

# The Blue River

## Fish Barrier: Background and Purpose

By Robert Clarkson and Jeff Riley, US Bureau of Reclamation

The Endangered Species Act (ESA) requires all federal agencies to utilize their authorities to carry out programs for the conservation of threatened and endangered species. The Blue River native fish restoration project complements similar projects being implemented by Reclamation and other agencies to assist in the recovery and conservation of federally-listed fish and amphibian species in the Gila River Basin. Reclamation's fish barrier construction program is mandated by a 2008 Fish and Wildlife Service (FWS) biological opinion that addressed delivery of water through the Central Arizona Project (CAP) and its potential to introduce and spread nonnative aquatic species in the Gila River Basin.

A key conservation measure of this opinion requires the construction of fish barriers to "prevent or hinder upstream movements of nonindigenous fish and other [nonnative] aquatic organisms into high-value native fish and amphibian habitats" during the 100-year life of the CAP. Fish barriers required under the CAP opinion have been completed or are planned on 12 high-priority streams, including the Blue River.

A native species management emphasis for certain Gila River Basin streams is

desirable to protect rare species and their habitats against nonnative invasions. Native fish populations in the Gila River Basin have deteriorated significantly over the past century and a half to the point that 11 of the 21 native fishes are now listed under the ESA, two are candidates for listing, and one is recently extinct. The remaining species have also declined, and five of them have been recommended for federal listing. Seven species have been extirpated from the basin, although some have been repatriated with variable success. Only the two native trouts have exhibited noticeable population increases in recent times, and slow progress is being made with five other species.

Many of the Gila River Basin's native amphibian and semi-aquatic reptile populations are also declining. Sonora tiger salamander and Chiricahua leopard frog are federally-listed as endangered and threatened, respectively, northern Mexican gartersnake is a candidate species, and northern leopard frog has been petitioned for listing. Eighteen species of native amphibians and semi-aquatic reptiles are listed by the State of Arizona as vulnerable species with the greatest conservation need.

Human-induced physical impacts to aquatic habitats of the Gila River Basin have resulted from construction of dams for water storage, hydroelectric production, and flood control; dewatering of streams due to surface diversions and groundwater pumping for municipal, industrial, and agricultural purposes; and watershed perturbations arising from grazing by domestic livestock, harvesting of timber, mining of commercially valuable ores; and habitat loss due to expansion of human populations. Concurrent with these physical impacts has been the widespread introduction and establishment of nonnative aquatic organisms that have biologically polluted native fish habitats.

Primary avenues by which nonnative species depress and often eliminate native species include predation on early life stages (eggs, larvae, juveniles) and adults, competition, hybridization, habitat alteration, and parasite and pathogen transmission. These effects are often exacerbated by low flow (drought) conditions. The accumulation of these physical and biological stressors to aquatic habitats, especially in the mainstem rivers, has fostered a pattern where native species persist, primarily only in tributaries or the upper reaches of tributary drainages.



**Chiricahua Leopard Frog**

The widespread situation in the Gila River Basin is that remaining tributary populations of imperiled native fishes usually cannot recolonize habitats from where their species have been extirpated. This is because connecting habitats often are fragmented due to physical perturbations, and large populations of predatory nonnative fishes that reside in mainstem habitats hinder native fish dispersal. Not only do nonnatives block

recolonization pathways, but they also prevent exchange of genetic material among diverse populations that historically facilitated adaptation to changing environments.

A prominent ichthyologist summarized this dire situation by stating: “Native fishes of the American West will not remain on earth without active management, and . . . control of nonnative, warmwater species is the single most important requirement for achieving that goal.” Practical and effective alternatives for dealing with nonnative biota are presently limited to chemical or mechanical removal or depletion of undesirable taxa. Inevitably, however, such controls are temporary unless accompanied by measures to prevent reinvasion by nonnatives.



**Roundtail Chub**

The only remedy against reinvasion is to protect a stream drainage with a fish barrier. When accompanied by control of nonnatives upstream, a barrier can effectively segregate natives from nonnatives found downstream. Although there are potential long-term negative impacts to native biota that can arise from such isolation, the immediate need to protect remaining populations against local extinction is imperative. Two reports that specifically reviewed fish barriers in the Gila River basin concluded that barriers are often the only feasible technology to segregate and protect imperiled native fishes. The same approach to recovery planning for federally-listed trouts across the West has improved or minimally halted further deterioration of their conservation status.

Reclamation's fish barrier construction program emphasizes streams that can be secured to prevent extinction and stabilize existing rare stocks of native fishes, or that can be renovated to replicate rare stocks of native fishes, especially loach minnow and spinedace that appear to be declining at a faster rate than many other species. The Blue River was identified in the 2008 CAP biological opinion as one of the high-value streams on which a fish barrier would be emplaced.

Among the streams considered, the Blue River is particularly noteworthy because it sustains a rare population of threatened loach minnow and is designated as critical habitat for loach minnow. In addition, the mainstem Blue River exhibits the necessary habitat heterogeneity (especially deep, flowing pools, complex shear zones along gravel/sand bars, and eddy habitats downstream of riffles) potentially suitable for repatriation of threatened spinedace and the candidate-for-listing roundtail chub.



**Loach Minnow**

Key recovery objectives for loach minnow and spinedace are to protect existing populations and to reintroduce populations into suitable habitat within the historic range of the species. Construction of barriers in streams with populations of loach minnow and/or spinedace is considered by FWS as a priority 1 action, defined as "absolutely essential to prevent the extinction of the species in the foreseeable future."

The purpose of the proposed native fish restoration project is to protect populations of loach minnow and Chiricahua leopard frog that reside in the Blue River drainage against future upstream invasions of nonnative aquatic organisms from the San

Francisco River, and to reduce or remove the threat posed by nonnative fishes that presently occupy, or may become established in the future in, the Blue River drainage. This would be accomplished by constructing a fish exclusion barrier on lower Blue River to prevent upstream invasions of nonnative aquatic organisms, in conjunction with mechanically removing nonnative fishes that already occupy the river upstream of the proposed fish barrier. Placement of a barrier low in the drainage is needed to minimize fragmentation of the existing loach minnow population. In addition, the project proposes to repatriate spinedace and roundtail chub to the mainstem Blue River upstream of the fish barrier. The success or failure of the project would be assessed via periodic monitoring of the fish community.

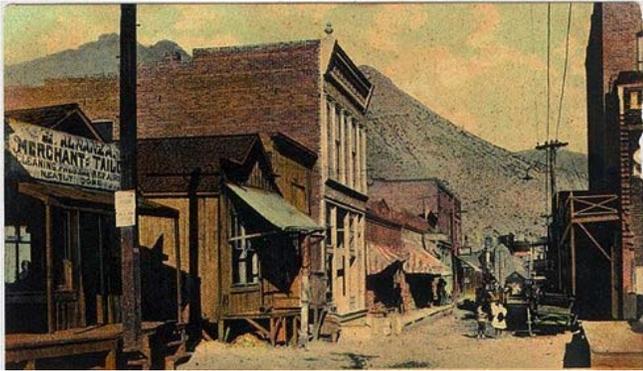


**Spinedace**

Opportunities for restoration of native fishes in the Gila River Basin are constrained by conflicts with nonnative sport fish management, challenges of controlling or removing firmly established nonnative fish populations, and land ownership issues. The Blue River provides an excellent opportunity because (1) habitats appear suitable for repatriation of spinedace and roundtail chub, (2) a population of loach minnow already occupies a major part of the drainage, (3) nonnative warm-water fish populations are presently small, (4) natural bedrock landforms provide solid anchor points for a fish barrier, and (5) most of the project area is located on National Forest System (NFS) lands.

# Project and Program Status Report

**The Business District Façade Improvement program in Clifton and Duncan** is in the home stretch with storefronts all over Clifton's Chase Creek and Duncan's commercial area getting dressed up with new windows and paint, awnings, tile work, signs and more. The program is funded by Freeport McMoRan Copper & Gold Foundation.



Chase Creek in 1912

**The AWPf Gila River Restoration Project at Apache Grove** - The earthwork will be completed soon, and then we will begin the revegetation process. If you would like to attend the field trip to the project, which will be held on the third day of the Arizona Riparian Council's annual meeting, please let me know, and I will make arrangements for you. Although we would love you to attend all three days of the meeting, I know how busy you all are. See the Arizona Riparian Council's web site for more information at: <http://azriparian.org>.

**E. coli Reduction on the San Francisco and Blue Rivers project** is enrolling now for a Master Watershed Steward course focusing on the San Francisco and Blue Rivers. Starting Monday evening, February 27<sup>th</sup> at the Greenlee County Supervisors' Room in Clifton, the course will run through May 5<sup>th</sup>. Monday night sessions will welcome presenters from University of Arizona,

U.S. Bureau of Land Management, U.S. Fish and Wildlife Service and local land owners and land stewards. There will also be two very interesting Saturday field trips. Adults and kids ages 16 and up are welcome. Enrollment is free. For more info write: [rivers@drgroup.net](mailto:rivers@drgroup.net) or call Deborah at 928-200-0790. The MWS course, like the rest of the program, is funded by ADEQ.



Kayaking on the San Francisco River to reach sampling points.

**ADEQ Education Master Watershed Steward Program, Phase II** - The class, now named Ecology of the Gila River in the EAC course book, is underway, and the students are having a great time. At the last class, Phil Ronnerud gave a talk on current issues in Greenlee County. The field trip on January 28 included a tour of the San Simon sub-watershed, the back country byway, and some of the sediment detention structures near the Gila River.

**The Chase Creek Business Support Center and Commercial Kitchen** was awarded a \$50,000 grant by FMI to complete construction on the kitchen facility and to help with the costs of the first year of operations. The Town of Clifton expects to open the doors to the public later this year.

**AWPF The E.coli Reduction on the San Francisco River Through Alternate Livestock Water on Kaler Ranch** - We had to make changes in the implementation plan as well as revise some permits – as there was a discrepancy in the location of the well. The plans and permits have been corrected and have gone back to the AWPF for approval.

**AWPF Eagle Creek Riparian Restoration at Filleman Crossing Project** - We have the approval from the landowner to go ahead with the project. Jan Holder is still working on final details on the contracts and agreements.

**The USFW Syfert Wildlife Watering Facility** – The Syferts are still waiting for some paperwork from the Arizona Department of Water Resources. As soon as it is complete, we will begin the permitting process.

**USFW Partners Eagle Creek Riparian Restoration at Filleman Crossing Project** - The USFW Partners program, administered by Kris Randall, has generously granted us additional funds for the Filleman Crossing Project. The additional funding will be used for permits and the re-vegetation.

**The BOR Graham County Fairgrounds Water Conservation Project** – Bill Brandau is asking the Bureau of Reclamation for an extension on the grant, as we are still working with the county on an implementation plan.

**The AWPF Gila River Water Conservation Education Program** - We are working with the City of Safford to make some changes in the program to reach the highest water users.

**AWPF Eagle Creek Riparian Restoration at Filleman Crossing Project** - We have the approval from the landowner to go ahead with the project. Jan Holder is still working on final details on the contracts and agreements.

**AWPF Eagle Creek Riparian Corridor Protection Project** - Jan Holder is still working on the contracts and agreements.



**Reduce + Save**

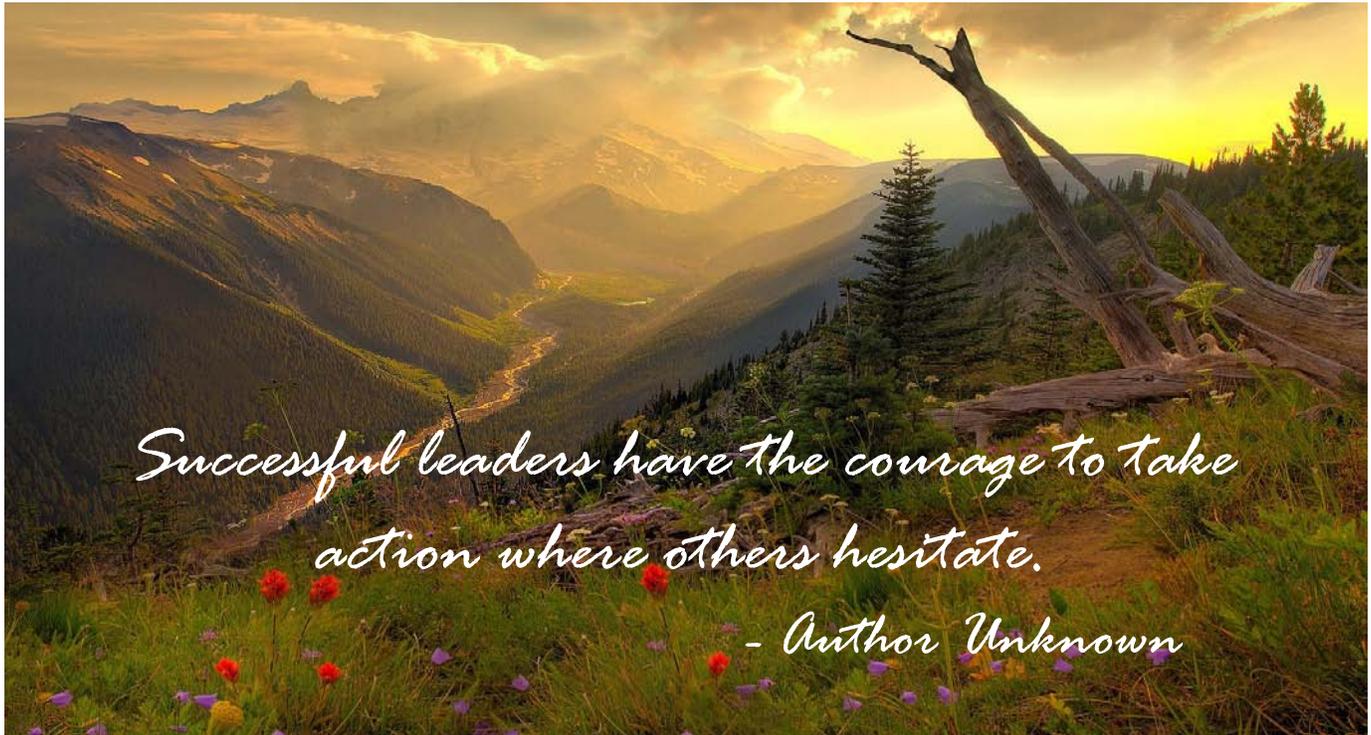
When you reduce your water usage you save money, protect local rivers, and conserve valuable agricultural water for future generations.

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**Water Counts**

**Water. Use less, get more.**

Funded by a grant from the Arizona Water Protection Fund



*Successful leaders have the courage to take  
action where others hesitate.*

*- Author Unknown*

Calendar of Events

**Wednesday, February 8, 2012,  
7 p.m.** Our meeting will be held at the Graham County General Services Building, 921 Thatcher Blvd., Safford, AZ, and will feature a talk by Anne Casey, Wildlife Biologist, USFS Safford Ranger District, speaks about the fish renovation and introductions on the Pinaleno Mountains, primarily aimed at restoring Gila Trout.

**March 29-31, 2012,**  
The Arizona Riparian Council Annual Meeting, at EAC.

Our partners include:

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| Arizona Department of Agriculture           | Discovery Park                              |
| Arizona Department of Environmental Quality | Farm Bureau                                 |
| Arizona Department of Transportation        | Freeport McMoRan Copper and Gold Inc.       |
| Arizona Department of Water Resources       | Graham County                               |
| Arizona Game and Fish Department            | Greenlee County                             |
| Arizona Geological Survey                   | Gila Valley Irrigation District             |
| Arizona State Land Department               | Natural Resource Conservation Service       |
| Bureau of Land Management                   | University of Arizona Cooperative Extension |
| City of Safford                             | University of Arizona NEMO Project          |
| Town of Thatcher                            | U.S. Fish and Wildlife Service              |
| Town of Pima                                | U.S. Forest Service – Apache                |
| Town of Clifton                             | Sitgreaves and Coronado Forests             |
| Town of Duncan                              | U.S. Bureau of Reclamation                  |
| Gila Valley NRCD                            | And many community members                  |

Get involved in your watershed

For more information, contact Jan Holder at the Gila Watershed Partnership, 711 S. 14th Avenue, 85546, 520-419-0374, email-watershedholder@gmail.com