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MANAGING RURAL VULTURES IN PROXIMITY TO AGRICULTURE:

An Integrated Wildlife Damage Management Approach

Mikayla Killam[1], Linda Tschirhart-Hejl[2], and John M. Tomeček, Ph.D.[3]

INTRODUCTION

Black vultures and turkey vultures have been expanding in range and number in recent decades (Buckley et al., 2022; Kirk & Mossman, 2020). Although conflicts between humans and vultures are not a new occurrence, as human populations and urban sprawl also increase, there are bound to be new areas of overlap and new conflicts that develop (Kluever et al., 2020; Quinby et al., 2022). Additionally, shifts in livestock practices that allow for year-round reproduction may have increased opportunities for conflict. While some of the conflict stems from misconceptions about these birds, other areas of conflict are caused by vultures destroying property, predating livestock, or endangering human health and safety (Kluever et al., 2020; Quinby et al., 2022).

In some situations, conflicts between humans and vultures require some form of management to minimize the impact of birds becoming a nuisance. When developing plans to manage nuisance wildlife, it is important to remember that these animals play an important role in our ecosystem. Management strategies for native wildlife should work towards coexistence, not elimination. While there can be situations where lethal action is necessary, there are often other effective non-lethal actions that can be taken to improve the existence between humans and vultures.

This guide provides managers in rural environments with information to safely and legally address vulture conflicts with or in proximity to livestock operations, rural homes, and other manmade structures. This guide does not address airport-related issues associated with vultures, including the potential for aircraft collision, as those issues are typically handled by full-time wildlife damage management personnel. In this guide, we will review regulations associated with vulture management and provide scientific information so that managers can select the best strategies for their individual situations.

[1] Wildlife Damage Management Program Specialist, Texas A&M AgriLife Extension Service
[2] District Supervisor, Texas A&M AgriLife Extension-Texas Wildlife Services
[3] Associate Professor and Extension Wildlife Specialist, Texas A&M AgriLife Extension Service

IDENTIFICATION

There are two species of vulture native to Texas: the black vulture (*Coragyps atratus*) (Fig. 1, left) and the turkey vulture (*Cathartes aura*) (Fig. 1, right). Both species of vulture are large-bodied birds with bare skin on their heads and necks. The turkey vulture is the slightly larger of the two and has a red head. They have brown feathers, and the underside of their wings are two-toned with a lighter half and a darker half. Black vultures have a gray-black head and black feathers all over, except for the underside of their wing tips, where they have white patches.

Figure 1. Black vulture (left) *by MTSOfan via Flickr*; turkey vulture (right) *by Phil Hauck*

GENERAL ECOLOGY

Around the world, there are 23 different species of vulture. The United States (U.S.) is home to three of those species: the California condor *(Gymnogyps californianus)*, the turkey vulture, and the black vulture.

The California condor is a critically endangered species of vulture found primarily in southern California and in pockets of nearby states, including Nevada, Arizona, and Utah. Turkey vultures and black vultures both have robust populations and expansive ranges and are of "least concern" from a conservation perspective (Buckley et al., 2022; Kirk & Mossman, 2020). Turkey vultures are a migratory species whose range can extend to southern Canada during the breeding season all the way down to the southern portions of South America (Kirk & Mossman, 2020). In milder climates, such as in states surrounding the Gulf of Mexico, turkey vultures are also considered resident, meaning they stay in one area year-round and do not migrate. Black vultures are typically more of a resident species, but they do migrate short distances near the upper portions of their range. In recent years, their range has expanded, and they can now be found in northeastern portions of the U.S. to down throughout most of South America (Buckley et al., 2022).

Vultures are obligate scavengers, which means that their diet is made up primarily of carrion. Carrion can include dead mammals, birds, and even dead fish if they are close enough to the shoreline (Buckley et al., 2022; Kirk & Mossman, 2020). When available, vultures also explore human trash and refuse for additional feeding opportunities (Grilli et al., 2019). All vultures found in the Western Hemisphere have weaker feet than those in the Eastern Hemisphere and are, therefore, unable to move large carrion, leading them to congregate to feed wherever the food source occurs (Kirk & Mossman, 2020).

As obligate scavengers, vultures have adaptations to assist them in locating and consuming carrion. Both turkey vultures and black vultures have broad wings that allow them to soar on warm air thermals in search of food. Turkey vultures have a highly developed sense of smell which allows them to locate carrion that may not be visually detectable in habitats such as woodlands or brush country (Byrne et al., 2019; Kirk & Mossman, 2020). Black vultures rely on their highly developed eyesight to find dead animals or to locate other scavengers who are already feeding. In areas where turkey and black vulture populations overlap, the differences in detection strategies often allow turkey vultures to locate carcasses first (Buckley et al., 2022). Black vultures benefit from sharing the location of a feeding opportunity within their species (Rabenold, 1987). If a flock of feeding black vultures becomes too large or aggressive, the turkey vultures will typically abandon that carcass (Kirk & Mossman, 2020).

Vultures play a very important role in the environment by removing carrion that could potentially spread disease to humans, wildlife, and livestock (Grilli et al., 2019). In areas where avian scavenger populations are dwindling, the decomposition of carcasses requires more time (Markandya et al., 2008). During that time, mammalian scavengers such as wild dogs and rats have a greater opportunity to feed on carrion which can increase the spread of disease (Markandya et al., 2008). If vultures were not in the equation, there would be a high economic cost for humans to collect, transport, and properly dispose of all the carrion vultures currently remove for free (Grilli et al., 2019).

Figure 2. Turkey vulture. *Photo by Rich Kotecke*

CONSERVATION STATUS AND REGULATIONS PROTECTING VULTURES

In the late 1800s and early 1900s, many wildlife species were hunted for commercial gain, causing population declines and even some extinctions among native wildlife. The Lacy Act of 1900 ended the commercial trade of wildlife occurring within the U.S., but migratory species that traveled outside the country were still unprotected (Tomeček & Frank, 2019). In 1918, an international treaty was established between the U.S., Canada, Mexico, Japan, and the USSR (now Russia), agreeing to end the commercial trade of birds that migrated between these countries (Tomeček & Frank, 2019). In response to the treaty, the U.S. passed the *Migratory Bird Treaty Act of 1918* (MBTA) to enforce this treaty within its borders (Tomeček & Frank, 2019).

Both turkey and black vultures are protected by the MBTA. While these species are not currently listed as a species of conservation concern, they have experienced population threats in the past. Due to inaccurate concerns about their potential to spread disease, vultures were trapped, shot, and poisoned well into the 20th century.

Today, the MBTA protects both vulture species, as well as many other bird species, from any form of "take." The MBTA defines take as any action that can be considered an attempt to pursue, capture, hunt, kill,

or sell a protected bird (Tomeček & Frank, 2019). The definition of take does not include harassment, which is an important tool for managing protected birds that are causing damage. If lethal action is deemed necessary as part of a management plan concerning a bird protected by the MBTA, a federal Migratory Bird Depredation Permit must be granted before any action can be taken.

WHEN TO ACT

While vultures do not present any direct threats to humans, there are situations where management actions might be necessary. Some of the areas with reoccurring conflict in rural environments include livestock predation, property damage to buildings and vehicles, and unsanitary conditions caused by defecation (Avery & Lowney, 2016; Kluever et al., 2020; Oliva-Vidal et al., 2022).

Although these issues do exist, it is important to remember that vultures are a native species that play an important role in the environment. By removing animal carcasses from the landscape, vultures help to minimize unsanitary conditions that could contribute to the spread of disease (Markandya et al., 2008). Like all native wildlife, the ultimate goal of vulture management is coexistence, recognizing that coexistence requires work. Property owners and managers must decide for themselves what level of coexistence they can tolerate and manage the situation accordingly.

Figure 3. A black vulture consuming a calf carcass. *Photo by Brad Moon*

MANAGEMENT APPROACH

An Integrated Wildlife Damage Management (IWDM) approach is recommended when developing a management strategy for coexisting with wildlife that may be causing damage issues. This simply means that a variety of management tools are used to improve the overall success of management efforts. There are a variety of tools available for legally managing vultures. Conflicts between humans and vultures can take on a variety of forms, and not all of these tools will be applicable in every situation. In an IWDM approach, the manager must select the combination of tools that make the most sense for their specific situation.

In some situations, permitted lethal action can be considered a component of an IWDM plan. Before any lethal action can be taken, other management practices must be attempted, and the permits must be approved prior to action. The permit will only be granted if it is part of an existing management plan with other non-lethal management efforts. We outline some of these options below.

Cultural management

Depending on the levels of damage encountered, there are adjustments that humans can make to minimize the potential for conflict with vultures. These practices are most effective when implemented prior to vultures establishing in an area but can also be an important part of managing the issue once it is established.

Removal of food sources

Regular access to carcasses and carrion could attract vultures to an area (Fig. 4). If the source of carrion is frequent roadkill on a nearby public road, consult with the Texas Parks and Wildlife Department or the Texas Department of Transportation for permission to remove or relocate it. Carcasses and remains produced by agricultural operations, hunting, and other management practices should follow local guidelines for proper disposal. If carcasses cannot be safely burned or buried, they should be placed in a location away from water where they will not attract vultures to livestock operations or human habitations. Human garbage can also become a food source for vultures, so it is important to make sure that trash is properly disposed of and inaccessible to vultures whenever possible (Avery & Lowney, 2016; Buckley et al., 2022; Quinby et al., 2022).

Figure 4. Turkey vultures eating roadkill. *Photo by Phil Hauck*

Safety practices for vulnerable livestock

Livestock tend to be most vulnerable to vulture predation when first born (Oliva-Vidal et al., 2022; Quinby et al., 2022). When calving, kidding, or lambing is in progress, extra precautions can be taken to help prevent losses to predation. Recommended precautions include providing cover, using smaller pens, frequent monitoring, and choosing a pasture closer to headquarters (to improve access and monitoring frequency) (Oliva-Vidal et al., 2022). Additionally, the time that male livestock spend with female livestock can be limited so that all offspring are born around the same time. If needed, additional males can be added so that all females are bred during the shorter window of time. These practices can reduce the amount of time that additional protection is needed.

Livestock selection

Ensure that the individuals in production are exhibiting characteristics of "good mothering." In a livestock operation, "good mothering" includes being attentive to offspring, protecting offspring from potential threats, and successfully raising young from year to year. If some individuals within the herd are not providing good parental care, then they may not be the best option for breeding in the future.

Habitat modification

Look for natural and artificial structures that may be used as perching and roosting locations for vultures. While vultures spend much of their foraging time soaring, easily accessible roosting and perching locations can attract them to an area (Quinby et al., 2022). When possible, remove perching structures such as large dead trees, especially in areas near calving or kidding. If structures cannot be removed (buildings, powerlines, etc.), consider additional options below to make the structures less enticing.

Exclusion devices

In situations where vulture conflicts involve a specific building or structure, exclusion devices might be a good option for keeping vultures away from the structure in question. There are many avian exclusion devices on the market, but the following have been tested to ensure that they are effective for vultures (Wildlife Services Florida, 2017).

Bird spikes

Physical barriers can help keep vultures from roosting on structures surrounding human habitations (Fig. 5). There are a variety of prefabricated spikes that can be purchased to deter perching at a specific location (Wildlife Services Florida, 2017). For maximum effectiveness, select an option that is specifically rated for vultures. Spikes should be sharp and tightly placed so that vultures cannot land between them (Avery & Lowney, 2016). They should also be short and resistant to bending, or vultures will be able to adjust the spikes so that the area is useable as a perch (Avery & Lowney, 2016).

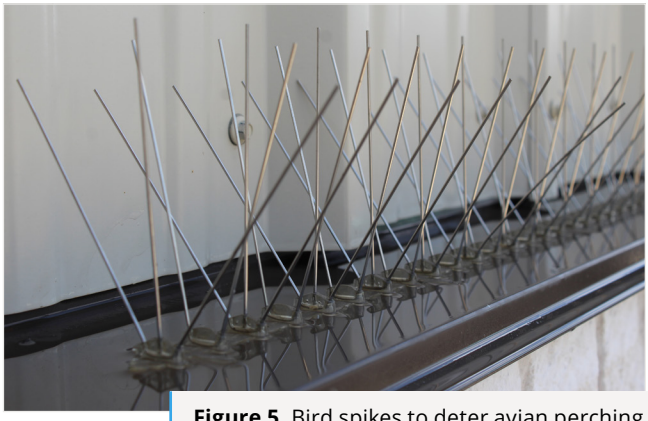


Figure 5. Bird spikes to deter avian perching.
Photo by Mikayla Killam

Invisible barriers

Where structures allow, barriers can also be created by running a taut monofilament line or wire directly above the structure that vultures are perching on (for example, above the railing of a deck). This exclusion method is not readily visible to humans but will make a narrow structure such as a fence or railing inaccessible. Lines should be run approximately 8 inches above the perching surface and be extremely taut so that vultures cannot land on them and bend them down to the perching surface.

Rollers

Rolling aluminum tubes can be installed along narrow structures and perching surfaces that are used by vultures (Avery & Lowney, 2016; Wildlife Services Florida, 2017). As vultures attempt to land on the tubes, the weight causes the tubes to rotate or spin, making it impossible for them to roost (Avery & Lowney, 2016).

Electric perch deterrent

There are prefabricated systems that allow a manager to run an electrified tape or track on a narrow perching surface that will briefly and safely shock any bird attempting to perch (Fig. 6; Wildlife Services Florida, 2017). This option is only recommended in areas where potential perches are inaccessible to people who could accidentally come in contact with the device.

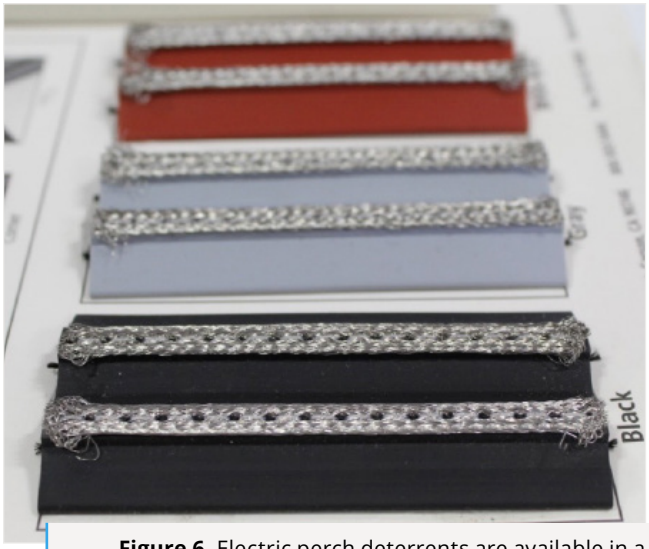


Figure 6. Electric perch deterrents are available in a variety of colors so that they can be inconspicuous when installed on potential perches. *Photo by Mikayla Killam*

Additionally, since this device is not vulture-specific, care must be taken to ensure that the provider is reputable, and that the device will not injure vultures or any other birds attempting to use the area.

Harassment techniques

Even though vultures are protected under the MBTA, a permit is not required to use aversive conditioning to scare or harass a vulture as long as the bird, its nest, and its eggs are not harmed in the process. If harassment causes a protected bird to abandon an active nest with eggs or hatchlings, then it would still be considered harming the bird. If there are eggs or young still in the nest, harassment methods should not be implemented. Additionally, a permit would be required for harassment methods if the bird in question was an eagle or another species federally listed as threatened or endangered. Some of the more common harassment strategies for vultures are listed below. Again, vultures are a protected species, so any selected strategies must not harm the bird.

Effigies

In vulture harassment, an effigy consists of an actual or artificial dead vulture hung in an area to scare away other vultures (Fig. 7). Due to the intelligence and wariness of this species, they will avoid the area for some time. Effigies work best when used directly in areas where vultures roost (spend the night) (Avery & Lowney, 2016). In areas outside of the roost where vultures gather to socialize or pass the time, often known as loafing areas, effigies may be less effective but may be used to enhance other forms of harassment.

It is important to note that since vultures are protected, a Migratory Bird Depredation Permit is required to use dead or taxidermically prepared vultures as effigies (Avery & Lowney, 2016). If an individual does not have a permit, there are artificial effigies available for purchase online, and other avian decoys can be painted to look like vultures (goose decoys or turkey wings). While similar structures can be constructed from household items (trash bags or tarps with a metal hanger), it is important to note that realistic effigies tend to be most effective long-term.

Once an effigy has been purchased or created, it should be hung upside down in a highly visible area where it can swing and move freely (Avery & Lowney, 2016). If the effigy will be visible to the public, it is important to include signage explaining the device and practice so that people do not think that there is an animal in distress or illegal activity (Avery & Lowney, 2016). Vultures can eventually become desensitized to this harassment, so it should only be used for a limited period and then removed until needed again.

Figure 7. Possession of vulture parts requires a permit, even if they are legally obtained and used for management. Artificial effigies are available for purchase or home construction. *Photos by USDA-APHIS Wildlife Services and Mikayla Killam, respectively*

Laser lights

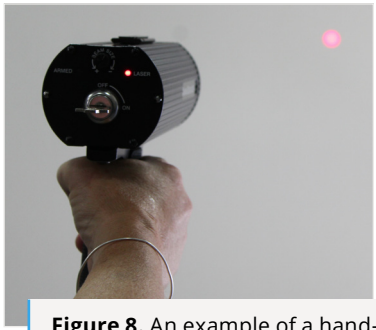


Figure 8. An example of a hand-held laser. *Photo by Mikayla Killam*

Lasers are an excellent option for avian roost harassment because they do not harm the birds, the potential for disturbing neighbors is minimal, and they are most effective in low light when birds are typically roosting (Fig 8; Avery & Lowney, 2016). The use of lasers has proven most effective in the low light of dawn and dusk (Avery & Lowney, 2016). Vultures are less likely to be dispersed by a laser during full darkness (Avery & Lowney, 2016). It is important to follow all

safety recommendations associated with your selected laser model, including but not limited to the following:

- Always point the laser in a safe direction and not at people, homes, or vehicles.
- When pointing the laser, know your target and what is behind your target.
- Do not aim the laser at a reflective surface, including mirrors, mirrored surfaces, or windows.
- Do not use lasers near airports or point them at aircraft.

When used to disperse vulture roosts, harassment with lasers must be diligent and constant, and the effort will likely take several consecutive nights. If you select an automated laser or light system, ensure that the laser uses a random pattern so that birds do not become accustomed to it.

Inflatable "scarecrows"

Artificial devices used to make an area look like humans are present have come a long way from historic scarecrows. Today, there are inflatable options that sway back and forth with no discernable pattern (Wildlife Services Florida, 2017). These can be excellent tools for scaring vultures away from a small area (Fig. 9). When used in proximity to livestock, managers should carefully monitor livestock to ensure they acclimate to the devices and are not negatively impacted.

Figure 9. A new model of inflatable scare devices currently under testing for effectiveness as a vulture deterrent. *Photo by USDA-APHIS Wildlife Services, Betsy Evans*

Pyrotechnics

Pyrotechnic noisemakers are specialized explosive devices that can be effective tools for avian harassment. The most commonly used pyrotechnics are cartridges launched from a hand-held launcher (Fig. 10) or specially designed shells discharged from a 12-gauge single-barrel, single-shot, break-action shotgun. Once fired, they either make a screaming sound as they travel or explode with a loud bang, depending on the type used (Avery & Lowney, 2016). Bear in mind that municipal sound ordinances and firearm laws must be considered when planning their use. Additionally, basic firearm safety should be used when handling these devices, as even non-lethal loads propelled by gunpowder can cause injury or death by accident. Never point these at any living thing or flammable/explosive substance. In most areas, a permit is required to use these devices within city limits. Depending on the type of pyrotechnics, additional permits from the U.S. Bureau of Alcohol, Tobacco, and Firearms may also be required (Avery & Lowney, 2016). Regardless of permit requirements, proper authorities should always be notified in advance to avoid any misunderstandings related to the sound or appearance of the pyrotechnics. When using pyrotechnics, managers should ensure the harassment effort is diligent and constant and not used on a regular interval that birds can learn and predict. Successful use of sound deterrents relies on startling the birds, and therefore, randomized timing and deployment locations should be used.

Figure 10. Unloaded pyrotechnic launcher. *Photo by Mikayla Killam*

Propane or air cannons

Propane or air-powered cannons (Fig. 11) can be effective avian harassment devices. Rather than firing a projectile, they use a compressed charge of ignited propane or air to make a loud noise when ignited (propane) or released (air). Bear in mind that municipal sound ordinances must be considered when planning their use. There are a variety of avian deterrent cannons available for purchase, but managers should ensure that whatever system they use does not operate on a regular interval that the birds can learn and predict. Successful use of sound deterrents relies on startling the birds, and therefore, managers should incorporate changes in timing, cannon position, and cannon direction as appropriate for their application.

Figure 11. Propane air cannon. *Photo provided by Mikayla Killam*

LETHAL ACTION

In some cases, lethal removal under a *Migratory Bird Depredation Permit* may be a necessary addition to an IWDM plan. Select removal of a few individuals can help to reinforce management efforts, improve their success, or eliminate the individuals specifically causing damage (Avery & Lowney, 2016). In some cases, vultures may become acclimated to harassment over time and no longer perceive it as a threat. In these situations, occasional lethal action paired with other management techniques can improve the overall success of vulture management efforts. As a species protected by the MBTA, lethal action can only be taken if a permit has been granted by the U.S. Fish and Wildlife Service (USFWS).

In Texas, there are two permit options available to landowners looking to implement lethal management practices: a sub-permit under the Texas Wildlife Damage Management Association's permit or an individual permit directly from USFWS. The sub-permit can be authorized very quickly if all criteria are met, there is no cost, and reporting is handled by the Texas Wildlife Damage Management Association. However, the sub-permit option is only good for five birds and cannot be combined with any other permits. For the individual permit option, there is a fee and a waiting period for permit approval, and the holder of the permit is responsible for reporting and renewal. Under the individual permit option, an issue-specific number of birds is authorized for lethal removal if approved.

In many cases, the sub-permit option is sufficient for a producer's needs, but if their operation involves year-round, non-seasonal livestock reproduction, then the individual permit may be a better fit. Interested individuals can reach out to their regional *Texas Wildlife Services office* for advice on which option best fits their needs, as they will be involved in either permit option.

The following steps can be followed to apply to be a sub-permittee under the Texas Wildlife Damage Management Association permit from USFWS:

1. Harassment actions must already have been taken for a permit to be reviewed.
2. Reach out to the U.S. Department of Agriculture and Wildlife Services to request a Form 37 Migratory Bird Damage Project Report. A Wildlife Services professional will conduct an investigation and document current harassment efforts, the results of those efforts, and total vulture numbers, and then determine if a USFWS sub-permit should be issued or not.
3. If a permit is issued, the number of birds taken will be required for Wildlife Services. If the problem persists and harassment efforts are still in place, managers can apply for permit renewals.

To apply for an individual permit directly from USFWS, follow the steps below:

1. Harassment actions must already have been taken for a permit to be reviewed.
2. Reach out to the U.S. Department of Agriculture Wildlife Services program to request a Form 37 Migratory Bird Damage Project Report. Regional contact information can be found at *https://agrilife.org/txwildlifeservices/who-to-contact/* or by contacting the state office at (210)561-3800. A Wildlife Services professional will conduct an investigation and document current harassment efforts, the results of those efforts, and total vulture numbers, then determine if they recommend a USFWS permit be issued or not. If Wildlife Services recommends a permit be issued, they will suggest a maximum quantity of birds to be taken, and they may recommend additional actions to be used in conjunction with lethal removal.
3. An applicant must then submit Form 37 with a Migratory Bird Depredation Permit application to USFWS and pay the associated fee.
4. If a permit is issued, yearly reports will be required. If the problem persists and harassment efforts are still in place, managers can apply for permit renewals.

Depredation permits are designed to reinforce the negative connotation of existing aversive conditioning. They are not the sole answer to conflict issues and will not be granted if they are not used in conjunction with other practices.

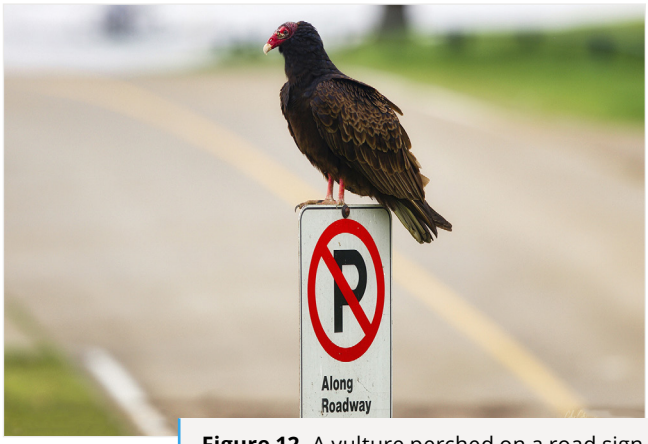


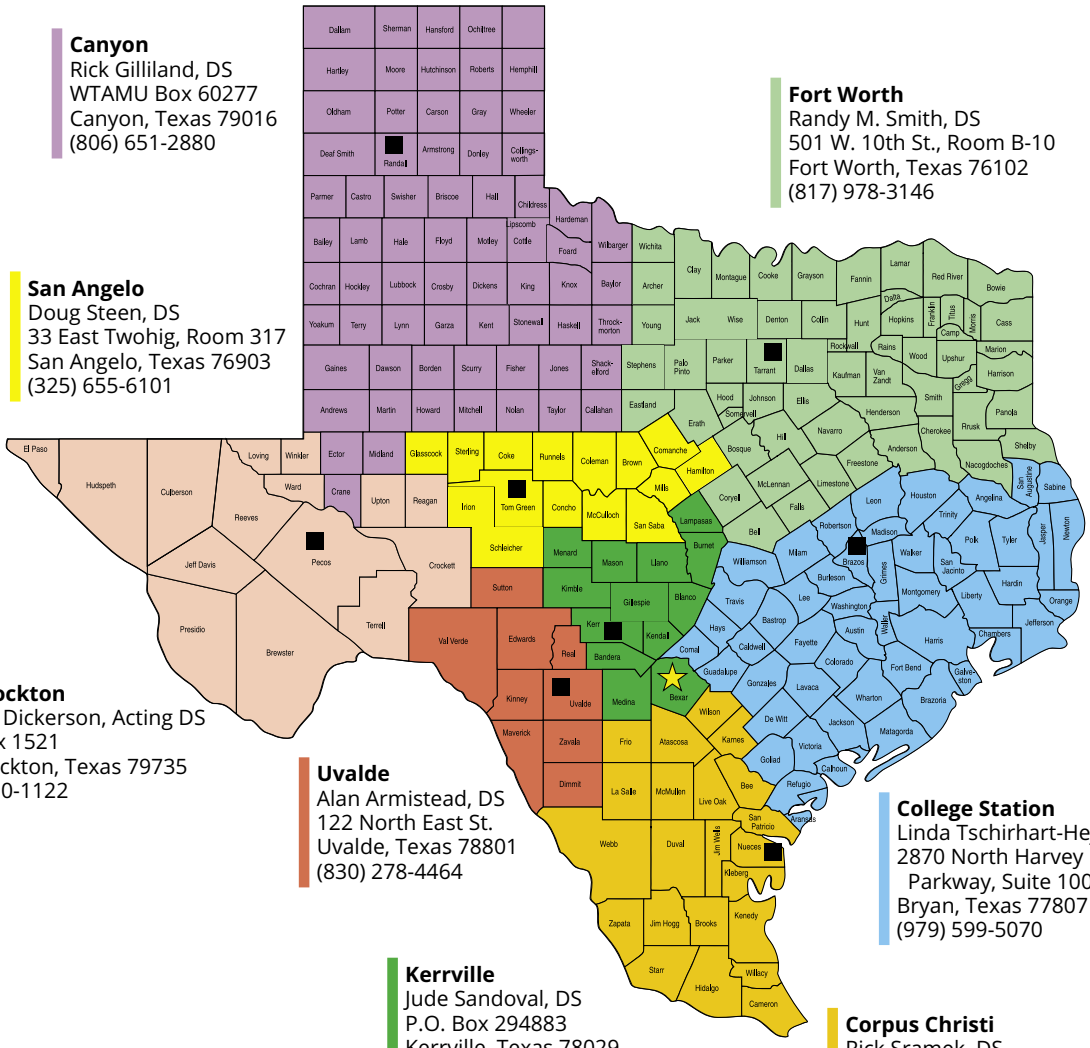
Figure 12. A vulture perched on a road sign.
Photo by Christopher Sanders in Grapevine, Texas

CONCLUSIONS

Expanding populations of humans and wildlife are bound to lead to conflicts in areas where they overlap. It is important for managers dealing with vulture nuisance issues to remember that they play a vital role in the environment and that coexistence with these birds is the ultimate goal. The tools outlined in this publication should provide managers with a variety of options for addressing vulture issues. In order to be successful, it is important that multiple tools are used and their timing is varied enough that the birds do not become accustomed to them.

If additional information is required, a qualified professional can provide situation-specific recommendations for management efforts. Contact the Texas Wildlife Services or the Texas A&M AgriLife Extension Service for more information.

Texas Wildlife Services Program



Canyon
Rick Gilliland, DS
WTAMU Box 60277
Canyon, Texas 79016
(806) 651-2880

Fort Worth
Randy M. Smith, DS
501 W. 10th St., Room B-10
Fort Worth, Texas 76102
(817) 978-3146

San Angelo
Doug Steen, DS
33 East Twohig, Room 317
San Angelo, Texas 76903
(325) 655-6101

Fort Stockton
Richard Dickerson, Acting DS
P.O. Box 1521
Fort Stockton, Texas 79735
(432) 360-1122

Uvalde
Alan Armistead, DS
122 North East St.
Uvalde, Texas 78801
(830) 278-4464

College Station
Linda Tschirhart-Hejl, DS
2870 North Harvey Mitchell Parkway, Suite 100
Bryan, Texas 77807
(979) 599-5070

Kerrville
Jude Sandoval, DS
P.O. Box 294883
Kerrville, Texas 78029
(830) 896-6535

Corpus Christi
Rick Sramek, DS
P.O. Box 9259
Corpus Christi, Texas 78469
(361) 299-1176

State Office
Michael J. Bodenchuk, SD
Bruce R. Leland, ASD
P.O. Box 690170
San Antonio, Texas 78269-0170
(210) 472-5451

SD	State Director
ASD	Assistant State Director
DS	District Supervisor
ADS	Assistant District Supervisor

■ **District Offices**

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