



RIPARIAN FUNCTIONS AND VALUES

REPRINTED WITH PERMISSION FROM THE ARIZONA RIPARIAN COUNCIL

We often hear it said that riparian ecosystems have many “functions and values.” What do these terms really mean? Function, according to *Webster’s Ninth New Collegiate Dictionary*, is defined as “the action for which a thing exists.” In other words, a purpose.

Some of the many functions or purposes of riparian ecosystems are listed below:

- Improve water quality by filtering out toxic compounds
- Stabilize water supply and moderate floods
- Reduce soil erosion and stabilize stream banks
- Increase *biodiversity* by providing plant and animal habitats
- Provide recreation sites

Value is defined as relative worth, utility, or importance to humans. People place a high value on many of the above functions. Riparian areas must be properly managed in a healthy condition to maintain these important functions.

WATER QUALITY

One function of riparian areas is improvement of water quality. Many human activities release pollutants into the environment. Water flowing over the landscape eventually carries these pollutants into streams. For example,

chemicals such as pesticides, herbicides, or toxic metals can wash into streams from farms, urban areas, or industrial areas.

When pollutants are too abundant in the water, they can be harmful to humans or other species that drink or live in the water.

Riparian areas help maintain the balance of the ecosystem. For example, streams that are surrounded by a riparian forest often have high water quality, meaning that they have low concentrations of harmful chemicals or pollutants. The riparian forests help *buffer* the stream from some sources of contaminants, in addition to reducing the potential for these contaminants to reach the water table. Through root absorption, these elements are kept from entering the aquatic system.

Plants also absorb nutrients, which in large amounts may decrease water quality. For example, roots of riparian forests absorb nutrients, such as nitrogen and phosphorus, from the groundwater or soil water, and transport the nutrients to the atmosphere or the soil surface. This occurs through the plant’s process of metabolism or photosynthesis. Oxygen is released as a by-product of photo synthesis into the atmosphere. The nutrients are returned to

the soil surface through decomposing plant litter (i.e., leaves, branches). This natural filtration function is valuable because water purification by artificial means can be expensive.

WATER SUPPLY AND FLOOD MODERATION

Riparian forests consume water, but at the same time contribute to a more stable water supply in the stream. The water consumed by riparian plants allows them to stay cool, to grow tall shady canopies, and to produce food for animals. The dense vegetation also aids in the development of sponge-like soils that serve to retain water. The stems of the plants help to trap small, fine textured soil particles on the floodplain, while the leaves add organic matter to the soil as they fall and decompose. The leaves that fall into the water also provide food for aquatic wildlife. The vegetation itself serves as a shield or creates a boundary layer over the stream and soil, preventing the wind from carrying the moisture away through evaporation.

The abundant root systems of riparian plants prevent the streamside soil from washing downstream. The sponge-like soils store water when it is abundant during floods and rains, and slowly release it back into the stream during drier parts of the year. This function is called *bank storage* of water, and helps ensure a more stable supply of water in the river.

Riparian areas also moderate flood flows. The dense vegetation in the floodplain helps to slow the velocity (speed) of the floodwaters, and to reduce the destructive power of the water to downstream areas. Vegetation also can force the waters to spread laterally from the stream; thus, it is important to minimize the amount of human development within the flood plain, even on high floodplain *terraces* that flood only infrequently. A very good example of why floodplains should not be extensively developed is the 1993 flood of the Mississippi River. Clearing of the floodplain and construction of levees along the river only made the floodwaters travel faster and more destructively downstream.

STREAMBANK STABILIZATION

The roots of riparian plants help stabilize stream bank soils and prevent soil from washing downstream during floods. The large, wide-spreading roots of riparian trees work together with the dense network of grass roots to stabilize the soils. At high elevation areas, the coverage by grasses, sedges, and rushes

helps keep banks warmer during the winter. These warmer conditions prevent the banks from being sloughed off as easily by freezing and fracturing.

Without this functional role of the riparian vegetation, channels become wide and unstable, and much soil and sediment is washed downstream. If you see a stream that has soil stabilization structures (such as *riprap*) along its banks, this is a sign that something is preventing the riparian zone from performing its natural functions.



Gila Box Riparian National Conservation Area

BIODIVERSITY

Providing habitat for animals, plants, and other life forms is one of the many important functions provided by riparian ecosystems. In semi-arid regions such as much of Arizona, dry conditions and high temperatures make for harsh living conditions. Several types of animals and plants are specialized to live in such arid conditions, but many others need cooler, wetter places in which to live. Riparian areas provide these conditions and serve as home to a great variety of organisms.

Over one-half of all animal species in Arizona depend on riparian areas for their existence. Some animals such as frogs, otters, beavers, some lizards, and birds live in riparian areas year round and are considered to be *obligate riparian species*. Many others such as javelina and deer occur in the surrounding desert but also rely on the riparian area as a source of water, food, and cover. These animals are *facultative riparian species*.

There are also many types of obligate riparian plants—cottonwood trees, for example—that naturally grow nowhere else but in riparian areas. Others such as mesquite trees grow both in the desert and the riparian zone. Because riparian areas provide such a diversity of growing conditions—with varying types of soils, varying amounts of moisture, and varying amounts of sunlight—they host a large diversity of plant species. For example, along a five-mile stretch of the Hassayampa River in central Arizona, there are more than 300 different types of plant species!

Because each riparian area is somewhat different, each contains a somewhat different assemblage of plant species. Just as no two snowflakes are alike, no two riparian areas are exactly alike.

RECREATION

Humans are attracted to riparian areas for many of the same reasons as animals. During the hot summer, we appreciate the shade and cooler temperatures of riparian forests, and year round, we appreciate their beauty.

Riparian areas are used recreationally for bird watching, picnicking, hiking, and many other activities. Some recreational activities if done in excess can damage riparian areas, such as indiscriminately driving off-road vehicles.

Riparian areas are for all of us—humans and wildlife alike. We all rely on them for water and must respect and maintain them for the present and future.

HOW TO LEARN MORE AND GET INVOLVED

- Please visit and enjoy our riparian areas but take care of them.
- Go to several different riparian areas and observe how people use them recreationally.
- Pick your own stretch of a stream to study. Take note of how it is used and how the vegetation and channel change over time.
- Keep a photographic diary of a stream by taking pictures of the exact same locations several times a year for several years.
- Don't drive off-road vehicles indiscriminately.
- Don't hack branches off trees for firewood or use them for target practice.
- Make sure you pick up all your trash and dispose of it properly. Riparian areas are not dumpsites. Don't dump used chemicals, abandon cars, etc. in them. Remember it will eventually affect your water supply!

GLOSSARY

Bank Storage - Soaking up of excess available water in the banks of a stream, which is then slowly released back into the stream.

Biodiversity - The wide variety of different life forms that occur in an area.

Buffer - To lessen the impact, cushion.

Ecosystem - The complex of living organisms and their environment functioning as a unit in nature.

Facultative riparian species - Plants and animals that use riparian areas, but are not restricted to spending their entire life there.

Obligate riparian species - Plants and animals that must remain in the riparian zone in order to survive.

Riprap - A foundation or sustaining wall made of stones, or chunks of concrete thrown together randomly on a stream bank to prevent erosion.

Terrace - A relatively level plain usually with a steep front bordering a river, stream, or lake.

This article is reprinted courtesy of the Arizona Riparian Council. The Arizona Riparian Council was formed in 1986 by individuals interested in the conservation of riparian areas in Arizona and throughout the West. Its members are from various academic, private, and state and federal agencies. Anyone interested in helping preserve and protect Arizona's riparian areas is invited to become a member.

OTHER AVAILABLE FACT SHEETS

Call the Arizona Riparian Council at (480) 965-2490 or write to us at:
Arizona Riparian Council
Center for Environmental Studies
Arizona State University
Box 873211
Tempe, AZ 85287-3211
<http://azriparian.asu.edu>

Project and Program Status Report

The AWPFF Gila River Restoration Project at Apache Grove – We will continue monitoring the project to document the success of the project. If you would like to be part of the monitoring team, let us know.

AWPFF The E.coli Reduction on the San Francisco River Through Alternate Livestock Water on Kaler Ranch – The well installation is complete. We will soon complete a round of photo monitoring to document the success of the project. We will complete another photo monitoring session and test for *E.coli* in the San Francisco River one year after project completion.

The Chase Creek Business Support Center and Commercial Kitchen continues to move toward opening later this year.

The BOR Graham County Fairgrounds Project – The project is on hold waiting for Graham County.

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. We are starting the permitting process and we will be doing construction this fall.

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

The Business District Façade Improvement The program is complete.

AWPFF Eagle Creek Riparian Restoration at Filleman Crossing Project - We have received an extension for two years to complete this project.

E. coli Reduction on the San Francisco and Blue Rivers project has wrapped up its Master Watershed Steward course. They are completing a Watershed Improvement Plan to be submitted to ADEQ and EPA. Proposed Best Management Practices were presented to the watershed improvement council on June 8, with assistance from Drs. Channah Rock and Phil Guertin. June will also see signage that was created in collaboration with Freeport McMoRan Copper & Gold, Inc., on the San Francisco River. The signs will encourage visitors to keep the river clean.

USFW Partners Eagle Creek Riparian Restoration at Filleman Crossing Project - The USFW Partners program, has generously granted us additional funds for the project.

ADEQ Education Master Watershed Steward Program, Phase II – The next class will be held in the fall.

AWPFF Eagle Creek Riparian Corridor Protection Project - The landowner, Darcy Ely, is taking GPS readings and completing the pre-project photo monitoring.

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

Assessing and Addressing the Water Demands of the Environment in Southeastern Arizona

At our July 11 meeting, Kelly Mott Lacroix from the University of Arizona Water Resources Research Center (WRRC) will be making a presentation about how the WRRC is exploring ways to meet the challenge of water for the environment in Arizona. She will tell us how the WRRC can help us apply available information about desert rivers and riparian areas to water planning in our region and help identify stakeholder driven options for addressing the environment in the context of limited water supplies and existing water rights.

I arise in the morning torn between a desire to improve the world and a desire to enjoy the world. This makes it hard to plan the day.

- E. B. White



Calendar of Events

Wednesday, June 13, 2012, at 7 p.m. - Heidi Blasius, BLM biologist, on the Porter Wash Restoration Project

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 the challenge of water for the environment in Arizona. They are working to identify, understand, and develop local solutions to water-related environmental challenges.

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

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 NEMO Project
- 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