



# Lower Colorado River Multi-Species Conservation Program

*Balancing Resource Use and Conservation*

## Monitoring MacNeill's Sootywings at the Cibola Valley Conservation Area and Palo Verde Ecological Reserve

### 2012 Annual Report



May 2017

# Lower Colorado River Multi-Species Conservation Program Steering Committee Members

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U.S. Fish and Wildlife Service  
National Park Service  
Bureau of Land Management  
Bureau of Indian Affairs  
Western Area Power Administration

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Desert Wildlife Unlimited

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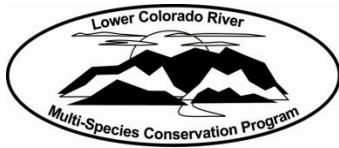
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Lower Colorado River RC&D Area, Inc.  
The Nature Conservancy



# **Lower Colorado River Multi-Species Conservation Program**

## **Monitoring MacNeill's Sootywings at the Cibola Valley Conservation Area and Palo Verde Ecological Reserve**

### **2012 Annual Report**

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Multi-Species Conservation Program  
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# ACRONYMS AND ABBREVIATIONS

CVCA	Cibola Valley Conservation Area
FY	fiscal year
PVER	Palo Verde Ecological Reserve
sootywing	MacNeill's sootywing skipper ( <i>Pholisora graciela</i> = <i>Hesperopsis graciela</i> [MacNeill])

## Symbols

>	greater than
%	percent

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## ABSTRACT

Habitat created by the Lower Colorado River Multi-Species Conservation Program in part for the MacNeill's sootywing skipper (*Pholisora graciellae* = *Hesperopsis graciellae* [MacNeill]) (sootywing) was surveyed for adult sootywings during April – August 2012. Five plots at the Cibola Valley Conservation Area (CVCA) and two plots at the Palo Verde Ecological Reserve (PVER) were surveyed using transects of varying lengths. Seven sootywings were counted at the CVCA, and 13 sootywings were counted at the PVER during fiscal year 2012 surveys. Sootywings were only found in the south check of CVCA Phase 4-west, the north and south checks of CVCA Phase 5, and PVER Phase 4. PVER Phase 4 had the highest detections during the April survey.

# INTRODUCTION

The MacNeill’s sootywing skipper (*Pholisora graciellae* = *Hesperopsis graciellae* MacNeill) (sootywing) is a small (wingspread = 23 millimeters) dark-brown skipper butterfly (Lepidoptera: Hesperiiidae; Pyrginae) found along the lower Colorado River and its tributaries in southeastern California, western Arizona, southern Nevada, and southern Utah (MacNeill 1970; Austin and Austin 1980; Nelson and Anderson 1999; Pratt and Wiesenborn 2011). The species is categorized as S1 (critically imperiled) in Nevada (Nevada Natural Heritage Program 2013) and as S2 (imperiled) in California (California Fish and Wildlife Department 2013). Flights of sootywings occur from April to October, with two to three flights of adults per year (Emmel and Emmel 1973; Austin and Austin 1980). Sootywings appear to require shade to tolerate the high temperatures where they live (Wiesenborn 1999).

Larvae of sootywings feed only on quailbush (*Atriplex lentiformis*) (Chenopodiaceae), a shrub found in dense clumps along lower Colorado River drainages (Emmel and Emmel 1973). Female sootywings oviposit on large (radius > 1.6 meters) host plants with high concentrations of water (> 64%) in branches and nitrogen (> 3.2% of dry-mass) in leaves (Wiesenborn and Pratt 2008; Malik et al. 1991). The sources of nectar for butterflies may limit the sootywing’s distribution because quailbush is wind pollinated and does not produce nectar; therefore, other plant species are needed by the sootywing for nectar. Sootywings have been documented nectar feeding (figures 1 and 2) on eight plant species (table 1) (Pratt and Wiesenborn 2009):

Table 1.—Sootywing nectar plants

Species common name	Scientific name	Family	Flower color
Alkali mallow	<i>Malvella leprosa</i>	Malvaceae	White-yellow flowers
Arrowweed	<i>Pluchea sericea</i>	Asteraceae	Purple flowers
Common purslane	<i>Portulaca oleracea</i>	Portulacaceae	Yellow flowers
Heliotrope	<i>Heliotropium curassavicum</i>	Boraginaceae	White flowers
Honey mesquite	<i>Prosopis glandulosa</i>	Fabaceae	Yellow flowers
Screwbean mesquite	<i>Prosopis pubescens</i>	Fabaceae	Yellow flowers
Tamarisk	<i>Tamarix ramosissima</i>	Tamaricaceae	White-pink flowers
Western purslane	<i>Sesuvium verrucosum</i>	Aizoaceae	Pink flowers

Heliotrope (*Heliotropium curassavicum*), and to a lesser extent western purslane (*Sesuvium verrucosum*), is the plant most used by sootywings as a source of nectar (Wiesenborn and Pratt 2010; Wiesenborn 2010). Aggregation of sootywings on heliotrope flowers allows the plant to be used as a monitoring tool for the butterfly (figures 1 and 2).



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**Figure 1.—Adult sootywing visiting a flower on heliotrope at the Havasu National Wildlife Refuge during 2009.**  
Note the hooked end of the antennae, characteristic of skippers (family Hesperiidae).



**Figure 2.—Adult sootywing on an inflorescence of heliotrope on Cibola Island within the Cibola National Wildlife Refuge during 2008.**  
This area was destroyed in the Three Slashes Fire during 2011.

The objective of this project is to document the presence of sootywings at Lower Colorado River Multi-Species Conservation Program conservation areas.

## STUDY AREAS

Five plots at the Cibola Valley Conservation Area (CVCA) and two plots at the Palo Verde Ecological Reserve (PVER) were surveyed in fiscal year (FY) 2012 that contained quailbush (table 2). These plots were planted with Fremont cottonwood-Goodding’s willow (*Populus fremontii-Salix gooddingii*) (hereafter cottonwood-willow) or honey mesquite (*Prosopis glandulosa*) land cover types, which include a variety of understory species, including quailbush.

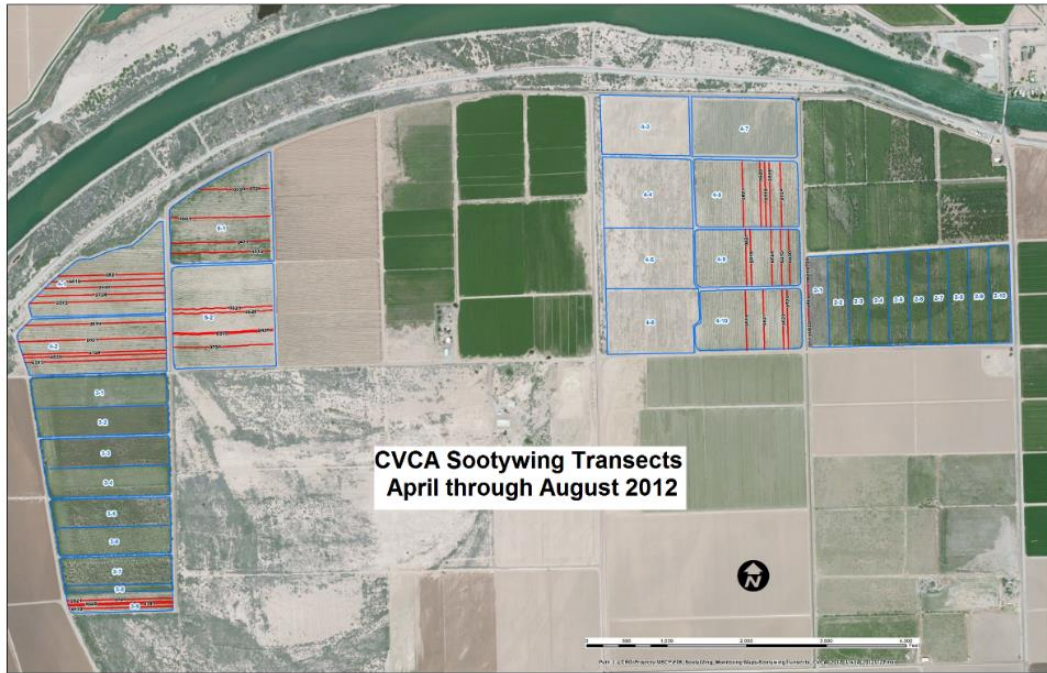
Table 2.—Plots surveyed for sootywings in FY12

Plot	Year planted	Description
CVCA Phase 2	2008	Cottonwood-willow land cover with quailbush Irrigation: flood irrigated
CVCA Phase 3	2007	Cottonwood-willow land cover with quailbush and honey mesquite Irrigation: deep furrows
CVCA Phase 4-west	2009	Honey mesquite land cover with quailbush Irrigation: deep furrows
CVCA Phase 4-east	2009	Honey mesquite land cover with quailbush Irrigation: deep furrows
CVCA Phase 5	2010	Honey mesquite land cover with quailbush Irrigation: deep furrows
PVER Phase 4	2009	Cottonwood-willow land cover with quailbush, honey mesquite, and native grasses Irrigation: flood irrigated
PVER Phase 5	2010	Cottonwood-willow land cover with quailbush, honey mesquite, and native grasses Irrigation: flood irrigated in shallow-furrows

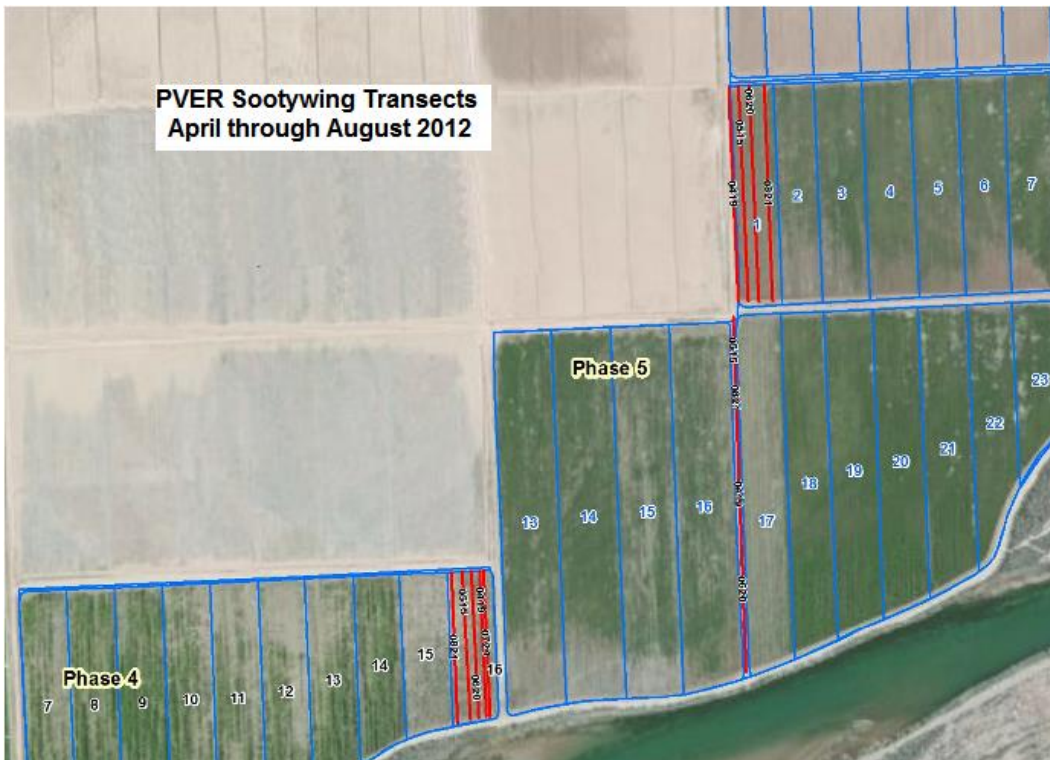
## METHODS

Sootywings were counted between April – August 2012 while walking one transect in each irrigation check in each plot on each date (figures 3 and 4). A check is a portion of a field bound by berms or irrigation ditches to contain water

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**Figure 3.—Transects (in red) sampled for sootywings at the CVCA, April through August 2012.**



**Figure 4.—Transects (in red) sampled for sootywings at the PVER, April through August 2012.**

within a defined area during irrigation. Plots CVCA Phase 4-west and CVCA Phase 5 each contained two checks, CVCA Phase 4-east contained three checks, PVER Phase 5 contained two checks, and PVER Phase 4 contained two checks, which were combined for sampling due to their smaller size.

One transect between rows of quailbush in each check was randomly selected on each date, with the exception of CVCA Phase 2 and the south check of PVER Phase 5, where the west edge of each plot was walked. These fields were not randomly sampled because most of the quailbush in CVCA Phase 2 appeared dead, and PVER Phase 5 (south check) was too dense to allow access. Each transect was walked for the length of the check. Plants to the right were examined while walking in each direction, thereby sampling both sides of each transect. Transects were walked between 0745–1330 Pacific Daylight Time when the air temperature was between 66–91 degrees Fahrenheit (19–33 degrees Celsius) and the relative humidity was between 21–51%.

## **RESULTS**

Seven sootywings were counted at the CVCA, and 13 were counted at the PVER during FY12 surveys (table 3). Sootywings were only found in the south check of CVCA Phase 4-west, the north and south checks of CVCA Phase 5, and PVER Phase 4. PVER Phase 4 had the highest detections during the April survey.

## **DISCUSSION**

Sootywings have been detected along transects with quailbush at the CVCA and PVER, usually with 40 or less individual adults observed per year per plot (figure 5). The exception was plot CVCA4-W where 453 sootywings were observed in 2009 and 1,403 sootywings were observed in 2010 (figure 6). No conclusions can be drawn about this difference in detections, as the plots were sampled differently each year.

As of 2012, the areal extent of quailbush at the CVCA and PVER (261 acres) exceeds the Lower Colorado River Multi-Species Conservation Program's requirement for sootywing habitat (222 acres). Attention may now be focused on managing existing patches of quailbush at conservation areas to support sustainable populations of sootywings through management of healthy quailbush and nectar plants.

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Table 3.—Sootywing survey results for FY12

<b>Plot</b>	<b>Transect</b>	<b>Date surveyed</b>	<b>Survey start time (PDT)<sup>1</sup></b>	<b>Air temperature (degrees Celsius)</b>	<b>Relative humidity (%)</b>	<b>Wind speed (MPH)<sup>2</sup></b>	<b>Number of adult sootywings</b>
CVCA2	W side	Apr. 19, 2012	930	28	24	0-5	0
	W road	May 15, 2012	1120	33	22	0	0
	W side	June 20, 2012	1050	32	22	0-5	0
	W road	July 24, 2012	1000	33	23	0-5	0
	W road	Aug. 21, 2012	1010	30	51	0	0
CVCA3	3 from S	Apr. 19, 2012	745	19	28	0-5	0
	5 from S	May 15, 2012	845	25	25	0	0
	6 from S	June 20, 2012	830	26	24	0-5	0
	8 from S	July 24, 2012	830	30	24	0-5	0
	8 from S	Aug. 21, 2012	800	28	51	0	0
CVCA4E-M	31 from E	Apr. 19, 2012	915	28	24	0-5	0
	12 from E	May 15, 2012	1030	31	23	0	0
	7 from E	June 20, 2012	1010	31	22	0-5	0
	18 from E	July 24, 2012	935	33	23	0-5	0
	44 from E	Aug. 21, 2012	940	29	51	0	0
CVCA4E-N	24 from E	Apr. 19, 2012	905	26	25	0-5	0
	21 from E	May 15, 2012	1040	31	22	0	0
	24 from E	June 20, 2012	1025	31	22	0-5	0
	11 from E	July 24, 2012	920	31	24	0-5	0
	35 from E	Aug. 21, 2012	930	29	51	0	0
CVCA4E-S	35 from E	May 15, 2012	1100	33	22	0	0
	12 from E	June 20, 2012	1040	32	22	0-5	0
	9 from E	July 24, 2012	945	33	23	0-5	0
	24 from E	Aug. 21, 2012	950	30	51	0	0
CVCA4W-N	22 from center road	Apr. 19, 2012	816	23	26	0-5	0
	9 from center road	May 15, 2012	930	30	23	0	0
	18 from center	June 20, 2012	920	31	21	0-5	0
	13 from S	July 24, 2012	815	30	24	0-5	0
	25 from center	Aug, 21, 2012	840	28	51	0	0
CVCA4W-S	31 from S	Apr. 19, 2012	800	21	27	0-5	0
	8 from S	May 15, 2012	910	29	23	0	0
	11 from S	June 20, 2012	900	30	22	0-5	<b>2</b>
	13 from S	July 24, 2012	800	30	24	0-5	0
	21 from S	Aug. 21, 2012	820	28	51	0	<b>1</b>

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Table 3.—Sootywing survey results for FY12

<b>Plot</b>	<b>Transect</b>	<b>Date surveyed</b>	<b>Survey start time (PDT)<sup>1</sup></b>	<b>Air temperature (degrees Celsius)</b>	<b>Relative humidity (%)</b>	<b>Wind speed (MPH)<sup>2</sup></b>	<b>Number of adult sootywings</b>
CVCA5-N	13 from center road	Apr. 19,2012	850	26	25	0-5	0
	6 from center road	May 15, 2012	1005	30	23	0	1
	48 from center	June 20, 2012	950	31	22	0-5	1
	24 from N	July 24, 2012	900	31	24	0-5	0
	30 from center	Aug. 21,2012	920	29	51	0	0
CVCA5-S	24 from S	Apr. 19, 2012	840	24	25	0-5	0
	23 from S	May 15, 2012	950	30	23	0	0
	37 from S	June 20, 2012	940	31	21	0-5	0
	14 from S	July 24, 2012	845	31	24	0-5	1
	40 from S	Aug. 21, 2012	900	29	51	0	1
PVER3	Not sampled – lack of quailbush	Apr. 19, 2012	1130	23	N/A <sup>3</sup>	N/A	N/A
PVER4	4 from E	Apr. 19, 2012	1030	28	24	0-5	9
	9 from E	May 15, 2012	1235	33	21	0-5	0
	7 from E	June 20, 2012	1130	33	21	0-5	1
	3 from E	July 24, 2012	1100	33	23	0-5	3
	13 from E	Aug. 21, 2012	1120	31	46	0	0
PVER5-N	W side	Apr. 19, 2012	1100	23	N/A	N/A	0
	2 from W	May 15, 2012	1300	33	21	0-5	0
	5 from W	June 20, 2012	1140	33	21	0-5	0
	Not sampled – no access	July 24, 2012	N/A	N/A	N/A	N/A	N/A
	1 from E	Aug. 21, 2012	1140	32	46	0	0
PVER5-S	W side – too dense to transect	Apr. 19, 2012	1100	31	23	0-5	0
	W road	May 15, 2012	1330	33	21	0-5	0
	W side	June 20, 2012	1200	33	21	0-5	0
	Not sampled – no access	July 24, 2012	N/A	N/A	N/A	N/A	N/A
	W road	Aug. 21, 2012	1150	32	46	0	0
<b>Total sootywing detections</b>							<b>20</b>

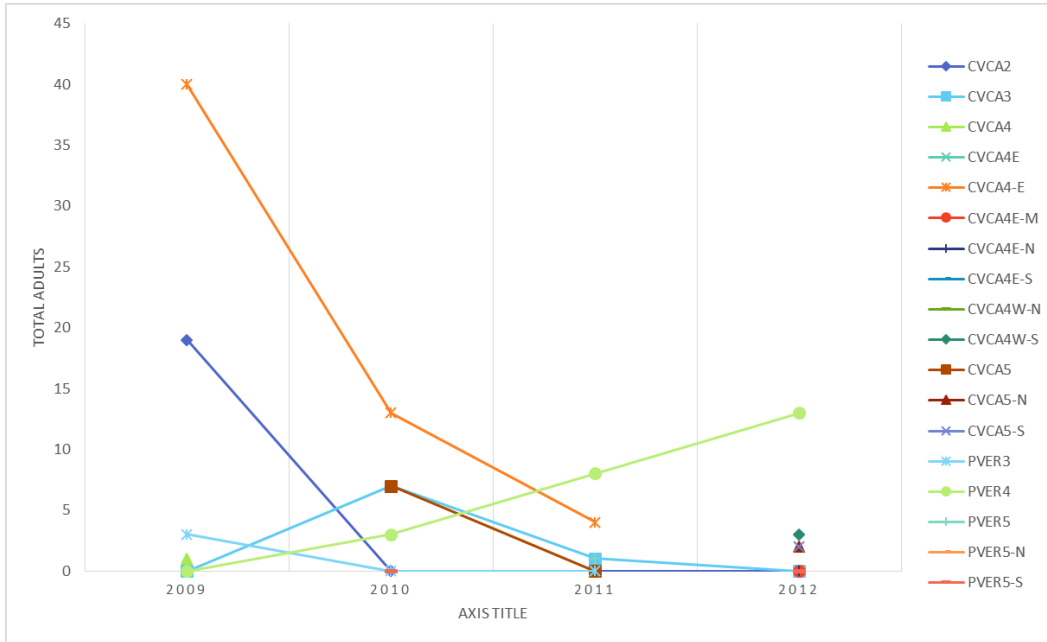
<sup>1</sup> PDT = Pacific Daylight Time.

<sup>2</sup> MPH = miles per hour.

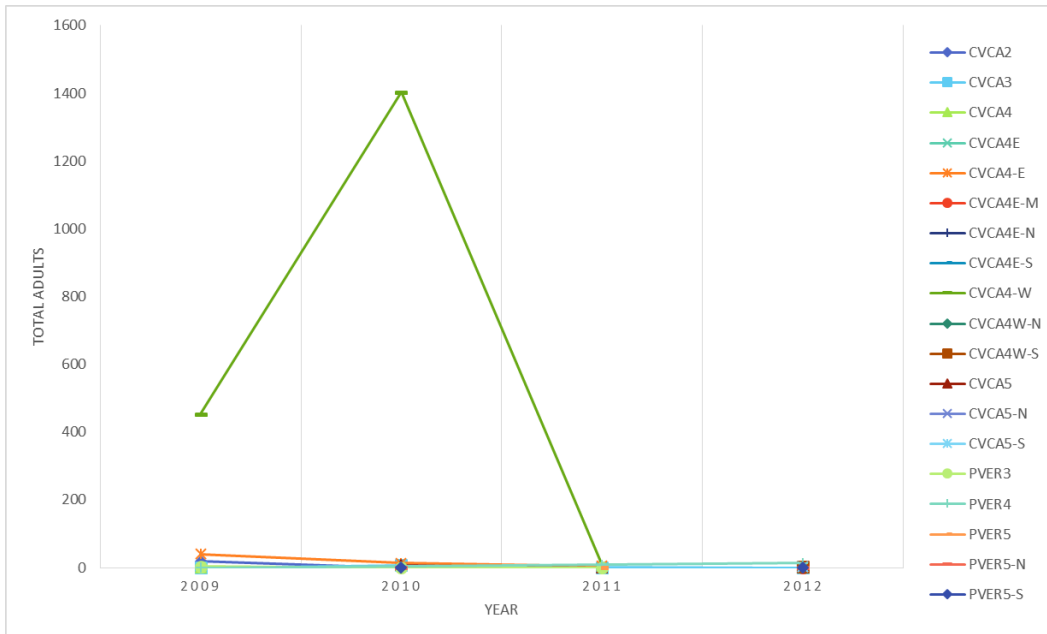
<sup>3</sup> N/A – not applicable.



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**Figure 5.—Total sootywings detected from 2009 to 2012, excluding plot CVCA4-W.**



**Figure 6.—Total sootywings detected by plot from 2009 to 2012.**

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