

HERMIT'S PEAK - CALF CANYON POST-FIRE MITIGATION ACTION PLAN SAPELLO WATERSHED

MAY 15, 2023

Summary

a) Incident Description:

Declared a wildfire on April 6, 2022, the Hermit's Peak fire was the result of the Las Dispensas prescribed fire on the Santa Fe National Forest. The same day, it was declared a wildfire. The wildfire began approximately 12 miles northwest of Las Vegas, NM.

The Calf Canyon fire started on April 19, from a winter prescribed pile burn project on the Santa Fe National Forest. The two fires merged on April 22nd during high wind events. The fires were then managed as a single incident called the Hermit's Peak-Calf Canyon Fire (HPCC).

b) **General Location:** Eastern flank of Sangre de Cristo Mountains, North Central New Mexico. Generally, east from Pecos to Las Vegas and north to Angel Fire.

c) **Total Area:** Fire Perimeter- 341,735 acres.

d) **Jurisdictional Area:** San Miguel, Mora, Taos, and Rio Arriba Counties. Santa Fe and Carson National Forests, State, and private lands.

Area Characterization

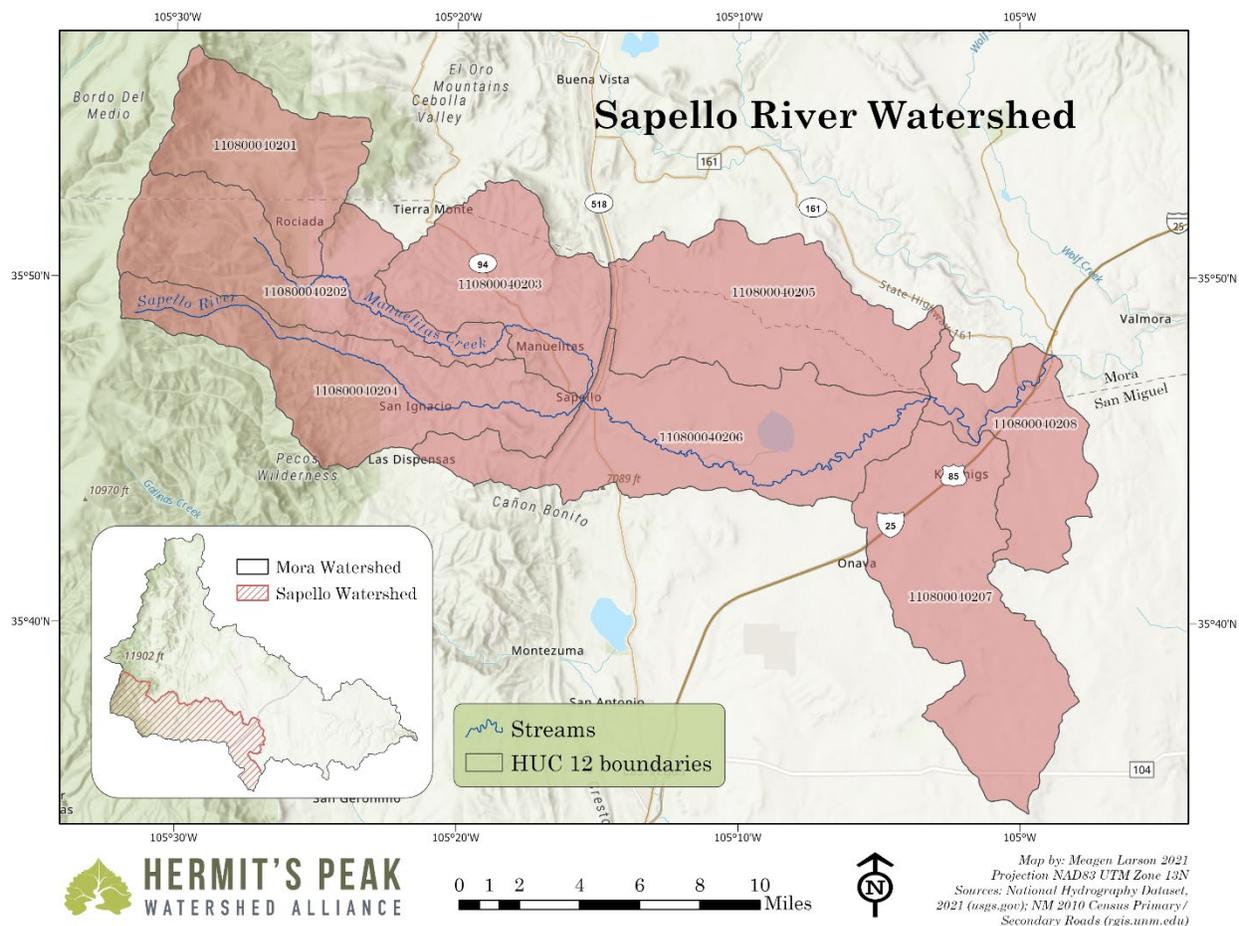
I. **General Physiography:** The Hermit's Peak - Calf Canyon fire burned the eastern flank of the Sangre de Cristo Mountain range. The Sangre de Cristo Mountains are part of an eastern belt of the Southern Rocky Mountains in northern New Mexico. The Sangre de Cristo Mountains are flanked by the Raton Basin to the east and the San Luis and Espanola Basins of the Rio Grande rift to the west.

The area drains to the Upper Canadian, Upper Pecos and Upper Rio Grande Basins. The watersheds associated with the Hermit's Peak Calf Canyon are Headwaters Pecos River, Cow Creek, Gonzales Arroyo-Pecos River, Tecolote Creek, Headwater Gallinas Creek, Coyote Creek, Sapello River and Upper Mora River. At the smaller scale, there are thirty-three subwatersheds within the fire perimeter (below).

Subwatershed (HUC 12)	Name	Acres	Soil Burn Severity			
			High	Moderate	Low	Unburned
110800040102	La Canada del Carro	23,172	21%	33%	21%	24%
110800040103	Middle Coyote Creek	26,354	1%	5%	8%	86%
110800040201	Rito San Jose	16,850	19%	31%	37%	12%
110800040202	Headwaters Manuelitas Creek	22,071	25%	26%	29%	20%
110800040203	Outlet Manuelitas Creek	19,510	13%	29%	25%	32%

110800040204	Deer Creek-Sapello River	25,053	14%	22%	45%	19%
110800040205	Arroyo de La Jara	26,953	0%	0%	0%	100%
110800040206	Sanguijuela Arroyo-Sapello River	31,441	3%	5%	8%	84%
110800040302	Quemado Canyon-Mora River	21,801	3%	7%	10%	80%
110800040303	Vigil Canyon-Mora River	28,126	26%	25%	27%	22%
110800040304	Rio La Casa	15,105	12%	17%	20%	52%
110800040305	Encinal Creek-Mora River	15,081	27%	26%	24%	22%
110800040306	Santiago Creek	19,698	27%	24%	32%	17%
110800040307	Rito Cebolilla	20,379	8%	13%	34%	45%
110800040308	Eagle Creek-Mora River	38,754	0%	3%	10%	87%
130201010901	Rito la Presa	19,258	0%	1%	1%	97%
130201010902	Rito Angostura-Rio Pueblo	21,255	13%	28%	12%	47%
130201010903	Osha Canyon-Rio Pueblo	23,005	2%	1%	1%	97%
130600010101	Headwaters Cow Creek	27,623	0%	0%	2%	98%
130600010102	Bull Creek	17,590	4%	4%	11%	81%
130600010103	Apache Canyon	14,069	2%	3%	18%	77%
130600010202	Rio Mora	34,395	26%	10%	16%	49%
130600010203	Winsor Creek-Pecos River	37,113	5%	4%	1%	91%
130600010204	Indian Creek-Pecos River	29,003	0%	0%	0%	100%
130600010301	Cabo Lucero Creek-Tecolote Creek	19,759	26%	27%	37%	10%
130600010302	Canon Mesteno-Tecolote Creek	23,368	18%	24%	28%	30%
130600010303	Ojitos Frios Creek-Tecolote Creek	24,202	3%	5%	7%	85%
130600010401	El Rito	28,219	7%	2%	6%	84%
130600010801	Porvenir Canyon	18,029	13%	26%	35%	26%
130600010802	Canovas Canyon-Gallinas Creek	16,073	19%	34%	32%	15%
130600010804	Arroyo Pecos	33,637	2%	5%	14%	78%
130600010805	Arroyo Hermanos-Gallinas Creek	28,941	22%	18%	25%	34%
130600010806	Agua Zarca	16,312	10%	16%	17%	57%

NOTE: Soil Burn Severity determined by BAER assessment. Reflects conditions immediately following fire and may not represent current conditions as recovery is expected to be variable 3-5 years post fire. Details are provided in this draft plan for watersheds shaded above (see Map 1).



Map 1. Sapello River Watershed with USGS subwatersheds (HUC 12).

- II. **Land Use:** National Forest System lands managed by the Carson and Santa Fe National Forests, state land, private, tribal lands in four counties (San Miguel, Mora, Taos, and Rio Arriba Counties). Uses include aquatic life, water supply, irrigation (acequias), grazing, recreation, mining, and agriculture.
- III. **General Overview of Concerns:** Changed conditions following wildfire with potential for loss of life, watershed function impacts, infrastructure damage and impacts to natural and cultural resources.
- IV. **Values at Risk:** Public infrastructure, powerlines, communication sites, roadways, water systems, livestock infrastructure, recreation sites, natural resources, and historical/cultural sites.

Key Issues

The table below identifies the risks or issues that need to be mitigated in the watershed (soil stabilization, flood attenuation, access, safety, protection of aquatic life, etc.); the reasons or evidence for the identification of risk/issues; and the proposed treatments. The goal in this section is to disclose the key elements needing to be addressed to mitigate post fire consequences. All of these key issues are applicable in the Sapello watershed.

Key Issues	Reasons or Evidence	Potential Treatments
Water Quality Degradation	Moderate and High Soil Burn Severity Ground cover less than tolerance	Increase effective ground cover Reduce connected disturbed area (CDA) Increase riparian condition (cover canopy and species diversity) Restore/improve water control, reconnect floodplains, arrest incision Manage to trap or maintain post-fire ash and sediment on-site
Water-repellent soils	Moderate and High Soil Burn Severity	Increase/develop/maintain effective ground cover and improve infiltration (seeding/mulching, scarification)
Soil Erosion	Lack of effective ground cover Water repellent conditions Rill development	Hillslope stabilization; seeding, mulching to increase effective ground cover > tolerance Reduce/manage run-on (water control)
Sedimentation	Post-fire flooding and resulting excessive erosion	Bank and channel stabilization Where appropriate, channel clearing Reduce CDA Establish water control Reduce run-on
Loss of effective ground cover	Vegetation Burn Severity	Seeding, planting, mulching
Hazard Trees	Vegetation Burn Severity	Vegetative thinning, hazardous tree removal
Spreading of Invasive & Noxious Plants	Introduction through management activities, invasion as a result of disturbance	Early detection and rapid response (EDRR). Weed abatement.
Forest Stand Replacement	Vegetation Burn Severity	Reforestation & Replanting of Fire adapted (climate smart species)

Key Issues	Reasons or Evidence	Potential Treatments
		Treat to reduce competitive invasives
Compromised road infrastructure	Post fire flooding and debris flows, slope failure	Replace damaged culverts Reestablish water control Replace signs and guardrails As appropriate, resize culverts or replace with bridges
Compromised trail network	Post fire flooding and debris flows, slope failure Excessive erosion	Reestablish/improve water control Where appropriate, relocate to stable locations
Unsafe or compromised conditions at campgrounds, trailheads, and ancillary facilities	Post fire flooding and debris flows, slope failure	Relocation of facilities out of flood prone or now unsafe areas. Limited access until conditions are safer Increased warning and safety messaging Closures
Threatened or compromised water infrastructure.	Sedimentation, Debris and ash deposition degraded water quality	Increase and/or maintain water delivery capacity Improve or install active water control Increase maintenance and monitoring Where appropriate and feasible, relocate structures and any demolition as needed
Threatened or compromised livestock infrastructure	Direct fire damage to fencing and watering infrastructures; Compromised vegetation recovery	Reconstruct fencing and watering infrastructure; Pursue advanced technologies (Virtual Fencing)

Specific Project Information:

Indicate specific planned projects intended to improve the status of key issues identified in the previous table.

Note: The scope and timeframe of actions described below are not comprehensive or long term. Additional actions outside the scope described in this document and the timeframe for recovery will exceed the timeframe of this document. This document is subject to revision with additional information contributed by reviewers.

Project Name: *Watershed Project Implementation and Post-Fire Remediation for Sapello River Watershed – Phase I.*

- **Agency/Entity:** *New Mexico Environment Department (NMED) and Hermit's Peak Watershed Alliance (HPWA).*
- **Ownership:** *Private (various landowners) and Santa Fe National Forest.*
- **Proposing Agency/Entity Contact Information:** *Lea Knutson, Executive Director of Hermit's Peak Watershed Alliance, lknutson@hermitspeakwatersheds.org.*
- **Action Type:** *Select from the list of potential actions from the FEMA Programmatic Environmental Assessment (PEA): vegetative thinning, hazardous tree removal, and noxious weed abatement; restoration and reforestation of fire-adapted vegetation types; restoration of riparian areas; post-wildfire hillslope stabilization treatments; post-wildfire channel treatments; post-wildfire road, culvert, and trail flow diversion treatments; post-wildfire ash, sediment, and debris removal and infrastructure repairs; structure demolition, relocation, or alteration; and hydraulic capacity improvements and protection of water infrastructure.*

The following actions from the PEA are included in this project:

- Post-wildfire hillslope stabilization treatments
- Post-wildfire channel treatments
- Post-wildfire road, culvert, and trail flow diversion treatments

Not in the PEA, the project will pursue the use of virtual livestock fencing on up to four Forest Service grazing allotments and various private lands, to prevent concentrated impacts of cattle and assist with utilization of more available grazing lands. Also not in the PEA, the project will support HPWA staff in providing compliance assistance to San Miguel County zoning enforcement to prevent non-conforming construction in floodplains. Also not in the PEA, the project will provide education and outreach for watershed residents and others including a road maintenance and design workshop, one or more videos and accompanying Landowner Guides, a video and accompanying document about the importance of not building in floodplains, a video and accompanying document on reconstructing driveways with stream crossings to be resilient to flooding, and watershed restoration workforce training.

- **Project Description:** *Provide overview of project and a general location (include subwatershed(s)).*

This project will implement the activities described below within tens of private property parcels, on lands managed by the Santa Fe National Forest, and on San Miguel County roads, in the six Sapello River sub-watersheds identified above. Even before HPCC, NMED had listed (and the Water Quality Control Commission and EPA approved) the Sapello River from the Mora River upstream to Manuelitas Creek as impaired by sediment loading. The project implements the Sapello River Watershed-Based Plan (*Sapello River Watershed Based Plan: De las Montañas a los Llanos*, or SRWBP) available at <https://hermitspeakwatersheds.org/sapello/> or <https://www.env.nm.gov/surface-water-quality/wbp/>. This plan was completed just prior to HPCC, and is intended to implement a total maximum daily load (TMDL) for sediment in the Sapello River.

The work described in the SRWBP is still appropriate for reducing the baseline sediment loading that was occurring before HPCC, and originated from sources and land management practices that are in general still present. HPCC added significant sediment loading, and new source areas, from a new generalized source type (burned forest). This Post-Fire Mitigation Action Plan adds information related to the post-fire impacts.

- **Activities:** *List activities which collectively make up the project.*

Arrest Upland Erosion and Rebuild Healthy Soils

Unusually rapid and voluminous surface water flows and excessive soil movement is the source of significant stream sedimentation and drainage channel erosion in burned areas. The loss of herbaceous and woody vegetation and soil organic material in high and moderate severity burn areas has resulted in wide-spread upland erosion, setting up the circumstances for unprecedented stream sedimentation and channel degradation. Restoring plant cover is a crucial first step in rebuilding healthy soils.

Herbaceous vegetation, where it is lacking and where slopes are moderate, will be reestablished by hand seeding with a native grass mix (e.g., Land of Enchantment Mountain Blend at Curtis and Curtis Seed), cover crop (e.g., oats), and mulch (straw). Woody vegetation (native trees and shrubs) will be planted on sites with a high probability of survival (moderate north-facing slopes, moist areas). Contour felling will be done on slopes to arrest soil movement and create suitable growing environments for herbaceous and woody vegetation while reestablishing soil organic matter. Upland erosion control structures like media lunas (probably built with logs), straw bale or log flow spreaders, slash, dirt filled gunny sacks, and rock laybacks will be built to arrest surface erosion. These efforts will slow or prevent water and sediment movement downhill to cumulatively keep sediments out of water courses while reducing storm water flooding.

HPWA expects to work with approximately 10 landowners each year to implement this activity. The exact area to be treated is yet to be determined but budget figures are based on treating 200 acres over three years. Several landowners have already committed to working with HPWA.

These techniques are supported by After the Fire (<https://afterwildfirenm.org/post-fire-treatments>) and Post-Fire Land Restoration Guides by HPWA (<https://hermitspeakwatersheds.org/3263-2/>). These practices are also recommended in the SRWBP sections called Restore Upland Vegetation, Arrest and Reverse Upland Erosion, albeit with post-fire modifications.

Restore Stream Geomorphology

Vast areas of disturbed and bare ground in the Sapello Watershed have already and will continue to cause significant degradation in most water courses. New channels have formed, channels have incised, streambanks have eroded, and floodplain connectivity has

been lost. In-channel erosion coupled with upland erosion is and will continue to deliver unprecedented levels of sedimentation and related pollutants to stream courses.

Using diverse, yet site appropriate tools, HPWA will implement the following treatments to prevent further degradation and restore functionality to ephemeral, intermittent, and perennial channels, with a focus on 1st – 3rd order streams. Treatments will prevent and arrest in-channel erosion, restore appropriate channel geomorphology, and reestablish floodplain connectivity. Low-tech, process-based techniques will be used and will mostly be hand-built. Structures will include step-down log structures, log mats, rock or log rundowns, baffles, vanes, log weirs, constructed log jams, and one-rock/log dams. Machine built structures in perennial or large ephemeral channels will include constructed log jams, Post-Assisted Log Structures (PALS), and lead-out channels that will be built by contractors. Structures will mostly be built with supplies found on the site (logs, rocks). Work will be done by contractors, trained work crews, or volunteer groups depending on the skills required. Work will primarily be done on private land, with some drainage work done on the National Forest later in the project when the USFS is ready.

HPWA expects to work with approximately 10 landowners each year for three years. The exact length of drainage channel to be treated is yet to be determined but HPWA plans to treat 4-5 miles of ephemeral, intermittent, and perennial channels. Several landowners have already committed to working with HPWA.

This in-channel restoration work is described in the SRWBP in the sections Restore Streambank and Channel Characteristics and Reconnect Streams to Floodplains. HPWA staff will be trained in Natural Channel Design early in 2023 so will be prepared to do some design work. Each work crew will have training by professionals in collaboration with Luna Community College. Contractors will help with design as needed.

Repair and Improve Roads – San Miguel County Collaboration

Close collaboration with San Miguel County (SMC) will occur to restore serviceability to dirt roads impacted by flooding to reduce sediment delivery to streams. Work will mostly occur in the upper reaches of the Sapello River valley where a single county dirt road follows the Sapello River, but may include the lower and upper Rociada areas. Work will feature gaps in support to the County and highlight improving road construction to mitigate impacts to water quality. Efforts will include training SMC road crews in watershed-friendly road maintenance and design, providing SMC with a watershed-road consultant to guide improvements, and doing selected road improvements not funded by FEMA (e.g., adding new culverts, road drainage, and low water crossings). FEMA will only fund SMC to reconstruct roads in pre-fire condition, not improve upon road designs to accommodate new flooding circumstances. Road work will draw from an inventory of roads completed in the SRWBP (see Road Issues Inventory section) and discussed further in the Infrastructure Management and Improvement and Road Projects sections. Budget figures for road improvements are included in the Financial Needs and Sources section of SRWBP. *A Good Road Lies Easy on the Land* (Zeedyk, 2006,

<https://hermitspeakwatersheds.org/educational-resources/>) will provide the foundation for work.

Improve Livestock Management with Virtual Fencing – US Forest Service Collaboration

Virtual fencing provides a worthwhile pursuit to solve the significant loss of physical fences from HPCC. Most fences on private land and National Forest land were fully burned or damaged so they no longer allow ranchers the ability to control livestock distribution. The lack of fences also make it impossible to keep livestock out of important recovery areas like riparian zones and wetlands. The USFS has identified livestock management as their top priority for post-fire work and has agreed to cooperate with HPWA to pursue virtual fencing outside of wilderness areas. They have identified four potential grazing allotments that might have willing participants in a virtual fencing trial operation and a few private property owners adjacent to the National Forest have likewise expressed interest.

While virtual fencing is still not fully adopted by ranchers as an alternative solution to traditional fences, the wide-spread loss of fences, especially in inaccessible areas, provides an excellent opportunity to test and employ this new technology in the burn-scar. Virtual fencing offers an alternative to traditional fencing that may reduce fencing construction costs, allows flexibility in fence location, provides easier livestock location and health monitoring, and offers resilience to future disturbances.

Vence, the primary vendor of virtual fences, now has an outlet in the U.S. making consultation with them easier (<https://vence.io/>). Consultation with Vence to learn and design the system is required plus the purchase of towers, GPS collars, and livestock management software. Grazing allotment holders will need to agree to the entire program, which includes training their livestock, to make it practical to pursue. Virtual fencing was identified as a worthwhile solution in the SRWBP in the Livestock Management and Planned Grazing section.

Support Strong Floodplain Ordinances and their Enforcement

The importance of strong floodplain ordinances and their enforcement has become abundantly clear in our post-fire environment. Homes and other infrastructure in floodplains are extremely vulnerable and their presence limits the ability of floodplains to mitigate severe post-fire flood events. San Miguel County Floodplain Ordinances will be reviewed for adequacy but more importantly, HPWA will support the County's efforts to enforce those ordinances by denying building permits in floodplains. Review of FEMA's efforts to update floodplain maps will also occur to ensure that SMC has the best data available to help enforce ordinances. Educational materials and programs will be developed and provided to SMC to offer building permit applicants, so they understand the reason for the ordinances. In the Policies and Regulations section, the SRWBP recommends improvements to floodplain ordinances and the inclusion of riparian buffer protection.

Education and Outreach

Education programs are a vital part of ensuring the adoption and longevity of these activities. A vibrant outreach effort is also key to building a network of stakeholders, partners, and volunteers. The following education efforts will complement work on-the-ground and build a community of watershed stewards. 1) A road maintenance and design workshop will be provided to San Miguel County and USFS road crews. It will be hands-on 4-day workshops provided by Steve Carson, Rangeland Hands, Inc. Both agencies have agreed to this training. 2) A video or series of videos and accompanying Landowner Guides that offer landowners direction in planning and doing post-fire restoration work and for creating resilience to future disturbances. Three Post-Fire Landowner Guides have already been developed, three more will be produced and existing ones may be updated to coincide with video material. This information will also be presented in field events. 3) Develop a video and accompanying document about the importance of not building in floodplains. These materials will be provided to SMC to distribute to building contractors and property owners applying for building permits. This information will be presented in at least one event. 4) A video and accompanying document on reconstructing driveways with stream crossings to be resilient to flooding. This information will be presented in an educational event. 5) Watershed Restoration workforce training. A two-week training program will be developed and given to hired work crews before beginning their summer work. This will consist of 10 sessions on post-fire impacts to watershed health and techniques for restoring watershed functions in support of the work planned in this project.

Outreach will entail regular social media posts and traditional media exposure (radio, newspaper, mailings) to promote our activities, invite participation, and provide educational resources. Outreach will include semi-annual newsletters, quarterly Watershed Moments (radio PSA), and updates to our website. Campaigns will be held to feature the release of aforementioned educational resources.

These Education and Outreach efforts continue and expand upon current similar efforts in other watersheds and were conceptually included in the Education and Outreach section of the SRWBP.

- **Goals/Accomplishments:** *State overall objective of project.*

Sapello River (Arroyo Jara to Manuelitas Creek) - Prevent 67,320 tons of sediment loading

Sediment load reduction goals provided in the TMDL and the SRWBP did not factor in wide-spread fire and consequent flooding in the Sapello River. Development of more specific load reduction goals is premature in this extremely dynamic post-fire environment. Proposed Management Measures focus on arresting upland erosion, reestablishing floodplain connectivity to promote deposition of sediment and debris, and stabilizing ephemeral drainages to prevent downcutting, thereby reducing sediment inputs.

The load reduction goal for this 19.46 mile reach of the Sapello River is based on the following three calculations. 1) Arrest Upland Erosion - A volumetric estimate of upland erosion control with Management Measure implementation was developed based on 25 hectares (62 acres) of erosion prevention, 0.1 m (~4") depth of sediment, and bulk density of 1,200 kg/cubic meter. The result is 33,000 tons of sediment prevented from reaching drainages over three years. 2) Floodplain connectivity - A volumetric estimate of floodplain deposition with Management Measure implementation was developed based on 25 hectares (62 acres) of added floodplain area, 0.1 m depth of deposition, and bulk density of 1,200 kg/cubic meter. The result is 33,000 tons of sediment deposited over three years. 3) Prevent streambank erosion and incision - A volumetric estimate of incision prevented in ephemeral tributary drainages was developed based on an average width of 2.0 meters, an average depth of 1.0 meter, and that five drainages averaging 100 meters in length will be stabilized to prevent streambank erosion and downcutting. The result is about 1,320 tons of sediment prevented from reaching the Sapello River over three years. A total of 67,320 tons of sediment is prevented from entering the river over a 3-year period or 22,440 tons per year.

Headwater streams (Sapello River (Manuelitas Creek to headwaters), Manuelitas Creek (Sapello River to Rito San Jose), Manuelitas Creek (Rito San Jose to Maestas Creek), Rito San Jose (Manuelitas Creek to headwaters), Maestas Creek (Manuelitas Creek to headwaters), Sparks Creek (Maestas Creek to headwaters), Rito de Gascon (Rito San Jose to headwaters)) - Prevent 135,000 tons of sediment loading

Sediment load reduction goals provided in the TMDL and the SRWBP did not factor in wide-spread fire and consequent flooding in the Sapello River. Development of more specific load reduction goals is premature in this extremely dynamic post-fire environment. Proposed Management Measures focus on arresting upland erosion, reestablishing floodplain connectivity to promote deposition of sediment and debris, and stabilizing ephemeral drainages to prevent downcutting, thereby reducing sediment inputs.

The load reduction goal is based on the following three calculations. 1) Arrest upland erosion - A volumetric estimate of upland erosion control with Management Measure implementation was developed based on 50 hectares (124 acres) of erosion prevention, 0.1 m (~4") depth of sediment, and bulk density of 1,200 kg/cubic meter. The result is 66,000 tons of sediment prevented from reaching drainages over three years. 2) Floodplain connectivity - A volumetric estimate of floodplain deposition with Management Measure implementation was developed based on 50 hectares (124 acres) of added floodplain area, 0.1 m depth of deposition, and bulk density of 1,200 kg/cubic meter. The result is 66,000 tons of sediment deposited over three years. 3) Prevent streambank erosion and incision - A volumetric estimate of incision prevented in ephemeral tributary drainages was developed based on an average width of 2.0 meters, an average depth of 1.0 meter, and that ten drainages averaging 100 meters in length will be stabilized to prevent streambank erosion and downcutting. The result is about 3,000 tons of sediment prevented from reaching the Sapello River over three years. A total of

135,000 tons of sediment is prevented from entering the river over a 3-year period or 45,000 tons per year.

- **Alignment of Priorities:** *State objectives in terms of how they are aligned with the priorities of the proposing agency or entity and priorities of other agencies or entities.*

This project is aligned with the State of New Mexico Nonpoint Source Management Program, a program required by Section 319 of the Clean Water Act and described in a Management Plan submitted by the Governor of New Mexico or his or her designee to the EPA Regional Administrator. EPA approved New Mexico's current Nonpoint Source Management Plan in 2019. It outlines several activities for implementation by NMED related to post-fire response:

- Provide information to help the United States Forest Service (USFS) develop Burned Area Emergency Response (BAER) plans, or to help other agencies (e.g., Energy, Minerals, and Natural Resources Department (EMNRD) Forestry Division) develop similar post-fire plans, to be used as the basis for project work plans that WPS will develop and submit to EPA, and that qualify as WBP alternatives.
 - Within two years of any major wildfire, with severity outside the natural range of variability for the affected forest types, occurring in the watershed of one or more streams with a high quality coldwater, coldwater, or cool water aquatic life designated use, a portion of Section 319 watershed project funds are used for implementing WBP alternatives that are post-fire response plans.
 - Participate in collaborative forest restoration efforts by providing information related to water quality and forest ecology, as a means of preventing impacts to water quality from unnaturally intense wildfire.
- **Partner Involvement:** *List and discuss roles partners will play in the project.*

Pending approvals of a project work plan by EPA and NMED, and of a sub-grant agreement by NMED, the NMED Watershed Protection Section intends to award a grant to HPWA to complete this project. HPWA will work with tens of private property owners, the Santa Fe National Forest, and San Miguel County to complete the project. Several landowners, the Santa Fe National Forest, and San Miguel County have submitted letters of support for the project.

Private property owners and the Santa Fe National Forest will host implementation of specific project components identified above. San Miguel County will collaborate on the roads workshop and on enforcement of floodplain development ordinances.

- **Total Costs:** *State total estimated costs for all activities in this project.*

The project will cost approximately \$782,000 in federal Clean Water Act Section 319 funds and \$523,000 in non-federal funds and in-kind costs contributed by HPWA and other local cooperators.

- **Timeline:** *By calendar year and month state expected start and completion dates for the project.*

The project is planned to start in July 2023 and be completed in December 2026.

- **Project Monitoring/Evaluation of Success:** *Describe what monitoring will be performed by and estimate the length of time monitoring is expected to continue. If monitoring is not appropriate or required for a project, describe how success will be measured. If monitoring is expected to be completed with assistance of cooperators/partners, list the specific cooperators involved.*

A Quality Assurance Project Plan (monitoring plan) will be developed at the beginning of the project to document and guide the monitoring specifics in terms of site locations, sampling methods, and data analysis. All sampling will follow NMED Standard Operating Procedures and be designed to contribute to NMEDs data collection as appropriate.

Implementation monitoring will track completion of Management Measures including the number of landowner partners, acres treated, stream length treated, acres fenced with virtual fencing, structures built, road miles treated, road structures built, and match dollars accumulated.

Effectiveness monitoring will be both watershed-wide and site specific and will focus on monitoring sedimentation and stream geomorphology. The four sites that were monitored during the SRWBP project will be continued to track watershed-wide conditions. At these sites Physical Habitat Assessment will be done annually to determine the effects of post-fire flooding on sediment distribution and geomorphology. Annually, two sonde samples and flow data will be collected, one during monsoons and one post-monsoon season. Sonde data will include turbidity, TDS, pH, temperature, DO, and specific conductivity. The UNM EcoHydrology and HydroSystems Lab will continue long-term sonde deployment at one site on the Sapello River (began immediately after the fire) and those data will complement our monitoring. Site specific data will also be collected at two selected in-channel restoration projects per year to examine pre and post treatment effectiveness. Photos of all projects will be collected and specific photo points of projects requiring Clean Water Act Section 404 monitoring will be taken. All data will be presented in the project's final report.

- **Project Scheduling:** *Use the table(s) below to list by activity the tasks (e.g., planning, design, permitting, implementation, project monitoring) necessary to complete the project, expected timing, and expected contribution by responsible party (Proposing Agency/Entity or Partner). Expand as necessary.*

Activity	Task	Year	Proposing Entity Contribution	Partner Contribution
Management Measure #1 - Arrest Upland Erosion and Rebuild Healthy Soils				
	<i>Planning, Management, Monitoring</i>	23-26	\$ 70,464.00	\$ 32,236.00
	<i>Design</i>	23-24	\$ 10,462.00	\$ 1,744.00
	<i>Permitting</i>			
	<i>Implementation</i>	23-26	\$ 115,150.00	\$ 181,308.00
Total Costs by Entity			\$ 196,076.00	\$ 215,288.00
Project Monitoring/Evaluation of Success: number of landowner partners, acres treated, number of structures built, narrative of observed successes and failures, photo gallery of projects				

Activity	Task	Year	Proposing Entity Contribution	Partner Contribution
Management Measure #2 - Restore Stream Geomorphology				
	<i>Planning, Management, Monitoring</i>	23-26	\$ 92,385.00	\$ 47,997.00
	<i>Design</i>	23-24	\$ 10,462.00	\$ 1,744.00
	<i>Permitting</i>	23	\$ 11,850.00	
	<i>Implementation</i>	23-26	\$ 236,650.00	\$ 164,308.00
Total Costs by Entity			\$ 351,347.00	\$ 214,049.00
Project Monitoring/Evaluation of Success: <i>Implementation Monitoring</i> - number of landowner partners, stream length treated, number of structures built. <i>Effectiveness Monitoring</i> - watershed-wide water quality monitoring (turbidity, TDS, pH, temperature, DO, and specific conductivity), flow, and physical habitat assessment at four sites; <i>project specific</i> pre and post treatment monitoring at two selected projects per year with photo points and physical habitat assessment; a photo gallery will be assembled for all projects				

Activity	Task	Year	Proposing Entity Contribution	Partner Contribution
Management Measure #3 - Repair and Improve Roads				
	<i>Planning, Management, Monitoring</i>	23-26	\$ 23,372.00	\$ 19,159.00
	<i>Design</i>			
	<i>Permitting</i>			
	<i>Implementation</i>	25	\$ 91,750.00	\$ 1,308.00
Total Costs by Entity			\$ 115,122.00	\$ 20,467.00
Project Monitoring/Evaluation of Success: narrative on successes/failures of partnership with San Miguel County, number and participation of SMC and USFS road trainings, road miles treated, road structures built				

Activity	Task	Year	Proposing Entity Contribution	Partner Contribution
Management Measure #4 - Improve Livestock Management				
	<i>Planning, Management, Monitoring</i>	23-26	\$ 28,850.00	\$ 20,758.00
	<i>Design</i>			
	<i>Permitting</i>			
	<i>Implementation</i>	24-25	\$ 40,000.00	
Total Costs by Entity			\$ 68,850.00	\$ 20,758.00
Project Monitoring/Evaluation of Success: number of landowner partners, acres fenced with virtual fencing, partner (USFS) acres fenced with Virtual fencing, narrative of successes/failures of Virtual Fencing to guide future endeavors				

Activity	Task	Year	Proposing Entity Contribution	Partner Contribution
Management Measure #5 - Support Strong Floodplain Ordinances and Enforcement				
	<i>Planning, Management, Monitoring</i>	23-26	\$ 17,523.00	\$ 21,048.00
	<i>Design</i>	23-24		
	<i>Permitting</i>	23		
	<i>Implementation</i>	25		
Total Costs by Entity			\$ 17,523.00	\$ 21,048.00
Project Monitoring/Evaluation of Success: number of education efforts completed, narrative of progress in improving floodplain ordinances and enforcement				

Activity	Task	Year	Proposing Entity Contribution	Partner Contribution
Management Measure #6 - Education and Outreach				
	<i>Planning, Management, Monitoring</i>	23-26	\$22,339.00	\$22,792.00
	<i>Design</i>			
	<i>Permitting</i>			
	<i>Implementation</i>	25	\$11,050.00	\$8,283.00
Total Costs by Entity			\$33,389.00	\$31,075.00
Project Monitoring/Evaluation of Success: number of volunteers, number of landowner partners, match dollars accumulated, number and list of education efforts completed, number of work crew members trained				

TOTAL Proposing Entity Contribution	\$ 782,307.00
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TOTAL Partner Contribution	\$ 522,685.00
TOTAL (cost + match)	\$ 1,304,992.00

Appendix A: Assessment Resources

[Instructions: Please add important resources that can help assess the watersheds (SBS, RAVG, BARC ([MTBS.gov](https://www.mtbs.gov)), etc.)]

The New Mexico Environment Department's Surface Water Quality Bureau has scheduled the Sapello watershed (along with other watersheds in the larger Canadian River Basin) for a two-year water quality survey in 2025-2026. The survey schedule is included in the *2022-2024 State of New Mexico Clean Water Act §303(d)/§305(b) Integrated Report*. The *Integrated Report* includes information on water quality standards attainment and is updated every two years based on recently completed water quality surveys and data submittals to NMED by other organizations. The most recent and past Integrated Reports are available at <https://www.env.nm.gov/surface-water-quality/303d-305b>. See <https://www.env.nm.gov/surface-water-quality/water-quality-monitoring> for more information about water quality monitoring. This site will be updated for 2025-2026 activities in early 2025. This survey will be an opportunity for NMED to assess water quality standards attainment in the Sapello Watershed.

The Sapello watershed has a recently completed watershed-based plan (WBP), available at <https://cloud.env.nm.gov/water/pages/view.php?ref=8514&k=46f64fbefa>. The Sapello WBP was completed shortly before the Hermit's Peak Calf Canyon fire. In general, the water quality and other natural resources problems identified in the Sapello WBP, and the management measures appropriate to address these problems, are still applicable post-fire. The fire has added significant additional pollutant sources that this plan is intended to address.

The Santa Fe National Forest completed the Hermit's Peak / Calf Canyon Fire BAER (Phase 2) Hydrology Resource Report as part of the Burned Area Emergency Response (BAER) process, which includes the four upper Sapello watershed HUC12s in its planning area. This document is available from Forest Service staff or NMED. The report includes a soil burn severity (SBS) map, and used the underlying data to model relative increases in peak flows expected from different return interval storm events. The report also presents debris flow probability and volume estimates developed by USGS for analyzed sub-basins within the upper Sapello watershed, and provides a section on projected impacts to Outstanding National Resource Waters (ONRWs).

Appendix B: Agency Specific Funding Programs and Requirements

Water Quality Planning Guidance

Post-Fire Watershed Mitigation Action Plan intended to protect or improve surface water quality (among other resources of concern) should include the following elements:

1. Identification of the causes or sources of water quality impairment, water quality problem, or threat to unimpaired/high quality waters;
2. Watershed project goal(s) and explanation of how the proposed project(s) will achieve or make advancements towards achieving water quality goals;
3. Schedule and milestones to guide project implementation;
4. Proposed management measures (including a description of operation and maintenance requirements) and explanation of how these measures will effectively address the water quality impairment identified above; and
5. Water quality results monitoring component, including description of process and measures (e.g., water quality parameters, stream flow metrics, biological indicators) to gauge project success.

These elements are appropriate for any program or project that supports water quality protection or improvement. The U.S. Environmental Protection Agency requires these elements to be included in a watershed plan before EPA will approve Clean Water Act Section 319 funding for post-fire projects¹. Region 6 of the EPA requires these elements to be included in a watershed plan, rather than in a project work plan or funding application.

The first four elements above are fundamental to most potential planning efforts and are well covered in the main template. Element 5 is more challenging because while proposed management measures such as seeding and mulching or contour felling may have been proven effective by field science, EPA requires (for Section 319 funding to be approved) watershed-specific monitoring to gauge success. The monitoring need not be direct water quality measurements – ground cover, acres treated, stream canopy cover, and number of days per year when water can't be diverted for irrigation or municipal use are example parameters that may be practical to measure and interpret. In addition, plans should integrate the routine water quality monitoring and assessment conducted by the New Mexico Environment Department's Surface Water Quality Bureau (NMED-SWQB). NMED-SWQB conducts this monitoring on a rotating basis statewide, with each area being monitored for two years in a row every ten years. An updated monitoring schedule is provided in the *Clean Water Act 303(d)/305(b) Integrated Report*² every two years, and should be confirmed by contacting NMED-SWQB staff at wpsprogram.manager@env.nm.gov.

NMED-SWQB staff are available to assist with addressing the planning elements listed in this appendix.

¹ The five elements listed here are from EPA's *Nonpoint Source Program and Grants Guidelines for States and Territories*, available at <https://www.epa.gov/nps/319-grant-current-guidance>, along with additional clarification and information.

² The current *Clean Water Act 303(d)/305(b) Integrated Report* is available at <https://www.env.nm.gov/surface-water-quality/303d-305b>.

Appendix C: Identify Agency Specific Compliance Needs

Any projects will be required to obtain all applicable federal, state, and local permits and authorizations as well as adhering to permit conditions for project implementation prior to construction. Project proponents should work with relevant agencies when developing projects to determine specific requirements as well as associated costs and timelines for the associated compliance steps. Lastly all projects utilizing the Programmatic Environmental Assessment (PEA) developed by FEMA would have to provide copies of all authorizations to the relevant agency and FEMA as well as adhering to the project specific conditions in the PEA.

Chapter 7 of the PEA identifies 9 compliance conditions that apply to all projects covered by the PEA.

1. Completing state and local environmental and land use reviews in accordance with federal, state, and local regulations.
2. Obtain an air permit based on the size and duration of construction projects or operation of supplemental power generation. BMPs applicable to minimizing effects to air quality shall be incorporated, including limiting vehicle idling, utilizing fugitive dust suppression techniques, such as those outlined in the NMAC for fugitive dust control.
3. May require authorization from USACE prior to conducting work. Obtaining all necessary federal permits and complying with all conditions of the permit including but not limited to notification and signature requirements to insure validation of permits.
4. May be required to obtain NPDES permits prior to construction, if applicable to the project.
5. Comply with any requirements and avoidance measures pursuant to Section 7 of the ESA. If protected species are observed during construction, activities that could result in harm or disturbance must stop immediately and notify the recipient and FEMA. USFWS may require FEMA to conduct additional consultation. Minimize the introduction or spread of invasive species, including decontamination procedures on vehicles and equipment, and using weed-free products.
6. Follow the conditions resulting from consultation with the SHPO and Tribal Nations. If unexpected archaeological resources are encountered during construction, the subrecipient must stop work and notify the recipient and FEMA. FEMA will determine what additional consultation with the SHPO, and the Tribal Nations are required, and what additional conditions or avoidance measures may apply.
7. Follow the conditions and requirements of the NMDOT or federal agency with respect to appropriate seed selection revegetation zones and temporary road closures permits and requirements, where project sites intersect with NMDOT jurisdiction.
8. Follow all permit conditions and manufacture guidelines applicable to the handling and application of any hazardous substances used in connection with actions evaluated in this PEA.
9. Incorporate all health and safety conditions applicable to minimizing effects to health and safety in site-specific HASP.

Clean Water Act Section 404 Compliance

Section 404 of the Clean Water Act requires approval from the U.S. Army Corp of Engineers (USACE) prior to discharging dredged or fill material into waters of the United States.

Proponents of in-stream projects should contact the USACE regarding the need to obtain a permit from the Regulatory Division. Most projects are already covered by existing permits, but the process of obtaining authorization for a project may require about twenty hours of technical staff time over the course of around three months to complete. More information on the Section 404 permitting process, including applicability of Nationwide Permits, mitigation requirements, requirements for certification for any discharges on state, private or tribal land, can be obtained from the USACE at: <https://www.spa.usace.army.mil/Missions/Regulatory-Program-and-Permits>. For additional information, including permitting procedures and jurisdictional water determination, contact the USACE, Albuquerque District, 4101 Jefferson Plaza NE, Albuquerque, New Mexico 87109, 505-342-3262.