

Source Water Protection in Wildfire Preparedness and Postfire Recovery

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**New Mexico Rural
Water Association**

NMED
New
Mexico
Environment
Department



**New Mexico
Forest and Watershed
Restoration Institute**

Roadmap for the presentation

- We're going to focus on wildfire impacts on source water and source water protection planning
 - We'll first define some terms
- Then spend some time talking about impacts of wildfire
- Martha will talk about what we can do to prepare for wildfires (mitigation and preparedness)
- Kristin will then talk about what we can do in postfire contexts

Takeaways

- *Whether before, during, or after the fire, source water protection planning empowers public water systems*
- *What can the fire world do to engage with source water protection and public water systems?*

Source Water Protection



- Source water is “untreated water from streams, rivers, lakes, or underground aquifers that is used to supply private wells and public drinking water” (EPA)
- Source water protection is a voluntary process designed to help prevent pollution of the primary sources of drinking water
- Protecting source water means less money and other resources spent on treatment or even the loss of the water resource

In New Mexico source water protection planning is voluntary and the recommendations are not binding

Source Water Protection Core Purposes

Mitigation

Preparedness

Response

Recovery



Clean water is a sustainable community.

Clean water is infrastructure.

Clean water is stability in the face of catastrophe.

Thinking like a Watershed (Taos Land Trust 2015)

Traditional Source Water Protection Planning

- Initially used the contaminants identified for Source Water Assessments
- Inventory organized by types of land use and types of contaminants
- Best management practices developed to mitigate the impacts of the contaminants

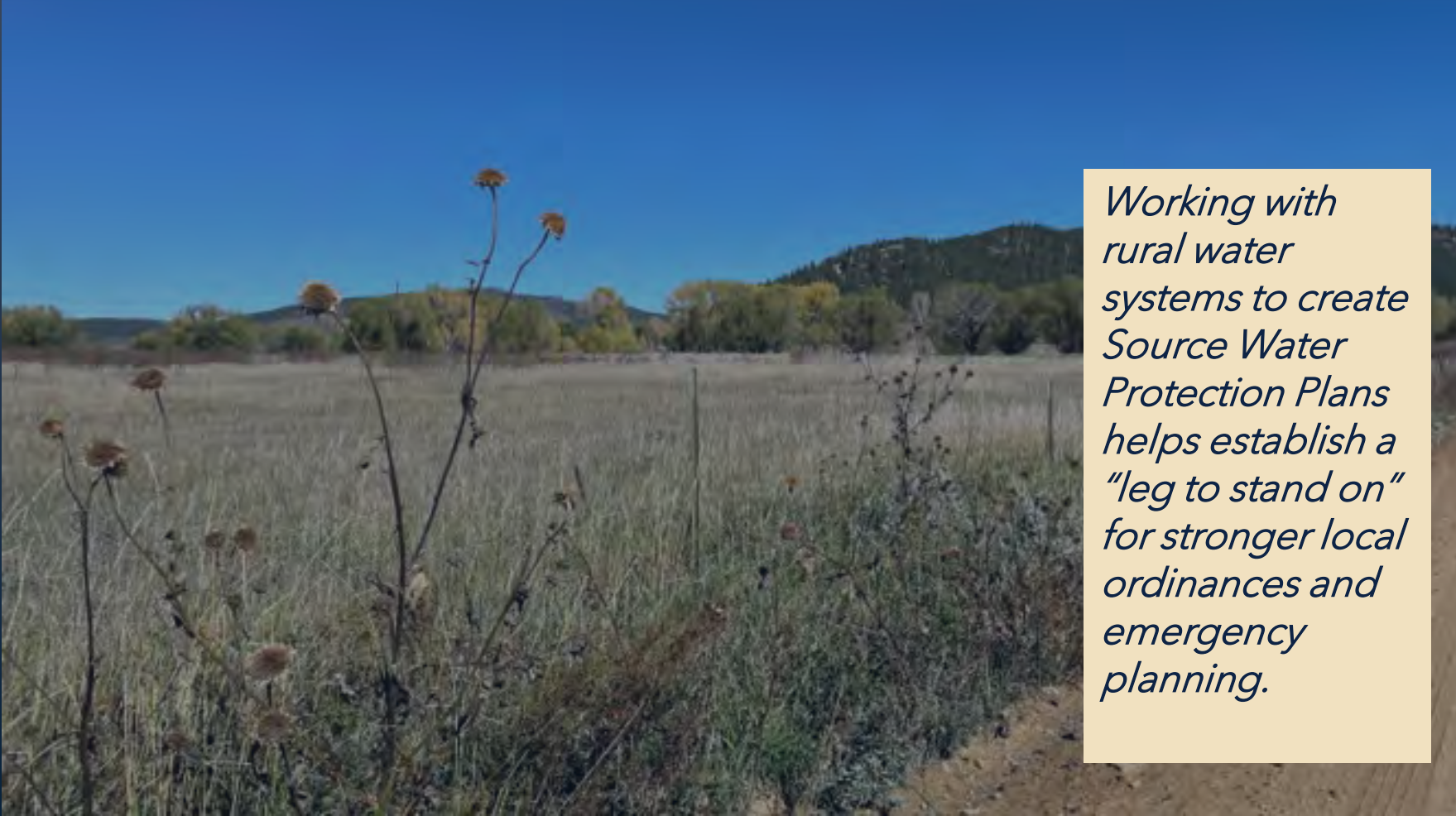


NMED and NMRWA recognize that source water protection extends beyond a list of contaminants to include natural disasters, cyber attacks, other hazards, and having a place at the table discussing emergencies.

NMED Drinking Water Bureau follows this format

- Record Review
- Communication with public water systems and local governments
- GIS: Delineate Source Water Protection Area & assess drainage. Confirm findings with constituents
- Use USGS topo maps, NMED Enviromap to gain information about surface water bodies
- SWP draft and review process can take many months to years

Doing Participatory Research with Public Water Systems



Working with rural water systems to create Source Water Protection Plans helps establish a “leg to stand on” for stronger local ordinances and emergency planning.

NMRWA follows this format

1. Form a SWP Core Team - what are the system's concerns and perceived threats?
2. Establish the SWP Area
3. Identify issues of concern
4. Develop best management practices and other actions to address those concerns
5. Contingency Planning

Creating Source Water Protection Plans



- *Demonstrates the larger context of stakeholders involved in all phases of disasters*
- *Provides opportunities to collaborate with those who may have more control over what impacts source water and critical infrastructure*
- *Facilitates reciprocal education and the opportunity to create relationships*

Costs of Fire and Postfire

Fire and postfire threaten how a public water system can secure, store, treat, and deliver reliable water supplies to its community and first responders



Wildfire Impacts to Water Systems

Damaged or destroyed well houses

Damaged/destroyed storage tanks

No water

Damaged metering system

Physical security issues

No electricity

Customer chaos, emotionally devastated



Impacts – There are More

- Upstream sites may now have toxic materials, damaged septic tanks, destroyed well houses, asbestos debris, lead-based paint, PCBs from older damaged electric utility systems
- Old mine tailings piles with toxic metals (lead, zinc, moly, sulfides, copper etc. depending on location) may enter surface waters and then groundwater
- Down stream surface water structures face contamination if/when it rains
- Remaining wells within watershed now at-risk for flood damage and contamination

Cimarron Canyon before and after the 2018 Ute Park Fire



Typical turbidity is
between 5-10 NTU



Post fire turbidity
exceeded 1000 NTU

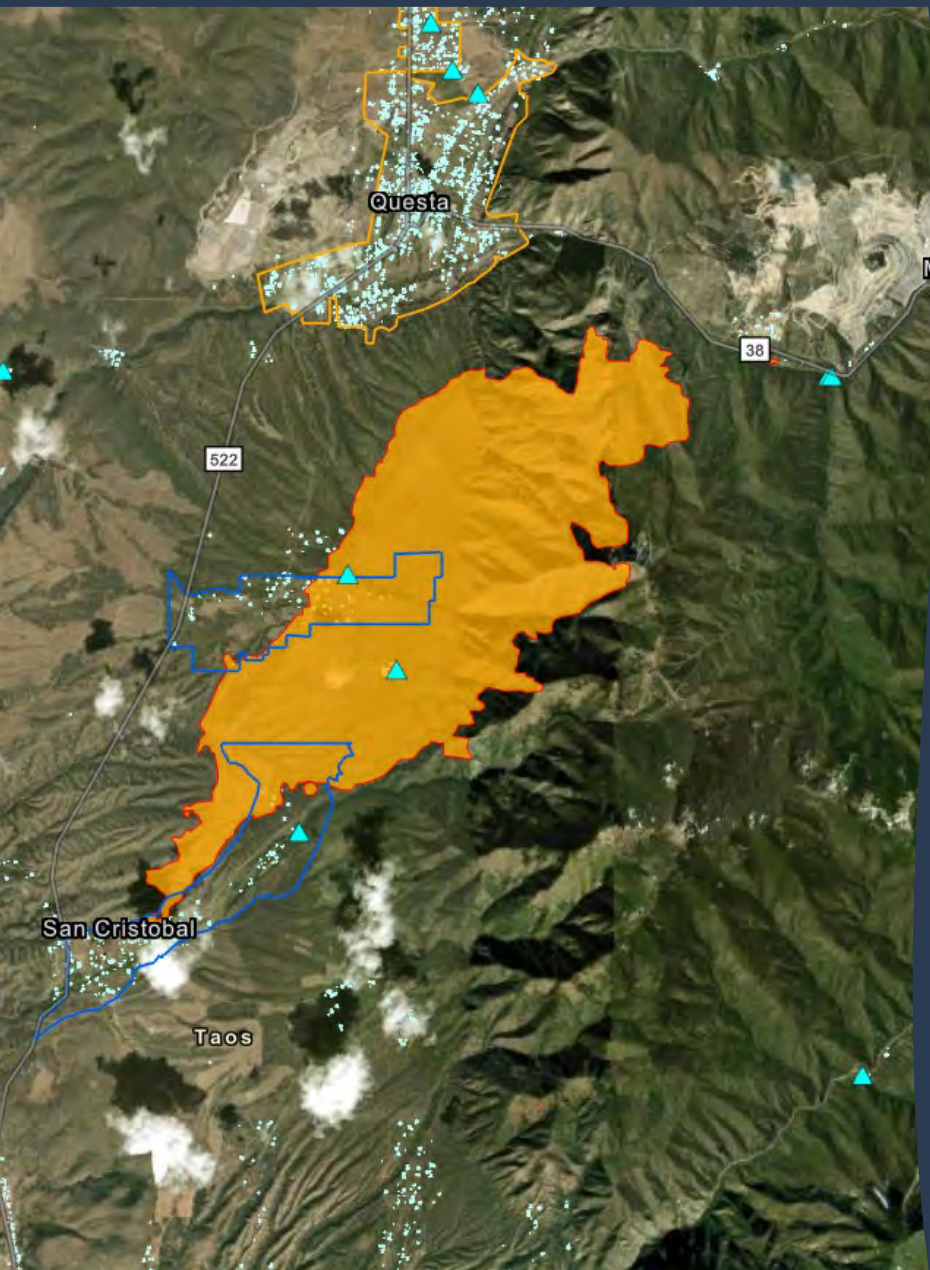
Secondary water source for the City of Raton

Operators and Board Members are the experts on their water and wastewater systems

Water systems can partner with the experts on forests and fire to protect their drinking water sources and infrastructure



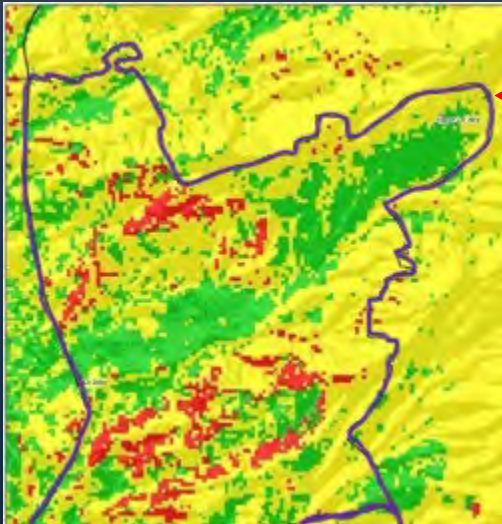
Wildfire Impacts on Source Water Can Last Generations



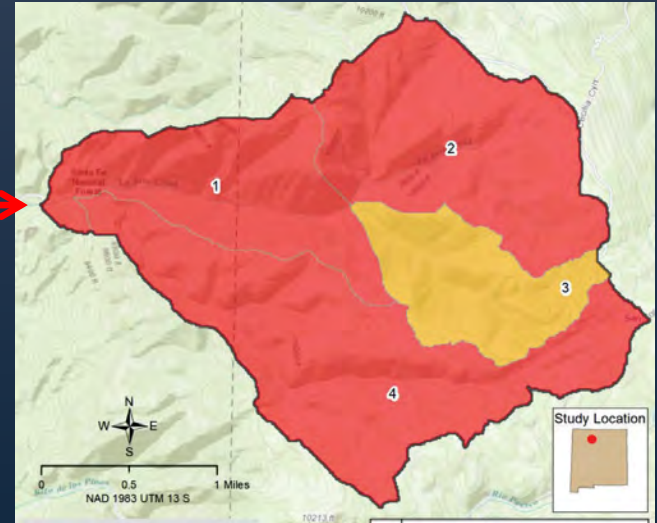
- The Hondo Fire started in San Cristobal from May 5-11, 1996, burning 31 km², destroying 27 homes and 5 other structures
- In 2014 the La Lama water system was still feeling the effects of the fire on its source water
- In 2026, the water system says the same is true

La Jara 2006 CWPP Risk Assessment vs. 2017 Postfire Debris Flow Model

CWPP assessed community risk as moderate



Postfire debris modeling tells a different story*



Arrows show approximate placement of the intake

*2-yr rainfall event, 1.65" per hour, and a moderate and high severity burn yields a debris flow probability of 80-100% with estimates of between 10 and 100 k cubic meters (Cram et al. 2017)

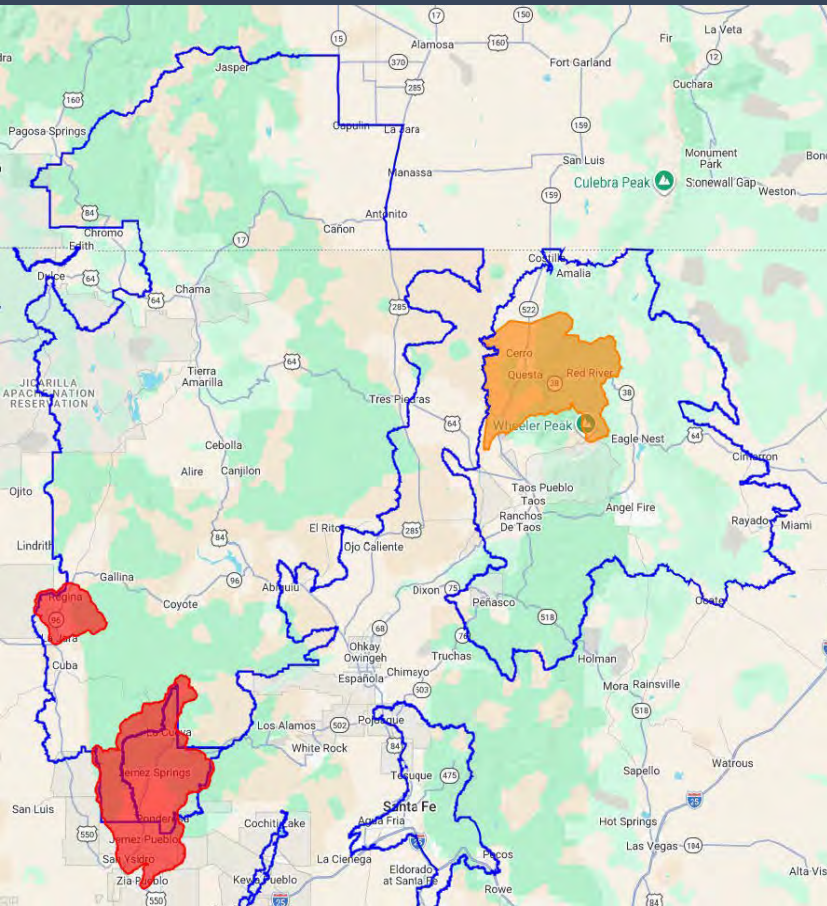
Postfire Effects of Bonita Fire on the Vallecitos MDWCA



Bonita Fire in 2017 – high severity burn only 170 of 7495 acres (2%) – a successful fire for all but the water users downstream

- Pump and infiltration gallery destroyed. Treatment facility overwhelmed
- Bottled water for 15 months. Boil water advisory Aug 2017 through Nov 2018
- Costs to the Association > \$15,000. Over \$6,800 on interim fixes → risked funding and installation of \$530k treatment plant
- In 2023 sediment flows in the Rio Vallecitos buried the infiltration gallery's intake

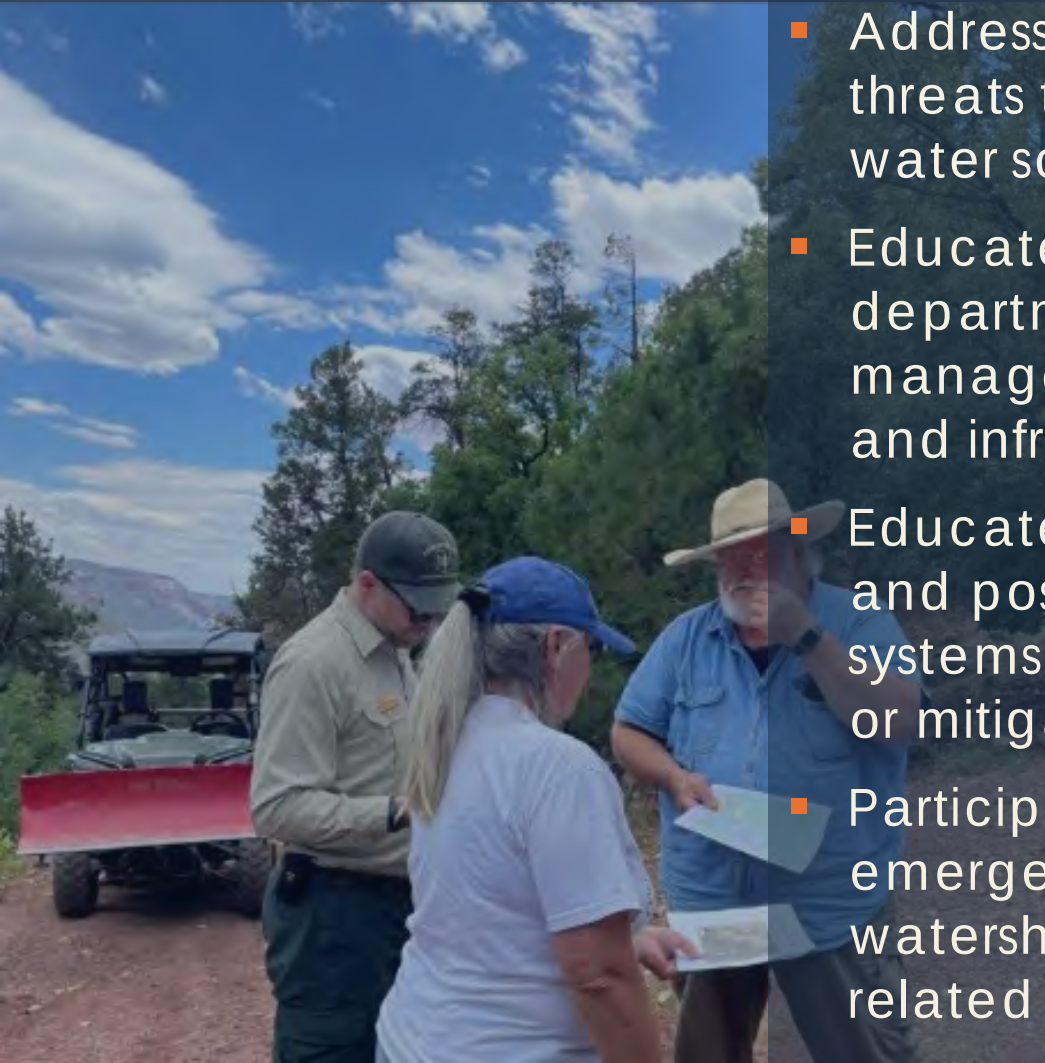
JAWS and Enchanted Arc SWP Areas within the FAP Priority Landscapes



Impacts of wildfire and postfire processes & events on drinking water often underestimated and underrepresented in planning watershed treatments, fighting wildfire, and planning postfire mitigation

We believe that an alliance of water systems can speak with a louder voice than can individual systems on protecting drinking water sources and infrastructure from wildfire and postfire events

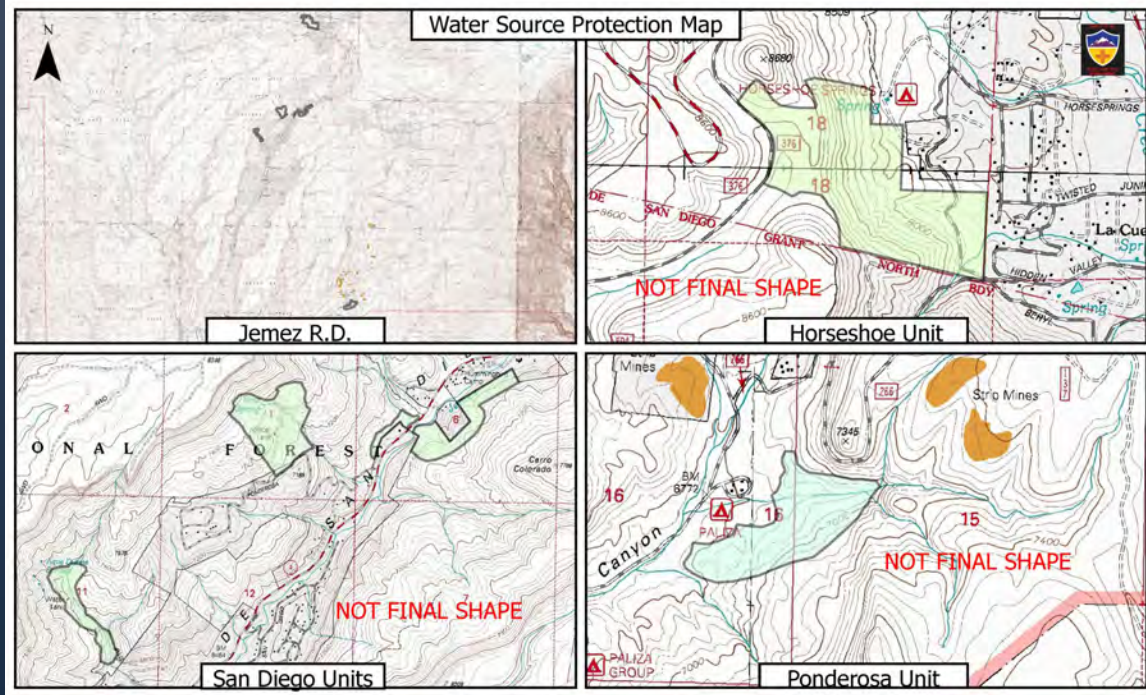
Jemez Alliance of Water Systems



- Address wildfire and postfire as primary threats to public water systems' drinking water source
- Educate land managers, fire departments, and emergency managers on drinking water sources and infrastructure
- Educate communities on how wildfire and postfire can affect public water systems, what can be done to prevent or mitigate impacts
- Participate in CWPPs and emergency/hazard planning, forest and watershed treatment projects, and related funding efforts

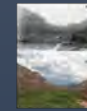
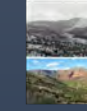
JAWS Fuels/SWP Initiative

- Drinking water sources at risk from wildfire & postfire where private & public lands adjacent
- Plan to protect the resources through public/private lands partnerships and fuel treatments where planning and environmental documents and funding opportunities already exist

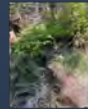
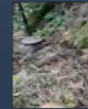
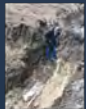
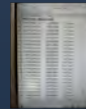
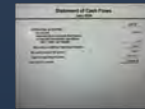


Preliminary SFNF treatments developed from the Fuels/SWP Initiative. Prescription on private lands completed Jan/Feb 2026 with NFL funds.

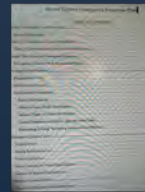
JAWS Photovoice Report



What a healthy watershed looks like to me



What I see as
the main risks to
drinking water
when the next
fire happen



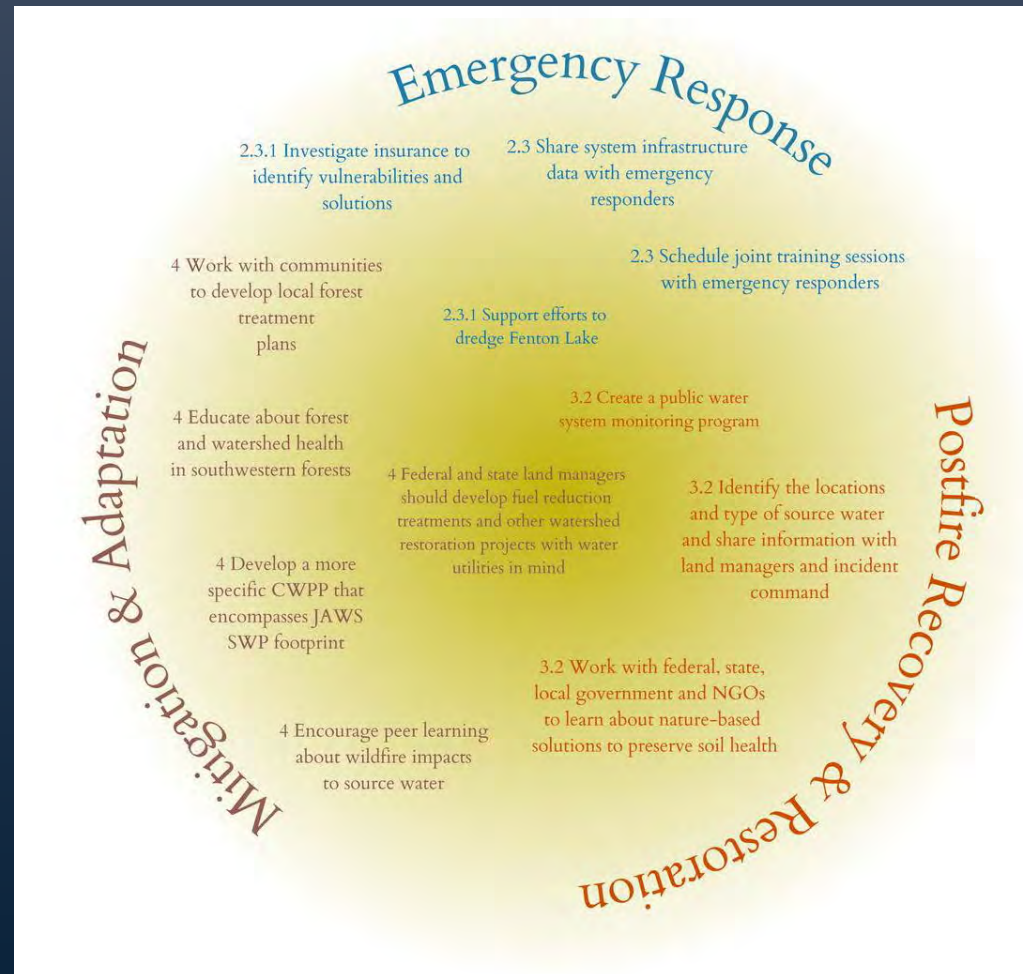
What a resilient water system looks like to me

How can we (the JAWS community) translate our values, interests, and goals into sustainable action?

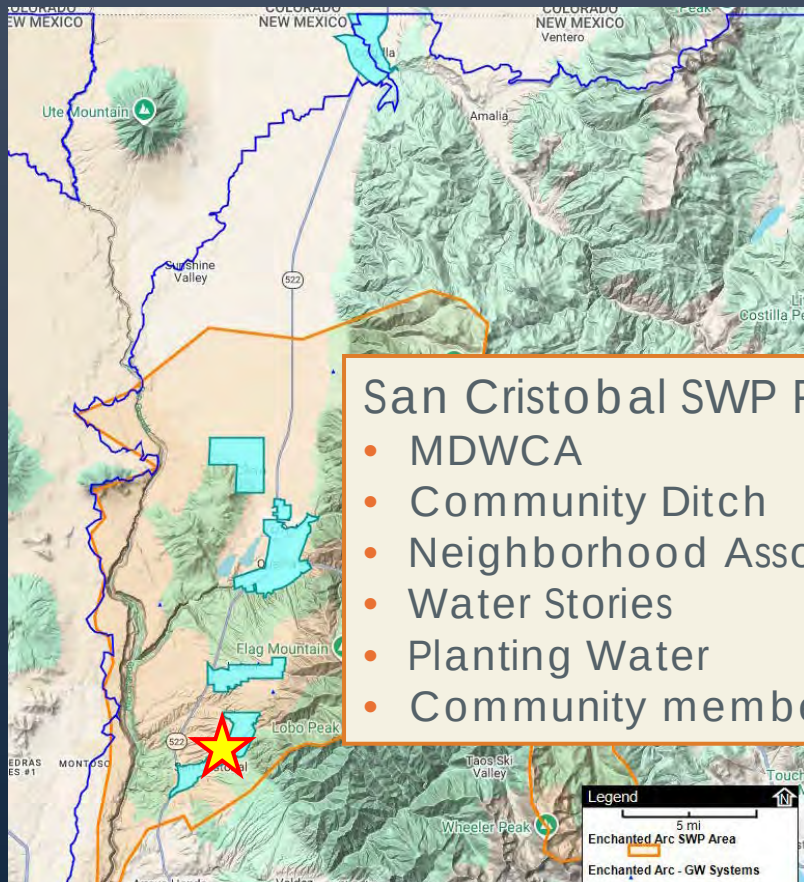
Living with Wildfire Cycle for Rural Water Systems

Recommended actions for building resiliency in fire-prone landscapes

- Water systems have more agency when their concerns are within their circle of influence
- When living and working in fire-prone areas – how do water systems gain agency over actions further from their direct influence?



Enchanted Arc SWP Plan



San Cristobal SWP Plan

- MDWCA
- Community Ditch
- Neighborhood Association
- Water Stories
- Planting Water
- Community members

Water Systems

- San Cristobal MDWCA
- La Lama MDWCA
- Cerro Regional MDWCA/SWA
- Questa Water System
- Red River Water System

Collaborating with

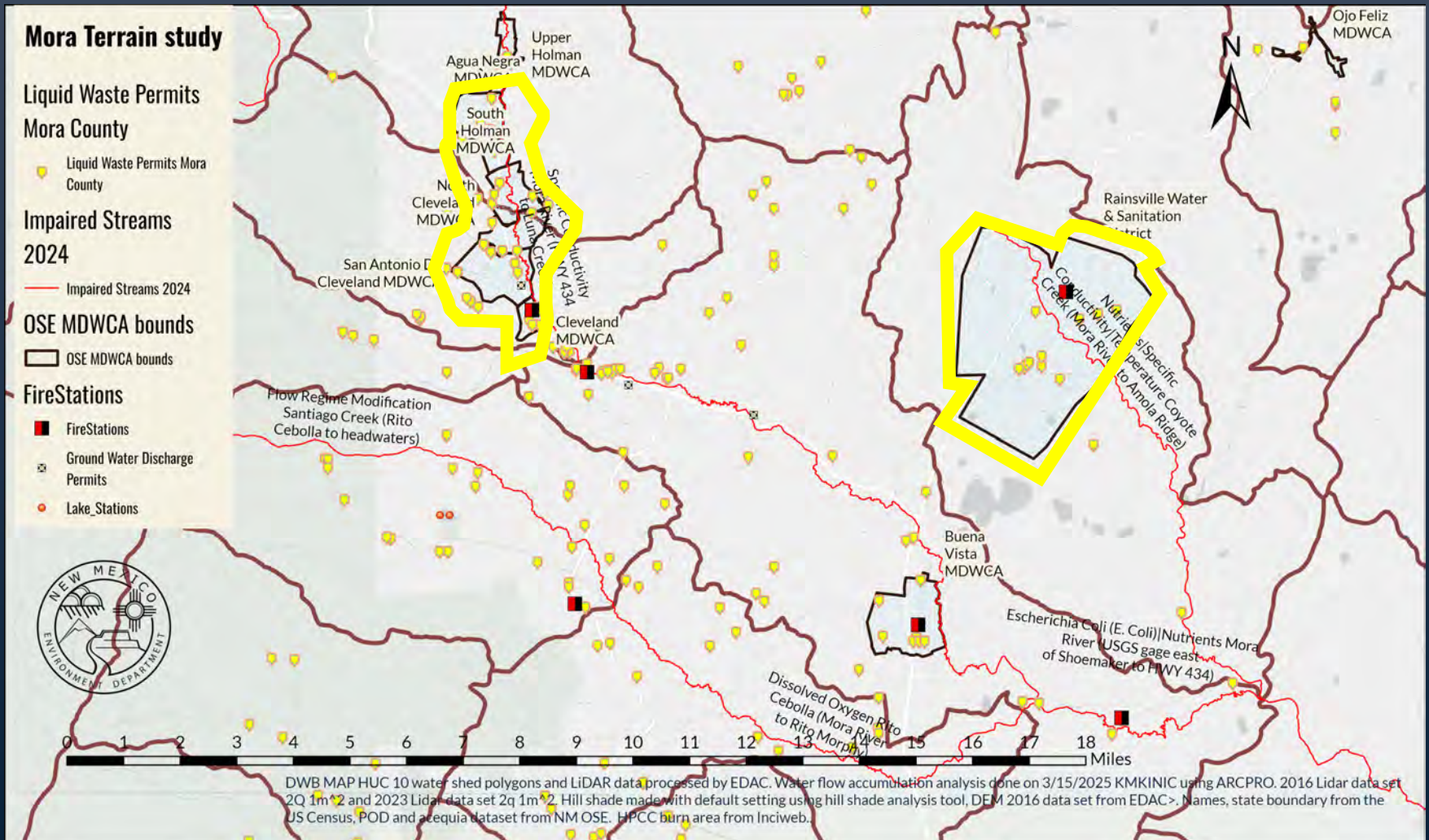
- NMRWA
- NMFWR
- Aquifer Mapping & Monitoring Program (NM Bureau of Geology & Mineral Resources)
- Cimarron District, NM State Forestry
- Questa Ranger District, Carson National Forest

Public Drinking Water Systems as Stakeholders

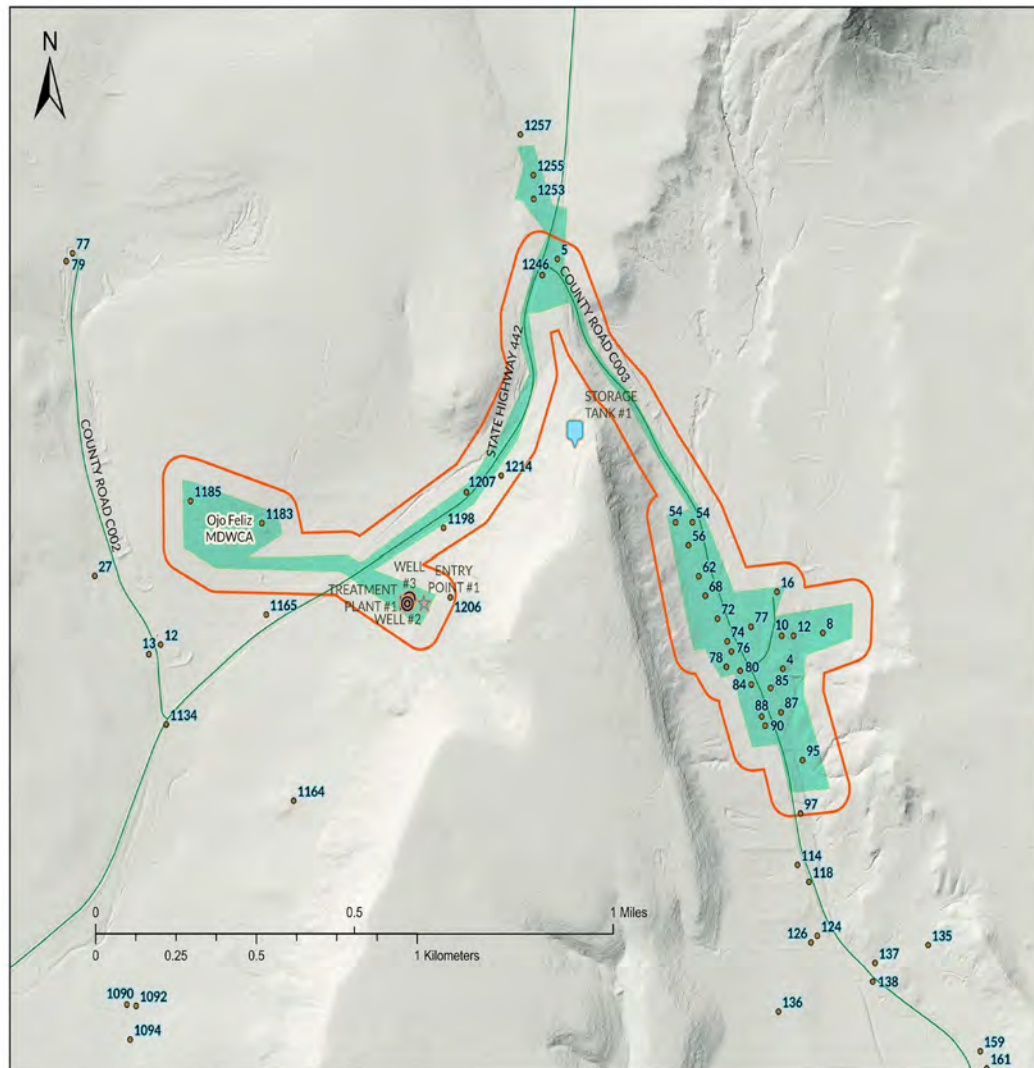
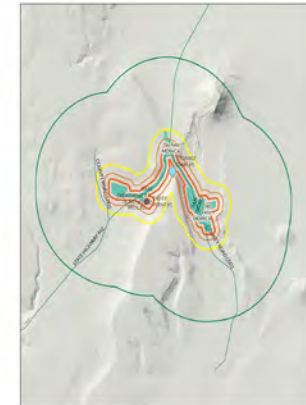
Mutual Domestics and other types of water utility organizations are subdivisions of the state under the New Mexico Sanitary Projects Act: NM Stat § 3-29-1 (2025)

Mutual Domestic Water Consumers Associations (MDWCA) and other types of locally run utilities need to be included in CWPP, Emergency Management Plans etc

Post and Pre Fire: Identification of Distribution Problems



Source Water Protection Areas: Beyond the Bullseye



Ojo Feliz System area with Address points
This preliminary map can be used to identify the service hook ups by address. Ojo feliz community members can identify the location of pressure valves and future storage tank or well location or areas of concern.

Ojo Feliz Infrastructure

WSF Type

- Pressure Tank
- Spring Box
- ★ Sampling Site
- Storage Tank
- Treatment Plant
- Well

● Addresses RGIS 2024

— New Mexico Center Lines 6/2025 (roads)

○ Zone A

Hillshade: DEM Q2: EDAC 2016

Value

153°07'40.787"

0°00'00.000"

■ Ojo Feliz Customer Area

KMK: 12/23/2025, OSE service area, NM roads from RGIS, Hillshade in ARCPRO 3.5 from DEM Q21" M: EDAC, 200 foot buffer generated pairwise buffer, Arc Pro 3.5

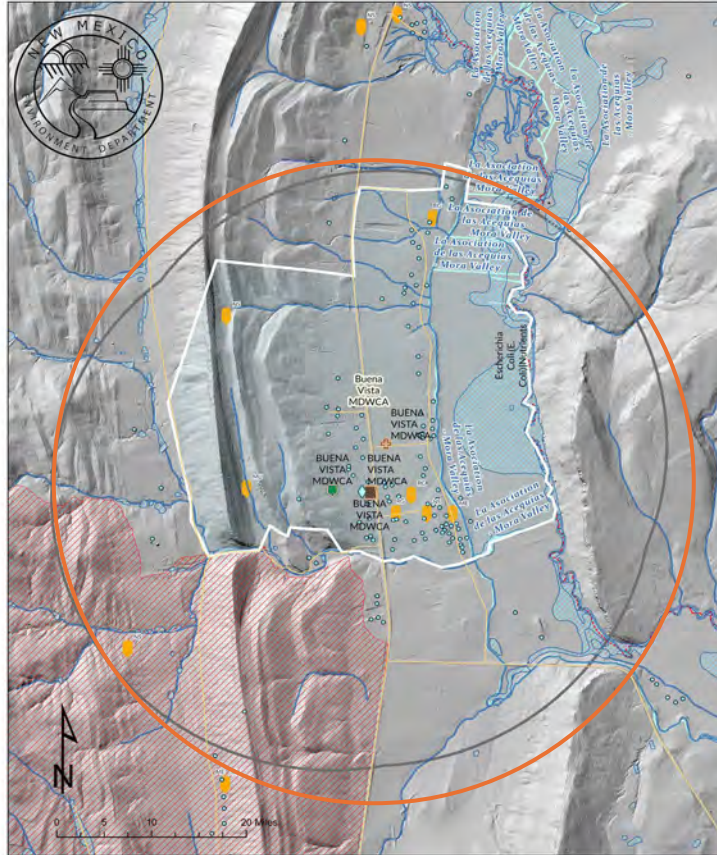
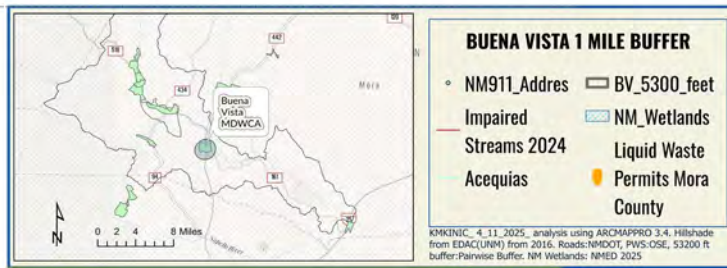
Buena Vista 1 Mile Buffer around Wellheads

EDAC=/RGIS

Is the state repository for
Geospatial Data

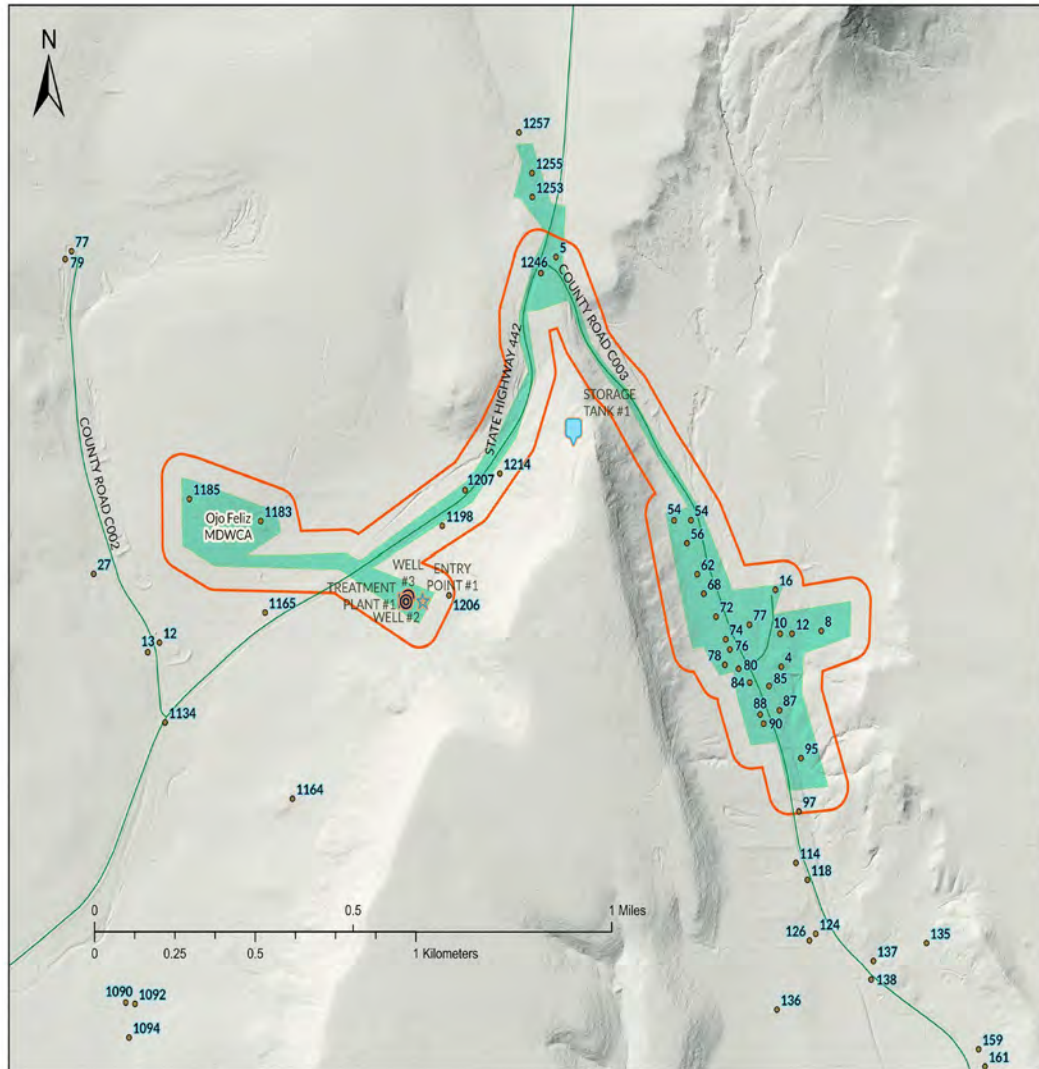
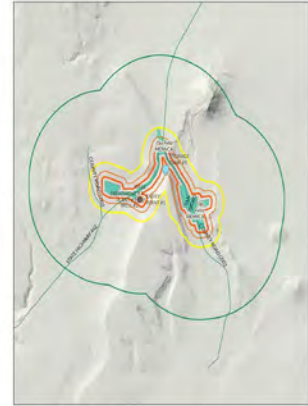
Q2 DEM data

Was available from 2016 and 2023 (post fire)



This is a location map for Buena Vista's SWP plan. Notice the proximity of liquid waste facilities, (septics), wetlands and the burn scar.

Source Water Protection Areas: Beyond the Bullseye



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-  Well

- Addresses RGIS 2024
- New Mexico Center Lines 6/2025 (roads)
- Zone A

Hillshade: DEM Q2: EDAC 2016

Value

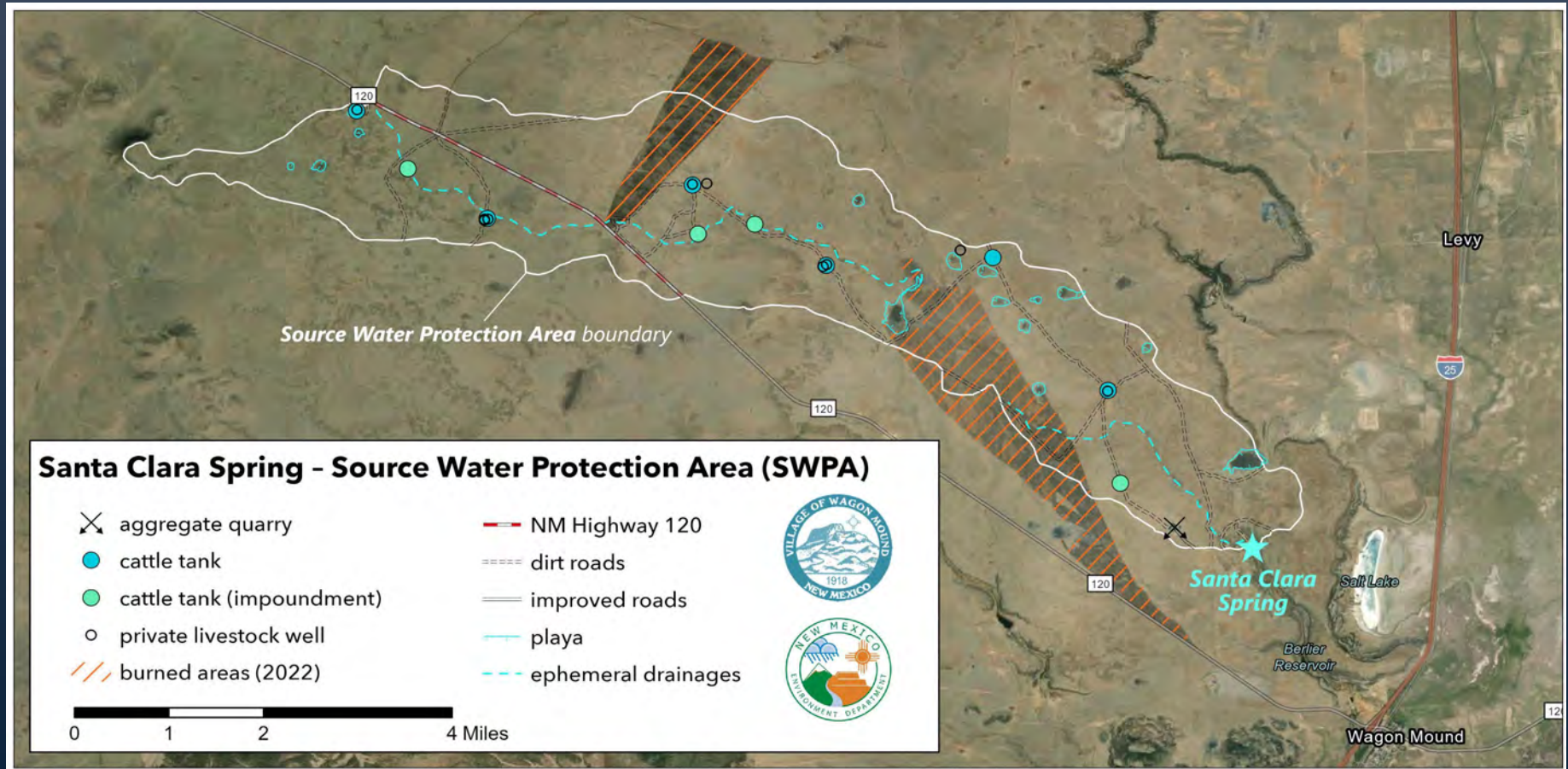
153°07'40.787"

0°00'00.000"

Ojo Feliz Customer Area

KMK: 12/23/2025, OSE service area, NM roads from RGIS, Hillshade in
ARCPRO 3.5 from DEM Q21*^M: EDAC, 200 foot buffer generated pairwise
buffer, Arc Pro 3.5

Wagon Mound SWP Area



When Wetlands and Drinking Water Collide

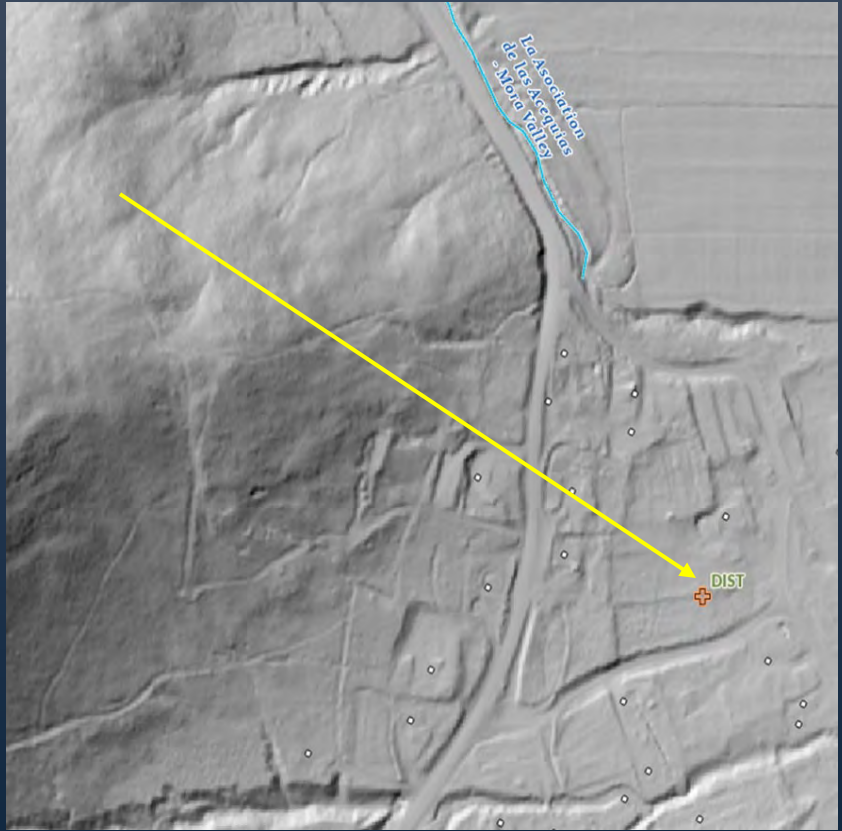


**There is an opportunity
for stakeholder buy in
to protect both**

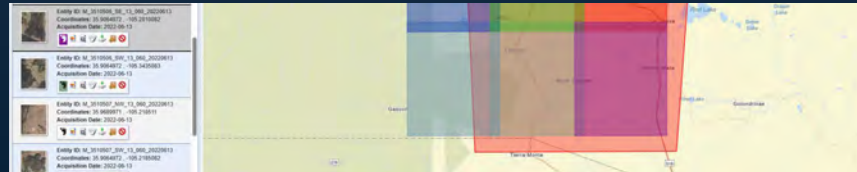
Reckless interventions Can Be Harmful



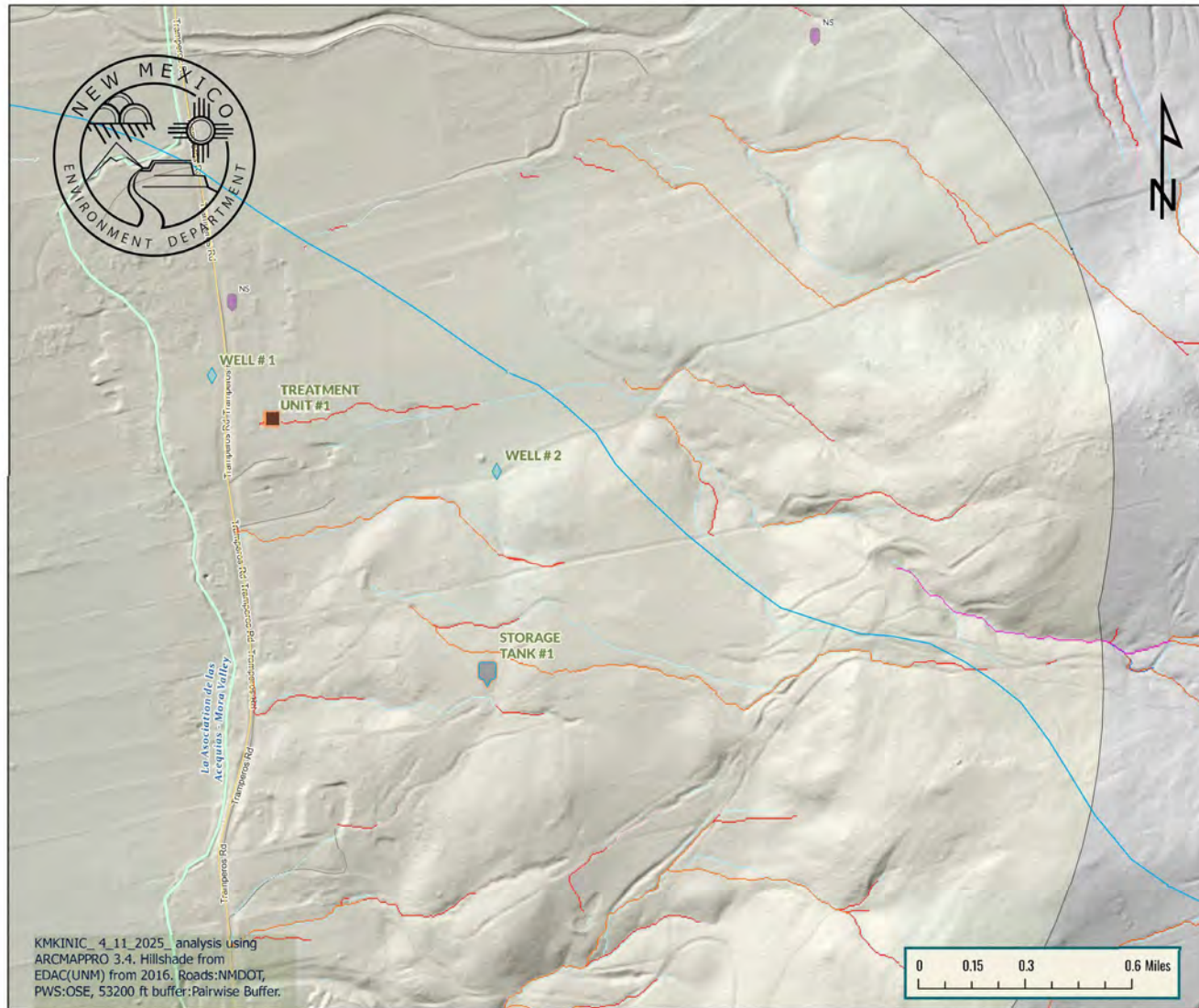
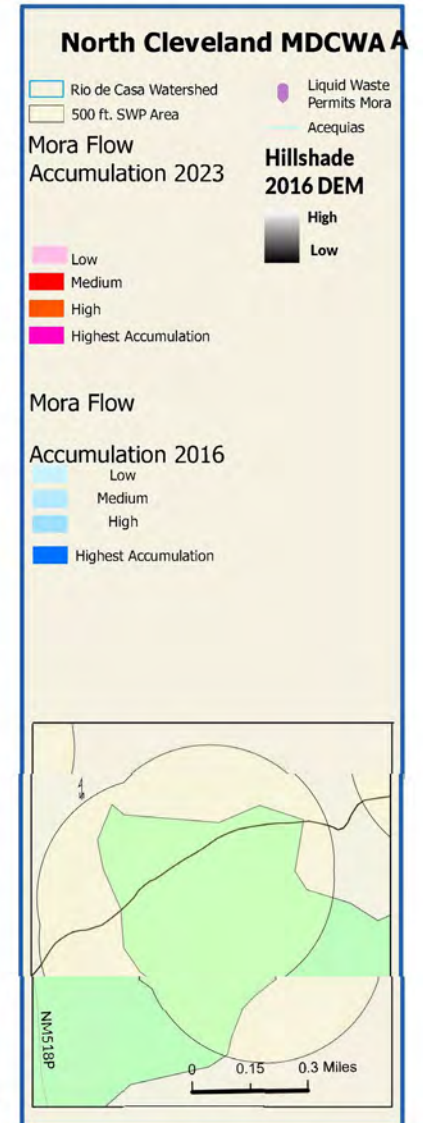
Drainage from Burn Scar Effects the PWS



USGS → Earth Explorers for NAIP tiles.

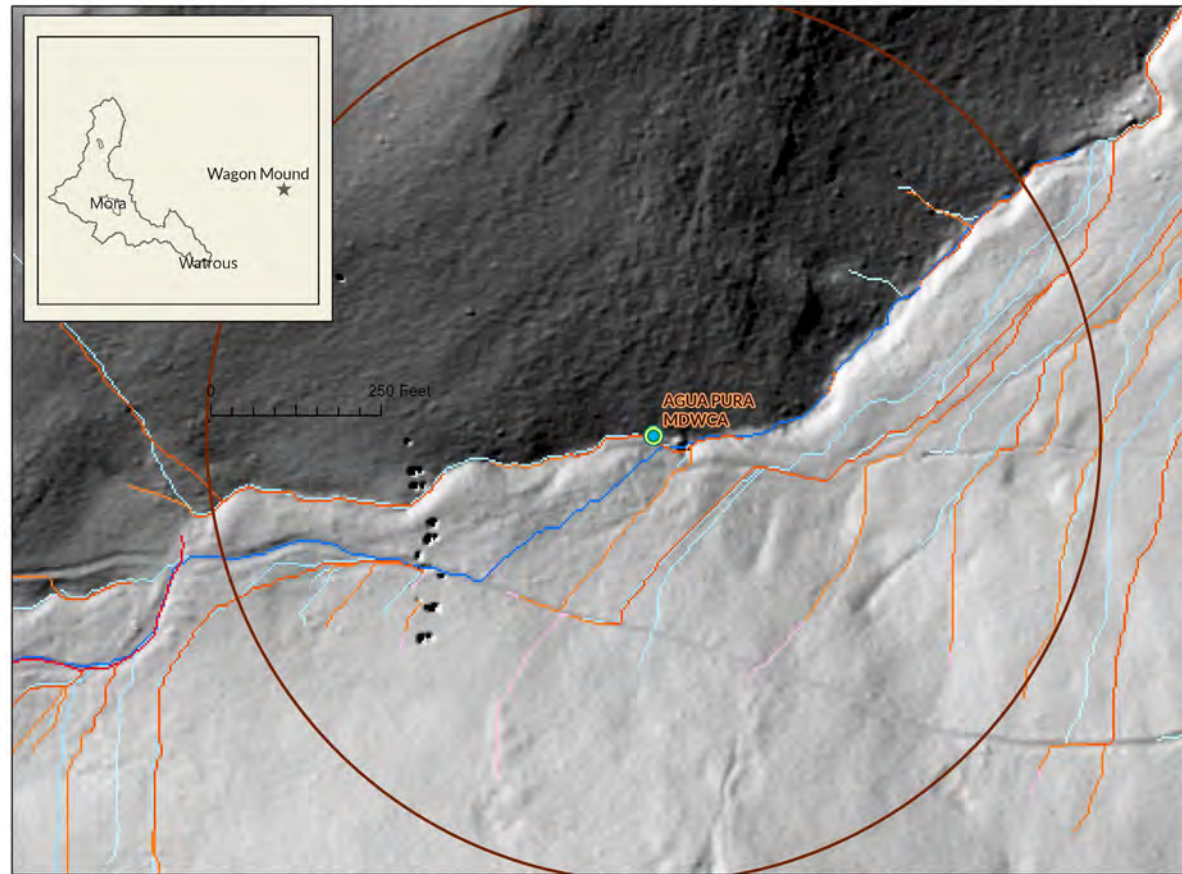


Flow Accumulation Comparison



2016 DEM Hillshade with Flow Accumulation Overlay

DWB MAP HUC 10 water shed polygons and LIDAR data processed by EDAC. Water flow accumulation analysis done on 3/15/2025 KMKINIC using ARCPRO. 2016 Lidar data set 2Q 1m*2 and 2023 Lidar data set 2q 1m*2. Hill shade made with default setting using hill shade analysis tool, DEM 2016 data set from EDAC. Names, state boundary from the US Census. POD and acequia dataset from NM OSE. HPCC burn area from Inciweb.



Agua Pura Changes in Flow Accumulation

NM Public Water System Infrastructure

- Spring
- 200ft

Mora Flow Accumulation 2016

- Low
- Medium
- High
- Highest Accumulation

Mora Flow Accumulation 2023

- Low
- Medium
- High
- Highest Accumulation

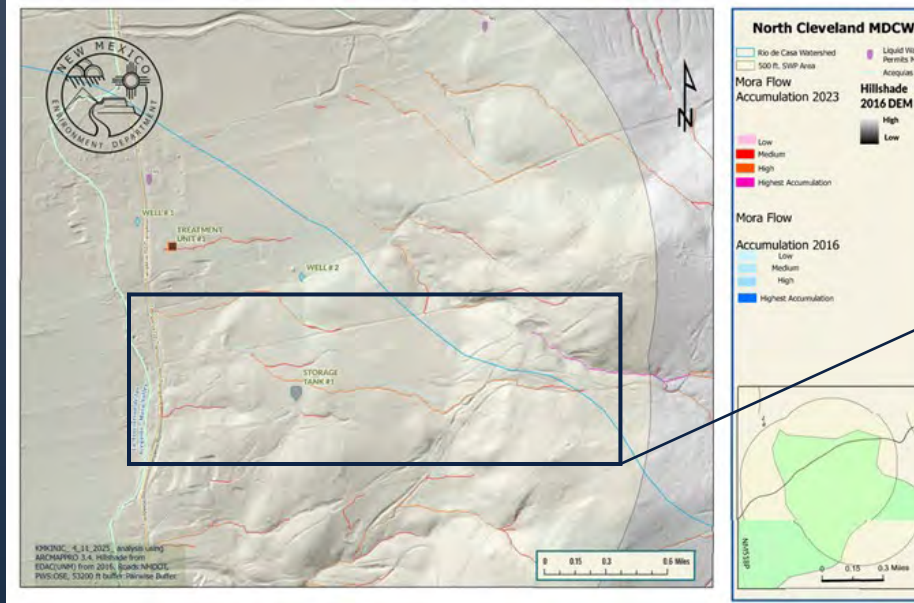
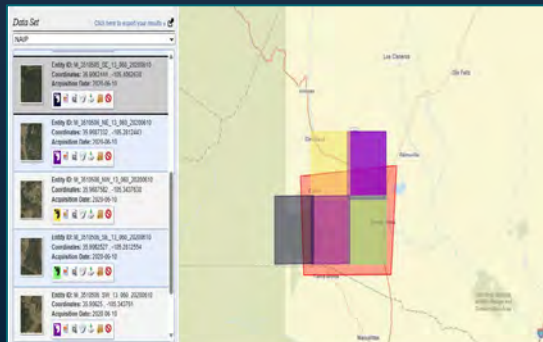
Hillshade from 2016 DEM

- High Elevation
- Low Elevation



KMKINIC 03/25/25

North Cleveland Sedimentation



- National Agricultural Imagery Project Data for time-based comparisons
- NAIP tiles acquired and used as base maps for burn scar analysis. Metadata can be found at USGS: <https://earthexplorers.gov>.
- Example of data from the NAIP acquisition and some NAIP tiles used in this study. Tiles were mosaicked using Arc Pro 3.5.3

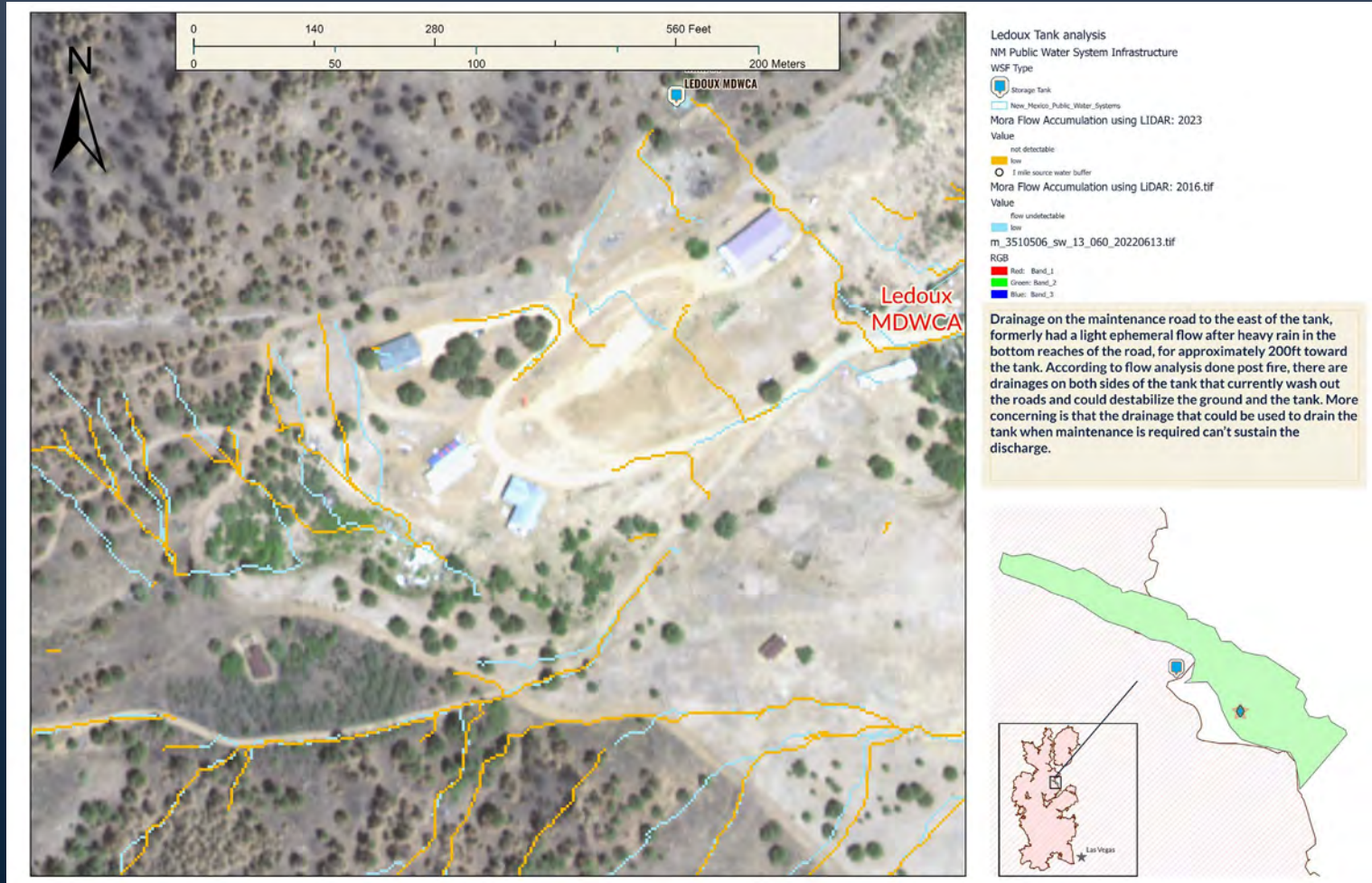


500
150

1,000 Feet
300 Meters

500
150

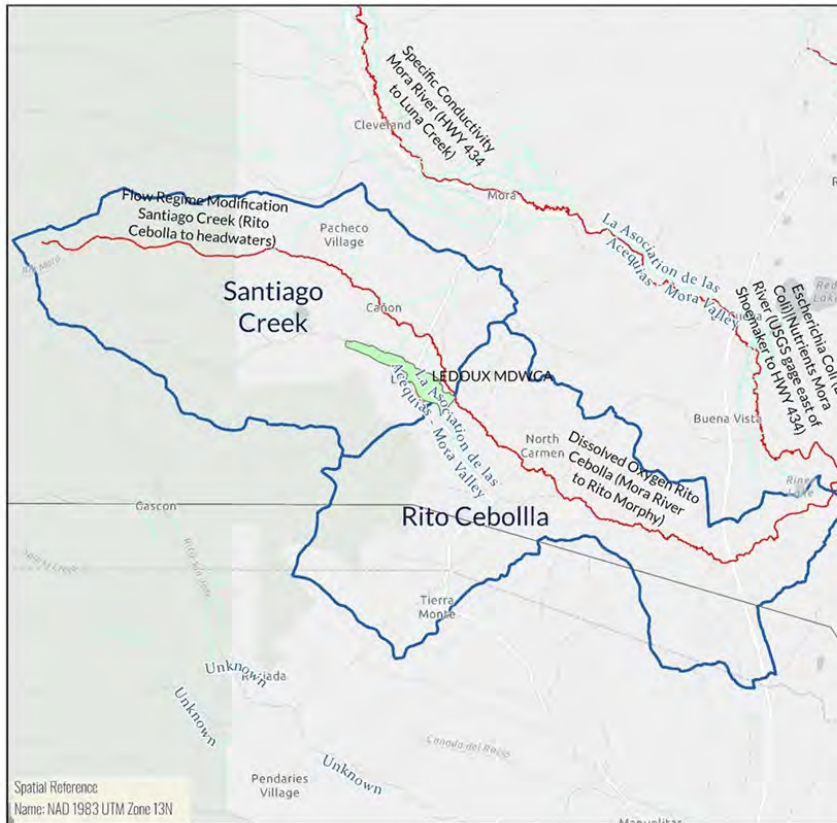
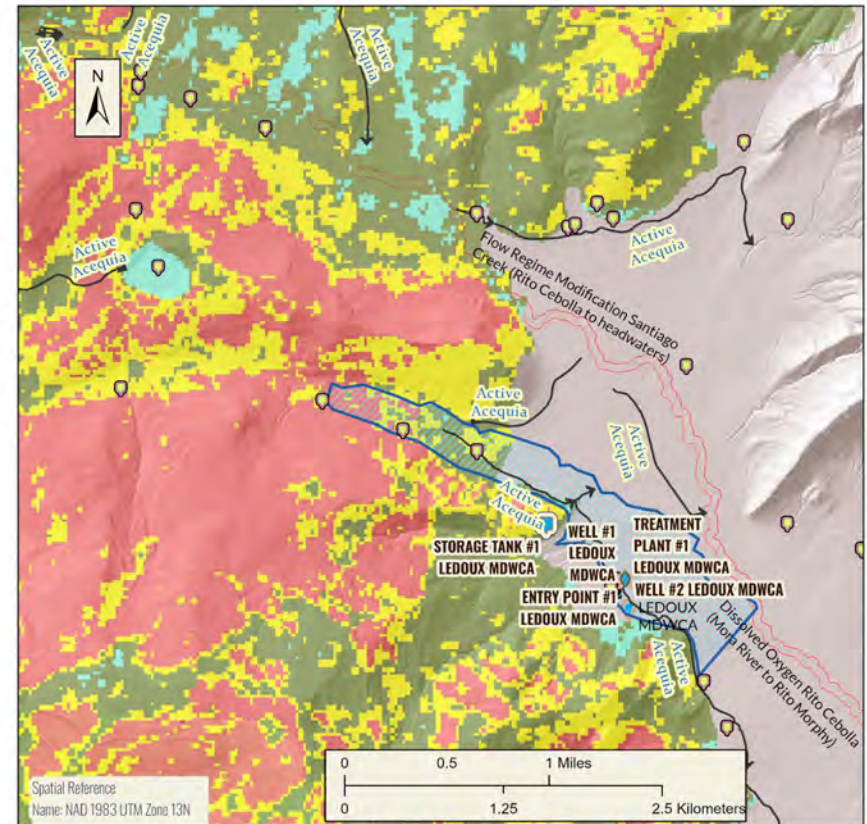
JE Fuller Flood Hazard Report says nothing about Ledoux MDWCA



Damage to Drainage Affects Drinking Water



Ledoux Source Water Protection Area



Ledoux SWPA

- OSE NM Public Water System
- Acequias
- 12-digit HU (Subwatershed)
- New Mexico Public Water Systems
- Impaired Streams 2024



NM Public Water System Infrastructure

- Sampling Site
- Storage Tank
- Treatment Plant
- Well

HPCC Soil Burn Severity

- High Severity
- Moderate Severity
- Low Severity
- Unburned to Very Low
- Acequias
- Las Vegas Field Office: Septics
- Fire Stations

- New Mexico Public Water Systems
- Impaired Streams 2024

Hillshade from 2016 DEM

- 254
- 0
- GU County or Equivalent
- Ledoux MDWCA Bouna



KMKINIC
11/7/2015
kristin.kinic@env.nm.gov

JE Fuller Flood Hazard Report

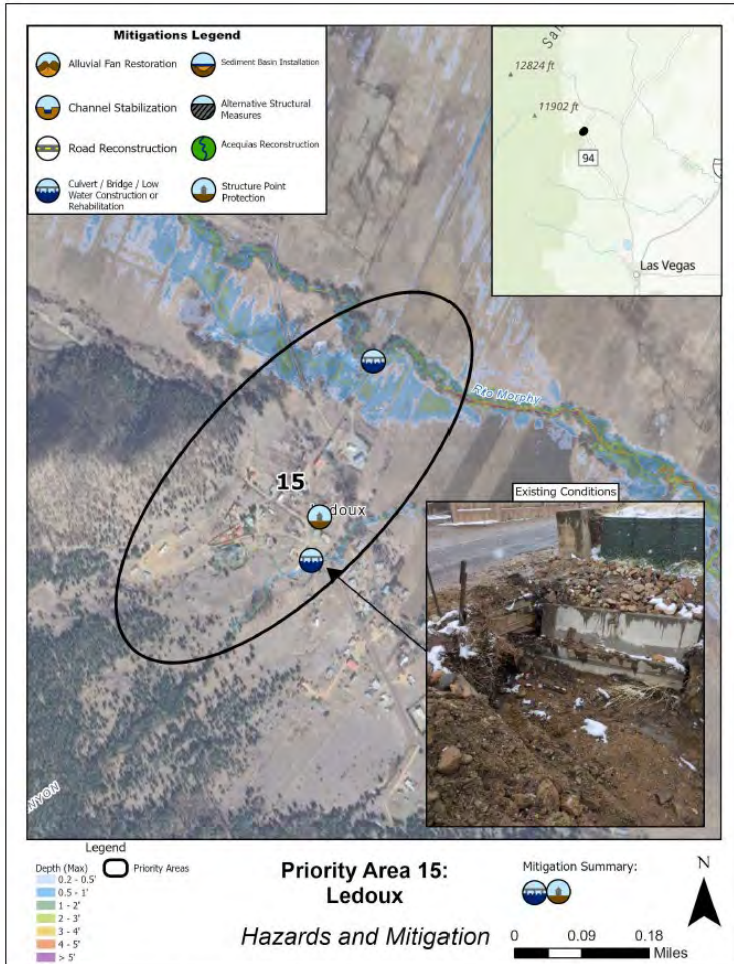
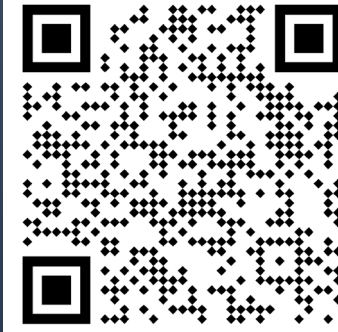
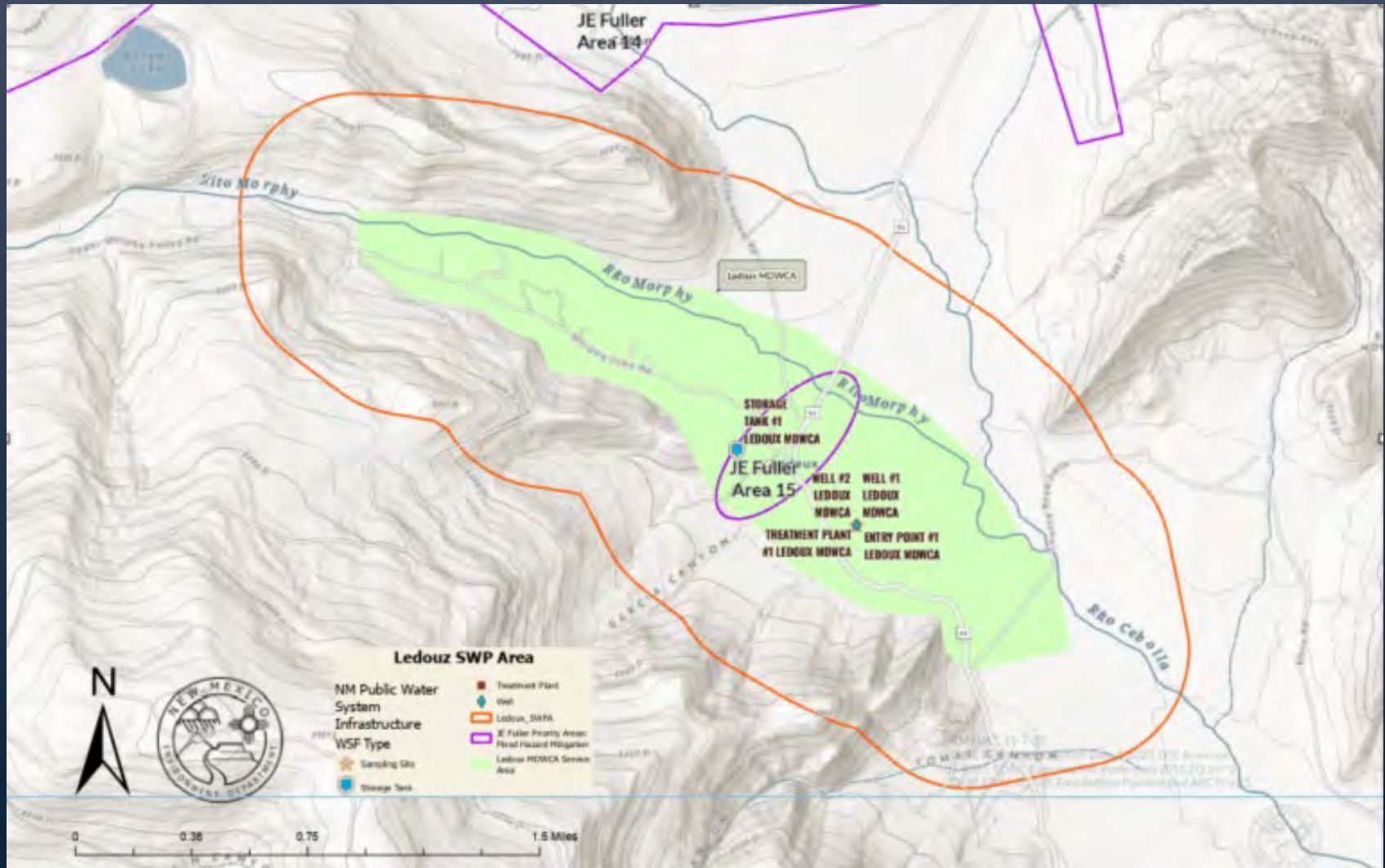


Figure 58: Ledoux hazard and mitigation summary



Does not list Mutual Domestic Utilities in the report despite intervention and flood mitigation plans affecting over 20 systems.

JE Fuller Flood Hazard Report



Drinking Water Watch by County

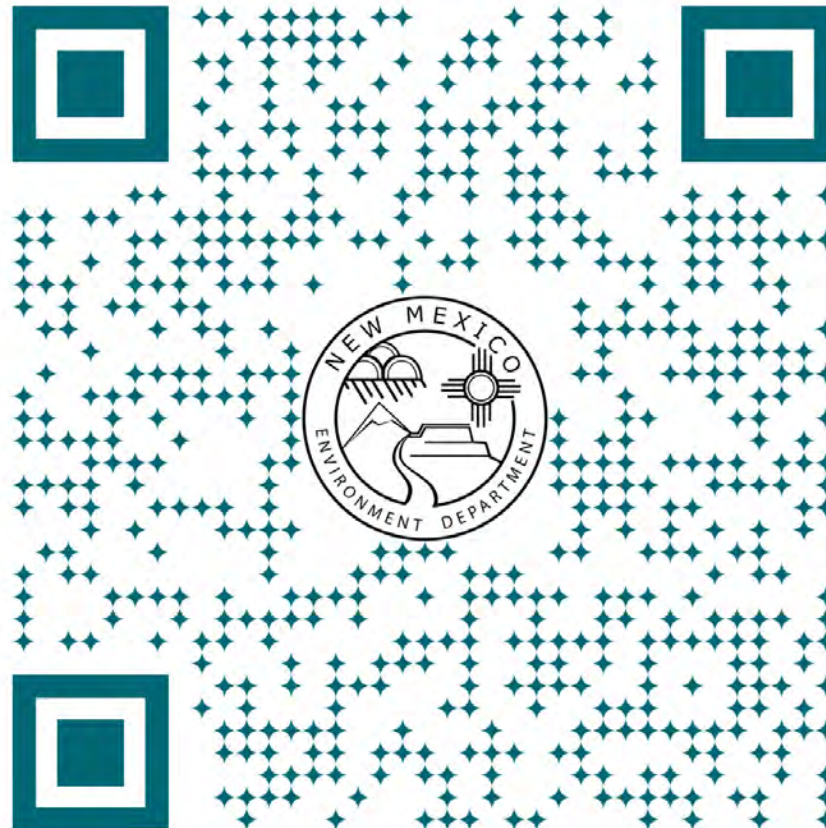
Managed Bookmarks Home Maps and Data OpenEnviroMap OpenEnviroMapsO... NMED Cartograph... NMED DWB SHAR... NMED DWB Team SHARE TRAINING ResourceSpace SDWIS/STATE L

New Mexico Environment Department	
County Map of NM	
Water System Facilities	
Sample Points	
Sample Schedules / FANLs / Plans	
Site Visits Milestones	
Operators All POC	
Water System No.:	NM3515918
Water System Name:	AGUA NEG
Principal County Served:	MORA
Principal City Served:	HOLMAN
Federal Population:	242

Type
AC - Administrative Contact

Name
WELL #2
WELL #1

Surface Water
Ground Water
Ground Water UDI



Drinking Water Program	
Help	
TTHM HAA5 Summaries	
PBCU Summaries	
Chlorine Summaries	
Turbidity Summaries	
TCR Sample Summaries	

Type:	C
Source:	GW
Status:	A
Date:	06-01-1977
S Permit No.	

Communication	
	Value
	arthurolivas60@gmail.com
	Value
	575-447-5185
	575-447-5185
	575-447-5185

Availability	
	P
	P

	0
	0
	0

Drinking Water Watch by County



NM Version 2.22

Drinking Water Branch



Public Water Supply Systems Search Parameters

Water System No.

Water System Name

Principal County Served

Water System Type

Primary Source Water Type

Point of Contact Type

Sample Search Parameters

Sample Class

*Search will also use State Classification Code

State Classification Code

Sample Collection Date Range

(The Sample Search always produces results for the last 2 years, unless you provide specific date range.)

Search For Water Sy

[Click Here for the County Map of New Mexico](#)

[Click Here for the GWR Information Page](#)

All

All

BERNALILLO

CATRON

CHAVES

CIBOLA

COLFAX

CURRY

DE BACA

DONA ANA

EDDY

GRANT

GUADALUPE

HARDING

HIDALGO

LEA

LINCOLN

LOS ALAMOS

LUNA

MCKINLEY

MORA

All

BERNALILLO

CATRON

CHAVES

CIBOLA

COLFAX

CURRY

DE BACA

DONA ANA

EDDY

GRANT

GUADALUPE

HARDING

HIDALGO

LEA

LINCOLN

LOS ALAMOS

LUNA

MCKINLEY

MORA

Select a value...

To 3/31/2026

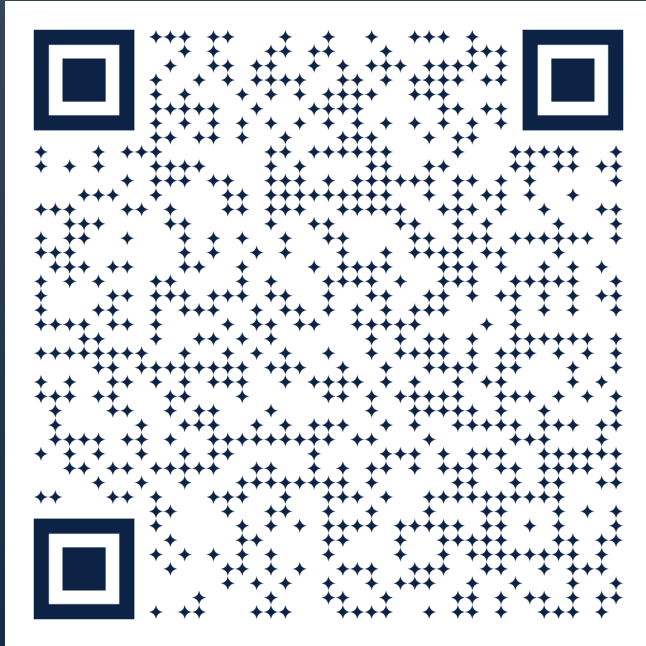
or Samples

Review Consumer Confidence Data

Clear

Glossary

NMED Data



Maps

Link	Description
NMED Districts and Offices	This web app is hosted on ArcGIS Online and shows where NMED field and district offices are located. Also includes office hours, address, and phone numbers.
OpenEnviroMap	The OpenEnviroMap displays NMED GIS data. GIS layers may be turned on and off as needed.
NMED at LANL Dashboard	This Dashboard highlights NMED regulatory activities in the vicinity of Los Alamos National Laboratory.
Formerly Operating Uranium Mines and Mills Sites in NM	This dashboard provides information on legacy uranium mine and mill operations. The dashboard will be updated regularly as new information on each site is received by NMED.
Air Permit Map	This map app shows all NMED Permitted Air Facilities and links to printable facility reports and downloadable documents. Permits may be viewed as a list or features on the map.
Air Quality Map	This map displays Air Quality monitoring sites throughout the state. A variety of data reports may be downloaded for the air monitoring station results.
Upcoming prescribed fires	This is a link to a tracking system for burn permits. Information includes burn dates, fuels, burn conditions, monitoring, acreage, etc., from the NMED Smoke Management System.
Petroleum Storage Tank Facilities, Releases, and Reports (GoNM)	OpenEnviroMap with all Petroleum Storage Tank facility data by priority and score. Features link to Resource Space for review and download of site documents.
Petroleum Storage Tank Facilities and Release Sites At a Glance (Dashboard)	This dashboard is hosted on ArcGIS Online and tracks Petroleum Storage Tank releases, facilities, and tanks across the state. The data may be filtered by counties or legislative district. Data updates automatically on a weekly schedule.
Find Your Petroleum Tank Inspector	This map application is hosted on ArcGIS Online and shows petroleum tank inspector districts and inspector contact information.
Source Water Protection Atlas	Tool for aiding Public Water System managers in creating Source Water Protection Plans to respond to emergencies and changing conditions.
Liquid Waste Compliance Map	OpenEnviroMap with man camps in Eddy County, includes links Documents, pictures on ResourceSpace. Data dated 2019.
Methane Map	OpenEnviroMap with links to 2019 and 2020 EPA flyover video's taken with Forward Looking Infrared (FLIR) Camera.
Interactive Wetlands Map	Tool to use in planning and management of wetlands in New Mexico. Includes wetland mapping and classification as well as links to NM Wetland Management Action Plans.
Surface Water Quality Map	OpenEnviroMap with Assessed Surface waters; streams, springs and lakes and well as water quality monitoring stations.
Infrastructure Project Loans	This web map is hosted on ArcGIS Online and displays Loans and grants and projects managed by the NMED Construction Programs.

Thank you –

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Bureau Kristin.kinic@env.nm.gov

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