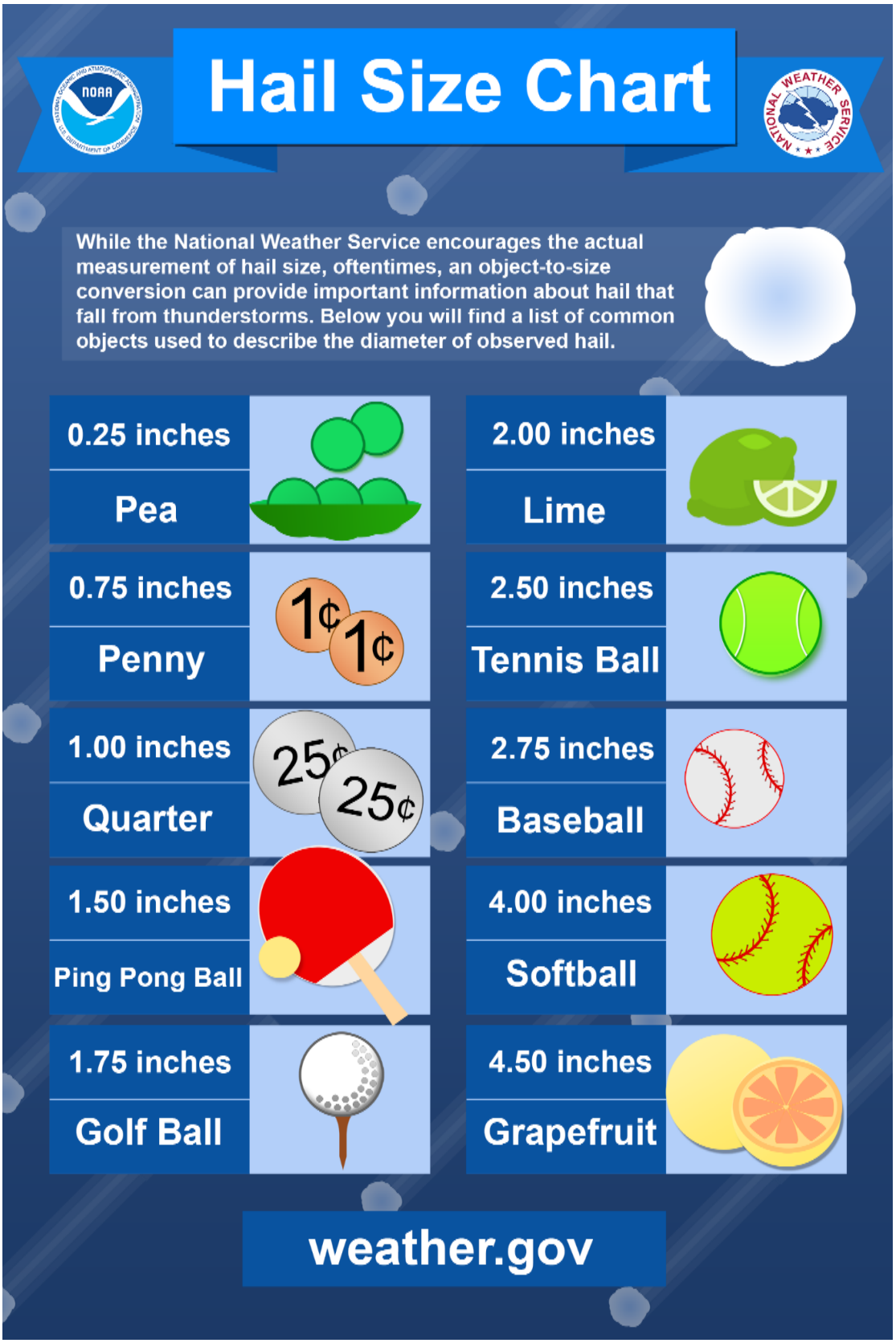
95	88	89	91	91	93	94	96	99	102	105	109	113	118	123	128	134	140			
96	89	90	92	93	94	96	98	101	104	108	112	116	121	126	132	138	145			
97	90	91	93	94	95	97	100	103	106	110	114	119	125	130	136	143	150			
98	91	92	94	95	97	99	102	105	109	113	117	123	128	134	141	148				
99	92	93	95	96	98	101	104	107	111	115	120	126	132	138	145	153				
100	93	94	96	97	100	102	106	109	114	118	124	129	136	143	150	158				
101	93	95	97	99	101	104	108	112	116	121	127	133	140	147	155					
102	94	96	98	100	103	106	110	114	119	124	130	137	144	152	160					
103	95	97	99	101	104	108	112	116	122	127	134	141	148	157	165					
104	96	98	100	103	106	110	114	119	124	131	137	145	153	161						
105	97	99	102	104	108	112	116	121	127	134	141	149	157	166						
106	98	100	103	106	109	114	119	124	130	137	145	153	162	172						
107	99	101	104	107	111	116	121	127	134	141	149	157	167							
108	100	102	105	109	113	118	123	130	137	144	153	162	172							
109	100	103	107	110	115	120	126	133	140	148	157	167	177							
110	101	104	108	112	117	122	129	136	143	152	161	171								
111	102	106	109	114	119	125	131	139	147	156	166	176								
112	104	107	111	115	121	127	134	142	150	160	170	181								
113	104	108	112	117	123	129	137	145	154	164	175									
114	105	109	113	119	125	132	140	148	158	168	179									
115	106	110	115	121	127	134	143	152	162	173	184									
116	107	111	116	122	129	137	146	155	166	177										
117	108	112	118	124	132	140	149	159	170	181										
118	108	113	119	126	134	142	152	162	174	186										
119	109	114	121	128	136	145	155	166	178											
120	110	116	122	130	138	148	158	170	182											
121	111	117	124	132	141	151	162	174	187											
122	111	118	125	134	143	154	165	178												
123	112	119	127	136	146	157	169	182												
124	113	120	129	138	148	160	172													
125	114	121	130	140	151	163	176													

Inspection of Figures 1-3, 1-4, 1-5, and 1-6 provides a depiction of the historic temperature extremes for the Corrales, Jemez Springs, Cuba, and Bernalillo Stations. Based on these data, it is reasonable to expect that similar temperature extremes within the seasons and locations depicted, are probable for these areas.

Hail – According to the 2018 State Plan (pg. 257), hail usually occurs during severe thunderstorms, and may also be accompanied by frequent lightning, flash flooding, strong winds, and potentially tornadoes. Hail size ranges from smaller than a pea to as large as a softball, and can be very destructive to buildings, vehicles and crops. Even small hail can cause significant damage to young and tender plants. Hail usually lasts an average of 10 to 20 minutes but may last much longer in some storms. The following chart depicts hail size and its comparable objects for proper size description.



Source: www.weather.gov; Accessed September 2018

Lightning – Lightning strikes occur routinely throughout the thunderstorm season and less frequently throughout the rest of the year, with an annual recurrence probability of 1.0 (100%). For the period of 2000-2009, Figure 3-6 depicts the mean annual flash density (reported in flashes per square kilometer per year) for the vicinity centered around Albuquerque (CIAMS, 2012). In the southern half of the County and especially along the Rio Grande valley, the flash densities are around 1.0 to 2.4 flashes per square kilometer per year. In the Jemez Mountains and the Valles Caldera area, the lightning densities range between 2.4 and 5.7 flashes per square mile per year.

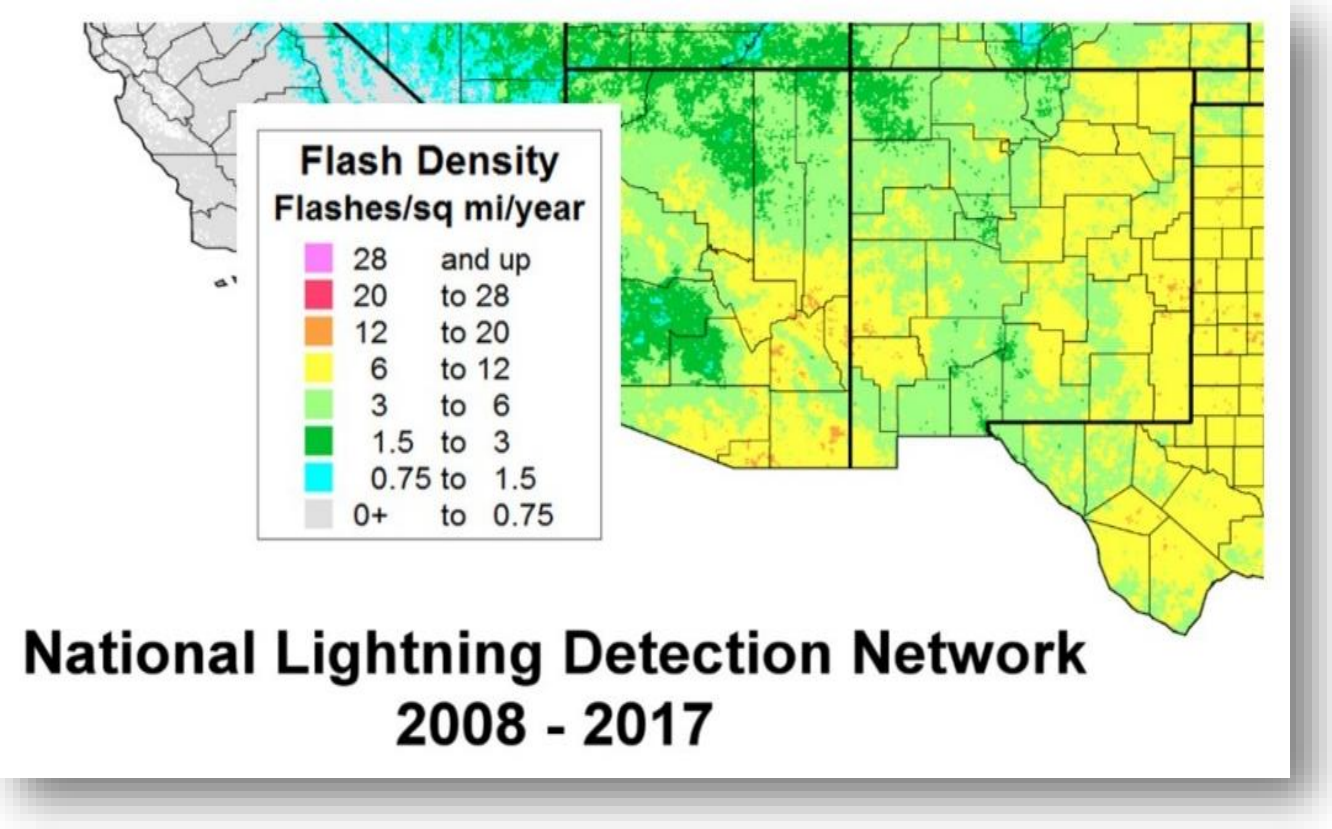
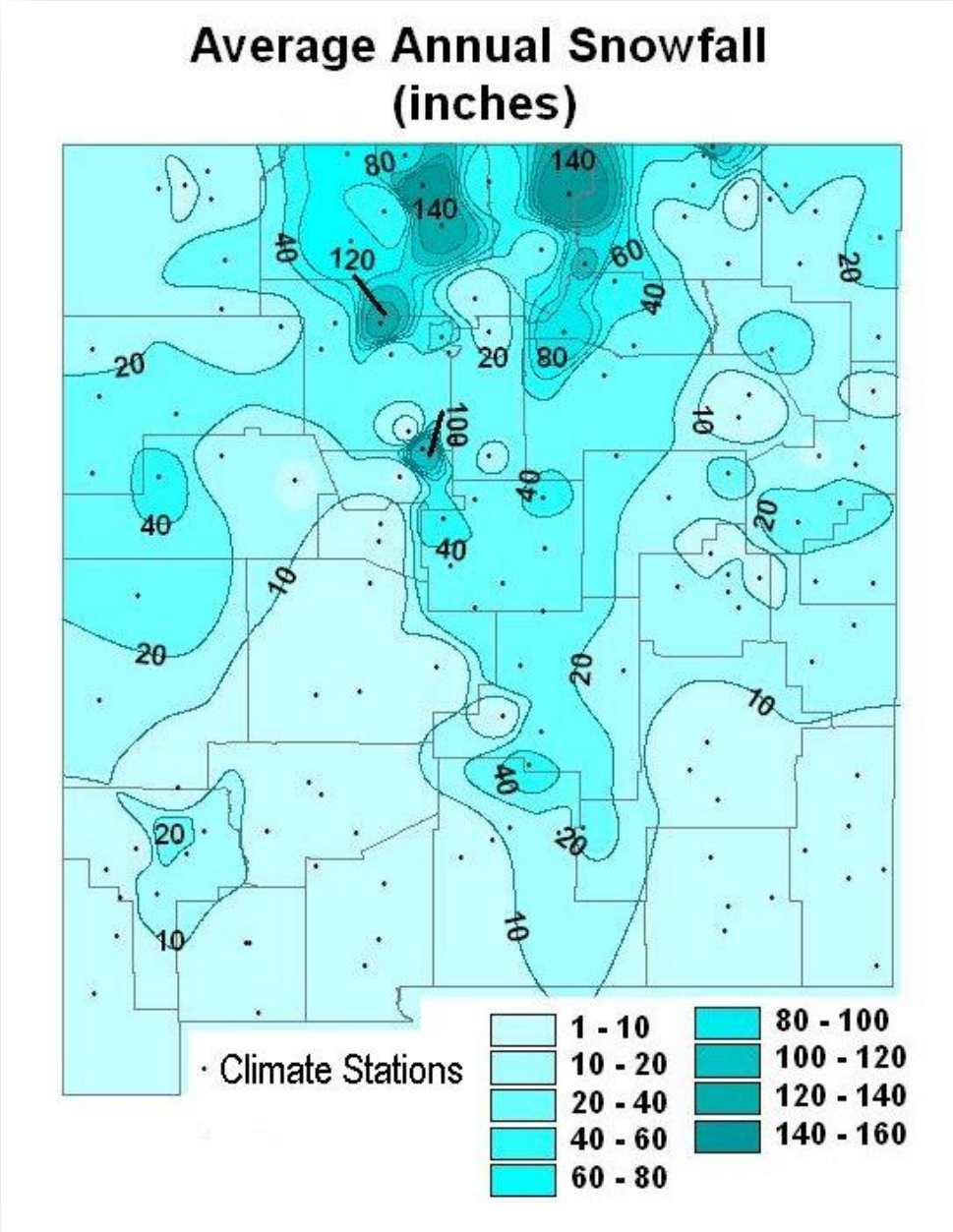


Figure 3-6: Lightning Flash Density Map

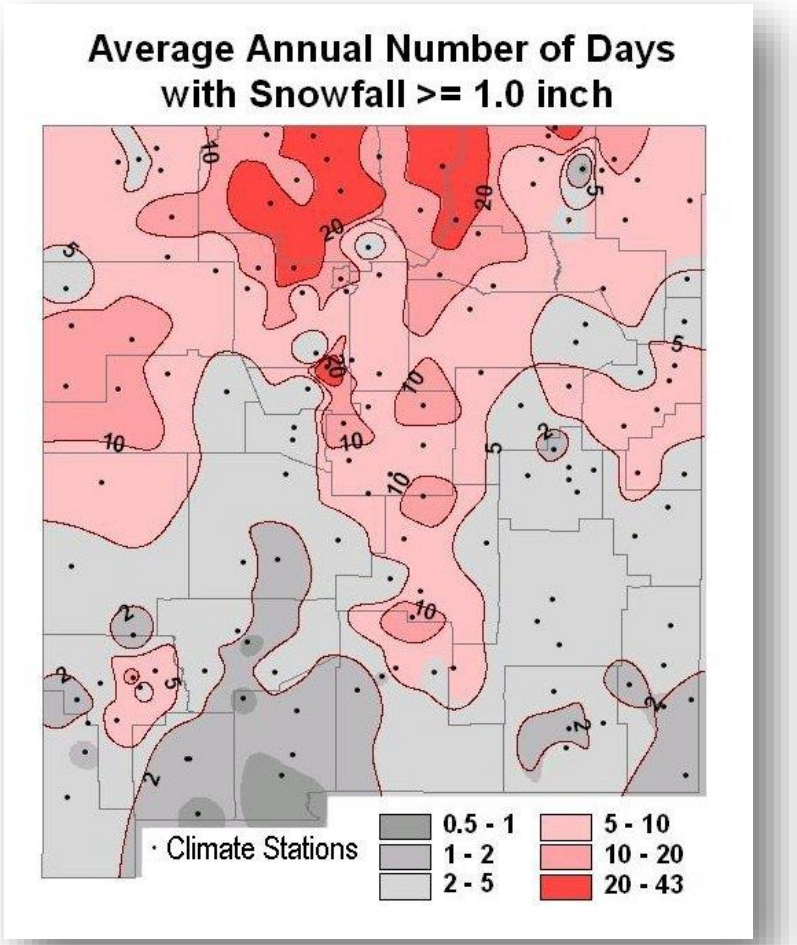
Source: https://www.weather.gov/images/safety/NLDN_CGFlash08-17-miles.png, August 2018

Winter Storms – Given the historic record, the probability of a winter storm occurring within the County is 100%. The magnitude of those storms will vary greatly with elevation and time of year. The National Weather Service Forecast Office in Albuquerque (ABQ-NWSFO) has compiled a series of snow climatology maps for the state. Figure 3-7 depicts the total average annual snowfall. Figures 3-8 and 3-9 depict the average annual number of days with snowfall that was greater than or equal to one and five inches, respectively.

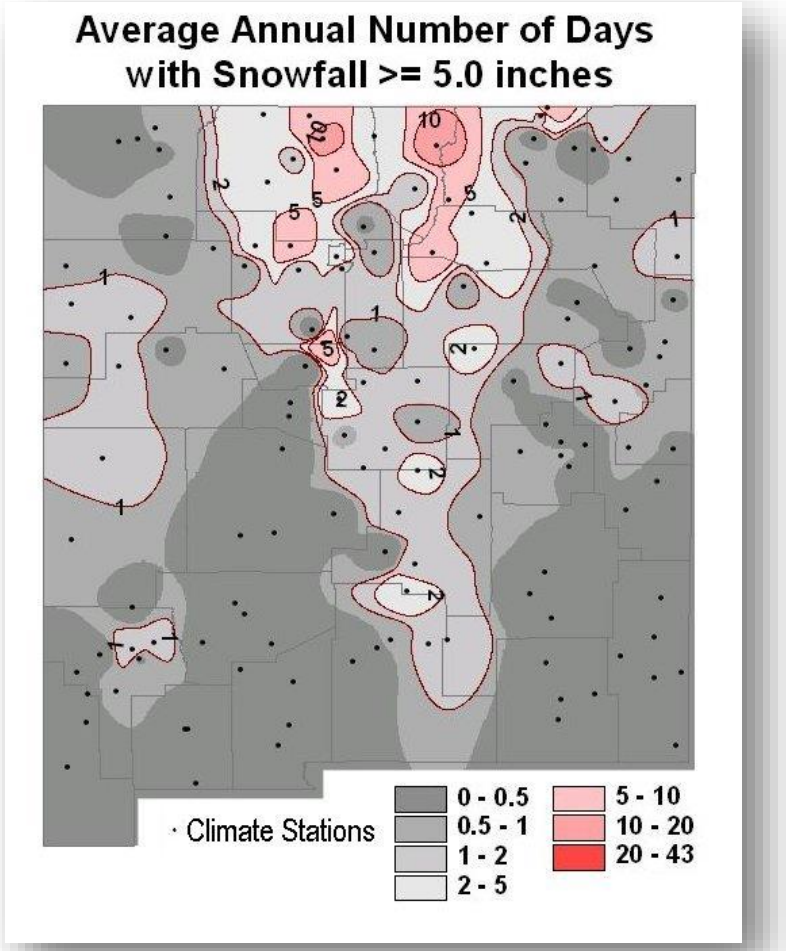


Source: https://www.weather.gov/abq/prepwinterwxclimo, August 2018

Figure 3-7: Average Annual Snowfall Map



Source: https://www.weather.gov/abq/prepwinterwxclimo, August 2018



Source: https://www.weather.gov/abq/prepwinterwxclimo, August 2018

Figures 3-8 and 3-9: Average Annual Number of Days with greater than 1.0 and 5.0 inches of snowfall

For Sandoval County, the higher elevation areas of the Jemez Mountains and Sandia Peak receive the greatest snowfall with approximately two to five plus days of over five inches of snowfall. The lower elevation areas along the Rio Grande valley and the southern half of the county are less likely to be impacted by heavy snows.

The ABQ-NWSFO issues winter weather products based on winter storm magnitude and intensity at various stages using what the ABQ-NWSFO calls a "Ready-Set-Go" concept. The "Ready" stage is anywhere from 24 to 72 hours before the impending weather event and highlights expected adverse winter weather conditions in the Hazardous Weather Outlook, which is issued daily and the primary product to be used for initial planning. The "Set" stage is 12 to 24 hours before the weather event, wherein a Winter Storm Watch highlighting the hazards and areas to be affected will be issued. Warnings and Advisories are issued during the "Go" stage, which is 6 to 24 hours before the onset of significant winter weather conditions. The following are descriptions of the winter weather products issued by ABQ-NWSFO:

- **Winter Storm Watch**: A watch is issued to give advance notice when a significant winter storm may affect your area within 12 to 48 hours. This would include any combination of significant snow or sleet accumulation, significant ice accretion, strong winds, extreme cold, low wind chills, or low visibilities in snow or blowing snow. A winter storm watch is issued when there is at least a 50/50 chance that warning criteria will be met. Usually the winter storm watch will be upgraded to a warning when the nature and location of the weather event become more apparent. In any case, when a watch is issued for your area, it is time to prepare for severe winter weather.
- **Winter Weather Advisory**: When a combination of snow, blowing snow, sleet, freezing rain or freezing drizzle is expected to cause localized disruption of travel and result in a significant inconvenience, a winter weather advisory will be issued. A winter weather advisory can address multiple winter weather hazards.
- **Winter Storm Warning**: When conditions that can quickly become life threatening and are more serious than an inconvenience are imminent or already occurring, a winter storm warning will be issued. Heavy snows, or a combination of snow, freezing rain or extreme wind chill due to strong wind, may bring widespread or lengthy road closures and hazardous travel conditions, plus threaten temporary loss of community services such as power and water. Deep snow and additional strong wind chill or frostbite may threaten even strong and well-dressed individuals or if exposed to the frigid weather for only a short period.
- **Blizzard Warning**: The most dangerous of all winter storms is the blizzard. In New Mexico, the northeast highlands and northeast plains are the most blizzard-prone areas where the deadly combination of fierce winds and snow can reduce visibility to near zero and create wind chills well below zero. A blizzard warning is issued when winds of 35 miles an hour will occur in combination with considerable falling and/or blowing snow for at least 3 hours. Visibilities will frequently be reduced to less than 1/4 mile and temperatures are usually 20 degrees Fahrenheit or lower.
- **Ice Storm Warning**: Ice storms leave a dangerous coating of ice, usually 1/4 inch or more. Ice storms are rare if not unheard of west of the Rio Grande Valley. However, across eastern New Mexico a mixture of freezing drizzle, freezing rain and light snow is not uncommon whenever arctic air masses invade the plains. In most cases, ice accumulations are less than 1/4 inch and a winter weather advisory is issued.
- **Wind Chill Warning**: Issued when the wind chill temperatures at or colder than minus 50 degrees F. At this level, frostbite can occur on exposed flesh within minutes. As the wind chill temperature drops, the frostbite time decreases, especially with higher wind speeds.

Vulnerability – CPRI Results

Severe Weather CPRI results for each community are summarized in Tables 3-10, 3-11, 3-12 and 3-13 below. Specific Pueblo information can be found in their respective Annex to this plan.

Table 3-10: CPRI results by jurisdiction for Severe Weather – Extreme Temperature

Participating Jurisdiction	Probability	Magnitude/ Severity	Warning Time	Duration	CPRI Score
Bernalillo, Town of	Highly Likely	Critical	12-24 hours	< 1 week	3.30
Corrales, Village of	Highly Likely	Limited	12-24 hours	< 1 week	3.00
Jemez Springs, Village of	Highly Likely	Limited	12-24 hours	> 1 week	3.10
Rio Rancho, City of	Likely	Limited	12-24 hours	< 1 week	2.55
San Ysidro, Village of	Highly Likely	Limited	12-24 hours	> 1 week	3.10
SSCAFCA	Possible	Limited	6-12 hours	< 1 week	2.25
Unincorporated Sandoval County	Likely	Limited	> 24 hours	< 1 week	2.40
				County-wide average CPRI =	**2.81**

Table 3-11: CPRI results by jurisdiction for Severe Weather – Hail

Participating Jurisdiction	Probability	Magnitude/ Severity	Warning Time	Duration	CPRI Score
Bernalillo, Town of	Highly Likely	Negligible	< 6 hours	< 6 hours	2.80
Corrales, Village of	Likely	Limited	< 6 hours	< 6 hours	2.65
Jemez Springs, Village of	Likely	Limited	< 6 hours	< 6 hours	2.65
Rio Rancho, City of	Likely	Limited	< 6 hours	< 6 hours	2.65
San Ysidro, Village of	Likely	Limited	< 6 hours	< 6 hours	2.65
SSCAFCA	Likely	Limited	< 6 hours	< 6 hours	2.65
Unincorporated Sandoval County	Highly Likely	Limited	< 6 hours	< 6 hours	3.10
				County-wide average CPRI =	**2.74**

Table 3-12: CPRI results by jurisdiction for Severe Weather – Lightning

Participating Jurisdiction	Probability	Magnitude/ Severity	Warning Time	Duration	CPRI Score
Bernalillo, Town of	Highly Likely	Negligible	< 6 hours	< 6 hours	2.80
Corrales, Village of	Likely	Limited	< 6 hours	< 6 hours	2.65
Jemez Springs, Village of	Highly Likely	Limited	< 6 hours	< 6 hours	3.10
Rio Rancho, City of	Highly Likely	Limited	6-12 hours	< 6 hours	2.95
San Ysidro, Village of	Highly Likely	Limited	< 6 hours	< 6 hours	3.10
SSCAFCA	Highly Likely	Critical	< 6 hours	< 6 hours	3.40
Unincorporated Sandoval County	Highly Likely	Negligible	< 6 hours	< 6 hours	2.80
				County-wide average CPRI =	**2.97**

Table 3-13: CPRI results by jurisdiction for Severe Weather – Winter Storm

Participating Jurisdiction	Probability	Magnitude/ Severity	Warning Time	Duration	CPRI Score
Bernalillo, Town of	Likely	Limited	> 24 hours	< 1 week	2.40
Corrales, Village of	Likely	Critical	12-24 hours	< 1 week	2.85
Jemez Springs, Village of	Likely	Limited	12-24 hours	< 1 week	2.55
Rio Rancho, City of	Likely	Limited	12-24 hours	< 1 week	2.55
San Ysidro, Village of	Likely	Limited	12-24 hours	< 1 week	2.55
SSCAFCA	Likely	Limited	12-24 hours	< 24 hours	2.45
Unincorporated Sandoval County	Highly Likely	Limited	12-24 hours	< 1 week	3.00
				County-wide average CPRI =	**2.62**

Vulnerability – Loss Estimations

In general, no quantitative estimations of potential losses will be made for Severe Weather events will be made in this Plan. Instead, the following paragraphs are general qualitative discussions of loss potential for each of the sub-hazards.

Extreme Temperature – Facility and infrastructure losses due to extreme temperatures are usually limited to agricultural and landscape products, water delivery systems and other wet utilities, and are relatively small when compared to other natural hazards. The greater impacts of extreme temperatures are the human and animal losses. There is at least one death associated with extreme cold exposure for the county, and there is certainly a potential for others. Indirect losses such as increased heating/cooling costs, power and heating delivery system overloads, and lost revenues due to operational shut downs all contribute to the economic impacts.

Hail – As previously stated, economic impacts and losses due to hail damage are significant both in Sandoval County and statewide. In one October 2010 incident, nearly 90% of the Kewa Pueblo's 600 homes sustained some level of damage, with the residents of 20 homes requiring evacuation. The property and crop damages associated with that single event were estimated to exceed $2 million. Deaths or injuries associated with hailstorms in the Sandoval County area are rare. Accordingly, any hail incident with quarter size or larger hailstones can cause significant damages with multi-million dollar losses, and especially within populated areas or sub-standard housing areas. Deaths or injuries are possible, but not probable.

Lightning – Facility and infrastructure losses due to lightning strikes are typically isolated to single structures and can sometimes be significant depending on the systems impacted and damages caused. Often, lightning strikes on structures result in significant damages to the electrical systems and electronics, and occasionally ignite structure fires. The greater impacts are the human losses in the forms of injury and death. Historically, there has been at least one lightning caused fatality and seven injuries in the County. It is probable that future death and/or injuries may result from lightning strikes.

Winter Storm – Losses due to winter storms for the majority of Sandoval County are typically attributed to traffic accidents and the impacts of the storms on the human population in the form of school and business closures, as well as the threat of exposure to frostbite and hypothermia. The only winter storm related death was due to a traffic accident. In the northern and higher elevation areas of the county, losses due to downed power lines, falling tree limbs, and the potential for structural collapse due to heavy snow loads are more possible.

Vulnerability – Development Trends

Growth within Sandoval County and the participating jurisdictions will increase the exposure to Severe Weather events. Practical use and enforcement of modern building codes and continuous public education regarding the dangers of the Severe Weather hazards and protection from the hazards will go a long ways towards providing effective mitigation for Severe Weather events. Organizations with greater exposure and resources may look at installing surplus fuel storage tanks and backup power generation equipment.

Vulnerability – Jurisdictional Summary

As discussed in the sections above, there are geographical variations of exposure to the Severe Weather hazards evaluated in this Plan. A crosswalk providing a brief summary of the Severe Weather hazards by jurisdiction and composite hazard vulnerability rating is summarized in Table 3-14. Specific Pueblo information can be found in their respective Annex to this plan.

Table 3-14: Severe Weather vulnerability rating crosswalk

Jurisdiction	Vulnerability Rating					Mitigation Priority?	Notes
	Extreme Temp.	Hail	Lightning	Winter Storm	COMPOSITE		
Bernalillo	Moderately Low	Moderate	Moderate	Moderately Low	Moderate	Yes	Bernalillo is exposed to moderately low to moderate severe Weather hazards, however, the Town's population and CFI keep its vulnerability at a moderate level.
Corrales	Moderately Low	Moderate	Moderate	Moderately Low	Moderate	Yes	Corrales is exposed to moderately low to moderate Severe Weather hazards, however, the Village's population and CFI keep its vulnerability at a moderate level.
Jemez Springs	Moderate	Moderate	Moderately High	High	Moderately High	Yes	Jemez Springs is geographically exposed to higher levels of Severe Weather hazard primarily due to its elevation and location within Jemez Mountains. This elevated exposure coupled with the remoteness of the Village, elevate its vulnerability to moderately high.
Rio Rancho	Moderately Low	Moderate	Moderate	Moderate	Moderate	Yes	Rio Rancho is exposed to moderately low to moderate Severe Weather hazards, however, the City's population and CFI keep its vulnerability at a moderate level.
San Ysidro	Moderate	Moderate	Moderately High	Moderate	Moderate	Yes	San Ysidro is exposed to moderate to moderately high Severe Weather hazards given its slightly higher elevation and location within the County. The slightly elevated exposure combined with the Village's remote location and small population keep its vulnerability at a moderate level.
SSCAFCA	Nuisance	Nuisance	Nuisance	Nuisance	Nuisance	No	Very few SSCAFCA facilities are vulnerable to damage or loss due to Severe Weather events except from an operational perspective, and then only at a nuisance vulnerability. Accordingly, SSCAFCA does not consider this hazard to be a mitigation priority.

Table 3-14: Severe Weather vulnerability rating crosswalk							
	Vulnerability Rating						
Jurisdiction	Extreme Temp.	Hail	Lightning	Winter Storm	COMPOSITE	Mitigation Priority?	Notes
Unincorporated Sandoval County	Moderate to High	Moderate	Moderate to High	Moderate to High	Moderate	Yes	The exposure to Severe Weather hazards county-wide varies geographically, however, the populated areas of Unincorporated Sandoval County are primarily considered to be, on average, at a moderate level of vulnerability.

Sources

FEMA, 1997, *Multi-Hazard Identification & Risk Assessment – A Cornerstone of the Nat'l Mitigation Strategy*.

New Mexico Department of Homeland Security and Emergency Management, 2018, *New Mexico Natural Hazard Mitigation Plan*.

Western Regional Climate Center, URL: http://www.wrcc.dri.edu/cgi-bin/cliMAIN.pl?nm8535

National Weather Service, Albuquerque Office, 2007-2018 Sandoval County Storm Data: Document located in Appendix F

Profile Maps – See the preceding figures and maps for hazard profile information. No additional mapping is provided. Specific Pueblo information can be found in their respective Annex to this plan.

3.3.5 Severe Wind

Description

The hazard of severe wind encompasses all climatic events that produce damaging winds. For Sandoval County, severe winds usually result from either extreme pressure gradients that can occur at any time of year, but are most common during the late fall, early winter and spring, or from winds that accompany 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 thunderstorms reaches the mature stage, traveling parallel to the ground surface at speeds of 75 mph or higher. These winds are frequently responsible for generating dust storms and sand storms, reducing visibility and creating hazardous driving conditions.

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

History

In reality, strong winds are a way of life for many areas of the County and severe wind events occur on a regular basis and especially during the spring and early summer months. These events do not always have reported damages however.

The following are examples of significant severe wind events that have occurred in the last ten years:

- In May 2008, cold air aloft associated with a large upper low over the Great Basin provided sufficient instability to create severe thunderstorm wind (MG 55 kt). (NWS, 2018)
- In April 2010, a windstorm/duststorm with sustained wind speeds of 35-45 MPH and a peak gust of 63 MPH hit the Rio Rancho area. There was much in the way of minor damages to trees and fences. A 99 mph peak wind gust was recorded at Sandia Crest. (City of Rio Rancho, 2012; NCDC, 2012).
- In June 2010, several reports of high winds across the Albuquerque Metro Area were reported as the east winds raced through the gaps of the central mountain chain. In the Albuquerque Foothills, winds were estimated around 70 mph, which blew down a fence, broke numerous

large branches, and uprooted at least two trees. Roof shingle damage also occurred to numerous houses in the foothills. A 60 mph gust was measured just west of Placitas. (NCDC, 2012).

- In October 2010, a lone severe thunderstorm developed near San Felipe Pueblo and moved east-southeast along the East Mountains producing wind in San Felipe and Placitas, which blew down tree limbs greater than two inches in diameter. (NWS, 2018)
- In August 2012, San Felipe Pueblo reported severe winds that were estimated at 60mph which greatly decreased visibility along Interstate 25. (NWS, 2018)
- In October 2014, a passing virga shower produced a severe wind gust to 58 mph near Santa Ana Pueblo and severe wind gusts up to 66 mph near Placitas. (NWS, 2018)
- In June 2016, a round of strong storms late in the day developed in the Rio Grande Valley. Hail, high winds, and heavy rainfall were reported around the Albuquerque Metro Area and a public weather station at Highway 528 and Northern Blvd. reported a peak wind gust of 60mph. There was also a short-lived dust devil wreaked havoc in Rio Rancho where a spotter reported that a dust devil tore through the backyard and destroyed a fence with four inch posts and estimated the wind speeds as high as 55 mph. (NWS, 2018)
- In July 2017 a brief landspout tornado developed just west of Interstate 25 north of the drainage that runs through San Felipe Pueblo. No damage, injuries, or fatalities were reported and it lasted for approximately four tenths of a mile. (National Weather Service, 2018; accessed October 2018 from https://www.weather.gov/abq/cli_torns)
- In May 2018 a Skywarn Observer spotted a funnel cloud near Bandelier National Monument that briefly made contact with the ground as noted by surface dust swirls. No damage, injuries, or fatalities were reported and it lasted for about 3.8 miles with a maximum width of 20 yards. (NWS, 2018; accessed October 2018 from https://www.weather.gov/abq/cli_torns)

Figure 3-10 presents a depiction of historic severe wind incident locations as reported to the National Weather Service the period of 1997 to 2017. It is noted that this map is only intended to provide a visual view of incident locations, as provided in the NWS database, and is not intended to represent a predictive tool. There is insufficient data to establish any significant patterns or areas of increased risk due to high wind events.

Probability and Magnitude

Many severe wind events are associated with thunderstorms. The probability of a severe thunderstorm occurring with high velocity winds increases as the average duration and number of thunderstorm events increases. The average duration of thunderstorms in Sandoval County ranges from 30 to 60 minutes with approximately 40 events per year and most concentrated during the May to August timeframe.

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

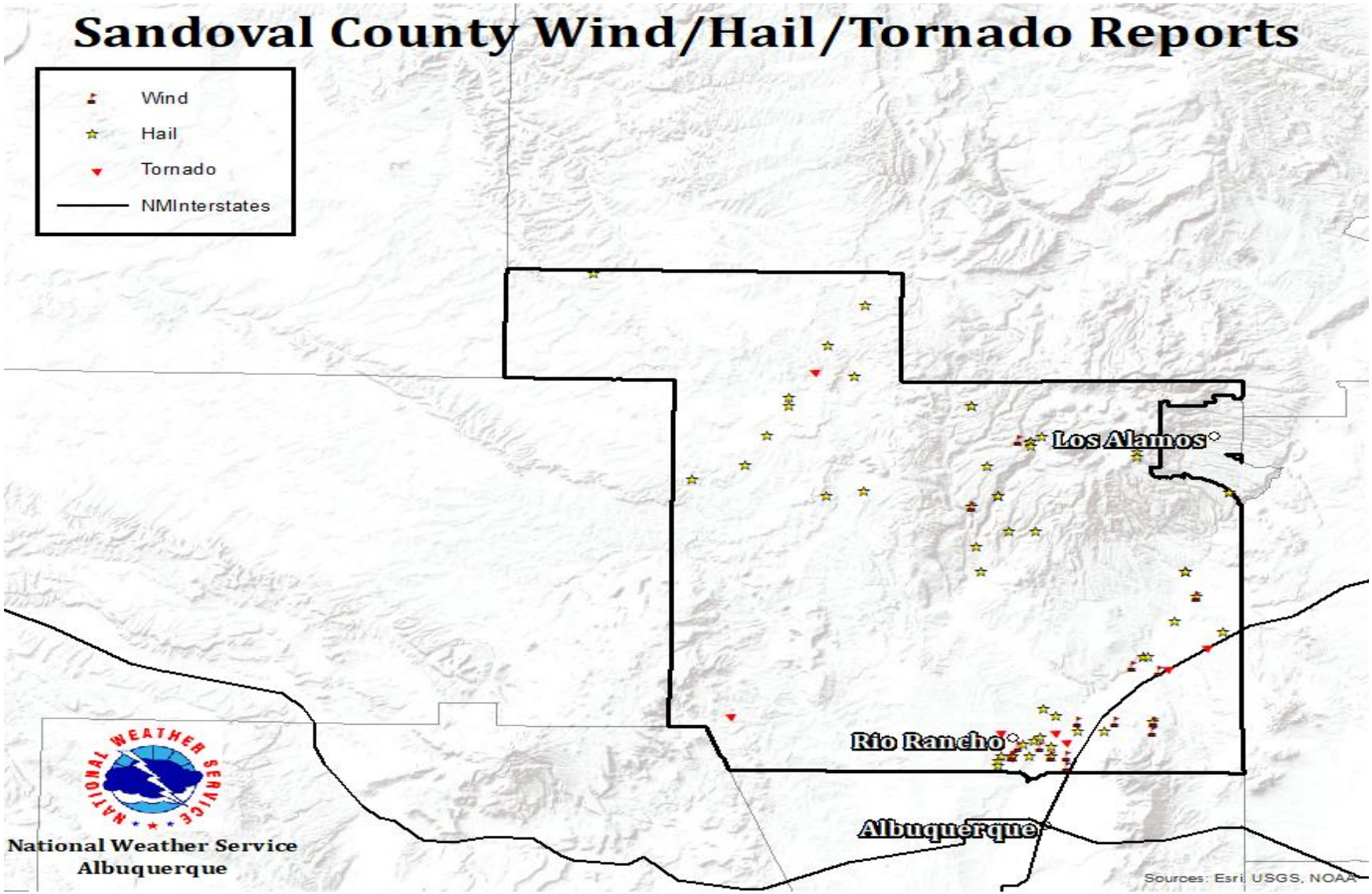
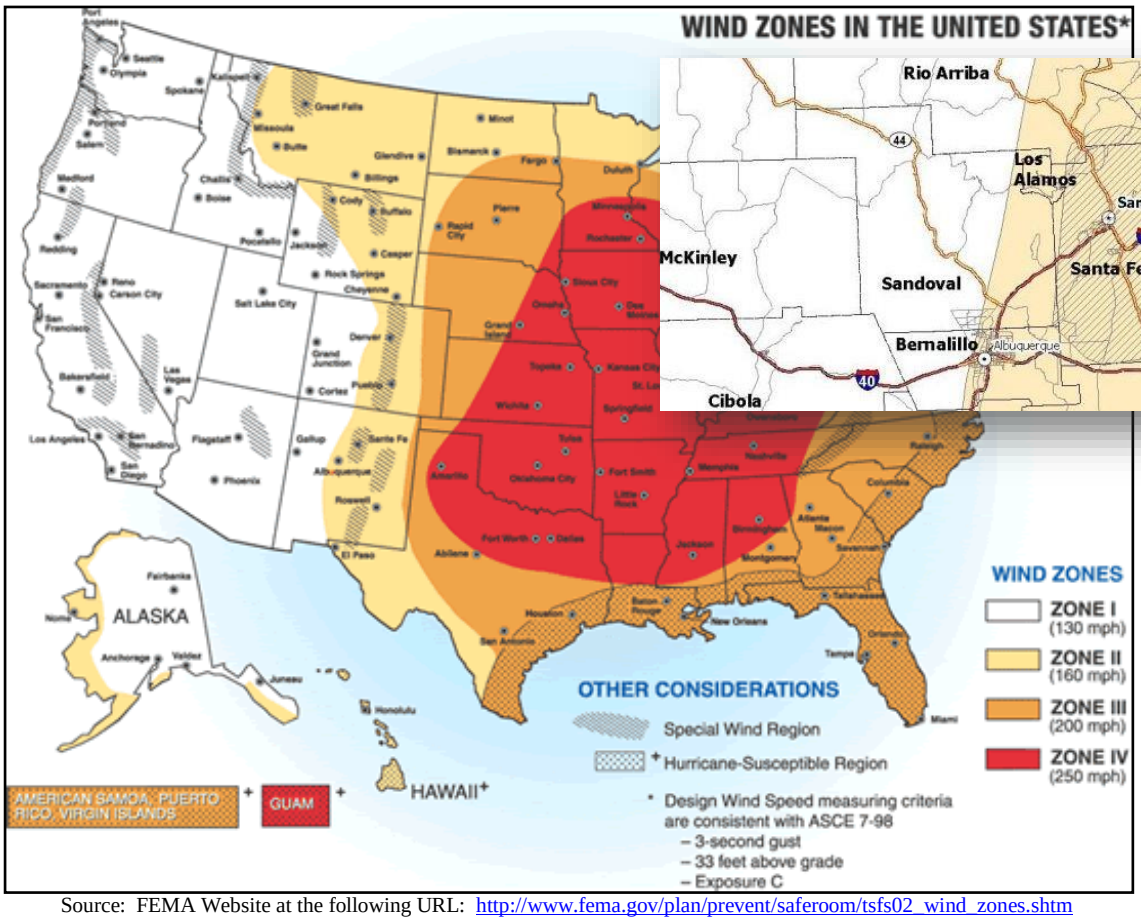


Figure 3-10: Map of Severe Wind events for Sandoval County

The American Society of Civil Engineers (ASCE) has identified a 3-second wind gust speed as the most accurate measure for identifying the potential for damage to structures. The 3-second wind gust criteria is recommended as a normal wind loading design standard. All of Sandoval County is designated with a standard design 3-second gust wind speed of 90 mph, indicating relatively low levels of risk from severe winds (ASCE, 1999). FEMA has taken the work from ASCE and further identified wind speed zones for use in designing community shelters and safe-rooms that can withstand tornado and hurricane winds. Sandoval County is split between Zone I and Zone II, as illustrated in Figure 3-11. In these zones, a design wind speed of 130 mph is recommended for the design and construction of community shelters in the western two-thirds of the county and 160 mph in the eastern third.



Source: FEMA Website at the following URL: http://www.fema.gov/plan/prevent/saferoom/tsfs02_wind_zones.shtm
INSET: NMDHSEM, 2018

Figure 3-11: Illustration of FEMA Wind Zones

The Beaufort Wind Scale, indicated by Table 3-15, provides a measure of wind magnitude versus expected damages. The Beaufort scale is useful because it specifically addresses wind effects over land based on wind speed. Wind speeds in the Beaufort Number 10-11 range annually impact the County. On rare occasions, wind gusts in the County can creep into the low end of the Beaufort Number 12 category.

Table 3-15: Beaufort Scale

Beaufort grade	Kind of wind	Knots		km/h		Effects		Height of waves (metre)
		Min	Max	Min	Max	Earth	Sea	
0	Calm	<1		<1		Smoke rises vertical	Flat sea	-
1	Very light	1	3	1	5	The wind bends smoke	Small ripples with no white foamy crests.	0.1
2	Light breeze	4	6	6	11	It can be felt on face	Small wavelets, with unbroken crests.	0.2 - 0.3
3	Gentle breeze	7	10	12	19	It shakes leaves	Very small crests; crests begin to break.	0.6 - 1
4	Moderate breeze	11	16	20	28	It lifts dust and papers	Small waves that begin to grow longer; spuma più frequente e più evidente.	1 - 1.5
5	Fresh breeze	17	21	29	38	It shakes branches	Moderate waves that grow longer in shape; possible spray.	2 - 2.5
6	Strong breeze	22	27	39	49	It shakes big branches	Bigger waves; white foamy crests are longer everywhere.	3 - 4
7	Near gale	28	33	50	61	It impedes walking	The sea swells up; white foam forms when waves break up.	4 - 5.5
8	Gale	34	40	62	74	It shakes big trees	Medium-high, longer waves; crests start to break up in sprays.	5.5 - 7.5
9	Strong gale	41	47	75	88	Chimney pots and slated removed	High waves; tight strips of foam form in the direction of the wind.	7 - 10
10	Storm	48	55	89	102	It uproots trees	Very high waves with long crests; the sea looks completely white; waves fall down violently, visibility is reduced.	9 - 12.5
11	Violent storm	56	63	103	117	Serious devastation	Exceptionally high waves (small and medium tonnage ships disappear for a few seconds); visibility is still more reduced.	11.5 - 16
12	Hurricane	>64		>118		Very serious catastrophes	Air is filled with foam and sprays; sea is completely white because of foam; visibility is greatly reduced.	>14

Based on historic records, the likelihood of tornados occurring in Sandoval County is probable, but rare. Tornado damage severity is measured by the Enhanced Fujita Tornado Scale, which assigns a numerical value of 0 to 5 based on wind speeds, as shown in figure below:

Scale	Wind speed		Relative frequency	Potential damage	
	mph	km/h			
EF0	65–85	105–137	53.5%	Minor damage. Peels surface off some roofs; some damage to gutters or siding; branches broken off trees; shallow-rooted trees pushed over. Confirmed tornadoes with no reported damage (i.e., those that remain in open fields) are always rated EF0.	
EF1	86–110	138–178	31.6%	Moderate damage. Roofs severely stripped; mobile homes overturned or badly damaged; loss of exterior doors; windows and other glass broken.	
EF2	111–135	179–218	10.7%	Considerable damage. Roofs torn off well-constructed houses; foundations of frame homes shifted; mobile homes completely destroyed; large trees snapped or uprooted; light-object missiles generated; cars lifted off ground.	
EF3	136–165	219–266	3.4%	Severe damage. Entire stories of well-constructed houses destroyed; severe damage to large buildings such as shopping malls; trains overturned; trees debarked; heavy cars lifted off the ground and thrown; structures with weak foundations blown away some distance.	
EF4	166–200	267–322	0.7%	Extreme damage to near-total destruction. Well-constructed houses and whole frame houses completely leveled; cars thrown and small missiles generated.	
EF5	>200	>322	<0.1%	Massive Damage. Strong frame houses leveled off foundations and swept away; steel-reinforced concrete structures critically damaged; high-rise buildings have severe structural deformation. Incredible phenomena will occur.	

Vulnerability – CPRI Results

Severe Wind CPRI results for each community are summarized in Table 3-16 below.

Specific Pueblo information can be found in their respective Annex to this plan.

Table 3-16: CPRI results by jurisdiction for Severe Wind

Participating Jurisdiction	Probability	Magnitude/ Severity	Warning Time	Duration	CPRI Score
Bernalillo, Town of	Highly Likely	Limited	12-24 hours	< 24 hours	2.90
Corrales, Village of	Highly Likely	Critical	12-24 hours	< 1 week	3.30
Jemez Springs, Village of	Likely	Critical	< 6 hours	< 6 hours	2.95
Rio Rancho, City of	Highly Likely	Limited	12-24 hours	< 1 week	3.00
San Ysidro, Village of	Highly Likely	Critical	< 6 hours	< 6 hours	3.40
SSCAFCA	Highly Likely	Critical	12-24 hours	< 24 hours	3.20
Unincorporated Sandoval County	Likely	Limited	12-24 hours	< 6 hours	2.35
				County-wide average CPRI =	**3.01**

Vulnerability – Loss Estimations

The entire county is assumed to be equally exposed to the damage risks associated with severe winds, although there is a minor distinction between the western and eastern portions of the county regarding design wind loads for saferooms and community shelters. Incidents are typically localized and damages associated with individual events are usually minor unless the event occurs within a densely populated area. It is likely that the losses due to severe wind events are under-reported/documented. Of the total events documented, there were no deaths and only a few injuries reported. No estimates of losses for individual jurisdictions are made due to the lack of discrete data. All facilities within Sandoval County are vulnerable to wind damage, but due to the nature of wind events there is not a specific hazard area identified for severe wind.

Vulnerability – Development Trend Analysis

Future development will expand the exposure of life and property to the damaging effects of severe wind events. Enforcement and/or implementation of modern building codes to regulate new developments in conjunction with public education on how to respond to severe wind conditions are arguably the best way to mitigate against losses. There is no geographical significance in the available data and individual jurisdictional assessments are not warranted.

Vulnerability – Jurisdictional Summary

As demonstrated in the previous discussions, there is little geographic difference in the severity of exposure to Severe Wind within the County and especially within the populated areas of the County. Accordingly, all of the participating jurisdictions except SSCAFCA is considered to be equally vulnerable to the hazard of Severe Wind, as summarized by the crosswalk in Table 3-17. Pueblo information can be found in their respective Annexes to this plan.

For the most part, SSCAFCA facilities and infrastructure are not greatly impacted by Severe Wind events, and therefore, their vulnerability is considered to be Low. For the rest of the participating jurisdictions, the given history of Severe Wind events and associated damages would indicate a county-wide vulnerability that is considered to be Moderate. Accordingly, Severe Wind is a mitigation priority for all participating jurisdictions except SSCAFCA. Specific Pueblo information can be found in their respective Annex to this plan.

Table 3-17: Vulnerability crosswalk for severe wind

Jurisdiction	Vulnerability Rating	Mitigation Priority?	Notes
Bernalillo, Corrales, Jemez Springs, Rio Rancho, San Ysidro, Unincorporated Sandoval County	Moderate	Yes	There is no significant geographic variability in the severity or probability of Severe Wind events within the populated areas of the County. Since Severe Wind events primarily impact buildings and above ground structures, all of the listed jurisdictions are considered to be equally vulnerable.
SSCAFCA	Nuisance	No	SSCAFCA facilities are vulnerable to Severe Wind events at a nuisance level only, as such SSCAFCA does not consider this hazard to be a mitigation priority.

Sources

American Society of Civil Engineers, 1999, *ASCE 7-98: Minimum Design Loads for Buildings and Other Structures*.

Federal Emergency Management Agency, 1997, *Multi-Hazard Identification and Risk Assessment – A Cornerstone of the National Mitigation Strategy*.

U.S. Dept. of Commerce, National Climatic Data Center, 2018, Storm Events Database, accessed via the following URL: http://www.ncdc.noaa.gov/stormevents/

U.S. Dept. of Commerce, NOAA National Weather Service, Storm Prediction Center, SVRGIS database, accessed at the following URL: http://www.spc.noaa.gov/gis/svrgis/

Profile Maps

See Figures 3-10 and 3-11. Specific Pueblo information can be found in their respective Annex to this plan.

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3.3.6 Wildfire

Description

A wildfire is an uncontrolled fire spreading through vegetative fuels, exposing and possibly consuming structures. They often begin unnoticed, spread quickly, and are usually signaled by dense smoke. Wildfires can be human-caused through acts such as arson, unattended campfires, or the improper burning of debris, or even an errant cigarette butt. Naturally sparked wildfires are usually caused by lightning. Wildfires can be categorized into four types:

- ***Wildland fires*** occur mainly in areas under federal control, such as national forests and parks, and are fueled primarily by natural vegetation. Generally, development in these areas is nonexistent, except for roads, railroads, power lines, and similar features.
- ***Interface or intermix fires*** occur in areas where both vegetation and structures provide fuel. These are also referred to as urban-wildland interface fires.
- ***Firestorms*** occur during extreme weather (e.g., high temperatures, low humidity, and high winds) with such intensity that fire suppression is virtually impossible. These events typically burn until the conditions change or the fuel is exhausted.
- ***Prescribed fires and prescribed natural fires*** are intentionally set or natural fires that are allowed to burn for beneficial purposes.

The following three factors contribute significantly to wildfire behavior and, as detailed more fully later, can be used to identify wildfire hazard areas:

- ***Topography***: As slope increases, the rate of wildfire spread increases. South facing slopes are also subject to greater solar radiation, making them drier and thereby intensifying wildfire behavior. However, ridgetops may mark the end of wildfire spread, since fire spreads more slowly or may even be unable to spread downhill.
- ***Fuel:*** Wildfires spread based on the type and quantity of available flammable material, referred to as the fuel load. The basic characteristics of fuel include size and shape, arrangement and moisture content. Each fuel is assigned a burn index (the estimated amount of potential energy released during a fire), an estimate of the effort required to contain a wildfire, and an expected flame length.
- ***Weather:*** The most variable factor affecting wildfire behavior is weather. Important weather variables are temperature, humidity, wind, and lightning. Weather events ranging in scale from localized thunderstorms to large fronts can have major effects on wildfire occurrence and behavior. Extreme weather, such as high temperatures and low humidity, can lead to extreme wildfire activity. By contrast, cooling and higher humidity often signals reduced wildfire occurrence and easier containment. Wind has probably the largest impact on a wildfire's behavior, and is also the most unpredictable. Winds supply the fire with additional oxygen, further dry potential fuel, and push fire across the land at a quicker pace.

The frequency and severity of wildfires is also impacted by other hazards, such as lightning, drought, and infestations (e.g., Pine Bark Beetle, Salt Cedar and Buffelgrass). These hazards combine with the three other wildfire contributors noted above (topography, fuel, weather) to present an on-going and significant hazard across much of New Mexico.

If not promptly controlled, wildfires may grow into an emergency or disaster. Even small grass fires can threaten lives, resources, and destroy improved properties. It is also important to note that in addition to affecting people, wildfires may severely affect livestock, pets, wildland animals, and aquatic habitat. Such events may require the emergency watering/feeding, shelter, evacuation, and increased event-caused deaths and burying of animals.

The indirect effects of wildfires can also be catastrophic. In addition to stripping the land of vegetation and destroying forest resources, large, intense fires can harm the soil, waterways and the land itself. Soil exposed to intense heat may lose its capacity to absorb moisture and support life. Exposed soils erode quickly and the resulting siltation of rivers and streams only enhances flood potential, harms aquatic life and degrades water quality. Steep lands stripped of vegetation are also subject to increased landslide hazards.

History

According to the 2012 Sandoval County Community Wildfire Protection Plan (CWPP), the last 40 years (1970–2010) has seen 188 wildfires on record that were greater than 100 acres in size within the County. Thirty-five fires on record grew to greater than 1,000 acres, including the Porter, La Mesa, Dome, Stable, Lakes, Cerro Grande, and Las Conchas fires. Fires that have occurred in the last ten years are described below in chronological order:

- In July 2009, the San Miguel Fire was ignited by lightning and burned an area 13 miles south of Los Alamos, New Mexico. The fire burned a total of 1,635 acres. (NWGC, 2011).
- In June 2010, the Rio Fire was ignited by humans and burned approximately 1,356 acres located off of Jemez Road, one-half mile southwest of Fenton Lake. There were four firefight related injuries. (NWCG, 2011).
- In October 2010, the Virgin Canyon Fire was ignited by lightning and burned a total of 1,706 acres near Jemez Springs, New Mexico. The fire destroyed two outbuildings. (NWCG, 2011).
- In June 2011, the Las Conchas wildfire was ignited when a tree fell on a power line 12 miles southwest of Los Alamos. The fire quickly spread eastward under windy and unstable conditions, covering more than 40,000 acres the first day. In total, the fire burned approximately 156, 593 acres. The fire destroyed 63 residences, 49 outbuildings, and 10 vehicles. The fire burned portions of the Santa Clara, Cochiti, San Ildefonso and Santa Domingo Indian Reservations as well as portions of Bandelier National Monument and the Valles Caldera National Preserve. This fire burned on both sides of Highway 4, and up to Highway 501, causing both highways to be closed for a time. Some of this area was previously burned by the Cerro Grande Fire in 2000. Fortunately, no member of the public or any emergency responders were seriously injured during the fire suppression efforts, although 15 injuries were reported. (InciWeb, 2012; NWCG, 2011; NCDC, 2012).
- In June 2017 the Cajete Fire, started by an abandoned campfire, was located 8 miles northeast of Jemez Springs burned 1,412 acres. It started approximately one mile northeast of Vallecitos de Los Indios and ran along the East Fork of the Jemez River and went to west of the burn scars from the 2011 Los Conchas Fire. (NM Fire Information, 2018)
- In June 2017, the Encino Fire northwest of Rio Rancho broke out near Northern and Encino. It burned 2,100 acres of brush west of the Santa Ana Star Center. The cause of this fire is still unknown to local officials. (NM Fire Information, 2018)
- In July 2017, the Cuba Fire was started by fireworks burned at least two homes, was estimated to be 6 acres, and was located 2 miles east of Highway 126. (NM Fire Information, 2018)
- In September 2017 the Deer Creek Fire on Peggy Mesa, a lightning caused fire burned 140 acres between the two-track Trujillo Road and Forest Road 652. (NM Fire Information, 2018)
- In May 2018, the Casitas Fire in Canon, NM there was a 10 acre fire that was located on private land off of Highway 485, north of the Jemez Pueblo and east of Ponderosa along the Rio Guadalupe Creek. (NM Fire Information, 2018)

- In July 2018, the Venado Fire, caused by lightning, burned 2,970 acres in a remote location on Mesa Venado and an adjacent drainage area, 1.5 miles north of Deer Creek Landing and 6.5 miles west of Jemez Spring, NM.

Probability and Magnitude

The probability and magnitude of wildfire incidents for Sandoval 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.

Sandoval County and various cooperating stakeholders have collaborated to prepare the Sandoval County CWPP (SWCA, 2012), which establishes the Wildland Urban Interface (WUI) areas for the county and mapped various wildfire risk elements such as vegetative fuels and densities, topographical slope and aspect, previous burn areas and ignition points, and prior treatment areas, etc. The CWPP documents the procedure used by the CWPP planning team for developing a county-wide wildfire risk coverage using GIS and various data sets and fire models, which is graphically illustrated by Figure 3-12 below. The resultant composite risk coverage is used in this Plan to represent the wildfire risk for the County.

The wildfire composite risk coverage is a 30-meter (98 foot) raster grid, with raster values that range from 1-4 to represent a graduated scale of fire risk where 1 = LOW, 2 = MEDIUM 3 = HIGH, 4 = EXTREME. Each of these hazard classifications are adopted for this Plan.

Maps 3A through 3D show the wildfire hazard areas for the entire county. Maps 3E through 3J show the flood hazard areas for Bernalillo, Corrales, Jemez Springs, Rio Rancho, San Ysidro, and SSCAFCA. Specific Pueblo information can be found in their respective Annex to this plan.

Vulnerability – CPRI Results

Wildfire CPRI results for each community is summarized in Table 3-20 below.

Specific Pueblo information can be found in their respective Annex to this plan.

Table 3-18: CPRI results by jurisdiction for wildfire

Participating Jurisdiction	Probability	Magnitude/ Severity	Warning Time	Duration	CPRI Score
Bernalillo, Town of	Highly Likely	Limited	< 6 hours	< 1 week	3.30
Corrales, Village of	Highly Likely	Catastrophic	< 6 hours	< 1 week	3.90
Jemez Springs, Village of	Highly Likely	Critical	< 6 hours	> 1 week	3.70
Rio Rancho, City of	Likely	Limited	< 6 hours	< 1 week	2.85
San Ysidro, Village of	Likely	Limited	< 6 hours	< 24 hours	2.75
SSCAFCA	Highly Likely	Catastrophic	< 6 hours	> 1 week	4.00
Unincorporated Sandoval County	Highly Likely	Critical	< 6 hours	> 24 hours	3.50
				County-wide average CPRI =	**3.43**

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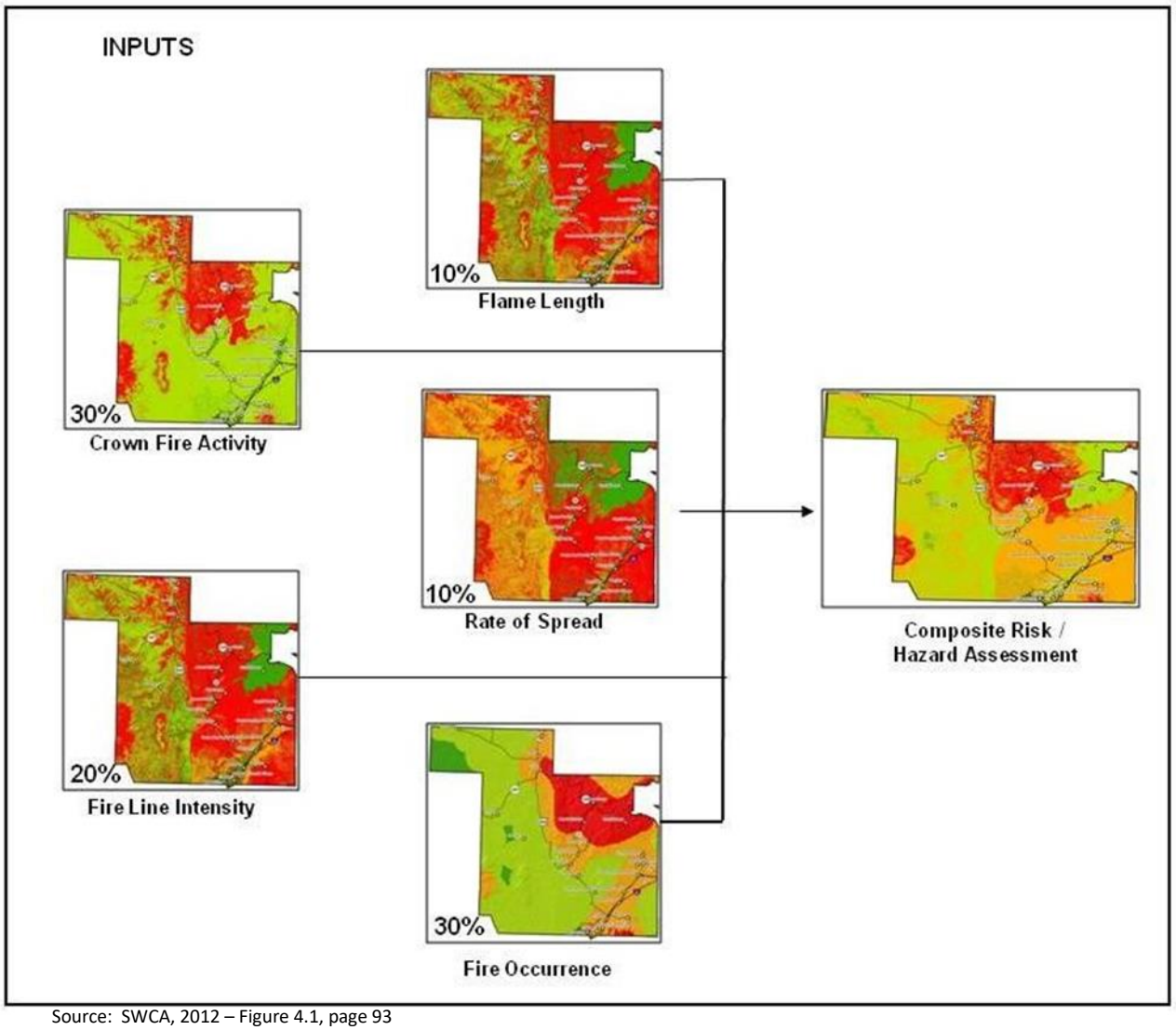

Source: SWCA, 2012 – Figure 4.1, page 93

Figure 3-12: CWPP wildfire composite risk model schematic

Vulnerability – Loss Estimations

The estimation of potential exposure to EXTREME, HIGH, and MEDIUM wildfire hazards was accomplished by intersecting the human and facility assets with the wildfire hazard limits depicted on Maps 3A–3D. Loss to exposure ratios of 0.50 (50%), 0.20 (20%) and 0.05 (5%) were assumed to estimate losses for all facilities located within the EXTREME, HIGH, and MEDIUM wildfire hazard areas, respectively. Table 3-21 summarizes the critical facility, population, and residential housing unit exposure estimates for the HIGH and MEDIUM wildfire hazard limits. No facilities or human population were estimated to be located within and EXTREME wildfire hazard area. Estimates are reported by jurisdiction and county-wide.

In summary, $3.8, $58.8 and $7.2 million in critical facility related losses are estimated for EXTREME, HIGH and MEDIUM wildfire hazards, for all the participating jurisdictions in Sandoval County. An additional $0.15, $1.54, and $0.35 billion in EXTREME, HIGH and MEDIUM hazard wildfire losses to 2010 Census defined residential housing units are estimated for all Sandoval 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, deployment of a Type 1 wildland firefight crew costs about $1 million per day. Regarding human vulnerability, a county-wide population of 1,775, 65,116 and 57,825 people, or 1.35%, 49.49% and 43.95% of the total, are potentially exposed to EXTREME, HIGH and MEDIUM hazard wildfire events, respectively. Typically, deaths and injuries not related to firefighting activities are rare. However, it is feasible to assume that at least one death and/or injury may be plausible. There is also a high probability of population displacement during a wildfire event, and especially in the urban wildland interface areas.

It is duly noted that the loss and exposure numbers presented above represent a comprehensive evaluation of the County as a whole. It is unlikely that a wildfire event would impact all of the EXTREME, HIGH and MEDIUM wildfire hazard areas at the same time. Accordingly, actual event based losses and exposure are likely to be only a fraction of those summarized above.

Vulnerability – Development Trend Analysis

By its very definition, the WUI represents the fringe of urban development as it intersects with the natural environment. Future development that occurs at the WUI interface will only increase the WUI areas and expand the potential exposure of structures to wildfire hazards. Figure 3-13 presents a graphic of the WUI identified by the CWPP. Each growth area identified by the participating jurisdictions, should take into account the interface that may be created and take the necessary precautions to reduce the exposure to wildland fires that may burn up to the developing perimeter. Further discussions regarding particular areas within the County are documented in the CWPP and will not be discussed further herein.

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Table 3-19: Sandoval County jurisdictional exposure and loss estimates due to wildfire

WILDFIRE HAZARD EXPOSURE / LOSS	Bernalillo	Corrales	Jemez Springs	Rio Rancho	San Ysidro	SSCAFCA	Sandoval County (U)	Total
Total Critical Facilities	**34**	**27**	**9**	**122**	**8**	**34**	**16**	**268**
Estimated Replacement Cost	**$0**	**$24,000,000**	**$10,275,000**	**$342,234,000**	**$2,550,000**	**$201,820,000**	**$56,850,000**	**$795,656,000**
Facilities Exposed to Extreme Hazard	0	0	6	0	0	0	0	6
Percentage of Total Facilities	0.00%	0.00%	66.67%	0.00%	0.00%	0.00%	0.00%	4.11%
Estimated Replacement Cost	$0	$0	$7,500,000	$0	$0	$0	$0	$7,500,000
Estimated Structure Loss	$0	$0	$3,750,000	$0	$0	$0	$0	$3,750,000
Facilities Exposed to High Hazard	7	6	0	77	8	28	9	71
Percentage of Total Facilities	20.59%	22.22%	0.00%	63.11%	100.00%	82.35%	56.25%	48.63%
Estimated Replacement Cost	$0	$5,000,000	$0	$150,802,000	$2,550,000	$145,800,000	$25,050,000	$294,012,000
Estimated Structure Loss	$0	$1,000	$0	$30,160,000	$510,000	$29,160,000	$5,010,000	$58,802,000
Facilities Exposed to Medium Hazard	27	21	3	39	0	5	7	68
Percentage of Total Facilities	79.41%	77.78%	33.33%	31.97%	0.00%	14.71%	43.75%	46.58%
Estimated Replacement Cost	$0	$19,000,000	$2,775,000	$188,249,000	$0	$54,520,000	$31,800,000	$143,410,000
Estimated Structure Loss	$0	$950,000	$139,000	$9,412,000	$0	$2,726,000	$1,590,000	$7,171,000
Total Population	**8,307**	**8,231**	**278**	**87,444**	**165**	**n/a**	**14,140**	**131,564**
Population Exposed to Extreme Hazard	2	0	165	0	0	n/a	1,475	1,775
Percent Exposed	0.02%	0.00%	59.36%	0.00%	0.25%	n/a	10.43%	1.35%
Population Exposed to High Hazard	1,295	2,845	4	43,746	108	n/a	9,753	65,116
Percent Exposed	15.59%	34.57%	1.51%	50.03%	65.73%	n/a	68.98%	49.49%
Population Exposed to Medium Hazard	7,010	5,385	109	34,895	56	n/a	2,790	57,825
Percent Exposed	84.39%	65.43%	39.13%	39.91%	34.03%	n/a	19.73%	43.95%
Population Over 65	**1,113**	**1,600**	**83**	**9,437**	**30**	**n/a**	**2,353**	**15,880**
Population Over 65 Exposed to Extreme Hazard	1	0	47	0	0	n/a	278	353
Percent Exposed	0.06%	0.00%	56.59%	0.00%	0.16%	n/a	11.83%	2.22%
Population Over 65 Exposed to High Hazard	192	527	1	3,472	20	n/a	1,656	6,577
Percent Exposed	17.21%	32.94%	1.46%	36.79%	65.02%	n/a	70.36%	41.42%
Population Over 65 Exposed to Medium Hazard	921	1,073	35	5,246	10	n/a	412	8,467

Table 3-19: Sandoval County jurisdictional exposure and loss estimates due to wildfire

WILDFIRE HAZARD EXPOSURE / LOSS	Bernalillo	Corrales	Jemez Springs	Rio Rancho	San Ysidro	SSCAFCA	Sandoval County (U)	Total
Percent Exposed	82.73%	67.05%	41.95%	55.59%	34.83%	n/a	17.52%	53.32%
Residential Building Count Totals)	**3,215**	**3,765**	**174**	**33,927**	**83**	**n/a**	**7,486**	**49,665**
Estimated Replacement Cost	**$622,530,000**	**$2,222,247,000**	**$40,712,000**	**$10,178,234,000**	**$18,694,000**	**n/a**	**$2,799,780,000**	**$16,073,849,000**
Residential Bldgs. Exposed to Extreme Hazard	1	0	115	0	0	n/a	1,324	1,439
Percentage of Total Residential Bldgs.	0.03%	0.00%	65.68%	0.00%	0.26%	n/a	17.68%	2.90%
Estimate Exposed Replacement Cost	$312,000	$0	$25,769,000	$0	$49,000	n/a	$272,247,000	$298,378,000
Estimated Residential Structure Losses	$156,000	$0	$12,885,000	$0	$24,000	n/a	$136,123,000	$149,189,000
Residential Bldgs. Exposed to High Hazard	479	1,277	3	15,938	55	n/a	4,630	22,801
Percentage of Total Residential Bldgs.	14.90%	33.93%	1.87%	46.98%	65.67%	n/a	61.85%	45.91%
Estimate Exposed Replacement Cost	$113,775,000	$672,204,000	$734,000	$4,781,579,000	$12,276,000	n/a	$2,038,688,000	$7,700,174,000
Estimated Residential Structure Losses	$22,755,000	$134,441,000	$147,000	$956,316,000	$2,455,000	n/a	$407,738,000	$1,540,035,000
Residential Bldgs. Exposed to Medium Hazard	2,735	2,488	57	14,517	28	n/a	1,493	21,913
Percentage of Total Residential Bldgs.	85.07%	66.07%	32.45%	42.79%	34.07%	n/a	19.94%	44.12%
Estimate Exposed Replacement Cost	$508,443,000	$1,550,040,000	$14,209,000	$4,355,184,000	$6,369,000	n/a	$478,031,000	$7,023,008,000
Estimated Residential Structure Losses	$25,422,000	$77,502,000	$710,000	$217,759,000	$318,000	n/a	$23,902,000	$351,150,000

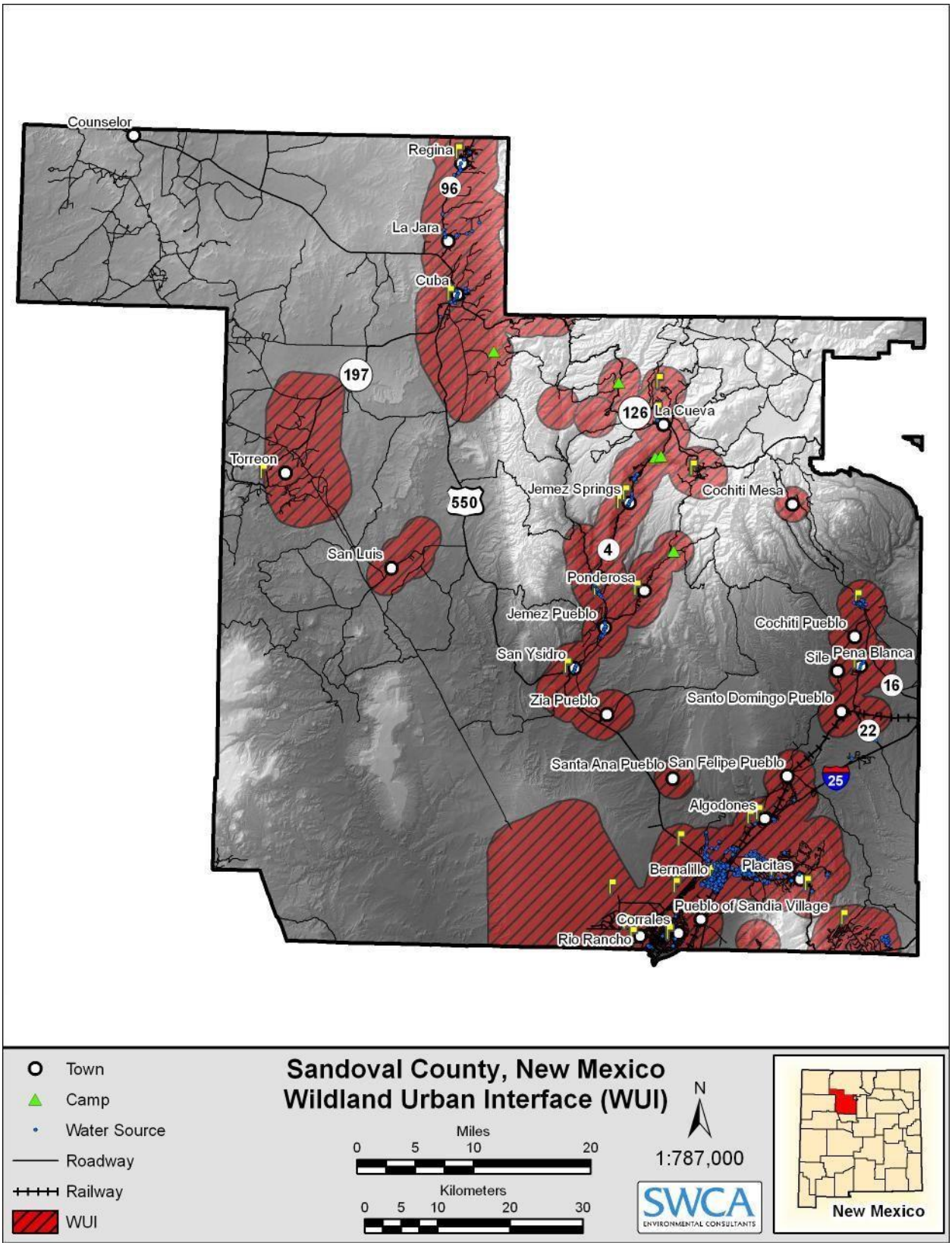

Figure 3-13: Wildfire Urban Interface for Sandoval County

Vulnerability – Jurisdictional Summary

The 2014 Plan utilized the CWPP to provide a summary of risk assessments for various areas within the WUI. Two types of wildfire risk assessments, Community Hazard/Risk Assessment and Composite Risk Assessment were performed and documented. The Planning Committee for this plan decided that more focus should be given on vulnerability to remain in line with previous hazards listed. As vulnerability is a weakness or gap that can be exploited by a threat or hazard and risk indicates the potential for loss, damage, or destruction of an asset as a result of a hazard exploiting a vulnerability.

The following crosswalk in Table 3-20 presents an overall summary of each jurisdiction's vulnerability to Wildfire. Specific Pueblo information can be found in their respective Annex to this plan.

Table 3-20: Vulnerability Crosswalk for Wildfire

Jurisdiction	Vulnerability Rating	Mitigation Priority?	Notes
Bernalillo	Moderate	Yes	Bernalillo's primary wildfire vulnerability is associated with the Bosque areas along the Rio Grande. The remainder of the Town is generally at a Moderate to Low wildfire vulnerability. Mitigation of wildfire vulnerability along the Bosque will continue to be a priority for the Town.
Corrales	Moderate/High	Yes	Wildifire vulnerability for Corrales was evaluating by splitting Corrales into east and west portions. East Corrales was given a High vulnerability due to the dense fuels in the bosque along the Rio Grande and a general lack of defensible space around most homes near the bosque. West Corrales is less at vulnerability due to the lighter density vegetation and greater defensible space. Wildfire mitigation will continue to be a priority for the Village.
Jemez Springs	Extreme	Yes	Dense and moderately dense fuels, steep slopes, inadequate defensible space, inadequate water supplies for fire suppression, and access issues all add to the Extreme vulnerability assessed for the Village. Wildfire mitigation is definitely a priority for Jemez Springs.
Rio Rancho	Moderate	Yes	Rio Rancho's primary wildfire focus are the areas close to the Bosque along the Rio Grande and the perimeter areas of the built environment.
San Ysidro	Moderate/High	Yes	In the CWPP, the Village's community vulnerability assessment pointed out that concentrations of dense brush have been allowed to build up on vacant lots and near area homes. The CWPP also cited inadequate defensible space and water supply/storage for firefighting. All these conditions elevate the wildfire vulnerability to a High category and make wildfire a mitigation priority for the Village.

Table 3-20: Vulnerability Crosswalk for Wildfire			
Jurisdiction	**Vulnerability Rating**	**Mitigation Priority?**	**Notes**
SSAFCA	Nuisance	No	SSCAFCA's primary focus is flood and sediment control for arroyos within their jurisdictional boundary. Facilities directly owned and operated by SSCAFCA are not particularly vulnerable to wildfire and wildfire mitigation responsibilities are primarily carried out by jurisdictions within SSCAFCA's service area. Accordingly, no wildfire mitigation actions/projects will be developed by SSCAFCA.
Unincorporated Sandoval County	Moderate/Extreme	Yes	Many of the Unincorporated areas of Sandoval County are located within High and Extreme hazard areas, and especially within the Jemez Mountains and other mountainous areas. Wildfire mitigation is a priority to the County.

Sources

InciWeb, 2012, Los Conchas Fire webpage at: http://www.inciweb.org/incident/2385/

InciWeb, 2018, Venado Fire webpage at: https://inciweb.nwcg.gov/incident/5996/

New Mexico Fire Information webpage at: https://nmfireinfo.com/?s=Sandoval+County&x=0&y=0

SWCA Environmental Consultants, Inc., 2012, *Sandoval County Community Wildfire Protection Plan*, dated August 2012.

Profile Maps

Maps 3A through 3D – County-Wide Wildfire Hazard Maps

Maps 3E through 3J– Bernalillo, Corrales, Jemez Springs, Rio Rancho, San Ysidro, and SSCAFCA Wildfire Hazard Maps. Specific Pueblo information can be found in their respective Annex to this plan.

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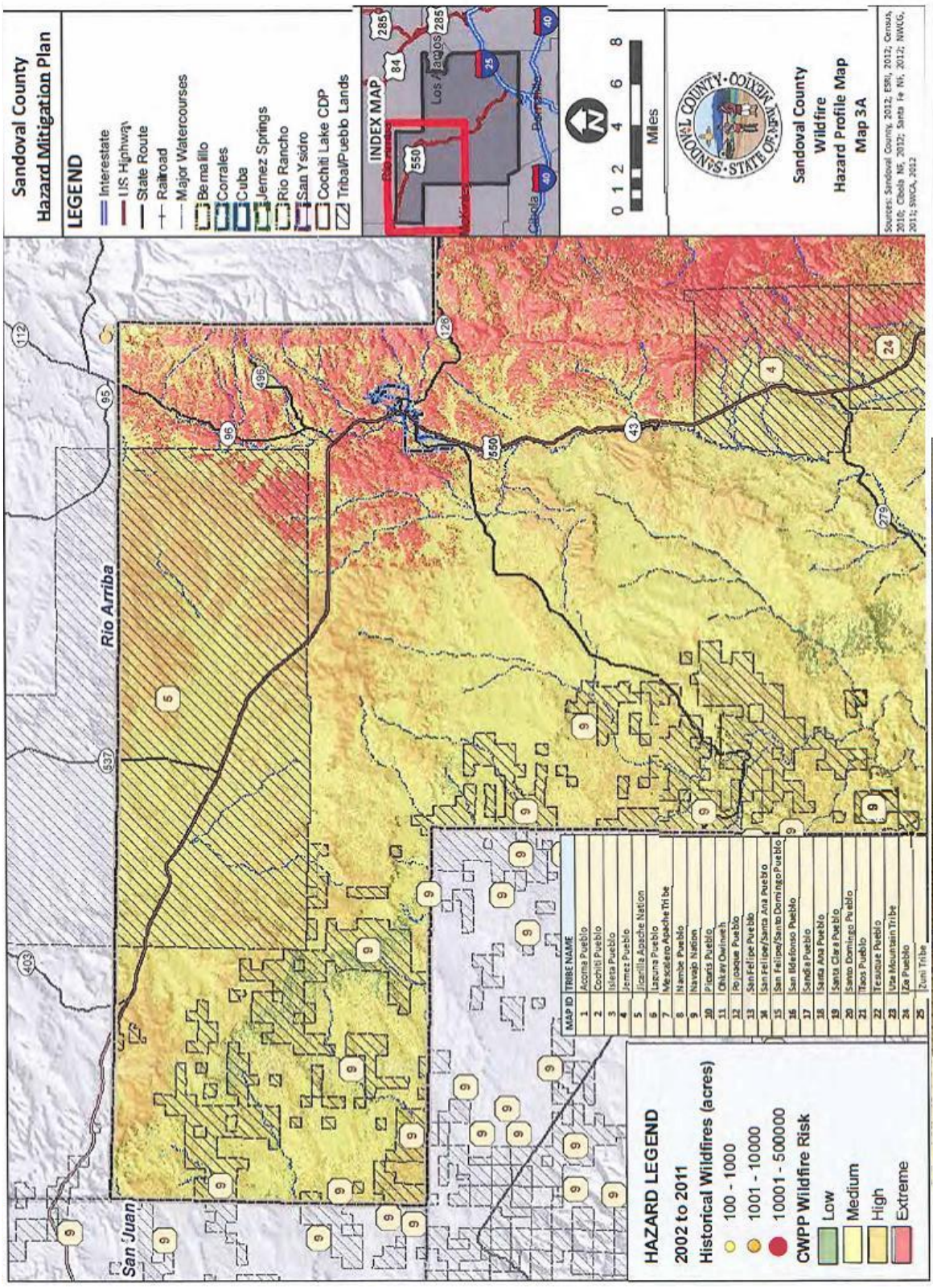
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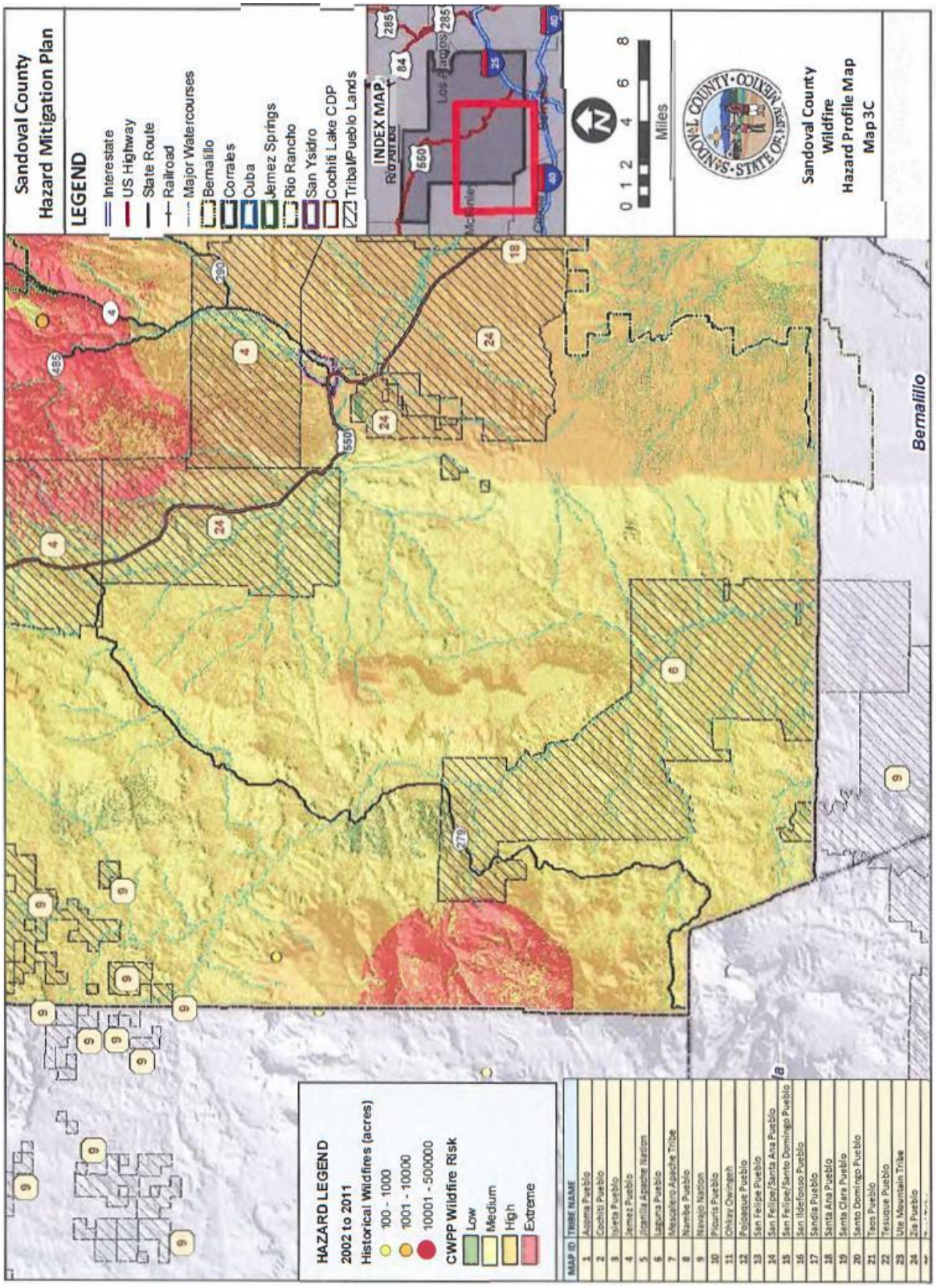
San Ysidro
Cochiti Lake CDP
Tribal/Pueblo Lands
INDEX MAP
Rio Arriba
San Juan
Los Alamos
Cibola
Miles
0 1 2 4 6 8
Sandoval County
Wildfire
Hazard Profile Map
Map 3A
Sources: Sandoval County, 2012; ESRI, 2012; Census, 2010; Cibola NF, 2012; Santa Fe Nf, 2012; NWCG, 2011; SWCA, 2012
HAZARD LEGEND
2002 to 2011
Historical Wildfires (acres)
100 - 1000
1001 - 10000
10001 - 500000
CWPP Wildfire Risk
Low
Medium
High
Extreme
MAP ID TRIBE NAME
1 Acoma Pueblo
2 Cochiti Pueblo
3 Isleta Pueblo
4 Jemez Pueblo
5 Jicarilla Apache Nation
6 Laguna Pueblo
7 Mescalero Apache Tribe
8 Nambe Pueblo
9 Navajo Nation
10 Picuris Pueblo
11 Ohkay Owingeh
12 Pojoaque Pueblo
13 San Felipe Pueblo
14 San Felipe/Santa Ana Pueblo
15 San Felipe/Santo Domingo Pueblo
16 San Ildefonso Pueblo
17 Sandia Pueblo
18 Santa Ana Pueblo
19 Santa Clara Pueblo
20 Santo Domingo Pueblo
21 Taos Pueblo
22 Tesuque Pueblo
23 Ute Mountain Tribe
24 Zia Pueblo
25 Zuni Tribe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Wildfire
Hazard Profile Map
Map 3C
HAZARD LEGEND
2002 to 2011
Historical Wildfires (acres)
100 - 1000
1001 - 10000
10001 - 500000
CWPP Wildfire Risk
Low
Medium
High
Extreme
MAP ID
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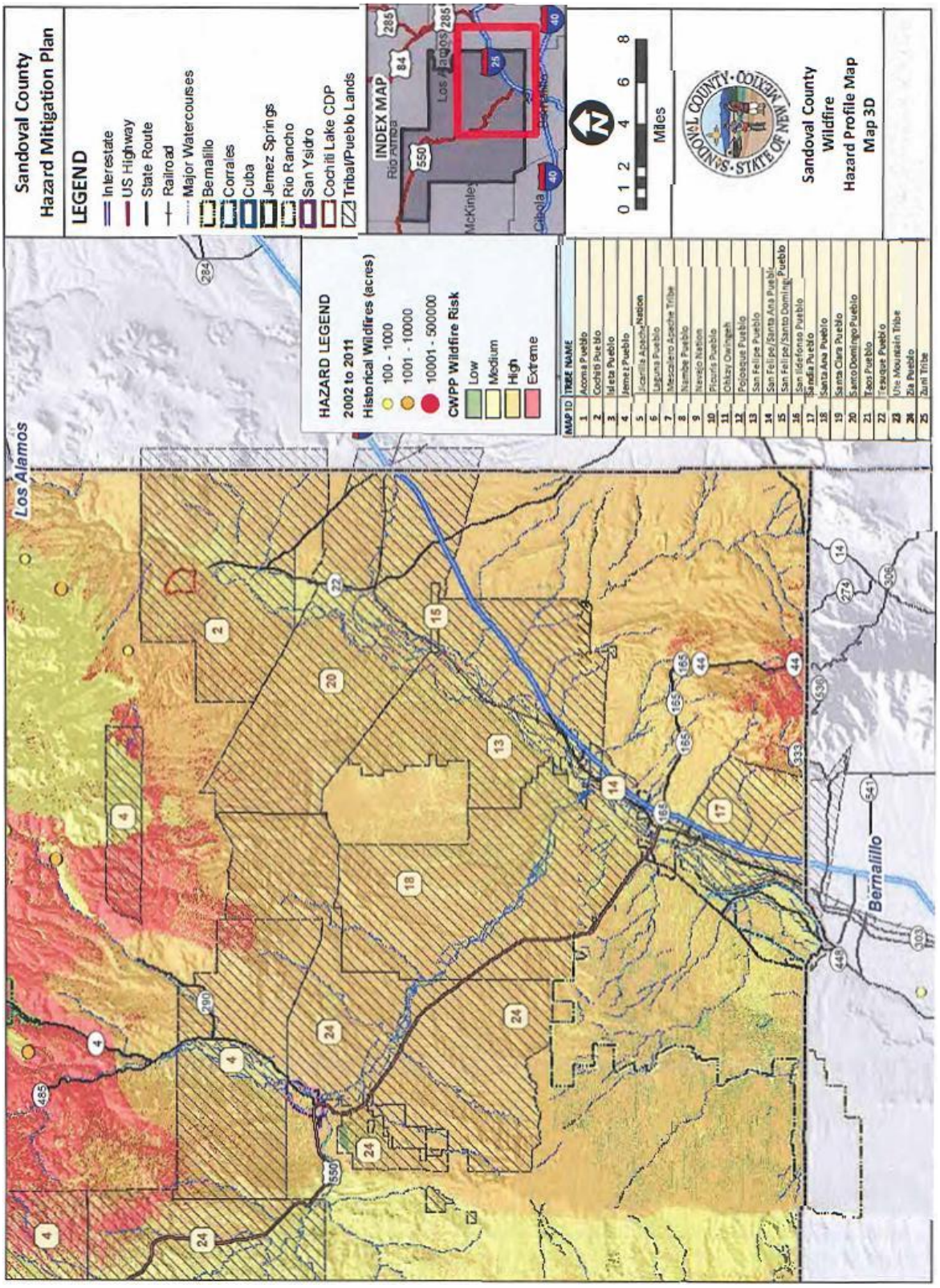
2 Cochiti Pueblo
3 Isleta Pueblo
4 Jemez Pueblo
5 Jicarilla Apache Nation
6 Laguna Pueblo
7 Mescalero Apache Tribe
8 Nambe Pueblo
9 Navajo Nation
10 Picuris Pueblo
11 Ohkay Owingeh
12 Pojoaque Pueblo
13 San Felipe Pueblo
14 San Felipe/Santa Ana Pueblo
15 San Felipe/Santo Domingo Pueblo
16 San Ildefonso Pueblo
17 Sandia Pueblo
18 Santa Ana Pueblo
19 Santa Clara Pueblo
20 Santo Domingo Pueblo
21 Taos Pueblo
22 Tesuque Pueblo
23 Ute Mountain Tribe
24 Zia Pueblo
Bernalillo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McKinley
Cibola
HAZARD LEGEND
2002 to 2011
Historical Wildfires (acres)
100 - 1000
1001 - 10000
10001 - 50000
CWPP Wildfire Risk
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Medium
High
Extreme
MAP ID
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4 Jemez Pueblo
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7 Mescalero Apache Tribe
8 Nambe Pueblo
9 Navajo Nation
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11 Ohkay Owingeh
12 Pojoaque Pueblo
13 San Felipe Pueblo
14 San Felipe/Santa Ana Pueblo
15 San Felipe/Santo Domingo Pueblo
16 San Ildefonso Pueblo
17 Sandia Pueblo
18 Santa Ana Pueblo
19 Santa Clara Pueblo
20 Santo Domingo Pueblo
21 Taos Pueblo
22 Tesuque Pueblo
23 Ute Mountain Tribe
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25 Zuni Tribe
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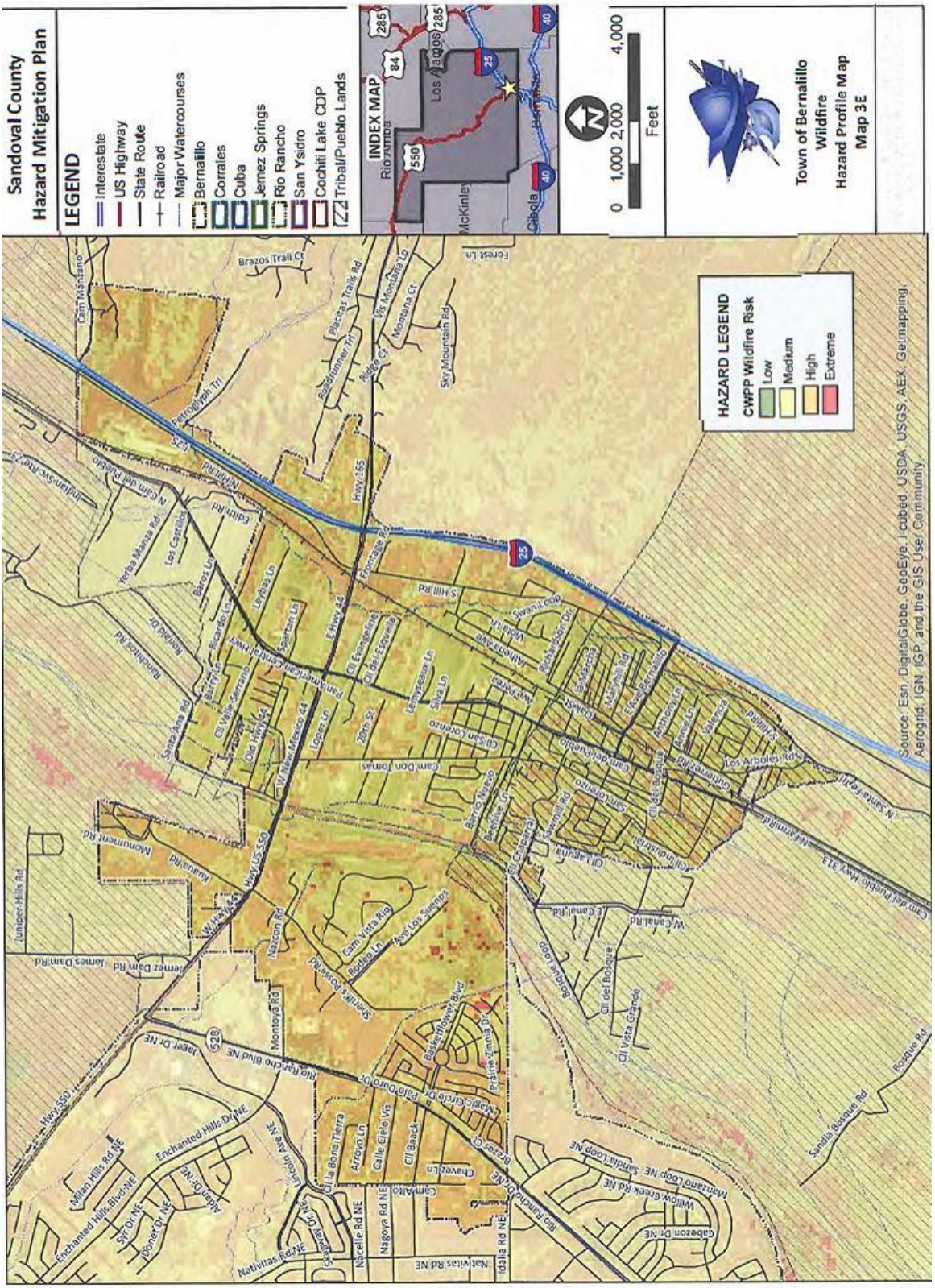
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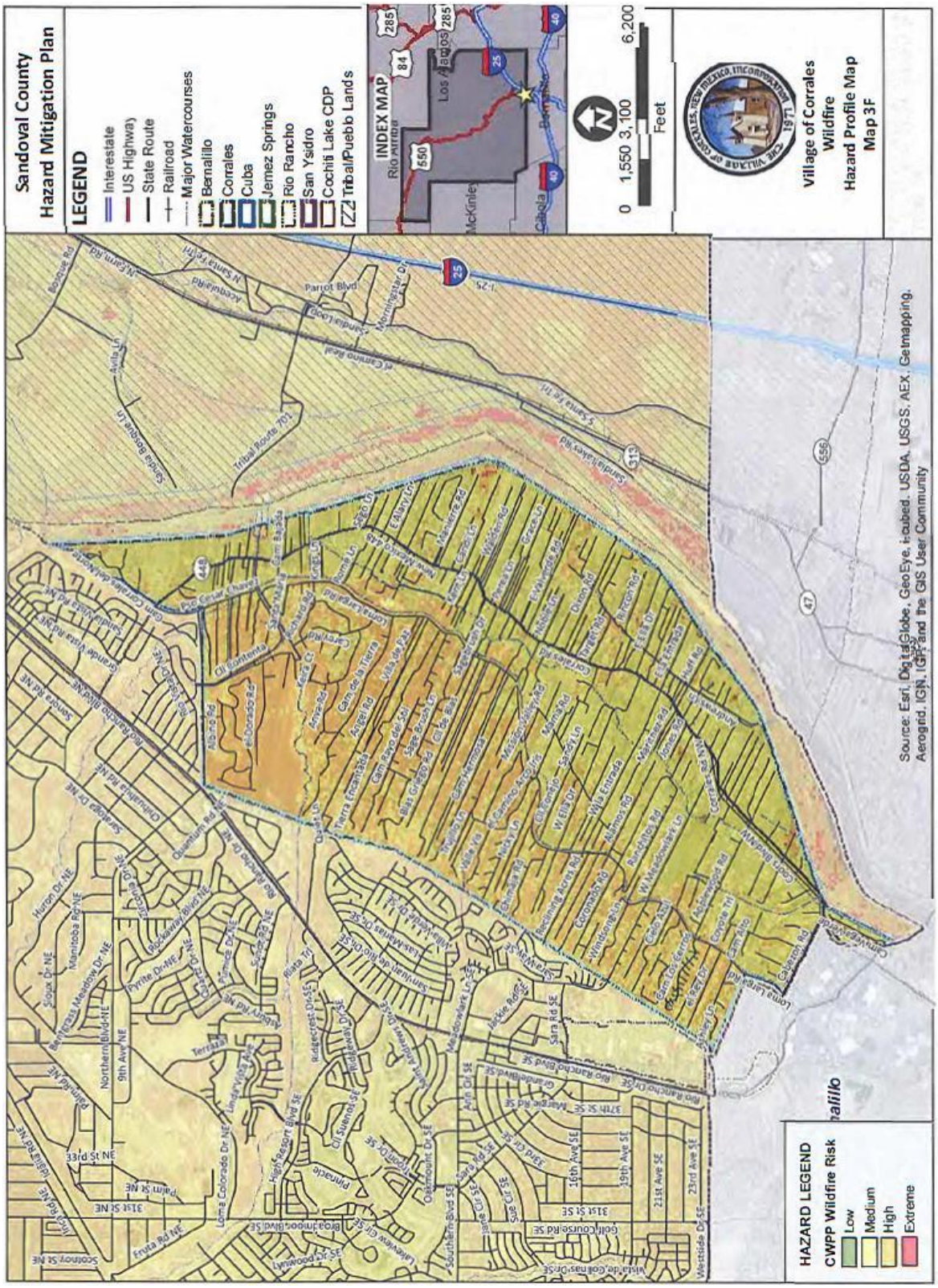
Cibola
0 1,000 2,000 4,000
Feet
Town of Bernalillo
Wildfire
Hazard Profile Map
Map 3E
HAZARD LEGEND
CWPP Wildfire Risk
Low
Medium
High
Extreme
Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, and the GIS User Community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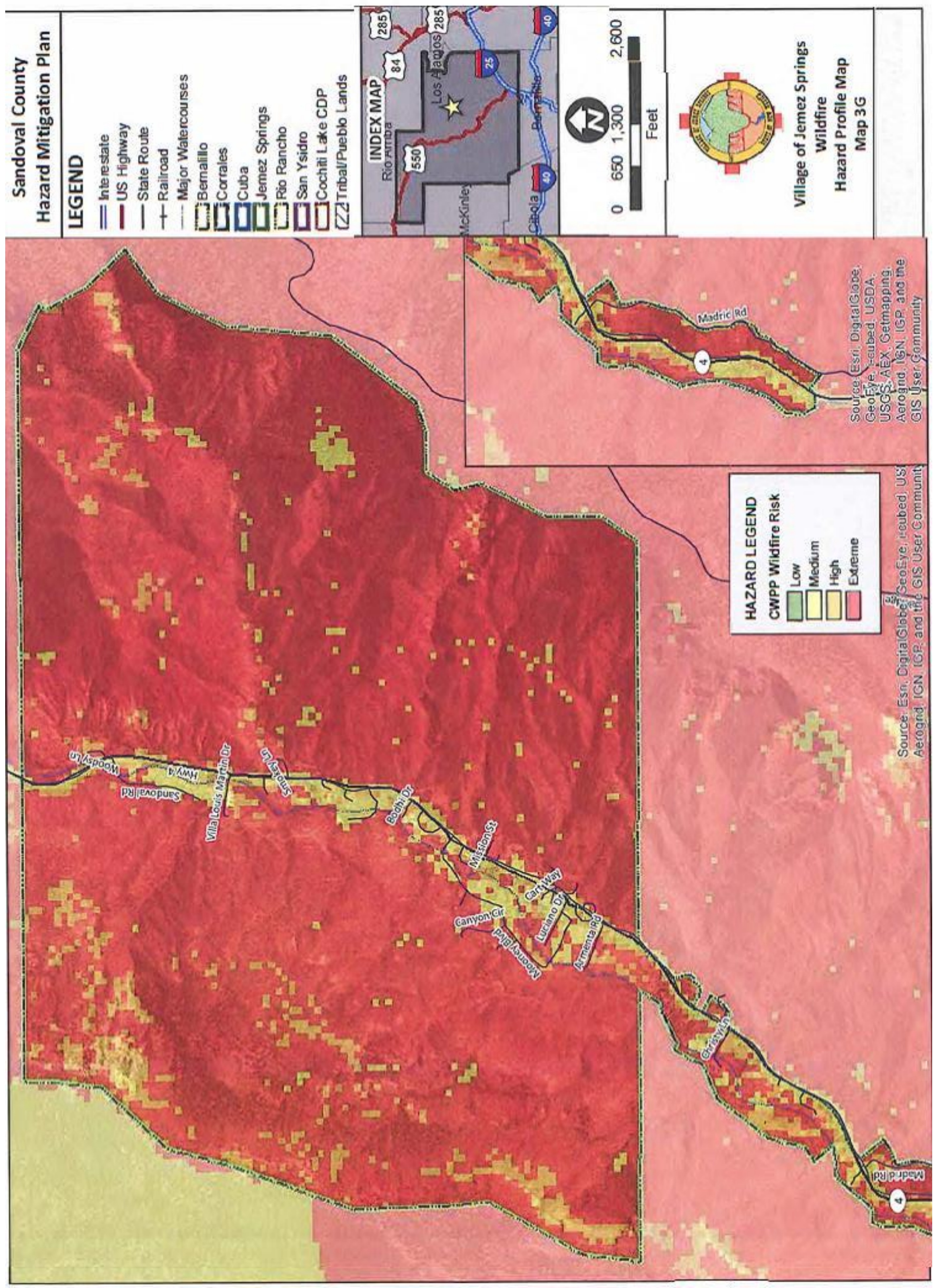
0 1,550 3,100 6,200
Feet
Village of Corrales
Wildfire
Hazard Profile Map
Map 3F
HAZARD LEGEND
CWPP Wildfire Risk
Low
Medium
High
Extreme
Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, and the GIS User Community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0 650 1,300 2,600
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Village of Jemez Springs
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Hazard Profile Map
Map 3G
HAZARD LEGEND
CWPP Wildfire Risk
Low
Medium
High
Extreme
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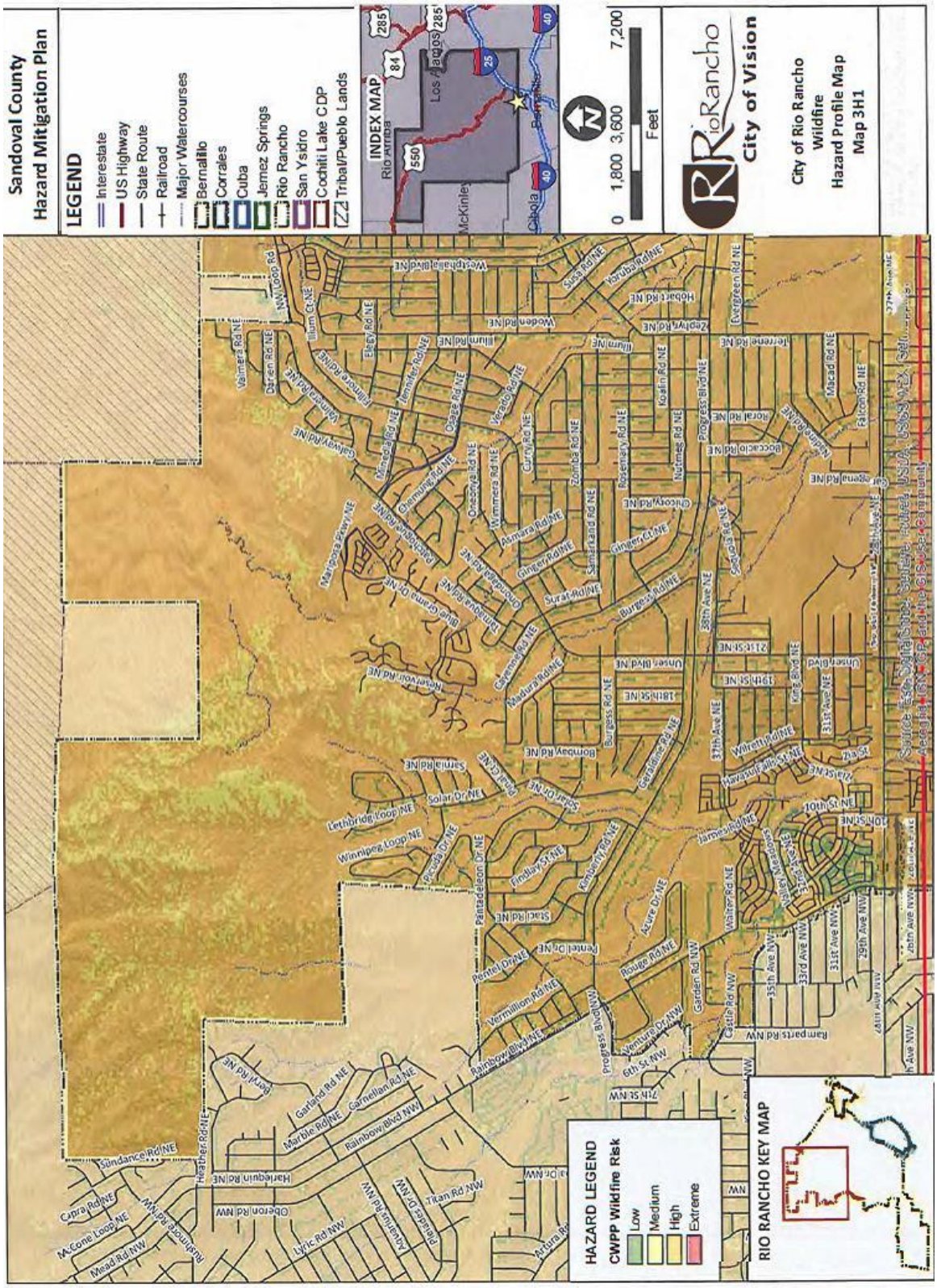
Woodsy Ln
Hwy 4
Sandoval Rd
Villa Louis Martin Dr
Bodhi Dr
Mission St
Canyon Cir
Luciano Dr
Armenta Rd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City of Rio Rancho
Wildfire
Hazard Profile Map
Map 3H1
HAZARD LEGEND
CWPP Wildfire Risk
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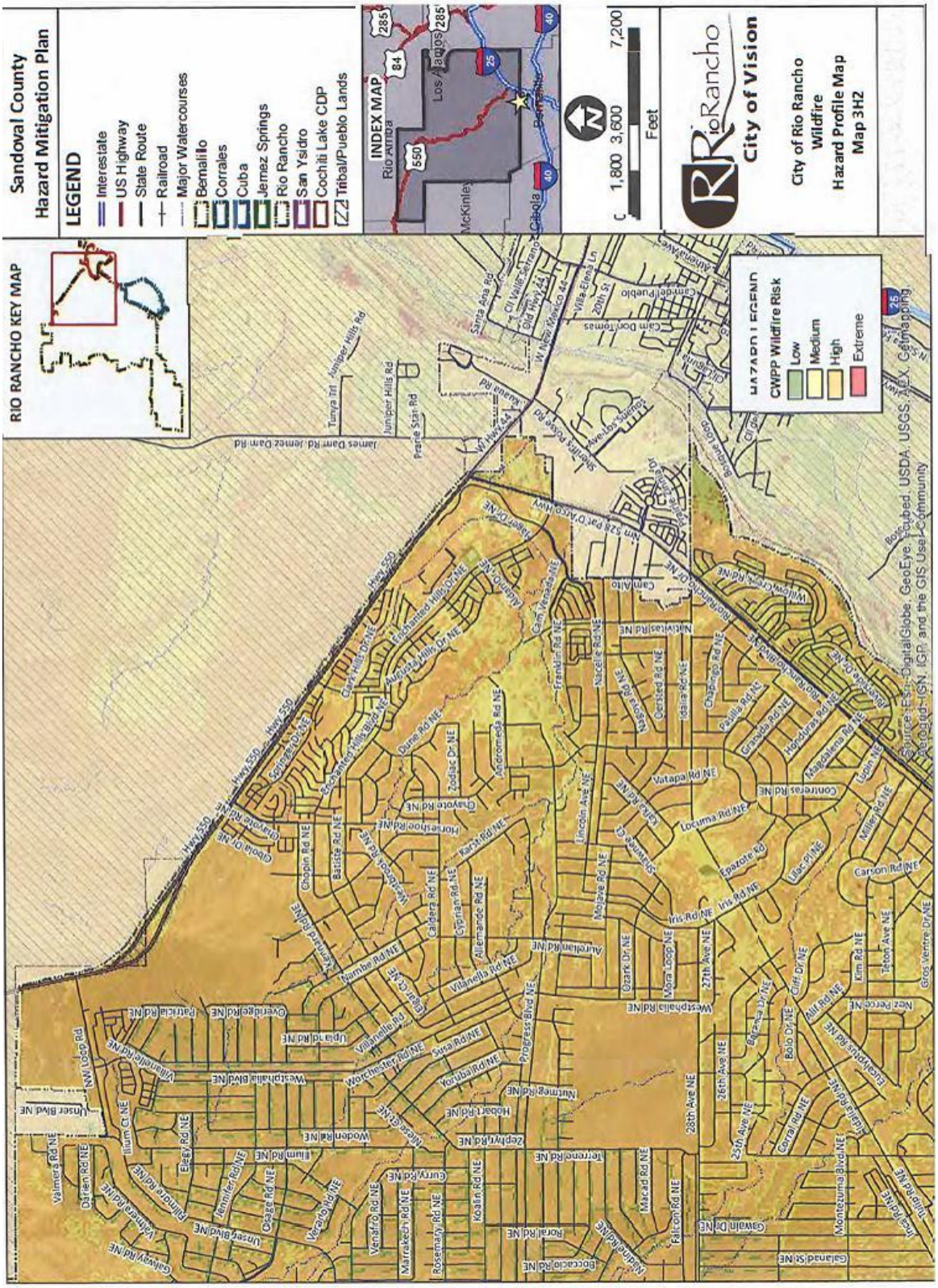
Extreme
RIO RANCHO KEY MAP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Tribal/Pueblo Lands
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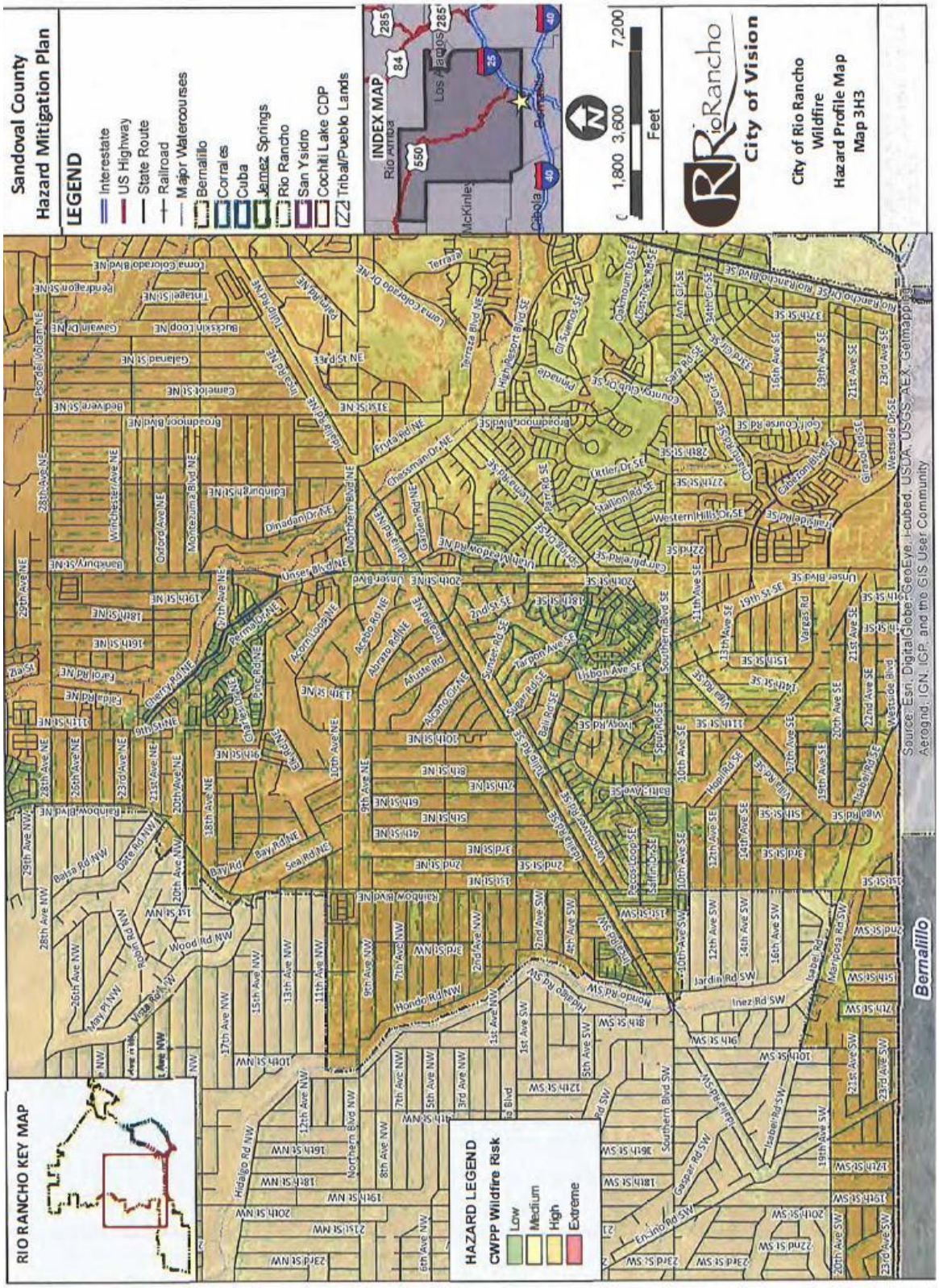
RIO RANCHO KEY MAP
City of Rio Rancho
Wildfire
Hazard Profile Map
Map 3H2
City of Vision
CWPP Wildfire Risk
Low
Medium
High
Extreme
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, IGP, and the GIS User Community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City of Rio Rancho
Wildfire
Hazard Profile Map
Map 3H3
City of Vision
RIO RANCHO KEY MAP
HAZARD LEGEND
CWPP Wildfire Risk
Low
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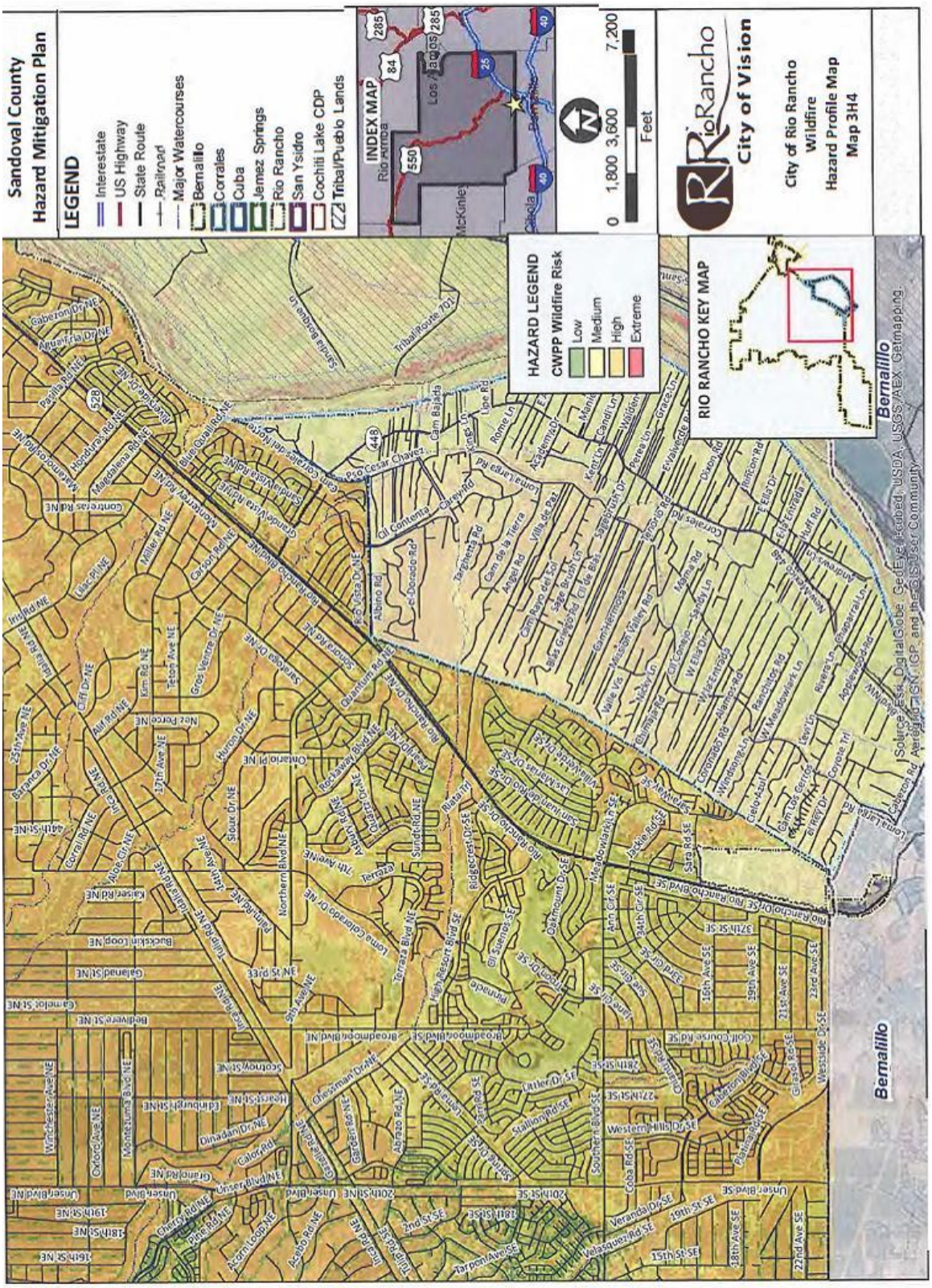
Bernalillo
Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, and the GIS User Community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City of Vision
City of Rio Rancho
Wildfire
Hazard Profile Map
Map 3H4
HAZARD LEGEND
CWPP Wildfire Risk
Low
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Extreme
RIO RANCHO KEY MAP
Bernalillo
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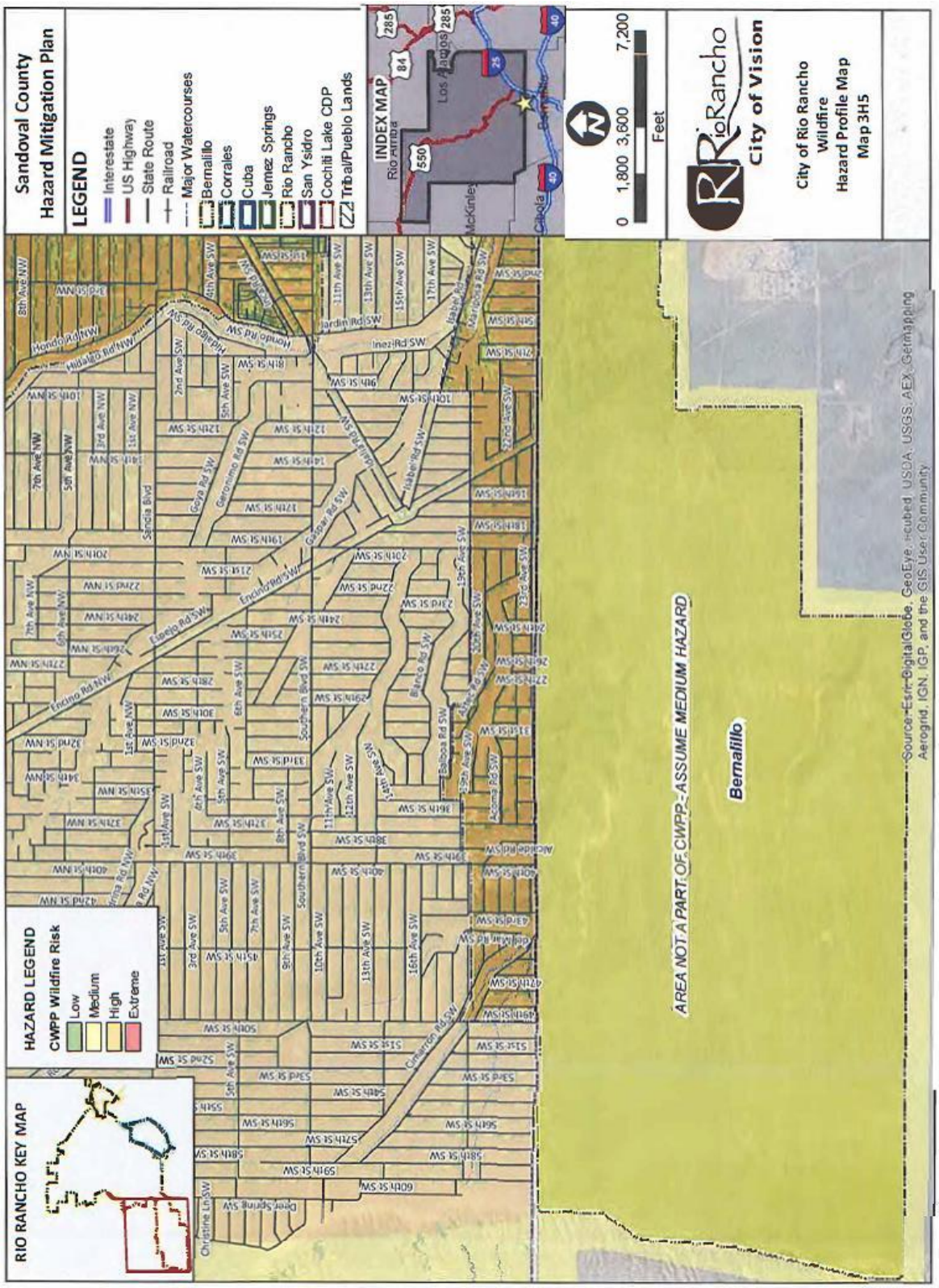
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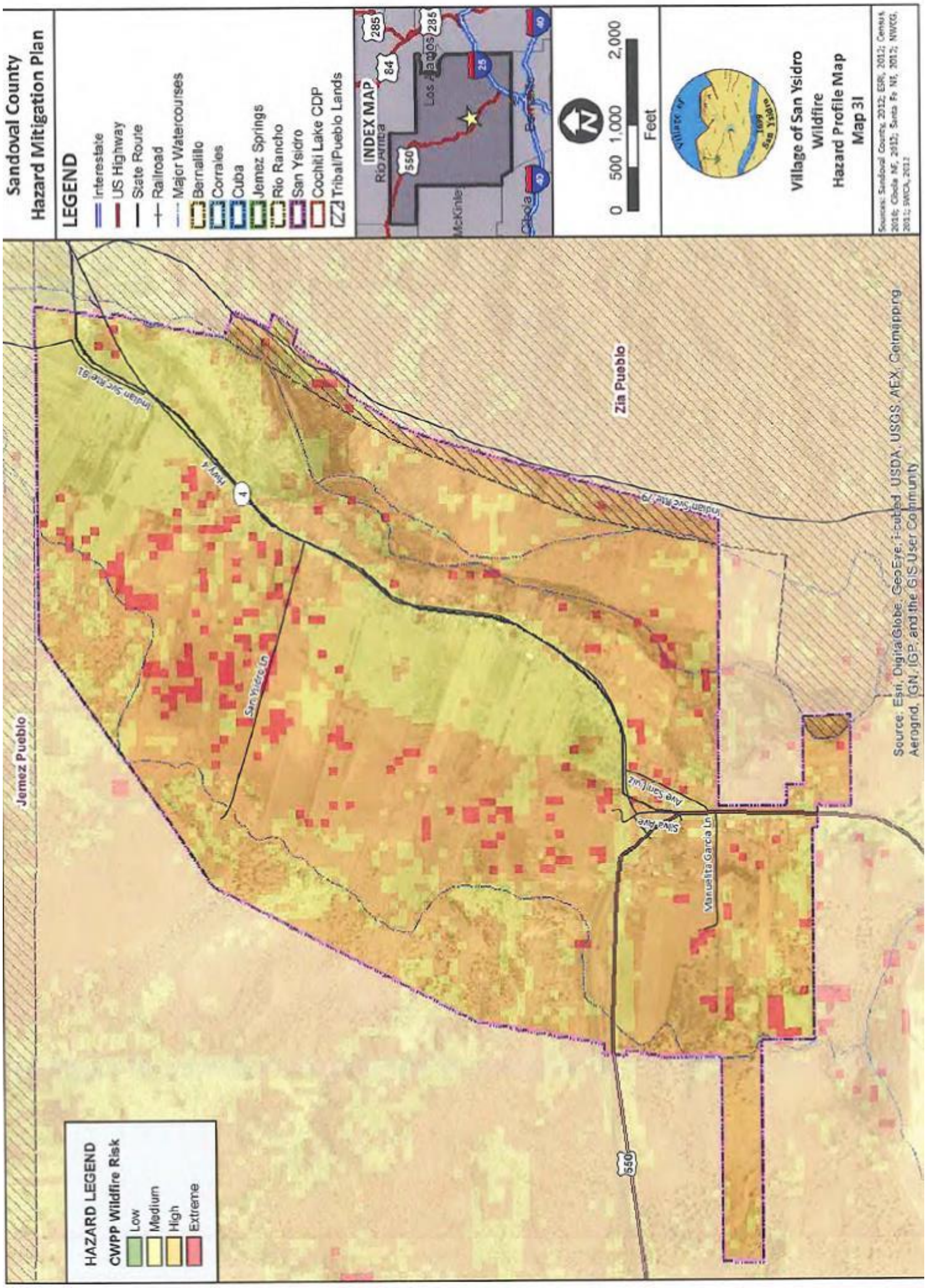
City of Vision
City of Rio Rancho
Wildfire
Hazard Profile Map
Map 3H5
HAZARD LEGEND
CWPP Wildfire Risk
Low
Medium
High
Extreme
RIO RANCHO KEY MAP
AREA NOT A PART OF CWPP - ASSUME MEDIUM HAZARD
Bernalillo
Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping
Aerogrid, IGN, IGP, and the GIS User Community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INDEX MAP
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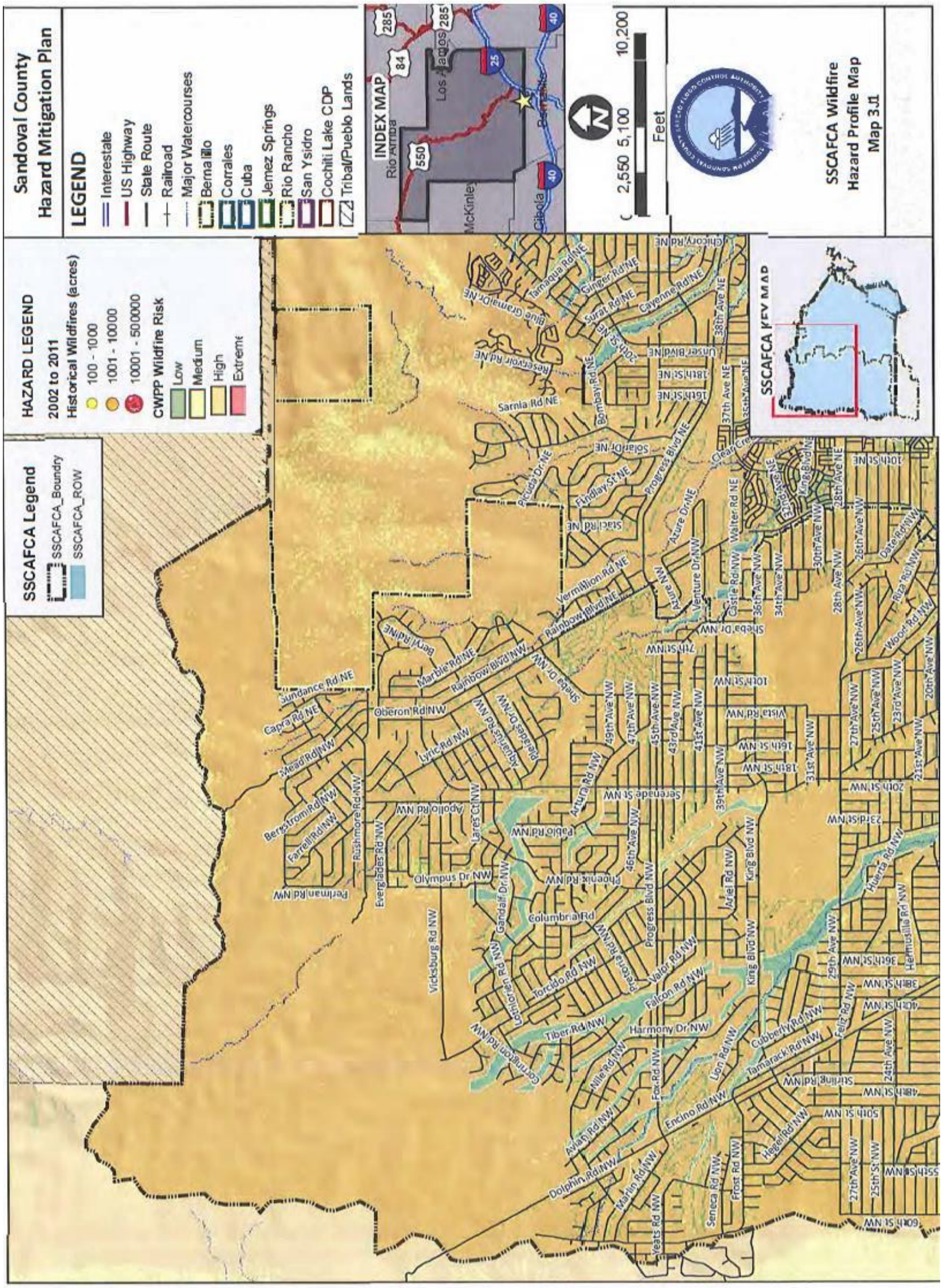
Village of San Ysidro
Wildfire
Hazard Profile Map
Map 31
HAZARD LEGEND
CWPP Wildfire Risk
Low
Medium
High
Extreme
Jemez Pueblo
Zia Pueblo
San Ysidro Ln
Manuelita Garcia Ln
Silva Ave
Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, and the GIS User Community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INDEX MAP
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SSCAFCA Wildfire
Hazard Profile Map
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HAZARD LEGEND
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Historical Wildfires (acres)
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CWPP Wildfire Risk
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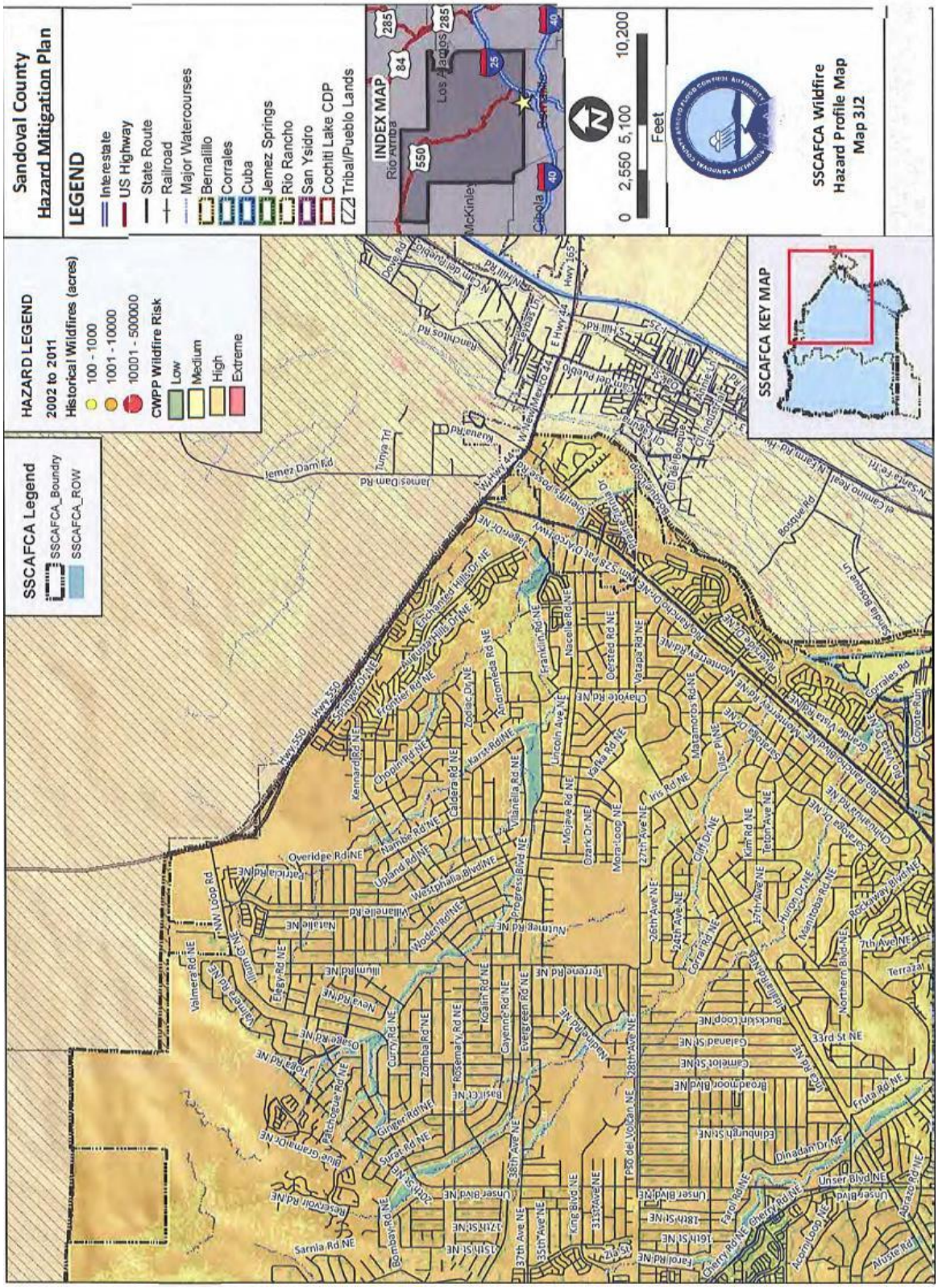
SSCAFCA_Boundry
SSCAFCA_ROW
SSCAFCA KEY MAP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SSCAFCA Wildfire
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Map 3J2
SSCAFCA KEY MAP
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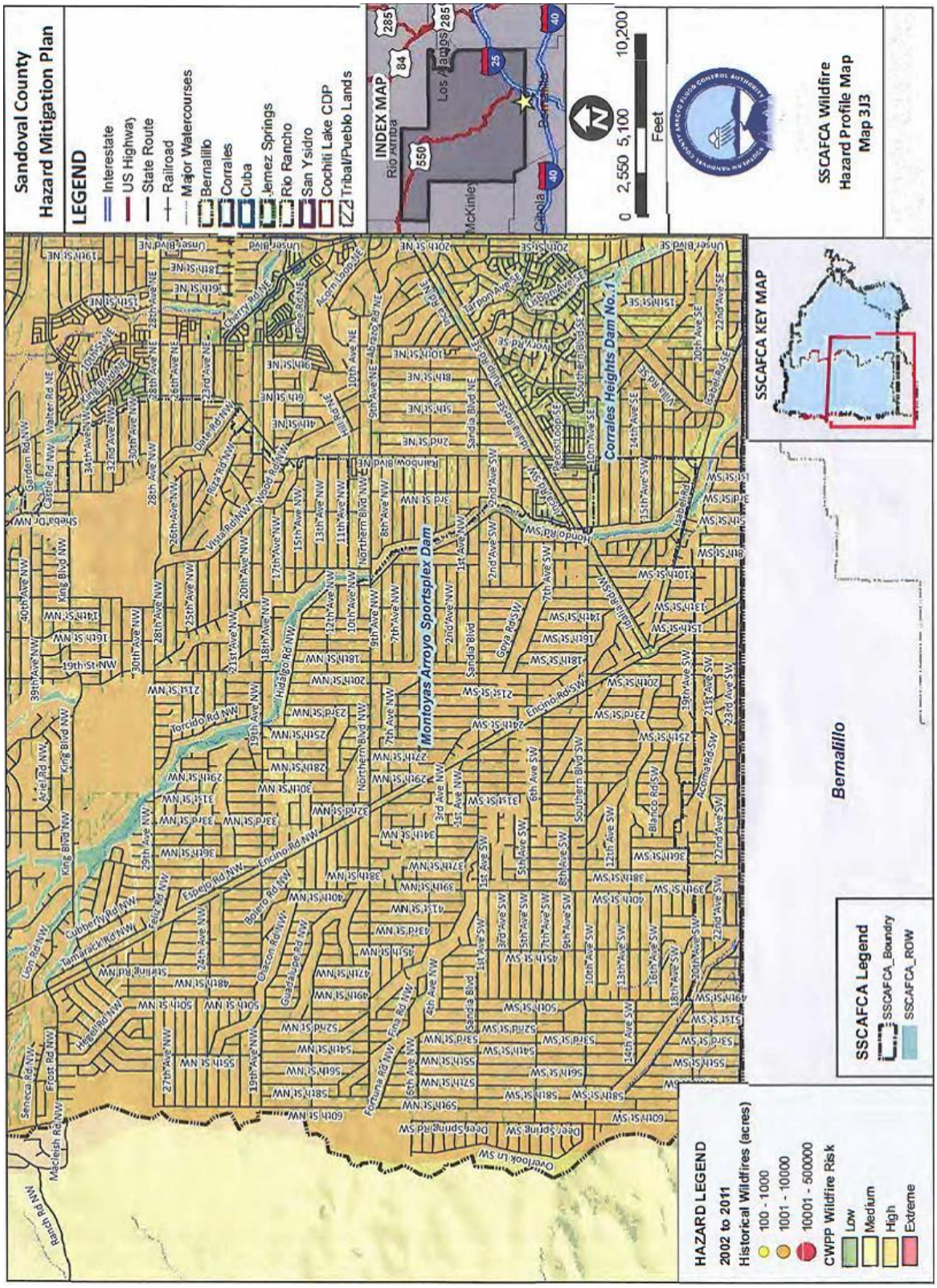
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Map 3J3
SSCAFCA KEY MAP
Montoyas Arroyo Sportsplex Dam
Corrales Heights Dam No. 1
Bernalillo
SSCAFCA Legend
SSCAFCA_Boundry
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HAZARD LEGEND
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Historical Wildfires (acres)
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CWPP Wildfire Risk
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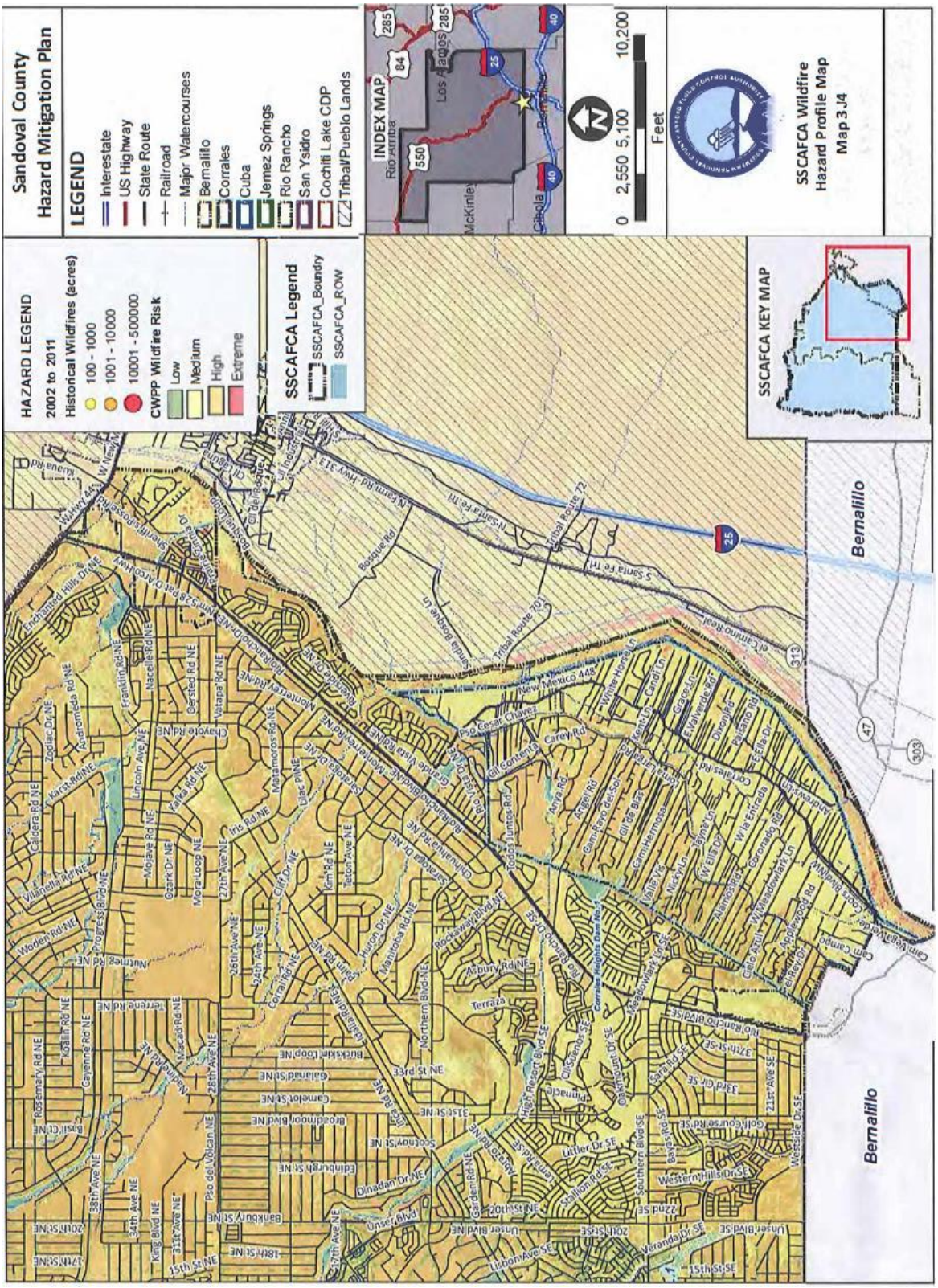
Extreme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SSCAFCA Wildfire
Hazard Profile Map
Map 3.J4
HAZARD LEGEND
2002 to 2011
Historical Wildfires (acres)
100 - 1000
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CWPP Wildfire Risk
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Extreme
SSCAFCA Legend
SSCAFCA_Boundry
SSCAFCA_ROW
SSCAFCA KEY MAP
Bernalillo
Bernalillo

3.4 Risk Assessment Summary

The jurisdictional variability of risk associated with each hazard assessed in Section 3.3 is demonstrated by the various CPRI and loss estimation results. Accordingly, each jurisdiction has varying levels of need regarding the hazards to be mitigated, and may not consider all of the hazards as posing a great risk to their individual communities. Table 3-21 summarizes the hazards selected for mitigation by each jurisdiction and will be the basis for each jurisdiction's mitigation strategy.

Specific Pueblo information can be found in their respective Annex to this plan.

Table 3-21: Summary of hazards to be mitigated by each participating jurisdiction

Jurisdiction	Dam Failure	Drought	Flood	Severe Weather	Severe Wind	Wildfire
Bernalillo, Town of	M	M	M	M	M	M
Corrales, Village of	M	M	M	M	M	M
Jemez Springs, Village of	L	M	M	M	M	M
Rio Rancho, City of	M	M	M	M	M	M
San Ysidro, Village of	M	M	M	M	M	M
SSCAFCA	M	M	M	NH	NH	NH
Unincorporated Sandoval County	M	M	M	M	M	M

M – Mitigation A/Ps will be identified
L – Mitigation A/Ps will be identified but given a low priority
NH – Nuisance hazard - no mitigation is warranted
NV – Jurisdiction is not vulnerable to hazard – no mitigation is warranted

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SECTION 4: MITIGATION STRATEGY

The mitigation strategy provides the "what, when, and how" of actions that will reduce or possibly remove the community's exposure to hazard risks. According to DMA 2000, the primary components of the mitigation strategy are generally categorized into the following:

- **Capability Assessment**
- **Goals and Objectives**
- **Mitigation Actions/Projects and Implementation Strategy**

The entire 2014 Plan mitigation strategy was reviewed and updated by the Planning Team, including the re-organization of the mitigation strategy elements into the multi-jurisdictional plan format.

4.1 Capability Assessment

An important component of the Mitigation Strategy is a review of each participating jurisdiction's capabilities in order to identify, evaluate, and enhance the capacity of local resources to mitigate the effects of hazards. The capability assessment is comprised of several components:

- ✓ Legal and Regulatory Review – a review of the legal and regulatory capabilities, including ordinances, codes, plans, manuals, guidelines, and technical reports that address hazard mitigation activities.
- ✓ Technical Staff and Personnel – this assessment evaluated and describes the administrative and technical capacity of the jurisdiction's staff and personnel resources.
- ✓ Fiscal Capability – this element summarizes each jurisdiction's fiscal capability to provide the financial resources to implement the mitigation strategy.
- ✓ National Flood Insurance Program (NFIP) Participation – the NFIP contains specific regulatory measures that enable government officials to determine where and how growth occurs relative to flood hazards. Participation in the NFIP is voluntary for local governments, but the program is promoted by FEMA as a basic first step for implementing and sustaining an effective flood hazard mitigation program, and is a key indicator for measuring local capability as part of this assessment.

Section One of the 2014 Plan summarized a capabilities assessment performed for that planning effort. General regulatory and planning capabilities, technical resources and funding opportunities were evaluated. The following subsections are similar in the areas evaluated in the 2014 Plan, with more detail for each jurisdiction.

4.1.1 Jurisdictional Capabilities

Table's 4A-1 through 4G-1 summarize the legal and regulatory mitigation capability for each participating jurisdiction. Information provided includes a brief listing of current codes, ordinances, plans, studies, and/or reports that are relevant to the jurisdictions capacity for mitigation. Table's 4A-2 through 4G-2 summarize the staff and personnel resources employed by each jurisdiction that serve as a resource for hazard mitigation. Table's 4A-3 through 4G-3 summarize the fiscal capability and budgetary tools available to each participating jurisdiction. Each of these three tables is listed below by jurisdiction. Each jurisdiction has the ability to use their existing authority to update, expand, and/or improve the policies and programs relating to this plan to the extent as authorized by law.

Specific Pueblo information can be found in their respective Annex to this plan.

Table 4A-1: Legal and regulatory capabilities for Sandoval County		
Regulatory Tools for Hazard Mitigation	**Description**	**Responsible Department/Agency**
CODES and/or ORDINANCES	• **ORDINANCE NO. 02-03-21.11C** - Relating to addressing, public safety, emergency service, road names, street signs, road maps and penalties. March 2002 • **ORDINANCE NO. _10-11-18.7A** - An ordinance establishing comprehensive zoning regulations and zoning maps for Sandoval County, New Mexico, and providing for the administration, enforcement, and amendment thereof. November 2010 • **ORDINANCE NO. 08-04-03.9A** - Flood damage prevention ordinance April 2008 • **ORDINANCE NO. 5-18-17.12** - an ordinance prescribing the powers, duties, and organization of the Sandoval County Planning and Zoning Commission, May 2017 • Sandoval County Subdivision Regulations, November 2007	• Planning and Zoning • Fire Department
PLANS, MANUALS, and/or GUIDELINES	• Sandoval County Comprehensive plan, November 2007 • Community Wildfire Prevention Plan, December 2012 • All Hazard Emergency Operations Plan, 2012 • Hazard Mitigation Plan, April 2014 • Placitas area Plan 2009 • Rio Rancho Estates Area Plan 2014	• Planning and Zoning • Emergency Management
STUDIES	• Phase I Ground Water Assessment For The Placitas Area, February 1997 • Hydrogeology And Water Resources Of The Placitas Area Sandoval County, New Mexico January 2008 • Update Of Hydrogeological Conditions At The Diamond Tail Subdivision, Sandoval County, New Mexico, August 2006 • Rio Rancho Estates Water Resources Planning Study 2013	• Planning and Zoning

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Table 4A-2: Summary of technical staff and personnel capabilities for Sandoval County		
Staff/Personnel Resources	☑	**Department/Agency - Position**
Planner(s) or engineer(s) with knowledge of land development and land management practices	☑	Planning and Zoning
Engineer(s) or professional(s) trained in construction practices related to buildings and/or infrastructure	☑	Public Works – Project Management
Planner(s) or engineer(s) with and understanding of natural and/or human-caused hazards	☑	Emergency Management
Certified Floodplain Manager	☑	Planning and Zoning
Surveyors		Contract
Staff with education or expertise to assess the community's vulnerability to hazards	☑	Emergency Management
Personnel skilled in GIS and/or HAZUS; AutoCAD-Civil 3D; ArcViewGIS	☑	Planning and Zoning – GIS
Scientists familiar with the hazards of the community		Contract
Emergency Manager	☑	Emergency Manager
Grant writer(s)	☑	Economic Development

Table 4A-3: Fiscal capabilities for Sandoval County		
Financial Resources	**Accessible or Eligible to Use (Yes, No, Don't Know)**	**Comments**
Community Development Block Grants	Yes	Included in Comprehensive Plan
Capital Improvements Project funding	Yes	General fund, legislative funding, grants.
Authority to levy taxes for specific purposes	Yes	One-quarter percent EMS tax.
Fees for water, sewer, gas, or electric service	No	No County owned Infrastructure except roads.
Impact fees for homebuyers or new developments/homes	No	
Incur debt through general obligation bonds	Yes	
Incur debt through special tax bonds	Yes	

Table 4B-1: Legal and regulatory capabilities for Bernalillo		
Regulatory Tools for Hazard Mitigation	**Description**	**Responsible Department/Agency**
CODES and/or ORDINANCES	• 2015 IBC, 2015IRC, 2008 UPC, 2008UMC, 2003 IFC, 2017 NEC, 2015 NM Codes • 2008 Flood Control Ord. • 2005 Building Safety Ord. • Comprehensive Planning & Zoning Ord.	• P & Z • Building Safety • Fire Department
PLANS, MANUALS, and/or GUIDELINES	• 2004 Comprehensive Land Use Plan • 2014 Multi-Hazard Mitigation Plan (currently being updated) • 1997 TOB Subdivision and Drainage Plan	• Community Development
STUDIES	• FEMA DFIRM Maps (FEMA, Effective date of March 2008) • Piedra Lisa Dam EAP – 2012 • Bernalillo Levee Study • Bernalillo LOMR Study • Athena Pond Study • Mid-Bernalillo Project Study • S. Hill Pond Study	• FEMA • Town of Bernalillo • ESCAFCA

Table 4B-2:Summary of technical staff and personnel capabilities for Bernalillo		
Staff/Personnel Resources	☑	**Department/Agency - Position**
Planner(s) or engineer(s) with knowledge of land development and land management practices	☑	Planning and Zoning - Planner/Director Public Works - Infrastructure Administrator
Engineer(s) or professional(s) trained in construction practices related to buildings and/or infrastructure	☑	Development Services - Town Engineer Planning and Zoning - Chief Building Official
Planner(s) or engineer(s) with and understanding of natural and/or human-caused hazards	☑	Building Official, Police Chief, Fire Chief
Floodplain Manager	☑	Planning and Zoning - Building Official
Surveyors		
Staff with education or expertise to assess the community's vulnerability to hazards	☑	Planning and Zoning - Infrastructure Administrator Police Chief Fire Chief
Personnel skilled in GIS and/or HAZUS; AutoCAD-Civil 3D; ArcViewGIS	☑	Information and Technology - GIS Tech
Scientists familiar with the hazards of the community		Contract
Emergency Manager	☑	Planning and Zoning - Infrastructure Administrator
Grant writer(s)	☑	Community Development-Grants Coordinator

Table 4B-3: Fiscal capabilities for Bernalillo		
Financial Resources	**Accessible or Eligible to Use (Yes, No, Don't Know)**	**Comments**
Community Development Block Grants	Yes	Apply for CBDG on an annual basis
Capital Improvements Project funding	Yes	15 Year ICIP program
Authority to levy taxes for specific purposes	Yes	Currently have a flood control district tax
Fees for water, sewer, gas, or electric service	Yes	Water and Sewer are TOB utilities, none other
Impact fees for homebuyers or new developments/homes	Yes	None Currently but may be enacting in the future.
Incur debt through general obligation bonds	Yes	
Incur debt through special tax bonds	Yes	We may be at capacity

Table 4C-1: Legal and regulatory capabilities for Corrales		
Regulatory Tools for Hazard Mitigation	**Description**	**Responsible Department/Agency**
CODES and/or ORDINANCES	• International Building Code 2015 codes as adopted by The State of New Mexico, New Mexico • Uniform Plumbing 2012 • Mechanical Code 2012 • National Electrical Code NFPA 70 Electrical Code,2017 • Corrales Building and Building Regulations Chapter 8 Corrales Village Code • Land Use Chapter1 8 Corrales Village Code includes Flooding, Subdivision • Uniform fire Code • International Fire Code of the International Code Council 2009	• Building Inspector • Code Enforcement Officer • Planning and Zoning • Fire Department
PLANS, MANUALS, and/or GUIDELINES	• Village of Corrales EOPP –updating now • Bosque Habitat Management Plan • Intel Corporation Emergency response and Contingency Plan • New Mexico Gas Company Emergency Plan • Emergency Action Plan for Montoya's Arroyo Sportsplex Dam • Bosque Wildfire Urban Interface Fire Run book • Storm Water Management Plan • Community Wildfire Protection Plan- update in progress • Village Comprehensive Plan	• Village of Corrales • Corrales Bosque Advisory Commission • Planning and Zoning • Fire Department
STUDIES	• Village of Corrales Escarpment Draining Report • Flood Insurance Rate Map (FIRM) 2008	• Village of Corrales • FEMA

Table 4C-1: Legal and regulatory capabilities for Corrales		
Regulatory Tools for Hazard Mitigation	**Description**	**Responsible Department/Agency**

Table 4C-2: Summary of technical staff and personnel capabilities for Corrales		
Staff/Personnel Resources	☑	**Department/Agency - Position**
Planner(s) or engineer(s) with knowledge of land development and land management practices	☑	Engineers are on contract and Floodplain Manager on staff have a and Planning & Zoning; Village has two staff member working on their Floodplain Manager
Engineer(s) or professional(s) trained in construction practices related to buildings and/or infrastructure	☑	Building Inspector/Building Official
Planner(s) or engineer(s) with and understanding of natural and/or human-caused hazards	☑	Engineers are on contract, Planning and Zoning and Building Official
Floodplain Manager	☑	Contract Engineers have a Floodplain Manger and Village has two staff member working on their Floodplain Manager
Surveyors		Contract
Staff with education or expertise to assess the community's vulnerability to hazards	☑	Fire department and Planning and Zoning; Building Official; Contract Engineering Firm
Personnel skilled in GIS and/or HAZUS; AutoCAD-Civil 3D; ArcViewGIS	☑	Building Inspector/Building Official
Scientists familiar with the hazards of the community		Contract
Emergency Manager	☑	Emergency Manager
Grant writer(s)	☑	Fire Department; Finance Officer

Table 4C-3: Fiscal capabilities for Corrales		
Financial Resources	**Accessible or Eligible to Use (Yes, No, Don't Know)**	**Comments**
Community Development Block Grants	No	
Capital Improvements Project funding	Yes	
Authority to levy taxes for specific purposes	Yes	
Fees for water, sewer, gas, or electric service	Yes	Fee's in limited area for wastewater line
Impact fees for homebuyers or new developments/homes	Yes	
Incur debt through general obligation bonds	Yes	
Incur debt through special tax bonds	Yes	

Table 4C-3: Fiscal capabilities for Corrales		
Table 4D-1: Legal and regulatory capabilities for Jemez Springs		
Regulatory Tools for Hazard Mitigation	**Description**	**Responsible Department/Agency**
CODES and/or ORDINANCES	• 1999 Sub Division regulations • 2009 Flood Damage Prevention Ordinance • 2007 Comprehensive Plan • 1999 Sign Ordinance	• Planning and Zoning
PLANS, MANUALS, and/or GUIDELINES	• 2000 Focus 2050 regional plan • 2003 Middle Rio Grande water plan • Rio Puerco and Rio Jemez Sub-Regional Water Plan • 2006 Jemez Valley Corridor Assessment • 2012 Infrastructure Capital Improvement plan • Snow Removal	• Mayor • Mayor Pro Tem • Village Council • Sandoval County • NMDOT
STUDIES	•	•

Table 4D-2: Summary of technical staff and personnel capabilities for Jemez Springs		
Staff/Personnel Resources	☑	**Department/Agency - Position**
Planner(s) or engineer(s) with knowledge of land development and land management practices	☑	Planning and Zoning
Engineer(s) or professional(s) trained in construction practices related to buildings and/or infrastructure	☑	Contract Engineers / Village Engineer
Planner(s) or engineer(s) with and understanding of natural and/or human-caused hazards		Not Sure
Floodplain Manager	☑	Sandoval County Certified Floodplain Manager
Surveyors		Contract
Staff with education or expertise to assess the community's vulnerability to hazards	☑	Police Department
Personnel skilled in GIS and/or HAZUS; AutoCAD-Civil 3D; ArcViewGIS	☑	Police Department
Scientists familiar with the hazards of the community		Contract
Emergency manager	☑	Police Department
Grant writer(s)	☑	Librarian

Table 4D-3: Fiscal capabilities for Jemez Springs		
Financial Resources	**Accessible or Eligible to Use (Yes, No, Don't Know)**	**Comments**
Community Development Block Grants	Yes	
Capital Improvements Project funding	Yes	
Authority to levy taxes for specific purposes	Yes	
Fees for water, sewer, gas, or electric service	Yes	
Impact fees for homebuyers or new developments/homes	Don't Know	
Incur debt through general obligation bonds	Yes	
Incur debt through special tax bonds	Yes	

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Table 4E-1: Legal and regulatory capabilities for Rio Rancho		
Regulatory Tools for Hazard Mitigation	**Description**	**Responsible Department/Agency**
CODES and/or ORDINANCES	• Flood Hazard Prevention Ordinance (Chapter 152) (City of RR) • Erosion Control; Storm Drainage (Chapter 153) (City of RR) • Planning and Zoning (Chapter 154) (City of RR) • Subdivision Ordinance (Chapter 155) (City of RR) • Greenbelt Concept Resolution 1992-8 (SSCAFCA) • Drainage Policy Resolution 1994-08 (SSCAFCA) • Drainage Policy Resolution 2001-6 (Drainage Design Criteria for Roadway Projects) (SSCAFCA) • Uniform Building Code (current edition adopted by the State of New Mexico) • Uniform Building Standards (current edition adopted by the state) • New Mexico Building Code (current edition) • Uniform Mechanical Code (current edition adopted by the state • New Mexico Mechanical Code (current edition) • Uniform Plumbing Code (current edition adopted by the state) • New Mexico Plumbing Code (current edition) • National Electric Code (current edition adopted by the state) • New Mexico Electric Code (current edition) • Off-Site Conventionally Built Modular-Manufactured Unit Standards (current edition) • Uniform Swimming Pool, Spa and Hot Tub Code (current edition adopted by the state) • Uniform Energy Conservation Code (current edition adopted by the state) • Uniform Fire Code (current edition adopted by the state) • New Mexico Standard Specifications for Public Works Construction (current edition).	• Development Services, • Public Works, • SSCAFCA

Table 4E-1: Legal and regulatory capabilities for Rio Rancho		
Regulatory Tools for Hazard Mitigation	**Description**	**Responsible Department/Agency**
PLANS, MANUALS, and/or GUIDELINES	• Development Process Manual • Guidelines for Allowable Velocities in Piping Systems approved June 14, 2001 (SSCAFCA) • Drainage Policy Amendment 2004-1 (SSCAFCA) • Drainage Policy Amendment 2004-2 (SSCAFCA) • Drainage Policy Adopted June 20, 2008 (SSCAFCA) • Sediment and Erosion Design Guide November 2008 (SSCAFCA) • Sediment and Erosion Design Guide Power Point Presentation (SSCAFCA) • Special Assessment Districts Manual	• Development Services, • Public Works, • SSCAFCA
STUDIES	• 2010 Montoyas Arroyo • 2010 Sugar Arroyo • Aug. 23, 2012 Westside Boulevard Channel • SportsPlex Dam Emergency Action Plan • Enchanted Hills Dam EAP #1	• Public Works, • SSCAFCA

Table 4E-2: Summary of technical staff and personnel capabilities for Rio Rancho		
Staff/Personnel Resources	☑	**Department/Agency - Position**
Planner(s) or engineer(s) with knowledge of land development and land management practices	☑	Development Services – Planning Manager, Zoning Manager. Public Works – City Engineer
Engineer(s) or professional(s) trained in construction practices related to buildings and/or infrastructure	☑	Public Works – City Engineer. Development Services – Construction, Building & Plumbing Inspector Supervisor.
Planner(s) or engineer(s) with and understanding of natural and/or human-caused hazards	☑	Public Works – City Engineer
Floodplain Manager	☑	Public Works – Floodplain Manager
Surveyors		Contract
Staff with education or expertise to assess the community's vulnerability to hazards	☑	Public Works – Floodplain Manager. Fire/Rescue – Emergency Programs Manager
Personnel skilled in GIS and/or HAZUS; AutoCAD-Civil 3D; ArcViewGIS	☑	Public Works – GIS Coordinator
Scientists familiar with the hazards of the community		Contract
Emergency manager	☑	Fire/Rescue – Emergency Programs Manager
Grant writer(s)	☑	Financial Services – Grants Specialist. Fire/Rescue-Emergency Programs Manager,

Table 4E-3: Fiscal capabilities for Rio Rancho		
Financial Resources	**Accessible or Eligible to Use (Yes, No, Don't Know)**	**Comments**
Community Development Block Grants	Yes	The city applies/receives this grant annually.
Capital Improvements Project funding	Yes	
Authority to levy taxes for specific purposes	Yes	
Fees for water, sewer, gas, or electric service	Yes	Fees for water and sewer
Impact fees for homebuyers or new developments/homes	Yes	Purpose of the Capital Improvement Plan Citizens Advisory Committee. The purpose of this section is to establish a citizen's advisory committee to advise and assist the city in the preparation, implementation and update of the impact fees capital improvement plan (IFCIP). The IFCIP is a plan developed to support the creation of impact fees. The provisions herewith are in accordance with the New Mexico Development Fees Act (NMSA 1978 Sections 5-8-1 et seq.) and City of Rio Rancho Code Sections 150.20 et seq
Incur debt through general obligation bonds	Yes	
Incur debt through special tax bonds	Yes	

Table 4F-1: Legal and regulatory capabilities for San Ysidro		
Regulatory Tools for Hazard Mitigation	**Description**	**Responsible Department/Agency**
CODES and/or ORDINANCES	• 2004 Sub division regulations • 2008 Flood Damage Prevention ordinance • 2010 Comprehensive plan • 2003 Water System ordinance • 2008 Sign Ordinance	• Village Engineer • Village Council • Water Department
PLANS, MANUALS, and/or GUIDELINES	• 2000 Focus 2050 Regional Plan • 2003 Middle Rio Grande Regional Water Plan • Rio Puerco & Rio Jemez Sub Regional Water Plan • 2006 Jemez Valley Corridor Assessment (Transportation) • 2012 Infrastructure Capital Improvement Plan • Snow Removal Plan	• Mayor • Mayor Pro Tem • Village Council • Marshal Department, DOT
STUDIES	•	•

Table 4F-2: Summary of technical staff and personnel capabilities for San Ysidro		
Staff/Personnel Resources	☑	**Department/Agency - Position**
Planner(s) or engineer(s) with knowledge of land development and land management practices	☑	Village Engineer
Engineer(s) or professional(s) trained in construction practices related to buildings and/or infrastructure	☑	Village Engineer
Planner(s) or engineer(s) with and understanding of natural and/or human-caused hazards	☑	Mayor Pro Tem
Floodplain Manager	☑	Cuba Soil Water Conversation District
Surveyors	☑	Village Engineer / Contractor
Staff with education or expertise to assess the community's vulnerability to hazards	☑	Marshal Department
Personnel skilled in GIS and/or HAZUS	☑	Marshal Department
Scientists familiar with the hazards of the community	☑	Mayor Pro Tem
Emergency manager	☑	Marshal Department
Grant writer(s)	☑	Mayor

Table 4F-3: Fiscal capabilities for San Ysidro		
Financial Resources	**Accessible or Eligible to Use (Yes, No, Don't Know)**	**Comments**
Community Development Block Grants	Yes	
Capital Improvements Project funding	Yes	
Authority to levy taxes for specific purposes	Yes	
Fees for water, sewer, gas, or electric service	Yes	
Impact fees for homebuyers or new developments/homes	Don't Know	
Incur debt through general obligation bonds	Yes	
Incur debt through special tax bonds	Don't Know	

Table 4G-1: Legal and regulatory capabilities for SSCAFCA		
Regulatory Tools for Hazard Mitigation	**Description**	**Responsible Department/Agency**
CODES and/or ORDINANCES	• NMSA, Article 19, SSCAFCA Enabling Legislation • Development Process Manual	• SSCAFCA
PLANS, MANUALS, and/or GUIDELINES	• Comprehensive Management Strategy for Arroyo Corridors • Rainwater Harvesting Guide. • Watershed and Drainage Management Plans • Montoyas Watershed Management Plan (WMP) Version 2.0 - Report • Montoyas WMP Version 2.0 - Appendices • Black WMP and 2013 Technical Addendum • Barranca WMP Version 2.0 - Report • Barranca WMP Version 2.0 - Figures • Venada WMP • Unnamed Arroyo (aka Coronado Arroyo) WMP • Rainbow Tributary Discharge Management Plan • Willow Creek WMP • Willow Creek WMP Appendices • Interim Calabacillas WMP • Interim Calabacillas WMP Appendices • Interim Calabacillas WMP Watershed Maps	• SSCAFCA
STUDIES	• Sierra Vista West Facility Plan • Edinburgh Facility Plan • Edinburgh Facility Plan Appendices • Edinburgh Drainage Implementation Plan • Dos Amigos Facility Plan • Dos Amigos Facility Plan - Plate 1 • City Center Facility Plan • NorthWest 17 Facility Plan • Sierra Vista East Facility Plan • Industrial Park Facility Plan • Corrales Heights Dam 1 EAP • Enchanted Hills Dam 1 EAP • Sportsplex Dam EAP	• SSCAFCA

Table 4G-2: Summary of technical staff and personnel capabilities for SSCAFCA		
Staff/Personnel Resources	☑	**Department/Agency - Position**
Planner(s) or engineer(s) with knowledge of land development and land management practices	☑	3-Professional Engineers 1-Land Use Planner
Engineer(s) or professional(s) trained in construction practices related to buildings and/or infrastructure	☑	3-Professional Engineers 1-Construction Manager
Planner(s) or engineer(s) with and understanding of natural and/or human-caused hazards	☑	3-Professional Engineers

Table 4G-2: Summary of technical staff and personnel capabilities for SSCAFCA		
Staff/Personnel Resources	☑	**Department/Agency - Position**
Floodplain Manager	☑	1-Floodplain Manager/PE
Surveyors	☑	3-On-call surveyors
Staff with education or expertise to assess the community's vulnerability to hazards		Contract
Personnel skilled in GIS and/or HAZUS; AutoCAD-Civil 3D; ArcViewGIS	☑	1-Water Resources Scientist/GIS Tech. 2-Professional Engineers
Scientists familiar with the hazards of the community	☑	1-Water Resources Scientist
Emergency manager	☑	1-Field Services Director
Grant writer(s)		

Table 4G-3: Fiscal capabilities for SSCAFCA		
Financial Resources	**Accessible or Eligible to Use (Yes, No, Don't Know)**	**Comments**
Community Development Block Grants	No	
Capital Improvements Project funding	Yes	
Authority to levy taxes for specific purposes	No	
Fees for water, sewer, gas, or electric service	No	
Impact fees for homebuyers or new developments/homes	No	
Incur debt through general obligation bonds	Yes	
Incur debt through special tax bonds	Yes	

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4.1.2 National Flood Insurance Program Participation

Participation in the NFIP is a key element of any community's local floodplain management and flood mitigation strategy. Sandoval County and the incorporated jurisdictions of Bernalillo, Corrales, Jemez Springs, and Rio Rancho currently participate in the NFIP. San Ysidro has adopted a floodplain management ordinance and has FEMA delineated floodplains within its corporate boundaries, but currently is not listed as an NFIP participating community. Specific Pueblo information can be found in their respective Annex to this plan.

Joining the NFIP requires the adoption of a floodplain management ordinance that requires jurisdictions to follow established minimum standards set forth by FEMA and the State of New Mexico, when developing in the floodplain. These standards require that all new buildings and substantial improvements to existing buildings will be protected from damage by the 100-year flood, and that new floodplain development will not aggravate existing flood problems or increase damage to neighboring properties. As a participant in the NFIP, communities benefit from having Flood Insurance Rate Maps (FIRM) that map identified flood hazard areas and can be used to assess flood hazard risk, regulate construction practices and set flood insurance rates. FIRMs are also an important source of information to educate residents, government officials and the private sector about the likelihood of flooding in their community. Table 4-2 summarizes the NFIP status and statistics for each of the participating jurisdictions and at the current time there are no RL/SRL properties located within Sandoval County.

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Table 4-2: NFIP status and statistics for Sandoval County and participating jurisdictions as of October 2018						
Jurisdiction	**Community ID**	**NFIP Entry Date**	**Current Effective Map Date**	**Number of Policies**	**Amount of Coverage**	**Floodplain Management Role**
Sandoval County	350055	06/30/1998	03/18/2008	283	$490,038,000	Floodplain management provided by the County Planning and Zoning Department for all unincorporated areas of the county and the Village of Jemez Springs
Bernalillo, Town of	350056	01/06/1983	03/18/2008	315	$510,822,000	Floodplain management provided by the Town for all incorporated areas of Bernalillo, through the Planning and Zoning Department.
Corrales, Village of	350094	01/06/1983	03/18/2008	104	$31,381,500	Floodplain management provided by the Village for all incorporated areas of Corrales, the Village Contract Engineering Fire WHPacific. Currently two Village staff members are working on Floodplain certification.
Jemez Springs, Village of	350096	01/03/1986	03/18/2008	11	$20,029,000	The Village of Jemez Springs defers floodplain management responsibilities to the County by written agreement.
Rio Rancho, City of	350146	04/15/1992	09/26/2008	108	$250,949,000	Floodplain management provided by the City for all incorporated areas of Rio Rancho, through the Public Works Department.
San Ysidro, Village of	Community ID: 350138. Currently not participating in NFIP but does have SFHA delineated within the Village boundaries. The Village of San Ysidro has adopted the ordinance to participate in the NFIP, but it was not sent to FEMA.					
Southern Sandoval County Arroyo Flood Control Authority	SSCAFCA does not regulate floodplains and as an entity and is not a participant in the NFIP. Floodplain management within SSCAFCA boundaries are managed by the County and respective incorporated jurisdictions.					
All Indian Pueblos	None of the participating Indian Pueblos are currently participants in the NFIP.					

Each of the incorporated jurisdictions currently participating in the NFIP program performed an overall assessment of their NFIP program by responding to the following questions:

Question 1: Describe your jurisdiction's current floodplain management / regulation process for construction of new or substantially improved development within your jurisdiction.

Question 2: Describe the status and/or validity of the current floodplain hazard mapping for your jurisdiction.

Question 3: Describe any community assistance activities (e.g. – help with obtaining Elevation Certificates, flood hazard identification assistance, flood insurance acquisition guidance, public involvement activities, etc.)

Question 4: Describe identified needs in your floodplain management program. This could include things like updating the floodplain management code/regulation, establishing written review procedures, modifying or adding flood hazard area mapping, etc.

Table 4-3 summarizes the responses provided by each of the current participating jurisdictions.

Table 4-3: NFIP program assessment for participating NFIP jurisdictions

Participating Jurisdiction	Responses to Questions 1-4	
Sandoval County	Q1	(1) Application for a Floodplain Development Permit shall be presented to the Floodplain Administrator on forms furnished by him/her and may include, but not be limited to, plans in duplicate drawn to scale showing the location, dimensions, and elevation of proposed landscape alterations, existing and proposed structures, including the placement of manufactured homes, and the location of the foregoing in relation to areas of special flood hazard. In all areas of special flood hazards the following provisions are required for all new construction and substantial improvements: (1) All new construction or substantial improvements shall be designed (or modified) and adequately anchored to prevent flotation, collapse or lateral movement of the structure resulting from hydrodynamic and hydrostatic loads, including the effects of buoyancy; (2) All new construction or substantial improvements shall be constructed by methods and practices that minimize flood damage; (3) All new construction or substantial improvements shall be constructed with materials resistant to flood damage; (4) All new construction or substantial improvements shall be constructed with electrical, heating, ventilation, plumbing, and air conditioning equipment and other service facilities that are designed and/or located so as to prevent water from entering or accumulating within the components during conditions of flooding; (5) All new and replacement water supply systems shall be

Table 4-3: NFIP program assessment for participating NFIP jurisdictions		
Participating Jurisdiction	**Responses to Questions 1-4**	
		designed to minimize or eliminate infiltration of flood waters into the system; (6) New and replacement sanitary sewage systems shall be designed to minimize or eliminate infiltration of flood waters into the system and discharge from the systems into flood waters; and, (7) On-site waste disposal systems shall be located to avoid impairment to them or contamination from them during flooding.
	Q2	Existing maps are FEMA flood maps, some of which are under LOMRs/LOMAs. No local jurisdiction maps have been created. The areas of special flood hazard are identified by the Federal Emergency Management Agency in the current scientific and engineering report entitled, "The Flood Insurance Study (FIS) for Sandoval County, New Mexico and Incorporated Areas," dated March 18, 2008, with accompanying current effective Flood Insurance Rate Maps (FIRM) dated March 18, 2008.
	Q3	Assistance is given on an individual basis by meeting with the Floodplain Administrator.
	Q4	Current Floodplain Ordinance is dated April 2008. Updates or modifications are done on an as needed basis.
Bernalillo, Town of	Q1	All building activity is permitted by the Building Official/Floodplain Manager. At the time of permit clients are advised as to their floodplain status and informed of the BFE, and how high they will need to elevate their project to be above BFE. Commercial facilities are also advised how they may alternatively flood proof their property.
	Q2	We were re-mapped in March 2008 and the quality was poor. FEMA just used the prior data from the earlier map. We are working with EDAC at UNM where they have LIDAR to make the process better and to provide more accurate topographical maps for assessing flood hazards at specific properties.
	Q3	We have had a couple of Town meetings to explain flood hazards, mapping and insurance. The Floodplain Manager almost daily works with clients to provide assistance with zone identification, insurance, and Elevation Certificates.
	Q4	We need more accurate maps and re-certification of our levees.
Corrales, Village of	Q1	All permits for new construction and/or remodels and/or additions in excess of 120 square feet must be reviewed and approved for zoning regulations, storm water and terrain management, and building codes. All development in excess of 1,000 square feet, located west of the Corrales Main Canal, requires a Terrain and Storm Water Management Plan (grading and drainage plan) prepared by a Professional Engineer or Architect, registered in the

Table 4-3: NFIP program assessment for participating NFIP jurisdictions		
Participating Jurisdiction	**Responses to Questions 1-4**	
		State of New Mexico, and the designing engineer is required to seal, sign, and certify the drainage plan's construction according to plan before a Certificate of Occupancy is issued. The zoning officials review the proposed permit location for flood zone determination and consult with contract engineer if needed. . If a property is in any flood zone except "X" or "X shaded", the contractor must obtain an Elevation Certificate prepared by a licensed surveyor in the State of New Mexico. The complete elevation certificate is kept on file in the Planning and Zoning Department. Village laws/ordinances regulate construction in flood plains and on steep slopes within the Village of Corrales.
	Q2	The Village of Corrales is using FIRM dated March 2008 as the official zone designation maps. The Southern Sandoval County Arroyo Flood Control Authority (SSCAFCA) works closely with the Village in designing and implementing flood control projects, including submitting requests for LOMR's as appropriate.
	Q3	The Village Planning and Zoning department staff and Emergency Manager answer questions from private property owners, realtors, and real estate appraisers on a regular basis. The Flood Plain Manager or Contract Engineering Company provides flood zone determination letters upon request for property owners. After completion of the US Army Corps of Engineers levee along the Rio Grande in 1998, most of the Village was removed from Flood zones A 1 to 3 feet in depth. There are very small areas remaining that are in the floodplain, and very little development has occurred in those areas in recent years. Staff does advise property owners and their contractors that at least 12" of freeboard is required in the X-shaded flood zone, but they may choose to allow for 18" of freeboard to help ensure the residence and major buildings are above base flood elevation.
	Q4	The Village of Corrales doesn't anticipate needing updated maps until the usual scheduled time, approximately 2019 or 2020. At this time the Village of Corrales hopes to have at least one in house Floodplain Manager and possible two. Until that time the Contract engineering firm's Floodplain Manager will be utilized.

Table 4-3: NFIP program assessment for participating NFIP jurisdictions		
Participating Jurisdiction	**Responses to Questions 1-4**	
Jemez Springs, Village of	Q1	The Village of Jemez Springs Floodplain manager is Sandoval County by virtue of written agreement and all permits are reviewed by Sandoval County.
	Q2	Everything is kept at Sandoval County
	Q3	Defer to Sandoval County
	Q4	Defer to Sandoval County
Rio Rancho, City of	Q1	AMENDING R.O. 2003 TITLE XV, CHAPTER 152, FLOOD HAZARD PREVENTION The City has identified some playa areas that are prone to flooding but have not been previously identified by either FEMA or City ordinances; and 44CFR60.5 requires communities participating in the National Flood Insurance Program to regulate the development of such areas. In addition, there have been areas identified that are subject to flood-related erosion that must also be regulated per 44CFR. Also, FEMA has recently issued revised Flood Insurance Rate Maps that must be officially adopted. Finally, FEMA has recently required the local municipalities to demonstrate compliance with the Endangered Species Act and has placed the burden of compliance on the local municipalities.
	Q2	All Floodplain mapping is through our city GIS system. Marked up revisions are done to the FEMA Flood Insurance Rate Map (FIRM) maps through a Letter of Map Revision (LOMR).
	Q3	None at this time.
	Q4	The newest Floodplain ordinance includes area that the FEMA maps leave out. Playa. An area of unimproved land that collects water without a defined channel or drainage way that provides for full discharge of the collected water. Playa Floodplain. A playa that has been analyzed and for which supporting documentation exists that indicates water surface elevations of greater than one foot may exist for the one percent chance design storm. § 152.33 FLOOD-RELATED EROSION-PRONE AREAS:

Table 4-3: NFIP program assessment for participating NFIP jurisdictions		
Participating Jurisdiction	**Responses to Questions 1-4**	
		Prior to development adjacent to a Major Channel, Flood-related-erosion prone areas, as defined by LEE (Lateral Erosion Envelope) lines, shall be determined as provided for in the Sediment and Erosion Design Guide included, by reference, in the City Development Process Manual. These additions to our ordinance provide better management of areas that could potentially be at risk.

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4.2 Hazard Mitigation Goals

An assessment of the mitigation goals summarized in the 2014 Plan was performed by the Planning Team and to aid with the assessment, the goals listed in the 2018 State Plan (pages 522 and 523) were made available as well as the section of the 2011 FEMA Review Guidelines that addresses the requirements for plan goals.

- The Planning Team preferred to not develop objectives, but only desired to have a list of goals.

In conclusion, the Planning Team chose to create a blend of the eight 2018 State Plan goals for natural hazard mitigation and the 2014 Sandoval County Plan. The following are the results of the goals assessment and update:

- ***Goal 1***: Reduce the number of injuries, fatalities, property damage, both public and private due to natural hazards.
- ***Goal 2***: Shorten recovery times after natural hazard events
- ***Goal 3***: Improve mitigation related communication, collaboration and integration among county, local and tribal emergency management agencies.
- ***Goal 4***: Promote hazard mitigation as a public value in recognition of its importance to the health, safety, and welfare of the population.
- ***Goal 5***: Promote hazard-resilient future development.

4.3 Mitigation Actions/Projects

Mitigation actions/projects (A/P) are those activities identified by a jurisdiction, that when implemented, will have the effect of reducing the community's exposure and risk to the particular hazard or hazards being mitigated. The implementation strategy addresses the "*how, when, and by whom?*" questions related to implementing an identified A/P.

The process for defining the list of mitigation A/Ps for the Plan was accomplished in three steps:

- ✓ First, an assessment of the actions and projects specified in the 2014 Plan was performed, wherein each jurisdiction reviewed and evaluated their jurisdiction specific list.
- ✓ Second, a new list of A/Ps for the Plan was developed by combining the 2014 Plan A/Ps that will be carried forward as a result of the assessment, and any new A/Ps.
- ✓ Third, an implementation strategy for the combined list of A/Ps was formulated.

Details of each step and the results of the process are summarized in the following sections.

4.3.1 Previous Mitigation Actions / Projects Assessment

The Planning Team reviewed and assessed the 2014 Plan actions and projects. The assessment included evaluating and classifying each of the previously identified A/Ps based on the following criteria:

STATUS		***DISPOSITION***	
Classification	Explanation Requirement:	Classification	Explanation Requirement:
"***No Action***"	Reason for no progress	***"Keep"***	None required
"***In Progress***"	What progress has been made	***"Revise"***	Revised components
"***Complete***"	Date of completion and final cost of project (if applicable)	***"Delete"***	Reason(s) for exclusion.

Any A/P with a disposition classification of "Keep" or "Revise" was carried forward to become part of the new A/P list for the Plan. All A/Ps identified for deletion were removed and are not included in this Plan. The results of the assessment for each of the 2014 Plan A/Ps are summarized by jurisdiction in Tables 4-4-1 through 4-4-7.

Specific Pueblo information can be found in their respective Annex to this plan.

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Table 4-4-1
Assessment of mitigation actions/projects identified by Sandoval County in the previous plan cycle

Action / Project Title	• **Lead Agency** • **Proposed Cost** • **Proposed Comp Date**	Status	Disposition	Explanation
1. Wildland-Urban Interface (Defensible Space). Reduction of fuels in and near urban interface areas of Sandoval County that are identified as hazardous by USFS.	• SC Fire Department; Public Works Dept. • $550,000 • On-going	Ongoing	Keep	USFS Grant covering $249,000 of project and Sandoval County will match with $301,000. Projects have been ongoing since 2006.
2. Public Education. Print material regarding positive aspects of forest thinning to reduce wildfire losses. Outreach materials to reduce the effects of dam failure, drought, flood, severe weather (heat /cold), and wind.	• SC Emergency Management • $50,000 • Within 2 years of funding	Ongoing	Keep	As funding is received, outreach programs will be developed and implemented to inform the community of preparedness activities.
3. Flood mitigation and response. Improve roads and bridges within Sandoval County to help mitigate the effects of flooding and create options for potential evacuation and response routes.	• SC Emergency Management; Public Works • $28,000,000 • 2030	Ongoing	Keep	As bonds are approved and local, state, and federal grants are applied for, utilize the funding to phase projects and complete in stages.
4. Increase GIS Infrastructure and Capability. Improve GIS infrastructure to have more real time information available for planned events and incidents that occur. Improve the continuity of operations to eliminate a single point of failure to current system.	• Planning and Zoning GIS Division • $100,000 • 2025	Ongoing	Keep	Utilizing local, state, and federal funding work to bolster and improve the County GIS capability to be able to better support itself and the surrounding municipalities and Pueblos.

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Table 4-4-2
Assessment of mitigation actions/projects identified by Town of Bernalillo

Action / Project Title	• Lead Agency • Proposed Cost • Proposed Comp Date	Status	Disposition	Explanation
1. GIS Infrastructure Improvements. Improve and implement our GIS program to better identify and mitigate at risk portions of town. In addition, we can create materials (maps both physical and digital) to improve response and planning in the event of emergencies.	• Planning and Zoning • $40,000 • 2020	In progress	Keep	Ongoing work with E911 addressing and infrastructure mapping
2. Develop a Stormwater Master Plan. Partner with other communities to develop a stormwater master plan.	• Sandoval County Stormwater Team • Staff Time • Staff time	Complete	Keep	A stormwater team has been created and consists of eleven communities to ensure there is a regional stormwater master plan for the jurisdiction.
3. Athena Pond. Implement a flood control project between the Town of Bernalillo and ESCAFCA. The flood control pond will help alleviate incoming runoff from the East.	• Planning and Zoning • $926,000 • 2017	Complete	Keep	A pond was created off of South Hill Road and Athena to help control the flooding that can occur.
4. EAP – Piedra Liza Dam. Update Emergency Action Plan for Piedra Liza Dam.	• CSWCD • Staff time • Every 5 years	Ongoing	Keep	The Coronado Soil and Water Conservation District along with the Town of Bernalillo, ESCAFCA, and Sandoval County review annually and update every plan.
5. Building Code Revision. Update existing building codes to ensure mitigation regarding Flood, Fire, Severe Weather/Wind, and Drought (irrigation restrictions etc.).	• Planning and Zoning • Staff Time • 2018	Complete	Revise	The State of NM adopted the 2015 IBC and IRC in July of 2017 and Bernalillo follows the codes.

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Table 4-4-3
Assessment of mitigation actions/projects identified by Corrales in the previous plan cycle

Action / Project Title	• Lead Agency • Proposed Cost • Proposed Comp Date	Status	Disposition	Explanation
1. Increase water storage capacity and waterlines for fire suppression, including a new to be Engineered calculated storage tank and distribution system on Angel Hill. Village water supply limited by present storage capacity; impacts ability to suppress wildland-interface fires and structure fires.	• Village of Corrales Fire Department • $5,000,000 • Ongoing project	Revise	Revise	Installed 3 Fire pumps and 5,000 feet of hydrant lines • 4920 Corrales Road - 120,000 gallon tank with pump and hydrants • 2200 Loma Larga - 80,000 gallon tank with pump and hydrants (2,500 feet of line 5 hydrants) • 500 Jones Road 36,000 gallons tank added with 400GPM well fire pumps and 3 hydrants) Want to install more tanks, waterline for fire suppression and hydrants to help with preservation of Life and Property within the Village. The Village with no municipal water system, This is an ongoing project. To expand fire protection through the Village
2. Create a building code inspector position to work under the Fire Department and the Department of Planning and Zoning. Additional inspector would help to reduce threat to structures from hazards by consistently enforcing fire and building codes in new and renovated structures.	• Village of Corrales Planning and Zoning • $50,000 per year • Within 24 months of adoption of plan	Complete	Revise	The Village now has a full time Building Inspector, Code Enforcement Officer and an Acting Emergency Manager. The Village still would like to fill a Fire Marshall position under fire department.
3. Develop a Geographic Information System –based mapping for the Village of Corrales. GIS mapping can help identify more precisely areas that are vulnerable to specific hazards.	• Village of Corrales Planning and Zoning • $50,000 • Within 36 months of adoption of plan	Keep	Keep	The Village still needs to update addressing and GIS mapping and have access in Emergency Vehicles to mapping through computers. To help evacuations and location of individual with special needs
4. Implement flood hazard mitigation and remediation projects identified in the Westside Drainage Plan (1999) and the Salce Basin Evaluation-Assessment (2010). Village of Corrales identified as being vulnerable to flood damage in steep terrain.	• Village of Corrales • $1,500,000 • Within 12 months of adoption of plan	In progress	Keep	The Village received funding for this project under FEMA-DR-4079-NM-3 in the amount if 2,199,515.00 and is in final engineering and Invitation to Bid phase.

Table 4-4-3
Assessment of mitigation actions/projects identified by Corrales in the previous plan cycle

Action / Project Title	• Lead Agency • Proposed Cost • Proposed Comp Date	Status	Disposition	Explanation
5. Add fuel reduction and "non-native species removal" to Village Bosque Fire Plan. Village of Corrales Bosque identified as being vulnerable to wildfires.	• Village of Corrales in cooperation with the State of NM Forestry Division • $1,500/acre; Total of $200,000 • Within 24 months of adoption of plan	Ongoing	Keep	Completed two fuel reduction areas, we had more but the citizens did not want to destroy Habitat and the Bosque was labeled a Audubon Bird Area Working with Corrales Bosque Advisory Commission on planning for maintenance of existing shaded fuel breaks and plans for more shaded fuel breaks
6. Hold Public Meetings and send flyers to residents of Corrales to educate them on defensible space and construction. Village of Corrales Bosque identified as being vulnerable to wildfires.	• Village of Corrales • $15,000 • Within 12 months of adoption of plan	Ongoing	Keep	We have been attending Neighborhood meetings, community meeting with defensible space information. Offering to assist citizens with defensible space palming by evaluating their property.
7. Update Emergency Operations Plan to include adherence to Homeland Security rules and regulations. Village of Corrales Bosque identified as being vulnerable to wildfires.	• Village of Corrales Emergency Manager with support of the Sandoval County Emergency Manager • $5,000 • Within 12 months of adoption of plan	In progress	Keep	Working with local groups to complete their animal evacuation plans. Working with citizens to have their own plan for emergencies. Working with new Administration to review and submit to council.
8. Install Emergency Generators at Village owned critical infrastructure	• Corrales Fire Department/ EM • 500,000 • Within 48 months of adoption of the plan	New	New	Corrales has one building with emergency backup power. One fire suppression tank has back up power. The Village Hall, Police Department and Council Chamber/Court house have no emergency backup power. All of these facilities are critical for Continuity of Government
9. Fire Marshall position to work under the Fire Department.	• Fire department • 75,000 • Within 36 months of adoption of plan	Revised	Keep	The Village still would like to fill a Fire Marshall position under fire department. This would increase fire safety and wildland urban interface safety for the Village

Table 4-4-3
Assessment of mitigation actions/projects identified by Corrales in the previous plan cycle

Action / Project Title	• Lead Agency • Proposed Cost • Proposed Comp Date	Status	Disposition	Explanation
10. Purchase a vactor truck for storm culvert cleaning	• Public works • 150,000 • Within 24 months of plan adoption	New	New	The village has numerous storm drains and will be installing more with the Salce Basin project. The Village currently has no ability to clean out the drains with owner equipment. This truck will help reduce flooding risks

Table 4-4-4
Assessment of mitigation actions/projects identified by Jemez Springs in the previous plan cycle

Action / Project Title	• Lead Agency • Proposed Cost • Proposed Comp Date	Status	Disposition	Explanation
1. Build levees, culverts, and dirt work to channel water away from roads and homes. Construct levees, culverts, and dirt work to channel water under, around, or away from NM 4, Mooney Boulevard, and homes. Jemez Springs is nestled in a long, narrow valley along NM 4, with the Jemez River running parallel to the road. Heavy Spring rains wash out several portions of the NM 4, and some houses stand in the path of the water as it continues its run toward the river. These washouts block the road in and out of the village and at times totally isolate emergency traffic and some homeowners. In addition to NM 4, Mooney Boulevard is subject to washouts that cause flooding to homes in the area.	• Village of Jemez Springs in coordination with the New Mexico State Highway Transportation Dept. and Sandoval County • $1 million • None specified. Project will be initiated upon receipt of funding and procurement of contractors.	Ongoing	Keep	Continue to look for sources of funding.

Table 4-4-4
Assessment of mitigation actions/projects identified by Jemez Springs in the previous plan cycle

Action / Project Title	• Lead Agency • Proposed Cost • Proposed Comp Date	Status	Disposition	Explanation
2. Thin trees and clean-up defensible spaces around Jemez Springs. Jemez Springs is susceptible to wildland fires. There is a small bosque area where beetles are killing large numbers of piñon pines and juniper trees. When the trees die and dry up, the fire danger is accelerated. Also, the threat of fire exists from the mesa tops as embers (fire brands) can ignite from great distances, as seen in other recent fires.	• Village of Jemez Springs in coordination with the USFS • $500,000 • None specified. Project will be initiated upon receipt of funding and procurement of contractors.	Ongoing	Keep	Continue to look for sources of funding.
3. Investigate and promote economic resources that provide alternatives to tourism based on the surrounding National Forests. The Jemez Springs economy is heavily dependent on tourism.	• Village of Jemez Springs • $500,000 • None specified. Project will be initiated upon receipt of funding.	Ongoing	Keep	Continue to look for sources of funding.

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Table 4-4-5
Assessment of mitigation actions/projects identified by Rio Rancho in the previous plan cycle

Action / Project Title	• Lead Agency • Proposed Cost • Proposed Comp Date	Status	Disposition	Explanation
1. Develop a City Stormwater Management Plan. As a sub-plan of the City's Vision 2020 Comprehensive Plan, develop a master plan for the City's natural and artificial drainage system that identifies general hazards, deficiencies, and other problems and presents a strategy for addressing them over the long term.	• Rio Rancho City Development, Rio Rancho Public Works, SSCAFCA • $40,000 • Two years to final draft.	No Action	Delete	Development within the City of Rio Rancho (CoRR) is totally at the whim of the individual developers. Although the CoRR Planning Section of the Department Services Development is in the process of creating "Specific Area Plans" in an attempt to create a development strategy, only a few of these plans exist and they in no way incorporate the entire jurisdiction of the CoRR. Since development depends upon what land a developer may be able to consolidate then the CoRR has no way of knowing what land areas are going to develop in what ways or at what density. Therefore, in summation, with the current development process it is impossible for the CoRR to produce a Comprehensive Storm Water Management Plan. The best we can do at this time is to require developers other than single family residences (SFR's) to build whatever Storm Water Management / Drainage infrastructure is necessary for their particular development to ensure that the discharge from their development has no adverse impact to either upstream or downstream properties.

Table 4-4-5
Assessment of mitigation actions/projects identified by Rio Rancho in the previous plan cycle

Action / Project Title	• Lead Agency • Proposed Cost • Proposed Comp Date	Status	Disposition	Explanation
2. Barrancas Arroyo Reach Plan. Develop a plan for the long-term mitigation and improvement of a reach of the Barrancas Arroyo that is subject to frequent flooding and erosion problems, compounded by threats to utilities, gas lines, and drainage infrastructure.	• Rio Rancho Public Works, SSCAFCA, affected utility companies • $40,000 for study $250,000 for implementation. • Study and Plan – 2003 Implementation – 2008 depending on financing.	No Action	Delete	It matters not which arroyo one wants to discuss, the results are the same. Everything that has been stated above applies to any reach of any arroyo. In fact the major arroyos are actually within the jurisdiction, and for the most part ownership, of the Southern Sandoval County Arroyo Flood Control Authority (SSCAFCA). SSCAFCA's Development Process Manual (DPM) identifies the requirements for the placement of utilities within and arroyo. As for the required drainage infrastructure, SSCAFCA has produced Watershed Management Plans (WMP) for each of the six major arroyo systems. It must be noted, however, that these plans are based on the plating and land use information available at the time of the WMP creation. Once again when developers consolidate land and deviate from the assumed land use then the "Plans" are no longer valid. The closest thing that was done for the lower reach of the La Barranca Arroyo was for FEMA to commission their engineer at the time, URS, to study and develop a plan for the reach between Hwy 528 and the river. This plan was submitted to FEMA, by FEMA's Engineer, and promptly rejected by FEMA.
3. Develop a Functioning GIS within the City of Rio Rancho's Emergency Management Operations. Initiate the development and use of a GIS to support mitigation strategies and increase information accessibility and effective decision-making during an emergency.	• Public Works • FY18	Completed	Keep	The City Council has approved the funding of the first phase of GIS integration. This is a three year project that will begin in FY13 and will incorporation Emergency Management needs.

Table 4-4-5
Assessment of mitigation actions/projects identified by Rio Rancho in the previous plan cycle

Action / Project Title	• **Lead Agency** • **Proposed Cost** • **Proposed Comp Date**	Status	Disposition	Explanation
4. In Rio Rancho, Increase the Number of Code Enforcement Officers in the Department of Public Safety Code Enforcement Division from five to eight within two years. Increase the number of Code Enforcement Officers in the Department of Public Safety Code Enforcement Division from five to eight within two years. Ensure that all Code Enforcement Officers obtain certification within four years. (p 78 of 2004 Plan). Allocate an officer as administration to attend to administrative duties for the division.	• Rio Rancho Department of Public Safety • $52,000 X 3 = $156,000. • Add one Code Enforcement Officer each budget year FY04 through FY06; each to complete certification within two years of hire (i.e., FY06 through FY08).	In Progress	Revise	Currently have 7 Code Enforcement Officers. Due to funding limitations the City has not been able to add the last needed Code Enforcement Position.
5. Utilize a GIS for Identifying Sensitive-Area Properties in Rio Rancho. Prioritize and implement a GIS sensitive-areas analysis to identify properties within severe slope areas, such as Mariposa (City of Rio Rancho) and Rio Puerco Escarpment (Rio Rancho Estates, Sandoval County), and flood hazard areas for property acquisition purposes.	• Rio Rancho City Development Department, Rio Rancho Public Works Department, in coordination with Sandoval County and SSCAFCA. • TBD • Within FY04	Completed/ In Progress	Keep	The City Council has approved the funding of the first phase of GIS integration. This is a three year project that will begin in FY13.

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Table 4-4-6
Assessment of mitigation actions/projects identified by San Ysidro in the previous plan cycle

Action / Project Title	• Lead Agency • Proposed Cost • Proposed Comp Date	Status	Disposition	Explanation
1. Install Early Warning Devices for Critical Facilities in Village of San Ysidro. Currently the Village of San Ysidro has an early warning system that is not operational. The system was installed in the 1970s, and the lack of an operational early warning system is a threat to public safety. A new system installed at the San Ysidro Marshal's Department Building would provide an early warning system that can be activated upon receipt of a notice of an emergency.	• San Ysidro Marshal's Department • $10,000 • 2025	In Progress	Keep	Waiting on funding source.
2. Install an Emergency Call Box at Each San Ysidro Municipal Complex. Within the last year the local telephone system has lost 911 service or all phone service approximately five times. The plan will be to install a microwave phone line on the Municipal Complex from the Qwest phone service area. Emergency call boxes will be added to the Municipal Building and the Fire Department belonging to Sandoval County. To notify the local public, the San Ysidro Marshal's Department will publish a notice in the local papers and mail fliers to residents, telling them where to find the call boxes and how to operate them. This will provide better service to all residents in the Jemez Mountain area.	• San Ysidro Marshal's Department • $7,000 • 2025	In Progress	Keep	Waiting on funding source.

Table 4-4-6
Assessment of mitigation actions/projects identified by San Ysidro in the previous plan cycle

Action / Project Title	• Lead Agency • Proposed Cost • Proposed Comp Date	Status	Disposition	Explanation
3. Extend Water Lines and Install Fire Hydrants on the Extended Lines to Areas Currently Not Served. By extending the water system lines and adding fire hydrants, the village will be able to provide water for fires in the Jemez Mountain, US 550, and NM 4 areas. This also assists with the drought condition providing water for residents within and outside of the village limits for household use. Currently the village provides water to several residences that lie outside the village limits. The village also provides water to all fire departments. Increasing the ability to get water closer to the fire scene will decrease property damage and increase the safety of the fire fighters.	• Village of San Ysidro • $100,000 • Within 3 years	Complete	Keep	The project is complete.
4. Prepare a Drought Plan. Drought plan will assist the Village in continued operations of water facilities and rural farmers during a drought. This plan will assist both public and private sector in managing resources, livestock, and farming during a drought. Will provide the ability to manage water resources for residential, agriculture, fire protection, and recreational use.	• Village of San Ysidro • $50,000 • 2018	Complete	Keep	The project is complete.

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Table 4-4-7
Assessment of mitigation actions/projects identified by SSCAFCA in the previous plan cycle

Action / Project Title	• Lead Agency • Proposed Cost • Proposed Comp Date	Status	Disposition	Explanation
1. Sugar Dam Outlet Structure	• SSCAFCA • $500,000 • 2012	In Progress	Revise	Other projects of higher priority have been identified. Project design has been completed, but project reprioritized and placed on hold.
2. Unit 17 Drainage Improvements	• SSCAFCA • $1,500,000 • 2017	Completed	Completed	The Alberta Watershed Improvements, Phase 2 has been completed.
3. Dulcelina Curtis Channel Inlet Upgrade	• SSCAFCA • $1,100,000 • 2013	Completed	Completed	The Lomitas Negras Improvements, Phase 2, was completed in 2014 to include the inlet for the Dulcelina Curtis Channel.
4. Willow Creek Drainage Improvements	• SSCAFCA • TBD • 2013	In progress	Revise	The watershed management plan for Willow Creek was developed. SSCAFCA has limited ownership in this watershed as the City of Rio Rancho is the primary agency.
5. La Barranca City Center Drainage / Dam Sites	• SSCAFCA • $7,000,000	In progress	Revise	Land acquisition for the Paseo del Volcan Dam has been completed. Preliminary design has been completed. Upstream development has not necessitated the construction of this facility, but planning has been completed.
6. Tributary A Dam	• SSCAFCA • $2,000,000 • 2014	In progress	Revise	Land acquisition for the Trib A dam has been completed. Planning is currently underway for this facility construction in partnership with CoRR, RRPS, and private developers.
7. Montoyas Arroyo Bank Stabilization Project	• SSCAFCA • TBD • 2015	In progress	Revise	One element of this project has been completed upstream of Sportsplex Dam. Stabilization of other reaches of the Montoyas Arroyo have been identified and are in planning or funding acquisition
8. Edinburgh pipeline	• SSCAFCA • TBD • 2014	In progress	Revise	This project is being constructed by private developers and is nearing the first phase of completion.

Table 4-4-7
Assessment of mitigation actions/projects identified by SSCAFCA in the previous plan cycle

Action / Project Title	• Lead Agency • Proposed Cost • Proposed Comp Date	Status	Disposition	Explanation
9. 19th Avenue Dam	• SSCAFCA • TBD • 2015	In progress	Revise	Land acquisition for this facility has been completed. Project has been conceptually designed. Waiting for funding and upstream development to necessitate the construction of this facility.
10. Venada Arroyo Channel Stabilization	• SSCAFCA • TBD • 2014	In progress	Revise	Areas requiring stabilization have been identified and are in planning and design.
11. Unser Dam	• SSCAFCA • $1,500,000 • 2017	In progress	Revise	Land acquisition and preliminary planning have been completed for this facility.
12. Upper Black Watershed Drainage Improvement	• SSCAFCA • TBD • 2015	In progress	Revise	Specific projects have been identified for implementation and land acquisition has been completed
13. Cite Center Drainage Improvements (PDV, SLO)	• SSCAFCA • TBD • 2016	In progress	Revise	Plans for City Center and PDV have been refined and scheduled for when development necessitates construction of facilities.
14. Cite Center Drainage Improvements (PDV, SLO)	• SSCAFCA • TBD • 2014	In progress	Revise	Plans for City Center and PDV have been refined and scheduled for when development necessitates construction of facilities.

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4.3.2 New Mitigation Actions / Projects and Implementation Strategy

The first step in developing a list of mitigation actions/projects for each participating jurisdiction was to conduct a brainstorming session at a Planning Team Meeting. Using the goals, results of the vulnerability analysis and capability assessment, and the Planning Team's institutional knowledge of hazard mitigation needs in the County and jurisdictions, the Planning Team brainstormed to develop a comprehensive list of potential mitigation A/Ps that address the various hazards identified. The results of that brainstorming effort are summarized as follows by hazard:

GENERAL MULTI-HAZARD:

- Install early warning sirens in select strategic locations as a part of a comprehensive emergency notification system to inform citizens of impending hazards such as dam failure, severe weather conditions, and severe wind events (particularly tornados). ****Addresses: Dam Failure, Flood, Severe Weather, Severe Wind, Wildfire ****
- Use newsletters, flyers, utility bill inserts, website notices, radio and television announcements, and newspaper articles to educate the public about hazards impacting the county and how to be prepared in the case of a disaster event. ****Addresses: Dam Failure, Drought, Flood, Severe Weather, Severe Wind, Wildfire ****
- Provide links on the community's website to sources of hazard mitigation educational materials (i.e. www.fema.gov) encouraging private citizens to be prepared for hazard emergencies. ****Addresses: Dam Failure, Drought, Flood, Severe Weather, Severe Wind, Wildfire ****
- Review and assess building and residential codes currently in use to determine if newer, more up-to-date codes are available or are required by the Construction Industries Division of the New Mexico Regulation and Licensing Department. ****Addresses: Dam Failure, Drought, Flood, Severe Weather, Severe Wind, Wildfire ****
- At a minimum, adopt and enforce the most current building codes required by the Construction Industries Division of the New Mexico Regulation and Licensing Department. ****Addresses: Dam Failure, Drought, Flood, Severe Weather, Severe Wind, Wildfire ****

DAM FAILURE:

- Post dam failure hazard evacuation routes.
- Conduct occasional table top exercises to identify potential mitigation measures for increasing response effectiveness, such as evacuation route marking and permanent protection measures for intended shelters.
- Conduct annual dam safety inspections and report the results to the State Engineer's Office.
- Annually coordinate with federal dam owners to get updates on any changes in dam safety conditions and emergency action plan information.

DROUGHT:

- Public education of water conservation best practices through newsletter, flyers and website notices.
- Develop an ordinance requiring strategic watering times and volumes.
- Mandate the use of drought resistant landscaping through ordinance development and/or enforcement.

- Coordinate with State Drought Task Force to perform drought management at the local/tribal level.
- Develop a local Drought Management Plan to define various levels of conservation requirements that are based on drought severity triggers and enforced through utility billing structures and ordinance.
- Implement a water harvesting program through the location, design and construction of dual functioning stormwater retention facilities with enhanced recharge elements designed into the basin. ****Addresses both Drought and Flood****

FLOOD:

- Implement a water harvesting program through the location, design and construction of dual functioning stormwater retention facilities with enhanced recharge elements designed into the basin. ****Addresses both Drought and Flood****
- Work with SSCAFCA to develop and/or modify existing plans for stormwater management that will analyze and identify problem flooding areas and propose long-term mitigation alternatives designed to reduce or eliminate the flood problems.
- Review and update or augment flood control ordinances to provide a greater level of protection than the minimum required by the NFIP
- Identify and map flood hazards in areas expected to grow or develop in the foreseeable future.

SEVERE WEATHER:

- Retrofit sub-standard roofs of key critical facilities and infrastructure to meet modern building code standards and mitigate damages and impacts of severe weather and wind events. ****Addresses both Severe Weather and Severe Wind****
- Install backup generators at key critical facilities such as fire and police stations, water pumping stations, sewer lift stations, etc., to provide emergency power for critical operations during power failures caused by severe weather and wind events. ****Addresses both Severe Weather and Severe Wind****

SEVERE WIND:

- Encourage homeowners to use tie-down straps and/or anchors to secure ancillary buildings and metal awnings or porches to mitigate the potential for flying debris during severe wind events.
- Retrofit sub-standard roofs of key critical facilities and infrastructure to meet modern building code standards and mitigate damages and impacts of severe weather and wind events. ****Addresses both Severe Weather and Severe Wind****
- Install backup generators at key critical facilities such as fire and police stations, water pumping stations, sewer lift stations, etc., to provide emergency power for critical operations during power failures caused by severe weather and wind events. ****Addresses both Severe Weather and Severe Wind****

WILDFIRE:

- Develop and/or enforce a weed abatement ordinance.
- Educate public on proper fuels thinning, setbacks, and water storage for wildfire mitigation using Firewise type of programs and guidance documents.
- Conduct Fire safety education programs in local public schools.

- Enact and enforce burn and fireworks bans as needed during extraordinarily dry and extreme wildfire conditions / seasons to mitigate possible, unintended wildfire starts.
- Perform, or encourage the performance of, routine roadside vegetation control to mitigate wildfire starts within the right-of-way areas along roadways and highways.
- Clear vegetation and wildfire fuels to create a defensible space around critical or key structures within the community.

Upon completion of the assessment summarized in Section 4.3.1, each jurisdiction's Local Planning Team used the results of the Section 4.3.1 review and the above general list to develop a new list of A/Ps for this Plan. The A/Ps can be generally classified as either structural or non-structural. Structural A/Ps typify a traditional "bricks and mortar" approach where physical improvements are provided to effect the mitigation goals. Examples may include forest thinning, channels, culverts, bridges, detention basins, dams, emergency structures, and structural augmentations of existing facilities. Non-structural A/Ps deal more with policy, ordinance, regulation and administrative actions or changes, buy-out programs, and legislative actions. For each A/P, the following elements were identified:

- **Name** – a unique short name for the A/P.
- **Hazard(s) Mitigated** – a list of the hazard or hazards mitigated by the A/P.
- **Community Assets Mitigated** – a brief descriptor to qualify the type of assets (existing, future, or both) that the proposed mitigation A/P addresses.
- **Description** – a brief description of the A/P including a supporting statement that tells the "what" and "why" reason for the A/P.
- **Estimated Costs** – concept level cost estimates that may be in dollars, staff time, or both.

Once the full list of A/Ps was completed to the satisfaction of the jurisdiction, the Local Planning Team then performed a STAPLE+E assessment[1] of each A/P using one of three qualifiers for each STAPLE+E category as follows:

- **F** – Assigned if the A/P has a favorable disposition for the category.
- **L** – Assigned for A/Ps that are less than favorable for the category
- **N** – Assigned if the A/P is neutral for the category.

Once the STAPLE+E assessment was completed, each jurisdiction then assigned a numeric ranking to each A/P based on the assessment results and the jurisdiction's priorities.

Upon completion of the ranking process, each jurisdiction then developed the implementation strategy for the A/Ps. The implementation strategy addresses the *"how, when, and by whom?"* questions related to the execution and completion of an identified A/P. Specific elements identified as a part of the implementation strategy included:

- **Planning Mechanism(s) for Implementation** – where applicable, a list of current planning mechanisms or processes under which the A/P will be implemented. Examples could include CIPs, General Plans, Area Drainage Master Plans, etc.

[1] FEMA, 2003, *Developing the Mitigation Plan – Identifying Mitigation Actions and Implementation Strategies*, FEMA 386-3, pp 2-12 through 2-21.

- **Anticipated Completion Date** – a realistic and general timeframe for completing the A/P. Examples may include a specific target date, a timeframe contingent upon other processes, or recurring timeframes.
- **Primary Agency and Job Title Responsible for Implementation** –the agency, department, office, or other entity and corresponding job title that will have responsibility for the A/P and its implementation.
- **Funding Source** – the source or sources of anticipated funding for the A/P.
    - When calculating the numbers for the projects, costs versus benefits considerations were discussed by the planning team for every jurisdiction to ensure all projects maintained a quality cost effectiveness for the jurisdiction.

Table's 4-5-1 and 4-5-2 summarize the new mitigation A/Ps and implementation strategy for Sandoval County. Similarly, Table's 4-6-1 through 4-11-1 and Table's 4-6-2 through 4-11-2 summarize the new mitigation A/Ps and implementation strategy for Bernalillo, Corrales, Jemez Springs, Rio Rancho, San Ysidro, and SSCAFCA, respectively.

Specific Pueblo information can be found in their respective Annex to this plan.

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Table 4-5-1
Mitigation actions/projects identified by Sandoval County

Name	Hazard(s) Mitigated	Community Assets Mitigated (Existing/ Future/ Both)	Description	Estimated Cost	STAPLE+E Assessment (F) Favorable; (L) Less Favorable; (N) Neutral							Project Rank
					Social	Technical	Administrative	Political	Legal	Economic	Environmental	
A.1 Wildland-Urban Interface (Defensible Space)	Wildfire	Both	Reduction of fuels in and near urban interface areas of Sandoval County that are identified as hazardous by USFS.	$550,000	N	N	N	F	N	F	F	2
A.2 Public Education	Dam Failure, Drought, Flood, Severe Weather, Severe Wind, Wildfire	Both	Printed media regarding positive aspects of forest thinning to reduce wildfire losses, also outreach material to reduce the effects of dam failure, drought, flood, severe weather (heat/cold) and wind.	$50,000	F	F	F	F	F	F	F	1

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Table 4-5-1
Mitigation actions/projects identified by Sandoval County

Name	Hazard(s) Mitigated	Community Assets Mitigated (Existing/ Future/ Both)	Description	Estimated Cost	STAPLE+E Assessment (F) Favorable; (L) Less Favorable; (N) Neutral							Project Rank
					Social	Technical	Administrative	Political	Legal	Economic	Environmental	
A.3 Flood Mitigation and Response	Flood, Wildfire, Severe Weather	Both	Road projects to mitigate the effects of local flooding and create options for potential evacuation and response. **County Road 11:** • 3 Bridge replacements • Road reconstruction **Arroyo Chico Bridge** • Bridge Construction • Channel realignment and erosion mitigation **La Madera Road-Hagan Road. Puerticito Road, and Madera Road** • Drainage improvements • Road Improvements	$6,000,000 $17,000,000 $5,000,000	F	F	F	F	F	F	N	3
A.4 GIS Infrastructure and Capability	Dam Failure, Drought, Flood, Severe Weather, Severe Wind, Wildfire	Both	Working with stakeholders get the necessary data, that is currently deficient, to successfully determine the inundation limits of dams and the effects of inundation (from SCHMP 2019 Section 3.3.1). Improve GIS infrastructure to have more real time information available for successful development of Incident Action Plans and response capabilities. Improve continuity of operations without single point of failure.	$100,000	N	F	F	N	N	N	N	4

Table 4-5-1
Mitigation actions/projects identified by Sandoval County

Name	Hazard(s) Mitigated	Community Assets Mitigated (Existing/ Future/ Both)	Description	Estimated Cost	STAPLE+E Assessment (F) Favorable; (L) Less Favorable; (N) Neutral							Project Rank
					Social	Technical	Administrative	Political	Legal	Economic	Environmental	
A.5 Drought Landscaping Resolution	Drought	Future	Encourage the use of drought resistant landscaping as appropriate through ordinance development.	Staff time	L	F	F	L	F	F	F	5
A.6 EAP – Sandia Mountain Site No.1 Dam (aka Piedra Liza Dam)	Dam Failure, Flood	Both	Work with the Town of Bernalillo to update the emergency action plan for the Sandia Mountain Site No. 1 Dam (aka the Piedra Liza Dam). Failure of this dam would be detrimental as its inundation would directly affect the Town and would allow all main governmental facilities, located directly downstream, to become severely damaged or destroyed.	Staff Time	F	F	F	F	F	N	N	6
A.7 Install Generator / Back-up power to critical facilities	Severe Weather, Severe Wind	Both	Purchase and install back-up generators for critical facilities. During severe weather events and severe wind, electricity would then still be available for the critical facilities. Develop a needs assessment to prioritize the critical facilities in need of back-up power in the event of a power loss incident.	$300,000	F	F	N	F	F	L	N	7

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Table 4-5-2
Mitigation actions/projects implementation strategy for Sandoval County

Name	Planning Mechanism(s) for Implementation	Anticipated Completion Schedule	Primary Agency / Job Title Responsible for Implementation	Funding Source(s)
A.1 Wildland-Urban Interface (Defensible Space)	Firewise, Community Wildfire Protection Plan	Ongoing	Public Works, Fire staff, volunteers, Non-Profit organizations, Firewise	State and Federal Grants
A.2 Public Education	Firewise, Community Wildfire Protection Plan	Ongoing	Fire Staff, Public Information Staff, IT staff, volunteers, Non-Profit organizations	State and Federal Grants, budget
A.3 Flood Mitigation and Response	Comprehensive plan, County Development plan	Ongoing	County Development, Public Works	State and Federal Grants, ICIP, budget
A.4 GIS Infrastructure and Capability	Hazard Mitigation Plan, Floodplain Management	2023	Community Development (GIS)	State and Federal Grants, budget
A.5 Drought Landscaping Resolution	Hazard Mitigation Plan	2020	Environmental Department	General Fund
A.6 EAP – Sandia Mountain Site No.1 Dam (aka Piedra Liza Dam)	Coronado Soil and Water Conservation District, Town of Bernalillo, Sandoval County	Ongoing	Coronado Soil and Water Conservation District, Town of Bernalillo, Sandoval County	Sandoval County; Town of Bernalillo
A.7 Install Back up power to critical facilities.	County EOP, Hazard Mitigation Plan	2025	Emergency Management, Public Works, Community Development	Federal and State Grants

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Table 4-6-1
Mitigation actions/projects identified by Bernalillo

Name	Hazard(s) Mitigated	Community Assets Mitigated (Existing/ Future/ Both)	Description	Estimated Cost	STAPLE+E Assessment (F) Favorable; (L) Less Favorable; (N) Neutral							Project Rank
					Social	Technical	Administrative	Political	Legal	Economic	Environmental	
B.1 GIS Infrastructure Improvements	Dam Failure, Drought, Flood, Severe Weather, Severe Wind, Wildfire	Both	Improve and implement our GIS program to better identify and mitigate at risk portions of town. In addition, we can create materials (maps both physical and digital) to improve response and planning in the event of emergencies.	$40,000	N	F	F	N	N	N	F	1
B.2 Storm Water Master Plan	Flood	Both	Write a storm water master plan for the Town of Bernalillo	Staff Time	F	F	F	F	F	F	F	2
B.3 Athena Pond	Flood	Both	Implement a flood control project between the Town of Bernalillo and ESCAFCA. The flood control pond will help alleviate incoming runoff from the East.	$926,000	F	N	N	F	N	N	N	3
B.4 EAP - Piedra Liza Dam	Dam Failure, Flood	Both	In coordination with the Coronado Soil and Water Conservation District, the dam owner, to update emergency action plan for Piedra Liza Dam.	Staff Time	F	F	F	F	F	N	N	4
B.5 Building Code Revision	Dam Failure, Drought, Flood, Severe Weather, Severe Wind, Wildfire	Both	Update existing building codes to ensure mitigation regarding Flood, Fire, Severe Weather/Wind, and Drought (irrigation restrictions etc.).	Staff Time	N	F	F	N	F	F	F	5

Table 4-6-1
Mitigation actions/projects identified by Bernalillo

Name	Hazard(s) Mitigated	Community Assets Mitigated (Existing/ Future/ Both)	Description	Estimated Cost	STAPLE+E Assessment (F) Favorable; (L) Less Favorable; (N) Neutral							Project Rank
					Social	Technical	Administrative	Political	Legal	Economic	Environmental	
B.6 Fischer Sand and Gravel Detention Pond	Dam Failure, Flood, Severe Weather	Both	An eleven acre detention pond on the east side of Interstate 25 creating a possible storage capacity of 49 acre feet.	$1,200,000	F	F	F	F	F	N	N	6
B.7 South Hill Road / Athena Road Pond	Dam Failure, Flood, Severe Weather	Both	Along South Hill Road, from Richardson to Bobby Place, construct a collection and transfer point to Athena pond through culverts along South Hill Road	$1,200,000	F	F	F	F	F	N	N	7
B.8 Removal of High-water usage plant life	Drought	Both	Removal of non-native and high-water usage plants such as Tamarisk and Russian Olives from the Bosque.	$250,000	F	F	F	F	F	F	F	8
B.9 Fuel reduction and removal of "non-native species" within the Bosque	Wildfire	Existing and Future	The Town has 1.5 miles of Wildland urban interface with the Rio Grande Bosque, Fuel load reduction to reduce the risk of loss of life and structure damage	$100,000	L	F	F	L	F	F	F	9
B.10 Generator / Back-up power for critical facilities	Severe Weather, Severe Wind	Both	Develop a needs analysis and implement resulting plan for power generation. Currently there is no backup power to some of the Town's critical facilities	$150,000	F	F	N	F	F	L	N	10

Table 4-6-1
Mitigation actions/projects identified by Bernalillo

Name	Hazard(s) Mitigated	Community Assets Mitigated (Existing/ Future/ Both)	Description	Estimated Cost	STAPLE+E Assessment (F) Favorable; (L) Less Favorable; (N) Neutral							Project Rank
					Social	Technical	Administrative	Political	Legal	Economic	Environmental	
B.11 GIS Infrastructure and Capability	Dam Failure, Drought, Flood, Severe Weather, Severe Wind, Wildfire	Both	Working with stakeholders get the necessary data, that is currently deficient, to successfully determine the inundation limits of dams and the effects of inundation (from SCHMP 2019 Section 3.3.1). Improve GIS infrastructure to have more real time information available for successful development of Incident Action Plans and response capabilities. Improve continuity of operations without single point of failure.	$100,000	N	F	F	N	N	N	N	11

Table 4-6-2
Mitigation actions/projects implementation strategy for Bernalillo

Name	Planning Mechanism(s) for Implementation	Anticipated Completion Schedule	Primary Agency / Job Title Responsible for Implementation	Funding Source(s)
B.1 GIS Infrastructure Improvements	Maintain fulltime GIS staff person	Ongoing	GIS Specialist	Town of Bernalillo
B.2 Storm Water Master Plan	Town of Bernalillo Public Works	2021	Town of Bernalillo	Town of Bernalillo
B.3 Athena Pond	ESCAFCA/TOB	2020	Town of Bernalillo/ ESCAFCA	Town of Bernalillo/ ESCAFCA

Table 4-6-2 Mitigation actions/projects implementation strategy for Bernalillo				
Name	**Planning Mechanism(s) for Implementation**	**Anticipated Completion Schedule**	**Primary Agency / Job Title Responsible for Implementation**	**Funding Source(s)**
B.4 EAP - Piedra Liza Dam	Coronado Soil and Water Conservation District, Town of Bernalillo, Sandoval County	Ongoing	Coronado Soil and Water Conservation District, Town of Bernalillo, Sandoval County	Town of Bernalillo
B.5 Building Code Revision	Town of Bernalillo Planning and Zoning	2020	Town Building Official	Town of Bernalillo
B.6 Fischer Sand and Gravel Detention Pond	ESCAFCA and the Town of Bernalillo	2019	ESCAFCA	ESCAFCA
B.7 South Hill Road / Athena Road Pond	Town of Bernalillo	2019	Town of Bernalillo	Town of Bernalillo
B.8 Removal of high-water usage plant life	Town of Bernalillo	2025	Town of Bernalillo	Grant funding
B.9 Fuel reduction and removal of “non-native species” within the Bosque	Town of Bernalillo Fire Department	2023	Town of Bernalillo Fire Department	Local, state, and federal funding options
B.10 Back-up power to critical facilities	ICIP, Hazard Mitigation Plan	2025	Town of Bernalillo	Local, state, and federal grant funding
B.11 GIS Infrastructure and Capability	Hazard Mitigation Plan, Floodplain Management	2023	Town of Bernalillo	State and Federal Grants, budget

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Table 4-7-1
Mitigation actions/projects identified by Corrales

Name	Hazard(s) Mitigated	Community Assets Mitigated (Existing/ Future/ Both)	Description	Estimated Cost	STAPLE+E Assessment (F) Favorable; (L) Less Favorable; (N) Neutral							Project Rank
					Social	Technical	Administrative	Political	Legal	Economic	Environmental	
C.1 Increase water storage capacity more storage tanks. Increase waterlines and hydrants for fire suppression	Wildfire	Existing and Future	Add water tanks with in the Village to increase firefighting ability as Corrales has no municipality water system We are starting to try to run hydrants in the Commercial Corridor of the Village, through residential areas and tie in existing dead end systems to make a looped system. This is for both structure and wildland fire fighting	$5,000,000	F	F	F	F	F	F	F	1
C.2 Fire Marshall	Wildfire	Existing and Future	The Village still would like to fill a Fire Marshall position under fire department. This would increase fire safety and wildland urban interface safety for the Village.	$75,000/yr.	F	F	F	F	F	F	F	7
C.3 GIS mapping and addressing	Dam Failure, Drought, Flood, Severe Weather, Severe Wind, Wildfire	Existing and Future	The Village still needs to update addressing and GIS mapping and have access in Emergency Vehicles to mapping through computers. To help with evacuations and locations of individuals with special needs	$50,000	F	F	F	F	F	L	L	3
C.4 Drainage remediation projects – Salce Basin	Flooding	Both	Remediate drainage facilities in the Salce Basin, protecting some 441 residential properties as well as public recreation facilities and Rights of Way. In progress	$2,300,000	F	F	F	F	F	F	F	10

Table 4-7-1
Mitigation actions/projects identified by Corrales

Name	Hazard(s) Mitigated	Community Assets Mitigated (Existing/ Future/ Both)	Description	Estimated Cost	STAPLE+E Assessment (F) Favorable; (L) Less Favorable; (N) Neutral							Project Rank
					Social	Technical	Administrative	Political	Legal	Economic	Environmental	
C.5 Fuel reduction and "non-native species removal" Village Bosque	Wildfire	Existing and Future	The village has 11 miles of Wildland urban interface in from the Bosque, Fuel load reduction to reduce the risk of structure damage, loss of life of Citizens and Fire fighters.	$300,000	L	F	F	L	F	F	F	2
C.6 Public Meetings and send flyers to residents of Corrales to educate them on defensible space and construction.	Wildfire	Existing and Future	Corrales has one acre lots with wildland urban interface, and a Bosque that is 11 miles of the eastern border. Educate homeowners how defensible space reduces risk to property and lives.	$15,000	F	F	F	F	F	F	F	8
C.7 Update Emergency Operations Plan to include adherence to DHS rules and regulations	Dam Failure, Drought, Flood, Severe Weather, Severe Wind, Wildfire	Existing and Future	Working on update and including coordination with local groups to complete their animal evacuation plans.	Staff Time	F	F	F	F	F	F	F	6

Table 4-7-1
Mitigation actions/projects identified by Corrales

Name	Hazard(s) Mitigated	Community Assets Mitigated (Existing/ Future/ Both)	Description	Estimated Cost	STAPLE+E Assessment (F) Favorable; (L) Less Favorable; (N) Neutral							Project Rank
					Social	Technical	Administrative	Political	Legal	Economic	Environmental	
C.8 Install Emergency Generators critical infrastructure	Dam Failure, Drought, Flood, Severe Weather, Severe Wind, Wildfire	Existing and Future	Corrales has one building with emergency backup power. One fire suppression tank has back up power. The Village Hall, Police Department and Council Chamber/Court house have no emergency backup power. All of these facilities are critical for Continuity of Government	$500,000	F	F	F	F	F	F	F	4
C.9 Vactor truck	Flooding	Existing and Future	The village has numerous storm drains and will be installing more with the Salce Basin project. The Village currently has no ability to clean out the drains with owner equipment. This truck will help reduce flooding risks	$150,00	F	F	F	F	F	F	F	8
C.10 Emergency shelters	Dam Failure, Flood, Severe Weather, Severe Wind, Wildfire	Existing and Future	Corrales need to work with Red Cross for shelter destination. To have an official shelter and staff Corrales is working to set up two locations for animal evacuation shelter. Animal service staff and fire department staff have been taking training s through DHSEM conferences for animal evacuations	$25,000	F	F	F	F	F	F	L	9
C.11 Removal of High-Water usage plant life	Drought	Both	Removal of non-native and high-water usage plants such as Tamarisk and Russian Olives from the Bosque.	$250,000	F	F	F	F	F	F	F	11
C.12 Retention Ponds Project	Drought	Both	Build and utilize piping to move water into retention ponds from the Rio Grande and allow the water to get back into the water table versus flowing downstream.	$500,000	F	F	F	F	F	F	F	12

Table 4-7-1
Mitigation actions/projects identified by Corrales

Name	Hazard(s) Mitigated	Community Assets Mitigated (Existing/ Future/ Both)	Description	Estimated Cost	STAPLE+E Assessment (F) Favorable; (L) Less Favorable; (N) Neutral							Project Rank
					Social	Technical	Administrative	Political	Legal	Economic	Environmental	
C.13 GIS Infrastructure and Capability	Dam Failure, Drought, Flood, Severe Weather, Severe Wind, Wildfire	Both	Working with stakeholders get the necessary data, that is currently deficient, to successfully determine the inundation limits of dams and the effects of inundation (from SCHMP 2019 Section 3.3.1). Improve GIS infrastructure to have more real time information available for successful development of Incident Action Plans and response capabilities. Improve continuity of operations without single point of failure.	$100,000	N	F	F	N	N	N	N	13
C.14 Public Education	Dam Failure, Drought, Flood, Severe Weather, Severe Wind, Wildfire	Both	Educate and encourage the public on the availability and use of National Weather Service (NWS) Severe Weather Alerts and the County reverse 911 system (CodeRED) that can be received through landlines, cell phones, and email.	$500	F	F	F	F	F	F	F	14
C.15 Emergency Evacuation Route Development	Dam Failure, Drought, Flood, Severe Weather, Severe Wind, Wildfire	Future	Purchase land to develop emergency routes for evacuations. Currently the Village has only one way in and one way out, but there is a history of this one route being blocked during severe weather, severe wind, and flooding events that occur.	$500,000	F	F	F	F	F	F	F	15

Table 4-7-2 Mitigation actions/projects implementation strategy for Corrales				
Name	**Planning Mechanism(s) for Implementation**	**Anticipated Completion Schedule**	**Primary Agency / Job Title Responsible for Implementation**	**Funding Source(s)**
C.1 Increase water storage capacity more storage tanks. Increase waterlines and hydrants for fire suppression	Improve fire safety	2025	Fire	AFG, State Fire Grants , ICIP
C.2 Fire Marshall	Improve fire safety	2021	Fire	AFG, local funding
C.3 GIS mapping and addressing	Working with P and Z and the County	2022	Planning and Zoning	State grants, federal grants, private grants Local funding
C.4 Drainage remediation projects – Salce Basin	Working with Bosque Commission, State Forester and Village Council	2019	Emergency Manager and Planning and Zoning	Federal, State, and local funding
C.5 Fuel reduction and "non-native species removal" Village Bosque	Remediate drainage facilities in the Salce Basin	2021	Fire	State and local grants and funding
C.6 Public Meetings and send flyers to residents of Corrales to educate them on defensible space and construction.	Council organized meeting about communications in emergencies	2020	Fire	State and local grants and funding
C.7 Update Emergency Operations Plan to include adherence to Homeland Security rules and regulations	Working with neighbor hoods and individuals through meetings and workshops	2019	Fire	Local, state, and federal funding and grants
C.8 Install Emergency Generators critical infrastructure	Working with Village and Emergency Manager and Fire Chief	2023	Fire and Emergency Manager	Federal, State, and local funding
C.9 Vactor truck	Working with Village to secure needed equipment for mitigation of flooding	2021	Public works	Local, state, and federal funding

Table 4-7-2 Mitigation actions/projects implementation strategy for Corrales				
Name	**Planning Mechanism(s) for Implementation**	**Anticipated Completion Schedule**	**Primary Agency / Job Title Responsible for Implementation**	**Funding Source(s)**
C.10 Emergency shelters	Work with Red Cross on training and shelter designation	2022	Parks and Recreation, Animal service and Fire Department	Local, state, and federal funding
C.11 Removal of High-Water usage plant life	Working with Bosque Commission, State Forester and Village Council	2025	New Mexico State Forestry	Local, state, and federal funding
C.12 Retention Pond Project	Working with Village and Emergency Manager and Fire Chief	2025	Village Public Works	State and Federal grant funding
C.13 GIS Infrastructure and Capability	Hazard Mitigation Plan, Floodplain Management	2023	Planning and Zoning	State and Federal Grants, budget
C.14 Public Education	Working with Village and Emergency Manager and Fire Chief	2024	Fire and Emergency Manager	State and Federal Grants, budget
C.15 Emergency Evacuation Route Development	Working with Village and Emergency Manager and Fire Chief	2023	Fire and Emergency Manager	State and Federal Grants, budget

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Table 4-8-1
Mitigation actions/projects identified by Jemez Springs

Name	Hazard(s) Mitigated	Community Assets Mitigated (Existing/ Future/ Both)	Description	Estimated Cost	STAPLE+E Assessment (F) Favorable; (L) Less Favorable; (N) Neutral							Project Rank
					Social	Technical	Administrative	Political	Legal	Economic	Environmental	
D.1 GIS Program Development	Dam Failure, Drought, Flood, Severe Weather, Severe Wind, Wildfire	Both	Equip and develop GIS based system to locate and map the potential of our hazards to ensure the Village is doing all that it can with its mitigation efforts.	$75,000	N	F	F	F	F	F	F	1
D.2 Flood Damage Mitigation	Flood	Both	Mitigate or prevent damage to Village infrastructure. • Clear debris from main river channel. • Improve all river crossings to withstand flood and allow access for emergency equipment. • Bank restoration and stabilization. • Protect sewer plant from flood damage.	$1,000,000	N	F	F	F	F	F	F	2
D.3 Forest Restoration	Wildfire	Both	Thinning within and adjacent to the Village on Federal land to reduce exposure to wildfire. Become a Firewise village.	$250,000	F	N	N	N	N	F	F	3
D.4 Early Warning Systems	Dam Failure, Flood, Severe Weather, Severe Wind, Wildfire	Both	Implement redundant early warning systems to warn the public and visitors of impending danger (i.e. a Dam Failure, Severe Weather, Severe Wind, Wildfire, etc.). System would have audible siren, emergency AM radio system, public education on reverse 911 system (existing) to increase participation (sign up).	$500,000	F	F	F	F	N	N	N	4

Table 4-8-1
Mitigation actions/projects identified by Jemez Springs

Name	Hazard(s) Mitigated	Community Assets Mitigated (Existing/ Future/ Both)	Description	Estimated Cost	STAPLE+E Assessment (F) Favorable; (L) Less Favorable; (N) Neutral							Project Rank
					Social	Technical	Administrative	Political	Legal	Economic	Environmental	
D5 Public Education Campaign	Dam Failure, Drought, Flood, Severe Weather, Severe Wind, Wildfire	Both	Develop written and audio messages (for AM radio system) to educate the resident and visiting public of the potential natural hazards in the area, how to be prepared for them and what resources are available in the area in the event that they occur.	$30,000	F	N	N	F	N	N	N	5
D.6 Generator power for critical facilities	Dam Failure, Severe Weather, Severe Wind	Future	Develop a needs analysis and implement resulting plan for power generation. Currently there is no backup power to the Village's critical facilities.	$75,000	F	F	N	F	F	L	N	6
D.7 Resolution for Drought Landscaping	Drought	Future	Resolution to encourage citizens to use drought resistant (Xeriscaping) landscaping as appropriate for existing and any future development.	Staff time	L	F	F	L	F	F	F	7
D.8 GIS Infrastructure and Capability	Dam Failure, Drought, Flood, Severe Weather, Severe Wind, Wildfire	Both	Working with stakeholders get the necessary data, that is currently deficient, to successfully determine the inundation limits of dams and the effects of inundation (from SCHMP 2019 Section 3.3.1). Improve GIS infrastructure to have more real time information available for successful development of Incident Action Plans and response capabilities. Improve continuity of operations without single point of failure.	$100,000	N	F	F	N	N	N	N	8

Table 4-8-2 Mitigation actions/projects implementation strategy for Jemez Springs				
Name	**Planning Mechanism(s) for Implementation**	**Anticipated Completion Schedule**	**Primary Agency / Job Title Responsible for Implementation**	**Funding Source(s)**
D.1 GIS Program Development	Jemez Valley Development Plan, ordinances, Planning and Zoning	2020	Planning and Zoning, Mayor, Village Trustees	Community Development Block Grant, Budget, Legislative
D.2 Flood Damage Mitigation	Flood Plain Ordinance, erosion studies and best practices, bridge construction standards	2022	Flood Plain Manager, Road Department, Public Works	Hazard mitigation grants, State and Federal Funding
D.3 Forest Restoration	Sandoval County CWPP, USFS management plans, Firewise	2020	Village Committee, Mayor	Community Forest Restoration Grants, Hazard Mitigation, State Severance funds
D.4 Early Warning Systems	Existing systems, studies	2019	Village Trustees, Mayor, Fire and Police	State and Federal Grants
D5. Public Education Campaign	Existing information, location specific information, State and Federal programs	Ongoing	Mayor, Fire, Police, Consultants	Community Development Grants, Budget, Private Donations
D.6 Back-up power to critical facilities	ICIP, Hazard Mitigation Plan	2025	Village Committee, Mayor, Mayor Pro-Tem	Local, state, and federal grant funding
D.7 Drought Landscaping Resolution	Hazard Mitigation Plan	2022	Village Committee, Village Trustees, Mayor, Mayor Pro-Tem	General Fund
D.8 GIS Infrastructure and Capability	Hazard Mitigation Plan, Floodplain Management	2023	Village Committee, Mayor, Mayor Pro-Tem	State and Federal Grants, budget

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Table 4-9-1
Mitigation actions/projects identified by Rio Rancho

Name	Hazard(s) Mitigated	Community Assets Mitigated (Existing/ Future/ Both)	Description	Estimated Cost	STAPLE+E Assessment (F) Favorable; (L) Less Favorable; (N) Neutral							Project Rank
					Social	Technical	Administrative	Political	Legal	Economic	Environmental	
E.1 Sportsplex	Flood	Both	The City's main sports fields are at great risk due to the meandering of the Montoya's Arroyo. This arroyo has moved significantly and cut deeply into the City's property. This project will restore the arroyo to its original location and armor the south bank adjacent to the Sportsplex. It will help to prevent the eroding of dirt which impacts downstream infrastructure.	$1,100,000	F	N	F	F	F	F	F	1
E.2 Red River Watershed	Flood	Both	This project is in an area of Rio Rancho Unit 17 that has experienced repeated flooding. It is primarily along Monterrey Road between Pasilla Road and Honduras Road. A drainage plan for this area has been completed. The infrastructure called for in this plan (storm drains and detention ponds) will solve the flooding problems in this area.	$1,800,000	F	N	F	F	F	F	F	2
E.3 Erosion Control	Flood	Both	City Library and Aquatic Center are adjacent to each other and are set below a substantial hill on their west sides. Whenever significant rains occur, a large amount of water and sediments flow off the hill and onto these properties. The parking lots and other areas have repeatedly been inundated with mud. This project will prevent damage to these facilities by reducing erosion and creating sediment traps.	$500,000	F	N	F	F	F	F	F	3

Table 4-9-1
Mitigation actions/projects identified by Rio Rancho

Name	Hazard(s) Mitigated	Community Assets Mitigated (Existing/ Future/ Both)	Description	Estimated Cost	STAPLE+E Assessment (F) Favorable; (L) Less Favorable; (N) Neutral							Project Rank
					Social	Technical	Administrative	Political	Legal	Economic	Environmental	
E.4 GIS Strategic Plan	Flood	Future	Continue to develop a city wide GIS program that is integrated into Public Works, Development Services, Police, Fire/Rescue and Emergency Management to help prevent development in flood prone regions.	Stage One: $228,000	F	L	L	F	F	L	F	4
E.5 Emergency Public Information Sources	Dam Failure Drought, , Flood, Severe Weather, Severe Wind	Existing	Educate & encourage the public on the availability and use of NWS severe weather alerts & our county reverse 911 systems (CodeRED) that can be received through home phones, personal cell phones, and email.	Staff time	F	F	F	F	F	F	F	5
E.6 Drought Landscaping Ordinance	Drought	Future	Encourage the use of drought resistant landscaping as appropriate through ordinance development.	Staff time	L	F	F	L	F	F	F	6
E.7 Emergency Generators	Dam Failure, Flood, Severe Weather, Severe Wind, Wildfire	Both	Purchase and maintain backup generators for key critical facilities serving emergency response functions to ensure adequate response capability during a major hazard event, to include both City libraries.	$100,000	F	L	F	F	F	L	F	7

Table 4-9-1
Mitigation actions/projects identified by Rio Rancho

Name	Hazard(s) Mitigated	Community Assets Mitigated (Existing/ Future/ Both)	Description	Estimated Cost	STAPLE+E Assessment (F) Favorable; (L) Less Favorable; (N) Neutral							Project Rank
					Social	Technical	Administrative	Political	Legal	Economic	Environmental	
E.8 Water Usage Ordinance	Drought	Both	Develop and enforce an ordinance requiring strategic landscape watering times and volumes designed to reduce unnecessary water loss due to evaporation or over-watering.	Staff time	L	L	L	L	F	F	F	8
E.9 Code Enforcement Officers	Wildfire	Both	Increase the number of code enforcement officers.	$156,000	L	F	L	F	F	L	F	9
E.10 Dam Failure Evacuation Routes	Dam Failure	Both	Identify dam failure evacuation routes for at risk population areas.	Staff time	F	L	L	F	N	F	F	10
E.11 Weed Abatement Ordinance	Wildfire	Both	Develop and enforce a weed abatement ordinance to mitigate wildfire potential in urban areas.	Staff time	F	N	L	F	F	L	F	11
E.12 Dam Emergency Action Plans	Dam Failure	Both	Coordinate & communicate with dam owners regarding status and updates of emergency action plans and dam failure inundation zones to keep records updated and to make the public aware of any changes.	Staff time	N	N	F	F	L	F	F	12

Table 4-9-1
Mitigation actions/projects identified by Rio Rancho

Name	Hazard(s) Mitigated	Community Assets Mitigated (Existing/ Future/ Both)	Description	Estimated Cost	STAPLE+E Assessment (F) Favorable; (L) Less Favorable; (N) Neutral							Project Rank
					Social	Technical	Administrative	Political	Legal	Economic	Environmental	
E.13 Wildfire Prevention Public Information	Wildfire	Both	Educate property owners within wildland urban interface areas for Rio Rancho this would be residents located near the Bosque or located on the West mesa, about Firewise programs in their area and the benefits of proper fuels thinning, setbacks, perimeter clearing, and water storage for wildfire mitigation.	Staff time	F	F	N	F	N	F	F	13
E.14 GIS Infrastructure and Capability	Dam Failure, Drought, Flood, Severe Weather, Severe Wind, Wildfire	Both	Working with stakeholders get the necessary data, that is currently deficient, to successfully determine the inundation limits of dams and the effects of inundation (from SCHMP 2019 Section 3.3.1). Improve GIS infrastructure to have more real time information available for successful development of Incident Action Plans and response capabilities. Improve continuity of operations without single point of failure.	$100,000	N	F	F	N	N	N	N	14

Table 4-9-2
Mitigation actions/projects implementation strategy for Rio Rancho

Name	Planning Mechanism(s) for Implementation	Anticipated Completion Schedule	Primary Agency / Job Title Responsible for Implementation	Funding Source(s)
E.1 Sportsplex	Mitigation Grant	FY14	Public Works / City Engineer	Mitigation Grant & General Fund
E.2 Red River Watershed	Mitigation Grant	FY14	Public Works / City Engineer	Mitigation Grant & General Fund

Table 4-9-2 Mitigation actions/projects implementation strategy for Rio Rancho				
Name	**Planning Mechanism(s) for Implementation**	**Anticipated Completion Schedule**	**Primary Agency / Job Title Responsible for Implementation**	**Funding Source(s)**
E.3 Erosion Control	Mitigation Grant	FY14	Public Works / City Engineer	Mitigation Grant & General Fund
E.4 GIS Strategic Plan	N/A	FY17	Public Works / GIS Manager	General Fund
E.5 Emergency Public Information Sources	N/A	FY14	Emergency Management / Emergency Programs Manager	General Fund
E.6 Drought Landscaping Ordinance	N/A	FY15	Utilities / Environmental Programs Manager	General Fund
E.7 Emergency Generators	SHSGP	FY15	Emergency Management / Emergency Programs Manager	Grants
E.8 Water Usage Ordinance	N/A	FY14	Utilities / Environmental Programs Manager	General Fund
E.9 Code enforcement officers	N/A	FY15	Police Department / Code Enforcement Manager	General Fund
E.10 Dam Failure Evacuation Routes	N/A	FY15	Emergency Management / SCAFCA / Emergency Programs Manager	General Fund
E.11 Weed Abatement Ordinance	N/A	FY14	Police Department / Code Enforcement Officer	General Fund
E.12 Dam Emergency Action Plans	N/A	FY15	Emergency Management / SCAFCA / Emergency Manager	General Fund
E.13 Wildfire prevention public information	N/A	FY14	Fire Department / Assistant Emergency Manager	General Fund
E.14 GIS Infrastructure and Capability	Hazard Mitigation Plan, Floodplain Management	2023	Public Works / GIS Manager	State and Federal Grants, budget

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Table 4-10-1
Mitigation actions/projects identified by San Ysidro

Name	Hazard(s) Mitigated	Community Assets Mitigated (Existing/ Future/ Both)	Description	Estimated Cost	STAPLE+E Assessment (F) Favorable; (L) Less Favorable; (N) Neutral							Project Rank
					Social	Technical	Administrative	Political	Legal	Economic	Environmental	
F.1 Install Back up power to critical facilities.	Dam Failure, Flood, Severe Weather, Severe Wind, Wildfire	Both	Develop a needs analysis and implement resulting plan for power generation. Currently there is no backup power to any critical facility such as the Law Enforcement Complex used during incident command and the water facilities.	$150,000	F	F	N	F	F	L	N	1
F.2 Install Early Warning Devices for Critical Facilities in Village	Dam Failure, Flood, Severe Weather, Severe Wind, Wildfire	Both	Currently the Village of San Ysidro has an early warning system that is not operational. The system was installed in the 1970s, and the lack of an operational early warning system is a threat to public safety. A new system installed at the San Ysidro Marshal's Department Building would provide an early warning system that can be activated upon receipt of a notice of an emergency.	$100,000	F	F	N	F	F	N	N	2
F.3 Install an Emergency Call Box at Each San Ysidro Municipal Complex	Dam Failure, Flood, Severe Weather, Severe Wind, Wildfire	Future	Within the last year the local telephone system has lost 911 service or all phone service approximately five times. The plan will be to install a microwave phone line on the Municipal Complex from the Qwest phone service area. Emergency call boxes will be added to the Municipal Building and the Fire Department belonging to Sandoval County. To notify the local public, the San Ysidro Marshal's Department will publish a notice in the local papers and mail fliers to residents, telling them where to find the call boxes and how to operate them. This will provide better service to all residents in the Jemez Mountain area.	$10,000	F	F	N	F	F	F	N	3

Table 4-10-1
Mitigation actions/projects identified by San Ysidro

Name	Hazard(s) Mitigated	Community Assets Mitigated (Existing/ Future/ Both)	Description	Estimated Cost	STAPLE+E Assessment (F) Favorable; (L) Less Favorable; (N) Neutral							Project Rank
					Social	Technical	Administrative	Political	Legal	Economic	Environmental	
F.4 Hazard education	Dam Failure, Drought, Flood, Severe Weather, Severe Wind, Wildfire	Both	Provide pamphlets with water bill to educate public on all hazard in the area and mitigation actions that they can complete as a private citizen and the benefits to them and the community	$500	F	F	F	F	F	F	F	4
F.5 Accessibility Study for Water Availability	Drought	Future	Conduct a water accessibility study to prioritize locations and depths of wells and then develop and implement a plan, as needed, to drill deep-water wells within the Village to continue providing clean drinking water in the event of continued drought conditions within the region.	$100,000	F	F	F	F	F	L	N	5
F.6 Refurbish Village Water Tank	Drought	Future	Village will refurbish the inner walls of its 200,000 gallon water tank. Remove scaling and apply NSF approved sealant and keep water supply available and clean for the Village residents. Currently interior of tank is peeling and rust has begun to form. This project will help stop the vulnerability of contamination and/or failure of the Village's main water supply source.	$60,000	F	F	F	F	F	L	F	6
F.7 Install Emergency Generators critical infrastructure	Dam Failure, Drought, Flood, Severe Weather, Severe Wind, Wildfire	Existing and Future	San Ysidro has no buildings with emergency backup power. The Village Hall, Marshall's Office, and Council Chamber have no emergency backup power. All of these facilities are critical for Continuity of Government. All of the Village is on well water and the generators would also provide back-up power for the wells that are needed to ensure continuous water supply to the community.	$175,000	F	F	F	F	F	F	F	6

Table 4-10-1
Mitigation actions/projects identified by San Ysidro

Name	Hazard(s) Mitigated	Community Assets Mitigated (Existing/ Future/ Both)	Description	Estimated Cost	STAPLE+E Assessment (F) Favorable; (L) Less Favorable; (N) Neutral							Project Rank
					Social	Technical	Administrative	Political	Legal	Economic	Environmental	
F.8 GIS Infrastructure and Capability	Dam Failure, Drought, Flood, Severe Weather, Severe Wind, Wildfire	Both	Working with stakeholders get the necessary data, that is currently deficient, to successfully determine the inundation limits of dams and the effects of inundation (from SCHMP 2019 Section 3.3.1). Improve GIS infrastructure to have more real time information available for successful development of Incident Action Plans and response capabilities. Improve continuity of operations without single point of failure.	$100,000	N	F	F	N	N	N	N	7

Table 4-10-2
Mitigation actions/projects implementation strategy for San Ysidro

Name	Planning Mechanism(s) for Implementation	Anticipated Completion Schedule	Primary Agency / Job Title Responsible for Implementation	Funding Source(s)
F.1 Install Back up power to critical facilities.	N/A	2025	Marshall's Office / Marshall	Federal and State Grants
F.2 Install Early Warning Devices for Critical Facilities in Village	Village Council	2025	Marshall's Office / Marshall	Grants
F.3 Install an Emergency Call Box at Each San Ysidro Municipal Complex	Village Council	2025	Marshall's Office / Marshall	Grants
F.4 Hazard Education	LEPC	On going	Marshall's Office / Marshall	General Fund

Table 4-10-2 Mitigation actions/projects implementation strategy for San Ysidro				
Name	**Planning Mechanism(s) for Implementation**	**Anticipated Completion Schedule**	**Primary Agency / Job Title Responsible for Implementation**	**Funding Source(s)**
F.5 Accessibility Study for Water Availability	Village Council	2025	Marshall's Office / Marshall	Local, state, and federal funding options
F.6 Refurbish Village Water Tank	Village Council	2021	Village Council, Marshall's Office	Local and state funding options
F.7 Install Emergency Generators critical infrastructure	Village Council	2025	Marshall's Office / Marshall	Federal, State, and local funding
F.8 GIS Infrastructure and Capability	Hazard Mitigation Plan, Floodplain Management	2023	Village Council, Marshall's Office	State and Federal Grants, budget

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Table 4-11-1
Mitigation actions/projects identified by SSCAFCA

Name	Hazard(s) Mitigated	Community Assets Mitigated (Existing/ Future/ Both)	Description	Estimated Cost	STAPLE+E Assessment (F) Favorable; (L) Less Favorable; (N) Neutral							Project Rank
					Social	Technical	Administrative	Political	Legal	Economic	Environmental	
G.1 Sugar Dam Outlet Structure	Dam Failure, Flood	Both	Construct outlet structure from Sugar Dam to Sugar arroyo	$500,000	F	F	N	F	F	F	F	15
G.2 Erosion and Grade Control Improvements	Flood	Both	Plan design and construct erosion and grade control facilities throughout SSCAFCA jurisdiction	$2,359,750	F	F	N	F	N	F	F	1
G.3 Lisbon Detention Facility and Channel	Flood	Both	Plan design and construct detention facility to reduce flows and upgrade channel	$2,122,000	F	F	N	N	F	F	F	2
G.4 Willow Creek Drainage Improvements	Flood	Both	Construct non-erosive protection around existing sanitary sewer abutting and within arroyo	$400,000	F	F	N	F	N	F	F	12
G.5 Saratoga Detention Center	Dam Failure, Flood	Both	Design and construct water quality detention facility to reduce downstream flooding and protect public elementary school	$3,813,000	F	F	F	F	F	F	F	3
G.6 Tributary A Dam	Dam Failure, Flood	Both	Acquire ROW, design dam, construct dam	$3,000,000	F	F	N	F	N	F	F	10

Table 4-11-1
Mitigation actions/projects identified by SSCAFCA

Name	Hazard(s) Mitigated	Community Assets Mitigated (Existing/ Future/ Both)	Description	Estimated Cost	STAPLE+E Assessment (F) Favorable; (L) Less Favorable; (N) Neutral							Project Rank
					Social	Technical	Administrative	Political	Legal	Economic	Environmental	
G.7 Guadalajara Drainage Improvements	Flood	Both	Design and construct a detention basin, storm drain pipes, inlets, and roadway improvements	$2,810,000	F	F	N	F	N	F	F	4
G.8 Paseo Del Volcan (PDV) Dam	Flood	Both	ROW acquisition, design, and construct flood control dam	$8,100,000	F	F	F	F	F	F	F	6
G.9 19th Avenue Dam	Dam Failure, Flood	Both	Acquire ROW and Design Facility	$1,000,000	F	F	N	N	N	F	F	5
G.10 Venada Arroyo Channel Stabilization	Flood	Both	Design and construct bank stabilization structures between Lincoln and NM 528 in Rio Rancho, and between NM 528 and the Rio Grande in Bernalillo.	$500,000	F	F	N	F	N	N	F	8
G.11 Industrial Park Water Quality Facility	Flood	Both	Permit, design, construct, water quality detention basin to treat storm water drainage from industrial park	$1,356,500	F	F	N	F	N	N	F	7
G.12 North hills Stormwater diversion facility	Flood	Both	Design and construct stormwater diversion detention facility in North Hills	$2,245,000	F	F	N	F	N	N	F	11

Table 4-11-1
Mitigation actions/projects identified by SSCAFCA

Name	Hazard(s) Mitigated	Community Assets Mitigated (Existing/ Future/ Both)	Description	Estimated Cost	STAPLE+E Assessment (F) Favorable; (L) Less Favorable; (N) Neutral							Project Rank
					Social	Technical	Administrative	Political	Legal	Economic	Environmental	
G.13 Arroyo Bank Stabilization Slope Control	Flood	Both	Design and construct erosion / slope protection facilities	$20,000,000	F	F	N	F	N	N	F	18
G.14 Venada Arroyo Dam	Flood	Both	Design and construct flood protection facility	$5,700,000	F	F	N	F	N	N	F	9
G.15 Unser Dam	Flood	Both	Design and construct flood protection facility	$800,000	F	F	N	F	N	N	F	16
G.16 Badger Dam	Flood	Both	Plan, design, construct detention facility on the Barrancas Arroyo upstream of Idalia	$2,445,000	F	F	N	F	N	N	F	13
G.17 Landfill Pond	Flood	Both	Complete environmental studies, plan, design, and construct detention pond at Idalia and Iris	$1,475,000	F	F	N	F	N	N	F	14
G.18 Corrales Heights Dam Improvements	Flood	Both	Design and construct improvements to jurisdictional dam outfall and slope	$860,000	F	F	N	F	N	N	F	17
G.19 Emphasize Arid Low Impact Development	Drought	Both	During actual implementation as part of the project, use techniques that emphasize infiltration of stromwater into ground water during all SSCAFCA led projects. Participate in the Arid Low Impact Development Coalition, a group dedicated to outreach and education regarding the use of low impact development techniques suitable for our arid environment.	$0.00 (Staff Time)	F	F	F	F	F	N	F	19

Table 4-11-1
Mitigation actions/projects identified by SSCAFCA

Name	Hazard(s) Mitigated	Community Assets Mitigated (Existing/ Future/ Both)	Description	Estimated Cost	STAPLE+E Assessment (F) Favorable; (L) Less Favorable; (N) Neutral							Project Rank
					Social	Technical	Administrative	Political	Legal	Economic	Environmental	
G.20 Removal of High Water Use Plants	Drought	Both	Remove Russian Olive and Salt Cedar plantlife from all SSCAFCA owned facilities.	$25,000	F	N	N	N	F	N	F	20

Table 4-11-2
Mitigation actions/projects implementation strategy for SSCAFCA

Name	Planning Mechanism(s) for Implementation	Anticipated Completion Schedule	Primary Agency / Job Title Responsible for Implementation	Funding Source(s)
G.1 Sugar Dam Outlet Structure	Black Arroyo Watershed Management Plan	2021	SSCAFCA/Executive Engineer	Local bonds
G.2 Erosion and Grade Control Improvements	Protect adjacent and downstream property owners from excess erosion	2019-2023	SSCAFCA/Executive Engineer	Local Bonds, State and Federal Grants
G.3 Lisbon Detention Facility and Channel	Montoyas Arroyo Watershed Management Plan	2019	SSCAFCA/Executive Engineer	Local Bonds, State and Federal Grants

Table 4-11-2 Mitigation actions/projects implementation strategy for SSCAFCA				
Name	**Planning Mechanism(s) for Implementation**	**Anticipated Completion Schedule**	**Primary Agency / Job Title Responsible for Implementation**	**Funding Source(s)**
G.4 Willow Creek Drainage Improvements	Willow Creek arroyo Watershed Management Plan	2021	SSCAFCA/Executive Engineer	Local Bonds, Local, State and Federal Grants
G.5 Saratoga Detention Facility	Enchanted hills Elementary School and comply with USEPA MS4 Permit	2019	SSCAFCA/Executive Engineer	Local Bonds, Local, State and Federal Grants
G.6 Tributary A Dam	Black Arroyo Watershed Management Plan	2020	SSCAFCA/Executive Engineer	Local Bonds, State and Federal Grants
G.7 Guadalajara Drainage Improvements	La Barrancas Watershed Management Plan	2022	SSCAFCA/Executive Engineer	Local Bonds, State and Federal Grants
G.8 Paseo Del Volcan PDV Dam	City Center Drainage Plan	2021	SSCAFCA/Executive Engineer	Local Bonds, Local Grants, public/private partnership
G.9 19th Avenue Dam	Black Arroyo Watershed Management Plan	2021	SSCAFCA/Executive Engineer	Local Bonds, State and Federal Grants
G.10 Venada Arroyo Channel Stabilization	Venada Arroyo Watershed Management Plan	2019-2023	SSCAFCA/Executive Engineer	Local Bonds
G.11 Industrial Park Water Quality Facility	Montoyas WMP	2020	SSCAFCA/Executive Engineer	Local Bonds, Local, State and Federal Grants
G.12 North Hills Stormwater Diversion Facility	Montoyas WMP	2021	SSCAFCA/Executive Engineer	Local Bonds, Local, State and Federal Grants
G.13 Arroyo Bank Stabilization Slope Control	SSCAFCA DMP & WMPs	2019-2023	SSCAFCA/Executive Engineer	Local bonds, Grants
G.14 Venada Arroyo Dam	Venada WMP	2020	SSCAFCA/Executive Engineer	Local bonds, Grants
G.15 Unser Dam	Venada WMP	2022	SSCAFCA/Executive Engineer	Local bonds, Grants
G.16 Badger Dam	Barrancas WMP	2021	SSCAFCA/Executive Engineer	Local bonds, Grants

Table 4-11-2 Mitigation actions/projects implementation strategy for SSCAFCA				
Name	**Planning Mechanism(s) for Implementation**	**Anticipated Completion Schedule**	**Primary Agency / Job Title Responsible for Implementation**	**Funding Source(s)**
G.17 Landfill Pond	Barrancas WMP	2021	SSCAFCA/Executive Engineer	Local bonds, Grants
G.18 Corrales Heights Dam Improvements	OSE Requirements	2022	SSCAFCA/Executive Engineer	Local Bonds, Local, State and Federal Grants
G.19 Emphasize Arid Low Impact Development	Directive from Management	2020	SSCAFCA/Executive Engineer	Project funding (varies with project)
G.20 Removal of High Water Use Plants	Directive from Management	2021	SSCAFCA/Executive Engineer	Operational Funding

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SECTION 5: PLAN MAINTENANCE STRATEGY

According to the DMA 2000 requirements, each plan must define and document processes or mechanisms for maintaining, updating, and integrating the hazard mitigation plan within the established five-year planning cycle. Elements of this plan maintenance section include:

Monitoring and Evaluating the Plan

Updating the Plan

Continued Public Participation

The following sections document the past and proposed plan maintenance and integration procedures discussed and defined by the Planning Team.

5.1 Monitoring and Evaluation

5.1.1 Past Plan Cycle

Sandoval County and the participating jurisdictions recognize that this hazard mitigation plan is intended to be a "living" document with regularly scheduled monitoring, evaluation, and updating. The 2014 Plan outlined responsibility and specific elements of monitoring and evaluation of the 2014 Plan that generally included:

- Creation of permanent planning group to be known as the Hazard Mitigation Team
- The Hazard Mitigation Team was to monitor and evaluate progress on implementation of identified action items.
- The findings of the monitoring and evaluation were to be documented on annual basis.

A poll of the Planning Team regarding the past execution of the plan maintenance strategy was taken and it was concluded that few of the maintenance activities have occurred in the past five years. Reasons for the lack of review included:

- All jurisdictional personnel cover multiple jobs and were not able to effectively communicate the plan maintenance requirements to other departments and communities.
- Changes in staff and lack of communicating responsibilities to new staff.
- Lack of major disaster situations.

Recognizing the need for improvement, the Planning Team discussed ways to make sure that the Plan review and maintenance process will occur over the next five years. The results of those discussions are outlined in the following sections.

5.1.2 Proposed Schedule and Scope

Having a multi-jurisdictional plan can aide in monitoring and evaluating through the consolidation of information for all participating jurisdictions into one document. The Planning Team reviewed the current DMA 2000 rules and FEMA guidance documents and discussed a strategy for performing the required monitoring and evaluation of the Plan over the next Plan cycle. The monitoring and evaluation procedures resulting from those discussions are as follows:

- **Schedule** – The Plan will be a standing agenda item on LEPC quarterly meetings, with the October meeting being specifically reserved for each jurisdiction or tribal entity to submit and discuss review questions.

- **Responsibility** – The Sandoval County Emergency Manager will send out a notice to each jurisdiction and Tribe that adopts this Plan, prior to that LEPC meeting, to remind them to perform a review and evaluation of their elements of the Plan using the questions below as a guideline. Each jurisdiction will provide responses to the county Emergency Manager prior to the LEPC meeting**.**
- **Review Content** – The content and scope of the above referenced Plan review and evaluation will address the following questions to be addressed by each participating jurisdiction:
    - ***Hazard Identification:*** *Have the risks and hazards changed?*
    - ***Goals and objectives:*** *Are the goals and objectives still able to address current and expected conditions?*
    - ***Mitigation Projects and Actions:*** *Has the project been completed? If not complete but started, what has been done and what percent of the project has been completed? What remains to be done? Are there changes to the scope of work?*
    - ***Plan Effectiveness:*** *During at least two LEPC quarterly meetings the planning team will go over and review with the LEPC to determine the effectiveness of this plan. Which goals are being met? Which goals need to be changed? Has the priorities of any goals changed? Do we need to update plan with new goals or changes?*
- **Documentation** – Each jurisdiction will review and evaluate the Plan as it relates to their community and document responses to the above questions in the form of an informal memorandum. During the scheduled review meeting, responses to each of the questions will be discussed by the Planning Team to address concerns or successes. Documentation of each review meeting will include a list of attendees, a compilation of the memorandums generated by each jurisdiction, and any notes on discussions and conclusions made during the meeting, all compiled into a brief memorandum or review report.
    - The planning team will continually monitor adherence to the processes described in the plan, to include progress on incorporating the plan into other planning processes. This will allow the planning team to evaluate those processes at the time of the next plan update and determine if any changes are needed.

5.2 Plan Update

For this plan update the Planning Team discussed, reviewed, and validated the existing priorities and determined that there was to be no significant changes made to the priorities of this plan. According to DMA 2000, the Plan requires updating and approval from the NMDHSEM and FEMA every five years. The plan updates will adhere to that set schedule using the following procedure:

- All jurisdictions will meet bi-annually to continually evaluate the plan and update it as needed to ensure that the planning team and its jurisdictions can incorporate any necessary changes as the time for rewrite approaches.
- Approximately eighteen months prior to the plan expiration date, the Planning Team will research sources and possibly secure funding to begin the plan update process.
- Approximately one year prior to the plan expiration date, the Planning Team will be re-convened to begin the update process. The Sandoval County Office of Emergency Management will take responsibility to organize and facilitate the update effort.
- The revised plan will be submitted to NMDHSEM and FEMA for review, comment and the issuance of an "Approval Pending Adoption" (APA) letter from FEMA.
- The APA Plan document will be presented before the respective councils and boards for an official concurrence/adoption of the changes.
- Official copies of the resolutions will be sent to NMDHSEM and FEMA for the final approval.

5.3 Continued Public Involvement

The Planning Team reviewed the public involvement subsection of the 2014 Plan and discussed the challenges and successes regarding the identified continued public involvement strategy. The 2014 Plan identified the following strategy for continued public involvement:

- Public involvement was to occur during the evaluation and the update of the plan.
- Methods were to include annual public education, workshops and hearings.
- The Hazard Mitigation Team would also use periodic newsletters, mailings, and different agency communications.
- Use of the county website to provide information about mitigation initiatives and to be a mechanism for public comment.

A poll of the Planning Team revealed that no public involvement occurred per the 2014 Plan strategy.

Several of the participating jurisdictions conducted other efforts to elevate hazard mitigation awareness in the general public and community on an ongoing basis over the past plan cycle, with varying degrees of success. Examples included:

- SSCAFCA had the 2014 Plan as an agenda item at a couple of board meetings.
- Corrales conducted public meetings that were tied to the implementation of each of the action items.
- Corrales sends out quarterly flyers with various wildfire mitigation elements.
- Any approved projects required council/board approvals
- Bernalillo provides an insert with monthly utility billing with various mitigation elements
- Bernalillo has a digital billboard with public awareness announcements.
- Rio Rancho CERT program with public awareness and mitigation elements.
- Digital billboard on Highway 550 warning of fire hazards.
- CWPP meetings in multiple locations across the County.
- County and jurisdiction bans on fireworks during the 4th of July timeframe.

All participating jurisdictions remain committed to keeping the public informed and aware about the hazard mitigation planning efforts, actions and projects. Table 5-1 summarizes proposed activities for continued public involvement and dissemination of information that shall be pursued whenever possible and appropriate during the next five years. The point of contact for each community will take responsibility for ensuring that their jurisdiction will continue to seek public participation in hazard mitigation and the Plan's implementation, monitoring and evaluation.

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Table 5-1: Proposed continued public involvement activities or opportunities identified by participating jurisdictions	
Jurisdiction	**Proposed Continued Public Involvement Activity or Opportunity**
Sandoval County	• ***Website*** – the Plan will be posted to the website, minus any sensitive material, as well as all subsequent revisions. • ***County Commission*** – presentations of the Plan and its contents will be given to the County Commission and other entities upon request. • ***CodeRED System*** – the CodeRED system will be used to alert citizens of hazards and provide early warning. • ***LEPC*** – Discussion and review of the Plan and hazard mitigation in general will be made a regular part of the quarterly LEPC meetings. • ***Stakeholder Engagement*** – the county will engage stakeholder agencies to garner support for boundary or joint hazard mitigation ventures using existing meeting structures (e.g. – council and commission meetings), with the goal of introducing the desired mitigation and combining resources for project success.
Bernalillo, Town of	• ***Town Council Meetings*** – Regularly inform the Town Council on hazard mitigation issues and Plan maintenance findings. • ***Town Hall Meetings*** – Use this forum, when appropriate, to disseminate information regarding hazard mitigation issues and Plan maintenance news. • ***Town Website*** – Create a permanent webpage notification about the Plan and where it can be accessed and viewed. • ***Mountain West Beer Festival*** – Develop and hand out fliers to attending public regarding local hazard mitigation issues. • ***Town Hall Digital Sign*** – Make use of this device to inform the public of meetings and announcements regarding hazard mitigation. • ***Homeowner Association Contacts*** – Provide information to local homeowner associations and ensure their involvement in hazard mitigation.

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Table 5-1: Proposed continued public involvement activities or opportunities identified by participating jurisdictions	
Jurisdiction	**Proposed Continued Public Involvement Activity or Opportunity**
Corrales, Village of	• ***Website*** – The village is working on a new website and will have access for departments to update and create information pages for citizens, this will included developing a webpage to house mitigation information, flood insurance information and other preparedness information • ***Social Media –*** Fire department and Emergency Manager utilize multiple forms of social media to educate the public and announce meetings. • ***Flyers*** – Distribute hazard mitigation related information with household waste bills every quarter. • ***Council Meeting*** – Distribute the same flyers as handouts at council meetings • ***Neighborhood Watch Meetings*** – Distribute same flyers at neighborhood watch meetings and conduct a question and answer session as appropriate. • ***Bosque watch Meetings*** – Distribute flyers teach basic ICS and NIMS principals • ***Annual Evacuation/Emergency Preparedness Meetings –*** Conduct trainings and information sessions for citizens on defensible space, evacuation and shelter in place plans. • ***Harvest Festival*** – the village will set up a booth at this annual event and staff will be available for questions. • ***Training*** – Provide hazard mitigation training to Village employees and local groups who assist. Provide ICS and NIMS to Village staff. • ***Drills –*** conduct both table top and exercise with Emergency Services, Animal Service and Village staff
Jemez, Pueblo of	• ***Website Updates –*** Provide website updates regarding hazard mitigation and the Plan maintenance. • ***Council Meetings –*** Occasional presentations of the hazard mitigation planning elements and projects to the tribal council. • ***Directors / Program Managers Meeting –*** Present information at monthly Directors / Managers Meeting. • ***Red Rocks Reporter –*** Articles in the "Red Rocks Reporter" a printed publication sent out monthly to entire tribe. • ***Back To School Nights –*** Provide hazard mitigation materials at this annual event for parents and children to prepare for the school year.
Jemez Springs, Village of	• ***Flyer Notification*** – Prepare and distribute a flyer by mail or as a utility bill insert that provides awareness of mitigation issues and Plan maintenance findings. • ***Village Council Meetings*** – Include hazard mitigation updates and reporting as an agenda item for council meetings at least twice every year. • ***Public Notification*** – Provide a permanent link to the county website hosting the Plan and other mitigation information.
Rio Rancho, City of	• ***City Website*** - Plan can be posted on the City website for public review and comments annually in coordination with Sandoval County. • ***Public Events*** - Distribute mitigation/preparedness information at the Fourth of July Festival, Pork-n-Brew, and Mayor's Sunday is Funday public events. • ***LEPC*** - Present current mitigation plan for input and review at regular intervals in LEPC meetings.

Table 5-1: Proposed continued public involvement activities or opportunities identified by participating jurisdictions	
Jurisdiction	**Proposed Continued Public Involvement Activity or Opportunity**
San Ysidro, Village of	• ***Village Council Meetings*** – Include hazard mitigation updates and public comment requests as discussion items on the Public Safety Department Agenda every six months. • ***Partnership with 4H*** **-** Club meeting are held approximately 8 times a year or more and provide an opportunity to communicate hazard mitigation awareness and inspire community involvement projects that the kids can conduct. • ***Web Updates*** – Post mitigation projects that are funded and completed and solicit public comments on hazard mitigation issues. Links will be set up so that all comments will be emailed directly to the public safety department. • ***Presentation Boards*** **-** Presentation boards are planned to be made by the 4 H kids and posted in the Village office and public safety meeting room. These rooms are used constantly by different groups every month to include higher education organizations throughout the country, many organizations within Sandoval County and the State of New Mexico
Sandia Pueblo	• ***Website Updates*** – Provide updates regarding hazard mitigation and Plan maintenance. • ***Back To School Night*** – Provide hazard mitigation materials at this annual event for parents and children to prepare for the school year. • ***Child Abuse Prevention Awareness Fair*** – Annual information event regarding preventing child abuse. • ***Earth Days*** – Informational event to promote Earth Day. • ***Education and Health Department Newsletters*** – Include information on hazard mitigation planning and opportunities for input. • **For more information, see Section 5 of Annex II**
Santo Domingo, Pueblo of	• ***"The Newsletter"*** – provide hazard mitigation updates and announcements in this newsletter that has community-wide distribution on a quarterly basis. • ***Flyers*** – Communicate hazard mitigation awareness and announcements using flyers that will be posted throughout public places in the community and at the community center.

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Table 5-1: Proposed continued public involvement activities or opportunities identified by participating jurisdictions	
Jurisdiction	**Proposed Continued Public Involvement Activity or Opportunity**
SSCAFCA	• ***River Exchange Program*** – Conduct 22 classes per year for various age groups within Bernalillo, Corrales and Rio Rancho, wherein flood hazards within arroyos are communicated. • ***Arroyo Safety Program*** – Develop and distribute educational materials regarding Arroyo Safety to the general population of the jurisdiction. • ***Watershed Stewards Program*** – Deliver educational programming to Senior Centers and other adult programming opportunities on the importance of a healthy watershed to prevent both flooding and improve stormwater quality. • ***Partnerships with "Keep Rio Rancho Beautiful" and the City of Rio Rancho*** – Conduct a public program to remove trash from the arroyos 4 times a year. • ***Water Quality Education Events and Fairs*** – Facilitate educational events for potential point source polluters, veterinarians, and commercial sites, twice a year. • ***Neighborhood Association and Community Organization Public Outreach*** – Meet with various groups before and after the monsoon season to conduct arroyo flood hazard education, 2 to 4 times a year. • ***SSCAFCA Board Agenda*** – Present and seek public comment on the hazard mitigation plan before the SSCAFCA Board in the spring and fall. • ***Children's Water Festival*** – Facilitate a booth for educating the public on the hazards of arroyo flooding and pollution. • ***Website Updates*** – update website in the spring and fall to reflect latest hazard mitigation news and Plan status • ***Know your Arroyos Campaign*** – SSCAFCA developed the Know Your Arroyos Safety Campaign to help educate students about the hazards of arroyos. The Know Your Arroyos literature is available on SSCAFCA's website. • ***Lateral Erosion Envelop*** – SSCAFCA developed and distributed literature on the Lateral Erosion Envelope (LEE) concept. The LEE literature is available on SSCAFCA's website.

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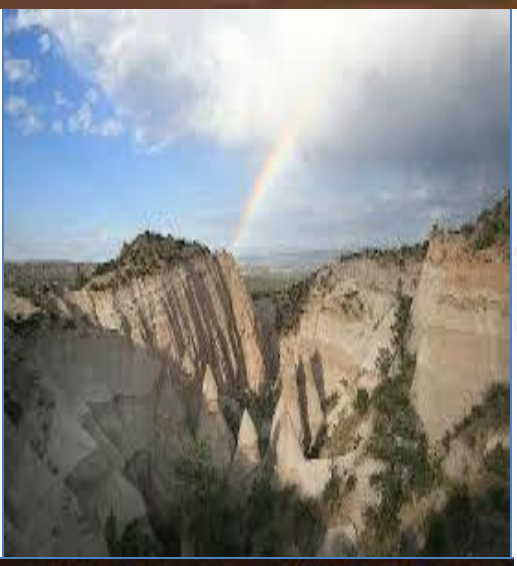

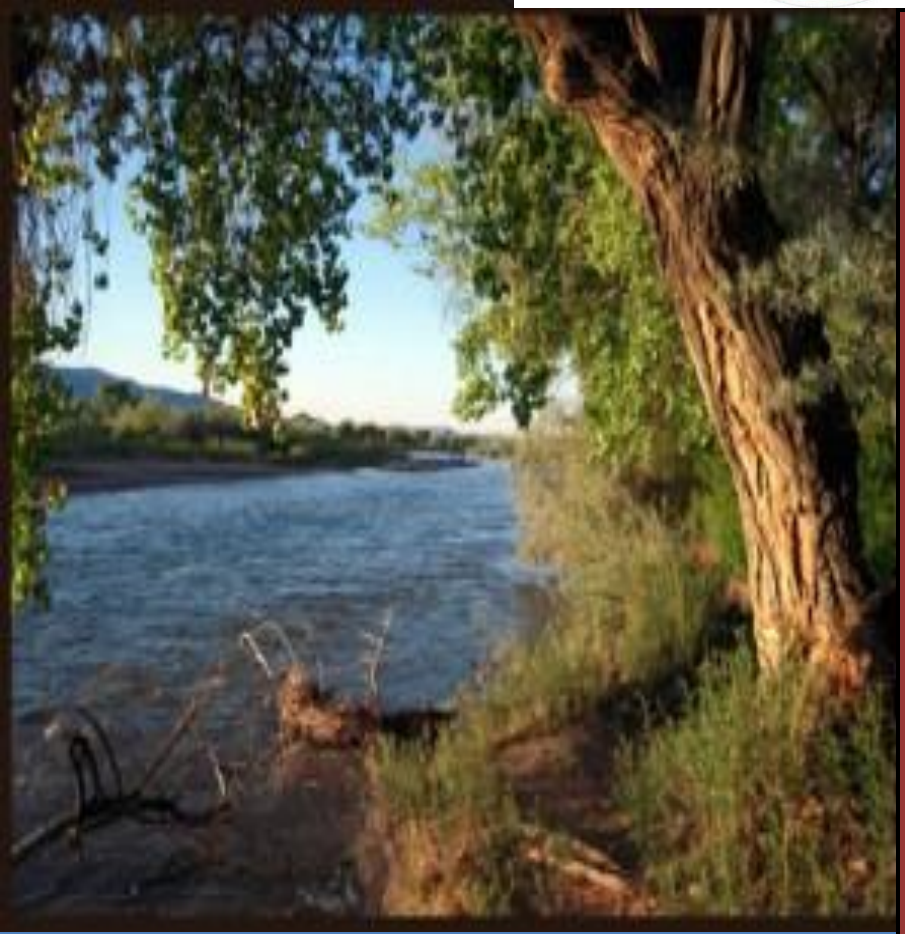

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