

**FY 2012 Summary of
Wildlife and Plant Management Activities on
Travis County's Balcones Canyonlands Preserve and Select Parks**



Texabama croton (*Croton alabamensis* var. *texensis*)

Photo by Paul Fushille

**Travis County
Department of Transportation and Natural Resources
Natural Resources and Environmental Quality Division**



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INTRODUCTION

On May 2, 1996, the City of Austin and Travis County were jointly issued a U.S. Fish and Wildlife Service (USFWS) regional permit (the Permit) referred to as the Balcones Canyonlands Conservation Plan (BCCP) that allows incidental “take” of eight locally occurring endangered species under Section 10(a)1(b) of the Endangered Species Act (U. S. Fish and Wildlife Service 1996a). The thirty-year permit covers Travis County outside of proposed Preserve boundaries identified in the Habitat Conservation Plan and Final Environmental Impact Statement (HCP/FEIS) (U. S. Fish and Wildlife Service, 1996b). The permit also covers incidental take of 27 species of concern should any become listed as threatened or endangered during the life of the Permit. The City of Austin and Travis County (the Permit Holders) are required by the terms of the Permit to assemble and manage a minimum of 30,428 acres of suitable habitat for the benefit of these species. This series of protected lands is known as the Balcones Canyonlands Preserve (BCP).

The City of Austin and Travis County also agreed to protect and manage populations of unique or endemic plant species of concern found within preserve boundaries, as well as on other city- and county-managed properties. Plant species of concern listed in the permit include canyon mock-orange (*Philadelphus ernestii*) and Texabama croton (*Croton alabamensis* var. *texensis*). Bracted twistflower (*Streptanthus bracteatus*) and Texas amorphia (*Amorpha roemerana*) were discussed in the HCP/FEIS, but were not listed in the BCCP Permit (U. S. Department of the Interior, Fish and Wildlife Service 1996b). However, because these two species are rare, they are afforded the same protection as plants listed under the permit.

The negative impacts of non-native, nuisance and invasive species have been well documented throughout Texas and around the world. The 2007 BCP Land Management Plan, approved by the USFWS, directs management of the BCP, including control of non-native, nuisance and invasive species.

Beginning in 2002 and updated annually, a *Travis County Parks and Preserves Wildlife Management Permit* is drafted which serves as a general guideline for Travis County staff to direct management of these species in response to the potential human health and safety, economic, and environmental impacts. The purpose of this permit is to recognize that threats may be posed by these species, outline appropriate management strategies, and provide management authority to implement measures to minimize these threats. The guidelines in this permit are intended to provide direction to managers for lands throughout the County system and are anticipated to represent a continually updated and flexible set of directives

that are able to meet the needs of a changing environment. As new species or conditions are discovered, this information will be incorporated to provide current status of the conditions and challenges faced by County Park and Preserve land managers.

The Texas Parks and Wildlife Department (TPWD) define exotic animals as herbivorous single-hoofed or cloven-hoofed mammals (ungulates) that are not indigenous or native to Texas, including animals from the deer and antelope families. Ranch and game managers throughout Texas have introduced such animals for various reasons. Animals found on Travis County managed portions of the BCP meeting the definition of exotic include Russian boars, which freely interbreed with feral hogs.

Non-native animals are species not indigenous to Texas, but which fall outside of the TPWD definition of “exotic”. Examples of non-native animal species in Travis County include house sparrows, European starlings, red-imported fire ants, and rock doves.

Feral animals are wild populations of otherwise domesticated species that have through release or escape reverted to a wild condition. Feral species found in Travis County include house cats, dogs, goats, and hogs.

Nuisance animals are native species that present threats to human health and safety, County property, or other natural resources due to population densities, by providing a disease reservoir or other threat. Nuisance animals may include species such as brown-headed cowbirds, coyotes, opossum, and white-tailed deer.

The BCP Land Management Plan (2007) defines non-native plants as species that were introduced where they did not evolve and do not naturally occur. These introduced species often thrive in the absence of their natural predators, diseases, competitors, and parasites. Non-native plant species can be detrimental to BCP properties by overcrowding and outcompeting native species that are important components to endangered species habitat, as well as reducing overall plant diversity in infested areas.

In Fiscal Year 2012 (FY12, Oct. 1-Sept. 30), wildlife management activities on Travis County-managed portions of the BCP focused on five species: brown-headed cowbirds (*Molothrus ater*), feral hogs (*Sus scrofa*), white-tailed deer (*Odocoileus virginianus*), Raspberry crazy ant (*Nylanderia* sp. nr. *pubens*), and red imported fire ants (*Solenopsis invicta*). Monitoring and control of cowbirds, hogs, deer, and Raspberry crazy ants are described in their respective sections in this report. Fire ant control efforts are described in

Appendix H: Balcones Canyonlands Preserve Karst Monitoring and Management FY2012 Annual Report.

In FY12, plant management activities focused on a Texabama croton survey and control of seven species of non-native plants, which are described in the *Plant Species of Concern Management* and *Non-Native Plant Management* sections of this report.

BROWN-HEADED COWBIRDS

Introduction

In addition to many other avian hosts, brown-headed cowbirds (cowbird) parasitize the nests of two Central Texas endangered avian species; the black-capped vireo (*Vireo atricapilla*) and golden-cheeked warbler (*Setophaga chrysoparia*). Cowbird trapping has been the subject of considerable research and management effort and is believed to be an important technique for the conservation of both species. At Fort Hood, cowbird trapping has been credited for drastically reducing parasitism rates of black-capped vireos from 91% before cowbird management to below 20% after a cowbird management program was implemented. Fort Hood currently meets local and regional recovery goals for the black-capped vireo and attributes this success to cowbird management (Kostecke et al. 2005).

This report summarizes the results of the FY12 Travis County cowbird trapping program. Five traps were operated within, or near, Travis County's BCP properties: the Hamilton Pool Preserve (HP), the Nootsie tract, the Vireo Ridge tract and on private land adjacent to the Toops and Vireo Ridge tracts. A fifth trap was operated at Travis County's Milton Reimers Ranch County Park. A new metal hybrid trap was donated to the County and set up on the Vireo Ridge tract.

Background

Cowbird trapping was previously conducted in western Travis County by Espey Huston and Associates and DLS Associates in 1989 and Texas Animal and Damage Control from 1990-1996. In 1997, Travis County Natural Resources Department initiated its own cowbird trapping program. This program was co-managed with the City of Austin until 2001, at which time the City of Austin began operating a program independently. Since 1997, trap locations have been added or removed according to trap success or failure and access availability. Trapping did not occur in 1998 due to staff shortage. See Exhibit A for a complete trapping history of the Travis County program.

Methods

Cowbird trapping in FY12 was conducted exclusively in the western half of the county. Travis County operated two mega traps (16'x16') and four metal hybrid traps (6'x 8'), two of which were on loan from TPWD. The mega traps are located at HP and on private property adjacent to the Vireo Ridge tract on FM 2769 (hereafter, FM 2769 trap). The four hybrid traps were operated at Milton Reimers Ranch County Park (hereafter, Reimers trap), within the Nootsie tract (hereafter, Nootsie trap), on the Vireo Ridge tract (hereafter, Vireo Ridge trap) and on private property adjacent to the Toops tract (hereafter, Toops trap).

Two groups of decoy birds (totaling 29 males, 9 females) were obtained from the Shield Ranch. An initial group of decoys (21 males, 2 females) were acquired in mid-March allowing three traps (Nootsie, Toops and FM 2769) to open relatively early. The remaining traps were opened once additional bait birds were acquired (8 males, 7 females from the Shield Ranch), or transferred from successful traps. Table 1 summarizes the FY12 cowbird trapping schedule and initial stocking numbers of decoy birds.

Table 1. FY12 Cowbird trap locations, trapping period dates, and initial cowbird stocking numbers.

Trap	Date Opened	Date Closed	Initial Stocking Numbers
Nootsie	March 15	June 11	21 Males, 2 Female
Toops	March 16	June 11	6 Males, 1 Female
FM 2769	March 23	June 7	7 Males, 1 Female
Reimers	March 30	June 4	5 Males, 2 Females
HP	March 30	June 4	3 Males, 5 Females
Vireo Ridge	April 10	June 11	8 males, 7 females

Traps were inspected and maintained at least three times per week throughout the season. Water and feed (whole milo) were refreshed on each visit. To offset the impact of rising air temperatures on bird health and survivability, plastic water baths and shade cloth were added to the traps. Some traps were reinforced with poultry fencing along the outer base edges to prevent digging by predators attempting to gain access. Non-target species found in traps were removed unharmed unless otherwise noted (Table 2). Cowbirds were euthanized by

placing them in a container with carbon dioxide gas following TPWD protocol (TPWD No Date).

Table 2. FY12 Non-target species found in Travis County operated traps.

Common Name	Species Name	Trap(s)	Comments
Red-winged blackbird	<i>Agelaius phoeniceus</i>	LM	1 released
Northern cardinal	<i>C. cardinalis</i>	VR	2 released
Bronzed cowbird	<i>Moluthrus aeneus</i>	NT, TP	1 (male) released, 2 euthanized (male and female)
Northern mockingbird	<i>Mimus polyglottos</i>	HP, NT, LM	2 released, 3 deceased
House sparrow	<i>Passer domesticus</i>	NT	1 released
Canyon towhee	<i>Pipilo fuscus</i>	RR	1 deceased
Bewick's wren	<i>Thryomanes bewickii</i>	VR	1 deceased
Yellow-headed blackbird	<i>X. xanthocephalus</i>	NT	2 released

RR= Reimers HP= Hamilton Pool Preserve NT= Nootsie TP= Toops VR=Vireo Ridge

Results and Discussion

In FY12, a total of 123 male, 72 female, and two juvenile cowbirds were captured. The total of 197 cowbirds captured this year was substantially lower than the previous year when 449 cowbirds were trapped. Table 3 summarizes cowbird captures at each trap by class (male, female, and juvenile), month, and trap efficiency (or capture rate) during the 2012 trapping season. Trap efficiency is calculated by dividing the number of females captured by the number of days in operation (x 100). Five of the six traps were operated in the same location as they were since the 2007 trapping season. A new trap was added on the Vireo Ridge tract in FY12.

Table 3. Results of the FY12 Travis County cowbird trapping season.

Trap	Month	Days in Operation	Males captured	Females captured	Juveniles Captured	Total Captured	Trap Efficiency %
FM 2769	March	9	1	0	0	1	0.00
	April	30	18	5	0	23	16.66
	May	31	8	3	0	11	9.67
	June	7	0	3	0	3	42.85
	Total	77	27	11	0	38	14.28
Hamilton Pool	March	2	0	0	0	0	0.00
	April	30	10	6	0	16	20.00

	May	31	6	1	0	7	3.33
	June	4	0	1	1	2	25.00
	Total	67	16	8	1	25	11.94
Nootsie	March	17	11	1	0	12	5.88
	April	30	7	5	0	12	16.66
	May	31	4	4	0	8	12.90
	June	11	1	0	1	4	0.00
	Total	89	23	10	1	34	11.23
Reimers	March	2	0	0	0	0	0.00
	April	30	17	20	0	37	66.66
	May	31	4	3	0	7	9.67
	June	4	0	0	0	0	0.00
	Total	67	21	23	0	44	34.32
Toops	March	16	4	3	0	7	18.75
	April	30	18	12	0	30	40.00
	May	31	6	2	0	8	6.45
	June	11	3	1	0	4	9.09
	Total	88	31	18	0	49	20.45
Vireo Ridge	April	21	4	2	0	6	9.52
	May	31	1	0	0	1	0.00
	June	11	0	0	0	0	0.00
	Total	63	5	2	0	7	3.17
Grand Totals		451	123	72	2	197	15.96

Travis County Natural Resources maintains a minimum goal of 20% trap efficiency for the program. In FY12, trapping efficiency, at 15.96%, fell to the lowest success rate since the inception of this program. The average efficiency rate from 2001-2011 was 39.80%. This year, most traps performed well below expectations and most had their lowest trapping rates on record. The total amount of cowbirds removed (n=197) was far below the average over the last six years (n=381). Only two traps met, or exceeded the goal of a 20% efficiency rate.

The new trap added to the program this year was placed on the Vireo Ridge tract adjacent to Travis County's largest black-capped vireo colony. This trap only caught two female cowbirds in 63 days of operation but was not expected to perform well. It was generally placed in this location in response to the abnormally high amount of cowbird activity on black-capped vireos observed during the 2011 field season where nest parasitism was noted on two black-capped vireo (BCVI) nests, causing both nests to be abandoned. Even without this trap in operation, the overall rate still would have fallen below the desired 20% mark (18.44%) indicating that generally the numbers of cowbirds in the trapping areas had markedly decreased in FY12.

In general, Travis County-managed preserve lands have few optimal trapping locations, particularly those adjacent to livestock or agricultural areas that serve as feeding and congregation sites for cowbirds. As the conversion of farms and ranches into subdivisions and other suburban development continues in much of western Travis County, easily accessible off-preserve areas that may concentrate cowbird numbers are becoming uncommon. With this change in land use, cowbird numbers generally have diminished on parts of the BCP, as was clearly seen in FY12. It is worth noting that no instances of parasitism were noted on any avian species during the 2012 field season.

Trap sites in and around the other County-managed BCP properties are limited, but as new tracts are acquired, additional, more suitable trap sites may be made available. Staff will continue monitoring the presence of cowbirds in endangered avian species habitat each season and adjust trap placement when necessary.

FERAL HOGS

Introduction

The BCP Land Management Plan (2007) directs land managers to control populations of feral hogs in order to minimize negative impacts to the native wildlife protected within the preserve system. Feral hogs degrade wildlife habitat and compete directly with native wildlife for food. Hogs are omnivorous, primarily consuming vegetation, mast, roots and tubers, and to a lesser degree a wide range of animal species including invertebrates, reptiles, amphibians, small mammals and birds (Davis 1994, Hellgren 1997). Their rooting habits create severely disturbed areas, which may lead to a localized shift in plant succession and increase the potential for soil erosion (Davis 1994). Feral hogs also destabilize wetland areas, springs, creeks and other riparian areas through excessive rooting and wallowing. Their threat to humans and livestock through the spread of disease has also been documented

(Miller 1997, U.S. Department of Agriculture 1992). Producing two litters a year, with an average litter size of four to eight piglets, hog numbers can expand rapidly if left unmanaged (Texas Wildlife Damage Management Service 1998).

Background

Travis County Natural Resources is responsible for the management of non-native wildlife on County-owned and managed portions of the BCP. Staff uses the discovery of wallows, rooted areas, rubs, well-worn trails, tracks, and first-hand staff encounters in the field to identify where hog populations occur within the BCP. Travis County BCP tracts that often show signs of significant feral hog populations include the Canyon Vista, Ribelin and Concordia tracts as well as several tracts within the Jollyville Unit. In 2008, feral hogs were also documented within Hamilton Pool Preserve for the first time since the property has been owned and managed by Travis County (since 1985), and have since caused considerable damage to habitat.

Some sections of the Steiner Ranch Preserve showed signs of feral hogs in previous years, but this area benefited from independent hog-trapping programs conducted by the managers of the Steiner Ranch neighborhood as well as the efforts by the City of Austin on the adjacent BCP Cortaña tract. Feral hog damage has not been evident in County-managed portions of Steiner Ranch for several years.

In FY12, Travis County continued to coordinate efforts with surrounding landowners and the City of Austin to implement management actions on and adjacent to Travis County BCP tracts. In 2008, an Interlocal Cooperation Agreement was entered into between Travis County and Texas AgriLife Extension Service (AgriLife) to conduct an operational wildlife damage management program for the protection of property from damage caused by wildlife and for the protection of human health and safety from wildlife-related diseases in Travis County. Covering all the unincorporated areas of Travis County and the City of Austin, this agreement provides a way of addressing the occasional nuisance wildlife complaints (most commonly feral hogs and coyotes) from preserve neighbors. In FY12, AgriLife continued to address nuisance wildlife complaints but was not actively managing hogs on Travis County properties.

In the fall/winter of FY12, Travis County contracted the services of Orion Research and Wildlife Management Services (Orion) to provide deer and feral hog management services on select Travis County properties. Travis County has also utilized contracted, volunteer hog-trappers in past years with varying degrees of success. Generally these trappers make casual

attempts at trapping primarily in the late fall to early spring. The County's regular contracted trapper was not active in FY12 primarily due to the decrease in the available amount of time to devote to trapping and to limited options for effective hog removal.

In December 2008, and updated regularly, a hog trapping protocol was developed to facilitate any Travis County operated feral hog trapping efforts. This protocol is used to guide activities of both staff and contracted hog trappers and addresses trapping guidelines as well as trapped animal management.

Methods

Although Travis County staff and Orion were authorized to shoot feral hogs while engaged in deer management actions, no hogs were taken during deer harvest activities in FY12. On the BCP, Travis County Natural Resources staff operated one stock panel (pen-style) trap on the Concordia tract from October-December 2011 and on the Canyon Vista tract from April-June 2012 after wide-spread habitat damage was noted on these tracts. Travis County Park staff operated one stock panel trap at Milton Reimers Ranch County Park (Reimers Park) from October-November 2011. Additionally, hogs began causing damage to sports fields at Webberville Park in east Travis County in FY12 to the extent that a new volunteer contracted hog trapper was added to support trapping efforts at that park, although the hogs moved off of the park before trapping could occur

Standard operation for Travis County staff included setting and baiting stock panel traps with dry or soured corn and occasionally rotten fruit and vegetables. Traps were routinely baited and monitored with the aid of motion-sensing cameras. Utilizing cameras enabled managers to set the trap at the most beneficial time to maximize success. Trapped hogs were humanely dispatched and carcasses were taken to be composted. The traps were operated until signs of hog activity in the area subsided, at which point it was closed.

Travis County began utilizing a more successful form of larger pen traps with a drop-down style trap door and shifted away from using smaller box-style traps. This new system can be easily transported and deployed, can be modified in size to fit individual situations, allows for non-target animals to easily escape, and can capture large groups of hogs at one time.

Results and Discussion

During FY12, Travis County staff successfully trapped and dispatched 21 hogs (nine adult female, 12 juveniles) from the Canyon Vista tract and one adult female hog from Reimers Park (County Park, not part of the BCP). Overall, signs of hog activity were not prevalent on

most properties; however there was a substantial increase in damage on both the Canyon Vista and Ribelin tracts. Other properties where hog damage was noted included the Vireo Ridge tract, the Concordia tract, Hamilton Pool Preserve, and Pogue Springs Preserve (non-BCP tract managed by Parks staff).

The prolonged drought that eased somewhat in FY12 most likely continued to have an impact on feral hog numbers and movements. The low incidence of hog activity generally made trapping a lower priority. Milder and wetter weather patterns experienced through most of FY12 will likely increase the need for trapping in FY13.

WHITE-TAILED DEER

Introduction

The BCP Land Management Plan (2007) directs that white-tailed deer populations be monitored and maintained at a level that allows for successful recruitment of plant species which make up habitat supporting the species listed in the permit (e.g. the golden-cheeked warbler and the black-capped vireo). Central Texas currently has the highest population density of white-tailed deer in the United States (Richards 2000). Recent research indicating that little or no regeneration of vital habitat components is occurring on some preserve tracts (Russell and Fowler, 1999; Russell and Fowler 2002; Russell et. al. 2001) has generated an effort to design and implement a white-tailed deer population monitoring and control program for Travis County BCP properties.

Travis County staff operated a deer management program utilizing lethal harvest from the FY03 through the FY08 hunting seasons on the Jollyville Unit of the BCP. Beginning in FY09 and continuing through FY12, Travis County contracted the services of Orion to manage the population by lethal harvest on the Jollyville Unit and several other BCP tracts.

Under the terms and condition of the BCCP, Travis County is also charged with managing populations of GCWAs and Texabama croton (*Croton alabamensis var. texensis*) that occur at Pace Bend Park. Texabama croton is a plant that although may not be over-browsed, is commonly subject to physical damage from rubbing by deer. Under the guidance and assistance of TPWD and in cooperation with the Lower Colorado River Authority (LCRA), Travis County staff has collected deer population data at Pace Bend Park since FY97. TPWD permitted various Wildlife Co-ops, under Travis County guidance, to conduct trap-and-relocation programs (1997-2001) in an attempt to manage the population in the park. However, deer densities after five consecutive years of this strategy continued to exceed healthy and sustainable levels.

According to TPWD biologists, release sites are becoming scarce and the effectiveness of these highly labor intensive control methods are minimal. Although the public may have a positive perception of trap and release efforts, TPWD scientists indicate that deer mortality rate within the first year of release may be considerably high (up to 80%). The trap and relocation efforts previously employed at Pace Bend Park are no longer considered a viable option. For most of the past decade (2002 to the present), Travis County has utilized lethal harvest to manage deer at Pace Bend Park.

Methods

Travis County staff and volunteers conducted nighttime spot-light deer surveys during the fall of FY12 on the Jollyville Unit of the BCP, Hamilton Pool Preserve/Reimers Park/ Pogue Springs Preserve, and Pace Bend Park. Due to limitations in conducting reliable censuses on other less accessible BCP tracts, Travis County biologists also utilized data collected by neighboring partner agencies on their properties (City of Austin and LCRA) for other County tracts (Volente, Lucas, Ribelin) that were targeted for harvests. Travis County staff, with assistance from a TPWD Technical Guidance Biologist, analyzed the survey data to determine deer population estimates and make harvest recommendations.

TPWD currently recommends population levels in the Texas Hill Country of one deer to 15-20 acres for effective songbird habitat management, and some research indicates population targets of one deer per 30 to 40 acres for successful hardwood forest regeneration. The goal on the BCP is to have a deer density of about one deer to 15-30 acres. At Pace Bend Park, the deer population goal is set at one deer to 12-15 acres in order to balance the needs of protecting habitat with the desire of the public to observe white-tailed deer in a park setting.

During FY12, deer management was supplied through the contracted services of Orion and by Travis County Park Rangers. This season marked the fourth year that Orion was contracted to harvest deer for Travis County. Orion harvested on the BCP, at Pace Bend Park and at Reimers Park. Park Rangers also harvested on Pace Bend Park with assistance from Natural Resources staff. Orion operates under a TPWD Scientific Permit. Travis County obtained a TPWD Managed Lands Deer Control Permit (MLDP) which allowed Park Rangers to harvest at Pace Bend Park.

During the deer harvests, animal removal was as discreet and humane as possible. Any animals taken were dispatched in a swift, effective, and humane manner. The safety of the public and staff was Travis County's top priority as efforts focused on effective management

of the deer population. Arrangements were made to donate all venison to a local charity, Caritas of Austin, for use in providing nutritious meals for needy Travis County citizens.

Results and Discussion

Survey data gathered in September and October 2011 were used to estimate deer densities and determine harvest recommendations for the FY12 harvest season (October 2011 to February 2012). Census results for Pace Bend Park estimated a deer density of one deer per 6.6 acres (Table 4). This density matches the average acres per deer (6.6) over the previous five years (2007-2011) but represents an improvement from the 3.8 average observed from 1997-2006. Census results for the Jollyville Unit, which estimated one deer per 27.3 acres, indicate the lowest deer densities since the inception of the management program (Table 5). For other areas of the preserve, particularly those in the Bull Creek and Cypress Creek Units, population data is gathered using survey data acquired by adjacent managing partners on their properties (City of Austin, LCRA). On the Bull Creek Unit surveys revealed a density of 8.8 acres per deer while the Cypress Creek Unit had a density of 7.2 acres per deer. At Hamilton Pool Preserve/Reimers Park/ Pogue Springs Preserve the deer density was 21.4 acres per deer.

A total of 65 deer were safely and humanely removed from Pace Bend Park by Travis County personnel (n=42) and Orion (n=23) (Table 6). A total of 22 deer were removed by Orion from the BCP Jollyville Unit and an additional 17 deer were removed off other preserve tracts (Table 6). Since implementing the lethal cull strategy on these tracts in FY03, the total population on the Jollyville Unit has been reduced and the number of acres per deer has improved dramatically (Table 5). Although the deer harvest has likely impacted the Jollyville Unit deer population, it should be noted that the current prolonged drought and increased habitat fragmentation are likely playing a role.

Overall population trends at Pace Bend Park and on the BCP have begun to reflect the harvest management strategies implemented by Travis County. The population trend data indicate that the lethal cull strategy has successfully increased the total acreage available per deer. The lethal harvest strategy currently in place since 2003 has been demonstrated to be an effective management option to control deer populations.

In addition to successfully managing the overpopulation of deer, this program has also generated significant public support for County management efforts. This support is largely due to the donation of processed ground venison to Caritas of Austin. In FY12, about 4,160 pounds of venison was given to Caritas which provided meat for approximately 16,640

meals, bringing the total that Travis County has donated over the years to approximately 12.6 tons (25,160 lbs.) of meat. This meat provided high quality, low fat protein to needy local residents.

Travis County staff will continue to monitor deer populations on Travis County-managed land and work to implement TPWD recommendations concerning appropriate management strategies and harvest levels. Annual censuses allow managers to evaluate the effectiveness of management strategies, determine whether desired deer densities have been attained, and calculate future harvest recommendations. As long as census data indicate that deer herds exceed the carrying capacity of County preserve or parklands, deer management should continue on select Travis County Parks and the tracts of the BCP.

Table 4. White-tailed deer population trends at Pace Bend Park FY97 through FY12.

YEAR	AC/ DEER	ESTIMATED COMPOSITION (BUCK/DOE/FAWN)	ESTIMATED POPULATION	TOTAL REMOVED
FY1997	4.9	70/117/57	244	85
FY1998	3.7	40/167/63	270	80
FY1999	3.8	53/156/55	264	111
FY2000	4.5	61/119/45	225	92
FY2001	5.7	29/97/28	326	19
FY2002	3.6	61/86/43	519	0
FY2003	2.7	29/139/30	464	18
FY2004	3.6	110/232/83	425	74
FY2005	2.5	154/329/133	616	91
FY2006	3.4	183/181/79	443	96
FY2007	6.2	86/134/25	245	59
FY2008	8.9	61/91/20	172	34
FY2009	6.1	48/135/67	250	41
FY2010	5.0	56/188/65	307	61
FY2011	6.9	56/108/55	219	89
FY2012	6.6	44/150/37	231	65

Table 5. White-tailed deer population trends on the BCP Jollyville Unit FY03 through FY12.

YEAR	AC/ DEER	ESTIMATED COMPOSITION (BUCK/DOE/FAWN)	ESTIMATED POPULATION	TOTAL REMOVED
FY03	5.6	46/162/82	290	9
FY04	5.5	61/158/78	297	12
FY05	7.2	35/127/63	225	22
FY06	9.6	33/103/33	169	20
FY07	10.0	44/142/55	241	12
FY08	9.1	29/122/46	197	26
FY09*	10.9	37/111/37	185	20
FY10*	18.8	20/60/20	100	35
FY11*	21.9	22/43/22	86	9 ^a
FY12*	27.3	31/36/33	90	22 ^b

*Population estimates were generated by Travis County staff. Previous years were generated by TPWD.

^a An additional 13 deer were removed from the Volente tract and one deer from the Lucas tract.

^b An additional 13 deer were removed from the Cypress Creek Unit and four deer from the Lucas tract in the Lake Austin Unit.

Table 6. Deer Harvested on Travis County Properties by Orion Research and Management Services, Inc. and by Travis County Park Rangers during FY12.

Location	Bucks	Does	Fawns	Total
BCP Jollyville Unit (Orion)	18	4	0	22
BCP Volente Tract (Orion)	8	3	1	12
BCP Lucas Tract (Orion)	3	1	0	4
BCP New Life Tract (Orion)	1	0	0	1
Reimers Park (Orion)	8	23	6	37
Pace Bend Park (Orion)	5	17	1	23
Pace Bend Park (Rangers)	14	25	3	42
Total	57	73	11	141

RASBERRY CRAZY ANT

Introduction

The Raspberry crazy ant is a new exotic insect species that was first discovered by pest control operator Tom Rasberry in Pasadena, Texas in 2002. In the last ten years, this ant species has spread to 21 counties in the Houston area and beyond, including Travis and Williamson Counties. These non-native invasive ants are known to invade homes and yards and cause major damage to critical electrical and computer systems in traffic signals, businesses, schools, airports, and hospitals. They are a serious threat to the nursery industry, and can also devastate livestock and crops. In wildland areas they are known to displace native ant species and adversely affect wildlife such as songbirds and honeybees (Meyers 2008; Texas A and M 2010).

Methods

In FY12, TC and COA BCP staff collaborated on a monitoring and collection protocol and reporting procedures for the Raspberry crazy ant, since this species could potentially adversely affect forest and karst ecosystems on the BCP. These protocols provide information on how to identify this newly arrived invasive species from other regional ant species, and if detected, how to collect and send specimens for confirmation. Early detection of populations in Parks, facilities, or on the BCP will be critical to slowing the spread and impact of this destructive species in our natural communities. Reporting procedures have also been created for suspected sites of Raspberry crazy ant infestation so that, if sites are positively identified, the appropriate staff and agencies are notified and proper response procedures initiated.

Monitoring for Raspberry crazy ants will focus on the following priority areas:

- Boundary areas adjacent to urban development and neighborhoods. Special attention will be given to areas with recent landscaping.
- Fresh dump sites on or near BCP or Parks properties.
- Trash cans or mulch collection sites at Parks and Facilities.
- Areas near or downstream from known infection sites.
- Areas around or near water sources
- Areas around caves/karst features with known endangered karst invertebrates or karst species of concern

Results and Discussion

Beginning in FY12, BCP staff has included monitoring for presence of the Raspberry crazy ant at all boundary inspections, infrastructure activities, and surface visits to cave sites.

Suspect ants were collected on the BCP and at Milton Reimers Ranch Park, but specimens were confirmed not to be Raspberry crazy ants. No infestations have been detected in FY12, but monitoring will continue in FY13 and beyond.

PLANT SPECIES OF CONCERN MONITORING

Canyon mock-orange and Texabama croton are generally monitored on a three-year cycle. Texabama croton was to be monitored in FY11, but due to the extreme drought conditions in 2011, it was decided to shift the survey to 2012. Canyon mock-orange is due to be resurveyed in FY13. Texas amorpha is currently not on a scheduled survey rotation, however all known locations will be surveyed and new locations mapped over the next two years (FY13 and FY14). Active searches will continue for bracted twistflower, which to date, has not been found on Travis County BCP or Park properties.

Texabama Croton

Texabama croton (hereafter, croton) is a thicket-forming woody species typically occurring as an understory shrub in mesic limestone canyon woodlands associated with live oak (*Quercus fusiformis*) mottes. Although this shrub is neither federally nor state listed, it is considered imperiled due to its rarity and restricted range. This species was discovered in Alabama over 90 years prior to its discovery in Texas in 1989 (Van Ee et al. 2006). In 1994 the species was first observed at Pace Bend Park (Travis County Transportation and Natural Resources Department, 1996). Pace Bend Park consists of 1520 acres owned by the Lower Colorado River Authority (LCRA) and managed by Travis County's Parks Division. The park is located in western Travis County, approximately 11 miles northwest of Bee Cave, north of State Highway 71 at the terminus of Ranch Road 2322. Pace Bend Park is found on the Pace Bend USGS 7.5" quadrangle maps.

Recent genetic studies indicate that this species of croton has a highly diverged lineage from other *Croton* and that the closest relative is a species endemic to Cuba or other species found in Mexico, Central America, South America or the Caribbean (Van Ee et al. 2006). Although not strongly conclusive, the data suggests that the Texas population may be the progenitor of the Alabama population. Regardless, the two American populations are genetically well separated and mutually distinct from one another (Van Ee et al. 2006).

The Pace Bend croton population is subdivided into numbered "colonies". A colony is a unique location of one or more plants. For identification, a colony is given a unique numerical value and can either be an individual plant or a group of nearby plants. Colonies

that are clustered near each other generally receive a similar number. When necessary, adjacent colonies are subdivided into subgroups or sub-individuals (e.g., 1A, 1B, 1C).

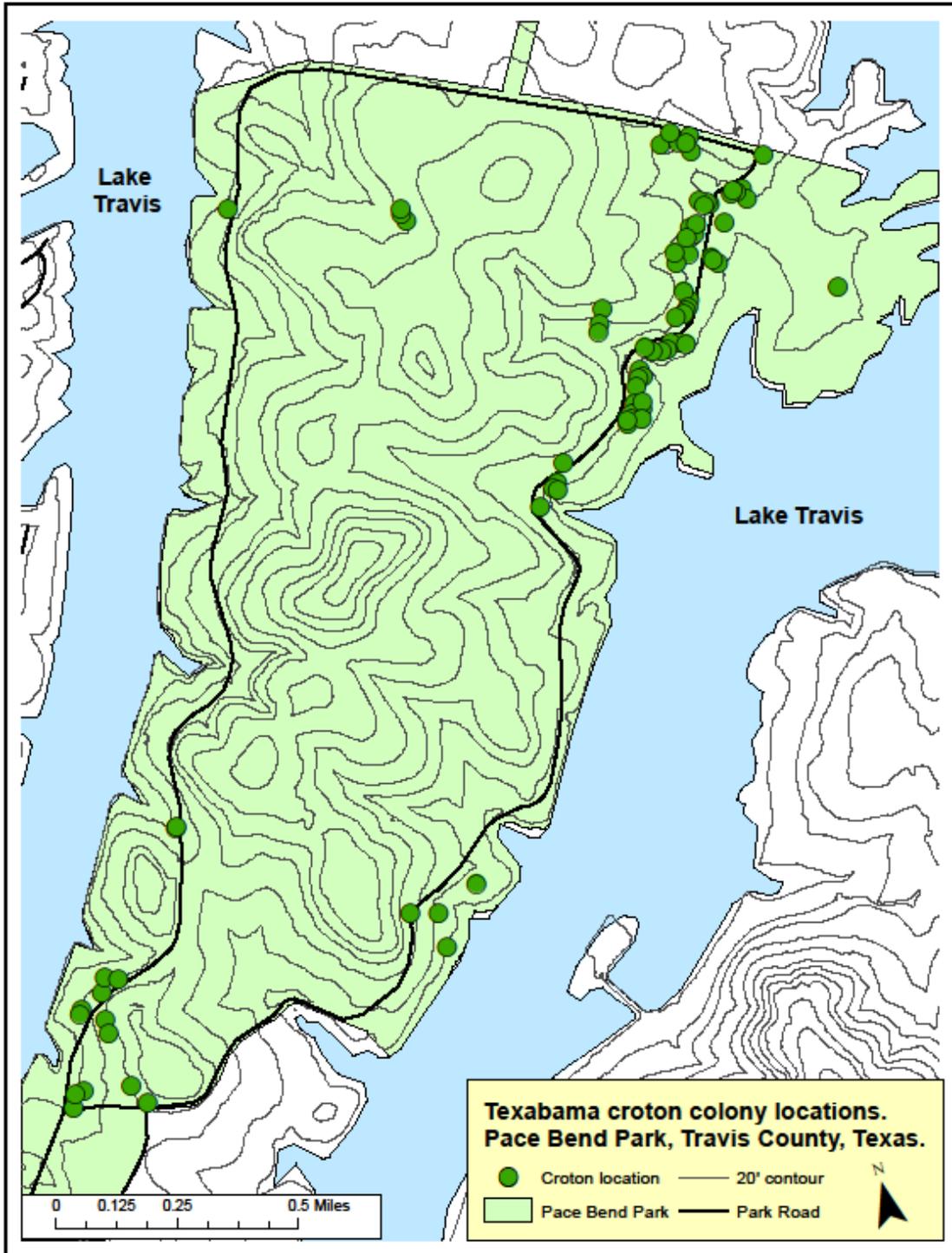
All known colonies of croton at Pace Bend Park were mapped using a Global Positioning System (GPS) (**Figure 1**) and surveys to locate new plants were conducted in August and September, 2012. Plants were assigned a size class; 1-3 where “1” was a plant under six inches tall, “2” was a plant between six inches to two feet tall and “3”, anything greater than 2 feet tall. Additionally, all located plants were checked for overall health. Two generalized categories were used in classifying the condition of individual plants or colonies: “poor-fair” - shows obvious, significant damage or stress from insects, deer rubbing, crowding, and other natural damage, and “good” – a vigorous plant or colony that showed little, or no signs of damage or stress. The general presence of insect damage was also noted along with whether the plant grew from a single stem that eventually branched or an immediate branching individual.

Search efforts in FY12 located 85 colonies at Pace Bend Park, including nine new colonies, numbering 27 plants that were not detected in 2008 (**Figure 1**). A total of three colonies disappeared since the 2008 survey comprising of three plants. These sites will continue to be surveyed in the future to look for potential resprouting or progeny. For accounting purposes, five previously unique colonies were merged into three adjacent colonies. Additionally, the largest colony (12C) that had been estimated to have up to 500 individuals was reevaluated and decreased to 300 individuals to represent a more accurate reflection. This loss of 200 plants was not considered in the overall population change.

Of the extant colonies, an additional 30 plants were missing from 15 colonies, while there was an increase of 126 plants from 21 locations (net gain of 96 plants). Approximately 1180 individual plants were counted at Pace Bend Park which is an adjusted gain of 106 individuals from 2008 (Travis County, 2008).

It appeared that the extreme draught conditions experienced primarily in 2010-2011 had no obvious effect on the croton population. Approximately 97% of the Texabama croton individuals were categorized as appearing to be in good condition while 3% were considered to be in poor-fair condition. Fewer than 20 individual plants were found with no obvious sign of insect damage while the great majority of plants (98%) had some form of leaf-cutting or chewing damage attributed to insects.

Figure 1. Texabama croton colony locations at Pace Bend Park, Travis County, Texas.



Protection of Texabama croton is enhanced through park staff education and training, including plant identification, familiarization of colony locations and proper management techniques. Two colonies were discovered by Park staff during the course of performing operational duties. Several additional locations were also noted but were not able to be relocated during this survey.

NON-NATIVE PLANT MANAGEMENT

Introduction

In addition to managing for exotic, feral, and nuisance animal species, Travis County Natural Resources also manages non-native plant species in accordance with the BCP Land Management Plan (2007) and Travis County's Wildlife and Vegetation Management guidelines. Non-native plants can cause habitat degradation by out-competing and replacing native plants, which ultimately causes a decrease in the quality of food, cover, and breeding sites for wildlife (Cheater 1992, MacDonald 1985, Simberloff 1996). For example, non-native trees can compete with native oaks, impacting a major component of both golden-cheeked warbler and black-capped vireo habitat. Therefore, in order to maintain the integrity of natural ecosystems on the BCP and prevent a negative impact on endangered species habitats, non-native plants found on the BCP are targeted for removal.

Methods

In FY12, Travis County BCP properties were inventoried for the presence of non-native plant species by surveying tracts and documenting locations. When located, these species were assessed for potential impacts to native plant and wildlife populations. Non-native plant species constituting a threat were prioritized for management action based on invasiveness of species, amount of infestation, and threats to sensitive habitats.

Control methods employed to manage non-native species included manual removal (mechanical control) and application of approved site-appropriate herbicide by Texas Department of Agriculture-licensed staff (chemical control). Whenever possible, mechanical control of non-natives without the use of herbicides was selected, since this method has no risk of impact on surrounding vegetation. Hand-pulling was especially effective on young seedlings and saplings of many woody plants, such as heavenly bamboo (*Nandina domestica*), chinaberry (*Melia azedarach*), and tree of heaven (*Ailanthus altissima*), as well as ground-running plants such as periwinkle (*Vinca sp.*). Larger woody plants were removed through use of Weedwrenches™, which ensured the removal of the entire root and eliminated the potential for resprouting.

When necessary, two chemical control techniques were used in conjunction to remove non-native plants. The “cut-treat” method was used on woody plants that could be completely removed using hand tools such as chainsaws, handsaws, or loppers. The cut stems were then treated with herbicide. The “hack-squirt” method was used on larger trees that could not be easily removed. These target plants were instead girdled around the circumference of the trunk at breast height using a hatchet or hand saw. The wounds were then sprayed with the appropriate herbicide. In FY12, a 10% Arsenal AC/surfactant mix was applied on all treated plants, with the exception Chinese wisteria (*Wisteria sinensis*; 100% Remedy RTU). All chemical applications were made when no rain was forecasted for ≥ 24 hours and winds were < 10 mph. Also, chemical control methods were avoided in areas within creek drainages.

Results and Discussion

Staff targeted seven species of non-native plants for removal on BCP tracts during FY12 (Table 7). Management activities occurred at the following 15 tracts: Bunten, Canyon Vista, Concordia, Cuevas East, Cuevas West, Greenshores, Lake Travis Bluffs, Lucas, Ribelin, Richards, Snowden, The Crossings (Travaasa), Vireo Ridge, Wendland, and Woody Hollow. Approximately 103 hours of staff time and 92 hours of volunteer time were devoted to non-native plant removal. Much of the volunteer effort was contributed by 21 Concordia University students who volunteered 84 hours of time removing the following number of stems: 625 Tree of Heaven, 162 Japanese privet, 26 heavenly bamboo, 33 Chinaberry, and 85 Wisteria from the Concordia tract.

In FY12, five Natural Resources staff members already licensed for pesticide application attended the necessary Continuing Education course in order to comply with annual license requirements.

Future plans include continuing to collect baseline data of non-native plant species on all current and newly acquired Travis County BCP properties, and prioritizing areas of non-native plant encroachment for mechanical and/or chemical control. Control efforts for FY13 will include removal of the typical invasive plants (Chinaberry, Chinese Tallow, Heavenly Bamboo, Japanese Ligustrum) at Stark’s North Mine, Cuevas, Grandview Hills, Lucas, and Steiner Ranch tracts. Tamarisk (*Tamarix ramosissima*) which has been identified along the Pedernales River at Hamilton’s Pool and Reimers Ranch will be removed. Also, staff will investigate treatment methods for Malta star-thistle (*Centaurea melitensis*), as the abundance has increased dramatically since the 2011 drought. Staff and volunteers will continue to remove target species such as *Vinca major* and multiflora rose (*Rosa multiflora*) on the Bunten tract. In addition, past control efforts will be evaluated for effectiveness. Natural

Resources staff will continue coordinating volunteer projects with Concordia University staff and students to identify and control exotic wisteria, Japanese privet, Chinese tallow, and chinaberry within the creek area of Concordia's Preserve tract.

Table 7. Non-native plant species targeted for removal on Travis County Balcones Canyonlands Preserve tracts in FY11.

Species	Location ¹	Number of plants removed	Removal methods
Bamboo	BU	50	Cut-treat
Chinaberry (<i>Melia azedarach</i>)	CV, CO, CE, CW, GS, LT, LU, RI, RC, SN, CR, WE	2853	Cut-treat, hack-squirt, hand-pull
Chinese Wisteria (<i>Wisteria sinensis</i>)	BU, CO	185	Cut-treat
Giant Reed (<i>Arundo donax</i>)	SN	451	Cut-treat, hack-squirt
Heavenly Bamboo (<i>Nandina domestica</i>)	CO, GS, LU, RI, SN, WE	685	Cut-treat, hand-pull
Japanese Ligustrum (<i>Ligustrum japonicum</i>)	CO, BU, GS, WH	903	Cut-treat, hand-pull
Tree of Heaven (<i>Ailanthus altissima</i>)	CV, CO, RI, RC, CR, WE	1131	Cut-treat, hack-squirt, hand-pull

¹ BCP tracts: BU=Bunten; CV=Canyon Vista; CO= Concordia tract; CE=Cuevas East; CR=The Crossings; CW=Cuevas West; GS= Greenshores; LT= Lake Travis Bluffs; LU= Lucas; RI= Ribelin; RC= Richards; SN=Snowden; VR= Vireo Ridge tract; WE= Wendland, WH= Woody Hollow.

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EXHIBIT A. Travis County Natural Resources Cowbird Trapping Program History

Travis County Natural Resources Cowbird Trapping Program History, 1997-2011

Year	Trap location/name	Cowbirds trapped (M, F, HY)	Total trapped
1997	Vireo Preserve	14, 6, 3	23
	Riverplace	26, 7, 9	42
	Steiner Ranch 1	6, 4, 4	14
	Steiner Ranch 2	7, 2, 0	9
	Canyon Creek mega	26, 13, 6	45
	Satellite 2	17, 17, 0	34
	McGregor	0	0
1997 Total			164*
1998	trapping did not occur in 1998		
1998 Total			0
1999	3M	13, 3, 3	19
	Riverplace	28, 11, 6	45
	Steiner Ranch	16, 4, 0	20
	Canyon Creek mega	57, 25, 21	103
	Ivanhoe mega	39, 13, 6	58
	Mansfield Dam	15, 11, 0	26
	Satellite 2	2, 0, 2	4
1999 Total			275*
2000	Cortaña	24, 11, 2	37
	Riverplace	17, 10, 2	29
	Steiner Ranch	0	0
	Canyon Creek mega	48, 57, 13	118
	Ivanhoe mega	10, 5, 0	20
	Mansfield Dam	8, 8, 0	16
	Hamilton Pool Preserve	18, 8, 1	27
	3M #1	0	0
	3M #2	19, 23, 0	42
2000 Total			284*
2001	Hamilton Pool Preserve	1, 3, 0	4
	Lake Perspectives tract	4, 0, 0	4
	FM2769	37, 41, 8	86
2001 Total			94

Year	Trap location/name	Cowbirds trapped (M, F, HY)	Total trapped
2002	Hamilton Pool Preserve mega	33, 7, 1	41
	FM2769 mega	60, 39, 12	111
	Grandview Hills North tract	24, 36, 15	75
	Vireo Ridge tract	27, 23, 7	57
2002 Total			284
2003	Hamilton Pool Preserve mega	115, 82, 0	197
	FM2769 mega	31, 58, 3	92
	Grandview Hills North tract	13, 24, 0	37
	Vireo Ridge tract #1	8, 4, 4	16
	Vireo Ridge tract #2	19, 12, 2	33
2003 Total			375
2004	Hamilton Pool Preserve mega	89, 128, 0	217
	FM2769 mega	56, 63, 4	123
	Grandview Hills North tract	11, 12, 0	23
	Vireo Ridge tract #1	10, 7, 3	20
	Steiner Ranch**	n/a	n/a
	Cuevas tract	1, 3, 0	4
2004 Total			387
2005	Hamilton Pool Preserve mega	38, 44, 0	82
	FM2769 mega	26, 45, 0	71
	Vireo Ridge tract #1	12, 4, 0	16
	Ribelin tract	13, 11, 7	31
2005 Total			200
2006	Hamilton Pool Preserve mega	83, 65, 0	148
	FM2769 mega	49, 45, 1	95
	Milton Reimers Ranch County Park	63, 49, 0	112
	Ribelin tract	20, 29, 1	50
	Nootsie tract	8, 3, 0	11
2006 Total			416
2007	Hamilton Pool Preserve mega	86, 73, 0	159
	FM2769 mega	14, 15, 1	30
	Milton Reimers Ranch County Park	90, 50, 3	143
	Nootsie tract	14, 6, 0	20
	Toops tract	3, 2, 0	5
2007 Total			357

Year	Trap location/name	Cowbirds trapped (M, F, HY)	Total trapped
2008	Hamilton Pool Preserve mega	71, 94, 0	165
	FM2769 mega	13, 12, 0	25
	Milton Reimers Ranch County Park	71, 67, 1	139
	Nootsie tract	14, 18, 0	32
	Toops tract	49, 60, 0	109
2008 Total			470
2009	Hamilton Pool Preserve mega	43, 81, 0	124
	FM2769 mega	23, 12, 0	35
	Milton Reimers Ranch County Park	48, 39, 0	87
	Nootsie tract	19, 22, 0	41
	Toops tract	39, 22, 0	61
2009 Total			348
2010	Hamilton Pool Preserve mega	30, 15, 1	46
	FM2769 mega	12, 19, 0	31
	Milton Reimers Ranch County Park	9, 11, 0	20
	Nootsie tract	24, 13, 0	37
	Toops tract	59, 54, 0	113
2010 Total			247
2011	Hamilton Pool Preserve mega	31, 21, 0	52
	FM2769 mega	28, 18, 0	46
	Milton Reimers Ranch County Park	28, 39, 0	67
	Nootsie tract	39, 36, 0	75
	Toops tract	100, 109, 0	209
2011 Total			449
2012	Hamilton Pool Preserve mega	16, 8, 1	25
	FM2769 mega	27, 11, 0	38
	Milton Reimers Ranch County Park	21, 23, 0	44
	Nootsie tract	23, 10, 1	34
	Toops tract	31, 18, 0	49
	Vireo Ridge tract	5, 2, 0	7
2012 Total			197

* Total adjusted to exclude cowbirds that escaped.

** This trap was vandalized and all cowbirds were released.