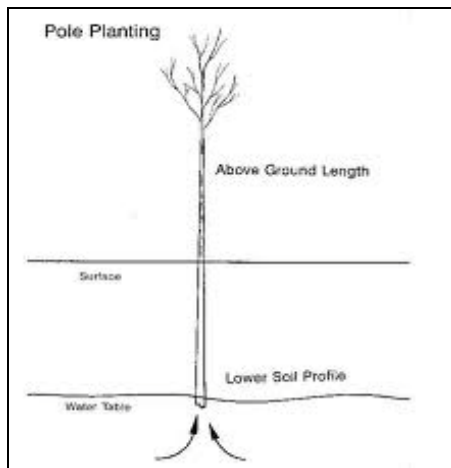


Where to Plant

Where the trees are to be planted should be considered carefully. All riparian species need water; the best way to insure they get the necessary water is to plant trees deep enough so even at low water levels, the roots always have access to water. This is difficult in a river such as the Shasta with significant withdrawals and water levels that can sometimes drop or raise 1-2 feet over night. For the willow species, it is possible to plant poles and whips very deep without affecting survival. They are adapted to changing water levels and getting buried by floods. When using poles or rooted whips, ensure that they are long enough to have at least 2 feet of their length underground and be in contact with the annual low water table.



Species to Plant

The best species to plant are those that are already present in the area. In the Shasta Valley, the common species that are planted include:

- Red Willow (*Salix laevigata*) is the largest of the native species and when full grown can provide the most shade to the river
- Arroyo Willow (*S. lasiolepis*) is large bushy tree that have had the highest survival in experimental trials
- Narrow-leaf Willow (*S. exigua*) is a shrub-type willow that have had a high survival in experimental trials
- Water Birch (*Betula occidentalis*) is a large tree that must be propagated from seed
- White Alder (*Alnus rhombifolia*) is a native tree that must be propagated from seed

Cottonwoods occur in the lower part of the Shasta Valley, but it is unclear whether they are native or of introduced origin.



For more information contact NRCS at 530-842-6123 or FWS Partners Program at 530-842-5367

Establishment of Trees on the Shasta River in Northern California



Water birch planted along the Shasta River from a potted plant and caged for protection. Photo by Sheri Hagwood, FWS

Created by
The Shasta River Riparian Working Group

Introduction

Tree planting along the Shasta River is fraught with difficulties. In the riparian area, the soil can be too wet and low in oxygen (i.e. anoxic), too high in salts (i.e. high salinity or alkalinity) or too dry for trees to survive well.

There are a number of things you need to consider when you plant trees: the species and stock type (e.g. seedling, rooted plant cutting or an unrooted pole), when trees should be planted (spring versus fall) and where trees should be planted.



When to Plant

What time is a better time to plant, late fall or early spring? This can depend on whether it is a wet year or a dry year, but typically fall plantings survive better. Fall plantings have more time to establish before they leaf out which can improve their survival.

Type of Stock

Type of stock to plant need only be considered for the willow species. Water Birch and White Alder are only propagated from seeds and must be planted as seedlings.

Seedlings

Seedlings survive best when they are large enough to have a healthy root mass and tall enough to compete with the much faster growing grass, which means at least 2 summers' growth for the slower growing Water Birch.

Pole Plantings

Willows grow well from un-rooted poles and are not typically grown from seeds because seeds are very small and have low germination rates. Poles are branches ($\frac{1}{2}$ to 1+ inch diameter) that are harvested from dormant willows and soaked in water for 1 to 2 weeks before planting either in the spring or fall.

Rooted Whips

Rooted whips are smaller branches ($\leq \frac{1}{2}$ inch diameter) that are harvested and soaked like the poles, but then are planted in pots. They are grown until fall and then planted in the ground. Whips are typically harvested in the spring and grown until planting season in the fall.

Planting equipment such as power augers and water stingers are available from NRCS and SVRCD.

Other Things to Consider

Irrigation

Irrigation is not recommended. If the roots of irrigated plants are not in contact with the water table once irrigation stops, the plant will not survive.

Protection/Caging

Caging is a necessary expense for woody plantings on the Shasta River. Without caging, newly planted trees can be lost to a beaver overnight, and damage can occur from deer and livestock (if present). Cages should include t-posts for support and netwire that is a minimum of 3' tall. Create a minimum 1.5' diameter cage around each tree or cage trees together in groupings.

Monitoring

The trees should be checked annually to see if they are still alive. Dead trees can be replanted and their cages removed or re-used. Knowing which trees survive, the species, stock, and where and when they were planted, can help inform future successful plantings.

Permits

You should contact the Department of Fish and Game to see if you need a 1600 permit, a Streambed Alteration Agreement, before you plant. There are seasonal requirements for riparian plantings if a 1600 is needed.