

**Arizona Water Protection Fund
FY 2011 Grant Application Review**

Application # WPF0387 Applicant: James W. Crosswhite

Title of Project: EC Bar Ranch Riparian Brush Control Project

Additional materials were submitted with this application that could not be reproduced and distributed for review. These materials may be reviewed in person at the Arizona Water Protection Fund offices at (3550 N. Central Avenue, 2nd Floor, Phoenix). The additional materials available are the following:

- Maps
- Photographs
- Disk
- Other

**Arizona Water Protection Fund
Application Cover Page
FY 2011**

1
WPF0387

Title of Project: EC Bar Ranch Riparian Brush Control Project							
Type of Project: <input checked="" type="checkbox"/> Capital or Other <input type="checkbox"/> Water Conservation <input type="checkbox"/> Research	Stream Type: <input checked="" type="checkbox"/> Perennial <input type="checkbox"/> Intermittent <input type="checkbox"/> Ephemeral						
Your level of commitment to maintenance of project benefits and capital improvements: <input type="checkbox"/> < 5 years <input type="checkbox"/> 5-10 years <input type="checkbox"/> 11-15 years <input checked="" type="checkbox"/> 16-20 years							
Applicant Information: Name: James W. Crosswhite Address: PO Box 44 City: Nutrioso State: AZ ZIP Code: 85932 Phone: (928) 339-4840 E-mail: jim@ecbarranch.com Tax ID No.: Available after project is awarded							
Inside an AMA: Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>							
Type of Application: <input checked="" type="checkbox"/> New <input type="checkbox"/> Continuation							
Contact Person: Name: Samé as Applicant Information Title: Phone: Fax: e-mail:							
Any Previous AWPf Grants: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No If yes, please provide Grant #(s): AWPf 98-046WPF AWPf 99-067WPF AWPf 03-05WPF							
Arizona Water Protection Fund Grant Amount Requested: \$102,200. Total Project Budget \$140,345. AWPf Share as Percentage of Total Budget 73% If the application is funded, will the Grantee intend to request an advance: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No							
Matching Funds Obtained and Secured: <table border="0"> <tr> <td><u>Applicant:</u></td> <td><u>Amount:</u></td> </tr> <tr> <td>Crosswhite</td> <td>\$38,145.</td> </tr> <tr> <td>Landowner Match as Percentage of Total Budget</td> <td>27%</td> </tr> </table>		<u>Applicant:</u>	<u>Amount:</u>	Crosswhite	\$38,145.	Landowner Match as Percentage of Total Budget	27%
<u>Applicant:</u>	<u>Amount:</u>						
Crosswhite	\$38,145.						
Landowner Match as Percentage of Total Budget	27%						
Has your legal counsel or contracting authority reviewed and accepted the Grant Award Contract General Provisions? <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A							
Signature of the undersigned certifies understanding and compliance with all terms, conditions and specifications in the attached application. Additionally, signature certifies that all information provided by the applicant is true and accurate. The undersigned acknowledges that intentional presentation of any false or fraudulent information, or knowingly concealing a material fact regarding this application is subject to criminal penalties as provided in A.R.S. Title 13. The Arizona Water Protection Fund Commission may approve Grant Awards with modifications to scope items, methodology, schedule, final products and/or budget.							
James W. Crosswhite	Landowner (928) 339-4840						
Typed Name of Applicant	Title and Telephone Number						
	August 18, 2010						
Signature	Date Signed						

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Executive Summary:

The **EC Bar Ranch Riparian Brush Control Project** is a three-year Project that seeks to eradicate 90% of the estimated 50,000 Rabbitbrush plants (*Chrysothamnus nauseosus*) that have invaded 3 miles of Nutrioso Creek riparian corridor within 94 acres of private land protected by the EC Bar Ranch Conservation Easement in eastern Arizona. The Grantee will implement treatments recommended by the Arizona Department of Environmental Quality (ADEQ *Nutrioso Creek TMDL for Turbidity Report*, 7/1/00), Natural Resources Conservation Service (NRCS Trip Report, 4/6/09), US Fish & Wildlife Service (FWS Letter, 7/8/09) and supported by US Forest Service (USFS Letter, 9/29/09), Little Colorado River Plateau RC&D (Letter 10/26/09), Audubon Arizona (Letter 2/22/10), and New Mexico Land Conservancy (NMLC letter 8/6/10). Results will be monitored using protocols developed in 2000 through Arizona Water Protection Fund grant AWPf 03-05WPF.

The project will restore 15,500 feet of the Federal Emergency Management Agency (FEMA) 100 year floodplain and 100 ft wide buffers on each side by removing Rabbitbrush. The *Safe Harbor Agreement With James W. Crosswhite for Voluntary Enhancement and Restoration Activities Benefiting the Southwestern Willow Flycatcher and Little Colorado Spinedace in Nutrioso Creek, Arizona* describes federally listed species that will benefit as the endangered southwestern willow flycatcher (*Empidonax traillii extimus*) and the threatened Little Colorado spinedace (*Lepidomeda vittata*). After Rabbitbrush treatments are completed, more wildlife habitat will be created and more water will be available as instream flow.

After 15 years of restoration by the Grantee, proper functioning conditions are returning to Nutrioso Creek. Examples are described: (1) ADEQ letter dated 8/27/09 advising the US Environmental Protection Agency (EPA) removed Nutrioso Creek from the Clean Water Act Section 303(d) list, the first instance in Arizona where a non-attaining waterbody has been delisted due to mitigation, (2) FWS letter dated 8/24/06 advising the first instance in Arizona where a federally listed fish species was relocated from public to private land was from the Apache Sitgreaves National Forest downstream to the EC Bar Ranch, and (3) letter dated 1/8/10 advising the Grantee had improved riparian conditions from "non-functional" to "Proper Functioning Condition". Yet as best management practices have improved conditions, the large number of invasive Rabbitbrush plants are acting to reverse successful practices by consuming millions of gallons of water annually, displacing native grasses, and reducing species diversity and soil stability resulting in decreased instream flows and increased erosion into the stream channel.

In 2008, the AWPf Commission did not award a similar a Rabbitbrush eradication proposal. The current proposal has been expanded and improved as follows: (1) the Grantee acquired an additional ½ mile section of creek (reach 5) that is now part of the Project Area, (2) the Grantee partnered with state and federal agencies to improve reach 5 by installing off-channel drinkers, constructing elk-proof fencing, revegetating streambanks, and building a livestock bridge to remove a watergap in riparian fencing, (3) the Grantee performed photo monitoring of riparian vegetation, (4) the Grantee received support for the project through field visits and collaboration with NRCS, FWS, USFS, LCR RC&D, Audubon Arizona, and riparian experts, (5) the Grantee donated the EC Bar Ranch Conservation Easement to the New Mexico Land Conservancy to protect natural habitat, agricultural, and scenic open space values in the 94 acre Project Area, and (6) the AWPf share of the treatment cost has been reduced to \$89,000, which is equal to \$5.74 per channel-foot or \$988 per acre, while the Grantee increased share of match to \$38,145, or 27% of the budget.

The **EC Bar Ranch Riparian Brush Control Project** is widely supported and has a high priority for funding because the project will permanently eliminate water consumption by treated Rabbitbrush plants to create more aquatic/wildlife habitat in a perennial stream protected by a conservation easement, and ensures existing successful conservation practices are not inhibited or reversed by this invasive species.

Project Overview

Background:

Between 1996 and 2008, the Grantee purchased property in Nutrioso that created the 410 acre EC Bar Ranch, including 3 miles of Nutrioso Creek designated as reaches 1, 2, 2A, 3, 4, 5, 6, and 8. Knowledgeable persons experienced in measuring the condition of soils, hydrology, and vegetation performed a Proper Functioning Condition (PFC) survey shortly after the reaches were acquired. Each reach was in "non-functional" condition due to overuse by large ungulates (livestock and elk). State and federal agencies performed separate surveys that indicated water quality did not meet Clean Water Act standards and aquatic/wildlife habitat conditions were inadequate to support natural resources, including a federally listed fish species.

During the period, the Grantee developed sustainable collaborative partnerships with state and federal agencies to implement all best management practices recommended in the *LC Spinedace Recovery Plan* (1998, FWS), *Nutrioso Creek TMDL Report For Turbidity* (ADEQ, 2000), and *Nutrioso Creek Fish Management Report* (2001, AGFD) on the 3.15 mile section of Nutrioso Creek on his property, which also affected four miles owned by the US Forest Service (reaches 7 and 9) downstream. However, riparian experts recommended Rabbitbrush growing in the riparian corridor not be eradicated until newly installed practices had time to change conditions from "non-functional" to "properly functioning" in hopes that Rabbitbrush would naturally die. Now that conditions have improved, Rabbitbrush plants have not died, but increased in numbers and density.

In 2006, the US Fish & Wildlife Service (FWS) and Arizona Game & Fish Department (AGFD) acknowledged aquatic/wildlife habitat conditions on the EC Bar Ranch met criteria in the 1998 and 2001 Plans. In August 2009, the Arizona Department of Environmental Quality (ADEQ) and US Environmental Protection Agency (EPA) advised that Nutrioso Creek was in full compliance with water quality standards. In September 2009, a survey was performed that confirmed proper functioning conditions had been met in all reaches, however it was noted that excessive numbers of Rabbitbrush plants were threatening to degrade successful practices. The PFC survey report dated January 8, 2010, stated in describing riparian conditions: *"Generally, the 3 miles of Nutrioso Creek on the EC Bar Ranch is largely in Proper Functioning Condition meeting water quality and aquatic/wildlife habitat objectives set by state and federal agencies, which ultimately benefit the long term public good, as well as, the Apache Sitgreaves National Forest downstream. However, I do have some concerns that Rabbitbrush plants growing in the riparian corridor could reverse the improving conditions by consuming large quantities of water that could otherwise be used as stream flow and displacing native riparian vegetation. I believe it is a high priority to eradicate Rabbitbrush in the riparian corridor on your 3 mile section of Nutrioso Creek, not only to avoid degrading successful water quality and aquatic/wildlife habitat improvements, but to create a new sustainable source of water for instream flows."* (see SUPPLEMENTAL INFORMATION: Existing Plans/Reports/Information – Attachment #5).

On November 20, 2009, in an effort to preserve natural habitat, scenic open space, and agricultural values for future generations, the Grantee donated the EC Bar Ranch Conservation Easement and a substantial cash endowment to the New Mexico Land Conservancy (NMLC). The 94-acre Project Area, which is identical to the easement property, includes 15,500 feet of Nutrioso Creek active channel and floodplain within the FEMA 100 year floodplain plus 100 ft buffers on each side. Easement provisions prohibit unlimited public access to the fragile and sensitive ecosystem being protected. However, supervised group tours for educational outreach may open to the public, e.g. the Little Colorado River LC&D tour in April 2010 was open to the public.

2008 AWPB Proposal:

On June 2, 2008, the Grantee submitted a grant proposal to the AWPB entitled: *EC Bar Ranch Riparian Brush Control Project*. Even though the project was rejected for funding by the AWPB Commission on October 20, 2008, the Grantee did not give up on the need or urgency of treating Rabbitbrush. The current proposal has been updated as follows:

1. 2008 AWPf staff review comments have been addressed.
2. Oral presentation comments and responses have been incorporated.
3. Commissioner comments on October 20, 2008, are addressed, including a new Task to provide information about conservation easements to Commissioners and the public.
4. Riparian Vegetative Photo Monitoring Plan was improved per 2008 grant Task #2.
5. Photo Monitoring was performed on 9/1/09 per 2008 grant Task #4, and will be performed in September 2010.
6. Proper Functioning Condition (PFC) survey was performed on 9/3/09.
7. Rabbitbrush Treatment Plan was improved per 2008 grant Task #2 by meeting with state and federal agencies during field trips to observe the Project Area and discuss treatment methods. Results of those meetings were:
 - A. FWS endorsed proposed treatments, using a chemical safe for aquatic life, in a letter dated 6/2/09.
 - B. Natural Resources Conservation Service (NRCS) Trip Report dated 4/6/09 identified Rabbitbrush as an invasive species in the Project Area and recommended eradication of Rabbitbrush plants by chemical spot treatments without overseeding followed by two years of deferred livestock grazing.
8. Shortly after the 2008 grant proposal was submitted, the Grantee acquired a 38-acre parcel, including ½ mile of Nutrioso Creek (reach 5). The current proposal includes Rabbitbrush treatments in reach 5. Other riparian restoration projects in reach 5 that are complimentary to the AWPf proposal include the following:
 - A. AGFD Landowner Incentive Program (LIP) completed in 2009 to permanently remove a livestock water gap in reach 5 by installing off-channel drinkers for use by livestock and wildlife; and construction of livestock fencing to create a 38 acre riparian pasture with limited grazing.
 - B. FWS Fish Passage Project completed in 2009 to construct a 100-ft steel bridge from bank to bank for use by livestock and wildlife allowing a livestock crossing point in reach 5 to be permanently removed.
 - C. AGFD Landowner Incentive Program (LIP) approved a project in August 2010 to construct 8-ft high fencing to exclude elk from reach 5 by modifying existing livestock fencing and adding new 8-ft fencing to enclose the 38 acre riparian pasture. This project will be completed in 2010.
9. Letters of support for the project have been obtained from the following:
 - A. Alpine District of the US Forest Service indicated that eradication of Rabbitbrush on the EC Bar Ranch would benefit the Apache Sitgreaves National Forest (ASNF), which adjoins the Project Area downstream at reach 6.
 - B. Audubon Arizona recommended eradication of Rabbitbrush on the EC Bar Ranch as described in the proposed project to benefit the Southwestern Willow Flycatcher, an endangered species.
 - C. Little Colorado River Resource Conservation and Development Area (LCRRC&D) joins the ADEQ, NRCS, FWS, and FS in support of eradication of Rabbitbrush-as a method to reduce water consumption by non-native vegetation. Rabbitbrush growing in the riparian corridor is not native to the riparian area as determined by the NRCS.
 - D. New Mexico Land Conservancy (NMLC) supports eradication of Rabbitbrush in the EC Bar Ranch Conservation Easement as a method to increase instream flows and native riparian vegetation compatible with easement conservation values for the public benefit.

In conclusion, since 1996, the Grantee has voluntarily developed collaborative sustainable partnerships with state and federal agencies and others to implement best management practice recommendations leading to improved water quality and aquatic/wildlife habitat for the benefit of natural resources dependent upon riparian conditions in Nutrioso Creek while protecting successful practices by the donation a conservation easement to a qualified organization for the public benefit in perpetuity. The *EC Bar Ranch Riparian Brush Control Project* is essential and critical to ensure properly functioning conditions are maintained and enhanced over the long term on 3 miles of Nutrioso Creek riparian

corridor on the EC Bar Ranch by eliminating water consumption by eradicating at least 90% of the invasive Rabbitbrush plants growing in the 94 acre Project Area. At \$102,200, the AWPf share of the project cost is \$6.60 per foot of 15,500 feet of stream channel treated, while the \$89,000 cost of treatments on 90 acres is \$5.74 per channel-foot or \$988 per acre. The Grantee is providing match of \$38,145, including 100% match of Task #2 Development of Plans, Task #5 Conservation Easement Presentation, and Task #6 Final Report, and about 25% of other Tasks for an average match of 27%.

Goals:

Project Goals are as follows:

1. Obtain all permits, authorizations, environmental clearances and agreements necessary to complete tasks listed in the Scope of Work (Task #1).
2. Permanently eradicate at least 90% of Rabbitbrush plants in the Project Area as a method of reducing water consumption by an invasive species in expectation that a new permanent source of water may be available for instream flows (Task #2 and #3).
3. Allow native plant species to naturally revegetate sites where Rabbitbrush has been eradicated, thus increasing species diversity and help prevent reinfestation by Rabbitbrush and/or noxious weeds, such as Muskthistle.
4. Reduce erosion, increase streambank storage, raise the water table, improve water quality, enhance aquatic/wildlife habitat, and increase reliability of instream flows on the EC Bar Ranch, with the expectation that such improvements may benefit the Apache Sitgreaves National Forest downstream.
5. Ensure existing successful conservation practices are not inhibited or reversed by the existing Rabbitbrush infestation.
6. Enhance the natural habitat, scenic open spaces, and agricultural values described in the EC Bar Ranch Conservation Easement Agreement for the public benefit with annual monitoring and enforcement by a qualified land trust in perpetuity.
7. Monitor riparian vegetation during the project period following a Riparian Vegetative Photo Monitoring Plan (Task #2 and #4).
8. Provide information to AWPf Commission about the EC Bar Ranch Conservation Easement (Task #5).

Objectives:

The proposed Project will follow a Rabbitbrush Treatment Plan described in Task #2 using methods endorsed by state and federal agencies to control and/or eradicate approximately 90% of the estimated 50,000 Rubber Rabbitbrush (*Chrysothamnus nauseosus*) plants growing in the 94 acre Project Area and easement property, which includes 3 miles of Nutrioso Creek riparian corridor on the EC Bar Ranch. Since these plants may consume as much as 50 million gallons of water annually through evapotranspiration (ET) from the water table, an Objective is to make a portion of this water savings available as instream flow, thus creating a new permanent source of water to help keep pools connected and fish populations alive.

Since the Rabbitbrush is displacing native grasses and reducing species diversity leading to soil instability and erosion into the stream channel, which impairs water quality and degrades aquatic habitat, an Objective is to allow native vegetation to naturally expand into sites cleared of Rabbitbrush. This may lead to more wildlife habitat, such as nesting sites for the endangered Southwestern Willow Flycatcher. Livestock will be excluded from the project area for two growing seasons to allow treated sites to naturally revegetate without disturbance. Rabbitbrush Treatment Reports will be deliverable on a schedule established in Task #2.

An Objective is to follow a Riparian Vegetative Photo Monitoring Plan described in Task #2 for the purpose of ensuring practices have been completed. Approximately, 70 photos will be taken at 28 established photo monitoring sites in September 2010, 2011, and 2012. The photos will be added to the existing photo database established in 1998 to produce a Riparian Vegetative Photo Monitoring Report, which will be deliverable in Task #4 on a CD.

In October 2008, Commissioners raised questions about how conservation easements may enhance or protect improvement practices for the proposed project. An Objective is to provide information about the EC Bar Ranch Conservation Easement, and easements in general, for the benefit of Commissioners with remarks about easement provisions, legalities, appraisals, tax consequences, and other issues. A summary of the presentation will be deliverable under Task #5.

An Objective is to summarize all methodologies used, outcomes of all Tasks, analysis of all Project data, suggestions for any changes or future actions, and an evaluation of the success of meeting Project objectives in Task #6: Final Report.

Statement of Problems/Causes:

Over the last 50 years, a reduction of farming practices and unmanaged grazing by livestock and elk has allowed thousands of Rabbitbrush plants to displace native grasses throughout Nutrioso Valley, including the EC Bar Ranch. The dense Rabbitbrush above ground foliage has created soil conditions that were susceptible to erosion into the stream channel. The large quantities of water being consumed by these plants along Nutrioso Creek riparian corridor has slowed the growth of desirable native species such as sedges, rushes, willows, cottonwoods, alders, and native grasses that help reduce erosion and filter suspended solids. In the mid-1990's, the ADEQ designated 27 miles of Nutrioso Creek as a non-attaining waterbody under the Clean Water Act because water quality standards were not met due to non-point source pollution in the form of suspended solids (turbidity).

In 1996, the Grantee acquired the EC Bar Ranch and began developing collaborative partnerships with state and federal agencies to mitigate water quality, aquatic/wildlife habitat, and natural resource concerns while improving ranching economics. In July 2000, the ADEQ completed the *Nutrioso Creek TMDL for Turbidity Report*, which identified the cause of excessive turbidity in Nutrioso Creek on the EC Bar Ranch and other downstream properties as incised and eroding streambanks aggravated by historical overuse by livestock and elk. The TMDL Report recommended the adoption of a number of Best Management Practices (BMP's) to improve water quality, including the treatment of Rabbitbrush in stating: *"By removing the Rabbitbrush and replacing it with grass seeding, more grass per acre is created for cattle consumption, reducing their reliance on the riparian vegetation of the stream corridor and allowing for livestock removal from the riparian corridor through the use of fences and range management plans. From a watershed standpoint the removal of Rabbitbrush and reintroduction of grasses improves species diversity and composition. Also, the grasses provide a more stable root mass than the Rabbitbrush, thus increasing the soil stability of the rangelands and decreasing the amount of sediment contributed from sheet flow and wind erosion over these rangelands"*.

While the Grantee successfully mitigated water quality and wildlife habitat concerns, including eradication of Rabbitbrush in upland pastures, he never treated Rabbitbrush growing in the riparian corridor because consulting ecologists and riparian experts advised him to wait and see if these plants would be naturally or culturally eliminated after pressures created by non-functional conditions, low water table, and uncontrolled livestock and elk were removed by riparian restoration practices, fencing, and improved management.

While waiting for cultural changes, Rubber Rabbitbrush plants have increased, rather than decreased, in the Project Area. Unlike riparian species with dense root masses that hold soils together on streambanks and terraces, Rabbitbrush is an upland plant species with a single tap root that can extend to a depth of 40 feet or more to consume water from the water table rather than a root mass near the surface that relies on natural precipitation. Rabbitbrush may live more than 20 years. The thick above ground foliage displaces desirable native plants leading to decreased species diversification, reduced soil stability, and increased erosion from terraces into the stream channel. Large ungulates do not browse or eat Rabbitbrush. Although no scientific study has been completed, and is not proposed in this project, it is estimated that 50,000 plants are growing in the Project Area and consume approximately 60 million gallons of water annually.

State and federal agencies have recommended improvements to meet water quality standards and aquatic/wildlife habitat objectives so that natural resources dependent upon Nutrioso Creek, the only perennial stream in the area, will have a stable and improved habitat. A federally listed fish species lives in the Creek and is totally dependent upon stream flows for survival. Perhaps Rabbitbrush will eventually die, but in the meantime one or more species may become extinct, a situation which is against public policy. A portion of the water consumed by Rabbitbrush could permanently increase instream flows and prevent species extinction. Unless treated soon, the impact of large numbers of Rabbitbrush will lead to degraded soils, compromised hydrology, and reduced native vegetation in the Project Area, which may negate successful existing conservation practices.

Statement of Solutions:

The proposed project will utilize mechanical and chemical methods described in Task #2 to eradicate up to 90% of Rabbitbrush growing within the 94 acre Project Area, which includes 22 acres in the FEMA 100 year floodplain with 15,500 feet of Nutrioso Creek stream channel, including 4 acres of annual floodplain, plus 72 acres of buffers, approximately 100 ft wide, or 36 acres, on each side of the creek. The Project Area has been surveyed and pinned by a licensed surveyor, with a plat and legal description recorded for the EC Bar Ranch Conservation Easement. The Project Area and easement property are identical in size. Improvements on the EC Bar Ranch will benefit the Apache Sitgreaves National Forest (ASNF) that adjoins reach 6 downstream.

The project related remedies and treatment solutions to reduce Rabbitbrush within the project area are to cut-off the above ground plant foliage and then apply a spot chemical application during the growing season followed by deferred livestock grazing. Gary Parrott, Rangeland Management Specialist, Area 1, Arizona NRCS, Stu Tuttle, State Biologist, Arizona NRCS, and Dave Fisher, District Conservationist, Springerville FO, Arizona NRCS, recommended this solution in the NRCS Trip Report after a field inspection of the Project Area in April 2009. The full Report is attached as SUPPLEMENTAL INFORMATION: Plans - Attachment #2, dated 4-6-09. In a letter dated 7-8-09, Steven Spangle, Field Supervisor, US Fish & Wildlife Service (FWS) also supported proposed treatment methods and recommended the use of "2,4 D Amine-4" (2,4 Dichlorophenoxyacetic acid), an unrestricted-use systemic herbicide. The FWS letter is attached as SUPPLEMENTAL INFORMATION: Plans - Attachment #3.

Rabbitbrush became established due to historical overuse by large ungulates. Since acquiring the Project Area between 1996 and 2008, the Grantee has erected fencing to control livestock and exclude elk, revegetated exposed streambanks, installed erosion control structures, and adopted management plans to rotate livestock, apply irrigation water, and control noxious weeds. This approach has increased the density and diversity of grasses growing in the Project Area, however grass cannot fully revegetate soils under dense Rabbitbrush foliage.

During their field trip, NRCS officials observed the wide diversity of plant species' in the Project Area and concluded that when Rabbitbrush is eradicated, adjacent grasses will quickly expand to cover the treated sites. Some of the existing species' that may cover treated sites in the FEMA 100 year floodplain include Alder, narrowleaf cottonwood, shiny willow, strappleaf willow, coyote willow, Nebraska sedge (*Carex nebraskensis*), bulrush (*Scirpus subterminalis*), baltic rush (*Juncus balticus*), cat tails (*Typha latifolia*), wheatgrass, globe mallow, hair grass, clover (*Melilotus alba*), wild rose (*Rosa arizonicum*), and cinquefoil (*Potentilla anserina*). Existing species that may cover treated sites on 100 ft buffers include western wheatgrass (*Agropyron smithii*), blue grama (*Bouteloua gracilis*), squirreltail (*Sitanion hystrix*), sideoats grama (*Bouteloua curtipendula*), sand dropseed (*Sporobolus cryptandrus*), muttongrass (*Poa fendleriana*), Junegrass (*Koeleria pyramidata*), hairy grama (*Bouteloua hirsute*), wheatgrass (*Agropyron spicatum*), Snakeweed (*Chrysothamnus nauseosus*), Skunkbush (*Rhus trilobata*), geranium (*Geranium californica*).

The Report advised against overseeding. On 7/30/10, Dave Fisher, District Conservationist, Springerville FO, Arizona NRCS, expanded on reasons for not overseeding treated sites: "*When you mow*

rabbitbrush, the amount of plant litter on the soil surface is significantly increased. Plant litter protects the soil surface from erosion by intercepting raindrops prior to striking the soil surface. Since rabbitbrush is somewhat woody, the litter will also take a longer time to break down than herbaceous (grass) litter and will thus provide protection to the soil surface for an adequate amount of time to let the adjacent grasses fill in the areas formerly occupied by rabbit brush. Adjacent grasses will not be affected by a systemic herbicide that is applied directly on the rabbitbrush stump and/or exposed root.” Mr. Fisher also stated: *“Due to the high volume of rabbitbrush litter that will likely be generated by the mowing, it may be difficult to establish a good stand of grass by seeding in these areas. Broadcast seeds may or may not work their way through the litter and into the soil. Mechanically drilling the seed is not feasible for individually treated plant sites.”* Mr. Fisher reiterated that grazing should be deferred for two growing seasons following treatments to allow adjacent grasses to fill in sites.

Fencing surrounds the Project Area that permanently excludes elk and allows rotation of livestock between pastures. Livestock will be totally excluded from grazing in the project area for at least two growing seasons. Since overgrazing and poor management that allowed Rabbitbrush to proliferate have been removed by best management practices, such as fencing, erosion control projects, and revegetation, the natural balance will be restored within the Project Area and water quality standards and aquatic/wildlife habitat can be maintained. Rabbitbrush is the last major pressure working against complete restoration and proper functioning condition of the natural balance in Nutrioso Creek.

After Rabbitbrush is eradicated and treated areas have naturally revegetated, more water may become available to expand the establishment of native riparian vegetation and grasses within Nutrioso Creek stream channel and terraces located on 94 acres of the EC Bar Ranch, resulting in improved water quality and aquatic/wildlife habitat. These desired outcomes are generally quantifiable by comparing data in the *Nutrioso Creek TMDL for Turbidity Report* for Nutrioso Creek with the U.S. Geological Survey Scientific Investigations Report 2006–5305 that studied evapotranspiration for Rabbitbrush and other selected vegetation. While not a scientific correlation, which is beyond the scope of this proposal, it appears that more water may be available as instream flow after the proposed project is completed. Any additional water will help maintain fish populations, including a federally listed fish species, and riparian vegetation. In addition to affecting natural resources, water quality decreases when less water is available to dilute suspended solids.

Native grasses that replace spot treated Rabbitbrush sites rely on natural precipitation to reach their roots whereas Rabbitbrush use a tap root, that can grow 30-40 feet deep, to find moisture. As the streambed restoration evolves, the water table rises to provide moisture closer to the upper terraces on the streambanks and buffer areas. This process stabilizes soils, while grasses filter run-off from upland pastures from entering the stream channel. The Grantee has adopted the livestock, irrigation water, nutrient, and pest management plans recommended by NRCS. While focused on upland pastures, good management of resources, combined with buffer strips, are important to the riparian corridor ecosystem. Property owned by the Grantee that adjoins the easement property/Project Area is enrolled in the Conservation Stewardship Program (CSP) with the NRCS for the long term. Adjoining property is protected from development for an additional width of 100-200 feet by deed restrictions compatible with the conservation easement.

Over time, the objective of a properly functioning riparian system in Nutrioso Creek is to raise the streambed and water table so grasses can utilize water from the stream to help stabilize soils and reduce erosion. In the near term, grasses must rely on natural precipitation for their source of water, whereas Rabbitbrush are tapped directly into the water table. The net effect of removing Rabbitbrush will be to reduce millions gallons per year of water table consumption without adding any significant offsetting consumption by native plants that replace Rabbitbrush.

Statement of Project Years of Benefit:

Once Rabbitbrush is eradicated by the proposed project, present and future landowners are committed to EC Bar Ranch Conservation Easement provisions that require protection and preservation of natural habitat, open spaces, and agricultural values in perpetuity. Annual monitoring by the New Mexico Land Conservancy backed up by authority to enforce conservation provisions discourages management actions that allow reestablishment of Rabbitbrush. The 94 acre easement property (Project Area) cannot be split into smaller parcels. Roads, buildings, or new structures cannot be constructed. External influences are reduced because the Nutrioso Watershed is mostly located on the Apache Sitgreaves National Forest, which surrounds the Project Area. Overall, the existing fencing, management, easement provisions, and watershed location will help ensure goals and objectives of Rabbitbrush treatments in the proposed project will be permanent.

The Grantee has eradicated Rabbitbrush in upland pastures with success in preventing regrowth and re-establishment. To illustrate that Rabbitbrush can be eradicated and prevented from becoming established again, see the photos below: Photo #1 was taken on a buffer area adjoining a streambank in July 2001 that shows Rabbitbrush growing inside the riparian fencing, but eradicated outside the fencing. Photo #2 was taken in July 2010 at approximately the same location. In the meantime, the fencing was relocated away from the streambank. While Rabbitbrush that was not treated in 2001 has increased in size and numbers adjoining the streambank, Rabbitbrush that was treated, has not regrown. Grass cover has increased significantly due to rotational grazing management policies.



Photo #1. July 2001. Rabbitbrush eradicated in upland pasture on the right side of fence. Untreated project area on left of fence. Grass is mostly warm season with incomplete groundcover.



Photo #2. July 2010. Fence relocated to the right away from the streambank. Rabbitbrush has increased in the untreated project area left of old fence line, but not regrown where eradicated in 2001. Grass diversity and density has increased.

The Grantee has engaged in long term protection strategies to preserve conservation values in riparian areas and protect open spaces on the EC Bar Ranch by the use of deed restrictions that prohibit and/or limit building, grazing, motorized vehicles, and similar activities through conservation easement provisions with long term monitoring and enforcement. Deed restrictions on property adjoining the easement property restricts building and development making the effective buffer width 200-300 feet on each side of the creek. While the easement property is 94 acres, the additional restrictions protect another 110 acres outside, but adjoining, the Project Area.

While the Grantee intends to eradicate at least 90% of Rabbitbrush plants during the project period, and adhere to good management practices, some Rabbitbrush plants are likely to emerge from the normal reseeding ecological process for which the Grantee has no control. Therefore, **the Grantee requests the standard 20-year operation and maintenance period for AWPf projects be waived entirely, or reduced to 3 years following the end of the project period.**

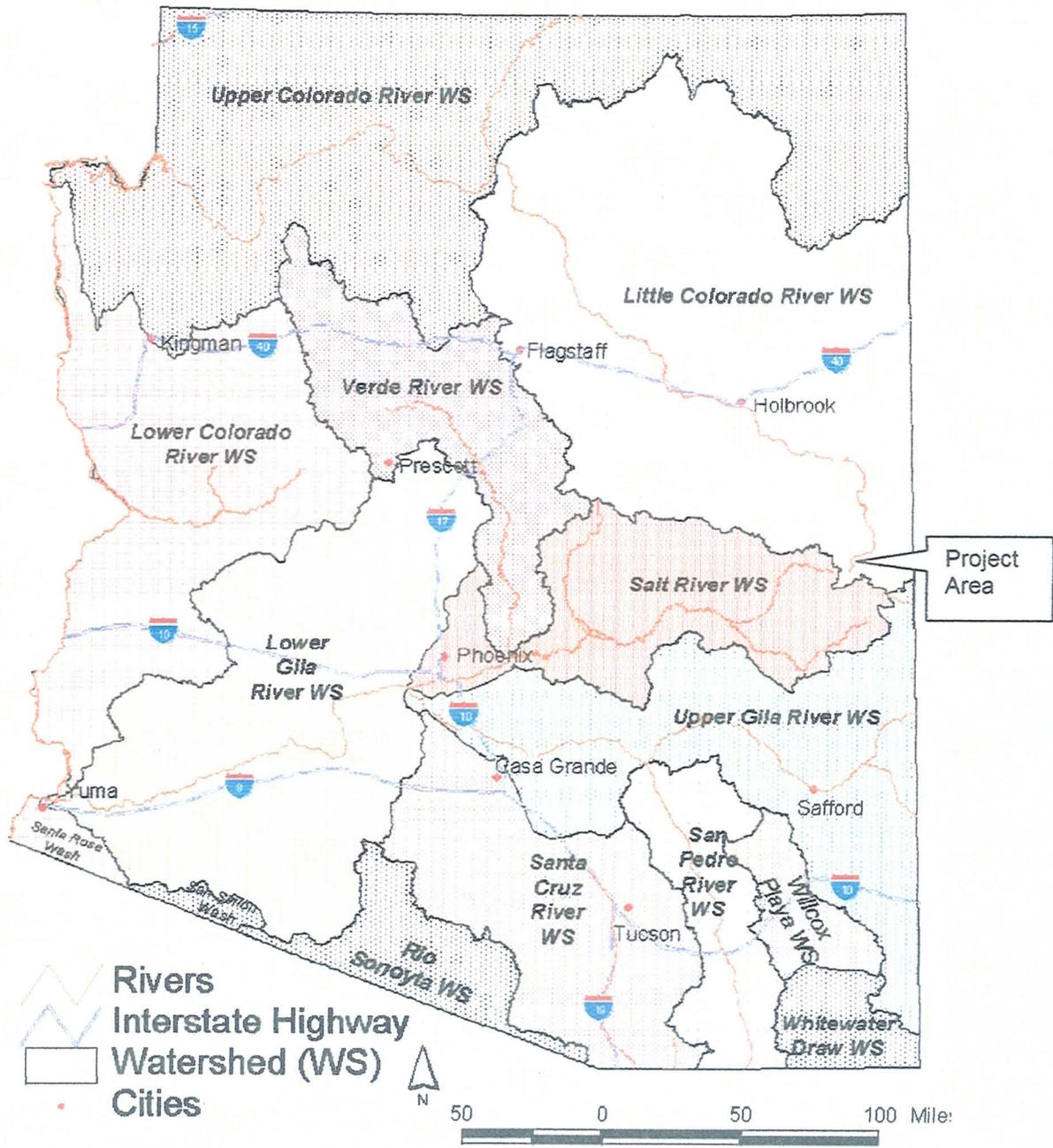
Project Location & Environmental Contaminant Information

Project Location Information			
1. County: <u>Apache</u>	2. Sections (stream reaches): <u>Section 29</u> (reaches 1, 2, 2A) <u>Section 20</u> (reaches 3, 4, 5, 6)	3. Township: <u>7 North</u>	4. Range: <u>30 East</u>
5. Watershed: <u>Little Colorado</u> (USGS HUC Code: 15020001-017). The Nutrioso Creek watershed drains approximately 159 square miles with an overall drop in elevation of 1500 ft (8400 ft-6900 ft). Nutrioso Creek is a 5 th order stream as identified using a USGS topographic map.			
6. Name of USGS Topographic Map where project is located: <u>Nutrioso Creek (1991) and Nelson Reservoir (1969), 7.5' USFS quads</u>			
7. State Legislative District: <u>5</u>			
8. Land ownership of project area: <u>James W. Crosswhite LLC and EC Bar Ranch LLC*</u>			
9. Current land use of project area: <u>Agricultural</u>			
10. Size of project area: <u>90.0 acres (Project Area is 94.20 acres, but 4.20 acres is active channel and floodplain where Rabbitbrush do not grow or require treatments)</u>			
11. Stream Name: <u>Nutrioso Creek</u>			
12. Miles of stream benefited: <u>2.95 miles (15,500 feet in reaches 1, 2, 2A, 3, 4, 5, and 6) in the Project Area plus 4 miles USFS downstream</u>			
13. Acres of riparian habitat: <u>94 acres will be enhanced, maintained, and restored, including 22 acres in the FEMA 100 year floodplain averaging 62 feet wide (includes 4 acres of active channel and floodplain) plus a 36 acre buffer on west side and 36 acre buffer on east side of the creek that are at least 100 feet wide.</u>			
15. Endangered Species Act (ESA) listed species in Nutrioso Creek: <u>Little Colorado spinedace (<i>Lepidomeda vittata</i>) is a threatened species; southwestern willow flycatcher (<i>Empidonax traillii extimus</i>) is an endangered species with potential habitat in the Project Area.</u>			
16. Arizona state listed fish "species of special concern" are: <ul style="list-style-type: none"> • <u>Little Colorado spinedace (<i>Lepidomeda vittata</i>)</u> • <u>Blueheaded sucker (<i>Pantosteus discobolus</i>)</u> • <u>Speckledace (<i>Rhinichthys osculus</i>)</u> 			
15. Directions to the project site from the nearest city or town: From Springerville Post Office, travel east through town on Hwy 60, turn south on Hwy 180/191 toward Nutrioso (marker 417) and Alpine. At mile marker 415, proceed ½ mile south on Hwy 180, turn right (west) on County Road 2112, and past EC Bar Ranch headquarters about 1/4 th mile to green gate on right side with sign "EC Bar Ranch Conservation Easement Donated by James W. Crosswhite 11/20/10". Enter this gate to Project Area at reach 1. Proceed north along creek for 3 miles to view reaches 1-6.			
Environmental Contaminant Location Information			
1. Does your project site contain known environmental contaminants? <u>NO</u>			
2. Are there known environmental contaminants in the project vicinity? <u>NO</u>			
3. Are you asking for AWPf monies to identify whether or not environmental contaminants are present? <u>NO</u>			
* James Wayne Crosswhite is Trustee and sole beneficiary of the James Wayne Crosswhite Trust. The Trust is the Member of James Wayne Crosswhite LLC, which owns 52.25 acres of the conservation easement (south half) and EC Bar Ranch LLC, which owns 41.95 acres (north half).			

Project Maps and Schematic

- Arizona Watershed Map
- Project Location/Ownership Maps
- Project Schematic

PROJECT MAPS AND SCHEMATIC: Arizona Watershed Map

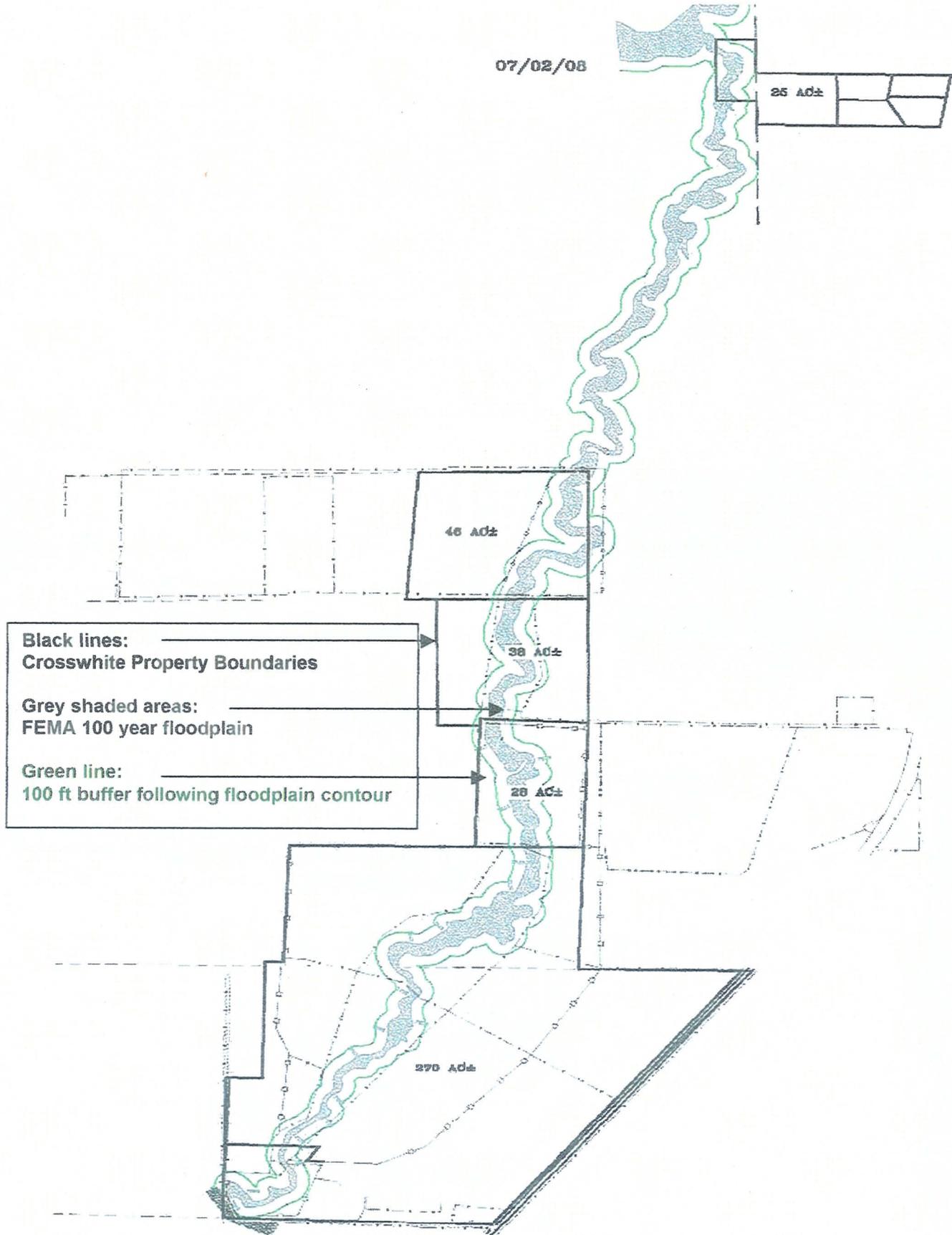


Title of Project: EC Bar Ranch Riparian Brush Control Project

PROJECT MAPS AND SCHEMATIC: Project Schematic

- Map #1: Project Location/Ownership. Topo map of Nutrioso area depicting Grantee property boundaries as black lines in Sections 20 and 29. Project area is inside Grantee property along Nutrioso Creek.
- Map #2: Project Location/Ownership. Grantee property boundaries depicted as black lines. FEMA 100 year floodplain, including Nutrioso Creek, is depicted as grey shaded areas. 100-ft buffers on each side of the floodplain are depicted as green lines. Project Area is within green lines.
- Map #3: Project Location/Ownership. Grantee property is shown as black lines. The 94.20 acre easement property boundary, including reaches 1-6, is depicted as a red line located approximately 100 feet on each side of the FEMA 100 year floodplain (grey areas) within Grantee property in Sections 20 and 29, including 15,500 feet of stream channel.
- Grantee property ownership information:
 - James Wayne Crosswhite is Trustee and sole beneficiary of the James Wayne Crosswhite Trust.
 - EC Bar Ranch LLC owns 41.95 acres of the 94.20 acre conservation easement (Tract A-3 in north half of the easement). The Trust is Member.
 - James Wayne Crosswhite LLC owns 52.25 acres of the 94.20 acre conservation easement (Tract A-2 in south half of the easement). The Trust is Member.

PROJECT MAPS AND SCHEMATIC: Project Location/Ownership Map #2.

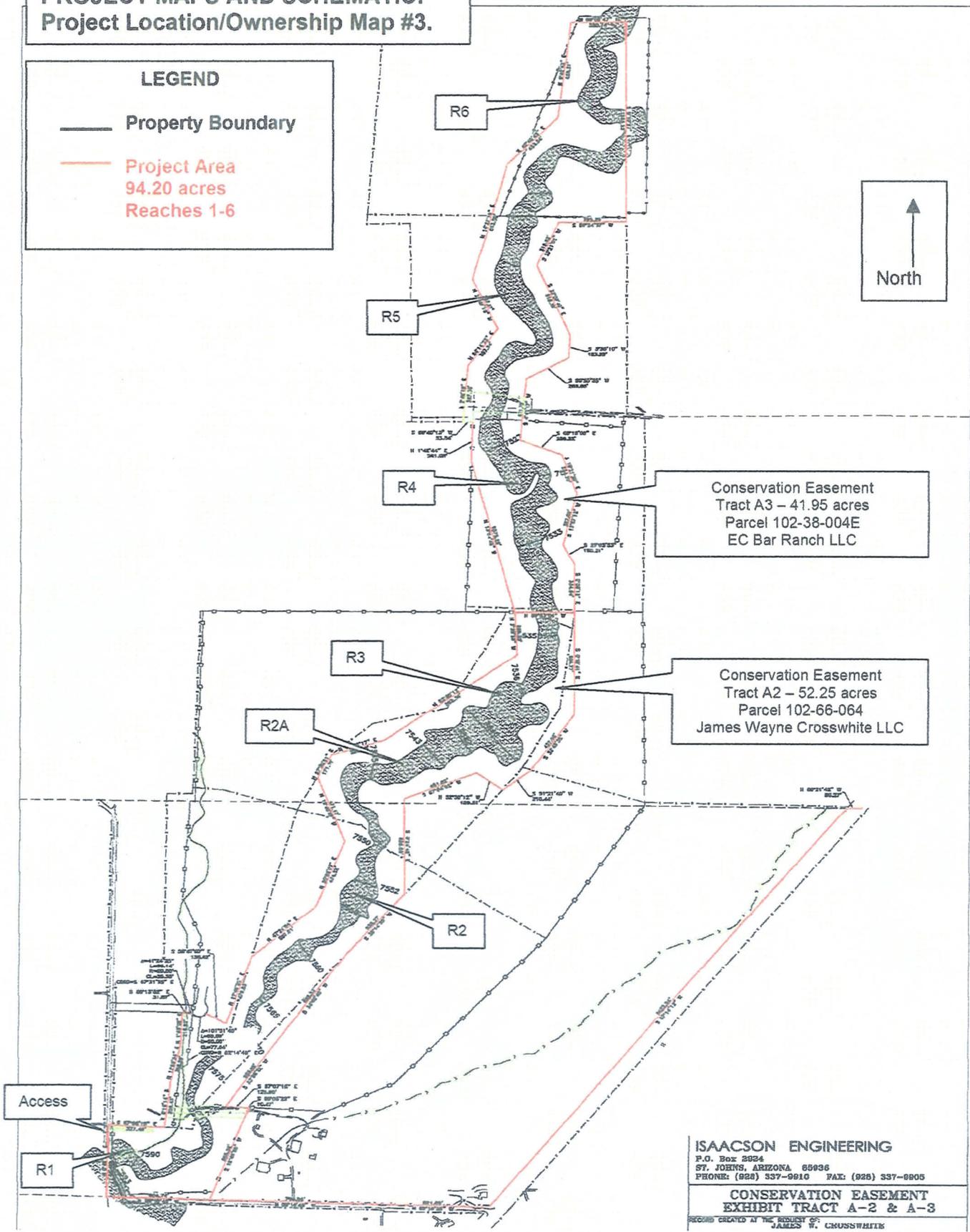


**PROJECT MAPS AND SCHEMATIC:
Project Location/Ownership Map #3.**

07-29-09

LEGEND

-  Property Boundary
-  Project Area
94.20 acres
Reaches 1-6



ISAACSON ENGINEERING
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ST. JOHNS, ARIZONA 85036
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**CONSERVATION EASEMENT
EXHIBIT TRACT A-2 & A-3**

RECORDS CREATED AT THE REQUEST OF:
JAMES W. CROSSWHITE

Scope of Work

Schedule of Payments and Deliverables			
Task No. and Description	Deliverables To AWPB	Due Date	AWPB Budget
Task #1: Permits, Authorizations, Clearances and Agreements	SHPO survey; Subcontractor Agreement	6/1/11	\$6,000.
Task #2: Development of Plans	1) Rabbitbrush Treatment Plan 2) Riparian Vegetative Photo Monitoring Plan	6/1/11	0.
Task #3: Implementation of Rabbitbrush Treatments	1) Rabbitbrush Initial Treatment Report 2011 2) Rabbitbrush Follow-up Treatment Report 2012	12/31/11 12/31/12	89,000.
Task #4: Implementation of Riparian Vegetative Photo Monitoring	1) Riparian Vegetative Photo Monitoring Report 2) Riparian Vegetative Photo Monitoring Report 3) Riparian Vegetative Photo Monitoring Report	12/31/11 12/31/12 12/31/13	7,200.
Task #5: Conservation Easement Presentation	Conservation Easement Presentation Report	12/31/13	0.
Task #6: Final report	Final report	2/28/12	0.
Total AWPB Budget (73%)			\$102,200.
Match Budget (27%)			\$38,145.
Total Project Budget (100%)			\$140,345.

Task #1: Permits, Authorizations, Clearances and Agreements.

Task Description: The Grantee shall obtain all permits, authorizations, environmental clearances and agreements necessary to complete the tasks listed in this Scope of Work. These may include but are not limited to:

- State Historic Preservation Office (SHPO) clearance
- Coordination with US Fish and Wildlife Service for protection of LC spinedace populations
- Subcontractor Agreements

Task Purpose: To comply with all local, state and federal permit/clearance requirements, environmental laws, and obtain legal access to project area.

Deliverable Description: Copies of all approved permits, authorizations, clearances and agreements; Pesticide license (if required); subcontractor agreement.

Deliverable Due Date: June 1, 2011

Reimbursable Cost: \$6,000.00

Task #2: Development of Plans.

Task Description: The Grantee shall develop a Plan for the treatment of Rabbitbrush and a Plan for monitoring progress before and after treatments.

Task Purpose:

- The Rabbitbrush Treatment Plan will outline steps in the treatment process to control and/or eradicate Rabbitbrush within the Project Area.
- The Riparian Vegetative Photo Monitoring Plan will outline steps illustrating portions of the Project Area before and after Rabbitbrush treatments using established photo monitoring format and data collection methods.

Deliverable Description:

- Rabbitbrush Treatment Plan.
- Riparian Vegetative Photo Monitoring Plan.

Deliverable Due Date: June 1, 2011

Reimbursable Cost: \$0.00

Task #3: Implementation of Rabbitbrush Treatments.

Task Description: The Grantee shall perform Rabbitbrush treatments following Rabbitbrush Treatment Plan.

Task Purpose: To eradicate and control Rabbitbrush in the Project Area.

Deliverable Description:

- Rabbitbrush Initial Treatment Report for 2011
- Rabbitbrush Follow-up Treatment Report for 2012

Deliverable Due Date: December 31, 2011, December 31, 2012

Reimbursable Cost: \$89,000.00

Task #4: Implementation of Riparian Vegetative Photo Monitoring.

Task Description: The Grantee shall perform photo monitoring in September 2011, 2012, and 2013 following the Riparian Vegetative Photo Monitoring Plan

Task Purpose: To illustrate selected locations of Rabbitbrush before treatment and verify that plants have been eradicated and/or controlled after treatment within the Project Area.

Deliverable Description:

- Riparian Vegetative Photo Monitoring Report for 2011 on a CD
- Riparian Vegetative Photo Monitoring Report for 2012 on a CD
- Riparian Vegetative Photo Monitoring Report for 2013 on a CD

Deliverable Due Date: December 31, 2011, December 31, 2012, December 31, 2013

Reimbursable Cost: \$7,200.00

Task #5: EC Bar Ranch Conservation Easement Presentation.

Task Description: The Grantee shall present information about the EC Bar Ranch Conservation Easement on one occasion during the project period to the AWPFC Commission.

Task Purpose: Describe how the EC Bar Ranch Conservation Easement benefits the proposed project.

Deliverable Description: EC Bar Ranch Conservation Easement Presentation Report.

Deliverable Due Date: December 31, 2013

Reimbursable Cost: \$0.00

Task #6: Final Report.

Task Description: The Grantee shall prepare and submit a comprehensive Final Report that shall include a summary of all methodologies used, outcomes of all Tasks, analysis of all Project data, suggestions for any changes or future actions, and an evaluation of the success of meeting Project objectives. The Grantee shall provide all data generated under this Contract, unless otherwise specified in the Special Provisions.

Task Purpose/Objective: To describe the goals and accomplishments of the project.

Deliverable Description: Final Report.

Deliverable Due Date: February 28, 2014

Reimbursable Cost: \$0.00

Detailed Budget Breakdown

Project Budget Form						
Item	Qty	Unit	Rate	Total	AWPF	Match
Task #1: Permits, Authorizations, Clearances and Agreements						
Administration:				0	0	0
Direct Labor Costs:						
Project Manager	20	Hours	\$80.00	\$1,600.	0	\$1,600.
Direct Costs:						
Archeological Survey, Subcontractor Agreements	50	Pages	.20	\$10.	0	\$10.
Mileage	200	Miles	.44	\$88.	0	\$88.
Outside Services Costs						
Archeologist	100	Acres	\$60.00	\$6,000.	\$6,000.	0
Total for Task #1				\$7,698.	\$6,000.	\$1,698.
Percentages				100%	78%	22%
Cost per foot of channel treated (15500 ft)					\$0.39/ft	
Task #2: Development of Plans						
Administration:				0	0	0
Direct Labor Costs:						
Project Manager	20	Hours	\$80.00	\$1,600.	0	\$1,600.
Direct Costs:						
Rabbitbrush Treatment Plan	10	Pages	.20	\$2.	0	\$2.
Riparian Vegetative Photo Monitor Plan	10	Pages	.20	\$2.	0	\$2.
Postage	2	Mailings	\$10.00	\$20.	0	\$20.
Total for Task #2				\$1,624.	0	\$1,624.
Percentages				100%	0%	100%
Cost per foot of channel treated (15500 ft)					\$0.00/ft	
Task #3: Implementation of Rabbitbrush Treatments						
Administration:				0	0	0
Direct Labor Costs:						
Project Manager	100	Hours	\$80.	\$8,000.	0	\$8,000.
Direct Costs:						
Rabbitbrush Treatment Reports	20	Pages	.20	\$4.	0	\$4.
Postage	3	Mailings	\$10.00	\$30.	0	\$30.
Mileage	1000	Miles	.44	\$440.	0	\$440.
Outside Services Costs: Subcontractor						
Year 1 – 90 acres (not including stream)						
Mow 80 ac - Tractor with mower	80	Acre	\$200.	\$16,000.	\$16,000.	0
Mow 80 ac – Tractor operator	80	Acre	\$60.	\$4,800.	0	\$4,800.
Hand cut 10 ac – Labor	10	Acre	\$900.	\$9,000.	\$9,000.	0
Treat root 70 ac – Tractor with tank	70	Acre	\$400.	\$28,000.	\$28,000.	0
Treat root 70 ac – Tractor operator	70	Acre	\$120.	\$8,400.	0	\$8,400.
Treat root 70 ac – Chemical	250	Gallon	\$20.	\$5,000.	\$5,000.	0
Sever root 20 ac – Tractor with blade	20	Acre	\$400.	\$8,000.	\$8,000.	0
Sever root 20 ac – Tractor operator	20	Acre	\$120.	\$2,400.	0	\$2,400.
Sever root 20 ac – Labor	20	Acre	\$100.	\$2,000.	\$2,000.	0
Total Year 1 – Mow & treat root - 90 ac				\$83,600.	\$68,000.	\$15,600.
Year 2 – 45 acres – Follow-up treatment						
Treat root 45 ac – Tractor with tank	45	Acre	\$400.	\$18,000.	\$18,000.	0
Treat root 45 ac – Tractor operator	45	Acre	\$120.	\$5,400.	0	\$5,400.
Treat root 45 ac - Chemical	150	Gallon	\$20.	\$3,000.	\$3,000.	0
Total Year 2 – Follow-up – 45 ac				\$26,400.	\$21,000.	\$5,400.
Total for Task #3				\$118,474.	\$89,000.	\$29,474.

Percentages				100%	75%	25%
Cost per foot of channel treated (15500 ft)					\$5.74/ft	
Task #4: Riparian Vegetative Photo Monitoring Report						
Administration:				0	0	0
Direct Labor Costs:						
Project Manager	20	Hours	\$80.00	\$1,600.	0	\$1,600.
Direct Costs:						
Riparian Veg Photo Monitoring Report	100	Pages	1.00	\$100.	0	\$100.
Binders	4	Each	\$5.00	\$20.	0	\$20.
Postage	4	Mailings	\$20.00	\$80.	0	\$80.
Mileage	200	Miles	.44	\$88.	0	\$88.
Outside Services Costs: Subcontractor						0
Year 1 – Take photos in September 2011	8	Hours	\$100.	\$800.	\$800.	0
Prepare on-line Report 2011	16	Hours	\$100.	\$1,600.	\$1,600.	0
Year 2 – Take photos in September 2012	8	Hours	\$100.	\$800.	\$800.	0
Prepare on-line Report 2012	16	Hours	\$100.	\$1,600.	\$1,600.	0
Year 3 – Take photos in September 2013	8	Hours	\$100.	\$800.	\$800.	0
Prepare on-line Report 2013	16	Hours	\$100.	\$1,600.	\$1,600.	0
Total for Task #4				\$9,088.	\$7,200.	\$1,888.
Percentages				100%	79%	21%
Cost per foot of channel treated (15500 ft)					\$0.46/ft	
Task #5: Conservation Easement Presentation						
Administration:				0	0	0
Direct Labor Costs:						
Project Manager	20	Hours	\$80.00	\$1,600.	0	\$1,600.
Direct Costs:						
Final Report	5	Pages	1.00	\$5.	0	\$5.
Postage	1	Mailings	\$10.00	\$10.	0	\$10.
Mileage	300	Miles	.44	\$132.	0	\$132.
Total for Task #5				\$1,747.	0	\$1,747.
Percentages				100%	0%	100%
Cost per foot of channel treated (15500 ft)					\$0.00/ft	
Task #6: Final Report						
Administration:				0	0	0
Direct Labor Costs:						
Project Manager	20	Hours	\$80.00	\$1,600.	0	\$1,600.
Direct Costs:						
Final Report	20	Pages	1.00	\$20.	0	\$20.
Binders	2	Each	\$5.00	\$10.	0	\$10.
Postage	2	Mailings	\$20.00	\$40.	0	\$40.
Mileage	100	Miles	.44	\$44.	0	\$44.
Total for Task #6				\$1,714.	0	\$1,714.
Percentages				100%	0%	100%
Cost per foot of channel treated (15600 ft)					\$0.00/ft	
Total Budget				\$140,345.	\$102,200.	\$38,145.
Percentages				100%	73%	27%
Cost per foot of channel treated-15,500					\$6.60/ft	

Supplemental Information:

- AWPf Commissioner Comments 10/20/08 Addressed
- AWPf Staff Comments 8/6/08 Addressed
- Project Area Description
- State Historic Preservation Office (SHPO) Review Form
- Project Site Photographs
- Key Personnel
- Description of Plans
 - Rabbitbrush Treatment Plan
 - Riparian Vegetative Photo Monitoring Plan
- Description of Existing Plans/Reports
- Description of Conservation Easement Presentation
- Letters of Community Support
- Evidence of Physical and Legal Availability of Water
- Evidence of Control and Tenure of Land

SUPPLEMENTAL INFORMATION: 2008 AWPf Commissioner Comments Addressed

The following comments by AWPf Commissioners and staff were recorded as Minutes of the meeting held on 10/20/08, during which 2008 grant awards were made. The *WPF0369 EC Bar Ranch Riparian Brush Control Project* was not awarded. While the AWPf grant process allows many months for Commissioner review, staff review, comments from the public, other agency review, and questions during oral presentation, Commissioners raised a number of issues, questions, and concerns at the meeting which did not allow a Grantee response. While each comment is addressed below, they have also been addressed in the current proposal. The Grantee is prepared to elaborate and respond to any further comments from Commissioners and staff during the grant review process.

AWPf Commission's comments regarding WPF0369: EC Bar Ranch Riparian Brush Control Project are in italics, followed by responses:

1. *Commissioner Brick stated that he is concerned that some of the brush control is a half mile away from the stream and questioned how much it would really improve the riparian area. Reply:* The 2008 grant proposal, and written Grantee responses to AWPf staff comments, stated the Rabbitbrush treatments were to take place in the FEMA 100 year floodplain plus 100 ft buffer on each side, including about 3 miles of riparian corridor (reaches 1, 2, 2A, 3, 4, 6, and 8). The current proposal describes the Project Area as 94.20 acres covered by a conservation easement along 15,500 feet of stream channel (3 miles) covering reaches 1-6. There was never any intent to treat any Rabbitbrush growing more than 100 ft on each side of the creek.
2. *Commissioner Olson stated that he had the same concern. The area is uphill and actual impacts on flows to the stream would most likely be minimal. He tried to look into it more extensively and can understand a little bit about the root mass of the rabbit brush, however he is concerned about some of the treatment locations. Reply:* The same reply as in #1 applies to this comment.
3. *Chairperson Light stated that she did some additional research and found that rabbit brush is identified as a native drought tolerant species that can be used as winter browse for some species in the area. She questioned the benefit of spending \$142,942 to replace a native drought tolerant plant (rabbit brush) with western wheatgrass. Reply:* Rabbitbrush is drought tolerant because the taproot can grow up to 40 feet deep to find water in the water table, which is not available to grasses growing on the surface that may wick moisture five feet deep. An estimated 50,000 Rabbitbrush plants growing in the Project Area, which includes 15,500 feet of Nutrioso Creek active channel and floodplain within the FEMA 100 year floodplain plus 100 ft wide buffers on each side, are consuming large quantities of water that might otherwise be released into the stream channel as flow and to support native riparian vegetation. The NRCS visited the Project Area and concluded in a Trip Report dated 4/6/09 that the number of Rabbitbrush growing in the Project Area should be reduced by 95%, which means about 47,000 plants are invasive and should be eradicated. NRCS recommended that no overseeding of treated sites be done, but that livestock grazing is deferred for two growing seasons following treatments. Vegetation that will cover treated sites is less dependent on the water table than Rabbitbrush. No browsing by livestock or wildlife on Rabbitbrush has ever been observed. The current proposal has a treatment cost of \$5.74 per foot of channel.
4. *Commissioner Keane agreed with the comments and added that there could be benefits with this type of project in areas that have been historically overgrazed. He stated that although this project is being presented as a riparian improvement project, he believes that fundamentally it is a range improvement project. Reply:* The Nutrioso Creek TMDL for Turbidity Report, written in 2000 by ADEQ, specifically identified the non-point source of turbidity as historic overgrazing by livestock and elk. Such activities caused streambanks to erode and become incised leading to levels of turbidity that exceeded water quality standards. Nutrioso Creek was placed on the Clean Water Act Section 303(d) list as a non-attaining waterbody. After the Grantee implemented best

management practices to voluntarily address ADEQ concerns, in August 2009, the ADEQ and Environmental Protection Agency (EPA) removed Nutrioso Creek from the 303(d) list. This was the first instance in Arizona where a non-attaining waterbody has been delisted due to mitigation. The response to #1 also applies in this case. The definition of a riparian corridor includes the Nutrioso Creek stream channel and active floodplain, which the Federal Emergency Management Agency (FEMA) describes as the FEMA 100 year floodplain. Buffers are important to prevent erosion and nutrients from entering the floodplain. The proposed project includes the FEMA 100 year floodplain plus 100 ft buffers on each side therefore it qualifies as a "riparian improvement project". It is not a range improvement project.

5. *Chairman Light asked staff for information regarding earlier fencing projects that were funded to keep cattle and elk out of the riparian area so that the stream channel could be restored. Reply: No AWPf project has funded livestock or elk proof fencing. The entire 94 acre Project Area is fenced to exclude elk and control livestock.*
6. *Mr. Held affirmed that the applicant has installed a lot of elk exclosure fencing that was partially funded by the Commission. The Commission also funded the installation of an off-channel drinker that was located outside of the elk exclosure. Mr. Held stated that he believes the applicant received a grant from the Arizona Game and Fish Department to install a water gap, but he could not remember the details of how that changed the fencing that AWPf paid for. Reply: The following AWPf projects have been completed, none of which included any fencing:*
 - *AWPF 98-046WPF EC Bar Ranch Water Well Project, started 5/99 and completed 3/02, to develop two off-channel wells and livestock drinkers so a watergap in riparian fencing could be permanently closed. This project has been operated and maintained by the Grantee.*
 - *AWPF 99-067WPF EC Bar Ranch Wildlife Drinker Project, started 12/99 and completed 5/03, funded installation of off-channel drinkers for use by wildlife and livestock. Monitoring of elk activity was also performed. The drinkers were placed outside existing elk fencing. This project has been operated and maintained.*
 - *AWPF 03-05WPF EC Bar Ranch Reach 8 Water Well and Drinker Project, started 10/4 and completed 9/05, funded development of an off-channel well and drinker for the purpose of closing a watergap in reach 8. The well later proved insufficient for the intended purpose, but the Grantee drilled a new well at his expense to supply the drinker, which has been operated and maintained.*
7. *Commissioner Uhlman asked if the applicant would continue grazing after the area was planted with western wheatgrass. Reply: The 2008 grant proposal stated that livestock grazing would not occur in the Project Area for three growing seasons following treatment. The current proposal has adopted NRCS recommendations to allow existing vegetation to naturally revegetate treated sites and defer grazing in the growing season for two years following treatments.*
8. *Mr. Held responded that he believed rest rotation grazing would occur. Reply: See #7.*
9. *Ms. Erlandsen stated that according to the staff review, the applicant will manage grazing on a rest rotation basis during the growing season. Reply: See #7.*
10. *Chairperson Light stated that according to Commissioner Bears comments evapotranspiration rates for western wheatgrass were not adequately discussed. The rate was not calculated and added to the overall water calculations/equations. Reply: Commissioner Bears comments were not included in the minutes provided by Mr. Held, so no response is possible. However, the 2008 grant proposal stated that the purpose of the ET calculations was to approximate water consumption for Rabbitbrush, which consumes water from the water table, whereas the roots of Western Wheatgrass growing on the surface of upper streambanks and in buffers, cannot reach*

the water table so are fully dependent on natural precipitation. The proposed project was not intended to research ET rates, but to only approximate consumption of an estimated 50,000 Rabbitbrush. The 2010 proposal is compatible with the NRCS Trip Report which identified Rabbitbrush as an invasive species in the Project Area, endorsed treatment methods, and recommended 95% of Rabbitbrush should be eradicated, without any overseeding of treated sites.

11. *Commissioner Uhlman asked if that meant planting the grass would ultimately cause less flow.* Reply: Planting grass and/or allowing existing grass to revegetate treated sites, will not cause less flow. See #12 comment from Commissioner Olson.
12. *Commissioner Olson stated that he believes the applicant would argue that the wheatgrass would subsist mainly on rainfall given its shallow root mass. This would allow for more flow in the stream. Commissioner Olson stated that Mr. Crosswhites letter to Mr. Held states that he believes that there will be a high potential to permanently increase flows during the growing season. The applicants letter also indicates that this project will benefit fish and wildlife by providing mitigation that will preserve flows.* Reply: Commissioner Olson correctly stated the Grantee's position, which is based on many years' of restoration activities and observations of stream flows. It also includes experience gained from temporarily adding groundwater during severe drought as a method of maintaining stream flows to prevent mass extinction of native fish populations, including a federally listed fish species. Based on experiences, a supplemental source of water at 100 gpm may be sufficient to keep most pools connected and save a substantial percentage of the fish populations. The Grantee believes the proposed project may supplement instream flows by at least 50 gpm during the growing season, when water is normally released from the banks.
13. *Commissioner Bray stated that it appears the project would be improving private property and he is concerned that there is no public access. He asked if the Commission has ever required a conservation easement as a condition of improving private property to insure some protection for future benefits of that property.* Reply: The proposed project will improve private property that is covered by a conservation easement for the long-term public benefit, but prohibits unlimited public access. Group tours may be allowed. State and federal agencies have discouraged unlimited public access to the Nutrioso Creek riparian corridor. Commissioner Bray made a very good point that the long term improvement benefits are ensured with the monitoring and enforcement provisions carried out by a qualified land trust.
14. *Mr. Held stated that the AWPf does not pay for conservation easements and has never required such an action. We do encourage people to consider that option. Conservation easements are considered real property, which AWPf is prohibited from purchasing by statute.*
15. *Chairperson Light stated that it would be good to have a future discussion regarding conservation easements.* Reply: The current proposal includes Task #5 to provide information to Commissioners about the EC Bar Ranch Conservation Easement and the relationship to the improvements made to the easement property.
16. *Commissioner Keane stated that he wanted to address Commissioner Brays question about improving private property with no public access. The question has come up many times over the years. He believes an argument can be made that there are benefits to improving property where there is no public recreational access, if there will be demonstrated benefits to the State (e.g. improvements to riparian habitat that will increase the States wildlife habitat, or improved water quality through the reduction in soil erosion).* Reply: Riparian areas are especially sensitive to damage caused by uncontrolled human and animal activities. The EC Bar Ranch Conservation Easement prohibits unlimited public access, but does allow group tours for educational purposes. In April 2010, the Little Colorado River LC&D Board toured a portion the easement property to learn about successful riparian restoration on Nutrioso Creek.

17. *Commissioner Kirchner asked if there could be a definition of livestock grazing opportunity cost for \$15,000.00.*

18. *Evelyn Erlandsen indicated that is the value the applicant determined was his loss for not grazing during project improvements.* Reply: The proposed project will defer grazing for 2 growing seasons following treatments. Grantee will absorb the cost of livestock feeding expenses resulting from deferred grazing of the Project Area estimated at \$10,000.

19. *Commissioner Kirchner stated that when he first saw the proposal he was concerned that the matching funds compared to their request were two very different numbers. He was hoping to see larger matching funds, especially on a grant request that has been rated as medium-priority.* Reply: The proposed project includes Grantee match of \$38,145 or 27% of the total budget.

20. *Chairman Light called for other comments. There were none. Grant application not awarded.*

In summary, the first four questions were related to the treatment location, which was critical to qualifying the project for AWPf funding. The 2008 grant proposal included maps and descriptions of the Project Area, which was further clarified in writing to AWPf staff, as the FEMA 100 year floodplain plus 100 ft buffers on each side for 3 miles of Nutrioso Creek stream channel located in the 100 acre Project Area. The current proposal is to treat Rabbitbrush in 94 acres covered by the EC Bar Ranch Conservation Easement, which includes 15,500 feet of Nutrioso Creek active channel and floodplain within the FEMA 100 year floodplain plus 100 ft wide buffers on each side of the floodplain. The Project Area has been surveyed, pinned, and the plat recorded along with a legal description. While Rabbitbrush has continued to proliferate over the past two years, the Grantee has used the time to improve the proposal with field trips by state and federal agencies and riparian experts who have addressed concerns in the 2008 proposal and provided written support for the project.

While the appropriate level of landowner match in the minds of Commissioners is unclear, the proposal includes match of \$38,145, or 27% of the total \$140,345 project budget. In addition, the Grantee asks Commissioners to consider that out of \$2 million already invested in restoration, including fencing and vegetative plantings essential to be completed prior to eradication of Rabbitbrush, the Grantee has matched over \$1 million, or 50%, from his own resources. In 2009-2010, fencing, drinkers, and livestock bridge projects completed or underway in reach 5 have totaled \$110,000 with \$30,000 in match plus the Grantee donated a conservation easement covering the Project Area valued at \$500,000 plus \$50,000 in cash contributions.

All questions and concerns expressed by Commissioners and staff about the 2008 project are addressed in the current proposal.

SUPPLEMENTAL INFORMATION: 2008 AWPf Staff Comments Addressed

AWPF staff comments dated 8/6/08 for Application WPF 0369 titled: EC Bar Ranch Riparian Brush Control Project are summarized in italics with a response related to the FY2011 proposal.

Evaluation Criteria:

River, Stream and Riparian Resources

Protects/Restores native riparian vegetation and habitat

The 2008 proposal moderately demonstrated that eradication of Rabbitbrush may reduce water consumption helping to make water available to native vegetation within Nutrioso Creek. Reply: The 94 acre FY2011 Project Area consists of the FEMA 100 year floodplain plus 100 ft buffers on each side of the floodplain. Any Rabbitbrush growing in the Project Area is consuming water, with a determination of the exact quantity not required to meet goals and objectives of the proposal. When a Rabbitbrush plant is eradicated by first mowing above ground foliage and then applying a spot herbicide application, nearby vegetation will replace the Rabbitbrush plant. Water previously consumed by Rabbitbrush will be available to other vegetative species, whether growing in the floodplain, streambanks, and/or buffer areas. The NRCS Trip Report dated 4/6/09 recommends this treatment method to restore vegetative species diversity in Nutrioso Creek.

Restores proper hydrologic conditions/functions

The 2008 project moderately demonstrated that reduction in Rabbitbrush will assist in restoring proper hydrologic conditions/functions thereby allowing more water to riparian habitats. Reply: In a letter dated 1/8/10, Tom Subirge, Riparian Coordinator, Apache Sitgreaves National Forest, discussed findings in a the Proper Functioning Condition survey he completed September 2, 2009, by stating that Rabbitbrush growing between 3 feet to 15 feet above the stream outside the active floodplain were consuming water from the water table and upsetting the hydrologic process whereby water is stored in banks during high flows and released into the stream during low flows. The FY2011 project will eradicate Rabbitbrush in the FEMA 100 year floodplain and 100 ft buffers on each side so water they had been consuming from the water table may be released to restore proper hydrologic conditions/functions for the benefit for riparian habitats.

Restores proper stream geomorphology/channel characteristics, floodplains, and wetlands

The 2008 proposal included a task to revegetate sites where Rabbitbrush was eradicated with Western wheatgrass. The FY2011 proposal follows recommendations in the NRCS Trip Report not to overseed treated sites, but to defer grazing for two growing seasons to allow vegetation surrounding the treated sites to naturally replace Rabbitbrush. On 7/30/10, Dave Fisher, District Conservationist, Springerville FO, Arizona NRCS, expanded on reasons for not overseeding treated sites: "When you mow rabbitbrush, the amount of plant litter on the soil surface is significantly increased. Plant litter protects the soil surface from erosion by intercepting raindrops prior to striking the soil surface. Since rabbitbrush is somewhat woody, the litter will also take a longer time to break down than herbaceous (grass) litter and will thus provide protection to the soil surface for an adequate amount of time to let the adjacent grasses fill in the areas formerly occupied by rabbit brush. Adjacent grasses will not be affected by a systemic herbicide that is applied directly on the rabbitbrush stump and/or exposed root." Mr. Fisher also stated: "Due to the high volume of rabbitbrush litter that will likely be generated by the mowing, it may be difficult to establish a good stand of grass by seeding in these areas. Broadcast seeds may or may not work their way through the litter and into the soil. Mechanically drilling the seed is not feasible for individually treated plant sites." Mr. Fisher reiterated that grazing should be deferred for two growing seasons following treatments to allow adjacent grasses to fill in sites.

Some of the existing species' that may cover treated sites in the FEMA 100 year floodplain include Alder, narrowleaf cottonwood, shiny willow, strapleaf willow, coyote willow, Nebraska sedge (*Carex nebraskensis*), bulrush (*Scirpus subterminalis*), baltic rush (*Juncus balticus*), cat tails (*Typha latifolia*), wheatgrass, globe mallow, hair grass, clover (*Melilotus alba*), wild rose (*Rosa arizonicum*), and cinquefoil (*Potentilla anserina*). Existing species that may cover treated sites on 100 ft buffers include western

wheatgrass (*Agropyron smithii*), blue grama (*Bouteloua gracilis*), squirreltail (*Sitanion hystrix*), sideoats grama (*Bouteloua curtipendula*), sand dropseed (*Sporobolus cryptandrus*), muttongrass (*Poa fendleriana*), Junegrass (*Koeleria pyramidata*), hairy grama (*Bouteloua hirsute*), wheatgrass (*Agropyron spicatum*), Snakeweed (*Chrysothamnus nauseosus*), Skunkbush (*Rhus trilobata*), geranium (*Geranium californica*).

Fish and Wildlife Dependent on River, Stream and Riparian Resources

Staff comments concluded the 2008 proposal would protect/restore habitat needs, decrease negative impacts of non-native species, and protect/restore river, stream and riparian resources that will benefit state listed species of special concern and federally listed species. Reply: The FY2011 proposal meets the same criteria as the 2008 proposal. In addition, the FY2011 Project Area is protected by a conservation easement that preserves aquatic/wildlife habitat for natural resources in Nutrioso Creek with monitoring and enforcement in perpetuity by the New Mexico Land Conservancy.

Feasibility

Objectives clearly identified and demonstrate direct benefits to riparian dependent fish and wildlife. Reply. Neither the 2008 proposal or FY2011 proposal are research projects, so the water consumed by Rabbitbrush after eradication that may be available to riparian resources is difficult to quantify. However, support for the FY2011 proposal from the Arizona Department of Environmental Quality, Natural Resources Conservation Service, US Fish and Wildlife Service, US Forest Service, Audubon Arizona, Little Colorado River LC&D, New Mexico Land Conservancy, and other experts identify and demonstrate direct benefits to riparian dependent fish and wildlife.

Methodologies and designs clearly presented and adequate. Staff indicated the 2008 proposal was adequate. Reply: The FY2011 proposal uses the same treatment methods, eg mowing and spot chemical treatments, with photo monitoring used to document treatments.

Clarity and adequacy of the scope of work and deliverables. Staff indicated the 2008 proposal was adequate. Reply: The FY2011 proposal uses the same scope of work.

Cost/benefit compared to other similar applications. The 2008 proposal rated a Medium cost and medium benefit. Reply: The FY2011 proposal has reduced the AWPf cost share by increasing landowner match. The Project Area is now protected by a conservation easement and clearly encompasses 3 miles of continuous perennial stream channel adjoining the US Forest Service downstream.

Expertise of applicant appropriate. Staff indicated a high level of expertise. Reply: The FY2011 has the same level of expertise.

Description of the relationship between existing plans to the proposed project.

Staff indicated the 2008 proposal was supportive of existing plans, etc. Reply: In addition to plans and reports in 2008, the FY2011 includes specific support in 2009 and 2010 for the project from NRCS Trip Report, FWS letter, FS letter, Proper Functioning Condition survey, and others.

Monitoring

The 2008 proposal objectives were clearly identified and methods clearly presented. Reply: The FY2011 proposal uses the same monitoring criteria.

Other Considerations

The FY2011 proposal includes more letters of support than the 2008 proposal.

Matching Funds

In 2008, the total project budget was \$142,942, which was 100% AWPf share. Match was \$15,000 in livestock grazing opportunity cost related to deferred grazing after treatments. In FY2011, the total

budget is \$140,345, with 73% or \$102,200 as AWPf share, including \$89,000 for treatment expenses, and 27% or \$38,145 as landowner match. The landowner will absorb \$10,000 in grazing opportunity costs or loss of income related to deferred grazing of the Project Area for two years.

Public Outreach

The 2008 proposal had no public outreach. Reply: The FY2011 proposal includes Task #5 in which the Grantee shall present information about the EC Bar Ranch Conservation Easement on one occasion during the project period to the AWPf Commission.

Summary

River, Stream and Riparian Resources

The 2008 proposal had a moderate potential to improve fish and wildlife populations and habitats by adding some increase of water flow to Nutrioso Creek as a result of eradicating Rabbitbrush. However, other impacts exist and will continue to exist that have caused decline in water flow including water diversions and drought. Reply: The AWPf staff correctly point out that the eradication of Rabbitbrush will eliminate consumption of water by this invasive species leading to "some increase of water flow", which will improve the hydrology, soils, and vegetative conditions of Nutrioso Creek, an important perennial stream near the headwaters in the Nutrioso Watershed, which feeds into the Little Colorado River. A federally listed fish species resides in the creek, thus any permanent increase in water is important to the survival of this species and encouraged by state and federal agencies as described in the FY2011 proposal. Furthermore, AWPf staff correctly points out that water diversions exist under the Norviel Decree, which allows surface water diversions for beneficial irrigation purposes, and Arizona water law requires periodic use to avoid forfeiture of water rights. The Grantee has no power to neither terminate water diversions nor prevent drought. The Grantee has taken steps to efficiently use water diversions through piping, storage tanks, sprinklers, and adoption of NRCS recommended irrigation water and nutrient management plans and development of an irrigation water management agreement with water rights holders. In 2010, the Grantee severed and transferred water rights by Superior Court Order from the easement property (Project Area) to other locations used for irrigation to reduce and avoid erosion into the stream and FEMA 100 year floodplain.

During 2005, one of the most severe droughts ever recorded in eastern Arizona caused flows upstream and downstream from the EC Bar Ranch to dry up for many months. In 2005, the Grantee temporarily supplemented flows in reach 1 by 100 gpm that kept pools connected through reach 3 resulting in survival of native fish populations, including a federally listed fish species. From this and similar experiences, the Grantee has concluded that implementation of best management practices leading to greater bank storage supplemented by a small amount of additional water may be sufficient to maintain a flow critical to fish populations and other riparian dependent wildlife during extreme droughts that may occur in the future.

The FY2011 proposal creates a permanent new source of water, albeit an unknown quantity, that benefits natural resources and aquatic/wildlife habitat consistent with policies encouraged and supported by state and federal agencies for the long term public benefit, which is assured by the EC Bar Ranch Conservation Easement.

Fish and Wildlife Resources Dependent on River, Stream and Riparian Resources

The 2008 proposal had a moderate potential to enhance fish and wildlife populations and habitats through potentially increasing water flow to Nutrioso Creek by reducing ET rates from Rabbitbrush. However, it's difficult to determine the direct benefit to wildlife when other factors are involved. For instance, water diversions and drought will most likely continue and provide a level of uncertainty to the future water flows in Nutrioso Creek. Reply: The Grantee fully agrees that: "water diversions and drought will most likely continue and provide a level of uncertainty to the future water flows in Nutrioso Creek." In fact, for this reason, the FY2011 proposal should receive a high priority for funding because the eradication of Rabbitbrush is an incremental step toward restoration. The Grantee has implemented

substantial improvements that have been judged successful by state and federal agencies in support of further restoration, as well as, protection of the Project Area by donation of a conservation easement.

Feasibility

Staff indicated the 2008 proposal was highly feasible, however the additional water to Nutrioso Creek through reduction of Rabbitbrush ET rates was moderately demonstrated because it is difficult to determine the amount of water that will benefit the creek. Also, the probability of continued drought and water diversions is likely to continue. **Reply:** The 2008 and FY2011 proposals are not research projects, so neither was designed to measure the quantity of additional water that will benefit the creek. However, the FY2011 proposal advances the case for Rabbitbrush eradication because persons completed field visits in 2009 with expertise from the Natural Resources Conservation Service, US Fish and Wildlife Service, US Forest Service, Audubon Arizona, Little Colorado River LC&D, and New Mexico Land Conservancy, then provided written support for the project. Occasional drought and water diversions have been part of the stream dynamics for over 120 years while historical overgrazing by large ungulates has occurred. Yet, the Grantee has reversed the downward trend and restored proper functional conditions for hydrology, soils, and vegetation that have improved water quality and aquatic/wildlife habitat to high standards recognized by state and federal agencies.

Monitoring

Staff concluded that photo monitoring in the 2008 proposal was adequate to document Rabbitbrush eradication. **Reply:** The FY2011 proposal uses the same photo monitoring sites and protocols. The Grantee performed photo monitoring in 2009 and 2010. He also completed a Proper Functioning Condition (PFC) survey in 2009 that documented the excessive numbers of invasive Rabbitbrush plants were detrimental to continued recovery.

Other Considerations

Staff recommended consideration of the long term operation and maintenance of the project, noting that no conservation easement exists for the project area. They indicated a preliminary subdivision plat had been recorded in 2007 titled EC Bar Ranch Estates. **Reply:** The Grantee has provided photos in the FY2011 proposal documenting that Rabbitbrush eradicated in 2001 has not reestablished in treated areas after 10 years. However, establishment of new plants is a natural phenomenon which Grantee has no control. For this reason, the Grantee has requested the standard 20 year operation and maintenance requirement for AWPf projects be waived entirely, or reduced to 3 years following the end of the project period. The EC Bar Ranch Conservation Easement covers the FY2011 Project Area. Easement provisions prohibit real estate development, splits, new construction, and protect natural habitat, open spaces, and agricultural values in the 94 acres including the FEMA 100 year floodplain and 100 foot buffers on each side. The Grantee donated the easement to the New Mexico Land Conservancy in November 2009. The Conservancy has visited the Project Area on numerous occasions and supports the eradication of Rabbitbrush as a method of restoring conservation values for the long term public benefit.

When the Grantee created the 94 acre EC Bar Ranch Conservation Easement within a 389 acre contiguous parcel, he was required to follow the Arizona State subdivision ordinance governing land splits. Part of his land adjoining the easement property was split into the EC Bar Ranch Estates subdivision so that deed restrictions (Covenants, Conditions, and Restrictions or CCR's) prohibiting development adjacent to the easement property could be monitored and enforced in perpetuity by a Property Owners Assn. Other land adjoining the easement property was split under Minor Land Division rules, with deed restrictions protecting land adjacent to the easement property. The Community Development Department and Apache County Board of Supervisors approved actions required under State law. Land splits made it possible to sever and transfer surface water rights out of the easement property to upland pastures so 100 ft buffers could function properly to filter nutrients and prevent erosion from entering the stream channel. Over time, as a limited number of lots are sold, lot owners may volunteer their services to maintain the easement property by controlling noxious weeds and invasive species, including Rabbitbrush. The combination of a conservation easement, subdivision, and minor land divisions will ensure natural habitat, open spaces, and agricultural values are preserved, noxious

weeds and invasive species are controlled, and fencing maintained within the easement property and on adjacent lands over the long term. The FY2011 proposal includes Task #5, which presents information about the EC Bar Ranch Conservation Easement to Commissioners.

GENERAL COMMENTS:

In 2008, AWP staff stated "The ability for this project to maintain these improvements for the long term depends on the future use of the land and what protections will be put in place." **Reply:** The FY2011 proposal includes substantially more land use protections in the form of a conservation easement and deed restrictions on land adjacent to the easement property which will be monitored and enforced by multiple qualified organizations over the long term. These conditions are superior to other private lands in Nutrioso because no other landowners have made similar deed restrictions with monitoring and enforcement provisions to preserve conservation values over the long term. Furthermore, public lands that surround the Grantee's property are owned by the US Forest Service and administered by bureaucrats that come and go with no personal ownership or interest in the land they administer. Historically, Forest Service policies have ranged from extensive over-use by grazing and timber production to non-use and recreational purposes. Over the last 10 years, the Grantee has improved 3 miles of riparian conditions in the Project Area from "non-functional" to "proper functioning condition", whereas downstream on the Apache Sitgreaves National Forest, conditions are still rated "non-functional". Actions taken by the Grantee will ensure long term preservation and protection of the Project Area whereas other private lands and public lands in Nutrioso have no such protections.

In 2008, AWP staff stated: "US Fish and Wildlife Service commented that planting the area with seed mix would provide more vegetation diversity." **Reply:** The FWS made this comment without visiting the Project Area. On February 3, 2009, Dave Smith, a FWS biologist, visited the Project Area. He also reviewed the NRCS Trip Report dated 4/6/10 which described the need for treating Rabbitbrush, methods, and recommended that instead of overseeding, deferred grazing be used to allow existing vegetation to replace treated Rabbitbrush sites. The FWS supported the proposal, including the NRCS findings, in a letter dated July 8, 2009. The FY2011 proposal follows recommendations of NRCS and FWS that overseeding treated sites with a seed mix is not needed.

The FY2011 proposal provides for deferral of livestock grazing for two growing seasons following treatments to allow vegetation adjacent to treated sites to naturally replace Rabbitbrush. The Grantee follows a rest-rotation grazing management plan recommended by the NRCS, with monitoring and reporting performed annually under the NRCS Conservation Stewardship Program. The Grantee has a 15 year track record of successful conservation projects that depend on effective grazing management. Generally, the Grantee allows riparian pastures in the Project Area to produce forage during the growing season and then utilizes the forage in the dormant winter months of October and November. The Grantee does not maintain a herd of cows from December through April.

TECHNICAL

Recommendations by staff in 2008 have been incorporated into the Rabbitbrush Treatment Plan.

ADMINISTRATIVE, POLICY, INSTITUTIONAL FACTORS:

In 2008, AWP staff stated: "It is unclear how the applicant will be responsible for maintaining project improvements given that the land has received a preliminary plat with Apache County and there is no conservation easement currently in place." **Reply:** The FY2011 proposal addresses these concerns by protecting the Project Area by the EC Bar Ranch Conservation Easement and adjacent lands with deed restrictions (CCR's) which will be monitored and enforced by qualified organizations over the long term.

CONTRACT CONDITIONS THAT WILL NEED TO BE ADDED:

Major: Staff indicated that coordination with US Fish and Wildlife Service should be required under Task #1 Permits, Authorizations, Clearances, and Agreements. **Reply:** The FY2011 proposal addresses concerns over chemicals, buffers, and treatments in the Rabbitbrush Treatment Plan.

SUPPLEMENTAL INFORMATION: Project Area Description

The 94.20 acre Project Area is identical to the 94.20 acre property covered by the EC Bar Ranch Conservation Easement. Attachment #1 is a Survey of the easement property recorded as document 2009-00735 on 11/5/09 in Book 19LS Page 157 in Apache County, Arizona.

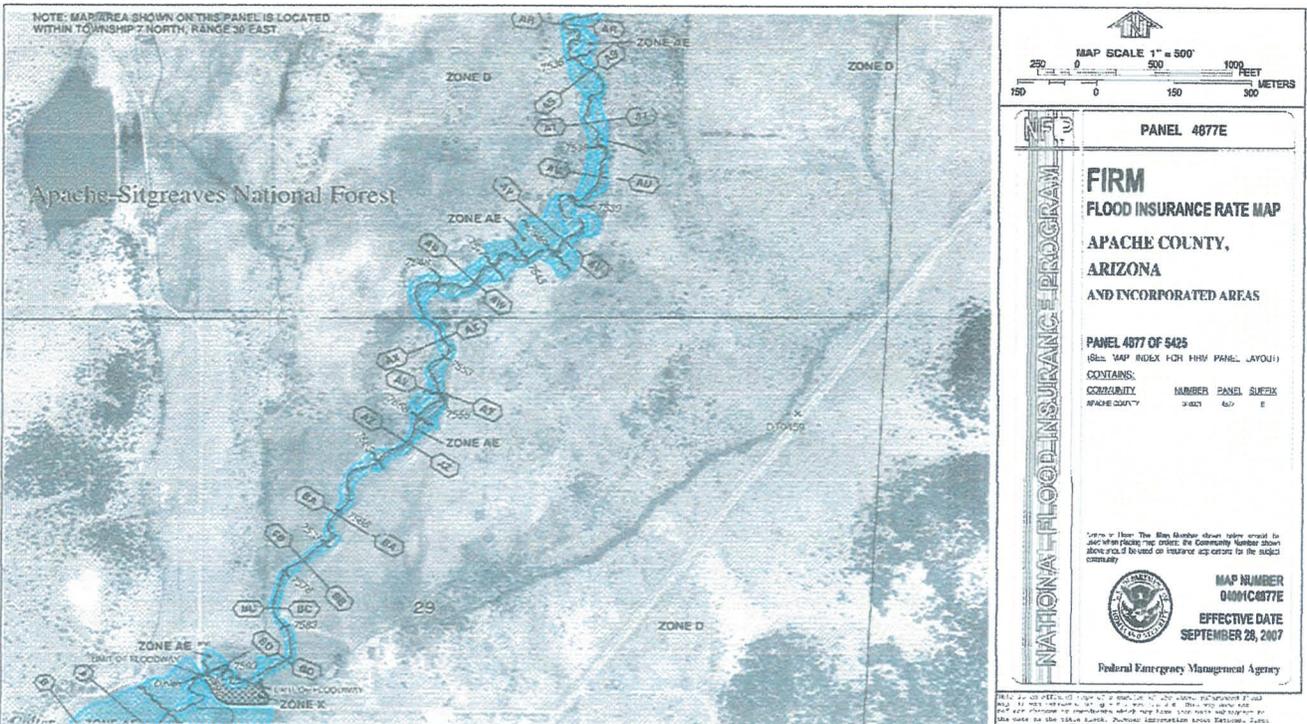
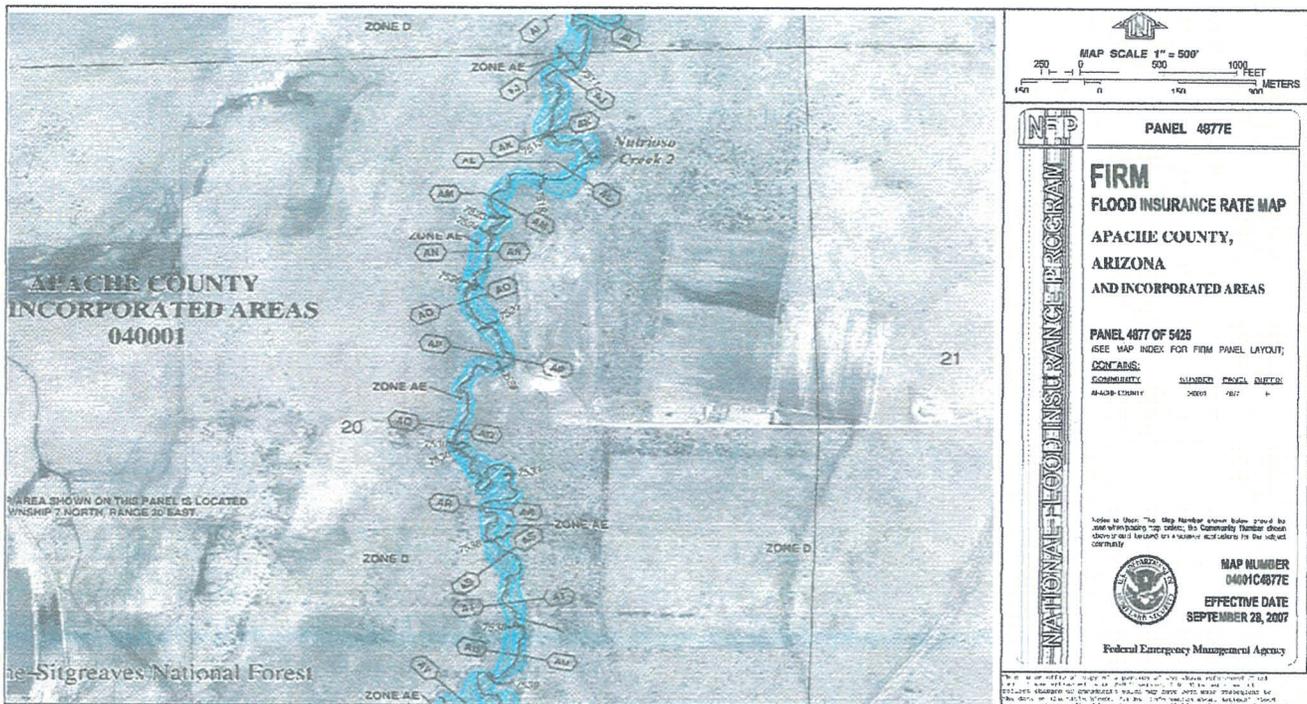
The Project Area is defined as 15,500 feet of Nutrioso Creek active channel and floodplain within the the Federal Emergency Management Agency (FEMA) 100 year floodplain plus 100 ft wide buffers on each side of the floodplain. The active stream channel and normal annual floodplain compose about 4.20 acres within the FEMA 100 year floodplain. Treatments will be applied to 90.00 acres since Rabbitbrush do not grow in the active channel and floodplain. Attachment #2 is a map of the FEMA 100 year floodplain. Attachment #3 is a map of the Project Area, including the FEMA 100 year floodplain and 100 ft buffers on each side. Attachment #4 is an aerial map of the 41.95 acre northern half of the Project Area shown inside a red line. Attachment #5 is an aerial map of the 52.25 acre southern half of the Project Area shown inside red line. Aerial photos depict the stream channel as a dark green and vegetation as lighter green, most of which is Rabbitbrush.

The Project Area encompasses 94.20 acres that includes stream reaches 1, 2, 2A, 3, 4, 5, and 6 for a total stream length of 15,500 feet or 2.95 miles. Stream reaches are used to designate a change in functional condition as described in the Riparian Vegetative Photo Monitoring Plan. The EC Bar Ranch Conservation Easement protects the 94.20 acres in the Project Area. The 100 ft buffer on the east side of the creek is 15,500 feet long which calculates an area of 36 acres, the west 100 ft buffer is 36 acres, and the FEMA 100 year floodplain calculates at 22 acres, averaging 62 feet in width for 15,500 feet. Buffers are part of the Project Area because no irrigation water or nutrients are applied on buffer strips and grazing is limited to the dormant season, just like the 100 year floodplain. The buffer areas on the EC Bar Ranch do not have any surface water rights, which means no surface water may be used in the buffer areas for irrigation purposes. State and federal agencies encourage landowners to leave a buffer strip between upland pastures and streambanks to filter run-off from upland pastures. Buffer strips are considered a best management practices (BMP) since they directly benefit the riparian corridor.

The 94 acre Project Area is covered by the conservation easement, which prohibits real estate development in the floodplain and on 100 ft buffer strips on each side of the floodplain. In addition, the landowner has placed deed restrictions on about 110 acres of irrigated pastureland and non-irrigated rangeland adjoining the easement property. The deed restrictions compliment easement provisions extending prohibitions against development for up to 200 feet on both sides of the creek, which effectively widen the protected area by 110 acres. The Conservancy will monitor and enforce easement provisions on the easement property in perpetuity, while a separate non-profit company will enforce deed restrictions on property adjoining the easement property. Ultimately, the easement may be expanded from 94 acres to about 200 acres, but only 94 acres would be considered as riparian corridor.

While the Project Area and easement property are 94 acres, the Grantee has voluntarily protected approximately 200 additional acres from real estate development and ensured deed restrictions will be monitored and enforced by non-profit organizations in perpetuity.

SUPPLEMENTAL INFORMATION: Project Area Description
Attachment #2. FEMA 100 Year Floodplain Map

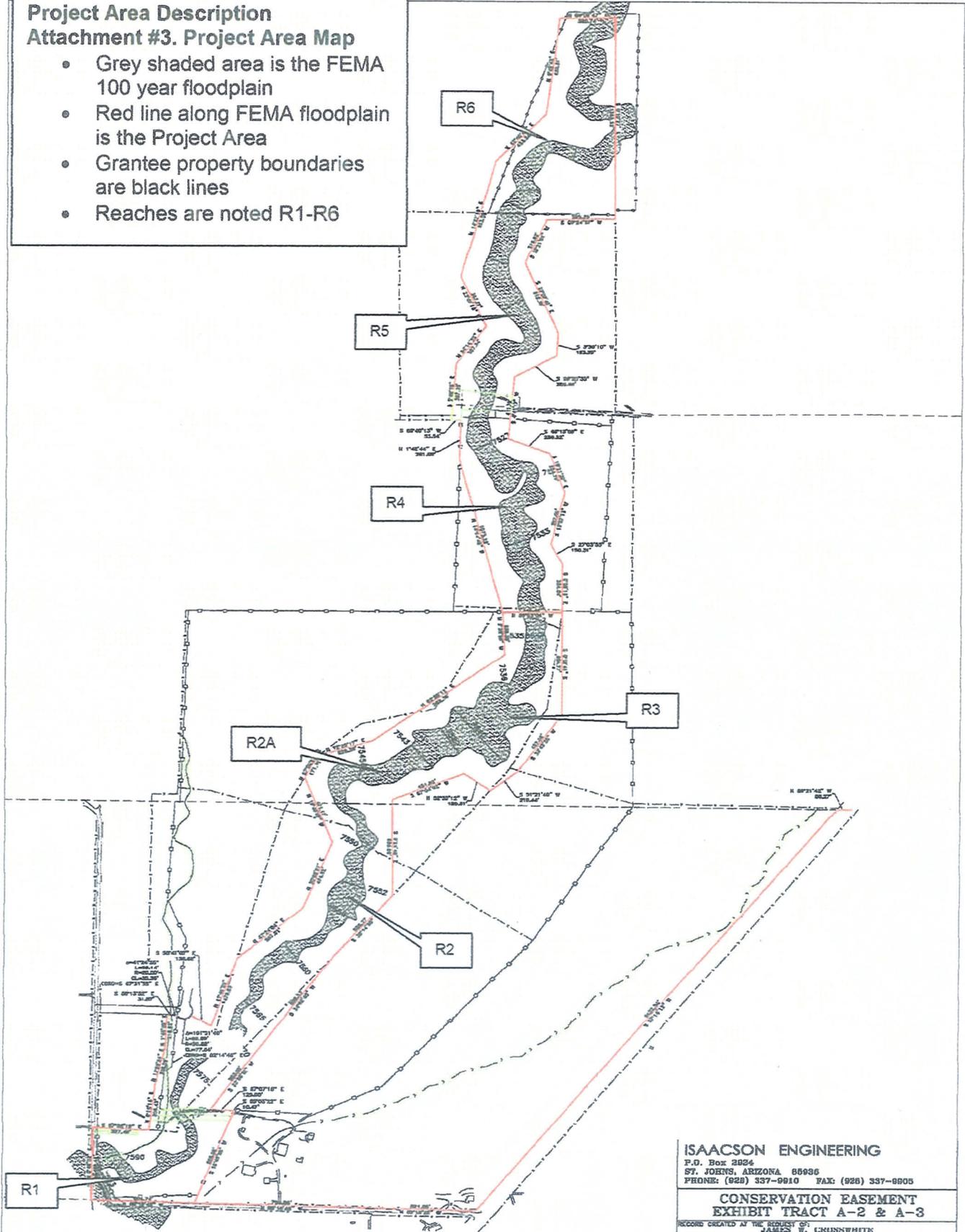


SUPPLEMENTAL INFORMATION:

**Project Area Description
Attachment #3. Project Area Map**

- Grey shaded area is the FEMA 100 year floodplain
- Red line along FEMA floodplain is the Project Area
- Grantee property boundaries are black lines
- Reaches are noted R1-R6

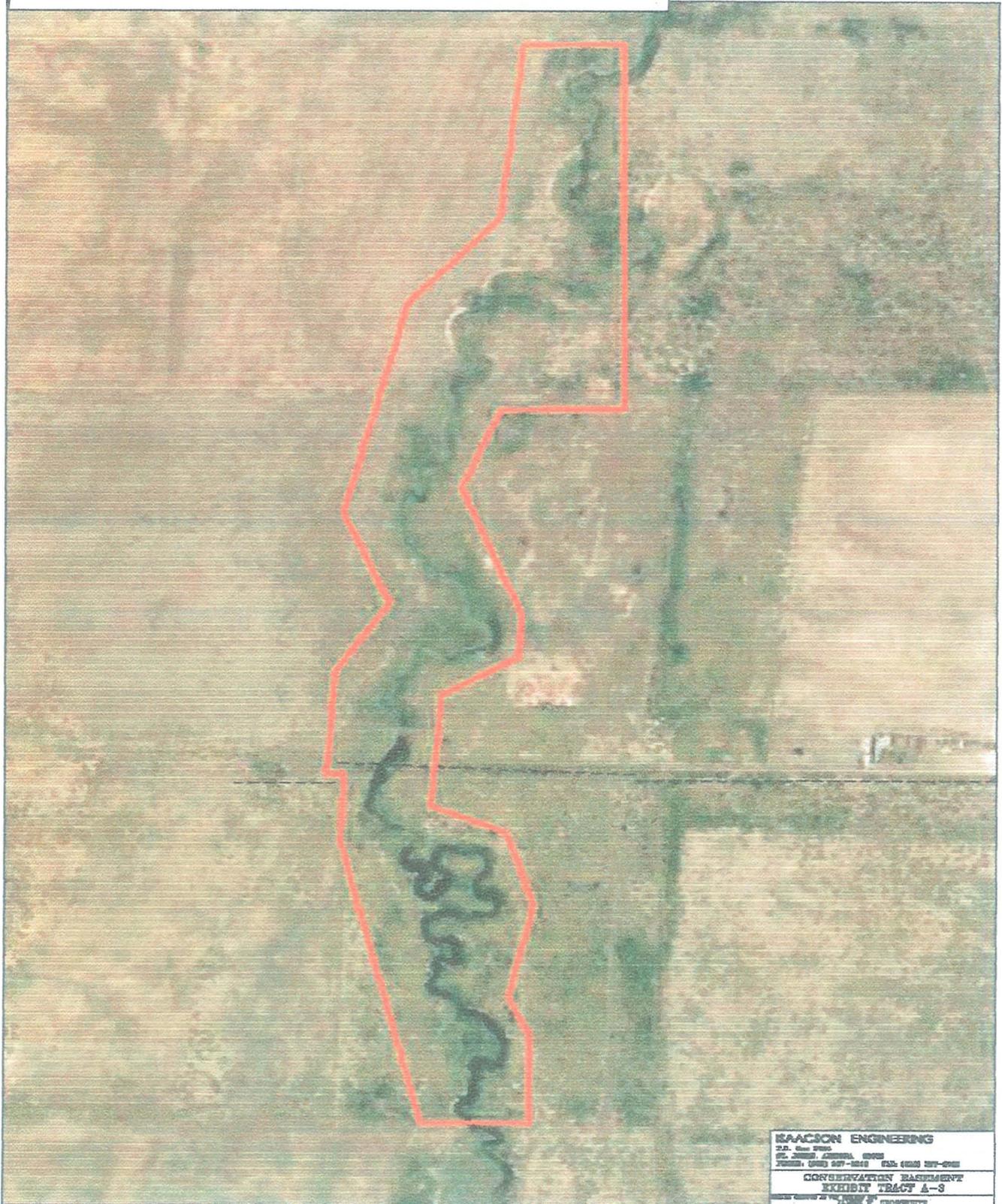
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CONSERVATION EASEMENT
EXHIBIT TRACT A-2 & A-3
RECORDS CREATED AT THE REQUEST OF:
JAMES W. CRUSSWITIK

SUPPLEMENTAL INFORMATION: Project Area Description
Attachment #4. North 41.95 acres of Project Area in red line



**SUPPLEMENTAL INFORMATION: Project Area Description
Attachment #5. South 52.25 acres of Project Area in red line**



SUPPLEMENTAL INFORMATION: SHPO Clearance

STATE HISTORIC PRESERVATION OFFICE Review Form

In accordance with the State Historic Preservation Act (SHPO), A.R.S. 41-861 *et seq.*, effective July 24, 1982, each State agency must consider the potential of activities or projects to impact significant cultural resources. Also, each State agency is required to consult with the State Historic Preservation Officer with regard to those activities or projects that may impact cultural resources. Therefore, it is understood that recipients of state funds are required to comply with this law throughout the project period. All projects that affect the ground-surface that are funded by AWPf require SHPO clearance, including those on private and federal lands.

The State Historic Preservation Office (SHPO) must review each grant application recommended for funding in order to determine the effect, if any, a proposed project may have on archaeological or cultural resources. To assist the SHPO in this review, the following information **MUST** be submitted with each application for funding assistance:

- A completed copy of this form, and
- A United States Geological Survey (USGS) 7.5 minute map
- A copy of the cultural resources survey report if a survey of the property has been conducted, and
- A copy of any comments of the land managing agency/landowner (i.e., state, federal county, municipal) on potential impacts of the project on historic properties.

OR

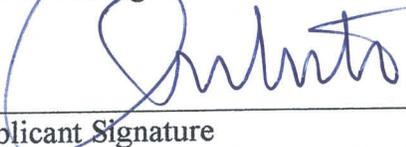
- A copy of SHPO comments if the survey report has already been reviewed by SHPO.

Please answer the following questions:

1. **Grant Program:** Arizona Water Protection Fund
2. **Project Title:** EC Bar Ranch Riparian Brush Control Project
3. **Applicant Name and Address:** James W. Crosswhite, PO Box 44, Nutrioso, AZ 85932
4. **Current Land Owner:** James Wayne Crosswhite LLC (James Wayne Crosswhite Trust Member) and EC Bar Ranch LLC (James Wayne Crosswhite Trust Member). James W. Crosswhite is Trustee and sole beneficiary of the James Wayne Crosswhite Trust.
5. **Project Location, including Township, Range, and Section:** Nutrioso Creek located in the FEMA 100 year floodplain plus 100 feet on each side. West of mile markers 414 and 415 on Highway 180/191 between Springerville and Nutrioso; Township 7 North, Range 30 East, Sections 20 and 29, Apache County, Nutrioso, AZ.
6. **Total Project Area in Acres:** 94.20 acres. See Map A showing Crosswhite property boundaries as black lines in Sections 20 and 29. See Map B showing 94 acre Project Area.
7. **Does the proposed project have the potential to disturb the surface and/or subsurface of the ground?** YES
8. **Please provide a brief description of the proposed project and specifically identify any surface or subsurface impacts that are expected:** Control and/or eradication of Rabbitbrush plants growing within the project area by a combination of mowing, root cutting within 4 inches of the surface by hand grubbing and/or mechanical methods and/or applying herbicides to the root. The intent is to kill the root by spot treating target plants. The active stream channel and floodplain of about 4.20 acres will not be treated.

9. **Describe the condition of the current ground surface within the entire project boundary area. Estimate horizontal and vertical extent of existing disturbance. Also attach photographs of project area to document condition:** The 94.20 project area includes approximately 3 miles of Nutrioso Creek stream channel, active floodplain, 100 year floodplain, and 100 ft buffers on each side of the creek. The ground is in a natural condition with no known historic structures present. There is presently no known existing disturbance. Photograph: See photos of present conditions and photos of treatment methods.
10. **Are there any known prehistoric and/or historic archaeological sites in or near the project area?** NO
11. **Has the project area been previously surveyed for cultural resources by a qualified archaeologist?** Portions of the Project Area have been surveyed with no artifacts found.
12. **Are there any buildings or structures which are 50-years or older in or adjacent to the project area?** The project area has no buildings and has been historically used for farming and ranching activities.
13. **Is your project area within or near a historic district?** NO

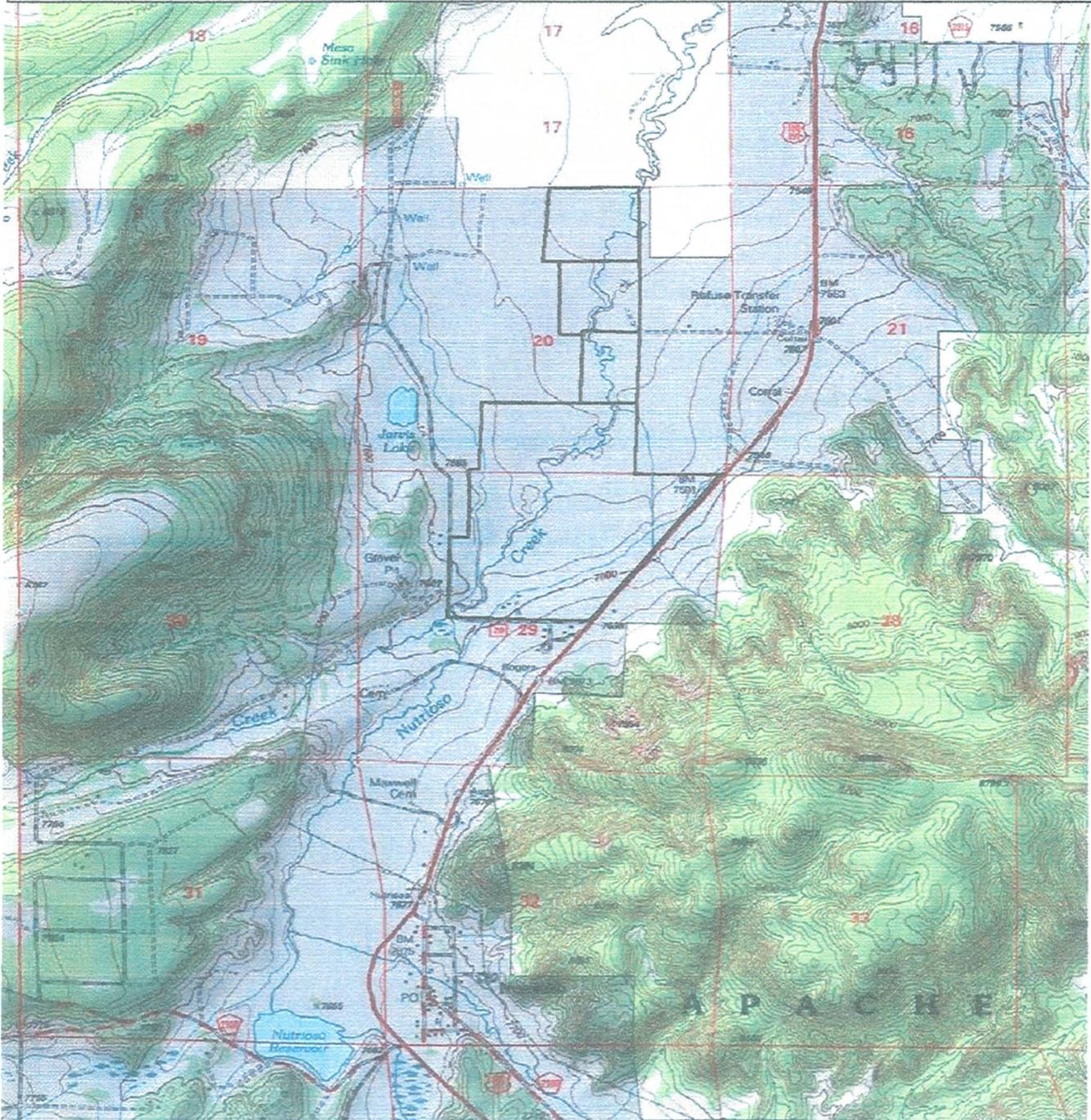
Please sign on the line below certifying all information provided for this application is accurate to best of your knowledge.

	1/8/18/2010	James W. Crosswhite
Applicant Signature	/Date	Applicant Printed Signature

FOR SHPO USE ONLY	
SHPO Finding:	
<input type="checkbox"/>	Funding this project will not affect historic properties.
<input type="checkbox"/>	Survey necessary – further GRANTS/SHPO consultation required.
<input type="checkbox"/>	Cultural resources present – further GRANTS/SHPO consultation required.
SHPO Comments:	
For State Historic Preservation Office:	Date:

Attachment to SHPO Form: Map A

94 acre Project Area is located along Nutrioso Creek within 400 acre Crosswhite property depicted as black lines in Section 20 and 29.



Attachment to SHPO Form: Map B
Project Area is depicted as red lines.

LEGEND

— Property Boundary

— Project Area

Project boundary

Project boundary

This red line on property boundary is not part of the Project Area.

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CONSERVATION EASEMENT
EXHIBIT TRACT A-2 & A-3
RECORD CREATED AT THE REQUEST OF:
JAMES W. CROSSWHITE

SUPPLEMENTAL INFORMATION: Project Site Photos.



1. Rabbitbrush infestation on buffer strip near streambank.



2. Rabbitbrush growing on streambanks and buffer area.



3. Rabbitbrush has dense above ground foliage.



4. Rabbitbrush growing in the FEMA 100 year floodplain.



5. Rabbitbrush crowding out willows in the floodplain.



6. Rabbitbrush growing near the stream channel.

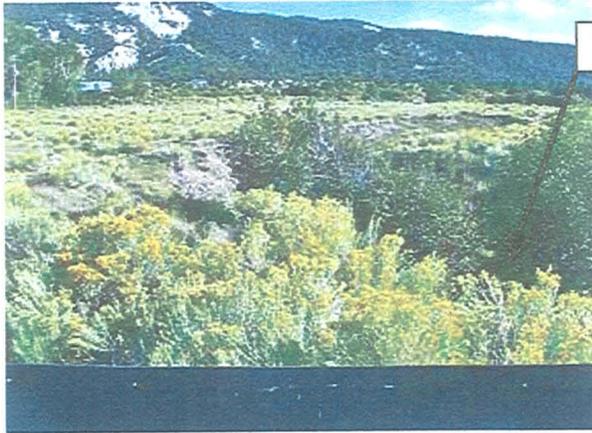


7. Rabbitbrush growing in FEMA floodplain reach 3.

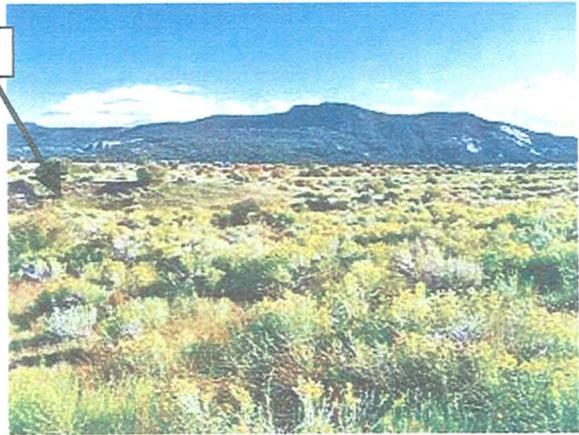


8. Rabbitbrush in FEMA 100 year floodplain reach 4.

SUPPLEMENTAL INFORMATION: Project Site Photos.



9. Rabbitbrush growing in buffer areas at reach 1.



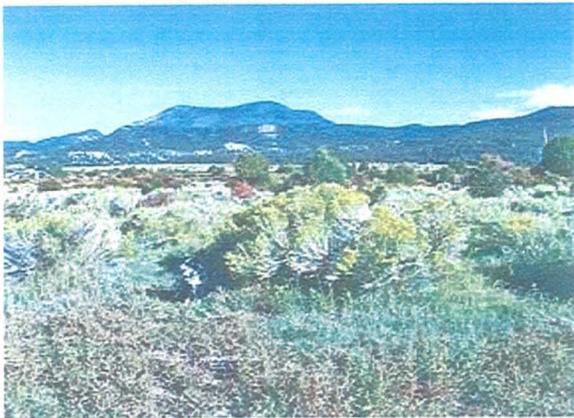
10. Rabbitbrush growing in buffer areas at reach 2.



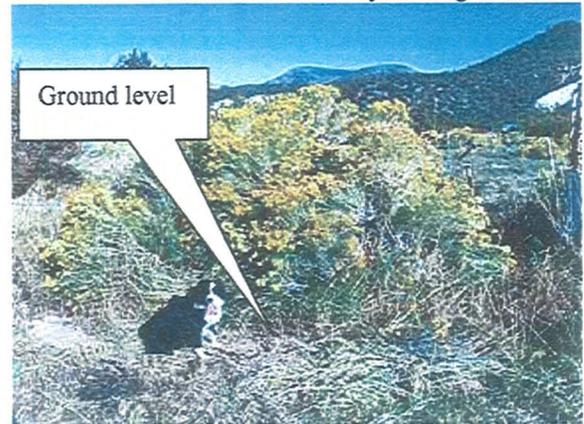
11. Rabbitbrush growing on banks and buffers reach 5.



12. Rabbitbrush surrounded by dense grasses.



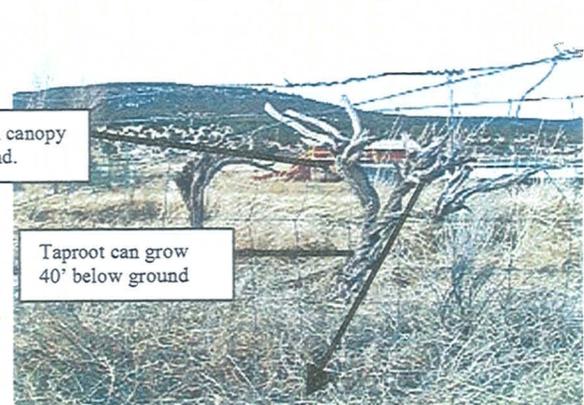
13. Rabbitbrush foliage height equals width.



14. Rabbitbrush growing 5 feet high and 5 feet wide.



15. Rabbitbrush killed by herbicide without mowing canopy.



16. Dead Rabbitbrush plant illustrates a severed taproot.

SUPPLEMENTAL INFORMATION: Key Personnel

James W. Crosswhite (Grantee). Since 1997, the Grantee has implemented projects on the EC Bar Ranch through participation in state and federal grant programs that demonstrate how the integration of conservation and sustainable agricultural practices can improve ranching economics, water quality, and wildlife habitat while meeting public policy objectives. He has eradicated Rabbitbrush in about 200 acres of upland pastures using mechanical, chemical, and cultural methods, which included mowing, burning, root plowing, hand grubbing, and chemical applications. He is aware of the challenges and methods required to treat Rabbitbrush within the 94 acre Project Area to ensure eradication is permanent. He has been trained to apply restricted use herbicides on noxious weeds and Rabbitbrush, however the proposed project does not require use of restricted use herbicides nor a licensed applicator.

As a producer-cooperator with the Natural Resources Conservation Services (NRCS), the Grantee has followed an NRCS Conservation Plan, developed in 1998, while completing all recommended Best Management Practices in the Arizona Game & Fish Department (AGFD) *Nutriosos Creek Fish Management Report*, Arizona Department of Environmental Quality (ADEQ) and Environmental Protection Agency (EPA) *Nutriosos Creek TMDL for Turbidity Report*, and US Fish & Wildlife Service (FWS) *Little Colorado River Spinedace Recovery Plan*. Successful outcomes include:

- The first Safe Harbor Agreement between FWS and a private landowner in Arizona. (2003)
- The first instance in Arizona when a federally listed fish species has been relocated from public land to private property by AGFD and FWS. (2006)
- The first time the ADEQ and EPA have removed a non-attaining waterbody in Arizona from the Clean Water Act Section 303(d) list due to mitigation. (2009)
- The first instance where a NRCS cooperator in Apache County has mitigated all resource concerns in the *AZ Resource Concerns & Quality Assessment for Crop & Pastureland*. (2005)
- Mitigation of riparian conditions from "non-functional" to "proper functioning condition". (2009)
- A 1200% increase in livestock forage production from 300 lbs/ac to 4,000 lbs/ac in 10 years.
- Adoption of an integrated Livestock Management Plan that includes rotational grazing. (1998)
- Adoption of an Irrigation Water Management Plan to control irrigation water application. (1998)
- Adoption of a Nutrient Management Plan to control fertilizer applications. (1998)
- Adoption of a Pest Management Plan to control and eradicate noxious weeds/invasive species.
- Outreach to over 450 people on visits to the EC Bar Ranch to see conservation projects.
- Conservation information to over 40,000 visitors to his website: www.ECBarRanch.com.
- Collaboration in over 30 pieces for newspaper, magazine, television show, and film.
- Annual riparian vegetative photo monitoring since 1998 with a commitment for 50 more years.
- Maintenance of successful conservation projects without public financial assistance.
- Protection of natural habitat, agricultural, and scenic open space values by donation of the 94 acre EC Bar Ranch Conservation Easement, including 3 miles of Nutriosos Creek. (2009)
- Protection of land adjoining the Conservation Easement using deed restrictions. (2009)
- See Attachment #1. NMLC letter dated 6/28/10 summarizing Grantee's qualifications.

As the grant applicant and project area landowner, Mr. Crosswhite will:

- Execute a Contract with the AWPf in a timely manner.
- Implement Tasks.
- Maintain and manage the project area to help prevent reestablishment of Rabbitbrush.

Subcontractors may be used in to implement Rabbitbrush treatments in Task #3 and perform photo monitoring in Task #4. Subcontractors have not been selected yet.

**SUPPLEMENTAL INFORMATION: Key Personnel
Attachment #1**



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*Preserving New Mexico's land
heritage for future generations.*

June 28, 2010

James W. Crosswhite
EC Bar Ranch
PO Box 44
Nutrioso, AZ 85932

Dear Mr. Crosswhite,

The New Mexico Land Conservancy (www.nmlandconservancy.org) would like to nominate you for the 2010 Clarence Burch Award, which is presented annually by the Quivira Coalition, Sante Fe, NM (www.quiviracoalition.org).

As an individual within the conservation and ranching community who has demonstrated proactive leadership in promoting and achieving ecological and economic health with a long history of stewardship accomplishments. On November 20, 2009, NMLC accepted the EC Bar Ranch Conservation Easement, along with a substantial endowment, that will protect the natural, scenic, and agricultural values along Nutrioso Creek riparian corridor for the public benefit in perpetuity. A copy of our letter dated November 23, 2009, is enclosed. NMLC holds 38 easements in New Mexico covering over 80,000 acres. Our Board of Directors and myself have welcomed the opportunity to expand our conservation efforts into Arizona by holding the EC Bar Ranch Conservation Easement covering 94 acres that includes 3 miles of Nutrioso Creek, which has been restored to one of the highest standards in the United States.

In reviewing the Clarence Burch Award criteria on the Quivira Coalition website, it is clear that your accomplishments have demonstrated the type of innovative and sustainable methods of land stewardship described by the Burch Award. I believe your collaborative partnerships with state and federal agencies were necessary to resolve water quality and wildlife habitat land stewardship conflicts. I also feel your contributions toward education of the public about sustainable use of natural resources are consistent with the Burch Award criteria.

I will encourage the Award Committee to consider the following enclosed information reviewed at NMLC in developing the EC Bar Ranch Conservation Easement since it demonstrates the innovative and sustainable methods of land stewardship and collaborative partnerships with state and federal agencies that Mr. Crosswhite coordinated.

- A. A list of best management practices implemented from 1998 to 2009 meeting state and federal recommendations to improve aquatic/wildlife habitat and water quality
- B. Letters supporting conservation projects on his property
- C. Letters from state and federal agencies confirming practices were completed, including three very significant outcomes:

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- The first instance in Arizona when the US Fish & Wildlife Service entered a Safe Harbor Agreement with a private landowner to protect and preserve wildlife habitat (2003)
 - The first instance when the US Fish & Wildlife Service and Arizona Game & Fish Department relocated a federally listed fish species from public land to private land (2006)
 - The first instance in Arizona where mitigation was used to meet water quality standards (2006) and approved by the US Environmental Protection Agency (2009)
- D. Letters of appointment from Governor Janet Napolitano to the Arizona Climate Change Advisory Group in 2005 and the Arizona Water Protection Fund Commission in 2006

I will ask the Award Committee to consider the various methods you used to contribute toward education of the public about sustainable use of natural resources, some of which are enclosed, including:

- A. Hosting over 450 people on 40 group tours, including a former Governor, State Legislators, local officials, ranchers, environmentalists, school children, and other members of the public
- B. Creating a 19 minute film about conservation projects that was used by Arizona Department of Environmental Quality in grant workshops
- C. Participation in over 40 news media articles, including several articles written by Courtney White, Quivira Coalition (news and media list is enclosed)
- D. Numerous speaking engagements, including the January 2005 Quivira Coalition Convention

You may be the only owner of 3-miles of a perennial riparian stream in the United States that has fully mitigated water quality concerns to Clean Water Act standards, restored aquatic/wildlife habitat to a higher standard than adjoining public lands, developed sustainable collaborative partnerships with state and federal agencies, and protected successful outcomes by donation of a conservation easement for the public benefit in perpetuity.

We recommend that you ask some of your contacts that are familiar with the conservation work you have completed on the EC Bar Ranch to submit a short letter supporting your nomination for the Clarence Burch Award addressed to yourself with a copy to NMLC. Each letter will be included in the nomination package, which is due July 15.

Sincerely,



J. Scott Wilber
Executive Director

Enclosures: NMLC letter

SUPPLEMENTAL INFORMATION: Plans

(1) Rabbitbrush Treatment Plan

Task #2 is the development of a Rabbitbrush Treatment Plan with steps and methods to control and/or eradicate Rabbitbrush, revegetate the treated areas, and defer grazing. Task #3 is the implementation of the Rabbitbrush Treatment Plan in two years following recommendations by state and federal agencies.

- The *Nutriosio Creek TMDL for Turbidity Report* written by Arizona Department of Environmental Quality in 2000 recommends the implementation of Rabbitbrush treatments adjacent to the Nutriosio Creek riparian corridor on the EC Bar Ranch as a direct benefit to water quality in stating: *"By removing the Rabbitbrush and replacing it with grass seeding, more grass per acre is created for cattle consumption, reducing their reliance on the riparian vegetation of the stream corridor and allowing for livestock removal from the riparian corridor through the use of fences and range management plans. From a watershed standpoint the removal of Rabbitbrush and reintroduction of grasses improves species diversity and composition. Also, the grasses provide a more stable root mass than the Rabbitbrush, thus increasing the soil stability of the rangelands and decreasing the amount of sediment contributed from sheet flow and wind erosion over these rangelands"*. See Supplemental Information: Existing Plans/Reports/Information – Attachment #1.
- The NRCS Trip Report dated April 6, 2009, describes the need for Rabbitbrush eradication as follows: *"...we could justify reduction of rubber rabbitbrush composition in the upper and middle terraces to 5% and in the lower terrace to 0% by weight of annual production."* Regarding methods, the Report states: *"I think cutting the above ground plant and treating the resprouting leaders is probably a good practice, but would avoid doing so if it meant a lot of ground disturbance. There are cautions in the literature that repeated treatment might be needed."* Regarding reseeding, the Report states: *"The areas that we toured had a very good cover of both native cool and warm season grasses, as well as introduced cool season grasses. Realistically I don't see the need for reseeding this area. This can be a risky thing when relying on natural precipitation anyway. I would rely on grazing management to help fill in areas under rabbitbrush."* Regarding grazing, the Report states: *"We require two growing seasons of deferment after brush management."* See Attachment #1.
- The FWS letter dated July 8, 2009, referred to concerns expressed in a comment letter dated July 31, 2008, to the AWPf regarding specific herbicide that would be used to control Rabbitbrush, protective measures near aquatic habitats, and how treatment locations were determined. In conclusion, FWS stated: *"You have addressed our initial concerns with the proposed project through the information you have provided and the time you have invested in contacts and site visits with NRCS and US Fish and Wildlife Service personnel."* The FWS recommends Rabbitbrush eradication in the Project Area using the chemical "2,4 D Amine 4", which is not restricted-use chemical. 2,4 D Amine 4 may be purchased and applied by any person following label directions. See Attachment #2.

Year 1 (2011). The Project Area is 94.20 acres, but Rabbitbrush do not grow in 4.20 acres of the active channel and floodplain. Rabbitbrush will be treated on 90 acres that includes the inactive floodplain within the FEMA 100 year floodplain, steambanks, and terraces up to 100 feet away from the steambanks on each side of the creek. The initial treatment in year 1 includes these steps:

Step #1: Remove foliage on 90 acres. Using a tractor mounted brushhog mower cut each Rabbitbrush plant off at ground level to remove the canopy vegetation and expose the plant base in 80 acres. Approximately, 10 acres of the riparian corridor terrain prevents use of a tractor and mower, so a hand held saw will be used to cut the foliage off above ground. Removal of foliage on 90 acres is necessary to access the base of the plant closest to the root. Step #1 will be completed when the majority of Rabbitbrush plants have been cut to ground level. Removing the plant in the

Project Area is considerably more labor intensive than in upland pastures because Rabbitbrush often grows along steep terrain on terraces where equipment, such as a tractor, cannot negotiate.

Step #2: Root kill. Two eradication methods may be employed to individually treat an estimated 50,000 Rabbitbrush plants on 90 acres within the 94 acre Project Area:

- **Method #1 - Chemical treatment after removing foliage on 70 acres:**
Following label directions during the 2011 growing season, apply "2,4 D Amine-4" (Active Ingredient: Dimethylamine salt of 2,4-Dichlor-phenoxyacetic acid), an unrestricted-use systemic herbicide, approved for use in the Project Area by FWS, on the base of plant using a portable tank and pump mounted on a tractor. While one person operates the tractor, another person walks while spraying the chemical directly on the exposed plant stumps. The systemic herbicide is absorbed into the root and kills it. Chemical treatments will be performed in 2012 if any regrowth occurs. Spraying is performed in calm conditions when natural precipitation is not expected for a few hours after treatment shortly after mowing. Adjacent grasses will naturally revegetate soils around the base of the treated Rabbitbrush as the stump decays.
- **Method #2 - Mechanical treatment after removing foliage on 20 acres:**
 - **Tractor.** Using a tractor with blade attached on the front, sever the taproot a few inches below ground level at the base of each plant. The tractor approaches the plant base, lowers the blade in front of the plant, drives forward shoving the blade through the root below the terminal bud a few inches below ground, reverses, raises the blade, and proceeds to the next plant. The diameter of the root may require multiple attempts to sever it completely. Once the root is fully severed, the plant is dead and will not grow again. The stump is left to rot in the ground. Follow up treatment will be performed if growth occurs. Nearby grass will revegetate soil around the base of the treated Rabbitbrush.
 - **Hand grubbing.** Holding a sharp blade, insert it through the root a few inches below ground, similar to the tractor mounted blade process. Larger roots require one person to insert the blade and another person to hammer it through the root.

Step #2 will be completed when 90% of the Rabbitbrush plants growing at the beginning of the project period have been treated. It is not desirable to eradicate much more than 90-95% of Rabbitbrush since some plants may be well established on steep streambanks that could be marginally susceptible to erosion without any vegetative coverage. Attachment #3 is photos of Rabbitbrush treatment methods.

Step #3: Deferred grazing. Livestock will not be allowed to graze in the Project Area for the 2011 and 2012 growing seasons following treatments to allow native grasses to naturally revegetate treated sites. Grazing will be closely monitored in 2013 and 2014 with longer frequencies and shorter durations to reduce grazing pressure on treated sites. Rotational grazing is practiced on the EC Bar Ranch following protocols recommended by NRCS. Elk are permanently excluded from the Project Area by 8-ft high fencing. Successful grazing management has resulted in improved water quality and aquatic/wildlife habitat as evidenced by attachments in this proposal from the ADEQ, EPA, AGFD, FWS, and NRCS. Rabbitbrush treatments will result in less grass available for livestock forage at a cost of \$10,000 for two years. The Grantee will absorb this project cost.

Year 2 (2012). Not all plants will be eradicated in the first year. Some small plants may be overlooked or intentionally allowed to develop more foliage. Multiple follow-up applications using chemicals will be performed following label directions as necessary on 90 acres in year 2. Density is expected to be less than 50% of the initial level. A tractor with a spray tank will be used to spot treat any plants with emergent vegetation.

Treatment Timing. Weather conditions are a big factor determining when treatments can be performed. High winds, snow cover, very wet soils, rain, and high stream flows may prevent or delay treatments. Mowing foliage can be done at any time of year when snow is not present and soil conditions will not be damaged using a tractor, eg the ground is not too wet. Following label directions, chemical applications can be done when the ground is clear of snow, plant stumps are dry, rain is not predicted within a few hours, and it is not too windy. Weather conditions may delay treatments planned for Year 1 into Year 2.

Treatment Progress. The Grantee will mow and spot treat reaches of the Project Area starting at reach 1 on the south and progress toward the north completing one or two reaches before moving north. With a channel length of 15,500 feet to treat (100%), progress will be measured by reaches completed: reach 1 is 1,884 ft (12%), reach 2 is 1,899 ft (12%), reach 2A is 1,414 ft (9%), reach 3 is 2,163 ft (14%), reach 4 is 3,201 ft (21%), reach 5 is 2,121 ft (14%), and reach 6 is 2,818 ft (18%). For example, the south 52 acres of the Project Area includes 47% of channel, while the north 42 acres of the Project Area includes 53% of channel. Random photos will be taken before, during, and after treatments in each reach to illustrate progress in the Rabbitbrush Initial Treatment Report for 2011, Rabbitbrush Follow-up Treatment Report for 2012, and Final Report.

Aquatic and Vegetation Safeguards. Rabbitbrush does not grow in the active channel or floodplain, therefore no treatments will be performed in these areas, which represent approximately 4.20 acres out of the 94.20 acre Project Area. Since no chemicals will be applied in the active channel or floodplain, no aquatic species may be at risk. The FWS letter dated 7/8/09 states that conversations were held between April Fletcher, Invasive Species Coordinator, Regional FWS Office, Dave Smith, Wildlife Biologist, Flagstaff FWS Office, and the Grantee concerning chemicals safe for use near aquatic areas, buffers, application methods, and treatment areas. As explained in the FWS letter: "Amine formulations of 2,4-D are practically non-toxic to cool and warm water fishes. 2,4-D breaks down very quickly in the environment, with an average half-life of 7 days, which further reduces its risk... In your June 9, 2009, email to Dave Smith you informed us you have decided to use 2,4-D Amine 4." The FWS advised that spot treatments with 2,4-D did not require any buffers between flowing water and treatment sites. After mowing or hand cutting has removed above ground Rabbitbrush foliage, an operator using a hand held spray gun and following label directions will direct chemical downward onto the stump, which is within inches of the below ground taproot. This technique avoids any chemical drift or over-spray onto nearby vegetation. 2,4-D is a "systemic" herbicide that penetrates into the taproot, not a "contact" herbicide that kills all above ground vegetation. 2,4-D is designed to kill broadleaf plants, not grasses. Special care will be taken to avoid chemical contact with willows, alders, sumac, and any vegetation other than Rabbitbrush stumps. Since mowing exposes the stump, direct application is easy to accomplish, whereas spraying foliage without mowing would impact other desirable vegetation. To ensure protection of the LC spinedace, the Grantee will coordinate any measures in the eradication plan and project timing activities that will reduce impacts to riparian resources, water quality, and fish populations with Dave Smith per the FWS letter dated 7/9/09 written by Steven Spangle, Field Supervisor, AZ Ecological Field Office, Phoenix, AZ. Grantee will follow label instructions when applying 2,4-D Amine 4. If this product is unsuitable for Rabbitbrush treatments for any reason, Grantee will coordinate with FWS to find a more appropriate chemical.

Specific Chemicals. Barry Wallace, Vegetation Management Specialist, Crop Production Services, Chandler, AZ, provided a letter dated 8/12/10 in support of FWS and NRCS recommendations for spot applications of 2, 4 D Amine 4. Mr. Wallace added the suggestion that treatments occur shortly after mowing rather than waiting for regrowth. Crop Productions Services can provide various products, but he recommended Loveland Products Inc. Amine 4, 2,4-D Weed Killer for selective broadleaf weed control (EPA Reg No. 34704-120). He provided a specimen label that describes spot treatment application rates and timing. This product is not a restricted chemical and is readily available for sale to the Grantee, who will apply the chemical following label directions. Attachment #4 is the letter from Mr. Wallace.

Attachment #5 is a calculation of the approximate effects of water consumed by Rabbitbrush.

National Resources Conservation Service (NRCS) TRIP REPORT

By: Gary Parrott, Rangeland Management Specialist, Area 1, Arizona NRCS
Stu Tuttle, State Biologist, Arizona NRCS
Dave Fisher - District Conservationist, Springerville FO, Arizona NRCS
Date(s): April 6, 2009

Dave Fisher asked for input from Stu Tuttle and I on proposed brush management and seeding practices on Jim Crosswhite's private land just north of Nutrioso. Mr. Crosswhite would like to reduce the rubber rabbitbrush in and around Nutrioso Creek to restore the riparian function of the creek and to increase forage production. Mr. Crosswhite would like to use a combination of cutting the rabbitbrush and treating the resprouts with 2,4-D amine-4. Mr. Crosswhite then proposes to reseed the area with western wheatgrass.

On April 6, 2009, we toured part of the proposed treatment area. From this meeting and tour I have two main areas of concern as follows:

- (1) Is reduction of rubber rabbitbrush needed here? If so, what would be a good method for controlling it?
- (2) Is range seeding needed, and if so what recommended species would be appropriate?

A check of the Little Colorado Headwaters watershed (15020001) on the Arizona Game and Fish website indicates the potential habitat for Apache Trout, Little Colorado Spinedace, and Chiricahua Leopard Frog all listed as threatened. In addition, the site lists the Little Colorado Sucker and Speckled Dace as species of concern. There is a concern about the effects of the proposed practices on them.

Of these two concerns I will mostly address the first group. When contemplating brush management, one of the main initial steps is to determine if the composition of the species you are controlling is higher than it should be in the plant community for the site. If so, will it be controlled to more potential levels by a change in grazing management, or will it be necessary to actively try removing the species to get it to potential levels in a reasonable amount of time. To answer these we need to know what ecological sites are involved here, their potential to have rabbitbrush in them, and how rabbitbrush would respond to different scenarios of grazing management that we might apply.

First let's look at how rubber rabbitbrush responds to grazing management. Rubber rabbitbrush, in general is not a palatable shrub and so we cannot expect to use livestock to directly influence its vigor by grazing it. Rabbitbrush resprouts vigorously after removal of the above ground plant unless it is stressed, in low vigor, or if it is an old mature plant. So, trying to do special treatments with livestock, like high density trampling, is ineffective. Rabbitbrush is a prolific seeder and ground disturbance creates a seedbed that is favorable to its germination. So, grazing should be at low stocking rates to avoid much disturbance.

With the above in mind, grazing management to reduce rabbitbrush to more potential levels, will need to be at light stocking rates, and give seasonal rest for the forage plants so that they can increase in cover and be the most effective at competing with new rabbitbrush seedlings. According to Mr. Crosswhite the current grazing strategy is to have only dormant season grazing. This is probably a good strategy for the riparian woody plants and the grasses. However I would try to get some use on grasses periodically. This will reduce the amount of dead standing material that might eventually interfere with sunlight reaching new growth. Grazing will also help stimulate sod formation in many of the grasses that can tiller or spread by rhizomes. This helps them spread into bare areas, increasing competition with rabbitbrush seedlings. This managed grazing will have little effect on the current mature rabbitbrush plants here but will tend to reduce the recruitment of new plants. Over time this strategy should reduce the composition of rabbitbrush to what its potential is, given this level of management. Rabbitbrush is somewhat similar to snakeweed in that it tends to establish in good years, given some sort of disturbance, and will grow and mature as a population. The population at this site seems fairly middle aged, although this may be the result of prior manipulation that Mr. Crosswhite has attempted. So, given time, this group of rabbitbrush may mature and its composition might drop on its own. If and when that happens, continued light rotational grazing to discourage recruitment will be key to keeping rabbitbrush composition low.

In general though, I think if we want to see change happen here quickly, we can't rely solely on grazing management to make that happen. Quick change will require a combination of grazing management and active control methods.

Now let's look at the ecological sites involved in the proposed area of rabbitbrush manipulation to see what the composition of the plant could be at potential here. Our ecological sites are grouped into areas of similar precipitation zones and land regions called Common Resource Areas, or CRA's. On our large scale state map of CRA's this area is located within 39.1 Arizona and New Mexico Mountains. The 39.1 CRA is typified by the presence of ponderosa pine. The old soil survey for this area includes all of the proposed manipulation into one map unit, which is composed of one soil, Nutrioso Loam 1-3% slopes. The type location for this soil is just a couple of miles north of the project area. The average precipitation given for the Nutrioso series in the survey is 13 to 16 inches. However the correlation to a range site (we weren't using the ecological site concept at the time the soil survey was done) is to a Loam Bottoms, 16-24" precipitation zone. The CRA that corresponds to a 13 to 16 inch precipitation zone in this area would be the 35.7 Colorado Plateau Woodland Grassland. This CRA is characterized by pinyon and juniper woodlands along with their associated rangeland ecological sites. The area of the proposed manipulation looks to me to be in a transitional area between the 35.7 and 39.1 CRA's. If we were definitely into the 39.1 you would expect to see more ponderosa pine growing into the deeper valley upland soils. Instead we see more juniper, with ponderosa pine isolated into more north facing slopes. So, when looking for a site, or sites, that describe the manipulation area we can be justified in searching either those in CRA 35.7 or 39.1.

When touring the area we saw deep, very uniform alluvial soils, dark brown in color, with no discernable layers of deposition. The one place I textured the surface it was a silty clay. There were lighter areas where the soil reacted with acid indicating the presence of calcium but for the most part it was fairly unreactive. This deep, uniform, fairly heavy texture might indicate the soil formed from rather low intensity deposition. This might be indicative of a marshy or very slow meandering site with fairly high water tables and high plant cover slowing down water velocity and allowing fines to drop. This situation changed with the downcutting of the channel and lowered available free water. There are about three benches or terraces at the site today. The lowest terrace is near the current average water level and is probably the result of the current riparian vegetation slowing water velocity and allowing sediment to deposit. Then there is in some places a middle level terrace. The upper terrace is probably at the elevation of the original site when it started downcutting.

UPPER TERRACE

At one time I think surface water and/or plant available subsurface water was present to this upper terrace. This is not the case today, due to the downcutting of the channel, and most riparian species will not be supported here. The old range site that the Nutrioso soil was correlated to was called a "bottom". In current ecological site nomenclature, a bottom is reserved for those sites that have a free water table that is available to plants during most of the growing season. This does not apply to the upper terrace site. Because it is toward the bottom of the valley it probably benefits from run in water more than your typical upland site. If I were to give this upper bench a site name it would probably be something like a clay loam terrace (one that is no longer flooded), or a clay loam fan. Unfortunately, neither 35.7 nor 39.1 CRA's have sites to fit this situation. So, in order to evaluate the potential for rabbitbrush here we will just have to resort to looking at similar sites. The following table lists the similar sites in 35.7 and 39.1 and the upper percentage by dry weight annual production of rubber rabbitbrush allowed in the Historic Climax Plant Community for those sites.

CRA	Ecological Site	% Rabbitbrush
39.1	Loamy Upland 17-22"	1
	Loamy Bottom 17-22"	2
	Clay Bottom 17-22"	10
35.7	Clayey Bottom 14-18"	1
	Clayey Upland 14-18"	5
	Clay Loam Upland 14-18"	5
	Loamy Bottom 14-18"	5
	Loamy Upland 14-18"	5

MIDDLE TERRACE

I am not certain of the origin of this middle terrace. It is not present everywhere along the reach and may be somewhat associated with side drainages. Or it may be related to erosion of the upper terrace away from the current bottom. In any case it is quite variable in horizontal distance from the main channel and in elevation above the current water level, so that you might expect, depending on the available groundwater, that it would show

different plant communities on it. This is not currently the case. It all appears somewhat similar to the upper terrace. In some places where this terrace reaches close to the water channel it has been planted to riparian woody species, with varying degrees of success. I think there probably are places, limited in extent, within this middle terrace, that have a fairly reliable subirrigated nature. These areas could possibly support some of the woody riparian species and would be best described as a riparian ecological site. The majority of this middle terrace however would not be subirrigated reliably, and so would have a potential much like the site on the upper terrace previously described. We have no riparian sites described for 35.7 or 39.1. The most similar site would probably be the Meadow 17-22" in 39.1. This site has no rubber rabbitbrush mentioned in the HCPC.

LOWER TERRACE

This is the bench with the most reliable access to surface and subirrigated water. As mentioned before, the riparian vegetation itself is probably responsible for creating its own soil substrate here by causing the deposition of sediment. The current vegetation here is riparian with willows, alders, sedges, and rushes. Again, we have no described riparian ecological sites to compare this to, but the closest is probably the Meadow 17-22" which has no rabbitbrush in the HCPC.

When NRCS does conservation planning, we look for resource problems that need to be addressed. In order to justify brush management with rabbitbrush as the target we need to show that its composition is higher than it should be. We do this by comparing its present composition to the potential composition that our ecological site guide says the site should support in the Historic Climax Plant Community. We would consider the current composition of rabbitbrush to be a problem if it is much higher than that shown in the site guide. For the upper terrace, the similar sites are showing roughly an average of 5% rabbitbrush by dry weight of annual production in the HCPC. The field office will need to do transects or ocular estimates to actually estimate current species composition, but it appears to me that rabbitbrush in these upper terraces is much higher than 5%. For most of the middle terrace we are dealing with the same ecological site as the upper terrace, and the above would be true for this site as well. All of the lower terrace, and a small portion of the middle terrace, would be the riparian site mentioned. I would expect to see negligible amounts of rabbitbrush here at potential.

As a general guideline I would say that we could justify reduction of rubber rabbitbrush composition in the upper and middle terraces to 5% and in the lower terrace to 0% by weight of annual production.

METHODS OF REMOVAL

We have already mentioned the ability of rabbitbrush to resprout, and its ability to colonize disturbed soil. Because of this, I think herbicide is a good option. Some research into the use of herbicides to treat rabbitbrush indicates that 2,4-D can be effective. Most references show 2,4-D to be not harmful to wildlife, although I did find one source that said, depending on its formulation, it can be highly toxic to rainbow trout. Other chemicals used include Dicamba, Picloram, and Clopyralid. Dicamba and Picloram have a low toxicity to fish. Most studies show that conventional herbicide treatment is most successful when new leader growth is 6-10 cm and there is sufficient soil moisture to allow for continued growth after the application. The effectiveness of the herbicide may be dramatically lowered when these conditions aren't met. I think cutting the above ground plant and treating the resprouting leaders is probably a good practice, but would avoid doing so if it meant a lot of ground disturbance. There are cautions in the literature that repeated treatment might be needed. Rubber rabbitbrush has a very woolly surface that tends to impede getting the herbicide to the surface where it can be absorbed. One study showed that the same amount of herbicide with higher carrier amounts was more effective. Unfortunately that is about the limit of my knowledge. The possible proximity of the threatened fish and amphibian species will probably limit the herbicide selection more than anything. Experts need to be consulted and I assume Stu will be initiating the dialogue with US Fish and Wildlife Service.

The areas that we toured had a very good cover of both native cool and warm season grasses, as well as introduced cool season grasses. Realistically I don't see the need for reseeding this area. This can be a risky thing when relying on natural precipitation anyway. I would rely on grazing management to help fill in areas under rabbitbrush. (* See Summary following Report)

This brings up the topic of our Prescribed Grazing practice. **We require two growing seasons of deferment after brush management. With the diversity of cool and warm season plants here this will mean practically the entire growing season. The intent of this deferment is to allow newly sprouting grasses to be able to establish sufficient root systems to resist grazing. With the current grazing scenario of dormant season grazing this deferment is already being practiced. If we initiate growing season grazing, as mentioned earlier, we should probably initiate it after the first two years to allow for this requirement. Often perennial grass seedling establishment comes after the

first two years so realistically we should be ready to defer after seeing a significant number of them in any given year. The Prescribed Grazing practice is not just deferment but is an agreement on numbers to be run and the timing of grazing and rest. This requires a fairly good inventory of composition and production. However on the small acreage involved this would not amount to a great deal of time.

COMMENTS FROM STU TUTTLE, State Biologist, Arizona NRCS

A draft of my trip report was sent to Stu and I got the following comments from him on 4-23-2009. Stu agreed that I could send this trip report with his comments attached.

Some reports do not show much luck using 2,4-D to treat rabbitbrush. Some NRCS staff in Utah and Wyoming have commented that 2,4-D did not get very good initial kill and the brush quickly returned. Mr. Crosswhite may have better results on his place, as his method of spot treating may better direct the chemical to the targeted plants than the reported efforts to the north. **We will need to consult with USFWS concerning this project. He has made Dave Smith with the USFWS aware of the proposed practices and visited with him recently. Dave Smith has some similar concerns on the chemical and if it should be applied to plants near the water. If Mr. Crosswhite goes forward with the project and especially if it is through an NRCS financial assistance program, Stu will assist the field office in the consultation process. **See SUPPLEMENTAL INFORMATION: Plans - Attachment #3 FWS letter.

Gary Parrott, Rangeland Management Specialist, Area 1, Arizona NRCS
4-23-2009

Summary and clarification of key points in the Trip Report.

NRCS questions and conclusions:

- (1) *Is reduction of rubber rabbitbrush needed here? The answer is yes, a reduction of 95% is needed. If so, what would be a good method for controlling it?* Mow plant foliage, followed by spot application of 2,4D Amine-4 to the base of each plant, and defer grazing for two growing seasons. Repeat spot application if regrowth appears.
- (2) *Is range seeding needed, and if so what recommended species would be appropriate?* No seeding is needed. *On 7/30/10, Dave Fisher, District Conservationist, Springerville FO, Arizona NRCS, expanded on reasons for not overseeding treated sites: "When you mow rabbitbrush, the amount of plant litter on the soil surface is significantly increased. Plant litter protects the soil surface from erosion by intercepting raindrops prior to striking the soil surface. Since rabbitbrush is somewhat woody, the litter will also take a longer time to break down than herbaceous (grass) litter and will thus provide protection to the soil surface for an adequate amount of time to let the adjacent grasses fill in the areas formerly occupied by rabbit brush. Adjacent grasses will not be affected by a systemic herbicide that is applied directly on the rabbitbrush stump and/or exposed root." Mr. Fisher also stated: "Due to the high volume of rabbitbrush litter that will likely be generated by the mowing, it may be difficult to establish a good stand of grass by seeding in these areas. Broadcast seeds may or may not work their way through the litter and into the soil. Mechanically drilling the seed is not feasible for individually treated plant sites." Mr. Fisher reiterated that grazing should be deferred for two growing seasons following treatments to allow adjacent grasses to fill in sites.

Some of the existing species' that may cover treated sites in the FEMA 100 year floodplain include Alder, narrowleaf cottonwood, shiny willow, strapleaf willow, coyote willow, Nebraska sedge (*Carex nebraskensis*), bulrush (*Scirpus subterminalis*), baltic rush (*Juncus balticus*), cat tails (*Typha latifolia*), wheatgrass, globe mallow, hair grass, clover (*Melilotus alba*), wild rose (*Rosa arizonicum*), and cinquefoil (*Potentilla anserina*). Existing species that may cover treated sites on 100 ft buffers include western wheatgrass (*Agropyron smithii*), blue grama (*Bouteloua gracilis*), squirreltail (*Sitanion hystrix*), sideoats grama (*Bouteloua curtipendula*), sand dropseed (*Sporobolus cryptandrus*), muttongrass (*Poa fendleriana*), Junegrass (*Koeleria pyramidata*), hairy grama (*Bouteloua hirsute*), wheatgrass (*Agropyron spicatum*), Snakeweed (*Chrysothamnus nauseosus*), Skunkbush (*Rhus trilobata*), geranium (*Geranium californica*).

Grantee underlined selected sentences in the Report for reference and emphasis.



United States Department of the Interior

U.S. Fish and Wildlife Service
Arizona Ecological Services Field Office
2321 West Royal Palm Road, Suite 103
Phoenix, Arizona 85021-4951
Telephone: (602) 242-0210 Fax: (602) 242-2513



In Reply Refer to:
AESO/SE
22410-2009-TA-0369

July 8, 2009

Mr. Jim Crosswhite
EC Bar Ranch
PO Box 44
Nutrioso, Arizona 85932

Dear Mr. Crosswhite:

On July 31, 2008, we provided a comment letter to the Arizona Water Protection Fund, administered by the Arizona Department of Water Resources, regarding projects that had been submitted for the 2009 grant cycle. One of the projects reviewed was the EC Ranch rabbitbrush removal project you submitted for funding. The original proposal was to treat 100 acres, 20 of which are located between the stream channel and floodplain. The proposal recognized the presence of threatened Little Colorado spinedace within Nutrioso Creek in the project area. This fish is listed as a beneficiary of this project. We addressed three concerns in our comment letter, specifically, the proposal did not describe:

- the specific herbicide that would be used to control rabbitbrush;
- protective measures such as buffer zones near aquatic habitats that contain the threatened Colorado spinedace; and
- how floodplain and terrace chemical treatments locations were determined.

Following receipt of our comment letter, you contacted April Fletcher, Invasive Species Coordinator, from our Regional Office and Dave Smith, Wildlife Biologist, from our Flagstaff Ecological Services Suboffice to address the concerns described above. Ms. Fletcher recommended using 2,4-D Amine 4 (EPA Registration #42750-19). Amine (salt) formulations of 2,4-D are practically non-toxic to cool and warm water fishes (White 2004). 2,4-D Amine breaks down very quickly in the environment, with a average half-life of seven days, which further reduces its risk. The 2,4-D label lists grey rabbitbrush as a species controlled by the herbicide, although it indicates repeat application may be needed. Ms. Fletcher also recommended avoiding use of any ester formulations which are highly toxic to aquatic

Mr. Jim Crosswhite

organisms. In your June 9, 2009 email to Dave Smith you informed us that you have decided to use 2,4-D Amine 4.

With respect to our concern for use of appropriate buffer zones, please note that Region 2 of the U.S. Fish and Wildlife Service developed recommended buffer zone widths that vary depending upon herbicide toxicity to aquatic organisms (White 2004). Originally, the project proposal discussed treating rabbitbrush within and adjacent to the Nutrioso Creek floodplain. We questioned the need to treat within the floodplain and active channel because photographs included with the application did not show rabbitbrush growing at that location. During the February 3, 2009, site visit with Dave Smith, you clarified that the treatments were intended to take place on the 100-year floodplain or upper terrace, as mapped by the Federal Emergency Management Agency, and the adjacent middle terrace. These sites are not adjacent to the aquatic community in Nutrioso Creek. This was further clarified within your June 2, 2009, email to Dave Smith, in which you note that your rabbitbrush control plan will address treatment outside the normal floodplain and channel.

Additional project details were further discussed during an April 6, 2009 site visit with Stu Tuttle, Dave Fisher, and Gary Parrot from the Natural Resource Conservation Service (NRCS). Gary Parrot identified three important features associated with Nutrioso Creek, including the presence of a floodplain (lower terrace), a middle terrace, and an upper terrace. Gary Parrot determined, from extrapolating information from NRCS ecological site guides that the rabbitbrush annual production was higher than what would be expected on the middle and upper terraces on Nutrioso Creek. Similar ecological sites to those on the upper and middle terraces had roughly an average of five percent rabbitbrush by dry weight of annual production. Ocular estimates at the project site show rabbitbrush annual production at much higher rates.

You described two methods that would be used to treat rabbitbrush: spot treatment of individual plants and a tractor-mounted mower to cut large, accessible brush stands. The mower will cut each plant off at ground level to remove the canopy vegetation and expose the plant base. Individual plants would be cut off at ground level with a hand axe or similar tool. Herbicide will be applied to emerging vegetation and on the base of each plant. After the initial spot treatment, three additional spot treatment applications will be applied throughout the project area as needed to prevent dormant rabbitbrush seeds in the soil from becoming established after larger plants have been removed. It is not the intention of this project to totally eradicate all rabbitbrush since some plants are well established on steep banks that could be marginally susceptible to erosion without any vegetative coverage.

You have addressed our initial concerns with the proposed project through the information you have provided and the time you invested in contacts and site visits with the NRCS and U.S. Fish and Wildlife Service personnel. Thank you for your continued efforts to conserve riparian habitat, endangered species, and water resources in Arizona.

Mr. Jim Crosswhite

Please contact Dave Smith (928) 226-0614 (x109) or Mary Richardson (602) 242-0210 (x242) for further information and refer to consultation number 22410-2009-TA-0369 in future correspondence concerning this project.

Sincerely,

Delna T. Bell

for Steven L. Spangle
Field Supervisor

cc (hard copy): Regional Supervisor, Arizona Game and Fish Department, Pinetop, AZ

cc (electronic copy):

Shaula Hedwall, Wildlife Biologist, Fish and Wildlife Service, Flagstaff, AZ
Regional Director, Fish and Wildlife Service, Albuquerque, NM (c/o Denise Baker)
(Attn: Invasive Species Coordinator)

Literature Cited

White, J.A. 2004. Recommended protection measures for pesticide applications in Region 2 of the U.S. Fish and Wildlife Service. Environmental Contaminants Program, Region 2. U.S. Fish and Wildlife Service.

W:\Mary Richardson\4 marys review from Dave thru az admin\EC Bar Ranch Rabbitbrush Control Project letter 6 10 09 2.doc:egg

SUPPLEMENTAL INFORMATION: Plans - Attachment #3
Photos illustrating Rabbitbrush treatment methods.



#1. Step 1. Mowing Rabbitbrush to remove foliage above ground exposes the stump and base for treatment.



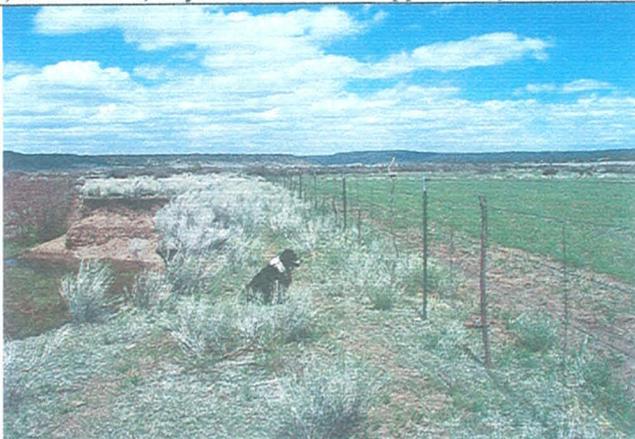
#2. Step 1. Tractor with rear mower. Tractor has front blade to sever the root. Terrain may prevent use of tractor.



#3. Step 2. The taproot may be killed by spot application of 2,4D Amine-4, a systemic herbicide approved by FWS.



#4. Step 2. In difficult terrain, foliage and taproot on each plant may have to be cut by hand.



#5. July 2001. Rabbitbrush eradicated in upland pasture on the right side of fence. Untreated project area on left of fence. See photo #6 for conditions 10 years later.



#6. July 2010. Fence relocated 100 ft to right. Rabbitbrush numbers have increased in the untreated project area left of old fence line, but not regrown where eradicated in 2001.

SUPPLEMENTAL INFORMATION: Plans - Attachment #4

August 12, 2010

Jim Crosswhite
EC Bar Ranch
PO Box 44
Nutrioso, AZ 85932

Dear Mr. Crosswhite,

This letter is a follow up to our discussions about using Loveland Products, Inc., 2, 4 D Amine 4 to spot treat Rabbitbrush growing on your property. I understand the 94 acre Project Area consists of about 20 acres of the FEMA 100 year floodplain plus about 35 acres of buffers on each side of the 100 year floodplain, with 4 acres of active channel and floodplain not to be treated.

I have reviewed the Fish & Wildlife Service letter dated July 8, 2009, in which Ms. Fletcher, Invasive Species Coordinator, USFWS Regional Office, "recommended using 2,4-D Amine 4 (EPA Reg #42750-19) because Amine formulations of 2,4-D are practically non-toxic to cool and warm water fishes. 2, 4-D Amine breaks down very quickly in the environment, with an average half life of seven days, which further reduces its risk. The 2, 4-D label lists grey Rabbitbrush as a species controlled by the herbicide, although it indicates repeat applications may be needed." I concur with Ms. Fletcher's comments that 2, 4 D has an aquatic label. This herbicide is not restricted use in Arizona.

I have also reviewed the Natural Resources Conservation Service (NRCS) Trip Report dated April 6, 2009, which recommended a reduction of Rabbitbrush by cutting the above ground plant foliage and applying herbicide to resprouting leaders, while avoiding a lot of ground disturbance. I agree with the NRCS State Biologist and Conservationists that removing Rabbitbrush foliage is the first step, but would recommend using Loveland Products, Inc. 2,4 D Amine 4 on the exposed stump without waiting for regrowth in the second step. While some repeated treatments may be needed for plants that may have been missed or partially killed, I believe the timing of mowing and initial chemical application during the growing season will reduce the number of follow up applications compared to treating after regrowth occurs. I agree with NRCS about deferring grazing by large ungulates, such as livestock and elk, for two growing seasons to allow revegetation of the treated areas to naturally occur without disturbances.

Based on previous visits to the EC Bar Ranch to discuss and test herbicides on Rabbitbrush, I estimate the current average Rabbitbrush density to be about 500 plants to the acre in the 90 acres to be treated, which may require 250 gallons of Loveland Products, Inc. 2, 4 D Amine 4. At \$20/gallon, the cost of initial spot applications, plus follow up as needed, may total \$5,000.

While root plowing and hand grubbing Rabbitbrush roots is possible in certain instances, I believe the most efficient and cost effective method in the uneven terrain of your riparian corridor is to use 2,4 D Amine 4 as recommended by the US Fish & Wildlife Service and the Natural Resources Conservation Service followed by deferred grazing. I will be glad to collaborate in any way that helps ensure the permanent eradication and control of Rabbitbrush in your project area.

Sincerely,


Barry Wallace
Vegetation Management Specialist
Crop Production Services
201 S. McKemy Ave
Chandler, AZ 85226
Office (480-592-9102)

Rabbitbrush Water Consumption Calculations

The proposed project is not a research project nor has a research project been completed to quantify the amount of water consumed by Rabbitbrush in the Project Area. Therefore, water consumption calculations for Rabbitbrush are approximations.

Project Area.

The 94.20 acre Project Area is divided into stream reaches 1, 2, 2A, 3, 4, 5, and 6. Stream reaches are used to designate a change in functional condition as described in the Riparian Vegetative Photo Monitoring Plan. The EC Bar Ranch Conservation Easement protects the 94.20 acres in the Project Area. The 100 ft buffer on the east side of the creek is 15,500 feet long which calculates an area of 36 acres, the west 100 ft buffer is 36 acres, and the FEMA 100 year floodplain calculates at 22 acres, averaging 62 feet in width for 15,500 feet. There is 4.20 acres of active floodplain and stream channel where Rabbitbrush plants do not grow. There are approximately 50,000 Rabbitbrush plants growing on 90 acres, with 90% to be eradicated by mowing and applying 2,4-D herbicide.

Nutriosio Creek Baseline Flows.

The *Nutriosio Creek TMDL for Turbidity Report* (ADEQ, 2000) quantified instream flows as follows: "*The discharge values for the USGS gauge stations, located above and below Nelson Reservoir on Nutriosio Creek, were averaged for each month from 1968-1989 (gauging stations ceased operation in 1989)... The large seasonal variation in flow in Nutriosio Creek is due primarily to snowmelt run-off and some spring rain events. The high runoff period occurs from mid February to the beginning of May. To take into consideration this seasonal variation, the critical flow condition is calculated to be the average flow value during the spring flow event. Average monthly flow values for this period (February, March, April, and May) were summed and divided by four to obtain an average critical flow value. The Average Spring Critical Flow value was calculated to be 4.3 cfs (cubic feet per second). The average stream flow for the remaining 8 months was calculated and found to be considerably lower, 0.46 cfs as opposed to 4.3 cfs.*" See the complete *Nutriosio Creek TMDL for Turbidity Report* at Supplemental Information: Existing Plans, Attachment #1. Since one cubic foot per second (CFS) is equivalent to 449 gallons per minute (GPM), 4.3 CFS equals an average rate of flow of 1,930 GPM for each month from February through May and 0.46 CFS equals an average flow rate of 206 GPM for each month from June through January.

Water Table.

During high spring flows (February-May), riparian vegetation, beaver dams, and other factors help slow flows, which naturally increases the amount of water stored in streambanks raising the water table. In the FEMA 100 year floodplain, the water table is close to the ground surface, but buffers are 10-15 feet higher due to incised banks, which resulted from historic overuse by large ungulates. Generally, native vegetation growing more than 3 feet above the surface relies on natural precipitation. Rabbitbrush have some root mass that relies on natural precipitation, but each plant has a taproot that can grow up to 40 feet deep to consume moisture from the water table. After Rabbitbrush are removed, water they consumed from the water table is available to riparian vegetation and release into the stream.

Rabbitbrush Evapotranspiration (ET) Rates.

In 2006, U.S. Geological Survey Scientific Investigations Report 2006-5305 studied evapotranspiration (ET) for selected vegetation and land-use types in the Carson Valley, Nevada and California in 2005 and 1979 based on Maurer, D.K., Berger, D.L., Tumbusch, M.L., and Johnson, M.J., 2006: *Rates of evapotranspiration, recharge from precipitation beneath selected areas of native vegetation, and streamflow gain and loss in Carson Valley, Douglas County, Nevada and Alpine County, California* (U.S. Geological Survey Scientific Investigations Report 2005-5288, 70 p). This data estimated the ET rate in

acre feet per annum (AFA) for a selected number of plants and conditions, including native phreatophytes (rabbitbrush and greasewood) which were measured at 1.9 AFA.

Rabbitbrush Consumption.

Rabbitbrush growing in the proposed project area on the EC Bar Ranch is near a perennial stream and riparian aquifer supplying a relatively high and stable source of water, which is probably a more favorable growing condition than existed in the USGS study. However, it is assumed for the purpose of this calculation, the number of Rabbitbrush plants and conditions in the USGS study are similar. There is an estimated 500 plants per acre growing in the 94 acre Project Area, which has an average corridor width of 263 feet for a distance of 15,500 feet in length. However, Rabbitbrush do not grow in 4 acres of active channel and floodplain, so the treatment area is 90 acres. Assuming a 1.9 AFA Rabbitbrush ET rate x 325,900 gallons per acre foot equals 619,210 gallons consumed annually by Rabbitbrush per acre x 90 acres equals 55,728,000 gallons per year of water consumed by Rabbitbrush in the Project Area.

Net Water Savings.

The proposed project will eradicate 90% of the Rabbitbrush, so the approximate annual reduction in water consumed by Rabbitbrush is estimated to be 50 million gallons. While it is impossible to know how much of the water savings may supplement instream flow, 50 million gallons is 95 gallons per minute. In fact, any water saved from Rabbitbrush consumption will benefit riparian vegetation and stream flows. The degree of benefit would rise during periods of drought. Any additional water available to restore vegetation or increase stream flows will benefit riparian dependent wildlife, including a federally listed fish species. Additional water will dilute suspended solids, reduce turbidity, and improve water quality. Rabbitbrush will be replaced by a natural expansion of existing vegetation into treated sites without disturbance from large ungulates for two growing seasons following treatments. Since existing vegetation will replace Rabbitbrush, the net water savings might be described as water consumed by Rabbitbrush through taproots into the water table. While the quantity of water saved is not measured by the proposed project, it is reasonable to conclude that a 4-5 ft high Rabbitbrush plant with dense above ground foliage consumes more water than grasses and riparian plants with significantly less foliage, but with dense root masses designed to hold soils together.

Stream Flow Affect.

The potential benefit may be estimated by relating the 206 GPM average rate of flow per month from June through January to potential water available of 95 GPM after eradicating 90% of the Rabbitbrush growing in 90 acres of the Project Area. The potential average rate of flow per month after treatments may be 300 GPM, an increase of 46%. It is beyond the scope of the proposed project to measure the quantity of net water saved by Rabbitbrush eradication. However, any new permanent additional source of water will help restore, preserve, and protect the Project Area over the long term. It could make the difference between a federally listed fish species going from a threatened status to endangered, as well as, other native fish becoming threatened or endangered.

SUPPLEMENTAL INFORMATION: Plans

(2) Riparian Vegetative Photo Monitoring Plan

Task #2 is the development of a Riparian Vegetative Photo Monitoring Plan. Task #4 is the implementation of the Plan in September 2011, 2012, and 2013 following the same Objectives and Methods described below by Lamar Smith under AWPf grant 99-067WPF: (italics)

OBJECTIVE:

The purpose of this analysis was to document the condition of the vegetation along Nutrioso Creek where it passes through the E C Bar (Crosswhite) Ranch starting in September 2000 and periodically thereafter. This qualitative assessment will help to establish baseline hydrologic and vegetation conditions as a basis for evaluating changes occurring as a result of management practices applied on the ranch to improve water quality and riparian habitat.

METHODS:

The first step was to divide Nutrioso Creek into 6 different reaches with differing hydrological and vegetation conditions. This classification was based on visual inspection of the entire length of the creek as it passes through the E C Bar Ranch. Each stream reach was visually rated for 17 factors using the Proper Functioning Condition checksheet used by the Bureau of Land Management and U. S. Forest Service and then identified with permanently marked photo points. Based on this assessment, each reach was classified as "non-functioning", "functioning at risk", or "properly functioning." In addition, apparent trend in condition was estimated on reaches classified as "functioning at risk."

Photopoints were selected along the entire length of Nutrioso Creek within the E C Bar Ranch (reaches 1, 2, 2A, 3, 4, 6, and 8). No photo points are in reach 5 on Reidhead Ranch nor reach 7 and 9 on the Apache Sitgreaves National Forest. Photo points were chosen to show the landforms and vegetation types along the creek in either an upstream or downstream direction. A 6-foot T-post was driven at the point where the photo was taken, tagged to indicate the photo point, and GPS coordinates recorded for each. The compass direction of each photo and time of day were recorded. A sketch map was made of the location of major vegetation types and landforms as a aid in interpreting the photos. After the photos taken in 2000 were developed, these vegetation types and landforms were drawn on the photo and descriptions provided of each photo. The photos are presented in order from upstream to downstream by each stream reach.

In 2000, Mr. Smith created 27 separate photo points in reaches 1, 2, 2A, 3, 4, and 6 and photos were taken in September 2000-2003. After acquiring reach 8 in 2003, the Grantee created two additional photo points. In September 2004-2007, 29 photo points were monitored. In July 2008, reach 5 was acquired and 3 photo points established. In September 2008 and 2009, photos were taken at 32 photo points. In September 2010, photos will be taken to monitor conditions prior to Rabbitbrush treatments in 2011. Monitoring will continue in September 2011, 2012, and 2013 to show conditions after Rabbitbrush is eradicated per Task #4.

The Riparian Vegetative Photo Monitoring Report is available online at <http://www.ecbarranch.com/monitoring/9-1-09/start.htm> .

The following is an example of photo monitoring from the Riparian Vegetative Photo Monitoring Report dated 9/5/07, which describes Reach 2 and illustrates conditions with photos taken annually in September beginning in 2000 and ending in 2007. In this example, photos illustrate a significant growth in vegetation on streambanks in the upper right corner during the period from 2000 to 2007. Observing that Rabbitbrush is present on the first and third terraces for the entire seven year period contradicts predictions by riparian experts and ecologists that Rabbitbrush would naturally be reduced over a reasonable period of time through a "non-use" management approach. The proposed project seeks to control and eradicate 90% of Rabbitbrush plants.

Reach 2 (conditions on 9/11/00)

This reach lies just downstream (north) of Reach 1 and runs from photopoint R-5 to just above photopoint R-7. The active floodplain and the low inner terrace are both wider than in Reach 1, but narrower than in Reach 3. There is some coarse gravel in the channel and the floodplain. The channel directly undercuts the higher terrace bank in some places. The bottom of the channel is silty except where riffles pass over gravel. Water flow is more or less continuous at time of observation. Water is turbid. There is relatively little silt deposition in the channel compared to Reach 3. Alders occur at certain points along this reach, apparently in association with gravel substrate; but fewer alders than in Reach 1.

Reach 2 includes photopoints 5-B(downstream), R-6, and JC-2. Reach 2 was classified as **FUNCTIONAL AT RISK** (Smith). The trend was estimated to be **UPWARD**, based on stable banks and regeneration of woody vegetation. In 2003, Bill Zeedyk classified the channel as a Rosgen F type in an "upward trend" toward PFC. In October 2005, Tom Subirge rated Reach 2 as "proper functioning condition". See description and photos at link <http://www.ecbaranch.com/monitoring/PFC/ECB%20Rch2pfc2005.htm>.



R-5 Photo 33, Roll #1 Reach: 2 Date: 9-11-00 Time: 11:02 a.m.
GPS: 12 S 0665919 - 3761030 Azimuth: 40
Looking downstream. This is the upper end of Reach 2.
Description: The high terrace (HT) is dominated by rabbitbrush with shortgrass understory. The low terrace (LT) has an overstory of rabbitbrush with moist grass/forb understory. The floodplain (FP) is fairly wide with good stand of wet grass/rush/sedge. Stream channel (C) mostly full of rushes and bulrushes. Note gravel in channel in lower part of photo. Some young alders (A) and willows (W) are on the floodplain. Three large skunkbushes are present, 2 on the low terrace and 1 partly dead one on the floodplain.

R-5 Date: 9-30-02 Time: 12:30 pm
Observations: Alders in left center of photo have grown since 2000. There is more vegetation cover along the channel, the floodplain and the low terrace, e.g. note that rocks in creek are less visible. Creek was running here and water was clear.



R-5 Picture 3242 Date 9-3-03 Time: 9:45 am
GPS: N33°58.037 W109°12.150
Sunflowers are growing where rocks were in 2000. Grass is now established on left bank due to sprinkler irrigation. Water flowing.



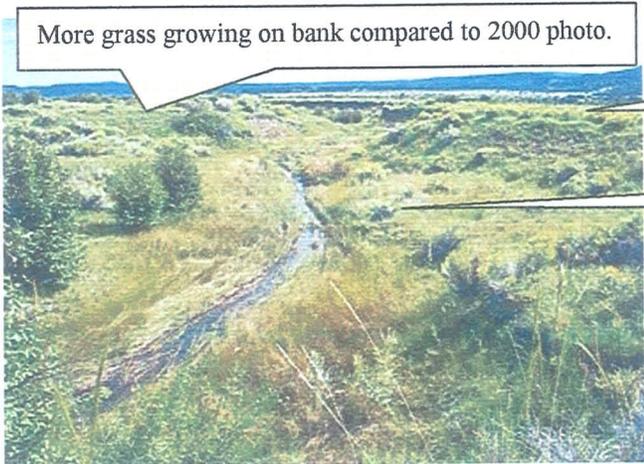
R-5 Picture 0216 Date 9-1-04 Time: 9:39 am
GPS: N33°58.037 W109°12.150
More rushes present.



R-5 Picture 5812 Date 9-12-05 Time: 9:22 am
 GPS: N33°58.037 W109°12.150. More grasses present. Note sedges depressed after high water in August.



R-5 Picture 748 Date 9-11-06 Time: 9:21 am
 GPS: N33°58.037 W109°12.150.



R-5 Picture 736 Date 9-5-07 Time: 9:43 am
 GPS: N33°58.037 W109°12.150.

More grass growing on bank compared to 2000 photo.

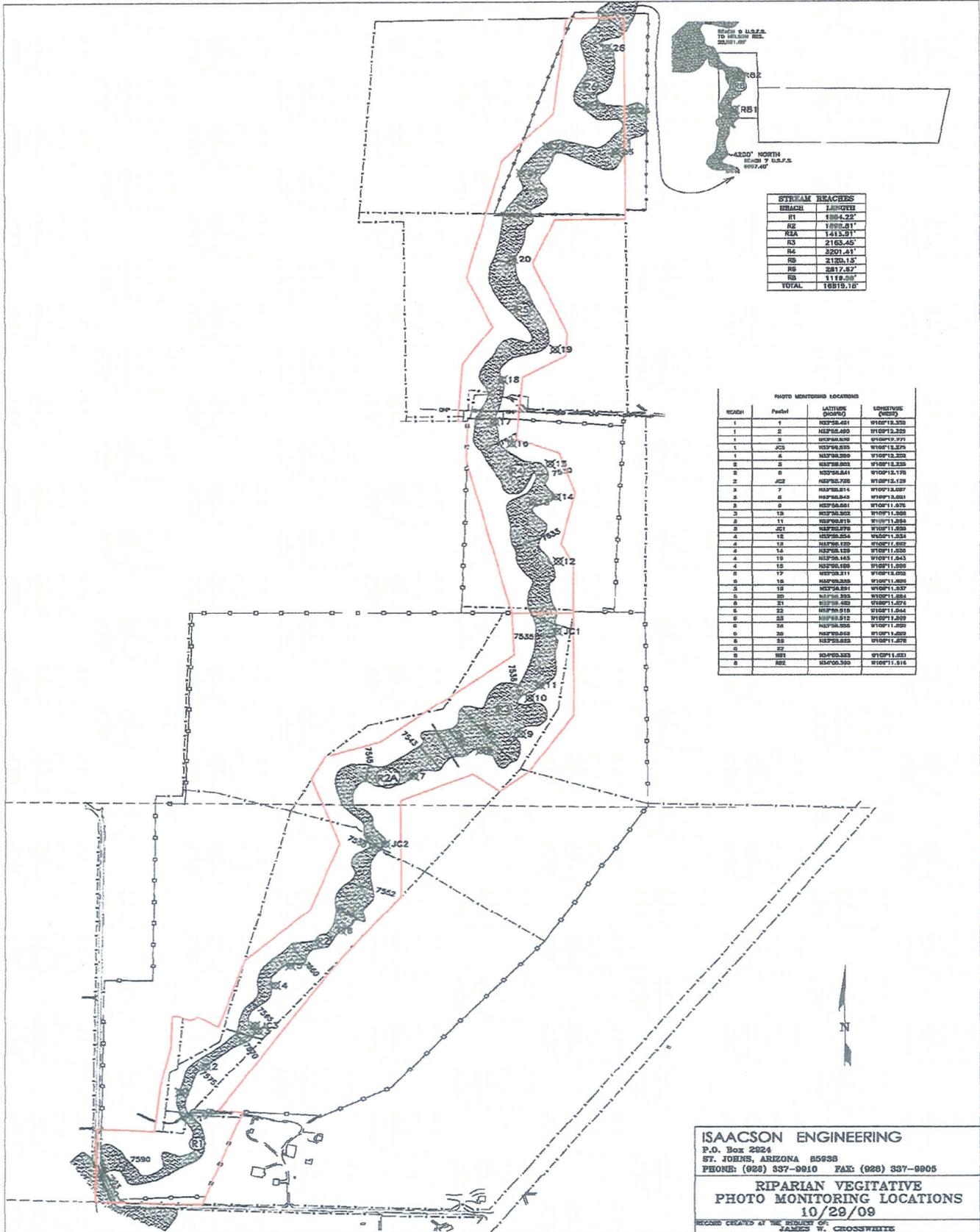
Rabbitbrush growing on the buffer strip.

Rabbitbrush growing on the FEMA 100 year floodplain.

Map. See Riparian Vegetative Photo Monitoring Site Map #1 that illustrates the location of 32 photo monitoring sites established in reaches 1, 2, 2A, 3, 4, 5, and 6 along with GPS coordinates. The red line depicts the 94 acre easement property and Project Area. Reach 8 is not part of the Project Area, but is monitored.

Riparian Vegetative Photo Monitoring Map #1. Photo points in Reaches 1-6

10-29-09



SUPPLEMENTAL INFORMATION: Existing Plans/Reports/Information

Reports have been written by the Arizona Department of Environmental Quality (ADEQ), Arizona Game and Fish Department (AGFD), Natural Resources Conservation Services (NRCS), US Fish and Wildlife Service (USFWS), and independent Proper Functioning Condition Surveys have been performed that provide information about water quality, aquatic/wildlife habitat, and riparian corridor conditions that may be related to the proposed project and Project Area. The Grantee has addressed concerns in these reports prior to seeking AWPf funding. The Reports are described below:

1. Nutrioso Creek was listed on the Clean Water Act Section 303(d) as an impaired waterbody in 1998. The ***Nutrioso Creek TMDL for Turbidity Report*** written by the Arizona Department of Environmental Quality (ADEQ) in 2000 identified the non-point source of pollution in Nutrioso Creek on the EC Bar Ranch as erosion from incised streambanks caused by historical overuse by large ungulates (livestock and elk). **Attachment #1** is the ***Nutrioso Creek TMDL for Turbidity Report***. **Attachment #2** is an article that appeared on the EPA website in April 2010 describing the Nutrioso Creek Watershed and restoration and protection completed by the Grantee. The article includes a very informative 3 minute video link at <http://www.youtube.com/watch?v=j8ZrOh8aECY>. **Attachment #3** is a letter dated August 28, 2006, in which the ADEQ advised the Grantee that Nutrioso Creek was recommended for removal from the Clean Water Act, Section 303(d) list as a non-attaining waterbody. **Attachment #4** is a letter dated August 27, 2009, in which ADEQ advised that EPA had removed Nutrioso Creek, making it the first instance where a non-attaining waterbody in Arizona had been delisted due to mitigation. Out of 40,000 waterbodies listed on the 303(d) list in the United States, only a handful have been "recovered". In addition to "recovering" water quality standards, aquatic/wildlife habitat in Nutrioso Creek has increased and is permanently protected by the EC Bar Ranch Conservation Easement. Attachments #2 through #4 provide evidence that water quality improvements have been implemented on the EC Bar Ranch and the proposed AWPf project is supportive of all water quality improvement practices recommended in the ***Nutrioso Creek TMDL for Turbidity Report***. The eradication of Rabbitbrush is recommended in the TMDL Report as an on the ground best management practice that directly maintains, enhances and restores water quality standards in Nutrioso Creek riparian corridor. As a "recovered" waterbody, Nutrioso Creek has the unique distinction to be part of the Watershed Improvement Measure (WIM) and SP-12, also known as Measure "W", which is a key performance measure in EPA's Strategic Plan. The Measure "W" tracks watersheds where water quality conditions have improved by utilizing a watershed approach. One of the primary purposes of this measure is to model and demonstrate the effectiveness of the watershed approach. EPA has a nation-wide goal to improve water quality conditions in 250 watersheds for 2012. EPA Region 9 and our state water quality agency partners have agreed to track the following watersheds for purposes of reporting on this measure and documenting environmental results, and to better focus our water quality restoration activities by identifying needs, sharing information, providing assistance and learning more about the related challenges. We expect some of these watersheds to show improvement by 2012 for the identified pollutant. Additional watersheds may be added and/or substituted. The proposed project will make a significant contribution toward permanently improving water quality in Nutrioso Creek and is supportive of ADEQ and EPA Measure "W" monitoring, with the eradication of Rabbitbrush being an on-the-ground measure that directly maintains, enhances and restores a waterbody in Arizona and riparian resources.
2. The ***Little Colorado Spinedace Recovery Plan*** written by the US Fish and Wildlife Service (USFWS) in 1998 recommended the implementation of aquatic habitat improvements in streams inhabited by the LC spinedace, a fish species listed under the Endangered Species Act (ESA) as "threatened". See FWS website to view the ***Little Colorado Spinedace Recovery Plan***. In addition to implementing habitat improvement practices, in December 2003, the Grantee executed a Safe Harbor Agreement (SHA) with FWS. Severe drought conditions in 2005-2006 caused a major

reduction in native fish populations living in Nutrioso Creek. Out of 27 miles, only the restored 2 miles on the EC Bar Ranch were supporting fish populations. See fish surveys at AGFD website which report only 5 LC spinedace were found out of all the sampled sites in the creek in 2005 compared to over 600 in 2000. The five fish were living in reach 3 on the EC Bar Ranch. In May 2005, at the request of biologists from the Arizona Game and Fish Department (AGFD) and USFS, Mr. Crosswhite allowed native fish captured by these agencies downstream on the Apache Sitgreaves National Forest (ASFN) to be released on his upstream property. Attachment #5 is a letter dated August 24, 2006, in which the FWS recognized this successful collaboration which saved the lives of hundreds of native fish, in stating: "*The practice of salvaging a listed species from public land and repatriating the species to private land is rarely warranted and demonstrates your commitment to threatened and endangered species. AGFD and the Service recognize that this practice can only occur because of the quality of habitat your reach of Nutrioso Creek provides. In fact, it may be the only instance where this has occurred in Arizona with a federally listed fish species.*" The LC Spinedace Recovery Plan is not included in this application because Attachment #5 provides evidence that the proposed AWPf project is supportive of all recommended aquatic/wildlife habitat improvement practices, with the eradication of Rabbitbrush in the Project Area being an on-the-ground measure that directly maintains, enhances and restores a waterbody in Arizona and riparian resources, including aquatic habitat for the long-term benefit of a federally listed fish species.

3. The ***Safe Harbor Agreement With James W. Crosswhite for Voluntary Enhancement and Restoration Activities Benefiting the Southwestern Willow Flycatcher and Little Colorado Spinedace in Nutrioso Creek, Arizona*** was completed in December 2003 between the US Fish and Wildlife Service (FWS) and James W. Crosswhite. This was the first instance in Arizona when the FWS completed a Safe Harbor Agreement (SHA) with a private landowner. As the title indicates, the SHA is a voluntary agreement designed to encourage the Grantee to implement, through his own resources, aquatic/wildlife habitat improvements in Nutrioso Creek riparian corridor to benefit the flycatcher and the LC spinedace. Since 2003, the Grantee has implemented many best management practices, funded in part by state and federal agencies that directly improve conditions for these federally listed species and many other natural resources. The SHA terms and conditions directly support the proposed AWPf project to eradicate Rabbitbrush because surrounding vegetation that replaces Rabbitbrush will benefit the flycatcher and less water consumed by Rabbitbrush will increase instream flows to benefit the LC spinedace. Under SHA provisions the Grantee will voluntarily perform riparian vegetative photo monitoring protocols established in 2000 by Arizona Water Protection Fund grant AWPf 03-05WPF and report annually through 2013, then once every ten years until 2053, eg a 50 year monitoring commitment. Additional monitoring performed by the New Mexico Land Conservancy in the Project Area for perpetuity is complimentary to the SHA. Further information about the SHA is available at link http://www.ecbarranch.com/monitoring/SHA%2012_19_03FINAL.pdf . The proposed project is supportive of all aquatic/wildlife habitat improvement practices recommended in the SHA, with the eradication of Rabbitbrush being an on-the-ground measure that directly maintains, enhances and restores a waterbody in Arizona and riparian resources, including habitat for the long term benefit of Threatened and Endangered species.
4. The ***Nutrioso Creek Fish Management Report*** written by the Arizona Game and Fish Department (AGFD) in 2001, documented aquatic habitat in Nutrioso Creek for native fish populations, including a federally listed fish species (LC spinedace). To view the Report and subsequent fish surveys, see AGFD website. Report data indicate that out of 27 miles of Nutrioso Creek, the majority of native fish, including a federally listed fish species, live within a 7 mile section upstream from Nelson Reservoir identified as reaches 1-6, and 8 on 3 miles of the EC Bar Ranch and reaches 7 and 9 on 4 miles of the ASNF. Due to severe drought, sampling in 2005 found only five LC spinedace in Nutrioso Creek, all of which were surviving in reach 3 of the EC Bar Ranch, since almost 26 miles of the creek had completely dried up. Then in 2006, AGFD and USFWS captured about 700 spinedace in reaches 7 and 9 on the ASNF and released them in

reaches 3 and 4 on the EC Bar Ranch. As a result, the population recovered to a level in 2007 that may have warranted removal of some spinedace to a secure refugia owned by AGFD in Eagar. The *Nutriosos Creek Fish Management Report* is not included in this application because Attachment #5 provides evidence that recommended practices in the Report have been implemented. The proposed project is supportive of all aquatic/wildlife habitat improvement practices recommended in the *Nutriosos Creek Fish Management Report*, with the eradication of Rabbitbrush being an on-the-ground measure that directly maintains, enhances and restores a waterbody in Arizona and riparian resources, including aquatic habitat for the long term benefit of native fish populations.

5. The **Proper Functioning Condition (PFC)** survey of hydrology, soils, and vegetation in Nutriosos Creek, completed at the time the riparian areas were acquired by the Grantee in 1996, indicated the stream was in a "non-functional" condition due to historical mismanagement of livestock and uncontrolled elk activities resulting in overgrazing of riparian pastures by large ungulates. Developed by the Bureau of Land Management (BLM) and US Forest Service (USFS), Proper Functioning Condition (PFC) survey criteria is widely utilized by state and federal agencies and private landowners to evaluate riparian conditions so restoration practices can be targeted toward areas most in need of attention. In 2005 and 2009, an independently conducted PFC survey of all stream reaches on the EC Bar Ranch indicated hydrology, soils, and vegetation had improved to a proper functioning condition. This conclusion appeared consistent with ongoing water quality and aquatic/wildlife assessments by state and federal agencies in the same time frame. Public land managers consider this a significant accomplishment considering less than 15% of riparian areas on public lands and less than 6% on private lands in Arizona appear to meet "proper functioning condition" criteria. See PFC surveys on the EC Bar Ranch in 1996 and 2005 at link http://www.ecbarranch.com/monitoring/pfc_survey.htm. Attachment #6 is a letter dated January 8, 2010, which describes riparian conditions: *"Generally, the 3 miles of Nutriosos Creek on the EC Bar Ranch is largely in Proper Functioning Condition meeting water quality and aquatic/wildlife habitat objectives set by state and federal agencies, which ultimately benefit the long term public good, as well as, the Apache Sitgreaves National Forest downstream. However, I do have some concerns that Rabbitbrush plants growing in the riparian corridor could reverse the improving conditions by consuming large quantities of water that could otherwise be used as stream flow and displacing native riparian vegetation. I believe it is a high priority to eradicate Rabbitbrush in the riparian corridor on your 3 mile section of Nutriosos Creek, not only to avoid degrading successful water quality and aquatic/wildlife habitat improvements, but to create a new sustainable source of water for instream flows."* The proposed AWP project supports improvements in riparian functional conditions.
6. The **EC Bar Ranch Conservation Easement** was donated on November 20, 2009, by the Grantee to the New Mexico Land Conservancy (NMLC) to protect natural habitat, scenic open space, and agricultural values for future generations. In addition, the Grantee donated a substantial cash endowment to the NMLC. The Project Area includes the 94-acre Easement Property with 2.9 miles of Nutriosos Creek riparian corridor that includes 15,500 feet of Nutriosos Creek active channel and floodplain within the Federal Emergency Management Agency (FEMA) 100 year floodplain plus 100 ft wide buffers on each side of the floodplain. Unlimited public access to the easement property is prohibited due to the fragile and sensitive ecosystem being protected. However, supervised group tours for educational outreach may open to the public. Attachment #7 is a letter dated November 23, 2009, from NMLC describing the EC Bar Ranch Conservation Easement. Attachment #8 is a NMLC Press Release dated December 17, 2009, which describes the easement donation. Attachment #9 is a story that appeared on the FWS website on January 15, 2010, describing how the conservation easement would protect the Safe Harbor Agreement referred to in #2 above. Attachment #10 is a story that appeared in the White Mountain Independent newspaper describing the conservation easement. The proposed AWP project supports conservation values in the EC Bar Ranch Conservation Easement.

-NUTRIOSO CREEK TMDL- FOR TURBIDITY

July 2000

Arizona Department of Environmental Quality

Shad N. Bowman

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Executive Summary

Section 303(d) of the Clean Water Act requires that States develop Total Maximum Daily Loads (TMDLs) for surface waters that do not meet and maintain applicable water quality standards. A TMDL sets the amount of a given pollutant that the waterbody can withstand without creating an impairment of that surface waters designated use. The TMDL by definition (40 CFR Part 130) is the sum of all Waste Load Allocations (point source) and Load Allocations (non-point source) with the inclusion of a margin of safety and natural background conditions.

Nutrioso Creek is located in the White Mountains near Springerville, AZ. Nutrioso Creek was listed as an impaired water for violating the turbidity standard for aquatic and wildlife cold water streams, which is currently set at 10 Nephelometric Turbidity Units (NTU.) The samples used to list the stream were collected from 1993-1996. The entire reach of Nutrioso Creek was listed in the 303(d) list, from the headwaters to the confluence with Picnic Creek, a 27 mile section, and from the Picnic Creek confluence to the confluence with the Little Colorado River, a 3.7 mile section.

Nutrioso Creek was the subject of an intensive turbidity study in November of 1999 and January of 2000. The results of this study indicate that the majority of the stream meets turbidity standards. A portion of the stream from the town of Nutrioso to Nelson Reservoir, about 7 miles, still violates the 10 NTU standard (primarily concentrated in a 3 mile section.) Field investigations indicate that entrenchment due to historic cattle grazing is a primary factor causing increased turbidity levels. The historic and current grazing practices also caused a loss of riparian vegetation, such as willows, which would help stabilize banks, dissipate stream energy, and slow stream velocities. The

entrenchment of the stream caused a loss of flood plain, which led to increased stream velocity and shear stress at higher flows. The soils are primarily composed of a silty-organic clay and are highly susceptible to freeze-thaw and wind erosion in addition to water borne erosion. (20) *(Crosswhite note: the 3 mile section was on property historically owned by Rogers, Reidhead, and Lund. Since 1996, Crosswhite has acquired the 3 mile section from these landowners and implemented water quality improvements recommended in the TMDL Report).*

The Target Load Capacity for Nutrioso Creek during critical spring flows was calculated to be 183 lbs/day as Total Suspended Solids (TSS.) The Measured Load was estimated to be 1020 lbs/day as TSS. The TMDL for Turbidity (as TSS) for critical spring flow conditions is 183 lbs/day. The Load Reduction necessary is 837 lbs/day of TSS. During the average base flow conditions no Load Reduction is necessary, as there is no violation, there is an estimated 9.1 lbs/day (TSS) gap between the Measured Load (10.7 lbs/day) and the Target Load (19.8 lbs/day.)

The Turbidity impairment appears to be directly correlated to the increased flows in the critical spring flow event. Implementation projects and best management practices will focus on reducing stream water velocities during these higher flows by increasing riparian vegetation, stabilizing banks, promoting the development of a flood plain, minimizing the impact of cattle and elk, and decreasing the contributions to the sediment loads to Nutrioso Creek due to sheet flow and wind erosion. Continued monitoring and milestones will be used to evaluate the success of individual best management practices and to reevaluate goals and strategies for achievement of water quality standards during critical flow periods.

BACKGROUND INFORMATION

GEOGRAPHY - Nutrioso Creek is located in the Little Colorado River Basin in southern Apache County along the eastern border of Arizona and is about a 30 mile long tributary to the Little Colorado River. The headwaters originate on Escudilla Mountain (elevation 10,912 ft.) and flow approximately twenty-three miles north and then turn west to flow into Round Valley east of Springerville, AZ. (21) The stream continues for an additional seven miles to the west to its confluence with the Little Colorado River at an elevation of 6907 ft. (21) (see Map 1)

HYDROLOGY - The Nutrioso Creek watershed drains approximately 159 square miles with an overall drop in elevation of 1500 ft (8400 ft to 6900 ft.) (21) Nutrioso Creek is a 5th order stream as identified using a USGS topographic map. (21) Nutrioso Creek responds primarily to a spring snowmelt and rain season from mid February to the beginning of May. Nelson Reservoir, located thirteen miles downstream of the headwaters, captures the snowmelt. Nelson Reservoir has a surface area of approximately 60 acres and releases a portion of the snowmelt, over a spillway, back into the Nutrioso Creek stream course. Two United States Geological Survey (USGS) gauge stations are present on Nutrioso Creek, neither of which has operated since 1989. (14) One is located just upstream of Nelson Reservoir (USGS station # 09383500), while the second is just downstream of Nelson Reservoir (USGS station # 09383550.) The major tributaries to Nutrioso Creek are Auger Creek, Colter Creek, Riggs Creek, Milk Creek, Rudd Creek, Hulsey Creek, Paddy Creek, and Picnic Creek. In general, the small mountain stream portions are steep and store little sediment, while the intermediate valley floor portions of the stream possess low gradients and high sinuosity and are overladen with sediment. (18)

LAND USE - According to the land ownership information provided by Arizona Land Resource Information System (ALRIS), most of the Nutrioso Creek watershed is a mixture of Federal and State lands and private land (see Map 1.) Land ownership is comprised of 48.6% private party ownership, 45.2% USFS Apache-Sitgreaves National Forest lands, 3.5% Arizona State Trust lands, and 2.7% Arizona Game and Fish lands. The majority of the headwaters are USFS land comprising part of the Apache-Sitgreaves National Forest. (35) The major land use in the area for private lands is agricultural activities, primarily cattle grazing.

VEGETATION - The vegetation of the Nutrioso Creek watershed can be divided into an uplands portion and a valley portion. The uplands area, located from just north of the town of Nutrioso to the headwaters in the Apache-Sitgreaves National Forest, at elevations above approximately 8000 ft, is comprised of ponderosa pines and mixed conifers with some spruce fir in the higher elevations. (35) The Nutrioso Creek valley extends from the town of Nutrioso to the confluence with the Little Colorado River and is comprised primarily of grasses, small shrubs, and some willows interspersed with some pinon pine and juniper. (35)

ENDPOINT IDENTIFICATION

TURBIDITY, AND THE LINKAGE OF WATER QUALITY AND POLLUTANT STANDARDS - According to the US EPA, the recommended approach to the development of TMDLs, Waste Load Allocations, and Load Allocations, with limited data, is to develop estimates comprising of the best methods and data available. (32)

Turbidity is a measure of the refraction of light as it passes through a sample of water, which is caused by the scattering of the photons. This scattering can be due to a variety of causes, however the turbidity standard was created as an indirect measure to protect aquatic wildlife uses from excessive sedimentation and excessive algal blooms. Because turbidity is a dimensionless unit, it is not easily transferred into the TMDL framework. As a result, a quantitative relationship was developed linking turbidity values to TSS values (see Graph 2.) Target Load Reductions of TSS will equate to reductions of turbidity in order to meet the turbidity water quality standard. For this TMDL a local TSS versus Turbidity correlation was created (see Graph 2.) This allows for the correlation of TSS values in mg/L to turbidity standards and measurements. This is useful as the increased turbidity during high flows is caused by higher TSS due to increased stream water velocities, shear stress, and stream power -which all result in higher erosional forces.

BACKGROUND SITE LOCATION AND VALUES - After searching the nearby areas for a suitable match to the geography, geology, hydrology, and channel morphology of Nutrioso Creek with minor anthropogenic influences, it was determined that most of the surrounding area has experienced the same channel degradation (and was therefore unsuitable for a background location) or did not match the same slope, sinuosity, vegetation, and geology of Nutrioso Creek. The background site was therefore located approximately 4.6 stream miles downstream of Nelson Reservoir in a small valley away from the highway and in an area that appears to be relatively undisturbed by ongoing cattle grazing and human impacts. (35) Nelson Reservoir acts as a sediment trap, decreasing stream velocity and allowing suspended solids to settle out prior to reaching this site location. While this background site is downstream of a reservoir and is thus affected to some degree by hydromodification, stream channel characteristics better resemble those characteristics considered representative of the desired future condition of Nutrioso Creek upstream of the reservoir following implementation Best Management Practices (BMPs.)

The background site has matching sinuosity, gradient, and geology to the main portion of Nutrioso Creek in the valley. The vegetation at the background site consists of willows in the stream course and on the point bars. Small shrubs and grasses comprise the vegetation surrounding the stream course. The stream itself has eroded banks formed as cutbanks and established point bars, which is to be expected given the silty-organic clay make-up of the soils in the region. The stream at the background location has a mixture of riffles, runs, and pools. The Flow at the background site, as measured upon site visits, matches the average base flow for Nutrioso Creek from USGS records (Graph 1.) (14) The average of the turbidity values measured during site visits was used to calculate the background turbidity and corresponding TSS values in this analysis.

IDENTIFICATION AND DESCRIPTION OF POLLUTANT SOURCES - In order to verify and identify a turbidity impairment on Nutrioso Creek a watershed wide sampling effort was undertaken in November of 1999. One hundred and twelve turbidity readings were obtained at 32 sampling stations over a three day period using a Hach brand turbidity meter. The turbidity values for each station were averaged and then plotted over a USGS topographic map cover using ArcView Geographic Informational Systems (GIS) (see Map 2.) Other more specialized sampling efforts were conducted in January 2000 and March 2000 to further identify and describe the turbidity and its sources and values and the condition of the stream itself.

In the 1998 303(d) list, Nutrioso Creek is listed as impaired by turbidity from the headwaters all the way to the confluence with Picnic Creek, and from Picnic Creek to the confluence of the Little Colorado River. (5) The November 1999 sampling effort defined the area of observed impairment to be approximately seven stream miles long occurring from slightly below the Town of Nutrioso to Nelson Reservoir, with the primary area of exceedences occurring in the middle portion of about three miles. There are three primary landowners* within this three mile portion of stream. No discernable point sources of turbidity were located. All of the loading is due to non-point source impacts on the area. This three mile central portion is where historic overgrazing occurred in conjunction with poor range management strategies. Grazing in the area dates back to the late 1800s (13). * *Crosswhite note: the three landowners in 2000 were Crosswhite, Rogers, and Reidhead. By 2010, Crosswhite acquired the entire 3 mile section.*

Portions of the Nutrioso Valley experienced heavy grazing since the late 1800s. (13) The highest measured turbidity values occur in an area where one of the current landowners has actively undertaken efforts to implement improved grazing practices. The property in question was purchased by the current landowner in 1996 and renamed the EC Bar Ranch. He has changed range management practices and has been actively seeking grant monies to protect the riparian corridor, help restore the stream, and implement more Best Management Practices. (13) He has been awarded grant money by the Arizona Water Protection Fund (AWPF) and ADEQ 319 grant money. (13) He has entered into a Cooperative Stewardship Agreement with AGFD and has received matching funding through the Environmental Quality Incentive Program (EQIP) and Stewardship Incentive Program (SIP.) (13) The NRCS has developed a conservation plan and provides on-going assistance. (13) The other two adjacent landowners, within the three mile section of particular concern, are currently seeking funding to implement BMPs and improved range management strategies on their lands.

There has been about a 75% reduction in cattle numbers in the Nutrioso Creek area since 1993. (13) In addition there has also been a 45% decrease in the number of elk in the watershed from 1993 to 1998. (6) Also the E.C. Bar Ranch (located within the 3 mile section of stream with higher turbidity readings) was the subject of a study by Wight Consulting to determine the Bureau of Land Management (BLM) "Proper Functioning Condition (PFC) score. In 1996 it was found to be "Functional-at-risk with a downward trend." In 1999, after implementation of some best management practices, the same area was found to be "Functional-at-risk with an upward trend." (37) * *Crosswhite note: In 2009, 3 miles of Nutrioso Creek on the EC Bar Ranch was rated as Proper Functioning Condition.*

WASTE LOAD ALLOCATIONS - The entire stream segment, from the town of Nutrioso to the USGS gauge station above Nelson Reservoir, was surveyed, and measurements and notes were taken as to the stream and channel morphology to identify areas of severe erosion and sediment loading. No point sources of turbidity were found to be present on Nutrioso creek for turbidity. Therefore, the Waste Load Allocation for all TMDL calculations is zero.

LOAD ALLOCATIONS - The turbidity impairment in Nutrioso Creek is a result of suspended solids in the form of excessive sediment. The excess sediment is coming from the banks of the stream itself, which is incised in areas due to channel degradation.

This downcutting of the channel created a loss in flood plain for the stream. A loss of flood plain in the channel means that during high flows, like the critical spring flows, the stream velocities are increased, thus increasing the shear stress/force acting upon the stream banks and thus increasing the erosional forces.

This portion of Nutrioso Creek also suffers from a lack of adequate riparian vegetation. The absence of willows in the stream course contributes to higher velocities during high flows, as they are not present to dissipate stream energy and act as a sediment trap holding soils in place. (30) In the rangeland itself, populations of Rubber Rabbitbrush (*Chrysothamnus nauseosus*) have driven off much of the native grasses. The Rabbitbrush occupies a large surface area, however the roots are only under the central portion of the bush. Native grasses provide a thicker root mat and do a better job holding soils in place and preventing excessive wind and sheet flow erosion. (31)

Field measurements and observations support the following conclusions regarding sources of sediment loading (in relative order of significance):

1. Stream bank degradation/erosion within the stream channel
2. Freeze-thaw erosion of the stream banks caused by the capillary action of the silty-organic clay soils which comprise the region coupled with the change in temperatures (20)
3. Sheet flow erosion of the surrounding landscape that is washed into the stream channel
4. Wind and airborne erosion from the very strong valley winds blowing the fine soil particles into the stream channel
5. Sediment transport from the headwaters

CONSIDERATION OF SEASONAL VARIATION - The discharge values for the USGS gauge stations, located above and below Nelson Reservoir on Nutrioso Creek, were averaged for each month from 1968-1989. (14) These values were then plotted in Graph 1, Appendix. The large seasonal variation in flow in Nutrioso Creek is due primarily to snowmelt run-off and some spring rain events. The high runoff period occurs from mid February to the beginning of May.

To take into consideration this seasonal variation, the critical flow condition is calculated to be the average flow value during the spring flow event. Average monthly flow values for this period (February, March, April, and May) were summed and divided by four to obtain an average critical flow value. The Average Spring Critical Flow value was calculated to be 4.3 cfs. The average critical flow value was then used to calculate a corresponding turbidity and TSS reading

by utilizing the Turbidity & TSS vs. Discharge graph (Graph 3, Appendix) and the TSS vs. Turbidity graph (Graph 2, Appendix). Both of the correlation graphs, and the resulting equations, are based on data obtained through field measurements on Nutrioso Creek. This correlation allows a numeric estimate of the amount of sediment and turbidity present in the stream during critical flow. **The average stream flow for the remaining 8 months was calculated and found to be considerably lower, 0.46 cfs as opposed to 4.3 cfs. (14) *Crosswhite note: This 8 month period is when Rabbitbrush consume millions of gallons of water from the water table, that might otherwise be used to supplement instream flows.***

MARGIN OF SAFETY - The Margin of Safety (MOS) for this TMDL is set to be 15% of the Load Allocation value. This MOS accounts for errors in using the average flows for seasonal variation, the innate errors present in the correlation of TSS with turbidity and discharge, and for the accuracy of the measurements and instruments.

TMDL CALCULATION - Calculations for the TMDL for turbidity for the critical spring flow is as follows: *Crosswhite note: several pages of Equations have been deleted to save space. They may be viewed in the complete TMDL Report on ADEQ website.*

IMPLEMENTATION

BEST MANAGEMENT PRACTICES - A variety of Best Management Practices (BMPs) can be utilized as part of the implementation strategy to help reduce sediment loading to Nutrioso Creek.

Cattle grazing in the riparian corridor could be confined to only the dormant winter months, which will allow for the emergent plants in the spring to grow and take hold. This will also allow for a greater diversity of plant communities in the riparian corridor will help establish more protective cover for the erosive soils, and act as stream energy dissipaters during higher flows. The cattle's hoof action will also act to compact soils and add in nutrients during their dormant months grazing period which is recommended according to the Bureau of Land Management. Also, the cattle will feed on the mature old growth allowing room in the spring for the new growth to occur and compete for resources. (7, 10, 11) The USFS recommends that grazing allow for adequate stubble height of the vegetation going into the spring growing season. (35)

The Apache-Sitgreaves National Forest has already implemented, or plans to implement, a variety of BMPs on lands under their jurisdiction including: (35)

1. Reduced timber cutting
2. 40 miles of roads were closed as an erosional control measure in 1999
3. Apache-Sitgreaves National Forest Grazing Allotment revisions include:
 - a.) Adjusted cattle entry times and densities
 - b.) Since 1995 they have had a 66% reduction in cattle numbers on the Alpine district
 - c.) A goal to balance the permitted numbers with the allowable use by 2005 in all Apache-Sitgreaves National Forest Grazing Allotments

OTHER POSSIBLE PROJECTS - The areas where historic overgrazing occurred may have the riparian corridor fenced off on private land to keep out cattle and elk during critical growing periods.

Stream grade stabilization structures (SGSS) can be installed to help protect the at risk banks during high critical flow events. SGSS can also be used to help dissipate stream velocities and thus dissipate stream energy and erosional forces during high flows. (31)

Stream restoration projects could be undertaken to speed up the development of an in-channel flood plain, increase sinuosity, etc. While these projects may create a more immediate impact on improving water quality during critical flow, they are more costly and severe to implement. In this situation a more natural approach is advisable for first consideration. (29, 31)

Off channel water wells and wildlife drinkers would allow for more water to remain in the stream itself and allow for the riparian corridor to be fenced off without water-gaps for wildlife and cattle to access the stream for drinking water purposes. This would also allow for irrigation of the revegetation projects along the stream corridor.

The riparian corridor could be revegetated with willow plantings and grass seeds using a Critical Area Planting (CAP) method as outlined by the Natural Resources Conservation Service (NRCS) as a guideline. These plantings could be supplemented with sprinkler irrigated waters until they take hold on the established banks and stream course. The plantings on the upland areas beyond the stream corridor would be sprinkler irrigated until the root systems are established enough to reach the moisture in the soils. These plantings will help protect the erosive soils and act to dissipate stream energy during critical flow. (31)

Sprinkler irrigation systems combined with a poly pipe to line the irrigation ditch would increase irrigation efficiencies and allow for more water to stay in the stream and thus increase the streamflow year round. Combined with other projects and aspects of implementation these tools allow for effective revegetation and removal of cattle and wildlife from the stream course for the majority of the year by creating more forage in the managed rangeland and an alternative water source created from the groundwater wells.

Rabbitbrush eradication projects have been undertaken on some properties. By removing the Rabbitbrush and replacing it with grass seeding more grass per acre is created for cattle consumption, reducing their reliance on the riparian vegetation of the stream corridor and allowing for their removal from the riparian corridor with the use of fences and range management plans. From a watershed standpoint the removal of Rabbitbrush and reintroduction of grasses improves species diversity and composition. Also, the grasses provide a more stable root mass than the Rabbitbrush –thus increasing the soil stability of the rangelands and decreasing the amount of sediment contributed from sheet flow and wind erosion over these rangelands. (31)

MONITORING PLAN - ADEQ staff will continue to monitor turbidity, TSS, flow, and stream morphology over the next several years during varied flow stages. The Little Colorado River watershed is scheduled for more intensive ambient monitoring in 2001 as a part of the Fixed Station Network (FSN) rotating watershed approach.

Macroinvertebrate sampling will be undertaken in the Spring/Summer of 2000 in order to obtain the necessary information to calculate an Index of Biological Integrity (IBI) score. This information coupled with a forthcoming Arizona Game and Fish Department (AGFD) study of the aquatic health of the stream and the BLM Proper Functioning Condition (PFC) score will allow for a more direct measure of the health of the Nutrioso Creek ecological system. (8, 9) This data will augment the turbidity and TSS data, as it is a more direct measure of stream health for the aquatic and wildlife cold water designated use currently being impaired. This data will allow for the reevaluation of the strategies and milestones undertaken as part of an implementation plan.

Bank Erosion Pins were installed into a vertical bank (approximately 15 ft in height) at a site in the middle of the impaired portion of the stream. These bank erosion pins will be monitored over time to see if the channel morphology stabilizes and starts to create a stable point bar and cutbank relationship with a flood plain as opposed to the present advancing vertical faces. (17)

Various other data has been obtained that will allow ADEQ to monitor water quality and physical integrity of Nutrioso Creek. These include:

- Historic photo monitoring sites are present on some sites on Nutrioso Creek, which can be utilized for future comparisons.
- Stream channel cross sections were collected at certain sites and will be used for future comparisons to see how the channel morphology has changed.
- Bank Erosion Hazard Index (BEHI) data can be used to make comparisons as to how stable the banks are along the stream.
- Permanent follow-up monitoring sites will be selected depending upon the location of future implementation projects and sampled to establish simple trend analysis.

Potential volunteer monitoring could be a source of additional data if the private landowners were provided the correct equipment and training.

TIME LINE - The Nutrioso Creek TMDL will use a Phased Approach to TMDL implementation. Watershed projects will be started incrementally as they are funded. The time frame for implementation is estimated to be 5 years. Therefore the timeframe estimated for Nutrioso Creek to meet the turbidity standard during critical flows is approximately 5 - 20 years, depending upon the amount and the duration of flow events in Nutrioso Creek. The US EPA recognizes that sediment TMDLs with primarily non-point sources of pollution can be difficult to manage, and that these problems are often generated over multiple generations and may require as long to correct. (32)

IMPLEMENTATION ACTIONS	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5
Public outreach & involvement	X	X	X	X	X
Establish Milestones	X				
Secure project funding	X	X	X	X	X
Best Management Practices	X	X	X	X	X
Determine BMPs effectiveness		X	X	X	X
Reevaluate Milestones and strategies					X

MILESTONES - Milestones will be used to determine if control measures and BMPs are having a positive impact on reducing turbidity and the erosional forces present in Nutrioso Creek. A Bank Erosion Hazard Index (BEHI) score was determined for sections of Nutrioso Creek. This BEHI information will be used to help locate and rank areas of primary concern for implementation projects. Various measures will be utilized as milestones to measure success of projects and BMPs, such as an overall percent reduction in exposed banks, an increased amount of willows in the stream course, more stable BEHI scores, more stable channel geometry, lowered stream velocities, and lowered TSS and turbidity values. The milestones will be reevaluated periodically to determine their validity and effectiveness, as more data becomes available.

Some goals of the TMDL implementation strategies will be to:

1. Increase education and public awareness to local landowners through the public participation process and watershed group activities
2. Create milestones for each BMP and Project and reevaluate the effectiveness as necessary
3. Decrease Stream Velocities during critical flow events utilizing,
 - a. Willow vegetation
 - b. Stream grade stabilization structures
 - c. Increase the flood plain (addition of point bars), natural creation preferred
4. Decrease sheet flow and wind erosion contributions to Nutrioso Creek
 - a. Remove Rabbitbrush
 - b. Increase density of grasses as land cover

- c. Promote BMPs
- 5. Stop downcutting of the stream channel and promote stabilization of the channel
 - . Remove cattle and wildlife from the stream channel during critical flow periods
 - a. Allow cattle to graze in the dormant winter months, under a range management system
 - b. Revegetation of the stream channel
 - c. Allow time for stabilization of stream banks to occur
 - d. Promote BMPs
 - e. Use stream restoration techniques to speed up recovery of stream corridor sections

ASSURANCES - Arizona Revised Statutes do not contain specific language that allows for enforceable actions to be taken against non-point sources of pollution. (1) This Implementation plan depends solely upon the volunteer approach of private landowners, with ADEQ's assistance, securing grant money for implementation projects and BMPs. Cooperation of State and Federal Agencies and private landowners will be paramount in the implementation of this TMDL.

PUBLIC PARTICIPATION

PUBLIC PARTICIPATION IN THE TMDL PROCESS - Public participation occurred in collecting data, background information, and in developing this report. The draft TMDL was made available for a public comment period lasting 30 days and starting on June 1, 2000. Public notice of the availability of the draft document was posted in a newspaper of general circulation (*The Observer*), email notifications, phone calls, and webpage postings. The Nutrioso Creek TMDL Draft was presented to the Upper Little Colorado Watershed Group in their June 22, 2000 meeting.

WATERSHED GROUP - The Nutrioso Creek watershed Partnership was formed in November of 1998 and is officially represented at every Upper Little Colorado River watershed group meeting by Mr. James W. Crosswhite. (13) The Nutrioso Creek Watershed Partnership incorporates concerned private citizens, private landowners, and other interested State and Federal Agency personnel. The watershed group will provide oversight for the implementation projects and plans, and may provide additional data in the form of volunteer monitoring of the stream.

WEB SITES - ADEQ has a website at <http://www.adeq.state.az.us> that will provide information and links to other data relevant to this Nutrioso Creek TMDL and contact information. This TMDL should be available for download from the ADEQ website in the foreseeable future.

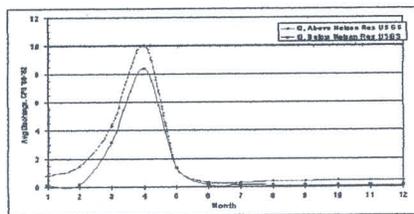
Another website containing information regarding Nutrioso Creek, maintained by private landowner James W. Crosswhite of the E.C. Bar Ranch, is located at <http://www.ecbarranch.com> and is maintained in collaboration with his current conservation and ranching projects. This website provides contact information and links for more information and questions, has photos of projects in progress, a delineation of the project areas, information regarding BMPs, grant writing, funding sources and much more. This website will be a useful tool for the watershed group in disseminating their information and projects.

LIST OF ABBREVIATIONS - *Crosswhite note: Abbreviations deleted to save space*

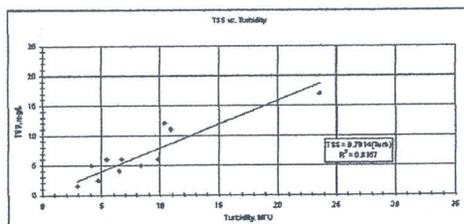
REFERENCES - *Crosswhite note: Referenced deleted to save space*

APPENDIX

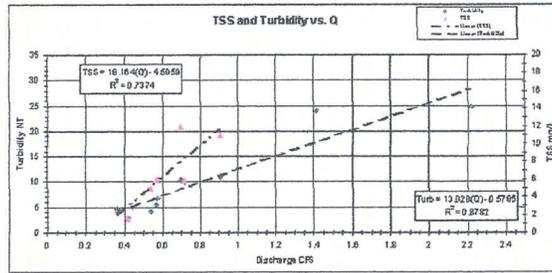
**GRAPH 1:
AVERAGE MONTHLY STREAM DISCHARGE AT USGS GAUGE STATIONS**



**GRAPH 2:
TSS VS. TURBIDITY FOR NUTRIOSO CREEK**



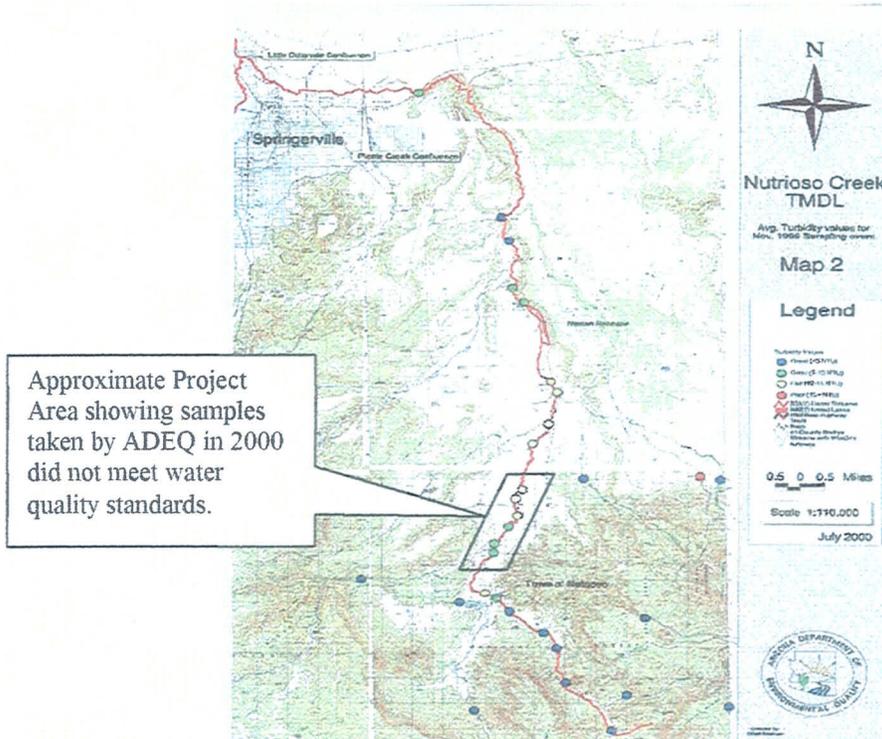
**GRAPH 3:
TSS AND TURBIDITY VS. DISCHARGE**



Map 1, Location of the Little Colorado River Watershed and Nutrioso Creek



Map 2, Nutrioso Creek Study area and Turbidity Values from November 1999 sampling event

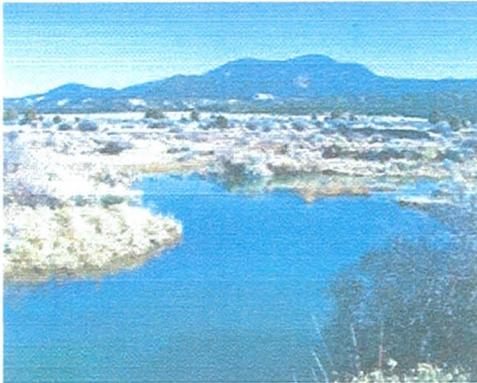


The TMDL Report may be viewed at <http://www.ecbarranch.com/monitoring/tdml.htm> or the ADEQ website

The following article appeared on EPA website

<http://www.epa.gov/region9/water/watershed/nutrioso.html> in April 2010.

Nutrioso Creek Watershed



On this page:

- [Watershed Implementation Activities](#)
- [Data](#)
- [Contact Information](#)
- [Additional Resources](#)

Nutrioso Creek is located in the Little Colorado River Basin in southern Apache County, along the eastern border of Arizona. The Nutrioso Creek watershed drains approximately 159 square miles, and is defined as the drainage area of land that captures and transports surface and ground water within the basin near Nutrioso, AZ. The town of Nutrioso is an unincorporated community, where the population is estimated at 150 people. Nutrioso Creek was listed on Arizona's impaired waterbody list in 1998 for not meeting state water quality standards for turbidity and is currently listed as a Measure W watershed for EPA Region 9 (*see footnote #1*).

A TMDL was completed for Nutrioso Creek in 2000. Field investigations found that historic grazing and forestry practices had led to a loss of riparian vegetation and caused stream entrenchment. Healthy riparian areas are needed to stabilize stream banks and dissipate stream energy during high flow events. The TMDL identified a variety of management practices to improve cattle grazing and forestry practices. What is a TMDL?



The 3 minute video produced by EPA Region 9 is an excellent discussion of TMDL reports and the improvements made to Nutrioso Creek by the Grantee. <http://www.youtube.com/watch?v=j8ZrOh8aECY>

[Watch a video tour of Nutrioso Creek Watershed](#)

Jim Crosswhite owns the EC Bar Ranch, which includes a three mile section of the Creek where historic overgrazing had occurred. Since 1998, Mr. Crosswhite has participated in the Arizona Department of Environmental Water Quality Improvement Grant Program by implementing water quality improvements recommended in the TMDL. In addition, Mr. Crosswhite donated a conservation easement to permanently protect water quality and aquatic wildlife habitat conditions on his property.

Adjoining the EC Bar Ranch downstream, the US Forest Service manages land within the watershed and has done implementation work using 319 funds as well.

As a result of the water quality and wildlife habitat improvements completed in the watershed, native fish populations, including a federally listed fish species, the Little Colorado Spinedace, have increased in numbers. Ongoing restoration will benefit other wildlife as well, including the endangered Southwestern Willow Flycatcher.

In 2009, DEQ and EPA removed Nutrioso Creek from the impaired waterbody list. This is the first instance in Arizona where a waterbody has been delisted by implementing NPS BMP's.

Watershed Implementation Activities

Water Quality Improvement Grant Projects

ADEQ awarded the following Water Quality Improvement Grants (319 Grants) in this watershed. More information concerning these grants or projects can be obtained at Arizona Department of Environmental Quality's Water Quality Improvement Grant Program.

EC Bar Ranch Turbidity Reduction Projects

Project years: 2000, 2001, 2002, 2003, 2004, and 2005, Location: Lat and Long 33 58 44, -109 12 08 (NAD 83)

Goals: Restore riparian proper functioning conditions by fencing to control livestock and elk activities, installation of off-channel drinkers, streambank restoration structures, erosion control structures, critical area grass plantings, and improved management practices to help stabilize streambanks and reduce sediment loading in Nutrioso Creek.

Rogers Ranch Turbidity Reduction Project

Project year: 2000, Location: Lat and Long 33 59 35, - 109 12 15

Goals: Control of large ungulate activities with fencing, streambank revegetation, and off-channel drinkers for livestock and wildlife to improve riparian conditions and reduce turbidity. Shortly after the grant was awarded, Mr. Crosswhite acquired the project area and completed the practices.

Greenwood Sediment Reduction Project

The Apache Sitgreaves National Forest (USFS), Project year 2001, Location: Lat and Long 34 01 58, - 109 11 50)

Goals: Reconstruct and realign forest roads to reduce sediment contributions to Nutrioso Creek. Erosion stabilization techniques were applied to control active head-cutting and bank erosion caused by roads.

Data

- WATERS
(Watershed Assessment, Tracking & Environmental ResultS) unites water quality information from several independent and unconnected databases.

- **GRTS**
The Grants Reporting and Tracking System (GRTS) is the primary tool for management and oversight of the EPA's Nonpoint Source (NPS) Pollution Control Program.

Contact Information

- EPA Region 9
Jared Vollmer (vollmer.jared@epa.gov)
(415) 972-3447
- AZDEQ
Krista Osterberg (osterberg.krista@azdeq.gov)
(602) 771-4635
- Landowner
James W. Crosswhite
www.ECBarRanch.com

Additional Resources

- Arizona Department of Environmental Quality
- Arizona Department of Water Resources
- United States Geological Survey
- University of Arizona - NEMO
- EPA's Watershed Central
Watershed Central has been designed to assist users to develop and implement effective watershed management programs. The site includes guidance, tools, case studies, and data sets to help you share information, analyze data, and identify opportunities to initiate or strengthen your watershed efforts.
- EPA's Watershed Webcasts
Watershed Academy Webcast Seminars

Footnote #1. Measure W Watersheds

Measure "W" (also known as the Watershed Improvement Measure (WIM) and SP-12) is a key performance measure in EPA's Strategic Plan. The measure tracks watersheds where water quality conditions have improved by utilizing a watershed approach. One of the primary purposes of this measure is to model and demonstrate the effectiveness of the watershed approach. EPA has a nation-wide goal to improve water quality conditions in 250 watersheds for 2012. EPA Region 9 and our state water quality agency partners have agreed to track the following watersheds for purposes of reporting on this measure and documenting environmental results, and to better focus our water quality restoration activities by identifying needs, sharing information, providing assistance and learning more about the related challenges. We expect some of these watersheds to show improvement by 2012 for the identified pollutant. Additional watersheds may be added and/or substituted. Nutrioso Creek Watershed is a "Measure W Watershed".



Janet Napolitano
Governor

ARIZONA DEPARTMENT OF ENVIRONMENTAL QUALITY

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Stephen A. Owens
Director

August 28, 2006

Mr. James Crosswhite
EC Bar Ranch
PO Box 44
Nutrioso, Arizona 85932

Re: Request to Delist Nutrioso Creek

Dear Mr. Crosswhite:

This letter is in response to your May 31, 2006 letter to the Arizona Department of Environmental Quality (ADEQ) requesting Nutrioso Creek be delisted from Arizona's list of impaired waters. **ADEQ appreciates the time and resources that you have spent on restoration efforts along the creek. As outlined in your letter, water quality is not the only indicator of ecosystem health. Through your restoration efforts, there have also been improvements in both wildlife habitat and fish populations along the creek.** ADEQ is obligated, however, to make impairment decisions based on whether applicable water quality standards are being met and maintained. After reviewing your letter and all available data, **ADEQ will recommend to EPA that the reach of Nutrioso Creek, above Nelson Reservoir, be delisted for turbidity.** Below we outline the factors that went into our decision and changes in rules that may affect the status of Nutrioso Creek in the future.

As you are aware, the *Nutrioso Creek TMDL for Turbidity* was completed and approved by the U.S. Environmental Protection Agency (USEPA) in 2000. The TMDL was written to address exceedances of the water quality standard for turbidity in cold water streams of 10 NTU. Unfortunately, NTUs cannot be used in calculating loads because they are a measure of the amount of light refracted in a water sample and not a measure of mass. In order to calculate the TMDL, a turbidity versus total suspended solids (TSS) relationship was established. Using the developed relationship, any given NTU value has a corresponding TSS value in milligrams per liter (mg/L), which was then used to calculate the [MDL.

For Nutrioso Creek, spring runoff (snow melt), occurring during the months of February through May, was determined to be the "critical condition" to sediment loading. The critical flow was determined to be 4.3 cubic feet per second (cfs) with a corresponding turbidity value of 55 NTU and a TSS value of 44 mg/L. The critical flow was calculated as the median value recorded by the U.S. Geological Survey gage above Nelson Reservoir, which operated from 1968-1989. The result of the 1' MDL stated that in order for Nutrioso Creek to meet water quality standards, the sediment load would need to be reduced by 837 pounds per day (lbs/day), or a total of approximately 50 tons, during the four months that spring runoff occurs, to a target value of 183 lbs/day. The TMDL implementation section listed several Best Management Practices (BMPs) that could be used to potentially reduce the sediment loading to Nutrioso Creek. BMP implementation for non-point source pollution, as is the case in Nutrioso Creek, is voluntary.

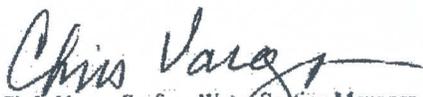
In 2000, you began restoration efforts with the help of ADEQ Water Quality Improvement Grant funds. ADEQ began effectiveness monitoring in 2004 to determine if implemented actions had improved the water quality of Nutrioso Creek. In order to determine that the creek is attaining water quality standards, the effectiveness

monitoring data must be collected under the critical conditions identified in the TMDI. Ideally, ADEQ would collect data under the critical spring runoff conditions (at or near 4.3 cfs), develop a new turbidity/TSS relationship, and calculate the reduction in sediment loading to Nutrioso Creek. Attainment of both the water quality standards and the load reductions specified in the TMDL would result in delisting the waterbody for the pollutant of concern. In 2002, ADEQ repealed the turbidity standard and replaced it with a Suspended Sediment Concentration (SSC) standard of 80 mg/L as a geometric mean of samples taken at or near baseflow in both warm and cold water streams. The turbidity standard was replaced because ADEQ considers the SSC standard to be a better indicator of water quality impairment than turbidity and to be more protective of aquatic life. This change in the applicable water quality standard has made the interpretation of the Nutrioso Creek effectiveness data more challenging. Through the effectiveness monitoring process, ADEQ staff determined that Nelson Reservoir causes a break in the hydrology of Nutrioso Creek. Therefore, as part of our upcoming triennial review of the surface water quality standards, Nutrioso Creek has been segmented into two reaches: one from the headwaters to the dam at Nelson Reservoir, and another from the dam to Picnic Creek. This response and the data analysis only addresses the reach of Nutrioso Creek above Nelson Reservoir.

The ADEQ collected effectiveness data for the upper segment of Nutrioso Creek from 2004-2006 and developed a new relationship between turbidity and TSS to determine the degree of attainment of the current SSC and old turbidity standards. Discharge data ranged from near zero to twenty cfs. Using the data collected from 2004-2006, at a flow equal to 4.3 cfs, we would expect a turbidity value of approximately 5 NTU and a corresponding TSS value of 5 mg/L (equaling 115.93 lbs/day). These numbers indicate that at critical flow of 4.3 cfs, the old turbidity standard of 10 NTU and the TMDL target load of 183 lbs/day are being met. The SSC geometric mean standard of 80 mg/L also was not exceeded.

After review of available information, it will be ADEQ's recommendation that the segment of Nutrioso Creek extending from the headwaters to Nelson Reservoir be delisted for turbidity. ADEQ will make this recommendation to USEPA as part of the 2006 Integrated Report of Water Quality*. In accordance with the Clean Water Act, EPA must concur with any final delisting decisions. Even if Nutrioso Creek is delisted, ADEQ will continue its effectiveness monitoring and evaluate water quality in the future especially as new surface water quality standards are adopted or revised. Of note, we expect narrative water quality standards for both bottom deposits and biocriteria to be adopted in the upcoming triennial review as well as a numeric cold water SSC standard of 25 mg/L. We will assess the stream for attainment of any new standards.

Sincerely,


Chris Varga, Surface Water Section Manager
Water Quality Division

SWS06:0103

cc: Jason Sutter, Mgr., TMDI. Unit
Steve Pawlowski, Mgr., Standards & Assessment Unit

Northern Regional Office
1801 W Route 66 • Suite 117 • Flagstaff, AZ 86004
(928) 779-0313

Southern Regional Office
400 West Congress Street • Suite 433 • Tucson, AZ 85701
(520)628-6733

* See the 2006-2008 Status of Ambient Surface Water Quality in Arizona Report regarding removal of Nutrioso Creek from Section 303(d) list as a non-attaining water body.



Janice K. Brewer
Governor

ARIZONA DEPARTMENT
OF
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Benjamin H. Grumbles
Director

August 27, 2009

Jim Crosswhite
EC Bar Ranch
PO Box 44
Nutrioso, AZ 85932

Re: Nutrioso Creek Delisting

Dear Mr. Crosswhite,

The purpose of this letter is to advise you that the EPA has finished their review of our 2006/08 Assessment in which they state "ADEQ has removed Nutrioso Creek (AZ 15020001-017A) from Category 4a - TMDLs completed and reclassified it as Category 1 - Attaining All Uses. The State has presented evidence that this reach of Nutrioso Creek should be delisted for turbidity/suspended sediment, supported by post-TMDL monitoring data in the 2004-2006 timeframe (ADEQ 2007b), which shows zero exceedences (n=26) of the SSC standard and compliance with the turbidity TMDL load allocations. We concur with ADEQ's assessment that this WQLS is attaining for SSC and turbidity." The rationale for the delisting decision was sent to you previously in a correspondence from Chris Varga, former ADEQ Surface Water Section Manager, dated July 14, 2006.

Nutrioso Creek has been delisted above Nelson Reservoir and is no longer considered not attaining the former turbidity surface water quality standard. This is the first instance in Arizona where a waterbody has been delisted as a result of voluntary mitigation efforts. ADEQ appreciates the time, effort and dedication you have shown to improving the water quality of Nutrioso Creek.

Sincerely,

Jason Sutter, Supervisor
ADEQ TMDL Unit

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(520) 628-6733

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**SUPPLEMENTAL INFORMATION:
Existing Plans/Reports/Information
Attachment #5**

**U.S. Fish and Wildlife Service
Arizona Fishery Resources Office
Partners for Fish and Wildlife Program
P.O. Box 39, Pinetop, Arizona 85935
928/338-4288 928/338-4763 Fax**



August 24, 2006

James W. Crosswhite
EC Bar Ranch
PO Box 44
Nutrioso, AZ 85932

Dear Mr. Crosswhite,

The riparian restoration practices implemented in Nutrioso Creek on the EC Bar Ranch, including water quality and aquatic/wildlife habitat improvements have created an ideal natural aquatic habitat to relocate the Little Colorado River spinedace, captured in degraded (lack of sufficient water) pools downstream on the Apache Sitgreaves National Forest. **In May 2006, Arizona Game and Fish Department (AGFD) and U.S. Fish and Wildlife Service (Service) staff salvaged approximately 767 Little Colorado River spinedace from degraded habitat on U.S. Forest Service property and repatriated them to perennial habitat on the EC Bar Ranch¹. The practice of salvaging a listed species from public land and repatriating the species to private land is rarely warranted and demonstrates your commitment to threatened and endangered species. AGFD and the Service recognize that this practice can only occur because of the quality of habitat your reach of Nutrioso Creek provides. In fact, it may be the only instance where this has occurred in Arizona with a federally listed fish species.**

Apparently, your three step approach of implementation, maintenance, and protection to improve aquatic and wildlife habitat on the EC Bar Ranch has proven successful. Through your utilization of the Service's Partners for Fish & Wildlife Program to improve wildlife and aquatic habitat you have brought the Little Colorado River spinedace one step closer to recovery, which is consistent with the Little Colorado River Spinedace Recovery Plan published in 1998.

The practices that you implemented were completed as agreed upon in the Partners in Fish & Wildlife grant proposal and resulted in successful outcomes. The Safe Harbor Agreement naturally ensued which is entitled: Voluntary Enhancement and Restoration Activities Benefiting the Southwest Willow Flycatcher and Little Colorado River Spinedace in Nutrioso Creek. This is the first and so far the only agreement to be created in Arizona between the Service and a private landowner.

After wildlife habitat improvement practices are implemented, there becomes an ongoing need to maintain, repair, and improve on those successful practices. This is especially important in a perennial stream like Nutrioso Creek where less frequent high flows alternate with predominant low flows the rest of the year. Under such conditions, minor practice flaws or miscalculations may be more likely to result in failure of a project. For example, low flows during the growing season can result in poor vigor in the planted willows, stunted growth, and/or death, thus reducing fish and wildlife habitat. To help meet maintenance objectives, the Service encourages enrollment through the Natural Resources Conservation Service (NRCS) Conservation Security Program (CSP). The CSP provides annual funding for maintenance of existing soil quality, water quality, and wildlife habitat practices to eligible private landowners meeting national stewardship criteria.

Riparian area management is critical to species recovery objectives. The Service encourages the adoption of sustainable management activities consistent with wildlife habitat conservation values, which may include creation of a conservation easement. Qualified organizations often apply for Service Section 6 funding to help create conservation easements. **The Service is very appreciative of the ongoing collaborative sustainable partnership with you and the EC Bar Ranch. It is always a pleasure to visit the EC Bar Ranch and see the riparian areas and grasslands adjacent to Nutrioso Creek thriving. We appreciate your efforts so much that we would like to showcase your projects as part of the 20th Anniversary of the Partners for Fish and Wildlife Program. Thank you for conserving the rare and ecologically significant resources of Arizona and please feel free to contact the Service if you have any questions or comments.**

Sincerely,


Stewart Jacka
Project Leader

¹ Carter, C. et al. 2006. Arizona Game and Fish Department - Region 1 - Nutrioso Creek Spinedace Repatriation Report

SUPPLEMENTAL INFORMATION: Existing Plans/Reports/Information – Attachment #6

January 8, 2010

Jim Crosswhite
EC Bar Ranch
PO Box 44
Nutrioso, AZ 85932

Dear Jim,

The letter summarizes the condition of soils, hydrology, and vegetation using the Proper Functioning Condition (PFC) rating criteria developed by the Bureau of Land Management and US Forest Service. This method of rating PFC has proven to have a high correlation to water quality and aquatic/wildlife habitat condition, eg non-functional condition implies poor water quality and habitat conditions. Generally, the 3 miles of Nutrioso Creek on the EC Bar Ranch is largely in Proper Functioning Condition meeting water quality and aquatic/wildlife habitat objectives set by state and federal agencies, which ultimately benefit the long term public good, as well as, the Apache Sitgreaves National Forest downstream. However, I do have some concerns that Rabbitbrush plants growing in the riparian corridor could reverse the improving conditions by consuming large quantities of water that could otherwise be used as stream flow and displacing native riparian vegetation. I believe it is a high priority to eradicate Rabbitbrush in the riparian corridor on your 3 mile section of Nutrioso Creek, not only to avoid degrading successful water quality and aquatic/wildlife habitat improvements, but to create a new sustainable source of water for instream flows.

In reviewing the PFC survey's on Nutrioso Creek on your property in 1996 (Wright Consulting) and 1998 (Arizona Game & Fish Department), the "non-functional" rating of riparian soils, hydrology, and vegetation correlated with state and federal agency reports that reported water quality and aquatic/wildlife habitat concerns, eg the year 2000 Arizona Department of Environmental Quality (ADEQ) TMDL Report on Nutrioso Creek recommended improvements to meet water quality standards; the 1998 US Fish & Wildlife Service (FWS) and 2001 Arizona Game & Fish Department (AGFD) fish reports recommended improvements to meet aquatic/wildlife habitat concerns, especially regarding the LC spinedace, a federally listed fish species. In 2000, Lamar Smith, Cascabel Range Consultants, performed a PFC survey at the same time he established photo-monitoring sites in a collaborative partnership with the Arizona Water Protection Fund. Mr Smith indicated reaches 1-3 were in "upward trends" toward PFC, while reach 4 and 6, which you had acquired from neighbors in 2000, were in "non-functional" condition.

In 2005, after about 6-7 years of restoration work on your part, I performed a PFC survey on reaches 1, 2, 2A, 3, 4, and 6. Reach 5 was not rated because Mr Reidhead owned the property. I rated your reaches in an "upward trend" reflecting significant improvement in soils, hydrology, and vegetation, which could only be attributed to your efforts. As expected, improved PFC data correlated closely with improved water quality and wildlife habitat as reported in August 2006 by ADEQ and FWS in letters to you. I did observe that Muskthistle, a noxious weed, required treatment, and Rabbitbrush, an invasive species, needed to be reduced in numbers to avoid potential negative impacts to stream flows and riparian vegetation.

In August 2009, ADEQ and the Environmental Protection Agency (EPA) removed the portion of Nutrioso Creek above Nelson Reservoir from the Clean Water Act 303(d) list as a non-attaining waterbody, including the sections on your property and the Apache Sitgreaves National Forest (ASNF). The ADEQ and EPA indicated this was the first instance in Arizona where a waterbody had been delisted due to mitigation, which you performed on the EC Bar Ranch and downstream on the ASNF. The significance of this accomplishment, which helped natural resources, private landowners, and public lands, is underlined

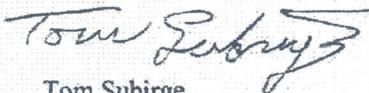
when compared with the fact that less than 15% of riparian areas on the ASNF are rated in PFC. For anyone genuinely concerned with preserving and protecting Arizona's remaining perennial streams and riparian ecosystems, it is unthinkable that a large number of invasive Rabbitbrush plants might degrade 3 miles of the creek on your property, plus downstream sections of the ASNF, and negate the many years of restoration work, collaborative partnerships, and public benefits of your conservation easement donation.

On September 2, 2009, I performed a PFC survey that included reaches 1, 2, 2A, 3, 4, 5, 6, and 8, a continuous stream length of 3 miles on 94 acres which includes the EC Bar Ranch Conservation Easement and 5 acres in reach 8, or approximately 100 acres in total. While my overall rating for the reaches was PFC, I observed that Rabbitbrush plants had increased to an average of about 500 plants per acre in the riparian area, defined as the FEMA 100 year floodplain plus 100 ft buffers on each side. While the normal annual streamflows encompass a narrower floodplain than the FEMA 100 year map depict, the entire floodplain was considered in my PFC rating. The 100 ft buffers on an upper terrace vary from a few feet to 15 feet above the stream. Therefore, due to their deep taproot, any Rabbitbrush plants growing in the buffers are consuming water from the riparian area water table and upsetting the hydrologic process whereby water is stored in banks during high flows and released during low flows. This natural process is critical to sustaining year round flows essential to fish populations and riparian dependent wildlife. PFC ratings address hydrologic impacts.

Since PFC ratings are a leading indicator, and correlate closely with changes in water quality and wildlife habitat conditions, it is my opinion that PFC in Nutrioso Creek may no longer be improving due exclusively to the proliferation of Rabbitbrush plants which are consuming water, crowding out native plants, and causing erosion. My observations are supported by the Natural Resources Conservation Service (NRCS) field report in April 2009 that identified Rabbitbrush as an invasive species in Nutrioso Creek on your property and recommended that 90% of Rabbitbrush plants in the FEMA 100 year floodplain and adjoining 100 ft buffers be eradicated by chemical and/or mechanical methods. The FWS also recommended eradication of Rabbitbrush in the riparian corridor by multiple chemical spot treatment applications because it does not harm nor endanger aquatic or wildlife. Rabbitbrush eradication was recommended by James Copeland, Alpine District Ranger, on September 9, 2009 per the enclosed letter.

As the Riparian Coordinator for the Apache Sitgreaves National Forest, I have extensive background, knowledge, and expertise in a wide range of riparian related topics. I have observed many instances where "riparian experts", "consultants", and landowners have claimed to restore riparian conditions. Your case is the only example where the agencies who have set the standards for water quality and habitat have also verified restoration results. This is an important point since anyone can claim to have restored a creek, but until a state or federal agency has collected data independently and interpreted it using their expertise, any claim is effectively an opinion, not a fact. In your case, the agencies who made the recommendations, have certified the results of your restoration practices meet criteria and standards for water quality and aquatic/wildlife habitat. This implies that Nutrioso Creek may be restored to the highest standards of any riparian area in Arizona. I encourage your on-going preservation and protection of Nutrioso Creek. Eradication of Rabbitbrush is essential to those efforts and for the long-term public benefit.

Sincerely,



Tom Subirge
P.O. Box 736
Eagar, Az. 85925



United States
Department of
Agriculture

Forest
Service

Apache-Sitgreaves
National Forests
Alpine Ranger District

P.O. Box 469
Alpine, AZ 85920
(928) 339-5000 FAX: 339-4323
TTY: (928) 339-4566

File Code: 1500

Date: September 29, 2009

Jim Crosswhite
EC Bar Ranch
P.O. Box 44
Nutrioso, AZ 85932

Dear Mr. Crosswhite:

Thank you for your informational letters dated March 3, 2009 and July 14, 2009. The Alpine Ranger District supports your extensive efforts to improve and maintain the limited riparian areas we have left in the southwest. Removal of Rubber Rabbitbrush on about 97 acres, including 3 miles of Nutrioso Creek on reaches 1-6 and 8 of your property can conceivably make a positive contribution towards stream discharge and other associated benefits to fish habitat, riparian habitat, and other wildlife habitat as a whole.

The Alpine Ranger District, Apache Sitgreaves National Forests adjoins your property downstream, and as your neighbor, we support the removal of Rabbitbrush as a means to help improve aquatic wildlife habitats that benefit federally listed species. Another recognized benefit is the maintenance of successful water quality improvement projects that resulted in the removal of a large reach of Nutrioso Creek (upstream of Nelson Reservoir) from the Clean Water Act, Section 303(d) list of impaired water bodies for Arizona.

I have reviewed the Natural Resources Conservation Service (NRCS) Trip Report dated April 4, 2009, and the U.S. Fish & Wildlife Service (USFWS) letter dated July 8, 2009, which provides further evidence that Rabbitbrush plants have proliferated to an unacceptably high cover density along the riparian corridor of Nutrioso Creek on both private and Forest Service system lands. Again, we support your efforts to control this pervasive species and wish you success in moving it back to a much lower proportional occurrence. Please keep us informed of your results as we may, in the future, be able to employ any of your proven techniques to control the species on adjacent Forest Service system lands.

Please feel free to use our letter of our concurrence with your Rabbitbrush removal efforts for any funding opportunities that may require public support.

Sincerely,

JAMES D COPELAND
District Ranger



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*Preserving New Mexico's land
heritage for future generations*

November 23, 2009

James W. Crosswhite
EC Bar Ranch
PO Box 44
Nutrioso, AZ 85932

Dear Mr. Crosswhite,

This letter is to confirm the EC Bar Ranch Conservation Easement Agreement ("Agreement") has been entered into between yourself as a representative of the James Wayne Crosswhite LLC and James Wayne Crosswhite Trust ("Landowner"), and the New Mexico Land Conservancy ("NMLC"), for the purpose of forever conserving the Conservation Values on your 94.2 acre property located in the White Mountains of eastern Arizona ("Property"). The effective date of the Agreement is November 20, 2009.

The Conservation Values are summarized below:

1. **Natural Habitat Values.** The Property consists of significant natural habitat along approximately 2.94 stream miles of Nutrioso Creek, an important perennial stream and tributary of the Little Colorado River, which flows through the Property. The Property represents one of the longest stretches of riparian corridor along Nutrioso Creek under private ownership as of the effective date of the Agreement, and is located upstream from other land along Nutrioso Creek that is under the ownership and management of the U.S. Forest Service. Nutrioso Creek provides important habitat for plants and animals including the Little Colorado River Spinedace, which is listed under the Federal Endangered Species Act; potential habitat for the Southwestern Willow Flycatcher and Arizona Willow; and other species of special concern as identified and listed by the Arizona Game and Fish Department. Nutrioso Creek also serves as important breeding habitat and a migration corridor for a great number and variety of passerine birds.
2. **Scenic Open Space Values.** The Property includes scenic open space consisting of a relatively natural riparian corridor associated with Nutrioso Creek visible from the Coronado Trail Scenic Byway (U.S. Highway 191) which has been designated a scenic byway by the National Scenic Byways Program administered by the U.S. Department of Transportation, Federal Highway Administration, the preservation of which is pursuant to the Apache County General Plan (2004), a clearly delineated local governmental conservation policy which states as a specific County policy that it intends to "maintain natural scenic qualities of the County by identifying and protecting cultural resources, protecting wildlife habitat, natural plant communities and riparian areas, and encouraging protection of scenic vistas".

Post Office Box 6759
Santa Fe, NM 87502-6759
T 505/986-3801 F 505/986-3806
www.nmlandconservancy.org

3. Agricultural Values. Portions of the Property are used for livestock grazing on a limited basis during specific periods of the year, the preservation of which is pursuant to the Apache County General Plan (2004), a clearly delineated local governmental conservation policy which states as a specific County policy that it intends to "conserve agricultural land and open space through density transfers or other programs".
4. Public Benefit. Conserving the 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:
 - A. The Property possesses significant natural habitat, scenic open space, and agricultural values of great importance to Landowner, to NMLC, to Apache County, to the State of Arizona, and to the people of this nation;
 - B. Agriculture has been an integral part of the way of life in Apache County for centuries and should be preserved in order to protect the area's local, rural economy, and way of life;
 - C. Open space has been an integral part of Apache County for centuries and should be preserved in order to protect the area's great natural beauty and scenic vistas;
 - D. The Property exists in an area where development is occurring and is expected to occur at an accelerated rate in the future;
 - E. The use of the Property as stated in the Agreement is consistent with public programs for conservation in the area, including programs for the protection of threatened and endangered species, soil conservation, and water quality enhancement;
 - F. The development of the 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 natural habitat of the area;
 - G. The Property has been evaluated for scenic quality and found to be scenic and easily seen by the public; and
 - II. The Property represents a high quality example of a riparian ecosystem.

The EC Bar Ranch Conservation Easement Agreement was effective on November 20, 2009, and was recorded in Apache County on November 23, 2009, as document number 2009-007496. The Baseline Conditions Report is on file with NMLC and dated November 20, 2009. Additional information is available at www.nmlandconservancy.org and www.ECBarRanch.com.

NMLC holds 31 easement properties protecting over 72,000 acres. As one of the foremost examples of a restored riparian area in Arizona, your generous donation of the EC Bar Ranch Conservation Easement and cash donations will help ensure the protection of existing Conservation Values and new improvement projects for the benefit of the land and future generations.

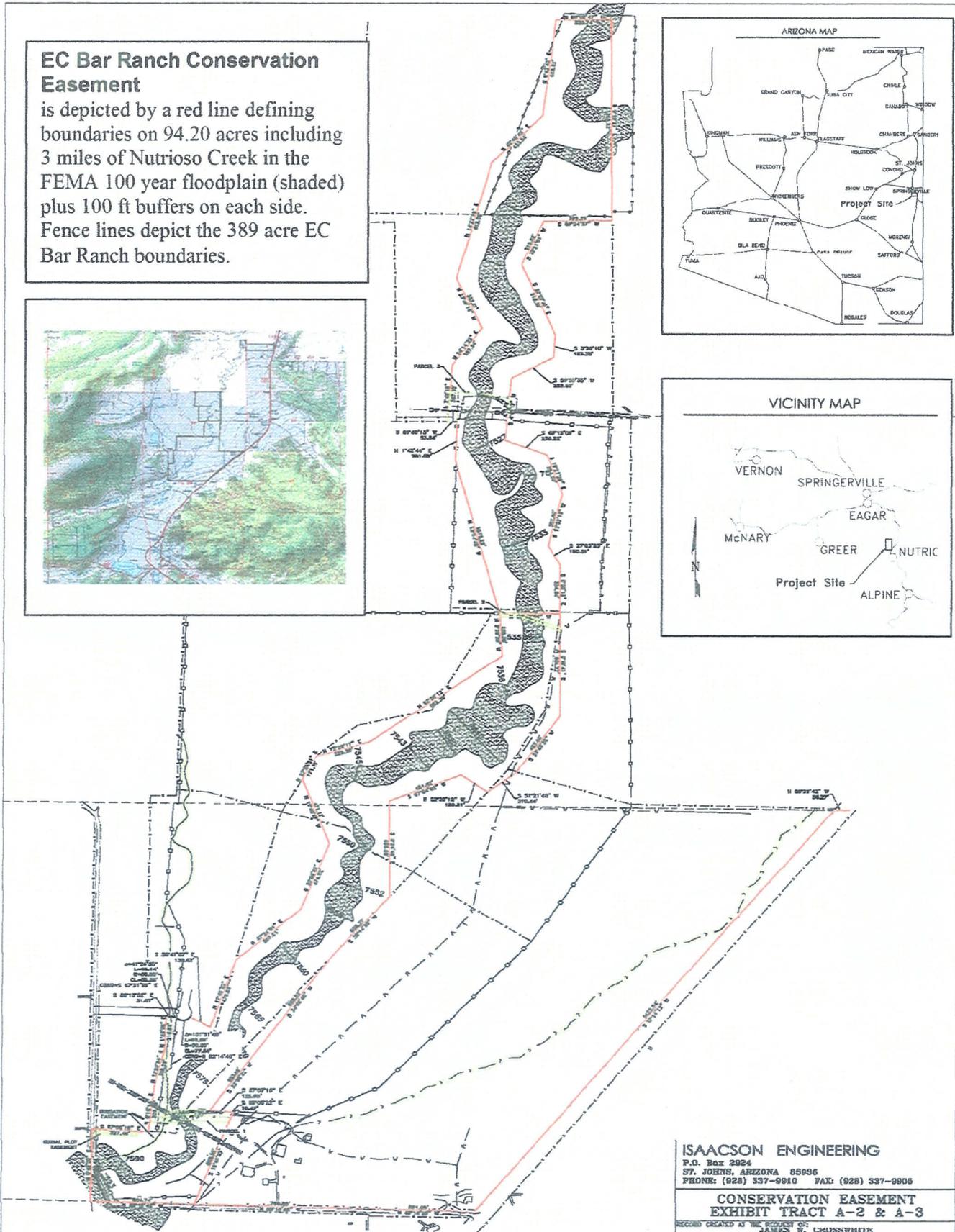
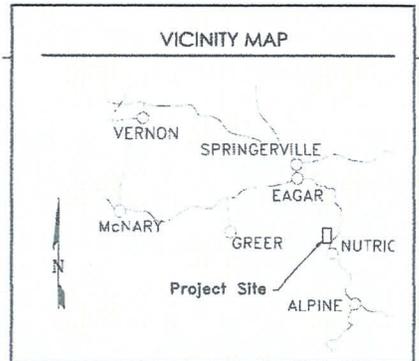
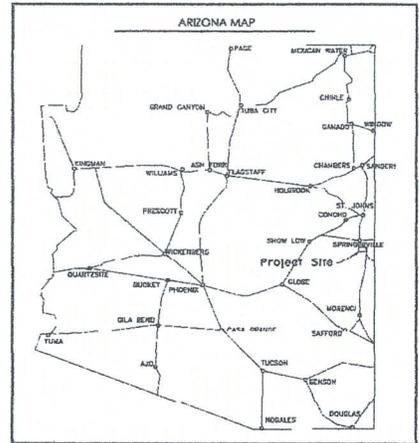
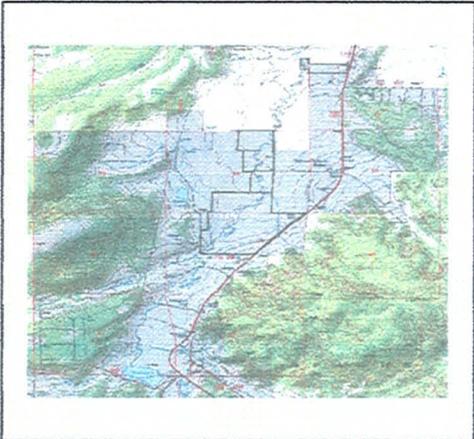
Sincerely,



J. Scott Wilber
| Executive Director

EC Bar Ranch Conservation Easement

is depicted by a red line defining boundaries on 94.20 acres including 3 miles of Nutrioso Creek in the FEMA 100 year floodplain (shaded) plus 100 ft buffers on each side. Fence lines depict the 389 acre EC Bar Ranch boundaries.



ISAACSON ENGINEERING
P.O. Box 2824
ST. JOHNS, ARIZONA 85936
PHONE: (928) 337-9910 FAX: (928) 337-9905

**CONSERVATION EASEMENT
EXHIBIT TRACT A-2 & A-3**

RECORDS CREATED AT THE REQUEST OF: JAMES W. GRUNSWHITE

NEW MEXICO LAND CONSERVANCY

Preserving New Mexico's Land Heritage

PRESS RELEASE

FOR IMMEDIATE RELEASE:

Contact: Jennifer Kilbourn, Communications and Development Coordinator
New Mexico Land Conservancy
Tel: 505-986-3801
Fax: 505-986-3806
jkilbourn@nmlandconservancy.org
www.nmlandconservancy.org

Nationally Recognized Arizona Ranch Protected with Conservation Easement

Santa Fe, New Mexico

December 17, 2009

The New Mexico Land Conservancy recently announced the completion of its first conservation easement in eastern Arizona on the nationally recognized EC Bar Ranch, located along the northern edge of the White Mountains just south of Springerville in Apache County.

The conservation easement donated by EC Bar Ranch owner, Jim Crosswhite, protects 94 acres of a larger 400+ acre ranch and includes restored riparian habitat along a three-mile stretch of Nutrioso Creek, an important perennial stream and tributary of the Little Colorado River. Nutrioso Creek and the surrounding riparian area provide significant habitat for a variety of fish and wildlife, including several state and federally threaten and endangered species.

As a former marathon runner, a long-time personal goal of Crosswhite's was to circumnavigate the entire Himalayan mountain range by self-supported running. However, when he acquired the EC Bar Ranch in 1996, he gave up that goal for one that has proven much more formidable: restoration and protection of a severely degraded riparian stream to the highest possible water quality and ecological standards.

"I am not a life-long rancher, biologist or restoration expert. My only qualification for restoring and protecting Nutrioso Creek was a history of doing what others didn't want to do," said Crosswhite.

Through significant land management and restoration efforts over the past 13 years, Jim Crosswhite has achieved many "firsts" and set an example for how to combine sustainable grazing practices with conservation in Arizona. As a result of his work, 13 miles of Nutrioso Creek have been removed from list of non-compliant water bodies under the Clean Water Act by the Arizona Department of Environmental Quality and the U.S. Environmental Protection Agency, and the EC Bar Ranch has attained the highest water quality and aquatic/wildlife habitat standards for any landowner, public or

private, in Arizona. And, for the first time ever, as part of a Safe Harbor Agreement with the U.S. Fish & Wildlife Service and the Arizona Game and Fish Department, the federally threatened Little Colorado River Spinedace was relocated from the segment of Nutrioso Creek on the Apache-Sitgreaves National Forest to the EC Bar Ranch.

Crosswhite credits much of his conservation success to collaborative partnerships with a variety of federal and state agencies, private organizations, and most recently the New Mexico Land Conservancy. However, after many years of discussions about the use of a conservation easement to protect the wildlife habitat, open space, and agricultural values along the riparian corridor of Nutrioso Creek, Crosswhite noted that no state agency, environmental organization or land trust in Arizona was willing to hold an easement over his ranch.

“Fortunately, the New Mexico Land Conservancy recognized the value of protecting Nutrioso Creek and agreed to complete the EC Bar Ranch conservation easement, while I applied restrictive covenants and other deed restrictions to control land use on an adjoining subdivision,” Crosswhite added. “My vision for the ranch is finally being realized - to protect and preserve open spaces, wildlife habitat and a rural lifestyle in perpetuity through a collaborative partnership involving a working ranch, a conservation easement and a subdivision.”

Scott Wilber, the New Mexico Land Conservancy’s Executive Director, said, “We were pleased to have the opportunity to complete our first easement in Arizona, particularly with a landowner as dedicated to conservation as Jim Crosswhite.” Wilber added, “Doing this easement was just a logical and natural extension of the work we were already doing with private landowners in western New Mexico.”

Always thinking of his next “marathon”, when asked about the future of his conservation work, Jim Crosswhite says he would like to continue to implement water quality and wildlife habitat improvement practices, such as removing invasive plants to improve habitat for the endangered Southwestern Willow Flycatcher and other birds. “I look forward to doing more outreach to educate the public about restoration and private land protection strategies,” said Crosswhite. “I also would like to help Arizona figure out how to create tax incentives similar to New Mexico’s for landowners who donate conservation easements to qualified organizations such as the New Mexico Land Conservancy.” For over 10 years, Crosswhite has maintained a website at www.ECBarRanch.com and has hosted numerous field trips to provide information about conservation projects on his ranch.

Founded in 2002, the New Mexico Land Conservancy works with private landowners and organizations, public agencies and community groups to protect significant wildlife habitat, productive agricultural lands, scenic open space, cultural and historic sites, and recreational lands for conservation purposes and human benefit. The Conservancy’s goal is to conserve, directly or in partnership with others, 250,000 acres of high priority, high conservation value lands by 2016 through the use of conservation easements and other voluntary land protection methods. To date, the New Mexico Land Conservancy has protected over 72,000 acres of high conservation value lands throughout New Mexico and Arizona. For more information, visit www.nmlandconservancy.org.



**U.S. Fish & Wildlife Service
Endangered Species Program**

Conservation Easement in Arizona Protects a Safe Harbor Ranch in Perpetuity



Jim Crosswhite, Arizona Rancher.
Photo credit: courtesy of EC Bar Ranch

January 15, 2010

“While implementing a Safe Harbor Agreement to restore habitat for the Little Colorado River spinedace, a threatened fish, and the southwestern willow flycatcher, an endangered bird, I was inspired to donate the EC Bar Ranch Conservation Easement to permanently protect 94 acres, including 3-miles of Nutrioso Creek,” said Jim Crosswhite, a rancher in Apache County, Arizona. The Arizona Partners for Fish and Wildlife program helped implement the Safe Harbor Agreement* through controlled grazing, vegetative plantings, and improved management. “The conservation easement will protect those practices in perpetuity,” Crosswhite said.

[Arizona Ranch Protected with Conservation Easement \[pdf\]](#)

[Safe Harbor Agreement with James Crosswhite \[pdf\]](#)

[Information about the Southwestern Willow Flycatcher](#)

[Listen to a Southwestern willow flycatcher \[audio\]](#)

This story appeared on USFWS website at <http://www.fws.gov/endangered/> on 1/15/10

* Safe Harbor Agreement (SHA) is entitled: *Safe Harbor Agreement With James W. Crosswhite for Voluntary Enhancement and Restoration Activities Benefiting the Southwestern Willow Flycatcher and Little Colorado Spinedace in Nutrioso Creek, Arizona*. Mr. Crosswhite is the first private landowner in Arizona to complete a SHA with the USFWS. See the complete SHA at link

http://www.ecbarranch.com/monitoring/SHA%2012_19_03FINAL.pdf.

**SUPPLEMENTAL INFORMATION:
Existing Plans/Reports/Information
Attachment #10**



Rancher donates conservation easement on Nutrioso Creek

Karen Warrick

The Independent
December 8, 2009

It's taken Jim Crosswhite almost 15 years to make sure the three-mile section of Nutrioso Creek that runs through his EC Bar Ranch meets the government's standards for water quality and aquatic/wildlife habitat. Now that he has achieved that goal through a lot of hard work, time and money, he is making sure the 94-acre riparian corridor will be preserved into perpetuity by donating a conservation easement to the New Mexico Land Conservancy, which holds 31 easements in the Southwestern United States.

In 1998, the Arizona Department of Environmental Quality determined Nutrioso Creek did not meet water quality standards and placed it on a list of "nonattaining" water bodies, which is a section of the Clean Water Act, called 303(d).

Decades of over-grazing by livestock and elk had caused severe erosion of the stream banks leading to non-functional riparian conditions and high levels of "turbidity" or suspended sediment. Crosswhite voluntarily implemented all state and federal recommendations to improve water quality and aquatic/wildlife habitat.

In 2003, as part of the restoration process, Crosswhite created a 50-year Safe Harbor Agreement with the U.S. Fish and Wildlife Service (USFWS) to protect the habitat, including two endangered species; the Little Colorado River Spine-dance and the Southwestern Willow Fly-catcher. Crosswhite was the first private landowner in Arizona to enter such an agreement.

By 2006, riparian conditions had improved to such an extent the Arizona Game and Fish Department (AGFD) and the USFWS captured hundreds of threatened native fish trapped in drying pools downstream on the Apache Sitgreaves National Forest and released them in

restored sections of the creek on his ranch. A USFWS spokesperson stated "The practice of salvaging a listed species from public land and placing them on private land is rarely warranted and demonstrates Crosswhite's commitment to threatened and endangered species ... In fact; it may be the only instance where this has occurred in Arizona."

Also in 2006, the ADEQ determined due to restoration by Crosswhite, water quality standards had been met on Nutrioso Creek, leading the EPA in 2009 to remove about 13 miles of the creek from the 303(d) list of nonattaining water bodies. This was the first instance a water body in Arizona has been delisted due to mitigation.

Crosswhite's work with riparian restoration and sustainable livestock practices has helped EC Bar Ranch to attain the highest water quality and aquatic/wildlife habitat standards of any landowner, public or private, in Arizona, while still maintaining a viable ranching operation.

Besides the protections to land, water and habitat that are preserved by the EC Bar Ranch Conservation Easement, scenic open space values are also protected since the easement property is visible from the Coronado Scenic Byway (High-way 191). The easement also preserves agricultural values, allowing livestock management practices compatible with conservation values, to continue.

When asked about the future, Crosswhite said he would like to "continue to implement conservation practices and work with Arizona legislators to create incentives for others to donate conservation easements to qualified organizations. Such incentives may include tax credits and education to the public about restoration and protection strategies."

For over 10 years, Crosswhite has hosted field trips on his ranch to provide information about his conservation methods. For more information, visit www.ECBarRanch.com.



This photo shows a stretch of Nutrioso Creek that has been restored by EC Bar Ranch owner Jim Crosswhite.

SUPPLEMENTAL INFORMATION: Conservation Easement Presentation

Task #5 is the presentation of information to Commissioners about the EC Bar Ranch Conservation Easement, which was donated on November 20, 2009, to the New Mexico Land Conservancy (NMLC). The 94.20 acre easement property is identical to the Project Area which includes 15,500 feet of Nutrioso Creek active channel and floodplain within the Federal Emergency Management Agency (FEMA) 100 year floodplain plus 100 ft wide buffers on each side of the floodplain. Treating Rabbitbrush in the Project Area, which is subject to conservation easement provisions, enhances conservation values while ensuring monitoring and enforcement of deed restrictions for the public benefit in perpetuity.

The Presentation will discuss:

- a. EC Bar Ranch Conservation Easement was created and donated by the Grantee to the NMLC as a method to protect natural habitat, scenic open space, and agricultural values on 94 acres that includes 3 miles of Nutrioso Creek riparian corridor.
- b. Background leading up to the conservation easement
- c. Provisions in the conservation easement agreement that benefit the proposed project
- d. Baseline conditions report
- e. Monitoring and enforcement by the Conservancy
- f. Questions from Commissioners, including those raised at the October 20, 2008, Commission meeting:
 - Commissioner Bray stated that it appears the project would be improving private property and he is concerned that there is no public access. He asked if the Commission has ever required a conservation easement as a condition of improving private property to insure some protection for future benefits of that property.
 - Commissioner Keane stated that he wanted to address Commissioner Brays question about improving private property with no public access. The question has come up many times over the years. He believes an argument can be made that there are benefits to improving property where there is no public recreational access, if there will be demonstrated benefits to the State (e.g. improvements to riparian habitat that will increase the States wildlife habitat, or improved water quality through the reduction in soil erosion).
 - Mr. Held stated that the AWPf does not pay for conservation easements and has never required such an action. We do encourage people to consider that option. Conservation easements are considered real property, which AWPf is prohibited from purchasing by statute.
 - Chairperson Light stated that it would be good to have a future discussion regarding conservation easements.
- g. The use of deed restrictions, compatible with easement provisions, on lands outside the easement property administered by a not-for-profit company. The Grantee may enlist voluntary support to assist in maintaining the easement property by treating noxious weeds, controlling Rabbitbrush, repairing fencing, improving native vegetation, and enhancing wildlife habitat.

SUPPLEMENTAL INFORMATION: Community Support

Public support is demonstrated because the proposed project supports Best Management Practice recommendations by state and federal agencies to address water quality, aquatic/wildlife habitat, and other natural resource concerns in Nutrioso Creek in the following documents:

1. *Nutrioso Creek TMDL for Turbidity Report (ADEQ, 2000)*
2. *LC Spinedace Recovery Plan (FWS, 1998)*
3. *Nutrioso Creek Fish Management Report (AGFD, 2001)*
4. *NRCS Trip Report (4/6/09)*
5. *FWS letter (7/8/09)*

These documents indicate that the eradication of Rabbitbrush is an on-the-ground measure that directly maintains, enhances and restores a waterbody riparian resources in Arizona. Evaluation of community support for the proposed project must consider these Plans and Reports were written by state and federal agencies and affirm support for the proposed project.

In addition, letters of community support from the US Forest Service, Little Colorado River LC&D, Audubon Arizona, and New Mexico Land Conservancy are attached as follows:

- Attachment #1 is a letter dated September 29, 2009, from the US Forest Service, Alpine District, which recommends the eradication of Rabbitbrush in the AWPf Project Area as a method to improve conditions downstream on the Apache Sitgreaves National Forest (reaches 7 and 9).
- Attachment #2 is a letter dated October 26, 2009, from the Little Colorado River LC&D that recommends Rabbitbrush eradication in the AWPf Project Area as a method to improve conditions in the Nutrioso Watershed and Little Colorado River Watershed.
- Attachment #3 is a letter dated February 22, 2010, from Audubon Arizona that recommends eradication of Rabbitbrush will improve habitat, as willows replace Rabbitbrush, for the Southwestern Willow Flycatcher, a federally endangered species. In addition to Audubon Arizona, the FWS and AGFD support eradication of Rabbitbrush to allow more willows to grow. The Audubon letter emphasizes that improving habitat on a perennial stream, such as Nutrioso Creek, is a high priority for funding.
- Attachment #4 is a letter dated August 6, 2010, from the New Mexico Land Conservancy that is "confident the proposed project will enhance natural habitat, open space, and agricultural values described in the EC Bar Ranch Conservation Easement Agreement leading to long-term public benefits."



United States
Department of
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Forest
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Apache-Sitgreaves
National Forests
Alpine Ranger District

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Alpine, AZ 85920
(928) 339-5000 FAX: 339-4323
TTY: (928) 339-4566

File Code: 1500

Date: September 29, 2009

Jim Crosswhite
EC Bar Ranch
P.O. Box 44
Nutrioso, AZ 85932

Dear Mr. Crosswhite:

Thank you for your informational letters dated March 3, 2009 and July 14, 2009. The Alpine Ranger District supports your extensive efforts to improve and maintain the limited riparian areas we have left in the southwest. Removal of Rubber Rabbitbrush on about 97 acres, including 3 miles of Nutrioso Creek on reaches 1-6 and 8 of your property can conceivably make a positive contribution towards stream discharge and other associated benefits to fish habitat, riparian habitat, and other wildlife habitat as a whole.

The Alpine Ranger District, Apache Sitgreaves National Forests adjoins your property downstream, and as your neighbor, we support the removal of Rabbitbrush as a means to help improve aquatic wildlife habitats that benefit federally listed species. Another recognized benefit is the maintenance of successful water quality improvement projects that resulted in the removal of a large reach of Nutrioso Creek (upstream of Nelson Reservoir) from the Clean Water Act, Section 303(d) list of impaired water bodies for Arizona.

I have reviewed the Natural Resources Conservation Service (NRCS) Trip Report dated April 4, 2009, and the U.S. Fish & Wildlife Service (USFWS) letter dated July 8, 2009, which provides further evidence that Rabbitbrush plants have proliferated to an unacceptably high cover density along the riparian corridor of Nutrioso Creek on both private and Forest Service system lands. Again, we support your efforts to control this pervasive species and wish you success in moving it back to a much lower proportional occurrence. Please keep us informed of your results as we may, in the future, be able to employ any of your proven techniques to control the species on adjacent Forest Service system lands.

Please feel free to use our letter of our concurrence with your Rabbitbrush removal efforts for any funding opportunities that may require public support.

Sincerely,

JAMES D COPELAND
District Ranger



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www.littlecolorado.net

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Western Moulding
Salt River Project

26 October 2009

Jim Crosswhite
EC Bar Ranch
PO Box 44
Nutrioso, AZ 85932

RE: Letter of Support, Rabbitbrush Eradication Project

Dear Mr. Crosswhite:

The Little Colorado River Plateau RC&D is pleased to provide a Letter of Support for your proposed project to eradicate Rabbitbrush on the EC Bar Ranch. Your previous projects have been noted and appreciated. Any reduction of water consumption by non-native vegetation, benefits to native aquatic and wildlife species and restoration activities on Nutrioso Creek are of great importance.

The LCRP RC&D joins with the Arizona Department of Environmental Quality; the Arizona Natural Resources Conservation Service; the US Fish and Wildlife Service and US Forest Service in support of your project.

The Little Colorado River Plateau RC&D and the Watershed are supportive of voluntary projects such as Rabbitbrush eradication that provide long term public benefits and improve habitat for natural resources in the Little Colorado River Watershed.

If there any further questions, please feel free to contact the Watershed Projects Director, David M. Newlin, as shown, or at his cell phone, (928) 322-6146 or via e-mail at david@littlecolorado.net.

Yours truly:

H. Milton Ollerton
President, Board of Directors

All RC&D programs and services are offered on a nondiscriminatory basis without regard to race, color, national origin, religion, sex, age, or handicap. RC&D meetings are open to the public. Persons with disabilities who require alternative means for communication of program information may request accommodations. Request for accommodations should be made as early as possible to allow time to arrange needed accommodations.



Audubon ARIZONA

Nina Mason Pulliam Audubon Center
3131 South Central Avenue
Phoenix, AZ 85040
Tel: 602-468-6470
az.audubon.org

Jim Crosswhite
EC Bar Ranch
PO Box 44
Nutrioso, AZ 85932

February 22, 2010

Dear Mr. Crosswhite

I am in receipt of your request to provide a letter of support for your proposed project to eradicate Rabbitbrush growing in an area covered by the EC Bar Ranch Conservation Easement, approximately 100 acres of riparian corridor, including 3 miles of Nutrioso Creek reaches 1-6 and 8, on the EC Bar Ranch.

I have visited the project area on the easement property and reviewed supporting documents from the Natural Resources Conservation Service (NRCS), US Fish and Wildlife Service (FWS), US Forest Service, and the Little Colorado River RC&D. I have also reviewed the Safe Harbor Agreement you have with the US Fish and Wildlife Service titled: *Safe Harbor Agreement With James W. Crosswhite for Voluntary Enhancement and Restoration Activities Benefiting the Southwestern Willow Flycatcher and Little Colorado Spinedace in Nutrioso Creek, Arizona*.

I agree with your proposal that eradication of Rabbitbrush in the riparian corridor will reduce consumption of water by these plants, which may allow more water to be released from the water table as instream flow for the benefit of native fish populations. This could be especially important during periods of severe drought when fish require flowing water shaded by streambank vegetation.

I also agree that after Rabbitbrush is removed from the easement property, which includes the FEMA 100 year floodplain and 100 ft buffers on each side of Nutrioso Creek, vegetation displacing the brush will include willows and native plants that will benefit a wide variety of birds, including the endangered Southwestern Willow Flycatcher. Since large ungulate activities are controlled, it appears unlikely Rabbitbrush will reinvade treated areas.

In Arizona, it is estimated that 80% of all fish and wildlife depend on a riparian area at some point in their lives. Therefore, a perennial stream, such as Nutrioso Creek, is vitally important to our natural resources. The Audubon Society is supportive of your efforts to improve aquatic/wildlife habitat. I encourage the use of public funding that may be available for this project.

Sincerely,

Vashti "Tice" Supplee
Director of Bird Conservation
Audubon Arizona

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*Preserving New Mexico's land
heritage for future generations*

August 6, 2010

Jim Crosswhite
EC Bar Ranch
PO Box 44
Nutrioso, AZ 85932

Dear Mr. Crosswhite

We received your request to provide a letter of support for the EC Bar Ranch Riparian Brush Control Project, which will be submitted for funding to the Arizona Water Protection Commission.

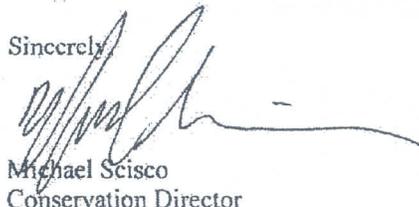
The New Mexico Land Conservancy (NMLC) holds the EC Bar Ranch Conservation Easement covering 94 acres that includes the FEMA 100 year floodplain and 100 ft buffers on each side of the floodplain. I understand the area in which the brush control is to be conducted is identical to the boundaries of the Easement Property. NMLC performs annual monitoring and enforces provisions of the Easement Agreement over EC Bar Ranch in perpetuity. NMLC has extensive experience stewarding private lands and presently holds 37 easements covering 80,269 acres in New Mexico and Arizona.

NMLC believes that after the majority of rabbitbrush is removed from the Easement Property, consumption of water by rabbitbrush will be reduced while existing vegetation will eventually cover treated sites. I am confident the proposed project will enhance the natural habitat, open space, and agricultural values described in the Easement Agreement leading to long-term public benefits.

I am aware that you have proposed to provide information to Commissioners about how the EC Bar Ranch Conservation Easement relates to the project. NMLC would welcome the opportunity to assist in completing this task.

In conclusion, I encourage the Arizona Water Protection Commission to award this grant to you.

Sincerely,



Michael Scisco
Conservation Director

Post Office Box 6759
Santa Fe, NM 87502-6759
T 505/986-3801 F 505/986-3806
www.nmlandconservancy.org

SUPPLEMENTAL INFORMATION: Evidence of physical and legal availability of water.

Not applicable. No irrigation water will be used in the proposed project.

SUPPLEMENTAL INFORMATION: Evidence of Control and Tenure of Land

Evidence of Control and Tenure of approximately 410 acres of land by one or more entities acting on behalf of James W. Crosswhite, that includes the 94.20 acre Project Area in Section 20 and 29, is described in this Section.

1. James Wayne Crosswhite Trust, established March 16, 1989, URA August 1, 2005, as amended, acquired portions of the Project Area as described below. James Wayne Crosswhite is Trustee and sole beneficiary of the Trust.
 - A. Attachment #1 is a Deed to property that includes Reach 1-3 acquired in 1996.
 - B. Attachment #2 is a Deed to property that includes Reach 4 acquired in 2000.
 - C. Attachment #3 is a Deed to property that includes Reach 5 acquired in 2008.
 - D. Attachment #4 is a Deed to property that includes Reach 6 acquired in 2000.
2. On November 20, 2009, James Wayne Crosswhite Trust donated Tract A-3 of 41.95 acres to the New Mexico Land Conservancy (NMLC), with an understanding that after the Assessor assigned a parcel number the 41.95 acre parcel would be conveyed to EC Bar Ranch LLC with James Wayne Crosswhite Trust as Member. In July 2010, the Apache County Assessor assigned Parcel 102-38-004E and Attachment #5 is a Deed conveying 41.95 acres from Crosswhite Trust to EC Bar Ranch LLC. The 41.95 acres is the northern half of the easement property that includes reaches 4, 5, and 6, which is identical to the Project Area. Attachment #6 is the EC Bar Ranch LLC Articles of Organization showing James Wayne Crosswhite Trust is the Member. James W. Crosswhite is the Trustee and sole beneficiary of the Crosswhite Trust, which gives him the right to submit an AWPf Application as Grantee and execute a Contract with AWPf if the proposal is approved.
3. Attachment #7 is a Deed conveying 52.25 acres from Crosswhite Trust to James Wayne Crosswhite LLC. The 52.25 acres is the southern half of the easement property that includes reaches 1, 2, 2A, and 3, which is identical to the Project Area. The 52.25 acres is identified as Apache County Assessor Parcel 102-66-064. Attachment #8 is the Amended Articles of Organization of James Wayne Crosswhite LLC showing James Wayne Crosswhite Trust is the Member. On November 20, 2009, James Wayne Crosswhite LLC donated Tract A-2 of 52.25 acres to the New Mexico Land Conservancy (NMLC). James W. Crosswhite is the Trustee and sole beneficiary of the Crosswhite Trust, which gives him the right to submit an AWPf Application as Grantee and execute a Contract with AWPf if the proposal is approved.
4. Attachment #9 is the Record of Survey and Legal Description of the EC Bar Ranch Conservation Easement covering 94.20 acres as recorded in Apache County on November 5, 2009, in Book 19LS Page 157.
5. Attachment #10 is a letter from James Wayne Crosswhite as Trustee of the James Wayne Crosswhite Trust, Member of the James Wayne Crosswhite LLC, and Member of the Nutrioso Creek Ranch LLC, which authorizes James W. Crosswhite to pay expenses, receive income, and make any other actions and/or obligations on behalf of these entities as he may see fit, including the right to submit an AWPf Application as Grantee and execute a Contract with AWPf if the proposal is approved.

6. In Summary, The Grantee, James W. Crosswhite is Trustee and sole beneficiary of the James Wayne Crosswhite Trust, which initially acquired all property, then sold/conveyed portions to James Wayne Crosswhite LLC and EC Bar Ranch LLC, retaining title to remaining portions. The Project Area consists of 52.25 acres covered by the EC Bar Ranch Conservation Easement with fee owned by James Wayne Crosswhite LLC with James W. Crosswhite Trust as the Member. The Project Area also includes 41.95 acres covered by EC Bar Ranch Conservation Easement with fee owned by EC Bar Ranch LLC with James Wayne Crosswhite Trust as the Member. James W. Crosswhite is the Trustee and sole beneficiary of the Crosswhite Trust, which gives him the right to submit an AWPf Application as Grantee and execute a Contract with AWPf if the proposal is approved.

Access to all parcels is available from Hwy 180 and/or across County Roads and/or private lands owned by the Grantee and/or across easements on private lands in favor of the Grantee.

If your project, including the benefits claimed for the Fund, involves surface water flows or use of groundwater withdrawals, demonstrate ownership and tenure by attaching the appropriate documentation.

- Nutrioso Creek flows across reaches 1-6 in the Project Area. The Deeds demonstrate Grantee ownership of stream channel, FEMA 100 year floodplain, and 100 ft buffers on each side of the floodplain that compose the Project Area. Surface water flows cannot be diverted for irrigation or any other purposes once entering the easement property at reach 1 (below the west headgate), therefore surface flows will be available to meet project goals and objectives.
- The Grantee owns surface water rights in Nutrioso Creek that are attached to the parcels covered by deeds and evidenced by the Norviell Decree. The 94 acre easement property and Project Area has no surface water rights nor are surface water rights available for irrigation of the Project Area. No surface water diversions are to be used in the project.
- The Grantee owns or has the right to use groundwater wells developed and used for domestic, irrigation, and/or stock watering purposes. No groundwater withdrawals are to be used in the project.
- The proposed project will not require use of effluent or CAP water.

#1

Recording Requested by:
FIRST AMERICAN TITLE



INSTRUMENT # 96002692
OFFICIAL RECORDS OF
APACHE COUNTY
JEANNE UDALL

When recorded mail to:

JAMES W CROSSWHITE AS TRUSTEE
P.O. BOX 1925
EAGAR, AZ 85925-1925

REQUEST OF:
FIRST AMERICAN TITLE CO
DATE: 05/03/96 TIME: 04:00 PM
BOOK: 820 PAGE: 309 - 313

WARRANTY DEED

265 ac
R1-R3

Escrow No. 278-083-64530

For the consideration of TEN AND NO/100 DOLLARS, and other valuable considerations, I or we,

KENDRICK LEROY TUCKER AND VELMA L. TUCKER trustees of the TUCKER REVOCABLE TRUST
DATED DECEMBER 14, 1989

do hereby convey to

the GRANTOR

JAMES W CROSSWHITE TRUSTEE FOR THE JAMES W CROSSWHITE TRUST DATED
MARCH 16, 1989

WAYNE

DECLARATION OF

the GRANTEE

the following described real property situate in Apache County, Arizona:

SEE EXHIBIT A ATTACHED HERETO AND BY THIS REFERENCE MADE A PART HEREOF.

SUBJECT TO: Existing taxes, assessments, liens, encumbrances, covenants, conditions, restrictions, rights of way
and easements of record.

And the GRANTOR does warrant the title against all persons whomsoever, subject to the matters above set forth.

DATED: April 1, 1996

Kendrick Leroy Tucker
KENDRICK LEROY TUCKER, TRUSTEE

Velma L. Tucker
VELMA L. TUCKER, TRUSTEE

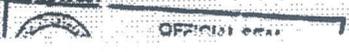
STATE OF ARIZONA)

) ss.

County of Apache)

This instrument was acknowledged and executed before me this 15th day of April 1996 by KENDRICK LEROY TUCKER AND VELMA L. TUCKER trustees of the TUCKER REVOCABLE TRUST DATED DECEMBER 14, 1989.

My Commission Expires:



Handwritten signature/initials

EXHIBIT "A"

AMENDED
NO. 278-64530

✓ PARCEL NO. 1:

The Southwest quarter of the Southeast quarter of Section 20, Township 7 North, Range 30 East of the Gila and Salt River Base and Meridian, Apache County, Arizona.

✓ PARCEL NO. 2:

The Southeast quarter of the Southwest quarter of Section 20, Township 7 North, Range 30 East of the Gila and Salt River Base and Meridian, Apache County, Arizona.

(PARCEL NO. 3:

The East half of the Northeast quarter of Section 29, Township 7 North, Range 30 East of the Gila and Salt River Base and Meridian, Apache County, Arizona.

EXCEPTING therefrom all that portion of said Northeast quarter lying East of U.S. Highway 180.

✓ PARCEL NO. 4:

The East half of the Northwest quarter of Section 29, Township 7 North, Range 30 East of the Gila and Salt River Base and Meridian, Apache County, Arizona.

✓ PARCEL NO. 5:

The West half of the Northeast quarter of Section 29, Township 7 North, Range 30 East of the Gila and Salt River Base and Meridian, Apache County, Arizona.

EXCEPTING therefrom all that portion of said Northeast quarter lying East of U.S. Highway 180.

EXCEPTING from the above described parcels the following described parcel of land as it may lie within said parcels, described as follows:



Continued....

EXHIBIT "A":
(278-64530)

That part of the Southeast quarter of the Southwest quarter of Section 20 and the Northeast quarter of the Northwest quarter of Section 29, Township 7 North, Range 30 East of the Gila and Salt River Base and Meridian, Apache County, Arizona described as follows:

Starting at the west 1/16 corner of Sections 20 and 29, Township 7 North, Range 30 East of the Gila and Salt River Base and Meridian, which is a pin and cap and the TRUE POINT OF BEGINNING, established by the L.S. 13574 from which the north quarter corner of Section 29 bears 89 degrees 20 minutes 34 seconds East a distance of 1444.70 feet;

thence North 00 degrees 27 minutes 19 seconds East along the mid quarter line a distance of 1287.12 feet to pin and cap at the Northwest 1/16 corner;

thence South 89 degrees 50 minutes 37 seconds East along the mid-quarter line a distance of 482.80 feet to a pin and cap on a fence line;

thence South 01 degrees 58 minutes 16 seconds West along said fence line a distance of 1243.16 feet to a pin and cap at a fence corner;

thence North 89 degrees 07 minutes 38 seconds West a distance of 148.92 feet to a pin and cap on a fence line;

thence South 00 degrees 45 minutes 31 seconds West a distance of 1258.61 feet to a pin and cap;

thence North 89 degrees 13 minutes 42 seconds West a distance of 300.01 feet to a point on the mid-quarter line a pin and cap bears South 89 degrees 13 minutes 42 seconds East a distance of 25.00 feet;

thence North 00 degrees 46 minutes 18 seconds East along the mid-quarter line a distance of 1198.80 feet to a pin and cap at the West 1/16 corner and the TRUE POINT OF BEGINNING.

217-



2000-01910
Page 1 of 2
JEANNE UGALL, RECORDER
OFFICIAL RECORDS OF APACHE COUNTY
03/06/2000 12:06 PM Recording Fee \$14.00

ATT
WHEN RECORDED, MAIL TO:
JAMES W. CROSSWHITE
PO BOX 44
NUTRIOSO, AZ. 85932

27ac
R4
#2

File #RV-4700

WARRANTY DEED

For the consideration of Ten Dollars, and other valuable considerations, I/We,
LEO ROGERS AND MARIE ROGERS, HUSBAND AND WIFE

as Grantor(s) do hereby convey to

JAMES W. CROSSWHITE, TRUSTEE OF THE JAMES W. CROSSWHITE TRUST DATED MARCH 16, 1989

as Grantee(s), the following described real property situated in Apache County, Arizona:

LEGAL DESCRIPTION ATTACHED HERETO AND MADE A PART HEREOF, MARKED EXHIBIT "A".

THE BENEFICIARIES OF THE JAMES W. CROSSWHITE TRUST ARE AS FOLLOWS:

- MARGARET M. BROWN, PO BOX 1925, EAGAR AZ 85925
- WILLIAM TODD ELY, RAGUS LAKE DR. SUGARLAND TEXAS
- CATHERINE NELL CROSSWHITE, RAGUS LAKE DR., SUGARLAND TEXAS

SUBJECT TO: Current taxes, assessments, reservations in patents and all easements, rights of way, encumbrances, obligations, liabilities, liens, covenants, conditions and restrictions as may appear of record.

And I or we do warrant the title against all persons whomsoever, subject to the matters above set forth.

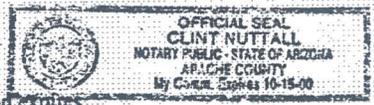
Dated this 11TH day of JANUARY, 2000.

Leo Rogers
Grantor LEO ROGERS

Marie Rogers
Grantor MARIE ROGERS

STATE OF Arizona)
) SS
COUNTY OF Apache)

This instrument was acknowledged before me this 25 day of February, 2000 by
LEO ROGERS AND MARIE ROGERS



My commission expires.

Clint Nuttall
Notary Public

(Commitment)

EXHIBIT "A"

That parcel of land located within the Northwest quarter of the Southeast quarter of Section 20, Township 7 North, Range 30 East of the Gila and Salt River Base and Meridian, Apache County, Arizona, described as follows:

The East 900.00 feet of the Northwest quarter of the Southeast quarter of Section 20, Township 7 North, Range 30 East of the Gila and Salt River Base and Meridian, Apache County, Arizona.

RECORDING REQUESTED BY
Transunion Title Insurance Company
AND WHEN RECORDED MAIL TO:
JAMES WAYNE CROSSWHITE
PO BOX 44
NUTRISO, AZ 85932

2008-005035
Page 1 of 1
OFFICIAL RECORDS OF APACHE COUNTY
LENORA Y. JOHNSON, RECORDER
07-02-2008 02:03 PM Recording Fee \$14.00

#3

Resch 5
38 ac

ESCROW NO: 01649481 - 285 - CB1

SPACE ABOVE THIS LINE FOR RECORDER'S USE

Warranty Deed

For the consideration of Ten Dollars, and other valuable considerations, I or we,

Terry D. Reidhead, an unmarried man
do/does hereby convey to

James Wayne Crosswhite, as Trustee of the James Wayne Crosswhite Trust, established March 16, 1989, URA August 1, 2005, as amended October 2, 2006 and April 30, 2007

the following real property situated in Apache County, ARIZONA:

See Exhibit A attached hereto and made a part hereof.

SUBJECT TO: Current taxes and other assessments, reservations in patents and all easements, rights of way, encumbrances, liens, covenants, conditions, restrictions, obligations, and liabilities as may appear of record.

And I or we do warrant the title against all persons whomsoever, subject to the matters set forth above.

Pursuant to ARS 33-404, Beneficiaries names and addresses under said trust are disclosed on Exhibit B attached hereto.

Dated: June 26, 2008

SELLER:

Terry D. Reidhead
Terry D. Reidhead

State of Arizona _____ } SS:
County of Apache _____

On July 1, 2008, before me personally appeared Terry D. Reidhead, whose identity was proved to me on the basis of satisfactory evidence to be the person whose name is subscribed to this document and who acknowledged that he/she signed the above/attached document in his or her authorized capacity (ies)

(Seal)



Morgan K. Belone
Notary Public
Commission Expires: 3 26 2011

#3

Exhibit A

Parcel No. 1:

A portion of Section 20, Township 7 North, Range 30 East of the Gila and Salt River Base and Meridian, Apache County, Arizona described as follows:

Commencing at the Northwest corner of said Section 20;

Thence North 89°08'18" East, along the North boundary of said Section 20, a distance of 1652.08 feet;

Thence North 89°09'42" East, along said boundary, a distance of 1244.14 feet;

Thence North 89°08'46" East, along said boundary, a distance of 1447.45 feet;

Thence South 00°10'27" East, a distance of 1365.32 feet to the Northeast one-sixteenth corner of said Section, said point being the True Point of Beginning;

Thence South 00°13'58" East, a distance of 1338.81 feet to the Southeast corner of the herein described parcel, said point also being the Northeast corner of that parcel described in Deed to James W. Crosswhite, Trustee in Document No. 2006-5397;

Thence North 87°32'49" West, along the North line of said parcel, 899.41 feet (record South 87°34'32" East 899.50 feet), to the Northwest corner of said parcel last described;

Thence South 01°42'44" West, a distance of 70.15 feet (record North 01°41'42" East, 70.20 feet) to the Southwest corner of said parcel last described;

Thence South 89°39'50" West, a distance of 350.45 feet;

Thence North 00°35'23" East, a distance of 1359.59 feet;

Thence North 89°24'37" East, a distance of 1259.75 feet to the True Point of Beginning.

Reserving unto the grantor, its heirs, successor and/or assigns, an easement for livestock crossing and occasional vehicle use lying North and West of the following described line:

Commencing at the Northwest corner of said Section 20;

Thence North 89°08'18" East, along the North boundary of said Section 20, a distance of 1652.08 feet;

Thence South 00°09'33" East, a distance of 1353.30 feet;

Thence North 89°24'29" East, a distance of 1222.22 feet;

Thence North 89°24'37" East, a distance of 209.86 feet;

Thence South 00°35'23" East, a distance of 1359.59 feet, to the Point of Beginning;

Thence North 89°39'50" East, a distance of 350.45 feet;

Thence North 01°42'44" East, a distance of 70.15 feet;

Thence North 87°32'49" West, a distance of 899.41 feet to the point of Terminus.

#3

together with a transferable non-exclusive easement for ingress and egress over a portion of Sections 20 and 21, Township North, Range 30 East of the Gila and Salt River Base and Meridian, Apache County, Arizona; lying North and East of the following described line:

- Commencing at the Northwest corner of said Section 20;
 - Thence North 89°08'18" East, along the North boundary of said Section 20, a distance of 1652.08 feet;
 - Thence South 00°09'33" East, a distance of 1353.30 feet;
 - Thence North 89°24'29" East, a distance of 1222.22 feet;
 - Thence North 89°24'37" East, a distance of 209.86 feet;
 - Thence South 00°35'23" East, a distance of 1359.59 feet;
 - Thence North 89°39'50" East, a distance of 358.45 feet;
 - Thence North 01°42'44" East, a distance of 70.15 feet;
 - Thence North 87°32'49" West, a distance of 899.41 feet to the Point of Beginning;
 - Thence South 01°41'01" West, a distance of 26.36 feet to the Center East one-sixteenth corner of said Section 20;
 - Thence North 89°39'45" East, a distance of 1491.51 feet to the East quarter corner of said Section 20;
 - Thence South 89°23'13" East, along the mid-Section line of Section 21, a distance of 1294.45 feet to the a point marking the Center West one-sixteenth the corner of said Section 21, the point of Terminus.
- EXCEPT any portion lying with that parcel of land conveyed to Apache County in Deed recorded in Docket 667, page 108, records of Apache County, Arizona.

file No. RV-4900A (DEED)

#4

EXHIBIT "B"

That parcel of land located within the North half of Section 20, Township 7 North, Range 30 East of the Gila and Salt River Meridian, Apache County, Arizona, more particularly described as follows:

FROM the North one-quarter corner of said Section 20, the TRUE POINT OF BEGINNING;

thence North 89°10'00" East a distance of 1447.87 feet to the East 1/16 corner of Sections 17 and 20, monumented with a 2 1/2 inch Aluminum post marked LS 13574;

thence South 00°08'32" East along the one-sixteenth line a distance of 1365.08 feet to the Northeast 1/16 corner of said Section 20, monumented with a 2 1/2 inch Aluminum post marked LS 13574;

thence South 89°25'19" West a distance of 1469.68 feet to the C-N 1/16 corner, monumented with a 5/8 inch rebar with an ACP marked LS 16165;

thence South 89°25'20" West a distance of 1222.32 feet to a point on the East-West 1/16 line monumented with a 5/8 inch rebar with a plastic cap marked LS 13014;

thence North 00°08'15" West a distance of 1353.17 feet to a point on the North section line of said Section 20, monumented with a 5/8 inch rebar with a plastic cap marked LS 13014;

thence North 89°10'16" East a distance of 519.25 feet to a 5/8 inch rebar with an ACP marked LS 13574;

thence North 89°10'16" East a distance of 724.88 feet to the TRUE POINT OF BEGINNING.

EXCEPT an undivided one-half interest in and to all oil, gas, petroleum, naptha, other hydro-carbon substances and minerals of whatsoever kind and nature, in, upon or beneath said property as reserved in Deed recorded April 14, 1942 in Book 26 of Deeds, page 537, records of Apache County, Arizona.

TOGETHER with an access easement, being 30 feet in width and the most northerly limits thereof being the North section line of said Section 20, more particularly described as follows:

FROM the Northwest corner of the above described parcel of land;

thence South 89°10'16" West a distance of 1213.07 feet to the center line of an existing road and the end of said easement.

RESERVING to the grantor, his heirs, successors and assigns, an Easement for access over and across the West 549.25 feet of the North 30.00 feet of the above described parcel of land.

#5

EXHIBIT "A"
Legal Description

A tract of land located in a portion of Section 20, Township 7 North, Range 30 East, G&SRB&M, Apache County, Arizona, said parcel being more particularly described as follows:

Commencing at the Aluminum Cap marking the Southeast Corner of the said Section 20, thence North 89°21'42" West along the south line of the said Section 20, a distance of 1449.21 feet;
thence North 1°40'45" East a distance of 1313.02 feet;
thence North 89°53'04" West a distance of 264.20 to the southeast corner of the herein described tract and the POINT OF BEGINNING;
thence continuing North 89°53'04" West a distance of 346.42 feet;
thence North 13°54'48" West a distance of 1076.28 feet;
thence North 1°42'44" East a distance of 261.98 feet;
thence South 89°40'13" West a distance of 53.54 feet;
thence North 3°49'18" East a distance of 387.03 feet;
thence North 34°14'23" East a distance of 307.34 feet;
thence North 23°45'16" West a distance of 367.37 feet;
thence North 14°27'16" East a distance of 813.09 feet;
thence North 42°40'45" East a distance of 433.54 feet;
thence North 6°42'42" East a distance of 653.21 feet;
thence North 89°08'47" East a distance of 320.74 feet;
thence South 0°10'27" East a distance of 1365.32 feet;
thence South 89°24'37" West a distance of 395.25 feet;
thence South 23°21'01" West a distance of 319.92 feet;
thence South 22°07'40" East a distance of 518.38 feet;
thence South 3°36'10" West a distance of 153.29 feet;
thence South 59°55'35" West a distance of 283.63 feet;
thence South 4°41'17" West a distance of 421.79 feet;
thence South 68°13'08" East a distance of 259.32 feet;
thence South 18°21'29" East a distance of 284.79 feet;
thence South 13°07'13" West a distance of 357.60 feet;
thence South 27°03'53" East a distance of 150.31 feet;
thence South 0°05'13" East a distance of 334.64 feet to the POINT OF BEGINNING.

Parcel contains 41.95 acres, more or less.

SUBJECT to existing easements and/or rights-of-way of record.

#5

Easement

An easement for ingress, egress and utilities located in a portion of Section 20, Township 7 North, Range 30 East, G&SRB&M, Apache County, Arizona, said easement being more particularly described as follows:

Commencing at the Aluminum Cap marking the Southeast Corner of the said Section 20;
thence North 89°21'42" West along the south line of the said Section 20, a distance of 1449.21 feet;
thence North 1°40'45" East a distance of 1313.02 feet;
thence North 89°53'04" West a distance of 610.62 feet;
thence North 13°54'48" West a distance of 1075.28 to a southwesterly corner of the herein described easement and the POINT OF BEGINNING;
thence South 89°40'13" West a distance of 53.54 feet;
thence North 03°49'18" East a distance of 207.89 feet;
thence South 89°15'59" East a distance of 54.26 feet;
thence South 82°10'33" East a distance of 290.83 feet;
thence South 04°41'17" West a distance of 109.53 feet;
thence North 89°37'22" West a distance of 291.80 feet;
thence South 1°47'40" West a distance of 69.80 feet to the POINT OF BEGINNING.

Easement contains 1.07 acres, more or less.

SUBJECT to existing easements and/or rights-of-way of record.

AZ CORPORATION COMMISSION
FILED



MAY 10 2010

ARTICLES OF ORGANIZATION
OF

FILE NO. 110018093 EC BAR RANCH, L.L.C.

ARTICLE 1. The name of this limited liability company is EC BAR RANCH, L.L.C. (the "Company").

ARTICLE 2. The address of the Company's registered office and the name and business address of the Company's agent for service of process are:

Company's registered agent:
JAMES WAYNE CROSSWHITE
PO BOX 44
#20 CR 2112
NUTRIOSO, AZ 85932

Company's registered office:
PO BOX 44
NUTRIOSO, AZ 85932

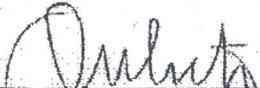
ARTICLE 3. Management of the Company is reserved to James Wayne Crosswhite as Manager.

ARTICLE 4. The names and addresses of each member at the time of formation of the Company are:

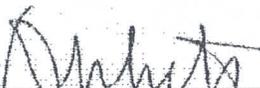
JAMES WAYNE CROSSWHITE, AS TRUSTEE OF THE JAMES WAYNE CROSSWHITE TRUST, ESTABLISHED MARCH 16, 1989, URA AUGUST 1, 2005, AS AMENDED OCTOBER 2, 2006, APRIL 30, 2007, APRIL 28, 2010

PO BOX 44
NUTRIOSO, AZ 85932

IN WITNESS WHEREOF, the undersigned have executed these Articles of Organization as of the 5th day of MAY, 2010.



JAMES WAYNE CROSSWHITE,
Manager



JAMES WAYNE CROSSWHITE,
as Trustee of the James Wayne
Crosswhite Trust, Member

I, JAMES WAYNE CROSSWHITE, having been designated to act as Statutory Agent, hereby consent to act in that capacity until removed or resignation is submitted in accordance with the Arizona Revised Statutes.



JAMES WAYNE CROSSWHITE

(#7)

2009-007079

Page 1 of 2
OFFICIAL RECORDS OF APACHE COUNTY
LENORA Y. JOHNSON, RECORDER
11-03-2009 01:56 PM Recording Fee \$13.00

RECORDING REQUESTED BY:
LAWYERS TITLE OF ARIZONA, INC.
AND WHEN RECORDED MAIL TO:
JAMES WAYNE CROSSWHITE
P.O. BOX 44
NUTRISO, AZ 85932

ESCROW NO.: 01697318-295-NA

SPACE ABOVE THIS LINE FOR RECORDER'S USE

CORRECTION QUIT CLAIM DEED

For consideration of Ten Dollars, and other valuable considerations, I or we,

James Wayne Crosswhite, as Trustee of the James Wayne Crosswhite Trust which acquired title as James W. Crosswhite, Trustee of The James Wayne Crosswhite Declaration of Trust dated March 16, 1989

hereby quit-claim to

James Wayne Crosswhite, L.L.C., an Arizona limited liability company

all right, title or interest in the following real property situated in Apache County, ARIZONA:

See Exhibit A attached hereto and made a part hereof.

Pursuant to ARS 33-404, the beneficiary and address of the grantor's trust is: James Wayne Crosswhite, P. O. Box 44, Nutriso, AZ 85932.

This Deed is EXEMPT from Affidavit pursuant to ARS-1134.B.2

This Deed is being recorded to comply with ARS 33-404 and to correct the names of the grantor and grantee shown on that certain Deed recorded September 30, 2008 in Document No. 2008-07263 and re-recorded November 5, 2008 in Document No. 2008-009450.

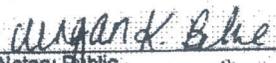
Dated: November 2, 2009


James Wayne Crosswhite, as Trustee
of the James Wayne Crosswhite Trust
established March 16, 1989, URA,
August 1, 2005, as amended October
2, 2006 and April 30, 2007
State of Arizona
County of Apache

} ss.

On November 2, 2009, before me personally appeared James Wayne Crosswhite, whose identity was proved to me on the basis of satisfactory evidence to be the person whose name is subscribed to this document and who acknowledged that he/she signed the above/attached document in his or her authorized capacity (ies)

(Seal)


Notary Public
Commission Expires: 3-26-2011



#7

EXHIBIT "A"

Portions of Sections 20 & 29, Township 7 North, Range 30 East, G. & S. R. B. & M., Nutrioso, Apache County, Arizona, more particularly described as follows:

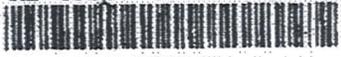
Commencing at a point marking the northeast corner of Section 29; thence North 89° 21' 41" West along the north boundary of Section 29 a distance of 86.27 feet to a point on the westerly right-of-way boundary of US Highway 180/191, said point being THE TRUE POINT OF BEGINNING; thence South 37° 14' 12" West along said right-of-way boundary, a distance of 3,422.94 feet to a point on the east-west mid-section line of Section 29; thence North 88° 18' 25" West along said line, a distance of 732.81 feet; thence North 10° 47' 13" West, a distance of 635.41 feet; thence North 86° 57' 55" West, a distance of 541.46 feet; thence South 19° 45' 28" West, a distance of 665.98 feet to a point on the east-west mid-section line; thence North 88° 18' 46" West along said line, a distance of 604.74 feet to a point marking the CW 1/16 corner; thence North 0° 46' 02" East, a distance of 1,499.14 feet; thence South 89° 14' 37" East, a distance of 299.97 feet; thence North 00° 45' 18" East, a distance of 1,255.84 feet; thence South 89° 03' 58" East, a distance of 149.81 feet; thence North 01° 57' 40" East, a distance of 1,243.59 feet; thence South 89° 46' 57" East, a distance of 969.03 feet to the CS 1/16 corner of Section 20; thence South 89° 51' 25" East, a distance of 570.26 feet; thence South 89° 53' 04" East, a distance of 900.36 feet to a point marking the SE 1/16 corner of Section 20; thence South 01° 40' 45" West, a distance of 1,313.02 feet to the E 1/16 corner of said section; thence South 89° 21' 41" East, a distance of 1,362.93 feet to the TRUE POINT OF BEGINNING;

said described parcel containing 257.93 Acres, more or less.



48

AZ Corp. Commission



03135788

AZ CORPORATION COMMISSION
FILED

MAY 14 2010

FILE NO. L1468052-6

AMENDMENT
TO THE
ARTICLES OF ORGANIZATION
OF
JAMES WAYNE CROSSWHITE, LLC

Pursuant to A.R.S. section 29-633, *et. seq.*, the undersigned limited liability company (the "Company") hereby adopts these Articles of Amendment to its Articles of Organization.

1. The name of the Company is JAMES WAYNE CROSSWHITE, LLC.
2. The Articles of Organization for the Company were filed on August 5, 2008. File No.: L 1468052-6.
3. In order to accurately reflect the current Member of the Company, ARTICLE 6 of the Articles of Organization of the Company is amended to read as follows:

6. NAME AND ADDRESS OF MEMBER

The name and address of the member owning twenty percent (20%) or more of the Company is:

James Wayne Crosswhite, Trustee of the JAMES WAYNE CROSSWHITE TRUST, established March 16, 1989, URA August 1, 2005, as amended; P.O. Box 44, Nutrioso, AZ 85932.

DATED this 14th day of May, 2010.

JAMES WAYNE CROSSWHITE TRUST,
established March 16, 1989, URA August 1, 2005,
as amended

By: 
JAMES WAYNE CROSSWHITE, Trustee

"Manager"

**Legal Description
Tracts A-2 & A-3**

A tract of land located in a portion of the North Half of Section 29 and a portion of Section 20, Township 7 North, Range 30 East, G&SRB&M, Apache County, Arizona, said tract being more particularly described as follows:

Commencing at the Aluminum Cap marking the Northeast Corner of the said Section 29 and the Southeast Corner of the said Section 20;
thence North 89°21'42" West along the common section line, a distance of 86.27 feet to a point on the westerly right-of-way of US Hwy 180/191;
thence South 37°14'12" West along the said westerly right-of-way, a distance of 3422.94 feet to a point on the mid-section line of the said Section 29;
thence North 88°18' 25" West along the mid-section line, a distance of 821.08 feet to a point marking the Center Quarter Corner of the said Section 29,
thence North 88°18' 46" West along the mid-section line, a distance of 796.86 feet to a point marking the southeast corner of Tract A2, said point being the POINT OF BEGINNING;
thence continuing North 88°18'46" West along the mid-section line a distance of 604.74 feet;
thence North 00°46'02" East a distance of 489.41 feet;
thence South 87°06'18" East a distance of 327.48 feet;
thence North 06°16'14" East a distance of 306.43 feet;
thence North 12°55'34" East a distance of 268.29 feet;
thence North 01°46'08" East a distance of 216.82 feet;
thence South 88°13'52" East a distance of 31.87 feet to a point of curvature on a curve to the right having a radius of 50.00 feet, a central angle of 41°24' 35", a chord bearing of South 67°31' 35" East and a chord length of 35.36 feet;
thence easterly along said curve, an arc distance of 36.14 feet to a point of reverse curvature on a curve to the left having a radius of 50.00 feet, a central angle of 101°51'49", a chord bearing of North 82°14'48" East and a chord length of 77.64 feet;
thence along said curve an arc distance of 88.89 feet;
thence South 58°41'07" East a distance of 138.62 feet;
thence North 17°45'20" East a distance of 479.83 feet;
thence North 47°24'04" East a distance of 507.61 feet;
thence North 20°08'07" East a distance of 474.62 feet;
thence North 19°40'07" West a distance of 471.15 feet;
thence North 27°52'51" East a distance of 171.15 feet;
thence North 72°29'17" East a distance of 323.25 feet;
thence North 52°30'12" East a distance of 962.38 feet;
thence North 02°28'39" West a distance of 285.03 feet;
thence North 13°54'48" West a distance of 1075.28 feet;
thence North 1°42'44" East a distance of 261.98 feet;
thence South 89°40'13" West a distance of 53.54 feet;
thence North 3°49'18" East a distance of 387.03 feet;
thence North 34°14'23" East a distance of 307.34 feet;
thence North 23°45'16" West a distance of 367.37 feet;
thence North 14°27'16" East a distance of 813.09 feet;
thence North 42°40'45" East a distance of 433.54 feet;
thence North 6°42'42" East a distance of 653.21 feet;
thence North 89°08'47" East a distance of 320.74 feet;
thence South 0°10'27" East a distance of 1365.32 feet;
thence South 89°24'37" West a distance of 395.25 feet;
thence South 23°21'01" West a distance of 319.92 feet;
thence South 22°07'40" East a distance of 518.38 feet;
thence South 3°36' 10" West a distance of 153.29 feet;

thence South 59°55'35" West a distance of 283.63 feet;
thence South 4°41'17" West a distance of 421.79 feet;
thence South 68°13'08" East a distance of 259.32 feet;
thence South 18°21'29" East a distance of 284.79 feet;
thence South 13°07'13" West a distance of 357.60 feet;
thence South 27°03'53" East a distance of 150.31 feet;
thence South 0°05'13" East a distance of 334.64 feet;
thence South 00°10'41" East a distance of 694.77 feet;
thence South 33°43'35" West a distance of 457.06 feet;
thence South 51°21'48" West a distance of 210.44 feet;
thence North 52°39'12" West a distance of 189.81 feet;
thence South 67°04'02" West a distance of 451.82 feet;
thence South 00°24'48" East a distance of 656.09 feet;
thence South 39°14'35" West a distance of 538.27 feet;
thence South 34°02'40" West a distance of 688.53 feet;
thence South 33°38'22" West a distance of 553.68 feet;
thence South 87°07'16" East a distance of 125.90 feet;
thence South 85°05'22" East a distance of 10.47 feet;
thence South 19°45'28" West a distance of 665.98 feet to the POINT OF BEGINNING.

Tracts contain 94.20 acres, more or less.

SUBJECT to existing easements and/or rights-of-way of record.

**SUPPLEMENTAL INFORMATION: Evidence of Control and Tenure of Land
Attachment #10**

To Whom It May Concern

James Wayne Crosswhite is Trustee and sole beneficiary of the James Wayne Crosswhite Trust, as amended, and whereas, the James Wayne Crosswhite Trust is the Member of James Wayne Crosswhite LLC, and whereas the James Wayne Crosswhite Trust is the Member of EC Bar Ranch LLC, all residing at PO Box 44, Nutrioso, AZ 85932, James Wayne Crosswhite Trustee of the James Wayne Crosswhite Trust authorizes James W. Crosswhite to pay expenses, receive income, and perform any other actions and/or obligations on behalf of these entities as he may see fit effective immediately.

Dated this 18 day of August, 2010.



JAMES WAYNE CROSSWHITE, as Trustee of the
JAMES WAYNE CROSSWHITE TRUST, established
March 16, 1989, URA August 1, 2005, as amended
October 2, 2006, April 30, 2007, and April 28, 2010