



United States  
Department of  
Agriculture

Soil  
Conservation  
Service

517 Gold Ave., SW  
Room 3301  
Albuquerque, NM 87102

March 7, 1989

BIOLOGY TECHNICAL NOTE NO. NM-35  
190

SUBJECT: ECS - BIOLOGY - DORMANT POLE PLANTING

Purpose. To distribute background information and planting guidelines for a method of establishing native trees within flood plains and stream corridors.

This method may be incorporated, by technical note reference, into appropriate practice standards and specifications.

Effective Date. When received.

Filing Instructions. File in Biology Technical Note binder.

Bob G. McQueen  
State Resource Conservationist

Enclosure

DIST:  
AC - 1  
DC - 1



The Soil Conservation Service  
is an agency of the  
Department of Agriculture

## DORMANT POLE PLANTING

Most non-montane floodplains of New Mexico no longer support viable native riparian plant communities. Vegetation has been destroyed by combinations of channelization, agricultural drainage, overgrazing, irrigation diversions, impoundments, and efforts to effect water salvage by the control of phreatophytes.

There has been a large invasion of the introduced saltcedar into floodplains, washes and arroyos. Where native trees remain, they are largely older stands, and little natural reproduction is taking place because of dry soils, low precipitation, grazing pressure and drastic change in the timing, frequency and duration of out-of-bank flooding.

Efforts to reestablish native trees utilizing conventional techniques such as planting seedlings have largely been unsuccessful. Tree establishment has been hampered by deep groundwater levels, hot and dry surface soils, lack of flooding, precipitation in the 6 to 11 inch range, and competition with saltcedar.

Pole planting studies by SCS have shown the feasibility of using large pole cuttings of Rio Grande cottonwood and black willow to restore depleted riparian stands. Poles of 2 to 3 inch basal diameter, and a height of up to 20 feet were used. Poles were cut from native stands while dormant; and again when dormancy first broke. We also studied the relationships between depth of pole butt placement and constant or fluctuating ground water levels. Depths to water of 7 to 12 feet were included in the studies.

Dormant poles set at constant water levels of 7, 8, 8 and 12 feet, had survival rates of 60, 90, 100 and 77 percent, respectively. Survival was reduced when poles were set two feet and four feet above the water table. Poles cut after breaking dormancy also had lower survival.

Poles in plots with naturally fluctuating water levels had lower survival rates than those with constant water levels. Again, poles set above the growing season water table had lower survival; as did poles cut after breaking dormancy.

In the years following these studies, pole plantings have been made by private landowners and land managing agencies, with varied results. The El Paso District of the Bureau of Reclamation has planted 4650 poles at 13 different sites along the lower Rio Grande. Water tables varied from seasonally flooded to a constant 12 foot depth. Salinity of the soils or ground waters varied from 700 to over 4000 ppm. Survival ranged from 0 to 100 percent one year after planting, and 0 to 80 percent after four years.

The most successful plantings were on a farm field within one half mile of the Rio Grande which had a growing season water table at two to four feet, salinity of 900 ppm and pH averaging 7.6. Despite heavy competition from annual weeds, survival was 83 percent after one year and 82 percent after two.

Observations from the 13 sites indicated that reduced growth and vigor resulted from high salinity, prolonged inundation, browsing, weed competition and defoliation by grasshoppers.

The Bosque del Apache National Wildlife Refuge sustained a spring wildfire which burned 1372 acres of monotypic saltcedar and 445 acres of cottonwood, black willow and screwbean mesquite floodplain forest. These lands had historically flooded and once supported extensive native riparian communities. A fire rehabilitation plan was funded to attempt restoration of a native plant community.

The plan calls for control of saltcedar basal sprouting with herbicide followed by pole planting with Rio Grande cottonwood, black willow and hybrid poplar. After trees are established a shrub understory will be planted. In 1987 there were 2350 poles planted at sites considered representative of the burned area in an effort to determine site-specific limitations. Determinations of survival and growth were made; and a sample of poles were excavated to examine soil, groundwater and rooting characteristics. The overall first year survival of 38 percent is considered not acceptable.

Analysis of the plantings has shown that three site problems led to the poor survival. These are: 1) sites which flooded; 2) sites where the ground water dropped more than two feet during the first growing season; and 3) sites where salinities went above 3000 ppm.

We have attempted to use poles cut from Rio Grande sites in plantings made in the lower Pecos River valley. To date these have been failures, which is attributed to the much higher salinities of the soils and water in the Pecos drainage; which can exceed 6000 ppm.

Conversely, moving to higher elevations, with more constant water tables, and higher precipitation has been very successful. First year survival of over 90 percent is common.

A distillation of what has been learned, over the past five years, about site selection and establishment procedures has led to this current set of recommendations for cottonwood and black willow.

## GUIDELINES FOR SUCCESSFUL POLE PLANTINGS

1. Determine seasonal salinities of the soil and ground water. Do not use cottonwood when salinities exceed 3000 ppm. Avoid pole planting at sites where salinities exceed 6000 ppm.
2. Select sites with sand, gravel or small cobble soils above and in the water table. Avoid sites with continuous clay or silt soils; or where lenses of clay or silt are thicker than one foot.
3. Prior to planting, measure monthly water table fluctuations for one year or preferably longer.
4. Cut poles from stands of open grown, young, rapidly growing trees, using only wood which is four years old or less. Remove side branches, leaving only the tip and next two lower side branches.
5. Cut poles when completely dormant.
6. Soak the poles in water from the day of cutting for 10 to 14 days.
7. Auger holes to the depth of the lowest anticipated growing season water table. Cottonwood will have reduced root formation when the water table is less than 2 feet from the ground surface. Consider using black willow at high water table sites.
8. Place the poles in the augered holes the same day they are removed from the soak. Set the butt at the lowest anticipated growing season groundwater depth. Select poles of a length which provides 4 to 6 feet above the soil surface.
9. Back fill the holes carefully to avoid air pockets. The use of dry surface soil is recommended.
10. Place tree guards around poles if rodent or rabbit damage is anticipated.
11. As buds begin to swell along the pole, usually in April or May, wipe them off the lower two-thirds of the pole.
12. Plantings must be excluded from livestock grazing for two and possibly three growing seasons. Beaver must be controlled for the full lifespan of the tree.

Following these guidelines will assure the success of dormant pole plantings.