ESCUDILLA LANDSCAPE

WATERSHED RESTORATION ACTION PLAN
&
WATERSHED BASED PLAN

Prepared by Southwest Native Ecosystems Management,
Apache-Sitgreaves National Forests,
Gila National Forest,
and
New Mexico Environment Department

July 31, 2018

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EXECUTIVE SUMMARY

Twelve 6th code watersheds are addressed in the Escudilla Landscape Watershed Restoration Action Plan (WRAP), with watersheds located in both Arizona and New Mexico. These twelve watersheds have been selected for analysis and the development of a WRAP because these watersheds make up the uppermost watersheds for the two major rivers systems (Little Colorado River and San Francisco River) that originate on the Apache-Sitgreaves National Forests (ASNF) and Gila National Forest (GNF). Threatened and endangered terrestrial and aquatic species, at risk or impaired watershed and riparian conditions, as well as grasslands that are highly departed from desired and historic conditions are a few reasons these watersheds ranked as high priority. The Escudilla Landscape 6th code watersheds have a high potential for restoration using a combination of mechanical and managed fire treatments. National Forest system lands in Arizona are administered by the ASNF and National Forest system lands in New Mexico are administered by the GNF. These watersheds are located on the north and east side of Escudilla Mountain, found in eastern Arizona. Three of the 6th code watersheds are located entirely in Arizona and five 6th code watersheds are located entirely in New Mexico. Four of the 6th code watersheds straddle the Arizona/New Mexico state line and are comprised of land in both states.

Four of the 6th code watersheds addressed in the Escudilla Landscape WRAP are located in the headwaters of the Little Colorado River and eight of the 6th code watersheds are located in the headwaters of the San Francisco River. All of the 6th code watersheds are considered to contain steep gradient mountain streams that come together to form the upper reaches of the Little Colorado and San Francisco Rivers. These 6th code watersheds are located mostly on National Forest System lands and support mixed conifer, Ponderosa pine, pinyon/juniper woodlands, and grassland communities.

The analysis of the twelve 6th code watersheds and the development of the Escudilla Landscape WRAP has been a joint effort between the ASNF and GNF. Watershed, soils, and various other Forest resource specialists have worked in a collaborative effort to provide the data and analysis to develop this WRAP. The two National Forests have jointly agreed on the current conditions, the desired future conditions, and the various treatments presented in this WRAP that, when implemented, will enhance the watershed conditions found within the twelve 6th code watersheds. By enhancing watershed conditions on these headwater 6th code watersheds, many downstream resources and users will benefit.

This Escudilla Landscape WRAP will also serve as a Watershed Based Plan (WBP) to address non-point source (NPS) water pollution in New Mexico, within the San Francisco River Basin, for the impaired reaches of San Francisco River and Whitewater Creek. It will address nine key criteria as required by the United States Environmental Protection Agency (USEPA, 2008). These criteria include:

1. Identification and the causes and sources of NPS water pollution that will need to be controlled; (see San Francisco River Basin – "Watershed Condition" and Water Quality Summary for 6th code watersheds);
2. An estimation of load reductions expected from the management measures used to achieve water quality goals. Load reductions were estimated for each of the 6th code watersheds that emptied into the listed reach of the San Francisco River from the Arizona state line downstream to its confluence with Centerfire Creek, and for each of the 6th codes watersheds that emptied into listed Centerfire Creek from its headwaters downstream to its confluence with the San Francisco River. (see "Estimated Load Reductions" under all 6th code watersheds found in the San Francisco River Basin) (for hyperlink, use Table of Contents);

3. Description of the management measures that will need to be implemented to achieve pollution load reductions; (see "Essential Projects" under all 6th code watersheds found in the San Francisco River Basin);
4. Technical and funding needs to support the implementation and maintenance of restoration measures; (see "Essential Projects – Costs" under all 6th code watersheds found in San Francisco River Basin watersheds, detailing funding needs);
5. Public outreach method(s) and structure that will be used to engage and maintain public and governmental involvement including local, state, federal, and tribal governments (see "Public Outreach");
6. Schedule for implementation of needed restoration measures and identification of appropriate lead agencies to oversee implementation, maintenance, monitoring, and evaluation (see "Essential Projects – Timelines" for all projects found in the San Francisco River Basin);
7. Description of interim, measurable milestones for the actions to be taken and desired water quality goals and outcomes (see "Escudilla Landscape WRAP Milestones");
8. Set of criteria that can be used to determine whether load reductions are being achieved over time and substantial progress is being made towards achieving water quality standards (see "Evaluation Criteria");
9. Monitoring component to evaluate the effectiveness of implementation and assess progress towards achieving water quality goals (see "Restoration Project Monitoring and Evaluations").

It is hoped that the creation of this WRAP will generate an interest for various entities to fund and implement the essential projects that are identified and it is hoped that most of this work can be accomplished with full cooperation and support from various agencies and funding sources.

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WATERSHED DESCRIPTION

Watershed Name, Hydrologic Unit Code (HUC) Numbers

The Escudilla Landscape WRAP area is located within the Little Colorado Headwaters 4th code watershed, HUC 15020001 and the San Francisco 4th code watershed, HUC 15040004. The Escudilla Landscape WRAP project area is made up of twelve 6th code watersheds that are located within four 5th code watersheds. The names and hierarchy of the 4th, 5th, and 6th code watersheds that are addressed in the Escudilla Landscape WRAP are shown in Table 1. Figure 1 displays the location of the WRAP area.

Table 1. Escudilla Landscape WRAP Watersheds

4th Code	5th Code	6th Code
Little Colorado Headwaters-15020001	Nutrioso Creek-1502000101	Dry Lakes-Nutrioso Creek-150200010106
	Coyote Creek-1502000103	Canovas Creek-Coyote Creek-150200010302 Pratt Lake-150200010303 Long Lake-150200010304
San Francisco-15040004	Centerfire Creek-San Francisco River-1504000403	Trout Creek-150400040302 Stone Creek-San Francisco River-150400040303 Big Canyon-San Francisco River-150400040308 Headwaters Centerfire Creek - 150400040306 Outlet Centerfire Creek-150400040307 Spur Draw - 150400040304 SA Creek-150400040305
	Upper Blue River-1504000405	Dry Blue Creek-150400040502

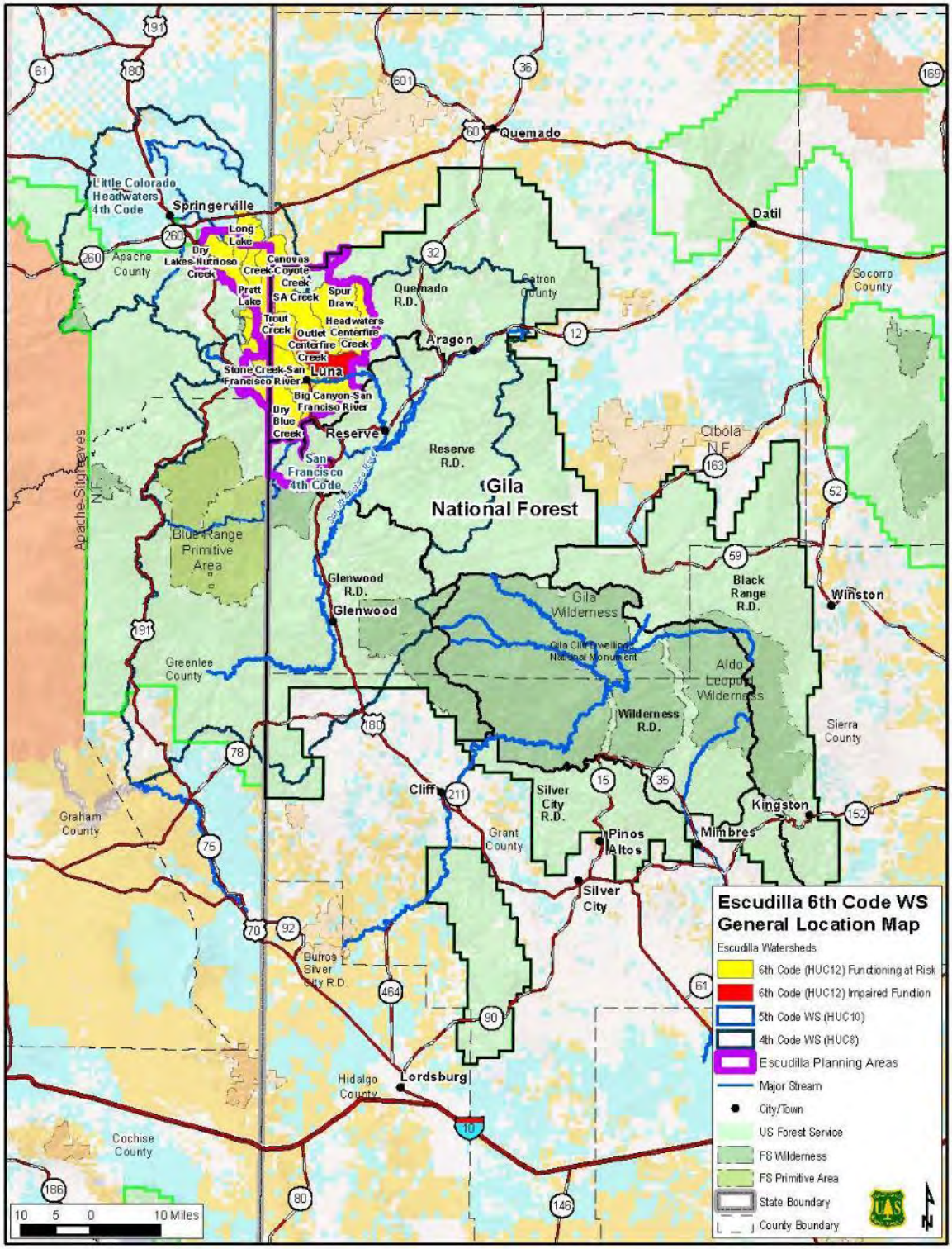

Figure 1. Escudilla Landscape WRAP area locator map.

Location:

The 6th code watersheds addressed in the Escudilla Landscape WRAP are located in both Arizona and New Mexico, on the Apache-Sitgreaves National Forests (ASNF). The Arizona portion of the WRAP Area is administered by the ASNF and the New Mexico portion is administered by the Gila National Forest (GNF). See Table 2 below:

Table 2. Escudilla Landscape Watershed Area Percentage by State & National Forest

6th Code Watershed	Arizona (Apache-Sitgreaves NF)	New Mexico (GNF)
Dry Lakes-Nutrioso Creek-150200010106	100%	0%
Canovas Creek-Coyote Creek-150200010302	46%	54%
Pratt Lake-150200010303	100%	0%
Long Lake-150200010304	100%	0%
Trout Creek-150400040302	37%	63%
Stone Creek-San Francisco River-150400040303	32%	68%
Big Canyon-San Francisco River-150400040308	0%	100%
Headwaters Centerfire Creek - 150400040306	0%	100%
Outlet Centerfire Creek-150400040307	0%	100%
Spur Draw - 150400040304	0%	100%
SA Creek-150400040305	0%	100%
Dry Blue Creek-150400040502	23%	76%

These 6th code watersheds are located within Apache County, Arizona and Catron County, New Mexico. The WRAP Area is located on portions of the Springerville and Alpine Ranger Districts (ASNF) in Arizona and the Quemado Ranger District (GNF) in New Mexico. The WRAP Area is located just east of the communities of Alpine and Nutrioso, Arizona and encompasses the community of Luna, New Mexico. The WRAP Area is sparsely populated, but is an area that supports a high level of both summer and winter recreation activities. Approximately one half of the Escudilla Wilderness Area is located within the WRAP Area.

The WRAP Area is accessible from State Highways NM 180/AZ 191 and various Forest roads which bisect the area. While there are numerous Forest roads and highways that provide some access, there are large portions of the WRAP Area that are remote and not easily accessed due to the rugged terrain.

WRAP Area Land Ownership and 6th Code Watershed Size:

There are lands of various ownership that makeup the watersheds addressed in this WRAP. Table 3 shows the land ownership of each of the 6th code watersheds located in the Little Colorado and San Francisco River basins.

Table 3. Escudilla Landscape Watershed Land Ownership by River Basin

Land Ownership by 4th Code Watershed (River Basin)					
Little Colorado Headwaters					
6th Code Watershed	**National Forest Land**	**Private Within FS Boundary**	**Private Outside FS Boundary**	**State Land**	**BLM**
Dry Lakes-Nutrioso Creek	18,609	167	17	2	1,936
Canovas Creek-Coyote Creek	23,611	1,363	4,938	618	0
Pratt Lake	9,144	197	396	2,999	0
Long Lake	5,621	9	1,297	5,389	0
TOTAL	**56,985**	**1,736**	**6,648**	**9,008**	**1,936**
TOTAL All Land Ownership	**76,313**				
San Francisco					
6th Code Watershed	**National Forest Land**	**Private Within FS Boundary**	**Private Outside FS Boundary**	**State Land**	**BLM**
Trout Creek	19,861	1,074	0	0	0
Stone Creek-San Francisco River	33,284	2,485	0	0	0
Big Canyon-San Francisco River	15,589	830	0	0	0
Headwaters Centerfire Creek	17,581	955	0	0	0
Outlet Centerfire Creek	17,861	2,730	0	0	0
Spur Draw	21,531	4,648	0	0	0
SA Creek	21,861	699	0	0	0
Dry Blue Creek	24,823	226	0	0	0
TOTAL	**172,391**	**13,647**	**0**	**0**	**0**
TOTAL All Land Ownership	**186,038**				
	National Forest Land	**Private Within FS Boundary**	**Private Outside FS Boundary**	**State Land Office**	**BLM**
Total in all 6th Code Watersheds	**229,376**	**15,383**	**6,648**	**9,008**	**1,936**
Grand Total Acres In WRAP Area	**262,351**				

While most of the WRAP Area is made up of National Forest system land, there are lands of various ownerships located within the 6th code watersheds that make up the WRAP Area as shown in Tables 4, 5 and 6 below:

Table 4. Escudilla Landscape Watersheds Land Ownership Arizona/ASNF

6th Code Watershed	ASNF	Private Within FS Boundary	Private Outside FS Boundary	State Trust Lands	BLM
Dry Lakes-Nutrioso Creek	18,609	74	17	2	0
Canovas Creek-Coyote Creek	12,869	1,264	319	339	0
Pratt Lake	9,144	197	396	2,999	0
Long Lake	5,621	9	1,297	5,389	0
Trout Creek	7,207	545	0	0	0
Stone Creek-San Francisco River	11,428	11	0	0	0
Dry Blue Creek	5,709	178	0	0	0
TOTAL	**70,587**	**2,278**	**2,029**	**8,729**	0
TOTAL in Arizona/ASNF	**83,623**				

Table 5. Escudilla Landscape Watersheds Land Ownership New Mexico/GNF

6th Code Watershed	GNF	Private Within FS Boundary	Private Outside FS Boundary	State Trust Lands	BLM
Dry Lakes-Nutrioso Creek	0	0	0	0	0
Canovas Creek-Coyote Creek	10,742	99	4,619	279	1,936
Trout Creek	12,654	529	0	0	0
Stone Creek-San Francisco River	21,856	2,474	0	0	0
Big Canyon-San Francisco River	15,589	830	0	0	0
Headwaters Centerfire Creek	17,581	955	0	0	0
Outlet Centerfire Creek	17,861	2,730	0	0	0
Spur Draw	21,531	4,648	0	0	0
SA Creek	21,861	699	0	0	0
Dry Blue Creek	19,114	48	0	0	0
TOTAL	**158,789**	**13,105**	**4,619**	**279**	**1,936**
TOTAL in New Mexico/GNF	**178,728**				

Table 6. Escudilla Landscape Watersheds Total WRAP Area

	National Forest Land	Private Within NF Boundary	Private Outside NF Boundary	State Land Office	BLM
Total WRAP Area Acres by Ownership	**229,376**	**15,383**	**6,648**	**9,008**	**1,936**
Total All Land Ownership Acres	**262,351**				

Any actions planned to enhance watershed conditions within the 6th code watersheds that make up the WRAP Area need to take into consideration the scattered lands of various ownership and the structures/facilities located on these lands.

Watersheds' Physiographic Setting

The topography of the area addressed in the Escudilla Landscape WRAP ranges from steep mountainous terrain with narrow canyons at the higher elevations, to long narrow ridges with somewhat broader canyons extending through the mid elevation. Intermixed with the mountainous terrain of the WRAP Area are flat top mesas bisected by narrow canyons and broad valley bottoms at the lower elevations.

The elevation within the WRAP Area ranges from 10,912 feet at the top of Escudilla Mountain to 6400 feet at the confluence of the Dry Blue and Blue River. The entire WRAP Area is comprised of lands that are considered to be at or near the headwaters of the 5th code watersheds that radiate out in different directions from Escudilla Mountain. As indicated in Table 1 above, water running off of Escudilla Mountain to the West and North end up in the Nutrioso Creek and Coyote Creek 5th code watersheds, which are part of the Little Colorado Headwaters 4th code watershed. While water running off the East and South sides of Escudilla Mountain end up in the Centerfire Creek-San Francisco River and Upper Blue River 5th code watersheds, which are part of the San Francisco 4th code watershed.

Even though the Little Colorado Headwaters portions of the WRAP Area drain into the Colorado River just above the Grand Canyon and the San Francisco portions of the WRAP drain into the Colorado River hundreds of miles downstream from the Grand Canyon (just north of Yuma, Arizona) the entire WRAP Area is considered to be within the Colorado River Watershed system.

While there is an increasingly significant difference between the ecosystems that make up the Little Colorado and San Francisco River watersheds, the further downstream you go from the headwaters, the ecosystems within the Escudilla Landscape WRAP 6th code watersheds are very similar. While there are some differences in the aquatic species found in the streams within the Little Colorado Headwaters and the San Francisco 4th code watersheds, vegetative species and terrestrial wildlife species are the same throughout the Escudilla Landscape WRAP Area.

Due to the steep mountainous characteristic of the WRAP Area, the past impacts from historic management activities and the recent Wallow Fire (Figure 2) that left many severely burned areas within the WRAP Area, the Escudilla Landscape 6th code watersheds are not considered to be in Properly Functioning watershed condition.

Figure 2. Picture of Wallow Fire

LAND USE

Pre-Historic and Historic Use

The Escudilla Landscape area has a long history of use by humans. A high density of pre-historical sites located throughout the 6th code watersheds indicates they were the home to different cultures long before the European settlers first came to the area in the 1600s. Many of these cultural sites remain relatively undisturbed, but there are some that have been looted for their artifacts.

The high density of sites along the major drainages is a strong indicator that these perennial water locations have been the source for water and provided the plants and animals the native people depended upon for thousands of years. Even though some key prehistoric sites have been excavated and explored within the WRAP Area, there is potential for further research and interpretation of the pre-historic occupation and use of this area.

When the Spanish explorers and missionaries began to arrive in what is now the Southwest portion of the United States, the first domestic livestock started to appear and impact the land. This occupation of the land by the Spanish and then later by other settlers was slow at first due to the harsh environment and the lack of water inherent to the desert climate.

The higher elevation areas such as found on and surrounding Escudilla Mountain became oases in the desert and were explored and exploited by early hunters and trappers. These first explorers were followed by settlers who brought with them their sheep, goats, cattle, burros and horses. Undoubtedly, the higher elevation portions of central Arizona and west central New Mexico were areas that were very attractive to the early settlers that moved into the area due to the perennial streams and abundant wildlife. The higher

cooler mountains with the abundant water and other resources had to provide relief to early settlers who crossed the desert regions of the Southwest, especially during the summer months.

In more recent times, during the late 1800s and early 1900s, the Escudilla Landscape WRAP Area was heavily logged and also grazed by large numbers of livestock. Large timber companies and local settlers moved into the area and harvested the abundant old growth timber and abundant fuel wood. The old growth timber was cut into lumber and sold to the developing mining industry and booming new communities that were springing up across the Southwest. The abundant fuel wood was cut to provide heat for home use and to fuel steam powered equipment.

The cattle barons ran their large herds of cattle and horses on the public domain land and would gather and hold their cattle at the few available water sources when they needed to work their herds. Large herds of sheep were grazed in the high elevation areas such as Escudilla Mountain, since these areas were not as suitable for stocking with cattle. Also numerous small homesteads were stocked with a variety of livestock, which were run on the public domain lands part of the time since the small homestead parcels were not large enough to support many animals (Abruzzi, 1995).

Early on during the westward expansion period there were many attempts to establish homesteads in the valley bottoms where the productive soils occurred and water was much easier to capture and use to irrigate the land. The many small farms were slowly abandoned during late 1800s and early 1900s as drought and flood events occurred that made living and farming along these flashy Southwest stream/river systems much harder than was originally thought. These early attempts to farm the flood plains substantially changed the geomorphology of many streams/rivers and reduced perennial flows of water due to down cutting, which resulted in deep channels that drained subsurface waters from the floodplains.

Figure 3. Stream Channel in Valley Bottom that Was Down-Cut Many Years Ago

Past management activities have left their mark on the land and many of the results of past management remain. There is still much that can be done to ensure a sustained yield of clean water and other resources from the lands that make up the Escudilla Landscape WRAP Area.

Current

In the 1980s, with the advent of the modern environmental movement, logging and livestock grazing became targeted land use practices on the ASNF and within Escudilla Landscape WRAP Area. Today these land uses practices play a much reduced role on the ASNF in both Arizona and New Mexico and in the WRAP Area. This change in land management practices is evident in the following statement taken from page 6, ASNF, Range Specialist Report, Forest Plan Revision FEIS, March 2012. "Permitted animal unit months (AUMs) have declined on the forests throughout the years. In the 1980s, about 236,000 AUMS were permitted on an annual basis compared to 130,000 AUMS permitted in 2011" (USDA, Range Specialist Report, 2012)

The major land uses in the 6th code watersheds addressed in the Escudilla Landscape WRAP are livestock grazing activities, recreation activities, and habitat improvement/protection of the area for various listed plant and wildlife species. Both non-consumptive recreation use (backpack trips, day hikes and winter snow activities) and consumptive recreation use (hunting and fishing) are common activities enjoyed by a large number of forest visitors in the WRAP Area. Along with the recreation use, recent litigation has mandated that habitat for listed wildlife species such as the Mexican wolf, Mexican spotted owl, a variety of endangered native fish and a host of other species is protected within the Escudilla Landscape 6th code watersheds. Other activities/uses that occur within the WRAP Area are the harvesting of fire wood and events such commercial photography and wildlife sightseeing trips.

While some investment is still being made to reduce fuel accumulations in the Wildland Urban Interface (WUI) areas on the Apache National Forest in both Arizona and New Mexico, much of this work is being done as the result of various grant funding opportunities or as a secondary benefit to wildlife habitat treatments. Some limited use of wood fiber is being made from the fuel treatment practices, but due to the limited facilities to process the abundant supply of wood fiber that is available much of the lower quality raw materials are being piled and burned.

Currently a substantial portion of the WRAP Area is starting the long process of recovering from the severe impacts to the area due to the 2011 Wallow Fire. As shown in Table 7 below, 39,385 acres of the WRAP Area were burned in the 2011 Wallow Fire. Post-fire satellite imagery indicated 1,757 acres were severely burned and 4,039 were moderately burned. While the severity of the acres burned as presented were determined immediately following the fire, the long term mortality of vegetation due to the fire is not reflected in Table 7. The large area that burned is alone enough to indicate that a significant adverse impact to the WRAP Area occurred due to the Wallow Fire.

The Wallow Fire burned during severe drought conditions and during the time of the year when the most severe impacts due to fire occur. The fire resulted in significant negative impacts to watershed conditions within the WRAP Area. Table 7 below shows the acres severely and moderately burned in the WRAP Area 6th code watersheds.

Table 7. Total Escudilla Landscape Watershed Acres Burnt in 2011 Wallow Fire

6th Code Watersheds	Acres Burned High Severity	Acres Burned Moderate Severity	Total Acres Burned	Percent Watershed Burned
Canovas Creek-Coyote Creek	546	328	2,281	7.03
Pratt Lake	5	22	210	1.65
Dry Lakes-Nutrioso Creek	0	1	3,210	17.08
Outlet Centerfire Creek	11	386	2,611	12.68
Stone Creek -San Francisco River	771	2,350	21,698	60.66
Trout Creek	258	488	5,849	27.94
Dry Blue Creek	166	464	3,526	14.08
Acres Burnt in Wallow Fire	**1,757**	**4,039**	**39,385**	**23.68**

Heavy fuel accumulations coupled with severe burning conditions that occurred during the Wallow Fire have resulted in changes to the potential productivity of a large portion of the area for many years to come. The impacts of the Wallow Fire have resulted in degraded watershed conditions on thousands of acres, which will substantially alter future yields of clean water and other resources. Future vegetative communities; thus land use opportunities especially on the heavily impacted areas, will continually change as the severely degraded areas move through successional stages of recovery and various vegetative communities develop. This process of evolving change will take many years and will effect resource production and land use activities for multiple generations.

Figure 4. Intense Burn Area on Escudilla Mountain Shortly after Wallow Fire

OVERVIEW OF CONCERNS

Even though it has taken many years to fully understand the consequences of the homestead era that took place in the late 1800s and early 1900s in the Southwest, it has become obvious that the movement of early settlers into the arid and fragile region of the Southwestern had a negative influence on watershed conditions across a large portion of the region (Webb, Leake, & Turner, 2007.) Many of the impacts of the homestead/exploitation era are still affecting land productivity, ecosystem characteristics and watershed condition/functionality.

The historic degradation of watershed condition and the various plant communities along with the severe impacts from the Wallow Fire are the primary conditions that need to be addressed in order to restore ecosystem health and enhance watershed functionality in the Escudilla Landscape 6th code watersheds. Restoration of watershed functionality and ecosystem health will result in the enhanced wetland/riparian wildlife habitat, increase the availability and prolong the flow of clean water in the areas streams, and in the long term return soil productivity to the area. As stable vegetative communities are re-established in areas that were degraded by past -management and/or uncharacteristic wildfire, ecosystem health will be restored and natural environmental process will again influence the makeup of the organisms that occur in the area.

The specific problems that need to be addressed are:

- The invasion of woody species of both trees and shrubs now occupy areas that once supported grassland and savanna ecosystems (Covington & Moore, 1994). Also the tree and shrub density within the woodland and forest ecosystems is much higher than what occurred in the past. The increase in woody plants has reduced herbaceous ground cover, thus degrading watershed health and functionality.

Figure 5. Dense Stand of Low Vigor Ponderosa Pine

- Severely burned areas that occurred during the Wallow fire need to be monitored and efforts to decrease sheet and gully erosion as well as downstream negative impacts that are resulting from the severely burned areas should be a priority.

Figure 6. Severely Burned Slopes of Escudilla Mountain

- Head cuts and gullies are still active in many of the streams and ephemeral drainages within the WRAP Area due to effects of past management and uncharacteristic wildfire. These head cuts and eroding stream banks are still releasing tons of sediment into the stream channels. Also the deep gullies and incised channels associated with past management are preventing elevated flow events from accessing the entire floodplain. The ability of many valley bottom floodplains to absorb and store water has been greatly reduced.

Figure 7. Head cut and Eroding Stream Banks in Mountain Meadow

- Channeling of flood water and erosion due to poorly located and improperly constructed roads contribute to the sediment load carried by many streams in the WRAP Area.

Figure 8. Two Track Road Crossing with Down Stream Eroding Banks

- Many of the riparian/wetland habitats and species that once were abundant in the Escudilla WRAP watersheds are only found in scattered location and in remnant populations (i.e. Bebb's willow) within the 6th code watershed due to the lowering of the water table by formation of incised channels in the broad valley bottoms.
- Riparian conditions for most of the perennial and intermittent streams in the WRAP Area are functioning-at-risk or non-functioning in PFC surveys completed since 2015.
- Some headwaters areas of Coyote Creek burned severely in the Wallow Fire. Apache trout habitat in Coyote Creek has been heavily impacted by the Wallow Fire and subsequent high flows. Currently high levels of sediment and nutrients along with scouring of the base flow channel have impacted the quality of Apache Trout habitat that once occurred in this 6th code watershed.
- Stream channel restoration in perennial and intermittent drainages, where past disturbances have resulted in gullying, headcutting, sidecutting, and changes in channel morphology and function.
- Large sediment loads and destructive flood flows are currently moving through most of the WRAP Area watersheds with each large precipitation event.
- Water quality exceedance in reaches of Coyote Creek, Nutrioso Creek, Trout Creek, Centerfire Creek and the San Francisco River.
- Noxious weed inventory and control is needed in areas where localized populations of invasive species are occurring.

IMPORTANT ECOLOGICAL VALUES

A significant portion of the Escudilla Landscape WRAP Area is comprised of land identified to have important ecological values. The following Tables 8, 9 & 10 identify the important ecological value areas, the acreage set aside for these special management locations and the 6th code watersheds where these important ecological values occur:

Table 8. Acres of Wilderness and Designated Roadless Area

Wilderness/Roadless Acres by 4th Code Watershed (River Basin)		
Little Colorado Headwaters		
6th Code Watershed	**Escudilla Wilderness Acres**	**Designated Roadless Acres**
Canovas Creek-Coyote Creek	1,359	0
TOTAL	**1,359**	**0**
San Francisco		
6th Code Watershed	**Escudilla Wilderness Acres**	**Designated Roadless Acres**
Trout Creek	1,246	332
Stone Creek-San Francisco River	0	1,126
Big Canyon-San Francisco River	0	75
Headwaters Centerfire Creek	0	4,973
Outlet Centerfire Creek	0	3,263
Dry Blue Creek	0	14,053
TOTAL	**1,246**	**23,822**
Total in WRAP Area	**2,605**	**23,822**

The Escudilla Wilderness Area along with various inventoried roadless areas are located within the WRAP Area. Vehicle access and the use of mechanized equipment to treat degraded watershed conditions are limited within these areas. This is due to prohibition of motorized uses with wilderness areas and limitations on road building within inventoried roadless areas. With these restrictions, the Forests have very limited ability to implement active management within these areas. It is planned that restoration of degraded watershed conditions and ecosystem health within these areas is and will continue to take place at a natural rate due to limited human impacts within these areas.

Table 9. Acres of Threatened and Endangered Species Designated or Proposed Critical Habitat			
TES Critical Habitat by 4th Code Watershed (River Basin)			
Little Colorado Headwaters			
6th Code Watershed	**Mexican Spotted Owl**	**Narrow Headed Garter Snake**	**Southwestern Willow Flycatcher**
Dry Lakes-Nutrioso Creek	184	0	0
Canovas Creek-Coyote Creek	10,459	0	0
Pratt Lake	409	0	0
TOTAL	**11,052**	**0**	**0**
San Francisco			
6th Code Watershed	**Mexican Spotted Owl**	**Narrow Headed Garter Snake**	**Southwestern Willow Flycatcher**
Stone Creek-San Francisco River	19,651	1,656	330
Big Canyon-San Francisco River	10,265	860	233
SA Creek	12,080	0	0
Spur Draw	642	0	0
Headwaters Centerfire Creek	0	0	0
Outlet Centerfire Creek	2,762	9	0
Dry Blue Creek	17,997	1,327	0
TOTAL	**63,397**	**3,852**	**563**
Total in WRAP Area	**74,449**	**3,852**	**563**

There is proposed critical habitat for three ESA listed terrestrial wildlife species (Mexican spotted owl *[Strix occidentalis lucida]*, Narrow-headed garter snake *[Thamnophis rufipunctatus]* and Southwestern willow flycatcher *[Empidonax traillii extimus]*) within the Escudilla WRAP Area. Watershed restoration activities planned within the designated critical habitat areas will need to go through the ESA section 7 consultation process in order to ensure that these activities will not degrade important habitat characteristic for these listed species.

Table 10. Miles of Stream Designated as Aquatic TES Critical Habitat or Recovery Habitat

Occupied and Critical Habitat Stream Miles by 4th Code Watershed (River Basin)				
Little Colorado Headwaters				
6th Code Watershed	**Apache Trout Occupied Habitat**	**Loach Minnow Critical Habitat**	**Spikedace Critical habitat**	**Spinedace Critical Habitat**
Dry Lakes-Nutrioso Creek	0.00	0.00	0.00	5.78
Canovas Creek-Coyote Creek	7.90	0.00	0.00	0.00
TOTAL	**7.90**	**0.00**	**0.00**	**5.78**
San Francisco				
6th Code Watershed	**Apache Trout Occupied Habitat**	**Loach Minnow Critical Habitat**	**Spikedace Critical Habitat**	**Spinedace Critical Habitat**
Dry Blue Creek	0.00	5.20	5.20	0.00
TOTAL	**0.00**	**5.20**	**5.20**	0.00
Total in WRAP Area	**0.00**	**5.20**	**5.20**	**0.00**

There is critical habitat designated for three ESA listed fish species (Loach Minnow *[Rhinichthys cobitis]*, Spikedace *[Meda fulgida]* and Little Colorado River Spinedace *[Lepidomeda vittata]*) within the Escudilla WRAP Area. Also there is occupied habitat for the Apache Trout (for which critical habitat has not been designated) within the Escudilla WRAP Area. Watershed restoration activities planned within the critical habitat designated stream reaches and the streams occupied by the Apache Trout may need to go through the ESA section 7 consultation process in order to assess any effects of these activities on listed species and their habitats.

Along with the critical habitat for listed terrestrial and aquatic wildlife species, three Region 3 sensitive plant species, including (White Mountain Clover *[Trifolium neurophyllum]*, groundcover milkvetch *[Astragalus humistratus]* and Goodding's Onion *[Allium gooddingii]*) are known to occur within the Escudilla Landscape WRAP Area. Plant surveys and ESA section 7 consultation will need to be completed for all watershed restoration activities that occurs within the occupied or potential habitat where these plant species could or do occur.

Sensitive species – Goshawk are found within the WRAP area, with approximately 7,440 acres of post-fledgling family area (Table 11).

Table 11. Goshawk PFA acres within WRAP Area	
6th Code Watershed	**PFA acres**
Stone Creek-San Francisco River	1431.63
Trout Creek	223.24
Big Canyon-San Francisco River	1888.55
Dry Blue Creek	2036.28
Headwaters Centerfire Creek	619.5
SA Creek	620.92
Headwaters Centerfire Creek	619.50
Grand Total	**7439.62**

Outstanding National Resource Waters – There are no Outstanding National Resource Waters within the Escudilla WRAP area.

Outstanding Arizona Waters – There are no Outstanding Arizona Waters within the Escudilla WRAP area.

Class I airsheds – The Gila Wilderness and Mount Baldy Wildernesses are both Class I airsheds. The Gila Wilderness is located approximately 24 miles to the southeast of the Escudilla WRAP area in New Mexico and the Mount Baldy Wilderness is located approximately 25.5 miles due west of the Escudilla WRAP area in Arizona.

Class II airsheds – The Escudilla Wilderness, Blue Range Wilderness, Blue Range Primitive Area, and Bear Wallow Wilderness are all Class II airsheds. The Escudilla Wilderness is located 2 miles due west of the Escudilla WRAP in Arizona; The Blue Range Wilderness (NM) and Blue Range Primitive Area (AZ) are approximately 4.5 miles south of the Escudilla WRAP area, and the Bearwallow Wilderness is located approximately 21.5 miles southwest of the Escudilla WRAP area in Arizona.

Fishery – Few if any Apache trout are present in Mamie Creek or Coyote Creek within the Escudilla WRAP area. However, both are Apache trout recovery streams as identified in the 2009 Recovery Plan (AGFD & USFWS, 1983).

TARGETED RESOURCE PRODUCTION AND RESTORATION OPPORTUNITIES

When considering the information provided in the Draft Plan, EIS and the various Specialist Reports associated with the updated ASNF Plan (Arizona portion of the Escudilla Landscape WRAP) along with the GNF Plan including the recent Travel Management Final EIS (New Mexico portion of the Escudilla Landscape WRAP), the future major land uses for the Escudilla Landscape WRAP Area will emphasize maintenance and improvement of critical wildlife habitat, improvement of ecological condition as well as non-consumptive recreation use.

An emphasis on returning to "Natural Processes" will determine the future ecosystems and the resource conditions (ecosystem health) that will occur within the WRAP Area. Active hands-on resource

management will only be practiced in and around communities and areas of heavy human activity. Closely managed human disturbance and consumptive land uses/activities will be authorized to occur in more of the WRAP Area in the future once satisfactory watershed conditions are restored.

While watershed functionality is considered to be important for the Escudilla Landscape WRAP Area in both Arizona and New Mexico in the future, changes from the traditional watershed treatment practices of the past are going to occur. Actual on-the-ground large scale thinning of trees, treating accumulations of fuels and manipulation of vegetative communities to provide specific resource conditions will be practiced in the Wildland Urban Interface (WUI) and degraded woodland/grassland areas. It is these watershed restoration management practices that will provide the forest products that the local community depends upon to maintain their local economy. Within the non WUI areas and the areas of important ecological value, natural processes will be allowed to determine watershed conditions, ecosystem health and the yield of clean water.

The Escudilla Landscape 6th code watersheds have been selected for analysis and the development of a WRAP because these watersheds make up the uppermost watersheds for the two major rivers systems (Little Colorado River and San Francisco River) that originate on the Apache National Forest. Threatened and endangered terrestrial and aquatic species, at risk or impaired watershed and riparian conditions, as well as grasslands that are highly departed from desired and historic conditions are a few reasons these watersheds ranked as high priority. The Escudilla Landscape 6th code watersheds have a high potential for restoration using a combination of mechanical and managed fire treatments. The following are examples of proposed restoration opportunities:

Restoration Opportunities

1. Reduce tree and shrub overstory through mechanical/fire treatments to restore ecosystem health and watershed functionality to Forest Plan desired conditions.
2. Treat fuels to reduce future risk of large uncharacteristic fire.
3. Decommission routes that are currently closed or non-motorized that have been identified as contributing to watershed and terrestrial resource concerns.
4. Conduct heavy road maintenance on motorized routes that are contributing to watershed degradation or lack appropriate BMPs to protect water quality and soil resources.
5. Harden, upgrade, and/or relocate stream crossings on routes that currently intersect sensitive aquatic resources.
6. Improve wildlife habitat for threatened and endangered terrestrial species through treatment of vegetative communities and by restoring functioning 6th code watershed conditions.
7. Improve fish habitat for threatened and endangered aquatic species and sensitive aquatic species through direct stream treatments and through improved upland watershed conditions.
8. Work with Arizona Game and Fish Department and New Mexico Department of Game and Fish to control non-native aquatic species and restore native aquatic species where appropriate.
9. Improve upland wildlife habitat to provide forage and needed cover for elk, deer and antelope species.
10. Rehabilitate willow populations and age classes within meadows and riparian areas.
11. Improve vegetation continuity and composition of riparian species with all age classes well represented along key perennial streams. (Restore key stream reaches to Proper Functioning Condition).
12. Improve upland wet meadows and valley bottoms by removing upland tree species.

13. Enhance and stabilize stream systems that have active erosions and destabilization occurring
14. Provide for drainage improvements at recreation areas, in particular those adjacent to riparian ecosystems and perennial and intermittent streams.
15. Reconstruct agricultural diversion systems to provide for a continuous and stabile water supply in affected streams.
16. Establish grade controls in areas that have active erosion in both uplands and channel bottoms.
17. Removal of noxious weed populations found in both uplands and channel bottoms
18. Maintain existing sediment control structures and establish new structures in areas of ongoing severe erosion.
19. Improve small game habitat using mechanical and managed fire treatments.
20. Improve rangeland vegetation conditions (species composition, ground cover) in areas of degraded rangelands associated with grazing allotments within the watershed areas.
21. Improve existing road locations, remove unauthorized routes and/or remove road generated sediment connectivity to streams.

PROCESS FOR DETERMINING CURRENT WATERSHED CONDITION RATINGS

The twelve 6th code watersheds that are being addressed in this WRAP have been assessed by an "Interdisciplinary Team" of resource specialists from the National Forest that manages the individual watersheds. These assessments were conducted using the Forest Service's Watershed Condition Classification Technical Guide (USDA, 2011). The assessment of these 6th code watersheds has resulted in a Watershed Indicator Score and Watershed Functionality Rating for each of the Little Colorado Headwaters and San Francisco 6th code watersheds addressed in this WRAP.

In the Watershed Condition Classification Technical Guide there are 12 watershed condition "Indicators" that are evaluated by assigning them various "Attributes", which are rated using a scale of 1 through 3 (1-Good – Functioning Properly, 2-Fair – Functioning at Risk, 3-Poor – Impaired Function). The ratings for the "Attributes" are averaged to determine the individual "Indicator" ratings. The 12 individual "Indicator" ratings are then averaged to determine the 6th code Watershed Score and Watershed Functionality Rating. The "Attributes" assigned to each of the 12 "Indicators" indicate the current resource management problems/activities that need to be addressed in order to improve the "Indicators" ratings; and thus the 6th code Watershed Score and Watershed Functionality Rating.

The May 2011 USDA-Forest Service Watershed Condition Framework (USDA, 2011) provides a framework for assessing and tracking changes to watershed conditions and provides national direction for implementing integrated restoration activities on priority watersheds. The watershed condition indicator datasheets found throughout this document provide useful data and important indicator/attribute information, which helps determine the actions necessary to restore watershed functionality in the Escudilla Landscape 6th code watersheds. The datasheets also play an important role in prioritizing the 6th code watersheds for treatment.

This WRAP is a key step in following the direction provided in the Watershed Condition Framework. For a copy of the Forest Service Watershed Condition Framework and Forest Service Watershed Classification Technical Guide see *www.fs.fed.us/publications/watershed/*.

Along with the latest Forest Service watershed condition assessment process, the Arizona and New Mexico, Clean Water Act 303 (d) lists of impaired waterbodies were consulted to determine the latest assessment of water quality for the streams and lakes associated with the Escudilla Landscape 6th code watersheds addressed in this WRAP. Water quality data provides an indicator of whether the 6th code watersheds are functioning properly and what problems may need to be addressed in these watersheds in order to return them to a properly functioning condition.

In the following sections, the Little Colorado Headwaters basin and the San Francisco basin will be described separately. This allows the WRAP to be split and used as a standalone document for each basin. The conditions of the 6th code watersheds within the Little Colorado Headwaters and San Francisco basins are similar, but the importance of the various "Indicators" and "Attributes" may vary between the basins as well as the downstream use of water. In addition, several important TES species are isolated to the individual river basins.

DETAILED DESCRIPTION OF LITTLE COLORADO HEADWATERS BASIN WATERSHEDS

The Dry Lakes-Nutrioso Creek, Canovas Creek-Coyote Creek, Pratt Lake and Long Lake 6th code watersheds are contained in the Coyote Creek and Nutrioso Creek 5th code watersheds and are within the Little Colorado Headwaters basin that are being address in this WRAP. (See Figure 9, Little Colorado Headwaters Overview Map) When combined, these 6th code watersheds make up the headwater watersheds located on the north side of Escudilla Mountain. These 6th code watersheds have very similar physical and biological characteristics. They have, in the past, supported the same type of human activities and are currently being managed to provide the same priority resource needs. These 6th code watershed adjoin each other and experience very similar climatic conditions.

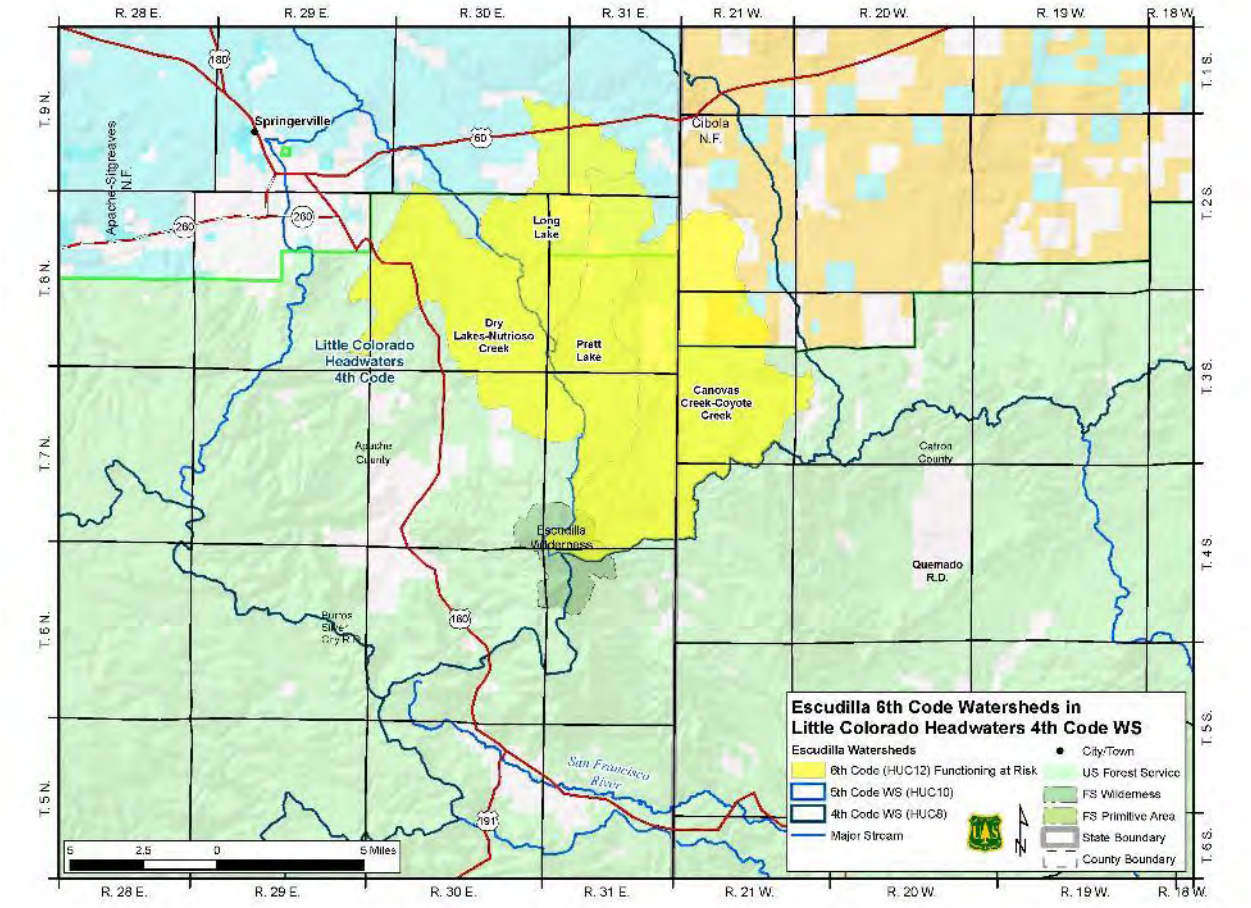

Figure 9. Little Colorado Headwaters Overview Map

Climate

Precipitation and temperature data for Springerville and Alpine Arizona (the nearest locations where long term climate information has been recorded) are being used to indicate the approximate average precipitation and daily temperatures for 6th code watershed in the Little Colorado Headwaters basin. As indicated by these data, the approximate long term average precipitation for the Little Colorado Headwaters basin in the northern low land areas is 11.95 inches (Springerville long term average) and in the southern higher mountainous area 21.75 inches (Alpine long term average).

In the lower elevation portions of the basin near Springerville most of the precipitation comes as monsoonal thunderstorms, with the remainder coming as mixed rain and snow events associated with cold fronts that sweep across the area throughout the winter. In the higher elevation portions of the 6th code watersheds near Alpine, nearly equal amounts of precipitation are received in both the summer and winter. Occasionally in the fall there are large amounts of rain associated with hurricanes that come onshore in southern Texas or northern Mexico and push large moist air masses into the area. These events often result in large amounts of rain falling in a short time period leading to flooding across much of the area.

As indicated above there is a substantial difference in annual precipitation between the high elevations mountainous and lower flatter portions of the WRAP Area. This difference is easily discerned in the rapid change in vegetative communities that occur as one travels from Alpine to Springerville.

Using the Springerville data as the best available information, the long term approximate average maximum and minimum daily temperatures are 65.6° F. and 31.3° F for the lower elevation portions of the 6th code watersheds near Springerville. The Alpine data indicates the long term approximate average maximum and minimum daily temperatures are 61.2° F. and 28.5° F for the higher mountainous portions of the 6th code watersheds near Alpine (WRCC, 2017).

The day time average high temperatures vary considerably by season with the highest average day time temperatures occurring in July and the coldest average night time temperatures occurring in December and January. Seasonal extremes can be well below 0 degrees during the winter and as high as 100 degrees during the summer. Even though there is a substantial difference between the elevation of Alpine (8050 ft.) and Springerville (6974 ft.) there is not a large difference between average maximum and minimum daily temperatures. Both Springerville and Alpine are located in valleys where cold air tends to settle, which greatly influences night time temperatures.

Hydrology

As is normal in higher elevation areas in the Southwest, which receive 20+ inches of annual precipitation, the small first and second order mountain streams that are located in the 6th code watersheds within the Little Colorado Headwaters basin are perennial, perennial interrupted or in some cases intermittent. While many of these streams are spring fed, which maintains the perennial flow, much of the maintenance flows within these streams are a direct result of snow melt and precipitation events. As is common throughout the Southwest, these steep gradient mountain streams are usually associated with high quality water, but can carry a large loads of sediment during major flow events when watershed conditions are deteriorated.

At the higher elevations these streams most often have exposed surface flows where the streams are perched on bedrock or very shallow alluvial deposits. As the streams descend in elevation, their gradient is reduced and the steep narrow canyons give way to broader valleys where wider more defined floodplains have developed. It is here the surface flows percolates into the deep alluvial deposits and the perennial flows usually disappear. Also as noted above, the amount of annual precipitation decreases substantially in the lower elevations of the northern portions of the Little Colorado Headwaters 6th code watersheds. The decrease in available run-off at the northern end of these 6th code watersheds further reduces the potential for perennial flows (Wikipedia, 2015).

The downstream portions of the Little Colorado Headwaters 6th code watersheds is where the collector second and third order streams join together to form the larger Little Colorado River that cuts through the sedimentary formations of the Colorado Plateau on to the north. Exposed surface flows again occurs within the upper Little Colorado River where the channel is perched on bedrock or very shallow alluvial deposits,

although most of the river is an ephemeral drainage below where irrigation dams and diversions have eliminated free flow conditions.

Within the mid to lower portion of the Little Colorado Headwaters 6th code watersheds there are reaches of the valley bottom alluvial floodplains that support wetland/riparian vegetation and some exposed surface flows. These key wetland habitat reaches are at high risk of being swamped with sediments and nutrients coming from the severely burnt areas of the Wallow Fire. It will take years for the potential sediment and nutrient loads from the Wallow Fire to become stabilized or wash through these key wetlands. Any efforts that can be implemented to reduce or stabilized the flow of nutrients and sediments from the Wallow Fire will help preserve these key wetland habitats.

Geomorphology

The Long Lake, Pratt Lake and Canovas Creek-Coyote Creek 6th code watersheds are located in and make up the headwater watersheds of the Coyote Creek 5th code watershed. All of the streams/arroyos that flow from these 6th code watersheds originate in Arizona except for Canovas Creek, which originates on the east side of Coyote Creek in New Mexico. Coyote Creek is the mainstem drainage in which all of the water that originates in these 6th code watershed collects and flows north. Coyote Creek eventually drains into the Little Colorado River approximately 8 miles north of Springerville, Arizona and 10 miles downstream of the forest boundary.

As described above, Coyote Creek and the numerous tributaries that feed into it in the higher elevation mountainous terrain are typical narrow, single channel, high gradient, perennial and intermittent streams. As Coyote Creek descends out of the mountainous terrain surrounding Escudilla Mountain, it flows into the Colorado Plateau region where the terrain is made up of nearly vertical wall basalt mesas that are surrounded by nearly flat bottom valleys. It is here that Coyote Creek fans out across the valley floor and becomes multiple braided channels where the base flow percolates into the ground and most evidence of a defined channel is lost. The only time flowing water is present in these reaches of Coyote Creek is following a major precipitation event.

There are a few reaches of Coyote Creek where the stream has carved its way through vertical wall basalt mesas and where water is forced back into a narrow channel as it runs through the narrow incised channel/canyon feature. These very confined channels, which run through bedrock formations sometimes flow for prolonged periods of time and are important habitat for a variety of plant and animal species, including the endangered Apache trout.

The Dry Lakes-Nutrioso Creek 6th code watershed is located below the high elevation mountainous terrain and encompasses a mid-level reach of Nutrioso Creek within the Nutrioso Creek 5th code watershed. This 6th code watershed is made up of mostly mesas top flat areas, steep mesa sides and the Nutrioso Creek drainage that bisects the watershed. This watershed encompasses a reach of the Nutrioso Creek drainage and multiple short ephemeral drainages that come off the mesas. Nutrioso Creek flow out of this 6th code watershed near Springerville where it then drains into the Little Colorado River.

This 6th code watershed is below Nelson Reservoir so the flows of Nutrioso Creek through this 6th code watershed are regulated and influenced by the dam and water impoundment above. Nutrioso Creek remains perennial intermittent through this 6th code watershed most probably due to seepage from the reservoir above.

Geology

The geology of Long Lake, Pratt Lake and Canovas Creek-Coyote Creek 6th code watersheds is a complex of basalt and volcanic tuff (sedimentary) geologic formations that are intermixed and show up as the surface parent material layer depending upon elevation and the degree to which the area as eroded (USDI, 1961**).** The mineral deposits that make up the area are igneous rock formations of various ages (Springerville volcanic field, Bear Wallow Mountain andesite along with the sedimentary volcanic tuff formation referred to as the Datil or Pueblo Creek formation). These volcanic tuff formations are a naturally cemented combination of the various volcanic mineral deposits of the area (Arizona Geological Survey Contributed Report, 1994).

The upper Escudilla Mountain portion of the 6th code watersheds is made up of a basalt cap formation (Bearwallow Mountain andesite) that covers the very upper portion of the mountain. Below this layer is a thick layer of what has potentially been identified as Bloodgood Canyon tuff. This layer makes up a large portion of the lower slopes of the mountain and the area that surrounds Escudilla Mountain.

To the north at the lower elevation portions of the Little Colorado Headwaters 6th code watersheds are located what has been identified as the Datil or Pueblo Creek formation which is capped to the north with the young basalt formation of the Springerville volcanic fields. The capping of the Datil or Pueblo Creek formation with the young basalt of the Springerville volcanic field makes the land form and hydrology of the area unique and also adds a high level of variability in soil productivity and erosion potential.

The weathering of these various geological formations makes up the rock fragments and soils found on the surface of the 6th code watersheds. Due to the substantial mixing of different volcanic and sedimentary formations in these watersheds, the soils found in these 6th code watershed are also found in a patchy network of soil types. Also multiple basalt extrusions that form dike like structures that forces water to the surface and into single narrow channels also greatly influence the hydrology and geomorphology of these 6th code watersheds.

Soils

The soils that make up 6th code watersheds in the Little Colorado Headwaters basin are derived mostly from andesite, volcanic tuff, and recent lava flow type basalt parent material. The soils formed from these parent materials are generally made up of small to very small size particles and tend to be fairly fertile soils. Depending upon the soil texture and other characteristics of the soils, these soils can be moderate to highly erodible when not protected by herbaceous vegetation. Without adequate ground cover to protect these soils, they tend to erode quickly and will continue to erode until herbaceous ground cover can be reestablished. These soils tend to retain soil moisture fairly well, but due to the various characteristic of the different soils, the rate at which these soils become wetted can vary substantial and the degree to which these different soils give up water and nutrients to plants can also vary greatly (USDA, 2016).

Wildlife

The wildlife species that occur in the 6th code watersheds within the Little Colorado Headwaters watersheds are the same species that can be found in most high elevation ecosystems in the Southwest. Comprehensive lists of all classes of wildlife species, the vegetative communities they reside in and other pertinent information about these species can be found in the ASNF Forest Planning Specialist Report (USDA, 2014). This detailed report, while done for the ASNF in Arizona, contains information that is also applicable to the New Mexico portion of the Little Colorado Headwaters 6th code watersheds.

The only "Critical Habitat" (CH) for terrestrial wildlife species that is located within the Little Colorado Headwaters 6th code watersheds is Mexican Spotted Owl (MSO) CH. This CH is locate in the higher

elevation Mixed Conifer and Ponderosa Pine vegetative communities, which was impacted the most by the Wallow Fire. Table 12 provides the acres of MSO CH within the Little Colorado Headwaters 6th code watersheds.

While watershed condition and management objectives do not directly overlap with wildlife management objectives, there is a direct correlation between healthy watersheds and high quality wildlife habitat that applies to many wildlife species. Since most wildlife species are mobile and can seek out areas that provide for their needs, functioning watersheds and healthy ecosystems within the Little Colorado Headwaters 6th code watersheds will mostly likely be sought out and used by the wildlife that need the conditions that functioning watersheds will provide.

Table 12. Acres of Mexican Spotted Owl Critical Habitat in Little Colorado River Headwaters 6th code watersheds

6th Code Watersheds	Mexican Spotted Owl CH Acres
Canovas Creek-Coyote Creek	10,459
Pratt Lake	409
Dry Lakes-Nutrioso Creek	184
Total	**11,052**

Fisheries

There are several fish species that occur within the Little Colorado Headwaters 6th code watersheds. A list of the native and non-native fish species and the streams where they are present can be found in the ASNF Forest Planning Specialist Report (USDA, 2014). This detailed report, while done for the ASNF in Arizona, contains information that is also applicable to the New Mexico portion of the Little Colorado River Headwaters 6th code watersheds.

Apache Trout and the Little Colorado spinedace are federally listed fish species located within the Little Colorado River Headwaters 6th code watersheds. Reaches of streams have been designated as critical habitat for the Little Colorado spinedace. The Little Colorado spinedace critical habitat is located in the lower elevation perennial stream segments of the Dry Lakes – Nutrioso Creek 6th code watershed. Table 13 provides the stream name and miles of occupied stream habitat for the Apache trout and miles of critical habitat for the Little Colorado spinedace within the Little Colorado River Headwaters 6th code watersheds.

Table 13. Miles of Apache Trout Recovery Habitat and Spinedace critical habitat in Little Colorado 6th Code Watersheds			
6th Code Watersheds	**Stream Name**	**Miles of Apache Trout Recovery Stream**	**Miles of Little Colorado Spinedace Critical Habitat**
Canovas Creek-Coyote Creek	Coyote Creek & Morrison Creek	5.5	
	Mamie Creek	2.4	
Dry Lakes-Nutrioso Creek	Nutrioso Creek		5.78
	Total	**7.9**	**5.78**

Vegetation

Uplands

Table 14 identifies the vegetation communities that make up the Little Colorado River Headwaters 6th code watersheds. These communities are classified by ecological response units (ERU). ERUs are map unit constructs that combine themes of site potential, historic disturbance regimes, and natural succession (USDA FS 2015a) and represent all major ecological types in the area. ERUs site potential is a term used to describe the characteristic ecological conditions at the latest successional state, resulting from interactions among climate, soil, and vegetation.

Table 14. 6th Code Ecological Response Unit (ERU) Summary for Little Colorado River 6th Code Watersheds		
6th Code Watersheds - ERU	**Acres**	**% of 6th Code**
Little Colorado Headwaters-15020001		
Canovas Creek-Coyote Creek-150200010302	**32,466**	**100.00%**
Colorado Plateau / Great Basin Grassland	9,085	27.98%
Herbaceous (wetland)	480	1.48%
Juniper Grass	1,655	5.10%
Mixed Conifer - Frequent Fire	2,599	8.01%
Mixed Conifer w/ Aspen	1,693	5.22%
Montane / Subalpine Grassland	2,884	8.88%
Narrowleaf Cottonwood / Shrub	45	0.14%
PJ Grass	937	2.89%
PJ Woodland	1,151	3.55%
Ponderosa Pine Forest	10,936	33.68%
Sparsely Vegetated	6	0.02%
Spruce-Fir Forest	945	2.91%
Water	6	0.02%
Willow - Thinleaf Alder	44	0.13%

Dry Lakes-Nutrioso Creek-150200010106	**18,795**	**100.00%**
Colorado Plateau / Great Basin Grassland	15,387	81.87%
Herbaceous (wetland)	24	0.13%
Juniper Grass	77	0.41%
Mixed Conifer - Frequent Fire	73	0.39%
Montane / Subalpine Grassland	655	3.48%
PJ Woodland	2,277	12.11%
Ponderosa Pine Forest	200	1.07%
Willow - Thinleaf Alder	101	0.54%
Long Lake-150200010304	**12,315**	**100.00%**
Colorado Plateau / Great Basin Grassland	8,861	71.95%
Herbaceous (wetland)	32	0.26%
Juniper Grass	2,106	17.10%
PJ Grass	204	1.66%
PJ Woodland	1,021	8.29%
Ponderosa Pine Forest	91	0.74%
Pratt Lake-150200010303	**12,735**	**100.00%**
Colorado Plateau / Great Basin Grassland	7,147	56.12%
Herbaceous (wetland)	41	0.32%
Juniper Grass	195	1.53%
Mixed Conifer - Frequent Fire	14	0.11%
Mixed Conifer w/ Aspen	15	0.12%
Montane / Subalpine Grassland	557	4.37%
PJ Grass	248	1.95%
PJ Woodland	1,110	8.71%
Ponderosa Pine Forest	3,367	26.44%
Sagebrush Shrubland	29	0.23%
Water	12	0.09%

The vegetation found growing within the Little Colorado River Headwaters 6th code watersheds is heavily influenced by local intrinsic factors, such as elevation, aspect, land form, soil type and the level of past disturbance. At the upper elevations of the 6th code watersheds, on the top of the highest peaks the dominant vegetation is comprised of mixed conifer species. Where mixed conifer forests have been disturbed by past fires, aspen still dominates the tree composition. The mixed conifer vegetation communities (conifer and aspen) are present due to mainly the high amounts of precipitation and the cold winter temperatures that occur. These vegetative communities were severely burnt in the recent Wallow Fire. Aspen tends to dominate some of the high elevation burned areas as they recover if clones are already present in the area.

Below the high elevation peaks at the top of Escudilla Mountain are the steep to moderate slopes that make up a large portion of the mountain. The dominant vegetative community that occurs on these slopes is ponderosa pine. There is a major change in the soils between the andesite cap found on top of Escudilla Mountain and the lower volcanic tuff formation that occurs below. This change in soils along with lower

amounts of precipitation and warmer temperatures are responsible for the change from the high moisture dependent wet mixed conifer vegetation to the dryer climate dependent ponderosa pine forest stands.

Below the ponderosa pine covered slopes of Escudilla Mountain, pinyon-juniper woodlands and a small scattering of pine-oak woodlands occur. These woodlands are again located on a volcanic tuff (Datil or Pueblo Creek formation) derived soils which are considered highly erosive. Pinyon-juniper woodlands make up the largest vegetation communities within the Little Colorado River Headwaters 6th code watersheds. The pinyon-juniper woodlands are located on the mesas and in the valleys below Escudilla Mountain. This vegetation community is associated with areas dominated by lower annual precipitation and soils that tend to have a high clay content and are alkaline in nature (USDA, 2014).

Grassland vegetation communities dominate the north end of the Little Colorado River Headwaters 6th code watersheds. The soils that make up this area are derived from the more recent Springerville volcanic flows. These recently formed basalt soils are considered to be fairly fertile when compared to the soils that make up the surrounding area. The grasslands occupy an area of low precipitation and fairly cold climate. The occurrence of this plant community on the north end of the Little Colorado River Headwaters 6th code watersheds can be linked to the soils derived from the Springerville volcanic flows.

Riparian

The wetland/riparian plant associations linked with the White Mountain-San Francisco Peak-Mogollon Rim Ecoregion are the vegetation classifications being used to describe the wetland/riparian vegetation communities addressed in this WRAP. The wetland/riparian associations identified in this ecoregion are Wetland/Cienaga, Cottonwood-Willow, Mixed Broadleaf Deciduous and Montane Willow. Only three of these plant associations are represented in the Little Colorado River Headwaters 6th code watersheds. (Wetland/Cienaga, Cottonwood-Willow and Montane Willow).

The specific wetland/riparian communities located within the Little Colorado River Headwaters 6th code watersheds consist of Herbaceous Riparian, Narrowleaf Cottonwood/Shrub and Willow-Thinleaf Alder. Table 15 shows which ecoregion riparian plant association the specific wetland/riparian vegetation communities are associated with:

Table 15. Link between Riparian Plant Associations and LCR Vegetation Communities

LCR VEGETATION COMMUNITY LINK TO ECOREGION PLANT COMMUNITY ASSOCIATION			
Ecoregion Association	**Herbaceous Riparian**	**Narrowleaf Cottonwood/Shrub**	**Willow-Thinleaf Alder**
Wetland/Cienaga	**X**		
Cottonwood-Willow		**X**	
Montane Willow			**X**

The Wetland/Riparian vegetation communities that are found within the Little Colorado River Headwaters 6th code watersheds consist of Herbaceous Riparian, Narrowleaf Cottonwood/Shrub and Willow-Thinleaf Alder. Table 16 shows the acres of each Wetland/Riparian vegetation community found on National Forest lands in the separate 6th code watersheds.

Table 16. Acres of Wetland/Riparian Vegetation Communities on NF Land in LCR 6th Code Watersheds

6th Code Watersheds	Herbaceous Riparian	Narrowleaf Cottonwood/Shrub	Willow-Thinleaf Alder	Total Acres of Riparian Habitat
Canovas Creek-Coyote Creek	203	33	24	260
Long Lake	0	0	0	0
Pratt Lake	0	0	0	0
Dry Lakes-Nutrioso Creek	24	101	0	125
Total of Specific Riparian Type	**227**	**134**	**24**	**385**

The following Table 17, shows acres of each Wetland/Riparian vegetation community found on State and private land in the separate 6th code watersheds.

Table 17. Acres of Wetland/Riparian Vegetation Communities on State/Private Land in LCR 6th Code Watersheds

6th Code Watersheds	Herbaceous Riparian	Narrowleaf Cottonwood/Shrub	Willow-Thinleaf Alder	Total Acres of Riparian Habitat
Canovas Creek-Coyote Creek	208	12	20	240
Long Lake	32	0	0	32
Pratt Lake	41	0	0	41
Dry Lakes-Nutrioso Creek	0	0	1	1
Total of Specific Riparian Type	**281**	**12**	**21**	**314**

Table 18 shows the number of acres of each Wetland/Riparian vegetation community found on all lands within the separate 6th code watersheds.

Table 18. Total Acres of Wetland/Riparian Vegetation Habitat in Little Colorado 6th Code Watersheds

	Herbaceous Riparian	Narrowleaf Cottonwood/Shrub	Willow-Thinleaf Alder	Total Acres of Riparian Habitat
Total Riparian Habitat National Forest	227	134	24	385
Total Riparian Habitat State and Pvt.	281	12	21	314
Total Riparian Habitat LCR Watersheds	**508**	**146**	**45**	**699**

The wetland/riparian vegetation found growing within the Little Colorado River Headwaters 6th code watersheds is heavily influenced by local intrinsic factors, such as elevation, aspect, land form, soil type, level of past disturbance, and the availability of perennial water. The herbaceous riparian vegetation community identified in the Little Colorado River Headwaters 6th code watersheds is located in the broad valley bottoms and intermittent lake bed type terrain where water accumulates in low lying areas. This vegetation community supports true obligate herbaceous riparian plant in small isolated patches where water is present for most of the year. Where water is not present for most of the year, the vegetation community supports species that thrive in wetter areas, but do not depend upon having hydrated soils yearlong to survive. This vegetation community is located in areas of moderate to high annual precipitation.

The narrowleaf cottonwood/shrub vegetation community is associated mid-elevation third or fourth order streams and is a true obligate riparian plant community. This vegetation community is dependent upon perennial flows and is usually found close to the stream edge or where the flood plain soils are shallow and the water table is near the surface. This vegetation plant community is usually found in areas that receive moderate to high annual precipitation

The willow-thinleaf alder vegetation community is associated with the steep gradient mountain streams and supports true obligate riparian species. This vegetation community is usually found growing in rocky and/or gravely substrates and depends upon having perennial or nearly perennial flows. The willow-thinleaf alder community is found at higher elevations within the Little Colorado River Headwaters 6th code watersheds where higher levels of annual precipitation are common.

WATERSHED CONDITION

Watershed condition encompasses both aquatic and terrestrial processes and functions as the quality of water and aquatic habitat is inseparably linked to the integrity of uplands and riparian areas within a watershed. Aspects of a watershed related to geomorphic integrity can be defined in terms of attributes such as slope stability, soil productivity, channel morphology and other upslope, riparian and aquatic habitat characteristics. Hydrologic integrity of a watershed is related primarily to flow, sediment and water quality attributes. Biological integrity can be defined by the aquatic

characteristics that influence the diversity and abundance of species. In each case, integrity must be evaluated in the context of the natural disturbance regime, geoclimatic setting and other important factors. The geomorphic, hydrologic, and biologic components are then combined and evaluated as a whole to assess watershed integrity and health.

Three classes are used to describe watershed condition (USDA Forest Service 2004, FSM 2521.1):

1. Class 1 watersheds exhibit high geomorphic, hydrologic, and biotic integrity relative to their natural potential condition.
2. Class 2 watersheds exhibit moderate geomorphic, hydrologic, and biotic integrity relative to their natural potential condition.
3. Class 3 watersheds exhibit low geomorphic, hydrologic, and biotic integrity relative to their natural potential condition.

Watershed condition classification was initially completed for both the Apache-Sitgreaves National Forests and the Gila National Forest, at the subwatershed level (6th code), in 2012 and 2011, respectively. A review and reclassification (if necessary) of all Forest watersheds was completed in 2015. The watersheds were classified as being in one of the three condition classes noted above, as translated to functionality.

- Class 1 = Functioning Properly,
- Class 2 = Functioning at Risk, and
- Class 3 = Impaired Function.

Table 19 summarizes the watershed functionality ratings of the Little Colorado River Basin sixth code watersheds included in this WRAP. All four watersheds are rated "Functioning at Risk". The following watershed condition datasheets provide useful data and important indicator/attribute information, which helps determine the actions necessary to restore watershed functionality in the Escudilla Landscape 6th code watersheds. The datasheets also play an important role in prioritizing the 6th code watersheds for treatment by identifying key watershed issues. The Little Colorado River Basin watersheds are primarily on the Apache-Sitgreaves NFs and were rated in 2011.

Table 19. Watershed Score and Watershed Functionality Rating for LCR watersheds

Watershed Score by 4th Code Watershed (River Basin)		
Little Colorado River Basin		
6th Code Watersheds	**Watershed Score**	**Watershed Functionality Rating**
Canovas Creek-Coyote Creek	1.8	Functioning at Risk
Long Lake	1.9	Functioning at Risk
Pratt Lake	2.0	Functioning at Risk
Dry Lakes-Nutrioso Creek	2.1	Functioning at Risk

Attributes/Indicator within FS control to affect: The Forest Service has the ability to influence and/or address, to some extent, all attributes with assistance of partners and cooperators. The Little Colorado River watersheds are jointly managed by the Forest Service (ASNF and GNF), Bureau of Land Management, states of Arizona and New Mexico, and various private land owners. The Forests manage those under Forest Service jurisdiction and often collaborate with neighbors during treatment proposals. Roads within

the watershed include those managed as National Forest System (NFS) roads, Catron and Apache County roads, and state and federal highways. The Forests are responsible for maintenance of the NFS roads and make work with county, state, and federal partners to complete work during times of emergency or when other opportunities present themselves.

Attributes/beyond FS control to affect-other parties need to address – The Forest Service has the ability to influence and/or address most of the attributes with assistance of partners and cooperators. County Roads are numerous in the four Little Colorado River watersheds, however the Forests may partner with the counties to achieve mutual benefits. Numerous private land parcels are located within the watersheds. The Forests often complete work to reduce risk to these neighboring lands, with emphasis paid to reducing wildfire risk to the urban interface.

Canovas Creek-Coyote Creek

Table 20. Canovas Creek-Coyote Creek watershed condition datasheet

2011 CANOVAS CREEK-COYOTE CREEK WATERSHED CONDITION INDICATORS					
INDICATOR	ATTRIBUTE	ATTRIBUTE SCORE	INDICATOR SCORE	WEIGHT	RATING RATIONALE
Aquatic Physical					
1 Water Quality	Impaired Waters (303)d Listed	1	1.5	10%	
	Water Quality Problems (Not Listed)	2			
2 Water Quantity	Flow Characteristics	1	1	10%	
3 Aquatic Habitat	Habitat Fragmentation	2	2.3	10%	
	Large Woody Debris	2			
	Channel Shape and Function	3			
Aquatic Biota					
4 Aquatic Biota	Life Form Presence	2	1.7	15%	
	Native Species	2			
	Exotic and/or Invasive Species	1			
5 Riparian/Wetland Vegetation	Vegetative Condition	2	2	15%	
Terrestrial Physical					
6 Roads and Trails	Open Road Density	2	2	15%	Calculated score
	Road Maintenance	3			
	Proximity to Water	2			Calculated score
	Mass wasting	1			
7 Soils	Soil Productivity	2	2	15%	Terrestrial Ecosystem Survey information
	Soil Erosion	3			
	Soil Contamination	1			
Terrestrial Biological					
8 Fire Regime or Wildfire	Fire Regime Condition Class	3	3	2%	
	Wildfire Effects	n/a			
9 Forest Cover	Loss of Forest Cover	No entry	No entry	2%	
10 Rangeland Vegetation	Vegetation Condition	2	2	2%	
11 Terrestrial Invasive Species	Extent and Rate of Spread	1	1	2%	
12 Forest Health	Insects and Disease	1	1	2%	
	Ozone				Calculated score
Watershed Score		**1.8**			

The above watershed condition classification assessment data and the ADEQ water quality data indicate the major watershed functionality problems for the Canovas Creek-Coyote Creek 6th code watershed are: 1) Degraded water quality due to high levels of conductivity in Canovas Creek and well as sediment input throughout the watershed, 2) Poor condition aquatic habitat due to fragmentation by road crossings and user created roads, low recruitment of larger woody debris in the lower end of the watershed, 3) Degraded aquatic biota due to lack of native species caused by water temperature and low flows, 4) Degraded riparian vegetation conditions related to past management practices, and current ungulate grazing, 5) Roads and

trails are adding to degraded watershed conditions due to low priority for road maintenance in the watershed, high open road densities, and many roads being within or too close to streams, 6) Soil condition is rated as poor due to the lack of adequate ground cover to prevent soil loss, 7) Risk of catastrophic fire is high due to past exclusion of fire and lack of fuels management in the watershed.

Long Lake

Table 21. Long Lake watershed condition datasheet

2011 LONG LAKE WATERSHED CONDITION INDICATORS					
INDICATOR	ATTRIBUTE	ATTRIBUTE SCORE	INDICATOR SCORE	WEIGHT	RATING RATIONALE
Aquatic Physical					
1 Water Quality	Impaired Waters (303)d Listed	1	2	10%	
	Water Quality Problems (Not Listed)	3			Datil
2 Water Quantity	Flow Characteristics	2	2	10%	Tanks
3 Aquatic Habitat	Habitat Fragmentation	2	2	10%	Est
	Large Woody Debris	n/a			
	Channel Shape and Function	2			
Aquatic Biota					
4 Aquatic Biota	Life Form Presence	2	2	15%	Est
	Native Species	2			
	Exotic and/or Invasive Species	2			
5 Riparian/Wetland Vegetation	Vegetative Condition	2	2	15%	Est
Terrestrial Physical					
6 Roads and Trails	Open Road Density	1	1.3	15%	Calculated score
	Road Maintenance	2			
	Proximity to Water	1			Calculated score
	Mass wasting	1			
7 Soils	Soil Productivity	2	1.7	15%	Terrestrial Ecosystem Survey information
	Soil Erosion	2			
	Soil Contamination	1			
Terrestrial Biological					
8 Fire Regime or Wildfire	Fire Regime Condition Class	3	3	2%	Rating based on Ecological Sustainability Report for the Revision of the Apache-Sitgreaves NFs' Forest Plan, 2009.
	Wildfire Effects	n/a			
9 Forest Cover	Loss of Forest Cover	No entry	No entry	2%	
10 Rangeland Vegetation	Vegetation Condition	2	2	2%	
11 Terrestrial Invasive Species	Extent and Rate of Spread	1	1	2%	
12 Forest Health	Insects and Disease	1	1	2%	RO Data
	Ozone	1			Calculated score
Watershed Score		**1.9**			

The above watershed condition classification assessment data and the ADEQ water quality data indicate the major watershed functionality problems for the Long Lake 6th code watershed are: 1) Degraded water quality due to exceedance in suspended sediments in tributaries to Coyote Creek, 2) Degraded flow characteristics due to multiple tanks throughout the watershed, 3) Poor condition aquatic habitat due to fragmentation cause by water temperature and dewatering, 4) Degraded aquatic biota due to lack of native species caused lack of perennial water, 5) Degraded riparian vegetation conditions due to mostly ephemeral channels, 6) Roads and trails are adding to degraded watershed conditions due to low priority for road and trail maintenance in the watershed, 7) Soils rated as being impaired due to the lack of adequate ground cover to prevent soil loss, 8) Risk of catastrophic fire is high due to past exclusion of fire and lack of fuels management in the watershed.

Pratt Lake

Table 22. Pratt Lake watershed condition datasheet

2011 PRATT LAKE WATERSHED CONDITION INDICATORS					
INDICATOR	ATTRIBUTE	ATTRIBUTE SCORE	INDICATOR SCORE	WEIGHT	RATING RATIONALE
Aquatic Physical					
1 Water Quality	Impaired Waters (303)d Listed	1	1.5	10%	
	Water Quality Problems (Not Listed)	2			
2 Water Quantity	Flow Characteristics	2	2	10%	
3 Aquatic Habitat	Habitat Fragmentation	2	2	10%	
	Large Woody Debris	n/a			
	Channel Shape and Function	2			
Aquatic Biota					
4 Aquatic Biota	Life Form Presence	2	2.3	15%	
	Native Species	2			
	Exotic and/or Invasive Species	3			
5 Riparian/Wetland Vegetation	Vegetative Condition	2	2	15%	
Terrestrial Physical					
6 Roads and Trails	Open Road Density	2	2.3	15%	Calculated score
	Road Maintenance	3			
	Proximity to Water	3			Calculated score
	Mass wasting	1			
7 Soils	Soil Productivity	2	1.7	15%	Terrestrial Ecosystem Survey information
	Soil Erosion	2			
	Soil Contamination	1			
Terrestrial Biological					
8 Fire Regime or Wildfire	Fire Regime Condition Class	3	3	2%	
	Wildfire Effects	n/a			
9 Forest Cover	Loss of Forest Cover	No entry	No entry	2%	
10 Rangeland Vegetation	Vegetation Condition	2	2	2%	
11 Terrestrial Invasive Species	Extent and Rate of Spread	1	1	2%	
12 Forest Health	Insects and Disease	1	1	2%	
	Ozone				Calculated score
Watershed Score		**2.0**			

The above watershed condition classification assessment data and the ADEQ water quality data indicate the major watershed functionality problems for the Pratt Lake 6th code watershed are: 1) Degraded water quality due to improper road locations, erosive soils that are located within the watershed and exceedance in suspended sediments in tributaries to Coyote Creek, 2) Degraded flow characteristics due to stock tanks capturing flows within the watershed, 3) Poor condition aquatic habitat due to level of road-stream crossings, 4) Degraded aquatic biota due to low native species to exotic species ratio and crayfish present within the watershed, 5) Degraded riparian vegetation conditions due to most being rated "functioning at

risk", 6) Roads and trails are adding to degraded watershed conditions due to low priority for road and trail maintenance in the watershed and roads being in proximity to water, 7) Soils rated as being impaired due to lack of adequate ground cover and removal of ground cover by the Wallow Fire, 8) Risk of catastrophic fire is high due to past exclusion of fire and lack of fuels management in the watershed where they were not consumed in the Wallow Fire.

Dry Lake-Nutrioso Creek

Table 23. Dry Lakes – Nutrioso Creek watershed condition datasheet

2011 DRY LAKES-NUTRIOSO CREEK WATERSHED CONDITION INDICATORS					
INDICATOR	ATTRIBUTE	ATTRIBUTE SCORE	INDICATOR SCORE	WEIGHT	RATING RATIONALE
Aquatic Physical					
1 Water Quality	Impaired Waters (303)d Listed	1	2	10%	
	Water Quality Problems (Not Listed)	3			
2 Water Quantity	Flow Characteristics	3	3	10%	
3 Aquatic Habitat	Habitat Fragmentation	3	2.3	10%	
	Large Woody Debris	2			
	Channel Shape and Function	2			
Aquatic Biota					
4 Aquatic Biota	Life Form Presence	2	2.3	15%	
	Native Species	2			
	Exotic and/or Invasive Species	3			
5 Riparian/Wetland Vegetation	Vegetative Condition	2	2	15%	
Terrestrial Physical					
6 Roads and Trails	Open Road Density	2	2	15%	Calculated score
	Road Maintenance	2			
	Proximity to Water	3			Calculated score
	Mass wasting	1			
7 Soils	Soil Productivity	2	1.7	15%	Terrestrial Ecosystem Survey information
	Soil Erosion	2			
	Soil Contamination	1			
Terrestrial Biological					
8 Fire Regime or Wildfire	Fire Regime Condition Class	2	2	2%	
	Wildfire Effects	n/a			
9 Forest Cover	Loss of Forest Cover	No entry	No	2%	
10 Rangeland Vegetation	Vegetation Condition	2	2	2%	
11 Terrestrial Invasive Species	Extent and Rate of Spread	1	1	2%	
12 Forest Health	Insects and Disease	1	1	2%	
	Ozone				Calculated score
Watershed Score		**2.1**			

The above watershed condition classification assessment data and the ADEQ water quality data indicate the major watershed functionality problems for the Dry lakes-Nutrioso Creek 6th code watershed are: 1) Degraded water quality due to exceedance of sediment standards and input of sediments from ephemeral channels, 2) Degraded flow characteristics due to Nelson Reservoir capturing and regulating flows, 3) Poor condition aquatic habitat due to Nelson Reservoir fragmenting the habitat and legacy entrenchment of channel, 4) Degraded aquatic biota due to exotic species from Nelson Reservoir and crayfish present within the watershed, 5) Degraded riparian vegetation conditions due to most being rated "functioning at risk", 6) Road and trail density adding to degraded watershed conditions, low priority for road and trail maintenance in the watershed and roads being located in ephemeral drainages (Murray Basin), 7) Soils rated as being impaired due to lack of adequate ground cover, 8) Risk of catastrophic fire is high due to past exclusion of fire and lack of fuels management in the watershed where they were not consumed in the Wallow Fire.

In addition to the Watershed "Indicator" and "Attribute" data presented above, ADEQ has found water quality exceedances for Coyote Creek (from the New Mexico line to the Little Colorado River) and for Nutrioso Creek (from Nelson Reservoir to Picnic Creek). These two findings are influenced by all four of the Little Colorado Headwaters 6th code watershed addressed in the WRAP. The Coyote Creek exceedance is for suspended sediment concentrations and biocriteria and is associated with the Canovas Creek-Coyote Creek, Long Lake, and Pratt Lake 6th code watersheds. The Nutrioso Creek exceedance is for dissolved oxygen, pH and suspended sediment concentrations and is associated with the Dry Lakes-Nutrioso Creek 6th code watershed.

LITTLE COLORADO RIVER BASIN RESTORATION GOALS, OBJECTIVES AND OPPORTUNITIES

Goal Identification and Desired Condition.

The Forest's goals for the Little Colorado Basin's watersheds include restoration of upland vegetation, reducing the risk of uncharacteristic wildfire, reestablishing riparian vegetation, improving stream channel stability across the watershed, maintaining soil productivity, reducing soil erosion, removing noxious plants, improving aquatic and terrestrial wildlife habitat, and improving overall water quality within streams and waterbodies. Reaching these goals would assist in achieving the goal of moving the watersheds out of Functioning at Risk condition classes and into Properly Functioning condition classes.

The following items denote specific desired conditions that will be focused on:

- Reestablish herbaceous vegetation on upland slopes where the Wallow Fire burned;
- Reestablish forested conditions in select areas;
- Improve aesthetic appearance of burned area;
- Reduce upland vegetation in areas of high tree densities to reduce risk of high severity wildfire;
- Improve soil condition/productivity;
- Improve water quality in Coyote Creek, Mamie Creek, Lily Creek, Nutrioso Creek and Little Colorado River;
- Increase riparian vegetation in Coyote Creek, Mamie Creek, Lily Creek, Nutrioso Creek, and Little Colorado River;
- Improve aquatic habitat in Coyote Creek, Mamie Creek, Lily Creek, Nutrioso Creek, and Little Colorado River;

- Improve road drainage in roads of all maintenance levels across the watersheds;
- Reduce sediment movement in watershed drainage network;
- Protect upland meadows and grasslands from conifer encroachment
- Reduce the occurrence of noxious weeds;

Objectives

Alignment with National, Regional, or Forest Priorities.

These watersheds are all currently in Functioning at Risk condition. They have a high potential for completing work and moving it into the Properly Functioning condition class within a 5 to 10 year timeframe.

Objectives include: restoring of safety, physical and biological integrity, and human use/enjoyment. The plan will utilize interdisciplinary teams and partners as appropriate in assessment and environmental analysis of proposed activities. The plan will also continue to add site-specific information as it becomes available.

An estimated 22,345 acres burned with high intensity during the Wallow Fire. Priorities for treatment have been high-severity burn areas with good rehabilitation potential and need, moderately burned areas with specific needs, and all areas with values at risk. It is recognized that climate will be a major factor, and some treated areas have failed during major weather events. "Good" rehabilitation potential is a site-specific evaluation by resource specialists, considering a variety of factors.

Restoration goals and objectives for the Little Colorado River basin watersheds tie into National priorities based on the guidance in the 2015-2020 Forest Service Strategic Plan (http://www.fs.fed.us/strategicplan) which outlines the following goals:

- Goal 1: Sustain Our Nation's Forests and Grasslands;
- Goal 2: Deliver Benefits to the Public;
- Goal 3: Apply Knowledge Globally;
- Goal 4: Excel as a High-Performing Agency.

Restoration goals and objectives for the Little Colorado River Basin watersheds tie into Regional priorities based on the guidance in the Southwestern Region Action Plan (http://fsweb.r3.fs.fed.us/action_plan/) which provides for the following:

- Assist Communities Adjacent to Forests
- Contribute to Economic Vitality
- Forest and Rangeland Restoration
- Safety and Health
- Supervision and Leadership

Restoration goals and objectives for Dry Lakes-Nutrioso Creek, Canovas Creek-Coyote Creek, Pratt Lake, and Long Lake watersheds tie into Forest priorities based on Apache-Sitgreaves National Forests' 2017 priorities which state the following:

- Accomplish vegetation treatment targets that protect communities,
- Implement watershed improvement projects
- Reduce the risk of catastrophic wildfire,
- Restore watershed functionality, and
- Promote economic development and community vitality through biomass production, stewardship projects and infrastructure development.

- Forest plan objective to improve condition class on at least 10 priority 6th level HUC watersheds by removing or mitigating degradation during the planning period.

Alignment with State or local goals

Objectives to improve water quality and overall watershed health and integrity in the Little Colorado River Basin's watersheds are aligned with partner goals and objectives as documented below:

- The Arizona Department of Environmental Quality's mission is to protect and enhance public health and the environment in Arizona by administering the state's environmental laws and delegated federal programs to prevent air, water and land pollution and ensure cleanup. http://www.azdeq.gov/node/209

- Arizona Game and Fish Department's mission is to conserve Arizona's diverse wildlife resources and manage for safe, compatible outdoor recreation opportunities for current and future generations. https://www.azgfd.com/Agency/Overview/

- Arizona Elk Society's mission is to benefit elk and other wildlife by generating resources for habitat conservation and restoration, and to preserve our hunting heritage for present and future generations. https://www.arizonaelksociety.org/visitor-center/about-us

- Rocky Mountain Elk Foundation's mission is to ensure the future of elk, other wildlife, their habitat and our hunting heritage. Find facts, such as the number of acres of elk habitat the RMEF has conserved or enhanced, the number of RMEF members and chapters across the country, and much more. http://www.rmef.org/NewsAndMedia/PressRoom/AboutRMEF

- Trout Unlimited's mission is to conserve, protect, and restore North America's coldwater fisheries and their watersheds. https://www.tu.org/conservation/our-conservation-approach

- National Wild Turkey Federation's mission is dedicated to the conservation of the wild turkey and the preservation of hunting heritage. http://www.nwtf.org/about

- Wildfire prevention and reduction in occurrence is a common goal among the State of Arizona, State of New Mexico and local affected county governments.

Opportunities

i. Partnership Involvement.

i. Arizona Game and Fish Department will be used as a partner for those projects associated with improving terrestrial wildlife habitat and improving aquatic and riparian habitats and species restoration.
ii. Arizona Department of Environmental Quality will be used as a partner in projects that address improving water quality. They will assist in planning, funding, and monitoring of activities throughout the watershed.
iii. Upper Little Colorado River Watershed Partnership will be used as a partner in projects within the Little Colorado River basin, including planning, funding, and monitoring.

iv. Other partners such as Trout Unlimited, Rocky Mountain Elk Foundation, Arizona Elk Society, National Wild Turkey Federation, Native Desert Fish Society, and other will be used where opportunities arise.

ii. Outcomes/Output

Performance Measure Accomplishment.

- miles of stream habitat improved/enhanced;
- acres terrestrial habitat enhanced
- acres of soil and water resources improved/enhanced;
- acres of lake habitat improved/enhanced;
- acres of riparian vegetation improved/enhanced
- acres of wetland improved/enhanced
- actions completed for recovery of threatened and endangered species
- acres treated of noxious plants
- acres of range vegetation improved
- structures maintained/improved (range/recreation);
- miles of trail maintained;
- acres of forest vegetation improved;
- miles of road decommissioned;
- miles of road maintained to standard
- acres forest vegetation improved
- volume timber sold
- acres fuels treatment total
- acres fuels treatment - Wildland Urban Interface
- acres fuels treatment- Non-Wildland Urban Interface

Socioeconomic Considerations.

Implementation of essential projects has the potential to benefit local economies by providing for local contracts; revenue from supplies purchased in local communities; increased value as a recreational destination leading to more tourist dollars spent in surrounding communities, and job creation. These watersheds can additionally serve as outdoor classrooms for other local institutions interested in teaching conservation education.

Additional R3 Guidance

iii. *Maintains and protects cultural values at risk:*

i. Are there any acequias, or acequia associations, within or dependent on these watersheds? ***YES*** *– Canovas Creek -Coyote Creek (ditches)*

ii. *Do the watersheds serve any Tribal, Land Grant, or small historical non-incorporated communities? NO*
iii. *Are there portions of water delivery features, such as acequias, dams, old power generation plants, or mills that were historically dependent on water from these watersheds?* ***NO*** *Do these features qualify as historical or heritage sites under the National Historic Preservation Act?* ***NO***

iv. *Supports local infrastructure:*
i. *Are any of these municipal watersheds?* ***NO***
ii. *If not, do the watersheds supply water to local communities (rural or small non-incorporated towns or villages, fire departments, local parks?* ***YES*** *– Escudilla Bonita within Canovas Creek – Coyote Creek*
iii. *Do the watersheds support agriculture or other local industries that require high water utilization, such as computer chip manufacturing or some types of wood products processing?* ***YES***

v. *Utilizes local contractors, workforce and resources*
i. *Are there local backhoe operators (or other heavy equipment), contracting companies who build and line ditches and canals/pipelines in the area that specifically service water-associated infrastructure?* ***YES***
ii. *Can you estimate how many workers these companies employ, or what such jobs entail?10-20*
iii. *Does the Forest contract with such companies for ditch or pipeline maintenance?* ***YES*** *If so, estimate the annual cost of such maintenance?$5,000-$30,000, depending on project/year*

ESSENTIAL PROJECTS – LITTLE COLORADO RIVER BASIN

Hyperlinks to watersheds (electronic versions)

Canovas Creek – Coyote Creek
- Essential projects and complimentary restoration projects
- Costs
- Timelines and project scheduling

Long Lake
- Essential projects and complimentary restoration projects
- Costs
- Timelines and project scheduling

Pratt Lake
- Essential projects and complimentary restoration projects
- Costs
- Timelines and project scheduling

Dry Lake – Nutrioso Creek
- Essential projects and complimentary restoration projects
- Costs
- Timelines and project scheduling

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Canovas Creek—Coyote Creek – Good Neighbor Watershed[1]

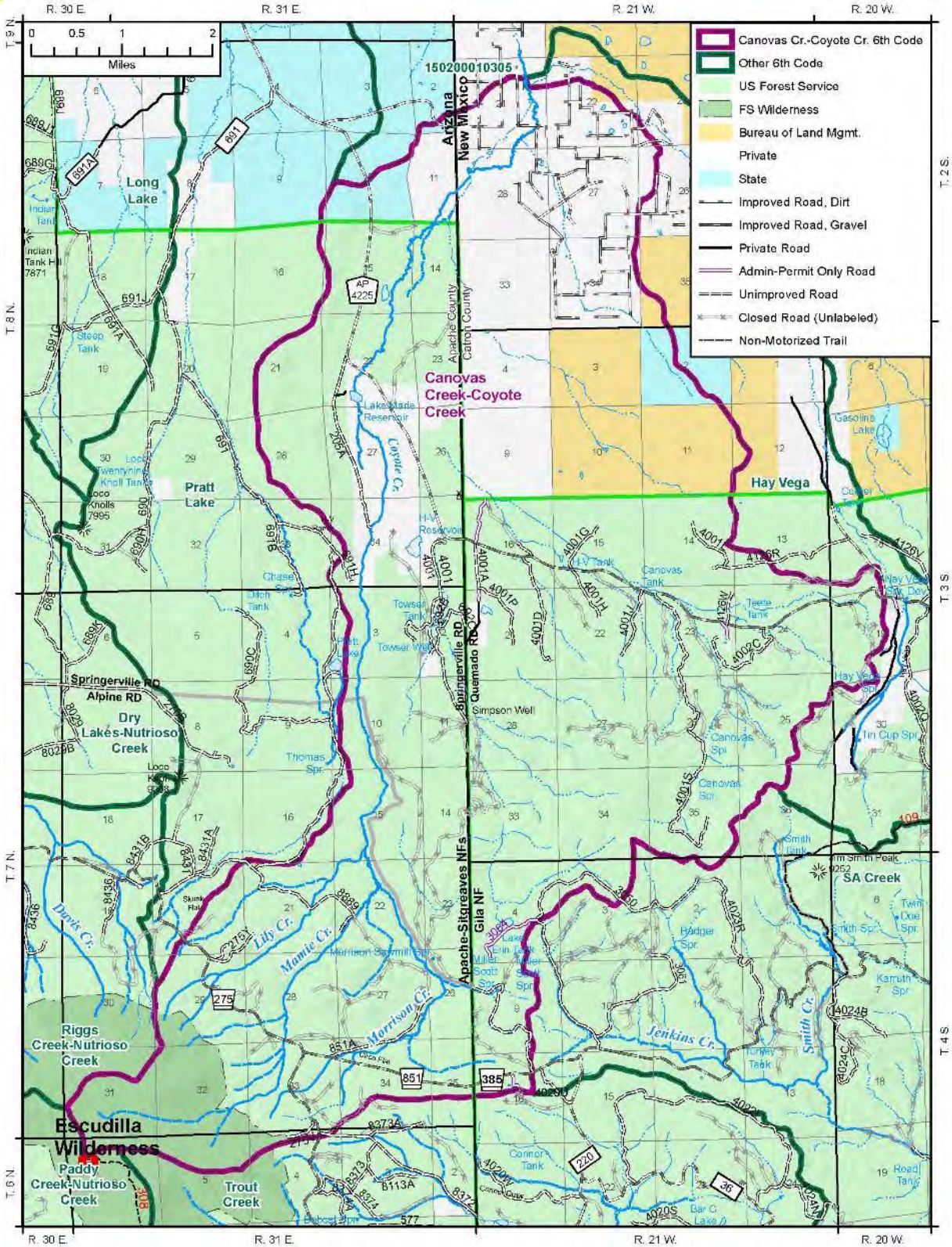

Figure 10. Canovas Creek – Coyote Creek 6th Code Watershed

Current Rating = Functioning at Risk = 1.8
Target Rating = Properly Functioning

Specific Project Activities

The following list of projects includes those identified to improve and, ultimately maintain watershed conditions. Not all projects are deemed necessary to move the watershed towards an improved condition class. Implementation and completion of Essential Projects 1 - 6 are required to move the watershed from Functioning at Risk to Properly Functioning. Projects 7 – 9 address other important landscape restoration objectives and are considered complimentary restoration projects. These projects will assist in improving and/or maintaining overall watershed conditions and ensure that it does not regress back into the Functioning at Risk state. This watershed covers portions of two Forests: the ASNF and the GNF.

Essential Projects

1. **Essential Project #1 – Road Decommissioning**
   a. Attribute/ Indicator Addressed – Roads and Trails
   b. Project Description: This project will focus on decommissioning roads identified in Luna Planning Area on the GNF and the West Escudilla Restoration Project on the Apache-Sitgreaves NFs. In this watershed, there are approximately 7 miles of road identified on the GNF and 4 miles of road identified on the ASNF for decommissioning. There are also 10 miles of user created roads identified for obliteration on the ASNF. Current decommissioning costs are approximately $1,500/mile. Decommissioning of a road involves reestablishing vegetation, and if necessary, initiating restoration of ecological processes interrupted or adversely impacted by the unneeded road. Treatments include one or more of the following treatments: Reestablishing former drainage patterns, stabilizing slopes, and restoring vegetation; Blocking the entrance to a road or installing water bars; Removing culverts, reestablishing drainages, removing unstable fills, pulling back road shoulders, and scattering slash on the roadbed; Completely eliminating the roadbed by restoring natural contours and slopes; and other methods designed to meet the specific conditions associated with the unneeded road
   c. Partners Involvement: Various partners have expressed interest in partnering in this effort, including New Mexico Environment Department, Wild Earth Guardians, and Arizona Game and Fish Department
   d. Timeline: TBD based on funding and prioritization of 12 watersheds; Decommissioning of roads without fuels treatments can be decommissioned in one fiscal year; roads with planned fuels treatments can be decommissioned immediately following treatment.
   e. Estimated costs and associated Budget Line Item: Estimated costs include the costs of monitoring, reseeding, reshaping, labor, heavy equipment transport, per diem, barrier, imported aggregate, and archaeological review (if necessary). GNF = $12,000; ASNF = $22,500 CMRD/NFVW/NFWF/CMLG

2. **Essential Project #2 – Road Improvement**
   a. Attribute/ Indicator Addressed – Roads and Trails
   b. Project Description: This project will focus on heavy road maintenance and improving best management practices for road drainage on Maintenance Level 2 and 3 roads within the watershed.

[1] Good Neighbor Watersheds are defined for this WRAP as those watersheds with management responsibilities shared by both the Gila National Forest and the Apache-Sitgreaves National Forests.

BMPs will include improvement of lead out ditches, road dips, and inlet and outlet features of culverts and road/stream crossings. Heavy road maintenance may involve some level of reconstruction of existing road beds to reestablish a safe and last driving surface with the intent of minimizing sediment movement off of the road. Currently there are approximately 40 miles of Maintenance Level 2 and 3 roads within the watershed. This project assumes that 40% of roads in the watershed need some degree of maintenance ranging from light to heavy.

c. Partners Involvement: Apache and Catron County

d. Timeline: TBD based on funding; can be completed in one fiscal year

e. Estimated costs and associated Budget Line Item: GNF = $13,500; ASNF = $10,500 CMRD/NFVW/NFWF/CMLG; Based on an estimate of $1,500/mile for road maintenance, which may include reshaping, heavy equipment transport, per diem, culvert replacement, and archaeological review (if necessary).

3. <u>Essential Project #3 – Erosion Control Structures</u>

a. Attribute/Indicator Addressed – Water Quality, Soils, Riparian Vegetation, Water Quantity, and Rangeland Vegetation.

b. Project Description: This project will focus on the new construction of 10 new erosion control structures and maintenance and/or reconstruction of 27 existing erosion control structures on the GNF. The existing structures on the GNF were originally implemented in the 1980s to impede and prevent ongoing erosion and gullying across the watershed in various drainages and swales. None of these structures have received maintenance over the last several decades and are currently in various stages of disrepair. Some structures have filled completely in and no longer serve to back up sediment. Others have breaches in the dams and are experiencing active headcutting, while others have water bypassing the structure, creating new erosion issues. New structures are planned in areas of the Canovas drainage on the GNF where gullying persists. Work will include heavy equipment cleanout of the sediment structures where needed or reconstruction/expansion of dams to preclude current and future gullying and sediment movement. Certified weed-free seeding will be required at sites requiring construction and reconstruction. Inventory and survey work will be necessary prior to beginning this project to establish necessary site design.

   On the ASNF, the project will include new construction of 8 new instream erosion control structures. Also, new construction of erosion control structures such as rock dropdown structures, rock aprons, rock "sausages", etc. to help dissipate overland flow and provide erosion control in prominent gullies within meadows along the aforementioned drainages along with Coyote Creek. Total miles of gullies treated with erosion control would be approximately 4 to 6 miles.

c. Partners Involvement: New Mexico Environment Department, Permittees, Arizona Department of Quality, Arizona Department of Game and Fish, Upper Little Colorado River Partnership, Trout Unlimited, Wild Earth Guardians

d. Timeline: TBD based on funding

e. Estimated Costs and associated Budget Line Item: GNF: $177,500 (force account) – $295,000 (contract) NFVW/NFWF/CMLG/CMRD; Costs are based on the following assumptions: $50,000 for design work on new structures or reconstruction of existing structures; $5,000/new structure construction if utilize Forest Construction and Maintenance Crew; $10,000/new structure construction if utilize contract labor; $2,500/structure maintenance if utilize Forest Construction and Maintenance crew; $5,000/structure maintenance if utilize contract labor. ASNF = meadow erosion control - $ 304,000 – $454,000 and $44,000 (force account) - $84,000 (contract) for instream structures; NFVW/CMRD/NFWF/CMLG; Costs are based on labor, equipment rental / transport, per diem, fencing supplies, seeding material, imported aggregate, and other materials as necessary.

4. **Essential Project #4 – Stream Restoration and Riparian Improvement**
   - **a.** Attribute/ Indicator Addressed – Water Quality, Water Quantity, Aquatic Habitat, Aquatic Biota, Riparian/Wetland Vegetation, Soils
   - **b.** Project Description: This project will focus on approximately 3 miles of stream/wetland/riparian restoration on perennial systems, including Morrison, Coyote and Mamie Creeks, and several springs. A major project will be stabilizing and existing 8+ ft high headcut in Morrison Creek which is Apache trout recovery habitat. Heavy equipment will be utilized to lay back the headcut and create a stepped log structure to stabilize the channel. Logs could be acquired from nearby mechanical harvest or purchased from a local mill. Aggregate and a liner would be placed beneath the log structure to prevent erosion or undercutting. Current conditions include headcutting and dewatering of these streams and their adjacent wet meadow systems, and isolated spring degradation. Work would include implementation of channel and wetland/spring restoration techniques to increase water table elevations, enhance productivity of wetland dependent species (both aquatic and vegetative), encourage deep rooted vegetation on streambanks, impede erosion processes, and restore channel stability. These techniques include placement of water control structures that reestablish macro/micro-topography and encourage natural channel form and function, streambank contouring, and re-establishment of wetland/riparian plants through natural and/or artificial means (both woody and herbaceous plants). Following treatments, portions of these systems would be fenced to exclude ungulate grazing and allow for recovery of wetland and riparian resources. All techniques will utilize minimum impact best management practices to control sediment movement and will follow necessary permitting requirements under the Clean Water Act.
   - **c.** Partners Involvement: Upper Little Colorado River Partnership, Trout Unlimited, Wild Earth Guardians, Arizona Department of Environmental Quality
   - **d.** Timeline: TBD based on Funding; project can be completed in one year.
   - **e.** Estimated costs and associated Budget Line Item: ASNF: $240,500/NFVW/NFWF/CMLG/CMRD and partner funding; Cost estimates are based on labor, heavy equipment rental and transport, per diem, fencing supplies for either livestock and/or elk, imported aggregate, other materials as necessary.

5. **Essential Project #5 – Stream Crossing NFS 8889/Mamie Creek**
   - **a.** Attribute/ Indicator Addressed – Roads and Trails; Water Quantity, Riparian/Wetland Vegetation
   - **b.** Project Description: ASNF: This project will focus on reconstruction of existing road crossing on NFS 8889 and Mamie Creek. NFS 8889's current crossing is causing resource degradation to riparian aquatic, and water quality resources. A new design will help control erosion issues and enhance riparian and aquatic features to prevent future harm. When the road is closed after mechanical treatments, the crossing will be restored to match the surrounding channel with heavy equipment and stabilized so it is not contributing to downstream erosion and channel issues.
   - **c.** Partners Involvement: none known
   - **d.** Timeline: Initial treatment will occur prior to mechanical treatment, final treatment will occur once the thinning task order is closed. TBD based on funding; this project can be completed in one year.
   - **e.** Estimated costs and associated Budget Line Item: Initial treatment cost: ASNF = $24,000 based on initial treatment costs of $11,500 and final treatment cost: $11,500; NFVW/NFWF/CMRD/CMLG

6. **Project #6 – Noxious Weed Removal**
   a. Attribute/ Indicator Addressed – Terrestrial Invasive Species
   b. Project Description: ASNF - This project will focus on the treatment of approximately 8 acres of Camelthorn located off County Road 4225 in sec 26 just east of the H-V headquarters. Treatments will include herbicide application, or other approved techniques
   c. Partners Involvement: none. Can be done jointly between ASNF & GNF.
   d. Timeline: TBD based on Funding; project is at least a 3 year project; initial treatment and follow-up to treat any residual plants.
   e. Estimated costs and associated Budget Line Item: $37,350/NFVW; Cost to treat just this site would be roughly $250/acre (total $2,000/year for three years = $6,000); both force account and contract. Addition of 1-2 extra seasonals to current crew for a three year period and be able to treat this Camelthorn site, the Russian olive site on Nutrioso Creek within the Dry Lakes-Nutrioso Creeks watershed, as well as survey other watersheds within the Escudilla WRAP for new infestations of noxious weeds and treat what is found. ($250/year in herbicide & supplies ($750), 1 x GS4 seasonals for 100 days @ $112/day for three years ($33,600), vehicle $10/day for 100 days/year for three years ($3,000)).

7. **Project #7– Road Improvement-Surfacing/Stabilization**
   a. Attribute/ Indicator Addressed – Water Quality
   b. Project Description: ASNF - NFSR 275 is a main route for recreation and Timber harvest for West Escudilla, the road quickly ravels and washboards immediately following maintenance activities. Road fines are lost quickly through creation of dust and washing from summer rains. The project would include placing stabilizing crushed aggregate to provide a reduction in sediment transported to water bodies.
   c. Partners Involvement: None.
   d. Timeline: TBD based on Funding; project is at least a 1 year project.
   e. Estimated costs and associated Budget Line Item: looking for partnership money. Putting in for CMLG money. Three and a half miles of road stabilization treatment x $10,000 per mile = $35,000.

8. **Essential Project #8 – Forest Vegetation Improvement – Meadow Encroachment**

   a. Attribute/Indicator Addressed – Water Quality, Soils, Riparian Vegetation, Water Quantity, Rangeland Vegetation
   b.

   On the ASNF, this project will include restoration of the potential extent of riparian and montane meadows and help rejuvenate meadow productivity / diversity by using site-specific determinations to prioritize certified weed-free native grass seeding treatment areas, and control or eliminate populations of invasive/noxious weeds if considerable extents are present in the meadows. Total area treated estimated to be around 300 – 500 acres across the meadows along Morrison Creek, Little Creek, and Mamie Creek. Following treatments, portions of these meadows would be fenced off to exclude ungulate grazing and allow for recovery of herbaceous meadow species, particularly those locations that may receive a native grass seeding treatment. New construction of erosion control structures such as rock dropdown structures, rock aprons, rock "sausages", etc. to help dissipate overland flow and provide erosion control in prominent gullies within meadows along the aforementioned drainages along with Coyote Creek. Total miles of gullies treated with erosion control would be approximately 4 to 6 miles.

Certified weed-free seeding of native grasses would be required at sites requiring heavy equipment usage. Inventory and survey work will be necessary prior to beginning this project to establish appropriate site / structure design.

c. Partners Involvement: Permittees, Arizona Game and Fish, Upper Little Colorado River Partnership, Trout Unlimited.
d. Timeline: TBD based on funding
e. Estimated Costs and associated Budget Line Item: ASNF = $92,500 – $152,500 NFVW/NFWF/WFHF.

Complimentary Restoration Projects

9. **Project #9 – Forest Vegetation Improvement**
   a. Attribute/ Indicator Addressed – Fire Regime
   b. Project Description: This project will focus on woodland and forest maintenance and restoration treatments where identified across the watershed. Treatment of vegetation will be accomplished by hand, mechanized, and/or herbicide treatment. In forested systems, activities would include forest vegetation treatments and group selections (e.g. creating 1-4 acre openings) to encourage regeneration of trees. Woodland areas include pinyon juniper and pinyon pine, while forested areas refer to ponderosa pine and mixed conifer. Specific silviculture prescriptions will be written for treatment units based on desired future conditions for the unit and area. Treatment units may be planned across watershed boundaries, thus this project will be implemented over multiple years, as the treatment units are prepared. More than one watershed within the West Escudilla and Luna Planning Areas may receive treatment in a single year, however acreages may be limited. Forest vegetation improvement within the Luna Planning Area includes group select (1,762 acres) and improvement thinning (1,472 acres) and is planned for a total of 3,235 acres. Forest vegetation improvement within the West Escudilla Restoration Project is planned for 5,990 acres within the watershed.
   c. Partners Involvement: New Mexico Environment Department (State Forestry)
   d. Timeline: TBD based on funding; this is a multiple year project. Budget constraints and treatment boundaries will greatly limit the amount of acres treated in a single year within a watershed.
   a. Estimated costs and associated Budget Line Item: GNF = up to $1,384,650; ASNF = $3,144,750. Costs are based on the following assumptions: pre-commercial thinning ≈$300/acre with limited piling; logging ≈ $125/acre (anticipate IRTC-good for services-thus reducing costs); Prep costs ≈ $100/acre for mark and cruise with crew of 6. Costs also include herbicide treatment of 20% of group selection acres @ $250/acre.

10. **Project #10 – Forest Vegetation Improvement – Prescribed Fire**
    a. Attribute/ Indicator Addressed – Fire Regime
    b. Project Description: This project would use prescribed fire to maintain and/or reduce fuel loadings. Prescribed fire can be implemented prior and after proposed vegetation treatments. Treatment units may be planned across watershed boundaries, thus this project will be implemented over multiple years, as the treatment units are prepared. More than one watershed within the Escudilla Planning Area may receive treatment in a single year, however acreages may be limited. Prescribed burning on the GNF is planned for 1,939 acres. Prescribed burning on the ASNF is planned for 1,850 acres.
    c. Partners Involvement: Wild Turkey Federation, Arizona Game and Fish Department, New Mexico Department of Game and Fish, Rocky Mountain Elk Foundation, Bureau of Land Management
    d. Timeline: TBD based on funding; this is a multiple year project based on budget constraints, burning units, burning limitations, and mitigation of cumulative impacts to natural and cultural resources.

e. Estimated costs and associated Budget Line Item = GNF = $96,950 - $155,120; WFHF/NFVW/NFWF; Costs are based on the following assumptions: burning with helicopter ≈ $80/acres; burning without helicopter ≈ $50/acre. ASNF = $92,500; WFHF/NFVW/NFWF

11. Project #11 – Nelson Shirley Property Stream Restoration and Wetland Enhancement

a. Attribute/ Indicator Addressed – Riparian/Wetland Vegetation, Water Quality
b. Project Description: ASNF - Construction of Plug and Spread structures, grade and erosion control features, and riparian plantings.
c. Partners Involvement: None to date.
d. Timeline: TBD based on Funding; project is at least a 1-2 year project.
e. Estimated costs and associated Budget Line Item: looking for partnership money. One mile of stream restoration x $66,000 per mile = $66,000.

Costs

Table 24. Canovas Creek-Coyote Creek Costs

Canovas Creek – Coyote Creek Good Neighbor Watershed							
Essential Projects	**Planning & Design**	**# Units**	**Cost / Unit**	**Implementation**	**Project Monitoring**	**Project Totals**	
ESSENTIAL PROJECTS							
#1 Road Decommissioning							
FS Contribution GNF	$ -	7 miles	$1,500	$ 10,500	$ 1,500	$ 12,000	
FS Contribution ASNF	$ -	14 miles	$1,500	$ 21,000	$ 1,500	$ 22,500	
Partner Contribution (both in kind and $)	$ -	n/a	n/a	$ -	$ -	$ -	
Funding already obtained	$ -	n/a	n/a	$ -	$ -	$ -	
Total	***$ -***	***21***		***$ 31,500***	***$ 3,000***	***$ 34,500***	
#2 Road Improvement							
FS Contribution GNF	$ -	9 miles	$1,500	$ 13,500	$ -	$ 13,500	
FS Contribution ASNF	$ -	7 miles	$1,500	$ 10,500	$ -	$ 10,500	
Partner Contribution (both in kind and $)	$ -	n/a	n/a	$ -	$ -	$ -	
Funding already obtained	$ -	n/a	n/a	$ -	$ -	$ -	
Total	***$ -***			***$ 24,000***	***$ -***	***$ 24,000***	
#3 Erosion Control Structures							
FS Contribution GNF	maintenance	$ 25,000	27	$2,500	IH	$ 67,500	$ 5,000	$ 97,500
				$5,000	C	$ 135,000		$ 165,000
	new	$ 25,000	10 new	$5,000	IH	$ 50,000	$ 5,000	$ 80,000

				$10,000	C	$ 100,000		$ 130,000
FS Contribution ASNF	meadows	$ 2,500	4-6 miles	$75,000/mile		$ 300,000	$ 1,500	$ 304,000
						$ 450,000		$ 454,000
	instream	$ 2,500	8 new	5,000	IH	$ 40,000	$ 1,500	$ 44,000
				$10,000	C	$ 80,000		$ 84,000
Partner Contribution (both in kind and $)		$ -	n/a	n/a		$ -	$ -	$ -
Funding Already obtained		$ -	n/a	n/a		$ -	$ -	$ -
Total		***$ 55,000***				***$ 457,500***	***$ 13,000***	***$ 525,500***
						$ 765,000		***$ 833,000***
#4 Stream Restoration and Riparian Improvement								
FS Contribution GNF		$ -	0	n/a		$ -	$ -	$ -
FS Contribution ASNF		$ 25,000	3 miles	$66,000 mile		$ 198,000	$ 500	$ 223,500
Partner Contribution (both in kind and $)		$ 1,500	1 log step fall structure	$40,000		$ 40,000	$ -	$ 41,500
Funding already obtained		$ -	n/a	n/a		$ -	$ -	$ -
Total		***$ 26,500***				***$ 238,000***	***$ 500***	***$ 265,000***
#5 Stream Crossing NFS 8889/Mamie Creek								
FS Contribution GNF		$ -	0	n/a		$ -	$ -	$ -
FS Contribution ASNF		$ 500	1 crossing Pre and post	$11,500		$ 23,000	$ 500	$ 24,000
Partner Contribution (both in kind and $)		$ -	n/a	n/a		$ -	$ -	$ -
Funding already obtained		$ -	n/a	n/a		$ -	$ -	$ -
Total		***$ 500***		***n/a***		***$ 23,000***	***$ 500***	***$ 24,000***
#6 Noxious Weed Removal								
FS Contribution GNF		$ -	0	n/a		$ -	$ -	$ -
FS Contribution ASNF		$ -	3 years	$12,450/yr		$ 37,350	$ -	$ 37,350
		$ -	n/a	n/a		$ -	$ -	$ -
Partner Contribution (both in kind and $)		$ -	n/a	n/a		$ -	$ -	$ -
Funding already obtained		***$ -***				***$ 37,350***	***$ -***	***$ 37,350***
#7 Road Improvement- Surfacing/ Stabilization								
FS Contribution GNF		$ -	n/a	n/a		-	$ -	$ -
FS Contribution ASNF		$ -	3.5 miles	$10,000		$ 35,000	$ -	$ 35,000

Partner Contribution (both in kind and $)		$ -	n/a	n/a	$ -	$ -	$ -
Funding already obtained		$ -	n/a	n/a	$ -	$ -	$ -
Total		***$ -***			***$ 35,000***	***$ -***	***$ 35,000***
#8 Forest Vegetation Improvement – Meadow Enhancement							
FS Contribution GNF		$ -	0	n/a	$ -	$ -	$ -
FS Contribution ASNF		$ 1,000	300 acres	$300/acre	$ 90,000	$ 1,500	$ 92,500
			500 acres		$ 150,000		$ 152,500
Partner Contribution (both in kind and $)		$ -	n/a	n/a	$ -	$ -	$ -
Funding already obtained		$ -	n/a	n/a	$ -	$ -	$ -
Total		***$ 1,000***			***$ 90,000***	***$ 1,500***	***$ 92,500***
					$ 150,000		***$ 152,500***
Forest Service Totals		***$ 83,000***	***n/a***	***n/a***	***$ 936,350***	***$ 18,500***	***$ 1,037,850***
					$ 1,303,850		***$ 1,405,350***
Partner Contribution Totals		***$ 1,500***	***n/a***	***n/a***	***$ -***	***$ -***	***$ 1,500***
Funding already obtained		***$ -***	***n/a***	***n/a***	***$ -***	***$ -***	***$ -***
Grand Totals		***$ 84,500***	***n/a***	***n/a***	***$ 936,350***	***$ 18,500***	***$ 1,039,350***
					$ 1,303,850		***$ 1,406,850***
COMPLIMENTARY RESTORATION PROJECTS							
#9 Forest Vegetation Treatments							
FS Contribution GNF	Group selection	$ 9,000	1,762 acres	$525/acre (includes precom, pile logging/prep)	$ 925,050	$ -	$ 934,050
	Improvement	$ -	1,472 acres	$300/acre (pre comm only)	$ 441,600	$ -	$ 441,600
FS Contribution ASNF	Group selection	$ -	5,990 acres	$525/acre (includes precom, pile logging/prep)	$ 3,144,750	$ -	$ 3,144,750
	Improvement	$ -	0 acres	$300/acre (pre comm only)	$ -	$ -	$ -
Partner Contribution (both in kind and $)		$ -	n/a	n/a	$ -	$ -	$ -
Funding already obtained		$ -	n/a	n/a	$ -	$ -	$ -
Total		$ 9,000			***$ 4,511,400***		***$ 4,520,400***
#10 Forest Vegetation Improvement/ Prescribed Fire							
FS Contribution – GNF		$ -	1,939 acres	$50/acre	$ 96,950	$ -	$ 96,950
				$80/acre	$ 155,120		$ 155,120

FS Contribution – ASNF	$ -	1,850 acres	$50/acre	$ 92,500	$ -	$ 92,500
Partner Contribution (both in kind and $)	$ -	n/a	n/a	$ -	$ -	$ -
Funding already obtained	$ -	n/a	n/a	$ -	$ -	$ -
Total	$ -			***$ 189,450***		***$ 189,450***
				$ 247,620		***$ 247,620***
#11 Nelson Shirley Property Stream Restoration and Wetland Enhancement						
FS Contribution GNF	$ -			$ -	$ -	$ -
FS Contribution ASNF	$ -	n/a	n/a	$ -	$ -	$ -
Partner Contribution (both in kind and $)	$ 25,000	1 mile	$66,000/mile	$ 66,000	$ -	$ 91,000
Funding already obtained	$ -	n/a	n/a	$ -	$ -	$ -
Total	$ 25,000			***$ 66,000***	***$ -***	***$ 91,000***
Forest Service Totals	***$ 34,000***	***0***	***0***	***$ 4,766,850***	***$ -***	***$ 4,800,850***
				$ 4,825,020		***$ 4,859,020***
Partner Contribution Totals	***$ -***	***0***	***n/a***	***$ -***	***$ -***	***$ -***
Funding already obtained	***$ -***	***0***	***n/a***	***$ -***	***$ -***	***$ -***
Grand Totals	***$ 34,000***	***0***	***n/a***	***$ 4,766,850***	***$ -***	***$ 4,800,850***
				$ 4,825,020		***$ 4,859,020***

Timelines and Project Scheduling

By fiscal year, list Tasks necessary to complete project (e.g. planning, design, permitting, and implementation) and the expected contribution by the responsible party (FS or Partner).

Completion of these tasks is contingent on securing necessary funding.

Table 25. Canovas Creek-Coyote Creek Timelines and Project Scheduling

	Canovas Creek – Coyote Creek Good Neighbor Watershed			
FY (TBD)	**Task**	**Forest Service Cost - rounded**		**Partner cost**
		GNF	**ASNF**	
Year 1	Essential Project #6 – Noxious weed removal – Year 1 of 3	n/a	$12,500	unknown
Year 1	Essential Project #2 – Road Improvement	$13,500	$10,500	unknown
Year 1	Essential Project #3 – Erosion Control Structures – maintenance (GNF) & meadow (ASNF) Year 1 of 3	$165,000	$227,000	unknown
Year 1	Complimentary Restoration Project #10 – Forest Vegetation Improvement -Prescribed Fire - Prep	$55,000	$40,000	unknown
Year 1	Complimentary Restoration Project #9 – Forest Vegetation Treatments – Year 1 of 5 (GNF = 490 acres improvement)	$147,000 precomm only	n/a	unknown
Year 1	Essential Project #8 – Forest Vegetation Improvement – Meadow Enhancement	n/a	$152,500	unknown
Year 2	Essential Project #3 – Erosion control structures – new (GNF) & meadow (ASNF) – Year 2 of 3	$130,000	$227,000	unknown
Year 2	Essential Project #6 – Noxious weed removal – Year 2 of 3	n/a	$12,500	unknown
Year 2	Complimentary Restoration Project #9 – Forest Vegetation Treatments – Year 2 of 5 (GNF = 490 acres improvement)	$147,000 precomm only	n/a	unknown
Year 2	Complimentary Restoration Project #10 – Forest Vegetation Improvement -Prescribed Fire - burn	$100,000	$52,500	unknown
Year 3	Essential Project #6 – Noxious weed removal – Year 3 of 3	n/a	$12,500	unknown
Year 3	Essential Project #3 - Erosion control structures – stream – Year 3 of 3	n/a	$84,000	unknown
Year 3	Essential Project #4 – Stream Restoration / Riparian Improvement	n/a	$199,000	$41,500
Year 3	Complimentary Restoration Project #9 – Forest Vegetation Treatments – Year 3 of 5 (GNF = 490 acres improvement; ASNF = 1,997 acres)	$147,000 precomm only	$1,048,250	unknown
Year 4	Essential Project #5 – Stream Crossing NFS 8889/Mamie Creek	n/a	$24,000	unknown
Year 4	Essential Project #7 – Road Improvement – Surfacing/Stabilization	n/a	$35,000	unknown
Year 4	Complimentary Restoration Project #11 – Nelson Shirley Property Stream Restoration and Wetland Enhancement	n/a	$66,000	unknown
Year 4	Complimentary Restoration Project #9 – Forest Vegetation Improvement – Thinning – Year 4 of 5 (GNF = 881 acres group select; ASNF = 1,997 acres)	$462,500	$1,048,250	unknown
Year 5	Complimentary Restoration Project #9 – Forest Vegetation Improvement – Thinning – Year 5 of 5 (GNF = 881 acres group select; ASNF = 1,997 acres)	$462,500	$1,048,250	unknown
Year 6	Essential Project #1 – Road Decommissioning	$12,000	$22,500	unknown

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Long Lake – Apache-Sitgreaves National Forests

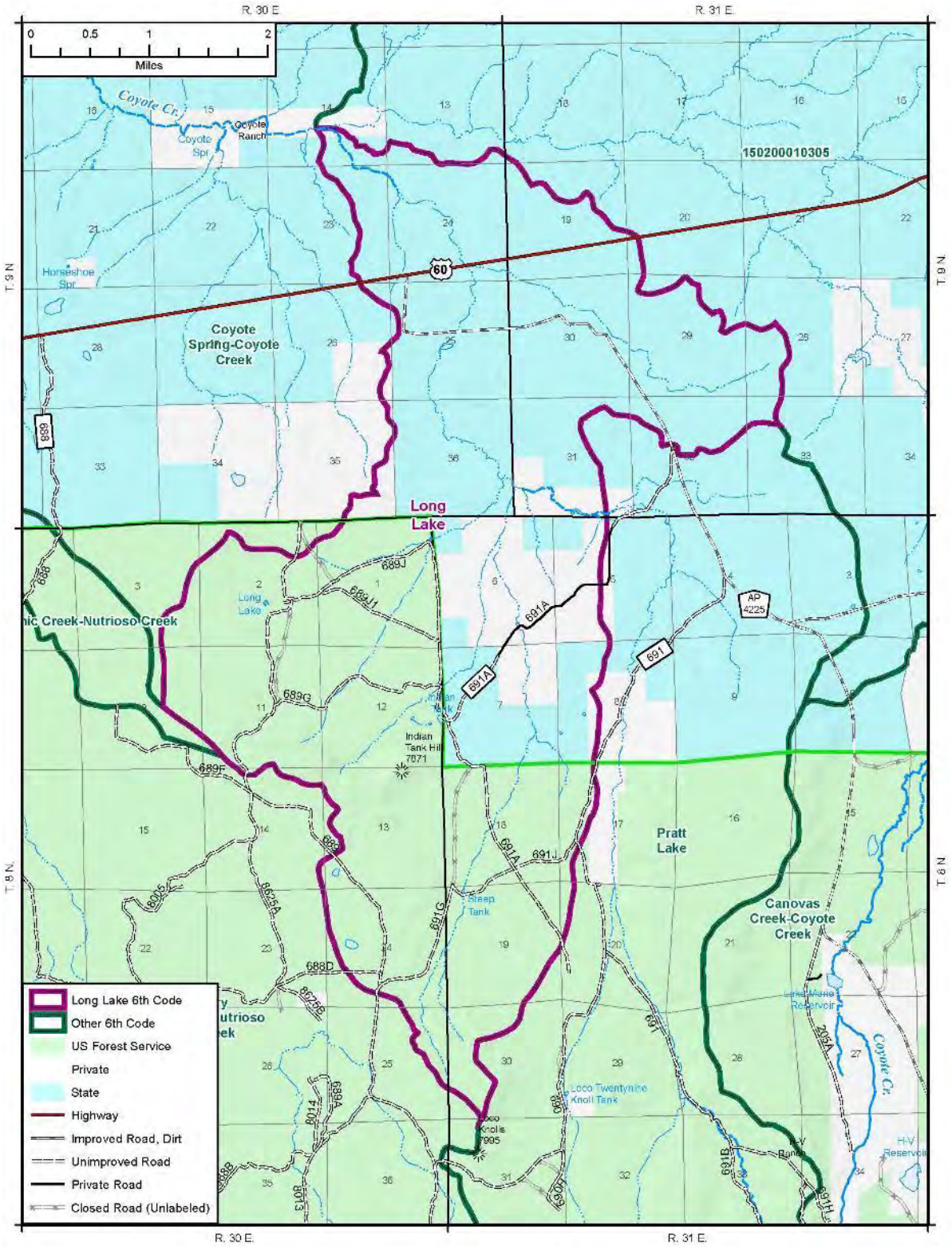

Figure 11. Long Lake 6th Code Watershed

Current Rating = Functioning at Risk = 1.9
Target Rating = Properly Functioning

Specific Project Activities

The following list of projects includes those identified to improve and, ultimately maintain watershed conditions. Not all projects are deemed necessary to move the watershed upwards to an improved condition class. Implementation and completion of Essential Projects 1 - 2 are required to move the watershed from Functioning at Risk to Properly Functioning. Projects 3 – 4 address other important landscape restoration objectives and are considered complimentary restoration projects. These projects will assist in improving and/or maintaining overall watershed conditions and ensure that it does not regress back into the Functioning at Risk state.

Essential Projects

1. **Essential Project #1 – Road Decommissioning**
   a. Attribute/ Indicator Addressed – Roads and Trails
   b. Project Description: This project will focus on decommissioning roads identified in West Escudilla Planning Area. In this watershed, there are approximately 5 miles of road identified. Current decommissioning costs are approximately $1,500/mile. Decommissioning of a road involves reestablishing vegetation, and if necessary, initiating restoration of ecological processes interrupted or adversely impacted by the unneeded road. Treatments include one or more of the following treatments: Reestablishing former drainage patterns, stabilizing slopes, and restoring vegetation; Blocking the entrance to a road or installing water bars; Removing culverts, reestablishing drainages, removing unstable fills, pulling back road shoulders, and scattering slash on the roadbed; Completely eliminating the roadbed by restoring natural contours and slopes; and Other methods designed to meet the specific conditions associated with the unneeded road
   c. Partners Involvement: Arizona Game and Fish Department
   d. Timeline: TBD based on funding and prioritization of 12 watersheds; Decommissioning of roads without fuels treatments can be decommissioned in one fiscal year; roads with planned fuels treatments can be decommissioned immediately following treatment.
   e. Estimated costs and associated Budget Line Item: Estimated costs include the costs of reseeding, reshaping, labor, heavy equipment transport, per diem, barrier, imported aggregate, and archaeological review (if necessary). $8,250/CMRD/NFVW, CMLG, NFWF

2. **Essential Project #2 – Road Improvement**
   a. Attribute/ Indicator Addressed – Roads and Trails
   b. Project Description: This project will focus on heavy road maintenance and improving best management practices for road drainage on Maintenance Level 2 and 3 roads within the watershed. BMPs will include improvement of lead out ditches, road dips, and inlet and outlet features of culverts and road/stream crossings. Heavy road maintenance may involve some level of reconstruction of existing road beds to reestablish a safe and last driving surface with the intent of minimizing sediment movement off of the road. Currently there are 15.5 miles of Maintenance Level 2 and 3 roads within the watershed. This project assumes that approximately 7 miles of road in the watershed need some degree of maintenance ranging from light to heavy.
   c. Partners Involvement: Apache County
   d. Timeline: TBD based on funding; can be completed in one fiscal year

e. Estimated costs and associated Budget Line Item = $10,500/ CMRD/NFVW, NFWF, CMLG; Based on an estimate of $1,500/mile for road maintenance, which may include reshaping, heavy equipment transport, per diem, culvert replacement, and archaeological review (if necessary).

Complimentary Restoration Projects

3. **Project #3 – Forest Vegetation Improvement – Thinning**
   - **a.** Attribute/ Indicator Addressed – Fire Regime
   - **b.** Project Description: This project will focus on woodland and forest maintenance and restoration treatments where identified across the watershed. Cutting of vegetation will be accomplished by hand or mechanized treatment. In forested systems, activities would include thinning and group selections (e.g. creating 1-4 acre openings) to encourage regeneration of trees. Woodland areas include pinyon juniper and pinyon pine, while forested areas refer to ponderosa pine and mixed conifer. Specific silviculture prescriptions will be written for treatment units based on desired future conditions for the unit and area. Treatment units may be planned across watershed boundaries, thus this project will be implemented over multiple years, as the treatment units are prepared. More than one watershed within the West Escudilla Restoration Project may receive treatment in a single year, however acreages may be limited. A total of 4,710 acres are planned for thinning treatments within the project area in Arizona.
   - **c.** Partners Involvement: none known
   - **d.** Timeline: TBD based on funding; this is a multiple year project. Budget constraints and treatment boundaries will greatly limit the amount of acres treated in a single year within a watershed.
   - **e.** Estimated costs and associated Budget Line Item = $2,472,750/WFHF/NFVW, NFWF, NFTM; Costs are based on the following assumptions: pre-commercial thinning ≈$300/acre with limited piling; logging ≈ $125/acre (anticipate IRTC-good for services-thus reducing costs); Prep costs ≈ $100/acre for mark and cruise with crew of 6.

4. **Project #4 – Forest Vegetation Improvement – Prescribed Fire**
   - a. Attribute/ Indicator Addressed – Fire Regime
   - b. Project Description: This project would use prescribed fire to maintain and/or reduce fuel loadings. Prescribed fire can be implemented prior and after proposed vegetation treatments. Treatment units may be planned across watershed boundaries, thus this project will be implemented over multiple years, as the treatment units are prepared. More than one watershed within the West Escudilla Restoration Project may receive treatment in a single year, however acreages may be limited. A total of 2,499 acres are planned for prescribed fire in this watershed within the project area in Arizona.
   - c. Partners Involvement: Wild Turkey Federation, Arizona Game and Fish Department, Rocky Mountain Game and Fish
   - d. Timeline: TBD based on funding; this is a multiple year project based on budget constraints, burning units, burning limitations, and mitigation of cumulative impacts to natural and cultural resources.
   - e. Estimated costs and associated Budget Line Item = $125,450/WFHF/NFVW, NFWF; Costs are based on the following assumptions: ≈ $50/acre.

Costs

Table 26. Long Lake Costs

Long Lake							
Essential Projects	**Planning & Design**	**# Units**	**Cost / Unit**	**Implementation**	**Project Monitoring**	**Project Totals**	
ESSENTIAL PROJECTS							
#1 Road Decommissioning							
FS Contribution ASNF	$ -	5 miles	$1,500	$ 7,500	$ 750	$ 8,250	
Partner Contribution (both in kind and $)	$ -	n/a	n/a	$ -	$ -	$ -	
Funding already obtained	$ -	n/a	n/a	$ -	$ -	$ -	
Total	***$ -***	***5 miles***	***$1,500***	***$ 7,500***	***$ 750***	***$ 8,250***	
#2 Road Improvement							
FS Contribution ASNF	$ -	7 miles	$1,500	$ 10,500	$ -	$ 10,500	
Partner Contribution (both in kind and $)	$ -	n/a	n/a	$ -	$ -	$ -	
Funding already obtained	$ -	n/a	n/a	$ -	$ -	$ -	
Total	$ -	7 miles	n/a	$ 10,500	$ -	$ 10,500	
Forest Service Totals	***$ -***	***n/a***	***n/a***	***$ 18,000***	***$ 750***	***$ 18,750***	
Partner Contribution Totals	***$ -***	***n/a***	***n/a***	***$ -***	***$ -***	***$ -***	
Funding already obtained	***$ -***	***n/a***	***n/a***	***$ -***	***$ -***	***$ -***	
Grand Totals	***$ -***	***n/a***	***n/a***	***$ 18,000***	***$ 750***	***$ 18,750***	
COMPLIMENTARY RESTORATION PROJECTS							
#3 Forest Vegetation Improvement/Thinning							
FS Contribution ASNF Group selection	$ -	4,710	$525/acre	$ 2,472,750	$ -	$ 2,472,750	
Partner Contribution (both in kind and $)	$ -	n/a	n/a	$ -	$ -	$ -	
Funding already obtained	$ -	n/a	n/a	$ -	$ -	$ -	
Total	***$ -***	***4,710***	***n/a***	***$ 2,472,750***	***$ -***	***$ 2,472,750***	
#4 Forest Vegetation Improvement/ Prescribed Fire							
FS Contribution – ASNF	$ -	2,499 acres	$50	$ 124,950	$ 500	$ 125,450	
Partner Contribution (both in kind and $)	$ -	n/a	n/a	$ -	$ -	$ -	
Funding already obtained	$ -	n/a	n/a	$ -	$ -	$ -	
Total	$ -	2,499	n/a	$ 124,950	$ 500	$ 125,450	
Forest Service Totals	***$ -***	***n/a***	***n/a***	***$ 2,560,215***		***$ 2,560,715***	

Partner Contribution Totals	***$ -***	***n/a***	***n/a***	***$ -***	***$ -***	***$ -***
Funding already obtained	***$ -***	***n/a***	***n/a***	***$ -***	***$ -***	***$ -***
Grand Totals	***unknown***	***n/a***	***n/a***	***$ 2,560,215***	***$ 500***	***$ 2,560,715***

Timelines and Project Scheduling

By fiscal year, list Tasks necessary to complete project (e.g. planning, design, permitting, implementation) and the expected contribution by the responsible party (FS or Partner).

Completion of these tasks is contingent on securing necessary funding.

Table 27. Long Lake Timeline and Project Scheduling

Long Lake			
FY (TBD)	**Task**	**FS Cost (rounded) ASNF**	**Partner cost**
Year 1	Essential Project #2 Road Improvement	$11,000	unknown
Year 1	Complimentary Restoration Project #4 Forest Vegetation Improvement - Prescribed Fire	$125,450	unknown
Year 2	Complimentary Restoration Project #3 Forest Vegetation Improvement - Thinning (1,570 acres) - Year 1 of 3	$825,000	unknown
Year 3	Complimentary Restoration Project #3 Forest Vegetation Improvement - Thinning (1,570 acres) – Year 2 of 3	$825,000	unknown
Year 4	Complimentary Restoration Project #3 Forest Vegetation Improvement - Thinning (1,570 acres) – Year 3 of 3	$825,000	unknown
Year 5	Essential Project #1 Road Decommissioning	$8,500	unknown

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Pratt Lake – Apache-Sitgreaves National Forests

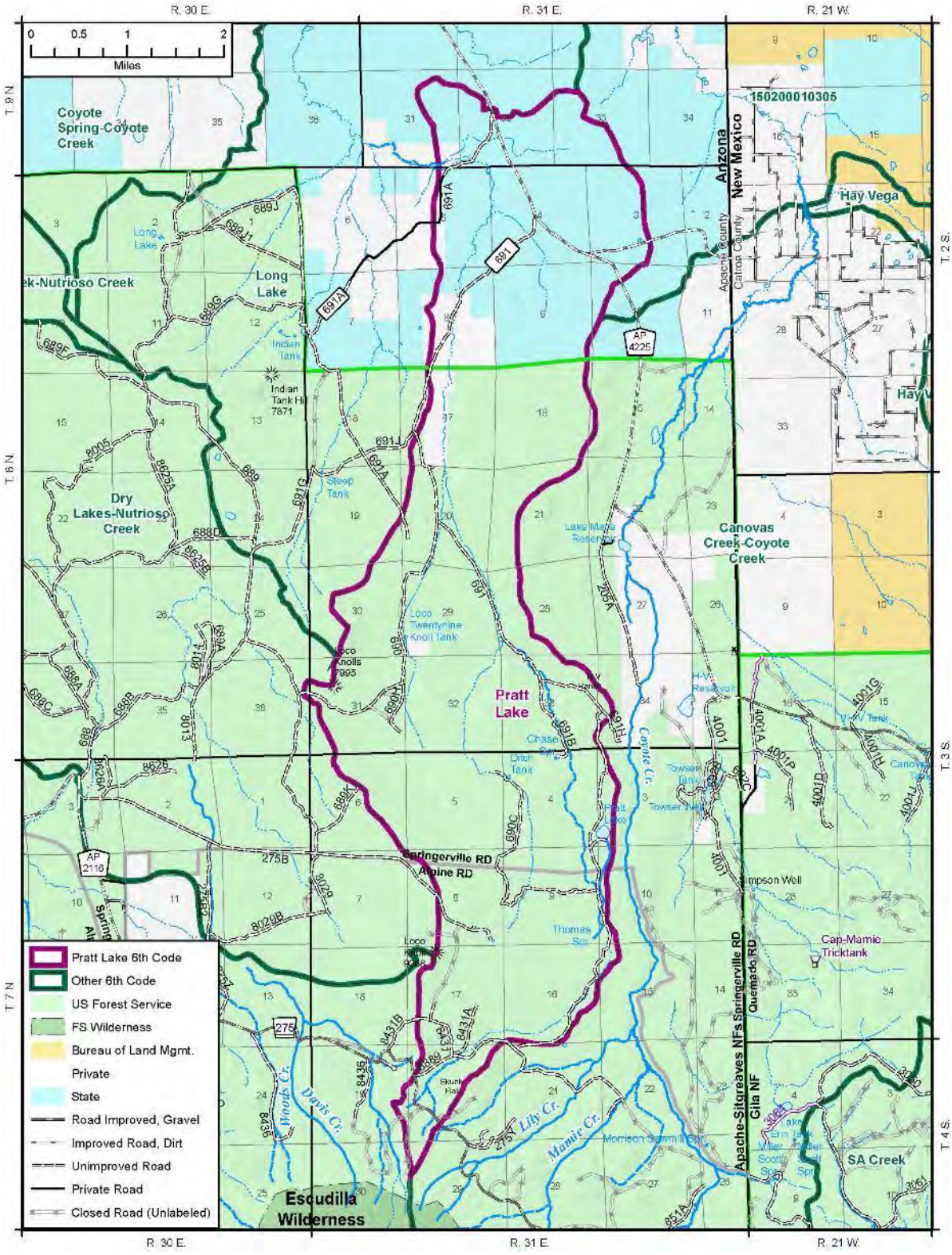

Figure 12. Pratt Lake 6th Code Watershed

Current Rating = Functioning at Risk = 2.0
Target Rating = Properly Functioning

Specific Project Activities

The following list of projects includes those identified to improve and, ultimately maintain watershed conditions. Not all projects are deemed necessary to move the watershed upwards to an improved condition class. Implementation and completion of Essential Projects 1 - 2 are required to move the watershed from Functioning at Risk to Properly Functioning. Projects 3 – 4 address other important landscape restoration objectives and are considered complimentary restoration projects. These projects will assist in improving and/or maintaining overall watershed conditions and ensure that it does not regress back into the Functioning at Risk state.

Essential Projects

1. **Essential Project #1 – Road Decommissioning**
   a. Attribute/ Indicator Addressed – Roads and Trails
   b. Project Description: This project will focus on decommissioning roads identified in West Escudilla Planning Area. In this watershed, there are approximately 4 miles of system and user created roads identified for decommissioning. Current decommissioning costs are approximately $1,500/mile. Decommissioning of a road involves reestablishing vegetation, and if necessary, initiating restoration of ecological processes interrupted or adversely impacted by the unneeded road. Treatments include one or more of the following treatments: Reestablishing former drainage patterns, stabilizing slopes, and restoring vegetation; Blocking the entrance to a road or installing water bars; Removing culverts, reestablishing drainages, removing unstable fills, pulling back road shoulders, and scattering slash on the roadbed; Completely eliminating the roadbed by restoring natural contours and slopes; and Other methods designed to meet the specific conditions associated with the unneeded road
   c. Partners Involvement: Arizona Game and Fish Department
   d. Timeline: TBD based on funding and prioritization of 12 watersheds; Decommissioning of roads without fuels treatments can be decommissioned in one fiscal year; roads with planned fuels treatments can be decommissioned immediately following treatment.
   e. Estimated costs and associated Budget Line Item: Estimated costs include the costs of reseeding, reshaping, labor, heavy equipment transport, per diem, barrier, imported aggregate, and archaeological review (if necessary). $6,500/CMRD/NFWF, NFVW, CMLG

2. **Essential Project #2 – Road Improvement**
   a. Attribute/ Indicator Addressed – Roads and Trails
   b. Project Description: This project will focus on heavy road maintenance and improving best management practices for road drainage on Maintenance Level 2 and 3 roads within the watershed. BMPs will include improvement of lead out ditches, road dips, and inlet and outlet features of culverts and road/stream crossings. Heavy road maintenance may involve some level of reconstruction of existing road beds to reestablish a safe and last driving surface with the intent of minimizing sediment movement off of the road. Currently there are 18 miles of Maintenance Level 2 and 3 roads within the watershed. This project assumes that 8 miles of road in the watershed need some degree of maintenance ranging from light to heavy.
   c. Partners Involvement: Apache County
   d. Timeline: TBD based on funding; can be completed in one fiscal year

e. Estimated costs and associated Budget Line Item = $12,000/ CMRD/NFVW, NFWF, CMLG; Based on an estimate of $1,500/mile for road maintenance, which may include reshaping, heavy equipment transport, per diem, culvert replacement, and archaeological review (if necessary).

Complimentary Restoration Projects

3. **Project #3 – Forest Vegetation Treatments**
   - **a.** Attribute/ Indicator Addressed – Fire Regime
   - **b.** Project Description: This project will focus on woodland and forest maintenance and restoration treatments where identified across the watershed. Cutting of vegetation will be accomplished by hand or mechanized treatment. In forested systems, activities would include thinning and group selections (e.g. creating 1-4 acre openings) to encourage regeneration of trees. Woodland areas include pinyon juniper and pinyon pine, while forested areas refer to ponderosa pine and mixed conifer. Specific silviculture prescriptions will be written for treatment units based on desired future conditions for the unit and area. Treatment units may be planned across watershed boundaries, thus this project will be implemented over multiple years, as the treatment units are prepared. More than one watershed within the West Escudilla Planning Area may receive treatment in a single year, however acreages may be limited. A total of 5,952 acres of thinning are planned with the West Escudilla Restoration Project in Arizona.
   - **c.** Partners Involvement: none known
   - **d.** Timeline: TBD based on funding; this is a multiple year project. Budget constraints and treatment boundaries will greatly limit the amount of acres treated in a single year within a watershed.
   - **e.** Estimated costs and associated Budget Line Item = $3,124,800/WFHF/NFVW, NFTM, NFWF; Costs are based on the following assumptions: pre-commercial thinning ≈$300/acre with limited piling; logging ≈ $125/acre (anticipate IRTC-good for services-thus reducing costs); Prep costs ≈ $100/acre for mark and cruise with crew of 6.

4. **Project #4 – Forest Vegetation Improvement – Prescribed Fire**
   - a. Attribute/ Indicator Addressed – Fire Regime
   - b. Project Description: This project would use prescribed fire to maintain and/or reduce fuel loadings. Prescribed fire can be implemented prior and after proposed vegetation treatments. Treatment units may be planned across watershed boundaries, thus this project will be implemented over multiple years, as the treatment units are prepared. More than one watershed within the West Escudilla Restoration Project may receive treatment in a single year, however acreages may be limited. A total of 3,940 acres of prescribed fire are planned with the project area.
   - c. Partners Involvement: Arizona Department of Game and Fish; Rocky Mountain Elk Foundation.
   - d. Timeline: TBD based on funding; this is a multiple year project based on budget constraints, burning units, burning limitations, and mitigation of cumulative impacts to natural and cultural resources.
   - e. Estimated costs and associated Budget Line Item = $197,500/WFHF/NFVW, NFWF; Costs are based on the following assumptions ≈ $50/acres plus monitoring.

Costs

Table 28. Pratt Lake Costs

Pratt Lake							
Essential Projects	**Planning & Design**	**# Units**	**Cost / Unit**	**Implementation**	**Project Monitoring**	**Project Totals**	
ESSENTIAL PROJECTS							
#1 Road Decommissioning							
FS Contribution ASNF	$ -	4	$1,500	$6,000	$500	$6,500	
Partner Contribution (both in kind and $)	$ -	n/a	n/a	0	0	$0	
Funding already obtained	$ -	n/a	n/a	0	0	$0	
Total	***$ -***	***4***		***$6,000***	***$500***	***$6,500***	
#2 Road Improvement							
FS Contribution ASNF	$ -	8	$1,500	$ 12,000	$ -	$ 12,000	
Partner Contribution (both in kind and $)	$ -	n/a	n/a	$ -	$ -	$ -	
Funding already obtained	$ -	n/a	n/a	$ -	$ -	$ -	
Total	***$ -***		***$1,500***	***$ 12,000***	***$ -***	***$ 12,000***	
Forest Service Totals	***$ -***	***n/a***	***n/a***	***$ 18,000***	***$ 500***	***$ 18,500***	
Partner Contribution Totals	***$ -***	***n/a***	***n/a***	***$ -***	***$ -***	***$ -***	
Funding already obtained	***$ -***	***n/a***	***n/a***	***$ -***	***$ -***	***$ -***	
Grand Totals	***$ -***	***n/a***	***n/a***	***$ 18,000***	***$ 500***	***$ 18,500***	
COMPLIMENTARY RESTORATION PROJECTS							
#3 Forest Vegetation Improvement/Thinning							
FS Contribution ASNF	Group selection	$ -	5,952 acres	$525/acre	$ 3,124,800	$ -	$ 3,124,800
Partner Contribution (both in kind and $)		$ -	n/a	n/a	$ -	$ -	$ -
Funding already obtained		$ -	n/a	n/a	$ -	$ -	$ -
Total		***$ -***	***5,990 acres***	***n/a***	***$ 3,124,800***	***$ -***	***$ 3,124,800***
#4 Forest Vegetation Improvement/ Prescribed Fire							
FS Contribution – ASNF		$ -	3,940 acres	$50	$ 197,000	$ 500	$ 197,500
Partner Contribution (both in kind and $)		$ -	0	0	$ -	$ -	$ -
Funding already obtained		$ -	0	0	$ -	$ -	$ -
Total		***$ -***	***3,940 acres***	***n/a***	***$ 197,000***	***$ 500***	***$ 197,500***
Forest Service Totals		***$ -***	***n/a***	***n/a***	***$ 3,321,800***	***$ 500***	***$ 3,322,300***

Partner Contribution Totals	***$ -***	***n/a***	***n/a***	***$ -***	***$ -***	***$ -***
Funding already obtained	***$ -***	***n/a***	***n/a***	***$ -***	***$ -***	***$ -***
Grand Totals	***$ -***	***n/a***	***n/a***	***$ 3,262,700***	***$ 500***	***$ 3,263,200***

Timelines and Project Scheduling

By fiscal year, list Tasks necessary to complete project (e.g. planning, design, permitting, implementation) and the expected contribution by the responsible party (FS or Partner).

Completion of these tasks is contingent on securing necessary funding.

Table 29. Pratt Lake Timeline and Project Scheduling

Pratt Lake			
FY (TBD)	**Task**	**FS Cost (rounded) ASNF**	**Partner cost**
Year 1	Essential Project #2 Road Maintenance	$12,000	Unknown
Year 1	Complimentary Restoration Project #4 Forest Vegetation Improvement -Prescribed Fire	$197,500	Unknown
Year 2	Complimentary Restoration Project #3 Forest Vegetation Improvement - Thinning – 1,996 acres	$1,042,000	Unknown
Year 3	Complimentary Restoration Project #3 Forest Vegetation Improvement - Thinning – 1,996 acres	$1,042,000	Unknown
Year 4	Complimentary Restoration Project #3 Forest Vegetation Improvement - Thinning – 1996 acres	$1,042,000	Unknown
Year 5	Essential Project #1 Road Decommissioning	$6,500	Unknown

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Dry Lake—Nutrioso Creek – Apache –Sitgreaves National Forests

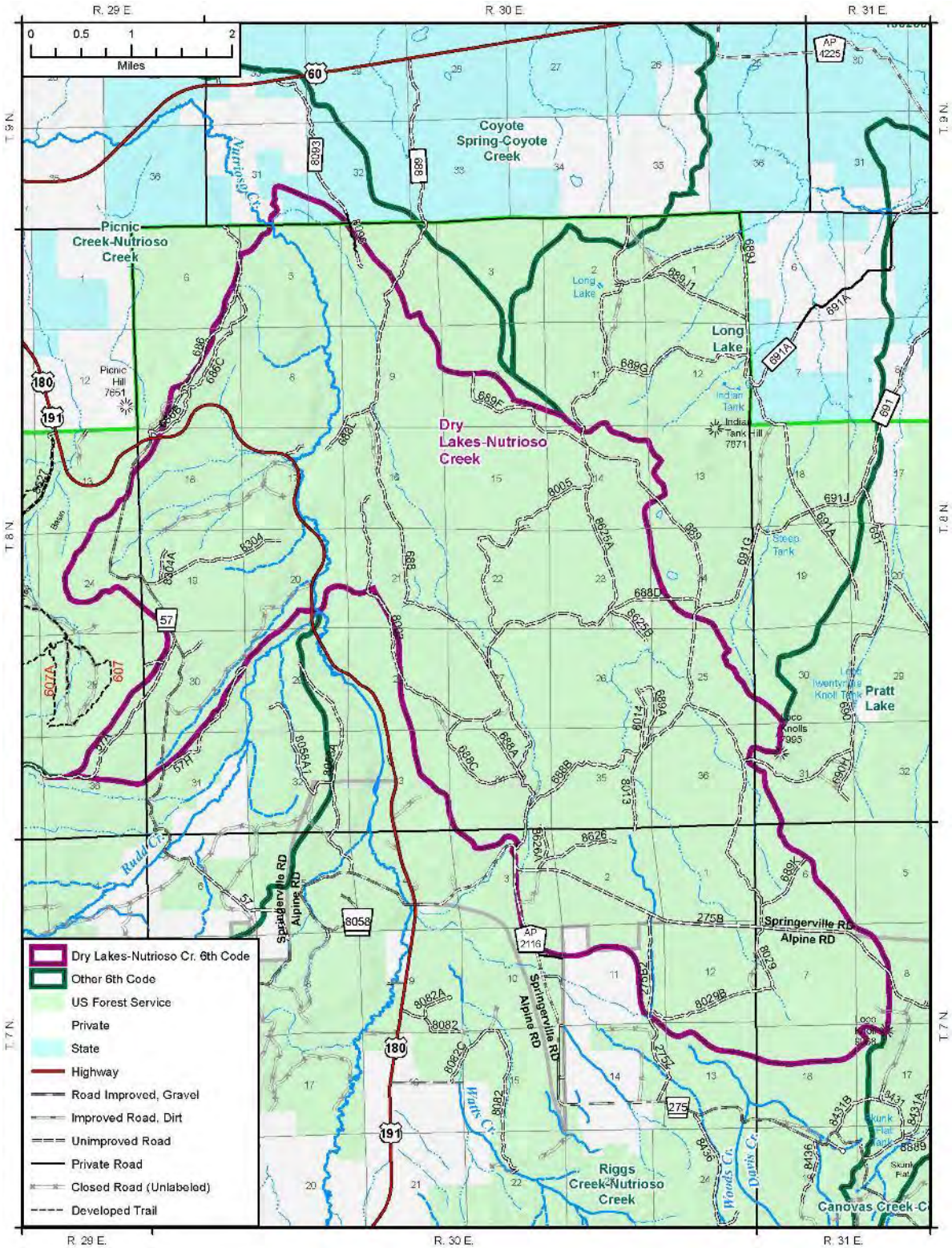

Figure 13. Dry Lakes – Nutrioso Creek 6th Code Watershed

Current Rating = Functioning at Risk = 2.1
Target Rating = Properly Functioning

Specific Project Activities

The following list of projects includes those identified to improve and, ultimately maintain watershed conditions. Not all projects are deemed necessary to move the watershed upwards to an improved condition class. Implementation and completion of Essential Projects 1 - 4 are required to move the watershed from Functioning at Risk to Properly Functioning. Projects 5 – 6 address other important landscape restoration objectives and are considered complimentary restoration projects. These projects will assist in improving and/or maintaining overall watershed conditions and ensure that it does not regress back into the Functioning at Risk state.

Essential Projects

1. **Essential Project #1 – Road Decommissioning**
   a. Attribute/ Indicator Addressed – Roads and Trails
   b. Project Description: This project will focus on decommissioning roads identified in West Escudilla Planning Area. In this watershed, there are approximately 12 miles of road decommissioning identified including system and unauthorized routes. Current decommissioning costs are approximately $1,500/mile. Decommissioning of a road involves reestablishing vegetation, and if necessary, initiating restoration of ecological processes interrupted or adversely impacted by the unneeded road. Treatments include one or more of the following treatments: Reestablishing former drainage patterns, stabilizing slopes, and restoring vegetation; Blocking the entrance to a road or installing water bars; Removing culverts, reestablishing drainages, removing unstable fills, pulling back road shoulders, and scattering slash on the roadbed; Completely eliminating the roadbed by restoring natural contours and slopes; and Other methods designed to meet the specific conditions associated with the unneeded road.
   c. Partners Involvement: Arizona Game and Fish Department
   d. Timeline: TBD based on funding and prioritization of 12 watersheds; Decommissioning of roads without fuels treatments can be decommissioned in one fiscal year; roads with planned fuels treatments can be decommissioned immediately following treatment.
   e. Estimated costs and associated Budget Line Item: $19,500,/CMRD/NFVW, NFWF, CMLG TBD based on funding and prioritization of 12 watersheds (including monitoring costs); Decommissioning of roads without fuels treatments can be decommissioned in one fiscal year; roads with planned fuels treatments can be decommissioned immediately following treatment.

2. **Essential Project #2 – Road Improvement**
   a. Attribute/ Indicator Addressed – Roads and Trails
   b. Project Description: This project will focus on heavy road maintenance and improving best management practices for road drainage on Maintenance Level 2 and 3 roads within the watershed. BMPs will include improvement of lead out ditches, road dips, and inlet and outlet features of culverts and road/stream crossings. Heavy road maintenance may involve some level of reconstruction of existing road beds to reestablish a safe and last driving surface with the intent of minimizing sediment movement off of the road. Currently there are 23 miles of Maintenance Level 2 and 3 roads within the watershed. This project assumes that approximately 10 miles of road in the watershed need some degree of maintenance ranging from light to heavy.
   c. Partners Involvement: Apache County

d. Timeline: TBD based on funding; can be completed in one fiscal year
e. Estimated costs and associated Budget Line Item = $15,000/ CMRD/CMLG, NFWF, NFVW; Based on an estimate of $1,500/mile for road maintenance, which may include reshaping, heavy equipment transport, per diem, culvert replacement, and archaeological review (if necessary).

3. **Essential Project #3 –Riparian Restoration**
   a. Attribute/ Indicator Addressed – Water Quality, Water Quantity, Aquatic Habitat, Aquatic Biota, Riparian/Wetland Vegetation, Soils
   b. Project Description: This project will focus on approximately 1 mile of stream/wetland/riparian restoration in Nutrioso Creek. Current conditions include headcutting and dewatering of the stream and its adjacent wet meadow system. Work would include implementation of channel and wetland/spring restoration techniques to increase water table elevations, enhance productivity of wetland dependent species (both aquatic and vegetative), encourage deep rooted vegetation on streambanks, impede erosion processes, and restore channel stability. These techniques include placement of water control structures that reestablish macro/micro-topography and encourage natural channel form and function, streambank contouring, and re-establishment of wetland/riparian plants through natural and/or artificial means (both woody and herbaceous plants). Following treatments, portions of these systems would be fenced to exclude ungulate grazing and allow for recovery of wetland and riparian resources. All techniques will utilize minimum impact best management practices to control sediment movement and will follow necessary permitting requirements under the Clean Water Act.
   c. Partners Involvement: Upper Little Colorado River Partnership, Trout Unlimited, Arizona Department of Environmental Quality
   d. Timeline: TBD based on Funding; project can be completed in one year.
   e. Estimated costs and associated Budget Line Item: $61,000/NFVW, NFWF; Cost estimates are based on labor, heavy equipment rental and transport, per diem, fencing supplies for either livestock and/or elk, imported aggregate, other materials as necessary.

4. **Essential Project #4 – Noxious Weed Control**
   a. Attribute/ Indicator Addressed – Terrestrial Invasive Species
   b. Project Description: This project will focus on the treatment of approximately 2 scattered acres of Russian olive within the Nutrioso Creek drainage downstream of Correjo Crossing. Treatments will include herbicide application, or other approved techniques
   c. Partners Involvement: none
   d. Timeline: TBD based on Funding; project is at least a 2 year project; initial treatment and follow-up to treat any residual plants.
   e. Estimated costs and associated Budget Line Item: Estimated costs and associated Budget Line Item: $38,000/NFVW, NFRG; Cost to treat just this site would be roughly $250/acre (total $500/year for three years = $1,500). That also might be a good estimate for contracting out the work. Realistically we could add 1-2 extra seasonals to our current crew for a three year period and be able to treat this Russian olive site, the Camelthorn site within the Canovas Creek-Coyote watershed, as well as survey other watersheds within the Escudilla WRAP for new infestations of noxious weeds and treat what is found. ($250/year in herbicide & supplies ($750), 1 x GS4 seasonals for 100 days @ $112/day for three years ($33,600), vehicle $10/day for 100 days/year

Complimentary Restoration Projects

5. **Project #5 – Forest Vegetation Improvement – Thinning**
   - **a.** Attribute/ Indicator Addressed – Fire Regime
   - **b.** Project Description: This project will focus on woodland and forest maintenance and restoration treatments where identified across the watershed. Cutting of vegetation will be accomplished by hand or mechanized treatment. In forested systems, activities would include thinning and group selections (e.g. creating 1-4 acre openings) to encourage regeneration of trees. Woodland areas include pinyon juniper and pinyon pine, while forested areas refer to ponderosa pine and mixed conifer. Specific silviculture prescriptions will be written for treatment units based on desired future conditions for the unit and area. Treatment units may be planned across watershed boundaries, thus this project will be implemented over multiple years, as the treatment units are prepared. More than one watershed within the West Escudilla Restoration Project may receive treatment in a single year, however acreages may be limited. A total of 14,795 acres of thinning treatments are planned within the project area in this watershed.
   - **c.** Partners Involvement: none known
   - **d.** Timeline: TBD based on funding; this is a multiple year project. Budget constraints and treatment boundaries will greatly limit the amount of acres treated in a single year within a watershed.
   - **e.** Estimated costs and associated Budget Line Item = $7,767,375/WFHF/NFTM, NFWF, NFVW; Costs are based on the following assumptions: pre-commercial thinning ≈$300/acre with limited piling; logging ≈ $125/acre (anticipate IRTC-good for services-thus reducing costs); Prep costs ≈ $100/acre for mark and cruise with crew of 6.

6. **Project #6 – Forest Vegetation Improvement – Prescribed Fire**
   - a. Attribute/ Indicator Addressed – Fire Regime
   - b. Project Description: This project would use prescribed fire to maintain and/or reduce fuel loadings. Prescribed fire can be implemented prior and after proposed vegetation treatments. Treatment units may be planned across watershed boundaries, thus this project will be implemented over multiple years, as the treatment units are prepared. More than one watershed within the Escudilla Planning Area may receive treatment in a single year, however acreages may be limited. A total of 8,480 acres of prescribed fire are planned within the project area in this watershed.
   - c. Partners Involvement: Arizona Game and Fish Department, Rocky Mountain Elk Foundation.
   - d. Timeline: TBD based on funding; this is a multiple year project based on budget constraints, burning units, burning limitations, and mitigation of cumulative impacts to natural and cultural resources.
   - e. Estimated costs and associated Budget Line Item = $424,500/WFHF/NFVW, NFWF; Costs are based on the following assumptions: burning ≈ $50/acres plus monitoring.

Costs

Table 30. Dry Lakes – Nutrioso Creek Costs

Dry Lakes-Nutrioso Creek						
Essential Projects	**Planning & Design**	**# Units**	**Cost / Unit**	**Implementation**	**Project Monitoring**	**Project Totals**
ESSENTIAL PROJECTS						
#1 Road Decommissioning						
FS Contribution ASNF	0	12 miles	$1,500	$18,000	$1,500	$19,500
Partner Contribution (both in kind and $)	0	n/a	n/a	0	0	$0
Funding already obtained	0	n/a	n/a	0	0	$0
Total	***0***	***11.98 miles***	***$1,500***	***$18,000***	***$1,500***	***$19,500***
#2 Road Improvement						
FS Contribution ASNF	0	10 miles	$1,500	$15,000	0	$15,000
Partner Contribution (both in kind and $)	0	n/a	n/a	0	0	$0
Funding already obtained	0	n/a	n/a	0	0	$0
Total	***0***	***10 miles***	***n/a***	***$15,000***	***0***	***$15,000***
#3Riparian Restoration						
FS Contribution ASNF	$10,000	1 mile	$60,000/mile	$60,000	$500	$70,500
Partner Contribution (both in kind and $)	0	n/a	n/a	0	0	$0
Funding Already obtained	0	n/a	n/a	0	0	$0
Total	***$10,000***	***1 mile***	***n/a***	***$60,000***	***$500***	***$70,500***
#4 Noxious Weed Control						
FS Contribution ASNF	0	2 acres	$18,750 acre	$37,500	$500	$38,000
Partner Contribution (both in kind and $)	0	n/a	n/a	0	0	$0
Funding already obtained	0	n/a	n/a	0	0	$0
Total	***0***	***2 acres***	***n/a***	***$37,500***	***$500***	***$38,000***
Forest Service Totals	***$10,000***	***n/a***	***n/a***	***$130,500***	***$2,500***	***$143,000***
Partner Contribution Totals	***0***	***n/a***	***n/a***	***0***	***0***	***0***
Funding already obtained	***0***	***n/a***	***n/a***	***0***	***0***	***0***
Grand Totals	***$10,000***	***n/a***	***n/a***	**$130,350**	**$2,500**	**$143,000**
COMPLIMENTARY RESTORATION PROJECTS						
#5 Forest Vegetation Improvement/Thinning						

FS Contribution ASNF	Group selection	$ -	14,795	$525/acre	$ 7,767,375	$ -	$ 7,767,375
Partner Contribution (both in kind and $)		$ -	n/a	n/a	$ -	$ -	$ -
Funding already obtained		$ -	n/a	n/a	$ -	$ -	$ -
Total		***$ -***	***14,795***		***$ 7,767,375***	***$ -***	***$ 7,767,375***
#6 Forest Vegetation Improvement/ Prescribed Fire							
FS Contribution – ASNF		$ -	8,480 acres	$50	$ 424,000	$ 500	$ 424,500
Partner Contribution (both in kind and $)		$ -	n/a	n/a	$ -	$ -	$ -
Funding already obtained		$ -	n/a	n/a	$ -	$ -	$ -
Total		***$ -***	***8,480 acres***	***n/a***	***$ 424,000***	***$ 500***	***$ 424,500***
Forest Service Totals		***$ -***	***n/a***	***n/a***	***$ 8,191,375***	***$ 500***	***$ 8,191,875***
Partner Contribution Totals		***$ -***	***n/a***	***n/a***	***$ -***	***$ -***	***$ -***
Funding already obtained		***$ -***	***n/a***	***n/a***	***$ -***	***$ -***	***$ -***
Grand Totals		***$ -***	***n/a***	***n/a***	***$ 8,064,175***	***$ 500***	***$ 8,064,675***

Timelines and Project Scheduling

By fiscal year, list Tasks necessary to complete project (e.g. planning, design, permitting, implementation) and the expected contribution by the responsible party (FS or Partner).

Completion of these tasks is contingent on securing necessary funding.

Table 31. Dry Lakes – Nutrioso Creek Timeline and Project Scheduling

Dry Lakes – Nutrioso Creek			
FY (TBD)	**Task**	**FS Cost ASNF (rounded)**	**Partner cost**
Year 1	Essential Project #2 Road maintenance	$15,000	Unknown
Year 1	Essential Project #3 Riparian Restoration	$61,000	Unknown
Year 1	Essential Project #4 Noxious weed control – Year 1 of 3	$13,000	Unknown
Year 2	Essential Project #4 Noxious weed control – Year 2 of 3	$13,000	Unknown
Year 2	Complimentary Restoration Project #6 Forest Vegetation Improvement - Prescribed Fire – 4,240 acres – Year 1 of 2	$212,000	Unknown
Year 2	Complimentary Restoration Project #5 Forest Vegetation Improvement - Thinning - 2,113 acres – Year 1 of 7	$1,110,000	
Year 3	Essential Project #4 Noxious weed control – Year 3 of 3	$13,000	Unknown
Year 3	Complimentary Restoration Project #6 Forest Vegetation Improvement - Prescribed Fire – 4,240 acres – Year 2 of 2	$212,000	Unknown
Year 3	Complimentary Restoration Project #5 Forest Vegetation Improvement - Thinning - 2,113 acres – Year 2 of 7	$1,110,000	Unknown
Year 4	Complimentary Restoration Project #5 Forest Vegetation Improvement - Thinning - 2,113 acres – Year 3 of 7	$1,110,000	Unknown
Year 5	Complimentary Restoration Project #5 Forest Vegetation Improvement - Thinning - 2,113 acres – Year 4 of 7	$1,110,000	Unknown
Year 6	Complimentary Restoration Project #5 Forest Vegetation Improvement - Thinning - 2,113 acres – Year 5 of 7	$1,110,000	Unknown
Year 7	Complimentary Restoration Project #5 Forest Vegetation Improvement - Thinning - 2,113 acres – Year 6 of 7	$1,110,000	Unknown
Year 8	Complimentary Restoration Project #5 Forest Vegetation Improvement - Thinning - 2,113 acres – Year 7 of 7	$1,110,000	Unknown
Year 9	Essential Project #1 Road decommissioning	$19,500	Unknown

Restoration project monitoring and evaluations

Internal Monitoring

The Forests will monitor watershed restoration success, choosing from the following methods:

1. Best management practice effectiveness – evaluate treatments once/year using Forest BMP form
2. Photo monitoring – establish permanent photo points in treatment areas to be photographed once/year
3. Riparian monitoring - conduct Proper Functioning Condition riparian surveys every 5 years on water bodies of concern to determine trend.
4. Noxious weed surveys – evaluate areas of known noxious weed infestations to determine if treatments are succeeding in eradicating populations; once/year
5. Water quality monitoring – use monitoring equipment to evaluate dissolved oxygen, pH, conductivity, and temperature levels in water bodies of concern, once/year *or* Establish long-term data logging on water bodies with other equipment.
6. Stream Temperature monitoring – establish permanent thermograph sites in waterbodies of concern; read once/year
7. Cross section and longitudinal profiles – establish 2 – 4 permanent monitoring sites on stream channels of concern to be read once every 5 years.
8. Establish sediment traps to measure sediment input

External Monitoring

Monitoring will be done in cooperation with:

The Arizona Department of Environmental Quality will continue monitoring water quality. The Forest will work on the establishment of photo points, permanent stream temperature monitoring sites, and cross section and longitudinal profiles. All monitoring data will be shared between both agencies.

Cooperators

The Gila National Forest and the Apache Sitgreaves National Forests, with the assistance of Ralph Pope, Southwest Native Ecosystems Management Consultant, developed the Escudilla Landscape Watershed Restoration Action Plan. It was reviewed by Arizona Department of Environmental Quality and New Mexico Environment Department prior to submittal for comment/additions/deletions.

DETAILED DESCRIPTION OF SAN FRANCISCO RIVER BASIN WATERSHEDS

The Trout Creek, Stone Creek-San Francisco River, Big Canyon-San Francisco River, Headwaters Centerfire Creek, Outlet Centerfire Creek, Spur Draw, and SA Creek 6th code watersheds are contained in the Centerfire Creek-San Francisco River 5th code watershed (see Figure 14, San Francisco River Watersheds Overview Map). The Dry Blue 6th code watershed is located in the Upper Blue River 5th code watershed. When combined these 6th code watersheds make up the headwater watersheds located on the east and south sides of Escudilla Mountain. These 6th code watersheds have very similar physical and biological characteristics. They have, in the past, supported the same type of human activities and are currently being managed to provide the same priority resource needs. These 6th code watershed adjoin each other and experience very similar climatic conditions.

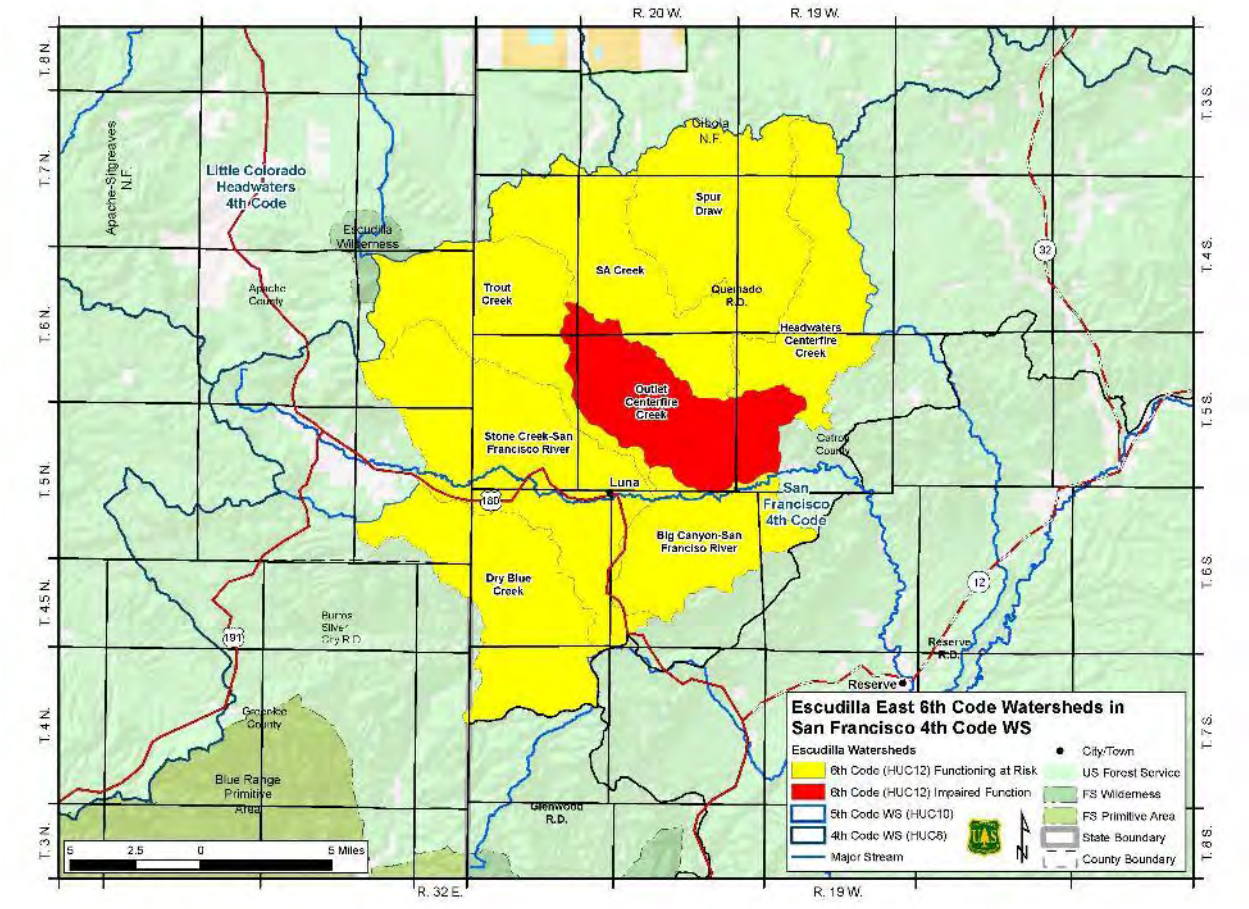

Figure 14. San Francisco River Watersheds Overview Map

Climate

Precipitation and temperature data for the Luna Ranger Station, New Mexico (7047 feet elevation) and Blue Arizona (5758 feet elevation) are being used to indicate the approximate average precipitation and daily temperatures for the San Francisco 6th code watersheds. As indicated by this data, the approximate long term average precipitation for the San Francisco 6th code watersheds in the northern higher elevations is 16.30 inches (Luna RS long term average) and in the southern lower mountainous area 20.73 inches (Blue, Arizona long term average).

In both the Centerfire Creek-San Francisco River and Upper Blue River 5th Code Watersheds nearly equal amounts of precipitation are received in the summer and winter. Occasionally in the fall there are large amounts of rain associated with hurricanes that come onshore in southern Texas or northern Mexico and push large moist air masses into the area. These events often result in large amounts of rain falling in a short time period leading to flooding across much of the area.

As indicated above there is somewhat less annual precipitation at the higher elevations mountainous area near Luna than at the lower canyon area near Blue, Arizona. This difference is not easily discerned as one travels from Luna, NM to Blue, AZ.

Using the Luna Ranger Station data as the best available information, the long term approximate average maximum and minimum daily temperatures are 66° F. and 26.7° F for the higher elevation portions of the 6th code watersheds. The Blue, AZ data indicates the long term approximate average maximum and minimum daily temperatures are 71.3° F. and 33.4° F for the lower canyon portions of the 6th code watersheds.

The day time average high temperatures vary considerably by season with the highest average day time temperatures occurring in July and the coldest average night time temperatures occurring in December and January. Seasonal extremes can be well below 0 degrees during the winter and as high as 100 degrees during the summer. There is a substantial difference between the elevation of Luna, NM (7047 ft.) and Blue, AZ (5758 ft.) and there is an approximate 5° difference between average maximum and average minimum daily temperatures for these two sites (WRCC, 2017).

Hydrology

As is normal in high elevation areas in the Southwest, which receive 20+ inches of annual precipitation, the small first and second order mountain streams that are located within the San Francisco 6th code watersheds are perennial, perennial interrupted or intermittent. While most of these streams are spring fed, which maintains the perennial flow, much of the flow within these streams is directly tied to current precipitation events. As is common throughout the Southwest, these steep gradient mountain streams are usually associated with high quality water, but can carry a large loads of sediment during major flow events when watershed conditions are deteriorated.

At the higher elevations the streams most often have exposed surface flows where the streams are perched on bedrock or very shallow alluvial deposits. As the streams descend in elevation, their gradient is reduced and the steep narrow canyons give way to broader valleys where wider more defined floodplains have developed. It is here where the surface flows often percolates into the deep alluvial deposits and the perennial flows disappears. Also, as noted above, the amount of annual precipitation increase somewhat in the lower southern portions of these watersheds. This increase in available run-off at the southern end of these 6th code watersheds sustains or further increases the potential for perennial flows at the lower elevations where the collector streams join together to form the larger San Francisco and Blue Rivers that flow on south and eventually join into the Gila River.

Within portion of the San Francisco 6th code watersheds where the steep gradient mountain streams leave the mountain/canyon terrain, there are reaches of valley bottom alluvial floodplains that support wetland/riparian vegetation. These key wetland habitat reaches are at high risk of being swamped with sediments and nutrients coming from the severely burnt areas of the Wallow Fire. It will take years for the potential sediment and nutrient loads from the Wallow Fire to become stabilized or wash through these key wetlands. Any efforts that can be implemented to reduce or stabilized the flow of nutrients and sediments from the Wallow Fire will help preserve these key wetland habitats.

Geomorphology

The Trout Creek, Stone Creek-San Francisco River, Big Canyon-San Francisco River, Headwaters Centerfire Creek, Outlet Centerfire Creek, Spur Draw, and SA Creek 6th code watersheds are located in and make up the headwater watersheds of the Centerfire-San Francisco River 5th code watershed. The Trout Creek and Stone Creek-San Francisco River 6th code watersheds originate in Arizona while the Big Canyon-San Francisco River, SA Creek, Outlet Centerfire Creek, Spur Draw, and Headwaters Centerfire Creek 6th code watersheds originate in New Mexico. The Dry Blue Creek 6th code watershed is located in and is a headwater reach of the Upper Blue River 5th code watershed. The San Francisco River is the mainstem drainage in which all of the water that originates in these 6th code watershed collects. From the eastern edge of the 6th code watersheds the San Francisco River flows east and then south and then back west into Arizona where it joins the Gila River near the town of Clifton, Arizona.

The San Francisco River and the numerous tributaries that feed into it in the higher elevation mountainous terrain are typical narrow, single channel, high gradient, perennial, streams. As the San Francisco River descends out of the eastern and southern slopes of Escudilla Mountain it cuts through the San Francisco Mountains north of Reserve, New Mexico. From Reserve it flows on south between the Saliz and Kelly Mountains into the broad San Francisco River valley that lies west of the Mogollon Mountains. The San Francisco River for the most part remains confined in a canyon setting until it reaches Alma, New Mexico. There is a reach near Reserve, New Mexico called the San Francisco Plaza where the river runs through a broader valley setting and it has a broad floodplain that support some farming.

The Dry Blue Creek 6th code watershed contains the headwater streams of the Blue River southeast of Alpine, Arizona and southwest of Luna New Mexico. This 6th code watershed is made up of narrow canyons and steep gradient streams that come together to make up the Blue River at the south end of the 6th code watershed. From this point the Blue River flow south in a relatively confined canyon setting until it joins the San Francisco River above Clifton, Arizona.

Geology

The geology of the Trout Creek, Stone Creek-San Francisco River, Big Canyon-San Francisco River, Headwaters Centerfire Creek, Outlet Centerfire Creek, Spur Draw, SA Creek, and Dry Blue Creek 6th code watersheds is a complex of basalt, volcanic tuff and alluvium sedimentary geologic formations that are intermixed and show up as the surface parent material layer depending upon elevation and the degree to which the area as eroded. *(USDI Geological Survey Bulletin 1121-H, Paleozoic and Cenozoic Rocks in the Alpine-Nutrioso Area, Apache County, Arizona, 1961)* The mineral deposits that make up the area are igneous rock formations of various ages (Bearwallow Mountain andesite along with the sedimentary volcanic tuff formation referred to as the Gila or Datil Group). These volcanic tuff and alluvium sedimentary formations are a naturally cemented combination of the various volcanic mineral deposits of the area. *(ARIZONA GEOLOGICAL SURVEY CONTRIBUTED REPORT CR-94-F, Alpine 1/Federal Final Report – Part 2, Temperature Gradients, Geothermal Potential, and Geology, June 1994)*

The upper Escudilla Mountain portion of Trout Creek and Stone Creek-San Francisco River 6th code watersheds is made up of a basalt cap formation (Bearwallow Mountain andesite) that covers the very upper portion of the mountain. Below this layer is a thick layer of what has been identified on the New Mexico side of Escudilla Mountain as volcaniclastic sedimentary rocks of the Spur Lake basin. This layer along with similar layers that make up a large portion of the slopes of Escudilla mountain and the area that surrounds Escudilla Mountain in New Mexico are all part of the Pueblo Creek formation. *(Geologic map of the Luna quadrangle, Catron County, New Mexico, May 2006)*

The lower elevation portions of the Stone Creek-San Francisco River 6th code watershed, most of the Dry Blue Creek 6th code watershed and upper portion of the Outlet Centerfire Creek 6th code watershed are made up of stream alluvium associated with the San Francisco River along with sedimentary fanglomerate and sandstone derived from local bedrock, which are part of the Gila Group. *(Geologic map of the Luna quadrangle, Catron County, New Mexico, May 2006)*

The lower elevation portions of the Outlet Centerfire Creek, Spur Draw, Headwaters Centerfire Creek and the Big Canyon-San Francisco River 6th code watersheds are made up of volcanic ash flow tuff and lava flow formations of the Mogollon Group. This geological formation is located between the Gila Group (above) and the Spears Group below. *(Geologic map of the Luna quadrangle, Catron County, New Mexico, May 2006).*

The weathering of these various geological formations makes up the rock fragments and soils found on the surface of the 6th code watersheds. Due to the substantial mixing of different volcanic and sedimentary formations in these watersheds, the soils found in these 6th code watershed are also found in a patchy network of soil types. Also multiple basalt extrusions that form dike like structures that forces water to the surface and into single narrow channels also greatly influence the hydrology and geomorphology of these 6th code watersheds. .

Soils

The soils that make up the San Francisco 6th code watersheds are derived mostly from basalt, volcanic ash tuff, and alluvium sedimentary parent material. The soils formed from the basalt and volcanic ash tuff parent materials are generally made up of small to very small size particles and tend to be fairly fertile soils. Depending upon the particle fractional make up and colloidal characteristics of the soils, these soils can be moderate to highly erodible when not protected by herbaceous vegetation. Without adequate ground cover to protect these soils, they tend to erode quickly and will continue to erode until herbaceous ground cover can be reestablished. These soils tend to retain soil moisture fairly well, but due to the varying ionic bond characteristic of the different soils, the rate at which these soils become wetted can vary substantial and the degree to which these different soils give up water and nutrients to plants can also vary greatly.

Wildlife

The wildlife species that occur within the San Francisco 6th code watersheds are the same species that can found in most high elevation ecosystems in the Southwest. A comprehensive lists of all classes of wildlife species, the vegetative communities they reside in and other pertinent information about these species can be found in the ASNF Forest Plan Revision Wildlife Specialist Report (USDA, 2013*).* This detailed report, while done for the ASNF in Arizona, contains information that is also applicable to the New Mexico (GNF) portion of the San Francisco 6th code watersheds.

There are multiple "Critical Habitat" (CH) designations for listed terrestrial wildlife species that are located within the San Francisco 6th code watersheds. These designations include CH for the Mexican Spotted Owl (MSO), Narrow-headed Garter (NGS) Snake and Southwestern Willow Flycatcher (SWWF). This CH is

locate in the higher elevation Mixed Conifer and Ponderosa Pine vegetative communities and along the major streams. Portions of the CH was impacted the by the Wallow Fire by either the burning of the habitat directly or due to the heavy flows of sediment that have resulted from this fire. The following Table 32, provides the acres of CH for the various species within the San Francisco 6th code watersheds.

While watershed condition and management objectives do not directly overlap with wildlife management objectives, there is a direct correlation between healthy watersheds and high quality wildlife habitat that applies to many wildlife species. Since most wildlife species are mobile and can seek out areas that provide for their needs, functioning watersheds and healthy ecosystems within the San Francisco 6th code watersheds will mostly likely be sought out and used by the wildlife that need the conditions that functioning watersheds will provide.

Table 32. Acres of MSO, Narrow-headed Garter Snake and SWWF Habitat in San Francisco River 6th Code Watersheds

6th Code Watersheds	MSO CH Acres	Narrow-headed Gartersnake proposed Critical Habitat Acres	SWWF CH Acres
Stone Creek – San Francisco River	19,651	1,656	330
Big Canyon-San Francisco River	10,265	860	233
Headwaters Centerfire Creek	0	0	0
Outlet Centerfire Creek	2,762	9	0
Spur Draw	0	0	0
SA Creek	12,080	0	0
Dry Blue Creek	17,997	1,327	0
Total	**62,755**	**3,852**	**563**

Fisheries

There are various fish species that potentially occur within the Trout Creek, Stone Creek-San Francisco River, Big Canyon-San Francisco River, Headwaters Centerfire Creek, Outlet Centerfire Creek, Spur Draw, SA Creek and Dry Blue Creek 6th code watersheds. A list of the native and non-native fish species that are potentially located in the San Francisco River within these 6th code watersheds can be found in the report, *Long-Term Monitoring of Fish Assemblages in the Gila River Drainage, New Mexico, 1988-2005 New Mexico Game and Fish Department, April 2006.*

A list of the native and non-native fish species that are potentially located in the Dry Blue Creek 6th code watershed is found in the *Fisheries Specialist Report, Forest Plan Revision FEIS, May 2014*. This detailed report, while done for the ASNF in Arizona, contains information that is also applicable to the New Mexico portion of the Dry Blue Creek 6th code watersheds.

Loach minnow and spikedace are the listed fish species located within the San Francisco River 6th code watersheds. Reaches of tributary streams and the main channel of the Blue River have been designated as critical habitat for these fish species within the Dry Blue Creek 6th code watershed. The following Table

33 provides the stream name and miles of designated critical habitat for loach minnow and spikedace within the San Francisco 6th code watersheds. Loach minnow are considered present in the Blue River and tributaries in the Dry Blue Creek watershed, while spikedace are not currently.

Table 33. Miles of Loach Minnow & Spikedace critical habitat (CH) in San Francisco River 6th Code Watersheds

6th Code Watersheds	Stream Name	Miles of Loach Minnow CH	Miles of Spikedace CH
Dry Blue Creek	Blue River	.06	.06
	Campbell Blue Creek	.02	0.02
	Dry Blue Creek	2.93	2.93
	Frieborn Canyon	1.30	1.30
	Pace Creek	.81	0.81
	Total	**5.20**	**5.20**

Vegetation

Uplands

Table 34 identifies the vegetation communities that make up the San Francisco River 6th code watersheds. These communities are classified by ecological response units (ERU). ERUs are map unit constructs that combine themes of site potential, historic disturbance regimes, and natural succession (USDA FS 2015a) and represent all major ecological types in the area. ERUs Site potential is a term used to describe the characteristic ecological conditions at the latest successional state, resulting from interactions among climate, soil, and vegetation.

The vegetation found growing within the San Francisco 6th code watersheds is heavily influenced by local intrinsic factors, such as elevation, aspect, land form, soil type and the level of past disturbance. At the upper elevations of the 6th code watersheds the dominant vegetation is comprised of mixed conifer species. Where the mixed conifer forests have been disturbed by past fires, aspen still dominates the tree composition. The mixed conifer vegetation communities (conifer and aspen) are present due to the high amounts of precipitation and cold winter temperatures that occur. The mixed conifer vegetation communities within the Trout Creek, Stone Creek-San Francisco River and Dry Blue Creek 6th code watersheds were severely burnt in the recent Wallow Fire and will be dominated by aspen as the severely burnt areas start to stabilize and become covered with vegetation again.

Below the high elevation peaks at the top of Escudilla Mountain are the steep to moderate slopes and associated smaller mountain ranges that extend out to the south and east. The dominant vegetation community that occurs on these slopes and associated mountain ranges is ponderosa pine. This change from mixed conifer to ponderosa pine is due to a change in soils along with somewhat lower amounts of precipitation and warmer temperatures. The ponderosa pine forest makes up the largest vegetation community within the San Francisco 6th code watersheds.

Table 34. 6th Code Ecological Response Unit (ERU) Summary for San Francisco River 6th Code Watersheds		
6th Code Watersheds - ERUs	**Acres**	**% of 6th Code**
San Francisco-15040004		
Trout Creek-150400040302	**20,934**	**100.00%**
Arizona Alder - Willow	90	0.43%
Colorado Plateau / Great Basin Grassland	66	0.31%
Herbaceous (wetland)	1,619	7.74%
Mixed Conifer - Frequent Fire	1,695	8.10%
Mixed Conifer w/ Aspen	1,622	7.75%
Montane / Subalpine Grassland	708	3.38%
Mountain Mahogany Mixed Shrubland	151	0.72%
Narrowleaf Cottonwood / Shrub	200	0.96%
PJ Grass	146	0.70%
PJ Woodland	73	0.35%
Ponderosa Pine – Evergreen Oak	259	1.24%
Ponderosa Pine / Willow	5	0.03%
Ponderosa Pine Forest	13,094	62.55%
Spruce-Fir Forest	1,200	5.73%
Willow - Thinleaf Alder	5	0.03%
Stone Creek-San Francisco River-150400040303	**35,769**	**100.00%**
Arizona Alder - Willow	12	0.03%
Colorado Plateau / Great Basin Grassland	1,462	4.09%
Gambel Oak Shrubland	67	0.19%
Herbaceous (wetland)	64	0.18%
Mixed Conifer - Frequent Fire	2,088	5.84%
Mixed Conifer w/ Aspen	2,194	6.13%
Montane / Subalpine Grassland	1,621	4.53%
Mountain Mahogany Mixed Shrubland	29	0.08%
Narrowleaf Cottonwood / Shrub	535	1.50%
PJ Grass	265	0.74%
PJ Woodland	656	1.83%
Ponderosa Pine – Evergreen Oak	3,120	8.72%
Ponderosa Pine Forest	22,039	61.61%
Spruce-Fir Forest	1,405	3.93%
Water	0	0.00%
Willow - Thinleaf Alder	211	0.59%
Big Canyon-San Franciso River-150400040308	**16,418**	**100.00%**
Colorado Plateau / Great Basin Grassland	473	2.88%
Herbaceous (wetland)	47	0.28%
Mixed Conifer - Frequent Fire	6,407	39.02%

Montane / Subalpine Grassland	528	3.21%
Mountain Mahogany Mixed Shrubland	161	0.98%
Narrowleaf Cottonwood / Shrub	161	0.98%
PJ Grass	674	4.10%
PJ Woodland	745	4.54%
Ponderosa Pine – Evergreen Oak	1,867	11.37%
Ponderosa Pine Forest	5,356	32.62%
Headwaters Centerfire Creek-150400040306	**18,536**	**100.00%**
Colorado Plateau / Great Basin Grassland	1,110	5.99%
Herbaceous (wetland)	180	0.97%
Mixed Conifer - Frequent Fire	872	4.71%
Montane / Subalpine Grassland	325	1.75%
Mountain Mahogany Mixed Shrubland	145	0.78%
Narrowleaf Cottonwood / Shrub	21	0.11%
PJ Grass	1,548	8.35%
PJ Woodland	4,248	22.92%
Ponderosa Pine – Evergreen Oak	4,616	24.90%
Ponderosa Pine Forest	5,409	29.18%
Semi-Desert Grassland	42	0.22%
Water	20	0.11%
Outlet Centerfire Creek-150400040307	**20,591**	**100.00%**
Colorado Plateau / Great Basin Grassland	2,086	10.13%
Fremont Cottonwood / Shrub	31	0.15%
Herbaceous (wetland)	110	0.53%
Mixed Conifer - Frequent Fire	1,292	6.28%
Montane / Subalpine Grassland	175	0.85%
Mountain Mahogany Mixed Shrubland	191	0.93%
Narrowleaf Cottonwood / Shrub	49	0.24%
PJ Grass	1,374	6.67%
PJ Woodland	3,173	15.41%
Ponderosa Pine – Evergreen Oak	2,941	14.28%
Ponderosa Pine Forest	9,147	44.42%
Semi-Desert Grassland	22	0.11%
Spur Draw-150400040304	**26,179**	**100.00%**
Colorado Plateau / Great Basin Grassland	7,801	29.80%
Herbaceous (wetland)	1	0.00%
Mixed Conifer - Frequent Fire	682	2.61%
Montane / Subalpine Grassland	553	2.11%
PJ Grass	376	1.44%
PJ Woodland	3,522	13.45%

Ponderosa Pine – Evergreen Oak	2,465	9.42%
Ponderosa Pine Forest	10,779	41.17%
SA Creek-150400040305	**22,560**	**100.00%**
Colorado Plateau / Great Basin Grassland	1,846	8.18%
Herbaceous (wetland)	177	0.78%
Mixed Conifer - Frequent Fire	2,118	9.39%
Mountain Mahogany Mixed Shrubland	6	0.03%
Narrowleaf Cottonwood / Shrub	77	0.34%
PJ Grass	728	3.23%
PJ Woodland	1,651	7.32%
Ponderosa Pine – Evergreen Oak	2,896	12.84%
Ponderosa Pine Forest	13,060	57.89%
Dry Blue Creek-150400040502	**25,048**	**100.00%**
Arizona Alder - Willow	57	0.23%
Colorado Plateau / Great Basin Grassland	16	0.06%
Herbaceous (wetland)	263	1.05%
Mixed Conifer - Frequent Fire	7,134	28.48%
Mixed Conifer w/ Aspen	689	2.75%
Montane / Subalpine Grassland	248	0.99%
Mountain Mahogany Mixed Shrubland	40	0.16%
Narrowleaf Cottonwood / Shrub	452	1.80%
PJ Woodland	4,177	16.68%
Ponderosa Pine – Evergreen Oak	2,192	8.75%
Ponderosa Pine Forest	9,780	39.05%

Below the ponderosa pine covered slopes of Escudilla Mountain and associated mountain ranges, pinyon-juniper woodlands and a small scattering of pine-oak woodlands occur. These woodland communities are located on a variety of soils, many of which are considered highly erosive. The pinyon-juniper woodlands are located on the lower mountain slopes, scattered mesa areas and in the valley areas located between the mountains. This vegetation community is associated with areas dominated by lower annual precipitation and soils that tend to be somewhat alkaline in nature.

Grassland vegetation communities are located in the lower valley bottoms and are for the most part associated with the deep alluvium sedimentary soils. These soils are considered to be fairly fertile when compared to the soils that make up the surrounding mountain slopes and mesas. The grasslands occupy an area of moderate to low precipitation and fairly cold climate.

Riparian

The wetland/riparian plant associations linked with the White Mountain-San Francisco Peak-Mogollon Rim Ecoregion are the vegetation classification being used to describe the wetland/riparian vegetation communities addressed in this WRAP. The wetland/riparian associations identified in this ecoregion are Wetland/Cienaga, Cottonwood-Willow, Mixed Broadleaf Deciduous and Montane Willow. Only three of

these plant associations are represented in the San Francisco River 6th code watersheds. (Wetland/Cienaga, Cottonwood-Willow and Montane Willow)

The specific wetland/riparian communities located within the San Francisco River 6th code watersheds consist of Herbaceous Riparian, Narrowleaf Cottonwood/Shrub, Willow-Thinleaf Alder, Fremont Cottonwood/Shrub and Arizona Alder/Willow. The following Table 35, show which ecoregion association the specific wetland/riparian vegetation communities are associated with:

Table 35. Link between Ecoregion Associations & San Francisco River 6th Code Watersheds

Ecoregion Association	Herbaceous Riparian	Narrowleaf Cottonwood /Shrub	Willow-Thinleaf Alder	Arizona Alder /Willow	Fremont Cottonwood / Shrub
Wetland/Cienaga	**X**				
Cottonwood-Willow		**X**			
Mixed Broadleaf Deciduous					
Montane Willow			**X**	**X**	**X**

The following Table 36, shows the acres of each Wetland/Riparian vegetative community that are found on National Forest land in the separate 6th code watersheds.

Table 36. Acres of Watershed/Riparian Vegetation Communities on NF Land in SFR 6th Code Watersheds

6th Code Watersheds	Herbaceous Riparian	Narrowleaf Cottonwood /Shrub	Willow-Thinleaf Alder	Fremont Cottonwood /Shrub	Arizona Alder-Willow	Total Acres of Riparian Habitat
Trout Creek	1,101	144	11	0	90	1,346
Stone Creek-San Francisco River	37	401	211	0	12	661
Big Canyon-San Francisco River	1	119	0	0	0	120
Headwaters Centerfire Creek	93	21	0	0	0	114
Outlet Centerfire Creek	9	29	0	7	0	45
Spur Draw	0	0	0	0	0	0
SA Creek	171	77	0	0	0	249
Dry Blue Creek	180	290	0	0	55	525
Total of Specific Riparian Type	**1,592**	**1,081**	**222**	**7**	**157**	**3,060**

The following Table 37, shows the acres of each Wetland/Riparian vegetation community that are found on State and private land in the separate 6th code watersheds.

Table 37. Acres of Wetland/Riparian Vegetation Communities on State & Pvt Land in SFR 6th Code Watersheds

6th Code Watersheds	Herbaceous Riparian	Narrowleaf Cottonwood /Shrub	Willow-Thinleaf Alder	Fremont Cottonwood /Shrub	Arizona Alder-Willow	Total Acres of Riparian Habitat
Trout Creek	518	12	0	0	0	531
Stone Creek-San Francisco River	27	129	0	0	0	156
Big Canyon-San Francisco River	47	43	0	0	0	89
Headwaters Centerfire Creek	88	0	0	0	0	88
Outlet Centerfire Creek	100	20	0	25	0	145
Spur Draw	0	0	0	0	0	0
SA Creek	3	0	0	0	0	3
Dry Blue Creek	83	44	0	0	2	129
Total of Specific Riparian Type	**866**	**248**	**0**	**25**	**2**	**1,141**

The following Table 38, shows the acres of each Wetland/Riparian vegetation community that are found on all lands within the San Francisco River 6th code watersheds.

Table 38. Total Acres of Wetland/Riparian Vegetation Habitat in the SFR 6th Code Watersheds

	Herbaceous Riparian	Narrowleaf Cottonwood/ Shrub	Willow-Thinleaf Alder	Fremont Cottonwood /Shrub	Arizona Alder-Willow	Total Acres of Riparian Habitat
Total Riparian Habitat National Forest	1,592	1,081	222	7	157	3,059
Total Riparian Habitat State and Pvt.	8,66	248	0	25	2	1,141
Total Riparian Habitat SFR Watersheds	**2,458**	**1,329**	**222**	**32**	**159**	**4,200**

The wetland/riparian vegetation found growing within the San Francisco River 6th code watersheds is heavily influenced by local intrinsic factors, such as elevation, aspect, land form, soil type, level of past disturbance, and the availability of perennial water. The herbaceous riparian vegetation community identified in the San Francisco River 6th code watersheds is located in the broad valley bottoms and intermittent lake bed type terrain where water accumulates in low lying areas. This vegetation community only supports true obligate riparian plants in small isolated patches where water is present for most of the year. The remainder of the vegetation community supports species that thrive in wetter areas, but do not depend upon having hydrated soils yearlong to survive. This vegetation community is located in areas of moderate to high annual precipitation.

The narrowleaf cottonwood/shrub vegetation community is associated mid-elevation third or fourth order streams and is a true obligate riparian plant community. This vegetation community is dependent upon perennial flows and is usually found close to the stream edge or where the flood plain soils are shallow and the water table is near the surface. This vegetation plant community is usually found in areas that receive moderate to high annual precipitation.

The willow-thinleaf alder vegetation community is associated with the steep gradient mountain streams and supports true obligate riparian species. This vegetation community is usually found growing in rocky and/or gravely substrates and depends upon having perennial or nearly perennial flows. The willow-thinleaf alder community is found at higher elevations within the San Francisco River 6th code watersheds where higher levels of annual precipitation are common.

The Fremont cottonwood/shrub and Arizona Alder/Willow vegetation communities are associated lower-elevation third or fourth order streams and are a true obligate riparian plant communities. These vegetation communities are dependent upon perennial flows and are usually found close to the stream edge or where the floodplain soils are shallow and the water table is near the surface. These vegetation plant communities are usually found in areas that receive moderate annual precipitation and are a lower elevation replacement of the narrowleaf cottonwood/shrub vegetation community.

WATERSHED CONDITION

Watershed condition encompasses both aquatic and terrestrial processes and functions as the quality of water and aquatic habitat is inseparably linked to the integrity of uplands and riparian areas within a watershed. Aspects of a watershed related to geomorphic integrity can be defined in terms of attributes such as slope stability, soil productivity, channel morphology and other upslope, riparian and aquatic habitat characteristics. Hydrologic integrity of a watershed is related primarily to flow, sediment and water quality attributes. Biological integrity can be defined by the aquatic characteristics that influence the diversity and abundance of species. In each case, integrity must be evaluated in the context of the natural disturbance regime, geoclimatic setting and other important factors. The geomorphic, hydrologic, and biologic components are then combined and evaluated as a whole to assess watershed integrity and health.

Three classes are used to describe watershed condition (USDA Forest Service 2004, FSM 2521.1):

4. Class 1 watersheds exhibit high geomorphic, hydrologic, and biotic integrity relative to their natural potential condition.
5. Class 2 watersheds exhibit moderate geomorphic, hydrologic, and biotic integrity relative to their natural potential condition.
6. Class 3 watersheds exhibit low geomorphic, hydrologic, and biotic integrity relative to their natural potential condition.

Watershed condition classification was initially completed for both the ASNF and the GNF, at the subwatershed level (6th code), in 2012 and 2011, respectively. A review and reclassification (if necessary) of all Forest watersheds was completed in 2015. The watersheds were classified as being in one of the three condition classes noted above, as translated to functionality.

- Class 1 = Functioning Properly,
- Class 2 = Functioning at Risk, and
- Class 3 = Impaired Function.

Table 39 summarizes the watershed functionality ratings of the San Francisco River Basin sixth code watersheds included in this WRAP. Seven watersheds were rating "Functioning at Risk" and one watershed was rated as "Impaired". The following watershed condition indicator datasheets provide useful data and important indicator/attribute information, which helps determine the actions necessary to restore watershed functionality in the Escudilla Landscape 6th code watersheds. The datasheets also play an important role in prioritizing the 6th code watersheds for treatment by identifying key watershed issues. Watersheds found on the ASNF were rated in 2011, while the watersheds on the GNF were rated initially in 2011, and recently re-evaluated in 2015.

Table 39. Watershed Score and Watershed Functionality Rating for San Francisco River watersheds

Watershed Score by 4th Code Watershed (River Basin)		
San Francisco River Basin		
6th Code Watersheds	**Watershed Score**	**Watershed Functionality Rating**
Trout Creek	1.8	Functioning at Risk
Stone Creek-San Francisco River	2.2	Functioning at Risk
Big Canyon-San Francisco River	1.7	Functioning at Risk
Headwaters Centerfire Creek	1.7	Functioning at Risk
Outlet Centerfire Creek	2.3	Impaired
Spur Draw	1.9	Functioning at Risk
SA Creek	2.0	Functioning at Risk
Dry Blue Creek	1.9	Functioning at Risk

Attributes/Indicator within FS control to affect: The Forest Service has the ability to influence and/or address, to some extent, all attributes with assistance of partners and cooperators. The San Francisco River watersheds are jointly managed by the Forest Service (ASNF and GNF), Bureau of Land Management, states of Arizona and New Mexico, and various private land owners. The Forests manage those under Forest Service jurisdiction and often collaborate with neighbors during treatment proposals. Roads within the watershed include those managed as National Forest System (NFS) roads, Catron, Apache, and Greenlee County roads, and state and federal highways. The Forests area responsible for maintenance of the NFS roads and make work with county, state, and federal partners to complete work during times of emergency or when other opportunities present themselves.

Attributes/beyond FS control to affect-other parties need to address – The Forest Service has the ability to influence and/or address most of the attributes with assistance of partners and cooperators. County Roads are numerous in the eight San Francisco River watersheds, however the Forests may partner with the counties to achieve mutual benefits. Numerous private land parcels are located within the watersheds are beyond Forest Service control, although the Forests often complete work to reduce risk to these lands.

Trout Creek

Table 40. Trout Creek watershed condition datasheet

2015 TROUT CREEK WATERSHED CONDITION INDICATORS					
INDICATOR	ATTRIBUTE	ATTRIBUTE SCORE	INDICATOR SCORE	WEIGHT	RATING RATIONALE
Aquatic Physical					
1 Water Quality	Impaired Waters (303)d Listed	1	1.5	10%	Trout Creek should have fish; temperatures are too high to support them. Sediment issues from road.
	Water Quality Problems (Not Listed)	2			
2 Water Quantity	Flow Characteristics	2	2	10%	Structures on Trout Creek somewhat impede flow characteristics. Large structure on Romero Creek on private.
3 Aquatic Habitat	Habitat Fragmentation	2	1.5	10%	Structures are fragmenting habitat.
	Large Woody Debris	n/a			
	Channel Shape and Function	1			
Aquatic Biota					
4 Aquatic Biota	Life Form Presence	3	2	15%	Natives still present but structures are fragmenting habitat
	Native Species	2			
	Exotic and/or Invasive Species	1			
5 Riparian/Wetland Vegetation	Vegetative Condition	2	2	15%	PFC data show PFC and Functional at Risk on Trout and Romero Creeks; used PFC, RASES and professional knowledge, A/S PFC trended towards a 2
Terrestrial Physical					
6 Roads and Trails	Open Road Density	3	2.3	15%	Calculated score
	Road Maintenance	2			Level 2 roads, with major County Road 007; proximity to water more prevalent on A/S
	Proximity to Water	3			Calculated score
	Mass wasting	1			
7 Soils	Soil Productivity	1	1.3	15%	General Ecosystem Survey information
	Soil Erosion	2			Lot of watershed structures built in 1980s and prior. Soil production condition from GNF GES and ASNF TES
	Soil Contamination	1			
Terrestrial Biological					
8 Fire Regime or Wildfire	Fire Regime Condition Class	3	3	2%	FRCC Rating from RO FRCC analysis
	Wildfire Effects	n/a			
9 Forest Cover	Loss of Forest Cover		1	2%	

10 Rangeland Vegetation	Vegetation Condition	1	2	2%	Average of 4 allotments
11 Terrestrial Invasive Species	Extent and Rate of Spread	2	1	2%	Not known
12 Forest Health	Insects and Disease		1	2%	
	Ozone				Calculated score
Watershed Score		**1.8**			

The above watershed condition classification assessment data and the NMED water quality data indicates the major watershed functionality problems for the Trout Creek 6th code watershed are: 1) Degraded water flow characteristics and fragmented aquatic habitat due to structures built in the channels, 2) Road influence due to high road density, inadequate road maintenance and roads located near or in drainage bottoms. 3) Degraded upland vegetation conditions due to past management practices,

Stone Creek-San Francisco River

Table 41. Stone Creek – San Francisco River watershed condition datasheet

2015 STONE CREEK WATERSHED CONDITION INDICATORS					
INDICATOR	ATTRIBUTE	ATTRIBUTE SCORE	INDICATOR SCORE	WEIGHT	RATING RATIONALE
Aquatic Physical					
1 Water Quality	Impaired Waters (303)d Listed	3	3	10%	Severe degradation in Stone Creek resulting in negative impacts to San Francisco River – Post 2011 Wallow Fire
	Water Quality Problems (Not Listed)	3			
2 Water Quantity	Flow Characteristics	3	3	10%	Continues to remain poor including additional changes to hydrograph as result of Wallow Fire
3 Aquatic Habitat	Habitat Fragmentation	2	2.5	10%	Stone Creek severely degraded following Wallow Fire
	Large Woody Debris	n/a			
	Channel Shape and Function	3			
Aquatic Biota					
4 Aquatic Biota	Life Form Presence	2	2	15%	Natives still present as well as non natives
	Native Species	1			
	Exotic and/or Invasive Species	3			
5 Riparian/Wetland Vegetation	Vegetative Condition	2	2	15%	Still in fair condition; however riparian in Stone Creek suffered setback following Wallow Fire
Terrestrial Physical					
6 Roads and Trails	Open Road Density	3	2.3	15%	Calculated score
	Road Maintenance	2			
	Proximity to Water	2			Calculated score
	Mass wasting	n/a			n/a
7 Soils	Soil Productivity	1	1.7	15%	9% high-moderate severity from 2011 Wallow Fire

	Soil Erosion	2			
	Soil Contamination	1			
Terrestrial Biological					
8 Fire Regime or Wildfire	Fire Regime Condition Class	n/a	3	2%	9% moderate-high burn severity and 31% low severity (2011 Wallow Fire)
	Wildfire Effects	3			
9 Forest Cover	Loss of Forest Cover	3	3	2%	Considered entire watershed including AZ portion for forest cover
10 Rangeland Vegetation	Vegetation Condition		2	2%	4 allotments
11 Terrestrial Invasive Species	Extent and Rate of Spread		1	2%	Very limited; cheatgrass occurring but not spreading within watershed
12 Forest Health	Insects and Disease		1	2%	
	Ozone				Calculated score
Watershed Score		**2.2**			

The above watershed condition classification assessment data and the NMED water quality data indicates the major watershed functionality problems for the Stone Creek-San Francisco 6th code watershed are: 1) Degraded water flow characteristics and fragmented aquatic habitat due to stock tanks built in the channels and water diverted for irrigation, 2) Degraded aquatic biota due to the presence crayfish in the San Francisco River, 3) Degraded upland vegetation conditions due to past management practices, 4) Road influence due to high road density and inadequate road maintenance.

Big Canyon-San Francisco River

Table 42. Big Canyon – San Francisco River watershed condition datasheet

2015 BIG CANYON – SAN FRANCISCO RIVER WATERSHED CONDITION INDICATORS

INDICATOR	ATTRIBUTE	ATTRIBUTE SCORE	INDICATOR SCORE	WEIGHT	RATING RATIONALE
Aquatic Physical					
1 Water Quality	Impaired Waters (303)d Listed	3	2	10%	San Francisco River listed in 2014-2016 305b report for benthic macroinvertebrate community and temperature
	Water Quality Problems (Not Listed)	1			
2 Water Quantity	Flow Characteristics	3	3	10%	Tanks and irrigation diversions
3 Aquatic Habitat	Habitat Fragmentation	2	1.5	10%	Diversions on San Francisco
	Large Woody Debris	n/a			
	Channel Shape and Function	1			
Aquatic Biota					
4 Aquatic Biota	Life Form Presence	2	1.7	15%	Crayfish on San Francisco
	Native Species	1			
	Exotic and/or Invasive Species	2			
5 Riparian/Wetland Vegetation	Vegetative Condition	1	1	15%	Repeated trespass of livestock have caused localized impacts

Terrestrial Physical					
6 Roads and Trails	Open Road Density	2	1.7	15%	Mostly level 2 roads
	Road Maintenance	2			
	Proximity to Water	1			
	Mass wasting	n/a			
7 Soils	Soil Productivity	1	1.3	15%	Soil production condition from GNF GES and ASNF TES
	Soil Erosion	2			
	Soil Contamination	1			
Terrestrial Biological					
8 Fire Regime or Wildfire	Fire Regime Condition Class	3	3	2%	2015 FRCC rating
	Wildfire Effects	n/a			
9 Forest Cover	Loss of Forest Cover	1	1	2%	
10 Rangeland Vegetation	Vegetation Condition	2	2	2%	3 allotments
11 Terrestrial Invasive Species	Extent and Rate of Spread	1	1	2%	Small amount of salt cedar on San Francisco
12 Forest Health	Insects and Disease	1	1	2%	
	Ozone	1			
Watershed Score		**1.7**			

The above watershed condition classification assessment data and the NMED water quality data indicates the major watershed functionality problems for the Big Canyon-San Francisco 6th code watershed are: 1) Degraded water quality, degraded flow characteristics and fragmented aquatic habitat due to Luna Lake, which is directly upstream of this watershed, 2) Degraded aquatic biota due to the presence of crayfish in the San Francisco River, 3) Degraded riparian and upland vegetation due to the Wallow Fire burning a major portion of this watershed. This may also lead to degraded soils and increased erosion in the future. 4) Road influence due to high road density, inadequate road maintenance and roads located near or in drainage bottoms.

Headwaters Centerfire Creek

Table 43. Headwaters Centerfire Creek watershed condition datasheet

2015 HEADWATERS CENTERFIRE CREEK WATERSHED CONDITION INDICATORS					
INDICATOR	ATTRIBUTE	ATTRIBUTE SCORE	INDICATOR SCORE	WEIGHT	RATING RATIONALE
Aquatic Physical					
1 Water Quality	Impaired Waters (303)d Listed	3	2	10%	Centerfire Creek on 303d list
	Water Quality Problems (Not Listed)	1			
2 Water Quantity	Flow Characteristics	2	2	10%	Several structures in main drainage not mimicking natural hydrograph
3 Aquatic Habitat	Habitat Fragmentation	2	2	10%	Structures in Centerfire Creek create fragmentation
	Large Woody Debris	n/a			
	Channel Shape and Function	2			
Aquatic Biota					
4 Aquatic Biota	Life Form Presence	2	2	15%	This area still requires survey
	Native Species	2			
	Exotic and/or Invasive Species	2			
5 Riparian/Wetland Vegetation	Vegetative Condition	2	2	15%	Centerfire Creek assessed as Functional at Risk
Terrestrial Physical					
6 Roads and Trails	Open Road Density	2	1.3	15%	Not too many roads in this watershed. All level 2
	Road Maintenance	1			
	Proximity to Water	2			
	Mass wasting	n/a			
7 Soils	Soil Productivity	1	1.3	15%	Soil production condition from GNF and ASNF TES
	Soil Erosion	2			
	Soil Contamination	1			
Terrestrial Biological					
8 Fire Regime or Wildfire	Fire Regime Condition Class	2	2	2%	2015 FRCC analysis
	Wildfire Effects	n/a			
9 Forest Cover	Loss of Forest Cover	1	1	2%	
10 Rangeland Vegetation	Vegetation Condition	2	2	2%	5 allotments
11 Terrestrial Invasive Species	Extent and Rate of Spread	1	1	2%	None known
12 Forest Health	Insects and Disease	1	1	2%	
	Ozone	1			
Watershed Score		**1.7**			

The above watershed condition classification assessment data and the NMED water quality data indicate the major watershed functionality problems for the Headwaters Centerfire Creek 6th code watershed are: 1) Degraded water quality due to a major portion of the watershed being made up of Datil soils, 2) Interrupted flow and degraded aquatic habitat due to structures in the channel.

Outlet Centerfire Creek

Table 44. Outlet Centerfire Creek watershed condition datasheet

2015 OUTLET CENTERFIRE CREEK WATERSHED CONDITION INDICATORS					
INDICATOR	ATTRIBUTE	ATTRIBUTE SCORE	INDICATOR SCORE	WEIGHT	RATING RATIONALE
Aquatic Physical					
1 Water Quality	Impaired Waters (303)d Listed	3	3	10%	Centerfire Creek and tributaries moving much sediment; gotten worse since Wallow Fire. Rains in past 3 years have resulted in flashy, high velocity flows that have degraded Centerfire Creek
	Water Quality Problems (Not Listed)	3			
2 Water Quantity	Flow Characteristics	2	2	10%	Joshua Canyon has seen recent high flows following prescribed fire that resulted in downcutting in Centerfire Creek
3 Aquatic Habitat	Habitat Fragmentation	3	3	10%	Centerfire Creek has downcut about 3 feet since 2010. Perennial waters in tributaries of Centerfire Creek are all disconnected due to drying.
	Large Woody Debris	n/a			
	Channel Shape and Function	3			
Aquatic Biota					
4 Aquatic Biota	Life Form Presence	2	2.3	15%	Based on upstream of Forest
	Native Species	2			
	Exotic and/or Invasive Species	3			
5 Riparian/Wetland Vegetation	Vegetative Condition	3	3	15%	Losing wetland component in Centerfire Creek due to downcutting
Terrestrial Physical					
6 Roads and Trails	Open Road Density	2	1.7	15%	Good portion of contiguous Datil soils on steep slopes in upper watershed
	Road Maintenance	2			
	Proximity to Water	1			
	Mass wasting	n/a			
7 Soils	Soil Productivity	1	1.7	15%	Due to loss of groundcover from Wallow Fire
	Soil Erosion	3			
	Soil Contamination	1			
Terrestrial Biological					
8 Fire Regime or Wildfire	Fire Regime Condition Class	2	2	2%	2% high-moderate burn severity from Wallow Fire; used FRCC
	Wildfire Effects	n/a			
9 Forest Cover	Loss of Forest Cover	1	1	2%	Stand change due to Wallow Fire
10 Rangeland Vegetation	Vegetation Condition	2	2	2%	6 allotments from monitoring data

11 Terrestrial Invasive Species	Extent and Rate of Spread	1	1	2%	Cheatgrass noted in isolated pockets; however, not spreading
12 Forest Health	Insects and Disease	1	1	2%	RO data, MSV shows 1
	Ozone	1			
Watershed Score		**2.3**			

The above watershed condition classification assessment data and the NMED water quality data indicate the major watershed functionality problems for the Outlet Centerfire Creek 6th code watershed are: 1) Degraded water quality due to a major portion of the watershed being made up of Datil soils and past severe erosion of the stream channel, 2) Interrupted flow and degraded aquatic habitat due to a large erosion control structure in the channel and the diversion of water, 3) Degraded aquatic biota due to the presence of crayfish in the streams, 4) Degraded vegetation condition related to past management practices.

Spur Draw

Table 45. Spur Draw watershed condition datasheet

2015 SPUR DRAW WATERSHED CONDITION INDICATORS					
INDICATOR	ATTRIBUTE	ATTRIBUTE SCORE	INDICATOR SCORE	WEIGHT	RATING RATIONALE
Aquatic Physical					
1 Water Quality	Impaired Waters (303)d Listed	1	2	10%	2015 information indicates severe erosion in Spur Draw coming from volcanic sediments. Historic sediment control structures have washed out. Centerfire Creek downstream listed for turbidity, sedimentation/siltation, temperature, nutrient/eutrophication, and specific conductants. TMDL for nutrients and conductivity.
	Water Quality Problems (Not Listed)	3			
2 Water Quantity	Flow Characteristics	2	2	10%	Arroyo Grande structure (very large) in bottom of channel modifies hydrograph
3 Aquatic Habitat	Habitat Fragmentation	2	2	10%	Very limited water; no species, used weighted average
	Large Woody Debris	n/a			
	Channel Shape and Function	2			
Aquatic Biota					
4 Aquatic Biota	Life Form Presence	2	2	15%	Very little water, used weighted average
	Native Species	2			
	Exotic and/or Invasive Species	2			
5 Riparian/Wetland Vegetation	Vegetative Condition	2	2	15%	Very little water, used weighted averages
Terrestrial Physical					

6 Roads and Trails	Open Road Density	2	1.7	15%	Lot of Datil soils with steep slopes in this watershed
	Road Maintenance	2			
	Proximity to Water	1			
	Mass wasting	n/a			
7 Soils	Soil Productivity	2	2	15%	Soils are formed by highly erosive volcanic sediments; lot of erosion of Datil slopes, hoodoos. Soil production condition from GNF GES and ASNF TES
	Soil Erosion	3			
	Soil Contamination	1			
Terrestrial Biological					
8 Fire Regime or Wildfire	Fire Regime Condition Class	2	2	2%	2015 FRCC data
	Wildfire Effects	n/a			
9 Forest Cover	Loss of Forest Cover	1	1	2%	
10 Rangeland Vegetation	Vegetation Condition	2	2	2%	3 allotments
11 Terrestrial Invasive Species	Extent and Rate of Spread	1	1	2%	Cheatgrass present in isolated areas
12 Forest Health	Insects and Disease	1	1	2%	
	Ozone	1			
Watershed Score		**1.9**			

The above watershed condition classification assessment data indicates the major watershed functionality problems for the Spur Draw 6th code watershed are: 1) Degraded watershed conditions due to high amount of volcanic sediments (Datil soils) which has resulted in historic gullying and destabilization, soil erosion, and soil productivity problems.

SA Creek

Table 46. SA Creek watershed condition datasheet

2015 SA CREEK WATERSHED CONDITION INDICATORS

INDICATOR	ATTRIBUTE	ATTRIBUTE SCORE	INDICATOR SCORE	WEIGHT	RATING RATIONALE
Aquatic Physical					
1 Water Quality	Impaired Waters (303)d Listed	1	1.5	10%	
	Water Quality Problems (Not Listed)	2			Due to Datil soils found in this watershed there are sedimentation issues into perennial stream. This may contribute to conductivity issues in Centerfire Creek.
2 Water Quantity	Flow Characteristics	2	2	10%	Many road crossing on the perennial streams
3 Aquatic Habitat	Habitat Fragmentation	2	2	10%	Roads and structures fragment habitat
	Large Woody Debris	n/a			
	Channel Shape and Function	2			
Aquatic Biota					

4 Aquatic Biota	Life Form Presence	2	2.3	15%	
	Native Species	2			
	Exotic and/or Invasive Species	3			Crayfish found in these streams
5 Riparian/Wetland Vegetation	Vegetative Condition	2	2	15%	SA Creek could use improvement
Terrestrial Physical					
6 Roads and Trails	Open Road Density	3	2.3	15%	FR 385 has major mas wasting issues, but this is not prevalent throughout the watershed
	Road Maintenance	2			
	Proximity to Water	2			
	Mass wasting	2			
7 Soils	Soil Productivity	2	2	15%	Greater than 10% of watershed has highly erosive soils (Datil formation), soil production came from GNF GES and ASNF TES
	Soil Erosion	3			
	Soil Contamination	1			
Terrestrial Biological					
8 Fire Regime or Wildfire	Fire Regime Condition Class	2	2	2%	FRCC Rating from RO FRCC analysis
	Wildfire Effects	n/a			
9 Forest Cover	Loss of Forest Cover	1	1	2%	
10 Rangeland Vegetation	Vegetation Condition	2	2	2%	3 allotments
11 Terrestrial Invasive Species	Extent and Rate of Spread	1	1	2%	None known
12 Forest Health	Insects and Disease	2	1.5	2%	RO data
	Ozone	1			
Watershed Score		**2**			

The above watershed condition classification assessment data indicates the major watershed functionality problems for the SA Creek 6th code watershed are: 1) Degraded aquatic biota due to the presence of crayfish in the streams, 2) Road influence due to high road density, inadequate road maintenance, roads near or in drainage bottoms and mass wasting problems associated with FR 385, 3) Soil erosion and soil productivity problems due to a major portion of the watershed being made up of Datil soils, 4) Degraded vegetation conditions related to past management practices and insect and disease.

Dry Blue Creek

Table 47. Dry Blue Creek watershed condition datasheet

2015 DRY BLUE CREEK WATERSHED CONDITION INDICATORS					
INDICATOR	ATTRIBUTE	ATTRIBUTE SCORE	INDICATOR SCORE	WEIGHT	RATING RATIONALE
Aquatic Physical					
1 Water Quality	Impaired Waters (303)d Listed	1	1	10%	
	Water Quality Problems (Not Listed)	1			
2 Water Quantity	Flow Characteristics	2	2	10%	Structures on Hy Clark. Private pond near state line on the Dry Blue
3 Aquatic Habitat	Habitat Fragmentation	3	3	10%	Tribs are fragmented to Dry Blue; Channel downcutting due to Wallow Fire in Pace and Dry Blue Creeks
	Large Woody Debris	n/a			
	Channel Shape and Function	3			
Aquatic Biota					
4 Aquatic Biota	Life Form Presence	3	2.3	15%	Pace has increased sediment dut to fire on A/S; Brown and rainbow trout reduced and possibly eliminated in Dry Blue Creek
	Native Species	2			
	Exotic and/or Invasive Species	2			
5 Riparian/Wetland Vegetation	Vegetative Condition	2	2	15%	Dry Blue could use improvement
Terrestrial Physical					
6 Roads and Trails	Open Road Density	2	2	15%	Level 2 roads; motorized trail has several crossings on Dry Blue with no BMPs; A/S info
	Road Maintenance	2			
	Proximity to Water	2			
	Mass wasting	n/a			
7 Soils	Soil Productivity	1	1.3	15%	Fire on A/S side contributed lot of sediment to Pace Creek; soil production condition from GNF GES and ASNF TES
	Soil Erosion	2			
	Soil Contamination	1			
Terrestrial Biological					
8 Fire Regime or Wildfire	Fire Regime Condition Class	3	3	2%	2015 FRCC data; 3% high/moderate burn severity due to Wallow Fire
	Wildfire Effects	n/a			
9 Forest Cover	Loss of Forest Cover	1	1	2%	.10% inadequate forest cover due to Wallow Fire
10 Rangeland Vegetation	Vegetation Condition	2	2	2%	1 allotment
11 Terrestrial Invasive Species	Extent and Rate of Spread	1	1	2%	Bull thistle population evident in wetlands associated with Dry Blue.

					Isolated populations of cheatgrass in watershed however no evidence of spreading
12 Forest Health	Insects and Disease	1	1	2%	RO data
	Ozone	1			
Watershed Score		**1.9**			

The above watershed condition classification assessment data and the ADEQ water quality data indicates the major watershed functionality problems for the Dry Blue Creek 6th code watershed are: 1) Fragmented aquatic habitat due perennial intermittent flows and structure built in stream channel, 2) Degraded aquatic biota due to lack of aquatic life form diversity and the presences of exotic and invasive species 3) Road influence due to high road density, inadequate road maintenance and roads located near or in drainage bottoms. 4) Degraded upland vegetation conditions due to past management practices and due to the Wallow Fire burning a substantial portion of this watershed in pace creek. This may also lead to degraded soils and increased erosion in the future.

Water Quality Summary

In addition to the above Watershed Scores and Watershed Functionality Ratings for the 6th code watersheds that are locate within the San Francisco River headwaters, the New Mexico Environment Department (NMED) has in place the 2016-2018 State of New Mexico Clean Water Act §303(d)/§305(b) Integrated Report and List. Also, Arizona Department of Environmental Quality's (ADEQ) Integrated 305(b) Assessment and 303(d) Listing Report was consulted for the portions of the above listed San Francisco 6th code that are in Arizona.

NMED has found water quality not supporting designated uses in Centerfire Creek (from the San Francisco River to its headwaters), in the San Francisco River (from Centerfire Creek to the Arizona border), and in Trout Creek (from perennial portion San Francisco River to its headwaters).

San Francisco River

San Francisco River is listed as not supporting Cold Water Aquatic Life with probable causes named as benthic macroinvertebrate community and temperature. Probable sources are noted as silviculture-fire suppression, rangeland grazing and unknown sources. It was first listed for temperature in 1998 with benthic macro-invertebrates listed in 2012. A TMDL has been completed for temperature and plant nutrients, with nutrients delisted in 2010.

Trout Creek, a tributary of the San Francisco River, is listed as not supporting High Quality Cold Water Aquatic Life with probable cause named as temperature. No probable sources are noted. It was first listed in 2014.

Review of Arizona's 2016 Draft Integrated 305(b) Assessment and 303(d) Listing Report showed no listings for the Blue River (tributary to San Francisco River) (from New Mexico border to KP Creek) or the San Francisco River (from its headwaters to the New Mexico border). The reach of the Blue River has had two biocriteria violations that indicate pervasive stressors on benthic macroinvertebrate communities. The headwater reach of the San Francisco River in Arizona has had exceedances of dissolved oxygen and e. coli, however more samples are needed.

ADEQ has also determined that the water quality of Luna Lake (on-channel storage reservoir on San Francisco River) does not support multiple designated uses. Listed issues are high pH, low dissolved oxygen and ammonia. While Luna Lake is above all of the San Francisco 6th code watersheds addressed in this WRAP, water from the lake flows through the Stone Creek-San Francisco River and Big Canyon-San Francisco River 6th code watersheds. Water discharged from Luna Lake may influence water quality downstream in New Mexico. The Trout Creek 6th code watershed drains into the San Francisco River.

Temperature Impairment.

The following information is provided courtesy of NMED (Moeny, 2018):

The temperature TMDL for the San Francisco, Arizona Border to Centerfire Creek assessment unit requires an approximate 4 degree Celsius decrease in stream temperature to meet water quality standards.

In this assessed reach of the San Francisco River there is only one perennial tributary, Stone Creek, which flows from Escudilla Mountain in Arizona into New Mexico. Stone Creek is an unassessed perennial tributary to the San Francisco River above the NMED monitoring station near Head of Ditch campground just west of Luna, NM. Water temperature dataloggers deployed in 2016 demonstrated that the average maximum daily high temperature in Stone Creek was 5.4 degrees Celsius warmer than the temperature where the San Francisco River enters New Mexico, and 1.3 degree Celsius warmer than the temperature measured at Head of Ditch Campground. Based on modeling using SSTEMP (USGS Stream Segment Temperature Model), it appears that there is the potential to lower the water temperature inputs from Stone Creek by as much as 6 degrees by increasing the streamside shading from the current <10% to an attainable 60% through the proposed actions of planting and exclusionary fencing (see "essential projects" section below). While Stone Creek is, by volume, a considerably smaller stream, discharging 1- 2 cubic feet per second to the San Francisco River's 3- 6 cubic feet per second, it would appear that a 6 degree reduction in Stone Creek water temperature could potentially reduce the stream temperature measured at Head of Ditch by as much as 2 degrees Celsius. SSTEMP is also relatively 'blind' to the temperature reductions that might be achieved through greater surface to ground water connectivity which would contribute to additional cooling effects by reducing the surface water temperature and increasing the volume of water entering the stream.

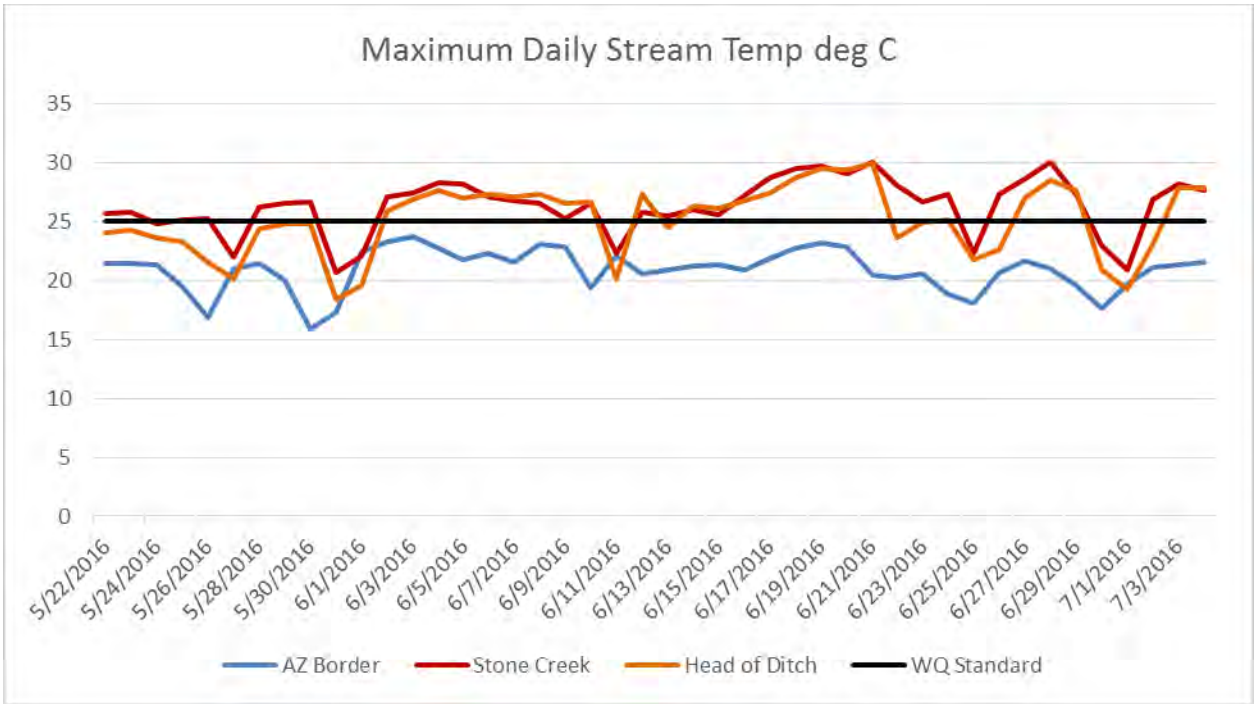

Figure 15. Recent temperature monitoring for San Francisco River and Stone Creek

Figure 16. San Francisco River upstream of Stone Creek in New Mexico

Figure 17. Stone Creek in New Mexico just above San Francisco River confluence

Benthic Macroinvertebrates.

The following information is provided courtesy of NMED (Moeny, 2018):

While there is currently no TMDL for this impairment, the essential projects planned for Stone Creek and the San Francisco River will likely lead to improvements in this water quality indicator. Stone Creek is a highly unstable and eroding stream for the 6 total miles it flows though Arizona and New Mexico. Pebble counts conducted in 2016 on the San Francisco River both above and below the confluence with Stone Creek demonstrated a tremendous sediment input from Stone Creek. Above the confluence with Stone Creek the percent sand and fines on the San Francisco River stream bottom was 25.7%. The San Francisco River in this assessment unit lies in ecoregion 23c and is considered a "mountain" site class for fine sediment thresholds based on biological responses. The maximum percent sand and fines in the mountain site class is less than 20% suggesting some departure from the mountain site class into the upper end of the "foothills" site class. Pebble counts below the confluence with Stone Creek resulted in a percent sand and fines score of 49.5%, which exceeds the sediment thresholds for both mountain and foothills classes and puts the San Francisco River below the confluence with Stone Creek into the "xeric" site class that is typically found in low elevation desert rivers in New Mexico like the lower Pecos, lower Rio Grande and lower Gila River.

Excessive sedimentation is detrimental to benthic macroinvertebrates that typically characterize coldwater aquatic life designated uses like mayflies, stoneflies, and caddisflies. With Luna Reservoir upstream in Arizona acting as a sediment trap, and based on the pebble count data, it appears that Stone Creek is the predominate source of sediment loading for this portion of the San Francisco River. Reducing sediment inputs through streambank stabilization and riparian planting on Stone Creek will improve water quality in the San Francisco.

Centerfire Creek

Centerfire Creek is listed as not supporting High Quality Cold Water Aquatic Life and Primary Contact with probable causes listed as nutrient/eutrophication, sedimentation/siltation, specific conductance, temperature, and turbidity. Probable sources are noted as low water crossings, channelization, recreational pollution sources, drought related impacts, silviculture-fire suppression, silviculture activities, road/bridge runoff, rangeland grazing, natural sources, streambank modification/destabilization, and unknown sources. This stream was first listed as not meeting State water quality standards in 1998 with listings continuing to occur through the most recent stream monitoring and assessment in 2014. A Total Maximum Daily Load (TMDL) has been completed for plant nutrients and conductivity.

The Headwaters Centerfire Creek, Outlet Centerfire Creek, Spur Draw, and SA Creek 6th code watersheds all contribute to Centerfire Creek and impact water quality to varying degrees. Centerfire Creek drains into the San Francisco River at the bottom end of lands covered under this WRAP.

The following information is provided courtesy of NMED (Moeny, 2018):

The Outlet Centerfire Creek subwatershed (HUC 150400040307) is one of two subwatersheds that drain Centerfire Creek, which has a single assessed unit from the confluence with the San Francisco River upstream to the headwaters (NM-2603.A_50). The assessed unit is listed at 16.3 miles, but only a small portion of that is perennial. The majority of perennial flow is contained within the Outlet Centerfire Creek subwatershed which is also where the water quality sampling station is located. In the 2014-2016 CWA §303(d)/§305(b) Integrated Report List, the designated use of High Water Cold Water Aquatic Life for Centerfire Creek was found to impaired by the following causes: turbidity, specific conductance, plant nutrients, sediment/siltation, and temperature. Total Maximum Daily Load documents have been written for conductance, nutrients, and turbidity.

Sources of Impairment.

For planning purposes, all three water quality impairments that currently have TMDLs will be discussed together in an effort to look at the watershed comprehensively.

The Outlet Centerfire Creek watershed is very sparsely inhabited. According to the EPA Environmental Justice Screening Tool, the Outlet Centerfire Creek watershed has a land area of 14.6 square miles and a total population of 9 (nine) residents for a population density of less than one person per square mile. The Headwaters Centerfire Creek is similarly sized and contains no residents or households. With such a very low population density, the likely sources for excessive plant nutrients, conductivity and turbidity are unlikely to be anthropogenic in nature, which eliminates such probable sources as failing septic systems, confined feeding operations, point sources including effluent discharge and polluted stormwater, and other sources typically found in developed areas. It does, however, leave human derived sources that result from landscape modifications or land uses. These include rangeland grazing, fire suppression, removal of riparian vegetation, and streambank destabilization. Each of the potential sources is discussed below and summarized in Table 48.

Rangeland Grazing:

Grazing by horses and cattle is present in all subwatersheds on both private and public land. The GNF has administratively closed several areas of Centerfire Creek to livestock grazing to prevent damage to streambanks and riparian vegetation. Two GNF grazing allotments encompass the Centerfire Creek watershed—Spur Lake and Centerfire. Spur Lake Allotment is 104,151 acres while the Centerfire allotment

is 23,232 acres. Cattle are grazed year round on both allotments but rotated to different pastures within the allotment every 2- 3 months or as forage quantity dictates. Between the two allotments, a total of 706 head of cattle graze on 104,151 acres which is approximately 147 acres per single head of cattle. In terms of nutrient loading, the primary concern from livestock grazing is the direct impact from urine and feces entering the water. Secondary impacts include damage to streambanks and degraded riparian vegetation and wetlands.

The direct impact of feces and urine is likely very small in Centerfire Creek. The GNF has excluded cattle from most of the perennial reaches that they administer. Similarly, private land holders who own land within the floodplain of Centerfire Creek have fenced the cattle out preventing access to the river from cattle that have been permitted to graze surrounding public lands. With little direct access to the creek, urine and feces do not comingle with the surface water except during high flow events where the large volume of water has a dilution effect on the nitrogen.

Secondary effects of rangeland grazing are more systemic throughout the Centerfire watershed and can be seen in the gullied and eroded uplands, poorly vegetated streambanks, incised stream channels and encroachment of woody upland species in the riparian zone. The water quality implication of this degradation is that even after an area has been excluded from grazing, the lingering effects of headcuts and bank sloughing continue. The effects are twofold: soils are mobilized which contributes directly to nutrient inputs into the stream, and there is a loss of nutrient removal from the stream as streamside wetlands are lost either to erosion or dewatering during channel incision.

Figure 18. Degraded rangeland condition in Spur Draw

Fire suppression

Fire suppression is an indirect contributor to nutrient loading through sediment transport. For most of the 20th century, land management agencies engaged in active fire suppression to limit the extent, intensity and frequency of fires. In ponderosa pine forests in the southwest a typical fire-return interval is estimated at 7- 20 years. These frequent, low intensity fires kept tree densities low and allowed for open forest canopies which favored herbaceous understory layers. These grassy understories were excellent soil stabilizers and slowed overland flow of meteoric precipitation. With fire suppression, tree densities have increased, canopy coverage has closed and the herbaceous groundcover is being converted to pine needle cast and bare soil. The loss of understory accelerates soil erosion and sediment transport. However, the floodplain of Centerfire Creek is fairly open even in the absence of fire due to the fine grained soils. While fire suppression is a contributing factor to the nutrient loading it assumed to be fairly minor relative to other sources.

Recreational pollution

Nutrient loading as a result of recreational impact is presumed to be indirect and insignificant in the Centerfire Watershed. No developed campgrounds or in-ground vault toilets exist within the watershed. Recreational use is primarily by hunters in the months of September- November, and off-highway vehicles users during the summer months. Still, the absolute number of recreational users in a calendar year is likely to be in the high hundreds to low thousands, spread over an area roughly the same size as Las Vegas, NV (137 square miles).

Removal of riparian vegetation and streambank destabilization.

These two probable sources are discussed together because they inextricably linked. Loss of riparian vegetation and streambank destabilization are both direct causes of nutrient loading via soil erosion and mobilization into the stream. They are also indirect causes as they lead to concomitant changes including stream incision and wetland dewatering. Centerfire creek under Rosgen's stream classification system, considered an "E" type stream characterized by low gradient, wide valley, sinuous flow pattern and fine-grained bank and channel bottom material. Without protective armoring in the form of cobble and large boulders, streamside vegetation is the only protection against erosion of streambanks. Grazing by livestock and ungulates can remove streamside vegetation and lead to erosion, but geomorphic instability bought on my upland disturbances, roadbuilding, low water crossings, vehicle trespass can all initiate headcuts, and bank erosion creating ripple effects as the stream attempts to reset to a place of stability or dynamic equilibrium.

Centerfire Creek has several areas of severe channel instability which is leading to extensive channel widening, bank erosion and headcuts. It has been estimated that at least 6" of bank erosion has been occurring ever year for at least the past 6 years.

Figure 19. Streambank instability in Centerfire Creek

Table 48. Probable Sources of Water Quality Impairments in Centerfire Creek and Their Relative Weight

Source	Direct or Indirect contributor	Potential Impact to WQ	Estimated contribution to impairments	Priority
Grazing	Indirect and Direct	Low	10	Low
Fire Suppression	Indirect	Minimal	5%	Low
Recreational	Indirect, Direct (rarely)	Minimal	5%	Low
Riparian Vegetation and Streambank stabilization	Direct and Indirect	High	79%	High
Agriculture	Direct	Low	0%	Low
Septic Systems	Direct	Moderate	1%	Low

SAN FRANCISCO RIVER BASIN RESTORATION GOALS, OBJECTIVES AND OPPORTUNITIES

Goal Identification and Desired Condition.

The Forest's goals for the San Francisco River's watersheds include restoration of upland vegetation, reducing the risk of uncharacteristic wildfire, reestablishing riparian vegetation, improving stream channel stability across the watershed, maintaining soil productivity, reducing soil erosion, removing noxious plants, improving aquatic and terrestrial wildlife habitat, and improving overall water quality within streams and waterbodies. Reaching these goals would assist in achieving the goal of moving the watersheds out of Functioning at Risk and Impaired condition classes and into Properly Functioning and Functioning condition classes.

The following items denote specific desired conditions that will be focused on:

- Reestablish herbaceous vegetation on upland slopes where the Wallow Fire burned;
- Reduce upland woody vegetation in areas of high tree densities to reduce risk of high severity wildfire;
- Improve water quality in Stone Creek, Centerfire Creek, San Francisco River, SA Creek, Dry Blue Creek, and other tributaries to the San Francisco River;
- Improve riparian condition in Stone Creek, Centerfire Creek, San Francisco River, SA Creek, Dry Blue Creek, and other tributaries to the San Francisco River;
- Improve road drainage in roads of all maintenance levels across the watersheds;
- Decommission roads that have been identified by interdisciplinary team as causing resource issues.
- Reduce sediment movement in watershed drainage network;
- Restore upland meadows and grasslands from conifer encroachment;
- Restore channel stability to ephemeral, intermittent and perennial channels;
- Reduce or eliminate known noxious weed infestations;
- Increase herbaceous vegetation on rangelands in poor condition.

Objectives

Alignment with National, Regional, or Forest Priorities.

These watersheds are all currently in Functioning at Risk or Impaired condition. They have a high potential for completing work and moving towards an improved condition class within a 5 to 10 year timeframe.

Objectives include: restoring of safety, physical and biological integrity, and human use/enjoyment. The plan will utilize interdisciplinary teams and partners as appropriate in assessment and environmental analysis of proposed activities. The plan will also continue to add site-specific information as it becomes available.

An estimated 19,053 acres burned with high intensity during the Wallow Fire. Priorities for treatment have been high-severity burn areas with good rehabilitation potential and need, moderately burned areas

with specific needs, and all areas with values at risk. It is recognized that climate will be a major factor, and some treated areas have failed during major weather events. "Good" rehabilitation potential is a site-specific evaluation by resource specialists, considering a variety of factors.

Restoration goals and objectives for the San Francisco River basin watersheds tie into National priorities based on the guidance in the 2015-2020 Forest Service Strategic Plan (http://www.fs.fed.us/strategicplan) which outlines the following goals:

- Goal 1: Sustain Our Nation's Forests and Grasslands;
- Goal 2: Deliver Benefits to the Public;
- Goal 3: Apply Knowledge Globally;
- Goal 4: Excel as a High-Performing Agency.

Restoration goals and objectives for the San Francisco River Basin watersheds tie into Regional priorities based on the guidance in the Southwestern Region Action Plan (http://fsweb.r3.fs.fed.us/action_plan/) which provides for the following:

- Assist Communities Adjacent to Forests
- Contribute to Economic Vitality
- Forest and Rangeland Restoration
- Safety and Health
- Supervision and Leadership

Restoration goals and objectives for the San Francisco River Basin watersheds tie into Forest priorities based on Gila National Forest 2017 priorities which state the following:

- Accomplish vegetation treatment targets that protect communities,
- Reduce the risk of catastrophic wildfire,
- Restore watershed functionality, and
- Promote economic development and community vitality through biomass production, stewardship projects and infrastructure development.

Alignment with State or local goals.

Objectives to improve water quality and overall watershed health and integrity in the San Francisco River Basin's watersheds are aligned with partner goals and objectives as documented below:

- The New Mexico Environment Department – Surface Water Quality Bureau's mission is to preserve, protect, and improve New Mexico's surface water quality for present and future generations.

- New Mexico Game and Fish's mission is to provide and maintain an adequate supply of wildlife and fish within the state of New Mexico by utilizing a flexible management system that provides for their protection, conservation, regulation, propagation, and for their use as public recreation and food supply.

- Rocky Mountain Elk Foundation's mission is to ensure the future of elk, other wildlife, their habitat and our hunting heritage. Find facts, such as the number of acres of elk habitat the RMEF has conserved or enhanced, the number of RMEF members and chapters across the country, and much more.

- Trout Unlimited's mission is to conserve, protect, and restore North America's coldwater fisheries and their watersheds.

- National Wild Turkey Federation's mission is dedicated to the conservation of the wild turkey and the preservation of hunting heritage.

- Wildfire prevention and reduction in occurrence is a common goal among the State of Arizona, State of New Mexico and local affected county governments.

Opportunities

a. Partnership Involvement.

- New Mexico Game and Fish Department will assist in planning, funding, and implementation of activities impacting wildlife and aquatic species in the Escudilla Landscape
- New Mexico Environment Department will assist in planning, funding, and monitoring of activities to improve water quality throughout the watersheds.
- Other partners such as Trout Unlimited, Mesilla Valley Flyfishers, Rocky Mountain Elk Foundation, Wild Earth Guardians, Upper Gila Watershed Association, National Wild Turkey Federation, Native Desert Fish Society, and other will be used where opportunities arise.

b. Outcomes/Output

Performance Measure Accomplishment.

- miles of stream habitat improved/enhanced;
- acres terrestrial habitat enhanced
- acres of soil and water resources improved/enhanced;
- acres of lake habitat improved/enhanced;
- acres of riparian vegetation improved/enhanced
- acres of wetland improved/enhanced
- actions completed for recovery of threatened and endangered species
- acres treated of noxious plants
- acres of range vegetation improved
- structures maintained/improved (range/recreation);
- miles of trail maintained;
- acres of forest vegetation improved;
- miles of road decommissioned;
- miles of road maintained to standard
- acres forest vegetation improved
- volume timber sold
- acres fuels treatment total
- acres fuels treatment - Wildland Urban Interface

- acres fuels treatment- Non-Wildland Urban Interface

Socioeconomic Considerations.

Implementation of essential projects has the potential to benefit local economies by providing for local contracts; revenue from supplies purchased in local communities; increased value as a recreational destination leading to more tourist dollars spent in surrounding communities, and job creation. These watersheds can additionally serve as outdoor classrooms for other local institutions interested in teaching conservation education.

Additional R3 Guidance:

c. *Maintains and protects cultural values at risk:*
   - i. *Are there any acequias, or acequia associations, within or dependent on these watersheds?* ***YES*** *– San Francisco River – Luna Ditch Commission*
   - ***ii.*** *Do the watersheds serve any Tribal, Land Grant, or small historical non-incorporated communities?* ***NO***
   - iii. *Are there portions of water delivery features, such as acequias, dams, old power generation plants, or mills that were historically dependent on water from these watersheds?* ***YES*** *Do these features qualify as historical or heritage sites under the National Historic Preservation Act?* ***YES***

d. *Supports local infrastructure:*
   - iv. *Are any of these municipal watersheds?* ***NO***
   - v. *If not, do the watersheds supply water to local communities (rural or small non-incorporated towns or villages, fire departments, local parks?* ***YES*** *– Luna, NM with San Francisco River – Stone Creek*
   - ***vi.*** *Do the watersheds support agriculture or other local industries that require high water utilization, such as computer chip manufacturing or some types of wood products processing?* ***YES***

e. *Utilizes local contractors, workforce and resources*
   - vii. *Are there local backhoe operators (or other heavy equipment), contracting companies who build and line ditches and canals/pipelines in the area that specifically service water-associated infrastructure?* ***YES***
   - viii. *Can you estimate how many workers these companies employ, or what such jobs entail?****10-20***
   - ***ix.*** *Does the Forest contract with such companies for ditch or pipeline maintenance?* ***YES*** *If so, estimate the annual cost of such maintenance****?$5,000-$30,000, depending on project/year***

ESSENTIAL PROJECTS – SAN FRANCISCO RIVER BASIN

Hyperlinks to watersheds (electronic versions)

Trout Creek
- Essential projects and complimentary restoration projects
- Costs
- Timelines and project scheduling
- Estimated load reductions

Stone Creek – San Francisco River
- Essential projects and complimentary restoration projects
- Costs
- Timelines and project scheduling
- Estimated load reductions

Big Canyon – San Francisco River
- Essential projects and complimentary restoration projects
- Costs
- Timelines and project scheduling
- Estimated load reductions

Headwaters Centerfire Creek
- Essential projects and complimentary restoration projects
- Costs
- Timelines and project scheduling
- Estimated load reductions

Outlet Centerfire Creek
- Essential projects and complimentary restoration projects
- Costs
- Timelines and project scheduling
- Estimated load reductions

Spur Draw
- Essential projects and complimentary restoration projects
- Costs
- Timelines and project scheduling
- Estimated load reductions

SA Creek
- Essential projects and complimentary restoration projects
- Costs
- Timelines and project scheduling
- Estimated load reductions

Dry Blue

- Essential projects and complimentary restoration projects
- Costs
- Timelines and project scheduling

Trout Creek – Good Neighbor Watershed

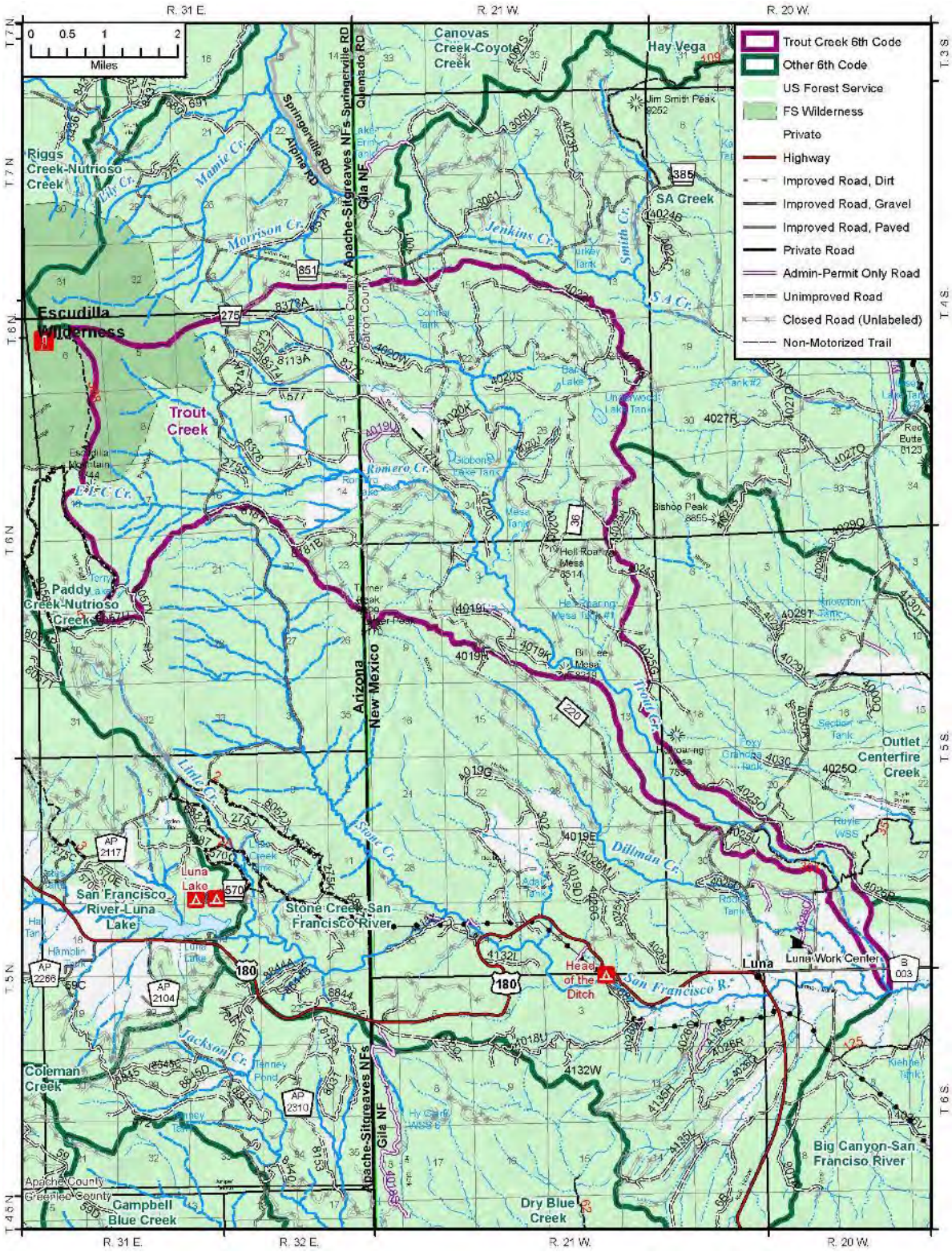

Figure 20. Trout Creek 6th Code Watershed

Current Rating = Functioning at Risk = 1.8
Target Rating = Properly Functioning

Specific Project Activities

The following list of projects includes those identified to improve and, ultimately maintain watershed conditions. Not all projects are deemed necessary to move the watershed upwards to an improved condition class. Implementation and completion of Essential Projects 1 - 5 are required to move the watershed from Functioning at Risk to Properly Functioning. Projects 6 – 7 address other important landscape restoration objectives and are considered complimentary restoration projects. These projects will assist in improving and/or maintaining overall watershed conditions and ensure that it does not regress back into the Functioning at Risk state. This watershed covers portions of two Forests; the ASNF and the GNF.

Essential Projects

1. **Essential Project #1 – Road Decommissioning**
   a. Attribute/ Indicator Addressed – Roads and Trails
   b. Project Description: This project will focus on decommissioning roads identified in Escudilla WRAP Area. In this watershed, there are approximately 18 miles of road identified for decommissioning within the Luna Planning. There are approximately 4 miles of road identified for decommissioning within the West Escudilla Restoration Project. Current decommissioning costs are approximately $1,500/mile. Decommissioning of a road involves reestablishing vegetation, and if necessary, initiating restoration of ecological processes interrupted or adversely impacted by the unneeded road. Treatments include one or more of the following treatments: Reestablishing former drainage patterns, stabilizing slopes, and restoring vegetation; Blocking the entrance to a road or installing water bars; Removing culverts, reestablishing drainages, removing unstable fills, pulling back road shoulders, and scattering slash on the roadbed; Completely eliminating the roadbed by restoring natural contours and slopes; and Other methods designed to meet the specific conditions associated with the unneeded road
   c. Partners Involvement: Various partners have expressed interest in partnering in this effort, including New Mexico Environment Department and Wild Earth Guardians
   d. Timeline: TBD based on funding and prioritization of 12 watersheds; Decommissioning of roads without fuels treatments can be completed in one fiscal year; roads with planned fuels treatments can be decommissioned immediately following treatment.
   e. Estimated costs and associated Budget Line Item: $39,250/CMRD/NFWF/NFVW/CMLG; Estimated costs include the costs of reseeding, reshaping, labor, heavy equipment transport, per diem, barrier, imported aggregate, and archaeological review (if necessary)

2. **Essential Project #2 – Road Improvement**
   a. Attribute/ Indicator Addressed – Roads and Trails
   b. Project Description: This project will focus on heavy road maintenance and improving best management practices for road drainage on Maintenance Level 2 and 3 roads within the watershed. BMPs will include improvement of lead out ditches, road dips, and inlet and outlet features of culverts and road/stream crossings. Heavy road maintenance may involve some level of reconstruction of existing road beds to reestablish a safe and last driving surface with the intent of minimizing sediment movement off of the road. Currently there are approximately 53 miles of Maintenance Level 2 and 3 roads within the watershed. This project assumes that 40% of roads in the watershed need some degree of maintenance ranging from light to heavy.

c. Partners Involvement: Catron County
d. Timeline: TBD based on funding; can be completed in one fiscal year
e. Estimated costs and associated Budget Line Item = $31,500/ CMRD, NFVW, NFWF, CMLG; Based on an estimate of $1,500/mile for road maintenance. Estimated costs may include reshaping, labor, heavy equipment transport, per diem, imported aggregate, and archaeological review (if necessary).

3. Essential Project #3 – Erosion Control Structures

a. Attribute/Indicator Addressed – Water Quality
b. Project Description: This project will focus on the maintenance and/or reconstruction of 24 existing erosion control structures. These structures were originally implemented in the 1980s to impede and prevent ongoing erosion and gullying across the watershed in various drainages and swales. None of these structures have received maintenance over the last several decades and are currently in various stages of disrepair. Some structures have filled completely in and no longer serve to back up sediment. Others have breaches in the dams and are experiencing active headcutting, while others have water bypassing the structure, creating new erosion issues. Work will include heavy equipment cleanout of the sediment structures where needed or reconstruction/expansion of dams to preclude current and future gullying and sediment movement. Certified weed-free seeding will be required at sites requiring reconstruction. Inventory and survey work will be necessary prior to beginning this project to establish necessary site design.
c. Partners Involvement: New Mexico Environment Department
d. Timeline: TBD based on funding
e. Estimated Costs and associated Budget Line Item: Cost range from $126,000 - $211,000/NFVW, CMRD ; Costs are based on the following assumptions: Maintenance→ $2,500/structure if utilize Forest Construction and Maintenance crew; $5,000/structure if utilize contract labor. New construction → $5,000/structure if utilize Forest Construction and Maintenance crew; $10,000 if utilize contract labor crew; $35,000 for design; monitoring costs.

4. Essential Project #4 – Stream Restoration/Riparian Improvement

a. Attribute/ Indicator Addressed – Water Quality, Water Quantity, Aquatic Habitat, Aquatic Biota, Riparian/Wetland Vegetation, Soils
b. Project Description : This project will focus on: GNF → approximately 1 mile of stream/wetland/riparian restoration on Romero Creek; and ASNF → approximately 3 miles of riparian restoration in headwater drainages on the ASNF. Current conditions include headcutting and dewatering of Romero Creek and the adjacent wet meadow system. Work would include implementation of channel and wetland restoration techniques to increase water table elevations, enhance productivity of wetland dependent species (both aquatic and vegetative), encourage deep rooted vegetation on streambanks, impede erosion processes, and restore channel stability. These techniques include placement of water control structures that reestablish macro/micro-topography and encourage natural channel form and function, streambank contouring, and re-establishment of wetland/riparian plants through natural and/or artificial means (both woody and herbaceous plants). All techniques will utilize minimum impact best management practices to control sediment movement and will follow necessary permitting requirements under the Clean Water Act.
c. Partners Involvement: Wild Earth Guardians, NMED
d. Timeline: TBD based on Funding; project can be completed in one year.
e. Estimated costs and associated Budget Line Item: $305,000 NFVW/NFWF; Costs are based on design, labor, equipment rental and transport, per diem, fencing supplies for both livestock and elk, imported aggregate and other materials as necessary.

5. **Essential Project #5 – Noxious Weed Removal/Inventory**
   a. Attribute/ Indicator Addressed – Terrestrial Invasive Species
   b. Project Description: This project will focus on the removal of approximately 5 acres of bull thistle located adjacent to NFS 4136B. Treatments may include grubbing out of thistle, herbicide application, or other approved techniques
   c. Partners Involvement: none
   d. Timeline: TBD based on Funding; project is a two year project; initial treatment and follow-up the next year to treat any residual rosettes.
   e. Estimated costs and associated Budget Line Item: $43,000/NFRG, NFVW; Costs are based on hiring a two-person crew for 3 summers to ensure thistle population is gone, including vehicle, and monitoring on ASNF.

6. **Essential Project #6 – 4127U French Drain**
   a. Attribute/ Indicator Addressed – Soils
   b. Project Description: This project will focus on improving the crossing of a small boggy depression and NFS 4127U. This will involve pipe installation to pass water and installation of all-weather surfacing/aggregate on the road for approximately 100 yards.
   c. Partners Involvement: none
   d. Timeline: TBD based on Funding; This project can be completed in one year.
   e. Estimated costs and associated Budget Line Item: $40,500/NFVW, CMRD, CMLG; Costs are based on hauling of aggregate, pipes, and installation costs.

7. **Essential Project #7 – Trout Creek Campground Improvement**
   a. Attribute/ Indicator Addressed – Water Quality, Soils
   b. Project Description: This project proposes to improve drainage features at campground sites and roads and provide new aggregate to roads, campsites, and pullouts. Storm water runoff is currently washing out interior roads in the campground and depositing gravel and sediment into campsites and adjacent Trout Creek. Best management practices will be implemented to divert water off of roads more efficiently and effectively and into buffer zones away from campsites.
   c. Partners Involvement: none
   d. Timeline: TBD based on funding; Project can be completed in one year
   e. Estimated costs and associated Budget Line Item: $35,000/NFRW, NFVW, CMLG, CMRD

8. **Project #8– Road Improvement-Surfacing/Stabilization**
   a. Attribute/ Indicator Addressed – Water Quality, Roads and Trails
   b. Project Description: ASNF – NFSR 275 is a main route for recreation and Timber harvest for West Escudilla, the road quickly ravels and washboards immediately following maintenance activities. Road fines are lost quickly through creation of dust and washing from summer rains. The project would include placing stabilizing crushed aggregate to provide a reduction in sediment transported to water bodies.
   c. Partners Involvement: None
   d. Timeline: TBD based on Funding; project is at least a 1 year project.
   e. Estimated costs and associated Budget Line Item: looking for partnership money. Putting in for CMLG money. Three miles of road stabilization treatment x $10,000 per mile = $30,000.

Complimentary Restoration Projects

9. **Project #9 – Forest Vegetation Improvement – Thinning**
   - **a.** Attribute/ Indicator Addressed – Fire Regime
   - **b.** Project Description: This project will focus on woodland and forest maintenance and restoration treatments where identified across the watershed. Treatment of vegetation will be accomplished by hand, mechanized, and or herbicide treatment. In forested systems, activities would include thinning and group selections (e.g. creating 1-4 acre openings) to encourage regeneration of trees. Woodland areas include pinyon juniper and pinyon pine, while forested areas refer to ponderosa pine and mixed conifer. Specific silviculture prescriptions will be written for treatment units based on desired future conditions for the unit and area. Treatment units may be planned across watershed boundaries, thus this project will be implemented over multiple years, as the treatment units are prepared. More than one watershed within the Escudilla Planning Area may receive treatment in a single year, however acreages may be limited. Thinning within this project area on the GNF includes both group select (7,658 acres) and improvement (1,947 acres) thinning. A total of 9,605 acres of thinning are planned within the Luna Planning Area. A total of 2,801 acres of thinning are planned within the West Escudilla Restoration Area.
   - **c.** Partners Involvement: New Mexico Environment Department (State Forestry)
   - **d.** Timeline: TBD based on funding; this is a multiple year project. Budget constraints and treatment boundaries will greatly limit the amount of acres treated in a single year within a watershed.
   - **a.** Estimated costs and associated Budget Line Item = $3,480,050/WFHF/NFVW/NFTM; Costs are based on the following assumptions: pre-commercial thinning ≈$300/acre with limited piling; logging ≈ $125/acre (anticipate IRTC-good for services-thus reducing costs); Prep costs ≈ $100/acre for mark and cruise with crew of 6. Costs also include herbicide treatment of 20% of group selection acres @ $250/acre.

10. **Project #10 – Forest Vegetation Improvement – Prescribed Fire**
    - a. Attribute/ Indicator Addressed – Fire Regime
    - b. Project Description: This project would use prescribed fire to maintain and/or reduce fuel loadings. Prescribed fire can be implemented prior and after proposed vegetation treatments. Treatment units may be planned across watershed boundaries, thus this project will be implemented over multiple years, as the treatment units are prepared. More than one watershed within the Escudilla Planning Area may receive treatment in a single year, however acreages may be limited. Within the Luna Planning Area, a total of 730 acres are planned for prescribed fire. Within the West Escudilla Restoration Project, a total of 1,887 acres are planned for prescribed fire.
    - c. Partners Involvement: New Mexico Department of Game and Fish, Rocky Mountain Elk Foundation.
    - d. Timeline: TBD based on funding; this is a multiple year project based on budget constraints, burning units, burning limitations, and mitigation of cumulative impacts to natural and cultural resources.
    - e. Estimated costs and associated Budget Line Item = $131,850 – 153,750/WFHF, NFVW, NFWF; Costs are based on the following assumptions: burning with helicopter ≈ $80/acres; burning without helicopter ≈ $50/acre

Costs

Table 49. Trout Creek Costs

Trout Creek Good Neighbor Watershed								
Essential Projects		**Planning & Design**	**# Units**	**Cost / Unit**		**Implementation**	**Project Monitoring**	**Project Totals**
ESSENTIAL PROJECTS								
#1 Road Decommissioning								
FS Contribution GNF		$ -	18 miles	$1,500/mile		$ 27,000	$ 5,000	$ 32,000
FS Contribution ASNF		$ -	4 miles	$1,500/mile		$ 6,000	$ 1,250	$ 7,250
Partner Contribution (both in kind and $)		$ -	n/a	n/a		$ -	$ -	$ -
Funding already obtained		$ -	n/a	n/a		$ -	$ -	$ -
Total		***$ -***	***22 miles***			***$ 33,000***	***$ 6,250***	***$ 39,250***
#2 Road Improvement								
FS Contribution GNF		$ -	14 miles	$1,500/mile		$ 21,000	$ -	$ 21,000
FS Contribution ASNF		$ -	7 miles	$1,500/mile		$ 10,500	$ -	$ 10,500
Partner Contribution (both in kind and $)		$ -	n/a	Na/		$ -	$ -	$ -
Funding already obtained		$ -	n/a	n/a		$ -	$ -	$ -
Total		***$ -***	***21***	***$1500/mile***		***$ 31,500***	***$ -***	***$ 31,500***
#3 Erosion Control Structures								
FS Contribution GNF	maintenance	$ 25,000	24 structures	2500	IH	$ 60,000	$ 5,000	$ 90,000
				5000	C	$ 120,000		$ 150,000
	new	$ 10,000	5 structures	$5,000	IH	$ 25,000	$ 1,000	$ 36,000
				10000	c	$ 50,000		$ 61,000
Partner Contribution (both in kind and $)		$ -	n/a	n/a		$ -	$ -	$ -
Funding Already obtained		$ -	n/a	n/a		$ -	$ -	$ -
Total		***$ 35,000***	***29 structures***	***varies***		***$ 85,000***	***$ 6,000***	***$ 126,000***
						$ 170,000		***$ 211,000***
#4 Stream Restoration and Riparian Improvement								
FS Contribution GNF		$ 10,000	1 mile	$66,000/mile		$ 66,000	$ 1,000	$ 77,000
FS Contribution ASNF		$ 25,000	3 miles	$66,000/mile		$ 198,000	$ 5,000	$ 228,000

Partner Contribution (both in kind and $)	$ -	n/a	n/a	$ -	$ -	$ -
Funding already obtained	$ -	n/a	n/a	$ -	$ -	$ -
Total	***$ 35,000***	***4 miles***	***$66,000/mile***	***$ 264,000***	***$ 6,000***	***$ 305,000***
#5 Noxious Weed Removal/Inventory						
FS Contribution GNF (5 acres)	$ -	3 years	$12,500/year	$ 37,500	$ 500	$ 38,000
FS Contribution ASNF	$ -	1 year	n/a	$ -	$ 5,000	$ 5,000
Partner Contribution (both in kind and $)	$ -	n/a	n/a	$ -	$ -	$ -
Funding already obtained	$ -	n/a	n/a	$ -	$ -	$ -
Total	***$ -***	***n/a***	***n/a***	***$ 37,500***	***$ 5,500***	***$ 43,000***
#6 4127U French Drain						
FS Contribution GNF	$ 10,000	1 crossing	$30,000/crossing	$ 30,000	$ 500	$ 40,500
FS Contribution ASNF	$ -	0	n/a	n/a	n/a	$ -
Partner Contribution (both in kind and $)	$ -	n/a	n/a	$ -	$ -	$ -
Funding already obtained	$ -	n/a	n/a	$ -	$ -	$ -
Total	***$ 10,000***			***$ 30,000***	***$ 500***	***$ 40,500***
#7 Trout Creek Campground Improvement						
FS Contribution GNF	$ -	1 year	$35,000 / year	$ 35,000	$ -	$ 35,000
FS Contribution ASNF	$ -	n/a	n/a	$ -	$ -	$ -
Partner Contribution (both in kind and $)	$ -	n/a	n/a	$ -	$ -	$ -
Funding already obtained	$ -	n/a	n/a	$ -	$ -	$ -
Total	***$ -***			***$ 35,000***	***$ -***	***$ 35,000***
#8 Road Improvement- Surfacing/Stabilization						
FS Contribution GNF	$ -	n/a	n/a	-	$ -	$ -
FS Contribution ASNF	$ -	3.0 miles	$10,000	$ 30,000	$ -	$ 30,000
Partner Contribution (both in kind and $)	$ -	n/a	n/a	$ -	$ -	$ -
Funding already obtained	$ -	n/a	n/a	$ -	$ -	$ -
Total	***$ -***			***$ 30,000***	***$ -***	***$ 30,000***
Forest Service Totals	***$ 80,000***	***n/a***	***n/a***	***$ 546,000***	***$ 24,250***	***$ 650,250***
				$ 631,000		***$ 735,250***
Partner Contribution Totals	*$ -*	*n/a*	*n/a*	*$ -*	*$ -*	*$ -*
Funding already obtained	*$ -*	*n/a*	*n/a*	*$ -*	*$ -*	*$ -*
Grand Totals	***$ 80,000***	***n/a***	***n/a***	***$ 546,000***	***$ 24,250***	***$ 650,250***
				$ 631,000		***$ 735,250***

COMPLIMENTARY RESTORATION PROJECTS							
#9 Forest Vegetation Treatments							
FS Contribution GNF	Group selection	$ 123,950	2,479 acres	$525 (includes precom, pile logging/prep)	$ 1,301,475	$ -	$1,425,425
	Improvement	$ -	1,947 acres	$300 (pre comm only)	$ 584,100	$ -	$ 584,100
FS Contribution ASNF	Group selection	$ -	2,801	$525 (includes precom, pile logging/prep)	$ 1,470,525	$ -	$1,470,525
Partner Contribution (both in kind and $)		$ -	n/a	n/a	$ -	$ -	$ -
Funding already obtained		$ -	n/a	n/a	$ -	$ -	$ -
Total		***$ 123,950***	***7,227***		***$ 3,356,100***	***$ -***	***$3,480,050***
#10 Forest Vegetation Improvement/ Prescribed Fire							
FS Contribution – GNF		$ -	730 acres	$50/acre	$ 36,500	$ 500	$ 37,000
				$80/acre	$ 58,400		$ 58,900
FS Contribution – ASNF		$ -	1,887 acres	$50	$ 94,350	$ 500	$ 94,850
Partner Contribution (both in kind and $)		$ -	n/a	n/a	$ -	$ -	$ -
Funding already obtained		$ -	n/a	n/a	$ -	$ -	$ -
Total		***$ -***	***2,617***	***varies***	***$ 130,850***	***$ 1,000***	***$ 131,850***
					$ 152,750		***$ 153,750***
Forest Service Totals		***$ 123,950***	***n/a***	***n/a***	***$ 3,486,950***	***$ 1,000***	***$3,611,900***
			n/a		***$ 3,508,850***		***$3,633,800***
Partner Contribution Totals		***$ -***	***n/a***	***n/a***	***$ -***	***$ -***	***$ -***
Funding already obtained		***$ -***	***n/a***	***n/a***	***$ -***	***$ -***	***$ -***
Grand Totals		***$ 123,950***	***n/a***	***n/a***	***$ 3,458,645***	***$ 1,000***	***$3,459,645***
					$ 3,480,545		***$3,481,545***

Timelines and Project Scheduling

By fiscal year, list Tasks necessary to complete project (e.g. planning, design, permitting, implementation) and the expected contribution by the responsible party (FS or Partner).

Completion of these tasks is contingent on securing necessary funding.

Table 50. Trout Creek Timelines and Project Scheduling

	Trout Creek			
FY (TBD)	**Task**	**Forest Service Cost - rounded**		**Partner cost**
		GNF	**ASNF**	
Year 1	Essential Project #2 – Road Improvement	$21,000	$10,500	unknown
Year 1	Essential Project #8 – Road Improvement – Surfacing/Stabilization	n/a	$30,000	unknown
Year 1	Essential Project #3 – Erosion Control Structures – maintenance – Year 1 of 2	$150,000	n/a	unknown
Year 1	Essential Project #4 – Stream restoration and riparian improvement – Year 1 of 2	n/a	114,000	unknown
Year 1	Complimentary Restoration Project #10 – Forest Vegetation Improvement – Prescribed fire	$60,000	$94,850	unknown
Year 1	Complimentary Restoration Project #9 – Forest Vegetation improvement – GNF 1,239 acres (group select) Year 1 of 2	$651,000	n/a	unknown
Year 1	Complimentary Restoration Project #9 – Forest Vegetation improvement – GNF 486 acres (improvement) Year 1 of 4	$147,000	n/a	unknown
Year 2	Essential Project #3 – Erosion control structures – new – Year 2 of 2	61,000	n/a	unknown
Year 2	Essential Project #4 – Stream restoration and riparian improvement – Year 2 of 2	$77,000	$114,000	unknown
Year 2	Complimentary Restoration Project #9 – Forest Vegetation improvement ; ASNF 1,400 acres Year 1 of 2		$735,500	unknown
Year 2	Complimentary Restoration Project #9 – Forest Vegetation improvement – GNF 1,239 acres (group select) Year 2 of 2	$651,000	n/a	unknown
Year 2	Complimentary Restoration Project #9 – Forest Vegetation improvement – GNF 486 acres (improvement) Year 2 of 4	$147,000	n/a	unknown
Year 3	Essential Project #5 – noxious weed removal – Year 1 of 3	$13,000	$5,000	unknown
Year 3	Essential Project #6 – NFS 4127 French Drain	$40,500	n/a	unknown
Year 3	Essential Project #7 – Trout Creek Campground improvement	$35,000	n/a	unknown
Year 3	Complimentary Restoration Project #9 – Forest Vegetation improvement ; ASNF 1,400 acres Year 2 of 2	$472,000	$735,500	unknown
Year 3	Complimentary Restoration Project #9 – Forest Vegetation improvement – GNF 486 acres (improvement) Year 3 of 4	$147,000	n/a	unknown
Year 4	Complimentary Restoration Project #5 – Noxious weed removal – Year 2 of 3	$13,000	n/a	unknown
Year 4	Complimentary Restoration Project #9 – Forest Vegetation improvement – GNF 486 acres (improvement) Year 4 of 4	$147,000	n/a	unknown
Year 5	Complimentary Restoration Project #5 – Noxious weed removal – Year 3 of 3	$13,000	n/a	unknown
Year 5	Essential Project #1 – Road Decommissioning	$32,000	$7,250	unknown

Estimated Load Reductions

The San Francisco River is listed as not meeting state water quality standards for benthic macro invertebrate community and temperature. The entire Trout Creek 6th code watershed drains into the listed reach of the San Francisco River. Load reductions into the San Francisco River as a result of implementing essential projects in the Trout Creek watershed are estimated in the Tables 51 and 52. Projects that would improve these water quality parameters are those that were modeled for load reductions. These include road decommissioning, road improvements, road/stream crossing improvements, diversion improvements, erosion control/watershed stabilization projects, campground improvements, stream and riparian restoration, and exclusion fencing. Load reductions related to road projects were estimated using the Forest Service's Watershed Erosion Prediction Project (WEPP): Road model. Streambank stabilization and sediment/nutrient loading was estimated with the EPA Region 5 sediment and nutrient reduction model.

Table 51. WEPP ROAD Estimated Load Reductions – Trout Creek 6th Code Watershed

Project	Estimated Current Road Prism Erosion	Estimated Current Sediment Leaving Buffer	Estimated Target Road Prism Erosion (tons)	Estimated Target Sediment Leaving Buffer	Estimated Load Reduction From Road Prism	Estimated Load Reduction of Sediment Leaving Buffer
	50 – Year Mean Annual Averages					
Road decommissioning (18 miles)	294 tons	45 tons	245 tons	38 tons	49 tons (17% decrease)	7 tons (16% decrease)

Table 52. R5 Model Results for Sediment and Nutrient Reductions – Trout Creek 6th Code Watershed

Stream restoration and riparian improvement	Linear feet treated (assume 1000 ft treated/mile)	Bank height (ft)	Lateral recession (ft/yr)	% BMP efficiency	Sediment reduced (tons/yr)	Phosphorus reduced (lbs/yr)	Nitrogen reduced (lbs/yr)
Bank 1	1000	1.0	.25	85%	9.6	8.1	16.3
Bank 2	1000	1.0	.25	85%	9.6	8.1	16.3

Stone Creek/San Francisco – Good Neighbor Watershed

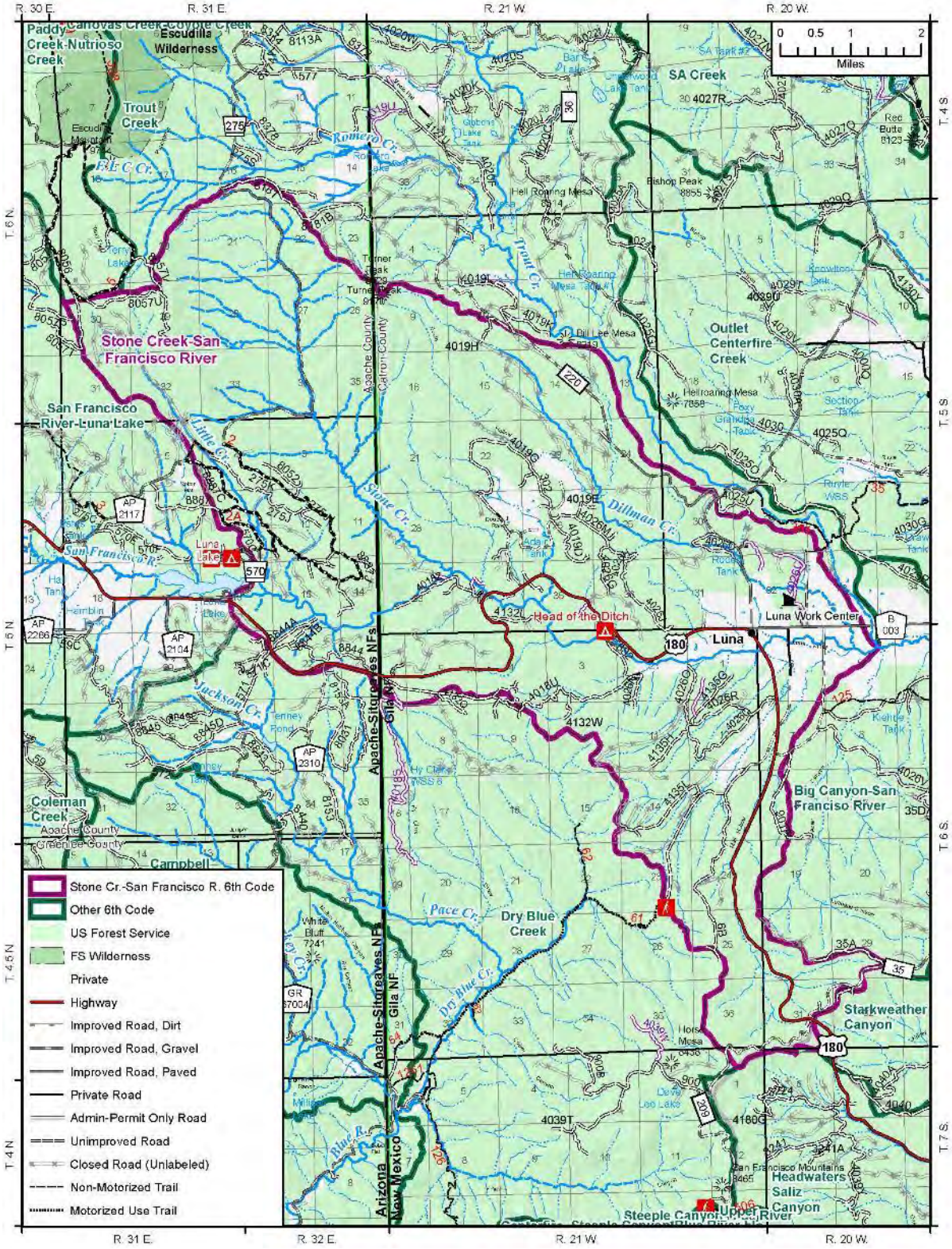

Figure 21. Stone Creek – San Francisco River 6th Code Watershed

Current Rating = Functioning at Risk = 2.2
Target Rating = Properly Functioning

Specific Project Activities

The following list of projects includes those identified to improve and, ultimately maintain watershed conditions. Not all projects are deemed necessary to move the watershed upwards to an improved condition class. Implementation and completion of Essential Projects 1 - 9 are required to move the watershed from Functioning at Risk to Properly Functioning. Projects 10 – 12 address other important landscape restoration objectives and are considered complimentary restoration projects. These projects will assist in improving and/or maintaining overall watershed conditions and ensure that it does not regress back into the Functioning at Risk state. This watershed covers portions of two Forests; the ASNF and the GNF.

Essential Projects

1. **Essential Project #1 – Road Decommissioning**
   a. Attribute/ Indicator Addressed – Roads and Trails
   b. Project Description: This project will focus on decommissioning roads identified in Escudilla WRAP area. In this watershed, approximately 15 miles of road have been identified on the GNF in the Luna Planning Area and approximately 2.0 miles identified on the ASNF in the West Escudilla Planning Area. There are also 4 miles of unauthorized routes to be obliterated on the ASNF. Current decommissioning costs are approximately $1,500/mile. Decommissioning of a road involves reestablishing vegetation, and if necessary, initiating restoration of ecological processes interrupted or adversely impacted by the unneeded road. Treatments include one or more of the following treatments: Reestablishing former drainage patterns, stabilizing slopes, and restoring vegetation; Blocking the entrance to a road or installing water bars; Removing culverts, reestablishing drainages, removing unstable fills, pulling back road shoulders, and scattering slash on the roadbed; Completely eliminating the roadbed by restoring natural contours and slopes; and Other methods designed to meet the specific conditions associated with the unneeded road
   c. Partners Involvement: Various partners have expressed interest in partnering in this effort, including New Mexico Environment Department, Arizona Department of Game and Fish, and Wild Earth Guardians
   e. Timeline: TBD based on funding and prioritization of 12 watersheds; Decommissioning of roads without fuels treatments can be completed in one fiscal year; roads with planned fuels treatments can be decommissioned immediately following treatment.
   d. Estimated costs and associated Budget Line Item: Estimated costs include the costs of reseeding, reshaping, labor, heavy equipment transport, per diem, barrier, imported aggregate, and archaeological review (if necessary). GNF → $22,500; ASNF → $9,000 CMRD/NFWF, NFVW, CMLG

2. **Essential Project #2 – Road Improvement**
   a. Attribute/ Indicator Addressed – Roads and Trails
   b. Project Description: This project will focus on heavy road maintenance and improving best management practices for road drainage on Maintenance Level 2 and 3 roads within the watershed. BMPs will include improvement of lead out ditches, road dips, and inlet and outlet features of culverts and road/stream crossings. Heavy road maintenance may involve some level of reconstruction of existing road beds to reestablish a safe and last driving surface with the intent of minimizing sediment movement off of the road. Currently there are approximately 67 miles of

Maintenance Level 2 and 3 roads within the watershed. This project assumes that 40% of roads in the watershed need some degree of maintenance ranging from light to heavy.

c. Partners Involvement: Catron County and Apache County

d. Timeline: TBD based on funding; can be completed in one fiscal year

e. Estimated costs and associated Budget Line Item = GNF → $30,000; ASNF → $22,500 CMRD/NFVW, NFWF, CMLG; Based on an estimate of $1,500/mile for road maintenance, which may include reshaping, heavy equipment transport, per diem, culvert replacement, and archaeological review (if necessary). Monitoring and design costs are additional.

3. <u>Essential Project #3 – Erosion Control Structures</u>

a. Attribute/Indicator Addressed – Water Quality

b. Project Description: This project will focus on the maintenance and/or reconstruction of 18 existing erosion control structures and installation of 5 new structures on the GNF and installation of 2 new erosion control structures in Little Creek on the ASNF. These structures were originally implemented in the 1980s to impede and prevent ongoing erosion and gullying across the watershed in various drainages and swales. None of these structures have received maintenance over the last several decades and are currently in various stages of disrepair. Some structures have filled completely in and no longer serve to back up sediment. Others have breaches in the dams and are experiencing active headcutting, while others have water bypassing the structure, creating new erosion issues. Work will include heavy equipment cleanout of the sediment structures where needed or reconstruction/expansion of dams to preclude current and future gullying and sediment movement. Certified weed-free seeding will be required at sites requiring reconstruction. Inventory and survey work will be necessary prior to beginning this project to establish necessary site design. On ASNF: removal of failing rock/wire gabions in Stone Creek and replacing them with large rip rap. These structures were originally implemented to impede and prevent ongoing erosion and channel movement near NFR 275. None of these structures have received maintenance and are currently in various stages of disrepair. Some structures have filled completely in and no longer serve to back up sediment. Work will include heavy equipment to remove the rock gabion baskets and replace them with very large rip rap to prevent erosion and stabilize the channel during flood flows.

c. Partners Involvement: New Mexico Environment Department

d. Timeline: TBD based on funding

e. Estimated Costs and associated Budget Line Item: Prices range from $253,500-$356,000 NFVW, CMRD; Costs are based on the following assumptions: $5,000/new structure construction if utilize Forest Construction and Maintenance Crew; $10,000/new structure construction if utilize contract labor; $2,500/existing structure maintenance if utilize Forest Construction and Maintenance crew; $5,000/existing structure maintenance if utilize contract labor. ASNF Stone Creek removal and replacement of gabions. $100,000/NFVW: Costs based on the following assumptions: $45,000 for service contract excavators to complete the work; $22,500 for service contract rock hauling; $15,000 to generate or purchase large rip rap; $14,000 for contracting, COR, and oversite.

4. <u>Essential Project #4 – Head of Ditch Campground Improvement</u>

a. Attribute/ Indicator Addressed – Water Quality, Soils

b. Project Description: This project proposes to improve drainage features at campground sites and roads and provide new aggregate to roads, campsites, bathrooms and pullouts. Storm water runoff is currently washing out interior roads in the campground and depositing gravel and sediment into campsites and adjacent San Francisco River. Best management practices will be implemented to divert water off of roads more efficiently and effectively and into buffer zones away from campsites.

c. Partners Involvement: none
d. Timeline: TBD based on funding; Project can be completed in one year
e. Estimated costs and associated Budget Line Item: $95,000/NFRW, NFVW, CMLG, CMRD

5. **Essential Project #5 – Head of Ditch Diversion Improvement**
   a. Attribute/ Indicator Addressed – Water Quality, Water Quantity, Aquatic Habitat, Aquatic Biota,
   b. Project Description: This project proposes to build a new AOP diversion in place of the current push-up dam diversion on the Head of Ditch, used by Luna Irrigators. The existing diversion consists of a push-up dirt dam that is installed seasonally by a bull dozer. At the end of the season, the diversion is removed to allow water passage. The diversion will often wash out multiple times during the rainy season, requiring the Luna Irrigators to re-install with bulldozer. This project would replace the push up dam with a permanent structure designed for Aquatic Organism Passage and to allow some water to remain in-channel during the irrigation season for aquatic habitat and water quality improvement. It would also provide for closed conduit transport of irrigation water versus the current open channel ditch.
   c. Partners Involvement: Luna Irrigation Commission, Interstate Stream Commission, Wild Earth Guardians, NMED
   d. Timeline: TBD based on funding.
   e. Estimated costs and associated Budget Line Item: $175,000/NFVW, NFWF, partner

6. **Essential Project #6 – Meadow Enhancement**
   a. Attribute/ Indicator Addressed – Riparian/Wetland Vegetation, Rangeland Vegetation, fire regime
   b. Project Description: This project will focus on the removal by hand thinning of 400 acres (Gila – 200 acres and ASNF – 200 acres) of conifer vegetation within the riparian corridor of Stone Creek and in the meadow adjacent to the riparian corridor.
   c. Partners Involvement: Wild Earth Guardians, NMED
   d. Timeline: TBD based on funding; project can be completed in one year
   e. Estimated costs and associated Budget Line Item: Costs based on hand-thinning at $200/acre; $80,000/NFVW, NFWF, WFHF, being split between the two Forests.

7. **Essential Project #7 – AOP Stream Crossing Improvements: NFS 275/Stone Creek and Bob Thomas Creek, NFS 85 Reroute/San Francisco River; NFS 8887/Little Creek; NFS LPR 9 /Dillman Creek**
   a. Attribute/ Indicator Addressed – Roads and Trails; Impaired Waters; Water Quality, Water Quality, Riparian/Wetland Vegetation
   b. Project Description: The ASNF project on NFS 275 will focus on redesign of two existing stream crossings: culverts on Stone Creek and a stream crossing on Bob Thomas on NFS 275. These crossings are adjacent to one another. Post-Wallow Fire flood flows have degraded Bob Thomas Creek, causing downcutting that is subsequently affecting Stone Creek, altering channel stability and the culverts. Assessment of a long term solution to stabilize these crossings, designs, and implementation are included in the costs. The GNF project will focus on relocation and redesign of an existing water crossing on NFS 85 and the San Francisco River, hardening of NFS LPR9 crossing of Dillman Creek, and hardening of NFS 8887 crossing of Little Creek. NFS 85's current crossing is at the same location of the Head of Ditch Diversion. This crossing is not compatible with the new diversion proposal, thus would be relocated upstream of its current site. The road crossing would be hardened to protect water quality and to ensure safe ingress and egress to private land owners in event of emergency. NFS LPR 9 crossing of Dillman Creek is currently a wet crossing that is negatively impacting a wet meadow area of Dillman Creek. This short crossing would be hardened to avoid impacts to soils and wetlands. NFS 8887 crossing of Little Creek is

currently a wet crossing that negatively impacting channel geometry. This crossing would be hardened to avoid impacts to soils and wetlands.

c. Partners Involvement: NMED, ADEQ, Federal Highways

d. Timeline: TBD based on funding; NFS 275 project requires NEPA. This project can be completed in one year.

e. Estimated costs and associated Budget Line Item: $975,000/NFWF, NFVW/CMRD and Federal Highways $; This is based on the following estimates: $750,000 for Stone Creek and Bob Thomas Creek, $20,000 for Dillman Creek metal crossing (cattle guard); $50,000 for Little Creek hardening, and $150,000 for San Francisco River concrete crossing.

8. <u>Essential Project #8 – Stream Restoration/Riparian Improvement – Stone Creek/Little Creek</u>

a. Attribute/ Indicator Addressed – Water Quality, Water Quantity, Aquatic Habitat, Aquatic Biota, Riparian/Wetland Vegetation, Soils

b. Project Description: This project will focus on approximately 6 miles of stream/wetland/riparian restoration on Stone Creek and ¼ mile in Little Creek. These streams were negatively impacted following the 2011 Wallow Fire on both the ASNF and GNF. Current conditions include headcutting and dewatering of Stone Creek and the adjacent wet meadow system for most of its length and a small headcut reach of Little Creek. On the ASNF downcut side drainages that are affecting Stone Creek will be addressed first; Stone Creek itself is currently too unstable to effectively treat. If the stream channel stabilizes, then restoration in Stone Creek may occur. Work would include implementation of channel and wetland restoration techniques to increase water table elevations, enhance productivity of wetland dependent species (both aquatic and vegetative), encourage deep rooted vegetation on streambanks, impede erosion processes, and restore channel stability. These techniques include placement of water control structures that reestablish macro/micro-topography and encourage natural channel form and function, streambank contouring, and re-establishment of wetland/riparian plants through natural and/or artificial means (both woody and herbaceous plants). An ungulate exclosure would be established following restoration work on a short reach of the creek to protect riparian vegetation, that could be relocated up or downstream once vegetation became reestablished. The District will coordinate with permittee to implement additional techniques for riparian protection. All implementation methods will utilize minimum impact best management practices to control sediment movement and will follow necessary permitting requirements under the Clean Water Act.

c. Partners Involvement: Wild Earth Guardians, ADEQ, NMED

d. Timeline: TBD based on Funding; project could be completed in 3 years.

e. Estimated costs and associated Budget Line Item: $515,000/NFVW, NFWF; Costs are based on the following assumptions: 2 miles restoration on GNF and 4 miles restoration on ASNF would require labor, supplies, aggregate, fencing material for livestock and/or elk, heavy equipment rental, per diem, design, imported aggregate and other materials as necessary. Estimate $75,000/mile over several years at 1 to 2 miles per year. This project has a lot of interest with partners and may have opportunity for matching dollars.

9. <u>Essential Project #9 – Stream Restoration/Riparian Improvement – San Francisco River</u>

a. Attribute/ Indicator Addressed – Water Quality, Water Quantity, Aquatic Habitat, Aquatic Biota, Riparian/Wetland Vegetation, Soils

b. Project Description: This project will focus on approximately 2 miles of stream/wetland/riparian restoration on San Francisco River. Current conditions include some sidecutting and loss of vegetation on streambanks following the 2011 Wallow Fire. Work would include implementation of channel and wetland restoration techniques to increase water table elevations, enhance productivity of wetland dependent species (both aquatic and vegetative), encourage deep rooted

vegetation on streambanks, impede erosion processes, and restore channel stability. These techniques include placement of water control structures that reestablish macro/micro-topography and encourage natural channel form and function, streambank contouring, and re-establishment of wetland/riparian plants through natural and/or artificial means (both woody and herbaceous plants). All techniques will utilize minimum impact best management practices to control sediment movement and will follow necessary permitting requirements under the Clean Water Act.

c. Partners Involvement: Wild Earth Guardians, NMED, ADEQ
d. Timeline: TBD based on Funding; project can be completed in one year.
e. Estimated costs and associated Budget Line Item: $185,000/NFVW, NFWF; Costs are based on the following assumptions: plantings and exclosure fencing to restore negative impacts from Wallow Fire. This would include plants, labor, fencing supplies, per diem, equipment rental and other supplies.

10. Essential Project #10– Road Improvement-Surfacing/Stabilization

a. Attribute/ Indicator Addressed – Water Quality, Roads and Trails
b. Project Description: ASNF – NFSR 275 is a main route for recreation and Timber harvest for West Escudilla, the road quickly ravels and washboards immediately following maintenance activities. Road fines are lost quickly through creation of dust and washing from summer rains. The project would include placing stabilizing crushed aggregate to provide a reduction in sediment transported to water bodies.
c. Partners Involvement: None.
d. Timeline: TBD based on Funding; project is at least a 1 year project.
e. Estimated costs and associated Budget Line Item: looking for partnership money. Putting in for CMLG money. Six and a half miles of road stabilization treatment x $10,000 per mile = $65,000.

Complimentary Restoration Projects

11. Complimentary Restoration Project #11 – Feasibility Study – Bob Thomas Creek

a. Attribute/ Indicator Addressed – Water Quality, Water Quantity, Aquatic Habitat, Aquatic Biota, Riparian/Wetland Vegetation, Soils
b. Project Description: This project will focus on a feasibility study of restoration on approximately 2 miles of Bob Thomas Creek. Current conditions include extreme channel downcutting in exceedances of 40' in the main channel following the 2011 Wallow Fire. This downcutting has resulted in tremendous loss of sediment that washes downstream into Stone Creek and ultimately the San Francisco River which is impaired in New Mexico. The feasibility study would evaluate the extent of resource damage, feasibility of restoration techniques, and costs associated with any recommendation.
c. Partners Involvement: Wild Earth Guardians, ADEQ
d. Timeline: TBD based on Funding; project can be completed in one year.
e. Estimated costs and associated Budget Line Item: Feasibility Study $35,000/NFVW, NFWF;

12. Complimentary Restoration Project #12 – Forest Vegetation Treatments

b. Attribute/ Indicator Addressed – Fire Regime
c. Project Description: This project will focus on woodland and forest maintenance and restoration treatments where identified across the watershed. Treatment of vegetation will be accomplished by hand, mechanized, and/or herbicide treatment. In forested systems, activities would include thinning and group selections (e.g. creating 1-4 acre openings) to encourage regeneration of trees. Woodland areas include pinyon juniper and pinyon pine, while forested areas refer to ponderosa

pine and mixed conifer. Specific silviculture prescriptions will be written for treatment units based on desired future conditions for the unit and area. Treatment units may be planned across watershed boundaries, thus this project will be implemented over multiple years, as the treatment units are prepared. More than one watershed within the Escudilla Planning Area may receive treatment in a single year, however acreages may be limited. Thinning within this project area on the GNF includes both group select (8,228 acres) and improvement (3,792 acres) thinning. In the Luna Planning Area, a total of 12,020 acres are planned for thinning. In the West Escudilla Restoration Area, a total of 3,129 acres are planned for thinning (group select).

d. Partners Involvement: New Mexico Environment Department (State Forestry)

e. Timeline: TBD based on funding; this is a multiple year project. Budget constraints and treatment boundaries will greatly limit the amount of acres treated in a single year within a watershed.

f. Estimated costs and associated Budget Line Item = $7,511,425/WFHF/NFVW/NFTM; Costs are based on the following assumptions: pre-commercial thinning ≈$300/acre with limited piling; logging ≈ $125/acre (anticipate IRTC-good for services-thus reducing costs); Prep costs ≈ $100/acre for mark and cruise with crew of 6. Costs also include herbicide treatment of 20% of group selection acres @ $250/acre.

13. <u>Complimentary Restoration Project #13 – Forest Vegetation Improvement – Prescribed Fire</u>

a. Attribute/ Indicator Addressed – Fire Regime

b. Project Description: This project would use prescribed fire to maintain and/or reduce fuel loadings. Prescribed fire can be implemented prior and after proposed vegetation treatments. Treatment units may be planned across watershed boundaries, thus this project will be implemented over multiple years, as the treatment units are prepared. More than one watershed within the Escudilla Planning Area may receive treatment in a single year, however acreages may be limited. In the Luna Planning Area, a total of 1,815 acres are planned for prescribed fire. In the West Escudilla Restoration Project, a total of 2,347 acres are planned for prescribed fire.

c. Partners Involvement: New Mexico Department of Game and Fish, Rocky Mountain Elk Foundation.

d. Timeline: TBD based on funding; this is a multiple year project based on budget constraints, burning units, burning limitations, and mitigation of cumulative impacts to natural and cultural resources.

e. Estimated costs and associated Budget Line Item = $208,100 - $262,550/WFHF/NFVW; Costs are based on the following assumptions: burning with helicopter ≈ $80/acres; burning without helicopter ≈ $50/acre.

Costs

Table 53. Stone Creek – San Francisco River Costs

Stone Creek – San Francisco River Good Neighbor Watershed									
Essential Projects		**Planning & Design**	**# Units**	**Cost / Unit**		**Implementation**	**Project Monitoring**	**Project Totals**
Essential Projects								
#1 Road Decommissioning								
FS Contribution GNF		$ -	15 miles	$1,500/mile		$ 22,500	$ -	$ 22,500
FS Contribution ASNF		$ -	6 miles	$1,500/mile		$ 9,000	$ -	$ 9,000
Partner Contribution (both in kind and $)		$ -	n/a	n/a		$ -	$ -	$ -
Funding already obtained		$ -	n/a	n/a		$ -	$ -	$ -
Total		***$ -***	***21 miles***	***$1,500/mile***		***$ 31,500***	***$ -***	***$ 31,500***
#2 Road Improvement								
FS Contribution GNF		$ 5,000	16 miles	$1,500		$ 24,000	$ 1,000	$ 30,000
FS Contribution ASNF		$ 5,000	11 miles	$1,500		$ 16,500	$ 1,000	$ 22,500
Partner Contribution (both in kind and $)		$ -	n/a	n/a		$ -	$ -	$ -
Funding already obtained		$ -	n/a	n/a		$ -	$ -	$ -
Total		***$ 10,000***	***n/a***	***n/a***		***$ 40,500***	***$ 2,000***	***$ 52,500***
#3 Erosion Control Structures								
FS Contribution GNF	maintenance	$ 20,000	18	$2,500	IH	$ 67,500	$ -	$ 87,500
				$5,000	C	$ 135,000		$ 155,000
	new	$ 10,000	5	$5,000	IH	$ 25,000		$ 35,000
				$10,000	C	$ 50,000		$ 60,000
FS Contribution ASNF	Maintenance	$ 10,000	1 reach (Stone)	$100,000	n/a	$ 100,000	$ 500	$ 110,500
	new	$ 10,000	2	$5,000	IH	$ 10,000	$ 500	$ 20,500
				$10,000	C	$ 20,000		$ 30,500
Partner Contribution (both in kind and $)		$ -	0	n/a		$ -	$ -	$ -
Funding Already obtained		$ -	0	n/a		$ -	$ -	$ -
Total		***$ 50,000***	***n/a***	***n/a***		***$ 202,500***	***$ 1,000***	***$ 253,500***
						$ 305,000		***$ 356,000***
#4 Head of Ditch Campground Improvement								
FS Contribution GNF		$5,000	1	$90,000 / campground		$ 90,000	$ -	$ 95,000
Partner Contribution (both in kind and $)		$ -	0	n/a		$ -	$ -	$ -
Funding already obtained		$ -	0	n/a		$ -	$ -	$ -
Total		***$5,000***				***$ 90,000***	***$ -***	***$ 95,000***
#5 Head of Ditch Diversion Improvement								

FS Contribution GNF	$ -	n/a	n/a	$ 75,000	$ -	$ 75,000
FS Contribution ASNF	$ -	n/a	n/a	$ -	$ -	$ -
Partner Contribution (both in kind and $)	$ 25,000	n/a	awsa	$ 75,000	$ -	$ 100,000
Funding already obtained	$ -	n/a		$ -	$ -	$ -
Total	***$ 25,000***			***$ 150,000***	***$ -***	***$ 175,000***
#6– Meadow Enhancement						
FS Contribution GNF	$ -	200 acres	$200/acre	$ 40,000	$ -	$ 40,000
FS Contribution ASNF	$ -	200 acres	$200/acre	$ 40,000	$ -	$ 40,000
Partner Contribution (both in kind and $)	$ -	n/a	n/a	$ -	$ -	$ -
Funding already obtained	$ -	n/a	n/a	$ -	$ -	$ -
Total	***$ -***			***$ 80,000***	***$ -***	***$ 80,000***
#7 AOP Crossing Improvements						
FS Contribution GNF	$ -	2 crossing structures	$20000/Dillman; $150,000/SFR& NFS8887	$ 175,000	$ -	$ 175,000
FS Contribution ASNF	$ -	3 crossing structures	$750000/Stone& BThomas; $50000/Little	$ 50,000	$ -	$ 50,000
Partner Contribution (both in kind and $)	$ -	n/a	n/a	$ -	$ -	$ -
Funding already obtained ASNF	$ -	n/a	Central Federal Lands	$ 750,000	$ -	$ 750,000
Total	***$ -***			***$ 975,000***	***$ -***	***$ 975,000***
#8 Stream Restoration and Riparian Improvement-Stone Creek and Little Creek						
FS Contribution GNF	$ 30,000	2	$75000/mile	$ 150,000	$ 2,500	$ 182,500
FS Contribution ASNF	$ 30,000	4	$75000/mile	$ 300,000	$ 2,500	$ 332,500
Partner Contribution (both in kind and $)	$ -		n/a	$ -	$ -	$ -
Funding already obtained	$ -		n/a	$ -	$ -	$ -
Total	***$ 60,000***			***$ 450,000***	***$ 5,000***	***$ 515,000***
#9 Stream Restoration/Riparian Improvement – San Francisco River						
FS Contribution GNF	$ 20,000	1.5 miles	$75,000/mile	$ 112,500	$ 2,500	$ 135,000
FS Contribution ASNF	$ 10,000	.5 miles	$75,000/mile	$ 37,500	$ 2,500	$ 50,000
Partner Contribution (both in kind and $)	$ -	n/a	n/a	$ -	$ -	$ -
Funding already obtained	$ -	n/a	n/a	$ -	$ -	$ -
Total	***$ 30,000***			***$ 150,000***	***$ 5,000***	***$ 185,000***
#10 Road Improvement- Surfacing/Stabilization						
FS Contribution GNF	$ -	n/a	n/a	-	$ -	$ -
FS Contribution ASNF	$ -	6.5 miles	$65,000	$ 65,000	$ -	$ 65,000
Partner Contribution (both in kind and $)	$ -	n/a	n/a	$ -	$ -	$ -
Funding already obtained	$ -	n/a	n/a	$ -	$ -	$ -
Total	***$ -***			***$ 65,000***	***$ -***	***$ 65,000***
Forest Service Totals	***$155,000***	***n/a***	***n/a***	***$ 1,409,500***	***$ 13,000***	***$ 1,577,500***
				$ 1,512,000		***$ 1,680,000***

Partner Contribution Totals		***$ 25,000***	***n/a***	***n/a***	***$ 75,000***	***$ -***	***$ 100,000***
Funding already obtained		***$ -***	***n/a***	***n/a***	***$ 750,000***	***$ -***	***$ 750,000***
Grand Totals		***$180,000***			***$ 2,234,500***	***$ 13,000***	***$ 2,427,500***
					$ 2,337,000		***$ 2,530,000***
COMPLIMENTARY RESTORATION PROJECTS							
#11 Feasibility Study – Bob Thomas Creek							
FS Contribution GNF		$ -	n/a	n/a	$ -	$ -	$ -
FS Contribution ASNF		$ -	1 project	$35,000/project	$ 35,000	$ -	$ 35,000
Partner Contribution (both in kind and $)		$ -	n/a	n/a	$ -	$ -	$ -
Funding already obtained		$ -	n/a	n/a	$ -	$ -	$ -
Total		***$ -***			***$ 35,000***	***$ -***	***$ 35,000***
#12 Forest Vegetation Treatment							
FS Contribution GNF	Group selection	$411,400	8,228 acres	$525 (includes precom, pile logging/prep)	$ 4,319,700	$ -	$ 4,731,100
	Improvement	$ -	3,792 acres	$300 (pre comm only)	$ 1,137,600	$ -	$ 1,137,600
FS Contribution ASNF	Group selection	$ -	3,129 acres	$525 (includes precom, pile logging/prep)	$ 1,642,725	$ -	$ 1,642,725
Partner Contribution (both in kind and $)		$ -	n/a	n/a	$ -	$ -	$ -
Funding already obtained		$ -	n/a	n/a	$ -	$ -	$ -
Total		***$411,400***			***$ 7,100,025***	***$ -***	***$ 7,511,425***
#13 Forest Vegetation Improvement/ Prescribed Fire							
FS Contribution – GNF		$ -	1,815 acres	$50/acre	$ 90,750	$ -	$ 90,750
				$80/acre	$ 145,200		$ 145,200
FS Contribution – A/S		$ -	2,347 acres	$50/acre	$ 117,350	$ -	$ 117,350
Partner Contribution (both in kind and $)		$ -	n/a	n/a	$ -	$ -	$ -
Funding already obtained		$ -	n/a	n/a	$ -	$ -	$ -
Total		***$ -***			***$ 208,100***	***$ -***	***$ 208,100***
					$ 262,550		***$ 262,550***
Forest Service Totals		***$ 411,400***	***n/a***	***n/a***	***$ 7,343,125***	***$ -***	***$ 7,754,525***
					$ 7,397,575		***$ 7,808,975***
Partner Contribution Totals		***$ -***	***n/a***	***n/a***	***$ -***	***$ -***	***$ -***
Funding already obtained		***$ -***	***n/a***	***n/a***	***$ -***	***$ -***	***$ -***
Grand Totals		***$ -***	***n/a***	***n/a***	***$ 7,307,920***	***$ -***	***$ 7,307,920***
					$ 7,362,370		***$ 7,362,370***

Timelines and Project Scheduling

By fiscal year, list Tasks necessary to complete project (e.g. planning, design, permitting, implementation) and the expected contribution by the responsible party (FS or Partner).

Completion of these tasks is contingent on securing necessary funding.

Table 54. Stone Creek – San Francisco River Timelines and Project Scheduling

	Stone Creek – San Francisco River			
FY (TBD)	**Task**	**Forest Service Cost - rounded**		**Partner cost**
		GNF	**ASNF**	
Year 1	Essential Project #7 – AOP Crossing Improvements – Stone and Bob Thomas (Central Federal Lands $) Year 1 of 2	n/a	$750,000	unknown
Year 1	Essential Project #4 – Head of Ditch Campground Improvement	$95,000	n/a	unknown
Year 1	Essential Project #5 – Head of Ditch Diversion Improvement	$75,000	n/a	$100,000
Year 1	Essential Project #10 – Road Improvement-Surfacing/Stabilization	n/a	$65,000	unknown
Year 1	Complimentary Restoration Project #13 – Forest Vegetation Improvement -Prescribed Fire	$145,200	$118,000	unknown
Year 1	Complimentary Restoration Project #12 – Forest Vegetation Improvement ASNF 1,565 acres- Year 1 of 2		$821,000	unknown
Year 1	Complimentary Restoration Project #12 – Forest Vegetation Improvement - GNF 1,028 acres (group select)- Year 1 of 8	$540,000	n/a	unknown
Year 1	Complimentary Restoration Project #12 – Forest Vegetation Improvement - GNF 541 acres (improvement) Year 1 of 7	$162,500	n/a	unknown
Year 2	Essential Project #7 – AOP Crossing Improvements – SFR & Little Creek - Year 2 of 2	$175,000	$50,000	unknown
Year 2	Essential Project #2 – Road Improvement	$30,000	$22,500	unknown
Year 2	Essential Project #8 – Stream Restoration/Riparian Improvement – Stone and Little Creeks – Year 1 of 3	$61,000	$111,000	unknown
Year 2	Complimentary Restoration Project #12 – Forest Vegetation Improvement ASNF 1,565 acres- Year 2 of 2	$682,000	$821,000	unknown
Year 2	Complimentary Restoration Project #12 – Forest Vegetation Improvement - GNF 1,028 acres (group select)- Year 2 of 8	$540,000	n/a	unknown
Year 2	Complimentary Restoration Project #12 – Forest Vegetation Improvement - GNF 541 acres (improvement) Year 2 of 7	$162,500	n/a	unknown
Year 3	Essential Project #3 – Erosion Control Structures – maintenance – Year 1 of 2	$155,000	110,500	unknown
Year 3	Essential Project #6 – Meadow Enhancement	$40,000	$40,000	unknown
Year 3	Essential Project #8 – Stream Restoration/Riparian Improvement – Stone and Little Creeks – Year 2 of 3	$61,000	$111,000	unknown
Year 3	Complimentary Restoration Project #12 – Forest Vegetation Improvement - GNF 1,028 acres (group select) Year 3 of 8	$540,000	n/a	unknown
Year 3	Complimentary Restoration Project #12 – Forest Vegetation Improvement - GNF 541 acres (improvement) Year 3 of 7	$162,500	n/a	unknown
Year 4	Essential Project #3 – Erosion control structures – new – Year 2 of 2	$60,000	$30,500	unknown
Year 4	Complimentary Restoration Project #11 – Feasibility Study – Bob Thomas Creek	n/a	$35,000	unknown

Year 4	Essential Project #8 – Stream Restoration/Riparian Improvement – Stone and Little Creeks – Year 3 of 3	$61,000	$111,000	unknown
Year 4	Complimentary Restoration Project #12 – Forest Vegetation Improvement - GNF 1,028 acres (group select)- Year 4 of 8	$540,000	n/a	unknown
Year 4	Complimentary Restoration Project #12 – Forest Vegetation Improvement - GNF 541 acres (improvement) Year 4 of 7	$162,500	n/a	unknown
Year 5	Essential Project #9 – Stream Restoration/Riparian Improvement – San Francisco River	$135,000	$50,000	unknown
Year 5	Complimentary Restoration Project #12 – Forest Vegetation Improvement - GNF 1,028 acres (group select)- Year 5 of 8	$540,000	n/a	unknown
Year 5	Complimentary Restoration Project #12 – Forest Vegetation Improvement - GNF 541 acres (improvement) Year 5 of 7	$162,500	n/a	unknown
Year 6	Complimentary Restoration Project #12 – Forest Vegetation Improvement - GNF 1,028 acres (group select)- Year 6 of 8	$540,000	n/a	unknown
Year 6	Complimentary Restoration Project #12 – Forest Vegetation Improvement - GNF 541 acres (improvement) Year 6 of 7	$162,500	n/a	unknown
Year 7	Complimentary Restoration Project #12 – Forest Vegetation Improvement - GNF 1,028 acres (group select)- Year 7 of 8	$540,000	n/a	unknown
Year 7	Complimentary Restoration Project #12 – Forest Vegetation Improvement - GNF 541 acres (improvement) Year 7 of 7	$162,500	n/a	unknown
Year 8	Complimentary Restoration Project #12 – Forest Vegetation Improvement - GNF 1,028 acres (group select- Year 8 of 8	$540,000	n/a	unknown
Year 9	Essential Project #1 – Road Decommissioning	$22,500	$9,000	unknown

Estimated Load Reductions

The San Francisco River is listed as not meeting state water quality standards for benthic macro invertebrate community and temperature. The entire Stone Creek-San Francisco River 6th code watershed drains into the listed reach of the San Francisco River. Load reductions into the San Francisco River as a result of implementing essential projects in the Stone Creek-San Francisco River watershed are estimated in the Tables 55-57. Projects that would improve these water quality parameters are those that were modeled for load reductions. These include road decommissioning, road improvements, road/stream crossing improvements, diversion improvements, erosion control/watershed stabilization projects, campground improvements, stream and riparian restoration, and exclusion fencing.

Load reductions related to road projects were estimated using the Forest Service's Watershed Erosion Prediction Project (WEPP): Road model. Streambank stabilization and sediment/nutrient loading was estimated with the EPA Region 5 sediment and nutrient reduction model. The Stream Segment Temperature Model (SSTEMP) was used to estimate temperature reductions in the San Francisco River.

Table 55. WEPP Road Model Estimated Load Reductions – Stone Creek – San Francisco River 6th Code Watershed

Project	Estimated Current Road Prism Erosion	Estimated Current Sediment Leaving Buffer	Estimated Target Road Prism Erosion (tons)	Estimated Target Sediment Leaving Buffer	Estimated Load Reduction From Road Prism	Estimated Load Reduction of Sediment Leaving Buffer
	50 – Year Mean Annual Averages					
Road decommissioning (15 miles)	339 tons	52 tons	302 tons	47 tons	37 tons (11% decrease)	5 tons (10% decrease)

Table 56. R5 Model Results for Sediment and Nutrient Reductions – Stone Creek – San Francisco River 6th Code Watershed							
Stream restoration and riparian improvement (San Francisco River and Stone Creek)	Linear feet treated	Bank height (ft)	Lateral recession (ft/yr)	% BMP efficiency	Sediment reduced (tons/yr)	Phosphorus reduced (lbs/yr)	Nitrogen reduced (lbs/yr)
Bank 1	11,000	0.75	0.5	85%	140.3	135	280.5
Bank 2	11,000	0.75	0.5	85%	140.3	135	280.5

Table 57. Stream Segment Temperature (SSTEMP) Load Reductions for Stone Creek				
Stream Miles Treated	Current Max Temperature degree Celsius	Current vegetative stream canopy cover	Projected Stream Temperature (post project)	Required stream canopy cover
6	30 deg C	5%	24 deg C	60%

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Big Canyon – San Francisco River – Gila National Forest

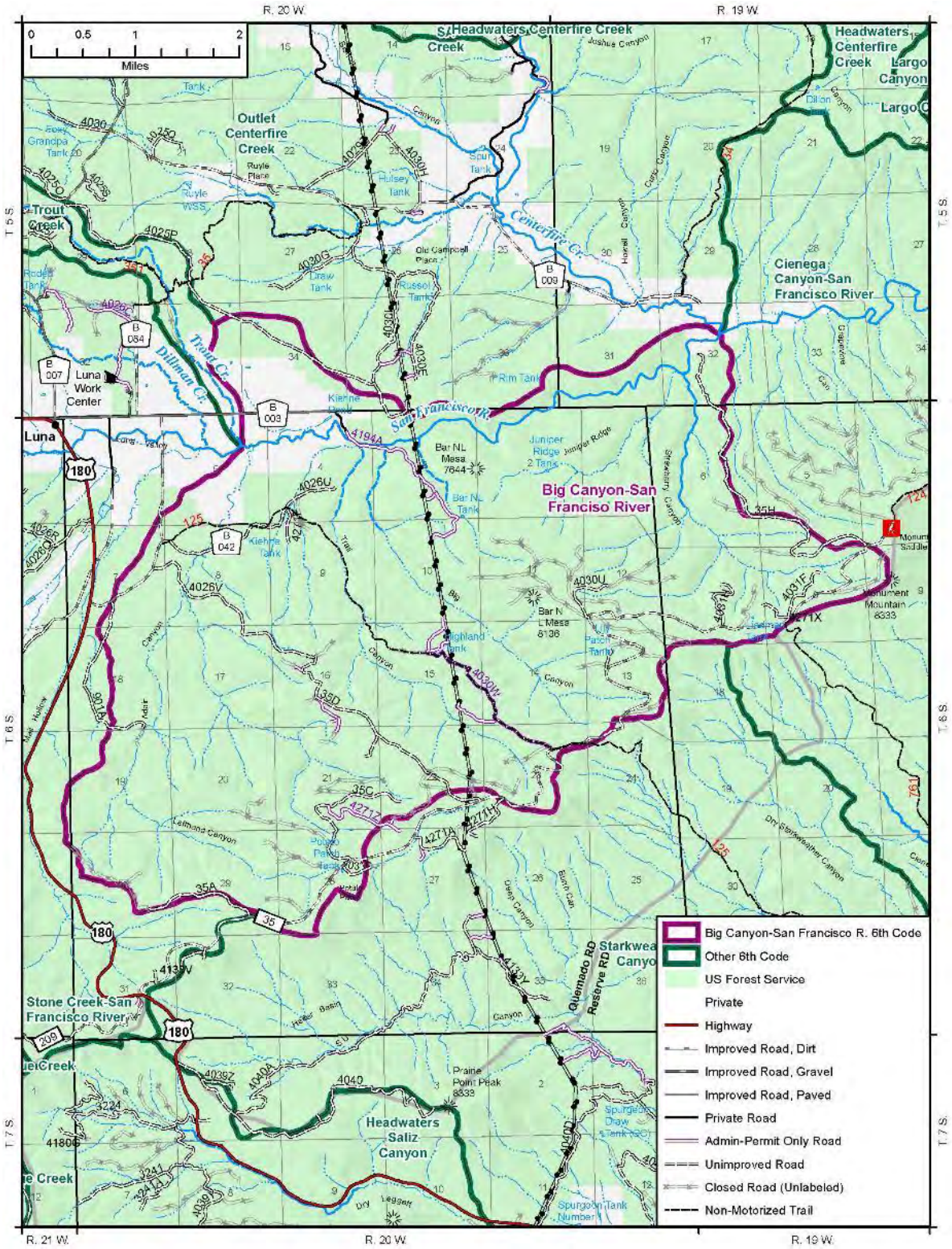

Figure 22. Big Canyon – San Francisco River 6th Code Watershed

Current Rating = Functioning at Risk = 1.7
Target Rating = Properly Functioning

Specific Project Activities

The following list of projects includes those identified to improve and, ultimately maintain watershed conditions. Not all projects are deemed necessary to move the watershed upwards to an improved condition class. Implementation and completion of Essential Projects 1 - 4 are required to move the watershed from Functioning at Risk to Properly Functioning. Projects 5 – 6 address other important landscape restoration objectives and are considered complimentary restoration projects. These projects will assist in improving and/or maintaining overall watershed conditions and ensure that it does not regress back into the Functioning at Risk state.

Essential Projects

1. **Essential Project #1 – Road Decommissioning**
   a. Attribute/ Indicator Addressed – Roads and Trails
   b. Project Description: This project will focus on decommissioning roads identified in Luna Landscape Planning. In this watershed, there are approximately 5 miles of road identified. Current decommissioning costs are approximately $1,500/mile. Decommissioning of a road involves reestablishing vegetation, and if necessary, initiating restoration of ecological processes interrupted or adversely impacted by the unneeded road. Treatments include one or more of the following treatments: Reestablishing former drainage patterns, stabilizing slopes, and restoring vegetation; Blocking the entrance to a road or installing water bars; Removing culverts, reestablishing drainages, removing unstable fills, pulling back road shoulders, and scattering slash on the roadbed; Completely eliminating the roadbed by restoring natural contours and slopes; and Other methods designed to meet the specific conditions associated with the unneeded road
   c. Partners Involvement: Various partners have expressed interest in partnering in this effort, including New Mexico Environment Department and Wild Earth Guardians
   d. Timeline: TBD based on funding and prioritization of 12 watersheds; Decommissioning of roads without fuels treatments can be completed in one fiscal year; roads with planned fuels treatments can be decommissioned immediately following treatment.
   e. Estimated costs and associated Budget Line Item: Estimated costs include the costs of reseeding, reshaping, labor, heavy equipment transport, per diem, barrier, imported aggregate, and archaeological review (if necessary). $8,000/CMRD/NFVW, NFWF, CMLG with monitoring.

2. **Essential Project #2 – Road Improvement**
   a. Attribute/ Indicator Addressed – Roads and Trails
   b. Project Description: This project will focus on heavy road maintenance and improving best management practices for road drainage on Maintenance Level 2 and 3 roads within the watershed. BMPs will include improvement of lead out ditches, road dips, and inlet and outlet features of culverts and road/stream crossings. Heavy road maintenance may involve some level of reconstruction of existing road beds to reestablish a safe and last driving surface with the intent of minimizing sediment movement off of the road. Currently there are approximately 33 miles of Maintenance Level 2 and 3 roads within the watershed. This project assumes that 40% of roads in the watershed need some degree of maintenance ranging from light to heavy.
   c. Partners Involvement: Catron County
   d. Timeline: TBD based on funding; can be completed in one fiscal year

e. Estimated costs and associated Budget Line Item = $19,500/ CMRD/NFVW, NFWF, CMLG; Based on an estimate of $1,500/mile for road maintenance, which may include reshaping, heavy equipment transport, per diem, culvert replacement, and archaeological review (if necessary).

3. Essential Project #3 – Erosion Control Structures

a. Attribute/Indicator Addressed – Water Quality
b. Project Description: This project will focus on the maintenance and/or reconstruction of 1 existing erosion control structures. This structure was originally implemented in the 1980s to impede and prevent ongoing erosion and gullying. It has not received maintenance over the last several decades and is currently in disrepair. Work will include heavy equipment cleanout of the structure and some reconstruction to preclude current and future gullying and sediment movement. Certified weed-free seeding will be required after site work is completed. Inventory and survey work will be necessary prior to beginning this project to establish necessary site design.
c. Partners Involvement: New Mexico Environment Department
d. Timeline: TBD based on funding
e. Estimated Costs and associated Budget Line Item: Price ranges from $2,500-$5,000/NFVW; Costs are based on the following assumptions: $2,500/structure if utilize Forest Construction and Maintenance crew; $5,000/structure if utilize contract labor.

4. Essential Project #4 – Wetland/Spring/Riparian Restoration – Adair Spring/Canyon

a. Attribute/ Indicator Addressed – Water Quality, Water Quantity, Aquatic Habitat, Aquatic Biota, Riparian/Wetland Vegetation, Soils
b. Project Description: This project will focus on approximately 0.5 mile/2 acres of stream/wetland/riparian restoration on Adair Spring/Adair Canyon. Current conditions include headcutting and dewatering of Adair Spring/Adair Canyon and the adjacent wet meadow system. Work would include implementation of channel and wetland restoration techniques to increase water table elevations, enhance productivity of wetland dependent species (both aquatic and vegetative), encourage deep rooted vegetation on streambanks, impede erosion processes, and restore channel stability. These techniques include placement of water control structures that reestablish macro/micro-topography and encourage natural channel form and function, streambank contouring, and re-establishment of wetland/riparian plants through natural and/or artificial means (both woody and herbaceous plants). Following treatment, Adair Spring would be fenced to exclude ungulate grazing and allow for recovery of wetland and riparian resources. All techniques will utilize minimum impact best management practices to control sediment movement and will follow necessary permitting requirements under the Clean Water Act.
c. Partners Involvement: Wild Earth Guardians, NMED
d. Timeline: TBD based on Funding; project can be completed in one year.
e. Estimated costs and associated Budget Line Item: $31,500/NFVW/NFWF; Costs are based on labor, heavy equipment rental and transport, per diem, fencing supplies for either livestock and/or elk, imported aggregate, other materials as necessary (including monitoring)

Complimentary Restoration Projects

5. **Project #5 – Forest Vegetation Improvement – Thinning**
   - **a.** Attribute/ Indicator Addressed – Fire Regime
   - **b.** Project Description: This project will focus on woodland and forest maintenance and restoration treatments where identified across the watershed. Treatments of vegetation will be accomplished by hand, mechanized, and/or herbicide treatment. In forested systems, activities would include thinning and group selections (e.g. creating 1-4 acre openings) to encourage regeneration of trees. Woodland areas include pinyon juniper and pinyon pine, while forested areas refer to ponderosa pine and mixed conifer. Specific silviculture prescriptions will be written for treatment units based on desired future conditions for the unit and area. Treatment units may be planned across watershed boundaries, thus this project will be implemented over multiple years, as the treatment units are prepared. More than one watershed within the Escudilla Planning Area may receive treatment in a single year, however acreages may be limited. Thinning within this project area includes both group select (3,673 acres) and improvement (1,582 acres) thinning. A total of 5,225 acres of thinning are planned in this watershed.
   - **c.** Partners Involvement: New Mexico Environment Department
   - **d.** Timeline: TBD based on funding; this is a multiple year project. Budget constraints and treatment boundaries will greatly limit the amount of acres treated in a single year within a watershed.
   - **b.** Estimated costs and associated Budget Line Item = $2,586,675/WFHF/NFTM/NFVW/ NFWF; Costs are based on the following assumptions: pre-commercial thinning ≈$300/acre with limited piling; logging ≈ $125/acre (anticipate IRTC-good for services-thus reducing costs); Prep costs ≈ $100/acre for mark and cruise with crew of 6. Costs also include herbicide treatment of 20% of group selection acres @ $250/acre.

6. **Project #6 – Forest Vegetation Improvement – Prescribed Fire**
   - a. Attribute/ Indicator Addressed – Fire Regime
   - b. Project Description: This project would use prescribed fire to maintain and/or reduce fuel loadings. Prescribed fire can be implemented prior and after proposed vegetation treatments. Treatment units may be planned across watershed boundaries, thus this project will be implemented over multiple years, as the treatment units are prepared. More than one watershed within the Escudilla Planning Area may receive treatment in a single year, however acreages may be limited. A total of 8,808 acres of prescribed fire are planned in this watershed.
   - c. Partners Involvement: New Mexico Department of Game and Fish, Rocky Mountain Elk Foundation.
   - d. Timeline: TBD based on funding; this is a multiple year project based on budget constraints, burning units, burning limitations, and mitigation of cumulative impacts to natural and cultural resources.
   - e. Estimated costs and associated Budget Line Item = $440,900 - $705,140 WFHF/NFTM/NFVW/NFWF; Costs are based on the following assumptions: GNF → burning with helicopter ≈ $80/acres; burning without helicopter ≈ $50/acre.

Costs

Table 58. Big Canyon – San Francisco River Costs

Big Canyon – San Francisco River						
Essential Projects	**Planning & Design**	**# Units**	**Cost / Unit**	**Implementation**	**Project Monitoring**	**Project Totals**
ESSENTIAL PROJECTS						
#1 Road Decommissioning						
FS Contribution GNF	$ -	5 miles	$1,500/mile	$ 7,500	$ 500	$ 8,000
Partner Contribution (both in kind and $)	$ -	n/a	n/a	$ -	$ -	$ -
Funding already obtained	$ -	n/a	n/a	$ -	$ -	$ -
Total	***$ -***	***5 miles***	***$1,500/mile***	***$ 7,500***	***$ 500***	***$ 8,000***
#2 Road Improvement						
FS Contribution GNF	$ -	13 miles	$1,500	$ 19,500	$ -	$ 19,500
Partner Contribution (both in kind and $)	$ -	n/a	n/a	$ -	$ -	$ -
Funding already obtained	$ -	n/a	n/a	$ -	$ -	$ -
Total	***$ -***	***13 miles***	***$1,500***	***$ 19,500***	***$ -***	***$ 19,500***
#3 Erosion Control Structures						
FS Contribution GNF	$ -	1 structure	2500 IH	$ 2,500	$ -	$ 2,500
			5000 C	$ 5,000		$ 5,000
Partner Contribution (both in kind and $)	$ -	n/a	n/a	$ -	$ -	$ -
Funding already obtained	$ -	n/a	n/a	$ -	$ -	$ -
Total	***$ -***	***1 structure***	***$2,500 - $5,000***	***$ 2,500***	***$ -***	***$ 2,500***
				$ 5,000		***$ 5,000***
#4 Wetland/Spring/Riparian Restoration (Adair Spring)						
FS Contribution GNF	$ 5,000	2 acres	$15,000/acre	$ 30,000	$ 1,500	$ 36,500
Partner Contribution (both in kind and $)	$ -	n/a	n/a	$ -	$ -	$ -
Funding already obtained	$ -	n/a	n/a	$ -	$ -	$ -
Total	***$ 5,000***	***2 acres***	***$15,000/acre***	***$ 30,000***	***$ 1,500***	***$ 36,500***
Forest Service Totals	***$ 5,000***	***n/a***	***n/a***	***$ 59,500***	***$ 2,000***	***$ 66,500***
				$ 62,000		***$ 69,000***
Partner Contribution Totals	***$ -***	***n/a***	***n/a***	***$ -***	***$ -***	***$ -***
Funding already obtained	***$ -***	***n/a***	***n/a***	***$ -***	***$ -***	***$ -***
Grand Totals	***$ 5,000***	***n/a***	***n/a***	***$ 59,500***	***$ 2,000***	***$ 66,500***
				$ 62,000		***$ 69,000***

COMPLIMENTARY RESTORATION PROJECTS							
#5 Forest Vegetation Treatments							
FS Contribution GNF	Group selection	$ 183,750	3,673 acres	$525/acre (includes precom, pile logging/prep)	$ 1,928,325	$ -	$2,112,075
	Improvement	$ -	1,582 acres	$300/acre (precomm only)	$ 474,600	$ -	$ 474,600
Partner Contribution (both in kind and $)		$ -	n/a	n/a	$ -	$ -	$ -
Funding already obtained		$ -	n/a	n/a	$ -	$ -	$ -
Total		***$ 183,750***	***acres***	***n/a***	***$ 2,402,925***	***$ -***	***$2,586,675***
#6 Forest Vegetation Improvement/ Prescribed Fire							
FS Contribution – GNF		$ -	8,808 acres	$50/acre	$ 440,400	$ 500	$ 440,900
				$80/acre	$ 704,640		$ 705,140
Partner Contribution (both in kind and $)		$ -	n/a	n/a	$ -	$ -	$ -
Funding already obtained		$ -	n/a	n/a	$ -	$ -	$ -
Total		***$ -***	***acres***	***$50 – $80/acre***	***$ 440,400***	***$ 500***	***$ 440,900***
					$ 704,640		***$ 705,140***
Forest Service Totals		**$ 183,750**	**n/a**	**n/a**	**$ 2,843,325**	**$ 500**	**$3,027,575**
					$ 3,107,565		**$3,291,815**
Partner Contribution Totals		**$ -**	**n/a**	**n/a**	**$ -**	**$ -**	**$ -**
Funding already obtained		**$ -**	**n/a**	**n/a**	**$ -**	**$ -**	**$ -**
Grand Totals		**$ -**	**n/a**	**n/a**	**$ 2,843,325**	**$ 500**	**$2,843,825**
					$ 3,107,565		**$3,108,065**

Timelines and Project Scheduling

By fiscal year, list Tasks necessary to complete project (e.g. planning, design, permitting, implementation) and the expected contribution by the responsible party (FS or Partner).

Completion of these tasks is contingent on securing necessary funding.

Table 59. Big Canyon – San Francisco River Timelines and Project Scheduling

Big Canyon – San Francisco River			
FY - TBD	**Task**	**FS Cost GNF (rounded)**	**Partner cost**
Year 1	Essential Project #2 Road Maintenance	$20,000	unknown
Year 1	Essential Project #3 Erosion Control Structures	$5,000	unknown
Year 1	Essential Project #4 Riparian Restoration – Adair Spring	$31,500	unknown
Year 1	Complimentary Restoration Project #6 Forest Vegetation Improvement – Prescribed Fire – 2,202 acres – year 1 of 4	$176,000	unknown

Year 1	Complimentary Restoration Project #5 Forest Vegetation Improvement – 527 acres (improvement) – Year 1 of 3	$158,000	unknown
Year 1	Complimentary Restoration Project #5 Forest Vegetation Improvement – 1,224 acres (group select) – Year 1 of 3	$642,600	unknown
Year 2	Complimentary Restoration Project #6 Forest Vegetation Improvement – Prescribed Fire – 2,202 acres – year 2 of 4	$176,000	unknown
Year 2	Complimentary Restoration Project #5 Forest Vegetation Improvement – 527 acres (improvement) – Year 2 of 3	$158,000	unknown
Year 2	Complimentary Restoration Project #5 Forest Vegetation Improvement – 1,224 acres (group select) – Year 2 of 3	$642,000	unknown
Year 3	Complimentary Restoration Project #6 Forest Vegetation Improvement – Prescribed Fire – 2,202 acres – year 3 of 4	$176,000	unknown
Year 3	Complimentary Restoration Project #5 Forest Vegetation Improvement – 527 acres (improvement) – Year 3 of 3	$158,000	unknown
Year 3	Complimentary Restoration Project #5 Forest Vegetation Improvement – 1,224 acres (group select) – Year 3 of 3	$642,000	unknown
Year 4	Complimentary Restoration Project #6 Forest Vegetation Improvement – Prescribed Fire – 2,202 acres – year 4 of 4	$176,000	unknown
Year 5	Essential Project #1 Road Decommissioning	$8,000	unknown

Estimated Load Reductions

The San Francisco River is listed as not meeting state water quality standards for benthic macro invertebrate community and temperature. The entire Big Canyon-San Francisco River 6th code watershed drains into the listed reach of the San Francisco River. Load reductions into the San Francisco River as a result of implementing road decommissioning in the Big Canyon-San Francisco River watershed are estimated in Table 60. Load reductions related to road decommissioning was estimated using the Forest Service's Watershed Erosion Prediction Project (WEPP): Road model.

Table 60. WEPP Road Model Estimated Load Reductions – Big Canyon – San Francisco River 6th Code Watershed

Project	Estimated Current Road Prism Erosion	Estimated Current Sediment Leaving Buffer	Estimated Target Road Prism Erosion (tons)	Estimated Target Sediment Leaving Buffer	Estimated Load Reduction From Road Prism	Estimated Load Reduction of Sediment Leaving Buffer
	50 – Year Mean Annual Averages					
Road decommissioning (5 miles)	247 tons	31 tons	224 tons	28 tons	23 tons (9% decrease)	3 tons (10% decrease)

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Headwaters Centerfire Creek – Gila National Forest

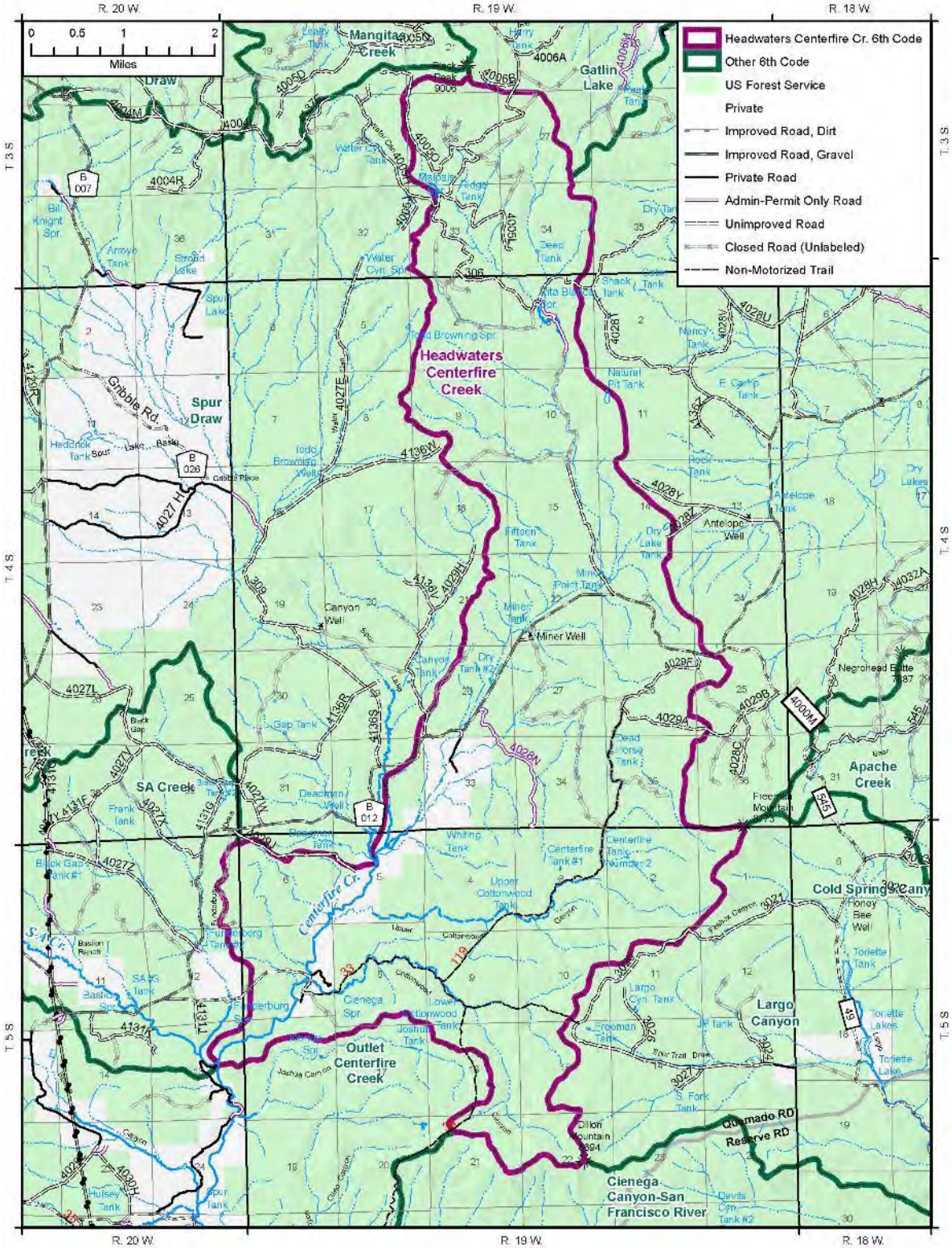

Figure 23. Headwaters Centerfire Creek 6th Code Watershed

Current Rating = Functioning at Risk = 1.7
Target Rating = Properly Functioning

Specific Project Activities

The following list of projects includes those identified to improve and, ultimately maintain watershed conditions. Not all projects are deemed necessary to move the watershed upwards to an improved condition class. Implementation and completion of Essential Projects 1 - 4 are required to move the watershed from Functioning at Risk to Properly Functioning. Projects 5 – 6 address other important landscape restoration objectives and are considered complimentary restoration projects. These projects will assist in improving and/or maintaining overall watershed conditions and ensure that it does not regress back into the Functioning at Risk state.

Essential Projects

1. **Essential Project #1 – Road Decommissioning**
   a. Attribute/ Indicator Addressed – Roads and Trails
   b. Project Description: This project will focus on decommissioning roads identified in Luna Landscape Planning. In this watershed, there are approximately 10 miles of road identified. Current decommissioning costs are approximately $1,500/mile. Decommissioning of a road involves reestablishing vegetation, and if necessary, initiating restoration of ecological processes interrupted or adversely impacted by the unneeded road. Treatments include one or more of the following treatments: Reestablishing former drainage patterns, stabilizing slopes, and restoring vegetation; Blocking the entrance to a road or installing water bars; Removing culverts, reestablishing drainages, removing unstable fills, pulling back road shoulders, and scattering slash on the roadbed; Completely eliminating the roadbed by restoring natural contours and slopes; and Other methods designed to meet the specific conditions associated with the unneeded road
   c. Partners Involvement: Various partners have expressed interest in partnering in this effort, including New Mexico Environment Department and Wild Earth Guardians
   d. Timeline: TBD based on funding; can be completed in one fiscal year
   e. Estimated costs and associated Budget Line Item: $15,500/CMRD, NFVW, NFWF, CMLG with monitoring.

2. **Essential Project #2 – Road Improvement**
   a. Attribute/ Indicator Addressed – Roads and Trails
   b. Project Description: This project will focus on heavy road maintenance and improving best management practices for road drainage on Maintenance Level 2 and 3 roads within the watershed. BMPs will include improvement of lead out ditches, road dips, and inlet and outlet features of culverts and road/stream crossings. Heavy road maintenance may involve some level of reconstruction of existing road beds to reestablish a safe and last driving surface with the intent of minimizing sediment movement off of the road. Currently there are approximately 18.5 miles of Maintenance Level 2 and 3 roads within the watershed. This project assumes that 40% of roads in the watershed need some degree of maintenance ranging from light to heavy.
   c. Partners Involvement: Catron County
   d. Timeline: TBD based on funding; can be completed in one fiscal year
   e. Estimated costs and associated Budget Line Item = $11,250/ CMRD, NFVW, NFWF, CMLG; Based on an estimate of $/mile for road maintenance.

3. **Essential Project #3 – Erosion Control Structures**
   a. Attribute/Indicator Addressed – Water Quality
   b. Project Description: This project will focus on the maintenance and/or reconstruction of 8 existing erosion control structures. These structures were originally implemented in the 1980s to impede and prevent ongoing erosion and gullying across the watershed in various drainages and swales. None of these structures have received maintenance over the last several decades and are currently in various stages of disrepair. Some structures have filled completely in and no longer serve to back up sediment. Others have breaches in the dams and are experiencing active headcutting, while others have water bypassing the structure, creating new erosion issues. Work will include heavy equipment cleanout of the sediment structures where needed or reconstruction/expansion of dams to preclude current and future gullying and sediment movement. Certified weed-free seeding will be required at sites requiring reconstruction. Inventory and survey work will be necessary prior to beginning this project to establish necessary site design.
   c. Partners Involvement: New Mexico Environment Department
   d. Timeline: TBD based on funding
   e. Estimated Costs and associated Budget Line Item: $31,500 - $51,500/NFVW; Costs are based on the following assumptions: $2,500/structure if utilize Forest Construction and Maintenance crew; $5,000/structure if utilize contract labor.

4. **Essential Project #4 – Stream Restoration/Riparian Improvement**
   a. Attribute/ Indicator Addressed – Water Quality, Water Quantity, Aquatic Habitat, Aquatic Biota, Riparian/Wetland Vegetation, Soils
   b. Project Description: This project will focus on up to 4 miles of stream/wetland/riparian restoration on Centerfire Creek. Current conditions include headcutting and dewatering of Centerfire Creek and the adjacent wet meadow system. Work would include implementation of channel and wetland restoration techniques to increase water table elevations, enhance productivity of wetland dependent species (both aquatic and vegetative), encourage deep rooted vegetation on streambanks, impede erosion processes, and restore channel stability. These techniques include placement of water control structures that reestablish macro/micro-topography and encourage natural channel form and function, streambank contouring, and re-establishment of wetland/riparian plants through natural and/or artificial means (both woody and herbaceous plants). All techniques will utilize minimum impact best management practices to control sediment movement and will follow necessary permitting requirements under the Clean Water Act.
   c. Partners Involvement: Wild Earth Guardians, NMED
   d. Timeline: TBD based on Funding; project can be completed in one year.
   e. Estimated costs and associated Budget Line Item: $155,000/NFVW, NFWF; Costs are based on the following assumptions: $30,000 for design, $30,000 / mile implementation, $5,000 monitoring.

Complimentary Restoration Projects

5. **Project #5 – Forest Vegetation Treatments**
   a. Attribute/ Indicator Addressed – Fire Regime
   b. Project Description: This project will focus on woodland and forest maintenance and restoration treatments where identified across the watershed. Treatment of vegetation will be accomplished by hand, mechanized, and/or herbicide treatment. In forested systems, activities would include thinning and group selections (e.g. creating 1-4 acre openings) to encourage regeneration of trees. Woodland areas include pinyon juniper and pinyon pine, while forested areas refer to ponderosa pine and mixed conifer. Specific silviculture prescriptions will be written for treatment units based on desired future conditions for the unit and area. Treatment units may be planned across watershed

boundaries, thus this project will be implemented over multiple years, as the treatment units are prepared. More than one watershed within the Escudilla Planning Area may receive treatment in a single year, however acreages may be limited. Thinning within this project area includes both group select (4,009 acres) and improvement (868 acres) thinning. A total of 4,877 acres of thinning are planned within this watershed.

c. Partners Involvement: New Mexico Environment Department

d. Timeline: TBD based on funding; this is a multiple year project. Budget constraints and treatment boundaries will greatly limit the amount of acres treated in a single year within a watershed.

g. Estimated costs and associated Budget Line Item = $2,565,575/WFHF/NFVW/NFWF/NFTM; Costs are based on the following assumptions: pre-commercial thinning ≈$300/acre with limited piling; logging ≈ $125/acre (anticipate IRTC-good for services-thus reducing costs); Prep costs ≈ $100/acre for mark and cruise with crew of 6. Costs also include herbicide treatment of 20% of group selection acres @ $250/acre.

6. <u>Project #6 – Forest Vegetation Improvement – Prescribed Fire</u>

a. Attribute/ Indicator Addressed – Fire Regime

b. Project Description: This project would use prescribed fire to maintain and/or reduce fuel loadings. Prescribed fire can be implemented prior and after proposed vegetation treatments. Treatment units may be planned across watershed boundaries, thus this project will be implemented over multiple years, as the treatment units are prepared. More than one watershed within the Escudilla Planning Area may receive treatment in a single year, however acreages may be limited. A total of 1,539 acres of prescribed fire are planned within this watershed.

c. Partners Involvement: New Mexico Department of Game and Fish, Rocky Mountain Elk Foundation.

d. Timeline: TBD based on funding; this is a multiple year project based on budget constraints, burning units, burning limitations, and mitigation of cumulative impacts to natural and cultural resources.

e. Estimated costs and associated Budget Line Item = $77,450 - $123,620/WFHF/NFVW, NFWF; Costs are based on the following assumptions: burning with helicopter ≈ $80/acres; burning without helicopter ≈ $50/acre.

Costs

Table 61. Headwaters Centerfire Creek Costs

Headwaters Centerfire Creek						
Essential Projects	**Planning & Design**	**# Units**	**Cost / Unit**	**Implementation**	**Project Monitoring**	**Project Totals**
Essential Projects						
#1 Road Decommissioning						
FS Contribution GNF	$ -	10 miles	$1,500/mile	$ 15,000	$ 500	$ 15,500
Partner Contribution (both in kind and $)	$ -	n/a	n/a	$ -	$ -	$ -
Funding already obtained	$ -	n/a	n/a	$ -	$ -	$ -
Total	***$ -***	***10 miles***	***$1,500/mile***	***$ 15,000***	***$ 500***	***$ 15,500***
#2 Road Improvement						
FS Contribution GNF	$ -	7.5 miles	$1,500	$ 11,250	$ -	$ 11,250
Partner Contribution (both in kind and $)	$ -	n/a	Na/	$ -	$ -	$ -
Funding already obtained	$ -	n/a	n/a	$ -	$ -	$ -
Total	***$ -***	***7.5 miles***	***$1,500***	***$ 11,250***	***$ -***	***$ 11,250***
#3 Erosion Control Structures						
FS Contribution GNF	$ 10,000	8 structures	2500 IH	$ 20,000	$ 1,500	$ 31,500
			5000 C	$ 40,000		$ 51,500
Partner Contribution (both in kind and $)	$ -		n/a	$ -	$ -	$ -
Funding already obtained	$ -	n/a	n/a	$ -	$ -	$ -
Total	***$ 10,000***	***8 structures***	***$2,500 - $5,000***	***$ 20,000***	***$ 1,500***	***$ 31,500***
				$ 40,000		***$ 51,500***
#4 Stream Restoration / Riparian Improvement						
FS Contribution GNF	$ 30,000	4 miles	$30,000/mile	$ 120,000	$ 5,000	$155,000
Partner Contribution (both in kind and $)	$ -	n/a	n/a	$ -	$ -	$ -
Funding already obtained	$ -	n/a	n/a	$ -	$ -	$ -
Total	***$ 30,000***	***4 miles***	***$30,000/mile***	***$ 120,000***	***$ 5,000***	***$155,000***
Forest Service Totals	**$ 40,000**	**n/a**	**n/a**	**$ 166,250**	**$ 7,000**	**$213,250**
				$ 186,250		**$233,250**
Partner Contribution Totals	**$ -**	**n/a**	**n/a**	**$ -**	**$ -**	**$ -**
Funding already obtained	**$ -**	**n/a**	**n/a**	**$ -**	**$ -**	**$ -**
Grand Totals	**$ 40,000**	**n/a**	**n/a**	**$ 166,250**	**$ 7,000**	**$213,250**
				$ 186,250		**$233,250**

COMPLIMENTARY RESTORATION PROJECTS							
#5 Forest Vegetation Improvement/Thinning							
FS Contribution GNF	Group selection	$ 200,450	4,009 acres	$525 (includes precom, pile logging/prep)	$ 2,104,725	$ -	$2,305,175
	Improvement	$ -	868 acres	$300 (pre comm only)	$ 260,400	$ -	$ 260,400
Partner Contribution (both in kind and $)		$ -	n/a	n/a	$ -	$ -	$ -
Funding already obtained		$ -	n/a	n/a	$ -	$ -	$ -
Total		***$ 200,450***	***4,877 acres***	***n/a***	***$ 2,365,125***	***$ -***	***$ 2,565,575***
#6 Forest Vegetation Improvement/ Prescribed Fire							
FS Contribution – GNF			1,539 acres	50/acre	$ 76,950	$ 500	$ 77,450
				$80/acre	$ 123,120		$ 123,620
Partner Contribution (both in kind and $)		$ -	n/a	n/a	$ -	$ -	$ -
Funding already obtained		$ -	n/a	n/a	$ -	$ -	$ -
Total		***$ -***	***1,539 acres***	***$50 - $80 / acre***	***$ 76,950***	***$ 500***	***$ 77,450***
					$ 123,120		***$ 123,620***
Forest Service Totals		**$ 200,450**	**n/a**	**n/a**	**$ 2,442,075**	**$ 500**	**$ 2,643,025**
					$ 2,488,245		**$ 2,689,195**
Partner Contribution Totals		**$ -**	**n/a**	**n/a**	**$ -**	**$ -**	**$ -**
Funding already obtained		**$ -**	**n/a**	**n/a**	**$ -**	**$ -**	**$ -**
Grand Totals		**$ 200,450**	**n/a**	**n/a**	**$ 2,442,075**	**$ 500**	**$ 2,442,575**
					$ 2,488,245		**$ 2,488,745**

Timelines and Project Scheduling

By fiscal year, list Tasks necessary to complete project (e.g. planning, design, permitting, implementation) and the expected contribution by the responsible party (FS or Partner).

Completion of these tasks is contingent on securing necessary funding.

Table 62. Headwaters Centerfire Creek Timelines and Project Scheduling

Headwaters Centerfire Creek			
FY – TBD	**Task**	**FS Cost GNF (rounded)**	**Partner cost**
Year 1	Essential Project #2 Road Maintenance	$12,000	unknown
Year 1	Essential Project #3 Erosion Control Structures	$52,000	unknown
Year 1	Essential Project #4 Stream Restoration / Riparian Improvement	$155,000	unknown
Year 1	Complimentary Restoration Project #6 Forest Vegetation Improvement – Prescribed Fire	$125,000	unknown
Year 1	Complimentary Restoration Project #5 Forest Vegetation Improvement – 1,002 acres – group select - Year 1 of 4	$526,181	unknown
Year 1	Complimentary Restoration Project #5 Forest Vegetation Improvement – 434 acres – improvement -Year 1 of 2	$130,000	unknown
Year 2	Complimentary Restoration Project #5 Forest Vegetation Improvement – 1,002 acres – group select - Year 2 of 4	$526,181	unknown
Year 2	Complimentary Restoration Project #5 Forest Vegetation Improvement – 434 acres – improvement –Year 2 of 2	$130,000	unknown
Year 3	Complimentary Restoration Project #5 Forest Vegetation Improvement – 1,002 acres – group select - Year 3 of 4	$526,181	unknown
Year 4	Complimentary Restoration Project #5 Forest Vegetation Improvement – 1,002 acres – group select - Year 4 of 4	$526,181	unknown
Year 5	Essential Project #1 Road Decommissioning	$16,000	unknown

Estimated Load Reductions

Centerfire Creek is listed as not meeting state water quality standards for nutrients/eutrophication, sedimentation/siltation, specific conductance, temperature, and turbidity. The entire Headwaters Centerfire Creek 6th code watershed drains into this listed reach. Load reductions into Centerfire Creek as a result of implementing essential projects in the Headwaters Centerfire Creek watershed are estimated in Tables 63 and 64. Projects that would improve these water quality parameters are those that were modeled for load reductions. These include road decommissioning, road improvements, road/stream crossing improvements, diversion improvements, erosion control/watershed stabilization projects, campground improvements, stream and riparian restoration, and exclusion fencing.

NOTE: Projected load reductions for both Headwaters Centerfire Creek and Outlet Centerfire Creek were calculated together and the results are found below:

Load reductions related to road projects were estimated using the Forest Service's Watershed Erosion Prediction Project (WEPP): Road model. Streambank stabilization and sediment/nutrient loading was estimated with the EPA Region 5 sediment and nutrient reduction model.

Table 63. WEPP Road Model Estimated Load Reductions – Headwaters and Outlet Centerfire Creek 6th Code Watersheds						
Project	Estimated Current Road Prism Erosion	Estimated Current Sediment Leaving Buffer	Estimated Target Road Prism Erosion (tons)	Estimated Target Sediment Leaving Buffer	Estimated Load Reduction From Road Prism	Estimated Load Reduction of Sediment Leaving Buffer
	50 – Year Mean Annual Averages					
Road decommissioning (18 miles)	235 tons	36 tons	190 tons	29 tons	45 tons (19% decrease)	7 tons (19% decrease)

Table 64. R5 Model Results for Sediment and Nutrient Reductions – Headwaters and Outlet Centerfire Creek 6th Code Watersheds							
Stream restoration and riparian improvement (San Francisco River and Stone Creek)	Linear feet treated	Bank height (ft)	Lateral recession (ft/yr)	% BMP efficiency	Sediment reduced (tons/yr)	Phosphorus reduced (lbs/yr)	Nitrogen reduced (lbs/yr)
Bank 1	2,500	1.5	0.5	85%	59.8	68.7	137.5
Bank 2	2,500	1.5	0.5	85%	59.8	68.7	137.5

Outlet Centerfire Creek – Gila National Forest

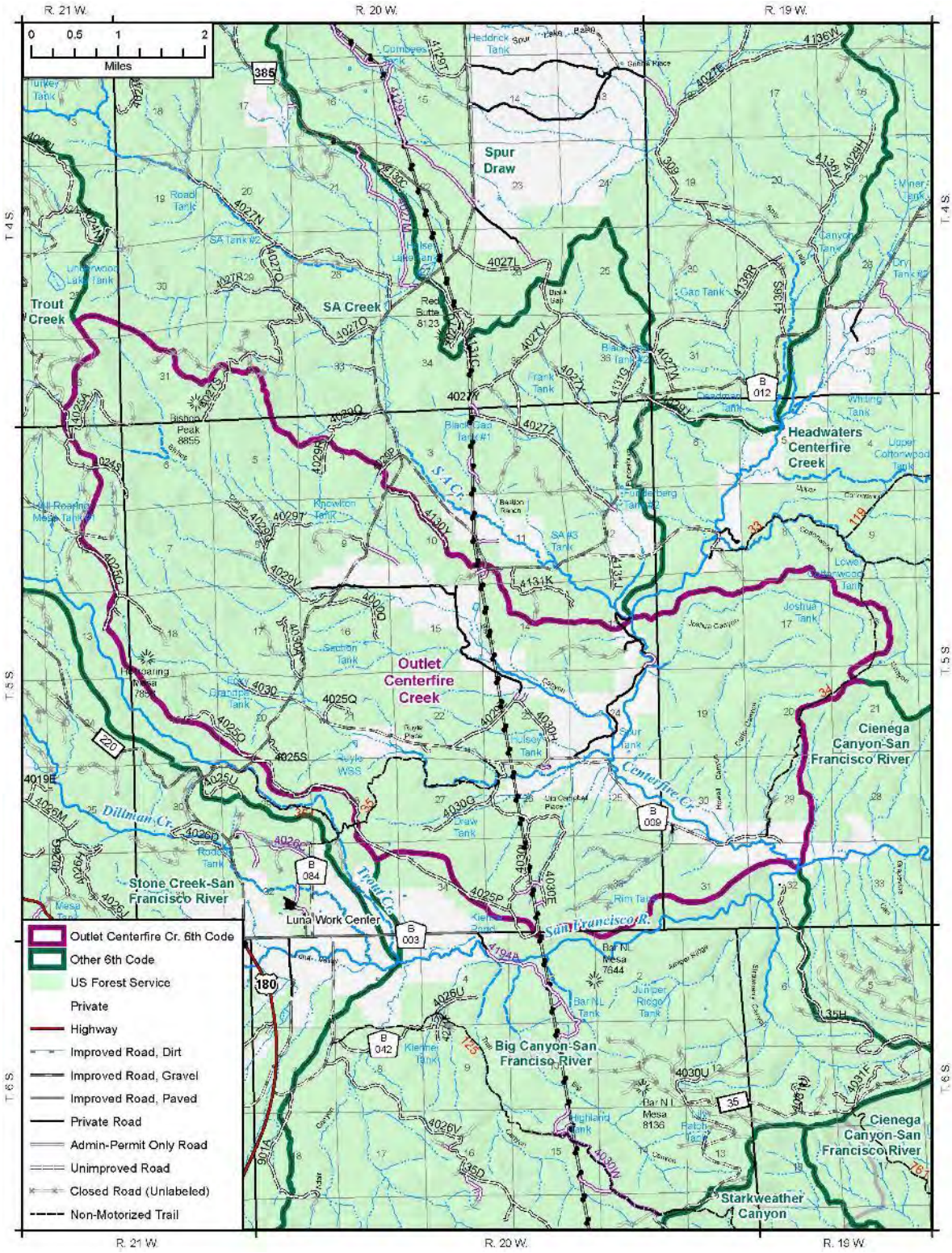

Figure 24. Outlet Centerfire Creek 6th Code Watershed

Current Rating = Impaired = 2.3
Initial Target Rating = Functioning at Risk
Final Target Rating = Properly Functioning

Specific Project Activities

The following list of projects includes those identified to improve and, ultimately maintain watershed conditions. Not all projects are deemed necessary to move the watershed upwards to an improved condition class. Implementation and completion of Essential Projects 1 - 3 are required to move the watershed from Impaired to Functioning at Risk. Projects 3 – 4 address other important landscape restoration objectives and are considered complimentary restoration projects. These projects will assist in improving and/or maintaining overall watershed conditions and ensure that it does not regress back into the Functioning at Risk state.

Essential Projects

1. **Essential Project #1 – Road Decommissioning**
   a. Attribute/ Indicator Addressed – Roads and Trails
   b. Project Description: This project will focus on decommissioning roads identified in Luna Landscape Planning. In this watershed, there are approximately 8 miles of road identified. Current decommissioning costs are approximately $1,500/mile. Decommissioning of a road involves reestablishing vegetation, and if necessary, initiating restoration of ecological processes interrupted or adversely impacted by the unneeded road. Treatments include one or more of the following treatments: Reestablishing former drainage patterns, stabilizing slopes, and restoring vegetation; Blocking the entrance to a road or installing water bars; Removing culverts, reestablishing drainages, removing unstable fills, pulling back road shoulders, and scattering slash on the roadbed; Completely eliminating the roadbed by restoring natural contours and slopes; and other methods designed to meet the specific conditions associated with the unneeded road.
   c. Partners Involvement: Various partners have expressed interest in partnering in this effort, including New Mexico Environment Department and Wild Earth Guardians
   d. Timeline: TBD based on funding and prioritization of 12 watersheds; Decommissioning of roads without fuels treatments can be completed in one fiscal year; roads with planned fuels treatments can be decommissioned immediately following treatment.
   e. Estimated costs and associated Budget Line Item = Estimated costs include the costs of reseeding, reshaping, labor, heavy equipment transport, per diem, barrier, imported aggregate, and archaeological review (if necessary). $12,500/CMRD/NFVW, NFWF, CMLG with monitoring

2. **Essential Project #2 – Road Improvement**
   a. Attribute/ Indicator Addressed – Roads and Trails
   b. Project Description: This project will focus on heavy road maintenance and improving best management practices for road drainage on Maintenance Level 2 and 3 roads within the watershed. BMPs will include improvement of lead out ditches, road dips, and inlet and outlet features of culverts and road/stream crossings. Heavy road maintenance may involve some level of reconstruction of existing road beds to reestablish a safe and last driving surface with the intent of minimizing sediment movement off of the road. Currently there are 37 miles of Maintenance Level 2 and 3 roads within the watershed. This project assumes that 40% of roads in the watershed need some degree of maintenance ranging from light to heavy.
   c. Partners Involvement: Catron County

d. Timeline: TBD based on funding; can be completed in one fiscal year
e. Estimated costs and associated Budget Line Item = $22,500/ CMRD/NFVW, NFWF, CMLG; Based on an estimate of $1,500/mile for road maintenance, which may include reshaping, heavy equipment transport, per diem, culvert replacement, and archaeological review (if necessary).

3. Essential Project #3 – Erosion Control Structures

a. Attribute/Indicator Addressed – Water Quality
b. Project Description: This project will focus on new construction of 12 erosion control structures. Work will include heavy equipment cleanout of the sediment structures where needed or reconstruction/expansion of dams to preclude current and future gullying and sediment movement. Certified weed-free seeding will be required at sites requiring reconstruction. Inventory and survey work will be necessary prior to beginning this project to establish necessary site design.
c. Partners Involvement: New Mexico Environment Department
d. Timeline: TBD based on funding
e. Estimated Costs and associated Budget Line Item: Ranges from $86,500- $146,500/NFVW; Costs are based on the following assumptions: $5,000/structure if utilize Forest Construction and Maintenance crew; $10,000/structure if utilize contract labor.

Complimentary Restoration Projects

4. Project #4 – Forest Vegetation Improvement – Thinning

c. Attribute/ Indicator Addressed – Fire Regime
d. Project Description: This project will focus on woodland and forest maintenance and restoration treatments where identified across the watershed. Treatments of vegetation will be accomplished by hand, mechanized, and/or herbicide treatment. In forested systems, activities would include thinning and group selections (e.g. creating 1-4 acre openings) to encourage regeneration of trees. Woodland areas include pinyon juniper and pinyon pine, while forested areas refer to ponderosa pine and mixed conifer. Specific silviculture prescriptions will be written for treatment units based on desired future conditions for the unit and area. Treatment units may be planned across watershed boundaries, thus this project will be implemented over multiple years, as the treatment units are prepared. More than one watershed within the Escudilla Planning Area may receive treatment in a single year, however acreages may be limited. Thinning within this project area includes both group select (3,727 acres) and improvement (3,652 acres) thinning. A total of 7,379 acres of thinning are planned within this watershed.
e. Partners Involvement: New Mexico Environment Department (State Forestry)
f. Timeline: TBD based on funding; this is a multiple year project. Budget constraints and treatment boundaries will greatly limit the amount of acres treated in a single year within a watershed.
g. Estimated costs and associated Budget Line Item = $3,238,625/WFHF/NFTM, NFVW, NFWF; Costs are based on the following assumptions: pre-commercial thinning ≈$300/acre with limited piling; logging ≈ $125/acre (anticipate IRTC-good for services-thus reducing costs); Prep costs ≈ $100/acre for mark and cruise with crew of 6. Costs also include herbicide treatment of 20% of group selection acres @ $250/acre.

5. Project #5 – Forest Vegetation Improvement – Prescribed Fire

a. Attribute/ Indicator Addressed – Fire Regime
b. Project Description: This project would use prescribed fire to maintain and/or reduce fuel loadings. Prescribed fire can be implemented prior and after proposed vegetation treatments. Treatment units may be planned across watershed boundaries, thus this project will be implemented over multiple years, as the treatment units are prepared. More than one watershed within the Escudilla Planning

Area may receive treatment in a single year, however acreages may be limited. A total of 1,173 acres are planned for prescribed fire in this watershed.

c. Partners Involvement: New Mexico Department of Game and Fish, Rocky Mountain Elk Foundation.
d. Timeline: TBD based on funding; this is a multiple year project based on budget constraints, burning units, burning limitations, and mitigation of cumulative impacts to natural and cultural resources.
e. Estimated costs and associated Budget Line Item = GNF – Costs range from $59,150-$94,340 /WFHF/NFWF, NFVW; Costs are based on the following assumptions: burning with helicopter ≈ $80/acres; burning without helicopter ≈ $50/acre.

Costs

Table 65. Outlet Centerfire Creek Costs

Outlet Centerfire Creek							
Essential Projects	**Planning & Design**	**# Units**	**Cost / Unit**		**Implementation**	**Project Monitoring**	**Project Totals**
ESSENTIAL PROJECTS							
#1 Road Decommissioning							
FS Contribution GNF	$ -	8 miles	$1,500/mile		$ 12,000	$ 500	$ 12,500
Partner Contribution (both in kind and $)	$ -	n/a	n/a		$ -	$ -	$ -
Funding already obtained	$ -	n/a	n/a		$ -	$ -	$ -
Total	***$ -***	***miles***	***$1,500/mile***		***$ 12,000***	***$ 500***	***$ 12,500***
#2 Road Improvement							
FS Contribution GNF	$ -	15 miles	$1,500/mile		$ 22,500	$ -	$ 22,500
Partner Contribution (both in kind and $)	$ -	n/a	n/a		$ -	$ -	$ -
Funding already obtained	$ -	n/a	n/a		$ -	$ -	$ -
Total	***$ -***	***miles***	***$1,500/mile***		***$ 22,500***	***$ -***	***$ 22,500***
#3 Erosion Control Structures							
FS Contribution GNF	$ 25,000	12 new structures	5000	IH	$ 60,000	$ 1,500	$ 86,500
			10000	C	$ 120,000		$ 146,500
Partner Contribution (both in kind and $)	$ -	n/a	n/a		$ -	$ -	$ -
Funding already obtained	$ -	n/a	n/a		$ -	$ -	$ -
Total	***$ 25,000***	***12 new structures***	***$5,000 inhouse; $10,000 contract***		***$ 60,000*** ***$ 120,000***	***$ 1,500***	***$ 86,500*** ***$ 146,500***
Forest Service Totals	***$ 25,000***	***n/a***	***n/a***		***$ 94,500*** ***$ 154,500***	***$ 2,000***	***$ 121,500*** ***$ 181,500***
Partner Contribution Totals	***$ -***	***n/a***	***n/a***		***$ -***	***$ -***	***$ -***

Funding already obtained		***$ -***	***n/a***	***n/a***	***$ -***	***$ -***	***$ -***
Grand Totals		***$ 25,000***	***n/a***	***n/a***	***$ 94,500***	***$ 2,000***	***$ 121,500***
					$ 154,500		***$ 181,500***
COMPLIMENTARY RESTORATION PROJECTS							
#4 Forest Vegetation Improvement/Thinning							
FS Contribution GNF	Group selection	$ 186,350	3,727 acres	$525/acre (includes precom, pile logging/prep)	$ 1,956,675	$ -	$2,143,025
	Improvement	$ -	3,652 acres	$300/acre (precomm only)	$ 1,095,600	$ -	$1,095,600
Partner Contribution (both in kind and $)		$ -	n/a	n/a	$ -	$ -	$ -
Funding already obtained		$ -	n/a	n/a	$ -	$ -	$ -
Total		***$ 186,350***	***7,379 acres***	***n/a***	***$ 3,052,275***	***$ -***	***$3,238,625***
#5 Forest Vegetation Improvement/ Prescribed Fire							
FS Contribution – GNF		$ -	1,173 acres	$50	$ 58,650	$ 500	$ 59,150
				$80 heli	$ 93,840		$ 94,340
Partner Contribution (both in kind and $)		$ -	n/a	n/a	$ -	$ -	$ -
Funding already obtained		$ -	n/a	n/a	$ -	$ -	$ -
Total		***$ -***	***1,173 acres***		***$ 58,650***	***$ 500***	***$ 59,150***
					$ 93,840		***$ 94,340***
Forest Service Totals		***$ 186,350***	***n/a***	***n/a***	***$ 3,110,925***	***$ 500***	***$3,297,775***
					$ 3,146,115		***$3,332,965***
Partner Contribution Totals		***$ -***	***n/a***	***n/a***	***$ -***	***$ -***	***$ -***
Funding already obtained		***$ -***	***n/a***	***n/a***	***$ -***	***$ -***	***$ -***
Grand Totals		***$ -***	***n/a***	***n/a***	***$ 3,110,925***	***$ 500***	***$3,111,425***
					$ 3,146,115		***$3,146,615***

Timelines and Project Scheduling

By fiscal year, list Tasks necessary to complete project (e.g. planning, design, permitting, implementation) and the expected contribution by the responsible party (FS or Partner).

Completion of these tasks is contingent on securing necessary funding.

Table 66. Outlet Centerfire Creek Timelines and Project Scheduling

Outlet Centerfire Creek			
FY - TBD	**Task**	**FS Cost GNF (rounded)**	**Partner cost**
Year 1	Essential Project #2 – Road Maintenance	$22,500	unknown
Year 1	Essential Project #3 – Erosion Control Structures	$146,500	unknown
Year 1	Complimentary Restoration Project #4 – Forest Vegetation Improvement – Thinning – 1,242 acres (group select) – Year 1 of 3	$715,000	unknown
Year 1	Complimentary Restoration Project #4 – Forest Vegetation Improvement – Thinning – 521 acres (improvement) – Year 1 of 7	$157,000	unknown
Year 1	Complimentary Restoration Project #5 – Forest Vegetation Improvement – Prescribed Fire	$94,500	unknown
Year 2	Complimentary Restoration Project #4 – Forest Vegetation Improvement – Thinning – 1,242 acres (group select) – Year 2 of 3	$715,000	unknown
Year 2	Complimentary Restoration Project #4 – Forest Vegetation Improvement – Thinning – 521 acres (improvement) – Year 2 of 7	$157,000	unknown
Year 3	Complimentary Restoration Project #4 – Forest Vegetation Improvement – Thinning – 1,242 acres (group select)– Year 3 of 3	$715,000	unknown
Year 3	Complimentary Restoration Project #4 – Forest Vegetation Improvement – Thinning – 521 acres (improvement) – Year 3 of 7	$157,000	unknown
Year 4	Complimentary Restoration Project #4 – Forest Vegetation Improvement – Thinning – 521 acres (improvement)– Year 4 of 7	$157,000	unknown
Year 5	Complimentary Restoration Project #4 – Forest Vegetation Improvement – Thinning – 521 acres (improvement)– Year 5 of 7	$157,000	unknown
Year 6	Complimentary Restoration Project #4 – Forest Vegetation Improvement – Thinning – 521 acres (improvement) – Year 6 of 7	$157,000	unknown
Year 7	Complimentary Restoration Project #4 – Forest Vegetation Improvement – Thinning – 521 acres (improvement) – Year 7 of 7	$157,000	unknown
Year 8	Essential Project #1 – Road Decommissioning	$12,500	unknown

Estimated Load Reductions

Centerfire Creek is listed as not meeting state water quality standards for nutrients/eutrophication, sedimentation/siltation, specific conductance, temperature, and turbidity. The entire Outlet Centerfire Creek 6th code watershed drains into this listed reach. Load reductions into Centerfire Creek as a result of implementing essential projects in the Outlet Centerfire Creek watershed were estimated and combined with Headwaters Centerfire Creek and are found in Tables 63 and 64 above.

Spur Draw – Gila National Forest

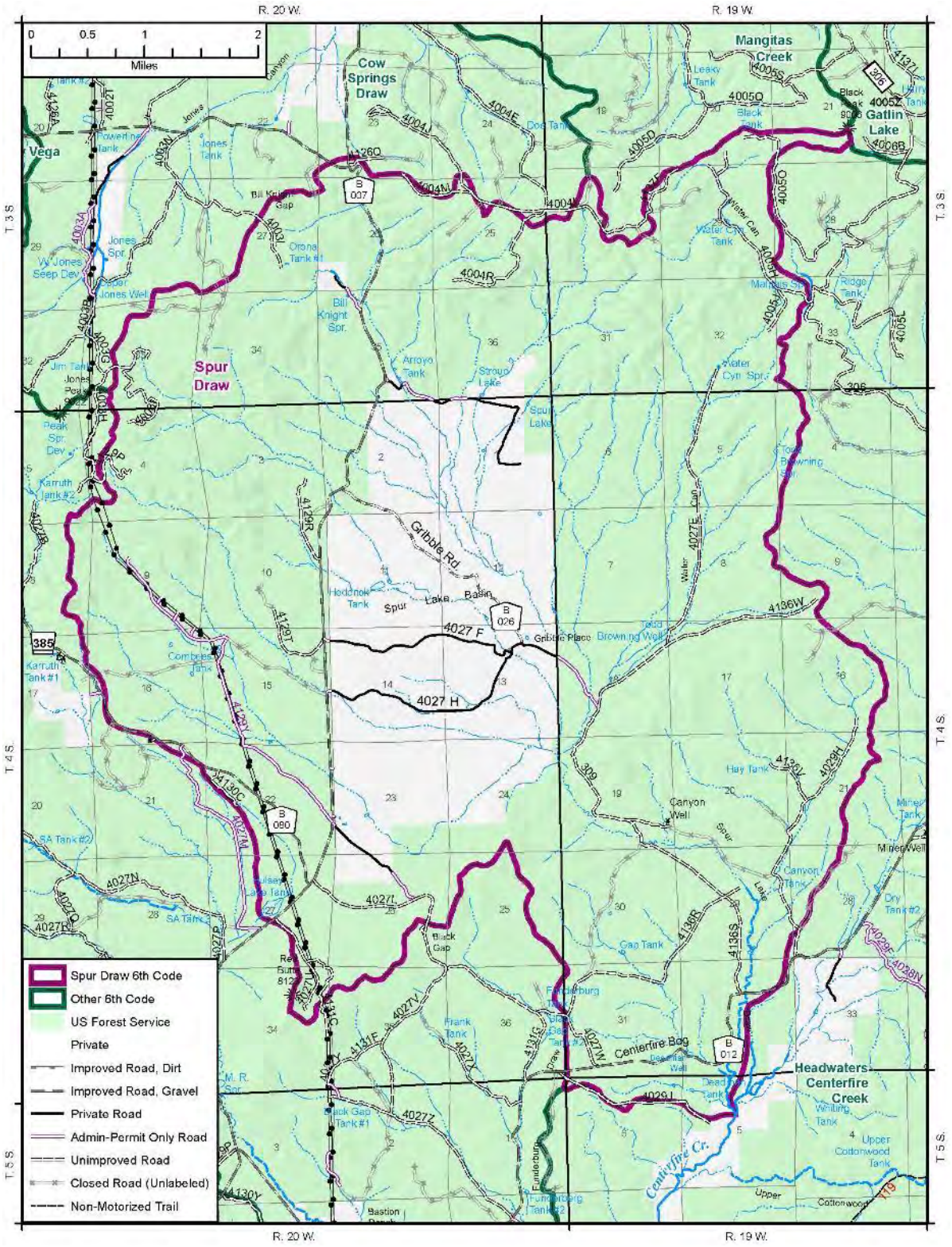

Figure 25. Spur Draw 6th Code Watershed

Current Rating = Functioning at Risk = 1.9
Target Rating = Properly Functioning

Specific Project Activities

The following list of projects includes those identified to improve and, ultimately maintain watershed conditions. Not all projects are deemed necessary to move the watershed upwards to an improved condition class. Implementation and completion of Essential Projects 1 - 6 are required to move the watershed from Functioning at Risk to Properly Functioning. Projects 7 – 8 address other important landscape restoration objectives and are considered complimentary restoration projects. These projects will assist in improving and/or maintaining overall watershed conditions and ensure that it does not regress back into the Functioning at Risk state.

Essential Projects

1. **Essential Project #1 – Road Decommissioning**
   a. Attribute/ Indicator Addressed – Roads and Trails
   b. Project Description: This project will focus on decommissioning roads identified in Luna Landscape Planning. In this watershed, there has been approximately 8 miles of road identified. Current decommissioning costs are approximately $1,500/mile. Decommissioning of a road involves reestablishing vegetation, and if necessary, initiating restoration of ecological processes interrupted or adversely impacted by the unneeded road. Treatments include one or more of the following treatments: Reestablishing former drainage patterns, stabilizing slopes, and restoring vegetation; Blocking the entrance to a road or installing water bars; Removing culverts, reestablishing drainages, removing unstable fills, pulling back road shoulders, and scattering slash on the roadbed; Completely eliminating the roadbed by restoring natural contours and slopes; and Other methods designed to meet the specific conditions associated with the unneeded road
   c. Partners Involvement: Various partners have expressed interest in partnering in this effort, including New Mexico Environment Department and Wild Earth Guardians
   d. Timeline: TBD based on funding and prioritization of 12 watersheds; Decommissioning of roads without fuels treatments can be completed in one fiscal year; roads with planned fuels treatments can be decommissioned immediately following treatment.
   e. Estimated costs and associated Budget Line Item: $12,500/CMRD, NFVW, NFWF, CMLG; Estimated costs include the costs of reseeding, reshaping, labor, heavy equipment transport, per diem, barrier, imported aggregate, and archaeological review (if necessary), including monitoring.

2. **Essential Project #2 – Road Improvement**
   a. Attribute/ Indicator Addressed – Roads and Trails
   b. Project Description: This project will focus on heavy road maintenance and improving best management practices for road drainage on Maintenance Level 2 and 3 roads within the watershed. BMPs will include improvement of lead out ditches, road dips, and inlet and outlet features of culverts and road/stream crossings. Heavy road maintenance may involve some level of reconstruction of existing road beds to reestablish a safe and last driving surface with the intent of minimizing sediment movement off of the road. Currently there are approximately 43.5 miles of Maintenance Level 2 and 3 roads within the watershed. This project assumes that 40% of roads in the watershed need some degree of maintenance ranging from light to heavy.
   c. Partners Involvement: Catron County
   d. Timeline: TBD based on funding; can be completed in one fiscal year

e. Estimated costs and associated Budget Line Item = $26,250/ CMRD, NFVW, NFWF, CMLG; Based on an estimate of $1,500/mile for road maintenance. Estimated costs may include reshaping, labor, heavy equipment transport, per diem, imported aggregate, and archaeological review (if necessary)

3. **Essential Project #3 – Erosion Control Structures**
   a. Attribute/Indicator Addressed – Water Quality
   b. Project Description: This project will focus on the construction of 15 new erosion control structures and the maintenance and/or reconstruction of 39 existing erosion control structures located across the watershed. These structures were originally implemented in the 1980s to impede and prevent ongoing erosion and gullying across the watershed in various drainages and swales. None of these structures have received maintenance over the last several decades and are currently in various stages of disrepair. Some structures have filled completely in and no longer serve to back up sediment. Others have breaches in the dams and are experiencing active headcutting, while others have water bypassing the structure, creating new erosion issues. Work will include heavy equipment cleanout of the sediment structures where needed or reconstruction/expansion of dams to preclude current and future gullying and sediment movement. Certified weed-free seeding will be required at sites requiring reconstruction. Inventory and survey work will be necessary prior to beginning this project to establish necessary site design.
   c. Partners Involvement: New Mexico Environment Department
   d. Timeline: TBD based on funding
   e. Estimated Costs and associated Budget Line Item: Costs range from $127,500 - $225,000/NFVW/NFWF/CMRD; Costs are based on the following assumptions: maintenance → $2,500/structure if utilize Forest Construction and Maintenance crew; $5,000/structure if utilize contract labor.

4. **Essential Project #4 – Spur Draw Watershed Stabilization**
   a. Attribute/ Indicator Addressed – Water Quality, Water Quantity, Riparian/Wetland Condition, Soils, Rangeland Vegetation
   b. Project Description: This project will focus on erosion control in 200 acres of severely degraded uplands immediately adjacent to an intermittent reach of Spur Draw and County Road B25. Multiple grade/erosion control structures will be constructed/reconstructed in this area, both in the uplands and in the channel bottom where necessary. Bank stabilization techniques will be employed along the intermittent reach of Spur Draw to encourage herbaceous revegetation. Rangeland seeding will be incorporated in the uplands within the 200 acres to facilitate recovery of herbaceous ground cover. Both woody and herbaceous plants will be planted to facilitate recovery of riparian resources and to contribute to bank stabilization.
   c. Partners Involvement: NMED
   d. Timeline: TBD based on funding; This project can be completed in one year
   e. Estimated costs and associated Budget Line Item: $275,500 - $350,500 NFVW/CMRD/NFWF/NFRG; These costs are based on heavy equipment rental and transport, imported aggregate, per diem, labor, design, seed, plants, filter fabric, and other necessary supplies.

5. **Essential Project #5 – Spur Basin Watershed Protection Fence**
   a. Attribute/ Indicator Addressed – Water Quality, Water Quantity, Riparian/Wetland Condition, Soils, Rangeland Vegetation
   b. Project Description: This project will focus on fencing Essential Project #4; Fencing is planned for the 200 acres (3 miles) of watershed/riparian restoration work to protect it from ungulate grazing to facilitate recovery of upland and riparian herbaceous species and woody riparian species.

c. Partners Involvement: NMED
d. Timeline: TBD based on funding; this project can be completed in one year.
e. Estimated costs and associated Budget Line Item: $75,000/NFVW/NFWF or NFRG;

6. **Essential Project #6 – Spur Draw/County Road B25 Crossing**
   a. Attribute/ Indicator Addressed – Roads and Trails; Impaired Waters; Water Quantity, Riparian/Wetland Vegetation
   b. Project Description: This project will focus on redesign of an existing water crossing on County Road B25. This road currently passes water with one undersized culvert. Design would consist of multiple raised culverts to slow the flow through the road and help restore wetland features to Spur Draw at this location. The current inadequate crossing design has resulted in headcutting in Spur Draw and dewatering of the local reach.
   c. Partners Involvement: NMED
   d. Timeline: TBD based on funding; this project can be completed in one year.
   e. Estimated costs and associated Budget Line Item: $105,000/NFVW/CMRD/Catron County/NMED; Costs are based on survey and evaluation, design, and implementation.

Complimentary Restoration Projects

7. **Project #7 – Forest Vegetation Improvement – Thinning**
   a. Attribute/ Indicator Addressed – Fire Regime
   b. Project Description: This project will focus on woodland and forest maintenance and restoration treatments where identified across the watershed. Treatment of vegetation will be accomplished by hand, mechanized, and herbicide treatment. In forested systems, activities would include thinning and group selections (e.g. creating 1-4 acre openings) to encourage regeneration of trees. Woodland areas include pinyon juniper and pinyon pine, while forested areas refer to ponderosa pine and mixed conifer. Specific silviculture prescriptions will be written for treatment units based on desired future conditions for the unit and area. Treatment units may be planned across watershed boundaries, thus this project will be implemented over multiple years, as the treatment units are prepared. More than one watershed within the Escudilla Planning Area may receive treatment in a single year, however acreages may be limited. Thinning within this project area includes both group select and improvement thinning. Thinning within this project area includes both group select (2,479 acres) and improvement (1,326 acres) thinning. A total of 3,805 acres of thinning are planned within this watershed.
   c. Partners Involvement: New Mexico Environment Department
   d. Timeline: TBD based on funding; this is a multiple year project. Budget constraints and treatment boundaries will greatly limit the amount of acres treated in a single year within a watershed.
   h. Estimated costs and associated Budget Line Item = $1,699,275/WFHF/NFTM/NFVW; Costs are based on the following assumptions: pre-commercial thinning ≈ $300/acre with limited piling; logging ≈ $125/acre (anticipate IRTC-good for services-thus reducing costs); Prep costs ≈ $100/acre for mark and cruise with crew of 6. Costs also include herbicide treatment of 20% of group selection acres @ $250/acre.
   e.

8. **Project #8 – Forest Vegetation Improvement – Prescribed Fire**
   a. Attribute/ Indicator Addressed – Fire Regime
   b. Project Description: This project would use prescribed fire to maintain and/or reduce fuel loadings. Prescribed fire can be implemented prior and after proposed vegetation treatments. Treatment units may be planned across watershed boundaries, thus this project will be implemented over multiple

years, as the treatment units are prepared. More than one watershed within the Escudilla Planning Area may receive treatment in a single year, however acreages may be limited. A total of 2,801 acres of prescribed fire are planned within this watershed.

c. Partners Involvement: New Mexico Department of Game and Fish, Rocky Mountain Elk Foundation.
d. Timeline: TBD based on funding; this is a multiple year project based on budget constraints, burning units, burning limitations, and mitigation of cumulative impacts to natural and cultural resources.
e. Estimated costs and associated Budget Line Item = $140,550 – $224,580/WFHF/NFVW/NFWF; Costs are based on the following assumptions: burning with helicopter ≈ $80/acres; burning without helicopter ≈ $50/acre.

Costs

Table 67. Spur Draw Costs

Spur Draw								
Essential Projects		**Planning & Design**	**# Units**	**Cost / Unit**		**Implementation**	**Project Monitoring**	**Project Totals**
ESSENTIAL PROJECTS								
#1 Road Decommissioning								
FS Contribution GNF		$ -	8 miles	$1,500/mile		$ 12,000	$ 500	$ 12,500
Partner Contribution (both in kind and $)		$ -	n/a	$1,500/mile		$ -	$ -	$ -
Funding already obtained		$ -	n/a	$1,500/mile		$ -	$ -	$ -
Total		$ -	8 miles			$ 12,000	$ 500	$ 12,500
#2 Road Improvement								
FS Contribution GNF		$ -	17.5 miles	$1,500/mile		$ 26,250	$ -	$ 26,250
Partner Contribution (both in kind and $)		$ -	n/a	$1,500/mile		$ -	$ -	$ -
Funding already obtained		$ -	n/a	$1,500/mile		$ -	$ -	$ -
Total		$ -	miles	$1,500/mile		$ 26,250	$ -	$ 26,250
#3 Erosion Control Structures								
FS Contribution GNF	maintenance	$ 25,000	39 structures	$2,500	IH	$ 97,500	$ 5,000	$127,500
				$5,000	C	$ 195,000		$225,000
Partner Contribution (both in kind and $)		$ -	n/a	n/a		$ -	$ -	$ -
Funding already obtained		$ -	n/a	n/a		$ -	$ -	$ -
Total		$ 25,000	miles	n/a		$ 97,500	$ 5,000	$127,500
						$ 195,000		$225,000
#4 Spur Draw Watershed Stabilization								
FS Contribution GNF	new construction	$ 25,000	15 structures	$5,000	IH	$ 75,000	$ 5,000	$105,000
				$10,000	C	$ 150,000		$180,000

	bank stabilization	$ 25,000	4 miles	$30,000/mile	$ 120,000	$ 5,000	$150,000
	seeding	$ -	200 acres	$100/acre	$ 20,000	$ 500	$ 20,500
Partner Contribution (both in kind and $)		$ -	n/a	n/a	$ -	$ -	$ -
Funding already obtained		$ -	n/a	n/a	$ -	$ -	$ -
Total		$ 50,000	miles	$1,500	$ 215,000	$ 10,500	$275,500
					$ 290,000		$350,500
#5 Spur Basin Watershed Protection Fence							
FS Contribution GNF		$ -	3 miles	$25,000/mile	$ 75,000	$ -	$ 75,000
Partner Contribution (both in kind and $)		$ -	n/a	$25,000/mile	$ -	$ -	$ -
Funding already obtained		$ -	n/a	$25,000/mile	$ -	$ -	$ -
Total		$ -	miles	$25,000/mile	$ 75,000	$ -	$ 75,000
#6 Spur Draw/County Road B25 Crossing							
FS Contribution GNF		$ 25,000	1 crossing	n/a	$ 80,000	$ -	$105,000
Partner Contribution (both in kind and $)		$ -	n/a	n/a	$ -	$ -	$ -
Funding already obtained		$ -	n/a	n/a	$ -	$ -	$ -
Total		$ 25,000	1 crossing	n/a	$ 80,000	$ -	$105,000
Forest Service Totals		**$100,000**	**n/a**	**n/a**	**$ 505,750**	**$ 16,000**	**$621,750**
					$ 678,250		**$794,250**
Partner Contribution Totals		**$ -**	**n/a**	**n/a**	**$ -**	**$ -**	**$ -**
Funding already obtained		**$ -**	**n/a**	**n/a**	**$ -**	**$ -**	**$ -**
Grand Totals		**$100,000**	**n/a**	**n/a**	**$ 505,750**	**$ 16,000**	**$621,750**
					$ 678,250		**$794,250**
COMPLIMENTARY RESTORATION PROJECTS							
#7 Forest Vegetation Improvement/Thinning							
FS Contribution GNF	Group selection	$ 124	2,479 acres	$525 (includes precom, pile logging/prep)	$ 1,301,475	$ -	$1,301,475
	Improvement	$ -	1,326 acres	$300 (pre comm only)	$ 397,800	$ -	$ 397,800
Partner Contribution (both in kind and $)		$ -	n/a	n/a	$ -	$ -	$ -
Funding already obtained		$ -	n/a	n/a	$ -	$ -	$ -
Total		$ -	3,805 acres	n/a	$ 1,699,275	$ -	$1,699,275
#8 Forest Vegetation Improvement/ Prescribed Fire							
FS Contribution – GNF		$ -	2,801 acres	$50 / acre	$ 140,050	$ 500	$ 140,550
				$80 / acre	$ 224,080		$ 224,580
Partner Contribution (both in kind and $)		$ -	n/a	n/a	$ -	$ -	$ -

Funding already obtained	$ -	n/a	n/a	$ -	$ -	$ -
Total	$ -	2,801 acres	$50 / acre	$ 140,050	$ 500	$ 140,550
			$80 / acre (heli)	$ 224,080		$ 224,580
Forest Service Totals	**$ -**	**n/a**	**n/a**	**$ 1,839,325**	**$ 500**	**$1,839,825**
				$ 1,923,355		**$1,923,855**
Partner Contribution Totals	**$ -**	**n/a**	**n/a**	**$ -**	**$ -**	**$ -**
Funding already obtained	**$ -**	**n/a**	**n/a**	**$ -**	**$ -**	**$ -**
Grand Totals	**$ -**	**n/a**	**n/a**	**$ 1,839,325**	**$ 500**	**$1,839,825**
				$ 1,923,355		**$1,923,855**

Timelines and Project Scheduling

By fiscal year, list Tasks necessary to complete project (e.g. planning, design, permitting, implementation) and the expected contribution by the responsible party (FS or Partner).

Completion of these tasks is contingent on securing necessary funding.

Table 68. Spur Draw Timelines and Project Scheduling

Spur Draw			
FY TBD	**Task**	**FS Cost GNF (rounded)**	**Partner cost**
Year 1	Essential Project #2 Road Maintenance	$27,000	unknown
Year 1	Essential Project #3 Erosion control structures – Year 1 of 2	$112,000	unknown
Year 1	Complimentary Restoration Project #8 Forest Vegetation Improvement – Prescribed Fire	$225,000	unknown
Year 1	Complimentary Restoration Project #7 Forest Vegetation Improvement – group select – 1,239 acres – Year 1 of 2	$651,000	unknown
Year 1	Complimentary Restoration Project #7 Forest Vegetation Improvement – improvement – 663 acres – Year 1 of 2	$199,000	unknown
Year 2	Essential Project #3 Erosion control structures – Year 2 of 2	$112,000	unknown
Year 2	Essential Project #5 Spur Draw Watershed Protection Fence	$75,000	unknown
Year 2	Complimentary Restoration Project #7 Forest Vegetation Improvement – group select – 1,239 acres – Year 2 of 2	$651,000	unknown
Year 2	Complimentary Restoration Project #7 Forest Vegetation Improvement – improvement – 663 acres – Year 2 of 2	$199,000	unknown
Year 3	Essential Project #4 Spur Draw Watershed Stabilization Year 1 of 2	$175,000	unknown
Year 3	Essential Project #6 Spur Draw/County Road B25 crossing	$105,000	unknown
Year 4	Essential Project #4 Spur Draw Watershed Stabilization – Year 2 of 2	$175,000	unknown
Year 5	Essential Project #1 Road Decommissioning	$13,000	unknown

Estimated Load Reductions

Centerfire Creek is listed as not meeting state water quality standards for nutrients/eutrophication, sedimentation/siltation, specific conductance, temperature, and turbidity. The entire Spur Draw 6th code watershed drains into this listed reach. Load reductions into Centerfire Creek as a result of implementing essential projects in the Spur Draw watershed are estimated in the tables below. Projects that would improve these water quality parameters are those that were modeled for load reductions. These include road decommissioning, road improvements, road/stream crossing improvements, diversion improvements, erosion control/watershed stabilization projects, campground improvements, stream and riparian restoration, and exclusion fencing.

Load reductions related to road projects were estimated using the Forest Service's Watershed Erosion Prediction Project (WEPP): Road model. The Pacific Southwest Interagency Committee (PSIAC) model was used to estimate load reductions from erosion control and rangeland seeding and fencing projects.

Table 69. WEPP Road Model Estimated Load Reductions – Spur Draw 6th Code Watershed

Project	Estimated Current Road Prism Erosion	Estimated Current Sediment Leaving Buffer	Estimated Target Road Prism Erosion (tons)	Estimated Target Sediment Leaving Buffer	Estimated Load Reduction From Road Prism	Estimated Load Reduction of Sediment Leaving Buffer
	50 – Year Mean Annual Averages					
Road decommissioning (8 miles)	95 tons	17 tons	84 tons	15 tons	11 tons (12% decrease)	2 tons (12% decrease)

Table 70. PSIAC Model Estimated Sediment Load Reductions Following seeding and fencing treatments

Factors Affecting Sediment Loading	**Before Treatment**	**After Treatment***
A. Surface Geology	3	3
B. Soils	5	5
C. Climate	7	7
D. Runoff	2	2
E. Topography	1	1
F. Ground Cover	7	-5
G. Land Use	-10	-10
H. Upland Erosion	3	3
I. Chanel Erosion/Sediment Transport	2	2
Total	20	8
Estimated Sediment Yield in ac ft./mi2/year	0.17	0.11
Sediment Load Reduction in ac ft./mi2/year	**0.06**	
Acres treated	**200**	
Sediment reduction per year in tons	**390**	

SA Creek – Gila National Forest

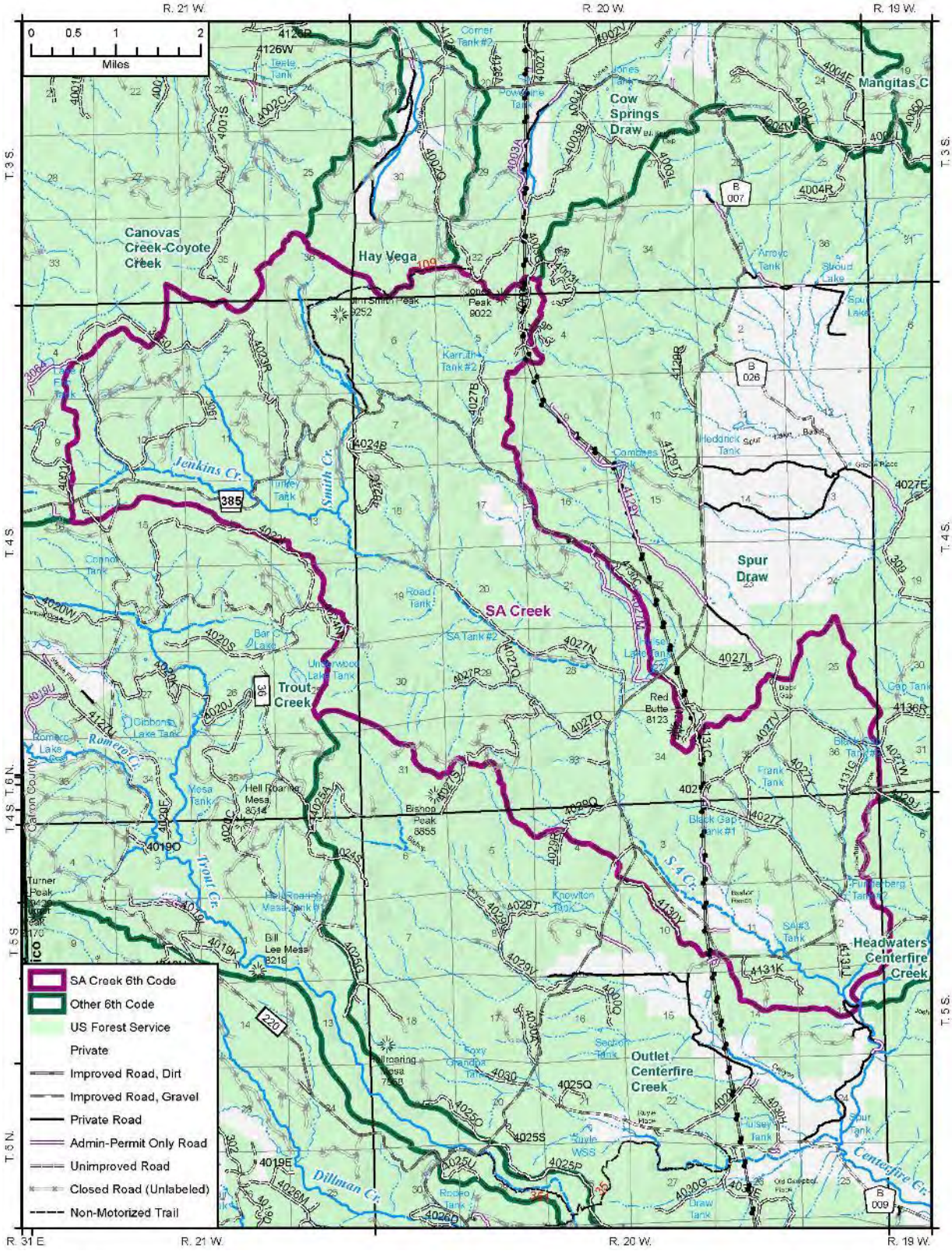

Figure 26. SA Creek 6th Code Watershed

Current Rating = Functioning at Risk = 2.0
Target Rating = Properly Functioning

Specific Project Activities

The following list of projects includes those identified to improve and, ultimately maintain watershed conditions. Not all projects are deemed necessary to move the watershed upwards to an improved condition class. Implementation and completion of Essential Projects 1 - 3 are required to move the watershed from Functioning at Risk to Properly Functioning. Projects 4 – 5 address other important landscape restoration objectives and are considered complimentary restoration projects. These projects will assist in improving and/or maintaining overall watershed conditions and ensure that it does not regress back into the Functioning at Risk state.

Essential Projects

1. **Essential Project #1 – Road Decommissioning**
   a. Attribute/ Indicator Addressed – Roads and Trails
   b. Project Description: This project will focus on decommissioning roads identified in Luna Landscape Planning. In this watershed, there are approximately 30 miles of road identified. Current decommissioning costs are approximately $1,500/mile. Decommissioning of a road involves reestablishing vegetation, and if necessary, initiating restoration of ecological processes interrupted or adversely impacted by the unneeded road. Treatments include one or more of the following treatments: Reestablishing former drainage patterns, stabilizing slopes, and restoring vegetation; Blocking the entrance to a road or installing water bars; Removing culverts, reestablishing drainages, removing unstable fills, pulling back road shoulders, and scattering slash on the roadbed; Completely eliminating the roadbed by restoring natural contours and slopes; and Other methods designed to meet the specific conditions associated with the unneeded road
   c. Partners Involvement: Various partners have expressed interest in partnering in this effort, including New Mexico Environment Department and Wild Earth Guardians
   d. Timeline: TBD based on funding and prioritization of 12 watersheds; Decommissioning of roads without fuels treatments can be completed in one fiscal year; roads with planned fuels treatments can be decommissioned immediately following treatment.
   e. Estimated costs and associated Budget Line Item: Estimated costs include the costs of reseeding, reshaping, labor, heavy equipment transport, per diem, barrier, imported aggregate, and archaeological review (if necessary). $45,500/CMRD/NFVW, NFWF, CMLG with monitoring.

2. **Essential Project #2 – Road Improvement**
   a. Attribute/ Indicator Addressed – Roads and Trails
   b. Project Description: This project will focus on heavy road maintenance and improving best management practices for road drainage on Maintenance Level 2 and 3 roads within the watershed. BMPs will include improvement of lead out ditches, road dips, and inlet and outlet features of culverts and road/stream crossings. Heavy road maintenance may involve some level of reconstruction of existing road beds to reestablish a safe and last driving surface with the intent of minimizing sediment movement off of the road. Currently there are 37 miles of Maintenance Level 2 and 3 roads within the watershed. This project assumes that 40% of roads in the watershed need some degree of maintenance ranging from light to heavy.
   c. Partners Involvement: Catron County
   d. Timeline: TBD based on funding and prioritization of 12 watersheds

e. Estimated costs and associated Budget Line Item = $22,500/CMRD/NFVW, NFWF, CMLG; Based on an estimate of $1,500/mile for road maintenance, which may include reshaping, heavy equipment transport, per diem, culvert replacement, and archaeological review (if necessary).

3. **Essential Project #3 – Erosion Control Structures**
   a. Attribute/Indicator Addressed – Water Quality
   b. Project Description: This project will focus on the maintenance and/or reconstruction of 38 existing erosion control structures. These structures were originally implemented in the 1980s to impede and prevent ongoing erosion and gullying across the watershed in various drainages and swales. None of these structures have received maintenance over the last several decades and are currently in various stages of disrepair. Some structures have filled completely in and no longer serve to back up sediment. Others have breaches in the dams and are experiencing active headcutting, while others have water bypassing the structure, creating new erosion issues. Work will include heavy equipment cleanout of the sediment structures where needed or reconstruction/expansion of dams to preclude current and future gullying and sediment movement. Certified weed-free seeding will be required at sites requiring reconstruction. Inventory and survey work will be necessary prior to beginning this project to establish necessary site design.
   c. Partners Involvement: New Mexico Environment Department
   d. Timeline: TBD based on funding
   e. Estimated Costs and associated Budget Line Item: Ranges from $121,500 - $216,500-$191,500/NFVW; Costs are based on the following assumptions: $2,500/structure if utilize Forest Construction and Maintenance crew; $5,000/structure if utilize contract labor with $25,000 for design.

Complimentary Restoration Projects

4. **Project #4 – Forest Vegetation Treatments**
   a. Attribute/ Indicator Addressed – Fire Regime
   b. Project Description: This project will focus on woodland and forest maintenance and restoration treatments where identified across the watershed. Treatment of vegetation will be accomplished by hand, mechanized, and/or herbicide treatment. In forested systems, activities would include thinning and group selections (e.g. creating 1-4 acre openings) to encourage regeneration of trees. Woodland areas include pinyon juniper and pinyon pine, while forested areas refer to ponderosa pine and mixed conifer. Specific silviculture prescriptions will be written for treatment units based on desired future conditions for the unit and area. Treatment units may be planned across watershed boundaries, thus this project will be implemented over multiple years, as the treatment units are prepared. More than one watershed within the Escudilla Planning Area may receive treatment in a single year, however acreages may be limited. Thinning within this project area includes both group select (5,549 acres) and improvement (4,182 acres) thinning. A total of 9,731 acres are planned for thinning in this watershed.
   c. Partners Involvement: New Mexico Environment Department
   d. Timeline: TBD based on funding; this is a multiple year project. Budget constraints and treatment boundaries will greatly limit the amount of acres treated in a single year within a watershed.
   h. Estimated costs and associated Budget Line Item = $4,445,325/WFHF/NFTM, NFVW, NFWF; Costs are based on the following assumptions: pre-commercial thinning ≈ $300/acre with limited piling; logging ≈ $125/acre (anticipate IRTC-good for services-thus reducing costs); Prep costs ≈ $100/acre for mark and cruise with crew of 6. Costs also include herbicide treatment of 20% of group selection acres @ $250/acre.

5. **Project #5 – Forest Vegetation Improvement – Prescribed Fire**
   a. Attribute/ Indicator Addressed – Fire Regime
   b. Project Description: This project would use prescribed fire to maintain and/or reduce fuel loadings. Prescribed fire can be implemented prior and after proposed vegetation treatments. Treatment units may be planned across watershed boundaries, thus this project will be implemented over multiple years, as the treatment units are prepared. More than one watershed within the Escudilla Planning Area may receive treatment in a single year, however acreages may be limited. A total of 1,789 acres of prescribed fire are planned in this watershed.
   c. Partners Involvement: New Mexico Department of Game and Fish, Rocky Mountain Elk Foundation.
   d. Timeline: TBD based on funding; this is a multiple year project based on budget constraints, burning units, burning limitations, and mitigation of cumulative impacts to natural and cultural resources.
   e. Estimated costs and associated Budget Line Item = $89,950 - $143,620 /WFHF/NFTM/NFVW/NFWF; Costs are based on the following assumptions: burning with helicopter ≈ $80/acres; burning without helicopter ≈ $50/acre.

Costs

Table 71. SA Creek Costs

SA Creek							
Essential Projects	**Planning & Design**	**# Units**	**Cost / Unit**		**Implementation**	**Project Monitoring**	**Project Totals**
ESSENTIAL PROJECTS							
#1 Road Decommissioning							
FS Contribution GNF	$ -	30 miles	$1,500		$ 45,000	$ 500	$ 45,500
Partner Contribution (both in kind and $)	$ -	n/a	n/a		$ -	$ -	$ -
Funding already obtained	$ -	n/a	n/a		$ -	$ -	$ -
Total	***$ -***	***30 miles***	***$1,500***		***$ 45,000***	***$ 500***	***$ 45,500***
#2 Road Improvement							
FS Contribution GNF	$ -	15 miles	$1,500		$ 22,500	$ -	$ 22,500
Partner Contribution (both in kind and $)	$ -	n/a	n/a		$ -	$ -	$ -
Funding already obtained	$ -	n/a	n/a		$ -	$ -	$ -
Total	***$ -***	***15 miles***	***$1,500***		***$ 22,500***	***$ -***	***$ 22,500***
#3 Erosion Control Structures							
FS Contribution GNF	$ 25,000	38 structures	$2,500	IH	$ 95,000	$ 1,500	$121,500
			$5,000	C	$ 190,000		$216,500
Partner Contribution (both in kind and $)	$ -	n/a	Na/		$ -	$ -	$ -
Funding already obtained	$ -	n/a	n/a		$ -	$ -	$ -
Total	***$ 25,000***				***$ 95,000***	***$ 1,500***	***$121,500***

		38 structures	***$2,500 - $5,000***	***$ 190,000***			***$216,500***
Forest Service Totals	***$ 25,000***	***n/a***	***n/a***	***$ 162,500***	***$ 2,000***		***$189,500***
				$ 257,500			***$284,500***
Partner Contribution Totals	***$ -***	***n/a***	***n/a***	***$ -***	***$ -***		***$ -***
Funding already obtained	***$ -***	***n/a***	***n/a***	***$ -***	***$ -***		***$ -***
Grand Totals	***$ -***	***n/a***	***n/a***	***$ 162,500***	***$ 2,000***		***$189,500***
				$ 257,500			***$284,500***
COMPLIMENTARY RESTORATION PROJECTS							
#4 Forest Vegetation Treatments							
FS Contribution GNF	Group selection	$ 277,500	5,549 acres	$525/acre (includes precom, pile logging/prep)	$ 2,913,225	$ -	$3,190,725
	Improvement	$ -	4,182 acres	$300/acre (precomm only)	$ 1,254,600	$ -	$1,254,600
Partner Contribution (both in kind and $)		$ -	n/a	n/a	$ -	$ -	$ -
Funding already obtained		$ -	n/a	n/a	$ -	$ -	$ -
Total		***$ 277,500***	***9,731 acres***	***n/a***	***$ 4,167,825***	***$ -***	***$4,445,325***
#5 Forest Vegetation Improvement/ Prescribed Fire							
FS Contribution – GNF		$ -	1,789 acres	$50/acre	$ 89,450	$ 500	$ 89,950
				$80/acre heli	$ 143,120		$ 143,620
Partner Contribution (both in kind and $)		$ -	n/a	n/a	$ -	$ -	$ -
Funding already obtained		$ -	n/a	n/a	$ -	$ -	$ -
Total		**$ -**	**acres**	**n/a**	**$ 89,450**	**$ 500**	**$ 89,950**
					$ 143,120		**$ 143,620**
Forest Service Totals	***$ 277,500***	***n/a***	***n/a***	***$ 4,257,275***	***$ 500***		***$4,535,275***
				$ 4,310,945			***$4,588,945***
Partner Contribution Totals	***$ -***	***n/a***	***n/a***	***$ -***	***$ -***		***$ -***
Funding already obtained	***$ -***	***n/a***	***n/a***	***$ -***	***$ -***		***$ -***
Grand Totals	***$ -***	***n/a***	***n/a***	***$ 4,257,275***	***$ 500***		***$4,257,775***
				$ 4,310,945			***$4,311,445***

Timelines and Project Scheduling

By fiscal year, list Tasks necessary to complete project (e.g. planning, design, permitting, implementation) and the expected contribution by the responsible party (FS or Partner).

Completion of these tasks is contingent on securing necessary funding.

Table 72. SA Creek Timelines and Project Scheduling

SA Creek			
FY TBD	**Task**	**FS Cost GNF (rounded)**	**Partner cost**
Year 1	Essential Project #2 – Road maintenance	$22,500	unknown
Year 1	Essential Project #3 – Erosional control structures	$216,500	unknown
Year 1	Complimentary Restoration Project # 5 – Prescribed fire	$145,000	unknown
Year 1	Complimentary Restoration Project #4 – Forest Vegetation Improvement – 1,110 acres (group select) – Year 1 of 5	$583,000	unknown
Year 1	Complimentary Restoration Project #4 – Forest Vegetation Improvement – 522 acres (improvement) – Year 1 of 8	$157,000	unknown
Year 2	Complimentary Restoration Project #4 – Forest Vegetation Improvement – 1,110 acres (group select) – Year 2 of 5	$583,000	unknown
Year 2	Complimentary Restoration Project #4 – Forest Vegetation Improvement – 522 acres (improvement) – Year 2 of 8	$157,000	unknown
Year 3	Complimentary Restoration Project #4 – Forest Vegetation Improvement – 1,110 acres (group select) – Year 3 of 5	$583,000	unknown
Year 3	Complimentary Restoration Project #4 – Forest Vegetation Improvement – 522 acres (improvement) – Year 3 of 8	$157,000	unknown
Year 4	Complimentary Restoration Project #4 – Forest Vegetation Improvement – 1,110 acres (group select) – Year 4 of 5	$583,000	unknown
Year 4	Complimentary Restoration Project #4 – Forest Vegetation Improvement – 522 acres (improvement) – Year 4 of 8	$157,000	unknown
Year 5	Complimentary Restoration Project #4 – Forest Vegetation Improvement – 1,110 acres (group select) – Year 5 of 5	$583,000	unknown
Year 5	Complimentary Restoration Project #4 – Forest Vegetation Improvement – 522 acres (improvement) – Year 5 of 8	$157,000	unknown
Year 6	Complimentary Restoration Project #4 – Forest Vegetation Improvement – 522 acres (improvement) – Year 6 of 8	$157,000	unknown
Year 7	Complimentary Restoration Project #4 – Forest Vegetation Improvement – 522 acres (improvement) – Year 7 of 8	$157,000	unknown
Year 8	Complimentary Restoration Project #4 – Forest Vegetation Improvement – 522 acres (improvement) – Year 8 of 8	$157,000	unknown
Year 9	Essential Project #1 – Road decommissioning	$46,500	unknown

Estimated Load Reductions

Centerfire Creek is listed as not meeting state water quality standards for nutrients/eutrophication, sedimentation/siltation, specific conductance, temperature, and turbidity. The entire SA Creek 6th code watershed drains into this listed reach. Load reductions into the San Francisco River as a result of implementing road decommissioning in the SA Creek watershed are estimated in Table 73. Load reductions related to road decommissioning was estimated using the Forest Service's Watershed Erosion Prediction Project (WEPP): Road model.

Table 73. WEPP Road Model Estimated Load Reductions – SA Creek 6th Code Watershed

Project	Estimated Current Road Prism Erosion	Estimated Current Sediment Leaving Buffer	Estimated Target Road Prism Erosion (tons)	Estimated Target Sediment Leaving Buffer	Estimated Load Reduction From Road Prism	Estimated Load Reduction of Sediment Leaving Buffer
	50 – Year Mean Annual Averages					
Road decommissioning (30 miles)	277 tons	43 tons	221 tons	34 tons	56 tons (20% decrease)	9 tons (21% decrease)

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Dry Blue Creek – Good Neighbor Watershed

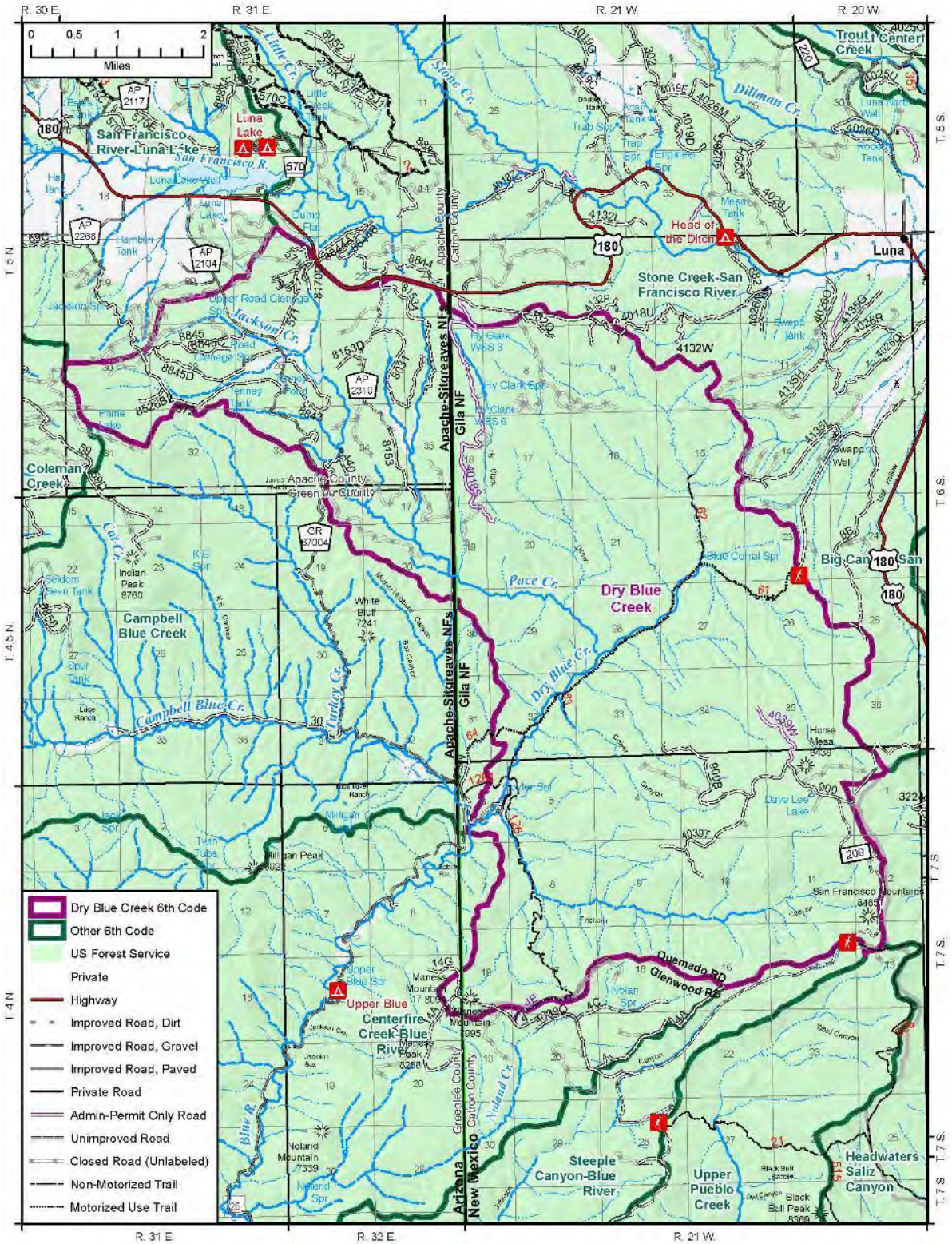

Figure 27. Dry Blue Creek 6th Code Watershed

Current Rating = Functioning at Risk = 1.9
Target Rating = Properly Functioning

Specific Project Activities

The following list of projects includes those identified to improve and, ultimately maintain watershed conditions. Not all projects are deemed necessary to move the watershed upwards to an improved condition class. Implementation and completion of Essential Projects 1 - 7 are required to move the watershed from Functioning at Risk to Properly Functioning. Projects 8 – 9 address other important landscape restoration objectives and are considered complimentary restoration projects. These projects will assist in improving and/or maintaining overall watershed conditions and ensure that it does not regress back into the Functioning at Risk state. This watershed covers portions of two Forests; the ASNF and the GNF.

Essential Projects

1. **Essential Project #1 – Road Decommissioning**
   a. Attribute/ Indicator Addressed – Roads and Trails
   b. Project Description: This project will focus on decommissioning roads identified in Escudilla WRAP Area. In the Luna Planning Area, there are approximately 2 miles of road identified for decommissioning in this watershed. In the West Escudilla Restoration Project, there are approximately 0.31 miles of road identified for decommissioning in this watershed. Current decommissioning costs are approximately $1,500/mile. Decommissioning of a road involves reestablishing vegetation, and if necessary, initiating restoration of ecological processes interrupted or adversely impacted by the unneeded road. Treatments include one or more of the following treatments: Reestablishing former drainage patterns, stabilizing slopes, and restoring vegetation; Blocking the entrance to a road or installing water bars; Removing culverts, reestablishing drainages, removing unstable fills, pulling back road shoulders, and scattering slash on the roadbed; Completely eliminating the roadbed by restoring natural contours and slopes; and Other methods designed to meet the specific conditions associated with the unneeded road
   c. Partners Involvement: Various partners have expressed interest in partnering in this effort, including New Mexico Environment Department and Wild Earth Guardians
   d. Timeline: TBD based on funding and prioritization of 12 watersheds; Decommissioning of roads without fuels treatments can be completed in one fiscal year; roads with planned fuels treatments can be decommissioned immediately following treatment.
   e. Estimated costs and associated Budget Line Item: $3,600/CMRD/NFVW/CMLG; Estimated costs include the costs of reseeding, reshaping, labor, heavy equipment transport, per diem, barrier, imported aggregate, and archaeological review (if necessary)

2. **Essential Project #2 – Road Improvement**
   a. Attribute/ Indicator Addressed – Roads and Trails
   b. Project Description: This project will focus on heavy road maintenance and improving best management practices for road drainage on Maintenance Level 2 and 3 roads within the watershed. BMPs will include improvement of lead out ditches, road dips, and inlet and outlet features of culverts and road/stream crossings. Heavy road maintenance may involve some level of reconstruction of existing road beds to reestablish a safe and last driving surface with the intent of minimizing sediment movement off of the road. Currently there are approximately 27.5 miles of

Maintenance Level 2 and 3 roads within the watershed. This project assumes that 40% of roads in the watershed need some degree of maintenance ranging from light to heavy

c. Partners Involvement: Catron County
d. Timeline: TBD based on funding; can be completed in one fiscal year
e. Estimated costs and associated Budget Line Item = $16,500/ CMRD, NFVW, NFWF, CMLG; Based on an estimate of $1,500/mile for road maintenance. Estimated costs include reshaping, labor, heavy equipment transport, per diem, imported aggregate, and archaeological review (if necessary)

3. <u>Essential Project #3 – Erosion Control Structures</u>

a. Attribute/Indicator Addressed – Water Quality
b. Project Description: This project will focus on the construction, maintenance and/or reconstruction of 6 (2 GNF/4 ASNF) existing erosion control structures. These structures were originally implemented in the 1980s to impede and prevent ongoing erosion and gullying across the watershed in various drainages and swales. None of these structures have received maintenance over the last several decades and are currently in various stages of disrepair. Some structures have filled completely in and no longer serve to back up sediment. Others have breaches in the dams and are experiencing active headcutting, while others have water bypassing the structure, creating new erosion issues. Work will include heavy equipment cleanout of the sediment structures where needed or reconstruction/expansion of dams to preclude current and future gullying and sediment movement. Certified weed-free seeding will be required at sites requiring reconstruction. Inventory and survey work will be necessary prior to beginning this project to establish necessary site design.
c. Partners Involvement: New Mexico Environment Department
d. Timeline: TBD based on funding
e. Estimated Costs and associated Budget Line Item: Costs range from $37,000 - $62,000/NFVW/CMRD; Costs are based on the following assumptions: $2,500/structure if utilize Forest Construction and Maintenance crew; $5,000/structure if utilize contract labor.

4. <u>Essential Project #4 – Stream Restoration/Riparian Improvement</u>

a. Attribute/ Indicator Addressed – Water Quality, Water Quantity, Aquatic Habitat, Aquatic Biota, Riparian/Wetland Vegetation, Soils
b. Project Description: This project will focus on approximately 5 miles of stream/wetland/riparian restoration on Dry Blue and Pace Creeks and drainage control on access road. Work would include implementation of channel and wetland restoration techniques to increase water table elevations, enhance productivity of wetland dependent species (both aquatic and vegetative), encourage deep rooted vegetation on streambanks, impede erosion processes, and restore channel stability. These techniques include placement of water control structures that reestablish macro/micro-topography and encourage natural channel form and function, streambank contouring, and re-establishment of wetland/riparian plants through natural and/or artificial means (both woody and herbaceous plants). All techniques will utilize minimum impact best management practices to control sediment movement and will follow necessary permitting requirements under the Clean Water Act. Drainage control on access road would include water bars, reshaping, leadout and other methods to control sediment input downstream into Dry Blue Creek.
c. Partners Involvement: Wild Earth Guardians, NMED
d. Timeline: TBD based on Funding; project can be completed in one year.
e. Estimated costs and associated Budget Line Item: $103,500/NFVW, NFWF; Costs are based on the following assumptions of $10,000/mile of stream; $27,000 design costs; $5,000 road improvement and monitoring.

5. **Essential Project #5 – Harden Stream Crossings/Loach Minnow Habitat Improvement**
   a. Attribute/ Indicator Addressed – Water Quality, Aquatic Habitat, Aquatic Biota, Riparian/Wetland Vegetation, Soils
   b. Project Description: This project will focus on hardening of six crossings on motorized Trail 63/Dry Blue Creek (GNF) and NFS 8153A/Pace Creek (ASNF). Trail 63 crosses Dry Blue Creek in multiple locations in occupied loach minnow habitat. Costs would include design, supplies, labor, per diem, helicopter transport of supplies to remote locations, and vegetation rehabilitation. NFS 8153A crosses a riparian reach of Pace Creek and is currently causing resource degrading. This crossing would be hardened to prevent further resource damage for mechanical treatment. Once the road is closed, final treatment will include using heavy equipment to restore and stabilize the stream banks so they are not contributing to downstream erosion and channel instability
   c. Partners Involvement: none – opportunities for fishery non-profits
   d. Timeline: TBD based on funding; project can be completed in one year
   e. Estimated costs and associated Budget Line Item: GNF → Dry Blue -- ($145,000/NFVW/NFWF/CMLG; $30,000 helicopter time (2 days), supplies $10,000, labor ($15,000), crossing prefab ($10,000 each = $60,000); per diem ($5,000); design ($25, 000)); ASNF → NFS 8153A/Pace - $125,000; This reflects costs for survey and evaluation, design, and implementation.

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6. **Essential Project #6 – Meadow Enhancement**
   a. Attribute/ Indicator Addressed – Riparian/Wetland Vegetation, Rangeland Vegetation, fire regime
   b. Project Description: This project will focus on the removal by hand thinning of 250 acres of conifer vegetation within the riparian corridor of Dry Blue Creek of Pace Creek and in the meadow adjacent to the riparian corridor.
   c. Partners Involvement: none
   d. Timeline: TBD based on funding; project can be completed in one year
   e. Estimated costs and associated Budget Line Item: $60,500/NFVW, NFWF, WFHF; costs are estimated at $200/acre.

7. **Essential Project #7 – Noxious Weed Control**
   a. Attribute/ Indicator Addressed – Terrestrial Invasive Species
   b. Project Description: This project will focus on 10 acres of noxious weed removal in the Dry Blue Creek drainage. Currently there are several species of invasives including bull thistle. Treatments may include grubbing out of thistle, herbicide application, or other approved techniques.
   c. Partners Involvement: none
   d. Timeline: TBD based on funding; this is a three year project. Initial year of treatment and follow-up the next year to retreat if any rosettes are present.
   e. Estimated costs and associated Budget Line Item: $38,000/NFVW/NFRG; Costs are based on hiring a two-person crew for three summers to ensure the population is eliminated.

Complimentary Restoration Projects

8. **Project #8 – Forest Vegetation Improvement – Thinning**
   a. Attribute/ Indicator Addressed – Fire Regime
   b. Project Description: This project will focus on woodland and forest maintenance and restoration treatments where identified across the watershed. Treatment of vegetation will be accomplished by hand, mechanized, and/or herbicide treatment. In forested systems, activities would include thinning and group selections (e.g. creating 1-4 acre openings) to encourage regeneration of trees.

Woodland areas include pinyon juniper and pinyon pine, while forested areas refer to ponderosa pine and mixed conifer. Specific silviculture prescriptions will be written for treatment units based on desired future conditions for the unit and area. Treatment units may be planned across watershed boundaries, thus this project will be implemented over multiple years, as the treatment units are prepared. More than one watershed within the Escudilla Planning Area may receive treatment in a single year, however acreages may be limited. Thinning within this project area on the GNF includes both group select (3,481 acres) and improvement (568 acres) thinning. A total of 4,049 acres are planned for thinning within the Luna Planning Area. A total of 4,531 acres are planned for thinning within the West Escudilla Restoration Project.

c. Partners Involvement: New Mexico Environment Department

d. Timeline: TBD based on funding; this is a multiple year project. Budget constraints and treatment boundaries will greatly limit the amount of acres treated in a single year within a watershed.

i. Estimated costs and associated Budget Line Item = $4,550,750/WFHF/NFTM/NFVW; Costs are based on the following assumptions: pre-commercial thinning ≈$300/acre with limited piling; logging ≈ $125/acre (anticipate IRTC-good for services-thus reducing costs); Prep costs ≈ $100/acre for mark and cruise with crew of 6. Costs also include herbicide treatment of 20% of group selection acres @ $250/acre.

9. <u>Project #9 – Forest Vegetation Improvement – Prescribed Fire</u>

a. Attribute/ Indicator Addressed – Fire Regime

b. Project Description: This project would use prescribed fire to maintain and/or reduce fuel loadings. Prescribed fire can be implemented prior and after proposed vegetation treatments. Treatment units may be planned across watershed boundaries, thus this project will be implemented over multiple years, as the treatment units are prepared. More than one watershed within the Escudilla Planning Area may receive treatment in a single year, however acreages may be limited. A total of 14,446 acres of prescribed fire are planned within the Luna Planning Area. A total of 2,641 acres of prescribed fire are planned within the West Escudilla Restoration Project.

c. Partners Involvement: New Mexico Department of Game and Fish, Rocky Mountain Elk Foundation.

d. Timeline: TBD based on funding; this is a multiple year project based on budget constraints, burning units, burning limitations, and mitigation of cumulative impacts to natural and cultural resources.

e. Estimated costs and associated Budget Line Item = $859,850 – $1,293,230 WFHF/NFVW/NFWF; Costs are based on the following assumptions: burning with helicopter ≈ $80/acres; burning without helicopter ≈ $50/acre;

Costs

Table 73. Dry Blue Creek Costs

Dry Blue Creek Good Neighbor Watershed									
Essential Projects		**Planning & Design**	**# Units**	**Cost / Unit**		**Implementation**	**Project Monitoring**	**Project Totals**	
ESSENTIAL PROJECTS									
#1 Road Decommissioning									
FS Contribution GNF		$ -	2 miles	$1,500/mile		$ 3,000	$ -	$ 3,000	
FS Contribution ASNF		$ -	.3 miles	$1,500/mile		$ 450	$ 150	$ 600	
Partner Contribution (both in kind and $)		$ -	n/a	n/a		$ -	$ -	$ -	
Funding already obtained		$ -	n/a	n/a		$ -	$ -	$ -	
Total		***$ -***		***$1,500/mile***		***$ 3,450***	***$ 150***	***$ 3,600***	
#2 Road Improvement									
FS Contribution GNF		$ -	6 miles	$1,500/mile		$ 9,000	$ -	$ 9,000	
FS Contribution ASNF		$ -	5 miles	$1,500/mile		$ 7,500	$ -	$ 7,500	
Partner Contribution (both in kind and $)		$ -	n/a	n/a		$ -	$ -	$ -	
Funding already obtained		$ -	n/a	n/a		$ -	$ -	$ -	
Total		***$ -***	***11 miles***			***$ 16,500***	***$ -***	***$ 16,500***	
#3 Erosion Control Structures									
FS Contribution GNF	maintenance	$ -	2 structures	$2,500	IH	$ 5,000	$ 1,500	$ 6,500	
				$5,000	C	$ 10,000		$ 11,500	
FS Contribution ASNF	Maintenance	$ -	0	$2,500	IH	$ -	$ -	$ -	
				$5,000	C				
	new	$ 10,000	4 new structures	$5,000	IH	$ 20,000	$ 500	$ 30,500	
				$10,000	C	$ 40,000		$ 50,500	
Partner Contribution (both in kind and $)		$ -	n/a	n/a		$ -	$ -	$ -	
Funding Already obtained		$ -	n/a	n/a		$ -	$ -	$ -	
Total		***$ 10,000***		***$2,500 inhouse; $5,000 contract***		***$ 25,000***	***$ 2,000***	***$ 37,000***	
						$ 50,000		***$ 62,000***	

#4 Stream Restoration/Riparian Improvement							
FS Contribution GNF	stream	$ 25,000	3 miles	$10,000 / mile	$ 30,000	$ 500	$ 55,500
	road	$ -	2 miles	$2,500 / mile	$ 5,000	$ 500	$ 5,500
FS Contribution ASNF		$ 2,000	2 miles	$10,000 / mile	$ 40,000	$ 500	$ 42,500
Partner Contribution (both in kind and $)		$ -	n/a	n/a	$ -	$ -	$ -
Funding already obtained		$ -	n/a	n/a	$ -	$ -	$ -
Total		***$ 27,000***			***$ 75,000***	***$ 1,500***	***$ 103,500***
#5 Harden Stream Crossing/Loach Minnow Habitat Improvement							
FS Contribution GNF		$ 25,000	6 crossings	$20,000/crossing	$ 120,000	$ -	$ 145,000
FS Contribution ASNF		$ 500	1 crossing	$11,500	$ 11,500	$ 500	$ 12,500
Partner Contribution (both in kind and $)		$ -	n/a	n/a	$ -	$ -	$ -
Funding already obtained		$ -	n/a	n/a	$ -	$ -	$ -
Total		***$ 25,500***	***7 crossings***	***varies***	***$ 131,500***	***$ 500***	***$ 157,500***
#6 Meadow Enhancement							
FS Contribution GNF		$ -	250 acres	$200/acre	$ 50,000	$ -	$ 50,000
FS Contribution ASNF		$ 500	50 acres	$200/acre	$ 10,000	$ -	$ 10,500
Partner Contribution (both in kind and $)		$ -	n/a	n/a	$ -	$ -	$ -
Funding already obtained		$ -	n/a	n/a	$ -	$ -	$ -
Total		***$ 500***		***$150/acre***	***$ 60,000***	***$ -***	***$ 60,500***
#7 Noxious Weed Control							
FS Contribution GNF		$ -	3 years (10 acres)	$12,500/year	$ 37,500	$ 500	$ 38,000
FS Contribution ASNF		$ -	n/a	n/a	$ -	$ -	$ -
Partner Contribution (both in kind and $)		$ -	n/a	n/a	$ -	$ -	$ -
Funding already obtained		$ -	n/a	n/a	$ -	$ -	$ -
Total		***$ -***	***3 years (10 acres)***	***$12,500***	***$ 37,500***	***$ 500***	***$ 38,000***
Forest Service Totals		**$ 63,000**	**n/a**	**n/a**	**$ 348,950**	**$ 4,650**	**$ 416,600**
					$ 373,950		**$ 441,600**
Partner Contribution Totals		**$ -**	**n/a**	**n/a**	**$ -**	**$ -**	**$ -**
Funding already obtained		**$ -**	**n/a**	**n/a**	**$ -**	**$ -**	**$ -**
Grand Totals		**$ 63,000**	**n/a**	**n/a**	**$ 333,950**	**$ 4,650**	**$ 401,600**
					$ 358,950		**$ 426,600**

COMPLIMENTARY RESTORATION PROJECTS							
#8 Forest Vegetation Improvement/Thinning							
FS Contribution GNF	Group selection	$ 174,050	3,481 acres	$525 (includes precom, pile logging/prep)	$ 1,827,525	$ -	$2,001,575
	Improvement	$ -	568 acres	$300 (pre comm only)	$ 170,400	$ -	$170,400
FS Contribution ASNF	Group selection	$ -	4,531 acres	$525 (includes precom, pile logging/prep)	$ 2,378,775	$ -	$2,378,775
Partner Contribution (both in kind and $)		$ -	n/a	n/a	$ -	$ -	$ -
Funding already obtained		$ -	n/a	n/a	$ -	$ -	$ -
Total		***$ 174,050***	***8,580 acres***		***$ 4,376,700***	***$ -***	***$4,550,750***
#9 Forest Vegetation Improvement/ Prescribed Fire							
FS Contribution GNF		$ -	14,446 acres	$50/acre	$ 722,300	$ 5,000	$ 727,300
				$80/acre	$ 1,155,680		$ 1,160,680
FS Contribution – ASNF		$ -	2,641 acres	$50	$ 132,050	$ 500	$ 132,550
Partner Contribution (both in kind and $)		$ -	n/a	n/a	$ -	$ -	$ -
Funding already obtained		$ -	n/a	n/a	$ -	$ -	$ -
Total		***$ -***	***17,087 acres***	***varies***	***$ 854,350***	***$ 5,500***	***$ 859,850***
					$ 1,287,730		***$ 1,293,230***
Forest Service Totals		**$ 174,050**	**n/a**	**n/a**	**$ 5,231,050**	**$ 5,500**	**$ 5,410,600**
					$ 5,664,430		**$ 5,843,980**
Partner Contribution Totals		**$ -**	**n/a**	**n/a**	**$ -**	**$ -**	**$ -**
Funding already obtained		**$ -**	**n/a**	**n/a**	**$ -**	**$ -**	**$ -**
Grand Totals		**$ 174,050**	**n/a**	**n/a**	**$ 5,191,435**	**$ 5,500**	**$ 5,196,935**
					$ 5,624,815		**$ 5,630,315**

Timelines and Project Scheduling

By fiscal year, list Tasks necessary to complete project (e.g. planning, design, permitting, implementation) and the expected contribution by the responsible party (FS or Partner).

Completion of these tasks is contingent on securing necessary funding.

Table 74. Dry Blue Creek Timelines and Project Scheduling

	Dry Blue Creek			
FY (TBD)	Task	Forest Service Cost - rounded		Partner cost
		GNF	ASNF	
Year 1	Essential Project #2 – Road Improvement	$9,000	$7,500	unknown
Year 1	Essential Project #3 – Erosion Control Structures	$11,500	50,500	unknown
Year 1	Essential Project #4 – Stream restoration/riparian improvement	$61,000	$42,500	unknown
Year 1	Complimentary Restoration Project #9 – Forest Vegetation Improvement -Prescribed Fire – 2,900(GNF) + 2,641(ASNF) = 5,541 acres – Year 1 of 5	$232,000	$133,000	unknown
Year 1	Complimentary Restoration Project #8 – Forest Vegetation Improvement – thinning – Year 1 of 4-ASNF = 1,132 acres)	n/a	$595,000	unknown
Year 1	Complimentary Restoration Project #8 – Forest Vegetation Improvement – Year 1 of 3 GNF = 1,160 acres (group select)	$609,000	n/a	unknown
Year 1	Complimentary Restoration Project #8 – Forest Vegetation Improvement – Year 1 of 1 (GNF = 568 acres)	$170,000	n/a	unknown
Year 2	Essential Project #5 – Harden stream crossings/loach minnow habitat improvement	$145,000	$12,500	unknown
Year 2	Complimentary Restoration Project #9 – Forest Vegetation Improvement -Prescribed Fire – 2,900 acres – Year 2 of 5	$232,000	n/a	unknown
Year 2	Complimentary Restoration Project #8 – Forest Vegetation Improvement – Year 2 of 3 GNF = 1,160 acres (group select)	$609,000	n/a	unknown
Year 2	Complimentary Restoration Project #8 – Forest Vegetation Improvement – thinning – Year 2 of 4-ASNF = 1,132 acres)	n/a	$595,000	unknown
Year 3	Essential Project #6 – Meadow Enhancement	$50,000	$10,500	unknown
Year 3	Essential Project #7 – Noxious weed removal – Year 1 of 3	$13,000	n/a	unknown
Year 3	Complimentary Restoration Project #8 – Forest Vegetation Improvement – Year 3 of 3 GNF = 1,160 acres (group select)	$609,000	n/a	unknown
Year 3	Complimentary Restoration Project #9 – Forest Vegetation Improvement -Prescribed Fire – 2,900 acres – Year 3 of 5	$232,000	n/a	unknown
Year 3	Complimentary Restoration Project #8 – Forest Vegetation Improvement – thinning – Year 3 of 4-ASNF = 1,132 acres)	n/a	$595,000	unknown
Year 4	Essential Project #7 – Noxious weed removal – Year 2 of 3	$13,000	$0	unknown
Year 4	Complimentary Restoration Project #9 – Forest Vegetation Improvement -Prescribed Fire – 2,900 acres – Year 4 of 5	$232,000	n/a	unknown
Year 4	Complimentary Restoration Project #8 – Forest Vegetation Improvement – thinning – Year 4 of 4-ASNF = 1,132 acres)	n/a	$595,000	unknown
Year 5	Complimentary Restoration Project #7 – Noxious weed removal – Year 3 of 3	$13,000	n/a	unknown
Year 5	Complimentary Restoration Project #9 – Forest Vegetation Improvement -Prescribed Fire – 2,900 acres – Year 5 of 5	$232,000	n/a	unknown
Year 6	Essential Project #1 – Road Decommissioning	$3,000	$600	unknown

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EVALUATION CRITERIA

Evaluation criteria are important to determine if project objectives are being met for all watersheds in the Escudilla Landscape WRAP. These criteria can be both qualitative and/or quantitative based on the parameters being addressed by the project. Regardless, they need to be of sufficient resolution to detect changes and trends over time resulting from implementation of management measures that address improvement of the watershed condition indicators that are contributing to Functioning at Risk or Impaired watershed condition ratings.

Criteria to Assess Water Quality

- Assessment of changes to water temperature over time as recorded by thermographs deployed seasonally
- Seasonal assessment of other water quality parameters including DO, pH, conductivity and turbidity
- Demonstrate water quality improvement for listed parameters by the NMED 10-year assessment of currently impaired streams meeting or moving towards State Water Quality Standards

Criteria to Assess Water Quantity

- Assessment of changes in groundwater levels in treated wet meadows as recorded by groundwater piezometers
- Annual assessment of increase, decrease, or improvement in dams and/or water diversion facilities.

Criteria to Assess Aquatic Habitat

- Annual assessment of habitat continuity and increase or decreases in fragmentation
- Assessment of changes to streamflow intermittency over time as recorded by intermittency loggers
- Assessment of width/depth ratios and vertical stability before and after implementation of channel treatments
- Assessment of increases in coarse woody debris (where expected) before and after implementation of channel treatments

Criteria to Assess Aquatic Biota

- Periodic survey of expected aquatic life forms, including counts of native species and exotic and/or aquatic invasive species.

Criteria to Assess Riparian/Wetland Vegetation

- Assessment of riparian vegetation changes along stream banks expressed as percent cover in treated areas
- Annual assessment of vegetation planting success expressed as percent mortality

Criteria to Assess Roads and Trails

- Annual assessment of number of roads and/or trails decommissioned expressed as open road density
- Annual assessment of miles of road and trail maintenance
- 5–year reassessment of number of open roads within 300 feet of water

Criteria to Assess Soils

- Annual assessment of number of erosion control structures improved, maintained and constructed

- 5-year reassessment of evidence of accelerated surface erosion and or changes to soil nutrient and hydrologic cycling process based on land surface disturbances (recent and past)

Criteria to Assess Fire Regime or Wildfire

- Annual update to national databases of vegetation treatment activities in each watershed
- 5-year reassessment of fire regime condition classification
- 5-year reassessment of soil and ground cover conditions in 2011 Wallow Fire burn scar

Criteria to Assess Forest Cover

- 5-year reassessment of percent of land in each watershed that contains cut-over, denuded, or deforested forest land where appropriate forest cover should be reestablished or restored in order to achieved desired conditions.

Criteria to Assess Rangeland Vegetation

- 5-year reassessment of rangeland composition if changes have been made to allotment operations and/or conditions

Criteria to Assess Terrestrial Invasive Species

- Annual inventory and treatment of noxious weeds in areas of known infestations to be reported as number of observations and acres of treatment.

Criteria to Assess Forest Health

- Periodic regional assessment of tree mortality from insects, disease, and air pollution.

RESTORATION PROJECT MONITORING AND EVALUATIONS

A monitoring program is planned to assess accomplishment of goals and objectives and to examine both short term and long term efficacy of implementation.

Internal Monitoring

The Forests will monitor watershed restoration success using the following methods:

a. Best management practice effectiveness – evaluate treatments once/year using U.S. Forest Service National Best Management Practices protocol

b. Watershed Condition Classification – reevaluation of watershed condition ratings within the WRAP area every 5 years. The watersheds were assessed in 2015 and will be reassessed in 2020, 2025, and 2030, and so forth.

c. Photo monitoring – establish permanent photo points in selective treatment areas to be photographed once/year.

d. Riparian monitoring - conduct Proper Functioning Condition riparian surveys every 5 years on water bodies of concern to determine trend.

e. Noxious weed surveys – evaluate areas of known noxious weed infestations to determine if treatments are succeeding in eradicating populations; once/year

f. Water quality monitoring – use monitoring equipment to evaluate dissolved oxygen, pH, conductivity, and temperature levels in water bodies of concern, once/year *or* Establish long-term data logging on water bodies with other equipment.

g. Groundwater monitoring – establish piezometers in meadows and/or riparian areas slated for restoration. Pull data once per year from dataloggers.

h. Stream Temperature monitoring – establish permanent thermograph sites in waterbodies of concern; read once/year. Baseline monitoring has already begun in San Francisco River, Stone Creek, Centerfire Creek, Dry Blue Creek, and SA Creek.

i. Cross section and longitudinal profiles – establish 2 – 4 permanent monitoring sites on stream channels of concern to be read once every 5 years.

j. Establish sediment traps to measure sediment input in selective areas treated for erosion.

External Monitoring

Baseline monitoring has already occurred on San Francisco River and Centerfire Creek by NMED in accordance with the Surface Water Quality Bureau (SWQB) guidelines. Future monitoring that continues to be conducted by NMED will be processed and entered into the SWQB database in accordance with New Mexico state protocols. Future monitoring will continue in state assessed water bodies within the project area. The New Mexico Environment Department will assist in the establishment of photo points, permanent stream temperature monitoring sites, and cross section and longitudinal profiles. All monitoring data will be shared between both agencies.

Cooperators

The Gila National Forest and the Apache Sitgreaves National Forests, with the assistance of Ralph Pope, Southwest Native Ecosystems Management Consultant, developed the Escudilla Landscape Watershed Restoration Action Plan. It was reviewed by New Mexico Environment Department prior to submittal for comment/additions/deletions.

PUBLIC OUTREACH

Public outreach takes into consideration the remoteness of the site and sparse population. As noted previously in the document, this area is located on both sides of the Arizona and New Mexico stateline. U.S. Highway 180 is the main paved road within the area, with the remaining travel routes being unpaved gravel and/or dirt roads. There are several private inholdings and the local communities of Luna, NM and Alpine and Springerville, AZ. All of the projects included in this WRAP have undergone an environmental analysis, where public scoping, public meetings, and public comment have been integral to the process. Outreach was directed at the stakeholders who have the greatest vested interest in the area and success of the project. These stakeholders include, but are not limited to:

- USFS Gila and Apache-Sitgreaves National Forests
- New Mexico Department of Game and Fish
- New Mexico Environment Department
- Arizona Department of Environment Quality
- USFS permittees
- Luna Off-Highway Vehicle Riders
- Luna Irrigation Commission
- Wild Earth Guardians
- Upper Little Colorado River Watershed Partnership
- Local Tribes

Outreach will be primarily directed at local permittees, State natural resource agencies, San Francisco Soil and Water Conservation District, non-profit conservation organizations, outdoor enthusiasts, recreational users, and local communities (including youth). The primary outreach components will consist of periodic press releases during project activities; opportunities for volunteer labor; opportunities for employment of local workforce; opportunities for funding partnerships, and youth engagement for projects located near schools. Participants will learn the significance of temperature as a water quality impairment, the nature of the water quality impairments in San Francisco River and Centerfire Creek, the need to improve water quality parameters in these streams, and the importance of a healthy watersheds and riparian areas to provide for clean, cool water and healthy ecosystems.

The following additional activities have been identified as part of an integrated Outreach Program.

- Support hosting of an annual fishing derby at Lake Roberts with a booth emphasizing the significance of temperature as a water quality impairment and the need to reduce temperatures to meet water quality standards.
- Forest participating in a water quality workshop at the annual Expanding Your Horizons conference aimed at engaging young girls in the fields of math and science
- Forest participation in an annual 4^{th} – 6^{th} grade Water Festival
- Forest participation in the US Fish and Wildlife Service's "Trout in the Classroom" program in New Mexico.
- Develop educational brochures and/or press releases that discuss the importance of temperature with respect to water quality and healthy fisheries.
- Distribute brochures to local communities, conservation organizations, and schools.
- Attend meetings such as the Southwest Native Trout Meeting and the AZ-NM American Fisheries Society.
- Prepare and submit articles to various conservation organization newsletters including: Trout Unlimited, The Western Native Trout Initiative and the AZ-NM American Fisheries Society.

ESCUDILLA LANDSCAPE WRAP MILESTONES

The Escudilla WRAP encompasses a large landscape area, covering two national Forests located in both Arizona and New Mexico. Year specific milestones have not been developed for this WRAP due to the size of the landscape and the logistics involved in the number of projects developed. Timelines are based on a yearly capacity of Forests to accomplish projects, and maximum funding that might be expected for implementation from federal funding sources. Future partner dollars may assist in advancing implementation schedules. Forest leadership determines work priorities on a yearly scheduled based on national target assignments. These targets may vary from year to year in different resource areas and different watersheds. The following table provides a brief indication of where the Forests will be in achieving targets and milestones.

Table 75. Escudilla Landscape WRAP Milestones

Milestone/Target	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
Planning												
West Escudilla Restoration Project (Apache-Sitgreaves NFs) – Decision Notice signed 8/2/17	X											
ASNF leadership team determines Program of Work for Fiscal Year 2018 and priority watersheds	X											
GNF releases Draft Environmental Impact Statement for Luna Restoration Project Spring 2018		X										
GNF signs Record of Decision for Luna Restoration Project Fall 2018		X										
GNF leadership team determines Program of Work for Fiscal Year 2019 and priority watershed(s)		X										
ASNF and GNF strategize funding needs for moving priority watersheds into improved condition classification		X										
ASNF and GNF determine design, permitting and implementation needs for yearly Essential Projects Complimentary Restoration Projects		X	X	X	X	X	X	X	X	X	X	X
Implementation												
Forests begin implementation of Year 1 Essential Projects and Year 1 Complimentary		X	X									

Table 75. Escudilla Landscape WRAP Milestones												
Milestone/Target	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**
Restoration Projects in priority watershed(s)												
Forests begin implementation of Year 2 Essential Projects and Year 2 Complimentary Restoration Projects in priority watershed(s)			X	X								
Forests begin implementation of Year 3 Essential Projects and Year 3 Complimentary Restoration Projects in priority watershed(s)				X	X							
Forests begin implementation of Year 4 Essential Projects and Year 4 Complimentary Restoration Projects in priority watershed(s) or starts work new priority watershed					X	X						
Forests begin implementation of Year 5 Essential Projects and Year 5 Complimentary Restoration Projects in priority watershed(s) or starts work in new priority watershed						X	X					
Forests begin implementation of Year 5 Essential Projects and Year 5 Complimentary Restoration Projects in priority watershed(s) or starts work in new priority watershed							X	X				
Forests begin implementation of Year 6 Essential								X	X			

Table 75. Escudilla Landscape WRAP Milestones												
Milestone/Target	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**
Projects and Year 6 Complimentary Restoration Projects in priority watershed(s) or start work in new priority watershed												
Forests begin implementation of Year 7 Essential Projects and Year 7 Complimentary Restoration Projects in priority watershed(s) or start work in new priority watershed									X	X		
Forests begin implementation of Year 8 Essential Projects and Year 8 Complimentary Restoration Projects in priority watershed(s) or start work in new priority watershed										X	X	
Forests begin implementation of Year 9 Essential Projects and Year 9 Complimentary Restoration Projects in priority watershed(s) or start work in new priority watershed											X	X
Monitoring												
Pre-work monitoring occurs prior to ground disturbance		X	X	X	X	X	X	X	X	X	X	X
Conduct BMP Effectiveness monitoring			X	X	X	X	X	X	X	X	X	X
Conduct watershed condition reclassification				X					X			
Conduct riparian monitoring				X					X			
Conduct photo monitoring		X	X	X	X	X	X	X	X	X	X	X

Table 75. Escudilla Landscape WRAP Milestones												
Milestone/Target	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**
Conduct noxious weed monitoring		X	X	X	X	X	X	X	X	X	X	X
Conduct water quality monitoring		X	X	X	X	X	X	X	X	X	X	X
Conduct groundwater level monitoring			X	X	X	X	X	X	X	X	X	X
Conduct channel geometry measurements		X					X					X
Establish sediment traps and estimate capture		X	X	X	X	X	X	X	X	X	X	X
Outreach												
GNF participates Trout in the Classroom project	X	X	X	X	X	X	X	X	X	X	X	X
GNF participates in Expanding Your Horizons	X	X	X	X	X	X	X	X	X	X	X	X
GNF participates in annual Water Festival	X	X	X	X	X	X	X	X	X	X	X	X
GNF participates in Lake Roberts Fishing Derby	X	X	X	X	X	X	X	X	X	X	X	X
Develop educational brochures and/or press releases		X		X		X		X		X		X
Distribute educational brochures and/or press releases		X	X	X	X	X	X	X	X	X	X	X
Attend meetings related to fisheries	X	X	X	X	X	X	X	X	X	X	X	X
Prepare and submit articles to conservation newsletters		X		X		X		X		X		X

APPROVAL – GILA NATIONAL FOREST

Action Plan Date: July 31, 2018

Reviewing Official and Title: _____
Adam Mendonca, Forest Supervisor, Gila National Forest

Forest Contact Information:
Carolyn Koury, Gila Watershed and Air Program Manager, 575-388-8378

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APPROVAL – APACHE-SITGREAVES NATIONAL FORESTS

Action Plan Date: July 31, 2018

Reviewing Official and Title: _____
Steve Best, Forest Supervisor, Apache-Sitgreaves National Forests

Forest Contact Information:
Paul Brown, Apache-Sitgreaves Watershed and Air Program Manager, 928-333-6308

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APPROVAL – NEW MEXICO ENVIRONMENT DEPARTMENT

Action Plan Date: July 31, 2018

Reviewing Official and Title: _____
Shelly Lemon, NMED Surface Water Quality Bureau Chief

NMED Contact Information:
John Moeny, NMED Surface Water Quality Bureau, 575- 956-1545

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R. 21 W. R. 20 W. R. 19 W.

T. 5 S. T. 6 S.

0 0.5 1 2 Miles

Stone Creek-San Francisco River

Trout Creek

Dillman Cr.

Laney Avenue

Luna Work Center

Luna

Township Line

Kiehne Pond

San Francisco R.

Luna Valley

Airstrip Tank

Outlet Centerfire Creek

Section Tank

Spur Tank

Rim Tank

Centerfire Cr.

Grapevine Can

Juniper Ridge

Strawberry Canyon

Bar NL Mesa 7644

Juniper Ridge Tank

Halfway Tank

Pine Tank

Cienega Canyon-San Francisco River

Monumer Saddle

Monument Mountain 8333

Strawberry Tank

Bar NL Tank

Kiehne Tank

Trail

Mail Trail Lane

Bar N L Mesa 8136

Big Canyon

Lily Patch Tank

Liedman Tank

Reserve RD

Quemado RD

Big Canyon-San Franciso River

Adair

Mail Hollow

Lefthand Canyon

Trail Tank

Highland Tank

Highland Pit Tank

Starkweather Canyon

Deep Canyon

Potato Patch

Blue Tank

Dry Blue Creek

Road Tank

Swapp Tank

Big Canyon-San Francisco R. WS

- Big Canyon-San Francisco R. 6th Code
- Other 6th Code
- Erosion Control Structure
- Stream/Riparian/Meadow improvement
- Road Decommissioning
- Perennial Stream
- Intermittent Stream
- Ephemeral Stream
- Non-Motorized Trail
- Motorized Use Trail
- Highway
- Improved Road, Dirt
- Improved Road, Gravel
- Improved Road, Paved
- Private Road
- Admin-Permit Only Road
- Unimproved Road
- US Forest Service
- Private

Luna Planning Area Treatments (prop.)

- Mechanical Vegetation Treatment locations
- Grassland Meadow - Maintenance and Restoration
- Meadow Riparian - Maintenance and Restoration
- Prescribed Burning

Canovas Creek - Coyote Creek WS

- Canovas Cr.-Coyote Cr. 6th Code
- Other 6th Code
- AOP Stream Crossing
- Erosion Control Structure
- Water Improvement point
- Stream/Riparian/Meadow improvement
- Road Decommissioning
- Perennial Stream
- Intermittent Stream
- Ephemeral Stream
- Non-Motorized Trail
- Improved Road, Dirt
- Improved Road, Gravel
- Private Road
- Admin-Permit Only Road
- Unimproved Road
- US Forest Service
- FS Wilderness
- Bureau of Land Mgmt.
- Private
- State

Luna Planning Area Treatments (prop.)

- Mechanical Vegetation Treatment locations
- Grassland Meadow - Maintenance and Restoration
- Meadow Riparian - Maintenance and Restoration
- Prescribed Burning

0 0.5 1 2 Miles

R. 30 E. R. 31 E. R. 21 W. R. 20 W.

T. 9 N. T. 8 N. T. 8 N. T. 7 N. T. 6 N.

T. 2 S. T. 3 S. T. 4 S. T. 5 S.

150200010305-Coyote Creek

Cow Springs Draw

Canovas Creek-Coyote Creek

Dry Lakes-Nutrioso Creek

Pratt Lake

Loco Twentynine Knoll Tank

Loco Knolls 7995

Loco Knoll 9068

Escudilla Mountain 9744

Noxious weed removal (Camelthorn)

Springerville RD Alpine RD

Quemado RD Springerville RD

Alpine RD Quemado RD

Apache-Sitgreaves NFs Gila NF

Arizona New Mexico

Apache County Catron County

Coyote Cr.

Lily Cr.

Morrison Cr.

Mamie Cr.

Jenkins Cr.

S A Cr.

Trout Cr.

Romero Cr.

Smith Cr.

E L C Cr.

Hay Vega

Gasoline Lake

Playa Pit Tank #1

Playa Pit Tank #2

Corner Tank

Boundary Tank

Canovas Tank

Canovas Tank #2

H-V Tank

H-V Reservoir

H-V Ranch

Ditch Tank

Towser Tank

Pratt Lake

Teete Tank

Hay Vega Tank

Corner Tank #2

Tin Cup Tank

Jim Tank

Jim Smith Peak 9252

Smith Tank

Karruth Tank #2

Karruth Tank #1

Lake Rim Tank

Skunk Flat Tank

Skunk Flat

Arizona Tank

Gibbons Lake Tank

Romero Lake

Flat Tank

Turkey Tank

Connor Tank

Morrison Tank

Bar C Lake

Underwood Lake Tank

Road Tank

SA Tank #2

Fir Tank

Mesa Tank

Turner Tank

Outlet Centerfire Creek

Hell Roaring Mesa 8514

Bishop Peak 8855

Escudilla Wilderness

Paddy Creek-Nutrioso Creek

Riggs Creek-Nutrioso Creek

Stone Creek-San Francisco River

Trout Creek

Lake Marie Reservoir

Pratt Lake

Profanity Ridge

Punchbowl

Circe Flat

Conner Draw 4020W

Steele Flat

Escudilla Mountain 9744

Loco Knoll 9068

Jim Smith Peak 9252

Bishop Peak 8855

Hell Roaring Mesa 8514

B 024

R. 30 E. R. 31 E. R. 21 W. R. 20 W.

T. 5 N. T. 4.5 N. T. 4 N. T. 3 N.

T. 5 S. T. 6 S. T. 7 S. T. 8 S.

0 0.5 1 2 Miles

Cotton Flat

AP 2117

Little Creek Tank

Estes Tank

Luna Tank

San Francisco R.

Luna Lake

570

Little Cr.

Stone Cr.

Arizona

New Mexico

Apache County

Catron County

Luna Lake

Hall Tank

Hamblin Tank

AP 2266

180

AP 2104

Jackson Cr.

Luna Lake-San Francisco River

Tenney Pond

Tenney Tank

AP 2310

Hy Clark WSS 3

Hy Clark WSS 1

Hy Clark WSS 4

Hy Clark WSS 5

Hy Clark WSS 6

Prime Canyon Tank

Prime Lake

Coleman Creek

Apache County

Greenlee County

Juniper Bench

Alpine RD

Quemado RD

Upper Canyon Creek Tank

Indian Peak 8760

Campbell Blue Creek

GR 67004

Seldom Seen Tank

Cat Cr.

K E Canyon

Mother Hubbard Canyon

White Bluff 7241

Box Canyon

Spur Tank

Turkey Cr.

Luce Ranch

Campbell Blue Cr.

Fall Cr.

Blue River Ranch

Milligan Lake

Milligan Peak 8022

Bobcat Flat

Bobcat Tank

Apache-Sitgreaves NFs

Gila NF

Dry Blue Creek

Pace Cr.

Dry Blue Cr.

Draw

Colyer

Canyon

Upper Tank

Horse Mesa 8438

Dave Lee Lake

Frieborn Tank

Frieborn

Quemado RD

Reserve RD

Noxious Weed Removal

Trout Creek

Outlet Centerfire Creek

Trout Cr.

Dillman Cr.

Double J Ranch

Adair Tank

B 089

Rodeo Tank

Turk Tank

Mesa Tank

B 007

Head of the Ditch

Luna

Stone Creek-San Francisco River

Pit Tank

Fork Tank

Swapp Tank

Big Canyon Francisco

Blue Tank

Big Canyon Franciso Ri

Ward Canyon

Upper Pueblo Creek

Black Bull Saddle

Black Bull Peak 8369

Owl Canyon

Reserve RD Glenwood RD

Seldom Seen Tank

Jackson Box

Centerfire Creek-Blue River

Jackson Can

Maness Peak 8258

Maness Mountain 8094

Maness Mountain 7995

Noland Tank

Stateline Tank Number 2

Noland Mountain 7339

Noland Cr.

Blue R.

Glenwood RD

Quemado RD

Upper Blue

Steeple

Hinkle Park

Pueblo Cr.

Bull Canyon

Buckskin Canyon

Headwaters Saliz Canyon

San Francisco Mountains 8465

Dangerous Park

Dry Blue Creek WS

- Dry Blue Creek 6th Code
- Other 6th Code
- Dry Blue/Trail #61 reroute
- AOP Stream Crossing
- Erosion Control Structure
- Water Improvement point
- Culvert-like structure w/ephemeral channel
- Stream/Riparian/Meadow improvement
- NFSR 275 road improvement
- Road Decommissioning
- Perennial Stream
- Intermittent Stream
- Ephemeral Stream
- Non-Motorized Trail
- Motorized Use Trail
- Highway
- Improved Road, Dirt
- Improved Road, Gravel
- Improved Road, Paved
- Private Road
- Admin-Permit Only Road
- Unimproved Road
- US Forest Service
- FS Wilderness
- Private

Luna Planning Area Activities (prop.)

- Mechanical Vegetation Treatment locations
- Grassland Meadow - Maintenance and Restoration
- Meadow Riparian - Maintenance and Restoration
- Prescribed Burning

R. 31 E. R. 32 E. R. 21 W.

R. 20 W. R. 19 W. R. 18 W.

T. 3 S. T. 4 S. T. 5 S.

0 0.5 1 2 Miles

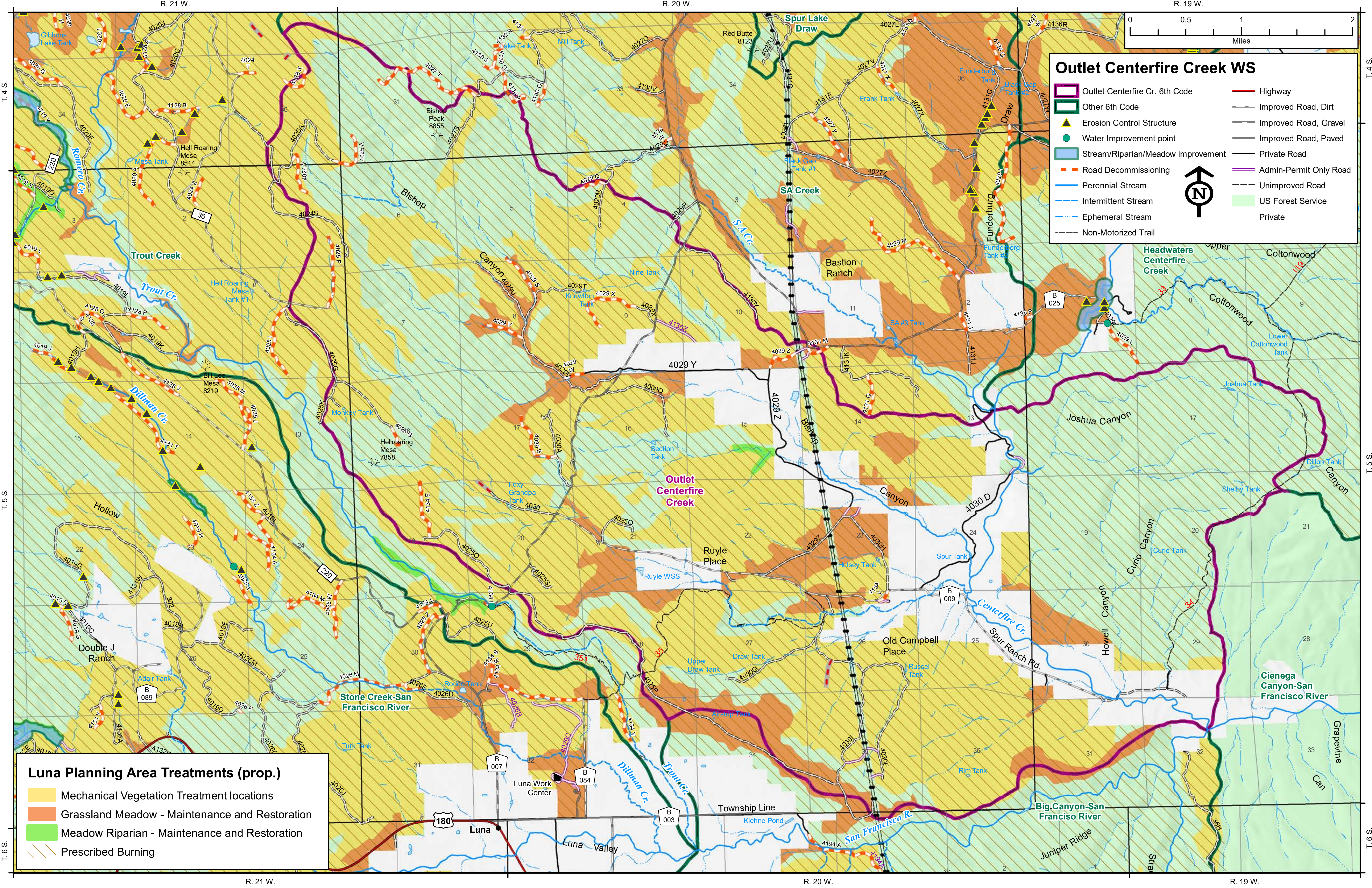
Headwaters Centerfire Creek WS

- Headwaters Centerfire Cr. 6th Code
- Other 6th Code
- Erosion Control Structure
- Water Improvement point
- Stream/Riparian/Meadow improvement
- Road Decommissioning
- Perennial Stream
- Intermittent Stream
- Ephemeral Stream
- Non-Motorized Trail
- Improved Road, Dirt
- Improved Road, Gravel
- Private Road
- Admin-Permit Only Road
- Unimproved Road
- US Forest Service
- Private

Luna Planning Area Treatments (prop.)

- Mechanical Vegetation Treatment locations
- Grassland Meadow - Maintenance and Restoration
- Prescribed Burning

Chihuahua Lake
Black Peak 9006
Gatlin Lake
Peak Tank
Trough Tank
Water Can
Water Cyn. Tank
Ridge Tank
Deep Tank
Dry Tank
Division Tank
Cabin Tank
Shack Tank
Shovel Tank
Thirty Two Tank
Nancy Tank
E. Camp Tank
Natural Pit Tank
Hardcastle Canyon
Draw Tank
Rock Tank
Spur Lake Draw
Gribble Place
Gribble Place Tank
Antelope Tank
Dry Lake Tank
Fifteen Tank
Hay Tank
Miner Point Tank
Miner Tank
Freeman Tank #2
Centerfire Bog
Canyon Tank
Dry Tank #2
Gap Tank
Black Gap
Dead Horse Tank
Corner Tank #1
Apache Creek
Freeman Mountain 8773
Frank Tank
Funderburg Tank
Black Gap Tank #2
Deadman Tank
Whiting Tank
Centerfire Tank #1
Centerfire Tank Number 2
Funderberg Tank #2
Bastion Ranch
SA Creek
SA #3 Tank
SAC.
Centerfire Cr.
Headwaters Centerfire Creek
Upper Cottonwood Tank
Firebox Canyon
Firebox Tank
Lower Cottonwood Tank
Largo Cyn. Tank
Largo Canyon
JP Tank
Freeman Tank
Joshua Tank
Spur Trail Draw
S. Fork Tank
Joshua Canyon
Outlet Centerfire Creek
Dillon Tank
Dillon Mountain 8694
Quemado RD Reserve RD
Cienega Canyon-San Francisco River
Hulsey Tank
Spur Tank
Curio Tank


Outlet Centerfire Creek WS
Outlet Centerfire Cr. 6th Code
Other 6th Code
Erosion Control Structure
Water Improvement point
Stream/Riparian/Meadow improvement
Road Decommissioning
Perennial Stream
Intermittent Stream
Ephemeral Stream
Non-Motorized Trail
Highway
Improved Road, Dirt
Improved Road, Gravel
Improved Road, Paved
Private Road
Admin-Permit Only Road
Unimproved Road
US Forest Service
Private
N
0 0.5 1 2
Miles
Luna Planning Area Treatments (prop.)
Mechanical Vegetation Treatment locations
Grassland Meadow - Maintenance and Restoration
Meadow Riparian - Maintenance and Restoration
Prescribed Burning
R. 21 W.
R. 20 W.
R. 19 W.
T. 4 S.
T. 5 S.
T. 6 S.
Outlet Centerfire Creek
Headwaters Centerfire Creek
Spur Lake Draw
SA Creek
Trout Creek
Stone Creek-San Francisco River
Cienega Canyon-San Francisco River
Big Canyon-San Francisco River
Gibbons Lake Tank
Hell Roaring Mesa 8514
Bishop Peak 8855
Red Butte 8123
Bill Lee Mesa 8219
Hellroaring Mesa 7858
Bastion Ranch
Ruyle Place
Old Campbell Place
Double J Ranch
Luna Work Center
Luna
Luna Valley
Township Line
Romero Cr.
Trout Cr.
Dillman Cr.
S A Cr.
Centerfire Cr.
San Francisco R.
Spur Ranch Rd.
Joshua Canyon
Curio Canyon
Howell Canyon
Cottonwood
Funderburg Draw
Juniper Ridge
Grapevine
Hollow
Bishop
Canyon
Mesa Tank
Lake Tank
Mill Tank
Frank Tank
Funderburg Tank
Black Gap Tank #2
Black Gap Tank #1
Funderberg Tank #2
SA #3 Tank
Nine Tank
Knowlton Tank
Monkey Tank
Section Tank
Foxy Grandpa Tank
Ruyle WSS
Hulsey Tank
Spur Tank
Upper Draw Tank
Draw Tank
Russel Tank
Airstrip Tank
Kiehne Pond
Rim Tank
Rodeo Tank
Adair Tank
Turk Tank
Joshua Tank
Lower Cottonwood Tank
Dillon Tank
Shelby Tank
Curio Tank
Hell Roaring Mesa Tank #1
220
36
180
B 025
B 009
B 089
B 007
B 084
B 003
4029 Y
4029 Z
4030 D
4025O
4025P
4131 M
4029 Q
4130Y
4029P

R. 31 E.
R. 21 W.
R. 20 W.
R. 19 W.
T. 7 N.
T. 6 N.
T. 3 S.
T. 4 S.
T. 5 S.

0 0.5 1 2
Miles

SA Creek WS

- SA Creek 6th Code
- Other 6th Code
- AOP Stream Crossing
- Erosion Control Structure
- Water Improvement point
- Stream/Riparian/Meadow improvement
- Road Decommissioning
- Perennial Stream
- Intermittent Stream
- Ephemeral Stream
- Non-Motorized Trail
- Improved Road, Dirt
- Improved Road, Gravel
- Private Road
- Admin-Permit Only Road
- Unimproved Road
- US Forest Service
- FS Wilderness
- Private

Luna Planning Area Treatments (prop.)

- Mechanical Vegetation Treatment locations
- Grassland Meadow - Maintenance and Restoration
- Meadow Riparian - Maintenance and Restoration
- Prescribed Burning

Apache-Sitgreaves NFs-Springerville RD Arizona
Quemado RD New Mexico
Gila NF
Apache County
Catron County
Escudilla Wilderness
Hay Vega
Cow Springs Draw
Jones Peak 9022
Jim Smith Peak 9252
Bishop Peak 8855
Red Butte 8123
Hell Roaring Mesa 8514
Bill Lee Mesa 8219
Turner Peak
SA Creek
Spur Lake Draw
Headwaters Centerfire Creek
Outlet Centerfire Creek
Jenkins Cr.
Smith Cr.
Trout Creek
Romero Cr.
E L C Cr.
SA Cr.
Centerfire Cr.
Conner Draw
Steele Flat
Bishop
Gribble Rd
Spur Lake Basin
Centerfire Bog
Joshua Canyon
Cottonwood
Lower Cottonwood Tank
Upper Cottonwood
Ridge Tank
Thirty Two Tank
Stroud Lake
Spur Lake
Arroyo Tank
Jones Tank
Peak Tank #2
Karruth Tank #2
Karruth Tank #1
Combees Tank
Heddrick Tank
Gribble Place
Smith Tank
Lake Erin Tank
Miller Road Tank
Turkey Tank
Sil Tank
Morrison Tank
Conner Tank
Gibbons Lake Tank
Mesa Tank
Hell Roaring Mesa Tank #1
Bar C Lake
Underwood Lake Tank
Road Tank
SA Tank #2
SA Tank 3
Fir Tank
Mill Tank
Nine Tank
Knowlton Tank
Section Tank
Monkey Tank
Robson Lake Tank
Black Gap
Black Gap Tank #1
Black Gap Tank #2
Frank Tank
Funderburg Tank
Funderburg Tank #2
Bastion Ranch
SA #3 Tank
Gap Tank
Canyon Tank
Whiting Tank
Hay Tank
Joshua Tank
Escudilla Wilderness
Flat Tank
Romero Lake
Turner
Tank
Road
Lake
Basin
Draw
Canyon
Water
Can
Spur
Trail
Creek
Bog
Gap
Ranch
Wilderness
Peak
Mesa
Cr.
Lake
Tank
Gribble Place
Centerfire Bog
Headwaters Centerfire Creek
Cottonwood
Joshua Canyon
Bastion Ranch
Black Gap
Red Butte 8123
Bishop Peak 8855
Hell Roaring Mesa 8514
Bill Lee Mesa 8219
Escudilla Wilderness
Trout Creek
Romero Cr.
E L C Cr.
Jenkins Cr.
Smith Cr.
SA Cr.
Centerfire Cr.
Conner Draw
Steele Flat
Bishop
Gribble Rd
Spur Lake Basin
Centerfire Bog
Joshua Canyon
Cottonwood
Lower Cottonwood Tank
Upper Cottonwood
Ridge Tank
Thirty Two Tank
Stroud Lake
Spur Lake
Arroyo Tank
Jones Tank
Peak Tank #2
Karruth Tank #2
Karruth Tank #1
Combees Tank
Heddrick Tank
Gribble Place
Smith Tank
Lake Erin Tank
Miller Road Tank
Turkey Tank
Sil Tank
Morrison Tank
Conner Tank
Gibbons Lake Tank
Mesa Tank
Hell Roaring Mesa Tank #1
Bar C Lake
Underwood Lake Tank
Road Tank
SA Tank #2
SA Tank 3
Fir Tank
Mill Tank
Nine Tank
Knowlton Tank
Section Tank
Monkey Tank
Robson Lake Tank
Black Gap
Black Gap Tank #1
Black Gap Tank #2
Frank Tank
Funderburg Tank
Funderburg Tank #2
Bastion Ranch
SA #3 Tank
Gap Tank
Canyon Tank
Whiting Tank
Hay Tank
Joshua Tank
Escudilla Wilderness
Flat Tank
Romero Lake
Turner
Tank
Road
Lake
Basin
Draw
Canyon
Water
Can
Spur
Trail
Creek
Bog
Gap
Ranch
Wilderness
Peak
Mesa
Cr.
Lake
Tank
Gribble Place
Centerfire Bog
Headwaters Centerfire Creek
Cottonwood
Joshua Canyon
Bastion Ranch
Black Gap
Red Butte 8123
Bishop Peak 8855
Hell Roaring Mesa 8514
Bill Lee Mesa 8219
Escudilla Wilderness
Trout Creek
Romero Cr.
E L C Cr.
Jenkins Cr.
Smith Cr.
SA Cr.
Centerfire Cr.
Conner Draw
Steele Flat
Bishop
Gribble Rd
Spur Lake Basin
Centerfire Bog
Joshua Canyon
Cottonwood
Lower Cottonwood Tank
Upper Cottonwood
Ridge Tank
Thirty Two Tank
Stroud Lake
Spur Lake
Arroyo Tank
Jones Tank
Peak Tank #2
Karruth Tank #2
Karruth Tank #1
Combees Tank
Heddrick Tank
Gribble Place
Smith Tank
Lake Erin Tank
Miller Road Tank
Turkey Tank
Sil Tank
Morrison Tank
Conner Tank
Gibbons Lake Tank
Mesa Tank
Hell Roaring Mesa Tank #1
Bar C Lake
Underwood Lake Tank
Road Tank
SA Tank #2
SA Tank 3
Fir Tank
Mill Tank
Nine Tank
Knowlton Tank
Section Tank
Monkey Tank
Robson Lake Tank
Black Gap
Black Gap Tank #1
Black Gap Tank #2
Frank Tank
Funderburg Tank
Funderburg Tank #2
Bastion Ranch
SA #3 Tank
Gap Tank
Canyon Tank
Whiting Tank
Hay Tank
Joshua Tank

R. 20 W.

R. 19 W.

T. 3 S.

T. 4 S.

T. 5 S.

0 0.5 1 2 Miles

Canyon

Jones

Cow Springs Draw

Bill Knight Gap

Water Can

Gatlin Lake

Chihuahua Lake

Spur Lake Basin

Spur Lake Draw

Spur Draw

Gribble Rd.

Gribble Place

Black Gap

Centerfire Bog

Draw

Funderburg

Headwaters Centerfire Creek

SA Creek

Centerfire Cr.

Joshua Canyon

Bastion Ranch

Red Butte 8123

Jones Peak 9022

Black Peak 9006

Tank #2

Powerline Tank

Jones Tank

Orona Tank #2

Orona Tank #1

Doe Tank

Woodside Tank

Leaky Tank

Black Tank

Water Cyn Tank

Ridge Tank

Jim Tank

Peak Tank #2

Karruth Tank #2

Karruth Tank #1

Combees Tank

Arroyo Tank

Stroud Lake

Spur Lake

Shovel Tank

Thirty Two Tank

Heddrick Tank

Gribble Place Tank

Draw Tank

Hay Tank

Miner Tank

Canyon Tank

Dry Tank #2

Whiting Tank

Upper Cottonwood Tank

SA Tank #2

SA Tank

SA Tank 3

Hulsey Lake Tank

SA #3 Tank

Gap Tank

Mill Tank

Lake Tank

Frank Tank

Black Gap Tank #2

Black Gap Tank #1

Deadman Tank

Funderberg Tank #2

Nine Tank

Knowlton Tank

Outlet Centerfire Creek

Spur Lake Draw: Watershed Stabilization & Watershed Protection Fence area

Luna Planning Area Treatments (prop.)

- Mechanical Vegetation Treatment locations
- Grassland Meadow - Maintenance and Restoration
- Meadow Riparian - Maintenance and Restoration
- Prescribed Burning

Spur Draw WS

- Spur Draw 6th Code
- Other 6th Code
- Water Improvement point
- Stream/Riparian/Meadow improvement
- Road Decommissioning
- Perennial Stream
- Intermittent Stream
- Ephemeral Stream
- Non-Motorized Trail
- Improved Road, Dirt
- Improved Road, Gravel
- Private Road
- Admin-Permit Only Road
- Unimproved Road
- US Forest Service
- Private

R. 31 E. R. 21 W. R. 20 W.

T. 6 N. T. 5 N. T. 4.5 N. T. 4 N. T. 4 S. T. 5 S. T. 6 S. T. 7 S.

0 0.5 1 2 Miles

Wilderness

Escudilla Mountain 9744

E L C Cr.

Romero Cr.

Trout Creek

Flat Tank

Paddy Creek-Nutrioso Creek

Terry Lake

Cienega Cr.

Turner Peak 9170

Turner Peak 9429

Stone Creek-San Francisco River

Luna Lake-San Francisco River

Bob Thomas Cr.

Alpine RD

Quemado RD

Conner Draw

Steele Flat

Bar C Lake

Underwood Lake Tank

Gibbons Lake Tank

Romero Lake

Turner Tank

Hell Roaring Mesa 8514

Hell Roaring Mesa Tank #1

Bill Lee Mesa 8219

Booth

Monkey Tank

Dillman Cr.

Trout Cr.

Hellroaring Mesa 7858

Foxy Grandpa Tank

Road Tank

SA Tank #2

SA Creek

Hulsey Lake Tank

Spur Lake Draw

Red Butte 8123

Fir Tank

Mill Tank

Bishop Peak 8855

Bishop

Knowlton Tank

Outlet Centerfire Creek

Section Tank

Ruyle Place

Ruyle WSS

Draw Tank

Rodeo Tank

Tank

Luna Work Center

Kiehne Pond

Luna

Luna Valley

Kiehne Tank

Swapp Tank

Fork Tank

Big Canyon-San Franciso River

Canyon

Mail Hollow

Adair

Blue Tank

Lefthand Canyon

Starkweather Canyon

Quemado RD

Reserve RD

Horse Mesa 8438

Upper Tank

Dave Lee Lake

Frieborn Tank

Frieborn

San Francisco Mountains 8465

Headwaters Saliz Canyon

Oak Springs

Hefer Basin

Draw

Colver

Canyon

Arizona

New Mexico

Apache County

Catron County

Greenlee County

Apache-Sitgreaves NFs

Gila NF

Stone Cr.

Little Cr.

San Francisco R.

Luna Lake

Little Creek Tank

Estes Tank

Hamblin Tank

Jackson Cr.

Hy Clark WSS 1

Hy Clark WSS 3

Hy Clark WSS 5

Hy Clark WSS 6

Tenney Pond

Tenney Tank

Pine Lake

Coleman Creek

Apache County

Greenlee County

Juniper Bench

Indian Peak 8760

Campbell Blue Creek

White Bluff 7241

Mother Hubbard Canyon

Box Canyon

Turkey Cr.

Dry Blue Creek

Pace Cr.

Dry Blue Cr.

Blue River Ranch

Bobcat Flat

Upper Blue

Maness Mountain 7995

Maness Mountain 8094

Maness Peak 8258

Noland Cr.

Centerfire Creek-Blue River

Steeple Canyon-Blue River

Alpine RD

Glenwood RD

Engineer Tank

Double J Ranch

Adair Tank

Tank

Head of the Ditch

NFSR 882 Reroute

Pit Tank

Hollow

Draw

Canyon

Jackson Can

Jackson Box

Lefthand Canyon

Oak Springs

Ruyle Place

Ruyle WSS

Draw Tank

Rodeo Tank

Tank

Luna Work Center

Kiehne Pond

Luna

Luna Valley

Kiehne Tank

Swapp Tank

Fork Tank

Big Canyon-San Franciso River

Canyon

Mail Hollow

Adair

Blue Tank

Lefthand Canyon

Starkweather Canyon

Quemado RD

Reserve RD

Horse Mesa 8438

Upper Tank

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Jackson Box

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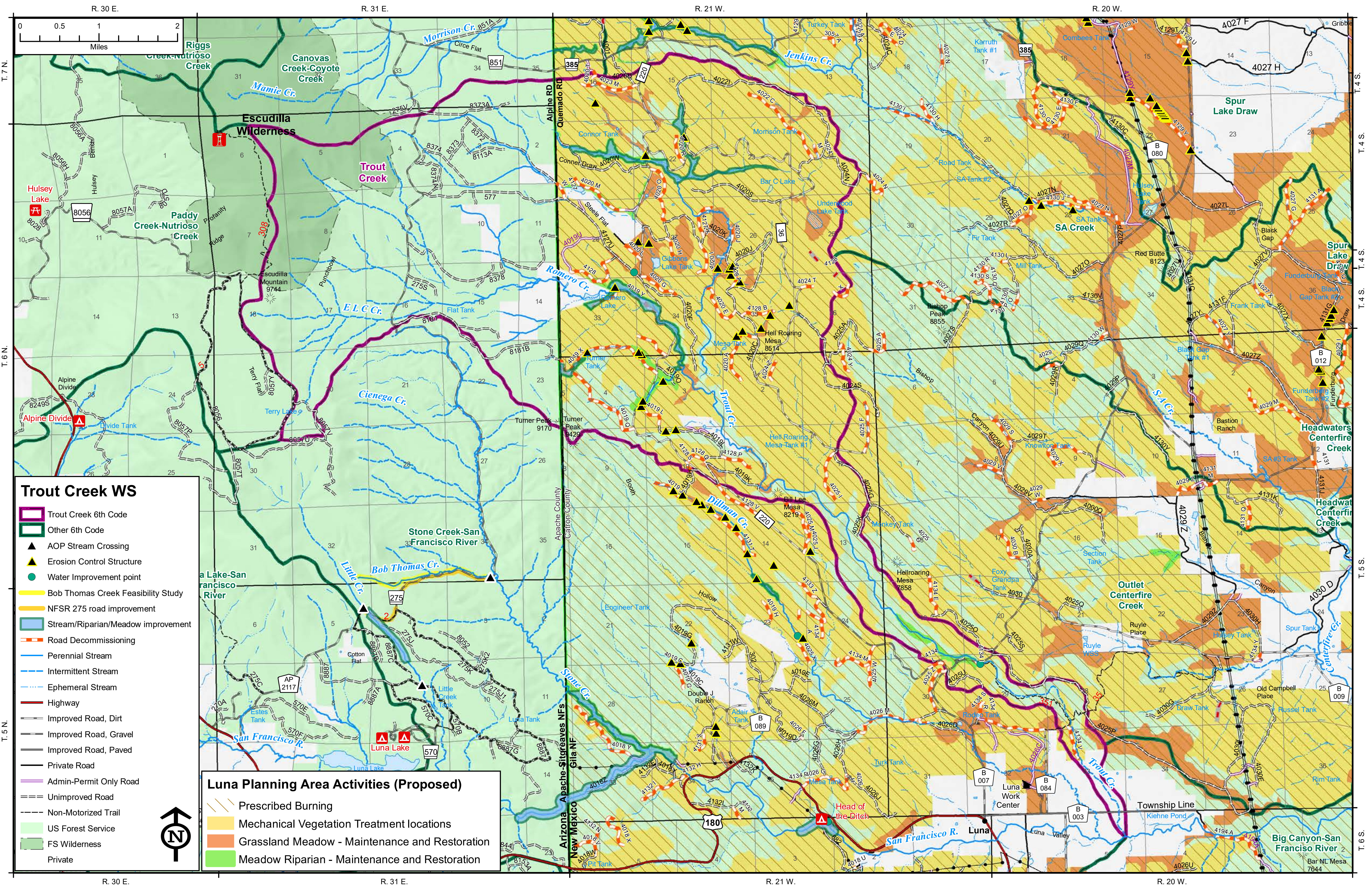
Oak Springs

Stone Creek - San Francisco River WS

- Stone Cr.-San Francisco R. 6th Code
- Other 6th Code
- AOP Stream Crossing
- Dry Blue/Trail #61 reroute
- Erosion Control Structure
- Culvert-like structure w/ephemeral channel
- Water Improvement point
- Bob Thomas Creek Feasibility Study
- NFSR 275 road improvement
- Stream/Riparian/Meadow improvement
- Road Decommissioning
- Perennial Stream
- Intermittent Stream
- Ephemeral Stream
- Highway
- Improved Road, Dirt
- Improved Road, Gravel
- Improved Road, Paved
- Private Road
- Admin-Permit Only Road
- Unimproved Road
- Non-Motorized Trail
- Motorized Use Trail
- US Forest Service
- FS Wilderness
- FS Primitive Area or Wilderness Study Area
- Private

Luna Planning Area Treatments (prop.)

- Mechanical Vegetation Treatment locations
- Grassland Meadow - Maintenance and Restoration
- Meadow Riparian - Maintenance and Restoration
- Prescribed Burning



Trout Creek WS
Trout Creek 6th Code
Other 6th Code
AOP Stream Crossing
Erosion Control Structure
Water Improvement point
Bob Thomas Creek Feasibility Study
NFSR 275 road improvement
Stream/Riparian/Meadow improvement
Road Decommissioning
Perennial Stream
Intermittent Stream
Ephemeral Stream
Highway
Improved Road, Dirt
Improved Road, Gravel
Improved Road, Paved
Private Road
Admin-Permit Only Road
Unimproved Road
Non-Motorized Trail
US Forest Service
FS Wilderness
Private
Luna Planning Area Activities (Proposed)
Prescribed Burning
Mechanical Vegetation Treatment locations
Grassland Meadow - Maintenance and Restoration
Meadow Riparian - Maintenance and Restoration
0 0.5 1 2
Miles
R. 30 E.
R. 31 E.
R. 21 W.
R. 20 W.
T. 7 N.
T. 6 N.
T. 5 N.
T. 4 S.
T. 5 S.
T. 6 S.
Escudilla Wilderness
Riggs Creek-Nutrioso Creek
Canovas Creek-Coyote Creek
Paddy Creek-Nutrioso Creek
Trout Creek
SA Creek
Spur Lake Draw
Headwaters Centerfire Creek
Outlet Centerfire Creek
Stone Creek-San Francisco River
Big Canyon-San Francisco River
Hulsey Lake
Alpine Divide
Luna Lake
Head of the Ditch
Luna
Luna Work Center
Township Line
Escudilla Mountain 9744
Turner Peak 9170
Turner Peak 9429
Hell Roaring Mesa 8514
Bill Lee Mesa 8219
Hellroaring Mesa 7858
Bishop Peak 8855
Red Butte 8123
Bar NL Mesa 7644
Morrison Cr.
Mamie Cr.
E L C Cr.
Cienega Cr.
Bob Thomas Cr.
Little Cr.
Stone Cr.
Romero Cr.
Trout Cr.
Dillman Cr.
Jenkins Cr.
S A Cr.
Centerfire Cr.
San Francisco R.
Alpine RD
Quemado RD
Apache County
Catron County
Arizona
New Mexico
Apache-Sitgreaves NFs
Gila NF