Living with Tamarisk: Integrated Management Options for Tomorrow

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Abstract

Tamarisk (*Tamarix* spp.), also known as saltcedar, is an aggressive invader of riparian areas. Tamarisk species have led to severe economic, ecological, and social implications. With rising global temperatures, tamarisk could potentially invade further north over the next 20 years. States in the Northwest need to monitor tamarisk spread and implement control measures before it reaches an irreversible level of establishment. Management techniques should vary due to the level of infestation, cultural factors, and budget concerns. Treatments advised for the Northwest include low-input mechanical, low-input chemical, and targeted grazing with goats. The tamarisk leaf beetle (*Diorhabda elongata*) has had success in larger infestations capable of supporting viable insect populations. Control of tamarisk has many challenges associated with it including cost and regulatory compliance. Each treatment is only deemed successful or affordable in specific situations. With careful assessment of a treatment area and a multiple scale approach coupled with a creative integrated plan, managers can effectively slow down or stop the spread of tamarisk throughout the Northwest.

Introduction

Introduced in the early nineteenth century from Asia, tamarisk was used for stream bank stabilization, shade, and ornamental purposes[2,4]. In a century's time, eight tamarisk species have spread into the western states, many of which now list tamarisk as a noxious weed[4,9]. Tamarisk is a vigorous, invasive plant that has little social, economic, or ecologic value. Tamarisk infestations dramatically reduce the species richness of native flora through direct and indirect mechanisms which in turn reduces wildlife diversity[3]. Tamarisk presence has changed stream morphology further altering the landscape[9]. Additionally, tamarisk-induced modifications have had detrimental impacts on critical habitats of threatened and endangered species. Over the next 50 years, tamarisk will cost the West $6 to $16 billion dollars in lost ecosystem function[8]. In the struggle to preserve native functioning ecosystems, tamarisk has become a serious hindrance for land managers in achieving functional and diverse ecosystems.

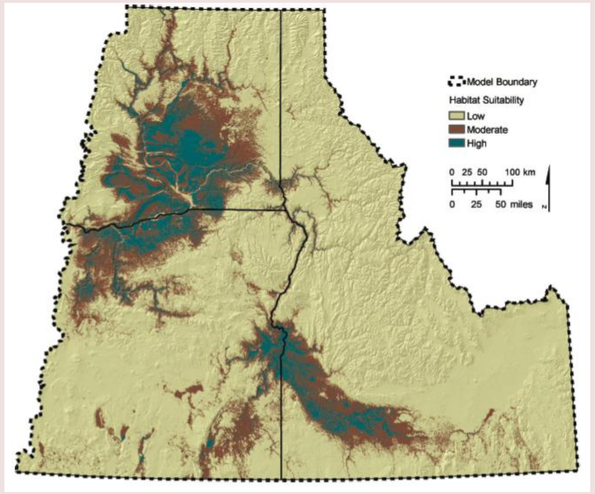

Figure 1. Projection of suitable habitat for tamarisk, indicating areas of low, moderate, and high suitability for the Northwest (Kerns et al. 2009).

Regulatory Challenges

The effects of invasion of tamarisk is a major concern for many threatened and endangered plant and animal species. Organisms including herptofauna, mammals, insects, fish, and birds are adversely affected by the encroachment of tamarisk[4]. For example, the Southwestern Willow Flycatcher (*Empidonax traillii extermus*) (SWWF) is one endangered species of great concern in tamarisk management. The SWWF will nest in tamarisk, thus removal of the plant constitutes an "incidental taking" according to the Endangered Species Act, Section 7[4]. Future research could be directed toward potential effects of tamarisk on northwestern species such as salmonids. Salmonids are species of great concern in the Northwest. The effects of tamarisk invasion on their migration, breeding, and rearing will need to be carefully addressed.

Figure 2. Goats grazing tamarisk in a targeted grazing study. Photo: K. Launchbaugh

Table 1: Tamarisk Management Strategies Matrix

Degree of Infestation	Mechanical Removal	Chemical Broadcast	Fire	Grazing	Diorhabda Beetle
Stage I - Few tamarisk, varying in age classes.	Works well in areas with dispersed initial recruitment.	Not feasible due to native community destruction.	Restrict fire occurrence.	Livestock and wildlife prefer native vegetation to tamarisk.	Effective when present but will not sustain viable beetle populations.
Stage II - Tamarisk is co-dominant with native species.	Possible but financially restrictive.	Not encouraged due to existing native vegetation loss.	Restrict fire use to reduce Tamarix competitive advantage.	Grazing could be effective depending upon vegetation distribution.	Beetle populations can be effective at reducing tamarisk competitive advantage over native plants.
Stage III - Tamarisk is the dominant vegetation type; nearly no existing native vegetation.	Excessive cost.	Expensive but highly successful at tamarisk eradication	Highly feasible when accompanied with post-treatment.	Highly effective depending upon distribution, size, and availability of tamarisk.	Diorhabda beetle can be extremely efficient when beetle populations are dense enough to defoliate most tamarisk.

Figure 3. Tamarisk leaf beetle (*Diorhabda elongata*) [5]

Challenges of Control

- Prolific seed producer (500,000 seeds/yr). Seeds easily disseminated by wind or water[8].
- Increases fire frequency and is more fire tolerant than native vegetation.
- Resprouts after defoliation by fire, grazing or when herbicides are not used efficiently.
- Capable of accessing both surface and ground water and can outcompete native phreatophytes.
- Tamarisk increases soil salinity effectively decreasing native species propagation.

2030 Predictions

- Scientists generally agree that the Northwest will be experiencing warming trends, thus suitable habitat for tamarisk will likely increase[6,14].
- Tamarisk's genetic plasticity increases the likelihood of spreading northward[6]
- Two subspecies of tamarisk (*T. ramosissima* and *T. chinensis*) evolved in the cold desert regions of eastern Turkey and Korea where severe winters are common[6].
- Habitat suitability models for the Northwest indicate that a substantial portion (21%) of the region is suitable habitat for tamarisk. Currently, tamarisk only occupies <1% [6].
- Using habitat and climate change models, scientists predict that available tamarisk habitat will increase roughly 30% within 20 years[6].
- Areas that are most likely to be heavily impacted are the Northern Basin and Range, Columbia Plateau, and the Central Snake River Plain due to adjacent areas currently inhabited by tamarisk.

Conclusions

The ecological and economic losses in the Southwest due to tamarisk invasion illustrates the importance of preventative control and monitoring. For the Northwest, we recommend controlling tamarisk with proactive control methods while it exists in the early stages of infestation (Table 1). Current tamarisk populations in the northwest have yet to become the dominant species where they occur. Managers should use their local knowledge of social, political, and ecological factors in prescribing management options. We recommend the use of low-input herbicide and mechanical treatments for current infestations. Follow-up treatments could include goat grazing to control saplings and resprouts after tamarisk removal. In order to use available management practices to their greatest potential, managers must attack tamarisk expeditiously. Tamarisk must be controlled before it outcompetes the native species in the area, causes detrimental ecological impacts, and depletes economic services as it has done in the desert southwest.

References

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