



Why should we care about bats?

Bats are essential to the health of our natural world. They help control pests and are vital pollinators and seed-dispersers for countless plants. Yet these wonderfully diverse and beneficial creatures are among the least studied and most misunderstood of animals.

Centuries of myths and misinformation still generate needless fears and threaten bats and their habitats around the world. Bat populations are declining almost everywhere. Losing bats would have devastating consequences for natural ecosystems and human economies. Knowledge is the key. Bat Conservation International has been combining education, research and conservation to protect bats worldwide since 1982.

The more than 1,200 species of bats – about one-fifth of all mammal species – are incredibly diverse. They range from the world's smallest mammal, the tiny bumblebee bat that weighs less than a penny to giant flying foxes with six-foot

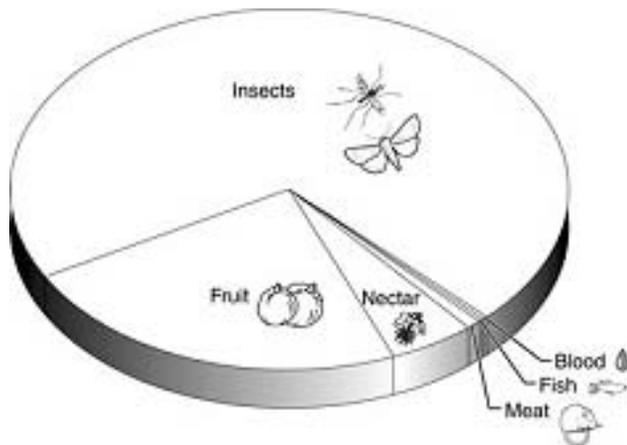
wingspans. Except for the most extreme desert and polar regions, bats have lived in almost every habitat on Earth since the age of the dinosaurs.

Bats are primary predators of night-flying insects, including many of the most damaging agricultural pests and others that bedevil the rest of us. More than two-thirds of bat species hunt insects, and they have healthy appetites. A single little brown bat can eat up to 1,000 mosquito-sized insects in a single hour, while a pregnant or lactating female bat typically eats the equivalent of her entire body weight in insects each night.

Almost a third of the world's bats feed on the fruit or nectar of plants. In return for their meals, these bats are vital pollinators of countless plants (many of great economic value) and essential seed dispersers with a major role in regenerating rainforests. About 1 percent of bats eat fish, mice, frogs or other small vertebrates.

Only three species, all in Latin America, are vampires. They really do feed on blood, although they lap it like kittens rather than sucking it up as horror movies suggest. Even the vampires are useful: an enzyme in their saliva is among the most potent blood-clot dissolvers known and is used to treat human stroke victims.

Benefits of Bats



Bats are hard at work around the world, fulfilling tasks that are vital to healthy ecosystems and human economies. Many of the more than 1,200 bat species consume vast amounts of insects, including some of the most damaging agricultural pests. Others pollinate countless plants, ensuring the production of fruits that support local economies, as well as diverse animal populations. Fruit-eating bats in the tropics disperse seeds that are critical to restoring cleared or damaged rainforests. Even bat droppings (called guano) are valuable as a rich natural fertilizer. Guano was a major natural resource in the United States a century ago, and it's still mined commercially in many countries.

Some biologists consider bats a "keystone" component of ecosystems in parts of the tropics and deserts. Without bats' pollination and seed-dispersing services, local ecosystems could gradually collapse as plants fail to provide food and cover for wildlife species near the base of the food chain. Consider the great baobab tree of the East African savannah. It is so critical to the survival of so many wild species that it is often called the "African Tree of Life." Yet it depends

almost exclusively on bats for pollination. Without bats, the Tree of Life could die out, threatening one of our planet's richest ecosystems.

Pest control

Insectivorous bats are primary predators of night-flying insects, and many very damaging pests are on their menu. Pregnant or nursing mothers of some species will consume their body weight in insects each night. A single little brown bat can eat more than 1,000 mosquito-sized insects in just one hour.

The millions of Mexican free-tailed bats at BCI's Bracken Cave in Central Texas eat up to 200 tons of insects each summer night. And a favorite target of Mexican freetails in the United States and Mexico is an especially damaging moth called the corn earworm moth (aka cotton bollworm, tomato fruitworm, etc.) that attacks a host of commercial plants from artichokes to watermelons. Worldwide crop damage from this moth is estimated at more than \$1 billion a year, and recent research concluded that freetails are so effective that they save farmers in south-central Texas up to \$1.7 million a year in pesticide costs. That, of course, means fewer pesticides enter the ecosystem.

Pollinators

From deserts to rainforests, nectar-feeding bats are critical pollinators for a wide variety of plants of great economic and ecological value. In North American deserts, giant cacti and agave depend on bats for pollination, while tropical bats pollinate incredible numbers of plants.

Most flowering plants cannot produce seeds and fruit without pollination – the process of moving pollen grains from the male part of the flower (the stamen) to the female part (the pistil). This process also improves the genetic diversity of cross-pollinated plants. Bats that drink the sweet nectar inside flowers pick up a dusting of pollen and move it along to other flowers as they feed.

A few of the commercial products that depend on bat pollinators for wild or cultivated varieties include: bananas, avocados, dates, figs, peaches, mangoes, durian, cloves, cashews, carob and balsa wood.

Seed dispersers

Vast expanses of the world's rainforest are cleared every year for logging, agriculture, ranching and other uses. And fruit-eating bats are key players in restoring those vital forests. Bats are so effective at dispersing seeds into ravaged forestlands that they've been called the "farmers of the tropics."

Regenerating clear-cut forests is a complex natural process, one that requires seed-scattering by birds, primates and other animals as well as bats. But birds are wary of crossing large, open spaces where flying predators can attack, so they typically drop seeds directly beneath their perches. Night-foraging fruit bats, on the other hand, often cover large distances each night, are quite willing to cross clearings and typically defecate in flight, scattering far more seeds than birds across cleared areas.

And many of the bat-dispersed seeds are from hardy pioneer plants, the first to grow in the hot, dry conditions of clearings. As these plants grow, they provide the shelter that lets other, more delicate plants grow. Seeds dropped by bats can

account for up to 95 percent of the first new growth. The pioneer plants also offer cover and perches for birds and primates, so they can add still more, different seeds to the mix that can lead eventually to a renewed forest.

Water for Wildlife

In the Western United States, the availability of safe and accessible water supplies can be a limiting factor for bat populations. Bats are especially dependent on available water sources, since they sometimes lose up to 30% of their body weight daily to evaporative water loss.

The distribution and abundance of natural water supplies in the West has decreased dramatically over the past century, largely because of expanding human populations and agriculture.

Climate models predict additional reductions, further threatening these bat populations. As natural sources of water have disappeared, livestock watering facilities have become a critical resource for bats and other wildlife. But since these facilities weren't designed with wildlife in mind, they often trap and drown bats and other animals that fall in

while attempting to drink or bathe.

Fencing, bracing and other obstructions can impede access for bats, which must drink while in flight from pooled water. Ponds and troughs often go dry during heat waves and drought, when bats' water needs are greatest.



This Townsend's big-eared bat is just one of the dozens of Western bat species that depends on livestock water developments to meet their daily water requirements

Project and Program Status Report



Allen Haden, an ecologist with Natural Channel Design, demonstrating revegetation techniques during the field trip at the Apache Grove Riparian Restoration project.

The AWPf Gila River Restoration Project at Apache Grove – The project was highlighted at the Arizona Riparian Council’s annual meeting which opened Thursday, March 29. The meeting began with a workshop by Stephanie Yard and Alan Haden from Natural Channel Design. They enlightened us on how they designed the project to restore the function of the river by removing levees to reduce the risk of erosion and land loss, re-contouring the river banks, managed the invasive salt cedar, and re-vegetated the riparian area with native plants.

On Saturday, we visited the project site, along with a number of local farmers. The work will continue with follow-up spraying of any salt cedar regrowth, monitoring, and more education and outreach.

AWPF The E.coli Reduction on the San Francisco River Through Alternate Livestock Water on Kaler Ranch – The off riparian well is complete, and the engineer – Robert Porter with Souder Miller and Associates will be going up and checking the construction next week. The contractor did a great job on the project. Removing the Kaler livestock will have profound impact on the health of the San Francisco River, which is listed as impaired for *E.coli* on the EPA’s 303(d) list of impaired waters.

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

The Business District Façade Improvement program is moving toward the wrap-up of its last projects in Clifton and Duncan. The program is funded by Freeport McMoRan Copper & Gold Foundation. Nearly 40 building facelifts will be completed by the end of April.

The BOR Graham County Fairgrounds Project – More details should be available next month.

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 – The Syferts are still waiting for some paperwork from the Arizona Department of Water Resources.

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 Chase Creek Business Support Center and Commercial Kitchen The Chase Creek Business Support Center and Commercial Kitchen has done some finish work on its facility. The Town of Clifton expects to open the doors to the public later this year.

ADEQ Education Master Watershed Steward Program, Phase II - This semester’s class culminated with an extra field trip to the Arizona Riparian Council Annual Meeting field trip at the farm of Larry Barney, where they visited the Apache Grove river restoration project.

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.

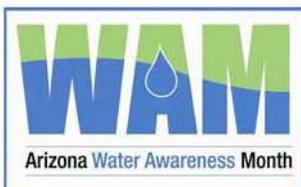
E. coli Reduction on the San Francisco and Blue Rivers project continues its Watershed Steward course focusing on the San Francisco and Blue Rivers. In this past month, BLM's Chris Morris and Rich Law and Greenlee County's Phil Ronnerud led sections of a field trip through parts of the San Francisco River near Clifton. Dr. Channah Rock presented on *E. coli* and other enteric pathogens of concern in recreational waters in the watershed. BLM's Tim Goodman and U.S. Fish & Wildlife's Kris Randall gave a thorough grounding in Threatened & Endangered Species concerns in the watershed and opportunities that landowners have to protect and improve habitats. Kris followed with a presentation on regional birds.

The next week, "Reptilist" Terry Johnson brought live rattlesnakes and a Gila monster and gave a presentation on all the reptiles and amphibians of the

watershed; BLM's Heidi Blasius wowed the group with her facts on and photos of aquatic life, particularly T&E species.

Finally, Phil Ronnerud shared his research on the complex history of land uses in the watershed, starting with the beginning of historical times. This was followed by a panel on livestock grazing, with Jeff Menges, Eric and Jean Schwennesen and BLM's Dave Arthun offering expert experience and perspective.

The AWPf Gila River Water Conservation Education Program – The water audit crew are hard at work performing water audits to over 100 of the high water users identified by the City of Safford. The water audits are free to residents, business owners or municipalities.

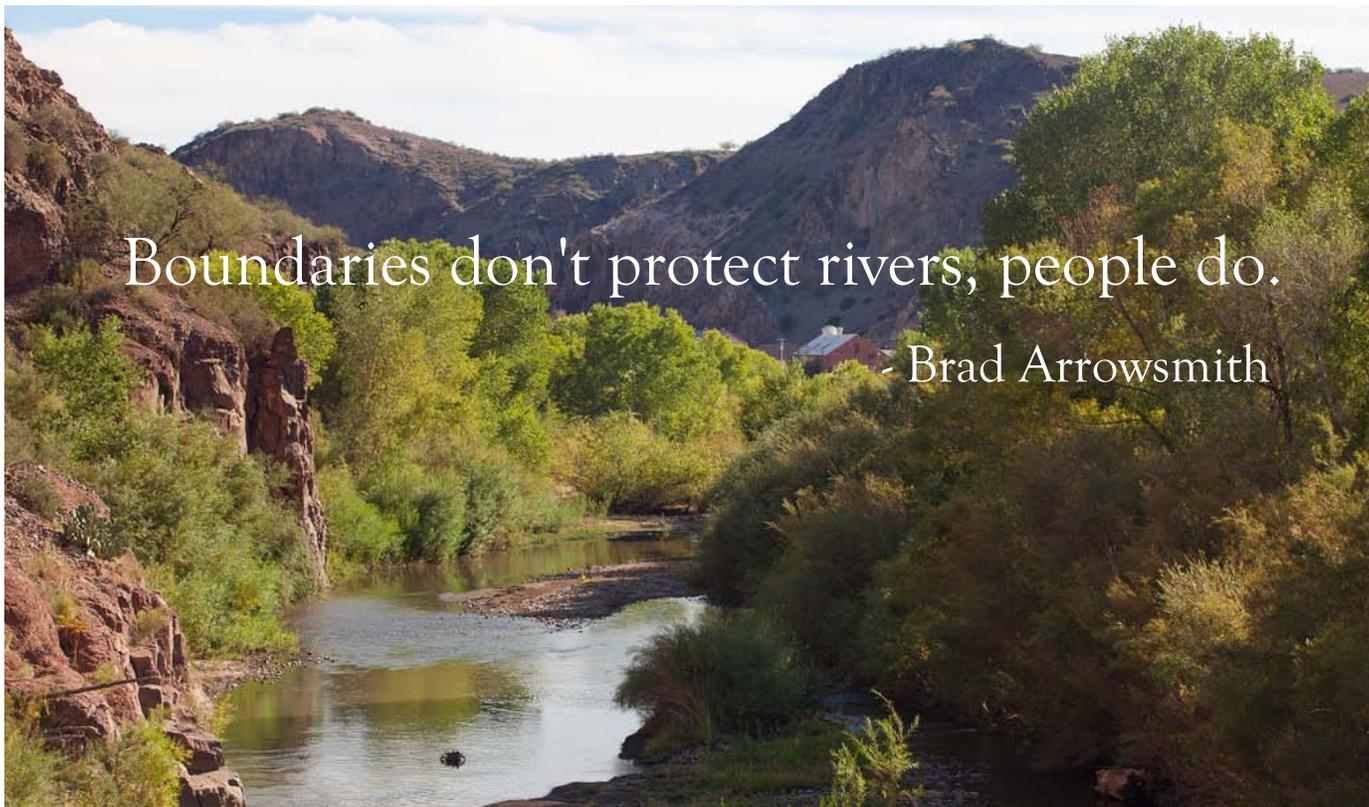


April is WATER AWARENESS MONTH in Arizona, and the Department of Water Resources and its partners are working to raise awareness about the importance of using water more efficiently. See what you can do to participate at: www.waterawarenessmonth.com.

APRIL

Arizona's Water Awareness Month is full of surprises

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| 1 NO FOOLING Save Water | 2 Don't Let Your Money Go Down the Drain | 3 What's Your Water Footprint? | 4 diy Landscape | 5 Cleanliness is next to water savings-ness | 6 Find Inspiration at the Garden | 7 WATERING YOUR LANDSCAPE IS EASY AS 1 2 3 |
| 8 Choose Desert Plant Survivors Over Revivors | 9 REBATES LET'S GO SHOPPING! | 10 RULE THE YARD AUTO-MAGICALLY | 11 Only Rain in the Storm Drain | 12 THE FORECAST FOR TODAY IS DRY | 13 From Snowflake to Tap | 14 Shop EPA WaterSense TO SAVE \$\$\$ |
| 15 The Water (Re)Cycle | 16 Quality Over achievers | 17 Streams of Life | 18 Get Smart! Go to a class | 19 Be cool with your pool | 20 Volunteers Make a World of Difference | 21 The Pavement Isn't Thirsty |
| 22 Happy Earth Day | 23 $H^2O = E$ Water = Energy | 24 The True Cost of Bottled Water | 25 ASK THE WATER EXPERTS | 26 GROW GREEN KIDS | 27 Lawn Envy | 28 RAINWATER! IT'S FREE, FRESH, AND FILLING |
| 29 Treat it with Care. Give it Clean Water, and Feed it Fresh Air | 30 CHOOSE HOW YOU USE | | | | | |



Boundaries don't protect rivers, people do.

- Brad Arrowsmith

Calendar of Events

Wednesday, April 11, 2012

7 p.m. Our meeting will feature Dan Taylor, with Bat Conservation International, who will talk to us about bats, bat habitat, bat food, and bat hobbies.

All Month in April !

Celebrate Water Awareness Month all 30 days with the Department of Water Resources and the Gila Watershed Partnership.

Wednesday, May 9, 2012

7 p.m. Our meeting will feature Terry Johnson, the Reptilist, who will introduce us to some affable and

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