

Work Task E8: Seed Feasibility Study

FY09 Estimates	FY09 Actual	Cumulative Accomplishment Through FY09	FY10 Approved Estimate	FY11 Proposed Estimate	FY12 Proposed Estimate	FY13 Proposed Estimate
\$210,000	\$132,389.11	\$859,825.69	\$0	\$0	\$0	\$0

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Start Date: FY05

Expected Duration: Closed in FY09

Long-term Goal: Restoration research

Conservation Measures: WIFL1, WRBA2, WYBA3, YBCU1, ELOW1, GIFL1, GIWO1, VEFL1, BEVI1, YWAR1, SUTA1, CLMB2, PTBB2

Location: Reach 4, Cibola NWR, one-half mile east of River Mile 97, Arizona

Purpose: This research project documents the feasibility of establishing native riparian habitat (cottonwood, willow, and other native groundcovers and shrubs) from seed to potentially increase the cost effectiveness and quality of future habitat creation projects.

Connections with Other Work Tasks (past and future): Beginning in FY11, operation and maintenance costs for this work task will be included in Cibola NWR Unit #1 (E24).

Project Description: Through a series of laboratory and field experiments, this study will document the necessary steps involved in using seed to create dense mosaics of native riparian land covers. Steps in the process include seed collection, storage, treatment, planting, germination, and seedling growth and survival. Using seeds in lieu of, or in conjunction with, cuttings may be feasible if it involves less labor, is more cost effective, or preserves the genetic diversity of the riparian habitat created under the LCR MSCP. The amount of nonnative to native vegetation resulting from using seed for restoration will also be an important factor in determining the feasibility of this method. Reclamation has entered into a 50-year land use agreement with the USFWS to conduct restoration research and manage created land covers in Unit #1 at Cibola NWR.

Previous Activities: During 2008, three additional germination trials were completed for frozen Fremont cottonwood, Goodding's willow, and coyote willow seed collected on the LCR during April 2006. Results indicate viability of over 80% for at least 27 months after collection. Vegetation and water content monitoring continued for cottonwood-willow study plots seeded at Cibola National Wildlife Refuge in May 2007. Results for continued monitoring indicate an expansion of Fremont cottonwood crown and canopy

cover as well as saltcedar crown and canopy cover. Monitoring of tagged trees has allowed documentation of superior growth rates of Fremont cottonwood over saltcedar under both irrigation regimes.

Sixteen additional small-scale study plots were implemented at Cibola National Wildlife Refuge to analyze the effectiveness of direct seeding Goodding's willow under reduced competition. Fremont cottonwood seed was not applied, and grass-specific herbicide was applied four times between May and July to control weed competition. Additionally, seeding rates were increased to approximately 140 pure live seed (PLS)/ft² (approximately 1400 PLS/m²). Finally, hydroseeding of un-cleaned seed was compared with broadcast seeding of cleaned seed.

Goodding's willow establishment in the 2008 plots averaged 0.13% for broadcast seed and 0.95% for hydroseed. The relative Goodding's willow establishment compared to the 2007 cottonwood-willow study plots increased approximately 300% and 450% for broadcast and hydroseed methods, respectively. These data indicate that reduced competition increased plant establishment. However, the plant density was still low enough that the ratio of saltcedar to Goodding's willow was approximately 1.5:1.

FY09 Accomplishments: In FY09, an additional set of willow plots were set up to determine whether the best treatments (most successful in terms of establishment, survival, and density) would have repeatable results and were not simply a result of random variability.

The interim results indicate a higher degree of promise than for previous small plot willow trials. Establishment success was high with less establishment of saltcedar. The researchers suggest that a reduction in saltcedar seed source next to the main canal and plots may have contributed to this lower observed saltcedar establishment. Grasses and other weedy species are also abundant in these plots, but don't seem to be out-competing the willows at this stage. Growth rates for the willows in these plots are still lower than what we have observed in other mass-transplanted areas; however, this may be a site-specific (local) effect.

Using seed appears to be feasible in terms of logistics and cost-effectiveness for establishing native riparian trees. However, using seed as a large-scale restoration method for the LCR MSCP still needs to be determined. This determination will be made by using a longer-term assessment of the seed-established trees' survival and competition as it pertains to the establishment of habitat for LCR MSCP cover species. Although these 2009 willow plots are showing more promise than previous willow trials, no additional experimentation will be conducted under this work task. Reclamation will participate in longer-term monitoring and assessment of the experimental plots to make an assessment for the large-scale feasibility of this technique.

Reclamation will continue to participate in monitoring of the small plots to determine whether the positive trend for seed-established natives (in terms of survival and competition versus non-native species) will continue. An assessment will also be made,

after five years of growth, as to whether the seeded plots show promise for habitat creation for LCR MSCP covered species and whether the composition of native versus nonnative species is acceptable for other habitat and fire management aspects. If this longer-term assessment shows promise for large-scale seeding, a demonstration project using the techniques and protocols established by this study may be advertised and funded at a future time. At that time, the E8 work task will be reopened, depending on steering committee input. Maintenance of this site will be covered under conservation area maintenance for Cibola NWR Unit 1 (E24).

Proposed FY10 Activities: No additional seed-feasibility research activities or expenditures will be undertaken associated with this work task for FY10. The work task was closed in FY09.

Proposed FY11 Activities: The work task was closed in FY09.

Pertinent Reports: *Year 1 Research Plan, Feasibility Study using Native Seeds in Restoration, July 17, 2006; Technical Proposal, Feasibility Study using Native Seeds in Restoration, and the 2008 Annual Report, Feasibility Study using Native Seeds in Restoration,* are posted on the LCR MSCP Web site.