

**Arizona Water Protection Fund
FY 2009 Grant Application Review**

Application # WPPF0369 Applicant: JAMES 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, 4th Floor, Phoenix). The additional materials available are the following:

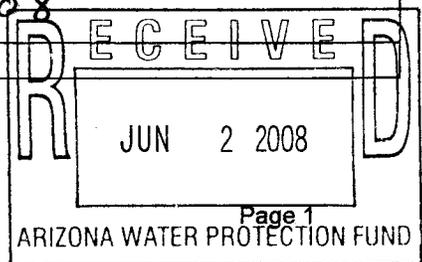
- Maps
- Photographs
- Disk APPLICATION
- Other

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Arizona Water Protection Fund
Application Cover Page
FY 2009

WPF 0369

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: City: State: ZIP Code: Phone: E-mail: Tax ID No.:					
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: Same as Applicant Information Title: Phone: Fax: e-mail:					
Any Previous AWPB Grants: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No If yes, please provide Grant #(s): AWPB 98-046WPF AWPB 99-067WPF AWPB 03-05WPF					
Arizona Water Protection Fund Grant Amount Requested: \$142,942.00 If the application is funded, will the Grantee intend to request an advance: <input type="checkbox"/> Yes <input checked="" 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>\$15,000.00</td> </tr> </table>	<u>Applicant:</u>	<u>Amount:</u>	Crosswhite	\$15,000.00
<u>Applicant:</u>	<u>Amount:</u>				
Crosswhite	\$15,000.00				
Has your legal counsel or contracting authority reviewed and accepted the Grant Award Contract General Provisions? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A					
<p>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.</p>					
James W. Crosswhite	Landowner				
Type Name of Applicant	Title and Telephone Number				
	June 2, 2008				
Signature	Date Signed				



Executive Summary:

This three-year Project, commencing 4/1/09 and terminating 4/1/12, will seek to develop and implement on the ground measures that directly maintain, enhance, restore and preserve Nutrioso Creek, an important perennial stream in the Little Colorado River Watershed. The Project measures are to control and/or eradicate up to 50,000 Rubber Rabbitbrush (*Chrysothamnus nauseosus*) plants that are presently growing on first, second, and third terraces in about 100 acres of fenced riparian pastures that include 3 miles of Nutrioso Creek on the EC Bar Ranch. These plants may consume 60 million gallons of instream flows annually, displace native grasses, and reduce species diversity and soil stability resulting in increased erosion into the stream channel lowering water quality and degrading aquatic habitat.

National non-point source water quality standards adopted by the US Congress under the Clean Water Act and administered by the Environmental Protection Agency (EPA) and the Arizona Department of Environmental Quality (ADEQ) are reflected by voluntary recommendations in the *Nutrioso Creek TMDL for Turbidity Report* (ADEQ, 2000) that directly support this Project in stating: "...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".

Further, national priority protections described under the Endangered Species Act administered by the US Fish and Wildlife Services (USFWS) and the Arizona Game and Fish Department (AGFD) seeking to protect aquatic habitat for a native fish species (*Lepidomeda vittata*) living in Nutrioso Creek through voluntary recommendations in the *Little Colorado River Spinedace Recovery Plan* (USFWS, 1998) is supportive of this Project in stating: "*Spinedace populations are known to remain in the Little Colorado River, Rudd, Nutrioso, Chevelon, Silver and East Clear creeks as well as other possible locations, threatened by ongoing habitat modification or destruction. Stream alteration, watershed modification and introduction of and dispersal of non-native fishes into the Little Colorado River drainage poses an increasing threat to remaining spinedace populations. Loss of any of these populations significantly increases risk of extinction by decreasing the likelihood of species survival. Loss of one or more of these populations may be grounds to consider reclassifying spinedace as endangered rather than threatened. It is imperative that existing populations and their habitats be protected to ensure survival of and effect recovery of this species...Recommendation 2.0 - Improve or restore habitats occupied by spinedace populations...where possible to enhance spinedace populations.*"

After Rabbitbrush plants have been controlled and/or eradicated, water consumption may be reduced while the water table and bank storage may expand to help ensure the survival and proper functioning condition of native riparian vegetation and grasses within Nutrioso Creek stream channel and terraces located in the project area on 100 acres of the EC Bar Ranch resulting in improved water quality and aquatic/wildlife habitat. This process is especially important during periods of drought, when a higher water table is essential to provide stream flows for native fish and to maintain riparian vegetation, prevent soil erosion, and ensure proper functioning conditions. As stream flows decrease during drought, the proportion of suspended solids increases until water becomes so saturated with sediments and shallow pools overheated by the sun, that fish populations may not survive.

In 2006, the ADEQ, AGFD, and the USFWS advised that since Mr. Crosswhite purchased the EC Bar Ranch in 1996, he has restored Nutrioso Creek to one of the highest standards for water quality and aquatic/wildlife in the State of Arizona. While his restoration activities may have eliminated the non-functional riparian conditions that helped Rabbitbrush become established in large numbers on first, second, and third terraces in the proposed project area, the cultural methods recommended by riparian experts to control Rabbitbrush have not been effective at reducing the proliferation of these plants. The proposed project will apply proven mechanical and chemical treatment methods to help reduce the number of Rabbitbrush plants, followed by overseeding the treated areas with Western Wheatgrass, so previously implemented Best Management Practices will continue to help sustain Nutrioso Creek perennial riparian functional conditions over the long term that:

- Improve water quantity by storing water in streambanks, which is slowly released to help maintain base flows.
- Improve water quality by trapping sediments from surface water runoff, proving nutrient cycling and increasing streambank stabilization.
- Provide flood control by slowing and absorbing flood waters, resulting in reduced flood damage and increased groundwater storage.
- Provide highly valued recreational opportunities such as wildlife viewing and picnicking.
- Sustain high biodiversity of plant and animal species.
- Provide important wildlife habitat such as food, shelter, relief and travel corridors.
- Help stabilize water temperatures for aquatic species.
- Provide economic benefits by increasing property values, improving water supplies, reducing flood damage, filtering pollutants and supporting recreational activities.

Project Overview

Background:

Between 1996 and 2003, Mr. Crosswhite purchased property in Nutrioso that created the 400 acre EC Bar Ranch, including approximately 3 miles of Nutrioso Creek. Today, he has successfully implemented, maintained, and protected the Best Management Practices (BMPs) recommended by state and federal agencies to improve water quality, aquatic/wildlife habitat, and the functional condition of Nutrioso Creek on the EC Bar Ranch. He followed the advice of riparian experts to leave Rabbitbrush in the riparian pastures untreated with the expectation that a rising water table and improved functional conditions would kill Rabbitbrush within a few years. In fact, Rabbitbrush plants have adapted to improved conditions by greatly expanding their numbers in riparian pastures within the proposed project area. Ironically, no additional funding may be available from the ADEQ, USFWS, AGFD, or Natural Resources Conservation Service (NRCS) to mitigate a serious invasive species problem with Rabbitbrush that could lead to the reversal of successful water quality and habitat improvements already implemented by Mr. Crosswhite. See the Application section titled *Supplemental Information: Existing Plans/Reports/Information* for further details about state and federal reports affecting the project area.

In recent years the urgency of treating Rabbitbrush in the project area has become increasing apparent by several AGFD fish sampling surveys in Nutrioso Creek. For example, a fish survey in 2005 documented that only five LC spinedace, a federally listed fish species, survived a severe drought in 2004-05 that effectively dried up all surface flows in 27 miles of the creek, except a 1-mile section on the EC Bar Ranch. State and federal agencies speculated that instream flows were only maintained in this section of the creek because Mr. Crosswhite added about 13 million gallons of supplemental water at a steady 100 gallon per minute rate in an effort to keep pools between reach 1 and 4 connected during the driest three month period in 2004 and 2005. In 2006, fish populations had rebounded so that AGFD and USFWS could capture fish downstream on public land before flows dried up and release the fish upstream on the EC Bar Ranch where aquatic habitat was substantially better. This was the first instance in Arizona where a federally listed fish species had ever been relocated from public land to private land. In 2007, recovery of the listed species merited removal of excess populations to a secure refugia.

Had the proposed project been completed prior to 2005 and Rabbitbrush not consumed water during the drought period, stream flows may not have dried up and no supplemental water would have been required to maintain a native fish population. Since Mr. Crosswhite may not be able to provide supplemental water in the future, it is critical that the proposed project be completed as soon as possible to protect natural resources owned by the State of Arizona.

Goals:

The Goal of the proposed Project is to help improve riparian area species diversification, reduce erosion, increase streambank storage, raise the water table, improve water quality, enhance aquatic/wildlife habitat, and increase reliability of instream flows, even during severe drought.

Objectives:

The proposed Project will control and/or eradicate up to 50,000 Rubber Rabbitbrush (*Chrysothamnus nauseosus*) plants that may presently be growing on first, second, and third terraces in about 100 acres of fenced riparian pastures that include 3 miles of Nutrioso Creek on the EC Bar Ranch. These plants may consume 60 million gallons of instream flows annually,

displace native grasses, and reduce species diversity and soil stability resulting in increased erosion into the stream channel which may lead to impaired water quality and degraded aquatic habitat. Western Wheatgrass will be overseeded at treatment locations. Previous photo monitoring since 2000 depicting Rabbitbrush growing in the riparian areas will provide a historical baseline comparison before and after treatments. A Final Report will 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.

Statement of Problems/Causes:

Over the last 50 years, a reduction of farming practices and unmanaged grazing by livestock and elk has allowed millions of Rabbitbrush plants to displace native grasses throughout Nutrioso Valley, including the EC Bar Ranch. The dense Rabbitbrush canopy-cover created barren soil conditions that were susceptible to erosion into the stream channel. The large quantities of water being consumed by the plants on first, second, and third terraces along Nutrioso Creek riparian corridor had slowed the growth of desirable native species such as sedges, rushes, willows, cottonwoods, alders, and native grasses necessary to help reduce erosion and filter suspended solids. In 1993, the ADEQ designated 27 miles of Nutrioso Creek as a non-attaining waterbody under the Clean Water Act, Section 303(d) because non-point source pollution in the form of turbidity (suspended solids) did not meet water quality standards.

In 1996, Mr. Crosswhite acquired the EC Bar Ranch and wanted to mitigate water quality, aquatic/wildlife habitat, and resource concerns by state and federal agencies, as well as, improve ranching economics. In an effort to assist Mr. Crosswhite to address water quality issues, the ADEQ completed the *Nutrioso Creek TMDL for Turbidity Report* in July 2000. This Report 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"*.

In recent years, Mr. Crosswhite has mitigated recommendations in the TMDL Report, as well as other state and federal reports that addressed aquatic/wildlife habitat and other resource concerns. While millions of Rabbitbrush plants growing in upland pastures on the EC Bar Ranch have been replaced by native grasses, Mr. Crosswhite has never treated Rabbitbrush growing on first, second, and third terraces in about 100 acres of riparian pastures because consulting ecologists and riparian experts advised him to suspend further Rabbitbrush treatments to see if these plants would be naturally or culturally eliminated after the non-functional conditions, low water table, and uncontrolled activities by large ungulates that allowed the plants to proliferate were mitigated by revegetation, erosion controls, fencing, and improved management.

Now it appears that waiting for cultural methods to naturally eradicate Rabbitbrush, so native grasses can become reestablished and water consumption will be reduced in the project area, may not be possible in a near term time frame necessary to protect previously implemented successful water quality and aquatic habitat improvements for the benefit of native fish populations, especially during periods of drought. For example, while waiting for cultural changes, Rubber Rabbitbrush (*Chrysothamnus nauseosus*) plants have invaded and proliferated first, second, and third terraces on about 100 acres of fenced riparian pastures resulting in an estimated 50,000 plants that need treatment. Unlike riparian species with dense root masses that hold soils together on streambanks and terraces, Rabbitbrush is an upland plant species, that may live more than 20 years, with a single tap root and thick above ground canopy that displaces desirable native plants leading to decreased species diversification, reduced soil stability, and increased erosion from terraces into the stream channel. Consumption of approximately 60 million gallons of water annually by Rabbitbrush may be causing stream flows in approximately 3 miles of Nutrioso Creek on the EC Bar Ranch to frequently dry up during the summer growing season, thus increasing turbidity and reducing survival of fish populations and riparian vegetation.

Statement of Solutions:

The proposed project will utilize mechanical and chemical methods to control and/or eradicate up to 90% of Rabbitbrush growing within the 100-acre project area consisting of about 80 acres of first, second, and third terraces and 20 acres of stream channel/floodplain area, or a 4:1 ratio, inside riparian fencing. Such a ratio requires riparian fencing to be located at least 100 feet from each side of the upper terrace stream bank so a grass buffer is available to meet NRCS recommended rotational livestock grazing requirements without risking overuse of the channel/floodplain area.

The project related remedies and treatment solutions to reduce Rabbitbrush within the project area are to cut-off the above ground plant canopy, sever the tap root below the surface by hand grubbing and/or apply selected herbicides, and then overseed the treated areas with a native grass (Western Wheatgrass) to prevent reestablishment and provide greater soil stability. A three year period of non-grazing during the project period growing season will allow native grasses in newly seeded areas to become established by natural precipitation. Riparian functional conditions that allowed Rabbitbrush to proliferate have now been mitigated so the natural balance will be restored within the project area so that water quality standards and aquatic/wildlife habitat can be maintained. Without the proposed project, the natural balance may never be restored to Nutrioso Creek.

After Rabbitbrush is controlled and/or eradicated and treated areas have been seeded, more water may become available to expand the establishment of native riparian vegetation and grasses within Nutrioso Creek stream channel and terraces located on 100 acres of the EC Bar Ranch, resulting in improved water quality and aquatic/wildlife habitat. These desired outcomes are 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. Attachment #1 summarizes data from these reports to demonstrate that 57% more water may be available as instream flow after the proposed project is completed. During periods of drought, this additional water may help maintain the water table high enough to avoid loss of riparian vegetation resulting in more stable soils, vigorous vegetation, and functional hydrology compared to current conditions where stream flows often cease for a month or more during the critical growing season allowing the

water table to drop below the level required for riparian vegetation to survive. When stream flows decrease, the proportion of suspended solids increases until water becomes so saturated with sediments that fish populations cannot survive, then finally may dry up completely.

While it may seem that replacing Rabbitbrush with native grasses would have an offsetting impact on water consumption, the fact is that Rabbitbrush tap root can penetrate 30 feet or more to reach water stored in streambanks that is normally released as flows decrease, to help the system maintain a viable flow during the driest periods. Native grasses have dense roots that only penetrate about 30 inches, and even with the upward wicking action of the watertable, at least five feet or more of dry soil separates water stored in banks from the upper terrace grasses. 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 may be to reduce 60 million gallons per year of water table consumption without adding any offsetting consumption by overseeding the treated areas.

Statement of Project Years of Benefit:

Once eradicated, and management prevents conditions that allow re-establishment, then the benefits of Rabbitbrush treatments in the proposed project will be permanent. Mr. Crosswhite is 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 may prohibit and/or limit building, grazing, motorized vehicles, and similar activities by future landowners through conservation easement provisions or other suitable methods of long term monitoring and enforcement. So far, no formalized protections have been realized, even though discussions have been underway for many years involving environmental groups, a state agency, and a federal agency to create a conservation easement and/or sell fee title to riparian areas within and/or adjoining the project area that could protect and preserve over four miles of Nutrioso Creek on approximately 350 acres of private lands that adjoin the Apache Sitgreaves National Forest.

Unfortunately, the agencies and environmental organizations have sought to adopt many non-use management provisions that may have been easy to administer, monitor, and enforce, but may have been counterproductive to conservation values over the long term. For example, had efforts to protect sensitive riparian areas been concluded by adopting conservation easement agreement provisions, treatments described in the proposed project necessary to eradicate Rabbitbrush would have been prohibited. Since a conservation easement will most likely be created within a few years with similar restrictive non-use provisions, it is urgent and imperative to implement Rabbitbrush treatments and revegetation options described in the proposed project as soon as possible.

Project Location & Environmental Contaminant Information

Project Location Information			
1. County: <u>Apache</u>	2. Sections (stream reaches): <u>Section 29</u> (reaches 1-2) <u>Section 20</u> (reaches 3-4, 6) <u>Section 17</u> (reach 8)	3. Township: <u>7 North</u>	4. Range: <u>30 East</u>
5. Watershed: <u>Little Colorado</u> (USGS HUC Code: 15020001-017)			
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</u>			
9. Current land use of project area: <u>Agricultural</u>			
10. Size of project area: <u>100 acres</u>			
1. Stream Name: <u>Nutrioso Creek</u>			
2. Miles of stream benefited: <u>3 miles in the project area</u>			
3. Acres of riparian habitat: <u>100 acres will be enhanced, maintained, and restored</u>			
4. ESA listed species in Nutrioso Creek: <u>Little Colorado spinedace (<i>Lepidomeda vittata</i>) is Federally listed as a "threatened" species.</u>			
5. Arizona state listed "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> 			
6. 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 (17 miles) and Alpine (25 miles). At mile marker 415, proceed 1/2 mile south on Hwy 180, turn right (west) on County Road 2112, and then 1/8 th mile and turn right at house #20 (white pipe gate). From parking area on private property in Section 29, proceed on foot west to Nutrioso Creek (reach 1). Once at Nutrioso Creek, proceed north on private property through and public land to visit each stream reach. Advance permission is required from the landowner prior to entering private property.			
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>			

Project Maps and Schematic

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

Scope of Work

Schedule of Payments and Deliverables			
Task No. and Description	Deliverables To AWPf	Due Date	AWPF Budget
Task #1: Permits, Authorizations, Clearances and Agreements	SHPO survey; Subcontractor Agreement	6/1/09	\$6,972.
Task #2: Development of Plans	1) Rabbitbrush Treatment and Revegetation Plan 2) Riparian Vegetative Photo Monitoring Plan	6/1/09	2,730.
Task #3: Implementation of Rabbitbrush Treatments and Revegetation	1) Rabbitbrush Treatment and Revegetation Report 2) Rabbitbrush Treatment and Revegetation Report 3) Summary of Rabbitbrush Treatment and Revegetation Reports	12/31/09 12/31/10 12/31/11	118,270.
Task #4: Implementation of Riparian Vegetative Photo Monitoring	1) Riparian Vegetative Photo Monitoring Report 2) Riparian Vegetative Photo Monitoring Report 3) Summary Riparian Vegetative Photo Monitoring Reports	12/31/09 12/31/10 12/31/11	9,870.
Task #5: Final report	Final report	2/28/12	5,100.
Total Project Budget			142,942.

Task #1:

Task Title: Permits, Authorizations, Clearances and Agreements.

Task Description:

- Archeological survey by an archeologist approved by the State Historic Preservation Office (SHPO) with subsequent clearance for work to be performed.
See Attachment #3: Archeological Survey Bid.
- Subcontractor Agreement with Isaacson Engineering to perform certain Tasks.
See Attachment #2: Subcontractor Letter of Intent.

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

Deliverable Description:

- State Historic Preservation Office (SHPO) survey and clearance
- Subcontractor Agreement

Deliverable Due Date: June 1, 2009

Reimbursable Cost: \$6,972.00

Task #2:

Task Title: Development of Plans.

Task Description:

- The Rabbitbrush Treatment and Revegetation Plan will outline steps in the treatment process to control and/or eradicate Rabbitbrush and revegetation of treated areas within the project area.
- The Riparian Vegetative Photo Monitoring Plan will outline steps in the existing photo monitoring process using existing format and data collection methods followed since 2000 as described in the Riparian Vegetative Photo Monitoring Report dated 9/5/07 available at website link <http://www.ecbarranch.com/adeq%206001/photomonitoring/9-4-07/start.htm>.

Task Purpose/Objective:

- The Rabbitbrush Treatment and Revegetation Plan will guide treatment implementation and revegetation.
- The Riparian Vegetative Photo Monitoring Plan will develop a monitoring plan for the proposed project based on 25 previously established photo monitoring points within the project area.

Photos taken since 2000 illustrate examples of where Rabbitbrush plants are presently growing. Photos will be updated in September 2009 prior to the start of Rabbitbrush treatments, then repeated in 2010 and 2011 to document progress and completion of treatments.

Deliverable Description:

- Rabbitbrush Treatment and Revegetation Plan, including livestock management plan.
- Riparian Vegetative Photo Monitoring Plan, including photopoint map.

Deliverable Due Date: June 1, 2009

Reimbursable Cost: \$2,730.00

Task #3:

Task Title: Implementation of Rabbitbrush Treatments and Revegetation.

Task Description:

- Rabbitbrush Treatment and Revegetation Report for 2009
- Rabbitbrush Treatment and Revegetation Report for 2010
- Summary of Rabbitbrush Treatment and Revegetation Reports for 2011

Task Purpose/Objective: To reduce erosion and increase species diversity with an apparent net reduction in water consumption in the project area by the control and/or eradication of Rabbitbrush plants followed by revegetation of treated areas with Western Wheatgrass.

Deliverable Description: Rabbitbrush Treatment and Revegetation Plan per Task #2.

Deliverable Due Date:

- Rabbitbrush Treatment and Revegetation Report on December 31, 2009
- Rabbitbrush Treatment and Revegetation Report on December 31, 2010
- Summary of Rabbitbrush Treatment and Revegetation Reports on December 31, 2011

Reimbursable Outside Services Cost: \$118,270.00

Match as a value of deferred grazing: \$15,000.00

Task #4:

Task Title: Implementation of Riparian Vegetative Photo Monitoring

Task Description:

- Riparian Vegetative Photo Monitoring Report for 2009
- Riparian Vegetative Photo Monitoring Report for 2010
- Summary Riparian Vegetative Photo Monitoring Report for 2011

Task Purpose/Objective: To illustrate sample 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 Plan per Task #2.

Deliverable Due Date:

- Riparian Vegetative Photo Monitoring Report on December 31, 2009
- Riparian Vegetative Photo Monitoring Report on December 31, 2010
- Summary Riparian Vegetative Photo Monitoring Report on December 31, 2011

Reimbursable Outside Services Cost: \$9,870.00

Task #5:

Task Title: 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, 2012

Reimbursable Cost: \$5,100.00

Detailed Budget Breakdown

Project Budget Form – AWP Funds				
Item	Item/Hours	Unit	Rate	Total
Task #1: Permits, Authorizations, Clearances and Agreements				
Administration: (5%)				\$332.
Direct Labor Costs:				
Project Manager	20	Hours	\$80.00	\$1,600.
Direct Costs: Supplies, printing, postage, travel, etc.				
Archeological Survey	50	Pages	.20	\$10.
Subcontractor Agreements	50	Pages	.20	\$10.
SHPO Clearance	50	Pages	.20	\$10.
Control and Tenure of Land Documents	50	Pages	.20	\$10.
Binders	10	Each	\$5.00	\$50.
Postage	10	Mailings	\$10.00	\$100.
Mileage	200	Miles	.50	\$100.
Outside Services Costs				
Archeologist	100	Acres	\$475.00	\$4,750.
Total for Task #1				\$6,972.
Task #2: Development of Plans				
Administration: (5%)				\$130.
Direct Labor Costs:				
Project Manager	20	Hours	\$80.00	\$1,600.
Direct Costs: Supplies, printing, postage, travel, etc.				
Rabbitbrush Treatment and Revegetation Plan	100	Pages	.20	\$20.
Riparian Vegetative Photo Monitoring Plan	100	Pages	.20	\$20.
Binders	10	Each	\$5.00	\$50.
Postage	10	Mailings	\$10.00	\$100.
Mileage	300	Miles	.50	\$150.
Outside Services Costs:				
Engineer	20	Hours	\$120.00	\$480.
Engineer Technician	30	Hours	\$60.00	\$180.
Total for Task #2				\$2,730.
Task #3: Implementation of Rabbitbrush Treatments and Revegetation				
Administration: (5%)				\$580.
Direct Labor Costs:				
Project Manager	100	Hours	\$80.	\$8,000.
Direct Costs: Supplies, printing, postage, travel, etc.				
Rabbitbrush Treatment and Revegetation Reports	200	Pages	.20	\$40.
Binders	10	Each	5.00	\$50.
Postage	10	Mailings	10.00	\$100.
Mileage	1000	Miles	.50	\$500.
Outside Services Costs:				
Engineer	50	Hours	\$120.	\$6,000.
Engineer Technician	50	Hours	\$60.	\$3,000.
Capital Outlay and Equipment Costs:				
Tractor with brush mower	200	Hours	\$100.	20,000.
Tractor with spray unit	250	Hours	\$100.	25,000.
Chemical Application (4 spot treatment applications)	100	Acres	\$500.	50,000.
Grass Seed Application (spot treatments)	100	Acres	\$50.	5,000.
Total for Task #3				\$118,270.

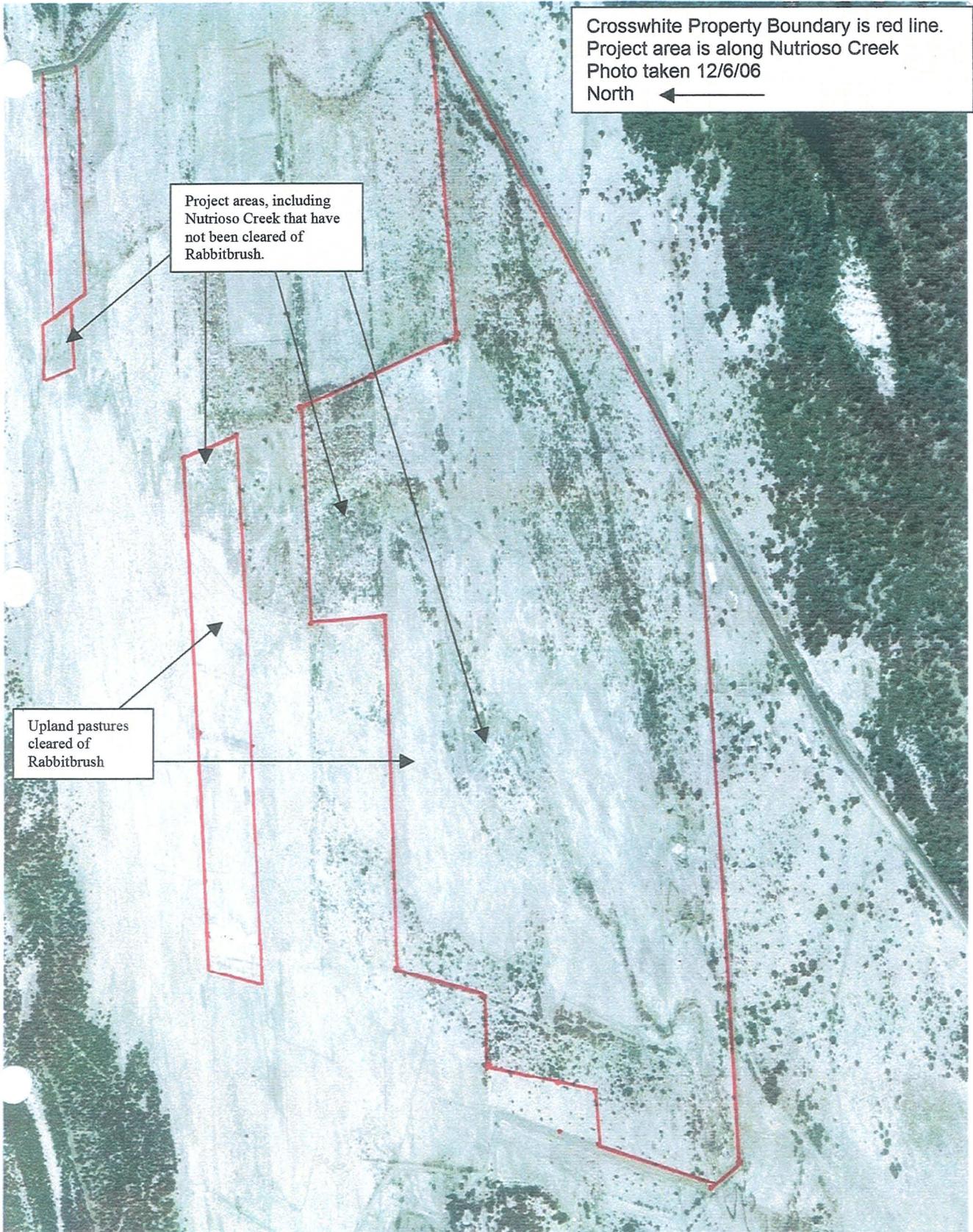
Task #4: Riparian Vegetative Photo Monitoring Report				
Administration: (5%)				\$470.
Direct Labor Costs:				
Project Manager	20	Hours	\$80.00	\$1,600.
Direct Costs: Supplies, printing, postage, travel, etc.				
Riparian Vegetative Photo Monitoring Report	400	Pages	1.00	\$400.
Binders	4	Each	\$5.00	\$20.
Postage	4	Mailings	\$20.00	\$80.
Mileage	200	Miles	.50	\$100.
Outside Services Costs:				
Engineer	20	Hours	\$120.00	\$2,400.
Engineer Technician	80	Hours	\$60.00	\$4,800.
Total for Task #4				\$9,870.
Task #5: Final Report				
Direct Labor Costs:				
Project Manager	30	Hours	\$80.00	\$2,400.
Engineer	10	Hours	\$120.00	\$1,200.
Engineer Technician	20	Hours	\$60.00	\$1,200.
Direct Costs: Supplies, printing, postage, travel, etc.				
Final Report	200	Pages	1.00	\$200.
Binders	2	Each	\$5.00	\$10.
Postage	2	Mailings	\$20.00	\$40.
Mileage	100	Miles	.50	\$50.
Total for Task #5				\$5,100.
Total				\$142,942.

Project Budget Form – Matching Funds				
Item	Item/Hours	Unit	Rate	Total
Task #1: Permits, Authorizations, Clearances and Agreements				
Total for Task #1				\$0.
Task #2: Development of Plans				
Total for Task #2				\$0.
Task #3: Implementation of Rabbitbrush Treatments and Revegetation				
Capital Outlay and Equipment Costs:				
Livestock Grazing Opportunity Cost	3	Years	\$5,000.	\$15,000.
Total for Task #3				\$15,000.
Task #4: Riparian Vegetative Photo Monitoring Report				
Total for Task #4				\$0.
Task #5: Final Report				
Total for Task #5				\$0.
Total				\$15,000.

Supplemental Information and Attachments:

- State Historic Preservation Office (SHPO) Review Form
- Key Personnel
- Project Site Photographs
- Description of Monitoring Plans
- Description of Revegetation/Restoration Plans
- Description of Existing Plans
- Letters of Community Support
- Evidence of Control and Tenure of Land
- Evidence of Physical and Legal Availability of Water
- Attachment #1: Rabbitbrush Water Consumption Calculations
- Attachment #2: Subcontractor Letter of Intent
- Attachment #3: Archeological Survey Bid
- Attachment #4: Deeds which provide Evidence of Control and Tenure of Land

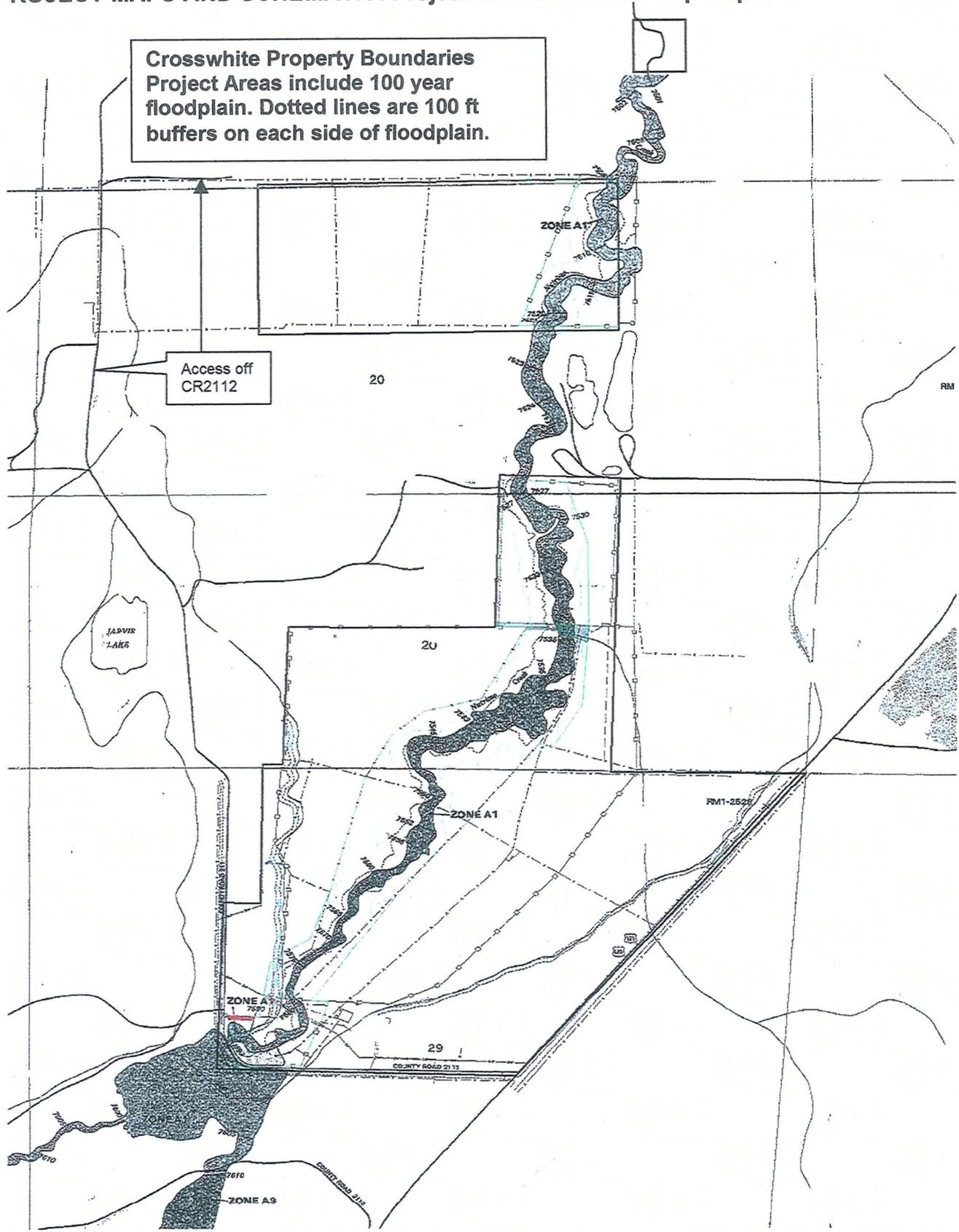
PROJECT MAPS AND SCHEMATIC: Project Location/Ownership Map #1.



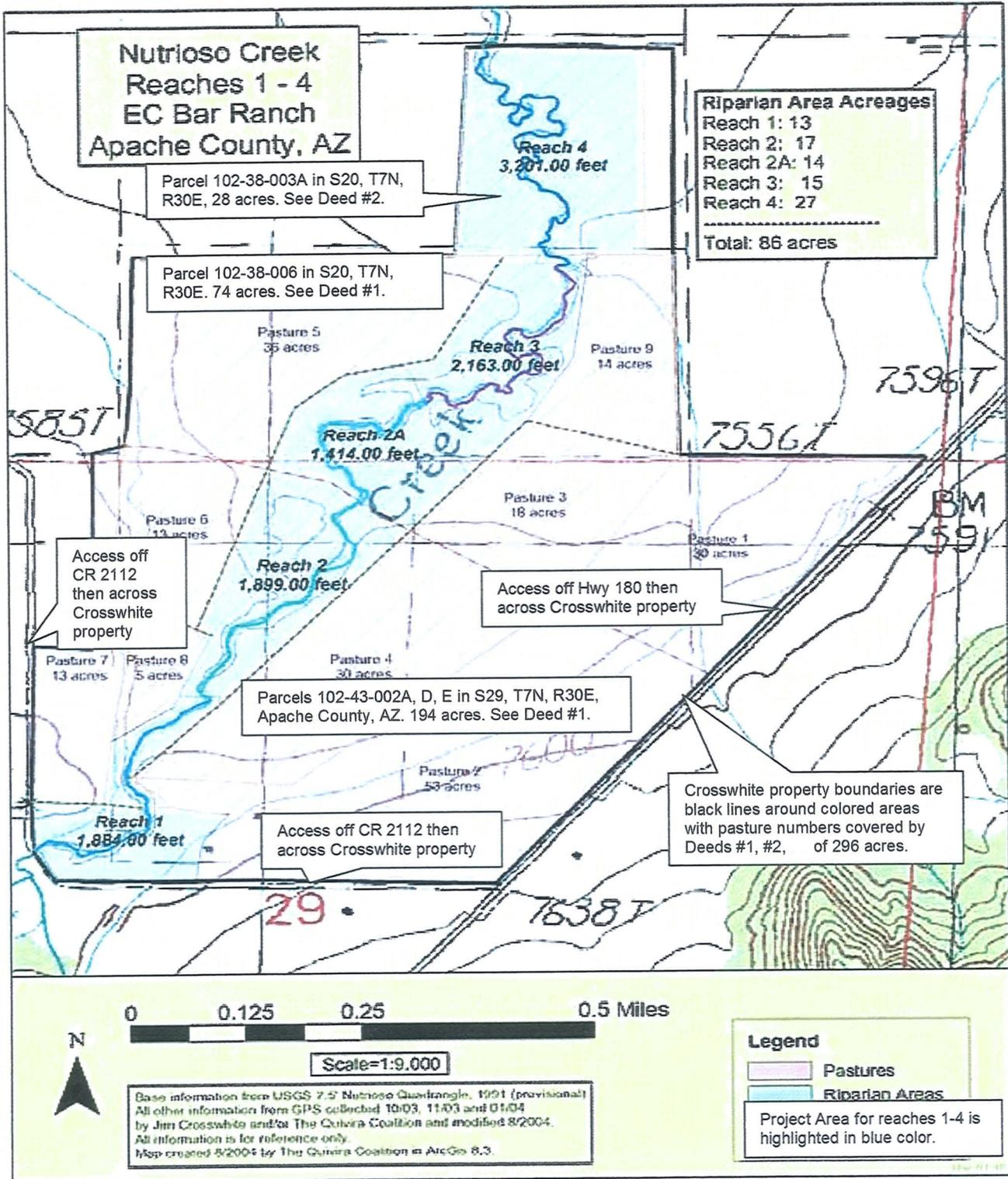
PROJECT MAPS AND SCHEMATIC: Project Location/Ownership Map #2.



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

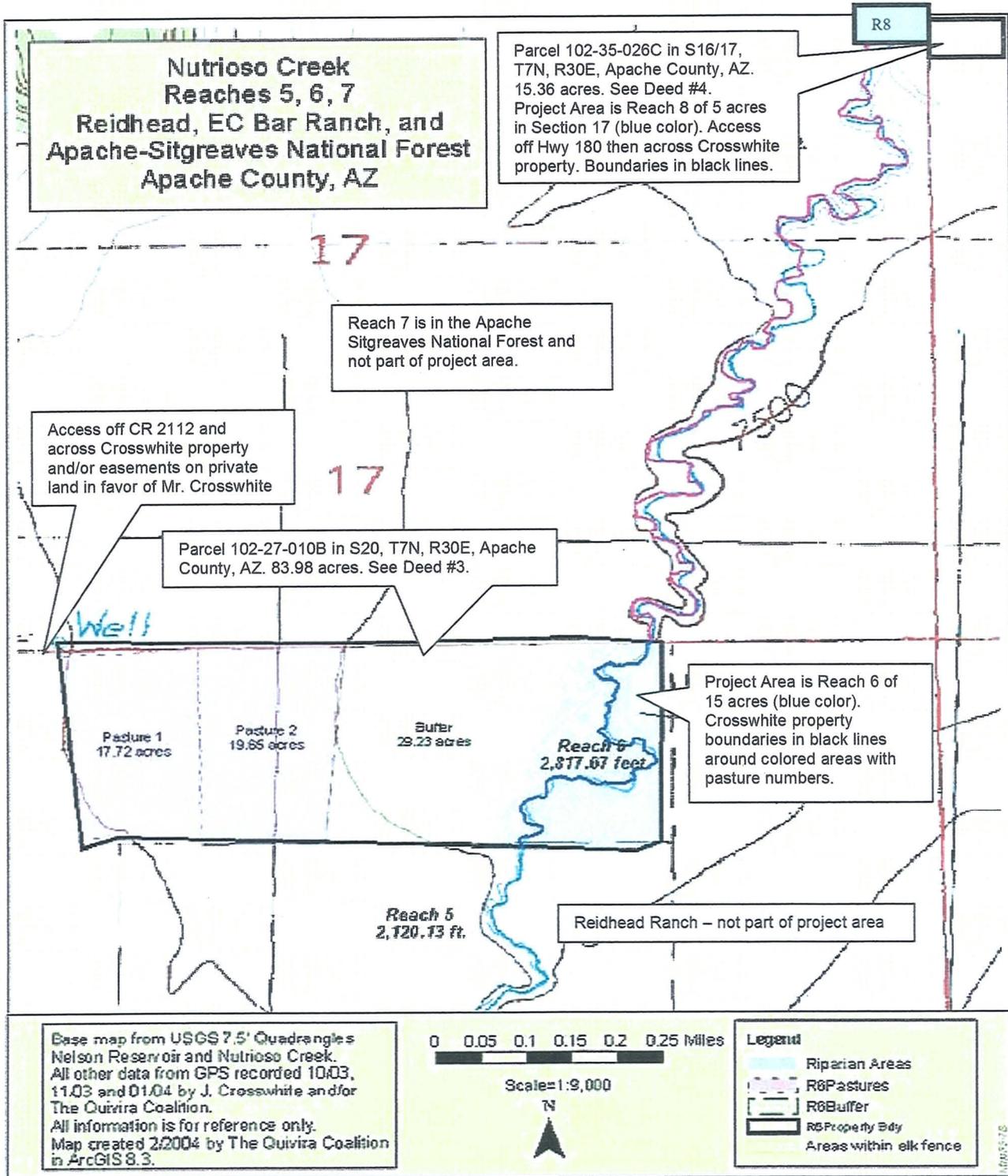


PROJECT MAPS AND SCHEMATIC: Project Location/Ownership Map #4 depicting Reaches 1-4 in 300 acre parcel (Sections 20 and 29)



Topographic Map = 7.5' USGS Nutrioso (33109h2), provisional edition of 1991, contour interval 20 feet. (NAD 1927, UTM, Zone 12N)

PROJECT MAPS AND SCHEMATIC: Project Location/Ownership Map #5 depicting Reach 6 in 84 acre parcel (Section 20) and Reach 8 in 5 acre parcel (Section 17)



Topographic Maps = 7.5' USGS Nutrioso (33109h2), provisional edition of 1991, contour interval 20 feet and 7.5' USGS Nelson Reservoir (34109a2), 1969, contour interval 20 feet.(Both NAD 1927, UTM, Zone 12N)

PROJECT MAPS AND SCHEMATIC: Project Schematic

- See Project Location/Ownership Map #1. Aerial Photo with Crosswhite property boundaries covered by Deeds #1, #2, #3, and #4 are depicted by red lines. Nutrioso Creek is seen flowing across the parcels with Rabbitbrush appearing along the riparian corridor contrasting against adjoining pastures. Photo taken 12/6/07.
- See Project Location/Ownership Map #2. Deeds #1, #2, and #3 cover these two properties with the 80 acre project area on the 296 acre property and the 15 acre project area on 84 acre property depicted within a green solid line representing riparian fencing; and the highest terrace is illustrated by a dark blue dotted line with a 100 ft buffer from the edge of the streambanks shown as a red dotted line.
- See Project Location/Ownership Map #3. The Nutrioso Creek 100-year floodplain is shown with Crosswhite property and project area boundaries. There is a 100 ft buffer from the edge of the floodplain depicted by a dotted line.
- See Project Location/Ownership Map #4. Crosswhite 296 acre property boundaries covered by Deeds #1 and #2 are black lines that include pasture numbers and colored areas, with the project areas in a blue color and including Reaches 1-4.
- See Project Location/Ownership Map #5. Crosswhite 84 acre and 15 acre property boundaries covered by Deeds #3 and #4 are black lines that include pasture numbers and/or colored areas, with project areas in a blue color and including Reaches 6 and 8.
- The following photos illustrate examples of Rabbitbrush treatments and revegetation methods:

Examples of Rabbitbrush treatments and revegetation methods.



Step 1. Mowing Rabbitbrush to remove above ground brush is necessary prior to treating the root.



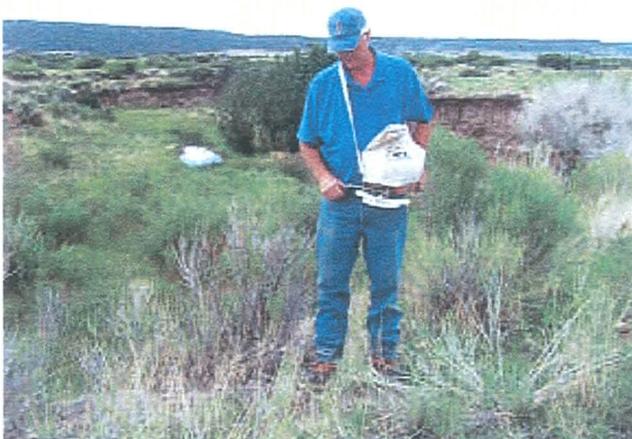
Step 1. Using a tractor to mow Rabbitbrush is often not possible due to steep terrain on terraces.



Step 2. After removing above-ground debris, hand grubbing each plant is necessary to sever the tap root.



Step 2. Each Rabbitbrush plant must be treated by multiple herbicide applications using a backpack sprayer.



Step 3. Each treated area must be hand seeded with native grass to prevent reestablishment of invasive species/brush.



Rabbitbrush eradicated in an upland pasture on the right side of fence compared to untreated project area on left.

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

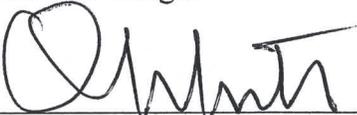
- A copy of SHPO comments if the survey report has already been reviewed by SHPO.

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 W. Crosswhite Trustee, James W. Crosswhite Trust
5. **Project Location, including Township, Range, and Section:** West of mile markers 413, 414, and 415 on Highway 180/191 between Springerville and Nutrioso; Township 7 North, Range 30 East, Sections 17, 20, and 29, Apache County, Nutrioso, AZ.
6. **Total Project Area in Acres:** 100 acres. See attached map showing 300 acre, 84 acre, and 5 acre parcels in sections 29, 20, and 17 that include project area; Attachment #4 shows 85 acre project area in 300 acre parcel in section 29 and 20; Attachment #5 shows 15 acre project area in 84 acre parcel in section 20 and 5 acre project area in 5 acre parcel in section 17.
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 approximately 50,000 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, and broadcast hand planting grass seed over treated areas. The intent is to kill the root on target plants with no other ground disturbances undertaken.

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 project area consists of approximately 3 miles of Nutrioso Creek stream channel, first, second, and third terraces with riparian fencing at least 100 feet away from the nearest stream banks. 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?** NO
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.


 Applicant Signature

16-2-2008
 /Date

James W. Crosswhite
 Applicant Printed Signature

FOR SHPO USE ONLY

SHPO Finding:

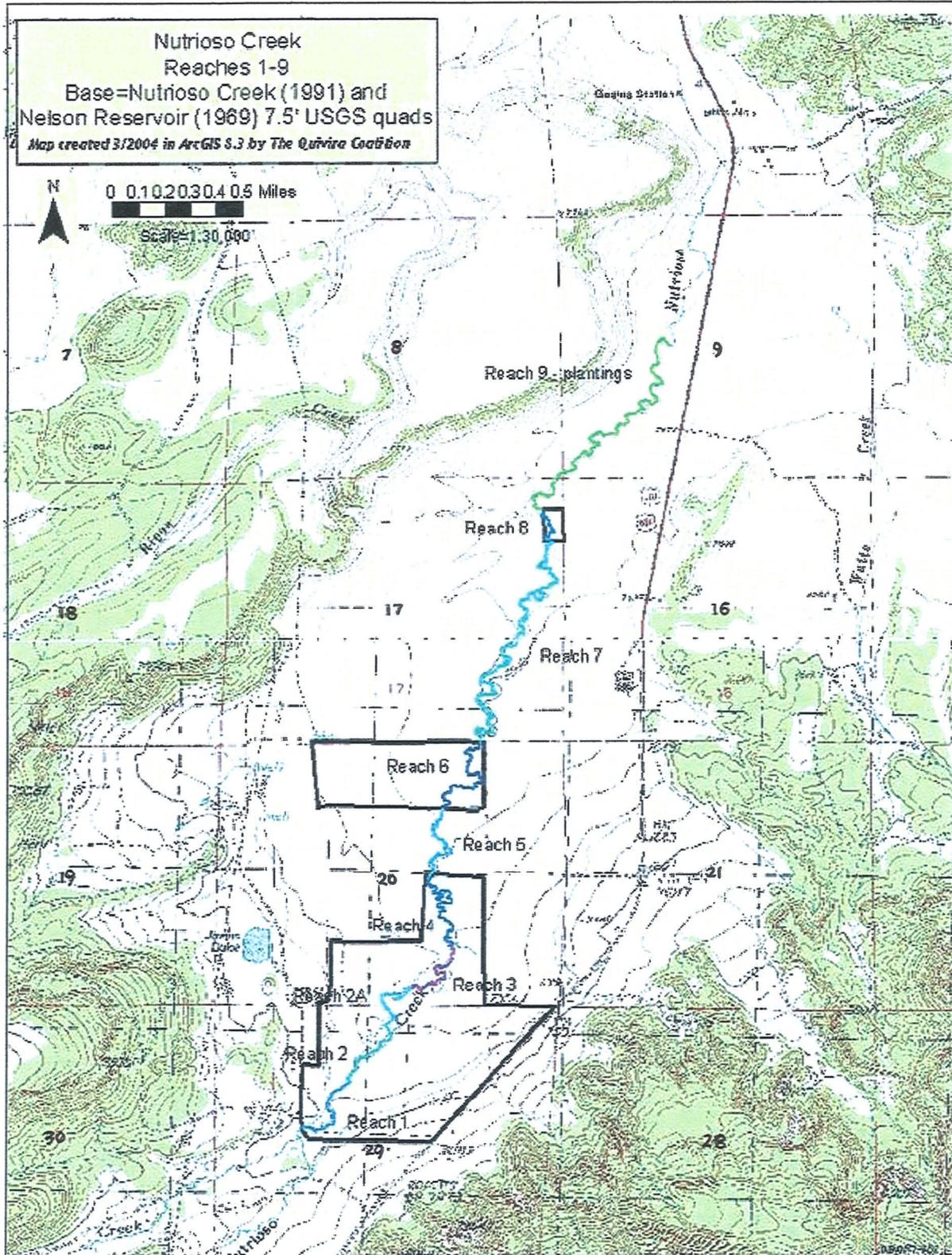
- Funding this project will not affect historic properties.
- Survey necessary – further GRANTS/SHPO consultation required.
- Cultural resources present – further GRANTS/SHPO consultation required.

SHPO Comments:

For State Historic Preservation Office:

Date:

Attachment to SHPO Form: Nutrioso Creek and Nelson Reservoir 7.5' USGS Map depicting project areas as Reaches 1-2 (Section 29), Reaches 2A, 3, and 4 (Section 20), Reach 6 (Section 20, and Reach 8 (Section 17). Reaches 5, 7 and 9 are not in project areas.



SUPPLEMENTAL INFORMATION: Key Personnel

The key personnel in the proposed project are:

Jim Crosswhite. Since 1997, Mr. Crosswhite 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 matched over 50% of public financial assistance with his own resources. As a producer-cooperator with the Natural Resources Conservation Services (NRCS), he has followed an NRCS conservation plan while completing all recommended Best Management Practices in the Arizona Game & Fish Department (AGFD) *Nutrioso Creek Fish Management Report*, Arizona Department of Environmental Quality (ADEQ) and Environmental Protection Agency *Nutrioso Creek TMDL for Turbidity Report*, and US Fish & Wildlife Service (FWS) *Little Colorado River Spinedace Recovery Plan*. Results include:

- The first Safe Harbor Agreement between FWS and a private landowner in Arizona.
- The first instance in Arizona when a federally listed fish species has been relocated from public land to private property by AGFD and FWS.
- The first time a non-attaining waterbody in Arizona has been recommended by ADEQ for removal from the 303(d) list due to mitigation.
- The first instance where a NRCS cooperator in Apache County, Arizona, has mitigated all resource concerns in the *AZ Resource Concerns & Quality Assessment for Crop & Pastureland*.
- Mitigation of riparian conditions from "non-functional" to "proper functioning condition".
- 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.
- Adoption of an Irrigation Water Management Plan to control irrigation water application.
- Adoption of a Nutrient Management Plan to control fertilizer applications.
- Adoption of a Pest Management Plan to control and eradicate noxious weeds/invasive species.
- Outreach to over 400 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 the production of over 30 newspaper, magazine, television show, and film pieces.
- Annual riparian vegetative photo monitoring for ten years with a commitment for 50 more years.
- Maintenance of successful conservation projects without public financial assistance.
- Protection and preservation of riparian habitat and open spaces on the EC Bar Ranch.

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

- Execute a Contract with the AWPf in a timely manner.
- Provide permits, authorizations, clearances, and agreements described by Task #1.
- Provide a final report as described by Task #5.
- Administer the project and budget under Contract terms and conditions.
- Prevent livestock grazing in the project area for three growing seasons as matching funding to AWPf funds.
- Maintain and manage the project area to help prevent reestablishment of Rabbitbrush.

Isaacson Engineering. With extensive experience in construction projects and civil engineering, Ken Isaacson, President and licensed Civil Engineer, along with other employees will:

- Develop Plans described in Task #2.
- Implement Rabbitbrush Treatments and Revegetation described in Task #3.
- Implement Riparian Vegetative Photo Monitoring described in Task #4.
- Collaborate with Mr. Crosswhite in the administration of the project.

SUPPLEMENTAL INFORMATION: Project Site Photos.



Rabbitbrush infestation on 3rd terrace in project area.



Hand grubbing is required to treat Rabbitbrush.



Many Rabbitbrush plants grown taller than an ATV.



Rabbitbrush growing on 1st and 2nd terraces.



Rabbitbrush growing next to willows on 2nd terrace.



Rabbitbrush growing on floodplain and 1st terrace.



Rabbitbrush killed by herbicide without mowing canopy.



Rabbitbrush canopy above ground.

Tap root can grow 30' below ground

Dead Rabbitbrush plant illustrates a severed tap root.

SUPPLEMENTAL INFORMATION: Plans

(1) Riparian Vegetative Photo Monitoring Plan Description

Data will be collected following the same protocols described in 2000 by Lamar Smith, a range consultant, when he created a Riparian Vegetative Photo Monitoring Plan under AWPf grant 99-067WPF which stated: (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 checklist 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.

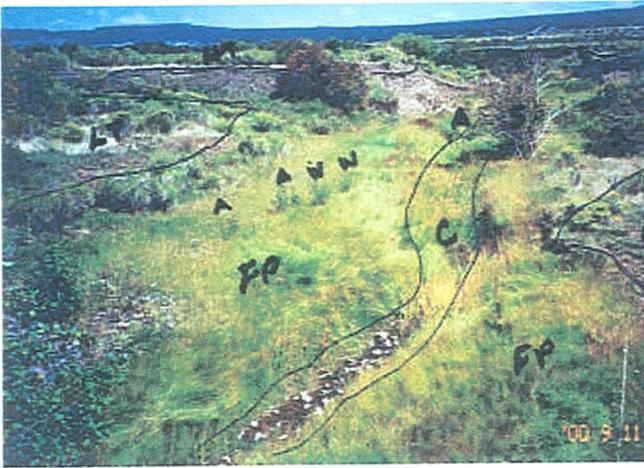
Mr. Smith originally created 23 separate photopoints in reaches 1, 2, 2A, 3, 4, and 6. Photos were taken in September for 2000, 2001, 2002, and 2003. After acquiring reach 8 in 2003, Mr. Crosswhite created two additional photo points. In September 2004, 2005, and 2006, all 25 photo points were monitored. In 2007, only photopoints in reach 1, 2, 2A, 3, and 4 were collected. On 9/5/07 a Riparian Vegetative Photo Monitoring Report was completed and may be viewed on the www.ECBarRanch.com website at link <http://www.ecbarranch.com/adeq%206001/photomonitoring/9-4-07/start.htm>. In September 2008, photos may be taken at all 25 photo points to provide a historical baseline comparison for riparian conditions, including the presence of Rabbitbrush, prior to photo monitoring in 2009 per Task #4.

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 and then revegetate treated areas with Western Wheatgrass.

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.ecbarranch.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 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.

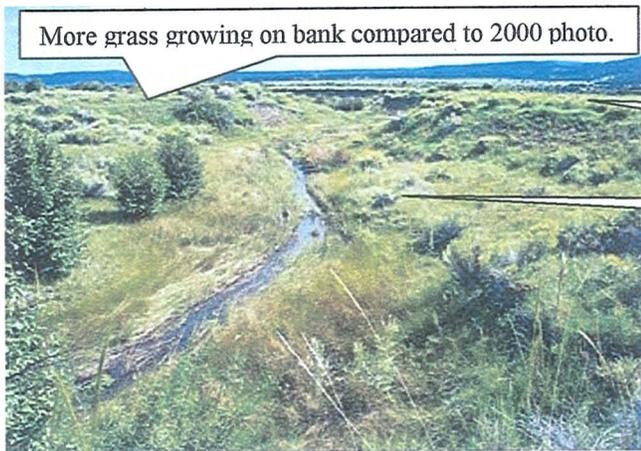
R-5 Picture 0216 Date 9-1-04 Time: 9:39 am
GPS: N33°58.037 W109°12.150
More rushes present.



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.



More grass growing on bank compared to 2000 photo.

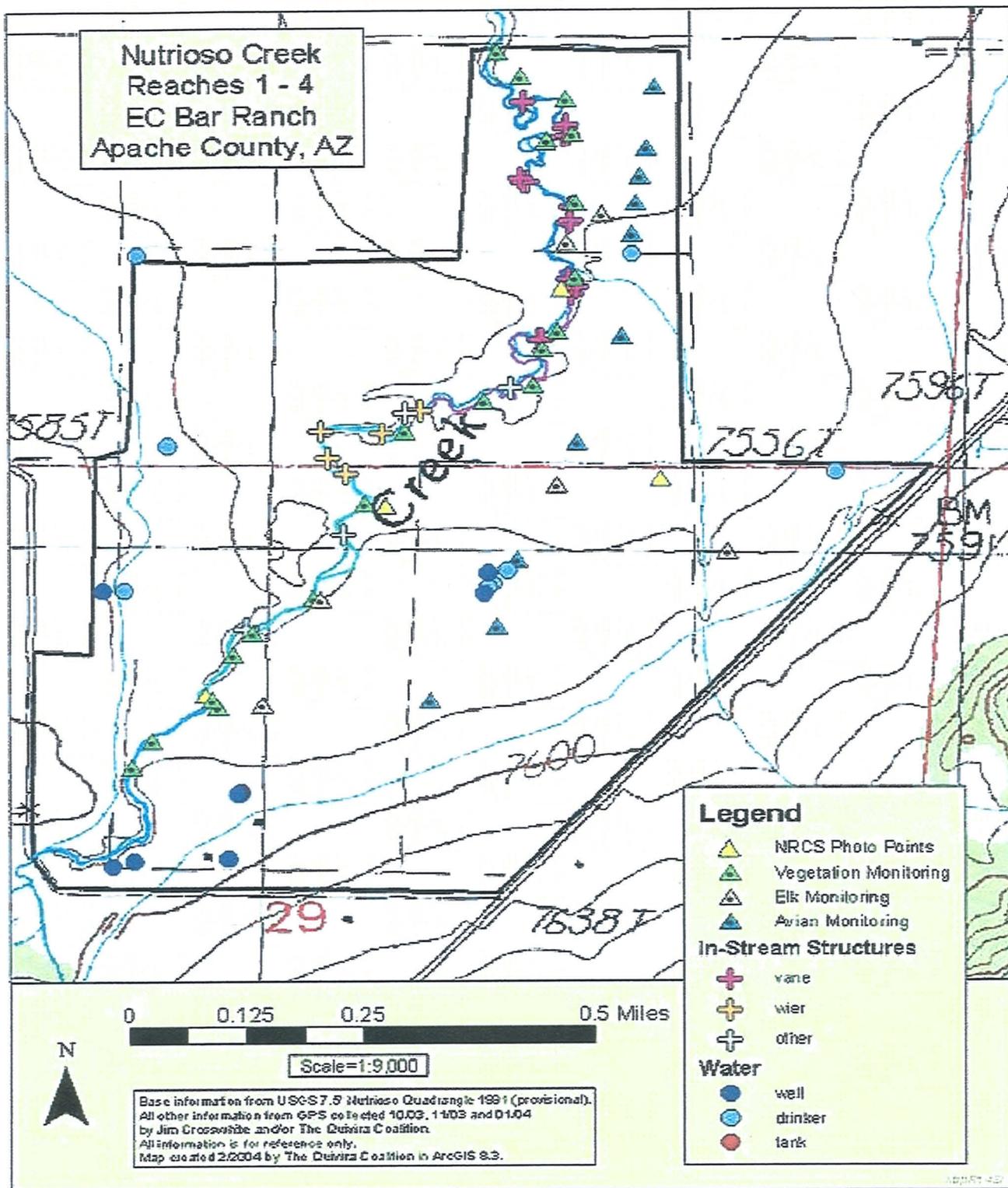
Rabbitbrush growing on the second terrace.

Rabbitbrush growing on the first terrace.

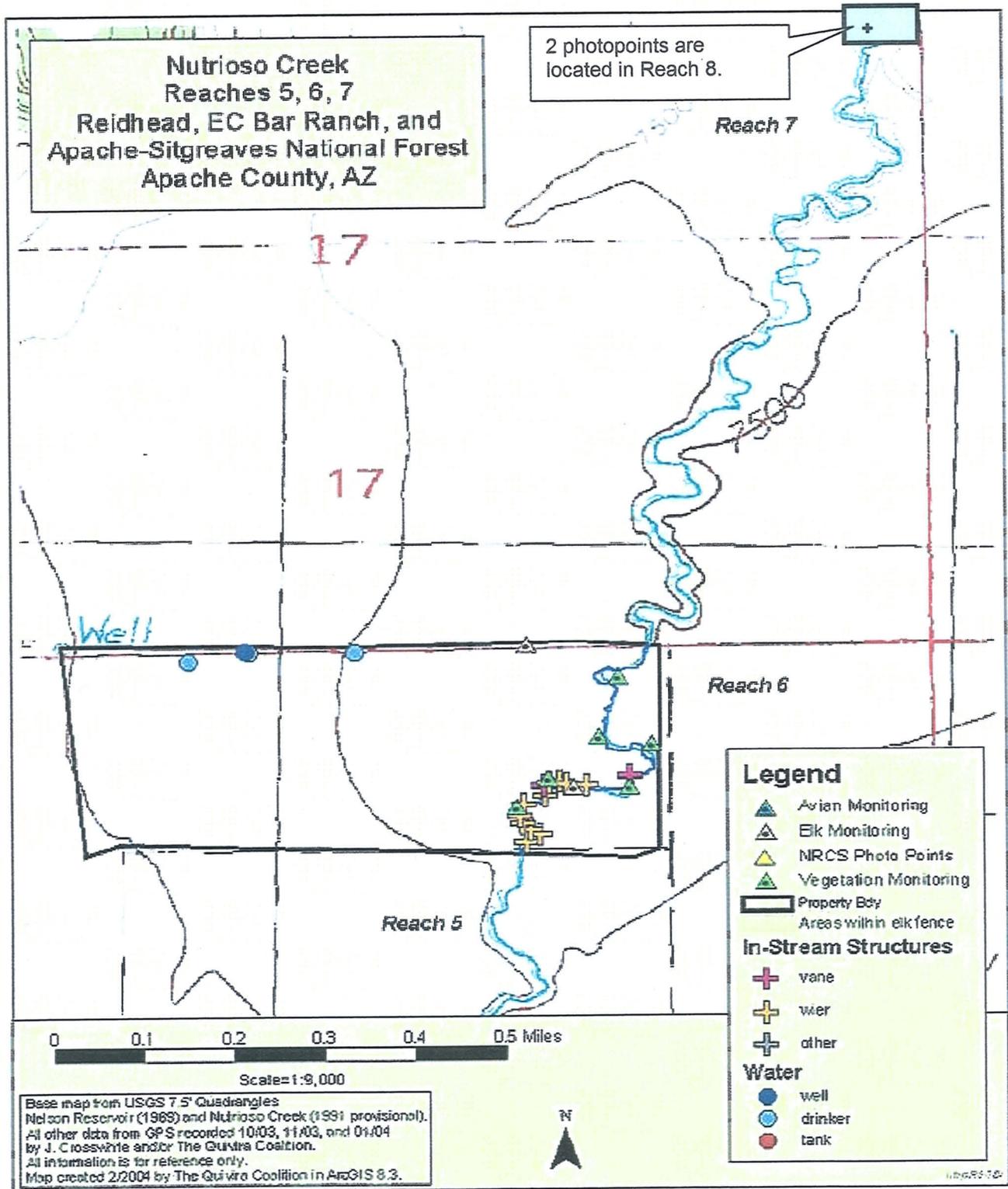
R-5 Picture 736 Date 9-5-07 Time: 9:43 am
 GPS: N33°58.037 W109°12.150.

Maps. See Riparian Vegetative Photo Monitoring Maps #1 and #2 that illustrate 25 photo monitoring sites established since 2000 for reaches 1, 2, 2A, 3, 4, 6, and 8.

Riparian Vegetative Photo Monitoring Map #1. Photopoints in Reaches 1, 2, 2A, 3, and 4.



Riparian Vegetative Photo Monitoring Map #2. Photopoints in Reach 6 and 8.



SUPPLEMENTAL INFORMATION: Plans

(2) Rabbitbrush Treatment and Revegetation Plan

The Rabbitbrush Treatment and Revegetation Plan includes the following Steps and methods to control and/or eradicate Rabbitbrush and revegetate the treated areas.

Step #1: Mow. Using a tractor mounted brushhog mower where possible, or hand saw, cut each Rabbitbrush plant off at ground level to remove the canopy vegetation and expose the plant base. This step allows access necessary to kill the root. Step #1 will be completed when the majority of Rabbitbrush plants have been cut to ground level. Small sized plants can be treated by Step #2 without being cut down. 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. While Step #1 may be implemented at any time of year, the winter months are preferred because less foliage must be cut.

Step #2: Root kill. Two eradication methods may be employed to individually treat an estimated 50,000 Rabbitbrush plants in 100 acres of riparian pastures in the project area:

- Using a hand axe or a similar mechanical technique, cut the terminal bud a few inches below ground level at the base of each plant that is accessible.
- Apply chemicals to any emerging vegetation and on the base of each plant, preferably after it has been cut to ground level. After the initial spot treatment, three additional spot treatment applications will be applied throughout the project area as may be required to prevent dormant Rabbitbrush seeds in the soil from sprouting after larger plants have been removed.
- Step #2 will be completed when 90% of the Rabbitbrush plants growing at the beginning of the project period have been treated. Not only is it impossible to kill 100% of the plants, it is not entirely desirable to totally eradicate all Rabbitbrush since some plants may be well established on steep streambanks that could be marginally susceptible to erosion without any vegetative coverage.
- While this Step may be implemented at any time of year, chemical treatments are most effective in the spring and early summer when plants are vigorously growing and no natural precipitation is expected during applications.

Step #3: Revegetation. Overseed each treated Rabbitbrush plant with Western Wheatgrass seeds to prevent reestablishment of Rabbitbrush and other invasive species or noxious weeds. Western Wheatgrass is a native species that spreads by rhizomes with a deep root structure and dense root mass for increased soil stability that helps reduce erosion. This step requires the exclusion of livestock grazing during the growing season in the project area during the three year project period.

SUPPLEMENTAL INFORMATION: Existing Plans/Reports/Information

State and federal 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. Mr. Crosswhite has addressed concerns in these reports prior to seeking AWPf funding. The reports are described below:

1. The **Nutrios Creek TMDL for Turbidity Report** written by the Arizona Department of Environmental Quality (ADEQ) in 2000 identified the non-point source of pollution in Nutrios Creek on the EC Bar Ranch as erosion from incised streambanks caused by historical overuse by large ungulates (livestock and elk). To view the TMDL Report, see www.ECBarRanch.com link <http://www.ecbarranch.com/adeq%202002/tdml.htm>. After acquiring portions of Nutrios Creek, Mr. Crosswhite collaborated with the ADEQ and others to improve water quality. In the attached letter dated August 28, 2006, the ADEQ advised Mr. Crosswhite that Nutrios Creek would be removed from the Clean Water Act, Section 303(d) list as a non-attaining waterbody. For further delisting information, see link http://www.ecbarranch.com/articles/adeq_delist_menu.htm. In an on-line section called "Success Stories", the Environmental Protection Agency (EPA) stated: "...in 2007, the ADEQ recommended removal of Nutrios Creek from the 303(d) list, making it the first impaired waterbody in Arizona to be delisted as a result of mitigation." To view the EPA article, see link http://www.ecbarranch.com/articles/success_story/success_2007.htm. As a result of his success at mitigating water quality concerns, riparian areas owned by Mr. Crosswhite may no longer qualify for funding under the Clean Water Act, Section 319(h) Water Quality Improvement Grant Program. The proposed project is supportive of all water quality improvement practices recommended in the *Nutrios Creek TMDL for Turbidity 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 water quality.
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 the Plan at link <http://www.ecbarranch.com/adeq%202002/Spinedace/fish.htm>. In addition to implementing habitat improvement practices, in December 2003, Mr. Crosswhite executed a Safe Harbor Agreement (SHA) entitled: *Safe Harbor Agreement With James W. Crosswhite for Voluntary Enhancement and Restoration Activities Benefiting the Southwestern Willow Flycatcher and Little Colorado Spinedace in Nutrios Creek, Arizona*, making him the first private landowner in Arizona to complete a SHA with the USFWS. For further information on the SHA, see link <http://www.ecbarranch.com/usfs%201011/Safe%20Harbor%20Agreement.htm>. Severe drought conditions in 2005-2006 created a survival situation for native fish living in Nutrios Creek because out of 27 miles, only the restored reaches on the EC Bar Ranch were supporting fish populations. See surveys at <http://www.ecbarranch.com/agfd/fishmonitoring.htm>. 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. Later, in attached letter dated August 2006, the USFWS 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 Nutrios Creek provides. In fact, it may be the only instance where this has occurred in Arizona with a federally listed fish species.*" As a result of his success at improving aquatic/wildlife habitat, riparian areas owned by Mr. Crosswhite may no longer qualify for public funded grant programs offered by the

USFWS. The proposed project is supportive of all aquatic/wildlife habitat improvement practices recommended in the *LC Spinedace Recovery Plan*, 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 a federally listed fish species.

3. The ***Nutrios Creek Fish Management Report*** written by the Arizona Game and Fish Department (AGFD) in 2001, documented aquatic habitat in Nutrios Creek for native fish populations, including a federally listed fish species (LC spinedace). To view the Report and subsequent fish surveys, see link <http://www.ecbarranch.com/agfd/fishmonitoring.htm>. Report data indicate that out of 27 miles of Nutrios 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 1-4, 6, and 8 on 3 miles of the EC Bar Ranch, reach 5 on ½ mile of the Reidhead Ranch, and reaches 7 and 9 on 4 miles of the ASNF. Due to severe drought, sampling in 2005 found only 5 LC spinedace in Nutrios 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 proposed project is supportive of all aquatic/wildlife habitat improvement practices recommended in the *Nutrios 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.
4. The ***Arizona Resource Concerns & Quality Criteria Assessment for Crop and Pastureland Report*** written by the Natural Resources Conservation Service (NRCS) in 1997 recommended the mitigation of 28 resource concerns on the ranch. By the end of 2005, Mr. Crosswhite became the first landowner/cooperator with the Apache Natural Resources Conservation District (ARNCD) and NRCS in Apache County to mitigate all resources concerns based on this nationally sanctioned assessment review. As a result, the EC Bar Ranch may no longer qualify for funding from the Environmental Quality Improvement Program (EQIP) to implement Best Management Practices (BMPs). To view the 1997 and 2005 Assessments, see link http://www.ecbarranch.com/nrcs/nrcs_cpa.htm. The proposed project is supportive of all Best Management Practices and management plans recommended by the NRCS to help maintain natural resources on the EC Bar Ranch, with the eradication of Rabbitbrush having a direct relationship to the mitigation of riparian area resource concerns.
5. The ***Proper Functioning Condition (PFC) survey*** of hydrology, soils, and vegetation in Nutrios Creek, completed at the time the riparian areas were acquired by Mr. Crosswhite 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, 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/pfc.htm>. The proposed project supports improvements in riparian functional conditions.



**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,

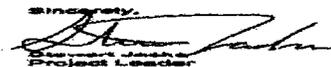
The riparian restoration practices implemented in Nutrioso Creek on the EC Bar Ranch, including water quality and aquatic/wildlife habitat improvements have created an ideal natural aquatic habitat to relocate the Little Colorado River spinedace, captured in degraded (lack of sufficient water) pools 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 Ranch.** 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,

Robert J. Jaska
Project Leader

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



Janet Napolitano
Governor

ARIZONA DEPARTMENT OF ENVIRONMENTAL QUALITY

1110 West Washington Street • Phoenix, Arizona 85007
(602) 771-2300 • www.azdeq.gov



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 TMDL 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

Nutriosio 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 TMDL. 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 Nutriosio 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 Nutriosio Creek effectiveness data more challenging. Through the effectiveness monitoring process, ADEQ staff determined that Nelson Reservoir causes a break in the hydrology of Nutriosio Creek. Therefore, as part of our upcoming triennial review of the surface water quality standards, Nutriosio 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 Nutriosio Creek above Nelson Reservoir.

The ADEQ collected effectiveness data for the upper segment of Nutriosio 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 Nutriosio 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 Nutriosio 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., TMDL 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 link http://www.ecbarranch.com/articles/adeq_delist_menu.htm for further information in the 2006-2008 Status of Ambient Surface Water Quality in Arizona Report regarding removal of Nutriosio Creek from Section 303(d) list as a non-attaining water body. This Report may be submitted to the Environmental Protection Agency (EPA) in May or June 2008 for final approval.

SUPPLEMENTAL INFORMATION: Community Support

Community support is demonstrated in this grant application by the fact that the proposed project supports Best Management Practice recommendations in the *Nutriosos Creek TMDL for Turbidity Report*, *LC Spinedace Recovery Plan*, *Nutriosos Creek Fish Management Report*, and the *Arizona Resource Concerns & Quality Criteria Assessment for Crop and Pastureland Report* written by state and federal agencies to address water quality, aquatic/wildlife habitat, and other natural resource concerns in Nutriosos Creek, with the eradication of Rabbitbrush being an on the ground measure that directly maintains, enhances and restores a waterbody in Arizona and riparian resources. See SUPPLEMENTAL INFORMATION: Existing Plans/Reports/Information, including letters from the Arizona Department of Environmental Quality (ADEQ) and US Fish and Wildlife Services (USFWS).

The *Nutriosos Creek TMDL for Turbidity Report* written by Arizona Department of Environmental Quality in 2000 recommends the implementation of Rabbitbrush treatments adjacent to the Nutriosos 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*".

In addition, the control and eradication of Rabbitbrush near the stream channel may reduce water consumption and allow more water to remain in the stream, which could improve chances for survival of native fish populations, including a federally listed fish species. Thus the proposed project supports objectives and aquatic habitat improvement recommendations in the *LC Spinedace Recovery Plan* and the *Nutriosos Creek Fish Management Report*.

Evaluation of community support for the proposed project should take into consideration that these Plans and Reports were written by state and federal agencies to comply with public policies voted into law by state and federal Legislators elected by citizens of the United States, the State of Arizona, County of Apache, and local communities of Nutriosos and Springerville and therefore the local community, including members of the public, private landowners, and elected officials, have already affirmed support for the voluntary implementation of the proposed project.

SUPPLEMENTAL INFORMATION: Evidence of Control and Tenure of Land

If you own the land on which the project is located, attach a copy of the appropriate legal document showing title in the name of the Applicant, and including a legal description of the property.

- Title is held in the name of the Applicant as follows: James Wayne Crosswhite, as Trustee of the JAMES WAYNE CROSSWHITE TRUST, established March 16, 1989, URA August 1, 2005, as amended October 2, 2006
- Attachment #4 includes the following Deeds for approximately 395 acres of property that includes the project area of approximately 100 acres:
 - Deed #1 for parcels 102-43-002A, D, E in S29, T7N, R30E, Apache County, AZ, and for parcel 102-38-006 in S20, T7N, R30E, Apache County, AZ
 - Deed #2 for parcel 102-38-003A in S20, T7N, R30E, Apache County, AZ
 - Total area covered by Deeds #1 and #2 for these parcels is 296.44 acres, including about 80 acres in project area
 - Deed #3 for parcel 102-27-010B in S20, T7N, R30E, Apache County, AZ, of 83.98 acres, including about 15 acres in project area
 - Deed #4 for parcel 102-35-026C in S16/17, T7N, R30E, Apache County, AZ of 15.36 acres, including about 5 acres in project area
- Access to all parcels is available from Hwy 180, County Road 2112, and/or across private lands owned by Mr. Crosswhite and/or across easements on private lands in favor of Mr. Crosswhite.
- Also see Supplemental Information: Project Maps and Schematic

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 all parcels listed above so deeds demonstrate ownership of surface water flows.
- Mr. Crosswhite has surface water rights in Nutrioso Creek that are attached to the parcels covered by deeds listed above under the Norviel Decree and such rights may be used for irrigation water purposes. However, since no surface water diversions are to be used in the project, no documentation is needed to demonstrate ownership.
- Mr. Crosswhite has groundwater wells that may be used for domestic and irrigation purposes. However, since no groundwater withdrawals are to be used in the project, no documentation is needed to demonstrate ownership.
- The proposed project will not require use of effluent or CAP water.

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

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

Attachment #1. Rabbitbrush Water Consumption Calculations

As described in the Project Overview, an important objective of the proposed project is to reduce water consumption by eradicating at least 90% of the estimated 50,000 Rabbitbrush plants growing on first and second terraces within the stream channel and third terraces averaging 100 feet on either side of the streambanks for approximately 3 miles of Nutrioso Creek on the EC Bar Ranch, a project area of about 100 acres. Project monitoring is not intended to measure the water consumption used before or after the treatment process, which not only includes eradication of Rabbitbrush plants, but overseeding treated areas with Western Wheatgrass.

Net Water Savings.

Before estimating net water savings, it is important to understand that as an upland species, Rabbitbrush adapt to relatively dry rangeland conditions by sending a single tap root deep into the ground in search of moisture. Observations of a 50 foot root have occasionally been reported along cliff faces, but on the EC Bar Ranch 15 foot tap roots have been exposed along streambanks incised by 20 feet. Clearly, Rabbitbrush roots are not designed to obtain moisture near the surface but to tap directly into the water table moisture zone. In contrast, Western Wheatgrass, and other native grasses with dense root masses, obtain moisture from within 2-3 feet below the surface, which is provided by natural precipitation rather than deeper subsoil moisture. Based on these bifurcating plant species characteristics, the eradication of Rabbitbrush growing on first, second and third terraces would apparently eliminate water consumption from the water table, while overseeding with Western Wheatgrass may consume no water table moisture. Over time, other riparian and native grass species may naturally replace Wheatgrass, but they all share common traits of dense root masses designed to hold soils together with natural precipitation being their primary source of moisture. Therefore, the following Rabbitbrush Water Consumption Calculations are estimated to be the net savings in water consumption within the project area.

Nutrioso Creek Baseline Flows.

The *Nutrioso 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 Nutrioso Creek, were averaged for each month from 1968-1989 (gauging stations ceased operation in 1989). 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 (cubic feet per second). The average critical flow value was then used to calculate a corresponding turbidity and Total Suspended Solids (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."* See the complete *Nutrioso Creek TMDL for Turbidity Report* at link <http://www.ecbarranch.com/adeq%202002/tdml.htm>. 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.

Rabbitbrush Evapotranspiration 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 most likely 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 to the estimated 500 plants per acre growing within an average corridor 300 feet wide, including the channel approximately in the middle, for a distance of about 15,000 feet of channel as found in reaches 1-4, 6, and 8. Thus, the project area would be computed as 103 acres in size (although the exact size will be measured as part of Task #2, it is expected to be 100 acres). Therefore, 1.9 AFA Rabbitbrush ET rate x 325,900 gallons per acre foot equals 619,210 gallons consumed annually by Rabbitbrush per acre; this quantity x 100 acres in the project area equals 61,921,000 gal/year of water consumed by Rabbitbrush in the project area; divided by 525,600 minutes per year equals an average consumptive flow of 118 GPM by Rabbitbrush growing in the 100 acre project area.

Stream Flow Affect.

The TMDL Report indicated that 206 GPM was the average rate of flow per month from June through January during the period of 1968-1989 in Nutrioso Creek. However, over the last ten years the Nutrioso area has experienced seven years when lack of natural winter precipitation has caused instream flows to cease for periods ranging from one month (June) to seven months (June to January) resulting in a decline in the water table that has resulted in an apparent loss of riparian vegetation. During this same ten year period, Rabbitbrush has been controlled and/or permanently eradicated in about 200 acres of upland pastures, but has never been treated in about 100 acres of riparian pastures on the EC Bar Ranch. Since the USGS study indicates that Rabbitbrush growing in riparian pastures may be consuming an average of about 118 GPM in water from the water table that would otherwise be available to supplement instream flows in Nutrioso Creek that have repeatedly dried up in recent years during the critical growing period from May to September, it appears that by controlling and/or eradicating Rabbitbrush in riparian pastures through the proposed project, an additional 118 GPM, or an increase of 57% of the average historical rate of flow, may be available for instream flows on a permanent basis.

Supplemented Stream Flow Example.

As an example of how important 100 GPM of supplemental flows can be, prior to 2005, Nutrioso had experienced below normal winter precipitation for a few years so when Arizona Game &

Fish Department (AGFD) performed a fish survey in April/May, only five LC Spinedace were found on the EC Bar Ranch out of a sampling of 27 miles of Nutrioso Creek. Presently, AGFD lists three native fish living in Nutrioso Creek, e.g. Little Colorado spinedace (*Lepidomeda vittata*), Blueheaded sucker (*Pantosteus discobolus*), and Speckledace (*Rhinichthys osculus*), as "species of special concern" with the LC spinedace also federally listed as "threatened" by US Fish & Wildlife Service (USFWS) under the Endangered Species Act. In this example of extreme drought, virtually all reaches of Nutrioso Creek had dried up except reaches 1 and 3 that Mr. Crosswhite had previously restored on the EC Bar Ranch (even restored reaches 2, 4, 6, and 8 were dry).

In May 2005, upon learning of the results of the fish survey and pending fish population disaster, Mr. Crosswhite immediately started adding 100 GPM of supplemental water directly into reach 1 to maintain a flow for two miles through reaches 2, 2A, 3 and 4 so pools where fish were surviving would remain connected. This action allowed some fish to move to deeper pools where water was cooler and survival was more likely. Mr. Crosswhite continued to monitor instream flows and maintain a supplemental flow as necessary through August when monsoon rains added some drought relief. Without his help, state and federal agencies predicted the majority of native fish populations living in Nutrioso Creek may not have survived six months with such a widespread loss of surface flows.

Fortunately, the relatively small number of LC Spinedace that survived the 2005 drought were able to replace much of the lost fish population in the following year. As another period of drought began in May 2006, AGFD and FWS used the opportunity to capture about 700 LC Spinedace living downstream on the Apache Sitgreaves National Forest and release them upstream in reach 3 and 4 on the EC Bar Ranch. Later, the entire downstream reach dried up, but fish survived upstream. In a follow-up survey in 2007, samples of fish populations indicated a large population of LC Spinedace. In fact, AGFD considered removing some of the federally listed species from the USFS to a secure refugia in Eagar, but elected to leave them in Nutrioso Creek. In Jan/Feb 2008, there was a 50 year flood event that has provided above normal instream flows along the entire 27 miles of Nutrioso Creek, thus allowing all native fish to expand their range and habitat downstream into the Upper Little Colorado River.

This recent example illustrates how a relatively small amount of water, eg 100 GPM, helped in the survival of fish populations in Nutrioso Creek.

Conclusions.

While the proposed project does not attempt to define the quantity of water that may be available as stream flows after Rabbitbrush have been treated to reduce water consumption and increase species diversity, the implementation of such treatments are an on the ground measure that directly helps maintain, enhance, and restore a riparian ecosystem found between aquatic and upland environments that is dependent on the existence of approximately 3 miles of Nutrioso Creek, a perennial water source located near the headwaters of the Little Colorado River. The opportunity presented by the proposed project to introduce a new source of water is important for the long term proper functioning condition of a riparian habitat essential to the survival of native fish populations, especially when drought conditions persist and stream flows draw down bank storage tied to the water table. In contrast to the distinct characteristics of soil and vegetation in riparian areas, Rabbitbrush is an invasive species on first, second and third terraces along Nutrioso Creek corridor that has a negative and undesirable affect on riparian habitat, vegetation, and the water table.

Attachment #2: Subcontractor Letter of Intent

Isaacson Engineering, Inc.

Civil Engineering & Land Surveying

P.O. Box 2924
1200 West Cleveland, Ste. 8
St. Johns, AZ 85936

Phone: (928) 337-9910
Fax: (928) 337-9905
isaacsoneng@frontiernet.net

5/8/08

Jim Crosswhite
PO Box 44
Nutrioso, AZ 85932

Dear Mr. Crosswhite,

I have read the draft grant application dated 5/4/08 entitled "EC Bar Ranch Riparian Brush Control Project". I am providing this Letter of Intent to perform the following Tasks:

Task 2: Development of Plans. The following deliverables are due on 6/1/09:

- (1) **Rabbitbrush Treatment and Revegetation Plan.** Develop a plan for treating approximately 50,000 Rabbitbrush plants growing in the 100 acre project area, including creation of map based on GPS survey data showing an accurate acreage in each parcel within the project area, property boundaries and project area depicting streambanks and riparian fencing.
- (2) **Riparian Vegetative Photo Monitoring Plan.** Develop a photo monitoring plan with a map of the project area indicating photo monitoring points, GPS points, and photo direction, etc, consistent with 25 existing photo points established since 2000.
- (3) Total cost is \$2,730.

Task 3: Implementation of Rabbitbrush Treatments and Revegetation. Following the Rabbitbrush Treatment and Revegetation Plan described in Task 2, perform mowing, root plowing, hand grubbing, and/or herbicide applications, and overseed with Western Wheatgrass as appropriate for weather conditions in 2009, 2010, and/or 2011 with the object to control and/or eradicate 90% of the approximately 50,000 plants in the 100 acre proposed project area. The following are deliverables:

- (1) Rabbitbrush Treatment and Revegetation Report due 12/31/09
- (2) Rabbitbrush Treatment and Revegetation Report due 12/31/10
- (3) Summary of Rabbitbrush Treatment and Revegetation Reports due 12/31/11
- (4) Total cost is \$118,270.

Task 4: Riparian Vegetative Photo Monitoring. Following the Riparian Vegetative Photo Monitoring Plan described in Task 2, perform photo monitoring at 25 sites in September 2009 as a baseline before treatments; perform photo monitoring in September 2010 and 2010 after treatments. Cost is \$9,870.

Sincerely,


Ken Isaacson
President



ENVIRONMENTAL CONSULTANTS

Sound Science. Creative Solutions.

Phoenix Office
3033 North Central Avenue, Suite 145
Phoenix, AZ 85012
Tel 602.274.3831 Fax 602.274.3958
www.swca.com

April 29, 2008

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

Re: Proposal for Archaeological Survey of 100 acres near Nutrioso, Apache County, Arizona

Dear Mr. Crosswhite:

SWCA Environmental Consultants (SWCA) appreciates the opportunity to provide you with our scope of work and cost estimate for archaeological survey associated with riparian habitat restoration. It is our understanding that this project will require a cultural resources (archaeological) survey of approximately 100 acres along Nutrioso Creek.

The project includes privately owned land. The survey may be required to comply with the Arizona Antiquities Act related to a grant application with the Arizona Water Protection Fund. The not-to-exceed cost is \$4,750.00 to complete these tasks, which are described in the attached scope of work.

Thank you for providing us with the opportunity to work with you. Please contact me at (602) 274-3831 if you have any questions regarding this proposal.

Sincerely,

A handwritten signature in black ink that reads "Douglas R. Mitchell". The signature is written in a cursive style.

Douglas R. Mitchell
Senior Project Manager

Attachment

SCOPE OF WORK

Archaeological Survey of 100 Acres along Nutrioso Creek, Nutrioso, Apach County, Arizona

The scope of work outlined below includes an archaeological survey of three parcels (80 ac, 15 ac, and 5 ac) that includes about 3 miles of Nutrioso Creek riparian area. The scope of work includes three components.

Background Research and Archaeological Records Search. Before fieldwork, SWCA will examine the files at the Bureau of Land Management and Arizona State Historic Preservation Office. In addition, the AZSITE database, which includes records from the Arizona State Museum (ASM) and Arizona State University, will be checked. This search will be conducted to determine the location of any previously conducted archaeological surveys or previously recorded archaeological sites within a 1-mile radius of the project area. SWCA will include the search results in the survey report.

Field Survey. SWCA will conduct an archaeological survey of the project area, adhering to survey methods established by the ASM and the Bureau of Land Management (BLM). These standards include having one or more qualified archaeologists cover the area with systematic pedestrian transects for 100% survey of the project area. During the inventory, any previously recorded sites will be re-evaluated and re-recorded as necessary. Newly discovered archaeological sites will be mapped to scale and fully recorded according to ASM guidelines. SWCA will evaluate the significance of all identified historic and prehistoric resources in terms of eligibility for listing in the State and National Registers of Historic Places.

Report. After fieldwork, SWCA will prepare a summary report that includes a cover, title page, introduction, project description, environmental setting, cultural setting, background research results, methods, results of investigations, recommendations, and references cited. The report will provide recommendations regarding the management of any significant cultural resources identified in the project area.

The report will be prepared using Microsoft Word software (unless otherwise specified in the contract), with color maps created using either AutoDesk (AutoCAD) or ESRI (ArcGIS) software. SWCA will submit to the client a copy of the draft report for review, and will incorporate client and agency comments into the final report. At the close of the project, SWCA will prepare and submit the necessary archaeological site and survey project records for permanent curation at the ASM, as required by SWCA's BLM and ASM permits.

Schedule

The project cost and schedule are based on the expectation of timely receipt of accurate information regarding the exact boundaries of the survey area. SWCA will begin work immediately after receiving a signed contract. SWCA anticipates completing the final report within 4 weeks after receiving the fully executed contract.

Assumptions

1. Access to private lands, if restricted, will be arranged by a client representative.
2. If for any reason the archaeologist is not able to survey the project area due to access restrictions, additional costs could be incurred beyond the amount proposed herein.

3. These costs do not include submission of the report to any agency, or tribal notification or costs and delays as a result of tribal consultation if any Native American tribes attach religious or cultural significance to historical properties in the project area.
4. Any task not expressly described herein is not included in the proposed cost.

Not-to-exceed cost: \$4,750.00