Reinkin Bridge South Planting
Workshops Demonstration Plantings
2008 Progress Report

Study Numbers: NMPMC-T-0803-RI and NMPMC-T-0804-RI

This planting is the result of three riparian workshops which were held in 2008 on January 30, February 28, and March 12. The Los Lunas Plant Materials Center (LLPMC) has developed two, unique planting methods that were demonstrated during these workshops: 1) Deep-planting of long-stem shrubs, and 2) planting willow whips using electric hammer drills. During a 25 year period, the LLPMC has also refined the methodology of planting cottonwood pole and willow pole cuttings, where successful plantings are now more common than unsuccessful plantings. Because of the LLPMC's development of these two technologies, workshops have been in high demand by local and regional conservationists from Arizona, Colorado, and New Mexico, and have been provided by the LLPMC.

Three workshops, averaging approximately 30 participants per session, were located on the west side of the river about one mile south of the Reinkin Road Bridge in Belen, New Mexico. The site was burned by a wildfire in the spring of 2007. Standing dead cottonwood trees, scorched from the fire, were cut down and were beginning to be removed from the site. However, much of the debris was still on the site at time of the plantings. Exotic woody species such as saltcedar, Russian olive, and Siberian elm also were cut down and removed from the site. For control purposes, stumps of the exotic species were treated with herbicide. A small portion (less than three acres) of the newly treated areas was planted by the workshop participants.

The riparian planting methods developed by the LLPMC involve drilling deep holes (up to eight feet) and connecting stem cuttings or the root systems of plants to groundwater. Root crowns of shrubs are buried deeply, which is contrary to traditional thinking for plant health. The LLPMC has been using the long-stem, deep-planting method for about five years, with plant survival averaging above 80 percent with minimal or no follow-up irrigation. These plantings are done in areas that receive less than 10 inches of annual precipitation. Plant growth is averaging 1- to 3-feet per year, depending on species and location.

Methods

The planting sites consisted of three adjacent sites, each about one-acre in size. GPS coordinates for each site were taken (Table 1). Holes were drilled with a 65-hp farm tractor with a front-end mounted auger (8-ft x 9-inches) by the LLPMC staff. Participants planted shrub rootballs to the depth of capillary water (about 3-feet) and cottonwood pole cuttings to the depth past ground water (about 8-feet). The holes were backfilled so there would be either good soil-to-root or soil-to-stem contact. Poultry wire tree guards that were 5-feet in height and 10-inches in diameter were assembled and installed by participants to protect the cottonwood pole cuttings from beaver, while the shrubs were not protected.

Electric 8.5 amp rotary hammer drills with 36-inch x 1-inch bits were used to drill 30-inch holes on the riverbank. Participants placed the willow whips in the holes past the groundwater level and then backfilled the holes.

Two groundwater monitoring wells were installed by the participants using an 8.5 hp, tripod mounted auger at each workshop. The well casing was composed of a 10-foot x 2-inch scheduled 40 PVC pipe, perforated at the bottom one-third of the pipe and caped at both ends. The casing was driven to the 9-foot depth with a hand- held posthole pounder.

Shrubs species planted as long-stems were New Mexico olive (*Forestiera pubescens*), indigobush (*Amorpha fruticosa*), false willow (*Baccharis salicina*), wolfberry (*Lycium torreyi*) golden currant (*Ribes aureum*), skunkbush sumac (*Rhus trilobata*), screwbean mesquite (*Prosopis pubescens*) and giant sacaton (*sporobolus wrightii*). Rio Grande cottonwood (*Populus deltoides*) was planted as pole cuttings. Coyote willow (*Salix exigua*) was planted as whip cutting. Each shrub was planted with a sub irrigation tube composed of a thin wall 40-inch x 1-inch PVC pipe perforated at the bottom one-third of the pipe. If the plants were to become water stressed, they would be irrigated through this pipe. This only happens when the watertable drastically drops well below the root system of plants and they are no longer connected to capillary water.

Results

Cottonwoods failed to establish on any of the three sites (Table 1). Shrubs only established on Site One with a 75% survival rate (Figures 1, 2, and 3).

Table 1: Survival of Plants at the Three Sites

Species	**Site 1**		**Site 2**		**Site 3**	
GPS Coordinates	**N34°38.202′**	**W106°44.716′**	**N34°38.232′**	**W106°44.700′**	**N34°38.237′**	**W106°44.652′**
	Alive	**Dead**	**Alive**	**Dead**	**Alive**	**Dead**
New Mexico Olive	6	3		3		9
Indigobush	1	1				11
False willow	1	0				
Wolfberry	3	0		2		
Golden current	1	0				
Skunkbush sumac						1
Screwbean mesquite				1		2
Giant sacaton			1			
Cottonwood		15		15		
% Survival Shrub	75		0		0	
% Survival cottonwood	0		0		0	

Figure 1: Dead cottonwood pole cuttings at Site 1.

Figure 2: Surviving New Mexico olive shrub (right corner) on Site 1.

Figure 3: Wolfberry (foreground) Baccharis (center) marked by a 6-inch white PVC pipe at site 1.

Figure 4: Slightly raised, cleared area at site 1 where the transplants survived.

Figure 5: Cottonwood saplings from vegetative root sprouts at site 2.

Figure 6: Black willow saplings from vegetative root sprouts at site 2.

Figure 7: Established vine mesquite grass protecting soil surface from erosion at site 3.

Figure 8: Stiff stem bulrush (center) and cattails (foreground) occupy a natural swale near site 3.

Discharge, cubic feet per second

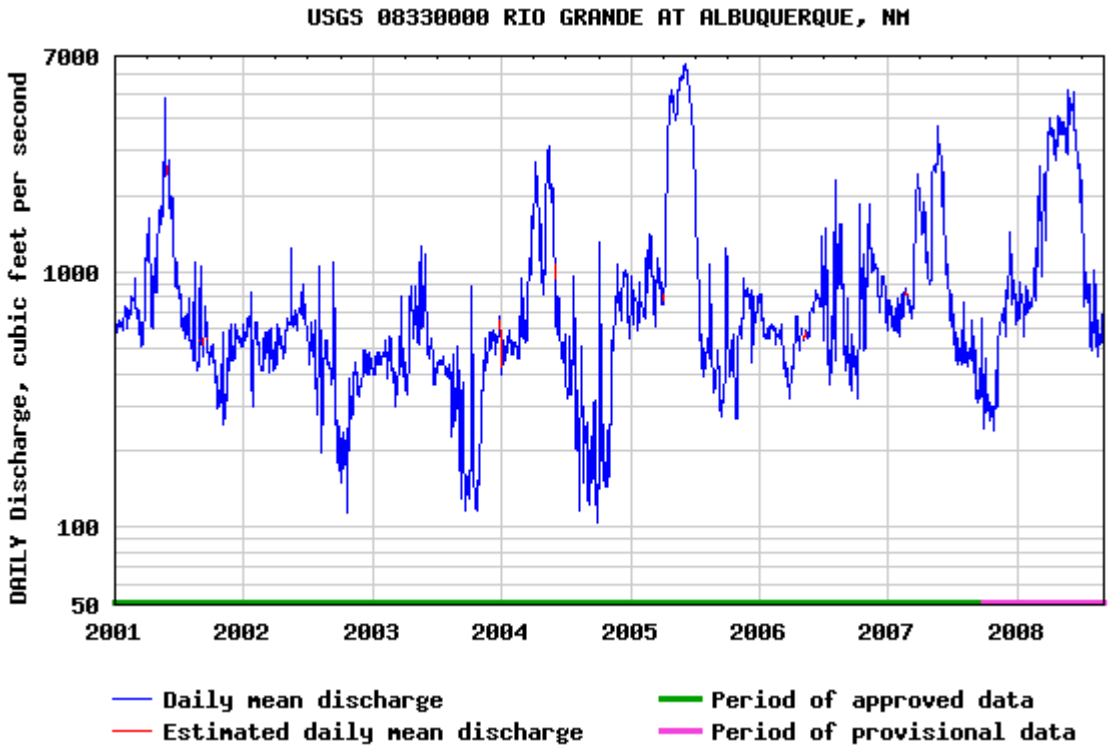

Figure 9: Rio Grande discharge in Albuquerque from 2001 - 2008

The poor survival rate of shrubs and trees may be attributed to the higher than normal water table caused by the higher than normal spring runoff in the Rio Grande during the 2008 spring runoff (Figure 9) that occurred for more than 40 days in May through June.

At Site 1, where there were surviving plants, is a slightly raised area relative to the planting location (Figure 4). When plant roots become submerged in groundwater for more than 30 days, they often die due to the restriction of root aeration. Even at Site 1, where the plants survived,

they seemed to have been stressed because of their lack of growth and some necrosis of leaves. After longstem transplants and cottonwood pole cuttings are established (after the first year) they can withstand much longer periods of this type of inundation. This same poor survival response was observed in the summer of 2005, when the Rio Grande experienced higher than normal spring runoff for more than 60 days. Of the 1,000 long-stem shrubs that were planted at the Los Lunas Silvery Minnow Habitat Reconstruction Site in Los Lunas, only about 700 survived. This was an interagency project that involved the LLPMC, the Bureau of Reclamation, the Army Corp of Engineers, and the University of New Mexico. The plants that were lost were mainly located in low areas of standing water for more than a two-month period.

Even though the vegetation planting mainly failed at the site, native riparian vegetation is rapidly reoccupying the entire area (Figures 5 through 8). However, root sprouts of salt cedar and Russian olive are also competing for dominance. The best restoration treatment for this area is the continuation of spot treating with herbicide the non-native pheatophytic species. Because the sites are so wet, the native riparian species are establishing mainly by vegetative reproduction. There does not seem to be any overbank flooding which would provide soil surface disturbance from deposition and scouring allowing for large scale riparian seedling emergence. However, there was a small number of cottonwood seedlings found emerging in depressions of bare soil areas where there may have been standing water. The native grasses are spreading by rhizomes, and the woody species such as cottonwoods and willows by root sprouting. After a period of eight to ten years when the cleared areas are re-occupied by native vegetation with continued woody exotic species controlled with herbicide, it may be beneficial to plant some various riparian shrub species (i.e. New Mexico olive, golden current, wolfberry, screwbean mesquite) to improve species diversity. Planting long-stem shrub transplants at shallow depths on elevated locations should prove successful.