Overview of Feral Swine

- Found throughout much of North America
- Various legal classifications – pest species, invasive species, game species
- Most prevalent in the southeast and Texas
- Significant expansion in past 10 to 20 years
Brief feral swine facts

- ~ 3 - 4 million feral swine
- non-native/invasive
- known populations in at least 38 States
- up to 400 lbs
- multiple litters/year possible
- 4 to 13 piglets/litter
- disease reservoirs
- high parasite loads
- popular hunting species
Feral Swine: Management and Disease Monitoring

Distribution of Feral Swine Over Time

1982

2004

2010

- Feral Swine Identified
- No Feral Swine
Range expansion is largely due to intentional transplanting...

“Aided by hunters, destructive wild pigs spreading”

... in addition to natural expansion of growing populations

Fecundity estimated at 4.5 female young per adult female per year
National feral swine disease monitoring

- Why we conduct monitoring
- Monitoring procedures
- What can we learn from the data
- What does the data mean
Direct Threat to Humans
Disease Transmission to Humans
COLLEGE STATION — Along with being upset over damage caused by feral hogs, landowners in the Plum Creek Watershed and elsewhere in Texas are concerned about disease from the pervasive pest, according to Texas AgriLife Extension Service experts.

“Residents of the Plum Creek Watershed area of Hays, Caldwell and Travis counties have expressed concern about diseases feral hogs may transmit to other animals or humans,” said Jared Timmons, an AgriLife Extension assistant addressing feral hog issues in those counties.

Timmons, whose work supports the Plum Creek Watershed Partnership, said several area residents have had property damaged by feral hogs and that the partnership has identified these animals as potential contributors to non-point source bacteria and nutrient pollution of the watershed.
Detection of *Clostridium difficile* and *Salmonella* in Feral Swine Population in North Carolina

Siddhartha Thakur, Mark Sandfoss, Suzanne Kennedy-Stoskopf, and Christopher S. DePerno

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ABSTRACT: We sampled 161 feral pigs in eastern North Carolina, USA, to determine the prevalence and antimicrobial resistance profile of *Clostridium difficile* and *Salmonella*. Seven (4.4%) and eight (5.0%) pigs tested positive for *C. difficile* and *Salmonella*, respectively, highlighting the importance of determining the epidemiology of these pathogens in feral pigs.

Howell Woods (35°22’14.7”N, 78°18’23.4”W), an 11-km² private property, in Johnston County. Pigs were either captured in walk-in drop door traps (1.3×2×1-m box-style traps and 6×6×2-m corral type traps) baited with corn, shot with the aid of spotlights at night, or hunted from tree stands. Pigs were necropsied in the field.
I'm in ur spinach

U wantz my E. coli?
Disease Transmission to Livestock
Program cooperators

- Federal Agencies
- State Wildlife Agencies
- State Agriculture Departments
- Domestic Swine Industry
- Diagnostic Laboratories
- Universities
- Wildlife/Animal Health Orgs.
- Hunting Organizations
Wildlife Services feral swine management operations

- Wildlife Services cooperates on feral swine issues in 35 states.
- Thousands of feral swine are removed each year.
- Disease samples may be taken opportunistically anywhere, or may be from targeted high value (high risk) areas.
- All feral swine tested are removed from the population.
Trapping
Hunting and Shooting
Feral swine disease monitoring

• Locally based monitoring with national goals for Swine Health
• One of several monitoring streams
• Based on VS CEAH’s Risk Assessment for CSF
• Classical swine fever is the focus, but SIV becoming increasingly important
• Mostly serology-based diagnostics
Feral Swine: Management and Disease Monitoring

Feral swine disease monitoring

- 34 Wildlife Disease Biologists in 33 states
- Targeted and Opportunistic Sampling
- Feral swine populations near:
  - domestic swine production facilities
  - landfills
  - backyard producers
  - international borders
- new populations
- damage management operations
Number of States Collecting Feral Swine Samples

- FY2007: 21
- FY2008: 30
- FY2009: 32
- FY2010: 35
- FY2011: 31
- FY2012: 29
- FY2013: 28
States and Counties with Feral Swine

Counties with Feral Swine
- No
- Yes
- Sampled by WS

Wildlife Services
Protecting People
Protecting Agriculture
Protecting Wildlife
Feral Swine Diseases Monitored Nationally, per Year

<table>
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<th>Year</th>
<th>2007</th>
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Domestic and foreign animal diseases (FADs) of feral swine

- Classical swine fever
- African swine fever
- Foot and mouth disease
- Pseudorabies virus (Aujeszky’s)
- Swine brucellosis
- PRRS
- Porcine circovirus 2
- Swine influenza virus
- Toxoplasmosis
- Trichinellosis
- many other…
Classical Swine Fever monitoring

- Goal – early detection of CSF introduction into US
- Status – risk-based monitoring
PRV and SB Monitoring

• Part of the comprehensive swine health monitoring plan

• PRV and SB “piggyback” on CSF monitoring

• Monitoring risk of introduction of PRV/SB into commercial swine:
  • Monitoring the feral swine reservoir.

• Monitoring international PRV/SB status.
PRV and Swine brucellosis

- Goal – development and expansion of baseline data
- Status – moving toward targeted monitoring
PRV current status

• No new cases in commercial herds since early 2004.

• 50 states certified PRV free (commercial herds).

• New cases are seen only in transitional herds exposed to feral swine.
  • One transitional farm indemnified in 2010 (co-infected with brucellosis)
PRV Diagnostics – Feral Swine Serum

- **FY2013**: Serum sent from field to 4 NAHLN labs, based on regional proximity.

- **gB ELISA** (blocking format).

- **No further testing of seropositive samples.**
Feral Swine: Management and Disease Monitoring

Pseudorabies Positive Serum Samples

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<th>Percentage</th>
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<td>FY2012</td>
<td>18.8%</td>
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<tr>
<td>FY2013</td>
<td>20.3%</td>
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</table>
FY2013 Pseudorabies Surveillance in Feral Swine

- States collecting feral swine samples:
  - California
  - Oklahoma
  - Texas
  - Arkansas
  - Louisiana
  - Georgia

- PRV positive samples:
  - California
  - Oklahoma
  - Texas
  - Arkansas
  - Louisiana
  - Georgia

Legend:
- No feral swine collected
- States collecting feral swine samples
- PRV positive samples
SB current status

- No new cases in commercial herds since early 2000’s.
- 50 states certified SB free (commercial herds 2007).
- Cases are seen only in transitional herds exposed to feral swine.
  - 3 transitional herds indemnified in 2010 (2-Texas; 1- Florida)

SB Diagnostics – Feral Swine Serum

- All samples sent to Kentucky Federal Laboratory: 
  **Fluorescence Polarization Assay (FPA)**
  - FPA plate test (screen)
  - FPA tube test (confirmatory)
Swine Brucellosis Positive Serum Samples

<table>
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<td>6.1%</td>
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<td>FY2013</td>
<td>10.3%</td>
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</table>
How widespread is each disease?

- CSF: 0
- SB: 14
- TRICH: ?
- SIV: 10
- TOXO: 24
- PRV: 15
- LEPTO: 16
What is the apparent prevalence of each disease?

- CSF: 0.0%
- SIV: 5.0%
- SB: 10.0%
- TOXO: 25.0%
- PRV: 30.0%
- LEPTO: 50.0%
Microagglutination testing was conducted on approximately 2000 samples by Colorado State University

Samples screened for 6 serovars (hardjo, icterohemorrhagiae, canicola, grippotyphosa, Pomona, and Bratislava) common in domestic animals or humans

Due to high apparent prevalence rates in feral swine, we will expand surveillance to coyotes and raccoons

Tissue samples also will be collected from feral swine in areas identified as leptospirosis positive to determine whether feral swine are actively shedding bacteria
Disease Surveillance: Lepto

Leptospirosis

% Positive

States:
- Alabama
- Arizona
- Arkansas
- California
- Colorado
- Florida
- Georgia
- Hawaii
- Illinois
- Kansas
- Kentucky
- Louisiana
- Michigan
- Mississippi
- Missouri
- New Hampshire
- New Jersey
- New Mexico
- New York
- Ohio
- Oklahoma
- Oregon
- Pennsylvania
- South Carolina
- Tennessee
- Texas
- Virginia

Wildlife Services
Protecting People
Protecting Agriculture
Protecting Wildlife
Disease Surveillance: PPRS

• Porcine reproductive and respiratory syndrome virus (PPRS) can cause late term reproductive failure in pregnant sows or pneumonia in neonatal, nursery and grow/finish stage pigs.

• Annual economic losses in the United States is estimated at $664 million.

• Primary objective of this study was to examine the reservoir potential of feral swine by determining the apparent seroprevalence of PRRS at various county, state, and national levels.
Disease Surveillance: PPRS

Overall apparent prevalence – 3.0%
61+/2027 feral swine
Wildlife Services initiated a feral swine SIV surveillance program during November, 2010.

Nasal swabs and serum samples are being collected to identify and map the distribution of type A SIV’s in feral swine populations.

Almost 1900 nasal swabs were collected during the first year of surveillance resulting in 13 matrix positive samples by PCR analysis.

Serum samples are also collected to identify the geographic distribution and apparent prevalence of Type A SIV’s in feral swine.
Disease Surveillance: SI

- **Seronegative**
- **Seropositive**
Disease Surveillance:

• **Streptococcus suis**
  - Since 2005 there have been several outbreaks of virulent serotypes of S. suis in humans in China, Vietnam and Thailand.
  - Domestic swine in North America are known to carry primarily serotype 2 strains with low virulence.
  - Wildlife Disease Biologists from several states have been collecting tonsil samples from feral swine for a pilot study.
  - Collaborating scientists at the University of Montreal, Canada, will conduct a series of diagnostic tests for S. suis.
    - matched serum samples will be screened for mycoplasma and A pleuropneumoniae using serological methods.
No national strategy currently exists

A cohesive national strategy will focus on:

- containment (eradication at the edge of the range expansion), and

- targeted population reduction or other management steps to mitigate damage and disease risk where populations are already established
WS, VS, and IS are collaborating to address domestic animal health issues and international trade issues

- **Wildlife Services**
  - Control of feral swine (Operational)
  - Research
  - Disease Surveillance

- **Veterinary Services**
  - Collecting and managing livestock disease data
  - Planned response to disease outbreaks when animal health, human health, or trade status are threatened

- **International Services**
  - Experience and capability to address cross border issues.
National Plan to Address Feral Swine

Strategic Management Goals

• Reduce Damage caused by feral swine
• Reduce disease threats to humans and livestock
• Develop better management tools and improve cost efficiency
Strategic Management Goals

• **Reduce Damage** through exclusion, lethal and non-lethal removal, reproductive inhibitors, selective toxicants, and other methods

• **Expand current surveillance and monitoring** of feral swine disease threats, and apply newly available technologies to improve surveillance

• **Conduct and support research** to develop better management tools and improve cost efficiency

• **Outreach and Collaboration** with state agencies on limiting range expansion, enhancing disease surveillance and damage management
The plan will incorporate national approaches to reduce problems associated with feral swine, based on local needs and opportunities.
Other considerations:

- Collaborate with other federal, state, county and local government agencies, and other non-governmental partners
- Cost share expenses when conducting activities to reduce problems associated with feral swine
- Incorporate existing WS personal or NTE employees
- Disease Surveillance:
  
  **Monitor** around key domestic pork production areas
  **Conduct targeted sample collection** to meet objectives of the VS Swine Health Group
  **Monitoring feral swine health along borders** with Canada and Mexico
• Feral swine are a rapidly growing problem in many parts of the United States.

• Feral swine inflict damage to natural resources, agriculture, and pose threats to human health.

• Issues with feral swine are expected to exacerbate if populations are left unmanaged.

• A national, coordinated plan, implemented at the local level and based on local needs, is needed to effectively address the problem of feral swine
QUESTIONS?