



United States Department of Agriculture

FERAL SWINE DAMAGE TO WETLANDS AND EFFECTIVE MANAGEMENT OF THIS INVASIVE SPECIES

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History of Feral Swine in U.S.

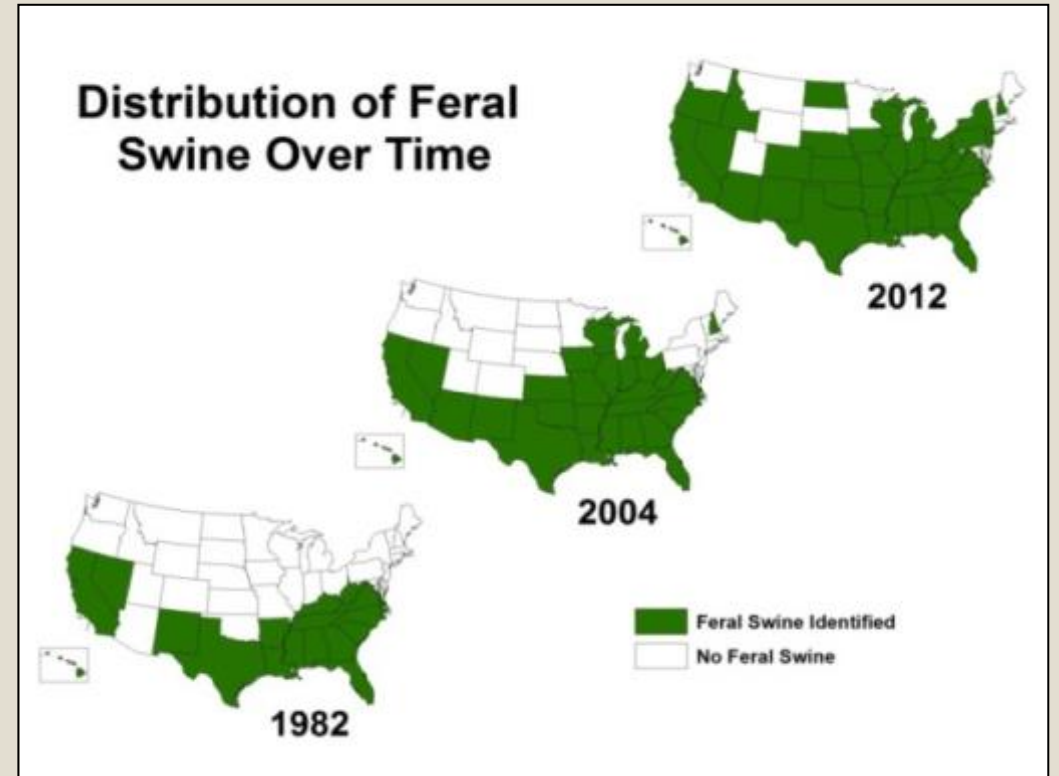
Swine were first brought into the U.S. in the 1500s by explorers and repeated introductions have occurred since.

In the past 20 to 30 years feral swine populations and distribution have greatly expanded due to:

- Intentional translocations
- Escapes from fenced farming and hunting operations
- Breeding with free-ranging domestic pigs

Over 6 million feral swine can now be found across more than 35 states.

Year	Number of States with Feral Swine
1982	17
2004	28
2012	36
2014	41
2016	37



Labeled the “World’s Worst Invasive Alien Species”

Feral swine cause damage by:

- Foraging
- Rooting
- Trampling
- wallowing

Damage across all resources:

- Agriculture and livestock
- Natural resources, including habitat and wildlife
- Property, including cultural resources
- Human and pet health and safety



How feral swine impact wetlands

Wallowing

- Wallows are muddy, wet areas frequented throughout the hottest part of the day to help maintain body temperature due to the lack of sweat glands
- Changes water quality

Rooting

- Rooting is the over-turning of soil in search of food items
- Causes soil disturbance and creates opportunistic habitats for invasive plants
- Decreases plant cover and alters plant communities
- Disturbs leaf litter
- Damages the slopes of ponds



How feral swine impact wetlands

Contamination

- Increases levels of nutrients, such as nitrogen and phosphorus, in the water source
- Lowers pH levels and dissolved oxygen levels
- Transmission of pathogens and parasites such as giardia and *E. coli*
- Creates breeding grounds for disease-carrying mosquitos



How feral swine impact wetlands

Plum Creek Watershed

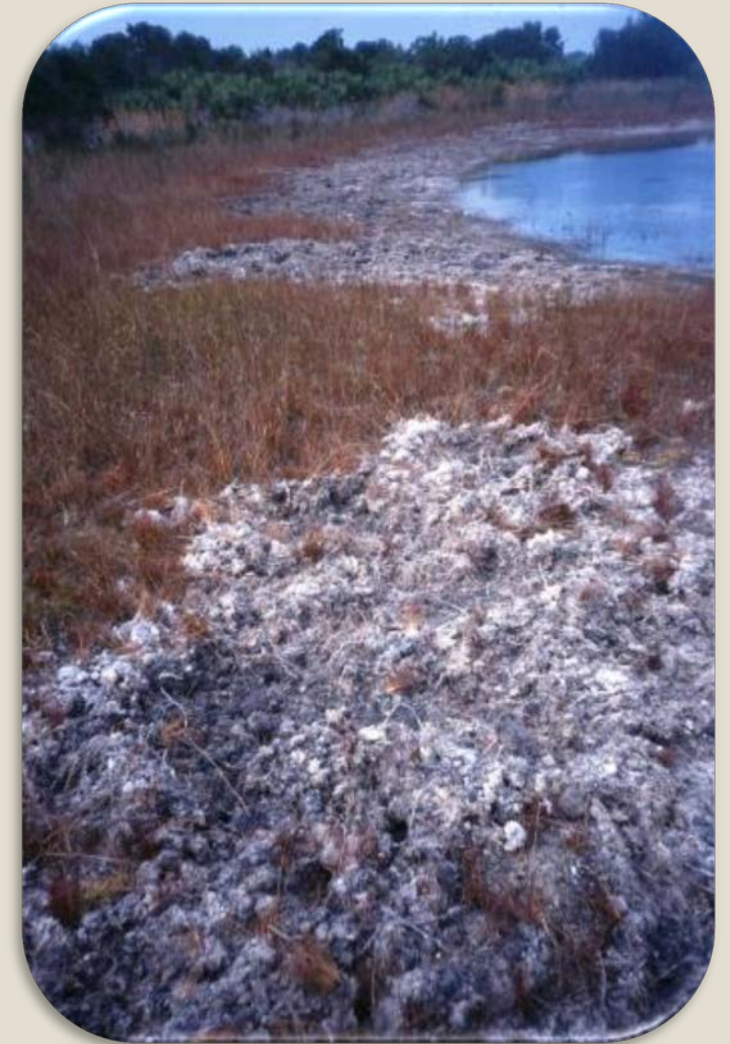
- 52 mile long stream running through Hays, Kyle, and Cadwell counties in Texas
- *E. coli* contamination in Plum Creek watershed was worsening
 - 2002 - parts of the watershed did not meet recreational contact water quality standards for *E. coli*
 - 2010 - entire watershed did not meet safety standards for bacteria and had high levels of nitrites and phosphorus
- Bacteria levels decreased significantly (about 50%) after conducting a collaborative feral swine removal program



How feral swine impact wetlands

Sedimentation

- High traffic and rooting from feral swine causes erosion and increases suspended solids in ponds and streams
- Rains and runoff carry increased sediment downstream
- Sediment settles in streambeds and changes micro-ecosystems by filling in cracks in rocks where invertebrates and other small animals live



How feral swine impact wetlands

Destabilization/ Erosion

- Wallowing and rooting along riparian and wetland areas increases erosion and causes embankments to give way
- Feral swine have even been known to collapse levees and earthen divergences on irrigation channels



How feral swine impact wetlands

Competition/Consumption

- Wetlands are unique ecosystems which support many rare and sensitive plant and animals species
- Consumption of seeds, seedlings, and other vegetation reduces the amount available for native wildlife
- Direct mortality to invertebrates and other small animals through consumption
- Consume or uproot vulnerable native plants
- Create competition for limited water resources with native wildlife during dry seasons



Endangered species at risk from feral swine damages to wetlands



Hine's Emerald Dragonfly

Impacts:

- Loss and degradation of delicate and unique fen habitat
 - A fen is a type of wetland, similar to a bog or mire, which is fed primarily by groundwater
- Disruption of life cycle
 - Nymphs live aquatically for 2-4 years and are sensitive to water quality and pollutants in this stage of life
 - Adults emerge and fly for only 4 to 5 weeks before death, if they emerge to a swamp degraded by feral swine they may not find a mate before death



Mead's Milkweed

Impacts:

- Loss and fragmentation of tallgrass prairie habitat
- Direct predation and destruction through rooting
 - Takes the plant 15 years or longer to reach sexual maturity and they can live for decades
 - Feral swine will eat root structures and seed pods plant uses to reproduce
- Mead's Milkweed is important for many other species including:
 - Monarch Butterfly
 - American Bumblebee
 - Digger Bees
 - Other pollinators



Houston Toad

Impacts:

- Habitat displacement
 - Structural damage to ponds affect egg strands and tadpole survivorship
- Direct predation
 - Feral swine consume adults, tadpoles, and egg strands of the slow moving toads
- Decreased water quality
 - Increased nutrients, lowered pH levels, and low dissolved oxygen levels negatively impacted larvae and tadpole survivorship



Okaloosa Darter

Impacts:

- Decreased Water Quality
 - Extremely sensitive to erosion of riparian areas from feral swine which causes siltation
 - Lives along stream margins in woody debris, feral swine rooting degrades this unique marginal habitat
 - The small population with a limited range is very sensitive to feral swine impacts



Black-necked Stilt

Impacts:

- Direct predation
 - Ground nesters - experienced up to 50% nest predation in one study
- Habitat alteration
 - Stilts prefer open, not over-grown wetlands
 - Feral swine activity destroys native plant species while increasing invasive weeds
 - Siltation and contamination from feral swine reduces availability of key food resources



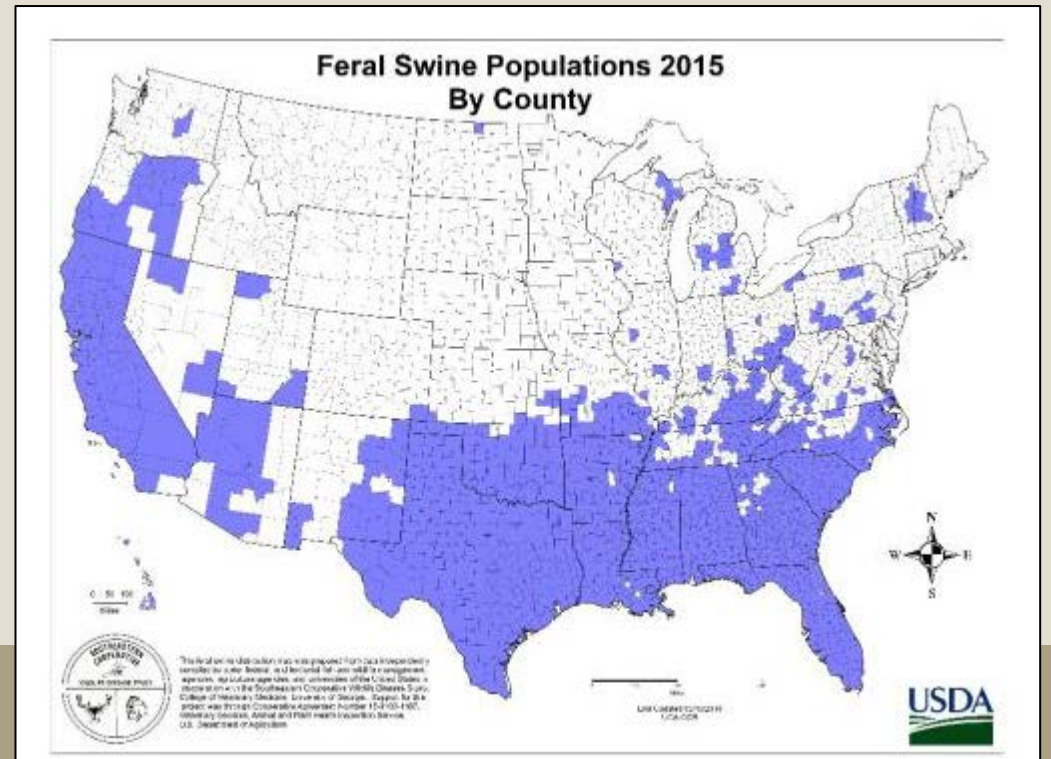
National Strategy to Manage Feral Swine

In 2014, USDA’s Animal & Plant Health Inspection Service (APHIS) began receiving \$20 million annually to implement a collaborative, national feral swine management program in states where there was a recognized feral swine population.

Primary Goal: Minimize damage caused by feral swine to protect agriculture and livestock, natural resources, property, and human health and safety.

Accomplished by:

1. Suppressing populations in states where feral swine populations are large and widely distributed
2. Eliminating feral swine in states where populations are low or newly emerging



Integrated Approach for Managing Feral Swine

Six Program Components:

- Direct Control and Management Operations
- Disease & Population Monitoring across State and International Borders
- Research
- Planning & Program Monitoring
- Communication & Outreach
- Regulatory Actions



Management Methods



Aerial Surveys



eDNA analysis



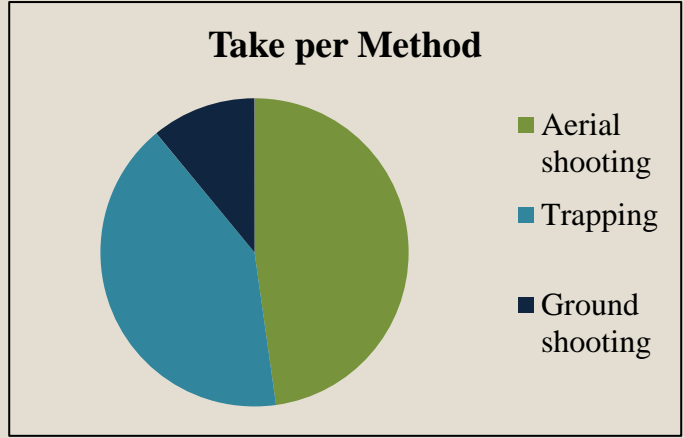
Scat Detection Dogs



Trail Camera Surveys



Management Methods





Questions?



For more information, please contact me at:
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Or visit our website at:
<http://www.aphis.usda.gov/wildlife-damage/stopferalswine>
Or call 1-866-4USDA to reach the office nearest you