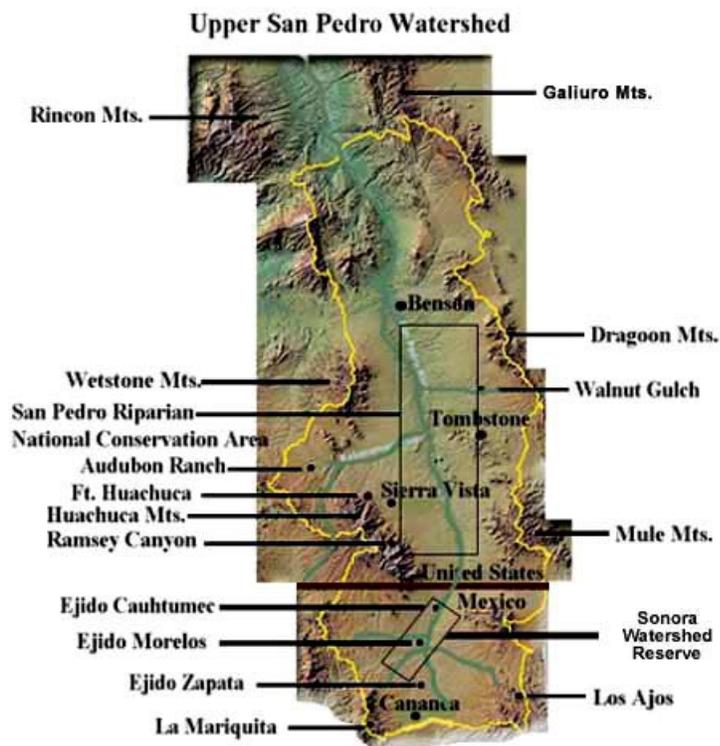


## At home on the San Pedro

The San Pedro River flows from its headwaters in Mexico into southern Arizona, where it enters a 40-mile protected stretch known as the **San Pedro River National Conservation Area (SPRNCA)**. It meanders 100 more miles north until it empties into the Gila River. These 140 miles of river comprise one of the healthiest and most diverse desert riparian areas in the Southwest. According to The U.S. Bureau of Land Management (a member of the Upper San Pedro Partnership), “more than 80 species of mammals, 40 species of reptiles and amphibians, 100 species of butterflies, 20 species of bats, and 350 species of birds live or migrate along its riverbanks.” In Arizona, 60 to 75 percent of wildlife species depend on riparian habitats to survive. Most of the once-common riparian areas in the Southwest have dried up due to over-pumping of groundwater or the diversion of water for agricultural and urban uses, but the San Pedro River is a survivor that has helped to serve our human needs since people first lived here over 11,000 years ago.



## Riparian areas change over time

Rivers and their surrounding areas transform over time, due to drought, fire, and flood, as well as human-caused changes

such as groundwater pumping, dredging, and damming. The green habitat that winds through the desert along the banks of the San Pedro has not always looked as it does today, and it will continue to change because of natural and human impacts.



*San Pedro River in front of the snow-capped Huachuca Mountains.*

Shifts in the way we use the land and the river drive the changes that scientists see in riparian area vegetation. Prehistoric hunters chased mammoths and bison through this area 11,000 years ago, when the San Pedro flowed through lush lowland grasses and upland valleys dotted with open woodlands of juniper, oak, and pinyon pine. One thousand years ago, early Hohokam farmers caught fish and used water from the San Pedro to grow crops, and set fires to maintain the grasslands and **cienegas** (treeless marshes) that dominated the area for thousands of years.

Scientists have found that complex patterns of change in the cottonwood forests have been set in motion by channel entrenchment that began in the early 1900's. The deepening of the San Pedro's channel



Notice how much the river changes with the seasons at this one location. (Photo courtesy of the Nature Conservatory)

and subsequent widening offered an entirely new stage upon which plants could grow. Recent human impacts, including groundwater pumping, may again change how the San Pedro looks in the future if groundwater availability near the river changes.

## Go with the flow

Even a single section of the river can look quite different over the course of a year. In **perennial** parts of the San Pedro, water flows year-round, but increases substantially during the summer monsoon. **Intermittent** stretches of the river remain dry for several months of the year, and have different vegetation patterns. Pictured above, a perennial stretch of the San Pedro River is shown at three different times during the year.

Vegetation varies from stream edge to the uplands, depending partly on its water source. Some plants are sustained by the river's subsurface flow (the shallow groundwater) while others take advantage of flood waters from winter and monsoon rains. Plants also become increasingly reliant on rainfall rather than groundwater as their distance from and above the river channel increases.

Cottonwood and willow are almost entirely dependent on groundwater and are very sensitive to changes in groundwater levels due to drought, over-pumping, or channel entrenchment. Flooding can also deepen and widen a river channel and cause a drop in available groundwater levels for vegetation.

## Location, location, location (upstream vs. downstream)

Riparian vegetation also shows patterns of change related to location upstream or downstream. Over the length of

the San Pedro River there are shifts from sacaton grasslands in upper reaches to mesquite forests in lower reaches, and corresponding shifts from older to younger cottonwood forests. Floods and fires can alter an area by reducing the leafy forest canopy and the forest floor litter layer. Other plant species can then establish themselves in the sunny, bare soil. Changing rates of **groundwater inflow** (water flowing from the groundwater aquifer into the stream) can also influence what grows in these marshy areas. As **surface flows** become intermittent, more drought-tolerant and deeper-rooted invasive species can move in.

## Ecosystem services

The San Pedro River provides benefits and services beyond the natural beauty and critical habitat for thousands of life forms. These benefits are sometimes called **ecosystem services**. We get flood protection for our human structures when wetland areas absorb large amounts of water during floods. We get erosion control when plant roots hold soil and river banks in place. The quality of our drinking water improves as plants pull out toxins, nitrogen, and phosphorous from the river. These benefits are compromised as the river becomes increasingly intermittent. The protection of the SPRNCA is in the hands of **Bureau of Land Management (BLM)**, also a member of the Upper San Pedro Partnership. Its work will continue to help ensure the future of the riparian ecosystem, which in turn may help to ensure our future within it.

### FIND OUT MORE...

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