

**FY 2013 Summary of  
Wildlife and Plant Management Activities on  
Travis County's Balcones Canyonlands Preserve and Select Parks**



Canyon Mock-orange in Bloom (*Philadelphus ernestii*)

Photo by Paul Fushille

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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 amorpha (*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 (*Passer domesticus*), European starlings (*Sturnus vulgaris*), red-imported fire ants (*Solenopsis invicta*), Tawny crazy ants (*Nylanderia fulva*), and rock doves (*Columba livia*).

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 (*Felis catus*), dogs (*Canis familiaris*), goats (*Capra aegagrus hircus*), and hogs (*Sus scrofa*).

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 (*Molothrus ater*), coyotes (*Canis latrans*), opossum (*Didelphis virginiana*), and white-tailed deer (*Odocoileus virginianus*).

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 2013 (FY13, Oct. 1-Sept. 30), wildlife management activities on Travis County-managed portions of the BCP focused on five species: brown-headed cowbirds, feral hogs, white-tailed deer, Tawny crazy ant, and red imported fire ants. Monitoring and control of cowbirds, hogs, and deer are described in their respective sections in this report. Fire ant and Tawny crazy ants control efforts are described in *Appendix H: Balcones Canyonlands Preserve Karst Monitoring and Management FY2013 Annual Report*.

In FY13, plant management activities focused on a Canyon Mock-orange (*Philadelphus ernestii*) survey and control of nine 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 FY13 Travis County cowbird trapping program. Four traps were operated within, or near, Travis County's BCP properties: the Hamilton Pool Preserve (HP), the Nootsie 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 (hereafter referred to as Reimers Ranch).

### **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 FY13 was conducted exclusively in the western half of the county. Travis County operated two mega traps (16'x16') and three 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 three hybrid traps were operated at Reimers Ranch (hereafter known as the Reimers trap), within the Nootsie tract (hereafter, Nootsie trap), and on private property adjacent to the Toops tract (hereafter, Toops trap).

Two groups of decoy birds (totaling 31 males, 15 females) were obtained from the Balcones Canyonlands National Wildlife Refuge and the Shield Ranch. An initial group of decoys (22

males, 5 females) were acquired in the beginning of April allowing three traps (Nootsie, Toops and FM 2769) to open April 3, 2013. The remaining traps were opened on April 11, 2013 once additional bait birds were acquired. Table 1 summarizes the FY13 cowbird trapping schedule and initial stocking numbers of decoy birds.

Table 1. FY13 Cowbird trap locations, trapping period dates, and initial cowbird stocking numbers.

Trap	Date Opened	Date Closed	Initial Stocking Numbers
Nootsie	April 3	June 14	6 Males, 2 Females
Toops	April 3	June 14	8 Males, 1 Female
FM 2769	April 3	May 31	8 Males, 2 Females
Reimers	April 11	June 20	3 Males, 5 Females
HP	April 11	June 27	6 Males, 5 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. FY13 Non-target species found in Travis County operated traps.

Common Name	Species Name	Trap(s)	Comments
Bronzed cowbird	<i>Moluthrus aeneus</i>	LM, NT, RR, HP	5 (4 males & 1 female) released, 1 euthanized (female)
Northern mockingbird	<i>Mimus polyglottos</i>	NT, RR	2 released, 1 deceased
Red-winged Blackbird	<i>Agelaius phoeniceus</i>	RR	1 released
Northern Cardinal	<i>Cardinalis cardinalis</i>	RR, HP	3 released

RR= Reimers HP= Hamilton Pool Preserve NT= Nootsie TP= Toops LM = Lonnie Moore (FM 2769)

## Results and Discussion

In FY13, a total of 90 male, 46 female, and two juvenile cowbirds were captured. The total of 138 cowbirds captured this year was marginally lower than the previous year when 197 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 2013 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 but was not opened in FY13.

Table 3. Results of the FY13 Travis County cowbird trapping season.

Trap	Month	Days in Operation	Males captured	Females captured	Juveniles Captured	Total Captured	Trap Efficiency %
FM 2769	April	28	4	1	0	5	3.57
	May	31	1	1	0	2	6.45
	Total	59	5	2	0	7	<b>3.39</b>
Hamilton Pool	April	20	5	5	0	10	25.00
	May	31	3	1	0	4	3.23
	June	28	7	2	0	9	7.14
	Total	79	15	8	0	23	<b>10.13</b>
Nootsie	April	28	16	8	0	24	28.57
	May	31	7	7	0	14	22.58
	June	14	1	1	2	4	12.90
	Total	73	24	16	2	42	<b>21.92</b>
Reimers	April	20	7	2	0	9	10.00
	May	31	7	10	0	17	32.25
	June	21	1	0	0	1	0.00
	Total	72	15	12	0	27	<b>16.67</b>
Toops	April	28	20	0	0	20	0.00
	May	31	12	8	0	20	25.80
	June	14	2	0	0	8	6.45
	Total	73	32	8	0	40	<b>13.70</b>
<b>Grand Totals</b>		<b>356</b>	<b>91</b>	<b>46</b>	<b>1</b>	<b>138</b>	<b>12.92</b>

Travis County Natural Resources maintains a minimum goal of 20% trap efficiency for the program. In FY13, trapping efficiency, at 12.92%, fell to the lowest success rate since the inception of this program. The average efficiency rate from 2001-2012 was 37.81%. This year, most traps performed well below expectations and most had their lowest trapping rates on

record. The total amount of cowbirds removed (n=138) was far below the average over the last seven years (n=355). Only one trap met, or exceeded the goal of a 20% efficiency rate.

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 and again in FY13. It is worth noting that no instances of parasitism were noted on any avian species during the 2013 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. In FY13 there was increased hog activity observed at the Canyon Vista, Ribelin, Grandview Hills North, Concordia, and Vireo Ridge Tracts.

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 FY13, 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 FY13, AgriLife continued to address nuisance wildlife complaints but was not actively managing hogs on Travis County properties.

In the fall/winter of FY13, 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 also utilized a contracted volunteer hog-trapper in the beginning of FY13 to deal with extensive hog damage at Webberville Park, although the hogs moved off of the park before trapping could occur. 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 FY13. On the BCP, Travis County Natural Resources staff unsuccessfully baited areas of high hog activity on the Vireo Ridge and Grandview Hills North tracts. At the very end of FY13 Natural Resources staff began baiting an area of high hog activity on the Ribelin Tract. Travis County Park staff operated one stock panel trap at Reimers Ranch from May-October 2013. Parks also attempted to

bait and run a trap at Hamilton Pool in the Spring of FY13, but soon abandoned the idea after no hogs showed interest in the corn bait.

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 they were closed. In FY13 periods of heavy rainfall resulted in unpredictable hog activity, making trapping more difficult in certain areas.

## **Results and Discussion**

Although Travis County staff made several attempts to bait hogs and had one trap open at Reimers Ranch, no hogs were removed from Travis County properties in FY13. Overall, signs of hog activity were not predictable on most properties; making trapping difficult. Also, food was prevalent around the preserve making corn less desirable to sounders. Several new stock panel traps were ordered in late FY13, which should allow Travis County staff to be more successful with hog management in FY14.

## **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 FY13, 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. In 2002 and continuing to the present, Travis County has utilized lethal harvest to manage deer at Pace Bend Park. This has proven to be more a more effective method at maintaining a deer herd closer to desired carrying capacity.

## **Methods**

Travis County staff and volunteers conducted nighttime spot-light deer surveys during the fall of FY13 on the Jollyville Unit of the BCP, Hamilton Pool Preserve/Reimers Ranch/ Pogue Springs Preserve, and Pace Bend Park. 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 FY13, deer management was supplied through the contracted services of Orion. 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 Ranch. Orion operates under a TPWD Scientific Permit.

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 2012 were used to estimate deer densities and determine harvest recommendations for the FY13 harvest season (October 2012 to February 2013). Census results for Pace Bend Park estimated a deer density of one deer per 9.6 acres (Table 4). This density is lower than the average acres per deer (6.6) over the previous six years (2007-2012) and represents an improvement from the 3.8 average observed from 1997-2006. Census results for the Jollyville Unit, which estimated one deer per 38.1 acres, indicate the

lowest deer densities since the inception of the management program (Table 5). At Hamilton Pool Preserve/Reimers Ranch/Pogue Springs Preserve the deer density was 13.7 acres per deer.

A total of 43 deer were safely and humanely removed from Pace Bend Park by Orion (Table 6). A total of 10 deer were removed by Orion from the BCP Jollyville Unit and an additional 28 deer were removed off other preserve tracts (Table 6). A total of 17 deer were removed from Reimers Ranch. 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 FY13, about 3,920 pounds of venison was given to Caritas which provided meat for approximately 15,680 meals, bringing the total that Travis County has donated over the years to approximately 14.5 tons (29,080 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 tracts of the BCP.

Table 4. White-tailed deer population trends at Pace Bend Park FY97 through FY13.

<b>YEAR</b>	<b>AC/ DEER</b>	<b>ESTIMATED COMPOSITION (BUCK/DOE/FAWN)</b>	<b>ESTIMATED POPULATION</b>	<b>TOTAL REMOVED</b>
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
FY2013	9.6	29/89/14	132	43

Table 5. White-tailed deer population trends on the BCP Jollyville Unit FY03 through FY13.

<b>YEAR</b>	<b>AC/ DEER</b>	<b>ESTIMATED COMPOSITION (BUCK/DOE/FAWN)</b>	<b>ESTIMATED POPULATION</b>	<b>TOTAL REMOVED</b>
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 <sup>a</sup>
FY12*	27.3	31/36/33	90	22 <sup>b</sup>
FY13*	38.1	26/29/10	65	10 <sup>c</sup>

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

<sup>a</sup> An additional 13 deer were removed from the Volente tract and one deer from the Lucas tract.

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

<sup>c</sup> An additional 8 deer were removed from the Cypress Creek Unit and 21 from the North Lake Austin Unit (Webb Tract).

Table 6. Deer Harvested on Travis County Properties by Orion Research and Management Services, Inc. during FY13.

Location	Bucks	Does	Fawns	Total
BCP Jollyville Unit	9	1	0	10
BCP Volente Tract	1	1	0	2
BCP Lucas Tract	0	0	0	0
BCP Toops Tract	1	0	0	1
BCP Webb Tract	14	7	0	21
BCP New Life Tract	4	1	0	5
Reimers Ranch	2	8	7	17
Pace Bend Park	9	29	5	43
<b>Total</b>	<b>40</b>	<b>47</b>	<b>12</b>	<b>99</b>

## PLANT SPECIES OF CONCERN MONITORING

Canyon mock-orange (*Philadelphus ernestii*) and Texabama croton (*Croton alabamensis* var. *texensis*) are generally monitored on a three-four year cycle. Texas amorpha (*Amorpha roemeriana*) is casually monitored on a few sites but is not on an official survey rotation. Canyon

mock-orange was surveyed in September and October of 2013 (Fiscal Year Oct. 2008-Sept. 2009).

Other rare species that, to date, have not been located on any Travis County managed property include bracted twistflower (*Streptanthus bracteatus*), Warnock's coral-root (*Hexalectris warnockii*) and Boerne bean (*Phaseolus texensis*). If any of these species are located, a suitable monitoring program will be established.

### **Canyon mock-orange**

Canyon mock-orange is a deciduous shrub typically associated with Cow Creek and Edwards limestone formations in both xeric and mesic juniper woodlands. The arching branched shrub is often found with elbowbush (*Forstiera pubescens*), shrubby boneset (*Eupatorium havanense*), fragrant sumac (*Rhus aromatica*), and yaupon holly (*Ilex vomitoria*) as an understory species beneath shin oak (*Quercus sinuata*), Texas mulberry (*Morus microphylla*) and Ashe juniper (*Juniperus ashei*).

Hamilton Pool Preserve, part of the Balcones Canyonlands Preserve, consists of 232 acres owned and managed by the Travis County Parks Division, with assistance of Travis County's Natural Resources staff. The tract is located at the confluence of Hamilton Creek and the Pedernales River in western Travis County. The property is located approximately 13 miles south of State Highway 71 on Hamilton Pool Road (FM 3238). Hamilton Pool Preserve is found on the Hammett's Crossing USGS 7.5" quadrangle maps.

Canyon mock-orange individuals were mapped and surveyed at Hamilton Pool Preserve in September and October 2013. An attempt to relocate all known and new individuals was made. New plants were mapped and tagged with circular, numbered aluminum tree tags. Occasionally, while searching for previously tagged plants, it was determined that tags were missing or lost, and subsequently re-tagged. Overall condition of individual plants was not measured; however plants that appeared in poor shape were noted. Generally, most plants appeared healthy, having survived the harsh drought that lasted through most of 2012. During this evaluation a total of 144 plants were located, two of which were dead. Of these, 142 were previously located (Travis County 2000, 2002, 2006, 2009). 12 individuals previously recorded in 2009 were unable to be located, one new plant was discovered and one plant previously lost was relocated (Table 1). Four plants were not observed due to their difficult location.

Table 7. Survey history for Hamilton Pool Preserve *Philadelphus ernestii* population.

	# located <sup>a</sup>	# previously located	# not relocated*	# new plants located
1999	154	-	-	-
2002	150	145	9	5
2006	152	145	15	7
2009	153	151	9	2
2013	144	142	12	1

<sup>a</sup> currently known population

\*adjusted number, that may include plants determined dead, not surveyed, overlooked from the previous survey or finally removed from the known population based on multiple years surveys.

A high number of plants were lost/presumed dead (n=12) or found dead (n=2). Many of these appear to have been lost directly from the result of the prolonged draught over the previous years or indirectly by 1) tree-fall and subsequent smothering of canyon mock-oranges by dead, or weakened trees and, 2) from the changes in micro-climate as a result of increased sunlight and decrease in moisture from the loss of canopy in specific areas.

With the exception of seven plants, the majority of canyon mock-orange individuals are located in protected areas away from public hiking trails. It should be noted that an eighth plant located along the main public trail was found dead, having been uprooted. Although the cause remains unknown, visitor activity likely played a part in this plant’s demise. Protection of this species, therefore, includes enforcement of the preserve rules requiring that visitors walk only on designated hiking trails and not to disturb or collect any plants or animals. Travis County Natural Resources staff cooperate with Hamilton Pool Preserve staff to educate the public about this species and how best to assist in its protection.

## 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). 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 FY13, 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 re-sprouting.

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 FY13, a 10% Arsenal AC/surfactant mix was applied on all treated woody plants, with the exception salt cedar (*Tamarix sp.*; 50% Garlon 3A). Malta star-thistle (*Centaurea melitensis*) was treated with foliar spray of 1% Arsenal AC/surfactant mix or 2% Ranger Pro. Johnson grass (*Sorghum halepense*) was treated with a foliar spray of 2.0 and 3.9 mL/gal Outrider/surfactant mix. All chemical applications were made when no rain was forecasted for  $\geq$  24 hours and winds were  $<$  10 mph. Also, chemical control methods were avoided in areas within creek drainages.

## Results and Discussion

Staff targeted nine species of non-native plants for removal on BCP tracts during FY13 (Table 7). Management activities occurred at the following eleven BCP tracts and two County Parks: Buntan, Canyon Vista, Concordia, Greenshores, Lucas, Nootsie, Ribelin, Snowden, Steiner Ranch, Vireo Ridge, Volente, Pace Bend and Reimers Ranch County Parks. Approximately 45 hours of staff time and 111.5 hours of volunteer time were devoted to non-native plant removal.

In FY13, 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 FY14 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. Travis County Natural Resources staff is coordinating with Travis County Parks, the Lower Colorado River Authority, and the Texas Parks and Wildlife Department to determine the best course of action to treat Tamarisk which has been identified along the shores of Lake Travis at Pace Bend Park and along the Pedernales River at Hamilton’s Pool and Reimers Ranch. 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 Concordia’s Preserve tract.

Table 8. Non-native plant species targeted for removal on Travis County Balcones Canyonlands Preserve tracts in FY13.

Species	Location <sup>1</sup>	Number of Plants Removed/ Area Treated	Removal methods
Johnson Grass ( <i>Sorghum halepense</i> )	NO, SN	1191 sq ft	Foliar Spray
Malta star-thistle ( <i>Centaurea melitensis</i> )	CO, LU	650 sq ft	Foliar Spray
Lilac chastetree ( <i>Vitex agnus-castus</i> )	SN	147	Cut-treat, hack-squirt
Japanese Ligustrum ( <i>Ligustrum japonicum</i> )	BU, CO, GS, SN, SR	331	Cut-treat, hack-squirt, hand-pull

Tamarisk ( <i>Tamarix sp.</i> )	PB	13	Cut-treat
Heavenly Bamboo ( <i>Nandina domestica</i> )	BU, CV, CO, GS, LU, RI, SN, VR	224	Cut-treat, hand-pull
Redtip Photinia ( <i>Photinia x fraseri</i> )	GS, SN	11	Cut-treat, hand-pull
Tree of Heaven ( <i>Ailanthus altissima</i> )	RI	106	Cut-treat, hack-squirt, hand-pull
Chinaberry ( <i>Melia azedarach</i> )	CO, CV, LU, RE, RI, SN, VO	1124	Hand-pull

<sup>1</sup> BCP tracts: BU=Bunten; CO=Concordia; CV=Canyon Vista; GS= Greenshores; LU= Lucas; NO=Nootsie; PB=Pace Bend Park; RI=Ribelin; RE=Reimers Ranch; SN=Snowden; SR=Steiner Ranch; VR= Vireo Ridge; VO=Volente.

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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
<b>1997 Total</b>			<b>164*</b>
1998	trapping did not occur in 1998		
<b>1998 Total</b>		0	<b>0</b>
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
<b>1999 Total</b>			<b>275*</b>
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
<b>2000 Total</b>			<b>284*</b>
2001	Hamilton Pool Preserve	1, 3, 0	4
	Lake Perspectives tract	4, 0, 0	4
	FM2769	37, 41, 8	86
<b>2001 Total</b>			<b>94</b>

<b>Year</b>	<b>Trap location/name</b>	<b>Cowbirds trapped (M, F, HY)</b>	<b>Total trapped</b>
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
<b>2002 Total</b>			<b>284</b>
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
<b>2003 Total</b>			<b>375</b>
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
<b>2004 Total</b>			<b>387</b>
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
<b>2005 Total</b>			<b>200</b>
2006	Hamilton Pool Preserve mega	83, 65, 0	148
	FM2769 mega	49, 45, 1	95
	Reimers Ranch	63, 49, 0	112
	Ribelin tract	20, 29, 1	50
	Nootsie tract	8, 3, 0	11
<b>2006 Total</b>			<b>416</b>
2007	Hamilton Pool Preserve mega	86, 73, 0	159
	FM2769 mega	14, 15, 1	30
	Reimers Ranch	90, 50, 3	143
	Nootsie tract	14, 6, 0	20
	Toops tract	3, 2, 0	5
<b>2007 Total</b>			<b>357</b>

<b>Year</b>	<b>Trap location/name</b>	<b>Cowbirds trapped (M, F, HY)</b>	<b>Total trapped</b>
2008	Hamilton Pool Preserve mega	71, 94, 0	165
	FM2769 mega	13, 12, 0	25
	Reimers Ranch	71, 67, 1	139
	Nootsie tract	14, 18, 0	32
	Toops tract	49, 60, 0	109
<b>2008 Total</b>			<b>470</b>
2009	Hamilton Pool Preserve mega	43, 81, 0	124
	FM2769 mega	23, 12, 0	35
	Reimers Ranch	48, 39, 0	87
	Nootsie tract	19, 22, 0	41
	Toops tract	39, 22, 0	61
<b>2009 Total</b>			<b>348</b>
2010	Hamilton Pool Preserve mega	30, 15, 1	46
	FM2769 mega	12, 19, 0	31
	Reimers Ranch	9, 11, 0	20
	Nootsie tract	24, 13, 0	37
	Toops tract	59, 54, 0	113
<b>2010 Total</b>			<b>247</b>
2011	Hamilton Pool Preserve mega	31, 21, 0	52
	FM2769 mega	28, 18, 0	46
	Reimers Ranch	28, 39, 0	67
	Nootsie tract	39, 36, 0	75
	Toops tract	100, 109, 0	209
<b>2011 Total</b>			<b>449</b>
2012	Hamilton Pool Preserve mega	16, 8, 1	25
	FM2769 mega	27, 11, 0	38
	Reimers Ranch	21, 23, 0	44
	Nootsie tract	23, 10, 1	34
	Toops tract	31, 18, 0	49
	Vireo Ridge tract	5, 2, 0	7
<b>2012 Total</b>			<b>197</b>
2013	Hamilton Pool Preserve mega	15,8,0	23
	FM 2769 mega	5, 2, 0	7
	Reimers Ranch	15, 12, 0	27
	Nootsie tract	23, 16, 2	41
	Toops tract	32, 8, 0	40
<b>2013 Total</b>			<b>138</b>

\* Total adjusted to exclude cowbirds that escaped.

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