



# OFAH Wild Pig Trail Camera Detection Protocol



## Goal

Capitalize on the knowledge, equipment, and expertise of hunters to monitor the distribution of wild pigs across Ontario trail cameras.

## Background

The term “wild pig” refers to any member of the pig species (*Sus scrofa*) that is free-ranging outside of a fenced enclosure. Wild pigs, also known as wild swine or feral hogs, bring with them the threat of disease, economic and ecological destruction, and risk to public safety (USDA, 2010). Types of wild pigs include Eurasian wild boar, escaped domestic pigs, pot-bellied pigs, and their hybrids, all of which can cause damage and are of concern. Wild pigs are now present in small numbers across Ontario.

The early detection of any free-ranging pigs is vital to preventing the establishment of this invasive species. The use of trail cameras by engaged members of the public has the potential to broaden the existing scope of wild pig monitoring efforts within the province. A high degree of spatial accuracy, credibly, and low cost make this kind of citizen science an ideal option for the field of ecological monitoring (Aschim & Brook, 2019; Parsons et al. 2018).

## Identifying feral swine, habitat and signs

Wild pigs can vary significantly in their appearance. Eurasian boars have narrow heads with sloping straight snouts, long legs, dark, thick fur and a straight tail. Pot-bellied pigs may have long, dense hair on their backs and shoulders. Domestic pigs have shorter snouts that may slope upwards or appear “pushed in”. All pigs, including feral domestic breeds and pot-bellied pigs, may have tusks. Although they usually weigh less than 100 kg, adult wild pigs have been known to exceed 400 kg (Alberta Invasive Species Council, 2016; Brook et al. 2020; USDA, 2010). Young pigs, or piglets, are generally smaller, lighter in colour and may have stripes or spots running along the length of their backs.

Wild pigs are an extremely adaptable species, capable of survival and reproduction in a variety of harsh environments. When it is available, however, they tend to prefer deciduous forests, crop and pastureland, and especially wetlands and shoreline areas. Although their diet consists primarily of vegetation like crops (especially corn and soybeans), tubers, roots, grasses, and mast crops (e.g., nuts, acorns, rosehips), wild pigs are omnivorous and readily consume a wide variety of arthropods and small vertebrates (Campbell & Long, 2009; Seward et al. 2004). They have even been known to eat the eggs of ground nesting birds and kill young deer and livestock. Animals killed by wild pigs can often be identified by a crushed head or throat and missing stomach contents, but can easily be confused with coyote kills (Seward et al. 2004).

Wild pigs often travel in groups of varying size called sounders and their movements across a landscape usually leave an abundance of sign. Their tracks look similar to those of a white-tailed deer except that the front toes of a wild pig are more rounded and point slightly outward, whereas those of a deer point in, and a pig's dew claws are wider than the front toes (Brook et al. 2020; Campbell & Long, 2009; West et al, 2009).

Another common sign of wild pig activity is evidence of rooting, where a pig uses its snout to dig up soil in search of food. Rooting occurs at all times of year but is especially common during the spring, when food is scarce, and is often described as resembling plowed soil (in ideal soil conditions, rooting disturbance can be up to one metre deep) (Brook et al. 2020; Campbell & Long, 2009; Seward et al. 2004). Raccoons may also root in soil, but damage is often shallower.

Wallows are pig-sized indents in the mud, often filled with water, where animals roll and loaf around. These features are especially important during the warmer months as pigs use the water to cool themselves (Campbell & Long, 2009; USDA, 2010).

Other evidence of wild pig activity includes rubs, where pigs scratch themselves against rocks, trees, or fenceposts, tusk marks, scat, and hair caught in fence-crossings (Brook et al. 2020; Campbell & Long, 2009; USDA, 2010).

During the winter, wild pigs have been known to create nests known as pigloos, which are burrowed under the snow and often filled with cattails (Brook et al. 2020).



## SITE SETUP

**WARNING:** Wild pigs can be extremely aggressive animals. Their size, speed, and sharp tusks can make them a serious threat to humans and extreme caution should be taken when visiting a location which may be occupied by these creatures (USDA, 2012; West et al. 2009).

Ideally, camera traps should be set up wherever there is sign of wild pigs. If there is no direct evidence of wild pig activity in an area, choose sites which are clearly used by other animals (e.g., deer trails) and have an abundance of low lying vegetation such as young trees and shrubs, especially in and around wetlands, deciduous forests, and agricultural areas. It is advisable to cover a variety of habitat types if they exist in your area (Engeman et al. 2013; Seward et al. 2004).

Although it is not necessary, bait can greatly improve the effectiveness of a camera trap for wild pigs. A variety of baits can be effectively used to attract wild pigs (including dog food, fruits and vegetables, grains, syrups, and commercial baits) but the most popular and accessible bait is corn (Davis et al. 2018; Hamrick et al. 2011; Hanson et al. 2009; Lavelle et al. 2017; USDA, 2010). Straight, whole kernel corn can be used for much of the year but is strongly discouraged during the winter months due to its potentially harmful or even fatal effects on non-target deer. During the winter, corn can be mixed with whole oats at a minimum ratio of 1:1 to avoid this problem (MNRF, 1997). An alternative, year-round, baiting option is soured corn - whole kernel corn which has been fermented in water and reduces attraction by non-target species such as deer (Lavelle et al. 2017; West et al. 2009). To speed up the fermentation process add yeast and sugar, and store it in sealed bucket in a warm spot for several days.

Spreadable baits should be distributed across the site rather than dumped into a single pile (Hamrick et al. 2011; Williams et al. 2011).

Another baiting option, potentially less effective but significantly less labour intensive than corn, is a salt lick; blue cobalt salt blocks or granulated salt mixed with the soil are especially effective for wild pigs (Ryan Brook, personal communication).

Before setting up a camera trap on public land, always consult the relevant legislation and regulations. Depending on the province, municipality, and specific location (e.g., a conservation authority or provincial park), there may be a variety of restrictions pertaining to bait, destruction of habitat, and access.

## CAMERA SETUP

Consult relevant land use and wildlife regulations for your area before setting up a trail camera or putting out bait.

Trail cameras with infrared technology (especially those with red-light filters) are ideal for wild pig monitoring, both for their effectiveness in low light conditions and their reduced detection by animals and humans (Engeman et al. 2013; Kays et al. 2009; USDA, 2010). It is vital that camera models are properly waterproof.

Still-photo cameras are much preferred over video cameras, primarily due to their improved memory and battery capacities (Engeman et al. 2009). Cameras with a fast trigger speed are also ideal, preferably at 0.5 seconds or less (eMammal, 2017; Kays et al. 2009). Cameras should be set to standard sensitivity with a maximum of 1 second delay between photos, although this may need to be made longer if the amount of pictures taken is excessive. Burst settings of 3-5 photos per trigger are often standard and are encouraged. Camera detection-ranges vary widely from one model to the next, so bait position should accommodate the capabilities of individual trail cameras (Davis et al. 2018; Kays et al. 2011; Rovero et al. 2013; Stolle et al. 2015; Williams et al. 2011; Wu et al. 2011). Set the bait as far away from the camera as possible while still allowing the camera to trigger reliably. This will increase the chance of clear pictures of multiple pigs if they are present. Where possible, perform a walk-test before leaving a site to ensure that the camera has been properly armed and the trigger is functional (Newey et al. 2015).

Trail cameras should be placed roughly 1 metre up a tree trunk or fencepost, facing toward the bait, trail, or other target location, from an unobstructed position. Any vegetation that is directly blocking the camera's view or could result in false triggers should be cut down (Kays et al. 2011; Rovero et al. 2013; Stolle et al. 2015; Williams et al. 2011). It is advisable to face infrared cameras northward whenever possible so as to avoid false triggers caused by the sun or backlighting when the sun rises in the east or sets in the west (Campbell et al. 2006).

If site locations are on publicly accessible land, theft prevention should always be a consideration. Trail cameras should be placed away from primary human trails, secured to their post using a lock, or even put into a security box made specifically for trail cameras.



## FOLLOW UP AND MAINTENANCE

Cameras should be run year round if possible and checked as often as is necessary relative to the individual memory and battery capacities of each device, but it is advised that sites are first visited within 7 to 14 days of initial setup to confirm this information (Kays et al. 2009). Bait replenishment should also be dependent on individual site needs.

When returning to a site, cameras should be checked for wear and tear, as well as corrosion or any other evidence of moisture buildup within the camera housing (Rovero et al. 2013). The addition of one or two silica desiccant packets to the inside compartment of a trail camera can work to prevent this (Kays et al. 2009).

After a maximum of five months in one location, cameras should be moved to a suitable habitat roughly 2 km away (the minimum size of a wild pig's range) (Davis et al. 2018; Karlin & De La Paz, 2015). Sites can be relocated earlier and to any location, however, if new evidence of wild pig activity is discovered. This protocol is not intended to avoid bias in any way and prioritizes only wild pig detection rather than abundance or occupancy information.

## RECORDS AND SUBMISSION:

All confirmed or possible sightings of pigs outside of a fence, domesticated or wild, should be reported directly to the Invading Species Hotline at 1-800-563-7711 or [info@invadingspecies.com](mailto:info@invadingspecies.com). Include the date, location (address, GPS coordinates, etc.) and a photo. Make sure all young pigs are reported.

For more information on wild pigs, visit <https://www.ofah.org/wildpigs>

## REFERENCES

- Alberta Invasive Species Council (2016) Feral Pig. Retrieved Feb 26, 2020 from <https://abinvasives.ca/wp-content/uploads/2017/11/FS-FeralPig.pdf>
- Aschim RA, Brook RK (2019) Evaluating Cost-Effective Methods for Rapid and Repeatable National Scale Detection and Mapping of Invasive Species Spread. *Scientific Reports* 9:7254. Retrieved Feb 20, 2020 from <https://www.nature.com/articles/s41598-019-43729-y#article-info>
- Brook R et al. 2020 Wild Pigs in Canada. Retrieved Feb 19, 2020 from <http://wildpigscanada.ca/>
- Campbell TA, Lapidge SJ, Long DB (2006) Using Baits to Deliver Pharmaceuticals to Feral Swine in Southern Texas. *Wildlife Society Bulletin* 34(4):1184-1189. Retrieved Feb 25, 2020 from [https://digitalcommons.unl.edu/cgi/viewcontent.cgi?article=1407&context=icwdm\\_usdanwrc](https://digitalcommons.unl.edu/cgi/viewcontent.cgi?article=1407&context=icwdm_usdanwrc)
- Campbell TA, Long DB (2009) Feral swine damage and damage management in forested ecosystems. *Forest Ecology and Management* 257:2319-2326. Retrieved Feb 19, 2020 from [https://digitalcommons.unl.edu/cgi/viewcontent.cgi?article=1874&context=icwdm\\_usdanwrc](https://digitalcommons.unl.edu/cgi/viewcontent.cgi?article=1874&context=icwdm_usdanwrc)
- Davis AJ, McCreary R, Psiropoulos J, Brennan G, Cox T (2018) Quantifying site-level usage and certainty of absence for an invasive species through occupancy analysis of camera-trap data. *Biol Invasions* 20:877-890. Retrieved Feb 20, 2020 from [https://digitalcommons.unl.edu/cgi/viewcontent.cgi?article=3077&context=icwdm\\_usdanwrc](https://digitalcommons.unl.edu/cgi/viewcontent.cgi?article=3077&context=icwdm_usdanwrc)
- eMammal (2017) Camera Trap Recommendations. Retrieved Feb 26, 2020 from <https://emammal.si.edu/about/camera-trap-recommendation>
- Engeman RM, Massei G, Sage M, Gentle MN (2013) Monitoring wild pig populations: a review of methods. *Environ Sci Pollut Res* 20:8077-8091. Retrieved Feb 19, 2020 from [https://digitalcommons.unl.edu/cgi/viewcontent.cgi?article=2483&context=icwdm\\_usdanwrc](https://digitalcommons.unl.edu/cgi/viewcontent.cgi?article=2483&context=icwdm_usdanwrc)
- Gansowski J, Hojnacki D, Jackling M (2016) New York Feral Swine Management Report: April 1, 2015 - March 31, 2016. USDA, APHIS, Wildlife Services
- Gansowski J, Hojnacki D, Long K (2016) New York Feral Swine Management Report: April 1, 2016 - March 31, 2017. USDA, APHIS, Wildlife Services
- Hamrick B, Smith M, Jaworowski C, Strickland B (2011) A landowner's guide for wild pig management: practical methods for wild pig control. Mississippi State University Extension Service & Alabama Cooperative Extension System. Retrieved Feb 20, 2020 from <https://www.forestpests.org/pdf/A%20Landowner's%20Guide%20of%20Wild%20Pig%20Management.pdf>



- Holtfreter RW, Williams BL, Ditchkoff SS, Grand JB (2008) Feral pig detectability with game cameras. *Proc. Annu. Conf. Southeast. Assoc. Fish and Wildl. Agencies* 62:17–21. Retrieved Feb 19, 2020 from <http://wp.auburn.edu/deerlab/wp-content/uploads/2014/05/272008-SEAFWA.pdf>
- Ivey MR, Colvin M, Strickland BK, Lashley MA (2019) Reduced vertebrate diversity independent of spatial scale following feral swine invasions. *Ecology and Evolution* 9:13. Retrieved Feb 20, 2020 from <https://onlinelibrary.wiley.com/doi/full/10.1002/ece3.5360>
- Karlin M, De La Paz G (2015) Using camera-trap technology to improve undergraduate education and citizen-science contributions in wildlife research. *The Southwestern Naturalist* 60(2-3):171-179. Retrieved Feb 21, 2020 from <https://bioone.org/journals/The-Southwestern-Naturalist/volume-60/issue-2-3/SWNAT-D-14-00005.1/Using-camera-trap-technology-to-improve-undergraduate-education-and-citizen/10.1894/SWNAT-D-14-00005.1.short>
- Kays R, Tilak S, Kranstauber B, Jansen PA, Carbone C, Rowcliffe M, Fountain T, Eggert J, He Z (2011) Camera traps as sensor networks for monitoring animal communities. *International Journal of Research and Reviews in Wireless Sensor Networks* 1(2):19-29. Retrieved Feb 21, 2020 from [https://repository.si.edu/bitstream/handle/10088/18646/stri\\_2011\\_Kays\\_et\\_al\\_IJRRWSN.pdf](https://repository.si.edu/bitstream/handle/10088/18646/stri_2011_Kays_et_al_IJRRWSN.pdf)
- Lavelle MJ, Snow NP, Fischer JW, Halseth JM, VanNatta EH (2017) Attractants for wild pigs: current use, availability, needs, and future potential. *European Journal of Wildlife Research* 63:86. Retrieved Feb 26, 2020 from [https://digitalcommons.unl.edu/cgi/viewcontent.cgi?article=3024&context=icwdm\\_usdanwrc](https://digitalcommons.unl.edu/cgi/viewcontent.cgi?article=3024&context=icwdm_usdanwrc)
- MNRF (1997) Guidelines for Winter Feeding of Deer in Ontario. Retrieved Feb 25, 2020 from [https://www.ofah.org/wp-content/uploads/2015/04/MNR-Guidelines-deer\\_winterFeeding.pdf](https://www.ofah.org/wp-content/uploads/2015/04/MNR-Guidelines-deer_winterFeeding.pdf)
- Newey S, Davidson P, Nazir S, Fairhurst G, Verdicchio F, Irvine JR, van der Wal R (2015) Limitations of recreational camera traps for wildlife management and conservation research: A practitioner's perspective. *Ambio* 44:624–635. Retrieved Feb 26, 2020 from <https://link.springer.com/article/10.1007/s13280-015-0713-1#citeas>
- Rovero F, Zimmermann F, Berzi D, Meek P (2013) “Which camera trap type and how many do I need?” A review of camera features and study designs for a range of wildlife research applications. *Hystrix It. J. Mamm* 24(2):148–156. Retrieved Feb 21, 2020 from <http://www.italian-journal-of-mammalogy.it/-Which-camera-trap-type-and-how-many-do-I-need-A-review-of-camera-features-and-study,77224,0,2.html>
- Rovero F, Marshall AR (2009) Camera trapping photographic rate as an index of density in forest ungulates. *Journal of Applied Ecology* 46:1011–1017. Retrieved Feb 20, 2020 from <https://besjournals.onlinelibrary.wiley.com/doi/pdf/10.1111/j.1365-2664.2009.01705.x>
- Seward NW, VerCauteren KC, Witmer GW, Engeman, RM (2004) Feral swine impacts on agriculture and the environment. *Sheep & Goat Research Journal* 12:34-40. Retrieved Feb 19, 2020 from <https://digitalcommons.unl.edu/cgi/viewcontent.cgi?article=1011&context=icwdmsheepgoat>
- Stolle K, van Beest FM, Vanderwal E, Brook RK (2015) Diurnal and Nocturnal Activity Patterns of Invasive Wild Boar (*Sus scrofa*) in Saskatchewan, Canada. *The Canadian Field-Naturalist* 129:76-79. Retrieved Feb 20, 2020 from <https://www.canadianfieldnaturalist.ca/index.php/cfn/article/view/1670>
- USDA, APHIS, Wildlife Services (2010) Status of Feral Swine in New York State.
- West BC, Cooper AL, Armstrong JB (2009) Managing wild pigs: A technical guide. *Human-Wildlife Interactions Monograph* 1:1–55. Retrieved Feb 26, 2020 from [https://digitalcommons.usu.edu/cgi/viewcontent.cgi?article=1000&context=hwi\\_monographs](https://digitalcommons.usu.edu/cgi/viewcontent.cgi?article=1000&context=hwi_monographs)
- Williams BL, Holtfreter RW, Ditchkoff SS, Grand JB (2011) Efficiency of time-lapse intervals and simple baits for camera surveys of wild pigs. *The Journal of Wildlife Management* 75(3). Retrieved Feb 21, 2020 from <https://wildlife.onlinelibrary.wiley.com/doi/abs/10.1002/jwmg.75>
- Wu N, Abril C, Hinic V, Brodard I, Thu B, Fattedbert J, Hu D, Ryser-Degiorgis MP (2011) Free-ranging wild boar: a disease threat to domestic pigs in Switzerland?. *Journal of Wildlife Diseases* 47(4): 868–879. Retrieved Feb 20, 2020 from <https://www.jwildlifedis.org/doi/pdf/10.7589/0090-3558-47.4.868>