

Cimarron Basin High Priority Issue

Salt Cedar and Other Non-Native Phreatophyte Control January 2009

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Issue

Tamarisk (salt cedar), Russian olives and other invasive high water consuming vegetation are choking out native riparian habitat along the Cimarron River and other southwestern streams.

Description

Riparian lands in Kansas have been seriously impacted by the infestation of non-native phreatophytes. Of greatest concern are the effects tamarisk and Russian olive have on our native riparian ecosystems.^(4, 5) Tamarisk is a tenacious shrub/small tree that has a deep root system (up to 100 feet) and leaves a salt residue on the soil surface. Tamarisk, a native of southern Europe and central Asia, is classified as a deciduous shrub that rapidly attains a height of five to twenty feet and grows best in sandy soils along streams. Tamarisk was brought to the United States for ornamental purposes and most likely was first established in Kansas in the early 1900s when it was planted in windbreaks. It has been widely used for bank stabilization and windbreaks since it is well suited for the western United States. There are many different species of tamarisk that are referred to with different common names. These problematic and invasive tamarisk species are commonly referred to as salt cedar.

Tamarisk can adapt to poor subsurface water quality. Tamarisk utilizes salt to increase the osmotic potential of its deep, extensive root system, which allows it to draw water from greater depths than the native vegetation. Therefore, tamarisk tends to out-compete native obligate phreatophytes during drought periods. The salt is excreted by the leaves and is concentrated in the leaf litter, thus impeding the growth of native species where tamarisk has gained a foothold. Tamarisk uses significant quantities of water. Actual water use by tamarisk depends on several factors: water availability, climate, water quality, population density, stresses, etc. However, it has been found that tamarisk will consume more water

than some native vegetation in the same setting.^(1, 2)

Russian olive, a different type of invasive phreatophyte shrub or small tree, was introduced in Kansas for windbreaks and wildlife plantings. The Russian olive, with its tendency to spread quickly, is a menace to riparian woodlands, threatening hardy native Kansas species like cottonwood and willow trees. Russian olive outcompetes native vegetation, interferes with natural plant succession and nutrient cycling, and chokes irrigation canals in Kansas.

The resulting invasive thickets of tamarisk and Russian olive provide poor habitat for livestock and wildlife, increase fire hazards, decrease water quality and generally use more water than native vegetation. The vegetation does, however, provide shelter protection for livestock. Infestations of phreatophytes in Kansas are roughly estimated to occupy greater than 50,000 acres.

Scientists with the U.S. Department of Agriculture (USDA) have stated that, "*tamarisk infestation has reached epidemic proportions and is one of the greatest disasters to ever befall native riparian areas in western United States.*"⁽³⁾ The National Invasive Species Council has identified tamarisk as one of its primary targets for control.

Tamarisk affects the water supply in both quantity and quality. The decrease in alluvial ground water levels due to tamarisk increases the transit loss of water delivered from John Martin Reservoir in the Arkansas River. Tamarisk affects

water quality by reducing in-stream flows and the concentrating of naturally occurring salts in tamarisk stands.

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Tamarisk Shrub.

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Thick tamarisk stands promote narrowing of river and stream channels. Since tamarisk replaces native species, there is a loss of bio-diversity in the infested areas. In the Cimarron River basin, tamarisk is rapidly replacing the last remaining native Alkali sacaton (*Sporobolus airoides*) and western wheatgrass prairie. Wildfires are more intense in tamarisk infested areas; however, due to the nature of the tamarisk root crown, tamarisk recovers from fires quicker than native vegetation. Thus, fires tend to promote additional infestation. Tamarisk infestation is problematic in Kansas because it negatively impacts water quantity and quality, and results in the loss of land utilization options and value, as well as a loss of habitat.

acres of the land surveyed in Kansas are infested with tamarisk. In the Cimarron basin counties, there are over 27,000 acres infested (Table 1).

County	Total Acres Tamarisk	Percent Tamarisk Infestation
Comanche	3,550	84
Clark	9,389	95
Meade	4,104	89
Seward	3,642	61
Morton	5,732	67
Grant	300	24
Stevens	553	25



Control demonstration, Clark County. Photo courtesy NRCS.

Estimates of the number of acres infested in the United States are between one and two million acres. Tamarisk has been identified in nearly every county in Kansas, but is concentrated along streams and lakes in the western portion of the state. Tamarisk is prevalent along the mainstem and tributaries to the Arkansas and Cimarron Rivers, as well as, the shorelines of several of the state's federal reservoirs.

Helicopter surveys of the Cimarron River were conducted in 2005 and 2006 by the Kansas Department of Agriculture. Estimates from the 2004 survey indicate that about 26,178 acres (73%) of the riparian corridor from the Colorado-Kansas state line east to the Kansas-Oklahoma state line along the Cimarron River are infested with tamarisk (Table 1). According to a state-wide county survey conducted in 2004, more than 50,000

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Recommended Action

1. Continue to work with agencies and other groups on the water issue strategic plan and 10-Year Strategic Plan to coordinate and implement the variety of programs, research and educational efforts that are occurring or recommended.
2. Promote education and seek local input through the state's Basin Advisory Committees.
3. Continue an evaluation of the most effective and cost-efficient control measures for the basin.
4. As an effective control measure is identified for the basin, implement a wide scale, watershed-based control effort, with plans to replant with beneficial vegetation that helps stabilize the soil and provide other benefits the invasive species had provided.
5. Research and evaluate biological control of tamarisk using leaf beetles and/or other suitable organisms, but pilot it with extreme caution to avoid unintended consequences.
6. Deliver educational materials and technical information to legislators, property owners and the public within the basin related to non-native phreatophyte research and control through Kansas State University Ag Experiment Station & Cooperative Extension Service.
7. Quantify the actual non-beneficial use of water by tamarisk in the basin's different ecological settings. Existing research should be used and augmented with on-the-ground measurements of changes to both stream flow and ground water before and after tamarisk control activities. This research will help to establish the difference in water consumption in Kansas between non-native phreatophytes and typical riparian plant communities.
8. Evaluate the recovery benefits after tamarisk control to provide valuable information on the specie's true impact to water quality, wildlife habitat, water quantity, grazing land, risk reduction from flood damages and other features that impact the basin's ecology and economy.
9. Determine the potential disposal of tamarisk biomass holds for various value-added products such as ethanol, bedding, fiberboard, and fuel pellets, and identify how to harvest and remove tamarisk without damaging the riparian area.

Resources

1. Butler, Jim, Kluitenberg, Gerard, and Whittemore, Don. 2005. *Ground Water Assessment in Association with Salt Cedar Control – Report on Year One Activities*. Kansas Geological Survey Open File Report 2005-19.
2. Colorado Department of Natural Resources. 2004. *10-Year Strategic Plan on the Comprehensive Removal of Tamarisk and the Coordinated Restoration of Colorado's Native Riparian Ecosystem*.
3. Kansas Water Office. 2003. *Kansas Water Plan, Cimarron Basin Section*.
4. Kansas Water Office. 2005. *10-Year Strategic Plan for the Comprehensive Control of Tamarisk and Other Non-Native Phreatophytes*.
5. Tamarisk Coalition. 2005. *Options for Non-Native Phreatophyte Control*.



Helicopter Survey of Tamarisk