COLORADO STATE PARKS
BEST MANAGEMENT PRACTICES
WEED PROFILE

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Parks Affected: Many

Saltcedar (Tamarisk)

Tamarix ramosissima **Ledeb.**
and *Tamarix parviflora* **DC.**

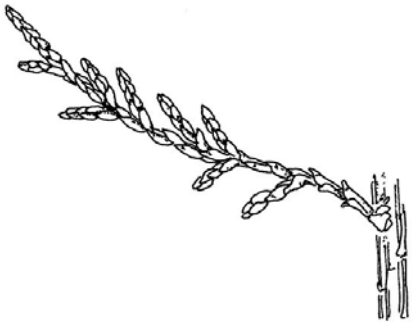
BMPs

Family: *Tamaricaceae* (Tamarisk)
Other Names: tamarisk, salt cedar
USDA Code: TARA, TAPA4
Legal Status: Colorado Noxious List A (general weeds)

Keys to Identification:
- Saltcedar is a tall shrub or small tree that has large sprays of small whitish or pinkish flowers that are born in finger-like clusters.
- Leaves are very small and scaly.

Identification

Growth form: Deciduous, loosely branched shrubs or small trees.
Flower: Flowers are whitish or pinkish and borne on slender racemes 2-5 cm long on the current year's branches and are grouped together in terminal panicles. Petals are usually retained on the fruit.
Seeds/Fruit: The seeds are borne in a lance-ovoid capsule.
Leaves: Leaves are minute, appressed scaly leaves, alternately arranged.
Stems: Branchlets are slender; plants may reach heights of 15 feet or more.
Roots: The primary root can grow to a depth of up to 30 meters or more (Baum 1978). Plants can develop spreading horizontal roots after reaching the water table. These can spread up to 50 meters and are capable of producing adventitious buds (DiTomaso 1996).
Seedling: No information available.



Branch

Similar Species

Exotics: None known.
Natives: None known.

Impacts

Agricultural: No information available.
Ecological: Saltcedar is an aggressive, woody invasive plant species that has become established over as much as a million acres of the western United States (Carpenter 1998). Saltcedar crowds out native stands of riparian and wetland vegetation. It increases the salinity of surface soil, rendering the soil inhospitable to native plant species. Saltcedar provides generally lower wildlife habitat value than native vegetation. It uses more water than comparable native plant communities and dries up springs, wetlands, riparian areas and small streams by lowering surface water tables. However, in places where beaver dams or other structures have raised the water table, saltcedar can be outcompeted by *Salix exigua* (R. Roberts, pers. comm.) Saltcedar widens floodplains by clogging stream channels and increases sediment deposition due to the abundance of saltcedar stems in dense stands.

Close up of leaves

Habitat and Distribution

General requirements: Saltcedar grows well on moist sandy, sandy loam, loamy, and clay soil textures (FEIS 1996). Saltcedar is tolerant of highly saline habitats, and it concentrates salts in its leaves. Over time, as leaf litter accumulates under saltcedar plants, the surface soil can become highly saline, thus impeding future colonization by many native plant species. Saltcedar is not tolerant of shading. Shaded plants have altered leaf morphology and reduced reproduction. Saltcedar commonly occurs along floodplains, riverbanks, stream courses, saltflats, marshes, and irrigation ditches in arid regions of the Southwest and the Southern Great Plains (FEIS 1996).
Distribution in Colorado: In Colorado, saltcedar is most commonly found between 3,400 to 7,000 feet (FEIS 1996), but can be found up to 8,000 feet (A. Green, pers. comm.). It is widespread in riparian areas throughout the western United States.
Historical: Introduced to North America for use as ornamental, windbreak, and erosion control.

Biology/Ecology

Life cycle: Saltcedar generally flowers in its third year of growth or later, but may flower during the first year (FEIS 1996). Saltcedar buds generally break dormancy in February or March. The flowers are most abundant between April and August, but may be found any time of the year in desert areas. Saltcedar flowers continuously under favorable environmental conditions but the flowers require insect pollination to set seed. Seedlings grow slowly and require saturated soils throughout the first 2-4 weeks of growth (FEIS 1996). Ideal conditions for first-year survival are saturated soil during the first few weeks of life, a high water table, and open sunny ground with little competition from other plants.
Mode of reproduction: Reproduces by seeds as well as vegetatively. Saltcedar sprouts from the root crown and rhizomes, and adventitious roots sprout from submerged or buried stems (FEIS 1996). This allows saltcedar to produce new plants vegetatively following floods from stems torn from the parent plants and buried by sediment.
Seed production: A mature saltcedar plant can produce 600,000 minute seeds annually (FEIS 1996).
Seed bank: Seeds are viable for up to 45 days under ideal conditions during summer, and can complete germination within 24 hours following contact with water (Carpenter 1998). Saltcedar seeds had no dormancy or after-ripening requirements.
Dispersal: The seeds are readily dispersed by wind and water.
Hybridization: No information available.

Keys to Control:

- Select the appropriate control method based on the size of the area and other environmental or cultural considerations.
- Re-seed controlled areas with desirable species to protect the soil resource and to prevent or retard saltcedar reinvasion.

Control

Biocontrol: The USDA has permitted the release of two species of insects for saltcedar biocontrol but widespread releases have not yet been permitted (A.T. Carpenter, pers. comm.).
Mechanical: As an alternative to herbicides, a bulldozer or prescribed fire can be used to open up large stands of saltcedar. Once opened, the resprouts can be sprayed when they are 1 to 2 m tall using imazapyr, or imazapyr plus glyphosate, or triclopyr.
Fire: See above.
Herbicides: For larger areas (> 2 hectares) that are essentially monotypic stands of saltcedar, the best methods would likely be foliar application of imazapyr herbicide to the intact plants or burning or cutting plants followed by foliar application of imazapyr or triclopyr to the resprouted stems. Foliar application of imazapyr or imazapyr in combination with glyphosate can be effective at killing large, established plants. Over 95% control has been achieved in field trials during the late summer or early fall (Carpenter 1998). The herbicide can be applied from the ground using hand-held or truck-mounted equipment or from the air using fixed-wing aircraft. Foliar application of herbicide works especially well in monotypic stands of saltcedar, although experienced persons using ground equipment can spray around native trees and shrubs such as cottonwood and willow.

Saltcedar eradication in areas that contain significant numbers of interspersed, desirable shrubs and trees is problematic. Depending upon site conditions, it may not be possible to rapidly kill saltcedar plants without also killing desirable shrubs and trees. It such situations, it may be necessary to cut and treat saltcedar stumps with herbicide, as outlined in the next paragraph. While this method is relatively slow and labor-intensive, it will spare desirable woody plants. Alternatively, it may be more cost-effective to kill all woody plants at a site and replant desirable species afterward.

For modest-sized areas (< 2 hectares), cutting the stem and applying herbicide (known as the cut-stump method) is most often employed. The cut-stump method is used in stands where woody native plants are present and where their continued existence is desired. Individual saltcedar plants are cut as close to the ground as possible with chainsaws, loppers or axes, and herbicide is applied immediately thereafter to the perimeters of the cut stems. Herbicides must be applied immediately to the cut because wound healing ocurrs very quickly and decreases herbicide penetration. The herbicides triclopyr and imazapyr can be very effective when used in this fashion. This treatment appears to be most effective in the fall when plants are translocating materials to their roots. The efficacy of treatments is enhanced by cutting the stems within 5 cm of the soil surface, applying herbicide within one minute of cutting, applying herbicide all around the perimeter of the cut stems, and retreating any resprouts 4 to 12 months following initial treatment.

Cultural/Preventive: No matter how effective initial treatment of saltcedar might be, it is important to re-treat saltcedar that is not killed by initial treatment. After saltcedars are killed, other vegetation must be established to protect the soil resource and to prevent or retard saltcedar re-invasion (Frasier and Johnsen 1991). Establishing a canopy cover on treated areas with seeded grasses and planted cottonwood cuttings could reduce the chances of saltcedar successfully re-invading an area (Frasier and Johnsen 1991).

Integrated Management Summary

Saltcedar is native of Eurasia that was introduced as an ornamental and stream bank stabilizer. It is a pioneer species that establishes on freshly exposed alluvium, sand and gravel bars, and streambanks or floodplains after disturbance (FEIS 1996). Once established it often occurs in pure stands, persisting indefinitely in the absence of disturbance (FEIS 1996). It can replace or displace native woody species, such as cottonwood, willow and mesquite, which occupy similar habitats, especially when timing and amount of peak water discharge, salinity, temperature, and substrate texture have been altered by human activities. Saltcedar produces massive quantities of small seeds and can propagate from buried or submerged stems.

Saltcedar can be controlled by five principal methods: 1) applying herbicide to foliage of intact plants; 2) removing aboveground stems by burning or mechanical means followed by foliar application of herbicide to resprouts; 3) cutting stems close to the ground followed by application of triclopyr (Garlon™) to the cut stems; 4) spraying basal bark with triclopyr; and 5) digging or pulling plants (Carpenter 1998).

Selecting an appropriate control method involves considering the size of the area where saltcedar is to be controlled, restrictions on the use of particular herbicides or herbicides generally, the presence or absence of desirable vegetation where saltcedar is growing, the presence or absence of open water, adjacent land uses that might restrict prescribed burning, and the availability and cost of labor (Carpenter 1998).

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