Saltcedar

A non-native invasive plant in the western U.S

WRIC Leaflet #02-2
03/2002 (edited 02/2010)

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Saltcedar: what is it and why is it a problem?

Saltcedar, also called tamarisk, is a shrubby tree that was brought into the U.S. from the Old World in the latter part of the 19th century. Eight species of *Tamarix* were introduced to the western U.S. as ornamentals, for windbreaks, or for erosion control. Some of these species, principally *T. ramosissima*, but also *T. chinensis, T. gallica* and *T. parviflora*, have escaped from domesticated sites and invaded rivers and other riparian habitats throughout the west. These weedy species are called saltcedars because they have small, scaly, cedar-like leaves that exude salt brought up from the soil through the roots.

Foliage of athel tamarisk (left) and saltcedar (right)

Saltcedar leaves are gray-green in color, but turn yellow and drop in the winter. Another species, the athel tree (*Tamarix aphylla*) is common in the deserts of the southwest as a shade and windbreak tree. It tolerates the harsh desert environment without human assistance, but only occasionally escapes and is not regarded as a widespread problem.

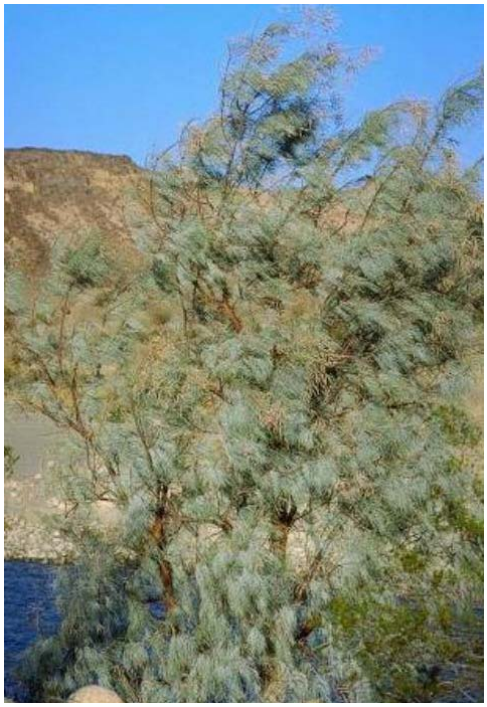
Smallflower tamarisk (*Tamarix parviflora*) flowering branches

Saltcedars produce thousands of flowers in spring and summer. Seed are very small and have a tuft of hairs on one end so they can disperse long distances on the wind or on water.

One mature plant is capable of producing 500,000 seed in one year. These seed are typically short-lived and must germinate within a few months after dispersal from the parent tree.

Saltcedar (*Tamarix ramosissima*) seedlings

Mature (*Tamarix ramosissima*) saltcedar
photo by Carl E. Bell



Athel tamarisk (*Tamarix aphylla*) along shoreline

Saltcedar grows rapidly from a seedling to a mature, flowering plant in one summer season. The root system is extensive, producing a taproot 10 feet deep to reach the water table, as well as secondary roots at the soil surface that readily soak up rainfall. Saltcedar tolerates drought, heat, cold, salinity, fire, and flooding.

In a little over 100 years, these species have come to occupy over one million acres of sensitive habitat ranging from northern Mexico to southern Canada. The southwestern states have become infested with dense stands of saltcedar along all major and minor river systems, including the Colorado, Gila, Sat, Pecos, and Rio Grande. In more recent years, saltcedar infestations have reached desert springs, water holes, and oases, especially in the southwestern deserts.

Where does it come from?

The genus *Tamarix* is common throughout the arid and semi-arid regions of the Old World. Weedy species in the western U.S. are native to Asia or the Mediterranean area. Athel tree was imported from India or Pakistan. Other *Tamarix* species are native to China, the Middle East, Africa, the Mediterranean, and even the Canary Islands in the Atlantic Ocean. There are no species native to the New World.

In the Old World, saltcedar can provide valuable shade, firewood or erosion control. Saltcedars have been purposely established in some areas of the Middle East to control wind-blown sand; the athel tree is used in the same way in the deserts of southern California. In its native range, saltcedar populations are restricted by

Smallflower tamarisk (*Tamarix parviflora*) in flower in riparian site

natural pests, such as insects and diseases. These pests did not accompany saltcedars to the U.S. Thus, weedy saltcedar species can expand their range anywhere the climate is suitable.

What effect does it have on natural habitat in the U.S.?

Effects on native vegetation

The most common native plants displaced by a saltcedar invasion are cottonwoods, mesquites, and willows growing along rivers and streams. The invasion of saltcedar is undoubtedly facilitated by human degradation of natural areas, such as areas where mesquite or cottonwood were over-harvested for firewood. Excessive groundwater pumping, dam building and flood control have also contributed to saltcedar establishment. Once saltcedar has invaded an area, it prevents native grasses, forbs and shrubs from recovering by exuding salts from its leaves, which increases the salinity of the surrounding soil beyond the tolerance of natives. Wildfires become more frequent and of higher intensity in saltcedar thickets, but saltcedar usually survives and regrows faster than natives.

Saltcedar (*Tamarix ramosissima*) infestation along a riparian site in the southwest

Effects on native wildlife

In the U.S., saltcedar is not commonly eaten by native herbivores, such as bighorn sheep or deer. Furthermore, saltcedar seed are too small to be a food source for birds or rodents. Some bird species, including the endangered Southwestern Willow Flycatcher, will nest or seek cover in saltcedar, but this plant is not a better home than the displaced native willow. The European honeybee will collect pollen and nectar from saltcedar, but the honey is reported to be of inferior quality.

Smallflower tamarisk (*Tamarix parviflora*) resprout from a stem fragment

Smallflower tamarisk (*Tamarix parviflora*) infestation

The invasion of a desert spring by saltcedar can negatively affect native wildlife. Bighorn sheep and deer avoid drinking from water holes where visibility is limited. A saltcedar thicket not only obstructs their view, but can provide cover for predators, such as mountain lions, and can physically impede their access to water. Equally important in the arid west, saltcedar uses large amounts of water and can dry up or lower the quality of a water source, which impacts aquatic organisms such as frogs, fish, and salamanders. This is especially significant in drought years, which occur regularly.

Effects on the physical environment

Not only does saltcedar increase surface soil salinity and fire potential, but also thickets created by dense infestations along rivers or streams increase soil erosion caused by floods. This occurs when saltcedar thickets decrease channel width and force flood water beyond the stream bank. Some remarkable changes have been observed following removal of saltcedar from a densely infested area. At Eagle Borax Works Spring in Death Valley, California, a historic one-acre pond disappeared when it was invaded by saltcedar. Eight weeks after the saltcedar stand was removed with a controlled burn, the pond reappeared. Similarly, at Spring Lake near Artesia, New Mexico, a 13-acre lake returned after eradication of saltcedar, verifying the impact of saltcedar on groundwater resources.

What can be done about it?

The critical things to do are to learn how to recognize saltcedar, to understand its negative impacts, and to know that it does not belong in our natural habitats. Control and eradication programs are being conducted throughout the western United States. Most of these efforts are on public lands, but restoration projects are also being conducted on privately owned nature reserves. The goal of most of these control programs is to preserve or recover sensitive areas, such as water holes or streams. In most cases, eliminating massive infestations along major rivers is not economically feasible at present.

Flowers of (left to right): saltcedar (*Tamarix ramosissima*)
athel tamarisk (*Tamarix aphylla*)
smallflower tamarisk (*Tamarix parviflora*)

With such a large and widespread infestation, biological control utilizing an imported insect pest of saltcedar is an optimal approach to long-term management. In 2001, the first biocontrol agent, the saltcedar leaf beetle (*Diorhabda elongata*), was released from caged sites throughout the southwest. Another insect, the manna mealybug (*Trabutina mannipara*) is being developed for release. Although the hope is that these insects will be successful in reducing the saltcedar problem, it is too soon to know how effective they will be.

Successful saltcedar control requires killing the root system. Some control methods that have been effective are foliar herbicide treatments, cutting the tree at the base and applying herbicide to the cut stump, applying a systemic herbicide to the base of uncut trees, ripping plants out by their roots with heavy equipment, or spraying regrowth with a systemic herbicide after a fire. When existing saltcedar plants are removed from an area, seedlings must be controlled for at least one year to prevent re-infestation. Sensitive riparian areas should be inspected at least once per year for new invasions of saltcedar. Small saltcedar plants growing from seed can be easily hand-pulled or sprayed with a systemic herbicide. This control effort is difficult, time consuming and expensive. For more information, or to make a contribution of your time and energy, please contact the **Bureau of Land Management** at a District Office, **California Invasive Plant Council** (Cal-IPC) or **The Nature Conservancy**.

A word about exotic pest plants

Saltcedar is one example of an exotic (i.e. non-native) pest plant causing large-scale ecological problems by taking over vital habitat for native plant and animal species. Estimates vary as to the number of exotic pest plant species that have made their way into the western U.S. since the arrival of Europeans, but there are probably thousands. Other examples are yellow mustards and brooms along the coast of California, giant reed (*Arundo donax*) clogging the rivers of coastal California, and yellow starthistle (*Centaurea solstitialis*), which infests 10-15 million acres of range and public lands in the state. Most of these have become so common they are mistaken for natives. The consequences of this invasion for the natural areas of the western states are grave.

Centaurea solstitialis **(yellow starthistle)**
photo by Carl E. Bell

Arundo donax **(giant reed)**

For further information on this subject or to see what you can do to help, visit the following websites:

California Invasive Plant Council
http://www.cal-ipc.org

U.S. Department of the Interior
http://www.invasivespecies.gov

University of California
Weed Research & Information Center
http://www.cal-ipc.org

This brochure was financed by grants from USDA Renewable Resources Extension Act. Additional support came from Cal-IPC.

All photos by Joseph M. DiTomaso unless otherwise noted.

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