Hill Country Land Trust | **Managing Ashe Juniper (Cedar)**

Frequently Asked Questions

Is Ashe Juniper a native plant?

Although commonly called "cedar", the correct name for this familiar plant is Ashe juniper (*Juniperus ashei*), or blueberry juniper. It is a native evergreen tree with dark green foliage whose range extends from Southern Missouri south through parts of Arkansas and Oklahoma, into New Mexico and the central and western parts of Texas.

Studies of Ice Age pollen reveal that juniper has been present in Texas since ancient times. A survey of early 19th European settlers and explorer's accounts of what they saw upon arrival in the Hill Country describes an abundance of juniper, not only in the canyons, but also in dense thickets and both rolling and flat terrain.

Yet the myth that the Texas Hill Country was originally a vast grassland savannah, dotted only intermittently by live oak mottes, with woodlands confined to waterways and canyons, persists today. We now understand that the Hill Country was instead a complex mosaic of woodland, savannah, shrub land and grassland, depending on different soils, topography, and the frequency of fire.

How did Ashe juniper become so widespread as to be considered a problem?

As mentioned above, juniper was widespread across much of the Hill Country long before the earliest European settlers arrived and was considered a valuable natural resource, not a problem. European settlers arriving in the 1840's harvested massive amounts of juniper for use as durable building material, fence posts, charcoal and fuel, and also to clear fields for cultivation. The open spaces created by clear-cutting densely wooded areas stimulated grasses to colonize the soils that had accumulated beneath the junipers and other hardwoods. This widespread clearing in turn initiated a surge of heavy grazing. It has been reported that that stocking rates at the turn of the 20th century were ten times what they are today – an incredible phenomenon considering how few people were around then to tend vast herds of livestock. Overgrazing followed by severe drought cycles in the 1870s, and again in the 1890's, led to devastating erosion, especially along limestone slopes, of precious topsoil that had taken millennia to accumulate.

Loss of topsoil, suppression of periodic fires, and continuation of poor grazing management resulted in a vastly different landscape than early settlers had first encountered. Juniper, like mesquite, prickly pear, and other brush species, has the capacity to aggressively colonize and eventually dominate barren, abused land, including abandoned cropland. The result is a landscape that is out of balance, lacking in

diversity, and less able to provide essential "ecological services" such as erosion control, absorption and storage of rainwater, and resources for livestock and wildlife.

Does juniper provide any benefits to the landscape?

Landowners need to have a greater understanding of juniper's role in the landscape in order to make sound and effective management decisions. Believing that "the only good cedar is a dead cedar" to justify wholesale eradication with heavy equipment of all juniper may result in further degradation of the land, as well as other unintended consequences such as a long, barren recovery period with poor end results. While it may initially appear cheaper in terms of cost per acre to hire a heavy equipment contractor to bulldoze juniper into massive piles for burning, this method does not factor in the extended cost of recovery and lack of stability once extreme clearing is over.

A more holistic approach to managing juniper would be to recognize its role as "nature's Band-Aid", and to *thin* or *reduce* juniper rather than completely eliminate it. Juniper is one of the few species capable of colonizing barren, eroded hillsides. After the topsoil has been scoured away by decades of heavy grazing, some sites have nothing left besides white rock or adobe subsoil. This kind of degraded soil rarely produces any kind of acceptable grass density. But as young junipers establish, grow in size, eventually merging to form a canopy, they begin to re-build topsoil from the accumulation of leaves. This is shown by the dark rich soil found underneath old juniper woodlands. At some point in time, after the topsoil is restored along with a thick layer of surface mulch, the land manager has the option of thinning the cedar in order to allow greater diversity of grasses, forbs, hardwoods and shrubs which will now be able to grow on the restored soil. Operating from this viewpoint, a landowner could save money and effort by allowing bands of juniper to remain on steep hillsides, old caliche pits, and barren abandoned roads, where erosion is a problem or where wildlife need cover, and instead focus resources to remove or reduce juniper in lower, flat areas such as old cropland.

Junipers have a reputation for being "water hogs" by sucking up groundwater and preventing rainfall from reaching the soil surface. However, junipers are extremely drought-tolerant, absorbing moisture mainly after significant rainfalls, and they have the ability to almost completely shut down when no water is available. Recent research has shown that brushy species use only slightly more water than grassland, and that live oaks use more water than juniper. Keep in mind that recharge of aquifers and springs typically occurs only after heavy rain events of over one inch. It is true that light rainfall (1/2" or under) is intercepted by the dense canopy of live oak or juniper, but infiltration rates under juniper woodlands are greater than in adjacent grassy areas.

In addition to the contribution to soil accumulation and site stability, juniper also provides wildlife with thermal protection, escape, nesting, loafing, and screening cover. Juniper makes up a significant part of the deer and goat diet in the region especially in winter when other trees are dormant. Juniper berries are also an extremely important food source for many bird species and small mammals. The endangered golden-cheeked warbler depends on mature oak- juniper for their nesting habitat. In addition to the benefits to wildlife, many landowners agree that mature juniper trees are attractive trees that add visual appeal to the landscape.

What are some ways landowners can set the goals and objectives for managing the juniper on their property?

It is important to understand that juniper control does not mean total removal or attempted eradication, but instead, It is management guided by logic and based on individual ranch goals. The best approach to reducing the amount of juniper that has taken over a property is to develop a site specific, incremental approach that allows for plenty of "course correction" during the process to evaluate results.

The first step in planning a project is to determine how much juniper to remove and where. A landowner with livestock will likely have different goals than one who is managing for wildlife alone. The most effective treatment will vary from one ranch to another, as well as among different pastures, hillsides and canyons within any given ranch.

A successful juniper management plan depends upon the density of the juniper, the type of terrain, availability of capital, the landowner's personal preferences, among other factors. Many different tools and implements are available that allow landowners to selectively control junipers where they occur in association with desirable browse plants, to thin junipers to an acceptable density, and to create grasslands interspersed with juniper savannahs and juniper woodlands. This "sculpting" of landscapes allows the landowner to optimize the value of his resource for livestock, wildlife, aesthetics, recreation, and real estate.

To save time and money, it is important to observe and document the proposed project area before taking any action. Establish photo points to document changes after thinning, and to gather information on results before moving into other areas.

Landowners who are primarily interested in managing their land for wildlife may benefit by passively preserving young or middle-aged juniper woodlands for several decades to promote forest maturation and health.

What are some of the tools, equipment, and methods used to thin juniper?

Juniper is managed in 4 basic ways: mechanical fire, chemical (not commonly used on Ashe juniper), and biological.

Methods, equipment, and costs will vary depending on several factors:

- Density and age of the juniper
- Accessibility to site will determine which equipment can be used. On steep slopes where heavy equipment cannot be mobilized, juniper will have to be removed by hand with chain saws, which is more expensive.
- The method used to dispose of cut material.
- Follow up plans for on-going management.

In the past, heavy equipment such as bulldozers was used almost exclusively. Now there is a suite of more smaller, more nimble equipment such as track hoe excavators that can better perform selective clearing on a variety of land types.

Tree dozing or grubbing and bulldozing, are mechanical methods of juniper tree removal. These methods are typically used for large-scale projects, and usually on larger trees.

Most juniper management projects will employ a variety of tools and equipment to match the varying conditions on the ranch. For instance, old cropland that has become a wall-to-wall “cedar brake” may be cleared with a bulldozer or a forestry mulcher, because the terrain is generally flat with little diversity. The advantage of a forestry mulcher is that recovery begins immediately. The juniper is shredded or chipped and left on the ground. An ideal thickness for the mulch is three inches or less, but eventually even deeper deposits of mulch will decay and be absorbed. Meanwhile, the organic material covers bare ground and can prevent erosion while the grass cover is developing.

Dense cedar brake after clearing with a forestry mulcher. Note emerging clumps of little bluestem.

Hydraulic shears attached to skid-steer tractors (Bobcats) and forestry mulchers are other tools that offer more versatility on a variety of different sites and conditions (i.e. hills, dense woodlands, etc.) This method is effective on Ashe juniper trees because they do not re-sprout.

One type of forestry mulcher A steel drum is with cutting knobs is attached to a skid steer tractor, then turns at high rpms to shred a tree from top to bottom.

Front-end loaders with smaller track cleats or rubber tires and with hydrostatic steering (each track driven by a separate hydraulic circuit) provide greatly improved maneuverability and minimize turf damage during juniper dozing. Hydraulically assisted grubbers reduce the horsepower requirements for tree dozing and various types of new transmissions increase the speed and efficiency of grubbing. Foam-filled tires allow rubber-tired equipment to be used for grubbing without the “down time” for repairing flats. Small-to-medium size junipers can now be controlled economically with grubbing implements mounted on the 3-point hitch of low-horsepower farm tractors or on the front of small front-end loaders.

Hand grubbing and hand cutting with lopping shears are effective juniper removal methods for small junipers and re-growth. Seedlings and saplings up to 28 inches tall can be hand grubbed easily and economically when soils are moist and not too rocky. Follow-up treatments will be needed every 6 to 8 years, and must be applied before junipers reach reproductive maturity to reduce seed production.

Fire - Historically, before European settlement, periodic fire was the control that kept juniper confined to its natural habitat. During the era of heavy livestock grazing, fire was lost as a natural control agent due to a lack of grass to carry fire. For the last several decades fire is being re-introduced in the Hill Country with prescribed burning. Prescribed burning is an effective tool for controlling initial juniper invasions and as a follow- up practice to eliminate small seedlings that sprout after the parent trees have been removed. For large-scale projects, roller chopping or 2-way chaining on Ashe juniper to stimulate grass production, followed with a prescribed burn has also been used as a management practice.

In general, when new juniper starts to become noticeable and when the plants are one to four feet tall, this is the best time to burn. Prescribed burning is not an easy tool to use - it requires a great deal of planning, specialized training, attention to detail, the right equipment and experienced crews. The advent of The Edwards Plateau Prescribed Burning Association with several chapters in the Hill Country greatly helps landowners with the safe and effective application of fire.

Chemical Control - although seldom used in the Hill Country, there are two herbicides approved for control of juniper. These applications work well on small plants, but are not recommended for larger trees. Tordon can be applied in a 1% solution in water as leaf spray with backpack sprayers. Velpar can be applied to the soil beneath juniper and will be absorbed by the roots to kill juniper. However both of these herbicides must be used with extreme caution since the chemicals will also kill or injure nearby trees and shrubs. In most cases, it will be more cost effective and environmentally safer to use lopping shears on small juniper rather than herbicides.

Biological Control - The use of goats to control juniper has been recommended by some. If goats are grazed in high enough numbers at the right time of the year, they will eat enough juniper to damage or even kill small plants. However, this method carries considerable risk of damaging desirable shrubs and trees that are more preferred than juniper. Biological control is not recommended unless the landowner has a great deal of experience with goats and has the fencing and managerial skills to rotate the goat herd properly in a way that will reduce damage to other species.

After Cutting: Now What?

Slash or cut branches left on the ground instead of gathered into huge piles can hasten recovery, especially on slopes and hillsides.

What are important follow up maintenance actions that are important for success?

Minimize your capital outlay and maximize your choice of treatment alternatives by controlling junipers in the seedling or sapling life stages rather than waiting until they are full-grown, mature plants. It is much easier and less expensive to kill seedlings and saplings compared to mature junipers. An observation is that young junipers begin reproduction when they are on average 5-7 years old or 6-8 feet in height. Controlling the regrowth before it reaches sexual maturity is very important. Small junipers are easily cut back with lopping shears or a string trimmer fitted with a brush-cutting attachment,

On slopes and hillsides, allow the cut juniper to remain on the land, especially when it can be dropped along the contour. This contributes to recovery of the site by trapping sediment and building up soil,

reducing erosion, protecting new grasses and seedlings from browsing and from pounding rain, while adding organic material to the ground. This is called the “juniper blanket method”.

In the juniper blanket method, the branches are left on the ground to prevent erosion and serve as “nurseries” for new plant growth. After several years, a managed burn can remove the branches, or they can be gathered and burned in small piles.

If you dispose of the cut cedar by stacking it in piles for burning, it is better to have a greater number of smaller piles rather than fewer large piles that smolder for days.

Properly timed fires extend the effectiveness of expensive mechanical treatments. The first follow-up burn probably should be used 3 to 5 years following a treatment such as chaining, tree dozing, or roller chopping. Subsequent burns usually can be conducted on an 8- to 10- year cycle. Burning cycles on lowland sites with deep soils will be shorter because growth rates are faster. With adequate fuel loads, expected plant kill is high. For Ashe junipers less than 4 feet tall, control should be nearly complete.

What changes in the landscape can I expect after I remove some of the juniper?

If juniper control is followed by long-term judicious management that promotes a good grass response, then watershed functions (runoff quality and subsurface quantity) might improve. However, a good cover of mid grasses also intercepts rainfall and utilizes soil moisture, so the net gain in aquifer recharge may be negligible. A dense cover of juniper is better watershed protection than a poor cover of grass.

High numbers of deer, exotics or heavy grazing will diminish and can even eliminate the benefits of juniper control. Leaving dead juniper slash on the ground rather than piling and burning will greatly hasten the recovery of desirable grasses and forbs and will provide safe sites for the establishment of many desirable native trees and shrubs.

Landowners will need to decide whether or not to re-seed following juniper control. In many cases the natural seed source of the most desirable grasses (Indian grass, big bluestem, Texas cupgrass and others) has been eliminated. If the landowner desires to restore a more natural mix of historic Hill Country grasses, re-seeding will usually be needed. However even without re-seeding, many species of short and mid grasses, forbs and wildflowers will usually return naturally sometimes with impressive growth.

In many cases, especially where there is significant soil disturbance, K. R. bluestem will be the primary grass to grow following juniper control. Landowners should be prepared for this possibility. There are few if any good options to reduce the growth of this exotic invasive grass once it is well established.

How can I find a reliable contractor? How should I define the scope of work so that my goals are met?

Thinning or reducing juniper can be expensive, especially if the landscape has been neglected for a number of years. Many contractors are used to working for developers or roadways, where the objective is to remove all juniper in order maximize open space for real estate. Does this conform to your goals? The wise landowner will take his or her time in locating the contractor that understands their goals. As with most home improvement projects, getting recommendations from neighbors and friends is a good place to start. Ask old established ranchers to recommend trustworthy contractors who will do a good job and charge a fair price.

Ask for references, and also to visit some sites of where the contractor has worked. Is the terrain similar to yours? How well is the land recovering after some juniper was removed? Were the goals similar to yours or more along the lines of complete “land scraping?” How long did it take and what did it cost to get those results? What tools does the contractor use and why? Do they have an assortment of tools to use? Are they flexible and adaptable in working in order to meet your objectives?

Ask for a written agreement, and don't make the final payment until all the work has been completed. Be on site when work is being done. Some landowners find that tagging trees either to be saved or removed is helpful.

Summary

Managing Ashe juniper is typically at the top of the average Texas Hill Country landowner's to do list. Properly done, thinning or reducing juniper, while at the same time appreciating and protecting juniper where it serves and enhances the landscape, will result in a richer, more resilient, and diverse ecosystem that provides benefits and enjoyment for everyone.