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Managing and Mitigating Equine and Nuisance Wildlife Interactions

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Many of the resources used to care for horses and other domestic animals can also be attractive to a variety of wildlife. These resources include easily accessible feedstuffs, water, and shelter in the forms of barns, storage sheds, or shade trees. Some of these uninvited guests can bring unintended consequences to your property, like disease, hazardous terrain created by burrows/holes, property damage, and feed and water contamination.

Inadvertently supporting nuisance wildlife with supplies intended for horses will not only result in a loss of resources for your operation, it can also create an opportunity for disease spread from wildlife to your animals or even to you. Preventative action to limit wildlife damage and equine-wildlife contact is the best tool for discouraging interactions with wildlife. Though this may require more upfront time and capital, remedying issues and dealing with animals after they have made themselves at home is much more challenging and stressful. You can mitigate horse-wildlife interactions by familiarizing yourself with the species commonly found around your equine operation and learning how to avoid or manage them.

This publication is designed to educate horse owners about the various species of nuisance Kentucky wildlife that may be found around their farm and inform them of methods that can be implemented to dissuade these animals from making a home on their property. The goal is to protect the equids as well as the wildlife species. However, be aware that even if you implement the strategies listed below, they will not prevent *all* interactions between horses and wildlife. Therefore, we highly recommend you work with your veterinarian to ensure an appropriate vaccination protocol for your animals.

Prevention Techniques

Wildlife behavior is driven almost completely by the desire to meet survival requirements of food, water, and shelter. Individual animals will remember and often revisit places where meals are readily available, and they will be more inclined to stay close to those sources. An easy and effective wildlife prevention strategy is to keep any potential food sources as secure from prying animals as possible, and to keep feed rooms and areas as clean as possible. Immediate cleanup of spilled grain and feed stuffs will remove the draw of food to local wildlife. Examples include:

- Keeping grain and other feeds secure and stored in properly latched containers
- Keeping pet food out of reach of wildlife
- Securing waste containers and emptying them frequently

Wildlife also need cover or shelter from inclement weather. Depending on the species, they may try to take up residence inside buildings, especially if easily accessible. Tightly sealing holes that go under or into buildings will take away easy entry points. Covering openings with a small-diameter metal mesh or screen is an alternative option if completely sealing areas is not possible or when air flow is desired. Additionally, keeping branches trimmed so they remain at least 5 feet away from rooflines will discourage movement from treetops to buildings.

Additionally, mowing grass removing rock piles, brush piles or anything that could be used as cover will help discourage wildlife from regularly using the area. Frequently visiting outbuildings, which leads to some noise and human scent, will also help prevent some species of wildlife from moving in.

Providing different water sources for horses and wildlife is one of the best approaches to prevent equine-wildlife interactions. Wildlife prefer to drink from streams near woods or ponds, so horses should be prevented from drinking out of these sources. Instead, they should be offered clean water from troughs, buckets or automatic waterers. However, when water becomes scarce, wildlife may utilize watering options designed for horses, so daily water checks (and cleaning where appropriate) are paramount.

The Kentucky Department of Fish and Wildlife Resources has a searchable database that populates a list of private trappers willing to trap properties for certain wildlife species. It is a useful tool for farmers and landowners experiencing crop or property damage or predation of livestock by coyotes, foxes, river otters, beavers, muskrats, mink, raccoons, opossums, weasels, bobcats, and striped skunks. The program can be accessed at https://app.fw.ky.gov/furtrapper/search.aspx.

Strategies to deal with wildlife are often species-specific and therefore are more effective if you know what animals are found near your farm. Below are some of the most common wildlife species that interact with or are found near equine facilities and their associated concerns and mitigation strategies.

Opossum (*Didelphis virginiana*)

Opossums are nocturnal opportunistic omnivores and scavengers that hunt mice, birds, insects, ticks, worms, snakes, and chickens, but also eat various vegetation, nuts, and fruit, and animal carcasses (Figure 1). They are excellent climbers but have poor eyesight. Although opossums do not hibernate, their metabolism slows in winter. They usually live alone, and the mating season ranges from January to July. With only a two-week gestation, opossums may have two to three litters a year, of six to 10 pups.

Although opossums can be problematic for horses, they provide valuable ecosystem services and are native to Kentucky. A single opossum can consume up to 5,000 ticks that carry Lyme disease, anaplasmosis, and Rocky Mountain spotted fever, making them beneficial to many species, including humans.

However, opossums are known to carry the sporocysts that cause equine protozoal myeloencephalitis (EPM), a potentially devastating equine neurologic disease. The main causative agent for this disease is *Sarcocystis neurona*, a protozoan parasite that can infect a horse that ingests foodstuffs (hay, grass, concentrate, etc.) contaminated with opossum feces. The lifecycle of this protozoa involves multiple other species that can be the source of infection for opossums when their carcass is consumed. The horse is a dead-end host, meaning it does not spread the disease to other horses or animals.

Though not all horses exposed to *S. neurona* will develop clinical signs of EPM, opossums should still be discouraged around your farm and horses. To prevent attracting opossums to your farm, special attention should be paid to cleanliness, including the removal of trash and disposal of animal carcasses.

Trapping and relocating opossums is not recommended because of the potential to spread parasites or diseases. Additionally, the health outcomes and welfare of both relocated animals and those that reside in the area to which the animals are relocated could be placed in peril if opossums are moved.

Figure 1. Opossums are known to carry the sporocysts that cause equine protozoal myeloencephalitis (EPM), a potentially devastating equine neurologic disease.

Lethal forms of pest management in opossums often begin with trapping the animal. A live-animal cage trap, measuring 10x12x32 inches with strong smelling bait such as canned pet food or fish, is best. By law, traps need to be checked at least once every 24 hours to prevent unnecessary stress on trapped opossums or non-target animals that are captured. Opossums can be killed with a shotgun or rifle. Eliminating opossums by poisoning is not legal.

Raccoon (*Procyon lotor*)

Raccoons are nocturnal, opportunistic omnivores that eat plants, fruit and berries, and hunt for rodents, frogs, and crayfish (Figure 2). They are generally intelligent and dexterous. This combination means they are efficient at scavenging for food and getting into poorly secured containers, including those containing farm animal and pet feed. Raccoons frequent many agricultural buildings and human dwellings and are typically the most common wildlife species found in barns. Raccoons do not hibernate, but they do become inactive during severe winter weather. Raccoons breed mainly in February or March, but mating may occur from December through June. With a two-month gestation, most litters—of two to five pups—are born in April and May, and kits are weaned at two to four months of age. Family groups of raccoons usually remain together for the first year and separate the following spring.

The most dangerous disease that raccoons can transmit to horses (and all other mammals) is rabies. Even though in Kentucky the skunk is the primary reservoir for rabies, raccoons can also infect and transmit the disease to other mammals, including humans. Rabies is lethal; for that reason the American Association of Equine Practitioners recommends that all horses be vaccinated for rabies annually.

Raccoons are also implicated in the EPM lifecycle. Although they cannot directly transmit the disease to horses, they can carry the protozoa that causes EPM, which can be ingested by opossums upon their death. The opossums, then, transmit the disease to horses through their feces, as further described above.

Other diseases that raccoons can transmit include leptospirosis, a bacterial disease that can cause blindness, abortion and liver/kidney failure in horses and other animals, including humans; they can also carry canine distemper, a deadly neurologic disease that affects dogs; and Baylisascaris, a type of roundworm that can infect humans and dogs.

The same techniques used to prevent and terminate opossums can be employed for raccoons, since they have similar behaviors and diets. Multiple styles of traps are effective with raccoons due to their curious nature and interest in food.

Figure 2. Rabies is the most dangerous disease raccoons can transmit to horses.

Striped Skunk (*Mephitis mephitis*)

The striped skunk is known for its smelly defense mechanism (Figure 3). They are nocturnal, but it is not uncommon to see them foraging during the day. Skunks are omnivores, eating plants, roots, berries, insects, snakes, lizards, and frogs, and are especially attracted to easy food sources. They live in burrows, but can make themselves at home in structures, like under porches or barns. They do not hibernate, but become less active in winter months, staying in the den for days or weeks at a time. Skunks generally have one litter a year, of two to 10 pups.

Skunks are the primary reservoir for rabies in Kentucky and they can also carry leptospirosis.

Skunks are native to Kentucky and provide ecological control of disease-spreading agricultural and garden pests like insects and rodents. However, because of their ability to transmit diseases to horses, it is ideal to not have skunks cohabitating on horse farms. In addition to removing accessible feed, garbage and habitat, emphasis should be placed on permanently covering any holes under foundations or in the ground that may be inviting to skunks. Wire mesh is best utilized under foundations as skunks have strong claws for digging.

Anecdotal evidence has shown that used kitty litter or moth balls placed inside or near the den can deter skunks from taking up residence on your farm. Additionally, a motion light or sound machine placed near the den can be used to encourage the skunk to move out. If only one skunk is occupying the den, the hole can be permanently sealed in the evening when it is visually confirmed that the skunk has left the den. If multiple animals are present, they can be evicted by using a one-way door over the den entrance, created by using a sturdy material like ½-inch hardware cloth hinged over the hole on one side and free on the other three sides. Once all skunks leave the den and cannot reenter, the hole can be permanently sealed.

Skunks are often attracted to rodents living in barns, crawl spaces, sheds and garages, so effective rodent control measures are imperative to keep skunks at bay.

Lethally, a skunk can be managed by trapping and killing. In Kentucky, this only applies to the striped skunk, as the spotted skunk is protected. A live trap measuring 10x10x30 baited with fish or cat food placed near the den entrance is ideal. Covering the trap with a heavy canvas will reduce the chances of a trapped skunk discharging its scent upon the person's approach, as long as the person approaches it slowly and quietly. Skunks can be killed with a shotgun or rifle. Shooting the skunk in the middle of the back to sever the spinal cord and paralyze the hindquarters may prevent the discharge of scent. It should be followed immediately by shooting in the head. However, most people who shoot trapped skunks should expect a scent discharge.

Figure 3. Skunks are often attracted to rodents living in barns, so effective rodent control measures are needed to keep skunks away.

Groundhogs/Woodchucks (*Marmota monax*)

Groundhogs are burrowing animals that create intricate den habitats Figure 4). Groundhog burrows are distinguished by a large amount of excavated earth at the main entrance. There are two or more entrances to each burrow system.

Groundhogs prefer open farmland and the surrounding wooded areas adjacent to open fields. They can pose a particular hazard in horse pastures because of the uneven terrain and holes they create, which can cause a horse to fracture a leg and be detrimental to farming equipment.

Groundhogs are diurnal, and prefer to feed in the early morning and evening hours. They are strict herbivores and feed on a variety of vegetables, grasses, and legumes. They enter true hibernation in October or November and come out in February or March for mating. They have one litter a year, of four to eight pups.

Groundhogs are notoriously difficult to prevent from burrowing under structures; the best way to keep them from inhabiting your area is to disturb them before they take up residence. Scarecrows moved regularly and a high level of human scent may discourage them from starting a den. Groundhogs can live for up to six years and often live their entire lives in the same burrow.

Once established, groundhogs are incredibly hard to manage non-lethally. It is often necessary to trap or use fumigants to remove groundhogs from their dens. Carbon monoxide gas cartridges discharged into burrows are a common way to control groundhogs once all entrances are sealed. These cartridges should not be used when the burrows are located under wooden sheds, buildings, or near combustible materials because of the fire hazard. They are appropriate for use in pastures. Live traps with double entrance are effective when baited with fruits or vegetables. Trapped groundhogs can be killed by rifle or shotgun.

Mice and Rats

Mice and rats are common inhabitants of barns, where they like to live in close association with horse feed (Figure 5). They are mainly nocturnal, though daytime activity may be seen. Seeing mice during daylight hours does not necessarily mean that a high population is present, although this is usually true for rats.

These pests are attracted to any loose grain or seed, and are able to fit through holes as small as ¼-inch. Mice can gain entry to structures by gnawing, climbing, jumping and swimming, and are more commonly seen than rats. These rodents carry diseases that can be transmitted to humans and horses (and other farm animals), including salmonellosis and leptospirosis, both of which can lead to serious diseases, including death. Rats also like to chew on horses' hooves, which cause discomfort, pain and possible infection.

Prevention and control of rodents involves three aspects: rodent-proof construction, sanitation, and population reduction by the use of traps or toxicants. The most effective way to prevent rodents from taking up residence in barns is to keep grain and feed stored in properly secured containers; keep aisles and stalls free of dropped feed; and keep areas around the barns clear of clutter and mowed to discourage their presence. It's important to note that it's nearly impossible to totally eliminate mice from a farm.

Commercial and homemade repellants are a non-lethal way to deter rodents, and these work with varying degrees of success. They often involve strong odors or taste, like peppermint, cinnamon, and clove. Ultrasonic devices have not been proven to control mice and rats.

Figure 4. Groundhogs are difficult to get rid of once they burrow under structures. The best way to keep them away is to disturb them before they take up residence.

The most common way to lethally manage these rodents in horse farms is to use traps. For snap traps, peanut butter or cheese are effective in controlling smaller rodent populations. Mice are very particular with food flavor, so if the food doesn't taste or smell good, they will reject it. Glue boards can also be used to capture them.

Poison is another option to lethally remove mice and rats from a farm. Mice are braver than rats, and readily enter bait stations. However, because they are less sensitive to rodenticides and nibble the bait, they may not eat enough to cause their death. Additionally, if the bait made them feel ill, they will not return to it. For this reason, generally, mice toxicants are very potent, with enough concentration of poison to kill the mice after the consumption of small amounts. There are multiple toxicants labeled for mice and rats, but they should be used very cautiously and not in areas accessible to non-target animals, as they often kill whatever ingests it.

Figure 5. Rats like to chew on horses' hooves, which can cause discomfort, pain, and infection.
(Photo by Dawn Jenkins/ The Hoof Blog)

Bats

Bats are the only true flying mammals, having their elongated finger bones connected with a thin membrane as their wings (Figure 6). They are the second largest order of mammals, after rodents, and comprise about 20% of all mammal species worldwide, with over 1,400 species. Bats can be insectivores, frugivores, nectarivores, and a few of them, so called vampire bats, feed on blood.

There are 16 species of bats in Kentucky and all of them eat only insects. They hibernate in the winter, and each female can bear between one to four pups between May and June. Bats can live up to 20 years of age. Although important for the ecosystem as bats pollinate flowers, disperse seeds and consume insects, a horse farm should not be a welcoming place for the flying mammals.

Bats are the most important reservoir for rabies worldwide, and the leading cause of rabies deaths in people in the United States (CDC). It is imperative that horses be vaccinated against this lethal disease.

It is illegal to kill bats in Kentucky, even if they are roosting in a barn. (Fish and wildlife website https://fw.ky.gov/Wildlife/Pages/Small-Mammals-and-Bats.aspx) Additionally, three species found in the Commonwealth are federally protected, so extrication is the only option for removal.

You can try to extricate them yourself, or you can hire a licensed Nuisance Wildlife Control Operator (https://app.fw.ky.gov/nuisancecontrol/). Because of their protected status, the operators will not remove bats from buildings or roost sites from mid-May until mid-August to ensure they don't disrupt maternity colonies and cause mothers to be separated from their pups.

For enclosed buildings, exclusion will focus on denying re-entry of bats by closing off all exit and entry points from roofs. This is generally done at night, when the bats have left to feed and before they return, so live bats are not trapped inside the building.

It's often impossible to complete close off all entry and exit points from barns, so efforts are best focused on making the barn an unpleasant place for them to set up shop in the first place. This is often achieved by:

- Illumination: Floodlights directed at areas where bats would roost or strung through the ceiling of a barn can deter bats from calling your barn home. Depending on the size and construction/design of the barn, these may be costly or pose an electrical hazard. In that case, bright LEDs that illuminate the entire barn at night will encourage bats to leave.
- Ventilation/air drafts: Bats don't like strong wind currents, so opening doors or windows, or installing electric fans may create enough of an air current to deter bats from roosting. The addition of roof vents will enhance this effort by lowering the roost temperature, which will increase the thermoregulatory burden on the bats, making the roost less desirable.
- Ultrasonic devices: It is unclear if ultrasonic devices repel bats.
- Naphthalene crystals and flakes: They are the only chemical repellent registered by the EPA, for indoor use; they are not appropriate in a barn setting.

Once you are able to extricate all bats from the premises, it is important to thoroughly clean up their droppings, as failure to do so will attract other bats to same spot. Always wear rubber gloves and mask when cleaning up the droppings to prevent inhalation of airborne particles, which could pose a risk for histoplasmosis.

Figure 6. It is illegal to kill bats in Kentucky, even if they are roosting in a barn.

Final Remarks

Making your place inhospitable to nuisance wildlife will decrease their interactions with the horses and other animals you may have, preventing the spread of diseases and damage to your property. Always wear gloves, and sometimes you may need to also wear protective goggles and a mask, when cleaning out wildlife droppings to reduce your likelihood of contracting any diseases or parasites.

It is more humane to lethally dispatch a captured nuisance wildlife animal than to relocate, as chances of survival are minimal to the relocated animals.

And finally, if you have any questions about laws or need help with trapping these animals, do not hesitate to contact the Kentucky Department of Fish and Wildlife Resources.

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