Tamarisk

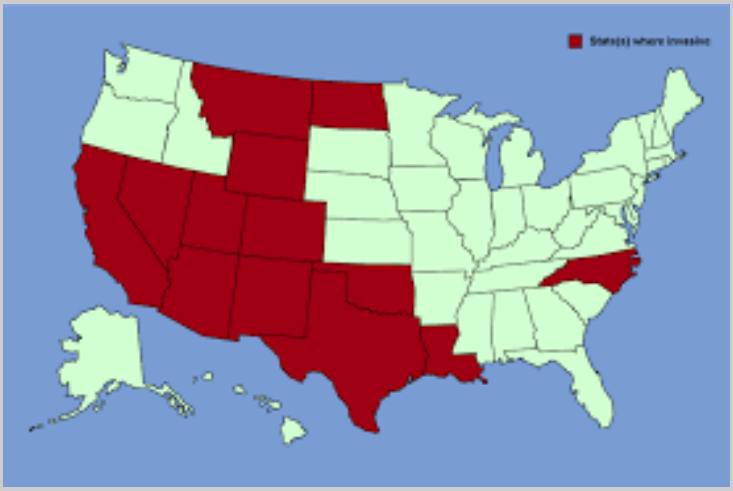
Tamarix ramosissima, T. chinensis, T. parviflora, T. aphylla, T. canariensis

Quick Facts

The plants are considered to be among the world's 100 top invaders and one of the most damaging invasive weeds in the western US. The species that are present in the U.S. include Tamarix ramosissima, T. parviflora, T. aphylla, T. chinensis, and T. canariensis, and several hybrid forms between the different species (Gaskin & Schaal 2002). Similar to Arundo donax (giant reed), tamarisk invades riparian systems and responds positively to flooding which seems to facilitate establishment. The plants form dense stands, and invaded areas often become completely dominated by tamarisk with few other plant species present.

Introduction

Tamarisks are small trees or shrubs native to Eurasia that were introduced into western North America in the mid 1800's, mainly to provide windbreaks and to prevent soil erosion in semi-arid and arid areas. The plants became naturalized in the late 1800's (Shafroth et al. 2005), and some species are still planted as ornamentals and shade trees. Approximately 1-1.6 million hectares of land in North America is infested today (Shafroth et al. 2005). This dense shrub lives up to approximately 100 years, can grow up to 30 feet tall and has a root depth of up to 30 feet. This root depth is roughly twice the depth of cottonwood roots - allowing displacement in areas with fewer shallow water sources and deeper groundwater sources.



Impacts

Tamarisk, also known as saltcedar (Tamarix spp.), is another invasive plant species that has significant causes and effects:

Causes:

Introduction for erosion control: Tamarisk was initially introduced to various regions, particularly in arid and semi-arid areas, for its ability to stabilize soil and prevent erosion along riverbanks, stream channels, and other water bodies.

Ornamental plantings: Tamarisk was also planted for ornamental purposes in landscaping due to its attractive pink flowers and ability to thrive in harsh environmental conditions, such as high salinity and drought.

Introduction for windbreaks: In some cases, tamarisk was intentionally planted as a windbreak or shelterbelt in agricultural areas to protect crops from wind damage.

Effects:

Ecological impacts: Tamarisk is highly invasive and can form dense monocultures that outcompete native vegetation, leading to reduced biodiversity and alterations in ecosystem structure and function. It can alter soil chemistry and hydrology, leading to changes in nutrient cycling and water availability.

Hydrological impacts: Tamarisk has deep root systems that can deplete groundwater and reduce water availability for native plant species, wildlife, and human communities. Its presence can also alter streamflow patterns and exacerbate issues related to water scarcity and drought.

Habitat alteration: The dense growth of tamarisk can degrade habitat quality for native wildlife by reducing habitat diversity, altering food availability, and displacing native plant species. It can also negatively impact riparian ecosystems by altering stream channel morphology and reducing habitat complexity.

Fire risk: Tamarisk is highly flammable, especially when dry, and its presence can increase the risk of wildfires in invaded areas, particularly in arid and semi-arid regions.

Economic impacts: Tamarisk can reduce the productivity of agricultural lands by competing with crops for water and nutrients. Additionally, the costs associated with controlling or managing tamarisk infestations can be substantial for landowners, land managers, and government agencies.

Overall, the invasion of tamarisk can have significant ecological, hydrological, economic, and fire-related impacts, highlighting the importance of proactive management and control efforts to mitigate its spread and minimize its effects on native ecosystems and human communities.

Management

Biological: The release of the saltcedar leaf beetle (Diorhabda carinulata) from China has made significant impacts on many populations of saltcedar. This insect feeds on the leaves of saltcedar and slowly reduces plant vigor. Tamarisk does not usually die from a single defoliation from tamarisk beetles, and it can resprout within several weeks of defoliation. Repeated defoliation of individual tamarisk trees can lead to severe dieback the next season and death of the tree within several years. Data indicate that 4 years of defoliation can result in about 60% mortality. Biological control will not eradicate tamarisk but it has the potential to suppress tamarisk populations by 75 to 85%.

Since its release, the beetle has defoliated tens of thousands of acres of tamarisk in Nevada, Utah, Colorado and Wyoming. The insect spreads rapidly but is poorly adapted to more southern regions of the U.S. This led to further exploration to find better adapted biotypes or species of Diorhabda. In this process, five sibling species were found to comprise a new Diorhabda species group. Each species has unique biogeographical traits suiting them to different regions invaded by tamarisk in North America. Four species were previously tested and verified as specific feeders of tamarisk, and released in North America under the name D. elongata. D. carinulata from China and Kazakhstan (old name D. e. deserticola), is successfully suppressing tamarisk over large areas of the Great Basin desert. The true D. elongata is established well in California and parts of west Texas and is best suited for Mediterranean habitats. D. sublineata has potential for the Sonoran and southeastern Chihuahuan deserts. D. carinata should be best suited for the Great Plains grasslands and the Mojave and northern Chihuahuan deserts. A fifth species, D. meridionalis, may be suited to subtropical maritime deserts but has yet to be safety tested.

One controversial aspect of the release of the tamarisk beetle is that defoliation can locally reduce nesting habitat for riparian woodland birds until native woodland flora recover. This has primarily centered on the federally endangered southwestern willow flycatcher, Empidonax traillii ssp. extimus. The beetles have defoliated some tamarisk nest trees of the southwestern willow flycatcher on the Virgin River in southern Utah, and actions to protect the flycatcher are under consideration. In some areas, tamarisk may be replaced by grasslands or shrublands, resulting in losses of riparian forest habitat for birds.

Cattle, goats, and sheep will graze saltcedar plants if desirable vegetation is lacking. Saltcedar has little nutritional value and cattle will only graze young seedlings early in the year. Goats might be able to control dense stands of tamarisk where little native vegetation is present, particularly if the stands are cut or burned first, with goats eating the regrowth.

Chemical: Triclopyr Garlon 3A, Garlon 4 Ultra, Pathfinder II Rate: Cut stump treatment: 50% to undiluted Garlon 3A (in water) or 25 to 100% Garlon 4 Ultra (in oil). Basal bark treatment: 20 to 30% Garlon 4 Ultra in oil on young trees

without well-developed bark. Timing: While many sources indicate that applications can be applied year round, it is best to apply in summer or fall when plants are still growing and not water stressed. At this time, the greatest amount of herbicide will translocate to the below-ground tissues.

Remarks: Cut stump treatments can be very effective. Cut stems horizontally at or near ground level, and immediately apply herbicide solution to cover the outer 20% of the stump face. Can be mixed with a color dye to determine which trees have been treated. Basal bark treatments should be made to smaller trees with thin bark. Spray the lower trunk, including the root collar, to a height of 12 to 15 inches from the ground; the spray should thoroughly wet the lower stem but not to the point of runoff. For smaller trees 3 to 4 ft tall, a foliar treatment of 7 oz aminopyralid (Milestone) + 3 qt Garlon 4 Ultra/acre with 0.25% non-ionic surfactant or 1 qt/acre seed oil surfactant gives good control. Follow-up treatment of resprouts with this mixture will be necessary. This mixture is selective and will not injure desirable grasses.

Mechanical: Mechanical control methods include mowing, burning, chopping, chaining, and disking. However, these methods usually only suppress saltcedar temporarily and will not eradicate infestations. Saltcedar is also able to resprout vigorously from the root crown following mechanical control methods. These methods can be labor intensive and expensive and may be more effective on small infestations. Hand pulling can be an effective way to control tamarisk in situations where plants are small, where access is difficult, or where herbicides cannot be used. Hand pulling is generally used to control new Tamarix seedlings and small plants around isolated desert springs in national parks after the larger plants have been killed with other techniques. Mowing is occasionally useful to reduce the volume of tamarisk before treatment with herbicide, especially in relatively level sites where prescribed burning is not feasible. However, a single cutting of tamarisk is ineffective, because tamarisks resprout vigorously. By comparison, cutting combined with herbicide treatment can be a very effective integrated approach. In addition, cutting tamarisk can reduce consumption of groundwater, through removal of transpiring leaves. Heavy equipment can be used to remove entire plants. However, this is expensive, and any fragments that move into the water column may resprout and form new populations. This technique also causes considerable soil disturbance and ecosystem disruption. A root plow pulled by a bulldozer has become a standard method for saltcedar control, providing good to excellent control. Root plowing is most effective when the soil is relatively dry and when combined with follow-up treatments such as hand grubbing resprouts or applying herbicides. Root plowing may affect desirable vegetation and could lead to wind erosion. Another technique uses site preparation tractors or skid steers equipped with forestry mulching attachments, such as a hydro-ax. These are adapted to forestry brush and tree clearing. The hydro-ax can mow or chip either living or dead saltcedar at about 1 acre/hr on level terrain.

As a stand-alone strategy, burning has not been successful. Saltcedar is generally top-killed by burning, but plants readily resprout from the remaining root crown and adventitious buds on the lateral roots. Repeated yearly burns can suppress saltcedar and kill some of the plants after 3 to 4 years. Furthermore, burning may suppress saltcedar infestations by eliminating the closed canopy, slowing the rate of invasion, and allowing desirable vegetation to respond, thereby increasing biodiversity. Prescribed burns can be followed up with herbicide treatments to control resprouting plants. One strategy is to cut 20 to 25% of the largest tamarisk plants in stands several months before burning to create enough dry ground fuel to carry a fire. For greatest 2 of 4 2013 A WEED REPORT from the book Weed Control in Natural Areas in the Western United States Saltcedar and tamarisk efficacy, burning should be conducted during the hottest part of summer, when plants experience the greatest water

stress.

If floods occur during the period of poplar/cottonwood (Populus spp.) or willow (Salix spp.) seeding (which precedes saltcedar seeding), then natural revegetation will consist of almost pure stands o