Engagement Plan / Pre-Discovery Report

Rio Chama Watershed, HUC *13020102*

Rio Arriba, Sandoval, Taos, Counties, NM

August 31, 2023


U.S. DEPARTMENT OF HOMELAND SECURITY
FEMA

Project Area Community List

Community Name*	CID
Rio Chama Watershed Communities	
Rio Arriba County, Unincorporated Areas	350049
Taos County, Unincorporated Areas	350078
Sandoval County, Unincorporated Areas	350055
Chama, Village of	350050

*Communities without CIDs are not included.

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The basis and format of this document is derived from FEMA Guidance and Specification, Procedure Memorandums, Operational Guidance, Regional Standard Operating Procedures, and current draft revisions and proposed guidance to include, but not limited to;

Guidance and Specifications: Appendix I - Discovery

Guidance and Specifications: Appendix M – Data Capture Standards

PM 56: Guidelines for Implementation of Coordinated Needs Management Strategy (CNMS)

PM 59: Guidance for Implementation of Watershed-Based Studies

PM 60: Guidance for Flood Risk Assessment Data Development and Analysis

Operational Guidance No. 1-11: Risk MAP Guidance for Incorporating Mitigation Planning Technical Assistance and Training into Flood Risk Projects

Operational Guidance No. 4-11: Risk MAP Meeting Guidance

FEMA Region 6 Discovery & Project Pre-Planning SOP

Any revisions or changes to this document will require FEMA Region 6 Authorization prior to implementation.

Acronyms and Abbreviations

BFE	base (1-percent-annual-chance) flood elevation
BLM	Bureau of Land Management
BOR	Bureau of Reclamation
CFR	Code of Federal Regulations
cfs	cubic feet per second
CID	Community Identification number
CLOMR	Conditional Letter of Map Revision
CNMS	Coordinated Needs Management Strategy
CRS	Community Rating System
DFIRM	Digital Flood Insurance Rate Map
EAP	Emergency Action Plan
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Map
FIS	Flood Insurance Study
FPA	Floodplain Administrator
GIS	Geographic Information System
HEC-1	Hydrologic Engineering Center – Hydrologic Model Program
HEC-2	Hydrologic Engineering Center – Hydraulic Model Program
HEC-HMS	Hydrologic Engineering Center – Hydrologic Modeling System
H&H	hydrologic and hydraulic
HMP	Hazard Mitigation Plan
HUC	Hydrologic Unit Code
HWM	High Water Mark
LiDAR	Light Detection and Ranging System
LOMA	Letter of Map Amendment
LOMC	Letter of Map Change
LOMR	Letter of Map Revision
MAT	Mitigation Assessment Team
MDP	Master Drainage Plan
MXD	Map Exchange Document
NFIP	National Flood Insurance Program

NHD	National Hydrologic Dataset
NMDHSEM	New Mexico Department of Homeland Security and Emergency Management
NM RGIS	New Mexico Resource Geographic Information System
NRCS	Natural Resources Conservation Service
NVUE	New Validated or Updated Engineering
Risk MAP	Risk Mapping, Assessment, and Planning
RL	Repetitive Loss
PMR	Physical Map Revision
RSC	Regional Service Center
SFHA	Special Flood Hazard Area
SHMO	State Hazard Mitigation Officer
SHP	ESRI Shape File
SRL	Severe Repetitive Loss
USACE	U.S. Army Corps of Engineers
USDA	U.S. Department of Agriculture
USFS	U.S. Forest Service
USGS	U.S. Geological Survey
USFWS	U.S. Fish & Wildlife Service

I. Discovery Overview

The Federal Emergency Management Agency (FEMA) is currently implementing the Risk Mapping, Assessment, and Planning (Risk MAP) Program across the Nation. The purpose of Risk MAP is the continued improvement of flood hazard information for the National Flood Insurance Program (NFIP), the promotion of increased national awareness and understanding of flood risk and the support of Federal, State, and local mitigation actions to reduce risk.

The vision and intent of the Risk MAP program is to, through collaboration with the State of New Mexico, local and tribal entities, to deliver quality data that increases public awareness and leads to mitigation actions that reduce risk to life and property. To achieve this vision, FEMA has transformed its traditional flood identification and mapping efforts into a more integrated process of more accurately identifying, assessing, communicating, planning and mitigating flood risks. Risk MAP attempts to address gaps in flood hazard data and form a solid foundation for risk assessment, floodplain management, and provide with the State of New Mexico, local and tribal entities with information needed to mitigate flood related risks.

The FEMA Region 6 office, in partnership with the Earth Data Analysis Center, University of New Mexico began the Discovery process in the Rio Chama watershed in January 2021 to gather local information and readily available data to determine project viability and the need for Risk MAP products to assist in the movement of communities towards resilience. The watershed location can be seen in Figure 1.

Through the Discovery process, FEMA can determine which areas of the HUC8 Discovery watersheds may/will be funded for further flood risk identification and assessment in a collaborative manner, taking into consideration the information collected from local communities during this process. Discovery initiates open lines of communication and relies on local involvement for productive discussions about flood risk. The process provides a forum for a watershed-wide effort to understand how the included watershed community's flood risks are related to flood risk throughout the watershed. In Risk MAP, projects are analyzed on a watershed basis, so Discovery Meetings target numerous stakeholders from throughout the watershed on local, regional, State, and Federal levels.

In September 2023 FEMA and the State will hold a Discovery Meeting in this watershed area. During Discovery, FEMA and the State reached out to local communities to:

- Gather information about local or Tribal flood risk and flood hazards.
- Reviewed current and historic mitigation plans to understand local or Tribal mitigation capabilities, hazard risk assessments, and current or future mitigation activities.
- Include multi-disciplinary staff from within their community to participate and assist in the development of a watershed vision.

The results of the Discovery process are presented in a Discovery Report, a watershed scale Discovery Map and the digital data that were gathered or developed during the process under fiscal year 2020 CTP Agreement, EMT-2020-CA-00029, Mapping Activity Statement (MAS) 18, between FEMA and EDAC.

This document contains the Discovery Report. The digital data submitted with this report contain correspondence, exhibits used at the Discovery meetings, geographic information system (GIS) data, mapping documents (PDF, shapefiles, personal geodatabases and ESRI ArcGIS Pro 3.1.2 ArcGIS Project File [APRX]), or other supplemental digital information. Graphics in this Discovery

Report are available as larger format graphics files for printing and as GIS data that may be printed and used at any map scale.

i. Watershed Selection

The Rio Chama Watershed (HUC 13020102) encompasses an area of approximately 3,157 square miles and extends across three counties in the north central part of New Mexico. Major communities include the village of Chama and Tierra Amarilla. Tribal Lands belonging to Okay Owingeh Pueblo, and the Jicarilla Apache Nation and small portion of the Santa Clara Pueblo are located in the watershed. There are no levees in the watershed that are shown to provide protection from the base flood on the DFIRMs.

The population in this watershed is approximately 7,500, based on the 2020 census. This is a rural area of New Mexico and according to the Justice 40 categories the entire watershed is consider disadvantaged. The watershed encompasses a small portion of Sandoval County that has no population.

Table 1 provides a status update for each community's NFIP participation, CRS rating, and current FIRMs. Three counties and one community are participating in the NFIP. Figure 1 shows the locations of all communities in the watershed.

Table 1: NFIP Status of Project Area Communities

County/Parish	Community Name	Community Identification Number (CID)	Participating Community?	CRS Rating	FIRM Date	FIRM Status	Population (2020 Census)
Rio Arriba	Rio Arriba County, Unincorporated Areas	350049	Yes	NR	03/15/12	Revised	40,363
Taos	Taos County, Unincorporated Areas	350078	Yes	NR	10/06/10	Revised	34,489
Sandoval	Sandoval County, Unincorporated Areas	350055	Yes	NR	03/18/08	Revised	148,834*
Rio Arriba	Chama, Village of	350050	Yes	NR	03/15/12	Revised	917

*Portion of Sandoval County in watershed has a population of fewer than 50.

The primary river in the watershed is the Rio Chama and the most important tributaries to the Rio Chama are Cañones Creek, the Rio Brazos, Rito de Tierra Amarilla, Rio Nutrias, Rio Cebolla, Rio Gallina, Rito de Canjilon, Rio Puerco de Chama, a second Cañones Creek, El Rito, Rio del Oso, Abiquiu Creek, and the Rio Ojo Caliente.

The Abiquiu Reservoir was built by the Army Corps of Engineers in 1963, primarily for flood control. Additionally, the reservoir is used to store San Juan-Chama (SJC) contractor water. The San Juan-Chama Project water, which is a portion of New Mexico's allocation under the 1922 Colorado River

Compact and the Upper Colorado River Basin Compact, is diverted from the upper reaches of the San Juan River and its tributaries in Colorado through a series of tunnels into the Rio Grande Basin for storage in Heron Reservoir on Willow Creek just above its confluence with the Rio Chama. San Juan-Chama water is released to project contractors using the Rio Chama for conveyance, with some of the released water stored for specific contractors in two other reservoirs on the Rio Chama (El Vado and Abiquiu), but the majority of the water is contracted to downstream users.

The San Juan-Chama Project (Project) is a federal water project built in the 1960s to transport approximately 110,000 acre-feet of water annually from the San Juan River system to the Rio Grande via the Chama River. The Project was authorized under Section 8 of the Act of June 13, 1962, 76 Stat. 96, and the Act of April 11, 1956, 70 Stat. 105. The Project includes a number of tunnels under the Continental Divide, as well as Heron Reservoir, where San Juan-Chama water is stored after it has been transported through the tunnels from the San Juan tributaries. The purpose of the Project was to make use of water to which New Mexico is entitled under the Colorado River compacts in the Rio Grande Basin. The storage facilities for the Project are located in the planning region. Specifically, the regulating and storage reservoir is formed by Heron Dam on Willow Creek just above the point where Willow Creek enters the Rio Chama. The dam forms a reservoir with a capacity of 401,320 acre-feet and a surface area of 5,950 acres. Storage from Heron Dam provides water for municipal, domestic, industrial, recreation, and fish and wildlife purposes and also provides supplemental water for irrigation. Heron Reservoir is operated by the Bureau of Reclamation in compliance with applicable federal and state laws, including the Project authorization and the Rio Grande and Colorado compacts. Under these laws, only imported Project water may be stored in Heron Reservoir; there are no provisions for storing native Rio Grande water. Thus, all native Rio Grande water is released to the river below Heron Dam. The outlet works for El Vado Dam, located 6 miles downstream of Heron Dam, were enlarged in 1965-1966 so that Project releases from Heron Reservoir could be passed unimpeded through El Vado Reservoir. The flow of native water in the region must address the storage requirements of Heron and El Vado reservoirs.

The stretch of the Rio Chama between El Vado Reservoir and Abiquiu Reservoir is designated as a Wild and Scenic River, intended to protect its free-flowing nature. The BLM manages a 22-mile stretch of the Rio Chama in the Chama River Canyon Wilderness.

There is no critical habitat for endangered species within the Rio Chama Watershed, however to the south of the watershed there is habitat for the yellow-billed cuckoo, southwestern willow flycatcher, Jemez Mountains salamander, and New Mexico meadow jumping mouse.

The State of New Mexico owns 44 square miles of the watershed. In addition, the New Mexico Game and Fist Department manages and additional 63 square miles, which includes the Humphries, Rio Chama, and Sargent wildlife management areas. There are two New Mexico State Parks El Vado Lake and Heron Lake within the Rio Chama Watershed. The Bureau of Land Management (BLM) owns 177 square miles, including the Rio Chama Wilderness Study Area. The United States Forest Service (USFS) Carson National Forest owns 1,524 square miles of the watershed, including the San Pedro Parks Wilderness Area and Chama River Canyon Wilderness. The United States Army Corps

Figure 1: Watershed and Communities

County/Parish	Community Name	Community Identification Number (CID)	Participating Community?	CRS Rating	FIRM Date	FIRM Status	Population (2020 Census)
Rio Arriba	Rio Arriba County, Unincorporated Areas	350049	Yes	NR	3/15/2012	Revised	40,363
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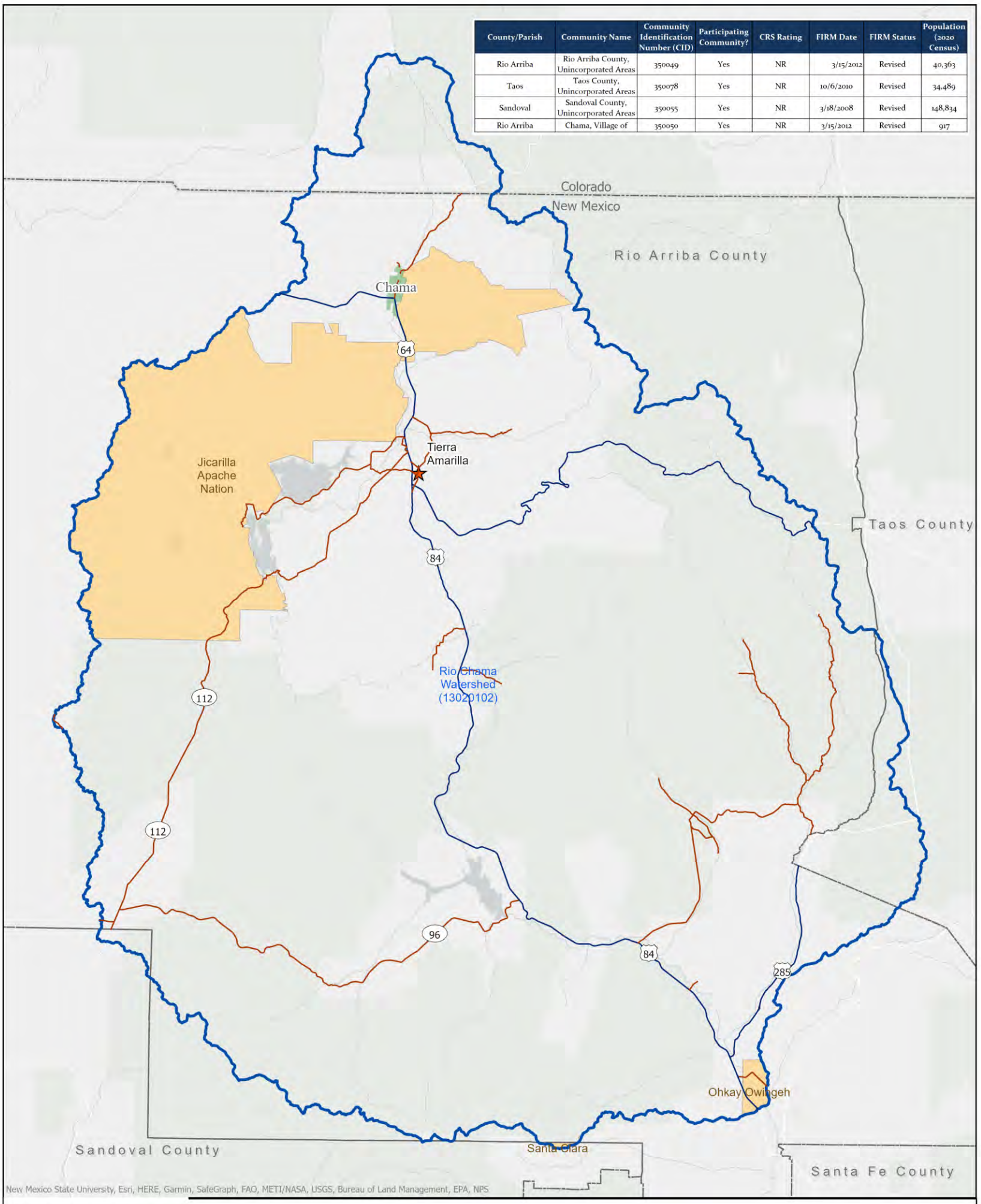

Map Symbology

- County Seat
- Watershed Boundary: HUC8
- Community Boundary
- Native American Reservation
- County Boundary

Roads

- State Highway
- US Highway

Discovery Map: Watershed and Communities

RIO CHAMA WATERSHED, NEW MEXICO
HUC 13020102 This Exhibit is for Illustrative Purposes Only

August 2023

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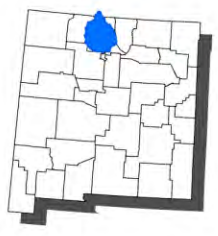
EDAC

FEMA

10 5 0 10 Miles

Project Location



of Engineers manages the Abiquiu Lake Recreation Area. The Jicarilla Apache Nation, Ohkay Owingeh Pueblo, and Santa Clara Pueblo own a combined 384 square miles with the Rio Chama Watershed. These areas contribute to the overall square mileage of the watershed but are not places where communities are able to plan for population growth or development.

Table 2 lists the 18 dams within the Rio Chama Watershed. This data is provided through the U.S. Army Corps of Engineers (USACE) National Inventory of Dams. There are ten dams classified as high hazard and four classified as having a significant hazard. One of the high hazard dams owned by the Bureau of Indian Affairs and two of the significant hazard dams, owned by a private owner and the New Mexico Department of Game and Fish, do not have Emergency Action Plans.

Table 2: Rio Chama Watershed Dams

Name	Owner	Hazard Rating	EAP
Abiquiu Dam	USACE	High	Yes
Canada Tanques Retention Dam	USFS	Low	Not Required
Dwight Baker Dam	Private	Low	Not Required
El Vado	BOR	High	Yes
Fort Heron Preserve Phase I Dam	Private	Low	Not Required
Fort Heron Preserve Phase II Dam	Private	Low	Not Required
Fourth of July	BIA	High	Yes
Grady Hamilton	BIA	High	No
Heron	BOR	High	Yes
Heron Dike	BOR	High	Yes
Hopewell Lake Dam	NM Dept. of Game and Fish	Significant	No
La Tierra Grande Dam	Private	Significant	No
Laguna Del Campo Dam	NM Dept. of Game and Fish	High	Yes
Pappaws	BIA	High	Yes
Pine Tree	BIA	High	Yes
Stone Lake	BIA	High	Yes
Upper of Lower Canjilon Lake Dam	USFS	Significant	Not Required
Upper Trout Lake Dam	USFS	Significant	Not Required

Population

The population in this watershed totals 7,500 people, based on the 2020 census. The village of Chama is the most populated incorporated place (population: 917), in total there are in total 22 populated areas inside this watershed. Figure 2 shows the population densities within the Rio Chama Watershed based on U.S. Census Data.

Land Use

The land use of the Rio Chama Watershed is predominantly rural with forest and shrublands being the dominant vegetation types. Figure 3 identifies the land use within the watershed. Figure 4 shows the changes in the percent urban coverage that have occurred in the watershed between 2001 and 2021. There has been minimal increase in urban areas in the watershed during that time, most of the increase has been due to an increase of roads across the watershed.

Figure 5 shows the wildfire potential in the Rio Chama watershed. The USDA Forest Service Rocky Mountain Research Station classifies the wildfire hazard potential from very low to very high. In the watershed there are 1,283 square miles of high and very high wildfire potential or about 41% of the watershed. These areas in the watershed have a higher probability of catastrophic wildfire that can then lead to post-fire flooding and debris flows. The New Mexico State Hazard Mitigation plan cycle of wildfire and flooding:

> "Catastrophic wildfire occurs when vegetation is consumed at a high-intensity leaving the forest floor susceptible to erosion and is referred to as the burn scar area. The burn scar area is where topsoil, duff, woody materials and ash from the catastrophic wildfire event can intensify post-fire flooding. Largescale erosion from burn scars can lead to the degradation of water resources for an entire region due to sediment transport. This type of sedimentation is due in part to soil damage during catastrophic wildfire. Organic components of the soil are lost and burnt which creates a soil condition called "hydrophobic." Hydrophobic soils lack the ability to infiltrate water which in turn can increase the potential for post wildfire flooding events by a four-hundred fold increase. Monsoon rainstorms can amplify the poor soil condition with high volumes of precipitation which is then transported during flood events settling in arroyos, ditches and flood control infrastructure.
>
> Vegetation loss from wildfire can also increase flooding potential and water stress. When New Mexico's coniferous dominated forest communities burn, their natural ability to absorb and deflect the precipitation load is lost. The combination of vegetation loss, hydrophobic soils and monsoon rainstorms can lead to highly destructive flooding events called "debris flows." Debris flows are a long-term risk to watersheds that have experienced wildfire. Loss of life, damage to property and significant infrastructure impacts are commonplace when debris flow flooding events occur. …. Debris flows move high amounts of sediment leading to sedimentation issues, including temporary dams or sediment plugs along existing waterways which can have further flooding impacts to downstream ecosystems and communities when the dams or plugs fill and break, resulting in a flood wave. The waterway is also damaged limiting its functionality as a both a natural water storage and/or water delivery conveyance for communities, thus increasing water stress." 2018 New Mexico State Hazard Mitigation Plan pp. 38-39.

Figure 6 shows the expected debris flow hazard for the watershed. This is the combined probability of a debris flow and the estimated volume of debris if a wildfire occurs in a certain location from the 2020 New Mexico Forest Action Plan created by the New Mexico Energy, Minerals and Natural Resources Department (EMNRD) Forestry Division. The threat of debris flow within the watershed

ranges from low to high, with the southern and northeastern portions of the watershed having the highest risk. In other watersheds in the state of New Mexico local communities have been impacted by post-wildfire debris flows that have destroyed homes, blocked culverts, over topped roads, destroyed acequias, and impacted local water supply sources.

Figure 2: Population Density in the Watershed

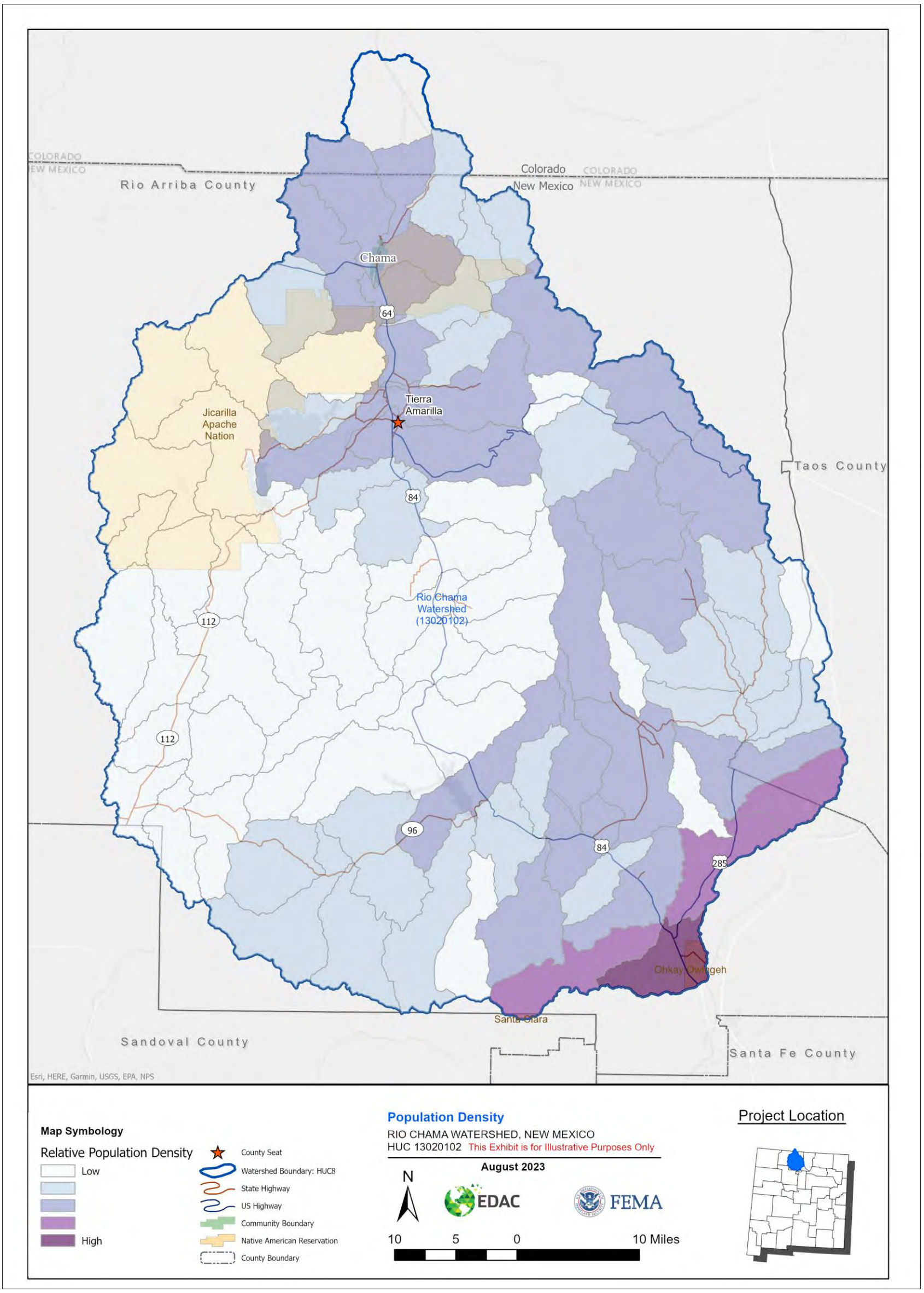


Figure 3: Rio Chama Land Cover

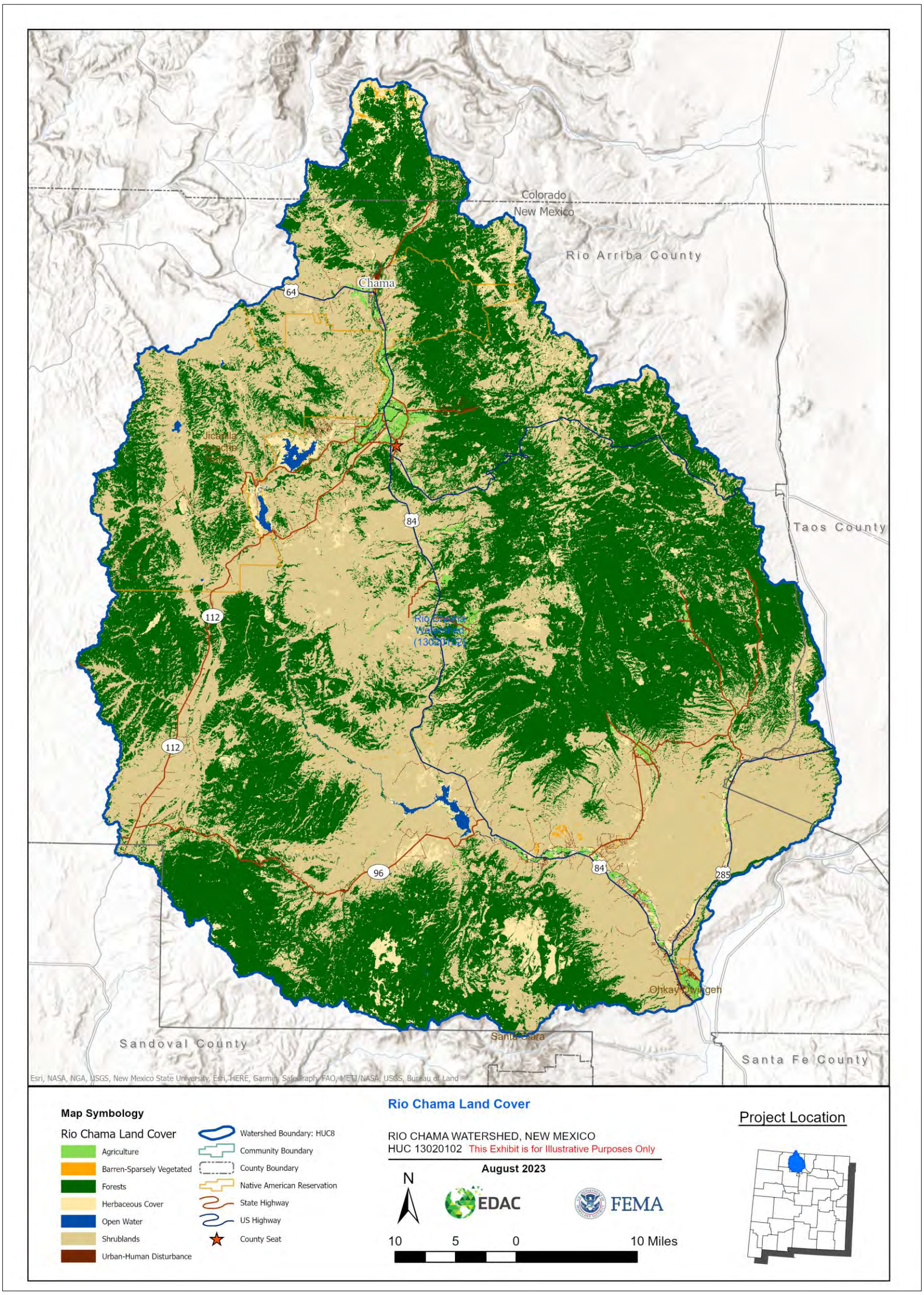


Figure 4: Urban Changes 2001 to 2021

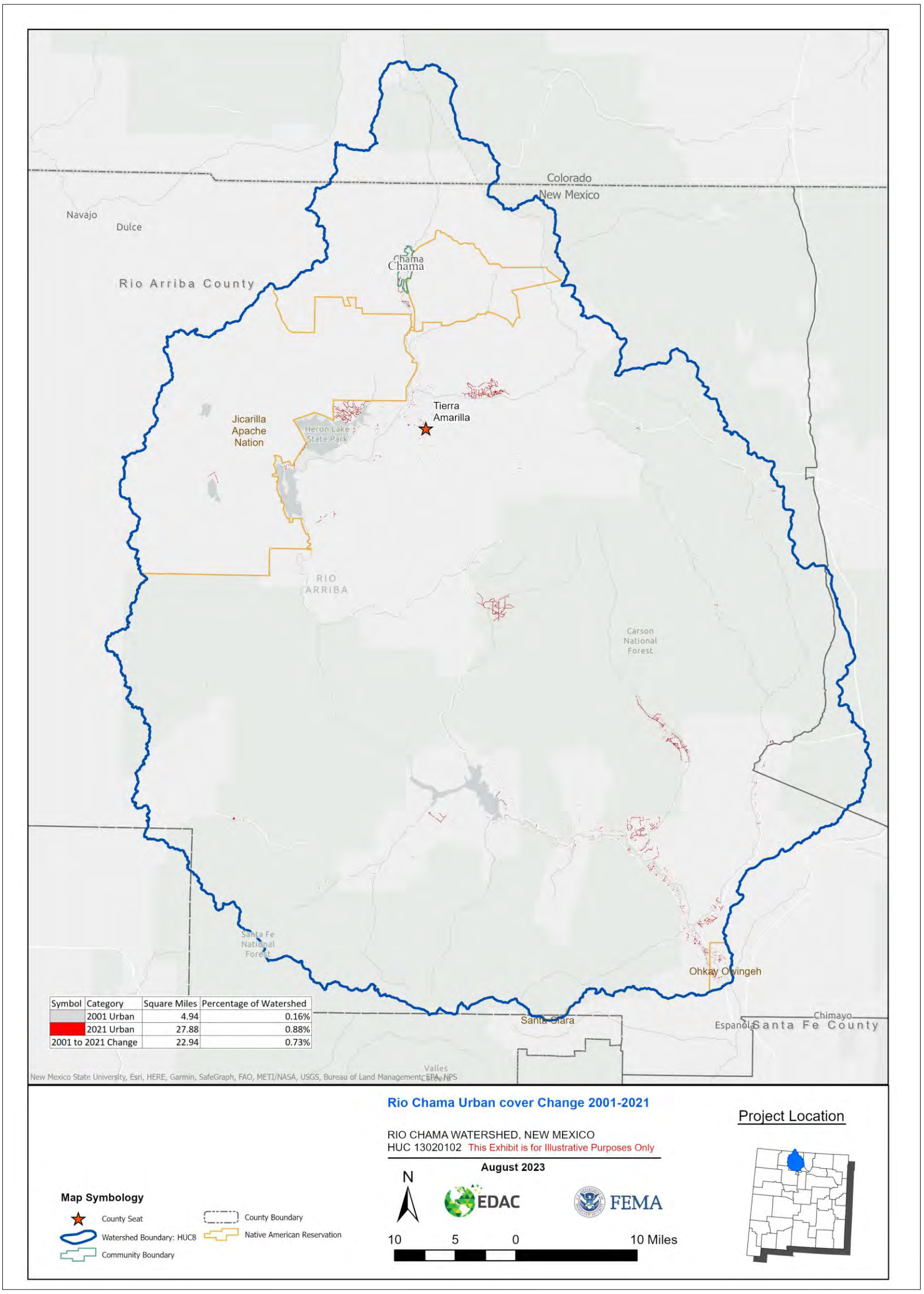


Figure 5: Wildfire Hazard Potential

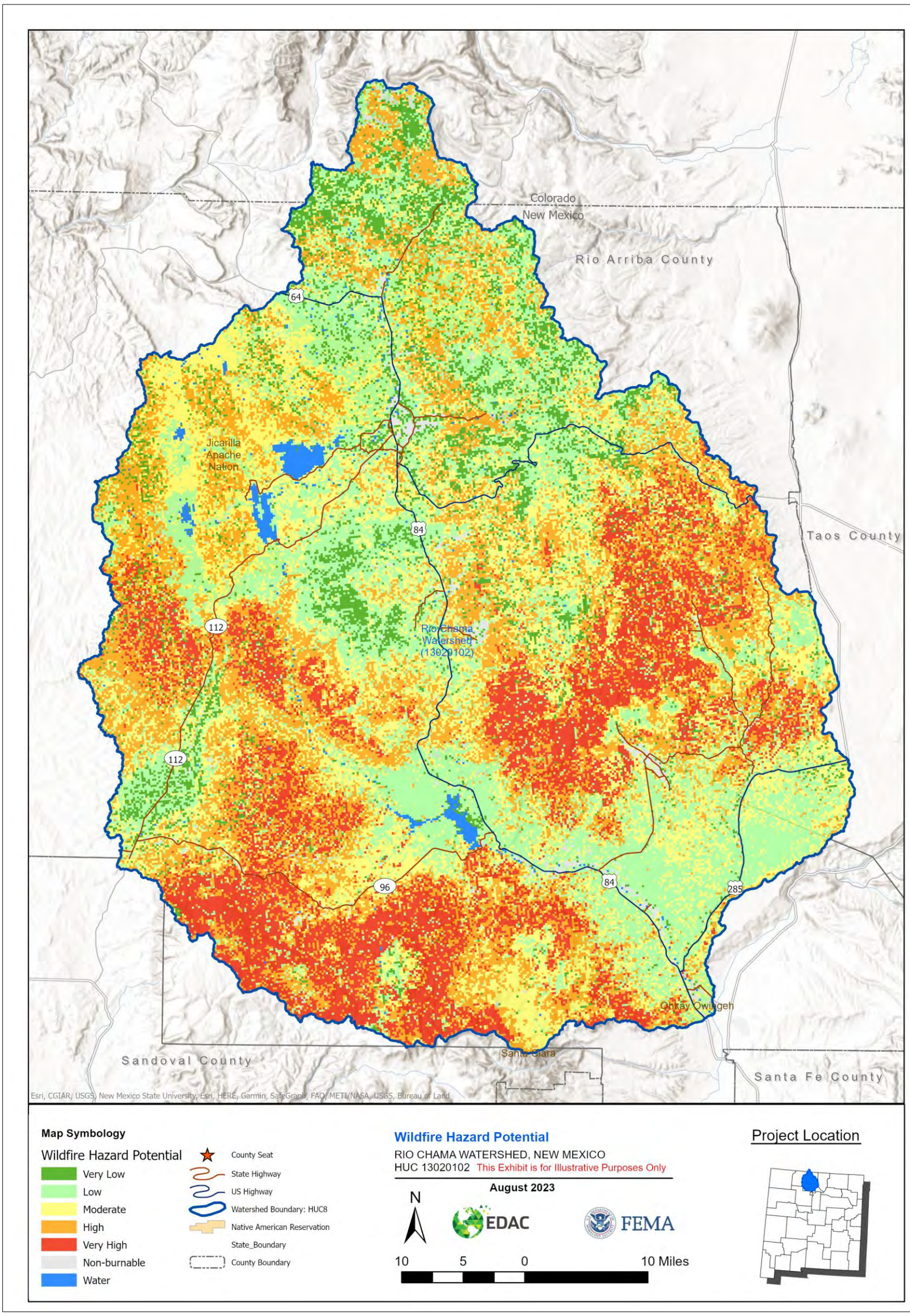


Figure 6: Expected Debris Flow Hazard

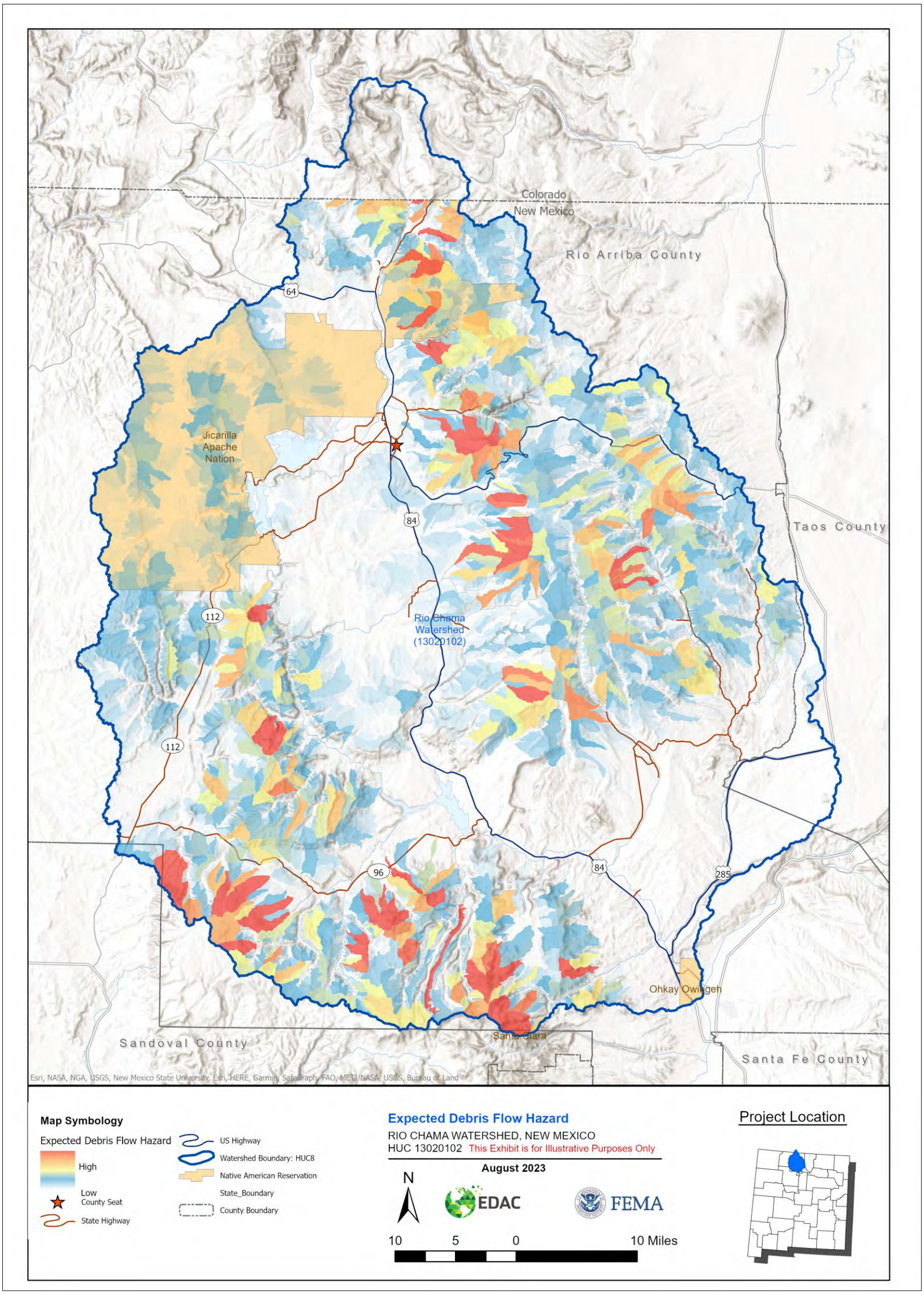


Table 33 lists the number of NFIP insurance claims for the portions of the communities within the Watershed. Figure 7 depicts the distribution of NFIP insurance claims within the Rio Chama Watershed.

Table 3: Total NFIP Insurance Claims

Total NFIP Insurance Claims by Community	
Community	**Claims**
Chama, Village of	1
Rio Arriba County	8

In addition to NFIP claims, there are several locations of Repetitive Loss (RL) or Severe Repetitive Loss (SRL) properties within the Rio Chama Watershed. **Error! Reference source not found.**4 summarizes RL and SRL claims by county and community within the Watershed. These losses are also displayed on the Discovery Map included in the supplemental digital data.

Table 4: Repetitive or Severe Repetitive Loss within the Watershed

Repetitive Losses/Severe Repetitive Losses by Community			
Community	**Number of Properties**	**Total Claims**	**Average Claim Per Property**
None			

The Rio Chama Watershed has had a history of flooding as demonstrated by numerous presidential disaster declarations with 12 issued in the past 23 years. Table 5 lists the larger historical floods in the watershed. Table lists recent disaster declarations for multiple hazards within the watershed.

Table 5: Historical Floods within the watershed

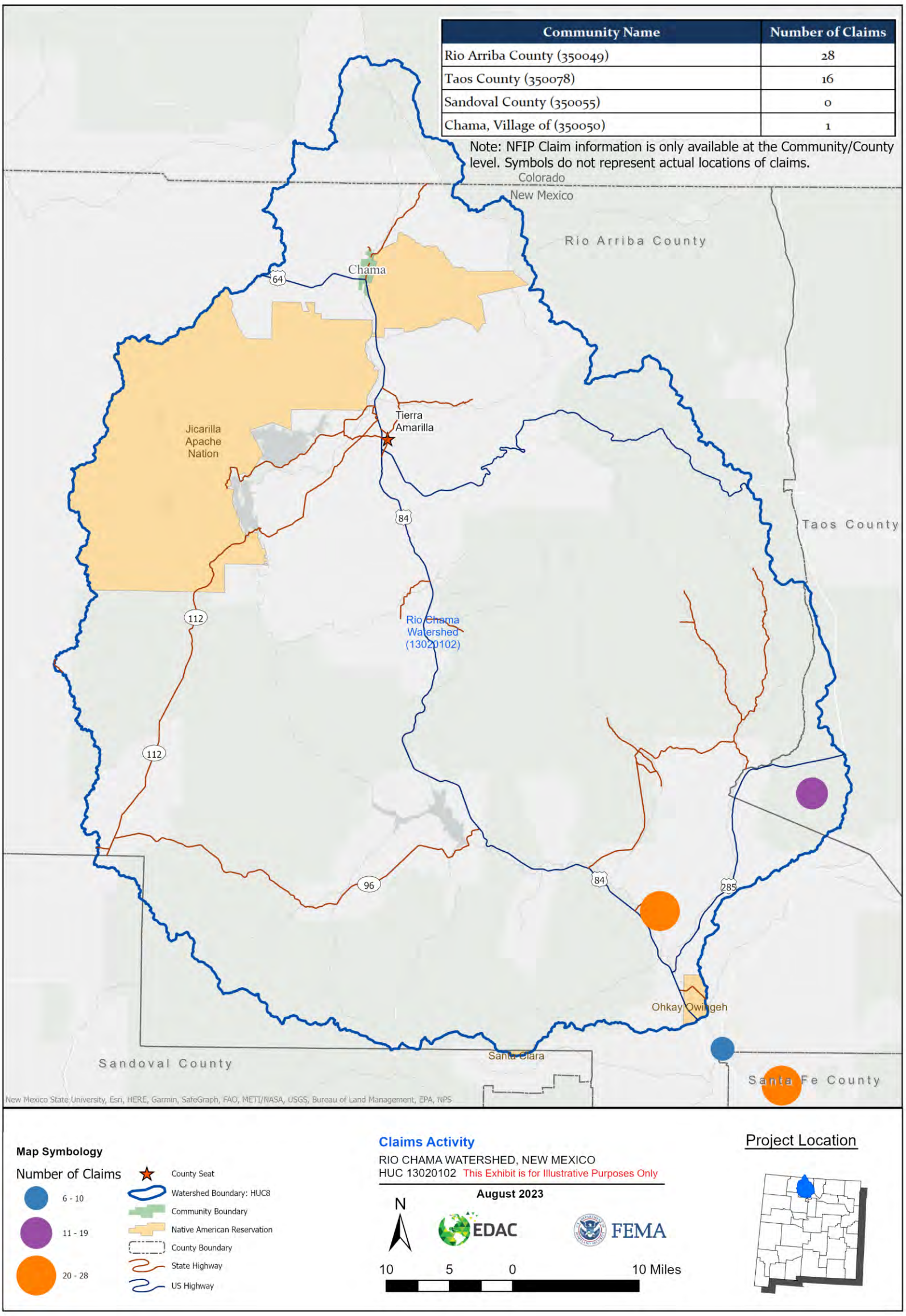
Historical Floods in Rio Chama Watershed			
Location	**Type of Flood**	**Date**	**Description**
Abiquiu	Flash Flood	7/15/2014	Twenty minutes of intense rainfall followed by 4 hours of moderate rainfall caused wash out of County Road 155. A culvert beneath the road could not hold all the water and breached the roadway.
Canjilon	Flash Flood	7/23/2021	A strong thunderstorm near Ghost Ranch produced several inches of water along U.S. Highway 84, and mud, rock, and debris were reported along the highway between mile marker 231 and mile marker 234.
Cañones	Flash Flood	7/7/2015	Flash flood wave moved down Yeso Rito arroyo in less than 30 minutes, resulting in significant damage at Ghost Ranch. At least three older structures and a ropes course were completely destroyed. One newer studio structure was seriously damaged. Trees were snapped in half and mud filled several other structures.
Chama	Flood	4/17/2010	Rising water from the Rio Chamita resulted in flooding of yards, storage sheds and possibly a barn on the west side of Chama.
Hernandez	Flash Flood	8/22/2016	Two elderly residents rescued from a mobile home that was washed off its foundation and displaced over 50 feet downstream. Up to 30 homes inundated with water and at least 10 families displaced from flood waters. U.S. Highway 285, highway 74, and county road 57 all closed to remove mud and debris. County Road 57 washed over with mudslides from nearby mesa.
La Madera	Flash Flood	7/19/2013	Highway 111 washed away along Rio Vallecitos. Vehicles parked at Ojo Caliente Mineral Springs Resort & Spa were among the damages and mudslides were reported along the hillsides near the resort.
Los Ojos	Flash Flood	8/2/1999	Several county roads were washed out.
Ojo Caliente	Flash Flood	8/15/2021	Heavy rain in Ojo Caliente resulted in flash flooding. Flood waters reportedly entered at least one mobile home, and debris and water covered many secondary roads east of U.S. Highway 285.
San Jose	Flash Flood	9/18/2013	Local broadcast media reported a home flooded near Chamita. Emergency management reported that a half dozen homes were filling up with water near US 84/285 due to flooding from the Rio Chama.

Table 5: Disaster Declarations in the Watershed

Date of Declaration	Watershed Counties Declared	Hazard
2000	Rio Arriba, Sandoval, Taos	Severe Fire Threats, Severe Forest Fire
2002	Rio Arriba, Sandoval	Forest Fire
2006	Rio Arriba, Sandoval, Taos	Severe Storms and Flooding
2010	Sandoval	Forest Fire

Date of Declaration	Watershed Counties Declared	Hazard
2011	Rio Arriba, Sandoval, Santa Clara Pueblo, Taos	Flooding, Forest Fire, Severe Winter Storm
2012	Santa Clara Pueblo	Flooding
2013	Rio Arriba, Sandoval, Santa Clara Pueblo, Taos	Severe Storms, Flooding, and Mudslides
2014	Rio Arriba, Sandoval, Taos	Severe Storms and Flooding
2015	Rio Arriba, Sandoval	Severe Storm
2017	Sandoval	Forest Fire
2020	Rio Arriba, Sandoval, Santa Clara Pueblo, Taos	COVID-19 Pandemic
2022	Sandoval	Forest Fire

Figure 7: Single Claims in the Watershed



Topographic Data

Recent acquisitions of topographic data via LiDAR have been made for the entire watershed. Topographic coverage totals are at about 100 percent for the entire watershed. Figure 8 provides a snapshot of CNMS factors for each stream segment, the HUC 12 risk decile, and the availability of topographic data.

Congressional Involvement

Senator Ben Ray Luján serves on the Committee on Commerce, Science, and Transportation; the Committee on Health, Education, Labor, and Pensions (HELP); the Committee on Agriculture, Nutrition, and Forestry; the Committee on Indian Affairs; and the Committee on the Budget. Senator Luján grew up in Nambé, a small community near the Rio Chama Watershed. Senator Luján is a long-time advocate for New Mexico's acequias and traditional lands. Senator Martin Heinrich serves as the Chair of the Joint Economic Committee; the Committee on Energy and Natural Resources; the Committee on Appropriations; and the Select Committee on Intelligence. Representative Teresa Leger Fernández serves on the House Committee on Natural Resources and is the Ranking Member of its Subcommittee on Indian and Insular Affairs; the House Committee on Education and the Workforce; and the House Rules Committee.

Streams and Waterways

Significant streams in this watershed include the Rio Chama, Rio Ojo Caliente, and El Rito. In addition, to significant streams, Abiquiu, El Vado, and Heron lakes are significant water resources within the watershed. The USGS provides a National Hydrologic Dataset (NHD) that can be used to identify stream miles that reflect drainage areas of one square mile from available topographic data. The NHD stream mileage may be used to gain a sense of the total potential stream miles for a watershed. Using the NHD, there are approximately 3,409 miles of streams in the Rio Chama Watershed.

The Coordinated Needs Management Strategy (CNMS) Inventory provides a snapshot of the status and attributes of currently studied streams existing within FEMA's floodplain study inventory. In general, the stream mileage shown in CNMS reflects streams with an approximately one-mile drainage area and that currently have effective Special Flood Hazard Areas (SFHA) designated for them. CNMS does not reflect the total potential of stream miles to be studied within a watershed.

In addition to listing the miles of studied stream within a watershed, CNMS documents certain physiological, climatological, or engineering methodological factors that may have changed since the date of the effective study. The stream miles shown in CNMS are attributed with an evaluation of a Validation Status and Status Type that allows an examination of the condition of a given study or group of studies. Studies which are considered Valid in CNMS are the only studies which contribute to the New Validated or Updated Engineering (NVUE) metric.

The NVUE metric is used as an indicator of the status of studies for FEMA's mapped SFHA Inventory. Those studies which are categorized as 'unverified', typically indicate that there are some factors of change since the SFHA became effective or may have a deficiency warranting restudy. CNMS stream mileage categorized as 'Requires Assessment' require further input to determine their validity – often because they represent paper inventory or non-modernized studies. CNMS aids in identifying areas to consider for study during the Discovery process by highlighting needs on a map,

quantifying them (mileage), and providing further categorization of these needs in order to differentiate factors that identify the needs.

Table 6 compares the NHD data to the CNMS data and summarizes the Validated NVUE stream mileage from CNMS for the watershed.

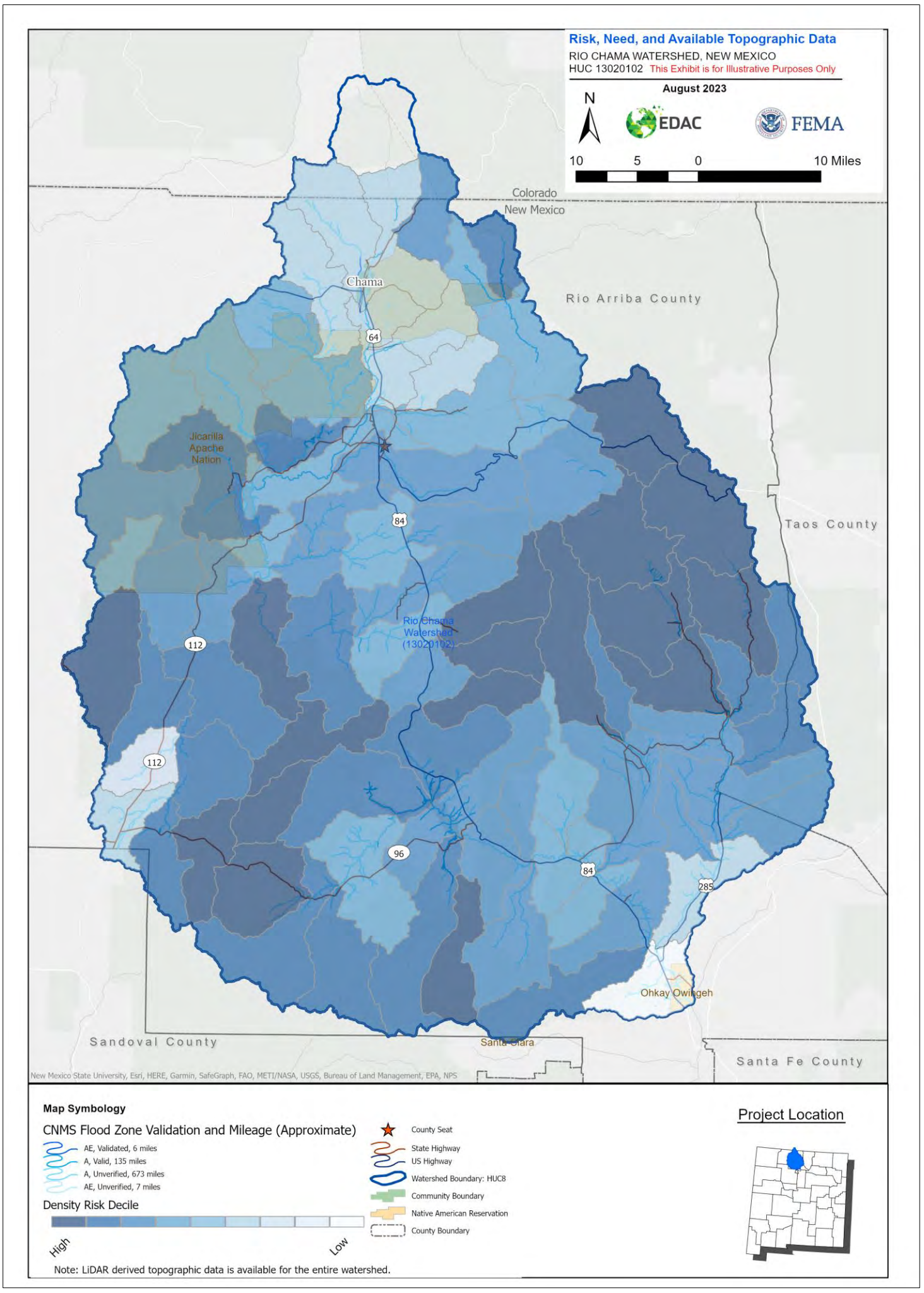
Table 6: NVUE Approximate Stream Mileage in the Watershed

NVUE Validation	Stream Miles
NHD Streams (streams with a drainage area of greater than one square mile)	**3,409**
CNMS Streams (streams with effective SFHA)	2,588.8
Stream Miles not accounted for in CNMS	**0**
CNMS Valid Zone AE / AH	5.7
CNMS Valid Zone A	135.1
CNMS Unverified Zone AE / AH	6.8
CNMS Unverified Zone A	672.5
CNMS Zone AE / AH Requiring Further Assessment or in the process of being studied	0
CNMS Zone A Requiring Further Assessment	0
All Stream Miles not accounted for in CNMS as there are no effective SFHAs (sum of the below)	0
Stream Miles not accounted for in CNMS that would fall in land that *could be* developed	0
Stream Miles not accounted for in CNMS that would fall in land that *could not be* developed	0

Within the Rio Chama Watershed and using these criteria from CNMS, approximately 672.5 miles of Zone A and 6.8 miles of Zone AE areas were identified as being unverified. Streams included in the unverified grouping include Abiquiu Creek, El Rito, Rio Chama, Rio Vallecitos, and Willow Creek with approximately *6.8* miles of Zone AE flagged as to be studied. Additionally, approximately 5.7 miles of Zone AE in the watershed were characterized as being Valid under the NVUE metrics.

Figure 8 provides a snapshot of CNMS factors for each stream segment, the HUC 12 risk decile, and the availability of topographic data. The combination of these three factors resulted in the selection of Rio Chama Watershed for a Discovery Project.

Figure 8: Risk, Need and Available Topographic Data



II. Discovery Efforts

i. Engagement Plan

Pre-Discovery Community Engagement

Table 7 provides the members of the Regional Project Team and was made up of the following staff.

Table 7: Regional Project Team

Organization	Name	Project Role
FEMA R6	Diane Howe	Project Monitor
FEMA R6	Shanene Thomas	Tribal Liaison and Mitigation Planning
FEMA R6	Trey Rozelle	Floodplain Management & Insurance
State of New Mexico		State Floodplain Coordinator
State of New Mexico		State Hazard Mitigation Officer
Earth Data Analysis Center	Shawn L. Penman	CTP Coordinator

FEMA and the Regional Project Team were in contact with all Watershed stakeholders via email, and phone calls before this Discovery meeting to request local participation. In addition to assisting scheduling the meeting, locals were asked to help identify additional key people who should be included in the Discovery process and acquire any data that will assist in the risk identification and assessment for the Rio Chama Watershed. A detailed list of Communities, local officials, federal, state and regional agencies that were invited to participate in the Discovery Process is included with the supplemental digital data accompanying this report.

In preparation for the Discovery meeting, the Regional Project Team:

- Gathered information about local flood risk and flood hazards
- Reviewed mitigation plans to understand local mitigation capabilities, hazard risk assessments, current or future mitigation activities, and areas of mitigation interest
- Encouraged communities within the watershed to develop a vision for the watershed's future
- Used all information gathered to determine which areas of the watershed may require further study through a Risk MAP project

The Regional Project Team began outreach efforts to the local governments within the Watershed, Congressional and public officials, to inform them of the Discovery process and to invite them to participate and contribute information about the Watershed about water resource concerns. The following are key steps that were taken before the Discovery workshops:

- Initial Coordination meeting with FEMA, the State of New Mexico (NFIP and SHMO) and contract personnel to set the stage for co-participation and sharing of the meeting. Establish potential meeting times and location
- Information and invitation letters mailed to the CEO, email invitation to other key personnel communities and other local stakeholders

- CTP follows up with phone calls to personally invite communities and remind them of the meeting details and logistics to ensure the major watershed players will be there

Discussions are being held with these agencies about potential partnership opportunities, as well as their help in identifying flood risk throughout the watershed.

Table 8: FEMA History of Engagement

Community Name	Type of Engagement	Date	Agency	Comments
Rio Arriba County	CAV	6/22/2016		FEMA/NMDHSEM

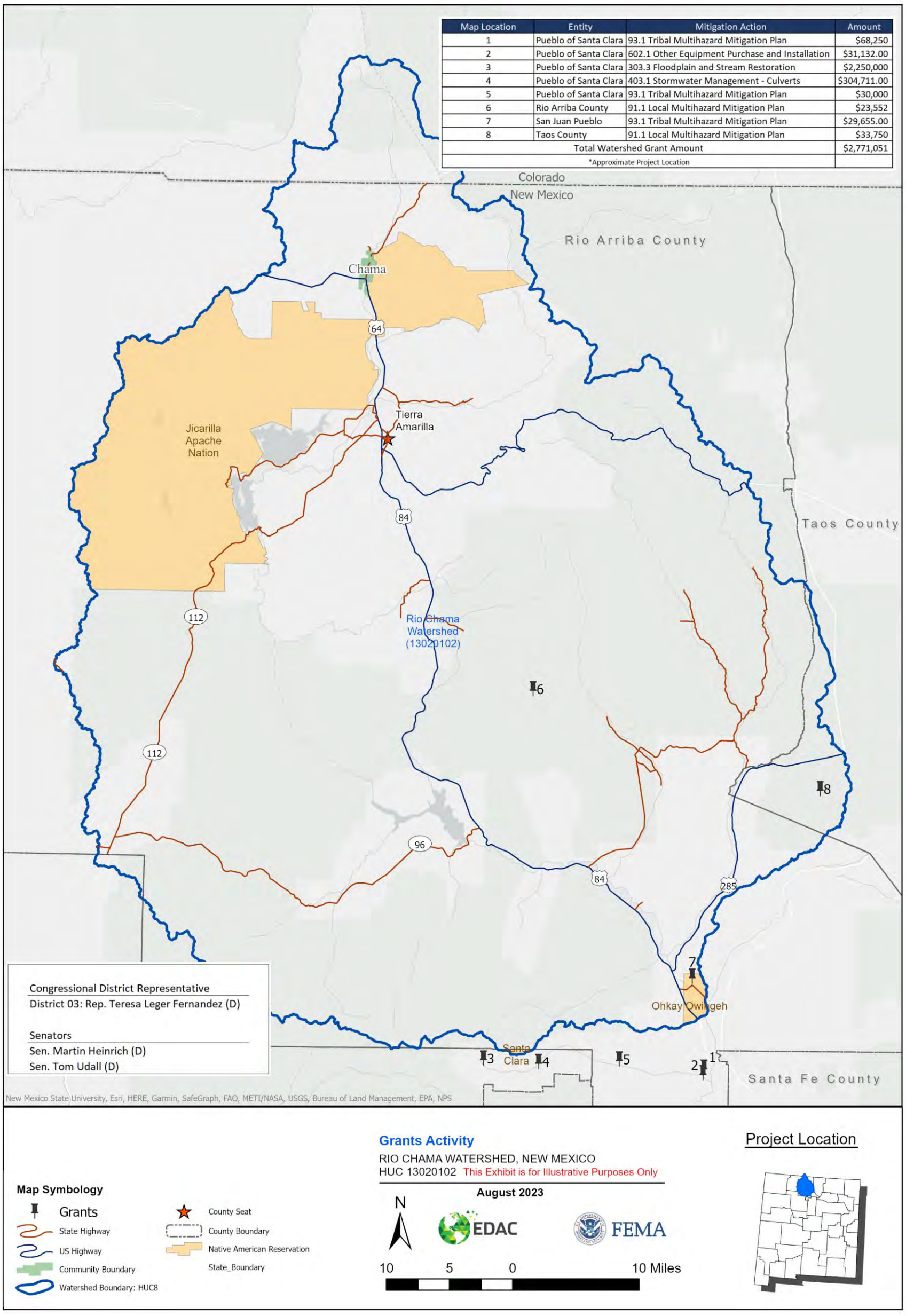
* Meetings or other FEMA engagement activities that have occurred in the watershed in the past 10 years.

Table 9: Mitigation Plan Status

Community Name	Community Mitigation Action:	Hazard Mitigation Plan Name:	Plan Status:	Plan Approved	Plan Expires
Ohkay Owingeh (San Juan Pueblo)			Expired		
Rio Arriba County		N/A	Expired		
Sandoval County				11/22/2019	11/21/2024
Taos County				1/2/2019	1/1/2024

Figure 9 displays the locations and types of mitigation grant activity in the Rio Chama Watershed which have been approved by FEMA. This map only shows approved grant activity. There may be additional grants being pursued at both the state and local level within the watershed.

Figure 9: Grants Activity



Pre-Discovery Congressional and Media Engagement

In order to achieve success with any Region 6 Risk MAP project, members of Congress and their staff members, as well as the media must be aware and understand the study process. Working with FEMA External Affairs to inform both legislators and the media will improve credibility and opens the door to understanding risk in a more holistic, comprehensive manner. An initial contact briefing of the legislators will occur prior to the Discovery meeting.

Table 10: Congressional Information

U.S. Senator		Term Expiration	FEMA History of Engagement
Martin Heinrich		2025	
Ben Ray Luján		2027	
U.S. Representative	**District Number**	**Term Expiration**	**FEMA History of Engagement**
Teresa Leger Fernández	3	2025	

State Senators	
District	**Name**
5	Leo Jaramillo
22	Benny Shendo, Jr.

State Representatives	
District	**Name**
40	Joseph Sanchez
41	Susan K. Herrera

Contact information for the community and additional stakeholders can be found with the supplemental digital data.

Tribal Engagement

The FEMA Region 6 tribal liaison contacted the tribes within the Upper Rio Grande Watershed to inform them about the Discovery process.

ii. Pre-Discovery Data Collection

Table 11: Data Collection for the Watershed

Data Types	Deliverable/Product	Source
Average Annualized Loss Data	Discovery Map Geodatabase	FEMA Region VI
Boundaries: Community	Discovery Map Geodatabase	RGIS
Boundaries: County and State	Discovery Map Geodatabase	RGIS

Data Types	Deliverable/Product	Source
Boundaries: Watersheds	Discovery Map Geodatabase	RGIS
Census Blocks	Discovery Map Geodatabase	U.S. Census Bureau
Contacts	Table	Local Web Sites, State/FEMA Updates
Community Assistance Visits	Discovery Report	New Mexico Department of Homeland Security and Emergency Management, State Floodplain Coordinator
Community Rating System (CRS)	Discovery Report	FEMA's "Community Rating System Communities and Their Classes"
Dams and Levees	Discovery Map Geodatabase	National Inventory of Dams USACE National Levee Inventory USACE

iii. Discovery Meeting

A two-hour Discovery meeting will be held at the Hernandez Community Center, a central location in the watershed on September 14, 2023. Workshop times and locations are shown in Table 12. The Workshop site was prepared with a series of stations, envisioned to be an interactive setting for the Regional Project Team and Discovery Workshop attendees listen, discuss and document any issues for the Watershed.

Table 12: Project Discovery Workshop Times and Locations

Workshop	Date and Time	Location
1	September 14, 2023	Hernandez Community Center

CTP personnel will greet each attendee as they arrive. Attendees will be rotated around the following four Discovery stations:

- Community Benefits and Grant Opportunities *(Grants station)* – Maps of current floodplain-related grants; risk, needs and topographic availability; RL/SRL properties; letters of map change (LOMCs); urban changes over the last 5 years; and single claims. The station also had handouts on various FEMA grant programs.
- Mitigation Planning and Mitigation Activities *(Planning station)* – Handouts on mitigation plans, understanding Risk MAP and determining risk.
- NFIP Community Actions *(Compliance and Mitigation station)* – Effective FIRMs, FIS and LOMCs; maps of RL/SRL properties; single claims; and urban changes over the last 5 years.
- Risk Identification and Communication *(Mapping station)* – Maps of risk/need/topographic availability, LOMCs, population density in the watershed, urban change in the watershed, estimated dollar exposure of parcels near SFHA areas, high-water marks and low water crossings.

At each station, attendees were asked to actively contribute information about concerns in the Watershed by identifying a relevant location on the large watershed map and then providing a short explanation on the comment form. The activity at the stations was intended to be interactive where attendees and staff at the stations work together to listen discuss and document any topical items for the watershed. Members of the Regional Project Team (State of New Mexico and CTP) were at the stations to answer questions and engage the attendees. During each workshop, Regional Project Team members requested that attendees provide any additional information within 2 weeks of the workshop.

Each station was equipped with a series of large-format watershed maps with an aerial photo of the Watershed displayed, along with community boundaries and road names to assist in identifying areas of concern. Additionally, the stations had several 11-inch by 17-inch laminated maps of the watershed with information related to that station's content.

Information sheets were collected at each station for locations that were identified and labeled on the Discovery watershed maps. These information sheets are included in the external files included with this report.

iv. Discovery Implementation (TO BE COMPLETED POST-DISCOVERY)

All Discovery Workshops were attended by local stakeholders. A full list of attendees is provided in the sign-in sheets included with the supplemental digital data accompanying this report. Some attendees included:

- Local community elected officials and councilpersons
- Local floodplain managers, emergency management staff, community planners, public works staff
- Add other notable attendees

The Workshops afforded personal, interactive communication with attendees at each station. The Project Team interviewed attendees and discussed areas of positive mitigation and areas of continuing concern for the Watershed as a whole. As attendees visited each station, they not only discussed their own local concerns but also listened to the concerns of others in the Watershed.

Attendees were polled by the FEMA Project Monitor as they exited the Workshop. Verbal feedback from the attendees indicated they felt the Workshop was an opportunity to express their issues and concerns for the Watershed. Many attendees were appreciative of the chance to speak with the various Regional Project Team members from FEMA and the State of New Mexico. The community perception conveyed to FEMA was that attendees felt more engaged in the process to determine where needs and projects may be identified.

v. Data Gathering Overview

Information about the Rio Chama Watershed was gathered both prior to the Discovery Workshops and interactively during the Workshop. Much of data collected in pre-

discovery was obtained from FEMA or other national datasets. Additional data was collected from NMRGIS and local communities via their public web sites. Table 13 summarizes the data collected prior to the Discovery Workshop and the primary sources of the data.

During the pre-discovery process phone calls were made to local FPAs, Emergency Managers, and Mitigation planners to collect current and proposed mitigation actions. This data was collected in spreadsheets and will be used by FEMA to track mitigation actions within the region. The final spreadsheets are included in the supplemental digital data.

Table 13: Data Collection Summary – Pre-Discovery Workshop

Data Location	Data Custodian	Data Set Description
Watershed-wide	FEMA	Effective FIRM and FIS and backup information available from FEMA's Map Service Center and FEMA Library
Watershed-wide	FEMA	LOMC locations from FEMA's Map Service Center and FEMA Library
Watershed-wide	FEMA,	Locations of RL/SRL properties and Claims
Watershed-wide	FEMA	Location of Grants being funded
Watershed-wide	FEMA	Participation in the NFIP, Community Rating System (CRS) ratings
Watershed-wide	FEMA	Disaster Declarations
Watershed-wide	FEMA	CNMS information
Watershed-wide	FEMA	AAL data
Watershed-wide	FEMA	Approved HMPs
Watershed-wide	FEMA, RGIS	Location of available or planned areas of updated LiDAR or other topographic data
Watershed-wide	U.S. Census, RGIS	Transportation features
Watershed-wide	U.S. Census, RGIS	Populated places and population characteristics
Watershed-wide	USGS	Watershed HUC (8 & 12) boundaries, NHD streams, stream gage information, land use and land cover
Watershed-wide	USDA	NAIP Imagery
Watershed-wide	Local FPAs, Mitigation Planners and Emergency Managers, FEMA	Mitigation Actions identified by local stakeholders and collected by phone call
Watershed-wide	USFWS	Critical habitat locations
Watershed-wide	USGS	Gage locations

At the Discovery Workshop stations, attendees completed data information sheets and placed stickers on the hard copy maps to identify the approximate locations of their concern within the Watershed. This information was later captured in GIS format (ESRI Personal Geodatabase, point features named "*Other_Community_Concerns")* and the data from the forms was matched with each point location on the watershed maps. Data from all of the stations were compiled into a single data set. The watershed collection maps

with the sticker locations as well as the individual comment forms are included in the supplemental digital data accompanying this report.

Table 14Table 14 summarizes the comments that were made at each of the stations. If the same comment was made at different stations by the same attendee, it is only listed once. If multiple attendees made the same comment, the "Information Provided By" column lists more than one attendee. Item numbers tie directly back to the GIS data and the data collection sheets. In addition data collected in pre-Discovery from Newton County and from calls with local community officials have also been placed in GIS format and are shown on the watershed collection. Discovery data collection continued after the Discovery Workshop as additional datasets were provided. This data set are also included in Table 14. Some comments collected at the Discovery Workshop reflect on areas outside of the Rio Chama Watershed. This information was collected for future use in future Discovery efforts and is noted below.

Table 14: Data Collection Summary - During and After Discovery Workshop

Item	Flooding Source	Information Provided By	Discovery Workshop Comment Summary

III. Watershed Findings (TO BE COMPLETED POST-DISCOVERY)

The Rio Chama watershed contains no levee structures.

Figure 10: Repetitive and Severe Repetitive Losses

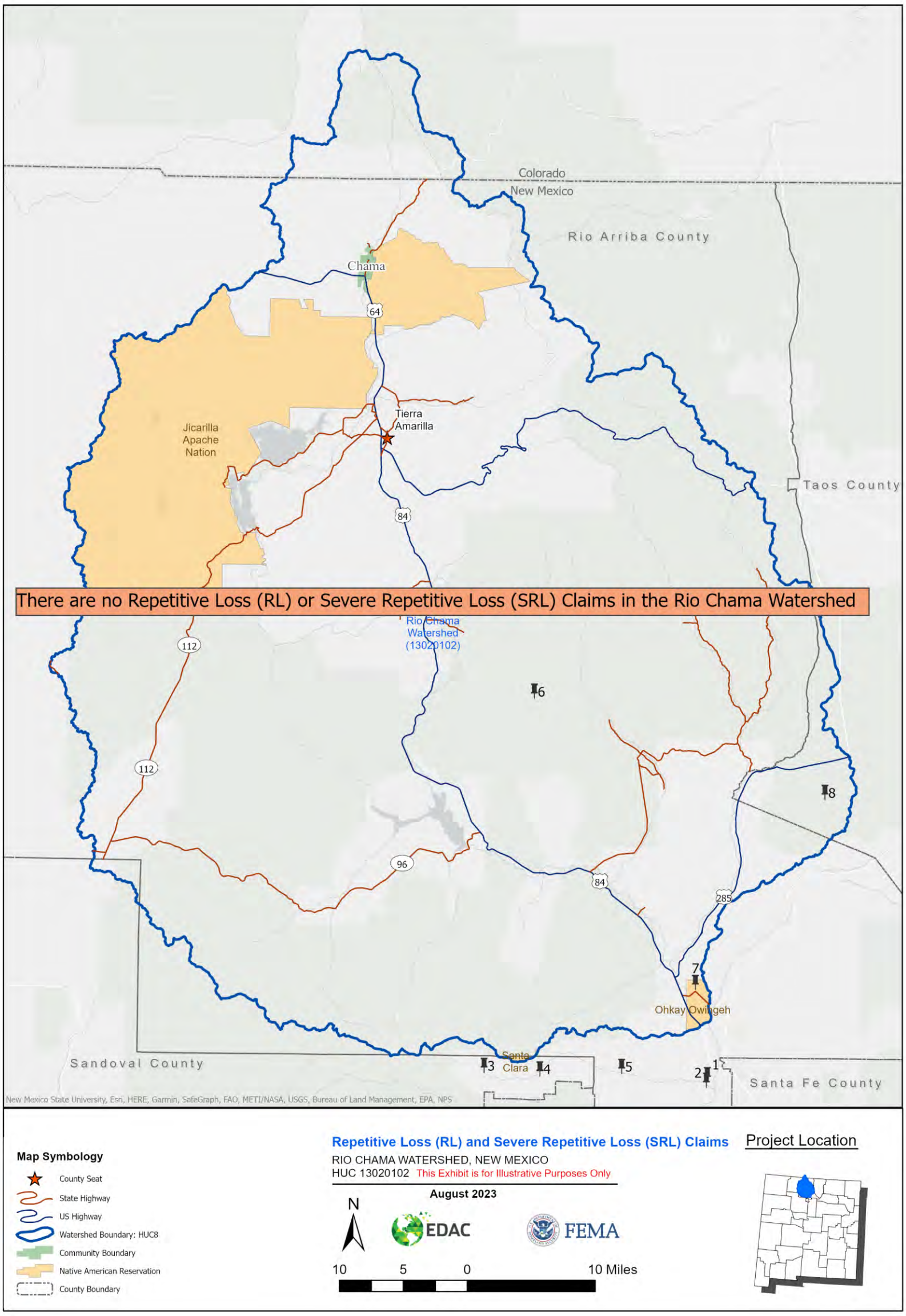


Figure 11: Letter of Map Changes (LOMCs)

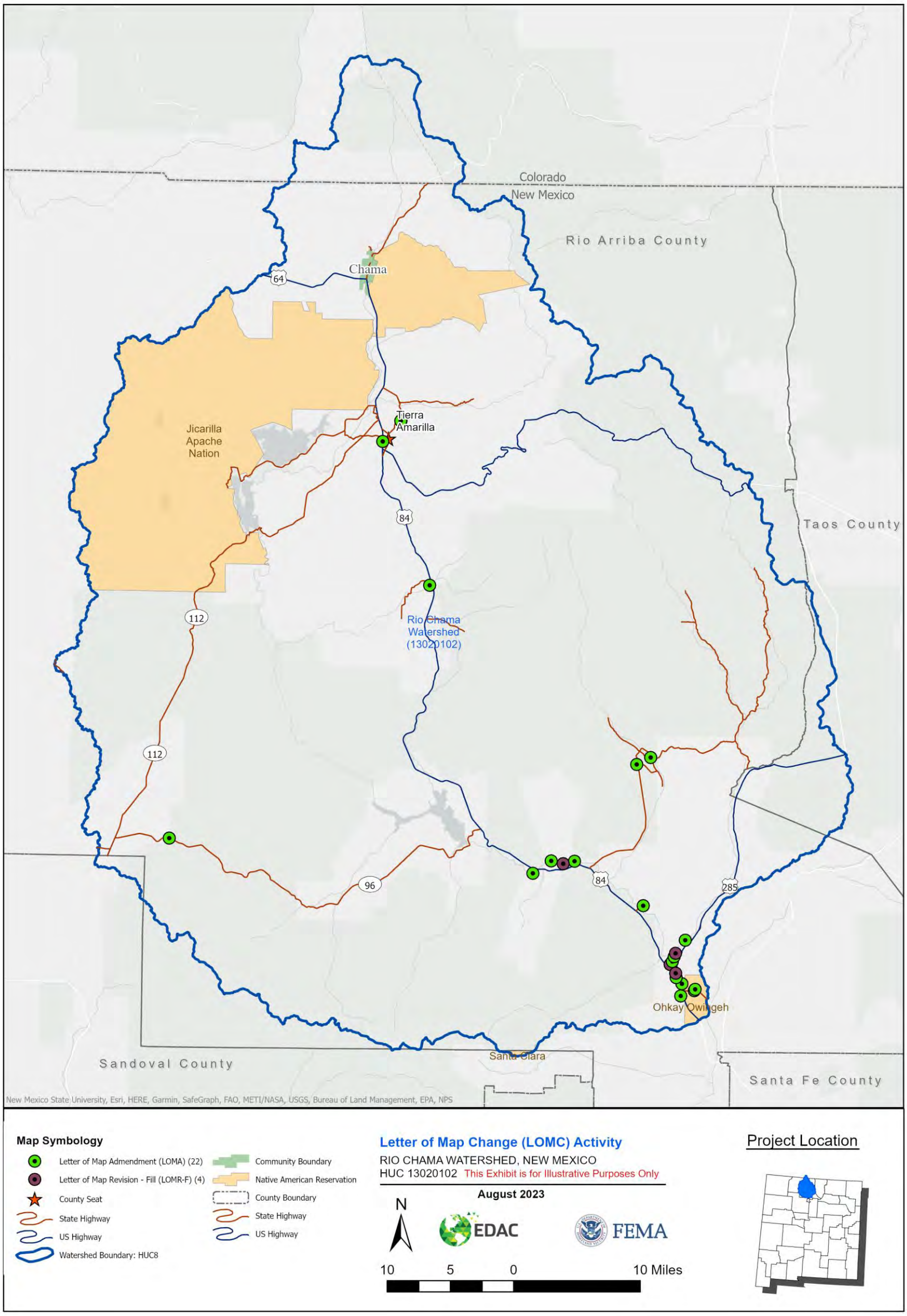
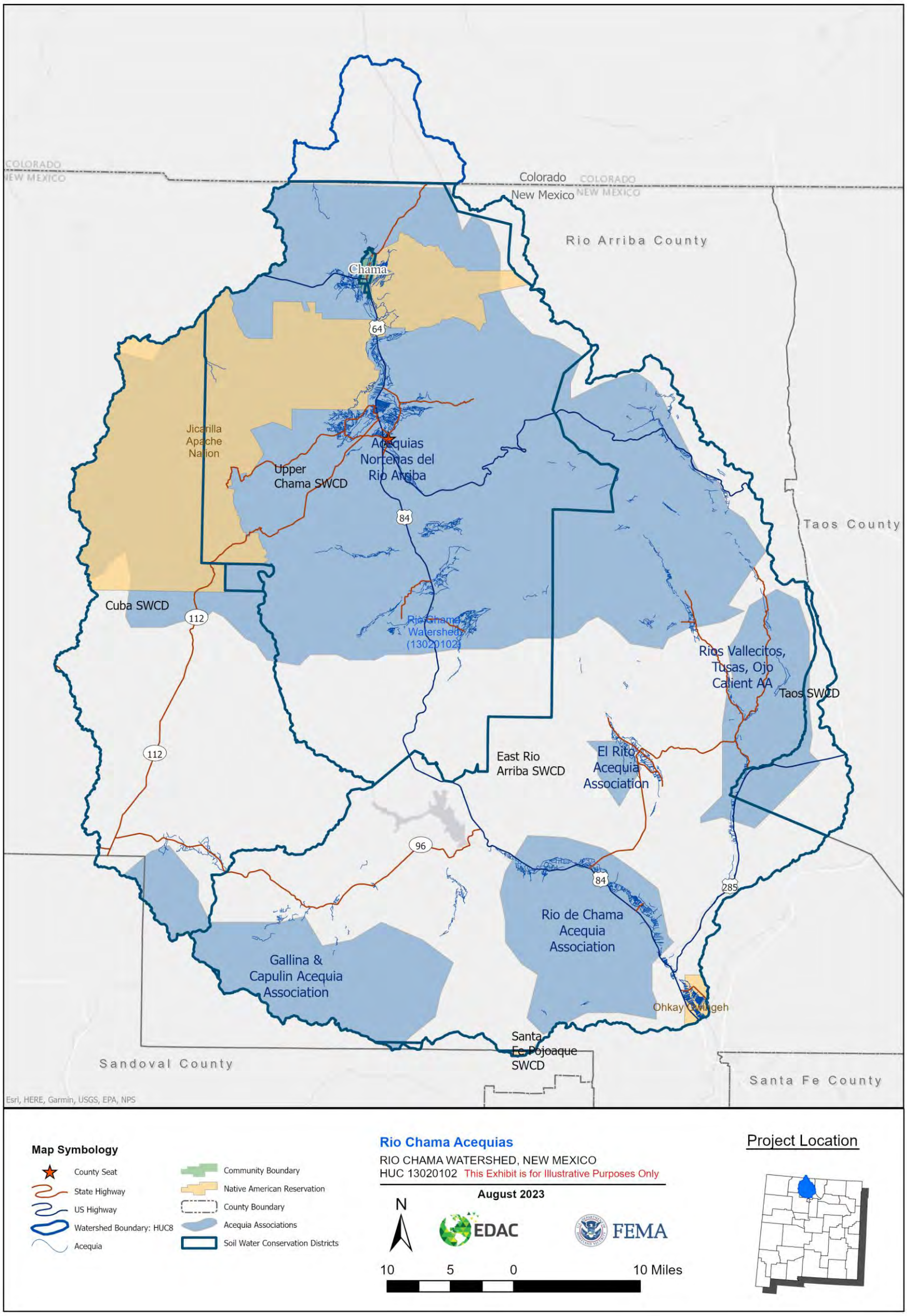


Figure 12: Acequias and Acequia Associations



i. Pre-Discovery Hydrology

Two limited reviews of hydrologic information were performed for Discovery analysis within the Rio Chama Watershed. The reviews were kept at a high level of informational research and were performed by senior engineering staff that relied on engineering judgment, some limited analysis, and regional experience. These reviews were focused on:

- Review of Peak Discharges in the watershed
- Limited Gage analysis for the watershed

For the watershed as a whole, the **one-percent** annual chance peak discharges were reviewed for all streams within a community and across community boundaries looking for discharge anomalies, places where LOMRs demonstrate that the effective discharges may be suspect on a more global basis. Any notes were added if these changes can be eliminated as a concern due to hydrologic factors including local flood control structures, detention, flow break outs, sinks or other natural or manmade factors that may significantly alter hydrology flows. Finally, a watershed wide high-level gage analysis was reviewed comparing the information on any available gages within the watershed that had appropriate historical information to the effective FIS, discharges for streams with gages. This analysis could potentially flag any anomalies that would indicate that the hydrology may be out of date, too high, or too low for sub-basin areas within the watershed.

Review of Peak Discharges

Peak discharges were reviewed based on available FIS reports, hydraulics models, flow gages and available LOMRs within the watershed at the crossing of SHFA areas at corporate limits (county, city and town). A comparison of discharges was made for the same streams across county boundaries as shown in Table 15, Discharge Comparison at Community Limits. No hydrology data is available for the streams with a Zone A designation, so these were not reviewed.

There have been no LOMRs for the Rio Chama Watershed that have had an impact on hydrology.

Table 15: Discharge Comparison at Community Limits

Stream Name	County/Parish	Effective one-percent annual chance discharge (cfs)	Effective Discharges Source	Notes
No discharge across a county boundary or community limits				

Frequency Analysis

For the 2019 Base Level Engineering (BLE) a comparison between discharges from FIS and the BLE hydrologic analysis was done and the results are listed in Table 15. The scope of the BLE study limited any hydrologic analysis to a direct use of the regression equations from USGS SIR 2008-5119. Any discrepancies between effective flooding and the discharges produced during the BLE study are likely related to differing methodologies. No hydrologic analyses for effective studies utilized equations from USGS SIR 2008-5119. Another reason for the differences in final discharges may be the use of newly acquired, high-quality LiDAR data used for determining the drainage area and the average basin elevation for each subbasin. There are two stream gages along the Rio Chama that are unaffected by regulation or diversion, other gages in along the Rio Chama in this watershed are affected by regulation or diversion from Heron Lake.

Table 16: Summary of Hydrologic Analysis

Stream Name	Drainage Area from USGS Gage (square mile)	Effective one-percent annual chance discharge (cfs)	BLE Discharge Area (sq. miles)	BLE 1% Discharge (fs)	Discharge Area % Difference	Q % Difference
Rio Chama	15.10	6,700	166.2	4,390	91%	-53%
Rio Chama	65.15	7,220	96.6	3,400	33%	-112%
Rio Chamita	4.76	1,450	44.7	1,630	89%	11%
Rio Chamita	43.02	1,700	44.4	1,630	3%	-4%

ii. Pre-Discovery Hydraulics and Floodplain Analysis

Hydraulics, hydrology, floodplains, and floodways were reviewed based on the FIS reports, available hydraulic models, available hydrologic models, and FIRMs. Table 17 shows the hydraulic analyses used for streams studied by enhanced methods.

Table 17: Summary of Hydraulic Analysis

Stream Name	Validation Status	Date of Effective Analysis	Hydrology Model	Hydraulic Model
Abiquiu Creek	Unverified	4/30/1987	Unknown	Unknown
Abiquiu Reservoir	Valid	4/30/1987	Unknown	Unknown
Acequia del Jaral	Unverified	4/30/1987	PEAKFQ-Regression Equations	E431
Agua Sarca	Unverified	4/30/1987	Unknown	Unknown
Almagre Arroyo	Unverified	4/30/1987	Unknown	Unknown
Angel Canyon Creek	Unverified	4/30/1987	Unknown	Unknown
Arroyo Almagre	Unverified	4/30/1987	PEAKFQ-Regression Equations	E431
Arroyo Almagre Trib 1-3a	Unverified	4/30/1987	PEAKFQ-Regression Equations	E431
Arroyo Anima	Unverified	4/30/1987	Unknown	Unknown
Arroyo Blanco	Unverified	4/30/1987	Unknown	Unknown
Arroyo Blanco North Trib 1	Valid	4/30/1987	PEAKFQ-Regression Equations	E431
Arroyo Blanco North Trib 2-8	Unverified	4/30/1987	PEAKFQ-Regression Equations	E431
Arroyo Blanco South	Unverified	4/30/1987	PEAKFQ-Regression Equations	E431
Arroyo Blanco South Trib 1-5	Unverified	4/30/1987	PEAKFQ-Regression Equations	E431
Arroyo Carreras	Valid	4/30/1987	Unknown	Unknown
Arroyo Cerro Negro	Unverified	4/30/1987	Unknown	Unknown

Arroyo de Agua	Unverified	4/30/1987	PEAKFQ-Regression Equations	E431
Arroyo de Comales	Valid	4/30/1987	PEAKFQ-Regression Equations	E431
Arroyo de Comales Trib 1	Valid	4/30/1987	PEAKFQ-Regression Equations	E431
Arroyo de la Penita	Unverified	4/30/1987	PEAKFQ-Regression Equations	E431
Arroyo de la Presa	Unverified	4/30/1987	PEAKFQ-Regression Equations	E431
Arroyo de la Presa West Trib 1-2	Unverified	4/30/1987	PEAKFQ-Regression Equations	E431
Arroyo de las Canobitas	Unverified	4/30/1987	PEAKFQ-Regression Equations	E431
Arroyo de las Lemitas	Unverified	4/30/1987	PEAKFQ-Regression Equations	E431
Arroyo de las Munas	Unverified	4/30/1987	Unknown	Unknown
Arroyo de los Galves	Unverified	4/30/1987	Unknown	Unknown
Arroyo de Soldados	Unverified	4/30/1987	Unknown	Unknown
Arroyo de Trujillos	Unverified	4/30/1987	PEAKFQ-Regression Equations	E431
Arroyo del Cerrito	Unverified	4/30/1987	Unknown	Unknown
Arroyo del Cerrito Negro	Unverified	4/30/1987	Unknown	Unknown
Arroyo del Chamiso	Valid	4/30/1987	PEAKFQ-Regression Equations	E431
Arroyo del Cobre	Unverified	4/30/1987	Unknown	Unknown
Arroyo del Ojitos	Unverified	4/30/1987	Unknown	Unknown
Arroyo del Palacio	Unverified	4/30/1987	Unknown	Unknown
Arroyo del Perro	Unverified	4/30/1987	Unknown	Unknown
Arroyo del Perro del Oeste	Unverified	4/30/1987	PEAKFQ-Regression Equations	E431

Arroyo del Perro Trib 1	Unverified	4/30/1987	PEAKFQ-Regression Equations	E431
Arroyo del Pueblo	Unverified	4/30/1987	Unknown	Unknown
Arroyo del Puerto Chiquito	Unverified	4/30/1987	Unknown	Unknown
Arroyo del Puerto Chiquito Trib 1-1a	Unverified	4/30/1987	PEAKFQ-Regression Equations	E431
Arroyo del Toro	Unverified	4/30/1987	Unknown	Unknown
Arroyo del Yeso	Unverified	4/30/1987	Unknown	Unknown
Arroyo del Yeso Trib 1	Unverified	4/30/1987	PEAKFQ-Regression Equations	E431
Arroyo el Rito	Unverified	4/30/1987	Unknown	Unknown
Arroyo Gavilan	Unverified	4/30/1987	Unknown	Unknown
Arroyo Hondo	Unverified	4/30/1987	Unknown	Unknown
Arroyo Jaspe	Valid	4/30/1987	Unknown	Unknown
Arroyo las Lagunitas	Unverified	4/30/1987	Unknown	Unknown
Arroyo las Lagunitas Trib 2-4	Unverified	4/30/1987	PEAKFQ-Regression Equations	E431
Arroyo las Tunas	Unverified	4/30/1987	Unknown	Unknown
Arroyo Maestas	Unverified	4/30/1987	PEAKFQ-Regression Equations	E431
Arroyo Ponil	Unverified	4/30/1987	Unknown	Unknown
Arroyo Rancho	Unverified	4/30/1987	Unknown	Unknown
Arroyo Seco	Unverified	4/30/1987	Unknown	Unknown
Arroyo Seco South	Unverified	4/30/1987	PEAKFQ-Regression Equations	E431
Arroyo Sejitas	Unverified	4/30/1987	Unknown	Unknown
Azotea Tunnel	Unverified	4/30/1987	PEAKFQ-Regression Equations	E431
Azotea Tunnel Trib 1-3f	Unverified	4/30/1987	PEAKFQ-Regression Equations	E431
Barranca Ditch	Unverified	4/30/1987	Unknown	Unknown
Boulder Creek	Unverified	4/30/1987	Unknown	Unknown
Brazos Creek	Unverified	4/30/1987	Unknown	Unknown

Bull Canyon	Unverified	4/30/1987	PEAKFQ-Regression Equations	E431
Bull Canyon Trib 1-1a	Unverified	4/30/1987	PEAKFQ-Regression Equations	E431
Canada Abeque	Unverified	4/30/1987	Unknown	Unknown
Canada Alamosa	Unverified	4/30/1987	Unknown	Unknown
Canada Ancha	Unverified	4/30/1987	Unknown	Unknown
Cañada Ancha North Trib 1-2	Unverified	4/30/1987	PEAKFQ-Regression Equations	E431
Cañada de Alamos	Unverified	4/30/1987	PEAKFQ-Regression Equations	E431
Cañada de los Alamos Trib 1	Unverified	4/30/1987	PEAKFQ-Regression Equations	E431
Canada de Bano	Unverified	4/30/1987	Unknown	Unknown
Canada de Borracho	Valid	4/30/1987	Unknown	Unknown
Canada de Buena Vista	Unverified	4/30/1987	Unknown	Unknown
Cañada de Horno	Unverified	4/30/1987	PEAKFQ-Regression Equations	E431
Canada de Humo	Unverified	4/30/1987	Unknown	Unknown
Canada de la Cruz	Unverified	4/30/1987	PEAKFQ-Regression Equations	E431
Canada de la Cueva	Unverified	4/30/1987	Unknown	Unknown
Canada de la Laguna	Unverified	4/30/1987	Unknown	Unknown
Canada de la Lagunita	Valid	4/30/1987	Unknown	Unknown
Cañada de la Osa	Unverified	4/30/1987	PEAKFQ-Regression Equations	E431
Cañada de la Tableta	Unverified	4/30/1987	PEAKFQ-Regression Equations	E431
Canada de las Corrales	Unverified	4/30/1987	Unknown	Unknown
Cañada de las Lemitas	Unverified	4/30/1987	PEAKFQ-Regression Equations	E431
Canada de Oso	Unverified	4/30/1987	Unknown	Unknown

Canada de Piedra	Valid	4/30/1987	Unknown	Unknown
Canada de Tio Alfonso	Unverified	4/30/1987	PEAKFQ-Regression Equations	E431
Canada de Tio Pula	Unverified	4/30/1987	Unknown	Unknown
Canada de Tio Roque	Unverified	4/30/1987	PEAKFQ-Regression Equations	E431
Cañada de Tio Roque Trib 1-4	Unverified	4/30/1987	PEAKFQ-Regression Equations	E431
Canada del Agua	Unverified	4/30/1987	Unknown	Unknown
Canada del Policarpo	Unverified	4/30/1987	Unknown	Unknown
Cañada del Policarpo Trib 1-1a	Unverified	4/30/1987	PEAKFQ-Regression Equations	E431
Cañada Gonzales	Unverified	4/30/1987	PEAKFQ-Regression Equations	E431
Canada Jacques	Unverified	4/30/1987	Unknown	Unknown
Canada Jarosita	Unverified	4/30/1987	Unknown	Unknown
Cañada las Lemitas	Unverified	4/30/1987	PEAKFQ-Regression Equations	E431
Canada lo Comanches	Unverified	4/30/2009	Regression Equations	HEC-RAS 3.1.3
Canada los Alamos	Unverified	4/30/1987	Unknown	Unknown
Canada los Apaches	Unverified	4/30/1987	Unknown	Unknown
Canada los Frijoles	Unverified	4/30/1987	Unknown	Unknown
Canada Pueblo	Unverified	4/30/1987	Unknown	Unknown
Canada Sanchez	Unverified	4/30/1987	Unknown	Unknown
Canada Spring de la Jarita	Unverified	4/30/1987	Unknown	Unknown
Canjilon Creek	Unverified	4/30/1987	PEAKFQ-Regression Equations	E431
Canjilon Creek Trib 1-3	Valid	4/30/1987	PEAKFQ-Regression Equations	E431
Canon de Chavez	Unverified	4/30/1987	Unknown	Unknown
Canon de los Alamos	Unverified	4/30/1987	Unknown	Unknown
Canon de los Tanques	Unverified	4/30/1987	Unknown	Unknown

Canon la Madera	Unverified	4/30/1987	Unknown	Unknown
Canon Madera	Unverified	4/30/1987	Unknown	Unknown
Canoncito de la Madera	Unverified	4/30/1987	Unknown	Unknown
Canoncito de La Madera Trib 1-1a	Unverified	4/30/1987	PEAKFQ-Regression Equations	E431
Canoncito Seco	Unverified	4/30/1987	Unknown	Unknown
Canoncito Seco Trib 1	Unverified	4/30/1987	Unknown	Unknown
Canones Creek	Valid	4/30/1987	Unknown	Unknown
Cañones Creek North	Valid	4/30/1987	PEAKFQ-Regression Equations	E431
Cañones Creek South Trib 1-2	Valid	4/30/1987	PEAKFQ-Regression Equations	E431
Canonizaria Canyon				
Chavez Creek	Unverified	4/30/1987	Unknown	Unknown
Chavez Creek Trib 2	Unverified	4/30/1987	PEAKFQ-Regression Equations	E431
Chico Flat	Unverified	4/30/1987	PEAKFQ-Regression Equations	E431
Comanche Canyon	Valid	4/30/1987	PEAKFQ-Regression Equations	E431
Comanche Canyon Trib 1	Unverified	4/30/1987	PEAKFQ-Regression Equations	E431
Cooper Arroyo	Unverified	4/30/1987	PEAKFQ-Regression Equations	E431
Coyote Creek	Unverified	4/30/1987	Unknown	Unknown
Coyote Creek Trib 1	Unverified	4/30/1987	PEAKFQ-Regression Equations	E431
Daggett Canyon Creek	Unverified	4/30/1987	Unknown	Unknown
Desague Aguita	Unverified	4/30/1987	Unknown	Unknown
Dorado Canyon	Unverified	4/30/1987	Unknown	Unknown
East Fork Rio Brazos	Unverified	4/30/1987	Unknown	Unknown

East Fork Rio Brazos Trib 1	Unverified	4/30/1987	PEAKFQ-Regression Equations	E431
East Gavilan Canyon	Unverified	4/30/1987	PEAKFQ-Regression Equations	E431
El Rito	Unverified	4/30/1987	Unknown	Unknown
El Rito Trib 1-8	Unverified	4/30/1987	PEAKFQ-Regression Equations	E431
El Vado Reservoir	Unverified	4/30/1987	Unknown	Unknown
Encinado Creek	Unverified	4/30/1987	PEAKFQ-Regression Equations	E431
Gavilan Creek	Unverified	4/30/1987	Unknown	Unknown
Gavilan Ditch	Unverified	4/30/1987	Unknown	Unknown
Heron Reservoir	Valid & Unverified	4/30/1987	Unknown	Unknown
Horse Lake Creek	Unverified	4/30/1987	PEAKFQ-Regression Equations	E431
Horse Lake Creek Trib 1-2	Unverified	4/30/1987	PEAKFQ-Regression Equations	E431
Jaroso Creek	Unverified	4/30/1987	Unknown	Unknown
La Puerta Grande	Unverified	4/30/1987	PEAKFQ-Regression Equations	E431
Llano Lobato	Unverified	4/30/1987	PEAKFQ-Regression Equations	E431
Los Alamos Creek	Unverified	4/30/1987	Unknown	Unknown
Madera Canon	Unverified	4/30/1987	PEAKFQ-Regression Equations	E431
Madera Canon Trib 1	Unverified	4/30/1987	PEAKFQ-Regression Equations	E431
Mastenas Spring Trib 2	Unverified	4/30/1987	PEAKFQ-Regression Equations	E431
Nabor Creek	Unverified	4/30/1987	Unknown	Unknown
Osier Fork Rio Brazos	Unverified	4/30/1987	Unknown	Unknown

Parrot Spring Trib 1-2	Unverified	4/30/1987	PEAKFQ-Regression Equations	E431
Poleo Creek	Unverified	4/30/1987	Unknown	Unknown
Rio Brazos	Unverified	4/30/1987	PEAKFQ-Regression Equations	E431
Rio Brazos Trib 4-5	Unverified	4/30/1987	PEAKFQ-Regression Equations	E431
Rio Capulin	Unverified	4/30/1987	Unknown	Unknown
Rio Cebolla	Unverified	4/30/1987	Unknown	Unknown
Rio Cebolla Trib 1	Unverified	4/30/1987	PEAKFQ-Regression Equations	E431
Rio Chama	Valid & Unverified	4/30/1987	Unknown	Unknown
Rio Chama	Unverified	9/30/1995	TR-20 (February 1992)	HEC-2
Rio Chama Trib 1-40	Valid & Unverified	4/30/1987	PEAKFQ-Regression Equations	E431
Rio Chamita	Unverified	9/30/1995	TR-20 (February 1992)	HEC-2
Rio Chamita Trib 2-5	Unverified	4/30/1987	PEAKFQ-Regression Equations	E431
Rio del Oso	Unverified	4/30/1987	Unknown	Unknown
Rio del Oso Trib 1	Unverified	4/30/1987	PEAKFQ-Regression Equations	E431
Rio Gallina	Unverified	4/30/1987	Unknown	Unknown
Rio Gallina Trib 1	Unverified	4/30/1987	PEAKFQ-Regression Equations	E431
Rio Nutrias	Unverified	4/30/1987	Unknown	Unknown
Rio Nutrias Trib 1-4b1	Unverified	4/30/1987	PEAKFQ-Regression Equations	E431
Rio Ojo Caliente	Valid & Unverified	4/30/1987	Unknown	Unknown

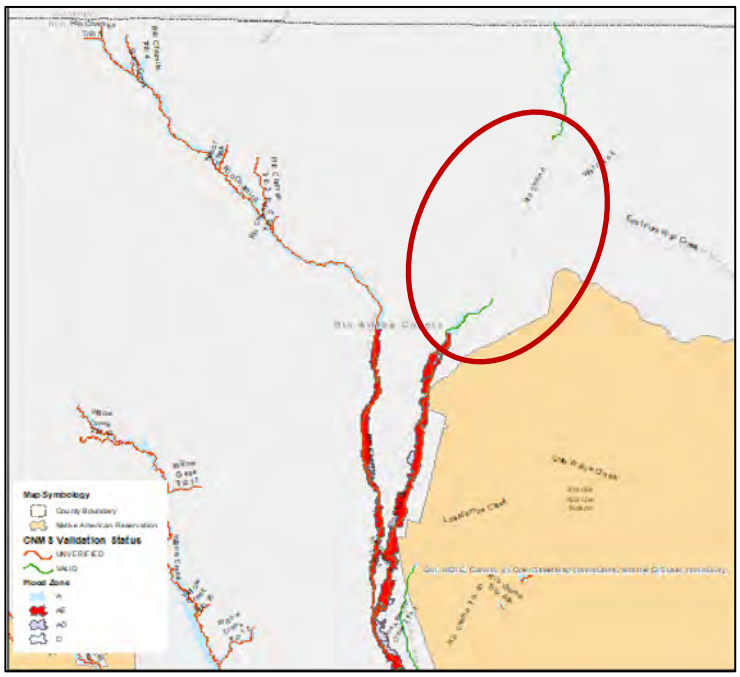
Rio Ojo Caliente Trib 1-2	Unverified	4/30/1987	PEAKFQ-Regression Equations	E431
Rio Puerco	Unverified	4/30/1987	Unknown	Unknown
Rio Puerco Trib 1-12	Valid & Unverified	4/30/1987	PEAKFQ-Regression Equations	E431
Rio Tusas	Valid & Unverified	4/30/1987	PEAKFQ-Regression Equations	E431
Rio Tusas	Valid	4/30/2009	Regression Equations	HEC-RAS 3.1.3
Rio Tusas Trib 1-4	Unverified	4/30/1987	PEAKFQ-Regression Equations	E431
Rio Vallecitos	Valid & Unverified	4/30/1987	Unknown	Unknown
Rio Vallecitos Trib 1-9	Valid & Unverified	4/30/1987	PEAKFQ-Regression Equations	E431
Rito de los Ojos	Unverified	4/30/1987	Unknown	Unknown
Rito de los Ojos Trib 1-7	Unverified	4/30/1987	PEAKFQ-Regression Equations	E431
Rito de Tierra Amarilla	Unverified	4/30/1987	PEAKFQ-Regression Equations	E431
Rito de Tierra Amarilla Trib 1&4	Unverified	4/30/1987	PEAKFQ-Regression Equations	E431
Rito del Medio	Unverified	4/30/1987	Unknown	Unknown
Rito Encino	Unverified	4/30/1987	Unknown	Unknown
Rito Encino Trib 1-2	Unverified	4/30/1987	PEAKFQ-Regression Equations	E431
Sagebrush Draw	Valid	4/30/1987	PEAKFQ-Regression Equations	E431
Salitral Creek	Unverified	4/30/1987	Unknown	Unknown
Salt Draw	Unverified	4/30/1987	PEAKFQ-Regression Equations	E431

Salt Draw Trib 1-2	Valid & Unverified	4/30/1987	PEAKFQ-Regression Equations	E431
Sandlin Arroyo	Unverified	4/30/1987	Unknown	Unknown
Sixto Creek	Unverified	4/30/1987	Unknown	Unknown
Spring Creek	Unverified	4/30/1987	Unknown	Unknown
Sulphur Canyon	Unverified	4/30/1987	PEAKFQ-Regression Equations	E431
Terrero Creek	Valid	4/30/1987	PEAKFQ-Regression Equations	E431
Tierra Amarilla Ditch	Unverified	4/30/1987	Unknown	Unknown
Tijera Spring	Unverified	4/30/1987	PEAKFQ-Regression Equations	E431
Vallecitos Creek	Unverified	4/30/1987	Unknown	Unknown
Vallecitos Creek Trib 1	Unverified	4/30/1987	PEAKFQ-Regression Equations	E431
West Fork Rio Brazos	Valid	4/30/1987	Unknown	Unknown
West Fork Rio Brazos Trib 1-4	Valid & Unverified	4/30/1987	PEAKFQ-Regression Equations	E431
Willow Creek	Unverified	4/30/1987	Unknown	Unknown
Willow Creek Trib 1-18	Valid & Unverified	4/30/1987	PEAKFQ-Regression Equations	E431

Rio Chama in Rio Arriba County

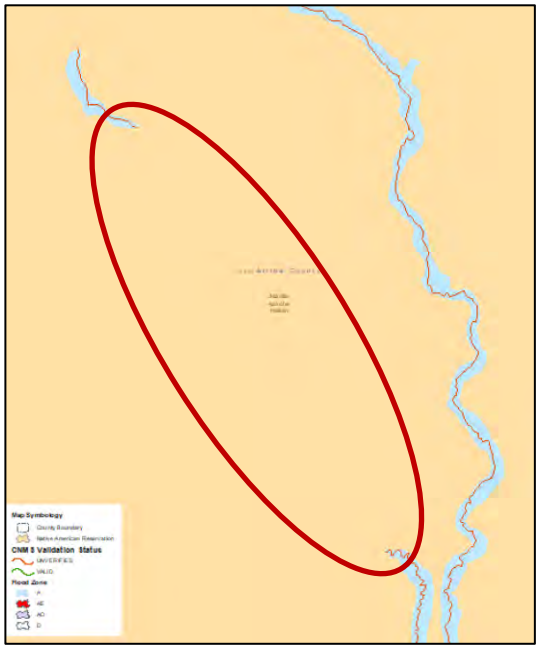
The Rio Chama, in Rio Arriba County, flows southwest in this area. The flood hazard for this flooding source is mapped as Zone A, there is a break in the mapped line for this river of approximately 2.7 miles (see Figure ##). This section of the Rio Chama is not included in the CNMS.

Figure ## Rio Chama in Rio Arriba County



The Horse Lake Creek Tributary 2 flows southeast into the Horse Lake Creek. The flood hazard for this flooding source is mapped as Zone A, there is a break in the mapped lines for this river of approximately 2.25 miles (see Figure ##).

Figure ## Horse Lake Creek Tributary 2 in Rio Arriba County



iii. Pre-Discovery CNMS Analysis

Table 18 shows the detailed study streams in the Rio Chama Watershed that have failed one or more validation elements during the CNMS stream reach level validation process. The CNMS validation elements attempt to identify changes to the Physical Environment, Climate and Engineering Methodologies since the date of the Effective Analysis (different from the Effective issuance date). Per the CNMS validation process, the study is considered as having a need or assigned an 'Unverified' status, if one of seven critical elements fail, or if four or more of the 10 secondary elements fail during stream reach level validation.

Table 18: CNMS Analysis

Stream Name	Validation Status	Failed CNMS Elements	Date Hydrology & Hydraulics Effective
Rio Chama	Unverified	C5, S4, S6	9/30/1995

Table 19 provides a description of the validation elements that failed as identified in the CNMS database.

Table 19: CNMS Category Descriptions

Element Name	Issue being identified by the Element	Element Description
C5	Current channel reconfiguration outside effective SFHA	Failure of this element indicates the streamline is seen on imagery as outside the SFHA and cannot be explained by a minor mapping error, which could be corrected through base fitting.
S4	More than one and less than five new or removed hydraulic structures (bridge/culvert) impacting BFEs	This element identifies addition or removal of more than one, but less than five hydraulic structures along the studied streams since the date of the Effective Study.
S6	Better topographic or bathymetric data available	Failure of this element indicates better topographic or bathymetric data has been made available since the Effective Study date.

Summary of CNMS Concerns

1. Rio Arriba County

Rio Arriba County contains 3,344.77 miles of streams within the Rio Chama Waters. The county contains 12.49 miles of Zone AE. The County contains 132.6 miles of Valid Zone A and 667 miles of Unverified Zone A. The County contains 2,532 miles of assessed Zone X. Main streams include Rio Chama, Rio Chamita, El Rito, and Abiquiu Creek.

2. Taos County

Taos County contains 58.2 miles of streams within the Rio Chama Watershed. The county contains 11. 54 miles of Zone A of which 6.22 miles are Valid and 5.32 are Unverified Zone A.

3. Sandoval County

There are no streams within the small portion of Sandoval County contained within the Rio Chama Watershed.

IV. Watershed Options (TO BE COMPLETED POST-DISCOVERY)

In conjunction with the assessment of risk, need, and the availability of topographic data, as well as the input of stakeholders within in this Watershed, future projects within the Rio Chama Watershed are recommended. FEMA looks to promote mitigation action within the watershed. After internal and partner review of the communities within the watershed, the following are overarching opportunities identified to promote community action within the watershed.

Table 20 lists some potential needs in the Watershed and actions that could be taken under each of the four areas discussed during the Discovery meetings, including:

- Risk Identification and Communication – traditional flood studies and data updates
- NFIP Community Actions – insurance-related mitigation or information
- Mitigation Planning and Mitigation Actions – items related to planning updates
- Community Benefits and Grant Opportunities – outreach and disaster activities as well as non-flooding hazards like safe room information

Table 20: Potential Watershed Activities (TO BE COMPLETED POST-DISCOVERY)

Risk Identification and Communication
•
NFIP Community Actions
• Discuss the CRS program with interested communities
Mitigation Planning and Mitigation Actions
•
Community Benefits and Grant Opportunities
•

BFE = Base Flood Elevation
BLE=Base Level Engineering
CAV = Community Assistance Visit
CFM = Certified Floodplain Manager
CLOMR = Conditional Letter of Map Revision
CNMS = Coordinated Needs Management Strategy
CRS = Community Rating System
DEM = Digital Elevation Model
FIRM = Flood Rate Insurance Map
FPA = Floodplain Administrator
G&S = FEMA's *Guidelines and Standards for Flood Hazard Mapping Partners*
H&H = hydrologic and hydraulic
Hazus = Hazards U.S.
HMP = Hazard Mitigation Plan
LiDAR = Light Detection and Ranging System
LOMA=Letter of Map Amendment
LOMR = Letter of Map Revision
NFIP = National Flood Insurance Program
NVUE = New, Validated, or Updated Engineering
PMRS = Physical Map Revision
RGIS = Resource Geographic Information System
Risk MAP = Risk Mapping, Assessment, and Planning
RL/SRL = Repetitive Loss/Severe Repetitive Loss
SFHA = Special Flood Hazard Area
USGS = U.S. Geological Survey

Table 21 provides specific evaluation guidelines for streams or areas that could benefit from additional study. Any FEMA-based metrics that would be met if the need or issue was addressed are noted, as well as any current FEMA map actions that would affect the activity. Any comments or concerns raised by a stakeholder during the Discovery process that could be tied to one of the needs or actions for the Watershed are also noted. Some needs/actions are listed that were not raised by any specific community but were identified as general improvements that could be made in the Rio Chama Watershed to meet general FEMA regional goals.

Needs are identified as being on the critical path as high, medium, or low priority or as a task that could be assigned to a State or local community to complete. These definitions are also included in Table 21.

- **High** – The local community would immediately benefit from the action and FEMA's metrics would also be met.
- **Medium** – The local community would benefit over the longer term from the action and a portion of FEMA's metrics may be met.
- **Low** – The local community activities can continue without this revision and FEMA's metrics are not affected.
- **Community Action** – The activity would be more appropriate as a community-led action rather than a FEMA-led action.

Table 21 Metrics and Rankings of Needs

Item	Description of Need Evaluation Guide **High** – Local community would immediately benefit from the action, and FEMA's metrics would also be met **Medium** – Local community would benefit over the longer term from the action, and a portion of FEMA's metrics may be met **Low** – Local community activities can continue without this revision, and FEMA's metrics are not impacted **Community Action** – Activity would be more appropriate as a community-led action rather than a FEMA-led action		Impacts From Any Current Map Actions	FEMA Metric or Community Benefit	Evaluation	Relates to Community Comment Number
	Location of Need/Project	Details				
		•	•	•		
		•	•	•		

i. Project Prioritization (TO BE COMPLETED POST-DISCOVERY)

Flood risk projects are intended to be initiated and cataloged at a HUC-8 unit. This means that when a project is initiated, all flood hazards within the HUC-8 will be evaluated to determine the project scope within that HUC-8 boundary. Evaluation means that risk, need, available data, and desired output products are assessed for the entire HUC-8. Evaluation does not mean the actual development of new or updated flood risk products, only the assessment of what products would be required to fulfill the identified needs in light of the level of risk. Unmet needs must be cataloged in the Coordinated Needs Management Strategy Database (CNMS).

Once the entire HUC-8 has been evaluated, the Region will select the project tasks necessary to respond to the identified levels of risk and need. The Region is expected to maximize the amount and usefulness of project work to be performed in any HUC-8, but is not expected to perform every project task and meet all needs in every watershed. All scope with the HUC-8 boundary must be tasked/ordered at one time.