

Wild Wednesday 11 November 2020 Alamos by Walt Anderson

Remember the Alamo! No, I don't mean the fort captured by Mexican General Santa Ana in 1836 when Davy Crockett, Jim Bowie, et al. were killed in battle. I mean the tree that fort (earlier a mission) had been named for—the cottonwood, “alamo” in Spanish.

Remember the Alamo! Became a battle cry, and we might want to adopt the same, for cottonwoods epitomize riparian areas, wooded wetlands that have been reduced in the Southwest by over 90%. The Nature Conservancy (TNC) has identified Fremont Cottonwood-Goodding Willow gallery forests as the rarest forest type in North America.

There are many places in Arizona where groundwater pumping, altered hydrology as dams constrain natural stream flow, grazing that inhibits seedling recruitment, urban development, mining, and more have eliminated or reduced cottonwoods to pitiful remnants. In some places, you see magnificent old trees but no younger generation coming up to replace them.

But there is good news. Cottonwoods are a marvelously adapted early successional species that can come back if their stressors are removed. Look at the glorious riparian area in Wickenburg today, where the highly degraded streambed was purchased and protected by TNC.

In the Granite Dells, cottonwoods are a dominant species along Granite and Willow Creeks and help support the high biodiversity that makes this range so special. So many other species depend upon this ecosystem for their livelihoods, and we people love them too. They are a treasure that we should make every effort to protect, and we are very hopeful that the City soon completes the annexation deal with Arizona Eco Development that would protect the lovely cottonwood-lined creek that makes the Peavine and Iron King Trails so special.

Let me take you through some cottonwood natural history illustrated with photos. When you have finished this storyline, I hope you too will remember the Alamo!



Big cottonwoods standing in isolation are a familiar scene in Arizona. This veteran (on Veteran's Day, no less) may have witnessed many changes in the landscape over the past century, but its life span is nearing its end. Cottonwoods grow fast but die young, as trees go. The lack of progeny here may reflect its lonely isolation (each cottonwood has either male or female flowers, but not both) or the history of grazing that mowed down little ones before they could grow up. It also could simply reflect the altered hydrology, as conditions under which these plants get established are pretty specific.



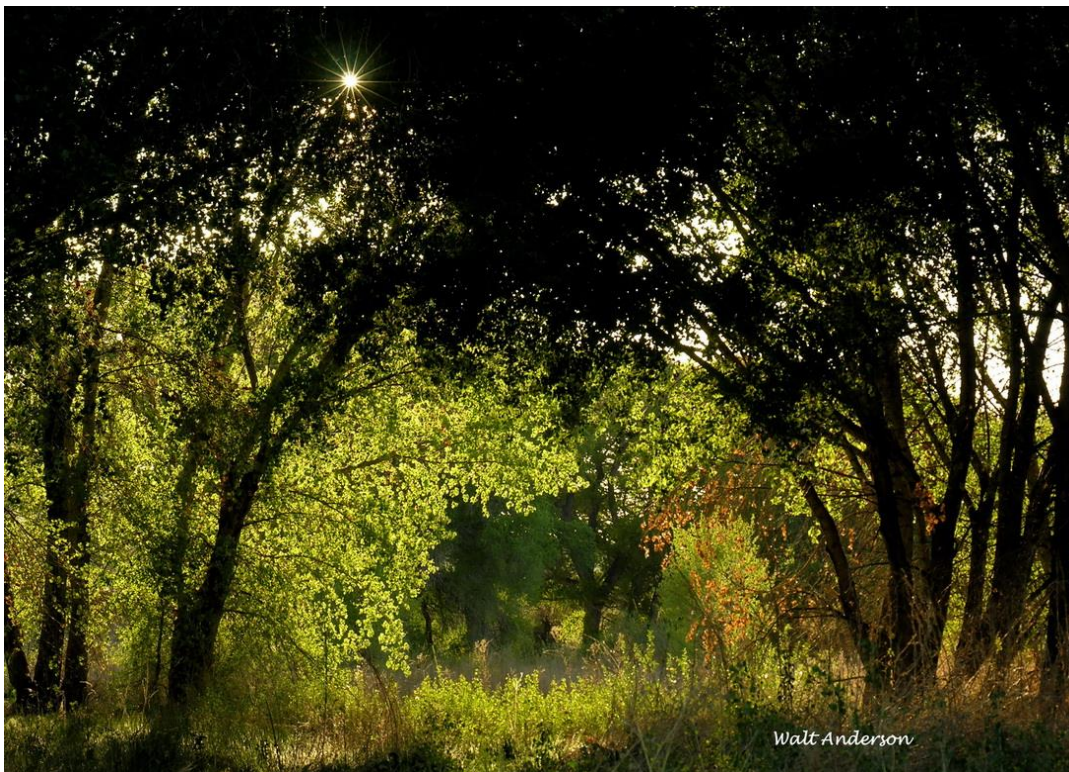
Clearly this grand old tree grew up without close neighbors, as its sprawling branches indicate. A tree like this provides wonderful shade and countless niches for smaller lifeforms to exploit.



One of my students performing a reverse hug on a gigantic cottonwood. These trees are phreatophytes, with roots that reach groundwater, typically within ten feet of the surface. Obviously, groundwater pumping dropping the water table can ring the death knell for these majestic trees.



Granite Creek flowing through the Dells creates a green ribbon or corridor of cottonwoods, willows, ash, and the like—a vital riparian area contrasting sharply with the surrounding drier landscape.



Granite Creek flowing through the Dells creates a green ribbon or corridor of cottonwoods, willows, ash, and the like—a vital riparian area contrasting sharply with the surrounding drier landscape.



Autumn brings an end to photosynthesis as nutrients are resorbed and the dry leaves, now without chlorophyll, show the warm pigments that had been masked with green during the summer. Though perhaps not as dramatically as their cousins, the aspens, cottonwoods can clone through basal sprouting, branch fragments rooting, or limbs contacting the ground if the tree is blown over. All members of a clone will turn color simultaneously. The differences in timing of leaf change shown here are indicative of genetic differences among individual plants, and these differences may allow some to survive the challenges of drought and climate change.



Leaves with this swelling at the base are parasitized by the poplar petiole gall aphid, *Pemphigus populitransversus*. Save that for a crossword puzzle someday! Pop it open, and you can see woolly, almost cottony, little aphids that obtain their food through strawlike probosces puncturing the gall wall. In the fall, the adult aphids fly out like tiny, woolly gnats and head to ground, where they crawl through soil cracks and parasitize the roots of cabbages and other Brassicaceae plants. We call them cabbage root aphids at that time, though they are simply a different life stage of the poplar petiole gall aphid. Those aphids are all female; sex occurs later when their descendants, both male and female, fly up into cracks in cottonwood bark and mate. A hatchling from an egg then produced becomes the founding mother, who enters a leaf petiole and creates the nesting chamber for the next generation of little woolly aphids. And they do all this without the aid of dating services!



An early snow catches a cottonwood before its leaves have fallen.



Cottonwoods are brittle (don't have one hanging over your house or tent!), so heavy snows can break them. Branches touching the ground, however, may root and keep that genotype going. Fallen leaves break down much more easily than do conifer needles, so soils in cottonwood groves can be fairly fertile.



Notice how a fallen leaf, darker than the snow, can absorb more heat and thus melt itself into a deltoid snow angel.



Winter cottonwood trunks can look almost skeletal. As spring approaches, the crowns begin to exhibit a green haze as buds emerge.



Seeds are small and poorly provisioned with nutrients by the mother tree, though their long, silky hairs are natural parachutes that allow them to spread far and wide. The sky on a windy day can be filled with millions of these feathery propagules (the Feather River in California was actually named for the clouds of “down” as seeds were released along the channel). Seeds can pile up on banks like this, where they may germinate quickly, each sending out a little root that must grow fast enough to follow the declining water table. Cottonwoods play a numbers game. The seeds fly everywhere, and it is a lucky seed (one in a million) that actually germinates and grows into a tiny seedling.



When conditions are just right, thousands of seedlings may establish in moist, sandy soil and begin to reach for the sky. A tremendous amount of competition occurs among these dense groups of seedlings, and Darwinian fitness begins to separate winners from losers. Of course, if the ground dries too quickly or floods again for a sustained period of time, they may all die. An old cottonwood represents both good genes and good luck!



Horses, cattle, and other herbivores take out many young, succulent, defenseless seedlings and saplings, and even older trees can fall victim to those whittling rodents, beavers. The cottonwood, however, can resprout or clone, and in some beaver areas, the critters effectively prune recovering trees back and maintain a perpetual source of food.



Reservoirs like Watson and Willow Lakes provide water to former grasslands, which then become suitable for cottonwood colonization. Since Prescott bought water rights to the lakes from the Chino Valley Irrigation District, cottonwoods and willows have exploded in abundance at both reservoirs. I think it's time to bring in the beavers!



Intricate plumbing of a cottonwood leaf.



A mature cottonwood tree is really an ecosystem, and we should feel a respect for and obligation to each such ecosystem to have a right to prosper. So once more I urge you: Remember the Alamo!