HEADWATERS BURRO CIENAGA WATERSHED

WATERSHED RESTORATION ACTION PLAN
AND
WETLANDS ACTION PLAN

Prepared by Southwest Native Ecosystems Management

2012

Executive Summary

The Headwaters Burro Cienaga 5th Code Watershed is located in Grant County, New Mexico, approximately 25 mile southwest of Silver City, New Mexico on the southeast corner of the Burro Mountains. The Burro Cienaga Watershed is accessible from Highway 90 and is comprised of Gila National Forest, New Mexico State Land Office, Bureau of Land Management and private lands.

The Headwaters Burro Cienaga Watershed contains 109,257 acres; the primary use of the lands that make up this watershed is ranching. A group of the local ranchers have come together to form the Upper Burro Cienaga Watershed Association and the members of this Association are currently working together to restore and enhance the ecosystem health and watershed conditions found on their ranches and the lands that make up the Burro Cienaga Watershed. This Watershed Association is actively working to acquire grant funds to improve resource conditions across the watershed and have completed some work to restore the degraded resource conditions that were the result of historic management practices that occurred during the era of western expansion and homesteading in Southwestern New Mexico.

The Headwaters Burro Cienaga Watershed contains a very unique situation within the Burro Cienaga drainage, which is the major drainage within the watershed. An approximately 10 mile reach of spring-fed perennial stream within the Burro Cienaga drainage is located in the center of an otherwise dry Chihuahuan Desert setting that is characteristic of the watershed. Because of this perennial reach of stream forming a "cienaga" (area of hydrated soils), a host of unique fish, wildlife and plants species are found to occur within the watershed. This unique situation lends itself to some rare and important opportunities to restore and enhance some of the least abundant wildlife habitat located within the southwestern United States and provides an opportunity to enhance the viability of many migrating bird species.

The goals of the Watershed Association and the land management agencies are to reclaim the historic wetland and riparian habitats that once occurred. In order to achieve the habitat restoration goals, the Association and land management agencies understand that an entire watershed or landscape approach is needed and have supported the development of this Watershed Restoration Action Plan (WRAP) and Wetland Action Plan (WAP) (hereafter "Plan"). A major goal of this Plan is to broaden the scope of work to be completed to include the restoration and enhancement of the upland watershed conditions, as well as defining the areas and projects that will restore and enhance wetland/ riparian habitats. Thus the watershed planning elements often used by the Forest Service in developing WRAPs have been supplemented by wetland planning components promoted by the New Mexico Environment Department. This is the first known combination of these planning efforts in the state of New Mexico.

This Plan identifies a number of essential projects which are located across the upper end of the watershed and identifies these projects as either "Watershed" or "Wetland/Riparian" projects. These projects are described and the cost of completing these projects is estimated using the latest NRCS Cost Docket and Cost Data. Once funding is acquired, the implementation of the projects will be carried out by the landowner or land lessee where the project is located, but with the oversight of the steering committee that has been developed for the Burro Cienaga Watershed. Short term monitoring will be part of the project implementation and will be carried out at yearly field reviews done by the steering committee. Long term monitoring will fall upon the Association and the resource agencies as part of their on-going management of the watershed.

It is hoped that the creation of this Plan 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.

Contents

I. Watershed Description

a. Watershed Name, Hydrologic Unit Code (HUC) Number, Land Ownership and Watershed Size:

The planning and project area is the Headwaters Burro Cienaga Watershed (Burro Cienaga Watershed), HUC 1504000302, which is made up of the following 6th code watersheds:

6th CODE WATERSHED NAME	HYDROLOGIC UNIT CODE	ACRES NATIONAL FOREST LAND	ACRES PRIVATE LAND	ACRES NM STATE LAND	ACRES BLM LAND	TOTAL ACRES
Hall Draw-Burro Cienega	150400030201	13,923 (56%)	10,801 (43%)	205 (1%)	0	24,929
Horse Canyon-Burro Cienaga	150400030202	0	13,273 (48%)	8,510 (31%)	5,844 (21%)	27,627
Ninetysix Creek	150400030203	3,743 (12%)	10,983 (35%)	15,822 (50%)	1,134 (3%)	31,682
Ninetysix Creek-Burro Cienega	150400030204	0	8,678 (35%)	15,230 (61%)	1,056 (4%)	24,964
	TOTAL	17,666 (16%)	43,735 (40%)	39,767 (36%)	8,034 (8%)	109,202

Table 1. Details for 6th Code or 12 digit HUC Watersheds

For a map of the 5th and 6th code watersheds, see Figure 1.

b. Location:

The Burro Cienaga Watershed is located approximately 25 miles southwest of Silver City, New Mexico on the southeast corner of the Burro Mountains. The Burro Cienaga Watershed is within Grant County, New Mexico, which has a population of 29,514 (2010 census), with Silver City, including the Santa Clara, Bayard and Hurley mining district, being the largest community in the area. The Burro Cienaga Watershed is accessible from Highway 90, which runs through the upper end of the watershed, and from the county maintained Separ Road, which runs through the middle of the watershed.

There are multiple ranch headquarters and associated structures (i.e. houses, barns, shops, bunkhouses) within the Burro Cienaga Watershed. Most of the ranch headquarters and structures are located on or near the drainage floodplains. Also, most of the secondary access roads within the Burro Cienaga Watershed are located in the canyon bottoms and are prone to flooding during the summer monsoon season.

c. Total Burro Cienaga Watershed Area:

The Burro Cienaga Watershed contains 109,257 acres, of which 16 % is managed by the Gila National Forest (GNF) and 8% is managed by the Las Cruces District Office of the Bureau of Land Management (BLM). Also, 40% is NM State Land Office (NMSLO) lands managed under leases to local ranches, and 36% is private land managed by the various local ranches. Most of the watershed is managed primarily for livestock production. The GNF lands are concentrated in the upper elevations of the

watershed while the private, BLM and NMSLO lands are scattered throughout the lower elevations (see Figure 1).

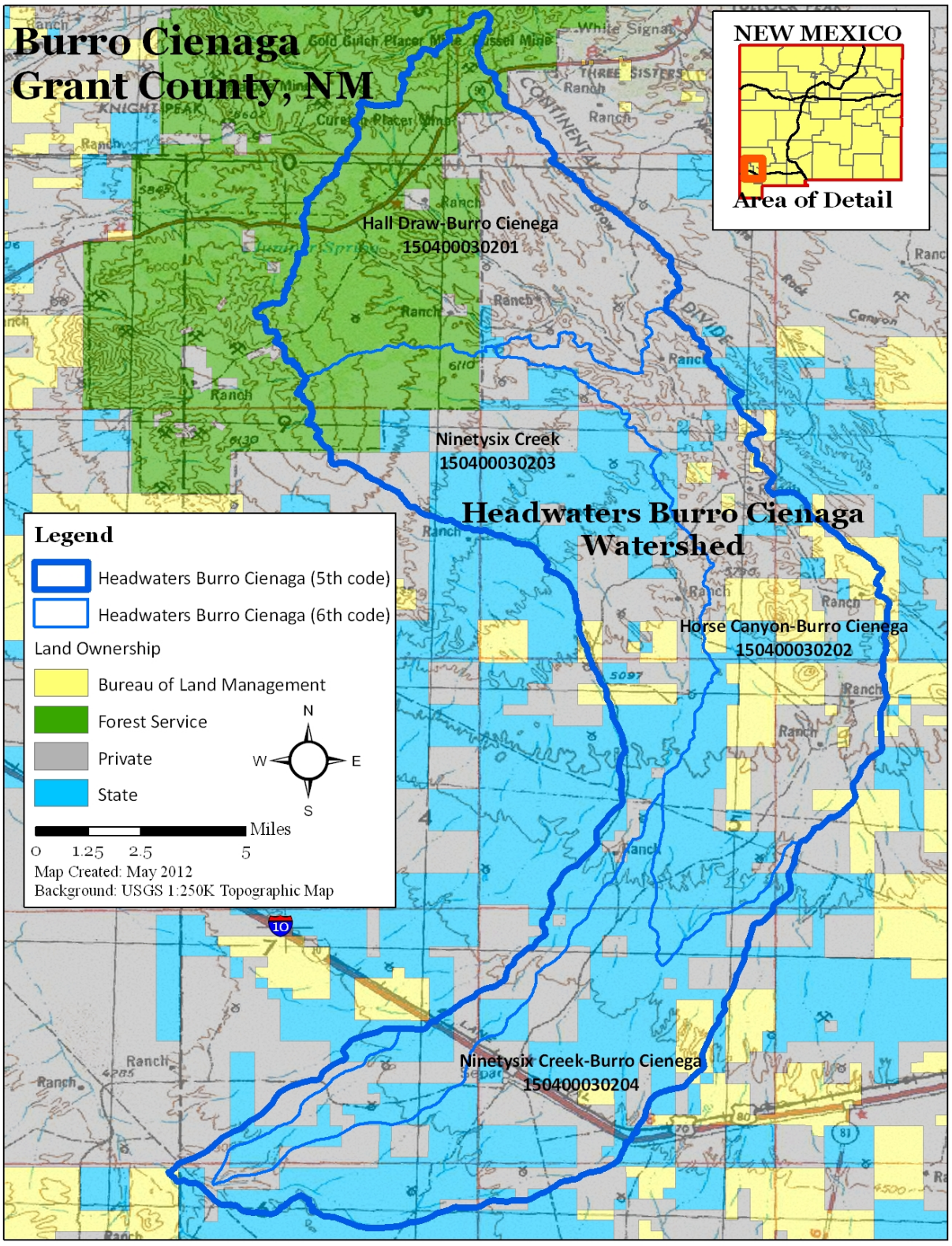

Figure 1. Burro Cienaga Watershed Location Map

d. Physiography:

The topography of the Burro Cienaga Watershed ranges from mountainous terrain with narrow canyons at the upper end; long rolling ridges and broader canyons extending through the mid portions; and flat alluvial fans at the lower end. This watershed is located on the western side and adjacent to the Continental Divide. However, it is considered a closed basin emptying into the Lordsburg Playa system with no defined connection with the Gila River or other major river features.

In the upper portions of the Burro Cienaga Watershed, numerous small tributary drainages such as C Bar, Walking X and Whitetail Canyons merge to form the mainstem drainage of the watershed (Burro Cienaga drainage). The mid portion of the watershed is made up of this mainstem channel and small side tributaries. At the lower end of the watershed the gradient decreases and the terrain becomes flat, at which point the mainstem channel becomes braided and forms a large alluvial fan.

There are portions of the Burro Cienaga Watershed where large outcrops of bedrock are exposed and protrude almost vertically, which form a huge bolder strewn maze-like landscape that is somewhat unique for the area. This area of protruding bedrock results in the water table being forced to the surface and the hydration of surface soils.

The mountainous upper portions of the Burro Cienaga Watershed are actively being eroded while the lower portions of the watershed, especially in the canyon bottoms, are aggrading as sediments are deposited where the channel gradient decreases. The rate of erosion and deposition for most of the watershed is above natural levels and is due to historic uses and past management actions. (Natharius, Mike and Koury, Carolyn; Watershed, Soils, & Air Specialist Report, C Bar Allotment, Silver City Ranger District; May 30, 2007)

e. Land Use:

The Burro Cienaga Watershed has a long history of use by humans. A high density of pre-historical archeological sites located throughout the watershed indicates this watershed has been the home to different cultures long before the European settlers first came to the area in the 1600's. Many of these cultural sites remain relatively undisturbed, but there are some that have been looted for their artifacts (R. Pope pers. obs.). The high density of sites along the Burro Cienaga drainages is a strong indication that this drainage was a once reliable source for water and provided the plants and animals the native people depended upon. There is a real potential for research and interpretation of the pre-historical occupation and use of this watershed.

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 in the desert climate. The few cienaga wetlands and perennial streams located in the Southwest became the oases in the desert that were heavily used by the settlers and their sheep, goats, cattle, burros and horses. Undoubtedly, the Burro Cienaga drainage was one of the areas that were very attractive to the early settlers that moved into the area. Bartlett (1854) described the Burro Cienaga valley as "a beautiful grassy meadow about three hundred yards wide, in which were many springs".

In more recent times, during the late 1800's and early 1900's, the Burro Cienaga Watershed was used heavily by large numbers of livestock, which left the watershed in a much degraded condition. 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. Also, there is much evidence that numerous small farms were started along the major drainages within the Burro Cienaga Watershed. Where water was available, the land was divided up and occupied by people who tried to establish homesteads where they engaged in farming and the raising of livestock. The attempts to farm in the valley bottoms served to further alter the vegetation and stability of the floodplain.

For well over one hundred years the major land use of the Burro Cienaga Watershed has been ranching. The many small farms were slowly abandoned as droughts occurred and the perennial flow of water dried up in all but a few localized areas. The overgrazing by livestock and the clearing of the valley bottom vegetation within the watershed left scars on the land and the degraded conditions that are present today. It has not been until the last 25 years that livestock numbers were reduced and stocking rates have been implemented that are within the capacity of the land.

Other significant land uses that currently occur in the Burro Cienaga Watershed are fuelwood harvesting and hunting. The Gila NF portion of the watershed yearly provides an estimated 25 cords of dead and down firewood to the public who purchase fuelwood permits from the Gila NF and cut their winter supply of wood on National Forest lands. To many people this fuelwood gathering activity has become a tradition and many people consider cutting fuelwood as an outdoor recreational experience. Most of the fuelwood harvesting that takes place in the Burro Cienaga Watershed is not closely monitored, and there has been some resource damage from the wood cutters creating new roads and driving up and down steep slopes.

The only significant hunting activity that occurs in the Burro Cienaga Watershed occurs each fall during the various deer (mule deer and Coues whitetail deer) hunting seasons that take place. While the number of hunters is regulated through a hunt unit/draw system managed by the New Mexico Department of Game and Fish, on occasion a number of hunters will congregate in an easily accessible site and leave behind heavily trampled areas where they camped. These heavily used camp areas can be found along most of the major Forest Roads within the watershed.

Recently there has been a smattering of wetland/riparian and upland restoration projects implemented within the Burro Cienaga Watershed. A list of these projects is found in Appendix A, Current Restoration Projects – Headwaters Burro Cienaga Watershed. The purpose of these projects has been mainly to enhance ecosystem health and to restore historic resource conditions at various locations along the Burro Cienaga mainstem drainage. Most of these projects were initiated as part of the efforts of the *Upper Burro Cienaga Watershed Association.*

In 2009, an association of the Pitchfork, C Bar, and Prevost Ranches was formed to address the ecological condition of the Burro Cienaga Watershed. Since 2009 the Pitchfork Ranch has withdrawn from the Association and the M-N Ranch, Thorne Ranch and A T Cross Ranch have joined. The Upper Burro Cienaga Watershed Association (Association) established as its purpose the following: 1) Mitigate further degradation of the watershed. 2) Restore and preserve the watershed in order to recapture its historic functions. 3) Expand the wetlands within the watershed in order to magnify and sustain the role wildlife, ranching, and recreation play in the local community. 4) Enhance and sustain the role that the watershed plays in providing for the "Common Good" of the local and world community.

The mission of the Association is to facilitate cooperation and coordination between the governmental land management agencies that have regulatory, fiscal and technical assistance responsibilities, and the stakeholders with interest in addressing the severe degradation of the watershed. In order to carry out its mission, the Association will:

- Assist in the process of data collection, site specific scientific studies and broader scientific research to develop pertinent information.

- Identify resource production, economic, social and environmental issues relevant to the health of the watershed.
- Support proposed projects and restoration solutions at the local, state and federal level which address degraded watershed conditions.
- Assist in finding funding opportunities to address the myriad issues confronting the health of the watershed.

Currently there are several projects being completed that will restore historically altered stream channels, reconnect stream flow access to the historic floodplain, and restore wetland/riparian vegetation at sites on the Pitchfork, C Bar and Prevost Ranches. This work consists of breaching earthen berms that were constructed to protect now abandoned farm fields, constructing boulder deflection structures across the current active flood channel, planting sub-obligate and obligate wetland species along the stream banks and on the abandoned fields, and reconstructing an old water impoundment structure to provide habitat where Chiricahua leopard frogs can be reintroduced.

In the future the Association hopes to secure additional funding to restore many more of the degraded watershed/riparian/wetland conditions within their watershed. The landowners, who make up the Association, while completing individual projects on their own lands, will coordinate their efforts for the benefit of the entire watershed.

f. Key Problems:

As explained above in the land use description, the Burro Cienaga Watershed along with most of Southwestern New Mexico were heavily impacted by grazing, farming and mining activities during the homestead era in the late 1800's and early 1900's. Even though it has taken many years to fully understand the consequences of this period of Southwest history, it has become obvious that the movement of early settlers into this arid and fragile desert grassland region of Southwestern New Mexico resulted in degraded resource conditions across a large portion of the region. Many of the impacts of the homestead/exploitation era are still affecting land productivity, ecosystem characteristics and watershed condition/functionality.

The historic degradation of the various ecosystems is the primary situation that needs to be addressed in order to restore ecosystem health and enhance watershed functionality in the Burro Cienaga Watershed. Improvements in watershed functionality and ecosystem health will result in the desired wetland/riparian wildlife habitat as conditions return to what were present when the settlers first moved into the area.

The specific problems that need to be addressed are:

- Dense stands of pinyon/juniper and other woodland species comprise most of the upper watershed vegetation.
- Many head cuts and gullies are still active in the uplands, which release tons of sediment into the stream channels.
- Large sediment loads are currently moving through the watershed with each large precipitation event. (Channeling of flood water and erosion due to poorly located roads contribute greatly to the sediment load.)
- Anthropogenic channel control dikes associated with the long abandoned farms are still preventing large flow events from accessing the entire floodplain, thus concentrating flow energy and are causing the channel to down cut in some of the major water courses.
- The lowering of the water table due to channel incision and reduced water infiltration. This has resulted in reduced groundwater storage in the floodplains and alluvial aquifers, which has led to the desiccation of former wetland areas.

- Many of the riparian/wetland species that once were abundant in the watershed are only found in remnant populations or no longer exist in the watershed.

g. Restoration Opportunities/Priorities:

The Burro Cienaga Watershed has been selected for restoration work because the Burro Cienaga drainage currently supports an approximate ten mile reach of perennial stream and there are indications that Ninetysix Creek once supported either perennial or perennial interrupted stream flow. Also recent changes in management have led to some natural reestablishment of riparian and wetland plant communities in the watershed. This natural reestablishment of native riparian/wetland plants is a strong indicator of the potential for future development and expansion of important riparian/wetland plant communities.

Many of the actions necessary to recover watershed functionality, thus sustainable riparian/wetland habitats, will need to take place in the headwater region of the Burro Cienaga Watershed, primarily on National Forest lands. As watershed functionality is restored in the headwater regions of the Burro Cienaga Watershed (Hall Draw-Burro Cienaga and Ninetysix Creek 6th code watersheds) the potential for supporting riparian/wetland plant communities will be increased; and thus wildlife habitat will be enhanced. The improvement in ecosystem health will be accomplished through both changes in natural ecosystem processes and site specific projects carried out to accelerate the establishment of key wetland/riparian plant communities. The site specific wetland/riparian projects are being targeted for the perennial and perennial interrupted reaches of the Burro Cienaga drainage and at key locations within the Ninetysix Creek 6th code watershed.

II. Watershed Characteristics and Conditions

a. Context/Overview of the Burro Cienaga Watershed

1. Climate:

Precipitation and temperature data for White Signal, New Mexico (the nearest location where long term climate information has been recorded) is being used to indicate the approximate average precipitation and temperature for the Burro Cienaga Watershed. (See Appendix B, White Signal, NM, Monthly Climate Summary) As indicated by this data, the long term average precipitation for the area is 14.93 inches per year with most of the precipitation occurring in the months of July and August during the summer monsoon season. Most of the watershed's annual 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. Occasionally in the fall, there are large amounts of rain associated with hurricanes that come onshore in Southern Texas or Northern Mexico which 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 substantial flooding.

Using the White Signal data, the long term approximate average high and low daily temperatures are 69.5° F. and 39.4° F respectively for the Burro Cienaga Watershed. (See Appendix B) The day time average high temperatures vary considerably by season with the highest average day time temperatures (87.1° F) occurring in June and the coldest average night time temperatures occur in January (23.8° F). Seasonal extremes can be as low as 0 degrees during the winter and as high as 110 degrees during the summer. Since the Burro Cienaga Watershed is bounded on the east by the Continental Divide, the weather during the winter is largely influenced by frontal systems as they sweep in from the west and cross over the Divide. During the summer the weather is influenced by high pressure systems leading to hot and dry conditions, but then later in the summer the North American Monsoon moisture system develops that usually brings significant precipitation.

2. Hydrology:

With 15 inches of annual precipitation and high evaporation rates, surface water is very limited in the Burro Cienaga Watershed. Most of the drainages in the Burro Cienaga Watershed only support ephemeral flows following high intensity precipitation events. As is common throughout the Burro Mountains, these ephemeral flows carry a large load of sediment. During smaller precipitation events these streams usually do not have exposed surface flow because the water percolates deep into the sand that is deposited in these drainages. There are reaches of the second order drainages that support wetland/riparian vegetation, but seldom have exposed surface flows. Once the sediment loads in the watershed become stabilized and are no longer swamping the channels, it is likely some of these areas will again have intermittent perennial water available in the channel especially in the areas of shallow water tables that currently support wetland and riparian vegetation.

Within the mainstem of the Burro Cienaga drainage, below a unique basalt flow geologic formation there is an approximate ten mile reach of perennial stream. This reach of perennial stream originates below the point where C Bar, Walking X, and Whitetail Canyons come together and form the "Burro Cienaga" mainstem drainage. The perennial flow originates where a subsurface bedrock formation forces groundwater to the surface and then it flows on the surface as a spring-fed perennial stream for a considerable distance before it percolates back into the soil and disappears again. This perennial reach of stream supports a ribbon of riparian/wetland "cienaga" vegetation that is unique and rarely found in the dry desert shrub and desert grassland plant communities that dominates Southwest New Mexico.

3. Geomorphology:

The elevation of the Burro Cienaga Watershed ranges from 7,296 feet on the northwest side along the Continental Divide to 4,370 feet where the Burro Cienega and Ninetysix Creek drainages spread out and form small playa areas. The Burro Cienaga Watershed is considered to be west of the Continental Divide and within the Gila River Basin in the Animas Valley 8-digit HUC (15040003). Presently, runoff from this Burro Cienaga Watershed terminates in a playa system located to the east of Lordsburg, New Mexico. None of the surface runoff transported through the Burro Cienaga Watershed actually reaches the Gila River.

The Hall Draw-Burro Cienega 6th code watershed (HUC 150400030201) comprises the uppermost portions of the Burro Cienaga Watershed and is made up of a mountain/canyon upland land form. The small, steep gradient drainages that make up the headwater portion of the Burro Cienaga Watershed merge and form C Bar, Walking X and Whitetail Canyons. Downstream these drainages plus Silver City and Hall Draws come together and form the Burro Cienaga watercourse. (See Map 1 in Appendix) At this point on the Burro Cienaga drainage the Hall Draw-Burro Cienaga 6th code watershed ends and the Horse Canyon-Burro Cienaga 6th code watershed (HUC 150400030202) begins. This 6th code watershed runs south/southwest through a gentler rolling hills landform and on out into the open flat terrain. (See Map 2 in Appendix)

Paralleling the Hall Draw-Burro Cienega 6th code watershed is the Ninetysix Creek 6th code watershed (HUC 150400030203), which also starts as multiple small steeper gradient drainages in the upper most reaches of the Burro Cienaga Watershed. This 6th code watershed is made up of JPB Draw, Taylor Canyon, Myers Canyon, Well Canyon, South Well Canyon and New Well Canyon that all come together and form the Ninetysix Creek drainage. The Ninetysix Creek drainage runs south/southwest through a gentle, rolling hill land form and out into open flat terrain where the watercourse spreads out and forms a broad alluvial fan and a system of small closed basin playas. (See Map 3 in Appendix)

The Ninetysix Creek-Burro Cienaga 6th code watershed (HUC 150400030204) is located downstream from the Hall Draw-Burro Cienaga and Ninetysix Creek 6th code watersheds. This 6th code watershed is located at a lower elevation and is comprised of broad floodplain alluvial deposits where multiple gullies and head cuts have dissected the deep alluvial soils. This 6th code watershed is comprised of desert grassland/desert shrub vegetative communities with some remnants of the giant sacaton

(*Sporobolus wrightii*) plant community scattered throughout the watershed. The land form and geomorphology of the Ninetysix Creek-Burro Cienaga 6th code watershed is commonly found in the ephemeral floodplain and playa areas that are scattered across the arid portions of Southwestern New Mexico and Southeastern Arizona. (See Map 4 in Appendix)

4. Geology

The mineral deposits that make up the Burro Cienaga Watershed are igneous rock formations of various ages along with the sedimentary formation called Gila Conglomerate which is a naturally cemented combination of the various volcanic mineral deposits of the area. The upper mountainous portion of the watershed is made up of a granite formation that contains a high amount of pure quartz, and a Gila Conglomerate formation that contains a mixture of eroded volcanic rock that has been welded back together as a sedimentary formation. The weathering of these deposits makes up the rock and soil particles that dominate the mountainous upper end of the watershed.

The lower ridge and canyon portions of the Burro Cienaga Watershed are made up of rhyolite and basalt formations that are very different in age. While both of these formations are the result of volcanic activity the rhyolite is much older and more weathered than the basalt formation. The basalt has been extruded through and overlays the rhyolite in sections of the mid portion of the Burro Cienaga Watershed. The weathering of these two different volcanic deposits make up the soils found in a patchy network of soil deposits in the lower end of the watershed. A basalt extrusion makes up the dike that forces water to the surface, which results in the perennial flows in the Burro Cienaga drainage.[1]

5. Soils

The soils that make up the Burro Cienaga Watershed are derived mostly from granite, rhyolite, quartz, and basalt parent material[2] The soils formed from granite and quartz generally are coarse textured soils (i.e. sandy), which are extremely sensitive and tend to be highly erodible when not protected by herbaceous vegetation. Without adequate ground cover to protect these soils, they erode quickly and will continue to erode until herbaceous ground cover can be reestablished. These soils tend to have low inherent fertility and because of their sandy texture, soil moisture is not retained for very long. These soils do not usually support dense stands of herbaceous vegetation very well. Most of the granite and quartz derived soils are located at the upper end of the watershed in the steeper more mountainous region.

The soils that are formed from rhyolite and basalt are fine textured soils with moderate to high inherent fertility and because of their silt and clay texture they hold nutrients and soil moisture well. These soils usually support dense stands of herbaceous vegetation very well, except for when herbaceous ground cover has been removed from the basalt soils, which then frost heave and make it hard to establish new plants. The basalt and rhyolite based soils are considered to be moderately erosive and are stable when covered with moderate levels of ground cover or located on areas with little or no slope. Most of the rhyolite and basalt derived soils are located in the mid portion of the Burro Cienaga Watershed in the rolling ridge and canyon region of the watershed.[3]

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[1] (Elliot Gillerman; Mineral Deposits of Western Grant County, New Mexico, Bulletin 83, New Mexico Bureau of Mines & Mineral Resources 1964)

[2] http://soildatamart.nrcs.usda.gov/Manuscripts/NM662/0/grant.pdf.

[3] (Terrestrial Ecosystem Survey of the Burro Mountains, USDA Forest Service, 1982) (Web Soil Survey, USDA Natural Resource Conservation Service)

There are areas of hydric soils buried deep under alluvium along many reaches of the mainstem Burro Cienaga stream channel. These soils indicate a very different vegetative and stream channel setting than occurs today. Since hydric soils form under anaerobic and submerged conditions these soils were formed long before the current channel down cut and drained the canyon bottom wetlands and floodplains. The current degraded condition of the Burro Cienaga Watershed with its periodic flash floods and huge sediment yields make it difficult to support the wetland ("cienaga") setting necessary for the rehydration of remnant hydric soils and the formation of new hydric soils in the future.

Photo 1. Dark layer of hydric soils buried deep under alluvium.

6. Vegetation

The vegetative communities that are established within the Burro Cienaga Watershed consist of the Montane Scrub, Desert Scrub and Desert Grassland habitat types as described by William A. Dick-Peddie in his book *New Mexico Vegetation, Past Present and Future.* While most of the vegetation found growing on the watershed is well represented in these habitat type descriptions, there are some unique characteristics about the Burro Cienaga Watershed vegetation that are found only in Southwestern New Mexico and Southeastern Arizona. (See Appendix G, Plant List for Burro Cienaga)

The plant communities found growing on the Burro Mountains and similar mid-elevation mountain ranges in Southwest New Mexico are a mixture of plant species found in the Great Basin, Rocky Mountains, and Central Plains regions that have combined with the vegetation found in the Chihuahuan and Sonoran Deserts. Because of the melding of these vegetative regions, there are plant species from the different regions that occur in Southwestern New Mexico and have hybridized overtime. There are also ecosystems within Southwestern New Mexico (including the Burro Cienaga Watershed ecosystems) that contain species and species associations that do not occur anywhere else in the world.

The vegetation found growing on the Burro Cienaga Watershed is also 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 watershed, on the steeper slopes where the soils are derived from granite and quartz parent material, the dominant vegetation is comprised of trees and shrubs. While there is a large variety of tree and shrub species growing at the upper elevations of the watershed, the dominant species are gray oak (*Quercus grisea)* on the upland slopes and alligator juniper *(Juniperus deppeana)* and pinyon pine *(Pinus edulis)* in the canyon bottoms where there are deeper soils and more soil moisture.

At the lower elevations of the Burro Cienaga Watershed, on the more moderate slopes where the soils are derived from mostly basalt and rhyolite parent material, the dominant vegetation is comprised of various grassland ecosystems. The dominant grass species found in these ecosystems are blue grama *(Bouteloua gracilis),* hairy grama *(Bouteloua hirsuta)* and sideoats grama *(Bouteloua curtipendula)* on the rhyolite derived soils and tobosa *(Hilaria mutica)* and blue grama *(Bouteloua gracilis)* on the upland basalt soils. In the canyon bottoms where deeper soils and more soil moisture are found, Tobosa *(Hilaria mutica),* giant sacaton *(Sporobolus wrightii),* sand dropseed *(Sporobolus cryptandrus),* and vine mesquite *(Panicum obtusum)* are the dominant grass species.

As stated earlier, most of the drainage bottoms within the Burro Cienaga Watershed are dry, and contain deep sandy soil that support a higher density of trees than the uplands. These stringers of trees are important corridors of protected habitat that are critical for the survival of a variety of wildlife species. The dominant tree species growing along these dry sand washes are alligator juniper *(Juniperus deppeana),* pinyon pine *(Pinus edulis),* net-leaf hackberry *(Celtis reticulata),* western soapberry *(Sapindus drummondii),* Arizona walnut *(Juglans major),* southwest chokecherry *(Prunus serotina)* Arizona white oak *(Quercus arizonica)* and Emory oak *(Quercus emoryi),* which are species unique to the Southwest. These two species of unique oak trees are valuable producers of acorns, which provide food for a large number of wildlife species. These trees usually become hollow as they get older, which provides habitat for a number of small mammals and birds. Also, these trees provide high quality fuelwood for many local citizens.

In addition to the unique tree species, there are a variety of unique shrubs, grasses and forb species found growing along the dry sand washes in the Burro Cienaga Watershed. Most of these species have been severely impacted by past grazing and farming practices, which makes the watershed an important area to restore and preserve for future generations.

There are patches of obligate riparian vegetation located along the major drainages within the Burro Cienaga Watershed including the ten miles of perennial stream located in the mid section of the watershed. These patches of true obligate riparian/wetland vegetation are representative of southwestern riparian communities, but are unique because they occur in an isolated area which is a considerable distance (> 25 miles) from any similar vegetation.

The major riparian/wetland species found growing within these isolated vegetative communities are Arizona sycamore *(Platanus wrightii)* and velvet ash *(Fraxinus velutina)* dominated ecosystems in the sandy and rocky substrate areas and Gooding or black willow *(Salix goodingdii)* and Fremont cottonwood *(Populus fremontii)* dominated ecosystems in the finer textured sediment substrates. These unique ecosystems are much like an oasis in the desert due to being isolated from any similar vegetative communities.

These riparian/wetland plant communities were severely degraded by past livestock grazing and farming activities, which occurred in the watershed for many years. These unique riparian/wetland ecosystems are now recovering from the past heavy use by livestock, but are still not supporting all of the vegetative species that potentially could grow in these areas. As these areas continue to recover they

may support many additional obligate riparian/wetland species (i.e. coyote willow *Salix exigua,* false indigo *Amorpha fruticosa)* that are very limited in the area today. These ecosystems will be monitored as future restoration projects are implemented to observe what riparian/wetland species and associated wildlife species will fill the vacated niches in the watershed as the riparian ecosystems are restored.

As saturated conditions are restored across the floodplain, herbaceous wetland species will become more prevalent. The most common herbaceous wetland plants of the southwestern region are the open water emergent species of bulrush (*Schoenoplectus* spp., *Bolboschoenus maritimus* (Linnaeus) Palla) and cattail (*Typha* spp.); sedges and rushes of water-saturated soils (*Eleocharis* spp., *Carex* spp., *Cyperus* spp., *Fimbristylis puberula* (Michaux) Vahl); alkali tolerant inland saltgrass (*Distichlis spicata* (Linnaeus) Greene), scratchgrass (*Muhlenbergia aperifolia* (Ness & Meyer) Parodi), and Mexican or Baltic rush (*Juncus arcticus* Willdenow vars. *mexicanus* (Willdenow) Balslev or *balticus* (Willdenow) Trautvetter) on seasonally saturated and sub-irrigated soils; and giant sacaton (*Sporobolus wrightii*) on the drier cienaga margins (Sivinski and Tonne 2011). Some of these herbaceous wetland plants have already been transplanted to restored wetland areas on the Prevost Ranch from source populations at Mangas Springs (Grant County, NM) (D.Evans pers. comm.).

7. Wetlands

The term "cienaga" (also spelled cienega) is Spanish for bog, swamp, or marsh. It was used by early Spanish explorers to describe and map riparian marshlands which were once more widespread than at present (Hendrickson and Minckley 1985). Hendrickson and Minckley (1985) restricted the definition of cienaga in their survey to wetlands (i.e. permanently saturated, highly organic, reducing soils) occurring between 1,000 to 2,000 meters in elevation occurring primarily in southeastern Arizona and southwestern New Mexico in desert grasslands and/or Madrean woodlands. The formation of cienagas is often related to the forcing of groundwater to the surface due to shallow bedrock sills, dikes, or lateral channel constrictions (Hendrickson and Minckley 1985, Heffernan 2008), but fault lines and stream confluences can also develop cienagas (Minckley et al. 2013).

Unfortunately, the National Wetlands Inventory (NWI) for the Burro Cienaga watershed has not been digitized, but a pdf of the 1:100K quadrangle maps "Silver City" and "Lordsburg" are available at http://www.fws.gov/ifw2es/nwi/Raster.html. These NWI maps show perennial and intermittent riverine wetlands along the Burro Cienaga drainage along with a number of natural and constructed palustrine wetlands scattered throughout the watershed (USFWS 1984)

The general stressors for this wetland type are channelization, draining, diversion, groundwater pumping, removal of beavers, alteration of disturbance regimes, roads, overgrazing, and scouring floods (Hendrickson and Minckley 1985, Minckley et al. 2013). In many cases across the desert southwest, cienagas are stressed from the lowering of the water table due to groundwater pumping for agriculture and development (Hendrickson and Minckley 1985), however, the low human population density of the Burro Cienaga watershed is not utilizing the groundwater resources in this manner which increases the prospects for long term sustainability of the cienaga wetlands if restored.

A number of assessments of cienagas in Arizona (Hendrickson and Minckley 1985; Minckley et al. 2013) and New Mexico (Sivinski and Tonne 2011) have been conducted. The closest extant reference cienaga to Burro Cienaga with similar elevation, geology, and landscape setting is likely Cloverdale Cienaga in Hidalgo County, New Mexico which was surveyed by Sivinski and Tonne (2011).

8. Wildlife

The terrestrial wildlife species that occur within the Burro Cienaga Watershed are common to Southwestern New Mexico and a comprehensive list can be queried in the Bison Web page, *www.bison-m.org*. A complete list of terrestrial wildlife species that are potentially found in the Burro Cienaga watershed can be queried by habitat type, hydrological unit code (HUC), and county to name a few using this web based tool.

A list of birds found on or in the vicinity of Pitchfork Ranch, which is located in the central portion of the watershed has been put together by Dr. Dale Zimmerman, Professor Emeritus Western New Mexico University (See Appendix D, Burro Cienaga Bird List). This list serves to identify the birds of significant that nest in or are winter visitors to the unique wetland/riparian habitat that occurs within the Burro Cienaga Watershed.

9. Fisheries

A location on the Pitchfork Ranch where an on-going restoration project is being completed has been identified as suitable habitat for Gila topminnow (*Poeciliopsis occidentalis)* and Gila chub *(Gila intermedia)*. Gila topminnows were reintroduced at this site in 2007 by the New Mexico Department of Game and Fish.

b. Watershed Conditions.

1. Available Data and Current Ratings:

A search for watershed condition, ecosystem health, and other condition assessment related data for the Burro Cienaga Watershed and related 6th code watersheds indicated that only the GNF has done any watershed assessments, which provide data for a portion of the watershed. A six-step watershed condition assessment was completed under the Watershed Condition Framework (www.fs.fed.us/publications/watershed/), which resulted in a "Watershed Weighted Score" and "Watershed Function Rating" for the Hall Draw-Burro Cienaga and Ninetysix Creek 6th code watersheds (USDA, 2011).

The Forest Service watershed condition indicators for the Hall Draw-Burro Cienaga and Ninetysix Creek 6th code watersheds are displayed in Appendix C, Watershed Condition Indicators Datasheets. The Watershed Weighted Score for these two 6th code watersheds is 1.9 and both 6th code watersheds are rated as being "Functioning at Risk". The Forest Service Watershed Condition Indicator Datasheets provide useful data and important "Indicator" and "Attribute" information that help determine and prioritize the actions necessary to restore watershed functionality in the Burro Cienaga Watershed..

2. Important Ecological Values:

As stated above, the ecosystems that make up the Burro Cienaga Watershed have been in a degraded condition for many years. This degraded condition and the isolated setting of the watershed with limited resource inventory information available have resulted in this watershed not receiving any special congressional or agency designations.

Limited inventories of plant species located along the Burro Cienaga and Ninetysix Creek drainages has found remnant populations of both common and unique endemic riparian plant species. Also, when looking at the numerous cultural sites and other indicators of the ecosystems that historically occurred in the Burro Cienaga Watershed, it is obvious that this is one of just a few watersheds that have a high potential for supporting a unique local complex of riparian/wetland plants, and thus vital Neotropical migrant bird and waterfowl habitat within the larger semiarid area of Grant County, New Mexico.

Wetlands provide an abundance of ecosystem services including water storage, water filtering, nutrient cycling, wildlife habitat, flood attenuation, vegetation productivity, and aesthetic value (Hassan et al. 2005). The ecological value of these ecosystems services is compounded in a semi-arid to arid environments, but often these systems are degraded in these settings due to economic pressures (Minckley et al. 2013). By restoring the wetlands at Burro Cienaga, the full suite of economic and ecosystem services could be recovered.

3. In-channel habitat conditions:

In-channel habitats within the Burro Cienaga Watershed are in various levels of degraded condition except for the areas where restoration projects have been completed. Some natural recovery of degraded channel conditions has occurred due the elimination of heavy grazing pressure that once occurred across much of the watershed. This natural channel recovery process has been slow to take place and is limited due to degraded watershed conditions in the uplands. Currently there are still major flood events that destroy channel banks and either down cut and disconnect the channel from the floodplain or fill the stream channels with sediment and force the channel out of the historic flood plain. (Photo 5)

4. Uplands/Hillslope conditions:

Much of the upper end of the Burro Cienaga Watershed was severely impacted during the late 1800's and early 1900's, and remains in a degraded condition today. The uplands/hill slopes within the mountainous portion of the watershed currently support dense stands of pinyon/juniper woodland vegetation, oaks and various other shrubs. These upland hill slopes contain many actively eroding gullies and head cuts. (Photo 2). The Forest Service watershed condition classification process noted extensive erosion in the Burro Cienaga watersheds, and gave the lowest rating for the soil erosion criterion. (See Appendix C, Watershed Data Indicators Datasheets)

Lower in the Burro Cienaga Watershed; where the slopes are not as steep and the soils are deeper, the vegetative and watershed conditions are fair to good. At the low end of the Burro Cienaga Watershed where the gradient becomes almost flat and the channel becomes braided, the upland watershed and vegetative conditions are poor to fair, mostly due to the area being very arid and experiencing a long term drought.

Roads are a major cause of erosion and sediment transport in the Burro Cienaga Watershed. Over the years many roads were created as people drove in the sand filled stream channels, since these were the easiest places to travel. As vehicle use increased and the need to maintain roads became a priority, many of the existing user-created roads became major access routes. Many of these existing roads were not properly located, engineered, or constructed using Best Management Practices. These improperly constructed roads are contributing to the current high level of erosion and sediment transport by collecting and concentrating runoff and by diverting natural watercourses. (Photo 3)

Photo 2. Example of gully and sheet erosion along with dense stand of woody vegetation in the uplands.

Photo 3. Major access road that now is a flood channel where large amounts of sediment are deposited and then bladed to the side to maintain the road.

5. Wetland conditions:

Cienaga condition is often dependant on the larger landscape condition (Minckley et al. 2013). The necessity to address the larger upland landscape conditions is very evident within the Burro Cienaga watershed. Without addressing the larger upland landscape conditions within the watershed, efforts to restore wetland conditions will be very limited.

Riparian/wetland ecosystems within the Burro Cienaga Watershed are recovering following changes in livestock grazing management where plants have access to a shallow water table. (Photo 4) There are still many locations along the mainstem drainages where evidence (e.g. remnant hydric soils) indicates that riparian/wetland vegetation historically occurred, but currently these areas support only upland vegetative species. These locations have not recovered and currently cannot support riparian/wetland vegetation due to either being swamped with sediment or now being too dry to support obligate wetland plant species. In many cases gullies have cut through and lowered the water table in the areas where the riparian/wetland vegetation once grew. There is an opportunity to re-hydrate the floodplain soils and again support riparian/wetland species at many locations in the watershed through erosion/grade control treatments and efforts to improve the overall functionality of the watershed.

Another indicator of fair to poor condition of the riparian plant community is that much of the current riparian/wetland habitat in the Burro Cienaga Watershed is still missing many of the riparian/wetland plant species that have the potential to occur in the area. Natural colonization of wetland species is limited due to the isolated location and lack of connectivity to other wetlands areas. Efforts to reestablish diverse wetland ecosystems and high quality wildlife habitat can be as easy as planting nurse plants of the missing species in the recovering areas to serve as seed sources to promote colonization and expansion. Efforts to reintroduce some of these missing species along the Burro Cienaga drainage are currently being explored *(i.e. Amorpha fruticosa)*. This process has been very successful in much of the riparian recovery work done along the Gila River on the Gila NF especially the Gila Bird Area (R. Pope pers. obs.) .

Photo 4. Example of natural recovery of riparian plant species (*Salix* sp.) in areas that once only supported non-palatable upland species (cholla and juniper).

6. Water Quality and Flow Conditions:

The most noticeable and challenging water quality problem in the Burro Cienaga Watershed is sedimentation. The high levels of erosion in the uplands of this watershed have totally swamped with sediments most of the streambeds and streamside vegetation in the watershed. (Photo 5) During moderate and severe runoff events, vast amounts of sediments are transported downstream. These sediments are then deposited in portions of the mainstem stream channels and often cover the riparian/wetland vegetation that is struggling to become established. The major water quality goal for this watershed is to reduce the level of sediment delivered to and transported in the stream channels.

Photo 5. Large amounts of sediment in active channel covers vegetation along banks

Associated with the excessive amount of sediment being carried downstream in the Burro Cienaga watershed is the "flashy" nature of runoff events characteristic of degraded watershed conditions with limited water infiltration and storage. The degradation of watershed conditions has resulted in a hydrograph with a high magnitude peak, but short duration rates of flow following a moderate to severe precipitation event. If sufficient upland watershed restoration work is completed, it is not unrealistic to expect a reduction in the magnitude of peak flows, an increase the time it takes for runoff water to enter the major stream channels after a precipitation event, and a longer duration of time water is flowing in the stream channels.

Restoration activities, which increase the infiltration capacity of the watershed and make the system less prone to flash flooding, will enable the downstream restoration of riparian/wetland areas. These downstream riparian/wetland areas are particularly sensitive to excessive channel down cutting or aggradations of sediment. Along with changes in the hydrograph that could be accomplished with improved watershed conditions, there would be many beneficial changes in the riparian/wetland plant communities. These changes would provide improved habitat for many species of mammals, birds, fish, amphibians and insects. There have been efforts to reintroduce Chiricahua Leopard Frogs and Gila Topminnow on the Pitchfork Ranch in a reach of perennial stream that is included in an on-going recovery project.

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7. Data Gaps:

There is still much that could be learned about the Burro Cienaga Watershed. While there are broad-scale surveys of the soils and vegetation that include the watershed, there are no detailed maps of the watershed that show the location of the specific soil types or the different vegetative communities. Also there has not been an effort to fully inventory and define the different ecosystems or to assess the ecological condition of the various ecosystems.

There is not much data concerning water quality or water yield for the Burro Cienaga Watershed, even though unacceptable levels of erosion are taking place and elevated sediment loads are being carried in the drainages each time there is a runoff event. Also, historically there has been a decrease in herbaceous ground cover and an invasion of woody plant species, especially in the mountainous upper end of the watershed. There is an opportunity to quantify how these changes in vegetation have altered the magnitude, timing, and duration of runoff events in this watershed as these degraded conditions are treated and restored to more favorable conditions. A lot could be learned in the Burro Cienaga Watershed about the relationship between upland ecological conditions and downstream flow dynamics and water quality by collecting baseline data and then implementing restoration practices and monitoring changes in both the vegetative condition and water quality over time.

In 2012, the New Mexico Environment Department established a new assessment unit along the perennial stream reaches of Burro Cienaga for the purpose of conducting water quality sampling to assess for designated use attainment. The water quality sampling station will be monitored during each season in 2012 for nutrients, metals, temperature, conductivity, turbidity, dissolved oxygen, pH, and other water quality parameters.

This information would help define the resource conditions and need for targeted action. Management decisions could then be made and implemented with a higher probability of success and less need for adaptive management changes over the life time of the project.

III. Restoration Goals, Objectives, and Opportunities

a. Goal Identification and Desired Condition.

The goals for the Burro Cienaga Watershed include improving watershed condition/functionality and restoring riparian/watershed habitat at all potential locations within the watershed. Along with these goals there will be many other resource benefits that will be accomplished as watershed conditions improve and natural ecosystem processes are reestablished throughout the watershed.

Desired Condition objectives are focused primarily on restoring watershed functionality, which will lead to enhanced and sustainable ecosystem health and restored riparian/wetland habitat. There are reaches of the Burro Cienaga drainage that currently support recovering riparian/wetland habitat due to natural recovery and recent restoration projects, but these areas are at high risk of being negatively impacted by flood events as long as the headwater upland areas remain in a degraded condition. Water quality, quantity, and condition of flow as well as the recovery of riparian/wetland habitats are the key functions of ecosystem health to focus on as efforts to improve the condition of the watershed progress.

b. Objectives, Existing and Post-Project Watershed Condition Class

The following are watershed specific management/treatment actions necessary to reach desired conditions in the Burro Cienaga Watershed:

- Reduce the dominance of the pinyon/juniper woodland and upland shrub plant communities within the watershed.

- Reestablish native desert grassland herbaceous vegetation within the uplands, especially in the upper end/ mountainous portion of the watershed ;
- Reestablish adequate ground cover in highly degraded areas;
- Stabilize soil condition and reduce the sediment load that is being carried through the watershed during moderate and large precipitation events;
- Return watershed functionality within the watershed through improved land management practices;
- Improve channel and floodplain stability by reestablishing native vegetation along the major drainages within the watershed;
- Restore important riparian/wetland habitat and ecosystem health through improved watershed conditions and site specific projects within the watershed;
- Create new habitat for Neotropical migrant upland and waterfowl species;
- Improve water quality in Burro Cienaga and Ninetysix Creek drainages;
- Through the implementation of watershed "Best Management Practices" and monitoring, ensure long term enhanced watershed conditions and healthy ecosystems in the watershed.

Accomplishing these action items will make possible the overall goal to move the Burro Cienaga watershed into the functioning properly condition class while also making available valued riparian/wetland habitat to all types of wildlife and restored ecosystem services. The reestablishment of herbaceous upland vegetation, improving channel stability throughout the watershed, and improving overall water quality within the watershed are objectives that will enhance ecosystem health and result in improved soil and rangeland condition ratings.

c. Opportunities

1. Contribute to National, Regional, or Local Priorities:

This watershed is one of many identified as functioning at risk by GNF on their 2011 Watershed Condition Classification map. While there are multiple functioning at risk watersheds identified in the GNF 2011 assessment, because of the interest and commitment to enhancing resource conditions by the private landowners who live and work within this watershed, there is a high potential for meeting national, regional and local ecosystem restoration priorities by investing in the reclamation of this watershed. The existing springs and perennial surface flow in the Burro Cienaga drainage along with the potential to restore and enhance many acres of riparian/wetland habitat makes this watershed an attractive place for the various land and resource management agencies to achieve their ecosystem health improvement priorities.

The objectives of this Watershed Restoration Action Plan/Wetland Action Plan are in keeping with the GNF Land Management Plan (Amendment 10), the BLM - Mimbres Resource Management Plan, NRCS Guide for Planning Riparian Treatments in New Mexico and the US Fish & Wildlife Service strategy for managing riparian habitat.

This Plan meets the following State Agency objectives for improving ecosystem health, water quality standards, and watershed conditions while also restoring riparian/wetland plant communities:

- The New Mexico State Land Office, who is a major land owner within the Burro Cienaga Watershed, has established multiple conservation initiatives for its land. This Plan meets the objectives of their River Restoration, Species Conservation and Range Stewardship Programs. As projects are developed and funded there will be multiple opportunities for the NM State Land Office to involve the public in the restoration of the ecosystems located on their land within this Burro Cienaga Watershed.

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

generations. This Plan will meet the NMED's mission and will enhance water quality and stream flow dynamics within this watershed. As part of this Plan, water quality data will be monitored by the NMED in the Burro Cienaga drainage and information on the condition of surface water quality in this watershed will be made available. The goals of the New Mexico Wetlands Program are to protect and restore New Mexico's remaining wetlands and riparian areas and to increase self-sustaining, naturally functioning wetlands and riparian areas so they continue to benefit New Mexico's future.

- New Mexico Department of Game and Fish's (NMDGF) mission is to manage and maintain a sustainable population of wildlife and fish within the state of New Mexico. Habitat quality plays a major role in meeting the NMDGF mission. This Plan will enhance wildlife habitat for most all wildlife species found within the Burro Cienaga Watershed, but especially improve habitat for Neotropical migrant upland and waterfowl species.

d. Partnership Involvement:

A steering committee has been developed to oversee the implementation and monitoring of this Plan. This steering committee is comprised of representatives from the land and resource management agencies who have interest in the Burro Cienaga Watershed and by a representative from the Upper Burro Cienaga Watershed Association who will represent the various private landowners who are interested in participating in the restoration of the Burro Cienaga watershed. The steering committee will meet and appoint one member to serve as the chairperson. The chairperson's major duties will be to coordinate, set up and run the meetings of the steering committee as needed and to ensure that a yearly field review of the projects is conducted and a report on the implementation and effectiveness of the projects is written and made available to the grantees. The following is a list of the Headwaters Burro Cienaga Watershed Steering Committee:

Agency/Organization	Representative
Gila National Forest	Carolyn Koury, Forest Hydrologist
BLM - Las Cruces District Office	Corey Durr, Hydrologist
NRCS - Silver City Field Office	Raquel Montoya, District Conservationist
NMSLO - Silver City Field Office	Diego Villalba, District Resource Manager
NMED – Surface Water Quality Bureau	Matt Schultz, Environmental Scientist-Specialist
Upper Burro Cienaga Watershed Association	C.R. Evans, Owner C Bar Ranch
Grant Soil and Water Conservation District	David McCauley, Board Chairperson
US Fish and Wildlife Service	Angel Montoya, Wildlife Biologist

Table. 2 Steering Committee and Representatives

Along with the steering committee, a stakeholders group, which is made up of the owners of the property where the potential projects will be completed, has been developed. This stakeholders group is open to any landowner in the Burro Cienaga watershed who is interested in restoring or enhancing watershed conditions within the Burro Cienaga watershed. The stakeholders own and manage their involved lands for multiple use purposes and in the case of the private land owners, depend upon these lands to support their families. Both the Forest Service and the BLM permit a host of land uses to occur on the lands they manage within the Burro Cienaga watershed. The NM State Land Office leases the lands they own within the Burro Cienaga watershed for mainly livestock grazing purposes, but also authorizes a variety of other uses. All of the stakeholders who are interested in participating and cooperating in watershed enhancement and riparian/wetland restoration under this Plan are committed to the long term stewardship of their land and want to see all of the land resources improved and sustained.

The stakeholders group will be expected to coordinate with each other and share ideas and outcomes of the projects. The stakeholders will communicate their issues and concerns to the steering committee and will ensure that the steering committee is implementing and monitoring the project work carried out under this Plan in a professional, fair and timely manner. The following is the current list of stakeholders:

Property Owner	Representative
Gila National Forest	Carolyn Koury, Forest Hydrologist
BLM - Las Cruces District Office	Corey Durr, Hydrologist
NMSLO - Silver City Field Office	Diego Villalba, District Resource Manager
C Bar Ranch	C.R. Evans, Owner
Prevost Ranch	Charles and Flinda Prevost, Owners
M-N Ranch	Danny and Harriet De Busk, Owners
Thorne Ranch	Dave Jones, Owner
A T Cross Ranch	Billy Billings, Owner

Table. 3 Stakeholders and Representatives

While this Plan mostly follows the Forest Service format and process for watershed restoration planning, it is intended for this Plan to all meet the planning requirements of all of the participating agencies. For instance, the planning elements of a Wetlands Action Plan have been incorporated into this document. NMED facilitates watershed groups throughout the State to develop "Wetlands Action Plans" as an additional component of their Watershed-Based Plan to address wetlands and riparian resources within the boundaries of a specific watershed. Since there are multiple agencies involved in the planning and implementation of this Plan, the Steering Committee will be tasked to ensure that the different agency planning and project implementation needs are being met.

e. Specific Project Activities and Funding

There are many specific resource conditions that need to be addressed in the Burro Cienaga watershed in order to improve watershed condition and ecosystem health. While the specific resource conditions will be addressed by planning and carrying out individual site specific projects, without identifying and approaching the overall watershed conditions and ecosystem health at the watershed scale, much time and resources could be wasted. (See Map 5 Proposed Restoration Projects in Appendix) It is very important to start addressing conditions of flow, erosion and sediment loads at the top of the watershed since flood waters and sediments flow down through the watershed, affecting the stream channels and vegetative communities that are located below. Recovering ecological function of cienaga wetlands entails considerations at both the wetland and upland zones (Minckley et al. 2013) especially the "provision of constant water supply and amelioration of catastrophic flooding events" (Hendrickson and Minckley 1985).

Funding for the specific resource restoration/enhancement projects will be done using matching fund opportunities when appropriate. Depending upon the funding sources, matching funds or matching in-kind labor or supplies will be utilized. The coordination of various grant funds will be utilized to the maximum extent possible to carry out the needed projects within the Burro Cienaga Watershed. These programs may include, but are not limited to the following:

- BLM Restore New Mexico
- EPA Wetland Program Development Grant
- Habitat Stamp Program
- NRCS Environmental Quality Improvement Program (EQIP)
- NRCS Wetland Reserve Program
- NRCS Wildlife Habitat Incentives Program (WHIP)
- State of New Mexico Water Trust Board

- USFWS Partners for Fish and Wildlife Program

The following are specific resource conditions that need to be addressed within the Burro Cienaga Watershed. Where appropriate the 2012 Natural Resource Conservation Service (NRCS) EQIP Cost Docket and Cost Data determination worksheets (See Appendix E, NRCS Cost Docket and Cost Data) are used to make the estimates for completing the work:

1. The lack of adequate ground cover in the uplands necessary to reduce overland flow of water; thus sheet erosion. Practices that will address this condition:
   a. Harvesting of fuelwood and related products on the select upland sites that have the potential to support dense stands of native grasses. Following the harvest of the fuelwood, the fuelwood areas need to be seeded with native grass and forb species. **Cost estimated at $660.00 per acre treated. *(2012 NRCS Fuel Break Treatment Cost),* Seeding cost estimated at $72.30 per acre**. ***(2012 NRCS Range Planting Cost)***
   b. Prescribed burning of select stands of non-sprouting shrubs and trees to reduce competition between the woody species and the herbaceous species. Following the burns the treated areas need to be seeded with native grass and forb species**. Cost estimated at $35.00 per acre treated. *(2012 NRCS Prescribed Burn Cost), Seeding* cost estimated at $72.30 per acre**. ***(2012 NRCS Range Planting Cost)***

2. Gully erosion and head cutting. Practices that will address this condition:
   a. Construction of a series of gully plugs and/or grade stabilization structures in the gullies where sufficient herbaceous ground cover is already established or where sheet erosion is also being addressed. The disturbed areas should be seeded with native grasses and forbs. **Cost estimated at $2.66 per CY of earth moved. *(2012 NRCS Grade Stab Structure Cost),* Seeding cost estimated at $72.30 per acre**. ***(2012 NRCS Range Planting Cost)***
   b. Treat vertical banks by back-sloping these eroding channel banks and then reestablishing vegetative ground cover on the disturbed areas. Native grasses and forbs species should used or where appropriate, native shrub and tree cuttings or nursery container plants could also be used. **Cost estimated at $2.66 per CY of earth moved. *(2012 NRCS Grade Stab Structure Cost),* Seeding cost estimated at $72.30 per acre**. ***(2012 NRCS Range Planting Cost)***
   c. Construct drainage features into the existing road system in order to reduce the formation of gullies and/or reduce the volume and the velocity of water that is being fed into existing gullies. **Cost estimated at $2.66 per CY of earth moved. *(2012 NRCS Grade Stab Structure Cost),* Seeding cost estimated at $72.30 per acre**. ***(2012 NRCS Range Planting Cost)***
   d. Where appropriate, stabilize and plant stream bank vegetation along the bends in established stream channels to stabilize the lateral erosion and movement of the channel during major runoff events. **Cost estimated at $2.66 per CY of earth moved. *(2012 NRCS Grade Stab Structure Cost),* Cost estimated at $110.00 per CY of material used. *(2012 NRCS Stream Habitat Improvement Cost)* Cost estimated at $11.25 per containerized plant used *(2012 NRCS Tree Shrub Establishment Cost)***

3. Large sediment loads are already deposited in and are being transported downstream by the existing channel system. Practices that will address this condition:
   a. In the wider canyon bottoms and in the lower end of the watershed, where appropriate, spread and slow the flow of water through the construction of water spreader structures, grade stabilization structures or by planting layers of vegetation that will trap and hold sediment. These structures promote the aggradation of the channel in incised reaches and the spreading of water across the floodplain. **Cost estimated at $2.66 per CY of earth**

moved. ***(2012 NRCS Grade Stab Structure Cost,*** **Cost estimated at $1021.42 per acre treated.** ***(2012 NRCS Wetland Restoration Cost)***

b. Relocate roads out of the canyon bottoms where they serve as flood channels which collect and transport sediments. The roads that need to be addressed are currently transporting and keeping sediments from becoming stable due to vehicle traffic and the maintenance of the roads. This will also allow the recovery of canyon bottom vegetation. ***Cost estimate based upon similar project recently completed by the Forest Service.***

c. Where the opportunity exists, remove and store sediments out of the active channel, or where the active channel is higher than the adjacent land, allow the flood water to access these lower areas and deposit sediments. **Cost estimated at $2.66 per CY of earth moved.** ***(2012 NRCS Grade Stab Structure Cost)***

d. Remove the historic farm era channel containment dikes and allow the floodwaters and sediment to again access the entire floodplain. **Cost estimated at $2.66 per CY of earth moved.** ***(2012 NRCS Grade Stab Structure Cost),*** **Rangeland seeding cost estimated at $72.30 per acre**. ***(2012 NRCS Range Planting Cost),*** **Cost estimated at $299.25 per acre for previous farmed land re-planted** ***(2012 NRCS Critical Area Planting Cost)*** **$11.25 per containerized plant used** ***(2012 NRCS Tree Shrub Establishment – Container)***

4. Wildlife habitat containing exposed surface water ponds and related wetland vegetation has in the past been degraded and/or lost throughout Southwest New Mexico and the Burro Cienaga watershed. Practices that will address this condition:

a. Maintain existing stock ponds that currently provide habitat for waterfowl and other wildlife species that depend upon open standing water for feeding or resting areas**. Cost estimated at $2.41 per CY of sediment removed.** ***(2012 NRCS Pond construction Cost)***

b. Reconstruct key stock tanks that have either been breached or the original construction designed was not adequate to provide water yearlong. **Cost estimated at $2.41 per CY of earth moved to reconstruct the structure.** ***(2012 NRCS Pond construction Cost),*** **Cost estimated at $2.33 / tree/shrub planted.** ***(2012 NRCS Tree Shrub Establishment Cost),*** **Cost estimated at $1.33 / foot of smooth or barbed wire fence constructed.** ***(2012 NRCS EQIP Fence Construction Cost),*** **Cost estimated at $1.09 / foot of pipe less than 2 inches in dia.** ***(2012 NRCS EQIP Pipe Cost),*** **Cost estimated at $1363.55 / hp of livestock water pump.** ***(2012 NRCS EQIP Pump Cost)***

5. Degraded native riparian/wetland plant communities, especially along the ten miles of perennial stream or areas where a shallow water table exists. Practices that will address this condition:

a. Identify and establish a source for native, local genotype, riparian/wetland vegetation. This includes establishing local natural nursery areas for species that can be propagated from cuttings. Also it may be necessary to establish a nursery where seed from desirable non-sprouting native species can be germinated and grown as potted nursery stock. The potted nursery plants can be used to establish seed source plants in areas where the desirable species are not currently found. These seed source plants can then establish new expanding subpopulations through natural reproduction. **Cost estimated for a one- time collection and planting of local native riparian genotype species. ($5000.00)**

b. Identify and treat sites where wetland or riparian habitat once existed and indications are that these areas could once again support these critical habitat types. **Cost estimated at $1062.08 per acre treated.** ***(2012 NRCS Wetland Restoration Cost)***

c. Identify, locate and treat undesirable native or non-native plant species that will prevent or slow the establishment of the desirable native riparian/wetland species. These plants may or may not be considered noxious weed species. **Cost estimated at $22.00 per acre treated.** ***(2012 NRCS Herbaceous Weed Control Cost)***

d. Take the appropriate action to remove or slow the spread and growth of the undesirable plants. This may include the use of mechanical, biological or chemical treatments. **Cost estimated at $125.00 per acre treated.** ***(2012 NRCS Riparian Forest Buffer Cost),*** **Cost estimated at $36.31 per acre treated.** ***(2012 NRCS EQIP Brush Control Cost, Chemical, Aerial Treatment, High Plant Density)***

e. Plant a variety of riparian/wetland species to establish a multi-layered stand of vegetation that will provide shade over the water and provide habitat for a wide variety of wildlife species. Site potential for either riparian or wetland plant communities should be determined prior to starting any restoration activities. **Cost estimated at $2.33 per plant.** ***(2012 NRCS Tree Shrub Establishment Cost)***

6. In addition to the specific land treatment activities that address the specific resource conditions within the Burro Cienaga watershed, administration support is needed to implement the various projects within the Burro Cienaga watershed. Since none of the land management agencies that hold lands within the Burro Cienaga watershed are currently the lead administrative agency for implementing the restoration projects proposed in this Plan, an administrative cost will need to be funded as part of grant proposals. Along with the project implementation administrative cost that covers the funding for a fiscal agent to process and track all disbursement of funds, these administrative costs will include short term project implementation and effectiveness monitoring and the costs to establish a noxious weed monitoring and treatment program for the Burro Cienaga watershed.

f. Specific Monitoring Attributes

The following are specific resource conditions that need to be monitored within the Burro Cienaga watershed:

- acres of riparian/wetland habitat restored/improved;
- miles of stream channel improved/enhanced;
- acres of upland vegetation treated and/or enhanced;
- miles of road improved or relocated;
- acres of floodplain treated for sediment retention;
- acres of surface water made available to wildlife;
- acres of ground cover reestablished on degraded upland

The monitoring of the above items will be carried out in the short term as part of project implementation. In the long term these items will be monitored by the land management agencies/private landowners that hold lands within the watershed. Also the agencies with landowner support responsibilities or resource management agencies with an interest in ecosystem health within the watershed will help in carrying out the long term monitoring needs for the watershed.

g. Local Public Involvement Strategy

The proximity of the Burro Cienaga watershed to the population centers of Silver City and Lordsburg allows a number of local public involvement opportunities. Education and outreach materials can be developed on the value of watershed and wetland restoration for the Silver Consolidated and Lordsburg School Districts. The Gila Conservation Education Center (www.gcecnm.org/) has the experience of developing education materials and programs for school groups of all ages and coordinating children's water festivals. In addition, a list of potential research projects in the Burro Cienaga watershed can be developed and made available to high school and university students in need of a research questions and study area. High school and Western New Mexico University science classes could be responsible for some of the long term monitoring on the wetland expansions and watershed improvements. Volunteers could be recruited from groups such as the Youth Conservation Corps, 4H, Future Farmers of America,

Wild Turkey Federation, and New Mexico Native Plant Society for monitoring and on-the-ground restoration activities such as riparian/wetland plantings.

h. Summary of Specific Project Activities Planned for the Burro Cienaga Watershed

Currently there are five ranches which are comprised of GNF, BLM, NMSLO and private lands within the watershed project area. These ranches and agency lands have been assessed to develop a preliminary list of essential projects that will address the resource needs of the planning area. The specific projects are grouped by ranch or agency land unit. Proposed projects are classified as either Watershed or Wetland/Riparian oriented projects and each category is given a ranch or agency priority number. Each of the projects is keyed to one of the resource conditions and mitigating practices located in Section e above. The following Table 4 is a summary of the projects identified as being essential for the restoration and enhancement of the Burro Cienaga Watershed. The detailed ranch/ agency lists of projects are located in Appendix F, Essential Project List by Land Owner.

Essential Projects	Project Priority	Year(s) Planned	Design/Layout Cost	Construction Cost	Project Totals
C Bar Ranch					
Wetland/Riparian #1	1	1-5	$2,000.00	$51,095.00	*$53,095.00*
Watershed #1	2	2-4	$1,000.00	$33,727.50	*$34,727.50*
Wetland/Riparian #2	3	5	$1,500.00	$34,752.20	*$36,252.20*
		Total	***$4,500.00***	***$119,574.70***	***$124,074.70***
Gila NF					
Wetland/Riparian #1	1	1	$2,000.00	$24,593.55	*$26,593.55*
Wetland/Riparian #2	2	1	$2,000.00	$14,418.00	*$16,418.00*
Wetland/Riparian #3	3	1	$2,000.00	$10,329.05	*$12,329.05*
Watershed #1	4	2	$7,000.00	$90,578.40	*$97,578.40*
Watershed #2	5	3	$7,000.00	$90,578.40	*$97,578.40*
Watershed #3	6	2	$4,000.00	$22,748.00	*$26,748.00*
Watershed #4	8	3	$4,000.00	$14,444.50	*$18,444.50*
Watershed #5	9	5	$6,000.00	$45,397.00	*$51,397.00*
Watershed #6	7	1-5	$6,000.00	$166,229.00	*$172,229.00*
		Total	***$40,000.00***	***$479,315.90***	***$519,315.90***
M-N Ranch					
Watershed #1	1	1	$500.00	$8,000.00	*$8,500.00*
Watershed #2	2	1	$560.00	$7,520.30	*$8,080.30*
Watershed #3	3	2	$500.00	$6,043.00	*$6,543.00*
		Total	***$1,560.00***	***$21,563.30***	***$23,123.30***
Prevost Ranch					
Wetland/Riparian #1	1	1	$1,000.00	$32,924.48	*$33,924.48*
Wetland/Riparian #2	2	2	$1,000.00	$66,921.00	*$67,921.00*
		Total	***$2,000.00***	***$99,845.48***	***$101,845.48***
Thorne Ranch					
Wetland/Riparian #1	1	1	$1,000.00	$49,761.05	*$50,761.05*
Wetland/Riparian #2	2	1	$1,000.00	$29,761.11	*$30,761.11*
Watershed #1	3	2	$1,000.00	$13,129.50	*$14,129.50*
Watershed #2	4	1-5	$500.00	$6,043.00	*$6,543.00*
Wetland/Riparian #3	5	1-5	$1,000.00	$24,823.00	*$25,823.00*
		Total	***$4,500.00***	***$123,517.66***	***$128,017.66***
Project Totals			***$52,560.00***	***$843,817.04***	***$896,377.04***

Table. 4 Summary of Essential Projects

i. Specific Administrative and Watershed-wide Noxious Plant Control Activities

The following administrative activities shown in Table 5 are considered as necessary for the implementation of the proposed on-the-ground restoration projects. These administrative activities and

related costs are to be applied throughout the estimated 5 year timeframe and are needed to implement all of the projects proposed under this Plan.

The Grant Soil and Water Conservation District (GSWCD) would serve as the fiscal agents if it is determined that the use of a local fiscal agent is an appropriate method for tracking and dispersing the grant funds. The use of the GSWCD as a fiscal agent will depend upon the rules under which grant funds are provided and the willingness of the GSWCD to take on the role as fiscal agent. (Currently the GSWCD is serving as the fiscal agent for a State of New Mexico River Ecosystem Restoration Initiative grant that is being used by the Upper Burro Cienaga Watershed Association to complete a wetland habitat restoration project on the Prevost Ranch.) The following are the specific items and cost estimates for the administrative activities carried as part of this Plan:

In order to implement the on-the-ground projects proposed in this Plan it is estimated that a $7,500.00 for the 5 ranches ($300 / year/ ranch x 5 ranches = $1,500 x 5 years = $7,500) and $5000.00 for the Forest Service land ($1,000 per year x 5 years= $5,000) administrative cost is needed. ***The total Administrative cost would be$12,500.00*** *and would fund payment/ record keeping activities and implementation/effectiveness monitoring for the project work carried out within the Burro Cienaga watershed.*

A small contract or agency cost share agreement will be used for the monitoring and treatment of noxious plants within the watershed. It is estimated that approximately 250 acres of noxious weed infestation including salt cedar is all that will need to be dealt within the next 5 years within the watershed. This estimate is based upon support from the land management agencies and private land owners in the inventory for noxious weeds and support from the Southwest New Mexico Cooperative Weed Management Area in the treatment of new populations of noxious weeds found within the watershed. ***A cost of $5,000*** *in grant funds will be needed to develop and implement a Noxious Weed Management Plan for the watershed @ 250 acres x $20 / acre, (2012 NRCS EQIP Herbaceous Weed Control, Develop Plan and Control Class A Noxious Weeds.)*

Administrative Cost	Year 1	Year 2	Year 3	Year 4	Year 5
Yearly Payment/Record Keeping Cost. (Fiscal agent reimbursement)	$1,300.00	$1,300.00	$1,300.00	$1,300.00	$1,300.00
Short Term Monitoring Cost. (Stakeholder Monitoring Costs)	$1.200.00	$1.200.00	$1.200.00	$1.200.00	$1.200.00
Noxious Weed Monitoring and Treatment Cost. (Stakeholder Managed Funds)	$1,000.00	$1,000.00	$1,000.00	$1,000.00	$1,000.00
Total Administrative Cost	$3,500.00	$3,500.00	$3,500.00	$3,500.00	$3,500.00

Table 5 Administrative Cost

i. Timelines and Project Scheduling

The following Table 6 displays the year and cost planned to implement each of the project:

Project	Year 1	Year 2	Year 3	Year 4	Year 5
C Bar Wetland/Riparian #1	$10619.00	$10619.00	$10619.00	$10619.00	$10619.00
C Bar Watershed #1		$11,575.83	$11,575.83	$11,575.83	
C Bar Wetland/Riparian #2					$36,252.20
GNF Wetland/Riparian #1	$26,593.55				
GNF Wetland/Riparian #2	$16,418.00				
GNF Wetland/Riparian #3	$12,329.05				
GNF Watershed #1		$97,578.40			
GNF Watershed #2			$97,578.40		
GNF Watershed #3		$26,748.00			
GNF Watershed #4			$18,444.50		
GNF Watershed #5					$51,397.00
GNF Watershed #6	$34,445.80	$34,445.80	$34,445.80	$34,445.80	$34,445.80
M-N Watershed #1	$8,500.00				
M-N Watershed #2	$8,080.30				
M-N Watershed #3		$6,543.00			
Prevost Wetland/Riparian #1	$33,924.48				
Prevost Wetland/Riparian #2		$67,921.00			
Thorne Wetland/Riparian #1	$50,761.05				
Thorne Wetland/Riparian #2	$30,761.11				
Thorne Watershed #1		$14,129.50			
Thorne Watershed #2			$6,543.00		
Thorne Wetland/Riparian #3			$25,823.00		
TOTALS	$232,432.34	$269,560.53	$205,029.53	$56,640.63	$132,714.00

Table. 6 Project Implementation Schedule

Completion of the projects in the year planned is contingent on securing necessary funding as planned.

j. Financial Management Process

The Steering Committee will be tasked to meet and agree on what grants or other funding sources will be pursued where multiple Burro Cienaga Watershed land owners are involved. When multiple Burro Cienaga Watershed land owners are involved under a jointly held grant, the Steering Committee will determine how the funds will be managed once funding is approved. Each agency or individual private landowner may apply for and manage the funds acquired under a separately held individual grant, but the landowners within the Burro Cienaga Watershed should make an honest effort to coordinate their resource restoration and enhancement efforts in order to increase their potential to compete for grant funding opportunities.

All requirements of the fund granting entity will be honored and if a fiscal agent is used, funds sufficient to cover their expenses will be made available. It will be critical that the steering committee and the grant provider agree to the process of how the funds will be managed prior to any grant funds being made available since multiple landowners and multiple agencies will be involved.

IV. Restoration Project Monitoring and Evaluation

a. Project Implementation Monitoring

The steering committee will ensure that the funded project work is being completed as agreed to by the granting entity or as planned in the Plan. As funds become available to carry out the various projects planned within the Burro Cienaga watershed, the stakeholders who agreed to complete the various projects or project components will coordinate and share their work schedules with the steering committee, so the projects can be completed in a coordinated and orderly fashion.

b. Project Effectiveness Monitoring

The Headwaters Burro Cienaga stakeholders and steering committee will work together to monitor watershed improvement and wetland/riparian restoration success using the following methods:

- Best management practice effectiveness – e.g evaluate road treatments once/year using BMP form found at: www.fs.fed.us/biology/resources/pubs/watershed/FS_National_Core_BMPs_April2012.pdf
- Plant transect survey using the various methods approved by the agencies involved– establish permanent transects in riparian treatment areas to measure change in plant species composition, change in diversity, and change in total biomass density. Riparian plant transect data will be collected every 3 to 5 years depending upon the rate of recovery.
- Photo monitoring – establish permanent photo points in riparian treatment areas to be photographed once/year
- Noxious weed surveys – evaluate treatment areas for establishment of noxious weeds; once/year
- Stream temperature monitoring – establish permanent thermograph sites in areas of restored riparian/wetland habitat. ftp://ftp.nmenv.state.nm.us/www/swqb/MAS/SOP/6.4SOP-Thermographs23Mar11.pdf
- Geomorphology – establish 2 to 4 permanent cross section and longitudinal profile monitoring sites on Burro Cienaga mainstem drainage and Ninetysix Creek to be read once every 5 years. (Harrelson et al. 1994)

- Groundwater levels – Currently water levels in wells near current restoration areas are measured manually on a semiannual basis. As funding becomes available monitoring wells and/or piezometers could be installed in targeted areas and equipped with pressure transducer dataloggers to monitor the groundwater levels more frequently. http://el.erdc.usace.army.mil/elpubs/pdf/tnwrap00-2.pdf
- Wetland expansion – Track wetland area expansion via aerial and satellite imagery especially color infrared as datasets are made available from the New Mexico GIS clearinghouse http://rgis.unm.edu/.
- Sediment Movement--establish estimates of sediment movement using sediment traps or permanent sediment level markers in key locations. The estimate of sediment movement will be made yearly in both the uplands and in the major drainages that flow through the Burro Cienaga Watershed.

In addition, all monitoring data will be shared among involved agencies and private property owners.

V. Contact Information

Organization	Contact Person	Phone Number	E-Mail Address
New Mexico Environment Department	Matt Schultz, Environmental Scientist-Specialist	575 956-1550	matthew.schultz@state.nm.us
Gila National Forest	Carolyn Koury, Forest Hydrologist,	575 388-8378	ckoury@fs.fed.us
Las Cruces District BLM	Corey Durr, District Hydrologist,	575 525-4345	CDurr@blm.gov
New Mexico State Land Office	Diego Villalba, District Resource Manager	575 538-9730	dvillalb@state.nm.us
NRCS	District Conservationist	575 388-1569 ext 100	
US Fish and Wildlife Service	Angel Montoya, Wildlife Biologist	505 525-4350	Angel_Montoya@fws.gov
Grant Soil and Water Conservation District	Board Chairperson	575 388-1569	grantswcd@zianet.com
Upper Burro Cienaga Watershed Association	C.R. Evans Owner C Bar Ranch	575 313-4028	cbarranch575@gmail.com

A T Cross Ranch	Billy Billings Ranch Owner	575 313-2780	bbillings@aznex.net
M-N Ranch	Danny & Harriet DeBusk	575 574-8242	
Prevost Ranch	Charles and Flinda Prevost	408 972-2599	
Thorne Ranch	Dave Jones	575 546-5501	dajonesjones65@yahoo.com

Table. 7 Contact Information

VI. Approval

IN WITNESS WHEREOF, the parties have approved this Watershed Restoration Plan as of the date of signature by all of the parties below. By signing this document no obligation of funds or obligation to complete work is being committed to by any of the parties involved. Any financial obligations or binding agreements will be made under a separate agreement between the affected parties.

By: _____ Date:_____
New Mexico Environment Department

By: _____ Date:_____
Gila National Forest

By: _____ Date:_____
Las Cruces District, BLM

By: _____ Date:_____
New Mexico State Land Office

By: _____ Date:_____
Natural Resource Conservation Service

By: _____ Date:_____
US Fish & Wildlife Service

By: _____ Date:_____
Grant Soil & Water Conservation District

By: _____ Date:_____
Upper Burro Cienaga Watershed Association

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VIII. Appendix

A. Current Restoration Projects – Headwaters Burro Cienaga 5th Code Watershed

Year	Name	Type	Location	Status	Funding Type
2006	Lower Burro Cienaga Restoration	Bank & Gradient Stabilization	Pitchfork Ranch	Complete	U.S. Fish & Wildlife Service
2006	Lower Burro Cienaga Restoration	Plant wetland species	Pitchfork Ranch	On-going	Various
2006	Upland Juniper Treatment	Removal of large Juniper on 320 acres	Pitchfork Ranch	Complete	NRCS
2007	Yucca Flats	Erosion Control Structures	C Bar Ranch	Complete	Private: C Bar Ranch
2008	Patterson & Gunn Canyon Restoration	Erosion Control Structures	Pitchfork Ranch	On-going	U.S. Fish & Wildlife Service
2008	Lower Burro Cienaga Restoration	Bank & Gradient Stabilization	Pitchfork Ranch	Complete	U.S. Fish & Wildlife Service
2008	Upper Horse Canyon	Erosion Control Structures	C Bar Ranch	Complete	Private: C Bar Ranch
2009	C Bar Canyon	Flood control structure; wildlife habitat	C Bar Ranch	Complete	U.S. Fish & Wildlife Service
2010	Burro Cienaga	Re-establish cienaga	Prevost Ranch	Complete	U.S. Fish & Wildlife Service
2010	C Bar Planting	Planting Giant Sacaton, Fourwing Saltbush	C Bar Ranch	In Progress	Private: C Bar Ranch
2010	C Bar Canyon	Erosion Structures	C Bar Ranch	In Progress	Private: C Bar Ranch
2010	Conservation Stewardship Program	Seeding 150 acres riparian corridor	C Bar Ranch	In Progress	NRCS
2011	Walking X	Erosion Structures, Planting	C Bar Ranch	In Progress	U.S. Fish & Wildlife Service
2012	Burro Cienaga	Planting native grasses, shrubs	Prevost Ranch	In Progress	NM Environment Dept., River Ecosystem Restoration Initiative

Appendix A - Current Restoration Projects-Headwaters Burro Cienaga 5th Code Watershed

B. White Signal, NM Monthly Climate Summary

WHITE SIGNAL, NEW MEXICO (299691)

Period of Record Monthly Climate Summary

Period of Record : 11/1/1948 to 12/31/2005

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Average Max. Temperature (F)	51.4	55.0	60.5	69.3	78.4	87.1	87.0	84.2	79.0	70.8	59.4	51.7	69.5
Average Min. Temperature (F)	23.8	26.6	29.9	35.7	44.3	53.5	59.1	57.1	50.1	39.4	29.5	23.9	39.4
Average Total Precipitation (in.)	1.22	1.05	0.81	0.35	0.32	0.59	2.82	2.66	1.63	1.25	0.86	1.38	14.93
Average Total SnowFall (in.)	4.0	3.1	2.1	0.4	0.0	0.0	0.0	0.0	0.0	0.3	1.5	3.5	14.9
Average Snow Depth (in.)	0	0	0	0	0	0	0	0	0	0	0	0	0

Percent of possible observations for period of record.
Max. Temp.: 75.5% Min. Temp.: 75% Precipitation: 98.8% Snowfall: 97% Snow Depth: 89.8%
Check Station Metadata or Metadata graphics for more detail about data completeness.

Western Regional Climate Center, wrcc@dri.edu

C. Watershed Data Indicator Datasheets

HALL DRAW-BURRO CIENEGA WATERSHED CONDITION INDICATORS

INDICATOR	ATTRIBUTE	Attribute Score	Indicator Score	Weight	REASON FOR RATING
Aquatic Physical					
1 Water Quality	Impaired Waters (303d Listed)	1	1.0	10%	Calculated Score – There are no impaired water bodies within the watershed.
	Water Quality Problems (Not Listed)	1			Limited water except CBar Canyon as it exits Forest
2 Water Quantity	Flow Characteristics	1	1.0	10%	
3 Aquatic Habitat	Habitat Fragmentation	2	2.0	10%	Limited water; weighted average 1.79
	Large Woody Debris	n/a			Not applicable
	Channel Shape and Function	2			Limited water; weighted average 1.79
Aquatic Biota					
4 Aquatic Biota	Life Form Presence	2	2.0	15%	Limited water; weighted average 1.79
	Native Species	2			Limited water; weighted average 1.79
	Exotic and/or Invasive Species	2			Limited water; weighted average 1.79
5 Riparian /Wetland Vegetation	Vegetation Condition	2	2.0	15%	Limited riparian except CBar Canyon as it exits Forest
Terrestrial Physical					
6 Roads and Trails	Open Road Density	2	2.0	15%	Calculated score
	Road Maintenance	2			Roads in drainage bottoms; no bmps
	Proximity to water	1			Roads in drainage bottoms; no bmps
	Mass wasting	n/a			Not applicable
7 Soils	Soil Productivity	3	2.7	15%	Gila General Ecosystem Survey and Apache-Sitgreaves Terrestrial Ecosystem Survey information
	Soil Erosion	3			Granite Soils; lots of gullies
	Soil Contamination	2			WO 2011 nutrient nitrogen data
Terrestrial Biological					
8 Fire Regime or Wildfire	Fire Condition Class	2	2.0	2%	Calculated score
9 Forest Cover	Loss of Forest Cover	1	1.0	2%	
10 Rangeland Vegetation	Vegetation Condition	2	2.0	2%	The four allotments average out to fair condition
11 Terrestrial Invasive Species	Extent and Rate of Spread	1	1.0	2%	No known populations
12 Forest Health	Insects and Disease	1	1.0	2%	No known populations
	Ozone				Calculated score
	Watershed Weighted Score	1.9			

NINETYSIX CREEK WATERSHED CONDITION INDICATORS

INDICATOR	ATTRIBUTE	Attribute Score	Indicator Score	Weight	REASON FOR RATING
Aquatic Physical					
1 Water Quality	Impaired Waters (303d Listed)	1	1.0	10%	Calculated Score – There are no impaired water bodies within the watershed.
	Water Quality Problems (Not Listed)	1			
2 Water Quantity	Flow Characteristics	2	2.0	10%	Blacktail Tank restricts flow
3 Aquatic Habitat	Habitat Fragmentation	2	2.0	10%	No fish limited water and riparian; weighted average 1.73
	Large Woody Debris	n/a			Not applicable
	Channel Shape and Function	2			weighted average 1.79
INDICATOR	**ATTRIBUTE**	**Attribute Score**	**Indicator Score**	**Weight**	**REASON FOR RATING**
Aquatic Biota					
4 Aquatic Biota	Life Form Presence	2	2.0	15%	Limited water; weighted average 1.73
	Native Species	2			Limited water; weighted average 1.73
	Exotic and/or Invasive Species	2			Limited water; weighted average 1.73
5 Riparian /Wetland Vegetation	Vegetation Condition	2	2.0	15%	Limited water; weighted average 1.73
INDICATOR	**ATTRIBUTE**	**Attribute Score**	**Indicator Score**	**Weight**	**REASON FOR RATING**
Terrestrial Physical					
6 Roads and Trails	Open Road Density	1	1.3	15%	Calculated score
	Road Maintenance	2			3 roads on Forest; level 2
	Proximity to water	1			
	Mass wasting	n/a			Not applicable
7 Soils	Soil Productivity	3	2.7	15%	Gila General Ecosystem Survey and Apache-Sitgreaves Terrestrial Ecosystem Survey information
	Soil Erosion	3			Granite parent material; some active gullying/healing in places but still a lot of erosion across the watershed
	Soil Contamination	2			WO 2011 nutrient nitrogen data
INDICATOR	**ATTRIBUTE**	**Attribute Score**	**Indicator Score**	**Weight**	**REASON FOR RATING**
Terrestrial Biological					
8 Fire Regime or Wildfire	Fire Condition Class	2	2.0	2%	Calculated score
9 Forest Cover	Loss of Forest Cover	1	1.0	2%	
10 Rangeland Vegetation	Vegetation Condition	2	2.0	2%	The two allotments average out to fair condition
11 Terrestrial Invasive Species	Extent and Rate of Spread	1	1.0	2%	No known populations
12 Forest Health	Insects and Disease	1	1.0	2%	No known populations
	Ozone				Calculated score
	Watershed Weighted Score	1.9			

D. Burro Cienaga Bird List

BIRDS RECORDED ON THE PITCHFORK RANCH
GRANT COUNTY, NEW MEXICO
compiled by Dale A. Zimmerman

Species visually recorded with certainty on, or in the near vicinity of, the ranch property are listed. Species names in **boldface** type are those birds considered by Partners in Flight to be "Species of Continental Importance" in its North American Landbird Conservation Plan of 2004. Species names in CAPITAL letters represent those present during the usual breeding season; most of these probably nest on or near the ranch. Species in **BOLDFACE CAPITAL** letters are of "Continental Importance" and are present during breeding season. The names of species known to on the ranch are followed by an asterisk (*). Primarily winter visitors (which may also be present as spring or fall transients) are followed by (w).

HERONS, EGRETS
GREAT BLUE HERON

VULTURES
TURKEY VULTURE

DUCKS, GEESE
American Wigeon
MALLARD
Cinnamon Teal

HAWKS, EAGLES, FALCONS
Bald Eagle
Northern Harrier (w)
Cooper's Hawk
RED-TAILED HAWK
GOLDEN EAGLE
American Kestrel
PRAIRIE FALCON
Aplomado Falcon (introduced)

QUAIL
SCALED QUAIL *
GAMBEL'S QUAIL *
MONTEZUMA QUAIL

PLOVERS
Killdeer

SANDPIPERS & ALLIES
Greater Yellowlegs
Spotted Sandpiper

PIGEONS, DOVES
Eurasian Collared Dove
WHITE-WINGED DOVE
MOURNING DOVE

CUCKOOS
GREATER ROADRUNNER

OWLS
BARN OWL
GREAT HORNED OWL
Long-eared Owl (w)

NIGHTJARS
COMMON POORWILL
Common Nighthawk

KINGFISHERS
Belted Kingfisher

HUMMINGBIRDS
BLACK-CHINNED HUMMINGBIRD
Broad-tailed Hummingbird

WOODPECKERS
Acorn Woodpecker
Red-naped Sapsucker (w)
LADDER-BACKED WOODPECKER
Northern Flicker

TYRANT FLYCATCHERS
Western Wood-Pewee
Willow Flycatcher
Hammond's Flycatcher
Gray Flycatcher
Dusky Flycatcher
Buff-Breasted Flycatcher
Black Phoebe
SAY'S PHOEBE
VERMILION FLYCATCHER *
ASH-THROATED FLYCATCHER
CASSIN'S KINGBIRD *
WESTERN KINGBIRD

SHRIKES
Loggerhead Shrike

VIREOS
Bell's Vireo
Plumbeous Vireo
Cassin's Vireo
Warbling Vireo

CORVIDS
WESTERN SCRUB-JAY
MEXICAN JAY
CHIHUAHUAN RAVEN

LARKS
Horned Lark *

SWALLOWS
Violet-green Swallow
Northern Rough-winged Swallow
Barn Swallow

TITMICE, BUSHTIT, NUTHATCHES
Bridled Titmouse
Juniper Titmouse
Bushtit
White-breasted Nuthatch

WRENS
CACTUS WREN
ROCK WREN
Canyon Wren
BEWICK'S WREN
House Wren

KINGLETS, GNATCATCHERS
Ruby-crowned Kinglet
Blue-gray Gnatcatcher

THRUSHES
Hermit Thrush
American Robin

MIMIDS
NORTHERN MOCKINGBIRD
CURVE-BILLED THRASHER *
Crissal Thrasher

PIPITS
American Pipit

WAXWINGS, SILKY-FLYCATCHERS
Cedar Waxwing
PHAINOPEPLA

WOOD-WARBLERS
Orange-crowned Warbler
Virginia's Warbler
Lucy's Warbler
Nashville Warbler
Yellow Warbler
Yellow-rumped (Audubon's) Warbler
Black-throated Gray Warbler
Townsend's Warbler
Grace's Warbler
Northern Waterthrush
MacGillivray's Warbler
Common Yellowthroat
Wilson's Warbler
Red-faced Warbler
Painted Redstart
Yellow-breasted Chat

TANAGERS
SUMMER TANAGER
Western Tanager

SPARROWS, TOWHEES, JUNCOS
Green-tailed Towhee
SPOTTED TOWHEE
CANYON TOWHEE
CASSIN'S SPARROW
BOTTERI'S SPARROW
RUFOUS-CROWNED SPARROW
Chipping Sparrow
Brewer's Sparrow
Vesper Sparrow
LARK SPARROW
BLACK-THROATED SPARROW
Lincoln's Sparrow
White-crowned Sparrow
(*white-lored and black-lored subspecies*) (w)
Dark-eyed Junco
(*Oregon, Pink-sided, & Gray-headed subspecies*) (w)
Chestnut-collared Longspur (w)

CARDINALS, GROSBEAKS, BUNTINGS
NORTHERN CARDINAL
Pyrrhuloxia
BLACK-HEADED GROSBEAK
BLUE GROSBEAK
Lazuli Bunting
Indigo Bunting
Painted Bunting

ICTERIDS
EASTERN MEADOWLARK
Western Meadowlark (w)
Yellow-headed Blackbird
BROWN-HEADED COWBIRD
HOODED ORIOLE
BULLOCK'S ORIOLE
SCOTT'S ORIOLE

FINCHES
HOUSE FINCH *
Pine Siskin
LESSER GOLDFINCH
Dickcissel

E. NRCS Cost Docket and Cost Data

2012 NRCS EQIP Cost Docket

Practice Code	Cost Share Program	Practice Name	Component	Unit Type	Unit Cost
102	EQIP	Comprehensive Nutrient Management Plan	Prepare CNMP	au	2.5
102	EQIP	Comprehensive Nutrient Management Plan	Prepare CNMP HU	au	3.75
104	EQIP	Nutrient Management CAP	Nutrient Management CAP <100 AC	No	1596
104	EQIP	Nutrient Management CAP	Nutrient Management CAP <100 AC - HU	No	1915.2
104	EQIP	Nutrient Management CAP	Nutrient Management CAP >300 AC	No	2268
104	EQIP	Nutrient Management CAP	Nutrient Management CAP >300 AC - HU	No	2721.6
104	EQIP	Nutrient Management CAP	Nutrient Mangement CAP 101-300 AC	No	1890
104	EQIP	Nutrient Management CAP	Nutrient Mangement CAP 101-300 AC - HU	No	2268
106	EQIP	Forest Management Plan	FMP > 500 acres	No	3750
106	EQIP	Forest Management Plan	FMP > 500 acres - HU	No	4500
106	EQIP	Forest Management Plan	FMP 101 - 250 acres	No	2250
106	EQIP	Forest Management Plan	FMP 101 - 250 acres - HU	No	2700
106	EQIP	Forest Management Plan	FMP 1-20 acres	No	975
106	EQIP	Forest Management Plan	FMP 1-20 acres - HU	No	1170
106	EQIP	Forest Management Plan	FMP 21-100 acres	No	1237.5
106	EQIP	Forest Management Plan	FMP 21-100 acres - HU	No	1485
106	EQIP	Forest Management Plan	FMP 251 - 500 acres	No	3225
106	EQIP	Forest Management Plan	FMP 251 - 500 acres - HU	No	3870
110	EQIP	Grazing Management CAP	Grazing Management Plan < 100 Acre	No	672
110	EQIP	Grazing Management CAP	Grazing Management Plan < 100 Acre - HU	No	806.4
110	EQIP	Grazing Management CAP	Grazing Management Plan < 1500 Acre	No	1764
110	EQIP	Grazing Management CAP	Grazing Management Plan < 1500 Acre - HU	No	2116.8
110	EQIP	Grazing Management CAP	Grazing Management Plan >5,000 Acre	No	3780
110	EQIP	Grazing Management CAP	Grazing Management Plan >5,000 Acre - HU	No	4536
110	EQIP	Grazing Management CAP	Grazing Management Plan 1,500-5,000 Acre	No	2940
110	EQIP	Grazing Management CAP	Grazing Management Plan 1,500-5,000 Acre - HU	No	3528
114	EQIP	Integrated Pest Management CAP	IPM CAP	No	1260
114	EQIP	Integrated Pest Management CAP	IPM CAP - HU	No	1512
118	EQIP	Irrigation Water Management CAP	Irrigation Water Management Plan	No	1942.5
118	EQIP	Irrigation Water Management CAP	Irrigation Water Management Plan - HU	No	2331
122	EQIP	Agricultural Energy Management - Headquarters CAP	AgEMP 122 Livestock - Large 301-2500 AU	No	1863.25
122	EQIP	Agricultural Energy Management - Headquarters CAP	AgEMP 122 Livestock - Large 301-2500 AU - HU	No	2238.3
122	EQIP	Agricultural Energy Management - Headquarters CAP	AgEMP 122 Livestock - Medium 70-300 AU	No	1506
122	EQIP	Agricultural Energy Management - Headquarters CAP	AgEMP 122 Livestock - Medium 70-300 AU - HU	No	1807.2
122	EQIP	Agricultural Energy Management - Headquarters CAP	AgEMP 122 Livestock - Small < 70 AU	No	1144.5
122	EQIP	Agricultural Energy Management - Headquarters CAP	AgEMP 122 Livestock - Small < 70 AU - HU	No	1373.4
122	EQIP	Agricultural Energy Management - Headquarters CAP	AgEMP 122 Livestock - XLarge >2500 AU	No	2401.88
122	EQIP	Agricultural Energy Management - Headquarters CAP	AgEMP 122 Livestock - XLarge >2500 AU - HU	No	2882.25
122	EQIP	Agricultural Energy Management - Headquarters CAP	AgEMP 122 Mixed Enterprises - HU	No	943.2
122	EQIP	Agricultural Energy Management - Headquarters CAP	AgEMP 122 Mixed Enterprises	No	786
122	EQIP	Agricultural Energy Management - Headquarters CAP	AgEMP 122 Non-Livestock - Single Enterprise	No	1908.38
122	EQIP	Agricultural Energy Management - Headquarters CAP	AgEMP 122 Non-Livestock - Single Enterprise - HU	No	2290.05
122	EQIP	Agricultural Energy Management - Headquarters CAP	AgEMP 122 Non-Livestock - Three Enterprises	No	3306.38
122	EQIP	Agricultural Energy Management - Headquarters CAP	AgEMP 122 Non-Livestock - Three Enterprises - HU	No	3967.65
122	EQIP	Agricultural Energy Management - Headquarters CAP	AgEMP 122 Non-Livestock - Two Enterprises	No	2440.88
122	EQIP	Agricultural Energy Management - Headquarters CAP	AgEMP 122 Non-Livestock - Two Enterprises - HU	No	2929.05

124	EQIP	Agricultural Energy Management - Landscape CAP	AgEMP 124 Irrigated < 50 acres	No	1908.38
124	EQIP	Agricultural Energy Management - Landscape CAP	AgEMP 124 Irrigated < 50 acres - HU	No	2290.05
124	EQIP	Agricultural Energy Management - Landscape CAP	AgEMP 124 Irrigated >5,000 acres	No	3721.88
124	EQIP	Agricultural Energy Management - Landscape CAP	AgEMP 124 Irrigated >5,000 acres - HU	No	4466.25
124	EQIP	Agricultural Energy Management - Landscape CAP	AgEMP 124 Irrigated 500-4,999 acres	No	3306.38
124	EQIP	Agricultural Energy Management - Landscape CAP	AgEMP 124 Irrigated 500-4,999 acres - HU	No	3967.65
124	EQIP	Agricultural Energy Management - Landscape CAP	AgEMP 124 Irrigated 50-499 acres	No	2552.63
124	EQIP	Agricultural Energy Management - Landscape CAP	AgEMP 124 Irrigated 50-499 acres - HU	No	3063.15
124	EQIP	Agricultural Energy Management - Landscape CAP	AgEMP 124 Non-Irrigated < 50 acres	No	1242.38
124	EQIP	Agricultural Energy Management - Landscape CAP	AgEMP 124 Non-Irrigated < 50 acres - HU	No	1490.85
124	EQIP	Agricultural Energy Management - Landscape CAP	AgEMP 124 Non-Irrigated >5,000 acres	No	2499.75
124	EQIP	Agricultural Energy Management - Landscape CAP	AgEMP 124 Non-Irrigated >5,000 acres - HU	No	2999.7
124	EQIP	Agricultural Energy Management - Landscape CAP	AgEMP 124 Non-Irrigated 500-4,999 acres	No	1930.5
124	EQIP	Agricultural Energy Management - Landscape CAP	AgEMP 124 Non-Irrigated 500-4,999 acres - HU	No	2316.6
124	EQIP	Agricultural Energy Management - Landscape CAP	AgEMP 124 Non-Irrigated 50-499 acres	No	1571.25
124	EQIP	Agricultural Energy Management - Landscape CAP	AgEMP 124 Non-Irrigated 50-499 acres - HU	No	1885.5
130	EQIP	Drainage Water Management Plan	DWM CAP with Map	No	1415.29
130	EQIP	Drainage Water Management Plan	DWM CAP with Map - HU	No	1698.35
130	EQIP	Drainage Water Management Plan	DWM CAP without Map	No	1626.37
130	EQIP	Drainage Water Management Plan	DWM CAP without Map - HU	No	1951.64
134	EQIP	AWEP Transition Plan	AWEP Transition CAP	No	1125
134	EQIP	AWEP Transition Plan	AWEP Transition CAP - HU	No	1350
138	EQIP	Organic Transition CAP	Conservation Plan Supporting Organic Transition	No	1560
138	EQIP	Organic Transition CAP	Conservation Plan Supporting Organic Transition - HU	No	1872
142	EQIP	Fish-Wildlife CAP	Fish & Wildlife Habitat Management CAP	No	2136.96
142	EQIP	Fish-Wildlife CAP	Fish & Wildlife Habitat Management CAP - HU	No	2564.35
146	EQIP	Pollinator CAP	Pollinator CAP	No	2136.96
146	EQIP	Pollinator CAP	Pollinator CAP - HU	No	2564.35
154	EQIP	IPM Herbicide Resist Weed Management CAP	IPM Herbicide Resist Weed CAP	No	1260
154	EQIP	IPM Herbicide Resist Weed Management CAP	IPM Herbicide Resist Weed CAP - HU	No	1512
313	EQIP	Waste Storage Facility	Waste Storage Pond	ac ft	6454.85
313	EQIP	Waste Storage Facility	Waste Storage Pond HU	ac ft	7745.83
314	EQIP	Brush Management	Biological OR Chemical High-Aerially applied Low	ac	36.31
314	EQIP	Brush Management	Biological OR Chemical High-Aerially applied Low - HU	ac	54.47
314	EQIP	Brush Management	Chemical High-Ground Applied	ac	30.91
314	EQIP	Brush Management	Chemical High-Ground Applied - HU	ac	46.37
314	EQIP	Brush Management	Chemical Low-Aerially Applied	ac	24.54
314	EQIP	Brush Management	Chemical Low-Aerially Applied - HU	ac	29.45
314	EQIP	Brush Management	Chemical Low-Ground Applied	ac	11.99
314	EQIP	Brush Management	Chemical Low-Ground Applied - HU	ac	14.38
314	EQIP	Brush Management	Chemical Spot Treatment or Mechanical Medium	ac	136.03
314	EQIP	Brush Management	Chemical Spot Treatment or Mechanical Medium - HU	ac	204.05
314	EQIP	Brush Management	Mechanical High	ac	134.05
314	EQIP	Brush Management	Mechanical High - HU	ac	201.08
314	EQIP	Brush Management	Mechanical High with Follow-up	ac	732.48
314	EQIP	Brush Management	Mechanical High with Follow-up - HU	ac	1098.72
314	EQIP	Brush Management	Mechanical Very Low	ac	24.22
314	EQIP	Brush Management	Mechanical Very Low - HU	ac	36.33
315	EQIP	Herbaceous Weed Control	Develop plan and manage Class A Noxious Weeds	Ac	20
315	EQIP	Herbaceous Weed Control	Develop plan and manage Class A Noxious Weeds HU	Ac	30
315	EQIP	Herbaceous Weed Control	Develop plan and manage Class B Noxious Weeds	Ac	15
315	EQIP	Herbaceous Weed Control	Develop plan and manage Class B Noxious Weeds HU	Ac	22.5
320	EQIP	Irrigation Canal or Lateral	All Soils	cy	1.21
320	EQIP	Irrigation Canal or Lateral	All Soils HU	cy	1.81
328	EQIP	Conservation Crop Rotation	Convert to Dryland Farming from Low Water Use	ac	38.2676
328	EQIP	Conservation Crop Rotation	Convert to Dryland Farming from Low Water Use HU	ac	38.2676
328	EQIP	Conservation Crop Rotation	Convert to Dryland Farming from Medium Water Use	ac	78.3856
328	EQIP	Conservation Crop Rotation	Convert to Dryland Farming from Medium Water Use HU	ac	78.3856
328	EQIP	Conservation Crop Rotation	Convert to Dryland Farming from High Water Use	ac	148.5921
328	EQIP	Conservation Crop Rotation	Convert to Dryland Farming from High Water Use HU	ac	148.5921
329	EQIP	Residue Management, No-Till/Strip Till/Direct Seed	No-Till/Strip Till	ac	22.8
329	EQIP	Residue Management, No-Till/Strip Till/Direct Seed	No-Till/Strip Till HU	ac	22.8
338	EQIP	Prescribed Burning	Prescribed Burn with Low Volatility Fuels	ac	8.13
338	EQIP	Prescribed Burning	Prescribed Burn with High Volatility Fuels	ac	17.5
338	EQIP	Prescribed Burning	Prescribed Burn with High Volatility Fuels HU	ac	26.25

338	EQIP	Prescribed Burning	Prescribed Burn with Low Volatility Fuels HU	ac	12.19
340	EQIP	Cover Crop	High Seed Cost (non-organic)	ac	28.71
340	EQIP	Cover Crop	High Seed Cost (non-organic) - HU	ac	43.07
340	EQIP	Cover Crop	Organic	ac	69.65
340	EQIP	Cover Crop	Organic - HU	ac	104.47
340	EQIP	Cover Crop	Pollinator Support	ac	23.13
340	EQIP	Cover Crop	Pollinator Support - HU	ac	34.69
340	EQIP	Cover Crop	Seeded with fertilizer	ac	57.64
340	EQIP	Cover Crop	Seeded with fertilizer - HU	ac	69.17
340	EQIP	Cover Crop	Seeded without fertilizer	ac	25.89
340	EQIP	Cover Crop	Seeded without fertilizer - HU	ac	31.07
342	EQIP	Critical Area Planting	Post Disturbance	ac	149.63
342	EQIP	Critical Area Planting	Post Disturbance HU	ac	224.44
348	EQIP	Dam, Diversion	Earthen Diversion	cy	1.21
348	EQIP	Dam, Diversion	Earthen Diversion HU	cy	1.81
348	EQIP	Dam, Diversion	Concrete Capped Gabion Diversion	cy	199.38
348	EQIP	Dam, Diversion	Concrete Capped Gabion Diversion HU	cy	299.07
348	EQIP	Dam, Diversion	Stream Barbs, Rock Placement, etc.	cy	25.99
348	EQIP	Dam, Diversion	Stream Barbs, Rock Placement, etc. HU	cy	38.99
350	EQIP	Sediment Basin	Earthen Sediment Basin	cy	1.21
350	EQIP	Sediment Basin	Earthen Sediment Basin HU	cy	1.81
353	EQIP	Monitoring Well	Monitoring Well	ft	34.95
353	EQIP	Monitoring Well	Monitoring Well HU	ft	52.42
356	EQIP	Dike	Earthen Dike	cy	1.21
356	EQIP	Dike	Earthen Dike HU	cy	1.81
356	EQIP	Dike	Rock or Concrete Dike	cy	128.75
356	EQIP	Dike	Rock or Concrete Dike HU	cy	193.13
362	EQIP	Diversion	Concrete Diversion	cy	128.75
362	EQIP	Diversion	Concrete Diversion HU	cy	193.13
362	EQIP	Diversion	Earthen Diversion	cy	1.21
362	EQIP	Diversion	Earthen Diversion HU	cy	1.81
362	EQIP	Diversion	Net Wire Diversion	ft	0.95
362	EQIP	Diversion	Net Wire Diversion HU	ft	1.43
366	EQIP	Anaerobic Digester	Complete Digester System	gal	26.71
366	EQIP	Anaerobic Digester	Complete Digester System HU	gal	40.07
367	EQIP	Roofs and Covers	Waste Storage Pond Flexible Cover	SqFt	0.9
367	EQIP	Roofs and Covers	Waste Storage Pond Flexible Cover HU	SqFt	1.35
372	EQIP	Combustion System Improvement	ElectricMotor 20-40 hp	HP	70
372	EQIP	Combustion System Improvement	ElectricMotor 20-40 hp HU	HP	105
372	EQIP	Combustion System Improvement	ElectricMotor 30 & 60 hp	No.	3650
372	EQIP	Combustion System Improvement	ElectricMotor 30 & 60 hp HU	No.	5475
372	EQIP	Combustion System Improvement	ElectricMotor 75 & 100 hp	No.	5500
372	EQIP	Combustion System Improvement	ElectricMotor 75 & 100 hp HU	No.	8250
372	EQIP	Combustion System Improvement	PowerUnit (100-134 bhp)	No.	7840
372	EQIP	Combustion System Improvement	PowerUnit (100-134 bhp) HU	No.	11760
372	EQIP	Combustion System Improvement	PowerUnit (135-174 bhp)	No.	9140
372	EQIP	Combustion System Improvement	PowerUnit (135-174 bhp) HU	No.	13710
372	EQIP	Combustion System Improvement	PowerUnit (50-74 bhp)	No.	5040
372	EQIP	Combustion System Improvement	PowerUnit (50-74 bhp) HU	No.	7560
372	EQIP	Combustion System Improvement	PowerUnit (75-99 bhp)	No.	6040
372	EQIP	Combustion System Improvement	PowerUnit (75-99 bhp) HU	No.	9060
372	EQIP	Combustion System Improvement	PowerUnit (up to 49 bhp)	HP	98.5
372	EQIP	Combustion System Improvement	PowerUnit (up to 49 bhp) HU	HP	147.75
374	EQIP	Farmstead Energy Improvement	Bulb Replacement	Ea	504
374	EQIP	Farmstead Energy Improvement	Bulb Replacement HU	Ea	756
374	EQIP	Farmstead Energy Improvement	Heater Replacement	Ea	900
374	EQIP	Farmstead Energy Improvement	Heater Replacement HU	Ea	1350
374	EQIP	Farmstead Energy Improvement	Insulation Attic	Ea.	1600
374	EQIP	Farmstead Energy Improvement	Insulation Attic HU	Ea.	2400
374	EQIP	Farmstead Energy Improvement	Insulation Side Walls	Ea	2900
374	EQIP	Farmstead Energy Improvement	Insulation Side Walls HU	Ea	4350
374	EQIP	Farmstead Energy Improvement	Sealing House with Drop Down Ceiling	Ea.	950
374	EQIP	Farmstead Energy Improvement	Sealing House with Drop Down Ceiling HU	Ea.	1710
374	EQIP	Farmstead Energy Improvement	Sealing House without Drop Down Ceiling	Ea	1600
374	EQIP	Farmstead Energy Improvement	Sealing House without Drop Down Ceiling HU	Ea	2880
374	EQIP	Farmstead Energy Improvement	Ventilation Doors	Ea.	36

374	EQIP	Farmstead Energy Improvement	Ventilation Doors HU	Ea.	54
374	EQIP	Farmstead Energy Improvement	Ventilation Fan	Ea.	562.5
374	EQIP	Farmstead Energy Improvement	Ventilation Fan HU	Ea.	843.75
378	EQIP	Pond	All Soils	cy	1.21
378	EQIP	Pond	All Soils HU	cy	1.81
380	EQIP	Windbreak/Shelterbelt Establishment	per foot	ft	1.55
380	EQIP	Windbreak/Shelterbelt Establishment	per foot HU	ft	2.32
382	EQIP	Fence	Electric - includes energizer or battery	ft	0.5
382	EQIP	Fence	Electric - includes energizer or battery - HU	ft	0.75
382	EQIP	Fence	Electric - portable includes energizer or battery	ft	0.22
382	EQIP	Fence	Electric - portable includes energizer or battery - HU	ft	0.33
382	EQIP	Fence	Elk or Worm Fence	ft	4.48
382	EQIP	Fence	Elk or Worm Fence - HU	ft	6.72
382	EQIP	Fence	Smooth or Barbed Wire	ft	1.13
382	EQIP	Fence	Smooth or Barbed Wire-Difficult Terrain or Remote Area	ft	1.65
382	EQIP	Fence	Smooth or Barbed Wire-Difficult Terrain or Remote-HU	ft	2.33
382	EQIP	Fence	Smooth or Barbed Wire - HU	ft	1.46
382	EQIP	Fence	Three rail corral - fence installed, installed to protect water quality	ft	10.33
382	EQIP	Fence	Three rail corral - fence installed, installed to protect water quality - HU	ft	15.5
382	EQIP	Fence	Typically 2 rail, 12-20 foot beams, on 6 to 8 foot posts	ft	7.86
382	EQIP	Fence	Typically 2 rail, 12-20 foot beams, on 6 to 8 foot posts - HU	ft	11.79
382	EQIP	Fence	Woven Wire w/Barbed Wire Strands	ft	1.36
382	EQIP	Fence	Woven Wire w/Barbed Wire Strands - HU	ft	2.04
383	EQIP	Fuel Break	1 - Light	ac	125
383	EQIP	Fuel Break	1 - Light HU	ac	187.5
383	EQIP	Fuel Break	2 - Medium	ac	240
383	EQIP	Fuel Break	2 - Medium HU	ac	360
383	EQIP	Fuel Break	3 - Medium Steep, or Heavy	ac	323.75
383	EQIP	Fuel Break	3 - Medium Steep, or Heavy HU	ac	485.63
383	EQIP	Fuel Break	4 - Heavy Steep	ac	445
383	EQIP	Fuel Break	4 - Heavy Steep HU	ac	667.5
383	EQIP	Fuel Break	5 - Mastication, Medium	ac	450
383	EQIP	Fuel Break	5 - Mastication, Medium HU	ac	675
383	EQIP	Fuel Break	6 - Mastication, Heavy	ac	700
383	EQIP	Fuel Break	6 - Mastication, Heavy HU	ac	1050
383	EQIP	Fuel Break	7 - WUI Medium	ac	330
383	EQIP	Fuel Break	7 - WUI Medium HU	ac	495
383	EQIP	Fuel Break	8 - WUI Medium Steep, or Heavy	ac	630
383	EQIP	Fuel Break	8 - WUI Medium Steep, or Heavy HU	ac	945
383	EQIP	Fuel Break	9 - WUI Heavy Steep	ac	1000
383	EQIP	Fuel Break	9 - WUI Heavy Steep HU	ac	1500
384	EQIP	Woody Residue Treatment	Lop and Scatter 1 - Light	ac	135
384	EQIP	Woody Residue Treatment	Lop and Scatter 1 - Light HU	ac	162
384	EQIP	Woody Residue Treatment	Lop and Scatter 2 - Med and Heavy	ac	198.75
384	EQIP	Woody Residue Treatment	Lop and Scatter 2 - Med and Heavy HU	ac	238.5
384	EQIP	Woody Residue Treatment	Lop and Scatter 3 - Steep	ac	277.5
384	EQIP	Woody Residue Treatment	Lop and Scatter 3 - Steep HU	ac	333
384	EQIP	Woody Residue Treatment	On-site chipping or offsite removal, steep slopes to Reduce Fire Hazard	ac	656.25
384	EQIP	Woody Residue Treatment	On-site chipping or offsite removal to Reduce Fire Hazard HU	ac	787.5
384	EQIP	Woody Residue Treatment	On-site chipping or offsite removal to Reduce Fire Hazard	ac	480
384	EQIP	Woody Residue Treatment	On-site chipping or offsite removal to Reduce Fire Hazard HU	ac	576
384	EQIP	Woody Residue Treatment	Piling	ac	191.25
384	EQIP	Woody Residue Treatment	Piling HU	ac	229.5
384	EQIP	Woody Residue Treatment	Piling on steep slopes	ac	272.63
384	EQIP	Woody Residue Treatment	Piling on steep slopes HU	ac	327.15
388	EQIP	Irrigation Field Ditch	All Soils	cy	1.21
388	EQIP	Irrigation Field Ditch	All Soils HU	cy	1.81
391	EQIP	Riparian Forest Buffer	Utilize existing vegetation and new plantings	ac	93.75

391	EQIP	Riparian Forest Buffer	Utilize existing vegetation and new plantings HU	ac	112.5
395	EQIP	Stream Habitat Improvement and Management	Stream Barbs, Rock Placement, etc.	cy	165
395	EQIP	Stream Habitat Improvement and Management	Stream Barbs, Rock Placement, etc. HU	cy	198
410	EQIP	Grade Stabilization Structure	Earthen	cy	1.33
410	EQIP	Grade Stabilization Structure	Earthen HU	cy	2
410	EQIP	Grade Stabilization Structure	Rock/Brush 1 - up to 2 Cubic Yards	each	100
410	EQIP	Grade Stabilization Structure	Rock/Brush 1 - up to 2 Cubic Yards HU	each	150
410	EQIP	Grade Stabilization Structure	Rock/Brush 2 - More than 2 cy to 5.3 cy	each	200
410	EQIP	Grade Stabilization Structure	Rock/Brush 2 - More than 2 cy to 5.3 cy HU	each	300
410	EQIP	Grade Stabilization Structure	Rock/Brush 3 - greater than 5.3 cubic yards	cy	37.5
410	EQIP	Grade Stabilization Structure	Rock/Brush 3 - greater than 5.3 cubic yards HU	cy	56.25
410	EQIP	Grade Stabilization Structure	Rock/Concrete	cy	85.72
410	EQIP	Grade Stabilization Structure	Rock/Concrete HU	cy	128.57
428	EQIP	Irrigation Ditch Lining	Concrete 1.5" slip form	ft	13.58
428	EQIP	Irrigation Ditch Lining	Concrete 1.5" slip form HU	ft	20.37
428	EQIP	Irrigation Ditch Lining	Concrete 2.0" or greater slip form	ft	14.74
428	EQIP	Irrigation Ditch Lining	Concrete 2.0" or greater slip form HU	ft	22.11
428	EQIP	Irrigation Ditch Lining	Concrete 2.5" or greater hand placed	ft	23.29
428	EQIP	Irrigation Ditch Lining	Concrete 2.5" or greater hand placed HU	ft	34.94
428	EQIP	Irrigation Ditch Lining	Concrete 2.5" or greater slip form	ft	19.11
428	EQIP	Irrigation Ditch Lining	Concrete 2.5" or greater slip form HU	ft	28.66
428	EQIP	Irrigation Ditch Lining	Membrane Modular HDPE Lining, greater than 16" depth	ft	19.88
428	EQIP	Irrigation Ditch Lining	Membrane Modular HDPE Lining, greater than 16" depth HU	ft	29.81
428	EQIP	Irrigation Ditch Lining	Membrane Modular HDPE Lining, up to 16" depth	ft	15.67
428	EQIP	Irrigation Ditch Lining	Membrane Modular HDPE Lining, up to 16" depth HU	ft	23.51
430	EQIP	Irrigation Pipeline	High Pressure 1 - 2 in or less	ft	2.66
430	EQIP	Irrigation Pipeline	High Pressure 1 - 2 in or less HU	ft	3.2
430	EQIP	Irrigation Pipeline	High Pressure 2 - 4 to 6 in	ft	4.69
430	EQIP	Irrigation Pipeline	High Pressure 2 - 4 to 6 in HU	ft	5.63
430	EQIP	Irrigation Pipeline	High Pressure 3 - 8-10 in	ft	7.74
430	EQIP	Irrigation Pipeline	High Pressure 3 - 8-10 in HU	ft	9.29
430	EQIP	Irrigation Pipeline	High Pressure 4 - 12-15 in	ft	9.64
430	EQIP	Irrigation Pipeline	High Pressure 4 - 12-15 in HU	ft	11.57
430	EQIP	Irrigation Pipeline	High Pressure 5 - 18-21 in	ft	22.17
430	EQIP	Irrigation Pipeline	High Pressure 5 - 18-21 in HU	ft	26.6
430	EQIP	Irrigation Pipeline	High Pressure 6 - 24+ in	ft	33.86
430	EQIP	Irrigation Pipeline	High Pressure 6 - 24+ in HU	ft	40.64
430	EQIP	Irrigation Pipeline	Low Pressure 1 - 2 in or less	ft	2.66
430	EQIP	Irrigation Pipeline	Low Pressure 1 - 2 in or less HU	ft	3.2
430	EQIP	Irrigation Pipeline	Low Pressure 2 - 4-6 in	ft	4.76
430	EQIP	Irrigation Pipeline	Low Pressure 2 - 4-6 in HU	ft	5.71
430	EQIP	Irrigation Pipeline	Low Pressure 3 - 8-10 in	ft	6.65
430	EQIP	Irrigation Pipeline	Low Pressure 3 - 8-10 in HU	ft	7.98
430	EQIP	Irrigation Pipeline	Low Pressure 4 - 12-15 in	ft	13.58
430	EQIP	Irrigation Pipeline	Low Pressure 4 - 12-15 in HU	ft	16.3
430	EQIP	Irrigation Pipeline	Low Pressure 5 - 18-21 in	ft	22.8
430	EQIP	Irrigation Pipeline	Low Pressure 5 - 18-21 in HU	ft	27.36
430	EQIP	Irrigation Pipeline	Low Pressure 6 - 24 in or greater	ft	30.53
430	EQIP	Irrigation Pipeline	Low Pressure 6 - 24 in or greater HU	ft	36.63
430	EQIP	Irrigation Pipeline	Steel Pipeline 1, Up to 6 In Dia wo valves	ft	10.91
430	EQIP	Irrigation Pipeline	Steel Pipeline 1, Up to 6 In Dia wo valves HU	ft	13.1
430	EQIP	Irrigation Pipeline	Steel Pipeline 2, 8 to 14 In Dia	ft	21.83
430	EQIP	Irrigation Pipeline	Steel Pipeline 2, 8 to 14 In Dia HU	ft	26.2
430	EQIP	Irrigation Pipeline	Steel Pipeline 3, 16 to 24 In Dia wo valves	ft	28.35
430	EQIP	Irrigation Pipeline	Steel Pipeline 3, 16 to 24 In Dia wo valves HU	ft	34.02
430	EQIP	Irrigation Pipeline	Steel Pipeline 4, 25 or Greater In Dia wo valves	ft	32.4
430	EQIP	Irrigation Pipeline	Steel Pipeline 4, 25 or Greater In Dia wo valves HU	ft	38.88
436	EQIP	Irrigation Storage Reservoir	Manufactured tank more than 10,000 gal	gal	0.31
436	EQIP	Irrigation Storage Reservoir	Manufactured tank more than 10,000 gal HU	gal	0.46
436	EQIP	Irrigation Storage Reservoir	Manufactured tank up to 10,000 Gal with float box	gal	0.56
436	EQIP	Irrigation Storage Reservoir	Manufactured tank up to 10,000 Gal with float box HU	gal	0.83
436	EQIP	Irrigation Storage Reservoir	Manufactured tank up to 10,000 gal without float box	gal	0.48
436	EQIP	Irrigation Storage Reservoir	Manufactured tank up to 10,000 gal without float box HU	gal	0.73
441	EQIP	Irrigation System, Microirrigation	Micro for Existing Windbreaks	ft	0.42

441	EQIP	Irrigation System, Microirrigation	Micro for Existing Windbreaks HU	ft	0.5
441	EQIP	Irrigation System, Microirrigation	Trickle or Drip System up to 6 ac, low cost filters	ac	1242.44
441	EQIP	Irrigation System, Microirrigation	Trickle or Drip System up to 6 ac, low cost filters HU	ac	1490.93
441	EQIP	Irrigation System, Microirrigation	Trickle or Drip System, with new filter	ac	1726.28
441	EQIP	Irrigation System, Microirrigation	Trickle or Drip System, with new filter HU	ac	2071.53
441	EQIP	Irrigation System, Microirrigation	Trickle or Drip System, without new filter	ac	1301.98
441	EQIP	Irrigation System, Microirrigation	Trickle or Drip System, without new filter HU	ac	1562.37
442	EQIP	Irrigation System, Sprinkler	Lateral Move/Linear Move w/Hose Drag	ft	35.54
442	EQIP	Irrigation System, Sprinkler	Lateral Move/Linear Move w/Hose Drag - HU	ft	53.31
442	EQIP	Irrigation System, Sprinkler	New Center pivot sprinkler system	ft	43.37
442	EQIP	Irrigation System, Sprinkler	New Center pivot sprinkler system - HU	ft	52.05
442	EQIP	Irrigation System, Sprinkler	Permanent or Portable Solid (hand)Set	ac	1460.62
442	EQIP	Irrigation System, Sprinkler	Permanent or Portable Solid (hand)Set - HU	ac	2022.39
442	EQIP	Irrigation System, Sprinkler	Pod System	ea	118.48
442	EQIP	Irrigation System, Sprinkler	Pod System - HU	ea	177.73
442	EQIP	Irrigation System, Sprinkler	Portable Gun	ea	15772.73
442	EQIP	Irrigation System, Sprinkler	Portable Gun - HU	ea	23659.1
442	EQIP	Irrigation System, Sprinkler	Portable Gun (Small)	ea	1633.36
442	EQIP	Irrigation System, Sprinkler	Portable Gun (Small) - HU	ea	2450.04
442	EQIP	Irrigation System, Sprinkler	Side Roll	ac	471.03
442	EQIP	Irrigation System, Sprinkler	Side Roll - HU	ac	706.54
442	EQIP	Irrigation System, Sprinkler	Sprinkler System Conversion	ft	6.88
442	EQIP	Irrigation System, Sprinkler	Sprinkler System Conversion - HU	ft	8.26
443	EQIP	Irrigation System, Surface and Subsurface	Gated Pipe 1 - 6 in dia or less	ft	1.88
443	EQIP	Irrigation System, Surface and Subsurface	Gated Pipe 1 - 6 in dia or less HU	ft	2.25
443	EQIP	Irrigation System, Surface and Subsurface	Gated Pipe 2 - 8 to 10 in dia	ft	3.33
443	EQIP	Irrigation System, Surface and Subsurface	Gated Pipe 2 - 8 to 10 in dia HU	ft	4
443	EQIP	Irrigation System, Surface and Subsurface	Gated Pipe 3 - 12 in dia or greater	ft	3.75
443	EQIP	Irrigation System, Surface and Subsurface	Gated Pipe 3 - 12 in dia or greater HU	ft	4.5
449	EQIP	Irrigation Water Management	Acre Inches of Water Saved	ac in	8.73
449	EQIP	Irrigation Water Management	Acre Inches of Water Saved HU	ac in	8.73
449	EQIP	Irrigation Water Management	Basic	ac	1.5
449	EQIP	Irrigation Water Management	Basic HU	ac	1.8
449	EQIP	Irrigation Water Management	High Level	ac	7.5
449	EQIP	Irrigation Water Management	High Level HU	ac	9
464	EQIP	Irrigation Land Leveling	Irrigation Land Leveling	cy	1.7
464	EQIP	Irrigation Land Leveling	Irrigation Land Leveling HU	cy	2.55
466	EQIP	Land Smoothing	Irrigation Land Smoothing	ac	236.49
466	EQIP	Land Smoothing	Irrigation Land Smoothing HU	ac	354.73
472	EQIP	Access Control	Access Control, No-Till	ac	27.52
472	EQIP	Access Control	Access Control, No-Till HU	ac	27.52
472	EQIP	Access Control	Grazing Exclusion to Allow Riparian Habitat Recovery	ac	12
472	EQIP	Access Control	Grazing Exclusion to Allow Riparian Habitat Recovery HU	ac	12
472	EQIP	Access Control	Grazing Exclusion to Increase Fine Fuels	ac	1.5
472	EQIP	Access Control	Grazing Exclusion to Increase Fine Fuels HU	ac	1.5
472	EQIP	Access Control	Use Local Materials	ac	51.25
472	EQIP	Access Control	Use Local Materials HU	ac	76.88
484	EQIP	Mulching	Mulching	ac	83.5
484	EQIP	Mulching	Mulching HU	ac	125.25
512	EQIP	Forage and Biomass Planting	Lite Site Preparation and Seeding	ac	28.36
512	EQIP	Forage and Biomass Planting	Lite Site Preparation and Seeding - HU	ac	42.54
512	EQIP	Forage and Biomass Planting	Organic	ac	149.49
512	EQIP	Forage and Biomass Planting	Organic - HU	ac	224.24
512	EQIP	Forage and Biomass Planting	Site preparation and Seeding for Pollinator Support	ac	38.74
512	EQIP	Forage and Biomass Planting	Site preparation and Seeding for Pollinator Support - HU	ac	58.1
512	EQIP	Forage and Biomass Planting	Typical Site Preparation and Seeding	ac	58.39
512	EQIP	Forage and Biomass Planting	Typical Site Preparation and Seeding - HU	ac	70.07
516	EQIP	Pipeline	2 inch pipe	ft	1.53
516	EQIP	Pipeline	2 inch pipe - HU	ft	2.29
516	EQIP	Pipeline	3 inch pipe	ft	2.69
516	EQIP	Pipeline	3 inch pipe - HU	ft	4.03
516	EQIP	Pipeline	High Pressure Steel	ft	6.11
516	EQIP	Pipeline	High Pressure Steel - HU	ft	9.17
516	EQIP	Pipeline	Less than 2 inch pipe	ft	1.09

516	EQIP	Pipeline	Less than 2 inch pipe - HU	ft	1.64
528	EQIP	Prescribed Grazing	Irrigated pasture - Management intensive Grazing	ac	7.39
528	EQIP	Prescribed Grazing	Irrigated pasture - Management intensive Grazing - HU	ac	8.87
528	EQIP	Prescribed Grazing	Irrigated pasture - Management intensive Grazing w workshop	ac	7.36
528	EQIP	Prescribed Grazing	Irrigated pasture - Management intensive Grazing w workshop - HU	ac	11.03
528	EQIP	Prescribed Grazing	Prescribed Grazing on small farms and ranches	ea	492.95
528	EQIP	Prescribed Grazing	Prescribed Grazing on small farms and ranches - HU	ea	739.43
528	EQIP	Prescribed Grazing	Rangeland - typical prescribed grazing	ac	0.58
528	EQIP	Prescribed Grazing	Rangeland - typical prescribed grazing - HU	ac	1.29
528	EQIP	Prescribed Grazing	Rangeland - typical prescribed grazing w workshop	ac	1.68
528	EQIP	Prescribed Grazing	Rangeland - typical prescribed grazing w workshop - HU	ac	2.52
533	EQIP	Pumping Plant	Livestock Water Pump	hp	1363.55
533	EQIP	Pumping Plant	Livestock Water Pump - HU	hp	1636.25
533	EQIP	Pumping Plant	Pump Rebowling	hp	83.47
533	EQIP	Pumping Plant	Pump Rebowling - HU	hp	125.21
533	EQIP	Pumping Plant	Pump, < 10 HP	hp	443.78
533	EQIP	Pumping Plant	Pump, < 10 HP - HU	hp	665.67
533	EQIP	Pumping Plant	Pump, > 30 HP	hp	115.78
533	EQIP	Pumping Plant	Pump, > 30 HP - HU	hp	173.67
533	EQIP	Pumping Plant	Pump, > 30 HP with Variable Frequency Drive	hp	179.49
533	EQIP	Pumping Plant	Pump, > 30 HP with Variable Frequency Drive - HU	hp	269.23
533	EQIP	Pumping Plant	Pump, 10-30 HP or all Waste Water Pumps	hp	393.5
533	EQIP	Pumping Plant	Pump, 10-30 HP or all Waste Water Pumps - HU	hp	544.84
533	EQIP	Pumping Plant	Solar Pumping Plant	watt	10.36
533	EQIP	Pumping Plant	Solar Pumping Plant - HU	watt	12.43
533	EQIP	Pumping Plant	Windmill	ft	592.54
533	EQIP	Pumping Plant	Windmill - HU	ft	861.88
548	EQIP	Grazing Land Mechanical Treatment	Grazing Land Mechanical Treatment	ac	10.16
548	EQIP	Grazing Land Mechanical Treatment	Grazing Land Mechanical Treatment HU	ac	15.24
550	EQIP	Range Planting	Site Preparation and Planting. Grass or Grass Mix	ac	54.22
550	EQIP	Range Planting	Site Preparation and Planting. Grass or Grass Mix HU	ac	65.07
561	EQIP	Heavy Use Area Protection	Concrete Surface Treatment	sq ft	2.62
561	EQIP	Heavy Use Area Protection	Concrete Surface Treatment - HU	sq ft	3.94
561	EQIP	Heavy Use Area Protection	Gravel Surface Treatment	sq ft	0.34
561	EQIP	Heavy Use Area Protection	Gravel Surface Treatment - HU	sq ft	0.51
561	EQIP	Heavy Use Area Protection	Paving	sq ft	1.64
561	EQIP	Heavy Use Area Protection	Paving - HU	sq ft	2.46
574	EQIP	Spring Development	Spring Development	ea	1085.49
574	EQIP	Spring Development	Spring Development HU	ea	1628.23
575	EQIP	Animal Trails and Walkways	Animal Trails and Walkways	LF	0.91
575	EQIP	Animal Trails and Walkways	Animal Trails and Walkways HU	LF	1.36
580	EQIP	Streambank And Shoreline Protection	Posts, Wire and Cable	ft	22.66
580	EQIP	Streambank And Shoreline Protection	Posts, Wire and Cable HU	ft	33.99
580	EQIP	Streambank And Shoreline Protection	Rock and Wire Gabions	cy	104.63
580	EQIP	Streambank And Shoreline Protection	Rock and Wire Gabions HU	cy	156.94
580	EQIP	Streambank And Shoreline Protection	Stream Barbs, Rock Placement, etc.	cy	25.99
580	EQIP	Streambank And Shoreline Protection	Stream Barbs, Rock Placement, etc. HU	cy	38.99
587	EQIP	Structure for Water Control	Drop 1 Small, Under 3 Feet	ea	571.88
587	EQIP	Structure for Water Control	Drop 1 Small, Under 3 Feet HU	ea	686.25
587	EQIP	Structure for Water Control	Drop 2 Medium, 3 to 6 Ft	ea	1200
587	EQIP	Structure for Water Control	Drop 2 Medium, 3 to 6 Ft HU	ea	1440
587	EQIP	Structure for Water Control	Drop 3 Large, More than 6 Ft Feet	ea	2062.5
587	EQIP	Structure for Water Control	Drop 3 Large, More than 6 Ft Feet HU	ea	2475
587	EQIP	Structure for Water Control	Fabrication, Metal	pound	2.44
587	EQIP	Structure for Water Control	Fabrication, Metal HU	pound	2.92
587	EQIP	Structure for Water Control	Head gate, Armco or Equivalent	ea	1101.43
587	EQIP	Structure for Water Control	Head gate, Armco or Equivalent HU	ea	1321.71
587	EQIP	Structure for Water Control	Head gate, Metal Check	ea	459.38
587	EQIP	Structure for Water Control	Head gate, Metal Check HU	ea	551.25
587	EQIP	Structure for Water Control	Head gate, Metal Pull	ea	194.76
587	EQIP	Structure for Water Control	Head gate, Metal Pull HU	ea	233.71
587	EQIP	Structure for Water Control	High Flow Turnouts	ea	1235.16
587	EQIP	Structure for Water Control	High Flow Turnouts HU	ea	1482.19
587	EQIP	Structure for Water Control	Meter 1, Surface	ea	650.87

587	EQIP	Structure for Water Control	Meter 1, Surface HU	ea	781.04
587	EQIP	Structure for Water Control	Meter 2, Mechanical	ea	944.63
587	EQIP	Structure for Water Control	Meter 2, Mechanical HU	ea	1133.55
587	EQIP	Structure for Water Control	Meter 3, Digital	ea	1348.31
587	EQIP	Structure for Water Control	Meter 3, Digital HU	ea	1617.98
587	EQIP	Structure for Water Control	Reinforced or Non-Reinforced Concrete Structure	cy	296.06
587	EQIP	Structure for Water Control	Reinforced or Non-Reinforced Concrete Structure HU	cy	355.28
587	EQIP	Structure for Water Control	Valve 1 Low - Sprinkler, or Alfalfa less than 15 in	ea	265.67
587	EQIP	Structure for Water Control	Valve 1 Low - Sprinkler, or Alfalfa less than 15 in HU	ea	318.8
587	EQIP	Structure for Water Control	Valve 2 Med - Backflow Chemigation, Inline 10 in or less, Alfalfa 15in or more	ea	531.52
587	EQIP	Structure for Water Control	Valve 2 Med - Backflow Chemigation, Inline 10 in or less, Alfalfa 15in or more HU	ea	637.82
587	EQIP	Structure for Water Control	Valve 3 High - In-Line Valve 12in or larger	ea	750
587	EQIP	Structure for Water Control	Valve 3 High - In-Line Valve 12in or larger HU	ea	900
587	EQIP	Structure for Water Control	Irr Computer Control Panel	ea	4717.98
587	EQIP	Structure for Water Control	Irr Computer Control Panel HU	ea	5661.57
590	EQIP	Nutrient Management	Intense Farms > 25 Ac	ac	6.72
590	EQIP	Nutrient Management	Intense Farms > 25 Ac - HU	ac	10.09
590	EQIP	Nutrient Management	Intense Small Farms	ea	169.29
590	EQIP	Nutrient Management	Intense Small Farms - HU	ea	253.93
590	EQIP	Nutrient Management	Non Intense >25 Ac	ac	1.32
590	EQIP	Nutrient Management	Non Intense >25 Ac - HU	ac	1.7
590	EQIP	Nutrient Management	Non Intense Small Farms	ea	36.62
590	EQIP	Nutrient Management	Non Intense Small Farms - HU	ea	47.09
595	EQIP	Intergrated Pest Management	595 IPM with Precision Application	ac	16.04
595	EQIP	Intergrated Pest Management	595 IPM with Precision Application - HU	ac	24.05
595	EQIP	Intergrated Pest Management	595-Basic IPM	ac	12.79
595	EQIP	Intergrated Pest Management	595-Basic IPM - HU	ac	19.18
595	EQIP	Intergrated Pest Management	Seasonal High Tunnel	ea	128.91
595	EQIP	Intergrated Pest Management	Seasonal High Tunnel - HU	ea	193.37
595	EQIP	Intergrated Pest Management	Small Farms	ea	316.72
595	EQIP	Intergrated Pest Management	Small Farms - HU	ea	475.08
600	EQIP	Terrace	Earthwork, All Types	cy	0.91
600	EQIP	Terrace	Earthwork, All Types HU	cy	1.37
603	EQIP	Herbaceous Wind Barriers	Herbaceous Wind Barrier	ft	0.64
603	EQIP	Herbaceous Wind Barriers	Herbaceous Wind Barrier HU	ft	0.96
612	EQIP	Tree/Shrub Establishment	Containerized planting, with irrigation	ea	5.63
612	EQIP	Tree/Shrub Establishment	Containerized planting, with irrigation HU	ea	8.44
612	EQIP	Tree/Shrub Establishment	Seedling or Whip planting, with irrigation	ea	1.62
612	EQIP	Tree/Shrub Establishment	Seedling or Whip planting, with irrigation HU	ea	2.43
612	EQIP	Tree/Shrub Establishment	Tree, Pole Deep, with irrigation	ea	9.45
612	EQIP	Tree/Shrub Establishment	Tree, Pole Deep, with irrigation HU	ea	14.18
614	EQIP	Watering Facility	Drinker - Freeze Proof	ea	794.88
614	EQIP	Watering Facility	Drinker - Freeze Proof - HU	ea	1192.33
614	EQIP	Watering Facility	Drinker, trough (electronically monitored typically steel, tire, poly, fiberglass, etc.)	gal	1.97
614	EQIP	Watering Facility	Drinker, trough (electronically monitored typically steel, tire, poly, fiberglass, etc.) - HU	gal	2.96
614	EQIP	Watering Facility	Drinker, trough (typically steel, tire, poly, fiberglass, etc.)	gal	2.31
614	EQIP	Watering Facility	Drinker, trough (typically steel, tire, poly, fiberglass, etc.) - HU	gal	2.97
614	EQIP	Watering Facility	Drinker, typically steel rimmed concrete bottom or lined	gal	0.36
614	EQIP	Watering Facility	Drinker, typically steel rimmed concrete bottom or lined - HU	gal	0.54
614	EQIP	Watering Facility	Guzzler, small typically wildlife (Pre-Built up to 1000 gal)	gal	1.02
614	EQIP	Watering Facility	Guzzler, small typically wildlife (Pre-Built up to 1000 gal) - HU	gal	1.22
614	EQIP	Watering Facility	Storage Greater than 10000 gal	gal	0.56
614	EQIP	Watering Facility	Storage Greater than 10000 gal - HU	gal	0.84
614	EQIP	Watering Facility	Storage Greater than 10000 gal with electronic monitoring	gal	0.57
614	EQIP	Watering Facility	Storage Greater than 10000 gal with electronic monitoring - HU	gal	0.86

614	EQIP	Watering Facility	Storage Up to 10000 gal	gal	0.82
614	EQIP	Watering Facility	Storage Up to 10000 gal - HU	gal	1.13
632	EQIP	Solid/Liquid Waste Separation Facility	Concrete Separator	cow	9
632	EQIP	Solid/Liquid Waste Separation Facility	Concrete Separator HU	cow	10.8
632	EQIP	Solid/Liquid Waste Separation Facility	Concrete, Reinforced, All Applications	cy	165
632	EQIP	Solid/Liquid Waste Separation Facility	Concrete, Reinforced, All Applications HU	cy	198
632	EQIP	Solid/Liquid Waste Separation Facility	Media Filter	ea	16500
632	EQIP	Solid/Liquid Waste Separation Facility	Media Filter HU	ea	19800
632	EQIP	Solid/Liquid Waste Separation Facility	Screen Separator	ea	30112.5
632	EQIP	Solid/Liquid Waste Separation Facility	Screen Separator HU	ea	36135
633	EQIP	Waste Recycling	Manure application source more than 10 mi	ac	38.64
633	EQIP	Waste Recycling	Manure application source more than 10 mi HU	ac	57.97
633	EQIP	Waste Recycling	Manure application source up to 10 mi	ac	33.14
633	EQIP	Waste Recycling	Manure application source up to 10 mi HU	ac	49.72
634	EQIP	Waste Transfer	12-15 inch high pressure	ft	9.64
634	EQIP	Waste Transfer	12-15 inch high pressure HU	ft	11.57
634	EQIP	Waste Transfer	4 to 6 in high pressure	ft	4.69
634	EQIP	Waste Transfer	4 to 6 in high pressure HU	ft	5.63
634	EQIP	Waste Transfer	8-10 inch high pressure	ft	7.29
634	EQIP	Waste Transfer	8-10 inch high pressure HU	ft	8.75
634	EQIP	Waste Transfer	Electromag Flow Meter Flow Tube	ea	2389.33
634	EQIP	Waste Transfer	Electromag Flow Meter Flow Tube HU	ea	2867.19
642	EQIP	Water Well	Drilling and Casing	ft	21.93
642	EQIP	Water Well	Drilling and Casing HU	ft	26.32
643	EQIP	Restoration of Rare or Declining Habitats	Managed Grazing to Allow Riparian Habitat Recovery	ac	9
643	EQIP	Restoration of Rare or Declining Habitats	Managed Grazing to Allow Riparian Habitat Recovery HU	ac	9
643	EQIP	Restoration of Rare or Declining Habitats	Playa Bottoms with Buffer	ac	72.25
643	EQIP	Restoration of Rare or Declining Habitats	Playa Bottoms with Buffer HU	ac	100.38
645	EQIP	Upland Wildlife Habitat Management	Develop Wildlife Habitat Management Plan	ea	437.67
645	EQIP	Upland Wildlife Habitat Management	Develop Wildlife Habitat Management Plan - HU	ea	656.51
645	EQIP	Upland Wildlife Habitat Management	Escape Ramp	ea	20.51
645	EQIP	Upland Wildlife Habitat Management	Escape Ramp - HU	ea	30.77
645	EQIP	Upland Wildlife Habitat Management	Fence Marking	ft	0.05
645	EQIP	Upland Wildlife Habitat Management	Fence Marking - HU	ft	0.06
645	EQIP	Upland Wildlife Habitat Management	SGI Grazing	AUM	5.53
645	EQIP	Upland Wildlife Habitat Management	SGI Grazing - HU	AUM	8.3
645	EQIP	Upland Wildlife Habitat Management	SGI Grazing Nesting Habitat	AUM	7.61
645	EQIP	Upland Wildlife Habitat Management	SGI Grazing Nesting Habitat - HU	AUM	11.41
645	EQIP	Upland Wildlife Habitat Management	Cover Management (Brush Piles, Rock Piles, Perches, and Snags)	ea	52.87
645	EQIP	Upland Wildlife Habitat Management	Cover Management (Brush Piles, Rock Piles, Perches, and Snags) - HU	ea	79.31
645	EQIP	Upland Wildlife Habitat Management	Temporary Cover Managment (Bat, Bird, and Bee Boxes)	ea	34.02
645	EQIP	Upland Wildlife Habitat Management	Temporary Cover Managment (Bat, Bird, and Bee Boxes) - HU	ea	49.48
646	EQIP	Shallow Water Development and Management	Plan Development	ea	437.67
646	EQIP	Shallow Water Development and Management	Plan Development - HU	ea	656.51
646	EQIP	Shallow Water Development and Management	Shallow Water Management	ac	18.45
646	EQIP	Shallow Water Development and Management	Shallow Water Management - HU	ac	27.67
646	EQIP	Shallow Water Development and Management	Shallow Water Management via Excavation	cu yd	1.4
646	EQIP	Shallow Water Development and Management	Shallow Water Management via Excavation - HU	cu yd	2.11
657	EQIP	Wetland Restoration	Wetland Restoration	ac	520.92
657	EQIP	Wetland Restoration	Wetland Restoration HU	ac	781.39
659	EQIP	Wetland Enhancement	Wetland Enhancement	ac	195.53
659	EQIP	Wetland Enhancement	Wetland Enhancement HU	ac	293.3
666	EQIP	Forest Stand Improvement	Chemical Treatment	ac	75.1
666	EQIP	Forest Stand Improvement	Chemical Treatment - HU	ac	112.65
666	EQIP	Forest Stand Improvement	Even Aged Treatment or Maintenance Treatments	ac	871.96
666	EQIP	Forest Stand Improvement	Even Aged Treatment or Maintenance Treatments - HU	ac	1121.09
666	EQIP	Forest Stand Improvement	Light Treatment with a hand crew	ac	189.69
666	EQIP	Forest Stand Improvement	Light Treatment with a hand crew - HU	ac	227.63
666	EQIP	Forest Stand Improvement	Maintenance Mastication, even or uneven aged management	ac	232.91
666	EQIP	Forest Stand Improvement	Maintenance Mastication, even or uneven aged management - HU	ac	349.37

666	EQIP	Forest Stand Improvement	Uneven Aged Management, Mastication Treatment	ac	563.67
666	EQIP	Forest Stand Improvement	Uneven Aged Management, Mastication Treatment - HU	ac	822.79
666	EQIP	Forest Stand Improvement	Uneven Aged Stand Treatment , high density stands or difficult access	ac	1026.26
666	EQIP	Forest Stand Improvement	Uneven Aged Stand Treatment , high density stands or difficult access - HU	ac	1492.74
910	EQIP	TA Planning	TA Planning	ea	0
911	EQIP	TA Design	TA Design	ea	0
912	EQIP	TA Application	TA Application	ea	0
913	EQIP	TA Check-Out	TA Check-Out	ea	0
521A	EQIP	Pond Sealing or Lining	Pond, Flexible Membrane	sq ft	0.87
521A	EQIP	Pond Sealing or Lining	Pond, Flexible Membrane HU	sq ft	1.04
521C	EQIP	Pond Sealing or Lining	Pond Sealing, Bentonite 1, Depth Up to 8 ft	sq ft	0.14
521C	EQIP	Pond Sealing or Lining	Pond Sealing, Bentonite 1, Depth Up to 8 ft HU	sq ft	0.22
521C	EQIP	Pond Sealing or Lining	Pond Sealing, Bentonite 2, Depth Exceeds 8 ft	sq ft	0.29
521C	EQIP	Pond Sealing or Lining	Pond Sealing, Bentonite 2, Depth Exceeds 8 ft HU	sq ft	0.43

Cost Data **2012 NRCS Dike Construction Cost - Earthen**

Typical Implementation Scenario

200 foot-long dike of principally utilizing on-site excavation and placement of earthen materials to protect farm headquarters or other sensitive land uses from flood waters.

A barrier constructed of earth or manufactured materials

Geographic Area: Statewide

Unit for Cost Estimate cy
Practice Life (Years): 20
Discount Rate (%/Year 0.05

Note: Size range is too great to pay on "number" or "each" basis and maintain reasonable level of accountability.

Materials **Cost/Uni** $2.56

Typical equipment includes backhoe, loaders and dozers.

$2.56 median

Includes Laobr, Equipment and Mobilization

Data Source: NM-2010 Program Payments Data Collected by Field Office Staff

ID	Date	Extent	Notes	Total	Unit	Office
A001	6/7/2010	1304	1 grade structure 1304 cu yds	$1,500.00	$1.15	Datil
008C	8/16/2010	1950	Cleanout and reshape 5.5ft depth	$3,315.00	$1.33	Carrizozo
A116	8/27/2010	452		$844.00	$1.87	Datil
A281	10/6/2009	950	Earthen Diversion Construction	$1,852.50	$1.95	Cuba
B370		2628	Common Excavation & Placement	$5,256.00	$2.00	Chama
91lq	3/1/2010	1104	Earthen Dam	$2,296.32	$2.08	Cuba
80V6	7/21/2010	366	Stowall	$800.00	$2.19	Santa Rosa
9137	5/26/2010	232	Rough Terrain	$508.08	$2.19	AZTEC
A245		2484	Pond	$5,440.00	$2.19	Chama
00JA	8/30/2010	13243	Two ponds	$29,216.00	$2.21	Alamogord
70NT	12/11/2009	2000	Completed 5 grade stab structures 2000 cu yds of earth work	$4,612.50	$2.31	Datil
91JT	6/23/2010	2391	Diversion was constructed by the producer with rented equipment.	$6,731.38	$2.82	Deming
80UK	1/27/2010	2336	Earthen dam built with a dozer	$6,614.00	$2.83	Cuba
9160	7/21/2010	558		$1,669.90	$2.99	Datil
904G	5/21/2010	2042	Pond built to 2nd specs 4 ft below ground, 6 ft above using importec	$7,000.00	$3.43	Las Vegas
915N	1/7/2010	2500	Total with tax added in. Bill not otherwise categorized.	$8,856.00	$3.54	Socorro
91H1	4/27/2010	80.6	Dug an irrigation field ditch 80.6 ft	$290.00	$3.60	Las Vegas
A049		276	pond	$1,137.50	$4.12	Chama
0064	6/22/2010	1341	Contractor installed	$5,550.00	$4.14	Socorro
A073	8/23/2010	1272	Producer built	$5,391.11	$4.24	Fort Sumne
AO49		276	Stock Pond	$1,203.00	$4.36	Chama
o159	4/22/2010	1040.2		$5,013.00	$4.82	Datil

Equipment/Installation $0.00
Included in Materials

Labor $0.00
Included in Materials

Mobilization $0.00
Included in Materials

Operation & Maintenance #REF!
Estiamted 5% of installation costs.

Acquisition of Technical Knowledge $0.00
None

Forgone Income $0.00
None

Risk $0.00
None

Administration & Permit Costs $0.00
None

Total Cost Estimate: $0.00

Associated Practices:
550-Range Planting; 342-Critical Area Planting

Cost Data — **2012 NRCS Fuel Break Treatment-Moderate Density**

Typical Implementation Scenario

Manipulating a stand of trees where more than 60 SqFt BA or greater than 800 stems/acre are removed (>120 BA present) to improve plant

The manipulation of species composition, stand structure and stocking by cutting or killing selected trees and understory vegetation.

Geographic Area: Statewide

Unit for Cost Estimate ac
Practice Life (Years): 10
Discount Rate (%/Year 0.05

Materials — **Cost/Unit: $647.50**

Total cost of chemical, mechanical or hand release.	% of site	cost/acre	total cost
Heavy Thinning (>60 SqFt BA or >800 TPA removed, >120 BA present)	75%	$640.00	$48,000.00
Medium Thinning (40-60 SqFt BA or 300-800 TPA removed, 100-120 BA present) on slopes > 1	25%	$670.00	$16,750.00

Data Source: NM State Forestry Division (FHI, FLEP, WUI/HFR), 2008
2010 NRCS invoice data used to verify state rates.

90Q1	10/22/2009	33		12591.65	$381.57	Gallup
00YV	8/30/2010	14.9	Completed with chainsaw	6122.25	$410.89	Alamogord
903Y	12/2/2009	4	Thinned 4 acres heavy pinon juniper, 100 hours of labor @ $20.00 per hour	2000	$500.00	Las Vegas
01N2	9/8/2010	30	Forest Stand Improvement - Med Steep or Heavy HU	18000	$600.00	Espanola
01EC	4/19/2010	16		11360	$710.00	Mora
01EC	5/21/2010	16		11360	$710.00	Mora
90QT	9/15/2010	58.7	cutting, thinning & piling according to St. Forestry Requirements	42378.6	$721.95	Grants
01BT	[illegible]	10	Lop and Scatter was included in total amount	8500	$850.00	Mora
01AT	[illegible]	14	Lop and Scatter included in total	12200	$871.43	Mora
01BB	[illegible]	40		38483.12	$961.58	Mora
91EE	[illegible]	91	Lop and Scatter included	89180	$980.00	Mora
903Y	12/16/2009	3	Chipped 3 acres of pinon juniper, took 400 hours of labor @ $20.00 per hour. Cost of rental of Chipper was $1,200.00. The total amount for Equipment and gas for saws and chipper was $476.00	3145.33	$1,048.44	Las Vegas
01AU	[illegible]	7	includes lop and scatter	7700	$1,100.00	Mora
716X	[illegible]	10	includes lop and scatter	12844	$1,284.40	Mora
714D	[illegible]	7	Paid workers by the hour usually paid by the acre	21955.39	$3,136.48	Mora

Data insufficient to vary from State rates, particularly as slash treatment costs (practice 384) commonly included in invoice data.

Equipment/Installation — $0.00
Included in materials above.

Labor — $0.00
Included in materials above.

Mobilization — $0.00
Included in materials above.

Operation & Maintenance — $0.00
none

Acquisition of Technical Knowledge — $0.00
none

Forgone Income — $0.00
none

Risk — $0.00
none

Administration & Permit Costs — $0.00
none

Total Cost Estimate: $647.50

Associated Practices
Forest Slash
384 Treatment

Cost Data **2012 NRCS Grade Stabilization Structure Cost-Earthen**

Typical Implementation Scenario

On-site earth moving to construct a grade stabilization structure including a berm or diversion structure. Typically constructed using heavy equipment to excavate and place soil as specified by engineering design. Part of an erosion control system on grazed, forest or wildlife land.
A structure used to control the grade and head cutting in a natural or artificial channels.

Geographic Area: Statewide

Unit for Cost Estimate: cy
Practice Life (Years): 15
Discount Rate (%/Year): 0.05

Note: Size range is too great to pay on "number" or "each" basis and maintain reasonable level of accountability.

Materials **Cost/Unit** $2.66

Typical equipment includes backhoe, loaders and dozers.

$2.66 weighted average
Includes Laobr, Equipment and Mobilization
Data Source: NM-2010 Program Payments Data Collected by Field Office Staff

ID	Date	Extent	Notes	Total	Unit	Office
A529	4/14/2009	1095	Paid for two ponds together	$1,450.00	$1.32	Mora
A791	3/9/2009	5500	Contractor	$8,118.00	$1.48	Tucumcari
A795	2/25/2009	985	Contractor	$1,477.50	$1.50	Tucumcari
8OPR	6/10/2009	2401		$3,630.00	$1.51	RATON
A009	10/23/2008	1373	Contractor	$2,116.25	$1.54	Tucumcari
B452	10/9/2008	1867	Common excavation & place.	$3,343.75	$1.79	Alamogord
80PR	8/25/2009	2401	Irrigation Pond	$4,311.76	$1.80	RATON
A372	9/8/2009	472		$859.04	$1.82	Aztec
A921	9/2/2009	2655	Installed 1 pond	$4,980.65	$1.88	Las Vegas
B370	3/18/2009	2628	Common Excavation & Placement	$5,256.00	$2.00	Chama
A050	9/18/2009	6987	3 ponds were constructed in a remote location using 6987 cu. Yds.	$14,009.00	$2.01	Grants
8OVE	6/16/2009	2418	POND DIRT WORK	$5,056.00	$2.09	RATON
B490	5/22/2009	725	Earth Fill	$1,522.50	$2.10	Cuba
9317	9/8/2009	1887		$4,132.53	$2.19	Aztec
A245	7/27/2009	2484	Pond	$5,440.00	$2.19	Chama
B452	10/9/2008	425	Common excavation & place.	$1,062.50	$2.50	Alamogord
B391	7/24/2009	2678	Stock Pond	$6,804.35	$2.54	Chama
	2/9/2009	1660	Pond	$4,300.00	$2.59	Chama
70ER	11/19/2008	6859	Contractor	$18,959.14	$2.76	Tucumcari
8152	7/20/2009	10132	Removal of 11.312 yards of dirt (Dirt Pond)	$28,280.00	$2.79	Las Vegas
70ZT	11/14/2008	1600	Dozer work	$4,500.00	$2.81	Grants
A900	7/14/2009	8473	Pond	$25,419.00	$3.00	Taos
A382	2/4/2009	2514	One man and excavator	$9,585.00	$3.81	Estancia
A049	7/22/2009	276	Stock Pond	$1,203.00	$4.36	Chama
A809	6/22/2009	2574	Producer installed	$14,047.66	$5.46	Tucumcari
A808	5/14/2009	2873	Producer installed	$17,672.00	$6.15	Tucumcari
A940	1/5/2009	802.6	Loader and one man	$7,212.71	$8.99	Estancia

Equipment/Installation $0.00
Included in Materials

Labor $0.00
Included in Materials

Mobilization $0.00
Included in Materials

Operation & Maintenance #REF!
Estiamted 5% of installation costs.

Acquisition of Technical Knowledge $0.00
None

Foregone Income $0.00
None

Risk $0.00
None

Administration & Permit Costs $0.00
None

Total Cost Estimate: $0.00

Associated Practices:
550-Range Planting; 342-Critical Area Planting

Cost Data **2012 NRCS Herbaceous Weed Control Cost**

Typical Implementation Scenario

Develop and implement a pest management component of a conservation plan on rangeland to control Class A weed infestations.
Utilizing environmentally sensitive prevention, avoidance, monitoring and suppression strategies, to manage weeds, insects, diseases, animals and other organisms (including invasive and non-invasive species), that directly or indirectly cause damage or annoyance.

Geographic Area: Statewide

Unit for Cost Estimate: Acre
Practice Life (Years): 1
Discount Rate (%/Year): 0

	Cost/Unit
Materials	$22.00
Typically, a mixture of noxious species-specific herbicides will be used with appropriate dyes and surfactants.	
Herbicide (average per acre) $22.00	
Equipment/Installation	$10.00
Typical equipment includes 4-wheeler with 12-volt 25-gallon sprayer.	
4-wheeler cost per hour: $10.00	
Acres treated per hour: 1	
Equipment cost per acre: $10.00	
Data Sources: Contract receipts from recent treatments and Area and Field Office specialists.	
Labor	$5.50
Labor includes locating presence and extent of weeds, hand-applying herbicide, and follow-up.	
Coordinate plan preparation $0.20	
Scouting acreage for noxious $0.20	
Herbicide application (per l $15.00	
Acres treated per hour: 3	
Follow-up of treatment (ac): $0.10	
Total Labor: $5.50	
Mobilization	$2.50
25% of equipment costs to get equipment to and from project site.	
Operation & Maintenance	$0.00
None	
Acquisition of Technical Knowledge	$0.00
None	
Forgone Income	$0.00
None	
Risk	$0.00
None	
Administration & Permit Costs	$0.00
None	
Total Cost Estimate:	$40.00

Associated Practices:
Prescribed Grazing (528), Conservation Crop Rotation (328)

Cost Data

2012 NRCS Pond Construction

Typical Implementation Scenario

Pond construction to provide livestock water, wastewater storage, and/or improve wildlife habitat.
A water impoundment made by constructing an embankment or by excavating a pit or dugout.

Geographic Area: Statewide

Unit for Cost Estimate: cy
Practice Life (Years): 20
Discount Rate (%/Year): 0.05

Note: Size range is too great to pay on "number" or "each" basis and maintain reasonable level of accountability.

Cost/Unit

Materials $2.41

Typical equipment includes backhoe, loaders and dozers.

$2.41 median
Includes Laobr, Equipment and Mobilization
Data Source: NM-2010 Program Payments Data Collected by Field Office Staff

ID	Date	Extent	Notes	Total	Unit	Office
7164		2600	Irrigation field ditch	$1,650.00	$0.63	Chama
B370	6/17/2010	2908	Dirt Pond	$2,908.00	$1.00	Chama
A001	6/7/2010	1304	1 grade structure 1304 cu yds	$1,500.00	$1.15	Datil
008C	8/16/2010	1950	Cleanout and reshape 5.5ft depth	$3,315.00	$1.33	Carrizozo
008C	8/16/2010	1784	Cleanout and reshape 5.5ft depth	$3,032.80	$1.33	Carrizozo
008C	8/16/2010	162	Cleanout and reshape 5.5ft depth	$275.40	$1.33	Carrizozo
008C	8/16/2010	264	Cleanout and reshape 5.5ft depth	$448.80	$1.33	Carrizozo
B146	11/10/2009	3761	Common Excavation & Placement	$6,050.00	$1.61	Chama
91lq	4/28/2010	3712	Earthen Dam	$6,124.80	$1.65	Cuba
A116	8/27/2010	452		$844.00	$1.87	Datil
A281	10/6/2009	950	Earthen Diversion Construction	$1,852.50	$1.95	Cuba
B370		2628	Common Excavation & Placement	$5,256.00	$2.00	Chama
91lq	3/1/2010	1104	Earthen Dam	$2,296.32	$2.08	Cuba
80V6	7/21/2010	366	Stovall	$800.00	$2.19	Santa Rosa
9137	5/26/2010	232	Rough Terrain	$508.08	$2.19	AZTEC
A245		2484	Pond	$5,440.00	$2.19	Chama
00JA	8/30/2010	13243	Two ponds	$29,216.00	$2.21	Alamogord
70NT	12/11/2009	2000	Completed 5 grade stab structures 2000 cu yds of earth work	$4,612.50	$2.31	Datil
A043	10/16/2009	1946	(SO corrected scenario name.) Pond	$4,693.49	$2.41	Cuba
B391		2678	Stock Pond	$6,804.35	$2.54	Chama
80Y9		470	Irrigation field ditch	$1,200.00	$2.55	Chama
A647		315	Earth Deversion	$806.34	$2.56	Chama
A643		1660	Pond	$4,300.00	$2.59	Chama
91lq	8/20/2010	8431	Earthen Dam	$22,173.53	$2.63	Cuba
912S	8/6/2010	6000	Soil Pond	$15,780.00	$2.63	Chama
01BB	8/27/2010	2237.4	Did not meet spec first time had to take equipment back up	$6,000.00	$2.68	Mora
91JT	6/23/2010	2391	Diversion was constructed by the producer with rented equipment.	$6,731.38	$2.82	Deming
80UK	1/27/2010	2336	Earthen dam built with a dozer	$6,614.00	$2.83	Cuba
9160	7/21/2010	558		$1,669.90	$2.99	Datil
904G	5/21/2010	2042	Pond built to 2nd specs 4 ft below ground, 6 ft above using importec	$7,000.00	$3.43	Las Vegas
915N	1/7/2010	2500	Total with tax added in. Bill not otherwise categorized.	$8,856.00	$3.54	Socorro
91H1	4/27/2010	80.6	Dug an irrigation field ditch 80.6 ft	$290.00	$3.60	Las Vegas
A049		276	pond	$1,137.50	$4.12	Chama
0064	6/22/2010	1341	Contractor installed	$5,550.00	$4.14	Socorro
A073	8/23/2010	1272	Producer built	$5,391.11	$4.24	Fort Sumne
AO49		276	Stock Pond	$1,203.00	$4.36	Chama
o159	4/22/2010	1040.2		$5,013.00	$4.82	Datil

Equipment/Installation $0.00
Included in Materials

Labor $0.00
Included in Materials

Mobilization $0.00
Included in Materials

Operation & Maintenance #REF!
Estiamted 5% of installation costs.

Acquisition of Technical Knowledge $0.00
None

Forgone Income $0.00
None

Risk $0.00
None

Administration & Permit Costs $0.00
None

Total Cost Estimate: $0.00

Associated Practices:

516	Pipeline
587	Structure for Water Control
646	Shallow Water Management for Wildlife
645	Upland Wildlife Habitat Management
644	Wetland Wildlife Habitat Management

Cost Data **2012 NRCS Prescribed Burn Cost-High**

Typical Implementation Scenario

Conduct Prescribed Burn on rangeland with High Volatile Fuels (including trees, forbs and shrubs) consists of labor and materials identified and applied as per the Prescribed Burn Plan to improve rangeland health.

Controlled fire applied to a predetermined area.

Geographic Area: Statewide

Unit for Cost Estimate acre
Practice Life (Years): 1
Discount Rate (%/Year 0.05

Cost/Uni

Materials $35.00

Scenario based upon 2006 & 2007 invoices. Due to data limitations, "materials, equipment/installation, labor, and mobilization" are treated as a single lump sum value.

Materials/Usages	Units	Costs
Burn Pinion Juniper Woodland,		$40
Burn Mixed Species Range		$30

Includes fire line, ignition, fire control, monitoring

Source: East Area Estimates, 2008

Equipment/Installation $0.00
Included in materials above.

Labor $0.00
Included in materials above.

Mobilization $0.00
Included in materials above.

Operation & Maintenance $0.00
None

Acquisition of Technical Knowledge $0.00
None

Forgone Income $1.50
Land taken out of production, value of .125 AUMs/year estimated to be $12/AUM/Year.
One-two year deferral to increase fine fuels typically required.

Risk $0.00
Increased to potential unplanned consequences of Burn

Administration & Permit Costs $1.56
Obtain burn permit from department of forestry, hire fire control personnel (assume 320 acre burn @ $500/burn event)

Total Cost Estimate: $38.06

Used in concert with Access Control (Ac.) (472) and/or Prescribed Grazing (Ac.) (528).

Cost Data

2012 NRCS Range Planting Cost

Typical Implementation Scenario

Complete planting includes cost of seed, typically grass, site preparation, mulching, fertilization, drilling in seed, and weed control for seeding or interseeding on grazing

Geographic Area: Statewide

Unit for Cost Estimate: ac
Practice Life (Years): 10
Discount Rate (%/Year): 0.05

Cost/Unit

Materials $72.30

$72.30 median

Includes Laobr, Equipment and Mobilization

Data Source: NM-2009 Program Payments Data Collected by Field Office Staff

ID	Date	Extent	Notes	Total	Unit	Office
80PF	4/29/2009	62		$3,228.96	$52.08	Portales
A764	11/17/2008	166	Completed seeding, hand app.	$10,545.49	$63.53	Alamogordo
A764	11/17/08	166	Completed seeding, hand app.	$10,545.49	$63.53	Alamogordo
A764	11/17/2008	118	Completed seeding, hand app.	$7,636.39	$64.72	Alamogordo
A764	11/17/08	118	Completed seeding, hand app.	$7,636.39	$64.72	Alamogordo
812N	6/9/2009	5		$325.00	$65.00	Aztec
A506	4/29/2009	96.4		$6,278.40	$65.13	Portales
90RF	8/31/2009	30.9	Contracted Seeding/Producer sprayed	$2,054.15	$66.48	Clovis
90IU	8/28/2009	73.6	Mostly contracted/ shredding by producer	$5,281.88	$71.76	Clovis
906B	9/17/2009	122.5	spray, seed, drilling and shredding	$8,856.40	$72.30	Clovis
90GR	8/31/2009	12.8	Contracted Seeding/Producer shreaded	$953.57	$74.50	Clovis
A184	3/19/2009	100	Blue/black g & alkali sac.	$8,341.89	$83.42	Alamogordo
90DR	8/28/2009	18.6	some work contracted/some work by producer	$1,566.66	$84.23	Clovis
A184	3/19/2009	418	Blue/black grama & alkali sac.	$35,562.78	$85.08	Alamogordo
A267	9/8/2009	15		$1,397.00	$93.13	Taos
Unruh 070N	4/24/2009	61	Custom farmer used to plant grass	$5,940.04	$97.38	Clayton
90NR	8/31/2009	302	Range Seeding	$30,455.80	$100.85	Taos
A267	7/14/2009	16	Dryland seed mix	$1,845.50	$115.34	Taos
70WJ	9/15/2009	67.6	67.6 ac. Of Native Grass Seed was planted with a Truax Gr	$8,112.00	$120.00	Grants

Equipment/Installation $0.00

Included in Materials

Labor $0.00

Included in Materials

Mobilization $0.00

Included in Materials

Operation & Maintenance #REF!

Estimated as 1% of installation costs.

Acquisition of Technical Knowledge $0.00

None

Forgone Income $0.00

None

Risk $0.00

None

Administration & Permit Costs $0.00

None

Total Cost Estimate: #REF!

Used with Prescribed Grazing, Upland Wildlife Habitat Management

Cost Data **2012 NRCS Riparian Forest Buffer Cost**

Typical Implementation Scenario

Develop and maintain existing riparian area habitat which via selective tree removal and/or tree planting.

An area of predominantly trees and/or shrubs located adjacent to and up-gradient form watercourses or water bodies.

Geographic Area: Statewide

Unit for Cost Estimate: ac
Practice Life (Years): 15
Discount Rate (%/Year): 0.05

			Cost/Unit
Materials			$125.00
	Chain saw, pick and shovel work & operator (hr)	$15	
	Hours/acre	5	
	Plant Materials (trees, shrubs forbs)	$50	
		$125.00	

Labor, Materials, and Equipment Lumped due to data constraints.
Source: NM Area Office Staff experience

Equipment/Installation	$0.00
Included in materials above.	
Labor	$0.00
Included in materials above.	
Mobilization	$0.00
Included in materials above.	
Operation & Maintenance	$0.00
None	
Acquisition of Technical Knowledge	$0.00
None	
Forgone Income	$0.00
None	
Risk	$0.00
None	
Administration & Permit Costs	$0.00
None	
Total Cost Estimate:	$125.00

Associated Practices: 612 - Tree/Shrub Establishment, 666- Forest Stand Improvement, 645- Wildlife Upland Habitat

Cost Data **NRCS 2012 Sediment Basin Cost**

Typical Implementation Scenario

Sediment basin construction to improve water quality.
A basin constructed to collect and store debris or sediment.

Geographic Area: Statewide

Unit for Cost Estimate: cy
Practice Life (Years): 10
Discount Rate (%/Year): 0.05
Note: Size range is too great to pay on "number" or "each" basis and maintain reasonable level of accountability.

Materials **Cost/Unit** $2.41
Typical equipment includes backhoe, loaders and dozers.

$2.41 median
Includes Labor, Equipment and Mobilization
Data Source: NM-2010 Program Payments Data Collected by Field Office Staff

ID	Date	Extent	Notes	Total	Unit	Office
7164		2600	Irrigation field ditch	$1,650.00	$0.63	Chama
B370	6/17/2010	2908	Dirt Pond	$2,908.00	$1.00	Chama
A001	6/7/2010	1304	1 grade structure 1304 cu yds	$1,500.00	$1.15	Datil
008C	8/16/2010	1950	Cleanout and reshape 5.5ft depth	$3,315.00	$1.33	Carrizozo
008C	8/16/2010	1784	Cleanout and reshape 5.5ft depth	$3,032.80	$1.33	Carrizozo
008C	8/16/2010	162	Cleanout and reshape 5.5ft depth	$275.40	$1.33	Carrizozo
008C	8/16/2010	264	Cleanout and reshape 5.5ft depth	$448.80	$1.33	Carrizozo
B146	11/10/2009	3761	Common Excavation & Placement	$6,050.00	$1.61	Chama
91lq	4/28/2010	3712	Earthen Dam	$6,124.80	$1.65	Cuba
A116	8/27/2010	452		$844.00	$1.87	Datil
A281	10/6/2009	950	Earthen Diversion Construction	$1,852.50	$1.95	Cuba
B370		2628	Common Excavation & Placement	$5,256.00	$2.00	Chama
91lq	3/1/2010	1104	Earthen Dam	$2,296.32	$2.08	Cuba
80V6	7/21/2010	366	Stovall	$800.00	$2.19	Santa Rosa
9137	5/26/2010	232	Rough Terrain	$508.08	$2.19	AZTEC
A245		2484	Pond	$5,440.00	$2.19	Chama
00JA	8/30/2010	13243	Two ponds	$29,216.00	$2.21	Alamogordo
70NT	12/11/2009	2000	Completed 5 grade stab structures 2000 cu yds of earth work	$4,612.50	$2.31	Datil
A043	10/16/2009	1946	(SO corrected scenario name.) Pond	$4,693.49	$2.41	Cuba
B391		2678	Stock Pond	$6,804.35	$2.54	Chama
80Y9		470	Irrigation field ditch	$1,200.00	$2.55	Chama
A647		315	Earth Deversion	$806.34	$2.56	Chama
A643		1660	Pond	$4,300.00	$2.59	Chama
91lq	8/20/2010	8431	Earthen Dam	$22,173.53	$2.63	Cuba
912S	8/6/2010	6000	Soil Pond	$15,780.00	$2.63	Chama
01BB	8/27/2010	2237.4	Did not meet spec first time had to take equipment back up	$6,000.00	$2.68	Mora
91JT	6/23/2010	2391	Diversion was constructed by the producer with rented equipment.	$6,731.38	$2.82	Deming
80UK	1/27/2010	2336	Earthen dam built with a dozer	$6,614.00	$2.83	Cuba
9160	7/21/2010	558		$1,669.90	$2.99	Datil
904G	5/21/2010	2042	Pond built to 2nd specs 4 ft below ground, 6 ft above using importec	$7,000.00	$3.43	Las Vegas
915N	1/7/2010	2500	Total with tax added in. Bill not otherwise categorized.	$8,856.00	$3.54	Socorro
91H1	4/27/2010	80.6	Dug an irrigation field ditch 80.6 ft	$290.00	$3.60	Las Vegas
A049		276	pond	$1,137.50	$4.12	Chama
0064	6/22/2010	1341	Contractor installed	$5,550.00	$4.14	Socorro
A073	8/23/2010	1272	Producer built	$5,391.11	$4.24	Fort Sumne
AO49		276	Stock Pond	$1,203.00	$4.36	Chama
o159	4/22/2010	1040.2		$5,013.00	$4.82	Datil

Equipment/Installation $0.00
Included in Materials

Labor $0.00
Included in Materials

Mobilization $0.00
Included in Materials

Operation & Maintenance #REF!
Estiamted 5% of installation costs.

Acquisition of Technical Knowledge $0.00
None

Forgone Income $0.00
None

Risk $0.00
None

Administration & Permit Costs $0.00
None

Total Cost Estimate: $0.00

Associated Practices:
528 Prescribed Grazing
342 Critical Area Planting

Cost Data **2012 NRCS Tree Shrub Establishment-Container**

Typical Implementation Scenario

Complete tree planting, with adequate irrigation system per standard, specification, design and job sheets, as provided.
Establishing woody plants by planting seedlings, cuttings or direct seeding.

Geographic Area: Statewide

Unit for Cost Estimate: ea
Practice Life (Years): 15
Discount Rate (%/Year): 0.05

						Cost/Unit
Materials						$2.25
Scenario based upon 2008 invoices.						
Shrub Species (e.g. Mountain Mahogony, 4-wing Salt Bush)						
1-year old, Sate Forestry					$1	
2 year-old, State Forestry					$2	
Shrub Species (e.g. Tree Species)						
Large					$2	
Small					$4	
Invoices used for verification						
W. Reardon-4A772						
RMontoya - 3A293						
Equipment/Installation						$0.00
Included in materials above.						
Labor						$9.00
Labor (Hr)	$ 15.00	Planting	0.5	$ 7.50		
		Watering	0.1	$ 1.50		
Mobilization						$0.00
Included in materials above.						
Operation & Maintenance						$0.00
none						
Acquisition of Technical Knowledge						$0.00
none						
Forgone Income						$0.00
none						
Risk						$0.00
none						
Administration & Permit Costs						$0.00
none						
Total Cost Estimate:						$11.25

Associated Practices:
490-Tree/Shrub Site Preparation, 666-Forest Stand Improvement, 484-Mulching, 391-Riparian Forest Buffer

Cost Data **2012 NRCS Tree Shrub Establishment-Seeding**

Typical Implementation Scenario

Complete seedling or whip planting, with adequate irrigation system per standard, specification, design and job sheets, as provided.
Establishing woody plants by planting seedlings, cuttings or direct seeding.

Geographic Area: Statewide

Unit for Cost Estimate: ea
Practice Life (Years): 15
Discount Rate (%/Year): 0.05

						Cost/Unit
Materials						$2.33
Scenario based upon 2008 invoices.						
Shrub Species (e.g. Mountain Mahogony, 4-wing Salt Bush)						
1-year old, State Forestry					$1	
Shrub Species (e.g. Tree Species)						
Large					$2	
Small					$4	
Invoices used for verification						
W. Reardon-4A772						
RMontoya - 3A293						
Equipment/Installation						$0.00
Included in materials above.						
Labor						$0.90
Labor (Hr)	$ 15.00	Planting	0.01	$	0.15	
		Watering	0.05	$	0.75	
Mobilization						$0.00
Included in materials above.						
Operation & Maintenance						$0.00
none						
Acquisition of Technical Knowledge						$0.00
none						
Foregone Income						$0.00
none						
Risk						$0.00
none						
Administration & Permit Costs						$0.00
none						
Total Cost Estimate:						$3.23

Associated Practices:
490-Tree/Shrub Site Preparation, 666-Forest Stand Improvement, 484-Mulching, 391-Riparian Forest Buffer

Cost Data **2012 NRCS Wetland Restoration Cost**

Typical Implementation Scenario

Restore 10 Acre wetland, on previously drained cropland.

A rehabilitation of a drained or degraded wetland where the soils, hydrology, vegetative community, and biological habitat are returned to the natural condition to the extent practicable.

Geographic Area: Statewide

Unit for Cost Estimate: ac
Practice Life (Years): 15
Discount Rate (%/Year): 5%

Cost/Unit

Materials $1,021.42

	Units	Unit	$/Unit	
Fill Material & Delivery (see calculation)	10	CuYd	$4.40	
Site Preparation, Earth Moving (see calculation)	100	CuYd	$3.60	
Drain Tile Removal	209	Foot	$2.00	
Geotextile Fabric		SqFt	$1.00	
Gravel		CuYd	20	
Invasive Species Control	1	Acre	100	
Pipe, All Types		DiaInFt	1.25	
Rock		CuYd	30	
Structures/Tide Gate, Removal		Each	3000	
Wetland Herbaceous/Woody Plantings	1	Acre	$200.00	
Woody Debris Placement		Each	500	
			$1,021	

Bulk Earth Moving with Bulldozer

Units Moved per hour:	25
Units	CuYd
Equipment Cost w/Operator ($/Hr)	$90.00
Total Excavation Cost/Unit (CuYd):	$3.60

Soil/Fill Imported with Dump Truck

Soil/Fill Material Cost ($/CuYd):	$2.00
Units Moved per hour:	25
Units	CuYd
Equipment Cost w/Operator ($/Hr)	$50.00
Total Material/Hauling Cost/Unit (CuYd):	$4.40

Data Source: Oregon State Office, 2007

Equipment/Installation $0.00
Mechanical Labor: Dozer, tractor / ripper (sub-soiler) / disk
Hand Labor: Spray rig, shovel, hoe-dad
(Included in Materials cost)

Labor $0.00
(Included in Materials cost)

Mobilization $20.43
2% or materials, equipment and labor

Operation & Maintenance (Annual) $10.21
Inspect embankments and structures, sediment removal, maintain vegetation, control weeds and pests.
1% of materials, equipment and labor

Acquisition of Technical Knowledge $0.00
None

Forgone Income (Annual) $0.00
Variable, possible land taken out of production

Risk $0.00
Reduced risk, change in land use

Administration & Permit Costs $0.00
None

Total Cost Estimate: $1,052.06

Cost Data **2012 NRCS Tree Shrub Establishment-Pole**

Typical Implementation Scenario

Complete tree pole planting (typically cottonwood or willow), with adequate irrigation system per standard, specification, design and job sheets, as provided.
Establishing woody plants by planting seedlings, cuttings or direct seeding.

Geographic Area: Statewide

Unit for Cost Estimate: ea
Practice Life (Years): 15
Discount Rate (%/Year): 0.05

							Cost/Unit
Materials							$7.00
Pole (cottonwood	$	8.00					
Pole (willow)	$	4.00					
Tree Subtotal	$	6.00					
Protection (Cage	$	1.00					
Materials Total	$	7.00					

Due to data limitations, "materials, equipment/installation, labor, and mobilization" are treated as a single lump sum value.

2010 Invoices used for verification

017W	5/11/2010	20	Includes tax and labor	527.06	$26.35	Socorro
9141	3/24/2010	23.6		888.33	$37.64	Santa Rosa

Equipment/Installation	$0.00
Included in Labor Factor	
Labor	$10.50
Mobilization	$1.40
20% of Materials	
Operation & Maintenance	$0.00
none	
Acquisition of Technical Knowledge	$0.00
none	
Foregone Income	$0.00
none	
Risk	$0.00
none	
Administration & Permit Costs	$0.00
none	
Total Cost Estimate:	$18.90

Labor Factor	$	1.50	
Labor Sub-Total	$	10.50	

Associated Practices:
490-Tree/Shrub Site Preparation, 666-Forest Stand Improvement, 484-Mulching, 391-Riparian Forest Buffer

Cost Data 2012 NRCS Critical Area Planting Cost

Typical Implementation Scenario

Re-plant previously smoothed or leveled rangeland, pasture and hayland to reduce erosion and improve irrigation efficiency on sites where substantial site preparation is necessary.

Establishing permanent vegetation on sites that have or are expected to have high erosion rates, and on sites that have physical, chemical or biological conditions that prevent the establishment of vegetation with normal practices.

Geographic Area: Statewide

Unit for Cost Estimate: ac
Practice Life (Years): 10
Discount Rate (%/Year): 0.05

Cost/Unit

Materials $285.00

Due to data limitations, "materials, equipment/installation, labor, and mobilization" are treated as a single lump sum value.

	Unit (Hrs)/ac	$/unit	$/unit
Seed (lbs per ac	1	$100	$ 100.00
Plowing	0.75	$40	$ 30.00
Disking	1	$40	$ 40.00
Drilling Operatio	0.5	$20	$ 10.00
Fertilization	1.5	$30	$ 45.00
Weed Control	2	$30	$ 60.00
			$ 285.00

2010 Invoices:

A412		26.4	Critical Area Planting	3380.48	$128.05 Chama
01MO	40361	12		3500	$291.67 Santa Ros
91ES	40119	15	Critical Area Planting	4487.45	$299.16 Cuba

Equipment/Installation $0.00

Included in materials above.

Labor $0.00

Included in materials above.

Mobilization $14.25

5% of Labor and Materials

Operation & Maintenance $0.00

None

Acquisition of Technical Knowledge $0.00

None

Forgone Income $0.00

None

Risk $0.00

None

Administration & Permit Costs $0.00

None

Total Cost Estimate: $299.25

Associated Practices: 378 Pond; 362 Diversion and other engineering practices.

F. Essential Project List by Land Owner

C Bar RANCH ESSENTIAL SITE SPECIFIC PROJECTS

1. Essential Project - Wetland/Riparian #1

a. Attribute/Indicator Addressed: Riparian/Wetland Vegetation Condition

b. Specific Project Activity/Project Description: (3d) Construct 15 earthen grade stabilization structures with lead-out ditches to spread floodwater across the historic flood plain at old homesteads along the C Bar Canyon, Walking X Canyon, and Whitetail Canyon on the C Bar Ranch. The area restored by these structures will be seeded with perennial grass and various sub-obligate riparian species will be planted as containerized nursery stock.

c. Partners Involvement: C Bar Ranch

d. Project Priority: 1

e. Timeline: Year 1-5

f. Estimated costs: **Total $53,095.00**, *1) $2,000 for project layout (staking grade stabilization structures and lead-out ditches 2) $22,610.00 for 8,500 cy of earth moved to construct 15 grade stabilization structures with lead-out ditches @ $2.66 cy NRCS earth moving cost. 3) $5,985.00 for site prep and seeding perennial grass and shrubs on 20 acres of affected abandoned farm fields @ $299.25 / acre NRCS Critical Area Planting cost, 4) $22,500.00 for planting and irrigating 2,000 containerized trees/shrubs @ $11.25 / tree/shrub, NRCS Tree Shrub Establishment Cost*

2. Essential Project –Watershed #1

a. Attribute/ Indicator Addressed: Upland Watershed Health

b. Specific Project Activity/Project Description:(2a) Construct earthen erosion control structures in 40 actively eroding head cuts and gullies at various locations on the C Bar Ranch. Most of the head cuts and gullies that need to be treated are medium to small and will not require extensive work to treat. (Approximately 200 cy / earthen structure) 5 of the structures will be large structures that will take approximately 1000 cy of earth to construct. These head cuts and actively eroding gullies are contributing a considerable sediment load to the Burro Cienaga and JPB drainages.

c. Partners Involvement: C Bar Ranch

d. Project Priority: 2

e. Timeline: Year 2-4

f. Estimated costs: **Total $34,727.50** *1) $1,000.00 for gully plug structure lay out and staking, 40 structure, 2) $18,620.00 for construction of 35 gully plugs @200 cy earth moved / structure x $2.66 /cy NRCS earth moving costs, 3) $13,300.00 for construction of 5 gully plugs @ 1,000 cy earth moved / structure x $2.66 /cy NRCS earth moving costs 4)$1,807.50 for seeding disturbed area, 25 acres disturbed x $72.30 / acre NRCS seeding cost.*

3. Essential Project –Wetland/Riparian #2

a. Attribute/Indicator Addressed: Riparian/Wetland Habitat Condition

b. Specific Project Activity/Project Description: (4a) Maintain 14 stock tanks at various locations on the C Bar Ranch. These earthen stock tanks have provided migrating waterfowl resting and feeding habitat for many years and will be maintained in order for them to continue to provide open water habitat for waterfowl on into the future.

c. Stakeholder Involvement: C Bar Ranch

d. Project Priority: 3

e. Timeline: Year 5

f. Estimated costs: **Total $36,252.20**, *1) $1,500 for detailed design and project layout, 2) $33,740.00 for earth moving, 14 stock tanks x 1,000 cy / tank = 14,000 cy @ 2.41 / cy NRCS Pond Construction Cost, 3)$1,012.20 for seeding approximately 14 acres of disturbed area @ $72.30 / acre NRCS seeding cost*

C Bar Ranch Total $124,074.70

GILA NATIONAL FOREST ESSENTIAL SITE SPECIFIC PROJECTS

1. Essential Project –Wetland/Riparian #1

a. Attribute/Indicator Addressed: Riparian/Wetland Habitat Condition

b. Specific Project Activity/Project Description: (4b) Reconstruct Blacktail Tank in order to develop Wetland/ Riparian Habitat (waterfowl feeding and resting location) while still providing an offsite water source for livestock. A .75 acre pond with associated riparian vegetation well be restored that well again be available to wildlife for use.

c. Partners Involvement: Gila National Forest

d. Project Priority: 1

e. Timeline: Year 1

f. Estimated costs: **Total $26,593.55**, *1) $2,000 for detailed project design, project layout, and conducting cultural resource survey 2) $18,075.00 for earth moving 7,500 cy @ 2.41 / cy NRCS Pond Construction, Cost 3) $2,825.00 for 2,500 ft of Barbed wire fence @ $1.13/ ft NRCS Smooth or Barbed Fence Cost, 4)$1,363.55 for1 hp livestock water pump@ $1363.55 / hp NRCS Pump Cost, 5)$163.5 for 150 ft pipe under 2inch dia. @ $1.09 / ft NRCS Pipe Cost. 6) $2,330.00 for 1000 trees planted to reestablish riparian vegetation @ $2.33 / tree NRCS Shrub Tree Establishment Cost*

2. Essential Project –Wetland/Riparian #2

a. Attribute/Indicator Addressed: Riparian/Wetland Habitat Condition

b. Specific Project Activity/Project Description: (4b) Reconstruct Goldhill Tank in order to develop Wetland/ Riparian Habitat (waterfowl feeding and resting location) while still providing an offsite water source for livestock. A .75 acre pond with associated riparian vegetation well be restored that well again be available to wildlife for use.

c. Partners Involvement: Gila National Forest

d. Project Priority: 2

e. Timeline: Year 1

f. Estimated costs: **Total $16,418.00**, *1) $2,000 for detailed project design, project layout, and conducting cultural resource survey, 2) $8,917.00 for earth moving 3,700 cy @ 2.41 / cy NRCS Pond Construction, Cost 3) $1,808.00 for 1,600 ft of Barbed wire fence @ $1.13/ ft NRCS Smooth or Barbed Fence Cost, 4)$1,363.55 for1 hp livestock water pump@ $1363.55 / hp NRCS Pump Cost, 5)$163.5 for 150 ft pipe under 2inch dia. @ $1.09 / ft NRCS Pipe Cost. 6) $2,330.00 for 1000 trees planted to reestablish riparian vegetation @ $2.33 / tree NRCS Shrub Tree Establishment Cost*

3. Essential Project –Wetland/Riparian #3

a. Attribute/Indicator Addressed: Riparian/Wetland Habitat Condition

b. Specific Project Activity/Project Description: (4b) Reconstruct Lonesome Tank in order to develop Wetland/ Riparian Habitat (waterfowl feeding and resting location) while still providing an offsite water source for livestock. A .4 acre pond with associated riparian vegetation well be restored that well again be available to wildlife for use.

c. Partners Involvement: Gila National Forest

d. Project Priority: 3

e. Timeline: Year 1

f. Estimated costs: **Total $12,329.05**, *1) $2,000 for detailed project design, project layout, and conducting cultural resource survey, 2) $4,940.50 for earth moving 2,050 cy @ 2.41 / cy NRCS Pond Construction, Cost 3) $1,695.00 for 1,500ft of Barbed wire fence @ $1.13/ ft NRCS Smooth or Barbed Fence Cost, 4)$1,363.55 for1 hp livestock water pump@ $1363.55 / hp NRCS Pump Cost, 5)$163.5 for 150 ft pipe under 2inch dia. @ $1.09 / ft NRCS Pipe Cost. 6) $2,330.00 for 1000 trees planted to reestablish riparian vegetation @ $2.33 / tree NRCS Shrub Tree Establishment Cost*

4. Essential Project –Watershed #1

a. Attribute/Indicator Addressed: Upland Watershed Health

b. Specific Project Activity/Project Description: (3b) Relocate 1.2 miles of Forest Service Road 4250 (Gold Gulch Road) which is located within the active stream channel of the upper end of the north fork of Walking X Canyon
c. Partners Involvement: Gila National Forest
d. Project Priority: 4
e. Timeline: Year 2
f. Estimated costs: ***Total $97,578.40,*** *1) $ 7,000.00 for plan, design staking the location of new road outside of the active channel and conducting the cultural resource survey, 2) $90,000 for construction of 1.2 miles of new road to FS Class 2 standards @$75,000 / mile, 3) $578.40 for seeding approximately 8 acres of disturbed area @ $72.30 / acre NRCS seeding cost.*

5. Essential Project –Watershed #2

a. Attribute/Indicator Addressed: Upland Watershed Health
b. Specific Project Activity/Project Description: (3b)Relocate 1.2 miles of Forest Service Road 4090 (Knight Canyon Road) which is located within the active stream channel of the upper end of the south fork of Walking X Canyon
c. Partners Involvement: Gila National Forest
d. Project Priority: 5
e. Timeline: Year 3
f. Estimated costs: ***Total $97,578.40,*** *1) $ 7,000.00 for plan, design staking the location of new road outside of the active channel and conducting the cultural resource survey, 2) $90,000 for construction of 1.2 miles of new road to FS Class 2 standards @$75,000 / mile, 3) $578.40 for seeding approximately 8 acres of disturbed area @ $72.30 / acre NRCS seeding cost.*

6. Essential Project –Watershed #3

a. Attribute/Indicator Addressed: Upland Watershed Health
b. Specific Project Activity/Project Description (1a) Treat invading pinyon/juniper on 110 acres of Gila National Forest Lands located in Sec. 10, T 21 S., R 16W. (Highway Fuelwood Area) This project would be accomplished with mechanical treatment using heavy equipment to push the trees and then the pushed trees would be sold in a commercial fuelwood sale. Receipts from the sale of the wood products would be then be used back on the treatment area to do addition watershed stabilization work.
c. Partners Involvement: Gila National Forest
d. Project Priority: 6
e. Timeline: Year 2
f. Estimated cost: ***Total $26,748 .00****, 1) $4,000.00 for project area layout, conducting the cultural resource survey and marking leave trees, 2)$14,795.00 for mechanical treatment of 110 acres of dense alligator juniper @ $134.05 /acre 2012 NRCS EQIP Brush Treatment Cost. 3) $7,953.00 for seeding approximately 110 acres of disturbed area @ $72.30 / acre NRCS Range seeding cost.*

7. Essential Project –Watershed #4

a. Attribute/Indicator Addressed: Upland Watershed Health
b. Specific Project Activity/Project Description: (1a) Treat invading pinyon/juniper on 70 acres of Gila National Forest Lands located in Sec. 21, T 21 S., R 16W. (Gold Hill Fuelwood Area) This project would be accomplished with mechanical treatment using heavy equipment to push the trees and then the pushed trees would be sold in a commercial fuelwood sale. Receipts from the sale of the wood products would be then be used back on the treatment area to do addition watershed stabilization work.
c. Partners Involvement: Gila National Forest
d. Project Priority: 8
e. Timeline: Year 3
f. Estimated cost: ***Total $18,444.50,*** *1) $4,000.00 for project area layout, conducting the cultural resource survey and marking leave trees, 2)$9,383.50 for mechanical treatment of 70 acres of dense alligator juniper @ $134.05 /acre 2012 NRCS EQIP Brush Treatment Cost. 3) $5,061.00 for seeding approximately 70 acres of disturbed area @ $72.30 / acre NRCS Range seeding cost.*

8. Essential Project –Watershed #5

a. Attribute/Indicator Addressed: Upland Watershed Health

b. Specific Project Activity/Project Description: (1a) Treat invading pinyon/juniper on 70 acres of Gila National Forest Lands located in Sec. 35, T 21 S., R 16W. (Blacktail Tank Fuelwood Area) This project would be accomplished with mechanical treatment using heavy equipment to push the trees and then the pushed trees would be sold in a commercial fuelwood sale. Receipts from the sale of the wood products would be then be used back on the treatment area to do addition watershed stabilization work.

c. Partners Involvement: Gila National Forest

d. Project Priority: 9

e. Timeline: Year 5

f. Estimated cost: ***Total $51,397.00*** *, 1) $6,000.00 for project area layout, conducting the cultural resource survey and marking leave trees, 2) $29,491.00 for mechanical treatment of 220 acres of dense alligator juniper @ $134.05 /acre 2012 NRCS EQIP Brush Treatment Cost. 3) $15,906.00 for seeding approximately 220 acres of disturbed area @ $72.30 / acre NRCS Range seeding cost.*

9. Essential Project –Watershed #6

a. Attribute/ Indicator Addressed: Upland Watershed Health

b. Specific Project Activity/Project Description:(2a) Construct approximately139 small to medium and 18 large earthen erosion control structures in actively eroding head cuts and gullies at various locations on the GNF portion of the Headwater Burro Cienaga 5th Code Watershed. Most of the head cuts and gullies that need to be treated are medium to small and will not require extensive work to treat. (Approximately 300 cy / earthen structure) 18 of the structures will be large structures that will take approximately 1000 cy / earthen structure. These head cuts and actively eroding gullies are contributing a considerable sediment load to the Burro Cienaga and JPB drainages.

c. Partners Involvement: Gila National Forest

d. Project Priority: 7

e. Timeline: Year 1-5

f. Estimated costs: **Total $172,229.00,** *1) $6,000.00 for gully plug structure lay out, staking and conducting the cultural resource survey, 2) $110,922.00 for construction of 139 small to medium gully plugs @ 300 cy earth moved / structure=41,700 cy x $2.66 /cy NRCS earth moving costs, 3) $48,800.00 for construction of 18 gully plugs @ 1,000 cy earth moved / structure = 18,000 cy x $2.66 /cy NRCS earth moving costs 4)$6,507.00 for seeding disturbed area, approximately 90 acres disturbed x $72.30 / acre NRCS seeding cost.*

Gila National Forest Total $519,315.90

M-N RANCH ESSENTIAL SITE SPECIFIC PROJECTS

1. Essential Project –Watershed #1

a. Attribute/Indicator Addressed: Upland Watershed Health

b. Specific Project Activity/Project Description: (2d) Stabilize 100 yards of eroding stream bank along Whitetail Canyon on the M-N Ranch. This project will consist of reshaping the existing bank, armoring the bank with native rock, and constructing small rock barbs along the bank. This eroding bank is associated with the main ranch access road and is contributing sediment to the stream channel in Whitetail Canyon.

c. Partners Involvement: M-N Ranch

d. Project Priority: 1

e. Timeline: Year 1

f. Estimated costs: **Total $8,500.00**, *1) $500 for project layout (staking active channel level and barb locations) 2) $5500 for 50 cy rock @ $110.00 per cy 3) $2660 for 1000 cy of earth moved to shape the bank.*

2. Essential Project –Watershed #2

a. Attribute/Indicator Addressed: Upland Watershed Health

b. Specific Project Activity/Project Description: (2c) Construct waterbars and drainage lead outs on 5.6 miles of two-track ranch road on M-N Ranch. This project is intended to stop and prevent further erosion associated with these key ranch access roads. These roads drain into Whitetail Canyon which drains into the Burro Cienaga drainage just above Burro Cienaga Springs.

c. Stakeholder Involvement: M-N Ranch

d. Project Priority: 2

e. Timeline: Year 1

f. Estimated costs: **Total $8,080.30**, *1) $560 for 5.6 miles of waterbar and lead out ditch layout and staking @ $100/ mile, 2) $7448 for constructing waterbars and lead out ditches. [20 cy earth moved per waterbar x 25 waterbars /mile = 500 cy of earth moved per mile x 5.6 miles of road drained =2800 cy of earth moved x $2.66 cy NRCS earth moving cost], 3)$72.30 for seeding approximately 1 acre of disturbed area @ $72.30 / acre NRCS seeding cost*

3. Essential Project –Watershed #3

a. Attribute/ Indicator Addressed: Upland Watershed Health

b. Specific Project Activity/Project Description:(2a) Construct earthen erosion control structures in 20 actively eroding head cuts and gullies at various locations on the M-N Ranch. The head cuts and gullies that need to be treated are medium to small and will not require extensive work to treat. (approximately 100 cy earthen structure) These head cuts and actively eroding gullies are contributing a considerable sediment load to Whitetail Canyon.

c. Partners Involvement: M-N Ranch

d. Project Priority: 3

e. Timeline: Year 2

f. Estimated costs: **Total $6,543.00** *1) $500.00 for gully plug structure lay out and staking, 20 structures @ $25 ea, 2) $5,320.00 for construction of gully plugs, 100 cy earth moved / structure x $2.66 /cy NRCS earth moving cost = $266 / structure x 20 structures, 3) $723.00 for seeding disturbed area, .5 acres disturbed / structure x 20 structures = 10 acres x $72.30 / acre NRCS seeding cost.*

M-N Ranch Total $23,123.30

PREVOST RANCH ESSENTIAL SITE SPECIFIC PROJECTS

1. Essential Project –Wetland/Riparian #1

a. Attribute/Indicator Addressed: Riparian/Wetland Vegetation Condition

b. Specific Project Activity/Project Description: (5b) Construct grade stabilization/water spreading structures in the actively eroding Burro Cienaga stream channel to reestablish flood water access to the historic flood plain and them reshape and stabilize eroding stream banks. Plant wetland/riparian plant species across the entire floodplain in the treated area. This project will restore approximately 30 acres of historic wetland/riparian habitat that once occurred at this site. This project is located below the existing wetland/riparian enhancement project recently completed on the Prevost Ranch.

c. Partners Involvement: Prevost Ranch

d. Project Priority: 1

e. Timeline: Year 1

f. Estimated costs: **Total $33,924.48**, *1) $1,000 for project layout (staking active channel level and water spreader berms) 2) $31,862.40 for earth work and planting of selected wetland/riparian plant species on 30 acres at NRCS Wetland Restoration cost of $1062.08 / acre 3) $2,290.00 for construction of 4.580 ft of electric fence @ $.50 /ft. NRCS EQIP Fence Cost.*

2. Essential Project –Wetland/Riparian #2

a. Attribute/Indicator Addressed: Riparian/Wetland Vegetation Condition

b. Specific Project Activity/Project Description: (2d) Stabilize 900 yards of eroding stream bank along Burro Cienaga Stream Channel on the Prevost Ranch. This project will consist of reshaping the existing bank, armoring the bank with native vegetation. This eroding bank is associated with several large bends in the stream course that are eroding at a excessive rate due to being totally devoid of any herbaceous or woody vegetation.

c. Partners Involvement: Prevost Ranch

d. Project Priority: 2

e. Timeline: Year 2

f. Estimated costs: **Total $67,921.00**, *1) $1,000 for project layout (staking active channel level and back slope grade and cuts) 2) $59,850 for 22,500 cy of earth moved to shape the bank @$2.66 / cy for earth moved, NRCS earth moving cost, 3) $1,446.00 for seeding perennial grass on 20 acres of disturbed area @ $72.30 / acre NRCS seeding cost 4) $5,625.00 for planting and irrigating 500 containerized trees @ $11.25 / tree, NRCS Tree Shrub Establishment Cost*

Prevost Ranch Total $101,845.48

THORNE RANCH ESSENTIAL SITE SPECIFIC PROJECTS

1. Essential Project –Wetland/Riparian #1

a. Attribute/Indicator Addressed: Riparian/Wetland Habitat Condition

b. Specific Project Activity/Project Description: (4b) Reconstruct JPB Tank in order to develop Wetland/ Riparian Habitat (waterfowl feeding and resting location) while still providing an offsite water source for livestock. A 2.5 acre pond with associated riparian vegetation well be restored that well again be available to wildlife for use.

c. Partners Involvement: Thorne Ranch

d. Project Priority: 1

e. Timeline: Year 1

f. Estimated costs: **Total $50,761.05**, *1) $1,000 for detailed project design and project layout, 2) $42,175.00 for earth moving 17,500 cy @ 2.41 / cy NRCS Pond Construction, Cost 3) $3,729.00 for 3,300 ft of Barbed wire fence @ $1.13/ ft NRCS Smooth or Barbed Fence Cost, 4)$1,363.55 for1 hp livestock water pump@ $1363.55 / hp NRCS Pump Cost, 5)$163.5 for 150 ft pipe under 2inch dia. @ $1.09 / ft NRCS Pipe Cost. 6) $2,330.00 for 1000 trees planted to reestablish riparian vegetation @ $2.33 / tree NRCS Shrub Tree Establishment Cost*

2. Essential Project –Wetland/Riparian #2

a. Attribute/Indicator Addressed: Riparian/Wetland Habitat Condition

b. Specific Project Activity/Project Description: (4b) Reconstruct Jonnie Tank in order to develop Wetland/ Riparian Habitat (waterfowl feeding and resting location) while still providing an offsite water source for livestock. A 1.0 acre pond with associated riparian vegetation well be restored that well again be available to wildlife for use.

c. Stakeholder Involvement: Thorne Ranch

d. Project Priority: 2

e. Timeline: Year 1

f. Estimated costs: **Total $30,761.11**, *1) $1,000 for detailed project design and project layout, 2) $24,100.00 for earth moving 10,000 cy @ 2.41 / cy NRCS Pond Construction, Cost, 3)$2,386.56 for 2,112 ft of Barbed wire fence @ $1.13/ ft NRCS Smooth or Barbed Fence Cost, 4)$1,363.55 for1 hp livestock water pump@ $1363.55 / hp NRCS Pump Cost, 5)$163.5 for 150 ft pipe under 2inch dia. @ $1.09 / ft NRCS Pipe Cost. 6) $1,747.50 for 750 trees planted to reestablish riparian vegetation @ $2.33 / tree NRCS Shrub Tree Establishment Cost*

3. Essential Project –Watershed #1

a. Attribute/Indicator Addressed: Upland Watershed Health

b. Specific Project Activity/Project Description: (2c) Construct waterbars and drainage lead outs on 20 miles of two-track ranch road on Thorne Ranch. This project is intended to stop and prevent further erosion associated with these key ranch access roads.

c. Stakeholder Involvement: Thorne Ranch

d. Project Priority: 3

e. Timeline: Year 2

f. Estimated costs: Total $14,129.50, *1) $1,000 for 20 miles of waterbar and lead out ditch layout and staking @ $50/ mile, 2) $12,768.00 for constructing waterbars and lead out ditches. [20 cy earth moved per waterbar x 12 waterbars / mile =240 cy of earth moved per mile x 20 miles of road drained =4800 cy of earth moved x $2.66 cy NRCS earth moving cost], 3)$361.50 for seeding approximately 5 acre of disturbed area @ $72.30 / acre NRCS seeding cost*

4. Essential Project –Watershed #2

a. Attribute/ Indicator Addressed: Upland Watershed Health

b. Specific Project Activity/Project Description:(2a) Construct earthen erosion control structures in 20 actively eroding head cuts and gullies at various locations on the Thorne Ranch. The head cuts and gullies that need to be treated are medium to small and will not require extensive work to treat. (approximately 100 cy earthen structure)

c. Partners Involvement: Thorne Ranch

d. Project Priority: 4
e. Timeline: Year 3
f. Estimated costs: **Total $6,543.00** *1) $500.00 for gully plug structure lay out and staking, 20 structures @ $25 ea, 2) $5,320.00 for construction of gully plugs, 100 cy earth moved / structure x $2.66 /cy NRCS earth moving cost = $266 / structure x 20 structures, 3) $723.00 for seeding disturbed area, .5 acres disturbed / structure x 20 structures = 10 acres x $72.30 / acre NRCS seeding cost.*

5. Essential Project –Wetland/Riparian #3

a. Attribute/Indicator Addressed: Riparian/Wetland Habitat Condition
b. Specific Project Activity/Project Description: (4a) Maintain 10 stock tanks at various locations on the Thorne Ranch. These earthen stock tanks have provided migrating waterfowl resting and feeding habitat for many years and will be maintained in order for them to continue to provide open water habitat for waterfowl on into the future.
c. Stakeholder Involvement: Thorne Ranch
d. Project Priority: 5
e. Timeline: Year 3
f. Estimated costs: **Total $25,823.00**, *1) $1,000 for detailed design and project layout, 2) $24,100.00 for earth moving, 10 stock tanks x 1,000 cy / tank = 10,000 cy @ 2.41 / cy NRCS Pond Construction Cost, 3)$723.00 for seeding approximately 10 acre of disturbed area @ $72.30 / acre NRCS seeding cost*

Thorne Ranch Total $128,017.66

G. Plant List for Burro Cienaga Watershed Restoration Action Plan

This plant list was compiled for the Pitchfork Ranch by the Gila Chapter of the New Mexico Native Plant Society

Family	*Scientific name*	Common name
EUPHORBIACEAE	*Acalypha neomexicana*	copperleaf, NM
VERBENACEAE	*Aloysia wrightii*	beebrush, Wright's
AMARANTHACEAE	*Amaranthus arenicola*	pigweed, sandhill
AMARANTHACEAE	*Amaranthus palmeri*	pigweed/carelessweed
ASTERACEAE	*Amauriopsis dissecta*	bahia, ragged-leaf
FABACEAE	*Amorpha fruiticosa*	false indigo
POACEAE	*Andropogon gerardii*	bluestem, big
MALVACEAE	*Anoda cristata*	anoda
CUCURBITACEAE	*Apodanthera undulata*	melon loco
PAPAVERACEAE	*Argemone pleicantha*	poppy, prickly
POACEAE	*Aristida adscensionis*	threeawn, 6 week
POACEAE	*Aristida harvardii*	threeawn, Havard's
POACEAE	*Aristida purpurea var. longiseta*	threeawn, red
POACEAE	*Aristida purpurea var. wrightii*	threeawn, Wright's
POACEAE	*Aristida schiedeana*	threeawn, single
POACEAE	*Aristida ternipes var. gentilis*	threeawn, hook
POACEAE	*Aristida ternipes var. ternipes*	spidergrass
ASTERACEAE	*Artemesia ludoviciana*	sage, Louisiana
ASTERACEAE	*Artemisia carruthii*	sagebrush, Carruth's
ASTERACEAE	*Artemisia filifolius*	sage, sand
FABACEAE	*Astragalus mollissimus*	locoweed, wooly
CHENOPODIACEAE	*Atriplex elegans*	saltbush, wheelscale
ASTERACEAE	*Baccharis salicifolia*	seepwillow/willow baccharis
ASTERACEAE	*Baccharis sarothoides*	baccharis, broom
ASTERACEAE	*Bahia absinthifolia*	bahia, sageleaf
BERBERIDACEAE	*Berberis haematocarpa*	algerita
ASTERACEAE	*Bidens bigelovii*	beggartick, Bigelow's
NYCTAGINACEAE	*Boerhavia coccinea*	spiderling, scarlet
NYCTAGINACEAE	*Boerhavia purpurascens*	spiderling, purple
POACEAE	*Bothriochloa ischaemum*	bluestem, yellow
POACEAE	*Bothriochloa springfieldii*	bluestem, Springfield's
POACEAE	*Bouteloua aristoides*	grama, needle
POACEAE	*Bouteloua barbata*	grama, 6 week
POACEAE	*Bouteloua curtipendula*	grama, side-oats
POACEAE	*Bouteloua eriopoda*	grama, black
POACEAE	*Bouteloua hirsuta*	grama, hairy
ASTERACEAE	*Brickellia brachyphylla*	brickellbush, plumed
ASTERACEAE	*Brickellia californica*	brickellbush, California
ULMACEAE	*Celtis reticulata*	hackberry, western
POACEAE	*Cenchrus spinifex*	bur(sand)
ASTERACEAE	*Chaetopappa ericoides*	
FABACEAE	*Chamaechrista nicitans* var. *leptadenia*	aster, baby partridge-pea
EUPHORBIACEAE	*Chamaesyce albomarginata*	spurge, rattlesnakeweed
EUPHORBIACEAE	*Chamaesyce dioica*	spurge, royal
EUPHORBIACEAE	*Chamaesyce hyssopifolia*	spurge, hyssop-leaf
EUPHORBIACEAE	*Chamaesyce revoluta*	spurge, curl-leaf
EUPHORBIACEAE	*Chamaesyce serpyllifolia*	spurge, thyme-leaf

Family	*Scientific name*	Common name
EUPHORBIACEAE	*Chamaesyce serrula*	spurge, saw-tooth
PTERIDACEAE	*Cheilanthes eatonii*	fern: lipfern, Eaton's
PTERIDACEAE	*Cheilanthes wootonii*	fern: lipfern, Wooton's
CHENOPODIACEAE	*Chenopodium watsonii*	goosefoot, stinking
POACEAE	*Chloris verticillata*	windmill grass
POACEAE	*Chloris virgata*	windmill grass, showy
ASTERACEAE	*Cirsium arizonicum*	thistle, Arizona
COMMELINACEAE	*Commelina erecta*	dayflower, white-mouth
RHAMNACEAE	*Condalia ericoides*	javelina bush
CONVOLVULACEAE	*Convolvulus equitans*	bindweed, Texas
ASTERACEAE	*Conyza canadensis*	horseweed
CACTACEAE	*Coryphantha vivipara*	cactus, pincushion
FABACEAE	*Crotalaria pumila*	rattlebox
EUPHORBIACEAE	*Croton texensis*	croton, Texas
BORAGINACEAE	*Cryptantha cinerea*	hiddenflower, bownut
CUCURBITACEAE	*Cucurbita digitata*	gourd, finger-leaf
CUCURBITACEAE	*Curcurbita foetidissima*	gourd, buffalo
CACTACEAE	*Cylindropuntia spinosior* cholla,	walking-stick
CYPERACEAE	*Cyperus sphaerolepis*	sedge: Rusby's flat-sedge
FABACEAE	*Dalea nana var. nana*	prairie-clover, dwarf
NOLINACEAE	*Dasylirion wheeleri*	sotol
POACEAE	*Dasyochloa pulchella*	fluffgrass
SOLANACEAE	*Datura quercifolia*	datura, oak-leaf
SOLANACEAE	*Datura wrightii*	datura, sacred
FABACEAE	*Desmodium neomexicanum*	tick-clover, NM
ASTERACEAE	*Dieteria asteroides*	aster(tansy), shaggy-cup
POACEAE	*Digitaria californica*	cotton top
CHENOPODIACEAE	*Dysphania graveolens*	goosefoot, fetid
CACTACEAE	*Echinocereus coccineus*	cactus, claretcup
POACEAE	*Echinochloa muricata*	cockspur
POACEAE	*Enneapogon desvauxii*	pappus grass
EPHEDRACEAE	*Ephedra trifurca*	ephedra, longleaf
ONAGRACEAE	*Epilobium ciliatum*	willow herb
POACEAE	*Eragrostis cilianensis*	stinkgrass
POACEAE	*Eragrostis mexicana*	lovegrass, Mexican
POACEAE	*Eragrostis pectinacea var. pectiacea*	lovegrass, Carolina
ASTERACEAE	*Ericameria laricifolia*	turpentine bush
ASTERACEAE	*Ericameria nauseosa*	chamiso/rabbitbrush
POACEAE	*Eriochloa acuminata var. acuminata*	cupgrass
POLYGONACEAE	*Eriogonum abertianum*	buckwheat, Abert's
POLYGONACEAE	*Eriogonum polycladon*	buckwheat(wild), sorrel
POLYGONACEAE	*Eriogonum wrightii* var. *wrightii*	buckwheat (wild), Wright's
EUPHORBIACEAE	*Euphorbia davidii*	poinsettia, David's
EUPHORBIACEAE	*Euphorbia exstipulata*	spurge, square-seed
ROSACEAE	*Fallugia paradoxa*	Apache plume
CACTACEAE	*Ferocactus wislizeni*	cactus, barrel
OLEACEAE	*Fraxinus velutina*	ash, velvet
AMARANTHACEAE	*Froelichia gracilis*	snake cotton, slender

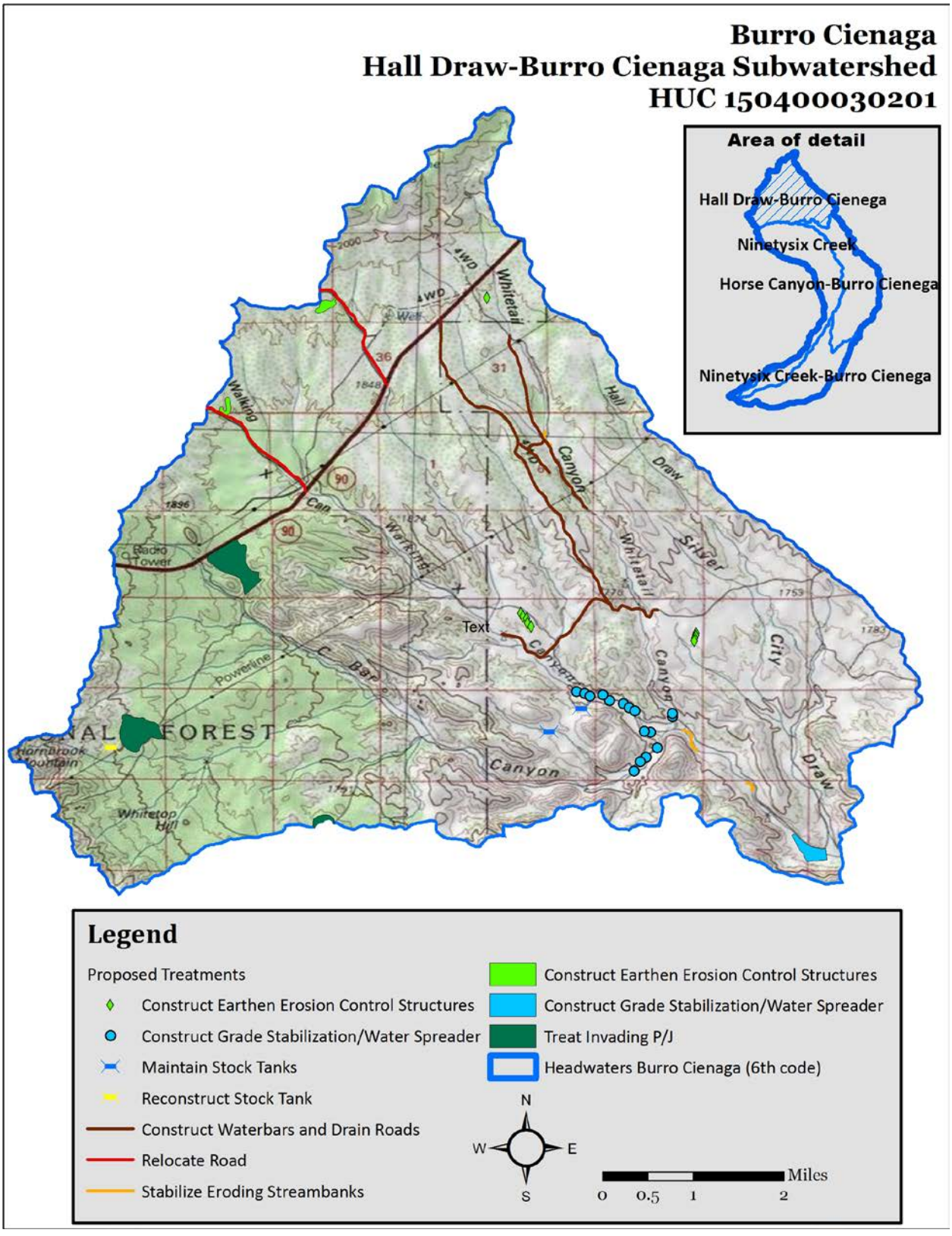
Family	*Scientific name*	Common name
ASTERACEAE	*Gaillardia pinnatifida*	blanketflower
GARRYACEAE	*Garrya wrightii*	silktassel, Wright's
ONAGRACEAE	*Gaura mollis*	gaura, small-flowered
VERBENACEAE	*Glandularia bipinnatifida*	vervain, Dakota
AMARANTHACEAE	*Gomphrena nitida*	amaranth, globe
ASTERACEAE	*Grindelia squarrosa*	gumweed, curly-cup
AMARANTHACEAE	*Guilleminia densa*	matweed, small
ASTERACEAE	*Gutierrezia microcephala*	snakeweed, thread-leaf
ASTERACEAE	*Gutierrezia sarothrae*	snakeweed, broom
LAMIACEAE	*Hedeoma nana*	false-pennyroyal, dwarf
ASTERACEAE	*Helianthus ciliaris*	blueweed
ASTERACEAE	*Helianthus petiolaris*	sunflower, plains
ASTERACEAE	*Heterosperma pinnatum*	wing-petal
ASTERACEAE	*Heterotheca subaxillaris*	camphorweed
FABACEAE	*Hoffmanseggia glauca*	hog potato
ASTERACEAE	*Hymenopappus filifolius*	ragweed, white
ASTERACEAE	*Hymenothrix wislizeni*	thimblehead, trans-pecos
ASTERACEAE	*Hymenothrix wrightii*	thimblehead, Wright's
CONVOLVULACEAE	*Ipomea costellata*	morning-glory, crested
CONVOLVULACEAE	*Ipomea cristulata*	morning-glory, scarlet
CONVOLVULACEAE	*Ipomea hederacea*	morning-glory, ivy-leaf
POLEMONIACEAE	*Ipomopsis multiflora*	gilia, many-flowered
ASTERACEAE	*Isocoma tenuisecta*	burroweed
JUGLANDACEAE	*Juglans major*	walnut, Arizona
CUPRESSACEAE	*Juniperus deppeana*	juniper, alligator
CUPRESSACEAE	*Juniperus monosperma*	juniper, one-seed
ZYGOPHYLLACAE	*Kallestroemia parviflora*	caltrop, warty
ASTERACEAE	*Lactuca serriola*	lettuce, prickly
BRASSICACEAE	*Lepidium thurberi*	pepperweed, Thurber's
POACEAE	*Leptochloa dubia*	sprangletop, green
FABACEAE	*Lotus wrightii*	vetch(deer)
SOLANACEAE	*Lycium pallidum*	wolfberry, pale
POACEAE	*Lycurus setosus*	wolftail
ASTERACEAE	*Machaeranthera tanacetifolia*	daisy(tahoka-)
LAMIACEAE	*Marrubium vulgare*	horehound
FABACEAE	*Melilotus albus*	sweet-clover, white
LOASACEAE	*Mentzelia pumila*	blazingstar, little yellow
FABACEAE	*Mimosa aculeaticarpa*	wait-a-bit
NYCTAGINACEAE	*Mirabilis longiflora*	four o'clock, sweet
NYCTAGINACEAE	*Mirabilis multiflora*	maravilla
MOLLUGINACEAE	*Mollugo verticillata*	carpetweed
MORACEAE	*Morus microphylla*	mulberry, littleleaf
POACEAE	*Muhlenbergia arenicola*	muhly, sand
POACEAE	*Muhlenbergia asperifolia*	muhly: scratchgrass
POACEAE	*Muhlenbergia emersleyi*	muhly: bullgrass
POACEAE	*Muhlenbergia fragilis*	muhly, delicate
POACEAE	*Muhlenbergia porterii*	muhly, bush/ hoegrass
POACEAE	*Muhlenbergia sinuosa*	muhly, barrens
POACEAE	*Muhlenbergia tenuifolia*	muhly, mesa

Family	*Scientific name*	Common name
POACEAE	*Munroa squarrosa*	false buffalo grass
SOLANACEAE	*Nicotiana trigonophylla*	tobacco, desert
PTERIDACEAE	*Notholaena standleyi*	fern: cloakfern, Standley's
CACTACEAE	*Opuntia chlorotica*	pricklypear, yellow-spined
CACTACEAE	*Opuntia engelmannii*	pricklypear, Engelmann
CACTACEAE	*Opuntia phaeacantha*	pricklypear, brown-spined
POACEAE	*Panicum hallii* subsp. *hallii*	witchgrass, Hall's
POACEAE	*Panicum hirticaule* subsp. *hirticaule*	witchgrass, Mexican
POACEAE	*Panicum obtusum*	vine mesquite
ASTERACEAE	*Pectis filipes*	lemonweed, thread-leaf
PTERIDACEAE	*Pellaea truncata*	fern: cliffbrake, spiny
SOLANACEAE	*Physalis foetens* var. *neomexicana*	ground-cherry, NM
POACEAE	*Pleuraphis mutica*	tobosa
CLEOMACEAE	*Polanisia dodecandra*	clammyweed
PORTULACEAE	*Portulaca oleracea*	purslane
PORTULACEAE	*Portulaca suffrutescens*	purslane, shrubby
PEDALIACEAE	*Probosidea althaeifolia*	devil's claw
FABACEAE	*Prosopis glandulosa*	mesquite, honey
ASTERACEAE	*Psilostrophe tagetina*	paperflower
FAGACEAE	*Quercus emoryi*	oak, emory
FAGACEAE	*Quercus grisea*	oak, gray
FAGACEAE	*Quercus turbinella*	oak(live)
RHAMNACEAE	*Rhamnus tomentella* subsp. *ursina*	buckthorn, California
ANACARDIACEAE	*Rhus microphylla*	sumac, small-leaf
ANACARDIACEAE	*Rhus trilobata*	limitas/skunkbush
FABACEAE	*Rhynchosia senna* var. *texana*	bean(snout-), Texas
GROSSULARIACEAE	*Ribes cereum*	current, wax
SALICACEAE	*Salix goodingdii*	willow, Gooding's
CHENOPODIACEAE	*Salsola collina*	Russian thistle, Slender
CHENOPODIACEAE	*Salsola tragus*	tumbleweed/Russian thistle
LAMIACEAE	*Salvia reflexa*	sage, Rocky Mountain
LAMIACEAE	*Salvia subincisa*	sage, sharp-tooth
ASTERACEAE	*Sanvitalia abertii*	Abert's dome
ASTERACEAE	*Senecio flaccidus*	groundsel, thread-leaf
POACEAE	*Setaria grisebachii*	bristlegrass, Grisebach's
POACEAE	*Setaria leucopila*	bristlegrass, plains
MALVACEAE	*Sida abutifolia*	mallow, spreading
SOLANACEAE	*Solanum elaeagnifolium*	nightshade, silverleaf
SOLANACEAE	*Solanum heterodoxum*	nightshade, melon-leaf
SOLANACEAE	*Solanum nigrum*	nightshade, black
SOLANACEAE	*Solanum rostratum*	buffalobur
ASTERACEAE	*Solidago lepida*	goldenrod, western
MALVACEAE	*Sphaeralcea incana*	globemallow, soft
POACEAE	*Sporobolus airoides*	sacaton, alkali
POACEAE	*Sporobolus giganteus*	sacaton, giant
LAMIACEAE	*Stachys coccinea*	scarlet hedge-nettle
ASTERACEAE	*Stephanomeria pauciflora*	skeletonweed
ASTERACEAE	*Thelesperma megapotamicum*	Hopi tea

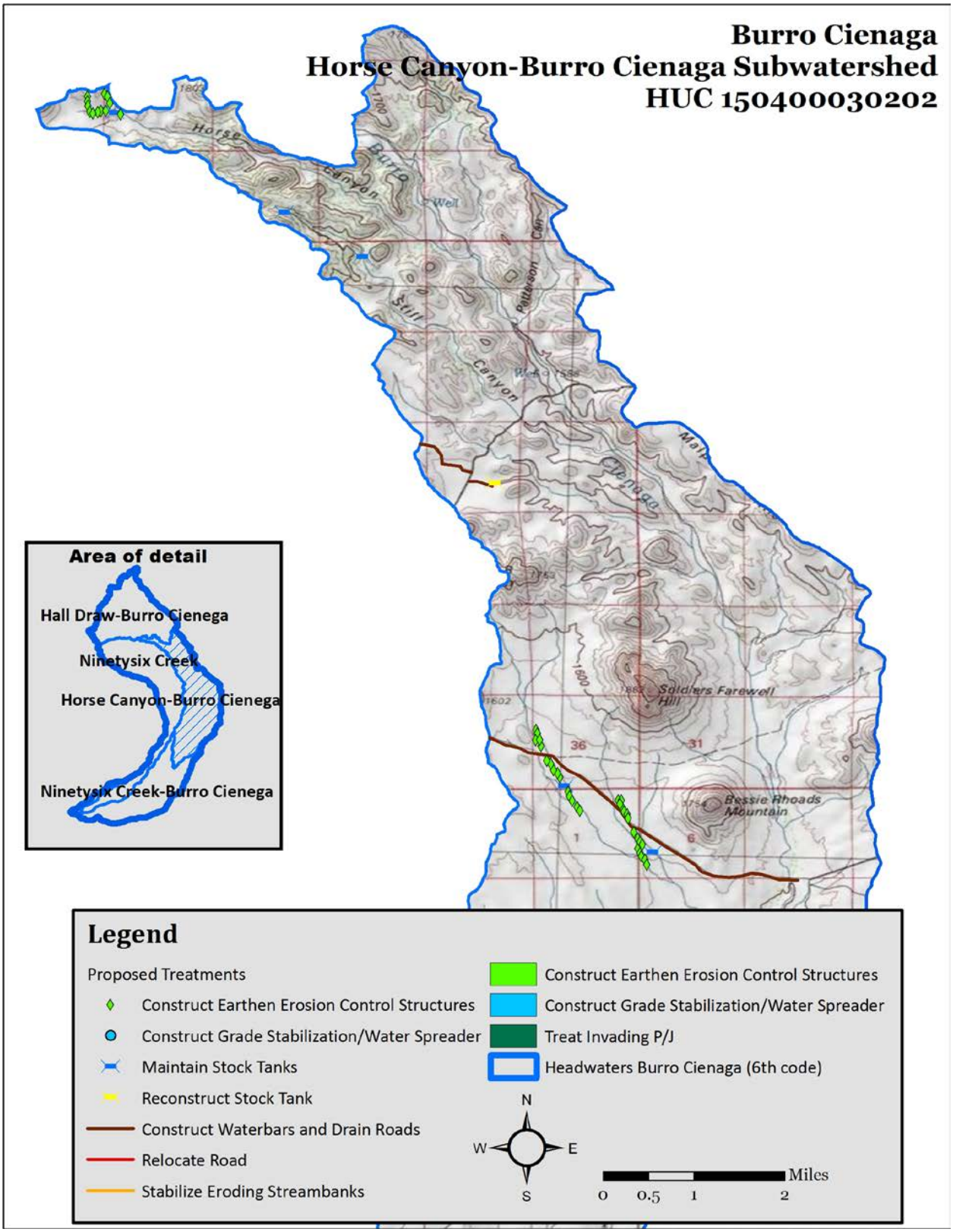
Family	*Scientific name*	Common name
EUPHORBIACEAE	*Tragia ramosa*	noseburn
AIZOACEAE	*Trianthema portulacastrum*	horse purslane
POACEAE	*Urochloa arizonica*	signal grass, Arizona
ASTERACEAE	*Verbascum thapsus*	mullein
VERBENACEAE	*Verbena gracilis*	vervain, Huachuca
ASTERACEAE	*Verbesina enceliodes*	daisy, cowpen
SCROPHULARIACEAE	*Veronica americana*	brooklime, American
VITACEAE	*Vitis arizonica*	grape, Arizona
ASTERACEAE	*Xanthisima gracile*	goldenweed, slender
ASTERACEAE	*Xanthium strumarium*	cocklebur
AGAVACEAE	*Yucca baccata*	yucca, banana
AGAVACEAE	*Yucca elata*	yucca, soaptree
ASTERACEAE	*Zinnia grandiflora*	zinnia,plain
RHAMNACEAE	*Ziziphus obtusifoli*	graythorn

IIX. MAPS

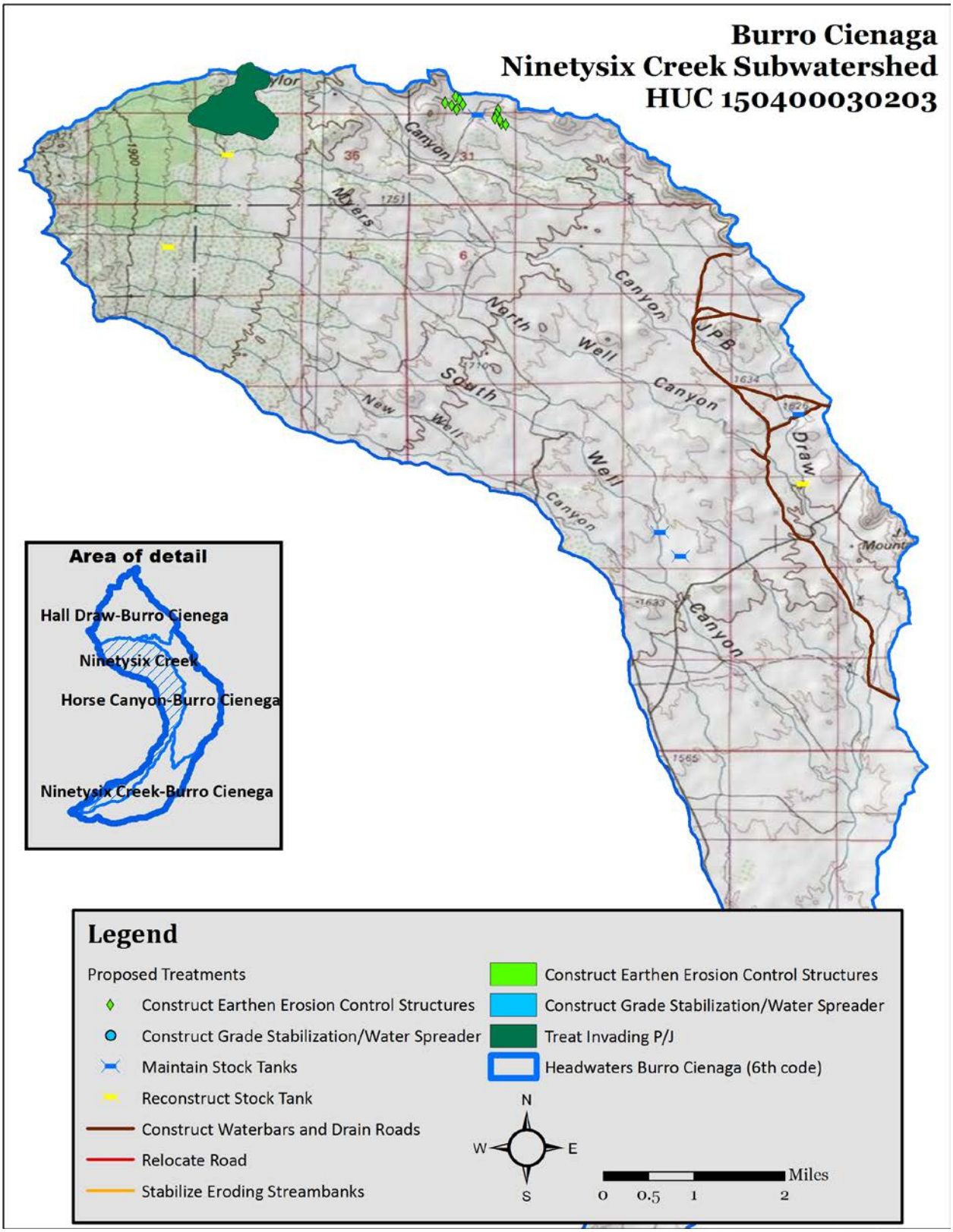
Map 1. Hall Draw – Burro Cienaga



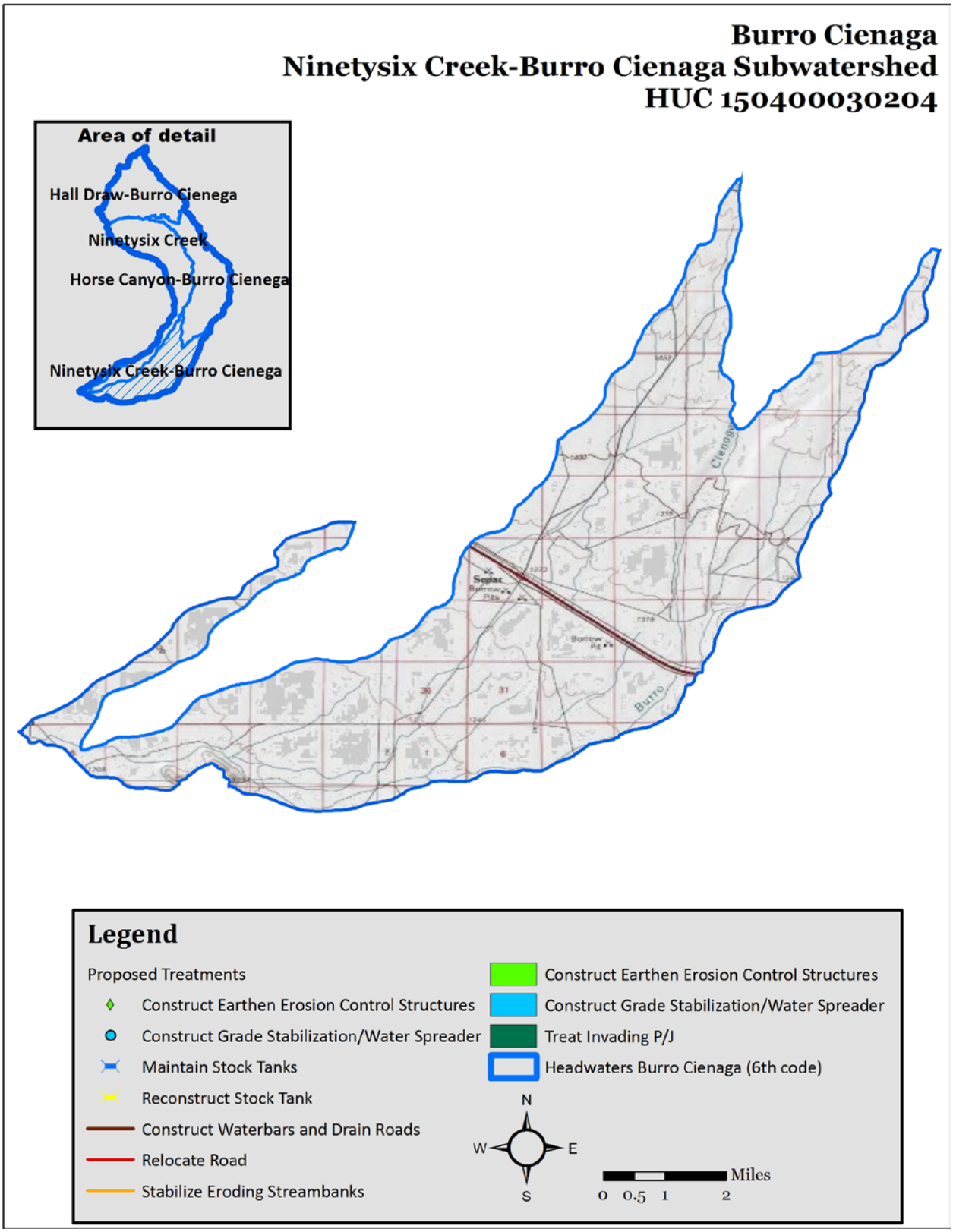
Map 2. Horse Canyon – Burro Cienaga



Map 3. Nintysix Creek



Map 4. Nintysix Creek – Burro Cienaga



Map 5. Proposed Restoration Projects