Selah's Cedar 101

"Do not initiate an action you are not willing to sustain." – JDavid Bamberger

Over the decades, the Bamberger Ranch Preserve has become well-known for the positive benefits of managing brush and grasslands, through a variety of means. We are quoted and referenced frequently, sometimes accurately and sometimes not. Although no specific formula for brush control can work for every single piece of property in the Texas Hill Country or elsewhere, we believe that many of the concepts are applicable to just about every land situation. The point is, if you research and discover how your land was naturally before man's mismanagement, and make that your goal for restoration, you will be on the right course.

Basic Steps: Ask questions and set goals

1. "What was the Texas Hill Country original landscape?" That one question has been hotly debated for many years by many land managers. Settlement in the Hill Country got underway in the mid-1850s, and the early settlers made use of natural resources that were readily available for their buildings as well as food for livestock. We can rely on anecdotal information that can be found in books (i.e. Explorers' Texas by Del Weniger or Path To Power about Lyndon B. Johnson by _____). We can also look at old agricultural stocking rates kept by USDA that, depending on your county or location, might defend the case there was more grass cover prior to heavy agricultural usage. What we should always remember is that Mother Nature is, and has always been, dynamic. To begin a "restoration project", one should ask oneself: "restore to what and when?" At what point in history of the planet do you want to restore your property to? The Bamberger Ranch has Cretaceous period dinosaur tracks that paleontologists hypothesize were left when the ranch was at sea level with wide open expanses of mudflats. Should we "restore" the ranch to beach front property? Of course not.
2. What are your land management goals? Plants are the foundation of a living ecosystem, therefore, to manage land means to manage plants. But how do you weigh the benefits for any kind of restoration? Is your goal to maximize water yield through aquifers? Control soil erosion? Increase the diversity of tree coverage to combat the very real threat of Oak Will disease?
3. Step back: And while you're asking yourself those questions, another set of questions can be directed towards Mother Nature's dynamic changes. Are your restoration goals achievable or consistent with current climate or possible future changes? If you moved to the Texas Hill Country from Houston, you cannot expect the plants you enjoyed at your former home to flourish in our drier climate. The soils are different and the rainfall is significantly less. Water, its availability and its accessibility – both current and future – is a topic that promises heated debate and angst in the years ahead.

The Bamberger Ranch Preserve example:

At the Bamberger Ranch we assessed the geology, varied topography, climate plus historic and present vegetation and wildlife. With this information we determined that the landscape most appropriate as a goal is an open grassland savanna with scattered mottes of trees. Steep hillsides, creek bottoms and riparian areas have more canopy cover from hardwood trees and junipers. These mini-ecosystems often escaped natural wildfires and periodic heavy grazing by migrating bison herds, hence, there remains a greater natural diversity of hardwoods species.

Our management goals at the Bamberger Ranch are anchored in the following beliefs:

- With an average annual rainfall of 27" and a climate that includes frequent hot, dry periods with intermittent floods, we believe the Bamberger Ranch Preserve is a highly effective ecological system when it is primarily managed as a grassland with scattered trees and valley forests.
- With grass-based agriculture and prescribed burns to maintain grass cover, we manage for maximum water yield in our perched aquifers of Edwards limestone, located on the tops of our hills – a geological system that responds very quickly to adequate rainfall. (Not everyone – even in Blanco County – shares the same geology.)
- We manage for minimal soil erosion on our steep, calcareous hill sides by prioritizing native grasses.
- We maintain approximately 5-10% of the ranch in a "cedar forest" condition, located primarily along creek bottoms and steep hillsides.
- We manage the northern slopes of our hillsides specifically for Golden-cheeked Warbler habitat where we have not only Ashe junipers, but a wide variety of tall hardwoods (i.e. Escarpment Black Cherry) where the birds actually build their nests. Tree canopy cover is at a higher percentage here than other parts of the ranch, where some pastures on the tops of the hillsides have the management goal of one tree per seven acres. A study from Texas Parks and Wildlife showed that one adult Ashe juniper (with the peeling bark) per is sufficient for Golden-cheeked Warbler habitat. Rarely, if ever, do the warblers nest in a juniper – they choose hardwoods 35+ feet tall. Insects found in the mixed hardwoods are an important food supply for baby birds.

Some facts about "cedar."

Yes, it is a true statement that "cedars" aren't native. It is a true statement that there are no native "cedar" trees to Texas or anywhere in this part of the Americas. However, the tree we refer to as "cedar" is really a native juniper – Juniperus asheii to be exact – one of 7 native junipers to Texas. (Cedars belong to a different genus.) Much confusion surrounds this tree: many people believe the Spanish or early settlers brought it in, and because it can become invasive very quickly, it behaves much like non-native species that become hard to control. We know, however, that the tree we incorrectly call "cedar" is native by several means: first, by pollen found in soil layers. Scientists have found pollen from this tree dating back 10,000 years – or to the last Ice Age, that far pre-dates any Spanish settlers. Second, the native bird, Golden-cheeked Warbler uses bark from a mature Ashe juniper as its primary nesting material, and has thus far, never learned to utilize any other material to build its nest – so we

know that because this bird has not yet adapted to use peeling bark from, say a non-native tree like the Crepe Myrtle, it makes sense that a native bird would use native building materials. Third, Ashe juniper is found only along a narrow band from northern Mexico up into Arkansas, no where else on the planet.

So what's the problem? Why not let the Texas Hill Country, or in our case, the Edwards Plateau, be maintained as forest rather than its more historical condition of open grassland savannahs? The answer to that question is tied to the one thing no one can live without, water, both in its quantity and its quality.

It is true that Ashe juniper trees use a lot of water – some estimates claim the low end of 16 gallons per day, some at the high end of up to 40 gallons per day. Given that it's an evergreen tree, it could conceivably use that much every day of the year, if it's available. But one must remember, trees – all of them – are typically giant organisms, so they all need a lot of water. At certain times of the year when trees transpire heavily, oaks, pecans and other hardwoods probably use even more per day than does a juniper.

Ashe juniper's main impact on water is its interception of rainfall. Quoting studies conducted at the Sonora Research Station decades ago, scientists found that due to the scale-like leaf structure of a juniper, a stand of juniper is capable of intercepting up to 36% of a one-inch rainfall. Go outside after a rainstorm and shake a branch of a cedar tree, and you'll see validation of that statistic. Typically, our rainstorms are short (less than ½ inch) and fast, so all that water captured in the canopy of needles will evaporate – it's lost to us. Of the next 43% of that one inch-rainfall, that same study found that it was captured in the organic matter on the forest floor. Depending on the slope of the land, that organic layer of decaying needles, sticks, stems, etc. can be up to 10 inches thick. What happens to a kitchen sponge if you soak it with water and then set it outside on a hot summer day? It dries out pretty quickly because of all the air pockets in the sponge. What happens to that 43% of our rainfall when it gets caught in that thick layer can act the same way – it will evaporate. So what does that leave us with our one inch rainfall? About 21%, the study says, reaches the soil layer. Now consider the wide network of tree roots just beneath the top soil, waiting for that moisture. Rain has to reach the soil first before it ever has the chance of recharging our aquifer systems deep below. The Bamberger Ranch Preserve is blessed with a hydrologic system that is relatively shallow and close to the soil's surface, we maintain that when the land was primarily covered with a cedar forest, virtually zero rain made it into our aquifers. That would explain why when Mr. Bamberger purchased a 3,000-acre cedar forest in 1969, there were no visible springs and only dry, eroded creek beds.

What happens when that same hill top is converted to predominantly a grassland? Almost exactly the opposite of a cedar forest. Approximately 80% of a one-inch rain event reaches the soil with about 20% evaporating from the surface of the grass plants.

One other point to consider – there is much talk how trees help with CO2 in the atmosphere. If we are worried about "global warming", shouldn't we keep all the trees we can? All plants help with carbon cycling – anything that produces chlorophyll will help the environment – so when you are wondering if you should convert your juniper forest back to a grassland in regards of our atmosphere, know that

grasses do the same thing that trees do. You have to ask yourself the important question of where do humans fit into your ecosystem? We all need water and clean air – grasses can provide a greater benefit to both in some cases than a forest full of cedars.

Other Cedar Factoids

The Edwards Plateau is lucky to have the endemic Ashe (or blue berry) juniper as it is easy to "kill". Cut below the lowest green stem or burn off all the green material and you have killed the tree. However, if you miss one little speck of green on a baby Ashe juniper, you will find years later that it survived and developed into a multi-trucked tree that is much more difficult to cut and manage. [Farther west grows the Pinchot or red berry juniper tree; if you cut it or burn it after a certain stage of its growth cycle, you have just made it mad and it will root-sprout like a mesquite.]

The male trees produce prodigious amounts of pollen that is pollinated by the wind (a bane to allergy sufferers); female trees produce the blue "berries" (actually fleshy cones). One research study found that one female juniper tree can produce 250,000 berries in a year. Why not cut down all the male trees then? The Ashe juniper tree can switch genders to produce pollen or berries, whichever is needed for its survival.

David and Margaret Bamberger conducted their own scientific experiment on the ranch several years ago. They wanted to know what would happen "if an adult Ashe juniper tree is cut down, how many babies (seedlings) come back?" They found that in the first year, 37 seeds sprouted. They cut those down and the next year had 25 sprouts. They cut those down, the next year 17 sprouted. The good news is that sprout numbers decreased as grasses regained ground. Now if a cedar waxwing poops out a "cedar" seed – it falls into a clump of grass and is unable to make seed-soil contact and germinate. The bad news, however, is if you are not prepared to manage the baby sprouts that come back from all those years of cedar berries sitting in the soil profile waiting for their chance at sunlight and rainwater, after a few years you'll have a worse condition than you started.

Just like your house – you can't clean it just one time and expect it to be clean in perpetuity. Even on the Bamberger Ranch, after 40 years, we remain vigilant with selective hand cutting and prescribed burns to manage the cedar saplings. Thus the Bamberger adage: "Do not initiate an action you are unwilling or unable to sustain."