VULTURES: SOARING TO NEW HEIGHTS OR FLAPPING IN THE BREEZE - A TEXAS PERSPECTIVE

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Abstract: Common throughout the Texas landscape, turkey vultures (*Carthartes aura*) are routinely observed in a variety of habitats ranging from off shore islands to urban rooftops. Gregarious birds, turkey vultures are often joined by black vultures (*Coragyps atratus*) throughout the southeast where their ranges are sympatric. These communal roosts have increasingly become problematic for Texans incurring monetary losses from building and vegetation damage, livestock losses, and sanitary cleaning expenses. Additionally, human health and safety concerns rise proportionally with length of stay and population size. The North American Breeding Bird Survey (BBS) and the annual Christmas Bird Count (CBC) report positive population trends for both species in Texas. Analysis of vulture data reported to the USDA-Wildlife Services, Texas Wildlife Damage Management Service (TWDMS) from October 1992 to September 2002, revealed a significant increase ($P = 0.001$), in the number of vulture-related calls received by TWDMS biologists. Counties hosting nuisance vultures doubled ($P = 0.001$) within 5 years, rising steadily from October 1997 to September 2002. Future trends predict continued increase in vulture populations, making new vulture management techniques paramount in reducing damage. An overview of vulture management in Texas is presented.

Key words: birds, *Carthartes aura, Coragyps atratus*, rate of increase, scavengers, Texas, vertebrate pests

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INTRODUCTION

Black and turkey vultures are common avian species across the Texas landscape. Year-round residents throughout most of Texas, vultures pose a multitude of problems from livestock predation to destruction of personal property. While Coleman and Fraser (1989) indicated that the status of their populations is not well known, Kirk and Mossman (1998) described turkey vulture populations as stable to increasing across the U.S. and Buckley (1999) found black vultures increasing in the Eastern U.S. In Texas, the North American Breeding Bird Survey (BBS) and Christmas Bird Counts (CBC) both indicate positive population trends for black vultures, but differ slightly on degree of positive population trends for turkey vultures.

Traditionally prevalent in rural areas, both species have adapted well to urban environments. Whether simply tolerant of urban sprawl or drawn to it for food resources, vultures have become a growing concern to many Texas residents. As vulture populations grow and distributional patterns change, property damage, livestock depredation, nuisance and safety problems

proportionally increase (Coleman and Fraser 1989, Lowney 1999, Humphrey et al. 2000). In the last ten years, the Texas Wildlife Damage Management Service (TWDMS) has received a sharp increase in the number of vulture-related requests for assistance. Resources affected include utilities, petrochemical plants, livestock, and various urban structures, both residential and commercial. Increased workload on biologists seeking innovative dispersal techniques has fueled the pursuit to better understand vulture dynamics and management in Texas. The primary objectives of this study were to: 1) evaluate increases in human/vulture interactions, 2) determine geographic implications of expanding need for assistance, 3) provide an overview of management practices currently employed by TWDMS personnel to resolve human/vulture conflicts, and 4) identify future trends and research needs.

METHODS

All requests for assistance received by TWDMS were entered into a national Management Information System (MIS) database. These entries include county information, date, species involved, and pertinent damage information. I evaluated Texas' MIS data involving turkey and black vultures from 01 October 1992 to 30 September 2002. Information was subdivided by federal fiscal year, 01 October - 30 September, and labeled as FY 93 - FY 02. E-Z Stat® ecological software (Trinity Software 1998) was used for all statistical analysis.

Chi-square analysis, a test for goodness of fit, was applied to assistance request rates received within the 10-year study period. Values compared were measures of disagreement between the observed frequencies of assistance requests to the expected frequency, allowing the calculation of the significance of the disagreement (Zar 1984). To access whether a significant increase in requests for assistance had occurred, requests received within each fiscal year were tabulated and resulting sums used as observed frequency values for each year. The 10-year average provided an expected frequency value for each year. The level of significance, $P \leq 0.05$, was used to determine statistical significance for request rate increases.

Annually, turkey vulture migration occurs in response to cooler winter temperatures occurring in the panhandle and western regions of Texas. However, throughout most of the state, both species are year-round residents. To determine if migration patterns were a factor in the observed increase in assistance requests, seasonal changes in request rates were examined using paired-sample t tests. Seasons were defined as: Fall (October-December), Winter (January-March), Spring (April-June), and Summer (July-September). The significance level, $P \leq 0.05$, was used for all seasons tested.

County information, collected from assistance requests, was analyzed to determine if, geographically, the scope of vulture damage management had grown during the study period. Chi-square testing compared the number of counties reporting vulture problems to an expected frequency, at a significance level of $P \leq 0.05$.

Monetary vulture damage, as recorded in MIS, was sorted by affected resource/fiscal year. Resulting category totals were further separated into 5-year increments, comparing FY 93 through FY 97 with FY 98 through FY 02. No statistical analysis was performed on damage figures.

RESULTS

Assistance request data revealed increases from 31 in FY 93 to 150 in FY 02, reaching a high of 181 in FY 00. Numbers indicated a fairly steady increase through the

first five years, then rising sharply over the last five years (Figure 1). Chi-square analysis resulted in a high level of significance ($P = 0.001$), indicating that the number of requests for assistance were significantly different over the 10-year study period. Likewise, while the number of counties having vulture problems remained steady for the first five years, they doubled to 40 counties in FY 01, reaching a high of 47 in FY 02 (Figure 2). Chi-square analysis found county data was also highly significant ($P = 0.001$), revealing a significant increase in the geographic area attributed to assistance requests.

Figure 1. The number of vulture assistance requests received by TWDMS for each fiscal year defined as, 01 October - 30 September.

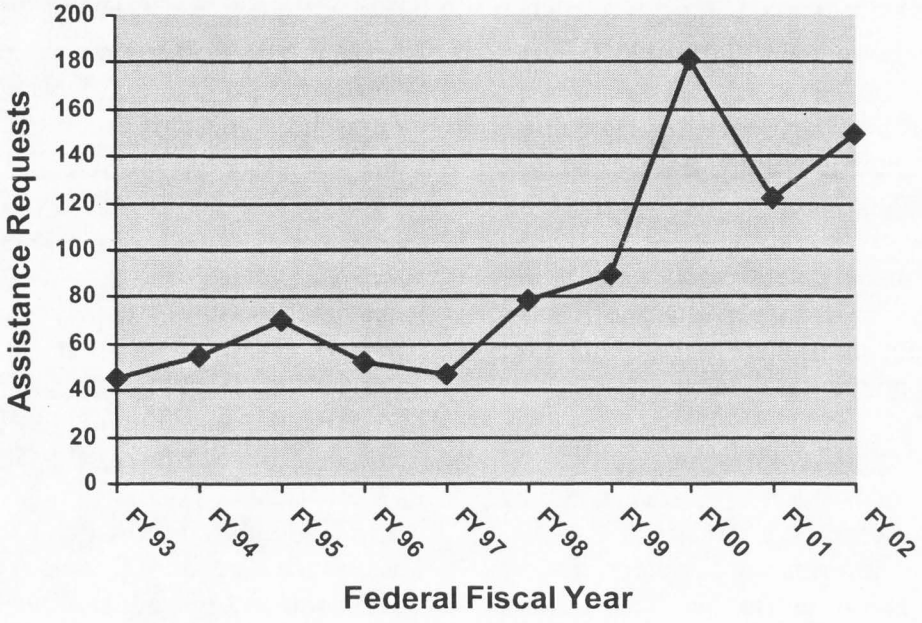
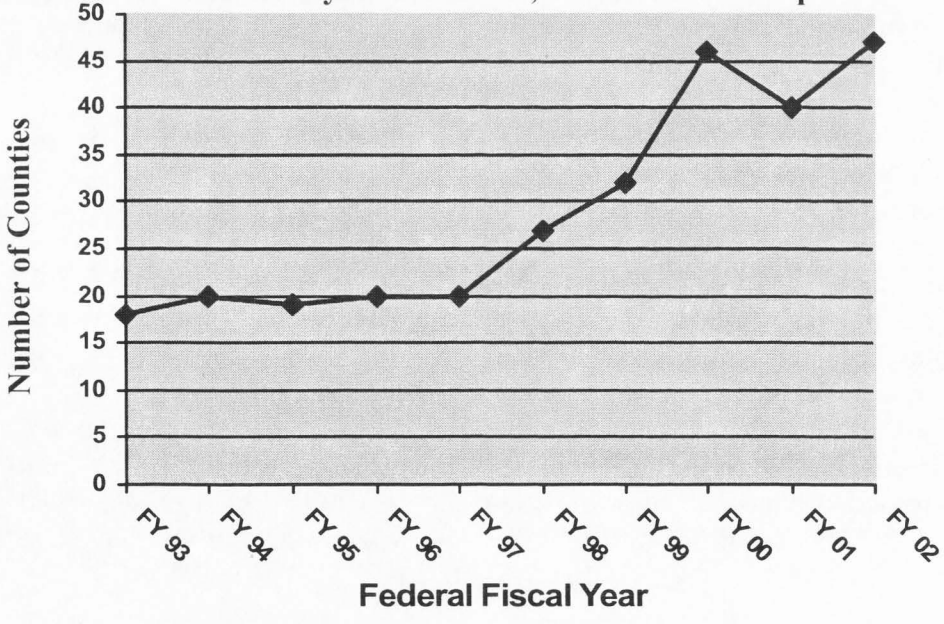


Figure 2. The number of counties where vulture assistance requests originated and reported to TWDMS for each fiscal year defined as, 01 October - 30 September.



Requests for assistance were separated into seasons and tested for seasonal variation. Paired t-testing results indicated that no significance difference existed among seasons.

Damage data were sorted by species involved, fiscal year, and resource affected for comparison between species and resources. Species data were divided by black vulture, turkey vulture, and by mixed vulture group. Six major categories of resource damage were identified as: watercraft, structures, equipment/utilities, livestock, aircraft, and general property. Because assistance requests and county data revealed an increase in calls and geographic area particularly over the last five years, damage data were divided into two 5-year time periods, FY 93 to FY 97 and FY 98 to FY 02 (Table 1). Simple comparison of damage categories during the two time periods revealed major increases in resource damage for all resources, except watercraft. Damage to watercraft remained stable throughout the 10-year study period. Total damage increased a staggering 1003% during FY 93 to FY 97, from $441,386 to $4,428,546 in just five years.

Table 1. Summary of vulture damage figures as reported to TWDMS between FY 93-FY 02.

Years	Species	Watercraft	Structures	Equip/Util	Livestock	Aircraft	Gen Prop.	TOTAL
FY 93 - 97	BlVu	$15,800	$7,000	$64,700	$23,418	$500	$10,346	**$121,764**
	TuVu	$800	$2,900	$2,000	$3,550	$332	$1,035	**$10,617**
	Mixed	$13,200	$18,550	$267,160	$2,495	0	$7,600	**$309,005**
	Total	**$29,800**	**$28,450**	**$333,860**	**$29,463**	**$832**	**$18,981**	**$441,386**
FY 98 - 02	BlVu	$8,800	$407,370	$1,509,600	$180,125	0	$17,350	**$2,123,245**
	TuVu	0	$6,550	$1,000,000	$6,580	$308,000	$9,065	**$1,330,195**
	Mixed	$11,250	$116,750	$265,500	$219,416	0	$362,190	**$975,106**
	Total	**$20,050**	**$530,670**	**$2,775,100**	**$406,121**	**$308,000**	**$388,605**	**$4,428,546**
FY 93 - 02	BlVu	$24,600	$414,370	$1,574,300	$203,543	$500	$27,696	**$2,245,009**
	TuVu	$800	$9,450	$1,002,000	$10,130	$308,332	$10,100	**$1,340,812**
	Mixed	$24,450	$135,300	$532,660	$221,911	0	$369,790	**$1,284,111**
	Total	**$49,850**	**$559,120**	**$3,108,960**	**$435,584**	**$308,832**	**$407,586**	**$4,869,932**

DISCUSSION

Vulture increases over time might be due to many factors, including shifting land use patterns as Texas has transformed from a rural to urban state. Thompson et al. (1990) found that urban development, and corresponding extensive road networks, created critical habitat factors. Resulting edge effect leads to an increase in road-killed animals, thus attracting vultures. Unfortunately, road-kill increases necessitate the need for increased animal disposal laws and personnel, often at a rate many urban areas are unable to facilitate (Coleman and Fraser 1987). While these increases might be real, Texas' urban transition has occurred over many years. No clear explanation exists as to why vultures have increased so dramatically in the last five years and increases have not been exclusive to urban areas. TWDMS has a very small employee turnover rate, with the

median employee exceeding 10 years in tenure. Likewise, no major changes have occurred in program objectives, employee number/area covered, or data collection procedures. However, this upward trend poses serious concerns for how the TWDMS can best serve its diverse clientele with management techniques currently available.

Current Program Overview

TWDMS implements an integrated vulture management program, utilizing many different dispersal methods to achieve success. Employment of a variety of methods, both non-lethal and lethal, is vital to sustaining initial fright response and avoiding bird acclimation. However, public attitudes, local law, safety concerns, habitat constraints, and other complicating circumstances often dictate availability and usability of some dispersal techniques, making every applicable method an important management component. TWDMS routinely uses nonlethal and nonlethal/lethal control combinations to respond to vulture complaints.

Nonlethal techniques used by TWDMS include traditional harassment through pyrotechnics, harassment shooting, trapping, and habitat modification. Pyrotechnics, including cracker shells, whistling shells, and banging shells are employed to scare birds from residential and commercial structures, roosting areas, and other sensitive locations. Davis (1998), however, found that when pyrotechnics were used exclusively, they quickly became ineffective through conditioning. Propane cannons, available with an automatic timing system, are sometimes used to complement pyrotechnics in areas where they are not deemed a public disturbance. Harassment shooting (i.e., noise production) using live shotgun ammunition can be a cheaper alternative to pyrotechnic shells, but use is heavily dependent on public safety and local law.

Vulture trapping has been useful in moving small populations of nuisance vultures and been used for controlling vultures in Texas since 1900 (Parmalee 1954). Live traps can be baited with assorted carrion, but TWDMS personnel have repeatedly observed high trap success when baiting with road-killed armadillo and squirrel. Davis (1998) found that while trapping proved very successful, vultures from peripheral areas typically utilized newly available space, thus not solving the roosting problem. Further complicating the process where large roosts are present, Rabenold (1986) found that at any one roost, the composition of individuals changes nightly, resulting in large-scale mixing of individuals allowing for open niche replacement.

TWDMS has worked extensively with state utilities and communications officials to find ways to reduce vulture damage to power lines, insulators, and electrical components. Electrical and communications towers, numerous throughout the state, provide extensive roosting habitat for vultures. The cell phone boom over the last decade has greatly increased the number of towers and exposed components. Habitat modification has included the use of commercial bird barriers, porcupine wires, and homemade barriers applied to towers, reducing perching space. Experimentation with artificial perch installation on towers has provided limited success by encouraging vultures to sit on artificial perches instead of sensitive electrical components.

Lethal control is often necessary to reinforce nonlethal methods and to resolve cases where nonlethal methods have been unproductive. As with all wildlife complaints, TWDMS strives to resolve issues with methods that can be further

implemented by the person encountering the damage. Often this precludes lethal control, due to safety concerns or local laws preventing the use of firearms. Where lethal control is warranted, vulture removal is in accordance with depredation permits issued by U.S. Fish and Wildlife Service.

Future Trends and Research Needs

Recently, TWDMS has begun experimenting with laser guns and vulture effigies. Lasers have provided limited success on roosting populations, particularly those on electrical and communication towers. Data is currently being collected to better understand the relationship between operator mechanics and successful dispersal. Likewise, effigies have also provided some limited success in dispersing birds from towers and structures. While several models have been tested, commercial flying goose decoys hung head-down have initially provided positive results. Painted with a black body and red head, decoys have moved some populations of turkey and black vultures. More data is needed to assess whether these methods, potentially very useful in urban/suburban areas, can provide long-term relief from nuisance vultures.

CONCLUSION

As black vulture and turkey vulture populations continue to rise across their ranges, wildlife damage managers are striving to find new control alternatives to accommodate increasingly complicated situations. Changing public attitudes and increased public awareness have forced biologists to find new tools for solving old problems that work in less time. TWDMS has an integrated vulture management program, using the full arsenal of available traditional techniques while researching new technologies to resolve human/vulture interactions. Laser and effigy use is definitely increasing throughout the state. In revisiting the opening question: "Are vultures soaring to new heights or flapping in the breeze?", the answer is yes to both. As vulture populations continue to rise in Texas, many more, in effigy form, may soon be flapping in the breeze.

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