

Work Task C5: Effects of Abiotic Factors on Insect Populations in Riparian Restoration Sites

FY05 Estimate	FY05 Actual	Cumulative Accomplishment Through FY05	FY06 Approved Estimate	FY07 Proposed Estimate	FY08 Proposed Estimate	FY09 Proposed Estimate
\$0	\$0	\$0	\$90,000	\$90,000	\$90,000	\$90,000

Contact: Bill Wiesenborn, (702) 293-8699

Start Date: FY06 **Expected Duration:** FY09

Long-Term Goal: Species Research

Conservation Measures: WIFL1, WIFL2, YBCU1, YBCU2, GIFL1, GIWO1, VEFL1, BEVI1, YWAR1, SUTA1, WRBA2, WYBA3, CLNB2, and PTBB2

Location: Palo Verde Ecological Reserve (E4) and Cibola Valley Conservation Area (E5)

Purpose: Evaluate insect populations at PVER and CVCA by varying irrigation and fertilization rates.

Connections with Other Work Tasks (past and future): This Work Task developed from Southwestern Willow Flycatcher Prey Base Study (C20). This previous study identifies insects and spiders utilized as food source by the SWFL. This new study also parallels Insect Population Biology in Riparian Restoration Sites (C6). C6 currently is examining source habitats (riparian, upland, or aquatic) of insects eaten by riparian birds covered by the LCR MSCP, and is developing a method for monitoring their populations. Plant water and nitrogen contents also likely affect populations of MacNeill's Sootywing being investigated in Survey and Habitat Characterization of MacNeill's Sootywing (C7). The same laboratory procedure will be used to measure plant nitrogen in C5 and C7. Information obtained in these studies will be used in the design and implementation of future habitat creation projects detailed in Section E.

Project Description: Eight species of birds (southwestern willow flycatcher, yellow-billed cuckoo, gilded flicker, gila woodpecker, vermilion flycatcher, bell's vireo, sonoran yellow warbler, summer tanager) and four species of bats (western red bat, western yellow bat, California leaf-nosed bat, pale Townsend's big-eared bat) covered in the LCR MSCP consume insects. Creating and maintaining habitat for these species requires providing an adequate supply of insects for food. This may be more difficult at the LCR MSCP habitat creation sites being developed, because riparian vegetation is being planted in non-riparian farmland (i.e. where water tables are lowered and spring flood flows are absent). Growing plants will not by itself guarantee insect abundances large enough to feed and support bird and bat populations. Two abiotic factors, plant water content and plant nitrogen content, greatly influence abundances of plant-feeding insects. Both of these factors can be manipulated, depending on soil conditions, by controlling plant irrigation and fertilization.

Insect densities will be estimated on different species of restored plants grown under a variety of irrigation and fertilizer treatments. Water and nitrogen contents will be measured in tissue samples taken from insect-sampled plants. Relationships between plant water and nitrogen contents, plant species, and insect density will be determined. Field work will be performed at the LCR MSCP habitat creation sites listed above.

FY05 Accomplishments: This Work Task is a new start in FY06.

FY06 Activities: A literature review is being conducted on the effects of plant water and nitrogen contents on insect populations. Information obtained from the literature review is being used to develop a method for measuring total nitrogen in plant tissue.

Proposed FY07 Activities: Field work will be conducted at CVCA when plants become large enough to support insect populations. We anticipate using plant species (*Salix exigua*, *Salix gooddingii*, *Populus fremontii*), and varying irrigation and fertilizer treatments.

Pertinent Reports: Study design is available upon request.