

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

FY11 Estimate	FY11 Actual Obligations	Cumulative Expenditures Through FY11	FY12 Approved Estimate	FY13 Proposed Estimate	FY14 Proposed Estimate	FY15 Proposed Estimate
\$100,000	\$103,142.42	\$81,526.65	\$200,000	\$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 low quality soils 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. A seed feasibility study was conducted under E24 and outcomes from that research will be used in conjunction with the soil amendment to determine if the amendment will bolster seed production.

**Project Description:** After a review of soil amendments and their associated costs, availability, and water retention capabilities, 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.

One application is combining seeds with the Lassenite to determine whether better seed production can be accomplished. Seeding will be combined with different concentrations of Lassenite to determine the most efficient and cost-effective means of optimizing seed germination and production in sandy locations.

**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. In FY10, laboratory work was completed to test the feasibility of this product for restoration purposes including movement of product through soil profile, application rates and soil moisture retention, and facilitation of water movement.

**FY11 Accomplishments:** A study plan was written to further test the amendment under field conditions at Beal Riparian Area at Havasu NWR. The purpose is to conduct research to determine whether the addition of Lassenite Pozzolan to sandy soils has a positive effect on germination, survival, and growth of dense willow habitat from seed. Smaller plots will be treated with extra Lassenite to determine whether the product will increase soil moisture retention in small areas. The Lassenite for use in the study in FY12 was purchased in FY11.

**FY12 Activities:** Two fields in the Beal Riparian Area that have not produced the desired habitat quality will be cleared for field trials of the amendment. The fields will undergo soil testing for salinity, weed seed-bed reduction, and irrigation to remove salts if needed. Seed will be collected and stored following procedures outlined in previous reports (GeoSystems Analysis, Inc. 2007-2010). Cottonwood poles will be collected from Beal and planted to the water table around the perimeter of each field to help block windborne seed from the surrounding area. Additional rock will be placed around the irrigation valve to direct water for furrow irrigation.

**Proposed FY13 Activities:** Final site preparation including the addition of Lassenite, tilling, leveling, furrowing, and installation of irrigation ditches will be completed in January and February 2012. Seeds collected in 2012 will be planted in March. Monitoring of germination, growth, and survival will begin after planting and continue through 2014.

**Pertinent Reports:** The report, *Laboratory Testing of Lassenite Pozzolan for Use as a Soil Amendment at Habitat Restoration Sites*, is posted on the LCR MSCP website.