

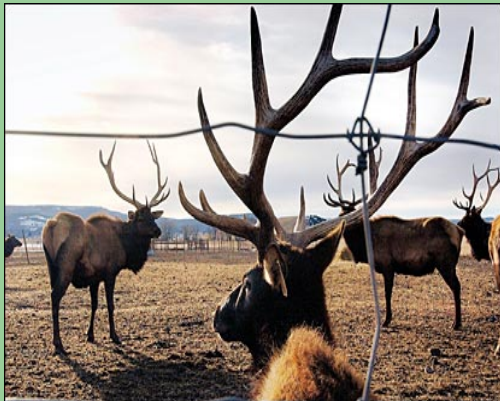


# Chronic Wasting Disease (CWD) in CERVIDS





# What is a **Cervid**?



# Cervid



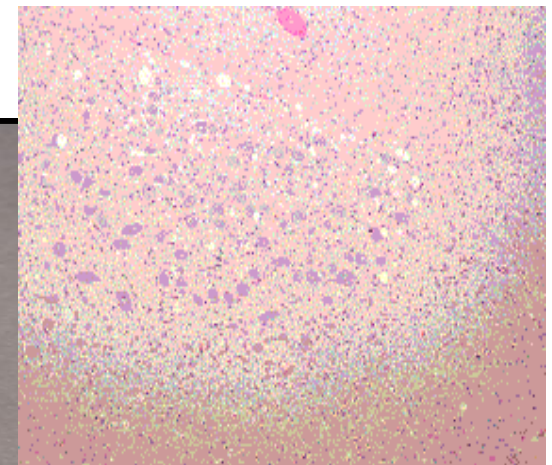
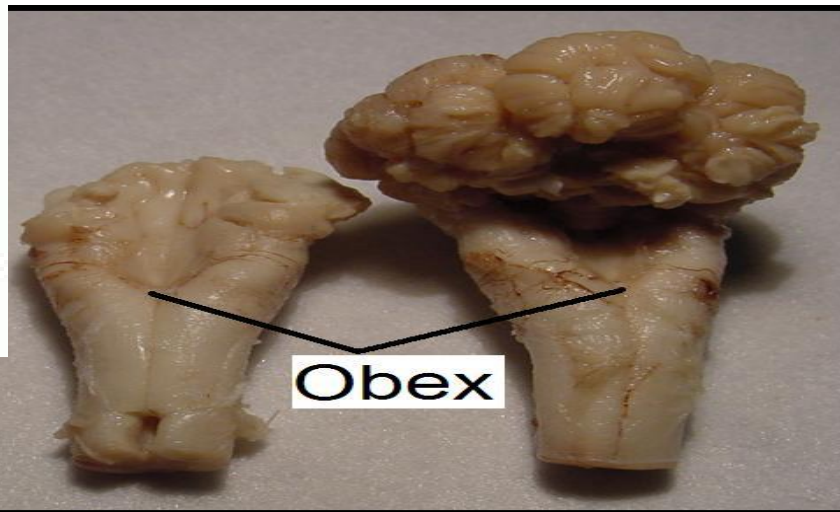
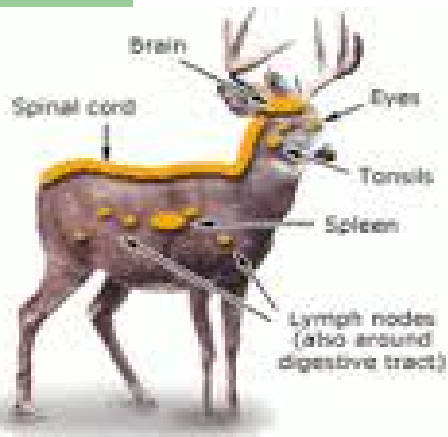
- any member of the deer family, *Cervidae*, comprising deer, reindeer caribou, elk, and moose, characterized by the bearing of antlers in the male or in both sexes.

# What is “Chronic Wasting Disease” (CWD)

- \* **Prion:** protein infectious agent
- \* Smaller than the smallest known virus
- \* Body has minimal reaction to unlike bacteria or virus
- \* Resistant to most disinfectants and treatments

# What is “Chronic Wasting Disease” (CWD)

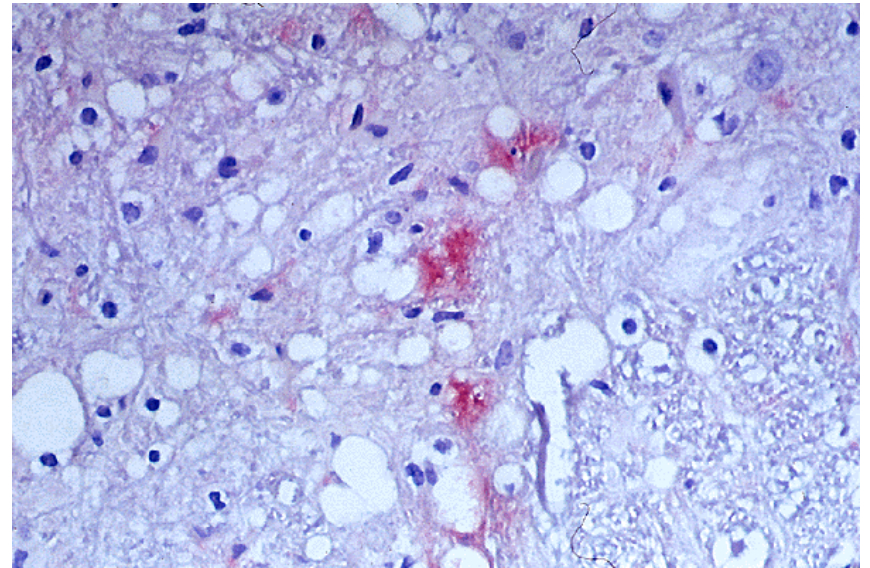
- A “transmissible spongiform encephalopathy”  
“TSE” that effects the brain/spinal tissue of  
cervids





# Transmissible Spongiform Encephalopathies

- **CWD** is classified as a **TSEs** similar to Scrapie, Creutzfeldt-Jakob disease (CJD), kuru, transmissible mink encephalopathy, bovine spongiform encephalopathy (BSE)



# Transmissible Spongiform Encephalopathies



Scrapie



BSE and vCJD



Kuru and  
CJD

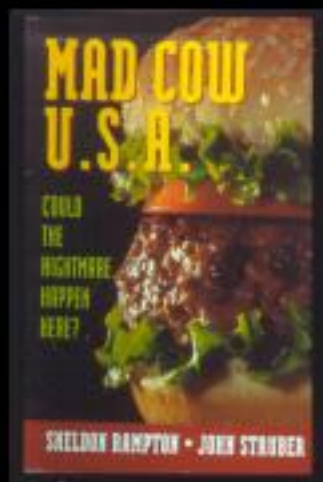
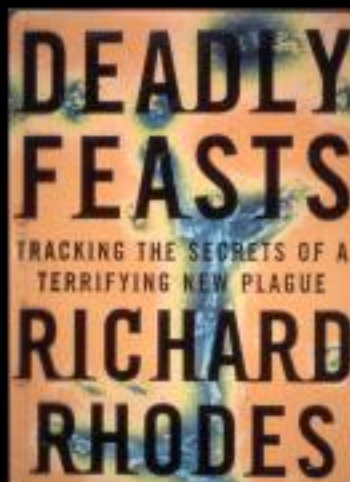


CWD



MAD DEER DISEASE  
CAN VENISON KILL YOU?

## Media Attention to the TSEs






# Causes of CWD

- Caused by a **prion (PrP)** that is **abnormal in structure, resists breakdown, accumulates**
- Protein prions are found in all mammals

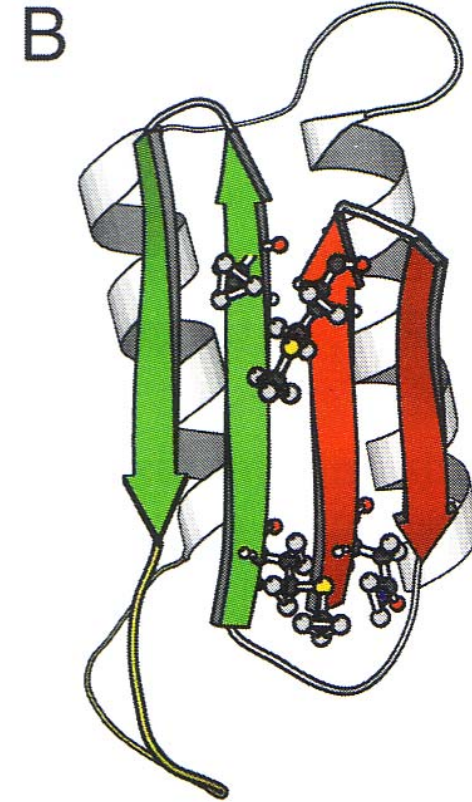


**Normal PrP<sup>C</sup> has been reported to play important roles in cell-cell adhesion and intracellular signaling *in vivo*, and may therefore be involved in cell-cell communication in the brain**





PrP<sup>C</sup>

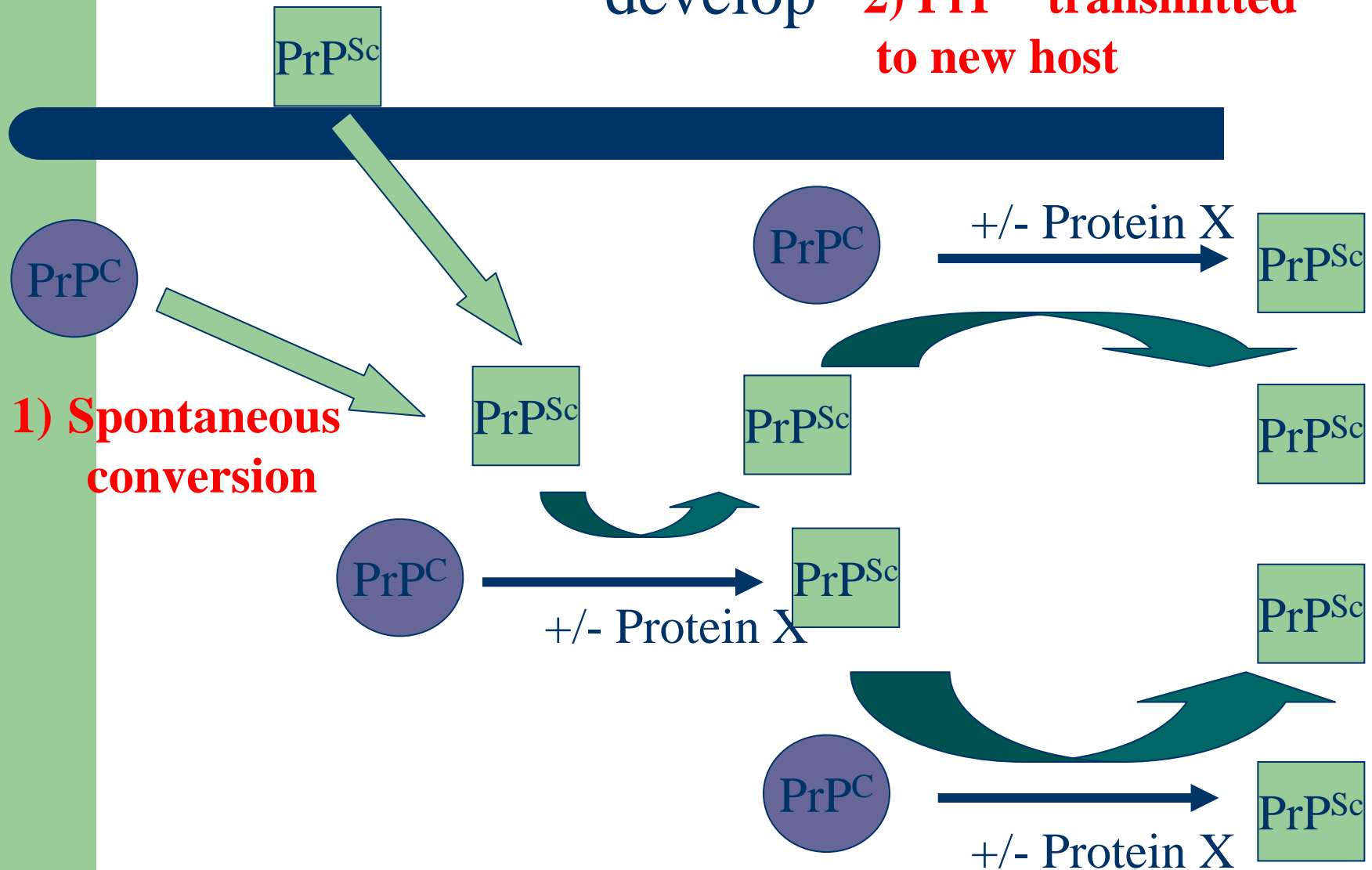


PrP<sup>Sc</sup>

Prusiner, S. B. 1999. An introduction to prion biology and diseases. Pages 1-66 in S. B. Prusiner, editor. Prion Biology and Diseases. Cold Springs Harbor Laboratory Press, Cold Springs Harbor, New York.

# Two ways in which spongiform encephalopathies develop

**2) PrP<sup>Sc</sup> transmitted to new host**



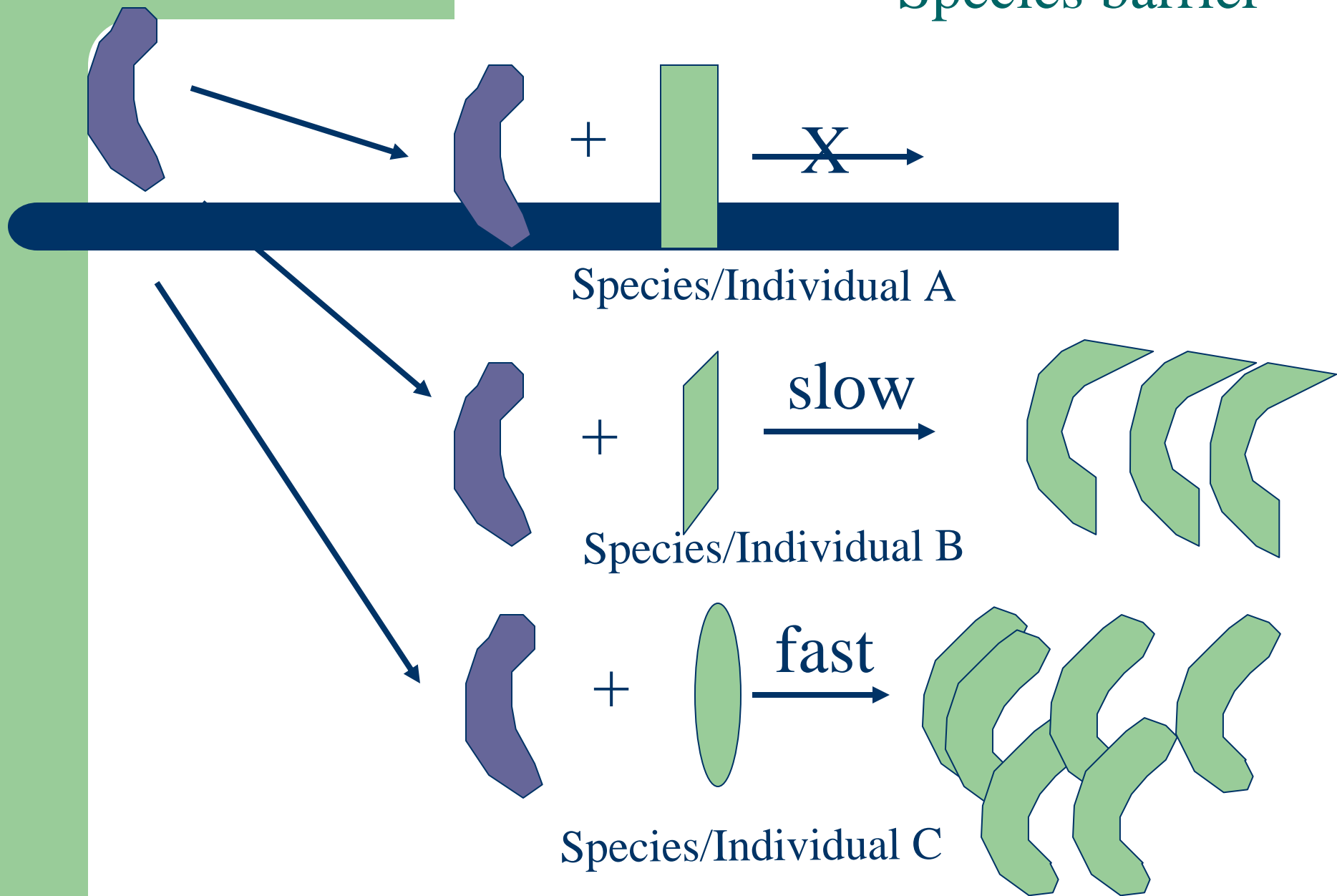


PrP<sup>Sc</sup>

PrP<sup>Sc</sup>

PrP<sup>C</sup>

“Species barrier”



# TRANSMISSION of CWD

- Direct inoculation
  - Experimental exposure
  - Iatrogenic exposure of humans to CJD
  - Vaccine for “louping ill” in sheep contaminated with scrapie prion
- Ingestion
  - Experimental exposure
  - BSE: sheep scrapie to cattle and then cattle to cattle
  - Kuru in humans
  - vCJD in humans
- Direct animal to animal spread
  - Scrapie in sheep
  - CWD in deer and elk

# CHRONIC WASTING DISEASE

## Transmission



# Symptoms of CWD

- Behavioral changes
- Increased drinking, urination, salivation
- Pneumonia
- In coordination





# Symptoms of CWD

- Animal is disorientated
- Chronic Weight loss- poor doer
- Animals lose control of basic bodily functions
- Finally death occurs
- Animal's brain tissue is riddled with holes



# CHRONIC WASTING DISEASE

## Clinical Features



Adults: 17 months to  
>15 years

most 3-5 years

Sex: males, females

No strict seasonality

Clinical duration:

days to >1 year

usually months

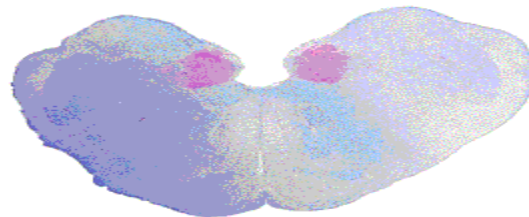
Incubation period

min: ~ 17 months

max: unknown

# Diagnosis of CWD

- Look for the **PRIONS**
- There are **NO** approved tests for **LIVE** animals-  
Working on Tonsil/Rectal Biopsy
- Due to the slow -growing nature of the disease, currently animals over 16 months are tested
- On **deceased** animals, the brain stem is removed and a staining test is used on tissue samples.



# Treatment of CWD

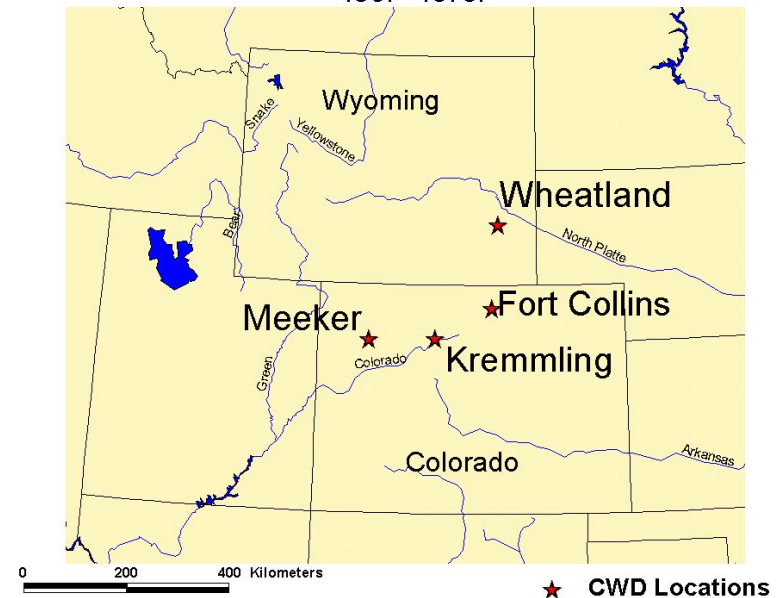
- There is **NO** treatment.
- There is **NO** vaccine for prevention yet-scientists are working on it.
- **100% FATAL** once infected.



# History of CWD

- First recognized as a clinical entity in the late 1960s in captive mule deer and elk in Colorado and Wyoming; confirmed as a TSE in late 1970s

Locations Where CWD was First Diagnosed in Captive Cervids, 1967 -1979.





## A BRIEF HISTORY OF CWD

Late 1960s: CWD recognized  
as a syndrome

1977-78: Recognized as a SE

1981: Recognized in free-  
ranging cervids

1996: Recognized in farmed  
elk

2001: Recognized in free-  
ranging deer in Canada

2001: Recognized in farmed  
elk in Korea

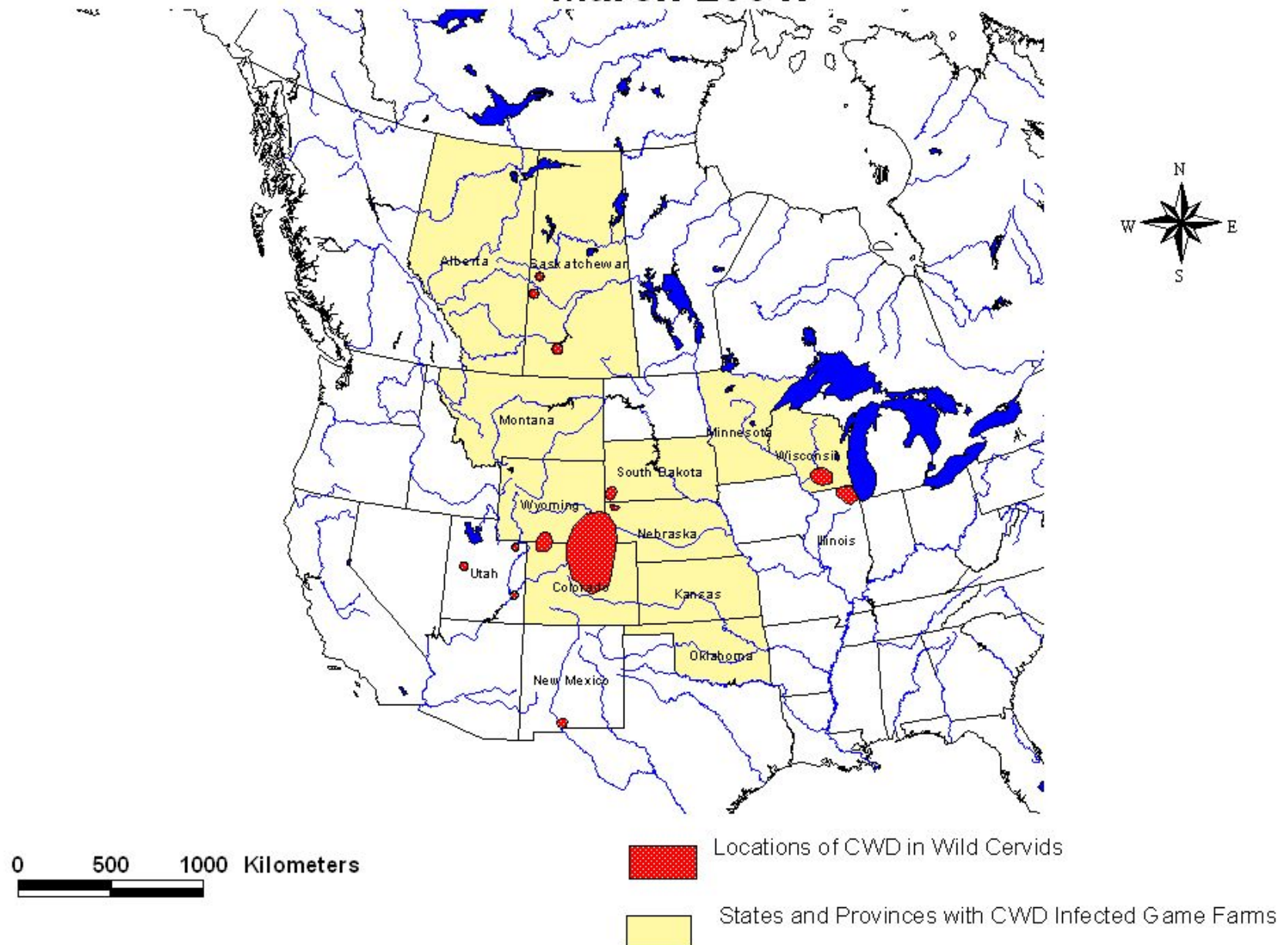
2002: Diagnosed in free-  
ranging white-tails in WI

# LOCATIONS of CWD- Captive and Wild Populations

- Several USA States
- 2 Canadian Provinces
- Korea



# Locations of Wild and Game Farm Infected Cervids March 2004.



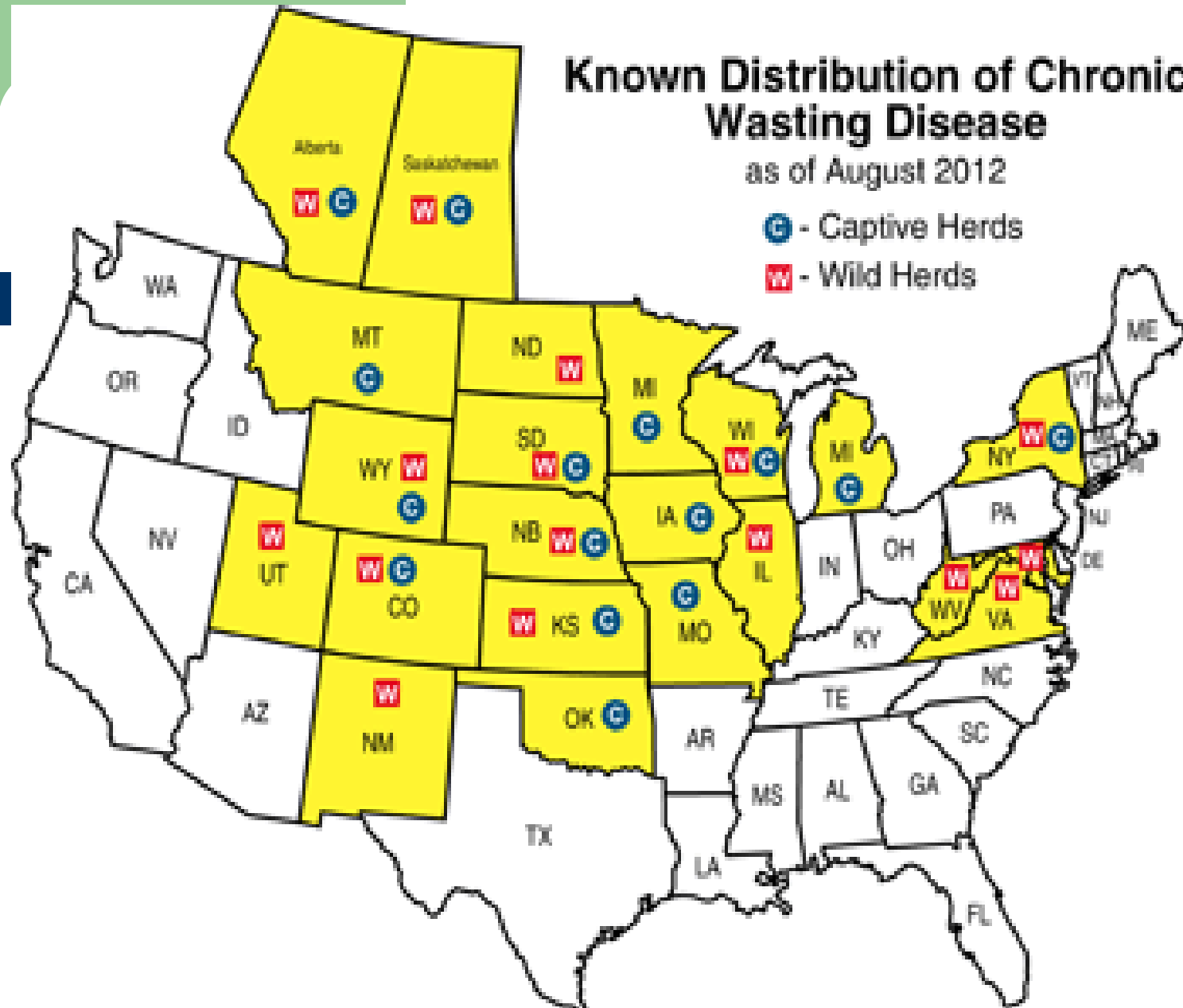


# Known Distribution of Chronic Wasting Disease

as of August 2012

 - Captive Herds

 - Wild Herds



# CHRONIC WASTING DISEASE

**The Big Question: How do we control CWD?**

**Captive Cervids:**

**surveillance and herd certification**

**moratoriums on movement**

**quarantine**

**depopulation/indemnity**

**environmental contamination and use of  
premises**

## Prevention of CWD:

- The only prevention for this disease is to make sure if you raise captive cervids that they are in a clean biosecure environment and that they are all well fed from known sources
- Follow sanitary practices while hunting and processing game
- Follow the Federal and State Regulations



# **CWD RULE** State and Federal Regs:



Animal and  
Plant Health  
Inspection  
Service  
**Veterinary  
Services**

## **Chronic Wasting Disease Program Standards**

July 2012





# **CWD RULE** State and Federal Regs: New Federal CWD Rule 2012

- CWD Captive Herd Certification Program –  
**Alaska Department of Environmental Conservation** \* At this time Reindeer **ARE NOT** included in the Rule.
  - \*Administrative Procedures
  - \*Participation
  - \*Registration, Identification, Recordkeeping
  - \*Fencing
  - \*Surveillance and Sampling

# **CWD RULE** State and Federal Regulations: continued

- \*Diagnostics
- \*National Reports
- \*Interstate Movement
- \*Herd Plans
- \*Carcass Disposal
- \*Sanitary Precautions/Biosecurity

# **CWD RULE** State and Federal Regulations:

- *WILDLIFE* is much harder to manage
  - Alaska Department of Fish and Game
    - \* Website
    - \* CWD Testing-Hunter Harvest- since 9/2003
- “To date, CWD has NOT been detected in any Alaskan wildlife, however Alaska is a state of concern and the disease is being closely monitored”**

# HELP!

- CWD has not been detected in Alaskan wildlife yet but ADF&G needs your **help** monitoring! Please report sick deer, elk, moose or caribou to [dfg.dwc.vet@alaska.gov](mailto:dfg.dwc.vet@alaska.gov)



# Other Organizations

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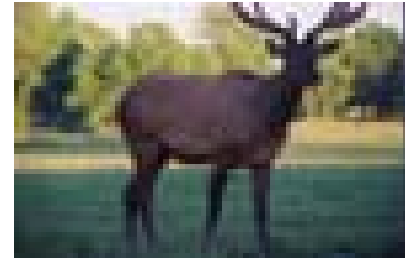
## Chronic Wasting Disease Alliance

- <http://www.cwd-info.org/>

# Hunting- General Disease Recommendations

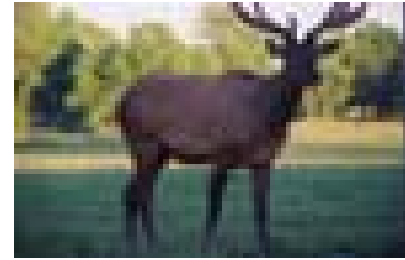
- Harvest Healthy Animals
- Wear latex/rubber gloves
- Do not EAT Brain, spinal Cord, Eyes, Lymphoid Tissue
- DEBONE meat when processing
- USE good Sanitation
- Cook meat thoroughly

# Summary of CWD



- CWD is **similar** to “mad cow” disease (BSE), Scrapie
- Scientists and biologists have known about the disease for 40 years. Known about “Scrapie” in sheep for 250 years
- The first case of CWD was in a captive mule deer in Wyoming.
- The World Health Organization and the US Food and Drug Administration have been studying the disease and have found no evidence that CWD is transmissible to humans. **“Prudence in the Face of Uncertainty”**

# Summary of CWD



- Certain cervid species seem to be more resistant- Reindeer/Caribou- **Species Barrier**
- Natural case **NOT** found to date in reindeer even with potential overlap of habitat with CWD infected elk or deer herds
- Recent article 2012 “ Experimental Oral Transmission of CWD to Reindeer”- Were able to transmit the disease Experimentally ORALLY.

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# Why is **CWD** Important ?

- Human Health Questions?
- Animal Health Questions?
- Wildlife Population Questions?

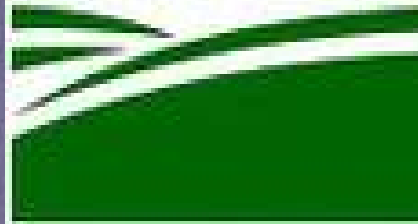


# **“Prudence in the Face of Uncertainty”**



# USDA

## APHIS



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