

**WATERSHED RESTORATION ACTION STRATEGY  
(WRAS)**

**for the**

**Rowe Mesa**



**Prepared by**

**Bionomics Southwest**

**For**

**The Conservation Fund**

**2005**

## Table of Contents

<b>INTRODUCTION .....</b>	<b>3</b>
<b>WRAS DEVELOPMENT .....</b>	<b>4</b>
<b>WATERSHED SETTING .....</b>	<b>5</b>
<i>Land Use History .....</i>	<i>5</i>
<i>Grazing.....</i>	<i>6</i>
<i>Other Uses.....</i>	<i>6</i>
<i>Valle Grande Grassbank.....</i>	<i>6</i>
<b>SECTION 1: DEFINING SPECIFIC WATER QUALITY PROBLEMS .....</b>	<b>7</b>
<b>CONTRIBUTING FACTORS .....</b>	<b>8</b>
<i>Vegetation Loss .....</i>	<i>8</i>
<i>Wildlife .....</i>	<i>9</i>
<b>SECTION 2: RESTORATION AND MANAGEMENT PROGRAMS .....</b>	<b>10</b>
<b>LANDSCAPE FIRE MANAGEMENT .....</b>	<b>10</b>
<b>Wildfire Management .....</b>	<b>11</b>
<b>Prescribed Burn Strategy .....</b>	<b>12</b>
<b>Pre and Post Fire Strategies .....</b>	<b>13</b>
<b>ROAD MANAGEMENT .....</b>	<b>15</b>
<b>NOXIOUS WEED MANAGEMENT .....</b>	<b>17</b>
<b>GRAZING MANAGEMENT .....</b>	<b>18</b>
<b>FOREST MANAGEMENT (PONDEROSA PINE SAVANNA RESTORATION).....</b>	<b>19</b>
<b>SECTION 3: PUBLIC OUTREACH AND INVOLVEMENT PLAN.....</b>	<b>19</b>
<b>OUTREACH.....</b>	<b>19</b>
Outreach Tools .....	20
<b>INVOLVEMENT .....</b>	<b>20</b>
Involvement Tools.....	20
<b>TECHNOLOGY TRANSFER .....</b>	<b>20</b>
Transfer Tools .....	20
<b>PUBLIC OUTREACH AND INVOLVEMENT ACTIVITIES TO DATE.....</b>	<b>21</b>
<b>SECTION 4: MONITORING AND EVALUATION.....</b>	<b>22</b>
<b>SECTION 5: DESIRED WATER QUALITY GOALS AND ACTIONS TO BE TAKEN ..</b>	<b>24</b>
<b>CURRENT GOALS .....</b>	<b>25</b>

## **INTRODUCTION**

The Federal Clean Water Action Plan (CWAP) of 1998 was developed to help meet the goals of the Clean Water Act through state-led cooperative efforts. These efforts attempt to identify and prioritize watersheds with water quality concerns. A New Mexico Unified Watershed Assessment (1998) was conducted by a statewide task force in response to the actions mandated in the CWAP. New Mexico's Unified Watershed Assessment identified 21 out of New Mexico's 83 watersheds as "in need of restoration" (Category 1).

This Watershed Restoration Action Strategy (WRAS) for the Rowe Mesa focuses on restoring and protecting water quality that is currently impaired by sediment. The WRAS is a required product of the CWAP process, and has been developed for a variety of planning, reporting, and funding purposes. The structure and content of this WRAS draws from previous Watershed Restoration Action Strategies (WRASs) developed for other watersheds in New Mexico. These include the Rio Puerco Watershed Restoration Action Strategy and the Comanche Creek Watershed Implementation Plan.

The ultimate goals of this plan are to improve the condition of Rowe Mesa and the two watersheds to which it contributes. The benefits of meeting these goals are numerous and include the primary objective of reducing sediment runoff into the Pecos and Galisteo rivers through improved forest and rangeland health. Secondary objectives include improved habitat for terrestrial wildlife; providing the foundations for sustainable economic use of forest and rangeland resources; and creating enhanced recreational opportunities for people in local communities as well as visitors to the area.

Restoration efforts on Rowe Mesa have a very high likelihood of success. Many of the administrative, social, and ecological elements needed to accomplish the goals outlined in this document are already in place. Rowe Mesa includes both private and public lands. Public lands include over 120,000 acres within the Pecos/Las Vegas management unit of the Santa Fe National Forest and an equal amount in private ownership. The public lands are under the management of a single Federal Agency (USDA Forest Service) and are protected from future development. Scattered in-holdings which are surrounded by forest lands total approximately 2,500 acres.

Both the primary and secondary objectives mentioned above are consistent with current Forest Service management objectives for the Rowe Mesa Management Unit. An informal, collaborative stakeholder group is forming to help shape watershed policies that impact Rowe Mesa on a broad landscape scale in concert with other management agencies such as San Miguel County and the NM Department of Game and Fish. These issues include the development and management of roads and fire management. Most indicators of forest and upland health are on upward trends due to management by the Forest Service, grazing permittees, projects implemented under the Section 319 program and Collaborative Forest Restoration Program (CFRP), and private land owners.

While this WRAS focuses on Rowe Mesa itself, outreach and program activities reach beyond the Mesa to include the watersheds immediately surrounding this unique landscape. This surrounding area is impacted in two ways by Rowe Mesa. It is impacted physically by runoff from the Mesa during storm events. It is also used heavily by surrounding communities for grazing, fuel wood, building materials (vigas) and rock, and hunting.

### **WRAS Development**

Development of this WRAS included input from the following agencies and organizations:

- USDA Forest Service
- The Conservation Fund
- Northern New Mexico Stockman Association
- The Quivira Coalition
- Bionomics Southwest
- Barbero Grazing Association
- Springs Grazing Association
- Various private in-holding and surrounding land owners
- New Mexico Environment Department
- U.S. Environmental Protection Agency

It is hoped and expected that the list of cooperating stakeholders will increase as restoration projects proceed and outreach efforts continue to inform others of activities on Rowe Mesa. While this WRAS defines many of the types of activities that need to be undertaken to restore Rowe Mesa, we expect this plan to evolve over time based on input from participants and from actually implementing measures on the ground.

This WRAS contains the following:

- A description of Rowe Mesa;
- The specific water quality problems to be addressed, and the sources of impairment;
- A discussion of previous restoration activities on Rowe Mesa;
- The public outreach plan and the methods that will be used to engage and maintain involvement by local residents, visitors, recreationists, and local, state, and federal governments;
- Monitoring and evaluation activities based on land health and other goals and the outcomes needed to refine the problems or assess progress towards meeting these goals;
- A strategy for implementing natural resource restoration activities;
- Plan for the management of controlled burns and wildfires; and
- Funding needs to support the implementation and maintenance of restoration measures

## **WATERSHED SETTING**

Rowe Mesa is located in north central New Mexico (Map A). The area included by Rowe Mesa feeds into the Pecos River and Galisteo Creek. Rowe Mesa is the second largest mesa in the west. The Mesa is bounded by cliffs along the north and east boundaries and gently sloping grasslands on the south and west. Rowe Mesa, sometimes referred to as Glorieta Mesa, is the headwaters of two Category 1 watersheds. The Mesa ranges in elevation from 6000 feet to 7200 feet. There are no perennial sources of water on the Mesa. Ephemeral springs and drainages provide seasonal sources of water. Playa lakes do contain wetland conditions. Most moisture on the Mesa occurs during the monsoon season months of July and August. The average precipitation is approximately 15.7 inches.

Some special status land surrounds the Mesa. To the west is the Eldorado community wilderness area which consists of approximately 4100 acres. The wilderness is managed as a community preserve to promote watershed values and provide open space for the enjoyment of Eldorado residents. The Santa Fe Trail is located to the north of the Mesa. Also bounding the Mesa on the north is the Pecos Historic Park and national monument to the Glorieta Battlefield.

No communities are located on the Mesa, however, several small communities surround the Mesa. US Interstate 25 lies to the north and passes through the communities of Glorieta, Rowe, and San Jose. State highway 3 lies to the east and passes through the communities of Ribera, San Miguel, and VillaNueva. County Road B31A borders the south boundary which passes through the small hamlet of Gonzales Ranch. US 285 passes along the west boundary which includes the communities of Eldorado, Lamy and White Lakes. State Road 34 transects the Mesa from north to south.

### **Land Use History**

Until the late 1940s, land use on the Mesa consisted of small family ranches. Much of the Mesa was treated as commons with few fences. After World War II, however, demographic and economic changes combined with severe drought drove many of these ranchers out of business. Subdivision on private land 40-acre ranchettes was popular in the 1970s along US 285. Much of this land is now owned by the San Cristobal Ranch which is approximately 131 square miles of the Mesa. While the Mesa is bounded by several communities, there is not a clear sense of community that encompasses the entire Mesa. Issues which tend to bind people together include road maintenance and illegal dumping of domestic garbage.

Rowe Mesa has a long history of grazing, woodcutting, logging, hunting and other natural resource based activities. These activities along with previously implemented restoration efforts, some partially complete, have left their mark on the landscape. Rowe Mesa and the surrounding landscape has many of the same resource quality problems faced by other western landscapes. These include: 1) open grassland meadows being displaced by woody tree species; 2) stands of ponderosa thickets subject to catastrophic fire and subsequent erosion; 3) closing in of ponderosa understory by pinyon and juniper

3) thickening of pinyon juniper savannahs that expose soil to increased erosion; 4) an increasing, high density of roads with poor drainage; 5) spot infestations of noxious weeds; 6) subdivision pressure in private in-holdings; 7) low numbers of large game in spite of high quality habitat.

### **Grazing**

Currently there are three grazing allotments on Rowe Mesa. These are the Springs Allotment, Barbero Allotment and the Valle Grande Allotment. Beginning in the early 1800s century and continuing until the late 1900s, the area was heavily grazed by cattle and sheep.

**Table 1**  
**Grazing Allotments on Rowe Mesa**

<b>Allotment</b>	<b>Number of Head</b>	<b>Season</b>
Springs	343	Year round
Barbero	373	Year round
Valle Grande	325	Year round

The combined impact of intensive, unregulated grazing by sheep and cattle and fire suppression over the past century has impacted the overall vegetation mix and productivity of the land. In most years, grazing use occurs from early spring to late fall for most grasses although permits are for year round grazing. Stocking rates are established by the Forest Service to allow for recovery of the vegetation base. All allotments currently follow an annual rest-rotation operation under an allotment management plan. These plans are modified annually. Under these controlled grazing plans, the cattle are moved within the individual allotments throughout the grazing season. All three grazing allotments are in fair or better condition.

### **Other Uses**

Logging in the watershed occurred for several decades during the mid 20th century. Logging, hunting and grazing management created numerous authorized and unauthorized roads. Some of these roads remain unstable with sparse natural vegetation recovery. Numerous water bars have been installed in the primary roadways such as FR 324, however many two track roads have no drainage at all.

Forest Service multiple-use mandates provide for the secondary land uses of grazing and recreation. Recreation use occurs in the form of camping, mountain bike riding, horseback riding, hunting, hiking, picnicking.

### **Valle Grande Grassbank**

The Grassbank was started in 1997 by the Conservation Fund, a nonprofit conservation organization located in Washington, D.C. In November of 2004, the Grassbank base property and grazing permit were sold to the Quivira Coalition. The Valle Grande

Grassbank is a joint undertaking between a number of agencies and special interest groups. These include the USDA Forest Service, the Northern New Mexico Stockman's Association, the NMSU Cooperative Extension Service, and the Quivira Coalition. Partners in the Grassbank program include ranchers, environmentalists, and scientists. A major goal of the Grassbank is to provide a model of cooperative landscape restoration that can be replicated throughout the West. Rehabilitation efforts are primarily focused on restoration of the grassy and herbaceous components of the regional ecological mosaic. Prescribed burning and mechanical thinning are the primary restoration tools used to remove large woody plants and encourage grass growth.

The decline in the grassy component of the ecological mosaic results from the combined effects of fire suppression and historical grazing. As in many other areas of the West, nearly all the ecological communities that support grazing in northern New Mexico depend upon recurrent, low-intensity fire to arrest the encroachment of trees and shrubs. While fire is a key tool in restoring grassland diversity and productivity, other treatment measures are needed to reduce fuels in order to reduce the intensity of fires that do occur.

A central premise of the Valle Grande Grassbank is that those who wish to improve the health of large landscapes must work constructively with the people who occupy and use those landscapes. For centuries, family ranching has provided a cornerstone for life in the region. So strong are the cultural and social values associated with tending livestock on ancestral lands that in most instances, the region's ranchers persist in ranching not because of the economics involved but in spite of them. Since the inception of the program in 1999, 35 livestock owners have participated in the Grassbank, some for as long as four years. The size of herds has varied from a high of 132 head to a low of three. All participants have been National Forest grazing permittees associated with grazing allotments with the Santa Fe or Carson National Forests.

The Grassbank has allowed a number of restoration efforts to proceed on other Forest Service allotments in both the Santa Fe and Carson National Forests. Participation in the Grassbank is based on the need for restoration and having commitments from the Forest Service to implement the restoration practices. The synergy between the Grassbank and these restoration efforts should have a large scale, cumulative effect on the Rio Grande, Santa Fe River, Pecos River and other watersheds and associated riparian areas within the Carson and Santa Fe National Forests.

## **SECTION 1: DEFINING SPECIFIC WATER QUALITY PROBLEMS**

The current condition of Rowe Mesa is clearly a product of past human land use within the watershed. Review of range condition photos taken by the Forest Service in the 40s and 50s shows the range in roughly similar condition to today. While some encroachment of pinyon and juniper was present in forested areas, these were largely open ponderosa pine savannah. Rowe Mesa has been used extensively and continuously for grazing, logging, and hunting for over 100 years. The Mesa drains into the Pecos Headwaters (HUC 13010001) and the Galisteo Basin which is a tributary to the Rio Grande just north of the Rio Grande – Albuquerque segment (HUC 13020203). Galisteo Creek is listed for

temperature and conductivity as causes of nonsupport for its designated use (one of several uses) as a high quality cold water fishery. The Surface Water Quality Bureau is not planning to prepare TMDLs for these parameters because this may not be an attainable use for the Galisteo Creek, but rather intends to conduct a use attainability analysis (UAA) in 2005 as provided for in New Mexico's water quality regulations. Following a UAA, the New Mexico Water Quality Control Commission may change the designated use to another kind of fishery. Based on currently available data, Galisteo Creek would not exceed standards for other fishery uses, and may therefore be delisted. This process is open to public comment, however, and the outcome is difficult to predict. One possible outcome would be dividing Galisteo Creek into two assessment units, with the upper unit (near Interstate 25 in the vicinity of Valencia) having a high quality cold water fishery use.

The main stem of the Pecos River adjacent to Rowe Mesa is within reach (from Tecolote Creek to Cañon de Manzanita) listed as impaired only by sedimentation and siltation. The designated use that is thought to not be attained is marginal coldwater fishery. The Surface Water Quality Bureau is currently unable to prepare a TMDL for this parameter because sufficient data are unavailable. As of January 2005, SWQB plans to collect the additional data in 2009, and a TMDL may then be prepared in 2010 or 2011.

### **Contributing factors**

The origin of these fine sediments is most likely from the following sources:

1. Loss of riparian habitat
2. Natural sources
3. Rangeland grazing

Other likely sources also include:

1. Roads without waterbars which allow fine sediment to be transported down the road surface
2. Bare ground resulting from fire suppression, and drought.

### **Vegetation Loss**

Vegetation removal in both forested and rangeland areas can be attributed to long-term grazing pressure by both wildlife and domestic livestock. Lack of grass and shrub vegetation increases both water and wind created erosion and loss of topsoil.

Large management programs were implemented in the 1960s and early 70s to remove pinon and juniper trees that were encroaching on meadows. This work was done primarily with bulldozers either with chains or simply pushing trees over. Uprooted trees were left in place with no further treatment. These treated areas have largely regrown and are now even thicker than they were 50 years ago. The dense stands of pinon and juniper result in sparse vegetation growth in the understory.



## Wildlife

### **\*\*Elk and Deer\*\***

Hunting and observation of elk and deer provide unique and compelling recreational opportunities for local communities and visitors alike. Rowe Mesa is home to a relatively small, seasonal elk population. It is likely these animals winter in this area and migrate to higher country in the Pecos Wilderness during the summer. Last surveyed by NM Game and Fish in \*\*\*\*, the herd numbers close to \*\*\* individuals. The population structure shows \_\_ bulls per hundred cows, and \_\_ juveniles per hundred cows. The herd has increased slightly in population over the last several surveys. Mule deer are common on the Mesa year round.

### **Turkey**

Rowe Mesa is known statewide as excellent turkey habitat. Flocks of turkeys can regularly be seen from the roadside. This population provides a popular hunting opportunity for local residents and hunters from around the state. The greatest opportunities for wildlife enhancement are in enhancing turkey habitat. These enhancements would include creation of water resources in close proximity to cover and maintenance of stands of dense brush in strategic locations to provide cover.



*Figure 1*  
Wildlife Drinker

## **SECTION 2: RESTORATION AND MANAGEMENT PROGRAMS**

A variety of tools can be applied to improving the health of the landscape on Rowe Mesa and to improve water quality and other watershed values. This WRAS outlines the key points for a variety of program initiatives most of which have begun and will likely continue and be expanded in the future. These program initiatives include the following:

- Landscape Fire Management
- Road Management
- Grassland Health and Grazing Management
- Noxious Weed Management
- Fuel wood management
- Ponderosa Pine Savanna restoration
- Land health, production and treatment monitoring

Each of these program areas is described below.

### **Landscape Fire Management**

Fire is a natural disturbance process in ecosystems such as Rowe Mesa. Other natural and human disturbance processes such as drought, grazing, wood cutting, road construction and use also play a major role in determining the health of the Mesa. Prior to European settlement and fire suppression activities, the frequency of fire in the Rowe Mesa landscape ranged from 3 – 40 years. Ponderosa pine fires were the most frequent – occurring from 3 – 10 years and fires in grasslands and pinyon-juniper savannahs and woodlands the least frequent. Fires had the effect of removing understory growth of both shrubs and young trees. The lack of fire can be seen today in the dog hair thickets found in much of the woodland and ponderosa pine areas located on the Mesa. A number of species require fire for nutrient cycling, for seed scarification and seed bed preparation. Many species, such as ponderosa pine, require fire for spacing to be maintained and for protection from extreme, destructive fires.

Extreme fires produce a number of undesirable consequences. The intense heat produced by moderate-severity fire, or flames that reach buds, can damage or kill mature trees. Severe surface or crown fires generally kill interior ponderosa pine of all size classes, although some sawtimber-sized trees may survive severe surface fire. The intense heat produced in crown fires often sterilizes the soil making the reestablishment of vegetation difficult and slow. Soils are more exposed and for a greater length of time thereby increasing the likelihood of erosion. Heavy accumulations of litter at the base of trees increase the duration and intensity of fire, making trees more susceptible to scarring. Resin deposits around an old "cat-face" may increase bark flammability and promote further injury

Single burns will not likely provide long term, sustainable results. Instead, a program of regular low intensity fires is most desirable to maintain open forest and woodland areas with low to moderate understory biomass. Pine needles and other litter tend to accumulate over time choking out grasses and increasing fire hazards. In addition, woody shrubs that are easily killed by fire germinate readily from seed and may require reburning before the new generation matures and produces viable seed. Managed fires are expensive, unmanaged fires are even more expensive. While a return to a more natural fire regime would be desirable from an ecological perspective, the constraints of financial resources may limit the use of managed fire on the Mesa. With a mixture of management approaches over time, however, a large destructive fire will hopefully be avoided. Although fire is not a cure-all in any resource management program, it can be a useful tool in controlling undesirable species and in reducing excess litter.

Fire will be a critical tool if large scale landscape restoration and management is to be implemented on the Mesa. The unique topographic and geologic structure of the Mesa make it an ideal experimental ground for large scale use of fire. There are relatively few built structures on the Mesa that could be damaged by fire. Of greatest concern is damage to fences, many of which are built from cedar posts. The steep, rocky escarpment on the north and east provides protection to the communities of Rowe, San Jose and Ribera and Villanueva.

### ***Wildfire Management***

Coordination and development of a wildfire fire management strategy between the Forest Service public land and private in-holdings and surrounding property owners is a desirable but challenging goal. Development of a regional fire management map patterned after the Malpais Borderlands Group in southwestern New Mexico and southeastern Arizona is an important first step in this process. The map documents and facilitates how various types of wild fires will be managed especially in areas that have the potential to cross from one property owner to another. Development of the map requires agreement between property owners and managers on the management of specific types of fires in specific locations. These agreements are documented on the map that is used by an Interagency Zone Fire Dispatch. Discussions with both property owners and the USDA Forest Service in charge of Rowe Mesa have revealed an interest in moving in this direction but also suggest the task will take considerable time to evolve and implement.

Without a prearranged fire management plan or strategy, the Zone Fire Dispatch is responsible for making appropriate decisions regarding the dispatch of fire fighting resources depending on a variety of factors. These factors include natural hazards, risks to private and public property, season, and the availability of fire fighting resources and other fires within the Zone or region. If dispatchers fail to make appropriate dispatch decisions, they, or the agency can be liable for damages. As a result, development of a comprehensive plan will require careful consideration of many factors and extensive coordination between all parties involved.

A potential wildfire fire management strategy was discussed with private landowners at a meeting in San Jose. The strategy included three categories of fire management:

1. Suppress, This option might be selected if property owners do not consider fire to be an appropriate land management tool or around areas with expensive infrastructure or habitation.
2. Consult with owner to address time dependent special concerns. These concerns might be seasonal or that a pasture is being rested to provide feed during the next growing season. Fires occurring during the hot dry months following spring cool season growth could cause more damage than good if allowed to burn too hot. Consultation between the dispatcher and property owner would determine if the fire should be suppressed, contained or controlled.
3. Contain and control is an option for landowners who believe fire is an appropriate restoration tool in almost all conditions. The contain and control strategy allows a wildfire to burn a larger area with containment provided by an easily defensible location such as a road or other natural barrier. When fire reaches the predetermined location, it is monitored until it is out and can be declared out. Generally this is the lowest cost suppression alternative, but not always.

The Dispatch Agreements are displayed on a map. The three categories are displayed by color code. Land ownership is delineated and the owners name and prime phone number are listed. There are two versions of the map. A landowner map has all involved agencies names with responsible individual name and phone number. The Zone Dispatch and fire agency map has the land owners name, prime phone number and alternative phone numbers.

When a fire occurs, other than suppress immediately, landowners, the dispatcher and agency personnel communicate quickly to develop containment and control strategies. A qualified Incident Commander is assigned and identifies a containment location and strategy along with acreage and cost estimates and resources needed to monitor and ensure containment as planned.

### ***Prescribed Burn Strategy***

In many situations, fire is desired as part of an integrated approach to improving ecosystem health. Prescribed fires are pre-planned at a specific location, burning condition, and funding source. Prescribed fires are not funded by fire suppression funds. Prescribed fires often need some form of pretreatment to insure a controlled, low intensity burn. These pretreatments may include thinning understory trees and leaving the trunks on the ground to reduce fuel load and to keep fires from crowning. Fires in meadow areas may require rest to build sufficient fuel to carry a fire. Prescribed fires require coordination with the New Mexico Environment Department Air Quality Bureau. Picking appropriate times when smoke is more readily dissipated in the atmosphere and limiting the size of the burn areas can mitigate smoke related impacts and concerns. Prescribed fires generally produce less smoke load than wildfires by spreading the burning over a longer time period. Prescribed fires also provide for greater protection of

historic and cultural resources. Prescribed fires, being cooler, also produce fewer of the finest particles that are most harmful to human health.

### ***Pre and Post Fire Strategies***

As mentioned above, fire frequency has been reduced since European settlement. This reduction in frequency has led to an increase in tree cover and density and an increase in fuels both on the ground and standing. Where heavy fuel loads occur near sites of concern, near valuable infrastructure, or to the extent that prescribed fire can't be safely carried out or ecological damage may occur, some form of mechanical thinning or other fuels reduction will be needed as a pre-fire treatment. Likewise, where trees have established in grasslands, they may now be too large to be controlled by grass fires. Also, they may have out competed grasses- especially during drought conditions – to the point where grass is ineffective in carrying a fire. Cutting these trees down will allow for more fine fuel growth and will provide slash to enable prescribed burning. Rest from grazing will also allow the last growing season fuels to be available to carry a fire.

Several prescribed burns have been implemented on the Mesa. These burns are summarized in Table \*\*.

**Table 2**  
**Burn Treatments on the Mesa**

<b>Location</b>	<b>Acres Burned</b>	<b>Year</b>
Madrid II	1200	2001
Capulin	930	2001
Springs	125	2002

In general these burns have been quite successful in reducing fuel loads and enhancing both diversity and production of grass and shrubs. Positive effects are generally seen in 3-5 years. The growth of fine fuels (i.e., grasses and shrubs) will support low intensity maintenance fires in the future.

During the first years following a fire, there is a greater risk of increased erosion from bare hillsides. With low to moderate intensity fires, however, not all litter is removed from the soil surface. This litter protects the soil from increased erosion. The relatively flat terrain found on the Mesa makes increased erosion caused by fire a relatively minor concern.





*Figure 2 Two Pines Burn Area Four Years After Burn*



*Figure 3 Madrid II Burn Area One Year After Burn*

In addition to prescribed burns on Rowe Mesa, burns have been implemented on eight other allotments in the Santa Fe and Carson National Forests as a result of the Grassbank. These burns have treated over 5,590 acres. These burns are being monitored to determine their effectiveness in opening the canopy and restoring a healthy grass and shrub component to the forest ecosystem. Grass fire projects were implemented by the Forest Service and Conservation Fund in the late 90s. These projects included burns in the Two Pines, Melton and Madrid pastures.

Tree clipping projects have treated over 500 hundred acres. These projects have used hydraulic clippers and hydraulic saws mounted on a rubber tired bobcat tractor.



Figure 4 *Pinyon/Juniper Clipping On Ortiz Pasture*

## **Road Management**

State Road (SR) 34 bisects the mesa from north to south. SR 34 is a two lane, all weather gravel road with a fenced right of way. It was improved in the mid 90s and is regularly maintained by the State Department of Transportation. The hardened gravel surface is effective in controlling erosion from the road surface. In general, drainage and culvert installation are not contributing to on or offsite erosion.

State Road (SR) 34 bisects the mesa west to east. This is an all weather road that provides access to the mesa and its residents year round. SR 34 is maintained in good condition at all times. FR 324 and its numerous side roads provide access to much of the mesa. FR 324 is an unsurfaced, in some spots two track, dirt road. The road is often deeply rutted and impassable when wet. Soils along FR 324 are high in clay and can become very slick when wet. They are also prone to damage when driven on wet which occurs frequently. In open meadow areas, drivers often abandon the roadway to drive on adjacent grass for better traction. These informal roads have created multiple tracked and damaged areas around these slick or muddy sections. Drainage on FR 324 is by means of water bars (dips) with few culverts. These water bars and the roads are the responsibility of the Forest Service and grazing permit holder to maintain.

All side roads are two track with little or no drainage. These side roads contribute to soil movement and turbidity during runoff and wind events. In many instances, old road alignments can be identified by the presence of arroyos or areas where runoff has created new arroyos.



*Figure 5 CFRP Treatment Area Prior to Burn*



*Figure 6 New informal road being created next to existing road.*

Road issues fall into the following categories:

- Poor drainage due to lack of water bars.
- Poor drainage due to entrenchment of roadway
- Water bars and drain spurs that have filled with sediment and are no longer functional
- Water bars that have breached and are channeling water along the roadway to the next water bar.



- Improperly located roads typically in valley bottoms.
- Informal roads created either to access new areas for woodcutting, hunting or rock collecting.

These road issues generally lead to increased erosion. While the sediment produced may not travel far in all cases, severe erosion certainly increases the chances of sediment leaving the Mesa during large rain events.

Water-barring of roads has been done in the past 3 years, though it is still not known which roads contribute the most sediment. Some restoration work has been conducted on the Valle Grande allotment. Approximately 5 miles of road have been either maintained, improved, or relocated to a less eroding condition since 1997.

Specific actions to improve the condition of roads and reduce the production of sediment from two track roads on the mesa include:

- Work with the Pecos Ranger District office to update the road condition inventory.
- Provide training to road users and grazing permittees on low maintenance road construction and how to prevent damage to two track roads.
- Maintain key travel roads to ensure proper functioning of waterbars and other drainage
- Relocate roads to improve drainage.
- Close roads experiencing high levels of erosion and gullying

### **Noxious Weed Management**

Noxious weeds are defined by state law to include those species currently identified on an approved list. Two perennial noxious weed species have been identified on the Mesa. Infestations are currently relatively small and occur mostly along roadways. Several infestations of scotch thistle have been identified along SR 34 and FR 324. One infestation of hoary cress was identified within the Valle Grande Allotment on FR 324 surrounding a water tank. This infestation was most likely brought in with hay fed to cattle in spite of Forest Service requirements for the use of weed free hay.

Currently the scotch thistle infestations are of a scale that they can be controlled with mechanical methods e.g., grubbing and bagging. The hoary cress infestation is currently too large for hand grubbing and will likely require either repetitive grazing by goats or sheep or the use of herbicides. Weed identification guides should be distributed to all grazing permittees so that isolated infestations on all three grazing allotments can be identified and managed.



*Figure 7 Infestation of Hoary Cress (White Top) Near A Cattle Drinker on FR 324*

## **Grazing Management**

As mentioned earlier, the Mesa has been heavily grazed for over a century with both cattle and sheep. Currently cattle are the only domestic livestock that use the Mesa for grazing. The number of animals and rotation schedule is developed in cooperation between the USDA Forest Service and grazing permittees. Since no perennial water is found on the Mesa, water is provided for all allotments through wells and earth stock tanks. Cattle movement is typically controlled with fencing and salt and water placement. Over 35 miles of pipeline provides water to 29 cattle drinkers on the Valle Grande Allotment. All allotments currently practice rest-rotation grazing where at least one pasture is rested each year. As a result of the drought, the USDA Forest Service withdrew all cattle from the Mesa in 2004. Good spring rains and an adequate monsoon season have resulted in excellent grass production throughout the Mesa.

The Grassbank provides an opportunity to demonstrate the effectiveness of different grazing management systems. In particular, more active use of herding will be implemented in 2005. The expected benefit of this practice will be better utilization of otherwise underutilized areas and avoids overgrazing sensitive areas. The Grassbank funded a herder on the Tio Gordito Allotment (TGA) in the Carson National Forest, Tres Piedras District from May through October 2004. Several benefits were noted from use of herders or range riders which included:

- Better monitoring of fences and gates;
- Removing cattle from other allotments that had strayed onto the TGA;
- Ability to remain on pastures longer due to better distribution and utilization of grazing resources;
- Better cattle management with fewer strays;
- Minimized conflicts between cattle and recreation users;

- More frequent monitoring of cattle health;
- Moving salt into areas where cattle impact was desired such as recently hot burn areas; and
- Improved grazing of key areas.

### **Forest Management (Ponderosa Pine Savanna Restoration)**

Photos taken of Rowe Mesa more than 50 years ago show a ponderosa pine savanna with widely spaced, mature ponderosa few young trees of any type. The ground was protected by grass and shrub cover. While pinyon and juniper trees were present, they were mature and also widely spaced to allow for grass to grow in between trees. This mix of vegetation made Rowe Mesa an extremely productive resource for a variety of uses. The management of forest resources is a critical factor in improving and maintaining the health of the Mesa and watersheds it feeds.

A Collaborative Forest Restoration Program (CFRP) grant was awarded to the Four Corners Institute in 2000 to be implemented on 377 acres of ponderosa pine forest on the Valle Grande Allotment. Partners in the project included The Conservation Fund, Four Corners Institute, the Forest Service, the Forest Trust, and the Quivira Coalition. Local residents were given free wood collection permits. The project implemented prefire thinning of thick pinyon-juniper understory trees. Removal of this thick understory reduces the potential for crown fires, allows more control of managed fire, and creates openings between trees that favor grasses and shrubs. A similar CFRP project was initiated in 2004 and will treat approximately 600 acres. This project will involve the same participants as the previous effort.

As mentioned previously, Rowe Mesa serves as an important source of fuel wood and other wood products such as vigas for the residents of surrounding communities. Implementation of forest restoration projects facilitates the use of specific areas for these wood harvesting activities. A survey of woodcutters who took advantage of the free permit program showed that they understood the connection between managed wood harvesting and forest health. A field day on the Mesa, sponsored by CFRP provided information to woodcutters and grazing permittees on forest health and strategies for restoring and managing healthy forests.

## **SECTION 3: PUBLIC OUTREACH AND INVOLVEMENT PLAN**

The goal of the public involvement process is to ensure a multifaceted, proactive and responsive interaction with the public and resource agencies. Restoration of Rowe Mesa continues the efforts of a number of organizations including: the Santa Fe National Forest, along with the State Department of Game and Fish, for management of small and large game species, and the New Mexico Environment Department (NMED).

### **Outreach**

The target audiences for outreach are people in surrounding communities, recreationists, and interested parties throughout the region who could easily be considered “stakeholders” with vested interests in the continued health and viability of the Rowe Mesa watershed. Outreach efforts will focus on informing individuals and groups,

including school children, about watershed restoration in general, with activities in the Rowe Mesa as an example. Most of this audience is not expected to become directly involved in restoration activities on Rowe Mesa, but can learn about the ecological processes involved with restoration through these materials. However, these outreach tools can also serve as a ‘gateway’ for those who would like to become directly involved with projects on Rowe Mesa.

#### *Outreach Tools*

- Printed Material – brochures and fliers, news releases, articles in media, working group member organization newsletters, etc..
- Talks and presentations to school groups
- Signage – for those recreationists who might visit the mesa but not be involved in restoration activities

#### **Involvement**

The target audience for public involvement strategies are those groups and individuals who are interested in and committed to being actively engaged in planning and on-the-ground restoration activities on Rowe Mesa. This includes neighboring landowners, permittees, and all the stakeholders listed as already being active in the restoration of this watershed.

#### *Involvement Tools*

- Field Trips – tours of the watershed to present the problems, what has been done in the past and what is currently being done
- Workshops – learning opportunities related to the techniques and concepts being used in the watershed. These might be classroom based or outdoors and might be combined with field trips or work days. Herding workshop, roads workshop
- Workdays – with or without a specific educational component, workdays provide structured and supported (i.e. lunch and water) opportunities for groups to participate in implementing techniques – building structures, collecting data, etc.
- Volunteer Monitoring Program – conducted by project staff (agency or nonprofit group), will provide training and field experience for those interested in learning how to plan, develop, and implement short and long term monitoring programs.

#### **Technology Transfer**

Technology transfer can be achieved through many of the outreach and involvement tools already discussed. It also may require specific, focused workshops, field trips or work days to address specific issues of concern to specialists or other agency personnel, or even employment.

#### *Transfer Tools*

- Within-organization employee/volunteer work details – temporary transfers of personnel within the member organizations to a Rowe Mesa project, or from a Rowe Mesa project to other units of their organization, with the hope that physical proximity, face-to-face interaction, and common vocabularies and experiences (organizational culture) will facilitate learning and creativity.
- Between-organization employee/volunteer details – exchange of personnel across agencies within the working group, or from working group member organizations to other organizations involved in watershed restoration.
- Training – focused training of personnel within member organizations of the working group, so they can continue, improve, and disseminate the ideas and methods used on Rowe Mesa.

### **Public Outreach and Involvement Activities to Date**

In addition to numerous individual meetings and interviews, three community meetings have been held in the past two years. The first meeting was held in the Village of Pecos in 2003 to discuss activities on the Mesa. This meeting was sparsely attended. Another meeting was held in San Jose in August 2004 with local ranch managers and residents including people who collect wood and rocks from Rowe Mesa. Approximately 15 residents attended this meeting. The purpose of the meeting was to describe the purpose of the WRAS and to solicit input on issues and concerns regarding water quality and erosion from attendees. Three areas were discussed at some length. Training on the use of Zeedyk methods for erosion control was top on the list of requests. Roads were the second topic of discussion. The need for training in road drainage and maintenance was acknowledged and how San Miguel County could be more involved in this type of remediation. Finally, the possibility of developing a comprehensive fire plan was discussed. Other issues discussed included the overgrowth of bosque along the Pecos River in Villanueva and illegal dumping of garbage.

Partly as a result of this meeting, workshops are now scheduled for the Rowe Mesa for 2005 in erosion control, road drainage and land health monitoring. These workshops will be funded through CFRP public outreach funds and other 319 grants managed by the Quivira Coalition.

Another meeting was held in Villanueva on September 2004 specifically to discuss the issue of vegetation (willows and Russian Olive) encroachment along the Pecos River. Seven people attended this meeting including representatives from the Natural Resources Conservation Service. Issues discussed included the relationship between the Mesa runoff and water quality, the scope of a pilot project to use grazing as a tool along the Pecos in Villanueva and the role of their project in the WRAS were discussed. During this meeting, NRCS representatives expressed their continued support for the project and discussed various opportunities for funding or implementation of projects.

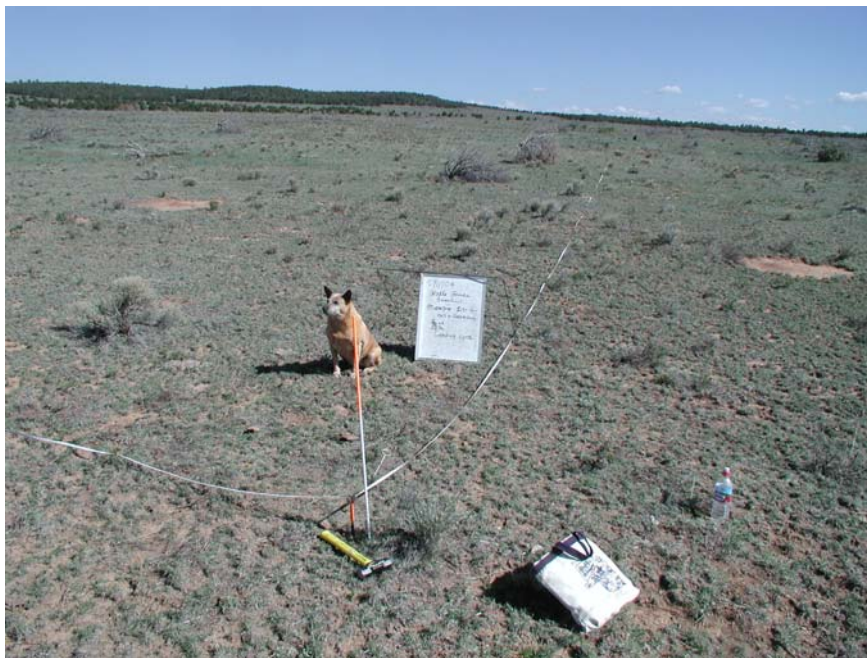
In 2004 a comprehensive survey of the two primary Rowe Mesa user groups (grazing permittees and fuel wood gatherers) was conducted as part of the multi-party monitoring component of the Federally funded CFRP program (Nieto, 2004). The survey consisted

of telephone interviews to determine perceptions of forest treatments and their impact on forest and rangeland health, fire risk in the wildland urban interface and on participants livelihoods. The survey found strong support for restoration treatments and continued community involvement.

#### **SECTION 4: MONITORING AND EVALUATION**

Monitoring and evaluation of projects undertaken by this WRAS is an important element in adjusting and improving on management strategies based on the performance of installed BMPs. The goal of the assessment and monitoring plan is to develop a long-range monitoring program that achieves two objectives:

- Targeting the implementation of Best Management Practices in areas that have the greatest potential for contributing sediment and other pollutants into the Pecos River and Galisteo Creek; and
- Tracking trends in reducing sediment loads and improving the overall health of the watershed.



*Figure 8 Monitoring Range Condition and Production*

Data collected to date on the conditions that contribute to the overall health of Rowe Mesa include:

1. The USDA Forest Service range condition reports for the past 50 years. These reports provide photos of range condition as well as species composition.
2. The New Mexico Cooperative Extension Service has been conducting photo point monitoring of Forest Service Key Areas on the Valle Grande Allotment since the inception of the Grassbank.

3. An assessment of upland conditions on the Valle Grande Grassbank was conducted by Natural Resource Options with support from the S319(h) Project (FY-00C). The assessment consisted of a six-day assessment on foot and vehicle. This assessment established monitoring points at six locations and recommended sites for approximately 14 more locations to track range condition and production. Data will be taken at these locations in spring, late summer and fall of each year.
4. An assessment of rangeland health using the *Interpreting Indicators of Rangeland Health, Version 3* (Pellant et al. 2000). This assessment established 18 long-term monitoring points within the Valle Grande Allotment. This preliminary assessment determined that the majority of upland conditions are in fair to good condition, however, a number of areas are at risk due to shifts in plant community composition.
5. Production assessment of 18 locations on the Valle Grande (August 2004).
6. Monitoring of restoration treatments has been conducted by GrassWorks, Inc. using quantitative monitoring methods developed by the Jornada Experimental Station. The results of this monitoring work is reported in the Valle Grande Grassbank Five-Year Summary Monitoring Report. This monitoring included treatments both on and off the Mesa. Treatment monitoring was included in the Barbero, Springs, and Madrid and Ortiz Pasture treatments. Specific treatment monitoring has been implemented for land treatments associated with the Grassbank and on the Grassbank itself in the Collaborative Forest restoration Program (CFRP) treatment area. Treatments occurred in eleven areas throughout northern New Mexico and on 266 acres on the Valle Grande Allotment. The goal of this monitoring effort has been to evaluate the success of Grassbank land treatments. Nine monitoring sites were established in each of the project areas. The quantitative monitoring protocol developed by the USDA Jornada Experimental Range. Data collected include: surface soil stability, percent surface in soil gaps, mean species richness, dominant plant cover, percent forb cover, percent shrub cover, vegetative canopy, bare soil cover, and woody seedling count.

The objectives of the upland monitoring efforts are:

- Determining the stability of the watershed associated with wind and water erosion;
- Assessing contributing factors to accelerated erosion with emphasis on closed and open roads and grazing impacts;
- Determining if land treatments are effective in improving overall rangeland and forest health.

Digital Orthophoto Quarter Quad (DOQQ) maps were used in conducting the initial assessment and will serve as base maps for collecting more detailed monitoring data, conducting roads inventories, and for building a series of GIS overlays. Upland monitoring points have been chosen and a monitoring design defined to fit priorities of management. The following detailed site data will be collected at each of the monitoring points annually.

1. Photo points
2. Land health 17 point qualitative assessment protocol,
3. Production monitoring using the NRCS clip plot harvesting method.

The frequency of measurements has not yet determined. Recommended frequency is yearly for photo points and 1-5 years for other indicators. The number of years is influenced by level of treatments applied (i.e., grazing management, slope plantings, etc.). The more rapid the rate of treatments applied, the more frequent the monitoring will be.

The monitoring efforts described above relate to land-use characteristics that affect water quality. The Surface Water Quality Bureau has more directly monitored water quality of some streams near Rowe Mesa. On the west side, Galisteo Creek was sampled at two locations on several dates in 2001, and resampled at fewer dates in 2003. Ions, nutrients, metals (total and dissolved), and field parameters (temperature, conductivity, pH, dissolved oxygen, and turbidity) were measured. A sample of fish at three sites in Galisteo Creek which drains a large part of Rowe Mesa, was sampled for ions, nutrients, and field parameters south of Galisteo in 2001. On the east side of Rowe Mesa, the Pecos River was sampled on several dates in 2001 at South San Ysidro, San Jose, and at Villanueva State Park for nutrients, ions, metals, and field parameters. In addition, the Pecos River at Villanueva State Park was sampled for a large suite of organochlorine pesticides in 2001 (none were detected), and above the confluence with Tecolote Creek in 2004 for nutrients only. The Pecos River at Villanueva State Park was sampled for fish in late September 2001 and flathead chub, shite sucker, and Rio Grande chub were found. No trout were found, but the designated use of this reach of marginal coldwater fishery indicates that coldwater species may only be expected to occur here seasonally (in winter) or when stocked.

A geomorphology survey was also conducted on the Pecos River at Villanueva State Park, with accompanying benthic macroinvertebrate samples. These data would have been sufficient to retain the listing of this segment of the Pecos River as impaired by sedimentation (with 45% of the streambed composed of same on the date of the survey) if the assessment protocol in use for smaller streams were applied. SWQB staff judged that it might be inappropriate to apply this protocol to the Pecos River because of its size, and propose to develop a new assessment protocol for larger streams, which will likely require the collection of additional data. Such a protocol was developed for the large streams of the San Juan Basin, and applied to update the 303(d) List for those streams, but SWQB has not yet decided to apply that protocol elsewhere.

## **SECTION 5: DESIRED WATER QUALITY GOALS AND ACTIONS TO BE TAKEN**

The Best Management Practices (BMPs) proposed for the watershed will address non-point sources to significantly reduce soil loss from wind and water erosion. These BMPs include revegetating disturbed areas, grazing management, clipping encroaching pinon



and juniper trees, constructing water bars on roads to direct water to areas where water will be most beneficial, and forest treatments.

### **Current Goals**

Three goals apply to efforts to improve water quality Rowe Mesa. The projects implemented under this WRAS will address:

- Sediment reduction through sediment retention;
- Vegetation and habitat improvement, both in forest and rangeland areas; and
- Support and promotion of other watershed factors through public awareness, promoting economic development, and improved resource management.

These goals will be achieved through a variety of specific activities listed below:

- Improved water distribution through the proper grading and drainage of active and abandoned roadways
- Improved management of cattle currently grazing on the three grazing allotments;
- Repair, relocation, removal, or supplementation of culverts to obtain proper water distribution;
- Public workshops on grazing management, erosion control, road management and fire management.

### **Project Management and Coordination**

The Forest Service is the primary land management agency on Rowe Mesa and has final authority on all projects implemented within the National Forest. Restoration projects and management on private lands are the responsibility of property owners.

### **Future Actions**

Implementation of the restoration and management plan will focus on the following categories of actions that are necessary to restore water quality and healthy watershed function on Rowe Mesa. Many of these activities were initiated in the late 90s and need to be continued drawing from the lessons learned.:

#### **Public Outreach**

- Continue to provide technical support and training for historical, baseline data collection
- Provide coordination support to assist in the planning and implementation of BMPs.
- Provide coordination support to assist in the planning and development of the monitoring program.

- Provide workshops to local residents in low maintenance roads and erosion control
- Support volunteer days.
- Provide professional engineering support for the development of BMPs where appropriate.

### **Implementation of Best Management Practices**

- Conduct road survey
- Maintain existing water bars
- Construct new water bars and other drainage improvements where needed
- Relocate sections of roads to accommodate better drainage
- Conduct pretreatment for prescribed burns
- Implement prescribed burns
- Controlled grazing using a variety of management methods including rest rotation and herding
- Tree clipping to remove encroaching pinyon and juniper trees into grass meadows
- Implement prescribed burns
- Develop and implement noxious weed controls especially for Hoary cress and Scotch thistle.
- Work with the Springs and Barbero allotments to modify a grazing management plan that minimizes impacts to forest and rangeland vegetation.
- Implement additional road closures with water bars and sediment traps.

### **Permitting and Compliance**

- Undertake appropriate cultural resource field surveys and undertake consultations with the State Historic Preservation Officer to satisfy National Historic Preservation Act, Section 106 requirements.
- Complete National Environmental Policy Act (NEPA) requirements for all proposed BMPs.

### **Data Gathering and Monitoring**

- Establish photo points for key locations.
- Establish and monitor at least 15 sites for rangeland condition and production at least twice and up to three times per year.
- Develop a broad ecological monitoring program that provides data on the major ecological trends on the Mesa. These include overall species diversity, soil cover, desirable plant density, degree of pinyon juniper and fringe sage encroachment.
- Continue to collect baseline data for land treatments and treatment implementation effectiveness

- Collect historical data of the condition of Rowe Mesa watershed and previous management practices.