

**Water Quality Improvement Grant Program  
Grant Application Form**

**1. Project Title:** Upper Verde Collaborative Watershed Restoration Project

**2. Project Description:** This project will reduce sedimentation in the Upper Verde River watershed through creation of 12 new pastures for better time controlled grazing on 21,000 acres, removal of resprouting juniper trees on 800 acres, and reclaiming 5 acres of gullied roadway and 25 acres of eroding rangeland through hay trampling. The intensive monitoring report will help educate other ranchers.

**3. PROJECT MANAGER** *(Enter the name, title and contact information of the individual who will have the day-to-day knowledge of the project and should be contacted if clarification is required):*

**Name:** Norman Lowe, Executive Officer  
EcoResults! Inc.

**Telephone number:** (928) 527-0661  
or 214-0640

**Address:** 114 N. San Francisco, Suite 207  
Flagstaff AZ 86001

**Fax number:** (928) 213-1971

**E-mail address:** loweflag@aol.com

**4. PROJECT PERIOD:**

- 0 - 2 Years (Preferred)
- Greater than 2 Years (Explain in "Scope of Work", Part II "Method of Approach")

**5. WRAS and/or TMDL** (See page 14 for additional information about WRASs & TMDLs)

WRAS  Has Been Completed  In Development

TMDL  Has Been Completed  In Development

Other Watershed Plans? (Describe in "Scope of Work", Part I "Expected Outcomes")

**6. Funds Requested:** \$55,700 \_\_\_\_\_  
**Matching Funds:** \$37,560 \_\_\_\_\_  
**Total Project Cost:** \$93,260 \_\_\_\_\_

**7. Hydrologic Unit Code** 15060202

(See Location Map Information, page 24)

**8. Are you or your organization currently debarred, suspended or otherwise lawfully prohibited from any public procurement activity?** Yes  No

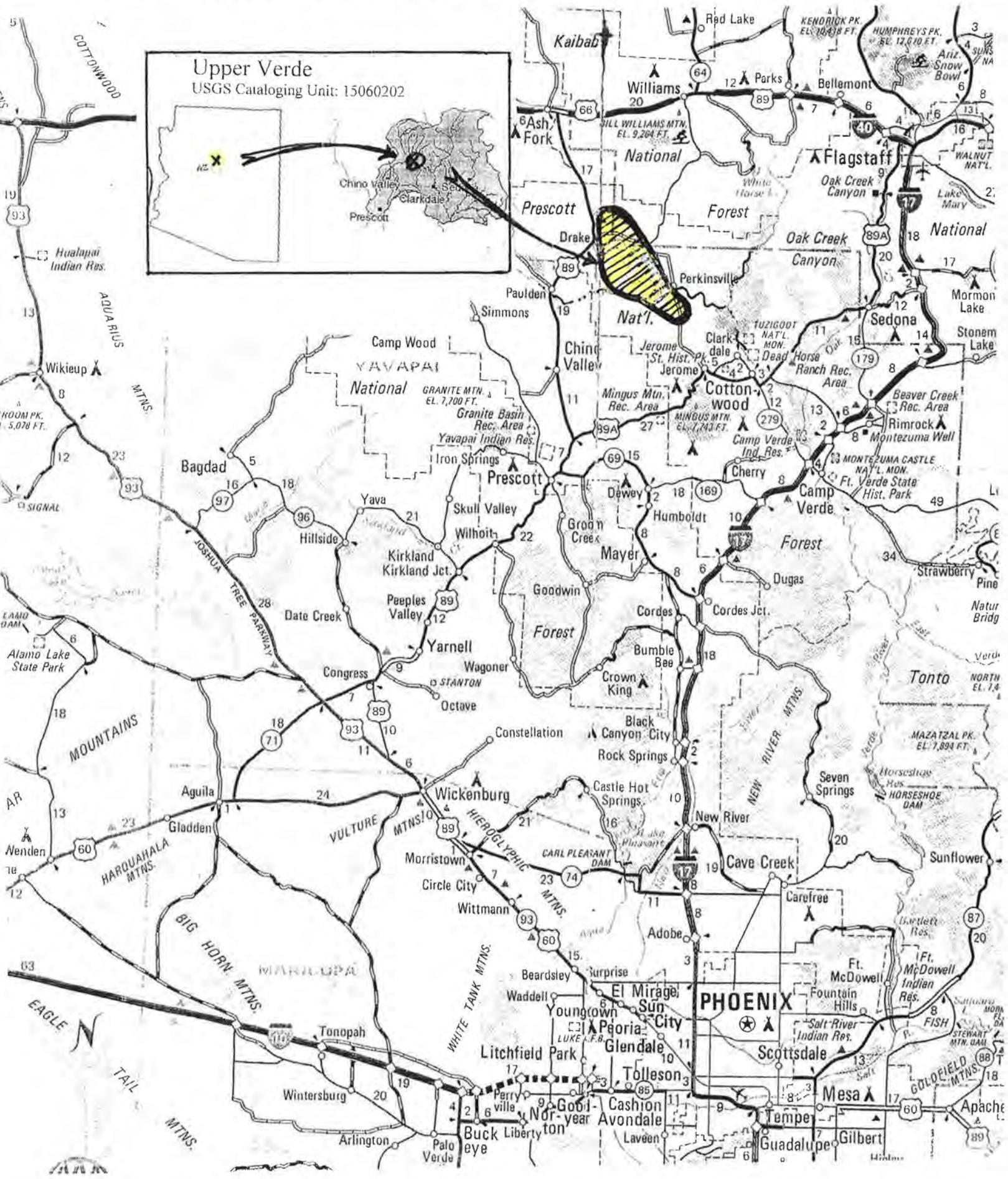
The undersigned hereby offers and agrees to perform in compliance with all terms, conditions, specifications and scope in this application. Signature certifies understanding and compliance with the application attached hereto. ADEQ may approve grant award with modifications to scope, methodology, schedule, final projects and or budget.

Authorized Signature  Date Nov. 27, 2001

Print Name and Title Norman Lowe, Exec. Officer Company/Agency EcoResults! Inc.

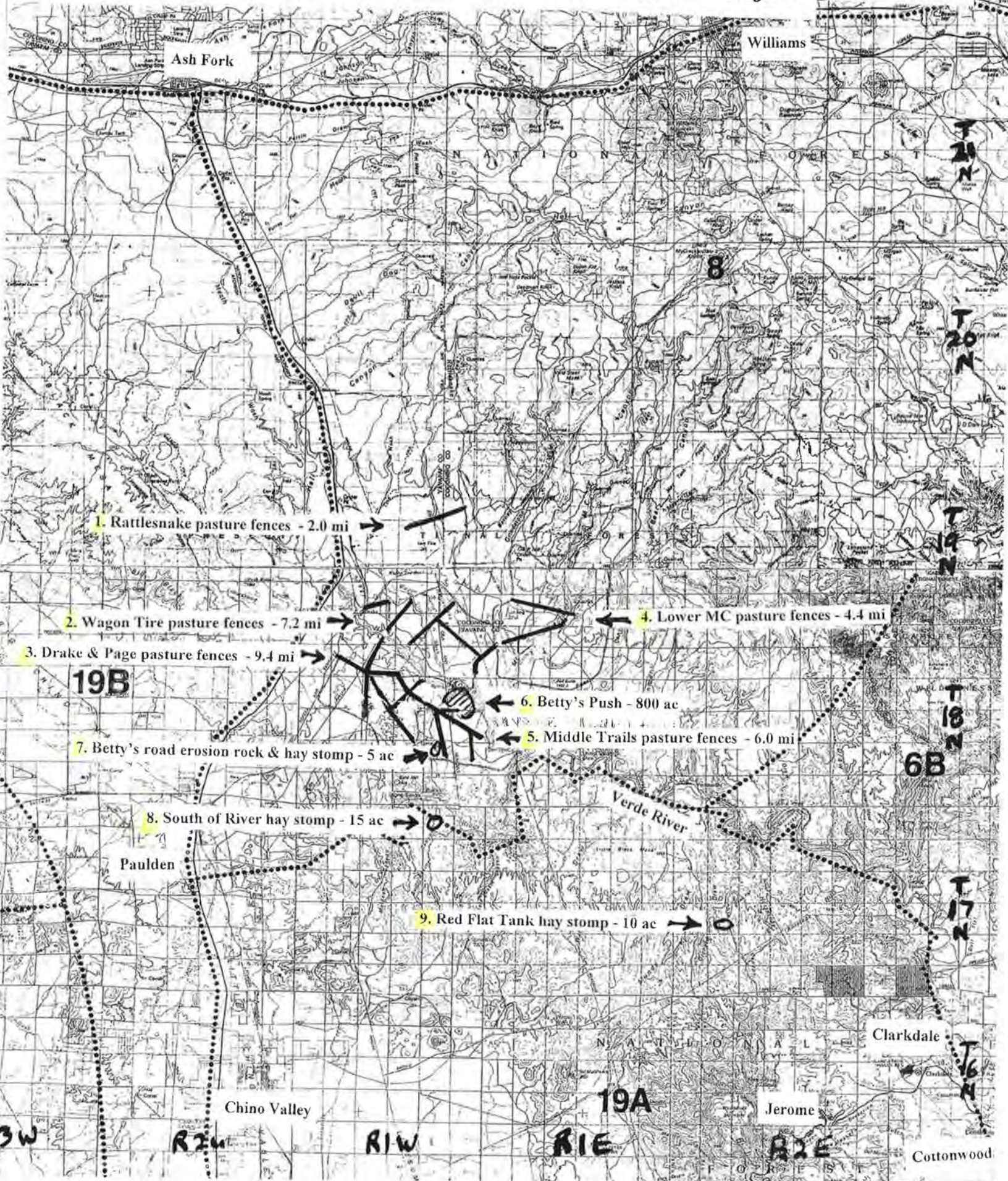
The Grant Application Form must be signed by the individual legally authorized to act on behalf of the Applicant in conducting all official business relating to the project. Signing this form and submitting a Grant Application Package certifies that the Applicant has authority to enter into the agreement, accept funding and fulfill the terms of the proposed project if approved. Applicant is required to read the Grant Agreement referenced here and included in Section IV.

# Upper Verde Collaborative Watershed Restoration Project



# Upper Verde Collaborative Watershed Restoration Project

Location Map  
2 of 2



## **WATER QUALITY IMPROVEMENT GRANT APPLICATION**

**Deadline: November 28, 2001**

**To: Susan Ward, Grant Coordinator  
3033 North Central Avenue, M0248D  
Phoenix, Arizona 85012-208**

**From: EcoResults!  
117 N. San Francisco St. Suite 107  
Flagstaff AZ 86001**

### **Project Title**

**Upper Verde Collaborative Watershed Restoration Project**

### **Scope of Work**

#### **Part I. Expected Outcomes and Anticipated Reduction of Pollution**

This grant will help fund local level creative approaches to improve watersheds while building partnerships with federal, state, and local entities. This project will reduce sedimentation in the Upper Verde River, which is the main water pollution problem of the Verde River and downstream reservoirs. The proposed project work is wholly on U.S. Forest Service administered lands. Analysis of the watershed by Forest Service personnel has documented that most increase in water body turbidity has come from the increase in bare ground associated with juniper trees gradually replacing grasslands. Soil erosion induced by the many roads crossing the rangelands also adds to sedimentation. The Upper Verde River Adaptive Management Partnership (UVRAMP) was formed three years ago, through signed Memorandum of Understanding among the Forest Service, Rocky Mountain Experimental Station, and four ranches, to focus on improving resource conservation practices on the Upper Verde River watershed between Paulden, AZ and Clarkdale, AZ. . From two field days in the past month with the Forest Service, UVRAMP team and EcoResults! staff, it is evident that most all the soil erosion on the area is not associated with current grazing practices, but is due to trends started from historic overgrazing and other land uses. It is also evident that removal of livestock grazing will not reverse the trends in sedimentation, as is evidenced by continued juniper invasion, grass cover loss, and gully cutting in areas that have had no livestock on them for several decades.

There is a lack of knowledge of how to effectively restore lands in this area of Arizona as most all past restoration attempts have ended in failure. In recent years many progressive ranchers across the West have been showing how livestock can be used as an effective tool to increase vegetative ground cover and decrease watershed sedimentation. EcoResults!, a non-profit corporation now

working with many ranchers to quickly restore watershed conditions, is initiating this grant proposal to document the best methods for watershed restoration in north-central Arizona. The Rio Verde and Bar Heart Ranches participating in this project currently focus on time controlled grazing to bunch cattle, as a Best Management Practice, on small pastures to get even distribution of grazing and then rotate pastures to provide long periods of rest for full vegetative regrowth. This time controlled grazing improves ground cover as minerals are cycled more quickly, with about 90% of the grazed organic matter being returned to the soil as fertilizer. The short duration hoof impact of the livestock breaks the soil surface capping to improve plant germination and provide for more effective water and mineral cycling.

A key outcome of this project will be increased vegetative ground cover from improved grazing practices on 21,000 acres of land through increasing the number of pastures on the Del Rio and Heart ranches by about 50%. This will allow better distribution of grazing on each pasture, shorter grazing periods, and longer rest periods to assure full regrowth of forage before being regrazed, even during periods of drought. Experience has shown that this intensity of management will greatly increase grass cover within a few years, resulting in reduced stream sedimentation from runoff events. Improved conditions will be measured by reading monitoring transects on key pastures to note changes in ground cover and species diversity.

A second outcome of this project will be to achieve the maintenance of 800 acres of grassland in the Middle Trails pasture which was developed as grassland by a juniper push about 20 years ago. Many hundreds of small juniper trees will be eliminated so that grasslands and open space will be preserved to benefit livestock and wildlife, and reduce soil loss. Improved conditions will be measured by reading monitoring transects.

A third outcome of this project will be the restoration of grassland on about 2,000 feet of road (5 acre area) in the Middle Trails pasture which has gullied out with incised banks one to five feet deep. Improved conditions will be measured by photo points and reading monitoring transects.

A fourth outcome of this project will be the establishment of grass cover on 25 acres of eroding soils where there currently is no grass cover. Improved conditions will be measured by photo points, reading monitoring transects and doing soil sample analysis.

A fifth outcome of this project will be the scientific study and documentation of the current degraded conditions, innovative methods used to restore land function, and the results of treatment at the end of two years. Public outreach through education workshops will have been conducted to educate many area ranchers, agency personnel and several dozen people from the Prescott and Chino Valley areas on the benefits methods used with this project. The published findings will be used by EcoResults! and UVRAMP to boost the effectiveness of the UVRAMP group, add more participating ranches and agency people to UVRAMP, and involve environmental groups and citizens in future effective watershed stewardship.

## **Part II. Method of Approach**

A key method of approach for this project to achieve effective land restoration is the use of a collaborative process. It is essential that a collaborative team be involved in this project because of the many stakeholders controlling this watershed area. The UVRAMP team has been focal in the development of this proposal and will remain active throughout project implementation. This project is being administered by EcoResults!, in consultation with Quivira Coalition, to assure a balanced approach is used with good scientific procedure.

The method to be used to improve ground cover and mineral cycling on 21,000 acres of the Del Rio and Heart Ranches will be to create twelve new pastures (map items numbers 1, 2, 3, 4, 5) to better concentrate cattle and control timing of grazing. Twenty-nine miles of electric fence will be installed using mostly labor contracted by the rancher. Two water lots will be fenced; one where new fences come together at Page Well on the Drake and Page pastures, and one where fences come together at Betty's Tank on Middle Trails pasture. After completion of fencing, the rancher and Forest Service will modify the Annual Operating Plan to shorten grazing periods and lengthen rest periods. Archaeological clearance was obtained on all but two miles of this fence, with an agreement with the Arizona State Historical Preservation Office (SHPO) to avoid the two cultural sites found. Fencing maps and clearance documentation are attached. Because of their policy of confidentiality, the Prescott National Forest did not authorize issuance of a copy of the full clearance report, however, SHPO has copies of the reports at their Phoenix office. Two miles of fencing in the Rattlesnake pasture will be surveyed for cultural clearance during the first year of the project.

The method to be used to maintain eight hundred acres of grassland in the Middle Trails pasture, enhanced by a juniper push about 20 years ago, will be the rancher eliminating many hundreds of small juniper trees, one to 15 feet tall, that have sprouted since initial treatment (map item 6). The rancher will rent a hydro-axe machine and use personal chain saws to cut new trees at their bases to lay them over. The Forest Service's District Ranger has determined this work to be normal rancher maintenance of a past project with no cultural clearance required.

The method to be used to restore about 2,000 feet (5 acres of area) of roadbed to grassland in the Middle Trails pasture (map item 7), which has gullied out with incised banks one to five feet deep, will be the ranchers and volunteers using rock riffles and cattle hay stomping. About 20 cubic yards of rock will be used to build riffles by stacking low rows of rock in strategic locations. Rocky Mountain Experimental Station staff will direct project design. Hay, seed, and cattle stomping will then be used to round over the cut banks and establish grass. Native seed mix approved by the Forest Service will be spread over the site at ten pounds per acre. Blue grama, galleta and stipa will be key grass species seeded. A bacterial inoculant will be mixed, using a base of soil from a healthy grassland site on the ranch, and sprayed over the treatment area. Two tons of hay per acre will be spread over the site. Two hundred head of cattle will be herded on the site for two days. Cattle will eat about half of the hay (with about 90% returned to the soil as manure) and half will be stomped into the soil surface. The Forest Service's District Ranger has

determined this work to be normal rancher maintenance of existing roads with no cultural clearance required.

The method to be used to stabilize twenty-five acres of eroding soils (juniper barrens) will be the hay stomp method described above. On the October 2001 UVRAMP tours with the Forest Service and Rocky Mountain Experiment Station, large areas of the ranches were noted to no longer have grass plants on them where juniper trees have invaded. Many of the areas are rarely grazed. It is apparent that soil micro-biology has changed to favor woody species. Based on the experience of Tony Tipton in juniper areas of central Nevada, grass can be successfully reintroduced on such areas by using seed, bacterial inoculant, and hay stomping. The Tiptons will be consulted in the design and implementation of the hay stomp method used here. One grass plant established per square foot within two years will be the measure of success, and Best Management Practices of time controlled grazing will be used to retain and expand the area of increased ground cover. The success of the New Mexico based Quivira Coalition (who have implemented several EPA 319 grants) and their New Ranch program will also be considered in project implementation. The Quivira Coalition will be hired to conduct at least two workshops on grazing and land restoration techniques. Fifteen acres will be treated with hay stomping south of the Verde River (map item 8), where there is currently no grass cover (see photo). Ten acres of eroding soil will be treated on Dr. George Yard's neighboring ranch on the Red Flat Tank drainage (map item 9) where the approximately 560 acre watershed has a deeply cut gully though the length of the bottom meadow area (see photo). The ten acre seed and hay stomp that is part of the present proposal will not attempt to heal the deep gully but rather to demonstrate the effect of cattle on healing small side rills and gullies up to three feet deep and in stabilizing soils by covering them with grass plants. The large gully will be studied for a future intensive erosion control project to be designed by the Forest Service Rocky Mountain Experimental Station. The Forest Service's District Ranger has determined the currently proposed total of 25 acres of hay stomp to be normal rancher maintenance of forage and soils on permitted grazing areas, with no cultural clearance required.

Methods used for obtaining scientific documentation of watershed conditions and project effects will be study methods currently used by federal agencies. Al Medina, Watershed Restoration Specialist with the Forest Service Rocky Mountain Experimental Station in Flagstaff is part of the UVRAMP team and has agreed to check methods used and to conduct water quality studies on the Verde River and key side watersheds as a part of this project. Soil samples will be taken by EcoResults! before and after treatment on all sites for thorough laboratory analysis of organic matter and microbial content. Photos will be taken at established photo points to supplement a full write-up of project progress a year following treatment. Education workshops will be conducted to educate several dozen people from the Prescott and Chino Valley areas of the benefits of this project. The published findings will be used by EcoResults! and UVRAMP to involve other ranchers, agency staff, and citizens in future effective watershed stewardship.

**Part III - Schedule of Project Milestones**

Milestones	Deliverables	Completin	Cost
Task #1: Execute contract with ADEQ	Signed contract	03/02	\$0
Task #2: Obtain permits, authorizations, clearnaces for work in action plan.	Permit documentation	05/02	\$500
Task #3: Tiptons brought in to consult on implementation of hay stomp areas.	Finished plan including consultant input	05/01	\$1,000
Task #4: Education workshop on methods conducted by Quivira Coalition	Workshop summary notes (20+ people attend)	05/02	\$1,500
Task #5: Submit quarterly report to ADEQ project manager	1st quarterly report	06/02	\$250
Task #6: Conduct pre-treatment monitoring, including FS Rocky Mtn Res Stn and soil testing.	Study data forms and photos	06/02	\$2,000
Task #7: Purchase hay and seed for 30 acres of treatment	Invoice for 60 tons of hay, 300 pounds of seed	06/02	\$11,400
Task #8: Rock riffles installed in 2,000 ft. of eroded roadway with design assistance by FS Rocky Mtn Exp Stn consultation on road restoration	Reporting of work done	06/02	\$1,200
Task #9: Do seed & hay stomp eroded road area, south of river, and Red FlatTank	Reporting & photos on 30 acres of bare land treated with seed and hay	07/03	\$13,060
Task #10: Submit quarterly report to ADEQ project manager	2nd quarterly report	09/02	\$250
Task #11: Obtain archaeological clearance on 2 miles of fence in Rattlesnake pasture.	FS and SHPO clearance record	10/02	\$0
Task #12: Rancher cuts new trees on 800 acre Betty's Push	Reporting and photos Machine rental invoice	11/02	\$4,200
Task #13: Construct 29 miles of electric fencing	Invoices for materials and labor	12/02	\$49,000



Task #14 Do 1st year post treatment soil monitoring.	Study data forms, photos and assessment report	12/02	\$2,000
Task #15: Submit quarterly report to ADEQ project manager	3rd quarterly report	12/02	\$250
Task #16: Submit quarterly report to ADEQ project manager	4th quarterly report on observations	03/03	\$250
Task #17: Submit quarterly report to ADEQ project manager	5th quarterly report on observations	06/03	\$250
Task #19: Submit quarterly report to ADEQ project manager	6th quarterly report on observations	09/03	\$250
Task #20: Do 2nd year post treatment soil monitoring and range study reading.	Study sheets, photos and assessment summary	11/03	\$1,500
Task #21: Education workshop on monitoring & project assessment conducted by Quivira Coalition	Workshop summary notes (30+ people attend workshop on land)	11/03	\$1,500
Task #22: Write and publish brochure on project treatments & disseminate it	Copies of published brochure	12/03	\$1,000
Task #23: Project completed by Jan. 31, 2004. Submit final report to ADEQ project manager	Final (7th) report Project published on Ecoresults.org website	1/04	\$250

## Part V - Key Personnel

### 1. Personnel receiving pay from these grant funds:

Norm Lowe is Project Manager. Norm is the Executive Officer and co-founder of EcoResults!, Inc.[Federal Tax ID# 86-1008738]. Norm received a BS in Range Management from the University of Arizona in 1978 and is a Certified Professional in Range Management with the Society of Range Management. He has worked as a Range Conservationist for the Forest Service, Bureau of Land Management, Bureau of Indian Affairs, and as Range Program Supervisor for the Office of Navajo and Hopi Indian Relocation for 12 years before retiring in 2001.

Dan Dagget is the primary writer and workshop coordinator for the educational outreach portion of this project. Dan is an environmental writer and co-founder of EcoResults!

Gail Lowe is the project accountant. Gail has her own CPA practice in Flagstaff and is one of the Directors of EcoResults!, Inc.

Courtney White is responsible for coordination of Quivira Coalition involvement in the project. Courtney lives in Santa Fe, New Mexico and is the Director of the Quivira Coalition. He will arrange project workshops to include presenters who have done effective grazing management and watershed restoration work in New Mexico.

Key participants not receiving any pay from these grant funds:

Dave Gipe is the rancher primarily responsible for directing project work on the Del Rio and Bar Heart ranches. Dave is a progressive manager and has run these ranches for over 15 years from his headquarters on the north bank of the Verde River. He is the current chairman of UVRAMP. His son-in-law Don Verner will assist in directing the restoration work.

Anne Verner is responsible for educational outreach to the local community. Anne lives on the Bar Heart Ranch and has already conducted many field days on the ranch with over 200 local school students and with environmental groups. She will involve students with the current project as volunteers and observers, and host the proposed training workshops.

George Yard is the rancher responsible for directing project work on the 10 acre Red Tank Flat portion of the project. Dr. Yard is a progressive rancher and has run his ranch for about ten years.

Al Medina is the primary person responsible for watershed restoration project design and conducting watershed sedimentation analysis studies. Dr. Medina works for the Forest Service Rocky Mountain Experimentation Station, located in Flagstaff on the NAU campus, as a watershed rehabilitation specialist.

Mark Johnson is responsible for Forest Service coordination of project elements. Mr. Johnson is the District Ranger for the Chino Valley Ranger District of the Prescott National Forest and has been active in the formation of the UVRAMP team. He will coordinate with Forest Service staff to assure archaeological, wildlife, watershed, recreation, and range concerns are integrated into project implementation.

## Project Pricing Schedule

PROJECT PRICING SCHEDULE	Funds Requested	Matching Funds**		Requested + Match
	ADEQ	Applicant Match	Donated Match	TOTAL
<b>ADMINISTRATIVE COSTS</b>				
Administration, bookkeeping, office space, phone use, travel	\$5,000	0	0	\$5,000
<b>DIRECT COSTS</b>				
Feed truck & fuel @ \$50/dy x 10dys	0	0	\$500	\$500
Water truck - 3000gal@\$12/dy x 10dys	\$600	0	\$600	\$1,200
Water tank & trough @\$20/dy x 10dys	0	0	\$200	\$200
Chain saws @45/hr x 40hrs	0	0	\$200	\$200
Hydro-axe rental @\$100/dy x 20dys	\$2,000	0	0	\$2,000
Cattle depreciation- 200head @\$50ea*	0	0	\$10,000	\$10,000
60 tons weed & chemical free hay @\$130/non	\$7,800	0	0	\$7,800
Native seed mix @\$120/ac x 30ac	\$3,600	0	0	\$3,600
Bacterial innoculant ingredient mix	\$200	0	0	\$200
12 inch rock for road rehab. 20cu.yd	\$600	0	0	\$600
Electric fence material-29mi@\$600/mi	\$10,440	0	\$6,960	\$17,400
Fence material for 2 water lots	\$2,100	0	\$1,400	\$3,500
Monitoring- 10 sites, 3 replicate soil & veg. studies, weather & water quality measure @ave. \$700/site (excludes agency time)	\$4,000	\$1,500	\$1,500	\$7,000
Education presentations & materials. Quivira Coalition workshops	\$2,500	\$250	\$250	\$3,000

<b>PERSONNEL</b>				
Feeding hay- 2men x 4hr x10d x \$12/hr	0	0	\$960	\$960
Cutting juniper regrowth- 1man x 20d @ \$100/d	0	0	\$2,000	\$2,000
Installing 29 miles fencing	\$15,660	0	\$10,440	\$26,100
Installing fencing on 2 water lots	\$1,200	0	\$800	\$2,000
<b>TOTALS</b>	\$55,700	\$1,750	\$35,810	\$93,260
Percentages	59.7%		40.3%	100%

\* Depreciation of cattle used as a treatment tool [as allowed under other grants EcoResults! has worked with - ie. NFWF grant in Nevada].

\*\* See two attached letters committing items in these columns: one from UVRAMP for \$35,800 and one from EcoResults! for \$1,750 for a total of \$37,560 or 40.3% cost match.

**EcoResults! Institute**  
**114 N. San Francisco St. Suite 204**  
**Flagstaff, AZ 86001**  
**(928) 527-0661**

August 20, 2005

Rebecca Followill  
Water Quality Improvement Grant Unit  
Arizona Department of Environmental Quality  
1110 W. Washington St.  
Phoenix, AZ 85007

## **FINAL REPORT**

Upper Verde Collaborative Watershed Restoration Project - #4-012, Grant ID# EV02-0047  
Grant period – March 2002 through June 2005

### **SUMMARY OF PROJECT GOALS AND OBJECTIVES**

The overarching goal of this project was to reduce sedimentation/non-point pollution, the main pollution problem in the Verde River and its downstream reservoirs. This project was designed to incorporate a number of innovative techniques so area land management stakeholders could learn first hand about the effectiveness of several state-of-the-art techniques. The project was designed by EcoResults Institute; the Upper Verde River Adaptive Management Partnership (UVRAMP) comprised of ranchers, local citizens and agency personnel in the area; and the Quivira Coalition, a not-for-profit environmental group based in Sante Fe, New Mexico.

Following is a summary of the objectives of the six innovative restoration techniques used on the Rio Verde, Bar Heart, and Y Bar D ranches in the upper Verde River watershed:

#### **1. COLLABORATION**

To note the effectiveness of UVRAMP as a collaborative group of stakeholders in effecting enhanced watershed conditions and sustained management. Bi-annual UVRAMP group meetings, special workshops, land tours and network discussions should provide a means for diverse stakeholders to (Forest Service, AZ Game and Fish, area ranchers, schools, interested publics) to observe, learn, plan, monitor and manage for the comprehensive health of the land.

#### **2. EDUCATIONAL PRESENTATIONS**

To enhance watershed restoration and management through holding workshops to include stakeholders and area residents and to be led by leading experts in land restoration and management.

#### **3. CREATING ADDITIONAL PASTURES AND WATER LOTS**

To increase vegetative health and ground cover on the 72,000 acre Rio Verde and Bar Heart Ranches by creating 12 new pastures and two water lots. This is to provide for improved forage utilization patterns and longer recovery periods for plants which will effect greater ground cover and improved soil stability.

#### 4. SEEDING AND HAY STOMP REVEGETATION

To test the effectiveness of using cattle as a tool to plant seeds and incorporate mulch and fertilizer into the soil to reestablish grass cover on 25 acres of test plots on eroding soils on the Rio Verde and Y Bar D ranches.

#### 5. ROCK RIFFLE AND HAY STOMP GULLY HEALING

To restore ecosystem function to a desertified meadow by healing about 2,000 feet of road that has severely eroded creating a gully that lowered the water table on a meadow on the Rio Verde Ranch.

#### 6. REMOVAL OF REINVADING JUNIPER

To restore open grassland conditions to an 800 acre area known as Betty's Push where juniper trees were re-invading after tree removal about 20 years ago. This will increase grass cover from reduced competition with re-invading juniper.

- All meetings and on-the-ground project work was completed by June 30, 2005. The production of a summary brochure to distribute to stakeholders has taken some additional time. The *attached* Brochure provides a summary of this project goals and accomplishments.

NOTE: At the request of both ADEQ and the ranches, we submit this brochure for review before final copies are printed and distributed to participants and the public. This is to assure all facts are correct and best presented so that the UVRAMP team can use the brochure in taking further steps to implement lessons learned in their continuing efforts at watershed improvement.

### PROJECT RESULTS

All items of the project proposal were implemented. Project work began in the spring of 2002 and was to be completed by the end of 2004. A six month extension to June 30, 2005 was granted to accommodate a request by the ranchers who needed more time to build the 29 miles of pasture fencing during a time of severe drought that reduced their livestock and capital resources.

#### 1. COLLABORATION

Several planning meetings and tours with UVRAMP were held in preparation for this grant and UVRAMP held strategic team meetings every fall and spring for the three years of the project. Members actively participated in helping with the hay stomp treatments and rock riffle building.

#### 2. EDUCATIONAL PRESENTATIONS

- EcoResults Executive Officer Norm Lowe gave a presentation at Heritage Middle School in Chino Valley in the spring of 2002 showing slides of restoration projects and explaining this ADEQ project. Some teachers and students had been involved in past UVRAMP field tours, and this updated them on progress.
- May 18, 2002 workshop at Rio Verde Ranch – Writer Dan Dagget gave a slide show presentation on “Restoring the West”; Writer Nathan Sayer of the Quivira Coalition discussed his new book “The New Ranch”; Researcher Dr. Al Medina of the USFS Rocky Mountain Research Station explained riparian

ecosystems and conducted a walk on the Verde River. Bryan Gangwich of ADEQ attended the six-hour workshop.

- June 6, 2003 Rangeland consultant Kirk Gazia of the Quivira Coalition hosted a day-long workshop with members of UVRAM at the Drake Exclosure to discuss principles of rangeland health.

- June 14, 2005 a public education workshop was held at the Rio Verde headquarters where Norm Lowe explained final monitoring results from this project; Dan Dagget shared restoration stories from his new book "Gardeners of Eden"; Courtney White, director of the Quivira Coalition, spoke about land restoration efforts in New Mexico (and offered grant assistance) and; Dr. Al Medina hosted a tour of the meadow restoration site and reviewed changes on the river bottom areas of the Verde River.

### 3. CREATING ADDITIONAL PASTURES AND WATER LOTS

All 29 miles of pasture fence the two water lots programmed in the project were installed by members of the Rio Verde and Bar Heart ranches.

- Final archeological clearance was received in December 2002 and work commenced with the building of two corrals around waters to serve as watering points for multiple pastures. A total of 13 pastures were created instead of the planned 12 pastures. Refer to *Attachment A* for an "As-built" map of fencing.

- Fencing of these water lots and pastures accounted for 53% of the project and, compared to the other parts of this project, will by far return the greatest benefit in the long term.

- This fencing has increased the number of ranch pastures by about 30% on the 72,000 acre Rio Verde and Bar Heart Ranches. This additional flexibility meant that the Bar Heart Ranch was totally rested from grazing for most of the past year (which was very dry), because all cattle could graze with short duration stays on the Rio Verde ranch. Also forage is now being more evenly grazed over the ranches as the new pastures change accessibility to water.

### 4. SEEDING AND HAY STOMP REVEGETATION

A total of 25 acres of poor condition rangeland were treated at #1 a 15 acre site a mile south of Rio Verde Ranch headquarters, #2 a 5 acre site two miles north of Rio Verde Ranch headquarters at the Middle Trails gully healing site, and #3 a 5 acre site four miles north of the Y BarD ranch headquarters at Perkinsville, Arizona.

- Rancher/consultant Jerry Tipton from Mina, Nevada assisted in the project design and helped direct work in the field. Jerry and her Husband Tony have done many well documented successful hay stomp projects on mines and rangelands in Nevada.

- 298 pounds of a seed mix approved by the Forest Service were broadcast on the sites prior to the time hay was put down for treatment. The seed mix consisted of: western wheatgrass, Indian ricegrass, squirrel tail, sand dropseed, green needlegrass, sideoats grama, blue grama, fourwing saltbrush, winterfat, Mexican cliffrose, alfalfa, and sainfoin.

- Hay stomp treatment involved dropping hay bales at about 33 foot intervals and then breaking them apart by hand to spread flakes evenly over the area at two tons per acre.

- Monitoring studies: two transects were installed at site #1, one at site #2 and one at site #3. At each study site a 3 ft X 3ft photo plot was installed, photos taken and a detailed sketch made of plants. At

each site three 170 foot tape lines were permanently staked and read with a 40cm X 40cm frame at every five foot mark. At each site the Forest Service pace-frequency method was read. Five separate readings of all studies were done: May 23, 2002 (before treatments), May 30, 2003, October 15, 2003, June 2, 2004, and June 5, 2005.

- A total of 198 pages of data/photos/summary were created during this project. See *ATTACHEMENT B* for a sample of one site's data taken June 2004, and data summaries of all study sites. Dr. Al Medina assisted in study design and the USFS pace frequency method was also applied. Dr. Medina also did independent studies on the Y Bar D ranch Red Tank Flat study site, as well as river monitoring. Monthly rain gauge data was collected from all ranches for the three year study period. Study results are as follows:

#### SITE #1 (South of River):

- On June 4-9, 2002 ranchers and volunteers spread 30 tons of hay on 15 acres and about 200 head of cattle followed the hay trailer eating and stomping the hay over the two day period.

##### Results:

- The two 3ft X 3ft photo plots show 60% and 90% loss of grasses. There was no change in ground cover and litter cover increased about 50% (11% before to 19% 3 years after), mainly due to heavy annual plant growth in early 2005. The average distance to plants improved 22% (14% before to 11% 3 years after). Plant density improved, doubling from 0.7 to 1.5 plants per square foot. Grass frequency was much lower at the end of the study. The total impact of the site the first year had the effect of refreshing growth on all plants to give them normal form and a younger age mix.

#### SITE #2 (Middle Trails meadow):

- On June 4, 2002 Rock work was done by ranchers and volunteers on 5 acres. On June 11-13<sup>th</sup> hay was spread and about 200 head of cattle graze/impacted the area.

##### Results:

- The 3ft X 3ft photo plot shows a loss of 60% of perennial plants. Ground cover and litter cover doubled (26% before to 59% 3 years after), mainly due to heavy annual plant growth in early 2005. Average distance to plants stayed essentially the same. Plant size increased 7%. Grass frequency stayed the same. Plant density decreased by 13%. There is now a younger age mix of plants.

#### SITE #3 (Red Tank Flat):

- On June 27-30, 2002 ranchers and volunteers spread 10 tons of hay on 5 acres and 134 head of cattle grazed/impacted the area. Under the direction of Dr. Medina some rock riffle dams were installed in gullies on a third of the area before the hay stomp treatment.

##### Results:

- The 3ft X 3ft photo plot shows a loss of all 61 perennial grass plants. The average distance to plants is 42% greater (from 5.7 inches to 9.8 inches 3 years after). Shrubs and weeds are noticeably larger. There is a much lower frequency of grass – much of the blue grama and sideoats grama was lost. There is now a younger age mix.

#### ● MEANING OF MONITORING DATA

- According to the ranchers, the June 2002 hay stomps were conducted during a harsh drought (only 0.55 inches of precipitation fell over the previous six months) and this was the worst timing for treatment that rancher Dave Gipe has seen in his 22 years on the Rio Verde Ranch!

- Because of the drought, the cattle were so hungry they ate most of the hay, not leaving the planned for 50% residual for mulch, which would aid germination.

- At the Red Tank site three inches of rain fell in a cloudburst 6 weeks after treatment, washing away most of the seeds and mulch.



- The ground was so hard at the sites that the cattle hooves did not disturb the surface to the depth expected, so most seeds and much easily blew or washed away.
- Several professions at the final UVRAMP workshop mentioned that seedings almost never succeed in this area and it can take up to 7 years to get results.

## 5. ROCK RIFFLE AND HAY STOMP GULLY HEALING

Over 1,000 feet of road that had severely eroded out creating a gully was treated by installing rock riffle dams.

- On June 4, 2002 a dump truck load of 6 inch rock was delivered to the Middle Trails pasture “road eraser” site. Dr. Al Medina directed a backhoe and a dozen volunteers in correct placement of the rock to make about 20 riffle dams (low contoured dams to create water friction and dropping of sediment) in the erosion channel that averaged 4 feet deep. On June 11-13<sup>th</sup> the hay stomp treatment was done on the 5 acres of meadow watershed on both sides of the gully.

### Results

- See Site #2 data above (Item 4.) for hay stomp results.
- The check dams filled up nicely. Another layering of rocks would fill the old road scar (gully) to the top within a couple of years. It is evident from the way the dams are filling that the sediment filling the dams is coming from above the meadow and not from the meadow itself.
- The rock riffle dams are clearly a cost effective method of healing gullies. Installed correctly (tied into soil gravel bars and aligned head to toe) they fill quickly, will not blow out, and can be built up over time to completely fill the gully and restore meadow water table function.

## 6. REMOVAL OF REINVADING JUNIPER

By Forest Service measurement, the Betty’s Push area treatment area is 470 acres in size.

- On July 9, 2003, following a lengthy NEPA clearance process, work began with an Agra-axe tree nipping machine (owned by the Forest Service) on the Betty’s Push site. Most all re-invading trees were cut down and piled or moved off of the site.

### Results:

- Because the ranchers now had the use of the machine they also treated other areas on the west boundary of the Rio Verde Ranch. A total of 880 acres were cleared in 2002 and 1,400 acres in 2003 for a total of 2,280 acres.
- Checks done this spring showed the grass responding very well, removal of the trees providing more water to grasses.
- The ranchers believe that the removal of trees by the Agra-axe is the best and most cost-effective treatment they can do to improve rangeland ground cover, thereby reducing sedimentation to the river system.

## ASPECTS OF THE PROJECT THAT WORKED WELL

- The UVRAMP collaborative group was very effective in getting land owners (private, federal, and state) together to discuss, plan and monitor projects.
- Creating new pastures greatly enhanced the effectiveness of livestock rotation, thereby enabling the ranchers to use the cattle herds as a tool to briefly impact sites to stimulate the vegetation then allowing long periods of rest for full regrowth of plants.

- The rock riffle dams worked very well, and are a low cost and low technology way to quickly fill gullies and agrade local watershed areas.
- The Agra-axe is an economical way to cut invading trees off at ground level and quickly create open areas of grassland that provide forage while stabilizing soils.

### **THINGS THAT DID NOT WORK WELL**

- The hay stomp seeding treatments showed little beneficial effect. It was concluded that 1) when done in this area there should be confidence that climate is not in a dry cycle, and 2) that the soil needs some tilling with a tooth harrow to assure the hard ground is broken, creating needed micro-sites for seed, mulch and manure fertilizer accumulation and moisture capture.

### **PUBLIC INVOLVEMENT AND COORDINATION**

- About 50 people were involved throughout this project. The UVRAMP group includes over 20 people, other ranchers were involved, and interested people from other agencies and the region participated at times. The UVRAMP group provided the public participation coordination.

### **FUTURE ACTIVITY RECOMMENDATIONS FOR THE WATERSHED**

- The UVRAMP collaborative group will continue to meet at least twice per year and take on new land treatment projects.
- The Forest Service needs to continue to work cooperatively with the ranchers in doing more Agra-axe clearing work.
- Work should continue with the Rocky Mountain Forest Research Station on treatments and research to document the most effective treatments for reducing river sedimentation and enhancing T and E species habitat.

EcoResults wishes to thank the ADEQ for funding assistance for this project. Please contact us with any further questions, and please review the attaché brochure and provide us with any edit comments you may have. We plan to copy and distribute the brochure with the help of the UVRAMP team starting in September.

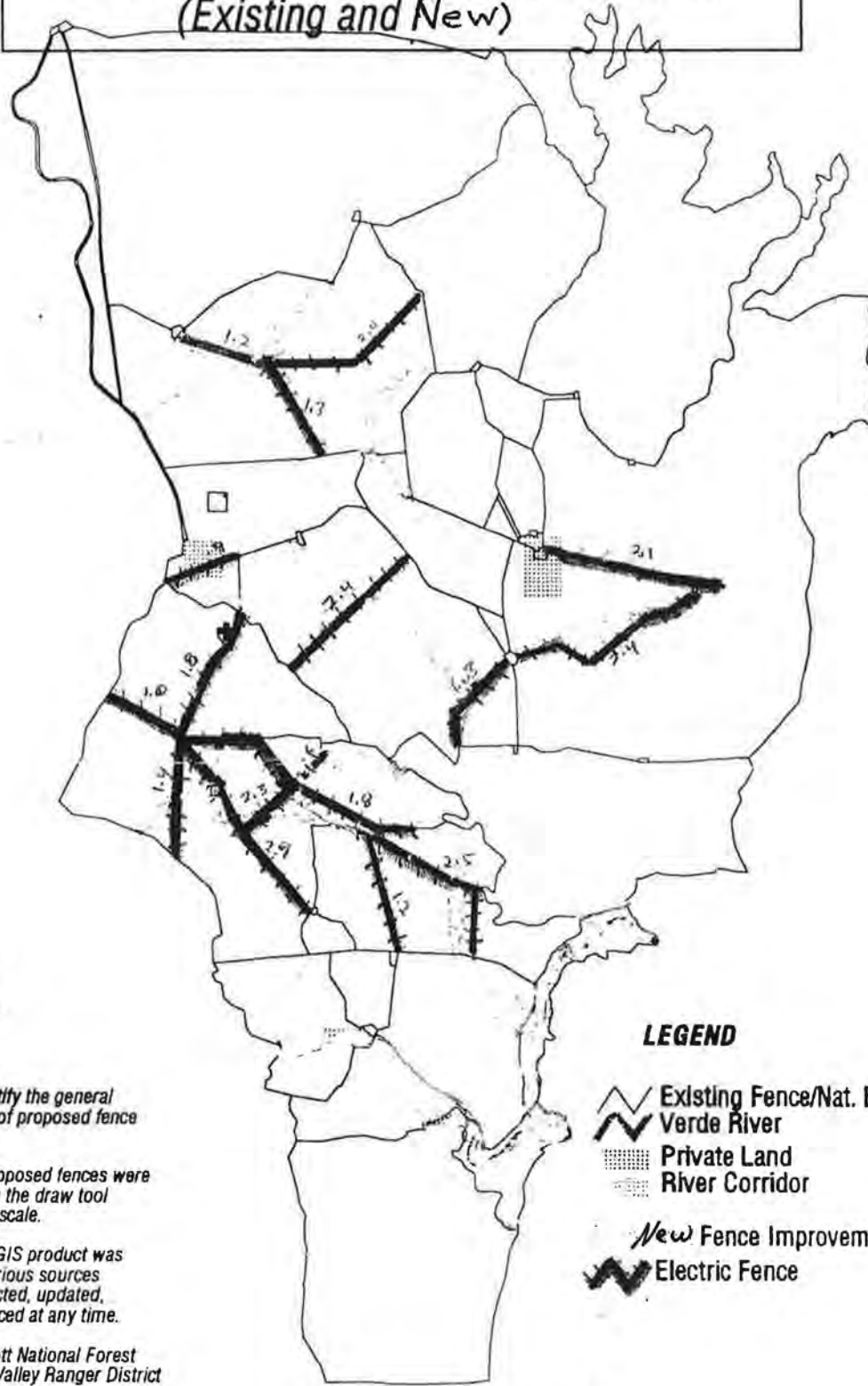
Signed,



Norman Lowe  
Executive Officer

ATTACHMENT A – AS BUILT MAP OF FENCING

**West Bear/Del Rio Fence Improvements  
(Existing and New)**



*Purpose: To identify the general location and type of proposed fence improvements.*

*Data Sources: Proposed fences were hand-drawn using the draw tool for display at this scale.*

*Disclaimer: This GIS product was compiled from various sources and may be corrected, updated, modified, or replaced at any time.*

*Publisher: Prescott National Forest  
Chino Valley Ranger District*

**LEGEND**

-  Existing Fence/Nat. Barrier
-  Verde River
-  Private Land
-  River Corridor
-  *New* Fence Improvements
-  Electric Fence



ATTACHEMENT B - DATA SUMMARIES AND PHOTOS OF MONITORING STUDIES

DATA SUMMARY FOR MONITORING TRANSECT ER-2 : Hay Stomp at Middle Trails

Code	Attribute	Date:	5-23-02	5-22-03	10-15-03	6-2-04	6-4-05
A	Bare Ground - Recent Cap (<1yr)		66 / 79.5	42 / 40.5	55 / 78	68 / 67	34 / 20
B	Bare Ground - Mature Cap		0	0	0	0	0
Q	Bare Ground Sum A + B		66	42	55	68	34
C	Rock greater than 1/4 inch		2	8	6	5	1
D	Litter cover		26 / 19	48 / 40.5	33 / 27	18 / 20	59 / 41
E	Canopy below 8 ft. - anything <sup>Basal</sup>		0	2	13	8	6
H	Distance, Ave of all plants G		10.25	12.7	12.71	9.15	11.48
I	Ave Distance w/o seedlings G-II		10.25	10.8	13.18	9.08	11.20
J	Diameter, Ave of all plants G		1.82	1.16	1.03	1.71	2.07
S	Cover Ratio 1+II		.169	.091	.081	.187	.180
G	% Composition, Nearest X / Freq Y						
	<i>Tolosa</i>		71 / 50 / 20.5	64 / 41 / 54	61 / 44 / 47	49 / 24 / 54.5	48 / 35 / 61.5
	<i>Blue grama</i>		19 / 27 / 5	5 / 2 / 9	3 / 2 / 3	4 / 4 / 11	5 / 6 / 9.5
	<i>Stolonchloa sp.</i>		5 / 3 / 2	2 / 1 / 1	7 / 6 / 0	11 / 9 / 5.5	5 / 9 / 1.5
	<i>Spartina</i>			6 / 6 / 0			
	<i>V. p. missouriensis</i>			5 / 9 / 9.5	6 / 10 / 2	15 / 11 / 2	
	<i>Galium mollis</i>			9 / 4 / 1	4 / 2 / 9	12 / 12 / 12.5	6 / 8 / 7.5
	<i>Snake weed</i>		2 / 2 / 2.5	3 / 1 / 3.5	8 / 3 / 2.5	5 / 5 / 7	4 / 2 / 3.5
	<i>T. juniper</i>		7 / 3.5	4 / 3	5 / 13	4 / 10.5	2 / 1.5
J	Seedling		0	5	5	4	3
K	Young plant		68	37	58	61	22
L	Mature plant		33	51	35	25	75
M	Decadent plant		11	7	1	0	0
N	Overstressed plant		13	0	1	1	0
O	Normal plant form		75	98	99	99	100
P	Overrested plant		10	-	0	0	0
V	Cool season plant total						
W	Warm season plant total						
	Precipitation - past 4months/ 12 months		.55 / 8.89	5.25 / 11.1	5.6 / 14.23	3.95 / 11.15	12.8 / 23.45
	Animal Months Use - past 6 months/ 12mos						
	Numerical rating from Z score above p 1/2		2.18	1.17	1.76	2.31	1.92
	Apparent Trend - Up, Down, Stable			↓		↑	↑

DATA SUMMARY FOR MONITORING TRANSECT ER-3 : Hay Stomp South of River - West

Code	Attribute	Date:	5-29-02	5-30-03	10-14-03	6-2-04	6-4-05
A	Bare Ground - Recent Cap (<1yr)		86 / 23.5	71 / 14.5	78 / 68.5	76 / 72.5	74 / 70.5
B	Bare Ground - Mature Cap		0	0	0	0	0
Q	Bare Ground Sum A + B		86	71	78	76	74
C	Rock greater than 1/4 inch		3	3	3	2	4
D	Litter cover		11 / 18	26 / 26.5	19 / 30	18 / 26.5	19 / 25.5
E	Canopy below 8 ft. - anything <sup>Basal</sup>		0	0	1	4	3
H	Distance, Ave of all plants G		11.74	10.56	9.97	8.69	8.59
I	Ave Distance w/o seedlings G-II		11.74	10.34	10.26	8.73	9.5
J	Diameter, Ave of all plants G		1.96	1.05	.85	1.61	1.28
S	Cover Ratio 1+II		.173	.095	.091	.185	.149
G	% Composition, Nearest X / Freq Y						
	<i>Blue grama</i>		25 / 24 / 3.5	31 / 34 / 6.5	12 / 11 / 7	10 / 9 / 18	3 / 8 / 6.5
	<i>A. sp.</i>		16 / 13 / 7	15 / 23 / 9	33 / 37 / 6.5	26 / 36 / 12	21 / 33 / 12.5
	<i>Trisetum</i>		25 / 16 / 13	5 / 2 / 2	1 / 3 / 7	4 / 2 / 2.5	3 / 2 / 2
	<i>H. p. missouriensis</i>			4 / 9 / 1.5	14 / 22 / 1.5	13 / 13 / 7	9 / 16 / 11.5
	<i>Galium mollis</i>			12 / 9 / 14	9 / 7 / 8.5	14 / 6 / 12	5 / 3 / 6.5
	<i>Snake weed</i>		5 / 9 / 4.5	24 / 23 / 11.5	14 / 18 / 12.5	17 / 23 / 14.5	25 / 41 / 21.5
	<i>T. juniper</i>		2 / 4 / 2.5	2 / 2 / 4.5	4 / 30	4 / 23	4
J	Seedling		0	32	15	1	20
K	Young plant		19	34	53	67	38
L	Mature plant		81	25	30	30	57
M	Decadent plant		6	28	0	2	3
N	Overstressed plant		0	0	2	0	0
O	Normal plant form		100	87	96	100	100
P	Overrested plant		0	0	2	0	3
V	Cool season plant total						
W	Warm season plant total						
	Precipitation - past 4months/ 12 months		.55 / 8.89	5.25 / 11.1	5.6 / 14.23	3.95 / 11.15	12.8 / 23.45
	Animal Months Use - past 6 months/ 12mos						
	Numerical rating from Z score above p 1/2		1.70	1.29	1.16	0.91	1.47
	Apparent Trend - Up, Down, Stable			↑			↑



# PHOTO RECORD

EcoResults! Form M2

Location: Rio Verde Allotment M. edle Trails, Pasture "Road Eraser"

Photo Ref. #:

ER-2

Date/ Hour:

6-2-04

8:30 am

Camera/ Lense setting:

Canon EOS Elan II

f35

Direction of photo:

South 190°

Legal Location:

Map Name:

Subject Description:

General View  
of 1st Transect leg



Photo Ref. #:

ER-2

Date/ Hour:

6-2-04

Camera/ Lense setting:

Direction of photo:

to East

Legal Location:

Map Name:

Subject Description:

General view of  
all 3 transects in  
Meadow area



# PHOTO RECORD

EcoResults! Form M2

Location: Rio Verde Allotment, Middle Trails Pasture "Local Emson"

Photo Ref. #:

ER-2

Date/ Hour:

6-2-04

Camera/ Lense setting:

Canon EOS Fk II  
-35 mm

Direction of photo:

To East

Legal Location:

Map Name:

Subject Description:

Gully to North of road.  
Note it is silting  
in and gully about  
half filled now. Dam  
at center is full.



Photo Ref. #:

ER-2

Date/ Hour:

6-2-04

Camera/ Lense setting:

Direction of photo:

To East

Legal Location:

Map Name:

Subject Description:

General view of  
meadow area from  
road



# PHOTO RECORD

EcoResults! Form M2

Location: Rio Verde Allotment, Middle Trails Pasture "Road Eriase"

Photo Ref. #:

ER-2

Date/ Hour:

6-2-04  
8am

Camera/ Lens setting:

Canon EOS Ebn II  
35mm

Direction of photo:

South 190°

Legal Location:

Map Name:

Subject Description:

Close up of  
3x3' plot

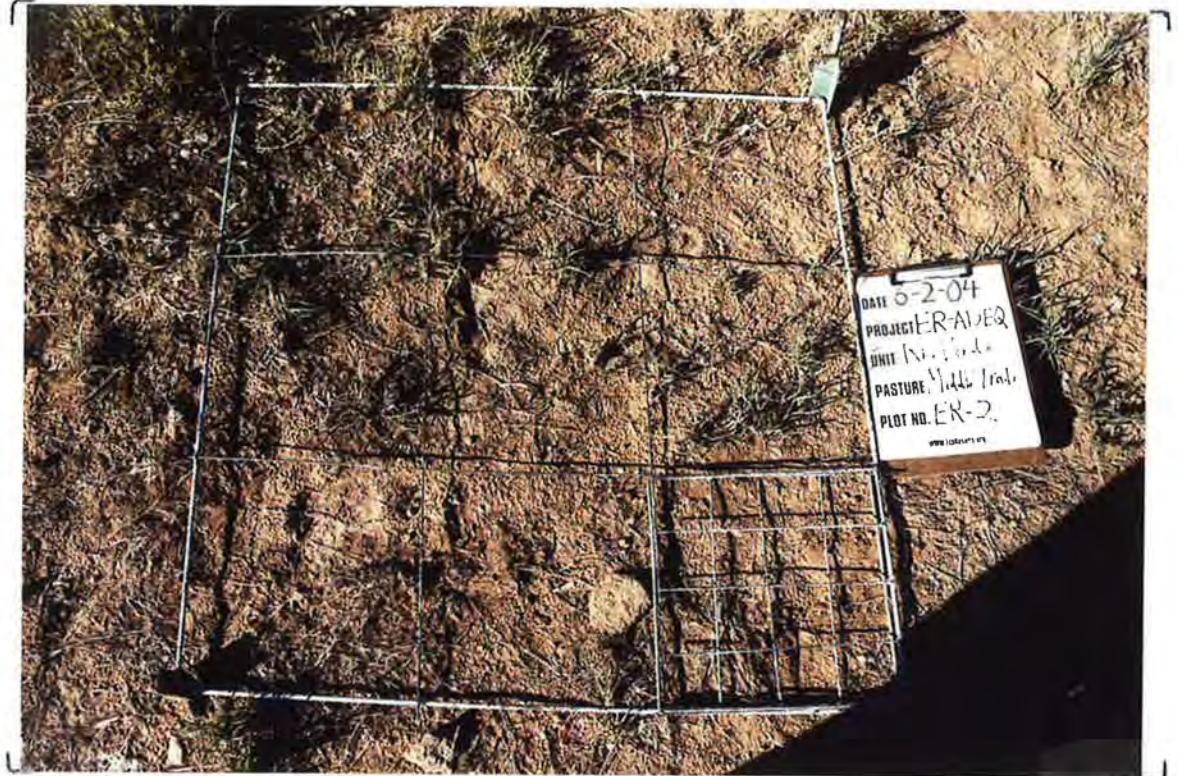


Photo Ref. #:

ER-2

Date/ Hour:

6-2-04

Camera/ Lens setting:

Direction of photo:

to East  
Looking downstream  
Legal Location:

Map Name:

Subject Description:

Photo of rock  
riffle down new  
fall of sediment







MONITORING DATA SHEET

EcoResults! Form M4

Transect # ER 2 Leg# 1 of 3 Start Point: 25' from Top UTM \_\_\_\_\_ E. \_\_\_\_\_ N.  
 Transect Bearing: S 190° Place 40 X 40 cm frame on E side of tape.  
 Date: 6-2-04 Time: 8:15-8:35 Examiner(s): Urban Low

PLOT NUMBER	LOCATION ON TAPE	POINT NOTE	Point Cover		Nearest Live Perennial						Species List - Record Density as No. of plants in each plot by species																	
			Bare with Recent Cap	Bare with Mature Cap	Density	Age	Form	Species																				
			Rock over 0.25" Litter	Basal hit	Canopy under 8'	Specie	Distance (.5")	Diameter (.5")	Seedling	Young	Mature	Decadent	OverStressed	Normal	OverRested	Ta	Ta	Ung. perenn. fr.	Succ. with glans	Trichloris Tr.	Pen. Feb	Glob. M. low	Bristly Lem	Suaresia	McPherson Dogon	Annual		
1	5					T	6.0	1.0								4												
2	10					T	4.0	1.0								15												
3	15					T	4.0	1.5								13												
4	20					T	2.5	1.0								2												
5	25					T	2.5	1.0								8												
6	30					T	5.5	6.5								2	1											
7	35					Gm	12.0	2.0														1						
8	40					Gm	2.0	1.0														1	2					
9	45					T	6.0	2.0																				
10	50					T	0	4.5								3	1											
11	55					Gm	4.0	2.0										2				4						
12	60					Gm	4.0	1.5														7						
13	65					T	13.5	1.0																				
14	70					Gm	2.0	1.5														5						
15	75					T	0	1.0								3	4											
16	80					T	2.5	1.0								3												
17	85					T	9.0	2.0								4						4						
18	90					T	2.0	1.0								4												
19	95					T	14.5	2.0										1										
20	100					T	6.0	1.5								2												
21	105					T	4.0	1.0								5						1						
22	110					T	5.0	1.0								10												
23	115					T	3.0	1.0								10												
24	120					T	2.5	1.0								4												
25	125					T	1.0	1.0								9												
26	130					T	5.5	1.0								7												
27	135					T	2.5	1.0								8												
28	140					Ta	1.5	1.5								4	3											
29	145					T	2.0	2.0								6	2					1						
30	150					S	8.5	3.5																				
31	155					H	2.5	2.0														1	1					
32	160					T	1.5	3.0								2	1											
33	165					Ta	5.0	1.5								6						1						
34	170																											
T1			21	4	2		14.75	55.5	23	0	83				108	13	6	2			3	23	2	1			178:6	
U1							4.47	1.68								22	5	3	1			3	6	2	1			3.1
Frequency (VI)																67	15	9	6			9	18					4.7





Range Frequency Data Form

Allotment - Rio Verde Pasture - Mud Lake TES Unit - \_\_\_\_\_ Date - 6-2-04  
 Plot # - ER-2 Size of plot # - \_\_\_\_\_ Legal Description: T \_\_\_\_\_ N, R \_\_\_\_\_ E, Sec \_\_\_\_\_, \_\_\_\_\_ 1/4 of the \_\_\_\_\_ 1/4  
 GPS File: R \_\_\_\_\_ UTM North \_\_\_\_\_ UTM South \_\_\_\_\_ Photo #'s \_\_\_\_\_

Directions to plot: 1.20° E of all 4 legs towards left of highest Mountain

Frames	Transect 1 <u>3x3/164</u>	Transect 2 <u>45' P<sub>2</sub></u>	Transect 3 <u>110' G</u>	Transect 4 <u>unlabeled</u>	Total	%
Ground Cover Hits	0000000000 0000000000 0000000000 0000000000 0000000000	0000000000 0000000000 0000000000 0000000000 0000000000	0000000000 0000000000 0000000000 0000000000 0000000000	0000000000 0000000000 0000000000 0000000000 0000000000		
Litter <1" eff	☒☒	☒	☒☒	☒☒	57	28.5
Bare Soil	☒☒☒	☒☒☒☒☒☒☒☒	☒☒☒☒☒☒☒☒	☒☒☒☒☒☒☒☒	134	67
Gravel .25-3"						
Rock 3"+						
Litter >1"						
Wood						
Grass basal	::		.	.	5	
Forb basal	.				1	
Tree/shrub						
GRASS						
<u>Tobacco</u>	☒☒☒☒	☒☒☒	☒☒☒	☒☒☒☒	109	54.5
<u>Blackgrass</u>	::	::	.	☒☒	22	11
<u>Sidewalk</u>	::	::	☒	::	11	5.5
<u>Bluegrass</u>	.	::		::	4	2
<u>Sand dune</u>				.	1	.5
<u>Blackgrass</u>						
<u>Violet's grass</u>	::				4	2
<u>Thereseum</u>		.			1	.5
<u>Machly</u>			.	::	3	1.5
TREE/SHRUB						
<u>Tanipis</u>	:		☒☒☒	☒☒☒☒	21	10.5
<u>Snake weed</u>	.		.	☒☒☒	14	7
<u>Prickly pear</u>						
<u>Yucca</u>			.		1	.5
<u>wolfberry</u>				.	1	.5
FORBS						
<u>Hoffmann's grass</u>		.			1	.5
<u>Loco</u>	.				2	1
<u>Leucolan</u>			.	.	2	1
<u>Alch Hollow</u>	☒☒☒☒☒☒☒☒	☒☒☒☒☒☒☒☒	☒☒☒☒☒☒☒☒	☒☒☒☒☒☒☒☒	35	17.5
<u>Pentst</u>	::	::	::	☒☒☒☒	16	8
Annual Grass						