Tamarisk Control and Common Sense

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Tamarisk (a.k.a. salt cedar) is one of the most invasive, natural community-altering, shrub-trees in the southwestern United States. Estimates of the tamarisk invasion in the southwest include over 600,000 ha of riparian habitats dominated by this species. One need only look to the Colorado River to see the potential that tamarisk has as an alien invader into natural ecosystems.

Tamarisk is a superior competitor in the wetland ecosystems of the southwest, and we have helped it further by damming and increasing the salinity of those systems. Each tamarisk produces 500,000 wind-dispersed seeds per year. Once established, tamarisk acts as a facultative halophyte, tolerating salt concentrations up to 15,000 ppm, and secreting salt at 41,000 ppm, which is deposited on the soil surface. In addition to increased soil salinity, tamarisk increases fire frequency within the riparian habitats it dominates. The high levels of dead leaves and branches produced by the fast growing tamarisk provide ample fuels for wildfires. After the fires, tamarisk sprouts Vigorously, while native riparian trees and shrubs generally do not. The result over time, as a result of both increased soil salinity and fire frequency is a riparian community dominated by tamarisk. Along with the invasive adaptations tamarisk possesses, human alteration of hydrologic regimes (i.e. dams) along streams and rivers has reduced the natural flood processes that willows and cottonwoods thrive under, and that flush out salts accumulating at the soil surface, giving tamarisk one more advantage.

Reduced surface water in desert springs and oases has far reaching impacts on desert wildlife. Tamarisk uses more water than other native riparian plants and once established is able to tolerate lower soil moisture than the native species. The result is a drying of isolated desert watering holes. These water sources are critical to the survival of desert bighorn sheep, deer, the endangered desert slender salamander, frogs, western pond turtles, desert pupfish and a variety of bird species. Nearly the entire bird community along the California shores of the Colorado river has been decimated by habitat loss due in large part to the habitat conversion from willow-cottonwood forests to nearly pure stands of tamarisk. Increased soil salinity, as a result of the tamarisk's ability to concentrate salt in its leaves which then form a thick mulch covering the ground, inhibits seeding establishment of native riparian plants and may affect egg viability in amphibians and invertebrates which depend on moist soil for nesting sites. Only doves and hummingbirds appear relatively unaffected by tamarisk's invasion.

While most land managers acknowledge the impacts tamarisk has on the riparian flora and fauna, the magnitude of the invasion reduces many to inaction. Some land managers argue that fighting tamarisk is a losing proposition, so we might as well accept the few values it offers. While biologists have universally found depauperate wildlife populations in tamarisk dominated stands, there are, however, a very few examples of endangered Willow Flycatchers nesting in tamarisk. Despite its archaic, single species management focus, this finding has caused some to argue for the maintenance of tamarisk within those riparian forests. Others have supported the retention of tamarisk stands in saline situations because they offer greater structural complexity than the bare earth or shrubs that would otherwise occupy that site, and therefore arguably greater numbers of birds (largely doves in most cases). As a result of these conflicts, there is an ongoing debate as to whether to wage a systematic war on tamarisk.

I want to present a case for a more holistic, ecosystem based approach that supports large scale tamarisk control. A healthy environment is defined by much more than bird abundance. Lets start with the building blocks of a healthy ecosystem, the primary producers - plants. We have already discussed how tamarisk, through its high water use and increased soil salinity, is able to exclude other native species. By increasing fire frequency the physical processes that affect plant community associations are shifted in favor of tamarisk. Given enough time, most desert riparian systems will, once invaded by tamarisk, shift to nearly monotypic tamarisk stands.

At the primary consumer level, insects, rodents, squirrels, rabbits, some lizards, and seed eating birds form a critical link between plants and secondary consumers - the predators. Tamarisk seeds are extremely small and are not known to be utilized as food by any primary consumers. Few insects forage on tamarisk; only the introduced honey bee has been noted as a regular insect associate of tamarisk here in North America. This lack of insects is obvious to anyone working in dense tamarisk thickets. In five years of removing 20 acres of tamarisk in Thousand Palms oasis in the Coachella Valley of southern California, we never found ant colonies, stem or leaf insects, or much at all in the way of animal life. Throughout that time we found one occupied woodrat hogan and one cactus wren nest along with several dove nests and wasp nests.

Thousand Palms oasis is now clear of tamarisk. Those 20 acres are now occupied by riparian strands of palms, cottonwoods, willows, and mesquite, as well as halophytic shrubs such as saltbush, inkweed, alkali goldenbush and arrowweed. Where once there was a depauperate fauna, there are now at least six lizard species, three or four kangaroo rat-pocket mouse species, woodrats, deer mice, rabbits and hares, antelope ground squirrels, and a diverse community of birds - including doves. As notable as were the changes listed above, perhaps the most important change in terms of ecosystem richness was with the insects. The diversity of shrubs provides a year-round sequence of flowering and new growth. With that available banquet, the insects have responded prolifically in both numbers and diversity. They provide fodder for the next levels of ecosystem organization, the lizard and bird insectivores and then the larger predators.

In a tamarisk dominated ecosystem, species richness is reduced and the levels of organization are simplified. In a native riparian ecosystem, even one dominated by halophytic shrubs, there are numerous, complex connections between producers and consumers creating greater species richness.

As indicated above, there have been dramatic successes in controlling tamarisk. In isolated springs and watersheds tamarisk has been successfully removed, native vegetation has returned, flowing water has returned to the surface, and native wildlife is thriving. New prospects for biological control offer a possible solution for larger systems; with the new concept of prescribed flooding, those habitats may once again return to a healthy mix of natives. Without a systematic "all out war" on tamarisk, those 500,000 wind dispersed seeds per tree per year will be constantly invading and degrading riparian habitats. The effect of a healthy, seed producing tamarisk plant goes far beyond its canopy and root zone. It extends to any spring, creek, or river its seeds can reach, lowering water levels along with the habitat quality for nearly all native plants and animals. The debate should not be on whether or not to try to control tamarisk, but focus on how, when and where to direct our control efforts. Anything else will result in a lowering of water availability and wildlife viability throughout the southwestern U.S.