

# Assessing and Addressing Environmental Water Demand in the Upper Gila River Watershed

by Kelly Mott Lacroix

Water is an increasingly scarce resource and is essential for Arizona’s future. With Arizona’s population growth and continued drought, citizens and water managers have been taking a closer look at water supplies in the state. Municipal, industrial, and agricultural water users are well-represented demand sectors, but water supplies and management to benefit the environment are not often considered.

The University of Arizona’s Water Resources Research Center (WRRC), through its Arizona Environment Water Needs Assessment, has assembled information essential for considering environmental water demands in discussions about water management, and is exploring how we can use this information to include the environment in water planning. The WRRC’s work, as part of the Connecting the Environment to Arizona Water Planning (EnWaP) project, supports community-based programs by quantifying environmental flow needs and informing stakeholders about the current science, providing critical information to inform planning and restoration efforts.

Humans have an interconnected and dependent relationship with the environment. Nature provides recreation opportunities, economic benefits, and water supplies to sustain our communities. For example, in 2001 a total of 9,597 angler use days were recorded in the Safford area, equating to over one million dollars in economic revenue generated by angler activity.

Although human and environmental demands are not always mutually exclusive, some streams in Arizona no longer contain perennial flows because of human water uses. The interactions between human and environmental water demands are complex, and understanding the connections between them can create opportunities for water management that is mutually beneficial.

For the entire Gila River, of which many of the perennial reaches are in the Upper Gila River Watershed, estimates of the amount of water per year currently supporting riparian and aquatic species are shown on Table 1. To put this in perspective, the Gila River’s mean annual flow at a stream gage east of Safford is 337,069 acre-feet per year.

Table 1.

	Annual Baseflow	Average Annual ET	Current Flow Supporting the Environment
	acre-feet per year		
Gila River	127,503	106,953 -151,568	234,456 - 279,071

Knowing the amount of water used by the environment can be helpful; however, it does not tell us if the environment is healthy or sustainable over the long term. If we are going to incorporate the environment into planning, we must first study the water demands of ecosystems. Environmental water demand refers to how much water a freshwater ecosystem needs to sustain itself. Arizona’s native animals and plants are dependent on dynamic flows, which are commonly described according to five elements: magnitude, duration, frequency, timing and rate of change. For example, seasonal flood events (e.g. timing) and constant flows (e.g. duration) cue important biological events, like reproduction. A local example of this is a study on the Gila River, which found that increased moisture availability (i.e. standing water) in late summer increased the productivity and breeding occupancy of the endangered southwestern willow flycatcher the following year.

So, how much water does the environment “need” to sustain itself? Table 2 provides a range of the magnitude, one element of environmental demand, of water necessary for three riparian tree communities and three fish species found in the Upper Gila River Watershed. Note that the amount of water for plants is consumptive whereas the amount of water for fish is not.

Thinking about the effects of an increased amount of standing water for birds, amount of flow through the river for fish, and amount of water consumption by plants for Gila River provides an idea of how complicated it can be to consider water for the environment. In truth, however, anticipating environmental demands is not too dissimilar from what municipal, agricultural or industrial water providers must also consider. For example, to plan for water demands in a municipality the water provider must consider: how much flow is needed (magnitude); when peak flows may occur so that sufficient supply is available (timing) and how long those flows will be necessary (duration); when high and low demand occurs (frequency); and how quickly demand for water increases or decreases (rate of change).

On July 11<sup>th</sup>, Kelly Mott Lacroix from the WRRRC will explore how the WRRRC can help apply available information on water demands for humans and the environment to water planning efforts in the Upper Gila River Watershed. She will also discuss both the need for environmental water planning and how we can identify voluntary, stakeholder driven options for addressing the environment in the context of limited water supplies and existing water rights.

Table 2

	Evapo-transpiration in feet per year	Gallons per second of stream flow
Mesquite forest	1.2 - 3.4	--
Saltcedar	1.2 - 2.4	--
Cottonwood-Willow	1.3 - 6.6	--
Desert Sucker	--	37-224
Longfin Dace	--	22-224
Sonora Sucker	--	187-374

# Project and Program Status Report

**The AWPf Gila River Restoration Project at Apache Grove** – Natural Channel Design has been adding some enhancements to the project. A total of 150 feet of brush revetments were added to the project by an American Conservation Experience (ACE) crew. The ACE crew improved one of the river banks where a head cut had formed, they re-sloped the banks and added erosion control fabric to stabilize the area. In addition, the crew completed a follow-up treatment on the re-sprouting tamarisk and tree of heaven, *Ailanthus altissima*.



Tree of heaven, *Ailanthus altissima*

**AWPF The E.coli Reduction on the San Francisco River Through Alternate Livestock Water on Kaler Ranch** – We are working on the education and outreach for the project, as well as scheduling photo monitoring and E.coli monitoring.

**AWPF Eagle Creek Riparian Corridor Protection Project** - The landowner, Darcy Ely, is taking GPS readings and completing the pre-project photo monitoring, and Jan Holder is working on the implementation plans.

**The Business District Façade Improvement Project** The program is complete. We will have a final report in August.

**The BOR Graham County Fairgrounds Project** – Graham County has purchased a reverse osmosis system to help the highly saline water from the fairgrounds well. Once installed, Bill Brandau will determine how best to utilize the BOR grant funds to enhance the system. Once completed, the system will produce approximately 100,000 gallons of clean, usable water.

**AWPF Eagle Creek Riparian Restoration at Filleman Crossing Project** – The AWPf has granted us an extension on the project.

**The USFW Syfert Wildlife Watering Facility** – This project will establish water for wildlife in an area that has no other water for wildlife for many miles. It will be on the Syfert's ranch approximately 30 minutes outside of Safford. Dan Taylor, from Bat Conservation International, and Tom Biebighauser, with the U.S. Forest Service Center for Wetlands and Stream Restoration designed the project. We have an approved budget, and we are scheduling the archeological clearance and getting bids from contractors to be ready for and October construction schedule.

**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.

**ADEQ Education Master Watershed Steward Program, Phase II** – The next class will start August 30. Deborah Mendelsohn will be helping with the outreach for the program this fall.

**AWPF Eagle Creek Riparian Restoration at Filleman Crossing Project** - We have received a grant extension from the AWPf for two years to complete this project.

**E. coli Reduction on the San Francisco and Blue Rivers project** The Watershed Improvement Plan (WIP) is complete, and is ready to send to ADEQ and the EPA for their approval. Jan Holder is hard at work on the final report for the project. The project has taken us three years of hard work, but we are very proud of the hard work completed by the project coordinator, Deborah Mendelsohn, the Watershed Improvement Council, and all of the many volunteers. Hopefully, ADEQ will fund the Best Management

Practices (BMPs) recommended in the WIP that will eliminate the *E.coli* in the San Francisco and Lower Blue Rivers. Ms. Mendelsohn will be giving us a full report at our October Meeting

**The AWPf Gila River Water Conservation Education Program** – The water audit crew is continuing its work with the municipalities, the businesses and homeowners.

## A note from your new Editor:

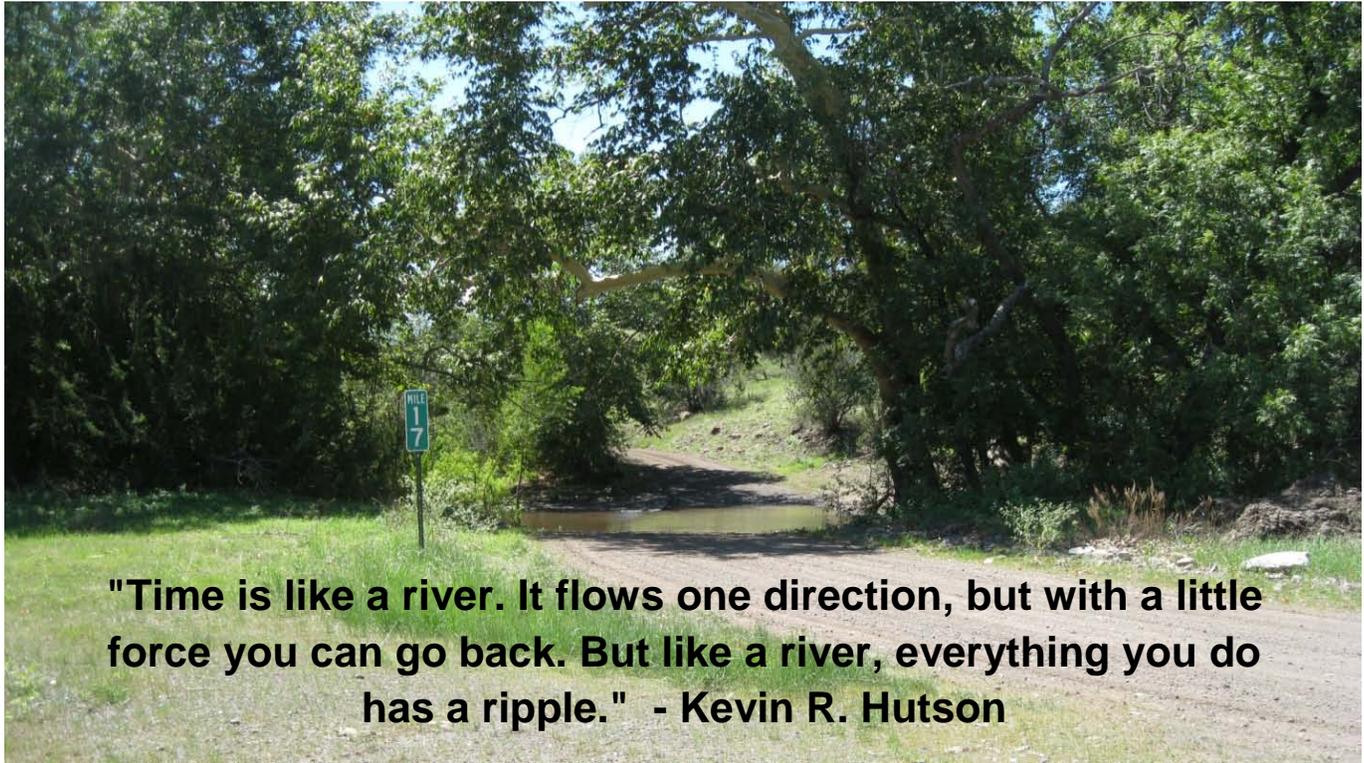
“Greetings from your new newsletter Editor, Robert L. Porter. I have volunteered to assist the Gila Watershed Partnership and help out Jan Holder, your hardworking Executive Director by editing the newsletter. I contacted Kelly Mott-Lacroix to prepare the article. Morgan Herbert assembles the newsletter each month. I will include a photograph of a tributary of the Gila River each month. This month’s photograph is of the Filleman Crossing on the Upper Eagle Creek. Our fresh water resources are so important to sustaining our environment, life, and civilization. I look forward to helping with the newsletter. In the future, I will ask our officers to include a brief message about any issues that are important to them.”

Sincerely,



Robert L. Porter, PE

Editor



**"Time is like a river. It flows one direction, but with a little force you can go back. But like a river, everything you do has a ripple." - Kevin R. Hutson**

Calendar of Events

**Wednesday, July 11, 2012 at 7 p.m.** - Kelly Mott Lacroix will tell us about how the U of A Water Resources Research Center is exploring ways to meet our water challenges, and Ben Johnson, from the Coronado Forest will be speaking about some interesting Forest Service programs.

**Wednesday, August 8, 2012 at 7 p.m.** - Seth Shafiqullah, U.S.F.S. on the priority watersheds in the Coronado Forest.

**Wednesday, September 12, 2012 at 7 p.m.** - Season Martin from the Tamarisk Coalition, will make a presentation on the tamarisk leaf beetle and its potential impacts.

Our partners include:

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