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ALL HAZARD MITIGATION PLAN

December 2013

Volume ___ of ___

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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 three federal disaster declarations and approximately 120 other documented and significant natural hazard events. The jurisdictions that have 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 participating jurisdictions know that with careful selection, mitigation actions in the form of projects and programs can become a long-term, cost effective means for reducing the impact of natural and human-caused hazards.

The elected and appointed officials of Sandoval County, Cochiti Lake, Corrales, Jemez Springs, Rio Rancho, San Ysidro, and the Southern Sandoval County Arroyo Flood Control Authority, demonstrated their commitment to hazard mitigation in 2003-2004 by preparing the *Hazard Mitigation Plan, Sandoval County, New Mexico* (2004 Plan). The 2004 Plan was approved by FEMA on August 31, 2005, and expired 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.

The Sandoval County Fire Department secured funding and hired private firms to provide consulting services and guide the planning process and Plan development. Sandoval County organized and reconvened a multi-jurisdictional planning team 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, US Forest Service, local Indian Tribes, and several other private, local, and state agencies. The planning team met four times during the period of December 2011 to April 2012 in a collaborative effort to review, evaluate, and update the 2004 Plan.

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

The Plan has been prepared in compliance with Section 322 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act (Stafford Act or the Act), 42 U.S. C. 5165, enacted under Sec. 104 the Disaster Mitigation Act of 2000, (DMA 2000) Public Law 106-390 of October 30, 2000, as implemented at CFR 201.6 dated October, 2011. 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 planning team and the consulting 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* (2004 Plan).

This Plan is the result of a multi-jurisdictional hazard mitigation planning update process performed by Sandoval County, the incorporated communities of Corrales, Jemez Springs, Rio Rancho and San Ysidro, the Southern Sandoval County Arroyo Flood Control Authority, Santo Domingo Pueblo and Sandia Pueblo. Santo Domingo and Sandia Pueblos do not have all of the required information in the existing Plan. When it is received, it will be added to

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

the Plan as an annex and be checked against the tribal crosswalk with the information already in the Plan. The Jemez and San Felipe Pueblos also participated in some of the planning team meetings but are not formally adopting the Plan. The result of the hazard mitigation planning process is a single, multi-jurisdictional plan that will replace the 2004 Plan.

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	• Sandia, Pueblo of • Santo Domingo, Pueblo of	• Southern Sandoval County Arroyo Flood Control Authority

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

- Cochiti Pueblo and Town of Cochiti Lake – The Cochiti Pueblo will be developing their own plan which will include the Town of Cochiti Lake.
- Village of Cuba – Coordination was performed with village officials, but no information or data for the Plan was provided.
- Jemez Pueblo – Jemez Pueblo will be developing their own plan.
- San Felipe Pueblo – Representatives from the San Felipe Pueblo attended several of the planning team meetings but did not provide any information or data for the Plan.

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

Each participating jurisdiction will keep a copy of their official resolution of adoption located in Appendix F of their copy of the Plan.

The Plan was submitted to the New Mexico Department of Homeland Security and Emergency Management (MNDHSEM), the authorized state agency, and FEMA for review and approval. FEMA's approval letter is included in Appendix F.

* Will adopt the Plan when their annexes are entered into the Plan.

1.3 Plan Purpose and Authority

The purpose of the Plan is to identify natural hazards and certain human-caused 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 2004 Plan. The State and FEMA review of this Plan was based on the criteria for a new plan.

Sandoval County, the City of Rio Rancho, the Town of Bernalillo, the Villages of Corrales, Cuba, Jemez and 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, the Jicarilla Apache Nation, and the Navajo Nation are all federally recognized Indian Tribes and sovereign entities. As such, all of these jurisdictions are empowered to formally plan and adopt the Plan on behalf of their respective jurisdictions.

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 Tectonic Engineering and Surveying, PC (Tectonic) to provide consulting services in guiding the planning process and Plan development. JE Fuller/ Hydrology and Geomorphology, Inc. (JEF) was retained by Tectonic as a sub-consultant to assist with the effort.

1.4 Plan Description

1.4.1 2004 Plan History

Following the Cerro Grande Fire in 2000, concerned government officials and citizens, led by Sandoval County Emergency Services, requested funding through the Cerro Grande Fire Assistance Act to complete a countywide hazard mitigation plan. With the assistance of a planning consultant provided by the then New Mexico Office of Emergency Management, a kickoff meeting was convened in June 2002, which began the planning process with the Sandoval County Emergency Services taking the lead. A planning team was formed and several meetings were convened over the next year to prepare the various plan elements. The 2004 Plan received official FEMA approval on January 27, 2005 and expired January 27, 2010.

1.4.2 General Content and Arrangement

The Plan is generally arranged and formatted to facilitate its review based on the review guidelines recently 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.

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.

This Plan is the result of a thorough update process that included a section by section review and evaluation of the 2004 Plan by the Planning Team participants. At the onset, each participating jurisdiction was provided a digital copy of the 2004 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 2004 Plan. More discussion regarding this process is summarized in Section 2 of this Plan. In general, the 2004 Plan was compiled into three general sections addressing the risk assessment, mitigation strategy, and maintenance elements to meet the DMA 2000 requirements. The Planning Team agreed that the 2004 Plan should be rearranged to comport with the recently FEMA published review guidelines and crosswalk. Accordingly, the format of the entire 2004 Plan has been dropped and rearranged per the sections previously listed.

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.

[2] 2011, FEMA, Local Mitigation Plan Review Guide

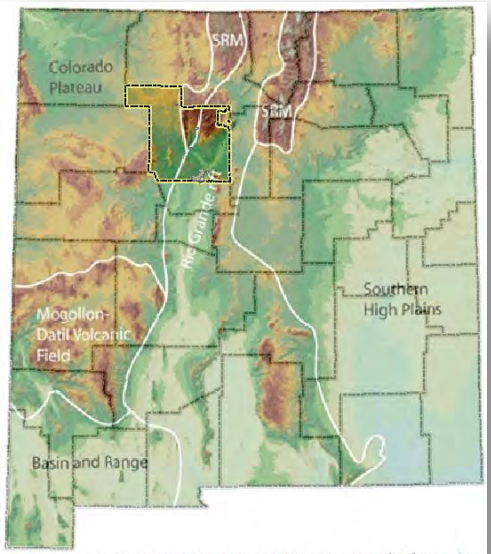
[3] Sandoval County, 2012, URL at: http://www.sandovalcounty.com/?q=node/108

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.

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 Arrriba 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 to right, 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]



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

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 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.

[4] New Mexico Bureau of Geology and Mineral Resources website at: http://geoinfo.nmt.edu/tour/provinces/home.html

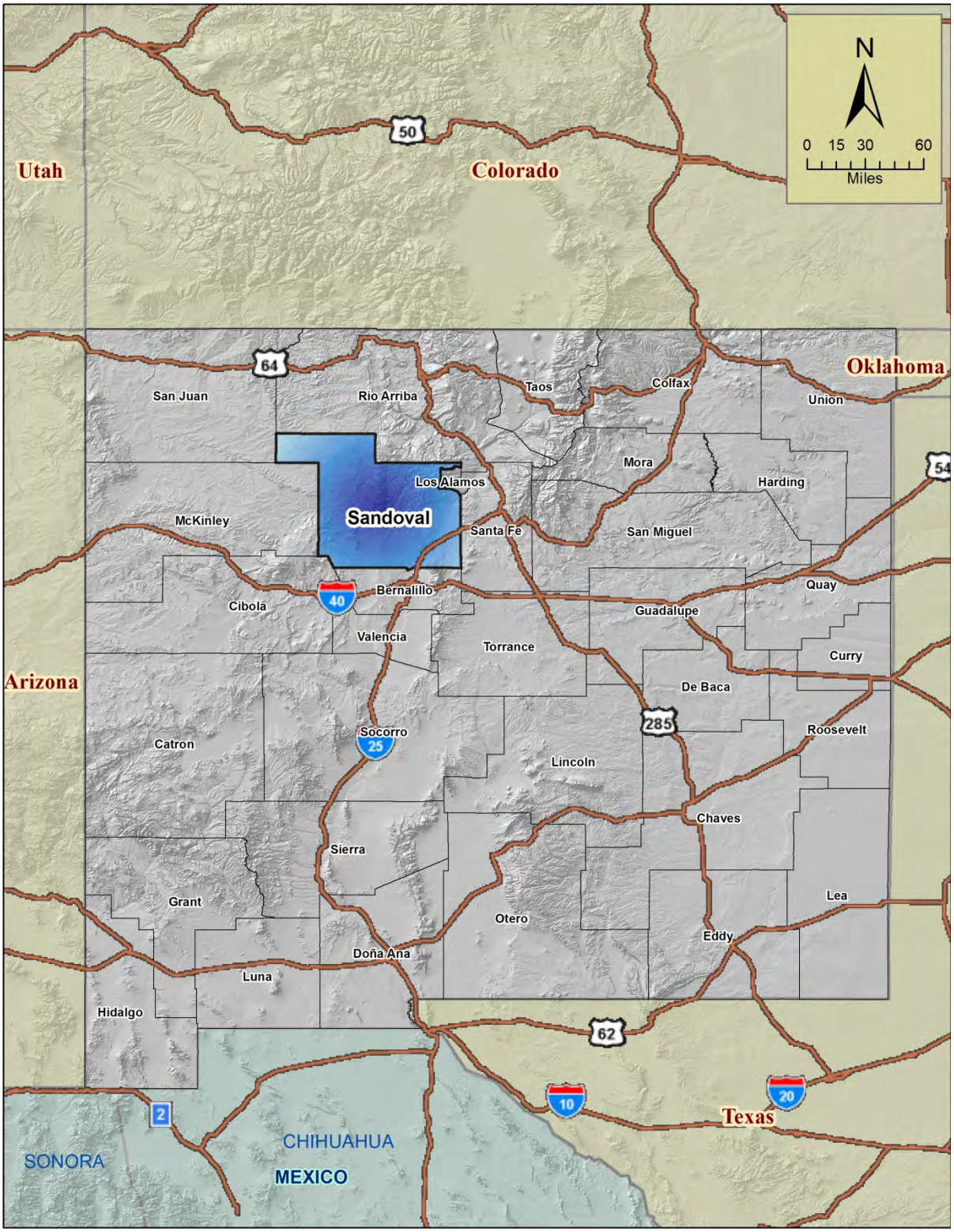


Figure 1-1
Vicinity Map

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 intersecting I-25 at Bernalillo. New Mexico 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 22 provide access to I-25 for Cochiti Pueblo, Town of Cochiti Lake, Peña Blanca, and Santa Domingo Pueblo.

The Burlington Northern Santa Fe (BNSF) Railroad crosses Sandoval County for approximately 31 miles beginning at the southern County line just southeast of Corrales, and continuing north-northeast to Santo Domingo Pueblo. It then extends approximately 6 miles east to the County border.

There are no major airports within Sandoval County, however several airports are located within 10 miles of the southern and eastern borders. Albuquerque International Sunport is the closest international airport and is located approximately 20 miles south of Bernalillo, New Mexico.

Figure 1-2 shows all the major roadway and railway transportation routes and the airports within or 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. Three climate stations representing geographically different areas of Sandoval County are shown on Figure 1-2. Figures 1-3, 1-4, and 1-5 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

[5] Most of the data provided and summarized in this Plan are taken from the WRCC website beginning at the following URL: http://www.wrcc.dri.edu/CLIMATEDATA.html.

[6] New Mexico Climate Center, 2012, *Climate of New Mexico*. New Mexico State University, Las Cruces. Accessed via the web in June 2012 at: http://weather.nmsu.edu/News/climate-in-NM.htm

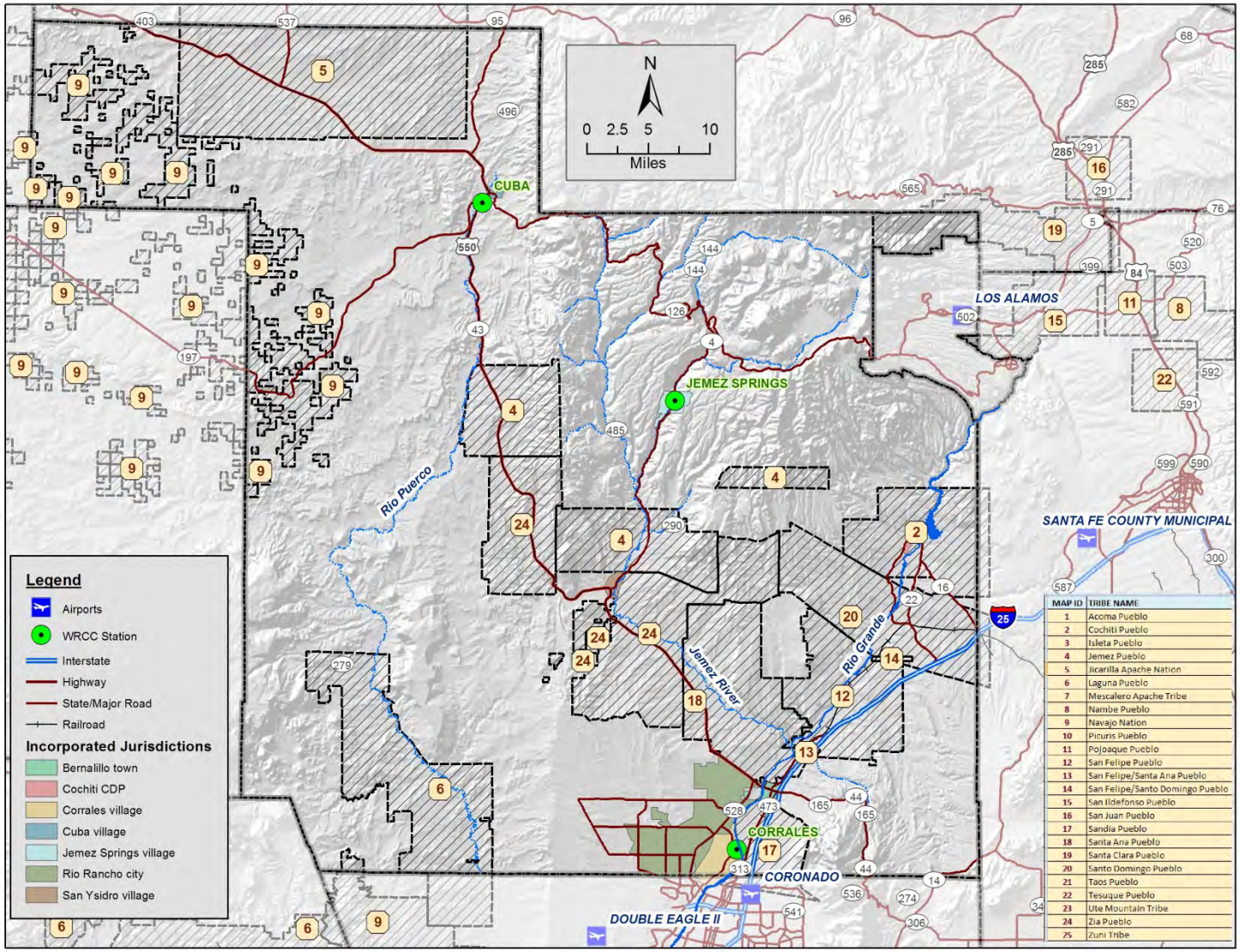


Figure 1-2
Transportation Routes Map

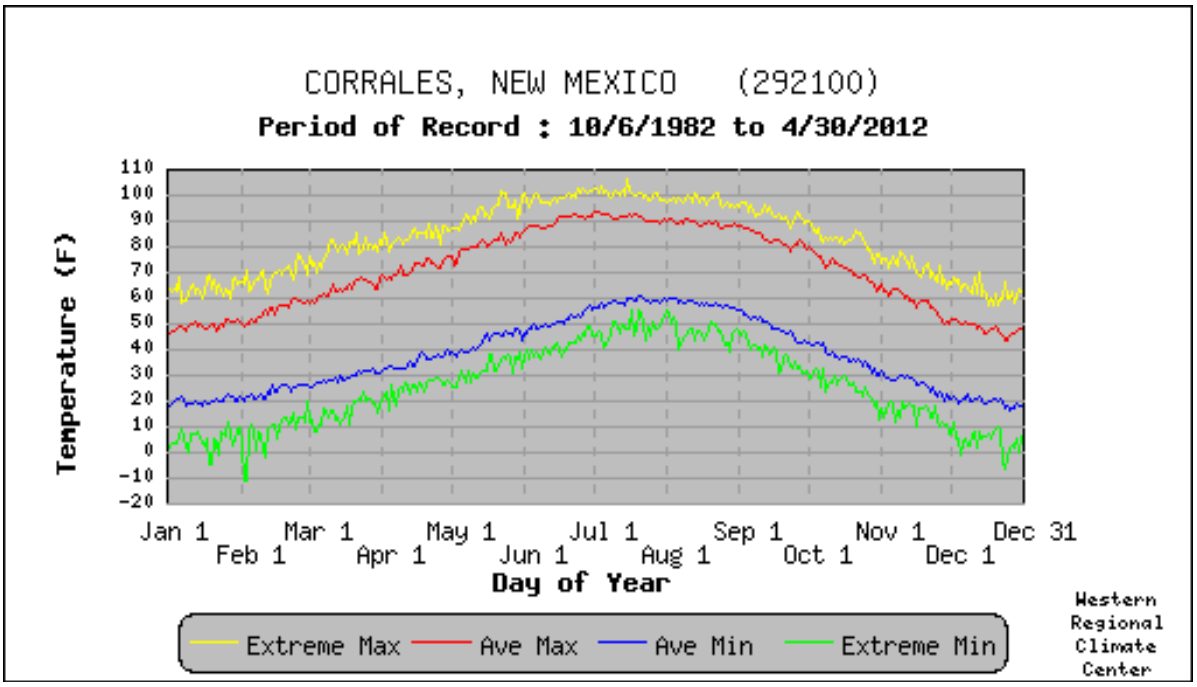


Figure 1-3
Daily Temperatures and Extremes for Corrales Station, New Mexico

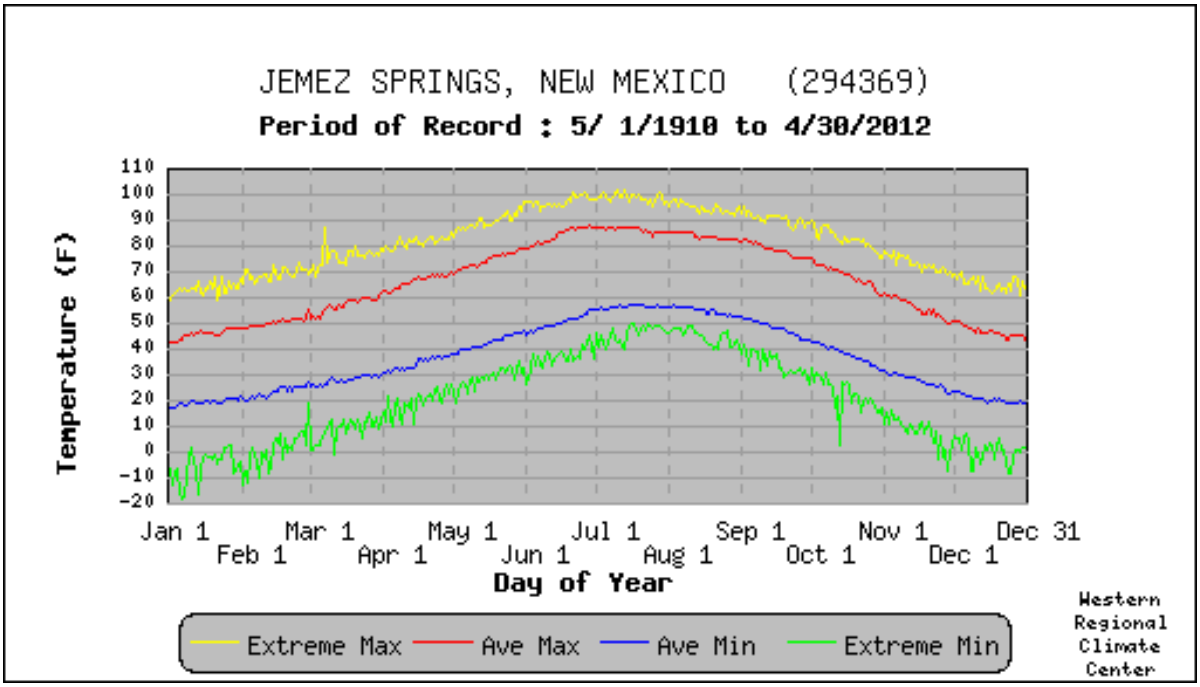


Figure 1-4
Daily Temperatures and Extremes for Jemez Springs Station, New Mexico

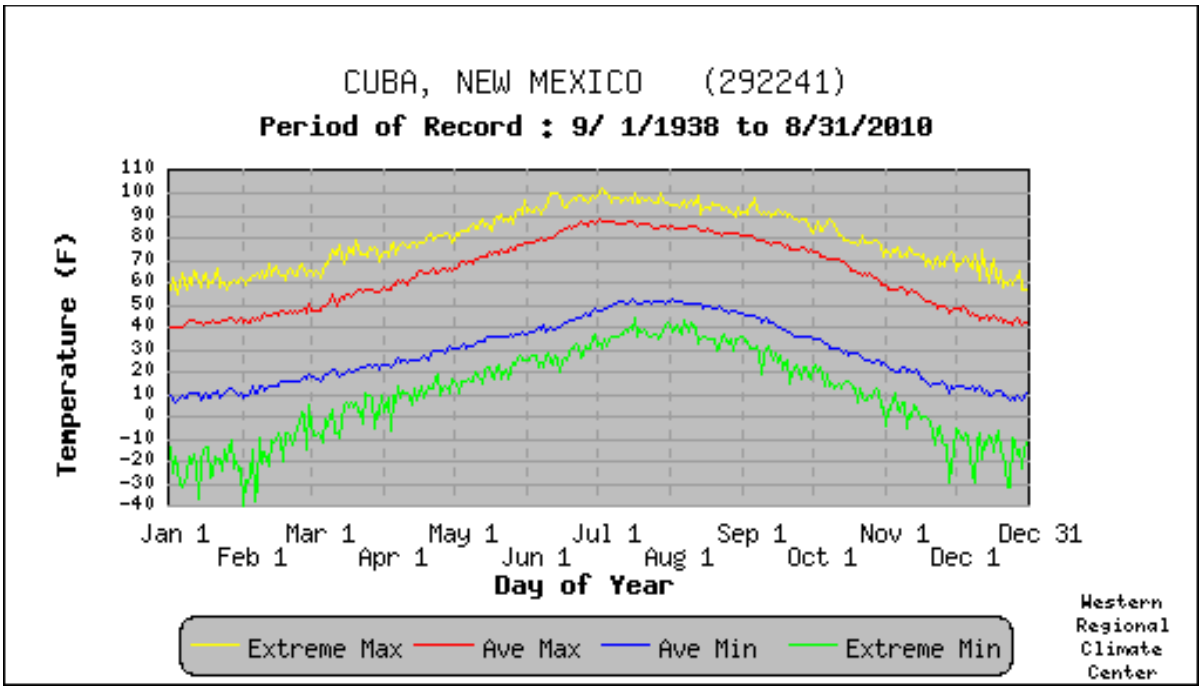


Figure 1-5
Daily Temperatures and Extremes for Cuba Station, New Mexico

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 1-6, 1-7, and 1-8 show tabular temperature and precipitation statistics for the Corrales, Jemez Springs, and Cuba Stations, respectively. Statistics for other stations within the County and surrounding area may be viewed by accessing the WRCC website.

CORRALES, NEW MEXICO (292100)

Period of Record Monthly Climate Summary

Period of Record : 10/6/1982 to 4/30/2012

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Average Max. Temperature (F)	49.3	55.1	63.5	71.7	80.7	89.8	91.7	89.0	83.0	71.5	58.5	48.2	71.0
Average Min. Temperature (F)	20.0	23.8	29.1	35.3	42.7	51.0	58.4	57.9	49.0	36.7	26.5	19.8	37.5
Average Total Precipitation (in.)	0.41	0.44	0.67	0.64	0.54	0.65	1.42	1.87	1.05	1.00	0.60	0.62	9.90
Average Total SnowFall (in.)	2.0	1.6	0.9	0.5	0.0	0.0	0.0	0.0	0.0	0.3	0.5	2.3	8.1
Average Snow Depth (in.)	0	0	0	0	0	0	0	0	0	0	0	0	0

Percent of possible observations for period of record.
Max. Temp.: 93.2% Min. Temp.: 93.2% Precipitation: 92.8% Snowfall: 93.4% Snow Depth: 92.2%
Check Station Metadata or Metadata graphics for more detail about data completeness.

Western Regional Climate Center, wrcc@dri.edu

Figure 1-6
Monthly Climate Summary for Corrales Station, New Mexico

JEMEZ SPRINGS, NEW MEXICO (294369)

Period of Record Monthly Climate Summary

Period of Record : 5/ 1/1910 to 4/30/2012

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Average Max. Temperature (F)	45.9	50.3	56.9	66.1	74.5	84.0	86.1	83.7	78.3	68.4	56.0	46.8	66.4
Average Min. Temperature (F)	19.6	23.3	27.8	34.4	42.5	50.4	56.2	54.9	48.2	38.1	27.7	20.9	37.0
Average Total Precipitation (in.)	0.91	0.93	1.07	0.98	1.11	1.11	2.64	3.01	1.78	1.55	0.93	0.98	17.00
Average Total SnowFall (in.)	7.3	6.1	4.1	1.6	0.1	0.0	0.0	0.0	0.0	0.3	2.3	7.1	28.9
Average Snow Depth (in.)	1	0	0	0	0	0	0	0	0	0	0	1	0

Percent of possible observations for period of record.
Max. Temp.: 97.6% Min. Temp.: 97.6% Precipitation: 98.1% Snowfall: 58.9% Snow Depth: 58.4%
Check Station Metadata or Metadata graphics for more detail about data completeness.

Western Regional Climate Center, wrcc@dri.edu

Figure 1-7
Monthly Climate Summary for Jemez Springs Station, New Mexico

CUBA, NEW MEXICO (292241)

Period of Record Monthly Climate Summary

Period of Record : 9/ 1/1938 to 8/31/2010

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Average Max. Temperature (F)	41.9	45.0	52.7	62.4	71.8	82.4	86.0	83.2	77.0	66.7	53.0	43.9	63.8
Average Min. Temperature (F)	10.0	13.7	20.4	26.2	34.1	41.6	50.0	48.8	40.2	28.3	17.7	10.6	28.5
Average Total Precipitation (in.)	0.84	0.71	0.95	0.74	0.81	0.73	2.01	2.32	1.38	1.15	0.73	0.80	13.15
Average Total SnowFall (in.)	8.0	5.9	4.2	1.1	0.1	0.0	0.0	0.0	0.0	0.5	2.4	6.6	28.6
Average Snow Depth (in.)	2	1	0	0	0	0	0	0	0	0	0	1	0

Percent of possible observations for period of record.
Max. Temp.: 83.4% Min. Temp.: 83.4% Precipitation: 97.1% Snowfall: 80.8% Snow Depth: 76.4%
Check Station Metadata or Metadata graphics for more detail about data completeness.

Western Regional Climate Center, wrcc@dri.edu

Figure 1-8
Monthly Climate Summary for Cuba Station, New Mexico

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)	no data	569
Corrales, Village of	7,334	8,329
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 (±217)
Jemez Pueblo	1,958	1,918 (±285)
Laguna Pueblo [a]	3,814	4,646 (±515)
Sandia Pueblo	4,436	5,471 (±422)
San Felipe Pueblo	3,185	3,241 (±425)
Santa Ana Pueblo	514	935 (±276)
Santa Clara Pueblo [b]	10,665	11,231 (±557)
Santa Domingo Pueblo	3,145	3,169 (±449)
Zia Pueblo	578	901 (±219)

Sources:

- *2000 and 2010 population estimate for incorporated jurisdictions from US Census Bureau and MRCOG.*
- *2000 Pueblo estimates are for resident populations as reported by US Census Bureau.*
- *2010 Pueblo estimates from 5-yr ACS estimates by US Census Bureau. Numbers in parenthesis are the margins of error reported.*

NOTES:

a – Most of the Laguna Pueblo population is located in Bernalillo and Cibola Counties.

b – Most of the Santa Clara population is located in Rio Arriba County.

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. As a part of this service, MRCOG prepares regional forecasts of data that pertain to population, housing, employment, and school enrollment. The forecasts are compiled by subunits of the service area known as Data Analysis Subzones (DASZ). According to MRCOG, Sandoval County population projections for 2015 and 2025 were estimated at 144,087 and 182,592, and represent a significant increase in population for the county[7]. Figures 1-9 and 1-10 present graphic depictions of population increase projections for 2015 and 2025 using 2008 projections as a base. Population increases are displayed by DASZ.

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[7] Mid-Region Council of Governments, 2011, *2010-2015 Comprehensive Economic Development Strategy for New Mexico State Planning and Development District 3*, accessed at: http://www.mrcog-nm.gov/images/stories/pdf/economic_development/2010_CEDS_Document.pdf

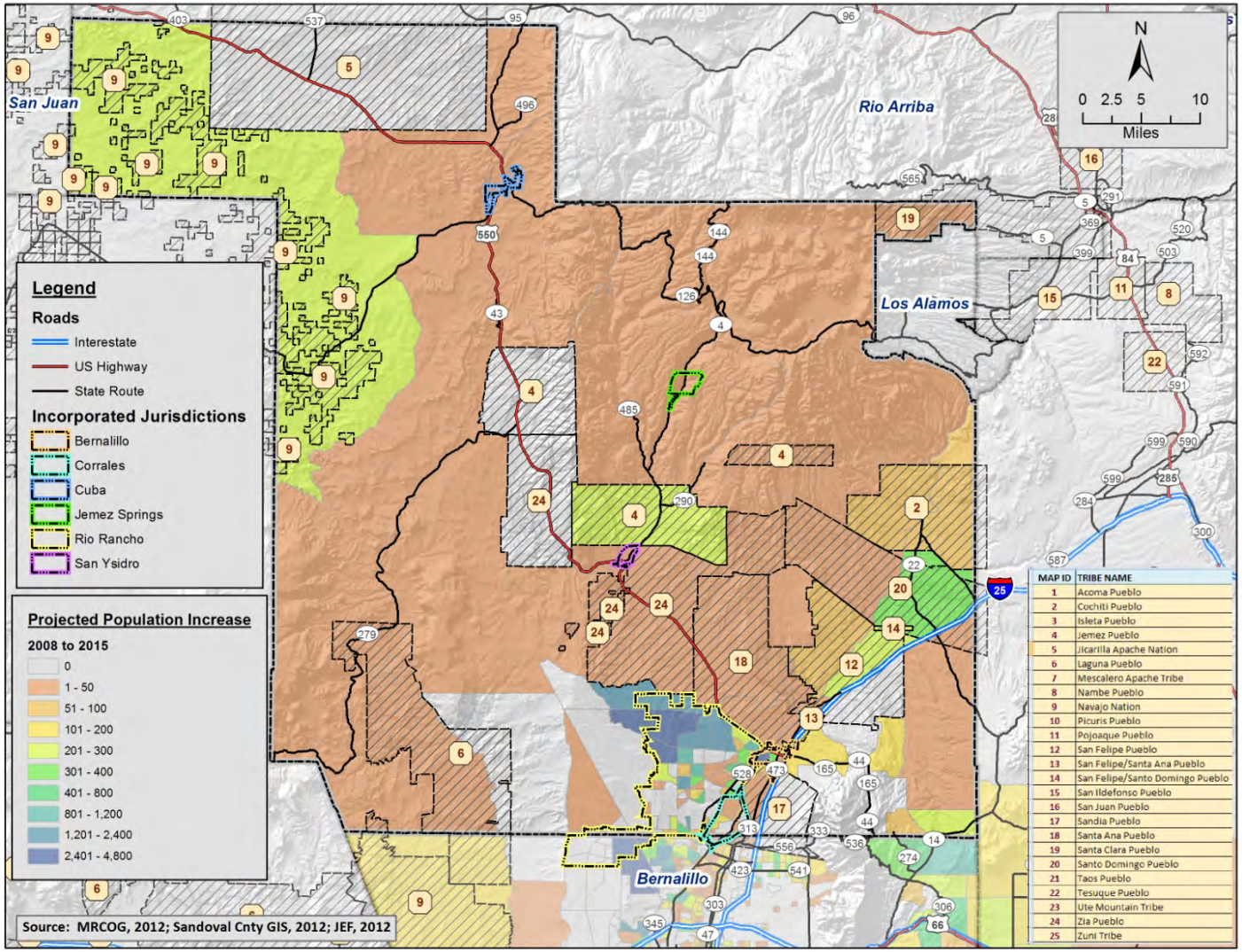


Figure 1-9
2008 to 2015 Population Increase Projections for Sandoval County

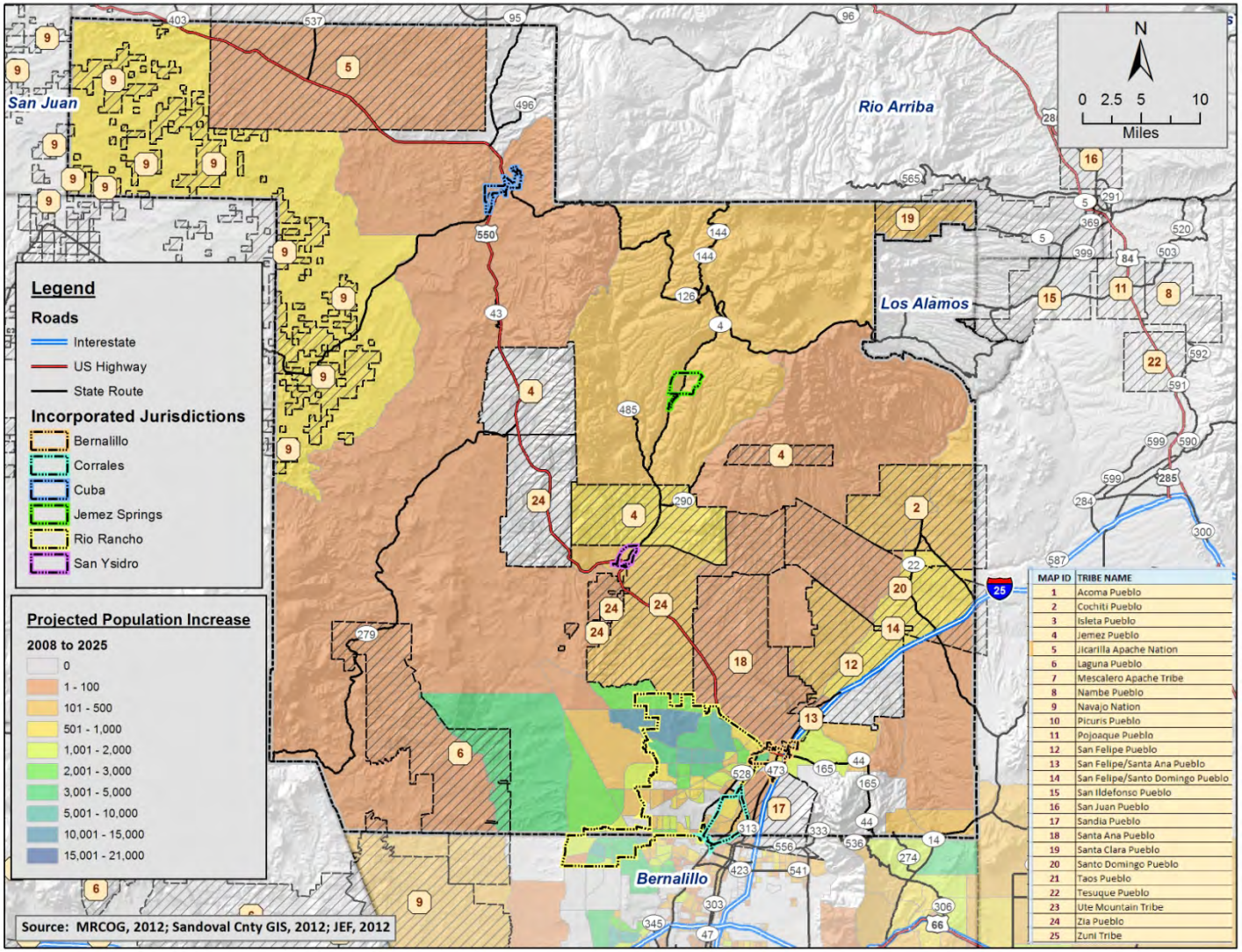


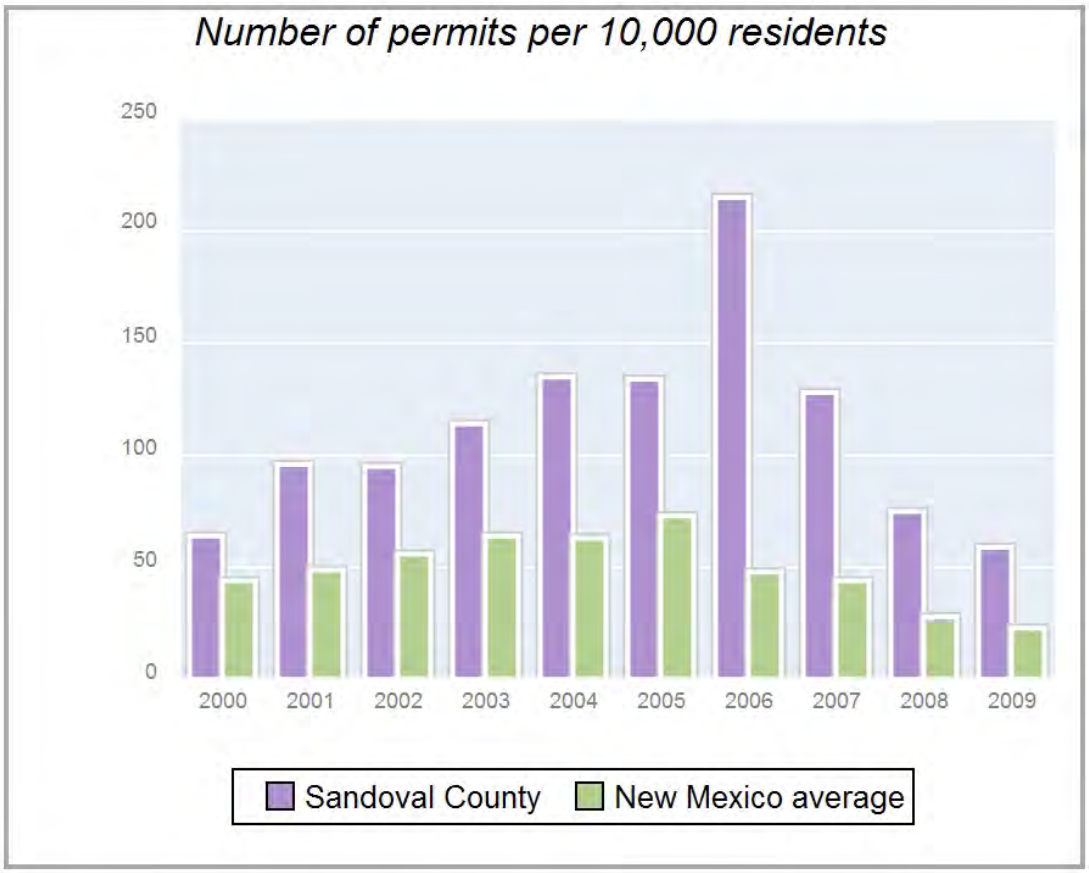
Figure 1-10
2008 to 2025 Population Increase Projections for Sandoval County

1.5.6 Economy

The Sandoval County economy is primarily fueled by retail and wholesale sales, manufacturing and tourism, with all of the other ancillary support 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. In particular, growth in the Rio Rancho, Corrales and Bernalillo communities has outpaced most of the state and nation. This rapid growth has fueled Sandoval County's economy and attracted many large companies.

Figure 1-11 presents an estimate of the number of building permits issued for Sandoval County during the period of 2000 to 2009, 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 is one of a general decline, but 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 (computer chip manufacturing), Sprint Personal Communication Services, Rio Rancho Public Schools, Pueblo of Santa Ana (Tribal government, Casino, other enterprises), Bernalillo Public Schools, City of Rio Rancho, and J.C. Penney Company (telemarketing).



Source: City-data.com, 2012 as accessed at: http://www.city-data.com/county/Sandoval_County-NM.html

Figure 1-11
Building permits for Sandoval County from 2000 to 2009

As of April 2012, the estimated Labor Force for Sandoval County is 55,770 with an unemployment rate of approximately 7.0%[8]

Table 1-2 provides a listing of gross receipts for fiscal year 2011 as reported by the New Mexico Taxation and Revenue Department.[9]

Table 1-2: 2011 Gross receipts for Sandoval County

Category	Number of Receipts	2011 Gross Receipts (x$1,000)
Agriculture, Forestry, Fishing and Hunting	215	$8,652
Mining and Oil and Gas Extraction	111	$833
Utilities	907	$158,106
Construction	8,310	$590,354
Manufacturing	2,359	$203,675
Wholesale Trade	2,655	$236,587
Retail Trade	10,251	$785,173
Transportation and Warehousing	674	$41,400
Information and Cultural Industries	4,159	$112,330
Finance and Insurance	512	$14,259
Real Estate and Rental and Leasing	2,402	$69,941
Professional, Scientific and Technical Services	6,428	$105,340
Management of Companies and Enterprises	46	$243
Admin and Support, Waste Mgt and Remed.	1,617	$21,342
Educational Services	481	$9,460
Health Care and Social Assistance	3,094	$98,413
Arts, Entertainment and Recreation	457	$6,248
Accommodation and Food Services	1,936	$118,058
Other Services (except Public Admin)	11,020	$179,429
Public Administration	-	$0
Unclassified Establishments	414	$2,822
Totals	**58,139**	**$2,764,070**

[8] New Mexico Department of Workforce Solutions, Labor Analysis Statistics and Economic Research website, URL at: http://laser.state.nm.us/default.asp

[9] New Mexico Taxation and Revenue Department website, URL at: http://www.tax.newmexico.gov/Tax-Library/Economic-and-Statistical-Information/Pages/Quarterly-RP-80-Reports-Gross-Receipts-by-Geographic-Area-and-2-digit-NAICS-Code.aspx

1.5.7 Land Ownership/Management

According to 2012 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 1-12 depicts the geographic distribution of the holdings.

Ownership / Management Agency or Entity	Land Area (SqMiles)	Percent of Sandoval County
Indian/Tribal	1,282.6	34.53%
National Park Service	41.1	1.11%
New Mexico State Game and Fish	5.1	0.14%
New Mexico State Park	0.6	0.02%
Other Federal Agency	134.9	3.63%
Private	738.2	19.88%
State of New Mexico	122.0	3.29%
US Bureau of Land Management	793.1	21.35%
US Department of Defense	3.4	0.09%
USDA Forest Service	593.0	15.97%

Source: U.S. Bureau of Land Management, 2012

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 Rio Rancho Estates. 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 Rio Rancho Estates area is a slowly developing residential area with scattered land ownership. A commercial node has begun at Centro de Algodones with the development of a veterinary clinic and a light manufacturing facility.

We anticipate further development within Petroglyph Trails and Centro de Algodones. There will likely be further development interest near Interstate 25, Exit 242 following the reconstruction of that interchange. Following the adoption of the Rio Rancho Estates Area Plan, It is anticipated that development activity will likely increase in that area.

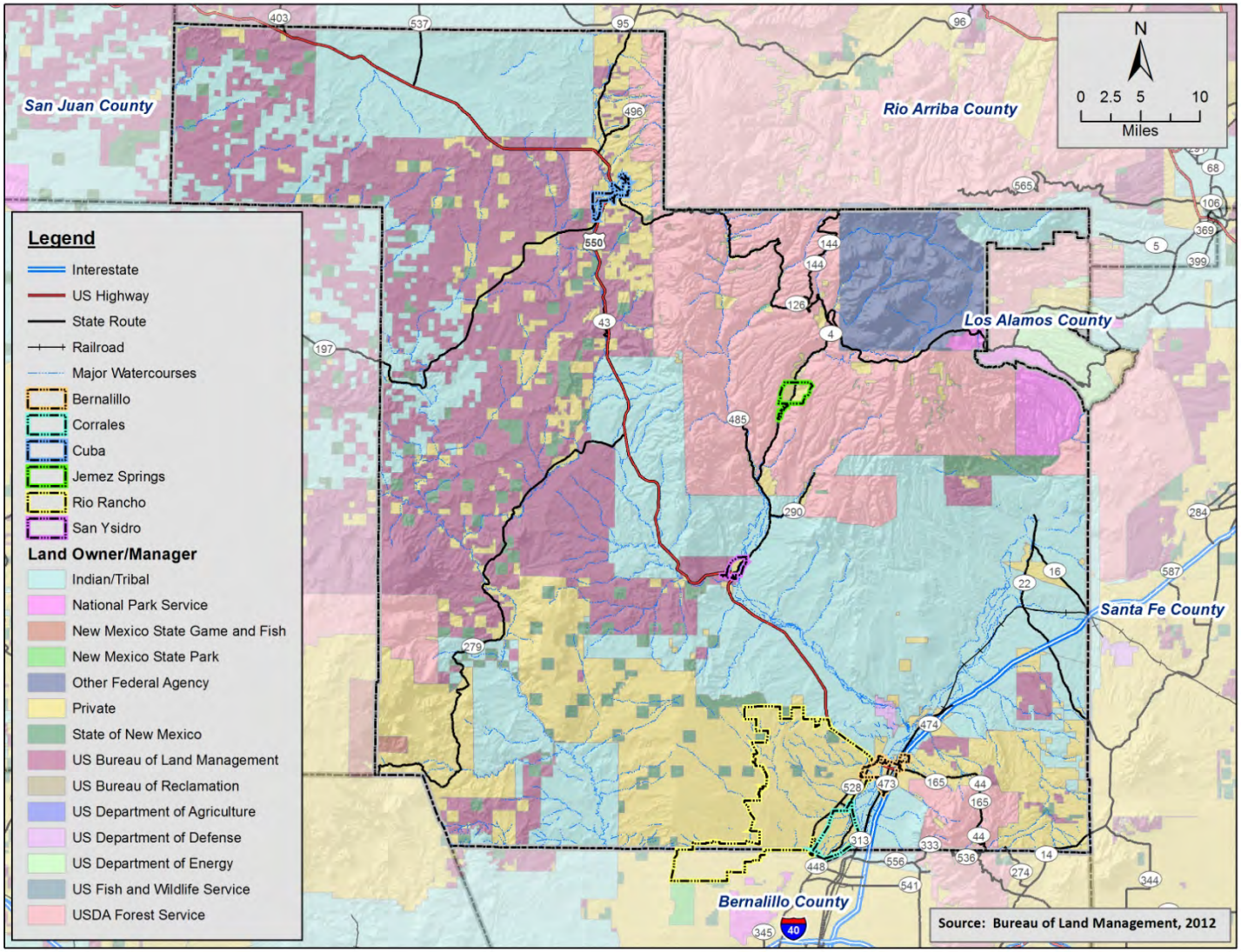


Figure 1-12
Land Ownership/Management within Sandoval County

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 the I-25/I-10 junction is located approximately 20 miles north at Rio Rancho. 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 2011 gross receipts for Bernalillo are estimated at $304.8 million [10] and account for almost 11% of the total gross receipts for the County. The 2011 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 New Mexico Wine Festival 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 services needs. [11] As of April 2012, the unemployment rate for the Albuquerque Metropolitan Statistical Area, which includes Bernalillo, was 6.5%.

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

[11] Mitchell, J., Bleecker, M., Akers, J.M., 2007, *Bernalillo Mainstreet: Community Economic Assessment*, University of New Mexico Bureau of Business and Economic Research, accessed at: http://www.townofbernalillo.org/bsa/BBER_Bernalillo_CES_110207_FINAL.pdf

Growth Trends – Over the last five years, the Town of Bernalillo has experienced the majority of its growth on the west side of Town, along the Rio Grande, in the form of residential housing developments. The two major housing developments can be seen on Figure 1-13.

Bernalillo currently has zero vacant developable land within its boundaries. Some discussion of annexation on its eastern border has arisen, however, with the current political climate, growth seems unlikely. Should annexation occur, the only option for the Town would be to grow eastward. There are also no other planned redevelopment projects for the Town in the foreseeable future.

Source: Town of Bernalillo

Figure 1-13
Recent 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 Curtiss 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 contruction to effect 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 MRGCD manages the "bosque" in cooperation with the US Corps of Engineers and the Village.

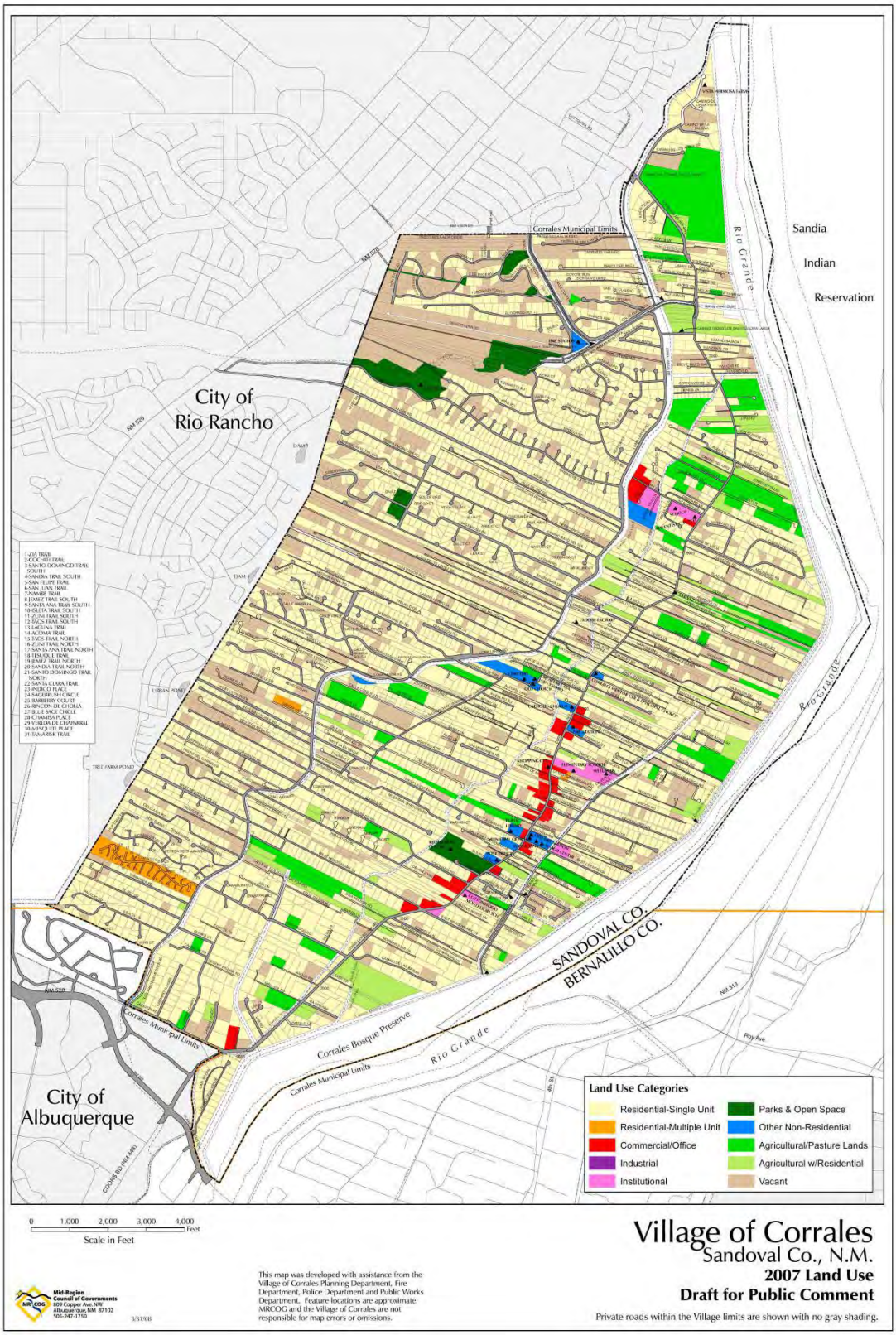
Economy – The 2011 gross receipts for the Sandoval County portion of Corrales are estimated at $91.9 million [12] and account for almost 3.3% of the total gross receipts for the County. The 2011 top producing industries for the Village were professional, scientific, and technical services, retail trade, and construction. According to the BBER, Corrales is a wealthy residential community with a very small economic base.[13] 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 April 2012, the unemployment rate for the Albuquerque Metropolitan Statistical Area, which includes Corrales was 6.5%.

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 tanks within the areas of 500 Jones Road at the recreation Center, at Salce Park North on Sagebrush, and at the top of Angel Road. The Village also has plans to add a multijurisdictional communications tower at the top of Angel Road. Construction of a new 195 person senior living facility with both individual living units and more concentrated care areas is hoped to start in the next year. The Village built a road from Don Julio Road in Corrales to NM 528 at Northern Boulevard, in Rio Rancho, and potentially commercially zoned property is available for development at that connection point. Figure 1-14 shows the available areas for new growth within the Village as depicted in a 2007 Land Use exhibit.

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

[13] Mitchell, J., Bleecker, M., Akers, J.M., 2007, *Corrales Mainstreet: Community Economic Assessment*, University of New Mexico Bureau of Business and Economic Research, accessed at: http://bber.unm.edu/pubs/MAINSTREET_Corrales.pdf



Source: Village of Corrales

Figure 1-14
2007 Land Use With Potential Growth Areas for the Village of Corrales

1.6.3 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. [14]

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 2011 gross receipts for Jemez Springs are estimated at $7.1 million [15] and account for less than one percent of the total gross receipts for the County. The 2011 top producing industries for the Village were 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. The Village is currently working on the renovation of two bridge crossings and expects this work to be completed by January 2014.

[14] Wikipedia website accessed at: http://en.wikipedia.org/wiki/Jemez_Springs,_New_Mexico

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

1.6.4 Rio Rancho, City of

History – According to the City's website[16], 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 and a portion of the City extends into Bernalillo 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 [17], 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 2011 gross receipts for the Sandoval County portion of Rio Rancho are estimated at $1.54 billion [18] and account for almost 56% of the total gross receipts for the County. The 2011 top producing industries for the City were retail trade, construction, utilities, and manufacturing. Major employers include Intel Corporation and Contractors, Rio Rancho Public Schools, Sprint PCS, Bank of America, City of Rio Rancho, e-Telecare Global Solutions, BRYCON Construction, and

[16] City of Rio Rancho website at the following URL: http://ci.rio-rancho.nm.us/index.aspx?nid=337

[17] City of Rio Rancho, 2010, *City of Rio Rancho Comprehensive Plan, November 2010*

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

Sandoval County.[19] As of April 2012, the unemployment rate for the Albuquerque Metropolitan Statistical Area, which includes Rio Rancho, was 6.5%.

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. Two new hospitals have been opened within the last two years on the southwest side of the city and in the northwest region. Commercial development 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 12 screen movie theater, Hewlett Packer Call Center and two satellite college campuses.

Over the next five 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 1-15 is a map from the City of Rio Rancho Comprehensive Plan[20] showing anticipated growth within the community through the year 2020.

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[19] City of Rio Rancho, 2010, *op. cit.*, page ED-6

[20] City of Rio Rancho, 2010, *op. cit.*, Map L-2

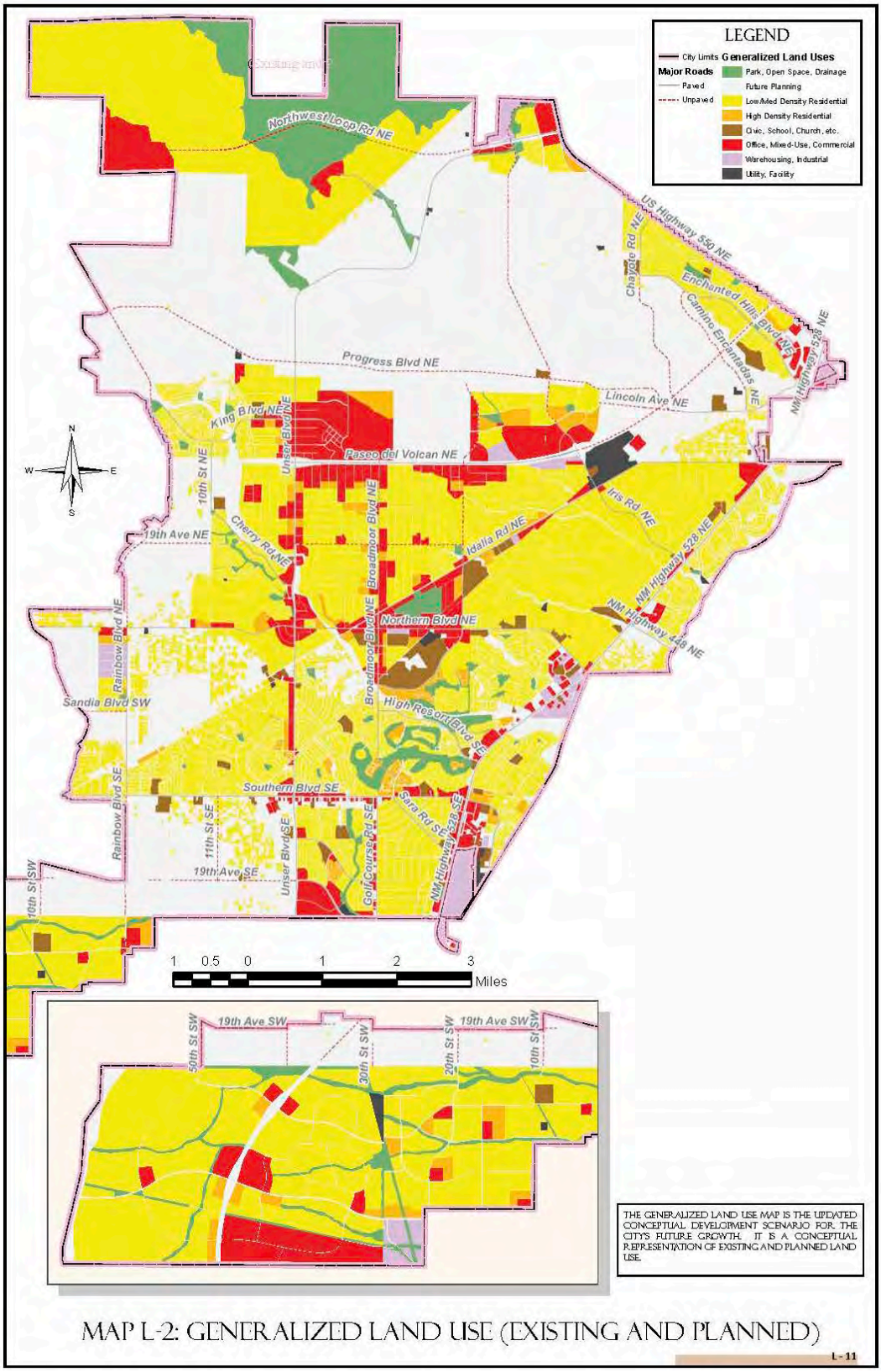


Figure 1-15
Future Growth Areas for the City of Rio Rancho Through 2020

1.6.5 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 1999, the weekday average traffic on US 550 south of the Village was 6,600 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. [21]

Growth Trends – San Ysidro has not experienced any growth in last five years. Over the next five 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 1-16. 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.

[21] MRCOG, website data accessed at: http://www.mrcog-nm.gov/region-aamp-people-mainmenu-186/regional-profiles-mainmenu-73/san-ysidro

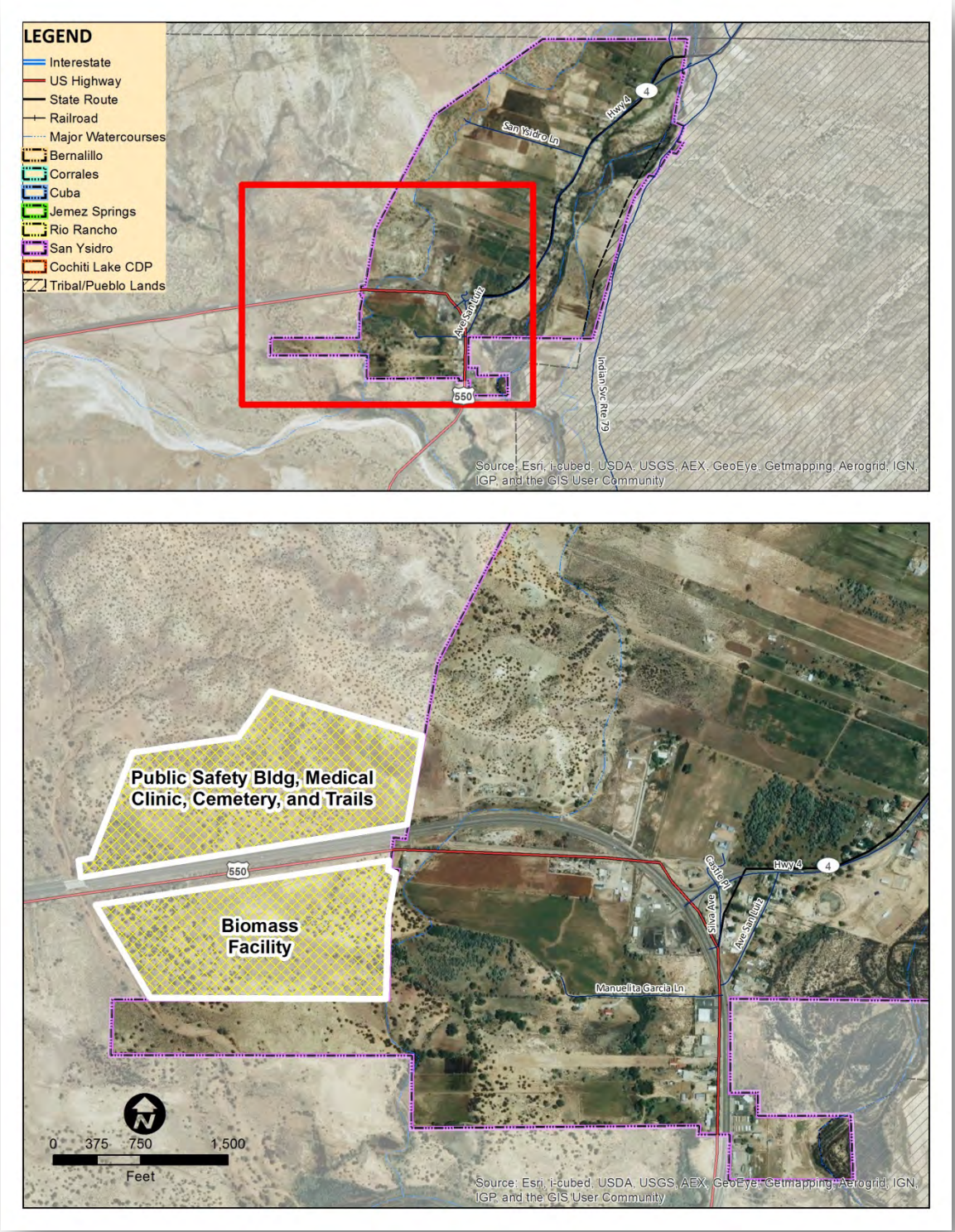


Figure 1-16
Future Growth Areas for the Village of San Ysidro

1.6.6 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.[22] 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.[23]

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.

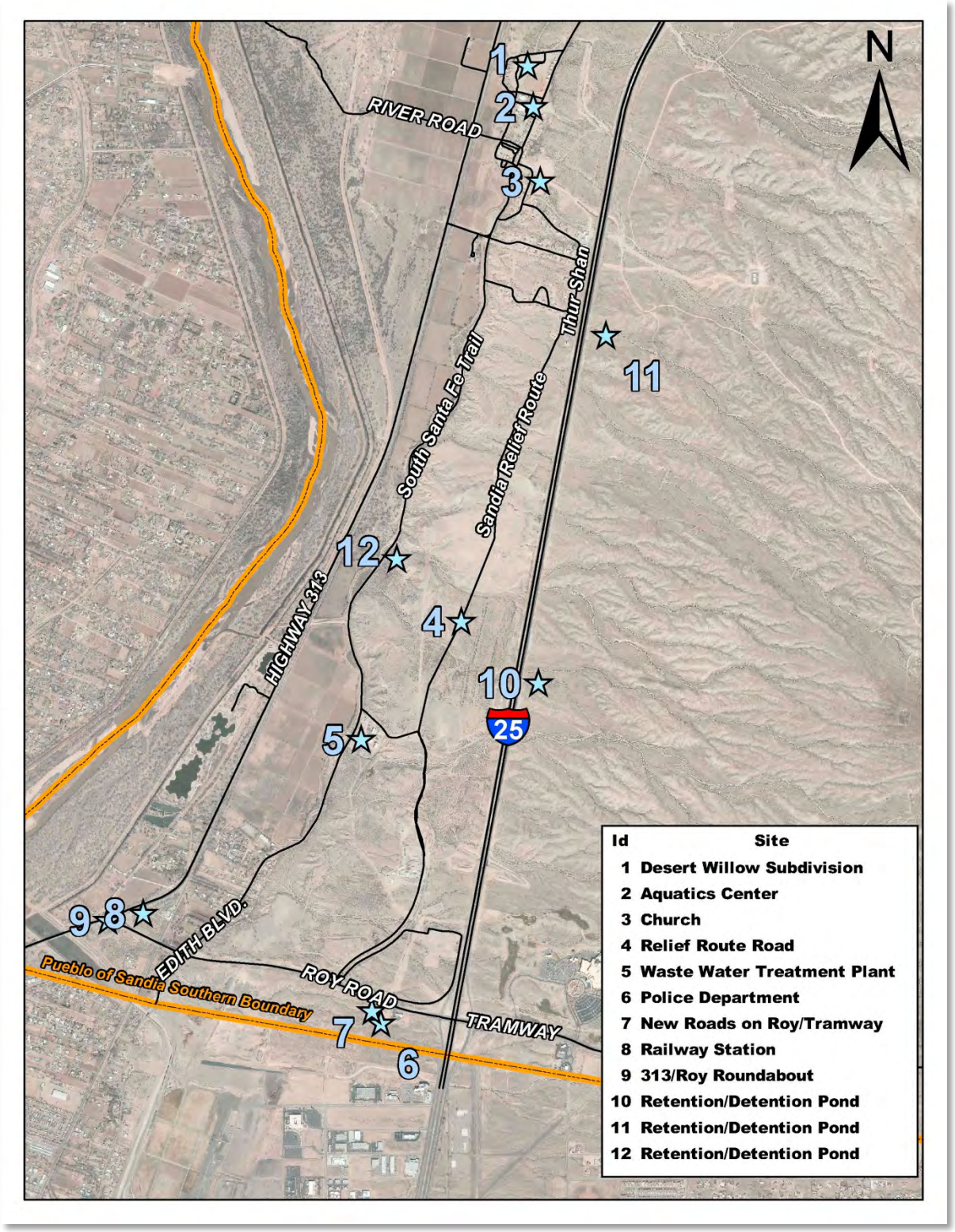
Economy – The Pueblo of Sandia owns and operates several thriving enterprises including the Sandia Resort and Casino, Bien Mur Indian Market and Travel Center, Sandia Lakes Recreation Area, and the Bobcat Ranch. In addition, the pueblo maintains its agricultural heritage with farming activities along 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 stormwater retention/detention ponds. The location for these recent facilities is located on Figure 1-17.

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.

[22] Pueblo of Sandia, website accessed at: http://www.sandiapueblo.nsn.us/home.html

[23] New Mexico Office of the State Historian, website accessed at: http://www.newmexicohistory.org/filedetails.php?fileID=1220



Source: Pueblo of Sandia

Figure 1-17
Past Five Year Development Locations for the Pueblo of Sandia

1.6.7 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. Throngs of tourists traveled to the village by automobile and by train on "Limited Pullman specials," which dropped visitors off near the pueblo for an hour.[24]

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.

[24] New Mexico Office of the State Historian website accessed at: http://www.newmexicohistory.org/filedetails.php?fileID=529

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. The Santo Domingo Indian Trading Post, which burned down in 2001, is currently being rebuilt and will serve a significant role in the Pueblo's economy.

Growth Trends – In the past five years Santo Domingo Pueblo has added a Health Clinic, Safety Complex and Early Childhood Development Center off Highway 22. Currently, the Pueblo is working on reconstructing the old historic Trading Post and a new housing development next to the Santo Domingo Elementary/Middle School know as Cedar Pointe.

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.

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1.6.8 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: [25]

- 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 and a small portion of Bernalillo. 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 impacting Corrales, Rio Rancho and the western portion of Bernalillo, as depicted by Figure 1-18 on the following page.

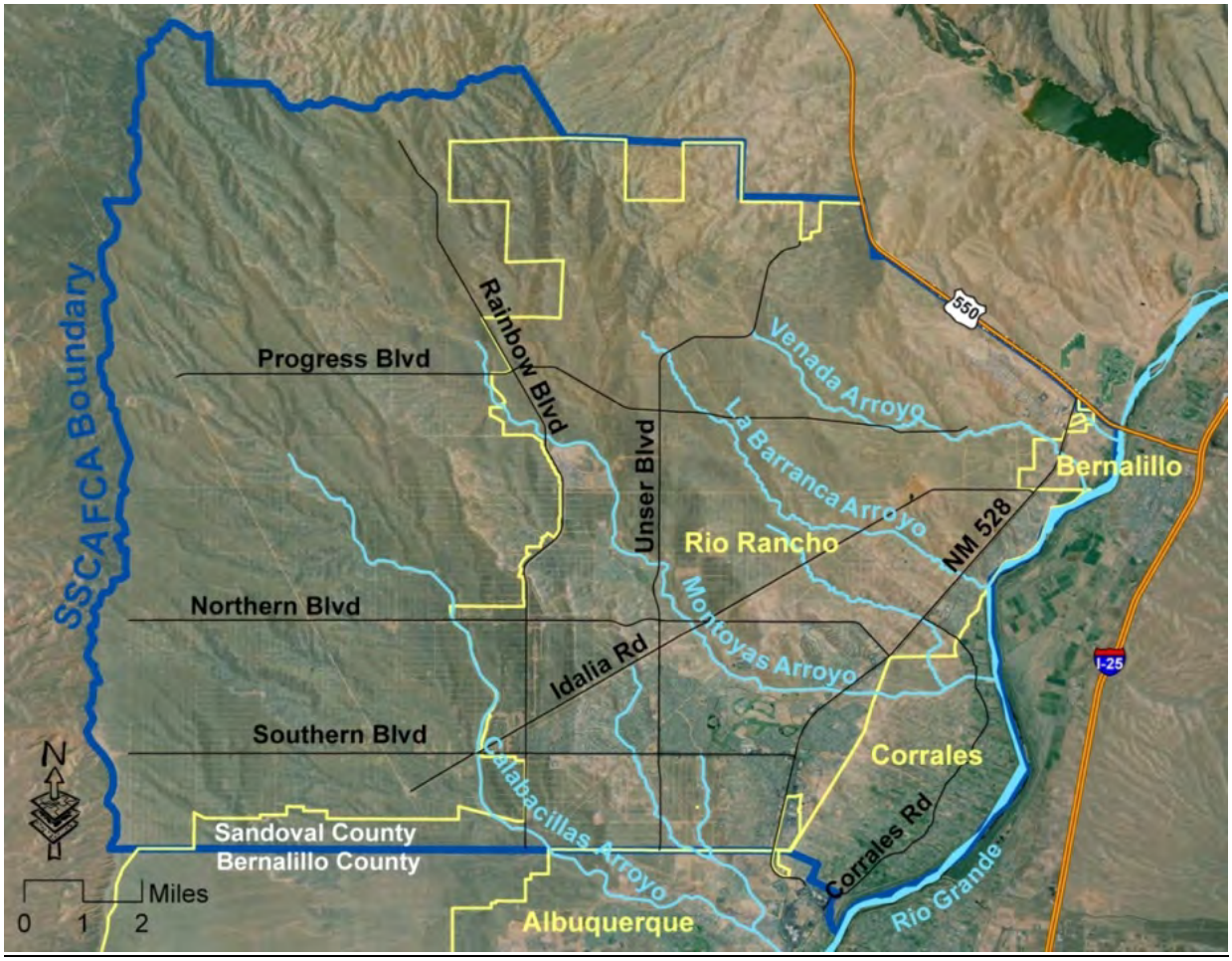
Economy – SSCAFCA is authorized by State law to levy and collect general ad valorem taxes on all property subject to property taxation within its boundaries. Revenue thus generated is budgeted for two purposes: 1) general operations and 2) debt service (principal and interest payments) on outstanding 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.

[25] SCCAFCA website at: http://www.sscafca.com/cms.php/about/

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 management plans developed by SSCAFCA and the programming of projects to provide the needed drainage protection. See the subsections for each of the SSCAFCA service communities for past and anticipated areas of growth.



Source: SSCAFCA, 2012

Figure 1-18
SSCAFCA Geographic Service Area

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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) initiated the planning process by applying for and receiving 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. 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 first task of preparation for this Plan, was to evaluate the process used to develop the 2004 Plan. This was initially discussed by SCFD and Tectonic/JEFuller prior to the first Planning Team meeting and again during the first Planning Team meeting.

The overall process to develop the 2004 Plan began in June 2002 and lasted for approximately 2.5 years. The NMDHSEM (then the New Mexico Office of Emergency Management or NMOEM) hired a consultant assist the county with developing their mitigation plan. The NMOEM and FEMA conducted a kickoff meeting in June 2002 to educate the public about pre-disaster mitigation, identify needs, and generate interest in the mitigation planning process. Shortly after that, the emergency services director for the County contacted incorporated jurisdictions within the county to invite them to participate in the planning process. Tribes and Pueblos were contacted and invited to participate by Office of Cerro Grande Fire Claims. The consultant and county emergency services director met with the Planning Team on several occasions to step through the planning process using a methodical process to identify County vulnerabilities and to propose the mitigation actions necessary to avoid or reduce those vulnerabilities. Each step in the planning process built upon the previous material.

The SCFD's perspective was that the 2004 Plan's process was adequate to accomplish the goal of developing a new Plan and would be generally the same for the update effort. The SCFD also

recognized its role as the primary point of contact and the primary conduit of communications between the consultant and the Planning Team.

The planning process was presented and discussed at the first Planning Team meeting and was contrasted to the 2004 Plan approach. There were two veteran planning team members present at the first Planning Team meeting, that were involved with the development of the 2004 Plan, so there was some institutional knowledge of the prior process represented during the update process.

2.3 Planning Team

The process used to update the 2004 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 with the planning consultant to perform the coordination, research, and planning element activities required to update the 2004 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 2004 Plan were presented and discussed at each Planning Team meeting, and task assignments and corresponding worksheets were normally 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 Primary Point of Contact

A primary point of contact has been established for each participating jurisdiction. This person or position normally attended the Planning Team meetings and is the lead contact for information regarding the hazard mitigation planning for their jurisdiction. Table 2-1 summarizes the primary points of contact identified for each participating jurisdiction.

Table 2-1: List of jurisdictional primary points of contact					
Jurisdiction	**Name**	**Department / Position**	**Address**	**Phone**	**Email**
Sandoval County	Dave Bervin	Fire Department / Emergency Manager-Assistant Chief	845 North Motel Boulevard, Room 1-250, Rio Rancho, NM 88007	505-867-0245	dbervin@sandovalcountynm.gov
Bernalillo, Town of	Wayne Wormhood	Planning and Zoning Department / Floodplain Administrator-Building Official	829 Camino del Pueblo, P.O. Box 638 Bernalillo, NM 87004	505-771-5882	wwormhood@townofbernalillo.org
Corrales, Village of	Tonya R. Lattin	Fire Department / Commander	4920 Corrales Road Corrales, NM 87048	505-898-7501	rlattin@corrales-nm.org
Jemez Springs, Village of	Scott Calcutt	Police Department / Police Chief	80 Jemez Springs Plz # B P.O. Box 269 Jemez Springs, NM 87025	505-934-8890	scottcalcutt@yahoo.com
Rio Rancho, City of	Theresa Greeno	Emergency Management / Emergency Manager	3200 Civic Center Circle NE Rio Rancho, NM 87144	505-891-5822	tgreeno@ci.rio-rancho.nm.us
San Ysidro, Village of	Daniel White	Marshall's Office / Marshal	389 NM 4 P.O. Box 190 San Ysidro , NM 87053	505-269-9164	d.white@sanysidronm.us or sanysidro1@hotmail.com
Sandia, Pueblo of	Lucille Baca	Lands Department / Planner	Sandia Pueblo Lands Building 481 Sandia Loop, Bernalillo, NM 87004	505-771-5064	lbaca@sandiapueblo.nsn.us
Santo Domingo, Pueblo of	Josh Schraeder	Emergency Management / Emergency Manager	KEWA Fire and EMS Station 75 West Highway 22 Santo Domingo Pueblo, NM 87052	505-270-8925	jschraeder@kewaems.org
Southern Sandoval County Arroyo Flood Control Authority	Jim Service	SSCAFCA / Field Service Director	1041 Commercial Dr. S.E. Rio Rancho, NM 87124	505-892-5266	jservice@sscafca.com

2.3.2 Planning Team Assembly

At the beginning of the planning process, SCFD 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),
- All Indian nations, tribes and pueblos within the boundaries of Sandoval County (Navajo Nation, Jicarilla Apache Nation, and the Cochiti, Jemez, Sandia, San Felipe, Santa Ana, Santo Domingo, and Zia Pueblos,
- The chartered Town of Cochiti Lake,
- Eastern Sandoval County Arroyo Flood Control Authority (ESCAFCA), and
- Southern Sandoval County Arroyo Flood Control Authority (SSCAFCA)

Other key local, state and federal agencies and entities were also invited to participate, as well as the Tectonic/JEFuller consultant team. Further discussion of the invitations extended to other agencies and entities with potential interest in hazard mitigation for

Sandoval County are summarized in Section 2.3.4. The participating members of the Planning Team are summarized in Table 2-2. Returning or veteran planning team members from the 2004 Plan effort are highlighted, although it is noted that they may be in a different job or employed by a different jurisdiction.

Table 2-2: Multi-jurisdictional Planning Team participants

Name	Jurisdiction / Organization	Department / Position	Planning Team Role
Lucille Baca	Pueblo of Sandia	Lands / Planner	Planning Team participant Local Planning Team Resource
Dave Bervin	Sandoval County	Fire Department / Emergency Manager-Assistant Chief	Planning Team Primary Point of Contact Jurisdictional Point of Contact Lead coordinator for Local Planning Team Planning Team participant
Robert Brown	State of New Mexico	New Mexico Energy, Minerals and Natural Resources Department, Forestry Division, Bernalillo District / Fire Management Officer	Planning Team participant
Scott Calcutt	Jemez Springs	Police Department / Police Chief	Jurisdictional Point of Contact Lead coordinator for Local Planning Team Planning Team participant
Rachel Candelaria	Pueblo of San Felipe	Health Department	Planning Team participant Local Planning Team Resource
David Cappelli	Tectonic Engineering & Surveying Consultants, P.C.	Senior Security - EOP Specialist	Planning Consultant
Mike Carroll	Town of Bernalillo	Fire Department / Interim Fire Chief	Planning Team participant Local Planning Team Resource
Vandora P. Casados	Village of Cuba	Administration / Clerk-Treasurer	Jurisdictional Point of Contact Lead coordinator for Local Planning Team Planning Team participant
Catherine Conran	SSCAFCA	SSCAFCA / Outreach Director	Planning Team participant Local Planning Team Resource
Chasity Coriz	Pueblo of San Felipe	Emergency Manager	Jurisdictional Point of Contact Lead coordinator for Local Planning Team Planning Team participant
Lawrence R. Crane	State of New Mexico	State Forestry / Special Project Forester	Planning Team participant
Theresa Greeno	City of Rio Rancho	Emergency Management / Emergency Manager	Jurisdictional Point of Contact Lead coordinator for Local Planning Team Planning Team participant
Sidney Hill	Sandoval County	Public Information Office / Public Info Officer	Planning Team participant Local Planning Team Resource
G. Renee Isackson	U.S. Forest Service	Santa Fe NF / Dispatch Center Manager	Planning Team participant
Dave Isackson	U.S. Forest Service	Santa Fe NF - Cuba Ranger District / District Assistant Fire Management Officer	Planning Team participant
Brian Keller	Town of Bernalillo	Information Technology / GIS Technician	Planning Team participant Local Planning Team Resource
Richard Kummerle	Tectonic Engineering & Surveying Consultants, P.C.	Project Principal	Planning Consultant

Table 2-2: Multi-jurisdictional Planning Team participants

Name	Jurisdiction / Organization	Department / Position	Planning Team Role
Tonya R. Lattin	Village of Corrales	Fire Department / Commander	Jurisdictional Point of Contact Lead coordinator for Local Planning Team Planning Team participant
Jerry Lazzari	State of New Mexico	DOH PHD Region 1 & 3 / Regional Emergency Preparedness Specialist	Planning Team participant
Jess Lewis	Sandoval County	Fire Department / Deputy Chief	Planning Team participant Local Planning Team Resource
Edward Martella	Tectonic Engineering & Surveying Consultants, P.C.	Vice President / Project Manager	Planning Consultant
Martin Montano	Bernalillo Public Schools	Facilities / Facilities Director	Planning Team participant
Scott Ogden	JE Fuller	Project Manager	Planning Consultant
Stephanie Paiz	NM Rail Runner Express	Safety Manager	Planning Team participant
Andrew Phelps	State of New Mexico	DHSEM / Preparedness Program Manager	Planning Team participant
Jacey Propp	City of Rio Rancho	Emergency Management / Assistant Emergency Manager	Planning Team participant Local Planning Team Resource
Kieth Radcliffe	San Felipe Pueblo	Health Services / Clinical Services Director	Planning Team participant Local Planning Team Resource
Mike Rose	State of New Mexico	DOH PHD Region 1 & 3 / Emergency Preparedness Specialist	Planning Team participant
David Ryan	Jemez Pueblo	Emergency Management / Director	Jurisdictional Point of Contact Lead coordinator for Local Planning Team Planning Team participant
Jim Service	SSCAFCA	SSCAFCA / Field Service Director	Jurisdictional Point of Contact Lead coordinator for Local Planning Team Planning Team participant
Karie Smith	Pueblo of Sandia	Lands / Director	Jurisdictional Point of Contact Lead coordinator for Local Planning Team Planning Team participant
Mike Traxler	Sandoval County	Sheriff's Office / OPS Manager	Planning Team participant Local Planning Team Resource
Daniel White	Village of San Ysidro	Marshal's Office / Marshal	Jurisdictional Point of Contact Lead coordinator for Local Planning Team Planning Team participant
Matt Williams	Santo Domingo Pueblo	Emergency Management / Emergency Manager	Jurisdictional Point of Contact Lead coordinator for Local Planning Team Planning Team participant
Wayne Wormhood	Town of Bernalillo	Planning and Zoning Department / Floodplain Administrator-Building Official	Jurisdictional Point of Contact Lead coordinator for Local Planning Team Planning Team participant
Jody Wright	Presbyterian Hospital	Safety Coordinator	Planning Team participant

Lists of local planning team members and their respective roles, for each jurisdiction, are provided in Appendix C.

2.3.3 Planning Team Activities

The Planning Team met for the first time on February 28, 2012 to begin the planning process. Three more meetings were convened over the next five months, to step through the plan review and update process, and a mid-term webinar was also presented as a reminder and motivation for completing the planning 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 2004 Plan for review and reference during each meeting. Following each Planning Team meeting, the Point of Contact for each jurisdiction would coordinate with the local officials and associates (the local planning team) as needed to work through the assignments. Table 2-3 summarizes the Planning Team meetings convened, along with a brief list of the agenda items discussed. Detailed meeting notes for all of the Planning Team meetings are provided in Appendix C. The sign-in sheets in Appendix C document the attendance at the first and subsequent meetings.

Following each Planning Team meeting, the Point of Contact for each jurisdiction coordinated with their local planning team as needed to work through the assignments and generate the necessary Plan elements pertinent to that jurisdiction.

Table 2-3: Summary of planning meeting dates, places and agendas convened as part of the plan update process

Meeting Type, Date, and Location	Meeting Agenda
Planning Team Meeting No. 1 February 28, 2012 8:30AM – 12:30PM Sandoval County Emergency Operations Center 10 Petroglyph Trail Placitas, NM 87043	1. INTRODUCTIONS 2. DISCUSSION OF SCOPE AND SCHEDULE 3. DMA2000 OVERVIEW AND UPDATE REQUIREMENTS a. General Planning Elements b. Current Plan c. Update Requirements d. Proposed Outline for Updated Plan 4. PLANNING PROCESS TOPICS a. Planning Team Roles and Responsibilities b. Additional Invitations c. Public Involvement Strategy 5. RISK ASSESSMENT TOPICS a. Critical Facilities and Infrastructure b. Initial Hazard List Identification 6. DATA NEEDS a. Base GIS Data b. Hazard specific data c. Critical Facilities and Infrastructure 7. CLOSING ITEMS a. Summarize Action Items / Task Assignments b. Schedule Next Meeting

Table 2-3: Summary of planning meeting dates, places and agendas convened as part of the plan update process

Meeting Type, Date, and Location	Meeting Agenda
Planning Team Meeting No. 2 March 27, 2012 8:30AM – 12:30PM Sandoval County Emergency Operations Center 10 Petroglyph Trail Placitas, NM 87043	1. INITIAL INTRODUCTIONS 2. TASK ASSIGNMENT STATUS REVIEW 3. RISK ASSESSMENT TOPICS: a. Hazard Profile Data Review i. Mapping / Maps ii. Historic Hazard Database Overview b. Critical Priority Risk Index (CPRI) c. Development Trend Discussion i. Past Plan Cycle (last 5 years) ii. Future Development (5-year horizon) 4. MITIGATION STRATEGY TOPICS a. Existing Mitigation Action/Project Assessment 5. CLOSING ITEMS a. Schedule Next Meeting b. Summarize Action Items / Task Assignments
Hazard Mitigation Plan Recap Webinar May 31, 2012 9:00AM – 10:30AM	1. INTRODUCTIONS 2. HAZARD MITIGATION PLANNING PROCESS REVIEW 3. REVIEW OF SCHEDULE AND CURRENT ASSIGNMENTS
Planning Team Meeting No. 3 June 26, 2012 9:00AM-1:00PM Sandoval County Emergency Operations Center 10 Petroglyph Trail Placitas, NM 87043	1. TASK ASSIGNMENT STATUS REVIEW 2. MITIGATION STRATEGY TOPICS a. NFIP Statistics and Compliance b. Repetitive Loss Properties c. Capability Assessment i. Legal and Regulatory (Codes / Ordinances / Plans / Manuals / Guidelines) ii. Administrative and Technical Staff Resources iii. Fiscal Capabilities 3. PLANNING PROCESS TOPICS a. Plan Integration and Incorporation i. Past Plan Cycle ii. Future Strategy 4. PLAN MAINTENANCE STRATEGY a. Review/Discuss maintenance and monitoring over the last plan cycle b. Develop New Monitoring Schedule c. Plan Update Schedule d. Continued Public Involvement 5. DEVELOPMENT TREND ANALYSIS - Recap from Meeting No. 2 6. PROMULGATION PROCESS 7. CLOSING ITEMS a. Next (LAST) Meeting – July 24th, 9AM – 4PM b. Summarize Action Items / Task Assignments

Table 2-3: Summary of planning meeting dates, places and agendas convened as part of the plan update process	
Meeting Type, Date, and Location	**Meeting Agenda**
Planning Team Meeting No. 4 July 24, 2012 1:00PM-5:00PM Sandoval County Emergency Operations Center 10 Petroglyph Trail Placitas, NM 87043	1. TASK ASSIGNMENT STATUS REVIEW 2. MITIGATION STRATEGY TOPICS a. Goals and Objectives i. Review current plan G&Os ii. Formulate G&Os for updated plan b. Mitigation Actions/Projects i. Action/Project Identification ii. Implementation Strategy iii. Workshop 3. CLOSING ITEMS a. Summary of Task Assignments b. Next Steps
Community Specific Work Session Meetings October-November 2012 Each Community	1. ALL OUTSTANDING WORKSHEETS FINALIZED One – on - one meeting with each jurisdiction to obtain the remaining outstanding Hazard Mitigation Plan (HMP) action items that are still needed from the following local jurisdictions: - Sandoval County - Bernalillo - San Ysidro - Corrales - Sandia Pueblo - Jemez Springs - Southern Sandoval County Arroyo Flood Control Authority (SSCAFCA - Rio Rancho - Cuba - Cochiti Lake Completion of the remaining action items regarding the County's Hazard Mitigation Plan is a *necessary* step before jurisdictions can be eligible to apply for and receive federal funding under hazard mitigation assistance programs.

The sign-in sheets in Appendix C document the attendance at the first and subsequent meetings.

2.3.4 Agency/Organizational Participation

Invitations for participation 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 and SCFD 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 2004 Plan, and was distributed to all of the potentially interested entities via email. A copy of that letter and email is provided in Appendix C and the following is a list of all entities that were sent the email letter:

Agency / Organization	Contact Position
*Albuquerque, City of	• Emergency Management – Emergency Manager
*American Red Cross	• Regional Director of Emergency Services
*Bernalillo County	• Homeland Security and Emergency Management – Emergency Manager
**Bernalillo, Town of	• Planning and Zoning Department – Floodplain Administrator/Building Official
*Bernalillo Public Schools	• Safety /Preparedness
*Greater Sandoval County Chamber of Commerce	• Executive Director
*Cochiti Lake, Town of	• Administration – Town Administrator
*Corrales, Village of	• Fire Department – Fire Chief and Commander
*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 Pueblo	• Emergency Management – Director
*Jemez Springs, Village of	• Police Department – Police Chief / Emergency Manager
*LEPC for Sandoval County	• Members
**National Weather Service	• Warning Coordination Meteorologist
**New Mexico, State of	• Department of Homeland Security and Emergency Management: o State Hazard Mitigation Officer o State NFIP Coordinator o Preparedness Program Manager o HAZMAT Coordinator • Office of the State Engineer – State Engineer • Department of Public Safety - State Police Officer • Public Regulation Commission – Pipeline Safety – General Manager • Department of Health – Emergency Preparedness

	Specialist • State Forestry – District Forester
**New Mexico State University	• Sandoval County Extension Agent
*Presbyterian Hospital	• Emergency Manager
*Presbyterian Medical Services	• Safety Officer
*Rio Rancho, City of	• Emergency Management – Emergency Manager
*Rio Rancho Public Schools	• Safety and Security – Specialist
*Rio Rancho Regional Chamber of Commerce	• President/CEO
*San Felipe, Pueblo of	• Emergency Management Services – Emergency Manager
*San Ysidro, Village of	• Marshal's Office - Marshal
*Sandia, Pueblo of	• Lands Department - Director
*Sandoval County	• County Commission – Commissioners • County Manager • Development Services - Director • Detention Department – Director • Fire Department – Fire Chief • GIS Department – Director • IT Department - Director • Sheriff's Office - Sheriff
*Santo Domingo, Pueblo of	• Emergency Services – Emergency Manager
*Southern Sandoval County Arroyo Flood Control Authority	• Director
**Tectonic Engineering & Surveying Consultants, P.C.	• Engineering/Planning Consultants
**U.S. Army Corps of Engineers	• Albuquerque District – Dam Safety Program Manager
**Western Refining	• Logistics – Regulatory Coordinator
*Zia Pueblo	• Tribal Secretary

* Communities and entities within Sandoval County, some of which are participants and will adopt the plan. Others were

** Communities and entities outside Sandoval County that were invited to comment and were kept apprised of the plan's progress.

2.4 Public Involvement

2.4.1 Previous Plan Assessment

The pre- and post-draft public involvement strategy for the 2004 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 2004 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 and press releases to the local newspapers and media outlets. Citizens within the county are accustomed to looking to these two sources for news and announcements of public events and government activities, and especially those that are county-wide and include all Sandoval County jurisdictions.

Pre-Draft – The Planning Team jointly issued a press release on April 12, 2012 to the following media outlets:

Newspapers:

- Albuquerque Journal
- Rio Rancho Observer
- Sandoval Signpost
- Corrales Comment
- Jemez Thunder

Television Stations:

- KOAT-Channel 7, Albuquerque
- KOB-Channel 4, Albuquerque
- KRQE-Channel 13, Albuquerque

The release was known to be picked up by the Rio Rancho Observer (run April 22, 2012) and the Sandoval Signpost (run in May 2012), with copies of those articles provided in Appendix D.

A web page notice was developed and posted to the Sandoval County website, with a home page "Sandoval County News" announcement and link that ran six weeks beginning April 22, 2012. The City of Rio Rancho also ran a website notice referring interested readers to the county's website. Copies of both web notices are provided in Appendix D. Email contact information for the Planning Team primary point of contact were provided on the County website and the county press release and any comments received from these notices were to be routed to the Planning Team primary point of contact for addressing. No responses to the pre-draft public notices or website postings were received.

Post-Draft – The post-draft public involvement strategy included the following actions:

- Update of the County website to announce the availability of the draft Plan at the County's website. A digital copy of the draft Plan will be posted to the County website.
- A press release to local news media announcing the completion of the draft Plan and its availability for download and review at the Sandoval County website and requesting comment.
- Notices will be posted to each jurisdiction's website (as appropriate) notifying readers that the draft Plan is completed and available for comment via the County website, for which links will be provided.

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 have included 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 in Table 2-4 and 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.

Table 2-4: List of resource documents and references reviewed and incorporated in the plan update process

Referenced Document or Technical Source	Resource Type	Description of Reference and Its Use
American Society of Civil Engineers	Technical Reference	Source for design wind speed data.
Bureau Net (2012)	Website Database	Source for NFIP statistics.

Table 2-4: List of resource documents and references reviewed and incorporated in the plan update process

Referenced Document or Technical Source	Resource Type	Description of Reference and Its Use
City-data.com	Website Database	Source for community demographic and economic data.
City of Rio Rancho Comprehensive Plan (2010)	City Comprehensive Plan	Source for past and future growth descriptions and projections. Some hazard data also compiled with this plan.
City of Rio Rancho Website	Website Resource	Source of historic hazard data
Cooperative Institute for Applied Meteorological Sciences	Technical Data	Source for regional lightning data.
InciWeb – Incident Information System (2011)	Wildfire Data	Source wildfire incident information for historical hazard and profile information
Environmental Working Group's Farm Subsidy Database (2012)	Website Database	Source of disaster related agricultural subsidies. Used in the risk assessment.
Federal Emergency Management Agency	Technical and Planning Resource	Resource for HMP guidance (How-To series), floodplain and flooding related NFIP data (mapping, repetitive loss, NFIP statistics), and historic hazard incidents. Used in the risk assessment and mitigation strategy.
Hazard Mitigation Plan for Sandoval County, New Mexico (2004)	Hazard Mitigation Plan	FEMA approved hazard mitigation plan that formed the starting point for the update process.
HAZUS-MH	Technical Resource	Based data sets within the program were used in the vulnerability analysis.
Mid-Region Council of Governments of New Mexico	Demographic and Economic Data Resource	Source of data for demographic and economic information for the County and jurisdictions.
National Climatic Data Center	Technical Resource	Online resource for weather related data and historic hazard event data. Used in the risk assessment.
National Integrated Drought Information System (2007)	Technical Resource	Source for drought related projections and conditions. Used in the risk assessment.
National Response Center	Technical Resource	Source of traffic related HAZMAT incidents and rail accidents. Used in the risk assessment.
National Weather Service	Technical Resource	Source for hazard information, data sets, and historic event records. Used in the risk assessment.
National Wildfire Coordination Group (2011)	Technical Resource	Source for historic wildfire hazard information. Used in the risk assessment.
New Mexico Bureau of Geology and Mineral Resources	Geology and Geographical Reference	Source for geologic and geographic information for the county.
New Mexico Climate Center	Website Resource	Resource for climate data
New Mexico Department of Workforce Solutions (2012)	Website Resource	Source for labor statistics and building permit information.
New Mexico Office of the State Engineer Dam Safety Bureau	Technical Resource	Source for state regulated dam safety information.
New Mexico Office of the State Historian	Website Resource	Source for description of community histories.
New Mexico Natural Hazard Mitigation Plan (2010)	Hazard Mitigation Plan	The state plan was used a source of hazard information and the state identified hazards were used as a starting point in the development of the risk assessment. The State Plan mitigation goals were also referenced.
New Mexico State Forestry	Technical Resource	Source for historic wildfire data.
New Mexico Taxation and Revenue Department	Website Data	Source of economic data for the County and communities.
Pueblo of Sandia Website	Website Resource	Source for historic and community data for the Pueblo of Sandia.

Table 2-4: List of resource documents and references reviewed and incorporated in the plan update process

Referenced Document or Technical Source	Resource Type	Description of Reference and Its Use
Sandoval County Community Wildfire Protection Plan (2008 and Draft 2012)	CWPP	Source for wildfire history and risk data
Southern Sandoval County Arroyo Flood Control Authority Website	Website Resource	Source for information and data regarding SSCAFCA and flood hazards.
Standard on Disaster/Emergency Management and Business Continuity Programs (2000)	Standards Document	Used to establish the classification and definitions for the asset inventory. Used in the risk assessment.
U.S. Army Corps of Engineers	Dam Inventory	Source for dam locations and characteristics
U.S. Bureau of Land Management	GIS Data	Source for land ownership data
U.S. Census Bureau	Technical Data	TIGER/Line shape file for County census block data was used to obtain block boundaries, population, and housing units
U.S. Department of Interior, Bureau of Indian Affairs	Technical Data	Dam failure data for dams on tribal lands
U.S. Forest Service	Technical Data	Source for local wildfire data. Used in the risk assessment.
U.S. Geological Survey	Technical Data	Source for geological hazard data and incident data. Used in the risk assessment.
University of New Mexico Bureau of Business and Economic Research	Demographic and Economic Data	Source for demographic and economic data.
Village of Jemez Springs Comprehensive Plan (2003)	Jurisdictional Comprehensive Plan	Source for past and future growth descriptions and projections. Some hazard data also compiled with this plan.
Western Regional Climate Center	Website Data	Online resource for climate data used in climate discussion of Section 4
Wikipedia (2012)	Website Reference	Source of information about various communities.
Zillow Real Estate Values	Website Reference	Obtained home value indexes for incorporated and unincorporated areas of Sandoval County to use for residential values in vulnerability assessment.

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

A poll of the participating jurisdictions revealed that success of incorporating the 2004 Plan elements into other planning programs has been limited over the past planning cycle. Ways in which the 2004 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 5 years for those jurisdictions.

County-wide Planning Mechanisms (All Jurisdictions):

- Referenced the 2004 Plan in the 2012 update of the Sandoval County Emergency Operations Plan.

- Referenced the 2004 Plan in the 2012 update of the Sandoval County Community Wildfire Protection Plan.

Town of Bernalillo:

- The 2004 Plan was referenced with development of new Floodplain Ordinance in 2008.

Village of Corrales, City of Rio Rancho and SSCAFCA:

- Coordinated and referenced the 2004 Plan mitigation actions/projects with the jurisdiction's Capital Improvements Program (CIP) over the past 5 years.

In all of the above instances, the 2004 Plan was found to be beneficial, and especially with regard to the risk assessment and mitigation strategy information. Other benefits of incorporating the 2004 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 2004 Plan discussed and identified by the Planning Team included:

- Original county emergency manager was trying to cover multiple jobs and was not able to effectively communicate the plan to other departments and communities.
- Changes in staff and lack of communicating responsibilities to new staff.
- Newness of the Plan and lack of familiarity by staff.
- Lack of major disaster situations.

2.6.2 Five Year Plan Integration/Incorporation Strategy

With the efficacy of integrating the 2004 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 Comprehensive Plan***
- ***Sandoval County Infrastructure and Capital Improvement Plan***
- ***Sandoval County All Hazards Emergency Operations Plan***
- ***Sandoval County Flood Damage Protection Ordinance***
- ***Sandoval County Community Wildland Protection Plan***

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:

- Comprehensive Plan
- Emergency Operations Plan
- Community Wildfire Protection Plan
- Animal Evacuation Plan
- Infrastructure and Capital improvement Plan
- Fire Department Strategic Plan / five year update
- Westside Drainage Study; 2010 Salce Basin Evaluation/study both (SSCAFCA)
- Codified Ordinances of the Village of Corrales Land Use Regulations – Chapter 18, Section V Terrain and Storm Water Management
- Codified Ordinances of the Village of Corrales Land Use Regulations – Chapter 18, Section IV Flood Hazard Prevention
-

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 Comprehensive Plan.
- ***Village of Jemez Springs 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 All 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

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 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[26]. 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.

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 2004 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 2004 Plan list to the comprehensive hazard list summarized in the 2010 State Plan[27] to ensure compatibility with the State Plan. Table 3-1 summarizes the 2004 Plan and 2010 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 2010 State Plan hazards.
- Duplication of effects attributed to each hazard.
- Focus on natural hazards.

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

[27] NMDHSEM, 2010, *New Mexico Natural Hazard Mitigation Plan*

Table 3-1: Initial hazard identification lists	
2004 Plan Hazard List	**2010 State Plan Hazard List**

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

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. The database generally represents a period of 1956 to mid-2012, with the majority of events being post 1990. Table 3-2 summarizes the compilation of historic events. If a hazard is not listed, then no documentation of a historic event was found. Detailed historic hazard records are provided as digital spreadsheet files on the Plan CD and printed format in Appendix E.

The Planning Team arrived at a final list of Plan hazard in stages. An initial list of working hazards was developed during Meeting Nos. 1 and 2 that included: Dam Failure, Drought, Extreme Temperature, Flood, Geologic Hazards (includes Collapsible Soils, Expansive Soils, Karst, Landslides, and Subsidence), Hail, Lightning, Public Health Emergency (includes Pandemic, West Nile, Hantavirus, etc.), Severe Wind (includes all damaging wind events like High Wind, Tornado, Microburst, Macroburst, Gustnadoes, etc.), Wildfire and Winter Storm. At Meeting No. 4, preliminary vulnerability information and hazard profile data were reviewed for each of the hazards listed above. 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.

Table 3-2: Sandoval County Historic Hazard Events – 1956 to 2011				
Hazard	No. of Records	Recorded Losses		
		Fatalities	Injuries	Damage Costs ($)
Drought	9	0	0	$0
Earthquake	4	0	0	$0
Extreme Heat/Cold	6	1	0	$0
Flood	45	0	35	$16,737,500
Hail	36	1	0	$2,535,000
Lightning	4	1	7	$100,000
Public Health Emergency	2	0	0	$0
Severe Wind	48	0	2	$484,300
Wildfire	18	0	19	$1,017,000,000
Winter Storm	20	1	0	$0

Notes:
- SEVERE WIND category includes all events with damaging winds (High Wind, Tornado, Microburst, Macroburst, Gustnadoes, etc.)
- PUBLIC HEALTH EMERGENCY category includes Pandemic, West Nile, Hantavirus, etc.)
- EARTHQUAKE incidents for 2.5 or greater magnitude events.
- WILDFIRE events for fires burning 100 or more acres from 2000-2011.
- Damage Costs include property and crop/livestock losses and are reported as is with no attempt to adjust costs to current dollar values. Furthermore, wildfire damage costs do not include the cost of suppression which can be quite substantial.
- Sources: NCDC, NWCG, NWS, USFS, Sandoval County, NMDHSEM

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 2004 Plan, but revise 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 2004 Plan or the 2010 State Plan are summarized below:

- **Earthquake** was given serious consideration by the Planning Team and was discussed at length in both Meetings No. 1 and No. 4. Risk based maps and data developed by the USGS showing recurrence probabilities of damaging seismic events, were reviewed by the Planning Team and were found to show that the seismic risk for the populated areas of the

County is at a nuisance level. There is also a lack of any significant historic events and no damages have been reported. Based on these findings, the Planning Team chose to focus energies on more hazards that can attain a least a 'low' hazard risk and drop Earthquake nuisance from the list.

- **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 2004 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, the entire 2004 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. Within the context of the county limits, the other hazards do not exhibit significant geographic variability and will not be categorized as such.

Unless otherwise specified in this Plan, the general cutoff date for new hazard profile data and jurisdictional corporate limits is the end of May 2012.

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[28] (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 summarizes the CPRI risk categories and provides guidance regarding the assignment of values and weighting factors for each category.

As an example, assume that the 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

Critical facilities and infrastructure (CFI) are referred to and evaluated within in the 2004 Plan; however, the original data sets were not available for this update. Accordingly, a new CFI data base was established for the mitigation planning process and vulnerability assessment. For the purpose of this Plan, the Planning Team used the following 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.*

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

Table 3-3: 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%
	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%
	Limited	▪ Slight property damages (greater than 5% and less than 25% of critical and non-critical facilities and infrastructure). ▪ Injuries or illnesses do not result in permanent disability and there are no deaths. ▪ Moderate quality of life lost. ▪ Shut down of critical facilities for more than 1 day and less than 1 week.	2	
	Critical	▪ Moderate property damages (greater than 25% and less than 50% of critical and non-critical facilities and infrastructure). ▪ Injuries or illnesses result in permanent disability and at least one death. ▪ Shut down of critical facilities for more than 1 week and less than 1 month.	3	
	Catastrophic	▪ Severe property damages (greater than 50% of critical and non-critical facilities and infrastructure). ▪ Injuries or illnesses result in permanent disability and multiple deaths. ▪ Shut down of critical facilities for more than 1 month.	4	
Warning Time	Less than 6 hours	Self explanatory.	4	15%
	6 to 12 hours	Self explanatory.	3	
	12 to 24 hours	Self explanatory.	2	
	More than 24 hours	Self explanatory.	1	
Duration	Less than 6 hours	Self explanatory.	1	10%
	Less than 24 hours	Self explanatory.	2	
	Less than one week	Self explanatory.	3	
	More than one week	Self explanatory.	4	

Following the criteria set forth by the Critical Infrastructure Assurance Office (CIAO), the following eight general categories[29] 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.

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.

Most of the CFI identified by the Planning Team jurisdictions are adequately represented geographically by a point on a map and are compiled into a point based GIS file. Each facility was attributed with a descriptive name, facility description, physical address, geospatial position (longitude and latitude), and an estimated replacement cost for the building/structure and contents.

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.

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

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. Instead, they are secured and on file at Sandoval County Emergency Operations Center for use by the County and Planning Team members in their respective hazard mitigation planning efforts. Maps and location descriptions are considered sensitive.

Table 3-4: Critical facility and infrastructure counts by category and jurisdiction as of April 2013

Jurisdiction	Communications Infrastructure	Electrical Power Systems	Gas and Oil Facilities	Banking and Finance Institutions	Transportation Networks	Water Supply Systems	Government Services	Emergency Services	Educational [a]	Shelter and Evacuation Facilities [a]	Business [a]	Flood Control [a]	Recreational Facilities [a]	Senior Residential [a]
County-Wide Totals [b]	**7**	**3**	**5**	**0**	**4**	**112**	**23**	**37**	**11**	**5**	**7**	**39**	**17**	**1**
Bernalillo, Town of	4	2	4	0	3	5	1	3	5	0	4	0	2	1
Corrales, Village of	0	0	0	0	0	8	6	4	2	0	0	0	7	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	1	0	0	88	5	11	2	4	0	1	8	0
San Ysidro, Village of	0	0	0	0	0	6	1	1	0	0	0	0	0	0
Sandia, Pueblo of	0	0	0	0	0	2	3	2	0	1	2	4	0	0
Santo Domingo, Pueblo of	0	0	0	0	0	1	1	2	2	0	1	0	0	0
SSCAFCA	0	0	0	0	0	0	0	0	0	0	0	34	0	0
Unincorporated Sandoval County	0	0	0	0	0	0	4	12	0	0	0	0	0	0

NOTES: a – CFI listed under these categories have been determined to be critical per the definition of this Plan by the corresponding jurisdiction.
b – Totals do not reflect possible CFI in communities and Indian Tribes within the county that did not participate.

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. They do 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 2004 Plan, losses were generally not estimated due to the lack of data. Where appropriate, exposure estimates were made for some hazards for CFI and general residential structures.

Loss estimates for this Plan will reflect 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.

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 2009 mean home values published online by City-Data.com. Average residential home replacement costs ranged between $120,000 and $200,000, 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. The loss to exposure ratios used in this Plan is summarized by hazard in Section 3.3, where appropriate. 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.
- No attempt has been made at developing annualized loss estimates, unless otherwise noted in Section 3.3

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 2004 Plan development trend analysis will require updating to reflect growth and changes in Sandoval County and jurisdiction boundaries over the last planning cycle. The updated analysis will focus on the potential risk associated with projected growth patterns and their intersection with the Plan identified hazards. 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)**

Much of the 2004 Plan data has been updated, incorporated and/or revised to reflect current conditions and Planning Team changes, as well as an overall plan format change. 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. It is also noted that the maps are not included in the page count of this document.

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, 2012

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 Dam Safety Bureau (NMOSEDSB) 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, NMOSEDSB 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 NMOSEDSB 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 NMOSEDSB 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 NMOSEDSB 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 NMOSEDSB 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 NMOSEDSB 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 July 2012, there are currently five dams within Sandoval County, listed below, that are jurisdictional and regulated by the NMOSEDSB.

Dam Name	Hazard Rating	Dam Safety Category
Fenton Lake Dam	High	Poor
Jemez Springs Reservoir Dam	Significant	Poor
Lower Vallecito Dam	High	Poor
Corrales Heights Dam	High	Satisfactory
Sandia Mountain Site No. 1 Dam	High	Satisfactory
Source: NMOSEDSB, 2012		

Federal dams are not regulated by NMOSEDSB, but are maintained and inspected by the constructing agency. The two primary federal dams impacting Sandoval County are Cochiti Dam and Jemez Canyon Dam. Both are owned, maintained and operated by the U.S. Army Corps of Engineers and both are considered to be high hazard dams.

The NID database contains information on approximately 77,000 dams in the 50 states and Puerto Rico, with approximately 30 characteristics reported for each dam, such as: name, owner, river, nearest community, length, height, average storage, max storage, hazard rating, Emergency Action Plan (EAP), latitude, and longitude. The NID dams within New Mexico 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 10 dams within the County as follows:

Dam Name	River	Owner Type	Hazard
Bear Paw Lake No. 7 Dam	San Jose Creek	Private	Significant
Cochiti	Rio Grande & Santa Fe	Federal	High
Encino Detention Dam No. 49	Arroyo Jarido	Federal	Significant
Jemez Springs Reservoir Dam	San Jose (offstream)	Private	Low

Dam Name	River	Owner Type	Hazard
Jemez Canyon Dam	Jemez River	Federal	High
Lower Vallecito Dam	Vallecito Creek	Private	High
Sandia Mountain Site No. 1 Dam	Piedra Lisa	Private	High
Santa Ana Detention	Arroyo Agua Sarca	Federal	High
Santa Ana Diversion Dike	Arroyo Agua Sarca	Federal	High
WP Johnson Erosion Ctrl	Jariado Arroyo	Private	Significant
Source: NID, 2010			

Additional dams that were noted by the Planning Team as not being in either database are summarized below:

Dam Name	Owner Name	Owner Type
Montoyas Arroyo Sportsplex Dam	SSCAFCA	Local
Enchanted Hills Dam No. 1	SSCAFCA	Local
San Francisco Dam	San Felipe Pueblo - DOI - BIA	Federal
Water Tank Dam	San Felipe Pueblo - DOI - BIA	Federal
Sandia Pueblo Dam 82-2	Sandia Pueblo - DOI - BIA	Federal
Sandia Pueblo Dam 82-1	Sandia Pueblo - DOI - BIA	Federal
Sandia Pueblo Dam 82-3	Sandia Pueblo - DOI - BIA	Federal
Sandia Pueblo Dam 82-4	Sandia Pueblo - DOI - BIA	Federal

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.

The available dam failure limits were either digitized from paper maps into a GIS shape file or provided in shape file format by the owner/agency. The inundation limits for all of the dams 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 NMOSEDSB 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 OSEDSB hazard classification and jurisdictional status, if available. Maps 1E through 1L are jurisdiction specific maps showing the dam failure hazard areas at a greater level of detail.

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 134 (Table 3-23).

Table 3-5: CPRI results by jurisdiction for dam failure

Participating Jurisdiction	Probability	Magnitude/ Severity	Warning Time	Duration	CPRI Score
Bernalillo, Town of	Unlikely	Critical	< 6 hours	< 1 week	2.25
Corrales, Village of	Possible	Critical	< 6 hours	< 24 hours	2.60
Jemez Springs, Village of	none	Negligible	< 6 hours	< 6 hours	1.45
Rio Rancho, City of	none	Negligible	12-24 hours	< 6 hours	1.75
San Ysidro, Village of	Unlikely	Negligible	< 6 hours	< 6 hours	1.45
Sandia, Pueblo of	Highly Likely	Catastrophic	< 6 hours	< 24 hours	3.80
Santo Domingo, Pueblo of	Unlikely	Catastrophic	< 6 hours	< 24 hours	2.45
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 =	**2.33**

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 3-6 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. 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 3-6: Sandoval County jurisdictional exposure and loss estimates due to dam failure

DAM FAILURE HAZARD EXPOSURE / LOSS	Bernalillo	Corrales	Jemez Springs	Rio Rancho	San Ysidro	Sandia, Pueblo of	Santo Domingo, Pueblo of	SSCAFCA	Uninc. Sandoval County	Total [1]
Total Critical Facilities and Infrastructure	**34**	**27**	**9**	**122**	**8**	**11**	**7**	**34**	**16**	**268**
Estimated Replacement Cost (x $1,000)	**$0** [2]	**$24,000**	**$10,275**	**$342,234**	**$2,550**	**$96,727**	**$61,200**	**$201,820**	**$56,850**	**$795,656**
Facilities Exposed to High Hazard	22	27	0	3	0	5	1	3	2	60
Percentage of Total Facilities	64.71%	100.00%	0.00%	2.46%	0.00%	45.45%	14.29%	8.82%	12.50%	41.10%
Estimated Replacement Cost (x $1,000)	$0	$24,000	$0	$10,868	$0	$35,315	$6,000	$46,490	$1,250	$113,055
Estimated Structure Loss (x $1,000)	$0	$12,000	$0	$5,434	$0	$17,658	$3,000	$23,245	$625	$56,528
Total Population	**8,307**	**8,231**	**278**	**87,444**	**165**	**907**	**3,255**	**n/a**	**14,140**	**131,564** [3]
Population Exposed to High Hazard	7,221	6,568	0	1,087	19	712	2,301	n/a	574	18,481
Percent Exposed	86.93%	79.80%	0.00%	1.24%	11.28%	78.49%	70.68%	n/a	4.06%	14.05%
Population Over 65	**1,113**	**1,600**	**83**	**9,437**	**30**	**95**	**240**	**n/a**	**2,353**	**15,880** [3]
Population Over 65 Exposed to High Hazard	961	1,215	0	112	4	80	205	n/a	63	2,641
Percent Exposed	86.39%	75.94%	0.00%	1.18%	13.33%	85.05%	85.45%	n/a	2.69%	16.63%
Residential Building Count Totals)	**3,215**	**3,765**	**174**	**33,927**	**83**	**348**	**666**	**n/a**	**7,486**	**49,665**
Estimated Replacement Cost (x $1,000)	**$622,530**	**$2,222,247**	**$40,712**	**$10,178,234**	**$18,694**	**$69,431**	**$122,220**	**n/a**	**$2,799,780**	**$16,073,849**
Residential Bldgs Exposed to High Hazard	2,821	2,944	0	416	10	280	484	n/a	217	7,172
Percentage of Total Residential Bldgs	87.75%	78.19%	0.00%	1.23%	12.53%	80.42%	72.72%	n/a	2.90%	14.44%
Estimate Exposed Replacement Cost (x $1,000)	$525,860	$1,936,325	$0	$124,745	$2,343	$53,572	$87,334	n/a	$50,265	$2,780,443
Estimated Residential Structure Losses (x $1,000)	$262,930	$968,162	$0	$62,373	$1,171	$26,786	$43,667	n/a	$25,133	$1,390,222

[1] Note that totals reported here are totals for the participating communities only.

[2] Bernalillo did not provided replacement costs for any CFI.

[3] Population count for the entire county and not just the participating jurisdictions.

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 are summarized below:

Bernalillo – With no available vacant developable land and 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 - No dam failure hazard for Jemez Springs

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.

Sandia Pueblo – The Sandia Pueblo has not identified specific areas of future growth. The significant portion the population and infrastructure are located within a high hazard dam failure area, and especially those areas located along the Rio Grande and downstream of the four pueblo dams. It is reasonable to project that some, of any, future development will occur in these areas and may be vulnerable to the low probability dam failure hazard.

Santo Domingo Pueblo – The portion of future development projected for the Santo Domingo Pueblo Village will likely be located within a high hazard dam failure area and should be considered vulnerable.

SSCAFCA – Any growth of SSCAFCA owned facilities or rights-of-way

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 is beginning to come to fruition. 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. A commercial node has begun at Centro de Algodones with the development of a veterinary clinic and a light manufacturing facility.

We anticipate further development within Petroglyph Trails and Centro de Algodones. There will likely be further development interest near Interstate 25, Exit 242 following the reconstruction of that interchange. Following the adoption of the Rio Rancho Estates Area Plan, it is anticipated that development activity will likely increase in that 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 3-7 below.

Table 3-7: 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	None	No	Jemez Springs is not located within any known or mapped Dam Failure inundation limits, so the Village's vulnerability to Dam Failure is Low. Accordingly, Jemez Springs will not be mitigating for Dam Failure.
Rio Rancho, City of	Nuisance	No	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 Nuisance level. Accordingly, Rio Rancho will not be mitigating for Dam Failure.

Table 3-7: Dam Failure vulnerability rating crosswalk			
Jurisdiction	**Vulnerability Rating**	**Mitigation Priority?**	**Notes**
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.
Sandia Pueblo	Moderate	Yes	A large portion of the Sandia Pueblo population and infrastructure are located within the Dam Failure inundation limits of Cochiti and Jemez Dams. The Sandia Village is also located downstream of Sandia Pueblo Dams 82-1 through 82-4. Given this exposure, the overall vulnerability of Sandia Pueblo is considered to be Moderate.
Santo Domingo Pueblo	Moderate	Yes	A major portion of the Santo Domingo Village is located within the dam failure limits of the Cochiti Dam, as well as many of the farms and scattered residences located along the Rio Grande. The remainder of the pueblo is located outside of dam failure limits. Given the exposure of the main village, the overall vulnerability of Santo Domingo Pueblo is considered to be 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.

Table 3-7: Dam Failure vulnerability rating crosswalk			
Jurisdiction	**Vulnerability Rating**	**Mitigation Priority?**	**Notes**
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.

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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*.

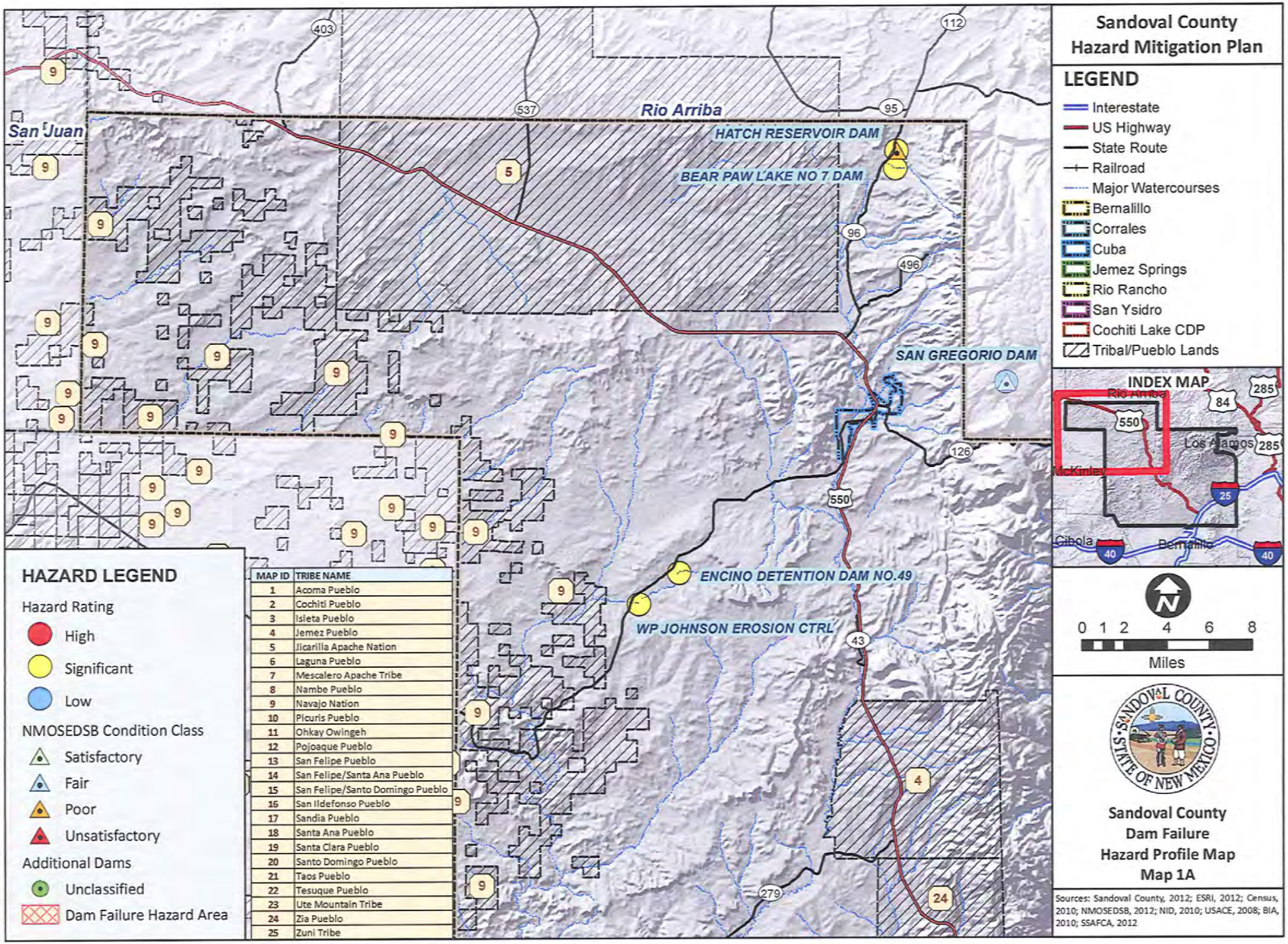
U.S. Department of Interior, Bureau of Indian Affairs, 2012, *Recommended Evacuation Zone, Sandia Pueblo Dams, Sandia Pueblo, New Mexico*.

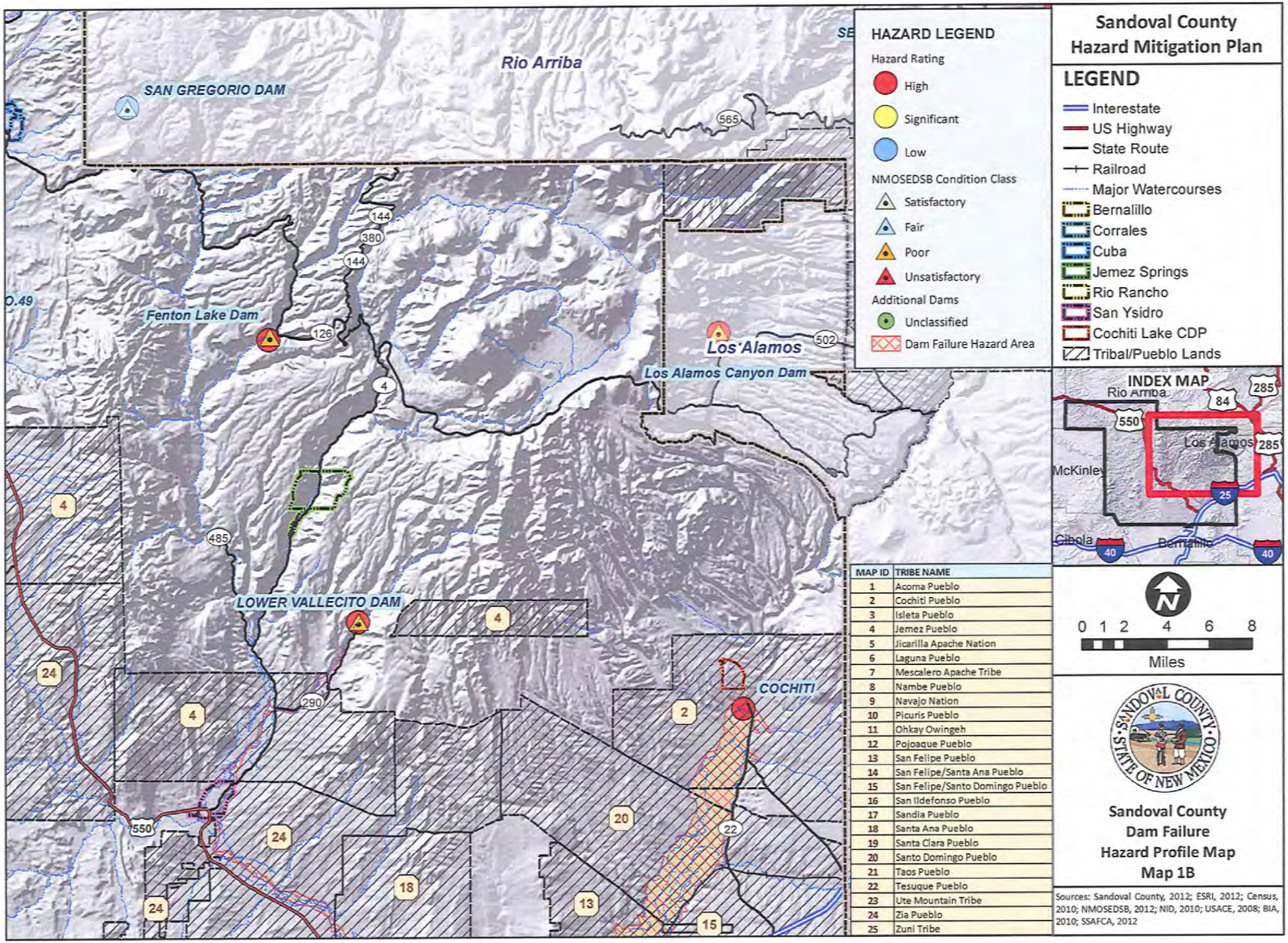
W.H. Pacific, 2011, *Corrales Heights Dam No. 1, Scenario 'B' PMF Breach Inundation Map*, Figure 15, Page 46, prepared for SSCAFCA.

Profile Maps

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

Maps 1E through 2L – Bernalillo, Corrales, Jemez Springs, Rio Rancho, San Ysidro, Sandia Pueblo, Santo Domingo Pueblo, and SSCAFCA Dam Inundation Hazard Maps.


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
Los Alamos
Cibola
Bernalillo
HAZARD LEGEND
Hazard Rating
High
Significant
Low
NMOSEDSB Condition Class
Satisfactory
Fair
Poor
Unsatisfactory
Additional Dams
Unclassified
Dam Failure Hazard Area
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
HATCH RESERVOIR DAM
BEAR PAW LAKE NO 7 DAM
SAN GREGORIO DAM
ENCINO DETENTION DAM NO.49
WP JOHNSON EROSION CTRL
Rio Arriba
San Juan
0 1 2 4 6 8
Miles
Sandoval County
Dam Failure
Hazard Profile Map
Map 1A
Sources: Sandoval County, 2012; ESRI, 2012; Census, 2010; NMOSEDSB, 2012; NID, 2010; USACE, 2008; BIA, 2010; SSAFCA, 2012



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
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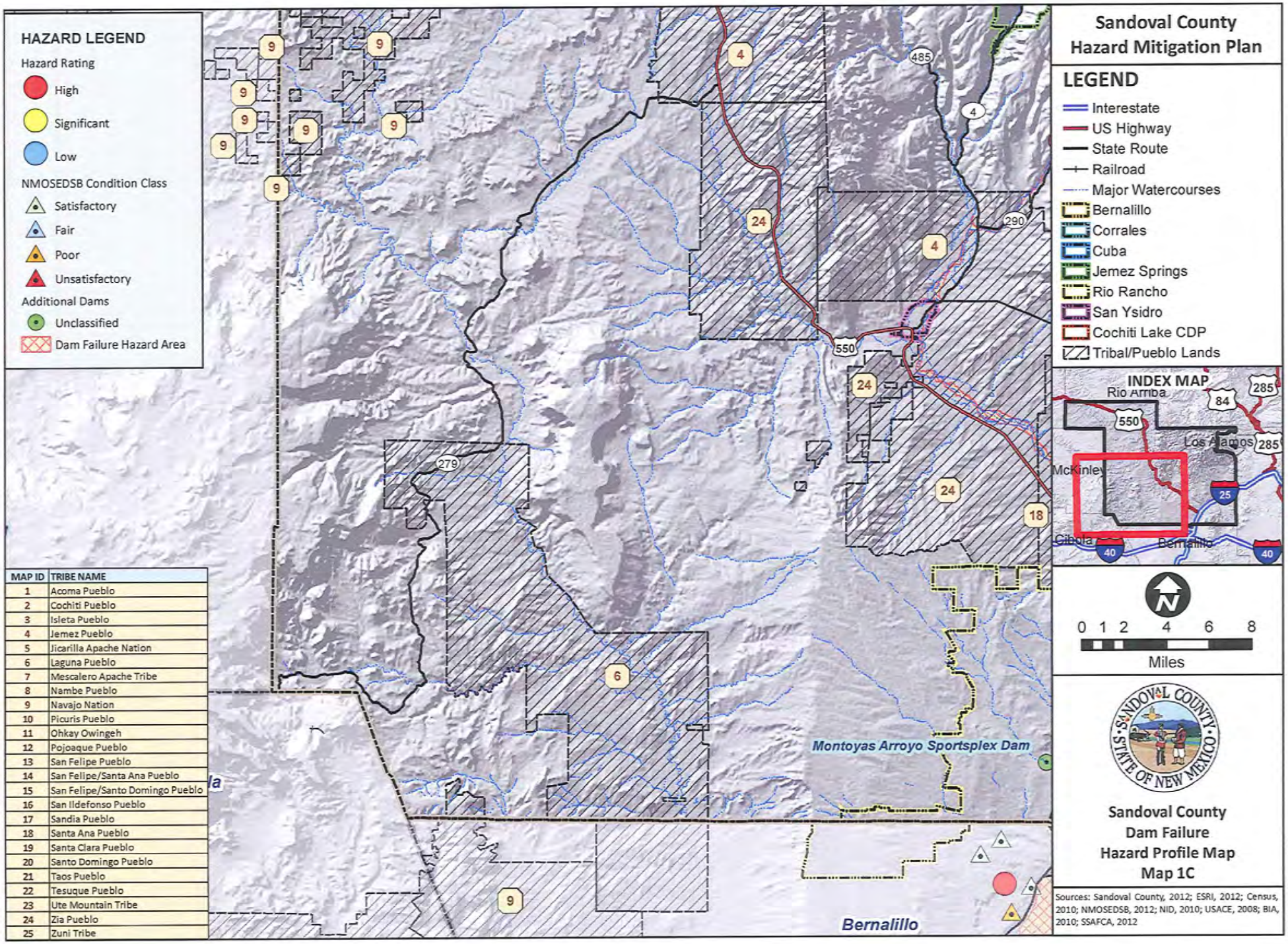
21	Taos Pueblo
22	Tesuque Pueblo
23	Ute Mountain Tribe
24	Zia Pueblo
25	Zuni Tribe



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4	Jemez Pueblo
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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
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17	Sandia Pueblo
18	Santa Ana Pueblo
19	Santa Clara Pueblo
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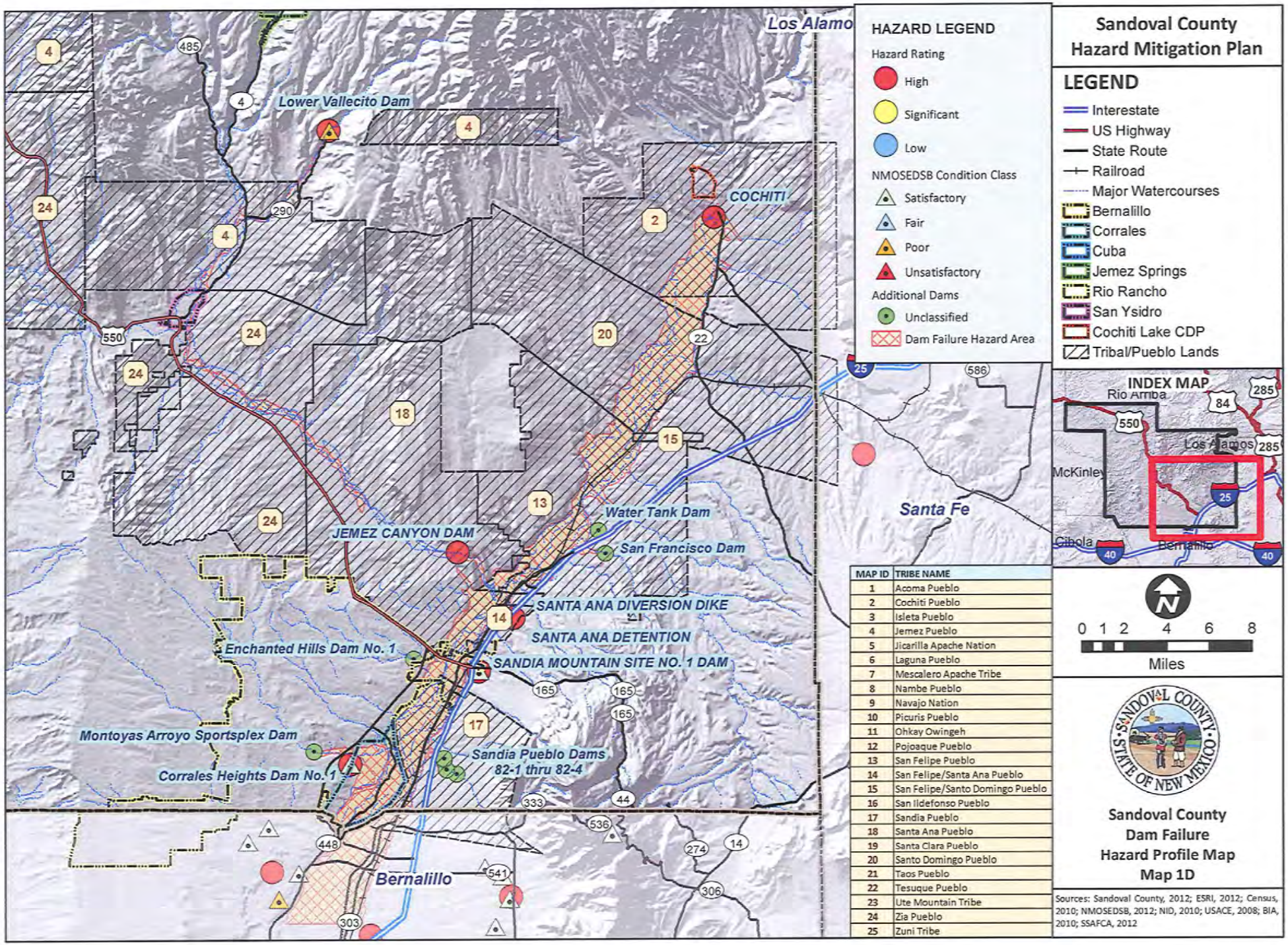
23	Ute Mountain Tribe
24	Zia Pueblo
25	Zuni Tribe



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18	Santa Ana Pueblo
19	Santa Clara Pueblo
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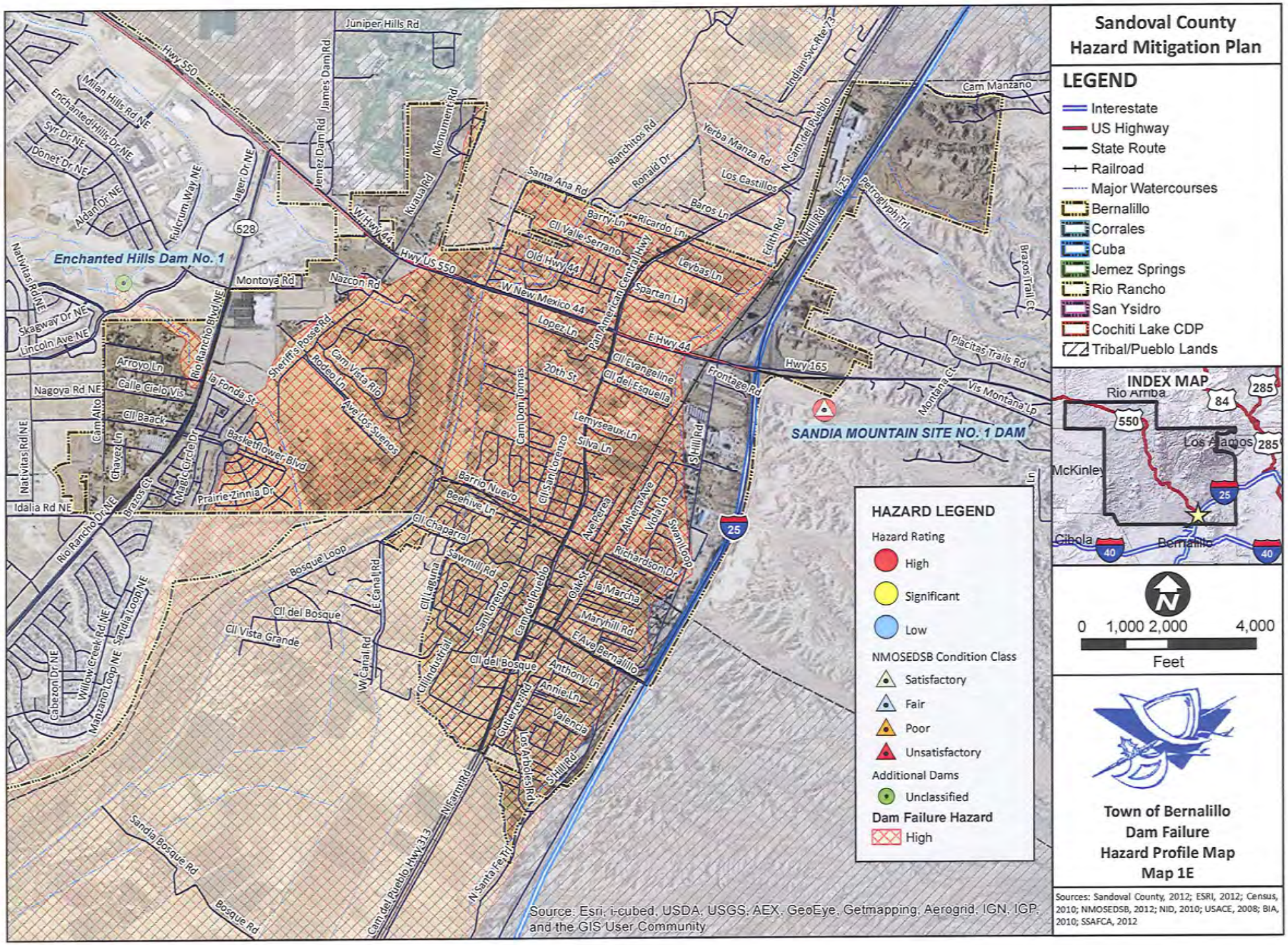
21	Taos Pueblo
22	Tesuque Pueblo
23	Ute Mountain Tribe
24	Zia Pueblo
25	Zuni Tribe


Sandoval County
Hazard Mitigation Plan
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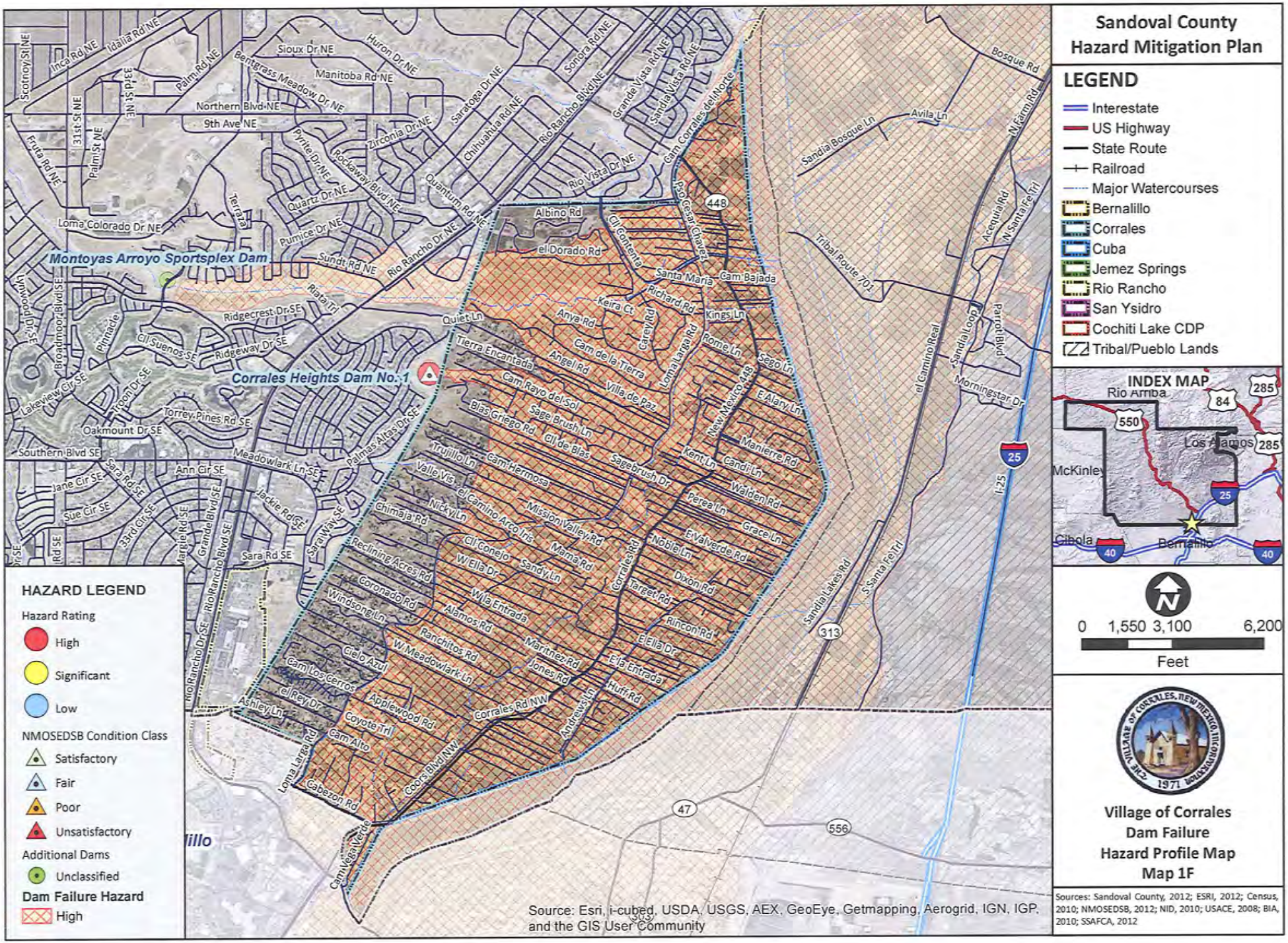
Interestate
US Highway
State Route
Railroad
Major Watercourses
Bernalillo
Corrales
Cuba
Jemez Springs
Rio Rancho
San Ysidro
Cochiti Lake CDP
Tribal/Pueblo Lands
INDEX MAP
Rio Arriba
Los Alamos
McKinley
Cibola
Bernalillo
HAZARD LEGEND
Hazard Rating
High
Significant
Low
NMOSEDSB Condition Class
Satisfactory
Fair
Poor
Unsatisfactory
Additional Dams
Unclassified
Dam Failure Hazard
High
0 1,000 2,000 4,000
Feet
Enchanted Hills Dam No. 1
SANDIA MOUNTAIN SITE NO. 1 DAM
Town of Bernalillo
Dam Failure
Hazard Profile Map
Map 1E
Sources: Sandoval County, 2012; ESRI, 2012; Census, 2010; NMOSEDSB, 2012; NID, 2010; USACE, 2008; BIA, 2010; SSAFCA, 2012
Source: Esri, i-cubed, USDA, USGS, AEX, GeoEye, Getmapping, Aerogrid, IGN, IGP, and the GIS User Community


Sandoval County
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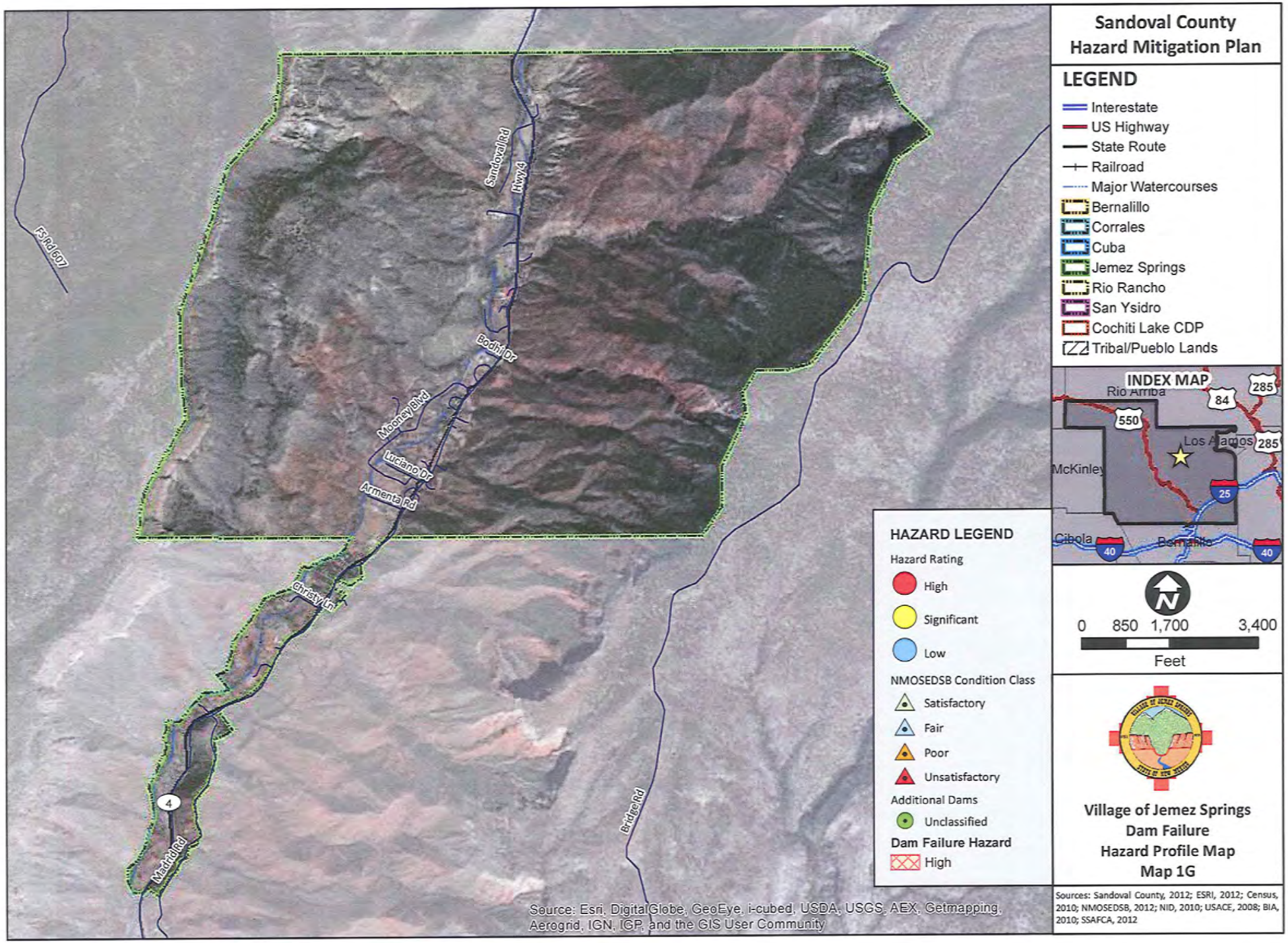
Low
NMOSEDSB Condition Class
Satisfactory
Fair
Poor
Unsatisfactory
Additional Dams
Unclassified
Dam Failure Hazard
High
Montoyas Arroyo Sportsplex Dam
Corrales Heights Dam No. 1
0 1,550 3,100 6,200
Feet
Village of Corrales
Dam Failure
Hazard Profile Map
Map 1F
Source: Esri, i-cubed, USDA, USGS, AEX, GeoEye, Getmapping, Aerogrid, IGN, IGP, and the GIS User Community
Sources: Sandoval County, 2012; ESRI, 2012; Census, 2010; NMOSEDSB, 2012; NID, 2010; USACE, 2008; BIA, 2010; SSAFCA, 2012


Sandoval County
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Bernalillo
Corrales
Cuba
Jemez Springs
Rio Rancho
San Ysidro
Cochiti Lake CDP
Tribal/Pueblo Lands
INDEX MAP
Rio Arriba
Los Alamos
McKinley
Cibola
Bernalillo
285
84
550
25
40
HAZARD LEGEND
Hazard Rating
High
Significant
Low
NMOSEDSB Condition Class
Satisfactory
Fair
Poor
Unsatisfactory
Additional Dams
Unclassified
Dam Failure Hazard
High
0 850 1,700 3,400
Feet
Village of Jemez Springs
Dam Failure
Hazard Profile Map
Map 1G
Sources: Sandoval County, 2012; ESRI, 2012; Census, 2010; NMOSEDSB, 2012; NID, 2010; USACE, 2008; BIA, 2010; SSAFCA, 2012
Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, and the GIS User Community
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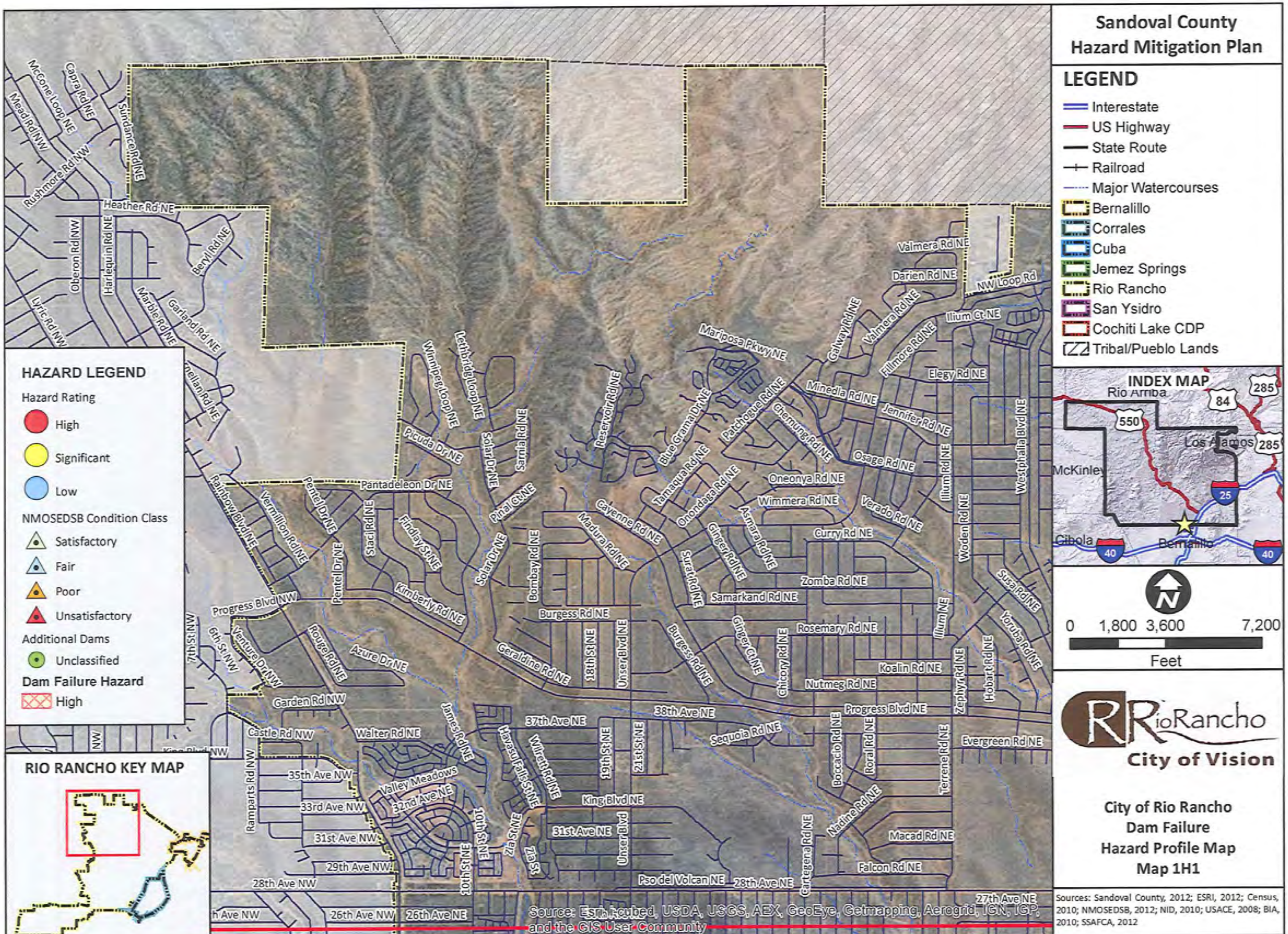
FS Rd 607
Bodhi Dr
Mooney Blvd
Luciano Dr
Armenta Rd
Christy Ln
Madrid Rd
Bridge Rd
4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Jemez Springs
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INDEX MAP
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McKinley
Cibola
Los Alamos
Bernalillo
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285
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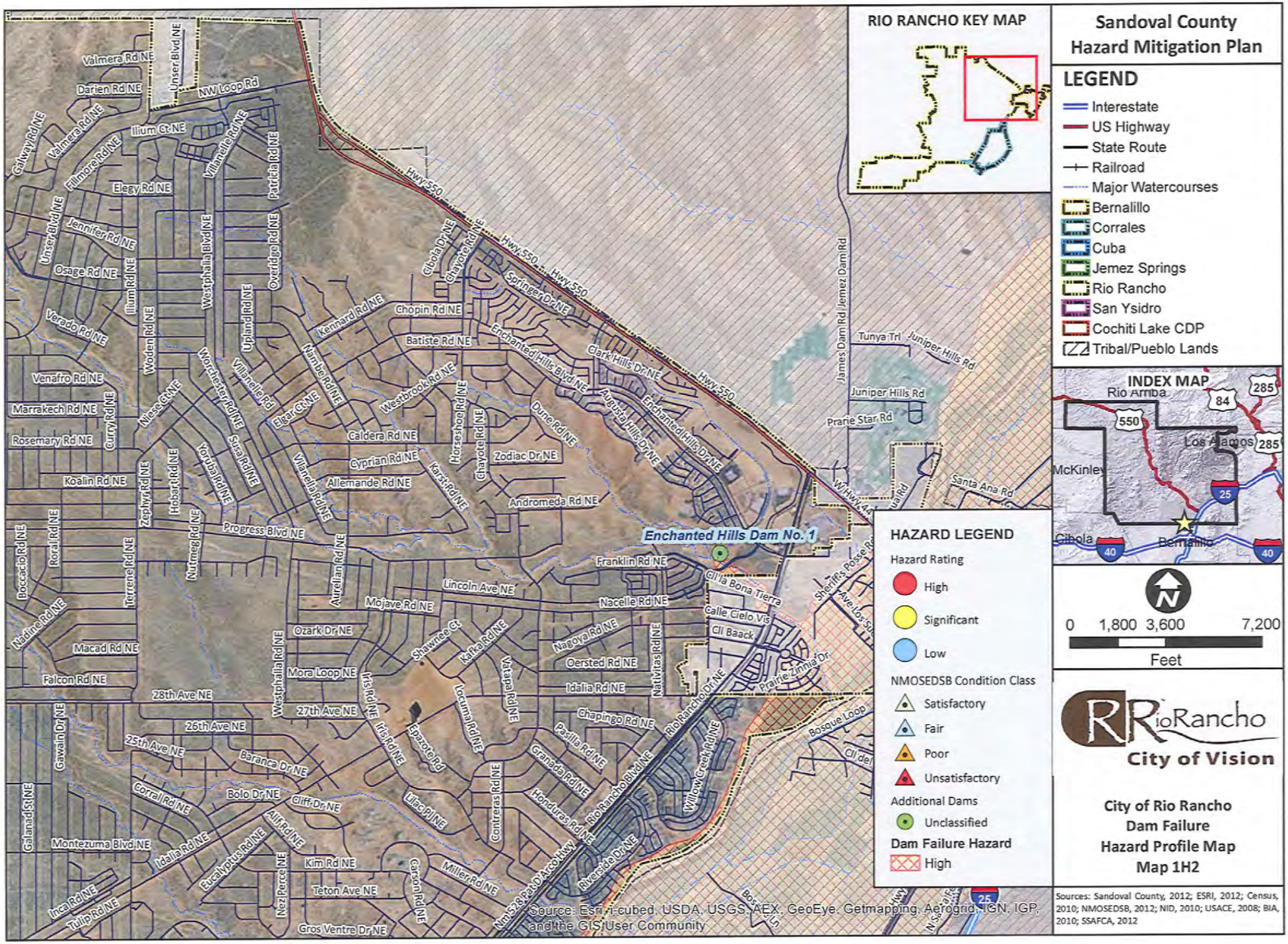
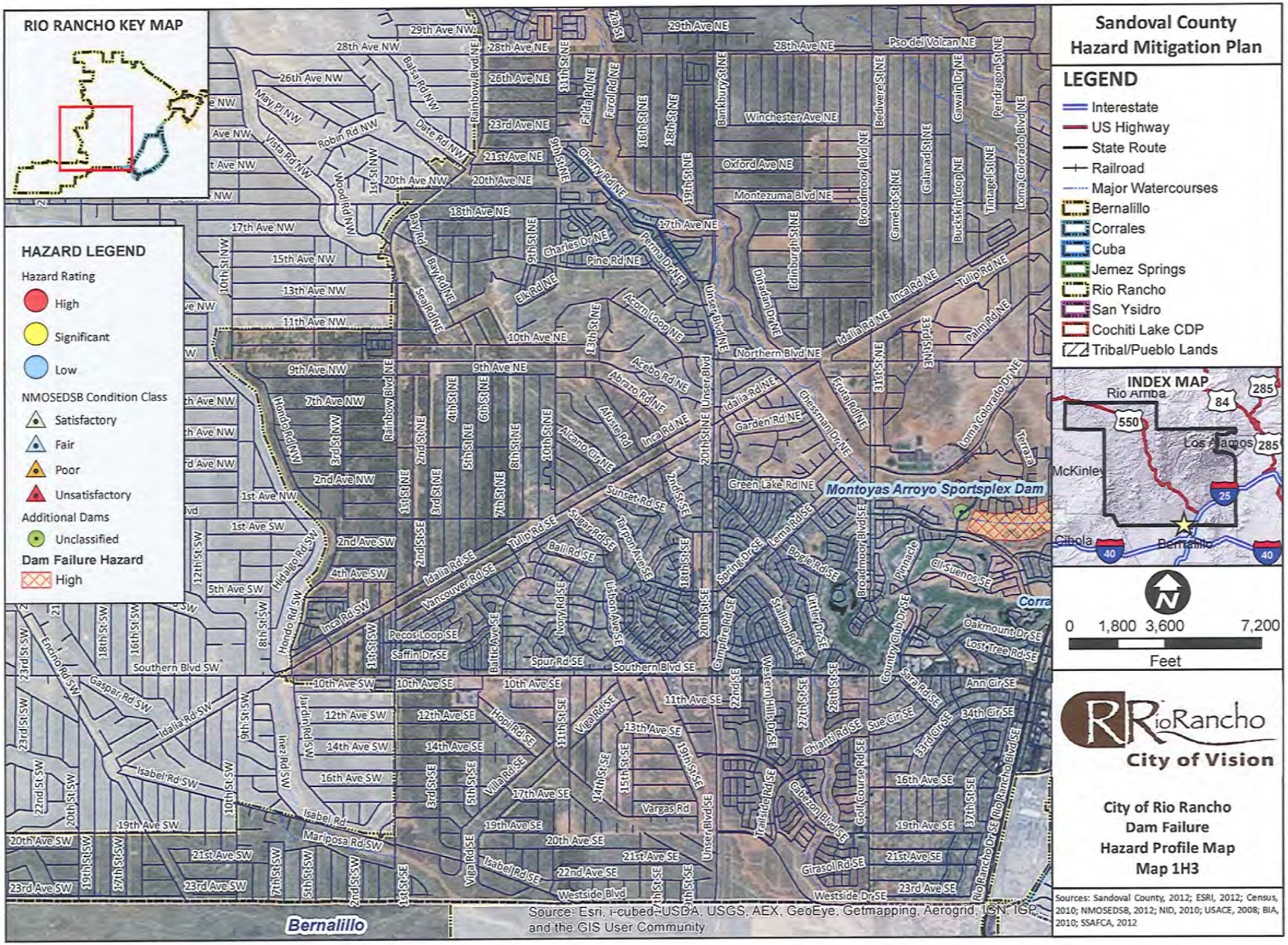
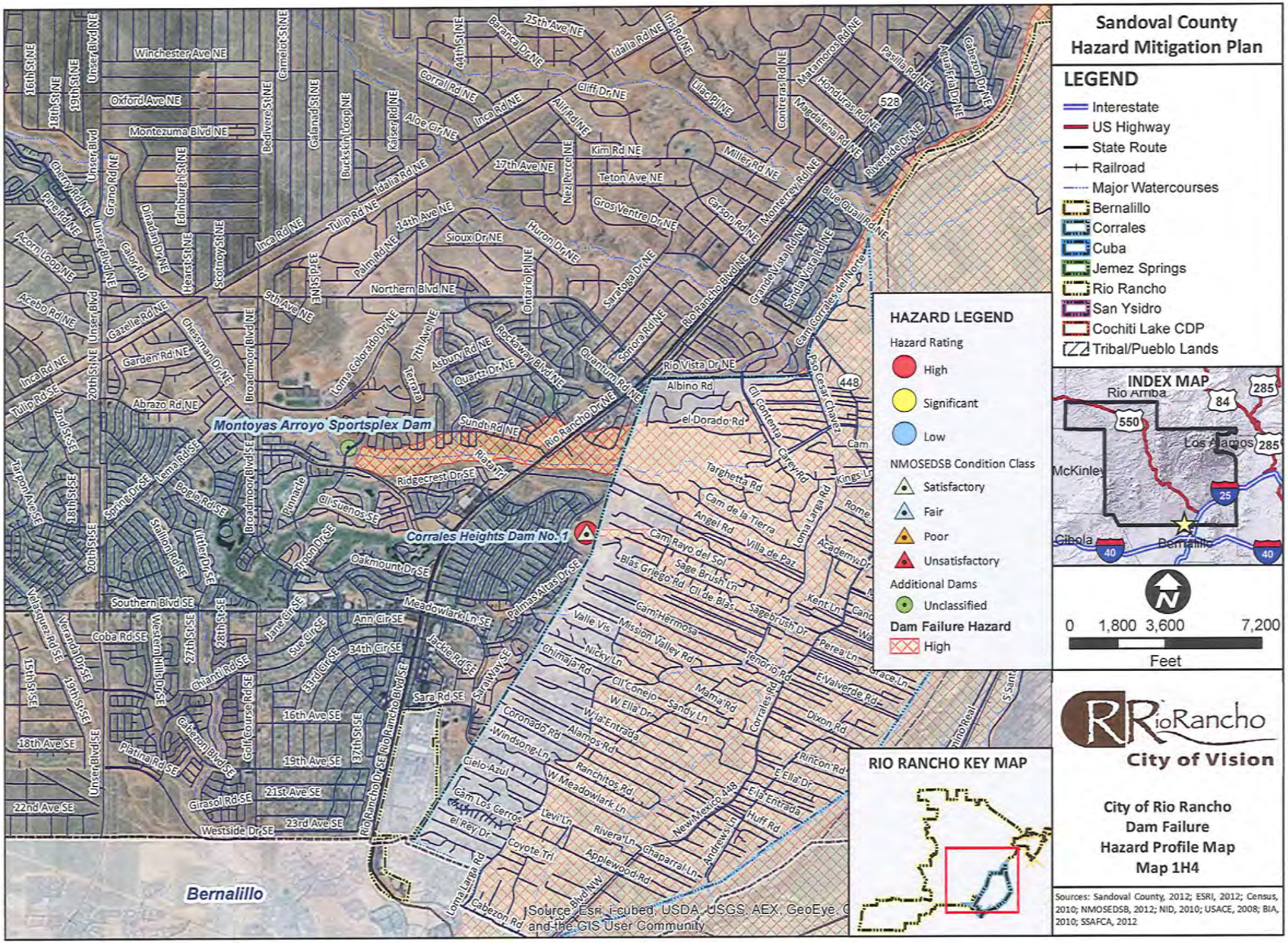
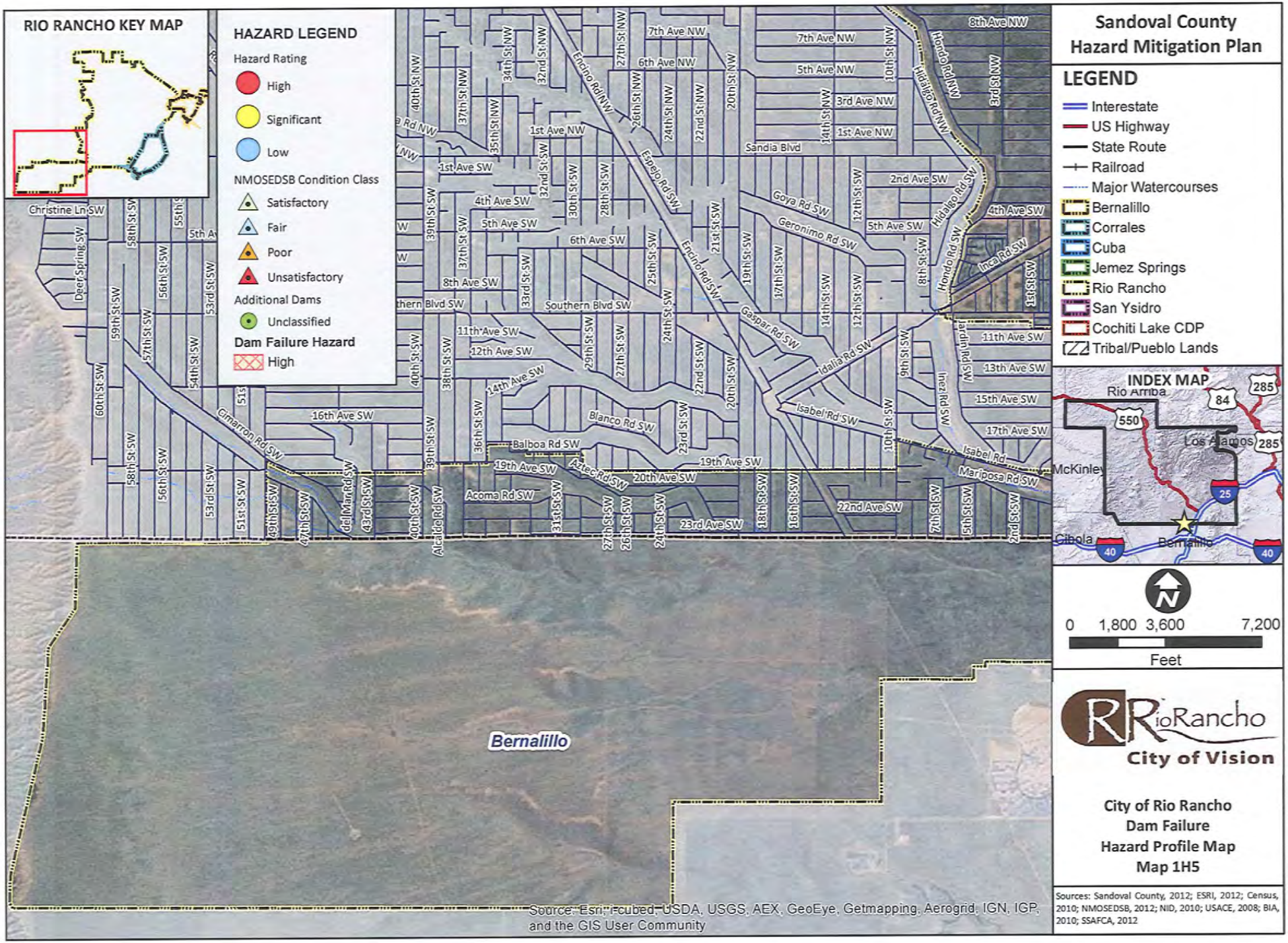
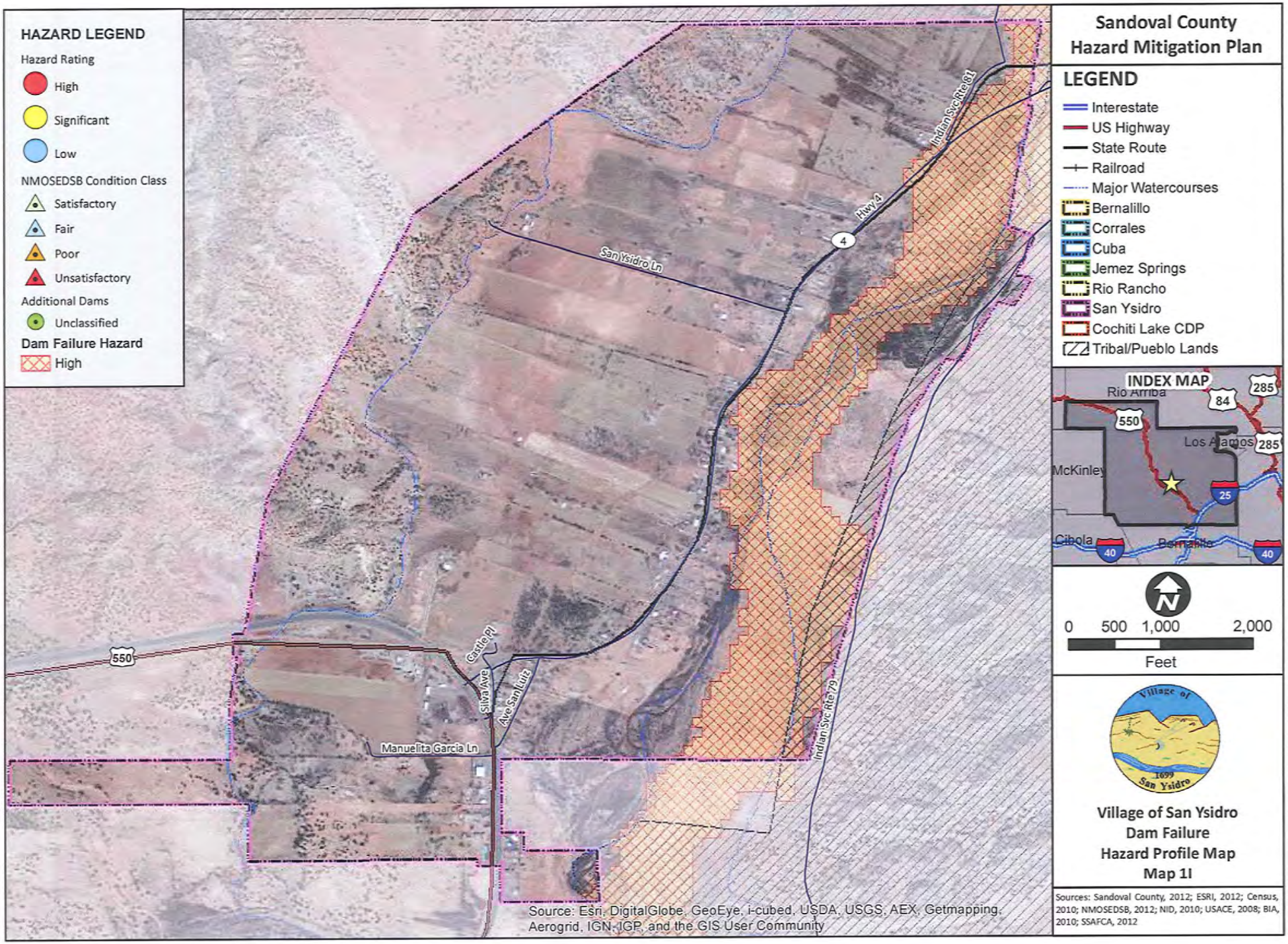
40
0 1,800 3,600 7,200
Feet
RioRancho
City of Vision
City of Rio Rancho
Dam Failure
Hazard Profile Map
Map 1H1
Sources: Sandoval County, 2012; ESRI, 2012; Census, 2010; NMOSEDSB, 2012; NID, 2010; USACE, 2008; BIA, 2010; SSAFCA, 2012
HAZARD LEGEND
Hazard Rating
High
Significant
Low
NMOSEDSB Condition Class
Satisfactory
Fair
Poor
Unsatisfactory
Additional Dams
Unclassified
Dam Failure Hazard
High
RIO RANCHO KEY MAP
Source: Esri, i-cubed, USDA, USGS, AEX, GeoEye, Getmapping, Aerogrid, IGN, IGP, and the GIS User Community
Progress Blvd NW
Progress Blvd NE
Unser Blvd NE
Westphalia Blvd NE
Mariposa Pkwy NE
Rainbow Blvd NE
King Blvd NE
38th Ave NE
Pso del Volcan NE

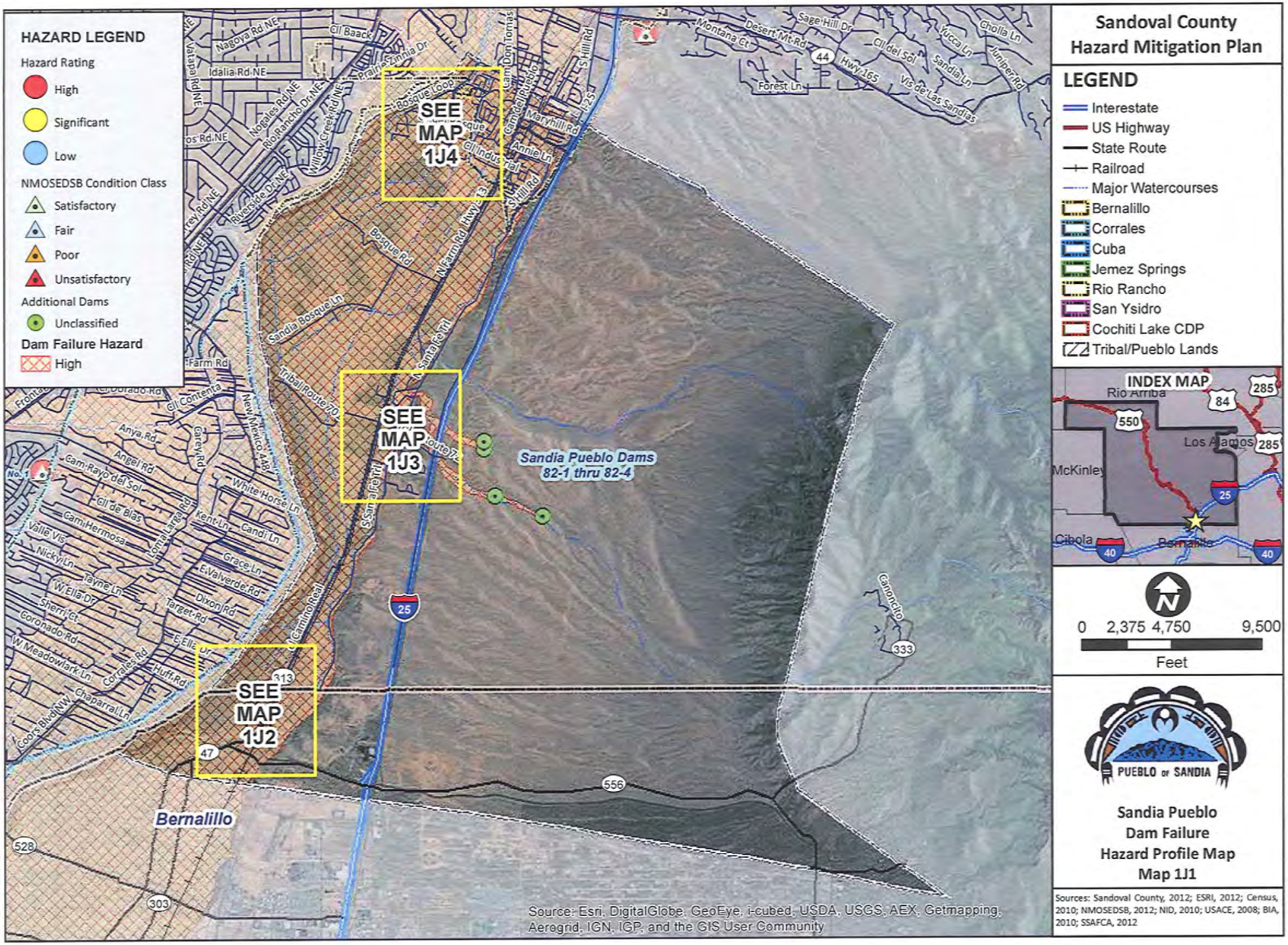

RIO RANCHO KEY MAP
Sandoval County
Hazard Mitigation Plan
LEGEND
Interestate
US Highway
State Route
Railroad
Major Watercourses
Bernalillo
Corrales
Cuba
Jemez Springs
Rio Rancho
San Ysidro
Cochiti Lake CDP
Tribal/Pueblo Lands
INDEX MAP
Rio Arriba
Los Alamos
McKinley
Cibola
Bernalillo
HAZARD LEGEND
Hazard Rating
High
Significant
Low
NMOSEDSB Condition Class
Satisfactory
Fair
Poor
Unsatisfactory
Additional Dams
Unclassified
Dam Failure Hazard
High
Enchanted Hills Dam No. 1
0 1,800 3,600 7,200
Feet
RioRancho
City of Vision
City of Rio Rancho
Dam Failure
Hazard Profile Map
Map 1H2
Source: Esri, i-cubed, USDA, USGS, AEX, GeoEye, Getmapping, Aerogrid, IGN, IGP, and the GIS User Community
Sources: Sandoval County, 2012; ESRI, 2012; Census, 2010; NMOSEDSB, 2012; NID, 2010; USACE, 2008; BIA, 2010; SSAFCA, 2012

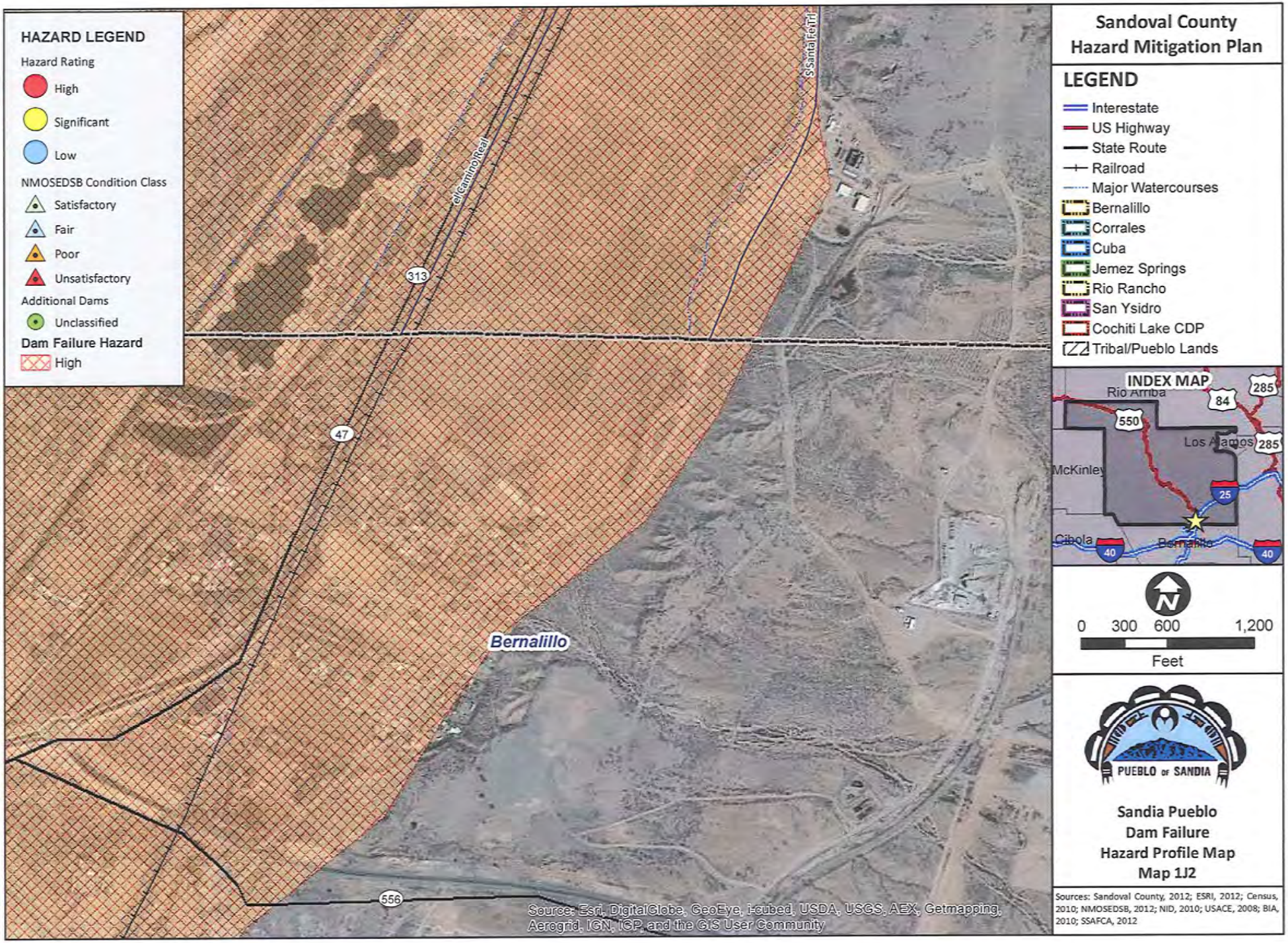

RIO RANCHO KEY MAP
HAZARD LEGEND
Hazard Rating
High
Significant
Low
NMOSEDSB Condition Class
Satisfactory
Fair
Poor
Unsatisfactory
Additional Dams
Unclassified
Dam Failure Hazard
High
Sandoval County
Hazard Mitigation Plan
LEGEND
Interestate
US Highway
State Route
Railroad
Major Watercourses
Bernalillo
Corrales
Cuba
Jemez Springs
Rio Rancho
San Ysidro
Cochiti Lake CDP
Tribal/Pueblo Lands
INDEX MAP
Rio Arriba
Los Alamos
McKinley
Cibola
Bernalillo
0 1,800 3,600 7,200
Feet
RRio Rancho
City of Vision
City of Rio Rancho
Dam Failure
Hazard Profile Map
Map 1H3
Montoyas Arroyo Sportsplex Dam
Source: Esri, i-cubed, USDA, USGS, AEX, GeoEye, Getmapping, Aerogrid, IGN, IGP, and the GIS User Community
Sources: Sandoval County, 2012; ESRI, 2012; Census, 2010; NMOSEDSB, 2012; NID, 2010; USACE, 2008; BIA, 2010; SSAFCA, 2012

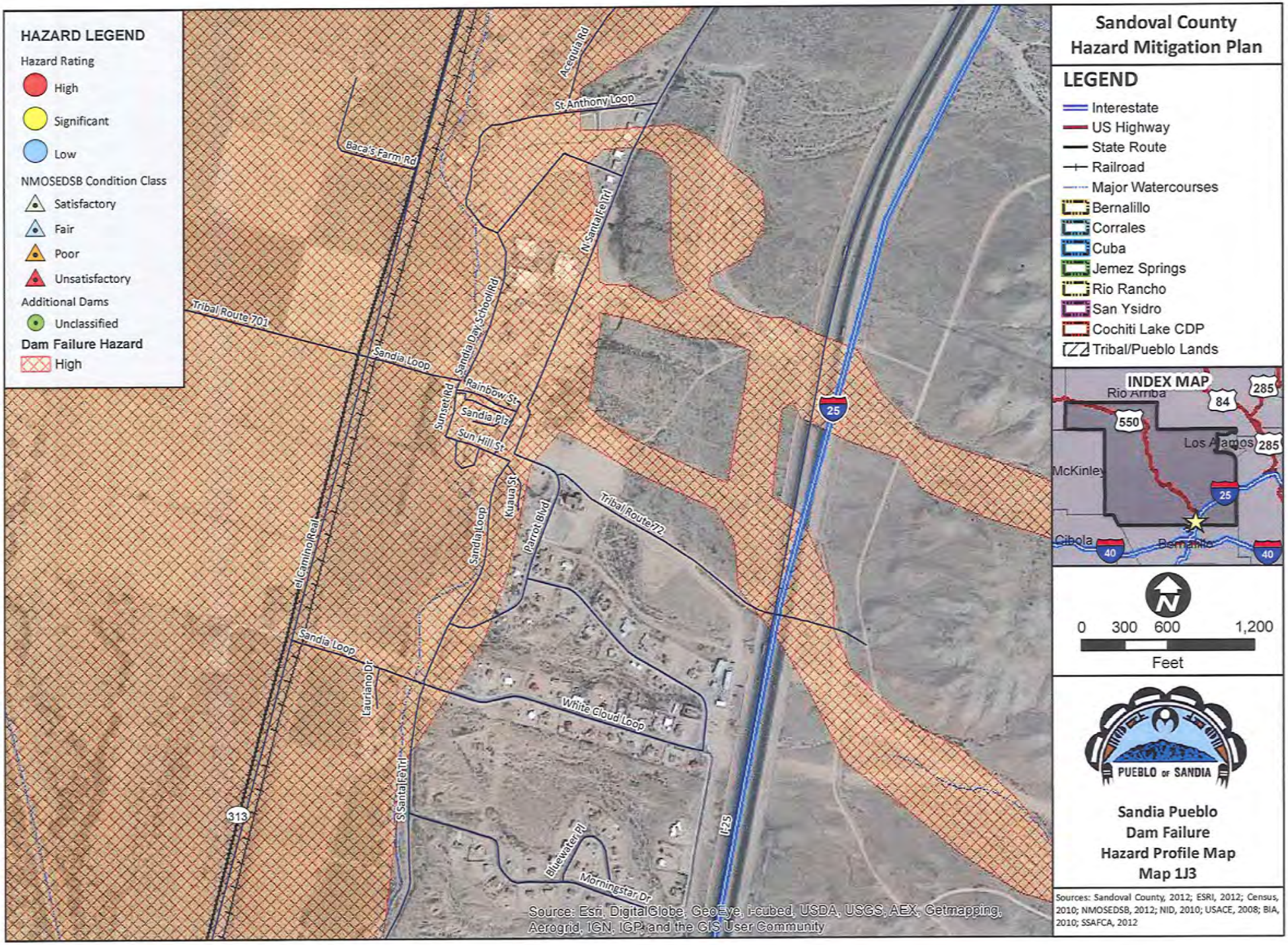

Sandoval County
Hazard Mitigation Plan
LEGEND
Interestate
US Highway
State Route
Railroad
Major Watercourses
Bernalillo
Corrales
Cuba
Jemez Springs
Rio Rancho
San Ysidro
Cochiti Lake CDP
Tribal/Pueblo Lands
HAZARD LEGEND
Hazard Rating
High
Significant
Low
NMOSEDSB Condition Class
Satisfactory
Fair
Poor
Unsatisfactory
Additional Dams
Unclassified
Dam Failure Hazard
High
INDEX MAP
Rio Arriba
Los Alamos
McKinley
Cibola
Bernalillo
RIO RANCHO KEY MAP
0 1,800 3,600 7,200
Feet
RioRancho
City of Vision
City of Rio Rancho
Dam Failure
Hazard Profile Map
Map 1H4
Montoyas Arroyo Sportsplex Dam
Corrales Heights Dam No. 1
Bernalillo
Source: Esri, i-cubed, USDA, USGS, AEX, GeoEye, and the GIS User Community
Sources: Sandoval County, 2012; ESRI, 2012; Census, 2010; NMOSEDSB, 2012; NID, 2010; USACE, 2008; BIA, 2010; SSAFCA, 2012

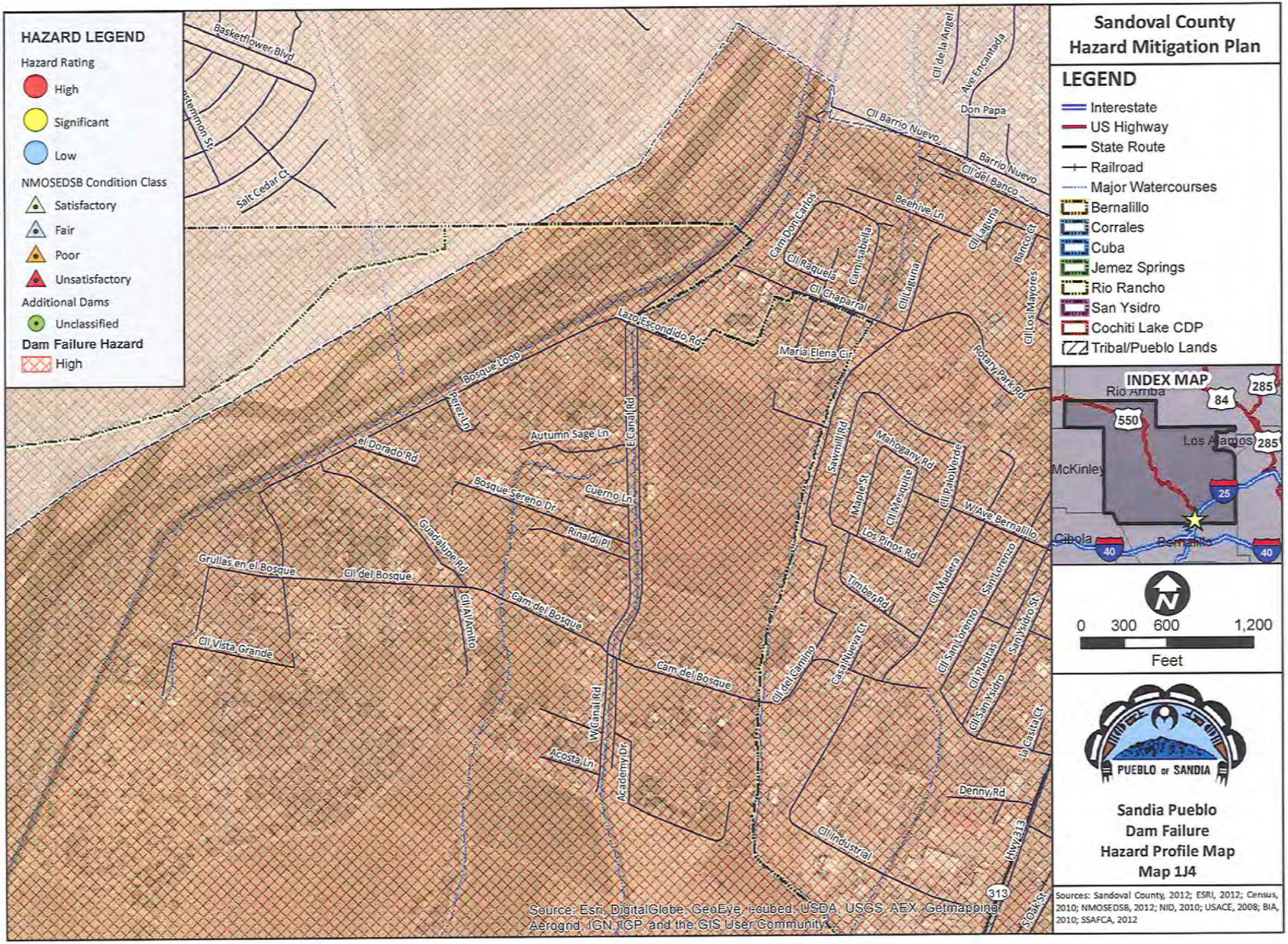

RIO RANCHO KEY MAP
HAZARD LEGEND
Hazard Rating
High
Significant
Low
NMOSEDSB Condition Class
Satisfactory
Fair
Poor
Unsatisfactory
Additional Dams
Unclassified
Dam Failure Hazard
High
Sandoval County
Hazard Mitigation Plan
LEGEND
Interestate
US Highway
State Route
Railroad
Major Watercourses
Bernalillo
Corrales
Cuba
Jemez Springs
Rio Rancho
San Ysidro
Cochiti Lake CDP
Tribal/Pueblo Lands
INDEX MAP
Rio Arriba
Los Alamos
McKinley
Cibola
Bernalillo
0 1,800 3,600 7,200
Feet
Bernalillo
Source: Esri, i-cubed, USDA, USGS, AEX, GeoEye, Getmapping, Aerogrid, IGN, IGP, and the GIS User Community
City of Vision
City of Rio Rancho
Dam Failure
Hazard Profile Map
Map 1H5
Sources: Sandoval County, 2012; ESRI, 2012; Census, 2010; NMOSEDSB, 2012; NID, 2010; USACE, 2008; BIA, 2010; SSAFCA, 2012

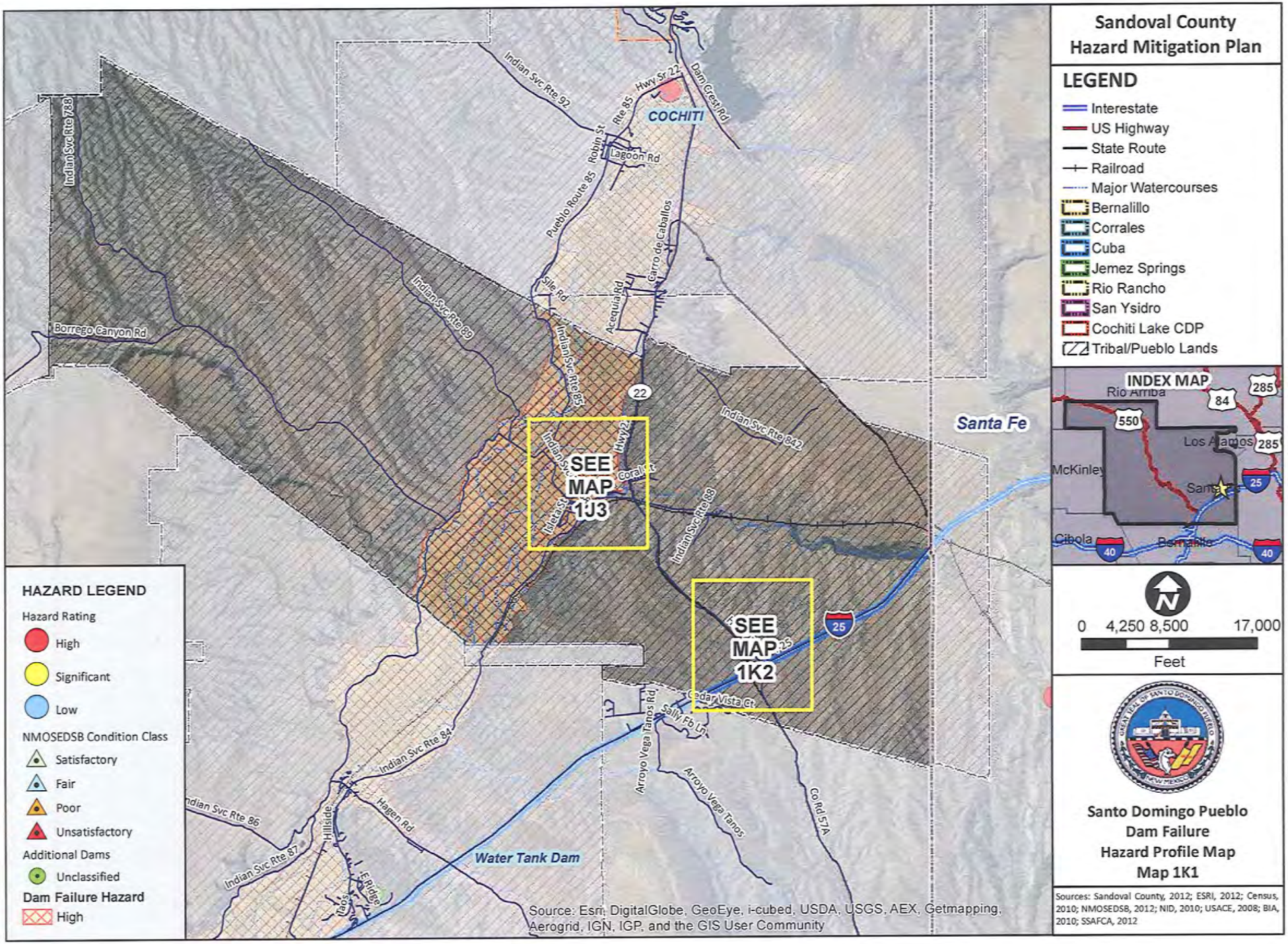

HAZARD LEGEND
Hazard Rating
High
Significant
Low
NMOSEDSB Condition Class
Satisfactory
Fair
Poor
Unsatisfactory
Additional Dams
Unclassified
Dam Failure Hazard
High
Sandoval County
Hazard Mitigation Plan
LEGEND
Interestate
US Highway
State Route
Railroad
Major Watercourses
Bernalillo
Corrales
Cuba
Jemez Springs
Rio Rancho
San Ysidro
Cochiti Lake CDP
Tribal/Pueblo Lands
INDEX MAP
Rio Arriba
McKinley
Los Alamos
Cibola
Torrance
285
84
550
25
40
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
Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, and the GIS User Community
Hwy 4
San Ysidro Ln
Indian Svc Rte 81
Indian Svc Rte 79
Castle Pl
Silva Ave
Ave San Luiz
Manuelita Garcia Ln
550
4

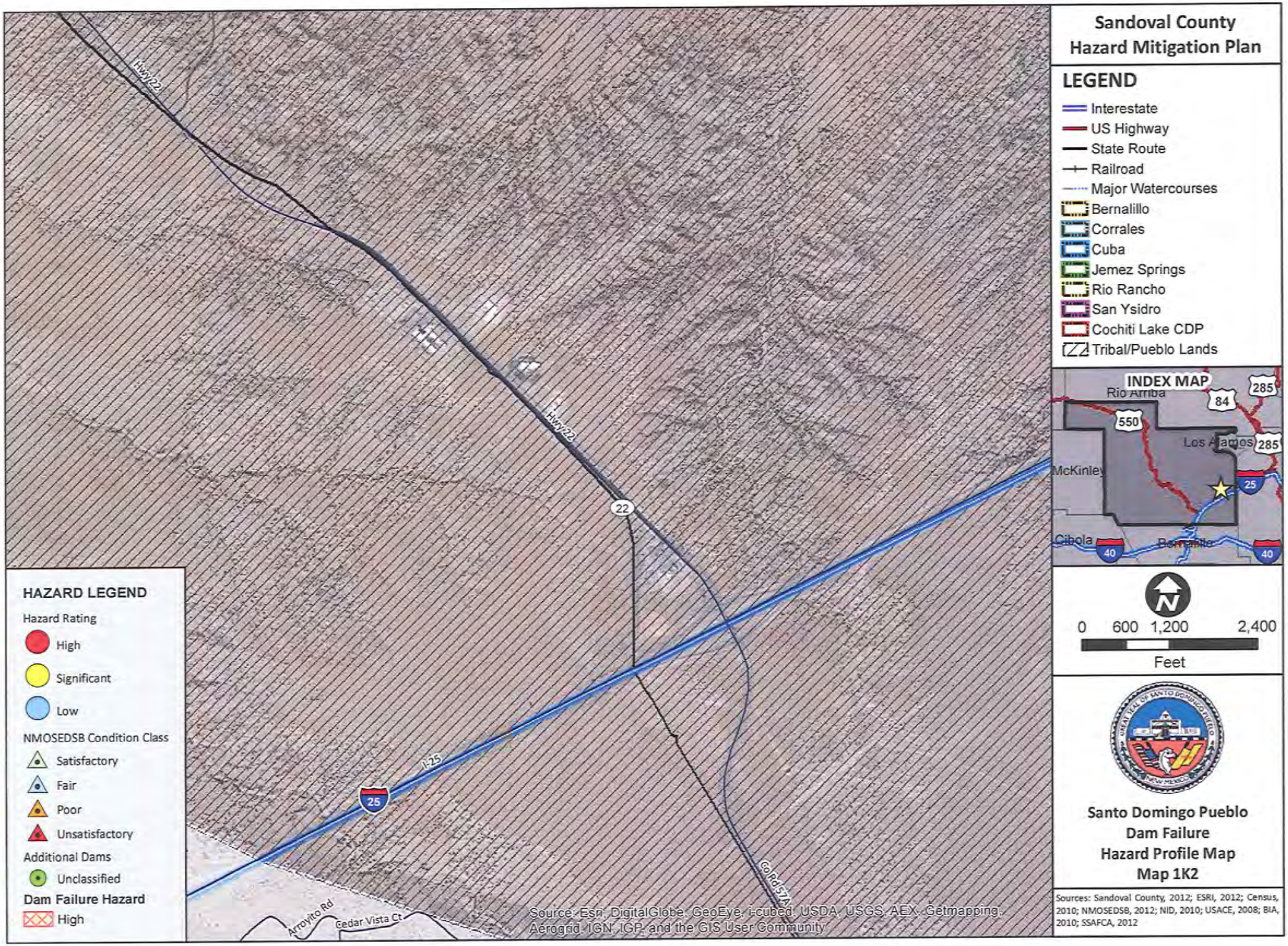

HAZARD LEGEND
Hazard Rating
High
Significant
Low
NMOSEDSB Condition Class
Satisfactory
Fair
Poor
Unsatisfactory
Additional Dams
Unclassified
Dam Failure Hazard
High
SEE MAP 1J4
SEE MAP 1J3
SEE MAP 1J2
Sandia Pueblo Dams 82-1 thru 82-4
Bernalillo
Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, 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
Bernalillo
0 2,375 4,750 9,500
Feet
PUEBLO OF SANDIA
Sandia Pueblo
Dam Failure
Hazard Profile Map
Map 1J1
Sources: Sandoval County, 2012; ESRI, 2012; Census, 2010; NMOSEDSB, 2012; NID, 2010; USACE, 2008; BIA, 2010; SSAFCA, 2012

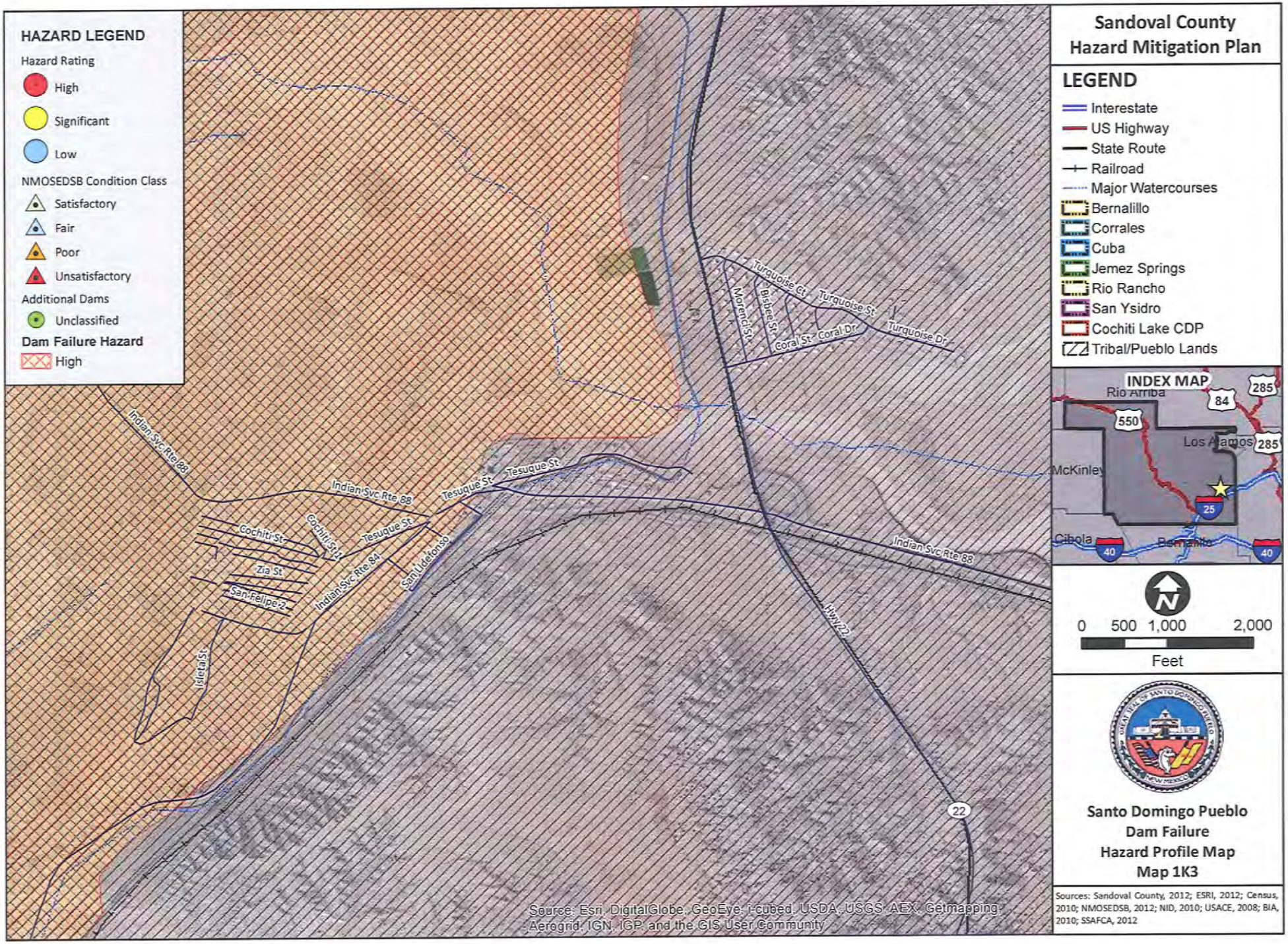

HAZARD LEGEND
Hazard Rating
High
Significant
Low
NMOSEDSB Condition Class
Satisfactory
Fair
Poor
Unsatisfactory
Additional Dams
Unclassified
Dam Failure Hazard
High
El Camino Real
S Santa Fe Trl
313
47
556
Bernalillo
Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, 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
84
285
550
Los Alamos
285
McKinley
25
Cibola
40
Bernalillo
40
0 300 600 1,200
Feet
PUEBLO OF SANDIA
Sandia Pueblo
Dam Failure
Hazard Profile Map
Map 1J2
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
Unclassified
Dam Failure Hazard
High
Acequia Rd
St Anthony Loop
Baca's Farm Rd
N Santa Fe Trl
Tribal Route 701
Sandia Day School Rd
Sandia Loop
Sunset Rd
Rainbow St
Sandia Plz
Sun Hill St
Kuaua St
Parrot Blvd
Tribal Route 72
Sandia Loop
el Camino Real
Sandia Loop
Lauriano Dr
White Cloud Loop
S Santa Fe Trl
313
Bluewater Pl
Morningstar Dr
I-25
25
Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, 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
84
285
550
Los Alamos
285
McKinley
25
Cibola
40
40
0 300 600 1,200
Feet
PUEBLO OF SANDIA
Sandia Pueblo
Dam Failure
Hazard Profile Map
Map 1J3
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
Unclassified
Dam Failure Hazard
High
Basketflower Blvd
Salt Cedar Ct
Cll de la Angel
Ave Encantada
Don Papa
Cll Barrio Nuevo
Barrio Nuevo
Cll del Banco
Beehive Ln
Cam Don Carlos
Cll Laguna
Banco Ct
Cll Raquela
Cam Isabella
Cll Chaparral
Cll Los Mayores
Lazo Escondido Rd
Maria Elena Cir
Rotary Park Rd
Bosque Loop
Perez Ln
Autumn Sage Ln
E Canal Rd
el Dorado Rd
Sawmill Rd
Mahogany Rd
Cll Palo Verde
Maple St
Cll Mesquite
Bosque Sereno Dr
Cuerno Ln
Rinaldi Pl
W Ave Bernalillo
Los Pinos Rd
Guadalupe Rd
Grullas en el Bosque
Cll del Bosque
Cll Al Arnito
Cam del Bosque
Timber Rd
Cll Madera
San Lorenzo
Cll San Lorenzo
San Ysidro St
Cll Vista Grande
Cll del Camino
Casa Nueva Ct
Cll Placitas
Cll San Ysidro
la Casita Ct
W Canal Rd
Acosta Ln
Academy Dr
Denny Rd
Cll Industrial
Hwy 313
313
S Oak St
Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, 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
285
84
550
Los Alamos
285
McKinley
25
Cibola
Bernalillo
40
40
0 300 600 1,200
Feet
PUEBLO OF SANDIA
Sandia Pueblo
Dam Failure
Hazard Profile Map
Map 1J4
Sources: Sandoval County, 2012; ESRI, 2012; Census, 2010; NMOSEDSB, 2012; NID, 2010; USACE, 2008; BIA, 2010; SSAFCA, 2012


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
Santa Fe
Bernalillo
0 4,250 8,500 17,000
Feet
HAZARD LEGEND
Hazard Rating
High
Significant
Low
NMOSEDSB Condition Class
Satisfactory
Fair
Poor
Unsatisfactory
Additional Dams
Unclassified
Dam Failure Hazard
High
SEE MAP 1J3
SEE MAP 1K2
COCHITI
Water Tank Dam
Indian Svc Rte 92
Hwy 22
Dam Crest Rd
Indian Svc Rte 788
Robin St
Rte 85
Lagoon Rd
Pueblo Route 85
Garro de Caballos
Borrego Canyon Rd
Indian Svc Rte 89
Sile Rd
Acequia Rd
Indian Svc Rte 85
Indian Svc Rte 842
Indian Svc Rte 88
Coral Ct
Cedar Vista Ct
Sally Fe Ln
Arroyo Vega Tanos Rd
Arroyo Vega Tanos
Co Rd 57A
Indian Svc Rte 84
Indian Svc Rte 86
Indian Svc Rte 87
Hillside
Hagen Rd
E Ridge
Taos
Santo Domingo Pueblo
Dam Failure
Hazard Profile Map
Map 1K1
Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, and the GIS User Community
Sources: Sandoval County, 2012; ESRI, 2012; Census, 2010; NMOSEDSB, 2012; NID, 2010; USACE, 2008; BIA, 2010; SSAFCA, 2012


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
285
84
550
25
40
HAZARD LEGEND
Hazard Rating
High
Significant
Low
NMOSEDSB Condition Class
Satisfactory
Fair
Poor
Unsatisfactory
Additional Dams
Unclassified
Dam Failure Hazard
High
Hwy 22
I-25
Arroyito Rd
Cedar Vista Ct
Co Rd 57A
0 600 1,200 2,400
Feet
Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, and the GIS User Community
Santo Domingo Pueblo
Dam Failure
Hazard Profile Map
Map 1K2
Sources: Sandoval County, 2012; ESRI, 2012; Census, 2010; NMOSEDSB, 2012; NID, 2010; USACE, 2008; BIA, 2010; SSAFCA, 2012



Sandoval County Hazard Mitigation Plan

LEGEND

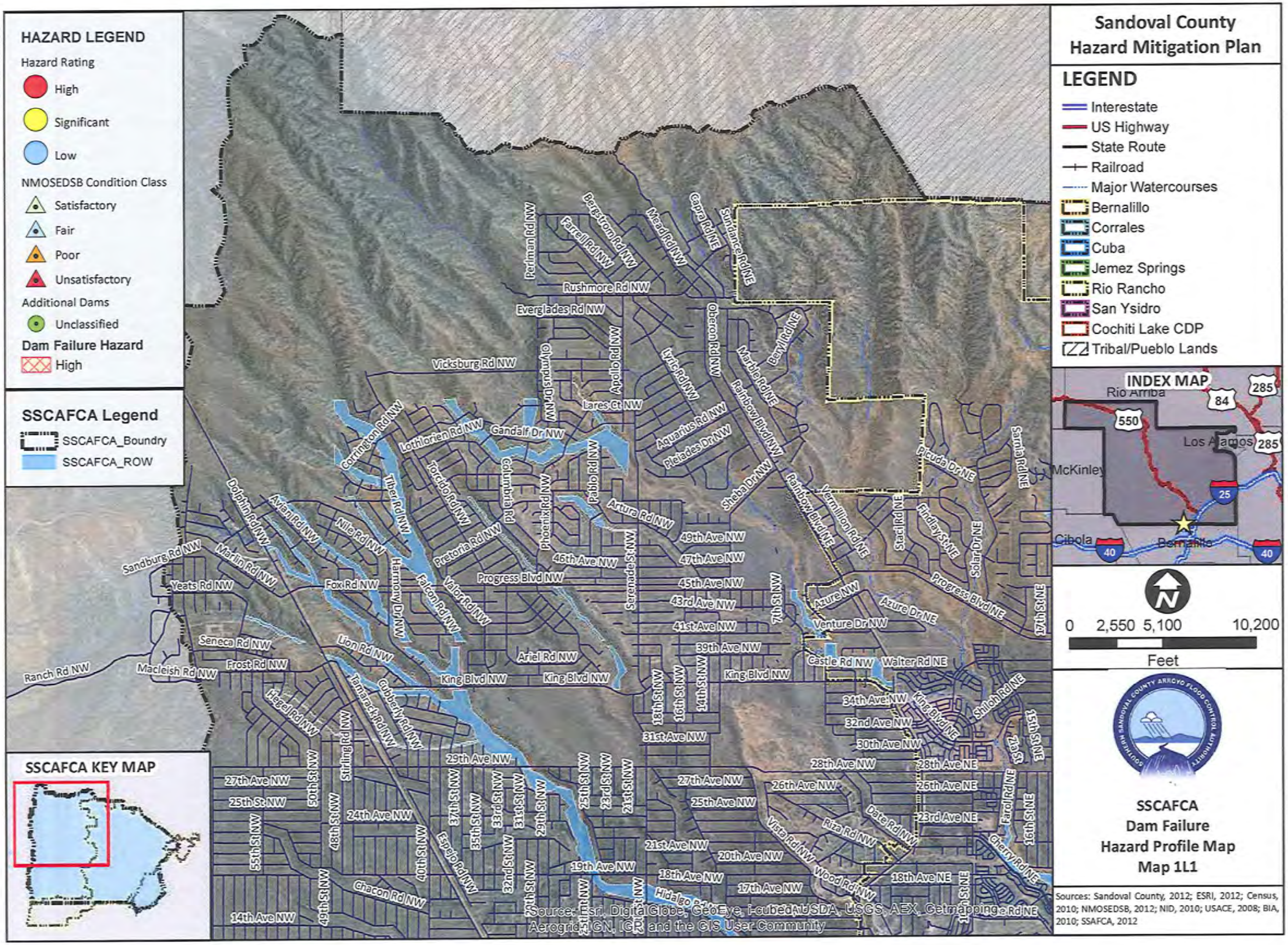
- Interestate
- US Highway
- State Route
- Railroad
- Major Watercourses
- Bernalillo
- Corrales
- Cuba
- Jemez Springs
- Rio Rancho
- San Ysidro
- Cochiti Lake CDP
- Tribal/Pueblo Lands

0 500 1,000 2,000

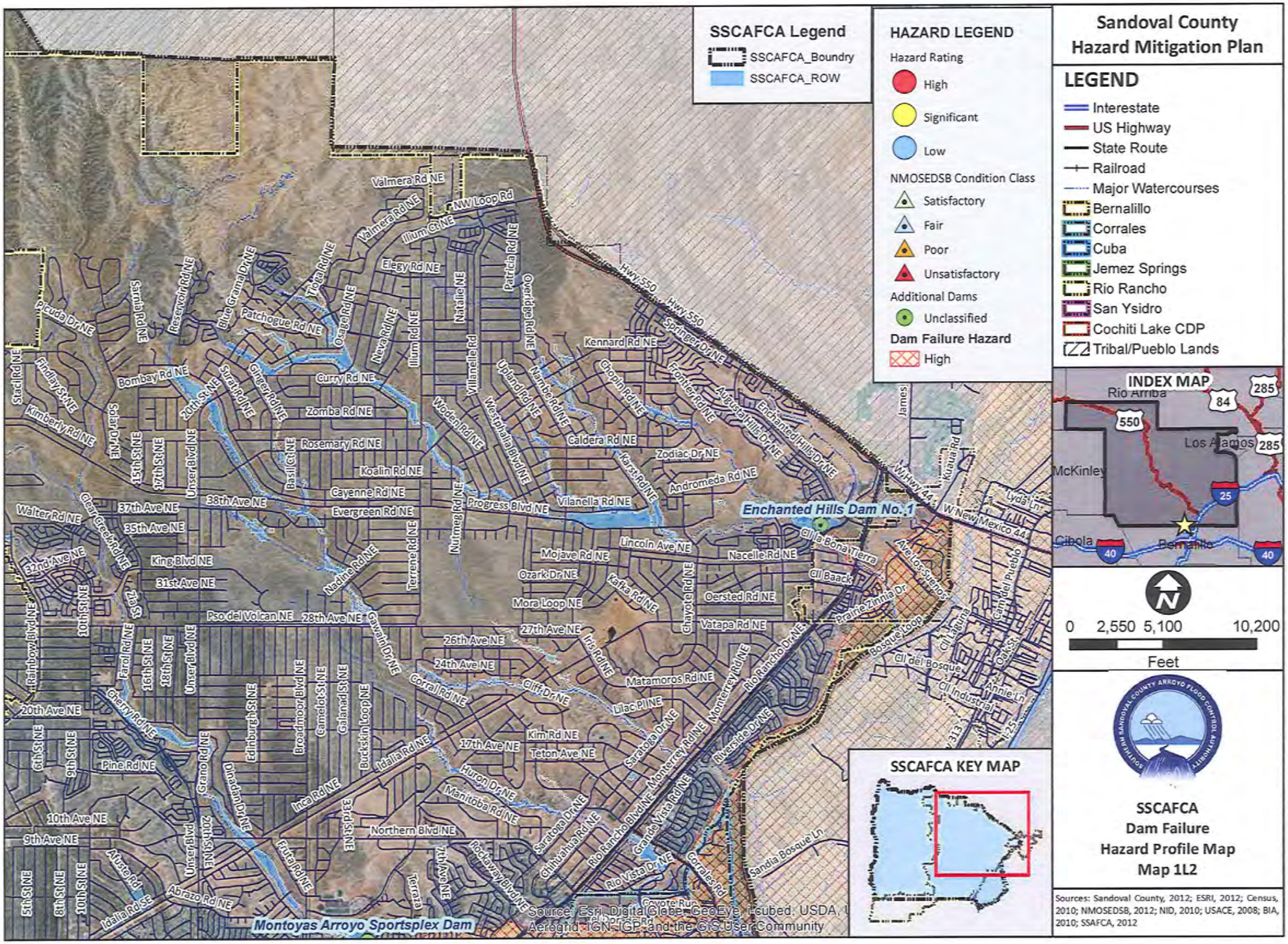
Feet

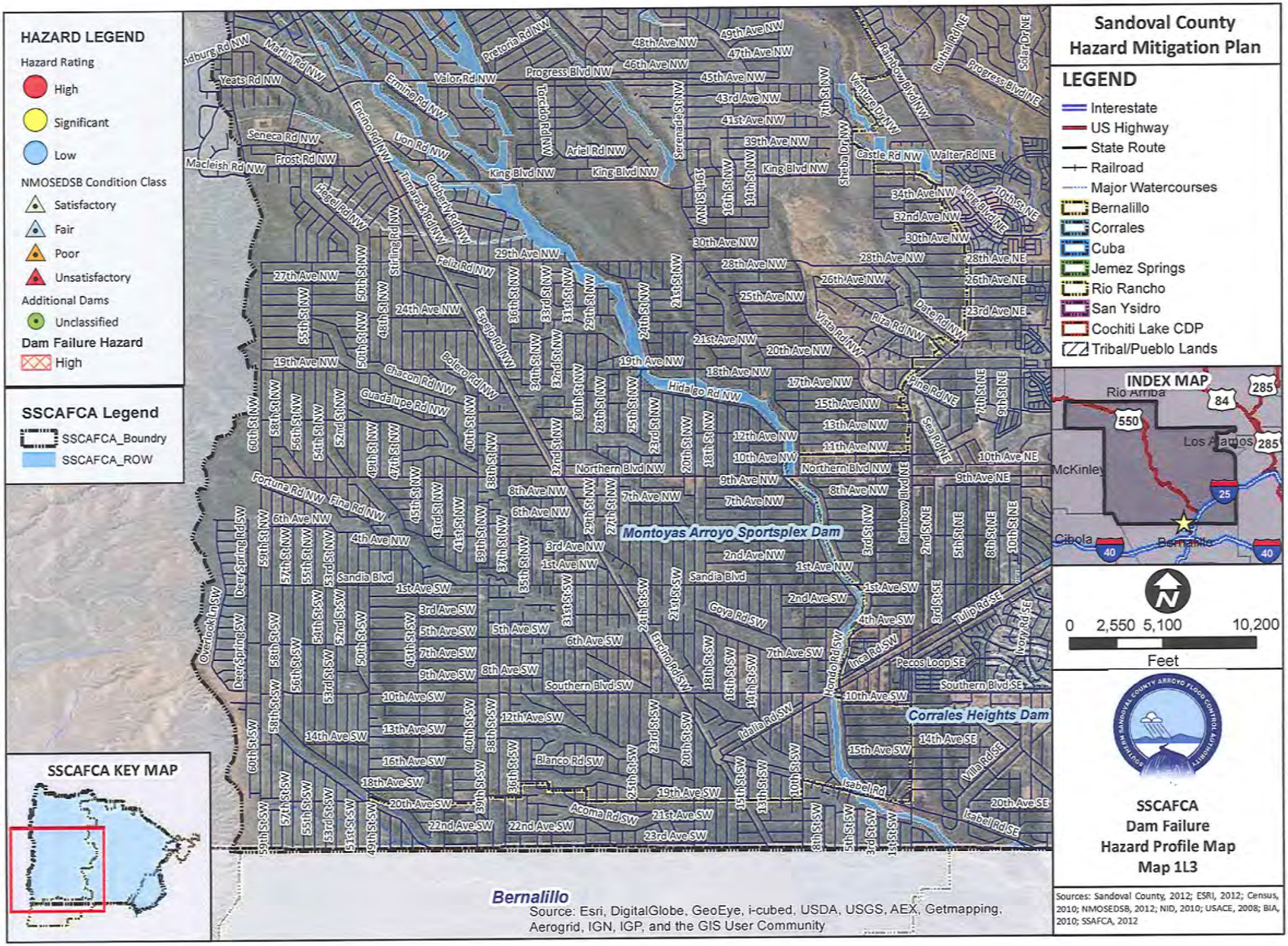
Santo Domingo Pueblo
Dam Failure
Hazard Profile Map
Map 1K3

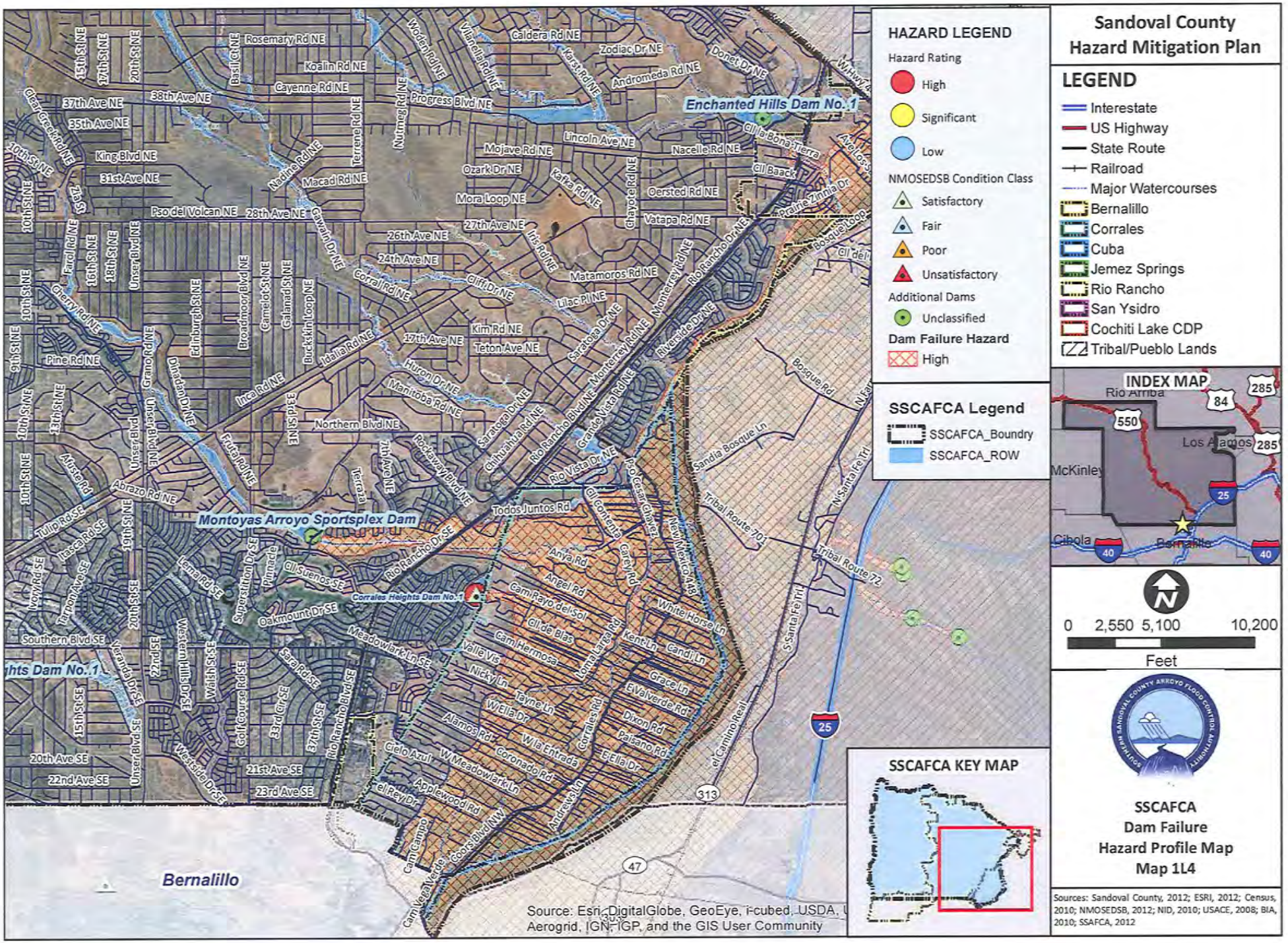
Sources: Sandoval County, 2012; ESRI, 2012; Census, 2010; NMOSEDSB, 2012; NID, 2010; USACE, 2008; BIA, 2010; SSAFCA, 2012



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
550
84
285
25
40
0 2,550 5,100 10,200
Feet
SSCAFCA
Dam Failure
Hazard Profile Map
Map 1L1
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
Unclassified
Dam Failure Hazard
High
SSCAFCA Legend
SSCAFCA_Boundry
SSCAFCA_ROW
SSCAFCA KEY MAP
Perlman Rd NW
Bergstrom Rd NW
Farrell Rd NW
Mead Rd NW
Capra Rd NE
Sundance Rd NE
Rushmore Rd NW
Everglades Rd NW
Oberon Rd NW
Beryl Rd NE
Marble Rd NE
Vicksburg Rd NW
Olympus Dr NW
Apollo Rd NW
Lyric Rd NW
Rainbow Blvd NW
Lares Ct NW
Aquarius Rd NW
Pleiades Dr NW
Corrington Rd NW
Lothlorien Rd NW
Gandalf Dr NW
Torcido Rd NW
Columbia Rd
Phoenix Rd NW
Pablo Rd NW
Sheba Dr NW
Picuda Dr NE
Sarnia Rd NE
Dolphin Rd NW
Avian Rd NW
Nile Rd NW
Tiber Rd NW
Pretoria Rd NW
Artura Rd NW
Rainbow Blvd NE
Vermillion Rd NE
Stacl Rd NE
Findlay St NE
Solar Dr NE
Sandburg Rd NW
Marlin Rd NW
Harmony Dr NW
Falcon Rd NW
Valor Rd NW
Progress Blvd NW
46th Ave NW
Serenade St NW
49th Ave NW
47th Ave NW
45th Ave NW
43rd Ave NW
41st Ave NW
39th Ave NW
7th St NW
Azure NW
Azure Dr NE
Progress Blvd NE
17th St NE
Yeats Rd NW
Fox Rd NW
Venture Dr NW
Seneca Rd NW
Lion Rd NW
Ariel Rd NW
Castle Rd NW
Walter Rd NE
Ranch Rd NW
Macleish Rd NW
Frost Rd NW
King Blvd NW
18th St NW
16th St NW
14th St NW
Hegel Rd NW
Stirling Rd NW
Tamarack Rd NW
Cubberly Rd NW
34th Ave NW
32nd Ave NW
30th Ave NW
King Blvd NE
Shiloh Rd NE
15th St NE
Zia St
31st Ave NW
29th Ave NW
28th Ave NW
28th Ave NE
27th Ave NW
50th St NW
25th St NW
23rd St NW
21st St NW
26th Ave NW
26th Ave NE
25th Ave NW
24th Ave NW
37th St NW
35th St NW
33rd St NW
31st St NW
29th St NW
Date Rd NW
23rd Ave NE
Farol Rd NE
16th St NE
55th St NW
48th St NW
40th St NW
Espejo Rd NW
Vista Rd NW
Riza Rd NW
21st Ave NW
20th Ave NW
Cherry Rd NE
19th Ave NW
18th Ave NW
17th Ave NW
Wood Rd NW
18th Ave NE
Chacon Rd NW
49th St NW
32nd St NW
14th Ave NW
Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, 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
McKinley
Los Alamos
Cibola
Bernalillo
550
84
285
25
40
SSCAFCA Legend
SSCAFCA_Boundry
SSCAFCA_ROW
HAZARD LEGEND
Hazard Rating
High
Significant
Low
NMOSEDSB Condition Class
Satisfactory
Fair
Poor
Unsatisfactory
Additional Dams
Unclassified
Dam Failure Hazard
High
Enchanted Hills Dam No. 1
Montoyas Arroyo Sportsplex Dam
Hwy 550
W Hwy 44
W New Mexico 44
0 2,550 5,100 10,200
Feet
SSCAFCA KEY MAP
SSCAFCA
Dam Failure
Hazard Profile Map
Map 1L2
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
Unclassified
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
84
285
550
25
40
0 2,550 5,100 10,200
Feet
SSCAFCA
Dam Failure
Hazard Profile Map
Map 1L3
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
Sources: Sandoval County, 2012; ESRI, 2012; Census, 2010; NMOSEDSB, 2012; NID, 2010; USACE, 2008; BIA, 2010; SSAFCA, 2012


Sandoval County
Hazard Mitigation Plan
HAZARD LEGEND
Hazard Rating
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Satisfactory
Fair
Poor
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Additional Dams
Unclassified
Dam Failure Hazard
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SSCAFCA Legend
SSCAFCA_Boundry
SSCAFCA_ROW
LEGEND
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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 KEY MAP
SSCAFCA
Dam Failure
Hazard Profile Map
Map 1L4
Enchanted Hills Dam No. 1
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
Sources: Sandoval County, 2012; ESRI, 2012; Census, 2010; NMOSEDSB, 2012; NID, 2010; USACE, 2008; BIA, 2010; SSAFCA, 2012

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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, 2010):

- **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 1995 and 2007, there were four state declared disasters for effects related to drought (NMDHSEM, 2010). The declarations, made in May 1996, May 2000, June 2002, and March 2006, were primarily for loss/conservation of domestic drinking water. The total direct cost incurred by the State for that time period was $279,459; however, indirect costs were estimated to be between $50-100 Million. In May 2012, the Governor of New Mexico issued the fifth drought state of emergency declaration, which authorized the continuation of the New Mexico Drought Task Force (NMDTF) for an additional two years and directed the State Engineer to convene the NMDTF to perform drought related assessments and make recommendation for intermediate and long-term strategies to mitigate drought conditions and impacts in the state.

Sandoval County was also included in USDA natural disaster declarations for drought and high winds in May 2006, August 2008, July 2011 and August 2012. For the period of 1995 to 2011, Sandoval County farmers and ranchers received approximately $1.95 million in USDA disaster payments and subsidies (EWG, 2012). Of those, approximately $1.0 million were for livestock assistance and the rest for crop assistance. There is no data to directly correlate the disaster assistance to drought, however, given the USDA declarations previously listed, and the fact that County farmers and ranchers were also eligible for assistance under several other USDA declarations for contiguous counties, it seems reasonable to assume that at least a portion of the funds were for drought related impacts.

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 2011. A significant period of below normal precipitation for the County occurred between 1950 and 1957. Over the last 10 years of data, the average precipitation has been significantly below normal for the majority of the period.

Probability and Magnitude

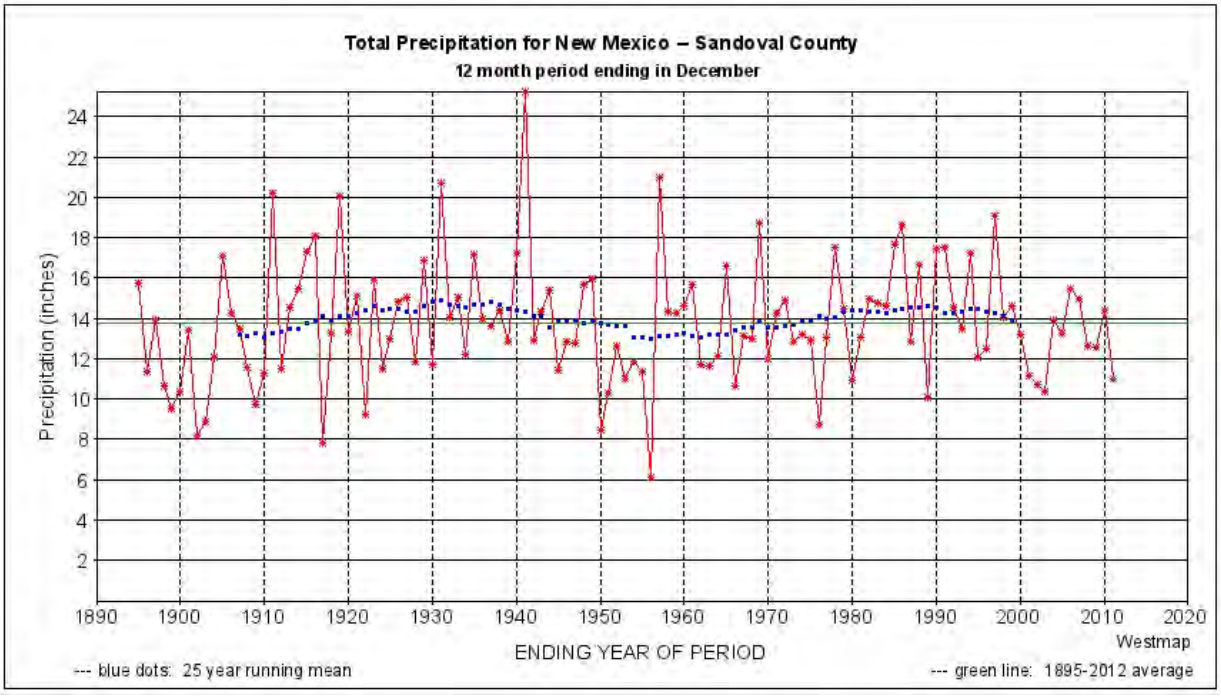
There are no commonly accepted return period or non-exceedance probabilities for defining the risk from drought (such as the 100-year or 1% annual chance of flood). The magnitude of drought is usually measured in time and the severity of the hydrologic deficit. There are several resources available to 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[33] 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. The August 7, 2012 drought intensity for the majority of the County is estimated to be a D1 or Moderate Drought. The extreme southern strip is estimated to be a D2 or Severe Drought.

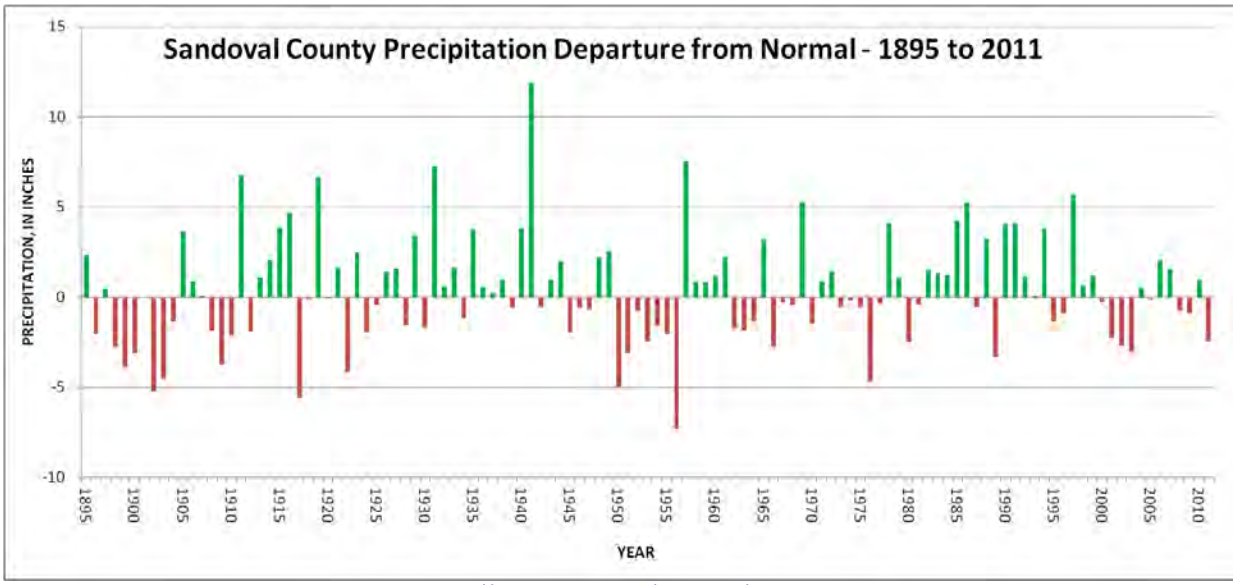
[33] NIDIS U.S. Drought Portal website is located at: http://www.drought.gov/portal/server.pt/community/drought.gov/202

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 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.



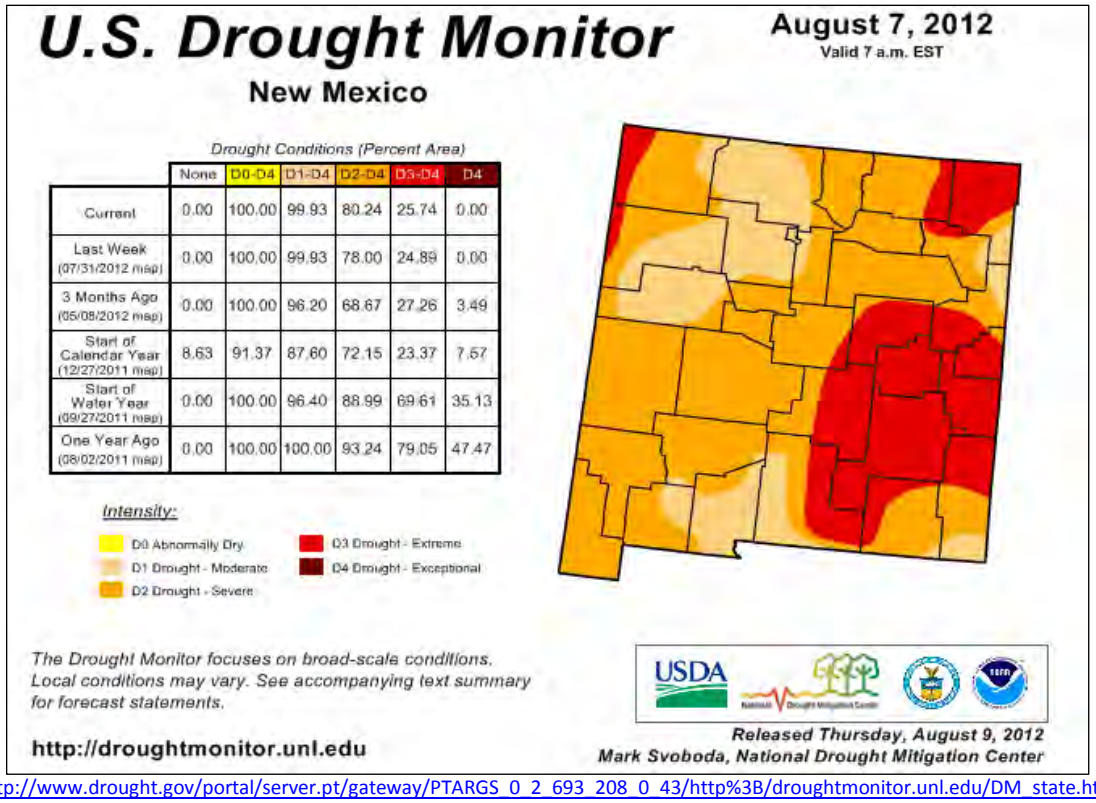
Source: WRCC, 2012, URL at: http://www.cefa.dri.edu/Westmap/Westmap_home.php?page=timeseries.php

Figure 3-1: Annual precipitation variances from average and running mean based on 1895-2012 period.



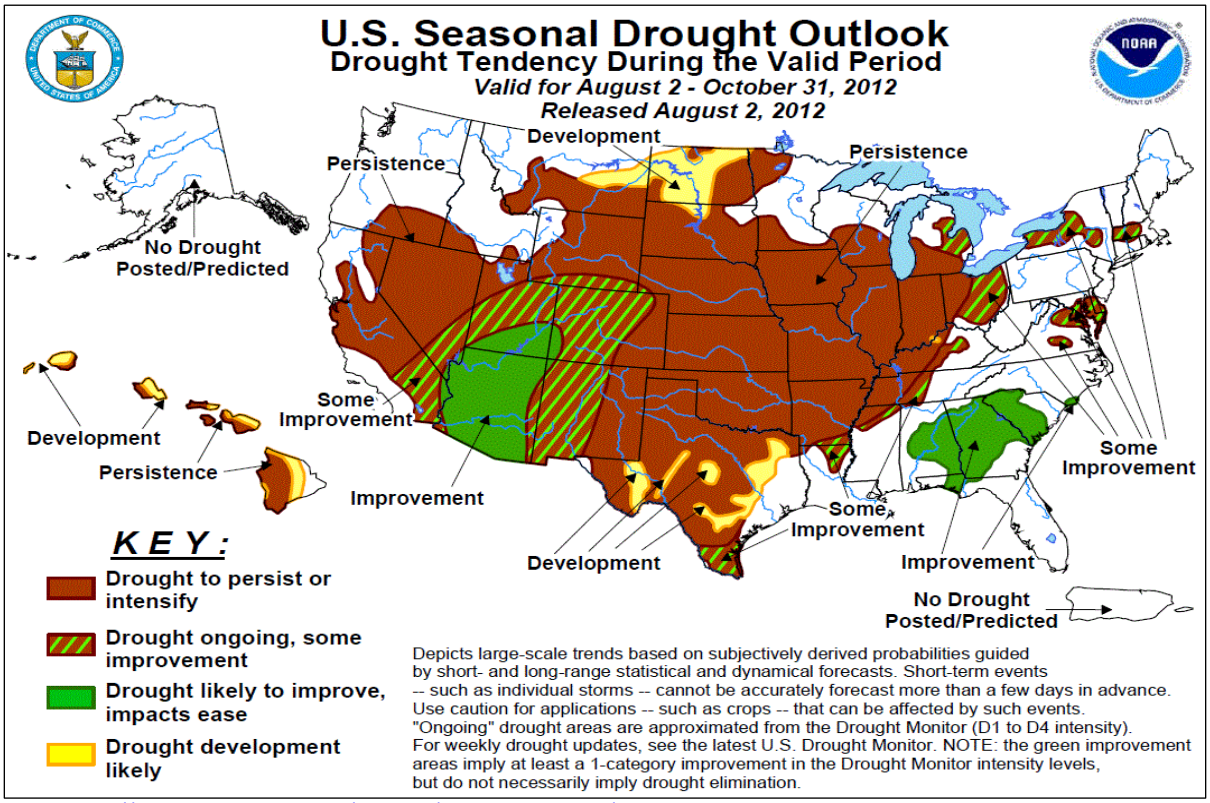
Data Source: JEF, 2012 and WRCC, 2012, URL at: http://www.cefa.dri.edu/Westmap/Westmap_home.php?page=timeseries.php

Figure 3-2: Average annual precipitation variances from a normal based on 1895 to 2011 period



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

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.

Governor Bill Richardson created the current New Mexico Drought Task Force by Executive Order 2003-019 in the spring of 2003 (NMDTF) to oversee the implementation of drought-related activities in the State of New Mexico. The twelve-member Task Force is chaired by the State Engineer and includes Cabinet Secretaries from the Energy, Minerals and Natural Resources Department, Department of Environment, Department of Finance and Administration, Department of Agriculture, Department of Indian Affairs, Department of Tourism, and Economic Development Department; Executive Director of the New Mexico Finance Authority; Directors of the Interstate Stream Commission and the Office of Emergency Management of DPS; and the Director of Policy and Planning from the Office of the Governor. The history of the Drought Task force goes back to 1996, when Governor Gary Johnson created the NMDTF by Executive Order, with an original five-member Task Force chaired by the Cabinet Secretary of Energy, Minerals and Natural Resources and further comprise of three Cabinet Secretaries, the State Engineer, and a representative from the Office of the Governor. The New Mexico Drought Plan, Volumes I and II, were published in 2002 under Governor Johnson's leadership. This Task Force acts as a liaison between the drought work groups and the Office of the Governor. The NMDTF also assumes the lead role in intergovernmental drought response coordination and media information releases. The last update to the New Mexico Drought Plan was in 2006 and the task force's last report was released in August 2008. New quarterly reports are expected following the May 2012 gubernatorial declaration and directives.

Vulnerability – CPRI Results

Drought CPRI results for each community are summarized in Table 3-8 below.

Table 3-8: 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
Sandia, Pueblo of	Likely	Limited	> 24 hours	> 1 week	2.50
Santo Domingo, Pueblo of	Possible	Negligible	> 24 hours	> 1 week	1.75
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 =	**2.77**

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 with expectations of continuance with some improvement over the next two months (August to October, 2012). Therefore, 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

New Mexico Department of Homeland Security and Emergency Management, 2010, *New Mexico Natural Hazard Mitigation Plan,* approved October 2007, updated September 2010.

Environmental Working Group's Farm Subsidy Database, 2012, http://farm.ewg.org/progdetail.php?fips=35043&progcode=total_dis&yr=mtotal

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

National Integrated Drought Information System, 2007, *National Integrated Drought Information System Implementation Plan*, NOAA.

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

NOAA, NWS, Climate Prediction Center, 2012, website located at: http://www.cpc.ncep.noaa.gov/products/expert_assessment/seasonal_drought.html

Western Regional Climate Center, WestMap Application, URL at: http://www.cefa.dri.edu/Westmap/Westmap_home.php?page=timeseries.php

Profile Maps

See Figures 3-3 and 3-4 for depictions of the current and anticipated drought conditions for the county.

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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, and 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 3-2. Sandoval County has been a declared county in five flood related presidential disaster declarations as follows:

Disaster	Declaration Date	Incident Type	Incident Period
FEMA-DR-353	September 20, 1972	Heavy Rains, Flooding	Late Summer 1972
FEMA-DR-380	May 11, 1973	Severe Storms, Snowmelt, Flooding	Spring 1973
FEMA-DR-1301	September 22, 1999	Severe Storms and Flooding	July 16, 1999 to August 7, 1999
FEMA-DR-1659	August 30, 2006	Severe Storms and Flooding	July 26, 2006 to September 18, 2006
FEMA-DR-4047	November 23, 2011	Flooding	August 19-24, 2011

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

- In August-September 2006, a series of summer storms caused significant flooding throughout Sandoval County and much of the rest of New Mexico, resulting in federal disaster declaration (FEMA-DR-1659) for most of the state. Strong and slow moving thunderstorms produced heavy rains of 2 to 3 inches in less than an hour

across southern Sandoval County. A bridge of large culverts over Las Huertas Creek was washed out stranding residents in Placitas. Heavy runoff into neighborhoods across northwest and northeast Rio Rancho destroyed recent dirt road repairs that followed the damaging flood of late June. The water again reclaimed the arroyo channels in the Rio Oso Road area that had been filled during neighborhood development. These fresh channels were even deeper than in the June event. Placitas damages were estimated at $100,000 and the Rio Rancho damages were estimated at $700,000. (NCDC, 2012; City of Rio Rancho, 2012)

- In August 2006, a heavy rain of one inch in 35 minutes occurred on the heels of prior events in a saturated watershed. The resultant flooding wiped out the road repairs along Rio Oso Road in eastern Rio Rancho leaving 6 to 10 foot gullies and again exposing water and electric lines buried in the road which runs in an old arroyo channel. Total damages throughout the City of Rio Rancho were estimated to exceed $2 million. (NCDC, 2012; City of Rio Rancho, 2012)
- In August 2008, a southerly flow of moist, unstable air poured into New Mexico, causing a few reports of flash flooding and large hail around the towns of Albuquerque and Bernalillo, and in the Jemez Mountains. Homes along State Route 4 were flooded within the Jemez Pueblo. Water and debris poured onto U.S. route 550 at mile marker 48 near the Dragon Fly area and a portion of State Route 4 at mile marker 10 was washed away. Collective damages for the storm were estimated to exceed $25,000. (NCDC, 2012)
- In Late August 2010, nearly 2 inches of rain fell across portions of northwest Rio Rancho. The intersection of Northern and Idalia was closed due to flash flooding. Unser Road was closed, but not before several cars got stuck in the high waters. A sewer line was also damaged, which allowed 250,00-600,000 gallons of raw sewage to flow into the Montoya's Arroyo. Montoyas Arroyo also widened by 60'-80' in some areas. Additional damages were reported elsewhere in the Montoyas watershed, at Canyon Park in North Hills, and at two schools. Damages were estimated at $600,000 for Rio Rancho.
- In August 2011, a series of summer storms caused significant flooding throughout Sandoval and Cibola Counties, resulting in a federally declared disaster (FEMA-DR-4047). Major flash flooding ensued after an estimated 3 to 4 inches of rain fell across the southern portion of the Las Conchas burn scar on August 21st. Flooding in Frijoles Creek caused damage in and around Bandelier National Monument. Two barrier walls around the Visitors Center were overtopped and the septic system lift station was inundated with water. Major flooding was also reported in Peralta Canyon around Kasha Katuwe (Tent Rocks) National Monument. Damage was reported to the access road as well as other local roads. Along and downstream of Cochiti Canyon sustained the most damage from flood waters. Flows were reported to be 8 to 10 feet high when they reached Dixon's Apple Orchard. The flood waters damaged the owners personal residence, inundated the main storage facility with 10 feet of mud and debris, moved a semi-truck approximately 200 yards and destroyed approximately 10 percent of the apple orchard. The water also wiped out a 50 yard long 4 foot by 4 foot rock retaining wall that was built in 1942. During the August 22nd damage survey of the previous days flooding, abundant rain above Cochiti Canyon resulted in another, more devastating flood to Dixon's Apple

Orchard which was witness first hand by the NWS Albuquerque Warning Coordination Meteorologist. The force of the flow was estimated to be 3 times that of the previous days flood. At least 10 feet high, the width of the flood waters was approximately 100 yards wide. Another 20 to 40 percent more of the apple orchard was destroyed. Also, the main storage building that sustained damage in the previous days flood was wiped completely off its foundation. The semi-truck that moved 200 yards before was washed downstream and ended up in the Cochiti Lake Reservoir in pieces. Damage estimates from both days of flooding exceeded $10.8 million. (NCDC, 2012).

Several other flood related incidents are summarized in the historic hazard database provided in Appendix E and on the enclosed CD.

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) and 0.2% (500-year) probability floodplains delineated on FEMA Flood Insurance Rate Maps (FIRMs), plus any provisional floodplain delineations used for in-house purposes by participating jurisdictions or Planning Team delineated areas. 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 2L show the flood hazard areas for Bernalillo, Corrales, Jemez Springs, Rio Rancho, San Ysidro, Sandia Pueblo, Santo Domingo Pueblo and SSCAFCA.

Vulnerability – CPRI Results

Flooding CPRI results for each community are summarized in Table 3-9 below.

Table 3-9: 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
Sandia, Pueblo of	Likely	Catastrophic	< 6 hours	< 24 hours	3.35
Santo Domingo, Pueblo of	Likely	Limited	< 6 hours	> 1 week	2.95
SSCAFCA	Possible	Critical	< 6 hours	> 1 week	2.80
Unincorporated Sandoval County	Likely	Limited	< 6 hours	< 6 hours	2.65
				County-wide average CPRI =	**2.92**

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 3-11 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. The latest FEMA records provided by SCFD indicate that dated January 31, 2011 indicate that there are two RL properties within Sandoval County with a total of five loss incidents between them and a total of $131,000 paid in claims. Neither property is currently mitigated and both are located within a FEMA delineated SFHA (or HIGH flood hazard area). Options for accomplishing mitigation are being pursued by the SCFD in cooperation with the property owners.

Table 3-10: Sandoval County jurisdictional exposure and loss estimates due to flooding

FLOOD HAZARD EXPOSURE / LOSS	Bernalillo	Corrales	Jemez Springs	Rio Rancho	San Ysidro	Sandia, Pueblo of	Santo Domingo, Pueblo of	SSCAFCA	Uninc. Sandoval County	Total [1]
Total Critical Facilities and Infrastructure	**34**	**27**	**9**	**122**	**8**	**11**	**7**	**34**	**16**	**268**
Estimated Replacement Cost (x $1,000)	**$0** [2]	**$24,000**	**$10,275**	**$342,234**	**$2,550**	**$96,727**	**$61,200**	**$201,820**	**$56,850**	**$795,656**
Facilities Exposed to High Hazard	14	2	0	0	0	1	0	9	1	26
Percentage of Total Facilities	41.18%	7.41%	0.00%	0.00%	0.00%	0.82%	0.00%	26.47%	6.25%	17.81%
Estimated Replacement Cost (x $1,000)	$0	$1,000	$0	$0	$0	$106	$0	$91,660	$750	$93,410
Estimated Structure Loss (x $1,000)	$0	$200	$0	$0	$0	$21	$0	$18,332	$150	$18,682
Facilities Exposed to Medium Hazard	0	21	0	0	0	0	0	0	0	21
Percentage of Total Facilities	0.00%	77.78%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	14.38%
Estimated Replacement Cost (x $1,000)	$0	$19,000	$0	$0	$0	$0	$0	$0	$0	$19,000
Estimated Structure Loss (x $1,000)	$0	$950	$0	$0	$0	$0	$0	$0	$0	$950
Total Population	**8,307**	**8,231**	**278**	**87,444**	**165**	**907**	**3,255**	**n/a**	**14,140**	**131,564** [3]
Population Exposed to High Hazard	4,822	161	52	1,337	22	508	1		758	7,794
Percent Exposed	58.05%	1.95%	18.72%	1.53%	13.42%	56.06%	0.03%		5.36%	5.92%
Population Exposed to Medium Hazard	192	3,702	3	78	0	0	0		29	4,005
Percent Exposed	2.31%	44.98%	1.23%	0.09%	0.00%	0.00%	0.00%		0.21%	3.04%
Population Over 65	**1,113**	**1,600**	**83**	**9,437**	**30**	**95**	**240**	**n/a**	**2,353**	**15,880** [3]
Population Over 65 Exposed to High Hazard	597	29	14	121	4	56	0		122	958
Percent Exposed	53.65%	1.81%	16.33%	1.29%	13.27%	58.94%	0.01%		5.18%	6.04%
Population Over 65 Exposed to Medium Hazard	30	719	1	10	0	0	0		6	765
Percent Exposed	2.69%	44.92%	0.69%	0.10%	0.00%	0.00%	0.00%		0.24%	4.81%
Residential Building Count Totals	**3,215**	**3,765**	**174**	**33,927**	**83**	**348**	**666**	**n/a**	**7,486**	**52,287**
Estimated Replacement Cost (x $1,000)	**$622,530**	**$2,222,247**	**$40,712**	**$10,178,234**	**$18,694**	**$69,431**	**$122,220**	**n/a**	**$2,799,780**	**$16,073,849**

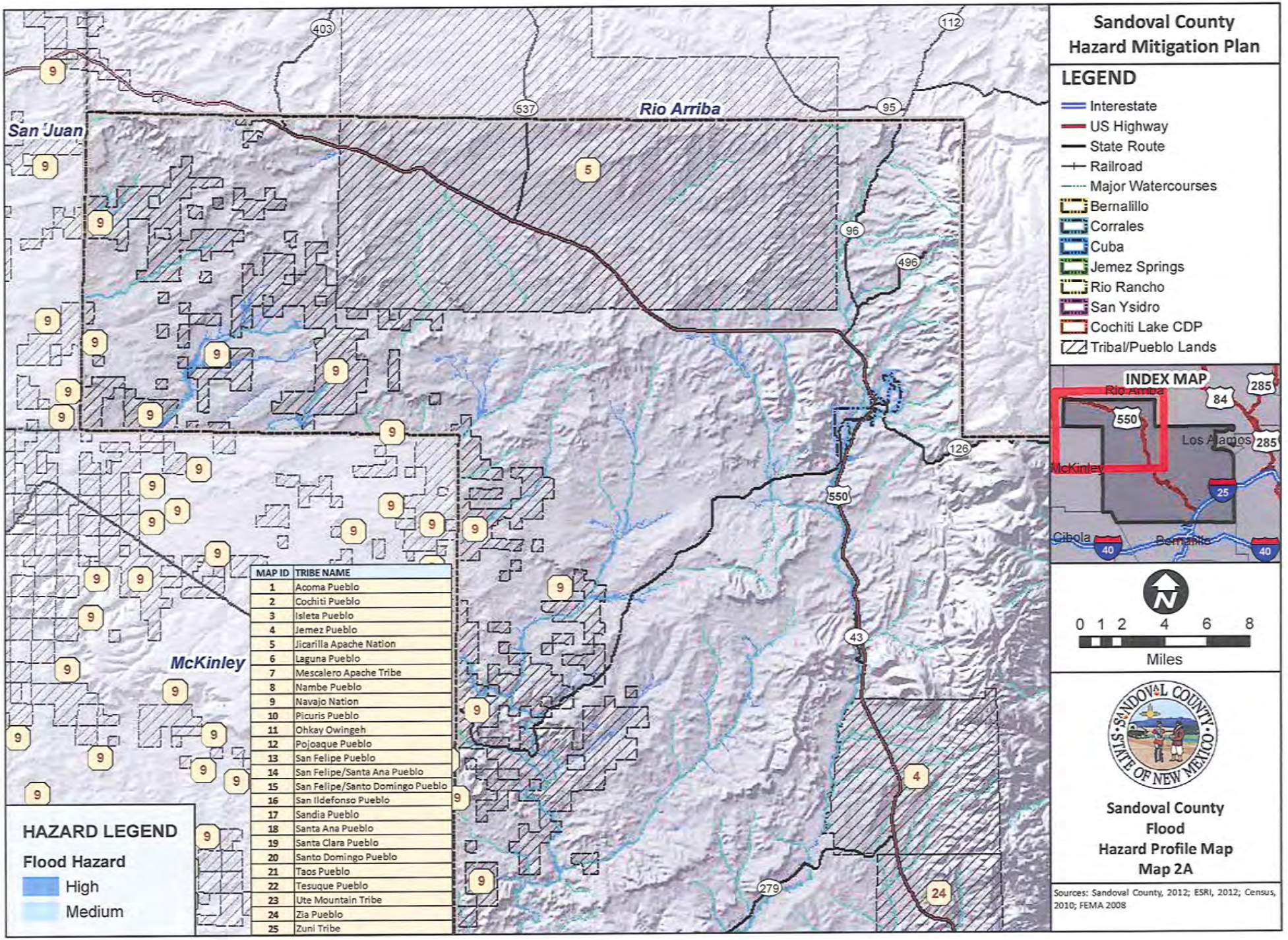
[1] Note that totals reported here are totals for the participating communities only.

[2] Bernalillo did not provided replacement costs for any CFI.

[3] Populations are countywide totals

Table 3-10: Sandoval County jurisdictional exposure and loss estimates due to flooding

FLOOD HAZARD EXPOSURE / LOSS	Bernalillo	Corrales	Jemez Springs	Rio Rancho	San Ysidro	Sandia, Pueblo of	Santo Domingo, Pueblo of	SSCAFCA	Uninc. Sandoval County	Total [1]
Residential Bldgs Exposed to High Hazard	1,897	77	30	515	12	185	0	n/a	406	3,123
Percentage of Total Residential Bldgs	59.02%	2.05%	17.27%	1.52%	14.14%	53.18%	0.02%	n/a	5.42%	6.29%
Estimate Exposed Replacement Cost (x $1,000)	$353,907	$42,998	$6,776	$154,649	$2,643	$33,361	$37	n/a	$149,005	$743,376
Estimated Residential Structure Loss (x $1,000)	$70,781	$8,600	$1,355	$30,930	$529	$6,672	$7	n/a	$29,801	$148,675
Residential Bldgs Exposed to Medium Hazard	79	1,693	2	29	0	0	0	n/a	13	1,816
Percentage of Total Residential Bldgs	2.46%	44.96%	1.00%	0.09%	0.00%	0.00%	0.00%	n/a	0.18%	3.66%
Estimated Exposed Replacement Cost (x $1,000)	$14,688	$1,160,113	$391	$8,766	$0	$0	$0	n/a	$8,683	$1,192,641
Estimated Residential Structure Loss (x $1,000)	$734	$58,006	$20	$438	$0	$0	$0	n/a	$434	$59,632



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

0 1 2 4 6 8

Miles

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

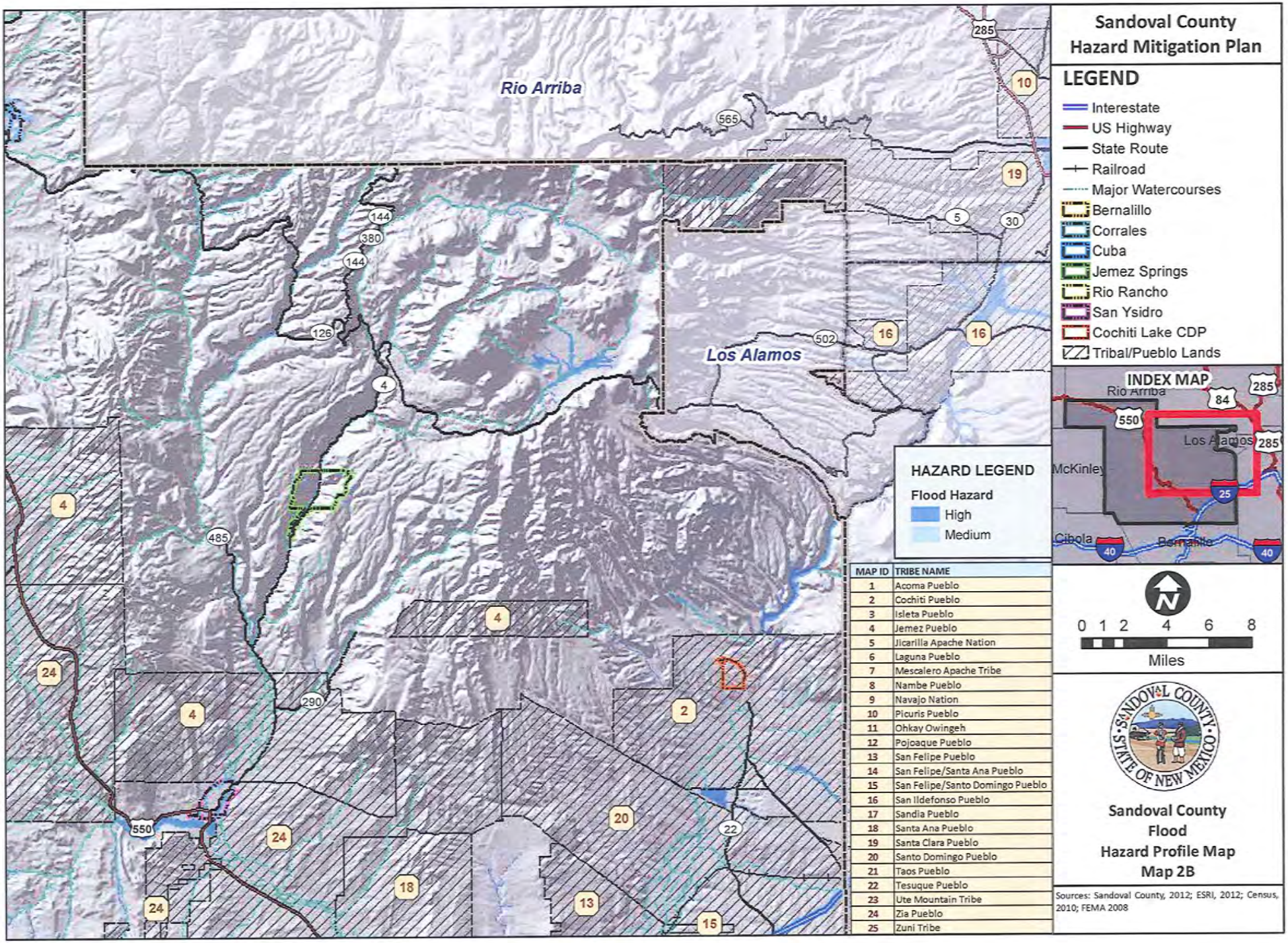
HAZARD LEGEND

Flood Hazard

- High
- Medium

Sandoval County Flood Hazard Profile Map Map 2A

Sources: Sandoval County, 2012; ESRI, 2012; Census, 2010; FEMA 2008



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

HAZARD LEGEND

Flood Hazard
- High
- Medium

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

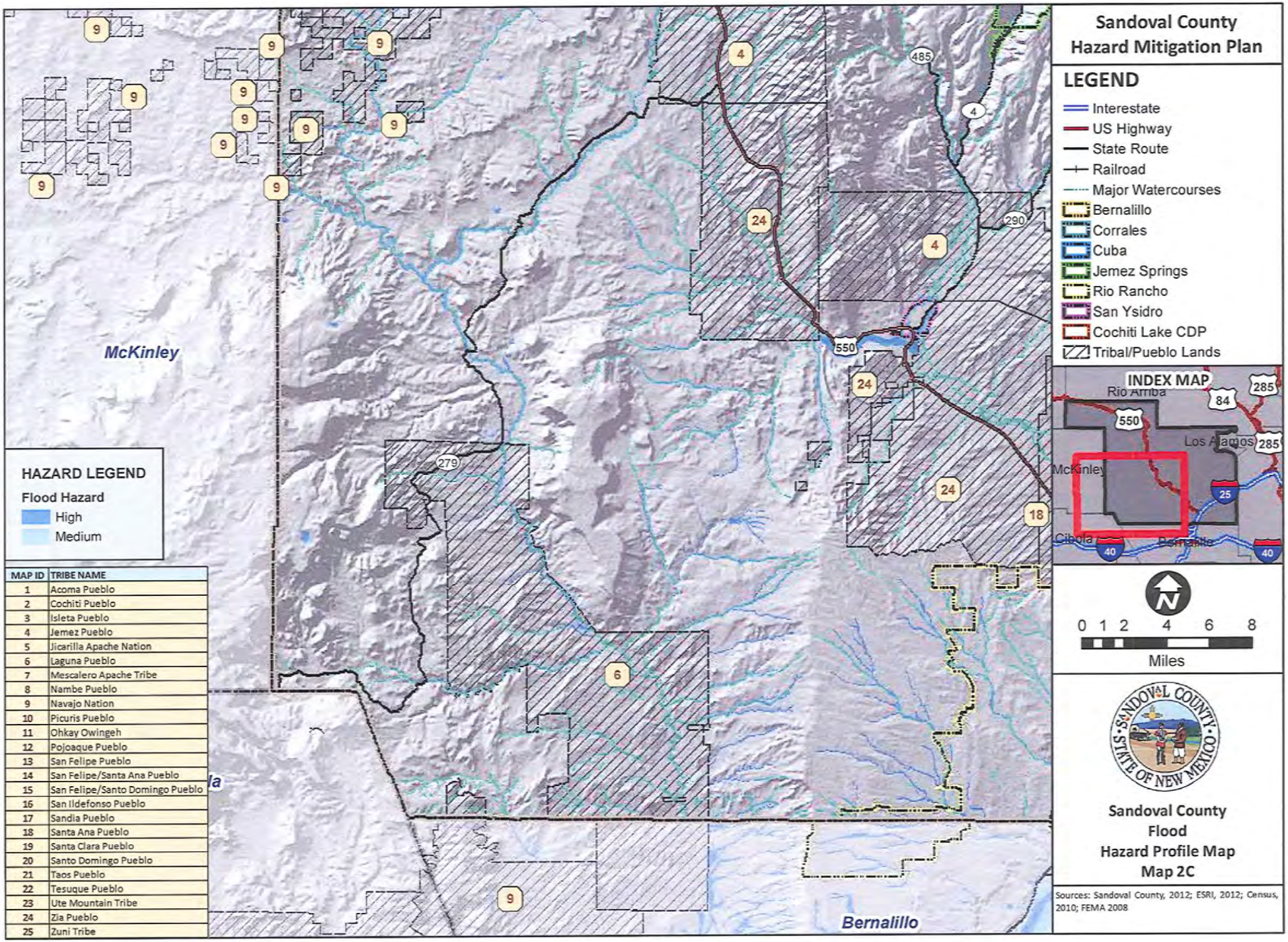
N

0 1 2 4 6 8

Miles

Sandoval County Flood Hazard Profile Map Map 2B

Sources: Sandoval County, 2012; ESRI, 2012; Census, 2010; FEMA 2008



MAP ID	TRIBE NAME
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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
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17	Sandia Pueblo
18	Santa Ana Pueblo
19	Santa Clara Pueblo
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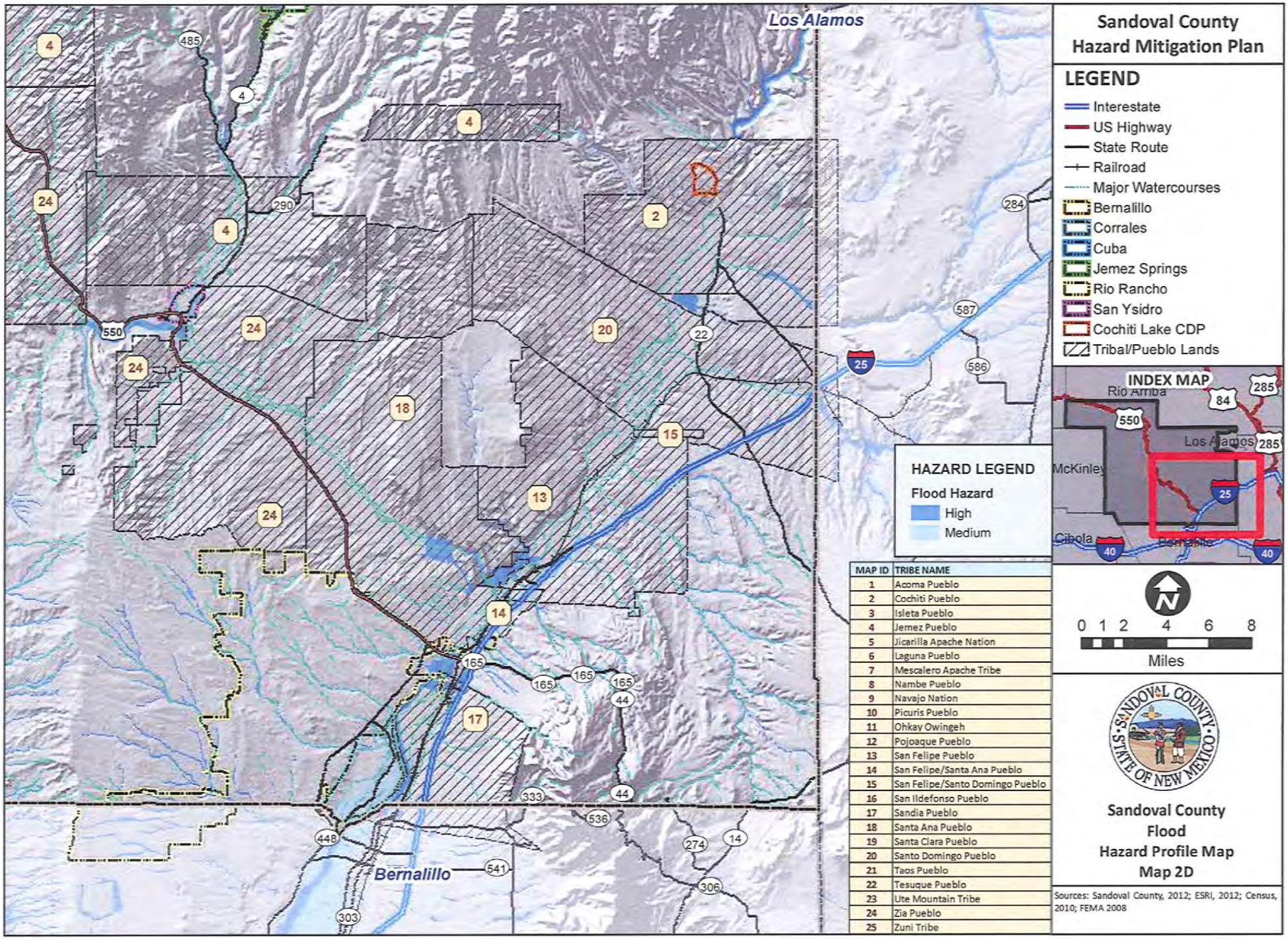
21	Taos Pueblo
22	Tesuque Pueblo
23	Ute Mountain Tribe
24	Zia Pueblo
25	Zuni Tribe



MAP ID	TRIBE NAME
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2	Cochiti Pueblo
3	Isleta Pueblo
4	Jemez Pueblo
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6	Laguna Pueblo
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9	Navajo Nation
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12	Pojoaque Pueblo
13	San Felipe Pueblo
14	San Felipe/Santa Ana Pueblo
15	San Felipe/Santo Domingo Pueblo
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18	Santa Ana Pueblo
19	Santa Clara Pueblo
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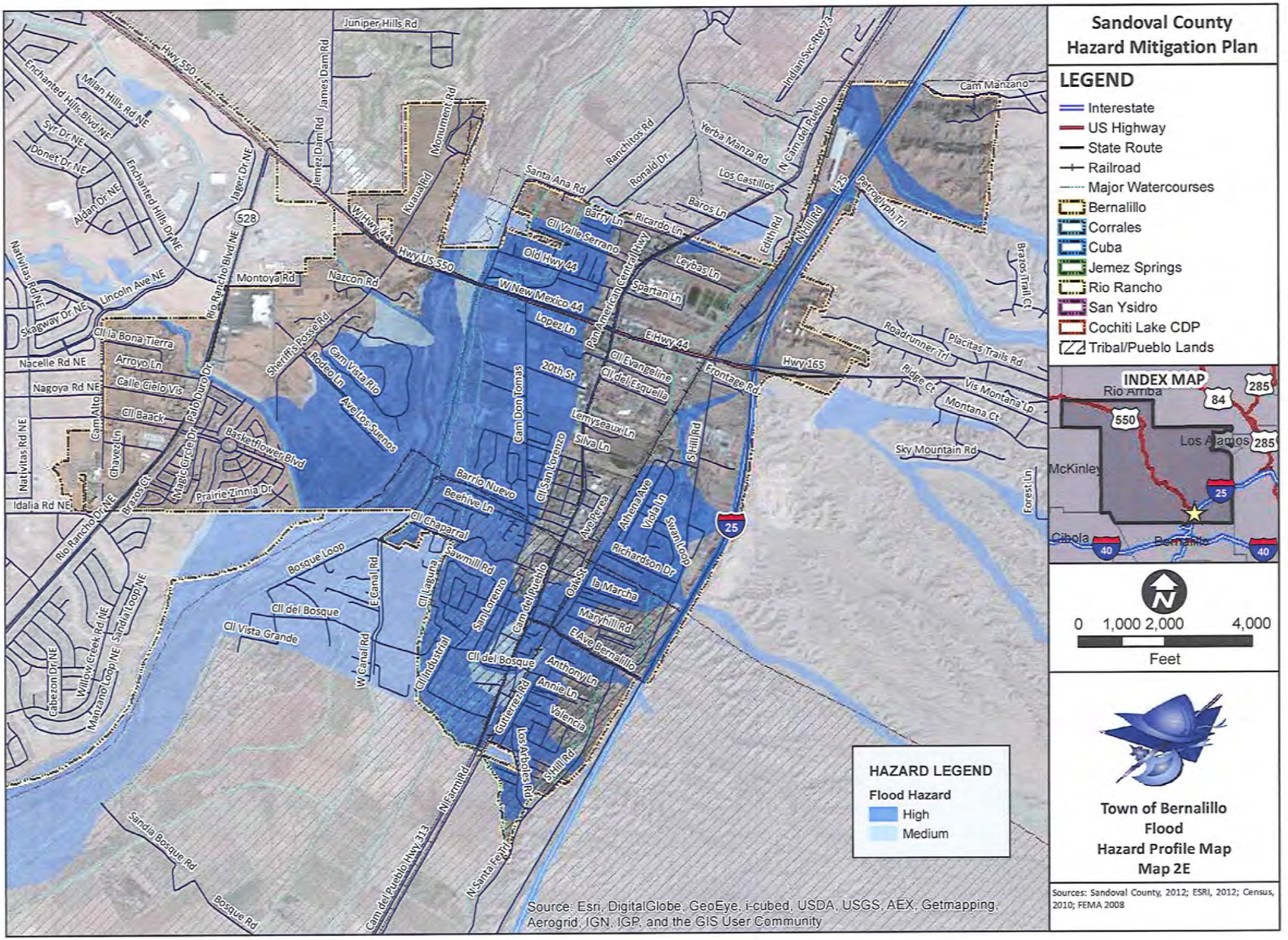
21	Taos Pueblo
22	Tesuque Pueblo
23	Ute Mountain Tribe
24	Zia Pueblo
25	Zuni Tribe


Sandoval County
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Interestate
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Cuba
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Los Alamos
McKinley
Cibola
Bernalillo
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Flood Hazard
High
Medium
0 1,000 2,000 4,000
Feet
Town of Bernalillo
Flood
Hazard Profile Map
Map 2E
Sources: Sandoval County, 2012; ESRI, 2012; Census, 2010; FEMA 2008
Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, and the GIS User Community
Juniper Hills Rd
Hwy 550
Enchanted Hills Blvd NE
Milan Hills Rd NE
Syr Dr NE
Donet Dr NE
Aldan Dr NE
Enchanted Hills Dr NE
Jaber Dr NE
James Dam Rd
Jemez Dam Rd
Monument Rd
Kuaua Rd
W Hwy 44
Hwy US 550
Santa Ana Rd
Ranchitos Rd
Ronald Dr
Yerba Manza Rd
Los Castillos
N Cam del Pueblo
Indian Svc Rte 73
Cam Manzano
I-25
Petroglyph Tri
Barry Ln
Ricardo Ln
Baros Ln
Cll Valle Serrano
Old Hwy 44
Leybas Ln
Edith Rd
N Hill Rd
Brazos Trail Ct
Nativitas Rd NE
Lincoln Ave NE
Skagway Dr NE
Cll la Bona Tierra
Nacelle Rd NE
Arroyo Ln
Nagoya Rd NE
Calle Cielo Vis
Cll Baack
Cam Alto
Chavez Ln
Brazos Ct
Idalia Rd NE
Rio Rancho Dr NE
Rio Rancho Blvd NE
528
Montoya Rd
Nazcon Rd
W New Mexico 44
Spartan Ln
Lopez Ln
Pan American Central Hwy
E Hwy 44
Roadrunner Trl
Placitas Trails Rd
Hwy 165
Frontage Rd
Ridge Ct
Vis Montana Ln
Montana Ct
Sky Mountain Rd
Forest Ln
Sheriffs Posse Rd
Rodeo Ln
Cam Vista Rio
Ave Los Suenos
Palo Duro Dr
Basketflower Blvd
Magic Circle Dr
Prairie Zinnia Dr
20th St
Cll Evangelina
Cll del Esquella
Cam Don Tomas
Lemysseaux Ln
Silva Ln
Cll San Lorenzo
S Hill Rd
Barrio Nuevo
Beehive Ln
Cll Chaparral
Ave Perea
Athena Ave
Viola Ln
Swan Loop
Richardson Dr
Sawmill Rd
Bosque Loop
E Canal Rd
Cll Laguna
San Lorenzo
Cam del Pueblo
Cll del Bosque
Cll Vista Grande
W Canal Rd
Cll Industrial
Ave A
la Marcha
Maryhill Rd
E Ave Bernalillo
Anthony Ln
Annie Ln
Valencia
Gutierrez Rd
Los Arboles Rd
S Hill Rd
N Farm Rd
N Santa Fe Trl
Cam del Pueblo Hwy 313
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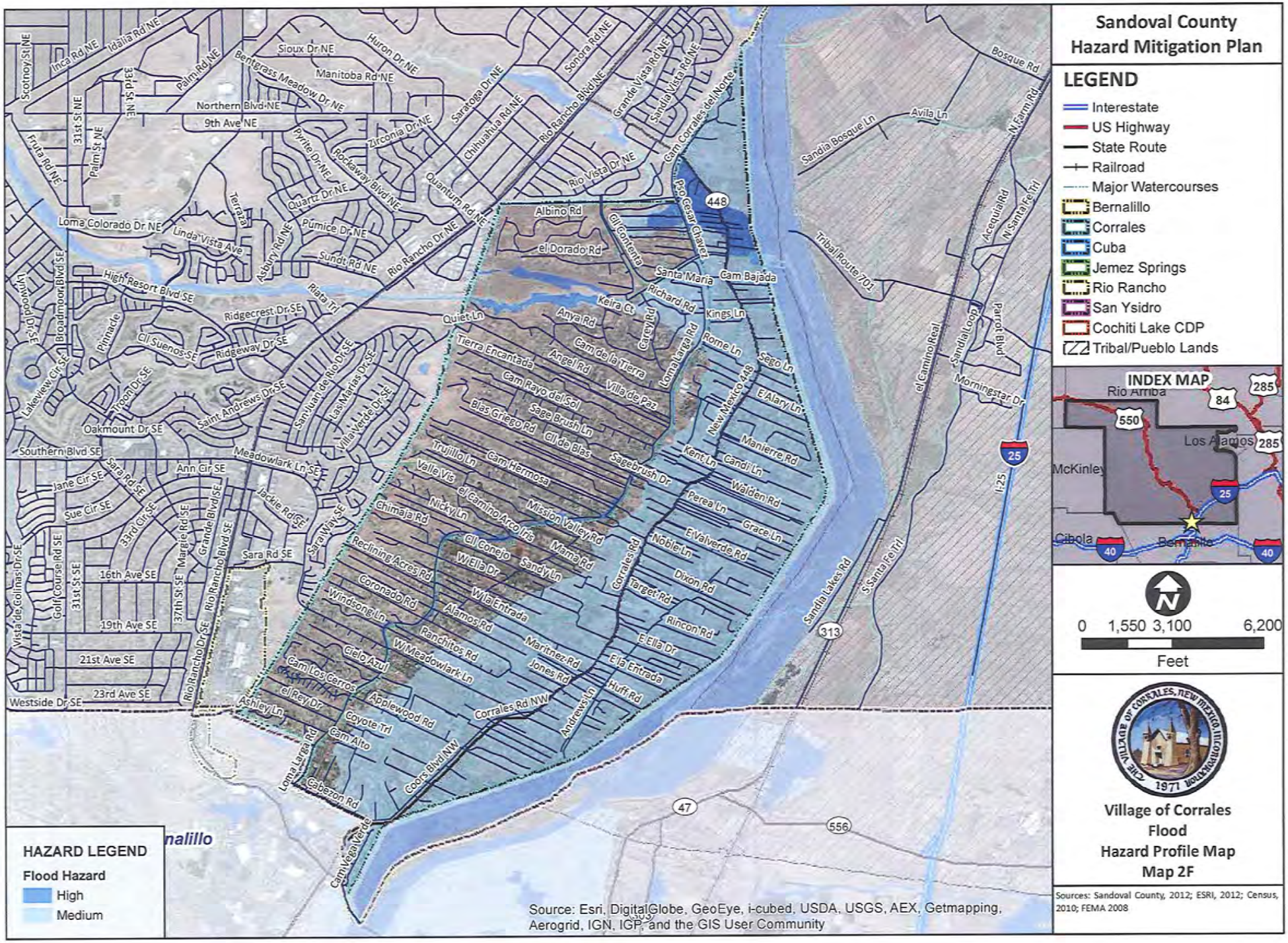
Bosque Rd
Willow Creek Rd NE
Sandia Loop NE
Manzano Loop NE
Cabezon Dr NE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Bernalillo
0 1,550 3,100 6,200
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Flood Hazard
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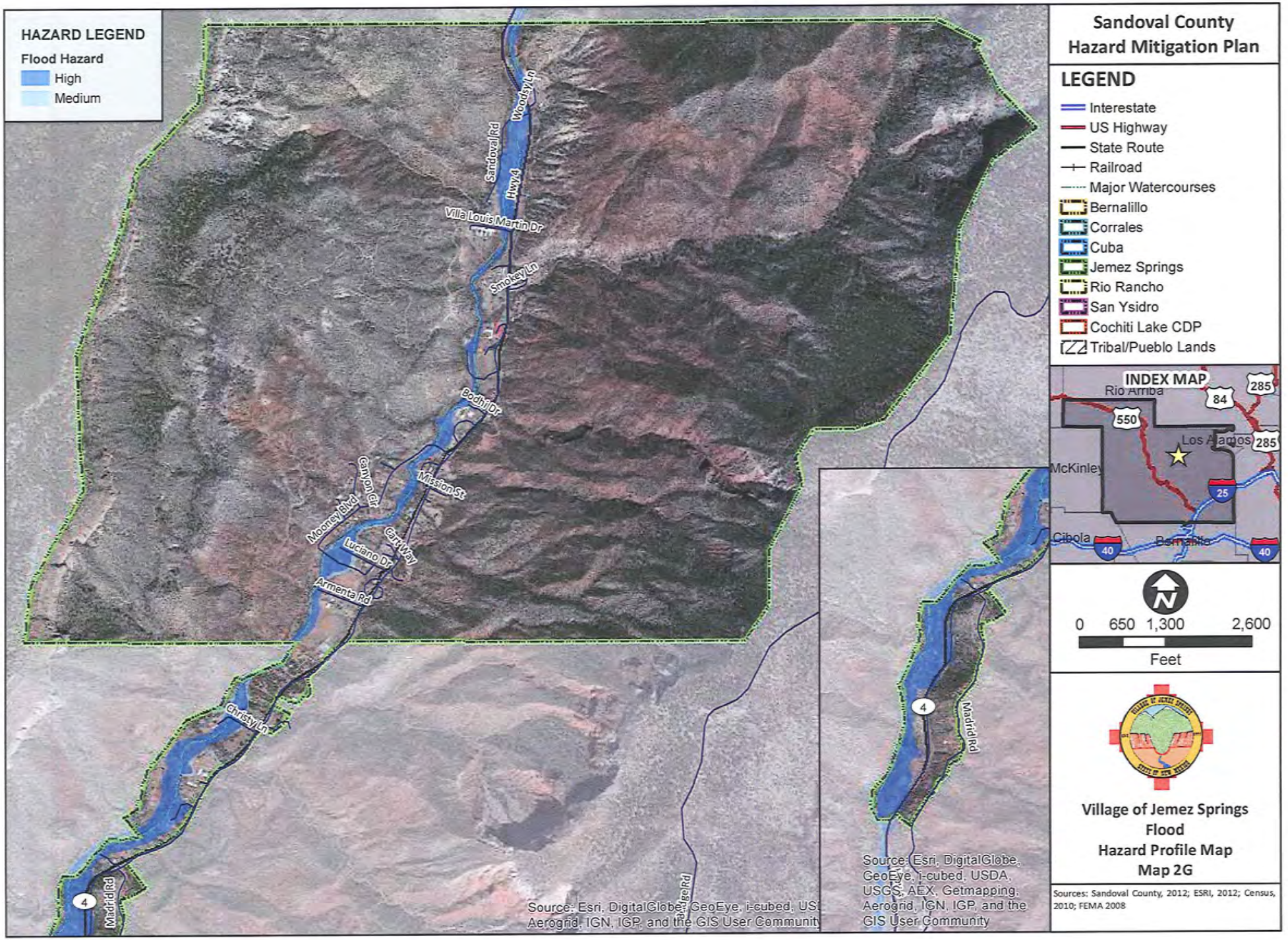
Medium
Village of Corrales
Flood
Hazard Profile Map
Map 2F
Sources: Sandoval County, 2012; ESRI, 2012; Census, 2010; FEMA 2008
Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, and the GIS User Community



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- Corrales
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- Tribal/Pueblo Lands

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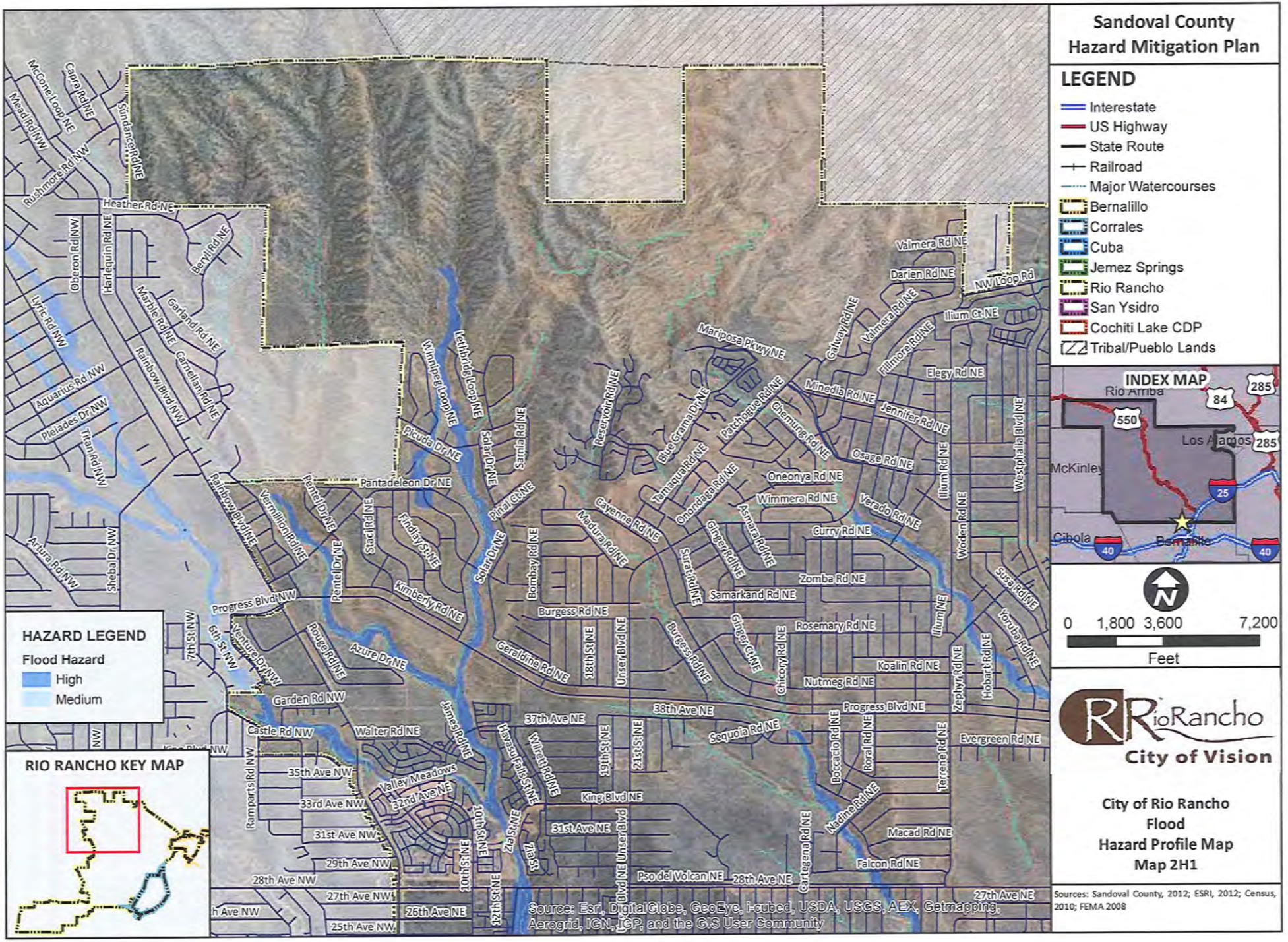
Feet

Village of Jemez Springs Flood Hazard Profile Map Map 2G

Sources: Sandoval County, 2012; ESRI, 2012; Census, 2010; FEMA 2008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0 1,800 3,600 7,200
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RioRancho
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City of Rio Rancho
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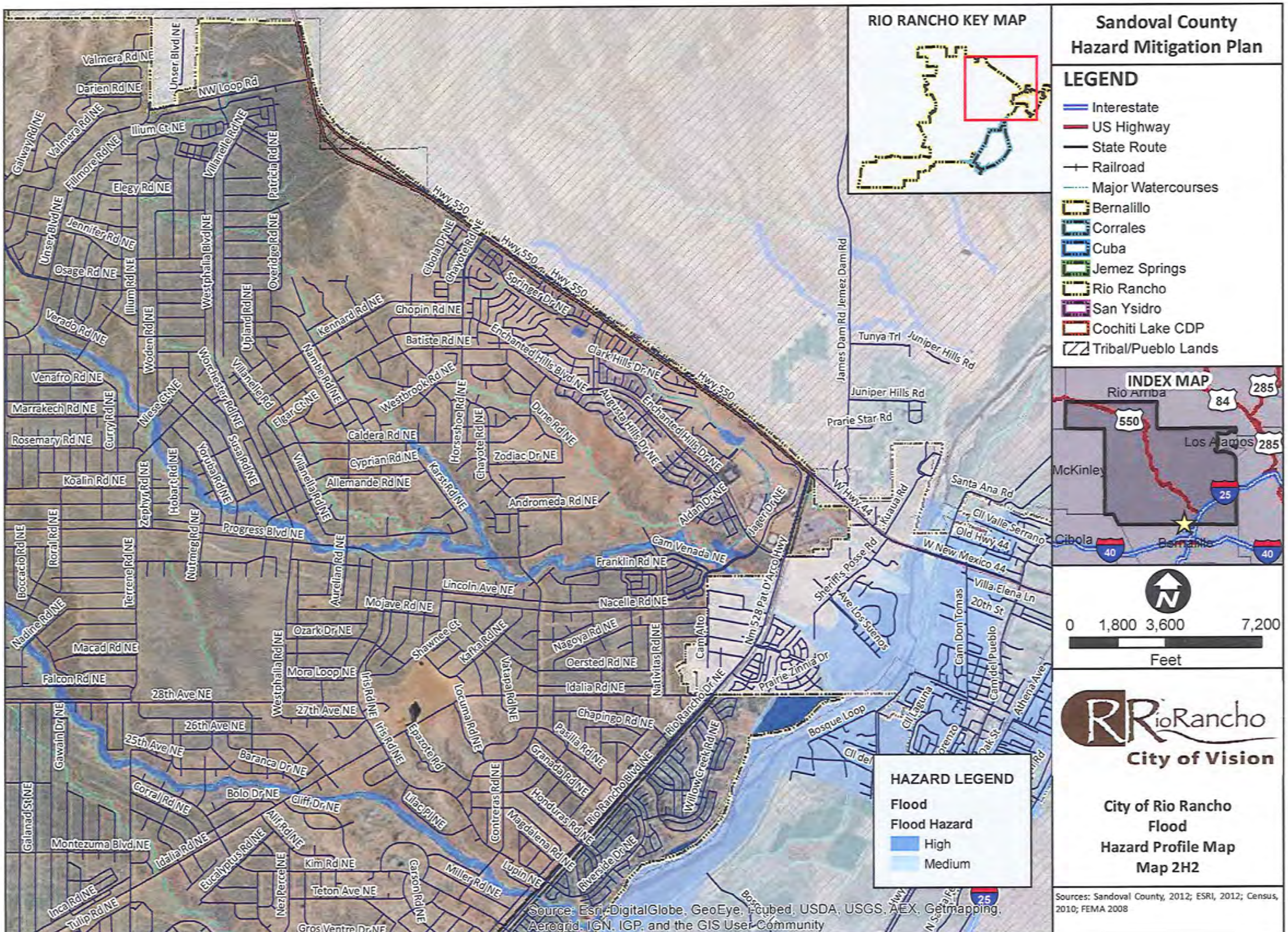
Hazard Profile Map
Map 2H1
Sources: Sandoval County, 2012; ESRI, 2012; Census, 2010; FEMA 2008
Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, and the G.S User Community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Feet
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City of Vision
City of Rio Rancho
Flood
Hazard Profile Map
Map 2H2
Sources: Sandoval County, 2012; ESRI, 2012; Census, 2010; FEMA 2008
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Flood Hazard
High
Medium
Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, and the GIS User Community
Hwy 550
W Hwy 44
W New Mexico 44
Nm 528 Pat D'Arco Hwy
James Dam Rd Jemez Dam Rd
Juniper Hills Rd
Prarie Star Rd
Tunya Trl
Santa Ana Rd
Progress Blvd NE
Westphalia Blvd NE
Rio Rancho Blvd NE
Rio Rancho Dr NE
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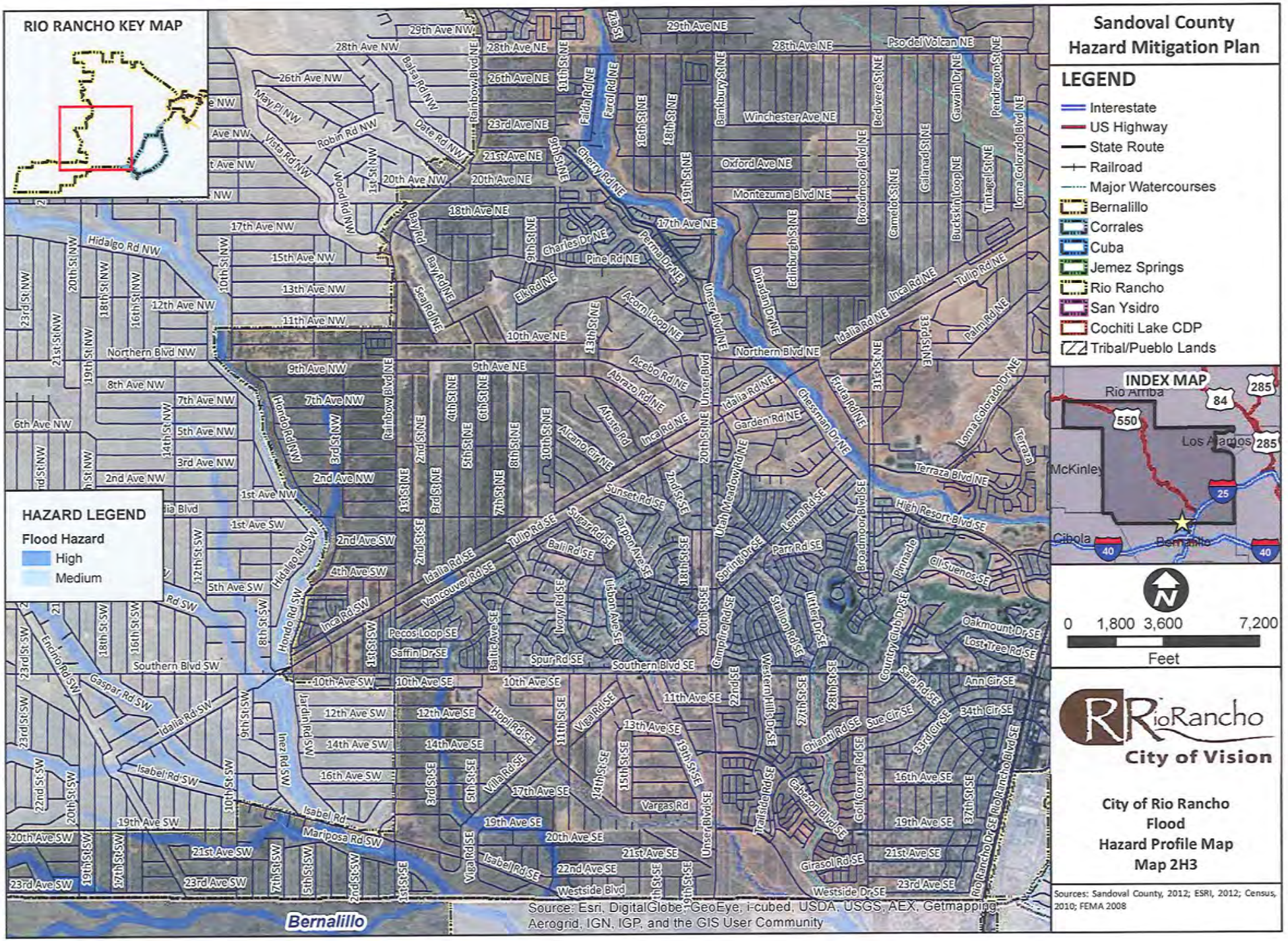
25th Ave NE
Montezuma Blvd NE


RIO RANCHO KEY MAP
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Flood Hazard
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Medium
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Sources: Sandoval County, 2012; ESRI, 2012; Census, 2010; FEMA 2008
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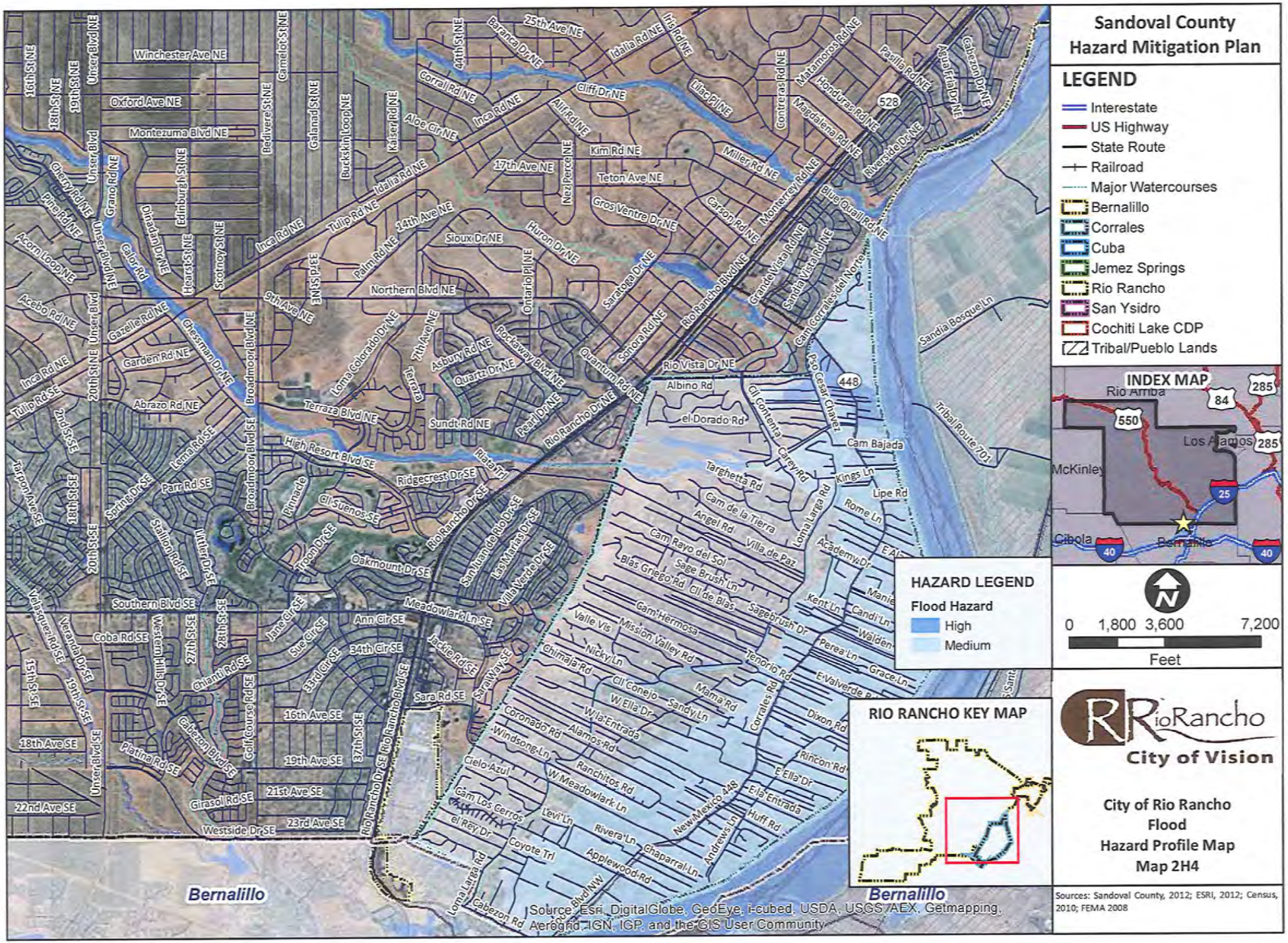
Bernalillo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Flood Hazard
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Medium
0 1,800 3,600 7,200
Feet
RIO RANCHO KEY MAP
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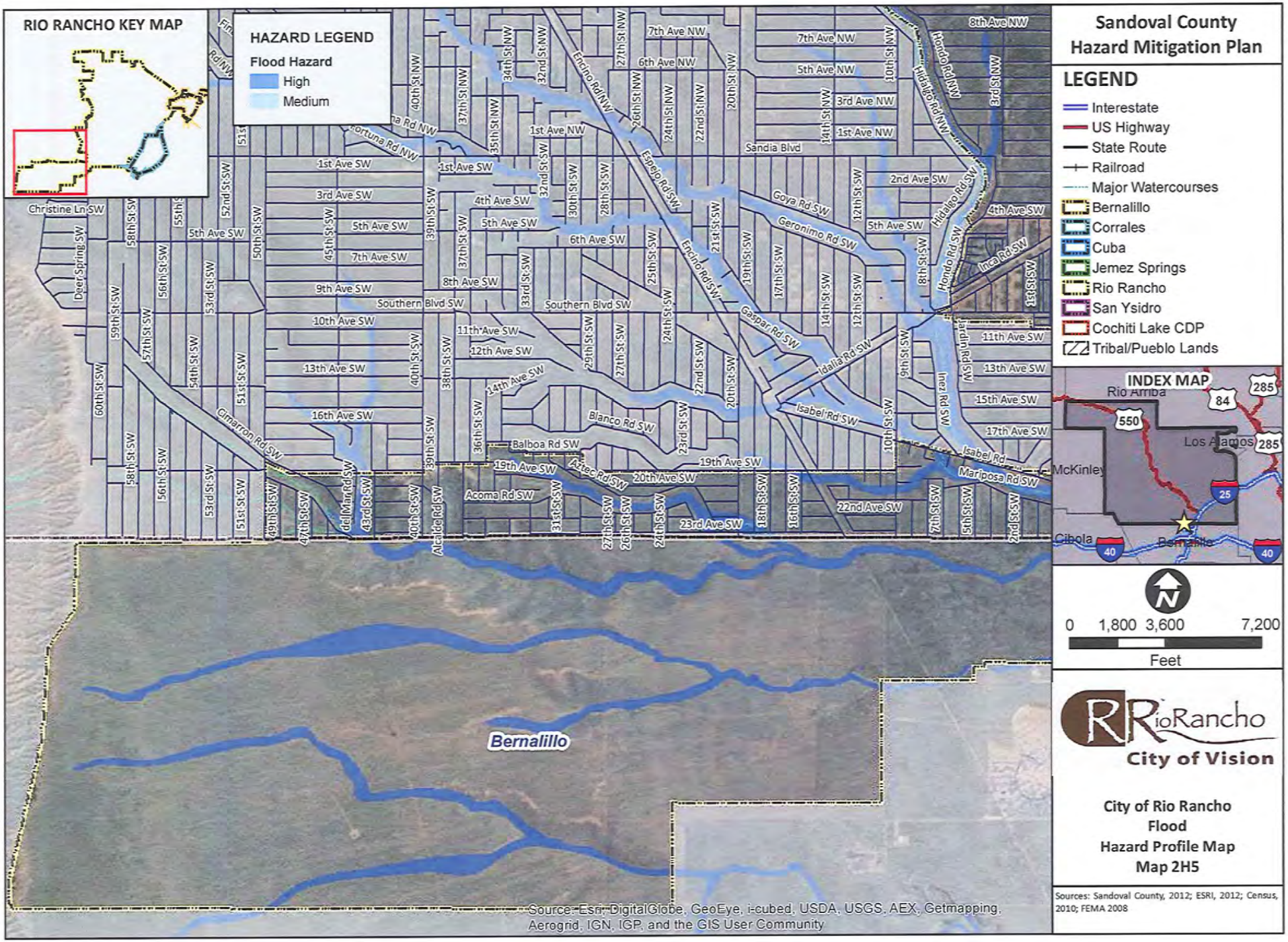
City of Vision
City of Rio Rancho
Flood
Hazard Profile Map
Map 2H4
Sources: Sandoval County, 2012; ESRI, 2012; Census, 2010; FEMA 2008
Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS AEX, Getmapping, Aerogrid, IGN, IGP, and the GIS User Community
Bernalillo
Bernalillo


RIO RANCHO KEY MAP
HAZARD LEGEND
Flood Hazard
High
Medium
Sandoval County
Hazard Mitigation Plan
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US Highway
State Route
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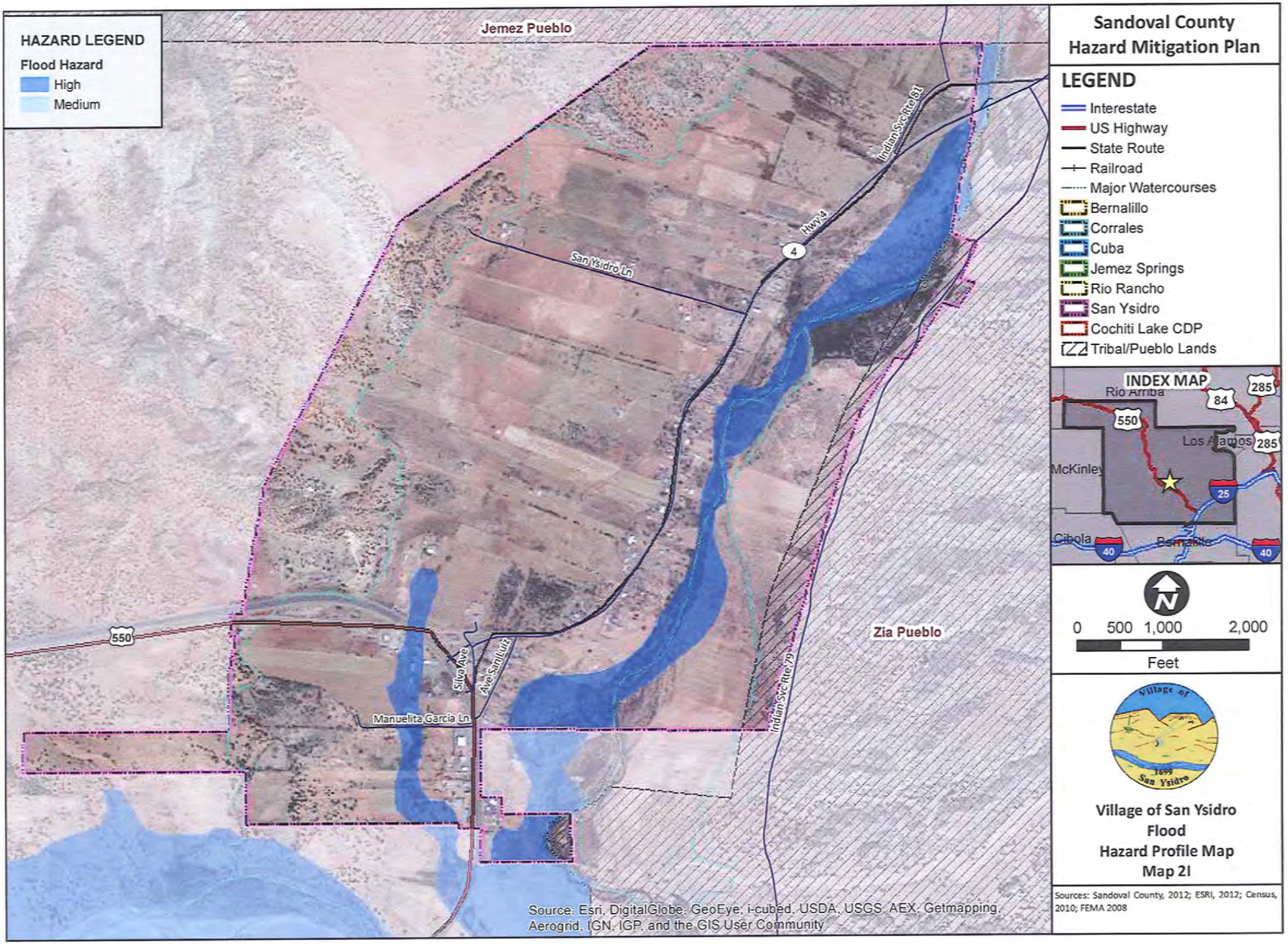
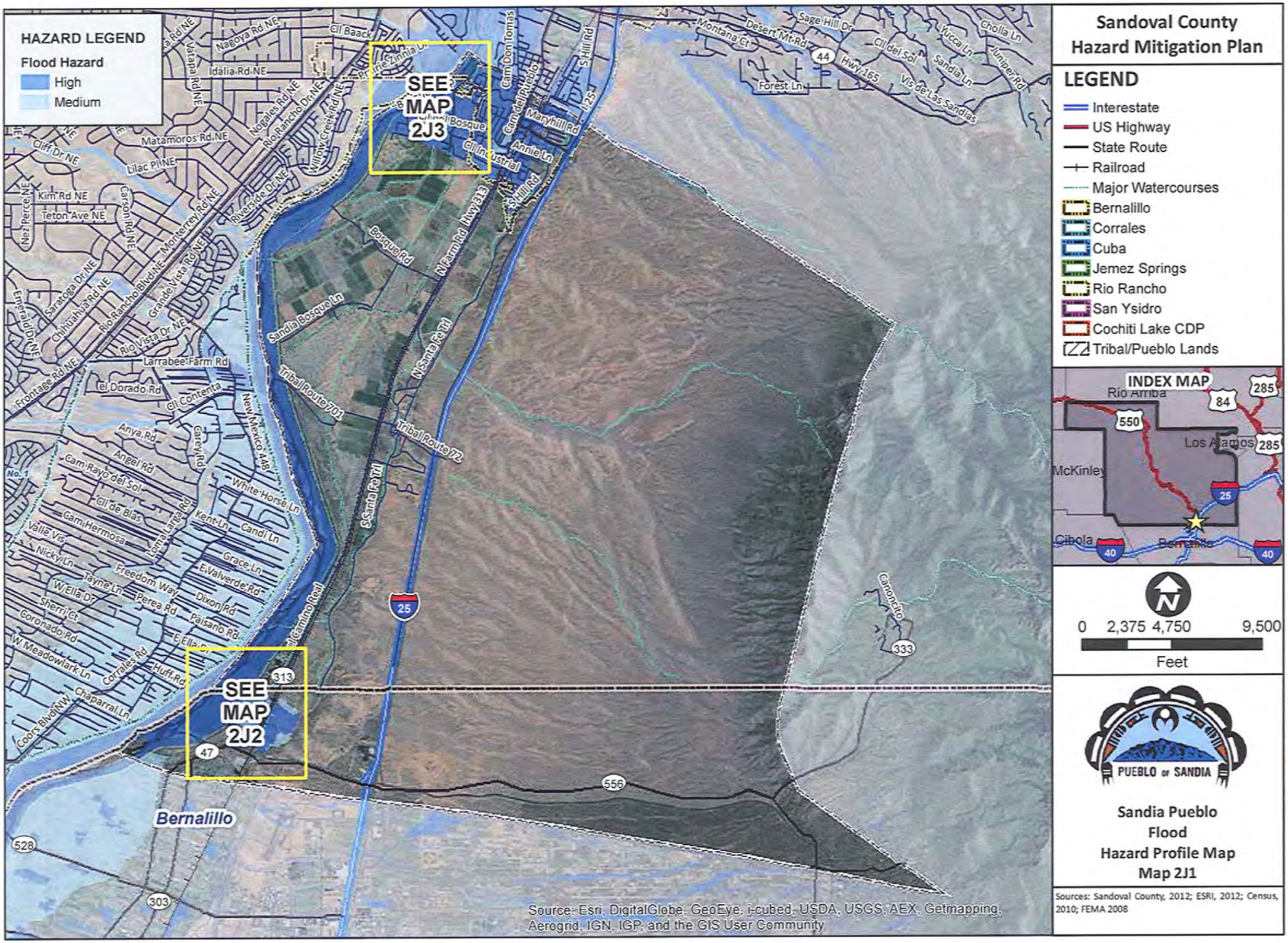
Tribal/Pueblo Lands
INDEX MAP
Rio Arriba
Los Alamos
McKinley
Cibola
Bernalillo
0 1,800 3,600 7,200
Feet
Bernalillo
Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, and the GIS User Community
RioRancho
City of Vision
City of Rio Rancho
Flood
Hazard Profile Map
Map 2H5
Sources: Sandoval County, 2012; ESRI, 2012; Census, 2010; FEMA 2008


HAZARD LEGEND
Flood Hazard
High
Medium
Jemez Pueblo
Zia Pueblo
Indian Svc Rte 81
Hwy 4
San Ysidro Ln
Silva Ave
Ave San Luis
Manuelita Garcia Ln
Indian Svc Rte 79
550
4
Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, 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
Bernalillo
285
84
550
25
40
N
0 500 1,000 2,000
Feet
Village of San Ysidro
Flood
Hazard Profile Map
Map 2I
Sources: Sandoval County, 2012; ESRI, 2012; Census, 2010; FEMA 2008



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

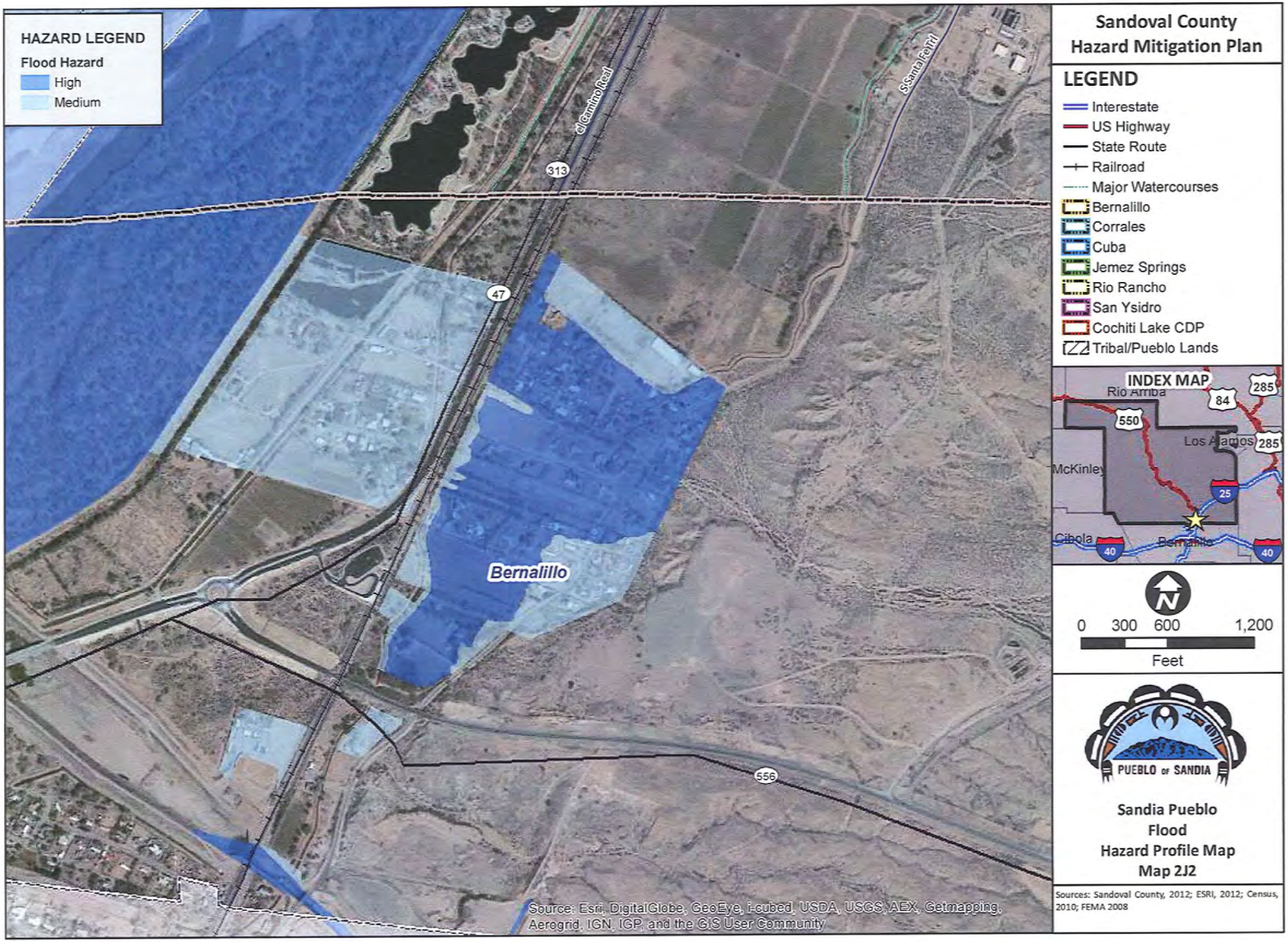
0 2,375 4,750 9,500

Feet

PUEBLO OF SANDIA

Sandia Pueblo
Flood
Hazard Profile Map
Map 2J1

Sources: Sandoval County, 2012; ESRI, 2012; Census, 2010; FEMA 2008



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

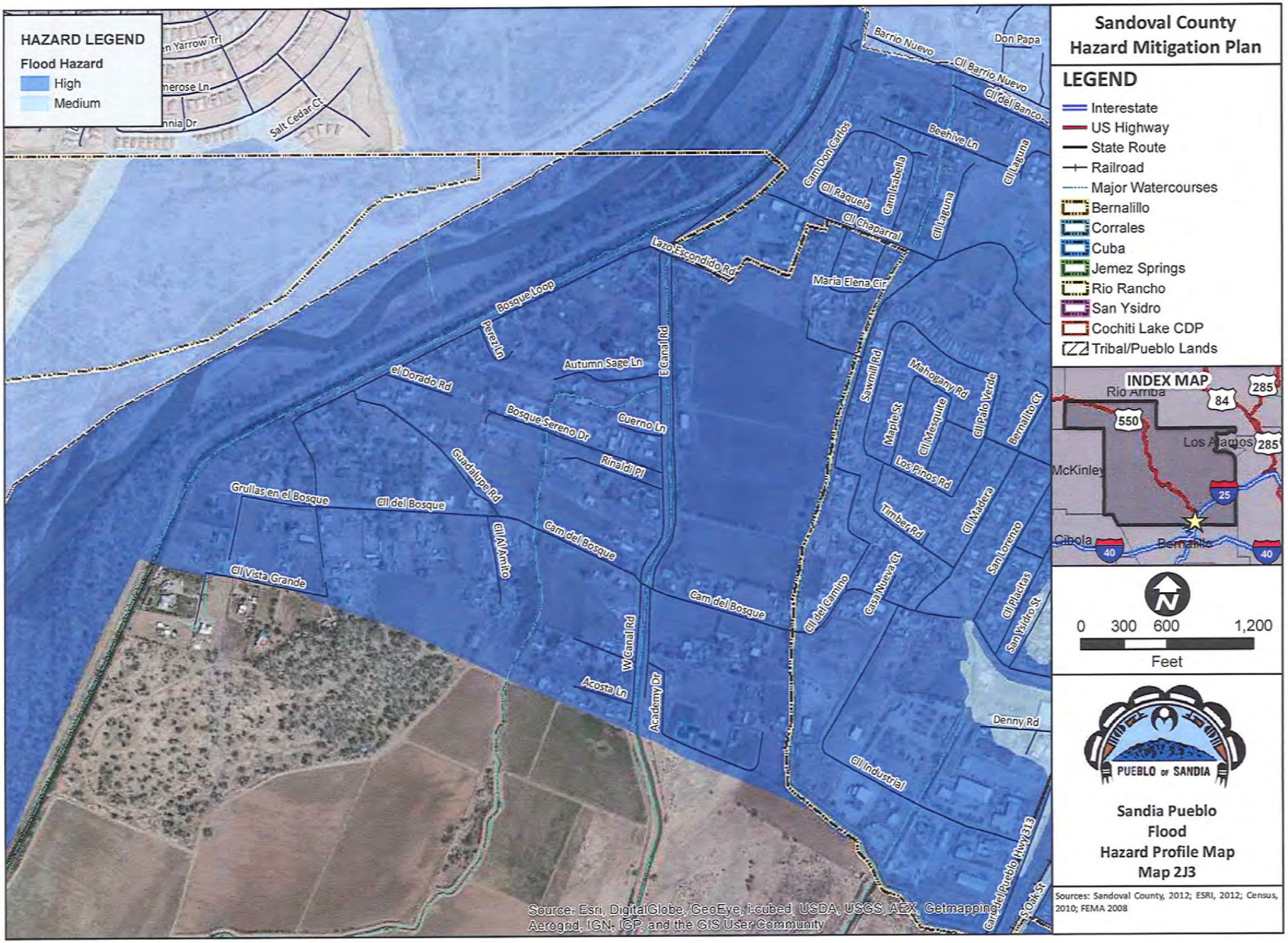
0 300 600 1,200

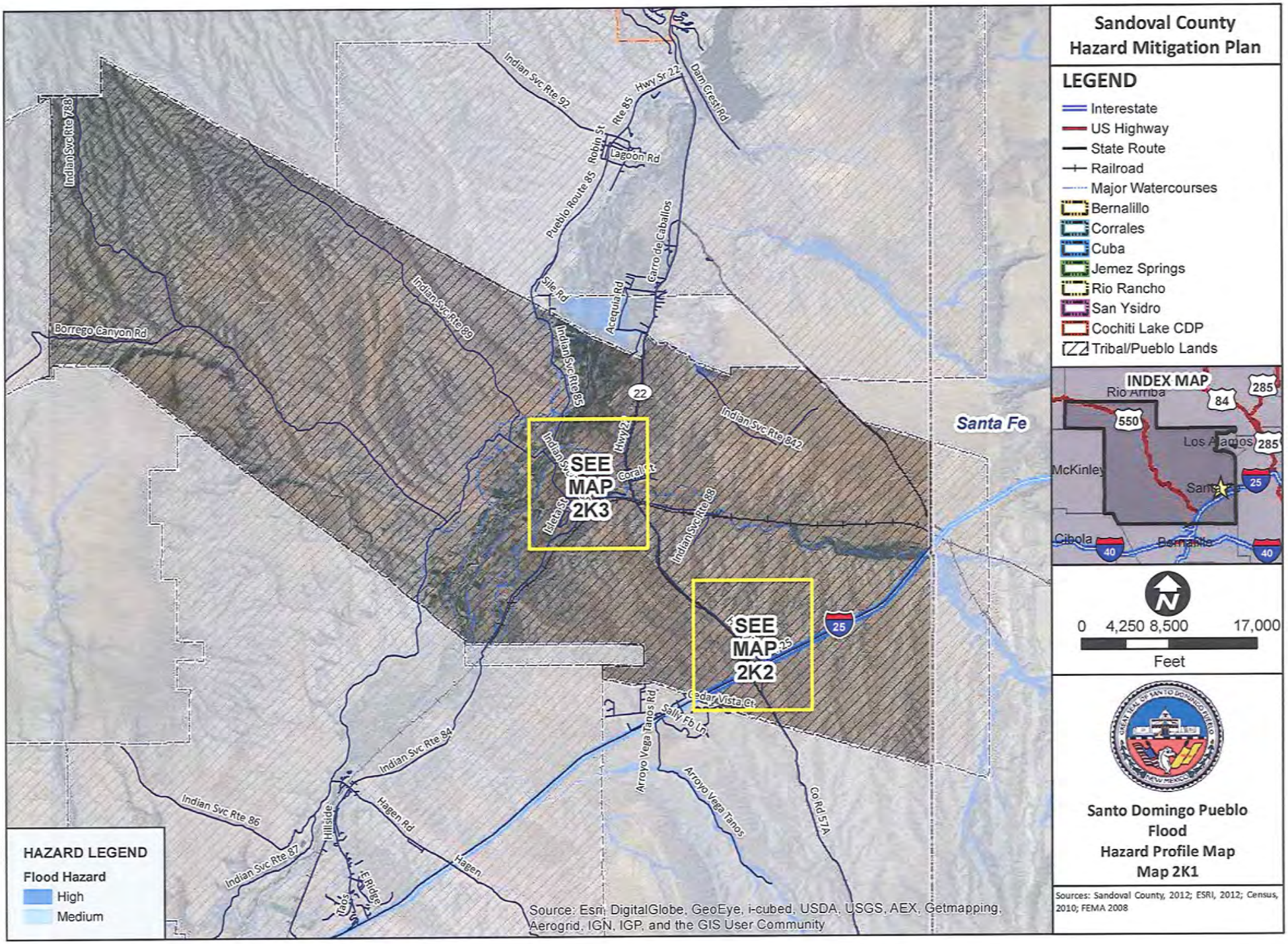
Feet

PUEBLO OF SANDIA

Sandia Pueblo
Flood
Hazard Profile Map
Map 2J2

Sources: Sandoval County, 2012; ESRI, 2012; Census, 2010; FEMA 2008


HAZARD LEGEND
Flood Hazard
High
Medium
Barrio Nuevo
Don Papa
Cll Barrio Nuevo
Cll del Banco
Beehive Ln
Cll Laguna
Cam Don Carlos
Cll Raquela
Cam Isabella
Cll Chaparral
Lazo Escondido Rd
Maria Elena Cir
Bosque Loop
Perez Ln
Autumn Sage Ln
E Canal Rd
el Dorado Rd
Bosque Sereno Dr
Cuerno Ln
Rinaldi Pl
Guadalupe Rd
Grullas en el Bosque
Cll del Bosque
Cll Al Amito
Cam del Bosque
Cll Vista Grande
W Canal Rd
Acosta Ln
Academy Dr
Sawmill Rd
Mahogany Rd
Maple St
Cll Mesquite
Cll Palo Verde
Bernalito Ct
Los Pinos Rd
Timber Rd
Cll Madera
San Lorenzo
Cll del Camino
Casa Nueva Ct
Cll Placitas
San Ysidro St
Denny Rd
Cll Industrial
Camino del Pueblo
Hwy 313
S Oak St
Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, 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
84
285
550
Los Alamos
McKinley
25
Cibola
Bernalillo
40
0 300 600 1,200
Feet
PUEBLO OF SANDIA
Sandia Pueblo
Flood
Hazard Profile Map
Map 2J3
Sources: Sandoval County, 2012; ESRI, 2012; Census, 2010; FEMA 2008


Sandoval County
Hazard Mitigation Plan
LEGEND
Interestate
US Highway
State Route
Railroad
Major Watercourses
Bernalillo
Corrales
Cuba
Jemez Springs
Rio Rancho
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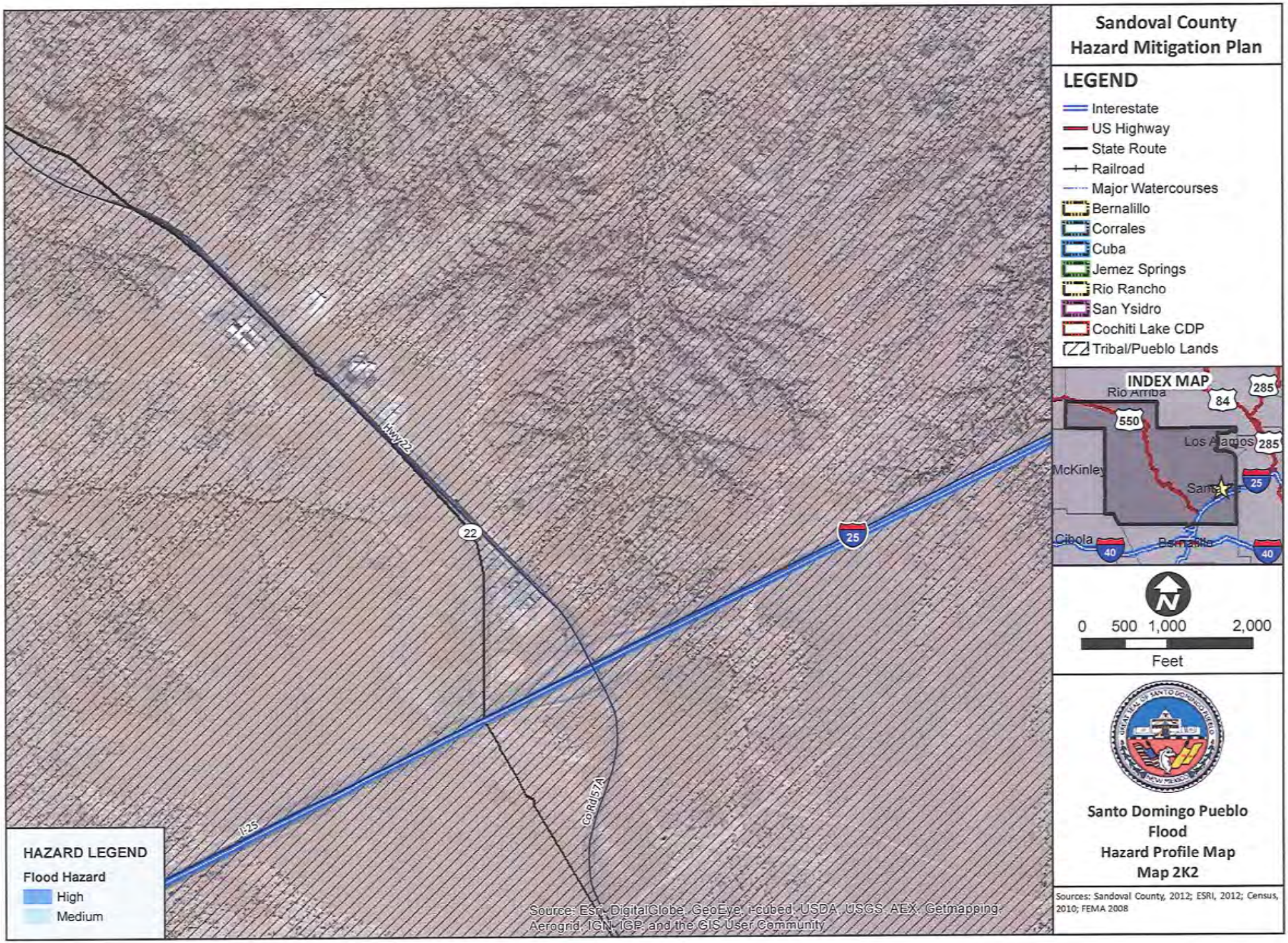
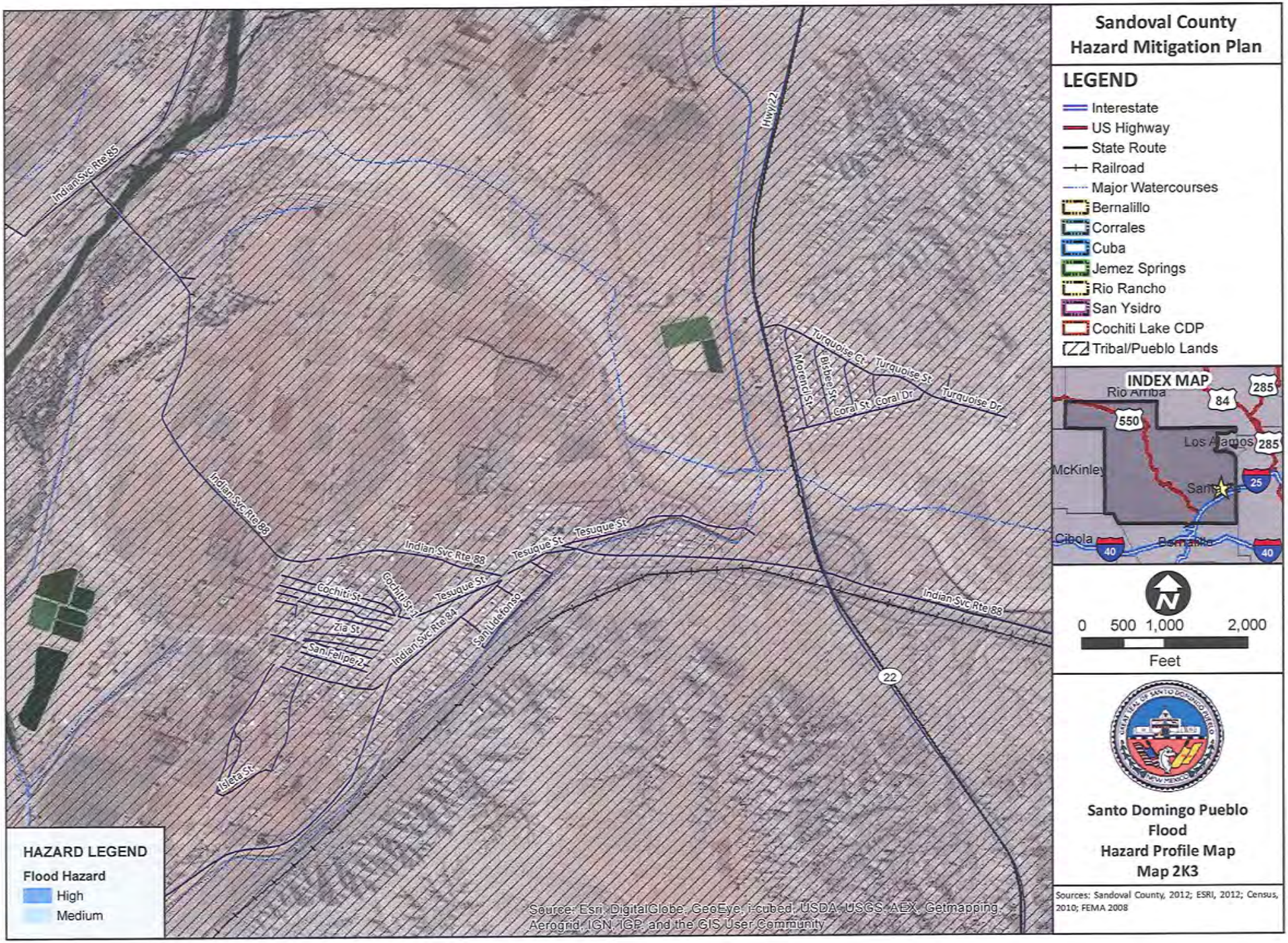
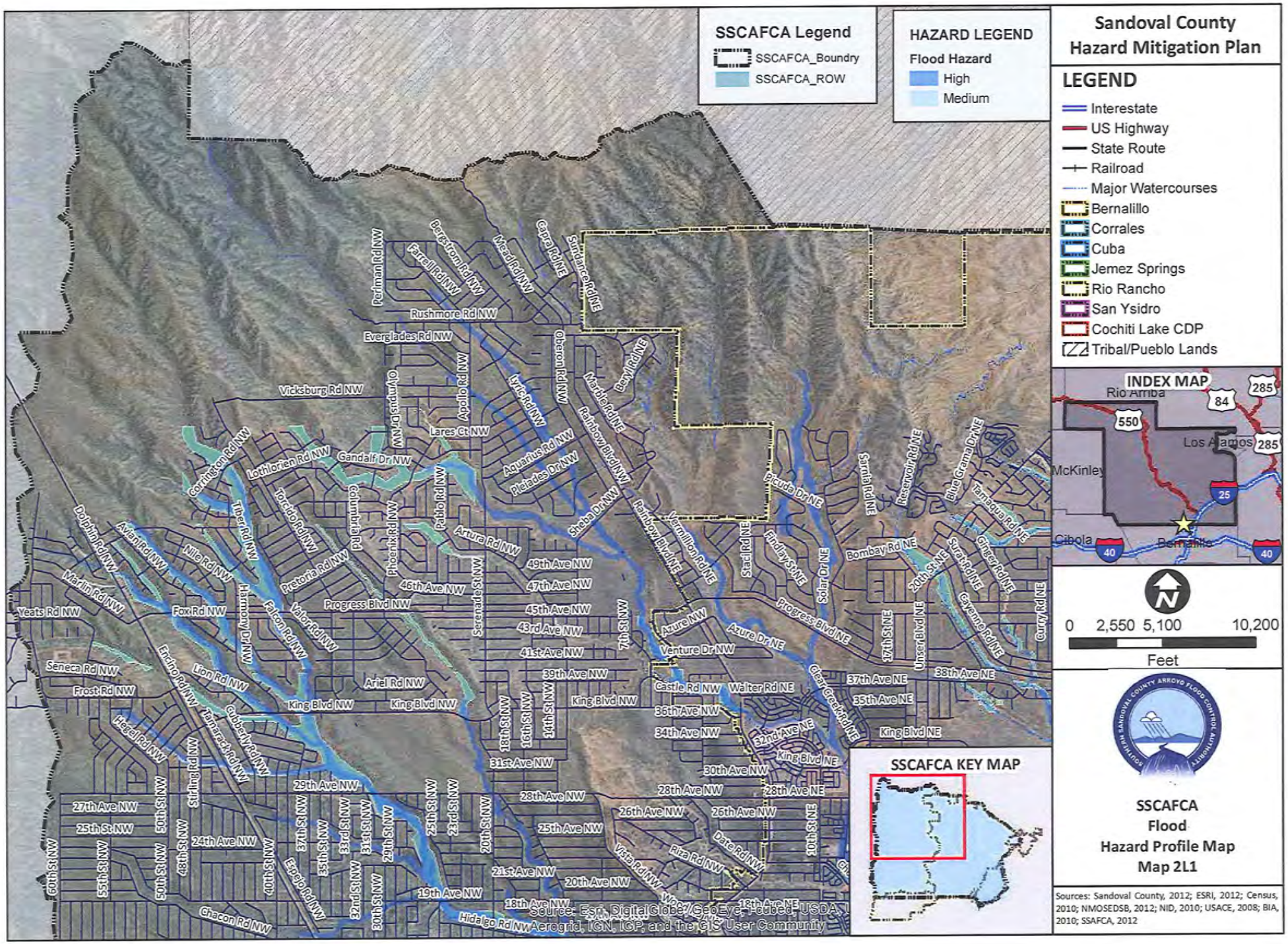
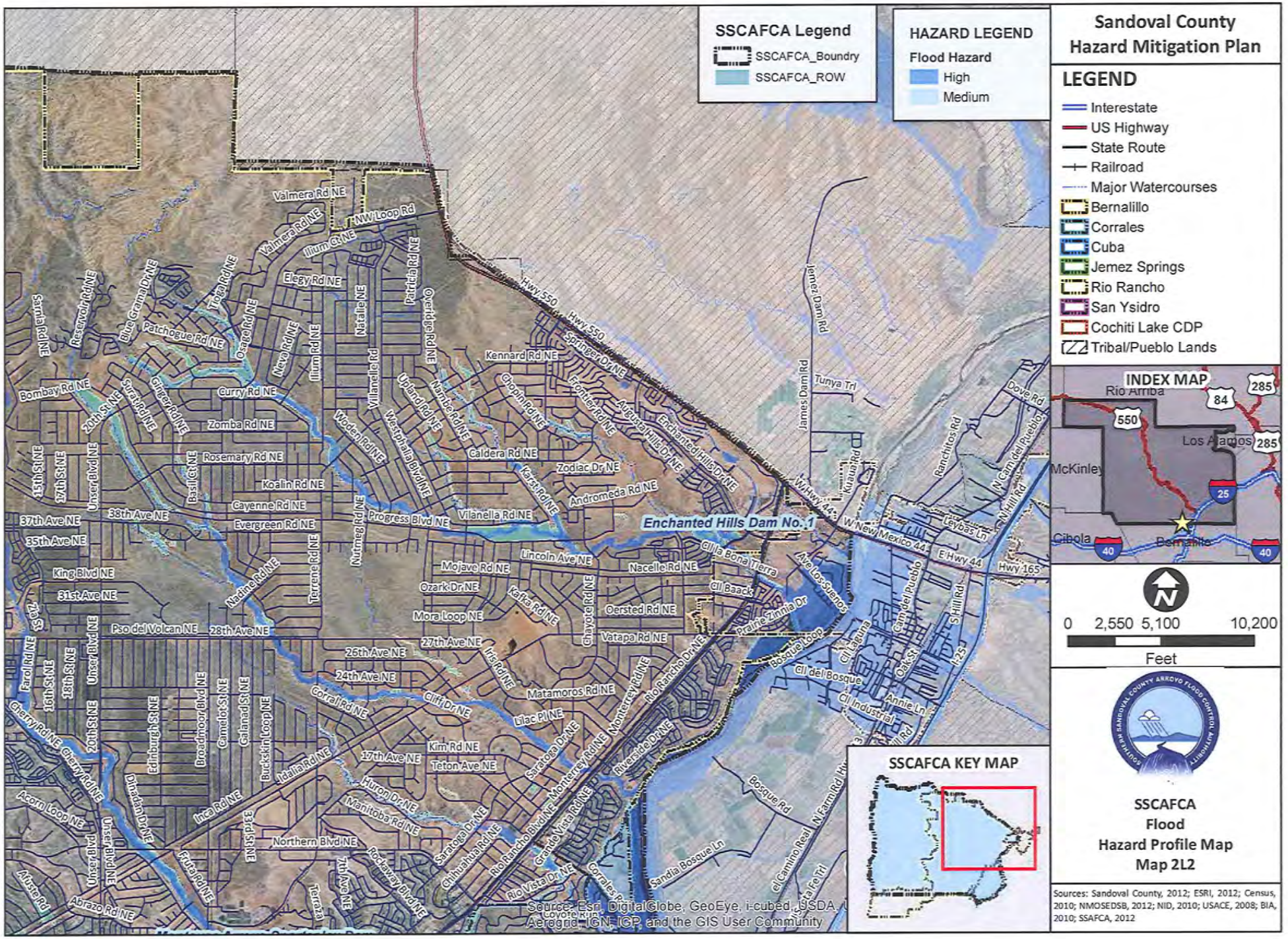
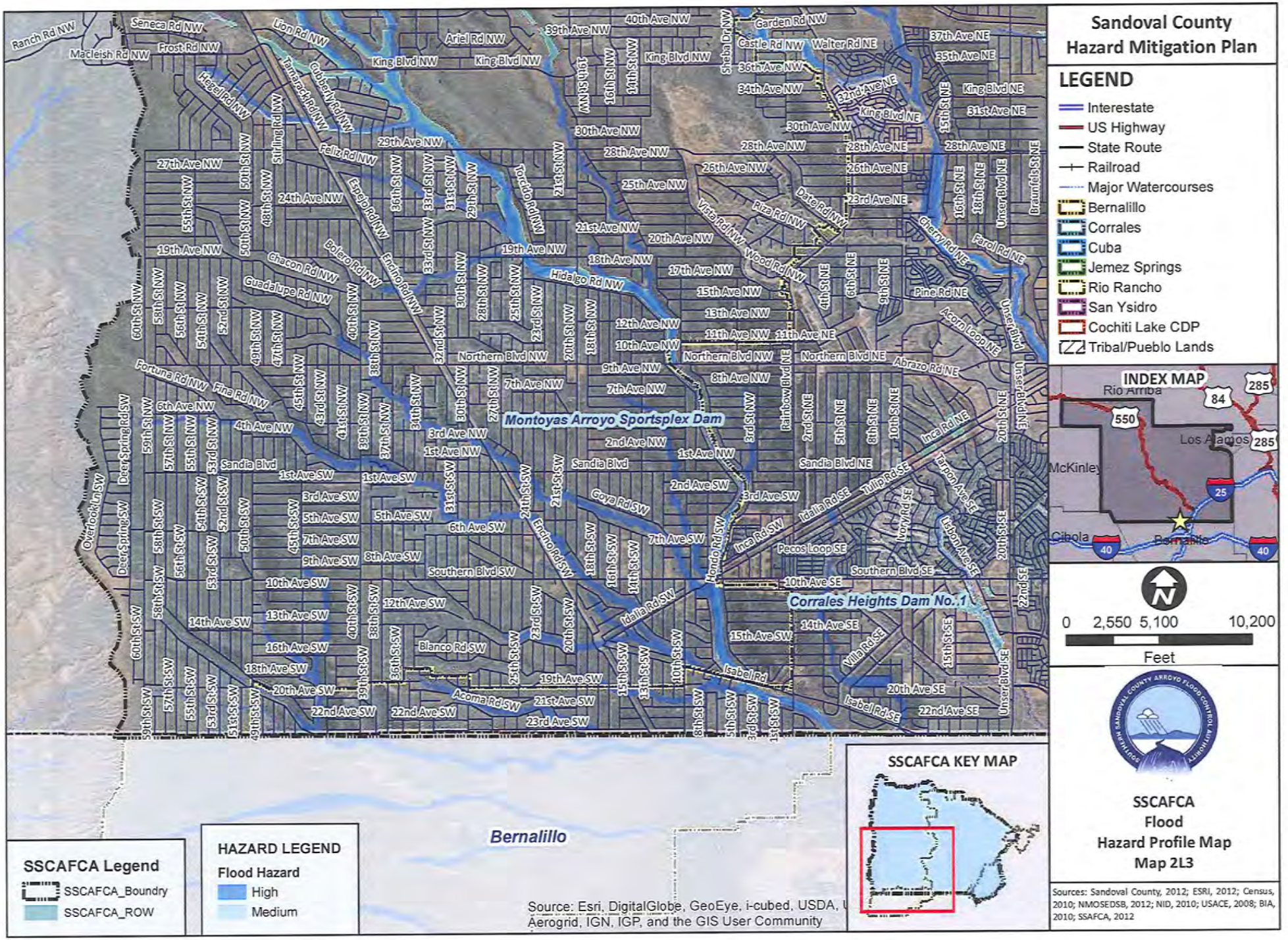
INDEX MAP
Rio Arriba
Los Alamos
McKinley
Cibola
Santa Fe
Bernalillo
SEE MAP 2K3
SEE MAP 2K2
Indian Svc Rte 92
Indian Svc Rte 783
Indian Svc Rte 89
Indian Svc Rte 842
Indian Svc Rte 88
Indian Svc Rte 85
Indian Svc Rte 84
Indian Svc Rte 86
Indian Svc Rte 87
Pueblo Route 85
Hwy 22
Hwy 25
Dam Crest Rd
Lagoon Rd
Robin St
Rte 85
Garro de Caballos
Acequia Rd
Sile Rd
Borrego Canyon Rd
Coral
Ideta St
Cedar Vista Ct
Sally Fb Ln
Arroyo Vega Tanos Rd
Arroyo Vega Tanos
Co Rd 57A
Hagen Rd
Hagen
Hillside
E Ridge
Tiosa
HAZARD LEGEND
Flood Hazard
High
Medium
0 4,250 8,500 17,000
Feet
Santo Domingo Pueblo
Flood
Hazard Profile Map
Map 2K1
Sources: Sandoval County, 2012; ESRI, 2012; Census, 2010; FEMA 2008
Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, and the GIS User Community

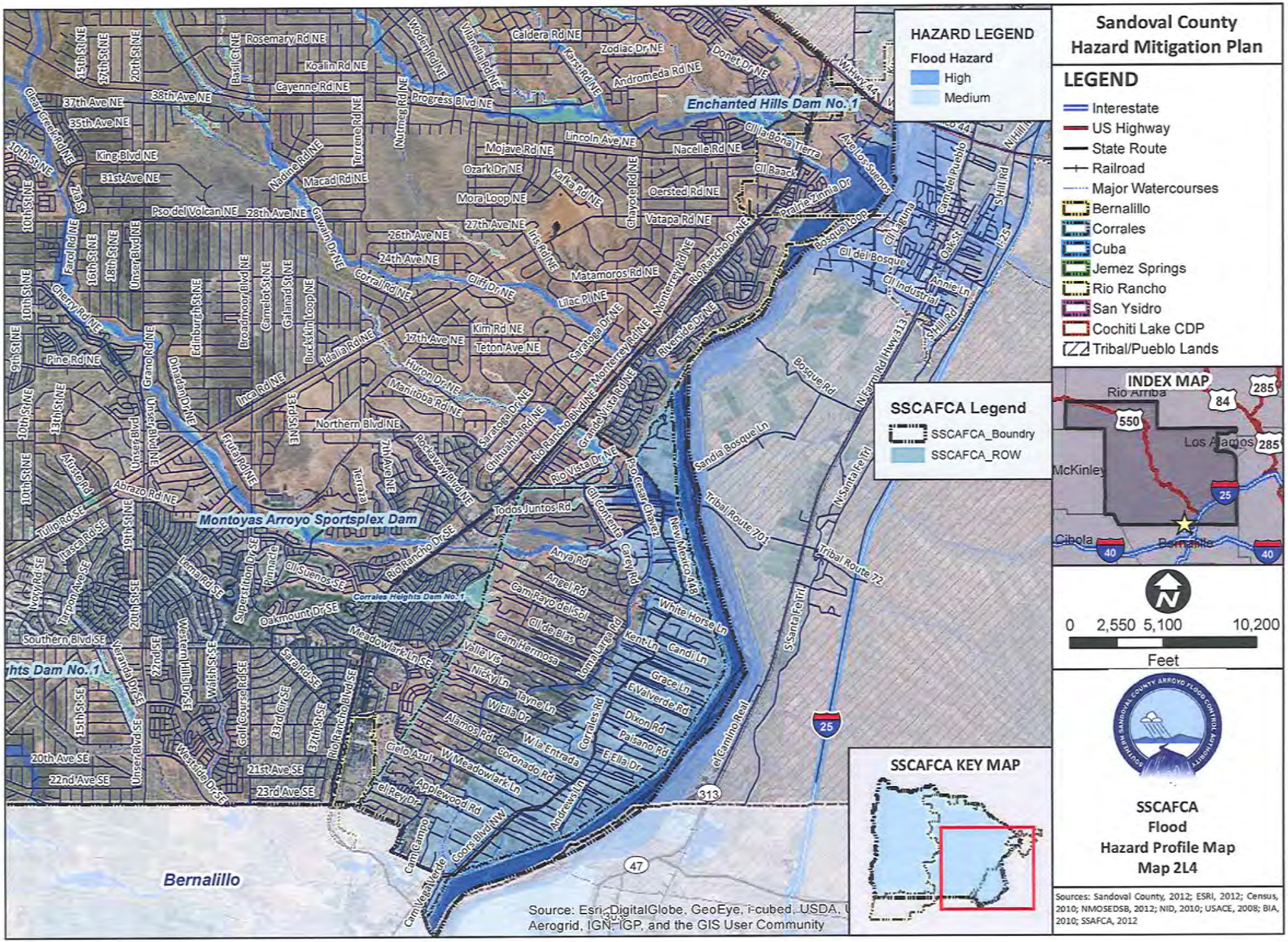

Sandoval County
Hazard Mitigation Plan
LEGEND
Interestate
US Highway
State Route
Railroad
Major Watercourses
Bernalillo
Corrales
Cuba
Jemez Springs
Rio Rancho
San Ysidro
Cochiti Lake CDP
Tribal/Pueblo Lands
INDEX MAP
Rio Arriba
84
285
550
Los Alamos
285
McKinley
25
Cibola
40
40
N
0 500 1,000 2,000
Feet
Santo Domingo Pueblo
Flood
Hazard Profile Map
Map 2K2
Sources: Sandoval County, 2012; ESRI, 2012; Census, 2010; FEMA 2008
HAZARD LEGEND
Flood Hazard
High
Medium
Hwy 22
22
I-25
25
Co Rd 57A
Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, and the GIS User Community


Indian Svc Rte 85
Hwy 22
Turquoise Ct
Turquoise St
Turquoise Dr
Moreno St
Bisbee St
Coral St
Coral Dr
Indian Svc Rte 88
Tesuque St
Cochiti St
Zia St
San Felipe 2
Indian Svc Rte 84
San Ildefonso
Ysleta St
22
HAZARD LEGEND
Flood Hazard
High
Medium
Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, 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
84
285
550
Los Alamos
285
McKinley
25
Cibola
40
40
N
0 500 1,000 2,000
Feet
Santo Domingo Pueblo
Flood
Hazard Profile Map
Map 2K3
Sources: Sandoval County, 2012; ESRI, 2012; Census, 2010; FEMA 2008


SSCAFCA Legend
SSCAFCA_Boundry
SSCAFCA_ROW
HAZARD LEGEND
Flood Hazard
High
Medium
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 KEY MAP
SSCAFCA
Flood
Hazard Profile Map
Map 2L1
Sources: Sandoval County, 2012; ESRI, 2012; Census, 2010; NMOSEDSB, 2012; NID, 2010; USACE, 2008; BIA, 2010; SSAFCA, 2012
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, IGP, and the GIS User Community
Vicksburg Rd NW
Everglades Rd NW
Rushmore Rd NW
Lares Ct NW
Gandalf Dr NW
Lothlorien Rd NW
Corrington Rd NW
Dolphin Rd NW
Avani Rd NW
Marlin Rd NW
Yeats Rd NW
Fox Rd NW
Nile Rd NW
Tiber Rd NW
Torch Rd NW
Pretoria Rd NW
Harmony Dr NW
Falcon Rd NW
Valor Rd NW
Progress Blvd NW
Artura Rd NW
Pablo Rd NW
Phoenix Rd NW
Columbia Rd
Olympus Dr NW
Apollo Rd NW
Perimon Rd NW
Farrell Rd NW
Bernstrom Rd NW
Mead Rd NW
Capra Rd NE
Sundance Rd NE
Oberon Rd NW
Lyric Rd NW
Aquarius Rd NW
Pleiades Dr NW
Marble Rd NE
Beryl Rd NE
Rainbow Blvd NW
Rainbow Blvd NE
Sheba Dr NW
Vermillion Rd NE
Stacl Rd NE
Sarita Rd NE
Reservoir Rd NE
Prelude Dr NE
Blue Grama Dr NE
Tamaqua Rd NE
Ginger Rd NE
Cayenne Rd NE
Curry Rd NE
Unser Blvd NE
Findlay St NE
Solar Dr NE
Bombay Rd NE
Surat Rd NE
20th St NE
17th St NE
Progress Blvd NE
Azure Dr NE
Azure NW
Venture Dr NW
Castle Rd NW
Walter Rd NE
Clear Creek Rd NE
37th Ave NE
38th Ave NE
35th Ave NE
King Blvd NE
32nd Ave NE
30th Ave NW
28th Ave NE
26th Ave NE
Date Rd NW
Riza Rd NW
Vista Rd NW
10th St NE
Seneca Rd NW
Frost Rd NW
Lion Rd NW
Encino Rd NW
Tamarack Rd NW
Gabbert Rd NW
Hagel Rd NW
Ariel Rd NW
King Blvd NW
Stirling Rd NW
Chacon Rd NW
Hidalgo Rd NW
Serenade St NW
7th St NW
18th St NW
16th St NW
14th St NW
49th Ave NW
47th Ave NW
46th Ave NW
45th Ave NW
43rd Ave NW
41st Ave NW
39th Ave NW
36th Ave NW
34th Ave NW
31st Ave NW
29th Ave NW
28th Ave NW
27th Ave NW
26th Ave NW
25th Ave NW
24th Ave NW
23rd Ave NW
21st Ave NW
20th Ave NW
19th Ave NW
18th Ave NW
18th Ave NE
60th St NW
55th St NW
50th St NW
48th St NW
40th St NW
37th St NW
35th St NW
33rd St NW
32nd St NW
31st St NW
30th St NW
29th St NW
25th St NW
23rd St NW
20th St NW
Espejo Rd NW


SSCAFCA Legend
SSCAFCA_Boundry
SSCAFCA_ROW
HAZARD LEGEND
Flood Hazard
High
Medium
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
SSCAFCA KEY MAP
0 2,550 5,100 10,200
Feet
SSCAFCA
Flood
Hazard Profile Map
Map 2L2
Enchanted Hills Dam No.1
Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, Aerogrid, IGN, IGP, and the GIS User Community
Sources: Sandoval County, 2012; ESRI, 2012; Census, 2010; NMOSEDSB, 2012; NID, 2010; USACE, 2008; BIA, 2010; SSAFCA, 2012


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
84
285
550
25
40
N
0 2,550 5,100 10,200
Feet
SSCAFCA KEY MAP
SSCAFCA
Flood
Hazard Profile Map
Map 2L3
Montoyas Arroyo Sportsplex Dam
Corrales Heights Dam No. 1
Bernalillo
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
Sources: Sandoval County, 2012; ESRI, 2012; Census, 2010; NMOSEDSB, 2012; NID, 2010; USACE, 2008; BIA, 2010; SSAFCA, 2012


HAZARD LEGEND
Flood Hazard
High
Medium
SSCAFCA Legend
SSCAFCA_Boundry
SSCAFCA_ROW
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
SSCAFCA KEY MAP
0 2,550 5,100 10,200
Feet
SSCAFCA
Flood
Hazard Profile Map
Map 2L4
Enchanted Hills Dam No. 1
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
Sources: Sandoval County, 2012; ESRI, 2012; Census, 2010; NMOSEDSB, 2012; NID, 2010; USACE, 2008; BIA, 2010; SSAFCA, 2012

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 available vacant developable land and 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.

Sandia Pueblo – The majority of Sandia Pueblo lands along the Rio Grande are protected from Rio Grande flooding by a levee. The significant portion of the population and infrastructure are located within these protected areas and there are no future development areas identified by the pueblo that will increase the current vulnerability of to flooding.

Santo Domingo Pueblo – There are currently no flood hazard areas delineated or mapped for the pueblo. Accordingly, it is unknown if future development will increase the vulnerability of the pueblo 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.

Sources

New Mexico Department of Homeland Security and Emergency Management, 2010, *New Mexico Natural Hazard Mitigation Plan,* approved October 2007, updated September 2010.

FEMA, 2001, Understanding Your Risks; Identifying Hazards and Estimating Losses, FEMA Document No. 386-2.

FEMA, 2008, *Digital Flood Insurance Rate Map Database, Sandoval County, NM*, effective date of March 18, 2008.

U.S. Dept of Commerce, National Climatic Data Center, 2012, Storm Events Database, accessed via the following URL: http://www.ncdc.noaa.gov/stormevents/

City of Rio Rancho, Historic hazard summaries posted at: http://ci.rio-rancho.nm.us/index.aspx?NID=455

Profile Maps

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

Maps 2E through 2L– Bernalillo, Corrales, Jemez Springs, Rio Rancho, San Ysidro, Sandia Pueblo, Santo Domingo Pueblo, and SSCAFCA Flood Hazard Maps

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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*.

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 August 2001, a lightning strike fried an entire pumping system on the Rio Rancho city water reservoir. The 7.5 million gallon reservoir dropped to less than 600 thousand gallons before the pump system was restored. Damages and restoration costs were estimated to exceed $100,000. (NCDC, 2012).
- In September 2002, A strong thunderstorm developed over south central Sandoval County south of Cuba and then moved eastward with a swath of hail and gusty winds. Funnel clouds, hail and gusty winds caused approximately $30,000 in

damages at the Ponderosa winery. Additional funnel clouds and hail were reported near Bernalillo and over far northern sections of Rio Rancho. (NCDC, 2012

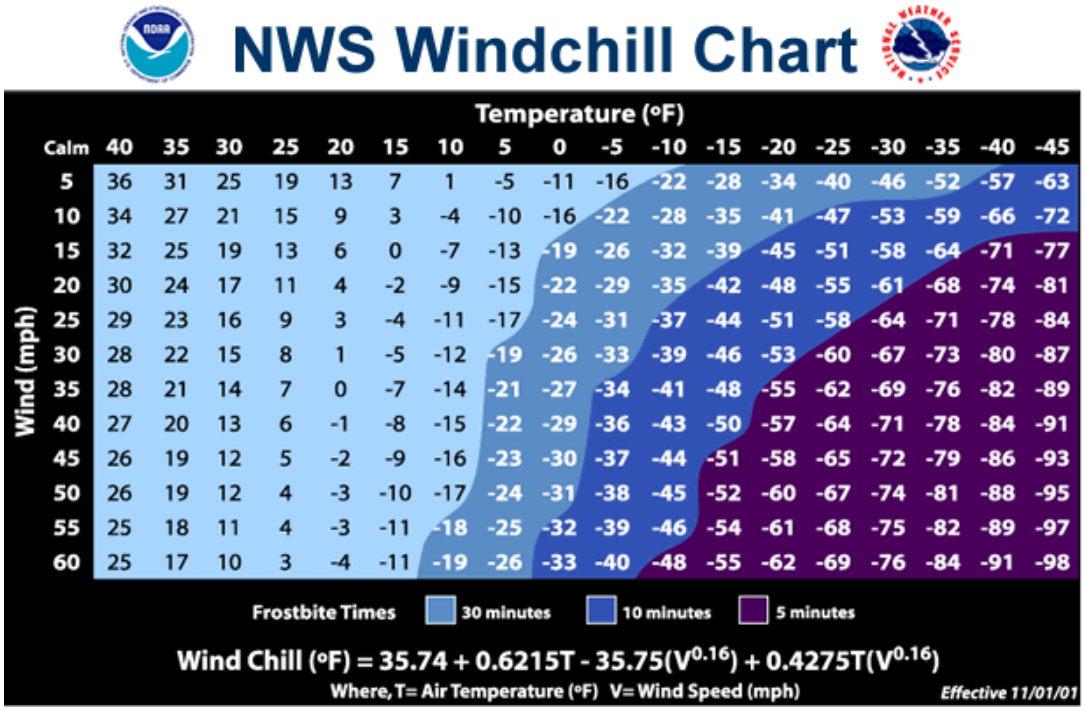
- In March 2005, a major winter storm paralyzed the state only days after 70 degree temperatures were enjoyed. I-25 closed to north and I-40 to east at Albuquerque. Rio Rancho received 6-9" of snow, highest amounts north and east; Sandia Crest recorded 24". There were numerous minor accidents but no reported casualties or losses. (City of Rio Rancho, 2012)
- 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)

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:



NWS Windchill Chart

Wind (mph) \ Temperature (°F)	Calm	40	35	30	25	20	15	10	5	0	-5	-10	-15	-20	-25	-30	-35	-40	-45
5		36	31	25	19	13	7	1	-5	-11	-16	-22	-28	-34	-40	-46	-52	-57	-63
10		34	27	21	15	9	3	-4	-10	-16	-22	-28	-35	-41	-47	-53	-59	-66	-72
15		32	25	19	13	6	0	-7	-13	-19	-26	-32	-39	-45	-51	-58	-64	-71	-77
20		30	24	17	11	4	-2	-9	-15	-22	-29	-35	-42	-48	-55	-61	-68	-74	-81
25		29	23	16	9	3	-4	-11	-17	-24	-31	-37	-44	-51	-58	-64	-71	-78	-84
30		28	22	15	8	1	-5	-12	-19	-26	-33	-39	-46	-53	-60	-67	-73	-80	-87
35		28	21	14	7	0	-7	-14	-21	-27	-34	-41	-48	-55	-62	-69	-76	-82	-89
40		27	20	13	6	-1	-8	-15	-22	-29	-36	-43	-50	-57	-64	-71	-78	-84	-91
45		26	19	12	5	-2	-9	-16	-23	-30	-37	-44	-51	-58	-65	-72	-79	-86	-93
50		26	19	12	4	-3	-10	-17	-24	-31	-38	-45	-52	-60	-67	-74	-81	-88	-95
55		25	18	11	4	-3	-11	-18	-25	-32	-39	-46	-54	-61	-68	-75	-82	-89	-97
60		25	17	10	3	-4	-11	-19	-26	-33	-40	-48	-55	-62	-69	-76	-84	-91	-98

Frostbite Times: 30 minutes | 10 minutes | 5 minutes

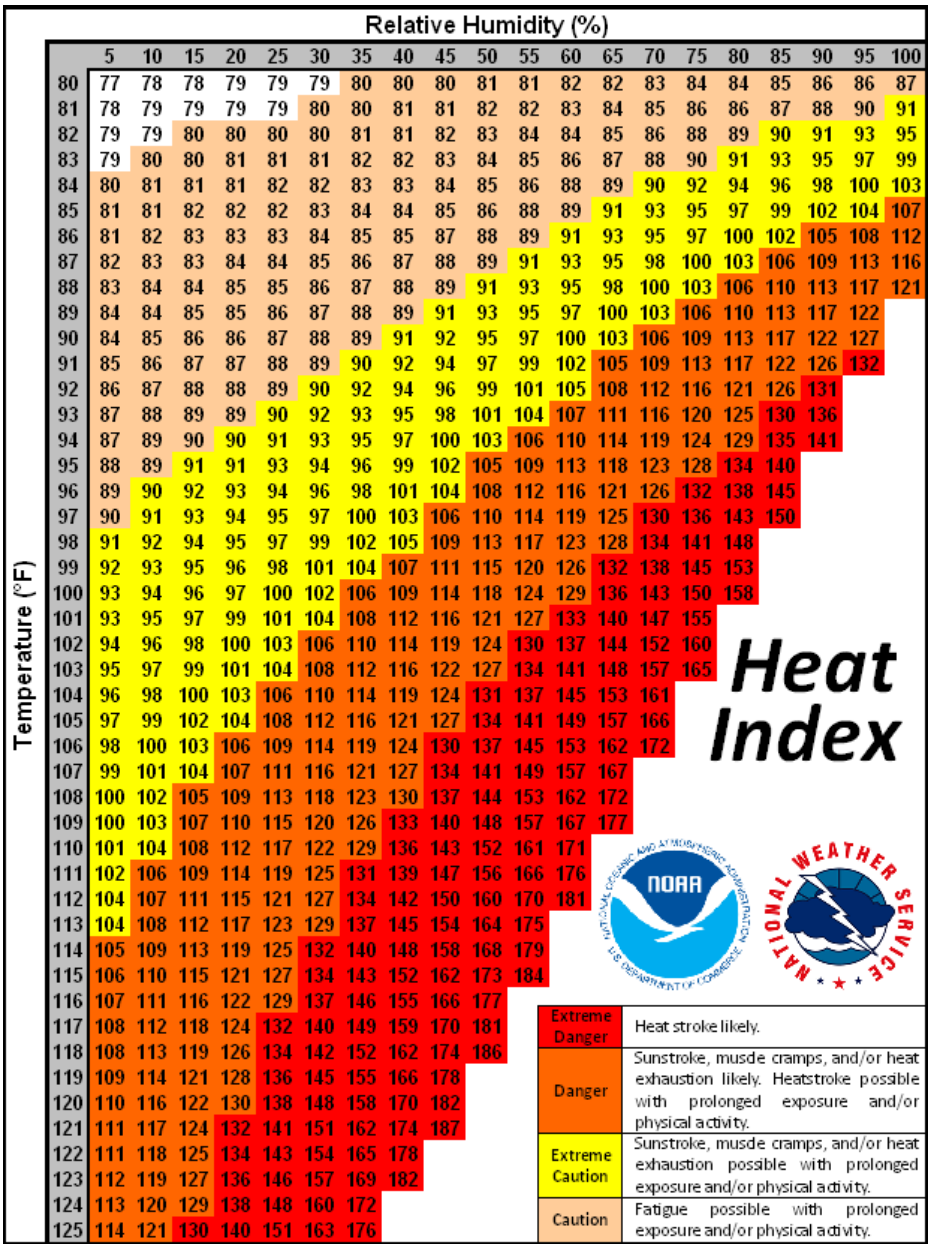
$$\text{Wind Chill (°F)} = 35.74 + 0.6215T - 35.75(V^{0.16}) + 0.4275T(V^{0.16})$$

Where, T= Air Temperature (°F) V= Wind Speed (mph) *Effective 11/01/01*

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.



	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100
80	77	78	78	79	79	79	80	80	80	81	81	82	82	83	84	84	85	86	86	87
81	78	79	79	79	79	80	80	81	81	82	82	83	84	85	86	86	87	88	90	91
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
84	80	81	81	81	82	82	83	83	84	85	86	88	89	90	92	94	96	98	100	103
85	81	81	82	82	82	83	84	84	85	86	88	89	91	93	95	97	99	102	104	107
86	81	82	83	83	83	84	85	85	87	88	89	91	93	95	97	100	102	105	108	112
87	82	83	83	84	84	85	86	87	88	89	91	93	95	98	100	103	106	109	113	116
88	83	84	84	85	85	86	87	88	89	91	93	95	98	100	103	106	110	113	117	121
89	84	84	85	85	86	87	88	89	91	93	95	97	100	103	106	110	113	117	122	
90	84	85	86	86	87	88	89	91	92	95	97	100	103	106	109	113	117	122	127	
91	85	86	87	87	88	89	90	92	94	97	99	102	105	109	113	117	122	126	132	
92	86	87	88	88	89	90	92	94	96	99	101	105	108	112	116	121	126	131		
93	87	88	89	89	90	92	93	95	98	101	104	107	111	116	120	125	130	136		
94	87	89	90	90	91	93	95	97	100	103	106	110	114	119	124	129	135	141		
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, and 1-5 provides a depiction of the historic temperature extremes for the Corrales, Jemez Springs, and Cuba 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 2010 State Plan, 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 table is a combination of NOAA and the Tornado and Storm Research Organization (TORRO) size and damage intensity classifications for hail.

Combined NOAA/TORRO Hailstorm Intensity Scales

Size Code	Intensity Category	Typical Hail Diameter (inches)	Approximate Size	Typical Damage Impacts
H0	Hard Hail	up to 0.33	Pea	No damage
H1	Potentially Damaging	0.33-0.60	Marble or Mothball	Slight damage to plants, crops
H2	Potentially Damaging	0.60-0.80	Dime or grape	Significant damage to fruit, crops, vegetation
H3	Severe	0.80-1.20	Nickel to Quarter	Severe damage to fruit and crops, damage to glass and plastic structures, paint and wood scored
H4	Severe	1.2-1.6	Half Dollar to Ping Pong Ball	Widespread glass damage, vehicle bodywork damage
H5	Destructive	1.6-2.0	Silver dollar to Golf Ball	Wholesale destruction of glass, damage to tiled roofs, significant risk of injuries
H6	Destructive	2.0-2.4	Lime or Egg	Aircraft bodywork dented, brick walls pitted
H7	Very destructive	2.4-3.0	Tennis ball	Severe roof damage, risk of serious injuries
H8	Very destructive	3.0-3.5	Baseball to Orange	Severe damage to aircraft bodywork
H9	Super Hailstorms	3.5-4.0	Grapefruit	Extensive structural damage. Risk of severe or even fatal injuries to persons caught in the open
H10	Super Hailstorms	4+	Softball and up	Extensive structural damage. Risk of severe or even fatal injuries to persons caught in the open

Source: 2010 State Plan, Table 8, page 39

Figure 3-5 depicts past historic locations of hailstorms and their severity for Sandoval County and the surrounding area. Data for this map covers a period of 1955-2010 and there are 39 incidents reported for Sandoval County, of which, a total of 37 occurred during 1990-2010.

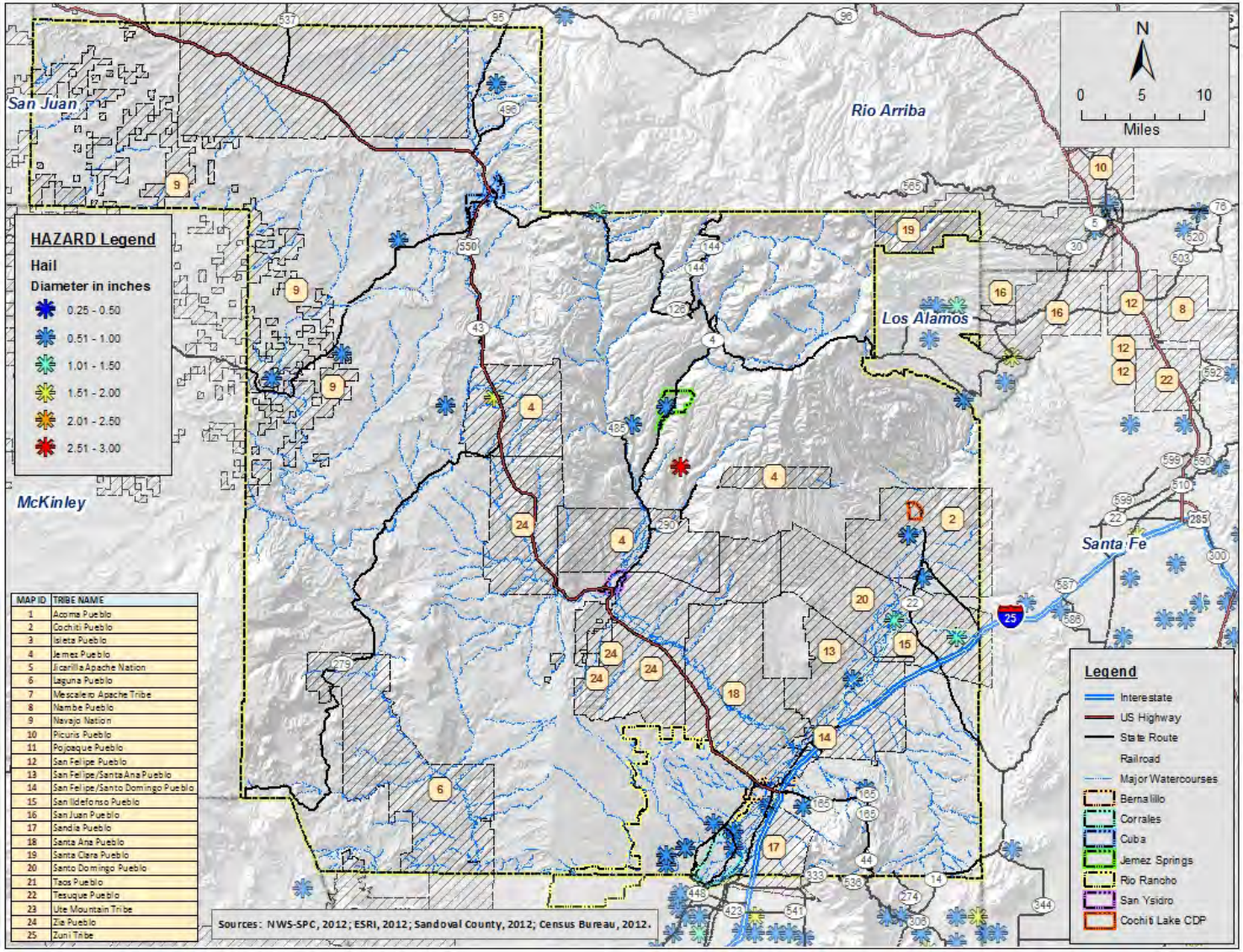
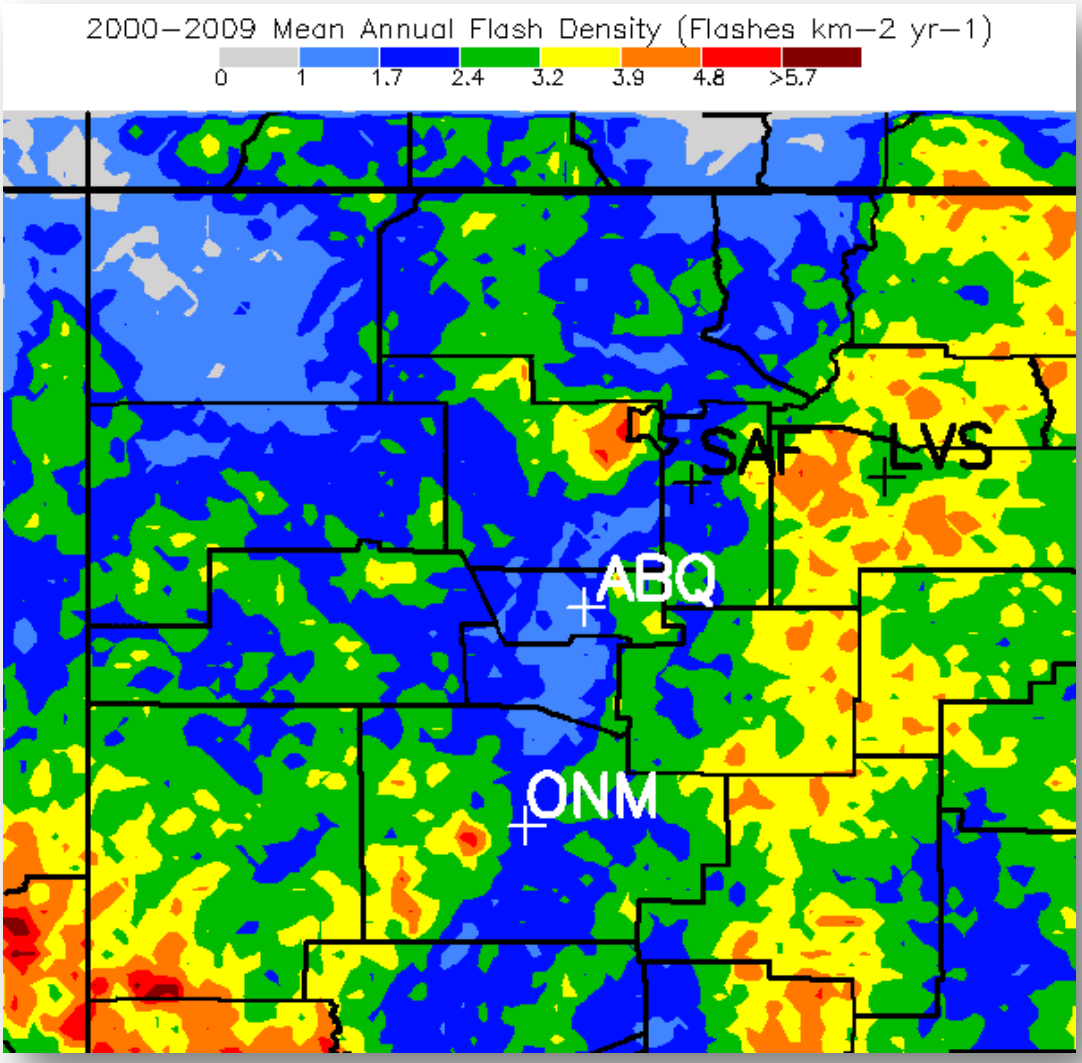


Figure 3-5: Historic Hail Incident Map

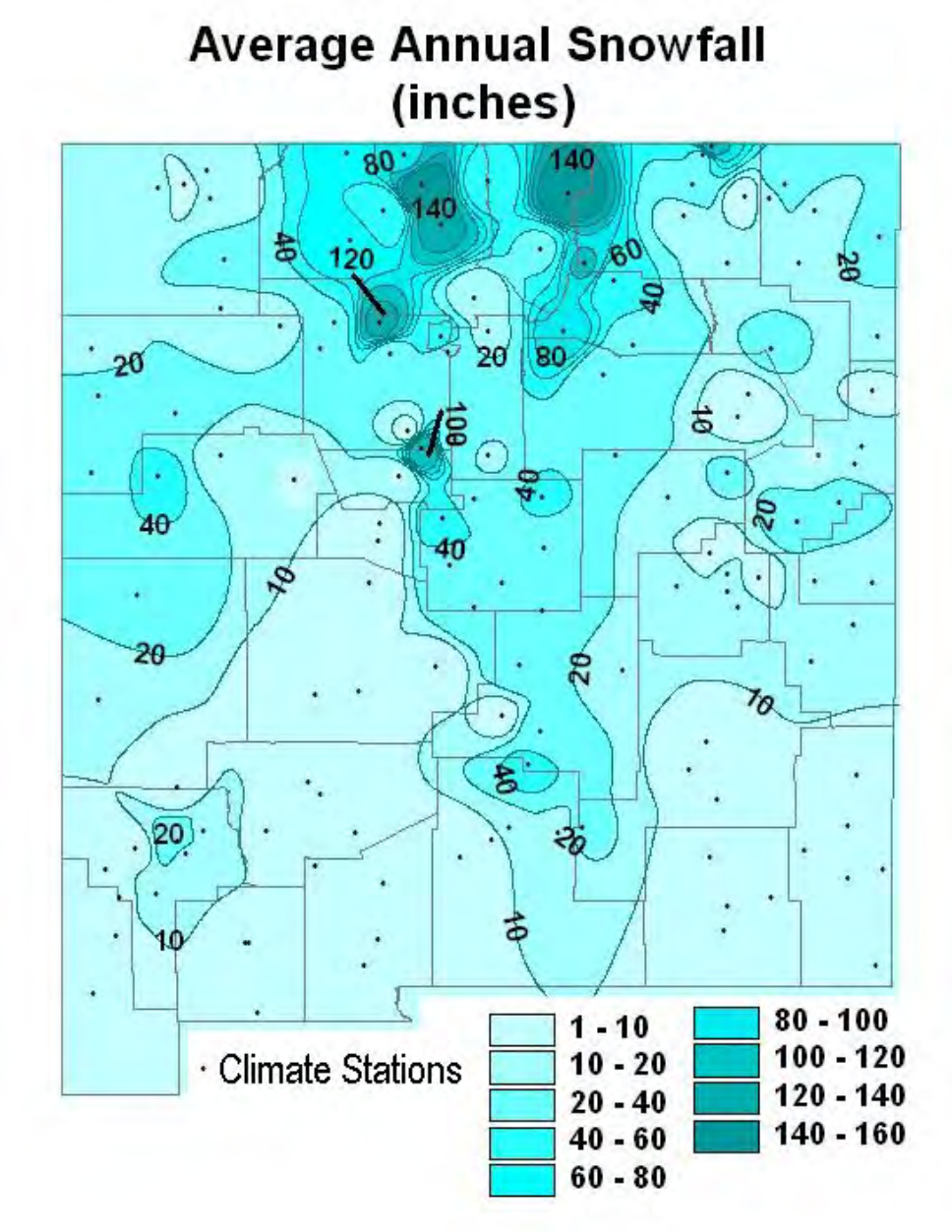
Lightning – According to Table 3-2, there have been four (4) reported incidents of lightning strike with at least one fatality and/or injury and/or property loss. Lightning strikes, however, occur routinely throughout the thunderstorm season and less frequently throughout the rest of the year, with an 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.



Source: CIAMS, 2012

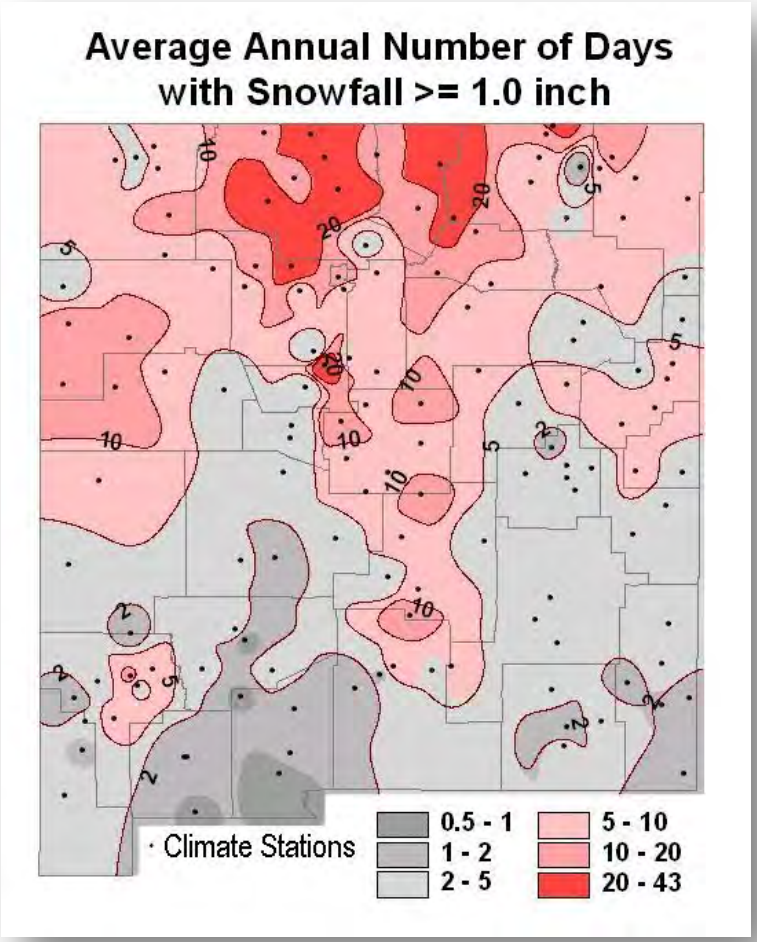
Figure 3-6: Lightning Flash Density Map

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.

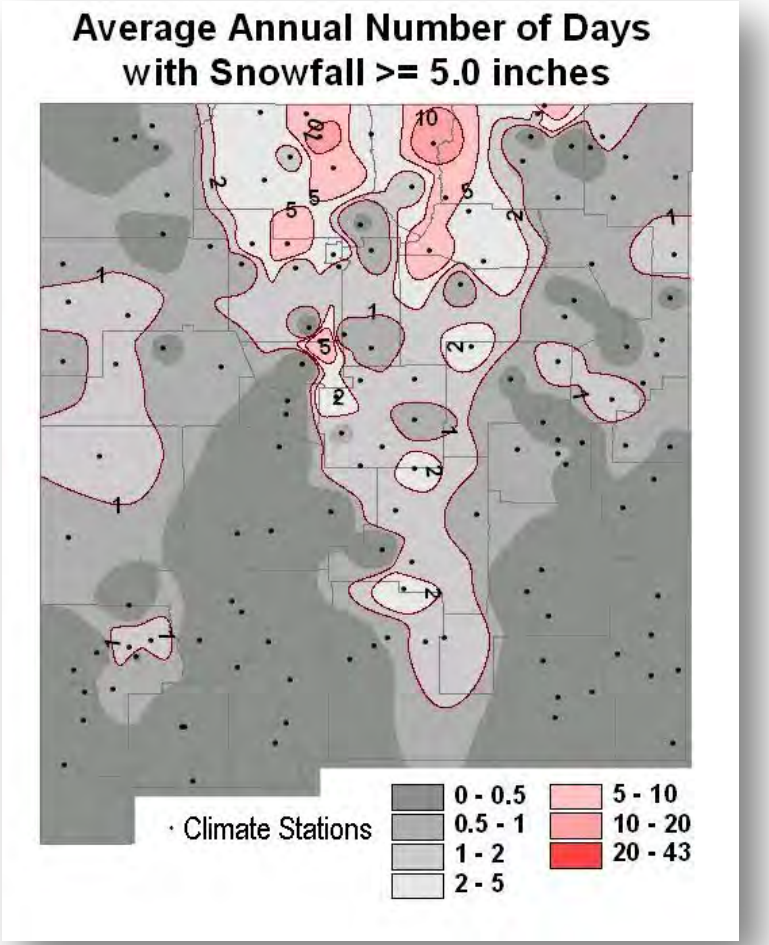


Source: ABQ-NWSFO, 2012

Figure 3-7: Average Annual Snowfall Map



Source: ABQ-NWSFO, 2012



Source: ABQ-NWSFO, 2012

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 3-11, 3-12, 3-13 and 3-14 below.

Table 3-11: 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
Sandia, Pueblo of	Possible	Critical	6-12 hours	< 24 hours	2.45
Santo Domingo, Pueblo of	Unlikely	Negligible	12-24 hours	< 24 hours	1.25
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 =	**2.63**

Table 3-12: 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
Sandia, Pueblo of	Likely	Limited	< 6 hours	< 6 hours	2.65
Santo Domingo, Pueblo of	Possible	Limited	< 6 hours	< 6 hours	2.20
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 =	**2.61**

Table 3-13: 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
Sandia, Pueblo of	Likely	Limited	< 6 hours	< 6 hours	2.65
Santo Domingo, Pueblo of	Likely	Negligible	< 6 hours	< 6 hours	2.35
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 =	**2.88**

Table 3-14: 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
Sandia, Pueblo of	Possible	Limited	6-12 hours	< 24 hours	2.15
Santo Domingo, Pueblo of	Possible	Limited	< 6 hours	< 6 hours	2.20
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 =	**2.46**

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. An early October 2007 hail storm over the Albuquerque area caused over $40 million in insurance claims. 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 3-15.

Sources

Cooperative Institute for Applied Meteorological Sciences, 2012, Regional Lightning Flash Density Map for the Albuquerque Area, as accessed at: http://atmo.tamu.edu/ciams/index.php/regional-us-lightning-maps/southern-states/albuquerque-new-mexico/7-nws-lightning-maps/135-albuquerque-2000-2009-flash-density

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

National Weather Service, URL: http://www.nws.noaa.gov/om/windchill/

National Weather Service Forecast Office – Albuquerque, URL: http://www.srh.noaa.gov/abq/?n=prepwinterwxproducts

New Mexico Department of Homeland Security and Emergency Management, 2010, *New Mexico Natural Hazard Mitigation Plan*.

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

Profile Maps – See the preceding figures and maps for hazard profile information. No additional mapping is provided.

Table 3-15: 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.
Cuba	Moderately High	Moderate	Moderate	Moderately High	Moderately High	Yes	Cuba's geographic location at the western foothills of the Southern Rocky Mountains and eastern edge of the Colorado Plateau exposes the Village to colder temperatures than heavier snowfall than the southern areas of the county. This elevated exposure coupled with the remoteness of the Village, elevate its vulnerability to moderately high.

Table 3-15: Severe Weather vulnerability rating crosswalk

Jurisdiction	Vulnerability Rating					Mitigation Priority?	Notes
	Extreme Temp.	Hail	Lightning	Winter Storm	COMPOSITE		
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	Moderately Low	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.

Table 3-15: Severe Weather vulnerability rating crosswalk

Jurisdiction	Vulnerability Rating					Mitigation Priority?	Notes
	Extreme Temp.	Hail	Lightning	Winter Storm	COMPOSITE		
Sandia Pueblo	Moderately Low	Moderate	Moderate	Moderately Low	Moderate	Yes	Sandia Pueblo is exposed to moderately low to moderate Severe Weather hazards, however, many of the older buildings and residences in the Pueblo are not constructed to current building code standards, which 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.
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.

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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

According to Table 3-2, there have been at least 48 severe wind events documented for Sandoval County with at least 2 associated injuries and almost $0.5 million in reported damages. 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 five years:

- In June 2007, a tornado was first spotted two miles south of Domingo in extreme eastern Sandoval County near Interstate 25. It continued east crossing into Santa Fe

County. The observer at the Santa Fe Municipal Airport reported seeing the tornado for 15 minutes. No damages were reported. (NCDC, 2012).

- In December 2007, A squall line moved through Corrales causing tree and structural damage. Several homes suffered roof, window or gutter damage. Roofs were blown off sheds and one metal shed was blown over completely. Several small evergreen trees were blown over and uprooted while a few cottonwood trees had large limbs broken. Over $100,000 in property damages were estimated. (NCDC, 2012).
- 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 Placita. Damages were estimated to exceed $10,000. (NCDC, 2012).

Figure 3-10 presents a depiction of historic severe wind incident locations as reported by the NCDC for the period of record up to January 2011. It is noted that this map is only intended to provide a visual view of incident locations, as provided in the NCDC 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.

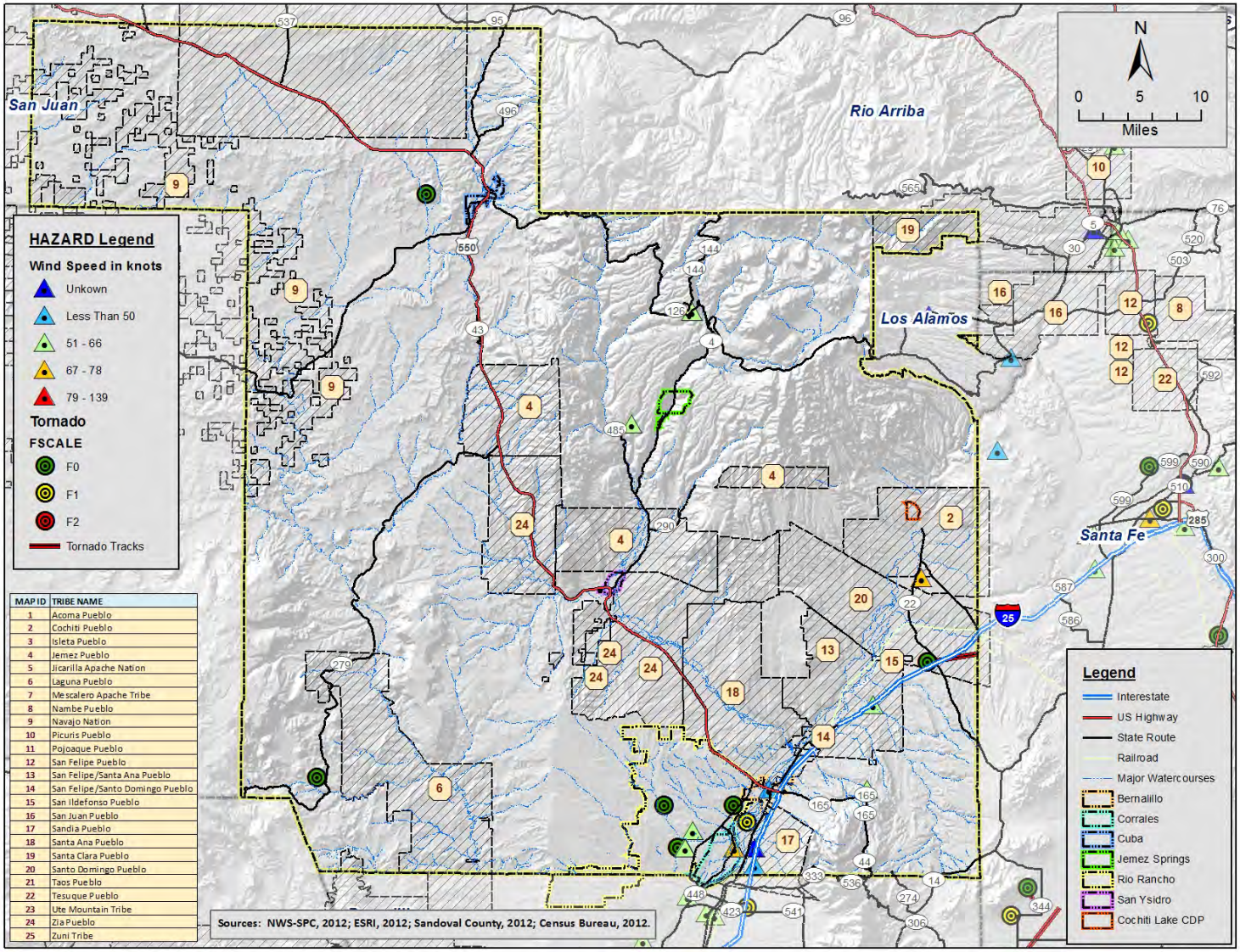
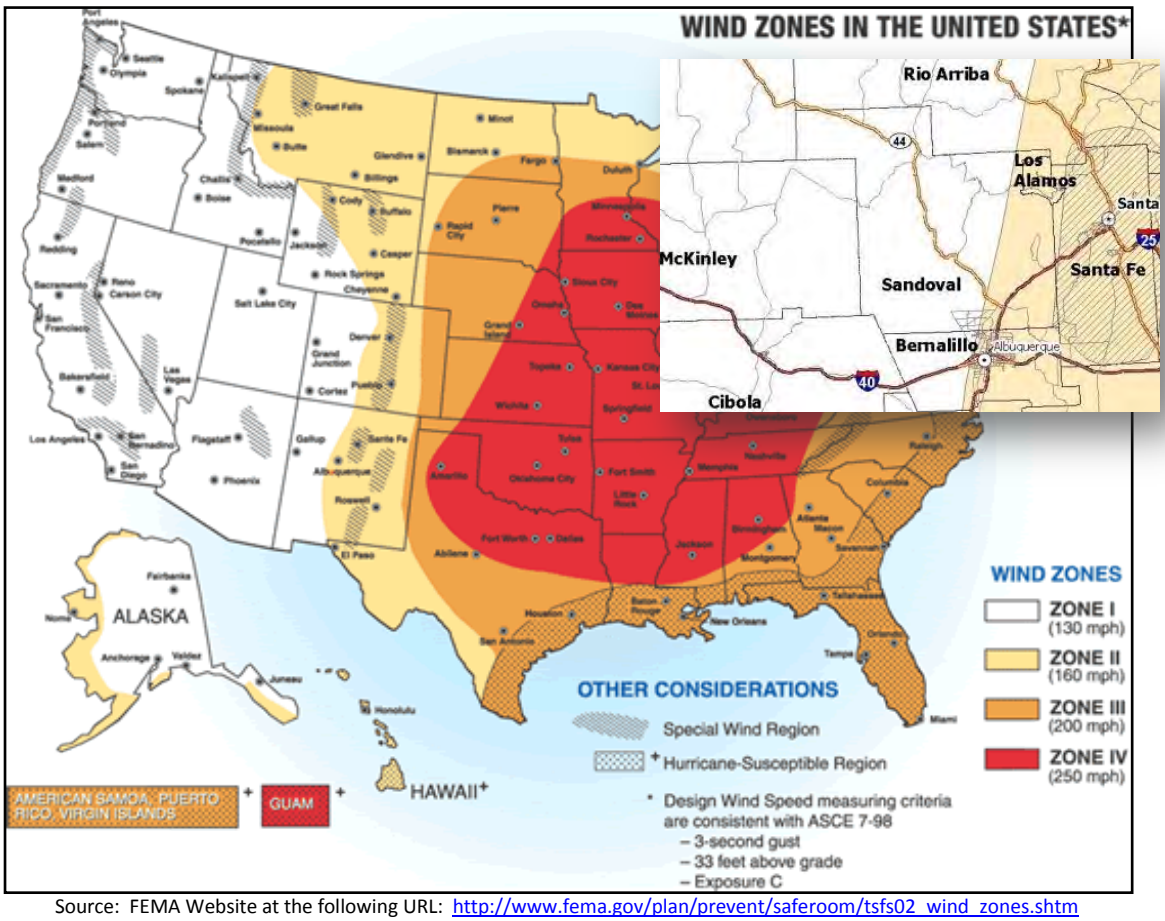


Figure 3-10: Map of Severe Wind events for Sandoval County

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.

The Beaufort Wind Scale, indicated by Table 3-16 shown below[37], 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.



Source: FEMA Website at the following URL: http://www.fema.gov/plan/prevent/saferoom/tsfs02_wind_zones.shtm
INSET: NMDHSEM, 2010

Figure 3-11
Illustration of FEMA Wind Zones

[37] Scale as depicted in the NM Natural Hazard Mitigation Plan, page 55.

Table 3-16: Beaufort Scale

Beaufort Wind Scale			
Beaufort Number	**Wind Speed mph**	**Description**	**Land Conditions**
0	0	Calm	Calm. Smoke rises vertically.
1	1-3	Light air	Wind motion visible in smoke.
2	4-7	Light breeze	Wind felt on exposed skin. Leaves rustle.
3	8-12	Gentle breeze	Leaves and smaller twigs in constant motion.
4	13-18	Moderate breeze	Dust and loose paper rises. Small branches begin to move.
5	19-24	Fresh breeze	Smaller trees sway.
6	25-31	Strong breeze	Large branches in motion. Whistling heard in overhead wires. Umbrella use becomes difficult.
7	32-38	Near gale	Whole trees in motion. Effort needed to walk against the wind.
8	39-46	Gale	Twigs broken from trees. Cars veer on road.
9	47-54	Strong gale	Light structure damage.
10	55-63	Storm	Trees uprooted. Considerable structural damage.
11	64-73	Violent storm	Widespread structural damage.
12	73-95	Hurricane	Considerable and widespread damage to structures.

Based on historic records, the likelihood of tornados occurring in Sandoval County is probable, but rare. Tornado damage severity is measured by the Fujita Tornado Scale, which assigns a numerical value of 0 to 5 based on wind speeds, as shown in Table 3-17, with the letter F preceding the number (e.g., FO, F1, F2). Most tornadoes last less than 30 minutes, but some last for over an hour. The path of a tornado can range from a few hundred feet to miles. The width of a tornado may range from tens of yards to more than a quarter of a mile.

Table 3-17: Fujita Tornado Scale

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

Source: FEMA, 1997.

Vulnerability – CPRI Results

Severe Wind CPRI results for each community are summarized in Table 3-18 below.

Table 3-18: 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
Sandia, Pueblo of	Likely	Limited	< 6 hours	< 6 hours	2.65
Santo Domingo, Pueblo of	Possible	Limited	< 6 hours	< 24 hours	2.30
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 =	**2.89**

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 (see Figure 3-11). Incidents are typically localized and damages associated with individual events are usually minor unless the event occurs within a densely populated area. Sandoval County jurisdictions have experienced approximately $0.5 million in documented damages between 1966 and 2011, and a total of $132,00 in damages from 22 events occurring since 2006. It is likely that the losses due to severe wind events are under-reported/documented. Of the 48 total events documented, there were no deaths and only two injuries reported. No estimates of losses for individual jurisdictions are made due to the lack of discrete data.

Vulnerability – Development Trend Analysis

Future development will expand the exposure of life and property to the damaging effects of severe wind events. Enforcement and/or implementation of modern building codes to regulate new developments 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 are considered to be equally vulnerable to the hazard of Severe Wind, as summarized by the crosswalk in Table 3-19.

For the most part, SSCAFCA facilities and infrastructure are not greatly impacted by Severe Wind events, and therefore, SSCAFCA's 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.

Table 3-19: Vulnerability crosswalk for severe wind			
Jurisdiction	**Vulnerability Rating**	**Mitigation Priority?**	**Notes**
Bernalillo, Corrales, Cuba, Jemez Springs, Rio Rancho, San Ysidro, Sandia Pueblo, 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 and 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, 2012, 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.

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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 draft Community Wildfire Protection Plan (CWPP) for Sandoval County (SWCA, 2012), 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. The National Wildfire Coordination Group (NWCG, 2011) has archived the ICS 209 reports for wildfires greater than 100 acres for the period of 2002 to 2011. Fires greater than 1,000 acres that have occurred in the last five years are described below in chronological order:

- On July 2, 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 and the approximate firefight costs exceeded $400,000. (NWGC, 2011).
- On June 1, 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 and firefight costs exceeded $3.0 million. (NWCG, 2011).
- On October 9, 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 to outbuildings and the approximate firefight costs exceeded $60,000. (NWCG, 2011).
- On June 26, 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 prompted evacuations of Los Alamos National Labs, Bandelier National Monument, the city of Los Alamos, as well as numerous other campgrounds and homes within the burn area itself. 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. The fire suppression costs were estimated to exceed $48 million. Damages were estimated to exceed $17 million, plus the additional, non-market value losses to cultural sites, habitat, recreational opportunities, and ecosystem services. (InciWeb, 2012; NWCG, 2011; NCDC, 2012).

Maps 3A through 3D provide a graphical depiction of the 100 acre plus wildfires for the 2002-2011 period (NWGC, 2011).

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.

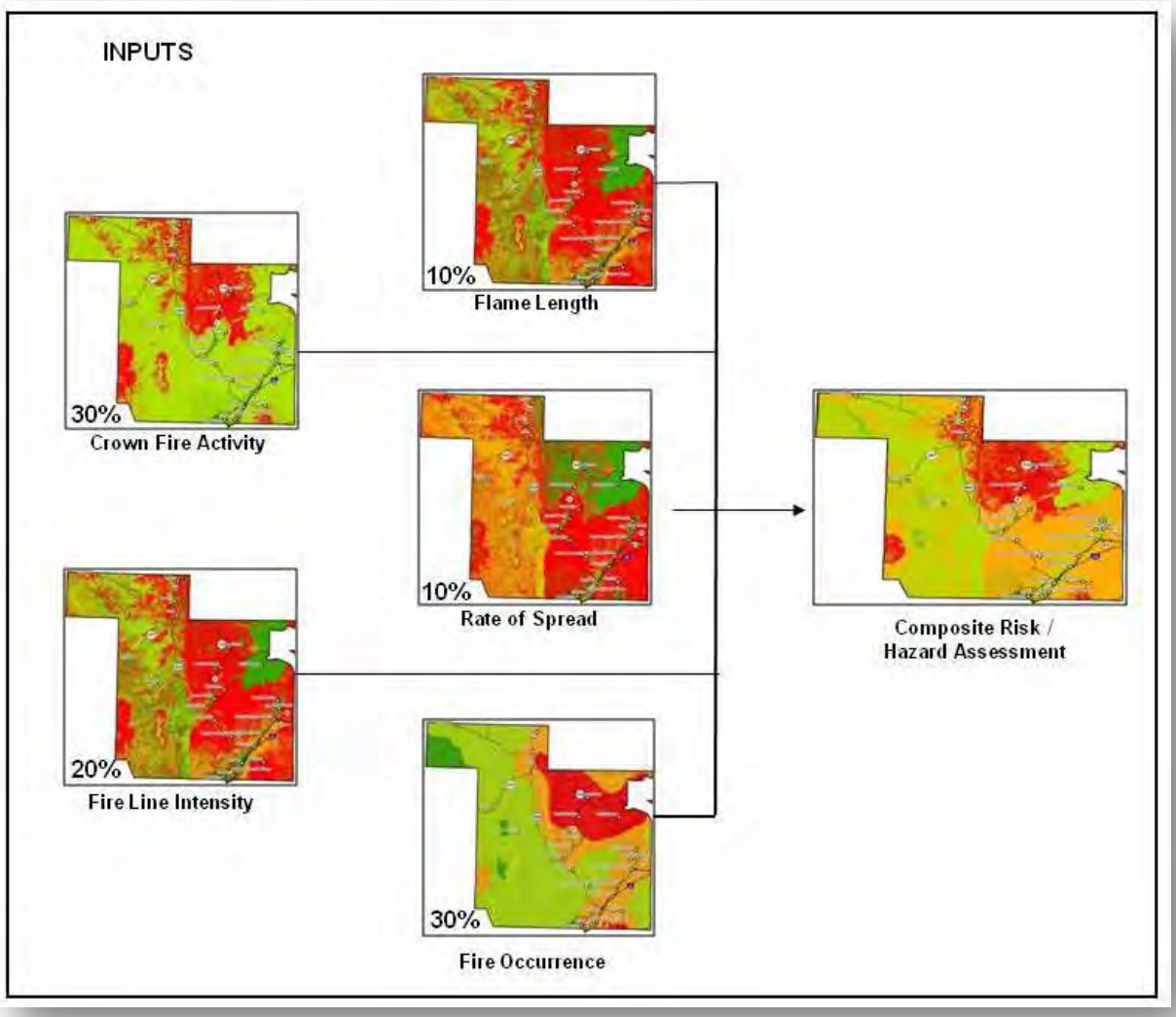
The wildfire composite risk coverage is a 30-meter (98 foot) raster grid, with raster values that range from 1-4 to represent a graduated scale of fire risk where 1 = LOW, 2 = MEDIUM 3 = HIGH, 4 = EXTREME. Each of these hazard classifications are adopted for this Plan.

Maps 3A through 3D show the wildfire hazard areas for the entire county. Maps 3E through 3L show the flood hazard areas for Bernalillo, Corrales, Jemez Springs, Rio Rancho, San Ysidro, Sandia Pueblo, Santo Domingo Pueblo and SSCAFCA.

Vulnerability – CPRI Results

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

Table 3-20: 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	6-12 hours	< 1 week	2.70
San Ysidro, Village of	Likely	Limited	< 6 hours	< 24 hours	2.75
Sandia, Pueblo of	Highly Likely	Catastrophic	< 6 hours	> 1 week	4.00
Santo Domingo, Pueblo of	Possible	Limited	< 6 hours	> 1 week	2.50
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 =	**3.37**



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.

Table 3-21: Sandoval County jurisdictional exposure and loss estimates due to wildfire

WILDFIRE HAZARD EXPOSURE / LOSS	Bernalillo	Corrales	Jemez Springs	Rio Rancho	San Ysidro	Sandia, Pueblo of	Santo Domingo, Pueblo of	SSCAFCA	Uninc. Sandoval County	Total [1]
Total Critical Facilities and Infrastructure	**34**	**27**	**9**	**122**	**8**	**11**	**7**	**34**	**16**	**268**
Estimated Replacement Cost (x $1,000)	**$0 [2]**	**$24,000**	**$10,275**	**$342,234**	**$2,550**	**$96,727**	**$61,200**	**$201,820**	**$56,850**	**$795,656**
Facilities Exposed to Extreme Hazard	0	0	6	0	0	0	0	0	0	6
Percentage of Total Facilities	0.00%	0.00%	66.67%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	4.11%
Estimated Replacement Cost (x $1,000)	$0	$0	$7,500	$0	$0	$0	$0	$0	$0	$7,500
Estimated Structure Loss (x $1,000)	$0	$0	$3,750	$0	$0	$0	$0	$0	$0	$3,750
Facilities Exposed to High Hazard	7	6	0	77	8	6	7	28	9	71
Percentage of Total Facilities	20.59%	22.22%	0.00%	63.11%	100.00%	54.55%	100.00%	82.35%	56.25%	48.63%
Estimated Replacement Cost (x $1,000)	$0	$5,000	$0	$150,802	$2,550	$54,412	$61,200	$145,800	$25,050	$294,012
Estimated Structure Loss (x $1,000)	$0	$1,000	$0	$30,160	$510	$10,882	$12,240	$29,160	$5,010	$58,802
Facilities Exposed to Medium Hazard	27	21	3	39	0	5	0	5	7	68
Percentage of Total Facilities	79.41%	77.78%	33.33%	31.97%	0.00%	45.45%	0.00%	14.71%	43.75%	46.58%
Estimated Replacement Cost (x $1,000)	$0	$19,000	$2,775	$188,249	$0	$35,315	$0	$54,520	$31,800	$143,410
Estimated Structure Loss (x $1,000)	$0	$950	$139	$9,412	$0	$1,766	$0	$2,726	$1,590	$7,171
Total Population	**8,307**	**8,231**	**278**	**87,444**	**165**	**907**	**3,255**	**n/a**	**14,140**	**131,564 [3]**
Population Exposed to Extreme Hazard	2	0	165	0	0	0	0	n/a	1,475	1,775
Percent Exposed	0.02%	0.00%	59.36%	0.00%	0.25%	0.00%	0.00%	n/a	10.43%	1.35%
Population Exposed to High Hazard	1,295	2,845	4	43,746	108	235	1,683	n/a	9,753	65,116
Percent Exposed	15.59%	34.57%	1.51%	50.03%	65.73%	25.93%	51.70%	n/a	68.98%	49.49%
Population Exposed to Medium Hazard	7,010	5,385	109	34,895	56	671	1,572	n/a	2,790	57,825
Percent Exposed	84.39%	65.43%	39.13%	39.91%	34.03%	74.07%	48.30%	n/a	19.73%	43.95%

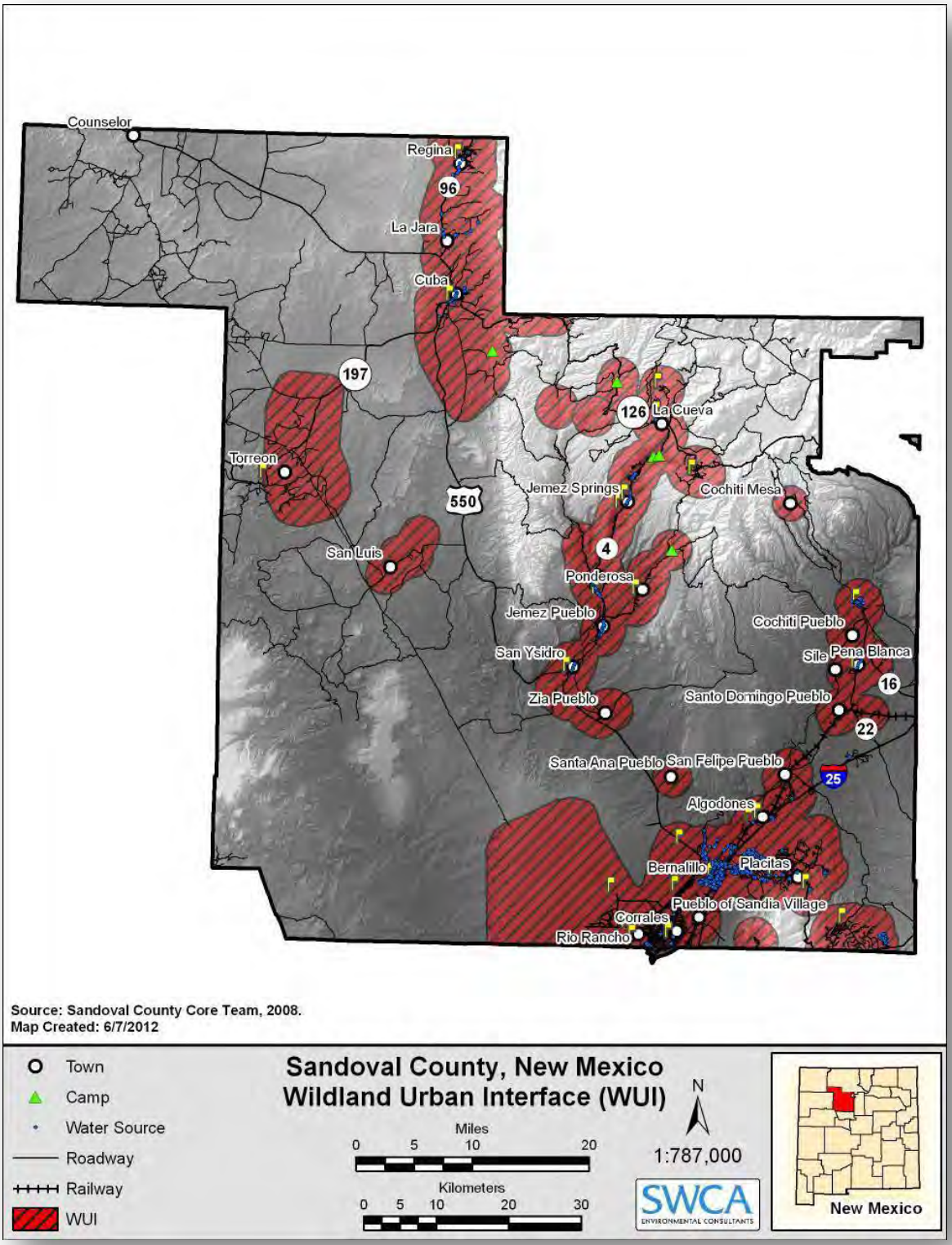
[1] Note that totals reported here are totals for the participating communities only.

[2] Bernalillo did not provided replacement costs for any CFI.

[3] Populations are countywide totals

Table 3-21: Sandoval County jurisdictional exposure and loss estimates due to wildfire

WILDFIRE HAZARD EXPOSURE / LOSS	Bernalillo	Corrales	Jemez Springs	Rio Rancho	San Ysidro	Sandia, Pueblo of	Santo Domingo, Pueblo of	SSCAFCA	Uninc. Sandoval County	Total [1]
Population Over 65	**1,113**	**1,600**	**83**	**9,437**	**30**	**95**	**240**	**n/a**	**2,353**	**15,880** [3]
Population Over 65 Exposed to Extreme Hazard	1	0	47	0	0	0	0	n/a	278	353
Percent Exposed	0.06%	0.00%	56.59%	0.00%	0.16%	0.00%	0.00%	n/a	11.83%	2.22%
Population Over 65 Exposed to High Hazard	192	527	1	3,472	20	17	116	n/a	1,656	6,577
Percent Exposed	17.21%	32.94%	1.46%	36.79%	65.02%	17.45%	48.14%	n/a	70.36%	41.42%
Population Over 65 Exposed to Medium Hazard	921	1,073	35	5,246	10	78	124	n/a	412	8,467
Percent Exposed	82.73%	67.05%	41.95%	55.59%	34.83%	82.55%	51.86%	n/a	17.52%	53.32%
Residential Building Count Totals)	**3,215**	**3,765**	**174**	**33,927**	**83**	**348**	**666**	**n/a**	**7,486**	**49,665**
Estimated Replacement Cost (x $1,000)	**$622,530**	**$2,222,247**	**$40,712**	**$10,178,234**	**$18,694**	**$69,431**	**$122,220**	**n/a**	**$2,799,780**	**$16,073,849**
Residential Bldgs Exposed to Extreme Hazard	1	0	115	0	0	0	0	n/a	1,324	1,439
Percentage of Total Residential Bldgs	0.03%	0.00%	65.68%	0.00%	0.26%	0.00%	0.00%	n/a	17.68%	2.90%
Estimate Exposed Replacement Cost (x $1,000)	$312	$0	$25,769	$0	$49	$0	$0	n/a	$272,247	$298,378
Estimated Residential Structure Losses (x $1,000)	$156	$0	$12,885	$0	$24	$0	$0	n/a	$136,123	$149,189
Residential Bldgs Exposed to High Hazard	479	1,277	3	15,938	55	85	333	n/a	4,630	22,801
Percentage of Total Residential Bldgs	14.90%	33.93%	1.87%	46.98%	65.67%	24.33%	50.04%	n/a	61.85%	45.91%
Estimate Exposed Replacement Cost (x $1,000)	$113,775	$672,204	$734	$4,781,579	$12,276	$18,919	$61,999	n/a	$2,038,688	$7,700,174
Estimated Residential Structure Losses (x $1,000)	$22,755	$134,441	$147	$956,316	$2,455	$3,784	$12,400	n/a	$407,738	$1,540,035
Residential Bldgs Exposed to Medium Hazard	2,735	2,488	57	14,517	28	264	333	n/a	1,493	21,913
Percentage of Total Residential Bldgs	85.07%	66.07%	32.45%	42.79%	34.07%	75.67%	49.96%	n/a	19.94%	44.12%
Estimate Exposed Replacement Cost (x $1,000)	$508,443	$1,550,040	$14,209	$4,355,184	$6,369	$50,512	$60,221	n/a	$478,031	$7,023,008
Estimated Residential Structure Losses (x $1,000)	$25,422	$77,502	$710	$217,759	$318	$2,526	$3,011	n/a	$23,902	$351,150



Source: SWCA, 2012 – Figure 3.1, page 26

Figure 3-13
CWPP wildfire urban interface for Sandoval County

Vulnerability – Jurisdictional Summary

The CWPP provides a summary of risk assessments for various areas within the WUI. Two types of wildfire risk assessments were performed and documented as follows:

- **Community Hazard/Risk Assessment (CommRA)** - Field assessments that were performed for each WUI community in the County. Road access, fuels, topography, and community characteristics were evaluated using a National Fire Protection Association (NFPA) form.
- **Composite Risk Assessment (CompRA)** - Fire behavior model outputs (hazard) were combined with geographic fire occurrence data (risk) in a weighted overlay to produce a Composite Risk Assessment.

The following crosswalk in Table 3-22 presents an overall summary of each jurisdiction's vulnerability to Wildfire as presented in the CWPP.

Table 3-22: Vulnerability crosswalk for severe wind

Jurisdiction	Community RA / Composite RA	Mitigation Priority?	Notes
Bernalillo	Moderate / Moderate	Yes	Bernalillo's primary wildfire risk is associated with the bosque areas along the Rio Grande. The remainder of the Town is generally at a Moderate to Low wildfire risk. Mitigation of wildfire risk along the bosque will continue to be a priority for the Town.
Corrales	Moderate/High / Moderate/High	Yes	Wildfire risk for Corrales was evaluating by splitting Corrales into east and west portions. East Corrales was given a High risk 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 risk due to the lighter density vegetation and greater defensible space. Wildfire mitigation will continue to be a priority for the Village.
Jemez Springs	High / 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 risk assessed for the Village. Wildfire mitigation is definitely a priority for Jemez Springs.
Rio Rancho	Low/Moderate / Moderate	Yes	Rio Rancho's primary wildfire focus are the areas close to the mesquite bosque along the Rio Grande and the perimeter areas of the built environment.

Table 3-22: Vulnerability crosswalk for severe wind			
Jurisdiction	**Community RA** **Composite RA**	**Mitigation Priority?**	**Notes**
San Ysidro	High Moderate	Yes	In the CWPP, the Village's community risk 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 risk to a High category and make wildfire a mitigation priority for the Village.
Sandia Pueblo	(None Provided) Moderate/High	Yes	The Sandia Pueblo lands encompass a diverse range of wildfire conditions that include heavy mesquite bosque and salt cedar along the Rio Grande to sparse brush and grasses along the geologic terrace up to the Sandia Mountain foothills.
Santo Domingo Pueblo	Moderate Moderate-High	Yes	The flat terrain, relatively light fuels, and adequate defensible space lower the wildfire risk, while narrow roads, lack of turnarounds and street signs, and no fire station are cited as increased risk factors. The exposure and vulnerability is sufficient to make wildfire mitigation a priority for the pueblo.
SSAFCA	Nuisance 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 (Bernalillo, Corrales, Rio Rancho, and Unincorporated Sandoval County). Accordingly, no wildfire mitigation actions/projects will be developed by SSCAFCA.
Unincorporated Sandoval County	Moderate/Extreme 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/

National Wildfire Coordination Group, 2011, Historical ICS 209 reports at: http://fam.nwcg.gov/fam-web/hist_209/report_list_209

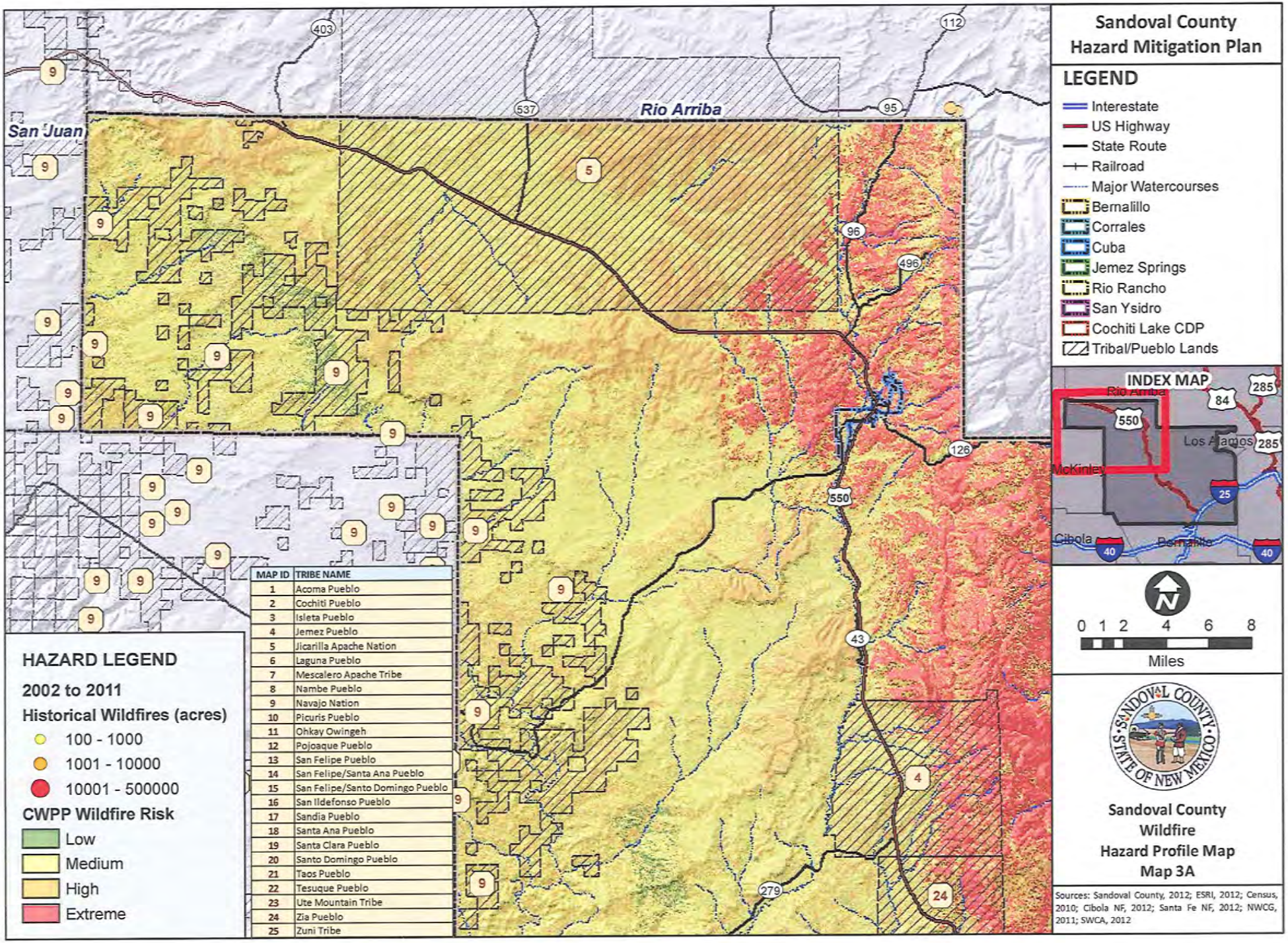
New Mexico State Forestry, 2012, GIS fire history data for private and State Lands, provided by Trent Botkin.

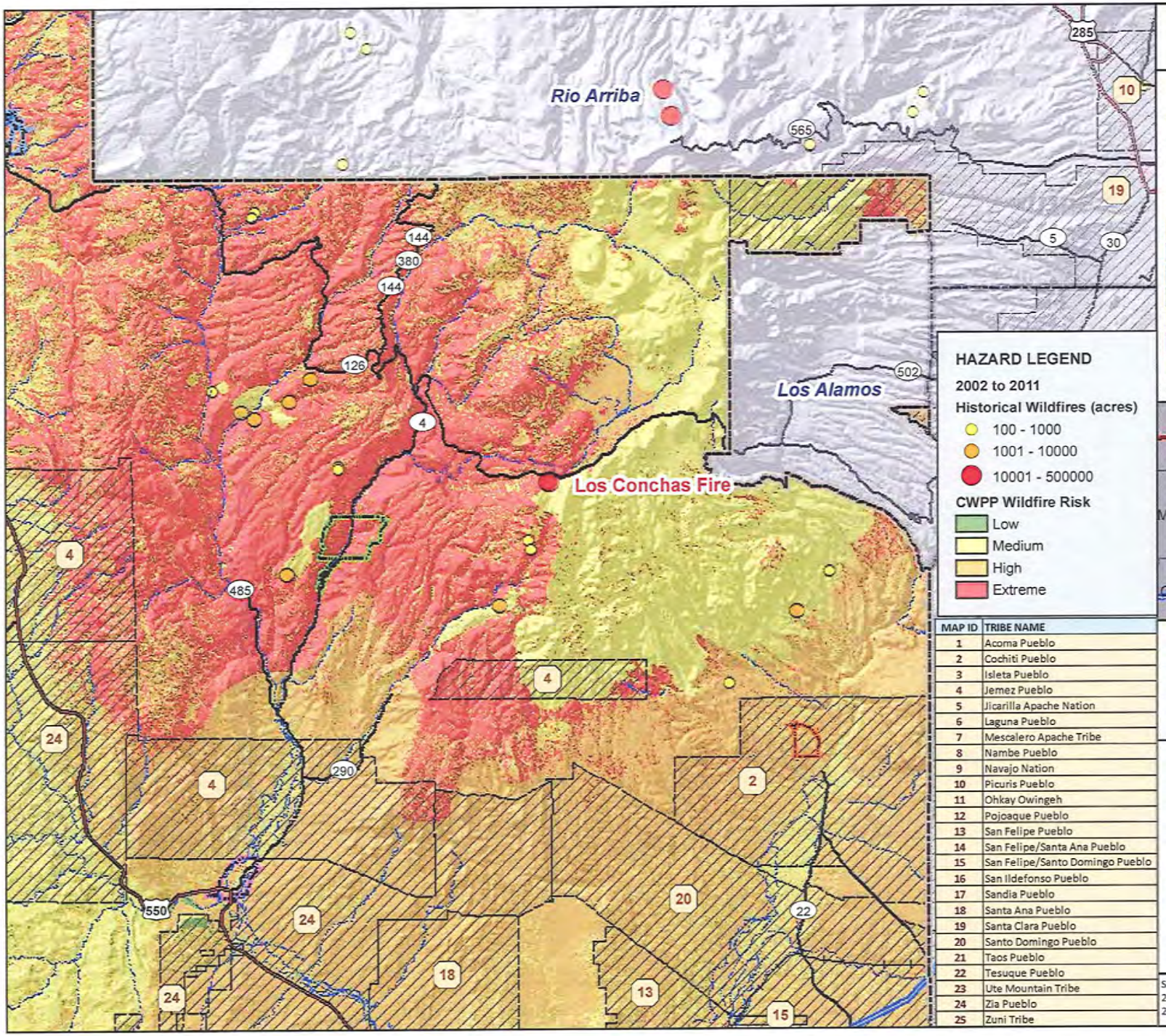
SWCA Environmental Consultants, Inc., 2012, *Sandoval County Community Wildfire Protection Plan*, draft dated August 2012.

Profile Maps

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

Maps 3E through 3L– Bernalillo, Corrales, Jemez Springs, Rio Rancho, San Ysidro, Sandia Pueblo, Santo Domingo Pueblo and SSCAFCA Wildfire Hazard Maps


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
Los Alamos
Cibola
Sandoval
San Juan
Rio Arriba
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
0 1 2 4 6 8
Miles
SANDOVAL COUNTY · STATE OF NEW MEXICO ·
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



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

HAZARD LEGEND

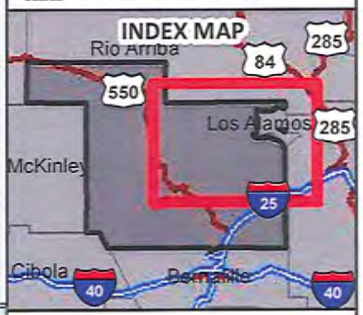
2002 to 2011

Historical Wildfires (acres)

- 100 - 1000
- 1001 - 10000
- 10001 - 500000

CWPP Wildfire Risk

- Low
- Medium
- High
- Extreme



N

0 1 2 4 6 8

Miles

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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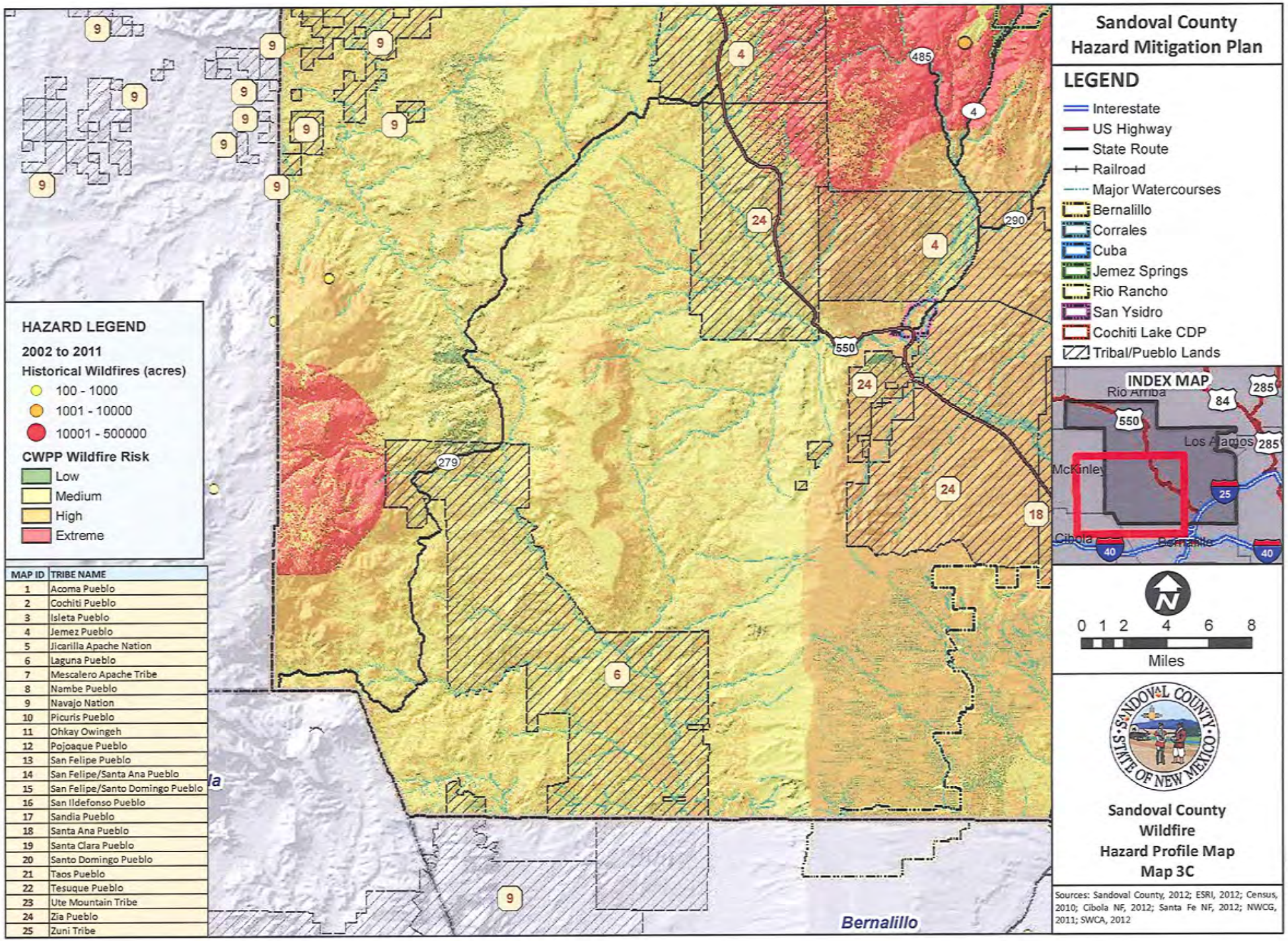
Sandoval County Wildfire Hazard Profile Map Map 3B

Sources: Sandoval County, 2012; ESRI, 2012; Census, 2010; Cibola NF, 2012; Santa Fe NF, 2012; NWCG, 2011; SWCA, 2012



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
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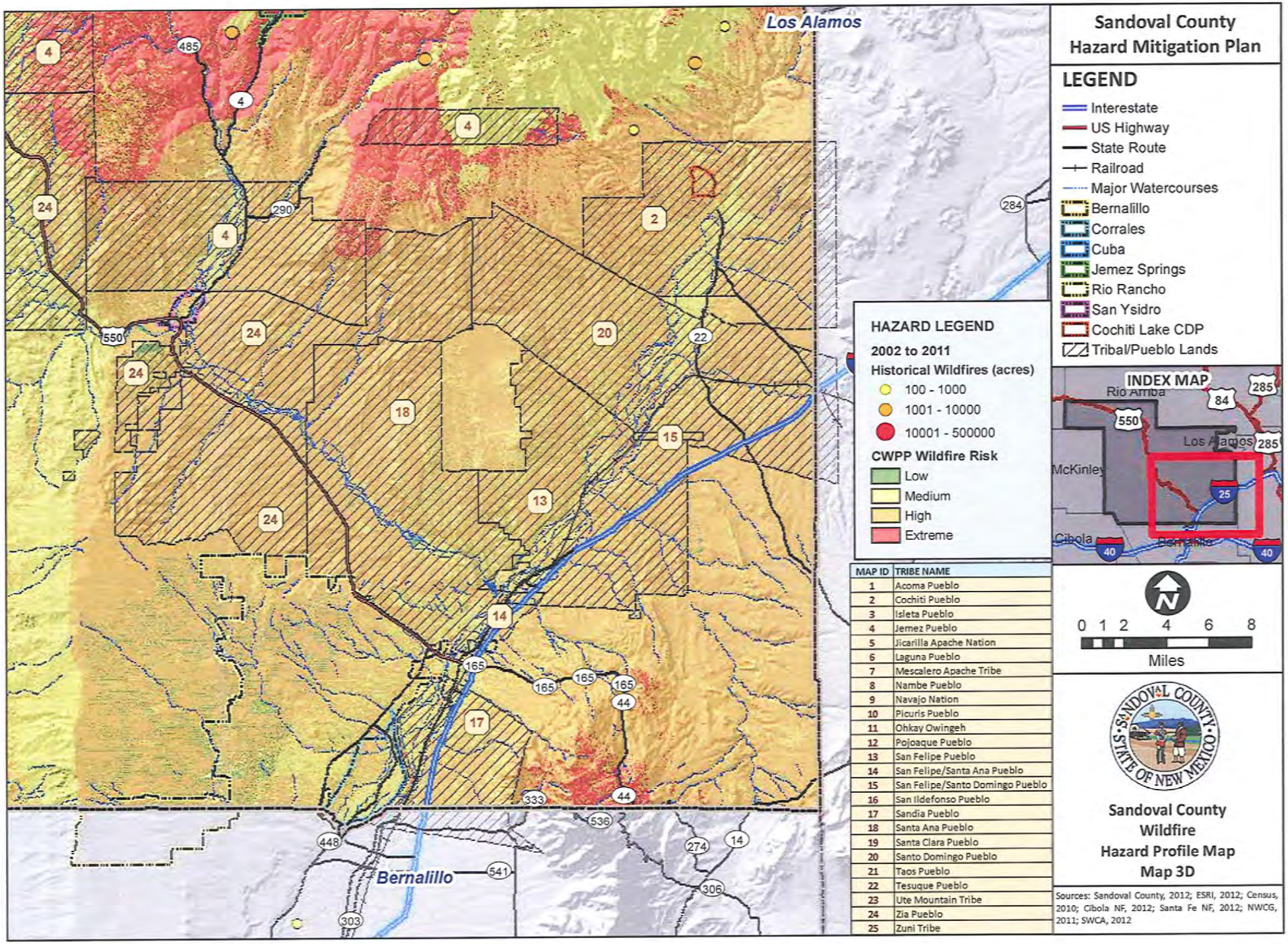
17	Sandia Pueblo
18	Santa Ana Pueblo
19	Santa Clara Pueblo
20	Santo Domingo Pueblo
21	Taos Pueblo
22	Tesuque Pueblo
23	Ute Mountain Tribe
24	Zia Pueblo
25	Zuni Tribe



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

HAZARD LEGEND

2002 to 2011

Historical Wildfires (acres)

- 100 - 1000
- 1001 - 10000
- 10001 - 500000

CWPP Wildfire Risk

- Low
- Medium
- High
- Extreme

N

0 1 2 4 6 8

Miles

MAP ID	TRIBE NAME
1	Acoma Pueblo
2	Cochiti Pueblo
3	Isleta Pueblo
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23	Ute Mountain Tribe
24	Zia Pueblo
25	Zuni Tribe

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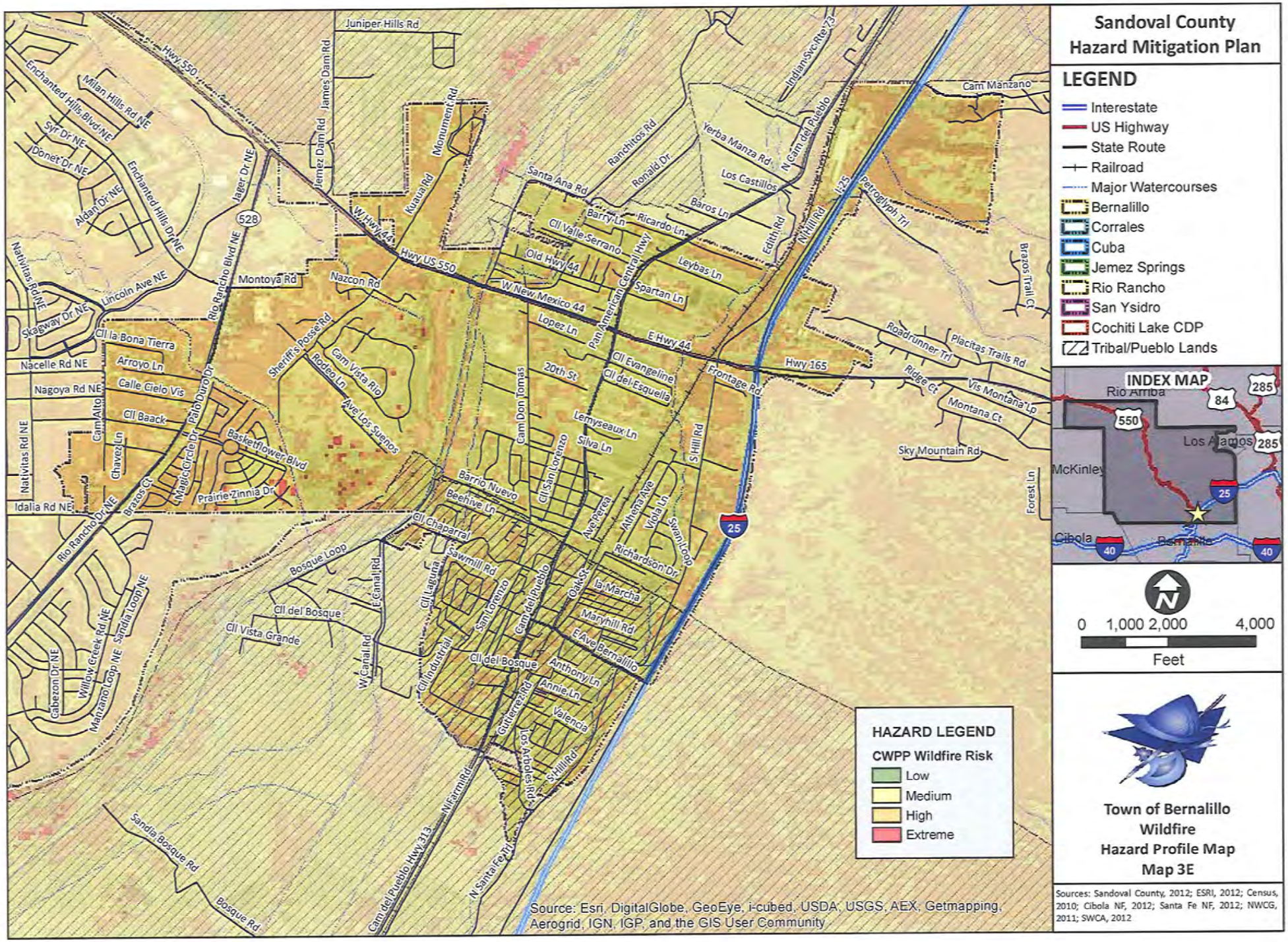
Sandoval County Wildfire Hazard Profile Map Map 3D

Sources: Sandoval County, 2012; ESRI, 2012; Census, 2010; Cibola NF, 2012; Santa Fe NF, 2012; NWCG, 2011; SWCA, 2012


Sandoval County
Hazard Mitigation Plan
LEGEND
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Railroad
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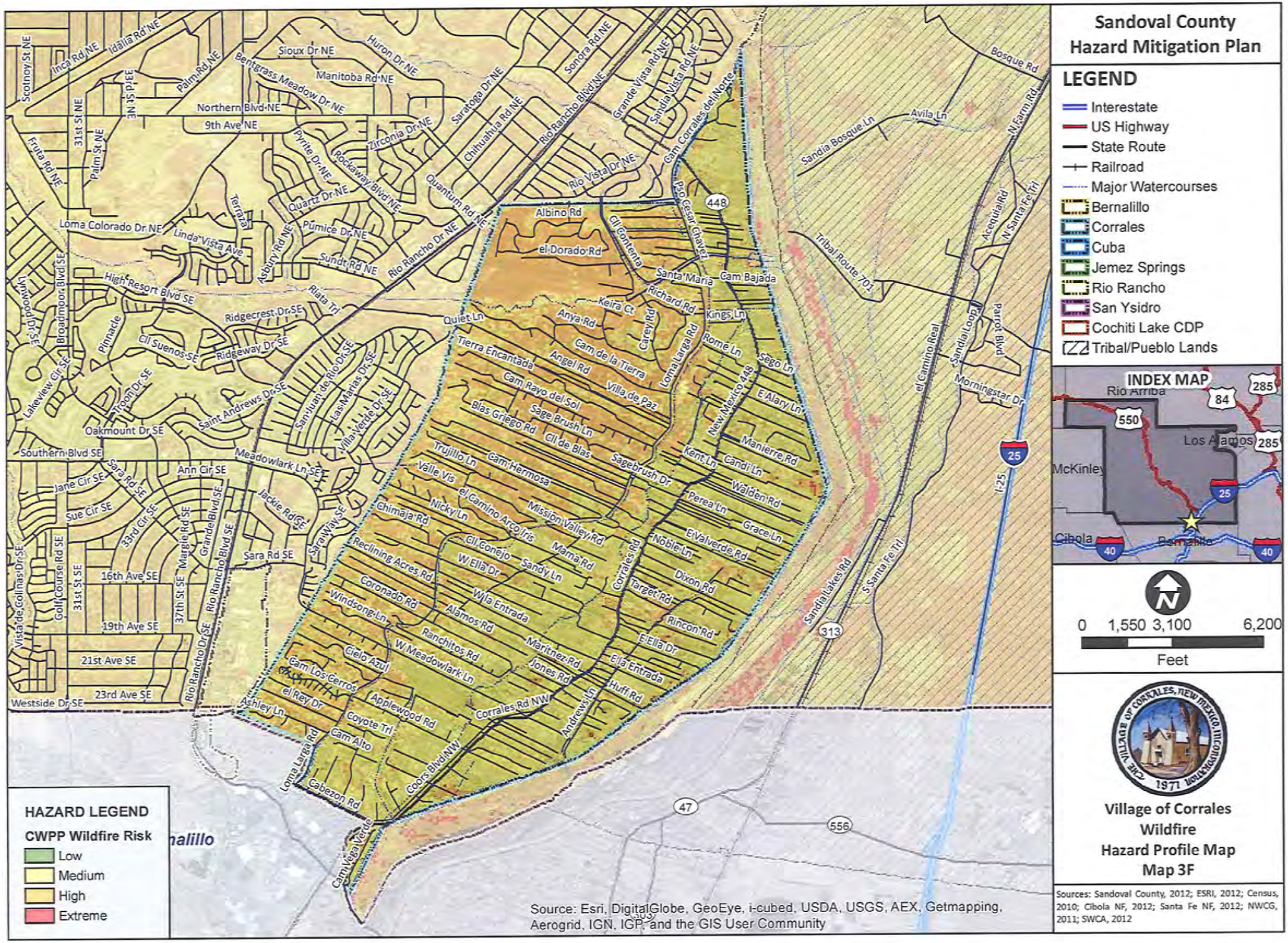
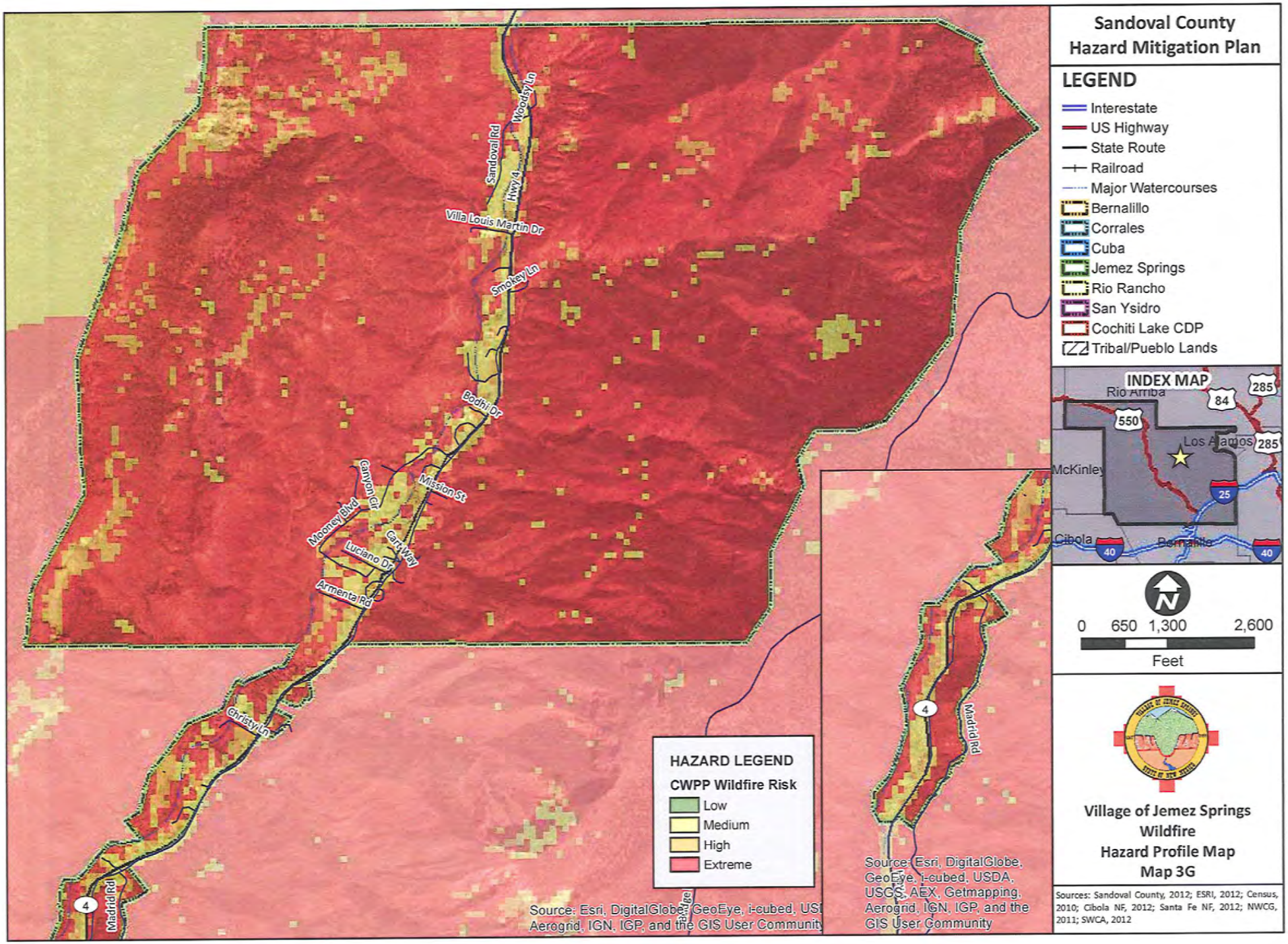
Los Alamos
McKinley
Cibola
Bernalillo
HAZARD LEGEND
CWPP Wildfire Risk
Low
Medium
High
Extreme
0 1,000 2,000 4,000
Feet
Town of Bernalillo
Wildfire
Hazard Profile Map
Map 3E
Sources: Sandoval County, 2012; ESRI, 2012; Census, 2010; Cibola NF, 2012; Santa Fe NF, 2012; NWCG, 2011; SWCA, 2012
Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, and the GIS User Community
Juniper Hills Rd
Hwy 550
Enchanted Hills Blvd NE
Milan Hills Rd NE
Syr Dr NE
Donet Dr NE
Aldan Dr NE
Enchanted Hills Dr NE
Jager Dr NE
James Dam Rd
Jemez Dam Rd
Monument Rd
Kuaua Rd
W Hwy 44
Hwy US 550
Santa Ana Rd
Ranchitos Rd
Ronald Dr
Yerba Manza Rd
Los Castillos
Baros Ln
Barry Ln
Ricardo Ln
Cll Valle Serrano
Old Hwy 44
Central Hwy
Leybas Ln
Spartan Ln
W New Mexico 44
Pan American
Lopez Ln
E Hwy 44
Edith Rd
N Hill Rd
I-25
Petroglyph Trl
Cam Manzano
N Cam del Pueblo
Indian Svc Rte 73
Brazos Trail Ct
Roadrunner Trl
Placitas Trails Rd
Hwy 165
Frontage Rd
Ridge Ct
Vis Montana Lp
Montana Ct
Sky Mountain Rd
Forest Ln
Nativitas Rd NE
Lincoln Ave NE
Skagway Dr NE
Cll la Bona Tierra
Nacelle Rd NE
Arroyo Ln
Nagoya Rd NE
Calle Cielo Vis
Cll Baack
Cam Alto
Chavez Ln
Idalia Rd NE
Rio Rancho Dr NE
Brazos Ct
Magic Circle Dr
Palo Duro Dr
Basketflower Blvd
Prairie Zinnia Dr
Rio Rancho Blvd NE
528
Montoya Rd
Nazcon Rd
Sheriff's Posse Rd
Rodeo Ln
Cam Vista Rio
Ave Los Suenos
20th St
Cll del Esquella
Cll Evangeline
Cam Don Tomas
Lemyseaux Ln
Silva Ln
Cll San Lorenzo
S Hill Rd
Barrio Nuevo
Beehive Ln
Cll Chaparral
Ave Perea
Athena Ave
Viola Ln
Swan Loop
Richardson Dr
25
Bosque Loop
E Canal Rd
W Canal Rd
Sawmill Rd
Cll Laguna
San Lorenzo
Cam del Pueblo
Oak St
la Marcha
Maryhill Rd
E Ave Bernalillo
Cll del Bosque
Cll Vista Grande
Cll Industrial
Anthony Ln
Annie Ln
Valencia
Gutierrez Rd
Los Arados Rd
S Hill Rd
N Farm Rd
Cam del Pueblo Hwy 313
N Santa Fe Trl
Sandia Bosque Rd
Bosque Rd
Sandia Loop NE
Willow Creek Rd NE
Manzano Loop NE
Cabezon Dr NE


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
HAZARD LEGEND
CWPP Wildfire Risk
Low
Medium
High
Extreme
0 1,550 3,100 6,200
Feet
Village of Corrales
Wildfire
Hazard Profile Map
Map 3F
Sources: Sandoval County, 2012; ESRI, 2012; Census, 2010; Cibola NF, 2012; Santa Fe NF, 2012; NWCG, 2011; SWCA, 2012
Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, 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
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Tribal/Pueblo Lands
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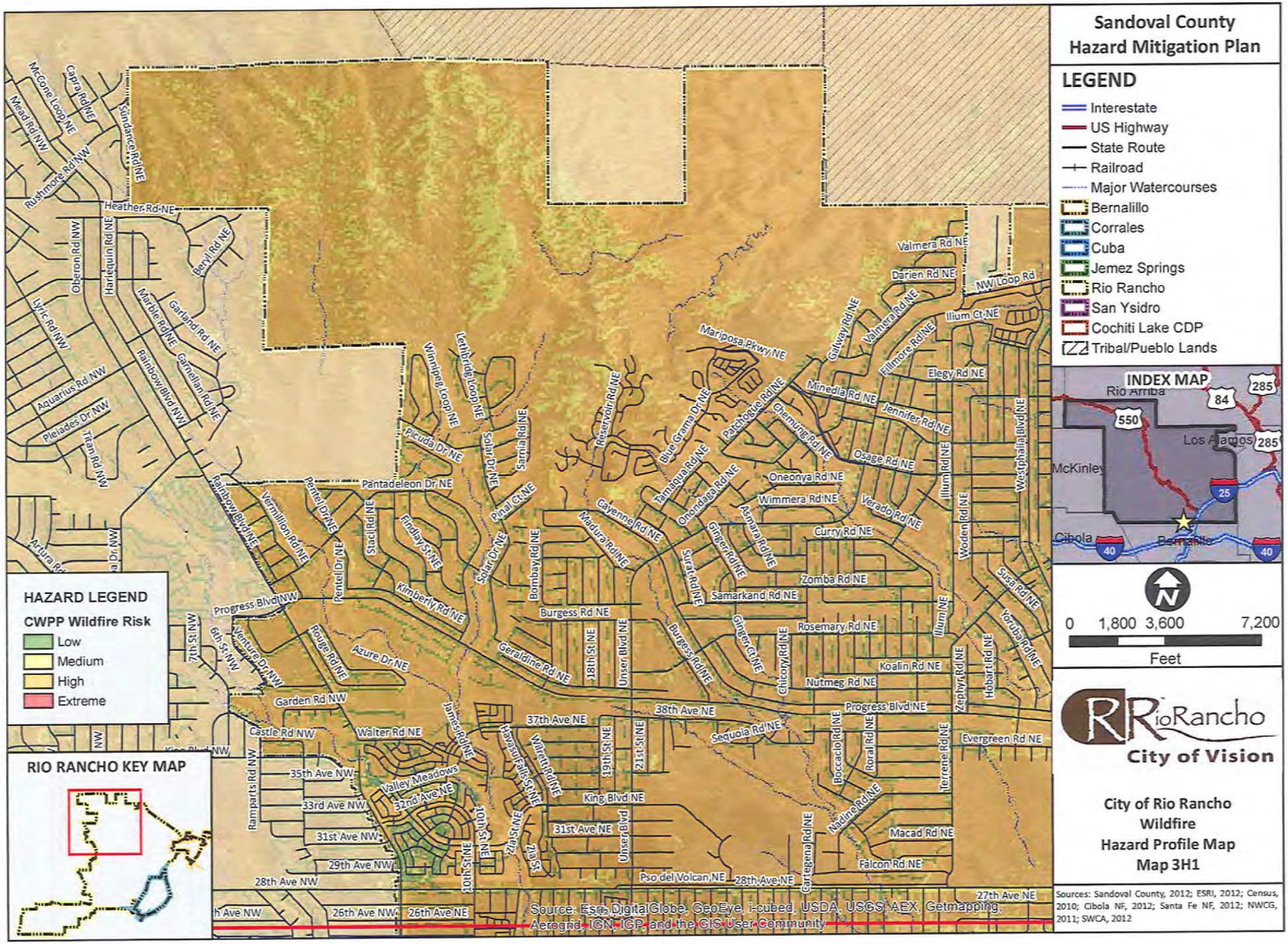
Los Alamos
McKinley
Cibola
Bernalillo
285
84
550
25
40
0 650 1,300 2,600
Feet
HAZARD LEGEND
CWPP Wildfire Risk
Low
Medium
High
Extreme
Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, and the GIS User Community
Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, and the GIS User Community
Sandoval Rd
Woodsy Ln
Hwy 4
Villa Louis Martin Dr
Smokey Ln
Bodhi Dr
Canyon Cir
Mooney Blvd
Mission St
Cart Way
Luciano Dr
Armenta Rd
Christy Ln
Madrid Rd
4
Village of Jemez Springs
Wildfire
Hazard Profile Map
Map 3G
Sources: Sandoval County, 2012; ESRI, 2012; Census, 2010; Cibola NF, 2012; Santa Fe NF, 2012; NWCG, 2011; SWCA, 2012


Sandoval County
Hazard Mitigation Plan
LEGEND
Interestate
US Highway
State Route
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Major Watercourses
Bernalillo
Corrales
Cuba
Jemez Springs
Rio Rancho
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Tribal/Pueblo Lands
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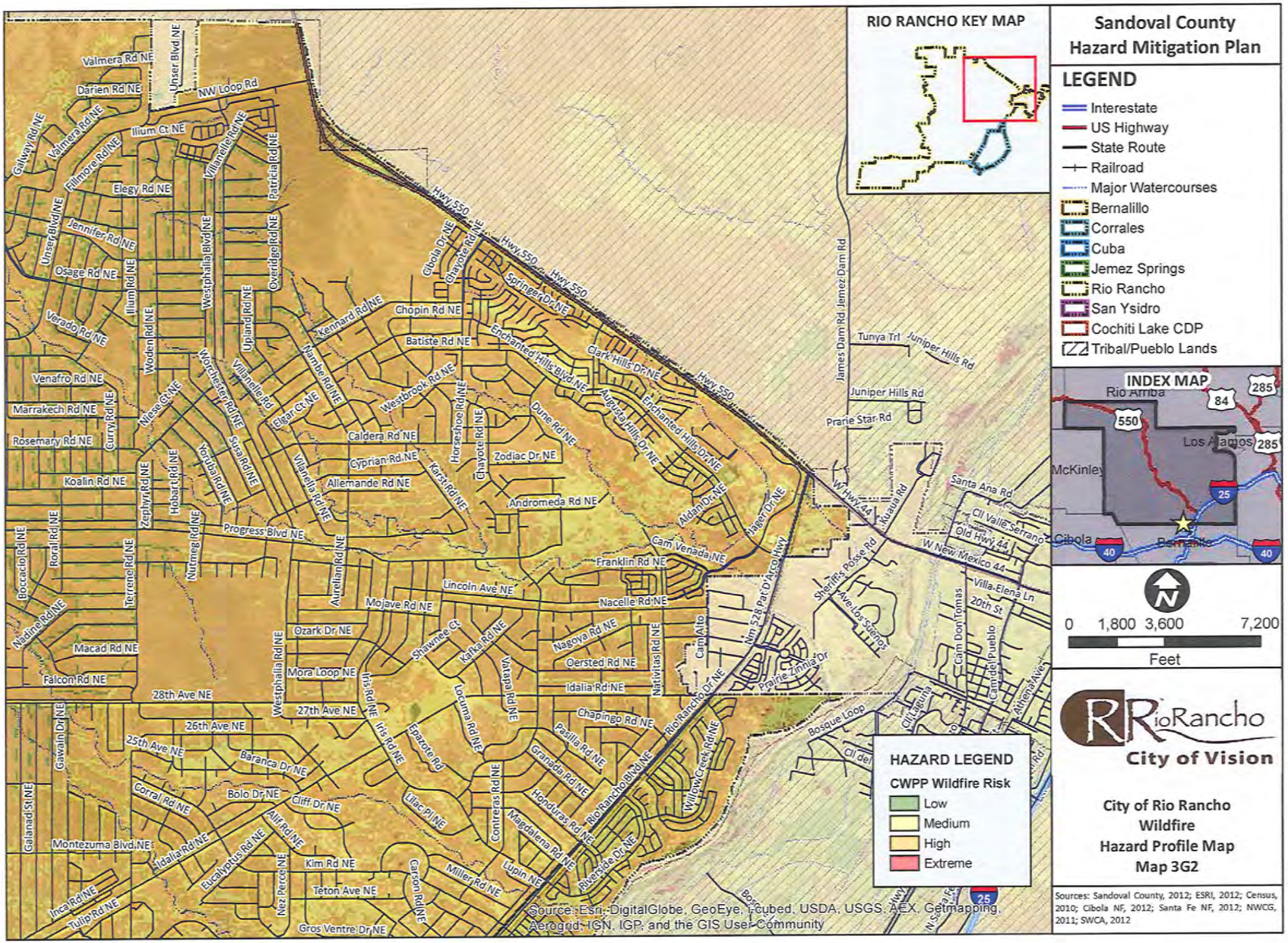
Bernalillo
HAZARD LEGEND
CWPP Wildfire Risk
Low
Medium
High
Extreme
RIO RANCHO KEY MAP
0 1,800 3,600 7,200
Feet
RioRancho
City of Vision
City of Rio Rancho
Wildfire
Hazard Profile Map
Map 3H1
Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, and the GIS User Community
Sources: Sandoval County, 2012; ESRI, 2012; Census, 2010; Cibola NF, 2012; Santa Fe NF, 2012; NWCG, 2011; SWCA, 2012


RIO RANCHO KEY MAP
Sandoval County
Hazard Mitigation Plan
LEGEND
Interestate
US Highway
State Route
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Major Watercourses
Bernalillo
Corrales
Cuba
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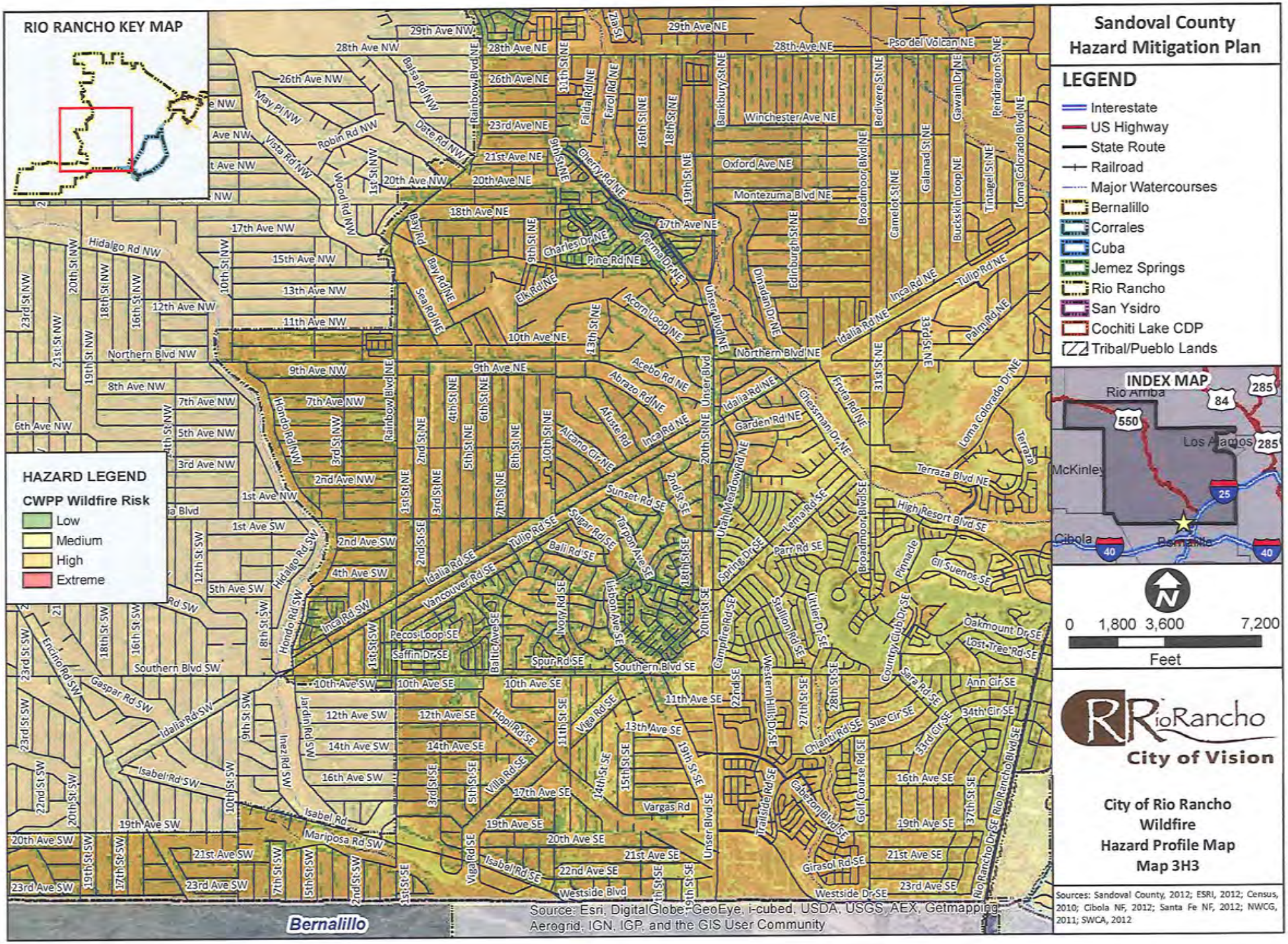
Bernalillo
0 1,800 3,600 7,200
Feet
HAZARD LEGEND
CWPP Wildfire Risk
Low
Medium
High
Extreme
RioRancho
City of Vision
City of Rio Rancho
Wildfire
Hazard Profile Map
Map 3G2
Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, and the GIS User Community
Sources: Sandoval County, 2012; ESRI, 2012; Census, 2010; Cibola NF, 2012; Santa Fe NF, 2012; NWCG, 2011; SWCA, 2012


RIO RANCHO KEY MAP
HAZARD LEGEND
CWPP Wildfire Risk
Low
Medium
High
Extreme
Sandoval County
Hazard Mitigation Plan
LEGEND
Interestate
US Highway
State Route
Railroad
Major Watercourses
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Tribal/Pueblo Lands
INDEX MAP
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Los Alamos
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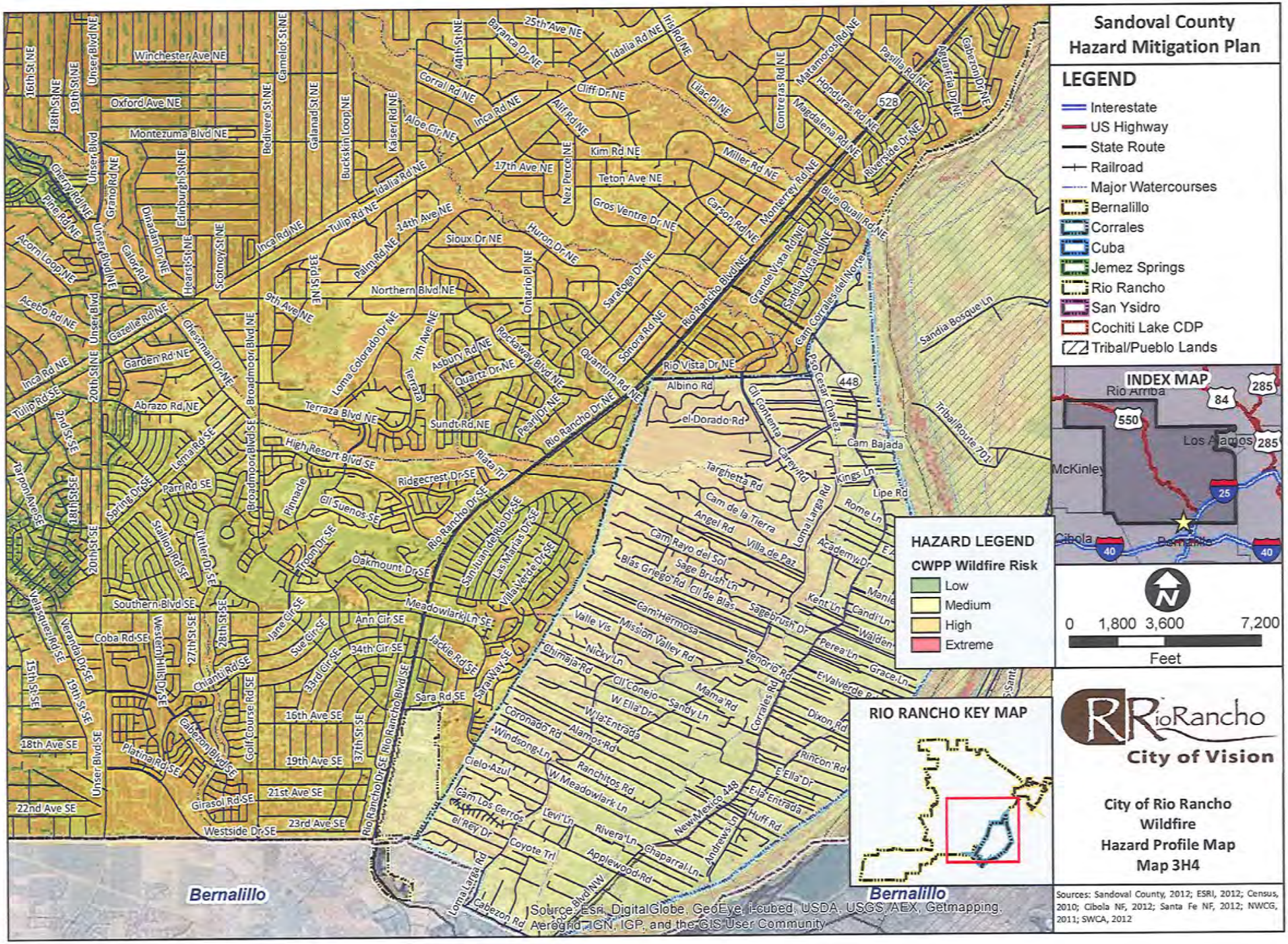
Cibola
Bernalillo
0 1,800 3,600 7,200
Feet
RioRancho
City of Vision
City of Rio Rancho
Wildfire
Hazard Profile Map
Map 3H3
Sources: Sandoval County, 2012; ESRI, 2012; Census, 2010; Cibola NF, 2012; Santa Fe NF, 2012; NWCG, 2011; SWCA, 2012
Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, and the GIS User Community
Bernalillo


Sandoval County
Hazard Mitigation Plan
LEGEND
Interestate
US Highway
State Route
Railroad
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Corrales
Cuba
Jemez Springs
Rio Rancho
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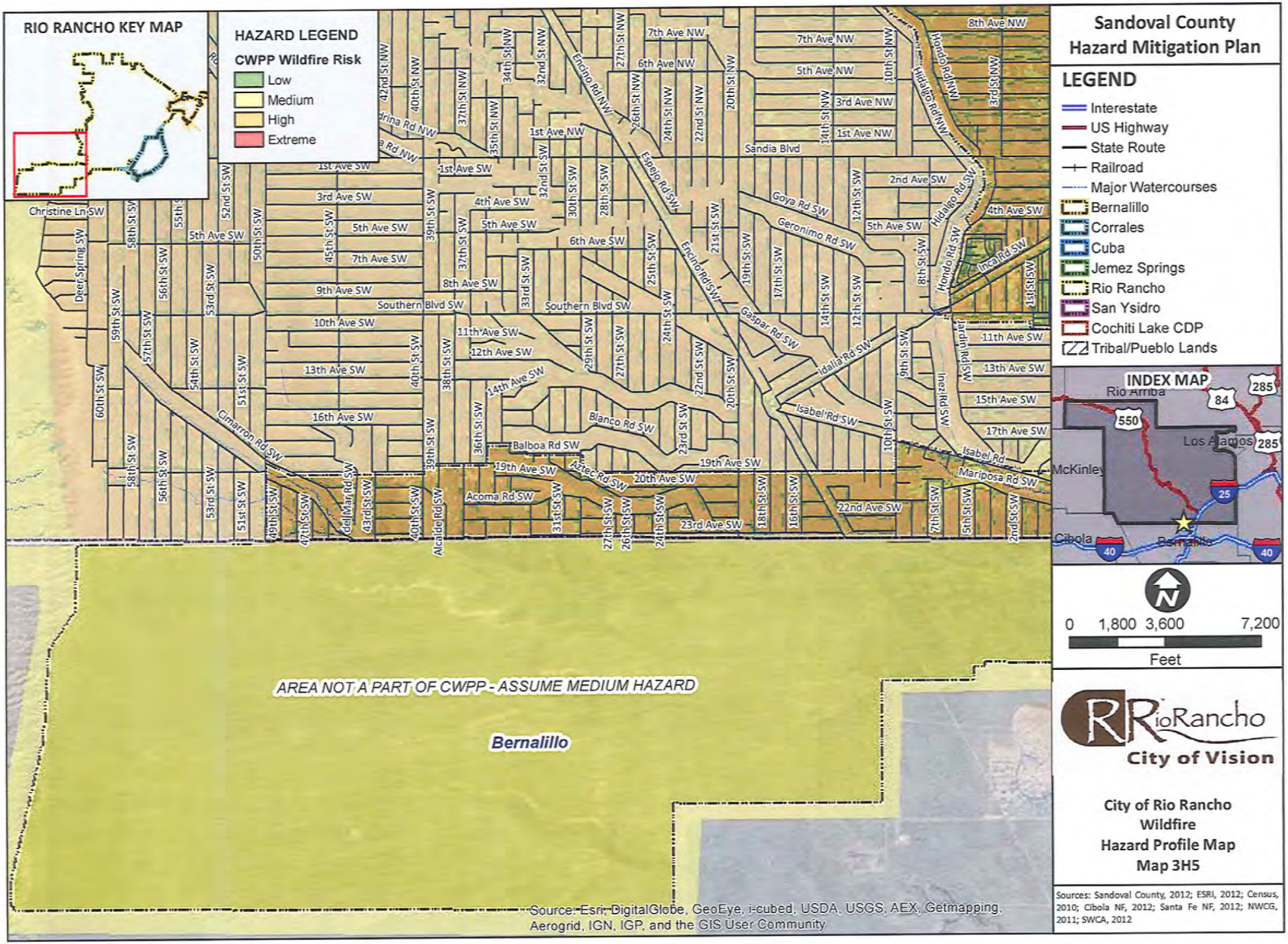
McKinley
Cibola
Sandoval
HAZARD LEGEND
CWPP Wildfire Risk
Low
Medium
High
Extreme
0 1,800 3,600 7,200
Feet
RIO RANCHO KEY MAP
RioRancho
City of Vision
City of Rio Rancho
Wildfire
Hazard Profile Map
Map 3H4
Bernalillo
Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, and the GIS User Community
Sources: Sandoval County, 2012; ESRI, 2012; Census, 2010; Cibola NF, 2012; Santa Fe NF, 2012; NWCG, 2011; SWCA, 2012


RIO RANCHO KEY MAP
HAZARD LEGEND
CWPP Wildfire Risk
Low
Medium
High
Extreme
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
Sandoval County
Hazard Mitigation Plan
LEGEND
Interestate
US Highway
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San Ysidro
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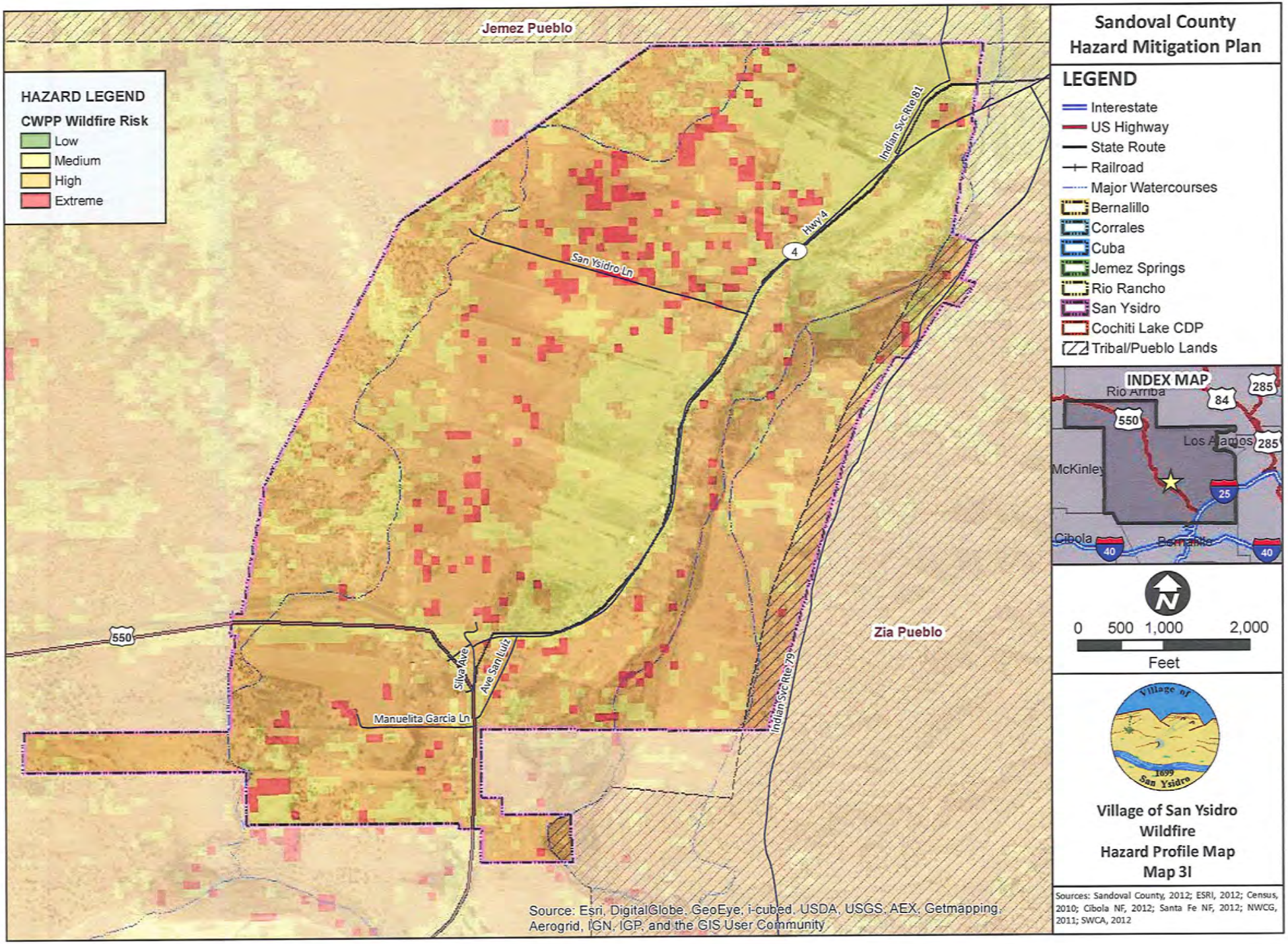
0 1,800 3,600 7,200
Feet
RioRancho
City of Vision
City of Rio Rancho
Wildfire
Hazard Profile Map
Map 3H5
Sources: Sandoval County, 2012; ESRI, 2012; Census, 2010; Cibola NF, 2012; Santa Fe NF, 2012; NWCG, 2011; SWCA, 2012



Sandoval County Hazard Mitigation Plan

LEGEND

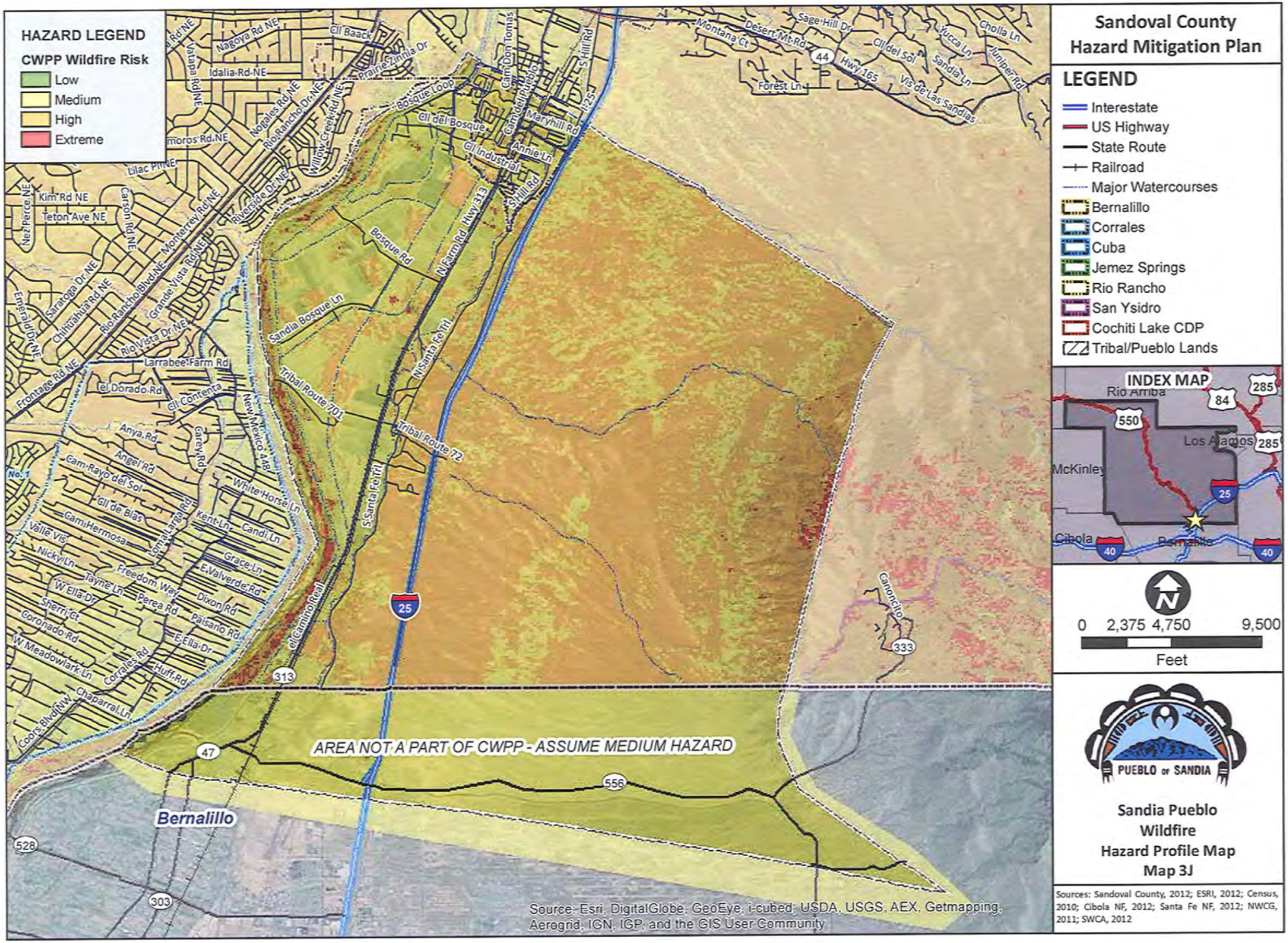
- Interestate
- US Highway
- State Route
- Railroad
- Major Watercourses
- Bernalillo
- Corrales
- Cuba
- Jemez Springs
- Rio Rancho
- San Ysidro
- Cochiti Lake CDP
- Tribal/Pueblo Lands

0 500 1,000 2,000

Feet

Village of San Ysidro
Wildfire
Hazard Profile Map
Map 3I

Sources: Sandoval County, 2012; ESRI, 2012; Census, 2010; Cibola NF, 2012; Santa Fe NF, 2012; NWCG, 2011; SWCA, 2012


HAZARD LEGEND
CWPP Wildfire Risk
Low
Medium
High
Extreme
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
Sandoval County
Hazard Mitigation Plan
LEGEND
Interestate
US Highway
State Route
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Bernalillo
Corrales
Cuba
Jemez Springs
Rio Rancho
San Ysidro
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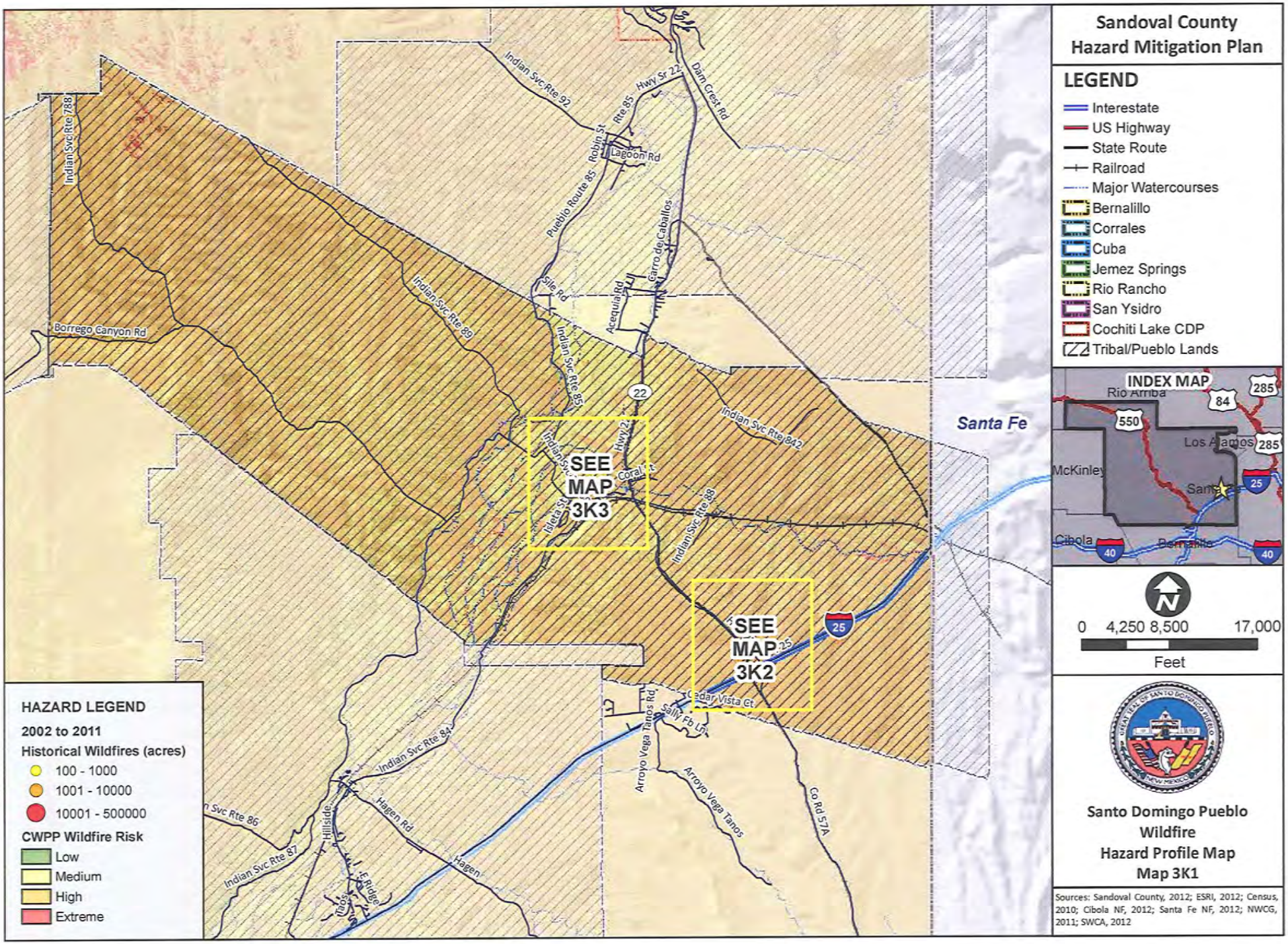
Tribal/Pueblo Lands
INDEX MAP
Rio Arriba
Los Alamos
McKinley
Cibola
0 2,375 4,750 9,500
Feet
PUEBLO OF SANDIA
Sandia Pueblo
Wildfire
Hazard Profile Map
Map 3J
Sources: Sandoval County, 2012; ESRI, 2012; Census, 2010; Cibola NF, 2012; Santa Fe NF, 2012; NWCG, 2011; SWCA, 2012


Sandoval County
Hazard Mitigation Plan
LEGEND
Interestate
US Highway
State Route
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Major Watercourses
Bernalillo
Corrales
Cuba
Jemez Springs
Rio Rancho
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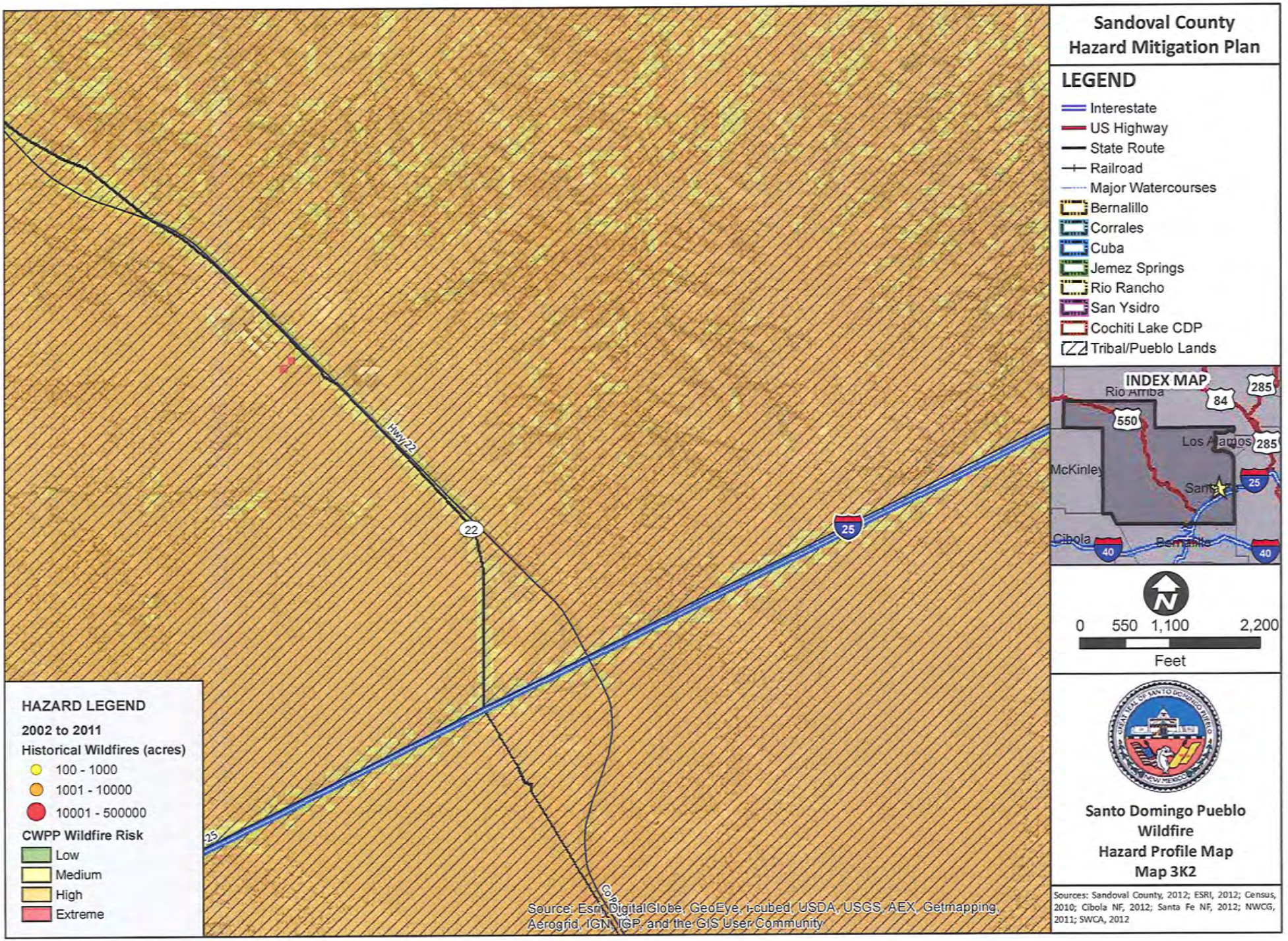
Santa Fe
SEE MAP 3K3
SEE MAP 3K2
HAZARD LEGEND
2002 to 2011
Historical Wildfires (acres)
100 - 1000
1001 - 10000
10001 - 500000
CWPP Wildfire Risk
Low
Medium
High
Extreme
0 4,250 8,500 17,000
Feet
Santo Domingo Pueblo
Wildfire
Hazard Profile Map
Map 3K1
Sources: Sandoval County, 2012; ESRI, 2012; Census, 2010; Cibola NF, 2012; Santa Fe NF, 2012; NWCG, 2011; SWCA, 2012


Sandoval County
Hazard Mitigation Plan
LEGEND
Interestate
US Highway
State Route
Railroad
Major Watercourses
Bernalillo
Corrales
Cuba
Jemez Springs
Rio Rancho
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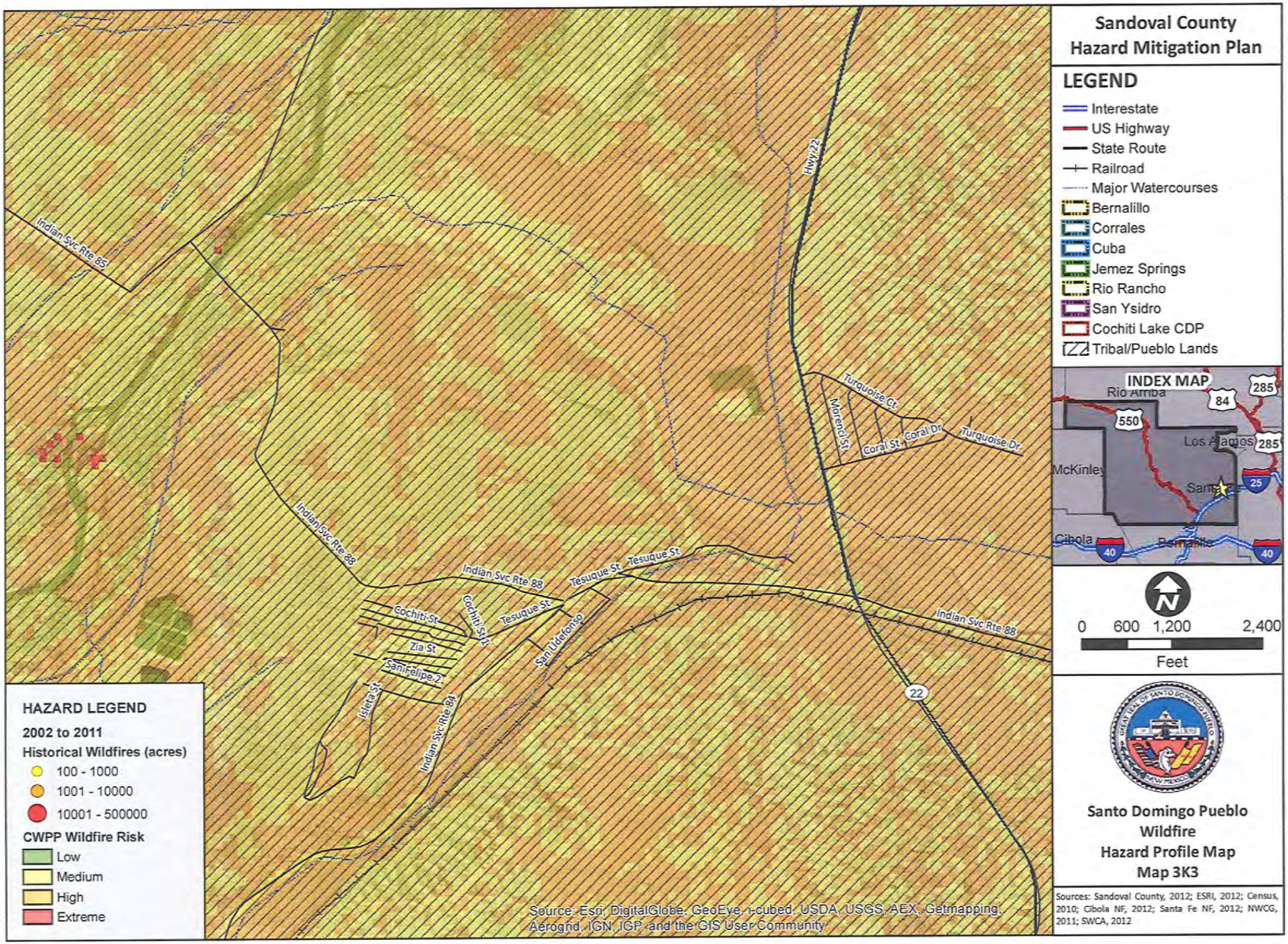
Tribal/Pueblo Lands
INDEX MAP
Rio Arriba
84
285
550
Los Alamos
285
McKinley
25
Cibola
40
40
N
0 550 1,100 2,200
Feet
HAZARD LEGEND
2002 to 2011
Historical Wildfires (acres)
100 - 1000
1001 - 10000
10001 - 500000
CWPP Wildfire Risk
Low
Medium
High
Extreme
Hwy 22
22
25
Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, and the GIS User Community
Santo Domingo Pueblo
Wildfire
Hazard Profile Map
Map 3K2
Sources: Sandoval County, 2012; ESRI, 2012; Census, 2010; Cibola NF, 2012; Santa Fe NF, 2012; NWCG, 2011; SWCA, 2012


Sandoval County
Hazard Mitigation Plan
LEGEND
Interestate
US Highway
State Route
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Major Watercourses
Bernalillo
Corrales
Cuba
Jemez Springs
Rio Rancho
San Ysidro
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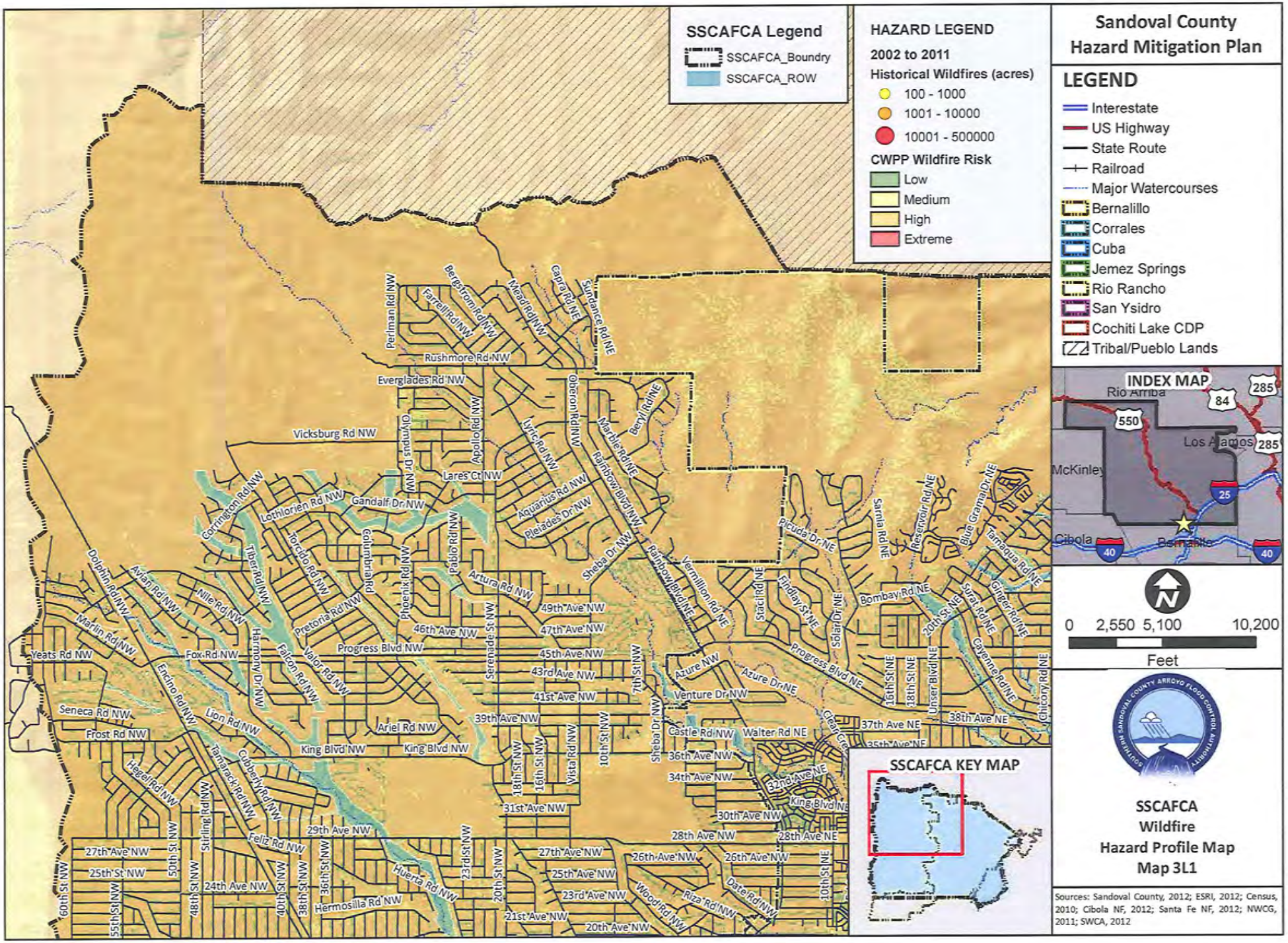
INDEX MAP
Rio Arriba
84
285
550
Los Alamos
285
McKinley
Sant
25
Cibola
Bernalillo
40
40
N
0 600 1,200 2,400
Feet
HAZARD LEGEND
2002 to 2011
Historical Wildfires (acres)
100 - 1000
1001 - 10000
10001 - 500000
CWPP Wildfire Risk
Low
Medium
High
Extreme
Indian Svc Rte 85
Hwy 22
Turquoise Ct
Morenci St
Coral St
Coral Dr
Turquoise Dr
Indian Svc Rte 88
Indian Svc Rte 88
Tesuque St
Tesuque St
Tesuque St
Indian Svc Rte 88
Cochiti St
Cochiti St
Zia St
San Felipe 2
San Ildefonso
Isleta St
Indian Svc Rte 84
22
Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, and the GIS User Community
Santo Domingo Pueblo
Wildfire
Hazard Profile Map
Map 3K3
Sources: Sandoval County, 2012; ESRI, 2012; Census, 2010; Cibola NF, 2012; Santa Fe NF, 2012; NWCG, 2011; SWCA, 2012


SSCAFCA Legend
SSCAFCA_Boundry
SSCAFCA_ROW
HAZARD LEGEND
2002 to 2011
Historical Wildfires (acres)
100 - 1000
1001 - 10000
10001 - 500000
CWPP Wildfire Risk
Low
Medium
High
Extreme
Sandoval County
Hazard Mitigation Plan
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US Highway
State Route
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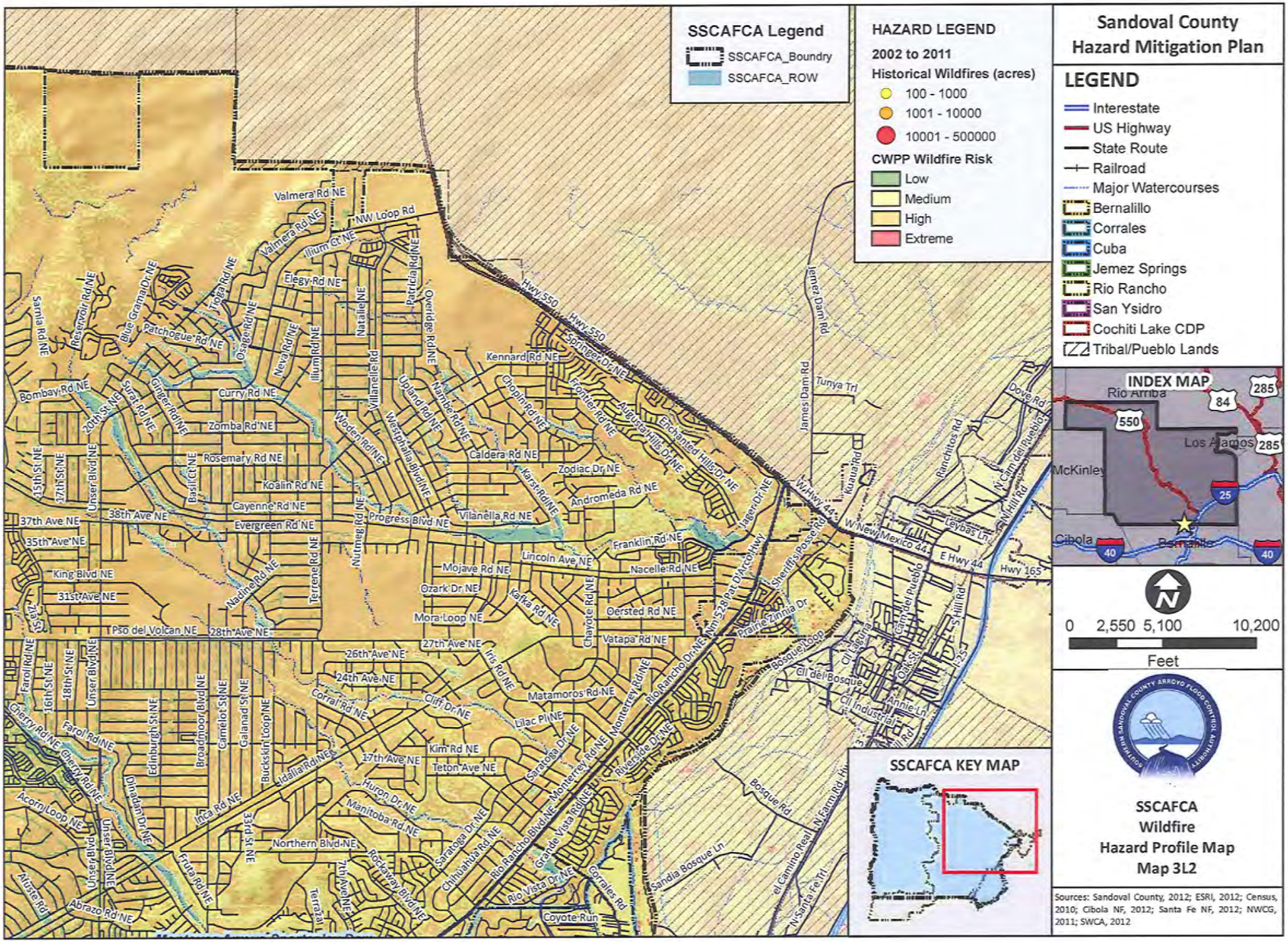
Los Alamos
McKinley
Cibola
Bernalillo
84
285
550
25
40
N
0 2,550 5,100 10,200
Feet
SSCAFCA KEY MAP
SSCAFCA
Wildfire
Hazard Profile Map
Map 3L1
Sources: Sandoval County, 2012; ESRI, 2012; Census, 2010; Cibola NF, 2012; Santa Fe NF, 2012; NWCG, 2011; SWCA, 2012
Perlman Rd NW
Farrell Rd NW
Bergstrom Rd NW
Mead Rd NW
Capra Rd NE
Sundance Rd NE
Rushmore Rd NW
Everglades Rd NW
Vicksburg Rd NW
Olympus Dr NW
Apollo Rd NW
Oberon Rd NW
Lyric Rd NW
Beryl Rd NE
Marble Rd NE
Rainbow Blvd NW
Lares Ct NW
Corrington Rd NW
Lothlorien Rd NW
Gandalf Dr NW
Aquarius Rd NW
Pleiades Dr NW
Dolphin Rd NW
Avian Rd NW
Nile Rd NW
Tiber Rd NW
Toledo Rd NW
Columbia Rd
Pablo Rd NW
Phoenix Rd NW
Artura Rd NW
Sheba Dr NW
Rainbow Blvd NE
Vermillion Rd NE
Picuda Dr NE
Reservoir Rd NE
Blue Grama Dr NE
Tamaqua Rd NE
Marlin Rd NW
Yeats Rd NW
Fox Rd NW
Encino Rd NW
Pretoria Rd NW
Harmony Dr NW
Falcon Rd NW
Valor Rd NW
Progress Blvd NW
46th Ave NW
47th Ave NW
49th Ave NW
45th Ave NW
43rd Ave NW
41st Ave NW
39th Ave NW
Serenade St NW
7th St NW
Azure NW
Azure Dr NE
Venture Dr NW
Progress Blvd NE
Stacil Rd NE
Flindray St NE
Solar Dr NE
Bombay Rd NE
20th St NE
Surat Rd NE
Ginger Rd NE
Cayenne Rd NE
Chicory Rd NE
16th St NE
18th St NE
Unser Blvd NE
38th Ave NE
37th Ave NE
35th Ave NE
Seneca Rd NW
Frost Rd NW
Lion Rd NW
Ariel Rd NW
King Blvd NW
Castle Rd NW
Walter Rd NE
36th Ave NW
34th Ave NW
32nd Ave NE
King Blvd NE
Hegel Rd NW
Tamarack Rd NW
Gubbels Rd NW
Stirling Rd NW
Feliz Rd NW
29th Ave NW
31st Ave NW
30th Ave NW
28th Ave NW
28th Ave NE
27th Ave NW
25th St NW
50th St NW
60th St NW
55th St NW
48th St NW
24th Ave NW
40th St NW
38th St NW
36th St NW
Hermosilla Rd NW
Huerta Rd NW
23rd St NW
20th St NW
27th Ave NW
25th Ave NW
23rd Ave NW
21st Ave NW
20th Ave NW
26th Ave NW
Wood Rd NW
Riza Rd NW
Date Rd NW
10th St NW
10th St NE
16th St NW
18th St NW
Vista Rd NW


SSCAFCA Legend
SSCAFCA_Boundry
SSCAFCA_ROW
HAZARD LEGEND
2002 to 2011
Historical Wildfires (acres)
100 - 1000
1001 - 10000
10001 - 500000
CWPP Wildfire Risk
Low
Medium
High
Extreme
Sandoval County
Hazard Mitigation Plan
LEGEND
Interestate
US Highway
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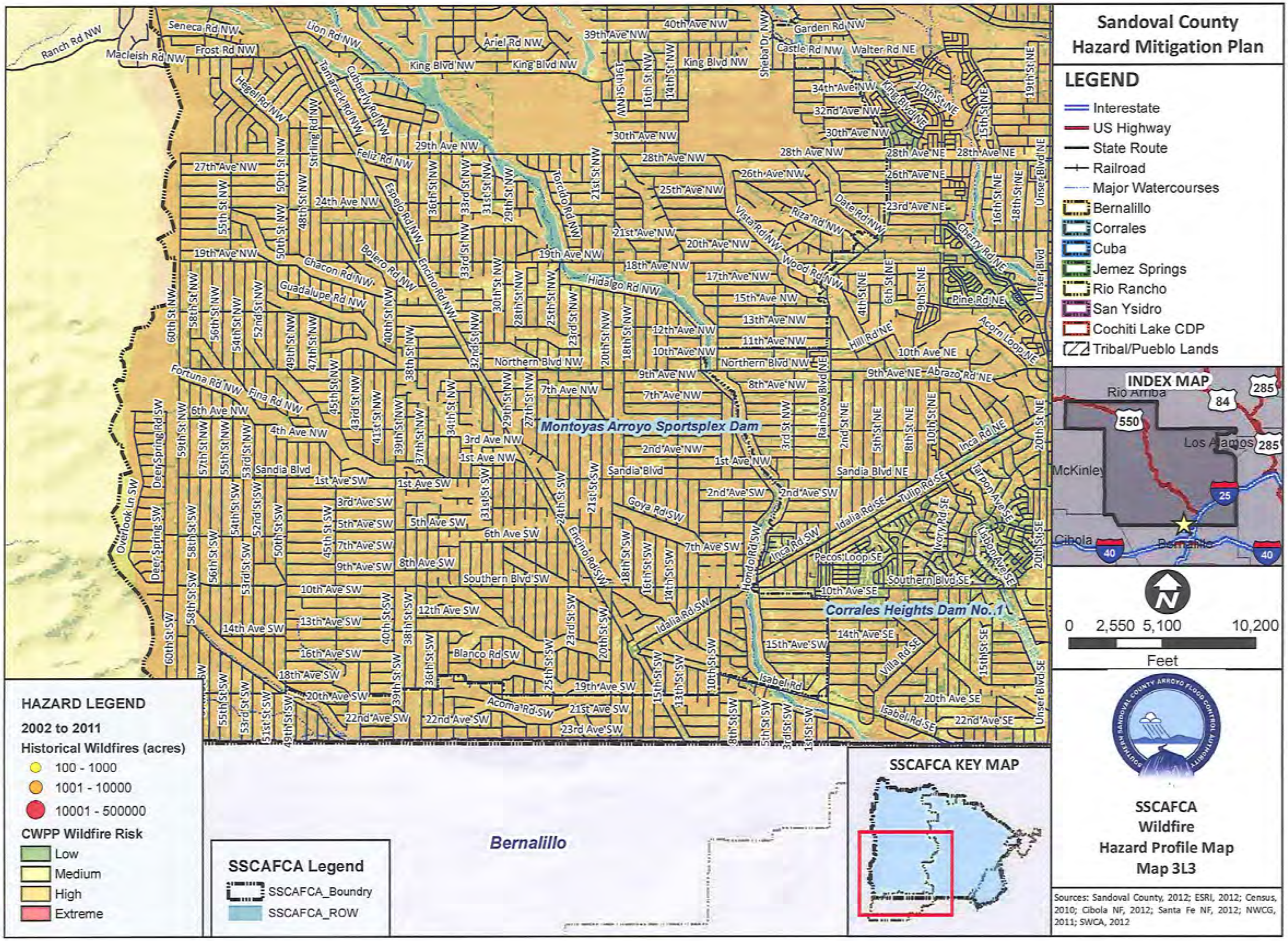
Cibola
0 2,550 5,100 10,200
Feet
SSCAFCA KEY MAP
SSCAFCA
Wildfire
Hazard Profile Map
Map 3L2
Sources: Sandoval County, 2012; ESRI, 2012; Census, 2010; Cibola NF, 2012; Santa Fe NF, 2012; NWCG, 2011; SWCA, 2012


Sandoval County
Hazard Mitigation Plan
LEGEND
Interstate
US Highway
State Route
Railroad
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Rio Rancho
San Ysidro
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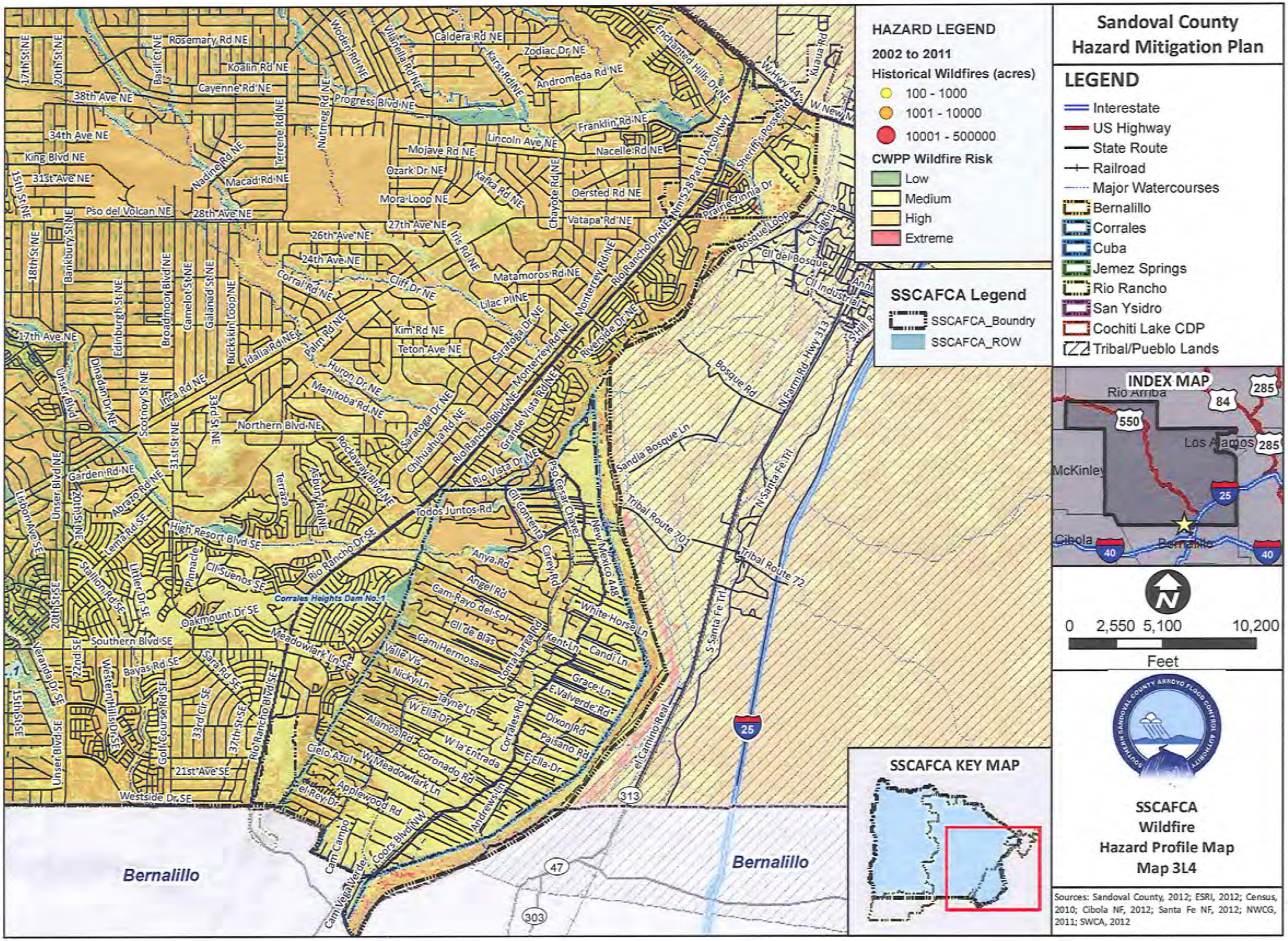
McKinley
Cibola
Bernalillo
285
84
550
25
40
0 2,550 5,100 10,200
Feet
SSCAFCA
Wildfire
Hazard Profile Map
Map 3L3
Sources: Sandoval County, 2012; ESRI, 2012; Census, 2010; Cibola NF, 2012; Santa Fe NF, 2012; NWCG, 2011; SWCA, 2012
Montoyas Arroyo Sportsplex Dam
Corrales Heights Dam No. 1
Bernalillo
HAZARD LEGEND
2002 to 2011
Historical Wildfires (acres)
100 - 1000
1001 - 10000
10001 - 500000
CWPP Wildfire Risk
Low
Medium
High
Extreme
SSCAFCA Legend
SSCAFCA_Boundry
SSCAFCA_ROW
SSCAFCA KEY MAP


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
HAZARD LEGEND
2002 to 2011
Historical Wildfires (acres)
100 - 1000
1001 - 10000
10001 - 500000
CWPP Wildfire Risk
Low
Medium
High
Extreme
SSCAFCA Legend
SSCAFCA_Boundry
SSCAFCA_ROW
INDEX MAP
Rio Arriba
McKinley
Los Alamos
Cibola
Bernalillo
0 2,550 5,100 10,200
Feet
SSCAFCA KEY MAP
SSCAFCA
Wildfire
Hazard Profile Map
Map 3L4
Sources: Sandoval County, 2012; ESRI, 2012; Census, 2010; Cibola NF, 2012; Santa Fe NF, 2012; NWCG, 2011; SWCA, 2012
Bernalillo
Bernalillo
Corrales Heights Dam No. 1
Rio Rancho Blvd NE
Tribal Route 701
Tribal Route 72
New Mexico 448
N Farm Rd - Hwy 313
S Santa Fe Trl
N Santa Fe Trl
el Camino Real
Sandia Bosque Ln
Bosque Rd
Unser Blvd
Northern Blvd NE
Southern Blvd SE
Westside Dr SE
Coors Blvd NW
Cam Vega Verde
Cam Campo

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 3-23 summarizes the hazards selected for mitigation by each jurisdiction and will be the basis for each jurisdiction's mitigation strategy.

Table 3-23: 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	NV	M	M	M	M	M
Rio Rancho, City of	NH	M	M	M	M	M
San Ysidro, Village of	M	M	M	M	M	M
Sandia Pueblo	M	M	M	M	M	M
Santo Domingo Pueblo	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 2004 Plan mitigation strategy was reviewed and updated by the Planning Team, including a major re-organization of the mitigation strategy elements into this multi-jurisdictional plan format. Specifics of the changes and updates are discussed in the subsections below.

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 2004 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 2004 Plan, with more detail for each jurisdiction.

4.1.1 Jurisdictional Capabilities

Tables 4-1-1 through 4-1-8 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. Tables 4-2-1 through 4-2-8 summarize the staff and personnel resources employed by each jurisdiction that serve as a resource for hazard mitigation. Tables 4-3-1 through 4-3-8 summarize the fiscal capability and budgetary tools available to each participating jurisdiction. Each of these three tables is listed below by jurisdiction.

Table 4-1-1: 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 Nexico, 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. 10-1-21.9F** - an ordinance prescribing the powers, duties, and organization of the Sandoval County planning and zoning commission, January 2010 • Sandoval County Subdivision Regulations, November 2007	• County Development • Planning and Zoning • Fire Marshall
PLANS, MANUALS, and/or GUIDELINES	• Jemez Valley Area Plan AUGUST 2007 • Sandoval County Comprehensive plan, November 2007 • Community Wildfire Prevention Plan, December 2012 • All Hazard Emergency Operations Plan, 2005 • Hazard Mitigation Plan, April 2003	• County Development • 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 Hydrogeologic Conditions At The Diamond Tail Subdivision, Sandoval County, New Mexico, August 2006	• County development

Table 4-2-1: 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	☑	County Development—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	☑	Fire Department—Emergency Management
Floodplain Manager	☑	County Development—Planning and Zoning

Table 4-2-1: Summary of technical staff and personnel capabilities for Sandoval County		
Staff/Personnel Resources	☑	**Department/Agency - Position**
Surveyors		Contract
Staff with education or expertise to assess the community's vulnerability to hazards	☑	Fire Department—Emergency Management
Personnel skilled in GIS and/or HAZUS; AutoCad-Civil 3D; ArcViewGIS	☑	County Development—GIS
Scientists familiar with the hazards of the community		Contract
Emergency manager	☑	Fire Department—Assistant Chief/EM
Grant writer(s)	☑	Economic Development

Table 4-3-1: 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 (so far).
Impact fees for homebuyers or new developments/homes	No	
Incur debt through general obligation bonds	Yes	
Incur debt through special tax bonds	Yes	

Table 4-1-2: Legal and regulatory capabilities for Bernalillo		
Regulatory Tools for Hazard Mitigation	**Description**	**Responsible Department/Agency**
CODES and/or ORDINANCES	• 2009 IBC, 2009IRC, 2008 UPC, 2008UMC, 2003 IFC, 2009 NEC, 2009 NM Codes • 2008 Flood Control Ord. • 2005 Building Safety Ord. • Comprehensive Planning & Zoning Ord.	• P & Z • Building Safety • Fire Dept.
PLANS, MANUALS, and/or GUIDELINES	• 2004 Comprehensive Land Use Plan • 2004 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 • TOB • ESSCAFCA

Table 4-2-2: 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 P & Z- 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	☑	P & Z-Building Official
Surveyors		
Staff with education or expertise to assess the community's vulnerability to hazards	☑	P & Z-Infrastructure Administrator Police Chief Fire Chief
Personnel skilled in GIS and/or HAZUS; AutoCad-Civil 3D; ArcViewGIS	☑	I.T.- GIS Tech

Table 4-2-2: Summary of technical staff and personnel capabilities for Bernalillo		
Staff/Personnel Resources	☑	**Department/Agency - Position**
Scientists familiar with the hazards of the community		
Emergency manager	☑	P & Z-Infrastructure Administrator
Grant writer(s)	☑	Community Development-Grants Coordinator

Table 4-3-2: 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 4-1-3: Legal and regulatory capabilities for Corrales		
Regulatory Tools for Hazard Mitigation	**Description**	**Responsible Department/Agency**
CODES and/or ORDINANCES	• International Building Code 2006 • 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 – third reading 11-13-12	• Building Inspector • 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
STUDIES	• Village of Corrales Escarpment Draining Report • Flood Insurance Rate Map (FIRM) 2008	• Village of Corrales • FEMA

Table 4-2-3: 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 Planning & Zoning Administrator; 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 Administrator
Floodplain Manager	☑	Planning and Zoning Administrator and/or Building Official
Surveyors		Contracted as needed
Staff with education or expertise to assess the community's vulnerability to hazards	☑	Fire department and Planning and Zoning Administrator; Floodplain Manager

Table 4-2-3: Summary of technical staff and personnel capabilities for Corrales		
Staff/Personnel Resources	☑	**Department/Agency - Position**
Personnel skilled in GIS and/or HAZUS; AutoCad-Civil 3D; ArcViewGIS	☑	Building Inspector/Building Official
Scientists familiar with the hazards of the community		
Emergency manager		
Grant writer(s)	☑	Fire Department; Planning & Zoning Administrator; Finance Officer; Floodplain Manager

Table 4-3-3: 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	No	
Impact fees for homebuyers or new developments/homes	Yes	
Incur debt through general obligation bonds	Yes	
Incur debt through special tax bonds	Yes	

Table 4-1-4: 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 • Sandoval County • Village Council • NMDOT
STUDIES	•	•

Table 4-2-4: 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
Surveyors		Contract Surveyors
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		Not Sure
Emergency manager	☑	Police Department
Grant writer(s)	☑	Librarian

Table 4-3-4: 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	

Table 4-1-5: 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 4-1-5: 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	• Public Works, • SSCAFCA

Table 4-2-5: 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		
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		
Emergency manager	☑	Fire/Rescue – Emergency Programs Manager, Assistant Emergency Programs Manager

Table 4-2-5: Summary of technical staff and personnel capabilities for Rio Rancho		
Staff/Personnel Resources	☑	**Department/Agency - Position**
Grant writer(s)	☑	Financial Services – Grants Specialist. Fire/Rescue-Emergency Programs Manager,

Table 4-3-5: 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 citizens 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 4-1-6: 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 4-2-6: 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 4-3-6: 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 4-1-7: Legal and regulatory capabilities for Sandia Pueblo		
Regulatory Tools for Hazard Mitigation	**Description**	**Responsible Department/Agency**
CODES and/or ORDINANCES	• Building Safety Operating Procedures for construction projects • Bernalillo County construction inspection codes	• Building Safety • Housing
PLANS, MANUALS, and/or GUIDELINES	• 2012 20 year long range transportation plan • Southern Border Economic Development Plan • 2006 Village Plan • Capital Improvement Plan • Sandia Pueblo Dams-Emergency Action Plan	• Lands
STUDIES	• 2010 Master Drainage Study • Waste to Energy Feasibility Study	• Lands

Table 4-2-7: Summary of technical staff and personnel capabilities for Sandia Pueblo		
Staff/Personnel Resources	☑	**Department/Agency - Position**
Planner(s) or engineer(s) with knowledge of land development and land management practices	☑	Lands Director Community Planner
Engineer(s) or professional(s) trained in construction practices related to buildings and/or infrastructure	☑	Building Safety Director Pueblo Engineer
Planner(s) or engineer(s) with and understanding of natural and/or human-caused hazards	☑	Water Quality Manager
Floodplain Manager	☑	Water Resources Manager
Surveyors	☑	BIA Surveyor
Staff with education or expertise to assess the community's vulnerability to hazards	☑	Police Captain
Personnel skilled in GIS and/or HAZUS	☑	GIS Manager
Scientists familiar with the hazards of the community		Unknown
Emergency manager	☑	Police Captain
Grant writer(s)	☑	Community Planner

Table 4-3-7: Fiscal capabilities for Sandia Pueblo

Table 4-3-7: Fiscal capabilities for Sandia Pueblo		
Financial Resources	**Accessible or Eligible to Use (Yes, No, Don't Know)**	**Comments**
Community Development Block Grants	Don't Know	
Capital Improvements Project funding	Yes	Five Year CIP Program
Authority to levy taxes for specific purposes	No	
Fees for water, sewer, gas, or electric service	Yes	
Impact fees for homebuyers or new developments/homes	No	
Incur debt through general obligation bonds	No	
Incur debt through special tax bonds	No	

Table 4-1-8: Legal and regulatory capabilities for Santo Domingo Pueblo		
Regulatory Tools for Hazard Mitigation	**Description**	**Responsible Department/Agency**
CODES and/or ORDINANCES	• None	•
PLANS, MANUALS, and/or GUIDELINES	• None	•
STUDIES	• None	•

Table 4-2-8: Summary of technical staff and personnel capabilities for Santo Domingo Pueblo		
Staff/Personnel Resources	☑	**Department/Agency - Position**
Planner(s) or engineer(s) with knowledge of land development and land management practices		
Engineer(s) or professional(s) trained in construction practices related to buildings and/or infrastructure		
Planner(s) or engineer(s) with and understanding of natural and/or human-caused hazards		
Floodplain Manager		
Surveyors		
Staff with education or expertise to assess the community's vulnerability to hazards		
Personnel skilled in GIS and/or HAZUS; AutoCad-Civil 3D; ArcViewGIS		
Scientists familiar with the hazards of the community		
Emergency manager	☑	Josh Schraeder, EMS Director
Grant writer(s)	☑	Charlene Reano , Grant Writer

Table 4-3-8: Fiscal capabilities for Santo Domingo Pueblo		
Financial Resources	**Accessible or Eligible to Use (Yes, No, Don't Know)**	**Comments**
Community Development Block Grants	Don't Know	
Capital Improvements Project funding	No	
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	No	
Incur debt through special tax bonds	No	

Table 4-1-9: 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 WMP Version 2.0 - Report • Montoyas WMP Version 2.0 - Appendices • Black WMP • Barranca WMP Version 2.0 - Report • Barranca WMP Version 2.0 - Figures • Venada WMP • Unnamed Arroyo WMP • Rainbow Tributary DMP	• 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 4-2-9: 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
Floodplain Manager	☑	1-Floodplain Manager/PE
Surveyors	☑	3-On-call surveyors
Staff with education or expertise to assess the community's vulnerability to hazards		
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 4-3-9: Fiscal capabilities for SSCAFCA		
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	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	

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. SSAFCA and Sandia Pueblo are not participants.

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 4-4 summarizes the NFIP status and statistics for each of the jurisdictions participating in this Plan.

Table 4-4: NFIP status and statistics for Sandoval County and participating jurisdictions as of June 2012						
Jurisdiction	**Community ID**	**NFIP Entry Date**	**Current Effective Map Date**	**Number of Policies**	**Amount of Coverage (x $1,000)**	**Floodplain Management Role**
Sandoval County	350055	06/30/1998	03/18/2008	283	$49,038	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	$51,822	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	125	$35,445	Floodplain management provided by the Village for all incorporated areas of Corrales, through the Planning and Zoning Department.
Jemez Springs, Village of	350096	01/03/1986	03/18/2008	11	$2,029	The Village of Jemez Springs defers floodplain management responsibilities to the County.
Rio Rancho, City of	350146	04/15/1992	09/26/2008	108	$25,949	Floodplain management provided by the City for all incorporated areas of Rio Ranch, through the Public Works Department.
Cochiti Lake, Town of	Cochiti Lake is a chartered community within Cochiti Pueblo lands and is not an NFIP participant.					
San Ysidro, Village of	Community ID: 350138. Currently not participating in NFIP but does have SFHA delineated within the Village boundaries. The Mayor was unaware that the village was not participating in the NFIP. The Village of San Ysidro has adopted the ordinance to participate in the National Flood Insurance Plan but it was not sent to NFIP. The Mayor is currently taking action to continue to enroll in the National Insurance plan but it may take some time to have the plan finalized.					
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. Stated reasons for not participating are provided as follows:					

	Sandia Pueblo – the Pueblo is not participating in the NFIP because they have their own flood insurance for the buildings on the reservation. Santo Domingo Pueblo – the Pueblo does not participate in the NFIP to protect the tribe's sovereignty.
Sources: Policy Statistics - http://bsa.nfipstat.com/reports/1011.htm (4/31/2012) ; NFIP Status - http://bsa.nfipstat.com/comm_status/index.html (6/25/2012)	

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 4-5 summarizes the responses provided by each of the currently participating jurisdictions

Table 4-5: NFIP program assessment for Sandoval County and 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.

Table 4-5: NFIP program assessment for Sandoval County and participating NFIP jurisdictions		
Participating Jurisdiction	**Responses to Questions 1-4**	
		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 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. 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.

Table 4-5: NFIP program assessment for Sandoval County and participating NFIP jurisdictions		
Participating Jurisdiction	**Responses to Questions 1-4**	
	Q3	Assistance is given on an individual basis by meeting with the Floodplain Administrator.
	Q4	Current Floodplain Ordinance is dated May 2003. 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. They are also advised how they may alternatively flood proof their property.
	Q2	We were re-mapped in March 2008. The quality was poor. FEMA just used the prior data from the earlier map. We have ongoing studies of topographical data and levees being done by ESSCAFCA and the Army Corps.
	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. We also need more stormwater retention ponds.
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 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. If a property is in any flood zone except "X" or "X shaded", the contractor

Table 4-5: NFIP program assessment for Sandoval County and participating NFIP jurisdictions		
Participating Jurisdiction	**Responses to Questions 1-4**	
		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. The Planning and Zoning Administrator is a Certified Floodplain Manager (administrator) with more than 12 years of experience.
	Q2	The Village of Corrales is using FIRM dated March 2008 as the official zone designation maps. A private landowner has submitted a request for LOMR that is under review by FEMA at this time for a small area in the Far Northwest Sector of the Village, addressing changes in the Tortugas Arroyo. When FEMA approves the LOMR, it will be included in our set of maps used to regulate subdivision, development, and construction in the Far Northwest Sector. 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 answers questions from private property owners, realtors, and real estate appraisers on a regular basis. The Flood Plain Manager 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,

Table 4-5: NFIP program assessment for Sandoval County and participating NFIP jurisdictions		
Participating Jurisdiction	**Responses to Questions 1-4**	
		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 2016 to2018. The Certified Flood Plain Manager is a member of the New Mexico Floodplain Managers Association, taking advantage of educational opportunities twice a year.
Jemez Springs, Village of	Q1	The Village of Jemez Springs Floodplain manager is Sandoval County 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

Table 4-5: NFIP program assessment for Sandoval County and participating NFIP jurisdictions		
Participating Jurisdiction	**Responses to Questions 1-4**	
		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: 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.

Table 4-5: NFIP program assessment for Sandoval County and participating NFIP jurisdictions		
Participating Jurisdiction	**Responses to Questions 1-4**	
		These additions to our ordinance provide better management of areas that could potentially be at risk.

4.2 Hazard Mitigation Goals

An assessment of the mitigation goals summarized in the 2004 Plan was performed by the Planning Team during the fourth planning meeting. To aid with the assessment, the goals listed in the 2010 State Plan (NMDHSEM, 2010) were made available as well as the section of the 2011 FEMA Review Guidelines that addresses the requirements for plan goals. During the review, the Planning Team made the following observations:

- Goals I – VI of the 2004 Plan essentially say the same thing only interchanging hazards. This seemed unnecessarily repetitive.
- Goal V specifically addressed human-caused hazards and needs to be deleted since there will be no human-caused hazards in the updated Plan.
- The Planning Team as a whole preferred the broader and more simple goals listed in the 2010 State Plan.
- 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 2010 State Plan goals (modified to reflect local and tribal communities) and the 2004 Plan Goals VII and VIII (with slight modifications to the text). 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 2004 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 2004 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 and Local Planning Team for each jurisdiction, reviewed and assessed the 2004 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 2004 Plan A/Ps are summarized by jurisdiction in Tables 4-6-1 through 4-6-6. It is noted that no tables are provided for Bernalillo, Cuba or Sandia Pueblo as these jurisdictions were either not adopting participants in the 2004 Plan or did not ever develop a list of A/Ps to assess.

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Table 4-6-1
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. (p 80 of 2005 Plan)	• SC Emergency Services; Public Works Dept. • $250,000 • FY06-FY08	Ongoing	Keep	Projects have been ongoing since 2006 and grants are applied for yearly.
2. Develop a County Stormwater Management Plan. Develop or update current flood/flash flood plan for the Bernalillo and Algodones areas of Sandoval County—covering both natural and artificial drainage systems—that identifies general hazards, deficiencies, and other problems and presents a strategy for addressing them over the long term. (p 80 of 2005 Plan)	• SC Emergency Services; Planning and Zoning • TBD • Within 2 years of funding	Complete	Delete	Project completed in 2010 using in-house staff.

Table 4-6-2
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

Table 4-6-2
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 with a new 50,000-gallon storage tank. Village water supply limited by present storage capacity; impacts ability to suppress wildland-urban fires (p 82 of 2004 Plan)	• Village of Corrales Public Works • $40,000 • Within 18 months of adoption of plan	In progress	Revise	Installed 3 Additional Municipal tanks • 4920 Corrales Road - 120,000 gallon tank • 100 Paseo Tomas Montoya - 54,000 gallon tank • 2200 Loma Larga - 80,000 gallon tank • 100 Target Road - 60,000 gallon tank owned by school but usable by fire department Want to install more tanks to help with preservation of Life and Property within the Village with no municipal water system ongoing project Fire Pump at the Corrales Road fire station to supply hydrants of the water tank
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. (p 82 of 2004 Plan)	• 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. Still desire to fill a Fire Marshall/EM 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. (p 82 of 2004 Plan)	• Village of Corrales Planning and Zoning • $50,000 • Within 36 months of adoption of plan	In progress	Keep	We received same funding and have a partial GIS of the Village, only visible addresses found by the company and basic GIS mapping in Emergency Vehicles. Need better information to complete the Mapping
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	Submitting application for Hazard Mitigation funds through FEMA following massive flood damage July 26-28, 2013.

Table 4-6-2
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. (pp 82-83 of 2004 Plan)	• 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	In progress	Keep	Completed three fuel reduction areas, we had more but the citizens did not want to destroy Habitat One area was a Shaded fuel break study. still working to get more areas mitigated.
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. (p 83 of 2004 Plan)	• Village of Corrales • $15,000 • Within 12 months of adoption of plan	In progress	Keep	We have been attending Neighborhood watch meetings with defensible space information
7. Update Emergency Operations Plan to include adherence to Homeland Security rules and regulations. Village of Corrales Bosque identified as being vulnerable to wildfires. (p 83 of 2004 Plan)	• Village of Corrales in 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.

Table 4-6-3
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

Table 4-6-3
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. (p 76 of 2004 Plan)	• 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.
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. (p 76 of 2004 Plan)	• 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. (p 76 of 2004 Plan)	• 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.

Table 4-6-4
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. (p 77 of 2004 Plan)	• 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 4-6-4
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. (p 77 of 2004 Plan)	• 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. (p 77 of 2004 Plan)	• Rio Rancho Department of Public Safety, City Development Dept. • TBD • TBD by budgeting constraints.	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 and will incorporation Emergency Management needs.

Table 4-6-4
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)	• 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. (p 78 of 2004 Plan)	• Rio Rancho City Development Department, Rio Rancho Public Works Department, in coordination with Sandoval County and SSCAFCA. • TBD • Within FY04	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.
NO VOTES: Citywide Drainage Right-of-Way Acquisition. Acquire the City drainage system in its entirety for comprehensive management and to prevent faulty construction. (p 78 of 2004 Plan)	• Rio Rancho Public Works Department, in coordination with SSCAFCA. • $150,000 annually • 10 years to complete	No Action	Delete	The CoRR does not know nor have control of the future development within its boundaries. Therefore, it is not possible to identify the land required for unknown infrastructure.

Table 4-6-5
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. (p 79 of 2004 Plan)	• San Ysidro Marshal's Department • $10,000 • End of fiscal year 2003-2004	No action	Keep	N/A
NO VOTES: 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. (p 79 of 2004 Plan)	• San Ysidro Marshal's Department • $7,000 • December 2003	No Action	Keep	N/A

Table 4-6-5
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
NO VOTES: 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. (p 79 of 2004 Plan)	• Village of San Ysidro • $100,000 • Within 3 years	In Progress	Delete	The project is in progress and should be completed in the next few months.

Table 4-6-6
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. Provide Flood Protection while Reducing Sediment and Erosion at Calabacillas Watershed (Code #03CA1). Project identified for flood protection. (p 80 of 2004 Plan)	• SSCAFCA • $40,000 • None Identified. Project will be initiated upon notification of funding and contractor procurement	In progress	Revise	Project will be completed in house by spring of 2013

Table 4-6-6
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
NO VOTES: Provide Flood Protection while Reducing Sediment and Erosion at Black Watershed (3 Elements). Projects identified for flood protection within the Black Watershed are #03BL2, 19th St. Pond Design, ROW & Construction; #03BL3, Tulip Road Dam Design and Tulip Road Dam ROW & Construction; and #03BL4, Lisbon Channel, from Southern Boulevard to Arkansas. (p 81 of 2004 Plan)	• SSCAFCA in cooperation with Rio Rancho, Bernalillo, and/or Corrales • Code 03BL2=$ 40,000 Code 03BL3=$ 65,000 Code 03BL4=$ 50,000 Total Cost: $155,000 • None Identified. Project will be initiated upon notification of funding and contractor procurement	In progress	Revise	#03BL2 Pond plans developed awaiting funding #03BL3 No change in status due to lack of funding #03BL4 Plans prepared, awaiting funding
NO VOTES: Provide Flood Protection while Reducing Sediment and Erosion at Montoyas Watershed (5 elements). Projects identified for flood protection within the Montoyas Watershed are #03M02, Montoyas Dam Site Engineering and ROW; #03M03, Lomitas Negras Overlay Zone; #03M04, Lomitas Negras ROW East of 528/Saratoga to 528; #03M05, Impact Study for Raising Corrales Road Bridge; and Lomitas Negras Soil Cement Investigation Part 2. (p 81 of 2004 Plan)	• SSCAFCA in cooperation with Rio Rancho, Bernalillo, and/or Corrales • Code 03M02=$175,000 Code 03M03=$ 65,000 Code 03M04=$ 75,000 Code 03M05=$ 30,000 Code N/A= $ 16,500 Total Cost: $361,500 • None Identified. Project will be initiated upon notification of funding and contractor procurement	In progress	Revise	#03M02 Project completed in 2006 (Sportsplex Dam) #03M03 On hold due to negotiations with the City of Rio Rancho for Overlay Zone status #03M04 City of Rio Rancho is fee simple owner of property. SSCAFCA in negotiations with city #03M05 Project status has been modified to providing an additional box under bridge. Project advertised, bids received, bid selection in July of 2012, start construction in fall/winter of 2012. #03M05 Awaiting funding

Table 4-6-6
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
NO VOTES: Provide Flood Protection while Reducing Sediment and Erosion at Venada Watershed (3 elements). Projects identified for flood protection within the Venada Watershed are #03VE2, Middle Venada ROW #03VE3, Venada Dam Site Engineering and ROW; and Enchanted Hills Boulevard (EHB) Channel. (p 81 of 2004 Plan)	• SSCAFCA in cooperation with Rio Rancho, Bernalillo, and/or Corrales • Code 03VE2=$160,000 Code 03VE3=$ 50,000 Code N/A= $100,000 Total Cost: $310,000 • None Identified. Project will be initiated upon notification of funding and contractor procurement	In progress	Revise	#03VE2 Have completed 35% of purchases. Continue to acquire row. #03VE3 Completed row purchase. Design awaiting funding for dam site. EHB awaiting funding

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 the Planning Team Meeting No. 4. 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 (e.g. – 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****
- Develop a community-wide, stormwater management plan that will analyze and identify problem flooding areas and propose long-term mitigation alternatives designed to reduce or eliminate the flood problems.
- Review 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

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

- **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.
- **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.

Tables 4-7-1 and 4-7-2 summarize the new mitigation A/Ps and implementation strategy for Sandoval County. Similarly, Tables 4-8-1 through 4-15-1 and Tables 4-8-2 through 4-15-2 summarize the new mitigation A/Ps and implementation strategy for Bernalillo, Corrales, Jemez Springs, Rio Rancho, San Ysidro, Sandia Pueblo, Santo Domingo Pueblo and SSCAFCA, respectively. Projects listed in *italics font* are recognized as being more response and recovery oriented, but are considered to be a significant part of the overall hazard management goals of the community and therefore included herein.

Table 4-7-1
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.	$250,000	N	N	N	F	N	F	F	1
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	2

Table 4-7-1
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 **Ojo Encino Bridge #8607** • Rehabilitation-Correct spalling and concrete delamination • Resurface and widen existing deck • Upgrade existing safety equipment(guardrails, end treatments, and signing) • Bank stabilization	$25,000,000 $13,000,000 $17,000,000 $5,000,000	F	F	F	F	F	F	N	3

Table 4-7-1
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.4 GIS infrastructure and capability	-Dam Failure -Drought -Flood -Severe Weather -Severe Wind -Wildfire	Both	Improve GIS infrastructure to have more real time information available for Incident Action Plans and response. Improve continuity of operations without single point of failure.	$100,000	N	F	F	N	N	N	N	4

Table 4-7-2
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	Late 2015	Fire staff, volunteers, Non-Profit organizations, Firewise	State and Federal Grants
A.2 Public Education	Firewise, Community Wildfire Protection Plan	Late 2015	Fire Staff, Public Information Staff, IT staff, volunteers, Non-Profit organizations	State and Federal Grants, budget

Table 4-7-2 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.3 Flood mitigation and response	Comprehensive plan, County Development plan	2020	County Development, Public Works	State and Federal Grants, ICIP, budget
A.4 GIS infrastructure and capability	Hazard Mitigation plan, Floodplain Management	2016	Community Development (GIS)	State and Federal Grants, budget

Table 4-8-1 Mitigation actions/projects identified by Bernalillo													
					STAPLE+E Assessment (F) Favorable; (L) Less Favorable; (N) Neutral								
Name	**Hazard(s) Mitigated**	**Community Assets Mitigated (Existing/ Future/ Both)**	**Description**	**Estimated Cost**	**Social**	**Technical**	**Administrative**	**Political**	**Legal**	**Economic**	**Environmental**	**Project Rank**
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

Table 4-8-1
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.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	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 4-8-2 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	N/A Ongoing	GIS Specialist	Town of Bernalillo
B.2 Storm Water Master Plan	Town of Bernalillo Public Works	winter 2012	Town of Bernalillo	Town of Bernalillo
B.3 Athena Pond	ESCAFCA/TOB	Winter 2012	Town of Bernalillo/ ESCAFCA	Town of Bernalillo/ ESCAFCA
B.4 EAP - Piedra Liza Dam	Coronado Soil and water conservation district, Town of Bernalillo, Sandoval County	2012	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	Summer 2013	Town Building Official	Town of Bernalillo

Table 4-9-1
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.	Wildfire	Existing and future	Add water tanks with in the Village to increase firefighting ability as Corrales has no municipality water system. This is for both structure and wildland fire fighting	$300,000	F	F	F	F	F	F	F	1
C.2 Fire pump at fire station 4920 Corrales Road	Wildfire	Existing and future	We are starting to try to run hydrants in the Commercial Corridor of the Village, but will need a fire pump to make sure water has adequate pressure	$50,000	F	F	F	F	F	F	F	2
C.3 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	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.	$1,500,000	F	F	F	F	F	F	F	4

Table 4-9-1
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 Emergency Communications – website	-Dam Failure -Drought -Flood -Severe Weather -Severe Wind -Wildfire	Both	Create a coordinated website with key information from local, state and federal government and emergency response agencies, for collecting and disseminating information to citizens, and local citizen groups to better prevent and prepare and recovery from emergencies. When an emergency occurs disseminate accurate and up-to-date information allowing citizens to have timely information on the emergency to make appropriate response to the emergency	$50,000	F	F	F	F	F	F	F	5
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	6

Table 4-9-1
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.7 Update Emergency Operations Plan to include adherence to Homeland Security 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	7
C.8 Geographic Information System –based mapping for the Village of Corrales	-Dam Failure -Drought -Flood -Severe Weather -Severe Wind -Wildfire	Existing and future	We have some mapping but not every address having address and mapping makes access to residences in emergencies easier also for contacting them for mitigation issues	$100,000	F	F	F	F	F	F	F	8

Table 4-9-1
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.9 Fire Marshall Emergency Manager Position	-Dam Failure -Drought -Flood -Severe Weather -Severe Wind -Wildfire	Existing and future	Hire a Fire Marshall/ Emergency Manager under the Fire department	$65,000 per year	F	F	L	F	F	L		9

Table 4-9-2
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.	Centralized locations for tanker travel within the Village on Village owned property	2020	Fire	ICIP, State fire Grants
C.2 Fire pump at fire station 4920 Corrales Road	Need fire flow in commercial corridor	2014	Fire	AFG, State Fire Grants , ICIP

Table 4-9-2 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.3 Fuel reduction and "non-native species removal" Village Bosque	Working with Bosque Commission, State Forester and Village council	2016	Fire	State and local grants and funding
C.4 Emergency Communications – website	Council organized meeting about communications in emergencies	2013	Fire	State and local grants and funding
C.5 Public Meetings and send flyers to residents of Corrales to educate them on defensible space and construction.	Working with neighbor hoods and individuals through meetings and workshops	2015	Fire	Local state and federal funding and grants
C.6 Update Emergency Operations Plan to include adherence to Homeland Security rules and regulations	Village	2013	Fire	General Budget
C.7 Geographic Information System –based mapping for the Village of Corrales	Working with P and Z and the County	2015	Planning and Zoning	State grants Local funding
C.8 Fire Marshall Emergency Manager Position	We have neither position in the village, fire department try's to cover	2015	Fire	State grants Local funding

Table 4-10-1
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 all potential hazards or hazard related mitigation activities for planning and documentation purposes.	$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

Table 4-10-1
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.4 Early warning systems	Wildfire, flood, severe weather	Both	Implement redundant early warning systems to warn the public and visitors of impending danger. 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
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

Table 4-10-2
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)

Table 4-10-2
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	2015	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	2016	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	2017	Village Committee, Mayor	Community Forest Restoration Grants, Hazard Mitigation, State Severance funds
D.4 Early warning systems	Existing systems, studies	2018	Village Trustees, Mayor, Fire and Police	State and Federal Grants
D5. Public Education campaign	Existing information, location specific information, State and Federal programs	2016	Mayor, Fire, Police, Consultants	Community Development Grants, Budget, Private Donations

Table 4-11-1
Mitigation actions/projects identified by Rio Rancho

Name	Hazard(s) Mitigated	Community Assets Mitigated	Description	Estimated Cost	STAPLE+E Assessment (F) Favorable; (L) Less Favorable; (N) Neutral	Project Rank

		(Existing/ Future/ Both)			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	Severe Weather, Drought, Dam Failure, Flood	Existing	Educate & encourage the public on the availability and use of NWS severe weather alerts & our county reverse 911 systems (Code Red) 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	Severe Weather	Both	Purchase and maintain backup generators for key critical facilities serving emergency response functions to ensure adequate response capability during a major hazard event.	$100,000	F	L	F	F	F	L	F	7
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

Table 4-11-1
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.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
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

Table 4-11-1
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.3	Flood	Both	These two facilities 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
E.2	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.	$1,500,000	F	N	F	F	F	F	F	2
E.1	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.	$1,000,000	F	N	F	F	F	F	F	1

Table 4-11-2 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.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.1 Sportsplex	Mitigation Grant	FY14	Public Works / City Engineer	Mitigation Grant & General Fund

Table 4-11-2
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.2 Red River Watershed	Mitigation Grant	FY14	Public Works / City Engineer	Mitigation Grant & General Fund
E.3	Mitigation Grant	FY14	Public Works / City Engineer	Mitigation Grant & General Fund

Table 4-12-1
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.	$100,000	F	F	N	F	F	L	N	1
F.2 Prepare a Drought Plan	Drought	Both	A drought plan will assist the village in continued operations of water facilities and rural famers / ranches in action during a drought. Developing a plan will assist both public and private sector in managing resources, livestock and farming during a drought. Giving the Village of San Ysidro a ability to manage water resources for residential use, agriculture, fire protection and recreation.	$50,000	F	F	F	F	F	F	N	2

Table 4-12-1
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.3 Install Early Warning Devices for Critical Facilities in Village of San Ysidro	-Dam Failure -Drought -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.	$75,000	F	F	N	F	F	N	N	3
F.4 Install an Emergency Call Box at Each San Ysidro Municipal Complex	-Dam Failure -Drought -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	4
F.5 Hazard education	All Hazards	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	5

Table 4-12-2 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	By 2015	Marshall's Office / Marshall	federal grants and state grants
F.2 Prepare a Drought Plan	Reference to State Drought Task Force Documents	by 2015	Mayor's office	grants and general fund
F.3 Install Early Warning Devices for Critical Facilities in Village of San Ysidro	village council	by 2016	Marshall's Office / Marshall	grants
F.4 Install an Emergency Call Box at Each San Ysidro Municipal Complex	village council	by 2015	Marshall's Office / Marshall	grants
F.5 Hazard education	LEPC	by 2013	Marshall's Office / Marshall	general fund

Table 4-13-1
Mitigation actions/projects identified by Sandia Pueblo

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 Southern Border Retention/ Detention Ponds	Flood, Dam Failure	Future	Construction of 30 retention/detention ponds surrounding the Pueblo of Sandia Southern Border to mitigate flooding.	$9,000,000	F	F	F	F	F	F	F	1
G.2 Village Retention/ Detention Ponds	Flood, Dam Failure	Future	Construction of 17 retention/detention ponds surrounding the Pueblo of Sandia Village Area to mitigate flooding in the Village.	$4,000,000	F	F	F	F	F	F	F	2
G.3 Bosque Restoration	Fire, Extreme Weather, Severe Wind	Both	Program intended to clear away trees from Bosque that could create fire hazard and dangerous debris during severe weather	Staff Time	F	F	F	F	F	F	F	3
G.4 Drought Wells	Drought	Future	Drill four supplementary irrigation wells (including associated infrastructure) for use in times drought for Pueblo of Sandia Farmland.	$2,000,000	F	F	F	F	F	F	F	4
G.5 Building Safety Permit Requirements	Fire, Flood	Both	Written requirements that specify codes that must be followed for all construction on the reservation	Staff Time	F	F	F	F	F	F	F	5

Table 4-13-1
Mitigation actions/projects identified by Sandia Pueblo

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.6 Sandia Pueblo Dams Emergency Action Plan	Dam Failure, Erosion Control	Both	Plan identifies evacuation strategies in case of failure of dams that currently exist around the Pueblo of Sandia Village	Staff Time	F	L	F	F	F	L	F	6
G.7 2010 Master Drainage Study	Flood	Both	Provides the Tribe with drainage management options for mitigation of downstream flooding		F	F	F	F	F	F	F	7
G.8 Pueblo of Sandia Irrigation System Engineering Evaluation	Flood, Drought, Erosion Control	Both	Plan aimed at supporting the Pueblo's water resource strategy in determining the existing and potential surface water available for irrigated agriculture on tribal lands.	Staff Time	F	F	F	N	F	N	F	8
G.9 2012 Long-Range Transportation Plan	Flood	Both	Identifies roads on the reservation that are prone to washouts during heavy rain/floods	Staff Time	F	F	F	F	F	F	F	9
G.10 Emergency Generators	Extreme Weather, Severe Wind	Both	Keep backup generators to supply power to emergency evacuation facilities	$150,000	F	F	F	F	F	L	F	10

Table 4-13-2
Mitigation actions/projects implementation strategy for Sandia Pueblo

Name	Planning Mechanism(s) for Implementation	Anticipated Completion Schedule	Primary Agency / Job Title Responsible for Implementation	Funding Source(s)
G.1 Southern Border Retention/ Detention Ponds	N/A	FY14	Tribe	Tribe/Grants
G.2 Village Retention/ Detention Ponds	N/A	FY15	Tribe	Tribe/Grants
G.3 Bosque Restoration	N/A	Ongoing	Tribe	Tribe
G.4 Drought Wells	N/A	FY16	Tribe	Tribe/Grants
G.5 Building Safety Permit Requirements	N/A	Completed	Tribe	Tribe
G.6 Sandia Pueblo Dams Emergency Action Plan	N/A	Completed	BIA/Tribe/ Sandoval County	Tribe
G.7 2010 Master Drainage Study	N/A	Completed	Tribe	Tribe
G.8 Pueblo of Sandia Irrigation System Engineering Evaluation	N/A	Completed	Tribe	Tribe
G.9 2012 Long-Range Transportation Plan	N/A	Completed	Tribe/FHWA	FHWA

Table 4-13-2
Mitigation actions/projects implementation strategy for Sandia Pueblo

Name	Planning Mechanism(s) for Implementation	Anticipated Completion Schedule	Primary Agency / Job Title Responsible for Implementation	Funding Source(s)
G.10 Emergency Generators	N/A	Completed	Tribe	Tribe

Table 4-14-1
Mitigation actions/projects identified by Santo Domingo Pueblo

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	
H.1 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	1
H.2 Wildfire prevention public information	Wildfire	both	Educate property owners within wildland urban interface areas within Santo Domingo Pueblo. Firewise programs in their area and the benefits of proper fuels thinning, setbacks, perimeter clearing.	Staff Time	F	F	N	F	N	F	F	2
H.3 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	3

Table 4-14-1
Mitigation actions/projects identified by Santo Domingo Pueblo

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	
H.4 Wildfire Evacuation Routes	Wildfire	Future	identify wildfire evacuation routes for at risk population areas	Staff Time	F	L	L	F	N	F	F	4
H.5 Emergency Public Information Sources	ALL	Future	Educate & encourage the public on the availability and use of NWS severe weather alerts.	Staff Time	F	F	F	F	F	F	F	5
H.6 Flood Control	Flood	Future	Plan and design way to divert water from being diverted into the village.	$200,000	F	L	L	F	N	L	F	6
H.7	Flood	Both	Design and construct bridge over Canon Santo Domingo drainage north of Pueblo to be resilient during flooding.	$2,500,000	F	F	F	F	F	F	F	7
H.8	Flood	Both	Design and construct bridge over drainage at latitude 35.5611 X longitude 106.3728 on Tribal Rt. 85 south of Sile to be resilient during flooding.	$1,000,000	F	F	F	F	F	F	F	8
H.9 Emergency Generators	Severe Weather, Severe Wind	both	Purchase and maintain backup generators for key critical facilities serving emergency response functions to ensure adequate response capability during major hazard.	$100,000	F	L	F	F	F	L	F	9

Table 4-14-1
Mitigation actions/projects identified by Santo Domingo Pueblo

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	
H.10 Water Conservation Public Information	Drought	Future	Educate on water conservation with the homes during droughts	Staff Time	L	N	N	L	N	F	F	10

Table 4-14-2
Mitigation actions/projects implementation strategy for Santo Domingo Pueblo

Name	Planning Mechanism(s) for Implementation	Anticipated Completion Schedule	Primary Agency / Job Title Responsible for Implementation	Funding Source(s)
H.1 Dam Emergency Action Plans	N/A	FY15	Emergency Management	EMS Budget
H.2 Wildfire prevention public information	N/A	FY14	Fire/EMS Public Outreach	EMS Budget
H.3 Dam Failure Evacuation Routes	N/A	FY15	Emergency Management	EMS Budget

Table 4-14-2 Mitigation actions/projects implementation strategy for Santo Domingo Pueblo				
Name	**Planning Mechanism(s) for Implementation**	**Anticipated Completion Schedule**	**Primary Agency / Job Title Responsible for Implementation**	**Funding Source(s)**
H.4 Wildfire Evacuation Routes	N/A	FY15	Emergency Management	EMS Budget
H.5 Emergency Public Information Sources	N/A	FY14	Fire Department	EMS Budget
H.6 Flood Control	N/A	Don't Know	Utilities and Natural Resources	Grant
H.7	EOP, BIA transportation plan	FY 15	Santo Domingo Pueblo, BIA	Grant, Legislative Funds
H.8	EOP, BIA transportation plan	FY 15	Santo Domingo Pueblo, BIA	Grant, Legislative Funds
H.9 Emergency Generators	N/A	FY 16	Emergency Management	Grant
H.10 Water Conservation Public Information	N/A	FY16	Emergency Management/ Utilities	EMS Budget

Table 4-15-1
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	
I.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	1
I.2 Unit 17 Drainage Improvements	Flood	Both	Construct drainage improvements at Guadalajara, Alberta, Miller and Campeche Roads in Rio Rancho	$4,000,000	F	F	N	F	N	F	F	2
I.3 Dulcelina Curtis Channel Inlet Upgrade	Flood	Both	Expand sediment capture facility at inlet to Dulce Curtis channel	$1,000,000	F	F	N	N	F	F	F	3
I.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	4
I.5 LaBarranca City Center Drainage/ Dam Sites	Dam Failure, Flood	Both	Acquisition of ROW for future dam sites and drainage easements	$1,900,000	F	F	F	F	F	F	F	5
I.6 Tributary A Dam	Dam Failure, Flood	Both	Acquire ROW, design dam, construct dam	$3,000,000	F	F	N	F	N	F	F	6

Table 4-15-1
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	
I.7 Montoyas Arroyo Bank Stabilization Project	Flood	Both	Construct hardened bank protection between Broadmoor and Sportsplex Dam in Rio Rancho	$1,700,000	F	F	N	F	N	F	F	7
I.8 Edinburgh pipeline	Flood	Both	Construct a portion of the 84" RCP pipeline from regional pond to CBC box culvert at Northern and Fruta	$500,000	F	F	F	F	F	F	F	8
I.9 19th Avenue Dam	Dam Failure, Flood	Both	Acquire ROW and Design Facility	$1,000,000	F	F	N	N	N	F	F	9
I.10 Venada Aarroyo Channel Stabilization	Flood	Both	Design and construct bank stabilization structures between Lincoln and NM 528 in Rio Rancho	$100,000	F	F	N	F	N	N	F	10
I.11 Montoyas Water Quality Feature	Flood	Both	Construct drop structures and enlarge sediment pond	$2,500,000	F	F	N	F	N	N	F	11
I.12 Rainwater Harvesting Program	Drought, Flood	Both	Continue to offer pamphlets and outreach program to citizens	$100,000	F	F	N	F	N	N	F	12

Table 4-15-1
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	
I.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	13
I.14 Venada Arroyo Dam	Flood	Both	Design and construct flood protection facility	$5,700,000	F	F	N	F	N	N	F	14
I.15 Unser Dam	Flood	Both	Design and construct flood protection facility	$800,000	F	F	N	F	N	N	F	15
I.16 Upper Black Watershed Drainage Improvement	Flood	Both	Design and construct erosion / flood protection facilities	$1,500,000	F	F	N	F	N	N	F	16
I.17 Cite Center Drainage Improvements (PDV, SLO)	Flood	Both	Design and construct flood protection facilities	$15,000,000	F	F	N	F	N	N	F	17
I.18 Low Impact Development (LID) Program	Drought, Flood	Both	Through the development review process encourage the adoption of LID techniques, such as rainwater harvesting practices, into approved development designs.	$175,000	F	F	N	F	N	N	F	18

Table 4-15-2 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)**
I.1 Sugar Dam Outlet Structure	Black Arroyo Watershed Management Plan	2012	SSCAFCA/Executive Engineer	Local bonds
I.2 Unit 17 Drainage Improvements	Red River Watershed Design	2017	SSCAFCA/Executive Engineer	Local Bonds, State and Federal Grants
I.3 Dulcelina Curtis Channel Inlet Upgrade	Montoyas Arroyo Watershed Management Plan	2013	SSCAFCA/Executive Engineer	Local Bonds
I.4 Willow Creek Drainage Improvements	Willow Creek arroyo Watershed Management Plan	2013	SSCAFCA/Executive Engineer	Local Bonds, Local, State and Federal Grants
I.5 LaBarranca City Center Drainage/ Dam Sites	CoRR, City Center Detention Pond Drainage Solution Project	2016	SSCAFCA/Executive Engineer	Local Bonds, Local, State and Federal Grants
I.6 Tributary A Dam	Black Arroyo Watershed Management Plan	2014	SSCAFCA/Executive Engineer	Local Bonds, State and Federal Grants
I.7 Montoyas Arroyo Bank Stabilization Project	Montoyas Arroyo Watershed Management Plan	2015	SSCAFCA/Executive Engineer	Local Bonds, State and Federal Grants
I.8 Edinburgh pipeline	Edinburgh Facility Plan, Montoyas Arroyo Watershed Management Plan	2014	SSCAFCA/Executive Engineer	Local Bonds, Local Grants, public/private partnership
I.9 19th Avenue Dam	Black Arroyo Watershed Management Plan	2015	SSCAFCA/Executive Engineer	Local Bonds, State and Federal Grants

Table 4-15-2 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)**
I.10 Venada Aarroyo Channel Stabilization	Venada Arroyo Watershed Management Plan	2014	SSCAFCA/Executive Engineer	Local Bonds
I.11 Montoyas Water Quality Feature	Montoyas WMP	2014	SSCAFCA/Executive Engineer	Local Bonds, Local, State and Federal Grants
I.12 Rainwater Harvesting Program	RR Drainage ordinance	2014	SSCAFCA/Executive Engineer	Local Bonds, Local, State and Federal Grants
I.13 Arroyo Bank Stabilization Slope Control	SSCAFCA DMP & WMPs	2018	SSCAFCA/Executive Engineer	Local bonds, Grants
I.14 Venada Arroyo Dam	Venada WMP	2017	SSCAFCA/Executive Engineer	Local bonds, Grants
I.15 Unser Dam	Venada WMP	2017	SSCAFCA/Executive Engineer	Local bonds, Grants
I.16 Upper Black Watershed Drainage Improvement	Black WMP	2015	SSCAFCA/Executive Engineer	Local bonds, Grants
I.17 Cite Center Drainage Improvements (PDV, SLO)	City Center DMP	2016	SSCAFCA/Executive Engineer	Local bonds, Grants
I.18 Cite Center Drainage Improvements (PDV, SLO)	SSCAFCA DMP & RR Drainage ordinance	2014	SSCAFCA/Executive Engineer	Local Bonds, Local, State and Federal Grants