

Arizona Water Protection Fund FY 2011 Grant Application Review

Application # WPF0390 Applicant: Harold E. Filleman + Jeanette Filleman

Title of Project: Eagle Creek Riparian Restoration at Filleman Crossing

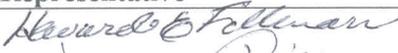
Additional materials were submitted with this application that could not be reproduced and distributed for review. These materials may be reviewed in person at the Arizona Water Protection Fund offices at (3550 N. Central Avenue, 2nd Floor, Phoenix). The additional materials available are the following:

Maps
 Photographs
 Disk
 Other

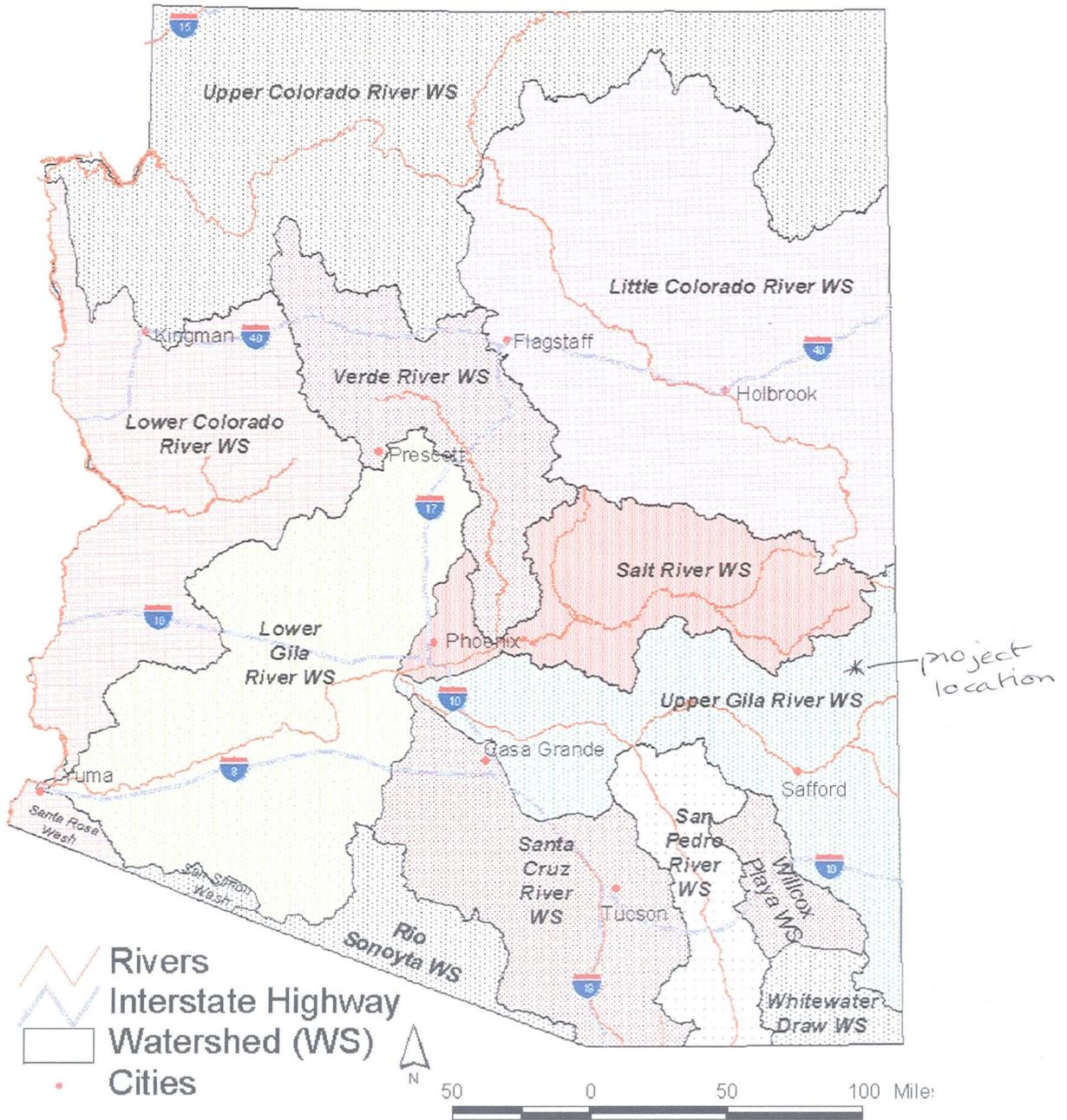
**Arizona Water Protection Fund
Application Cover Page
FY 2011**

AUG 31 2010

Water Protection Fund

Title of Project: Eagle Creek Riparian Restoration at Filleman Crossing											
Type of Project: <input checked="" type="checkbox"/> Capital or Other <input type="checkbox"/> Water Conservation <input type="checkbox"/> Research	Stream Type: <input type="checkbox"/> Perennial <input type="checkbox"/> Intermittent <input checked="" 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/Organization: Howard E. Filleman and Jeanette Filleman Address 1: 148564 S. 46th Pl., Phoenix, AZ 85044 Address 2: 108 Church Lane, Duncan, AZ 85534 City: State: ZIP Code: Phone: 602-809-0512, 928-687-1048 Fax: none Tax ID No.: ss # will be provided upon grant approval	Inside an AMA: Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> If yes, which AMA: <input type="checkbox"/> Phoenix <input type="checkbox"/> Tucson <input type="checkbox"/> Prescott <input type="checkbox"/> Pinal <input type="checkbox"/> Santa Cruz										
Contact Person: Name: Jan Holder Title: Executive Director Phone: 520-395-2499 Fax: 520-829-3660 e-mail: watershedholder@yahoo.com	Type of Application: <input checked="" type="checkbox"/> New <input type="checkbox"/> Continuation Any Previous AWPf Grants: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No If yes, please provide Grant #(s):										
Arizona Water Protection Fund Grant Amount Requested: \$258,876.75 If the application is funded, will the Grantee intend to request an advance: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Matching Funds Obtained and Secured: <table style="width:100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;"><u>Applicant/Agency/Organization:</u></th> <th style="text-align: right;"><u>Amount (\$):</u></th> </tr> </thead> <tbody> <tr> <td>1. Applicant</td> <td style="text-align: right;">680.00</td> </tr> <tr> <td>2. Greenlee County</td> <td style="text-align: right;">23,820.00</td> </tr> <tr> <td>3. Upper Eagle Creek Watershed Association</td> <td style="text-align: right;">1,200.00</td> </tr> <tr> <td align="right" colspan="2">Total: \$25,700.00</td> </tr> </tbody> </table>	<u>Applicant/Agency/Organization:</u>	<u>Amount (\$):</u>	1. Applicant	680.00	2. Greenlee County	23,820.00	3. Upper Eagle Creek Watershed Association	1,200.00	Total: \$25,700.00	
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1. Applicant	680.00										
2. Greenlee County	23,820.00										
3. Upper Eagle Creek Watershed Association	1,200.00										
Total: \$25,700.00											
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											
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.											
Howard E. Filleman and Jeanette Filleman	Landowners 602-809-0512, 928-687-1048										
Typed Name of Applicant or Applicant's Authorized Representative	Title and Telephone Number										
	8/28/2010										
	8/28/2010										
Signature	Date Signed										

Arizona Watershed Map FY 2011



Title of Project: Eagle Creek Riparian Restoration at Filleman Crossing

Project Location & Environmental Contaminant Information FY 2011

Project Location Information			
1. County: <u>Greenlee</u>	2. Section: <u>19</u>	3. Township: <u>T1N</u>	4. Range: <u>R28E</u>
5. Watershed: <u>Upper Gila</u> 6. 8 or 10 Digit Hydrologic Unit Code (HUC): <u>1504000502</u> 7. Name of USGS Topographic Map where project area is located: <u>Robinson Mesa</u> 8. State Legislative District: <u>1</u> (Information available at: http://159.87.126.6/mapping/default2.asp?tname=Original.2009.Legislative.Map&org2009leg=on&service=ircmaps&init=true)			
9. Land ownership of project area: <u>Private - Howard E and Jeanette Filleman</u>			
10. Current land use of project area: <u>road crossing</u>			
11. Size of project area (in acres): <u>1/4 acre</u>			
12. Stream Name: <u>Eagle Creek</u>			
13. Length of stream through project area: <u>300 feet</u>			
14. Miles of stream benefited: <u>1 miles</u>			
15. Acres of riparian habitat: <u>6 acres</u> will be: <div style="margin-left: 200px;"> <input checked="" type="checkbox"/> Enhanced <input type="checkbox"/> Maintained <input type="checkbox"/> Restored <input type="checkbox"/> Created </div>			
16. Provide directions to the project site from the nearest city or town. List any special access requirements: <i>From Phoenix go 172 miles on rt 60. Go past Safford and Tleet about 5 miles out of town. Turn L at 191, GO approx 50 miles thru Clifton + Morenci to mile marker 188. Turn left at Eagle Creek sign. Go approx 13.5 miles to Filleman Crossing</i>			
Environmental Contaminant Location Information			
1. Does your project site contain known environmental contaminants? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO If yes, please identify the contaminant(s) and enclose data about the location and levels of contaminants: E.coli from the livestock waste			
2. Are there known environmental contaminants in the project vicinity? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO If yes, please identify the contaminant(s) and enclose data about the location and levels of contaminants: E.coli from the livestock waste. The EPA's 303(d) list does not list Upper Eagle Creek as impaired for E.coli. However, there is considerable evidence of livestock waste throughout the riparian area.			
3. Are you asking for Arizona Water Protection Fund monies to identify whether or not environmental contaminants are present? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO			

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.
- NOTE: If a federal agency is involved, the agency must consult with SHPO pursuant to the National Historic Preservation Act (NHPA); a state agency must consult with SHPO pursuant to the State Historic Preservation Act (SHPA),
- 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: Eagle Creek Riparian Restoration at Filleman Crossing
3. Applicant Name and Address: Howard E. Filleman, 14854 S. 46th Pl. Phoenix, AZ 85044, and Jeanette Filleman, 108 Church Lane, Duncan, AZ 85534
4. Current Land Owner/Manager(s): Howard E. Filleman and Jeanette Fillemann
5. Project Location, including Township, Range, Section: T1N, R28E, S19
6. Total Project Area in Acres (or total miles if trail): 1/4 acre
7. Does the proposed project have the potential to disturb the surface and/or subsurface of the ground? YES NO
8. Please provide a brief description of the proposed project and specifically identify any surface or subsurface impacts that are expected: Road Crossing on Upper Eagle Creek
9. Describe the condition of the current ground surface within the entire project boundary area (for example, is the ground in a natural undisturbed condition, or has it been bladed, paved, graded,

etc.). Estimate horizontal and vertical extent of existing disturbance. Also, attach photographs of project area to document condition: The area is a steam crossing. The surrounding area has been disturbed continually by flow from Eagle Creek, and periodically from flood events.

10. Are there any known prehistoric and/or historic archaeological sites in or near the project area?
 YES NO

11. Has the project area been previously surveyed for cultural resources by a qualified archaeologist?
 YES NO UNKNOWN

If YES, submit a copy of the survey report. Please attach any comments on the survey report made by the managing agency and/or SHPO

12. Are there any buildings or structures (including mines, bridges, dams, canals, etc.), which are 50-years or older in or adjacent to the project area? YES NO

If YES, complete an Arizona Historic Property Inventory Form for each building or structure, attach it to this form and submit it with your application.

13. Is your project area within or near a historic district? YES NO

If YES, name of the district:

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

Howard E. Fillemann 8/28/2010 HOWARD E FILLEMANN
Jeanette Fillemann 8/28/2010 JEANETTE FILLEMANN
Applicant Signature /Date Applicant Printed Name

FOR SHPO USE ONLY

SHPO Finding:

- Funding this project will not affect historic properties.
- Survey necessary – further GRANTS/SHPO consultation required (*grant funds will not be released until consultation has been completed*)
- Cultural resources present – further GRANTS/SHPO consultation required (*grant funds will not be released until consultation has been completed*)

SHPO Comments

For State Historic Preservation Office:

Date:

**STATE OF ARIZONA
HISTORIC PROPERTY INVENTORY FORM**

Please type or print clearly. Fill out each applicable space accurately and with as much information as is known about the property.

PROPERTY IDENTIFICATION

For properties identified through survey: Site No. _____ Survey Area: _____

Historic Names (enter the name(s), if any that best reflect the property's historic importance): _____

Address: _____

City or Town: _____ Vicinity County: _____ Tax Parcel No.: _____

Township: _____ Range: _____ Section: _____ Quarters: _____ Acreage: _____

Block: _____ Lot(s): _____ Plat (Addition): _____ Year of plat (addition): _____

UTM Reference – Zone: _____ Easting: _____ Northing: _____

USGS 7.5' quadrangle map: _____

ARCHITECT: _____ not determined known Source: _____

BUILDER: _____ not determined known Source: _____

CONSTRUCTION DATE: _____ known estimated Source: _____

STRUCTURAL CONDITION

Good (*well maintained; no serious problems apparent*)

Fair (*some problems apparent*) Describe: _____

Poor (*major problems; imminent threat*) Describe: _____

Ruin/Uninhabitable

USES/FUNCTIONS

Describe how the property has been used over time, beginning with the original use: _____

Sources: _____

PHOTO INFORMATION

Date of photo: _____

View Direction (looking towards): _____

Attach a recent photograph of property in this space.
Additional photographs may be appended.

SIGNIFICANCE

To be eligible for the National Register, a property must represent an important part of the history or architecture of an area. The significance of a property is evaluated within its historic context, which are those patterns, themes, or trends in history by which a property occurred or gained importance. Describe the historic and architectural contexts of the property that may make it worthy of preservation.

A. HISTORIC EVENTS/TRENDS – Describe any historic events/trends associated with the property: _____

B. PERSONS – List and describe persons with an important association with the building: _____

C. ARCHITECTURE – Style: _____ no style

Stories: _____ Basement Roof Form: _____

Describe other character-defining features of its massing, size and scale: _____

INTEGRITY

To be eligible for the National Register, a property must have integrity (i.e. it must be able to visually convey its importance). The outline below lists some important aspects of integrity. Fill in the blanks with as detailed a description of the property as possible.

Location - Original Site Moved: Date: _____ Original Site: _____

DESIGN

Describe alterations from the original design, including dates: _____

MATERIALS

Describe the materials used in the following elements of the property:

Walls (structure): _____

Walls (sheathing): _____

Windows: _____

Roof: _____

Foundation: _____

SETTING

Describe the natural and/or built environment around the property: _____

How has the environment changed since the property was constructed? _____

WORKMANSHIP

Describe the distinctive elements, if any, of craftsmanship or method of construction: _____

NATIONAL REGISTER STATUS (if listed, check the appropriate box)

Individually Listed; Contributor; Non-contributor to _____ Historic District

Date Listed: _____ Determined eligible by Keeper of National Register (date: _____)

RECOMMENDATIONS ON NATIONAL REGISTER ELIGIBILITY (opinion of SHPO staff or survey consultant)

Property is is not eligible individually.

Property is is not eligible as a contributor to a listed or potential historic district.

More information needed to evaluate.

If not considered eligible, state reason: _____

EAGLE CREEK RIPARIAN RESTORATION AT FILLEMAN CROSSING PROJECT

AWPF Application Package

Submitted by:

The Gila Watershed Partnership of Arizona

711 South 14th Avenue

Safford, Arizona 85546

520-395-2499

Submitted: August 29, 2010

The Eagle Creek Riparian Restoration at Filleman Crossing

Executive Summary

The Eagle Creek Road, located in a remote area of Greenlee County in Eastern Arizona, has been used for over a century. It has a major influence on the health of Eagle Creek, as it parallels the creek for about 12 miles, and crosses it three times. Eagle Creek contains critical habitat for the threatened Loach minnow and Gila chub, and the riparian area is home to other threatened and endangered species, including the Common black hawk, the Yellow-billow cuckoo, the Southwest willow flycatcher, the Bald eagle, the Chiricahua leopard frog, the Mexican grey wolf, and the Spike dace.

Filleman Crossing, which has been washed out many times during high flood flows. The crossing has always been deep and difficult to maneuver even during "normal" conditions, which frequently causes vehicles to become trapped in the roadway, which results in erosion, and creation of substantial sedimentation. After flood events, Greenlee County, who holds an easement through the Filleman property for the road, is obligated to repair the damage, as there are families living beyond the crossing, as well as forest service campgrounds. This requires heavy equipment, which damages the creek bed crossing and the riparian area, and creates extensive sedimentation. Erosion and sedimentation in the creek area negatively affects the fish and vegetation, as sediment particles in the water clogs the gills of fish, and decreases the amount of sunlight available to aquatic plants.

Greenlee County does not have the funding to improve the Filleman Crossing to keep vehicles from repeatedly damaging the creek bed and withstand damage from high flood flows in Eagle Creek. Consequently, in future floods, the crossing will continue to be washed out causing erosion in the stream and damage to the existing riparian habitat, and the county will continue to repair the crossing the best that it can.

The purpose of the project is 1) to enhance the health of the Eagle Creek riparian area by improving and stabilizing the road crossing, thereby decreasing stream erosion, 2) restoring the native vegetation in the adjacent area to improve the riparian habitat and stream function, and 3) provide a successful example for other communities with similar road crossing areas.

We will contract with Souder, Miller & Associates Engineering to provide engineering services to assess the existing conditions of the project area and prepare and execute a design that will meet project goals. Souder, Miller & Associates will work with the Greenlee County Public Works Manager and the Greenlee County Engineer, to develop engineering plans for the project for construction activities. The construction of the improved crossing will be performed by a local contractor, and the final roadwork will be performed by Greenlee County. Monitoring of the project will be completed by monitoring erosion and through photo monitoring and turbidity monitoring using a turbidometer before and after construction upstream and downstream of the improved crossing.

This project is just one piece of a continuously developing recovery of the Eagle Creek riparian corridor. Implementation and long term maintenance of this valued road project will be effective in speeding recovery of Eagle Creek, reducing downstream sedimentation and turbidity, and protecting and enhancing habitat for federally listed species.

Project Overview

Background

Eagle Creek, with its almost pristine cottonwood and willow gallery, is designated as a priority one stream by the U. S. Forest Service. It is an 83 mile tributary to the Gila River located in Greenlee County, Arizona. It is an intermittent stream with surface water occurring only 2-3 months a year.

In addition to the two federally protected fish with critical habitat occurring for both the Threatened loach minnow (*Tiaroga cobitis*) and Endangered Gila chub (*Gila intermedia*), the Endangered Southwestern willow flycatcher, Threatened Mexican spotted owl, Threatened Chiricahua leopard frog, and the Experimental Non-Essential population of the Mexican Gray Wolf of the Blue Recovery Area occur or have potential to occur within the Eagle Creek Watershed. Other species occurring or potential to occur in the Eagle Creek Watershed include a variety of Forest Service Sensitive and Management Indicator Species including: native fish, amphibians, reptiles, raptors, insects, neotropical songbirds, and plants.

Human influences to Eagle Creek have come primarily from livestock grazing, water development, mining, irrigated agriculture, roads, recreation, beaver removal, flood control, and channelization. Although the area is remote and sparsely settled, these human activities caused the worst damage 50 to 100 years ago to the watershed and the stream channel. Altered hydrologic conditions within the Eagle Creek watershed have resulted in a braided stream channel throughout much of the upper, non-canyon reach of Eagle Creek. Surface flow in areas of the creek ceases during parts of the year, where anecdotal information from local residents indicates the stream may have flowed perennially throughout the year in the early 1900's. Also affecting the Eagle Creek watershed was the historic cutting of timber for mine construction and fuel.

The Eagle Creek Road has been used well over a century. The road has a major influence on the health and stability of the Eagle Creek, as it parallels Upper Eagle Creek for about 12 miles, and crosses it three times. The location of this project is the Filleman Crossing, which has been washed out several times in the past during high flood flows in Eagle Creek. The Filleman Crossing was originally perpendicular to Eagle Creek when it was constructed and dedicated to Greenlee County in 1934 and has always been deep and difficult to maneuver. During the flood of 1993, the Filleman Crossing was washed out by flood flows. Greenlee County completed emergency repairs to restore the crossing. The emergency repairs changed the location of the crossing moving it 200 feet upstream and more parallel to the stream. Recently, the Clifton Ranger District, was able to obtain limited funds to relocate and reconstruct a perpendicular crossing. The perpendicular crossing is easier to maintain and less damaging to the riparian environment. While the re-establishment of the road to a less damaging perpendicular crossing is beneficial, we need to improve and stabilize the crossing and revegetate the area to ensure the continuing protection and restoration of the Eagle Creek Riparian Corridor. Greenlee County does not have the funding to improve the Filleman Crossing to withstand damage from high flood flows in the Eagle Creek. Consequently, in future floods, the crossing will continue to be washed out causing erosion in the stream and damage to the existing riparian habitat.

Road construction, reconstruction, and maintenance have resulted in substantial alterations in the hydrologic regime of Eagle Creek. Improving and stabilizing the Filleman Crossing of Eagle Creek reduces future reconstruction disturbance that creates siltation. The improved crossing will resist erosion and damage to the streambed. The Greenlee County Engineer reports that the Blue Box area on the Blue River is a good example of the value of improving and stabilizing the crossing. It was stabilized in 2000 with a grant that was obtained by Greenlee County using funds from a Arizona Department of Water Resources Emergency Management grant.

After improvement of the Filleman Crossing, vegetation in the area will stabilize resulting in long term restoration and protection of the riparian corridor in the area. A stable stream crossing will result in little or no future disturbance to native animal species because future construction activities will decrease.

Background of the Road Crossings

The Eagle Creek Road parallels Upper Eagle Creek for about 12 miles until it ends at the Honeymoon Campground, some 22 miles from State Highway 191. Maintenance and use of the Eagle Creek road has occurred for over a century, and continues to influence the health and stability of upper Eagle Creek, especially where the road crosses the creek.

The Filleman road crossing is one of three low water crossings in Eagle Creek along road 217. Frequent flood events require ongoing maintenance of these locations. Maintenance includes, hardening the crossings and approaches to reduce the amount of sediment input into the stream. The Filleman Crossing was rerouted after the 1993 flood to parallel the Eagle Creek for about 200 feet in 1993. In 2009, the Filleman Crossing was rerouted to eliminate the 200 foot in-stream travel route by making the crossing perpendicular to the stream, improving habitat quality for federally listed fish and wildlife species by decreasing the length of travel in the streambed and reducing potential erosion from vehicles.

Floods in 1979, 1983, 1993, 1999 and 2005 all significantly impacted the road and required extensive rebuilding of three main low water creek crossings to allow the road to be passable for both private residents along Eagle Creek and for public access. Emergency repairs from the 1979 and 1983 floods required extensive work on several sections of roadway that has typically involved grading of the road bed and the placing of material into stream crossing approaches and within the wetted channel of the creek to harden and stabilize the crossings. The Apache Sitgreaves National Forests and Greenlee County cooperatively maintained FR 217 under Cooperative Agreement until recently, when the responsibility was returned to Greenlee County, due to management changes within the forest.

Annual flood flows associated with monsoonal rain events and spring runoff in the Upper Eagle Creek watershed require that regular maintenance of the Filleman Crossing occurs on a near annual basis. The watershed area at the Filleman Crossing is estimated to be 144 square miles. A peak 100 year flood flow in the Eagle Creek channel at Filleman Crossing is estimated to be 19,000 cubic feet

per second at a velocity of 14 feet per second. The peak flow from a five year flood in the stream is estimated to be 4,800 cubic feet per second. Unless the Filleman Crossing is improved to withstand these flows and velocities, it will continue to be damaged in future floods.

In the last decade or more, Greenlee County has applied Best Management Practices (BMP's) developed to compliment and improve on natural riparian recovery processes, and the proposal to enhance the Filleman crossing is based on this experience and sound engineering.

Goals

The goal of the project to protect and restore the Eagle Creek riparian corridor at the Filleman Crossing by improving the stability of the crossing, reducing stream erosion and turbidity, and restoring the native plants and grasses in the area of the crossing.

Objectives

This project seeks to address the goal of the project by completing the following objectives:

- Plan and design a roadway crossing that is stable, resists damage from flooding, and resists erosion.
- Construct the new roadway crossing in accordance with the plans.
- Control erosion during construction using best management practices for construction operations.
- Restore the vegetation in the immediate construction area to stabilize the approaches and areas of disturbance due to construction.
- Monitoring of the area will ensure that the restoration work and revegetation are maintained properly.
- An Education and Outreach Plan will educate and inform the community of the success of this project, demonstrate a method to improve the other stream crossings, and protect and restore the Eagle Creek riparian corridor.

Statement of Problems/Causes

Roads throughout the watershed are a significant source of sediment in Eagle Creek. The Filleman Crossing has always been deep and difficult to maneuver. The crossing has been recently returned to a perpendicular crossing by the U.S. Forest. However, the roadway was repaired during an emergency situation, and was not engineered to withstand the flows of the creek or the traffic. Without proper engineering and construction, the road crossing will continue to be washed out in future floods, need frequent repair, requiring equipment in the stream channel, and continue to negatively impact the Eagle Creek riparian corridor. In addition, until the crossing is improved the sediment caused by vehicular traffic will do continuous harm to the riparian area.

Statement of Solutions

We will contract with Souder, Miller & Associates, (SMA) to characterize the existing conditions of

the project area, study the hydrology and hydraulics of Eagle Creek at the Filleman Crossing, and plan and design improvements for the Filleman Crossing that will meet project goals. SMA is very experienced in planning and completing channel improvements and roadway crossings. SMA will complete environmental clearances including a Biological Evaluation and an Archeological Evaluation. SMA will plan and design the restoration of the vegetation in the construction area to protect and restore the Eagle Creek riparian corridor. The final designs for the project will be based on the appropriate standards for hydraulic design, stable stream crossings, and appropriate methods to restoration vegetation to meet the project goals in this application. Pre- and post-project conditions will be documented to provide information for the project landowner, Greenlee County, and the Water Protection Fund to quantify the benefits achieved by the project. This project will restore and protect the Eagle Creek riparian corridor at the Filleman Crossing and provide a successful example for the improvement of other stream crossings.

We intend to:

1. Plan and design the improvements for the project. A rip rap crossing is anticipated but other erosion control measures will be evaluated during project planning to ensure that the improvements meet the project goals and objectives.
2. Complete a Biological and Archeological Evaluation in the project area to ensure that the project does not negatively impact biological and archeological resources.
3. Improve and stabilize the Filleman Crossing to resist erosion and damage during flood flows.
4. Improve and stabilize the Filleman Crossing to resist erosion from traffic.
5. Prepare and implement a Storm water Pollution Prevention Plan to control erosion during construction by utilizing best management practices for construction activities adopted by the State of Arizona.
6. Restore the vegetation in the area of construction by planting native species.
7. Monitor the results of the erosion control improvements of the project to demonstrate the benefits of the project.
8. Develop and implement an effective public outreach program to inform the community of the success of this project, demonstrate a method to improve the other stream crossings, and document our efforts protect and restore the Eagle Creek riparian corridor

Statement of Project Years of Benefit

The Greenlee County Public Work Manager and the Greenlee County Engineer, predict a minimum of twenty year lifespan for the improvements. The benefit to the Eagle Creek riparian area and to the watershed will be twenty years or more.

- i) Maintenance and liability agreements from landowners (if necessary);
- j) Greenlee County Flood Control Permit (if needed);

All permits and authorizations will be obtained and submitted prior to any ground disturbing activities.

Task Purpose/Objective: Because the project area is small and not on federal property, we propose to complete a Biological Evaluation and Archeological Evaluation of the site. It is not anticipated that a 404 permit will be required, but we will consult with the Army Corps of Engineers. We will follow the Nationwide permit for such construction and consult with the Arizona Department of Environmental Quality concerning 401 certifications and requirements. We will consult with the Arizona Game and Fish Department concerning the project. We will also submit copies of all sub-contractor agreements describing all activities to be performed and delineating responsible parties for each activity.

For the purposes of site access, we shall submit a binding agreement any affected landowners allowing access.

Deliverable Description:

- (1) Copy landowner educational access agreements
- (2) Copy of Maintenance Easement for Greenlee County
- (3) Copies of site access agreements or letters between Grantee and landowner
- (4) Copy of SHPO clearance
- (5) Copy of Corps of Engineers Consultations.
- (6) Copies of AZGF and FWS Consultations
- (7) Copy of 401 Certification based on consultation with ADEQ, as applicable.
- (8) Copy of Storm water Pollution Prevention Plan
- (9) Copies of sub-contractor agreements describing all activities to be performed and delineating responsible parties for each activity

Deliverable Due Date:

- (1)-(3) Upon award of grant or by February 1, 2011.
- (4)-(8) Prior to any ground disturbing activities, expected
June 30, 2011
- (9) Prior to initiation of any sub-contracted work.

AWPF Reimbursable Cost: \$13,697.25 (Includes 5% administrative costs)

Matching Cost: \$5,120.00

Task 2. Project Work Plan

Task Description: We will prepare a final Project Work Plan outlining the phases and expectations of project design and implementation including:

- 1. A description of existing conditions of physical components of affected area at material site and at the Filleman Crossing. An evaluation of alternatives will be completed in the planning stage.
- 2. A detailed drainage study for the Eagle Creek at the Filleman Crossing. The purposes of this study are to determine the peak flows at Filleman Crossing and to determine the velocity and depth of flow in the channel accurately. The drainage study will be the basis of design for the improvements.

3. Final Engineering plans for materials development, construction, and improving the crossing including materials and equipment needed, contributions by partners and contracted work and materials, and construction sequence.
4. Restoration of vegetation for stabilizing affected or impacted areas especially those on private lands;
5. Monitoring including pre and post construction activities, and long-term effects monitoring criteria and baseline data collection. Monitoring plan will be completed in draft and submitted for review and approval prior to any ground disturbing activities .
6. Inspection of the construction by the engineer.
7. Preparation of as-built plans and a final engineer's report prepared by SMA to document that the work has been completed in accordance with plans and specifications in an acceptable manner.
8. Education and outreach activities during, post, and long-term effects from expected impacts and benefits from construction and future maintenance activities.

Task Purpose/ Objective: A well documented plan to ensure correct design and proper installation of road crossing improvements including erosion control measures, mitigation of impacts to the riparian areas, effective and valued monitoring of all associated activities to document success and offer corrective actions for future similar work as needed .

Deliverable Description: Copies of monitoring plan, material development plan, road relocation and crossing improvement plan, revegetation and rehabilitation plan, and the education and outreach plan.

Deliverable Due Date: June 30, 2011

AWPF Reimbursable Cost: \$24,344.25 (Includes 5% administrative costs)

Matching Cost: \$4,180.00

Task 3. Implement Monitoring Plan

Task Description: Develop a plan that outlines parameters of monitoring, timelines, and assigned responsibilities. Provides specificity to parameters identified to assess if project objectives have been met. Plan will include a description of parameter and technique(s) to be used to measure, timeline for collection of baseline pre and post construction, and long-term effects data, and persons or entities assigned responsibility for parameter monitoring.

Task Purpose/ Objective: To establish and validate the success of the project.

Deliverable Description: Baseline Monitoring Plan, Pre and Post Monitoring progress reports; Final Monitoring report including initial long-term effects assessment.

Deliverable Due Date: March 31, 2012

AWPF Reimbursable Cost: \$5,549.25

Matching Cost: \$660.00

Task 4. Implement Material Development Plan and Roadbed Preparation Plan

Task Description: The project will require angular rip rap to construct and stabilize the roadbed for the crossing. The rip rap will be placed 24 feet wide at a thickness of approximately 3 feet thick. Based on preliminary design information, the maximum size of the rip rap required is 24 inches in diameter. The rip rap will vary in size from 4 inches to 24 inches in diameter with an average size of 12 inches in diameter. The rip rap must be very durable rock. The rip rap will be placed as an erosion control structure to hold and stabilize the stream crossing from bank to bank across the

channel. This structure must withstand the erosive forces of Eagle Creek when it is flowing above bank full. Based on observations of large flood flows and preliminary planning, we must plan improvements that will withstand a flood flow as deep as 14 feet at a velocity as high as 14 feet per second.

The preliminary estimate for the volume of rip rap required is 900 cubic yards. We anticipate that the contractor will have to prepare twice this much material to obtain the sizes needed for the rip rap structure. Therefore, the contractor will have to process approximately 1,800 cubic yards of material to obtain the rip rap required. The rip rap must be very hard, angular materials. The closest quarry with this type of material is owned by Darcy Ely. Mr. Ely has tentatively agreed to prepare and provide the materials. The quarry is approximately 5 miles from the Filleman Crossing site.

In addition, materials from the blast will be processed into materials for the surface of the roadbed. This will be materials from 0.5 inch to 2 inch in diameter. We plan that this material will be 16 feet wide by 8 inches deep placed over the rip rap structure across the channel. We estimate that 150 cubic yards of this material will be required.

In order to prepare and deliver the materials, the following actions will be required:

1. Drill and blast an area approximately 60 feet wide by 60 feet long by 15 feet deep.
2. Sort and screen the materials using a large loader to produce the sizes outlined above. Use a bar screen to screen materials.

Haul the materials to the Filleman Crossing using a dump truck.

In order to construct the rip rap structure and road materials across the Filleman Crossing, the following work activities will be required. It is assumed that the rip rap structure will be 24 feet wide by 3 feet deep. It is assumed that the roadbed will be placed over the rip rap structure. The roadbed will be crushed aggregate materials 0.5 inch to 2 inches in diameter placed in a layer 8 inches thick.

The work activities to complete this task will include the following:

1. The contractor will have to install erosion control measures to control erosion during construction.
2. If Eagle Creek is flowing, the contractor will have to control and divert the channel somewhat to complete the work. The diversion will occur within the streambed.
3. The contractor will have to excavate a trench approximately 4 feet deep across the channel from top of bank to top of bank to place the rip rap and roadbed materials. This will require a large excavator and a loader to move materials.
4. The contractor will have to place the rip rap in the bottom of the trench. This will require the use of the loader and the excavator to place the materials.
5. The contractor will have to compact the materials using a large vibratory roller.
6. The contractor will then have to place the roadbed materials over the rip rap. The contractor will use the large loader to place the materials.
7. It is likely that the contractor will wish to use a grader to level the roadbed materials.

The contractor will have to wet the materials with a water truck and roll the roadbed materials with a vibratory roller to compact it.

Task Purpose/ Objective: To generate suitable materials for stabilization and hardening of the Filleman Crossing from a location as close to the project site as possible.

Deliverable Description: Materials development Progress report

Deliverable Due Date: December 31, 2011

AWPF Reimbursable Cost: \$95,387.25 (Includes 5% administrative costs)

Matching Cost: \$3,720.00

Task 5. Implement Road Engineering Plan

Task Description: The existing roadway will be improved and stabilized to ensure that the perpendicular crossing is brought to natural stream gradient, is stabilized to resist erosive forces from future flood flows in the channel and banks during future above bank full flows, and compacted or hardened to ensure longevity of use and for maintenance. Approaches and the crossing will be imbedded and re-enforced with large, mid-size, and smaller angular materials sized to resist the erosive forces. Geo-textile will be inlaid as needed to assist in stabilization and interlocking of large angular materials. The stream crossing will be brought to natural gradient, flattened to create a riffle reach, and imbedded in the stream channel and channel banks to ensure stabilization and longevity of the actual crossing bed. Compaction of the rip rap and roadbed materials will be completed using both a small and larger vibratory roller.

Task Purpose/ Objective: To create a stable and improved stream crossing that can withstand heavy flows during peak precipitation events, but will also reduce in-stream impacts from sediment disturbance and downstream deposition, encourage continuing riparian vegetation establishment, and reduce long term road maintenance.

Deliverable Description: Filleman Crossing Stabilization and Hardening report

Deliverable Due Date: March 31, 2012

AWPF Reimbursable Cost: \$100,253.25 (Includes 5% administrative costs)

Matching Cost: \$13,280.00

Task 6. Implement Revegetation Plan

Task Description: Seed and hand mulch disturbed areas, and plant 200 to 300 willow poles on private and Forest Service lands, not expected to exceed 1 acre total

Task Purpose/ Objective: Stabilize and mitigate disturbed areas to prevent erosion and sedimentation into Eagle Creek. Seed mix and straw will be certified weed free. Willow pole plantings will be harvested from local sites approved by the Forest Service.

Deliverable Description: Report with photos showing areas of disturbance pre and post treatment, and post growth periods.

Deliverable Due Date: March 31, 2012

AWPF Reimbursable Cost: \$14,642.25 (Includes 5% administrative costs)

Matching Cost: \$4,520.00

Task 7. Implement Education and Outreach Plan

Task Description: We will implement the education and outreach plan as outlined in the implementation plan. Activities will include a presentation to the Greenlee County Supervisors meeting, with a power point and printed material describing the project and the benefits, an article written for the Greenlee County newspaper, The Copper Era, to educate the community on the project and its benefits, and a field day upon completion of the project.

Task Purpose/ Objective: To educate the local communities, road maintenance organizations, and decision makers in the effectiveness of techniques and principles that make this project successful.

Deliverable Description: Copies of articles for newspapers, power point presentations, descriptions, and/or photos of education and outreach activities and contacts, and a CD including all educational materials .

Deliverable Due Date: March 31, 2012

AWPF Reimbursable Cost: \$2,966.25 (Includes 5% administrative costs)

Matching Cost: \$2,180.00

Task 8. Final Report

Task Description: Includes a summary of the components of the project with discussion of the success and lessons learned.

We shall prepare and submit a comprehensive final report consistent with AWPF policies and guidelines, including a summary of all methodologies used, outcome of all tasks, analysis of all project and monitoring data, suggestions for any further changes needed in the project, and an evaluation of the projects success measured against the objectives. The Final Report will include the As-Built Plans and the Final Engineer's report.

Task Purpose/Objective: To document the project's effectiveness at meeting objectives, including resource objectives, budgetary summary, and education and outreach activities.

Deliverable description: Interim Reports - Summary of methodologies used, outcome of tasks, copies of invoices and photos. The final report will summarize all methodologies used, outcome of all tasks, summarize and analyze project data & monitoring data, suggest any further changes needed in the project and evaluate project success measured against the objective, copies of invoices and photos.

Deliverable Due Date: March 31, 2012

AWPF Reimbursable Cost: \$5,003.35 (Includes 5% administrative costs)

Matching Cost: \$3,080.00

Supplemental Information

Key Personnel

Ron Pearson, the Greenlee County Public Works Manager, will be providing oversight for all tasks in the project and assuring that the project is constructed according to the engineering plan. Mr. Pearson has been employed as the Greenlee County Public Works Manager since 2006. He is responsible for the county's parks, roads, facilities, and landfill. Prior to that time, Mr. Pearson was employed in the county's roads department since 1995.

Phil Ronnerud, P.E., Greenlee County Engineer, a registered professional civil engineer, will be assisting with site supervision and providing oversight for the project. After obtaining a bachelor's degree in civil engineering from Northern Arizona University, Mr. Ronnerud was employed by the U.S. Navy as a civil engineer for four years, then worked for several engineering firms in the Phoenix area until 1990 when he was hired by Greenlee County, where he is employed as the County Engineer. Mr. Ronnerud has planned, designed and supervised many major construction projects for the county, as well as currently supervising watershed improvement restoration and cleanup projects and programs for the Gila Watershed Partnership.

Jan Holder, the Executive Director for the Gila Watershed Partnership, will be administering the grant. Jan has over 20 years of experience in marketing with numerous major national companies, and approximately ten years of experience in solving environmental challenges throughout the Upper Gila Watershed. The Gila Watershed Partnership is the oldest watershed group in Arizona, and acts as a focus for environmental community action, outreach and education, and water planning efforts for both Graham and Greenlee counties.

Deborah Mendelsohn, Project Coordinator for the Gila Watershed Partnership, will coordinate all project activities, coordinate the development of the implementation plans, conduct the monitoring and develop and implement the education and outreach plan for the project. Ms Mendelsohn is currently the coordinator for the ADEQ E.coli Reduction on the San Francisco and Lower Blue Rivers grant project for the Gila Watershed Partnership, which is due to be completed in April of 2011. Ms Mendelsohn has been active in environmental and community development activities since 1993, and has an extensive background in project conception, planning, management, and implementation, from local to international.

Souder, Miller & Associates, Engineering, Environmental, and Surveying. Souder, Miller & Associates (SMA) is an engineering firm providing Civil Engineering, Environmental Studies, and Surveying services to clients in New Mexico, Arizona, Colorado, Utah, and Texas. SMA has over 60 professional and 80 technical staff members distributed in 8 offices throughout the Southwest region of the United States. The professional and technical staff represents specialties in every discipline commonly grouped as surveying, environmental and engineering. SMA is very experienced in completing erosion control measures and channel crossings. Robert L. Porter, Arizona P.E. No. 16,386 is located in the Safford Office of SMA. Robert L. Porter will be SMA'S Project Manager and Designer on the project. Robert has extensive experience in planning and designing erosion control projects and stream crossings. Robert has completed such projects

working for the City of Safford for over 25 years. Comparable projects include flood control studies in Graham County for 4 large watersheds, design of erosion control measures to repair City of Safford facilities, planning restoration projects with the Bureau of Land Management and the Gila Watershed Partnership including a project along the Gila River, and project management for improvement projects with a total constructed value of \$80,000,000 over the past 27 years. SMA and Mr. Porter have the expertise and knowledge to successfully plan and design the improvements needed for the crossing.

Project Site Photograph



Vehicle traveling through the Filleman crossing at low flows



Eagle Creek contains critical habitat for the threatened Loach minnow and Gila chub



Upper Eagle Creek's riparian area is also home to other threatened and endangered species, including the Common black hawk, the Yellow-billow cuckoo, the Southwest willow flycatcher, the Bald eagle, and the Spike dace.



Description of Monitoring/Sampling Plans –

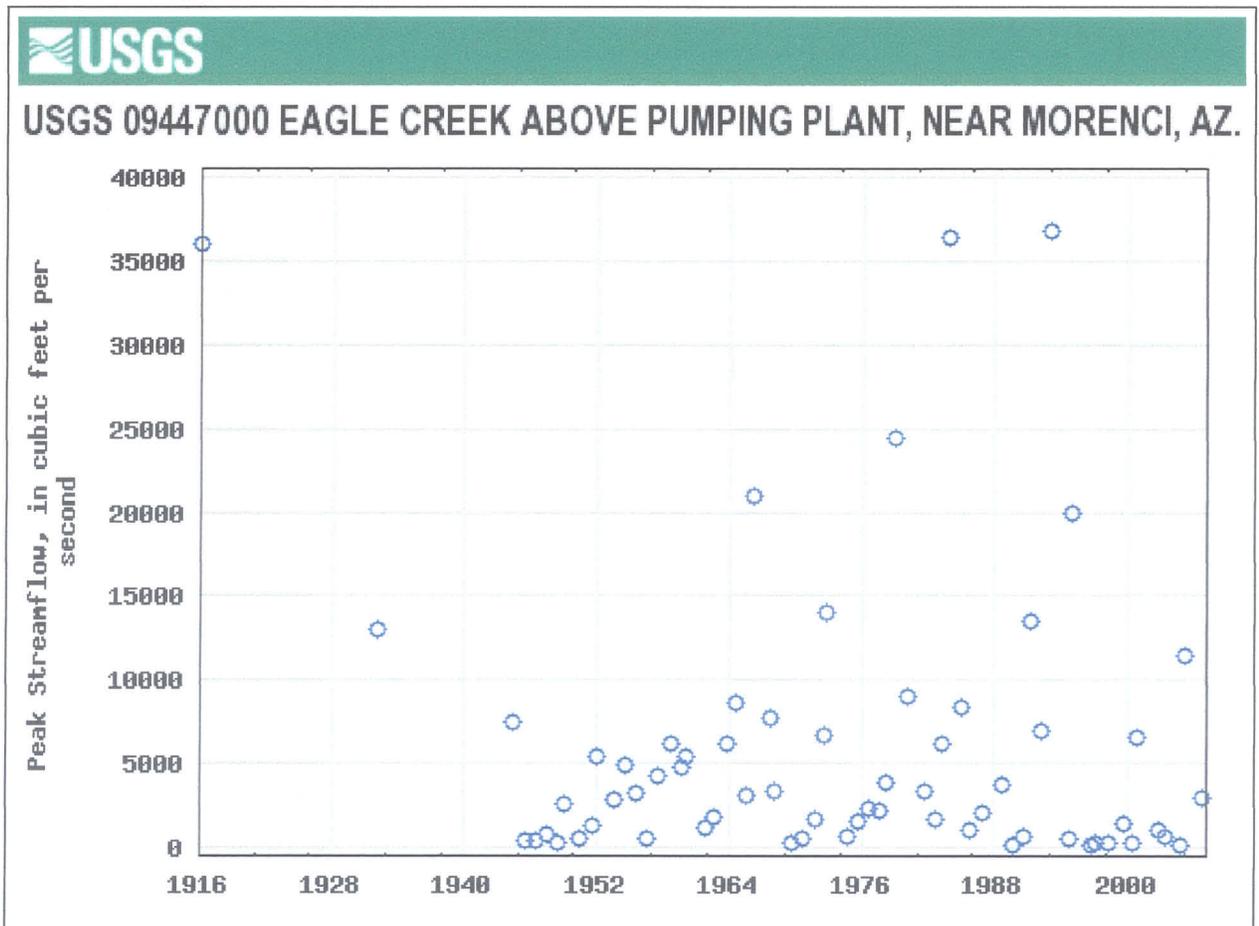
Previous Monitoring/Sampling Plans

According to the Arizona Department of Environmental Quality, Total Maximum Daily load studies for sedimentation in the Upper Gila Watershed are underway in 2010. A two year monitoring plan was implemented in 2005 and 2006 for an ADEQ grant approximately six miles downstream of this project area at the confluence of Willow and Eagle Creeks.

Eagle Creek Roads Assessment An assessment of the background of the Eagle Creek roads is attached. It was completed by the Clifton Ranger District in 2008.

USGS Peak Flow Data

Data from the USGS monitoring site was used to determine the peak design flows at the gage location which is approximately 25 miles downstream of Filleman Crossing. The watershed area at this gage is 622 square miles. Peak flood flows at the Filleman Crossing for the Eagle Creek Watershed has been estimated by SMA based on the watershed area of 144 square miles at the project site. The estimated peak flood flows have been used for preliminary planning for erosion control measures at the project site.



**EAGLE CREEK RIPARIAN RESTORATION AT FILLEMAN CROSSING
DETAILED BUDGET BREAKDOWN**

Task 1				
Permits, Authorizations, Agreements - includes 404 and 401 permits, land owner agreements, arch survey	Amount	Unit	Cost per Unit	Total Cost
Direct Labor				
Gila Watershed Coordinator	24	hrs	\$ 65.00	\$ 1,560.00
Contract Engineer	80	hrs	\$ 65.00	\$ 5,200.00
Contract Biologist	70	hrs	\$ 50.00	\$ 3,500.00
Contract Archeologist	54	hrs	\$ 50.00	\$ 2,700.00
Subtotal				\$ 12,960.00
Other Direct Costs				
Office Supplies and Postage	1	each	\$ 85.00	\$ 85.00
Subtotal				\$ 85.00
Task Subtotal				\$ 13,045.00
Administration Costs (5%)				\$ 652.25
Task Total				\$ 13,697.25

Task 2				
Develop Project Work Plan (Planning and design for Monitoring Plan, Roadbed Preparation Plan, Roadwork Engineering Plan, Revegetation Plan, Education & Outreach Plan)	Amount	Unit	Cost per Unit	Total Cost
Direct Labor				
Gila Watershed Coordinator	60	hrs	\$ 65.00	\$ 3,900.00
Contract Engineer	178	hrs	\$ 120.00	\$ 21,360.00
Contract Roadbed Preparation Specialist	8	hrs	\$ 45.00	\$ 360.00
Monitoring Specialist	20	hrs	\$ 65.00	\$ 1,300.00
Subtotal				\$ 23,020.00
Other Direct Costs				
Office Supplies and Postage	1	each	\$ 165.00	\$ 165.00
Subtotal				\$ 165.00
Task Subtotal				\$ 23,185.00
Administration Costs (5%)				\$ 1,159.25
Task Total				\$ 24,344.25

Task 3				
Implement Monitoring Plan	Amount	Unit	Cost per Unit	Total Cost
Direct Labor				
Gila Watershed Coordinator	24	hrs	\$ 65.00	\$ 1,560.00
Monitoring Specialist	80	hrs	\$ 65.00	\$ 5,200.00
Subtotal				\$ 5,200.00
Other Direct Costs				
Office Supplies and Postage	1	each	\$ 85.00	\$ 85.00
Subtotal				\$ 85.00
Task Subtotal				\$ 5,285.00
Administration Costs (5%)				\$ 264.25
Task Total				\$ 5,549.25

Task 4				
Implement Materials Development and Roadbed Preparation Plan	Amount	Unit	Cost per Unit	Total Cost
Direct Labor				
Gila Watershed Coordinator	24	hrs	\$ 65.00	\$ 1,560.00
Contract Engineer	8	hrs	\$ 125.00	\$ 1,000.00
Construction Labor	380	hrs	\$ 20.00	\$ 7,600.00
Construction Supervision	120	hrs	\$ 30.00	\$ 3,600.00
Truck Driver	70	hrs	\$ 20.00	\$ 1,400.00
Subtotal				\$ 15,160.00
Material and Supplies				
Explosives	1	ttl	\$ 9,850.00	\$ 9,850.00
Subtotal				\$ 9,850.00
Material Development Equipment				
Drill Rig	120	hrs	\$ 100.00	\$ 12,000.00
Water Truck	120	hrs	\$ 60.00	\$ 7,200.00
Loader	70	hrs	\$ 120.00	\$ 8,400.00
Bar Screen	70	hrs	\$ 50.00	\$ 3,500.00
Dump Truck	70	hrs	\$ 55.00	\$ 3,850.00
Service Truck	120	hrs	\$ 60.00	\$ 7,200.00
Subtotal				\$ 42,150.00
Roadbed Preparation Equipment				
Dozer	40	hrs	\$ 150.00	\$ 6,000.00
Loader	60	hrs	\$ 120.00	\$ 7,200.00
Material Transport Truck	64	hrs	\$ 150.00	\$ 9,600.00
Pickup Truck	80	hrs	\$ 10.00	\$ 800.00
Subtotal				\$ 23,600.00
Other Direct Costs				

Office Supplies and Postage	1	each	\$ 85.00	\$ 85.00
Subtotal				\$ 85.00
Task Subtotal				\$ 90,845.00
Administration Costs (5%)				\$ 4,542.25
Task Total				\$ 95,387.25

Task 5				
Implement Roadwork Engineering Plan	Amount	Unit	Cost per Unit	Total Cost
Direct Labor				
Gila Watershed Coordinator	24	hrs	\$ 65.00	\$ 1,560.00
Contract Engineer	35	hrs	\$ 120.00	\$ 4,200.00
County Roads Personnel	6	days	\$ 220.00	\$ 1,320.00
Roadway Preparation Supervisor	10	days	\$ 400.00	\$ 4,000.00
Subtotal				\$ 11,080.00
Other Direct Costs				
Office Supplies and Postage	1	each	\$ 85.00	\$ 85.00
Subtotal				\$ 85.00
Capital Outlay & Equipment				
Equipment Mobilization	40	hrs	\$ 150.00	\$ 6,000.00
2.5 CY Hydraulic Excavator (\$160/hr + \$45/hr labor = \$205/ hr, \$3,280/day)	10	days	\$ 3,280.00	\$ 32,800.00
10 CY Dump Truck (\$75/hr + \$45/hr operator = \$115/hr, \$1150/day)	10	days	\$ 1,150.00	\$ 11,500.00
20 CY End Dump (\$125/hr+ \$45/hr. operator= \$170/hr, \$1700/day)	10	days	\$ 1,700.00	\$ 17,000.00
Loader	10	days	\$ 500.00	\$ 5,000.00
Pickup Truck	10	days	\$ 100.00	\$ 1,000.00
Vibratory roller (\$65/hr + \$45/hr operator = \$110/hr)	60	hrs	\$ 140.00	\$ 8,400.00
Subtotal				\$ 81,700.00
Materials/Supplies				
Geo-Textile	2	rolls	\$ 450.00	\$ 900.00
Subtotal				\$ 900.00
Task Subtotal				\$ 93,765.00
Administration Costs (5%)				\$ 4,688.25
Task Total				\$ 100,253.25

Task 6				
Implement Revegetation Plan	Amount	Unit	Cost per Unit	Total Cost
Direct Labor				
Gila Watershed Coordinator	24	hrs	\$ 65.00	\$ 1,560.00
Reveg Workers	60	hrs	\$ 25.00	\$ 1,500.00
Subtotal				\$ 3,060.00
Other Direct Costs				
Office Supplies and Postage	1	each	\$ 85.00	\$ 85.00
Subtotal				\$ 85.00
Equipment				
Tractor with disc/harrow + operator	16	hrs	\$ 75.00	\$ 1,200.00
Transport tractor with Trailer	8	hrs	\$ 65.00	\$ 520.00
Subtotal				\$ 1,720.00
Material & Supplies				
Straw waddles and silt fencing/stakes	10	roll	\$ 300.00	\$ 3,000.00
Weed free straw	2	tons	\$ 340.00	\$ 680.00
Seeding mix	300	lbs	\$ 18.00	\$ 5,400.00
Subtotal				\$ 9,080.00
Task Subtotal				\$ 13,945.00
Administration Costs (5%)				\$ 697.25
Task Total				\$ 14,642.25

Task 7				
Implement Education & Outreach Plan	Amount	Unit	Cost per Unit	Total Cost
Direct Labor				
Gila Watershed Coordinator	24	hrs	\$ 65.00	\$ 1,560.00
Monitoring Specialist	16	hrs	\$ 65.00	\$ 1,040.00
Subtotal				\$ 2,600.00
Other Direct Costs				
Office Supplies and Postage	1	each	\$ 225.00	\$ 225.00
Subtotal				\$ 225.00
Task Subtotal				\$ 2,825.00
Administration Costs (5%)				\$ 141.25
Task Total				\$ 2,966.25

Task 8				
Final Project Report	Amount	Unit	Cost per Unit	Total Cost
Direct Labor				
Gila Watershed Coordinator	40	hrs	\$ 65.00	\$ 2,600.00
Contract Engineer	16	hrs	\$ 125.00	\$ 2,000.00
Subtotal				\$ 4,600.00
Other Direct Costs				
Office Supplies and Postage	1	each	\$ 165.00	\$ 165.00
Subtotal				\$ 165.00
Task Subtotal				\$ 4,765.00
Administration Costs (5%)				\$ 238.25
Task Total				\$ 5,003.25

Total Requested AWP	\$ 258,876.75
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DETAILED MATCHING BREAKDOWN

Task 1				
Permits, Authorizations, Agreements - includes 404 and 401 permits, land owner agreements, arch survey	Amount	Unit	Cost per Unit	Total Cost
Direct Labor				
Greenlee County Public Works Manager	44	hrs	\$ 55.00	\$ 2,420.00
Greenlee County Engineer	20	hrs	\$ 55.00	\$ 1,100.00
Greenlee County Roads Supervisor	8	hrs	\$ 200.00	\$ 1,600.00
Subtotal				\$ 5,120.00
Task Total				\$ 5,120.00

Task 2				
Develop Project Work Plan	Amount	Unit	Cost per Unit	Total Cost
Direct Labor				
Greenlee County Public Works Manager	48	hrs	\$ 55.00	\$ 2,640.00
Greenlee County Engineer	28	hrs	\$ 55.00	\$ 1,540.00
Subtotal				\$ 4,180.00
Task Total				\$ 4,180.00

Task 3				
Implement Monitoring Plan	Amount	Unit	Cost per Unit	Total Cost
Direct Labor				
Greenlee County Engineer	12	hrs	\$ 55.00	\$ 660.00
Subtotal				\$ 660.00
Task Total				\$ 660.00

Task 4				
Implement Materials Development and Roadbed Preparation Plan	Amount	Unit	Cost per Unit	Total Cost
Direct Labor				
Greenlee County Public Works Manager	36	hrs	\$ 55.00	\$ 1,980.00
Greenlee County Engineer	28	hrs	\$ 55.00	\$ 1,540.00
Land Owner	10	hrs	\$ 20.00	\$ 200.00
Subtotal				\$ 3,720.00
Task Total				\$ 3,720.00

Task 5				
Implement Roadwork Engineering Plan	Amount	Unit	Cost per Unit	Total Cost
Direct Labor				
Greenlee County Public Works Manager	36	hrs	\$ 55.00	\$ 1,980.00
Greenlee County Engineer	60	hrs	\$ 55.00	\$ 3,300.00
Land Owner	40	hrs	\$ 20.00	\$ 800.00
Subtotal				\$ 6,080.00
Task Total				\$ 6,080.00

Task 6				
Revegetation & Rehabilitation of Affected Lands	Amount	Unit	Cost per Unit	Total Cost
Direct Labor				
Greenlee County Public Works Manager	16	hrs	\$ 55.00	\$ 880.00
Greenlee County Engineer	8	hrs	\$ 55.00	\$ 440.00
Land Owner	16	hrs	\$ 20.00	\$ 320.00
Subtotal				\$ 1,640.00
Task Total				\$ 1,640.00

Task 7				
Implement Education & Outreach Plan	Amount	Unit	Cost per Unit	Total Cost
Direct Labor				
Greenlee County Engineer	12	hrs	\$ 55.00	\$ 660.00
Land Owner	16	hours	\$ 20.00	\$ 320.00
Upper Eagle Watershed Association	60	hours	\$ 20.00	\$ 1,200.00
Subtotal				\$ 2,180.00
Task Total				\$ 2,180.00

Task 8				
Final Project Report	Amount	Unit	Cost per Unit	Total Cost
Direct Labor				
Greenlee County Public Works Manager	36	hrs	\$ 55.00	\$ 1,980.00
Greenlee County Engineer	20	hrs	\$ 55.00	\$ 1,100.00
Subtotal				\$ 3,080.00
Task Total				\$ 3,080.00

Total Matching Funds	\$ 26,660.00
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Total AWP and Matching Funds	\$ 285,536.75
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UPPER EAGLE CREEK WATERSHED ASSOCIATION



August 29, 2010

Arizona Water Protection Fund Commission
3550 North Central Ave.
Phoenix, AZ 85012

Dear Arizona Water Protection Fund Commissioners:

I am writing this letter to express my support for the Gila Watershed Partnership and their application for grant funding for the Eagle Creek Riparian Restoration at Filleman Crossing grant project. This grant is important as it will restore and protect the river and riparian area of Eagle Creek.

The Upper Eagle Creek Watershed Association supports their efforts to secure these grant funds, and are confident that they will be used in a very worthwhile and efficient manner.

Thank you for your consideration in this matter.

Sincerely,

Chase L. Caldwell
President



656 N. Bisbee Avenue
Willcox, AZ 85643
Phone: (520) 384-2229 x122
Fax: (520) 384-2735

August 29, 2010

Arizona Water Protection Fund Commission
3550 North Central Ave.
Phoenix, AZ 85012

Dear Arizona Water Protection Fund Commissioners:

The Coronado Resource Conservation & Development Area supports the Gila Watershed Partnership and their application for grant funding for the Eagle Creek Riparian Restoration at Filleman Crossing project. This project will stabilize a key area crossing and protect the stream banks from erosion which is very important in the protection and restoration of Eagle Creek and its riparian area.

We have worked closely with the Gila Watershed Partnership and the Upper Eagle Creek Watershed in other projects directed at protecting and improving Eagle Creek. We support the Gila Watershed Partnerships efforts to secure these grant funds to implement a very important next step in the Eagle Creek stream corridor restoration.

Thank you for your consideration in this matter.

Sincerely,

John E. Hays, President

"Local People Making Things Happen"
Serving Cochise, Graham, Greenlee, Pima, and Santa Cruz Counties

PO Box 127 • 2100 S. Bowie Avenue • Solomon AZ 85551-0127 • (928) 428-2611 • FAX: (928) 428-7023

August 27, 2010

Arizona Water Protection Fund
3550 North Central Ave.
Phoenix, AZ 85012

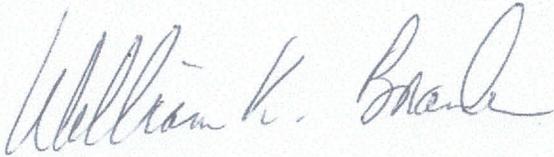
Dear Representatives of the Arizona Water Protection Fund:

I am writing this letter to express my support for the Gila Watershed Partnership and their application for grant funding for the Eagle Creek Riparian Restoration at Filleman Crossing grant project. This grant project will assist in the restoration effort of the Upper Eagle Creek riparian area.

I support their efforts to secure these grant funds and I am confident that they will be used in a very worthwhile and efficient manner.

Thank you for your consideration in this matter.

Sincerely,



Bill Brandau
Graham County Cooperative Extension Director
Area Agent, Agriculture and Natural Resources,
Graham and Greenlee County
University of Arizona Cooperative Extension
P.O. Box 127
Solomon, Arizona 85551

wbrandau@cals.arizona.edu

Greenlee County Planning and Zoning

Director Voice - (928) 865 4762
P.O. Box 908 253 Fifth Street
Clifton, Arizona 85533

Facsimile - (928) 865 4763
email - pronnerud@co.greenlee.az.us

Clerk
Yvonne Pearson

Administrator
Deborah K. Gale

Board of Supervisors
David Gomez, District 1
Hector Ruedas, Chair, District 2
Richard Lunt, District 3

August 20, 2010

Arizona Water Protection Fund Commission
3550 North Central Avenue
Phoenix, Arizona 85012

Dear Arizona Water Protection Fund Commissioners:

I support the Gila Watershed Partnership's grant application for Eagle Creek Riparian Restoration at Filleman Crossing. This grant is important as it will improve critical infrastructure to stabilize Eagle Creek and its riparian ecosystem.

I support their efforts to secure these grant funds, and are confident that they will be used in a very worthwhile and efficient manner.

Please call if you have questions.

Yours truly,



Philip Ronnerud
Engineer

d: filleman.wpd

Background of Eagle Creek Road Crossings January 2008



Prepared by the US Forest Service Apache Sitgreaves Clifton District

Shari Anderson, Detailed Fisheries Biotech

Lance Brown, District Wildlife Biologist

Forward by: Frank Hayes, District Ranger January 29, 2008

Eagle Creek watershed has long been recognized for priority management primarily because of the effect on Eagle Creek, occupied habitat for several native fish species, some of which are listed under the Endangered Species Act of 1973, as amended. The Apache-Sitgreaves National Forests Land and Resource Management Plan, as amended (Forest Plan), categorized Eagle Creek and at least one tributary (Chitty Creek) as a priority 1 stream for protection and recovery of habitats for federal and state listed aquatic species like Loach minnow, Gila chub, and Chiricahua leopard frog.

The District began aggressive action to improve and restore functionality and productivity to Eagle creek and associated tributaries in the early 1990's by implementing a series of actions or activities directed at addressing direct and indirect impacts that would have cumulative restoration benefits. This approach quickly noted that only about half of the entire watershed that affects the health of Eagle creek was encompassed within Forest boundaries, the remainder within the San Carlos Apache Indian reservation to the west. In addition, several small private land parcels totaling about two sections exist within the Eagle creek riparian corridor.

The following document is an attempt to summarize management activities that have been completed since at least 1993 on the Clifton District, influencing both the Eagle Creek watershed and Eagle Creek. The compilation of this document is an effort meant to identify the breadth and amount of commitment to help achieve the goals or restoration and recovery of the area and resources of issue. Management actions have been accomplished not only by Forest personnel, but grazing permittees, private land owners, and partnering agencies using Forest Service appropriated dollars and substantive outside funding and support.



Introduction

Eagle Creek is one of two primary watersheds on the Clifton Ranger District and is designated as a priority one stream with critical habitat occurring for both the Threatened loach minnow (*Tiaroga cobitis*) and Endangered Gila chub (*Gila intermedia*). The purpose of this document is to provide a brief history of the management activities that have occurred in the watershed to actively improve the conditions of Eagle Creek riparian corridor and provide background information for the Eagle Creek Crossings.

Eagle Creek is an 83 mile tributary to the Gila River located in Greenlee County, Arizona. Approximately, 31 miles (75%) of the perennial flows occur on non-National Forest land including tribal and private lands. It is an intermittent stream with surface water occurring only 2-3 months a year from Mud Springs Canyon to Big Dry Canyon on National Forest System lands.

Human influences to Eagle Creek have come primarily from livestock grazing, water development, mining, irrigated agriculture, roads, recreation, beaver removal, and flood control and channelization. Although the area is remote and sparsely settled, these human activities caused the worst damage 50 to 100 years ago to the watershed and the stream channel. Altered hydrologic conditions within the Eagle Creek watershed have resulted in a braided stream channel throughout much of the upper, non-canyon reach of Eagle Creek. Surface flow in substantial areas of the creek ceases during parts of the year, where anecdotal information from local residents indicates the stream may have flowed perennially throughout the year in the early 1900's. These changes were occurring as early as 1921, when Leopold noted that significant erosion of the floodplain was underway (Leopold 1921, 1946).

Existing Condition

Fish and Wildlife Species

Eagle Creek is designated as a priority one stream as described by the Apache-Sitgreaves Forest Management Plan. There is 17.7 miles of stream designated as critical habitat for the loach minnow beginning at the Phelps Dodge Diversion dam and extending upstream along Eagle Creek to the confluence with Dry Prong Creek. The Gila chub has 24.4 miles of designated critical habitat starting at the southern boundary of the Mud Springs Allotment and extending upstream on Eagle Creek to the confluence of Dry Prong and including all of East Eagle Creek which ends just south of Hwy. 191.

In addition to the two federally protected fish and Critical Habitat within Eagle Creek, the Endangered Southwestern willow flycatcher, Threatened Mexican spotted owl, Threatened Chiricahua leopard frog, and the Experimental Non-Essential population of the Mexican Gray Wolves of the Blue Recovery Area occur or have potential to occur within the Eagle Creek Watershed. Other species occurring or potential to occur in the Eagle Creek Watershed include a variety of Forest Service Sensitive and Management

Indicator Species including: native fish, amphibians, reptiles, raptors, insects, neotropical songbirds, and plants.

Arizona State University completes annual fish surveys on Eagle Creek which began in the 1980's. They use a variety of sampling methods and sample all available habitat types including, riffles, pools, runs, and isolated backwater. The purpose is to sample the entire fish assemblage but focus on threatened spinedace and loach minnow habitats. As of 2006, eighteen species have been encountered including 8 native and 10 exotic species. Razorback sucker and spinedace were the only species not encountered that were previously known to exist in Eagle Creek. The last spinedace found in Eagle Creek was in 1989 during a survey conducted by University of Arizona.

The most recent ASU survey in 2006 reported non native red shiner *Cyprinella lutrensis* was the most abundant species overall (29% of total catch). 99% of red shiners were captured at one site, Bat Cave, in the lower section of Eagle Creek. Second abundant species was native speckled dace *Rhinichthys osculus* (14%), followed by desert sucker *Pantosteus clarki* (9%), green sunfish *Lepomis cyanellus* (8%), longfin dace *Agosia chrysogaster* (7%), and smallmouth bass *Micropterus dolomieu* and Gila chub *Gila intermedia* each comprising about 5%. Other species each comprised less than 5% of the total catch. Native species were only found upstream of the diversion dam where they comprised 95% of the total catch. Eleven species, 6 native and 5 non native were found above the dam and 6 non natives were found below. Other species encountered on this trip were natives, roundtail chub *G. robusta* and Sonora sucker *Catostomus insignis*. Non natives included western mosquitofish *Gambusia affinis*, common carp *Cyprinus carpio*, fathead minnow *Pimephales promelas*, channel catfish *Ictalurus punctatus*, yellow bullhead *Ameiurus natalis*, and rainbow trout *Oncorhynchus mykiss*. Neither loach minnow nor spinedace were found. The non native northern crayfish (*Orconectes virilis*) was abundant at all sites and may account for the general paucity of fish, particularly young of the year fish.

Previous ASU surveys also found native loach minnow (1996, 1997) and non native flathead catfish *Pylodictus olivaris* (1994), fathead minnow *Pimephales promelas* (1996, 1997, 1998, 2005) and a cutthroat trout *Onchorynchus clarki* (1994).

Arizona State University's 1997 trip report shows that since the re-discovery of loach minnow in Eagle Creek, they have only been located at the Smelley low water road crossing. They were first found there in 1994, in the riffle provided by the crossing. In the 1997 survey, the road crossing had been modified and no loach minnow were found there, but instead just a few specimens were captured 100 meters downstream. The construction at the crossing had modified the habitat to the point of displacing the loach minnow. The manner in which the road crossing is maintained in the future may have significant impacts on this loach minnow population (ASU, 1997).

The most recent fish survey was completed by the Arizona Game and Fish Department in the spring of 2007. AZGFD surveyed the upper one third of Eagle Creek, consisting mostly of Forest Service land and some private land. The lower end of the survey began

near the Sheep Wash confluence and it ended just upstream of Mud Springs Canyon. This survey only sampled high gradient riffle habitats, as they were focused on collecting loach minnow and spinedace for propagation. AZGFD reported 99.9% of captured species were natives. No loach minnow or spinedace were found. The most common species captured were speckled dace followed by desert sucker. Rainbow trout was the only non native fish species encountered.

Rainbow trout are the primary non native species in the upper portion of Eagle Creek. These fish were stocked on an annual basis by AZGFD up until 1993 for sport fishing purposes but still persist with naturally reproducing populations. After the capture of a cutthroat trout by ASU surveyors (1994), it is thought that cutthroat trout may have been introduced by way of AZGFD however there is no record of this.

Native species still form the majority of the fish community in Eagle Creek above the Phelps Dodge diversion dam, but nonnatives dominate below the dam. The long-term trend in the native/nonnative species balance is toward more nonnatives and less natives. However, the presence of the diversion dam has deterred the upstream movement of many nonnatives and available data are too limited to determine the present rate of the trend in upper Eagle Creek.

Stream surveys

A Water Resources Assessment for Eagle Creek was completed by the Forest Service in 1998. A reference reach (T3) was set up in the area below the Dry Prong confluence to above the Honeymoon Campground. Two other reaches were set up for comparison. The first reach (T1) occurred below the Willow Creek confluence to above the Sheep Wash confluence. The second reach (T2), occurred below Mud Springs Canyon confluence to above the Willow Creek confluence. The final assessment found T1 to have excessive amounts of sediment in the stream and eroding banks contributed by area roads, crop fields, and livestock. Temperatures were also a concern due to lack of vegetation cover and shading. It was also noted in the summary that there is a lack of large woody debris throughout Eagle Creek. At the turn of the century large down wood was cut into smaller pieces to prevent flooding events and were washed out during high flows. The result is no large wood available to withstand high flows and sort large sediment loads that are transported downstream.

A Level II stream survey was performed on Eagle Creek by Clifton Ranger District personnel during the summer of 2004 and a summary report completed in November 2007. The survey extended from the confluence of Willow Creek upstream 11.55 miles to Honeymoon Campground. Only stream sections on National Forest Land were surveyed along Eagle Creek.

The results of the stream survey did not reflect the disturbance the Watershed Resources Assessment described. A significant amount of the disturbance reported in the Watershed Resources Assessment occurs downstream of the Level II stream survey. The data show the stream to be within Standards and Guidelines as described in the Forest

Plan for the Apache Sitgreaves National Forest. There are less than 20% unstable banks (1% recorded) and the amounts of fine sediments are limited. The average temperature of 69.1 degrees F for the stream was well within the tolerable temperatures for all federally listed species present and no single temperature recorded exceeded the species maximum tolerance. The Standards and Guidelines require temperatures not to exceed 68 degrees Fahrenheit; however, it could be that this system has naturally warmer stream conditions.

It is unclear what the proper amount of wood should be; however, low numbers could decrease stream structure and complexity and reduce the number and volume of pools. The notes in the watershed assessment indicate that woody debris has been removed in the past by private landowners to reduce flooding and erosion on their lands. This practice was still occurring as recently as the late 1980's after the 1983 flood. Assuming these practices no longer take place and there is still potential for wood recruitment, the large woody debris numbers should be increasing over time. It would be important to note any changes to pool frequency or pool riffle ratio during future surveys.

Primary Constituent Elements are listed in the Federal Register's Final Rules for Loach Minnow and Gila Chub Designation of Critical Habitats and are located in Appendix A. Large woody debris in the stream is an important habitat factor for Gila chub. Gila chub need sufficient cover consisting of downed logs in the water channel, submerged aquatic vegetation, submerged large tree root wads, undercut banks with sufficient overhanging vegetation, large rocks and boulders with overhangs, a high degree of streambank stability, and a healthy, intact riparian vegetation community.

Loach minnow require swifter water velocities and need sufficient riffle habitats with cobble and gravel substrate. A balanced pool to riffle ratio is important to accommodate both species. Both species require stable bank conditions that limit the amounts of sediment input in the stream as well as habitat devoid of non native species.

For a complete discussion on the Stream Surveys, please refer to the 2007 Stream Survey Summary located at the Clifton Ranger District Office.

Riparian Conditions

The riparian vegetation on Eagle Creek includes Arizona sycamore (*Platanus wrightii*) and narrowleaf cottonwood (*Populus angustifolia*) with an understory of Arizona walnut (*Juglans major*), boxelder (*Acer negundo*), alder (*Alnus oblongifolia*), several willow species, and baccharis. Terrace vegetation along the streams includes juniper, pinyon, gray oak, desert ceanothus, and other species.

In the years 1998 and 1999, a Proper Functioning Condition assessment was performed for riparian condition in the upper Eagle Creek drainage. Results show, generally speaking, the drainage is functioning at risk with an upward trend. Timeframes associated with full recovery are estimated to be in excess of 50 to 100 years, in part dependent on riparian vegetation regrowth and incorporation of sufficient amounts of large woody

vegetation and coarse woody debris in the system. However, due to the apparently unstable flow regimes of some major tributaries, along with flow augmentation and removal through pumping, the potential configuration of a stable Eagle Creek system will be different from what it was, and may take centuries to equilibrate (USFS 2001b).

Direction by Law

NFMA - 1976

The National Forest Management Act of 1976 required the Secretary of Agriculture to develop guidelines for land management planning with the individual forest being the planning unit or area. The Act states that “Fish and wildlife habitat shall be managed to maintain viable populations of existing native and desired non-native vertebrate species in the planning area.” (36 C.F.R. § 219.19). A viable population is defined as “[a population] which has the estimated numbers and distribution of reproductive individuals to insure its continued existence is well distributed in the planning area.” (§ 219.19). Therefore, management of viable populations is intended to be accomplished at the individual National Forest level (planning area).

Apache-Sitgreaves Forest Plan – 1987 Standards and Guidelines

Eagle Creek is a priority one stream as defined by the Apache-Sitgreaves Forest Plan. Standards and Guidelines state that all Priority 1 areas will be placed under proper management by 1992. Proper management means that systems are in place and activities are scheduled that will put unsatisfactory areas on the road to recovery.

Recovery activities such as fencing, vegetation projects, and special management prescriptions will be maintained until the affected area(s) are brought into satisfactory condition and as long thereafter as necessary to maintain the area(s) in satisfactory condition, or until they are replaced by more effective techniques.

Recreation use, including off-road vehicle use, will be prohibited or restricted and sites rehabilitated in areas in unsatisfactory condition, when recreation was a significant causative factor affecting condition

For Priority 1 and 2 Riparian Areas:

- a) Aquatic resources:
 - (1) Manage for and maintain at least 80 percent of near natural shade over water surfaces.
 - (2) Manage for and maintain at least 80 percent of streambank total linear distance in stable condition.
 - (3) Prevent siltation not to exceed 20 percent fines (<855mm) in riffle areas.
 - (4) Maintain 80 percent of the spawning gravel surface free of inorganic sediment.

- (5) Manage for stream temperatures not to exceed 68 degrees F, unless not technically feasible.
- (6) Manage for and maintain at least a 80 Biotic Condition Index on all perennial streams.

In areas of unsatisfactory riparian condition where grazing has been determined to be a significant causative factor revised allotment management plans will:

- a) Implement intensive management systems which limit grazing and provide adequate rest for riparian areas.
- b) Reduce stocking to a level that will allow degraded areas to recover. or
- c) Use site specific exclusion fencing

Endangered Species Act -1976

The Endangered Species Act (ESA) of 1976, as amended, directs each federal agency to ensure that any action authorized, funded, or carried out by such agency is not likely to jeopardize the continued existence of any threatened or endangered species or result in the destruction or adverse modification of their critical habitat (Section 7). The ESA also directs each federal agency to confer or consult with the appropriate Secretary on any action, which is likely to jeopardize or affect the continued existence of any species or its habitat. Additionally Section 2(c)(1) of the ESA includes affirmative conservation direction, stating “that all Federal departments and agencies shall seek to conserve endangered species and threatened species and shall utilize their authorities in furtherance of the purposes this act.”

Clean Water Act Section 401 and 404

Section 401 of the Clean Water Act requires certification from the state where construction will contribute to any discharge into navigable waters. Section 404 of the Clean Water Act requires a permit from the U.S. Army Corps of Engineers for the discharge of dredged or fill material into navigable waters.

Section 404 Nationwide permits that could be obtained for the Eagle Creek Crossing maintenance and reroute would include the Maintenance permit and the Bank Stabilization permit. Descriptions of activities that fall under these permits are located in Appendix B.

Tribal Permits

One of the Eagle Creek low water crossings scheduled for maintenance is on the San Carlos Apache Reservation. This crossing will require section 401 and 404 certification obtained by the tribes through a separate application process than used by the Forest Service.

Range Management

Grazing by livestock has been the primary pervasive use of the Eagle Creek watershed for the past 150 years with substantial alteration of watershed vegetation, soil, erosion, and hydrologic characteristics (Leopold 1946, USFS 2001a-g). Livestock grazing within the watershed has been reduced from historic levels and the Forest Service and private landowners have been working cooperatively to improve the management of livestock in the riparian corridor of Eagle Creek since 1993. These cooperative efforts have facilitated an increase in riparian woody species composition and age class with significant improvement in watershed conditions.

Allotments within the Eagle Creek watershed include East Eagle, Mud Springs, Baseline-Horsesprings, Double Circle, Tule, and Dark Canyon. Critical Habitat for both loach minnow and Gila chub occur on Mudsprings and East Eagle allotments. Critical habitat for only loach minnow occurs on all the remaining allotments. In 1993 the Clifton Ranger District requested that permittees and private land holders to fence out the Eagle Creek riparian zone to come into compliance with the Standards and Guidelines of the Forest Plan for priority one riparian areas. As of 1995 fencing was in place to exclude Eagle Creek from these allotments.

Clifton Ranger District currently has an ongoing effort to update all allotment analysis and adjust the permitted number of livestock per allotment with the goal of continuing the recovery of Eagle Creek. Memorandums of Understanding (MOU's) have been in place since 1995 for reduced stocking of the Eagle Creek allotments. The permitted number of combined AUM's for these 6 allotments is 25,169 and the current stocking levels are at 13,146 AUM's. This is only 52% of the permitted number.

The Clifton Ranger District has followed up with administrative actions and impoundments when grazing permits were not followed by the permittees and the condition of the land was receiving resource damage. In 2002, an administrative action removed all cattle from the Mud Springs allotment when there was a violation of the grazing permit during drought conditions. Similar actions were taken in 2002 on the Double Circle allotment and in the early 90's on the Dark Canyon allotment. In 2001, 17 head of reservation cattle were impounded when they crossed down fencing and were grazing in the mid prong and west prong areas, degrading stream banks and riparian vegetation.

The East Eagle Allotment is in the headwaters of Eagle Creek and is an extremely important native fish stream with Critical Habitat for two fish species. While being managed under the resource protection MOU with the livestock permittee by reduced stocking rates, there have been recent improvements in range condition on the allotment with almost 90% of capacity acres rated in fair condition. Riparian fencing, development of offsite water, active cattle management on the allotment, and livestock exclusion immediately downstream on National Forest and private lands, has resulted in improvement in the regeneration of riparian areas. The Gust MOU has been in place

since 1995 for the specific purpose of riparian recovery in the East Eagle and Mudsprings Allotments.

The Upper Eagle Creek Watershed Association (UECWA) was formed in 2003. Board Members are permittees and ranchers who own property within the watershed. Other members include Federal, State and County employees, other watershed residents, recreational users, special interest groups, educators, and scientists with a stake in Upper and Lower Eagle Creek 5th code watersheds. The goals of the UECWA include improvement and preservation of the watershed and promotion of the perennial nature of Upper Eagle Creek as well as the protection, enhancement, and increased habitat for wildlife and domestic animals, especially in times of drought. The UECWA has been working to develop a watershed management plan to provide detailed information and direction to facilitate ongoing landscape scale cooperative efforts between the UECWA and its partners and cooperators for the purpose of benefiting the land and the people. The management plan will address the Environmental Protection Agency's (EPA) nine critical elements.

Hydrologic Condition

Water development and interbasin water transfers have altered the volume and timing of flow in the creek. In 1945, Phelps Dodge Corporation constructed a diversion from the Black River (Gila River basin) into Willow Creek, a tributary of middle Eagle Creek. This diversion augments flow in Eagle Creek below Willow Creek by about 27 percent (Minckley and Sommerfeld 1979). Current water levels have increased an undetermined amount due to increased scope of operations at the Phelps Dodge Corporation mine.

Aquatic Conditions

Also affecting the Eagle Creek watershed was the historic cutting of timber for mine construction and fuel. According to Olmstead (1919) "the watershed [of Eagle Creek] has been badly torn up for the past nine years, largely on account of changes in the ground cover conditions, due to extensive mining operations." Extensive harvest of wood from watersheds surrounding the Clifton/Morenci mines decimated both upland and riparian woodlands and its depletion made it necessary to bring additional wood for the mines from as far away as Wilcox (Bahre 1991). In addition, it is likely that some of the wood from the Eagle Creek watershed was moved down the creek in tie-drives (Coor 1992). To facilitate this on small streams without sufficient flow to carry logs, cut logs were stockpiled behind small trees on a slope near the stream and when flood flows rose, the small trees were knocked down with small charges of dynamite allowing the logs to roll into the flood waters and be carried downstream (B. Marks, Blue, Arizona, pers. com. 1994). Water transportation of logs is highly destructive of stream channels and fish habitat (Meehan 1991) with long-term consequences.

Changes in stream flow and hydrologic cycles have caused reduction in the presence of large riparian trees and loss of recruitment along Eagle Creek overall. In the past aquatic habitat diversity in Eagle Creek has been low with few pools and a dominant habitat of

shallow runs and riffles over unstable cobble-gravel-boulder substrate (Marsh *et al.* 1990, Arizona Game and Fish Department 1994, Knowles 1994). According to the recent Level II survey, described previously, there is an upward trend in habitat conditions with increases in pool frequency and more balanced pool riffle ratios since 1994.

Arizona Department of Environmental Quality completed a draft watershed assessment for the Upper Gila Watershed in 2007 which include water quality testing in Eagle Creek. Sampling periods were January through July of 2000 and August through November of 2005. Sampling sites were above Honeymoon Campground, above Sheep Wash, and below Gold Gulch. Samples were taken to evaluate a wide range of parameters including dissolved metals, nutrients, pH, oxygen, bacteria, suspended sediments, turbidity, and dissolved solids. No exceedances were detected at any of the sites.

In the past, Eagle Creek was recognized as having water quality issues. In 1992 ADEQ 305b report listed Eagle Creek as "Threatened" due to sediment from grazing and forest roads, and metals (geology). However, by 1994 ADEQ 305b report listed Eagle Creek as supporting full uses without any exceedences in any category.

Roads and Recreation Management

Road construction, reconstruction, and maintenance has resulted in substantial alterations in the hydrologic regime of Eagle Creek, and associated tributaries of East Eagle and Dry Prong above Honeymoon campground. Approximately 8 miles of the 22 miles of Forest Road 217 which connects Highway 191 to Honeymoon campground, follows closely along upper Eagle Creek to the campground destination, including 3 crossings (all on private or Tribal lands) and substantial amount of private lands.

Following floods of 1973 and 1984 significant reconstruction occurred on portions of the upper roadway in this 8 mile corridor of Eagle Creek. Travelways and roads above Honeymoon campground into perennial reaches of East Eagle and Dry Prong forks of upper Eagle Creek were historically dozier access created roads to ranch cabins or sawmill locations that required annual maintenance. Prior to 1991, both prongs had roadways that were traveled the entire length, but were closed to vehicle traffic following the 1993 winter flood events. Previous management of these travelways included both dozing open roadways and clearing/burning of large log jams. These practices were completed in both drainages following the flood of 1983, but have been discontinued since that time.

Clifton Ranger District, in cooperation with Greenlee County, has taken a proactive road maintenance approach along the 22 mile Forest Road 217 and especially in the 8 mile Eagle Creek corridor since about 1993. Maintenance improves access for Eagle Creek residents and reduces future reconstruction disturbance that creates excess siltation. Maintenance includes improved hardening of four Eagle Creek crossings, three on private land and one on reservation land. Hardening of the crossings both in the stream and the approaches to the stream is known to reduce siltation within critical habitat for loach minnow and Gila chub fish species.

Very limited maintenance has been performed on Forest Road 8369 (upper Eagle Creek above Honeymoon campground). Road 704, which splits off from 8369, was previously an old dozier route and was improved for vehicle travel to Maylay. A seasonal closure (Feb. 1st – June 30th) was implemented for both roads in February of 2000 to enhance riparian recovery. Also seasonally closed, is Forest Road 515 connecting Hwy. 191 to Forest Road 217 which contains the Sheep Wash wetland area. Past improvements including camping exclosures, riparian exclosures, log jam placement, and induced meandering along the 515 road have been constructed to protect this area from further disturbance.

There are three low water crossings in Eagle Creek along road 217 and one crossing on road 217P. Smelly, Filleman, and Eagle/Willow Creek crossings are located on private land and one crossing, Reservation Crossing is located on the San Carlos Apache Reservation. Frequent flood events require ongoing maintenance of these locations. Maintenance includes, hardening the crossings and approaches to reduce the amount of sediment input into the stream. Currently there is a proposed action for extensive work on two of the crossings. The Reservation Crossing will be rip-rapped in several locations along the bank and in the channel to re-create a natural meander and prevent erosion of the stream bank. The Filleman Crossing has been rerouted within the last year to eliminate a 200 foot in-stream travel route by making the crossing more perpendicular to the stream, improving habitat quality for federally listed fish and wildlife species.

In 2000, emergency repairs were made at Honeymoon Campground on Eagle Creek after a flood event in 1999 damaged bank protection structures. Two work sites were established. The Honeymoon site included stabilizing and replacing damaged gabions which provide structural support to Forest Road 217 at the campground. The 4-Drag work site included stabilizing and extending existing rock riprap that protects private lands associated with the 4-Drag headquarters and historic Honeymoon Ranger Station. The repairs at both sites stabilized the stream bank to prevent further erosion and siltation into Eagle Creek as well as protect the recreation site.

Restoration: Prescribed Fire and Thinning

The use of prescribed fire and mechanical thinning has been a key factor in the restoration goals of the Eagle Creek watershed. After decades of suppression, the reintroduction of fire to the system helps return the vegetation conditions to a more natural state by reducing the amount of woody fuel species such as junipers that have built up over the past 50 plus years. Reduction of these species creates more surface water availability in the watershed. Another goal of restoration is to reduce the potential for catastrophic fire that can burn over sensitive riparian corridors and have negative effects on native fish species.

The Federal Register's Final Rule of Gila Chub listing for endangered status and designation of critical habitat was published by the U.S. Fish and Wildlife Service in

2007. This document links catastrophic fires as a major threat to remaining populations of the Gila chub.

“Wildfires pose a threat to these remaining extant populations. The frequency and intensity of wildfires in the southwestern United States has increased over the past 10 years due to drought conditions, historical wildfire suppression activities, and increased recreational activities (e.g., camping). Efforts are underway to restore natural fire regimes to forest and grass lands.”

“Fires in the southwest frequently occur during, or just prior to, the summer monsoon season. As a result, fires are often followed by rain that washes ash-laden debris into streams (Rinne 2004). It is usually such debris, rather than the fires themselves, that impact, and sometimes devastates fish populations (Rinne 2004), although direct effects from fire, including changes in temperature and water chemistry, can also cause fish mortality. Indirect effects of fire also include watershed alteration that can alter streamflow, water quality, riparian vegetation, and instream sediment loads, all of which can drastically alter habitat for the Gila chub. Fire suppression can cause adverse affects to Gila chub from vegetation removal and road building, using fish habitats as water sources for fire fighting, and using fire retardants that are often toxic to aquatic species (see U.S. Fish and Wildlife Service 2004b for a thorough review of the effects of fire on fishes, including Gila chub, in Arizona).”

The scenario described above; wildfire followed by monsoonal rains, occurred during the summer of 2007 in the Chitty Creek watershed with complete scouring of Chitty Creek. The Chitty Wildfire burned from June 30, 2007 to July 16, 2007 totaling 6,999 acres burned with a variety of fire intensities. Over 16% of the burned acreage in Chitty Creek Watershed was crown and high intensity fire while the entire Eagle Creek Watershed had 11% of the burned area described as crown and high intensity fire. Based upon fire intensity mapping and field observations, the primary causal factor for erosion and scouring of Chitty Creek was the Crown and High Intensity fire. Sediment and ash from the Chitty Creek Watershed was observed to move down the system, through East Eagle Creek and into Eagle Creek. It's unknown how far the effects of this debris flow reached.

Clifton Ranger District has been using prescribed fire and mechanical thinning in the Eagle Creek watershed since 1995. 19,371 acres have been treated using broadcast burn with 715 of those acres thinned prior to burning and many areas having multiple applications of fire. Treated areas include Sheep Wash (1995), East Eagle (1996, 1999), Mesa (1997), Pine Flat (1997), Mitchel Peak (1998), Hot Air (1999), Robinson Mesa (1999, 2000), and Chitty (2007). In the future the NO Bar, 4-Bar Mesa, and Mallet areas within the watershed are planned for prescribed fire projects with an ongoing effort to maintain a natural fire regime.

Conclusion

In conclusion, many activities have been initiated by the Forest Service, permittees, private land holders, and the UECWA to facilitate the improved conditions along Eagle Creek and the upland habitats that are closely linked with cause and effect to Eagle Creek water quality.

Improving and providing for long-term maintenance of the multitude of road crossings that traverse Eagle Creek using Best Management Practices, would further the goals of all parties to improve the water quality of Eagle Creek, reduce the need for continuous maintenance within native fish Critical Habitat, and provide safe public access for the residents along Eagle Creek.

Literature Cited

- Arizona State University (ASU). 1997. Eagle Creek Fisheries Survey June 23-25 1997. Arizona State University. Tempe, Arizona
- Bahre, C.J. 1991. A legacy of change. Historic human impact on vegetation in the Arizona borderlands. University of Arizona Press, Tucson, AZ
- Brown, M. 1990. Fall fish count trip to Eagle Creek. Arizona Game and Fish Department, Phoenix, AZ. 2pp.
- Coor, C.C. 1992. Down on the Blue. Blue River, Arizona, 1878-1986. Blue River Cowbells. Art Printing West, Goodyear, AZ
- Henderickson, D.A. 1987. Memo - update on nongame fish activities, August 26, 1987. Arizona Game and Fish Department, Phoenix,, AZ. 3 pp.
- Knowles, G.W. 1994. Fisheries survey of the Apache-Sitgreaves National Forests, third trip report: Eagle Creek, June 05 - 07 and August 02, 1994. Arizona State University, Tempe, Arizona. 6 pp.
- Kynard, B.E. 1976. A study of the pollution sources and their effect on the aquatic habitat of Eagle Creek watershed, Apache-Sitgreaves National Forest, Arizona. University of Tucson, AZ. 82 pp.
- Leopold, A. 1946. Erosion as a menace to the social and economic future of the southwest. A paper read to the New Mexico Association for Science, 1922. Journal of Forestry 44: 627-633.
- Marsh, P.C., J.E. Brooks, D.A. Hendrickson, and W.L. Minckley. 1990. Fishes of Eagle Creek, Arizona, with records for threatened spikedace and loach minnow (Cyprinidae). Journal of the Arizona-Nevada Academy of Science 23(2):107-116.

Meehan, W.R. 1991. Influences of forest and rangeland management on salmonid fishes and their habitats. American Fisheries Society Special Publication 19, Bethesda Maryland. 751 pp.

Minckley, W.L. and M.R. Sommerfeld. 1979. Resource inventory for the Gila River complex, eastern Arizona. USDI Bureau of Land Management, Safford, AZ. 570 pp.

Olmstead, F.H. 1919. A report on flood control of the Gila River in Graham County, Arizona. U.S. Congress. Sixty-fifth, third session. Senate Document 436. Washington, D.C. 94 pp.

Papoulias, D., D. Valenciano, and D.A. Hendrickson. 1989. A fish and riparian survey of the Clifton Ranger District. Arizona Game and Fish Department, Phoenix, AZ. 165 pp.

Propst, D.L., P.C. Marsh, and W.L. Minckley. 1985. Arizona survey for spikedace (*Meda fulgida*) and loach minnow (*Tiaroga cobitis*): Fort Apache and San Carlos Apache Indian Reservations and Eagle Creek, 1985. U.S. Fish and Wildlife Service, Albuquerque, New Mexico. 8pp. plus maps.

U.S. Forest Service (USFS). 2001a. Addendum to the Biological Assessment and Evaluation In Regards to Baseline/Horsesprings Grazing Allotment

U.S. Forest Service (USFS). 2001b. Addendum to the Biological Assessment and Evaluation In Regards To the East Eagle On-Grazing

U.S. Forest Service (USFS). 2001c. Addendum to the Biological Assessment and Evaluation In Regards to Tule Ongoing Grazing.

U.S. Forest Service (USFS). 2001d. Addendum to the Consultation Forms in Regards to Dark Canyon Ongoing Grazing

U.S. Forest Service (USFS). 2001e. Allotment Summary Sheets for Dark Canyon Allotment.

U.S. Forest Service (USFS). 2001f. Allotment Summary Sheets for East Eagle.

U.S. Forest Service (USFS). 2001g. Biological Assessment and Evaluation In Regards to Tule Ongoing Grazing.

Appendix A

Primary Constituent Elements

Gila Chub

Primary constituent elements for Gila chub as described in the Federal Register's Final Rule for Endangered Species Listing and Critical Habitat Designation list woody debris as an important habitat factor. Gila chub are highly secretive animals, preferring quiet deeper waters, especially pools, or they remain near cover, including terrestrial vegetation, boulders, and fallen logs (Minckley 1973). Undercut banks created by overhanging terrestrial vegetation with dense roots growing into pool edges provide ideal cover for this species (Nelson 1993). A relatively intact riparian area, along with periodic flooding in a relatively natural pattern, is important in maintaining the stream conditions necessary for long-term conservation of the Gila chub.

In its habitats, the Gila chub was probably the most predatory fish and experienced little or no competition. The introduction of more aggressive and competitive nonnative fish has led to significant losses of Gila chub. Nonnative crayfish also appear to prey on and compete with Gila chub (Carpenter 2000, 2005).

- (1) Perennial pools, areas of higher velocity between pools, and areas of shallow water among plants or eddies all found in headwaters, springs, and cienegas, generally of smaller tributaries;
- (2) Water temperatures for spawning ranging from 17 to 24 °C (62.6 to 75.2 °F), and seasonally appropriate temperatures for all life stages (varying from approximately 10 °C to 30 °C).
- (3) Water quality with reduced levels of contaminants, including excessive levels of sediments adverse to Gila chub health, and adequate levels of pH (*e.g.* ranging from 6.5 to 9.5), dissolved oxygen (*e.g.* ranging from 3.0 to 10.0) and conductivity (*e.g.* 100 to 1000 mmhos).
- (4) Food base consisting of invertebrates (*e.g.* aquatic and terrestrial insects) and aquatic plants (*e.g.* diatoms and filamentous green algae);
- (5) Sufficient cover consisting of downed logs in the water channel, submerged aquatic vegetation, submerged large tree root wads, undercut banks with sufficient overhanging vegetation, large rocks and boulders with overhangs, a high degree of streambank stability, and a healthy, intact riparian vegetation community;
- (6) Habitat devoid of nonnative aquatic species detrimental to Gila chub or habitat in which detrimental nonnatives are kept at a level that allows Gila chub to continue to survive and reproduce; and
- (7) Streams that maintain a natural flow pattern including periodic flooding.

Loach Minnow

1. Permanent, flowing water with no or minimal pollutant levels, including:

- a. Living areas for adult loach minnow with moderate to swift flow velocities between 9.0 to 32.0 in/second (24 to 80 cm/second) in shallow water between approximately 1.0 to 30 inches (3 cm to 75 cm) in depth, with gravel, cobble, and rubble substrates;
 - b. Living areas for juvenile loach minnow with moderate to swift flow velocities between 1.0 and 34 in/second (3.0 and 85.0 cm/second) in shallow water between approximately 1.0 to 30 inches (3 cm to 75 cm) in depth with sand, gravel, cobble, and rubble substrates;
 - c. Living areas for larval loach minnow with slow to moderate velocities between 3.0 and 20.0 in/ second (9.0 to 50.0 cm/second) in shallow water with sand, gravel, and cobble substrates;
 - d. Spawning areas with slow to swift flow velocities in shallow water where cobble and rubble and the spaces between them are not filled in by fine dirt or sand; and
 - e. Water with dissolved oxygen levels greater than 3.5 cc/l and no or minimal pollutant levels for pollutants such as copper, arsenic, mercury, and cadmium; human and animal waste products; pesticides; suspended sediments; and gasoline or diesel fuels.
2. Sand, gravel, and cobble substrates with low or moderate amounts of fine sediment and substrate embeddedness. Suitable levels of embeddedness are generally maintained by a natural, unregulated hydrograph that allows for periodic flooding or, if flows are modified or regulated, a hydrograph that allows for adequate river functions, such as flows capable of transporting sediments.
 3. Streams that have:
 - a. Low gradients of less than approximately 2.5 percent;
 - b. Water temperatures in the approximate range of 35 to 82 °F (1.7 to 27.8 °C) (with additional natural daily and seasonal variation);
 - c. Pool, riffle, run, and backwater components; and
 - d. An abundant aquatic insect food base consisting of mayflies, true flies, black flies, caddisflies, stoneflies, and dragonflies.
 4. Habitat devoid of nonnative aquatic species or habitat in which nonnative aquatic species are at levels that allows persistence of loach minnow.
 5. Areas within perennial, interrupted stream courses that are periodically dewatered but that serve as connective corridors between occupied or seasonally occupied habitat and through which the species may move when the habitat is wetted.

Notification: For activities authorized by paragraph (b) of this NWP, the permittee must submit a pre-construction notification to the district engineer prior to commencing the activity (see general condition 27). Where maintenance dredging is proposed, the pre-construction notification must include information regarding the original design capacities and configurations of the outfalls, intakes, small impoundments, and canals. (Sections 10 and 404)

Note: This NWP authorizes the repair, rehabilitation, or replacement of any previously authorized structure or fill that does not qualify for the Clean Water Act Section 404(f) exemption for maintenance.

Bank Stabilization. Bank stabilization activities necessary for erosion prevention, provided the activity meets all of the following criteria:

- (a) No material is placed in excess of the minimum needed for erosion protection;
- (b) The activity is no more than 500 feet in length along the bank, unless this criterion is waived in writing by the district engineer;
- (c) The activity will not exceed an average of one cubic yard per running foot placed along the bank below the plane of the ordinary high water mark or the high tide line, unless this criterion is waived in writing by the district engineer;
- (d) The activity does not involve discharges of dredged or fill material into special aquatic sites, unless this criterion is waived in writing by the district engineer;
- (e) No material is of the type, or is placed in any location, or in any manner, to impair surface water flow into or out of any water of the United States;
- (f) No material is placed in a manner that will be eroded by normal or expected high flows (properly anchored trees and treetops may be used in low energy areas); and,
- (g) The activity is not a stream channelization activity.

Notification: The permittee must submit a pre-construction notification to the district engineer prior to commencing the activity if the bank stabilization activity: (1) involves discharges into special aquatic sites; (2) is in excess of 500 feet in length; or (3) will involve the discharge of greater than an average of one cubic yard per running foot along the bank below the plane of the ordinary high water mark or the high tide line. (See general condition 27.) (Sections 10 and 404)