

Tamarisk

by David Williams

In Death Comes to the Archbishop, Willa Cather wrote, "They [were] . . . miraculously endowed with the power to burst into delicate foliage and flowers, to cover themselves with long brooms of lavender-pink blossom. Father Joseph had come to love the tamarisk above all trees. It had been the companion of his wanderings." Although this is a fictitious account (tamarisk were not recorded in New Mexico at the time this story occurs), these three sentences address two of the problems with tamarisk: to many people they are beautiful and they grow throughout the southwest, at least in riparian areas. Botanists, ecologists and river runners think less well of tamarisk. It is commonly viewed as a nuisance, a killer of native plants, a colonizer of beaches, and a generally useless shrub.

Nurseries on the east coast introduced tamarisk into this country from the Middle East in the early 1800s. The Old American Nursery in New York City offered tamarisk as early as 1823 and several eastern nurseries listed in them in the 1830s. A California nursery, representing the Highland Nursery of New York, listed three species in 1854. By 1861, other nurseries based in California had begun to offer tamarisk.

The United States Department of Agriculture soon began growing the plant and by 1868 listed six species in their Annual Report. These plants grew in the Department's Arboretum and contributed to the growing distribution channels.

At present, botanists have separated tamarisk into two common species, although, like many aspects of tamarisk, this is controversial. The evergreen variety, Tamarix aphylla, can grow to 60 feet in height and generally has one trunk. The deciduous variety, Tamarix chinensis, is the one that has spread throughout the west. However, some botanists believe that another species exists: Tamarix

ramosissima. This confusion arises because these two species may interbreed and because of variation within plants of the same community.

Tamarisk escaped from cultivation sometime in the 1870s. The earliest collection outside of a nursery occurred in Galveston, Texas, in 1877. Wild tamarisk appeared in Utah in 1880. By the 1920s, California, New Mexico, and Arizona also reported tamarisk. It spread widely and quickly as people introduced the plant for erosion control, as we altered river banks through the removal of native vegetation, and by the construction of dams.

We are fortunate that an excellent record of the tamarisk invasion of the Colorado and Green Rivers exists. E. O. Beaman's photographs of Powell's 1871 expedition reveal what the river looked like before tamarisk. A Kolb brothers photograph shows tamarisk at the head of Marble Canyon in 1911. Photographs taken by the Bureau of Reclamation for potential dam sites in Cataract Canyon in 1914 and 1921 do not show tamarisk, but they do appear in a 1927 C. Eddy picture of the confluence. One geographer estimates that tamarisk moved up the rivers at a rate of 12 miles per year.

Comparing Powell's photos with modern photos shows how tamarisk has affected the riparian shoreline. In most cases, the only difference is that tamarisk now dominate the shoreline. They have colonized and stabilized ephemeral sand bars, creating river channels that are an average of 27% narrower (see illustration on page 13). River islands have also become larger and some are now attached to the shoreline creating new river bottoms (for instance, June Bottom was an island in 1951). These changes have resulted in increased overbank flooding and a river less able to adapt to changing flows.

Less obvious changes have also occurred. Tamarisk has contributed to a lowering of the water table, due to its extremely high transpiration rate; mature plants can use 200 gallons of water per day. In one case study in Death Valley National Monument, a tamarisk removal project begun in 1972 helped return a dried marsh back to a wet, healthy ecosystem.

Tamarisk have several adaptations that have helped the plants spread so far, so quickly. A single mature plant can produce 500,000 seeds a year, which can germinate within 24 hours of becoming wet. Tamarisk flower from April through October and seeds can establish themselves in fall when other species' seeds are not present. Seedlings can tolerate desiccation at an earlier stage than willow or cottonwood, and mature shrubs are more drought resistant than native plants. One study also found that tamarisk can survive up to three years in cold, well-oxygenated water.

One author summarized the tamarisk predicament: "Under optimum conditions, a desert riparian area containing only a few tamarisk trees can be converted to an impenetrable thicket in less than a decade." Once they become established, tamarisk have further adaptations to resist invasion by other species. A dense thicket has little bare soil underneath for other plants to set seed and tamarisk exudes salt from leaf openings, which fall to the

ground, creating a hypersaline condition that kills other grasses and seedlings. The closely spaced trees also allow little sunlight to reach other species seedlings, further preventing invasion. Tamarisk also redevelop quickly after burning or cutting.

Despite all these adaptations, the tamarisk picture may not be as bleak as it has been painted. Some researchers now believe that tamarisk has reached its maximum distribution. Land managers have started to realize the deleterious effects of tamarisk and in some areas, successful efforts are under way to remove the plant. More importantly, further establishment is being discouraged; we are attacking the plant before it gets out of control.

Although most people think that tamarisk is bad for wildlife, some success stories have been reported. The willow flycatcher, a de facto endangered species, has shown an increase correlated to its use of tamarisk for nesting. Beekeepers in Texas report that they can charge more for honey produced from bees that use tamarisk.

At this point though, we only have about fifty years of data on tamarisk, much of it conjectural. Ecologists are just starting to learn about the tamarisk lifecycle and its place in the riparian ecosystem. We know that the tamarisk invasion occurred at a time when humans were significantly altering western waterways. Will it continue to thrive in its present state or will native species reestablish themselves? Fifty years is not a long time in the natural world.

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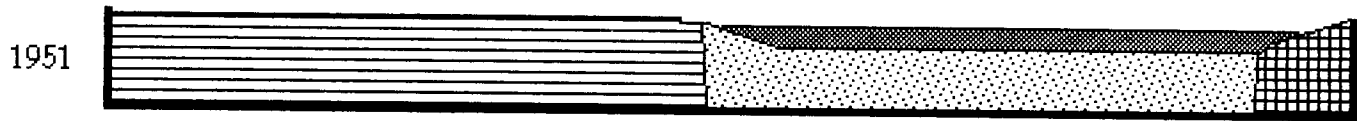
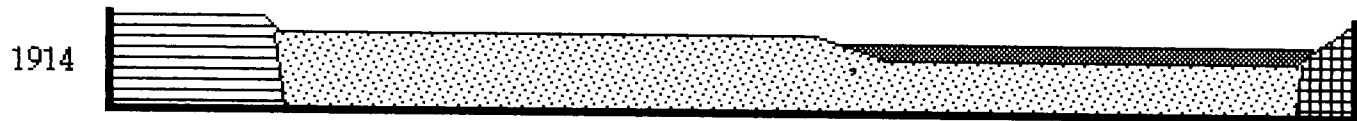
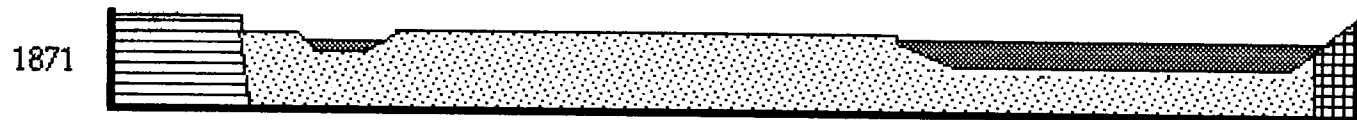
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Cross section of the Green River at mile 69.2, Bowknot Bend
(from Graf, W. GSA Bulletin, v. 89, pg. 1491-1501)



River
Channel



Stable
Sand



Talus,
Bedrock



Unstable
Sand