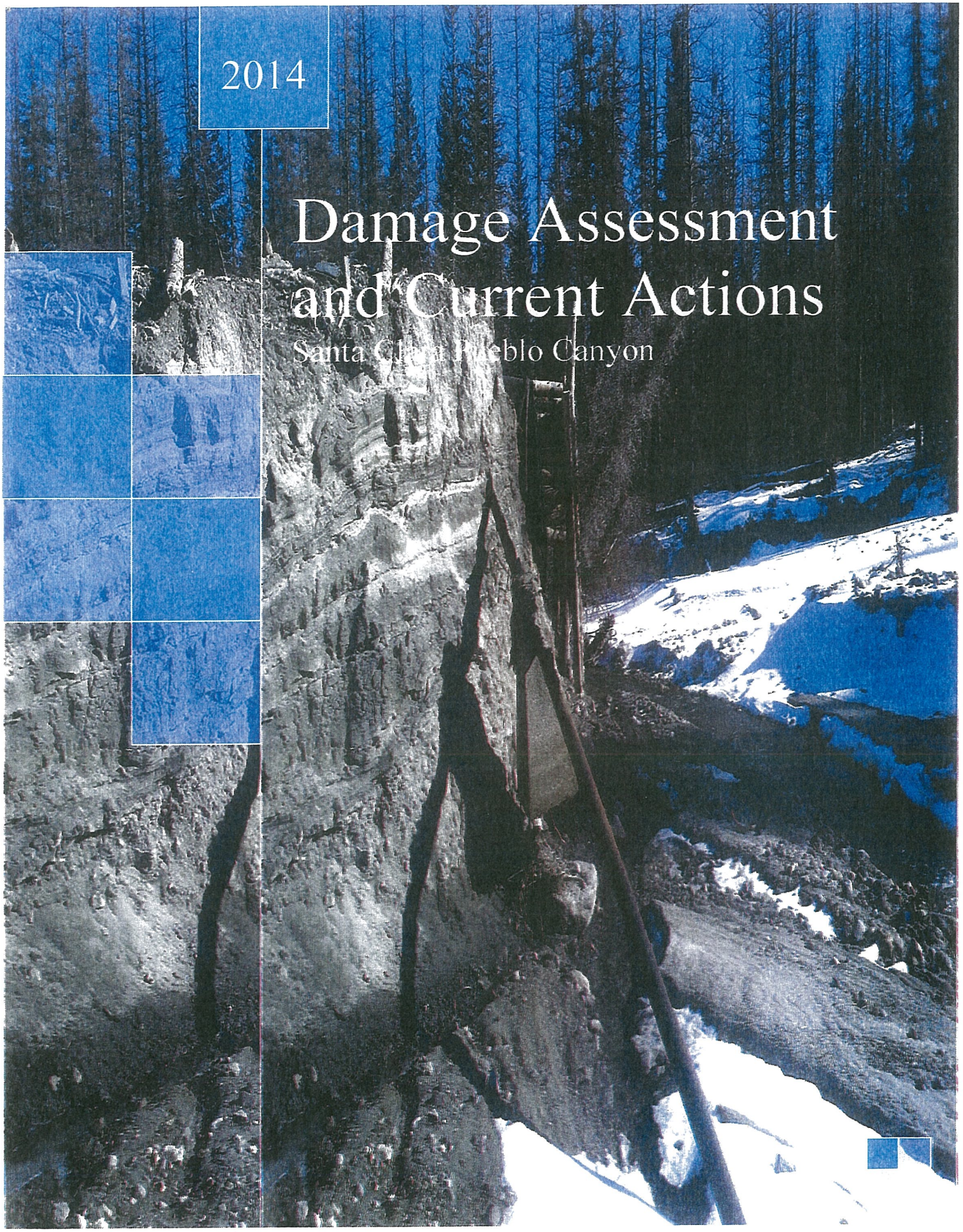
2014

Damage Assessment and Current Actions

Santa Clara Pueblo Canyon



Contents

Acronyms

BAER	Burn Area Emergency Response
BIA	Bureau of Indian Affairs
BOR	Bureau of Reclamations
cfs	Cubic Feet Per Second
EWP	Emergency Watershed Protection Program
FCO	Federal Coordinating Officer
FEMA	Federal Emergency Management Agency
MAs	Mission Assignments
NAMS	North American Monsoon Season
NDRF	Natural Disaster Response Framework
NIFC	National Interagency Fire Center
NRCS	Natural Resources Conservation Service
PA	Public Assistance
PWs	Project Worksheets
SME	Subject Matter Expert
USACE	United States Army Corps of Engineers
USDA	United States Department of Agricultural

Executive Summary

Santa Clara Canyon has sustained major damage in 2011[1], 2012[2], and 2013[3]. The recurring damages are a result of the Las Conchas wildfire that occurred in the summer of 2011 and includes debris and structural damages from flash flooding. It is the opinion of this report that the Santa Clara Pueblo's lands and citizens are in danger from future events unless decisive preventive measures are taken.

The purpose of this report is to provide situational awareness for FEMA Region 6 Recovery Leadership and to provide recommendations for Public Assistance (PA) actions necessary to expedite the protection and recovery of the Santa Clara Pueblo.

FEMA Region 6 Debris Subject Matter Expert (SME) visited the affected areas of the canyon on December 16, 2013. The damages observed in the canyon and continuing throughout the Pueblo are catastrophic[4]. The severity of the damages to the topography of the canyon and the affects these damages have on the ability of the natural watershed to efficiently handle runoff poses a significant risk to the public health and safety of the Santa Clara Pueblo. Additionally, it is noted that the magnitude of the damage will exceed the ability of any one agency's recovery efforts.

Prior to the Las Conchas wildfire of 2011, the canyon's normal ability to absorb rainfall depended on a series of four ponds which were utilized to retain flash flood runoff that occurs yearly during the monsoon season[5]. The four ponds provided flood attenuation, sediment management, water supply, and recreational opportunities for the Pueblo. The Santa Clara watershed also provided timber, pasture, and traditional and recreational resources for the citizens of the Pueblo. The fire had an adverse effect on the soil's natural ability to absorb rainfall, which was the trigger for the first event in 2011. In August of 2011, the flash flood runoff was severe, due to the fire, and this runoff carried soils and sediment which completely filled the four retention ponds. Recognizing the potential for flood impacts on downstream values, tribal representatives contacted the Southwest Tri-Regional Burn Area Emergency Response (BAER) coordinator and the National Interagency Fire Center (NIFC) to request

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[1] DR-4047-NM - Incident period: August 19, 2011 to August 24, 2011, Major Disaster Declaration declared on November 23, 2011

[2] DR-4079-NM - Incident period: June 22, 2012 to July 12, 2012, Major Disaster Declaration declared on August 24, 2012

[3] DR-4147-SCP – Incident Period: July 19, 2013 to July 21, 2013, Major Disaster was declared September 27, 2013 - DR-4151-SCP - Incident period: September 13, 2013 to September 16, 2013, Major Disaster Declaration declared on October 24, 2013

[4] Definition - Causing or liable to cause widespread damage or death

[5] New Mexico and other areas across the Southwest U.S. are affected by the North American Monsoon System (NAMS) every summer, and the "Monsoon Season" is designated as the period lasting from June 15th through September 30th. With the onset of the Monsoon, New Mexico is typically impacted by a variety of weather hazards that can often put the population at risk for serious injury or death.

assistance with emergency post-fire stabilization planning. BAER Team members worked with the tribe to prescribe and implement treatments in an effort to protect life and property from potential flooding. As of July 24, 2011 the following treatments had been completed at Santa Clara Pueblo:

- 3,000 feet of K-rails were placed with associated sand bags.
- 40,000 sandbags had been filled and placed.
- Three miles of floatable debris removal in Santa Clara drainage had been completed.
- Two major box culverts (Highway 30 and Day School Bridge) were cleaned and 15 other minor culverts were also cleaned.
- One wellhead had been protected with sandbags up Santa Clara Canyon.
- 0.5 miles of fence were removed from places in the stream channel.

Rescue of USACE and SCP personnel after the 2011 event

USACE equipment lost after 2011 event

Additionally, after the 2011 event, efforts were made to clear the roadway by USACE maintenance workers from the Abiquiu Lake field office in an attempt to provide access to the ponds for rehabilitation and maintenance. During the operation, a flash flood swept through the work site. A rescue was required to remove the workers by helicopter and the equipment was lost. The damage was compounded again in June of 2012 when flash flooding carried even more soil and sediment into the canyon where only a small portion of the restoration work had been completed from the previous year. Because ponds had not been restored, this event breached the earthen dams and rendered the ponds ineffective. This uncontrolled flash flooding carried debris

some 23 miles downstream through the Pueblo to the confluence of the Rio Grande. Because of the inability to complete restoration work again in 2012 and because of the impaired soil absorption, this year's September event was devastating. Runoff waters were estimated by the United States Army Corps of Engineers (USACE) to be eight times what would have been normal prior to 2011. This uncontrolled flooding carried debris, silt, and large boulders again to the confluence of the Rio Grande which threatened the Highway 30 and Kee Street bridges in the Pueblo. Due to the continued erosion of the burn scar, the elevation and topography of the canyon, and the limited yearly window available to complete restoration work, it is feared uncontrolled flooding will be a yearly reoccurring event that will increase the threat to the populated area of the Pueblo.

FEMA PA is limited to providing a restoration to pre-disaster condition in this repetitive loss situation. Because the majority of the canyon is unimproved area, FEMA does not have the ability to provide funding for total canyon restoration. FEMA's Federal Coordinating Officer (FCO) Nancy Casper has taken the first step by activating the Natural Disaster Recovery Framework (NDRF) and has been appointed as the Federal Disaster Recovery Coordinator (FDRC). This activation will allow a federally coordinated effort to bring multiple agencies and all stakeholders together in an attempt to provide a coordinated recovery and to leverage additional assets.

Public Assistance Actions

It is the recommendations of this report that FEMA PA act decisively in the formulation and obligation of Project Worksheets (PWs) to identify and fund damages from this and prior events. Doing so will make funds available to the Santa Clara Pueblo which could be used on improving projects for the immediate protection of the Pueblo in 2014.

Analysis

Because of the severely impaired watershed and the continued erosion from the burn scar, it is impractical to simply remove debris and restore the current earthen dams in the canyon. The truth of this has been established in the past two events and any federal money expended in this manner would not be a prudent use of taxpayer dollars. The recommendations of this report are aligned with USACE recommendations and concur with the priorities of the Santa Clara Pueblo.

Completion of the following projects prior to the 2014 monsoon season would offer the highest level of protection to the health and safety of the Pueblo population and would protect the improved property and infrastructure located there. These immediate priorities include:

1. Provide ongoing support to USACE, in regards to data sharing and clarification of respective authorities, in order for USACE to pursue feasibility of establishing an emergency dam at pond 2 by July 2014. Such a structure would serve as a catchment basin for ash, rock, and other debris before it can reach the Pueblo Village. FEMA and USACE are exchanging letter outlining their authorities to prevent any Duplication of

Benefits and ensure each Federal Agency is providing the appropriate assistance in the protection of the canyon and Santa Clara Village.

2. Support USACE, through NDRF, with the coordination of technical assistance to the Pueblo for advising on long-term permanent flood control mechanisms for the Santa Clara Canyon.

In addition, the following recommendations should take place in conjunction with the above priorities:

1. Work with the NDRF team to solicit the participation of the National Resources Conservation Service (NRCS) and the Emergency Watershed Protection Program (EWP). Because the natural stream running through the canyon is ineligible for FEMA funding, it is imperative that NRCS be a partner in the cleanup of the stream. Currently Mission Assignments (MAs) are in place for NRCS, USDA Forest Service, and the National Park Service to assist in supporting the long term recovery of Santa Clara Pueblo. The Bureau of Indian Affairs is also participating with the other NDRF partners under their own authorities and responsibilities with Santa Clara Pueblo. The stream is completely silted and littered with fallen trees and previously cut trees, which severely impairs the stream's ability to convey runoff. This restriction is causing the water flow to change locations and is reshaping the canyon. If not removed, this debris will continue to flow downstream and impact any restoration work that is completed. This work must start at the top of the canyon.

2. Pursue additional (some have been funded) protective measures, such as strategically placed debris catchment systems like the Geobrugg flexible ring net barriers.

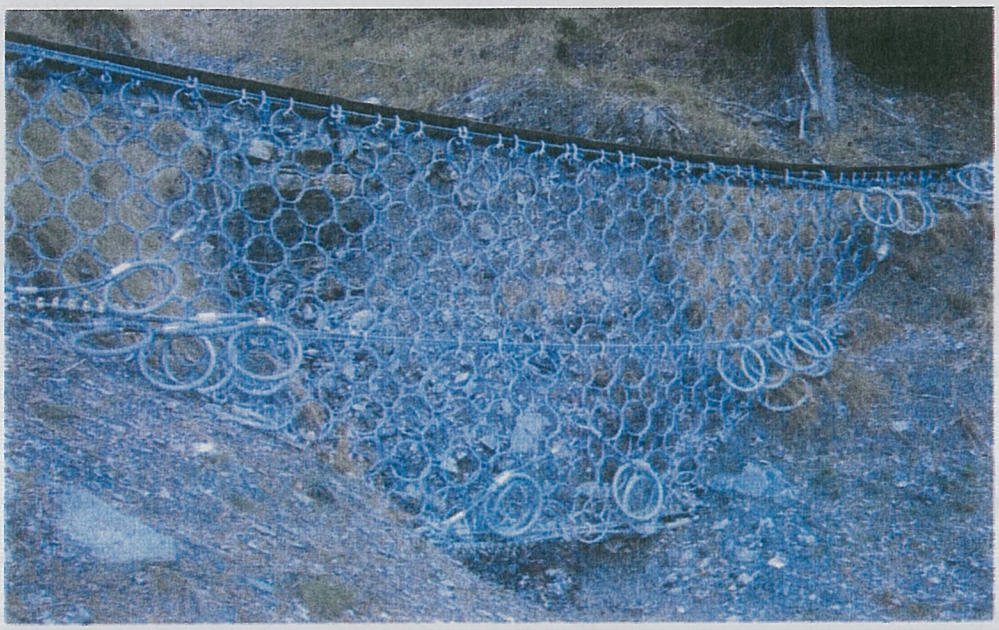
3. FEMA funded $3,789,013.00 in November 2013 for the installation of Debris Collection Structures (DCS) to reduce the flow of large vegetative and rock debris being washed down the side canyons leading to the main Santa Clara Creek Canyon. In certain areas where smaller flows are possible, the Santa Clara Pueblo has proposed heavy duty woven cable catch fences designed to accomplish the function and also have the capability to be easily cleaned after an event that produces large flows of debris. In larger flow areas, other DCS will be used. The USACE has determined that these structures will significantly reduce the potential hazard to the dams and by extension the Santa Clara Pueblo village itself. The sites, as recommended by the USACE, were and quoted by an installation contractor.

4. USACE and FEMA are working through respective authorities in an effort to collaborate on the determination if USACE may have authority and funding to build emergency dam at pond 2 by July 2014. The Emergency Dam's primary function would be as a catchment basin for sediment and debris to prevent such from continuing downstream to pueblo village and tribal administration.

5. FEMA has the project worksheet in formulation for the restoration of the 4 ponds destroyed in 2012.

a. Project Worksheet is being formulated to fund the Architectural and Engineering (A&E) Study to develop the design and restoration of the canyon dam structure.

b. Upon completion of the A&E Study, the existing Category D project can be converted to an improved project permit the Santa Clara Pueblo to use the project funding for a Flood Control Works. This is also prudent and a best practice for utilizing the Federal funding to promote effective design and accommodates the physical changes occurring within Santa Clara Canyon. The current anticipated funding for the project worksheet is $38 million.



This recovery and restoration will be complex and must incorporate a unified, long-term effort by multiple federal agencies. FEMA Public Assistance has a part in this effort but is limited in the funding which can be provided. Communication and coordination through the NDRF will be paramount. If not properly planned, coordinated, and funded, the future safety of the Santa Clara Pueblo is in jeopardy.

Since the 2011 event, the Santa Clara Pueblo, working with the USACE, Bureau of Reclamations (BOR), and others has utilized multiple alternatives and methods to help protect the Pueblo from future events. Eligible FEMA funding can be used on these alternatives as either an improved project or the less desirable alternate project. The most important thing is to complete projects as quickly as possible in order to protect the Pueblo and mitigate costs in the upcoming 2014 monsoon season.

Narrative

Santa Clara Pueblo sustained damages from severe storms and flooding on July 19-21, and again on September 13-16, 2013. These events were declared on September 27, and October 24, 2013, as DR-4147 and DR-4151. The canyon was previously damaged in August, 2011, (DR-4047-

NM) and again in July, 2012, (DR-4079-NM). The continuing damages in the canyon have been exacerbated by the burn scar created by the Las Conchas wildfire in the summer of 2011.

The Las Conchas wildfire burned a total of 156,590 acres or more than 244 square miles during the summer of 2011. This was the largest wildfire in New Mexico's history. Of the 244 square miles burned, 25.9 square miles of Santa Clara Creek's upper watershed was moderately to severely burned. This comprises more than half of the total 49 square mile watershed. Santa Clara Pueblo lands are centered on this watershed, and most of the Pueblo's population and economic activities are concentrated in the downstream end of the creek near its confluence with the Rio Grande. Because of the severity of the burn, there has been a dramatic reduction in the infiltration rates in burned areas. This has resulted in a four-to eight-fold increased runoff and sediment/debris flow along the creek; this situation poses a severe threat to the safety of Santa Clara Pueblo and increases the potential for widespread property damage. Drainage facilities within the upper watershed have been overwhelmed by a series of average rainfall events following the fire. In addition, the channel through Santa Clara Pueblo no longer has the conveyance capacity necessary to safely pass large post-fire flows. Hundreds of residential structures, including several public structures, are at risk from flood and debris flows if no action is taken.

Debris Damage Assessment

This damage assessment is limited to the four retention ponds found within the Santa Clara Canyon. In DR-4047-NM, FEMA completed PW 00028 for the debris removal from the four ponds. See table below:

Event NM-4047	PW No. 00028						
Pond Identification		Length (lf)	Width (lf)	Depth	Cubic Yards	Per CY Estimated Cost	Total Cost
Pin Dee	No. 1	600	250	15	83,333	$ 50.00	$ 4,166,666.67
Weinpovi	No. 2	500	350	15	97,222	$ 50.00	$ 4,861,111.11
Nanaka	No. 3	600	300	10	66,667	$ 50.00	$ 3,333,333.33
Tsichoma	No. 4	600	300	8	53,333	$ 50.00	$ 2,666,666.67
	Total				**300,555**	**$ 50.00**	**$ 15,027,750.00**

The applicant only completed a portion of the debris removal prior to the event of 2012. Therefore, additional PWs were completed to cover the cost of the removed debris only. This methodology prevents any duplication of benefits. Partial work was completed in pond 1 and pond 2. See table below

	NM-4079	00050	00065	00080	00064	Work Completed in PW 00028 NM-4047	Cost Per CY	Total Funded
Pin Dee	No. 1	600	250	15	83,333	2,986.30	$ 50.00	$149,315.00
Weinpovi	No. 2	500	350	15	97,222	8,958.90	$ 50.00	$447,945.00
Nanaka	No. 3	600	300	10	66,667	0		$ -
Tsichoma	No. 4	600	300	8	53,333	0		$ -
	Total					11,945.20		$597,260.00

This assessment finds the actual dimensions of the ponds to be indiscernible after the event of 2013. The areas that were once detention ponds now appear to be wide stream beds as siltation is again, complete.

Pond number 4

Due to indiscernible debris in the retention ponds and complete loss of the retention ponds, it was decided to follow the previous methodology. It will be necessary to obtain quantification from the applicant showing the amount or percentage of the work completed in order to estimate

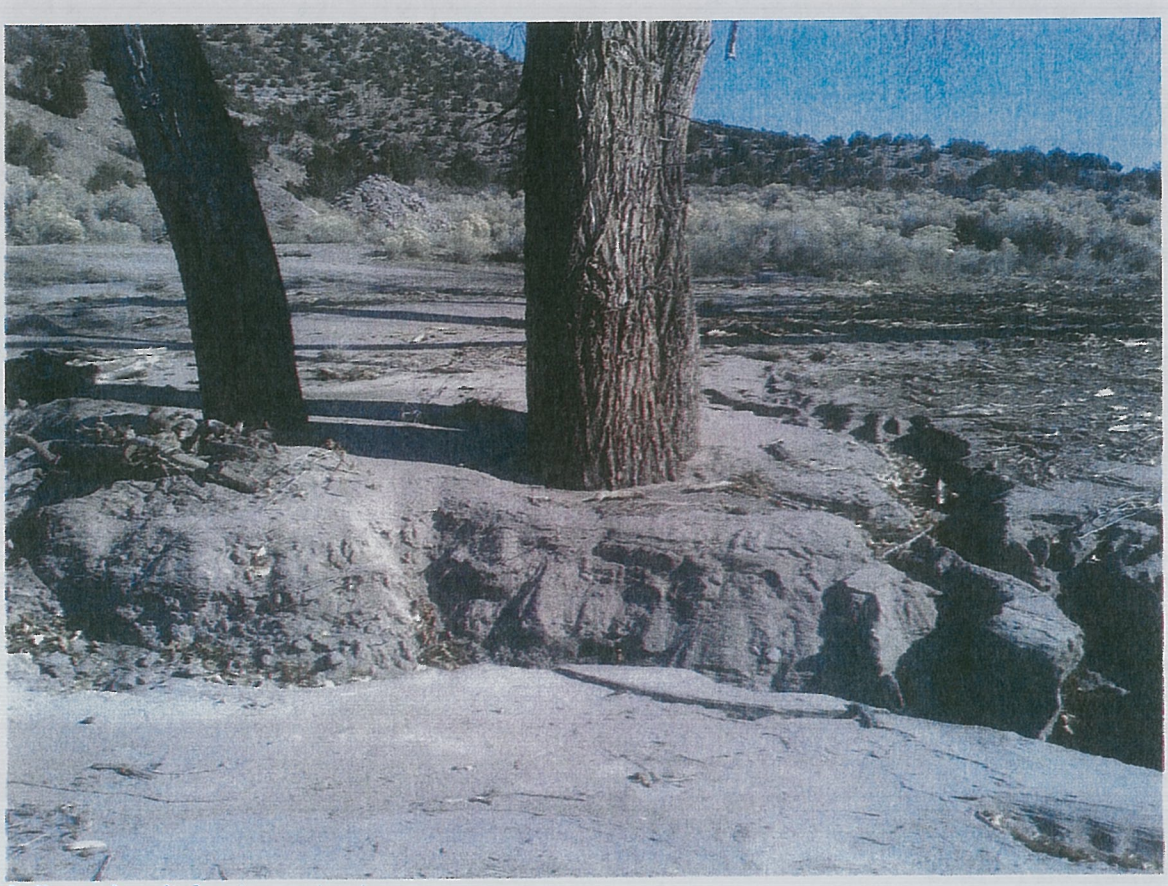
new damages. The Project Specialist in the field is tasked with obtaining this information. Once this is obtained projects can be formulated and monies obligated.

Pond number 3

Streambed Debris

The streambed (unimproved property) outside the retention ponds is the statutory responsibility of the NRCS EWP Program. It is the opinion of this R6 DEBRIS SME that any attempt to estimate this debris would be a guess at best. Without the original dimensions of this area that covers over 20 miles, it is impossible to estimate length, width, and depth of current debris load. In order to complete a project of this magnitude in a remote area, it will be necessary to utilize tub grinders for the tree/vegetative debris, rock crushers, heavy off-road dump trucks, and long-reach track hoes. Due to the distance out of the canyon it will be cost effective to grind the vegetative debris and use the mulch for ground cover. This will aid in the stabilization of the burned soil and the regrowth of ground cover that will begin the healing process of the burn scar and increase absorption rates of any rainfall. Rocks that are not used for stream bank stabilization can be crushed and the resulting aggregate can be used in the permanent repairs to the access road. This will result in useful construction materials as well as the removal of rocks from any future flash floods; it will also eliminate the threat of subsequent damage downstream. Additionally, in the future, this streambed sediment will kill hundreds of cottonwood trees.

Trees were identified with as much as six feet of sediment deposited around them. If not removed, these trees will die and add additional debris to any future flash flood events. A project of this nature will be costly, as a true scope of work cannot be estimated. This R6 Debris SME recommends that a small section of the canyon that is representative of all areas be completed on a time-and-materials basis. From those incurred costs, an estimate could be compiled for possible bidding purposes if the applicant wishes to contract this project.



Sediment deposited on tree root system

Beneficial use of resulting mulch and aggregate can be considered in the reduction of project costs. Fallen trees that are not suitable for lumber can be used to construct log weirs in strategic locations throughout the canyon to reduce the speed of runoff and allow the natural disposition of sediment.

Conclusion

While this is not a scientific assessment, these report was compiled using best practices from past events of this nature. It is not intended to be all inclusive, nor does it attempt to cover all areas of damage. What it does intend to convey is the urgency of the situation and the impending future danger to the Pueblo and its citizens. It is imperative that agencies cooperate with and participate in the efforts of the NDRF team. To simply address current debris issues would assure that those efforts will be repeated in the years to come.