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MANAGING FERAL HOGS ON SCHOOL GROUNDS:
An Integrated Pest Management Approach

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INTRODUCTION

Populations of feral hogs, a non-native species, have grown dramatically in recent years. As human populations and urbanization also continue to increase, interactions and conflicts between feral hogs and humans will only continue to grow. Although feral hogs rarely present a direct physical threat to humans, the hogs damage property, negatively impact the environment, and carry diseases that are transmissible to livestock, pets, and humans. On school grounds, damage by feral hogs can impact sports fields, lawns and landscaping, irrigation systems, and gardens. Additional risks of disease transmission exist wherever fecal matter is deposited, especially when in proximity to young children or school-related livestock projects. When feral hogs do appear in a community, it is essential that schools understand how to manage the presence of feral hogs on their properties to protect their students and their communities alike.

While the management of nuisance wildlife is primarily designed to control negative impacts rather than remove animals, feral hogs are different. As an exotic, invasive species, they must be removed whenever possible to prevent damage to ecosystems, native plants and animals, and human health, safety, and food supplies. Although there are a variety of management tools for feral hogs, lethal removal is the ultimate goal, whether euthanasia occurs at the damage site or at a remote location, such as a meat processor.

This guide functions as an aid, primarily to school Integrated Pest Management (IPM) coordinators, to address the presence of feral hogs on school grounds. The following information provides scientifically founded techniques to aid in those maintaining the safety of students at schools. School grounds impacted by feral hog damage can take on a variety of forms but are typically situated in urban or suburban environments. The areas impacted can include sports fields, play areas, agricultural facilities, educational field sites, and even areas immediately surrounding buildings. These management techniques could also be applied by any individual or organization seeking to manage feral hogs in and around human habitation and development.

Figure 1. Feral hogs can look similar to domestic swine. They typically have rough coats that can include a variety of colors. *Photo by David Campbell*

IDENTIFICATION

Feral hogs are easily recognized. These animals range in size from a few pounds as newborn piglets, to several hundred pounds as adults. They look like domestic swine, although feral hogs' coats are usually rougher, and may be black, brown, white, spotted, or some other color. Newborn piglets are often brown-and-black striped for the first several weeks of life.

GENERAL ECOLOGY

Feral hogs have impressive diet flexibility, reproductive output, and survival rates. As one of mankind's first domestic animals, some traits are the product of selective breeding, but most are natural to the species, and perhaps part of the reason mankind domesticated them originally.

These animals, the descendants of domestic swine—in some cases a hybrid of domestic swine and Eurasian

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wild boar—are arranged into a social structure based on matrilineal kinship. That is, they are often seen in large groups, called "sounders," that are related through the maternal side. This amounts to sisters, female cousins, aunts, grandmothers, and so forth raising their offspring together. Young females stay in the group after sexual maturity, whereas sexually mature males leave to roam as solitary boars. Sexual maturity occurs between 6 and 10 months of age. Females come into estrus every 18 to 24 days until bred. Gestation lasts roughly 54 days, and litters typically contain between 4 to 8 offspring.

The diet of feral hogs is that of an opportunistic omnivore. Every food item that can be ingested is ingested. From plant matter, to live animals, to carrion, feral hogs have a remarkable ability to eat most things and not succumb to disease. Feral hogs are most commonly associated with their "rooting" behavior, which consists of using snouts and powerful tusks to dig around in the soil for roots, tubers, insects, fungi, and other matter to consume.

Feral hogs are a detriment to the ecosystem. They are not native and often interrupt natural processes by damaging soils, native plants, and wildlife. Although they can be a source of wonder and interest in the natural world for students, it is important to contextualize this with their status as an exotic, invasive species. At the same time, they present a potential safety threat for students at schools if they become habituated toward humans. Therefore, it is essential that school IPM coordinators monitor the presence and behaviors of these animals to determine if management action is needed.

WHEN TO ACT

Every manager must decide for themselves what level of feral hog activity is acceptable for their property. For rural areas, tolerance of feral hog activity may differ considerably from urban areas. In a school environment, the presence of feral hogs can be viewed by many as undesirable due to perceived risks to children and potential damage to school grounds. Long-term peaceful coexistence with feral hogs at close proximity is not an option due to environmental damage, risk of disease transmission, and human safety risks. Ideally, feral hogs will not be present at all on school grounds. Needless to say, their presence in close proximity to students during the daytime would be cause for concern. Between these two points is a continuum along which managers must choose their threshold for action. It is critical to understand signs of feral hog presence to determine when each management action is appropriate.

Schools with active agricultural programs may have a school-controlled livestock project center to house FFA and 4-H animals. These "Ag Barns" are often located away from the main campus in rural areas and can be major attractions to feral hogs. Livestock feed and the presence of young domestic pigs can make the barns appealing to feral hogs. Besides the loss of feed or the potential safety risk to students, feral hogs pose a direct disease threat to the animals housed at the barns. Since animals are housed, trailered, and shown together, transmission of a disease to a show animals can lead to a catastrophic outbreak. School officials and IPM coordinators should adopt a zero-tolerance policy for feral hogs at ag facilities controlled by the school.

School IPM coordinators may ensure that there are no feral hogs present on school grounds, whether seen or unseen, by continued monitoring and inspection. Note that these monitoring methods may be easily integrated into science projects that are aligned with Texas Essential Knowledge and Skills for students, or TEKS. Please contact the Texas A&M AgriLife Extension Service's *Wildlife Unit* for more information on including wildlife monitoring in classroom curriculum.

MONITORING AND INSPECTION

Schools should train IPM managers or groundskeepers on the identification of feral hog signs. It is very unlikely that hogs will be observed directly, as they are often nocturnal and will use the site after school hours. There are four primary types of evidence that may indicate the presence of feral hogs on school grounds or surrounding areas: tracks, scat, landscape damage, and vehicle collisions. Trail cameras, used with or without bait present, can be excellent tools for schools seeking to actively monitor the property for the presence of more elusive individuals or to better understand the quantity of hogs on site.

Tracks

Feral hogs have split, hard hooves. When viewed on the ground, observers may have difficulty distinguishing between the tracks of white-tailed deer and feral hogs. A good rule for differentiating these two is that deer tracks are angled and wider at the toe than the heel, resulting in a heart-like track. Feral hog hooves are of uniform width, so they resemble two, parallel bars (Fig. 2).

Figure 2. Feral hog track.
Photo by Cody Stricker

Scat

The scat of feral hogs is generally of a large, log-like structure, up to roughly 1.5 inches in diameter (Fig. 3). The texture is often uniform, owing to the diversity of food items consumed. Due to the digestive similarity of humans and pigs, there are striking similarities between the scat of these two species.

Figure 3. Feral hog scat.
Photo by Mikayla Killam

Landscape Damage

The rooting behavior used by foraging feral hogs can leave a distinct impression on their surroundings, especially when it occurs in more manicured environments (Fig. 4). Areas of damage will consist of freshly dug soil and displaced plants. In areas where water is present from rainfall or sprinkler systems, hogs may also wallow, creating a deep muddy rut that will retain water.

Figure 4. Feral hog landscape damage.
Photo by Mikayla Killam

Vehicle Collisions

Feral hogs are low to the ground, have dark coats, and no reflective eyeshine, which can make them even more susceptible to vehicle collisions (Fig. 5) than some other native wildlife. Female hogs typically travel in large groups, so deceased individuals on the road can confirm the presence of other hogs in the area. Consult with local law enforcement staff for nearby vehicle strike information, as they may be aware due to engagements with motorists or insurance companies.

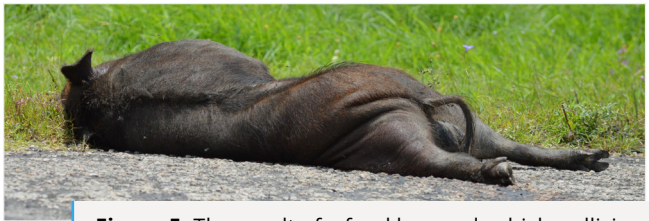

Figure 5. The result of a feral hog and vehicle collision.
Photo by Jon McIntyre

Remote-triggered Cameras

Remote-triggered or "trail" cameras can be placed around the property to monitor feral hog movements (Fig. 6). These are excellent additions to science classes. Place the camera at a 45-degree angle across a path or trail, roughly 18 to 30 inches above the ground. Be sure to clear vegetation that might blow easily in the wind to limit the number of accidental photos not triggered by an animal. Locations should focus on areas where scat has been deposited, or pathway intersections. Cameras should be placed in secure, lockable boxes designed to prevent tampering or theft. Whole corn bait can be used in conjunction with cameras to increase the odds of capturing photos of the animals using the area. These bait sites and monitoring cameras can be used in the first steps of trapping and removing the animals from the site if that is the goal.

Figure 6. Game camera mounted to a tree with a stick to adjust the angle of the lens.
Photo by Mikayla Killam

MANAGEMENT APPROACH

It is critical to understand and classify the behavior of any wild animal that is a management concern. Unlike insect pests, wild animals possess advanced intelligence, learn from experiences, and can change behavior over the years of their lives. When occurrences of feral hogs are new or rare, most experts and municipalities advise the use of preventative measures to keep animals from establishing in the area and interacting with humans. When occurrences become more regular, and prevention is no longer effective, it is typically recommended that municipalities engage in lethal removal. The IPM coordinator will need to decide what frequency of occurrence is acceptable for their specific facility and when prevention efforts or removal efforts should take place.

There are many different management tools available to resolve conflicts with feral hogs. The tools best suited for a school are detailed below, but note that in any integrated approach to managing nuisance animals, each tool available has a time and place for its use. In the case of intelligent animals such as feral hogs, using a combination of tools is most successful in allowing personnel to manage hogs without teaching the hogs patterns of activity that they may avoid. Certain regulations, ordinances, and cultural positions

may dictate which tools are legal and/or desired. For example, it is often illegal to discharge firearms within city limits, which may preclude onsite euthanasia, if part of the feral hog management plan.

Increasingly, there is a desire to trap and relocate rather than euthanize animals. Although peaceful coexistence should be the goal with native wildlife, exotic, invasive wildlife such as feral hogs should never be relocated—they will cause the same problems in a new location. Trapping and relocating feral hogs merely relocates the problem, but it is also illegal under most circumstances, other than to release tagged males at a Texas Parks and Wildlife Department-licensed hunting preserve. Managers, however, may transport and sell live hogs to a *Texas Animal Health Commission*-approved buying station.

CULTURAL MANAGEMENT

The appropriate time to consider habitat modifications is before feral hogs establish a regular presence in or near a school. Feral hogs are attracted to environments that provide habitat for them. In suburban and urban areas, several actions can be taken to make the landscape less hospitable to feral hogs.

Habitat Modification

Clear brushy undergrowth of trees and other plants. Remove debris such as wood piles, trash piles, and neatly organized stacked materials, such as lumber and pipe. This creates a more "visible" landscape that minimizes places for feral hogs to move while concealed. Coordinate with neighbors and other authorities to increase the area adjacent to school grounds that is managed to reduce feral hogs' movement.

Fencing

While there is no truly "hog-proof" fence, strong fencing is an excellent deterrent to hog traffic (Fig. 7). A strong, 6-foot net-wire perimeter fence will deter most feral hogs. The fence should be installed with the bottom touching the ground in all places to avoid allowing feral hogs to crawl under a high spot. Wire can also be buried to form a "curtain," which can prevent digging under fences by a variety of wild animals and domestic pets. Security gates (that roll across pavement at access points) should be closed after hours to prevent feral hogs from entering the school grounds. While the initial costs of such fencing may be high, the long-term benefits may be appreciated in both wildlife management and school security.

Figure 7. Strong, strategic fencing can help deter feral hogs.
Photo by Jacob Hetzel

Electric fencing can be highly effective at blocking access to feral hogs, but it is inadvisable to use this in areas with student access. Electric fencing may be considered as a perimeter fence around livestock barns or in areas that are not accessible to students.

Food Removal

Supplemental food for pets and wildlife is often provided by residents in towns and cities. Unfortunately, consistently available food sources often contribute to increased feral hog presence. Pet foods intended for household pets or feral animals, bird seed, supplies for show animals, or conspicuous disposal of human food waste can attract feral hogs and increase human habituation. These should be removed or secured in inaccessible locations, and the school IPM coordinator should actively monitor the property to ensure no food sources are available. Coordination with neighbors to eliminate food from their properties is also essential. If school compost piles are targeted, IPM coordinators should consider erecting fences around these items.

Water Removal

If supplemental water is provided for wildlife on the school property, it is important that it be made as unavailable as possible to feral hogs. Of equal importance is the management of areas that are wet due to runoff from rain or irrigation systems. These areas will attract feral hogs, who come to feed on the plant, insect, and fungi matter present in the moist soils. Areas where runoff pools or sprinkler systems are leaking should be adjusted to minimize the water, as it may become a "wallow" for feral hogs. Additionally, such wet areas can harbor other animals or insects, such as mosquitos, that may pose health risks to students.

AVERSIVE CONDITIONING

Hazing, harassing, and otherwise "running off" wildlife is often referred to as aversive conditioning, or simply teaching animals to avoid people. On school grounds, aversive conditioning is the preferred method of managing species such as coyotes to prevent habituation in an area. Care must be exercised with

feral hogs, however, as some methods of hazing become ineffective over time. Methods of hazing such as noise-making and light-making devices may startle feral hogs at first, but they ultimately become accustomed to such strategies. Physical harassment (including throwing objects, paintball guns, etc.) is an option, but over time, a habituated feral hog may attack a human that physically harasses it. For feral hogs, prevention efforts will be the best strategy to prevent establishment in an area. If hogs do become established, removal of hogs through the means outlined below should be the next step.

MECHANICAL MANAGEMENT

Removal of feral hogs by mechanical means generally involves using one of several trap types. These traps are often not inherently lethal, and each presents risks and benefits. All traps should be placed in areas where school children will not encounter them, and where the risk of non-target capture is minimal. For trapping efforts to be successful, trail cameras over bait should be monitored so managers know the size of the sounder and when to set the trap. For maximum effectiveness, managers should wait to begin trapping efforts until all the hogs in the sounder are comfortable entering the trap and feeding. Acclimating hogs to a trap can take several days to a week.

Generally, schools employ professional assistance in setting traps. Professionals can assist with safe euthanasia practices or transportation of hogs to an approved buying station, depending on what the situation requires. The *Texas Wildlife Services Program* is a useful resource for providing professional assistance with issues of wildlife damage management. They are available to support schools, organizations, and private individuals throughout the state experiencing wildlife damage issues in relation to agriculture, property, natural resources, and human health and safety. Depending on the specific situation, Wildlife Services can provide technical guidance on trapping and management options, or they can be hired to manage the issue directly. For more information on available services, contact a *local office*.

Outlined below are the four basic mechanical management options suitable for use on school grounds. Full descriptions and instructions for these techniques, both print and video, are available from the *Texas A&M AgriLife Extension Service*. School IPM Coordinators should first check with their municipal and county authorities to see if there are regulations or ordinances governing the use of any method. If euthanasia is a possible or planned part of management, appropriate authorities and administration should be notified in advance. Additionally, if IPM coordinators plan to dispatch captured hogs themselves, they must have a plan for carcass removal in place prior to trapping.

Corral Traps

In the removal of feral hogs, large corral-style traps such as the model pictured in Figure 8 are considered the best way to remove an entire sounder, or group, of hogs in a single event. These traps come in a variety of configurations, construction types, and styles, but all have a few details in common. The fencing should be at least 60 inches tall with t-posts spaced every 4 to 6 feet to prevent feral hogs from breaking the fence. It should have no corners that provide a focused location for efforts to escape. Head gates typically consist of saloon-type gates, drop gates, or lifting rooter gates and can be purchased or custom built. There is a diverse assortment of trigger options for corral traps. Triggers range from remote cellphone apps informed by game cameras to specially positioned bait and trip wires. The best trigger for a particular setup will depend on the frequency of nontarget species, costs, cell phone reception, and feral hog behavior in the area. Remember, the goal is to catch the entire sounder so that hogs do not have the opportunity to become trap-shy. The amount of time needed for a sounder to acclimate to a trap will vary from one situation to the next, but the trigger should not be set until the entire sounder is regularly entering the trap.

Figure 8. Corral trap built from hog panels and t-posts.
Photo by Billy Higginbotham

Box Traps

Although the most commonly available style of trap, box traps (Fig. 9) are only recommended for the removal of individual feral hogs. When in sounders, feral hogs learn from communal experience. Thus, a box trap that can only fit a single adult, or perhaps several piglets, will train the rest of the sounder to avoid such structures. In these scenarios, it is best to pursue the use of corral-style traps, as mentioned above. Additionally, box traps may capture non-target wildlife (e.g., deer, coyotes,

etc.) that will have to be released safely. In some cases, animals injure themselves in the trap to the point of needing euthanasia. Thus, box traps can be both a safety and optics concern for non-target animals.

Figure 9. Box trap. *Photo by Jacob Hetzel*

Drop Traps

Another popular trap design is a drop trap (Fig. 10). These traps suspend a circular perimeter fence in the air, which allows hogs to easily access bait at the center of the trap from any direction without having to pass through a door or gate. Once the trap is triggered, the circular fence drops to the ground, immediately surrounding all the hogs in the trap. These traps can be constructed on site or can be purchased prefabricated. These traps do drop at a very high speed with a large amount of weight behind them, so it is very important that they only be used in locations inaccessible to students or the public.

Figure 10. Drop trap. *Photo by The Noble Foundation*

Root-under Net Traps

With any trap, it is important to make the setup as "hog-specific" as possible. Relying on hog-specific behaviors can limit the chances of capturing non-target animals such as raccoons, deer, or dogs. Root-under net traps (Fig. 11) are now available for purchase. These traps

Figure 11. Root-under net trap. *Photo by Pig Brig*

are lightweight and set up in a circle using T-posts in an arrangement similar to the corral trap. These traps rely on a hog's rooting behavior to make it under the perimeter of the trap. Once inside, the net anchor system prevents the hogs from rooting back out of the trap, but allows additional pigs to continue entering.

CHEMICAL CONTROL

At present, there is no lethal chemical control product for feral hogs approved for use in Texas. There are chemicals available that are designed to control the fertility of hogs, but to be effective, the chemicals must be consumed at regular intervals by all sexually mature males on the landscape. Although it is likely that lethal control products requiring permits will enter the market in the near future, IPM coordinators should exercise caution in integrating these into management scenarios. Label restrictions must be carefully observed, and carcasses from poisoned feral hogs removed expediently to prevent further health risks to students. It is possible that, in time, there will be a feral hog toxicant safe for use on school grounds, as for other pests. It is important to remember that when available, chemical control options will be most effective when used as part of an Integrated Pest Management approach, not as a solve-all solution.

REMOVAL IS THE BEST CHOICE

In the event that feral hogs establish themselves on school grounds, the best choice is simply to remove them through any means possible. They are pests to soils, water, plants, and wildlife. Dangers posed to human health and safety underscore this issue.

There are a variety of service providers that can assist schools in the removal of feral hogs, but one should be careful to select a service provider known for their discretion, professionalism, and "polish," given the sensitive nature of this topic in many communities, as well as potentially negative optics of mishandled trapping. You may have access to municipal or county

animal control officers. Inquiries can be made to the Texas Cooperative Wildlife Services program for support with lethal removal methods. As mentioned previously, if managers plan to lethally remove hogs on their own, the proper authorities should be notified and there should be a plan in place for carcass disposal.

CONCLUSIONS

Urban wildlife becoming habituated to humans is an increasing challenge in the management of wildlife. Although feral hogs are non-native, they are no exception to that trend. Feral hogs are a highly adaptable species that is constantly expanding into new habitats, including urban and suburban areas. While coexistence is the primary goal for native wildlife, feral hogs are an invasive species that damage the environment, and can be a risk to human health and safety. Where feral hogs are concerned, eradication should be the ultimate management goal. This publication is an attempt to provide school IPM coordinators with the guidance needed to undertake a successful management program.

The simplest solutions to prevent problems with feral hogs consist of removing the resources that attract hogs and installing good fencing to secure property borders. The removal of resources and habitat manipulation should also be extended into surrounding communities, when possible, to further limit the access and appeal of the school property. If feral hogs do become established on school grounds, they are easiest to remove if identified early on. Methods of mechanical removal should be implemented as soon as possible.

Needs for additional help or guidance should be sought from a qualified professional. Contact the appropriate employee of the *Texas Wildlife Services* program or the Texas A&M AgriLife Extension Service for more information.