Ontario's Strategy to Address the Threat of Invasive Wild Pigs

Ontario

Executive Summary

Any pig that is not contained or under the physical control of any person, or is otherwise roaming freely is considered a wild pig. Wild pigs are invasive and pose a threat to the natural environment, agricultural industry, and human health and safety. In regions of the world where wild pigs have been introduced and become established, jurisdictions are investing significant time and resources to compensate for damages and for undertaking efforts to control their spread. At this time, there is no firm evidence to suggest that wild pigs are established (i.e., self-sustaining and breeding) in Ontario. However, reports of wild pigs in Ontario continue to be submitted, indicating that wild pigs could become established unless continued actions are taken.

The least costly and most effective approach for managing wild pigs is to act early. As such, Ontario is setting the proactive goal of preventing the establishment of invasive wild pigs in the province. This strategy outlines four objectives and supporting actions to achieve this goal. Actions are multi-pronged, highlighting the need for clear communications, robust policy, Ontario-specific research and management, and strong collaboration between governments, agencies and industry partners.

Wild pig: Eurasian wild boar. Simcoe County, Ontario.

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The Wild Pig Problem

Wild pigs have been coined 'an ecological train wreck' because of the extent and magnitude of damage they cause. In the United States alone, the costs for control and damages are estimated at more than $1.5B annually. Damages are wide ranging, including impacts to the natural environment, agricultural industry, and human health and safety. Costs are also related to funding required to implement control measures.

Wild pigs can destroy native ecosystems through trampling, wallowing, and rooting behaviours. They prey on and compete with native wildlife for food and habitat and can impact water quality. In many areas, damages to the agricultural industry have been devastating. Wild pigs can impact almost any crop, including stored crops and pastures. They damage equipment and infrastructure, and prey on livestock. They can also impact private property and areas that are used for tourism, recreation, and nature conservation.

One of the most concerning impacts of wild pigs is their potential to transmit diseases and parasites that affect wildlife, livestock, pets, and humans. Wild pigs are a host to over 30 significant viral and bacterial pathogens and diseases (e.g., influenza, brucellosis, classical swine fever, foot and mouth disease, and pseudorabies, among many others) and more than 37 species of parasites.

In recent years, a notable disease concern is African Swine Fever, which is currently considered the largest threat to the global pork industry. Although outbreaks have occurred in many countries, it is not currently present in North America. A detection in Canada, either in domesticated or wild pigs, could be catastrophic to Ontario and Canada's export driven hog industry. In Ontario alone, the Ontario pork industry contributes $2.8 billion in gross domestic product annually across the entire value chain, including over 57,000 jobs. Wild pigs are a key reservoir and vector for the virus given their resilience and elusive nature. Although not harmful to humans, African Swine Fever can spread quickly through contact with infected pigs or pig products or contaminated farm equipment, feed, and clothing.

Definitions

Definitions for the purposes of this strategy (see also Figure 1):

Domesticated pig is any animal of the species *Sus scrofa domesticus*, as can be demonstrated by DNA, pedigree, or phenotype. Domesticated pigs are typically raised and bred as livestock or kept as pets (e.g., pot-bellied pigs).

Farmed pig is a pig, including all subspecies of *Sus scrofa*, that is raised and bred as livestock. In Ontario, pigs are farmed principally for food production (e.g., pork). Most farmed pigs are domesticated pigs (i.e., *Sus scrofa domesticus*), including popular breeds such as Yorkshire, Landrace, Duroc, and Hampshire, as well as heritage breed pigs. Eurasian wild boar are also farmed in small numbers.

Direct impacts of wild pigs on people, such as from attacks, are considered rare, but when they do occur the consequences can be severe. Motor vehicle collisions with pigs on roadways can also be very dangerous.

Ontario's Response to the Threat of Invasive Wild Pigs

Based on experiences from other jurisdictions, it is clear that the least costly and most effective approach for managing wild pigs is to act early. Once populations become established, eradication may no longer be feasible. Given the current state of wild pigs in Ontario – with no evidence of self-sustaining breeding populations – the province has an opportunity to proactively address the threat of invasive wild pigs.

Ontario's goal is to prevent the establishment of invasive wild pigs in the province.

For the purpose of this strategy, wild pigs that are self-sustaining and reproducing in the wild are considered established.

Prevention, early detection, and effective response and management are the core principles of the **Ontario Invasive Species Strategic Plan**. Ontario's approach to address the threat of wild pigs is consistent with these principles. This approach is based on best-available science and management experiences from other jurisdictions as well as Ontario-specific research. It reflects the views of conservation organizations, the agriculture industry, and the public who have shared their concerns about invasive wild pigs. Given the threat that wild pigs pose to native flora, fauna, and the broader environment, preventing the establishment of wild pigs in the province will help protect our natural resources and the important activities that depend on them.

Heritage breed pig is a domesticated pig with bloodlines that can be hundreds of years old. They are typically farmed for food production. Unlike conventional pig farming, heritage breeds tend to be raised outdoors. In Ontario, heritage pig farming of breeds including Tamworth and Berkshire are growing in popularity.

Eurasian wild boar is any animal of the species *Sus scrofa*, excluding *Sus scrofa domesticus*. The term includes, but is not limited to, European Wild Boar (*Sus scrofa scrofa*), which is the predominant wild boar subspecies in North America. Wild boar are sometimes referred to as Old World swine or razorbacks. Wild boar subspecies have not undergone the same domestication process as domesticated pigs, even though wild boar subspecies may also be bred and raised in captivity for food production.

No single government, ministry, conservation organization or sector can achieve this goal alone. The goal will be achieved by leveraging the resources and expertise of many. It will depend on strong inter-governmental collaboration, particularly between the Ontario Ministry of Northern Development, Mines, Natural Resources and Forestry (NDMNRF) and the Ontario Ministry of Agriculture, Food and Rural Affairs (OMAFRA), as well as support from other jurisdictions, partners, academia, stakeholders, and the public.

Wild pigs: Eurasian wild boar. United Counties of Prescott and Russell, Ontario

Eurasian wild boar hybrid is the result of genetic mixing between domesticated pigs and Eurasian wild boar. Hybrids can result directly from breeding a domesticated pig with a Eurasian wild boar and/or through breeding the resulting offspring. Hybrids may be identified through genetic and/or morphological analysis. Any animal that is genetically greater than 25% Eurasian wild boar may be considered a hybrid. Any pig possessing one or more of the following morphological features may be considered a hybrid:

- elongated snout,
- light tip bristles,
- dark point colouration on distal portions (e.g., legs, ears, snout and tail),
- muscular shoulders with small hams or loins,
- straight tail structure,
- erect ears,
- coarse hair or ridge of hair along the back, or
- striped piglets.

The following objectives and actions outline Ontario's path for achieving the goal of preventing the establishment of wild pigs in the province. Given the complex nature of the wild pig problem, the province is taking a multi-pronged approach. This approach includes clear communications, robust policy, Ontario-specific research, management actions, and strong collaboration within and between provincial, state, and federal governments and agencies.

Wild pig is any animal of the species *Sus scrofa* that is not contained or under the physical control of any person or is otherwise roaming freely. This includes a pig of any type (i.e., domesticated pig, Eurasian wild boar, or hybrid) that has escaped or been released from containment, is no longer on the owner's property, and is free roaming. It also includes any pigs that were born in the wild. Terms that are used by other jurisdictions to describe wild pigs include invasive pigs, feral swine, feral hogs, wild hogs, and wild boar.

Objective 1. Prevent the introduction of pigs into the natural environment.

To achieve the province's goal for invasive wild pigs, introduction of pigs into the natural environment must be prevented and minimized. Introductions can be accidental or intentional. They can be a result of escapes from containment, purposeful releases, or abandoned domesticated pigs. Regardless of the cause, pigs that are introduced into the natural environment can quickly adapt to their new surroundings and contribute to a wild pig invasion.

Action 1.1: Regulate wild pigs as an invasive species under the Invasive Species Act, 2015.

Ontario has regulated wild pigs as a restricted invasive species under the *Invasive Species Act, 2015* (Ontario Regulation 354/16). This action provides the province with additional tools to address the threat of wild pigs, such as new rules to prohibit the release of any pig and clear actions that pig owners must take if a release occurs. For example, if a pig escapes or is otherwise caused to be released, the ministry must be notified, and actions taken to capture or dispatch the escaped pig as soon as possible. Enforcement officers have the authority to address issues of non-compliance relating to the release of pigs.

Action 1.2: Work with partners to develop, update and promote best management practices for outdoor pig containment, transporting pigs, and addressing escapes.

Preventing pigs from escaping containment can be a difficult task. Pigs can use their strong snouts and muscular build to go over, through, or under fences that are not designed properly. Wherever outdoor pig production occurs in the province, owners must take measures to keep their pigs contained. Proper fencing not only reduces the risk that pigs will escape, but it is also important for biosecurity. Proper fencing protects contained livestock, including pigs, from unintended interactions with wild animals – interactions that can lead to the spread of diseases. In fact, in areas of the world that have experienced outbreaks of African Swine Fever, direct contact between domesticated pigs that are kept outdoors and wild pigs is thought to be a primary transmission route. Ontario Pork developed a guide for **Small Scale Pig Production** to help those rearing pigs in Ontario. The guide provides information on feeding, management, health, and mandatory requirements for raising pigs in Ontario, including housing and fencing recommendations. OMAFRA produced a complementary factsheet to share information on installing fencing that is suitable for keeping pigs contained. Following this guidance will ensure owners are not unintentionally causing the release of pigs. Ensuring adequate measures are in place to keep pigs contained is not only important when pigs are raised outdoors, but also during transportation (including loading and unloading). OMAFRA has also produced guidance for rural residents about the responsibilities of livestock owners and best practices for the return of escaped animals to containment. OMAFRA will continue to work with partners, including Ontario Pork, to share these resources and promote responsible pig production practices that reduce and address pig escapes.

Action 1.3: Collaborate with partners to develop and deliver outreach for pig owners and producers on their obligations if a pig escape occurs.

Pigs can escape if they are not secured with a properly fitted harness, appropriate fencing or other barriers. Owners may face civil liability for any harm or damage that is caused by their escaped pigs. When escapes occur, it is prudent that any escaped pigs are recaptured or otherwise removed from the natural environment as soon as possible. NDMNRF, OMAFRA, and partners, will continue to develop and deliver outreach to inform pig owners and producers of their obligations if a pig escapes, including new obligations under the *Invasive Species Act, 2015*.

Wild pig: pot-bellied pig. Regional Municipality of Niagara, Ontario

Action 1.4: Coordinate with federal and industry-led initiatives to support traceability of escaped pigs (e.g. PigTrace).

Existing programs, such as **PigTrace** and **Provincial Premises Registry (PPR)** can be helpful to identify and respond to accidental releases that occur during transport. PigTrace is a national, live animal traceability initiative that tracks the movement of animals and requires producer registrations and unique number identifiers for certain classes of pigs when they are being moved. While these programs are primarily intended for emergency management in the event of a food safety issue or foreign animal disease outbreak, they can also be helpful to reunite escaped animals with their owners and ensure that all animals are accounted for should an escape occur while pigs are being transported. PigTrace is mandated under federal **Health of Animals Regulations** and enforced by the Canadian Food Inspection Agency. It is delivered by the Canadian Pork Council and Ontario Pork (in Ontario). Ontario continues to appreciate strong partnerships with these organizations and will collaborate to leverage the benefits of this program as a tool to address pig escapes.

Action 1.5: Collaborate with partners in developing and promoting guidance for responsible pig ownership.

Evidence from other jurisdictions indicates that not all pig releases are accidental. Intentional releases also occur. While the vast majority of pig owners use responsible management practices, there is some evidence of purposeful releases. For example, wild pig populations in the United States increased in 2008 and 2009 when the hog market crashed.

Pot-bellied pigs and mini pigs, also known as micro-pigs, pocket pigs, and teacup pigs, have recently experienced a surge in popularity as pets. While many of these pigs have been selectively bred to be a smaller size, they all belong to the species *Sus scrofa* and are considered livestock in most urban municipalities. Keeping livestock is illegal in areas of some municipalities, such as those that are zoned for residential purposes. People who acquire a pig and later learn of local restrictions are faced with the difficult decision of moving or finding a new home for their pig. In other instances, individuals may not be aware of the responsibilities and risks of pig ownership. Pigs that are not physically and mentally stimulated, contained, or fed may become burdensome. Finding a new home for a pet pig can be difficult. Many Ontario sanctuaries and organizations (e.g., Swine Health Ontario) have developed resources and are sharing information about responsible pet pig ownership. Preliminary research and monitoring in Ontario indicates that a substantial number of wild pig sightings are pot-bellied pigs. As such, NDMNRF and OMAFRA will continue to collaborate with partners to promote these important resources.

Action 1.6: Prohibit hunting of wild pigs in Ontario.

There is a common misconception that hunting could be an effective approach for eradicating wild pig populations; however, research and management experiences from other jurisdictions indicates that hunting actually accelerates their spread. Wild pigs that are exposed to hunting pressure flee into new areas and learn to avoid humans. In some jurisdictions where hunting seasons were introduced as an approach to manage wild pigs, the intentional release of wild pigs into new areas to create additional recreational hunting opportunities significantly accelerated population expansion. Other jurisdictions (e.g., New York) have reduced or eliminated the spread of wild pigs by, in part, banning wild pig hunting. In alignment with best information and Ontario's proactive approach to address the threat of wild pigs, NDMNRF has passed a regulatory amendment to prohibit hunting wild pigs under the *Invasive Species Act, 2015*. Landowners or agents acting on their behalf are able to protect their property from wildlife damage, including for the purpose of biosecurity.

Action 1.7: Support municipalities, where appropriate, in determining policy and legislative actions to address wild pigs in their communities.

Under the *Municipal Act*, a municipality may pass by-laws respecting matters that involve animals, such as pets and livestock. In Ontario, municipalities have effectively used various tools, including by-laws, to address animal control. For instance, some municipalities do not allow livestock, including pot-bellied pigs, to be kept in certain areas (e.g., areas zoned for residential purposes) and/or have prohibitions against livestock at large. Municipalities may consider opportunities to supplement provincial regulations, such as pet registration, to better track and monitor local pet pig ownership. OMAFRA encourages municipalities to develop by-laws to address issues of escaped, abandoned or otherwise uncontained animals and livestock, and provides support, where appropriate.

Wild pigs: pot-bellied pigs. United Counties of Stormont, Dundas and Glengarry, Ontario.

Objective 2. Address the risk posed by Eurasian wild boar in Ontario.

Eurasian wild boar and hybrids are known to play a greater role in the establishment and spread of wild pigs relative to domesticated breeds (i.e., breeds of *Sus scrofa domesticus*). To address this issue, certain jurisdictions have imposed restrictions on possessing Eurasian wild boar to help curb wild pig population growth. Relative to other types of pigs, the number of purebred and hybrid Eurasian wild boar that are farmed for meat production in Ontario is small.

Action 2.1: Phase-out the possession of Eurasian wild boar and their hybrids in captivity in Ontario.

Research from the continental United States indicates that the vast majority of wild pigs in North America have mixed ancestry – they are hybrids of Eurasian wild boar and domesticated pigs. This suggests that hybrids have certain characteristics that make them more likely to survive in the wild and successfully reproduce.

Although keeping Eurasian wild boar in captivity for hunting has been prohibited in Ontario since 2005, Eurasian wild boar may be kept for certain other purposes, including farming. *The Fish and Wildlife Conservation Act, 1997* and supporting policy, prescribe an owner's obligations if a Eurasian wild boar escapes from containment. When escapes are not resolved, Eurasian wild boar can pose a significant risk of becoming established in the wild.

Similar to the situation with domesticated pigs, not all releases of Eurasian wild boar are accidental. Documented evidence from the prairie provinces of Canada shows that, in the past, some Eurasian wild boar farmers purposefully released their livestock, likely as a result of decreased market value and the significant challenge of raising Eurasian wild boar. The released animals were able to survive the harsh winter climate, reproduce, and have become widely established in the Canadian prairies. Likely as a result of both accidental and intentional releases, the proximity of Eurasian wild boar farms in Saskatchewan's rural municipalities is one of the strongest predictors of local wild pig distribution.

Prohibitions on live Eurasian wild boar is consistent with actions taken by other jurisdictions to address the threat of invasive wild pigs. This approach was a large contributor to New York state's successful elimination of wild pigs. Based on this information, Ontario passed a regulatory amendment under the *Invasive Species Act, 2015* to prohibit the import, possession, transport, propagation, lease, trade, buying, and sale of Eurasian wild boar and their hybrids in the province as of January 1, 2022. Anyone who possesses Eurasian wild boar on January 1, 2022 is eligible for an exemption for up to two years (i.e., until January 1, 2024), provided the MNDMNRF is notified. This transition period is intended to limit impacts to Ontarians who would otherwise be directly affected. Individuals who wish to engage in certain activities (e.g., research or education) that would otherwise be prohibited under the *Invasive Species Act, 2015* may seek an authorization from the Minister of NDMNRF.

Objective 3. Use a coordinated approach to remove wild pigs from the natural environment.

In addition to actions that Ontario is taking to prevent the introduction of wild pigs into the natural environment, the province is committed to responding to high risk sightings of wild pigs. Response techniques that have been successful in eradicating wild pigs elsewhere have involved removing entire groups of pigs simultaneously. This method requires coordinated efforts by trained professionals. Management experiences from other jurisdictions, as well as Ontario-specific research, will inform the province's approach for removing wild pigs from the natural environment.

Action 3.1: Maintain reports of wild pig sightings in a central database.

Ontario's wild pig reporting initiative was launched in 2018 along with a request for the public to report sightings. Sightings are received through a dedicated email address (**wildpigs@ontario.ca**), a phone line (1-833-933-2355), and an online platform (**iNaturalist Wild Pig Reporting Ontario**). All sightings are analyzed and stored in a central database. The ongoing collection and monitoring of sightings is critical for the NDMNRF to detect, and where appropriate, control wild pigs.

Wild pigs: domesticated pigs. Parry Sound District, Ontario

Wild pig: domesticated pig. Algoma District, Ontario.

Action 3.2: Develop and share communications to encourage public reporting of wild pig sightings.

Communication efforts have provided the public with information on invasive wild pigs and soliciting their help in reporting sightings of pigs outside of a fence. Communications have been released through print, radio, online news, and social media. Preliminary analysis suggests that media and outreach, including instructions on where and how to submit reports of wild pigs, significantly increased the number of sightings received by the NDMNRF. Ongoing communications by NDMNRF and OMAFRA will ensure the public's continued involvement in wild pig reporting and will continue to be necessary to address occurrences of wild pigs.

Action 3.3: Improve knowledge of the distribution, sighting frequency, characteristics (e.g., disease, genetics), and risks of wild pigs in Ontario.

Where appropriate, NDMNRF will fill knowledge gaps about wild pigs in the province. This work could include further research into the sighting frequency and distribution of wild pigs. It could also include the use of active surveillance (i.e., on-the-ground), aerial surveys, and/or collection of DNA from water samples in areas potentially frequented by wild pigs. Surveillance may become important in remote areas where there are fewer people to observe and report wild pigs. In collaboration with the wildlife disease diagnostic capacity provided by the Canadian Wildlife Health Cooperative, research could also lead to an improved understanding of disease and body condition in Ontario wild pigs. NDMNRF researchers will continue to actively engage with experts about emerging techniques to address the risk of wild pigs.

Action 3.4: Undertake actions to remove wild pigs from the natural environment.

Ontario-specific research, as well as management experiences and best practices from other jurisdictions, will inform the province's approach for removing wild pigs from the natural environment. Management activities that have been particularly effective at eradicating wild pigs in other jurisdictions involve coordinated efforts (e.g., trapping or sharp-shooting) by professionals to remove entire groups of pigs simultaneously, an approach that is referred to as whole-sounder removal. NDMNRF will develop a protocol to inform removal activities, including a prioritization framework to assess the various risks that each wild pig sighting poses to human health and safety, the agriculture industry, and the natural environment. The assessment of these risks will help inform roles and responsibilities, and will guide management activities to remove wild pigs from the natural environment.

Objective 4. Leverage expertise and resources by collaborating across ministries, with federal agencies, other jurisdictions, and industry stakeholders and partners.

Ontario is not alone in addressing the threat of invasive wild pigs. In fact, the number and distribution of wild pigs in Ontario is substantially less than some other jurisdictions with decades of experience. The province is gaining insights from researchers and wildlife managers from these jurisdictions. While the primary source of wild pigs in Ontario currently appears to be escapes within the province, cooperation with neighbouring provinces and states is particularly important for successful wildlife management when the species can cross borders. This may be particularly important for wild pigs, if range expansion continues eastwards from the Canadian prairie provinces and northwards in the United States. Ontario continues to seek advice from relevant agencies, organizations, Indigenous people, stakeholders, and the public who have first-hand knowledge about the province's unique situation and possible solutions.

Action 4.1: Ensure provincial coordination and leverage expertise.

Ontario is committed to ensuring strong within and cross-Ministry collaboration and coordination of actions to support the management of invasive wild pigs. Ontario is also committed to leveraging expertise across jurisdictions by sharing provincial research and management experiences, and other resources as appropriate. This collaboration has been key to the development of Ontario's communications, research, and policy progress. Of particular note, the NDMNRF is working to strengthen relationships with bordering jurisdictions to share information on the distribution of wild pigs and promote monitoring and management activities.

Action 4.2: As opportunities arise, contribute to federal initiatives to address the risk of invasive wild pigs in Canada.

Ontario will continue participating in initiatives to support information sharing and collaboration at a national level. This coordination will address the risk of wild pigs as vectors of disease and implications for Canada's swine industry.

Action 4.3: Continue to share knowledge on wild pigs in Ontario and take collaborative action with relevant stakeholders, industry partners and academia.

The Government of Ontario cannot address the wild pig problem alone. Success will require the collective knowledge of stakeholders, industry partners, and academics with provincial experience and expertise. For example, OMAFRA will continue to partner with the agriculture industry to develop and distribute information on responsible pig ownership. Where appropriate, Ontario will work with stakeholders and partners to develop targeted communications to raise awareness in reporting sightings and addressing the risks associated with escaped or released pigs. As appropriate, Ontario will also contribute experiences and perspectives to inform wild pig research, including large scale modelling and mapping, and management.

Wild pigs: domesticated pigs. Regional Municipality of Halton, Ontario.

Role of Hunters in Wild Pig Management

Hunters have an important role to play in protecting native Ontario wildlife and the natural environment. Although hunting wild pigs is prohibited in Ontario, hunters still have an important role in addressing the wild pig problem. Given the knowledge and time that hunters spend outdoors across the province, the ministry is seeking their partnership and expertise in reporting wild pigs sightings.

Hunters who hold an Ontario hunting licence for other harvestable game are already important partners in assisting property owners in preventing and responding to damage from wildlife. Hunters will continue to play this vital role, including protection against damage caused by wild pigs. When an accidental pig escape occurs, hunters may also assist pig owners in recapturing or dispatching the escaped pig as soon as possible. NDMNRF is committed to filling knowledge gaps about wild pigs in the province. Hunters may have an important role in ongoing and future wild pig research that is conducted by the ministry, academics, and partners.

Next Steps

Research and management experiences from other jurisdictions demonstrate the high costs and challenges associated with eradicating wild pigs once they become established. By implementing the actions in this strategy, Ontario will continue to be proactive in its response to the threat of wild pigs. The province is committed to implementing and tracking progress on achieving the commitments in this strategy and, if necessary, adapting actions as appropriate. Participation from the public, agricultural communities, academia, conservation organizations, Indigenous communities and organizations, and other jurisdictions will continue to be integral in addressing the threat of invasive wild pigs in Ontario.

Responsible Jurisdictions

Ontario Ministry of Northern Development, Mines, Natural Resources and Forestry (NDMNRF)

NDMNRF provides provincial oversight of Ontario's natural resources, which includes protecting Ontario's biodiversity while promoting economic opportunities in the resource sector and supporting outdoor recreation opportunities. In general, NDMNRF is the lead ministry for addressing threats of invasive species on the natural environment, including threats posed by invasive wild pigs. The ministry provides oversight for the *Invasive Species Act, 2015* which sets out a legislative framework that enables the identification of invasive species and includes provisions to prevent invasive species from entering the province, to control their spread, and for removal and eradication.

Although the ***Fish and Wildlife Conservation Act, 1997*** (FWCA) primarily applies to native wildlife, certain rules apply to exotic wildlife (i.e., imported wildlife and stock propagated from imported wildlife), including Eurasian wild boar. As such, this legislative framework includes rules and guidance for certain wild pigs as well as relevant activities, including hunting, protection of property and keeping wildlife in captivity.

Ontario Ministry of Agriculture, Food and Rural Affairs (OMAFRA)

OMAFRA strives to support the province's agri-food sector, enforce and improve food safety and strengthen Ontario's rural communities. The ministry plays an important role in helping to manage animal and plant pests and disease. It also works closely with agricultural industry stakeholders related to both crops and livestock, both of which may be significantly impacted by the issue of invasive wild pigs in Ontario. In the event of a disease introduction that could affect livestock (e.g., the commercial swine industry), OMAFRA provides oversight of the ***Animal Health Act, 2009***.

Municipalities

There are over 400 municipalities in Ontario, all of which play an important role in providing and delivering valuable programs and services to meet the needs of their residents. Under the ***Municipal Act, 2001*** or the ***City of Toronto Act, 2006***, a municipality can pass and enforce by-laws. By-laws can address the control of animals such as livestock at large and domesticated animals subsequently deemed feral. They can also set and enforce rules that generally limit or prohibit pot-bellied pig ownership, for example, in areas that have been zoned for residential purposes.

Canadian Food Inspection Agency (CFIA)

CFIA is dedicated to safeguarding food, animals and plants, which enhances the health and well-being of Canada's people, environment and economy. The agency oversees several acts and regulations related to food safety, plant health and animal health and is Canada's official Veterinary Authority. For animal health, the CFIA administers programs and services to mitigate risks associated with animal diseases and to protect the health of Canada's animal resources. This includes roles in activities such as disease response, trade in animal and animal products, humane transportation of animals, and registration of animal feeds and veterinary biologics. In the context of invasive wild pigs, the CFIA most notably would lead the response in the event of an introduction of a foreign animal disease (e.g., African Swine Fever) into the domestic swine population, and may assist provinces and territories with a response to foreign animal diseases in wild populations, if Veterinary Authority oversight is required by the international standards. Under its mandate, the CFIA remains concerned about the issue of invasive wild pigs in the context of disease control, particularly at the interface between wild and domesticated pig populations.

Environment and Climate Change Canada (ECCC)

ECCC is the lead federal department for a wide range of environmental and sustainability issues. They oversee various acts and regulations to support the preservation and enhancement of the natural environment including the ***Species at Risk Act***, the ***Migratory Birds Convention Act, 1994***, the ***Canada Wildlife Act***, and the ***Wild Animal and Plant Protection and Regulation of International and Interprovincial Trade Act***, among others. ECCC undertakes coordination with other governments, Indigenous organizations, non-government organizations, and universities to address cross-cutting issues such as invasive species, wildlife disease, and the preservation of healthy ecosystems.

Wild pig: domesticated pig. Middlesex County, Ontario.

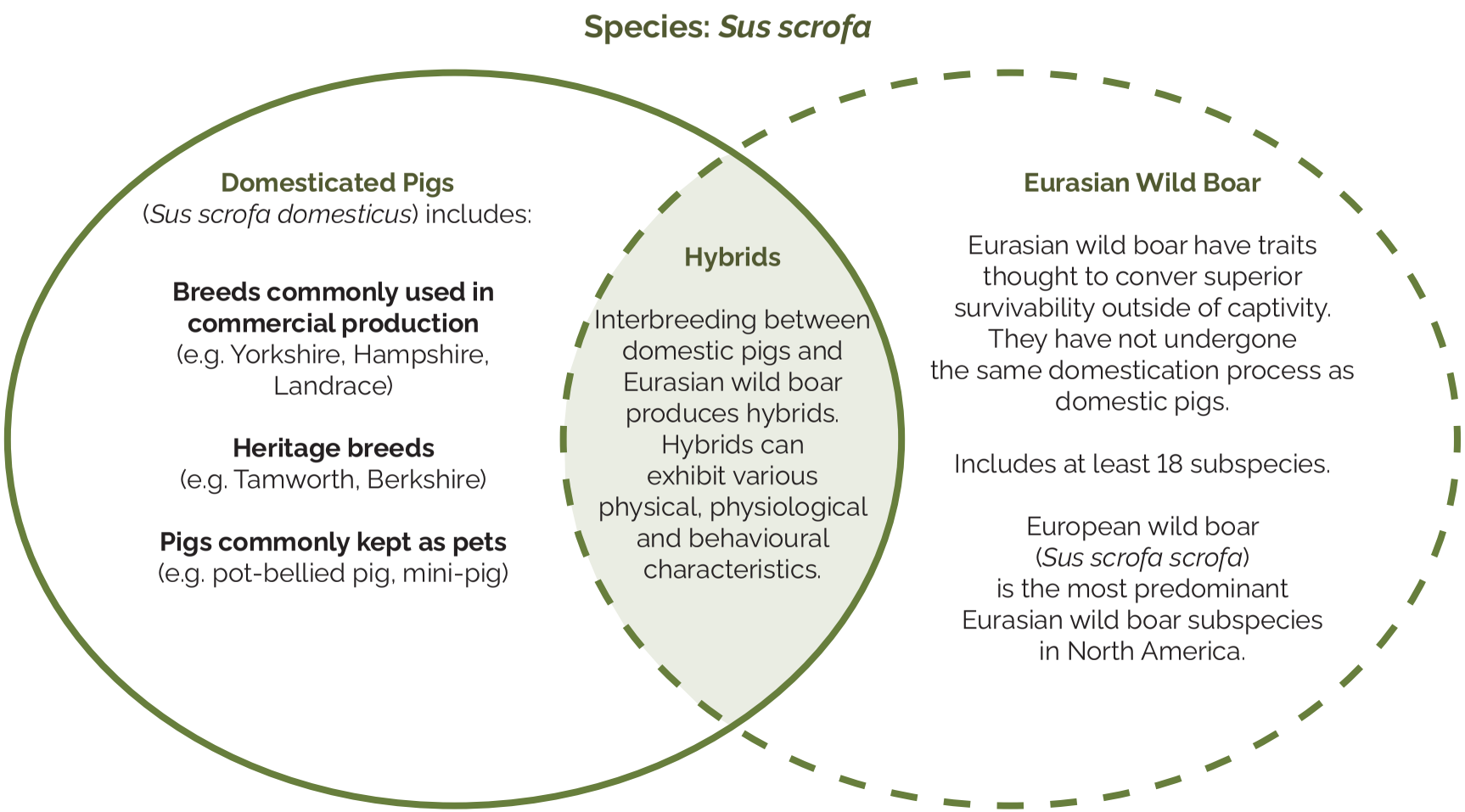
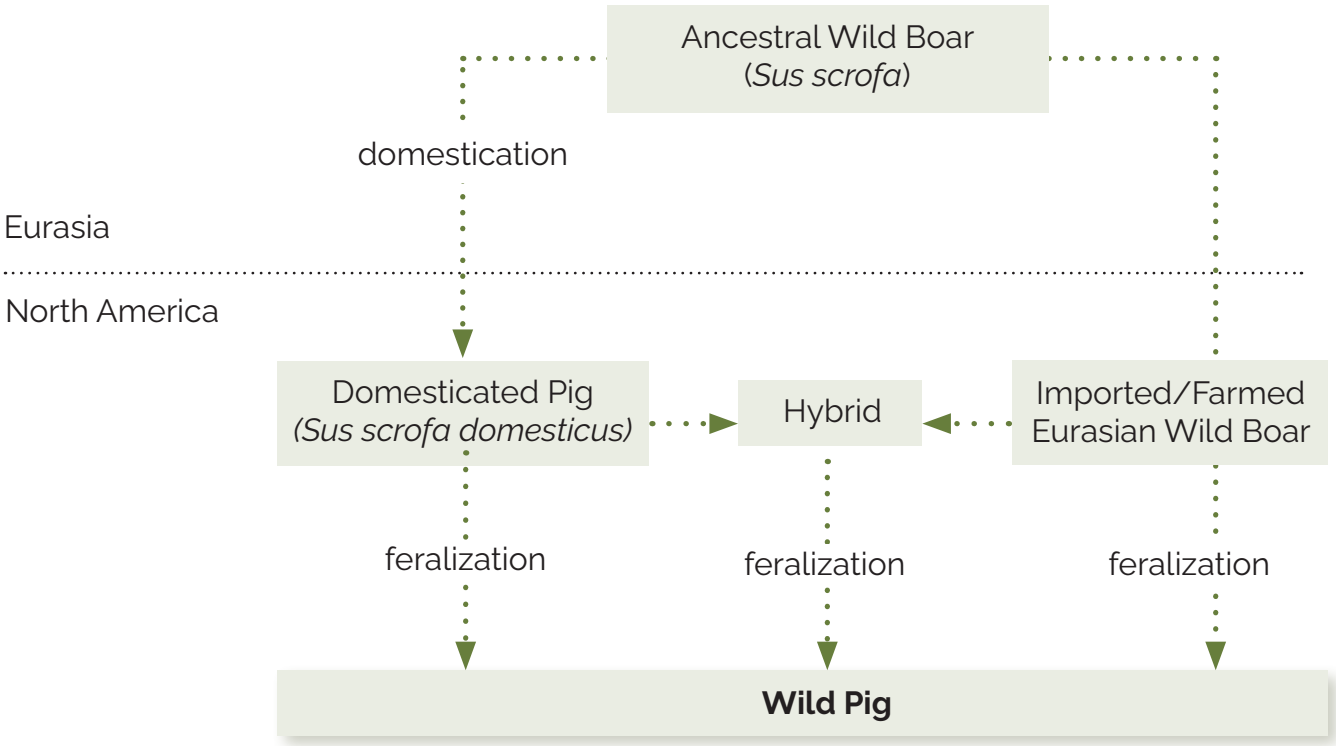


Figure 1. Venn diagram of the different types of *Sus scrofa* referenced in this strategy.

What are wild pigs?

The term wild pig encompasses all pigs, including Eurasian wild boar, domesticated pigs, and hybrids (Figure 2), that are not contained or under the physical control of any person, or are otherwise roaming freely. This includes individuals that have escaped or been released from captivity, as well as their progeny. There are several synonyms for the term wild pig, such as feral pig, feral hog, feral swine, wild hog, wild swine, razorback, and wild boar.

Eurasian wild boar and domesticated pigs belong to the same species, *Sus scrofa*. Through the process of domestication, individuals of *Sus scrofa* were selectively bred for favourable characteristics, such as tameness, size, and reproductive capacity, resulting in *Sus scrofa domesticus* (sometimes referred to as simply *Sus domesticus*). Many contemporary (e.g., Yorkshire, Hampshire and Landrace) and heritage (e.g., Tamworth and Berkshire) breeds of *Sus scrofa domesticus* are recognized today. Although not all distinct breeds per se, pot-bellied pigs, 'micro' pigs, and 'teacup' pigs are also included in the subspecies *Sus scrofa domesticus*.



*Feralization can occur when animals escape or are released from captivity.

Figure 2. History and general taxonomy of wild pig (*Sus scrofa*) types found in North America. Wild pigs may also interbreed and produce hybrids in the wild.

Wild pig biology

Wild pigs can be born in the wild or they can be the result of an escape or release from captivity. Within a matter of months, a wild pig originating from captivity can become untamed and exhibit appearances (e.g., dense hair) and behaviours (e.g., foraging and aggression) that are more typical of their ancestors – Eurasian wild boar. Over generations of uncontrolled breeding, their similarities to Eurasian wild boar can be even more pronounced through the expression of genetic traits (e.g., longer snout, larger tusks) that provide higher survivorship in the wild. These biological characteristics and behaviours enable them to adapt to and thrive in a variety of environments.

Diet

Wild pigs have a highly variable diet, feeding opportunistically on a variety of plants and animals. They require a large volume of food to support their large body size (typically 70-100 kg but can weigh in excess of 300kg). Wild pigs living in landscapes dominated by agriculture tend to exploit crops and small livestock, while wild pigs in more natural settings predominantly root for tubers, amphibians (e.g., salamanders) and worms. They also eat available seeds and nuts, eggs of ground nesting birds and reptiles, and even prey on native game species (e.g., white-tailed deer fawn).

Reproduction

Wild pigs have a very high reproductive rate and are able to double their local density in just one year. Females are able to breed as early as five to eight months of age and can produce two large litters of piglets annually. While litter sizes of five or six piglets is typical, litters with more than ten piglets are not unusual.

Behaviour

Wild pigs are intelligent and social animals. Adult males are usually solitary outside of the breeding season whereas females live in groups, called sounders, made up of several females and their offspring.

Wild pigs can be active during both the day and at night. When confronted with human activity (e.g., living in areas with a higher human population density or if faced with hunting pressures), they become more elusive and increasingly nocturnal.

Overwintering

Wild pigs are capable of surviving northern winter climates, and in fact are thriving in parts of Canada (i.e., the prairies). There are cases where wild pigs have persisted over multiple seasons, including winter, in Ontario.

Habitat

Wild pigs are habitat generalists. They can live anywhere that provides ample shelter, food, and water, including agricultural areas, riparian areas, grasslands, and forests. Wild pigs are also capable of inhabiting cities, and have been found in cities such as Houston, Barcelona, and Rome, among others.

Predators

In North America, wild pigs have few, if any, natural predators. Accounts of predation on wild pigs by, for example, coyotes, are opportunistic and primarily directed at the youngest individuals within the sounder.

Distribution of wild pigs

North America

With the exception of Antarctica, wild pigs are found on every continent making them one of the most widely distributed mammals in the world. They are not native to North America. Domesticated pigs were initially brought to North America in the mid-16th century by explorers and settlers as a source of food. Populations of wild pigs began establishing on the landscape in the southern United States shortly after, resulting from accidental and intentional releases. Subsequent introductions of Eurasian wild boar into North America for sport hunting occurred in the 19th and 20th centuries.

Presently, wild pig populations are established and spreading throughout vast areas of the United States. Abundance estimates of wild pigs in the United States exceeds 6 million and their range covers at least 35 states, with estimates increasing over time (Figure 3).

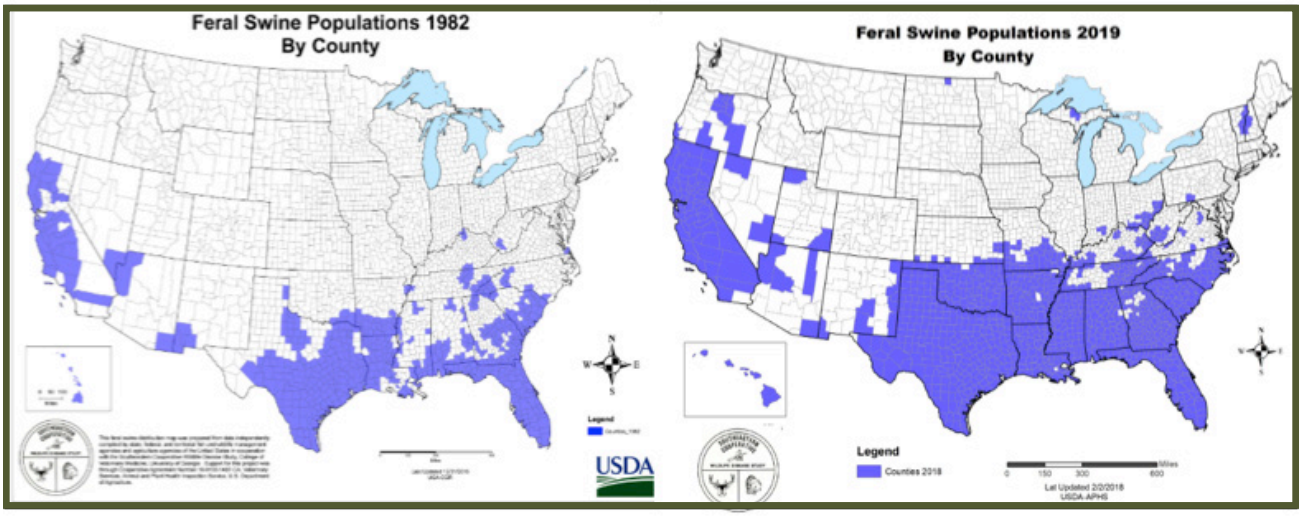


Figure 3. Distribution of wild pigs in the United States mapped by county in 1982 (left) and 2019 (right) (USDA. 2020. History of Feral Swine in the Americas. **https://www.aphis.usda.gov/aphis/ourfocus/wildlifedamage/operational-activities/feral-swine/sa-fs-history**.)

Canada

Eurasian wild boar were first introduced to western Canada in the 1980s and 1990s as part of an agricultural diversification program. The number of wild pigs in Alberta, Saskatchewan, and Manitoba is growing (Figure 4). Established populations of wild pigs are not known to occur in the Canadian territories or Atlantic Canada.

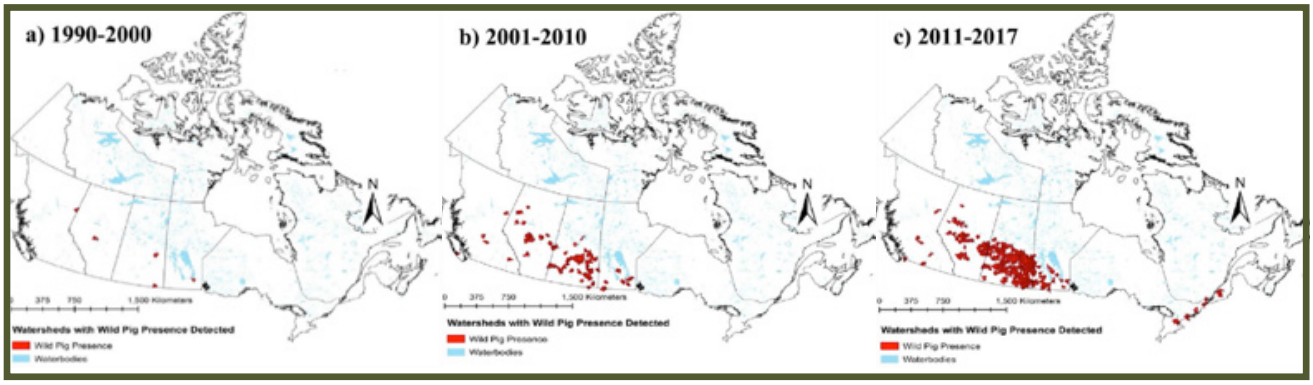


Figure 4. Spatial expansion of wild pigs in Canada from (a) 1990-2000, (b) 2001-2010, and (c) 2011-2017 (Aschim, R. A. and Brook, R. K. 2019. Evaluating Cost-Effective Methods for Rapid and Repeatable National Scale Detection and Mapping of Invasive Species Spread. Scientific Reports, 9:7254.)

Ontario

In 2018, NDMNRF initiated a project to learn more about the number and locations of wild pigs through sightings reported by the public. Reports vary, including everything from domesticated pigs loose on the road, to trail camera footage of Eurasian wild boar, to pot-bellied pigs that have wandered away from home or have been abandoned. Based on current information, it's likely that Ontario has small numbers of wild pigs scattered across southern, central, and eastern Ontario. Unlike many jurisdictions in North America, most reports in Ontario describe a single wild pig or small group of pigs. At this time, there is no evidence to suggest that wild pig populations are self-sustaining and breeding in the province.

Source of wild pigs

In other jurisdictions, the primary sources of wild pigs are releases or escapes from agricultural operations, immigration from neighbouring jurisdictions, releases or escapes from non-agricultural settings, and natural population growth from existing populations.

Agricultural operations

In Ontario, domesticated pigs and Eurasian wild boar are bred and raised for meat production. While farming practices vary widely, most commercially farmed domesticated pigs are raised indoors. Farmed Eurasian wild boar, on the other hand, are typically raised outdoors. Wild pigs that originate from agricultural operations enter the natural environment through escapes from containment, unintentional release during transport, or abandonment.

Wild pig: pot-bellied pig. Prince Edward County, Ontario.

Neighbouring jurisdictions

Wild pigs dispersing into Ontario from neighbouring jurisdictions are another possible source of wild pigs in Ontario. Wild pigs are able to cross roads, urban areas, open fields and cropland with no apparent difficulty. Although the shape of the Ontario landmass with most provincial borders bounded by lakes and rivers may provide some protection from wild pig immigration, wild pigs are excellent swimmers and have been observed crossing large waterbodies. At this time, there is no evidence to suggest that immigration from neighbouring jurisdictions is a source of wild pigs in Ontario.

Non-agricultural Sources

Experience from other jurisdictions has shown that wild pigs can originate from non-agricultural sources. The majority of wild pig populations in the United States are thought to be the result of intentional releases to create new recreational hunting opportunities in areas previously uninhabited by wild pigs. Non-agricultural sources also include captive hunting establishments and pets. Pet pigs can become wild when they escape or are purposefully abandoned by their owner. In Ontario, of the sightings of wild pigs where the type of pig could be verified, roughly one third were pot-bellied pigs. Ontario is not unique: other jurisdictions have reported that escaped or abandoned pot-bellied pigs have become feral and management actions have been necessary.

Natural Population Growth

In jurisdictions where wild pigs are established, natural population growth and dispersal have resulted in range expansion from within their borders. Rapid rates of population growth can largely be attributed to high reproductive rates combined with high rates of survival. In Ontario, the majority of wild pig sightings are of single individuals, rather than groups. This, coupled with the fact that most wild pigs are separated by large distances, makes it very unlikely that natural population growth is a source of wild pigs in Ontario at this time.

Acknowledgements

Science and management experiences of other jurisdictions have been instrumental in developing Ontario's approach to address the threat of invasive wild pigs. Efforts by partner ministries, agencies, and organizations, including the Ontario Federation of Anglers and Hunters, have been particularly valuable in sharing information on wild pigs. Research on wild pigs, including studies conducted in Canada by Ryan Brook and colleagues, as well as management experiences from our neighbours (e.g., New York and Michigan) were particularly informative. While the issue of wild pigs is not unique to Ontario, this strategy is grounded in provincial context. Defining a solution to the wild pig problem in an Ontario-context would not be possible without the public's contribution in reporting sightings of wild pigs.

Additional Resources

Ontario Ministry of Agriculture, Food and Rural Affairs. 2020. Fencing for outdoor pig production: protecting your livestock and the environment. **https://www.ontario.ca/page/fencing-outdoor-pig-production-protecting-your-livestock-and-environment**.

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Ontario Ministry of Natural Resources. 2012. Ontario Invasive Species Strategic Plan. **https://www.ontario.ca/page/invasive-species-strategic-plan-2012**

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Ontario Pork. 2019. Small Scale Pig Production: An Introduction to Small Scale Pig Farming in Ontario. **https://www.ontariopork.on.ca/Portals/0/Small-Scale-Pig-Production-in-Ontario-Manual-November-21.pdf**.

Swine Health Ontario. 2019/20. Guide to Pet Pig Ownership. **http://www.swinehealthontario.ca/Communications/pet-pig-guide**.