

# Foreign Animal Disease Preparation 2022

# Learning Objectives

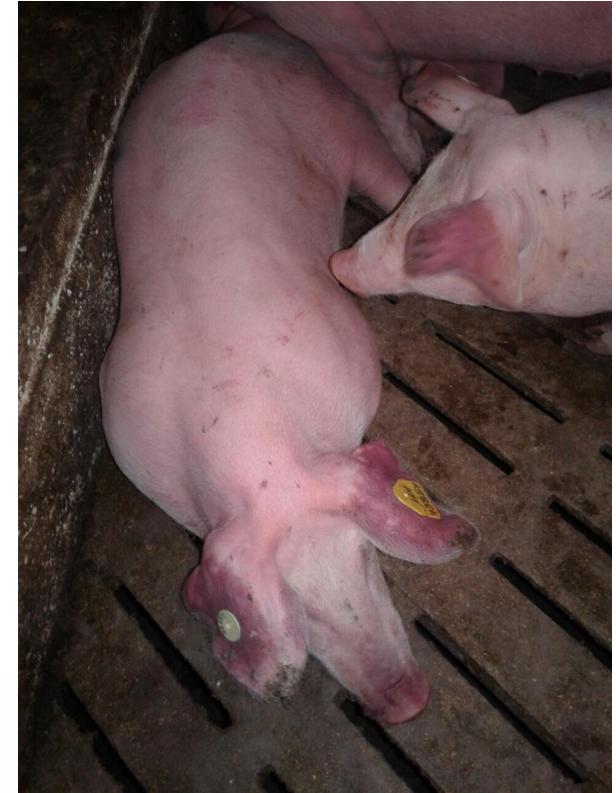
- What participants should leave here with:
  - Knowledge of ASF signs and symptoms and how to report them
  - Understand how FAD preparedness programs work together
  - How to enroll in US SHIP
  - What to expect during the 72 hour standstill if my site is involved
  - Options if I have to extend feed in my bin in case I cannot order mine during standstill
  - Options for feed mitigation
  - Considerations for depopulation and disposal plans.

# Agenda

- Update on ASF and how are we keeping it out
- FAD Preparedness Programs
- Response once FAD is diagnosed : 72 hour standstill
- What happens after the standstill is lifted?
  - Considerations for everyone NOT in control zones
- Checklist of FAD Preparedness activities

# What should you expect to see in ASF Outbreak?

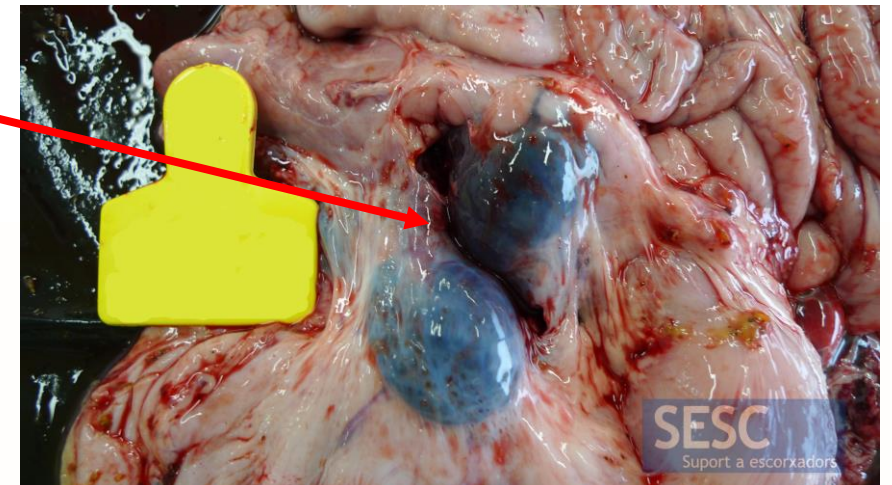
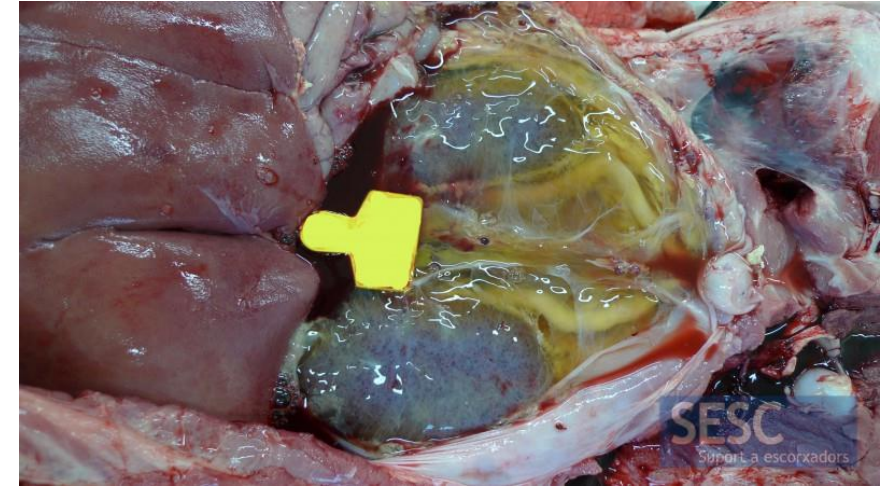
- Fever (**105-108F**)
  - Be sure to carry your thermometers!!
- Hemorrhages
  - Ears, nose, hind quarters on live pigs
  - Petechial, ecchymosis to frank hematomas
- Bloody diarrhea (melena)
- Anorexia
- Recumbency (lying down, not getting up)
- Abortion (May be primary sign in Sow Herds)



**Will just look like sick pigs initially!! (Salmonella, PRRS, Erysipelas, PCV2, etc)**

# What post-mortem lesions might you see with ASF?

- Splenomegaly (large spleen)
  - Very large and friable
- Internal hemorrhages
  - Kidneys (very common)
  - Lymph nodes
    - Gastro-hepatic (very common)
    - Renal
    - Retropharyngeal
    - Others
  - Walls of intestine
  - Lumens



# ASF: Yes or No??

- Case processed at ISU Veterinary Diagnostic Lab
  - PRRS
  - PCV2
  - *Salmonella cholerasuis*



# What economic impact would an ASF outbreak have?

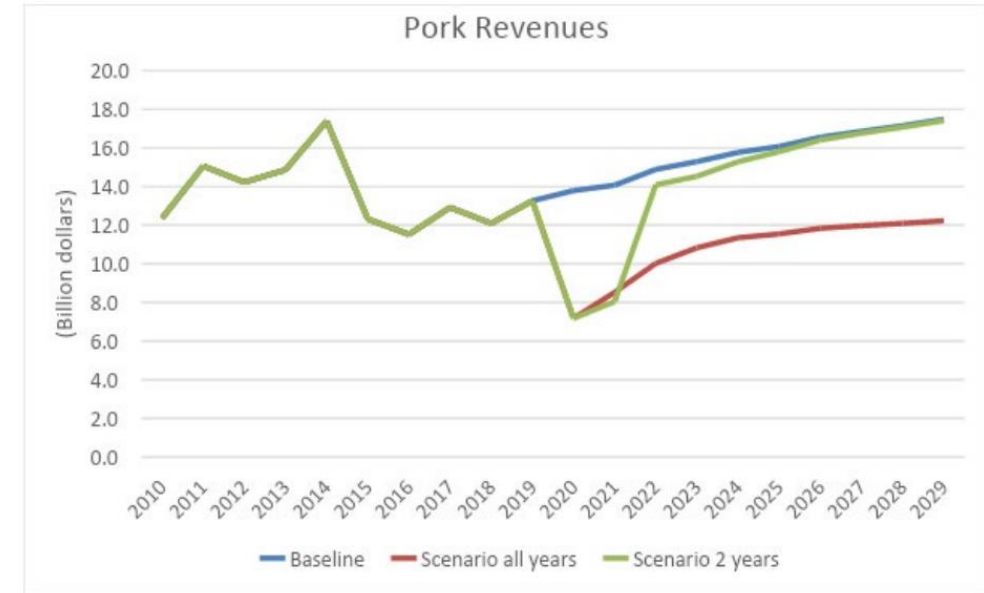
## 2 Models

### Model 1: Eradicate in 2 years (no feral pig +)

- **\$15 Billion**
- Minimal Job Loss due to industry contraction

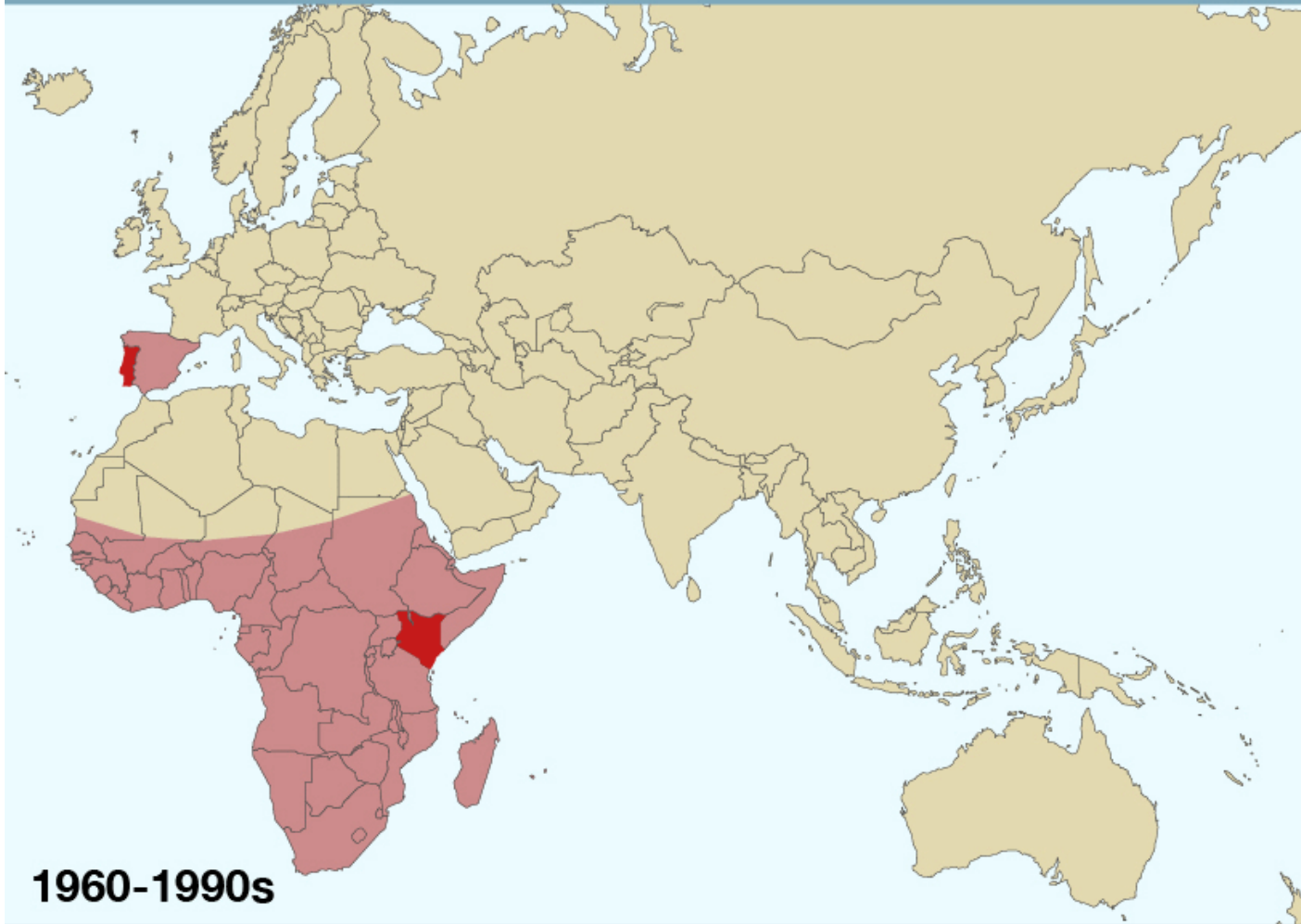
### Model 2: Endemic in feral pigs – 10 years

- **\$ 50 Billion**
- Loss of 140,000 jobs due to industry contraction



**Highlights the value of the loss of exports – 25-30% of the pigs produced are exported**

# African Swine Fever Spread



1960-1990s

# African Swine Fever Spread

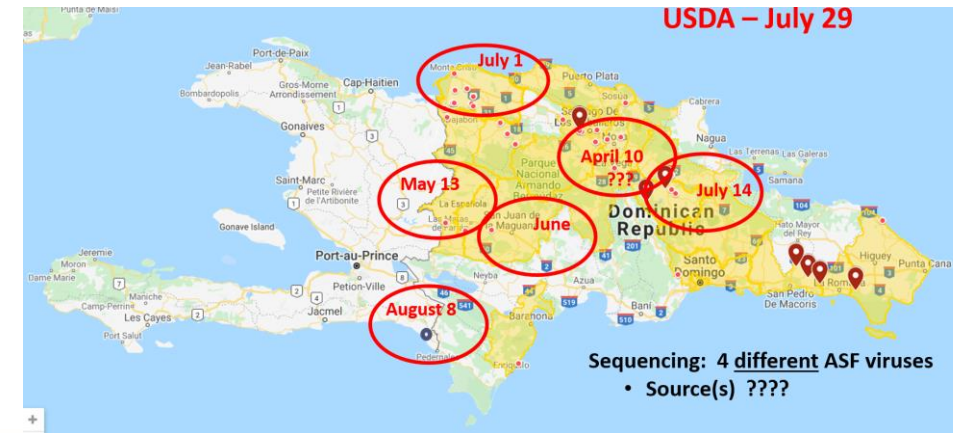


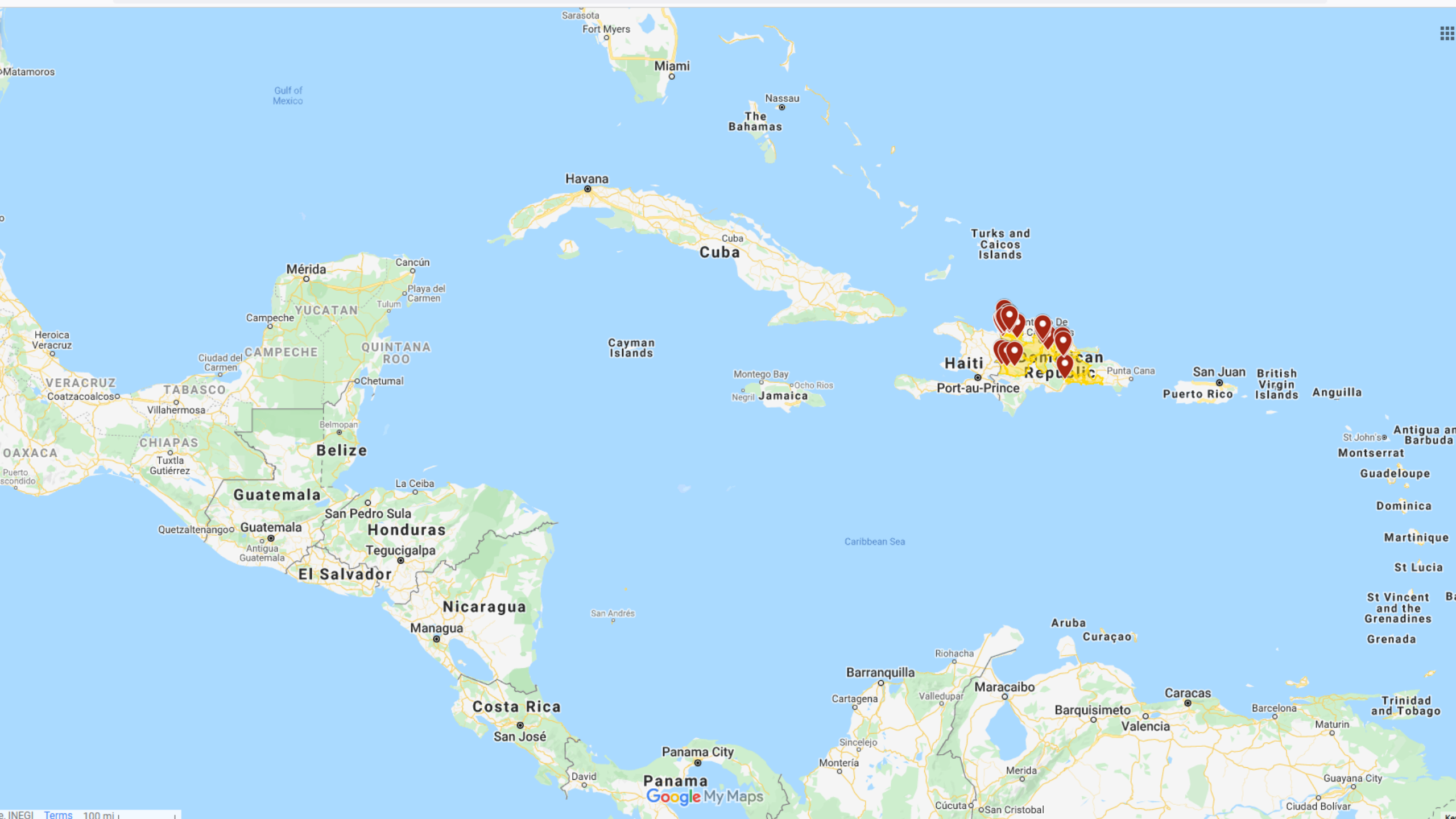
2021



# Dominican Republic – Science and Politics

- DR/USDA cooperative surveillance since 2019
  - Samples collected and submitted by DR quarterly
  - Were concerned about samples collected in June 2021
- Depopulation is underway but difficult to stay ahead of ASF
  - Trust and indemnity
  - Garbage feeding is very prominent
  - Technical ability





# Puerto Rico / U.S. Virgin Islands

## Protection Zone

- Response to increased foreign disease risk from a neighboring country.
- Acceptance and recognition of this protection zone will occur on a country-by-country basis.

USDA Issues Federal Order as Part of Establishment of Foreign Animal Disease Protection Zone in Puerto Rico and U.S. Virgin Islands to Protect from African Swine Fever

Published: Sep 16, 2021

Print



*USDA Issues Federal Order to Establish Foreign Animal Diseases Protection Zone*

Contact: [APHISpress@usda.gov](mailto:APHISpress@usda.gov)

The U.S. Department of Agriculture's (USDA) Animal and Plant Health Inspection Service (APHIS) is issuing a [Federal Order](#) suspending the interstate movement of all live swine, swine germplasm, swine products, and swine byproducts from Puerto Rico and the U.S. Virgin Islands to the mainland United States until APHIS can establish sufficient mitigations to authorize such movement. This Federal Order, effective today, is the final action in a series of safeguards needed to establish an African Swine Fever (ASF) protection zone in Puerto Rico and the U.S. Virgin Islands.



# USDA Action in Puerto Rico

- Diagnostic laboratory improvements
- Increased inspections of legal and illegal boat traffic
- Increased inspection of licensed garbage feeders
  - Domestic swine also tested at these establishments
    - 165 premises
- Feral swine surveillance and removal
  - Testing of depopulated feral pigs (325 in 2021)

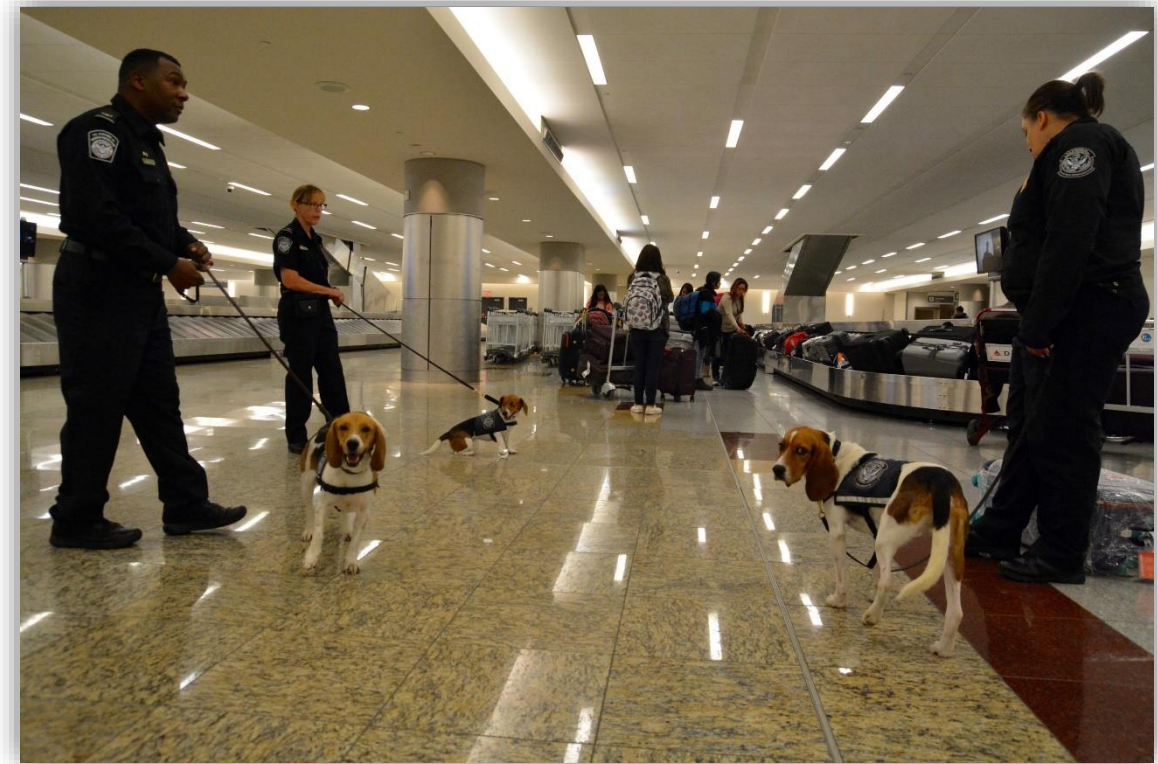


# Beagle Brigade

- >165 canine teams
- 39-43 ports

## Beagle Brigade Act of 2022

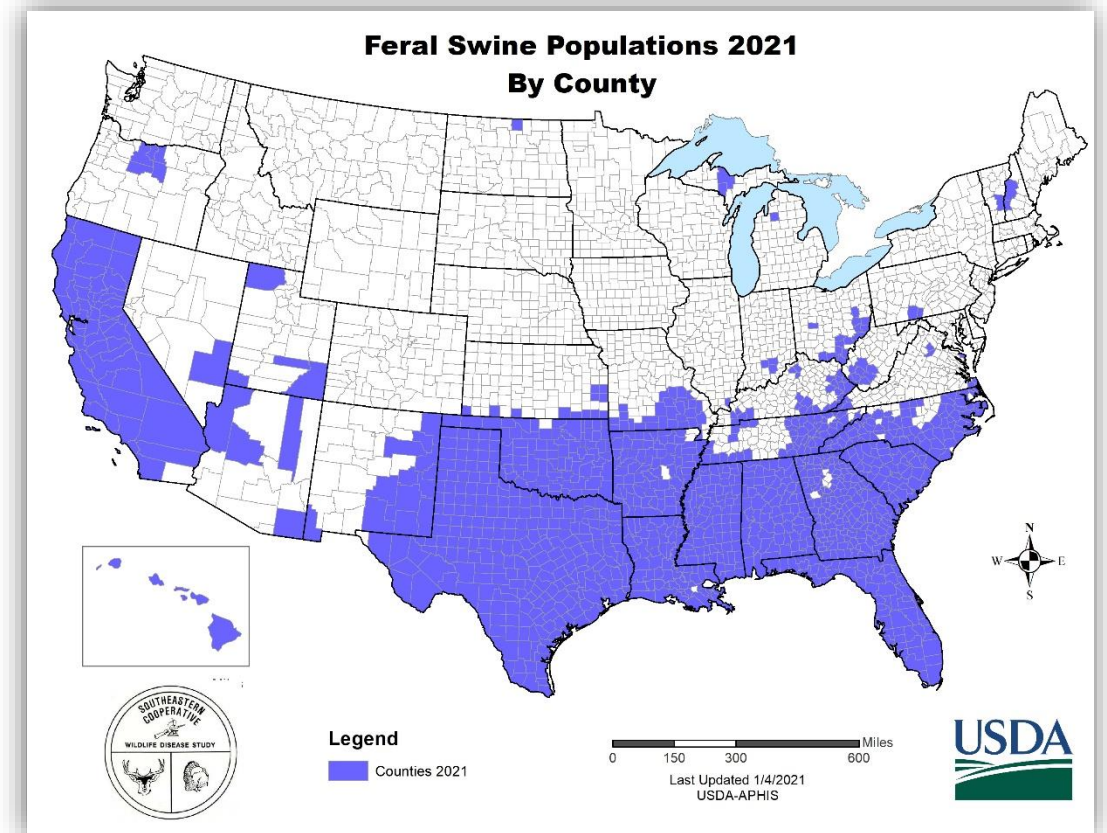
- Would specifically authorize National Detector Dog Training Center



# USDA Wildlife Services

## Feral swine surveillance

- Identified 30 high-risk counties
  - GA, FL, LA, TX
  - Active feral swine control programs
- Testing for ASF and CSF



# What about vaccines for African Swine Fever (ASF)?

- **Still a LONG ways away from a vaccine to be used in the US.**
- U.S. candidate (Plum Island Vaccine - 2020)
  - First generation is the one that was licensed to a company in Vietnam for commercial production.
  - Good: Safe and effective – does not revert to wild type recombination and prevents wild type infection in pigs
  - Bad: Not DIVA → can't tell vaccinated from wild type infected animals
  - Bad: Will grow only in pig primary macrophages so it is very limited in production scalability.
    - Working on 2<sup>nd</sup> generation vaccine that could be grown on cell lines → scaled up.



# FAD Preparation Programs

**US SHIP**

**SPS**

**AgView**

**CSSC**

**IDALS**

**USDA-  
APHIS**



# Fundamentals among all programs



**Traceability**

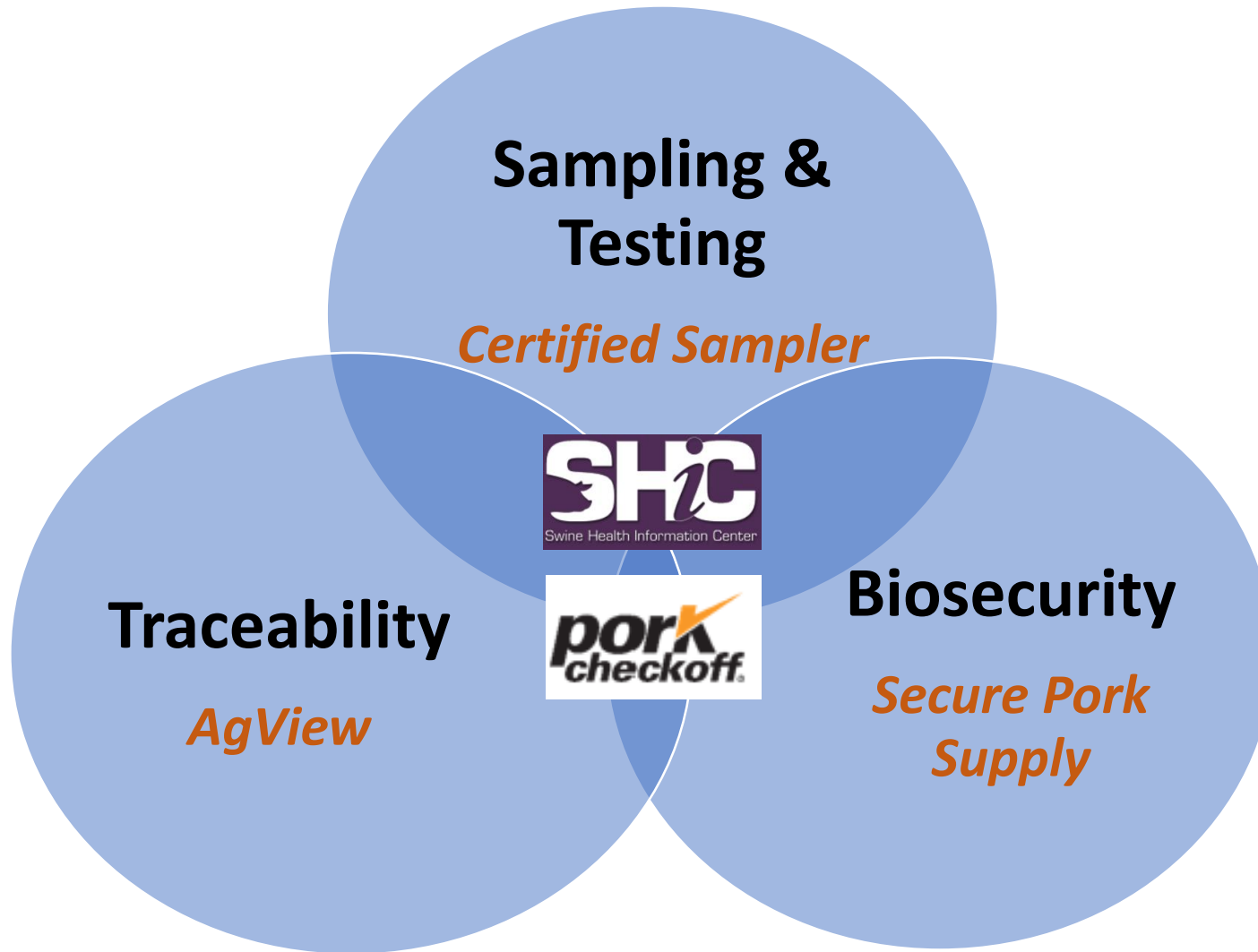
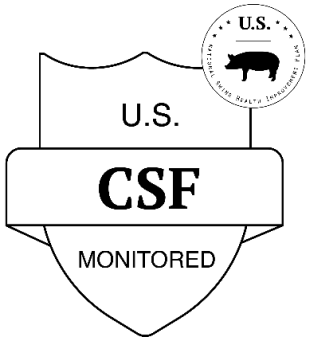


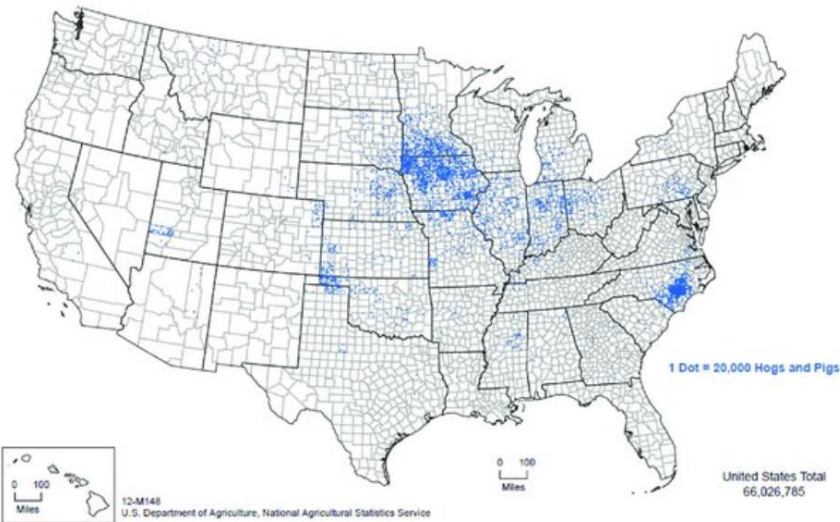
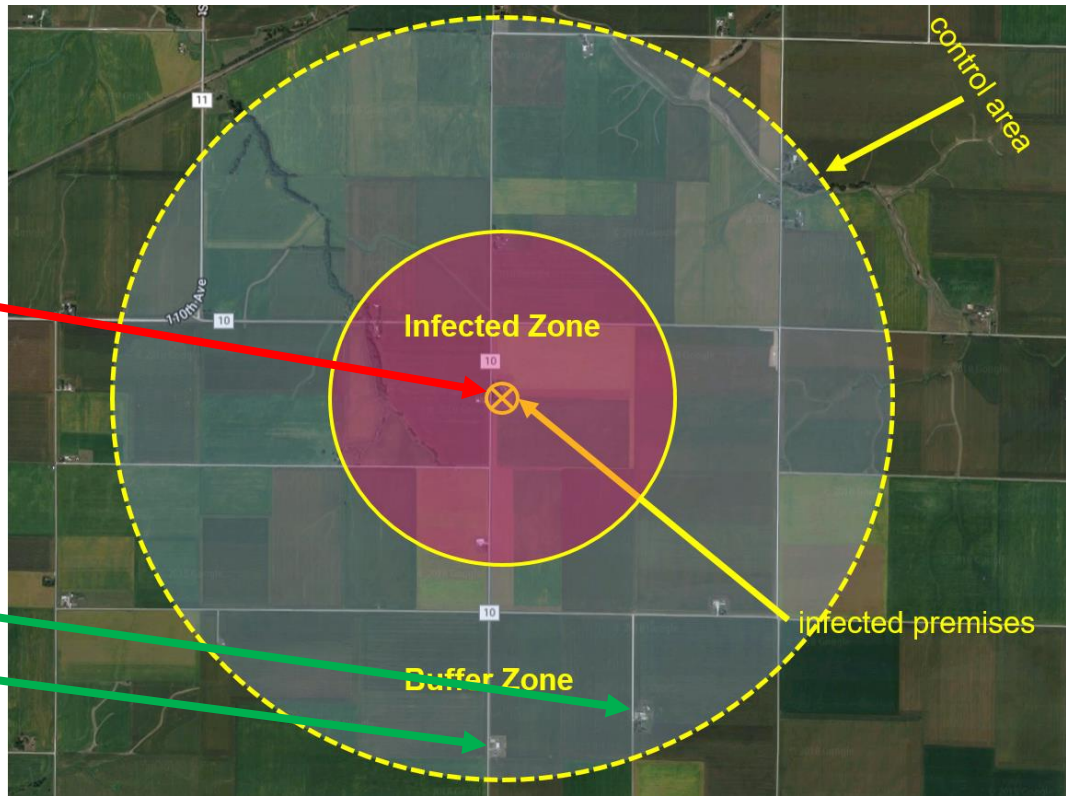
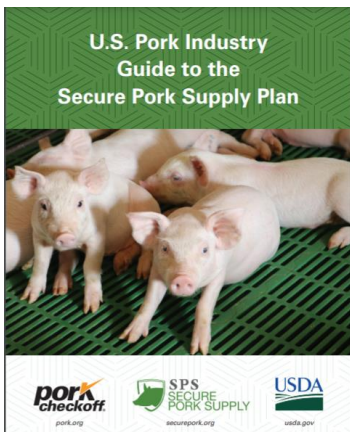
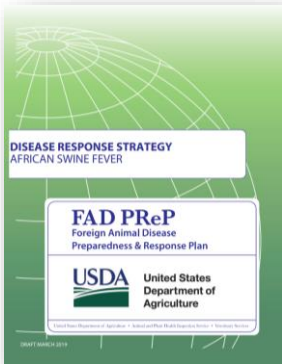
**Biosecurity**



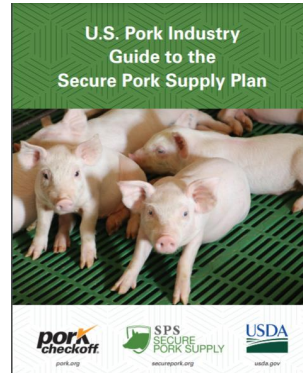
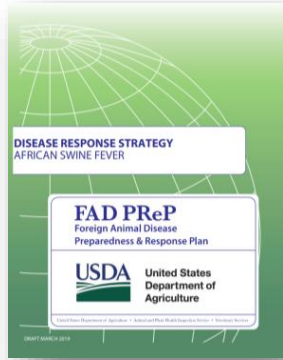
**Surveillance**

# US SHIP – *A National Playbook* for Preparedness





# Requirements for each program in FAD outbreak



Movement records last 30 days	Movement records last 30 days	Electronically captured movement records
Premises ID	Premises ID	Premises ID
Diagnostic Testing	Diagnostic Testing	Diagnostic testing
Biosecurity Plan	Biosecurity Plan	Biosecurity Plan
Depopulation Plan	Disease Monitoring (Surveillance)	
Disposal Plan		

# Resources Available at [www.securepork.org](http://www.securepork.org)

Protect Your Herd Through Biosecurity

The screenshot shows the top of the website with a search bar, navigation links for 'About Us' and 'Questions?', and the SPS Secure Pork Supply logo. Below the logo is a horizontal menu with categories: SPS PLAN, PORK PRODUCERS, VETERINARIANS, PACKERS, REGULATORY OFFICIALS, and TRAINING MATERIALS. A section titled 'Biosecurity Plans For Your Herd' features four icons: a checkmark, a padlock, a location pin, and a document, with a 'LEARN MORE' button below.

The cover features a green geometric pattern at the top with the title 'U.S. Pork Industry Guide to the Secure Pork Supply Plan'. Below the title is a photograph of several piglets. At the bottom, the logos for 'pork checkoff.' and 'SPS SECURE PORK SUPPLY' are displayed with their respective websites: pork.org and securepork.org.

The logo consists of a green pig head silhouette inside a shield shape, followed by the text 'SPS SECURE PORK SUPPLY' and the website address 'www.securepork.org'.

The cover has a green header and footer. The main title is 'INFORMATION MANUAL FOR ENHANCED BIOSECURITY FOR PORK PRODUCTION: ANIMALS RAISED INDOORS'. The SPS Secure Pork Supply logo is in the bottom right corner.

The cover features a green background with the title 'Secure Pork Supply Plan Biosecurity' and a play button icon. Below the icon is the text 'Employee Training Do NOT Bring Disease to the Site'. The SPS Secure Pork Supply logo is in the bottom right corner.

The page title is 'SPS Plan for Continuity of Business'. It contains text explaining that if FMD, CSF, or ASF is found in the US, regulatory officials will limit animal movement. It lists key concerns: FMD, CSF, and ASF are not public health or food safety concerns, but they will still be safe to eat. The plan provides opportunities to voluntarily prepare before an outbreak. A bulleted list includes: moving animals to processing or other premises under a permit, and maintaining business continuity for producers, haulers, and packers. It provides links to read the plan, download booklets, and watch overview videos in English and Spanish. It also lists handouts for FMD and ASF, and links to disease information. A footer note mentions funding from USDA APHIS and the Pork Checkoff, and a copyright notice for 2019.

ITY

# Biosecurity

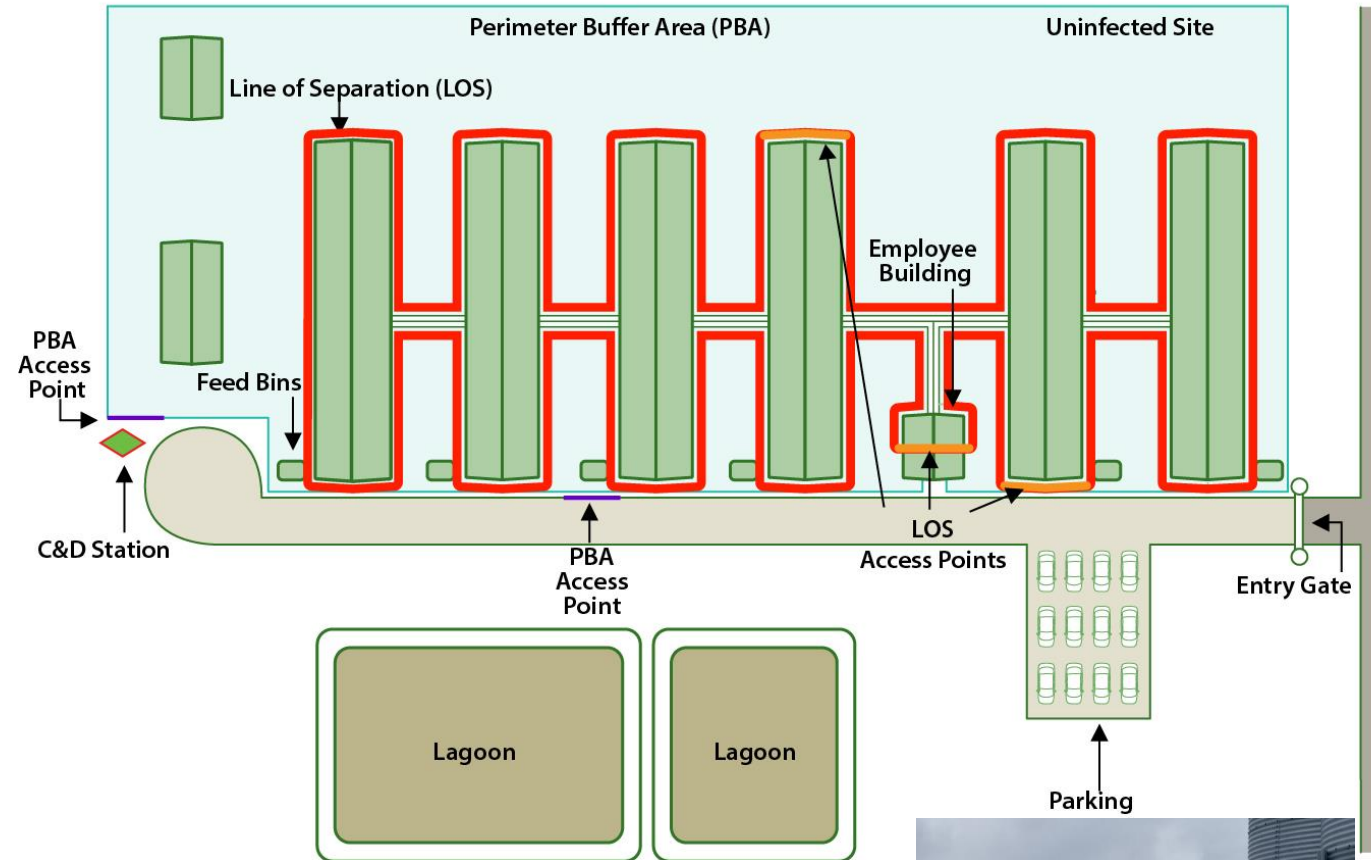
Complete a site-specific biosecurity plan

- Explain how site meets all biosecurity measures – Enhanced Biosecurity
- LOS and PBA
- Biosecurity updates are available

Important biosecurity measures

- Site-specific coveralls
- Supply-entry process
- Load-out area

Indoor Raised Animals



**SPS**  
**SECURE**  
**PORK SUPPLY**





**SPS**  
SECURE  
PORK SUPPLY

**In a confirmed  
FAD outbreak,  
samples will need  
to be collected  
and test negative  
for a movement  
permit to be  
issued within a  
Control Area.**



# Certified Swine Sample Collector (CSSC) Training Program

## Overview:

ASF, CSF and FMD

Samples collected faster

- Increase lab results efficiency
- Reduce biosecurity risk

Standardized Curriculum Led by Certified Veterinarians

- Classroom
- Hands-on

[securepork.org](http://securepork.org)



Photo Source: Swine Medicine Education Center at Iowa State University, Ames, Iowa



# CSSC Trainer Qualifications

- a. USDA category II accredited veterinarians with swine experience (work with SAHO for training)
  - a. **Must attend iFAD training here in Iowa**
  
- b. Have a business relationship with the owner of the pigs on farms where individuals are trained  
OR  
Perform training by request of the site's category II accredited veterinarian under who the collectors will be submitting samples

# CSSC Trainee Qualifications


- a. Be approved by category II accredited veterinarian
- b. Have valid PQA Plus certification ??
- c. Attend sample collection training session
- d. Pass written exam covering training curriculum
- e. Successfully complete hands-on evaluation demonstrating competency to collect, package, and submit samples

# CSSC Sample Collection Resources

## BLEEDING

JUGULAR GROOVE / PREWEAN OR NURSERY PIG

1. OPEN CAMERA APP  
2. FOCUS ON QR CODE  
3. TAP BANNER TO WATCH VIDEO



1. OPEN CAMERA APP  
2. FOCUS ON QR CODE  
3. TAP BANNER TO WATCH VIDEO

**CONSIDERATIONS:**

- MAKE SURE TO USE THE CORRECT TYPE OF BLOOD TUBE. CONSULT WITH YOUR VETERINARIAN TO DETERMINE WHICH ONE MATCHES YOUR DESIRED DIAGNOSTICS.
- WHEN USING SYRINGE, PULL BACK PLUNGER TO BREAK SEAL PRIOR TO PUNCTURING SKIN.
- WHEN USING VACUTAINER™, PUNCTURE SKIN WITH NEEDLE BEFORE PUSHING THE TUBE ON THE HUB NEEDLE.
- IF UTILIZING VACUTAINER™ AND VACUUM IS LOST ON THE TUBE, EITHER USE A NEW TUBE OR FILL TUBE WITH NEEDLE AND SYRINGE.
- NEVER STRAIGHTEN A BENT NEEDLE, REPLACE WITH NEW.
- FOR SAFETY, BE AWARE OF PEN SURROUNDINGS FOR HAZARDS AND CURIOUS ANIMALS WHEN COLLECTING SAMPLES.
- USE PERSONAL PROTECTIVE EQUIPMENT.
- USE CLEAN SUPPLIES TO AVOID SAMPLE CONTAMINATION.
- LABEL SAMPLES WITH PERMANENT MARKER.

**SUPPLIES:**

- BLOOD TUBE
- SYRINGE (OR VACUTAINER™ HUB)
- NEEDLES


AGE	GAUGE
PREWEAN	20 x 3/4" or 1"
NURSERY	16 or 18 x 1.5"

**ANIMAL RESTRAINT:** (PERSON 1)


REFER TO PIGLET BLEEDING RESTRAINT INSTRUCTIONS ON RESTRAINT PAGE

**COLLECTION INSTRUCTIONS:** (PERSON 2)


**STEP 1.**  
PERSON COLLECTING BLOOD, USE NON-BLEEDING HAND TO GENTLY EXTEND NECK, BEING AWARE TO NOT RESTRICT BREATHING.



**STEP 2.**  
COLLECT BLOOD FROM JUGULAR GROOVE WITH A BLIND STICK, STARTING ON THE PIG'S RIGHT SIDE PREFERABLY.

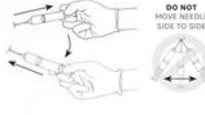


**STEP 3.**  
ENSURE NEEDLE IS PERPENDICULAR TO THE SKIN. THE DEEPEST PART OF THE JUGULAR GROOVE IS THE ENTRY POINT.

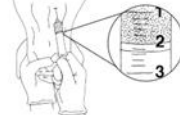


**STEP 4.**  
ADJUST NEEDLE ANGLE AND DEPTH UNTIL BLOOD FLOWS. TO REPOSITION, PULL BACK, ADJUST ANGLE, INCREASE OR DECREASE DEPTH.


DO NOT MOVE NEEDLE SIDE TO SIDE



**STEP 5.**  
ONCE BLOOD IS FLOWING, COLLECT A MINIMUM OF 2 ML. FOR FUTURE REFERENCE, NOTE THE POSITION AND DEPTH BEFORE REMOVING THE NEEDLE.



**STEP 6.**  
TRANSFER BLOOD FROM SYRINGE TO BLOOD TUBE. CHECK ANIMALS TO CONFIRM NORMAL ACTIVITY IN PEN WHEN BLEEDING IS COMPLETE. PROMPTLY CHILL SAMPLES FOR SHIPMENT.



**SUBMISSION INSTRUCTIONS:**

REFER TO SAMPLE SUBMISSION INSTRUCTIONS ON SAMPLE SUBMISSION PAGE


**COLLABORATORS:**  
These materials were developed through a collaborative process between Swine Medicine Education Center, Center for Food Security and Public Health, American Association of Swine Veterinarians, National Pork Board, National Pork Producers Council, and United States Department of Agriculture.

**FUNDING:**  
This project is funded by USDA's Animal and Plant Health Inspection Service through the National Animal Disease Preparedness and Response Program.

**ILLUSTRATIONS:**  
Mary Brann  
Swine Medicine Education Center  
Iowa State University

# BLEEDING

JUGULAR GROOVE / PREWEAN AND NURSERY PIG



0:05 / 2:14

1:35 / 2:14

# CSSC Access to Resources

## securepork.org

Available in English and Spanish



- SPS PLAN
- PORK PRODUCERS
- VETERINARIANS
- PACKERS
- REGULATORY OFFICIALS
- TRAINING MATERIALS

Get Your PIN

LEARN MORE




### SPS Plan for Continuity of Business

If foot and mouth disease (FMD), classical swine fever (CSF), or African swine fever (ASF) is found in United States livestock, Regulatory Officials will limit the movement of animals and animal products to try and control the spread of these very contagious animal diseases.

**FMD, CSF, and ASF are not public health or food safety concerns. Meat will still be safe to eat.**

The Secure Pork Supply (SPS) Continuity of Business Plan provides opportunities to voluntarily prepare before an outbreak. This will better position pork premises with animals that have no evidence of infection to:

- Limit exposure of their animals through enhanced biosecurity,
- Move animals to processing or another pork production premises under a movement permit issued by Regulatory Officials, and
- Maintain business continuity for the swine industry, including producers,



New!

Certified Swine Sample Collector Training (CSSC)

LEARN MORE



- SPS PLAN
- PORK PRODUCERS
- VETERINARIANS
- PACKERS
- REGULATORY OFFICIALS
- TRAINING MATERIALS**

#### Training Materials

#### Biosecurity

#### Disease Monitoring:

#### Disease Monitoring: Certified Swine Sample Collector Training

#### Forms

#### Outreach

### Certified Swine Sample Collector Training

#### Sample Collector training curriculum includes:

- Foreign animal disease videos;
- Resources addressing biosecurity, restraint, and sample submission; and
- Tier 1 or Tier 2 resources.

[Program Standards \(pdf\)](#)

[Frequently Asked Questions \(pdf\)](#)

#### Attention Category II Accredited Veterinarians:

Contact the state animal health official before conducting training in each state.

[SAHO Contact List](#)

### Required Foreign Animal Disease Videos

[African Swine Fever](#)  
(English & Spanish)

[Classical Swine Fever](#)  
(English & Spanish)

[Foot and Mouth Disease](#)  
(English & Spanish)

### Additional Required Resources

[Biosecurity handouts](#)



# What is AgView



# Getting Data into AgView

- add premises and movements



## 1. Data entry – In the application

## 2. Upload Data

- **Application Program Interface (API) from 3<sup>rd</sup> party software**
- **Export data from 3<sup>rd</sup> party software – clean/format to AgView standards – then upload**
- **AgView formatted Excel spreadsheet template**

# Premises Data

---

- **Company name**
- **Site name**
- **PIN**
- **Address**
- **Lat/Long**
- **Location type**
- **Site capacity**
- **# of barns**
- **# of pigs on site**
- **Emergency contact info  
(name. phone, e-mail)**

# Movement Data

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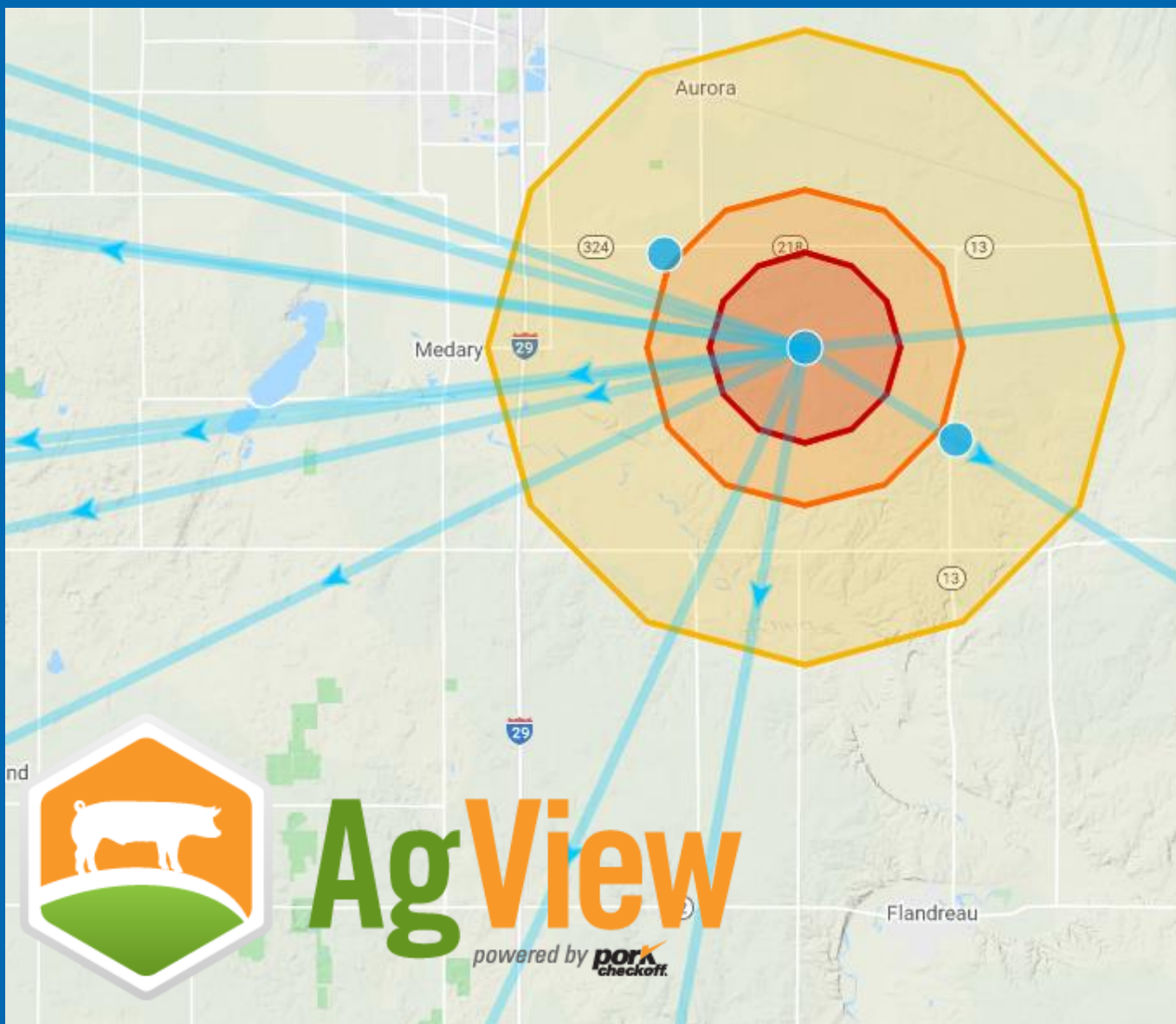
- **Source PIN**
- **Destination PIN**
- **Number in Shipment**
- **Shipment Date**
- **Shipment Type**



## Movement Type

- Boar
- Cull Boar
- Cull Sows
- Feeder Pigs
- Inner Sanctum
- Market Pigs
- Replacement Gilt
- Semen
- Truck Wash
- Wean Pigs

# AgView in Action



## Movement Details

### Recent Movements

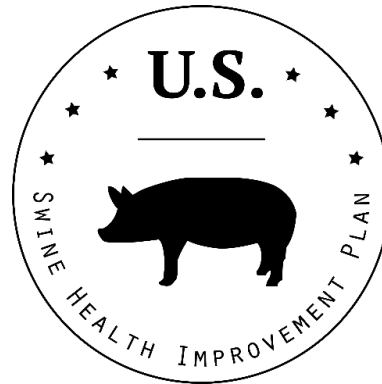
Date Moved	Type	Shipment Size
11/11/2021	Wean Pigs	202
10/25/2021	Wean Pigs	244

[VIEW ALL MOVEMENTS](#)

Create an free account at  
[porkcheckoff.org/AgView](https://porkcheckoff.org/AgView)



# So what is US SHIP??



# Development and Demonstration of a US Swine Health Improvement Plan (US SHIP) modelled after the National Poultry Improvement Plan



## Industry, State, & Federal Partnership



*Investigators from ISU, SDSU, UIUC, UMN, and KSU*

*Pilot Program Funded By USDA and NPB*



# National Poultry Improvement Plan (NPIP)

- NPIP is a cooperative industry, state, and federal partnership
- Sustain export markets & ongoing interstate commerce in unaffected states and regions
  - Demonstration of freedom of disease outside of trade-impacting control areas
- NPIP serves to safeguard, certify, and represent the health of US poultry.

**HPAI: 2015 vs 2022**  
**60 countries vs 2 countries**



National Poultry  
Improvement Plan

- Participation is voluntary and ~ universal
- Implemented across US poultry & egg industries
- Officially recognized standards of poultry health

**Established in 1935**



Figure 3

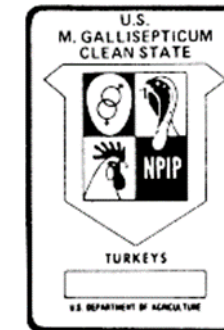


Figure 10



# ASF-CSF Monitored Certification

**US SHIP will establish a “national playbook” of technical standards to provide a uniform approach to disease prevention, response, and recovery by each of the participating states.**

## **Modelled after the National Poultry Improvement Plan (NPIP)**

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US SHIP is modelled after the National Poultry Improvement Plan (NPIP), a collaborative effort involving industry, state, and federal officials providing standards for disease certification.



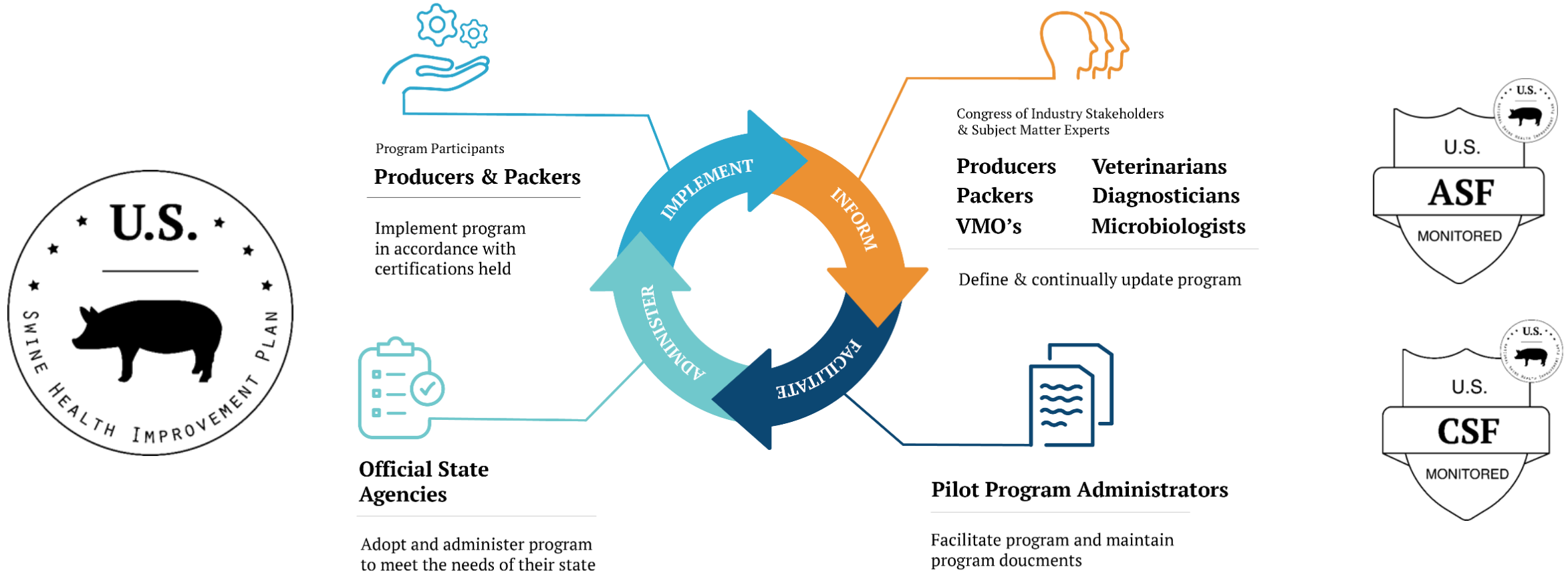
ASF/CSF Monitored certification will be held at the individual site level.

Participants:

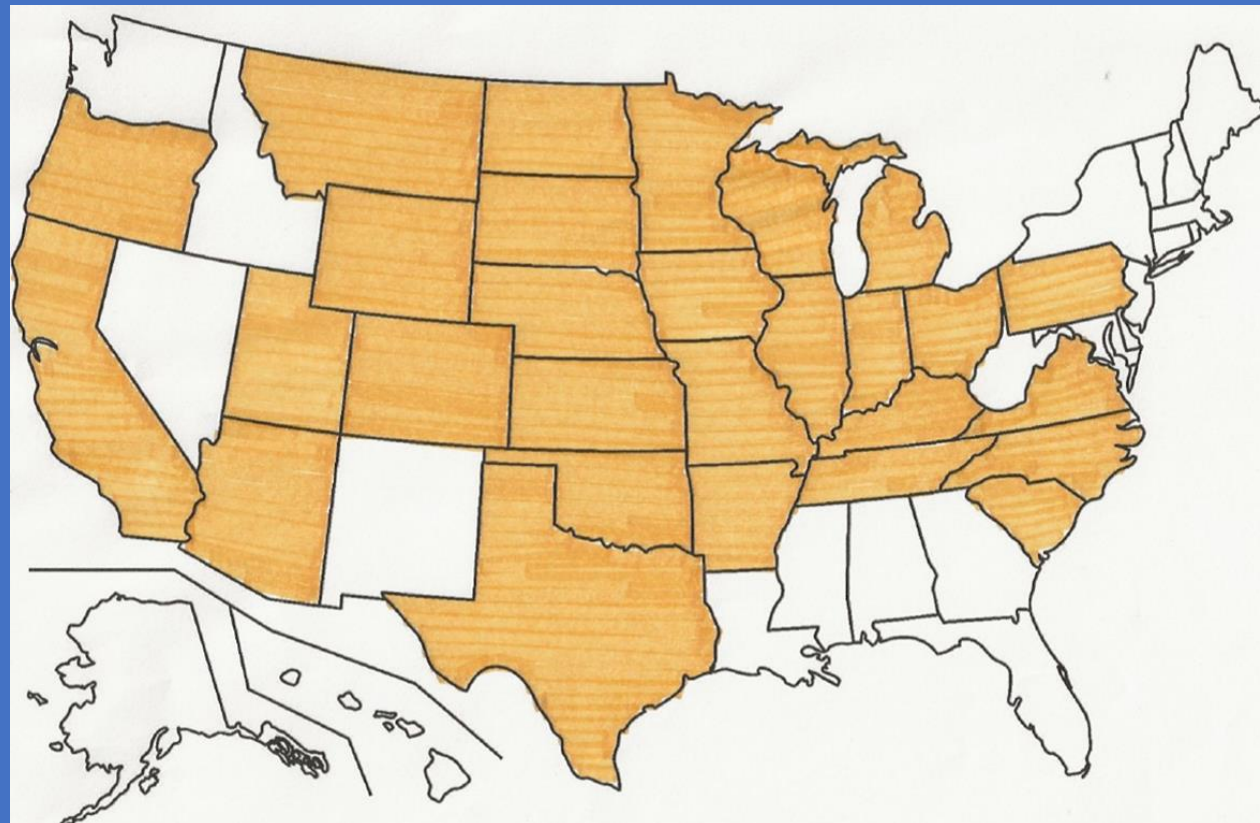
- Farm Sites
- Slaughter Facilities

Centers on *Prevention* and *Demonstration of Freedom of Disease Outside of Control Areas*

# ASF-CSF Monitored Certification

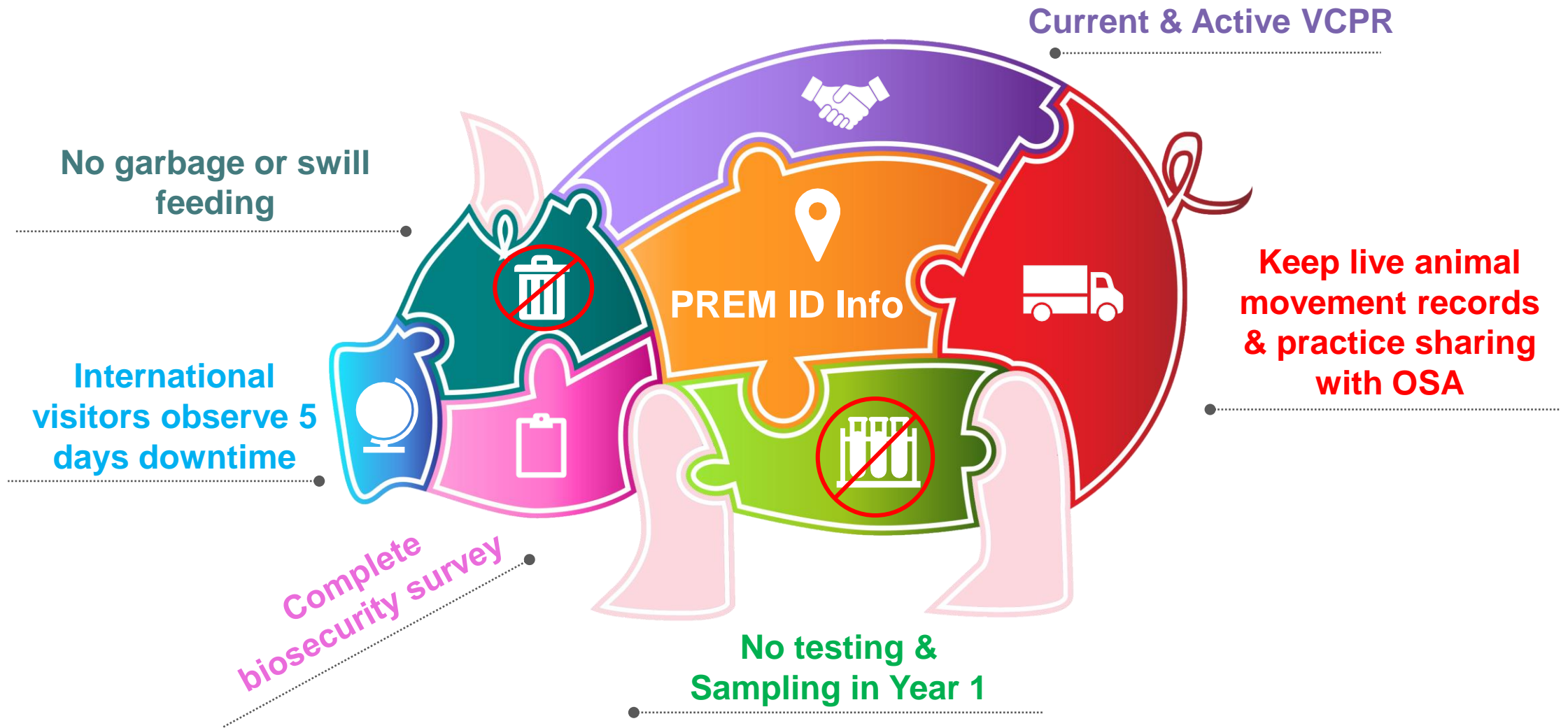


Modeled after basic tenets of the NPIP H5/H7 Avian Influenza



A total of 32 states have expressed an interest in participating in US SHIP pilot, > 99% of US Domestic Swine

# US-SHIP Year 1 Requirements



# Why Should I Participate?

- Improved ASF/CSF preparedness with integration between producers, packers, state and federal animal health officials.
- Successful pilot program can build foundation for official program
  - Streamline interstate movements between certified sites
  - Establish international recognition for trade
  - Expand program to certify endemic diseases
    - Genetic stock certified free of specific diseases
    - Improved health in commercial production



## *National Playbook - Trade*



# How Do I Participate in US SHIP?

## US SHIP Participant Checklist

HOW TO BECOME US SHIP CERTIFIED

### Step 1. Enrollment

- Contact US SHIP Official State Agency (OSA) in which the participating premises is located
- Enroll live swine production and slaughter facility premises with the US SHIP OSA in which the participating premises is located
- Acknowledge understanding of and compliance with requirements for certification
- Complete biosecurity survey



# FAQ on US-SHIP

- **Is there any cost to be in the program?**
  - Only costs are those that are associated with meeting or exceeding the standards.
  - Currently:
    - VCPR with herd veterinarian
    - Routine biosecurity and traceability standards
    - No testing standard for ASF/CSF currently.



# FAQ on US-SHIP

- **How are packers participating in US-SHIP?**
  - They can enroll their participating plants with their state's OSA.
- North American Meat Institute President and CEO Julianna Potts has indicated that their membership is fully supportive of US-SHIP as National Program.



# Enrollment Forms: Single Site or Multi-Site



## US Swine Health Improvement Plan

Piloting a proven platform for safeguarding, certifying, and bettering animal health

### Single Premises US SHIP Enrollment Form

**State of Participation** (location of participating premises):   
*Participants are to enroll with each US SHIP OSA in which they have participating facilities located.*

#### Swine Owner Information (US SHIP Participant)

Name (Business Entity):

Address:   
 Address City State Zip

Phone Number:  Email:

#### Premises (Site) Information

Premises Identification Number (PIN):

Common Name of Site (if different than Swine Owner Name):

911 Address of Site:   
 Address City State Zip

GPS Coordinates (if 911 address not assigned) Latitude:  Longitude:

Site Type:

- Boar Stud - Production site with mature boars that distribute semen to other production sites.
- Breeding Herd - Production site with breeding females and house ≥ 1,000 breeding females. (e.g., breed-to-wean, breeding/gestation or farrowing only, with or without on-site gilt isolation/grow-out).
- Growing Pigs - Production site with ≥ 1,000 feeder swine (nursery, grower, or finisher).
- Farrow to Feeder/Finish - Production site with breeding females and grow feeder swine for purposes other than breeding stock replacement for this particular farm site, and house ≥ 1,000 breeder or feeder swine.
- Small Holding - Production sites with ≥ 100 and < 1,000 total breeder or feeder swine.
- Non-Commercial - Production sites with < 100 pigs (e.g., exhibition, niche, hobby)
- Packing Plant - A facility that slaughters pigs.

Site Capacity:

#### Premises (Site) Owner Information

Premises Identification Number (PIN)	Site Name	Site 911 Address	Site 911 City	Site 911 State	Site 911 Zip Code	Site Latitude (if 911 address not assigned)	Site Longitude (if 911 address not assigned)	Site (Premises) Type	Site Capacity	Swine Owner Name	Swine Owner Address	Swine Owner City	Swine Owner State	Swine Owner Zip Code	Swine Owner Phone Number	Swine Owner Email	Site Owner Name	Site Owner Address	Site Owner City	Site Owner State	Site Owner Zip Code	Site Owner Phone Number	Site Owner Email

<https://iowaagriculture.gov/ship>



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## US Swine Health Improvement Plan (US SHIP)

A national strategy for biosecurity, traceability & disease surveillance

**ENROLL NOW**

The **U.S. Swine Health Improvement Plan** (US SHIP) is a producer-driven national program that establishes consistent health standards that serve as a platform for control of foreign animal diseases (FAD) of high consequence like **African swine fever** (ASF) and **classical swine fever** (CSF). It also has benefits for the control of endemic diseases.

The US SHIP program is designed to help you remain a sustainable and reliable supplier of pork amidst the constant threat of foreign animal diseases. The technical standards focus initially on the prevention, mitigation, and traceability of ASF and CSF but will likely

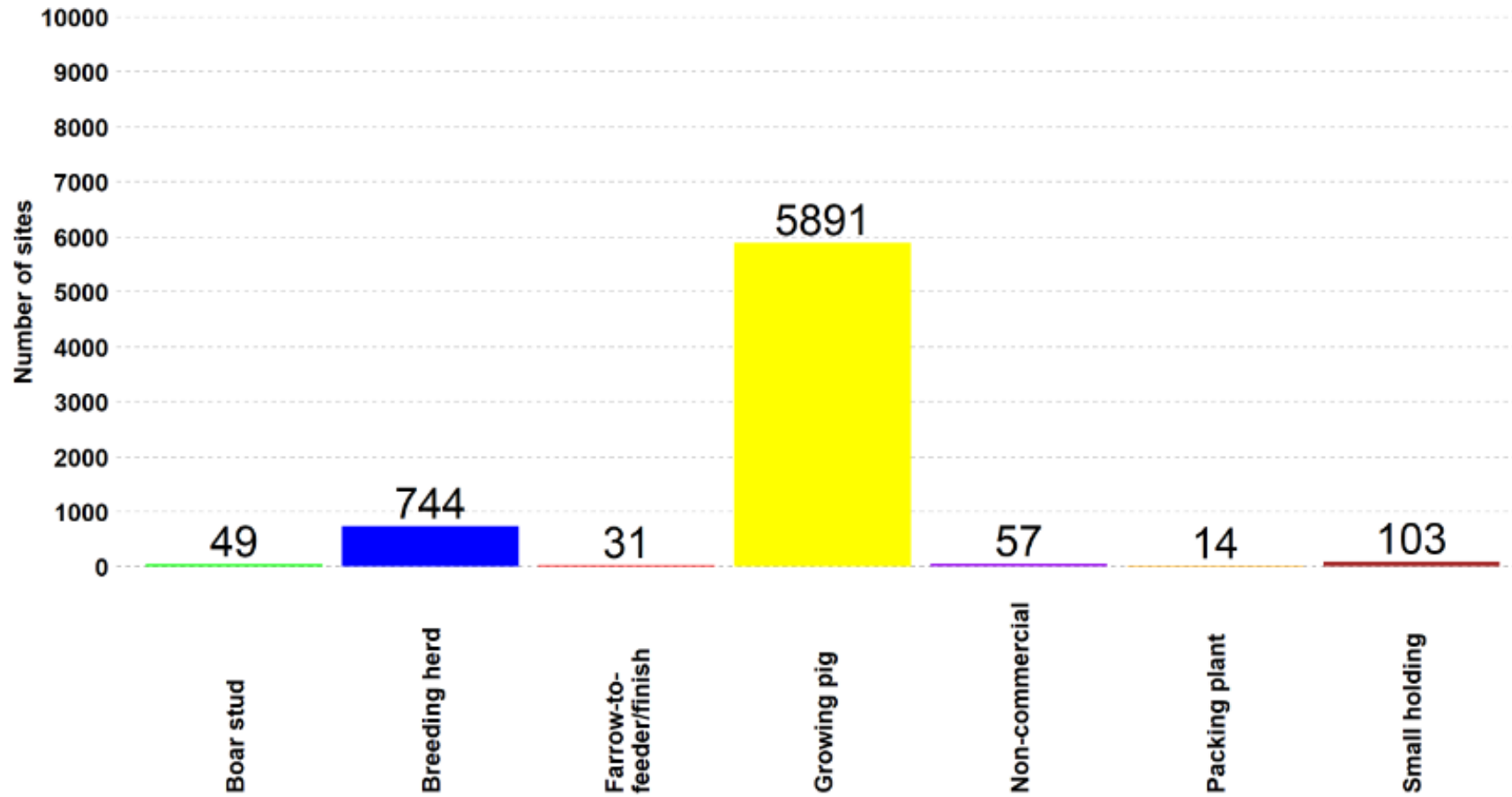
# Biosecurity Survey

- Provides information to Biosecurity working groups
  - Helps to create future biosecurity related standards
  - Electronically captured information
  - Only 10 questions
- Biosecurity questions cover:
    - SPS plans
    - Perimeter fencing and outdoor access
    - Mortality disposal methods
    - Farm entry procedures
    - Imported feed ingredients and holding times
    - Transportation sanitation procedures

# 1.1 Sites by site type

Number of sites that filled out a US SHIP biosecurity survey

Source: US SHIP biosecurity enrollment survey.



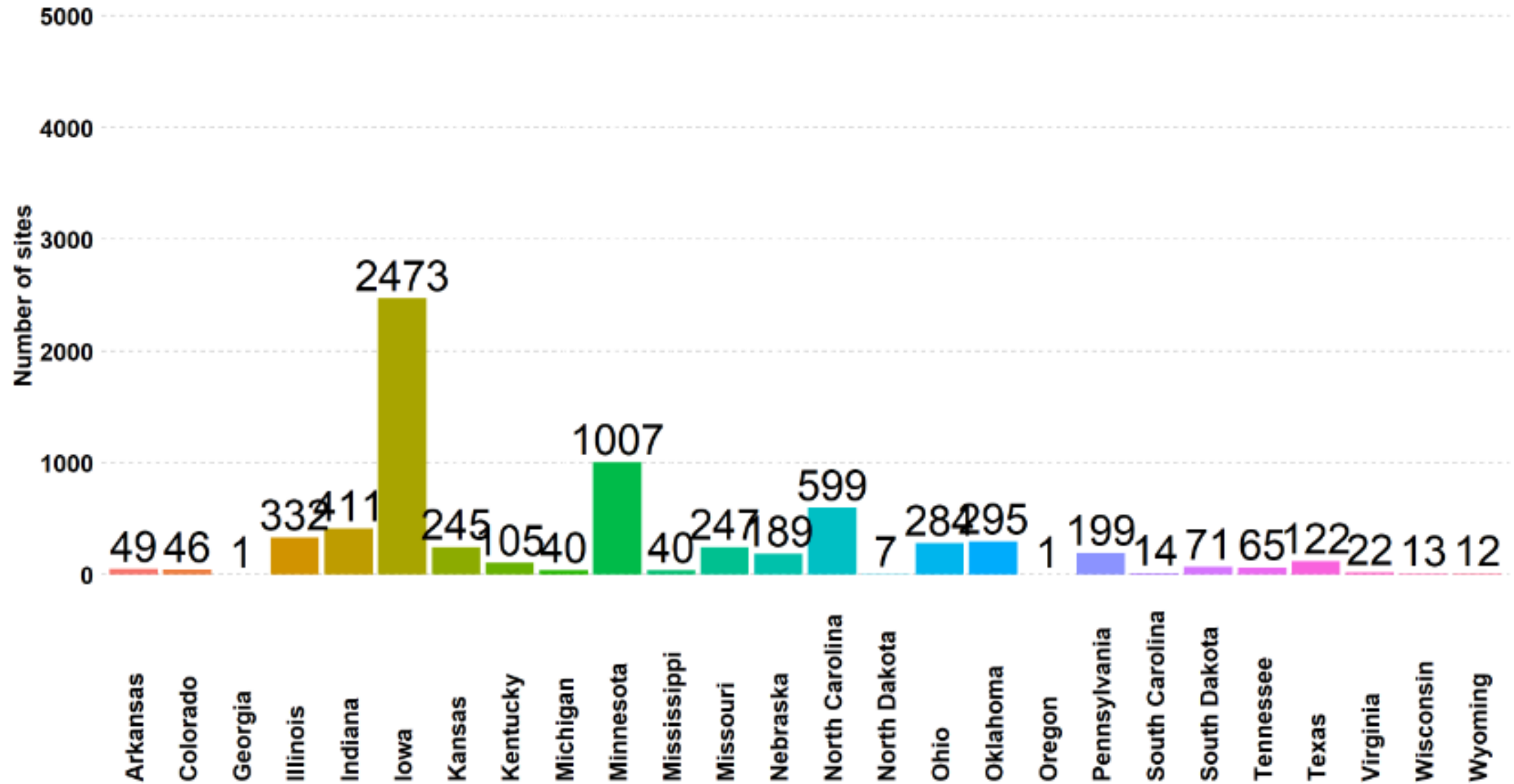
**As of August 10, 2022**

- **6,889 sites**
- **26 states**

# 1.2 Number of sites by state

Number of sites that filled out a US SHIP biosecurity survey by state

Source: US SHIP biosecurity enrollment survey.

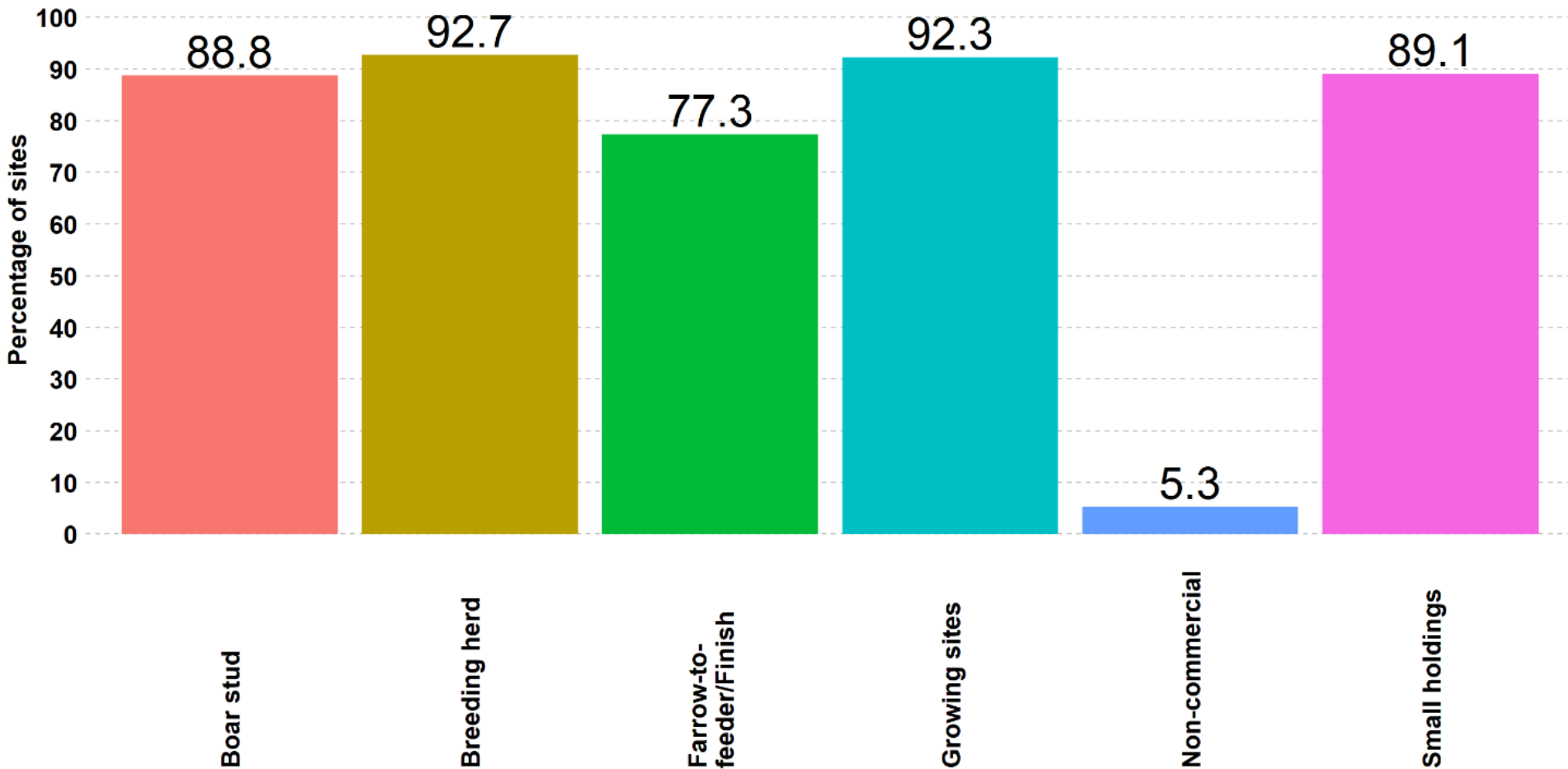


# 2 Secure Pork Supply

As of August 10, 2022, 49 Boar stud, 744 Breeding herd, 5891 Growing sites , 31 Farrow-to-feeder/Finish, 103 Small holdings, and 57 Non-commercial sites had filled out the biosecurity survey question related to Secure Pork Supply Plans.

**Percentage of sites by site type that have completed the Secure Pork Supply Plans (SPS)**

Source: US SHIP biosecurity enrollment survey.



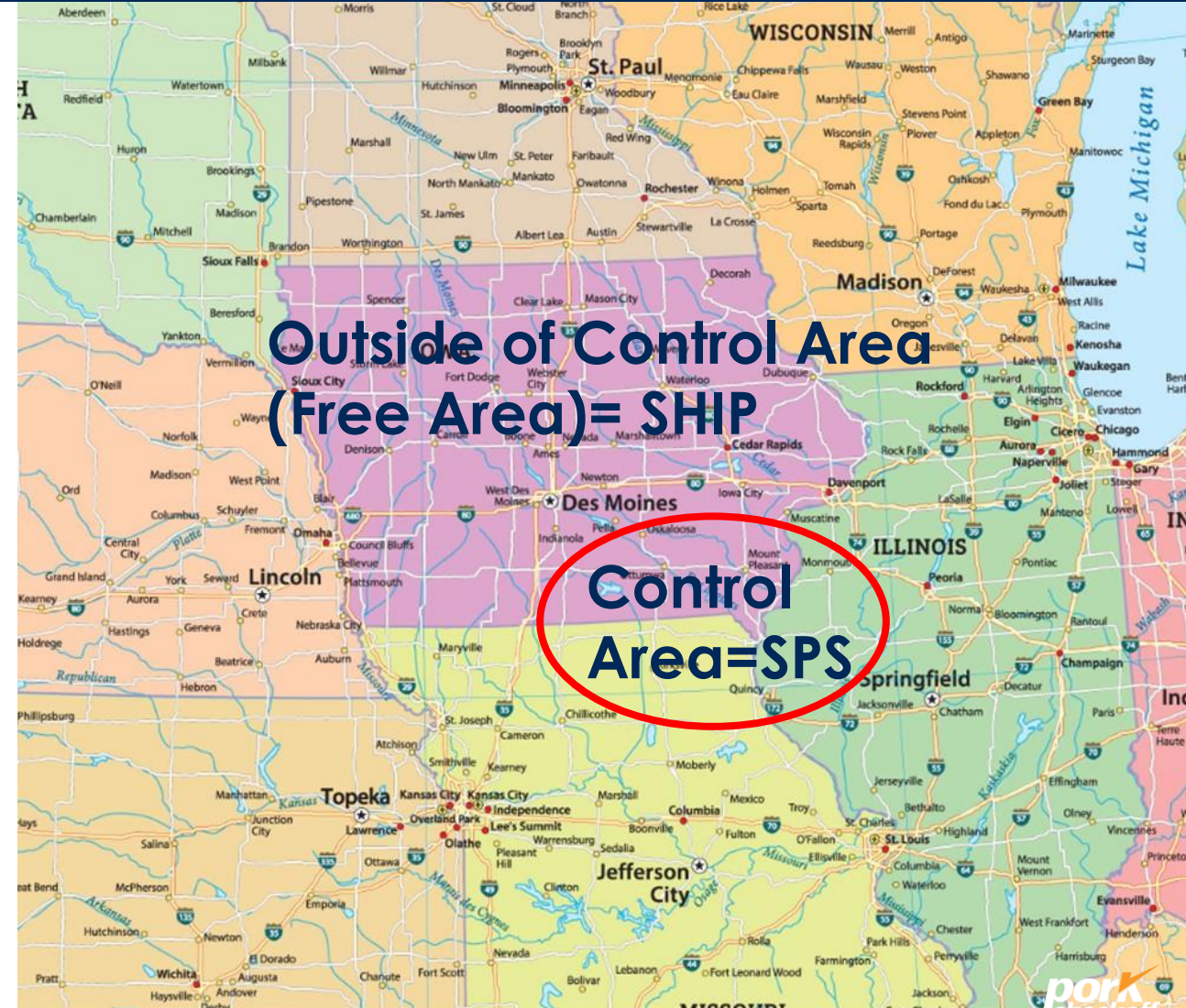


# On-Farm Preparedness



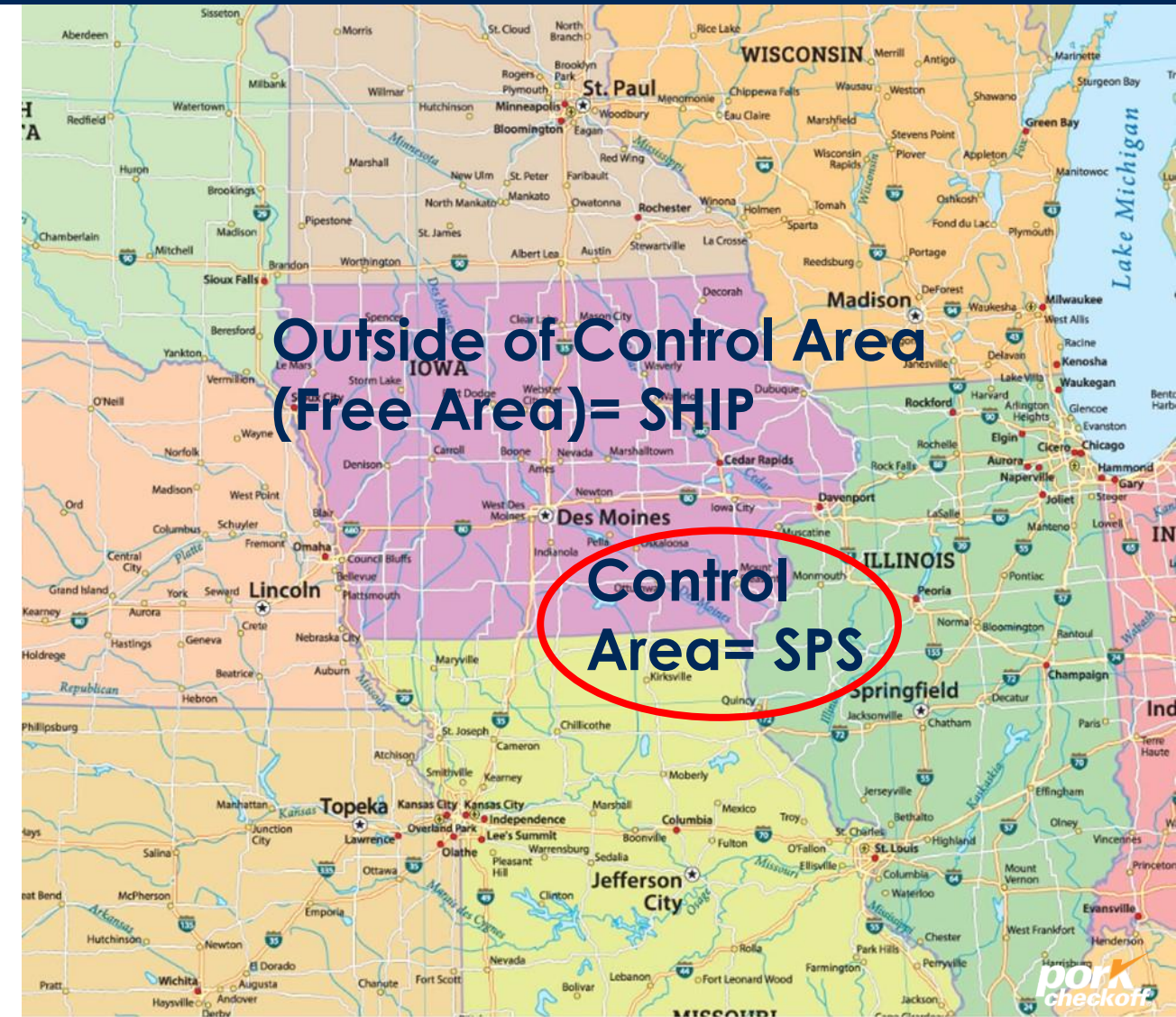
# ASF Outbreak- Prepared Producer 1 in Control Area

- Certified in SHIP
- Traceability
  - Verified PIN, tracking animal movements
- Biosecurity
  - Written plan, implement prior to and remaining few
- Surveillance
  - CSSCs trained on the farm
- AgView
  - Account created and updates data regularly



# ASF Outbreak- *Unprepared* Producer 2 in Control Area

- Not certified in SHIP
- Traceability
  - Verified PIN, but not tracking animal movements
- Biosecurity
  - Started a written plan, but didn't finish and hasn't implemented
- Surveillance
  - No one trained- counting on herd vet
- AgView
  - Meant to create account but hasn't taken the time yet



# Producer Call to Action – FAD Preparedness

- 1. Enroll and become certified in US SHIP**
  - Contact the Official State Agency in your state
  - Find OSA Contact at [usswinehealthimprovementplan.com](http://usswinehealthimprovementplan.com) under *Enroll and Certify*
- 2. Enhance Traceability/Create an AgView Account**
  - [porkcheckoff.org/agview](http://porkcheckoff.org/agview)
  - Verify if the PIN reflects the actual location of the animals
  - Track all animal movements onto and off of the farm
- 3. Implement Biosecurity**
  - [securepork.org](http://securepork.org)
  - Complete a site-specific biosecurity plan using SPS templates or RABapp
  - Implement the plan
- 4. Improve On-Farm Surveillance**
  - Learn about the clinical signs associated with African swine fever as shown at [securepork.org](http://securepork.org)
  - Ask your herd vet about getting trained to collect samples through CSSC program.

# National Movement Standstill

What happens when the first case of FAD is diagnosed in the US??



# National Movement Standstill

- Stop movement once disease is diagnosed in US
- Goal: Find the virus & limit spread
- Could include: Animals, semen, manure, rendering, feed, deliveries
- 72 hours minimum initially
- All new movements will stop
- Trucks in transit can go to destination
- Producers need to think through contingency plans



# Keys to Success in the Standstill

- PIN database up to date
- Coordination of testing
- Collaboration with producers and vets to identify epidemiological connections

A map of the United States showing state boundaries. A blue callout box with white text is positioned over the central part of the map.

**National Movement  
Standstill**

# IDALS: Swine Records

- Records of any movement
  - At least last 30 days
  - Time to gather
- Prioritized order
- High-priority
  - Live animals
  - Animal products
  - Mortality collection
  - Regular employees
  - History of international travel

## Premises Trace-In and Trace-Out Priority Ranking for Swine Facilities during Foreign Animal Disease Outbreaks

During a foreign animal disease outbreak, the Iowa Department of Agriculture and Land Stewardship will conduct epidemiological investigations examining any movement that could have potentially carried disease onto or off a swine facility during a minimum of the previous 30 days.

During the investigation, the Department will review the records of all live animals, animal products, animal wastes, feed, equipment, personnel, as well as everything else (animal related or otherwise) that has moved on or off the premises. While not all movements have the same potential to spread disease, every movement must be reviewed to control disease spread. The Department recognizes that it will take time to gather these records. To make this more manageable the following classifications list the priority of which records should be quickly gathered.

### High-Priority

- Entry and exit of live animals (i.e. any swine moving onto or off the premises, including transportation trucks)
- Entry of animal products (i.e. semen)
- Collection of mortalities ("deads") by rendering
- Entry of regular employees (i.e. those working on the farm on a daily or weekly basis)
- History of any international travel (both employees and visitors)

### Medium-Priority

- Entry of visitors (tours, students, extended family, i.e. anyone)
- Entry of animal health professionals (i.e. veterinarians, veterinary technicians, etc.)
- Entry of equipment directly related to daily operations and swine production (i.e. equipment shared between sites, etc.)
- Removal of manure/waste
- Entry of repair/service personnel (i.e. electricians, plumbers, etc.)
- Delivery of feed

### Low-Priority

- Delivery of fuel (i.e. propane, diesel, etc.)
- Removal of garbage
- Delivery of mail and packages
- History of other animals on the site (i.e. pets, wild animals, etc.)
- Entry of pest management personnel (i.e. rodent control, exterminators, etc.)
- Entry of grounds maintenance personnel (i.e. mowing, snow removal, etc.)

In the case of an outbreak, records will be reviewed in the order of highest priority first. However, if at any time someone knows of equipment, supplies, or personnel listed in the Medium or Low-Priority groups that were in contact with other swine not located on their premises, they should be treated as High-Priority and immediately reported.

To streamline the process of gathering these records it is recommended that if possible, premises pre-identify one staff member or employee to be responsible for tracking listed movements. Designating specific people for tasks will increase the speed of gathering records. Regardless, it is recommended for every premises to create a plan on how they would report all movement records to the Iowa Department of Agriculture. When recording these records, the person responsible should also collect the names, addresses, contact information (including phone numbers and email address) of any third party coming on their premises.

Last updated 1/16/2020



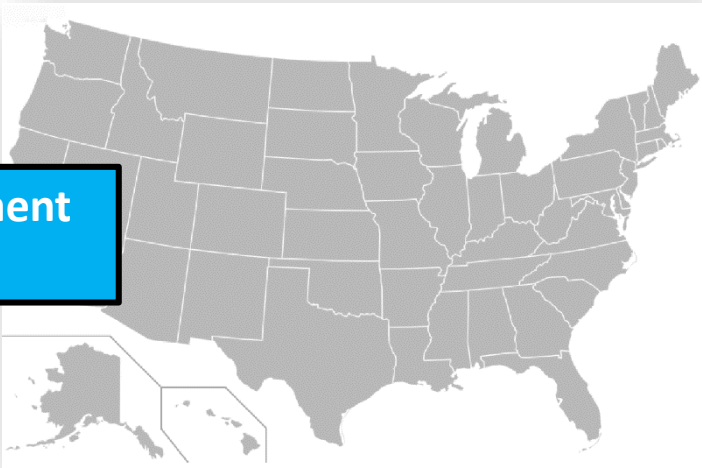
IOWA DEPARTMENT OF  
AGRICULTURE &  
LAND STEWARDSHIP

Dr. Jeff Kaisand, State Veterinarian  
(515) 281-5321  
jeff.kaisand@iowaagriculture.gov

<https://iowaagriculture.gov/sites/default/files/animal-industry/pdf/IDALS-Swine-record-priorities.pdf>

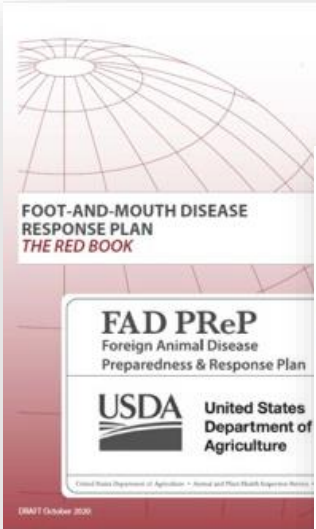


National Movement Standstill



Farm infected with FMD

Control Areas designated



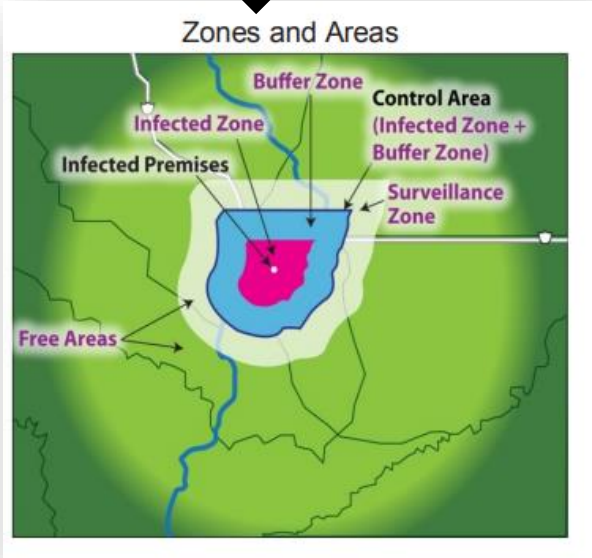
**Iowa Foot-and-Mouth Disease State Response Plan**  
IOWA DEPARTMENT OF AGRICULTURE & LAND STEWARDSHIP  
This is a draft plan and is subject to change  
February 27, 2020

Table of Contents:

1. Introduction
2. Pre-Outbreak Actions
  - i. Biosecurity
    - a. General Recommendations
    - b. Outdoor Access
    - c. Personnel policies
      - Housing
      - International travel
      - Clothing
      - Showers on Shower-out
      - Outside food
      - Outside materials
    - d. Mechanical vectors
  - ii. Premises Registration
3. Classifications of an FMD Outbreak in relation to Iowa
  - i. Continental: FMD outbreak in Canada or Mexico but not in the U.S.
  - ii. Domestic: Confirmation of the first FMD case in the U.S. but not in Iowa
  - iii. In-State: Surveillance shows a positive case in Iowa or epidemiologic evidence proves a connection of an Iowa herd/flock to an infected herd/flock.

Appendix 1: Standstill Order  
Appendix 2: Epidemiological Investigation and Surveillance  
Appendix 3: Mitigation

- i. Quarantine
- ii. Control Area
- iii. Permitted
- iv. Mass Depopulation
- v. Carcass Disposal
- vi. Cleaning and Disinfection
- vii. Vaccination



Standstill lifted for those outside Control Area

Permitting and Surveillance for those inside the Control Area (not known to be infected)

# Infected Premises



# Goal: Find the Disease as Fast as Possible



- Call IDALS

- Office Hours: 515-281-5305
- After Hours: 515-240-6632

# FAD Investigation Steps

- Foreign Animal Disease Diagnostician (FADD) visit
  - Collect history
  - Examine animals
  - Collect samples if needed
- Cost: Free
- Confidential



## Foreign Animal Disease Investigation: Producer Guidance



If you suspect a Foreign Animal Disease, report it immediately to your veterinarian, the Iowa Department of Agriculture and Land Stewardship (IDALS) at (515) 281-5305, or the USDA at 515-284-4140. Below are the investigation steps and expectations for IDALS and the person reporting.

- A state or federal Foreign Animal Disease Diagnostician (FADD) will visit the operation, examine healthy and sick animals, and may collect diagnostic samples (such as blood, swabs, etc. from a live animal or tissue samples from a dead animal)
- If the FADD determines that samples should be collected, two sets will be collected
  - One set of samples to the Veterinary Diagnostic Lab in Ames; one set to a USDA Lab
  - There are no labs fees when testing for FAD. There are fees if testing for endemic diseases.

### While you are waiting for the FADD to arrive, please take the following steps:

- Do not leave the farm without first speaking to your veterinarian or a state/federal animal health official
  - If you or any employees need to leave the premises:
    - Change into clean clothing/footwear, showering if able,
    - Leave equipment and vehicles that contacted poultry or livestock on the operation, and
    - Do not handle any other susceptible animals without first talking to your veterinarian or a state/federal animal health official.
- Do not allow any animals to leave or arrive without first talking to your veterinarian or a state/federal animal health official
- Put your operation's enhanced biosecurity plan in place
- During chores, care for the "healthy" animals first
- After chores, clean/disinfect your clothes/footwear
- Gather records as the FADD will need to know:
  - Animal arrival and departure dates
  - Animal product (semen, embryos, manure, milk, eggs, spent hens, etc.) arrival and departure dates
  - People traffic (visitors and employees)
  - Feed and supply deliveries
  - When the sick animals first started showing signs of illness
  - Any increase in animal sickness or deaths over the last week
  - Any wildlife presence on the operation or known contact with your animals

### While the FADD is on the operation:

- Be available to answer questions and guide them throughout your operation
- First show them the animals that appear healthy and sick animals last
- Be prepared to assist with restraining animals and collecting samples if asked
- Exchange contact information so test results and next steps can be quickly communicated
- Discuss a plan to dispose of the protective outerwear worn while on your operation

### Once the FADD leaves:

- Continue to implement enhanced biosecurity measures for animals, people, vehicles, equipment, supplies
- If placed under quarantine, no animals or animal products can arrive or leave unless by permission of Iowa's State Veterinarian

### If samples were collected and test results are negative:

- Work with your herd/flock veterinarian to identify the cause of disease on your farm

### If samples were collected and test results are positive OR if the clinical signs displayed on the farm are highly suspicious of an FAD:

- IDALS will start an FAD response
- No animals, animal products, or equipment will be allowed to leave
- An animal health official will be assigned to your operation to guide next steps and answer questions

# Initial findings of FADI

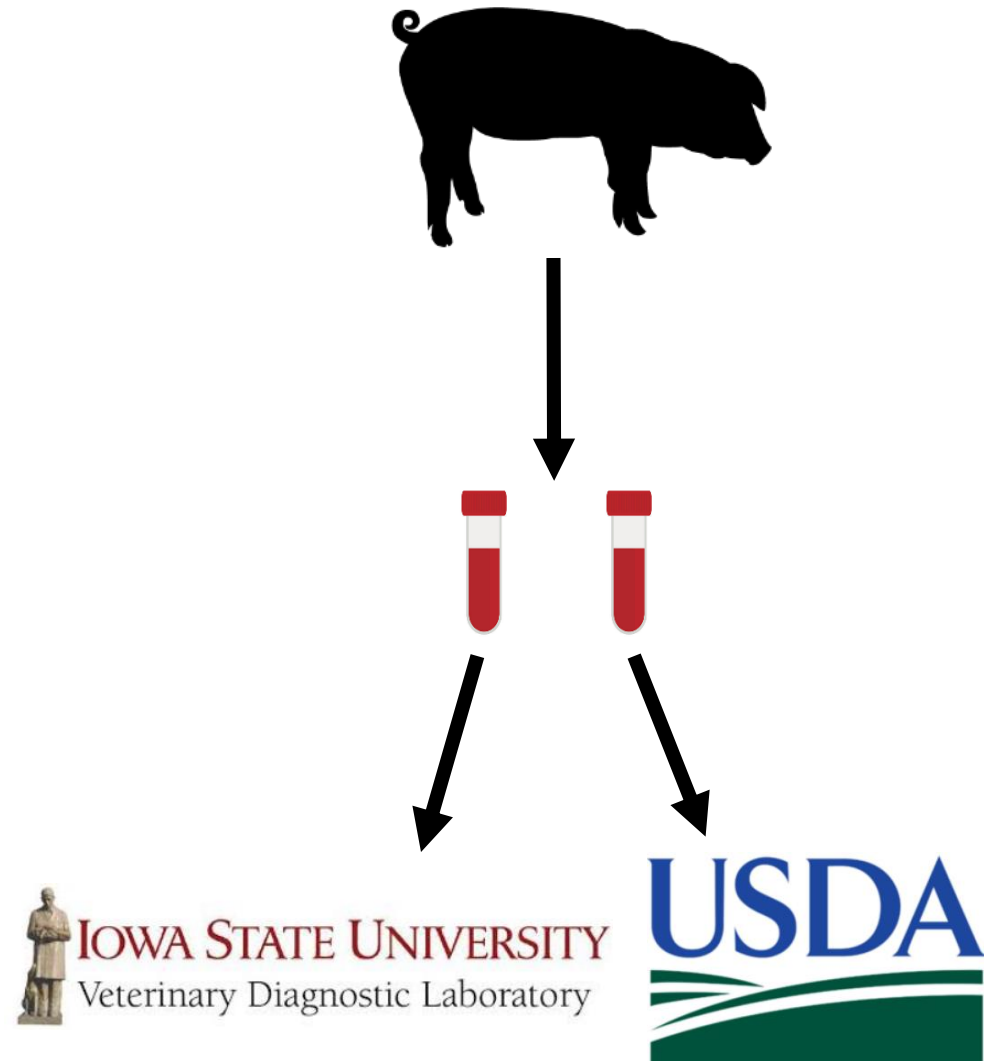
- FADD discusses onsite findings with AVIC and State Veterinarian
- Quarantine
- Determine priority for samples to be sent to FADDL
- Coordinate shipment of samples to FADDL if highly suspicious of FAD



# Sample Testing

- IDALS, USDA work with producer
- One set: ISU Veterinary Diagnostic Lab in Ames
- One set: USDA National Veterinary Services Lab\* to Plum Island (off coast of New York)

\*swine samples



# Infected Premises

- Assigned a case manager
- Quarantine and biocontainment
- Start trace-in and trace-out
- Indemnity paperwork
- Depopulation and disposal



Courtesy of the National Pork Board, Des Moines, Iowa



# Biocontainment on Infected Premises

## SETTING UP A TEMPORARY CLEANING AND DISINFECTION (C&D) STATION

### SELECT THE LOCATION FOR THE DECON CORRIDOR



**LOCATION:** Directly outside each controlled access point where vehicles/equipment will enter/exit an Infected Premises in the Decontamination "Decon" Corridor  
**SIZE:** Minimum wash pad area must accommodate the largest piece of equipment plus room for people to work (estimated 8.5 feet wide and 70-80 feet long for semi-tractor and trailer)  
**SLOPE:** Level or slopes towards the "hot zone" or infected Premises  
**SURFACE:** Paved or well-drained gravel

### CONTROLLING ACCESS



**BARRIERS:** Highly visible, prevents site entry or exit

**SIGNS:** Highly visible, lists steps drivers need to take to enter in language(s) understood by all entering



IDALS YouTube <https://youtu.be/8zS3-1MtPpY>



**Table 1: Euthanasia methods appropriate to pigs of different sizes (weights)**

Method	Approved for...
Carbon dioxide (CO <sub>2</sub> )	All ages but may not be practical for pigs over 70 lbs
Gunshot	Nursery pigs or older
Non-penetrating captive bolt	Pigs less than 70 lbs*
Penetrating captive bolt	Pigs greater than 12 lbs
Electrocution, head-to-heart	Pigs over 3 days of age
Electrocution, head only	Pigs over 3 days of age with a secondary step
Veterinarian administered anesthetic overdose	All ages but may not be practical
Manual blunt force trauma	Pigs up to 12 lbs

\* Refer to page 9 to determine appropriate force and weight range combinations

AASV

# AVMA Approved Euthanasia Methods

## 13 What Is Euthanasia?

Euthanasia is derived from the Greek terms *eu* meaning good and *thanatos* meaning death. The term is usually used to describe ending the life of an individual animal in a way that minimizes or eliminates pain and distress. A good death is tantamount to the humane termination of an animal's life.

AVMA 2020

# Infected Premises: Depopulation

- **GOAL:** Stop virus spread
  - Dead pigs as fast as possible
- AVMA preferred Methods for Depop
  - Gunshot
  - Electrocutation
  - Captive bolt
  - CO<sub>2</sub>
- Permitted in Constrained Circumstances
  - Ventilation Shutdown Plus
  - Sodium nitrite
- Research in Progress
  - Nitrogen Foam
  - Water Based Foam

## Depopulation

The term depopulation refers to the rapid destruction of a population of animals in response to urgent circumstances with as much consideration given to the welfare of the animals as practicable. Urgent circumstances may include emergency situations, such as the need for immediate disease control or a response to natural or human-made disasters. These

# Goal: 24 hours



# Depopulation Equipment Summary

- Swine mass depopulation equipment
- Equipment existing or under development as of Dec 2021
- Summary of methods
- Pros and cons

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# Indemnity

- Information on USDA ASF website
- Provides and overview about financial processes for producers
  - Indemnity for pigs
  - Compensation for depop, disposal, and virus elimination
- Paperwork must be completed prior to depopulation

## ✓ Policy Information

RRG=Ready Reference Guide

### Initial Response

- [Epidemiology Questionnaire !\[\]\(4c660a3c4ce1da3313488b7854f55083\_img.jpg\)](#) (Nov 2020)
- [ASF Chronology and Affected-State Checklist !\[\]\(f01c435bb39e3068a9b4895c9a993158\_img.jpg\)](#)
- [Summary of Initial ASF Response Actions RRG !\[\]\(c5f009707b314589d498a683120545c5\_img.jpg\)](#)
- [Critical Activities and Tools during an FAD Response RRG !\[\]\(8b308e9f1e6682fd04ddef01495a93be\_img.jpg\)](#)

### Finance and Administration Processes

- [Overview of Finance & Administration Procedures !\[\]\(13dd0e1ab3baa23f7c1ed52b3eec2756\_img.jpg\)](#) (Nov 2020)
- [Appraisal and Indemnity Request Form Appendix A1: Form for Owner !\[\]\(5ed985c65f50e5350eeeb77f03c2e095\_img.jpg\)](#) (Nov 2020)
- [Appraisal and Indemnity Request Form Appendix A2: Form for Grower !\[\]\(9df44d2794f927e8a7eb6682863e4aa8\_img.jpg\)](#) (Nov 2020)
- [ASF Herd Plan Template !\[\]\(d71b3fa200323d68855615929e9633f6\_img.jpg\)](#) (Nov 2020)

# Carcass Disposal

- Main Options
  - Composting
  - Burial (Deep or Above Ground)
  - Incineration
- Work with your local DNR office to determine disposal options
  - Locate local contact at <https://www.iowadnr.gov/fieldoffice>
  - Call (515) 725-8694



## Goal: On-Site Disposal



# Control Area



# Ongoing Actions After Confirmed Positive

- Continue tracing, investigations, and data entry into EMRS
- Determine Control Areas around infected premises
- Coordinate surveillance (not known to be infected sites)
  - Premises in the Control Area
  - Contact premises (premises linked to the infected premises)



# FAD Diagnosed

- Infected Zone
  - Swine FADs: 3km (~1.86 miles) beyond perimeter of infected premises
- Buffer Zone
  - ASF: 2km (~1.24 miles)
  - FMD, CSF: 7km (~4.35 miles)
- **Control Area = Infected + Buffer Zones**
  - ASF: minimum 5km
  - FMD, CSF: minimum 10km



USDA, Overview of Zones, 2018





# Areas and Zones

- Surveillance Zone
  - Outside, along border of Control Area
  - ASF: 5km (~3.2 miles)
  - FMD, CSF: 10km (~6.21 miles)
- Free Area
  - Includes Surveillance Zone and all areas not in Control Area(s)



USDA, Overview of Zones, 2018

# Premises Designations

- **Contact Premises**

- Susceptible animals
- Exposed to FAD directly, indirectly
- Animals, animal products, fomites, people
- Subject to Network Based Controls

- **Suspect Premises**

- Under investigation
- Susceptible animals with compatible signs
- Short-term designation

Contact = exposure  
Suspect = signs



# Premises Designations (cont'd)

## • At-Risk Premises

- Susceptible animals, NO clinical signs
- Demonstrates not Infected, Contact, or Suspect Premises
- Permitted movement WITHIN Control Area

## • Monitored Premises

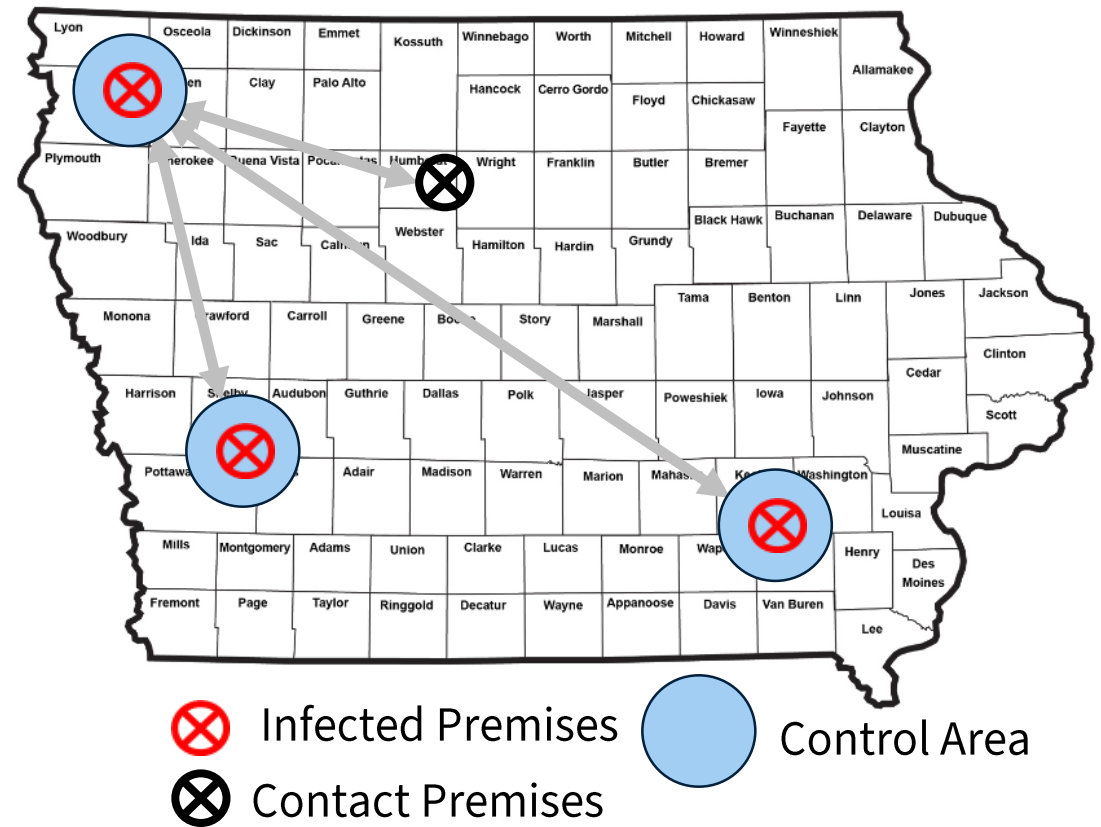
- Demonstrates not Infected, Contact, or Suspect Premises
- Meet set of criteria for permitted movements OUT of Control Area



USDA, Overview of Zones, 2018

# Network Based Controls (NBC)

- Address movement between swine sites
- Relies on epidemiology, record keeping to find contacts
- Control Areas set up around other Infected Premises
  - NOT set up around Contact Premises



# Control Area

- Infected Premises
  - Quarantine
  - Biocontainment
  - Depopulation and disposal
- All other premises in CA
  - Quarantine
  - Surveillance
  - Permitting



Courtesy of the National Pork Board, Des Moines, Iowa

# Quarantine

- All premises with susceptible species within Control Area subject to Quarantine
- IDALS Terms
  - Affected quarantine
    - Infected Premises
  - Not known to be infected quarantine
    - All other premises



# Movement by Permit Only in Control Area

- Prevent disease spread
  - Criteria to meet to determine movement is as safe as possible
- Traceability – initially:
  - If infection found after a movement, trace to other premises
  - Transparency to industry, States, public
- Traceability – longer term:
  - Report to trade partners
  - Demonstrate outbreak control



USDA, Overview of Zones, 2018

# Permit Example- Swine to Slaughter

## Permit

### Swine Moving from a Control Area Directly to Slaughter

Permit number*	
Date of issuance*	
Period permit is valid for*	
Animal type moving**	
Premises identification number (PIN) of origin of movement**	
Premises identification number (PIN) of destination of movement or 911 address**	
Name of person that collected samples***	
Electronic or hand signature of permit applicant****	

\*To be filled in by IDALS

\*\*To be filled in by owner or authorized agent of owner


\*\*\*If not collected by an accredited veterinarian

\*\*\*\*Must be submitted by owner or authorized agent of the owner of the swine.



# IDALS Permit Process

- Traceability information
  - PIN for origin, destination
  - Info on what needs to move
- Premises designation = Monitored
  - Not Infected, Suspect, Contact
  - Record evaluation
  - Surveillance testing
- Willingness to accept?

 IOWA DEPARTMENT OF AGRICULTURE & LAND STEWARDSHIP

Mike Naig  
Secretary of Agriculture

Wallace State Office Building • 502 E 9th St, Des Moines, IA 50319 • (515) 281.5321 • www.IowaAgriculture.gov

**Permit**  
**Swine Moving from a Control Area Directly to Slaughter**

Permit number*	
Date of issuance*	
Period permit is valid for*	
Animal type moving**	
Premises identification number (PIN) of origin of movement**	
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\*\*To be filled in by owner or authorized agent of owner  
\*\*\*If not collected by an accredited veterinarian  
\*\*\*\*Must be submitted by owner or authorized agent of the owner of the swine.

Page 1 of 3

# Summary of Permit Requirements

- Samples collected by accredited veterinarian, approved sampler
- All movements under this permit reported to EMRS, IDALS
  - Movement reports with vehicle, driver info
- Permit cancelled with
  - Presumed positive test results
  - Increases in daily mortality, clinical signs

**Permit**  
**Swine Moving from a Control Area Directly to Slaughter**

Permit number*	
Date of issuance*	
Period permit is valid for*	
Animal type moving**	
Premises identification number (PIN) of origin of movement**	
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Page 1 of 3

# For More Information, Check Out Our Webinar

## **FAD Control Areas, Secure Pork Supply, and the Permitting Process in Iowa**

Dr. Jeff Kaisand, State Veterinarian of Iowa  
Dr. Jim Roth, Director, CFSPH, ISU  
Ms. Amanda Chipman, Emergency Management Coordinator, IDALS



IOWA DEPARTMENT OF  
AGRICULTURE &  
LAND STEWARDSHIP

June 23, 2021

[www.iowaagriculture.gov/foreign-animal-disease-webinars](http://www.iowaagriculture.gov/foreign-animal-disease-webinars)

# What happens if feed is involved in standstill?

- How would you feed your pigs if no feed could be delivered during the standstill?
  - Manage what feed is available on-site
  - Slow pig growth
  - Find alternative sources of feed

# Experimental Design

- 1,407 mixed sex late-finishing pigs
  - $92 \pm 11$  kg BW
  - DNA 610 E x DNA 241 F1 genetics
- Pens randomly assigned to one of five treatments
  - n=12 pens/treatment, 22-24 pigs/pen
- 3-week study with 2 periods
  - Day 0 – 14: treatments in place (period 1) – 14 days
  - Day 14 – 21: *ad libitum* control diet (period 2) – 7 days

Following slides provided by Kayla Miller and Nick Gabler

# Treatment strategies

1. *Ad libitum* (~**3x** maintenance energy requirement) access to feed (**CON**)
2. Feeding based on 1.45x maintenance energy requirement (**1.45x**)
3. Feeding based on 2x maintenance energy requirement (**2x**)
4. Closed feeders to tightest setting, with *ad libitum* access (**Closed**)
5. Whole corn kernels, offered *ad libitum* (**Corn**)

**1.45 and 2x maintenance – restriction fed at pen level**

# Feeder adjustments

Control



Closed  
Feeder



Whole  
Corn

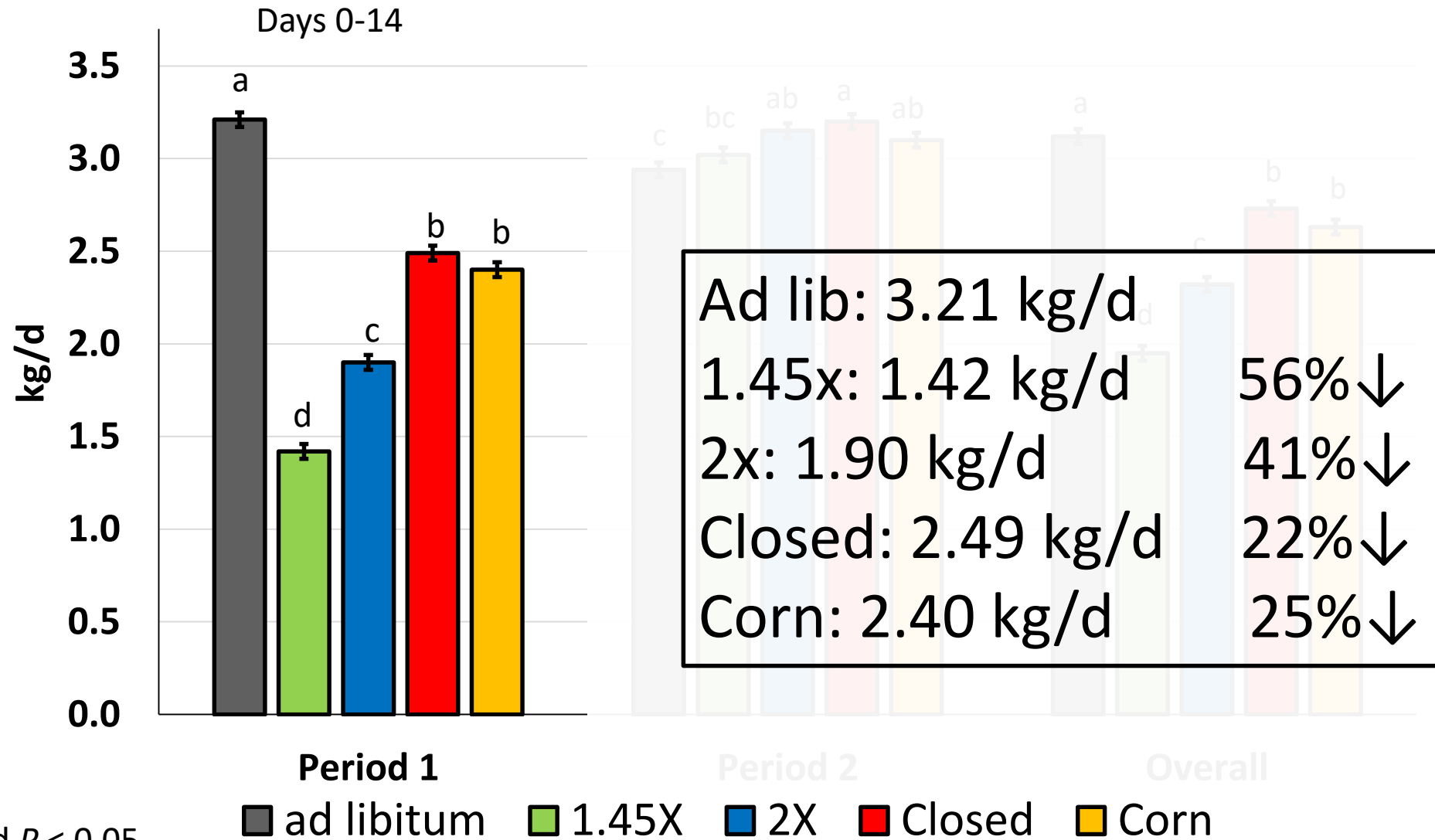


# Materials & Methods

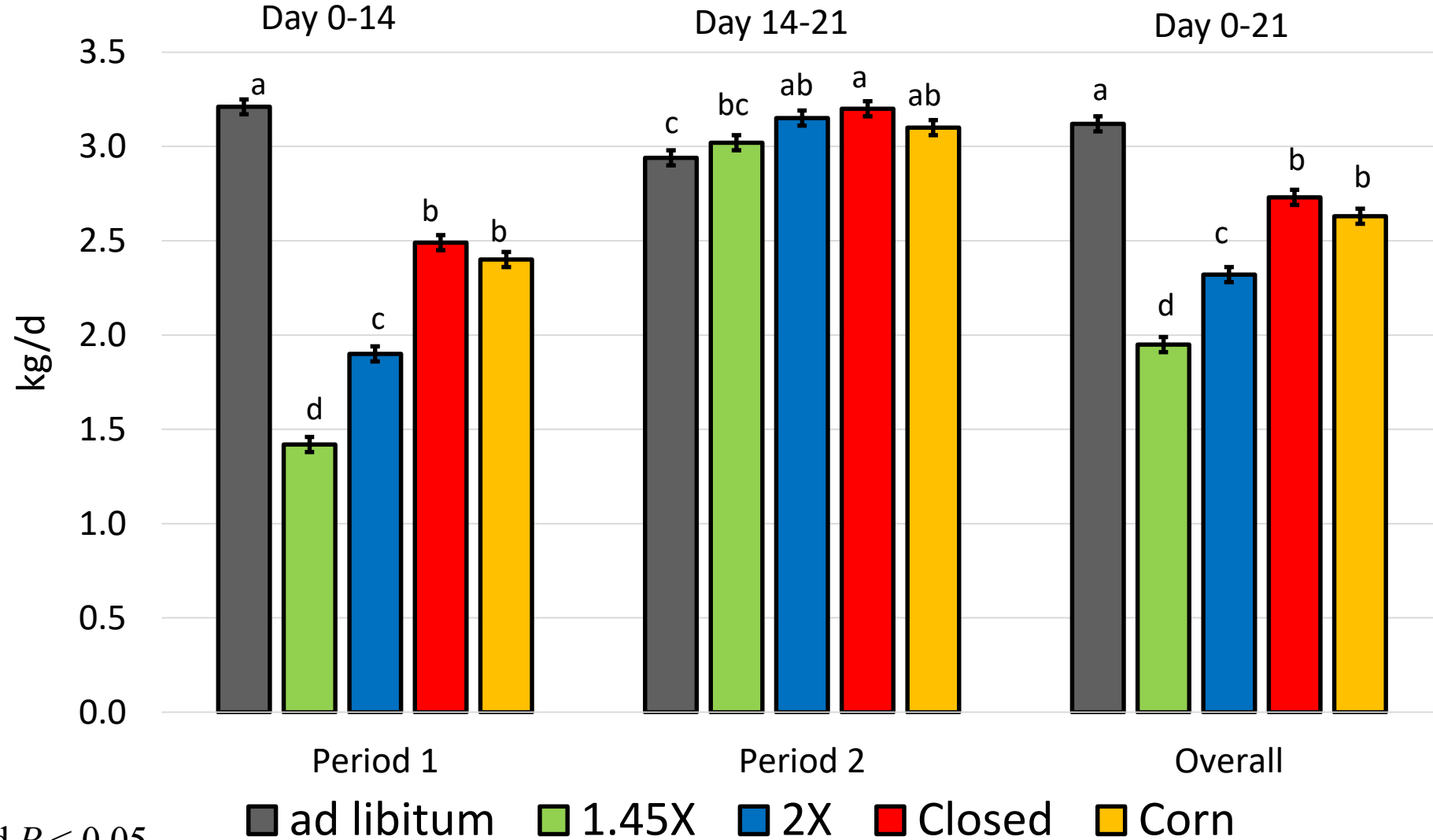
- Data collected on day 0, 14, and 21
  - Individual body weights and pen feed intake recorded to calculate ADG, ADFI and feed efficiency (G:F)
- Daily observations per pen were made on d 0 – 14 and d 21
  - To count tail bites, ear bites, side bites/ sores, other indicators of aggression
- Mortality and removals were recorded



# Average Daily Feed Intake

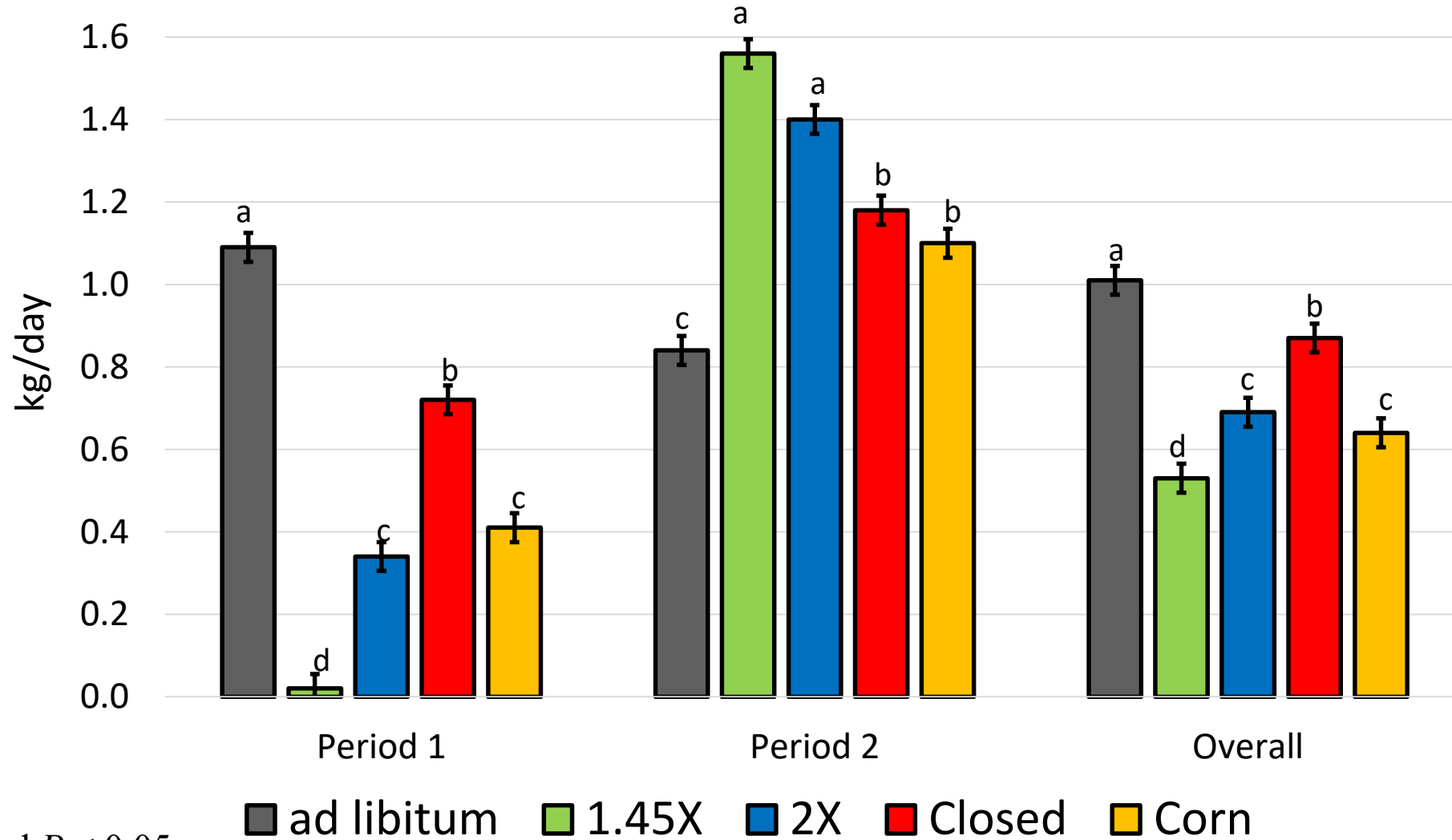


# Average Daily Feed Intake



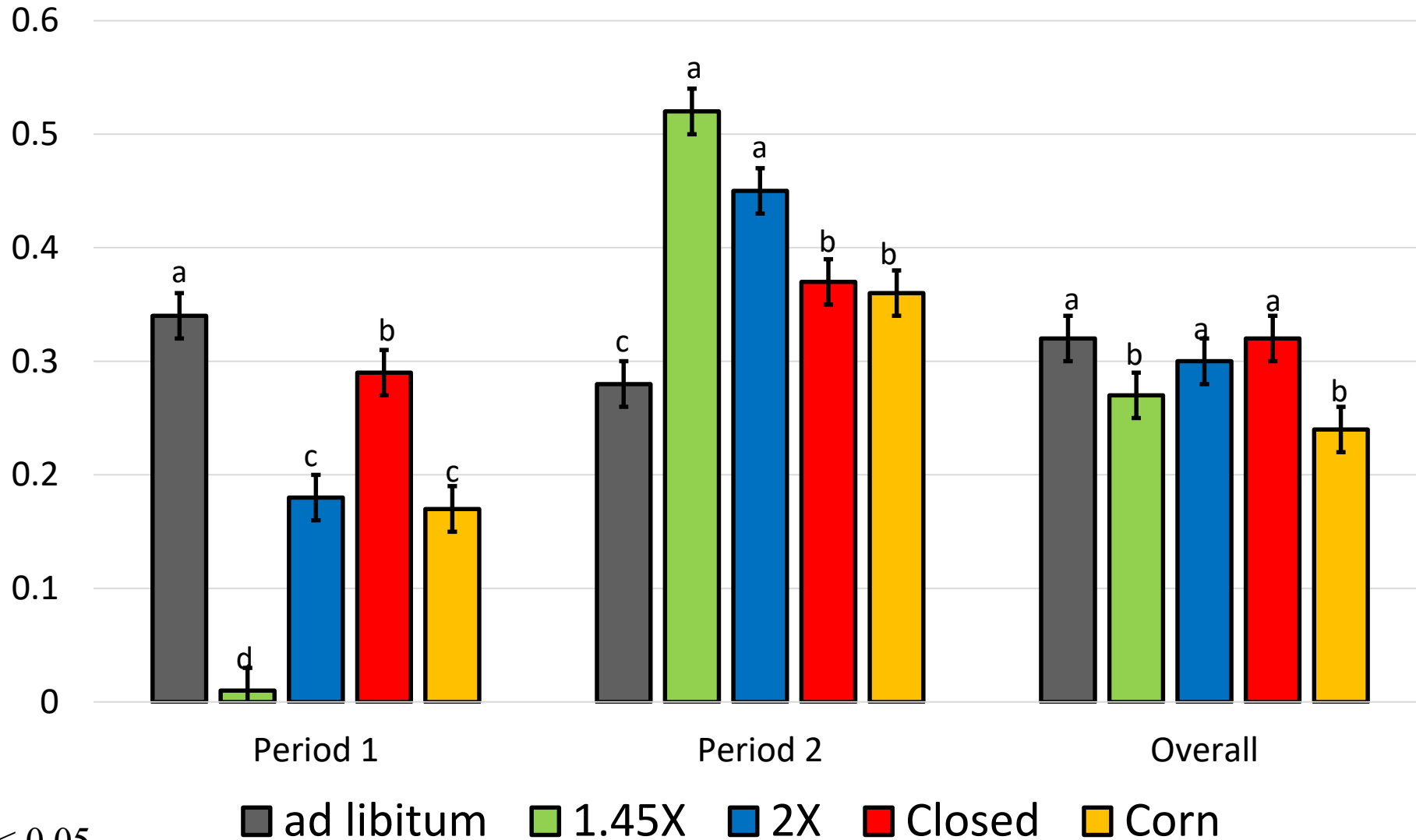
Letters a,b,c,d  $P < 0.05$

# Average Daily Gain



Letters a,b,c,d  $P < 0.05$

# Feed efficiency (G:F)



Letters a,b,c,d  $P < 0.05$

# Growth Performance – Body Weights, kg

Item	Control	1.45x	2x	Closed	Corn	SEM	P value
Day 0	92.1	92.4	92.4	92.3	92.3	0.654	0.752
Day 14	107.5 <sup>a</sup>	92.6 <sup>d</sup>	97.3 <sup>c</sup>	102.4 <sup>b</sup>	98.1 <sup>c</sup>	0.739	<0.001
Day 21	113.3 <sup>a</sup>	103.6 <sup>d</sup>	107.8 <sup>c</sup>	110.8 <sup>b</sup>	105.7 <sup>c</sup>	0.686	<0.001

<sup>a,b,c,d</sup>Means within a row with differing superscripts differ significantly at  $P < 0.05$

**Body weights at d 14 were reduced ~5 to 15%**  
**d 21 were reduced ~2 to 9%**

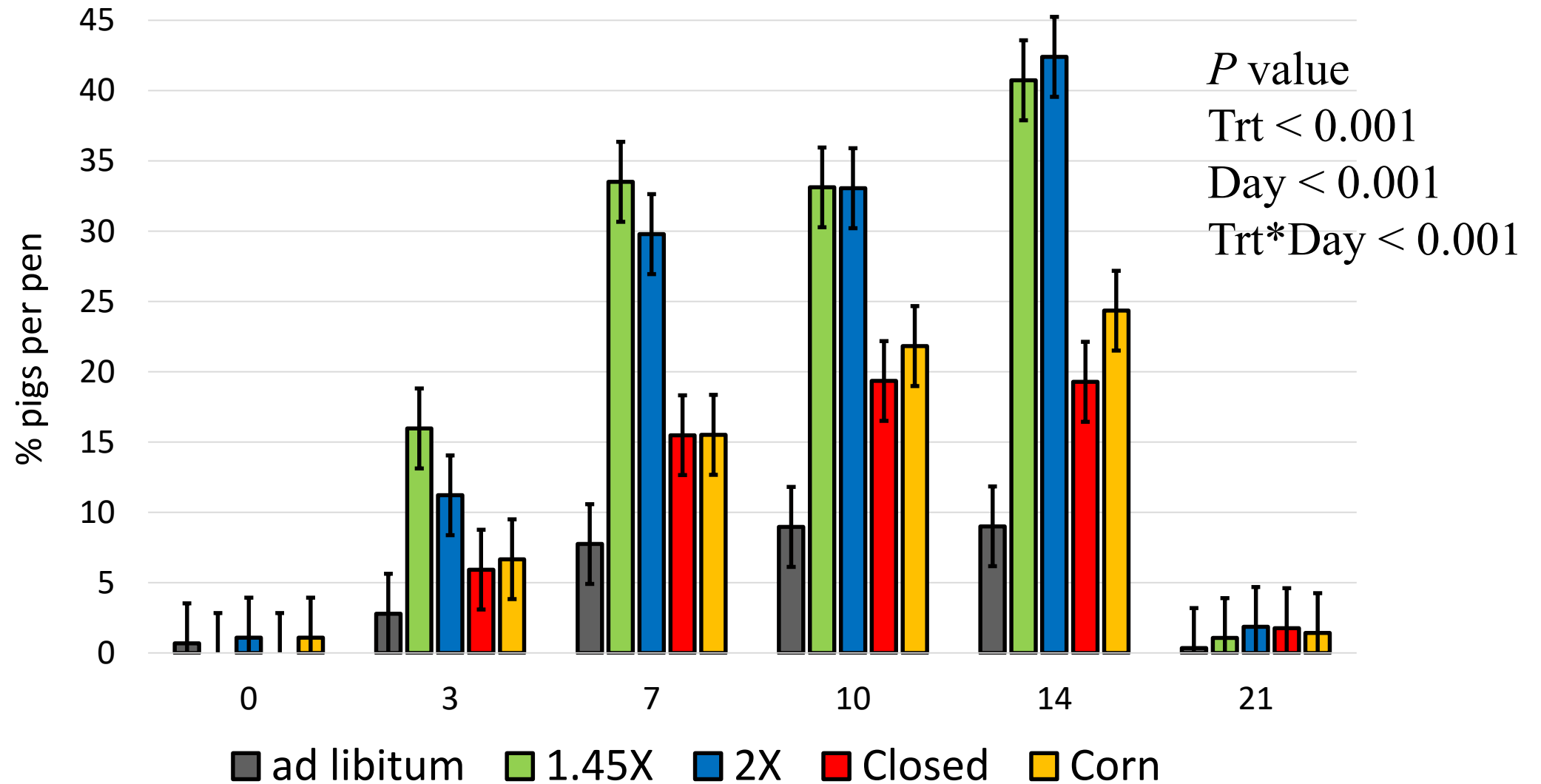
## Carcass composition – Overall

Item	Control	1.45x	2x	Closed	Corn	SEM	P value
Live Weight, kg	130.0 <sup>a</sup>	121.5 <sup>d</sup>	124.7 <sup>c</sup>	127.5 <sup>b</sup>	123.2 <sup>cd</sup>	0.656	<0.001
Carcass Weight, kg	95.3 <sup>a</sup>	88.3 <sup>c</sup>	91.4 <sup>b</sup>	93.9 <sup>a</sup>	90.6 <sup>bc</sup>	0.829	<0.001
Fat depth, cm	1.21 <sup>a</sup>	1.11 <sup>b</sup>	1.16 <sup>ab</sup>	1.20 <sup>a</sup>	1.21 <sup>a</sup>	0.031	0.007
Loin depth, cm	7.28 <sup>a</sup>	6.93 <sup>bc</sup>	7.12 <sup>ab</sup>	7.18 <sup>a</sup>	6.89 <sup>c</sup>	0.058	<0.001
Lean, %	57.8 <sup>a</sup>	57.2 <sup>ab</sup>	57.4 <sup>a</sup>	57.4 <sup>a</sup>	56.9 <sup>b</sup>	0.119	0.001
Yield, %	74.0	73.6	72.7	73.8	73.9	0.502	0.215

<sup>a,b,c,d</sup>Means within a row with differing superscripts differ significantly at  $P < 0.05$

- Whole corn decrease lean% and loin depth
- Restrict feeding reduces fat and loin depth
- Close feeders similar to the Control

# Behavioral assessment – Total abrasions



# FAD – After the standstill is lifted

- What is going to happen to those **NOT** in control zones?
- Possibilities?
  - Biosecurity changes
    - Loss of rendering? → What are your on farm disposal options?
    - Secure Pork Supply → PBA and C&D stations?
  - Movement testing?
    - Importance of CSSC
  - Feed mitigation – if feed was involved
  - Supply chain disruption due to loss of exports or plant in control zone?



# COVID Supply Chain Disruption – 2020 lessons learned

- Diet manipulation
  - Slow growth diets
- IRCC
- Depopulation
- Disposal

# NUTRITIONAL APPROACHES TO REDUCE GROWTH RATES IN FINISHING PIGS

1. Increasing neutral detergent fiber (NDF) content to “bulk up” the diet and lower energy content
  - Reduce appetite
2. Reducing protein and essential amino acids to restrict lean growth
  - Low Lysine
  - Lower branched chain amino acid (isoleucine) to create an imbalance
3. Increasing the dietary acidogenic salt (calcium chloride) to suppress appetite

# **Study 1: NUTRITIONAL APPROACHES TO REDUCE GROWTH RATES IN FINISHING PIGS (March-April 2020)**

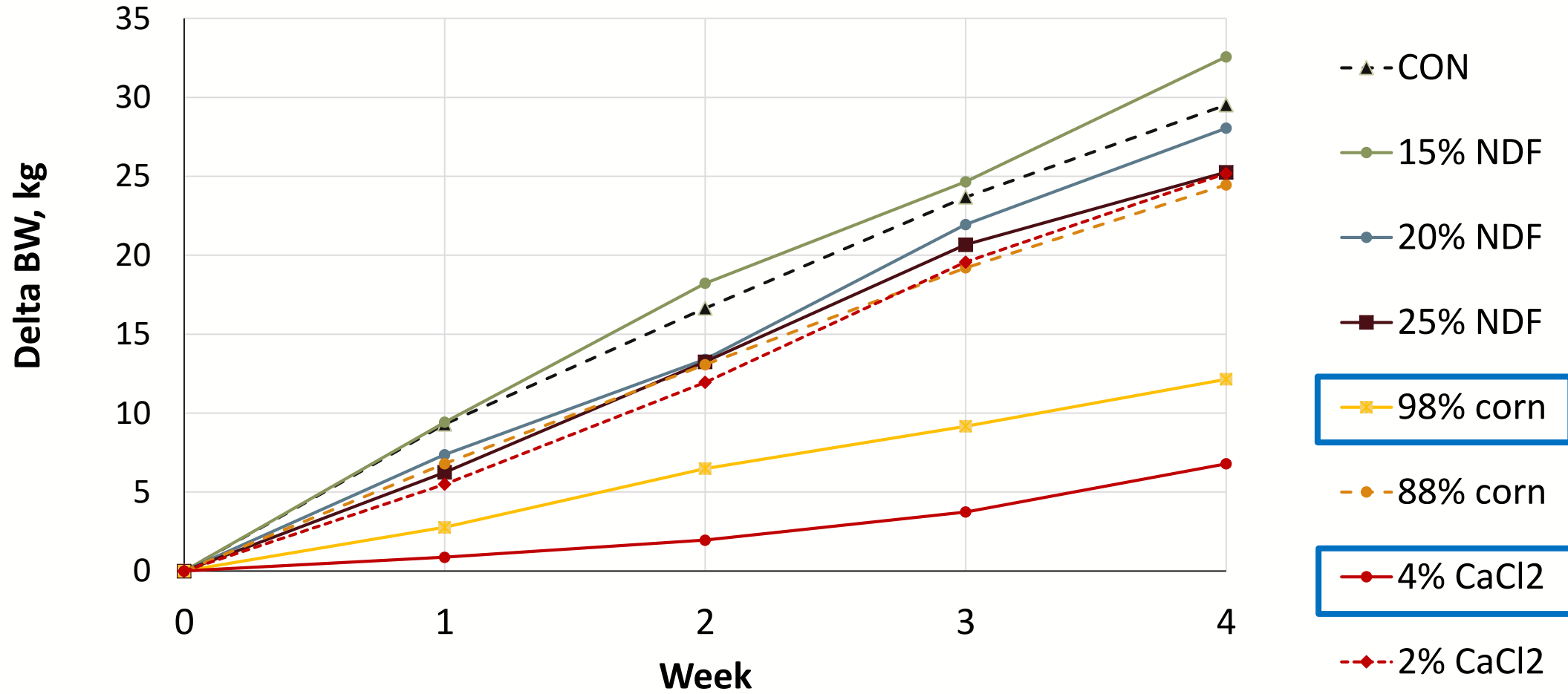
## Objectives

1. To evaluate and provide data to the industry on nutritional approaches to reduce finishing pig growth rates for 28 days
  - Practical to implement
  - Welfare minded approaches (i.e. not restricting feed or water)
2. To evaluate compensatory growth responses for 14 days

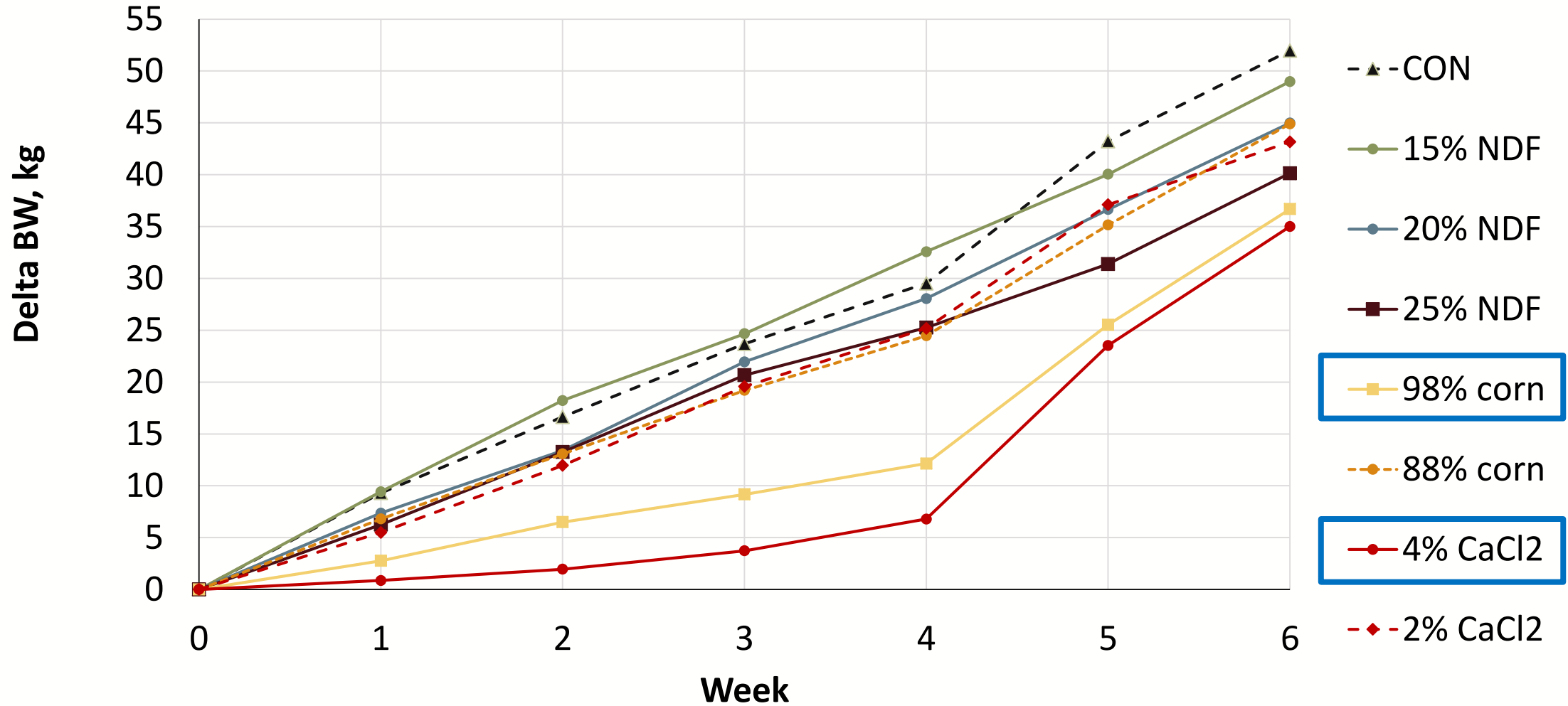
# Study 1: NUTRITIONAL APPROACHES TO REDUCE GROWTH RATES IN FINISHING PIGS (March-April 2020)

- 96 barrows and gilts ( $72 \pm 4.5$  kg BW; Camborough (1050) X 337) were blocked by body weight and sex, and assigned to 1 of 8 dietary treatments (n=12 pigs/trt). Dietary treatments:
  1. Control diet (**CON**)
  2. 15% Neutral detergent fiber (**15% NDF**)
  3. 20% Neutral detergent fiber (**20% NDF**)
  4. 25% Neutral detergent fiber (**25% NDF**)
  5. No Soybean meal (**97% Corn**) – no SBM or synthetic AA
  6. Half soybean meal of #1 (**89% Corn**) – reduced SBM and synthetic AA
  7. Anhydrous Calcium chloride 4% (**4% CaCl<sub>2</sub>**)
  8. Anhydrous Calcium chloride 2% (**2% CaCl<sub>2</sub>**)

# Study 1: Performance results (0-28 days)



# Study 1: Compensatory gains (28-42 days)



# Summary

- Corn diet, or some variation of it, appears to be the most common option selected to reduce growth (lower lysine).
  - Is easy to implement and is effective
  - Often used in combination with tightening feeders and/or elevating barn temperature
- Calcium chloride diet appears to be popular only when growth needs to be stopped completely.
- No negative vice behaviors
- Slight increase in backfat from the 97% corn diet and a slight reduction in pH and tenderness of the calcium chloride loins.
  - These differences have the potential to reduce pork quality, but may not be big enough to be noticed by a pork consumer.

Finding the Right Resources:

**Feed Additives to Mitigate the Risk  
of Virus-contaminated Feed**

Mark Storlie

Swine Field Specialist



# Feed ... risk of virus movement

Research trials have documented viruses can survive in feed ingredients and complete feed for transoceanic shipping (30 and 37 days) and transcontinental shipping (23 days.)

1. Viruses survival is variable and depends on specific properties of each virus
2. Certain feed ingredients or feed products present a better matrix for virus survival than others
3. Select ingredient matrices seemed to enhance the survival of multiple viruses.

Ingredient	SVA (FMDV)	ASFV
Soybean meal-Conventional	(+)	(+)
Soybean meal-Organic	(-)	(+)
Soy oil cake	(+)	(+)
DDGS	(+)	(-)
Lysine	(+)	(-)
Choline	(+)	(+)
Vitamin D	(+)	(-)
Moist cat food	(+)	(+)
Moist dog food	(+)	(+)
Dry dog food	(+)	(+)
Pork sausage casings	(+)	(+)
Complete feed (+ control)	(+)	(+)
Complete feed (- control)	(-)	(-)
Stock virus control	(-)	(+)

Dee S.A., F.V. Bauermann, M.C. Niederwerder, A. Singrey, T. Clement, M. de Lima, et al. (2018) Survival of viral pathogens in animal feed ingredients under transboundary shipping models. PLoS ONE 13(3): e0194509. <https://doi.org/10.1371/journal.pone.0194509>.

Dee S., A. Shah, C. Jones, et al. Evidence of viral survival in representative volumes of feed and feed ingredients during long-distance commercial transport across the continental United States. Transbound Emerg Dis. 2021;00:1–8. <https://doi.org/10.1111/tbed.14057>.

# Feed Additives to Mitigate the Risk

Research has demonstrated that feed additives can mitigate the negative effects of virus contaminated feed

- **ASF**
- **FMD**
- **PRRSV, PEDV, SVA**

Dee S.A., M.C. Niederwerder, R. Edler, et al. An evaluation of additives for mitigating the risk of virus-contaminated feed using an ice-block challenge model. *Transbound Emerg Dis.* 2020;00:1–13.  
<https://doi.org/10.1111/tbed.13749>.

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## Feed Additives to Mitigate the Risk of Virus-contaminated Feed

The introduction of Porcine Epidemic Diarrhea Virus (PEDV) in 2013 into the US swine industry pointed toward feed ingredients as the likely route of introduction<sup>1</sup>. Subsequent research trials have documented viruses can survive in feed ingredients and complete feed for transoceanic shipping<sup>2</sup> (30 and 37 days) and transcontinental shipping<sup>3</sup> (23 days.) Authors of the transoceanic trial concluded: 1. Viruses can survive in feed, but survival is variable and depends on specific properties of each virus; 2. Certain feed ingredients or feed products present a better matrix for virus survival than others; and 3. Select ingredient matrices seemed to enhance the survival of multiple viruses.

This fact sheet focuses on three research papers which evaluated compounds to mitigate virus-contaminated feed. The compounds are classified into two different groups. Foreign Animal Disease (FAD) viruses: African Swine Fever (ASF) and Foot and Mouth Disease (FMD); and Domestic viruses: Porcine Reproductive and Respiratory Syndrome virus (PRRSV), Senecavirus A (SVA), and Porcine Epidemic Diarrhea virus (PEDV) are discussed.



**Factsheet available on  
IPIC website**

**<https://www.ipic.iastate.edu/nutrition.html>**

# FEED ADDITIVES

Tested & Observed Results

Equal Challenge of **PRRS, SVA & PEDV**

*Effective vs ASF at 0.33% inclusion*

Niederwerder MC, Dee S, Diel DG, et al. Mitigating the risk of African swine fever virus in feed with antiviral chemical additives. *Transbound Emerg Dis.* 2021;68:477–486. <https://doi.org/10.1111/tbed.13699>

Product	Company	Description	Study Inclusion rate(s)	No evidence of infection via PCR in rectal, tonsil and serum samples	No signs of clinical disease and mortality level of <1%
Activate DA	Novus	A blend of organic acids and methionine hydroxy analogue (HMTBa)	0.5% or 0.15%		X (at 0.5%)
Sal CURB®	Kemin	A blend of aqueous formaldehyde and organic acids	0.275%	X (at 0.275%)	X (at 0.275%)
Sal CURB® K2	Kemin	An organic acid blend, including formic acid, ammonium formate, propionic acid, and lactic acid	0.275%		
CaptiSURE™	Kemin	Medium-chain fatty acid blend	0.5% or 1.0%	X (at 0.5% and 1.0%)	X (at 0.5% and 1.0%)
Daafit® S	ADM	A source of fatty acids, including lauric and myristic acids and glycerol mono laurate	0.5% or 0.3%		
Daafit® Plus	ADM	Acidifier blend composed of short-chain fatty acids, formic, propionic acid, acetic acid, sorbic acids, and a blend of medium-chain fatty acids including lauric acid, caprylic acid, and glycerol-mono-laurate	0.5%		X (at 0.5%)
Dominante	Purina Animal Nutrition	A blend of 3 medium-chain fatty acids	0.5%		
Finio®	Anitox	A blend of propionic acid, trans-2-hexenal (leaf aldehyde), and nonanoic acid (pelargonic acid)	0.2%		
Guardian	Alltech	A blend of organic acids and essential oils	0.44%		X (at 0.44%)
R2™	Feed Energy	A natural lipid-based line of products made by a combination of short-, medium-, and long-chain fatty acids	3.0%		X (at 3.0%)
VVC	DSM	Pure benzoic acids with nature-identical flavorings	0.5% or 0.3%	X (at 0.3% and 0.5%)	X (at 0.3% and 0.5%)
Vigilex	Provimi	A blend of oils, bacterial fermentation products, whey products, plant protein, and natural flavorings	0.4%		
pHorce	Anpario	A blend of liquid formic and propionic acids on a mineral carrier	0.3%		X (at 0.3%)
Dual Defender™	Ralco	A blend of essential oils and prebiotic fiber	0.1%		X (at 0.1%)
Furst Protect	McNess	A blend of emulsifying monoglycerides of medium-chain fatty acids and essential oils, plus botanical extracts	0.4%		X (at 0.4%)

# Feed Additives Currently Available

**“Summary of feed additives with scientific evidence evaluating efficacy against viral pathogens in swine feed”**

Provides current product offerings, suggested inclusion rate per ton, relative cost per ton, and company contact information

Document is maintained at [www.ksufeed.org](http://www.ksufeed.org)  
periodically check for document updates

Following table is current as of April, 2022

Company	Product name	Active ingredient(s)	Inclusion, lb/ton	Pricing <sup>1</sup>	# of published studies documenting efficacy <sup>2</sup>	Total # of published studies
ADM	DaaFit & DaaFit S	Lauric and myristic acids and glycerol monolaurate	10 (Daafit S) 6 (Daafit)	\$\$	1	1
ADM	DaaFit PLUS	Lauric Acid, GML-90, formic acid, short chain fatty acids	10	---	1	1
Alltech	Guardian	Lactic acid, propionic acid, essential oils	8 (dry) 5.3 (liquid)	\$\$\$ (dry) \$\$ (liquid)	3	3
Anitox	Termin8	Formaldehyde, propionic acid (liquid or powder form)	6	---	0	0
Anpario	pHorce	Formic acid, propionic acid, ammonium formate	6	\$\$	1	1
DSM Nutritional Products	VVC Premix	Blend of essential oil compounds and benzoic acid	7	\$	2	3
Feed Energy	R2	Short, medium, long chain fatty acids and essential oils	60 (R2 active ingredients along with added fats/oils)	\$ (active ingredient)	1	1
Feedworks USA	LipoVital GL-90	Glycerol monolaurate	2 to 4	\$\$	0	0
Form A Feed	Prohibio-R	Medium chain fatty acid and monoglyceride, organic acids	4-5	\$\$\$	0	0
Furst McNess	Furst Protect	Monoglycerides, Essential oil, natural extracts	8	\$\$\$	1	1
Kemin	FeedSURE MG	Monoglyceride blend, organic acids	3.3 to 7.7	\$\$	1	1
Kemin	Sal CURB	Formaldehyde, propionic acid	6.5	\$	8	8
Novus	Activate DA	Organic acids, 2-Hydroxy-4-Methylthio Butanoic acid	10	\$\$\$	2	3
PMI	Vitacy FeedLock	Blend of activated medium chain fatty acids	4	\$	0	0
Provimi	Vigilex	Fatty acids	8	\$	1	1
Ralco	Dual Defender	Phytonutrients	2	\$\$ to \$\$\$	1	1

<sup>1</sup> Pricing at recommended inclusion. \$ = < \$10/treated ton; \$\$ = \$10-15/treated ton; \$\$\$ = > \$15/treated ton. --- indicates that pricing estimate not available.

<sup>2</sup> Efficacy defined as a reduction in the infectivity of viral samples (PEDV, PRRSV, SVA, ASFV, FMDV) using either a cell culture based assay or swine bioassay. Other non-peer reviewed data may be available to support the products such as meeting abstracts and proceedings, but not considered in this summary.

# Feed Additives to Mitigate the Risk

Claims of efficacy for reduction of viral contamination have not been reviewed and approved by the United States Food and Drug Administration for many of the products described in this presentation.

**Therefore, within this presentation there are no claims directed (whether stated or implied) beyond what is provided on the manufacturer label.**

Information is provided for awareness of products and formulations and is not a statement of endorsement for companies or products presented, nor is criticism implied for companies or products not listed.

# Iowa Resource Coordination Center

- Public – Private Partnership
- Incident management team
- 1-stop for producer resources and technical assistance
  - Depopulation options
  - Disposal options

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RESOURCE COORDINATION CENTER

IOWAFARMERHELP.COM OR CALL (515) 725-1005



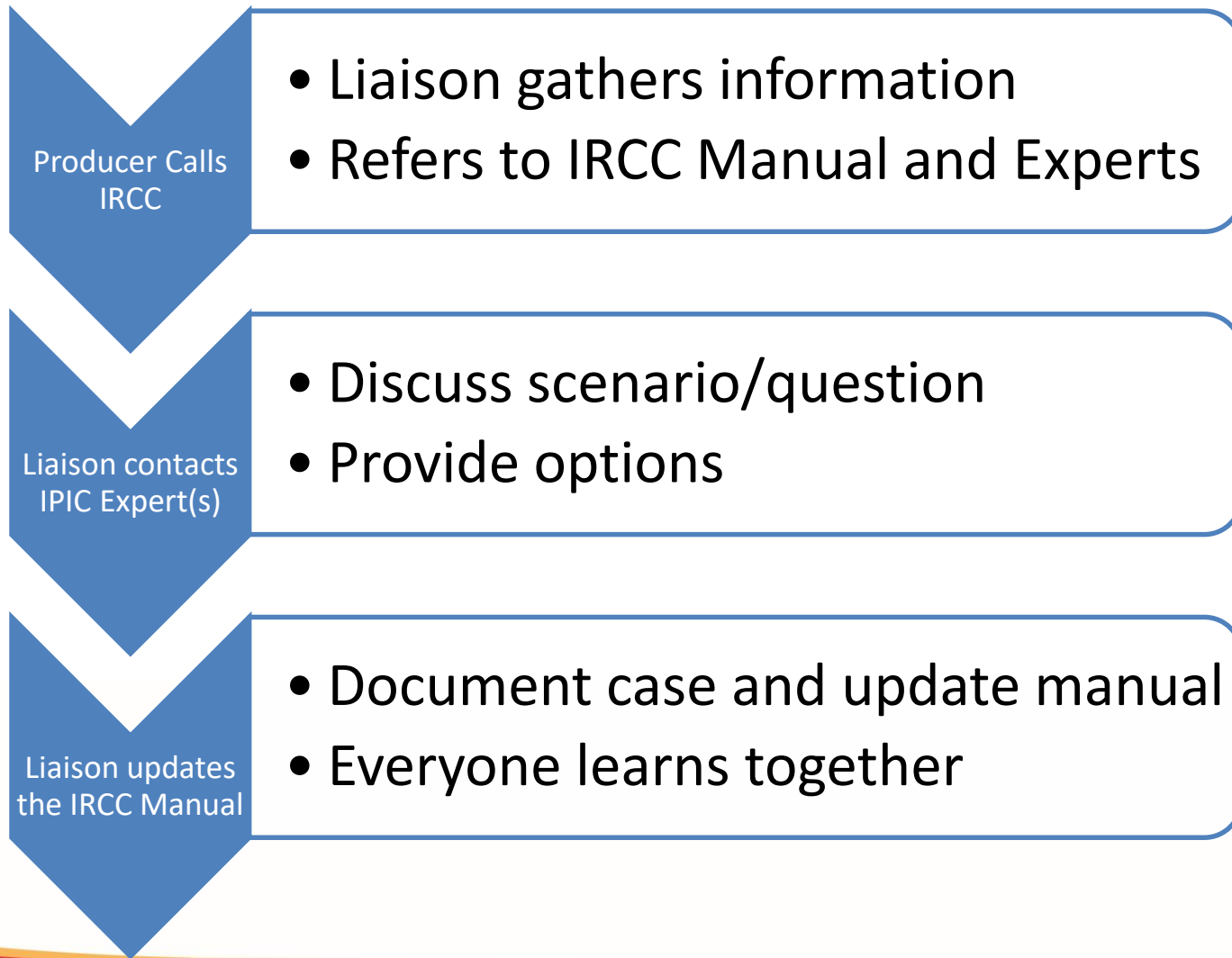
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# IRCC Process Model to Build Knowledge

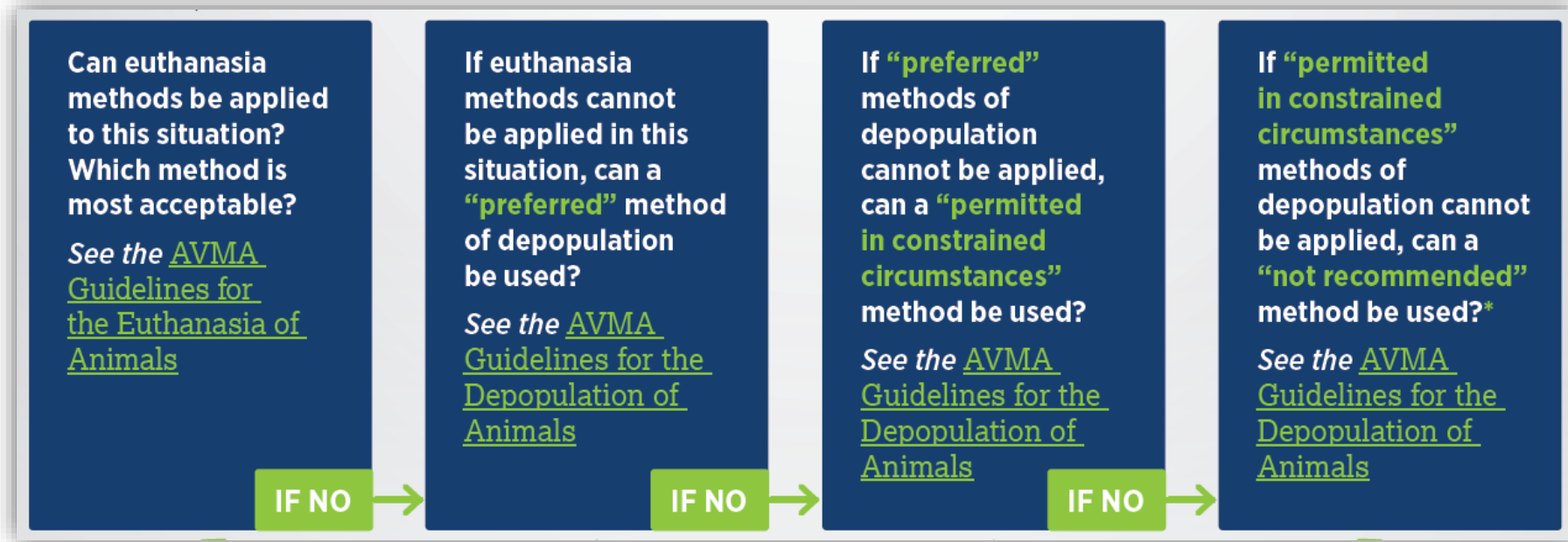




# Depopulation as a Last Resort

## AVMA Guidelines for the Depopulation of Animals – Chapter 4: Swine

Preferred		Permitted in Constrained Circumstances	Not Recommended
Carbon dioxide	Movement to slaughter	Sodium Nitrite	None listed
Electrocution	Nonpenetrating captive bolt	Ventilation Shutdown Plus (VSD+)	
Gunshot	Manual blunt force trauma	Compounded or nonpharmaceutical-grade injectable anesthetics and euthanasia agents	
Penetrating captive bolt	Anesthetic overdose		



# Human Considerations for Mass Depopulation Method – IRCC Resource

Method	Worker Physical Danger	Worker Mental Danger	Other logistical issues	Total Hours/People (2min/animal 6000 sows)
Gunshot	+++	+++	Acquiring guns and ammo, lack of training, on going cleaning, device gets hot, fatigue, blood	67 hours 84 people
Captive Bolt Gun	+++	+++	Acquiring guns and ammo, lack of training, on going cleaning, device gets hot, fatigue, blood	67 hours 84 people
Electrocution	+++	++	Specialized equipment currently not readily available. Small pigs only.	67 hours 84 people
CO2	+	+	Can only vaporize small amounts of CO2 (n=50 pigs). 30-minute cycles (100 adult pigs per hour). Only practical for small pigs currently.	46 hours 36 people
Anesthetic overdose	+	+	Availability, difficult to train and apply, lack of veterinarian availability	67 hours 84 people



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# Ambient air vaporizers

- Fill the LP tanks to 50-60 psi
  - 20-25 minutes
- Feather the tanks into the chamber over 5-minute period
- Let the CO<sub>2</sub> dwell in the chamber for another 15 minutes
- 100% efficacy





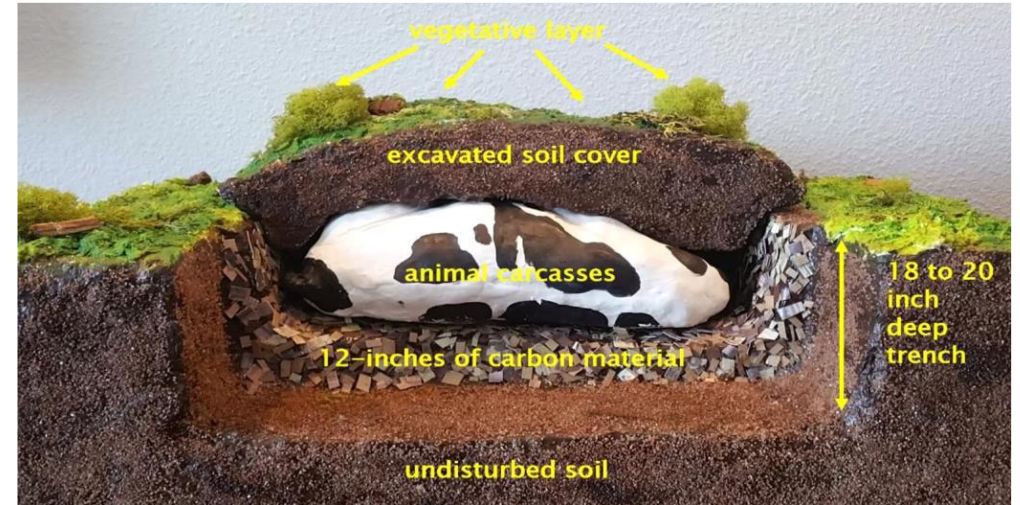


# Disposal Methods

- Deep Burial
- Shallow Burial
- Grind and Compost
- Compost
  - Cattle Manure

# Shallow Burial

- SDSU – Bob Thaler
- On going projects at SDSU and OK State University
  - Keep from water table
  - Inactivates pathogens
- Cheaper option, so long as you have land available
- Still need carbon and earth moving equipment
- Modeled to be \$5-7 per carcass



Add Carbon Material



Place Carcasses





# Grind and Compost

- Tree grinder (550-1100 hp)
- Have to have equal parts compost material and carcasses
  - Straw
  - Corn Stalks
  - Wood Chips
- Estimated 10 carcasses per minute
- Finalized material achieves >165 deg F in a couple of days
  - Completely composted within 30 days.
- Cost is \$20-30 per carcass, depending the cost of the carbon source



**Recent work in summer in Vietnam**  
**ASF VI negative at 3 days of composting**

DOI: 10.1111/tbed.14659

# Construction of Compost Pile

1. Width: Start with 15-20 feet wide
2. Base layer of 12-24 inches bulking agent
3. Place mortalities in a single layer and at least 6 inches from the edge
4. Cover with 12-18 inches of bulking agent in a mound shape

# Operation and Maintenance of Pile

1. Monitor temperature  $> 110$  F in 5 days
2. Should maintain 130-160 degrees F
3. Turning pile will be necessary if temp drops to about 100 degrees
4. Inspect regularly and maintain cover

# IPIC Checklist of Priorities

## Prevention

- Join/register with US Swine Health Improvement Plan (<https://iowaagriculture.gov/ship>)
- Review biosecurity plan with all farm staff
- Consult with veterinarian to become proficient in identifying clinical signs and review with all farm staff
- Use SPS resources to create an enhanced biosecurity plan
- Verify all premises ID (PIN) (<https://lms.pork.org/Premises>)
- Maintain electronic pig movement records with PIN locations (i.e. using AgView)
- Maintain daily movement records (people, trucks, equipment, etc) in and out of site
- Have contact list of attending veterinarian, state veterinarian, DNR

## Contingency planning

- Develop a plan for a national standstill (minimum of 72 hours) regarding movements
- Develop a plan if feed deliveries are included in standstill (minimum of 72 hours)
- Develop a plan for mortalities if rendering is not available during the standstill
- Think through a method for mass euthanasia
- Identify potential carbon source for disposal
- Identify a potential place for on-site disposal of carcasses and discuss options with DNR if needed
- Establishment of C&D station(s)
- Establish plan for “isolated/designated/alternative” caretaker routines in event of standstill
- Contact herd veterinarian for eligibility of Certified Swine Sample Collector program

## Response

- Establish appropriate depopulation method WITH IDALS (***do not*** do any euthanasia without consulting IDALS as indemnity request could be denied)
- Maintain appropriate documentation of method, number, age, etc during depopulation
- Establish carcass disposal method with IDNR approval
- Fill and submit appraisal and indemnity request forms with IDALS and USDA

# Questions??

## Iowa Pork Industry Center Swine Extension Contact Information



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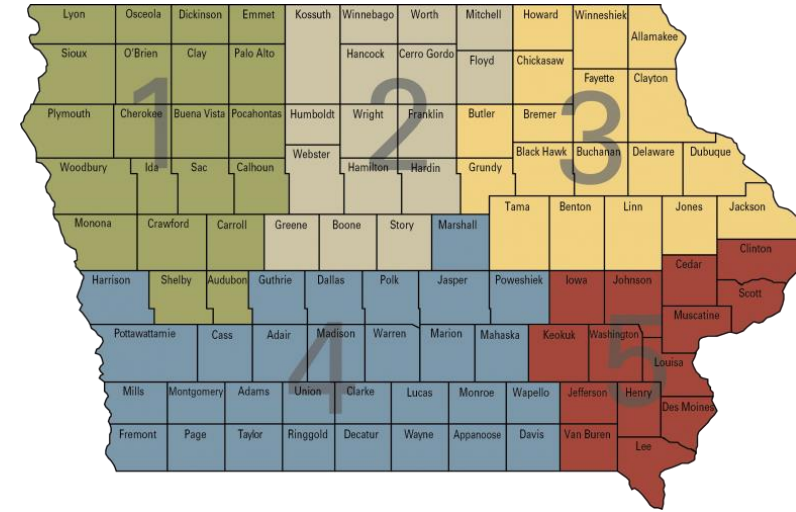
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