Understory vegetation responses to various tamarisk (saltcedar, *Tamarix* spp.) removal and control methods

Cameron H. Douglass[*1] and Scott J. Nissen[1]

[*]cameron.douglass@colostate.edu
[1]Colorado State University, 114 Weed Research Laboratory 1179 Campus Delivery Ft. Collins CO 80523-1179

The ultimate objective of tamarisk management is to restore the ecological functioning of treated sites, sometimes requiring re-vegetation by desirable and useful plant species. Active re-vegetation is frequently cost-prohibitive for large-scale tamarisk management projects, and so passive re-vegetation remains the only viable option for many land managers. Our ongoing research along the Arkansas River in southeastern Colorado studies how several common tamarisk removal and control methods (chemical control – aerial and backpack imazapyr applications; mechanical control – Hydro-axe mulching and tree excavation; and biological control – *Diorhabda carinulata* releases) affect subsequent understory re-vegetation. Additionally, pre-treatment soil seedbank samples were collected to identify the relative contribution of species resident in the seedbank compared with those dispersed to the sites after treatments. Herbicide applications resulted in severely reduced species diversity, with imazapyr-tolerant species - particularly kochia (*Bassia scoparia*) - being the primary species present in treatment plots. Diversity and abundance of species was significantly higher in mechanical treatment plots, although the disturbance caused by excavations in particular appear to favor re-vegetation by resident perennial species with the capacity for vegetative regeneration (e.g. perennial pepperweed (*Lepidium latifolium*) and Russian knapweed (*Acroptilon repens*)). Similarly, a slight majority (59%) of species emerging in seedbank study samples were introduced plant species, and 25% of emerged plant species in samples were noxious, invasive species (such as perennial pepperweed and Russian knapweed). Such species quickly proliferate at treated sites and can create secondary invasions which themselves require large-scale treatments. Therefore, monitoring and control of initial populations are essential to the success of tamarisk management projects. Finally, most of the seedbank species were functionally characteristic of upland sites, suggesting that historical riparian ecological contexts for tamarisk restoration projects may be inappropriate for some affected sites.