

# River Ranch Management Plan

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Photo J.N. Stuart

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## River Ranch Purchase

River Ranch was purchased by the New Mexico Department of Game and Fish (NMDGF) in 2014 using Natural Resource Damage Assessment funds (\$350,000), which were provided by the New Mexico Office of Natural Resources Trustee (ONRT) and the U.S. Fish and Wildlife Service (USFWS)(collectively, the “Trustees”), and Share With Wildlife Program funding (\$235,000).

The Trustees engaged in a Natural Resource Damage Assessment and Restoration (NRDAR) process for three copper mines near Silver City, Grant County, owned by Freeport-McMoRan Copper & Gold Inc. (FMI). As part of the NRDAR, the Trustees assessed and quantified damages and injuries to wildlife and wildlife habitats from the operation of three mine sites. As a result, the Trustees were awarded a financial settlement from FMI to compensate the public for injuries to wildlife and wildlife habitat resulting from releases of hazardous substances at these mine sites. Damages were primarily to birds, so protecting and enhancing bird habitat was the primary goal for the selection of projects to fund through the NRDAR process (ONRT 2013).

Funding sources for the River Ranch purchase (NRDAR and Share with Wildlife) possess shared goals of conserving and restoring wildlife habitat. The Share with Wildlife program (SwW) is administered by NMDGF to perpetuate renewable wildlife resources that provide pleasure and recreation to all New Mexicans (7-2-23 NMSA 1978), by supporting projects that consist of biological and ecological studies, habitat conservation and restoration projects, conservation education, and wildlife rehabilitation. Revenues for SwW originate from voluntary contributions generated primarily through the state income tax form, sales of wildlife license plates, yields from the invested SwW trust fund, and federal matching funds that become available as a result of these non-federal contributions. Following its statutory guidance, SwW focuses on conservation and management of wildlife species and their habitats that are generally without other sources of funding.

The Specialty Warranty Deed for the sale of River Ranch from Ponderosa Highlands, Inc., to the New Mexico State Game Commission was recorded by the Luna County Clerk on July 14, 2014, and the Grant County Clerk on July 16, 2014.

With the purchase of River Ranch, the Department assumes the stipulations of the River Ranch Conservation Easement, which was implemented in 2011 by the New Mexico Land Conservancy.

## Site Description

The River Ranch is located approximately 23 miles north-northwest of Deming, and approximately 25 miles southeast of Silver City. Deeded lands total 1,010 acres. Of the deeded lands, 400 acres occur in Grant County and 610 acres occur in Luna County. Deeded land elevations range from 5,000 to 5,150 feet. The ranch includes a 1,800 acre Bureau of Land Management grazing allotment, and a 1,120 acre State Land Office grazing allotment.

## River Ranch History

The River Ranch was created in 1979 when Eugene A. “Gene” and Elisabeth Simon purchased 49 acres with historic buildings from George O. Smith. Gene began stocking the River Ranch by driving on horseback 100 head of livestock down the Mimbres Valley from their Ponderosa Highlands Ranch north of NM Highway 152. The Smith’s had purchased the 49 acre property from the Trujillo family, whose family cemetery is still within the River Ranch boundary, west of NM Highway 61. The Trujillo family homesteaded 81 acres in the area in 1916. Gene Simon greatly expanded the size of River Ranch to 4500 acres with the purchase of the Cerro Mesa Ranch from the Walsh family in 1996. The BLM and New Mexico State Land Office grazing leases were assigned with the purchase of the Cerro Mesa Ranch. Upland habitat portions of River Ranch were later sold by the Simon’s to City of Rocks State Park and a private landowner on Taylor Mountain.

Gene Simon passed away in 2012 at the age of 96, having operated River Ranch for 33 years. As of the writing of this management plan, Elisabeth Simon still lives on the property, and has a life estate with the Department to remain on the property as long as she wishes, or until her passing.

Ultimately it was Gene and Elisabeth Simon’s wish to protect River Ranch from development, and for a public land or wildlife management agency to purchase, manage and conserve River Ranch and its unique wildlife and habitats to benefit the citizens of New Mexico.

## General Management Goals<sup>1</sup>

The River Ranch includes approximately 2.0 miles of the lower Mimbres River, which drains into the Mimbres Closed Basin near Deming. Of the 1,010 deeded acres, approximately 380 acres (38%) are riparian, floodplain and aquatic habitats. Riparian habitat on the ranch is dominated by a mature Fremont cottonwood (*Populus fremontii*) and velvet ash (*Fraxinus velutina*) woodland that provides habitat for a high diversity and abundance of wildlife, including 23 SGCN documented on the property. River Ranch provides important wildlife habitat because about 80% of all vertebrates in New Mexico and Arizona are dependent on riparian habitats for at least part of their life cycle (Hubbard 1977).

Department goals and objectives for the aquatic, riparian, floodplain and upland Chihuahuan semi-desert grassland habitats of the River Ranch include: 1) re-generate younger age classes of deciduous riparian trees to replace the mature stands and continue recovery of the riparian system to a fully functioning condition; 2) develop a vegetative understory to provide habitat

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<sup>1</sup> From the River Ranch Conceptual Management Plan.



for Species of Greatest Conservation Need (SGCN); 3) establish wetlands and off-channel ponds for establishment of SGCN; 4) use mowing, burning and/or livestock grazing to maintain healthy stands of native giant sacaton grasslands, which benefits multiple bird and small mammal species, while maintaining some stands in a decadent state to benefit other species dependent on this habitat; 5) use livestock grazing, fire and possibly mechanical means as tools to restore upland Chihuahuan semi-desert grasslands; 6) manage the property in full compliance with the stipulations and conditions of the existing conservation easement (NMLC no date).

## Conservation Elements

### Soils

In fall 2014, Natural Resource Conservation Service's Technical Soil Service staff from the Las Cruces office conducted soil and vegetation sampling and mapping on River Ranch. The objective of the NRCS's soil and vegetative surveys are to provide NMDGF with baseline soils and vegetation data to better understand existing conditions and natural potential vegetation associated with existing soils. Soil surveys identified five distinct soil types and map units in the Mimbres River floodplain portion of River Ranch. Upland soils were generally not analyzed. The floodplain soils are derived from andesitic and rhyolitic bedrock from the surrounding and upstream hills and mountains.

### Cottonwood Gallery Forest and Woodland

Of the 1,009 deeded acres, approximately 380 acres (38%) are riparian, floodplain and aquatic habitats. Riparian and aquatic habitats were identified as key habitats in the CWCS, and are being designated as Tier 1 (most important habitat types) in the Department's 2015 State Wildlife Action Plan (in development).

The River Ranch has a diversity of riparian vegetation communities. There are relatively large and mature woodland stands dominated by Fremont cottonwood, Goodding's willow (*Salix gooddingii*), and velvet ash. These communities are mostly associated with the higher river bars and terraces, and are considered some of the most imperiled in the Southwest (NatureServe 2013). Lining the river bank and occasionally on alluvial terraces are shrublands dominated by coyote willows (*Salix exigua*) and seepwillows (*Baccharis salicifolia*) along with strands of herbaceous wetlands along the channel. In addition to the woodlands and shrublands, there are extensive swaths of big sacaton (*Sporobolus wrightii*) grasslands on the upper terraces (Natural Heritage New Mexico 2015).

### Tigner Grove

The unique ecological heart of River Ranch is Tigner Grove, which was named after earlier owners of the property. Tigner Grove is a 6.8 acre mature, multi-canopy stand of large diameter deciduous riparian trees, including velvet ash, soapberry (*Sapindus saponaria*), Arizona walnut (*Juglans major*), netleaf hackberry (*Celtis reticulata*), and box elder (*Acer*

*negundo*). Tigner Grove contains the State, and possibly national, record velvet ash tree. According to the New Mexico State Forestry Division's Big Tree Program, this record velvet ash tree has a circumference of 224 inches, a height of 95 feet, and a crown spread of 77 feet.

Tigner Grove and other deciduous riparian stands on the property provide documented nesting habitat for SGCN common black-hawk (*Buteogallus anthracinus*), yellow-billed cuckoo (*Coccyzus americanus*), and thick-billed kingbird (*Tyrannus crassirostris*), and the southern-most known population of Arizona gray squirrel (*Sciurus arizonensis*) in New Mexico. More xeric riparian shrub habitats at the southern end of the property provide documented nesting habitat for SGCN Bell's vireo (*Vireo bellii*).

The River Ranch Forest Stewardship Plan (New Mexico Forestry Division 2012) documents that during the Simon's ownership, a portable sawmill was brought to Tigner Grove and five to six thousand board feet of lumber was milled from dead and down velvet ash trees. Until Gene Simon's death in 2012, routine bucking and piling of dead and down trees and branches in Tigner Grove was conducted. Large tree trunks were generally left in place. Presumably slash piles in Tigner Grove were burned routinely during Gene Simon's 33 year tenure at River Ranch.

Since the Department first inspected Tigner Grove in 2012, multiple mature velvet ash trees have fallen over or had their tops blown out, creating a large hole in what was essentially a closed canopy stand in 2012. Several ash trees on the northeast corner of Tigner Grove have been weakened or killed by fire, likely from intentional burning of the adjacent giant sacaton grasslands. Mature velvet ash trees in Tigner Grove appear to be characterized in general by a lack of reproduction, except for a few root suckers, which could be caused by grazing and browsing by livestock and wild ungulates, lack of sunlight from a closed canopy, lack of overbank flooding, competition from giant sacaton grass, or some combination of those factors. Ongoing mortality could be caused by the advanced age of the trees, drought, disease, insect attacks or some combination of these factors.

In February 2015 foresters from the New Mexico Forestry Division inspected ash trees in Tigner Grove for emerald ash borers (*Agrilus planipennis*) or other insect pests that could cause disease. No insect pests were found. Emerald ash borers are recently introduced beetles from Asia. The larvae feed on the inner bark of *Fraxinus* species of ash, and have killed millions of ash trees in eastern and central United States. Emerald ash borers were documented in Colorado in the fall of 2013.

The floor of Tigner Grove has been invaded by giant sacaton grasses that create fine fuels that reach five or six feet into the lower canopy of the trees. The low hanging branches of the deciduous ash trees co-mingle with the 6-foot tall giant sacaton grass, creating a fuels ladder into the canopy of the grove. Without constant maintenance, continued falling of trees and branches in Tigner Grove increases the risk of a canopy fire in the entire grove.

The River Ranch deed of conservation easement allows forest management activities to occur to "...maintain the natural habitat's character and nature..." (p. 8). Continued pruning of lower branches, bucking and piling of fallen branches and dead trees, and occasional winter pile

burning will be required to protect Tigner Grove from a severe fire that could eliminate the old growth grove, possibly changing the ecological community to a more open cottonwood/sacaton savanna, as occurs over most the floodplain of River Ranch.

As a result of the potential for wildfire after Gene Simon's death, the Department has initiated a bucking and piling fuels treatment in Tigner Grove by the New Mexico Forestry Division's Returning Heroes or Inmate Program. State Forestry Division owns 99.9% of the River Ranch conservation easement, so is a logical partner to conduct these activities. In January 2015, Tonya Vowles of State Forestry Division in Silver City visited Tigner Grove and developed a proposal to buck and pile dead and down course woody material, and limbing low hanging branches to reduce ladder fuels into the tree canopy. The fuels treatment is expected to occur in fall 2015, after the migratory bird breeding nesting season has concluded.



Figure 1. Tigner Grove (M. L. Watson)



Figure 2. Tigner Grove fuel load (T. Vowles)

### Giant Sacaton Bottomlands

The primary grass species on River Ranch that typify the C and D floodplain soil types and provide the majority of forage, cover, watershed protection and habitat for various species is giant sacaton (*Sporobolus wrightii*). Giant sacaton bottomlands can be found throughout southern New Mexico at elevations from 3,400 feet to over 5,000 feet. They occur on floodplains, alluvial fans and stream terraces where the soils are loamy to clayey in texture. On the River Ranch at least 350 acres of the private land along the river is characterized by this species (Gadzia 2015).

Extensive giant sacaton grasslands on the property provide nesting habitat for sacaton-nesting obligate and SGCN Botteri's sparrow. Giant sacaton grasslands once covered riparian floodplains in the southwestern United States and northern Sonora, Mexico, but now occupy less than 5% of their historical range, primarily due to clearing for agriculture (Richter and Stutz 2002). Giant sacaton grasslands naturally spread flood waters and trap sediments, limiting soil erosion (Cox and Morton 1986).

Giant sacaton grass has been described as shade-intolerant. However, under the burning/mowing/grazing regime implemented by the previous owner to manage the giant sacaton stands, the grass has apparently expanded into Tigner Grove. When cured, this tall grass could act as ladder fuel and carry wildfire into the canopy. The recent ranch owners protected Tigner Grove from fire by actively harvesting dead and down wood to reduce fire danger.

### **Chihuahuan Desert Grasslands and Mesquite**

Chihuahuan desert grasslands were identified in the CWCS (NMDGF 2006) as a key habitat type. Dick-Peddie (1993) identifies River Ranch as occurring in the "Desert Grassland" vegetation type. Based on soils and vegetation characterization work conducted by NRCS Las Cruces office staff, some Chihuahuan desert grassland sites on River Ranch have been replaced by honey mesquite (*Prosopis glandulosa*) scrub-shrub stands with large patches of mostly unvegetated soils in the interstitial spaces between mesquite shrubs. The following discussion of mesquite invasion of Chihuahuan Desert grasslands (and references therein) is taken from Peters and Gibbens *in* Havstad et al. eds. (2006).

Chihuahuan Desert vegetation communities such as desert grasslands have experienced major shifts in vegetation composition over the past 50-150 years (York and Dick-Peddie 1969). The most dramatic changes in vegetation and associated ecosystem processes have occurred as a result of woody plant encroachment into perennial grasslands (Grover and Musick 1990, Bahre and Shelton 1993). The conversion from desert grassland to mesquite was likely initiated by changes in climate, historic over-grazing by domestic livestock, modification of fire regime, and small mammal activity (Humphrey 1958; Allred 1996; Reynolds et al 1997; Van Auken 2000).

Where arid environments are dominated by shrubby vegetation, the distribution of soil properties is patchy, with accumulations of plant nutrients under shrubs and relatively infertile soils in the inter-shrub spaces. The spatial heterogeneity of shrubs controls movements of water and soil materials in desert ecosystems (Noy-Meir 1985). Total ground cover is the most important variable influencing runoff and sediment production on desert rangelands in southern New Mexico (Wood et al. 1987). When shrubs replace grasslands, the rate of erosion increases and the surface soil materials are progressively lost from the barren shrub interspaces, especially for sand textured soils (Bull 1979; Abrahams et al. 1994, 1995; Gutierrez and Hernandez 1996). When shrubs are widely spaced, the barren inter-shrub soils are also subject to wind erosion that redistributes soil materials across the landscape (Snow and McClelland 1990; Stockton and Gillette 1990; Okin and Gillette 2001). Losses of soils and soil

nutrients are closely tied to the degradation and desertification of desert grasslands in southern New Mexico and other arid and semiarid regions of the world (Schlesinger et al. 1990).

The use of herbicides and minimally ground disturbing mechanical treatments such as mastication or mowing may be required to restore desert grasslands in mesquite-dominated upland areas on River Ranch. An advantage of herbicide use is the lack of ground disturbance, but it may also kill desirable non-target species such as four-wing saltbush (*Atriplex canescens*) or winterfat (*Erotia lanata*) (Gadzia 2015). Once mesquite has been removed from upland sites, minimizing livestock dispersal of seed and maintenance of an effective fire regime may be crucial for sustaining herbaceous desert grassland production (Brown and Archer 1999).

Desert grassland communities developed under conditions of relatively lower fire frequencies than many other grassland types (e.g., tallgrass and mixed-grass prairies)(Wright and Bailey 1980). For a discussion of fire treatment effects to mesquite, see Peters and Gibbens 2006 (p. 229).

## **Range and Riparian Assessments and Management Recommendations**

### **Range Health Assessment**

As stated in the River Ranch Conceptual Management Plan (RRCMP; Appendix A), carefully managed livestock grazing can be used as a tool to improve habitat conditions for wildlife (U.S. Forest Service 1990). The Department's primary goal in purchasing the River Ranch is to benefit bird species, and priority riparian, aquatic and Chihuahuan desert grassland. Because livestock grazing could benefit some or all of these habitats and the associated species, Department goals will be to integrate appropriate livestock grazing to benefit bird species and key habitats, and further the recovery of the Mimbres River riparian and aquatic habitats to fully functioning condition (Baker et al. 2001;New Mexico Department of Game and Fish 2004; Wyman et al 2006).

In the RRCMP, the Department committed to conduct a range health assessment to determine appropriate levels of livestock grazing that could facilitate wildlife habitat restoration. The Department contracted with Kirk Gadzia of Resource Management Services LLC to conduct the assessment. The Report evaluated the health of River Ranch deeded property and BLM and SLO allotment rangelands. The resulting report *Rangeland Health Evaluation Report NMDGF River Ranch June 2015* is attached as Appendix B. The following is a summary of the Range Health Assessment's recommendations:

1. Isolate the River corridor from the floodplain pastures by fencing where practical.
2. Isolate the upland pastures from the floodplain pastures by fencing where practical.
3. Establish 1-3 floodplain pastures on the west side of the river and 6 - 8 floodplain pastures on the east side of the river to facilitate proper stock density, grazing period

control, and allow for recovery before re-grazing. Size of floodplain paddocks should reflect roughly equal forage production to facilitate similar grazing periods.

4. Design fences to be resistant to fire damage in order to retain this tool for periodically managing the floodplain Sacaton pastures. Typically this is steel permanent fence or temporary electric fence with steel corners.
5. Provide water for livestock through a pipeline system with drinkers or selected access points to the river with hardened crossing spots for livestock and vehicles.
6. Develop the grazing plan to maximize forage utilization for floodplain and upland vegetation on a rotational basis.
7. Work with BLM and State grazing management personnel to clarify Allotment use boundaries and coordinate goals for land health objectives and habitat needs. Develop alternative watering points and gates that facilitate ease of livestock movement between pastures.
8. Tigner Grove represents a habitat type not commonly found in the Southwest and may be managed differently from other portions of the property to ensure persistence of this unique habitat type.

### **BLM Allotment**

The BLM and State land allotments are located primarily on the upland portions of the ranch, with the private land consisting of approximately one section primarily in the Mimbres River floodplain. The Las Cruces District's BLM Table Mountain lease 02525 consists of 1,800 acres west of the River Ranch deeded land. BLM lease lands include primarily upland Chihuahuan semi-desert grassland and scrub-shrub habitats. The lease authorizes year-round grazing (1 March 2014 to 28 February 2015) for 372 animal units per year. Annual rental on the allotment is \$502.20.

The Range Health Assessment states that carrying capacity of the BLM and State lands are set, but there may be room for an increase. The increase would come from grazing more livestock on these areas, but for a shorter length of time. This would remove the same amount of forage as yearlong grazing but be more effective based on concentrating the use for a shorter period of time. Livestock would spend the remainder of the year grazing the private land giant sacaton pastures. The carrying capacity calculations show a capacity for about 72 head for 8 months on the BLM and State lands and 72 head for 4 months on the private land. Season of use and pasture rotations would be determined in the yearly grazing plan.

The Range Health Assessment documented rangeland infrastructure and health conditions on the BLM and State allotments, and found that in general allotments appeared to be in moderately good health and stable condition. As with the private land sites, some areas were found to be in poor to declining health condition, but these sites were the exception. Access to the BLM and State land allotments are from Taylor Mountain Road and from gates along



Highway 61. Some of the gates on BLM land which appear to be in the Allotment were found to be locked.

The Range Health Assessment found that anomalies exist with the BLM and State land allotment boundaries. Fence lines are not located as indicated on the BLM and State land allotment boundary overlays. In several cases the allotment boundaries themselves are not fenced or fences exist that do not show on the BLM maps. Additionally, the private land fence lines do not appear to always follow the private land boundary line as shown on the property ownership overlays (see map on page 41 of the Range Health Assessment). These issues are discussed in more detail in the Grazing Management Plan (within the Range Health Assessment), but will need to be resolved before the grazing plan is implemented.

### **State Lands Allotment**

The State Lands Office Grazing Lease No. GT-2853 consists of 1,120 acres in multiple disjunct parcels west of the River Ranch deeded land. Lease lands include primarily upland Chihuahuan semi-desert grassland and scrub-shrub habitats. Annual rental on the allotment is \$760.83. The lease authorizes 17 animal units yearlong from 1 October 2013 to 30 September 2018. Lease renewal is on a 5-year rotation. The allotment is not tied to the base property. The Department will assess State Land Office Lease No. GT-2853 to determine habitat value for SGCN and potential management opportunities. The State Land Office can issue commercial leases for longer than 5 years that designate wildlife habitat as the use. The Department will consider this as well as sub-leasing to retain the option for livestock grazing as a tool to meet upland habitat management goals.

### **Riparian Assessment**

In the RRCMP, the Department committed to conduct a riparian assessment to determine baseline conditions of the Mimbres River riparian and aquatic habitats. Natural Heritage New Mexico (NHNM) conducted the assessment on May 18-20, 2015. The report provides the following recommendations for riparian habitat management on the ranch (see Appendix C for full report):

1. Maintain the maximum possible base flow in the active river channel throughout the year, but particularly during the growing season and in keeping with the property water rights.
2. If future grazing is considered, it will need to be actively managed to protect woody riparian tree and shrub reproduction and recovery. Regardless, current livestock should be kept out of the active channel and adjacent riparian zone for at least two years or more to allow young shrubs and trees to establish and grow to a size where they will be less desirable browse. This will also allow the herbaceous wetland vegetation and the river banks to recover to a more stable state. Once the vegetation has recovered, livestock use will need to be carefully monitored and, if possible, their access to the active channel should remain limited or excluded.

3. If recommendations 1 and 2 do not produce increases in woody riparian vegetation, particularly in tree recruitment following the next large (5 to 10 year) spring flood event, then active restoration should be considered. Removal of giant sacaton from selected terrace areas adjacent to the active channel, with lowering of the terrace such that it will be easily flooded during the next high flow can be planned for one or two terrace areas of an acre or more each. Earthwork should be done in the winter, so that the cleared area can be accessed by high water the next spring. If this sort of restoration is attempted, it should be designed by an engineer with an understanding of fluvial processes, and familiar with this type of riparian restoration work. (Examples of successful projects of this type can be found on the Rio Grande (Robert 2005; Muldavin et. al. 2012))
4. Giant sacaton stands around large mature tree stands should be managed to reduce fire risk to the forests. Creating fire breaks in the giant sacaton at the edges of the forest should be sufficient in the short term, and can be achieved mechanically. Burning of the giant sacaton is not recommended, as this would pose a risk to the trees. Also, removal of entire giant sacaton stands is not recommended, except as part of active restoration activities mentioned above in recommendation 3.
5. Removal of Invasive Exotic tree species (saltcedar, Russian olive) now could save money and environmental disruption in the future. There were only a handful of saltcedar and Russian olive individuals observed, and these could be cut down, and treated with topical herbicide efficiently. Left in place these trees may interfere with native riparian tree reproduction.

Observations and recommendations from both the range health assessment (Gadzia 2015) and riparian assessment (Natural Heritage New Mexico 2015) concur regarding limiting livestock grazing within the Mimbres River riparian corridor to short duration dormant season grazing or to access water at limited hardened crossings. Both assessments also concur that irrigation withdrawals that dewater the Mimbres River channel during the growing season need to be addressed to restore riparian habitat below the diversion dam.

### **Biological Surveys**

To fulfill commitments in the RRCMP, a number of wildlife surveys have been conducted by Department biologists to document baseline conditions. The River Ranch Wildlife List is attached as Appendix D. As stated above, to date 23 SGCN have been documented, including Arizona toad (*Anaxyrus microscaphus*), nesting common black hawks (*Buteogallus anthracinus*) and yellow-billed cuckoos (*Coccyzus americanus*), tree roosting western red bats (*Lasiurus blossevillii*), and Arizona gray squirrel (*Sciurus arizonensis*).



Figure 3. Yellow-billed Cuckoo(M.L. Watson)Figure 4. Western Red Bats (M.L. Watson)

### Mimbres River Fish Sampling at River Ranch

As part of the baseline biological inventory of the River Ranch a fish survey was conducted on 17 November 2014 by a crew of NMDGF biologists (Appendix E). The Mimbres River channel through River Ranch is dominated by shallow runs over sand, gravel, and cobble substrates (Photo 1). A few exceptions are shown in Photos 2-4. The locations documented in these photographs show the greatest potential to support the native fish community of the Mimbres River, which consists of Chihuahua Chub (*Gila nigrescens*), Rio Grande Sucker (*Catostomus plebeius*), and Beautiful Shiner (*Cyprinella formosa*).

One Longfin Dace (*Agosia chrysogaster*) was collected during the survey. It was in pool habitat with a large log for cover. Longfin Dace is known to have persisted through the Silver Fire and subsequent flooding in Moreno Spring approximately 30 miles upstream. Longfin Dace is a species that quickly colonizes new areas, so it is likely that this individual moved from Moreno Spring rather than survived in the Mimbres River at this location.

Additional surveys should be conducted at the River Ranch after the Mimbres River has had more time to recover from recent fires and drought conditions to gain a better understanding of what the fish community may be at the site under normal conditions.

## **Roads and Security**

Because of the size of the River Ranch (ca. 1009 acres), roads through the property are limited. Roads consist of primarily 2-tracks that require brush clearing maintenance to provide access. Road improvement may be needed to facilitate use by vehicles, such as on the very southern boundary of the property. However, the Department does not anticipate the need to develop new roads to facilitate ranch management. Existing roads will be used, and if beneficial to habitat restoration and not necessary for management purposes, some existing roads or tracks may be allowed to naturally re-vegetate. The Department intends to secure the property utilizing fences and signage. Signs would be used to delineate the property boundary stating the landowner is the State Game Commission and that rules and regulations apply to the land. A larger set of signs would be installed at the pertinent entrances delineating the property name, the State Game Commission as the owners and any associated rules and regulations that would apply. These security measures would enable Department staff to manage unauthorized use, theft and habitat damage.

## **OHV Use**

OHV use will be exclusively for administrative management activities by the Department.

## **Hunting**

The River Ranch holds abundant populations of game animals and game birds such as mule deer, Merriam's turkey, Gambel's quail, and mourning dove. The Department will assess hunting opportunities and make sustainable hunting recommendations to the State Game Commission for consideration.

## **Gaining Access Into Nature (GAIN) Program**

The River Ranch will be incorporated into the Department's Gaining Access Into Nature (GAIN) or alternative public access program for State Game Commission owned properties. Activities for River Ranch may be limited to pedestrian wildlife viewing and photography along existing roads, two-tracks and trails. Development of a trail network is not anticipated. Public access restrictions may be implemented during sensitive periods to preclude disturbance in sensitive areas and habitats such as during nesting season for state- and/or federally-listed bird species.

## **Conservation Education**

The River Ranch will provide conservation education opportunities for youth and adults. Students and teachers may be instructed by Department personnel or contractors in a wide

variety of wildlife-related outdoor education and recreation activities, such as hunting, fishing, trapping, shooting sports, archery, wildlife identification and ecology, habitat management, and citizen science ecological monitoring. Students and teachers may, as appropriate, be able to use the existing facilities for training and long-term habitat monitoring and research.

## **Research**

The Department will support scientific research on the property that provides additional knowledge about wildlife biology, ecology, population status, wildlife habitat restoration techniques, potential effects of climate change on wildlife species and key habitats, and other identified research needs. The Department is already working with researchers from the University of Nebraska Kearney, Western New Mexico University and the University of New Mexico to identify and document SGCN, and to set up long-term monitoring programs to assess SGCN population status and habitat trends.

The Natural Resource Conservation Service's Las Cruces office staff documented River Ranch soils and vegetation to establish baseline conditions. Because of the quality of riparian habitat, NRCS is also interested in using River Ranch to develop an ecological site description for Chihuahuan Desert riparian habitats. Department staff may work with NRCS to facilitate this work.

## **Water Plan**

In the RRCMP, the Department committed to developing a water management plan (as a section of the larger final management plan). The Deed of Conservation Easement (see Appendix F) states that the Easement Property includes three acre feet per annum of water rights for the irrigation of and appurtenant to 12.8 acres of land, with a priority date of 1880 described in NM State Engineer's file #M2147. The Department is still the process of determining the most effective and beneficial use of the water rights on the property. The Department will work with the local soil and water conservation district and the NM State Engineer's office to determine the most effective water usage for the Mimbres river channel, riparian habitats, and native fish and wildlife species.

The Department will investigate the potential to create wetland habitat and/or an off-channel pond. The Office of the State Engineer can make a written determination that wetland habitat restoration or creation is a beneficial use. Wetland and riparian habitat restoration activities at River Ranch connected to the Mimbres River can be authorized through a U.S. Army Corps of Engineers Nationwide Permit 27, Aquatic Habitat Restoration, Establishment and Enhancement Activities (expiration date 18 March 2017). Any changes in use for wetland habitat restoration or creation will be coordinated with the Office of the State Engineer.

Each spring a diversion dam is constructed on River Ranch by a downstream water user to divert Mimbres River flows into an irrigation ditch just south of the main headquarters



buildings. As a result, almost all Mimbres River surface water flow is being diverted from the channel into a ditch around the lower three-quarters of the River Ranch reach during the spring-summer irrigation period. In May 2015, Department staff found that a diversion dam was diverting water into the small irrigation ditch that runs along the eastern boundary of the property for approximately 1.5 miles. The water then flows overland across a fallow agricultural field and back into the Mimbres River channel approximately 100 feet north of the southern River Ranch boundary.

As identified in both the range health (Gadzia 2015) and riparian (Natural Heritage New Mexico 2015) assessments, riparian forest and woodland restoration below the diversion dam relies on restoring flows to the dewatered portions of the Mimbres River channel. The Department will explore all options that would insure continued flow of Mimbres River surface water through the entire length of the property.



Figure 5. Mimbres River diversion dam (K. Gadzia)





Figure 6. De-watered Mimbres River channel below diversion dam (K. Gadzia)

### **Monitoring**

The RRCMP states that periodic monitoring reports of the effects of recreational and restoration activities will be provided to the Trustees. Initially the Department will strive to provide annual progress reports. After 5 years, the Department will discuss with the Trustees an appropriate future reporting schedule.

The Department will coordinate continuing migratory bird, mammal, amphibian and reptile, lepidopteran and odonate surveys using Department staff, academic researchers, contractors, and citizen scientists and naturalists.

As funding allows, the Department may also consider implementing additional rangeland health assessments using the Resource Management Services methodology (Gadzia 2015) and riparian assessments using the NMRAM methodology (Natural Heritage New Mexico 2015), to document upland and riparian habitat changes over time.

The Department may also initiate photo points at selected areas or other structured monitoring approaches along the Mimbres River riparian area to document changes in riparian vegetation over time.

## Existing Conservation Easement

River Ranch ownership by the Department is subject to a 7 April 2011 deed of conservation easement granted to the New Mexico Land Conservancy and the New Mexico Energy, Minerals and Natural Resources Department Forestry Division by Ponderosa Highlands, Inc. The complete easement is attached as Appendix F. Key requirements of the easement include:

“Fences-Existing fences may be repaired and replaced, and new fences may be built anywhere on the Easement property with the exception of big game-proof fences, which cannot be constructed on the Property or on the Property’s exterior boundary. All fences shall be constructed in such a manner and with such materials for the purposes of reasonable and customary management of livestock and as not to unduly endanger wildlife safety or to materially inhibit wildlife movement. Grantor shall obtain the Managing Grantee’s prior written approval prior to constructing any fencing on the Property that unduly endangers wildlife safety or that materially inhibits wildlife movement.”

**Agriculture:** All farming, ranching, and agricultural practices shall be conducted in a sustainable manner, and in keeping with practices that are best suited for the conservation of soil and water, the maintenance of soil and water quality, and so as to avoid erosion, overgrazing, soil contamination, and water pollution.

**Forest Management:** This deed prohibits clear-cutting of forests and woodlands on the Easement Property. Notwithstanding, Grantor may cut and remove trees and shrubs on a limited basis to prevent personal injury and property damage, to thin stands appropriately for fire management within the designated building envelopes, to control insects or disease, to facilitate erosion control and watershed management, to maintain the natural habitat’s character and nature, and posts, poles, building materials, and firewood for the Grantor’s personal use. This Deed permits selective thinning, prescribed fire, reseeding or replanting trees, and other forest management activities that maintain forest health on the Easement Property in accordance with all federal and state statutes and regulations or rules, and in accordance with a forest management plan. The Grantor may allow forest areas denuded by wildlife, insects, or disease to regenerate naturally or plant them with native tree species.

**Roads and Trails:** In general, the maintenance, repair, and reconstruction of existing roads and trails are allowed. The construction of new roads is prohibited except as provided for in paragraph 2.B. Grantor may also construct one, single lane bridge across the Mimbres River. Trails for pedestrian and equestrian use may be constructed on the Easement Property provided that: 1) no trail outside of a designated building envelope shall be made of an impervious surface; and 2) plans for new trails shall be approved by the Managing Grantee [NMLC] and Grantee [State Forestry] prior to construction of the trail; and 3) shall be in compliance with the terms of this deed and do not diminish or threaten the Conservation Values.

Off-road vehicle use: Use of ATVs, motorcycles or other motorized vehicles off of road or travel ways, is prohibited except for agricultural, Easement Property maintenance or emergency access purposes.

Recreation: Only those low-impact recreational uses such as wildlife viewing, hiking, biking, horseback riding, hunting and fishing not inconsistent with the preservation and protection of the Conservation Values are permitted.

Public Access: The Grantor [owner of River Ranch] retains the right to allow public access to the Easement Property in the future provided that such public access complies with the terms of this Deed and is consistent with preservation of the Conservation Values.

Perpetual Duration: The Easement shall run with the land in perpetuity.

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## **Appendices**

**Appendix A. River Ranch Conceptual Management Plan**

**Appendix B. Rangeland Health Evaluation Report**

**Appendix C. River Ranch Riparian Assessment**

**Appendix D. River Ranch Documented Wildlife Species**

**Appendix E. River Ranch Mimbres River Fish Seining Report**

**Appendix F. River Ranch Deed of Conservation Easement**

## **Appendix A: River Ranch Conceptual Management Plan**

New Mexico Department of Game & Fish  
River Ranch Conceptual Management Plan

June 2013

**Introduction**

The New Mexico Office of Natural Resources Trustee and the United States Department of Interior Fish and Wildlife Service (collectively, the “Trustees”) engaged in a Natural Resource Damage Assessment and Restoration (NRDAR) process for Freeport-McMoRan Copper & Gold Inc. and its associated companies’ three copper mine sites near Silver City, New Mexico. As part of the NRDAR, the Trustees assessed and quantified damages and injuries to wildlife and wildlife habitats from the operation of these three mine sites. As a result, the Trustees were awarded a financial settlement from Freeport McMoRan to compensate the public for injuries to wildlife and wildlife habitat resulting from releases of hazardous substances at these mine sites. Damages from releases were primarily to birds, so protecting and enhancing bird habitat was the primary goal for the selection of projects to fund through the NRDAR process (ONRT 2013).

The Trustees and the New Mexico Department of Game and Fish (Department) are providing funds for the acquisition of the River Ranch to protect wildlife and restore wildlife habitat. This conceptual management plan for the River Ranch will identify general guidelines by which activities will be conducted to benefit the wildlife and wildlife habitat that occur on the property.

Acquisition, management and long-term conservation of River Ranch fulfills Department Strategic Plan 2013-2018 goals and objectives by conserving and enhancing significant amounts of wildlife habitat (Objective 8), and attaining measurable progress toward the restoration of wildlife identified as being at the risk of depletion or extinction (Objective 10). Acquisition, management, and long-term conservation of the River Ranch fulfills goals and objectives of the Department’s 2006 Comprehensive Wildlife Conservation Strategy (CWCS) (NMDGF 2006). The acquisition preserves key habitats (riparian, aquatic, and Chihuahuan semi-desert grassland) and a high diversity and abundance of Species Greatest Conservation Need (SGCN) that are known to occur, likely to occur, or may occur as wildlife habitat restoration continues on the property.

**Site Description**

The River Ranch is located approximately 30 miles northwest of Deming, and approximately 35 miles southeast of Silver City, and straddles Luna and Grant Counties. Private fee lands total 1,009 acres. It includes an 1,346 acre Bureau of Land Management grazing allotment, and a 1,030 State Land Office grazing allotment.

## Conservation Elements

The River Ranch includes nearly three miles of the lower Mimbres River, which drains into the Mimbres closed basin near Deming. Of the 1,009 deeded acres at least 380 acres (38%) are riparian, floodplain and aquatic habitats. Riparian habitat on the ranch is dominated by a mature Fremont cottonwood (*Populus fremontii*) and velvet ash (*Fraxinus velutina*) woodland that provides habitat for a high diversity and abundance of wildlife, including 17 SGCN already documented on the property. About 80% of all vertebrates in New Mexico and Arizona are dependent on riparian habitats for at least part of their life cycle (Hubbard 1977).

The River Ranch contains the State, and possibly national, record velvet ash tree, which occurs in "Tigner Grove". Tigner Grove is a 6.8 acre mature, multi-canopy stand of large diameter deciduous riparian trees, including soapberry (*Sapindus saponaria*), Arizona walnut (*Juglans major*), and netleaf hackberry (*Celtis reticulata*). This dense multi-canopy stand, and other deciduous riparian stands on the property, provide documented nesting habitat for SGCN common black-hawk (*Buteogallus anthracinus*), yellow-billed cuckoo (*Coccyzus americanus*), and thick-billed kingbird (*Tyrannus crassirostris*), and the southern-most known population of Arizona gray squirrel (*Sciurus arizonensis*) in New Mexico. More xeric riparian shrub habitats at the southern end of the property provide documented nesting habitat for SGCN Bell's vireo (*Vireo bellii*).

Extensive giant sacaton (*Sporobolus wrightii*) grasslands on the property provide nesting habitat for sacaton nesting obligate and SGCN Botteri's sparrow (*Aimophila botteri*). Giant sacaton grasslands once covered riparian floodplains in the southwestern United States and northern Sonora, Mexico, but now occupy less than 5% of their historical range, primarily due to clearing for agriculture (Richter and Stutz 2002). Giant sacaton grasslands naturally spread flood waters and trap sediments, limiting soil erosion (Cox and Morton 1986).

Giant sacaton grass has been described as shade-intolerant. However, under the burning/mowing/grazing regime implemented by the previous owner to manage the giant sacaton stands, the grass has expanded into Tigner Grove. When cured, this tall grass could act as ladder fuel and carry wildfire into the canopy. The recent ranch owners protected Tigner Grove from fire by actively harvesting dead and down wood to reduce fire danger.

Department goals and objectives for the aquatic (streams and springs), riparian, floodplain and upland Chihuahuan semi-desert grassland habitats of the River Ranch are to: 1) re-generate younger age classes of deciduous riparian trees to replace the mature stands and continue recovery of the riparian system to a fully functioning condition; 2) develop a vegetative understory to provide habitat for SGCN such as Southwestern willow flycatcher (*Empidonax traillii extimus*); 3) establish wetlands and off-channel ponds for possible establishment of SGCN and federally-threatened Chiricahua leopard frog (*Lithobates chiricahuensis*); 4) use mowing, burning and/or livestock grazing to maintain healthy stands of native giant sacaton grasslands, which benefits multiple bird and small mammal species, while maintaining some stands in a decadent state to benefit nesting Botteri's sparrows; 5) use livestock grazing, fire and possibly mechanical means as tools to restore upland Chihuahuan semi-desert grasslands; 6) manage the property in full compliance with the stipulations and conditions of the existing conservation easement (NMLC no date).



Within a year of closing, the Department will conduct a riparian habitat assessment to determine baseline conditions of the Mimbres River riparian habitat. Riparian assessment methodologies that could be used include: 1) the New Mexico Environment Department's Rapid Assessment Method for Montane Riverine Wetlands (NMED 2011), 2) Visual Assessment of Riparian Health (Ward and Atwill 2003); or 3) User's Guide for the Rapid Assessment of the Functional Condition of Stream-Riparian Ecosystems in the American Southwest (Stacey et al. 2006).

Within a year of closing, the Department will also conduct additional aquatic, riparian, and upland habitat biological inventories to determine species diversity and establish a baseline of biological information to measure success of habitat restoration activities.

### **Livestock grazing**

#### **Deeded Land**

Carefully managed livestock grazing can be used as a tool to improve habitat conditions for wildlife (U.S. Forest Service 1990). The Department's primary goal in purchasing the River Ranch is to benefit SGCN, riparian, aquatic and Chihuahuan desert grassland key habitats identified in the CWCS. Because livestock grazing could benefit some or all of these habitats and the associated species, Department goals will be to integrate appropriate livestock grazing to benefit SGCN and key habitats, and further the recovery of the Mimbres River riparian and aquatic habitats to fully functioning condition.

Within a year of closing, the Department will initiate a range health assessment to determine potential appropriate levels of livestock grazing that could facilitate wildlife habitat restoration. The assessment will also address existing infrastructure (e.g., existing fences). If the Department determines that livestock grazing is feasible, the Department will develop a livestock management plan to facilitate implementation of livestock grazing based on assessment recommendations. Sustainable livestock grazing strategies that could be implemented include short duration grazing, rest-rotation grazing, and/or dormant season grazing. Herders may be needed to achieve utilization goals. Determining the most appropriate course of action requires consideration of existing fencing, management costs, and the potential need to use fire as a habitat management tool.

#### **BLM Allotment**

The Las Cruces District's BLM Table Mountain lease 02525 consists of 1,800 acres west of the River Ranch deeded land. Lease lands include primarily upland Chihuahuan semi-desert grassland and scrub-shrub habitats. The lease authorizes year-round grazing (1 March 2014 to 28 February 2015) for 372 animal units per month. Annual rental on the allotment is \$502.20.

The Department will assess the Table Mountain lease to determine habitat value for SGCN and management opportunities. Depending on the results of the assessment, the Department would evaluate directly managing appropriate livestock grazing or sub-leasing the allotment to maintain livestock grazing as a tool to meet habitat management goals.

### **State Lands Allotment**

The State Lands Office Grazing Lease No. GT-2853 consists of 1,120 acres in multiple disjunct parcels west of the River Ranch deeded land. Lease lands include primarily upland Chihuahuan semi-desert grassland and scrub-shrub habitats. Annual rental on the allotment is \$760.83. The lease authorizes 17 animal units yearlong from 1 October 2013 to 30 September 2018. Lease renewal is on a 5-year rotation. The allotment is not tied to the base property.

The Department will assess State Land Office Lease No. GT-2853 to determine habitat value for SGCN and potential management opportunities. The State Land Office can issue commercial leases for longer than 5 years that designate wildlife habitat as the use. The Department will consider this as well as sub-leasing to retain the option for livestock grazing as a tool to meet upland habitat management goals.

### **Roads**

Because of the size of the River Ranch (ca. 1009 acres), roads through the property are limited. Roads consist of primarily 2-tracks that require brush clearing maintenance to provide access. Road improvement may be needed to facilitate use by vehicles, such as on the very southern boundary of the property. However, the Department does not anticipate the need to develop new roads to facilitate ranch management. Existing roads will be used, and if beneficial to habitat restoration and not necessary for management purposes, some existing roads or tracks may be allowed to naturally re-vegetate.

### **OHV Use**

The Department is not contemplating any public OHV use. OHV use will be exclusively for administrative management activities by the Department.

### **Hunting**

The River Ranch holds game animals and game birds such as mule deer, Merriam's turkey, Gambel's quail, and mourning dove. The Department will assess hunting opportunities and develop sustainable hunting strategies that support the primary goal of property acquisition to benefit and conserve key wildlife habitats and SGCN.

### **Gaining Access Into Nature (GAIN) Program**

The River Ranch will be incorporated into the Department's Gaining Access Into Nature (GAIN) program. The GAIN program offers outstanding wildlife viewing and other activities on State Game Commission-owned wildlife management areas. GAIN activities for River Ranch will likely be limited to pedestrian wildlife viewing and photography along existing roads, two-tracks, trails, and cross-country. Development of a trail network is not anticipated. All GAIN participants are required to have permits for the appropriate season and activity. Public access restrictions may be implemented during sensitive periods to preclude disturbance in sensitive areas and habitats such as during nesting season for state- or federally-listed bird species.

### **Conservation Education**

The River Ranch will serve as a conservation education property and destination for K-12 students and teachers from throughout the state. Students and teachers will be instructed by Department personnel or contractors in a wide variety of wildlife-related outdoor education and recreation activities, such as hunting, fishing, trapping, shooting sports, archery, wildlife identification and ecology, habitat management, and citizen science monitoring. Students and teachers will be able to use the existing facilities for training and long-term habitat monitoring and research. The main residence and/or facilities can be used as a conservation education classroom.

### **Research**

The Department will encourage scientific research on the property that provides additional knowledge about wildlife biology, ecology, population status, wildlife habitat restoration techniques, potential effects of climate change on SGCN and key habitats, and other research needs as identified in the CWCS.

### **Water Rights**

Within a year of closing, the Department will develop a water management plan (as a chapter of the larger final management plan) to determine how water rights will be maintained for beneficial use. The Department will investigate the potential to create wetland habitat as part of long-term Mimbres River restoration activities. Wetland habitat restoration or creation can be determined to be of beneficial use with written approval by the State Engineers office.

### **Monitoring**

Within a year of closing, the Department will: 1) conduct or fund a riparian assessment to determine baseline conditions of the Mimbres River riparian habitats; 2) conduct aquatic, riparian and upland habitat biological inventories to determine species diversity and establish a baseline of biological information to measure success of future habitat restoration activities; 3) conduct a range health assessment to determine appropriate land management to facilitate wildlife habitat restoration and improvement. Reports will be provided to Trustees.

In addition, periodic monitoring reports of the effects of recreational and restoration activities will be provided to the Trustees. Initially the Department will strive to provide annual monitoring reports. After 5 years, the Department will discuss with the Trustees an appropriate future reporting schedule.

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## **Appendix B. Rangeland Health Evaluation Report**



# Rangeland Health Evaluation Report

## NMDGF River Ranch

### June 2015



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## Rangeland Health Evaluation Report

### NMDGF River Ranch

#### June 2015

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## Executive Summary

In April of 2015, a contract was signed between the NMDGF (the Department) and Resource Management Services, LLC (RMS) to conduct a *Rangeland Health Evaluation* and write a *Grazing Management Plan* for the River Ranch located in Grant and Luna Counties of New Mexico. The purpose of the study and plan is to partially fulfill the commitments of the Department to the Trustees of the River Ranch as outlined in the Conceptual Management Plan (CMP) document of June, 2013.

The evaluation will help determine the current rangeland health status of the resource base and outline potential tools such as livestock grazing, fire, mechanical or other interventions which might improve the current health status. Particular emphasis will be placed on the creation of a flexible outline for a grazing management plan, should the department deem that livestock grazing is feasible. An initial inventory of infrastructure (fences, water, corrals, etc.) was also evaluated in terms of the potential effect on implementing the grazing plan.

The highly varied landscape of the River Ranch created substantial differences in the general soils, vegetation and rangeland health attributes encountered during the study. Despite the best effort to place study sites in representative areas, the variation within each site cannot hope to be captured by a relatively small sample size. However, the rangeland health summary is sufficient to explain the general observed health status of the various types of Ecological Sites Descriptions (ESD's) located on the property. In general, the range of conditions varied from healthy to moderately unhealthy depending on the location of each transect on the property.

Only one of the transects had any prior data associated with it (RR T-3 BLM 02525). Despite this, the general picture that emerged from the rangeland health study is that much of the property is in a relatively healthy state, and indeed many areas have probably improved significantly over time. Other areas appears stable, and some sites appear to be degrading with current management and conditions.

Of particular note was that the entire riparian corridor encompassing the floodplain and various terraces associated with it were recently studied and re-categorized by personnel from the Natural Resource Conservation District (NRCS) in Las Cruces. Details of the soil and vegetation studies that are associated with the current rangeland health study sites are found in appendix A. There is also a link to the entire report on the NRCS study at River Ranch.

The Ecological Site Descriptions (ESD's) used to compare the remainder of the study sites at the ranch are also included in this report under Appendix B. A map of the ESD's and their relative distribution and acreages across the ranch are found on pages 10-13. Considerable thought went into placement of the 7 study sites. The percentage of ESD's, accessibility for subsequent readings, and overall vegetative production being the three main factors influencing the choices. Thus, 2 of the sites were placed in the D type soil of riparian terrace, 1 in the C type soil, 4 in the Hills ESD, and 1 in the Loamy ESD.

Potential solutions to improve rangeland health on areas of the River Ranch that are in suboptimal condition include planned livestock grazing, prescribed fire, mechanical treatments and/or continuing the current management strategy of primarily using rest as the main management tool. The main reason for using grazing, fire or mechanical approaches would be to provide disturbance and renewal to the stagnant or over mature vegetation types. This might include a high proportion of oxidizing grasses, too high a percentage of standing litter, lack of soil disturbance and other factors.

Anomalies exist in the boundaries shown on property ownership maps and where fence lines are located on Private, BLM and State properties. These issues are discussed in more detail in the Grazing Management Plan (GMP), but they will need to be resolved before the plan is implemented. Another issue that will need to be clarified and resolved is the removal of all river flow into an irrigation channel that runs to the neighboring property to the south.

The current state of infrastructure including fences, watering points, working facilities, and roads is in various states of disrepair. Perhaps one of the greatest concerns would be that the entire riparian corridor has access to livestock at this time due to lack of fences or fences that are down. It is recommended that a general fence plan be developed that separates the river corridor from the surrounding floodplain pasture areas. In addition much of the uplands on the west side of the river are not fenced separately and can be accessed from the river pastures.

The general focus of the grazing plan is to utilize the two main types of forage resources in the most optimum and complimentary manner. The river terraces generally identified as soil types C and D are largely dominated by Giant Sacaton grass. This grass is highly productive but presents unique management issues because of its rapid growth and is relatively non-palatable to livestock when growth is not fresh. Managers thus often turn to burning and mowing as tools to keep these sites productive for livestock grazing.

The uplands portions of the ranch are largely located on the BLM allotment and State lands with about one section located on the private land. The majority of these sites are identified as the Hills ESD. However this classification is highly variable depending on slope, aspect, soil depth and type. About 7% of the land is identified as a Loamy ESD and the transect place in this site showed it to be relatively unhealthy. One factor that probably influenced this result is the proximity of this upland site to the water source at the corrals and river.

Carrying capacity of the BLM and State lands are set, but there may be room for an increase. The increase would come from running more livestock on these areas, but for a shorter length of time. This would remove the same amount of forage as yearlong grazing but be more effective based on concentrating the use for a shorter period of time. The remainder of the year would be spent on the private land grazing the Sacaton pastures. The carrying capacity calculations show a capacity for about 72 head for 8 months on the BLM and State lands and 72 head for 4 months on the private land. Season of use and pasture rotations would be determined in the yearly grazing plan.

The River Ranch is a unique and beautiful property. It represents a wonderful opportunity to further the goals of the Department in terms of wildlife conservation and in particular SGCN. However, it does present some management challenges in implementing a grazing plan because of the current state of infrastructure and identifying the right person to manage the livestock and plan. Clarity is also needed in the area of water rights, boundaries, and fences. The Rangeland Health Study shows that the majority of the ranch is in a relatively health state and this status can be improved over time with proper management.



## Introduction

Rangeland Health Surveys were conducted in May of 2015 on 7 selected sites within the private and public lands of the River Ranch. The purpose of these studies was to determine the current health status of the resource base. If the studies show that the rangeland health rating was less than desirable for current goals and objectives, the report also recommends potential tools such as grazing, fire, mechanical or other interventions that could improve the rating if implemented.

An initial site visit with NMDGF personnel familiar with the areas and field conditions was completed in January of 2015. In addition to conducting the rangeland health analysis, grazing management planning options were also developed.

## Methodology

Prior to the initial site visit, the Conceptual Management Plan, maps, and other information were provided for review by the Department. During the meeting at the ranch in January of 2015, the NRCS presented their work to date on reclassification of the soils in the Mimbres River floodplain of the River Ranch. A tour following the meeting provided a beginning knowledge of the roads, access points and some of the infrastructure of the private land portion of the ranch.

The basic methodology chosen for the rangeland health survey was ***Bullseye! – Targeting Your Rangeland Health Objectives***, by Kirk Gadzia and Todd Graham, V2.0 March 2009.

<http://quiviracoalition.org/images/global/19-Bullseye%25202010%2520Web.pdf>

A link for downloading this publication is shown above. In addition, a hard copy of the publication is also provided with the report. This methodology is qualitative in nature, meaning that no data points are measured at the site. Instead, an overall assessment is made of the site's rangeland health based on 14 specific indicators. This methodology was chosen because of its simplicity, affordability and general applicability to the situation for the properties at present.

Maps showing soil types and Ecological Site Descriptions (ESD's) were generated for all the land ownership areas of the ranch. In addition, the detailed ESD's narratives were printed and made available for field work. These ESD's are specific for the general soils, elevations, precipitation zones vegetation species, and other factors that can be expected under various conditions at each site. Some variability in the sites is expected but the evaluation locations were chosen to be generally representative of the ESD as a whole. The major ESD's used in this study are found in Appendix B.

Because all the monitoring points in the floodplain area are associated with the new NRCS soil investigation, the sites were selected with the assistance of NRCS employee Luis Garcia who helped conduct the investigation. For the other sites, the plant community descriptions in the Ecological Site Descriptions (ESD's) were used as part of the benchmark for measuring departure from the health of the range conditions. This was done by comparing the current plant community, and other rangeland health parameters, to the potential for the area. Departures from potential are noted in the Rangeland Health Target produced for each evaluation site. In most cases, the ESD identified on the map was a fairly good match to current conditions.

Both the initial reconnaissance visit and field survey were used to determine that the evaluation site chosen for each location was representative of the ESD in the area. Sites were also chosen based on the percentage of the ESD in the ranch acreage. A GPS UTM coordinate reading was recorded at each evaluation site using a Garmin GPSMAP 62S. One digital overview photo of each site was taken from the GPS marker using a Nikon Coolpix AW100 digital camera. The direction of the photo

was variable, but the attempt was to include an easily recognizable feature on the skyline (such as a windmill or sand hill) in the direction of the photo. This should make re-taking subsequent photos from the site easier.

In addition to the overview photo, a digital photo was also taken of a 1M square plot at approximately five paces from the GPS coordinate location. The plot photo was paired with the directional photo and these are shown for each evaluation site location in this report. The plot gives a direct reference to the vegetation cover, soil cover, litter, dung and other attributes measured in the subsequent methodology.

After monitoring and photo points were established, the rangeland health “Bullseye” method was conducted at each site to measure 14 different indicators of rangeland health. A “walkabout” of about an acre was done prior to filling out the scoring form to obtain a general feel for the area, rather than just evaluating the spot adjacent to the GPS coordinate.

A mark was placed on the spoke of each indicator within the Bullseye target. Either the **Gold** – *Achieving Goal*, **Silver** – *Moving Toward or Away From Goal*, or **Bronze** – *Not Achieving Goal*, category was marked to indicate the score for that attribute. The Score Guide on pages 26-27 of the *Bullseye* manual were used to aid in determining the location of each mark. Additionally, the ESD’s were used to provide benchmarks for comparison where applicable. Upon completion of the 14 indicator score, the overall picture of the individual target placement marks created a visual record of Rangeland Health for each site.

A detailed survey of plant species was not conducted, but the twelve most abundant plant species at each site were listed. The most common herbaceous and woody species were listed because of the importance of both types to the area. Emphasis was given to perennial plant species rather than annuals. A complete list of the plants encountered during the survey is found in Appendix D.

Noxious or invasive weed species were also investigated during the evaluation effort. Fortunately, no large infestations were noted. Salt Cedar (Tamarisk) was noted in some areas along the river, but nowhere in a dense stand. Mesquite is probably the most prevalent invasive species, although it is native to the area. It was seen as a component of nearly all sites visited, but varied in abundance from one or two individuals to dominance of the site. Fortunately only a few areas were severely infested. Other weedy species such as moth mullein and silver leaf nightshade were abundant in some areas, but this may be due to good moisture conditions earlier in the year. These species are not considered noxious.

The combination of photo points, dominant vegetation and rangeland health measurements gives a fairly comprehensive view of the current rangeland health situation on the River Ranch. Although technically a prior reading is needed to access the trend of the rangeland health, a judgment of apparent trend at each site is indicated in this report. The apparent rangeland trend is the author’s opinion from the assessment about the direction or stability of the conditions at each site. Subsequent evaluation efforts will give a much better indication of this trend because a snapshot of conditions in the spring of 2015 will be available to measure against.

Evaluations were conducted in the spring. Although a rainfall total was unavailable, indications were that there has been some good winter/spring moisture in most areas and substantial growth was observed on some grass species. In addition, the mesquite in many areas was severely frosted and is just beginning to resprout. Some of the damage was severe enough it may have caused mortality.

The grazing management plan was developed after taking into account the conditions observed during the rangeland health survey. The plan is an outline of considerations and suggested management options rather than a strict calendar of grazing dates for different areas.



# **NMDGF River Ranch**

## **Maps, Transect Locations, Rangeland Health Documentation, and Photo Points**

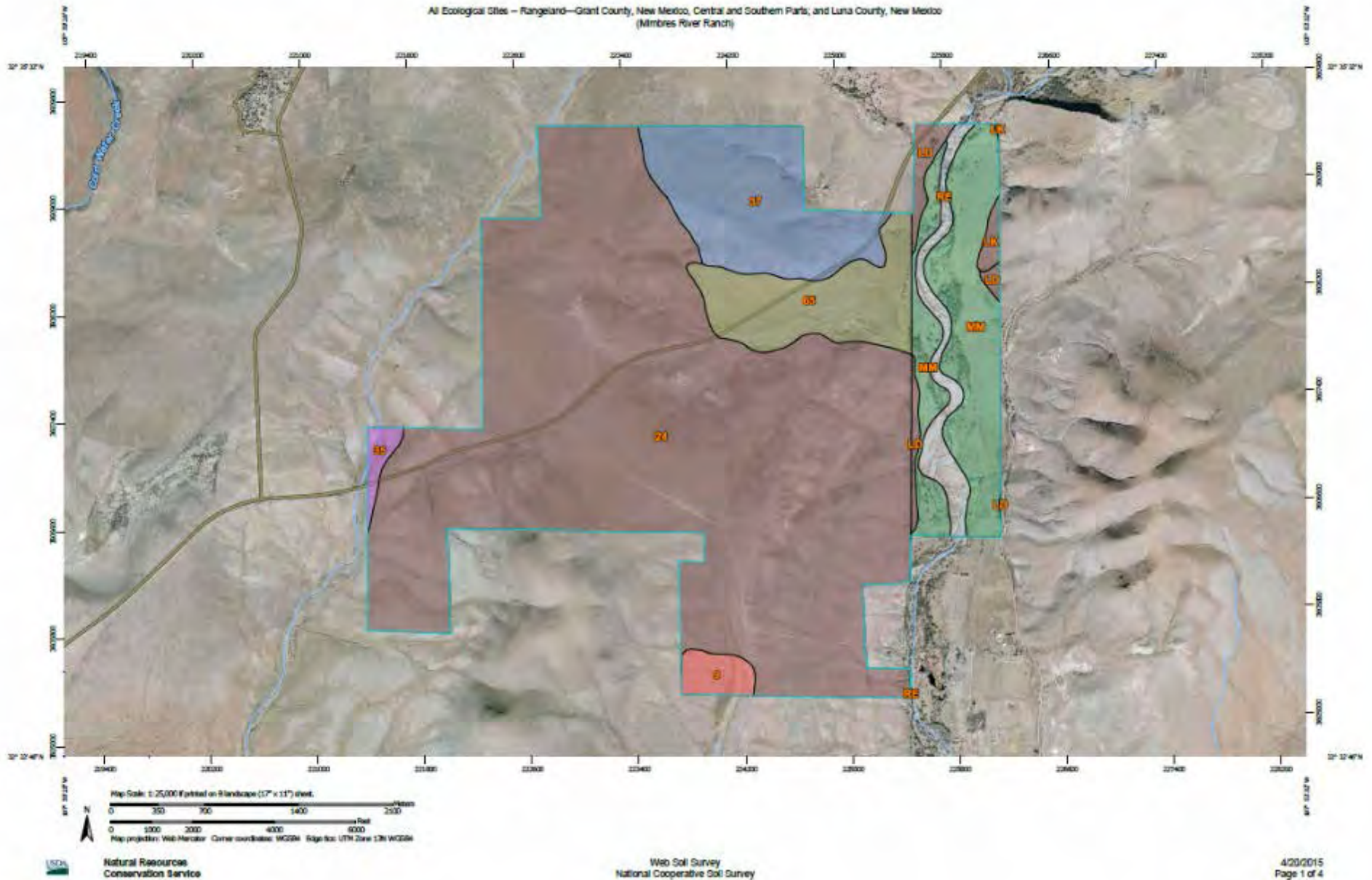



































<b>River Ranch Rangeland Health Monitoring Points      Data Collected May 6-10, 2015</b>			
	<b>UTM Format NAD 83 13 South</b>		
<b>Point #</b>	<b>Northing</b>	<b>Easting</b>	<b>Ecological Site Description</b>
<b>RR T-1 MB-7 Soil Type C</b>	0225734	3608249	New NRCS Soil Type Classification- See supporting cocumentation in Appendix A
<b>RR T-2 MC-6 Soil Type D</b>	0225903	3608499	New NRCS Soil Type Classification- See supporting cocumentation in Appendix A
<b>RR T-3 BLM 02525</b>	0223502	3606771	Hills R042XB027NM - Transect site for 1997 BLM reading - See documentation in Appendix B
<b>RR T-4</b>	0225059	3606711	Hills R042XB027NM - Tobosa / Mesquite dominated site
<b>RR T-5</b>	0222498	3608075	Hills R042XB027NM - Black Grama / Tobosa dominated site
<b>RR T-6 MC-1 Soil Type D</b>	0226005	3607214	New NRCS Soil Type Classification- See supporting cocumentation in Appendix A
<b>T-7</b>	0225332	3608084	Loamy - R042XB014NM Porter Muhly / Mesquite dominated site
<b>Photo Point 1 BLM N</b>	0222752	3608789	Hills R042XB027NM on BLM Allotment Northern location

All Ecological Sites – Rangeland—Grant County, New Mexico, Central and Southern Plains, and Luna County, New Mexico  
(Mimbres River Ranch)



## MAP LEGEND

 Area of Interest (AOI)	 Not rated or not available
<b>Soils</b>	<b>Water Features</b>
<b>Soil Rating Polygons</b>	 Streams and Canals
 R038XB103NM	<b>Transportation</b>
 R042XB010NM	 Rails
 R042XB014NM	 Interstate Highways
 R042XB018NM	 US Routes
 R042XB023NM	 Major Roads
 R042XB027NM	 Local Roads
 Not rated or not available	<b>Background</b>
<b>Soil Rating Lines</b>	 Aerial Photography
 R038XB103NM	
 R042XB010NM	
 R042XB014NM	
 R042XB018NM	
 R042XB023NM	
 R042XB027NM	
 Not rated or not available	
<b>Soil Rating Points</b>	
 R038XB103NM	
 R042XB010NM	
 R042XB014NM	
 R042XB018NM	
 R042XB023NM	
 R042XB027NM	

## MAP INFORMATION

The soil surveys that comprise your AOI were mapped at scales ranging from 1:24,000 to 1:48,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service  
Web Soil Survey URL: <http://websoilsurvey.nrcs.usda.gov>  
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Grant County, New Mexico, Central and Southern Parts  
Survey Area Data: Version 11, Sep 26, 2014

Soil Survey Area: Luna County, New Mexico  
Survey Area Data: Version 12, Sep 26, 2014

Your area of interest (AOI) includes more than one soil survey area. These survey areas may have been mapped at different scales, with a different land use in mind, at different times, or at different levels of detail. This may result in map unit symbols, soil properties, and interpretations that do not completely agree across soil survey area boundaries.

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jan 15, 2011—Feb 23, 2011

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

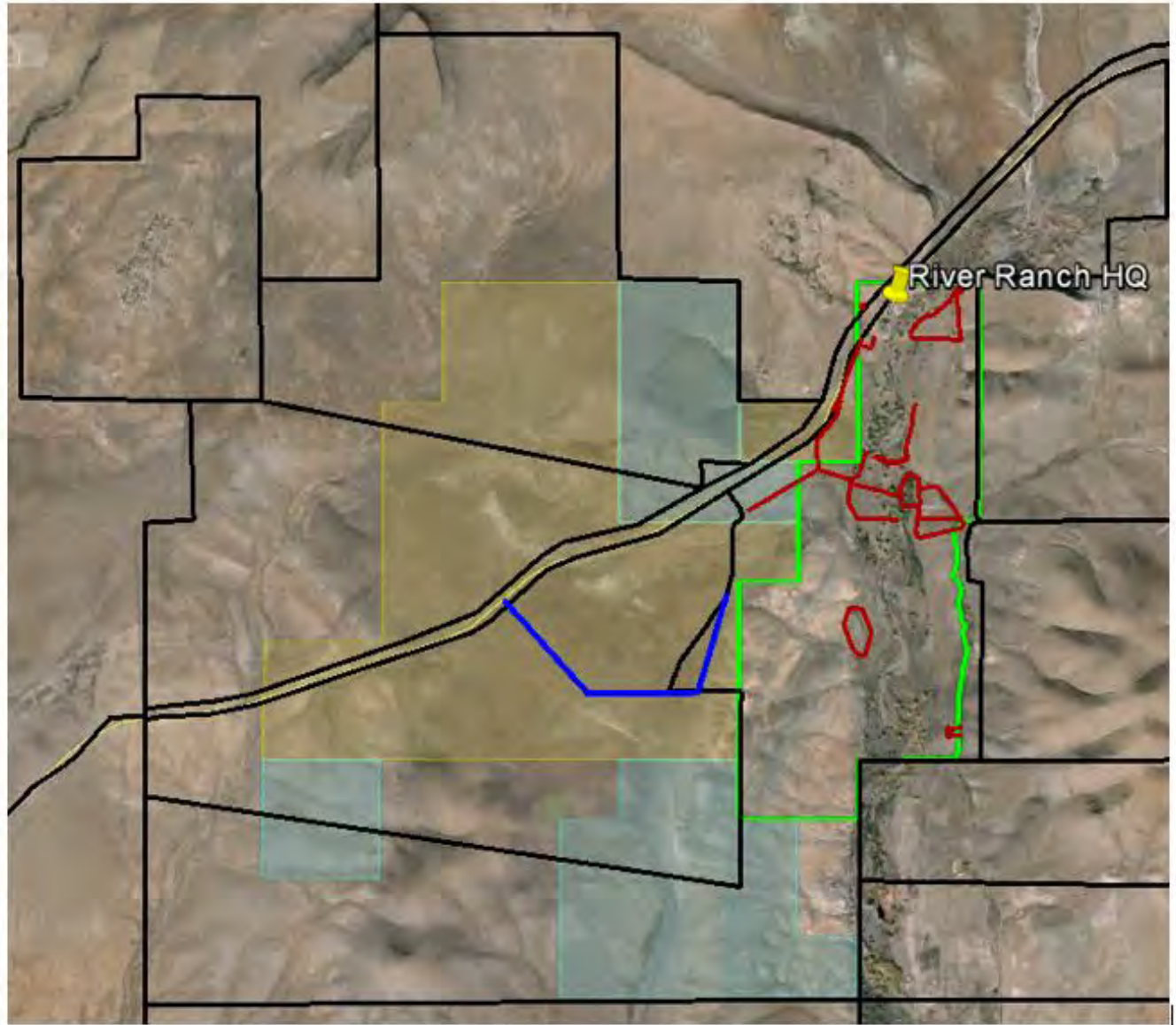


## All Ecological Sites — Rangeland

Grant County, New Mexico, Central and Southern Parts					
Map unit symbol	Map unit name	Component name (percent)	Ecological site	Acres in AOI	Percent of AOI
9	Conger-Stellar association, 0 to 5 percent slopes MLRA 42	Conger (60%)	R042XB010NM — Gravelly	40.8	1.2%
		Stellar (30%)	R042XB014NM — Loamy		
24	Lithic Haplargids-Rock outcrop association, 15 to 75 percent slopes	Lithic Haplargids (70%)	R042XB027NM — Hills	2,298.5	67.0%
		Rock outcrop (15%)			
35	Mimbres-Arizo-Riverwash association, 0 to 5 percent slopes	Mimbres (40%)	R042XB018NM — Bottomland	22.3	0.6%
		Arizo (30%)	R042XB024NM — Gravelly Sand		
		Riverwash (15%)			
37	Muzzier-Rock outcrop association, 25 to 45 percent slopes	Muzzier (60%)	R038XB103NM — Hills	338.7	9.9%
		Rock outcrop (25%)			
65	Stellar-Mohave association, 0 to 5 percent slopes	Stellar (50%)	R042XB014NM — Loamy	229.4	6.7%
		Mohave (35%)	R042XB014NM — Loamy		
Subtotals for Soil Survey Area				2,929.7	85.4%
Totals for Area of Interest				3,430.9	100.0%

Luna County, New Mexico					
Map unit symbol	Map unit name	Component name (percent)	Ecological site	Acres in AOI	Percent of AOI
LD	Lehmans very rocky loam, 0 to 10 percent slopes	Lehmans (65%)	R042XB027NM — Hills	48.3	1.4%
		Rock outcrop (20%)			
LK	Lehmans extremely rocky loam, 10 to 25 percent slopes	Lehmans (50%)	R042XB027NM — Hills	14.3	0.4%
		Rock outcrop (40%)			
MM	Mimbres soils	Mimbres (65%)	R042XB023NM — Clayey	351.8	10.3%
		Mimbres (20%)	R042XB014NM — Loamy		
RE	Riverwash	Riverwash, gravelly (99%)		86.7	2.5%
		Riverwash, gravelly (1%)			

Luna County, New Mexico					
Map unit symbol	Map unit name	Component name (percent)	Ecological site	Acres in AOI	Percent of AOI
Subtotals for Soil Survey Area				501.2	14.6%
Totals for Area of Interest				3,430.9	100.0%



## River Ranch Rangeland Health Study

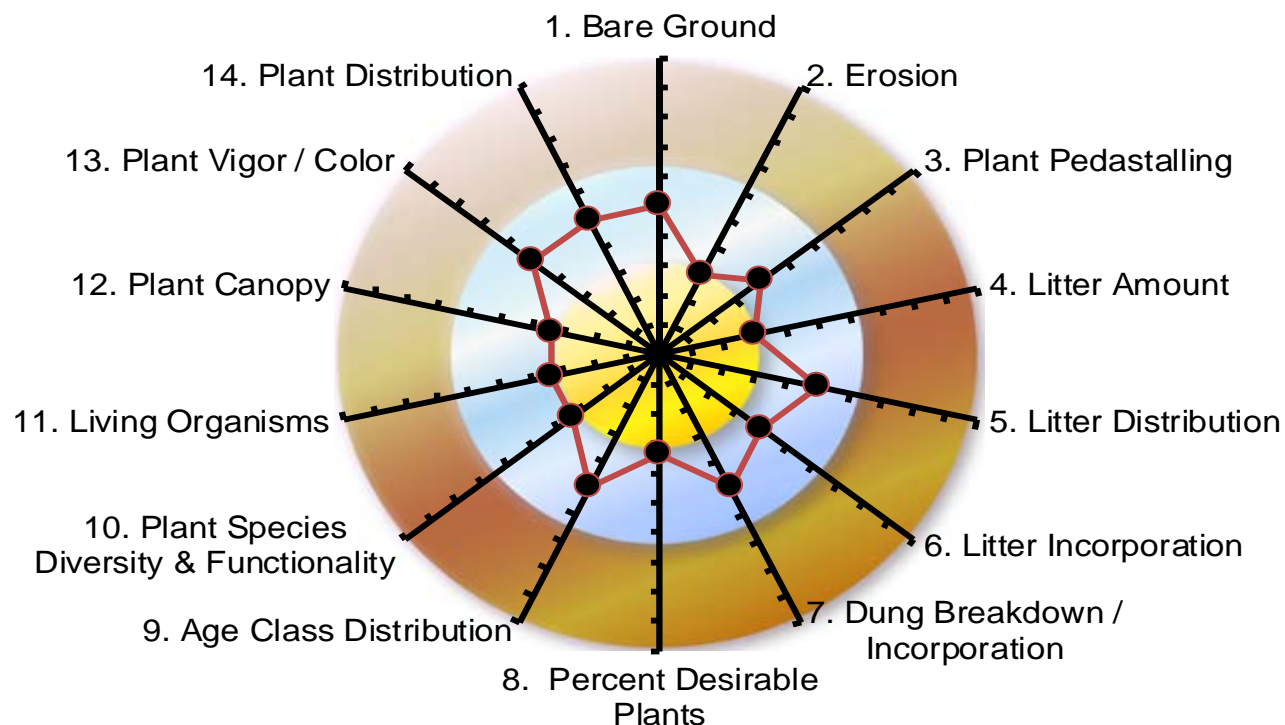
**ESD: NRCS Soil Type C (New Classification) Transect T-1 NRCS MB-7**

**Date: 5-6-2015 Examiner: K. Gadzia**

**Gold:** Achieving goal.

**Silver:** Moving toward/away from goal.

**Bronze:** Not achieving goal.



**Transect Location  
GPS Coordinatates**

13S 02235734  
3608249

**Goals include:  
wildlife habitat,  
species of concern,  
watershed, grazing  
management, and  
demonstration  
area.**

This is the first rangeland health evaluation for this site. Judging by the 14 rangeland health indicators monitored, this site is in a moderately healthy state in 2015. The site retains good plant cover, little erosion and some litter cover. This site is strongly dominated by Giant Sacaton with at least 85% of the vegetation production. The concerns are the large bare spaces between many of the plants and areas with no new seedlings of any desired species. The site could benefit from grazing, mowing or perhaps burning followed by other tools. Deer and elk droppings were encountered on this site. This site was chosen because it is representative of soil type C which is a new classification done by the NRCS for the ranch.



## Photo Points



RR T-1-M B-7 Overview 5-6-2015 Note Bare Ground



RR T-1-M B-7 Plot 5-6-2015



RR T-1-M B-7 Overview 1-16-2015



RR T-1-M B-7 Close-up 1-16-2015





Elk and Droppings on T-1 Site



Old Burned Cottonwood tree near transect location

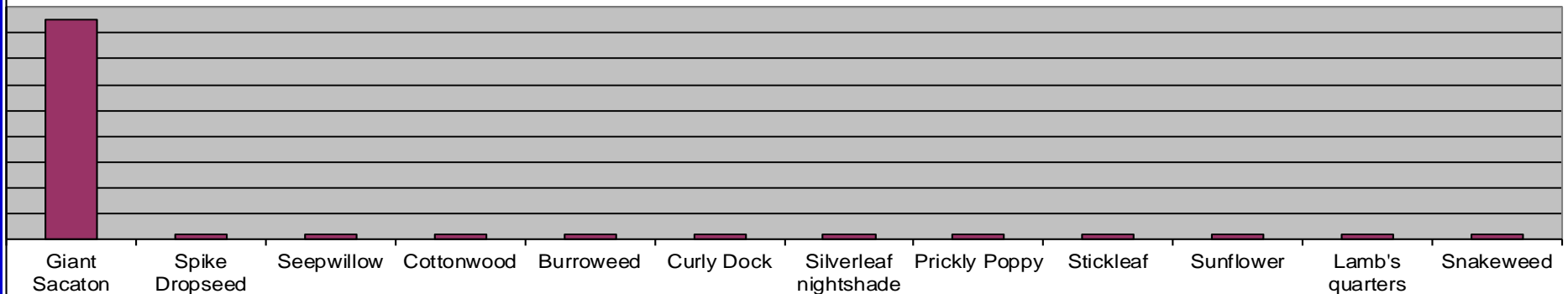
Apparent range trend:



Stable to slightly downward trend due to summary of monitoring indicators.

**Notes:** This site appears to be stable with a fairly uniform stand of Giant Sacaton. Concerns are that there are few young plants to be seen and many of the older plants have large buildup of oxidizing material. A fairly diverse community of forbs are present ,but in low numbers. Use by elk and mule deet is evident by dung droppings. Past overuse of fire may have contributed to the lack of litter and bare areas encountered.

### 12 Most Abundant Plants



## River Ranch Rangeland Health Study

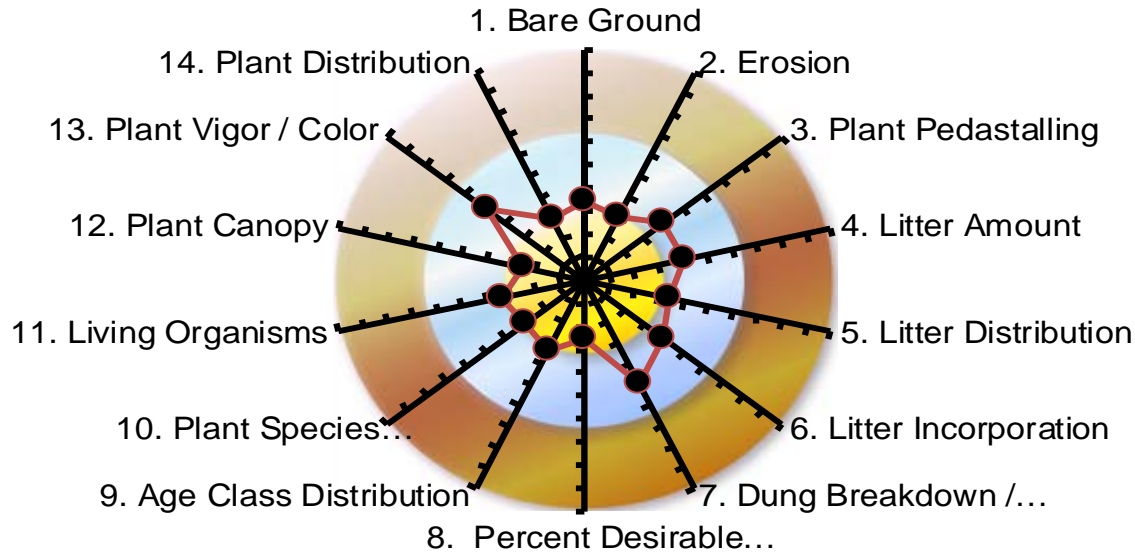
ESD: NRCS Soil Type D (New Classification) Transect T-2 NRCS MC-6

Date: 5-6-2015 Examiner: K. Gadzia

**Gold:** Achieving goal.

**Silver:** Moving toward/away from goal.

**Bronze:** Not achieving goal.



**Transect Location  
GPS Coordinatates**

13S 02235903  
3608499

**Goals include:  
wildlife habitat,  
species of concern,  
watershed, grazing  
management, and  
demonstration  
area.**

This is the first rangeland health evaluation for this site. Judging by the 14 rangeland health indicators monitored, this site is in a relatively healthy state in 2015. The site retains good plant cover, very little erosion and good litter cover. This site is strongly dominated by Giant Sacaton with at least 90% of the vegetation production. There are obvious contrasts between the burned and unburned margins of nearby areas, as shown in the photos. Less litter and more green characterize the old burned areas. The site could benefit from grazing, mowing or perhaps further burning in unaffected areas. Any burning should be followed by mowing or grazing on a rotational schedule. This site was chosen because it is representative of soil type D which is characteristic of a large part of the riparian area and is a new classification done by the NRCS for the ranch. There is less diversity of forbs here due to almost complete plant canopy cover.



**Photo Points**



**RR T-2-M C-6 Overview 5-6-2015**



**RR T-2-M C-6 Plot 5-6-2015**



**RR T-2-M C-6 Overview 2-23-2015**



**RR T-2-M C-6 Close-up 2-23-2015**





Burned area green growth and lack of litter on T-2 Site



Old burned sacaton carcass with pedastalling on T-2 site.

Apparent range trend: 

Stable trend due to positive summary of monitoring indicators.

**Notes:** This site appears to be a mosaic of formerly burned Giant Sacaton and unburned portions. The unburned areas exhibit more litter cover and younger plant recruitment. This patch burning pattern might be an interesting study of direction of land health and the tool of burning in this environment. There is a less diverse community of forbs are present ,mainly cosistng of Moth Mullein. The lone mesquite plant appears dead or severly frosted, as observed in many other areas.

### 12 Most Abundant Plants



## River Ranch Rangeland Health Study

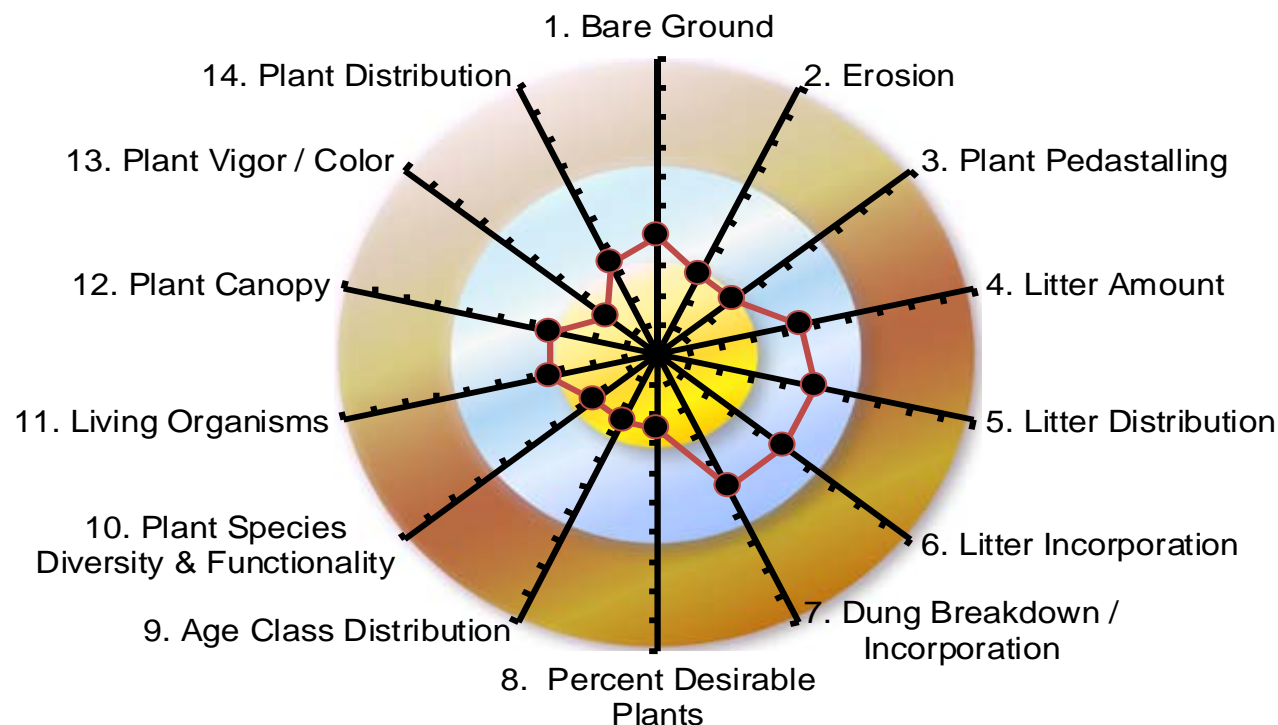
**ESD: Hills RO42XB027NM Transect RRT-3 BLM 02525**

**Date: 5-7-2015 Examiner: K. Gadzia**

**Gold:** Achieving goal.

**Silver:** Moving toward/away from goal.

**Bronze:** Not achieving goal.



### Transect Location GPS Coordinatates

13S 0223502

3606771

**Goals include:**  
wildlife habitat,  
species of concern,  
watershed, grazing  
management, and  
demonstration  
area.

This is the first rangeland health evaluation for this site. Judging by the 14 rangeland health indicators monitored, this site is in a relatively healthy state in 2015. The site retains good plant cover by black grama, little erosion, and fair litter cover. The forb community is diverse here and includes Locoweed, which should be considered in any future grazing plans during the spring. This site was chosen because it had a transect reading and photos from 1997 and is representative of the low slope Hills ESD. As this site moves upward toward the steeper areas and downward towards the more level areas, the vegetation (and production) changes dominance dramatically, although the ESD remains Hills.



**Photo Points**



**RR T-3-BLM 0252 Overview 5-7-2015**



**RR T-3-BLM 0252 Plot 5-7-2015**



**RR T-3-BLM Overview 02-04-1997**



**RR T-3-BLM Plot View 02-04-1997**





Kangaroo rat mounds and connecting trails abundant on T-3 Site

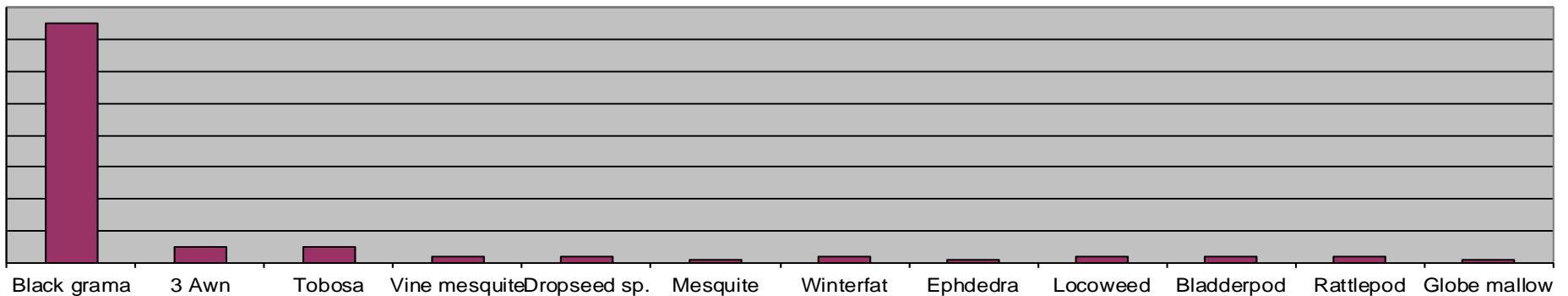
Locoweed on site should be noted for grazing planning timing.

Apparent range trend: 

Upward trend since 1997 due to data comparison and photos.

**Notes:** This site appears to be in an upward trend judging from the 1997 reading of the site by the BLM. The black grama grassland community is very stable and appears to be thickening in cover. There is an abundance of various species of forbs interspersed with the grass community, this should make good antelope habitat, although none were observed on this site. There was lots of rooting evidence by Javalena and this disturbance provides good areas for forb regeneration.

### 12 Most Abundant Plants





## River Ranch Rangeland Health Study

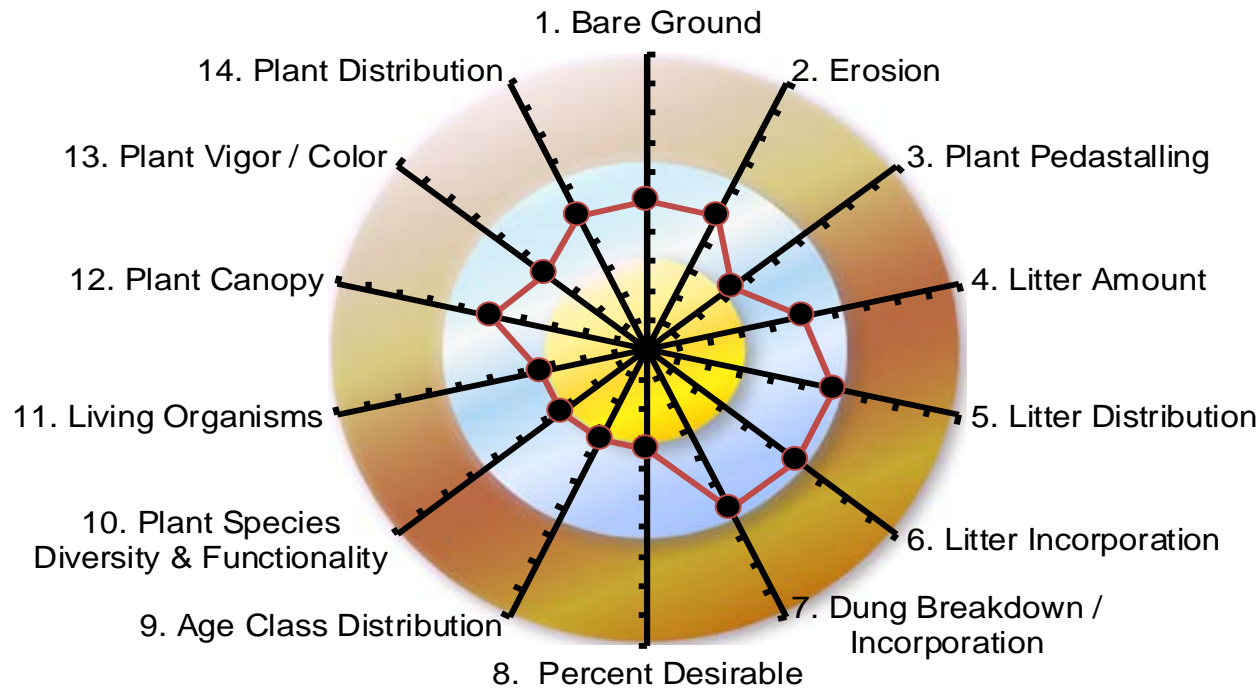
**ESD: Hills RO42XB027NM Transect RRT-4**

**Date: 5-7-2015 Examiner: K. Gadzia**

**Gold:** Achieving goal.

**Silver:** Moving toward/away from goal.

**Bronze:** Not achieving goal.



**Transect Location  
GPS Coordinates**

13S 0225059  
3606711

**Goals include:**  
wildlife habitat,,  
species of concern,  
watershed, grazing  
management ,and  
demonstration  
area.

This is the first rangeland health evaluation for this site. Judging by the 14 rangeland health indicators monitored, this site is in a relatively unhealthy state in 2015. The site has too much bare ground, and poor litter cover. However there is good species diversity and recruitment of young of desirable species in the area. This site is located on a fairly shallow soil and is representative of the Hills ESD as it nears the junction of the Mimbres river plains and soil types. This site indicates the high variability of the Hills ESD with its Tobosa / Mesquite dominance as opposed to other areas where black grama dominates (T-3) . Young mesquite plants are abundant and this is probably the biggest concern at this site.

**Photo Points**



**RR T-4-Hills Tobosa/Mesquite Overview 5-7-2015**



**RR T-4 Hills Tobosa/Mesquite Plot 5-7-2015**



**Overview of T-4 Hills to North. Note Loamy ESD in background**



**RR T-4 site with clear boundary of rocky outcrop and cover loss**





Hedgehog Cactus (*Echinocereus fendleri*) in full bloom.



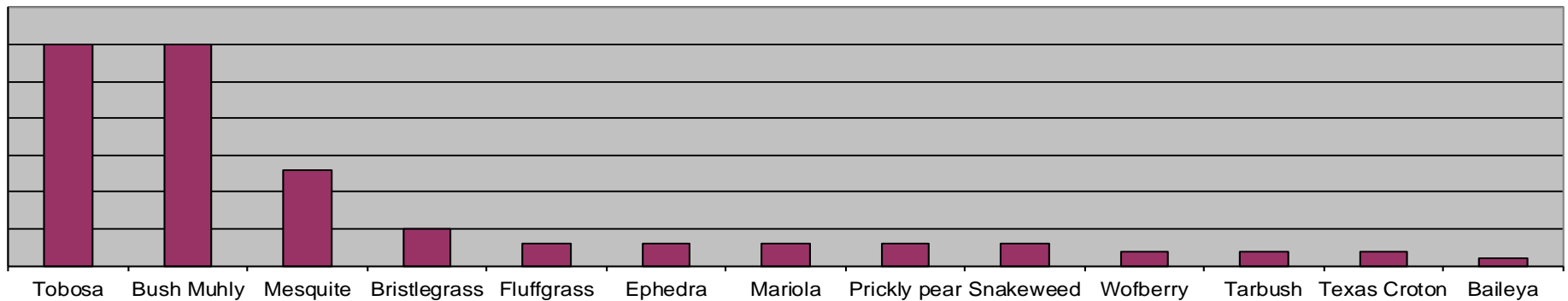
Bush muhly established in transitional rocky areas of site.

Apparent range trend: 

Stable to downward trend because of apparent mesquite encroachment.

**Notes:** This site appears to be in a slight downward trend judging from the amount of young mesquite plants. The dominance of tobosa grass quickly gives way to rocky shallow areas that are dominated by other species such as Bush Muhly and mesquite. There is a fairly good variety of forbs interspersed with the grass community and cacti of various species were also observed. The site was chosen to help show the variation in the Hills ESD sites found on the property.

### 12 Most Abundant Plants



## River Ranch Rangeland Health Study

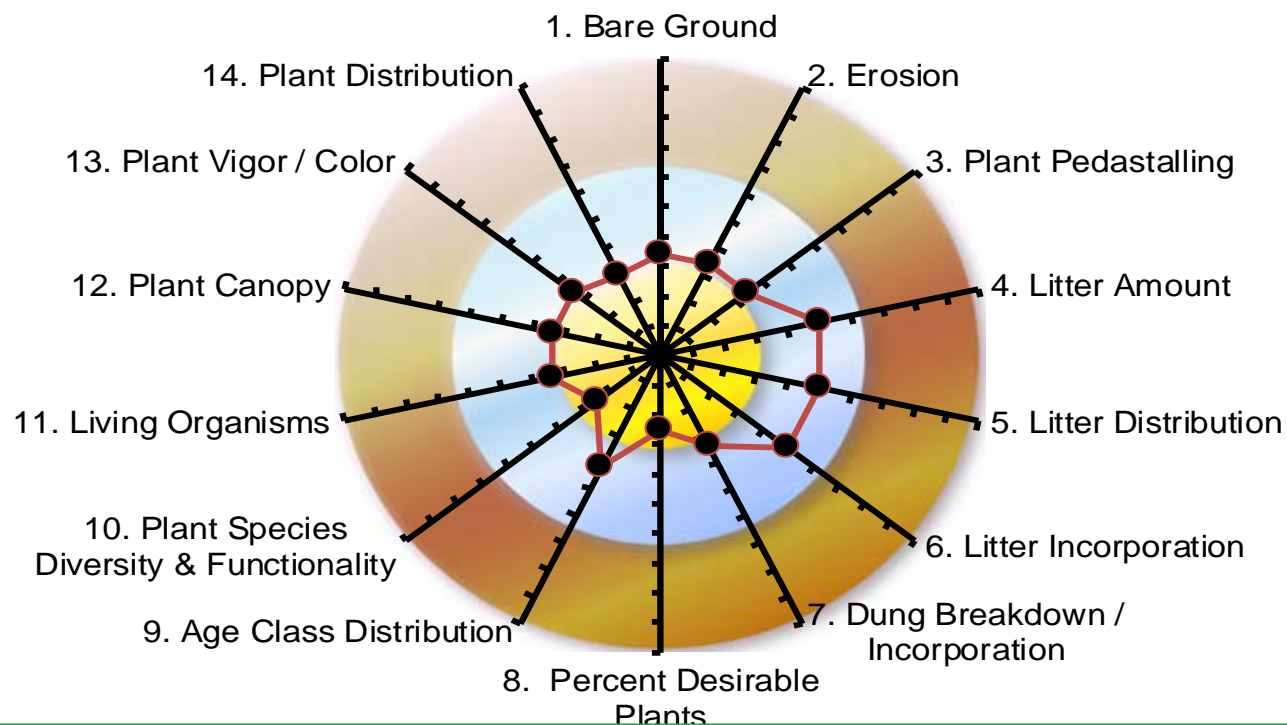
**ESD: Hills RO42XB027NM Transect RRT-5**

**Date: 5-8-2015 Examiner: K. Gadzia**

**Gold:** Achieving goal.

**Silver:** Moving toward/away from goal.

**Bronze:** Not achieving goal.



### Transect Location GPS Coordinatates

13S 0222498

3608075

**Goals include:**  
wildlife habitat,  
species of concern,  
watershed, grazing  
management, and  
demonstration  
area. Location of  
transect on BLM  
allotment 0252.

This is the first rangeland health evaluation for this site. Judging by the 14 rangeland health indicators monitored, this site is in a relatively healthy state in 2015. The site has little bare ground and is very rocky with a rock mulch cover between most of the plants. The site is dominated by a healthy stand of blue grama with tobosa and many other grass species encountered. There is also good species diversity of forbs and no invasive species such as mesquite were encountered. This site is located west of the old caliche pit on BLM property and is representative of the Hills ESD over much of the BLM acreage on the west side of the ranch. A lone female antelope was seen from the transect site.



**Photo Points**



**RR T-5-BLM Hills Black Grama/ Tobosa Overview 5-8-2015**



**RR T-45 BLM Hills Black Grama-Tobosa Plot 5-8-2015**



**View E from T-5 towards Taylor Mountain and Cooks Peak**



**RR T-5 site with pea vine vetch growing amongst the tobosa**





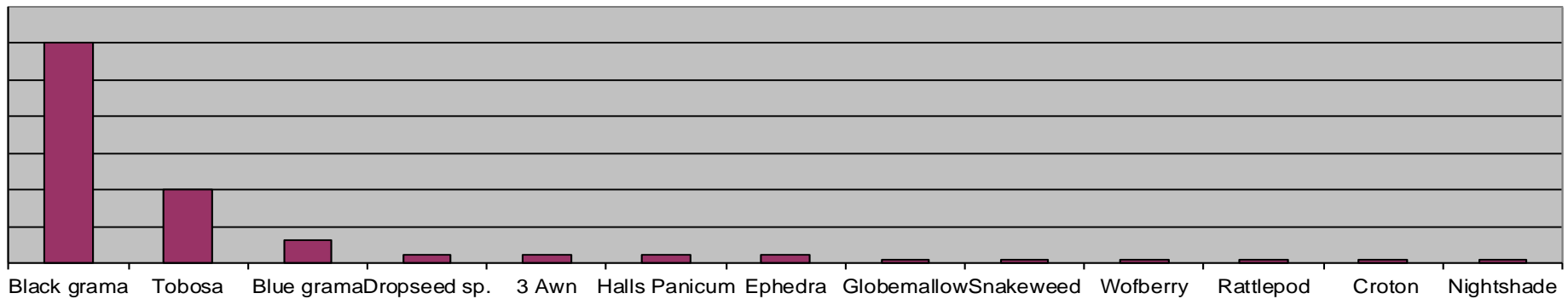
Locked gate on BLM 0252 allotment area in background is grazed

Windmill and tank located 1 mile SW of RR T-5

**Apparent range trend:**  **Stable to upward trend because of positive health indicators & rock mulch cover**

**Notes:** This site appears to be stable and improving. There was no evidence of grazing or dung on the transect area. The areas with tobosa grass had pea vine vetch growing in them, which is a rare sight. There is a locked gate on a fence on the allotment, which is unusual and the area north of it is grazed. Also, there is a windmill located SW of the transect about one mile. There is no fence between the transect site and this windmill, but it is located off the allotment. Further investigation seems warranted.

### 12 Most Abundant Plants



## River Ranch Rangeland Health Study

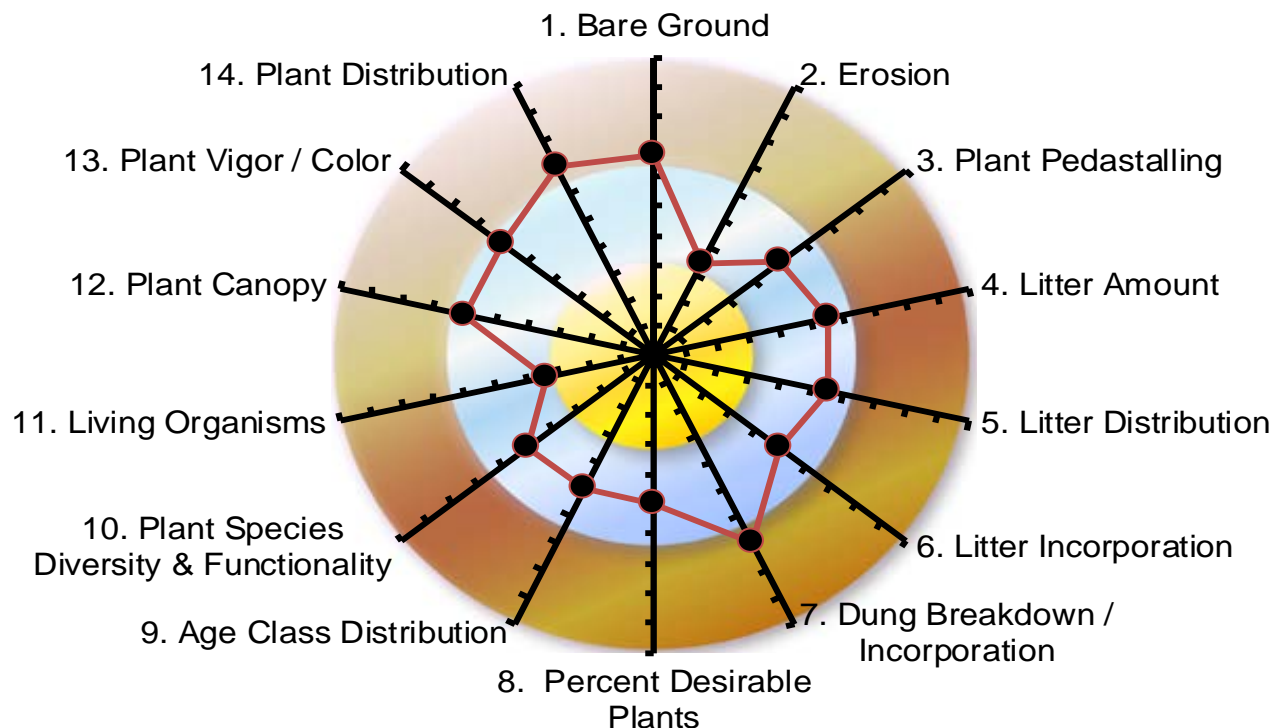
**ESD: Hills RO42XB027NM Transect RR T-6 MC-1 NRCS Soil Type D**

**Date: 5-9-2015 Examiner: K. Gadzia**

**Gold:** Achieving goal.

**Silver:** Moving toward/away from goal.

**Bronze:** Not achieving goal.



### Transect Location GPS Coordinatates

13S 0226005

3607214

**Goals include:**  
wildlife habitat,  
species of concern,  
watershed, grazing  
management, and  
demonstration  
area.

This is the first rangeland health evaluation for this site. Judging by the 14 rangeland health indicators monitored, this site is in a relatively unhealthy state in 2015. The site has large areas of bare ground and many of the bare areas are connected and dominated by weedy species. The site is dominated by giant sacaton, but it appears to be losing ground to mesquite invasion. This site is located on the East side of the river towards the center of the ranch property. It is representative of a fairly large are of Soil Type D that appears to be declining in vigor. Disturbance from proper grazing, mowing, and mesquite control would be helpful in rejuvenating this area. Burning might also be used to help with site mainteance.



**Photo Points**



**RR T-6-M C-1 Soil D Overview 5-9-2015**



**RR T-6-M C-1 Soil D Plot 5-9-2015 (green plant was clipped in December)**



**NRCS Photo of M C-1 view E taken 12/11/2015**



**NRCS Photo of M C-1 plot taken 12/11/2015**





Bare weedy area with old cow dung in RR T-6 site

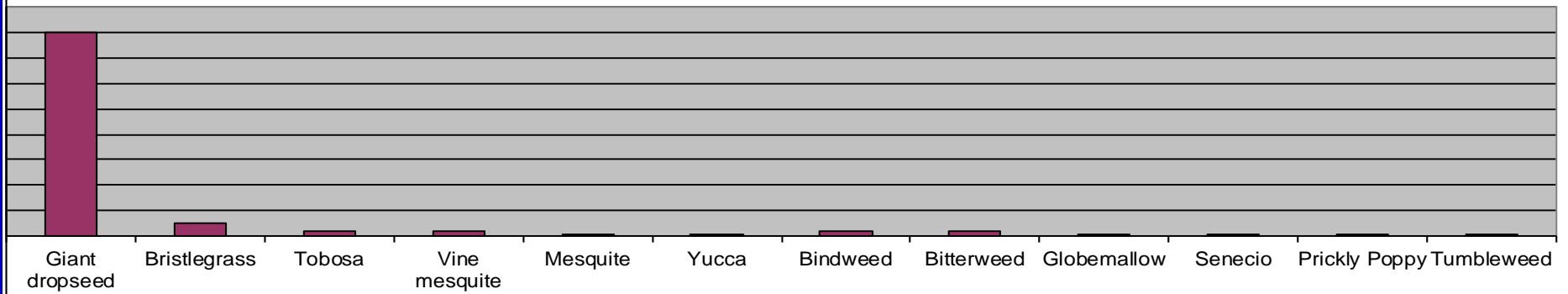


RR T-6 site with good cover from Giant Sacaton

**Apparent range trend:**  **Stable to downward trend because of negative indicators & areas of bare ground.**

**Notes:** This site appears to be declining in health because bare ground percentage is high and mesquite are invading the area. The old dung on the transect area has not broken down in many years which indicates a poor mineral cycle. On a positive note, there are adjacent areas that retain good cover from the Giant sacaton grass and have good litter cover as well. This site is a balance of both poor and good qualities, and was chosen because it represents both types in one area.

### 12 Most Abundant Plants



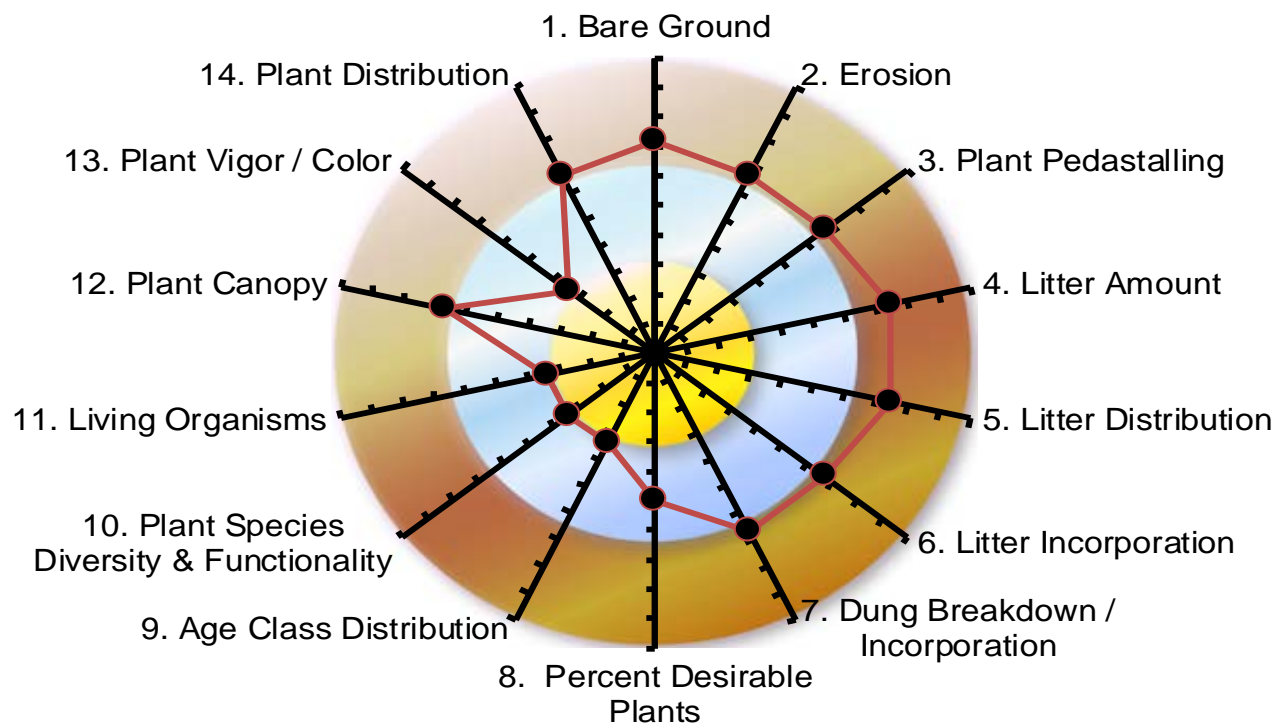
## River Ranch Rangeland Health Study

**ESD: Loamy RO42XB014NM Transect RR T-7    Date: 5-9-2015    Examiner: K. Gadzia**

**Gold:** Achieving goal.

**Silver:** Moving toward/away from goal.

**Bronze:** Not achieving goal.



**Transect Location  
GPS Coordinates**

13S 0226005  
3607214

**Goals include:  
wildlife habitat,  
species of concern,  
watershed, grazing  
management, and  
demonstration  
area.**

This is the first rangeland health evaluation for this site. Judging by the 14 rangeland health indicators monitored, this site is in a relatively unhealthy state in 2015. The site has large areas of bare ground and appears to be losing ground to mesquite invasion. On the positive side, there are components of desirable plants such as 4 Wing slatbush, Winterfat and Porters muhly that appear to be increasing and may continue to do so. Although this site makes up only about 7% of the entire property, it was representative enough of some areas to warrant inclusion in the study. Typically, loamy sites can be productive but are subject of rapid degradation with abuses such as overgrazing.



**Photo Points**



**RR T-7 Overview 5-9-2015**



**RR T-7 Plot 5-9-2015**



**Porters muhly plants establishing in the open ground.**



**Healthy Winterfat shrubs growing with Porters muhly grass.**





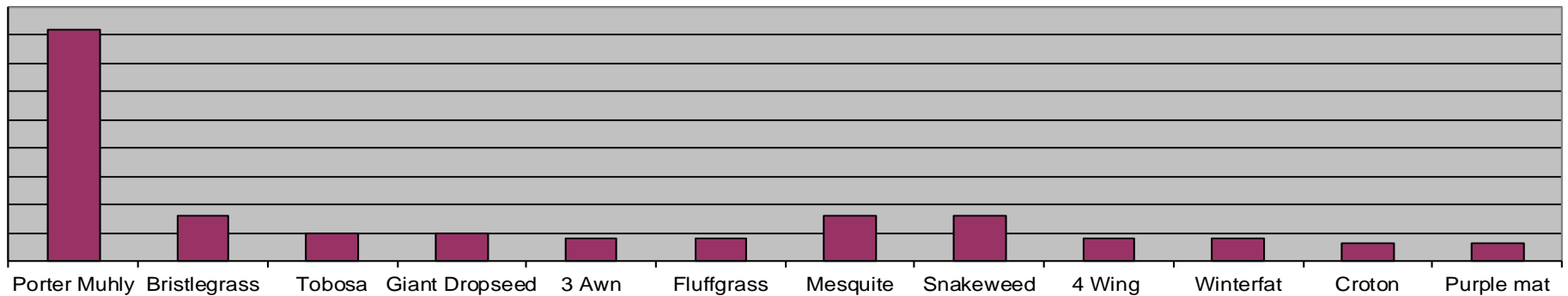
Formerly eroding area near RR T-7 showing stabilized erosion.

RR T-7 Overview showing mesquite cover.

**Apparent range trend:**  **Stable to downward trend because of negative indicators & areas of bare ground.**

**Notes:** This site appears to be declining in health because bare ground percentage is high and mesquite are invading the area. It might be possible to improve this site with mechanical or chemical clearing of mesquite, but other areas may have a higher priority for treatment options. Despite past uses that probably degraded this site, it appears to be slowly healing in some ways, such as reduced erosion and establishment of desirable plants. Javalena and rodent activity signs were abundant in the site area.

### 12 Most Abundant Plants



## **Rangeland Health Summary**

Analysis of data from the 7 evaluation sites, as well as driving and walking surveys of the areas indicates that the River Ranch is in a stable to improving condition in most areas. There are many indications that the land was once in far poorer condition, as evidenced by the gully erosion and BLM 1997 data collected. However, as the Bullseye targets show, almost all areas show room for improvement in land health. The drought of 2010-2012 that had impacted the entire region has also had moderate to severe consequences on some sites and may be the reason for some die off of grasses and replacement by woody species such as mesquite.

Because of their importance and uniqueness, 3 of the seven indicators were located in the bottomland area of the private land. Although the land area here is small in comparison to the acreage of the uplands, the productivity and habitat values are much higher on an acre per acre basis. Rangeland Health readings on these sites showed a range from healthy and stable to unhealthy and declining. A detailed description and range of options to improve these sites are discussed in the Grazing Management Plan. There was no recent sign of livestock grazing or fire disturbance in these sites which has led to the buildup of old material in many areas and increased the potential fuel load for a wildfire and tied up the nutrient cycling within these sites.

An equal amount of sites (3) were placed in the Hills ESD, which makes up approximately 80% of the acreage of River Ranch, when including private, BLM and State lands. An effort was made to place these sites to reflect the high degree of variability contained within the Hills sites. This variability is based on many factors but slope, aspect and soil depth are probably the three biggest influences.

Overall, the majority of the land in the Hills classification appears to be in a very healthy to moderately healthy condition at present. The bulk of these areas show no signs of recent livestock grazing or fire. Wildlife sign was noted in most areas including many species of birds (see lists in Appendix D) Javelina, Mule Deer, Elk, Antelope, Rabbits, Coyote, Badger, and many rodents (especially Kangaroo rats).

The lack of disturbance from grazing and fire has produced an oxidized condition (dark gray coloration) of many of the grass plants in these sites. While this can be viewed negatively because of its impacts on mineral cycling and plant vigor, the fact that this does not appear to be negatively affecting wildlife is a consideration that must be considered in any grazing plan. Additionally, Black grama and Tobosa grass which are prevalent on these sites, have the ability to grow over their own old stems and increase cover over time without being choked out, as some bunch grasses are.

The final transect was placed in the Loamy ESD site which makes up about 7% of the total land area. While not significant in size, the site is probably the most degraded area encountered during the survey. Brush encroachment from mesquite is high as is the amount of bare ground and erosion. This is probably mostly an artifact of past management since this area is located next to a water source and the corrals. Even so, there are signs of improvement because desirable species such as Bush Mulhly, Plains Bristle grass, Winterfat and Four Wing Saltbush appear to be increasing across the site.



**Other Notes and Observations**

The overuse or improper use of any land management tool including livestock grazing, fire, mechanical or prolonged rest can have a negative effect on land health. This ranch shows evidence of nearly all these influences, but most recently, the tool of rest.

The Grazing Management Plan which follows, discusses some of the management options in detail and is a beginning point to develop the correct balance of management tools to produce the goals of the Department for the River Ranch.

## **Grazing Management Plan Options**

If grazing is determined feasible by the Department it must be implemented through a sound grazing management plan. The essential elements of the grazing plan would be the following:

### **Grazing Management Plan Goals:**

1. To use grazing to improve the habitat for SGCN and associated species.
2. To use grazing to improve the recovery of the Mimbres River riparian and aquatic habitats to fully functioning condition.
3. To use grazing to reduce fire hazards to ecologically and culturally significant resources such as Tigner Grove.
4. To use grazing to improve the watershed of uplands surrounding the riparian corridor.

Implementation of the grazing plan to achieve these goals will require a knowledgeable livestock operator with the ability to understand the objectives of the Department and balance livestock needs with the aforementioned goals. Accomplishing this may require some training in understanding the grazing planning process or finding a lessee with a proven track record of management towards similar goals.

### **General Grazing Management Plan Factors:**

Because of yearly variations in rainfall timing and amount patterns, the rotational grazing plan should also be flexible. Some guidelines in developing the plan each year include the following factors:

1. Any factors that influence SGCN habitat or other requirements such as critical times for breeding, nesting, or other related dynamics. Other wildlife species needs such as cover and forage must also receive priority in the plan.
2. Grazing of Sacaton dominated areas (bottomlands) will usually take place in the spring or summer growth period due to higher palatability and productivity.
3. Upland areas will generally receive dormant season use due to higher quality forage during that time than is generally available in the Sacaton floodplain.
4. Any grazing in the actual riparian corridor (not including associated bottomland areas) should be restricted to dormant season use only or to limited water access points.
5. Grazing periods in active growth should not exceed 30 days in any one pasture.
6. Recovery periods may be 6 month to over a full year and some pastures may need even longer to achieve habitat requirement objectives.
7. Utilize one herd for grazing management if at all possible.
8. Placement of salt and/or minerals should be away from water points.
9. Plan for rotational burning and/or mowing of bottomland pastures on a periodic (3-5 year) basis.

### **Private Land Infrastructure Factors:**

The current state of infrastructure including fences, watering points, working facilities, and roads are in various states of disrepair. Perhaps one of the greatest concerns would be that the entire riparian corridor has access to livestock at this time due to lack of fences or fences that are down. It is recommended that a general fence plan be developed that separates the river corridor from the surrounding floodplain pasture areas. In addition much of the uplands on the west side of the river are not fenced separately and can be accessed from the river pastures. Permanent fences that cross the river should be avoided if possible. A possible plan that shows draft of such paddock development on the private land is shown on page 45.

In general the infrastructure necessary for proper grazing management on the private land portion of the River Ranch is deteriorated or non-existent. Many of the fences are in poor repair and all are down wherever they cross the river. The only functioning water system appears to be associated directly with the corrals, storage building and windmill located west of Tigner Grove. However there is very limited storage of about 1,500 gallons at the small tank located above the corral.

No other functioning watering points, other than some abandoned troughs (see photo below), could be found except those noted on the map on BLM land. Responsibility for maintenance of these windmills must also be clarified. The wells and submersible pumps at the north and south ends of the private land may be functioning but have not yet been tested. Pipelines from these water sources to drinking troughs in other areas also do not appear to exist. The well on the north side appears to be solely used for the irrigation of a small pasture with a side-roll distribution for the water, and the system appears inoperable presently.



The small corral by the functioning windmill would be serviceable with a minimal amount of repair. However, the other set of corrals at the south end of the ranch is completely dilapidated and would need to be entirely rebuilt if required.

The roads system throughout the ranch, with the exception of Taylor Mountain Road, is fairly rough 2 track, and in some areas impassible due to wash outs. A plan to maintain needed roads and properly close unused or unnecessary roads should be developed.

Except for the river, the single existing watering point for livestock is at the working corrals. This situation is problematic and will need to be addressed in the grazing management plan. Because of the productivity of the Giant Sacaton areas, these pastures should be isolated from the uplands wherever practical. At present, because of the fence locations and state of repair, the entire private land is essentially available to any livestock that would be brought in.

The general plan to properly develop grazing infrastructure on the private land to achieve the goals of the Department would be to:

1. Isolate the River corridor from the floodplain pastures by fencing where practical.
2. Isolate the upland pastures from the floodplain pastures by fencing where practical.
3. Establish 1-3 floodplain pastures on the west side of the river and 6 - 8 floodplain pastures on the east side of the river to facilitate proper stock density, grazing period control, and allow for recovery before re-grazing. Size of floodplain paddocks should reflect roughly equal forage production to facilitate similar grazing periods.
4. Design fences to be resistant to fire damage in order to retain this tool for periodically managing the floodplain Sacaton pastures. Typically this is steel permanent fence or temporary electric fence with steel corners.
5. Provide water for livestock through a pipeline system with drinkers or selected access points to the river with hardened crossing spots for livestock and vehicles.
6. Develop the grazing plan to maximize forage utilization for floodplain and upland vegetation on a rotational basis.
7. Work with BLM and State grazing management personnel to clarify Allotment use boundaries (see discussion below) and coordinate goals for land health objectives and habitat needs. Develop alternative watering points and gates that facilitate ease of livestock movement between pastures.

#### **BLM and State Lease Land Infrastructure Factors:**

Rangeland infrastructure and health conditions on the BLM (1,800 ac.) and State (1,100 ac.) leased lands were also assessed. In general these areas appear to be in moderately good health and stable condition. As with the private land sites, there are some areas that are in poor to declining health condition, but these are the exception. Access to these areas is from Taylor Mountain Road and from gates along Highway 61. Some of the gates on BLM land which appear to be in the Allotment were found to be locked.

Some anomalies seem to exist in the Allotment and State Land boundaries and the areas that are actually grazeable. It appears that the actual fence lines are somewhat different from the fence lines shown on the BLM Allotment and State Land ownership overlays. In several cases the Allotment boundaries themselves are not fenced or fences exist that do not show on the BLM maps. Additionally, the private land fence lines do not appear to always follow the private land boundary line as shown on the property ownership overlays (See map on page 41).



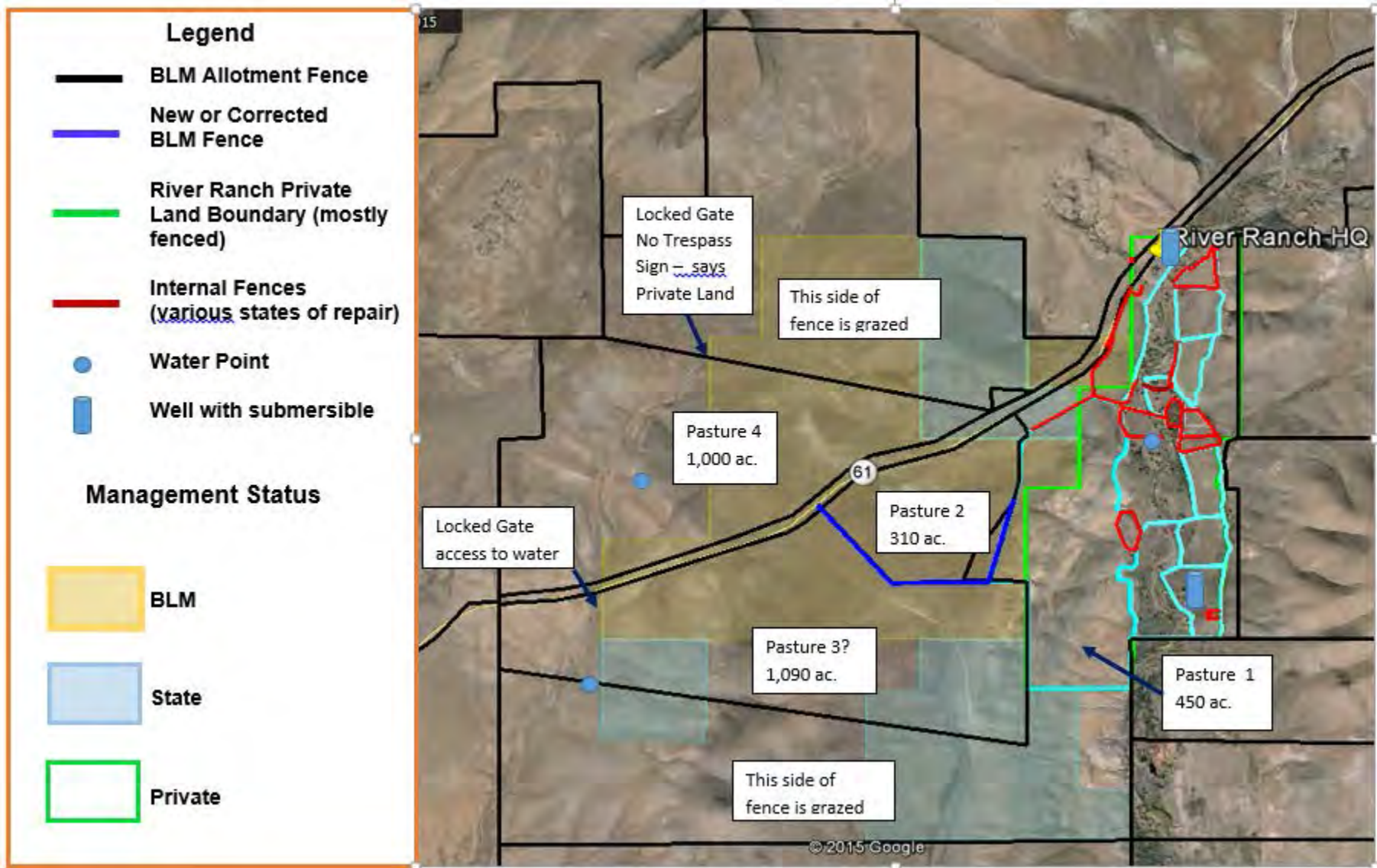
On the West side of Highway 61 a fence across BLM land runs in a NW direction from the State land southern boundary to the fence around City of Rocks SP and then south along the access road to the SP from the highway. There is no fence on the BLM western boundary of the BLM allotment so that this large area would be open for grazing if livestock were brought in through the gate leading to the caliche mines. Additionally, a good water source with windmill, storage tank and drinker is situated nearly at the center of this pasture on BLM land (see photo below). No grazing is currently taking place in this pasture, which is approximately 1,000 acres.



An important fence line is not shown on any maps. This fence is entirely on BLM property and parallels Taylor Mountain Road (TMR) to the north for about .7 miles before turning east for 1/2 mile and intersecting the private land fence boundary. This fence cuts off grazing access to a large part of the BLM land to the south and the entire State property south of TMR. This fence creates what is labeled Pasture 2 on the map and is approximately 310 acres in size. There does not appear to be any water point associated with this pasture unless there is access given to the water on private land.

Another fence bisects both of the State properties south of TMR and runs in a NE direction to a windmill and corral west of the allotment. Access to this water point and working facility is from a locked gate with a private property sign at Highway 61. This creates what is labeled Pasture **3?** on the map which is approximately 1,090 acres in size. However, the **3?** denotes that it is unclear if this is part of the Allotment or not. Certainly the only road access to this water point and associated corrals is clearly locked and marked as private.

In general the fences are in fair to good shape but two of the 3 pastures are fairly large and these are the only 2 of that have a water source. Despite the discrepancies in boundaries outlined above, the overall approximate acreage of these 3 areas (2,400 acres) is very close to 2,376 acres reported to be on the combined BLM and State leases.



The land north of the fence described above is inaccessible from the road leading to the caliche mines because the gate is locked and has a No Trespassing / Private Land sign at the gate. The actual gate may be on private property, but this fence cuts off access to the north ½ of the BLM allotment on the west side of the highway as well as all the State land on that side.

Perhaps some trade of use or access agreement has been recorded for these anomalies. In any case, these are major concerns with the grazing plan development. The question is which of these pastures are assigned to the BLM and State leases for the River Ranch? It appears that there is actually about the same amount of acreage in total, but it does not correspond with the Land Management Status maps currently provided. These details would need to be worked out with the agencies prior to finalizing or implementing the plan.

### **Carrying Capacity:**

The private land with its highly productive terraces dominated by Giant Sacaton (*Sporobolus wrightii*) grass, differs greatly in its carrying capacity for livestock than the BLM and State uplands to the west and south. Using a conservative estimate of 750 pounds average of useable forage production per acre for these areas, an estimate of carrying capacity can be projected as follows:

- 750 lbs. per acre x 220 acres (east side of river only) = 165,000 lbs. forage
- 165,000 lbs. / 30 lbs. per animal unit per day = 5,500 animal unit days of grazing (AD's)
- 5,500 AD's / 30 days per month = 183 Animal Unit Months (AUM's)

The combined overall capacity for the permitted livestock is 31 Animal Units (cow with calf) for one year on the BLM Taylor Mountain Allotment 02525 and 17 Animal Units for the State Land lease GT-2853, for a total of 48 Animal Units year long.

48 Animal Units x 12 months = 576 Total Animal Unit Months (AUM's)

However, it might be possible to run a higher stocking rate closer to 72 Animal Units if grazing capacities on the BLM and State properties are calculated in Animal Unit Months and the remaining 4 months grazing is on private land.

- 48 AU x 12 mos. on lease land = 576 AUM's; Current Permitted AUM's.
- 60 AU X 9 mos. on lease land = 540 AUM's (26 AUM's below permitted capacity)
- 60 AU X 3 mos. on private land = 180 additional AUM's taken on private land while leased land is resting.

The reasons for potentially wanting to have a higher stocking rate include higher stock density, economy of scale, more attractive to potential lessee, and more flexibility to reduce numbers in drought conditions. This increase in animal numbers, but overall reduction in AUM's removed from the leased land would need to be approved by the BLM and State agencies.

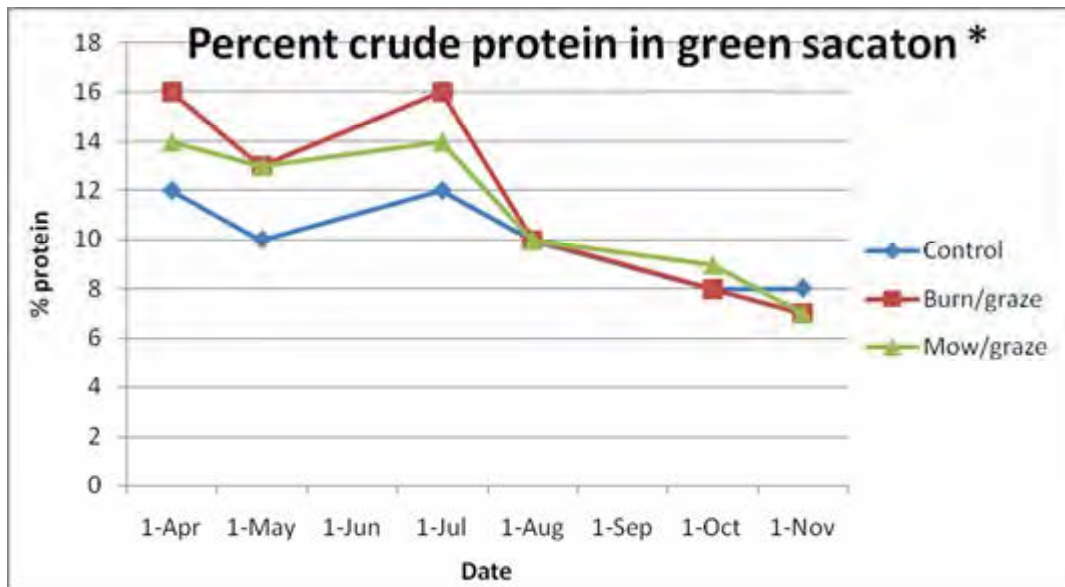
### **Bottomlands**

The major species which typifies the C and D soil types and provides the majority of forage, cover, watershed protection and habitat for various species is Giant Sacaton (*Sporobolus wrightii*). Giant Sacaton bottoms can be found throughout southern New Mexico at elevations from 3,400 feet to over 5,000 feet. They occur on floodplains, alluvial fans and stream terraces where the soils are loamy to clayey in texture. On the River Ranch at least 350 acres of the private land along the river is characterized by this species.



Although Giant Sacaton is potentially extremely productive with annual production varying from 1,000 to over 5,000 pounds per acre, proper management is often problematic. Because the grass is relatively unpalatable to livestock unless it is fresh growth, it tends to build up old material for 3 or more years on the plant. Also, because the growth happens so fast, it is difficult to put on enough livestock to consume the production while the plant is most nutritious.

These factors often lead managers of these areas to use burning or mowing as a way to control the old growth and freshen the plants back up. The following graph shows the decline in forage quality of protein levels through the year with different management regimes.



These strategies

can be effective, but overuse of burning in particular produces negative consequences including loss of soil cover, failure to recruit young plants, and larger spaces between old clumps. Some areas of the ranch exhibit these symptoms and they appear to be a legacy from past management regimes. A neighbor familiar with the past management of the ranch reported that these areas were burned semi-annually, mowed on the alternate years and grazed following these treatments. The combination of these treatments appears to lower productivity of these areas over time.

An excellent publication concerning management of Giant Sacaton is "Prescribed Burning in Giant Sacaton Bottomlands" by Dan Robinett, May 16 2009. In this publication there are several recommendations made for burning and grazing management of Sacaton bottoms in Arizona. Other publications which report data on management practices of Sacaton are listed in Appendix E. The following recommendations are from Robinett, 2009:

**The risks associated with Sacaton burns can be minimized by following a good prescription.** Risks include; burning without adequate moisture for re-growth and subsequent loss of plant density and productivity, loss of soil cover and increased risk of soil sheet and gully erosion, high fuel loads increases the risk of escaped fire and possible increase in noxious weeds.

**A good prescription for Prescribed burning in giant Sacaton bottoms is as follows;**  
**Recommended Frequency** – No more than once every three years



**Burn window** – February 15 – March 15

**Pre-burn moisture conditions** – Should have at least 4 inches of available soil water in a five foot root zone. This can come from winter precipitation (4 inches Nov. 1 through Feb 15) or from late summer or fall flooding during the previous year.

**Temperatures** - Daytime 59-68 degrees F Night -time 23-41 degrees F

**Relative humidity** - Between 20 and 30%

**Wind speed** - Less than 10 mph

**Extent of burn areas** – Large areas of Sacaton bottoms can be treated leaving unburned strips to retain plant cover and prevent erosion in large summer floods

**Recommended grazing season** – May 1 through July 15

**Stocking rate** – variable but should average 0.5 AUM per acre for the season

Another contributing factor to the decline of the Sacaton bottoms in some areas may be disconnection of the Mimbres River from the upper terrace (D soils) in particular. The riparian survey that has been conducted may help to determine if this is in fact the case. There are restoration techniques that could be implemented to help reconnect the floodplain to improve the chances of periodic flooding.

The higher production sites usually have seasonally high water tables and / or receive extra water from flooding due to runoff from their watershed areas. Lower production sites usually have deeper incised channels and no longer flood although they may have seasonal water tables within the rooting zone of Giant Sacaton. This species has one of the deepest rooting zones of all grasses, at 20-25 feet. In nearly every Sacaton site on the ranch the variation in degree of productivity can be seen due to many factors. The photo below shows a healthy Sacaton bottom site near Tigner Grove. Note the growth is over 6 feet tall in many areas. This photo was taken near the RR T-1 monitoring location.



## Grazing Management Recommendations for Tigner Grove

Tigner Grove is a unique environment that is considered a “jewel” along the Mimbres River. The grove of trees that exist here consists primarily of the following species in approximated order of abundance:

<b>Velvet Ash</b>	Fraxinus velutina
<b>Box Elder</b>	Acer negundo
<b>Cottonwood</b>	Populus wislezeni
<b>Hackberry</b>	Celtis reticulata
<b>Arizona Walnut</b>	Juglans arizonica
<b>Soapberry</b>	Sapundis saponerica
<b>Mulberry</b>	Morus rubra

While these species and others exist along most of the entire riparian corridor, the large size and density of the trees in the grove is remarkable. Although not verified, State record trees of Velvet Ash and Walnut may exist here. Some regeneration of the tree species was observed, but in general the closed canopy, tight spacing, and shading of the ground seems to prevent much new regeneration.

The understory of this grove is dominated by Giant Sacaton, Western Wheatgrass, and various warm and cool season annual grasses and forbs. This dried forage represents a fire threat to the grove which could kill many of the trees. Reduction of the fuel load by grazing is a good option because it would create some soil disturbance and return nutrients to the site through manure deposition. These factors may in fact help with new tree regeneration in the understory of the grove.

The herbaceous forage density under the canopy is widely variable, but I estimated forage production at the time of the survey to be approximately 25 Animal Days per acre. The current fence around the grove defines an area of about 5.2 acres. This 25 ADA's x 5.2 acres would equal around 130 Animal Days of grazing.

The preferable grazing scenario would be to remove the forage with as many animals as possible for the shortest period of time as possible. Thus, if 130 animal units were put into the grove, they could stay only 1 day. If 25 animal units were put into the grove they could stay about 5 days (130 ADA / 25 Animals).

Currently, the fence around the grove is in need of repair and a water source would need to be provided for the stock at about 20 gallons per day per head depending on the time of year. A forage estimate would need to be done prior and during the grazing period to correctly determine the number of days of grazing desired for the actual conditions at that time.

Because of the large amount of deadfall, sawn timber logs, and firewood piles in the grove; grazing would be preferable to mowing or other mechanical reduction of the fuel load. I also recommend a fixed point monitoring site to be established and data on tree regeneration might also be included. The photos should be taken before and after the grazing treatment, and at approximately one year intervals following the treatment. This will help determine when the grazing may need to be repeated and any positive or negative consequences that result.

Map of Proposed Pasture Numbers and Locations for Upland Pastures: Includes BLM, State, and Private Lands

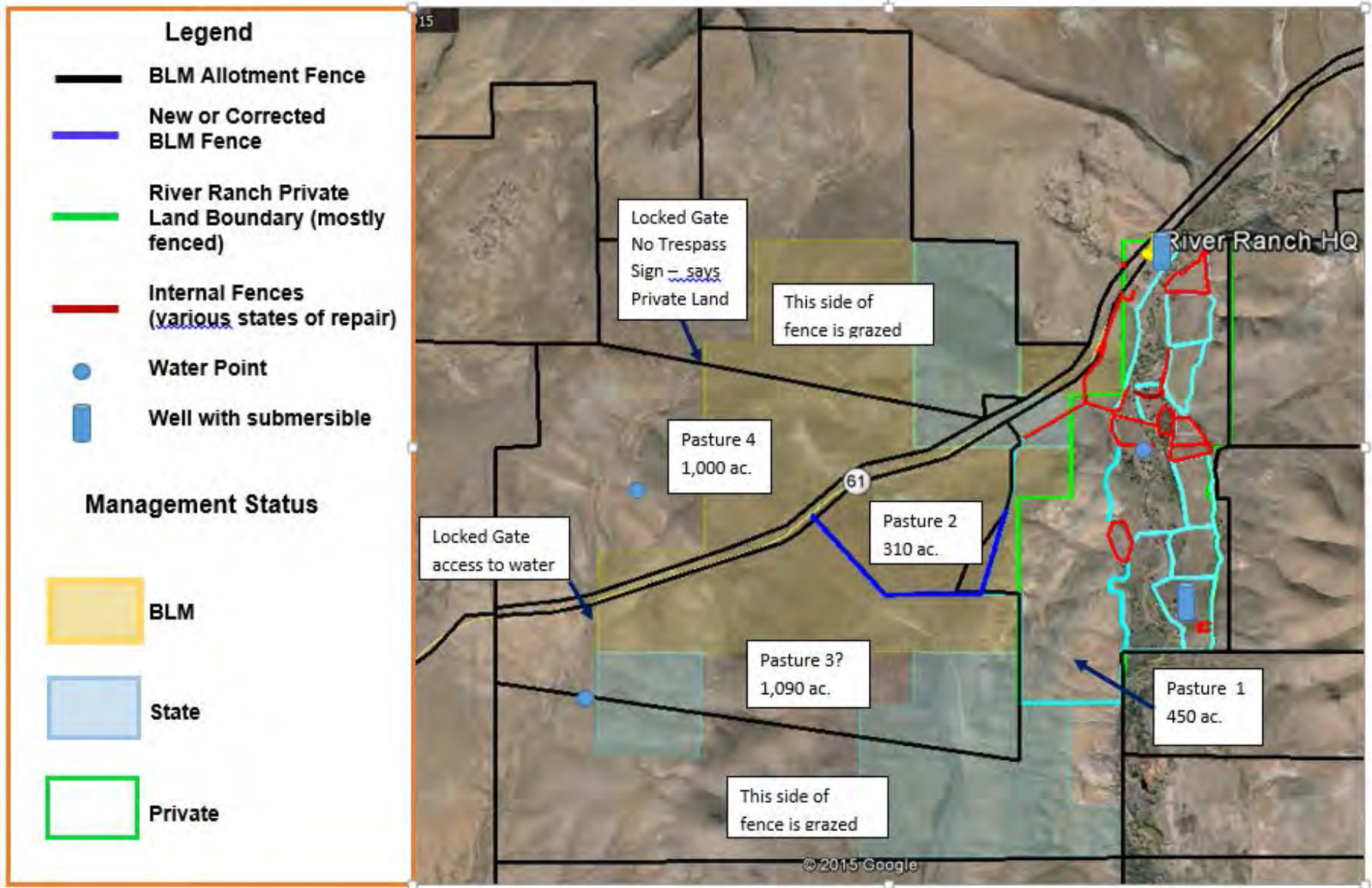
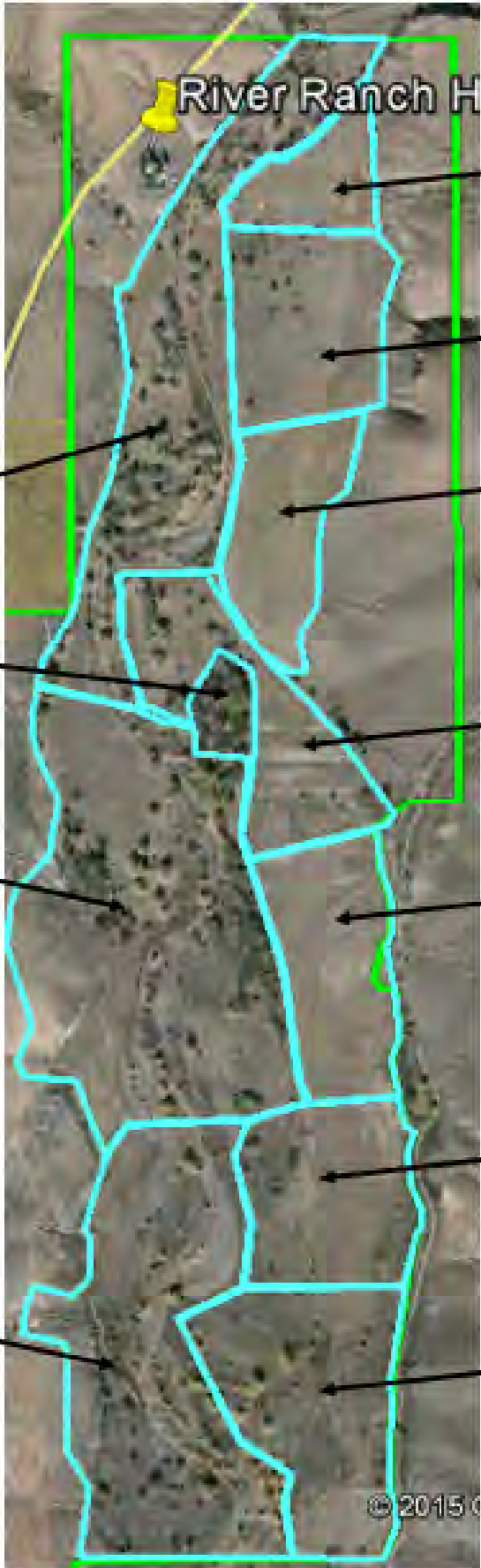




Diagram of Potential Grazing Paddock Development on River Ranch Bottomland. Temporary Electric Fences Recommended



Paddock 1  
Irrigated Field  
15 Acres

Paddock 2  
32 Acres

Paddock 3  
25 Acres

Paddock 4  
33 Acres

Paddock 5  
32 Acres

Paddock 6  
33 Acres

Paddock 7  
50 Acres

Paddock 10  
70 Acres  
Dormant  
Season Only

Tigner Grove

Paddock 9  
105 Acres  
Dormant  
Season Only

Paddock 8  
80 Acres  
Dormant  
Season Only



### Possible Grazing Schedule for River Ranch

As noted earlier in the grazing planning factors section of this report, the timing of livestock grazing must be flexible depending on weather and the other factors that change with each year. The factors also list a number of guidelines for the development of any plan that is put into action. The following chart is only an example of what timings might look like for a grazing schedule that would incorporate the recommendations for paddock development and grazing/recovery guidelines outlined in previous sections.

The timing of grazing for each paddock is based on size considerations, but quality and quantity of pasture will vary in each paddock. Thus, timings may be somewhat longer or shorter based on those factors, but will generally be in this range of time. The following table shows the possible livestock grazing periods if all grazing areas are developed and water is available in each grazing area.

<b>River Ranch Possible Grazing Plan Timings If All Grazing Areas Developed</b>					
<b>Location</b>	<b>Paddock #</b>	<b>Acres</b>	<b>Days</b>	<b>Recovery Period</b>	<b>Comments</b>
RR Irrigated East	1	15	6	One Year	See Map on Page 45. Mow or Burn Every 3rd Year
RR Sacaton East	2	32	13	One Year	See Map on Page 45. Mow or Burn Every 3rd Year
RR Sacaton East	3	25	10	One Year	See Map on Page 45. Mow or Burn Every 3rd Year
RR Sacaton East	4	33	13	One Year	See Map on Page 45. Mow or Burn Every 3rd Year
RR Sacaton East	5	32	13	One Year	See Map on Page 45. Mow or Burn Every 3rd Year
RR Sacaton East	6	33	13	One Year	See Map on Page 45. Mow or Burn Every 3rd Year
RR Sacaton East	7	50	21	One Year	See Map on Page 45. Mow or Burn Every 3rd Year
RR Private Upland	Pasture 1	450	37	One Year	See Map on Page 46. Water Access Available
BLM State	Pasture 2	310	26	One Year	See Map on Page 46. Must Develop Water
BLM State	Pasture 3	1090	93	One Year	See Map on Page 46. Water Available, But Access Unkown
BLM State	Pasture 4	1000	85	One Year	See Map on Page 46. Water Access Available
<b>Total</b>		<b>3,070</b>	<b>330</b>	<b>Then Graze One of the Paddocks Below for Approximately 35 days.</b>	
RR Riparian	8	80	35	3 Years	See Map on Page 45. Grazed in Dormant Season Every 3rd Year
RR Riparian	9	105	45	3 Years	See Map on Page 45. Grazed in Dormant Season Every 3rd Year
RR Riparian	10	70	30	3 Years	See Map on Page 45. Grazed in Dormant Season Every 3rd Year

The following calendar schedule is just a guideline. It begins with the grazing period for the Sacaton bottoms since that is more of a critical time than most other areas. The other most critical timing for grazing is the Riparian paddocks (West side of river) to insure that any grazing takes place in the dormant season. The schedule is to graze one of these areas every third year. All of the dates are approximate and must be flexible with the season and special habitat considerations.

<b>River Ranch Possible Grazing Plan Timings If All Grazing Areas Developed</b>					
<b>Location</b>	<b>Paddock #</b>	<b>Acres</b>	<b>Days</b>	<b>Recovery Period</b>	<b>Potential Calender Dates</b>
RR Irrigated East	1	15	6	One Year	May 1- May 6
RR Sacaton East	2	32	13	One Year	May 7 -May 19
RR Sacaton East	3	25	10	One Year	May 20 - May 29
RR Sacaton East	4	33	13	One Year	May 30 - June 11
RR Sacaton East	5	32	13	One Year	June 12 - June 24
RR Sacaton East	6	33	13	One Year	June 25 - July 7
RR Sacaton East	7	50	21	One Year	July 8 -July 28
BLM State	Pasture 3	1090	93	One Year	July 29 - October 30
BLM State	Pasture 4	1000	85	One Year	October 31 - January 24
RR Riparian	8	80	35	3 Years	January 25 - February 30 Every 3rd Year
RR Riparian	9	105	35	3 Years	January 25 - February 30 Every 3rd Year
RR Riparian	10	70	35	3 Years	January 25 - February 30 Every 3rd Year
BLM State	Pasture 2	310	26	One Year	March 1 - March 27
RR Private Upland	Pasture 1	450	37	One Year	March 28- April 31
<b>Total</b>		<b>2,310</b>	<b>365</b>		

## **Reality Check**

The proposed grazing plan elements represent a fairly sizeable investment of resources in order to develop the infrastructure needed to implement the plan successfully. In addition, a livestock operator familiar with the principles of planned rotational grazing and recovery periods would be needed to apply the system.

However, such operators do exist in the area. David and Tammy Ogilvie ranch in the area and might be interested in operating a lease for the property. Contact information is available from the author if this option might be of interest. In addition the New Mexico Society for Range Management (NMSRM) is offering a tour of the Ogilvie's U Bar Ranch, July 30–31, 2015. Mr. David Ogilvie has invited participants to his ranch just outside of Silver City where riparian management, range improvements, and grazing are producing beneficial results. A detailed agenda will be forthcoming on the NMSRM webpage, but the general plan is to tour the ranch on Thursday (lunch included), have a social mixer that night, and then engage invited speakers with riparian expertise on Friday morning (adjourn by noon). Contact Dr. Nick Ashcroft for additional details (575-646-5394; nashcrof@nmsu.edu).

Other options such as minimal internal fence development but using higher numbers of livestock for a shorter period might prove the simplest alternative. However, with large bottomland pastures, it would be harder to get the kind of stock density that would really impact the Sacaton and simulate a "living fire" or mowing. Additionally, it would be difficult to manage the riparian zones unless this corridor was excluded at a minimum.

At present there seem to be many anomalies in the BLM and State land boundary situation. This can probably be sorted out fairly easily with communications between the Departments. However, large areas with few watering points necessitate fairly long grazing periods of several months in some cases. These long grazing periods are offset somewhat by the long recovery periods proposed in the plan.

## **Fire**

Burning is a tool that is often discussed, but seldom implemented in many management plans. Often this is because of the planning and personnel needed to accomplish it on the ground. This consideration, as well as the liability it represents should the fire escape the boundaries of the target zone, do represent some of the realities of implementing this plan. Grass fires are generally easier to prescribe and manage than woody areas. However, the current fuel load of several tons per acre in many areas could create unpredictable conditions. The benefits and problems associated with burning Sacaton are discussed in an earlier section of this report.

## **Mowing**

Mowing the Sacaton is another alternative to burning. It has the advantage of placing the litter cover on the ground to protect the soil. It is more costly than burning on a per acre basis. Also, in areas like the River Ranch where no grazing or burning has taken place for several years, the buildup of old material is difficult for even heavy duty mowers pulled by tractors to accomplish efficiently. That is why the three tools of grazing, fire and mowing can be useful when rotationally applied.

## **Mechanical and Chemical Treatment of Brush**

It is fortunate that much of the ranch retains a dominance of grass. However, some areas have varied levels of brush encroachment, mainly by mesquite. As mesquite becomes more

dominant, changing habitat may affect some species negatively.

The use of machinery such as bulldozers, loaders or excavators to control invasive areas of mesquite is an option in some of the ranch. The same areas would be candidates for herbicide application. The advantage of herbicide use is the lack of ground disturbance, but it may also kill non-target desirable species such as 4 Wing Saltbush or Winterfat. The main reason for such treatments would be to prevent a negative shift in habitat, not to create more forage for livestock. In fact, as discussed in the paper by Holecheck, 1994, it seldom makes financial sense to control mesquite in New Mexico.

The few areas where Salt Cedar was found on the ranch are fortunately not large infestations. These areas can probably be easily treated by hand cutting and treatment of stumps with an herbicide that prevents re-sprouting of the stumps. No other infestations of noxious or invasive plants were encountered.

### **Continuation of Current Management**

Continuation of current management practices seems unlikely to create severe negative consequences in the near future for much of the ranch. Probably the biggest consequence of continuing to let the Sacaton bottoms rest is that this strategy will create an increasing fuel load. This might enhance a wildfire that runs unchecked and kills the large trees in areas such as Tigner Grove and the riparian corridor where beautiful specimens of gallery forest exist. Upland areas may become somewhat less productive with the buildup of old growth, but this is not an issue that needs to be addressed in the immediate future.

### **Conclusion**

Protecting and enhancing the unique habitats that exist on the River Ranch must be the primary focus of any management plan for the property. Fortunately, the Rangeland Health Study that was conducted for this report shows that most areas are in a healthy condition at present.

Livestock grazing is a wonderful tool for maintaining habitat when used properly, and in conjunction with other tools. Currently, rest is the main tool being used on the ranch and is having some negative effects. However, it is not presently creating severe problems other than an increased risk of fire in some portions of the property.

Finding the right mix of infrastructure that can protect the critical riparian corridor and allow its periodic use seems of primary importance. Any fences that isolate this area should be placed well away from the normal flood zone. Thus, the majority of regularly scheduled grazing in the Sacaton areas should be on the east side of the river. The west side of the river can be incorporated into the riparian corridor to simplify the infrastructure design. These areas could receive periodic grazing during the dormant season every 3<sup>rd</sup> or 4<sup>th</sup> year.

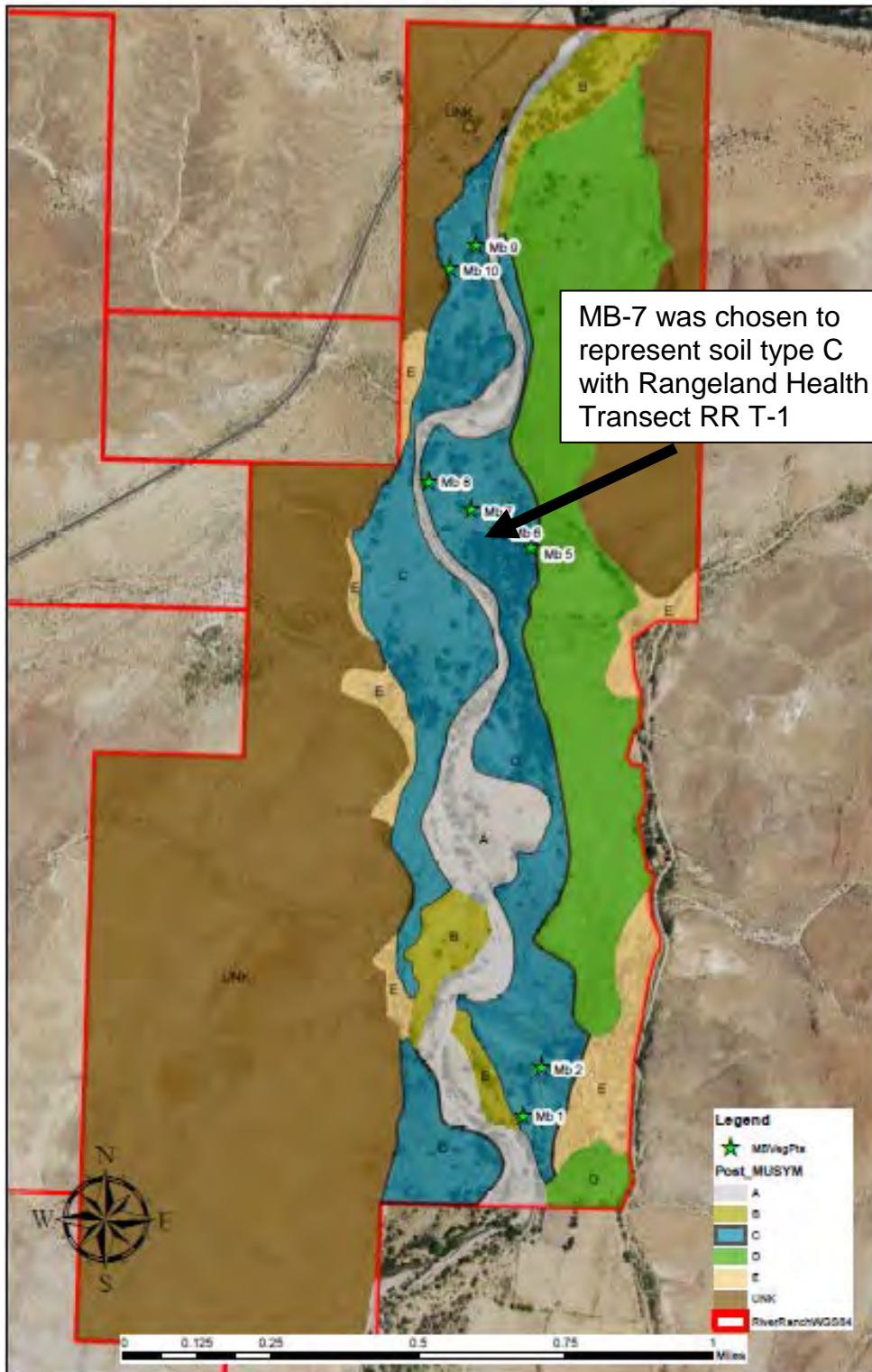
Should livestock grazing be deemed an appropriate tool for management by the Department, the biggest difficulty may be finding the right operator to conduct proper grazing management. Livestock grazing can have a positive or very negative affect on habitat objectives. Managed grazing with a plan for controlling grazing periods and providing adequate recovery for plants is the key to creating the positive effect desired if this tool is used.





# Appendix A: NRCS Data on riparian area of River Ranch

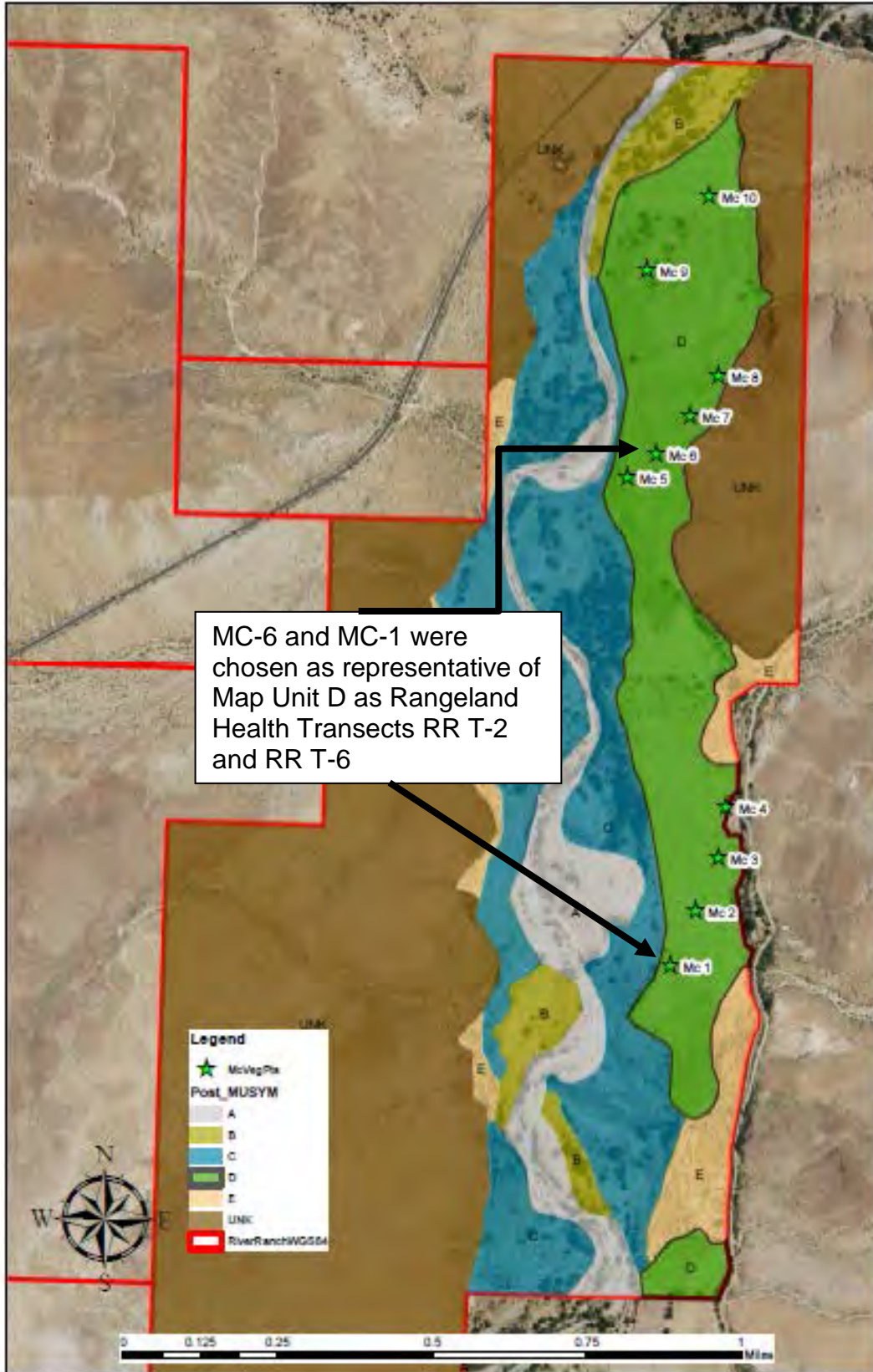
Vegetation Transects for Map Unit C  
Winter 2014





# Vegetation Transects for Map Unit D

Winter 2014







# Appendix B: BLM Data on Taylor Mountain Allotment 02525 Chosen as RR T-3 Hills for Rangeland Health Study

UNITED STATES DEPARTMENT OF THE INTERIOR BUREAU OF LAND MANAGEMENT				District <i>N M O 30</i>	
RANGE TREND PLOT LOCATION DATA				Resource Area <i>Mimbres</i>	
				Date established <i>2-4-97</i>	
				Established by (name) <i>Draper</i>	
Allotment Name <i>Taylor Mountain #02525</i>					Number <i>02525</i>
PLOT		KEY SPECIES (as shown in AMP)			
NUMBER <i>1</i>	SIZE <i>3x3</i>	1 <i>BDEA</i>	2 <i>AAST</i>	3	
LOCATION	Township <i>20S</i>	Range <i>11W</i>	Section <i>14</i>	SW $\frac{1}{4}$ Section	
Elevation	Slope	Exposure	Vegetative type <i>Hills</i>		
Map reference			Aerial photo reference		
Witness post is located <i>80 (feet) off the road</i> (bearing) from (known survey corner or land feature)					
Remarks <i>Turn onto the Taylor Mountain road &amp; travel 1/2 mile to witness post on the S. side of the road. Photo point is 10 paces</i>					
Part A @ 214° & Part B @ 31° LANDMARKS @ 198° from W.P.					
Scale: inches equals one mile					
(Instructions on reverse)				Form 4412-24 (July 1971)	

BLM 02525 1997  
RR T-3 Hills 2015



## Double Sampling Observation for 02525-ONE-1 on 02/04/1997

Species	Estimated	Actual	PCF Factor	Aver Phen	Phen Fact	Aver Util	Util Fact	%Dry Fact	Wt All Plots	Lbs/Acre	% Comp
AFF	52						1.00		52.00	52.00	12.38
AAGG	13						1.00		13.00	13.00	3.10
ARIST	23						1.00		23.00	23.00	5.48
BOER4	93						1.00		93.00	93.00	22.14
CRPO5	14						1.00		14.00	14.00	3.33
ENDE	5						1.00		5.00	5.00	1.19
EPTR	60						1.00		60.00	60.00	14.29
ERPU8	21						1.00		21.00	21.00	5.00
GUSA2	3						1.00		3.00	3.00	0.71
LESQU	13						1.00		13.00	13.00	3.10
PAOB	3						1.00		3.00	3.00	0.71
PPFF	41						1.00		41.00	41.00	9.76
SCBR2	70						1.00		70.00	70.00	16.67
SPCR	9						1.00		9.00	9.00	2.14

## Traditional Range Condition Report

Site Name 02525-ONE-1 Site Ecosite 036CY108NM BASALT HILLS WP-3

EcoSite ID 036CY108NM BASALT HILLS WP-3 Date 02/04/1997

Total Production 420.00 Lbs/Acre Condition Rating 40.71

Group	Life	FGST	Species	Lbs/Acre	% Comp	Low	High	% Allowed
2	P	Grass	BOER4	* 93.00	22.14	10	15	15.00
6	P	Grass	PAOB	* 3.00	0.71	1	3	0.71
7	P	Grass	SCBR2	* 70.00	16.67	1	5	5.00
9	P	Grass	ARIST	* 23.00	5.48	1	3	3.00
9	P	Grass	SPCR	* 9.00	2.14			0.00
11	P	Grass	ENDE	5.00	1.19	1	3	1.19
11	P	Grass	ERPU8	* 21.00	5.00			1.81
12	A	Grass	AAGG	* 13.00	3.10	0	3	3.00
14	A	Forb	AFF	* 52.00	12.38	1	5	5.00
15	P	Forb	CRPO5	14.00	3.33	1	3	3.00
15	U	Forb	LESQU	13.00	3.10			0.00
15	P	Forb	PPFF	* 41.00	9.76			0.00
21	P	Shrub	EPTR	60.00	14.29	1	3	3.00
21	P	Shrub	GUSA2	3.00	0.71			0.00

\* Plants encountered on Cover/Frequency Transects

# Observation Record

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Site Name 02525-ONE-1

Transect #1 Transect Date 02/04/1997 Length 200.00 Paces

Ground Cover			Basal and Foliar Cover				
Cover Category	Count	% Cover	Species	Hits	% Hits	Cover	% Cover
AAFF	1	0	AAFF	1	1	0	0
AAGG	4	2	AAGG	4	2	0	0
ARIST	7	3	ARIST	7	4	0	0
BGROUND	44	22	BGROUND	44	22	0	0
BOER4	15	7	BOER4	15	8	0	0
ERPU8	1	0	DAWH2	1	1	1	1
LITTER	58	29	ERPU8	1	1	0	0
PAOB	1	0	LITTER	58	29	0	0
PLMU3	2	1	PAOB	1	1	0	0
PPFF	2	1	PLMU3	2	1	0	0
SCBR2	3	1	PPFF	2	1	0	0
SOEL	1	0	SCBR2	3	2	0	0
SPCR	2	1	SOEL	1	1	0	0
SROCK	59	29	SPCR	2	1	0	0
			SROCK	59	30	0	0

	Number of Plots Observed	200
	Number of Species Observed	15
	Cover	1
	Plots w/hits above Ground	1
	% Cover	1
	Live Basal Hits	39
	% Live Basal Hits	20



# Appendix C: NRCS ESD's of upland areas of River Ranch

## R042XB027NM — Hills: Historic Climax Plant Community

### Plant Community Photos

Grassland/succulent state



- Black grama, yucca, feather dales
- Left is drier, S. facing slope
- Right is looking down a N. facing slope.
- Rock outcrop-Torriorthents association, Robledos Mtns, Dona Ana Co. NM

Grassland/succulent state



- Left- Black grama, various shrubs
- Stonier surface, ungrazed 40 years
- Rock land, warm, White Sands Missile Range, NM
- Right- Black grama, creosotebush
- Steep (ca. 30% slope)—note shrubs on south face of ridge
- Rock outcrop-Torriorthents ass., extremely steep, Caballo Mtns, Sierra Co., NM

Grassland/succulent state



- Black and sideoats grama, whitethorn, creosotebush
- S. facing slope, moderate grazing use
- Bare ground high, many live plants
- Rock outcrop-Torriorthents ass., extremely steep, Sierra Co. NM

Grassland/succulent state



- Left--tobosa, some whitethorn, creosotebush, above roadcut and inaccessible to livestock
- Right--whitethorn, creosotebush dominates, below roadcut nearer to water source
- Stony loam soil in Courthouse-Rock outcrop ass. Sierra Co. NM

### Historic Climax Plant Community

## Plant Community Description

### Grassland/Succulent State

Black grama is typically dominant and bush muhly (*Muhlenbergia porteri*), blue grama, and sideoats grama are subordinates. On heavier soils, tobosa may be dominant. Succulents are also common subordinate plants, including banana yucca (*Yucca bacata*), sotol (*Dasyliirion* spp.), ocotillo (*Fouquieria splendens*) and agaves (*Agave* spp.). Cool season grasses, such as New Mexico feathergrass (*Hesperostipa neomexicana*) may also be present. Creosotebush (*Larrea tridentata*) may also be present. Heavy grazing or drought disturbance within this state leads to increasing bare ground and/or increases in the representation of threeawns (*Aristida* spp.), hairy grama (*Bouteloua hirsuta*), fluffgrass (*Dasyochloa pulchella*), and snakeweeds (*Gutierrezia* spp.). Drier, south-facing slopes tend to have a greater representation of succulents and shrubs, more bare ground, and less grass cover even when currently ungrazed. Abundant rocks and very shallow soils may also restrict grass cover. Steep, northerly-facing slopes often exhibit surprisingly abundant grass growth even where adjacent sites are degraded. With heavy grazing, grasses may be restricted to spaces between rocks but may increase with good management and adequate rainfall. Shrub encroachment (e.g., by creosotebush) that results in competitive influences on grasses is generally not observed. On some soils in some areas, however, whitethorn acacia (*Acacia constricta*) is becoming an important, and apparently recent, invader. It may prove useful to consider a shrub-invaded state if whitethorn dominance proves detrimental to grasses.

Diagnosis: Black grama (or tobosa) is usually dominant in undisturbed settings. Grass cover is more or less continuous, with patches of bare ground becoming more common on the drier slopes and with grazing pressure. Shrubs and succulents may be common, especially on south-facing slopes. In cases of drought or heavy grazing, grasses may be inconspicuous and found only alongside rocks.

### Additional States:

Transition to bare state (1a): Sites with steep slopes and relatively smooth surfaces may be susceptible to erosion if overgrazing/drought is severe. Gullies may need to be blocked and water flow redistributed more evenly. Sites with shallower slopes and more rough surfaces may be less likely to experience this transition under similar environmental conditions.

Key indicators of approach to transition: Increases in bare ground, evidence of sheet flow including litter dams and loss of soil around rocks, rills, gullies.

## Plant Community Tables

Plant Type	Annual Production (Lbs/Acre)		
	Low	Representative Value	High
Grass/Grasslike	227	376	525



Annual Production (Lbs/Acre)			
Plant Type	Low	Representative Value	High
Forb	23	38	53
Shrub/Vine	75	124	172
Totals	325	538	750

Plant Species Composition (Lbs/Acre)				
Grass/Grasslike				
Group	Plant Common Name	Plant Scientific Name	Annual Production Pounds Per Acre	
			Low	High
1			135	161
	black grama	<i>Bouteloua eriopoda</i>	135	161
2			54	81
	bush muhly	<i>Muhlenbergia porteri</i>	54	81
3			54	81
	sideoats grama	<i>Bouteloua curtipendula</i>	54	81
	blue grama	<i>Bouteloua gracilis</i>	54	81
4			5	16
	perennial threeawn spp.	<i>Aristida</i>	5	16
5			5	27
	tobosa	<i>Pleuraphis mutica</i>	5	27
6			5	16
	new mexico feathergrass	<i>Hesperostipa neomexicana</i>	5	16
7			27	54
	cane bluestem	<i>Bothriochloa barbimodis</i>	27	54
	arizona cottontop	<i>Digitaria californica</i>	27	54
	plains lovegrass	<i>Eragrostis intermedia</i>	27	54
	tanglehead	<i>Heteropogon contortus</i>	27	54
	green srangetop	<i>Leptochloa dubia</i>	27	54
8			5	16
	hall's panicum	<i>Panicum hallii</i>	5	16
	tridens spp.	<i>Tridens</i>	5	16
9			5	27

Plant Species Composition (Lbs/Acre)				
Forb				
Group	Plant Common Name	Plant Scientific Name	Annual Production Pounds Per Acre	
			Low	High
17			5	27
	wild buckwheat	Eriogonum	5	27
	wooly plantain	Plantago patagonica	5	27
	gloemallow spp.	Sphaeralcea	5	27
18			16	43

Plant Species Composition (Lbs/Acre)				
Shrub/Vine				
Group	Plant Common Name	Plant Scientific Name	Annual Production Pounds Per Acre	
			Low	High
10			43	65
	agave spp.	Agave	43	65
	sotol (common)	Dasyliion wheeleri	43	65
	ocotillo	Fouquieria splendens	43	65
	yucca spp.	Yucca	43	65
11			5	16
	sacahuista	Nolina microcarpa	5	16
12			5	16
	fourwing saltbush	Atriplex canescens	5	16
13			5	27
	oak spp.	Quercus	5	27
	littleleaf sumac	Rhus microphylla	5	27
14			0	16
	juniper spp.	Juniperus	0	16
15			5	16
	feather dalea	Dalea formosa	5	16
16			5	16
	broom snakeweed	Gutierrezia sarothrae	5	16



Plant Growth Curve											
Growth Curve Name RD42XB027NM-Hills-Warm Season Plant HCPC											
Growth Curve Description SD-2 Warm Season Plant Community.											
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0%	0%	0%	5%	10%	10%	25%	30%	15%	5%	0%	0%

Soil Surface Cover		
Cover Type	Minimum	Maximum
Basal cover - Grass/grasslike	18.000%	18.000%
Basal cover - Forb	—	—
Basal cover - Shrub/Vine/liana	—	—
Basal cover - Tree	—	—
Non-vascular plants	—	—
Biological crust	—	—
Litter	10.000%	10.000%
Surface fragments > 0.25" and <= 3"	—	—
Surface fragments > 3"	—	—
Bedrock	—	—
Water	—	—
Bare ground	22.000%	22.000%
Down wood, fine-small	—	—
Down wood, fine-medium	—	—
Down wood, fine-large	—	—
Down wood, coarse-small	—	—
Down wood, coarse-large	—	—
Basal cover - Tree snags	—	—
Hard snags	—	—
Soft snags	—	—

## R042XB014NM — Loamy: Historic Climax Plant Community

### Plant Community Photos

#### MLRA 42; SD-2; Loamy

##### Burrograss-tobosa-threeawn state



- Tobosa, some burrograss and black grama, in patches, few mesquite in background
- Cover of grasses high to moderate
- At left, grassed black grama patch surrounded by tobosa
- At right, tobosa dominates but varies in cover with microtopography.
- Benito sandy loam, Dona Ana Co.

##### Shrub-invaded, tobosa-mesquite



- Tobosa, some burrograss, mesquite
- Cover of grasses moderate
- Evidence of wind erosion
- Algenita sandy loam, Dona Ana Co.

##### Shrub-invaded state, threeawn-mesquite



- Threeawn dominant, some burrograss and fluffgrass. Mesquite and arbovit present
- Cover of grasses low
- Evidence of wind erosion and pedestaling, large bare patches
- Algenita sandy loam, eroded phase, Jornada Exp. Range, Dona Ana Co.

##### Shrub-invaded state, burrograss-creosotebush



- Burrograss dominant, some tobosa. Creosotebush at moderate density
- Cover of grasses low
- Evidence of wind erosion and pedestaling, large bare patches.
- Dona Ana fine sandy loam, Jornada Exp. Range, Dona Ana Co.

##### Shrub-dominated state, creosotebush-larbrush



- Creosotebush dominant, some bush mallow among shrubs. Barren gravelly site.
- Cover of grasses very low
- Evidence of wind erosion, and pedestaling, mostly continuous bare ground.
- Dona Ana fine sandy loam, Jornada Exp. Range, Dona Ana Co.

#### Historic Climax Plant Community

## Plant Community Description

### State Containing Historic Climax Plant Community

Black grama-tobosa grasslands: This state is now rare throughout SD-2. On Berino fine sandy loam soils west of

Las Cruces (the Corralitos Ranch), a tobosa-black grama community occurs in which tobosa is the overwhelming

dominant and black grama is restricted to small patches. In other settings (e.g. the Jornada Experimental Range),

black grama appears to have colonized where sand has blown onto silt loam soils. Dominance by black grama,

however, has not been observed on soils classified to this site. Other than tobosa and black grama, alkali sacaton is a

relatively consistent feature of this site. Threeawns or dropseeds (*Sporobolus* spp.) may achieve dominance or

subdominance depending upon variation in soil texture and natural disturbances. On more gravelly soils, bush muhly

(*Muhlenbergia porteri*) cover may be significant. In any case, the historic community was probably extremely

diverse due to the intermediate nature of this site along the gradient of soil texture. Grazing-induced retrogression

would be expected to reduce this diversity and to severely reduce the dominance of black grama. Subordinate

species of lower palatability and higher tolerance to disturbance, including tobosa and threeawns, would be expected

to attain dominance. As long as sufficient black grama cover persisted and climatic conditions favored black grama

reproduction, then recovery would be possible.

Diagnosis: Ranging from near co-dominance between black grama and other grasses to the representation of black

grama in isolated patches. Mesquite, tarbush, and creosotebush are absent. Signs of erosion, including gullies, rills,

and litter movement are infrequent.

Transition to burrograss-tobosa-threeawn grassland (1a): Grazing and/or drought may limit

the growth of black grama (see also transition 1, Sandy model). Disturbance to individual black

grama plants due to trampling or other physical disturbance may be especially important.



Key indicators of approach to transition: Loss of grass species diversity, reduction in black

grama cover and increased decadence of black grama plants, decreases in overall grass cover

coincident with increases in the relative cover of burrograss, tobosa and/or threeawns, increases

in bare patch size. If climate is not favorable for black grama reestablishment, the transition may

be inevitable.

Transition to shrub-invaded state (2a): Mesquite invasion may be due to introduction by cattle

or humans (see Sandy model), although tarbush and creosotebush are wind-dispersed. Surface soil

disturbance, reduced grass cover, and the presence of large bare patches may facilitate the

germination of seeds of all shrubs. This mechanism assumes that shrub invasion is coincident

with grazing-induced loss of grass (black grama) cover, as is the case on the Jornada

Experimental Range. The reduction of periodic fire in conditions where black-grama/tobosa

grasslands have sufficient grass production (e.g. >600 lbs/acre; Wright et al. 1978) may also

have facilitated shrub invasion. These factors may be independent of management (Herbel and

Gibbens 1998) if climate has played a large role.

Key indicators of approach to transition: Same as for 1a if mesquite is limited by competition

with grasses, in addition to the presence of maturing shrubs. If fire is important, then a persistent

reduction in production and litter cover coincident with reduced fire frequencies may portend

shrubs invasion.

## Plant Community Tables

Plant Type	Annual Production (Lbs/Acre)		
	Low	Representative Value	High
Grass/Grasslike	246	400	554
Forb	24	39	54



Annual Production (Lbs/Acre)			
Plant Type	Low	Representative Value	High
Shrub/Vine	30	49	67
Totals	300	488	675

Plant Species Composition (Lbs/Acre)				
Grass/Grasslike				
Group	Plant Common Name	Plant Scientific Name	Annual Production Pounds Per Acre	
			Low	High
1: Warm Season			98	146
	black grama	<i>Bouteloua eriopoda</i>	98	146
2: Warm Season			24	49
	bush muhly	<i>Muhlenbergia porteri</i>	24	49
3: Warm Season			0	24
	blue grama	<i>Bouteloua gracilis</i>	0	24
4: Warm Season			15	39
	perennial threeawn spp.	<i>Aristida</i>	15	39
	burgrass	<i>Scleropogon brevifolius</i>	15	39
5: Warm Season			5	24
	fluffgrass	<i>Dasyochloa pulchella</i>	5	24
	ring muhly	<i>Muhlenbergia torreyi</i>	5	24
6: Warm Season			24	49
	sand dropseed	<i>Sporobolus cryptandrus</i>	24	49
	mesa dropseed	<i>Sporobolus flexuosus</i>	24	49
7: Warm Season			49	73
	tobosa	<i>Pleuraphis mutica</i>	49	73
8: Warm Season			24	49
	alkali sacaton	<i>Sporobolus airoides</i>	24	49
9: Warm Season			5	24
	cane bluestem	<i>Bothriochloa barbimodis</i>	5	24
	arizona cottontop	<i>Digitaria californica</i>	5	24
	plains bristlegass	<i>Setaria vulpiseta</i>	5	24
10: Warm Season			5	15

Plant Growth Curve											
Growth Curve Name RD42XB014NM-Loamy-Warm Season Plant -HCPC											
Growth Curve Description SD-2 Loamy HCPC Warm Season Plant Community.											
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0%	0%	0%	5%	10%	10%	25%	30%	15%	5%	0%	0%

Soil Surface Cover		
Cover Type	Minimum	Maximum
Basal cover - Grass/grasslike	25.000%	25.000%
Basal cover - Forb	—	—
Basal cover - Shrub/vine/lana	—	—
Basal cover - Tree	—	—
Non-vascular plants	—	—
Biological crust	—	—
Litter	15.000%	15.000%
Surface fragments > 0.25" and <= 3"	—	—
Surface fragments > 3"	—	—
Bedrock	—	—
Water	—	—
Bare ground	50.000%	50.000%
Down wood, fine-small	—	—
Down wood, fine-medium	—	—
Down wood, fine-large	—	—
Down wood, coarse-small	—	—
Down wood, coarse-large	—	—
Basal cover - Tree snags	—	—
Hard snags	—	—
Soft snags	—	—

## Appendix D: Plant, Bird, and Mammal Species Lists (Field work sightings in May, 2015)

<b>Grasses</b>			
	<b>Common Name</b>	<b>Genus</b>	<b>Species</b>
1	Purple 3 Awn	Aristida	purpurea
2	Poverty 3 Awn	Aristida	divericata
3	Cane beardgrass	Bothriochloa	barbinoides
4	Blue grama	Bouteloua	gracilis
5	Sideoats grama	Bouteloua	curtipendula
6	Hairy grama	Bouteloua	hirsuta
7	Black grama	Bouteloua	eriopoda
8	6 Weeks Grama	Bouteloua	barbata
9	Rescuegrass	Bromus	catharticus
10	Feather Fingergrass	Chloris	virgata
11	Common bermudagrass	Cynodon	dactylon
12	Barnyardgrass	Echinochloa	crus-galli
13	Western wheatgrass	Elymus	smithii
14	Squirreltail	Elymus	elymoides
15	Lehmans lovegrass	Eragrostis	intermedia
16	Plains lovegrass	Eragrostis	elongatus
17	Weeping lovegrass	Eragrostis	curvula
18	Fluffgrass	Erioneuron	pulchellum
19	Foxtail	Hordeum	jubatum
20	Little Barley	Hordeum	pusillum
21	Green sprangletop	Leptochloa	dubia
22	Porter's muhly (hoegrass)	Muhlenbergia	porteri
23	Deergrass	Muhlenbergia	rigens
24	Hall's Panicum	Panicum	Hallii
25	Vine mesquite	Panicum	obtusum
26	Tobosa	Pleuraphis	mutica
27	6 Weeks Bluegrass	Poa	annua
28	Rabbitsfoot grass	Polypogon	monspeliensis
29	Burrograss	Sclerepogon	brevifolius
30	Plains bristlegrass	Setaria	machrostachya
31	Clinging bristlegrass	Setaria	adhaerens
32	Sand Dropseed	Sporobolus	cryptandrus
33	Giant Sacaton	Sporobolus	giganteus
34	Spike dropseed	Sporobolus	contractus
35	New Mexico feathergrass	Stipa	neomexicana

<b>Forbs</b>			
	<b>Common Name</b>	<b>Genus</b>	<b>Species</b>
1	Desert Holly	Acourtia	wrightii
2	Dwarf Desert Holly	Acourtia	nana
3	Wild Onion	Allium	macropetalum
4	Palmer amaranth	Amaranthus	palmeri
5	Carelessweed	Amaranthus	palmeri
6	Western ragweed	Ambrosia	psilostachya
7	Prickly poppy	Argemone	polyanthemus
8	Louisiana Sagewort	Artemesia	ludoviciana
9	Hassayampa milkvetch	Astragalus	allochorus
10	Desert marigold	Bailea	multiradiata
11	Shepard's Purse	Capsella	bursa-pastoris
12	Dusty maiden	Chaenactis	stevioides
13	Baby Aster	Chaetopappa	ericoides
14	Prostrate Euphorbia	Chamaesyce	prostrata
15	Rattlesnake weed	Chamaesyce	albomarginata
16	Lamb's Quarters	Chenopodium	sp.
17	Blue Mustard	Chorispora	tenella
18	New Mexico thistle	Cirsium	neomexicanum
19	Field Bindweed	Convolvus	arvensis
20	Mare's Tail	Conyza	canadensis
21	Hawksbeard	Crepis	acuminata
22	Croton	Croton	texensis
23	Hiddenflower	Cryptantha	crassisejala
24	Buffalogourd	Cucurbita	foetidissima
25	Foxtail Prairie-clover	Dalea	leporina
26	Sacred Datura	Datura	wrightii
27	Organ Mtn. Larkspur	Delphinium	wootonii
28	Tansy Mustard	Descuriana	pinata
29	Richardson tansy mustard	Descuriana	incana
30	Spectacal Pod	Dimorphocarpa	wislizeni
31	New Mexico daisy	Erigeron	neomexicana
32	Buckwheat	Eriogonum	sp.
33	Filaree	Erodium	cicutarium
34	Indian blanket	Gaillardia	pulchella
35	Gaura	Gaura	sp.



Forbs Continued
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36	Blueweed	Helianthus	ciliaris
37	Sunflower	Helianthus	annus
38	Trumpet gilia	Ipomopsis	longiflora
39	Kochia	Kochia	scoparia
40	Stickseed	Lapula	occidentalis
41	Bladder Pod	Lesquerella	fendleri
42	Bladderpod	Lesquerella	fendleri
43	Deervetch	Lotus	piebieus
44	Skeleton plant	Lygodesmia	texana
45	Purple Aster	Machaeranthera	canescens
46	Horehound	Marrubium	vulgare
47	Blackfoot daisy	Melampodium	leucanthum
48	Yellow Sweetclover	Melilotus	officinalis
49	White Sweetclover	Melilotus	alba
50	Blazing Star	Mentzelia	sp.
51	Monkeyflower	Mimulus	guttatus
52	Purple mat	Nama	hipidum
53	Desert tobacco	Nicotiana	obtusifolia
54	Stemless evening primrose	Oenothera	cespitosa
55	Purple Locoweed	Oxytropis	mollissimus
56	Fendler penstemon	Penstemon	fendleri
57	Sana Fe Phlox	Phlox	nana
58	Ground Cherry	Physalis	sp.
59	Wooly plantain	Plantago	purshii
60	Prostrate Knotweed	Polygonum	aviculare
61	Purslane, Verdolaga	Portulaca	oleracea
62	Devels claw	Proboscidia	parviflora
63	Gray everlasting	Pseudodognaphalium	canescens
64	False dandelion	Pyrrhopappus	pauciflorus
65	Watercress	Roripa	sinuata
66	Curly Dock	Rumex	crispus
67	Russian Thistle	Salsola	kali
68	Vipers Grass (Savinski's)	Scorzonera	laciniata
69	Threadleaf groundsel	Senecio	flaccidus
70	Silver Leaf Nightshade	Solanum	eleagnofolium

Forbs Continued
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71	Buffalo Bur	Solanum	rostratum
72	Sow Thistle	Sonchus	asper
73	Globemallow	Sphaeralcia	sp.
74	Globe Mallow	Sphearalcia	sp.
75	Yellow Salsify	Tragapogon	dubius
76	Pink sandpuffs	Tripterocalyx	micranthus
77	Mullein	Verbascum	thapsus
78	Verbena	Verbena	wrightii
79	Water speedwell	Veronica	aquatica
80	Slim vetch	Vicia	ludoviciana
81	Cocklebur	Xanthium	strumarium

	<b>Shrubs &amp; Vines</b>		
	<b>Common Name</b>	<b>Genus</b>	<b>Species</b>
1	Catclaw acacia	Acacia	greggii
2	Burroweed quinine	Alenrolfia	occidentalis
3	Beebush	Aloysia	wrightii
4	4 Wing Saltbush	Atriplex	canescens
5	Yerba de Pasmó	Bacharis	pteronoides
6	Brickelbush	Brickellia	Sp.
7	Fairyduster	Caliandra	humulis
8	Rubber Rabbitbrush	Chrysothamnus	nauseosus
9	Sotol	Dasyliirion	wheeleri
10	Mormon tea	Ephedra	trifurca
11	Winterfat	Eurotia	lanata
12	Apache plume	Fallugia	paradoxa
13	Mountain spray	Holodiscus	dumosa
14	Burrobrush	Hymenoclea	monogyra
15	Crucifix thorn	Koeberlinia	spinosum
16	Range ratany	krameria	erecta
17	Creosote bush	Larrea	tridentata
18	Pale Wolfberry	Lycium	pallidum
19	Morftonia	Mortonia	semipervins
20	Beargrass	Nolina	macrocarpa
21	Prickly Pear	Opuntia	polycantha
22	Cholla	Opuntia	imbicata
23	Mariola	Parthenium	incanum
24	Mesquite	Prosopis	glandula
25	Littleleaf Sumac	Rhus	microphylla
26	3 Leaf Sumac	Rhus	trilobata
27	Snakeweed	Xanthocephalum	sorathorae
28	Soapweed Yucca	Yucca	glauca
29	Bannana Yucca	Yucca	bacata
30	Soaptree Yucca	Yucca	elata
31	Yucca Spanish Dagger	Yucca	sp.
32	Graythorn Iotebush	Ziziphus	obtusifolia

<b>Trees</b>			
	<b>Common Name</b>	<b>Genus</b>	<b>Species</b>
1	Box Elder	Acer	negundo
2	Hackberry	Celtis	reticulata
3	Mexican Bird of Paradise	Cesalpinia	mexicana
4	Velvet Ash	Fraxinus	velutina
5	Arizona Walnut	Juglans	major
6	Alligator Juniper	Juniperus	deppeana
7	One Seed Juniper	Juniperus	monosperma
8	Mulberry	Morus	rubra
9	Cottonwood	Populus	wislizeni
10	Lance leaved Cottonwood	Populus	acuminata
11	Emory Oak	Quercus	emoryi
12	Gray Oak	Quercus	grisea
13	Wavy leaf Oak	Quercus	turbinella
14	Soapberry	Sapundis	saponaria
15	Salt Cedar	Tamarix	pedentrata
16	Siberian Elm	Ulmus	pumila



	<b>Birds</b>		
	<b>Common Name</b>	<b>Genus</b>	<b>Species</b>
1	Mallard duck	Anas	platyrinchos
2	Turkey vulture	Cathartes	aura
3	Cooper's Hawk	Accipiter	cooperii
4	Red-Tailed Hawk	Buteo	jamaicensis
5	Swainson's Hawk	Buteo	regalis
6	Golden Eagle	Aquila	chrysaetos
7	American Kestrel	Falco	sparverius
8	Wild Turkey	Meleagris	gallopavo
9	Gambel's Quail	Calipepla	Ggambelii
10	Kildeer	Charadrius	vociferus
11	Spotted sandpiper	Actitis	macularia
12	White Wing Dove	Zenaida	asiatica
13	Mourning Dove	Zenaida	macroura
14	Greater Roadrunner	Geococcyx	californicus
15	Barn Owl	Tyto	alba
16	Western Screech Owl	Otus	kenicottii
17	Great Horned Owl	Bubo	virginianus
18	Common Poorwill	Phalaenoptilus	nuttallii
19	Black-chinned hummingbird	Archilochus	aleandri
20	Broad tailed hummingbird	Selasphorus	platycerus
21	Northern Flicker	Colaptes	auratus
22	Downy Woodpecker	Picoides	pubescens
23	Hairy Woodpecker	Picoides	villosus
24	Ladder-backed Woodpecker	Picoides	scalarus
25	Western Wood- Pewee	Contopus	sodidulus
26	Least Flycatcher	Empidomax	minus
27	Ash-Throated Flycatcher	Myiarchus	cinweascens
28	Western Kingbird	Tyrannus	verticalis
29	Loggerhead Shrike	Lanius	ludoviiianus
30	Western Scrub-Jay	Aphelocoma	californica
31	Common Raven	Corvus	corax
32	Horned Lark	Eremophila	alpestris
33	Violet-Green Swallow	Tachycineta	thalassina
34	Bewick's Wren	Thryomanes	bewickii
35	Rock Wren	Salpinctes	obsoletus

Birds Continued
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36	Canyon Wren	Catherpes	mexicanus
37	Blue-gray Gnatcatcher	Polioptila	Caerulea
38	Western Bluebird	Sialia	mexicana
39	Northern Mockingbird	Mimus	polyglottus
40	Curve-bill Thrasher	Toxostroma	curviostre
41	Sage Thrasher	Oreoscoptes	montanus
42	American Robin	Turdus	migratorius
43	Lucy's Warbler	Vermivora	luciae
44	Yellow Warbler	Dendroica	petechia
45	Yellow-rumped Warbler	Dendroica	coronata
46	Wilson's Warbler	Wilsonia	pusilla
47	Yellow Breasted Chat	Icteria	virens
48	Black-Headed Grosbeak	Pheucticus	melanocephalus
49	Rose-breasted Grosbeak	Pheucticus	ludovicianus
50	Canyon Towhee	Pipilo	fuscus
51	Spotted Towhee	Pipilo	maculitus
52	Black-throated Sparrow	Amphispiza	bilineata
53	Chipping Sparrow	Spizella	passerina
54	White-crowned Sparrow	Zonotrichia	leucophrys
55	Bullock's Oriole	Icterus	bullocki
56	Great Tailed Grackle	Quiscalus	mexicanus
57	Brown-headed Cowbird	Molothrus	ater
58	House Finch	Carpodacus	mexicanus

<b>Mammals (sighting, tracks, call, burrow, or scat)</b>			
	<b>Common Name</b>	<b>Genus</b>	<b>Species</b>
1	unknown Bat	seen midday	large chocolate brown
2	Coyote	Canis	latrans
3	Badger	Taxidea	taxus
4	Raccoon	Procyon	lotor
5	Rock Squirrel	Citellus	variegatus
6	Merriam Kangaroo Rat	Dipodomis	merriami
7	Beaver	Castor	canadensis
8	Mexican Woodrat	Neotoma	mexicana
9	Javalina	Pecari	angulatus
10	Blacktail Jackrabbit	Lepus	californicus
11	Desert Cottontail	Sylvilagus	audoboni
12	Elk	Cervus	canadensis
13	Mule Deer	Odocoileus	hemionus
14	Pronghorn Antelope	Antilocapra	americana

## Appendix E: Literature References

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**Appendix C. River Ranch Riparian Assessment**

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# River Ranch Riparian Assessment

A Survey of Current Ecological Conditions  
to  
Support Resource Management Planning

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Natural Heritage New Mexico Report – 15-GTR-388  
For  
New Mexico Department of Game and Fish

June 2015



# River Ranch Riparian Assessment

## *A Survey of Current Ecological Conditions to Support Resource Management Planning*<sup>1</sup>

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June 2015

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### Executive Summary

The New Mexico Department of Game and Fish (NMDGF) is developing a natural resources management plan for its newly acquired River Ranch property along the Mimbres River in Luna County, NM. The long-term goals for the River Ranch are to maintain and improve riparian habitat for all wildlife species as well as species of greatest conservation need (SGCN). To help meet these goals and support the planning process, this riparian assessment was conducted on River Ranch May 18 to 20, 2015 to provide baseline data on biotic and abiotic habitat conditions using the New Mexico Rapid Assessment Method for Lowland Riverine Wetlands (NMRAM). The NMRAM is a semi-quantitative and efficient approach to sampling and assessing the ecological status of riverine wetland and riparian areas. The NMRAM assessment uses a combination of mapping analysis and field surveys to measure 12 metrics that reflect landscape context, biotic, and abiotic attributes of the riparian ecosystem. These in turn are rolled-up into an overall ecological condition score by sampling area (SA) and averaged for the site as a whole.

River Ranch is located approximately 38 km (23 mi) north of Deming, NM on the north edge of Luna County, within the lower portion of the Mimbres River. The section of the Mimbres River on which the River Ranch is located is among the last wet portions of the river where it leaves the confines of the Mimbres Valley and enters the wide, closed desert basin to the south. At the River Ranch, the Mimbres has mostly perennial flow. However, surface flow can be intermittent, particularly in the summer months. The River Ranch has a diversity of riparian vegetation communities. These include relatively large and mature woodland stands dominated by Fremont's Cottonwood (*Populus fremontii*), Goodding's willow (*Salix gooddingii*), and velvet ash (*Fraxinus velutina*), shrublands along the river banks and some low terraces, and extensive swaths of big sacaton (*Sporobolus wrightii*) grasslands on the upper terraces. Associated with this diversity of vegetation communities is a wealth of fauna.

On the River Ranch, livestock grazing was the most recent land use, but the ranch also contains a few old fields. South of the upstream property boundary 0.6 km (0.4 mi) there is an earthen irrigation

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<sup>1</sup> Final report Project Work Order Number EEP-150302, New Mexico Department of Game and Fish to the University of New Mexico.

diversion dam that was diverting about 80% of the base flow when the site was visited in May 2015. The dam diverts water into an irrigation ditch that runs along the eastern side of the floodplain.

Based on the NMRAM assessment the River Ranch riparian wetlands overall are currently in excellent condition, with both the lower and upper SA rating excellent, and the middle SA rated good. The ranch average for both landscape context and biotic metrics was also excellent. The abiotic metrics were rated in the good category. However, the data from some individual metrics also point out areas where management is needed to maintain or improve the condition status of the ranch. Both in some of the biotic and abiotic metrics, there are indications of a decline in groundwater, and losses in hydrologic connectivity on the ranch. Most measurements showed that these declines were more severe below the irrigation diversion dam. In particular, the metric Vegetation Vertical Structure indicated a lack of riparian shrub layers across the lower portion of the ranch, indicating a reduced groundwater table, as well as possible removal by livestock in the past. Across the ranch scores for the metric Native Riparian Tree Regeneration were low, with very few young trees observed. This can indicate both a reduced groundwater table, a loss of hydrological connectivity to the floodplain, and/or removal of seedling and sapling trees by livestock. Finally the metric Hydrologic Connectivity, which was measured using two different methodologies, indicated a minor to moderate loss in connectivity from the expected, with the lowest connectivity scores coming from the middle SA, just below the irrigation dam.

The recommendations from this assessment are:

1. Maintain maximum possible base flows in the active river channel, particularly in the growing season, and in keeping with the property water rights. If possible this should include a redesign of the irrigation dam, and active flow in the irrigation ditch only when needed for downstream irrigation.
2. Livestock should be kept out of the active channel and adjacent riparian zone until the woody riparian vegetation has had a chance to reproduce and mature. Once vegetation has recovered, if grazing is considered, livestock use should be carefully monitored, and access to the active channel should be limited or excluded.
3. If recommendations 1 and 2 do not produce an improvement in riparian tree reproduction, it is suggested that the ranch management look into more active restoration, including earthwork.
4. Big sacaton stands around the large mature tree stands should be managed to create fire breaks to reduce fire risk to the forests.
5. Removal of the few saltcedar and Russian olive individuals on the ranch is recommended to prevent expansion of these species and future ecosystem disruption.



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Cover: View from western terrace towards Mimbres River near the center of the River Ranch property (Photo by E. Muldavin).

## Introduction

The New Mexico Department of Game and Fish (NMDGF) is developing a natural resources management plan for its newly acquired River Ranch property along the Mimbres River in Luna County, NM. The long-term goals for the River Ranch are to maintain and improve riparian habitat for all wildlife species as well as species of greatest conservation need (SGCN). To help meet these goals and support the planning process, this riparian assessment was conducted on River Ranch May 18 to 20, 2015 to provide baseline data on biotic and abiotic habitat conditions using the New Mexico Rapid Assessment Method for Lowland Riverine Wetlands (NMRAM)<sup>2</sup>.

The NMRAM is a semi-quantitative and efficient approach to sampling and assessing the ecological status of riverine wetland and riparian areas. For River Ranch, three sampling areas (SAs) were established for the assessment, distributed such that they captured the range of variation in riparian ecological conditions. The NMRAM assessment uses a combination of mapping analysis and field surveys to measure 12 metrics that reflect landscape context, biotic, and abiotic attributes of the riparian ecosystem. These in turn are rolled-up into an overall ecological condition score by SA and averaged for the site as a whole. Based on the information gathered in the NMRAM process—the individual metric scores and other observations made while on the site—we provide an assessment of current conditions with a discussion of the implications for maintaining and improving the riparian habitat of the ranch.



Figure 1. The Mimbres River near the northern boundary of the River Ranch.

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<sup>2</sup> The most current version of the NMRAM Handbook and Field Guides can be downloaded from the New Mexico Environment Department, Surface Water Quality Bureau, Wetlands Program website at <https://www.env.nm.gov/swqb/Wetlands/NMRAM/>. The Lowland draft manual should be available from the site in the fall of 2015.

## Methods

### Study area

#### *Location and hydrology*

River Ranch is located approximately 38 km (23 mi) north of Deming, NM on the north edge of Luna County, within the lower portion of the Mimbres River (Figure 1). The section of the Mimbres River on which the River Ranch is located is among the last wet portions of the river where it leaves the confines of the Mimbres Valley and enters the wide, closed desert basin to the south. Approximately 5 km (3 mi) below the southern River Ranch boundary the Mimbres becomes a dry drainage that only carries surface flows during large precipitation events. The River Ranch incorporates 3.8 km (2.3 mi) of river reach flowing from north to south, with elevations that range from 1,543 m (5,060 ft) at the upper end to 1,518 m (4,980 ft) at the lower, resulting in a low stream gradient (approximately 0.6-0.7%).

The floodplain varies from approximately 130 to 500 m in width, but is 200 to 400 m in width on average. The narrower floodplain widths occur at the northern (upstream) end of the River Ranch, where the Mimbres passes through a natural confinement created by bedrock at the base of a hill on the west and a ridge to the east. At the River Ranch, the Mimbres has mostly perennial flow sustained by discharge from a drainage basin of 1,335 km<sup>2</sup> (515 mi<sup>2</sup>). However, surface flow throughout the upper Mimbres valley can be intermittent, particularly in the summer months, due to climatic conditions and irrigation withdrawals (Cooper 2013).

There are no stream gages with consistent data on the Mimbres River below the River Ranch, but there is a gage at the town of Mimbres (Gage Station 08477110) 38 km (23 mi) upstream of the study site that is used here to understand the general flow regime of the river. Data for this gage is available for the years 1978 to 2014. In general, the data set was complete, but there was a 15-month gap between June 2013 and Oct 2014. Also, peak discharge data was only available for some years. Stream flow shows bi-modal peak flows, with one peak occurring between February and March, and the other occurring in August (Fig. 3). The system is driven by both winter snowmelt and later summer precipitation, with both capable of producing large- magnitude flows. The large peak flow from the fall of 2014 was just under 500 cfs at the Mimbres gage (Fig. 4). Similarly sized peak flow events occurred in 2012 and 2008. Within the period of record, there have been 12 peak-flow events that were more than 1000 cfs, and approximately five in the 500-1000 cfs range (Fig. 5), giving the 2014 flow a two-to-three-year return interval.



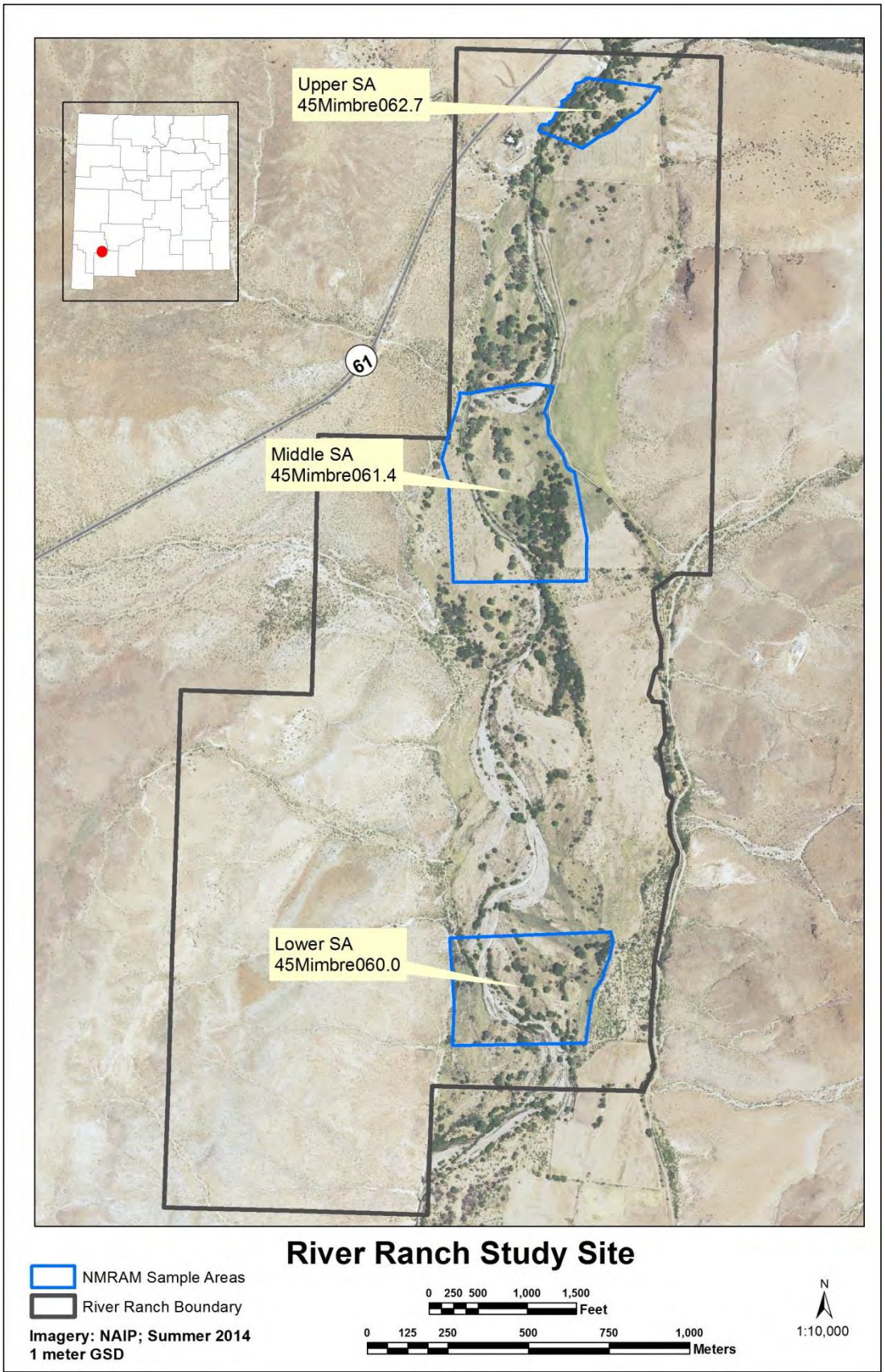


Figure 2. River Ranch study area showing three NMRAM Sampling Areas (SAs).



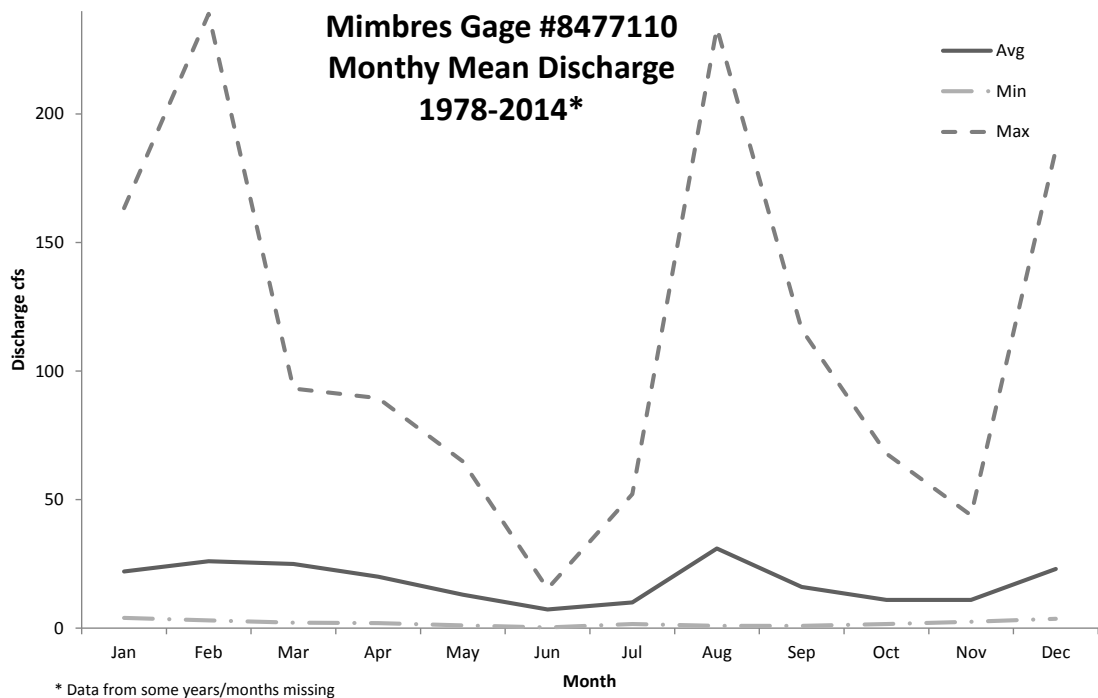


Figure 3. Average, maximum, and minimum monthly discharge on the Mimbres River at Mimbres NM (Gage Station 08477110). Gage period 1978 to 2014.

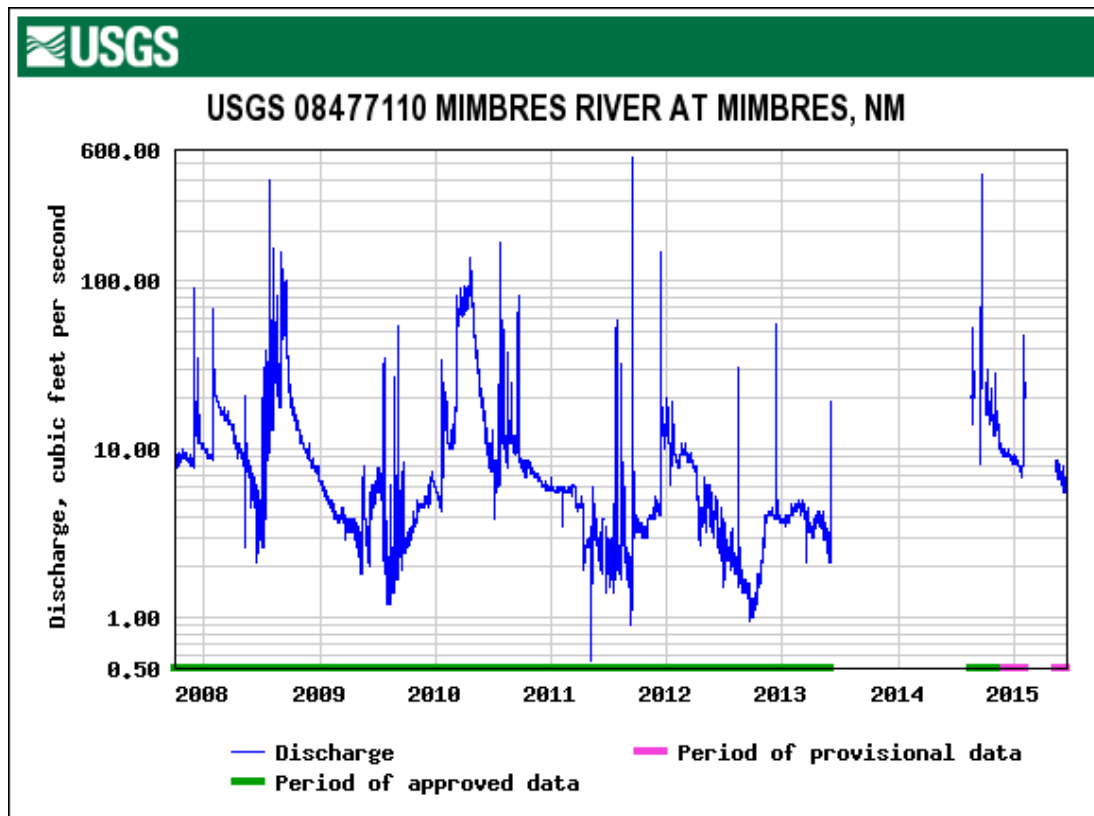


Figure 4. Daily discharge at Mimbres gage from Oct 2007 to May 2015

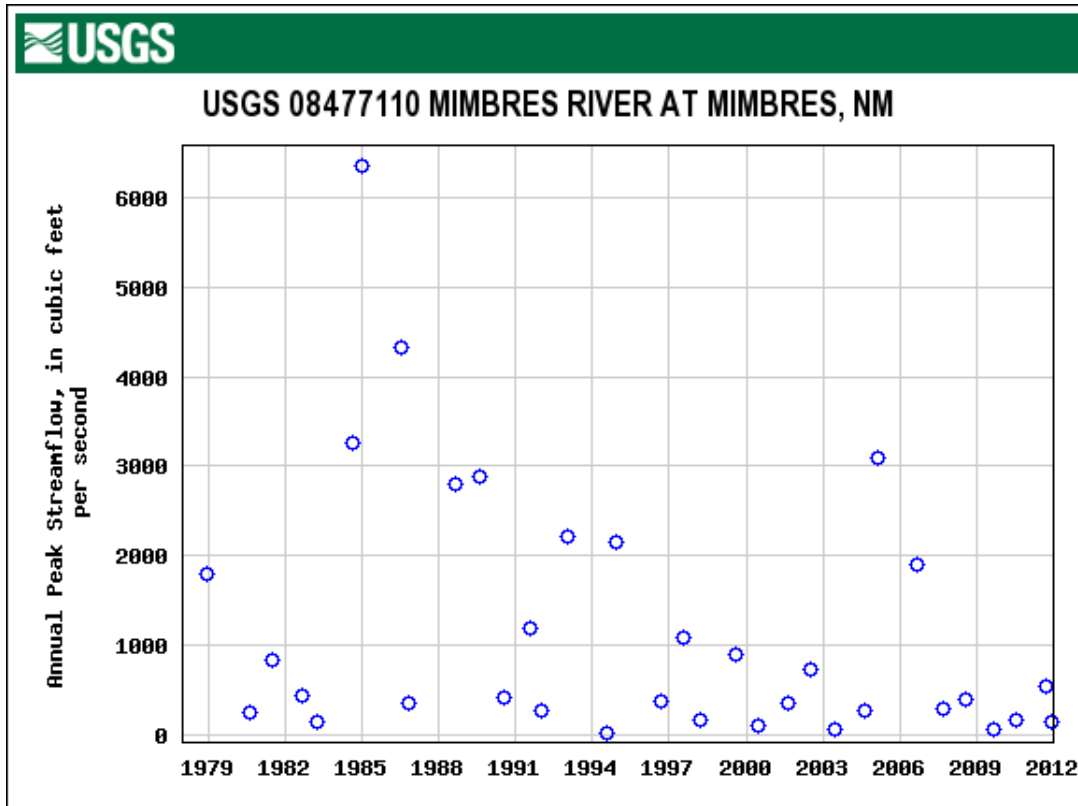


Figure 5. Annual peak flow in cfs for Mimbres gage from 1978 to 2012.



Figure 6. There are large expanses of big sacaton grasslands on the River Ranch.

## Vegetation and Fauna

The River Ranch has a diversity of riparian vegetation communities. There are relatively large and mature woodland stands dominated by Fremont's Cottonwood (*Populus fremontii*), Goodding's willow (*Salix gooddingii*), and velvet ash (*Fraxinus velutina*) (see Figures 7, 13-15). These communities are mostly associated with the higher river bars and terraces per map unit B of the provisional soils map<sup>3</sup> (Figure 9). These communities are considered some of the most imperiled in the Southwest (NatureServe 2013). In addition, the site reportedly supports the state record for the largest velvet ash. Lining the river bank and occasionally on

alluvial terraces are shrublands dominated by coyote willows (*Salix exigua*) and seepwillows (*Baccharis salicifolia*) along with strands of herbaceous wetlands along the channel (soils map units A and C). In addition to the woodlands and shrublands, there are extensive swaths of big sacaton (*Sporobolus wrightii*) grasslands on the upper terraces (Figure 6). The 10 plant associations identified in this survey are listed in Table 1 and ordered by the U.S. National Vegetation Classification hierarchy<sup>4</sup>.

Associated with this diversity of vegetation communities is a wealth of fauna (Figure 8). For the ranch, 174 species have been reported, including 108 birds, 28 mammals, 13 reptiles and amphibians, and 25 dragonflies and damselflies<sup>5</sup>. Among these, 22 are on the New Mexico Species of Greatest Conservation Need list (SGCN)<sup>6</sup>. Together with two Nature Conservancy preserves located at mid and upper sections of the Mimbres, the River Ranch anchors a unique conservation opportunity area of state-wide importance.



Figure 7. The Mimbres though the River Ranch supports a wide variety of riparian habitats.

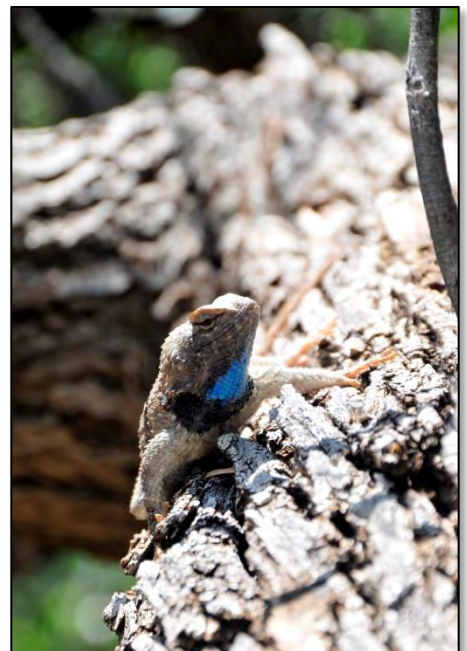


Figure 8. A Clarks spiny lizard in a Fremont cottonwood on the south end of Tigner grove.

<sup>3</sup> Personal Communication, Luis Garcia, Natural Resources Conservation Service, Las Cruces, NM.

<sup>4</sup> See <http://usnvc.org/>.

<sup>5</sup> Personal communication, River Ranch species list as of May 20, 2015. Mark Watson, New Mexico Department of Game and Fish.

<sup>6</sup> Draft State Wildlife Action Plan June 24, 2015, New Mexico Department of Game and Fish.



Soil and Vegetation  
Transect Locations

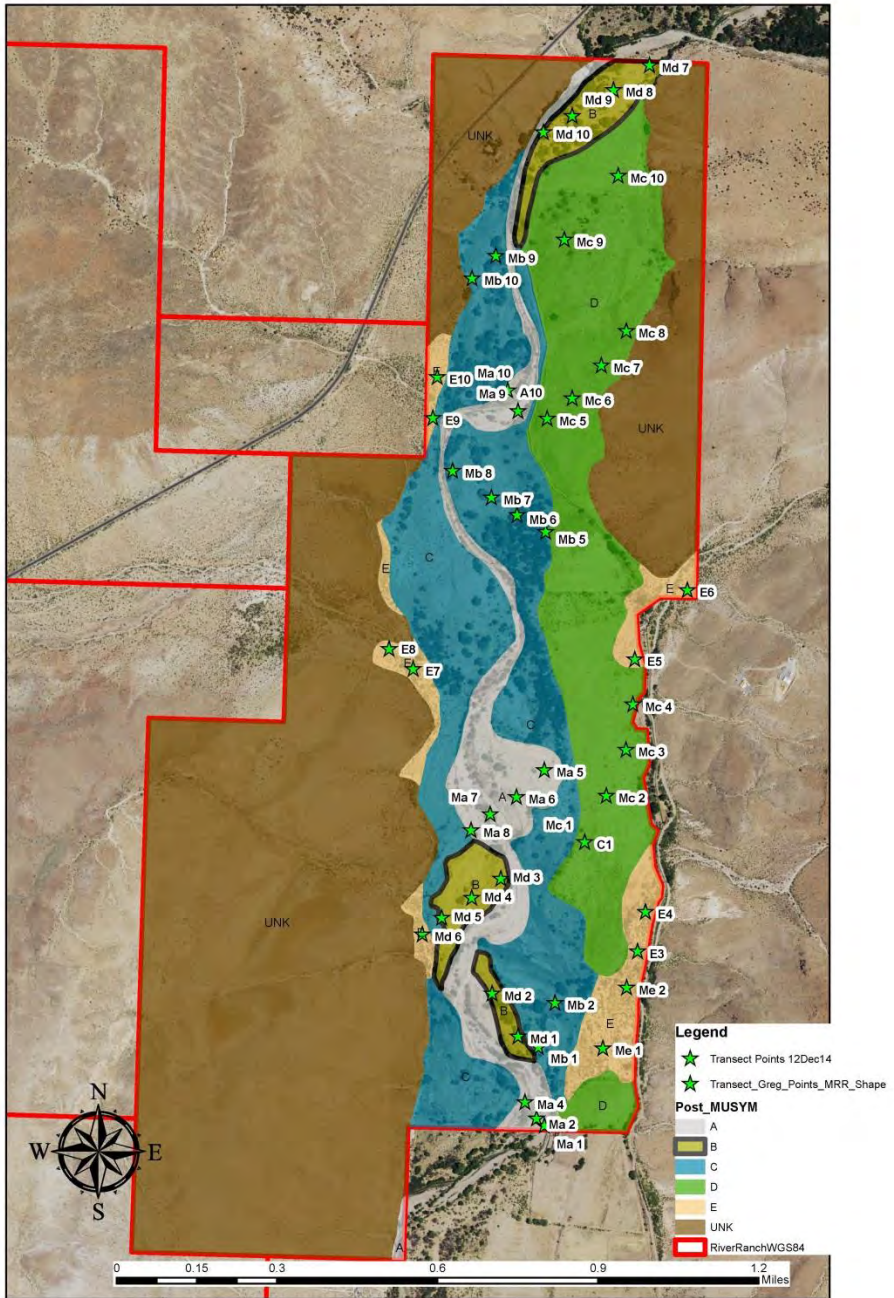


Figure 9. Provisional soils map for River Ranch developed by the Natural Resources Conservation Service, Las Cruces Office.



Table 1. River Ranch vegetation plant associations based on the 2015 reconnaissance survey as order by the U.S. National Vegetation Classification hierarchy (<http://usnvc.org/>).

National Vegetation Classification Hierarchy			NVC Code
1 Forest to Open Woodland			
1.B Temperate & Boreal Forest			
1.B.3 Temperate Flooded & Swamp Forest			
1.B.3.Nd Southwest North American Flooded & Swamp Forest			
M036	Warm Southwest Riparian Forest		
	G508	Sonoran-Chihuahuan Lowland Riparian Forest Group	
		<i>Fraxinus velutina</i> - <i>Celtis laevigata</i> var. <i>reticulata</i> / <i>Sporobolus wrightii</i> Woodland	NHNM000875
		<i>Populus fremontii</i> - <i>Juglans major</i> Forest	NHNM000874
		<i>Populus fremontii</i> - <i>Salix gooddingii</i> / <i>Baccharis salicifolia</i> Forest	<b>CEGL002683</b>
		<i>Populus fremontii</i> - <i>Salix gooddingii</i> Woodland	CEGL000944
		<i>Populus fremontii</i> / <i>Sporobolus wrightii</i> Woodland	NHNM000878
		<i>Salix gooddingii</i> / <i>Baccharis salicifolia</i> Woodland	NHNM000877
2 Shrubland & Grassland			
2.B Temperate & Boreal Grassland & Shrubland			
2.B.6 Temperate & Boreal Freshwater Marsh, Wet Meadow & Shrubland			
2.B.6.Nc Southwestern North American Warm Desert Freshwater Marsh			
M076	Warm Desert Freshwater Shrubland, Meadow & Marsh		
	G533	North American Warm Desert Riparian Low Bosque & Shrubland Group	
		<i>Baccharis salicifolia</i> / <i>Gravel Bar Shrubland</i>	CEGL005951
		<i>Baccharis salicifolia</i> / <i>Sporobolus wrightii</i> Shrubland	NHNM000876
3 Desert & Semi-Desert			
3.A Warm Desert & Semi-Desert Woodland, Scrub & Grassland			
3.A.2 Warm Desert & Semi-Desert Scrub & Grassland			
3.A.2.Na North American Warm Desert Scrub & Grassland			
M086	Chihuahuan Desert Scrub		
	G289	Chihuahuan Mesquite Upland Scrub Group	
		<i>Prosopis glandulosa</i> / <i>Sporobolus wrightii</i> Shrubland	NHNM000653
M087	Chihuahuan Semi-Desert Grassland		
	G489	Chihuahuan Semi-Desert Lowland Grassland Group	
		<i>Sporobolus wrightii</i> / <i>Monotypic Herbaceous Vegetation</i>	NHNM000270

### Land use history

The Mimbres valley has a long history of human use going back to the prehistoric Mimbrenño people. Within the last two centuries it has been significantly altered by human activities. The biggest changes to the watershed were initiated by landscape-altering grazing from large numbers of imported livestock and extensive logging for the booming mining industry of the late 19<sup>th</sup> and early 20<sup>th</sup> century. Although the forests recovered, the soils and watercourses have not. The Mimbres may have been more cienega-like in the past (NMDGF 2006). Agricultural surface-water diversion, groundwater withdrawal, inappropriate livestock management, channelization, and invasion of exotic plants and animals remain significant threats to the Mimbres River ecosystem as a whole (Cooper 2013).

On the River Ranch, livestock grazing was the most recent land use, but the ranch also contains a few old fields, and a very old tomato cannery. South of the upstream property boundary 0.6 km (0.4 mi) there is an earthen irrigation diversion dam approximately three feet higher than the river bottom on the west side, and six feet higher on the east side (Figure 2). The dam had been recently replaced, because the fall 2014 flood had removed the previous



Figure 10. Earthen irrigation dam in the river channel looking upstream and north.

dam, and filled the ditch headgate with sediment.<sup>7</sup> This dam was diverting about 80% of the base flow when the site was visited in May 2015. The dam diverts water into an irrigation ditch that runs along the eastern side of the floodplain. In May 2015, the water was being returned to the river via overland flow just above the lower ranch boundary. The ditch continues south along the edge of the floodplain to actively cultivated fields below the property boundary.

## Sampling design and analysis

The New Mexico Rapid Assessment Method for Riverine Wetlands (NMRAM) was used to assess the current condition of the Riparian Wetlands on the River Ranch. This assessment method examines landscape context, biotic and abiotic attributes of a wetland of interest, and is based on a combination of mapping and field observations. Currently there are two modules of the NMRAM for unconfined riverine systems. One is for smaller montane streams with gradients above one percent and at higher elevations and associated with montane riparian vegetation, and the other for larger lowland rivers with gradient less than one percent and dominated by desert riparian vegetation. The lower Mimbres, while a relatively small river, occurs in a lowland setting with the type of vegetation and stream gradient that is consistent with the requirements of the Lowland module. Hence, data was collected using the Lowland module (version 1.0). Yet, because it is a small river we also employed a few components of the Montane module that we thought might help in the assessment as supplemental information.

NMRAM data collection occurs in discrete Sampling Areas (SA) with defined boundaries. For the River Ranch, three SAs were created. These SAs were distributed more or less equally from north to south across the property to obtain a representative sample of conditions on the

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<sup>7</sup> Personal communication, Mark Watson, NMDGF.

ranch and to capture the range in variation across the property (Fig 1). There are 12 metrics distributed across three attribute categories: landscape context, biotic, and abiotic (Table 1). Each metric is assessed and assigned a rating based on the data. The data and the scores themselves are entered onto the NMRAM datasheets. The datasheet contains a roll-up table which takes all the individual scores and calculates new scores by attribute categories and then an overall SA score based on the attribute scores. The SA scores for a site are then averaged to produce an overall project score. Finally, the NMRAM datasheets include a series of stressor checklists, which although not used in calculating the final SA score, are included as ancillary information on factors that may be affecting the conditions of the wetland. Copies of the complete NMRAM datasheets, with all of the data collected are provided as part of the Digital Addendum and summaries of the data and are reported below.

All data collected by the NMRAM is done on a rank scale of A to D (4 to 1), with A representing a wetland in Excellent condition, B a wetland in Good condition, C a wetland in Fair condition, and D a wetland in Poor condition. The implication is that wetlands in excellent condition are providing all of their expected functions and services, while wetlands in poor condition are providing few to none of their expected functions and services. Full descriptions of all the methods for collecting NMRAM data and metric descriptions and rationale can be obtained from the NMRAM field guides available on the New Mexico Environment Departments website (<https://www.env.nm.gov/swqb/Wetlands/NMRAM/>).

As part of the NMRAM biotic metric assessment process, a vegetation patch map was created for each SA. These were digitized in GIS and are provided as shapefiles in the Digital Addendum. Additionally, photographs of each vegetation patch were taken, as well as photographs of channel cross-sections, and other features. All photographs are provided in the digital addendum included with the report. The locations of some vegetation and abiotic features, as well as the channel cross-sections were recorded with a Garmin GPS with an accuracy of +/- 3 m (Digital Addendum). An electronic Data Addendum to this report contains all of the raw data in PDF files, along with the photo files and a PDF of this report.

Table 2. NMRAM Lowland Version 1.0 list of Metrics.

<i>Attribute categories and metrics</i>		<i>Score weights</i>	
		<i>Attributes</i>	<i>Metrics</i>
<b>Landscape Context Metrics</b>		<b>0.3</b>	
	1. Buffer Integrity Index		0.3
	2. Riparian Corridor Connectivity		0.3
	3. Relative Wetland Size		0.2
	4. Surrounding Land Use		0.2
<b>Biotic Metrics</b>		<b>0.35</b>	
	1. Relative Native Plant Community Composition		0.3
	2. Vegetation Horizontal Patch Structure		0.2
	3. Vegetation Vertical Structure		0.2
	4. Native Riparian Tree Regeneration		0.1
	5. Invasive Exotic Plant Species Cover		0.2
<b>Abiotic Metrics</b>		<b>0.35</b>	
	1. Hydrologic Connectivity		0.4
	2. Physical Patch Diversity		0.4
	3. Soil Surface Condition		0.2

## Results

### NMRAM Scores

The NMRAM rating scores by attribute category and metric for each sampling area and the overall site scores are provided in Table 3. Each of the metrics measures a different aspect of riparian condition. Below we will present a brief introduction to each of the metrics measured on the ranch, along with the conditions that lead to the scores of each.

Landscape context metrics are designed to measure the conditions surrounding an SA, and are primarily assessed using a GIS, with field confirmation. The Buffer Integrity Index, which is composed of two sub-metrics, Buffer Percent and Buffer Width, is a measure of the amount of natural and semi-natural vegetated buffer on the lateral sides of the SA. Vegetated buffers enhance wetland function and protect the wetland from anthropogenic environmental



stressors. Overall buffers on the River Ranch were excellent, with only a slight reduction in width due to Highway 61 to the west, and the dirt County Road to the east.

Table 3. NMRAM scores for all metrics by attribute categories for each sampling area and the overall ranch average.

		Sampling Areas			
		Upper	Mid	Lower	Ranch Avg.
		62.7	61.4	60.0	
<b>Landscape Context Attributes</b>					
	Buffer Integrity Index	3.5	4	3.5	<b>3.67</b>
	Buffer Percent	4	4	4	<b>4</b>
	Buffer Width	3	4	3	<b>3.33</b>
	Riparain Corridor Connectivity	4	4	4	<b>4</b>
	Relative Wetland Size	3	3	4	<b>3.33</b>
	Surrounding Land Use	3	3	3	<b>3</b>
<b>Biotic Metrics</b>					
	Relative Native Plant Community Composition	4	4	3	<b>3.67</b>
	Vegetation Horizontal Patch Structure	4	3	4	<b>3.67</b>
	Vegetation Vertical Structure	3	2	2	<b>2.33</b>
	Native Riparain Tree Regeneration	2	1	2	<b>1.67</b>
	Invasive Exotic Pland Species Cover	4	4	4	<b>4</b>
<b>Abiotic Metrics</b>					
	Hydrologic Connectivity (Multi-channel)	3	2	3	<b>2.67</b>
	Physical Patch Diversity	3	3	4	<b>3.33</b>
	Soil Surface Condition	4	4	4	<b>4</b>
<b>Additional Montane Abiotic Metrics (Not in score roll-up)</b>					
	<i>Hydrologic Connectivity (Montane)</i>	<i>2</i>	<i>1</i>	<i>3</i>	<b><i>2.00</i></b>
	<i>Channel Stability</i>	<i>3</i>	<i>3</i>	<i>3</i>	<b><i>3</i></b>
	<i>Stream Bank Stability and Cover</i>	<i>3</i>	<i>3</i>	<i>2</i>	<b><i>2.67</i></b>
<b>Landscape Context Score</b>		<b>3.45</b>	<b>3.6</b>	<b>3.65</b>	<b>3.57</b>
<b>Biotic Score</b>		<b>3.6</b>	<b>3.1</b>	<b>3.1</b>	<b>3.27</b>
<b>Abiotic Score</b>		<b>3.2</b>	<b>2.8</b>	<b>3.6</b>	<b>3.2</b>
<b>SA Wetland Condition Score</b>		<b>3.415</b>	<b>3.145</b>	<b>3.44</b>	<b>3.33</b>
<b>SA Wetland Rank</b>		<b>A</b>	<b>B</b>	<b>A</b>	<b>A</b>

Riparian Corridor Connectivity (RCC) measures the integrity of connectivity versus fragmentation of the riverine corridor upstream and downstream from the SA. Intact riparian corridors allow for unimpeded movement of wildlife, intact habitat, and propagation of plant communities. On the ranch riparian corridor connectivity was also excellent. The only break in riparian corridor connectivity that was measured was the earthen dam, but it was small enough to not lower the RCC rating.

Relative Wetland Size is an index of reduction of the current wetland size relative to its estimated historical extent, due to human-induced disturbances, particularly land-use conversions. Large reductions of area can alter hydrology and ecosystem processes, and may create ecological instability or reduce viability. Overall the ranch had good relative wetland size, and only missed an Excellent rating for this metric due to the presence of old fields at the edge of the floodplain on its east side.

Surrounding Land Use measures the amount and intensity of human land use in the buffer zone surrounding the SA. The intensity of human activity in the landscape has a proportionate impact on the ecological processes of the riparian ecosystem. The ranch was rated Good on surrounding land use. The rating table for surrounding land use is very strict for the Excellent category, so although the ranch is mostly surrounded by undeveloped range land, there were enough roads and fields in the buffer zone to move it to the Good category.

Biotic metrics measure key biological attributes within the wetland that reflect ecosystem integrity. Relative Native Plant Community Composition is an index of the abundance of native-dominated vegetation communities versus exotic-dominated vegetation communities. High native plant species diversity generally indicates overall high biotic diversity, stability of wetland biotic communities, increased wildlife habitat and species diversity. The ranch received an Excellent score on relative native-plant community composition. The lower SA scored a Good rather than Excellent on this metric, but that was due to exotic herbaceous species in the understory. Woody dominant species throughout the ranch are predominantly native. Of note, the introduced shrub bird-of-paradise (*Caesalpinia gilliesii*) was found in scattered patches on the high terraces, although not in large enough numbers to affect the metric rating.

Vegetation Horizontal Patch Structure is an assessment of general vegetation patch diversity and complexity of the patch pattern (interspersion) within and SA. Multiple horizontal plant patches across the SA indicate high biotic diversity and a history of dynamic fluvial processes. The ranch as a whole earned an Excellent rating on this metric, and generally a high number of different vegetation patches were recorded. However, the amount of area per patch was not very equally distributed in the middle SA, where there was a majority of one vegetation type, big sacaton grasslands.

Vegetation Vertical Structure is an assessment of the overall vertical structural complexity and richness of the vegetation canopy layers across the SA. Vertical vegetation structure is an integral part of habitat structure and is correlated with overall biodiversity. The

ranch earned only a Fair rating on this metric, due to limited riparian shrub layers, both in the understory of mature forest patches and as independent stands. Of note, the upper SA did earn a rating of Good on this metric, as it had a greater percentage of forest with shrub understory than the other SAs.

Native Riparian Tree Regeneration assesses the abundance of riparian tree reproduction across the SA. Healthy functioning riverine wetlands should consist of a mosaic of woody vegetation stands that include stands of both mature and young regeneration trees. Absence of young trees may indicate ecological dysfunction. The ranch earned a Poor rating on this metric, due to a near absence of native riparian tree reproduction. The upper and lower SAs did earn Fair ratings on this metric, but still had very little active tree reproduction. The majority of reproduction that was seen on the ranch was root, or adventitious shoots (Figure 11)



Figure 11. Gooding’s willow branch in the active channel with adventitious shoots (Lower SA).

**Invasive Exotic Plant Species Cover** is a measure of the total percent cover of a set of exotic plant species that are considered invasive based on the New Mexico list of noxious weeds<sup>8</sup>. Invasive non-native species can have a significant impact on community diversity and function. High levels of invasive exotic species within a riparian plant community are a direct threat to maintaining wetland function and biodiversity. The ranch earned an Excellent rating on this metric, as did all three SAs. Only a few isolated Russian olive and saltcedar individuals were observed across the ranch.

The abiotic metrics focus on hydrological conditions, physical ecological complexity and anthropogenic disturbances. Hydrologic Connectivity is an assessment of the ability of water to flow into or out of the wetland or to inundate adjacent areas. Surface hydrological connectivity between a river and riverine wetlands formed on its floodplain supports key ecological functions and plant and wildlife habitat diversity by promoting an exchange of water, sediment, nutrients and organic carbon (Collins et al. 2008). On the River Ranch we assessed Hydrologic Connectivity using the Lowland module narrative rating system for multi-channel systems, as the method most suited to the lower Mimbres. Using this method the ranch rated Good on

<sup>8</sup> List maintained by the New Mexico Department of Agriculture, last updated 2009. Available on the website <http://www.nmda.nmsu.edu/apr/noxious-weed-information/>

Hydrologic Connectivity as a whole. The majority of back and side channels showed evidence of flow from the fall 2014 flood event, which was estimated to be a two to five-year return event based on gage data (Figures 4 and 5). Of note, the middle SA showed less evidence of water flow through its side channels and thus rated only a Fair on Hydrologic Connectivity.

To get a more complete picture of the Hydrologic Connectivity on the ranch, we also measured the entrenchment ratio within the active channel using the protocols from the Montane module. While entrenchment ratio does not give a complete picture of flow patterns in a multi-channel system, it does speak to the ease or difficulty for water to move out of the main active channel. The entrenchment ratios, with their ratings from the Montane module, are provided in Table 4. As a whole the ranch scored a Fair rating on Hydrologic Connectivity as measured by this method, due to generally poor entrenchment ratios. However, there was a great deal of variability in entrenchment ratios between the SAs, and even within SAs. The lower SA had the least amount of entrenchment on average, but also had the widest variability on entrenchment ratios between cross-sections, with ratios spanning Excellent to Poor. The lower SA also had the highest number of active side and back channels, and showed evidence of a highly dynamic fluvial process. Between the middle and lower cross sections on the lower SA there was a fallen cottonwood in the channel that had recently caused the active channel to be abandoned (Figure 12). Below the fallen tree a head cut had formed a new active channel, while the former main channel was now a side channel (Figure 13). The channel below this head cut was the one with the worst measured entrenchment ratio on the SA.

Table 4. Entrenchment Ratios measured for cross-section and average for each SA. U=Upper cross-section, M=Middle cross-section, L=Lower cross section.

SA	Cross Section	Entrenchment Ratio	NMRAM Rating
Upper (062.7)	U	1.96	3 (B)
	M	1.45	1 (D)
	L	1.28	1 (D)
	<b>SA Average</b>	<b>1.56</b>	<b>2 (C)</b>
Middle (061.4)	U	1.08	1 (D)
	M	1.37	1 (D)
	L	1.32	1 (D)
	<b>SA Average</b>	<b>1.26</b>	<b>1 (D)</b>
Lower (060.0)	U	3.19	4 (A)
	M	1.73	2 (C)
	L	1.15	1 (D)
	<b>SA Average</b>	<b>2.02</b>	<b>3 (B)</b>
<b>River Ranch Average</b>		<b>1.61</b>	<b>2 (C)</b>



Physical Patch Diversity describes the physical structural richness of riverine wetlands and associated channels. Variety in physical features leads to a varied and complex habitat that fosters biological diversity. Overall the ranch had an Excellent rating for physical patch diversity, due to a high number of side and back channels, as well as other physical patch types spread across the floodplain. The lower SA was particularly diverse due to dynamic multiple channels.



Figure 12. Fallen cottonwood blocking main channel on lower SA. Beaver activity most likely occurred after the tree fell.

Soil Surface Condition is a measure of anthropogenic disturbance to the wetland and riparian soils that results in modification of soil characteristics. Disturbance to the soil can affect biological, physical and chemical processes and impede wetland function. The ranch overall, and all three SAs, scored an Excellent rating on soil surface condition, due to the very minimal level of development throughout the ranch.



Figure 13. Head cut at top of new channel, just below fallen cottonwood (Figure 12).

In addition to the Lowland module metrics, we also collected Channel Stability, and Stream Bank Stability and Cover metric data using the Montane module protocols. These metrics are not included in the Lowland module because they are not well suited to sand-bedded lowland rivers. Because of this the data collected with these metrics on the River Ranch can only be considered descriptive, and is included here to broaden our understanding. Channel Stability assesses the degree of channel aggradation or degradation based on the departure from characteristic pattern, profile, and dimension. Large, persistent changes to the flow or sediment regime caused by upstream land-use changes, alterations of the watershed, or climatic changes tend to destabilize the channel and cause it to change form (Collins et al. 2008). Overall the ranch as a whole rated a Good on this metric. There were slight indications of aggradation, particularly in the upper SA, but most of the indicators

available to score the metric were only applicable to rock or cobble-bottom streams, so the score is based on three or less indicators per site.

Stream Bank Stability and Cover is a measure of stream bank soil/substrate stability and stream bank erosion potential that reflect overall stream bank stability, which generally indicates less anthropogenic disturbance. Stable stream banks should support more perennial vegetation and more stable and healthy wetland communities. The ranch overall scored in the Good category on this metric, with the lower SA scoring only fair. In general the banks throughout the ranch had a high degree of variability in the amount of stabilizing vegetation and indicators of erosion potential present, and the scores on this metric often varied greatly from one cross-section to another within an SA.

Based on the NMRAM assessment the River Ranch riparian wetlands overall are in Excellent condition, with both the lower and upper SA rating Excellent, while the middle SA was rated Good (Table 3). The ranch average for both landscape context and biotic metrics is also Excellent. The abiotic metrics rated in the Good category. However, the data from selected metrics indicate areas of Poor condition, and a potential for future overall conditions to decline without active management, and are discussed below.

There were 14 different vegetation patches types mapped as part of the Biotic Metric data collection process (Figs. 14 to 16). These patches represent nine recognized plant communities, and four vegetation groups in the U.S. National Vegetation Classification<sup>9</sup> (Table 1). Although detailed community composition data was not collected as part of the NMRAM process, there is a wealth of published data available on the majority of the vegetation communities observed on the River Ranch. The ranch's forest communities dominated by Fremont's cottonwood, velvet ash and Goodding's willow are all considered globally rare and highly threatened due to altered hydrologic regimes, flood control structures, and land conversion.

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<sup>9</sup> Available on <http://usnvc.org/>

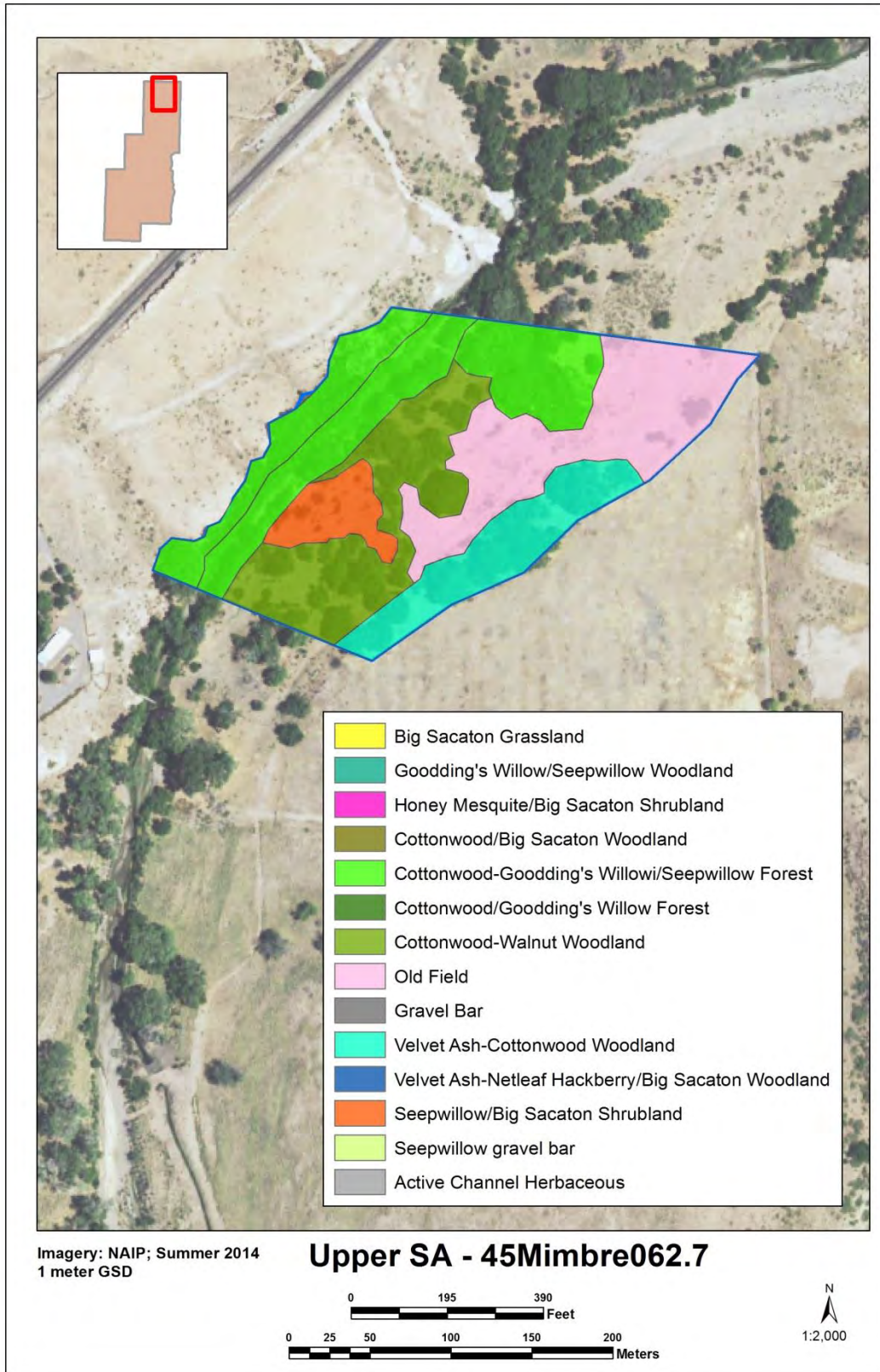


Figure 14. Vegetation Polygon Map for Upper SA - 45Mimbre062.7.



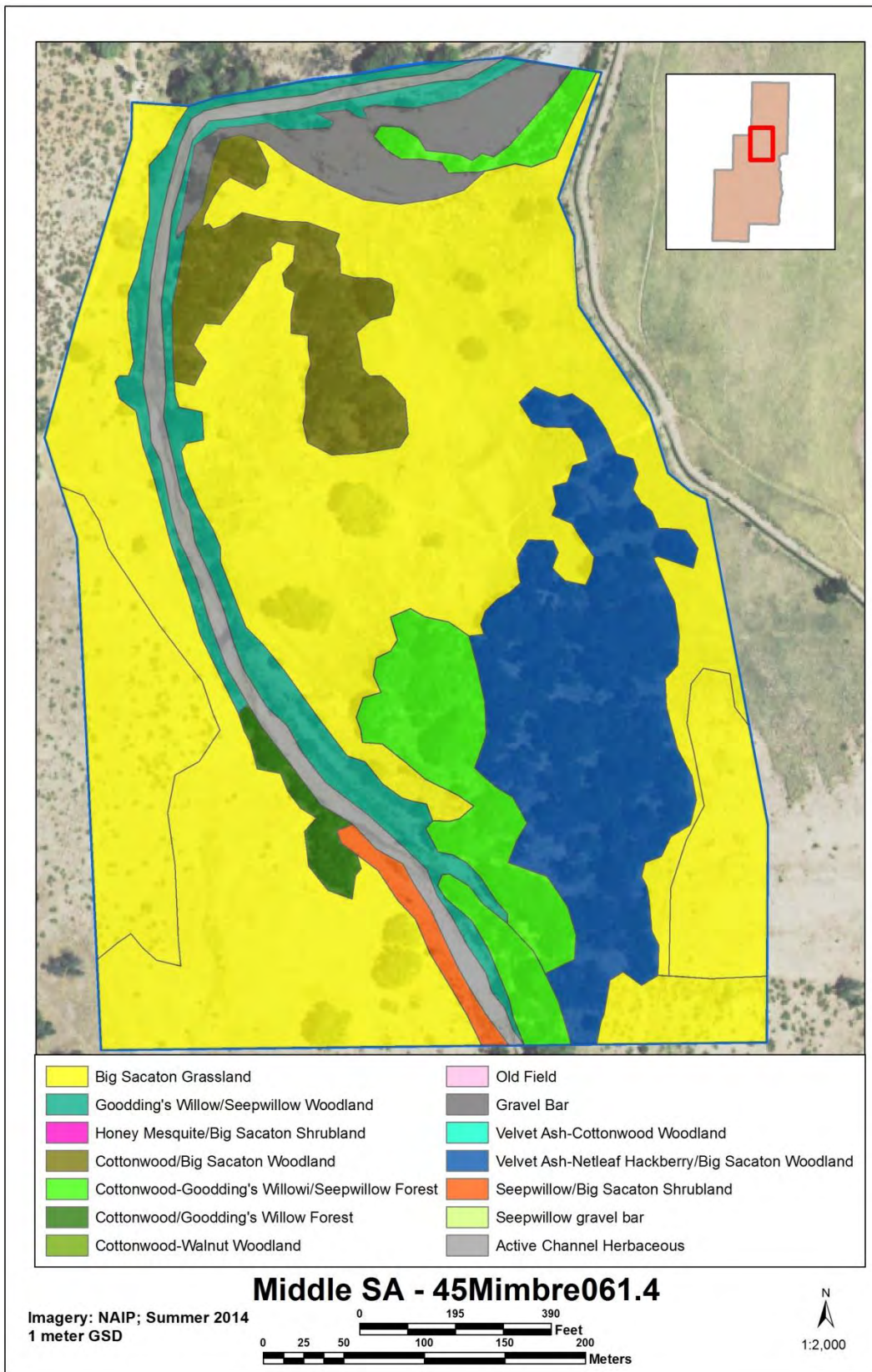


Figure 15. Vegetation Polygon Map for Middle SA - 45Mimbre061.4.



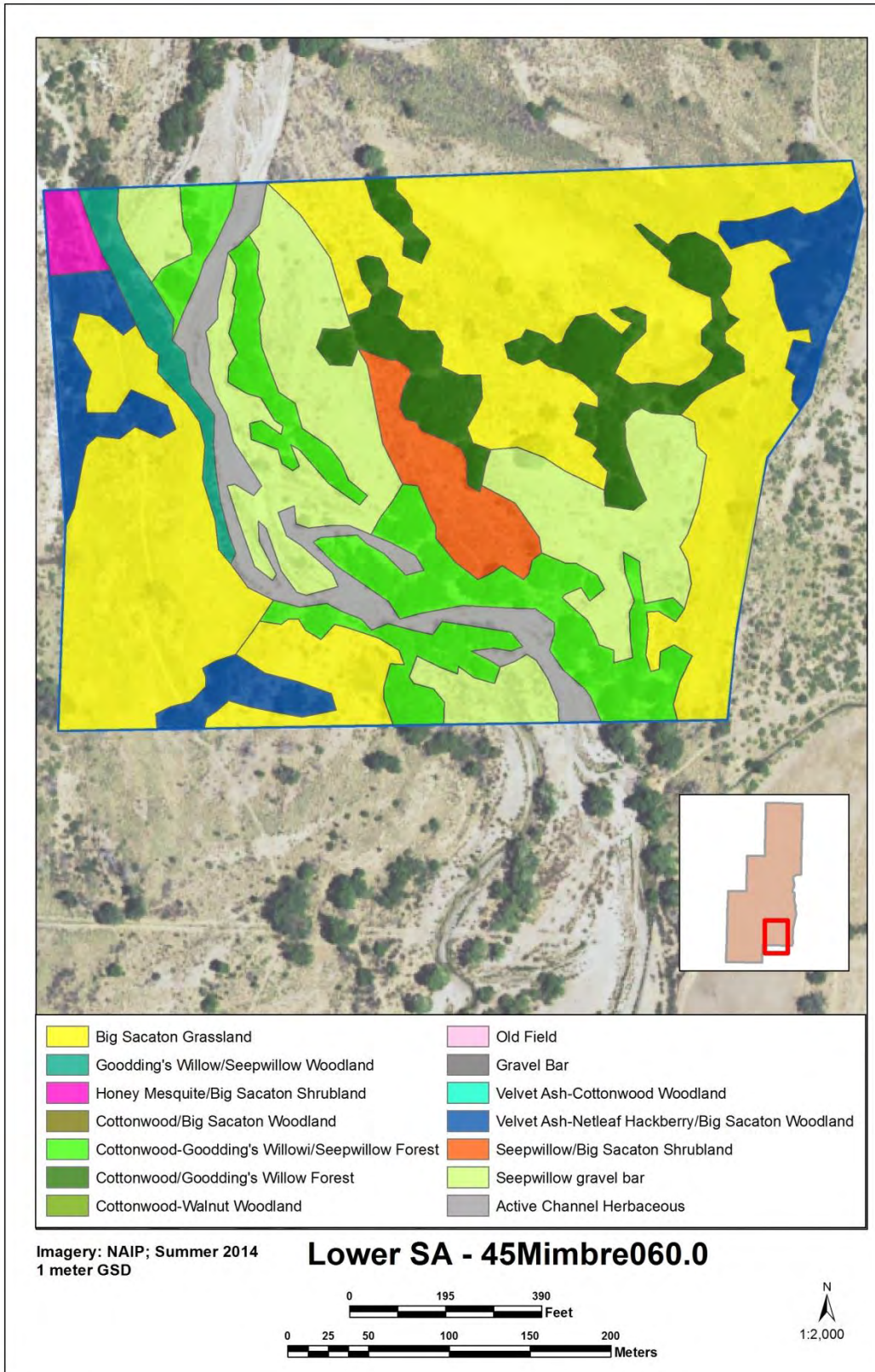


Figure 16. Vegetation Polygon Map for Lower SA - 45Mimbre060.0.

## Discussion

The remoteness of the River Ranch from urban and town centers provides favorable landscape context for the site and this is reflected by the high Landscape Context ratings. But there are water-management issues involving upstream and downstream users that will need to be addressed to improve ecological conditions within the property. While the ranch is in overall excellent condition, there are indications that without management intervention ecological conditions will decline. The abiotic and biotic data point to a history of highly dynamic fluvial process that lent to the inherent riparian vegetation and habitat diversity on the ranch. However, the data also show that the system has become less hydrologically connected with limited overbank or terrace flooding and possibly lowered groundwater tables that are impacting the health of the site.

Overall, the River Ranch supports high quality stands of globally rare and important riparian forest habitat (Figures 14 to 16). However, indications from the NMRAM assessment are that some of these forest stands are relatively old (125+ years), and young reproduction is absent. Most of the forest stands on the ranch consist of old mature trees, with minimal or no riparian shrub understory, which is reflected in the Poor Vertical Vegetation Structure score. Lack of a shrub layer suggests a lowered groundwater table that fails to support wetland obligate and facultative species such as coyote willow (*Salix exigua*) and seepwillow (*Baccharis salicifolia*) (Stromberg and Tiller 1996). Further vegetative indicators of a lowered groundwater table were seen in the upland or facultative herbaceous species, such as big sacaton that made up the forest herbaceous understories. Big sacaton, which tolerates deeper water tables than even mature riparian trees (Stromberg and Tiller 1996), also occurred as large nearly monotypic grasslands on the terraces in between the mature forest patches.

Forests with understory shrub layers provide necessary high structure habitat for many riparian bird species. A healthy, well connected riparian zone would be expected to have a mix of both high structure, shrub rich, forests, and lower structure mature forest stands with open understories. Of note, the upper SA, which is above the irrigation diversion dam, had a better Vegetation Vertical Structure score than the other two SAs, both of which were below the irrigation diversion dam, possibly due to a higher and more stable groundwater table from an undiverted base flow in the river.

The low Vegetation Vertical Structure scores were also related to a paucity of Riparian shrublands across the ranch. In addition to the obligate and facultative wetland shrub species mentioned above, many riparian shrublands include young riparian trees, which are more sensitive to groundwater depletion than mature trees (Stromberg and Tiller 1996). The limited riparian shrublands on the ranch may also be related to the history of grazing. Coyote willow is highly palatable to cattle, particularly when they are young. Additionally, trampling and soil disturbance from cattle in the active channel and along banks can be deleterious to riparian shrubs. Significant improvements in riparian shrub and herbaceous habitat have been seen with removal from grazing on the Nature Conservancy properties on the Mimbres upstream of

the River Ranch<sup>10</sup>. Riparian shrublands provide excellent habitat for many bird and animal species, as well as contributing to higher overall species diversity (Milford and Muldavin 2004), and are an important part of a dynamic riparian patch mosaic.

Many of the large mature trees were showing signs of water stress with partial die back, dropped limbs, and tree death. These indications also suggest stress from a lowered groundwater table and they were more pronounced in the SAs below the earthen irrigation diversion dam. If the dam diverts the majority of the river flow throughout the growing season, as it was during the May site visit, then it could have a significant effect on hyporeic flow and groundwater depth on the ranch downstream. In turn, the drop in groundwater can lead to habitat degradation throughout the lower portions of the ranch. Lower in-stream flows can also be related to irrigation diversions and groundwater pumping upstream off the ranch, however, the dam on the ranch is one cause of lower stream flow that can possibly be addressed and ameliorated by ranch management.

Big sacaton poses a fire hazard for the existing stands of mature riparian trees as the big sacaton grasslands are adjacent to, and in many cases, underneath the forest patches. Tigrer grove is one area of particular concern, as it contains some of the largest mature velvet ash trees in New Mexico and is also one of the largest stands of mature forest on the ranch. Removal of big sacaton within and adjacent to the forests is recommended in the short-term to protect the grove, and similar forest patches on the ranch. In the long-term activities aimed at improving hydrologic connectivity, and reconnection of the floodplain should help encourage growth of new riparian shrublands and woodland allowing them to replace big sacaton in areas with improved groundwater.

Almost no native riparian tree regeneration was observed during the sampling of the ranch. The reproduction that was observed was mostly sucker, or root sprouts (Figure 11). Only one seedling cottonwood was observed (on the lower SA), along with a handful of seedling walnut, soapberry and netleaf hackberry scattered across the ranch. There were also a handful of younger mature trees, but the majority the riparian trees on the ranch were old mature individuals. For germination, cottonwood and Goodding's willow need moist bare areas, generally fresh post-flood sediment splays. The areas need to maintain a high water table through the first growing season. Water should not recede faster than 3cm/day for optimal survival (Mahoney and Rood 1991). Finally, those areas of bare, moist ground must occur when seeds are dispersing in the spring. These riparian trees have evolved to take advantage of spring flood flows, and time seed dispersal relative to historic flood periods. The trees establish best at flood flows greater than or equal to seven-year return events (Stromberg 1993).

On the ranch there are three ways that this process may have been interrupted. First, the missing cohort of young trees may have been removed by cattle while seedling or saplings. Young cottonwoods and Gooddings' willow are palatable and desirable browse to cattle

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<sup>10</sup> Personal communication, John Money, Surface Water Quality, New Mexico Environment Department, Silver City, NM.

(Stomberg 1993; Samuleson and Rood 2004). Velvet ash reproduction is also affected by grazing (Szaro and Pase 1983). Second, the extensive stands of big sacaton may have limited the available bare ground for seedling establishment. Finally, rapid draw down of the water in the active channel for irrigation in the early summer, and the concomitant drop in the hyporheic zone, may have been too extreme for those seedlings that did establish to survive. Keeping cattle out of the riparian zones, especially when woody riparian vegetation would be most vulnerable in the early spring and summer will prevent loss of young trees to browsing. Maintaining a growing season base flow in the river will aid in maintaining a water table high enough for young trees and shrubs to establish. If, after significant flood events, the two above suggestions are not resulting in native woody reproduction, active earthwork could be used to lower some of the riverside terraces currently dominated by big sacaton, and reconnect them to the river at lower peak flows. This would aid reproduction by both providing bare ground for seed germination, and a higher groundwater table for young trees. It is a technique that has been used with good results on the Rio Grande (Robert 2005; Zeedyk 2009; Muldavin et. al. 2012)

Although all SAs on the ranch scored in the Excellent range for Invasive Exotic Weed Cover, there were scattered individual invasive exotic trees observed. Treating and removing these trees now could prevent a future problem. One Russian olive was observed along the river channel at the lower edge of the upper SA, and there were several scattered individual saltcedars observed in the lower SA. Many of them were marked on the vegetation field maps and invasive exotic weeds are also tracked at the polygon level on the NMRAM datasheets (see digital addendum). Although not considered an invasive exotic species, the introduced shrub bird-of-paradise (*Caesalpinia gilliesii*) was found in scattered patches on the high terraces, particularly on the eastern side of the ranch. It is not yet widespread enough to affect the Relative Native Plant Community Composition metric, but may continue to spread on the drier floodplain terraces if not addressed.

From the perspective of multi-channel lowland systems, the ranch appeared to be relatively well connected hydrologically. However, there were indications that it was not fully hydrologically connected, particularly in the center of the ranch, just below the irrigation dam. When entrenchment ratio was used to assess hydrologic connectivity, it again was lowest for the center SA. This suggests that the dam is interfering with the hydrologically connectivity, and that the effect is greater proximal to the dam. Although of limited use in a multi-channel system, entrenchment ratios for both the upper and middle SAs indicate an active channel that is relatively entrenched, and limited in its ability to access the floodplain. This may stem from water withdrawals upstream of the ranch, however management aimed at limiting disturbance to the active channel and floodplain, and addressing the hydrological alterations caused by the dam on the ranch, should aid hydrologic connectivity in the long term. Although the lower SA was the one with the most limited base flows, it showed the greatest level of hydrologic connectivity on all measures, with indications of highly dynamic fluvial processes, a promising sign of potential for success with restoration on the middle and upper SAs.



There were some indications of aggradation on the ranch from the Channel Stability metric, but any conclusions based on this metric are very tentative, as most of the indicators available to score the metric were only applicable to sandy bottom systems. For a multi-channel, lowland, sand-bedded river aggradation during large flood events is to be expected. The one portion of the ranch where this may be of concern is in the upper SA, which was dominated by rocky pools prior to the fall 2014 flood.<sup>11</sup> During the May 2015 site visit the entire upper SA had a flat sand bed. Due to the 2013 Silver Fire in the Black Range, the 2014 flood may have been carrying an abnormal amount of sediment. As the upper watershed revegetates sediment loads in the river will return to normal, and this portion of the reach should scour back to its natural rock bed.

There were also indications that the river banks throughout the ranch may have suffered a loss of vegetation and stability, likely due to grazing, in the past. With rest from grazing these banks should recover, and become more heavily vegetated. Relatively rapid vegetation and bank recovery has been observed in similar riparian systems after exclusion from grazing in as little as 4 to 6 years (Milford et al. 2015; Belsky et al. 1999; Krueper et al 2003; Magilligan and McDowell 1997). Recovery of the vegetation and bank stability will improve not just the terrestrial habitat, but also improve in channel habitat for fish and other aquatic fauna (McIver and McInnis 2007). Additionally better vegetated and stable banks lead to decreased evaporation, which can increase hyporheic exchange (Magilligan and McDowell 1997; Kauffman et al. 1983; Theurer et al. 1985).

## Summary of Recommendations

In summary, we make the following recommendations for riparian habitat management on the ranch:

1. Maintain the maximum possible base flow in the active river channel throughout the year, but particularly during the growing season and in keeping with the property water rights. Negotiate to redesign the earthen diversion dam in the center of the ranch, such that it does not cross the entire active channel. Also, limit flows in the irrigation ditch to only those times when the water is being actively used for downstream irrigation.
2. If future grazing is considered, it will need to be actively managed to protect woody riparian tree and shrub reproduction and recovery. Regardless, current livestock should be kept out of the active channel and adjacent riparian zone for at least two years or more to allow young shrubs and trees to establish and grow to a size where they will be less desirable browse. This will also allow the herbaceous wetland vegetation and the river banks to recover to a more stable state. Once the vegetation has recovered,

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<sup>11</sup> Personal communication from Mark Watson, NMDGF

livestock use will need to be carefully monitored and, if possible, their access the active channel should remain limited or excluded.

3. If recommendations 1 and 2 do not produce increases in woody riparian vegetation, particularly in tree recruitment following the next large (5 to 10 year) spring flood event, then active restoration should be considered. Removal of big sacaton from selected terrace areas adjacent to the active channel, with lowering of the terrace such that it will be easily flooded during the next high flow can be planned for one or two terraces areas of an acre or more each. Earthwork should be done in the winter, so that the cleared area can be accessed by high water the next spring. If this sort of restoration is attempted, it should be designed by an engineer with an understanding of fluvial processes, and familiar with this type of riparian restoration work. (Examples of successful projects of this type can be found on the Rio Grande (Robert 2005; Muldavin et. al. 2012)
4. Big sacaton stands around large mature tree stands should be managed to reduce fire risk to the forests. Creating fire breaks in the big sacaton at the edges of the forest should be sufficient in the short term, and can be achieved mechanically. Burning of the big sacaton is not recommended, as this would pose a risk to the trees. Also, removal of entire big sacaton stands is not recommended, except as part of active restoration activities mentioned above in recommendation 3.
5. Removal of Invasive Exotic tree species (saltcedar, Russian olive) now could save money and environmental disruption in the future. There were only a handful of saltcedar and Russian olive individuals observed, and these could be cut down, and treated with topical herbicide efficiently. Left in place these trees may interfere with native riparian tree reproduction.

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**Appendix D. River Ranch Documented Wildlife Species**

## River Ranch Documented Wildlife Species

(**Bold** = Species of Greatest Conservation Need)

As of 1 August 2015

### Birds

Great Blue Heron (*Ardea herodias*)

Green Heron (*Butorides virescens*)

Turkey Vulture (*Cathartes aura*)

Mexican Duck (Mallard) (*Anas platyrhynchos*)

Common Merganser (*Mergus merganser*)

**Golden Eagle** (*Aquila chrysaetos*)

Zone-tailed Hawk (*Buteo albonotatus*)

Red-tailed Hawk (*Buteo jamaicensis*)

Northern Goshawk (*Accipiter gentilis*)

Cooper's Hawk (*Accipiter cooperii*)

**Common Black Hawk** (*Buteogallus anthracinus*)

**Northern Harrier** (*Circus cyaneus*)

Swainson's Hawk (*Buteo swainsoni*)

American Kestrel (*Falco sparverius*)

**Prairie Falcon** (*Falco mexicanus*)

Spotted Sandpiper (*Actitis macularis*)

Gambel's Quail (*Callipepla gambelii*)

**Montezuma Quail** (*Cyrtonyx montezumae*)

Merriam's Turkey (*Meleagris gallopavo merriami*)

Killdeer (*Charadrius vociferous*)

**Band-tailed Pigeon** (*Patagioenas fasciata*)

White-winged Dove (*Zenaida asiatica*)

**Mourning Dove** (*Zenaida asiatica*)  
Inca Dove (*Columbina inca*)  
Greater Roadrunner (*Geococcyx californianus*)  
**Yellow-billed Cuckoo** (*Coccyzus americanus*)  
Western Screech-Owl (*Megascops kennicottii*)  
Great Horned Owl (*Bubo virginianus*)  
Barn Owl (*Tyto alba*)  
Common Poorwill (*Phalaenoptilus nuttallii*)  
Lesser Nighthawk (*Chordeiles acutipennis*)  
Common Nighthawk (*Chordeiles mino*)  
White-throated Swift (*Lampornis clemenciae*)  
Black-chinned Hummingbird (*Archilochus alexandri*)  
Broad-tailed Hummingbird (*Selasphorus platycercus*)  
Rufous Hummingbird (*Selasphorus rufus*)  
Red-naped Sapsucker (*Sphyrapicus nuchalis*)  
Ladder-backed Woodpecker (*Picoides scalaris*)  
Downy Woodpecker (*Picoides pubescens*)  
Northern (Red-shafted) Flicker (*Colaptes auratus*)  
Western Wood-Pewee (*Conotopus sordidulus*)  
Eastern Phoebe (*Sayornis phoebe*)  
Black Phoebe (*Sayornis nigricans*)  
Say's Phoebe (*Sayornis saya*)  
Ash-throated Flycatcher (*Myiarchus cinerascens*)  
Brown-crested Flycatcher (*Myiarchus tyrannulus*)  
Vermillion Flycatcher (*Pyrocephalus rubinus*)  
Gray Flycatcher (*Empidonax wrightii*)  
Cordilleran Flycatcher (*Empidonax occidentalis*)

Olive-sided Flycatcher (*Conotopus cooperi*)  
**Thick-billed Kingbird** (*Tyrannus crassirostris*)  
Cassin's Kingbird (*Tyrannus vociferans*)  
Western Kingbird (*Tyrannus verticalis*)  
Loggerhead Shrike (*Lanius ludovicianus*)  
Warbling Vireo (*Vireo gilvus*)  
**Bell's Vireo** (*Vireo bellii*)  
Western Scrub Jay (*Aphelocoma californica*)  
Common Raven (*Corvus corax*)  
Violet-green Swallow (*Tachycineta thalassina*)  
Northern Rough-winged Swallow (*Stelgidopteryx serripennis*)  
Cliff Swallow (*Petrochelidon pyrrhonota*)  
Barn Swallow (*Hirundo rustica*)  
Bridled Titmouse (*Baeolophus wollweberi*)  
Verdin (*Auriparus flaviceps*)  
Bushtit (*Psaltriparus minimus*)  
White-breasted Nuthatch (*Sitta carolinensis*)  
Cactus Wren (*Campylorhynchus brunneicapillus*)  
Rock Wren (*Salpinctes obsoletus*)  
Bewick's Wren (*Thryomanes bewickii*)  
Ruby-crowned Kinglet (*Regulus calendula*)  
Western Bluebird (*Sialia mexicana*)  
American Robin (*Turdus migratorius*)  
Northern Mockingbird (*Mimus polyglottos*)  
Curve-billed Thrasher (*Toxostoma curvirostre*)  
Crissal Thrasher (*Toxostoma crissale*)  
European Starling (*Sturnus vulgaris*)



Phainopepla (*Phainopepla nitens*)  
Yellow-rumped Warbler (*Setophaga coronata*)  
Yellow Warbler (*Setophaga petechial*)  
Wilson's Warbler (*Cardellina pusilla*)  
Common Yellowthroat (*Geothlypis trichas*)  
Yellow-breasted Chat (*Icteria virens*)  
**Lucy's Warbler** (*Oreothlypis luciae*)  
Summer Tanager (*Piranga rubra*)  
Western Tanager (*Piranga ludoviciana*)  
Canyon Towhee (*Melospiza fusca*)  
Lark Sparrow (*Chondestes grammacus*)  
Black-throated Sparrow (*Amphispiza bilineata*)  
Rufous-crowned Sparrow (*Aimophila ruficeps*)  
Black-headed Grosbeak (*Pheucticus melanocephalus*)  
Blue Grosbeak (*Passerina caerulea*)  
Indigo Bunting (*Passerina cyanea*)  
Eastern Meadowlark (*Sturnella magna*)  
Brown-headed Cowbird (*Molothrus ater*)  
Bullock's Oriole (*Icterus bollockii*)  
House Finch (*Haemorhous mexicanus*)  
Green-tailed Towhee (*Pipilo chlorurus*)  
Spotted Towhee (*Pipilo maculatus*)  
Rufous-crowned Sparrow (*Aimophila ruficeps*)  
Lark Sparrow (*Chondestes grammacus*)  
White-crowned Sparrow (*Zonotrichia leucophrys*)  
Black-throated Sparrow (*Amphispiza bilineata*)  
Chipping Sparrow (*Spizella passerine*)

Song Sparrow (*Melospiza melodia*)  
**Botteri's Sparrow** (*Peucaea botterii*)  
Clay-colored Sparrow (*Spizella pallida*)  
House Sparrow (*Passer domesticus*)  
Dark-eyed Junco (*Junco hyemalis*)  
Lesser Goldfinch (*Spinus psaltria*)

### **Mammals**

Long-legged Myotis Bat (*Myotis volans*)  
**Arizona Myotis Bat** (*Myotis occultus*)  
Yuma Myotis Bat (*Myotis yumanensis*)  
California Myotis Bat (*Myotis californicus*)  
Southwestern Myotis Bat (*Myotis auriculus*)  
Fringed Myotis Bat (*Myotis thysanodes*)  
Brazilian Free-tailed Bat (*Tadarida brasiliensis*)  
**Townsend's Big-eared Bat** (*Corynorhinus townsendii*)  
Pallid Bat (*Antrozous pallidus*)  
Hoary Bat (*Lasiurus cinereus*)  
Canyon Bat (*Parastrellus hesperus*)  
**Western Red Bat** (*Lasiurus blossevillii*)  
Desert Cottontail (*Sylvilagus auduboni*)  
Black-tailed Jackrabbit (*Lepus californicus*)  
Northern Pygmy Mouse (*Baiomys taylori*)  
Western Harvest Mouse (*Reithrodontomys megalotis*)  
Plains Harvest Mouse (*Reithrodontomys montanus*)  
Silky Pocket Mouse (*Perognathus flavus*)  
Rock Pocket Mouse (*Chaetodipus intermedius*)

White-footed Deer Mouse (*Peromyscus leucopus*)  
Cactus Mouse (*Peromyscus eremicus*)  
Brush Mouse (*Peromyscus boylii*)  
Deer Mouse (*Peromyscus maniculatus*)  
Mearns's Grasshopper Mouse (*Onychomys arenicola*)  
White-throated Wood Rat (*Neotoma albigula*)  
Hispid Cotton Rat (*Sigmodon hispidus*)  
**Tawny-bellied Cotton Rat** (*Sigmodon fulviventer*)  
**Banner-tailed Kangaroo Rat** (*Dipodomys spectabilis*)  
Ord's Kangaroo Rat (*Dipodomys ordii*)  
Merriam's Kangaroo Rat (*Dipodomys merriami*)  
**American Beaver** (*Castor canadensis*)  
**Arizona Gray Squirrel** (*Sciurus arizonensis*)  
Coyote (*Canis latrans*)  
Cougar (*Puma concolor*)  
Bobcat (*Lynx rufus*)  
Raccoon (*Procyon lotor*)  
Striped Skunk (*Mephitis mephitis*)  
Hognose (*Conepatus leuconotus*)  
Collared Peccary (*Peccari tajacu*)  
Elk (*Cervus elaphus*)  
Mule Deer (*Odocoileus hemionus*)

### **Amphibians and Reptiles**

**Ornate Box Turtle** (*Terrapene ornata*)  
**Arizona Toad** (*Anaxyrus microscaphus*)  
Great Plains Toad (*Anaxyrus cognatus*)

Bullfrog (*Lithobates catesbeiana*)  
Great Plains Skink (*Plestiodon obsoletus*)  
Northern Tree Lizard (*Urosaurus ornatus*)  
Chihuahuan Spotted Whiptail (*Aspidoscelis exsanguis*)  
Little Striped Whiptail (*Aspidoscelis inornatus*)  
Clark's Spiny Lizard (*Sceloporus clarkii*)  
Texas Horned Lizard (*Phrynosoma cornutum*)  
Terrestrial (Wandering) Garter Snake (*Thamnophis elegans*)  
Black-necked Garter Snake (*Thamnophis cyrtopsis*)  
Western Diamondback Rattlesnake (*Crotalus atrox*)

### **Odonata (Dragonflies and Damselflies)**

#### **Dragonflies:**

**Dashed Ringtail** (*Erpetogomphus heterodon*)  
Common Green Darner (*Anax junius*)  
**Arroyo Darner** (*Rhionaeschna dugesi*)  
Serpent Ringtail (*Erpetogomphus lampropeltis*)  
Widow Skimmer (*Libellula luctuosa*)  
Flame Skimmer (*Libellula saturata*)  
Blue Dasher (*Pachydiplax longipennis*)  
Filigree Skimmer (*Pseudoleon superbus*)  
Variegated Meadowhawk (*Sympetrum corruptum*)  
Giant Darner (*Anax walsinghamii*)  
Gray Sanddragon (*Progomphus borealis*)  
Pale-faced Clubskimmer (*Brechmorhoga mendax*)  
Neon Skimmer (*Libellula croceipennis*)  
Roseate Skimmer (*Orthemis ferruginea*)



Western Pondhawk (*Erythemis collocata*)

Plateau Dragonlet (*Erythrodiplax basifusca*)

Red Saddlebags (*Tamea onusta*)

Black Saddlebags (*Tamea onusta*)

Cardinal Meadowhawk (*Sympetrum illotum*)

**Damselflies:**

Great Spreadwing (*Archilestes grandis*)

American Rubyspot (*Hetaerina americana*)

Sooty Dancer (*Argia lugens*)

Aztec Dancer (*Argia nahuana*)

Springwater Dancer (*Argia plana*)

Blue-ringed Dancer (*Argia sedula*)

Fiery-eyed Dancer (*Argia oenea*)

Amethyst Dancer (*Argia pallens*)

Arroyo Bluet (*Enallagma praevarum*)

Painted Damsel (*Hesperagrion heterodoxum*)

Forktail species (*Ischnura* sp.)

**Appendix E. River Ranch Mimbres River Fish Seining Report**

# Mimbres River Ranch Trip Report

19 November 2014

Andrew Monié, NMDGF

The New Mexico Department of Game and Fish (NMDGF) purchased the Mimbres River Ranch in 2014. The property is approximately 25 miles downstream from another property that NMDGF owns for the conservation of Chihuahua Chub, a federally Threatened species (Figure 1). There is no recent fish survey data from the River Ranch property.

The Mimbres River flows in a closed basin and normally becomes subsurface downstream of the River Ranch property. During drought periods the terminus of surface flows moves upstream and the Mimbres River at the River Ranch can be reduced to isolated pools (Figure 2).

The Silver Fire burned much of the upper Mimbres watershed in 2013 and it is likely that all fish in the mainstem Mimbres were killed. Fish did survive in tributaries and the U.S. Fish and Wildlife Service's Southwest Native Aquatic Research and Recovery Center has a breeding population of Mimbres River Chihuahua Chub. Due to the effects of the Silver Fire and the recent drought, expectations of a healthy fish community at the River Ranch property were low.

As part of an initial inventory of the River Ranch a fish survey was conducted on 17 November 2014 by a crew of NMDGF biologists. The river was surveyed with a 2 meter x 1.5 meter seine. There are pools that are too deep to sample effectively with a seine at the upstream end of the property. Follow up surveys should be conducted at lower flows and with a backpack electrofisher. At the time of the survey flows were continues through the property.

The survey started at the upstream end of the property and worked downstream. All mesohabitats were sampled with a total of 11 seine hauls. The channel is dominated by shallow runs over sand, gravel, and cobble substrates (Photo 1). A few exceptions are shown in Photos 2-4. The locations documented in these photographs show the greatest potential to support the native fish community of the Mimbres River, which consists of Chihuahua Chub, Rio Grande Sucker, and Beautiful Shiner.

One Longfin Dace was collected during the survey. It was in pool habitat with a large log for cover. Longfin Dace was known to have persisted through the Silver Fire and subsequent flooding in Moreno Spring approximately 30 miles upstream. Longfin Dace is a species that quickly colonizes new areas, so it is likely that this individual moved from Moreno Spring rather than survived in the Mimbres River at this location.

Additional surveys should be conducted at the River Ranch after the Mimbres River has had more time to recover from recent fires and drought to gain a better understanding of what the fish community may be at the site under normal conditions.

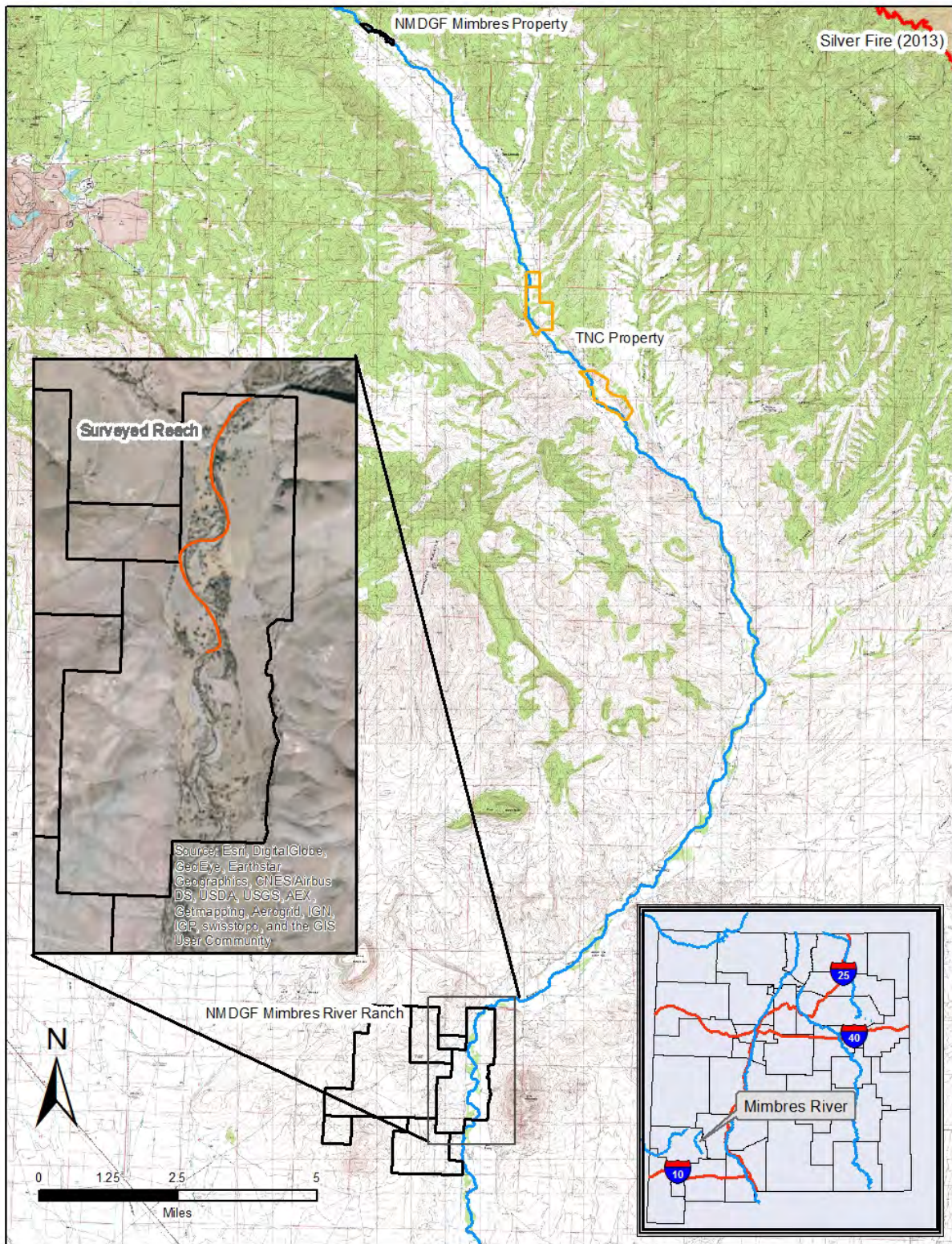


Figure 1. Location of NMDGF's Mimbres River Ranch showing 17 November 2014 fish survey reach.





Figure 2. The effects of recent drought reduced the river to isolated pools. This is an aerial view of the bedrock channel shown in Photos 1 and 3, November 2011.





Photo 1. Long run habitat with sand, gravel, and cobble substrates at NMDGF Mimbres River Ranch, November 2014.



Photo 1. Bedrock channel at upstream end of River Ranch Property. The property fence line is visible in the background, November 2014.



Photo 2. A run, cobble riffle, and pool of the Mimbres River in the River Ranch, November 2014. The cover provided by the root mat on the right side of this photo is a scarce habitat in this reach of the river.





Photo 3. The cut off tree trunk on the left in this photo may be evidence of woody debris removal. More fish habitat may develop if large woody debris was allowed to remain in the channel. November, 2014. The pool in the foreground is the location of the isolated pool visible in Figure 2.



**Appendix F River Ranch Deed of Conservation Easement**

CERTIFIED A TRUE COPY AND  
IN FULL FORCE AND EFFECT  
DATE April 21  
Robert Zarrillo  
Grant County Clerk  
21101263

DEED OF CONSERVATION EASEMENT  
RIVER RANCH  
(GRANT & LUNA COUNTIES, NEW MEXICO)

This Deed of Conservation Easement ("Deed") is granted on this 7<sup>th</sup> day of April, 2011, by Ponderosa Highlands, Inc, a New Mexico Corporation, having an address at HC 71, Box 1215, Faywood, NM 88034, (the "Grantor") to the New Mexico Land Conservancy, a New Mexico nonprofit corporation, having an address at P.O. Box 6759 Santa Fe, New Mexico 87502 (the "Managing Grantee") and the New Mexico Energy, Minerals and Natural Resources Department, Forestry Division, having an address of 1220 South Saint Francis Drive, Santa Fe, New Mexico 87505 (the "Grantee") for the purpose of forever conserving the agricultural, natural habitat, wildlife, and scenic open space values of the subject property (collectively and hereinafter, the "Conservation Values").

This Deed was purchased in part with funds appropriated by the State of New Mexico.

The Managing Grantee shall hold a .01% ownership interest in the Deed and the Grantee shall hold a 99.9% ownership interest in the Deed.

RECITALS

A. Property. The Grantor is the sole owner in fee simple of the Easement Property, which consists of approximately one thousand and nine (1,009) acres of land, located in Grant and Luna Counties, State of New Mexico, which is shown on the survey in Exhibit 1 entitled "Conservation Easement Survey for River Ranch and Ponderosa Highlands, Inc, a New Mexico Corporation" recorded in the official records of Luna County, New Mexico on December 22, 2010 at Book 2, Page 2 as Instrument # 100-0349, and also recorded in the official records of Grant County, New Mexico on December 23, 2010 at Book 9, Page 2 as Instrument # 1075-1578 the "Easement Property", attached to and made a part of this Deed.

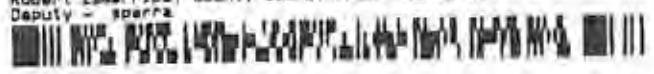
B. Water Rights. The Easement Property includes three acre feet per annum of water rights for the irrigation of and appurtenant to 12.8 acres of land, with a priority date of 1880, which are more particularly described in Exhibit 2 (the "Water Rights"). In addition, the term Water Rights as used herein includes all of the Grantor's right, title, and interest in any and all water or water rights of any kind or nature located on or associated with the Easement Property (including stock wells, domestic wells, and supplemental wells) whether or not adjudicated, permitted, or decreed. Any and all water associated with the Water Rights is sometimes referred to herein as the "Water."

C. Mineral Rights. Certain mineral rights have been severed from the Easement Property, but the possibility of future mining is so remote as to be negligible, as indicated by the geologist's report on file with the Managing Grantee and Grantee. All other mineral rights associated with the Easement Property and owned by the Grantor as of the date of this Deed are governed by the terms of this Deed.



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Robert Zarrillo, County Clerk, Grant County NM  
Deputy - SPARRZ



D. Agricultural Values. The Easement Property consists primarily of ranchland including an area of Sacaton grassland that is optimal for livestock grazing and management. The Easement Property also includes 12.8 acres of irrigated farmland.

E. Natural Habitat and Biological Values. The Easement Property consists of significant natural habitat that can be divided into three distinct habitat types. (1) Riparian Gallery Forest - an impressive aged 6.8 acre velvet ash grove as well as mature cottonwood trees that line the Mimbres River for over two miles within the Easement Property. In addition, there is the State Champion Velvet Ash located on the Easement Property within the ash grove area. (2) Sacaton Grasslands - an impressive area of native Sacaton Grass grows on the Easement Property with additional smaller areas in and around the floodplain. The natural occurrence of this grass is extremely rare in New Mexico. (3) Upland Chihuahua Scrub/ Shrub - this portion of the Easement Property is mainly located in its western portion and provides habitat for a variety of desert plant and animal species. Common terrestrial wildlife species include deer, black bear, mountain lion, bobcat, coyote, fox, antelope, javelina as well as other small mammal species. In the year 2000, the University of New Mexico, New Mexico Natural Heritage Program, Department of Biology conducted a bird survey on the Easement Property and counted over 55 bird species on the ranch over a two day period.

F. Scenic Values. The Easement Property includes scenic open space consisting of open vistas of riparian gallery forests and upland Chihuahua Desert scrub/shrub from New Mexico State Highway 61 and from Luna County Road A10.

G. Governmental Policies. The Easement Property includes scenic open space and productive rangeland, the preservation of which is pursuant to the following clearly delineated federal and state governmental conservation policies:

1. The New Mexico Land Use Easement Act, NMSA 1978, Sections 47-12-1 through 47-12-6, which aids the Grantor who wishes voluntarily to donate a conservation easement intended to restrict the use of a specific parcel of land so as to maintain in perpetuity the character of the land.

2. The New Mexico Land Conservation Incentives Act, NMSA 1978, Sections 75-9-1 through 75-9-6, which provides a tax credit to New Mexico taxpayers for the unconditional donation in perpetuity of land or interest in land that is conveyed for the purpose of open space, natural resource or biodiversity conservation, agricultural preservation or watershed or historic preservation.

3. The New Mexico Right to Farm Act, NMSA 1978, Sections 47-9-1 through 47-9-7, which declares the purpose "to conserve, protect, encourage, develop and improve agricultural land ... and to reduce the loss to the state of its agricultural resources."

4. The New Mexico Industrial and Agricultural Finance Authority Act, NMSA 1978, Sections 58-24-1 through 58-24-23, which evidences the Legislature's concern for the maintenance of agriculturally productive resources, and its intention to encourage an increase in the inventory of agricultural lands and a resultant increase in the gainful employment of the citizens of the state.

5. Easement Property tax relief adopted by the State of New Mexico, which provides for tax relief for agricultural properties through a special method of valuation of land used primarily for agricultural purposes. NMSA 1978, Section 7-36-20.

6. The Federal Farmers Home Administration (FmHA) Instruction 1951-S (7 C.F.R. 1951 Subpart S), which states a public policy to "keep the farmer on the farm."

7. The Federal Farmland Protection Policy Act, 7 U.S.C. Sections 4201 through 4209, which committed the federal government to the goal of conserving farmland in carrying out its public works and other development projects.

H. Public Benefit. Conserving the Easement Property is consistent with and important to the environment, culture, and economy of the surrounding area; and will result in a significant public benefit because:

1. The Easement Property possesses significant natural habitat, biological, scenic, open space, and agricultural values of great importance to Grantor, to Managing Grantee, to Grantee, to Luna and Grant Counties, to the State of New Mexico, and to the people of this nation;

2. Agriculture has been an integral part of the way of life in Luna and Grant Counties for centuries and should be preserved in order to protect the area's great natural beauty, scenic vistas, and way of life;

3. Open space has been an integral part of Luna and Grant Counties for centuries and should be preserved in order to protect the area's great natural beauty and scenic vistas;

4. The Easement Property exists in an area where development is occurring and is expected to occur at an accelerated rate in the future;

5. The use of the Easement Property as stated in this Deed is intended to be consistent with public programs for conservation in the area, including programs for irrigation, soil protection, and agricultural uses;

6. The development of the Easement Property would impair the scenic character of the local rural landscape and would contribute to the degradation of the natural character, agricultural productivity, riparian ecology, and wildlife habitat of the area;

7. The Easement Property has been evaluated for scenic quality and found to be scenic and easily seen by the public;

8. The Easement Property represents a high quality example of a terrestrial/aquatic ecosystem and includes important habitat for deer, black bear, mountain lion, bobcat, coyote,

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fox, antelope, javelina as well as other small mammal species and also includes areas of the rare native Sacaton grass species; and

9. The Easement Property surrounds an archaeological site owned and managed by the Archaeological Conservancy out of Albuquerque, New Mexico and is approximately 10 acres in size. The placement of a conservation easement around this site may aid in its continued protection and existence.

I. Baseline Documentation Report. The characteristics of the Easement Property and its current use and the status of improvements and development are described in Exhibit 3, a Baseline Documentation Report (the "Baseline") prepared by the Managing Grantee with the cooperation of the Grantor. The Baseline has been acknowledged by the Managing Grantee, Grantee and the Grantor to be complete and accurate as of the date of this Deed. The Managing Grantee, Grantee and the Grantor have copies of this report, and a copy will be retained in the Managing Grantee's and Grantee's files. The Baseline will be used by the Managing Grantee to assure that any future changes in the use of the Easement Property will be consistent with the terms of this Deed.

J. Qualifications. The Managing Grantee is a nonprofit, tax-exempt organization qualified under Sections 501(c)(3) and 170(b)(1)(A)(vi) of the Internal Revenue Code (the "Code"), a "qualified organization" as defined by Section 170(h)(3) of the Code, a qualified "holder" as defined by Section 47-12-2A of the Land Use Easement Act and an eligible holder pursuant to the Land Conservation Incentives Act.

K. Purpose and Intent. The Grantor intends to make a charitable gift to the Managing Grantee of a portion of the value of the Easement Property interest this Deed conveys through a below fair market sale of said Easement Property interest for the purposes of assuring that, under the perpetual oversight of the Managing Grantee and Grantee, the Conservation Values shall be maintained forever, and uses of the Easement Property that are inconsistent with the Conservation Values shall be prevented or mitigated. Subject only to the purposes set forth above (the "Conservation Purposes"), the parties' intent is to permit all other uses of the Easement Property that are not inconsistent with the preservation and protection of the Conservation Values as the Managing Grantee and Grantee determine in their reasonable discretion and that this Deed does not expressly prohibit. Nothing in this Deed is intended to compel a specific use of the Easement Property, other than the preservation and protection of the Conservation Values. The conveyance of this Deed shall not adversely affect contiguous landowners' existing property rights.

L. Rights of the State of New Mexico. Under this Deed, the same rights that are granted to the Managing Grantee are granted to the Grantee. However, the Secretary of Energy, Minerals and Natural Resources (the "Secretary"), on the Grantee's behalf, shall only exercise these rights under the following circumstances: In the event that the Managing Grantee fails to enforce any of this Deed's terms, the Secretary and his or her successors or assigns may exercise the Grantee's rights to enforce this Deed's terms through any and all authorities available under New Mexico law. In addition, nothing in this Deed shall prevent or limit existing, deeded and recorded legal access to adjoining State Trust Land holdings for management and leasing activities as well as public hunter access under State Land Office's agreement with the New Mexico Department of Game and Fish, nor shall this Deed

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prevent or limit the Grantor from negotiating future access with the State Land Office for such purposes.

### AGREEMENT

NOW, THEREFORE, in consideration of the mutual promises and covenants contained herein, and four hundred and fifty thousand dollars (\$450,000), the receipt and sufficiency of which is acknowledged by the Grantor, the Grantor voluntarily grants and conveys to the Managing Grantee and Grantee, and the Managing Grantee and Grantee voluntarily accept, a perpetual "land use easement" over the Easement Property, as defined by the Land Use Easement Act, NMSA 1978, Section 47-12-2B (the "Easement"), which is also a "qualified real property interest" as defined by Section 170(h)(2)(C) of the Code, the conveyance of which through a below fair market sale is the gift of a "qualified conservation contribution" as defined by Section 170(h) of the Code.

1. General Rights Retained by Grantor. Grantor reserves to itself and to its personal representatives, heirs, successors, and assigns, all rights not expressly prohibited or limited by this easement, including all rights accruing from its ownership of the Easement Property, the right to engage in or permit or invite others to engage in all uses of the Easement Property that are not expressly prohibited herein and are not inconsistent with the purpose of this easement, the right to exclude any member of the public from trespassing on the Easement Property, the right to sell or otherwise transfer the Easement Property to anyone they choose, and the right to mortgage the Easement Property, so long as the mortgage is subordinated to this Deed.

2. Uses of the Easement Property. The Grantor shall not perform, nor knowingly allow others to perform, any act on or affecting the Easement Property that is inconsistent with the Conservation Purposes enumerated in this Deed. The Grantor and the Managing Grantee acknowledge, however, that the uses of the Easement Property and the improvements to the Easement Property described in this Deed and in the Baseline are consistent with the Conservation Purposes. The Grantor understands that nothing in this Deed relieves them of any obligation or restriction on the use of the Easement Property imposed by law.

A. Subdivision. The Grantor and Managing Grantee agree that the Easement Property is composed of multiple legal parcels. With the exception of one allowable subdivision of the Easement Property along the New Mexico Highway 61 right-of-way, the Grantor and the Managing Grantee agree that the Easement Property must be sold as a single unit and that any further division or subdivision of the Easement Property is prohibited. The sole, allowable subdivision of the Easement Property may only occur north of the New Mexico Highway 61 right-of-way. No other physical subdivision configurations are allowed under the terms of this Deed. Creation of a condominium or any *de facto* division of the Easement Property is prohibited. Lot line adjustments or lot consolidation without the prior written consent of the Managing Grantee is prohibited. The Easement Property cannot be used to meet density requirements for building or development outside the Easement Property. The Grantor may transfer undivided interests in the Easement Property, provided, however, that no cotenant or owner of an undivided interest shall have the right, either independently or through legal action, to have the Easement Property physically or legally partitioned. The Grantor shall notify

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the Managing Grantee immediately of the name and address of any grantee of an undivided interest in the Easement Property.

B. Construction. In general, all existing buildings, agricultural structures, and improvements on the Easement Property may be maintained, repaired, and replaced in their current locations. The construction of any new temporary or permanent buildings, facilities, or structures of any kind is prohibited except as follows:

- i. Building Envelope #1 – As shown on the survey set forth in Exhibit I attached hereto and made a part of this Deed, a building envelope is located around the existing ranch headquarters and is 12 acres in size. Within this building envelope the Grantor is allowed to construct, enlarge, maintain, repair or replace existing and new buildings, impervious surfaces (e.g. roads and parking lots) and agricultural structures provided however that the maximum allowable cumulative footprint for all impervious surfaces and buildings shall not exceed 50,000 square feet of which the square footage for buildings shall not exceed 15,000 square feet. All buildings and structures located within Building Envelope #1 shall not exceed 30 feet in height.
- ii. Building Envelope #2 – As shown on the survey set forth in Exhibit I attached hereto and made a part of this Deed, a building envelope is located in the northern portion of the Easement Property and is 2 acres in size. Within this building envelope the Grantor will be allowed to construct, enlarge, maintain, repair or replace existing and new buildings (e.g. homes, agricultural structures, etc.) and impervious surfaces (e.g. roads and parking lots) provided however that the maximum allowable cumulative footprint for all buildings, impervious surfaces and associated agricultural structures shall not exceed 10,000 square feet. All buildings and structures located within Building Envelope #2 shall not exceed 30 feet in height.
- iii. Building Envelope #3 – As shown on the survey set forth in Exhibit I attached hereto and made a part of this Deed, a building envelope is located in the southeastern portion of the Easement Property and is 2 acres in size. Within this building envelope the Grantor will be allowed to construct, enlarge, maintain, repair or replace existing and new buildings (e.g. homes, agricultural structures, etc.) and impervious surfaces (e.g. roads and parking lots) and agricultural structures provided however that the maximum allowable cumulative footprint for all buildings, impervious surfaces and associated agricultural structures shall not exceed 5,000 square feet. No buildings, structures, or improvements within Building Envelope #3 shall be constructed or used for residential purposes. All buildings and structures located within Building Envelope #3 shall not exceed 30 feet in height.
- iv. Minor Agricultural and Recreational Structures and Improvements. All existing agricultural structures and improvements on the Easement Property may be maintained, repaired, reasonably enlarged and replaced in their current

locations. New loafing sheds; corrals; windmills; water tanks; above and below ground water transmission pipes; small diesel, gasoline, and solar pumps; earth dams for erosion control and water storage; and other minor agricultural and recreational structures and improvements may be constructed anywhere on the Easement Property all in a manner consistent with and in furtherance of the Conservation Purposes.

Major agricultural structures, such as barns, stables, garages and storage sheds, are not permitted outside the Building Envelopes described in paragraphs 2B (i, ii, and iii) of this Deed.

- v. Fences - Existing fences may be repaired and replaced, and new fences may be built anywhere on the Easement Property with the exception of big-game proof fences; which cannot be constructed on the Property or on the Property's exterior boundary. All fences shall be constructed in such a manner and with such materials for the purposes of reasonable and customary management of livestock and as not to unduly endanger wildlife safety or to materially inhibit wildlife movement. Grantor shall obtain the Managing Grantee's prior written approval prior to constructing any fencing on the Property that unduly endangers wildlife safety or that materially inhibits wildlife movement.

At least 30 days prior to undertaking any construction permitted herein, and prior to applying for a building permit for such construction, the Grantor shall notify the Managing Grantee in writing and provide the Managing Grantee with the opportunity to review the plans for such construction for compliance with the terms of this Deed.

C. Water Rights

(a) *Beneficial Use.* The Grantor shall continue to use the Water Rights in a manner and for a use consistent with the Conservation Values and shall take all prudent measures to avoid loss of the Water Rights, including: (i) beneficially using the Water; (ii) timely paying applicable assessments; (iii) complying with permit requirements, if any, and (iv) applying for extension of time in which to complete any of the foregoing.

(b) *Alternative Uses.* The Grantor may sell Water or temporarily lease the Water Rights to a third party or participate in a conservation program approved by the Office of the State Engineer, acreage reserve program or conservation reserve program established by federal law and recognized under state law, water bank authorized by state law, strategic water reserve administered by the Interstate Stream Commission, or any similar program under which the Water Rights will not be lost, forfeited, or abandoned. Any such alternative use of Water or the Water Rights, however, may only be done with the prior written consent of the Managing Grantee, in a manner and for a use consistent with the Conservation Values, and in no event for a domestic, municipal, or industrial use.

(c) *No Abandonment.* Abandoning the Water Rights or taking any action from which abandonment might reasonably be implied is prohibited.

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(d) *No Forfeiture.* If the Grantor is ever notified or aware of any possible forfeiture of any of the Water Rights, the Grantor shall immediately notify the Managing Grantee in writing and: (i) arrange for the beneficial use of the Water; (ii) arrange for an extension of time to put the Water to beneficial use; and/or (iii) establish, to the Managing Grantee's reasonable satisfaction, entitlement to a lawful exemption from the requirements of beneficial use as provided by state law. Similarly, if the Managing Grantee ever independently becomes aware of any possible forfeiture of any of the Water Rights, the Managing Grantee may require that the Grantor take advantage of one or more of the options described above.

(e) *No Severance.* Changing any element of the Water Rights (including priority, amount, purpose, and place of use) is prohibited. In no event shall any use or disposition of the Water or the Water Rights permitted by this Section (Water) be allowed to result in the severance of the Water Rights from the Easement Property.

D. Agriculture. All farming, ranching, and agricultural practices shall be conducted in a sustainable manner, and in keeping with practices that are best suited for the conservation of soil and water, the maintenance of soil and water quality, and so as to avoid erosion, overgrazing, soil contamination, and water pollution. The establishment of any feedlot (defined as a permanently constructed confined area or facility within which the land is not grazed or cropped annually, and which is used for the concentrated feeding and/or slaughter of animals) on the Easement Property is prohibited). The Grantor, Managing Grantee and Grantee desire to encourage the continuation of agricultural activities on the Easement Property and to provide sufficient flexibility so that the Grantor can take advantage of appropriate practices and technologies in the future, all in a manner consistent with and in furtherance of the Conservation Purposes.

E. Forest Management. This Deed prohibits clear cutting of forests and woodlands on the Easement Property. Notwithstanding, Grantor may cut and remove trees and shrubs on a limited basis to prevent personal injury and property damage, to thin stands appropriately for fire management within the designated building envelopes, to control insects or disease, to facilitate erosion control and watershed management, to maintain the natural habitat's character and nature, and posts, poles, building materials, and firewood for the Grantor's personal use. This Deed permits selective thinning, prescribed fire, reseeding or replanting trees, and other forest management activities that maintain forest health on the Easement Property in accordance with all federal and state statutes and regulations or rules, and in accordance with a forest management plan, prepared by a professional forester and approved by the Grantor, Managing Grantee, and Grantee. The Grantor, Managing Grantee, and Grantee may periodically amend this forest management plan by mutual agreement. The Grantor may allow forest areas denuded by wildlife, insects, or disease to regenerate naturally or plant them with native tree species.

F. Utilities. Above ground utilities (including electric, sewer, water, telephone, cable, gas, etc.), except for those currently located on the Easement Property or specifically anticipated by the Grantor and described in the Baseline, are prohibited. Prior to placing any utilities underground, the Grantor shall notify the Managing Grantee in writing, specifying the type and location of such utilities and the steps to be taken to protect the Conservation Values. No communication towers are allowed on the Easement Property, except for communication towers

constructed by a governmental entity operating as a state park, which must be installed within one of the designated building envelopes identified in section 2.B.

G. Roads and Trails. In general, the maintenance, repair, and reconstruction of existing roads and trails are allowed. The construction of new roads is prohibited except as provided for in paragraph 2.B. Grantor may also construct one, single lane bridge across the Mimbres River, a new road to accommodate and service the bridge, and a road to provide access to Building Envelope #2. These roads shall be no more than 15 feet in width and will be constructed of pervious materials (e.g. gravel or base course). Temporary, unimproved roads for agricultural and property management purposes (i.e., roads used to maintain fences and water systems) may be constructed provided that these temporary roads are allowed to return to a natural condition after their use is discontinued. Wherever possible, construction and reconstruction of any roads shall be consolidated so as to minimize the number and length of roads and road cuts on the Easement Property, and to minimize the visibility of roads and road cuts from areas surrounding the Easement Property. At least 30 days prior to undertaking the construction of any new roads permitted herein, and prior to applying for any permits necessary for such construction, the Grantor shall notify the Managing Grantee in writing and provide Managing Grantee with the opportunity to review the plans for such construction for compliance with the terms of this Deed.

Trails for pedestrian and equestrian use may be constructed on the Easement property provided that: 1) no trail outside of a designated building envelope shall be made of an impervious surface; and 2) plans for new trails shall be approved by the Managing Grantee and Grantee prior to construction of the trail; and 3) and shall be in compliance with the terms of this deed and do not diminish or threaten the Conservation Values.

H. Impervious Surfaces. Paving, covering, or treating the soil with an impervious surface including concrete, asphalt, or any other material, is prohibited except for existing paved roads or as foundations for construction specifically permitted by this Deed. Any use of the Easement Property which causes any of its surfaces, other than roads permitted pursuant to subparagraph G, to become relatively impervious or eroded (either through compaction, denuding the land, or otherwise) is prohibited. Helicopter landing pads and airstrips are prohibited.

I. Off-road vehicle use. Use of ATVs, motorcycles or other motorized vehicles off of roads or travel ways, is prohibited except for agricultural, Easement Property maintenance or emergency access purposes.

J. Mining. Soil, sand, gravel, and rock may be extracted from the Easement Property provided that such extraction is solely for use on the Easement Property, that not more than one-quarter acre of the Easement Property is disturbed at any one time by such extraction, that the Grantor restores the extraction site to a natural condition after the extraction has occurred, and that such extraction is done in a manner consistent with the Conservation Purposes and is consistent with Section 170(h) of the Code and the Treasury Regulations adopted pursuant thereto. Any other mining or extraction, or consent by the Grantor to any mining or extraction, of soil, sand, gravel, rock, hydrocarbons, or any mineral substance, using a surface mining method or any other extractive technique that is inconsistent with the Conservation Purposes, is prohibited. Consent to any mining or surface mining on the Easement Property under the New Mexico Surface Mining Act, Sections 69-

25A-1 to 69-25A-35 NMSA 1978 or its successor statute, or any other New Mexico surface mining consent law, is prohibited. In addition, no mining shall be conducted within one-hundred (100) feet of the centerline of the Mimbres River.

K. Refuse. The dumping, accumulation, or storage of any kind of refuse on the Easement Property is prohibited. Should accumulations of refuse be found on the Easement Property, it is the Grantor's responsibility to remove it. Nothing in this section ("Refuse"), however, shall prevent composting of biodegradable materials, the storage of agricultural supplies, agricultural equipment, agricultural products on the Easement Property, so long as such storage is done in a manner consistent with the Conservation Purposes.

L. Hazardous Materials. Grantor may use agri-chemicals on the Easement Property in accordance with all applicable federal, state, or local laws. Otherwise, the treatment, permanent storage, disposal or release of hazardous materials on, from or under the Easement Property is prohibited. For the purpose of this Deed, hazardous materials shall mean any hazardous or toxic material or waste that is subject to any federal, state, or local law or regulation ("Hazardous Materials").

M. Commercial Activity.

(a) Generally. Commercial or industrial activity related to the producing, buying, or selling of goods or services are prohibited, with the exception of any activities conducted by a governmental entity operating as a state park, home occupations (described below), recreational activity, commercial activity related to agricultural products grown on the Easement Property, and agricultural services performed on the Easement Property.

(b) Home Occupations. Nothing in this section ("Commercial Activity") shall prohibit the conduct of "home occupations" permitted by applicable zoning codes, if any, which home occupations are carried out exclusively within structures permitted by the terms of this Deed, and which home occupations are consistent with the Conservation Purposes.

N. Recreation. Only those low-impact recreational uses such as wildlife viewing, hiking, biking, horseback riding, hunting and fishing not inconsistent with the preservation and protection of the Conservation Values are permitted. Buildings and facilities for public or private recreational use may be built on the Easement Property only in accordance with Section 2(B), and then only in a manner that is consistent with the preservation and protection of the Conservation Values of the Easement Property. Golf courses are prohibited on the Easement Property.

O. Public Access. This Deed is not intended to provide for public access to the Easement Property. The Grantor retains the right to allow public access to the Easement Property in the future provided that such public access complies with the terms of this Deed and is consistent with preservation of the Conservation Values. The Managing Grantee shall have no obligation to take any action to prevent trespassing on the Easement Property.

P. Signs. Signs are permitted for purposes of identifying the Easement Property, posting the Easement Property against trespassing or hunting, identifying the Easement Property as



protected by the Managing Grantee and Grantee, trail markers, interpretive markers, directional markers, "for sale" signs or any posting or notice required by law. All other signs are prohibited. Signs shall not exceed two (2) by two (2) feet in size, be made with reflective surfaces, or be artificially illuminated. In addition, one (1) sign for the purpose of posting the name of the Easement Property is allowed near the main access to the Easement Property. This sign shall be no more than 60 square feet in size and shall not be made with reflective surfaces or be artificially illuminated.

3. Perpetual Duration. The Easement shall run with the land in perpetuity. Every provision of this Deed that applies to the Grantor, Grantee or Managing Grantee shall also apply to their respective heirs, executors, administrators, assigns, and all other successors in interest as their interests may appear. A party's rights and obligations under this Deed terminate upon transfer of the party's interest in this Deed or the Easement Property except that liability for acts or omissions prior to transfer shall survive transfer.

4. Responsibilities of Grantor. Other than as specified herein, this Deed is not intended to impose any legal or other responsibility on the Grantor, or in any way to affect any obligation of the Grantor as owner of the Easement Property. Additionally, unless otherwise specified below, nothing in this Deed shall require Grantor to take any action to restore the condition of the Easement Property after any Act of God or other event over which Grantor had no control. Grantor shall continue to be solely responsible and Grantee and Managing Grantee shall have no obligation for the upkeep and maintenance of the Easement Property and Grantor understands that nothing in this Deed relieves Grantor of any obligation or restriction on the use of the Easement Property imposed by law. Among other things, this shall apply to:

(a) Taxes. The Grantor is solely responsible for payment of all taxes and assessments levied against the Easement Property if applicable. If the Grantee or Managing Grantee is ever required to pay any taxes or assessments on its interest in the Easement Property, the Grantor shall reimburse the Grantee or Managing Grantee for the same, and until such reimbursement occurs, such payment shall constitute a lien on the Easement Property.

(b) Upkeep and Maintenance. The Grantor is solely responsible for the upkeep and maintenance of the Easement Property.

(c) Liability and Indemnification. The Grantor is solely responsible for liability arising from or related to the Easement Property, including injury (bodily or otherwise) or damage to any person or organization directly or indirectly caused by any action or omission of the Grantor. If the Grantee or Managing Grantee are ever required by a court to pay damages resulting from personal injury, Easement Property damage, loss, or theft that occurs on the Easement Property, the Grantor shall indemnify and reimburse the Grantee or Managing Grantee for these payments, as well as for the Grantee's or Managing Grantee's costs and reasonable attorneys' fees and other expenses of defending itself, unless the Grantee or Managing Grantee or any of its agents have committed a deliberate act that is determined by a court to be the proximate cause of the injury or damage.

(d) Insurance. Grantor warrants that the Grantee and Managing Grantee is and will continue to be an additional insured on Grantor's liability insurance policy covering the



Easement Property. Grantor shall provide certificates of such insurance to Managing Grantee within thirty (30) days after the date of recordation of this Deed and subsequently, upon Managing Grantee's written request thereof. Grantor shall advise Managing Grantee at least thirty (30) days in advance of cancellation of any insurance policy.

5. Grantor Warranties.

(a) *Title Warranty.* The Grantor warrants that the Grantor has good and sufficient title to the Easement Property, and that there are no liens on, leases to, pending or threatened litigation relating to the Easement Property, or other interests in the Easement Property, including verbal agreements, that have not been disclosed to the Grantee or Managing Grantee in writing. The Grantor hereby promises to defend the Easement Property and the Easement against all claims from persons claiming by, through, or under the Grantor.

(b) *Environmental Warranty.* The Grantor warrants that the Grantor has no knowledge of a release or threatened release of Hazardous Materials on the Easement Property. The Grantor shall indemnify, defend, and hold harmless the Grantee and Managing Grantee against all litigation, claims, demands, penalties, damages, losses, and expenses of any kind, including reasonable attorneys' fees, arising from or connected with any release of Hazardous Materials or violation of federal, state, or local laws. Nothing in this Deed shall be construed as giving rise to any right or ability in Grantee or Managing Grantee, nor shall Grantee or Managing Grantee have any right or ability, to exercise physical or managerial control over the day-to-day operations of the Easement Property, or otherwise to become an operator with respect to the Easement Property within the meaning of the Comprehensive Environmental Response, Compensation and Liability Act of 1980, as amended, or successor statutes.

6. Inspection.

(a) *Annual.* With reasonable advance notice to the Grantor, representatives of the Grantee or Managing Grantee may enter the Easement Property at reasonable times for the purpose of inspecting the Easement Property to determine if there is compliance with the terms of this Deed. Inspections will generally occur once a year but may occur whenever the Grantee or Managing Grantee deems appropriate.

(b) *Emergency.* If the Grantee or Managing Grantee believes or has reason to believe that there is an ongoing, imminent, or threatened violation of the terms of this Deed, the Grantee or Managing Grantee may enter the Easement Property for the purpose of inspecting the Easement Property to determine if there is compliance with the terms of this Deed. The Grantee and Managing Grantee will use good faith efforts to contact the Grantor, but the Grantee or Managing Grantee may enter the Easement Property without the Grantor's knowledge or presence.

7. Enforcement. The Grantee and Managing Grantee have all the rights, remedies, and powers to enforce the terms of this Deed against the Grantor that are provided by law or in equity, including mediation or arbitration, which shall be pursued prior to court action, if in the sole discretion of the Grantee or Managing Grantee such is feasible. Except when an ongoing or imminent violation

could irreversibly diminish or impair the Conservation Values, the Managing Grantee shall give the Grantor written notice of the violation and thirty (30) days to correct it before filing any legal action. If a court with jurisdiction determines that a violation may exist or has occurred, the Managing Grantee may obtain an injunction to stop the violation, temporarily or permanently, and to restore the Easement Property to its condition prior to the violation. In any case where a court finds that a violation has occurred, the Grantor shall reimburse the Managing Grantee for all its expenses incurred in stopping and correcting the violation, including reasonable attorneys' fees and court costs. If the court finds no violation, the Grantor and Managing Grantee shall each bear their own expenses and attorneys' fees. The Grantor and the Managing Grantee agree that this allocation of expenses is appropriate in light of the potential disparate financial incentives of the Grantor and the Managing Grantee and the Managing Grantee's public benefit mission.

8. Transfer of Easement. The Easement, and the rights and responsibilities contained in this Deed, may be transferred by the Grantee and Managing Grantee to another organization only pursuant to the subsections below:

(a) *Involuntary.* If the Managing Grantee ever ceases to exist or no longer qualifies under Section 170(h)(3) of the Code or applicable state law, a court with jurisdiction shall transfer the Easement to another organization having similar purposes, that is qualified under Section 170(h)(3) of the Code, the Land Use Easement Act, the Land Conservation Incentives Act, and other applicable state law, and that agrees to monitor the Easement and enforce the terms of this Deed.

(b) *Voluntary.* If the Grantee and Managing Grantee ever wish to voluntarily transfer the Easement, the Grantee and Managing Grantee will notify the Grantor in writing and give the Grantor sixty (60) days from receipt of notification in which to deliver any preferences the Grantor may have regarding a successor organization. The Grantee and Managing Grantee shall give due consideration to Grantor's choice of successor grantee. The Easement may be transferred only to another organization having similar purposes, that is qualified under Section 170(h)(3) of the Code and applicable state law, and that agrees to monitor the Easement and enforce the terms of this Deed.

9. Amendment. The Grantor, Grantee and Managing Grantee recognize that circumstances could arise which might justify the modification of certain provisions of this Deed. The Grantor, Grantee and Managing Grantee have the right to agree to amendments to this Deed provided that, in the reasonable discretion of the Grantee and Managing Grantee, such amendment enhances the Conservation Values. In no event, however, shall any amendment be made that: (i) adversely affects the qualification of the Easement under any applicable laws, including the Land Use Easement Act, the Land Conservation Incentives Act, and Section 170(h) of the Code; (ii) adversely affects the status of Grantee or Managing Grantee under any applicable laws, including Section 501(c)(3) of the Code; (iii) affects the perpetual duration of this Deed; or (iv) permits any additional homesites. This Deed shall not be altered, changed, or amended other than by a written instrument executed by the parties and recorded in the Office of the County Clerk of the county in which this Deed was recorded. Nothing in this section ("Amendment") shall require the Grantor, Grantee or Managing Grantee to agree to, or negotiate regarding, any proposed amendment.

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10. Termination.

(a) *Condemnation.* If all or a part of the Easement Property is taken for public use by exercise of the power of eminent domain whether by public (which does not include the Grantee), corporate, or other authority, or sold to a public authority under threat of condemnation, and the Easement is terminated in whole or in part, then the Grantor, Managing Grantee and Grantee shall each be entitled to a percentage of the condemnation award or sale proceeds (net any increase in value attributable to improvements made after the date of this Deed) equal to the ratio, as of the date of this Deed, of the appraised value of the Easement to the unrestricted fair market value of the Easement Property. This percentage shall remain constant. A qualified appraisal shall determine the Easement Property's value at the time of such taking. Condemnation awards or proceeds shall be paid out to the parties in accordance with the value of their interest in the Easement Property. The Grantor's portion of any funds recovered shall be 53.543%, which is the percentage interest it holds in the Easement Property. The Managing Grantee's portion of any funds recovered shall be .005%, which is the percentage interest it holds in the Easement Property. The Grantee's portion of any funds recovered shall be 46.452%, which is the percentage interest it holds in the Easement Property.

(b) *Changed Conditions.* The Grantor, Managing Grantee and Grantee recognize that conditions on or surrounding the Easement Property could change so much in the future that it becomes impossible to protect and preserve the Conservation Values. The Grantor, Managing Grantee and Grantee may jointly request that a court with jurisdiction terminate all or a portion of the Easement that this Deed creates. The total loss of all of the Conservation Values is the only grounds under which this Deed may be terminated. Upon such termination of the Easement and subsequent sale of the Easement Property, the Grantor, Managing Grantee and Grantee shall each be entitled to a percentage of the sale proceeds (net of any increase in value attributable to improvements made after the date of this Deed) equal to the ratio, as of the date of this Deed, of the appraised value of the Easement to the unrestricted fair market value of the Easement Property. This percentage shall remain constant. The Grantor's portion of any funds recovered shall be 53.543%, which is the percentage interest it holds in the Easement Property. The Managing Grantee's portion of any funds recovered shall be .005%, which is the percentage interest it holds in the Easement Property. The Grantee's portion of any funds recovered shall be 46.452%, which is the percentage interest it holds in the Easement Property.

(c) *Other Termination Provisions.* The Easement conveyed by this Deed constitutes a property right, immediately vested in the Grantee and Managing Grantee, which the parties stipulate to have a fair market value determined as set forth above. Nothing in this section ("Termination") shall require the Grantor, Grantee or Managing Grantee to agree to, or negotiate regarding, any proposed termination. Any funds received by the Grantee and Managing Grantee pursuant to this section ("Termination") shall be used by the Grantee and Managing Grantee in a manner consistent with the Conservation Purposes exemplified by this Deed.

(d) *Economic Value.* In granting this Easement, The Grantor has considered the fact that any use of the Easement Property that this Deed expressly prohibits, or any other use that the Managing Grantee and Grantee determine to be inconsistent with the Easement's

Conservation Purposes, may become greatly more economically valuable than uses this Deed allows, or that neighboring properties may in the future be put entirely to uses that are not permitted under this Deed. The Grantor, Managing Grantee, and Grantee all intend that any such changes should not be assumed to be circumstances justifying this Easement's termination or extinguishment pursuant to this section. In addition, the inability to carry on any or all of the permitted uses, or the unprofitability of doing so, shall not impair this Easement's validity or be considered grounds for its termination or extinguishment pursuant to this section.

11. Approvals. Before doing anything that requires the consent or approval of the Managing Grantee or Grantee pursuant to this Deed, the Grantor shall seek approval from the Managing Grantee and Grantee, as appropriate, in writing. The Managing Grantee and Grantee may grant any consent or approval that this Deed permits or requires for uses or acts that are conditional or not expressly reserved by the Grantor only if the Managing Grantee and Grantee have determined in their reasonable discretion, that the proposed use or act conforms to the intent of this Deed, meets any applicable conditions stated in this Deed, and is consistent with and not to the detriment of the Conservation Purposes. The Managing Grantee and Grantee shall respond, as appropriate, in writing within 45 days of receipt of the Grantor's written request for approval. A lack of response within the 45 day period shall constitute approval.

12. Notices.

(a) *Generally.* Any notices permitted or required by this Deed shall be in writing and shall be personally delivered or sent by certified U.S. mail, return receipt requested.

(b) *Current Addresses.* As of the date of this Deed, the addresses for the Grantor and the Managing Grantee are as follows:

To Grantor:	Ponderosa Highlands, Inc HC 71, Box 1215 Faywood, NM 88034
To Managing Grantee:	New Mexico Land Conservancy P.O. Box 6759 Santa Fe, NM 87502
To Grantee:	State of New Mexico Energy, Minerals and Natural Resources Department Forestry Division 1220 S. St. Francis Drive Santa Fe, NM 87505

All parties shall be notified of any change of address.

13. Transfer of the Easement Property. The Grantor reserves the right to transfer the Easement Property in its entirety at any time. Portions of the Easement Property may not be sold



without written permission of the Grantee and Managing Grantee. Anytime the Easement Property itself, or any interest in it, is transferred by the Grantor to any third party, the Grantor shall notify the Managing Grantee and Grantee in writing at least thirty (30) days prior to the transfer of the Easement Property and the document of conveyance shall expressly refer to this Deed.

14. Subsequent Mortgages. No provision of this Deed should be construed as impairing the ability of the Grantor to use the Easement Property as collateral for subsequent borrowing. Any mortgage or lien arising from such a borrowing is subordinate to this Deed.

15. Waiver. No term of this Deed shall be deemed waived unless such waiver is in writing signed by the party making the waiver. No forbearance, delay, or failure to exercise any right, power, or remedy shall impair such right, power, or remedy, shall be construed as a waiver of such right, power, or remedy, or shall prevent the exercising of such right, power, or remedy in the future.

16. Incorporation. The recitals set forth at the beginning of this Deed, and any exhibits referenced herein and attached hereto, are incorporated herein by this reference.

17. Interpretation. This Deed was negotiated and entered into in the State of New Mexico and shall be governed by the laws of the State of New Mexico. This Deed shall not be interpreted for or against any party on the basis of authorship, but rather shall be interpreted so as to give maximum protection to the Purpose of this Deed. The captions and section headings of this Deed are not intended or represented to be descriptive of all the terms there under, and such captions and section headings shall not be deemed to limit, define, or enlarge the terms of this Deed. The use of the words "include" and "including" shall be construed as if the phrases "without limitation" or "but not [be] limited to" were annexed thereafter.

18. No Third Party Beneficiaries. This Deed is entered into by and between the Grantor, Managing Grantee, and Grantee, and is intended solely for the Grantor, Managing Grantee and Grantee and their respective successors and assigns, and does not create rights or responsibilities in any third parties.

19. Counterparts. The parties may execute this Deed in two or more counterparts which shall, in the aggregate, be signed by all parties; each counterpart shall be deemed an original instrument as against any party who has signed it; all counterparts, when taken together, shall constitute a single agreement.

20. Severability. If any provision of this Deed or the application thereof to any person or circumstance is found to be illegal, invalid, or unenforceable, the remainder of the provisions of this Deed shall not be affected thereby.

21. Integration. This Deed sets forth the entire agreement of the parties with respect to the easement and supersedes all prior discussions, negotiations, understandings, documents, or agreements relating to this Deed or the Easement.

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22. Recording. The Managing Grantee shall record this Deed in a timely fashion in the official records of Luna and Grant Counties, New Mexico, and the Managing Grantee and Grantee may re-record it at any time to preserve their rights in this Easement.

23. Acceptance. Pursuant to the Resolution of the Board of Directors of the Managing Grantee adopted on September 10, 2010, attached hereto as Exhibit 4, the Managing Grantee has accepted the Easement conveyed by this Deed and the rights and responsibilities described in this Deed.

To Have and To Hold, this Deed of Conservation Easement unto the Managing Grantee, Grantee, and its successors and assigns, forever.

In Witness Whereof, the Grantor, Managing Grantee, and Grantee, intending to legally bind themselves, have set their hands on the date first written above.

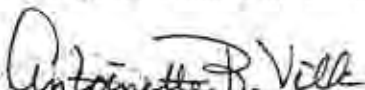
**SIGNATURES AND ACKNOWLEDGMENTS**

"Grantor"

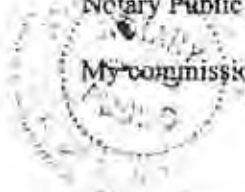
  
Ponderosa Highlands, Inc.  
Eugene A. Simon, President

County of Grant )  
State of New Mexico ) ss

The foregoing instrument was acknowledged before me this 9<sup>th</sup> day of March, 2011, by Eugene A. Simon, the President of Ponderosa Highlands, Inc.

  
Notary Public (SEAL)

My commission expires: 4-25-2011



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**"Grantee"**

State of New Mexico by and through the  
Energy, Minerals and Natural Resources Department,  
Forestry Division

John H. Bowen

Cabinet Secretary



The foregoing instrument was acknowledged before me this 22<sup>nd</sup> day of March, 2011,  
by John Bowen, as Cabinet Secretary of the New Mexico Energy, Minerals and Natural  
Resources Department.

Denise M. Zindel  
Notary Public (SEAL)

My commission expires: 01-09-12





Approved by:

Ray Powell  
Commissioner of Public Lands

3/21/11  
Date



**Exhibit 1 to Deed of Conservation Easement**

**SURVEY OF EASEMENT PROPERTY**

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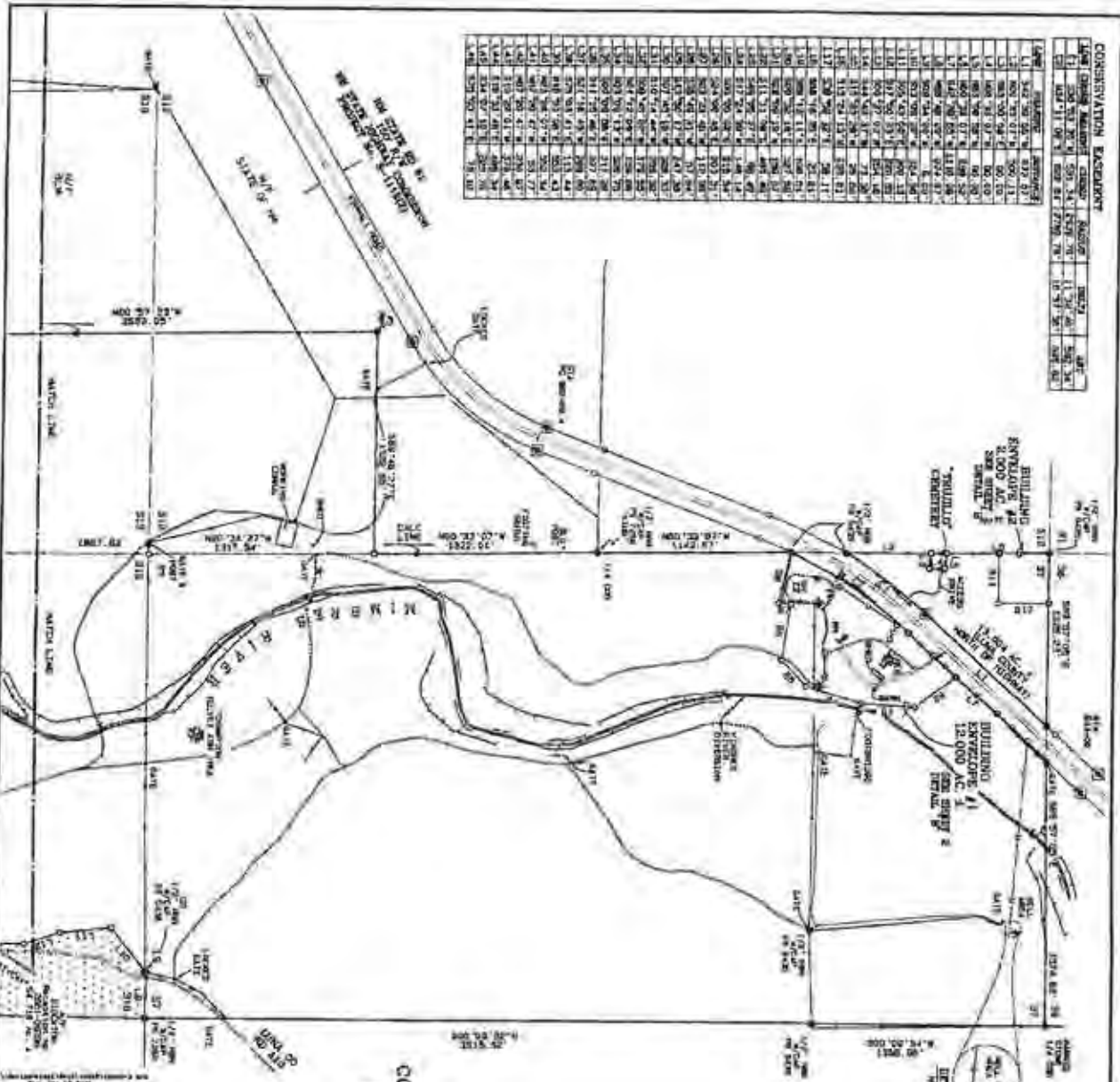
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SECTION APPROVED FOR COUNTY CLERK

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BY: MARIA

CONSERVATION EASEMENT SURVEY  
FOR  
PONDEROSA HIGHLANDS, INC.  
A New Mexico Corporation  
of the  
"RIVER RANCH"

LUNA & KERRY SURVEYING, INC. & PARTNERS LP  
REGISTERED PROFESSIONAL SURVEYORS  
1111 W. 11th St., Suite 100  
Tulsa, Oklahoma 74106-5000  
Phone: (918) 438-8888 Fax: (918) 438-1188  
www.lunaandkerry.com

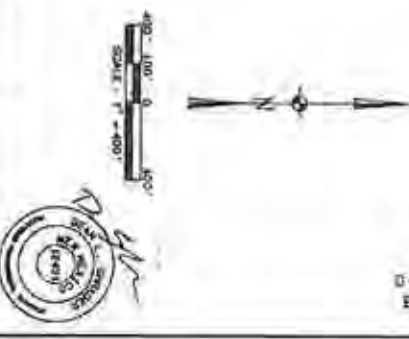
CONSERVATION EASEMENT SURVEY  
LUNA COUNTY, NEW MEXICO

SHEET 3 OF 4

CONSERVATION EASEMENT SURVEY  
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CONSERVATION EASEMENT SURVEY  
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STATE OF NEW MEXICO  
DEPARTMENT OF AGRICULTURE  
LUNA COUNTY CLERK'S OFFICE

LEGAL DESCRIPTION

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BY MARLA

Section 12: SE $\frac{1}{4}$ SE $\frac{1}{4}$

Section 13: E $\frac{1}{2}$ , less NW $\frac{1}{4}$ NE $\frac{1}{4}$  and less tract described in Book 260 page 7331

Section 24: N $\frac{1}{2}$ NE $\frac{1}{4}$

Township 20 South, Range 11 West, N.M.P.M., GRANT COUNTY, NEW MEXICO.

The Northeast Quarter of the Northwest Quarter (NE $\frac{1}{4}$ NW $\frac{1}{4}$ ) and Lot Numbered 1 of Section Seven (7), Township Twenty (20) South, Range Ten (10) West, N.M.P.M., Luna County, New Mexico.  
EXCLUDING therefrom the Trujillo Cemetary comprising a tract of land 90 feet by 90 feet and a right of way to and from said cemetary plat.

AND

The Southwest Quarter (SW $\frac{1}{4}$ ) and The South Half of the Northwest Quarter (S $\frac{1}{2}$ NW $\frac{1}{4}$ ) of Section Seven (7), Township Twenty (20) South, Range Ten (10) West, N.M.P.M., Luna County, New Mexico.

AND

The West Half (W $\frac{1}{2}$ ) and the Northwest Quarter of the Northeast Quarter (NW $\frac{1}{4}$ NE $\frac{1}{4}$ ) of Section Eighteen (18), Township Twenty (20) South, Range Ten (10) , N.M.P.M, Luna County, New Mexico,

SAVE AND EXCEPT the following described tract:

All that part of the West Half of Section 18, T20S, R10W, N.M.P.M., Luna County, New Mexico, described as follows:

Beginning at the Southeast Corner, a point which is identical with the point accepted as the South Quarter corner of Section 18; thence N.89°33'08"W., along the south boundary of said Section, 427.97 feet to a point at an existing barbed wire fence corner; thence northerly along the lines of said fence and remnants thereof, the following eighteen courses: N.21°18'49"E., 289.80 feet: N.11°15'46"W., 227.69 feet: N.00°09'58"W., 311.26 feet: N.03°09'13"E., 326.75 feet: N.01°12'09"W., 159.86 feet: N.08°45'22"E., 179.55 feet: N.10°14'44"E., 259.92 feet: N. 07°45'16"E., 326.33 feet: N.13°50'17"E., 247.38 feet: N.36°49'31"E., 57.84 feet: N.03°33'45"E., 112.96 feet: N. 24°00'45"W., 203.31 feet: N.06°05'02"W., 216.54 feet: N. 17°24'39"E., 148.14 feet: N. 49°05'37"W 88.49 feet: N. 11°11'08"W., 465.49 feet: N. 22°09'19"E., 159.97 feet: and N. 06°32'18"W., 327.59 feet; thence S. 89°08'33"E. 386.62 feet to a point on the north-south mid-section line of Section 18; thence S.00°48'33"W., along said line, 3975.01 feet to the point of beginning.

SAVE AND EXCEPT the following described tract:

All of the NW $\frac{1}{4}$ NE $\frac{1}{4}$  and part of the NE $\frac{1}{4}$ NW $\frac{1}{4}$  of Section 18, T.20S, R.10W., N.M.P.M., Luna County, New Mexico being more particularly described as follows:

Beginning at a point which is identical with the North Quarter Corner of Section 18; thence S88°50'00"E along the north boundary of said section, 1336.92 feet to the northeast corner of the NW $\frac{1}{4}$ NE $\frac{1}{4}$ ; thence S00°47'05"W, 1325.81 feet to the southeast corner of the NW $\frac{1}{4}$ NE $\frac{1}{4}$ ; thence N89°08'33"W along the north boundary of the NW $\frac{1}{4}$ NE $\frac{1}{4}$  and the prolongation of said boundary, 1724.09 feet to a point on an existing barbed wire fence; thence following the line of said fence, the following eight courses; N08°18'35"W, 23.81 feet; N38°59'32"W, 58.11 feet; N13°24'13"E, 229.61 feet; N15°23'28"E, 25.68 feet; N44°43'37"E, 73.36 feet; N00°27'02"E, 254.18 feet; N17°50'33"W, 220.85 feet and N05°43'00"W, 300.13 feet; thence N53°09'22"E, 324.90 feet to an existing fence corner; thence N10°17'03"E along the line of said fence, 5.99 feet to a point on the north boundary of Section 18; thence S88°50'00"E, 274.75 feet to the point of beginning.

SAVE AND EXCEPT the following described tract:

All that part of Lots 2 & 3 of Section 18, T20S, R10W, N.M.P.M., Luna County, New Mexico described as follows:

Beginning at the southwesterly corner, a point on the west boundary of Section 18 which bears N. 00 degrees 04'45"W., 2305.85 feet from the point accepted as the Southwest Corner of said Section; Thence N. 00 degrees 04'45"W., along said boundary, 1008.82 feet; thence S. 87 degrees 23'32"E., 53.52 feet; thence S. 23 degrees 31'10"E., 552.57 feet; thence S. 16 degrees 55'26"W., 553.40 feet; thence N. 75 degrees 04'43"W., 115.38 feet to the point of beginning.

**Exhibit 2 to Deed of Conservation Easement**

**WATER RIGHTS**

The Easement Property includes three acre feet per annum of water rights for the irrigation of and appurtenant to 12.8 acres of land, from with a priority date of 1880 described in NM State Engineer's file #M 2147.

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**Exhibit 3 to Deed of Conservation Easement**  
**BASELINE DOCUMENTATION REPORT**

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**BASELINE DOCUMENTATION REPORT  
FOR THE  
RIVER RANCH CONSERVATION EASEMENT**



Prepared For:



PO Box 6759  
Santa Fe, NM 87502

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## **I. OWNER ACKNOWLEDGEMENT STATEMENT**

### **A. Grantors:**

Ponderosa Highlands, Inc.  
Gene Simon, President  
HC 71, Box 1215  
Faywood, NM 88034  
(575) 536-3665

### **Managing Grantee:**

New Mexico Land Conservancy  
P.O. Box 6759  
Santa Fe, NM 87502  
(505) 986-3801  
[info@nmlandconservancy.org](mailto:info@nmlandconservancy.org)

### **B. Purpose:**

This Baseline Documentation Report ("Baseline") is intended to support the conservation easement granted by Ponderosa Highlands, Inc ("Grantor") on the River Ranch Conservation Easement in Grant and Luna Counties, New Mexico ("Easement Property") to the New Mexico Land Conservancy (NMLC) ("Managing Grantee") and the New Mexico Energy, Minerals, and Natural Resources Department – Forestry Division (NMFDD) ("Grantee") on \_\_\_\_\_, 2011. The purposes of this Baseline are: (1) to describe and establish the condition of the Easement Property at the time of the charitable donation; (2) to serve as a baseline for monitoring and enforcement of easement rights and restrictions; (3) to serve as a guide for the perpetual stewardship of the Easement Property; (4) to document the conservation values associated with the Easement Property; and (5) to qualify the conservation easement donation for federal and state tax deductions related to the charitable gift of a perpetual conservation easement. This Baseline was prepared by Michael Scisco, Conservation Director for NMLC and is an accurate representation of the Easement Property as of September 2010.

### **C. Easement Property Description:**

The Easement Property consists of approximately 1,009 acres of deeded land 30 miles northwest of Deming, New Mexico and approximately 35 miles southeast of Silver City in Grant and Luna Counties, New Mexico (Map 1, Appendix A). The Easement Property straddles the Grant and Luna County line with 400 acres of deeded land in Grant County and 609 acres of deeded land in Luna County.

The Easement Property consists of riparian gallery forests, irrigated pastureland, Sacaton Grasslands, and upland Chihuahuan Desert scrub/shrub. Elevations on the Easement Property range from approximately 5,000 feet near the river to 5,150 feet near the highway. The Easement Property is currently being managed for livestock production, wildlife enhancement and scenic enjoyment with specific management techniques that include:

- Vegetation control including thinning and burning
- Erosion control

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- o Sacaton Grassland management (burning, mowing, seeding)
- o Rotational Cattle Grazing

The Easement Property contains nearly three miles of the Mimbres River which bisects the Easement Property. The floodplain and river corridor on the ranch is fairly wide and makes up a good portion of the acreage. The upland areas consist of rolling topography mostly in the western (SW, W, NW) portions of the Easement Property (Map 2, Appendix A).

The Easement Property consists of multiple legal parcels of land that are interspersed among Bureau of Land Management (BLM) and New Mexico State Trust Lands (State Trust Lands) (Map 3, Appendix A). The Grantor leases 1,030 acres of State Trust Lands and 1,346 acres of BLM lands, which brings the total area of land managed by the Grantor to approximately 3,385 acres.

The Easement Property contains multiple conservation values including:

- Agricultural Values
- Natural Habitat Values
- Scenic Open Space Values

#### **D. Project Background:**

NMLC and NMFD were successful in securing \$450,000 in funding from the State of New Mexico through the House Bill 5 appropriations in 2010 to help fund the purchase of the conservation easement over the River Ranch property described in this report. As a requirement of the state funding, NMLC will co-hold the easement with the New Mexico Forestry Division. NMLC has been identified as the Managing Grantee of the conservation easement, meaning that NMLC will be the lead organization responsible for monitoring, managing and legally defending the conservation easement.

**E. Signature Page:**

This section must be completed to satisfy Section 1.170A-14(g)(5)(i)(D) of the federal tax regulations for donated conservation easements and certifies that all parties agree to the accuracy of information contained herein.

**Baseline Preparer**

\_\_\_\_\_  
Michael Scisco  
Conservation Director  
New Mexico Land Conservancy

\_\_\_\_\_  
Date

**Grantor**

\_\_\_\_\_  
Ponderosa Highlands, Inc  
Eugene Simon, President

\_\_\_\_\_  
Date

**Managing Grantee**

\_\_\_\_\_  
J. Scott Wilber  
Executive Director  
New Mexico Land Conservancy

\_\_\_\_\_  
Date

*New Mexico Land Conservancy  
River Ranch  
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## **II. BASELINE SUMMARY INFORMATION**

### **A. Name of Easement Property:** River Ranch (Rancho del Rio)

### **B. Grantor Contact Information:**

Ponderosa Highlands, Inc  
Gene Simon, President  
HC 71, Box 1215  
Faywood, NM 88034  
(575) 536-3665

### **C. Easement Property Location:**

The Easement Property is located along NM Highway 61 near Faywood, NM and is approximately 30 miles northwest of Deming, New Mexico and approximately 35 miles southeast of Silver City in Grant and Luna Counties, New Mexico

### **D. Directions to the Easement Property:**

From Santa Fe: Beginning at the St. Francis/I-25 interchange, travel south on Interstate 25 for approximately 218 miles. Take Exit 63, go west on Highway 152 for 51 miles, crossing the Black Range. Turn left on N.M Highway 61. Follow N.M. Highway 61 for 14 miles. The Easement Property is located at milepost 7 and is on the left with a sign that says "Rancho del Rio". Contact Grantor for permission to access the Easement Property prior to any visit.

Approximate driving distance: 288 miles.  
Approximate one-way driving time: 4 hours.

### **E. Easement Property Legal Description:**

See Appendix B for a survey of the Easement Property.

### **F. Access description:**

The Easement Property can be directly accessed off of NM Highway 61. The entrance to the Easement Property is at milepost 7 and is marked with a wooden "Rancho del Rio" sign.

### **G. Date of Easement Conveyance:**



**H. Easement Property Size:**

Deeded Acres – 1,009  
Leased Acres (BLM and State Trust Lands) – 2,376  
Total Ranch Acres – 3,275

**I. Easement Property Zoning:**

There are no known zoning restrictions in this portion of Luna and Grant Counties, therefore it is assumed that the minimum subdivision parcel size allowed without completing an official subdivision process is the New Mexico State Standard of 140 acres.

**J. Adjacent Easement Property Ownership:**

The Easement Property is bounded by publicly-owned lands on its west side and by private lands on its other boundaries. Below is a list of the surrounding Grantors and contact information. (See Map 3, Appendix A for surrounding land ownership types).

Adjacent Easement Property Owner Contact Information:

New Mexico State Land Office  
P.O. Box 1148  
Santa Fe, NM  
505-827-5760

Earl McNaughton (to the north)

Dick Thompson (to the east)  
Deming, NM

United States Bureau of Land  
Management  
New Mexico Office  
1474 Rodeo Road  
Santa Fe, NM 87505  
(505) 438-7400

Bill Crosslind (to the south)  
Deming, NM

New Mexico State Parks  
1220 South St. Francis Drive  
Santa Fe, NM 87505  
P.O. Box 1147  
Santa Fe, NM 87504  
(505) 476-3355

Nick Shelton (to the south)  
Magic Ranch Investments

**K. Government Policies Served by this Conservation Easement:**

- \* The New Mexico Land Use Easement Act, NMSA 1978, Sections 47-12-1 through 47-12-6, which aids the Grantor who wishes voluntarily to donate a conservation easement intended to restrict the use of a specific parcel of land so as to maintain in perpetuity the character of the land.

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- The New Mexico Land Conservation Incentives Act, NMSA 1978, Sections 75-9-1 through 75-9-6, which provides a tax credit to New Mexico taxpayers for the unconditional donation in perpetuity of land or interest in land that is conveyed for the purpose of open space, natural resource or biodiversity conservation, agricultural preservation or watershed or historic preservation.
- The New Mexico Right to Farm Act, NMSA 1978, Sections 47-9-1 through 47-9-7, which declares the purpose "to conserve, protect, encourage, develop and improve agricultural land ... and to reduce the loss to the state of its agricultural resources."
- The New Mexico Watershed District Act, NMSA 1978, Sections 73-20-1 through 73-20-49, which states the Legislature's desire to further the "conservation ... of water, and thereby preserve and protect New Mexico's land and water resources."
- The New Mexico Industrial and Agricultural Finance Authority Act, NMSA 1978, Sections 58-24-1 through 58-24-23, which reflects the Legislature's concern for the maintenance of agriculturally productive resources, and its intention to encourage an increase in the inventory of agricultural lands and increase the gainful employment of the citizens of the state.
- Easement Property tax relief adopted by the State of New Mexico, which provides for tax relief for agricultural properties through a special method of valuation of land used primarily for agricultural purposes: NMSA 1978, Section 7-36-20.
- The Federal Farmers Home Administration (FmHA) Instruction 1951-5 (7 C.F.R. 1951 Subpart 5), which states a public policy to "keep the farmer on the farm."
- The Federal Farmland Protection Policy Act, 7 U.S.C. Sections 4201 through 4209, which committed the federal government to the goal of conserving farmland in carrying out its public works and other development projects.

**L. Summary of Easement Rights and Restrictions:**

The New Mexico Land Conservancy, as the recipient of this conservation easement, has been granted a number of rights as part of the deeding of this conservation easement. Refer to the deed of conservation easement for a description of the specific rights and use restrictions.

### **III. GENERAL BASELINE METHODS**

#### **A. Extent of Baseline Investigation**

This document was completed through a combination of site visits, meetings and telephone conversations with Gene Simon, the Easement Property owner. A single site visit was conducted for baseline purposes on January 13<sup>th</sup> and 14<sup>th</sup>, 2010. A total of approximately 11 hours of field assessment was conducted on the Easement Property.

#### **B. Photographic Documentation**

Terrestrial photographs were taken at specific photopoint locations during the site visit to document the present condition of the Easement Property and to serve as points of reference for future monitoring. These photographs are presented in Appendix C, which also includes a photopoint reference map that clearly delineates the location of each of the photopoints. This map, along with global coordinates and azimuth readings, can be used to precisely identify the location and direction of each photopoint for future monitoring of the Easement Property.

#### **C. Mapping Documentation**

Multiple maps were created to describe and delineate the location of the Easement Property, to show physical and biological characteristics, and to exhibit any human improvements that currently exist on the Easement Property. The following maps are located in Appendix A:

- Map 1: General location map
- Map 2: USGS topographic map
- Map 3: Surrounding land ownership map
- Map 4: Aerial imagery map
- Map 5: Human Improvements map
- Map 5a: Ranch Headquarters Building Envelope map
- Map 6: Soils map

### **IV. DESCRIPTION OF THE EASEMENT PROPERTY**

#### **A. General Bio-Physical Characteristics**

The Easement Property consists of significant natural habitat that can be divided into three distinct habitat types. (1) Riparian Gallery Forest - an impressive aged 6.8 acre velvet ash grove as well as mature cottonwood trees that line Rio Mimbres for over two

miles within the Easement Property. In addition, there is the State Champion Velvet Ash located on the Easement Property within the ash grove area. (2) Sacaton Grasslands – an impressive area of native Sacaton Grass grows on the Easement Property with additional smaller areas in and around the floodplain. The natural occurrence of this grass is extremely rare in New Mexico. (3) Upland Chihuahua Scrub/ Shrub - this portion of the Easement Property is mainly located in its western portion and provides habitat for a variety of desert plant and animal species.

Elevations on the Easement Property range from approximately 5,000 feet near the river to 5,150 feet near the highway.

The precipitation regime of the general area where the Easement Property is located is arid and averages approximately 12 inches of precipitation per year falling primarily during the monsoon season (July, August, September) (Table 1). Temperature extremes vary seasonally and daily with maximum temperatures reaching the lower to mid 90's in summer to the lower 20's in winter months.

**Table 1: Faywood, NM Period of Record Monthly Climate Summary (WRCC, 2007).**  
 (Period of Record : 6/1/1946 to 8/31/2009).

		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Average Temperature (F)	Max.	56.0	59.9	65.9	74.1	82.6	91.1	91.3	88.0	83.5	74.8	64.0	55.8	73.9
Average Temperature (F)	Min.	26.6	28.9	33.1	38.7	46.8	55.4	61.2	59.4	53.4	42.9	32.2	26.5	42.1
Average Precipitation (in.)	Total	0.69	0.59	0.39	0.22	0.28	0.76	2.29	2.70	1.55	1.16	0.66	0.89	12.19
Average SnowFall (in.)	Total	0.8	0.3	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	1.1	2.7
Average Depth (in.)	Snow	0	0	0	0	0	0	0	0	0	0	0	0	0

**B. Geology and Soils**

**Geology**

The Easement Property is located southeast of Silver City in the Mimbres River valley where it cuts between the southern terminus of the Mogollon Range and the Cooke's Range. To the southeast of the Easement Property, the low rolling hills are primarily



lower Oligocene to upper Eocene andesite with minor associated volcanoclastics. Southeast of these volcanic units is the Cooke's Range, which is comprised of fault blocks of Paleozoic and Mesozoic sedimentary rocks. To the northwest, the southernmost Mogollon slopes are lower Oligocene rhyolite ash flow tuffs. The region is structurally complex because it is within the Basin and Range province and thus consists of numerous fault-bounded basins and uplifted fault blocks. In addition, southwestern New Mexico is part of the geographically extensive San Juan volcanic field, which extends from northern Mexico into southwestern Colorado. The majority of the volcanic materials in the region are silicic in composition, with minor amounts of intermediate and mafic rocks. In addition to the Cenozoic volcanic rocks exposed in the Mogollon and Cooke's Range, Paleozoic and Mesozoic strata have been uplifted in both ranges. Strata exposed include Ordovician-Permian sedimentary rocks that are primarily limestone and dolomite with lesser sandstone and Cretaceous strata that are primarily limestone and sandstone (Zeigler, 2010).

### Soils

The Easement Property consists of multiple soil types, the description of which is beyond the scope of this report. The soil types contained within the Easement Property are listed below (See Map 6, Appendix A for location and extent of each soil type).

### Grant County Soils

- 24 - Lithic Haplargids-Rock outcrop association, 15 to 75 percent slopes
- 65 - Stellar-Mohave association, 0 to 5 percent slopes
- 37 - Muzzler-Rock outcrop association, 25 to 45 percent slopes

### Luna County Soils

- LK - Lehman's extremely rocky loam, 10 to 25 percent slopes
- LD - Lehman's very rocky loam, 0 to 10 percent slopes
- MM - Mimbres soils
- RE - Riverwash

## **C. Hydrology**

The Easement Property is located within the Mimbres Surface Water Basin within the Taylor Mountain-Mimbres River (130302020505) HUC 12 Watershed. The Easement Property is within the Mimbres (1931) Underground Water Basin as defined by the New Mexico Office of the State Engineer.

#### D. Vegetative Communities

- Common Species

Characteristic grasses of the Chihuahuan Desert are tobosa (*Pleuraphis mutica*) and black grama (*Bouteloua eriopoda*) but other common species include alkali sacaton (*Sporobolus airoides*), big alkali sacaton (*S. wrightii*), mesa dropseed (*S. flexuosus*), blue grama (*B. gracilis*), sideoats grama (*B. curtipendula*), hairy grama (*B. hirsuta*), slender grama (*B. filiformis*), chino grama (*B. brevista*), spruce top grama (*B. chondrosioides*), bush muhly (*Muhlenbergia porteri*), several three awns (*Aristida* spp.), and fluff grass (*Dasyochloa pulchella*) (Dinerstein et. al, 2000).

- Rare Plant Species

A comprehensive list of Rare Plant Species that may occur in Grant and Luna Counties, NM is located in Appendix F (NMRPTC, 2009).

#### E. Wildlife

- Common Species

Common wildlife species known to occur on the Easement Property include: Common terrestrial wildlife species include deer, black bear, mountain lion, bobcat, coyote, fox, antelope, javelina as well as other small mammal species. Bird species include a host of species that have been documented by the University of New Mexico in the summer of 2000 (See Appendix E).

- Threatened and Endangered Species

A comprehensive list of Federal and State Threatened, Endangered, and Globally Ranked (G1 and G2) faunal species that may occur in Grant and Luna Counties, NM is located in Appendix F (NMDGF, 2009).

#### F. Cultural and Historic Resources

Located on the Easement Property is a 10-acre archaeological site owned by the Archaeological Conservancy. The site was donated by the Grantor to the conservancy in fee. The conservancy fenced off the site and it is currently used for educational purposes. The site contains remnants from the historic community of Old Town. While this site is not legally a part of the Easement Property, NMLC acknowledges that having a conservation easement surrounding this site will help protect it from threats from activities directly adjacent.

## **V. LAND/RESOURCE USE AND MANAGEMENT**

### **A. Ownership History**

The current Grantors purchased 80 acres of land which now comprises a portion of the Easement Property in 1979 from George Smith. In 1994 the Grantors purchased approximately 5,300 acres from Jim Walsh of the Sierra Mesa Ranch. This was the largest deeded holding under the current Grantors. In 1995 and 1997, the Grantors sold approximately 4,500 acres of land to NM State Parks and a neighboring Grantor. What was remaining after these sales currently comprises the current configuration of the Easement Property (approximately 1,009 acres of deeded land).

### **B. Historic Uses**

The Easement Property has historically been managed for grazing and wildlife enhancement. The current Grantors have owned the Easement Property for the past 30 years and have practiced sustainable, rotational grazing practices while maintaining and enhancing wildlife habitat along the riparian corridor and associated floodplains.

### **C. Current Uses**

Current uses of the Easement Property are similar to historic uses with added emphasis on the management of Sacaton Grass for grazing and wildlife habitat enhancement and additional management of associated riparian vegetation.

### **D. Water Rights**

The Easement Property includes three acre feet per annum of water rights for the irrigation of and appurtenant to 12.8 acres of land, with a priority date of 1880 described in NM State Engineer's file #M 2147. There are also multiple wells located throughout the Easement Property (Map 5, Appendix A). As of the date of this Baseline report, the baseline preparer could not find any records with the State Engineer's Office that show the registration of any additional wells on the Easement Property.

### **E. Mineral Rights**

Certain mineral rights have been severed from the Easement Property, but the current potential for commercial mining is so remote as to be negligible (See Mineral Remoteness Letter in Appendix D). All other mineral rights associated with the Easement Property and owned by the Grantor as of the date of the conservation easement deed are governed by said deed.

## VI. INFRASTRUCTURE AND IMPROVEMENTS

### **A. Buildings and Structures**

A majority of the existing permanent buildings and structures on the Easement Property are located within Building Envelope #1 and consist of the following (See Map 5, Appendix A for Building Envelope locations):

- Main House – 3,200 square feet
- Ranch Hand Mobile Home – 720 square feet
- Guest Residence – 1,200 square feet
- Historic Adobe Cabin – 240 square feet
- Shed/Shop – 1,300 square feet
- Small Hay Barn – 475 square feet

APPROXIMATE total square footage of buildings and structures located within Building Envelope #1 is 7,135 square feet (See Map 5a for current configuration of structures within the Ranch Headquarters Building Envelope). Per the terms of the conservation easement deed, the Grantor is allowed to construct or replace buildings and structures within Building Envelope #1 up to 15,000 square feet and total impervious surfaces up to 50,000 square feet. Therefore, the Grantor is allowed to construct an additional 7,865 square feet of permanent buildings or structures within the Ranch Headquarters Building Envelope.

The remainder of the Easement Property does not contain any residential structures. There are a number of agricultural improvements located on the Easement Property, including fencing, feeding sheds, water infrastructure (tanks, windmills), and a small hay storage unit (less than 80 square feet).

In general, all existing buildings, agricultural structures, and improvements on the Easement Property may be maintained, repaired, and replaced in their current locations. The construction of any new temporary or permanent buildings, facilities, or structures of any kind is prohibited except as follows:

- Building Envelope #1 – This building envelope is located around the existing ranch headquarters and is 12 acres in size. Within this building envelope the Grantor is allowed to construct, enlarge, maintain, repair or replace existing and new buildings, impervious surfaces (e.g. roads and parking lots) and agricultural structures provided however that the maximum allowable cumulative footprint for all impervious surfaces and buildings shall not exceed 50,000 square feet of which the square footage for buildings shall not exceed 15,000 square feet. All



buildings and structures located within the Building Envelope #1 shall not exceed 30 feet in height.

- Building Envelope #2 – This building envelope is located in the northern portion of the Easement Property and is 2 acres in size. Within this building envelope the Grantor will be allowed to construct, enlarge, maintain, repair or replace existing and new buildings (e.g. homes, agricultural structures, etc.) and impervious surfaces (e.g. roads and parking lots) provided however that the maximum allowable cumulative footprint for all buildings, impervious surfaces and associated agricultural structures shall not exceed 10,000 square feet. All buildings and structures located within Building Envelope #2 shall not exceed 30 feet in height.
- Building Envelope #3 – This building envelope is located in the southeastern portion of the Easement Property and is 2 acres in size. Within this building envelope the Grantor will be allowed to construct, enlarge, maintain, repair or replace existing and new buildings (e.g. homes, agricultural structures, etc.) and impervious surfaces (e.g. roads and parking lots) and agricultural structures provided however that the maximum allowable cumulative footprint for all buildings, impervious surfaces and associated agricultural structures shall not exceed 5,000 square feet. No buildings, structures, or improvements within the Building Envelope #3 shall be constructed or used for residential purposes. All buildings and structures located within Building Envelope #3 shall not exceed 30 feet in height.
- Minor Agricultural and Recreational Structures and Improvements - All existing agricultural structures and improvements on the Easement Property may be maintained, repaired, reasonably enlarged and replaced in their current locations. New loafing sheds; corrals; windmills; water tanks; above and below ground water transmission pipes; small diesel, gasoline, and solar pumps; earth dams for erosion control and water storage; and other minor agricultural and recreational structures and improvements may be constructed anywhere on the Easement Property all in a manner consistent with and in furtherance of the Conservation Purposes.
- Fences - Existing fences may be repaired and replaced, and new fences may be built anywhere on the Easement Property with the exception of big-game proof fences; which cannot be constructed on the Easement Property or on the Easement Property's exterior boundary. All fences shall be constructed in such a manner and with such materials for the purposes of reasonable and customary management of livestock and as not to unduly endanger wildlife safety or to materially inhibit wildlife movement. Grantor shall obtain the Managing Grantee's prior written approval prior to constructing any fencing on the

Easement Property that unduly endangers wildlife safety or that materially inhibits wildlife movement.

At least 30 days prior to undertaking any construction permitted herein, and prior to applying for a building permit for such construction, the Grantor shall notify the Managing Grantee in writing and provide the Managing Grantee with the opportunity to review the plans for such construction for compliance with the terms of this Deed.

#### **B. Subdivision**

The Grantor and Managing Grantee agree that the Easement Property is composed of multiple legal parcels. With the exception of one specific, allowable subdivision of the Easement Property, the Grantor and the Managing Grantee agree that the Easement Property must be sold as a single unit and that any further division or subdivision of the Easement Property is prohibited. The sole, allowable subdivision of the Easement Property may only occur along the New Mexico Highway 61 right-of-way. No other physical subdivision configurations are allowed under the terms of the Conservation Easement Deed. Other than this single subdivision, the Easement Property must be sold as a single unit.

#### **C. Roadways and Trails**

In general, the maintenance, repair, and reconstruction of existing roads and trails are allowed. The construction of new roads is prohibited except as provided for in paragraph 2.B of the Conservation Easement Deed. Grantor may also construct one, single lane bridge across the Mimbres River, a new road to accommodate and service the bridge and a road to provide access to Building Envelope #2. These roads shall be no more than 15 feet in width and will be constructed of pervious materials (e.g. gravel or base course). Temporary, unimproved roads for agricultural and property management purposes (i.e., roads used to maintain fences and water systems) may be constructed provided that these temporary roads are allowed to return to a natural condition after their use is discontinued. Wherever possible, construction and reconstruction of any roads shall be consolidated so as to minimize the number and length of roads and road cuts on the Easement Property, and to minimize the visibility of roads and road cuts from areas surrounding the Easement Property. At least 30 days prior to undertaking the construction of any new roads permitted herein, and prior to applying for any permits necessary for such construction, the Grantor shall notify the Managing Grantee in writing and provide Managing Grantee with the opportunity to review the plans for such construction for compliance with the terms of this Deed.

Trails for pedestrian and equestrian use may be constructed on the Easement Property provided that: 1) no trail outside of a designated building envelope shall be made of an impervious surface; and 2) plans for new trails shall be approved by the Managing

Grantee and Grantee prior to construction of the trail; and 3) and shall be in compliance with the terms of this deed and do not diminish or threaten the Conservation Values.

All existing roads within the Easement Property have been documented and are shown on Map 5 in Appendix A.

#### **D. Utilities and Water Systems**

Above ground utilities (including electric, sewer, water, telephone, cable, gas, etc.), except for those currently located on the Easement Property or specifically anticipated by the Grantor and described in the Baseline, are prohibited. Prior to placing any utilities underground, the Grantor shall notify the Managing Grantee in writing, specifying the type and location of such utilities and the steps to be taken to protect the Conservation Values. No communication towers are allowed on the Easement Property, except for communication towers constructed by a governmental entity operating as a state park, which must be installed within one of the designated building envelopes identified in section 2.B of the Conservation Easement Deed.

The Grantors have also installed some water harvesting infrastructure which is located within the ranch headquarters and services primarily the landscaping around the Main House.

#### **E. Agricultural and Other Improvements**

Multiple, temporary and small scale agricultural improvements exist on the Easement Property (e.g. fencing, utility/well pump shed, windmills). As part of the terms of the conservation easement deed, all existing agricultural structures and improvements on the Easement Property may be maintained, repaired, reasonably enlarged and replaced in their current locations. New loafing sheds; corrals; windmills; water tanks; above and below ground water transmission pipes; small diesel, gasoline, and solar pumps; earth dams for erosion control and water storage; and other minor agricultural structures and improvements may be constructed anywhere on the Easement Property all in a manner consistent with and in furtherance of the Conservation Purposes.

### **VII. CONSERVATION VALUES**

#### **A. Open Space Values**

- **Agricultural Values**

The Easement Property has been in agricultural productivity for the past 30 years by the current Grantor and was ranched for many years prior to when the current

Grantor purchased the Easement Property. The Grantor currently grazes cattle on a seasonal rotation between the upland portions of the Easement Property and the lower pasture areas near Rio Mimbres. The Easement Property also includes approximately 13 acres of irrigated pasture land with water rights out of Rio Mimbres.

• Scenic Values

The Easement Property includes scenic open space consisting of open vistas of riparian gallery forests and upland Chihuahua Desert scrub/shrub from New Mexico State Highway 61 and from Luna County Road A10.

**B. Natural Habitat and Wildlife Values**

The Easement Property consists of significant natural habitat that can be divided into three distinct habitat types. (1) Riparian Gallery Forest - an impressive forest of aged velvet ash and cottonwoods line Rio Mimbres for over two miles within the Easement Property. In fact, there is the National Champion Velvet Ash located on the Easement Property in an impressive ash grove. (2) Sacaton Grasslands - there is a large area where native Sacaton Grass grows on the Easement Property with additional smaller areas in and around the floodplain areas. The natural occurrence of this grass is extremely rare in New Mexico. In fact, the Nature Conservancy repeatedly expressed interest in purchasing the Easement Property because of the rareness and habitat value the grass provides. (3) Upland Chihuahua Scrub/ Shrub - this portion of the Easement Property is mainly located in its western portion and provides habitat for a variety of desert plant and animal species. Common terrestrial wildlife species include deer, black bear, mountain lion, bobcat, coyote, fox, antelope, javelina as well as other small mammal species. In 2000, the University of New Mexico conducted a bird survey on the Easement Property and counted over 55 bird species on the ranch over a two day period (See Appendix E).

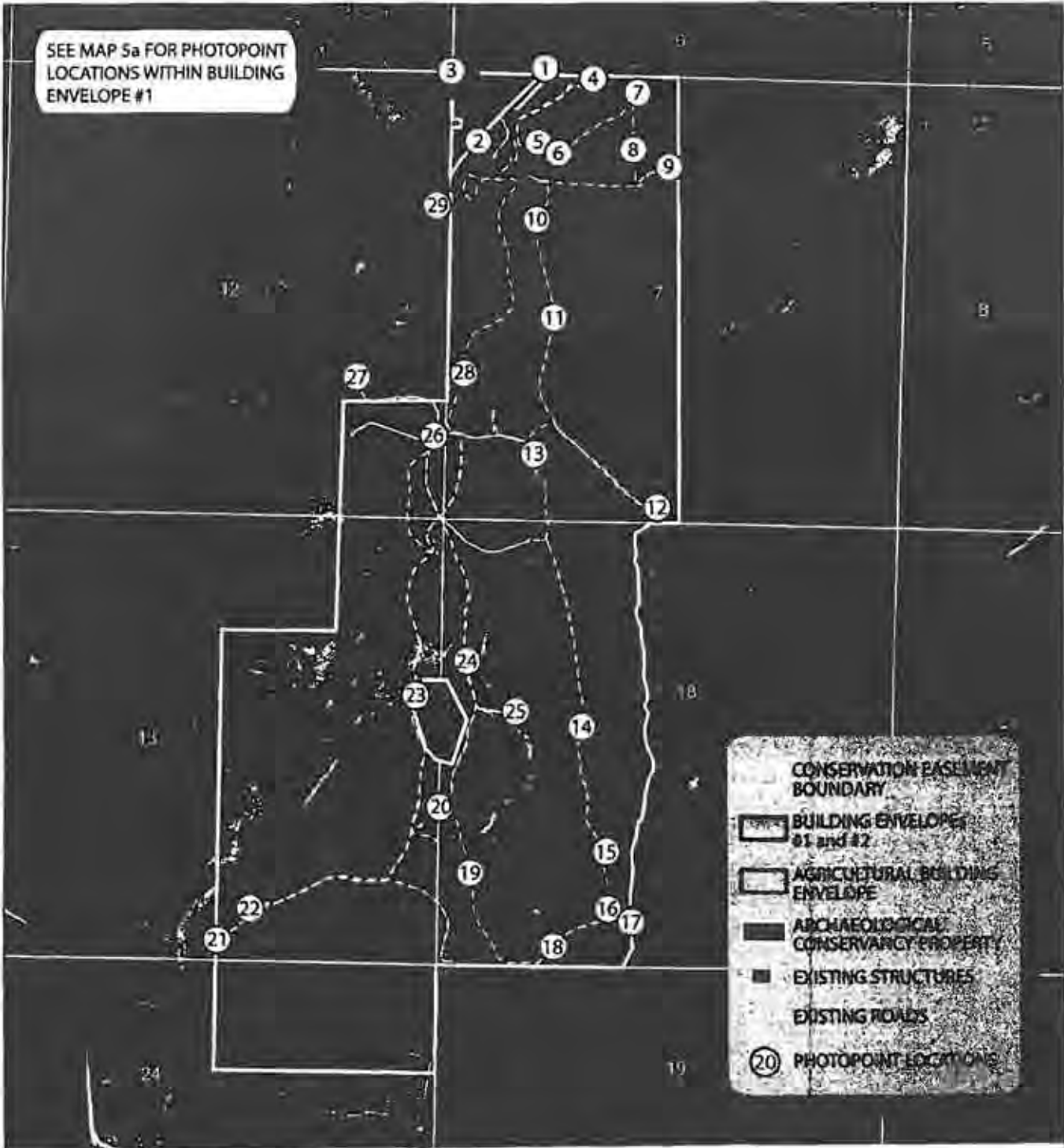
**VIII. APPENDICES**

- A. Easement Property Maps
- B. Legal Description of the Easement Property
- C. Photographic Documentation
- D. UNM Bird Species List
- E. Flora and Fauna Lists
- F. References



**Appendix A: Easement Property Maps**

SEE MAP 5a FOR PHOTOPOINT  
LOCATIONS WITHIN BUILDING  
ENVELOPE #1



**CONSERVATION EASEMENT BOUNDARY**

**BUILDING ENVELOPE #1 and #2**

**AGRICULTURAL BUILDING ENVELOPE**

**ARCHAEOLOGICAL CONSERVANCY PROPERTY**

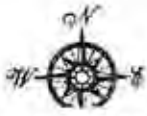
**EXISTING STRUCTURES**

**EXISTING ROADS**

**PHOTOPOINT LOCATIONS**

# River Ranch Photopoint Map

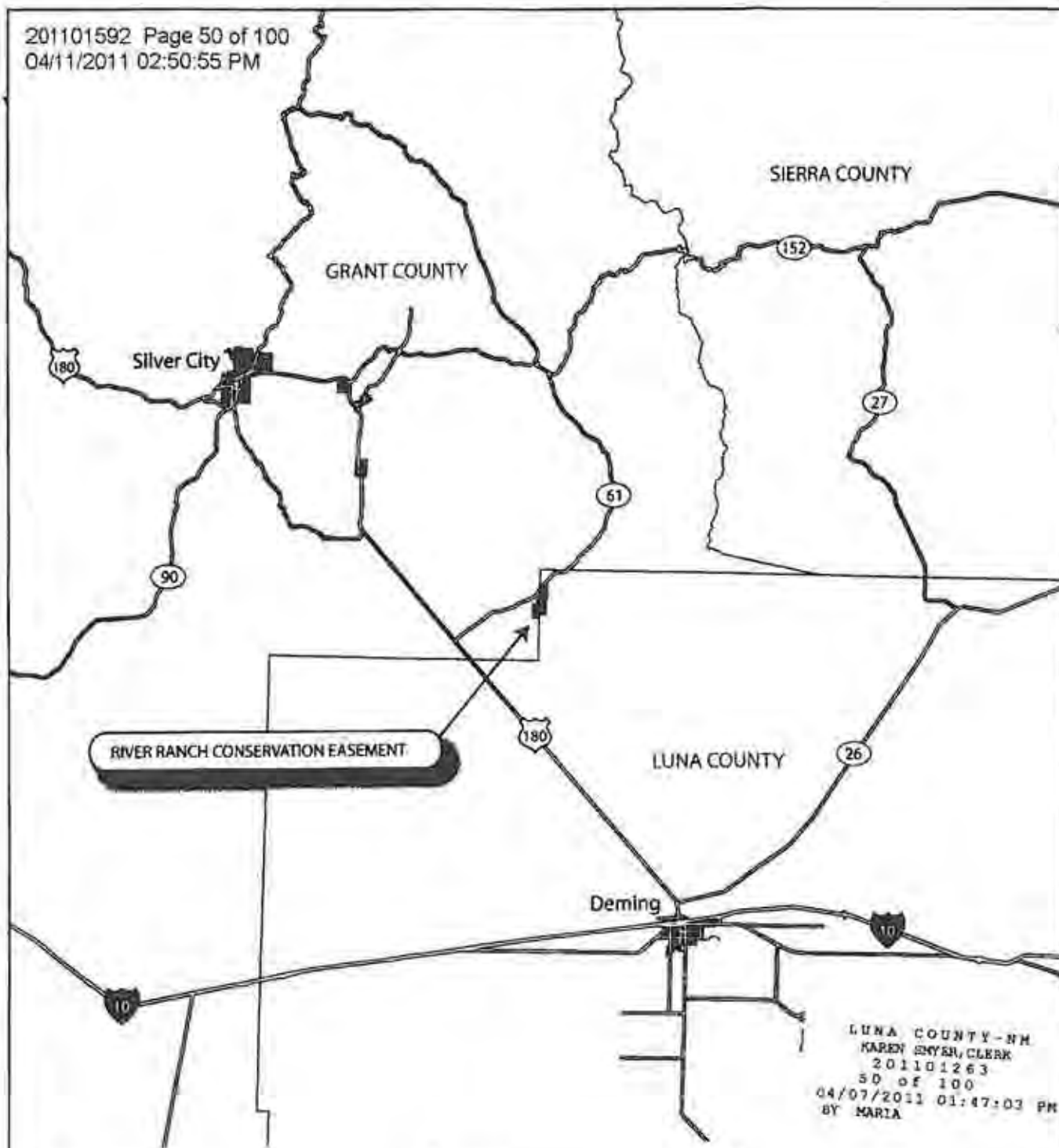
Luna and Grant Counties, NM  
Aerial Imagery circa 2005



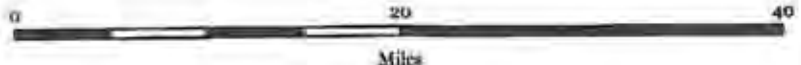
**NEW MEXICO  
LAND CONSERVANCY**

Preserving New Mexico's Land Heritage

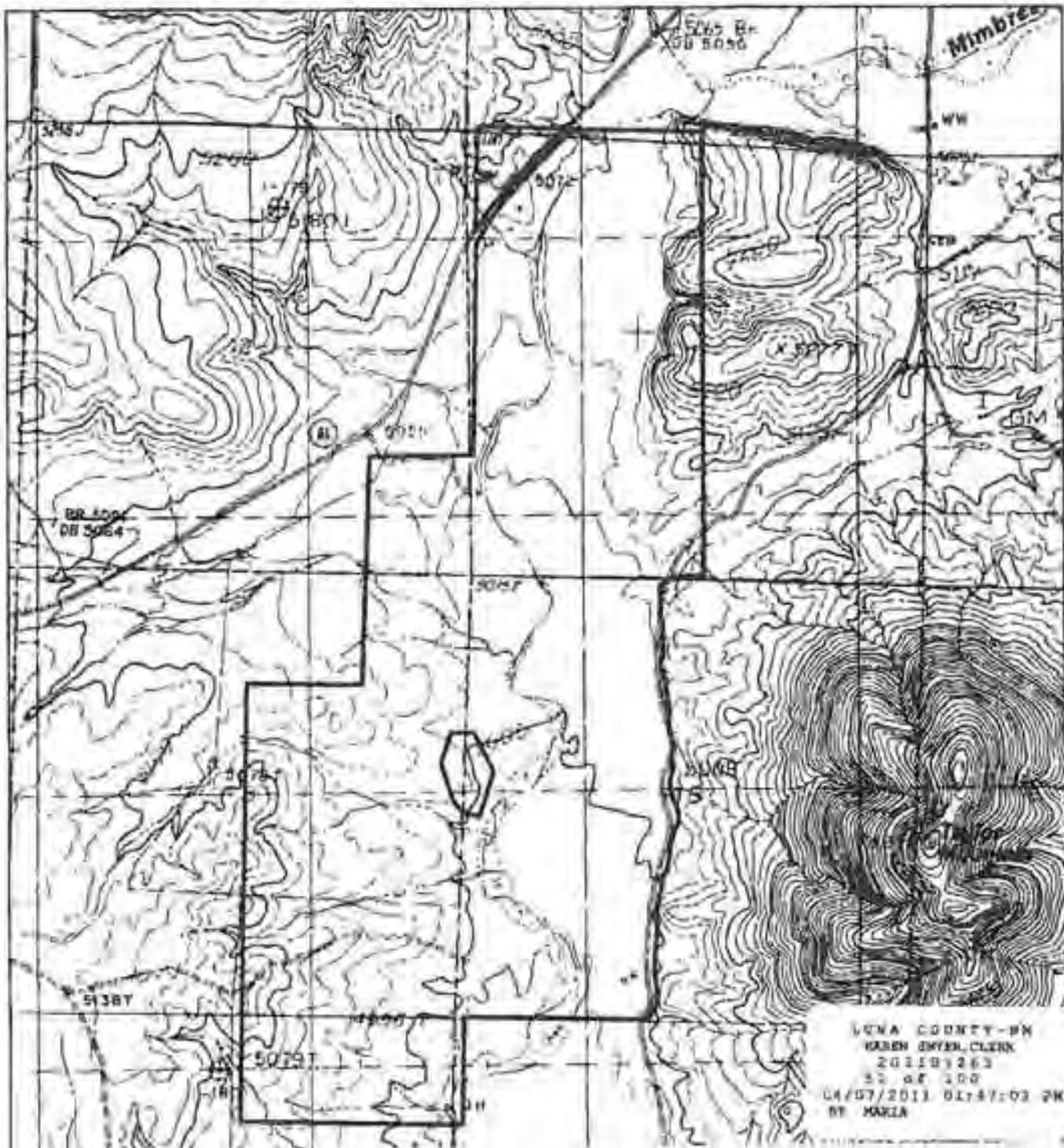
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**Map 1:**  
River Ranch  
Regional Location  
Luna and Grant Counties, NM



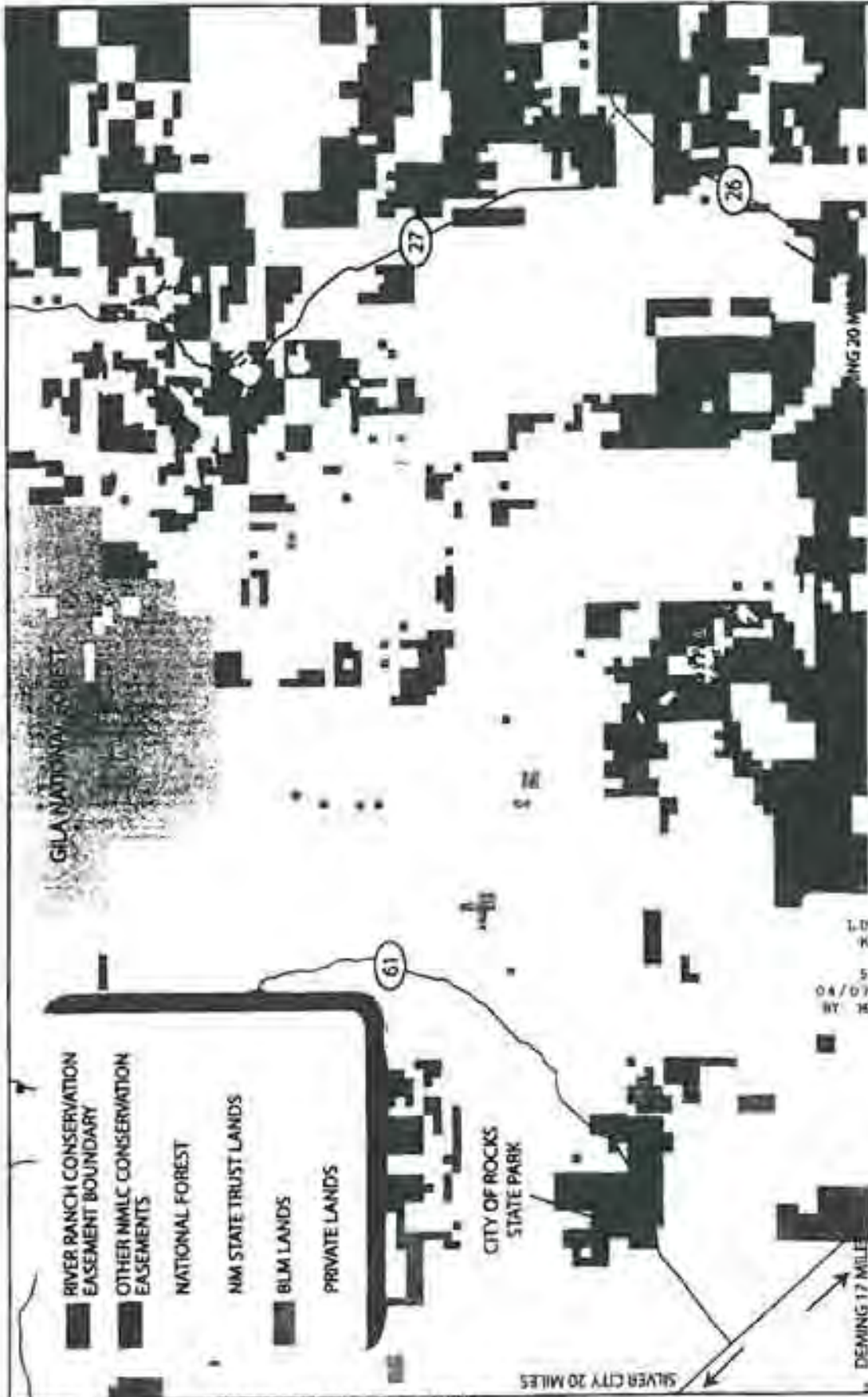
**Map 2:  
River Ranch  
Topographic Map**

USGS Quadrangle Taylor Mountain, NM

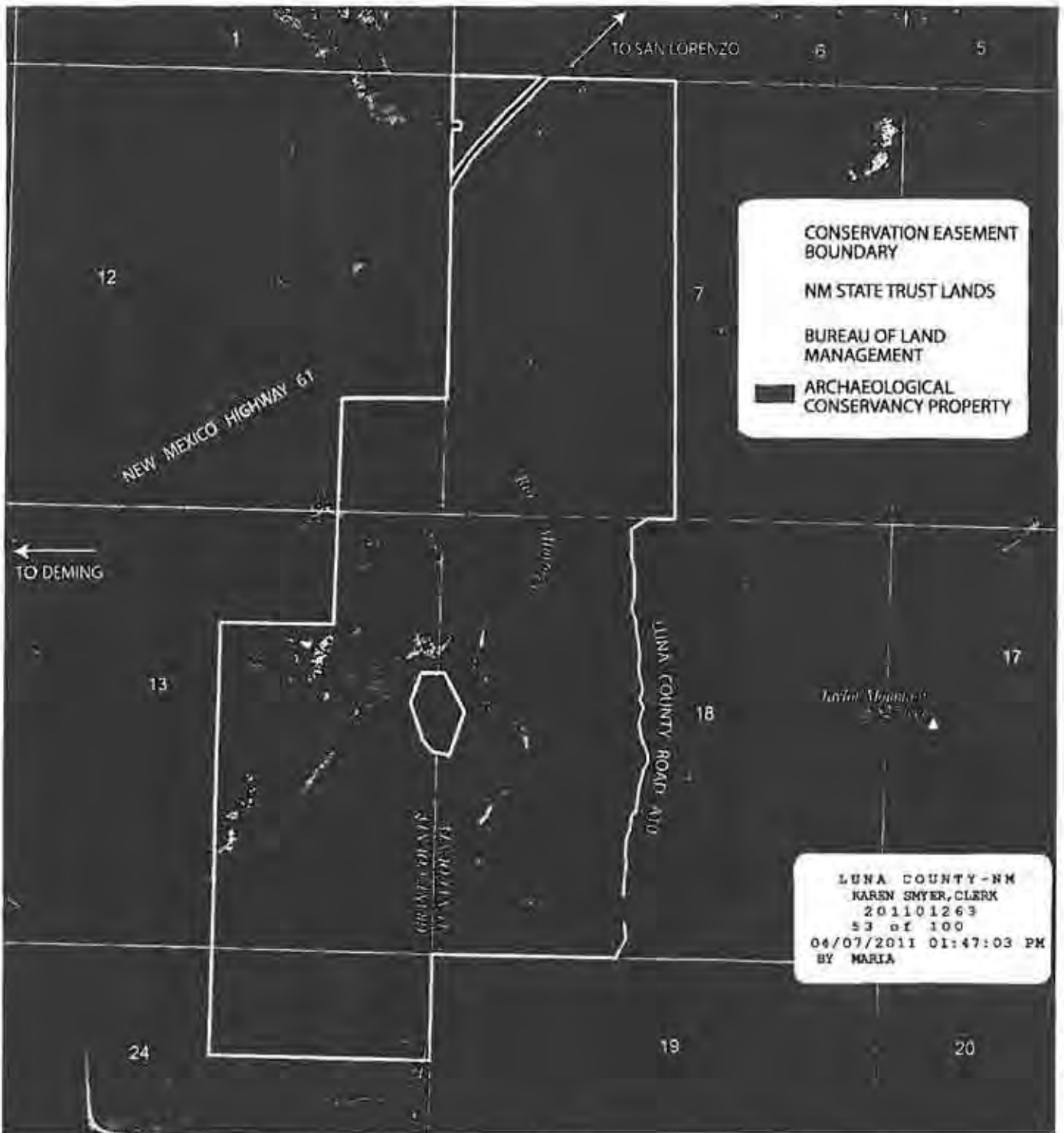


**NEW MEXICO  
LAND CONSERVANCY**  
Preserving New Mexico's Land Heritage



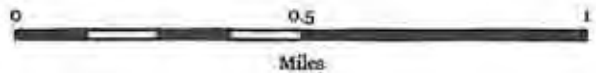


**Map 3:**  
**River Ranch**  
**Surrounding Ownership**  
 Luna and Grant Counties, NM



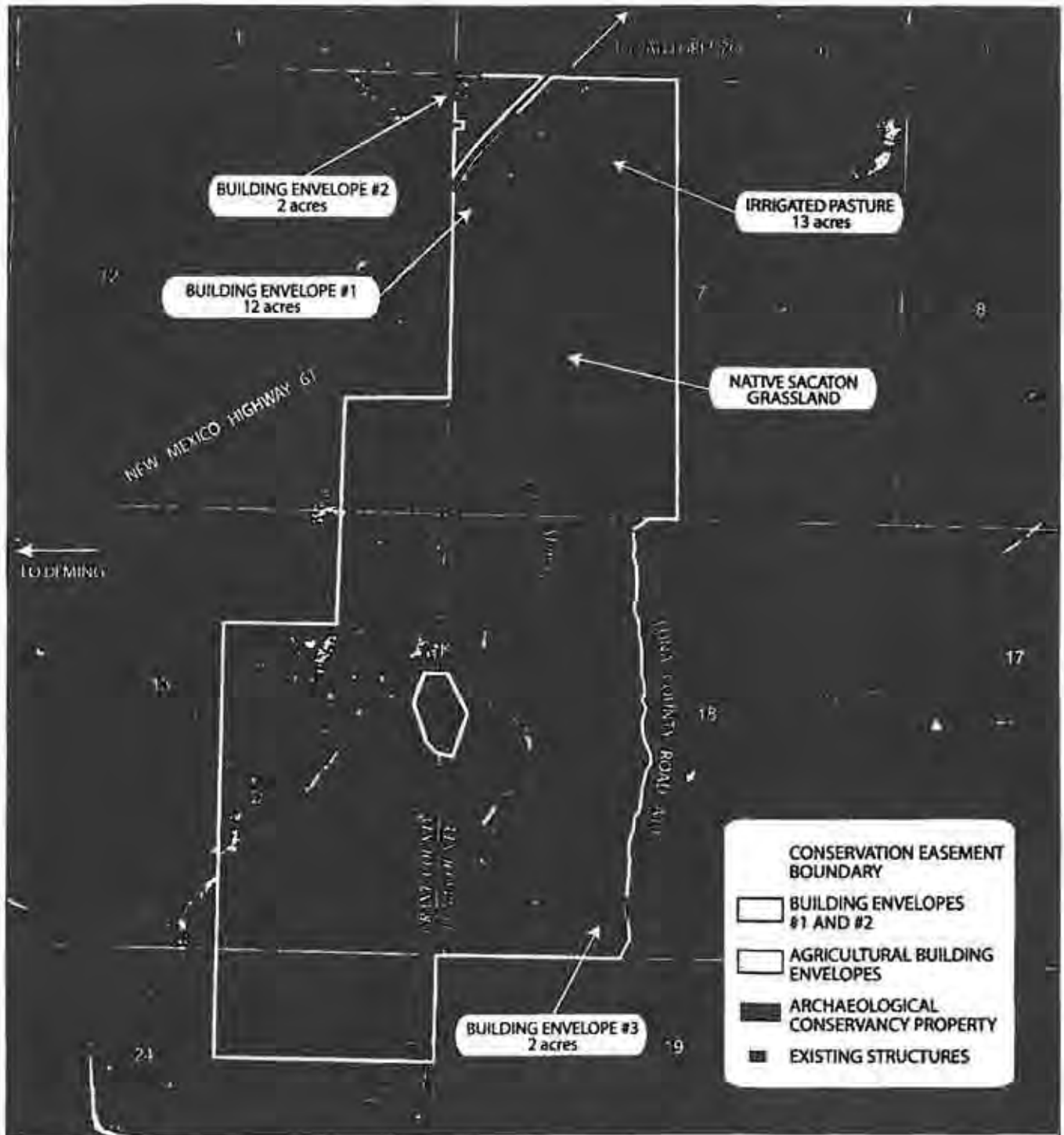
**River Ranch  
Adjacent Lands**

Luna and Grant Counties, NM  
Aerial Imagery circa 2005



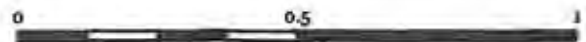
**NEW MEXICO  
LAND CONSERVANCY**

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**Map 4:  
River Ranch  
Aerial Imagery**

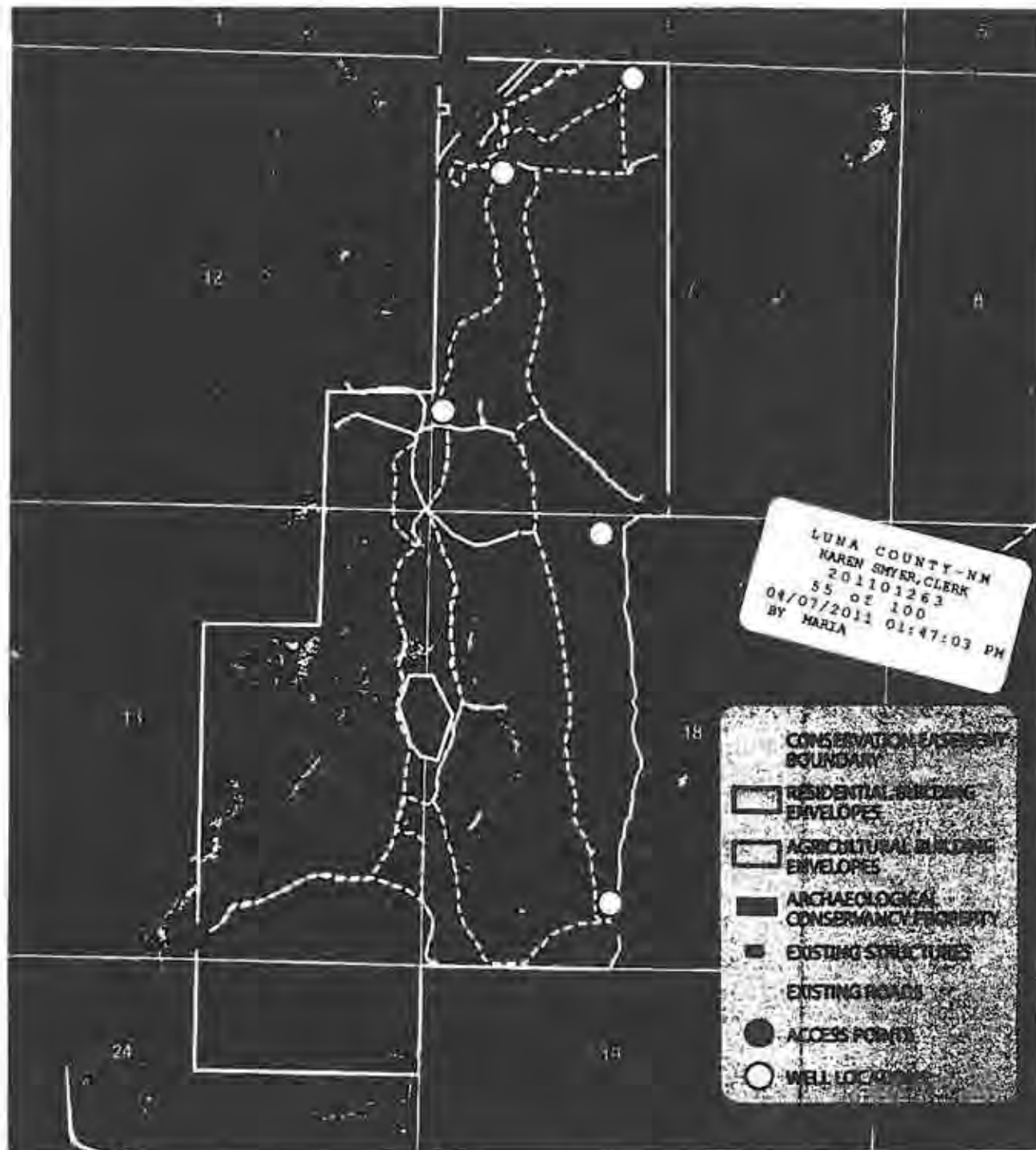
Luna and Grant Counties, NM  
Aerial Imagery circa 2005



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**Map 5:  
River Ranch  
Human Improvements**

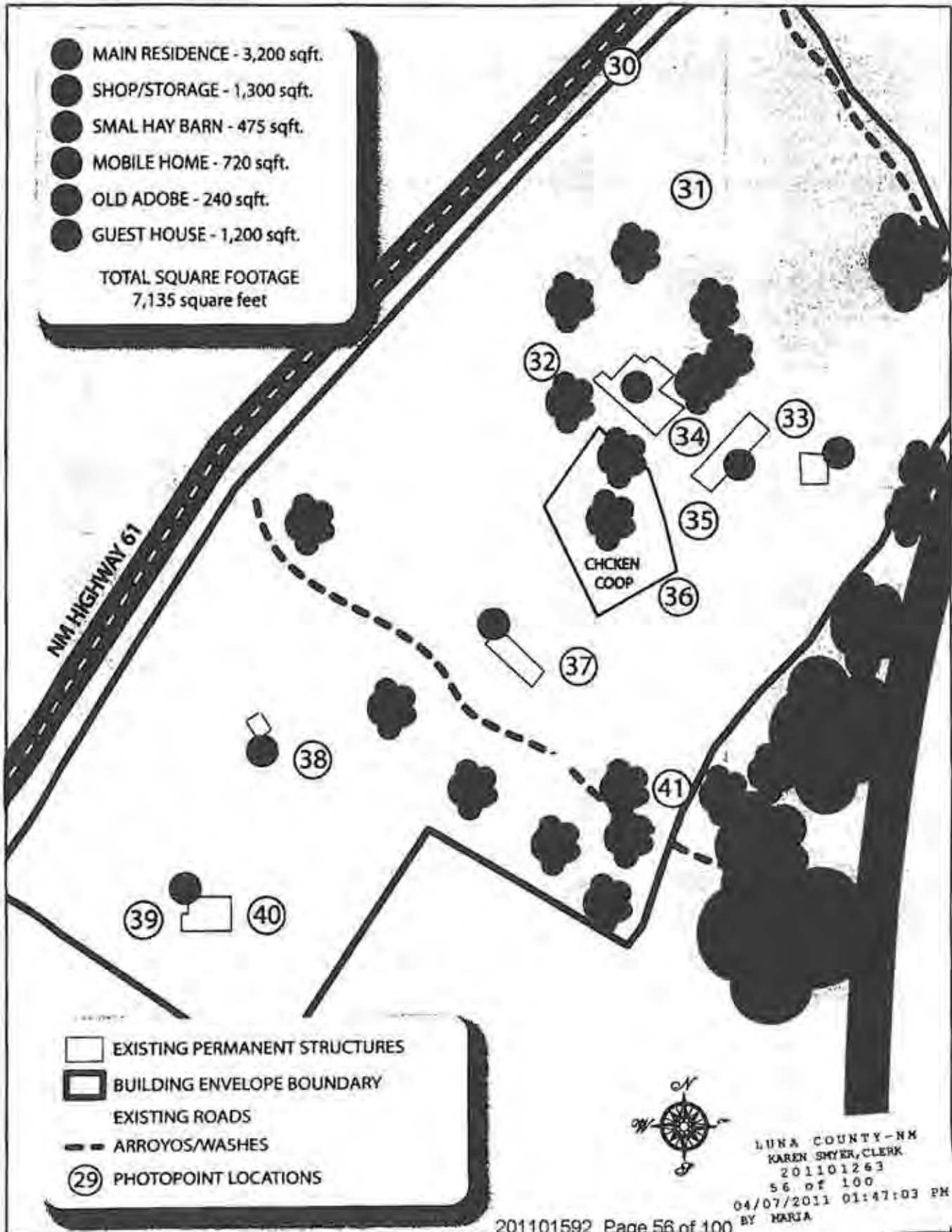
Luna and Grant Counties, NM  
Aerial Imagery circa 2005





- MAIN RESIDENCE - 3,200 sqft.
- SHOP/STORAGE - 1,300 sqft.
- SMAL HAY BARN - 475 sqft.
- MOBILE HOME - 720 sqft.
- OLD ADOBE - 240 sqft.
- GUEST HOUSE - 1,200 sqft.

TOTAL SQUARE FOOTAGE  
7,135 square feet



- EXISTING PERMANENT STRUCTURES
- ▭ BUILDING ENVELOPE BOUNDARY
- EXISTING ROADS
- - - ARROYOS/WASHES
- ⊙ (29) PHOTOPPOINT LOCATIONS



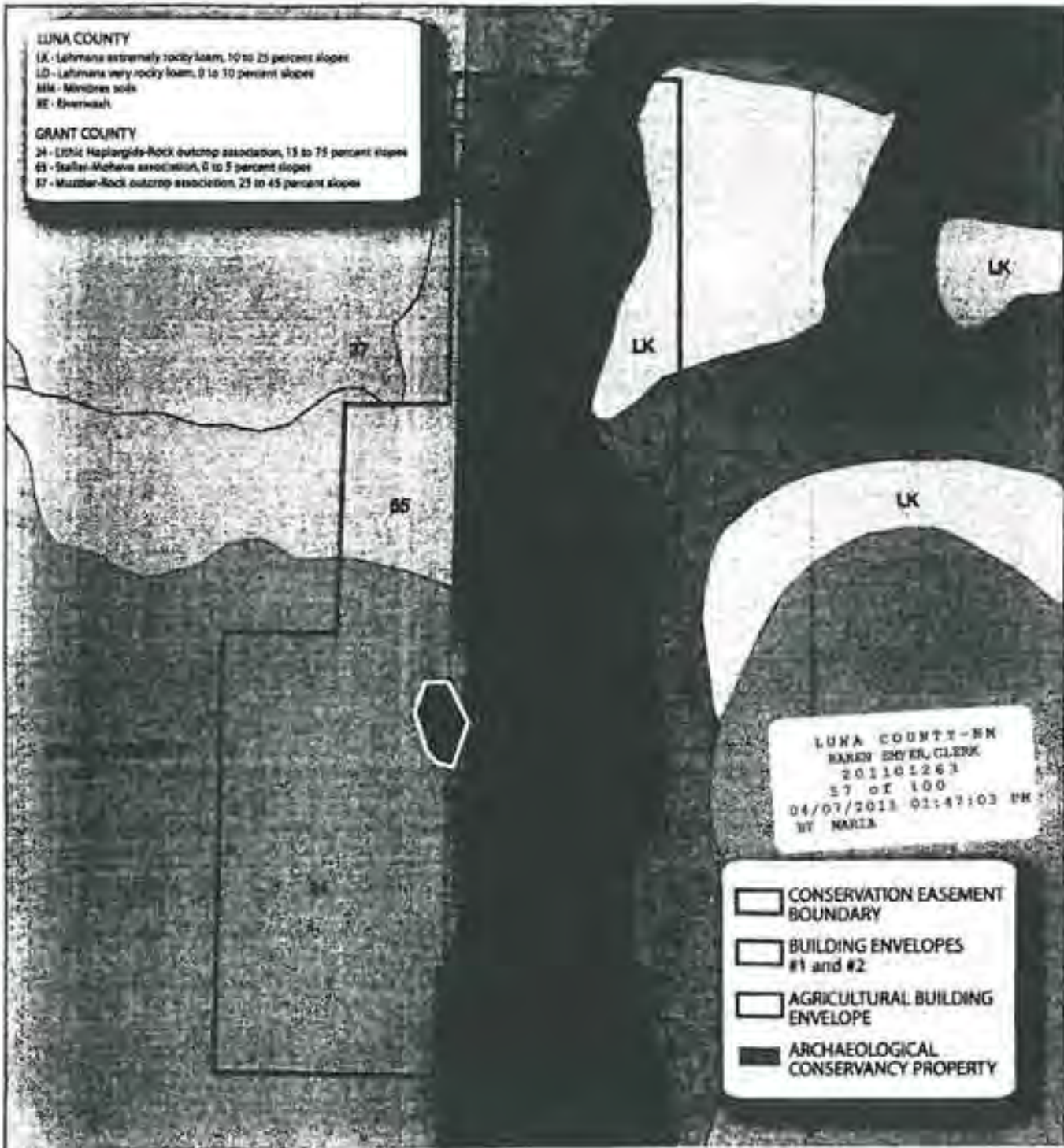
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**LUNA COUNTY**

LK - Lithans extremely rocky loam, 10 to 25 percent slopes  
LD - Lithans very rocky loam, 0 to 10 percent slopes  
MM - Mimbres soils  
RE - Riverwash

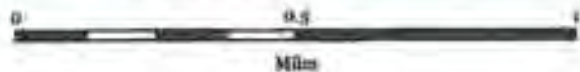
**GRANT COUNTY**

24 - Lithic Haplargids-Rock outcrop association, 15 to 75 percent slopes  
43 - Staller-Mohave association, 0 to 5 percent slopes  
47 - Muttler-Rock outcrop association, 25 to 45 percent slopes



**Map 6:  
River Ranch  
Soil Types**

Luna and Grant Counties, NM



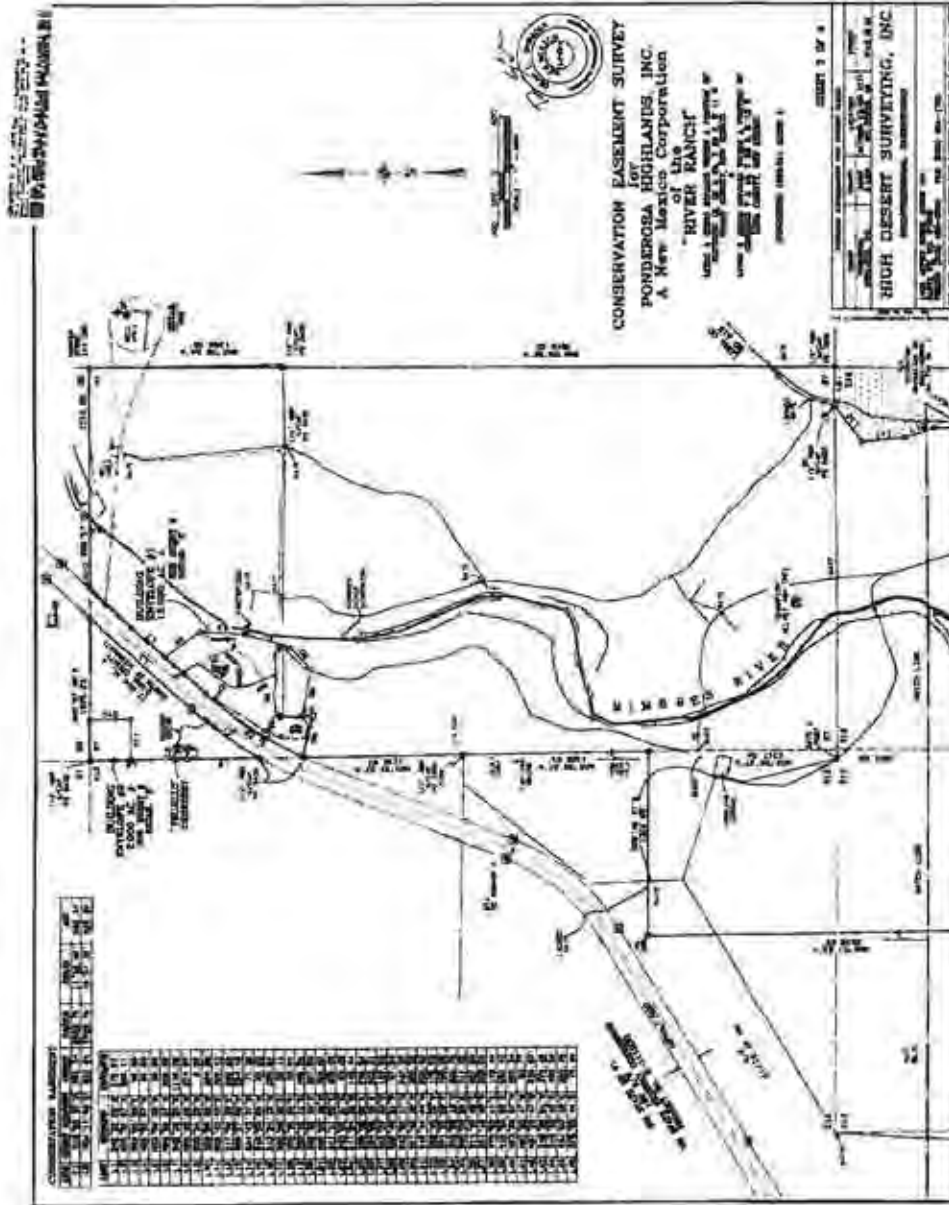
**NEW MEXICO  
LAND CONSERVANCY**

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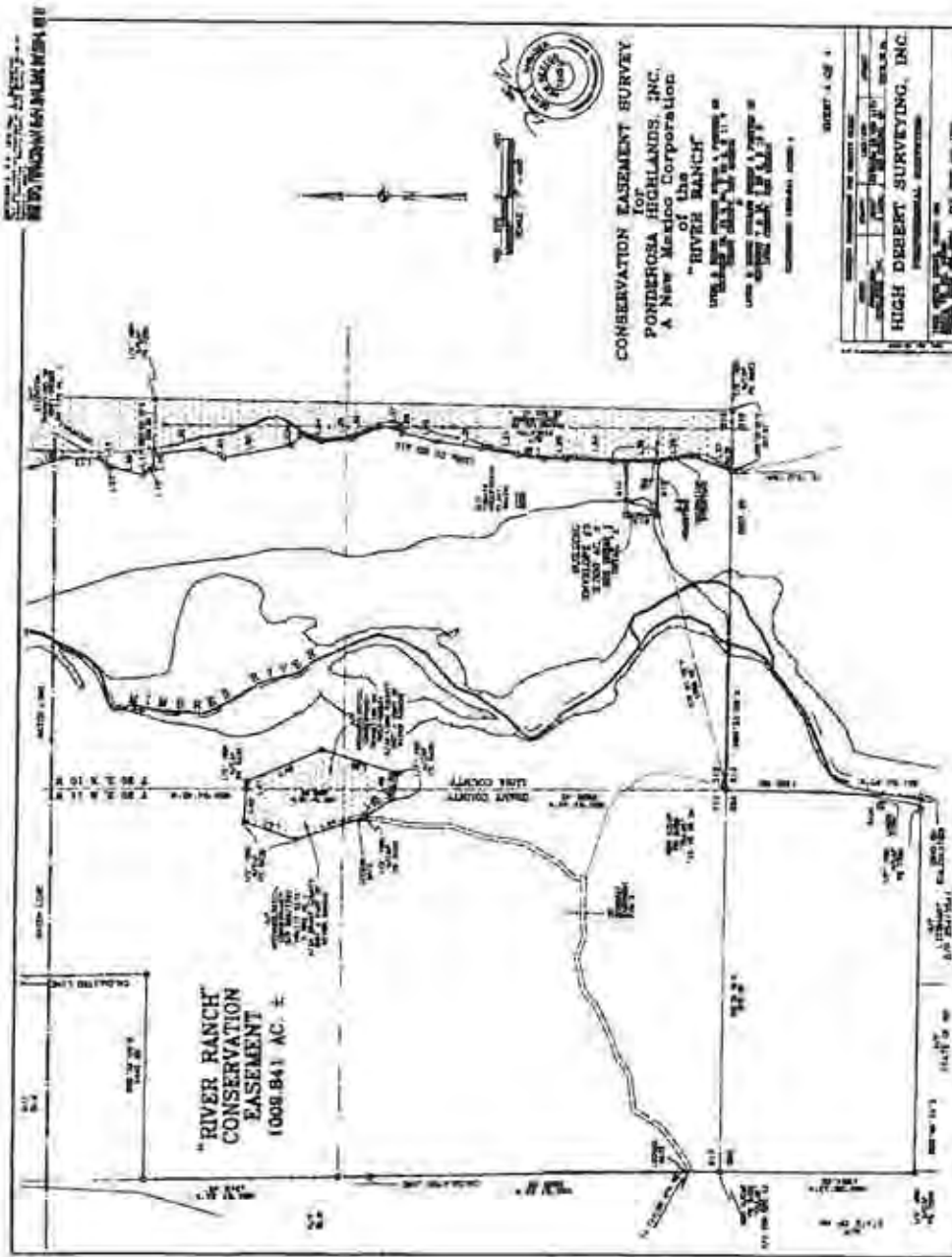






New Mexico Land Conservancy  
River Ranch  
Baseline Documentation Report

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### Appendix C: Photographic Documentation

Photopoint Table including photo descriptions, UTM coordinates, and azimuth readings

Photo #	Photopoint Description	UTM Northing (meters)	UTM Easting (meters)	Azimuth
1-1	View southwest at northeast portion of Easement Property, Rio Mimbres on left.	N/R	N/R	202
2-1	View of access to northern portion of Easement Property off of Highway 61.	N/R	N/R	352
2-2	View of Residential Building Envelope site.	N/R	N/R	N/R
3-1	View of ranch and riparian gallery forest from Residential Building Envelope site.	N/R	N/R	140
4-1	View of from north boundary down Rio Mimbres.	3609567	226048	210
5-1	View of upstream of river crossing near northeast corner of Ranch Headquarters Building Envelope	3609336	225848	278
6-1	View of floodplain with cottonwoods	3609294	225922	0
7-1	View of irrigation well	3609515	226211	172
8-1	View of irrigated field	3609306	226193	210
9-1	View of fish pond and handmade dam	3609241	226325	74
10-1	View of burned Sacaton area	3609055	225842	346
10-2	View northeast of Sacaton grass and cottonwoods	3609055	225842	68
10-3	View southeast of Sacaton grass and Thompson Mtn.	3609055	225842	134
11-1	View south of "sand" Sacaton grassland	3608702	225904	198
12-1	View of access off of Luna County Road A10	3608019	226281	268
13-1	View of velvet ash grove	3608212	225833	170
14-1	View north	3607229	226000	20
14-2	View east	3607229	226000	80
14-3	View south	3607229	226000	158
15-1	View of old tomato cannery	3606778	226087	302
16-1	View of old homestead, windmill, well	3606568	226092	198
17-1	View of access off of Luna County Road A10	3606521	226176	244
18-1	View upstream from southern river crossing	3606433	225893	298
19-1	View north along road with Sacaton grass	3606705	225593	338
20-1	View north	3606945	225483	0
20-2	View east	3606945	225483	80
20-3	View south	3606945	225483	138
21-1	View north from access gate near Thompson Mtn. road	3606471	224669	358
21-2	View south from access gate near Thompson Mtn. road	3606471	224669	174
22-1	View north of ranch from road near gate	3606583	224789	14
23-1	View of Tabletop Mtn.	3607345	225398	258
24-1	View of Archaeological Site from road	3607468	225586	202
25-1	View upstream from river crossing	3607285	225762	208
25-2	View downstream from river crossing	3607285	225762	142
26-1	View of corral	3608279	225467	180

Photo #	Photopoint Description	UTM Northing (meters)	UTM Easting (meters)	Azimuth
26-2	View of small hay storage and windmill	3608279	225467	116
27-1	View of access gate along NM Highway 61	3608491	225186	140
28-1	View of Rio Mimbres from riverbank	3608502	225578	74
29-1	View of ranch and riparian gallery forest from NM Highway 61	3609106	225480	150
30-1	View of main entrance to Easement Property	N/A	N/A	N/A
31-1	View of driveway and main residence	N/A	N/A	N/A
32-1	View of main residence	N/A	N/A	N/A
33-1	View of small hay storage and corrals	N/A	N/A	N/A
33-2	View of garage/shop/storage structure	N/A	N/A	N/A
34-1	View of back of main residence	N/A	N/A	N/A
35-1	View of bird/chicken coop	N/A	N/A	N/A
35-2	View of back of garage/shop/storage structure	N/A	N/A	N/A
36-1	View of chicken coop	N/A	N/A	N/A
37-1	View of mobile home/ranch manager residence	N/A	N/A	N/A
38-1	View of historic adobe structure	N/A	N/A	N/A
39-1	View of back of guest residence	N/A	N/A	N/A
40-1	View of front of guest residence	N/A	N/A	N/A
41-1	View of picnic area	N/A	N/A	N/A





Photo 1-1: View southwest at northeast portion of Easement Property, Mimbres River on left.



Photo 2-1: View of access to northern portion of Easement Property off of Highway 61.



Photo 2-2: View of Residential Building Envelope site.



Photo 3-1: View of ranch and riparian gallery forest from Residential Building Envelope site.



Photo 4-1: View of from north boundary down Rio Mimbres.



Photo 5-1: View of upstream of river crossing near northeast corner of Ranch Headquarters Building Envelope



Photo 6-1: View of floodplain with cottonwoods



Photo 7-1: View of irrigation well.





Photo 8-1: View of irrigated field

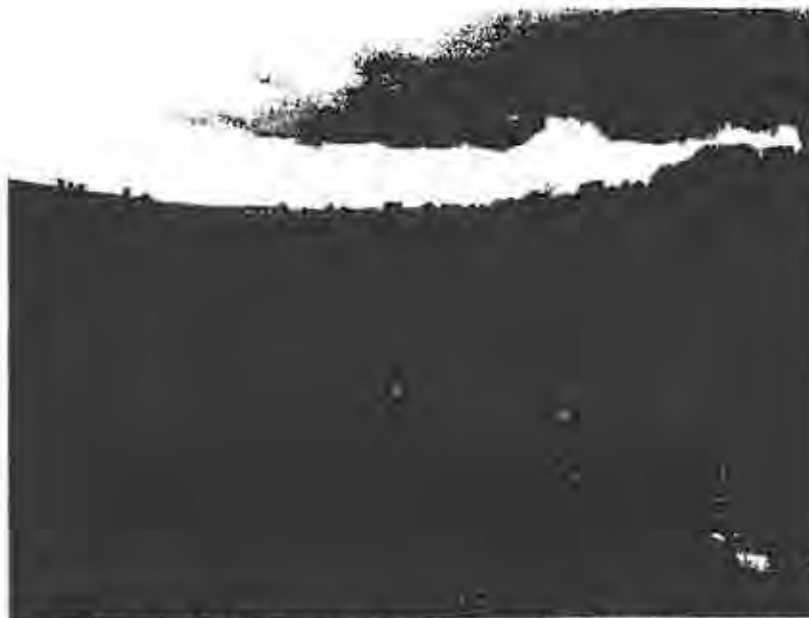


Photo 9-1: View of fish pond and hand-constructed 45' and 5' high dam.



Photo 10-1: View of burned Sacaton area

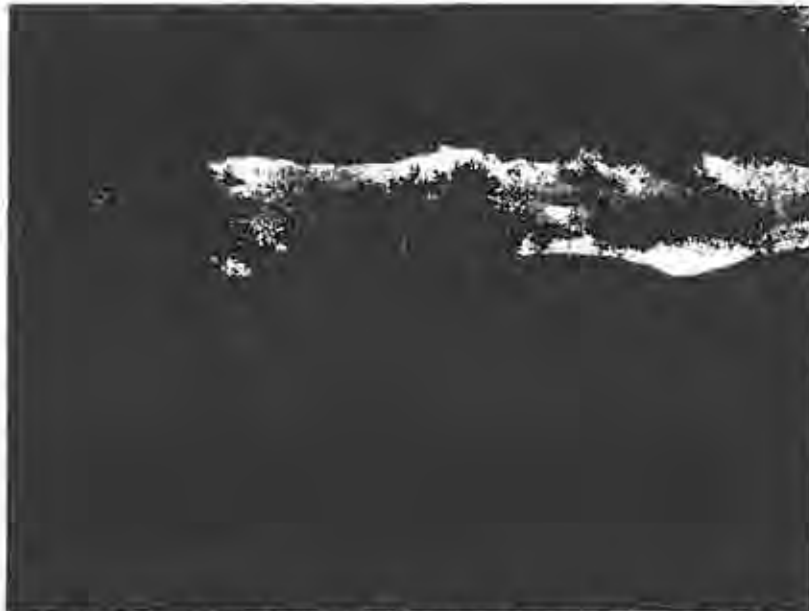


Photo 10-2: View northeast of Sacaton grass and cottonwoods



Photo 10-3: View southeast of Sacaton grass and Taylor Mtn.

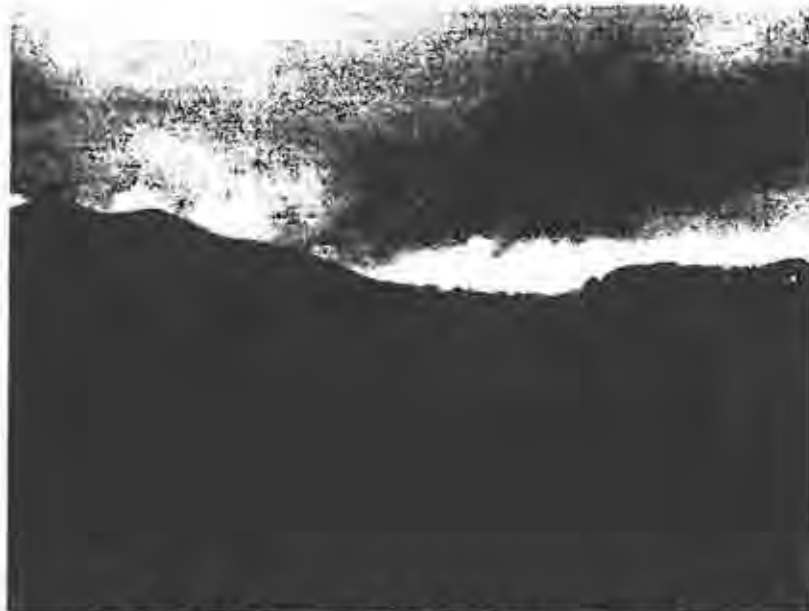


Photo 11-1: View south of alkali Sacaton grassland



Photo 12-1: View of access off of Luna County Road A10



Photo 13-1: View south of velvet ash grove





Photo 14-1: View north



Photo 14-2: View east



Photo 14-3: View south



Photo 15-1: View of remnants of old tomato cannery which was in operation up until World War II.



Photo 16-1: View of Agricultural Building Envelope, old homestead, windmill, and well.



Photo 17-1: View of access off of Luna County Road A10 near Agricultural Building Envelope.



Photo 18-1: View upstream from southern river crossing



Photo 19-1: View north along road with Sacaton grass





Photo 20-1: View north (Archaeological Site on left)



Photo 20-2: View east of Taylor Mtn.



Photo 20-3: View south



Photo 21-1: View north from access gate near Taylor Mtn. Road.

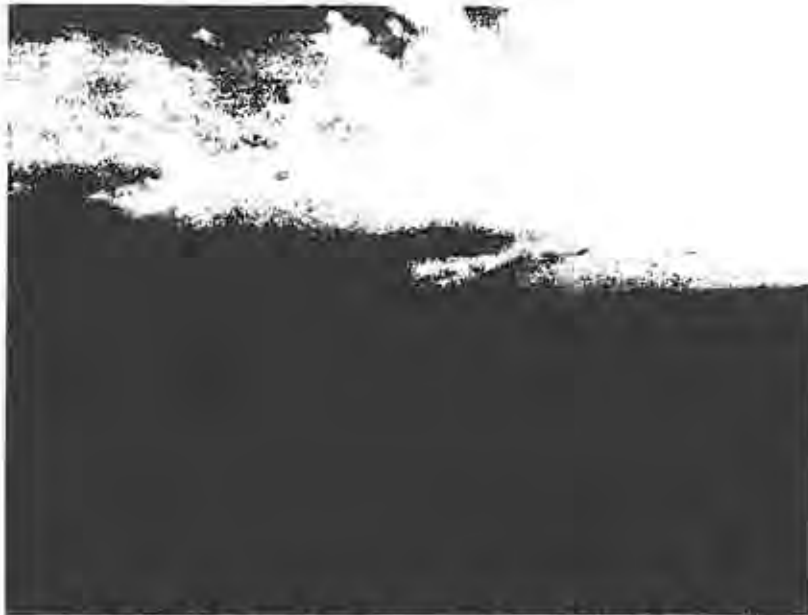


Photo 21-2: View south from access gate near Taylor Mtn. Road.



Photo 22-1: View northeast of ranch from road near Taylor Mtn. Road access gate.



Photo 23-1: View of Tabletop Mtn.



Photo 24-1: View southwest of Archaeological Site from road.

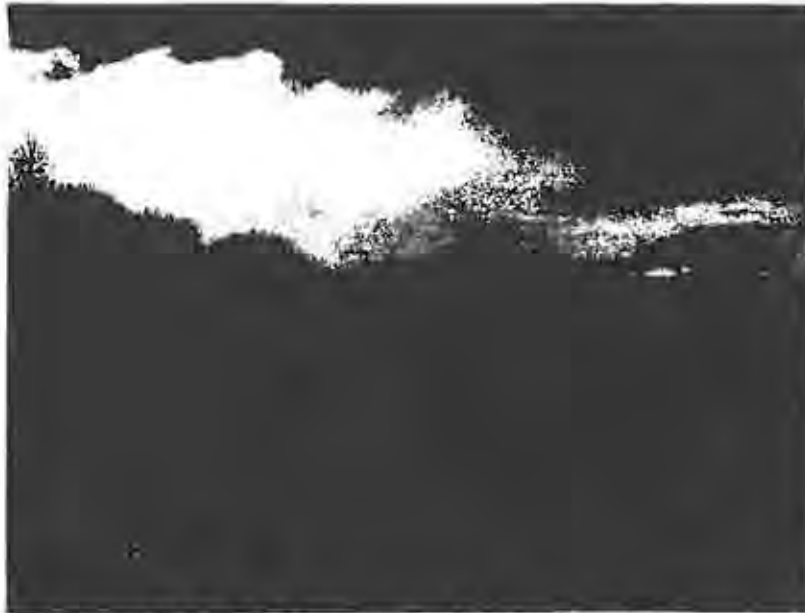


Photo 25-1: View upstream from road crossing



Photo 25-2: View downstream from road crossing





Photo 26-1: View of corral



Photo 26-2: View of small hay storage and windmill



Photo 27-1: View of access point along Highway 61 (not part of the Easement Property)



Photo 28-1: View northeast of Rio Mimbres from riverbank

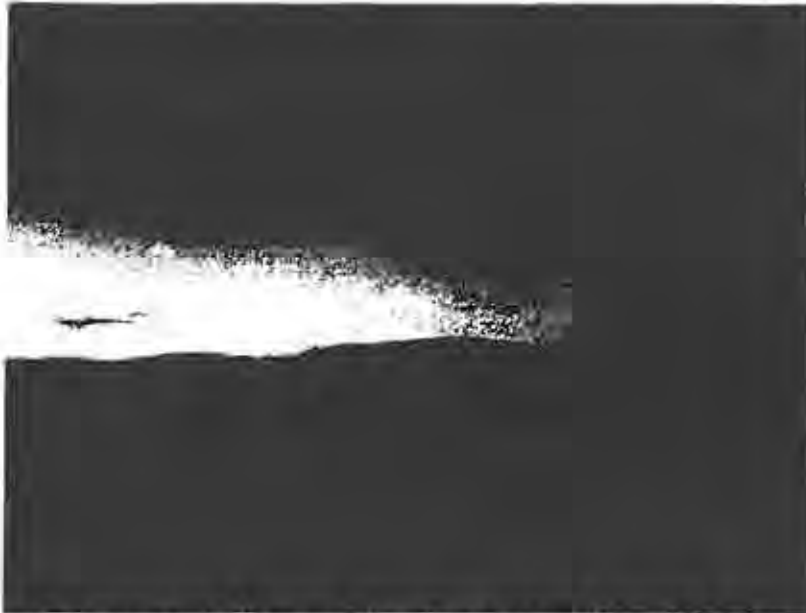


Photo 29-1: View east of riparian gallery forest and ranch from NM Highway 61



Photo 30-1: View of main entrance to Easement Property from NM Highway 61



Photo 31-1: View of driveway and Main House

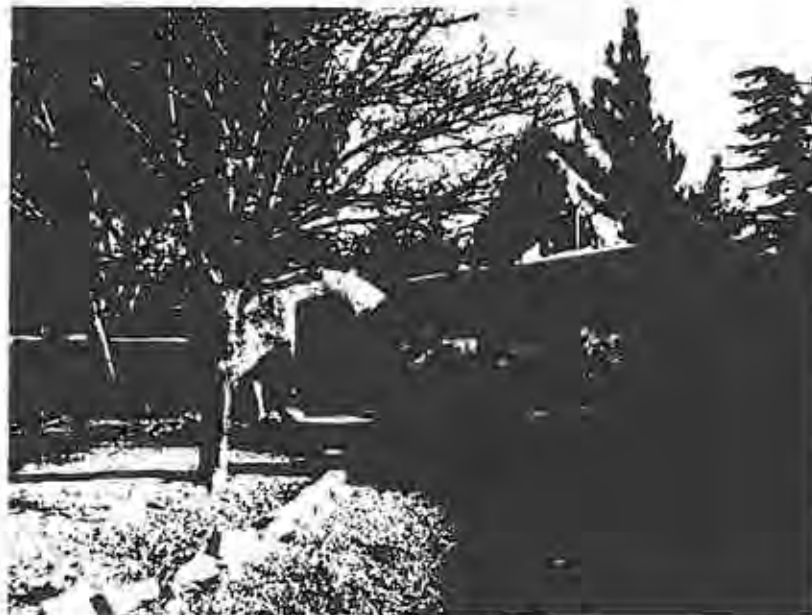


Photo 32-1: View of Main House



Photo 33-1: View of small horse stables and corrals

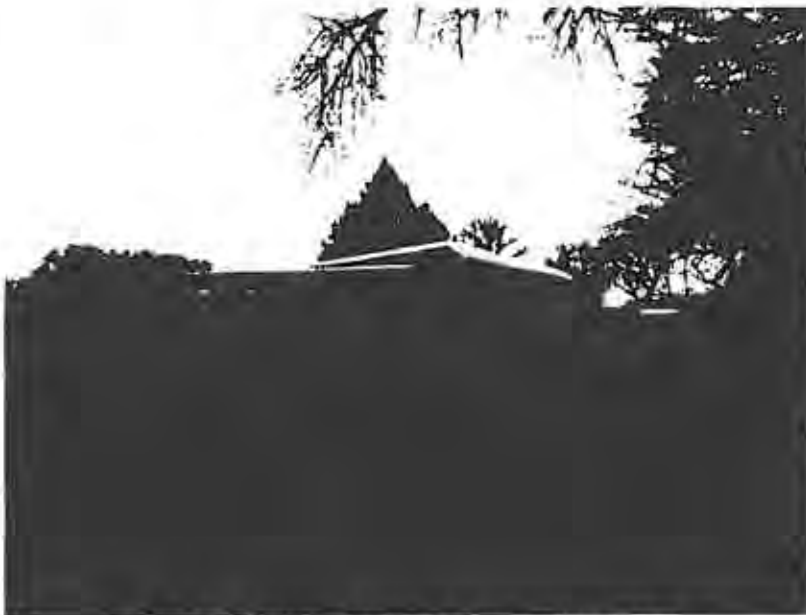


Photo 33-2: View of tool shed/garage/workshop





Photo 34-1: View of back of Main House



Photo 35-1: View of bird/chicken coop area and duck pond



Photo 35-2: View of back of storage/workshop/garage



Photo 36-1: View of chicken coop area



Photo 37-1: View of mobile home/ranch hand residence



Photo 38-1: View of historic adobe structure



Photo 39-1: View of back of guest residence



Photo 40-1: View of front of guest residence



Photo 41-1: View of picnic area

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## Appendix D: Mineral Remoteness Letter

**Zeigler Geologic Consulting**  
Dr. Kate E. Zeigler  
704 Monte Alvo Dr. NE  
Albuquerque, NM 87121  
(505) 261-1448  
kuzigler@gmail.com

Mr. Michael Scisco  
New Mexico Land Conservancy  
P.O. Box 6759  
Santa Fe, NM 87502

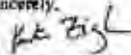
March 5, 2010

Re: Rio del Rancho Conservation Easement

Dear Mr. Scisco:

As per our agreement of January 26, 2010, I have conducted a thorough review of the scientific literature regarding the local geology in the area of the Rio del Rancho Conservation Easement in northwestern Luna County, southeast of Silver City. The results of my research are attached as a report with pertinent figures. Based on a thorough review of the literature and my professional experience as a geologist, the commercial viability of metallic minerals, oil, natural gas and/or coal in the area encompassed by the Rio del Rancho Conservation Easement is so remote as to be negligible.

Sincerely,

  
Dr. Kate E. Zeigler

New Mexico Land Conservancy  
River Ranch  
Baseline Documentation Report

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## Appendix E: UNM Bird Species List



The University of New Mexico

New Mexico Natural History Program  
Department of Biology  
167 Cannon Hall  
Albuquerque, NM 87131  
Telephone (505) 277-3622  
FAX (505) 277-3844  
<http://nmnh.unm.edu>

July 14, 2006

Gene and Elizabeth Simons  
HC71  
Box 1215  
Payson, New Mexico 88034

Dear Gene and Elizabeth:

Thank you so much for the opportunity to survey the riparian area of your ranch for summer birds. It was a real treat. We found 67 species, of which only four are limited to the adjacent uplands, leaving an impressive 63 that are riparian inhabitants. This is a remarkably diverse riparian bird community worthy of your pride. Some of the species are particularly noteworthy. Bell's Vireo is a declining species and listed as endangered by the state (no federal listing). Along with the beautiful blue Indigo Bunting, it occupies the regenerating riparian thickets (cottonwood and willow) at the south end of the ranch. Yellow-billed Cuckoo, another riparian species that is in reported decline, occupies the riparian forests of ash, cottonwood and willow along the river. We found a pair of Brown-crowned Flycatchers in the riparian forest between the ranch house and the ash grove. This is a Mexican species that ranges the U.S. to southeastern Arizona and southwestern New Mexico. Birds on the Mimbres River are disjunct and at the eastern periphery of the range. We found a Bowen's Sparrow singing in the large stand of mesquite grove just to the north of the ash grove and southeast of the ranch house. This represents a substantial range extension northeast of the only other population known in New Mexico. Both New Mexico populations are disjunct from the core of the range in Mexico. The bright red bird Gene mentioned seeing is a Summer Tanager. While they are not rare, they are certainly a treat to see.

The results of our surveys are summarized on the attached list, which includes evaluations of relative abundance, seasonal resident status and habitats occupied on the ranch. I hope that we will find an opportunity to visit the ranch at other seasons to find additional avian treasures. Thank you again for the opportunity to have so much birdwatching fun.

Sincerely,

*Pat*

New Mexico Land Conservancy  
River Ranch  
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Birds of the Simons' Ranch River/Can and Immediate Upland Habitats

Surveyed by Sandy Williams and Pat Mahoney

June 9-11, 2000

State Scientific Name	State Common Name
ARDEA HERODIAS	GREAT BLUE HERON
BUTORIDE VIRESCENS	GREEN HERON
CATHARTES AURA	TURKEY VULTURE
ANAS PLATYRHYNCHOS	MEXICAN DUCK (MALLARD)
MERCUS MERGANSER	COMMON MERGANSER
BUTEO ALBOCINCTATUS	ZONE-TAILED HAWK
BUTEO JAMAICENSIS	RED-TAILED HAWK
FALCO SPARVERIUS	AMERICAN KESTREL
CALLIPEPLA GAMBELI	GAMBEL'S QUAIL
CHARADRIUS VOGELIUS	KILLDEER
COLUMBA FASCIATA	BAND-TAILED PIGEON
ZENAIDA ASIATICA	WHITE-WINGED DOVE
ZENAIDA MACROURA	MOURNING DOVE
COLUMBINA INCA	INCA DOVE
GEOCOCCYX CALIFORNIANUS	GREATER ROADRUNNER
OTUS KENNICOTTI	WESTERN SCREECH-OWL
BUBO VIRGINIANUS	GREAT HORNED OWL
CHORDEILES ACUTIPENNIS	LESSER NIGHTHAWK
CHORDEILES MINOR	COMMON NIGHTHAWK
AERONAUTES SAXATALIS	WHITE-THROATED SWIFT
ARCHILOCHUS ALEXANDRI	BLACK-CHINNED HUMMINGBIRD
PHOENIX SCALARIS	LADDER-BACKED WOODPECKER
COLAPTES AURATUS	NORTHERN (RED-SHAFTED) FLICKER
CCOTOPUS BORDIDULUS	WESTERN WOOD PEWEE
EMPIDONAX SP	UNIDENTIFIED EMPIDONAX FLYCATCHER
SAYORNIS NIDRIFICANS	BLACK PHOEBE
MYIARCHUS CINERESCENS	ASH-THROATED FLYCATCHER
TYRANNUS VOCEIFERANS	CASSIN'S KINGBIRD
TYRANNUS VERTICALIS	WESTERN KINGBIRD
CORVUS CORAX	COMMON RAVEN
TACHYONETA THALASSINA	VIOLET-GREEN SWALLOW
STELGIOPTERYX SERRIPENNIS	NORTHERN ROUGH-WINGED SWALLOW
PETROCHELIDON PYRRHONOTA	CLIFF SWALLOW
HIRUNDO RUSTICA	BARN SWALLOW
BASOLOPHUS WOLLWEBERI	BRIDLED TITMOUSE
AURIPARUS FLAVICIPS	VERDIN
SITTIA CAROLINENSIS	WHITE-BREADED NUTHATCH
CAMPYLORHYNCHUS BRUNNICAPILLUS	CACTUS WREN
SALICINOTES OBSOLETUS	ROCK WREN
THRYOMANES BEWICKI	BEWICK'S WREN
TURCULUS MIGRATORIUS	AMERICAN ROBIN
MIMUS POLYGLOTTOS	NORTHERN MOCKINGBIRD

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**Beds of the Sunova Ranch Riparian and Immediate Upland Habitats**

Surveyed by Sandy Williams and Pat Melhop

June 8<sup>th</sup>, 2000

TOXOSTOMA CURVIROSTRIS	CURVE-BILLED THRASHER
TOXOSTOMA CRISTATA	CRISAL THRASHER
STURMUS VULGARIS	EUROPEAN STARLING
PHAINOPEPLA NITENS	PHAINOPEPLA
VERMIVORA LUCIAE	LUCY'S WARBLER
PIRANGA RUBRA	SUMMER TANAGER
PILO FUSCUS	CANYON TOWHEE
CHONDESTES GRANMACUS	LARK SPARROW
PHOENICUS MELANOCERPHALUS	BLACK-HEADED GROSBEAK
GURACA CAERULEA	BLUE GROSBEAK
PASSERINA CYANEA	INDIGO BUNTING
STURNELLA MAGNA	EASTERN MEADOWLARK
MOLOTHRUS ATER	BROWN-HEADED COWBIRD
ICTERUS BULLOCKII	BULLOCK'S GIGGLE
CARPODacus MEXICANUS	HOUSE FINCH
PASSER DOMESTICUS	HOUSE SPARROW

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**Appendix F: Threatened and Endangered Fauna and Rare Flora Lists**

**Federal and State Threatened and Endangered Species and Globally Ranked Species in Grant and Luna Counties, NM (NMDGF, 2009).**

Common Name	Scientific Name	County	Status
Chub, Chihuahuia	<i>Gila nigrescens</i>	Grant	Federal: Threatened State NM: Endangered
Chub, Gila	<i>Gila intermedia</i>	Grant	Federal: Endangered State NM: Endangered
Chub, Headwater	<i>Gila nigra</i>	Grant	State NM: Endangered
Chub, Roundtail	<i>Gila robusta (lower Colorado River populations)</i>	Grant	State NM: Endangered
Minnow, Loach	<i>Tiaroga cobitis</i>	Grant	Federal: Threatened State NM: Threatened
Spikedace	<i>Meda fulgida</i>	Grant	Federal: Threatened State NM: Endangered
Topminnow, Gila	<i>Paecillopsis occidentalis occidentalis (NM,AZ)</i>	Grant	Federal: Endangered State NM: Threatened
Trout, Gila	<i>Oncorhynchus gilae</i>	Grant	Federal: Threatened State NM: Threatened
Frog, Leopard, Chiricahua	<i>Rana chiricahuensis</i>	Grant Luna	Federal: Threatened
Frog, Leopard, Lowland	<i>Rana yavapaiensis</i>	Grant	State NM: Endangered
Toad, Narrowmouth, Great Plains	<i>Gastrophryne olivacea</i>	Luna	State NM: Endangered
Monster, Gila, Reticulate	<i>Heloderma suspectum suspectum (NM,AZ)</i>	Grant Luna	State NM: Endangered
Snake, Garter, Mexican	<i>Thamnophis eques megalops (NM)</i>	Grant	State NM: Endangered
Snake, Garter, Narrowhead	<i>Thamnophis rufipunctatus rufipunctatus (NM)</i>	Grant	State NM: Threatened
Tyrannulet, Beardless, N.	<i>Camptostoma imberbe ridgwayi (NM)</i>	Grant	State NM: Endangered
Black-Hawk, Common	<i>Buteogallus anthracinus anthracinus (NM)</i>	Grant Luna	State NM: Threatened
Bunting, Varied	<i>Passerina versicolor versicolor (NM);dickeyae (NM)</i>	Grant Luna	State NM: Threatened
Cormorant, Neotropic	<i>Phalacrocorax brasilianus</i>	Grant Luna	State NM: Threatened
Eagle, Bald	<i>Haliaeetus leucocephalus alascanus (NM)</i>	Grant Luna	State NM: Threatened
Falcon, Aplomado	<i>Falco femoralis septentrionalis (NM)</i>	Grant Luna	Federal: Endangered State NM: Endangered



Common Name	Scientific Name	County	Status
Falcon, Peregrine	<i>Falco peregrinus anatum</i>	Grant Luna	State NM: Threatened
Falcon, Peregrine, Arctic	<i>Falco peregrinus tundrius</i>	Grant Luna	State NM: Threatened
Flycatcher, Willow, SW	<i>Empidonax traillii extimus</i>	Grant Luna	Federal: Endangered State NM: Endangered
Ground-dove, Common	<i>Columbina passerina pallescens (NM)</i>	Grant Luna	State NM: Endangered
Hummingbird, Broad-billed	<i>Cynanthus latirostris magicus (NM)</i>	Grant	State NM: Threatened
Hummingbird, Costa's	<i>Calypte costae</i>	Grant	State NM: Threatened
Hummingbird, Lucifer	<i>Calothorax lucifer</i>	Grant Luna	State NM: Threatened
Hummingbird, Violet-crowned	<i>Amazilia violiceps ellioti (NM)</i>	Luna	State NM: Threatened
Hummingbird, White-eared	<i>Myiobolis leucotis borealis (NM)</i>	Grant	State NM: Threatened
Junco, Yellow-eyed	<i>Junco phaeonotus palliatus (NM)</i>	Grant	State NM: Threatened
Kingbird, Thick-billed	<i>Tyrannus crassirostris</i>	Grant	State NM: Endangered
Nightjar, Buff-collared	<i>Caprimulgus ridgwayi ridgwayi (NM)</i>	Grant	State NM: Endangered
Owl, Spotted, Mexican	<i>Strix occidentalis lucida (NM,AZ)</i>	Grant Luna	Federal: Threatened
Pelican, Brown	<i>Pelecanus occidentalis carolinensis (NM)</i>	Grant Luna	State NM: Endangered
Sparrow, Baird's	<i>Ammodramus bairdii</i>	Grant Luna	State NM: Threatened
Towhee, Abert's	<i>Pipilo aberti aberti (NM)</i>	Grant	State NM: Threatened
Trogon, Elegant	<i>Trogon elegans canescens (NM)</i>	Grant	State NM: Endangered
Vireo, Bell's	<i>Vireo bellii arizonae (NM,AZ); medius (NM)</i>	Grant Luna	State NM: Threatened
Vireo, Gray	<i>Vireo vicinior</i>	Grant Luna	State NM: Threatened
Woodpecker, Gila	<i>Melanerpes uropygialis uropygialis (NM)</i>	Grant	State NM: Threatened
Bat, Spotted	<i>Euderma maculatum</i>	Grant	State NM: Threatened
Sheep, Bighorn, Desert	<i>Ovis canadensis mexicana (endangered pops)</i>	Grant	State NM: Endangered
Wolf, Gray, Mexican	<i>Canis lupus baileyi (NM,AZ)</i>	Grant	Federal: Endangered State NM: Endangered
Woodlandsnail, Cooke's Peak	<i>Ashmunella macromphala</i>	Luna	Heritage Global: Very Rare/Critically Imperiled (G1) State NM: Threatened

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Common Name	Scientific Name	County	Status
Springsnail, Hot, New Mexico	<i>Pyrgulopsis thermalis</i>	Grant	Heritage Global: Very Rare/Critically Imperiled (G1) State NM: Threatened
Springsnail, Gila	<i>Pyrgulopsis gilae</i>	Grant	Heritage Global: Rare/Imperiled (G2) State NM: Threatened
Snail, Holospira, Metcalf	<i>Holospira metcalfi</i>	Grant	Heritage Global: Very Rare/Critically Imperiled (G1)
Mountainsnail, Black Range	<i>Oreohelix metcalfei concentrica (NM)</i>	Grant	Heritage Global: Rare/Imperiled (G2)
Mountainsnail, Bearded	<i>Oreohelix barbata</i>	Grant	Heritage Global: Very Rare/Critically Imperiled (G1)
Snail, Slug, Marsh	<i>Deroceras heterura</i>	Grant	Heritage Global: Very Rare/Critically Imperiled (G1)
Woodlandsnail, Iron Creek	<i>Ashmunella mendax</i>	Grant	Heritage Global: Very Rare/Critically Imperiled (G1)
Talusnail, New Mexico	<i>Sonorella hachitana flora (NM)</i>	Luna	Heritage Global: Very Rare/Critically Imperiled (G1)
Shrimp, Fairy, Moore's	<i>Streptocephalus moorei</i>	Luna	Heritage Global: Very Rare/Critically Imperiled (G1)
Mayfly	<i>Leucrocota petersi</i>	Grant	Heritage Global: Rare/Imperiled (G2)
Mayfly	<i>Lachania dencyanae</i>	Grant	Heritage Global: Very Rare/Critically Imperiled (G1)
Skipper, Skipperling, Four-potted	<i>Pisum polingii</i>	Grant	Heritage Global: Rare/Imperiled (G2)

Rare Plant Species for Grant and Luna Counties, NM (NMRPTC, 2007)

<b>LUNA COUNTY</b>	
Scientific name	Common Name
<i>Agastache cana</i>	Grayish-white giant hyssop
<i>Atriplex griffithsii</i>	Griffith's saltbush
<i>Escobaria arcuttii</i>	Orcutt pincushion cactus
<i>Opuntia arenaria</i>	Dune pricklypear
<i>Peniocereus greggii</i> var. <i>greggii</i>	Night-blooming cereus
<i>Scrophularia macrantha</i>	Mimbres figwort
<i>Silene wrightii</i>	Wright's campion
<i>Sphaeralcea procera</i>	Porter's globe mallow
<i>Sphaeralcea wrightii</i>	Wright's globe mallow
<b>GRANT COUNTY</b>	
Scientific name	Common Name
<i>Agastache cana</i>	Grayish-white giant hyssop
<i>Brickellia chenopodioides</i>	Gila brickellbush
<i>Cleome multicaulis</i>	Slender spiderflower
<i>Crataegus wootoniana</i>	Wooton's hawthorn
<i>Cymopterus davidsonii</i>	Davidson's cliff carrot
<i>Desmodium metcalfei</i>	Metcalf's ticktrefoil
<i>Draba mogollonica</i>	Mogollon whitflowgrass
<i>Grindella arizonica</i> var. <i>neomexicana</i>	New Mexico gumweed
<i>Peniocereus greggii</i> var. <i>greggii</i>	Night-blooming cereus
<i>Penstemon linarioides</i> ssp. <i>maguirei</i>	Maguire's beardtongue
<i>Phemeranthus humilis</i>	Pinos Altos fame flower
<i>Puccinella parishii</i>	Parish's alkali grass
<i>Scrophularia macrantha</i>	Mimbres figwort
<i>Silene thurberi</i>	Thurber's campion
<i>Silene wrightii</i>	Wright's campion
<i>Stellaria porsildii</i>	Porsild's starwort

## Appendix G: References

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Exhibit 4 to Deed of Conservation Easement

**RESOLUTION BY THE BOARD OF DIRECTORS OF  
THE NEW MEXICO LAND CONSERVANCY  
REGARDING THE RIVER RANCH CONSERVATION EASEMENT**

The following Resolution was passed by the Board of Directors of the New Mexico Land Conservancy on December 10, 2010, as recorded in the Minutes of the Board Meeting:

"RESOLVED by the Board of Directors of the New Mexico Land Conservancy that a Deed of Conservation Easement from Ponderosa Highlands, Inc to the New Mexico Land Conservancy, conserving certain conservation of agricultural, natural habitat, and scenic open space values on one thousand and nine (1,009) acres of land in Luna and Grant Counties, New Mexico, be accepted by the New Mexico Land Conservancy, and that the New Mexico Land Conservancy accepts all of the rights and responsibilities described in said Deed, and that the Chair of the Board of Directors of the New Mexico Land Conservancy, John B. Wright, is hereby authorized by the Board of Directors to act on its behalf to finalize and execute said Deed on behalf of the New Mexico Land Conservancy."

By:

  
Moo Thorpe  
Treasurer, Board of Directors

Date: 12/10/10

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