

## Work Task C42: Experiments and Demonstration of Soil Amendments for Use in Restoration Sites

FY10 Estimates	FY10 Actual	Cumulative Accomplishment Through FY10	FY11 Approved Estimate	FY12 Proposed Estimate	FY13 Proposed Estimate	FY14 Proposed Estimate
\$200,000	\$49,236.73	\$49,236.73	\$100,000	\$200,000	\$200,000	\$200,000

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**Start Date:** FY10

**Expected Duration:** FY15

**Long-term Goal:** To determine and demonstrate the feasibility of soil amendments to improve restored habitat and management options for irrigation of habitat restoration sites.

**Conservation Measures:** MRM1 (WIFL, YBCU, ELOW, SUTA, GIWO, GIFL, VEFL, YWAR, BEVI).

**Location:** Reclamation's Denver TSC laboratory for controlled experiments; possible sites for large demonstrations include the Beal Restoration Site on Havasu NWR.

**Purpose:** The purpose of this study is to explore the use of soil amendments, alternative site preparation, and irrigation methods to maintain moist soils and/or standing water within habitats created for the southwestern willow flycatcher. Habitat conditions for other covered species will also be improved by maintenance of moist soil conditions. Improving soil water holding capacity will also improve water conservation and lower irrigation costs. This work will parallel species habitat and hydrology studies. This information will be used by project managers during site preparation and by land managers to create and maintain habitat with enough standing water and/or moist soils to replicate the structural characteristics of vegetation and microclimate found at occupied flycatcher habitat.

**Connections with Other Work Tasks (past and future):** Initial literature search and laboratory studies were conducted under G3.

**Project Description:** After a review of soil amendments and their associated costs, availability, water retention capabilities, etc., a product called Lassenite Pozzolan was identified as the most feasible and appropriate product for improving water retention and irrigation practices of sandy soils. Although the material has been tested for use on golf courses in desert environments, there are several differences in the use proposed by Reclamation that require further examination. Depending on results from these controlled experiments, application demonstrations will be conducted on site at the Beal Restoration

Site, where sandy soil conditions exist. Other demonstration areas may be identified in the future.

**Previous Activities:** In 2007, under Work Task G3, a preliminary literature and product search was conducted to gather information on soil amendments for use in habitat restoration projects. In 2008-2009, additional information was gathered on Lassenite Pozzolan and a complete study proposal was written.

**FY10 Accomplishments:** Laboratory work was designed to test the feasibility of Lassenite Pozzolan for restoration purposes by exploring: 1) movement of product through the soil profile under flood irrigation, 2) application rates and soil moisture effects at the surface and upper root zones of targeted riparian plants, 3) facilitation of surface water movement from irrigation source to distant areas compared to untreated soils. Results of these experiments showed that 1) the material does not move out of the soil profile under repeated irrigations, 2) soil-Lassenite mixes with percentages as low as 5-10% Lassenite significantly improve moisture retention in sandy soils and maintained moisture levels above 10%, and using Lassenite at 100% in “corridors” on the surface facilitated movement of water through and across sandy soils significantly faster than sand alone.

**FY11 Activities:** Based on the positive results of laboratory experiments conducted in 2010, a Study Plan will be written to further test the amendment under field conditions at Beal Riparian Area at HNWR. Biomass resulting from seeding of various riparian trees and shrubs will be examined to determine if the addition of Lassenite Pozzolan has a positive effect on germination, survival, growth and soil moisture retention.

**Proposed FY12 Activities:** Field trials of the amendment will be conducted in existing fields at Beal that were planted previously but have not produced the desired habitat quality. Implementation of the study plan will begin once the site has been cleared (January/February 2012), prepared with Lassenite, and planted. Monitoring will continue at the study site at Beal.

**Pertinent Reports:** *Feasibility of Using Soil Amendments to Increase Water Retention at Restoration Sites on the LCR, and Laboratory Testing of Lassenite Pozzolan for Use as a Soil Amendment at Habitat Restoration Sites, 2010* will be posted to the website. The study plan is available upon request.