WEST REGIONAL SPOTLIGHT

Each quarter, the ASDSO Regional Representatives from one region recognize an individual, organization, or group that has made outstanding contributions to dam safety in their region or nationally as a representative from their region. The ASDSO Annual Awards Committee oversees the effort. If you have an idea for a regional spotlight that you would like to be considered, please email **awards@damsafety.org**.

Impacts of Wildfires on New Mexico Dams

Similar to many western states, New Mexico has experienced increasingly large wildfires in recent years and public perception is that the wildfires are becoming more common and are intensely burning larger swaths of forested terrain. Figure 1 shows the footprints of the wildfires in New Mexico for the last 75 years. Wildfires have occurred statewide, with the largest ones having occurred within the last 15 years (see Table 1). Climate prediction for the next 50 years (Dunbar et.al., 2022) forecasts New Mexico to be hotter and drier thus fueling the potential for even larger and more devastating wildfires in the future.

There are numerous dams in the state that have been impacted by the wildfires cited above with several of these dams being water storage dams that provide municipal water for various communities, irrigation water for farmers, and/or serve as scenic lakes for wildlife propagation and recreation. New Mexico is a mostly semi-arid state where water is scarce, and consequently any loss of reservoir storage capacity significantly impacts the state and its economic drivers. Wildfire impacts can be immediate and long-term, and most communities are ill-prepared to handle these impacts. Watershed recovery can take much longer in semi-arid and arid climate zones and in many cases, the impacted watersheds may never fully recover to pre-fire conditions. The impacts of wildfires on specific dams and their effects on the corresponding communities in proximity to the dams are discussed herein.

The June 2012 Little Bear Fire burned about 44,330 acres of land including most of the watershed above Bonito Dam. Bonito Dam is a 113-ft tall rockfill dam constructed in 1930 with a 34-square-mile watershed and a normal storage capacity of 1230 ac-ft. Shortly after the fire, several rainfall events occurred between June 22 and July 12, 2012, bringing flood debris and ash laden sediment into the reservoir. Bonito Dam is the primary source of municipal water for the City of Alamogordo and is a popular site for recreational activities. As a result of the fire and the subsequent floods, the reservoir was immediately taken out of service due to water quality concerns. Contaminated sediment filled the reservoir (see Figures 2 and 3). Approximately 372 (+/-38) ac-ft of accumulated sediment within the reservoir was attributed to the wildfire resulting in state and federal disasters being declared. Funding from several sources and nearly 11 years of planning, design, collaborative effort and several millions of dollars were required to clean up the reservoir and bring the dam back into service in 2023.

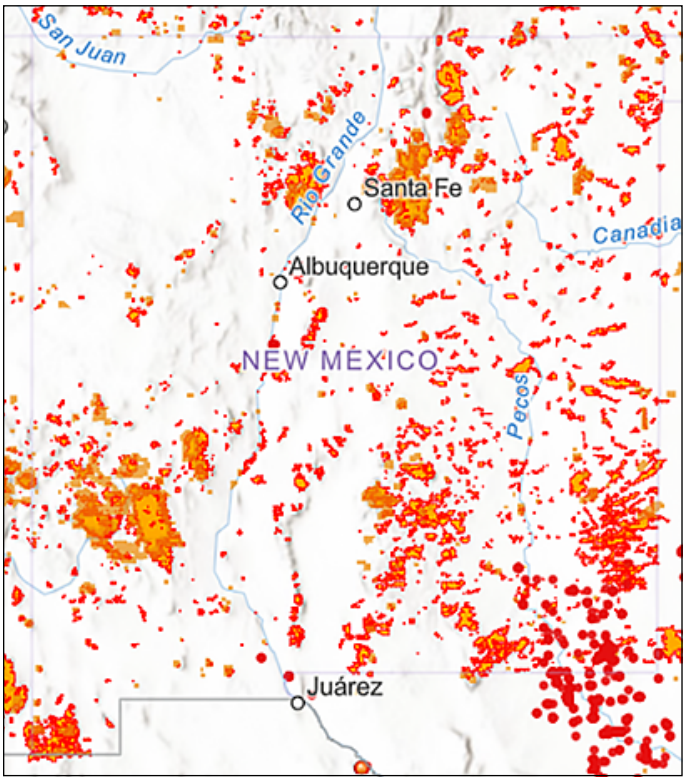

Figure 1 Footprint of Wildfires in New Mexico from 1950 to Present (https://nmfireviewer.org/)

TABLE 1 TOP 5 LARGEST WILDFIRES IN NEW MEXICO (LAS CRUCES SUN NEWS, JULY 5, 2023)

Rank	Wildfire Name	Year	Location (NF)	Acres Burned
1	Hermits Peak–Calf Canyon	2022	Santa Fe	341,735
2	Black Fire	2022	Gila	325,136
3	Whitewater–Baldy	2012	Gila	297,845
4	Las Conchas	2011	Santa Fe	156,593
5	Silver Fire	2013	Gila	138,546

Figure 2 Bonito Dam Reservoir Shortly After Wildfire and Flood

Figure 3 Bonito Dam Sediment Removal in Progress

Figure 4 Breached Diversion Channel at Peterson Dam

Figure 5 Peterson Dam After Overtopping

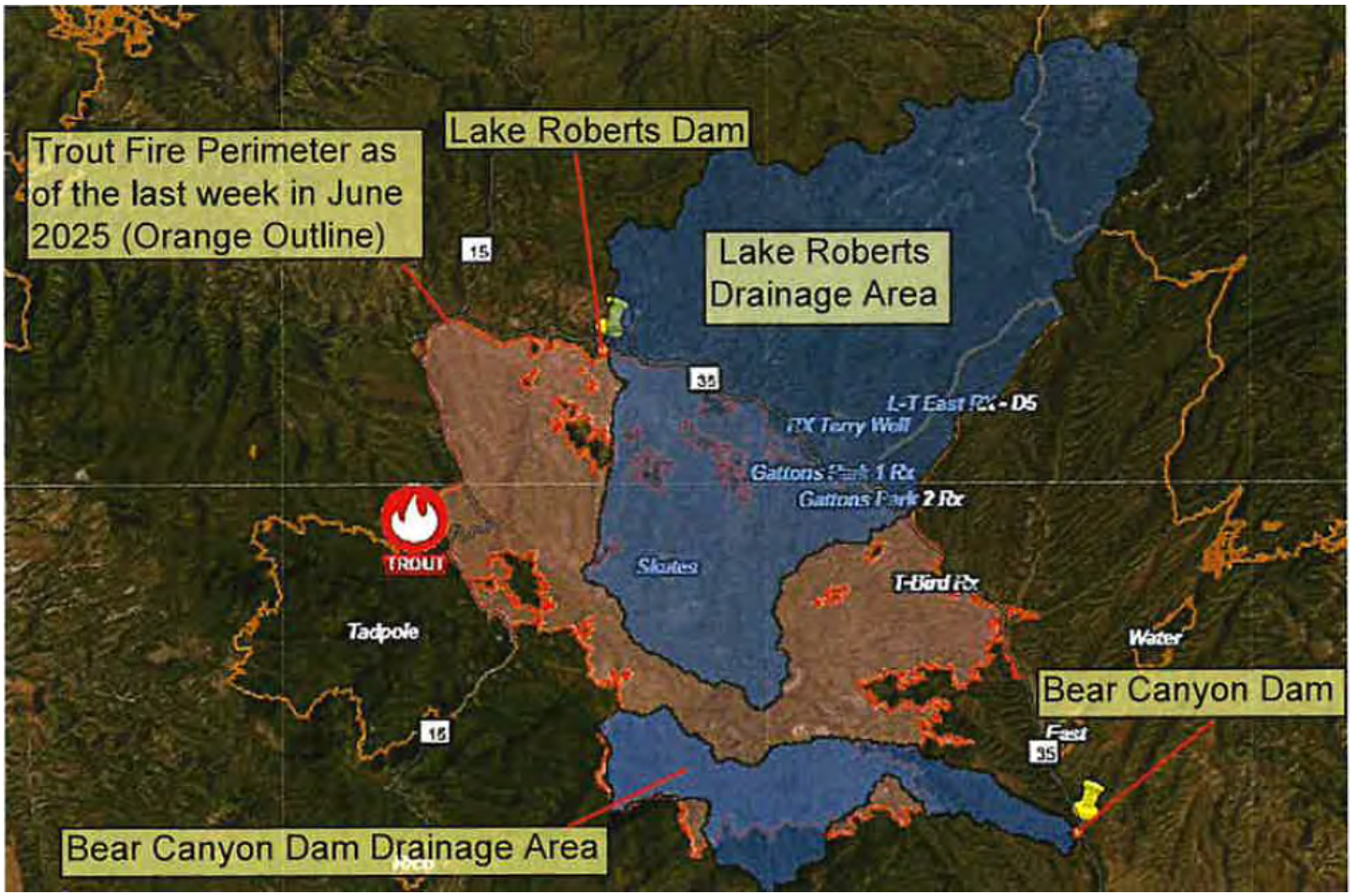

Figure 6 Trout Fire Footprint Impacting the Bear Canyon and Lake Roberts Dams

The 2022 Hermits Peak-Calf Canyon Fire, the largest wildfire in state history, impacted several dams and communities in three northern New Mexico counties. Four water storage dams, namely Morphy Lake, Storrie, Bradner, and Peterson were impacted by the wildfire. The Storrie, Bradner, and Peterson dams supply drinking water for the City of Las Vegas and water quality was severely impaired due to a series of storms that occurred in the burn scar areas in late June 2024 resulting in the city not being able to treat water. Consequently, operations at the water treatment plant and non-essential businesses were closed for over a week. The flooding that occurred as a result of excessive runoff from the burn scarred areas overwhelmed the earthen diversion structure and associated diversion channel upstream of Peterson Dam (Figure 4). This in turn resulted in the dam being overtopped by approximately 2 ft on June 21, 2024 (Figure 5).

Peterson Dam is a concrete structure, therefore minimal damage was incurred at the dam. However, several homes in the downstream area along the Gallinas River were flooded.

The June 2024 South Fork Fire in the Lincoln National Forest burned the entire watershed above Alto Lake Dam, which supplies 70-percent of the municipal water supply for the Village of Ruidoso. Shortly after the fire, there were a series of monsoon storms that caused flooding that overwhelmed the sedimentation basin and the diversion channel which in turn contaminated the reservoir. This dam has a severely undersized spillway and is in danger of overtopping during significant flood events. There are several homes located in the downstream floodplain below the dam. The state dam safety program has been working closely with Village of Ruidoso personnel concerning close monitoring of this dam any time there is a forecast of significant rain in the area.

The June 2025 Trout Fire that occurred in the Gila National Forest near Silver City burned the vast majority of the watershed above Bear Canyon Dam and a significant portion of the Lake Roberts Dam watershed (see Figure 6). These dams supply irrigation water, propagate wildlife, and are popular for recreational opportunities. There are several homes below each of the dams. Bear Canyon Dam has a severely undersized spillway and had an estimated overtopping potential of 1 in 33 prior to the wildfire, which is extremely high for a high hazard dam. The New Mexico Department of Homeland Security and Emergency Management (NMDHSEM) has coordinated a multi-agency response to stabilize the streams and mitigate flooding risks. The dam owner has an approved design for pending rehabilitation work to the dam to address overtopping. This work has been delayed due to a lack of adequate funding to proceed with construction.

The New Mexico dam safety program has focused increased effort on emergency preparedness and public education to address the impacts of wildfires on dams. The program is working closely with the lead state response agency, which is the New Mexico Department of Homeland Security and Emergency Management (NMDHSEM). The State Hazard Mitigation Plan has included all associated risks concerning dams and the dam safety program and the NMDHSEM have been working with local emergency managers at the county and local community level to update their local hazard mitigation plans. The dam safety program has also presented and participated in several workshops with the local emergency managers, dam owners, engineers, and other stakeholders concerning the importance of emergency response and preparedness by updating and exercising the emergency action plans (EAP). The dam safety program is active in the US Army Corps of Engineers Silver Jackets program and has completed several projects including development of a new EAP template for owners with multiple dams and post-wildfire flood risk education series webinars. The dam safety program has retained the services of a private consultant to provide technical assistance for preparation and exercising of EAPs for dam owners. The dam safety program recently completed a functional exercise involving the NMDHSEM, county and city emergency managers, dam owners, and other emergency response entities. It is hoped that this functional exercise will be replicated to additional counties around the state. ■

References:

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https://nmfireviewer.org - Interactive website maintained by New Mexico Forest and Watershed Restoration Institute at New Mexico Highlands University, Las Vegas, NM

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