

Brush Management for Water Conservation

Sixty percent of the land surface in Texas is rangeland. These rangelands comprise most of the states watershed. They often lie in the recharge zone of many aquifers in the state and provide the major contribution of surface runoff to rivers and streams. With drought conditions and the population of Texas steadily increasing, supplying water to diverse agricultural, industrial, and municipal uses has become of major concern.

Brush has long been recognized as a “water thief” on Texas rangelands. Landscape-scale brush control programs have become increasingly popular for enhanced water production from rangelands. In 1985, Senate Bill 1083 implemented the State Agriculture Code that provide for “the selective control, removal, or reduction of noxious brush such as mesquite, pricklypear, saltcedar or other phreatophytes that consume water to a degree that is detrimental to water conservation” (Chapter 203, Brush Control). Since this time, major efforts have been made to implement State funded brush control programs, with mixed reviews.

One of the first questions becomes, then, how much water can be released by simply controlling brush on rangelands? The answer to this question is greatly influenced by not only the species of brush but also the habitat in which it grows. Three species that have gained increasing attention in Texas: mesquite, juniper, and saltcedar. Each of these species is not only unique in physical characteristics related to water use, but in the habitats they occupy as well.

Western juniper (*Juniperus occidentalis*) was cited as using 4.09 acre feet of water per year in a study conducted in Oregon (Eddleman and Miller, 1991) as determined from measuring precipitation through fall, stem flow, and interception along with transpirational water use. The study stated that this amount of use occurred during a year with good soil moisture with these

numbers greatly reduced during dry years. They concluded that winter soil moisture recharge may be reduced over 50 percent by dense stands of western juniper.

Water use by mesquite has shown similar variability. By measuring soil and plant water potentials, Easter and Sosebee (1975) studied mesquite water use in irrigated and non-irrigated conditions. The trees growing under irrigated conditions produced two times more foliage and showed greater soil water depletion than the trees growing without irrigation.

Saltcedar is well known for its ability to exploit groundwater from shallow sources. While the studies, on saltcedar, are too numerous to detail individually, general water use by saltcedar reported in the literature ranges from 0.75 to 2.6 meters (2.5 to 8.5 feet) per year. Evidence shows that water use by saltcedar is primarily influenced by stand density and age, depth to the water table, environmental conditions, and salinity of the water.

As stated earlier, there is no doubt that brush control is a viable water conservation practice for Texas rangelands. There is some question as to where and when brush control will produce economically viable increases in streamflow augmentation to reservoirs. Due to the relative high consumptive use of water by saltcedar, and the fact that it generally grows in close proximity to flowing, standing, or shallow underground water, saltcedar control should be considered as a practice for increasing streamflow.

Control of upland species such as mesquite and juniper may increase streamflow to reservoirs in certain situations. Regardless of the species being considered, brush control for streamflow augmentation should target areas that show the greatest economical potential for increasing water yields to reservoirs. With proper planning and implementation, brush control can and should be considered as a viable option for helping to meet the water supply demands for future Texans.

The Permian Basin Underground Water Conservation District invites you to view their website at www.pbuwcd.com for more information on brush control. You can also call their office at 432-756-2136 or email them at permianbasin@sbcglobal.net.