

# CWD Risk Assessment & Surveillance in Kentucky

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March 2013

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# Why do we care about CWD?

- Deer and elk are the most important and popular game species in Kentucky
- Without revenue from deer and elk hunting, many other wildlife programs would not be possible
- Disease surveillance is the best way to ensure and reassure others that we do not have a **population-affecting** disease in the state
- If we had a disease such as CWD in the state, translocation of elk to initiate new populations would not be possible

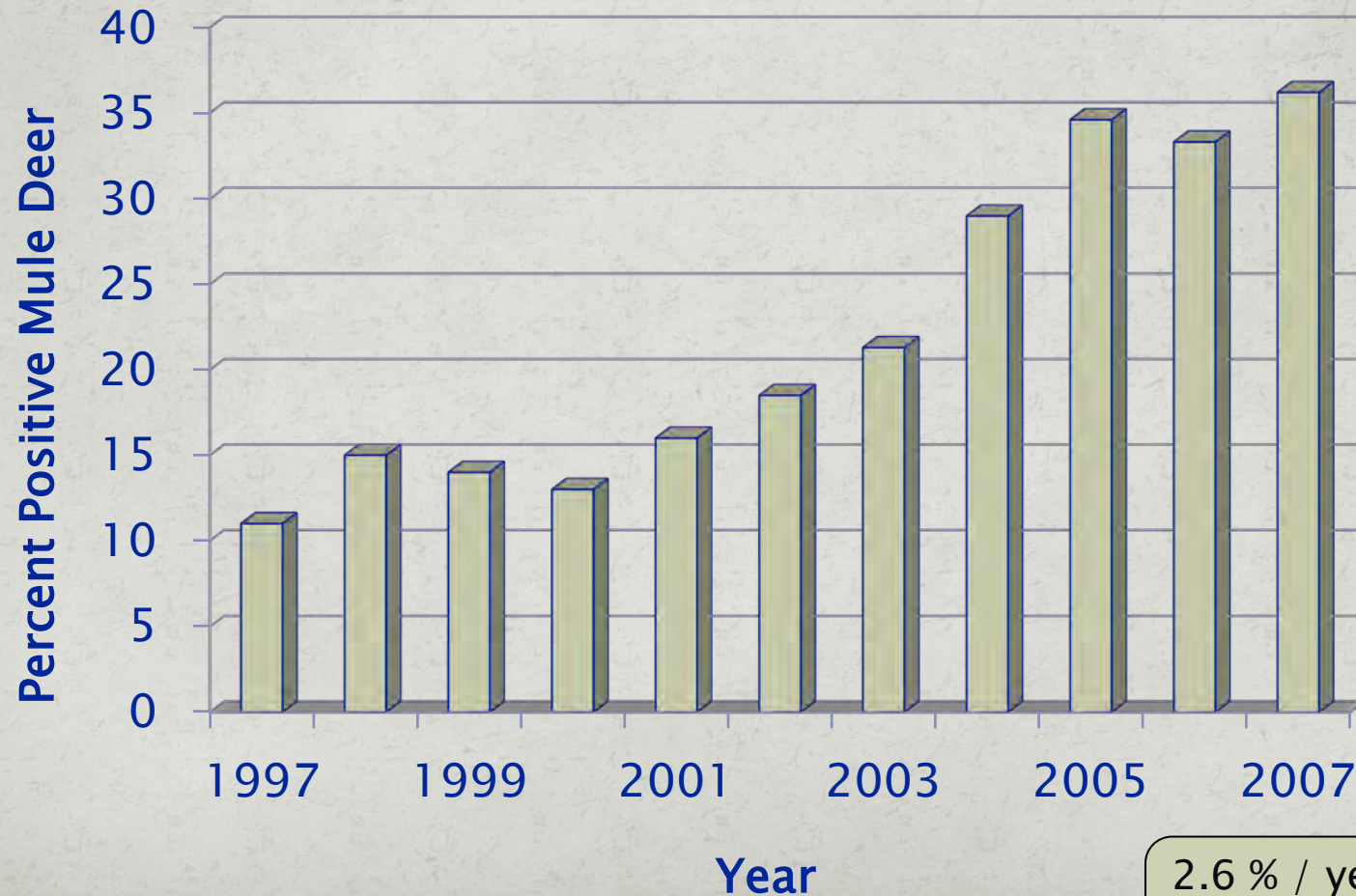


# Why do surveillance?

- First, prevention is the best way to protect a wild population.
  - Once a disease gets into a free-ranging population, it's nearly impossible to eradicate it
- Early detection is the second best way
  - If we detect CWD early, we have the best chance at minimizing the spread and effect
  - Example: New York appears to have eliminated the disease

# Impact of CWD on deer herds

- Endemic area of Wyoming (mule deer)

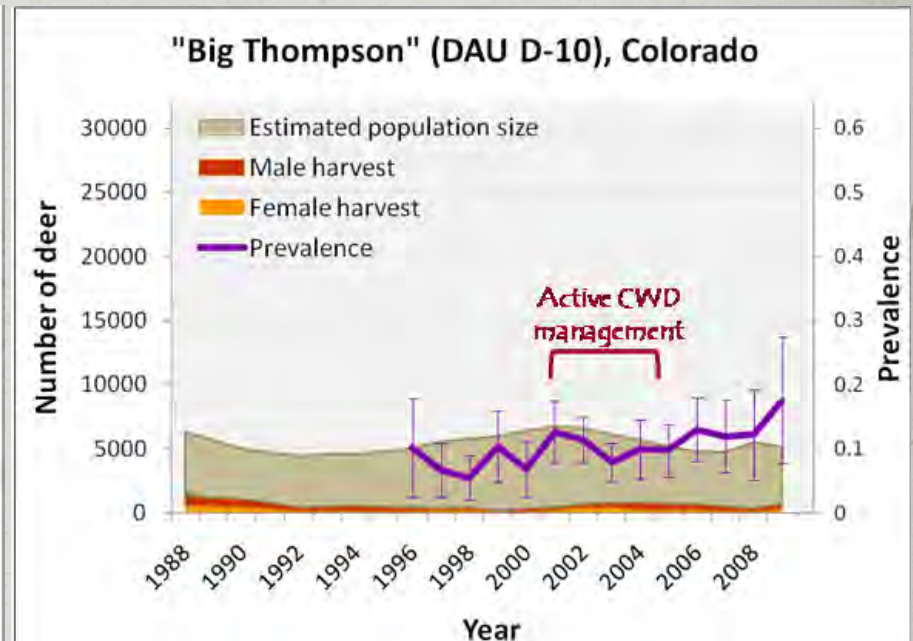
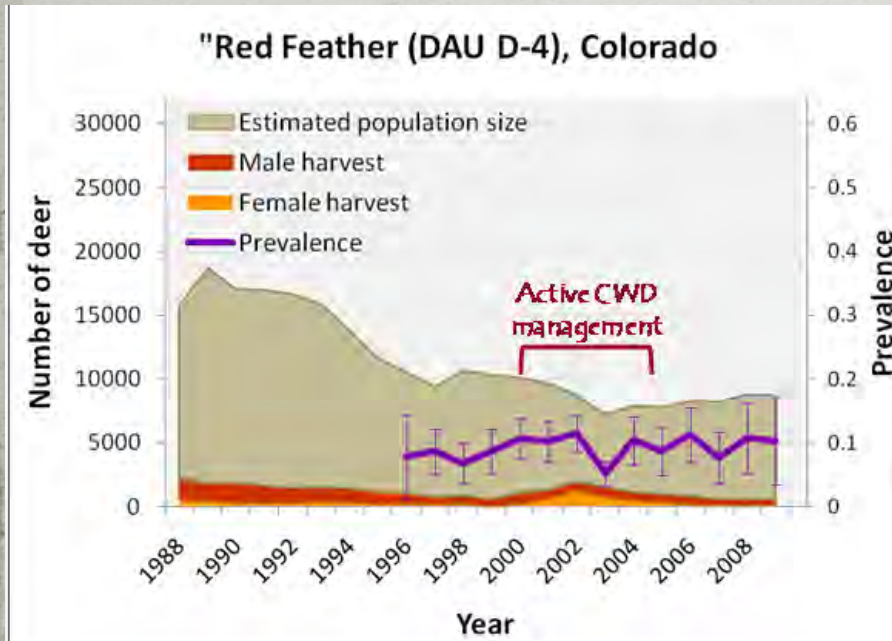


2.6 % / year increase,  
Higher among males



# Impact of CWD on deer and elk

- Endemic areas of Colorado (mule deer)



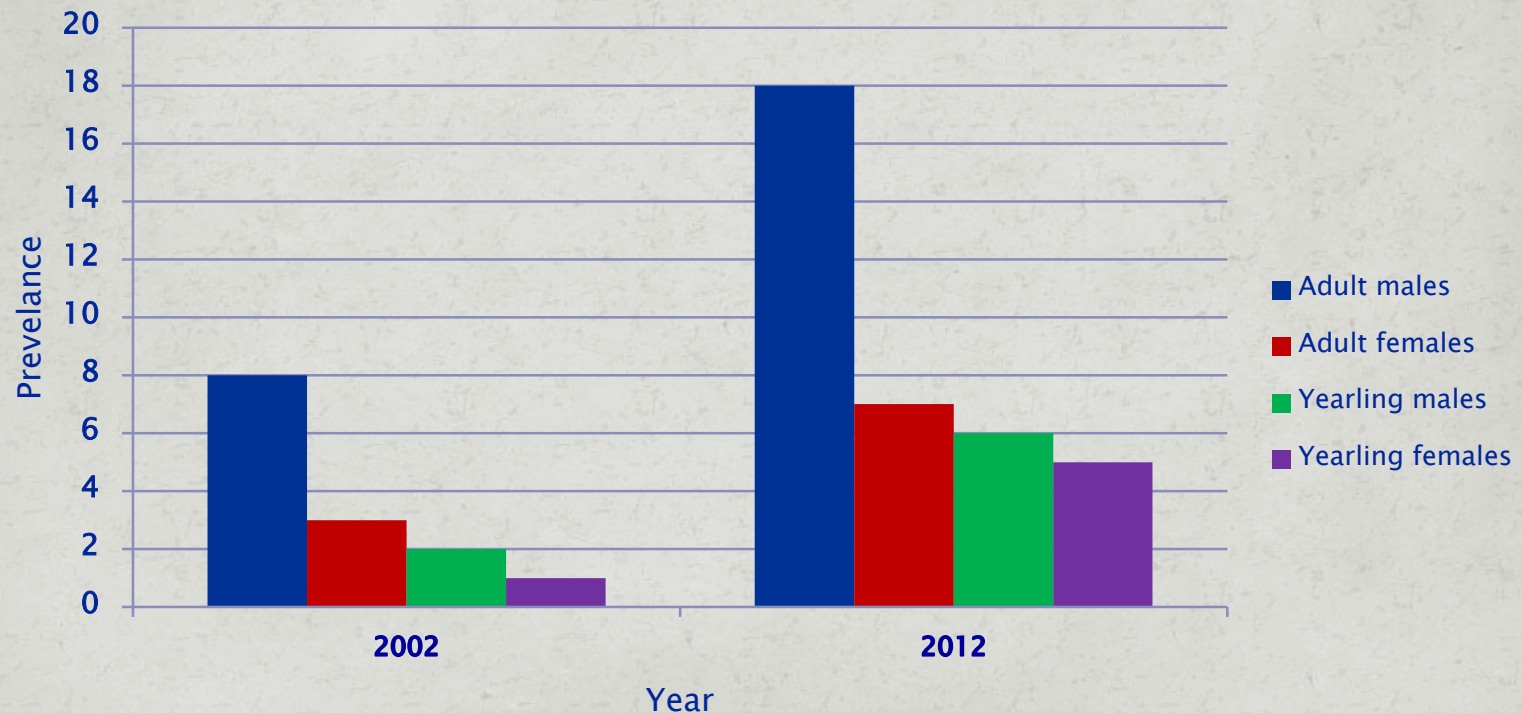
- Up to 25% prevalent in mule deer and 17% in elk affected populations
- Hunting is still as much or more popular than before CWD

Source: Colorado Division of Parks and Wildlife. "Chronic Wasting Disease in Colorado: 2010–2011 Surveillance Update." August 2011.

# Impact of CWD on deer herds

- Endemic areas of Wisconsin (white-tailed deer)

Prevalance of CWD in Wisconsin deer

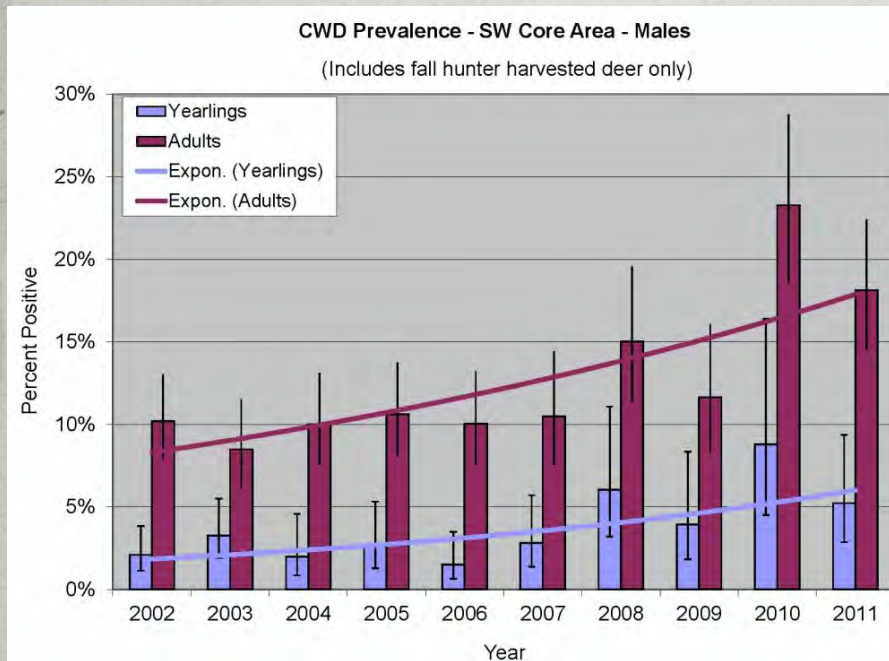


Source: Wisconsin Division of Natural Resources webpage, "CWD Prevalence & Surveillance."  
<<http://dnr.wi.gov/topic/wildlifehabitat/prevalence.html>>. Accessed February 19, 2013.

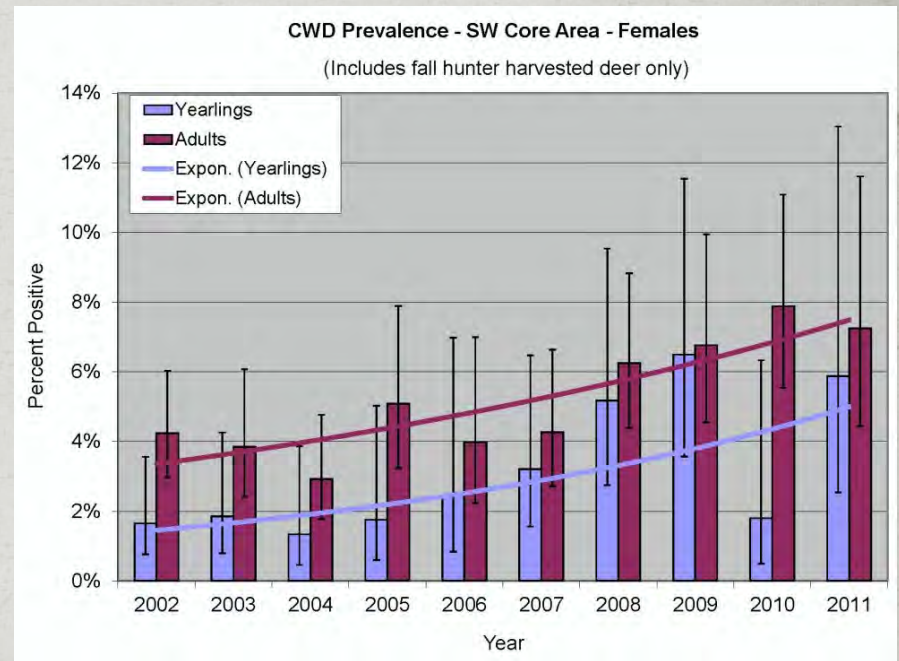


# Impact of CWD on deer herds

- Endemic areas of Wisconsin (white-tailed deer)



**Males**



**Females**

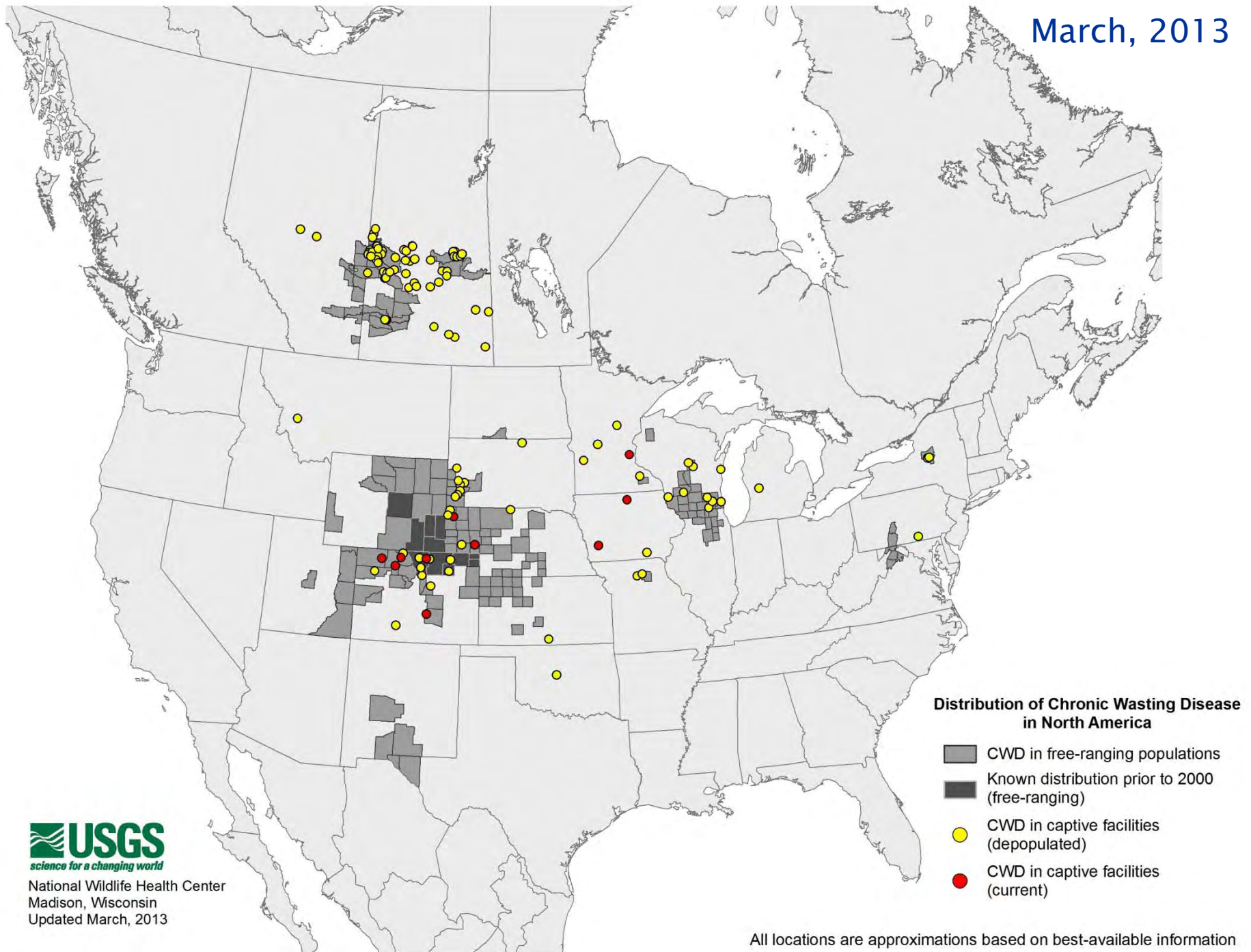
Source: Wisconsin Division of Natural Resources webpage, "CWD Prevalence & Surveillance."  
<<http://dnr.wi.gov/topic/wildlifehabitat/prevalence.html>>. Accessed February 19, 2013.

# Movement of CWD closer to Kentucky

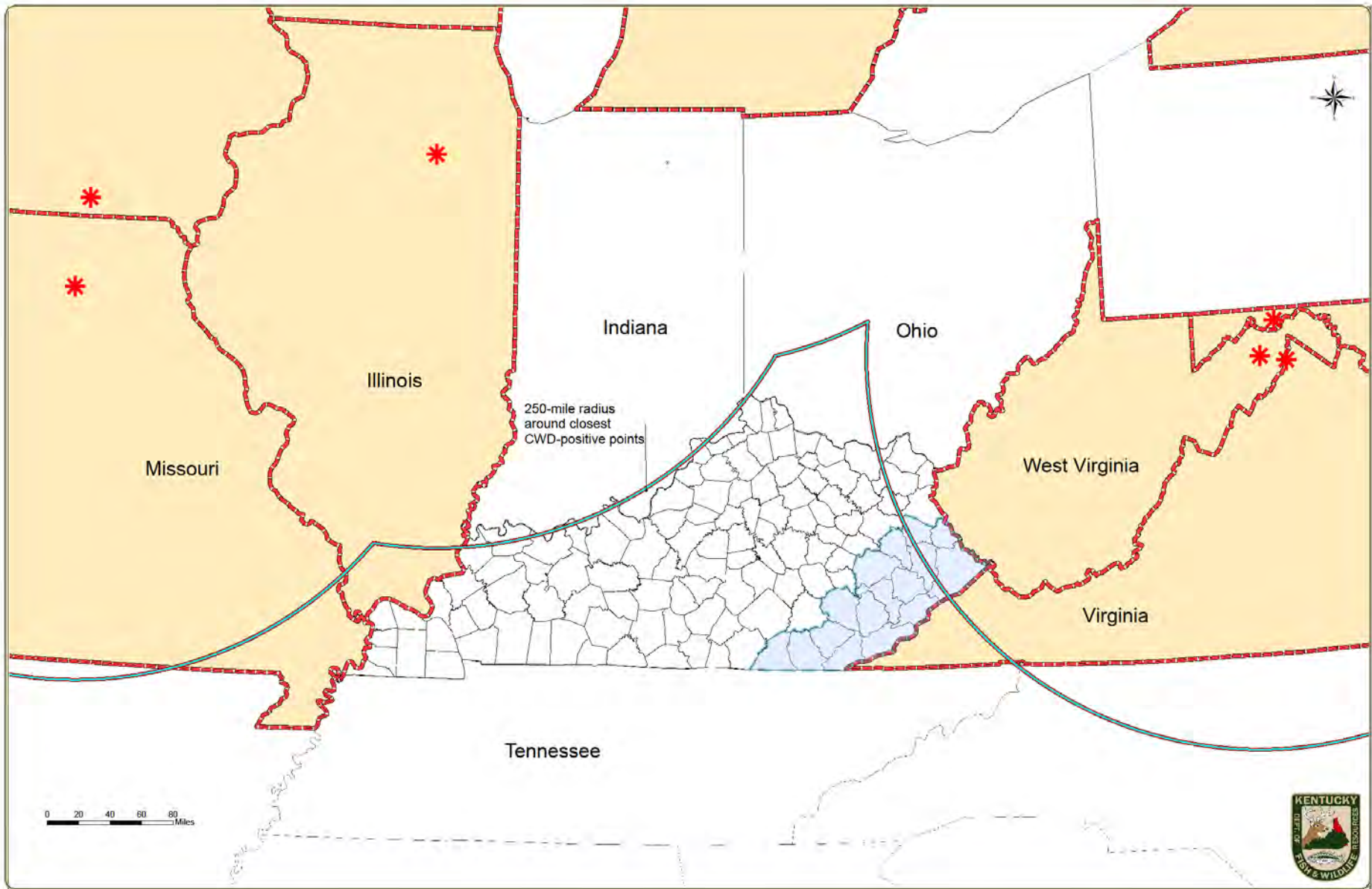
- **2002:** Wisconsin (wild first, then captive)
- **2002** (later in year): northern Illinois (wild)
- **2005:** New York (captive and then wild) and West Virginia (wild)
  - Jumped several states?
- **2010:** Virginia (wild) and Missouri (captive)
- **2011:** Maryland (wild)
- **2012:** Missouri (wild)



March, 2013



National Wildlife Health Center  
Madison, Wisconsin  
Updated March, 2013





# Epidemiology In Wild Cervids



- Mule & white-tailed deer, elk, moose, and red deer
- Various modes of transmission:
  - Direct contact (nose-nose)
  - Fecal-oral transmission
  - Infectivity of urine or saliva is not yet known



# Epidemiology In Wild Cervids



- Infection rates vary with species, herd, and age
  - <1% up to 17% of elk infected
  - Up to 57% of male mule deer infected
  - 20% or more male white-tailed deer infected
- Older males more likely infected, followed by older females
  - Males >3 years old are up to 3.7x more likely to have infection
- Fawns rarely infected



# Epidemiology In Captive Cervids



- Documented spread among farmed elk via animal import/export
- Transmission between farmed and wild cervids
  - Unproven but suspected
- Source of CWD in several farmed herds and wild populations is unknown



# Clinical Signs

- Incubation: 15–60 months – no obvious symptoms
- Behavior changes: staggering, trembling, aimless wandering
- Emaciation
- Excessive drinking, salivation, urination





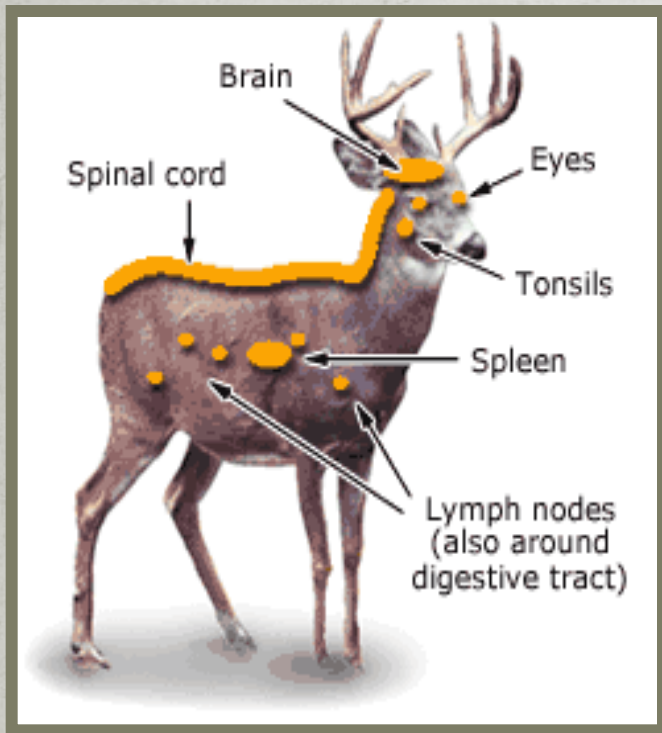
# Human Health Concerns



- No current evidence CWD is transmissible to humans
- No increase in Creutzfeld–Jacob disease in people living in endemic areas of WY or CO
  - CJD is human form of TSE
- Public health officials continue to assess the risk, if any, of CWD transmission to humans



# Recommendations to Hunters

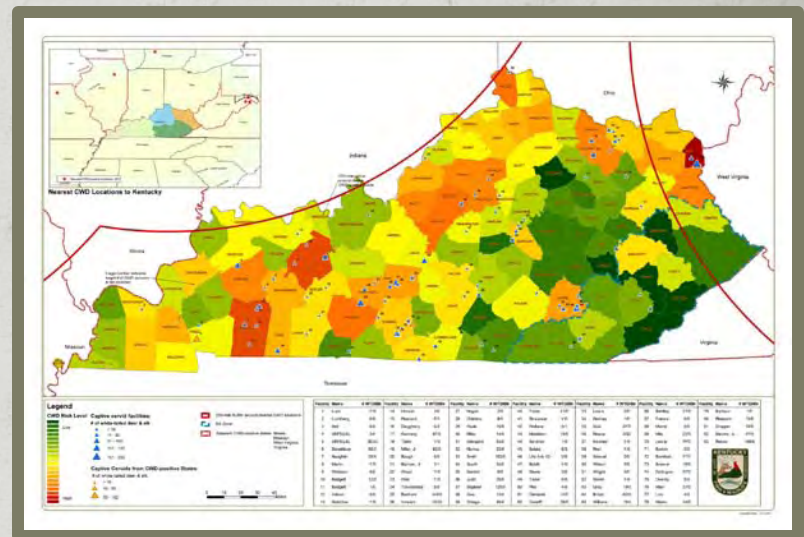


- Wear rubber gloves when field dressing
- Animals that look sick or test positive for CWD should not be consumed
- Wash hands when done
- Minimize handling of brain, spinal cord and cerebrospinal fluids
- Debone carcasses
  - avoid consuming brain, spinal cord, spleen, lymph nodes, eyes
- Request that meat from different animals be processed separately
- Contact KDFWR regarding sick animals
- Follow state regulations and/or recommendations regarding carcass disposal and movement



# Risk Model – 2012 Surveillance

- Focus on target animals = higher risk animals
- Looked to literature to identify CWD risk factors



# Risk Factors

- Clinically ill – showing symptoms indicative of CWD
  - Emaciated
  - Neurologic
- Age
  - Older males ( $>3$  years) are 3.7x more likely
  - Older females are 2x more likely
  - Fawns are only 0.025x as likely as any adult
- Road killed deer are 2x more likely



# Risk Factors

- Proximity to nearby CWD–positive sites
  - In miles
- Cervid density (deer + elk)
  - Estimated by county, based on hunter harvest
- Number of captive cervids
- Number of captive cervid facilities
- Number of cervid imports from out of state
- Number of taxidermists and deer processors

# Risk Factors

Code	Description	Value
x	Sample (typical 2.5 year old)	1
MM	mature male (>2.5 years)	3.7
MF	mature female (>2.5 years)	2
Y	youth (fawn or calf, <1.0 years)	0.025
RK	road kill	2
CB	county buffer (within 250 mi buffer from nearby CWD sites)	0 (no), 1 (yes)
DC	county deer density (categorical)	-1 to 3
CC	captive cervids (categorical)	1 to 3
CCF	captive cervid facilities (categorical)	0.5 to 2
IM	interstate movements (categorical)	1 to 3
TP	taxidermists and deer processors (categorical)	0.5 to 3

## Calculation of risk per sample:

$(MM \text{ or } MF \text{ or } Y)x + RK + \text{county risk factor} = \text{animal's risk}$

$(\text{county risk factor} = CB + DC + CC + CCF + IM + TP)$



# Risk Factors – example

## Christian County

County risk factor	Number	Value
Proximity to CWD-positive site	>250 mi.	0
Cervid density (deer + elk)	23/sq. mi.	0
Number of captive cervids	44	2
Number of captive cervid facilities	5	2
Number of interstate movements	0	0
Number of taxidermists & processors	6	2
<b>Total County Risk</b>		<b>6</b>



[illegible]



# Risk Factors – example

3.5 year-old road-killed buck from  
Christian County:

animal risk = MM + RK + county risk factor:

$$\text{animal risk} = 3.7 + 2 + 6 = 11.7$$

# Surveillance Strategy – Kentucky

In 2012, only high-risk animals:

- Males  $\geq 3.5$  years
- Females  $\geq 3.5$  years
- Road kill – adults or clinical animals only
  - Adults are  $\geq 2$  years
- As many clinical animals as possible
  - Clinical = sickly, neurologic, emaciated
- Any tagged animals wandering wild
- Focus on higher-risk counties (yellow or orange on the risk map)



# Sampling Results

	2011		2012	
	n	%	n	%
Clinically ill animals	8	0.5%	45	6%
Road kill	289	17.8%	106	15%
MM (mature males)	235	14.5%	265	38%
MF (mature females)	159	9.8%	229	32%
Total	1626		706	

# Risk Model Results

Year	# of CWD samples collected	$\Sigma$ animal risks*	Index (animal risk/n)	* Sum of animal risks = indicator of effectiveness of surveillance effort
2010	2,016	4,356	2.16	
2011	1,626	4,096	2.52	
2012	706	3,242	4.59	

In 2012, there were 57% fewer samples collected than 2011, but the sum of animal risks was 79% of that in 2011, indicating a more efficient, yet effective, surveillance effort.



# Surveillance Strategies

- **West Virginia 2002 – 2005**
  - 1,401 deer sampled (80% target animals).
- **Iowa 2010 – 2011**
  - 4,374 deer sampled (6% road kill, 31% adult male).
- **Ohio 2010 – 2011**
  - 1,108 deer sampled (45% road kill, 20 clinical).
- **Illinois 2010 – 2011**
  - 7,583 deer sampled (14% sharpshot, 26 clinical, 42 positive).
- **Kentucky 2011–2012**
  - 2332 deer and elk sampled (17% road kill, 53 clinical).

# Questions...

This research and the surveillance effort are funded in part by the Rocky Mountain Elk Foundation.

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