Brush Control Over the Edwards Aquifer

Jodie Lloyd

The Edwards Plateau is a vegetational area in Texas which originally consisted of a mid grass or mixed tall and mid grass savannah with randomly located oak trees. This is no longer the case. The San Antonio metropolitan area is the commercial center of the Edwards Aquifer region. As the third largest city in the state, San Antonio hosts a booming industrial, tourist, and trade center and provides homes for hundreds of thousands of urban and suburban dwellers.

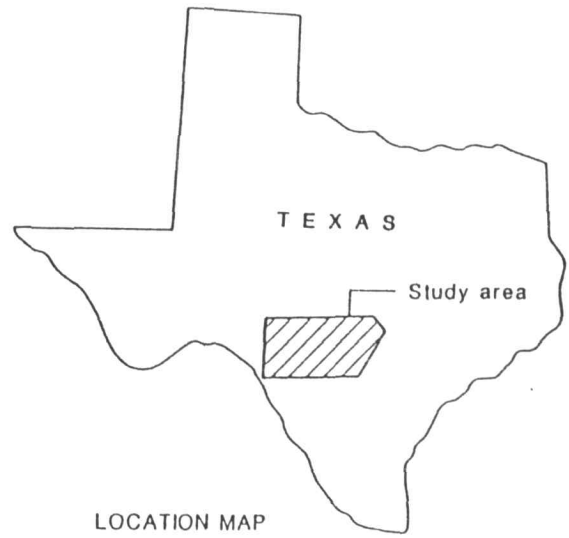
The Edwards Aquifer is a shallow and rapidly recharged zone sometimes called an underground river. Water from the catchment area in the Edwards Plateau drains directly into fractured limestone faults in the recharge zone along the rough boundary between the Edwards Plateau and the Texas Gulf Coast Plains. The artesian area of the Edwards Aquifer supplies water for numerous cities and towns, industry, and an intense farming region.

Over the past 200 years the recharge and transition zones to the north and northwest of San Antonio have become densely populated with woody plants. The Edwards Plateau region receives an annual rainfall ranging from 22 to 34 inches. Much of the rainfall is used to grow plants of lower nutritional value for livestock. Junipers, cactus, Texas persimmon, mesquite, and thick stands of live oak have become serious problems. Very little grass and few forage plants are able to grow through the dense "cedar brakes" that cover almost two million acres in the Edwards Plateau.

Since the 1950's, the population of the Edwards Aquifer region has more than doubled. The increasing demands on the aquifer have caused the water levels to decline more rapidly and stay lower for longer periods of time during extended drought periods. One possible method for increasing water quantities in the aquifer is the control of unwanted weeds and woody plants over the aquifer and its recharge and transition zones. These plants consume an estimated 38% of the water used in Texas every year.

A program that includes brush control, revegetation, and proper rangeland management would be a positive step toward increased water supplies for future needs in the area. Removing a portion of this brush and replacing it with desirable grasses has been estimated to save the equivalent of three inches of water annually.

Revegetation with bunchgrasses improves water infiltration rates, which reduces the runoff, allowing more water to percolate into the aquifers. Also, bunchgrass-dominated areas are characterized by lower sediment production, which promotes less water pollution for the watershed. Based on a four-year study from the Sonora Research Station in Texas, runoff from bunchgrass-dominated areas is one-half that of sodgrass areas.



LOCATION MAP

Implementing a practical brush control plan on the Edwards Plateau could have far-reaching benefits. The added recharge to the aquifer areas may, in some instances, reestablish dormant springs. Near San Angelo, in the Rocky Creek area, large areas of range were cleared of brush and the result was a dry wash that turned into a flowing stream. The springs had failed because the aquifers were no longer being recharged. With the brush removed, a thick cover of grass allowed most of the rainfall to be absorbed and percolate into the aquifer that fed the springs.

Other benefits of brush management are numerous, including increased livestock- and wildlife-carrying capacities. The increased amount of available forage allows for higher stocking rates of livestock. The more desirable plants will be more vigorous and provide greater forage with less competition.

Brush management can also increase wildlife-carrying capacity. The most beneficial vegetation patterns for wildlife are those that create an "edge effect" which provides a greater diversity of food plants and cover types. The two most popular management plans are the checkerboard design and the strip pattern where thick stands of brush are opened up, but adequate escape cover is left. Good brush management techniques aid in stimulating

Editor's Note: This is the third place winner in the High School Youth Forum contest at the Reno, NV, 1990 Annual SRM meeting. Jodie Lloyd was also elected President of the High School Youth Forum for 1991.

forb production while maintaining browse and cacti when forbs are not available. Whitetail deer hunting plays a major economic role in the Hill Country which lies just north and northwest of San Antonio and includes the recharge and transition zones of the Edwards Aquifer. The positive effects of selective brush management in these areas could mean higher revenues for ranchers and landowners, in addition to the benefits derived from increased available water for urban areas.

The removal of brush in the upper areas of the Edwards recharge zone could mean increased water available for use in all of the other areas in the region. The areas that are used for farming of row crops, such as grain sorghum, corn, cotton, vegetables, and fruit, would benefit from the increased amount of water in the aquifer that is used for irrigation purposes.

In summary, a brush management program over the recharge and transition zones of the Edwards Aquifer region that includes brush control, revegetation, and grassland management is a positive step toward increased water supplies in the aquifer. The selective removal of brush species and revegetation of bunchgrasses will promote higher infiltration rates, deeper percolation of water, decreased runoff, and less-severe soil erosion. Water quality likewise, is improved due to less watershed pollution. The added recharge to the aquifer may reestablish dormant springs or keep present springs flowing at full potential, as well as raise the water tables. The added benefits of the program include increased livestock- and wildlife-carrying capacities and increased irrigation supplies for areas of intense farming. Brush management over the recharge and transition zones of the Edwards Aquifer could mean increased water supplies for all areas in the region and should be included in our plans for the future.

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