Work Task C43: Population Demographics and Habitat Use of California Leaf-Nosed Bat, a Genetic Evaluation

FY13 Estimate	FY13 Actual Obligations	Cumulative Expenditures Through FY13	FY14 Approved Estimate	FY15 Proposed Estimate	FY16 Proposed Estimate	FY17 Proposed Estimate
$60,000	$27,536.19	$31,494.87	$50,000	$25,000	$0	$0

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Start Date: FY11

Expected Duration: FY15

Long-term Goal: Determine the population demographics and habitat use of an LCR MSCP evaluation species, the California leaf-nosed bat.

Conservation Measures: CLNB1, CLNB2.

Location: Reaches 3-5.

Purpose: Determine the population genetic history of California leaf-nosed bats along the LCR including geographic structuring, evolutionary history, and other population demographic parameters using modern molecular techniques and determine the distribution of genetic variation in California leaf-nosed bat roost sites and identify where individuals from different roosts are foraging.

Connections with Other Work Tasks (past and future): Data on roost site location and samples collected from restoration sites will come from surveys conducted under D9 and F4.

Project Description: This work task evaluates the status of California leaf-nosed bats along the LCR within the framework of the LCR MSCP using a modern molecular approach. This will allow a better understanding of how far individuals are willing to travel to forage (currently assumed to be only 5 miles) and what constitutes appropriate habitat.

Genetic samples from each of the known roost sites near the LCR and from individuals captured during system monitoring will be collected and DNA sequencing and microsatellite analyses will be performed. This will document the genetic structuring of roost sites and allow various population demographic parameters to be estimated. These parameters include population size, previous population expansion or contraction, and dispersal between roosts. Individuals collected during conservation area monitoring will be assigned to their most likely roost site based on their unique genetic signature. Distance from roosts to restoration sites and other pertinent habitat information will be determined using GIS.

Previous Activities: Preliminary activities of gathering genetic samples and mitochondrial sequencing for initial samples prior to FY12 were conducted under G3.

FY13 Accomplishments: The majority of the netting effort has been completed thus far in the study. We have a total of 52 tissue samples from roosts near the lower Colorado River, 15 from Sonora Mexico, and 12 from Baja CA. In FY13, surveys were conducted in parts of the range of California leaf-nosed bat without representatives in this study. Four additional samples from southeastern Arizona were collected, and sequenced.

FY13 obligations were less than approved due to fewer samples being collected and processed than anticipated.

FY14 Activities: There are several new cost effective next-gen DNA sequencing methods that allow for a detailed look at population level parameters. In FY14, we will decide which of these methods is most cost effective. By the end of FY14, samples will be sent to a next-generation sequencing provider. In early FY14, any remaining gaps in our sampling range will be filled with exploratory roost surveys in areas with prior California leaf-nosed bat presence. In FY14, genetic analysis through programs such as Arlequin and MEGA will be learned and implemented.

Proposed FY15 Activities: In FY15, the project will be completed and it is expected to provide a detailed view of genetic population structure within and among roosts along the LCR. We may be able to assess the current and historic populations of California leaf-nosed bats along the LCR. In addition to the project goals of documenting population structuring and gene flow, this study may provide a phylogeographic view of California leaf-nosed bats and how the LCR roosts fit within the broader scope of the species range.

Pertinent Reports: *Genetic Characterization of Macrotus californicus Populations along the Lower Colorado River—2010 Annual Report* is available on the LCR MSCP website. The research design is available upon request.