

# Assessing and Managing Disease Risks in Wildlife

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# SCWDS



Pennsylvania 1983 - HPAI



Texas 1971 - END

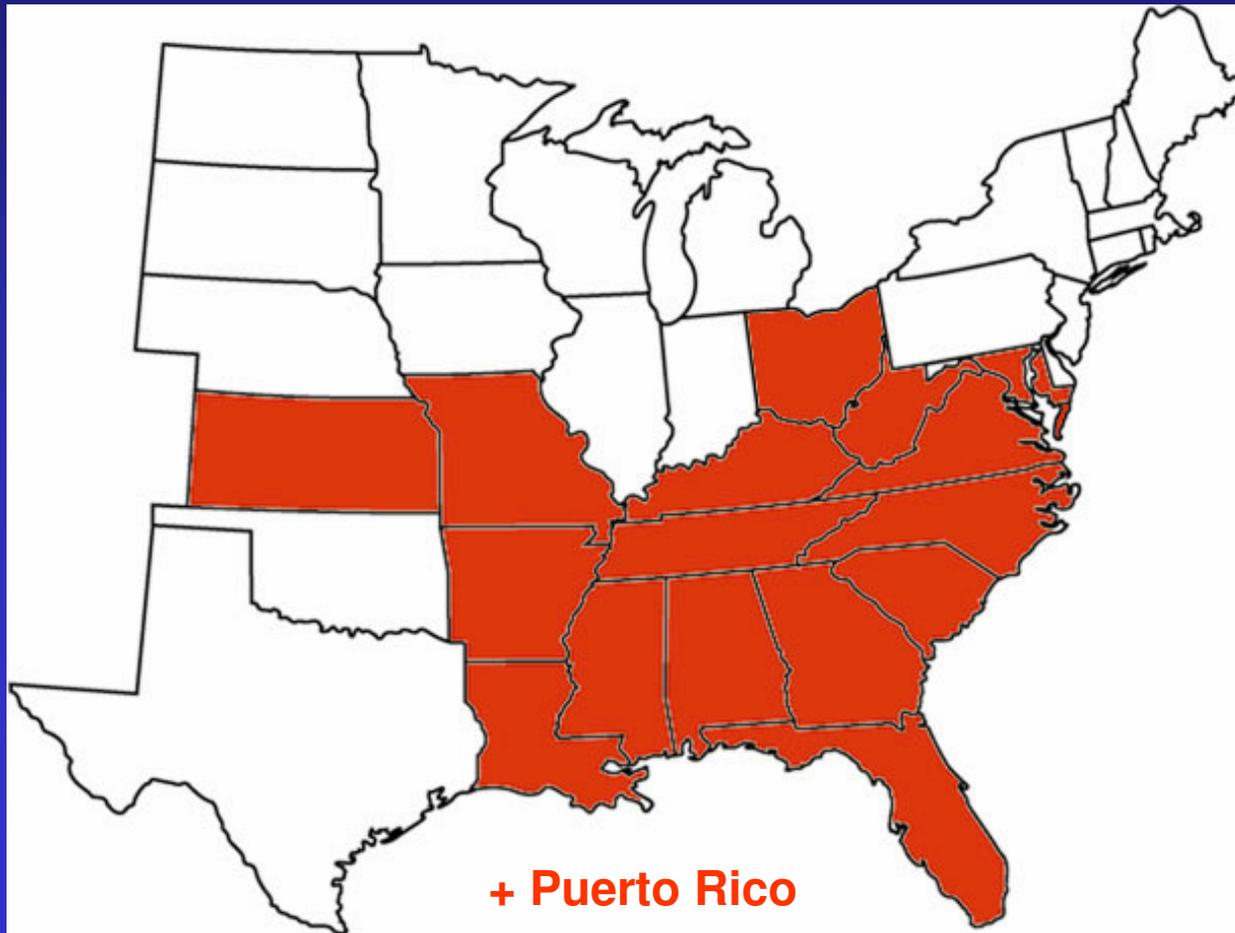


Haiti 1981 - ASF

- Southeastern Cooperative Wildlife Disease Study
- Founded in 1957 to investigate deer mortality
- University of Georgia, College of Veterinary Medicine
- Contracts with wildlife agencies of 17 states (N. Carolina)
- US DOI funding began in 1963
- Cooperative Agreement with USDA-APHIS-VS since 1979

SCWDS

## Member States - 2006



# SCWDS

## Objectives

Detect causes of sickness and death in wildlife

Define the impact of diseases and parasites on wildlife populations

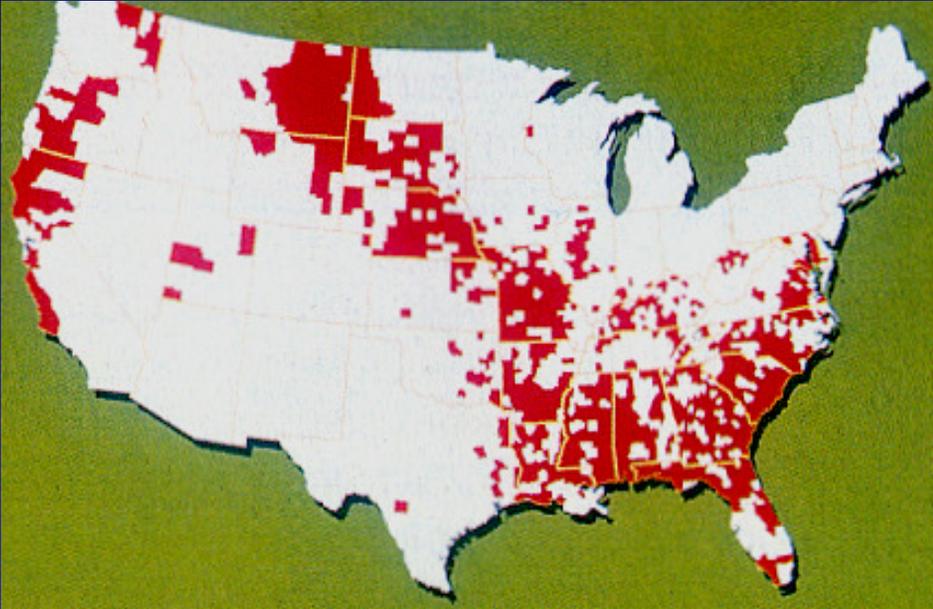
Delineate disease relationships among wildlife and domestic livestock

Determine the role of wildlife in the epidemiology of human diseases

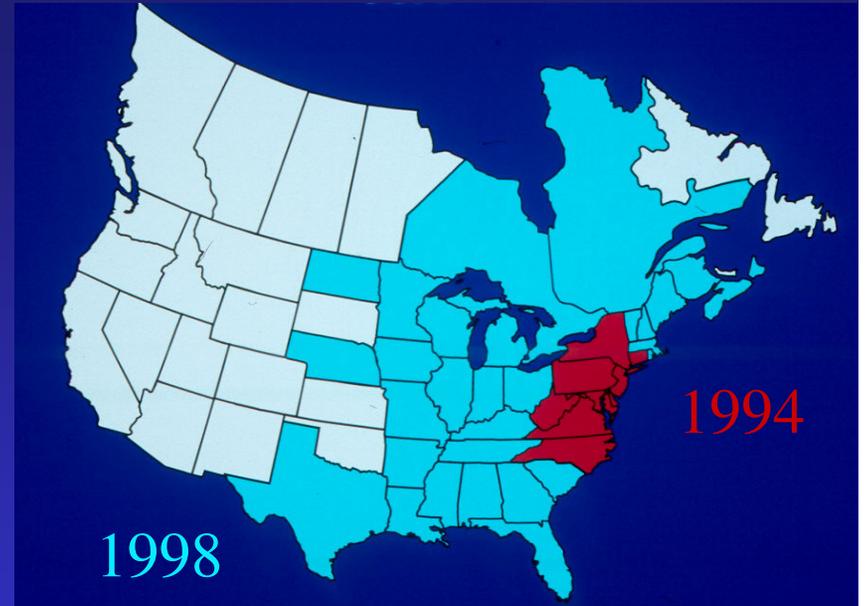


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## Assemble & Evaluate Wildlife Disease Data



Hemorrhagic disease of deer  
1980 - Present



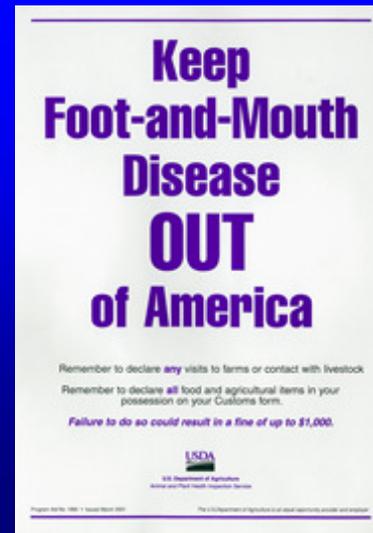
Finch conjunctivitis

SCWDS

# Livestock/Wildlife Disease Interactions

Emergency (FAD) preparedness,  
surveillance, and response

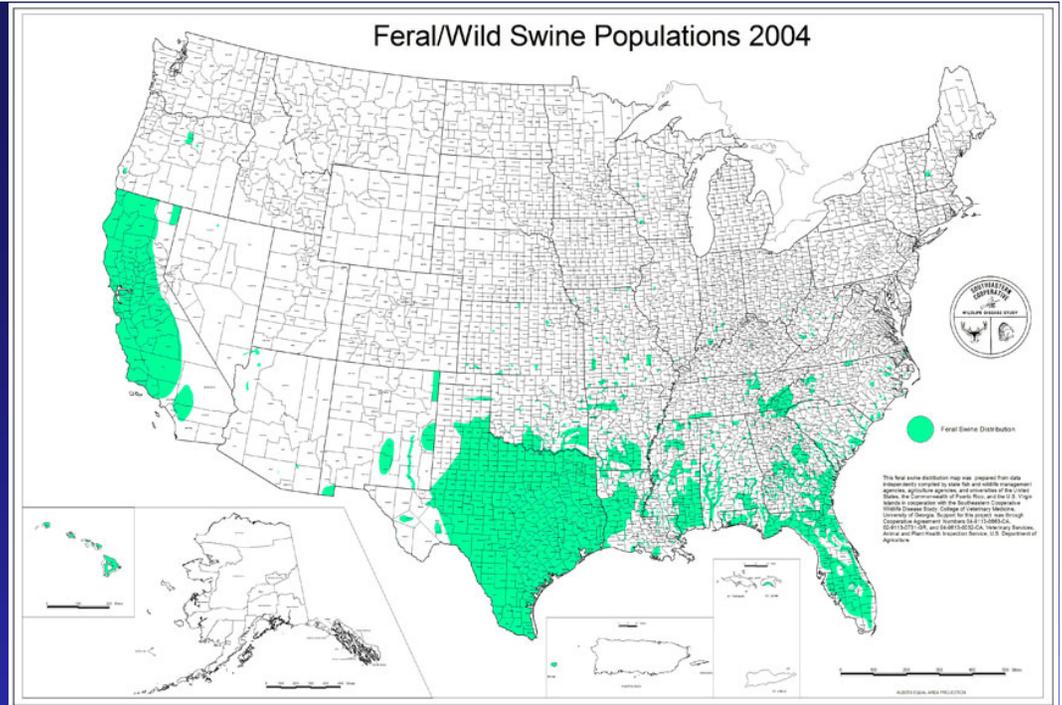
- training state wildlife agencies
- training FADDs
- assist USDA and states with  
planning, task forces and test  
exercises
- FAD & vector surveillance



# SCWDS

## Livestock/Wildlife Disease Interactions

Research and surveillance of  
diseases/agents including PRV,  
VSV, ASF, MG, AIV, END,  
Brucellosis, Johne's, Fever ticks,  
*M. bovis*, *E. coli* O157:H7, etc



## Role of Wildlife in Human Disease

NIH & CDC grants, collaboration with State Public Health Agencies

Projects include Lyme Disease, *Ehrlichia*, Rabies, WNV, HPAI



**Susceptibility of North American Ducks and Gulls to HPAI (EID, 2006)**

# Free-Ranging Wildlife

- This presentation concerns free-ranging birds and mammals
- Zoo and exotic animals, and captive wildlife are included only when noted



# Background Economics

- Fish and wildlife recreation is BIG BUSINESS
- There is a large public constituency
- Economic importance under-recognized



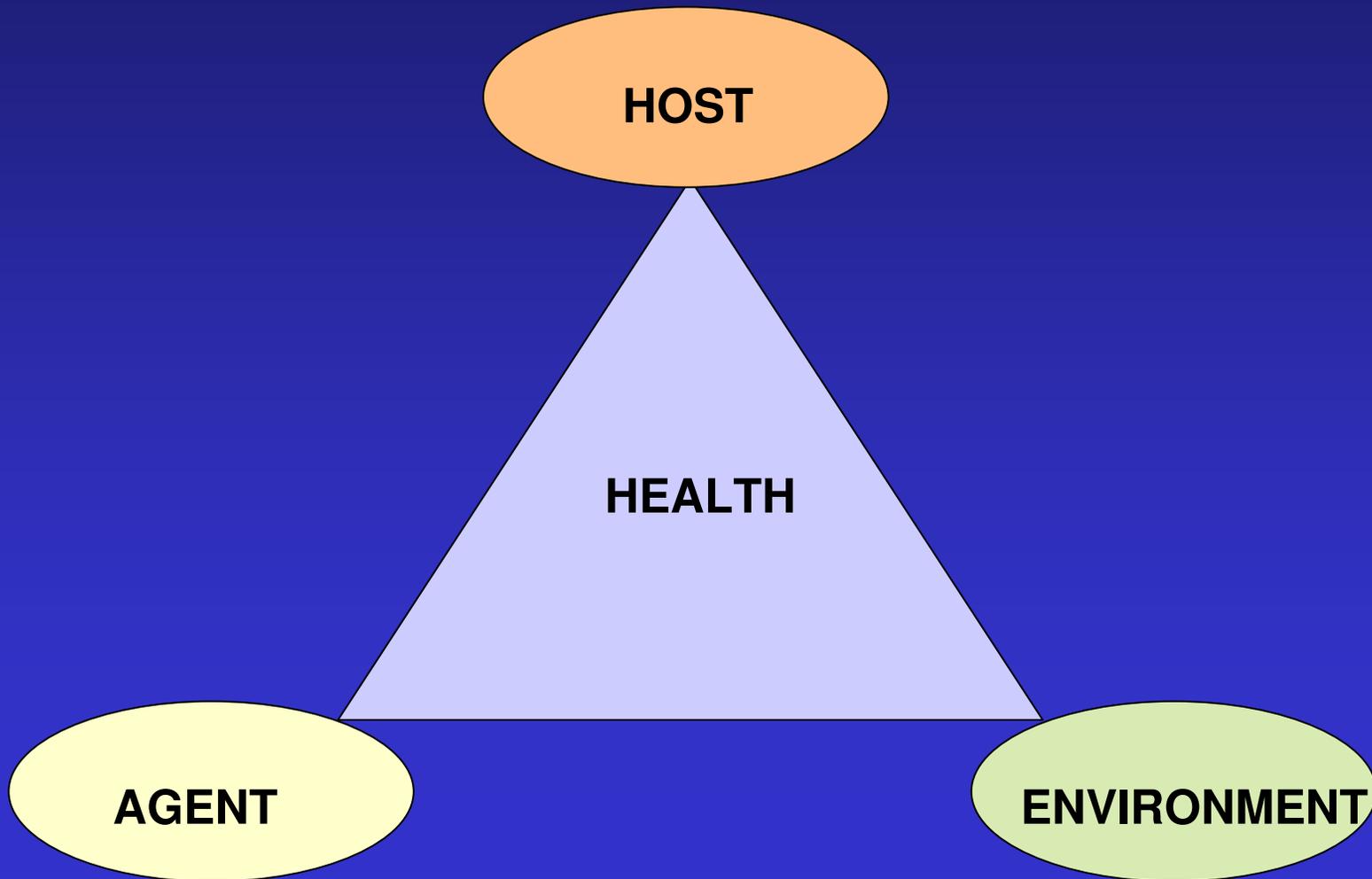
# National Survey - 2001

- 82 million Americans (32%) participate in wildlife-associated recreation
- Spend \$109 billion annually (1.1% of GDP)
- 34 million fish and spend \$36 B
- 13 million hunt and spend \$ 21 B
- 66 million “non-consumptive users” enjoy wildlife and spend \$26 B

# Federal Aid in Wildlife Restoration (Pittman-Robertson Act, 1937)

- Self-imposed, Federal excise tax on firearms, ammunition, and archery equipment
- Federal funds are provided to states for the restoration and improvement of wildlife habitat & research, and for the distribution of information
- An allocation formula based on the total area of the state and licensed hunter numbers is used to distribute funds
- Through this program, hunters have funded much of the conservation of many game and non-game species

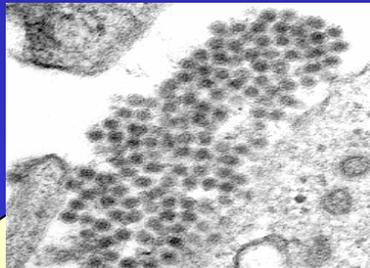
# Diseases in Wildlife: Assessing and Managing Risks





**HOST**

**HEALTH???**



**AGENT**

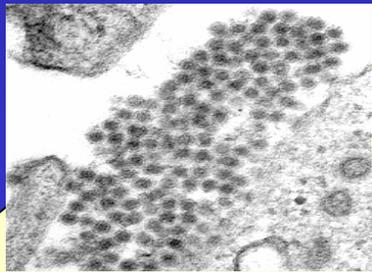


**ENVIRONMENT**



**HOST**

**HEALTH???**



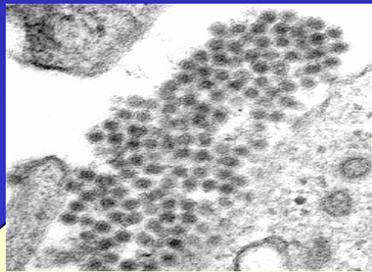
**AGENT**



**ENVIRONMENT**



**HOST**



**AGENT**



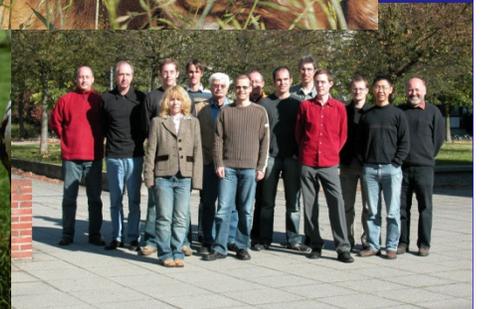
**HEALTH???**



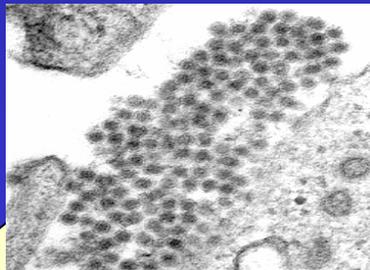
**ENVIRONMENT**



**HOST**



**HEALTH???**



**AGENT**



**ENVIRONMENT**

# Disease Agents in Wildlife- Generalities

- Wild species generally are susceptible to the same disease agents as livestock and poultry
- Transmission is a two-way street between domestic animals and wild animals
- Wild animals, due to natural dispersion, are less likely to maintain livestock diseases



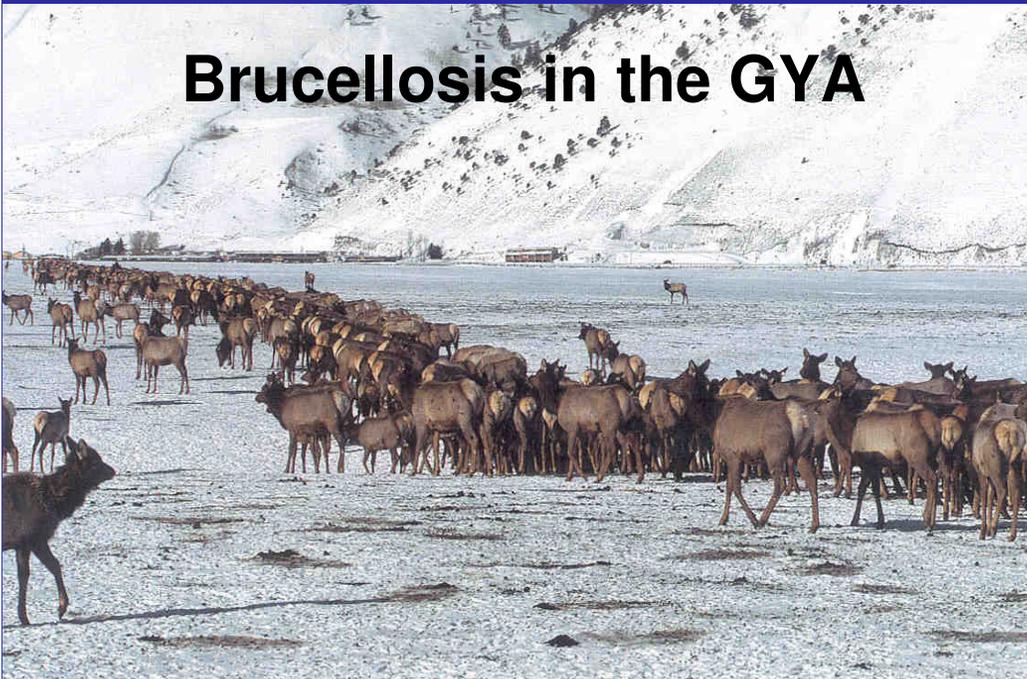
# Disease Agents in Wildlife

- Many disease problems in wildlife are associated with unnatural or artificial situations

**Finch conjunctivitis**



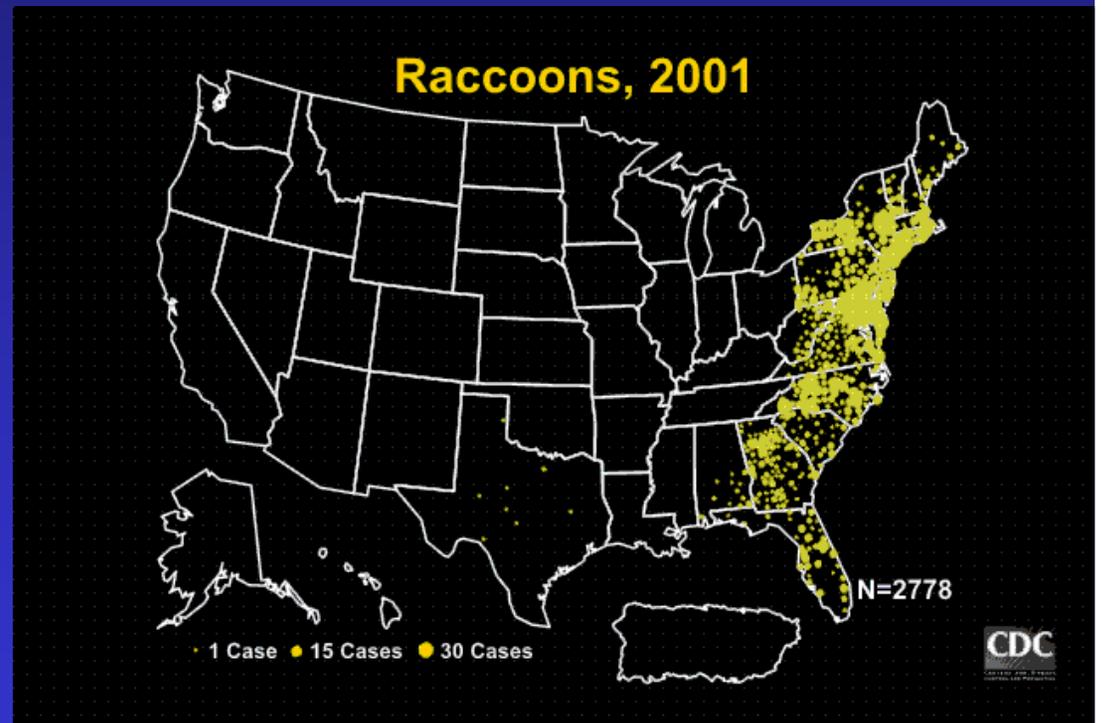
**Brucellosis in the GYA**



**Bovine TB in Michigan**



# Disease Problems in Wildlife



Illegal wildlife translocation

# Miami International Airport

- Nov 94 - Jan 95
- 349 import shipments, 117,690 reptiles
- 142 species of reptiles, 82 genera
- Ticks recovered from 92 shipments (28%)
- 13 species of *Amblyomma*, *Aponomma*, *Hyalomma*

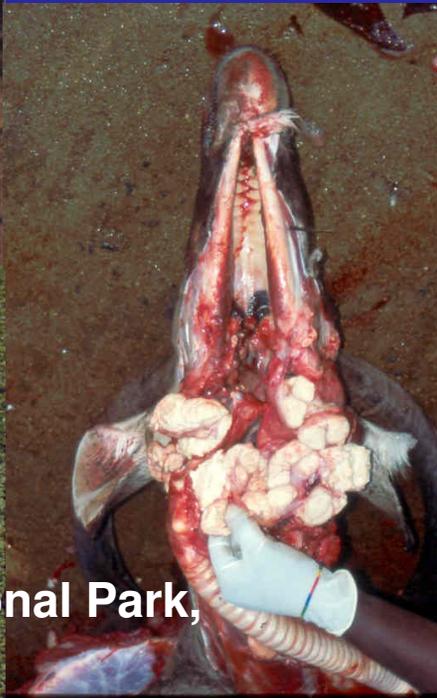


Legal translocation



# Disease Agents in Wildlife-Generalities

Many “wildlife diseases” are livestock diseases that have been introduced & established in wild animals



**Bovine TB – Kruger National Park,  
South Africa**

# Disease Agents in Wildlife

Nettles' Rule: Once a disease has become established in free-ranging wildlife... you've got big trouble

PC Version: There is no substitute for prevention

Prevention is the only truly effective way to manage disease in wildlife



# Disease Risks

- Disease agents in wild animals can present risks to:
  - Other wild animals
  - Domestic animals
  - Humans

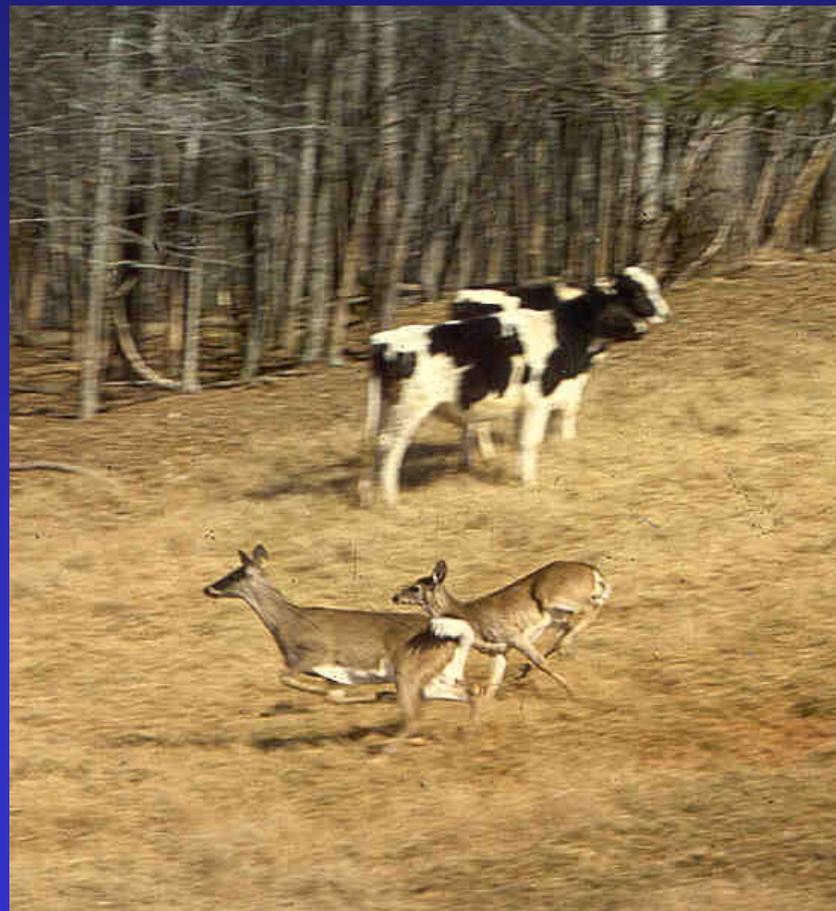


# The Wildlife-Livestock Disease Interface

Who Is Concerned and Why?

# Livestock/Poultry Producer

- Risk of disease introduction
- Economic losses due to testing, quarantines, vaccination, etc.
- Loss of foreign markets
- Loss of grazing access
- Reservoir for diseases nearing eradication in livestock: TB, brucellosis, PRV (feral swine)



# Wildlife Manager/ Consumptive User/Enthusiast



Direct risk of disease losses

Indirect risk via perceived or real  
involvement in epidemiology

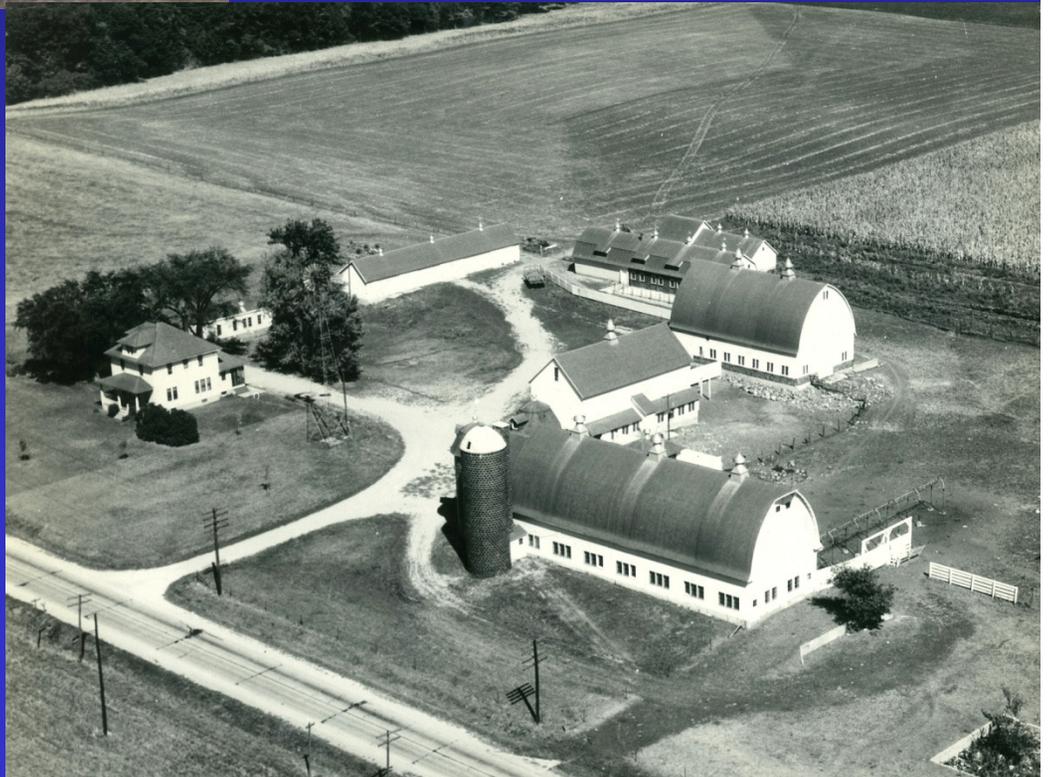
..... Potential conflict between  
wildlife and livestock interests

# Wildlife/Agriculture: Common Ground



- Manage animals on a population basis
- Lose land to development/sprawl
  - Saving farms benefits wildlife
- Mutual animal rights threat
- Mutual foreign animal disease risk
- Many people are involved in both activities...





# Significance of Disease Agents in Wildlife to Humans/Domestic Animals

- Infected wild animals may represent a true risk factor for humans and domestic animals...
- Or may pose little or no risk, such as house finches with *Mycoplasma gallisepticum*...but other wildlife may be at risk



# The Level of Risk Must be Assessed

- Is risk reduction necessary, feasible, or affordable?
- Factors to consider when assessing risks due to an infectious disease agent in wildlife
  - Epidemiology of the disease
  - Ecology/ biology of wild animals involved
  - Humans, domestic, and wild animals at risk

# Risk Assessment and Reduction

- Interfaces between humans, domestic animals, and wildlife
  - eliminating or reducing these interactions is critical because controlling disease in wildlife is difficult and expensive, when it is possible at all!



HPAI in PA, 1983



Experimental FMD in Deer

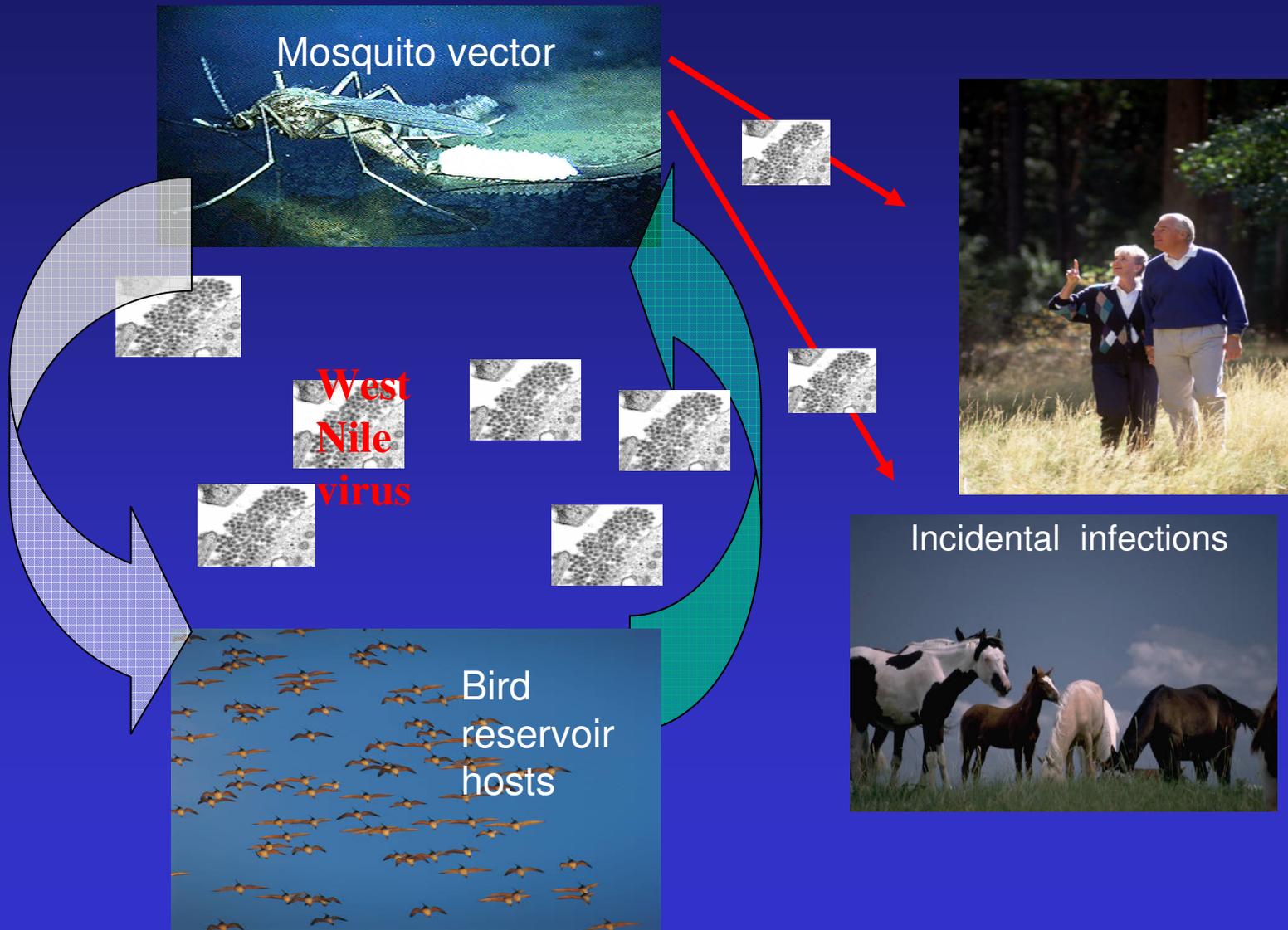
## Risk Assessment

- Scientific literature - A good starting point
  - Field data from previous occurrences
  - Experimental and field studies in wildlife
    - Often there is little information regarding disease in non-domestic species
    - Essential to develop additional information during risk assessment and management activities - to adapt strategies and for the next thing that comes along...

# Risk Assessment: Information Gathering

- Local information -
  - Variety of agencies with different expertise
    - Human Health - disease incidence in people
    - Animal Health - numbers, husbandry, and disease status of domestic animals
    - Wildlife Management - density and distribution of wild animals important in epidemiology, their biology, prevalence of disease
- COMMUNICATION-COOPERATION

# West Nile Virus Transmission Cycle



# Surveillance of Disease Agents

- Human diseases
  - Governmental public health agencies monitor diseases in human populations
- Livestock and poultry diseases
  - Animal health regulatory agencies involved (state and fed)
  - Variety of methods
    - Morbidity and mortality, Abattoir surveys
    - Serological surveys, Eradication programs



# Surveillance of Disease Agents

- Wildlife Diseases
  - Challenging due to authority issues, responsibility, and FUNDING
  - Interagency cooperation to gain maximum data
    - Carcasses – mortality events, hunter-killed animals
    - Captured animals
    - Other sources



# Detection of Disease Agents

- Detection of outbreaks missed or delayed
- Capture/testing may injure or kill animals
- Need significant sample of population
- Tests validated for domestic animals may not work



# Disease Management in Wildlife

- Challenging: few proven strategies known
- Labor intensive and expensive (no substitute for prevention!)
- Strategies based upon manipulation of:
  - Disease agents
  - Host
  - Environment
    - Human activities
  - (Wobeser, 1994)



# Management of Disease Agent

- Control the disease agent or its vector
  - Very difficult in wildlife (not easy in domestic animals)
  - Screw worm eradication is an example
    - benefit to livestock and to wildlife such as deer



Screw worms

# Host Population Management

More options available:

Removal of infected or exposed animals

Reduction of population density to decrease opportunities for disease transmission

Total depopulation of wildlife is unlikely

expensive and difficult

potential problems with public opinion

# Wildlife Population Management

- Manipulation of population density and distribution
  - wildlife management agencies are experienced
- Public participation such as legal hunting
  - reduced costs
  - better acceptance
- Public acceptance is essential for success



# Other Strategies for Host Management

- Treatment of sick or exposed animals
  - Population impact unlikely
  - Expensive, difficult, & potentially harmful



# Vaccination of Wildlife

- Requires appropriate conditions - a limited and isolated population works best
- Requires effective vaccine, multiple applications (=\$\$\$)
- Requires delivery system for species & local situation - must reach significant portion of the population
- Growing area of interest with certain diseases



# Vaccination of Wildlife

- Examples include oral rabies vaccination of carnivores
- Oral vaccination of wild boar for classical swine fever in Europe
- Vaccination of elk in GYA for cattle brucellosis using a “biobullet”



# Environment and Habitat Manipulation to Control Disease

- Create areas unattractive to wildlife
  - a “barrier” between wildlife and susceptible domestic animals and humans
- Results usually are not rapid
- Effects generally long lasting

# Management of Human Activity

- May be most efficient because of the expense and difficulty of managing disease in wildlife
- However, this is based on a huge assumption: Managing humans is easier than managing wild animals

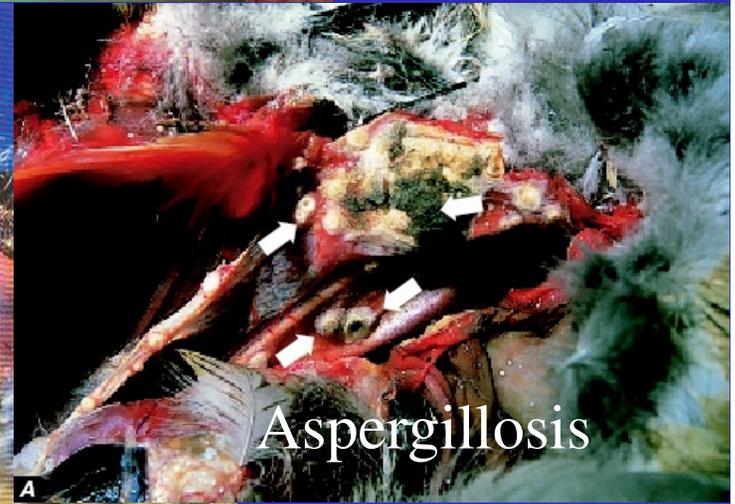
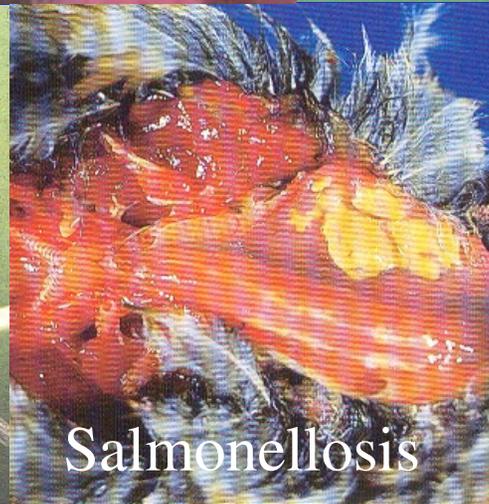
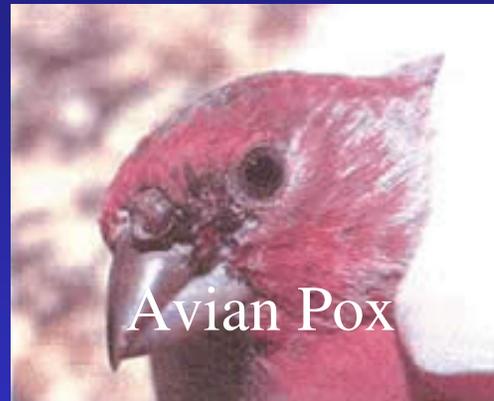
# Managing Human Activity

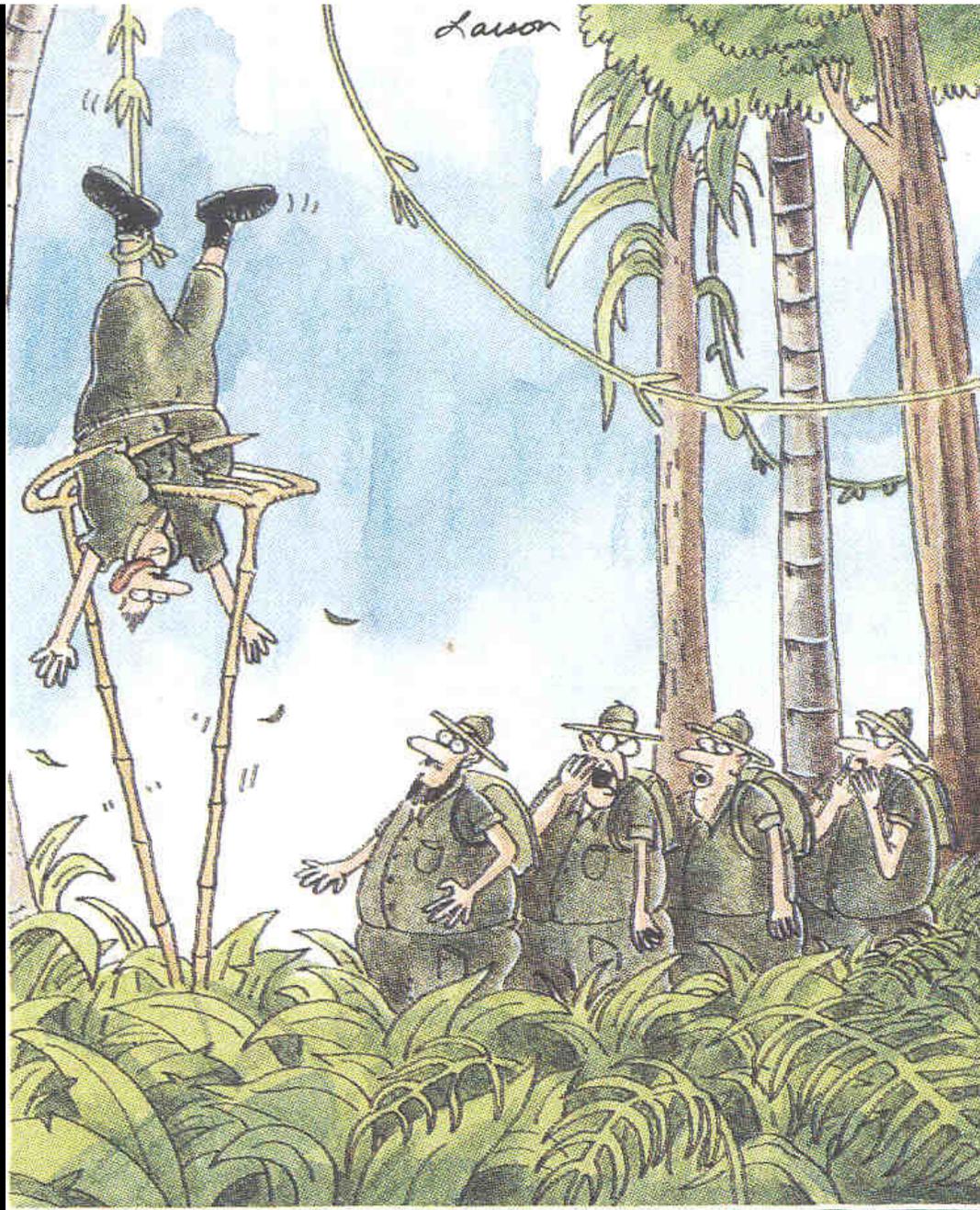
- Such as wildlife feeding
  - Unnatural congregation
  - “Wildlife daycare center”
  - May inflate population density beyond carrying capacity of habitat



# Bird Feeder Associated Diseases

- Birdfeeders are associated with transmission of at least 5 common diseases of songbirds
- Who wants to recommend that people stop feeding birds???





“That’s why I never walk in front.”

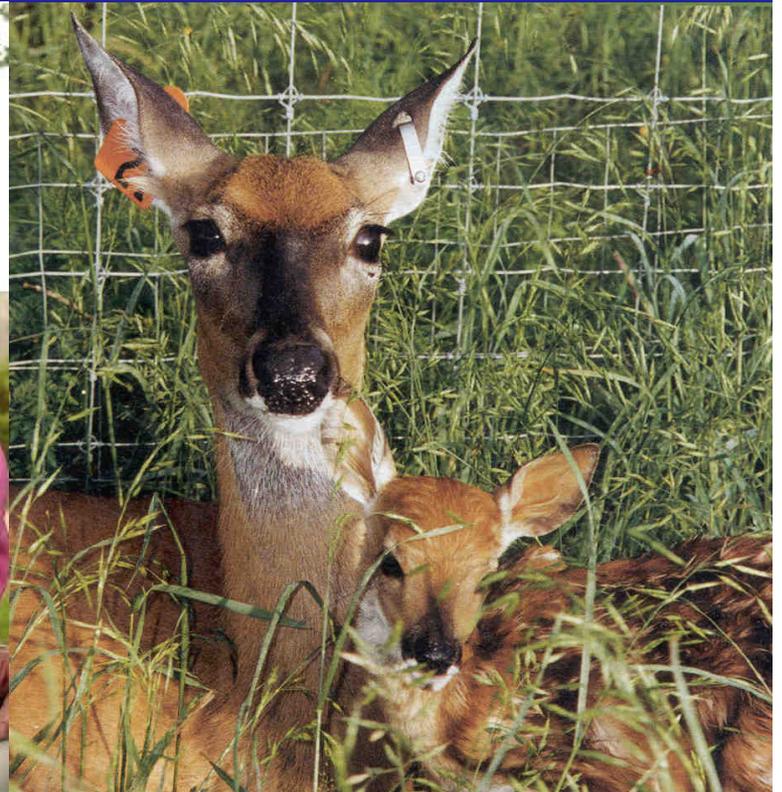
# Managing Human Activity

- Moving infected animals
  - “Asian H5N1” avian influenza virus isolated from two crested hawk-eagles from Thailand confiscated from airline passenger in Brussels



# Managing Human Activity

- Private ownership of native wildlife species
  - Monkeypox outbreak in 2003 (also involved moving infected animals)
  - Chronic wasting disease (a TSE) in captive cervids



# Biosecurity and Protection

- Disease control in wildlife may not be feasible or affordable
- May need to protect humans and domestic animals
  - Often most cost effective and successful
  - Physical barriers - partitioning or containment
    - Fencing, housing, window screens, etc.
  - Immunization of humans or domestic animals
  - (Combination of environment and host management)



Fight the bite!

# Public Education

- Essential in risk reduction
- Facilitate human compliance
- Important for livestock and poultry producers and the general public



# Risk Reduction Strategies

- A combination of the available methods may be used to increase chances for success
- Management strategies should be adapted as new information on the disease and management techniques becomes available

# Key Points

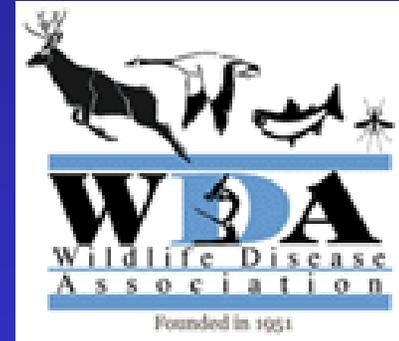
- Prevention is the number one priority
- Disease control is complex, difficult, and costly – is it necessary or even possible?
- Financial and technological restraints
- Public opinion may hinder efforts

# Key Points

- Communication and cooperation between multiple agencies and interest groups offer the only chance for success
- The field of controlling diseases in wildlife is growing and evolving in response to
  - new situations
  - new technology
  - needs of animal agriculture, human health, and wildlife resource interest groups

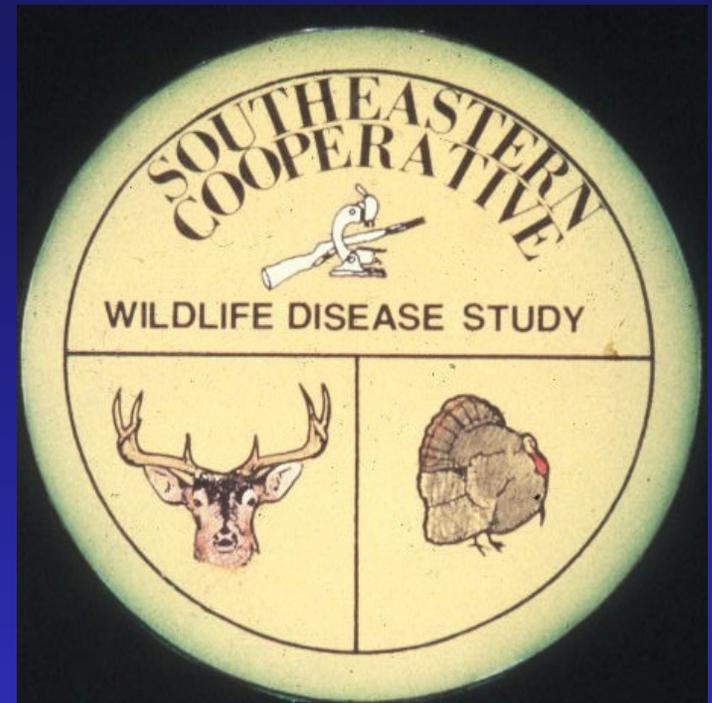
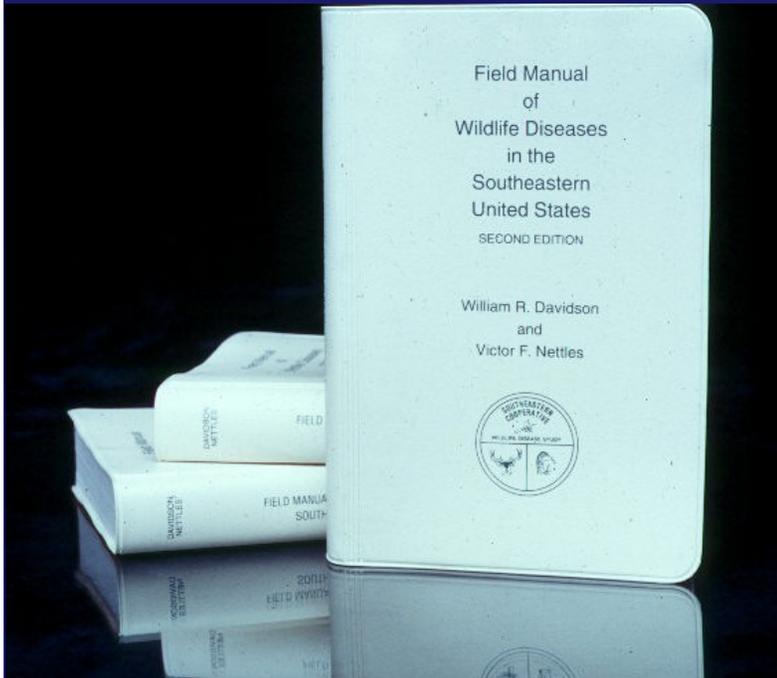
# Organizations

- United States Animal Health Association - Committee on Wildlife Diseases
- Association of Fish and Wildlife Agencies – Fish & Wildlife Health Committee
- Wildlife Disease Association – 1951
- American Assoc of Wildlife Veterinarians



SCWDS

# Contact Information



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