

Work Task C6: Insect Population Biology in Riparian Restoration Sites

| FY06 Estimates | FY06 Actual | Cumulative Accomplishment Through FY06 | FY07 Approved Estimate | FY08 Proposed Estimate | FY09 Proposed Estimate | FY10 Proposed Estimate |
|----------------|-------------|--|------------------------|------------------------|------------------------|------------------------|
| \$126,000 | \$76,875 | \$76,875 | \$30,000 | \$0 | \$0 | \$0 |

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Start Date: FY06

Expected Duration: FY07

Long-term Goal: Species Research

Conservation Measures: WIFL1, WIFL2, YBCU1, YBCU2, GIFL1, GIWO1, VEFL1, BEV11, YWAR1, SUTA1, WRBA2, WYBA3, CLNB2, PTBB2

Location: Topock Marsh (Reach 3, Havasu NWR, AZ, 3 miles east of River Mile 243), Beal Lake (Reach 3, Havasu NWR, AZ, 1 mile east of River mile 239), and Cibola Valley Conservation Area (Reach 4, Reclamation, Hopi Tribe, and Mohave County, AZ, south of River Mile 103).

Purpose: Eight species of birds and four species of bats included in the LCR MSCP eat insects. Creating and maintaining habitat for these species requires providing an adequate supply of insects for food. Growing plants will not by itself guarantee insect abundances large enough to feed and support bird and bat populations. In addition, earlier work has found that riparian birds feed on insects that have emigrated from non-riparian habitats such as marshland. Providing an adequate food supply for riparian birds and bats will require determining insect sources, developing techniques for increasing insect abundances, and developing methods for monitoring insect populations.

Connections with Other Work Tasks (past and future): This work task developed from Southwestern Willow Flycatcher Prey Base Study (C20). Work task C20, completed in July 2006, identifies insects and spiders eaten by the southwestern willow flycatcher. This work task, C6, parallels work task Effects of Abiotic Factors on Insect Populations in Riparian Restoration Sites (C5).

Project Description: The initial objectives of this project are to: 1) determine sources of insects eaten by LCR MSCP vertebrates, 2) recommend activities for increasing insect abundances, and 3) develop a method for monitoring insect populations. Sources of insects will be determined by sampling and identifying populations. Activities for increasing insect populations will be recommended by locating information on their biological requirements in the literature. A monitoring method will be developed by testing different trap designs at LCR MSCP habitat

creation sites, with the objective of developing a monitoring method that is specific to insect species eaten by LCR MSCP-covered birds and bats and is simple to use.

Previous Activities: This was a new start in FY06.

FY06 Accomplishments: The Southwestern Willow Flycatcher Prey Base Study (C20) determined diets of birds breeding in cottonwood and Goodding's willow at Pahranaagat Lake, Nevada, in tamarisk and coyote willow along the Virgin River, Nevada, and in tamarisk at Topock Marsh, Arizona. Birds ate similar diversities (numbers of taxa), but different taxonomic compositions (abundances in orders), of spiders and insects among localities. Diets at all three sites were more closely related to abundances of spiders and insects swept from plants than trapped in flight. Similarity between flycatcher diet and abundances of insects on plants was least at Topock Marsh, suggesting that insects on tamarisk provide a small proportion of prey eaten by flycatchers. In general, flycatchers appear to be generalist feeders that exploit the spiders and insects available.

Previous research on feeding by SWFL at Topock Marsh found birds eating insects that may have been visiting tamarisk flowers. As a follow-up study, insects on tamarisk flowers at Topock Marsh were collected during May-August 2006, identified, and examined for pollen loads to estimate their reliance on tamarisk flowers. Fourteen genera or species were identified including plant bugs, ladybird beetles, paper wasps, sand wasps, leaf-cutting bees, western honey bees, and flower flies. Western honey bees and flower flies were most commonly collected. All insects collected carried high proportions (greater than 85%) of tamarisk pollen, indicating high reliance on tamarisk flowers as adults. Birds do not eat western honeybees (because of their sting) but do eat flower flies. Flower-fly larvae develop in wet, rotting vegetation. Rotting cattails in Topock Marsh appear to provide food for insects eaten by nearby, nesting SWFL.

FY07 Activities: A final report will be completed in FY07. Additional FY07 work may include refining the design of a trap for monitoring populations of insects eaten by birds, especially SWFL. Several trap designs may be tested at the Beal Riparian and Marsh (E1) site or at Cibola Valley Conservation Area (C5), if trees are large enough.

Proposed FY08 Activities: Closed in FY07

Pertinent Reports: Wiesenborn, W.D. and S.L. Heydon. In Press. *Diets of Breeding Southwestern Willow Flycatchers in Different Habitats*. Wilson Journal of Ornithology. The study plan is available upon request from the LCR MSCP.