

The New Battle for the Bighorn

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One-hundred-thirty years ago General George Armstrong Custer and the 7th Cavalry battled the Sioux Indians on the banks of the Bighorn River. They fought over control of the land. We are fighting a similar battle in Montana again today, except the enemy is of a different sort. Salt cedar has invaded our land and is attempting to turn our waterways into a monoculture. You can see its slender red branches holding the line as tender green shoots march down the river's banks year after year. Every summer they send forth a new armada of innocent pink seeds equipped to takeover Montana's riparian areas. The battle has begun and we have been caught off-guard. The time to learn about our enemy and develop a plan is now!

Salt cedar is a twelve to fifteen foot tall shrub native to Eurasia and Africa. It was first introduced to American soil in the 1800's when it was brought in by a nursery in Philadelphia. They marketed it for use in stream bank stabilization, windbreaks, and as an ornamental shrub. Salt cedar fit the bill perfectly as it grows vigorously in riparian areas, forms impenetrable forests, and produces pink flowers which are visually appealing. Americans began using salt cedar for these purposes, thus distributing it throughout the country. It was first found in the wild in the 1870's and had infiltrated Montana's habitats by the 1960's. Since then, it has invaded 250 miles of waterways in Montana.

As notorious as salt cedar is, it is only recognized as a noxious weed in eleven states. Even in Montana, where it is considered noxious, many people aren't familiar with it. The salt cedar plant most common in Montana is a hybrid between two species, *Tamarix ramosissima* and *Tamarix chinensis*. It is characterized by slender reddish brown branches that typically reach between twelve and fifteen feet in height. These branches become furrowed and acquire a brownish-purple hue with age. Its deciduous leaves are gray-green in color and scale-like, much like those of other cedar species. Tamarix reproduces from March to September through pink to whitish blooms and, to some extent, by its adventitious roots. The most formidable trait, though, is its root system. Salt cedar has a long taproot which can extend very deep in search of water. Adventitious roots also grow along the ground surface to collect runoff and for reproduction. Salt cedar is most commonly



found in riparian areas, but has adapted to many habitats. Salt cedar is also capable of growing in soils with salt concentrations of up to 15,000 parts per million.

The plant's tenacity and adaptability lead to many of the problems that salt cedar causes. A main problem is that it monopolizes water sources. It is able to do this using its tap and adventitious roots, which are capable of extending deep into the water table to collect ground water. This trait wouldn't be so bad, except that salt cedar also uses an enormous quantity of water. Jennifer Cramer, a Montana weed coordinator, suggests that one salt cedar may be capable of using 200 gallons of water per day.

Along with all of that water, tamarix also absorbs large amounts of salt. Tamarix stores this salt in its leaves and exudes extra salt onto the soil surface. At the end of the growing season its leaves fall off, further increasing the amount of salt in the soil. The increased soil salinity prevents other plant species from growing in areas of tamarix infestation. Furthermore, the salt will stay in the soil, so more desirable plants can't grow in a former tamarix stand for two to three years after the stand has been eradicated.

The ability of salt cedar to create saline soils and absorb huge quantities of water leads to monocultures when an infestation becomes established in an area. This is not only bad for native plant species, but for animals as well. Tamarix isn't a great source of food because its seeds are much too small and its foliage is only palatable to certain animals. It has also been observed that salt cedar isn't desirable to many species, especially birds, for shelter because of its sticky salt secretions. These qualities mean that when salt cedar invades an area, the wildlife diversity plummets.

Observations suggest several other problems stem from salt cedar. These range from increased wildfire frequency due to salt cedar's volatile nature, to increased and intensified flooding because salt cedar's growing habits often narrow stream and river channels. All in all, salt cedar's growth habits cause the displacement of Montana's native range species and contribute to the one thing Montanans fear most, loss of our water resources.

The effects that tamarix could have on Montana's ecosystem if left untouched are unimaginable. That is why it is vital that a management plan be perfected and used on the various tamarix infestations in Montana. So far, a management plan hasn't been developed that can be applied to all of the infestations in Montana, but mechanical, chemical, and biological controls all are useful and can be extremely effective when used together.

One of the best ways to protect Montana's natural resources from being ravaged by the negative effects of salt cedar is to prevent infestations from even starting. This tactic requires land managers to be vigilant in searching for and identifying salt cedar plants in order to control them before a large infestation can be established. This tactic is good for salt cedar, but is also an excellent philosophy when it comes to stopping the spread of any noxious weed invasion. Although it is far easier to prevent a tamarix infestation than to combat an established one, there

will always be a sapling that goes unnoticed and develops into a real problem. In these cases, we need to bring out the big guns.

The first weapon in Montana's noxious weed control arsenal is mechanical control, and for small infestations this means pulling by hand. This treatment is effective when the stems are less than one inch in diameter. When tamarix invades an area too large to be controlled with hand pulling alone, machinery can be used. Bull dozing and root cutting are used most often and are useful in knocking plants down, but these machines are expensive to use and cause soil damage. Dozing or root cutting is even more effective when the plants are burned after being knocked down. Fire by itself can also be used, but salt cedar has adapted to wildfire and may not be killed by it. Since tamarix grows along waterways, another control tactic can be used against it. Flooding salt cedar can yield a nearly 100% death rate when the root crown is submerged for at least two years. This management tool isn't that useful in Montana, but it could be a way to severely reduce the numbers of salt cedar present around Fort Peck Reservoir. Each of these methods is effective, but they can be even more effective when combined with other management options.

That brings us to our next weapon - chemical control. By itself, chemical control is the most effective way to manage large infestations. Systemic herbicides work best and common application methods include foliar sprays, cut stump treatments, basal bark treatments and aerial sprays. Aerial application is not common in Montana because our infestations aren't big enough to justify it. Scott Heidi, McCone County weed coordinator, applies Tordon as a foliar spray and as a cut-stump treatment. As a foliar spray, it has proven to be very effective, but only if the plant is completely covered by the chemical. The cut stump treatment is also effective according to Heidi, but the chemical must be applied soon after the stem is cut or the plant won't take in the chemical. Jennifer Cramer commonly uses Arsenal as a basal bark treatment when managing salt cedar, but the task can be very time consuming. Chemicals, alone or with other control methods, can be used to effectively combat salt cedar, but they must be applied properly.

Although chemicals and machinery can produce immediate results, biological controls are available and effective. Dave Kazmer, a research entomologist from the Sidney Agricultural Research Service station, has experimented with insects and their usefulness in controlling salt cedar. The salt cedar leaf beetle is the only insect approved for control of salt cedar in the western United States, and it is the insect that Kazmer has worked with the most. He suggests that the leaf beetle could be used as a way to suppress the current tamarix invasion, and possibly eradicate smaller infestations. He also notes that this method is cost effective, considering that the insects disperse rapidly over a large area and are inexpensive to introduce into an infestation.





Insects aren't the only biological weapon that Montana has, as Boer goats may also be an option. Ken and Eileen Pike, of the Bighorn Basin in Wyoming, raise these goats and rent them out to control salt cedar through grazing. Mr. Pike speculates that 100 goats could work over one acre of tamarisk per day. Pike hires Peruvian herders to direct the goats and make sure they are foraging on the salt cedar. The goats can also be sold for meat, although they

need to be shipped to a more goat-favorable market than Montana. Pike has used intensive goat grazing on his land, and has eradicated the salt cedar stands in some areas. Goats could eventually prove to be a very useful tool in managing salt cedar infestations.

It is apparent that salt cedar is already a problem in Montana. It is capable of causing all sorts of troubles in Montana's ecosystems such as lowering our water reserves, and displacing native plants and wildlife. Fortunately, we have control options such as root plowing, spraying, and insects. Once these management methods are fine-tuned for use in the Big Sky State, the only thing we'll have to do is watch the tide of war change in this new "Battle for the Bighorn".

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