Work Task C7: Survey and Habitat Characterization for MacNeill's Sootywing

FY07 Estimates	FY07 Actual	Cumulative Accomplishment Through FY07	FY08 Approved Estimate	FY09 Proposed Estimate	FY10 Proposed Estimate	FY11 Proposed Estimate
$160,000	$80,818	$270,607	$160,000	$145,000	$90,000	$0

Contact: Bill Wiesenborn, (702) 293-8229, wwiesenborn@lc.usbr.gov

Start Date: FY06

Expected Duration: FY10

Long-term Goal: Species research.

Conservation Measures: MNSW1 and MNSW2.

Location: Floodplain of entire LCR, dependent on permission by landowners.

Purpose: The purpose of this work task is to survey the MacNeill's sootywing distribution along the LCR and determine its habitat requirements. Results from MNSW1 will be used to accomplish MNSW2, which creates habitat for the species.

Connections with Other Work Tasks (past and future): Results of this study will be used in future work tasks to create habitat for MacNeill's sootywing under work tasks in Section E.

Project Description: The butterfly and its host plant, quailbush, will be surveyed within the LCR MSCP boundaries. Annual surveys will cover one third of the flood plain. In 2006, Parker Dam to Imperial Dam was surveyed, in 2007 Imperial Dam to SIB was surveyed, and in 2008 Lake Mead to Parker Dam will be surveyed. Surveys will record GPS coordinates of stands of quailbush and estimate the plant's area of coverage. Species will be detected as eggs, larvae, pupae, or adults on host plants and as adults on nearby nectar sources. Surveys will be conducted during April to October when adults are intermittently present (2-3 generations occur per season). Sootywings will be digitally photographed and their GPS coordinates will be recorded. Densities, recorded as individuals of each life stage per plant or plant area, will be estimated.

The species habitat requirements will be determined concurrent with surveys by measuring site factors affecting sootywing presence or absence and density. Possible site factors are:

a. plant water and nitrogen content
b. plant species used as nectar sources
c. availability of nearby nectar sources (distances, amounts)
d. area of *A. lentiformis* stands
e. elevation and latitude

Previous Activities: Surveys during FY06 were conducted for host plants and sootywing eggs, larvae, or adults from Parker Dam to the northern boundary of Imperial NWR, excluding the CRIT Reservation. Stands of host plants were found at 29 localities and GPS coordinates were entered into a Geographic Information System (GIS). Sootywings were found on host plants at 13 of the host plant localities. Numbers of adults and their behaviors (nectaring, oviposition, etc.) were counted on eight dates monthly from April to October at Cibola NWR. One flight of adults was observed, peaking at the end of June. The most common behavior observed was flying within quailbush plants. Adults were found feeding at flowers of six plant species: heliotrope, sea purslane, tamarisk, honey mesquite, alkali-mallow, and arrowweed. Heliotrope was the most frequent nectar source during spring, and tamarisk was the most frequent nectar source during summer. Females were more likely to oviposit on hostplants with higher water content. However, oviposition did not increase on acceptable plants as water content increased (i.e., plants were either acceptable or unacceptable to ovipositing female sootywings).

FY07 Accomplishments: We continued to locate host plants and eggs, larvae, and adults of MacNeill's sootywing by surveying the LCR between the northern boundary of Imperial NWR and the Southerly International Boundary with Mexico. Stands of host plants were found at 21 additional sites that were entered onto Reclamation's Regional GIS. Sootywings were found at 11 of these localities.

We continued observing plant species used by sootywings for nectar. A seventh plant species used for nectar was identified: the weedy succulent *Portulaca oleracea* (Portulacaceae). We also compared frequencies of nectaring on potted *Heliotropium curassavicum* (Boraginaceae) and *Sesuvium verrucosum* (Aizoaceae), two species observed as nectar sources during 2006. Nectarings per plant did not differ between plant species. Nectarings per flower were greater on *S. verrucosum*, the species with fewer flowers per plant.

We completed a study of host-plant selection by ovipositing sootywings begun in 2006 at Cibola NWR. The effects of plant size (canopy radius), plant water content, and leaf water content on host acceptance were tested. Percentages of plant water and leaf nitrogen were positively correlated. Acceptance of plants was most-influenced by plant size and leaf nitrogen-content acting simultaneously. All plants (n = 9 of 39 plants sampled) that exceeded 1.6 m in canopy radius, 64% in water content, and 3.2% in leaf nitrogen received eggs. We presented preliminary recommendations for restoring sootywing habitat based on our survey and study results in the FY07 Annual Report.

Initial project planning anticipated a 3-year cooperative agreement to evaluate sootywing habitat requirements. Funding for the first two years was obligated using FY06 funds, so FY07 costs were less than anticipated.

FY08 Activities: Surveys will be conducted from Lake Mead NRA south to Parker Dam. We also will be conducting two field studies on the sootywing's nectar requirements. First, additional work will be performed examining nectaring on potted plants (see FY07 Accomplishments). Second, nectaring by sootywings in relation to the quantity of nectar in flowers will be studied at Cibola NWR. These two studies will help us determine the plant species most-important to sootywings as a nectar source. A small laboratory study will be conducted examining the

importance of plant moisture in stimulating adult emergence in the spring. If plant moisture is important, habitat-creation sites may need late-winter irrigation to ensure sootywing emergence.

Proposed FY09 Activities: Field work determining the sootywing's habitat requirements will be completed by examining: 1) survival of sootywing eggs and larvae on quailbrush, including predation and parasitism, 2) sootywing dispersion in relation to patch size, and 3) further work on the sootywing's requirement for shade. The laboratory study on spring-emergence described above will be completed.

Pertinent Reports: Study plans are available upon request from the LCR MSCP. 2006 and 2007 annual reports for LCR MSCP Work Task C7: *Survey and Habitat Characterization for MacNeill's Sootywing,* will be available on the LCR MSCP Web site.