

GEORGIA LANDOWNERS' GUIDE TO



WILD PIG MANAGEMENT

This manual was prepared by:
Michael T. Mengak
University of Georgia
Warnell School of Forestry and Natural Resources
Athens, GA 30677
mmengak@uga.edu
April 2020

© Warnell School, UGA

All photos - unless otherwise noted - are protected by copyright and are the property of the photographer. This manual is a revision of the previous version by Michael Foster and Michael T. Mengak, June 2016.

Acknowledgements

This version of the Georgia Landowner's Guide to Wild Pig Management is a revision of the 2016 edition. Michael Foster, graduate student at the Warnell School of Forestry & Natural Resources, University of Georgia, played a substantial role in creation of the 2016 edition. Michael has moved to a different job but his influence on the current version of the Guide is evident.

This edition of the Guide was funded in part by a grant from the Flint River Soil and Water Conservation District. Mr. Marty McClendon, Ms. Perri Campis, and Ms. Casey Cox were the primary contacts for this project. Ms. Kami Kent, graduate student in the Department of Agricultural Leadership, Education & Communication (ALEC), University of Georgia played a critical role in helping to develop the website that is associated with this Guide.

Input provided by Mr. Matthew P. Ondovchik, USDA APHIS Wildlife Services, was essential to producing a Guide that will be both practical and accurately convey knowledge to landowners, farmers, hunters, legislators, and others who are seeking factual information about wild pig management and control. In the past 6 years, we have conducted many wild pig workshops together and his voice was in my head as I wrote and re-wrote many sections of this Guide. The student has become the teacher. Thank you, Matt.

I have imposed on numerous people to review sections of this manual along the way. I thank each of them for their insight and comments. Mr. Matthew Ondovchik, Drs. Robert Cobb, Gino D'Angelo, David Dickens, Travis Devault, Michel Kohl, and Michael Yabsley provided valuable reviews. However, all errors remain mine.

Introduction

All wild pigs are members of the same biological species – *Sus scrofa*. However, wild pigs are also referred to by different names such as wild boar, Eurasian wild boar, wild hogs, and feral swine. In their native range they are called “wild boar.” Their native range includes almost all of Europe, much of Asia (including the Middle East, Persian Gulf, Siberia, China, Southeast Asia, and Indonesia), as well as the north Africa coast and a narrow zone south along the Nile River. Relatively little of Russia is included in the native, historic range. To call these animals “Russian Boar” is incorrect. Eurasian boar is more accurate. Pigs were domesticated about 8,000 – 10,000 years ago. Most authors agree that pigs were domesticated in several places throughout their native range. Fossil evidence has been found in Siberia, Ethiopia, the United Kingdom, Norway, Denmark, and scattered locations in Asia.

Pigs were first introduced to North America by Spanish explorers in the early 16th century. Some escaped; some were released intentionally. Most were allowed to range freely throughout forest, marsh, and field. They were captured when colonists and settlers needed meat. These pigs may or may not have established wild populations. Some authors believe that most wild free ranging pig populations originated with animals imported by early English colonists who settled Virginia in the early 17th century. Other introductions followed additional English colonies in South Carolina, North Carolina, and Georgia.

Early settlers favored pigs because they were independent and required little care. Settlers raised them with a free-range practice for centuries. Free-range livestock (mainly horses and pigs) roamed freely across the landscape, foraged wherever they could find food, and were rounded up in the fall for slaughter by farmers and settlers. This resulted in the establishment of “open range” across the Southeastern United States – a practice that would continue for over 300 years. Early colonial governments mandated that crops (especially corn fields) be fenced to exclude feral animals and reduce damage. The concept of fence out the animal rather than fencing it in seems strange today but is still enforced in some states (e.g. some Virginia counties).

In the early 1900s, the introduction of the Eurasian wild boar for sport hunting resulted in interbreeding with the free-ranging domestic pigs already present. Due to farm abandonment related to world wars, the depression and dust bowl along with the unique features of pig biology, the pig population increased rapidly and spread throughout the southeastern United States. This caused immeasurable economic and ecological damage across the region.

Later, primarily in the early 20th century, some hunting preserves (especially in the Appalachian Mountains) imported wild boar from central Europe. Wild boar escaped and interbreed with captive and free-ranging feral pigs (Figure 1.1). As a result, the wild pigs, or feral swine, in the United States today are a mixture of wild boar (recent introductions) and domestic livestock (present in North America for at least 500 years). The important fact is that all pigs are simply pigs. They can look slightly different and display many color patterns but all wild swine in the United States are pigs.

As a result of the pig population boom, free-ranging practices in this country became illegal in the mid-20th century, with the exception of a few parishes in Louisiana. Unclaimed free-range populations of hogs quickly increased and spread throughout the United States. Many sources of information on the biology of wild pigs are available. We will only briefly review the main factors believed to be responsible for rapidly increasing wild pig populations. But first, we establish the legal framework that will guide our recommendations for hunting, trapping, and other control measures.



Figure 1.1: Several wild pigs under a game feeder. Wild pigs come in a variety of different colors as a result of both the domestic and primitive influences.

Legal. In Georgia, a “feral hog” is defined in the state code (O.C.G.A. §27-1-2. Definitions) as “any hog which has lived any part of its life in a wild, free-ranging state and is currently in such state or has been taken”. Taking means killing, capturing, destroying, catching, or seizing – in every day terms this means, simply, possession. If the animal is in your possession (with or without control) it has been “taken”. Terms such as feral hog, wild hog, feral pig, feral swine, wild pig and others are interchangeable to the public and refer to the same biological organism.

Biological Factors. Four biological factors are the main reasons for the rapid growth of wild pig populations -

- high reproductive potential,
- habitat generalization,
- wide range in diet, and
- low mortality rates

Reproduction. A major factor contributing to population growth of wild pigs is a short reproductive cycle and large litter sizes. In its native range, the wild boar has the highest reproductive rate of any ungulate (hooved mammal) of its size. Once domesticated, breeding stock were manipulated by farmers and breeders for thousands of years to further enhance their high reproductive potential. Historically, wild pigs were the result of escaped or intentionally released domesticated stock that were bred for the purposes of commercial production. While large litters were an ideal trait in a domestic hog, this characteristic has persisted in feral strains and is a major reason for the explosion of wild pig population.

Wild pigs have a gestation period between 112 and 115 days, or about 16 weeks. Females (sows) can begin to reproduce at 4-6 months of age but this is rare. Generally, reproduction begins around 10-11 months for sows but males can be reproductively active at 5-7 months. Although a sow may give birth to only one litter per year, numerous studies have documented two litters per year. Under ideal conditions, a sow can produce five litters in just two years. However, the average litter frequency is 1.5 litters per year or three litters in 2 years. Litter size can vary from 3-13 young but an average of 4 to 6 piglets per litter is most common (Figure 1.2).

Figure 1.2: A sounder of wild pigs under a game feeder. A sounder often consists of 2 to 3 adult females and their offspring. Like any successful invasive species, wild pigs are very adaptable and non-specific in their habitat and diet requirements.



Habitat. Another trait that has made wild pigs highly successful in expanding throughout the United States is their ability to utilize a variety of habitats. These animals are highly adaptable and inhabit mountainous areas, forests, salt and brackish swamps and marshes, old growth pinelands, semi-arid brush habitats, and many other habitats. Research shows that pigs are most consistently found in moist areas unless mast (acorns and other nuts) are unavailable in the leaf litter, in which case they will inhabit any available habitat with a food source.

Wild pigs are highly mobile and nomadic. This has allowed wild pigs to colonize at least 42 of the 50 states since their introduction to the United States (Figure 1.3). Wild pig populations are high, growing, and at uncontrollable densities from Texas east to Florida and north to Virginia. Populations of wild pigs have been historically present in California, Hawaii, Puerto Rico, and the Virgin Islands. Uncontrolled mid-western populations have also been established in Kansas and Oklahoma.

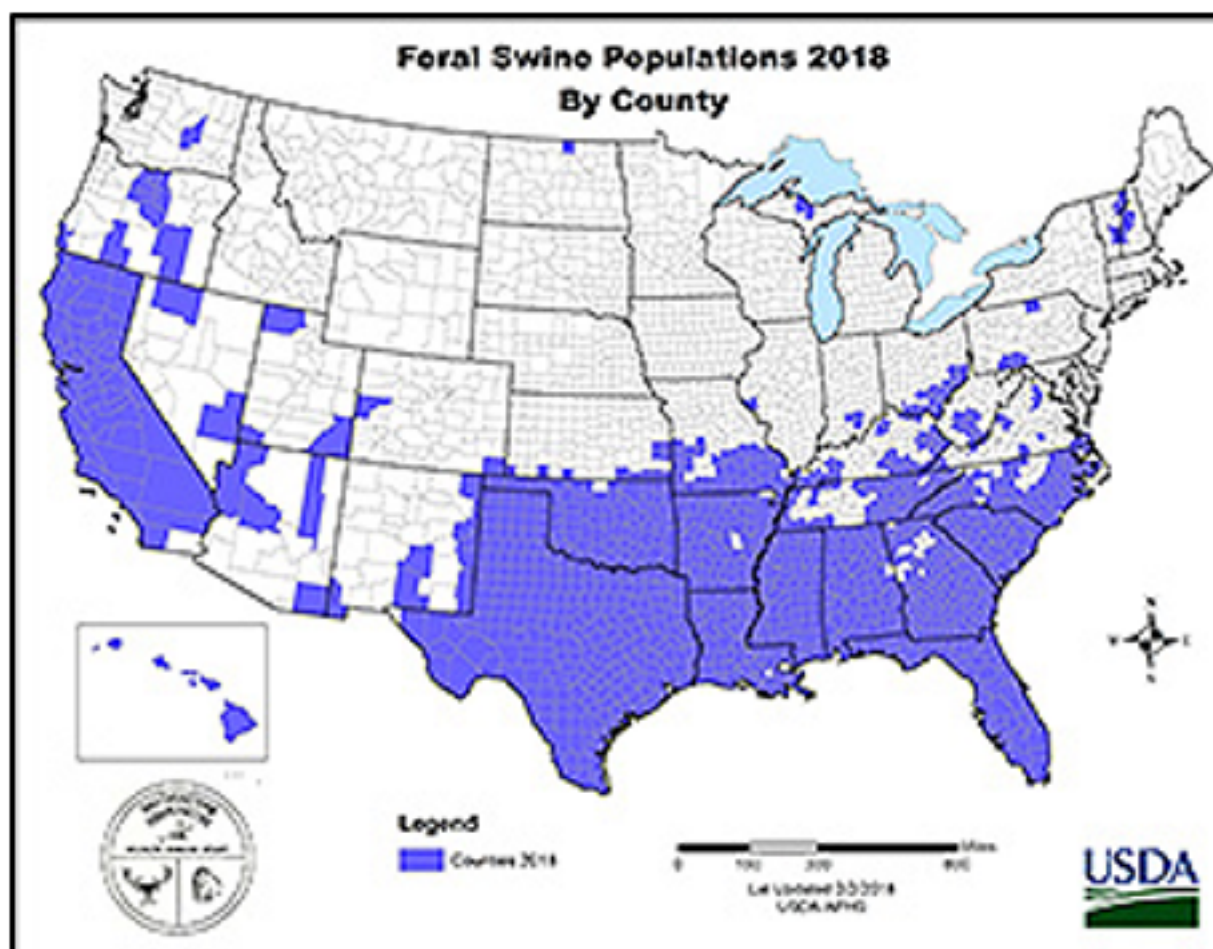


Figure 1.3: States that have reported the presence of wild pigs in 2018 (USDA APHIS History of feral swine in the Americas; (<https://www.aphis.usda.gov/aphis/home/>) Accessed on 20 December 2019).

Diet. Part of what makes wild pigs so adaptable is their wide-ranging diet. Wild pigs are opportunistic omnivores. This means they will consume almost anything from mast crops (acorns and fruit) and agricultural crops to grub worms and carrion (dead ani-

mals). Though not normally thought of as predators, they will opportunistically consume deer fawns, eggs of ground nesting birds, young sea turtles, roots and tubers, grass, herbaceous plants, and other food items.

The carnivorous portion of the wild pigs' diet is generally small (less than 2% of the annual diet in most studies). However, earthworms make up approximately fifty to ninety percent of the carnivorous portion of the wild pig's diet, depending on availability and region inhabited. The volume of earthworms consumed by wild pigs has been shown to decrease during the winter and dryer months. This is due to the difficulty of accessing this food source deeper in dry soils. Consumption of small mammals tends to increase during the winter months due to a lack of earthworms. Wild pigs will consume newborn calves, kids, lambs, and fawns. They will kill and consume wounded deer and carrion.

Diet varies seasonally. A seasonal change in the utilization of above-ground and below-ground components of plants corresponds to the plant's availability during different seasons. The roots of a plant will often be consumed by wild pigs when the leafy portion or fruits/nuts are no longer available. Grass can be an important dietary item in the spring and summer. When available, acorns, beach nuts, pecans, are consumed throughout the fall and winter. Soft mast or fruit is consumed throughout the year. In some cases, the roots of plants may be preferred, such as peanuts, potatoes, carrots, sweet potatoes, and many wild plant species.

Mortality Rates. Males, especially larger boars, are usually solitary (Figure 1.4).

Groups of wild pigs traveling together are called sounders which consist of two or more related adult females and their offspring. Sounders can number 30 or more animals. Often members of a sounder will exhibit cooperative nursing. Piglets from all the females will suckle from one sow while the others stand watch for predators. This group behavior can be considered a contributing factor to their low mortality rates (Figure 1.5).



Figure 1.4. Solitary boar hog feeding on acorns.

Wild pigs are most susceptible to predation when they are piglets, falling victim to alligators, black bears, coyotes, and other predators. However, few are lost to predation due to the protection afforded them by the sounder. Beyond this stage of life, the only true predator wild pigs face are humans through hunting, trapping, and automobile collisions. In a recent South Carolina study, 71 piglets between 2.2 and 6.6 pounds (1-3 kg) were radio tagged. Eleven died within 2 days probably as a result of handling and tagging. Of the 60 remaining piglets, only 3 died during the study (up to 160 days before the tags fell off or the batteries failed). That is an incredible 95% survival during the study for piglets at least two weeks old. Of the 11 that died, evidence suggested that 10 (91%) were killed or scavenged by coyotes. Piglets that survive to 10 or more

pounds are fast, mobile, protected by their sows and not likely to succumb to predation.



Figure 1.5: A typical sounder group. There are 16 pigs in this photo.

Human Dimensions. The human dimension of wild pig management often brings about mixed emotions. Some people strongly oppose removing wild pigs. These individuals may include hog hunters and commercial hunters, trappers or hunting guides. On one side of the spectrum there are those who promote the eradication of these creatures whole heartedly. These people tend to be private landowners, farmers, and ranchers who have experienced wild pig related damage on their property. The University of Georgia 2015 Wild Pig Survey indicates that 79% of people do not enjoy having wild hogs on their property

(<https://www.warnell.uga.edu/sites/default/files/publications/WSFNR-16-23%20Mengk.pdf>)

In addition, the majority of those surveyed reported that they hunt hogs or allow pig hunting on their lands. The sudden appearance of wild pigs in a given area may be the direct result of the illegal translocation of hogs by hunters or private hunting guides trying to provide another species for hunters. Transporting and releasing wild hogs is illegal in Georgia. This will be discussed in greater detail in Section 4.

In the UGA Wild Pig Survey, respondents felt that the causes for increased wild hog populations in Georgia were due to lack of hunting pressure (54% of respondents), natural causes such as high reproduction (53%) and illegal release or transfer (43%).

With their tough snouts and well-developed neck muscles, wild pigs become nature's "bulldozers." With their persistent rooting and digging for food, the most common damage that these "bulldozers" cause is crop damage, destruction of homeowner's yards, and damage to wildlife habitat (Figure 1.6).

Figure 1.6. Typical destruction to a wildlife food plot caused by wild pig rooting. This damage can be created overnight.



In the UGA Wild Pig Survey, 79% of respondents noticed a decline in turkeys, 75% noticed a decline in deer, and 67% noticed a decline in quail. The majority (78%) felt the decline was, at least partly, due to wild pigs. In addition, destruction of farm ponds and livestock watering holes is also common when used by wild pigs for wallowing. Wild pigs also cause substantial damage to livestock fencing and food plots (Figure 6).

Predation on young livestock was mentioned earlier in the section on diet, but wild pigs also indirectly affect livestock. Wild pigs are known to gorge themselves on feed, which not only takes food directly from livestock, but could also damage feeders and potentially spread disease. Wild pigs are also known to damage livestock fencing. Wild pigs are known to exclude deer from feeders which can have an indirect effect on deer populations and hunting opportunities.

In addition to effects on livestock and agricultural areas, wild pigs damage natural environmental areas and directly compete with other wildlife for food sources and habitat. Wildlife affected by wild pigs include, but are not limited to deer, turkey, foxes, quail, raccoons, squirrels, salamanders, small mammals, and waterfowl.

Wild pigs also contribute to the erosion of stream banks, forest floors, and road beds caused by their heavily traveled trails and wallowing patterns. Other wild pig effects include damage to trees and tree seedlings through tusking and foraging, water quality degradation (for example, contamination with *E. coli* bacteria), and changes to the struc-

ture of vegetation communities. Wild pigs are well known for their ability to quickly destroy a newly planted pine stand, especially longleaf pine.

Due to their highly destructive nature and rapid population growth, wild pigs are gaining increased attention from wildlife biologists, managers, and researchers across the country. It is important to acknowledge that complete eradication is probably impossible on the mainland of the United States. In areas where pigs are established in isolated pockets (such as on islands or isolated counties), local extermination may be possible. The best-case scenario is the prevention of further spread. Management goals should include development of management targets for current populations, preventing new occurrences of wild pigs by restricting or eliminating transport and release and local eradication where this is a feasible goal. The majority of today's management philosophy for wild pigs is centered on controlling current populations and preventing further range expansion or invasion of new areas.

When controlling wild pig populations, it is essential to choose the most effective control techniques possible. This often involves a tradeoff between recreation and effectiveness. In the Management Techniques (Section 2) portion of this manual, we will discuss a variety of control techniques and their effectiveness. We will cover topics such as sport hunting, night shooting, aerial shooting, and trapping.

Because we believe there exists a great deal of misleading and inaccurate information about wild pigs, this manual will inform the user about the biology and ecology of wild pigs. This manual will also instruct users in the proper techniques for successful wild pig management or local eradication. We hope this manual will refute or dispel sometimes widely available but inaccurate information about wild pigs.

The purpose of this manual is to explain the biology of wild pigs and provide management techniques that can be used to control populations and to mitigate the ongoing problems caused by wild pigs.

Management Techniques

There are a variety of management tools that can be employed to control wild pig populations. We can broadly characterize these as large-scale control and mop-up or small-scale control. We will review the different management techniques in this section.

Large scale control includes large corral traps or aerial gunning. Mop-up or small-scale control includes exclusion (fences), hunting with dogs, still hunting or shooting, baiting and shooting, and night shooting. A combination of methods may give the best control or be appropriate in specialized situations. For example, hunting with dogs may be an effective “mop-up” technique after other lethal control methods are applied. Night shooting may be the best technique to rapidly remove or harass pigs from a golf course. This section will cover some positives and negatives of each technique along with the effectiveness of each.

Our approach to wild pig management and control is the efficient application of whole-sounder removal using large corral traps as the first step in an integrated approach to local eradication. We are not suggesting wild pigs should be eliminated from every place they occur because this is both not feasible with current technology and complete eradication is not socially acceptable at this time. Future changes in public attitudes and improvement in technology are likely to change this goal.

A sounder is a group of pigs that travel together. Typically, boars (males) are solitary. Therefore, a sounder generally consists of one or more adult sows (females) and offspring. Sounders vary in number from just a few pigs to 25 or more.

In this section, we will first discuss large scale control options and then review management techniques suitable for smaller scale operations. Before we discuss specific control techniques, we will review some general guidelines for getting ready to undertake wild pig control.

Getting Ready

Scouting the area. For large properties there may be opportunity to set up multiple trap locations. When scouting any tract of land look for areas with a large amounts of pig sign (Figures 2.1a-d). This includes recent rooting, wallows, mud-rubs on trees, heavily used trails, and lots of tracks. The first places that should be checked are along river and creek bottoms as well as in swamps and marshes; especially during the summer months. Once an area with abundant wild pig activity has been located start prebaiting the site.



Figure 2.1a. Deer track. Image from Texas Parks & Wildlife

Figure 2.1b. Comparison of tracks. Image from Iowa State Extension.



Cow



Feral Hog



Deer



Figure 2.1c. Comparison of deer and wild pig tracks. Image from Indiana Wildlife.

Figure 2.1d. Wild pig track (Photo Credit: Mississippi State Extension)



Prebaiting. Some general guidelines include:

- Select an area where pig sign is obvious
- Place your bait of choice in an area sufficient to allow feeding without crowding – a game camera will be very useful to determine the number of pigs
- Check the pile daily wearing rubber boots to reduce human scent
- Replenish bait as needed as you slowly construct the trap (see section below on Trapping).

Regardless of the type of trap or other control method used there must be a prebaiting period.

Some bait recommendations include:

- Soured grain has the advantage of reducing the risk of catching non-target species (animals that are not meant to be caught).
- The pre-baiting period for trapping will last much longer than the time for trapping or shooting.
- The trap area needs to be pre-baited for sufficient time prior to placement of the trap to allow the sounder (group of pigs) to become accustomed to feeding in this area.
- Dry corn can be poured on the ground or it can be poured in a cut-out barrel, a broadcast feeder, or a pipe feeder.
- Sour corn must be poured on the ground rather than in a feeder.
- Prebaiting period should continue while the corral trap is constructed so the sounder continues to visit the trap site.

Prebaiting (Figure 2.2) is used to increase success with both day and nighttime shooting. While it is not required for either, prebaiting creates a central location for pigs to gather and allows for shooters to focus on one area. Since wild pigs are omnivorous there is a variety of things that can be used as food items including pelletized pig feed,

rotted produce, and soured corn. Whole corn and pelletized baits can be used in broadcast game feeders or in gravity feeders.

Figure 2.2. Soured corn can be used as bait for wild pigs. Spreading the soured corn on the ground allows for the aroma to be carried by the wind. Dry feed corn can be used inside a game feeder for prolonged attraction.



Making soured corn (Figure 2.2). Follow this simple recipe:

- Buy a 50-pound bag of whole kernel corn from local feed store
- Fill a 5-gallon bucket half full of corn
- Fill the bucket with water so that its 2-3 inches above the corn
- Stir well using a stick
- Put a lid on the bucket and sit it in the sun for 3-5 days
- Check daily and add water as needed to keep the corn submerged. If it dries out it will either sprout or mold.

NOTE: some people like to add a package or two of Jell-O powder or fruit jelly. Some trappers claim that strawberry jelly or Jell-O powder increases bait acceptance by wild pigs. We know of no study that supports or disputes this claim. It seems to be solely a matter of individual experience or preference.

Prebaiting may need to continue for several days up to 2 weeks prior to establishing the trap or initiating a shooting program produces the greatest success. It gives pigs plenty of time to adjust to their new surroundings. Allow the pigs to determine the pre-baiting and trap building schedule. The objective is to keep the pigs coming to the area and allow them to become comfortable with the surroundings while the trap is being constructed – especially when using a corral trap. Prebaiting (and trap construction) speed is dictated by the pigs. The goal is to attract a sounder of wild pigs and keep them returning to the trap site while the trap is slowly constructed.

Trapping

Trapping and whole-sounder removal is the most effective method of reducing damage from wild pigs. It is often the most successful at reducing densities. This is attributed to the fact that multiple wild pigs can be removed at one time in an appropriate trap and it requires significantly less effort than most other control strategies. Trapping is more work-like and not recreational. Above all, trapping is a process and not a singular event. Successful trapping requires patience and skill.

Like any method, trapping has positive and negative aspects. Trapping may require more skill than shooting. It may require more patience and, because it is a passive activity, there is less excitement. The recommended trap is a large corral trap. This trap is circular to avoid any corners where pigs will bunch up, climb on each other, and escape from the top. Keeping the top open minimizes non-target capture. Animals like deer, turkey and bears can easily escape. Drop nets can be used and will be discussed later.

Once the pigs have started using the bait, begin by placing the trap door (if a corral trap) on the site. During prebaiting, keep the trap door tied open so that pigs can go in and out of the trap freely. Some camouflage on the door – pine branches work well – increase the comfort level of the pigs. A game camera can also be used and checked daily to determine how many pigs are coming to the trap site. Using a game camera allows you to determine the sounder size and this becomes your target group.

Build the trap slowly by introducing additional panels but not so quickly as to scare away the sounder. Using a game camera capable of transmitting pictures to your computer or cellphone will allow you to watch the pig's behavior and monitor their presence. If you introduce trap panels and the sounder stops visiting the bait site, do not add any additional panels until the sounder returns and begins to comfortably feed again. Then resume trap construction. Camouflage the door and panels with cut branches if necessary but keep the area as natural as possible – don't risk scaring the sounder with any elaborate construction to hide a trap.

Trapping can stimulate the most spirited arguments among people with wild pig problems. The most efficient trap design is a large corral trap (minimum 28 feet diameter). The preferred door design is a drop door (remote activated is best but animal activated can work). Door design is discussed below. Some poor trap designs (for example, metal cage with top; circular metal cage with top) and poor door designs (for example, rooster door and saloon door) exist and should be avoided. If traps are not set up properly, such as improper trigger placement, pigs will become trap shy and will not enter the trap. Wild pigs are intelligent animals and the slightest mistake made while trapping will result in avoidance of traps in future attempts.

Before using trapping as a method of control always check local hunting and trapping regulations or contact your state Wildlife Department. Trapping is legal in Georgia on private lands. When using trapping as a control strategy be sure to check traps daily; this is required by most state trapping regulations and it reduces the risk of damage to the trap by trapped pigs. Snaring wild pigs is illegal in Georgia. In Georgia, snares can only be set within 10 feet of water for beaver trapping only. Snares may be legal in your state.

WARNING. In many states, like Georgia, the use of snares to capture wild pigs is illegal.

Corral traps. Corral traps are the most successful style of trap for catching entire sounders of pigs. However, the success is also heavily determined by the style of door. Much of their success is attributed to openness of the trap. Wild pigs can see a great deal of open space within the trap and they are more likely to enter it. Semi-permanent traps are corral traps that can be disassembled easily and quickly and moved from one location to another. Due to their large sizes, a corral trap can utilize two doors—one on either end of the trap—to allow wild pigs to enter from two directions.

Corral traps (Figures 2.3) can be designed and constructed from individual panels and T-posts or purchased from several suppliers. When purchased from a commercial manufacturer, the traps typically consist of welded panels that are portable and often fit in the bed of a standard pickup truck. This feature makes them popular with professional trappers. They may be more expensive than homemade corrals. However, a solid homemade corral trap can be effective in whole-sounder pig removal if basic guidelines are followed.

Guidelines for building and using corral traps:

- Use 16-foot by 5-foot utility panels in a circular design. It is important, when constructing the corral, to avoid any corners where pigs may congregate, bunch up on top of one another and climb out of the trap.
- The 16-foot panels can be awkward to transport and therefore are used for a semi-permanent trap, but this reduces the flexibility to move the trap if the sounder changes its behavior.
- The 16-foot panels must be at least 5 feet tall.
- The 16-foot panels must have smaller openings (no more than 2-inch by 4-inch) at the bottom to prevent escape of piglets.
- Due to the trouble of modifying a cattle gate – these are rarely used as trap material.
- Gates should be at least 4-feet wide, but 8-feet is preferred.
- Utility panels are supported by steel T-posts driven at the points where the panels overlap and every 4-feet apart after.
- T-posts will also be used to secure the door.

- The recommended size for a corral trap is at least 26-feet in diameter and 30-32 feet in diameter preferred.
- It is very important to get the shape as close to round as possible and to secure the wire panels with an adequate number of T-posts.
- Wire the panels to the T-posts and securely wire each panel to one another.

Figure 2.3. A female wild pig inside of a corral trap. This is a unique trap set up in Baker County, Georgia. It is a smaller corral trap set up inside of a larger one. The sow is left inside to draw in other wild pigs. Photo taken by Ashley Warren.



Another corral trap based on a different design principle is one in which the entire trap is lifted when it is set. A high-quality camera system (still or video) allows the trapper to view the trap and release it when the sounder is inside (Figure 2.4). This design was developed by the Noble Foundation – a research center in Oklahoma. It is based on the principle of the drop net (discussed later).

Figure 2.4. Circular corral trap (i.e., Boar-Buster) in which the entire trap is lift on an included pulley system and drops once the sounder is inside. Mention of trade names is for illustration



Drop Nets. The use of drop nets is a new method of capturing wild pigs (Figures 2.5 and 2.6). It is a method that has traditionally been used for capturing wild turkeys, prairie chickens, and whitetail deer but has been modified to capture entire sounders of wild pigs. Recent studies at the Noble Foundation in Oklahoma have documented success in capturing wild pigs using drop nets (Figure 2.6). The Foundation attributes this success to reduced animal fear. This means that pigs do not associate the overhead canopy of the net with danger.



Figure 2.5. Wild pigs under a drop net at the Noble Foundations research site in Oklahoma County, Texas.

When drop nets are used for capturing wild pigs observe these guidelines:

- A 60-foot by 60-foot net with 4-inch mesh is suspended above ground using light weight steel tubing at each of the corners and one in the center.
- The corner posts are 10 to 12 feet tall and the center pole is 12 to 15 feet tall.
- Steel chains are stretched from the top of each pole and anchored to the ground using $\frac{3}{4}$ " steel rebar to provide support for each corner post.
- Each of the corner poles have a wench located in the center and pulley at the top.
- A steel cable is passed through the pulley to the winch; this mechanism is used to pull the corners and center of the net off the ground.
- A rope is tied to each corner of the net and fixed to the end of each of the steel cables.
- Each of these ropes are can be rigged with a blasting cap that when detonated cuts to cord in half, allowing the net to fall.

Either 16 or 18 gage thermostat wire can be used carry the charge needed to detonate the blasting caps. A wire needs to be run up each pole so that each blasting cap can be detonated simultaneously. A junction also needs to be made at the ground end of each wire and another wire should be run back to the detonator.

Newer, high tech trigger mechanisms utilize magnets to release the nets; however, they tend to be more expensive than those that use blasting caps. As with other methods of trapping, there must be a prebaiting period prior to setting the drop net up. Using soured corn during the prebaiting period will aid in reducing the chances of non-target species utilizing the area.

Using drop nets offers the advantage of capturing an entire sounder in a short period of time. However, drop nets require human presence at the trap site in order to trigger the net to fall. In addition to this, trapped pigs have to be dispatched immediately once captured to avoid damage to the net and the potential for pigs to escape.



Figure 2.6. Wild pigs under a drop net in Smoky Mountains National Park.

One trigger mechanism that is used is simply a hook through a metal ring, which releases when another rope is pulled. The rings are attached to the net corners: when a rope is pulled, the hook mechanism swivels up and the net falls. The correct set up can be seen on the right side of Figure 2.7.

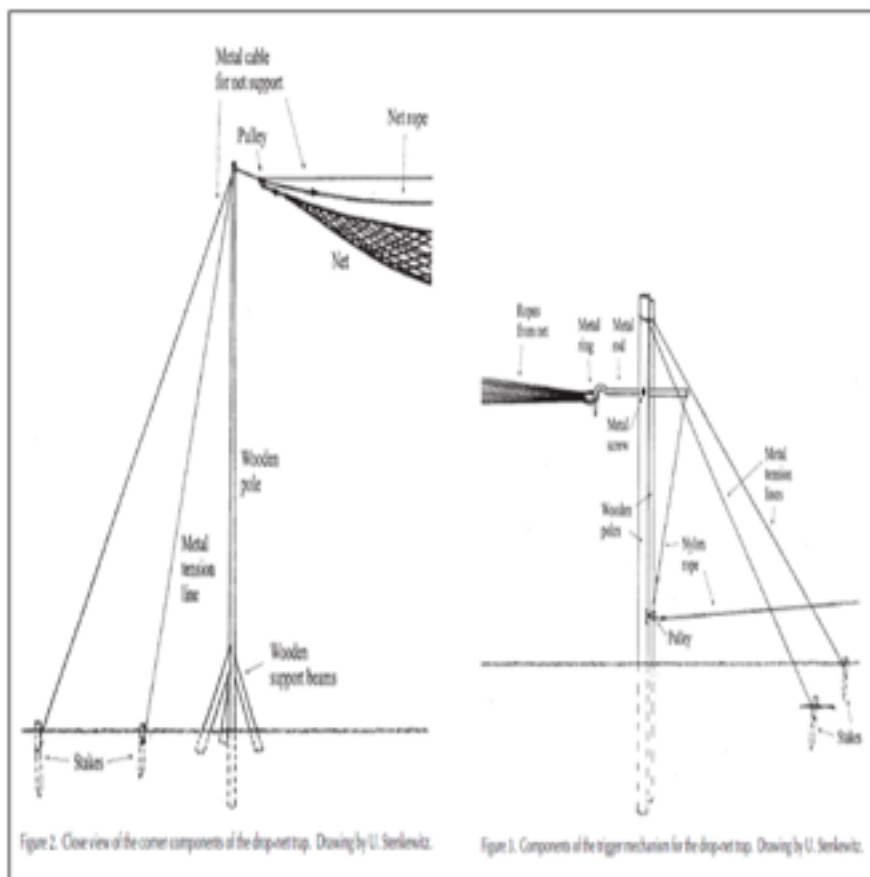


Figure 2.7. A diagram on the set up of the aluminum or steel poles used for a drop net with a simple hook and ring trigger mechanism.

Aerial gunning

Aerial gunning (Figure 2.8) is used in Texas and other open areas of the midwestern United States. It has limited usefulness in the forested regions typical of Georgia. However, it has recently been used on a few barrier islands. It is becoming more widely available in areas of Georgia with open canopy pine forests, large agricultural fields, and some bottomland areas during leaf-off season. It is unlikely to be effective in closed canopy forests during the leaf-on season. Currently, aerial gunning is used mainly by federal wildlife control agencies. Individuals interested in aerial gunning should contact the Georgia Wildlife Resource Division District Office of state headquarters.

Aerial gunning most often employs the use of a helicopter and shotguns or semi-automatic rifles. Rarely are fixed wing aircraft used. This method of control is often ef-

fective for remote areas with short vegetation where there is high visibility, fairly smooth topography, and mild weather conditions. This method works well in states like Texas, Oklahoma, and New Mexico. In areas with high wild pig densities, it can be highly effective and is selective; the high cost of the aircraft is often negated due to the high success rates associated with this type of control.

Figure 2.8. Shooting pigs from a helicopter with a semi-automatic rifle in the open range lands of Texas and other Western states. (americanhunter.org).



In 2007, USDA APHIS Wildlife Services programs in 23 states removed over 6,700 wild pigs using aerial gunning. More recently, Wildlife Services has increased the use of aerial gunning for wild pig control and expanded into new areas. Wildlife Services has successfully employed helicopters and aerial gunning across larger areas of Georgia. While no specific cost estimates are available at this time, the program is considered cost effective (dollars spent per animal removed) when factoring in labor for an intensive trapping program. Use of this technique will likely continue to increase in Georgia.

One study employed aerial shooting over a five-day period in Australia and reduced wild pig populations by 65-80 percent. Wild pigs modified their behavior to avoid detection from the helicopter. In a later Texas study, 31%, 56%, and 67% of the initial population was removed after one, two, and three flights, respectively. The number of pigs removed per hour varied from a low of 4 to a high of 23.8 and was related to habitat conditions – removal in open habitat was more efficient (less flying time per pig removed). A later study in Texas reported 27 wild pigs killed per hour of flying on one area and 9 removed per hour on a second area.

As a comparison, a trapping project in Kansas reported 16 hours per pig trapped. Not every aerial or trapping operation will have numbers like this but there will be a range of efficacy based on many factors. Surviving pigs continue to cause damage and potentially pose a disease risk. Aerial gunning may remove a large portion of a population, but it may be necessary to employ trapping or shooting to complete the removal. It is

interesting to note that radio-collared wild pigs increase their movements when pursued by helicopter, but they quickly return to their core area and home range. There is no evidence that aerial gunning forces wild pigs off property and onto adjacent landowners. This is good news for landowners that are not participating in an aerial gunning operation.

The efficacy of aerial gunning is density and habitat dependent. Locating large groups of pigs in open landscapes makes this method feasible. However, widespread use of aerial gunning can alter pig behavior to nocturnal activity periods. In that case, trapping remains a critical tool. The takeaway message with aerial gunning is that it can be effective at removing many pigs at low individual cost, but it also has limitations. Furthermore, aerial shooting requires trained professionals to implement, may require special licenses and permits, and cannot be used in thickly forested or residential areas. Aerial gunning in open canopy pine stands may be suitable but dense, leaf-on hardwood stands will likely limit visibility of pigs.

Next we will discuss wild pig control methods that are often employed in specific situations for mop-up and final eradication. Additionally, we discuss other methods of wild pig removal. Most of these methods are small scale – resulting in the removal of one or a small number of wild pigs. Rarely, do these methods result in control. Sometimes these methods may actually make the problem worse. Shooting can scatter a sounder of pigs and make trapping efforts more difficult. Generally, when employing a trapping program, it is critical to shut down and halt all hunting, dog hunting, and shooting activities on the property where trapping is taking place. If possible, such activities should be halted on adjoining properties as well. This is where landowner to landowner cooperation and communication is critical.

Exclusion and Fencing

It is important to understand that the reproductive potential of wild pigs can be increased when they have access to supplemental feed – like corn (e.g., deer corn). This is why it is important to exclude wild pigs from your deer feeders. Exclusion of wild pigs involves fencing (Figure 2.9). It is relatively easy to exclude pigs from a deer feeder or other area if you construct a solid fence. The fence need only be 3 feet tall – deer can easily jump over this fence to access the feeder and you will be saving money by not feeding the pigs but instead getting the deer corn to the deer. This may help in reducing the reproductive capacity of the pigs as well.

Sometimes the goal may be to exclude wild pigs from a small area like a garden. This may also be used to separate backyard domestic pigs from feral or wild pigs. Fencing large fields, orchards, vineyards or other acreages is unlikely to be cost effective. However, airports and cemeteries are often fenced, and this can be effective if the fence is properly maintained. Fence construction and maintenance is expensive.

There are multiple designs for excluding wild pigs from small areas. Many fence materials (for example, wood, chain link fence, rigid panels, or barbed wire) are available. Common designs include wire mesh, electric strand, or a combination of the two (Figure 2.10). Fencing, done correctly, is a highly effective means of excluding wild pigs from small areas. Wild pigs are intelligent creatures and they can easily breach a poorly constructed fence. Before constructing a fence, it is important to weigh the costs and benefits. Wire mesh is generally recommended only for small areas like flower gardens, small crop fields, game feeders, and household yards. While there are several styles of fencing available there are few designs that completely exclude invasion by wild pigs.

Nonelectric fences should be constructed using net wire or diamond mesh (chain link) with a maximum mesh size of 6 inches. However, smaller mesh size will prevent piglets from squeezing through. Some fence panels have smaller mesh at the bottom and larger openings toward the top. This reduces cost yet still provides effective exclusion.

- Wire mesh with a 2-inch spacing near the bottom and increasing to larger spacing 2 feet off the ground generally prevents small piglets from entering the area. These are often called feedlot panels and typically start with 2-inch spacing near the ground and increase to 4-inch spacing then 6-inch spacing near the top. Panels are typically 48-, 50-, or 52-inches tall.
- Use either pressure treated 4-inch by 4-inch posts, locust posts, or steel T-posts every 8-10 feet apart.
- Posts should be a minimum of 6 feet tall and sunk a minimum of 20 inches in the ground for wooden post and 10 inches for steel T-posts.

The mesh should be stretched tight enough to eliminate sagging; this allows for flexibility in case a wild pig was to charge the fence.

- Fence height should be a minimum of 48 inches but 60-inch (5 feet) is much better.
- To prevent persistent wild pigs from burrowing under the fence, bury the bottom of the wire 12 inches below ground surface.
- This behavior can also be prevented by adding an electric strand 8 to 12 inches off the ground on the outside of the fence.



Figure 2.9. An example of a non-electric wild pig exclusion fence built by 50yearfence.com.

With all wildlife exclusion fences using wire mesh, the fence must be tight to the ground.

- Pay close attention to slight changes in topography.
- Regular maintenance to remove fallen trees or limbs is required.

Stranded wire fences used in conjunction with electric fence chargers are less effective than mesh wire fences; however, they are much cheaper to construct. One study in Texas found that 3 strand electric fences reduced wild pig invasion by 50 percent as compared to 1 strand fence.

When constructing an electric fence follow these guidelines:

- Use steel T-posts or locust posts.
- Plastic insulators, either nail on or snap on, are also required along with a minimum of 14-gauge galvanized steel wire (NOTE: the larger the fenced area the larger the wire gauge needs to be to account for voltage drop—either a 12 or a 10 gauge).
- A high output fence charger is also needed along with an 8-foot ground rod and clamp.
- The bottom strand should be a maximum of 8 inches off the ground.
- There should be a 12-inch spread between strands for a three-wire system and 18 inches for a two-wire system (Figure 9).

Stranded wire fences are cheaper to construct than mesh wire. However, they also tend to be more labor intensive in the long run because they require a lot of maintenance to prevent vegetation from growing on it and grounding it out. There are many fence designs. Other publications and Internet sources discuss designs in more detail.



Figure 2.10. A multi-purpose electric fence which is designed to exclude both wild pigs and whitetail deer. Image from the Georgia Peanut Commission.

Hunting with dogs

Hunting with dogs, while popular in some areas, is ineffective at reducing wild pig populations (Figure 2.11). Dog hunting can greatly increase the chances of locating groups of wild pigs. However, this method can be expensive due to the initial cost of dogs and veterinary expenses due to injuries caused by wild pigs goring and biting the dogs. Usually only one or two wild pigs is captured so this method is time intensive and not effective in controlling a large population or area.

This method of hunting involves a team of dogs; bay dogs, scent trailers and catch dogs. This method will not control or eradicate wild pigs. This method should be used only as a last resort to “mop-up” after effective, whole sounder trapping. Hunting with dogs is primarily a recreational activity. This is not an effective choice for initial control. Rarely are more than one or two pigs taken. Failure to remove the entire sounder only educates the remaining pigs and makes them more difficult to trap. Dog hunting must be stopped while trapping is underway. This may include working with neighbors to stop their dog hunting as well.

- The catch dogs typically wear either a thick leather vest or a Kevlar vest to help prevent injury.
- Scent trailers are normally some breed of hound dog. They follow the scent of a until they locate it; at this point they bay loudly so that the hunter can find them.
- The hunter, who is usually on horseback or on an all - terrain vehicle, releases the catch dogs.
- Catch dogs are most often a boxer breed. These dogs grab the pig by the ear and hold it in place until the hunter can get there to dispatch the pig.



Figure 2.11. Catch dogs taking down a wild pig. The lead dog most often controls the pig by grabbing it by the ear and pulling its head down while the other dogs hobble the animal by grabbing it by its legs (easttexasdoghoppers.com).

Shooting and Hunting

Shooting and hunting incorporates traditional still hunting and night shooting. Shooting and hunting are not the same. Shooting may be defined as using a weapon (rifle, shotgun, bow and arrow) to remove an individual animal. Shooting requires skill and ethics but may be done with depredation permits outside of legal hunting seasons. Shooting may focus on offending animals and is more work-like or routine. Shooting may be effective in situations requiring immediate results - for example, on a golf course or cemetery. Shooting may be temporarily effective in hazing pigs away from an area such as a newly planted field. This may be necessary when a 1-2 week trapping program cannot be implemented due to time constraints. However, shooting a few pigs to remove or haze them is only a temporary measure.

Hunting has a long tradition in America and elsewhere. It involves training, ethics, fair chase, legal seasons, licenses and more. It is a recreational and social activity. Each of these methods has advantages and disadvantages and requires excellent marksmanship for quick, humane kills.

Whenever using shooting or hunting as a means of control the following guidelines may apply:

- Head shots provide the quickest death and minimize the need for tracking.
- Target the adults of a sounder first. If an older pig falls in its tracks most of the time younger individuals will not break and run.
- Most states have very liberal regulations for wild pigs on private property, allowing harvest to occur year-round.
- Be sure to follow state game laws whenever using any of these methods.

Sport Hunting. Sport hunting is commonly used in many areas across the United States as a method to reduce wild pig populations. It can provide extra revenue in the form of lease fees for many farmers, ranchers, and private landowners. Hunters often use archery equipment, high powered centerfire rifles, shotguns loaded with buckshot, or muzzleloaders.

While this type of control can be fun and exciting for hunters, it is limited in success because only a small number of pigs are taken at one time. To encourage the availability of hunting land, Georgia has enacted two liability laws to protect landowners who allow access to their land for hunting. The following is a passage taken from the Georgia Wildlife Resources Division website (<https://georgiawildlife.com/landowners>).

To encourage landowners to make their lands available for public recreational purposes, including hunting and fishing, Georgia law (OCGA 51-3-20 through 51-3-26) explicitly shields landowners from civil liability for injuries to persons who use their land for recreational purposes without charge unless the landowner willfully or maliciously fails to guard against or warn of a dangerous condition, use, structure, or activity. Landowners will not be liable unless they violate this standard of care. Georgia Courts have interpreted this reasonable standard of care as the “duty of slight care” which is lower than that of ordinary care.

Georgia law (OCGA 27-3-1) further extends this protection to landowners, lessees of land, or lessees of hunting rights who have permission to hunt on their property with or without charge.

Remember:

- Hunting as a method of management is often useful in remote, inaccessible areas.
- It is often difficult to employ in urban and suburban areas.
- It tends to be selective to adult wild pigs and removal of these individuals alone is typically not enough to reduce pig densities.

- Part of this can be attributed to learned behavior exhibited by wild pigs. Wild pigs are intelligent creatures and under heavy hunting pressure they will often become nocturnal and learn to avoid humans all together.

Night shooting. Once wild pigs become nocturnal, traditional hunting and shooting become less effective as a management tool. At this point night shooting comes into play. Night shooting employs the use of bait and specialized equipment such as spotlights, motion detecting floodlights, night vision goggles, telescopic sights (both regular optical and thermal imaging), and sound suppressed weapons.

Before utilizing night shooting as a means of wild pig control:

- Check state and local regulations on what equipment or lights can and cannot be used.
- Suppressed weapons require special permitting and there may be other equipment restrictions.
- Several private companies offer night hunting opportunities. However, they are expensive (over \$200 per hunter per night) and generally result in the removal of very few animals.
- Night hunting may include the use of thermal imaging optics and high-capacity magazines on semi-automatic rifles.
- Baiting can be used to increase success.

Spotlighting. The oldest means of night shooting utilizes spotlights and traditional rifles and scopes. Typically spotlights between 1 and 5 million candlepower (or 900-1000 lumens) are used. These lights are fairly inexpensive - ranging between \$30 for a basic hand-held style and \$150 for scope mounted versions. While spotlight technology has improved with the development of LED bulbs, they tend to have a focused beam which can only illuminate one or two animals at a time. Plus, the constant turning on and off could spook pigs and deter them from coming to the bait.

In Georgia, a light must be carried by the person, attached to a belt system or to a hat worn by the hunter. There is no voltage restriction on lights used to night hunting wild pigs in Georgia.

Solar powered motion detection floodlights. An alternative to traditional spotlights carried by the hunter is solar powered motion detection floodlights (Figure 2.12). These can be used with night shooting from tree stands often over bait. These lights range in cost depending on brand and lumen output. They operate from long-lasting batteries or a solar panel that charges a battery during the day. The light can be mounted on a 4-inch by 4-inch pressure treated post between 10 and 12 feet tall or to a tree with the light and motion detector facing down on the bait. The beam created by the flood head

can be up to 350 square feet (approximately 17-feet by 17-feet), depending on how high the fixture is mounted. Some lights have multiple settings that allow the bulb to stay on for 1, 3, or 5 minutes. During prebaiting, the light can be set for five-minute intervals to allow wild pigs to become accustomed to it.

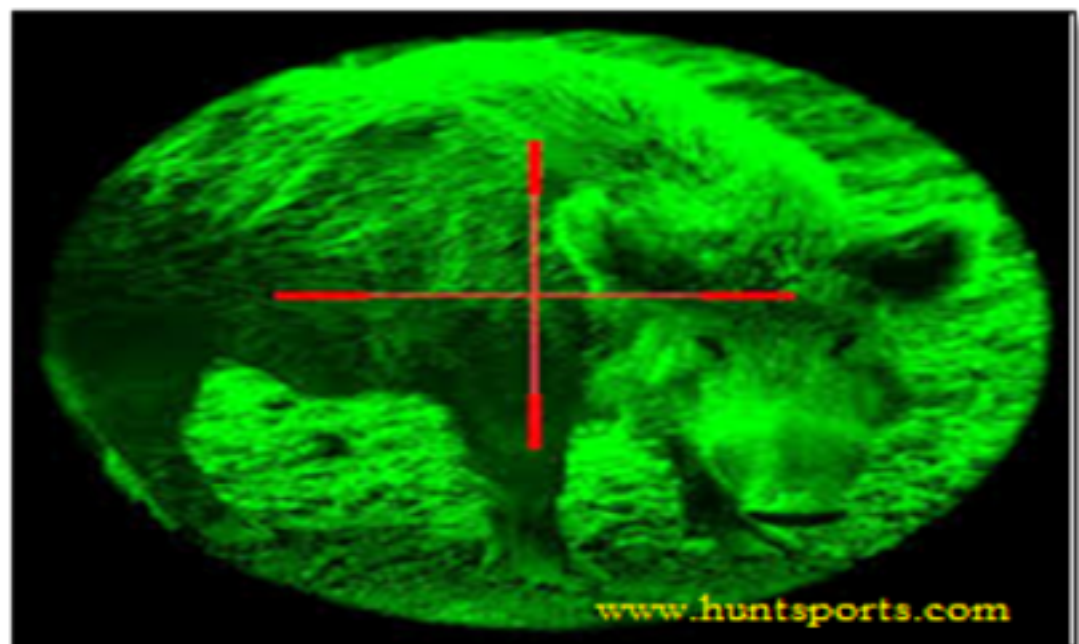


Figure 2.12. Night light with motion detection. This model can operate for up to one year on 3 D-cell batteries. Other versions have solar powered battery chargers.

Night vision technology. Spotlight and motion detecting floodlights are fairly low tech, inexpensive, and often limited to baited areas. Night vision goggles and scopes have made their way onto the public market from military development in recent years.

While this technology works best with bait it can be used remove multiple pigs feeding in open terrain. This equipment allows shooters to get fairly close to a group of pigs using the dark of night to their advantage. However, night vision optics tends to be fairly expensive with costs ranging from \$300 to \$5,000. There are two types of night vision optics available; near-infrared light and thermal imaging. Near-infrared light has been on the public market longer than thermal imaging, but initial costs can still come in at \$200 or more for low-resolution optics. This technology works by collecting and concentrating light, including a portion of the infrared spectrum invisible to the human eye. Incoming light particles hit a photoelectric plate inside the device and react by freeing electrons for each photon that strikes it. The electrons pass a photomultiplier, producing more electrons by using an electrical current to propel them down a tube. The electrons strike a phosphor screen, creating a reaction that makes light which is visible to the human eye (Figure 2.13).

Figure 2.13. Infrared scope image of a wild pig.



Most people identify this technology by the characteristic green images produced in the eyepiece. Early models produced for public use had very poor resolution and images were often blurred and unclear. Today's models can provide very clear images.

Thermal imaging is a newer technology and very expensive (Figure 2.14). Devices start at around \$2,000 for simple models. This type of night vision technology works by creating images from heat rather than light. The device captures a portion of the infrared spectrum. All objects in the environment have a certain temperature and radiate waves of energy known as infrared radiation. Hot objects produce more energy than cold objects. Heat signatures of warm bodied animals appear as white images in the scope because they radiate more heat than their cold backgrounds. Objects such as rocks absorb heat during the day and reflect heat at night. They can also be seen by thermal imaging viewers.

Since the equipment works by capturing heat energy no light source is required to operate the device. Like near-infrared optics, early thermal imaging devices produced poor image quality but the best models on the market today can detect heat sources from up to a mile away with some equipment. This means that a shooter does not have to be close to kill a wild pig in an open space. However, due to the high cost of this type of equipment it is not cost-effective for the average landowner or most wildlife removal businesses to use them. Despite the high cost, many hunters and control companies have thermal optics. This drives up the per pig cost of removal yet still only removes small numbers of animals. Ultimately, thermal hunting equipment contributes very little to the overall goal of wild pig eradication on a specific property.

Shooting over bait. As the name implies this management tool employs the use of bait. An area where wild pig sign is prevalent is prebaited consistently to get the sounder comfortable with visiting the site. Longer pre-baiting (up to a week) is better than a shorter time. Shooting over bait can be done during the day or at night from a tree stand or on the ground from a distance. Baiting is legal for hunting wild pigs in

Georgia on private land (owned by the hunter) or on other private land with written permission of the landowner.

Shooting generally takes only a few pigs in the sounder and educates the others. They may quickly learn to avoid bait making them more difficult to trap. For this reason, trapping should be used first and shooting (any form) should be employed only as a mop-up procedure. Shooting should be stopped on adjacent properties, if possible, while intensive trapping is in progress.

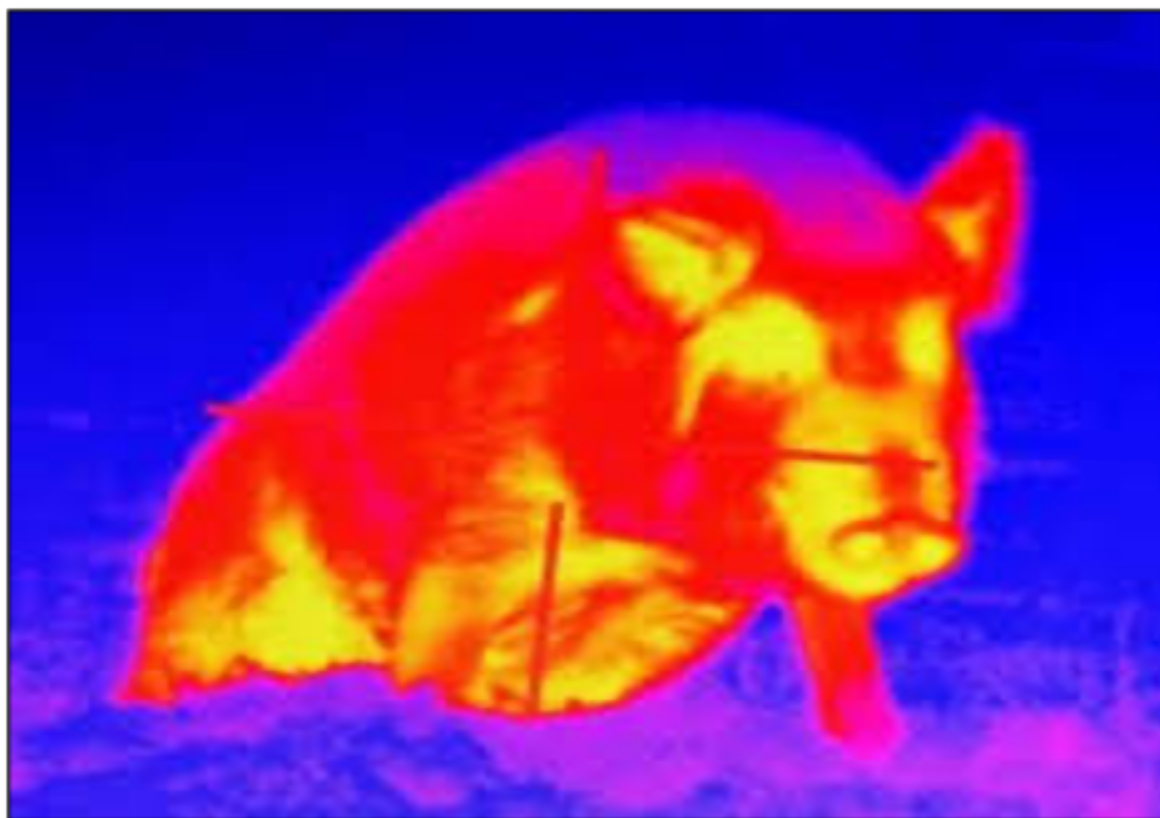


Figure 2.14. Actual thermal image of a wild pig as seen through thermal imaging optics.

Cage or Box traps. These traps (Figures 2.15, 2.16, and 2.17) have the advantage of being portable so they can easily be moved to different locations on your property. However, these traps can catch only a few pigs and are not effective in whole sounder removal. Though inefficient at capturing multiple pigs, they are probably the most common trap type used by landowners or individuals attempting to capture a few wild pigs. They remain popular with some landowners because they are inexpensive. However, the cost and efficiency of a corral trap almost always warrants its use instead of a box or cage trap. Steel framed cage traps are often available for sale commercially and also comes in circular designs—circular models tend to be the strongest because they lack corners which are weak points.

Cage traps can be constructed entirely out of wood, have a wood frame wrapped in heavy gauge wire livestock panels, or with a steel frame with the livestock panels welded to the frame. These traps often have a wire bottom – especially if purchased from farm supply dealers. Stepping on or walking on a wire bottom is very unnatural to a wild pig. Wild pigs are often reluctant to enter a fully enclosed cage trap. Some trappers spend considerable time covering or hiding the wire bottom which increases set-up time and reduces the efficacy of the design.

Cage traps with wire tops are detrimental to non-target animals like bears, deer, turkeys or even alligators. Releasing a large, dangerous non-target animal from a cage trap can pose a serious risk to the trapper. White-tailed deer often experience so much stress from confinement in a cage trap that they die within a day or two of release. The condition is called capture myopathy and is widely document in white-tailed deer. Hunting clubs managing for large deer should be aware of this risk.



Figure 2.15: Wooden box trap constructed out of decking boards and pressure treated lumber with a wood drop door. Notice the tall wooden threshold at the door. This will limit entry by pigs and should not be used. Photo by author.

Figure 2.16. Steel framed rectangular cage trap. Steel cage traps with floors and with or without a top are NOT recommended trapping.



Box traps are generally constructed of pressure treated lumber. They are heavy and cumbersome but can be designed in a way that allows disassembly into four pieces for transport and construction on site. They should be constructed without any top, floor or door threshold (Figure 2.15). They should be located on level ground and may be secured to the ground with stakes. Guidelines for building and using a wooden box trap follow -

- The panels of an all wood box trap can be built in a shop and transported to the trap site where it can be assembled. This makes it easier for one person to set it up.
- To be portable, wooden box traps should be the size of the bed of a pick-up truck—5 feet tall, 8 feet long, and 4 feet wide.
- Side boards should be narrowly spaced at the bottom (2 inches apart) and can be wider spaced (6-7 inches) near the top.
- It is best to build box traps without a bottom. Pigs do not like to stand on wire or wood.
- It is very important to be sure the bottom edges of the side rails are flush against the ground. This will prevent a wild pig from getting its snout underneath it.
- Be sure to drive steel T-posts at the corners of the trap and wire the trap to them using bailing wire; this will prevent wild pigs from lifting the edge of the trap and escaping.

Door Designs

There are two main categories of trap doors; single catch and multiple catch. Triggers can be either animal or human activated. We will discuss door design first and triggers later. Door design is certain to create the most heated discussion among pig trappers and wild pig control experts. While once popular, multiple catch doors have generally fallen out of favor and are not recommended. Multi-catch doors are often too narrow – under 4 feet. Examples of multi-catch doors are so-called rooster doors or saloon doors. The principal is that pigs can continually enter the trap through the swinging door but, once inside, cannot escape. Research and video surveillance have suggested several flaws. Wild pigs do not like steel brushing along their sides or backs and may be reluctant to push in through a swinging door. Also, entry of a large pig may provide a sufficient opening for smaller pigs already in the trap to escape. For these reasons and others, multiple catch doors are not recommended and will not be discussed further.

Single catch doors. These are so named because once the trigger has been tripped no more pigs can enter the trap. The phrase - single catch door – does not mean only one pig will be caught. Rather, it means that each time the door closes this is a single capture event. Multiple pigs may enter the trap prior to door closure.

Most single catch doors use a guillotine or drop design to close the trap. Most guillotine gates (Figure 2.18) are constructed of wood, using 2" X 4" channel frame and ¾" plywood for the actual door. Often, the door can be doubled plywood giving 1 ½" for added strength.

Construction of a drop or guillotine door is relatively simple and inexpensive. Details for construction are given at the end of this Section. This style of door can be used with box traps or will corral traps. The essential feature is that the trigger is animal activated. That means, once it is set and the trap baited, the trapper has no control over the trap. Non-target animals could trip the door. In the case of an open-top corral or box, the non-target can easily escape but the trap is no longer available for the target – wild pigs.

Most traps and door combinations are limited in the number of pigs that can be trapped during any given trapping period. It is essential to properly pre-bait, bait, and strategically locate the trigger mechanism so that the majority of the sounder will enter the trap before the door falls. When using a drop door or guillotine gate design it important to place the majority of your bait away from the trigger mechanism. Too much bait around the trigger may cause a pig to spring the trap before any other pig has a chance to enter.

Guidelines for building a drop door are:

- The frame should be at least 6 feet tall, but 8 feet is better for a trap with 4-foot sides.
- The door has a pulley mounted on an eye bolt on the top cross brace.
- A draw loop made of wire is mounted to the bottom of the door. This is for the rope used to hold the door up when the trap is set.
- Doors should be at least 4 feet tall and 4 feet wide – a quarter sheet of plywood ¾" thick.
- Doubling the plywood to 1 ½" thickness is better. If doubling, use high quality construction glue (outdoor and waterproof) and screws to bind the two sheets to prevent warping or twisting.
- The trigger is either a root stick or trip wire.

Building the channels:

1. Start with two 2"x4"x12' pressure treated boards; measure and cut four 6-foot sections out of the 2" X 4" boards.
2. Using a 1/8" drill bit, pre-drill 5 equally spaced pilot holes in each of the 6-foot 2" X 2" boards; this will keep them from splitting whenever running screws through them.
3. Lay the 2" X 2" board along the edge of one of the 2" X 4" boards and attach it using the 2-inch deck screws.
4. Lay another 2" X 4" board on top of the 2" X 2" board and screw it down using the 2-inch deck screws. The first channel is now complete. Repeat this process for the second channel.
5. Once the second channel is assembled lay both of them on a flat surface and exactly 37" apart; this will allow space for swelling of the door. Measure the top and bottom exactly.
6. From the third 2" X 4" x 12' cut two sections long enough to span the door frame and allow a 5" overhang (approximately 49" each) and one section exactly the width of the door frame.
7. Place one at the top of the channels, the middle cross piece at 24" from the top, and the third cross piece at the bottom of the door when the door is in the raised position (Figure 2.18). DO NOT place any cross piece at the bottom of the frame on the ground.
8. Arrange them so that they have 5" of overhang on the top and bottom of the door; the middle cross piece should be flush with the door frame. Screw them down using the 3" deck screws—be sure not to allow the screws to pass into the channel.
9. Drill a 1/2" hole on the end of each of the lower two cross braces; this is where the gate will attach to the frame of the trap.
10. On the top support drill a 1/8" pilot hole in the middle of the board and twist the eye bolt into this hole with the pliers. Hang the pulley from the eye bolt using the S hook (Figures 2.18 and 2.19).
11. Drill a 1/2" pilot hole 1 inch from the bottom through the center of the plywood.
12. Fold the 10-gauge wire in half and pass one end through the hole. Bring the two ends of the wire together and using the lineman pliers twist them together.

13. Attach the 3/8" nylon rope through the pulley (Figure 2.19) and the loop formed by the 10-gauge wire. Don't allow the wire to get stuck in the frame. Ensure the door opens and closes smoothly.

14. Lubricating the wooden track by rubbing bar soap on them will help them slide smoothly.



Figure 2.18. A wooden guillotine door. Notice the rope guided through the pulley; this stops the rope from hanging up when closing.

Figure 2.19. A pulley and S hook used for guillotine gates.



Place a small amount of bait (the same bait used in pre-baiting) near the entrance to the trap. Place most of the bait in a circle or arc around the trap along the sides. Place only a small pile on or near the trigger. The objective is to lure as many pigs as possible into the trap and have the feed comfortably but away from the trigger. Don't use too much bait so the sounder stops feeding before they reach the trigger.

Trigger Mechanisms. The trigger can be constructed by driving two pieces of pipe or rebar into the ground at the back of the trap. The rebar should be about 10 inches apart and parallel to the door. A rope is attached to a stout stick that is then placed behind the rebar stakes. The door is run up along the back of the trap to a pulley attached to the top of the side wire and then run to the door (Figure 2.18). The tension of the door will keep the rope and stick held in place to the rebar (Figure 2.20). When a pig pushes or bumps the stick, it

will fall off the rebar. The rope will slide through the pulleys at the back of the trap and on the door and gravity will cause the door to rapidly fall. Once set and baited, kick the stick and rebar to ensure that the system fires and works as intended. The door must slide smoothly in the frame channels. Wax (or bar soap) rubbed on the channels helps insure smooth operation. Grease is not necessary.



Figure 2.20. A root-stick trigger.

Trip wires are lines or wires that are strung across the trap from the door to and routed around the outside of the trap, and tied to the triggering device on the trap door. Trip wires should be strung at the back of the trap at a minimum of 12 inches off of the ground. This height is designed to be tripped by an adult pig – small pigs fit under the wire and do not trip the door. This increases the chances that the first few little, naïve pigs don't run into the trap, hit the bait, release the door and scare away the large sow or sows that may be reluctant to enter the trap at first.

If it is tied lower than this, smaller pigs may trip the door prior to adults entering the trap or it may be tripped by non-target species like raccoons or opossums. Trip wire triggers work by pressure; the amount of force required to pull the pin, hook, or prop stick can be adjusted by tightening or loosening the line.

A marine snap shackle (Figure 2.21) can be purchased at any boating supply store. It has a fixed steel loop and a break-away steel loop that pulls apart once a certain amount of pressure is placed on it. Use a shackle with a 50 to 75-pound breaking load. This is the amount of pressure required to pull the break-away loop open. The parachute cord or string is tied to the break-away loop whenever the trigger mechanism is set up.

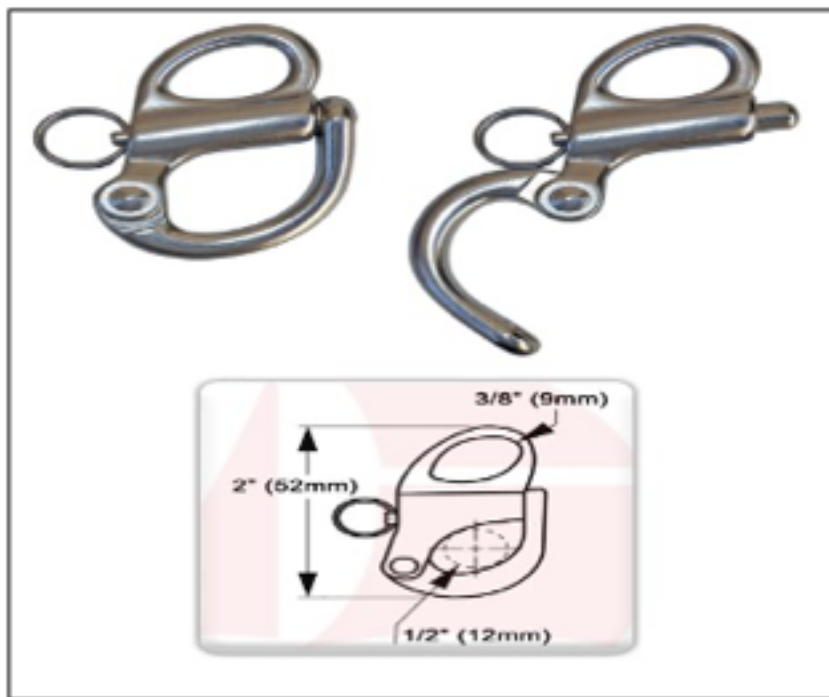


Figure 2.21. A marine snap shackle that can be used with a trip wire.

Commercial Doors. Several commercial companies have taken this door design to new levels. Some companies include (this is not an endorsement – names are for illustrative purposes only):

- Jager Pro Hog Control Systems, Columbus, GA
- Tusk Innovations, Conway, AR
- Wireless Traps, Dallas, TX

These companies market door and trigger mechanisms that are wireless. The door can be activated from a computer or cell phone in your home. This can be a major advantage over older systems of manual release from a hunting blind or a trip mechanism activated by the pigs. It virtually eliminates the need for regular trap checks. This human activated design has distinct advantages over the previously described animal activated design.

Advantages include less chance of trap closure by small pigs or just a few pigs, virtually no chance of trap closure by non-targets, and control of the process by the trapper. State trapping regulations still require daily trap checks but use of a camera to verify there are no animals in the trap is sufficient. Once the target animals (pigs) are inside the trap and the trapper confirms that the entire sounder group (verified from previous photographs) the trapper sends a signal to the control box and the door drops trapping the target animals inside the trap. The trapper then must visit the site in a short amount of time to humanely dispatch the captured pigs.

The primary disadvantages to remote control door systems are cost and the need for a strong cellular signal. The cost can range up to \$6,000 for a complete trap, door, control box and camera system. The cost is easily justified if one stops to consider the elements at stake. Research surveys in Georgia (2016) suggest that the average loss in-

curred by farmers and landowners exceeds \$14,000 per year. The remote-control trap can easily last 10 or more years and easily pays for itself 2-3 times in the first year alone. Financial returns over the life of the trap easily justify purchase and deployment in the fight against wild pigs.

The entire remote-control trap system (Figure 2.21) consists of numerous parts:

- Door (one required). Two doors can be used to facilitate entry by trap shy pigs, but the cost is higher and the logistics of getting both doors to drop at the same time can be a failure. One door should be sufficient for most landowners, but professionals may, occasionally use two doors.
- Panels (number depends on size of corral but 10-12 are typical to achieve the recommended 24-30-foot diameter corral).
- T-posts (7 feet long; spaced every 4 feet; 5 per 16-foot panel).
- Alternatively, new trap designs have interlocking panels secured with long pins that drop into pre-welded guides on the panels. This is much easier than the old designs that required driving T-posts.
- Camera (at least one).
- Trigger control box.
- Cellular system possibly with a booster antenna.



Figure 2.21. Remote controlled door design triggered by a cellular signal. This photo shows the trap door without the control box. The white object around the feeder was placed there to direct the corn to the ground to concentrate the pigs in the center of the trap. Photo by author.

One popular system utilizes a guillotine door that is triggered remotely via a computer or a cell phone. The system incorporates a camera with a transmitter. Whenever the camera senses motion in front of it either live video or a picture is taken and sent to the owner's computer and/or cell phone. At this point the owner can decide whether or not to send a signal that will close the gate (Figure 2.22).



Figure 2.22. Commercial trap door trigger control box. Example from Jager Pro for illustration only. Use does not imply endorsement.

Tips and Troubleshooting

Trapping is not an exact science. Every trap has advantages and disadvantages. Every trapper has tricks and tips to increase their success. It is important to be creative, to be innovative. If something is not working – bait, doors, trip stick – try something different. Trappers, farmers, landowners or others who are experiencing damage from wild pigs are encouraged to contact your local Cooperative Extension office, USDA APHIS Wildlife Services (Georgia - Phone: 706-546-5637 or Toll Free: 1-866-4USDAWS), or the Georgia Wildlife Resources Division (<https://georgiawildlife.com/about/contact>).

Disease Issues

This section will discuss some disease issues important to wild pig management and control. A great deal of additional information can be found in the references at the end of this section.

Along with physical destruction that wild pigs are well known for, there are many wild pig diseases of interest to hunters and landowners. Wild pigs are known to carry or transmit at least 30 diseases (viral and bacterial) as well as host a minimum of 37 parasites that can affect humans, pets, wildlife or other livestock. Wild pigs present a significant risk to the domestic pig population and pork industry. Introduction of certain diseases into the wild or domestic pig population would have severe economic consequences due to rapid and high pig mortality, loss of domestic and export markets for pork and pork products and quarantine regulations. Costs to quarantine herds, monitor disease progression, and treat infected animals would amount to many billions of dollars.

The capture and relocation of wild pigs without the proper testing is illegal in most states—including Georgia. Where feral hogs and livestock interact the best means of disease prevention is wild pig population control and exclusion of wild pigs from feeding and watering areas.

The National Wildlife Disease Program (NWDP) (USDA APHIS VS) tests wild pigs for three foreign and seven endemic (may be present in the US) diseases. The foreign diseases that are not present in the United States but are monitored include – classical swine fever, African swine fever, and foot-and-mouth disease. Domestic disease monitoring includes brucellosis and pseudorabies. If one of these diseases is suspected in wildlife call the Wildlife Services Hotline (866) 4 USDA WS (866-487-3297). In addition, if wild pigs are found dead, they can be submitted to the Southeastern Cooperative Wildlife Disease Study (SCWDS, <https://vet.uga.edu/scwds/>) for necropsy and diagnostic evaluation. Veterinarians at SCWDS work closely with USDA to monitor for foreign diseases as well. We will discuss a few of the more important diseases in this section.

Wild pig diseases that can infect humans—known as zoonotic diseases—include:

- brucellosis
- leptosporosis
- salmonellosis
- toxoplasmosis,
- sarcoptic mange

- tuberculosis
- tularemia
- anthrax
- E. coli
- trichinosis

Livestock, pets, and wildlife can develop:

- pseudorabies
- bovine tuberculosis
- classical swine fever
- swine brucellosis
- vesicular stomatitis

Damage caused by the many diseases spread by wild pigs is often financial in nature.

- Human (zoonotic) diseases are most often times treatable and often curable, but treatments and doctor visits can be expensive.
- Human (zoonotic) diseases can be difficult to diagnose.
- Diseases transmitted to livestock often cause financial damage to farmers and ranchers because they can cause death to livestock producing immediate financial loss.

Many of the diseases spread to livestock by wild pigs have historically been eradicated from domestic animals using vaccination, biosecurity, or good animal husbandry. Biosecurity, good animal husbandry and surveillance can prevent introduction of new diseases. However, a disease introduced by wild pigs can rapidly spread through livestock herds and wildlife populations, making it extremely costly, extremely difficult, and in some cases impossible to eliminate.

While there are multiple pathogens that can be spread by wild pigs, a full coverage of all of them is beyond the scope of this management guide. For the purposes of this manual we will focus on a few diseases that are most often encountered by hunters, farmers, and landowners as well as diseases that pose the greatest threat to human health. Additional information on these and other pathogens of wild pigs can be found in some references provided at the end of this section.

Most of the important diseases are caused by a bacteria or a virus. Other diseases are caused by a parasite or other causative agent. Most of the zoonotic pathogens are transmitted to humans when they are cleaning (field dressing) wild pigs or through consumption of undercooked meat or pork products.

Reportable diseases are considered to be of significant public health importance and are required to be reported when they are diagnosed. Some common reportable dis-

eases associated with wild pigs include: brucellosis, leptospirosis, trichinellosis, and possibly others. Certain diseases are added or removed from lists and some states have different reportable diseases so you should always check with state and federal agencies for a current list.

Brucellosis. Brucellosis is a bacterial disease that affects livestock or wild animals — primarily cattle, bison, elk, and swine — and humans. It is also known as abortion disease and other names. There are many species of *Brucella* and many strains of *Brucella suis* associated with swine. Swine brucellosis has been nearly eradicated from domestic pigs but wild pigs — especially in the southern United States — remain a reservoir for this pathogen.

Infection rates vary — up to 9% of wild pigs tested in South Carolina; 3.5% in Louisiana; 10% in Texas; 22% on some hunting areas in Arkansas. Up to 4% of wild pigs tested in Georgia were positive for *B. suis*. Humans get this disease through contact with blood, other fluids, and tissue of infected wild pigs. People can become ill if these products come in contact with your eyes, nose, mouth, or cut on your skin.

Diagnosis of brucellosis in humans is often difficult because it often resembles and shares symptoms with other illnesses. In some cases, symptoms may not become apparent for four to six months after initial infection. It requires a blood test and sometimes a tissue sample to confirm infection.

Patients often experience:

- Joint pain
- Reduced appetite
- Headaches
- Chills
- Weakness or fatigue.
- Infection can cause abortion in women and testicular pain in males.
- Patients may also experience weight loss, difficulty in breathing, chest pain, enlarged liver and/or spleen, and abdominal pain.

Brucellosis in livestock causes:

- Abortion or birth of weak offspring.
- Can cause a reduction in milk production.
- While not all infected cows abort, those that do usually abort between five and seven months into the pregnancy.
- Infected livestock usually abort once, but sometimes sequential abortions may occur in any given individual.
- Offspring born from later pregnancies are often weak and unhealthy.

- Though offspring appear healthy, infected livestock continue to harbor and spread infectious bacteria and should be treated as dangerous sources of the disease.
- Other signs of brucellosis include lowering of fertility with poor conception rates, retained afterbirths causing uterine infections, and (rarely) enlarged, arthritic joint.

Transmission of the *Brucella* bacteria often occurs due to direct contact with infected animals. Contact can be in the form of nose touching, licking, sexual contact, or grooming. Other ways for transmission include contact with an environment where an infected individual has urinated, given birth, or drank from a water tank or trough. Aborted fetuses, placental membranes or fluids, and other vaginal secretions present after an infected animal has aborted or calved are all highly contaminated with contagious bacteria. Livestock may lick placental fluids or the genital area of other animals or ingest the bacteria with contaminated food or water.

The general rule is that brucellosis is carried from one herd to another by an infected or exposed animal. For this reason, wild pigs should never be introduced or mixed with domestic herds unless they are tested and certified free of disease.

Human infection most often occurs through field dressing harvested feral hogs. Blood, guts and knife cuts are common avenues of exposure. Humans can also be infected through the consumption of undercooked meat.

There is no cure for brucellosis in humans—or animals—only treatments. Humans are treated with very high doses of antibiotics for extended periods to hopefully clear the infection. Wearing latex or rubber gloves while cleaning and butchering harvested pigs is an important precautionary measure for avoiding exposure. Also, make sure any meat consumed is thoroughly cooked. Cook to an internal temperature (use a meat thermometer) of 160° F.

Foot-and-Mouth Disease (FMD). This is a highly contagious viral disease of many wild and domestic mammals. Cloven-footed (split hooves; like deer, pigs, cattle, elk) are susceptible. Symptoms include fluid filled cysts or sacs (vesicles) on the feet, snout and in the mouth. In some countries, swine are frequently infected. Although FMD is not present in the US, proximity of wild pigs to domestic herds along the southern border warrant vigilance and USDA APHIS closely monitors for this disease.

Historically, there have been 9 FMD outbreaks in the United States. All outbreaks required very expensive eradication. The last US outbreak occurred in 1929 but all current livestock populations in the United States are highly susceptible to the disease.

Symptoms in swine may include vesicles (blister-like fluid sac) that quickly burst and cause excessive salivation (if in the mouth) or lameness (if on the feet). Other symptoms include open sores on the feet or snout, foamy or stringy saliva, loss of appetite,

abortions, weight loss. Humans do not contract FMD but can acquire a similar disease called hand, foot, and mouth disease that manifests as a skin rash of flat red spots, fever, sore throat and mouth sores.

Pseudorabies. This disease is caused by a herpes virus and importantly, this virus is not related to rabies virus. However, it does cause symptoms similar to rabies – convulsions, excessive salivation – and it does affect the central nervous system. This is why it is named ‘pseudo’ rabies. It is also known as Aujeszky’s disease and mad itch disease. Infection rates for pseudorabies virus among wild pigs are generally much higher than for *B. suis*. In fact, swine (including wild pigs) are the main host of this disease. Pseudorabies cannot be transmitted to humans. Infection in other animals such as cattle, sheep, cats, and dogs is almost always fatal. Pseudorabies can cause disease in domestic dogs and some wildlife species (e.g., Florida panthers).

Pseudorabies frequently causes abortions and mortality in mature sows. In domestic swine, it is often spread by asymptomatic carriers. This means a wild pig can have the disease but not show any signs of illness. The virus can survive on environmental objects and be transmitted on contaminated boots, trucks, tires, feed and equipment. Horses rarely get the disease; dogs and livestock are susceptible to infection. Young pigs are mostly severely infected and display signs of fever, vomiting, tremors, convulsions, and lack of coordination. Adult pigs rarely die from pseudorabies but display fever and upper respiratory tract inflammation. Infection in adult sows results in abortion or mummified fetuses

Studies have shown that up to 50% of wild pigs in Florida and 30% in some areas of South Carolina are infected with the virus that causes pseudorabies.

Pseudorabies is characterized by:

- Lesions in the central nervous system, respiratory system or reproductive system.
- In domestic hogs, clinical signs may vary from unnoticeable to infections that are often fatal.
- Young pigs less than four weeks of age often display symptoms including light fever, tremors, uncoordinated movements, convulsions, and death.
- Adults usually survive but often exhibit fever and upper respiratory inflammation.
- Infection of pregnant individuals often results in abortion of the fetus or still births.
- In wild populations the disease is rarely fatal.

When pseudorabies affects the central nervous system of other animals it causes loss of appetite, depression, staggering, spasms, and high mortality. It is also known as mad itch because it leads to self-mutilation as a result of persistent scratching and rubbing.

Pseudorabies is spread through:

- Contact with an infected individual's saliva or nasal discharges.
- Domestic livestock most often contract the disease from wild pig populations as a result of shared feed and watering troughs, as has been reported in Florida and Texas.
- Excluding feral hogs from these areas is critical to preventing infection of domestic animals.
- Other forms of transmission of the virus include ingestion of infected meat, as is seen in carnivorous species.
- Transmission in feral hog populations most often occurs through sexual contact.

Every year millions of dollars are spent to diagnose and prevent the spread of pseudorabies.

- It is often seen in wild pig populations, and
- It is highly transmissible to domestic livestock.

The capture and relocation of wild pigs without the proper testing is illegal in most states—including Georgia. Where feral hogs and livestock interact the best means of pseudorabies prevention is wild pig population control and exclusion of wild pigs from feeding and watering areas.

Trichinosis. While most diseases associated with feral hogs are caused by bacteria or viruses, trichinosis is caused by a nematode parasite—commonly known as a round worm. Most mammals, including humans, are susceptible to infection and most often become infected through ingestion of infected muscle tissues. Trichinosis typically does not cause illness in wild pigs or other animals. Although infected animals almost never exhibit clinical signs, it can be quite severe in humans.

- Adult nematodes inhabit the intestinal tract of all infected individuals.
- In humans it causes abdominal pain, nausea, cramps, and vomiting.
- The larvae of the parasite invade the muscle tissues, mostly the active muscles like the tongue, diaphragm, jaw, and intercostal muscles.
- This generally leads to fever, muscle pains, facial swelling, fatigue, skin lesions, and swelling of the upper eyelids. This leads to sensitivity to light – called photophobia.
- It can eventually lead to death in humans if left untreated.
- Abdominal symptoms usually present 1 to 2 days after infection.
- Other symptoms may take 2 to 8 weeks to develop.
- Treatment should begin immediately after diagnosis.

Human infection is most often a result of ingestion of undercooked meat, including both wild and domestic pork. The number of infections directly related to domestic pork sources has been greatly reduced in recent years.

To avoid infection:

- When handling meat from feral hogs wear latex or rubber gloves.
- Cook meet to an internal temperature of at least 1650 Fahrenheit.
- Freezing meat from pigs in the southern United States can kill the parasite but it is important to note that certain *Trichinella* spp. from the North can survive freezing.

To prevent the further spread of Trichinosis to other wildlife species:

- Bury the carcass of any dead animal.
- Georgia law requires dead animals to be buried at least 3 feet deep and not in a way that contaminates surface or ground water (O.C.G.A. § 4-5-5).
- Carcasses can also be burned to prevent further infection and spread.

Classical Swine Fever. Primarily known as hog cholera, this disease is caused by a virus that was once prevalent among domestic pigs. However, it was eradicated from the United States in the 1970s. It is contagious and often fatal disease of pigs.

Infected individuals:

- Show signs of depression, loss of appetite, sleepiness, and fever.
- Vomiting and yellowish diarrhea may also occur, causing progressed weakness in animals infected.
- It progresses rapidly and animals may die within 10 to 20 days after initial infection.
- Before dying the animal will convulse violently.
- If the disease does not cause death then it will develop into a chronic condition with milder symptoms and infected individuals become carriers of the disease.

The virus is easily transmitted from pig to pig by direct contact (nasal discharge, licking, grooming). It can be spread via exposure to contaminated feeders or pens. If infection does occur in a domestic hog population, then it must be reported to state and federal animal health authorities.

Porcine Epidemic Diarrhea Virus (PEDv). PEDv was first diagnosed in the US in 2013. PEDv continues to wreak havoc on domestic pig populations. It is a viral disease associated with outbreaks of diarrhea and vomiting in pigs. It was found in two sets of

samples from a recent domestic swine show in Perry, Georgia. While it is not transmissible to humans it still affects humans financially through losses of domestic hog stock.

Porcine Epidemic Diarrhea Virus:

- Is most devastating to young pigs, where it is almost always 100% fatal.
- It can affect pigs of all ages and can be fatal to older pigs.
- Adult pigs typically recover within 7-10 days.
- Transmission usually occurs through ingestion of fecal matter during in feeding.

Currently there is no treatment for PEDv. Due to the epidemic presented by the disease, it is now a reportable disease to the United States Department of Agriculture (as of April 18, 2014).

Other diseases:

Leptospirosis is caused by a spirochete bacterium in the genus *Leptospira*. It is an ancient disease and may be the most widespread zoonotic disease in the world. It can and does occur in domestic swine; prevalence in wild pigs is not clear. Wild pigs – if infected – can shed the bacteria to water where humans may be exposed while swimming, wading, kayaking, fishing, or rafting in contaminated water. Other exposure occurs during floods. Humans are susceptible to leptospirosis. In humans, this disease can lead to kidney damage, liver failure, respiratory distress, meningitis, and death.

A common intestinal bacterium, *Escherichia coli*, is generally harmless and beneficial, but some variants – notably *E. coli* O157 can cause illness in humans. Pigs – including wild pigs – are known carriers for *E. coli*. Up to 15% of animals tested in California were positive for *E. coli* O157. Wild pigs are widely believed to be responsible for the outbreak of illness in humans several years ago and traced to contaminated spinach from a field in California known to have been exposed to wild pigs. The Pentahatchee Creek watershed in Dooly County, Georgia had high levels of *E. coli* contamination that lead to a major project to eradicate wild pigs from the watershed and to the production of the first edition of this manual.

Toxoplasmosis is caused by a protozoan parasite *Toxoplasma gondii*. This is one of the world's most common parasites. It may be spread through contaminated water, blood products (unscreened blood) and unclean needles. Transmission and prevention are similar to what was described for *Trichinella*. Although most infected humans have few clinical signs, it can cause disease in immunocompromised individuals and is a risk to fetuses if a mother becomes infected during the pregnancy. Symptoms may include muscle pain, fever, and headache. Recently, toxoplasmosis was classified as one of

five neglected parasitic diseases in the United States that have been targeted by the CDC for public health action.

General precautions for handling wild pigs

- Wear latex or rubber gloves when cleaning, field dressing or processing wild pigs.
- Thoroughly clean knives, saws and all surfaces with hot soapy water and a commercial disinfectant (e.g., bleach) after processing wild pigs.
- Properly dispose of dead animal remains – bury them or landfill if legal. Never feed animal remains to dogs or leave out for scavengers.
- Store and handle wild pig meat and meat products safely.
- Cook all wild pig meat and meat products to an internal temperature of 165-170 degrees Fahrenheit.
- Freezing renders bacteria inactive but does not kill all bacteria or parasites.

Additional sources of information about disease risk from wild pigs –

Anonymous. N.D. Diseases of Feral Swine. https://vet.uga.edu/wp-content/uploads/2019/07/diseases_of_feral_swine_brochure.pdf

Corn, J.L. and M.J. Yabsley. 2020. Diseases and parasites that impact wild pigs and species they contact. Pages 83-126 In K. VerCauteren, J. Beasley, S. Ditchkoff, J. Mayer, G. Roloff, and B. Strickland eds., Invasive Wild Pigs in North America: Ecology, Impacts and Management. CRC Press/Taylor and Francis Group.

Davidson, W. R. and V. F. Nettles. 2006. Field manual of wildlife diseases in the southeastern United States, 3rd edition. Southeastern Cooperative Wildlife Disease Study, College of Veterinary Medicine, University of Georgia.

Hutton et al. 2006. Disease risk associated with increasing feral swine numbers and distribution in the United States. Report for the Midwest Association of Fish and Wildlife Agencies.

Mississippi State University Extension. Wild pigs and disease.

<https://www.wildpiginfo.msstate.edu/diseases-wild-pigs-public-health.html> Accessed on 23 January 2020.

USDA APHIS Feral Swine Disease Surveillance.

https://www.aphis.usda.gov/aphis/ourfocus/wildlifedamage/programs/nwrc/sa_nwdp/ct_feral_swine. Accessed on 23 January 2

Legal Issues

Most of the legal issues surrounding wild pigs primarily deal with the management strategies used to control them. This section is devoted to the issues surrounding hunting, trapping, and moving wild pigs.

Georgia Code

Several sections of the Official Code of Georgia Annotated (O.C.G.A., <https://georgia.gov/popular-topic/georgia-law>) relate to wild pigs. We will briefly outline and discuss relevant sections here. First, the Georgia Code is divided into topical areas called “Titles”. Titles 2 (Agriculture) and 27 (Fish and Game) are most relevant to wild pigs. Statutes (laws) are published in the O.C.G.A. To implement statutes (laws), agencies are given the authority to publish rules. The rules that govern feral hogs (wild pigs) are published by the Georgia Department of Agriculture (GDA) and can be found in GDA Rule 40-13-15 Transportation and Holding of Live Feral Hogs (<https://casetext.com/regulation/georgia-administrative-code/>).

We should note that in the O.C.G.A. these animals are called “feral hogs”. Feral swine, feral hog, wild hog, wild pig, and wild boar are all synonyms that refer to the same biological creature. The use of various terms for the same creature can be confusing. While they are called “feral hogs” in the O.C.G.A, they are called feral swine by USDA APHIS Wildlife Services. A recent book on this animal used wild pig in the book’s title. This manual uses wild pig as the common name of this beast, but readers are notified that, no matter the name, we are referring to the same creature.

§ 2-7-200 – Definition: "Feral hog" means any hog which has lived any part of its life in a wild, free-ranging state and is currently in such state or has been taken.

Note: Feral hogs or wild pigs live in the wild and are considered separate from commercial pig breeding and husbandry operations. Commercial pigs may be defined as “pigs that are housed indoors in biosecure environments and have no interaction with feral hogs” (R. M. Cobb, pers. comm.). Wild pigs could include small backyard operations. Sometimes the only distinction between a backyard pig and a wild pig is what side of the fence it is on. A backyard pig is “a pig that is housed outdoors and has ready interaction with feral swine” (R. M. Cobb, pers. comm.). Wild pigs can readily cross fences. Intermixing or commingling of wild pigs and domestic backyard pigs is common. Often, the animals are visually indistinguishable.

§ 2-7-201 – Transportation – it is illegal to transport a live feral hog without a permit. Permits must be obtained, prior to transport, from the Georgia Department of Agriculture (GAD) (<http://agr.georgia.gov/feral-hogs.aspx>).

§ 2-7-202 – Commingling – mixing or housing together in a pen or holding area feral hogs and domestic swine is illegal.

§ 2-7-203 – Penalty – penalties for violation of 2-7-201 are a misdemeanor of a high and aggravated nature and punishable by fines of at least \$1,500 per violation up to \$5,000 per violation.

Note: any permits issued under Title 27 (fish and game) can be revoked for up to three years. This means hunting and fishing privileges can be revoked upon conviction under 2-7-203.

§ 2-7-204 – Rules – the Georgia Department of Agriculture has authority to make administrative rules to enforce these sections of the code.

Anyone wishing to transport a wild pig must first kill the pig in the field before moving it. Or, if moving a live wild pig, the person must first have a transport permit issued by the Department of Agriculture (<http://agr.georgia.gov/feral-hogs.aspx>). This permit is valid for one-year from the date of issue.

A live wild pig can be transported to one of three locations: 1. A licensed and inspected Feral Hog Holding Facility; 2) an approved and inspected GDA slaughter facility; or, 3) a personal location to be slaughtered provided the hog remains on the transport vehicle until slaughter and is slaughtered within 24 hours of transport. The holding facility must be inspected by the GAD and the holding facility license fee is \$100.

Additionally, anyone wishing to take a dead wild pig to a processing facility should be aware that not all deer processing facilities can take a dead wild pig. Wild pig processing facilities can be located on the Georgia Department of Natural Resources_Wildlife Resources Division (DNR_WRD) webpage (<https://georgiawildlife.com/hunting/processors>).

A live wild pig presented to a licensed and fully inspected slaughter facility must pass both antemortem (before death) and postmortem (after death) inspection if the processed product is to be sold, donated or given away. If a dead feral hog is presented to a licensed and inspected custom exempt slaughter facility, the processed product MUST be mark NOT FOR SALE and can only be used by the presenter/owner of the animal and their immediate household family and friends – it cannot be sold, donated, or given away.

Hunting

Hunting as a management technique is discussed in Section 2. Hunting rules and regulations are under the authority of the Georgia Department of Natural Resources – Wildlife Resource Division. Here we discuss the legal aspects of wild pig hunting.

On private land in the state of Georgia, wild pigs may be hunted year-round with no bag limits. They may also be hunted at night with a light of any power. Generally hunting from a moving vehicle is illegal. However, a wildlife control permit can be issued by the Wildlife Resources Division that allows hunting from a vehicle. Generally, the vehicle cannot be moving or under power while hunting. Hunters must have written permission from the landowner to hunt on private land.

Although wild pigs in Georgia are not considered a game species, a resident or nonresident hunting license is required to hunt wild pigs by all hunters 16 years old or older, except when hunting or trapping on land owned by them or their immediate family. Immediate family is defined as living in the same house of a blood relative. Wild pigs can be hunted over bait. However, use of bait cannot be in violation of any deer hunting regulations. Bait cannot be located within 50 yards of a property boundary.

Wild pigs can also be hunted on Federal lands and state Wildlife Management Areas (WMA) in Georgia. However, there are additional restrictions on hunting on public land. On public land, there must be an open season for a listed game species. There are restrictions on the equipment that can be used in these areas. This means a person can only use the weapon or weapons that are legally allowed during the specific season in question. For example, the legal weapon depends on the game species season open at a given time—wild pigs can be hunted with deer rifles during deer rifle season or shotguns during turkey season, etc. Muzzleloaders can be used during small game seasons but centerfire rifles cannot.

There is no limit on the number of wild pigs that can be taken on public hunting lands during the appropriate season. It is illegal to hunt feral swine on public land at night. It is also illegal to hunt over bait on public lands. Hunting on public lands requires a Georgia hunting license. Blaze orange vests are required for all hunters during firearm and primitive weapons seasons. Hunting wild pigs with dogs is permitted on public lands with appropriate weapons restrictions while training dogs during dates when training season coincides with small game or turkey season.

Consult the Georgia Hunting Regulations to confirm where and when dog training dates occur for a given area. Certain Wildlife Management Areas have specially designated hunts for wild pigs outside of other regular seasons. Consult the WMA regulations or the Georgia Hunting Regulations booklet for exact locations and dates. Live wild pigs

captured with dogs must be killed immediately upon capture or a transport permit is required in order to move a live wild pig – see section above.

Trapping

Trapping wild pigs on public lands in Georgia is illegal. According to the GA trapping regulations only furbearing animals are allowed to be trapped on public lands. Trapping wild pigs on private lands is allowed. There is no season or bag limit. Trap designs described previously in this manual (Section 2) can be used to capture wild pigs. Snaring wild pigs in Georgia, on public or private lands, is illegal. Georgia trapping laws require that all traps be labeled with the trappers' name and contact information. All traps in Georgia must be checked at least once every 24 hours and all captured animals must be removed.

Moving Wild Pigs

It is illegal to move feral swine (wild pigs, wild pigs) within the state of Georgia without proper transport permits as described above.

Disposal of Dead Animals

Wild pigs harvested, hunted, or trapped can be consumed by the person or persons who took the animal. Review the section above under 2-7-204 – Rules. Only fully inspected feral hog meat can be sold, donated, or given away in Georgia. Take proper precautions when handling a wild pig carcass. Wear proper protective gear. This means wearing rubber or other appropriate gloves such as Nitrile or Latex. Cloth, leather, or other porous material is not acceptable. To be safe, eye protection such as goggles or safety glasses should be worn. Boots or closed toe shoes should be worn. Wear protective items that cover exposed skin and that can be disinfected after butchering or processing the carcass. After processing, all equipment such as cutting boards, knives, saws, coolers, and surfaces as well as clothing should be disinfected with a dilute bleach solution.

A diluted bleach solution can be made by adding common household bleach to warm water. Wash everything with hot soap water and then disinfect in the bleach solution. Use the hottest water appropriate for laundry. The Environmental Protection Agency (EPA) and USDA APHIS Animal Health Emergency Management guidelines outline the procedures for disinfection (https://www.aphis.usda.gov/animal_health/emergency_management/downloads/epa-approval-sodium-hypochlorite.pdf). According to the guidelines, commercial bleach is available in a variety of concentrations from 5% to 12.5%. Typical household bleach concentrations are 5% or 6% but are not always printed on the product label. According to EPA guidance at the website listed, a bleach solution at 0.3% strength is made by mixing 1 ounce of commercial bleach

(5.25% sodium hypochlorite product) to 16.5 ounces of water. This solution should be kept in contact with the soiled items (knives, cutting boards, and other surfaces) for 15 minutes if a non-porous surface (like a knife) or 30 minutes if a porous surface like wooden cutting boards and clothing (as in a washing machine).

Other precautions include – do not eat, drink, smoke, or chew tobacco while processing wild pigs. Use clean and sharp knives for field dressing and butchering and clean equipment properly when finished. If you nick or cut yourself, dispose of the damaged gloves, wash the wound with hot, soapy water for at least 20 seconds, apply antiseptic and a proper bandage. Do not touch a carcass with bare hands. Do not cross contaminate surfaces with wild pig meat or blood. Remember, freezing, smoking, drying, and pickling does not kill bacteria. Thoroughly cook all wild pig and pig products (bacon, sausage, etc.) to a minimum internal temperature of at least 165°F – always confirm with a meat thermometer. Never feed raw wild pig meat, bones, or organs to pets or other animals including livestock or other pigs.

Once harvested and/or processed there is the issue of carcass disposal (GDA Rule: 40-13-5). It is illegal to abandon the dead animal. It is illegal to dispose of a dead animal on another person's land without permission. Some city or county landfills take dead animals but arrangements must be made in advance with the proper officials (O.C.G.A. – Section 4-5-3).

Approved or lawful (GDA Rule 40-13-5) methods of carcass disposal include: burning, incineration, burial, rendering (composting). Disposal of dead animals must be completed within 24 hours of death. Dead animals that are buried must be buried at least three feet below ground with at least three feet of dirt over the carcass. Dead animals cannot be buried in any location that might contaminate surface or ground water (O.C.G.A. – Section 4-5-5). Some landfills will accept dead animals if arranged in advance. For large trapping operations, landowners (not the trapper) are responsible for disposal. Excavating equipment and a disposal site should be arranged in advance. Wild pig carcass disposal is consistent with good farming or ranching and animal husbandry practices normally employed on agriculture properties. Proper disposal discourages scavengers, prevents the spread of disease, and reduces offensive odors. Remember it is legal to move a dead animal, but live animal movement requires a transport permit.

It is illegal to release any trapped or transported live feral hog into any area that is not fenced to prevent escape of such feral hog. Any persons convicted of the release of live wild pigs in violation of established laws and regulations may be subject to revocation of hunting privileges for up to three years. Transport and possession of live wild pigs are regulated by Georgia Department of Agriculture; contact the Animal Industry Division at 404-656-3671 for more information.

Other Considerations and Issues

Other topics related to wild pig control include bounties, carcass disposal, poisoning, and contraception. Legal methods of carcass disposal should be considered before large wild pig removal or trapping activities occur. Bounties, carcass disposal, poisoning, and contraception are presented for general consideration of topics related to wild pig management in Georgia.

Bounties

The question of paying bounties to reduce the number of wild pigs is often raised among farmers, hunters, county agents, politicians, and participants at extension workshops. A 1976 paper published in Australia stated “for more than 3,000 years man has tried to reduce the number of pest animals by payment of bounties. In general, the system has failed.”

The same can be said for wild pig management. This is because bounties are not likely to decrease wild pig populations and, in some cases, may lead to an increase in wild pig populations. For example, bounties may encourage some trappers to release females and young animals to leave enough “seed” for future trapping. Likewise, bounties may contribute to the spread of the pig population if trappers illegally move pigs to new areas. Even when this doesn’t occur, the increase in food and energy resources used to attract pigs to the area can contribute to increased reproduction due to the increased availability of bait used in the trapping and bounty program.

This was observed at Fort Benning, Georgia, where a wild pig bounty program from 2007-2008 resulted in a take of 1,138 pigs at a total cost of \$57,296 or \$50.35 per pig. In the bounty area, researchers found the pig density increased between 23 – 130% while sounder size increased 144 – 233%. The number of juvenile pigs per adult increased 191-219%. Increased food availability likely attracted wild pigs to the study area and reproduction increased.

In addition to these problems, bounty programs are also challenging because of the ease of making fraudulent claims about where the pigs were killed. Other states have tried to manage wildlife populations with bounties. In one form or another, Pennsylvania has paid bounties on predators since 1802. The state passed a bounty law (the Scalp Act) in 1885 and repealed it in 1887 because it failed to produce desired results of reducing pest populations (namely hawks and owls). The bounty law was expensive, and it was easy to cheat the requirements. California found a bounty had no effect on mountain lion populations. Virginia had a bounty on wolves, but it took over two centu-

ries to eliminate wolves from the state. However, their demise was primarily due to habitat loss and increasing human populations in the 19th century. Utah had a coyote bounty in 2000 and found that 77.5% of trappers turned in 5 or fewer coyotes per individual. The bounty program accounted for about 1% of the total statewide coyote harvest.

Additionally, the bounty payment must be high enough to encourage participation, but such high payments may, collectively, exceed the damage caused by wild pigs. It is important to remember that current wild pig harvest levels in Georgia may approach 200,000 animals annually. This harvest is not, currently, reducing statewide damage. Most wild pig harvest is done by hunters – for free. To be effective, any bounty program at the state or county level must increase harvest above the current level. Paying hunters and trappers to harvest wild pigs would require payments for all the pigs currently harvested for free and then additional dollars to increase mortality in order to drive down the population. Any such program would be prohibitively expensive and ineffective. Large scale trapping and education programs are more cost effective in the long run.

Carcass Disposal

The meat from wild pigs is very edible. The meat can be taken home by the landowner. There may be certain meat processors that can accept wild pigs. Generally, deer processors cannot accept wild pigs. Hunters and others must contact the Georgia Department of Agriculture to identify approved processing facilities. Wild pigs can be processed at “any facility licensed by the GA Department of Agriculture Meat Inspection Section” authorized to handle “custom exempt products.” A list of custom exempt facilities is available by calling the Ga Department of Agriculture at 404-656-3673. Deer processing facilities and wild pig (feral hog) processing facilities are listed on the Georgia Wildlife Resources Division webpage at. Red meat establishments are licensed by the Georgia Department of Agriculture to process wild pigs (feral swine). These lists were current as of 18 March 2020. Readers should contact the GA Department of Agriculture for up-to-date information. If the animal is not to be used by the trapper, hunter, or landowner then legal methods of carcass disposal must be considered.

Once wild pigs have been trapped and dispatched the question that often arises is “what do I do with the carcasses?” This is an important consideration when large scale corral trapping is used, and a large group of pigs are captured. Sometimes 20-30 (or more) animals may be captured in one trap event. Georgia law stipulates that the approved methods of disposal include burning to ash, incineration, burial, rendering, or other method approved by the Commissioner of Agriculture (Ga. Department of Agriculture Rule 40-13.5-.04). Disposal must occur within 24 hours after death or discovery of the dead animal. Burning must comply with federal, state, and local requirements. In-

cineration must occur in a facility approved by the US EPA and Georgia EPD. Burying is illegal without permission from the landowner or the landfill manager.

Georgia Department of Agriculture – Dead Animal Disposal Rule, 40-13-5, describes the proper way to bury an animal. Hunter killed wild pigs or products from them cannot be donated or given away. Hunter killed wild pigs are to be used exclusively by the owner (person who harvests) of the animal, his/her household, and his/her non-paying guests and employees.

Carcasses may also be burned or buried. Burning or burying is done to avoid attracting scavenging animals such as vultures or coyotes. Utilization of heavy digging machinery will be required to dig a pit that will be deep, long, and wide enough to contain the carcasses of dispatched wild pigs. State law requires a minimum grave depth of 3 feet and the carcass must be covered by at least 3 feet of soil. Burial is not recommended in South Georgia or areas where there is a high ground water table due to risk of groundwater contamination.

Regulations pertaining to carcass disposal are found in the Georgia legal code (O.C.G.A – Title 4, Chapter 5, Sections 1-11;
<https://advance.lexis.com/container?config=00JAAzZDgzNzU2ZC05MDA0LTRmMDItYjgzMS0xOGY3MjE3OWNIODIKAFBvZENhdGFsb2fcIFfJnJ2IC8XZi1AYM4Ne&crd=f6d7394f-b06c-4c49-a502-1d56fe9d7806&prid=f48c56d1-fa1e-4fb5-8528-5beb391cc830>).

If burning carcasses, it is best to dig a pit and throw the carcasses into it. This will help ensure that the fire does not get out of control and provides a means of covering any remains. An accelerant such as diesel fuel or kerosene is often poured over the carcasses to get the fire started. Burning must comply with applicable regulations and burning bans in effect at the time.

Hunter sometimes allow wild pig carcasses to lay where they fall after shooting them. This is not advised. The disadvantage to this method is that it often attracts scavengers (coyotes, vultures, etc.), as well as pets and wild dogs, to the area where the pigs are laying. Additionally, odor can be a consideration as well as disease transmission and surface water contamination. It is best to plan for carcass disposal prior to conducting removal activities.

Wild pigs are not considered wildlife in Georgia. Hunters may leave individual wild pigs lay where they fall. This is not a violation of willful and wanton waste laws as these rules do not apply to wild pigs (C. Killmaster, Ga Wildlife Resources Division, pers. comm.). Wild pigs die in the woods all the time – there is no obligation to locate them or bury them. However, when conducting large scale hunting or trapping operations adequate means of carcass disposal in compliance with all applicable laws must be em-

ployed. Contact the Georgia Department of Agriculture or the Georgia Wildlife Resources Division for guidance on legal means of carcass disposal.

Poisoning

Currently there are no state registered toxicants or poisons available for controlling wild pig populations. However, there is a great deal of ongoing research to identify and register a toxicant that can be used to combat the overabundant pig population. An effective toxicant could be a powerful and cost-effective tool for reducing wild pig numbers. However, the greatest hurdle is finding a poison that can humanely kill wild pigs while having little effect on non-target species.

Currently researchers in Australia have developed a product known as PIGOUT® in an effort to reduce wild pig populations. The product is a bait containing Compound 1080—a poison commonly used in predator control—and is designed to only attract wild pigs. PIGOUT® has proven successful in Australia because of the absence of any native midsized generalist mammals. However, this product is unacceptable in the United States due to too many non-target hazards.

Aside from non-target issues, there is also the issue of the effectiveness of Compound 1080 on killing wild pigs. While this product is effective, wild pigs are relatively insensitive to the toxin and there are concerns that it can cause an inhumane death. In addition, the compound can remain in the carcass of the animal that ingested it and can remain in the environment or be consumed by scavengers resulting in secondary poisoning. Also, there is no antidote for Compound 1080 if accidentally ingested by humans. The concerns surrounding PIGOUT® has led Australian researchers to identify a different toxicant to use against wild pigs.

In early trials, sodium nitrite caused a quick, humane death. It is cheap, displays no secondary toxicity and methylene blue is an antidote. While currently undergoing trials in Australia, if it proves to be a viable toxin the commercially available product will be known as HOG-GONE®. Extensive testing by the federal government (USDA APHIS Wildlife Service and NWRC) is occurring in the United States. Issues related to bait acceptance by wild pigs, non-target toxicity, and registration hurdles related to testing a new toxicant suggest the product may be 3-5 years from the commercial market.

Once released, and if registered for use, substantial restrictions on use and application of sodium nitrite are anticipated. It will probably be a limited use pesticide available for very specific situations. This toxicant, at least initially, is not likely to be widely available. If labeled as a wild pig toxicant, a limited use designation means it will be available to specific personnel (likely USDA APHIS Wildlife Services employees) and the time of application, dose, and removal from the field will be tightly regulated. At this time, it is unlikely that sodium nitrite will become publicly available.

A major issue for use in the United States that still has to be addressed is the non-target risk. Bears, raccoons, deer, endangered species, other mammals and some birds readily ingest sodium nitrite. In addition, this product is very salty and distasteful to pigs. It has to be specially formulated to mask the salty taste. Otherwise pigs will avoid it. Landowners that attempt to apply sodium nitrite as a toxicant will quickly learn that it has little to no effect on wild pigs. It is also illegal to apply to the environment.

More information on sodium nitrite research can be found at:

https://www.aphis.usda.gov/aphis/ourfocus/wildlifedamage/programs/nwrc/research-a-reas/sa_feral_swine/ct_project_feral_swine_ungulate).

A commercial company in the United States is developing another toxicant for wild pigs that is currently marketed as KAPUT™. The active ingredient is warfarin. Warfarin is often used in humans as a blood thinner which is available as a prescription drug. Warfarin was also widely used in rat and mouse poison until 2011. Dosage levels in the pig toxicant are 0.01 times the strength of commercial rat/mouse poison. Wild pigs are highly susceptible to warfarin. Like sodium nitrite, wild pigs will not readily consume warfarin so the drug must be carefully concealed in special bait formulations. Testing is underway on the efficacy of KAPUT™ for use as a wild pig toxicant.

Because there are no registered toxicants for wild pigs the use of any poisons registered for use against other pest species—i.e. rats, mice, etc.—is illegal and will result in felony charges. All registered toxicants are listed under the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) and any use of these toxicants outside their labeled use is a violation of federal law with severe penalties.

REMEMBER – it is not legal to poison wild pigs in Georgia.

Contraception

Currently there are no state registered contraceptives available for controlling wild pig populations. Along with the research surrounding effective toxicants that can be used to combat wild pig populations there are also studies investigating a means of birth control for these animals. Development of an effective contraceptive for any animal faces several challenges. First of all, the contraceptive should not produce any adverse reactions in target animals. Secondly, it has to be administered in the field. Thirdly, it cannot have any non-target species risks. Also, it cannot affect animal behavior: this includes not only social behavior but breeding behavior as well. Finally, animals that received the contraceptive and are then taken for human consumption may pose an unacceptable risk to the hunter or trapper.

Currently there are no anti-fertility control drugs approved for wild pig control. However, it is possible that endocrine regulatory drugs can be developed that would suppress certain hormones and prevent fertility. The greatest challenge to be met in wild pig populations is administration of the contraceptive.

A major drawback to the use of contraceptives in wild pigs is the delivery mechanism. Most fertility control vaccines are injectable or require some sort of projectile to administer. This means of deployment would be as ineffective as hunting and shooting wild pigs. The utilization of baits laced with the contraceptive agent could be a viable option but the key is to find bait which non-target species would avoid. Also, getting the appropriate dose to the target animal is difficult in field situations. Contraceptives typically target one sex of animal – for example, females. The issue of males consuming the drug are unresolved.

Current research has found that injections of gonadotropin-releasing hormone to be effective in captive pigs. However, this is an ineffective means of control because it cannot be deployed in the field.

One contraceptive that has been researched is GonaCon™. Originally developed for controlling white-tailed deer populations, this contraceptive is a single shot, multiyear birth control agent that prevents animals from entering an estrous cycle through hormonal control. GonaCon™ is effective in both sexes but works best in the female portion of an animal population, keeping them infertile for 1 to 4 years without boosting. This contraceptive is most often administered using a dart fired from a tranquilizer gun. Although GonaCon™ is an effective means of fertility control in captive pigs, it is not registered for use in wild populations.

With any contraceptive the problems include: initial delivery of the agent; effectiveness in the animal; duration of the effect. Additional considerations include: delivery of subsequent doses and how to identify treated and untreated animals; impact on non-target species especially on humans or predators that may consume the treated individual; and, cost of the program including trapping, handling, drug cost, follow-up treatment, veterinary care and public education. Liability for mishandled drugs or illness in consumers must also be considered.

Though relatively easy to treat individual captive animals, it is not easy to effectively treat large numbers of free-ranging individuals. Therefore, contraceptive use as a population control agent is not effective.

It is unlikely that contraceptives will ever be useful wild pig damage management. First, the animals must be captured unless a remote delivery system can be developed. It seems unrealistic to expect managers, farmers, landowners, or others to incur the cost of capturing a destructive wild pig only to release it after administration of a birth

control drug or surgical sterilization. If the contraceptive drug can be delivered with a remote injection or other device then two issues are apparent. An infertile animal causes as much damage as a fertile one. Also, if one can get close enough to deliver a drug fired from a weapon then lethal control is more cost effective. Furthermore, wild pigs occur all across the landscape. It is highly unlikely that enough animals could be sterilized to affect a population reduction sufficient to reduce damage to acceptable levels. For some, there may never be an “acceptable” level of damage.

REMEMBER – contraception of wild pigs is illegal.

References

There is a tremendous body of scientific literature on wild pigs. There is also an extensive collection of blogs, newsletters, news stories, and articles (including magazine, radio and television). Some of this second group contains rumors, superstitions, and inaccurate information along with excellent summaries of research and interviews with highly respected experts. It can be difficult for many people to separate the facts about wild pigs from the hyperbole and stories. The very small collection of literature listed below is only a tiny part of the total. I have tried to restrict it to easily accessible scientific journals and outreach/extension publications. It is not an exhaustive list nor is it meant to be.

Barrett, R. H. and G. H. Birmingham. 1994. *Wild Pigs. Prevention and Control of Wildlife Damage Handbook*. University of Nebraska – Lincoln, Lincoln, NE.

Baubet, E., Y. Ropert-Coudert, and S. Brandt. 2003. Seasonal and annual variations in earthworm consumption by wild boar (*Sus scrofa scrofa* L.). *Wildlife Research* 30:179-186.

Bieber, C. and T. Ruff. 2005. Population dynamics in wild boar *Sus scrofa*: ecology, elasticity of growth rates and implication for the management of pulsed resource consumers. *Journal of Applied Ecology* 42: 1203-1213.

Campbell, T. A. and D. B. Long. 2007. Mammalian visitation to candidate feral swine attractants. *Journal of Wildlife Management* 72: 305-309.

Campbell, T. A. and D. B. Long. 2009. Feral swine damage and damage management in forested ecosystems. *Forest Ecology and Management* 257: 2319-2326.

Conley, R. H., V. G. Henry, and G. H. Matschke. 1972. *European Hog Research Project W-34*. Tennessee Game and Fish Comm., Nashville. Final Report, 259 p.

Davis, A. J., B. Leland, M. Bodenchuk, K. C. VerCauteren, and K. M. Pepin. 2018. Costs and effectiveness of damage management of an overabundant species (*Sus scrofa*) using aerial gunning. *Wildlife Research* 45: 696-705.

Ditchkoff, S. S. and B. C. West. 2007. Ecology and management of feral hogs. *Human-Wildlife Conflicts* 1: 149-151.

Ditchkoff, S. S., R. W. Holtfreter, and B. L. Williams. 2017. Effectiveness of a bounty program for reducing wild pig densities. *Wildlife Society Bulletin* 41:548-555.

- Engeman, R. M. B. U. Constantin, S. A. Shwiff, H. t. Smith, J. Woolard, J. Allen, and J. Dunlap. 2007. Adaptive and economic management for feral hog control in Florida. *Human-Wildlife Conflicts* 1: 178-185.
- Engeman, R. M. J. Woolward, H. T. Smith, J. Bourassa, b. U. Constantin, and D. Griffin. 2007. An extraordinary patch of feral hog damage in Florida before and after initiating hog removal. *Human-Wildlife Conflicts* 1: 271-275.
- Graves, H. B. 1984. Behavior and ecology of wild and feral hogs (*Sus scrofa*). *Journal of Animal Science* 58: 482-492.
- Hamrick, B., M. Smith, C. Jaworowski, and B. Strickland. 2011. A landowner's guide for wild pig management. Mississippi State University Extension Service, Publication 2659, 42 pages.
- Hone, J. and H Pedersen. 1984. Changes in feral hog populations after poisoning. New South Wales Department of Agriculture, Veterinary Research Station, Glenfield, Australia.
- Mayer, J. J. 2013. Wild pig attacks on humans. *Proceedings 15th Wildlife Damage Management Conference* 15: 17-35.
- Mayer, J. J. 2014. Estimation of the number of wild pigs found in the United States. Savannah River National Laboratory, SRNL-STI-2014-00292, Revision 0. 8 pages
- Jeskey, J. and K. VerCaurteren. 2018. A new tool in feral swine management: sodium nitrite. *Alabama Wildlife*. Spring 2018.
- Poche, R. M., D. Poche, G. Franchowiak, D. J. Somers, L. N. Briley, B. Tseveenjav, L. Polyakova. 2018. Field evaluation of low-dose warfarin baits to control wild pigs (*Sus scrofa*) in North Texas. *PLoSone* November 7, 2018. 21 pages
- Saliki, J. T., S. J. Rodgers, and G. Eskew. 1998. Serosurvey of selected viral and bacterial disease in wild swine in Oklahoma. *Journal of Wildlife Disease* 34: 834-838.
- Schley, L. and T. J. Roper. 2003. Diet of wild boar (*Sus scrofa*) in Western Europe, with particular reference to consumption of agricultural crops. *Mammal Review* 33: 43-56.
- Sweeney, J. M., J. R. Sweeney, and E. E. Provost. 1979. Reproductive biology of a feral hog population. *Journal of Wildlife Management* 43: 555-559.
- VerCauteren, K. C., J. C. Beasley, S. S. Ditchkoff, J. J. Mayer, G. J. Roloff, and B. K. Strickland. 2020. *Invasive wild pigs in North America: Ecology, Impacts, and Management*. CRC Press, Taylor and Francis Group, Boca Raton, FL. 479 pages

West, B. C., A. L. Cooper, and J. B. Armstrong. 2009. Managing wild pigs: A technical guide. Human-Wildlife Interactions Monograph 1: 1-55.uHu

Williams, B. L., R. W. Holtfreter, S. S. Ditchkoff, and J. B. Grand. 2011. Trap style influences wild pig behavior and trapping success. Journal of Wildlife Management 75:432-436.

Witmer, G. W., R. B. Sanders, and A. C. Taft. 2003. Feral swine – are they a disease threat to livestock in the United States? Proceedings 10th Wildlife Damage Management Conference 10:316-325.