

2009 BOVINE TB SURVEILLANCE



Michigan **DNR**
natural resources & environment



Michigan
Department of
AGRICULTURE



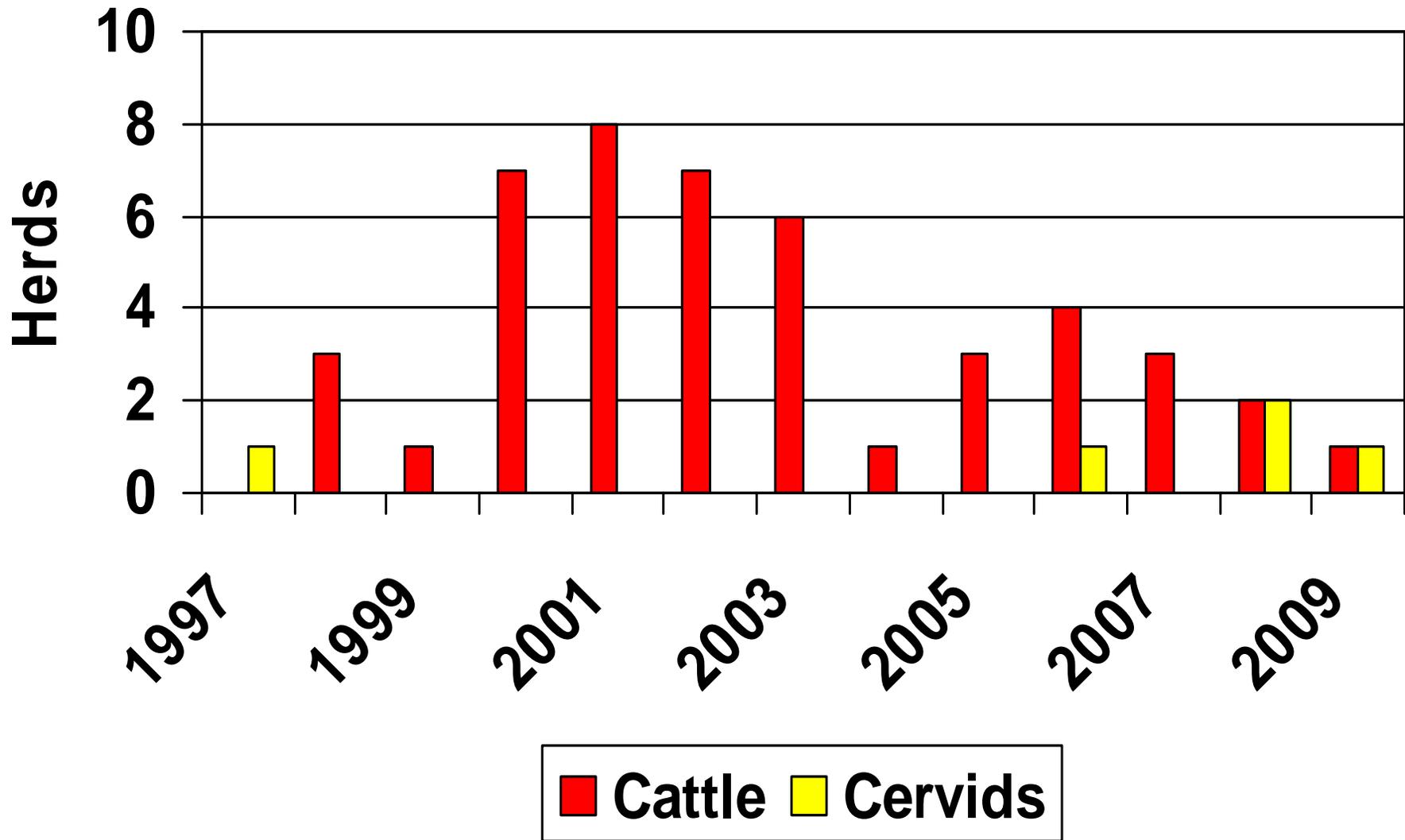
Dr. Steven Halstead
Dr. Steve Schmitt
Dr. Dan O'Brien



What is at Stake?

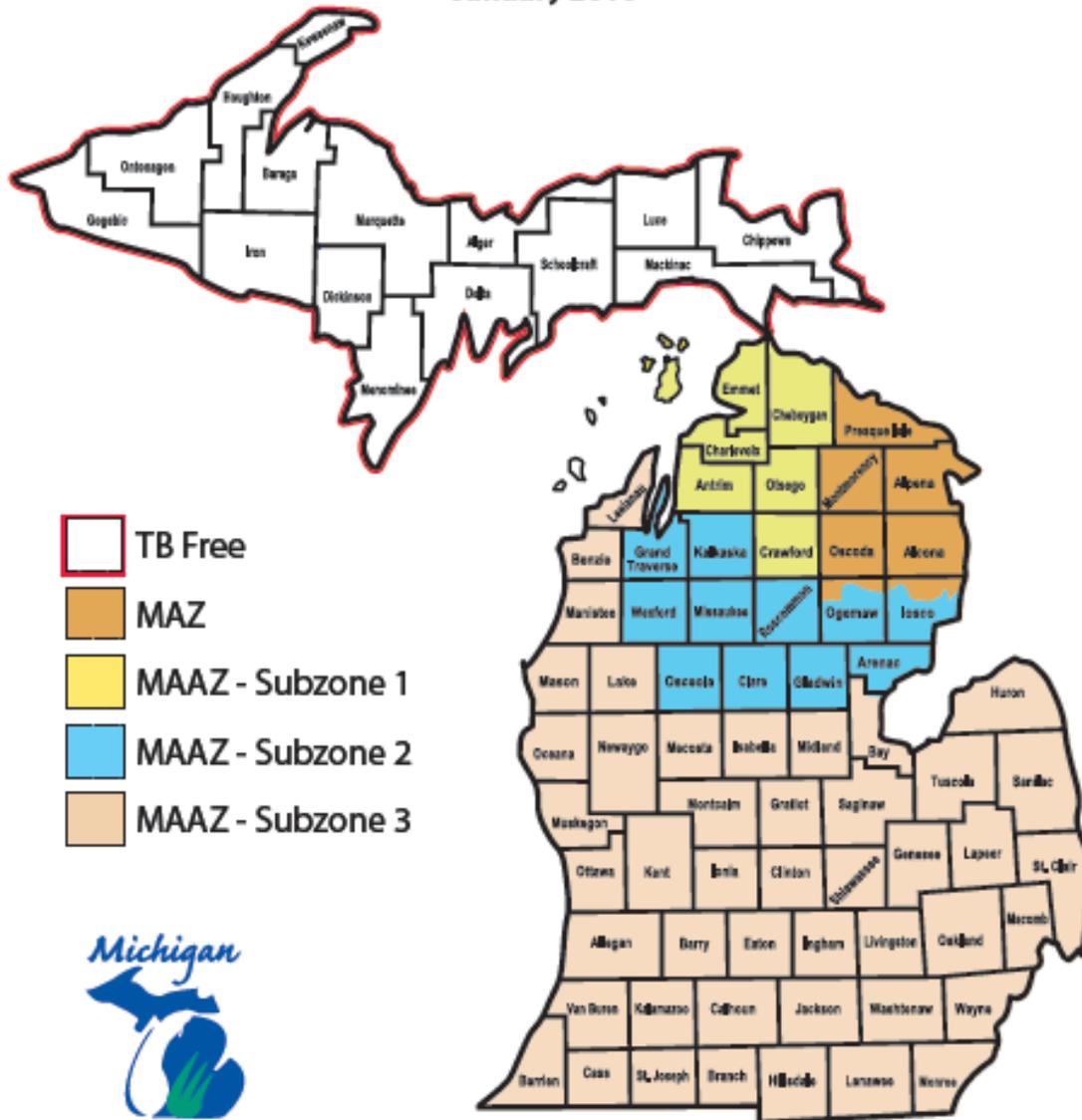
- Agriculture is a growing industry in Michigan
 - ~\$70 Billion annually to economy
 - 1.5 million jobs linked to food & agriculture
- Michigan cattle industry 1.1 million head
 - Estimated value \$1.4 billion

Bovine TB Positive Livestock



Michigan Bovine Tuberculosis Zones

January 2010



- TB Free
- MAZ
- MAAZ - Subzone 1
- MAAZ - Subzone 2
- MAAZ - Subzone 3



Michigan White-tailed Deer Surveillance

Year	Positive	Total Deer Tested
1975 & 1994	2	2
1995	18	403
1996	56	4,966
1997	73	3,720
1998	78	9,057
1999	58	19,496
2000	53	25,858
2001	61	24,278
2002	51	18,100
2003	32	17,302
2004	28	15,131
2005	16	7,364
2006	41	7,914
2007	27	8,316
2008	37	16,308
2009	31	5,692
<u>2010 suspects</u>	<u>6</u>	<u>213</u>
Grand Total	668	184,120



2010 Preliminary Bovine Tuberculosis Survey Results -Cervids-

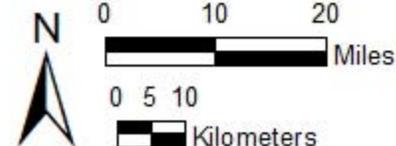


Legend

-  2010 TB Suspect Deer
-  10 Mile Buffer Zone
-  DMU 452
-  Modified Accredited Zone
-  County Line
-  Water
-  Highway
-  County with Positive or Suspect Deer 1975-2010

**Total Number
2010 Suspects**

6



What Drives TB Transmission?

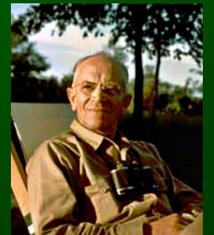
1. Density

2. Concentration

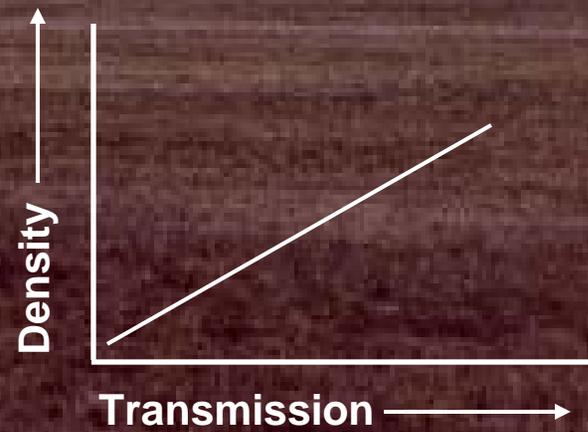


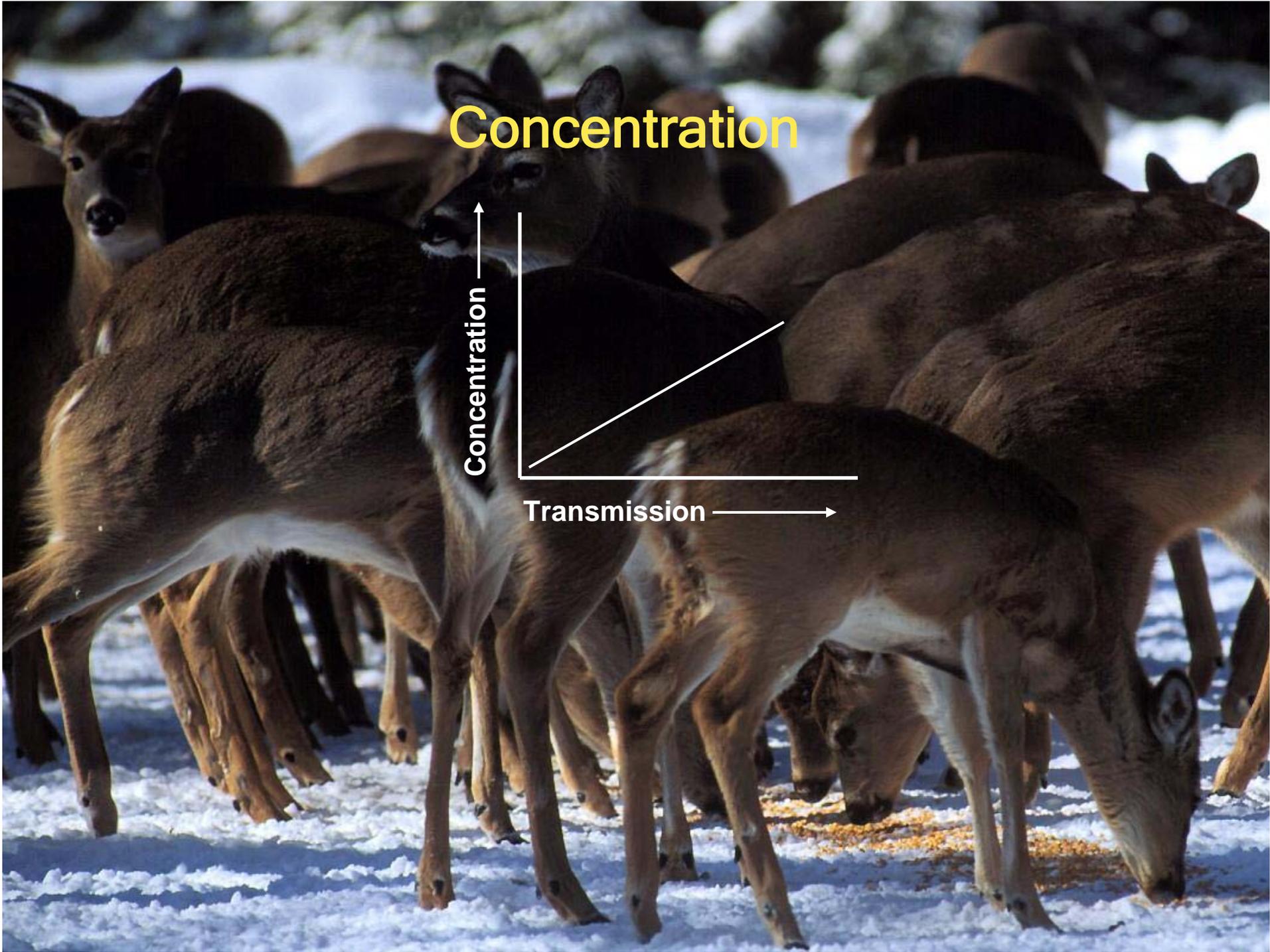
“A high density of population - the very thing the game manager is so far seeking - must be set down as the fundamental condition favorable to disease.”

Aldo Leopold, *Game Management*, 1933



Density





Concentration

Concentration

Transmission

Bovine TB Eradication Strategies

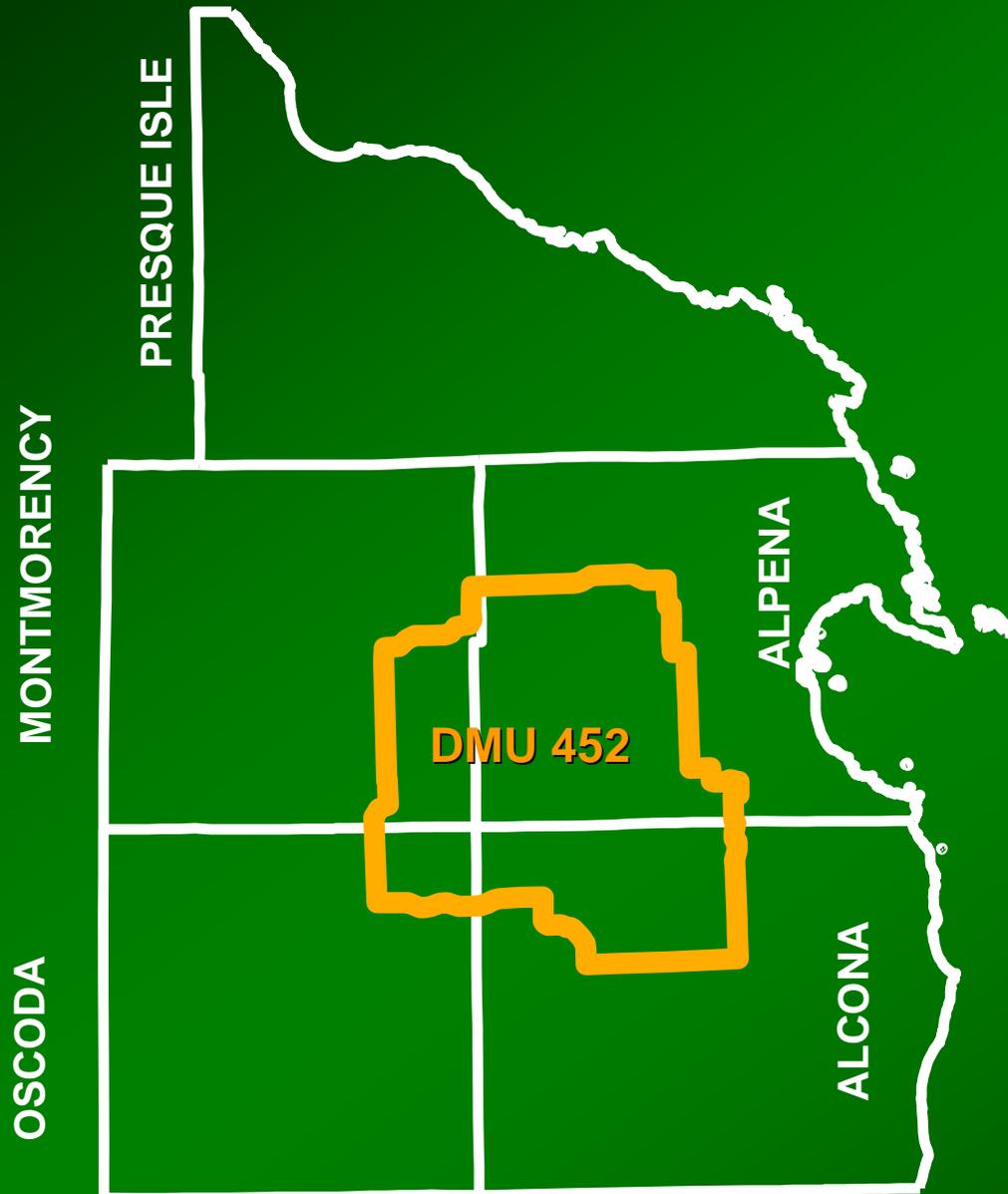
1. Keep deer from concentrating by eliminating supplemental feeding and baiting



2. Reduce deer numbers through hunting to a level supported by the natural vegetation.



Apparent TB Prevalence in White-tailed Deer



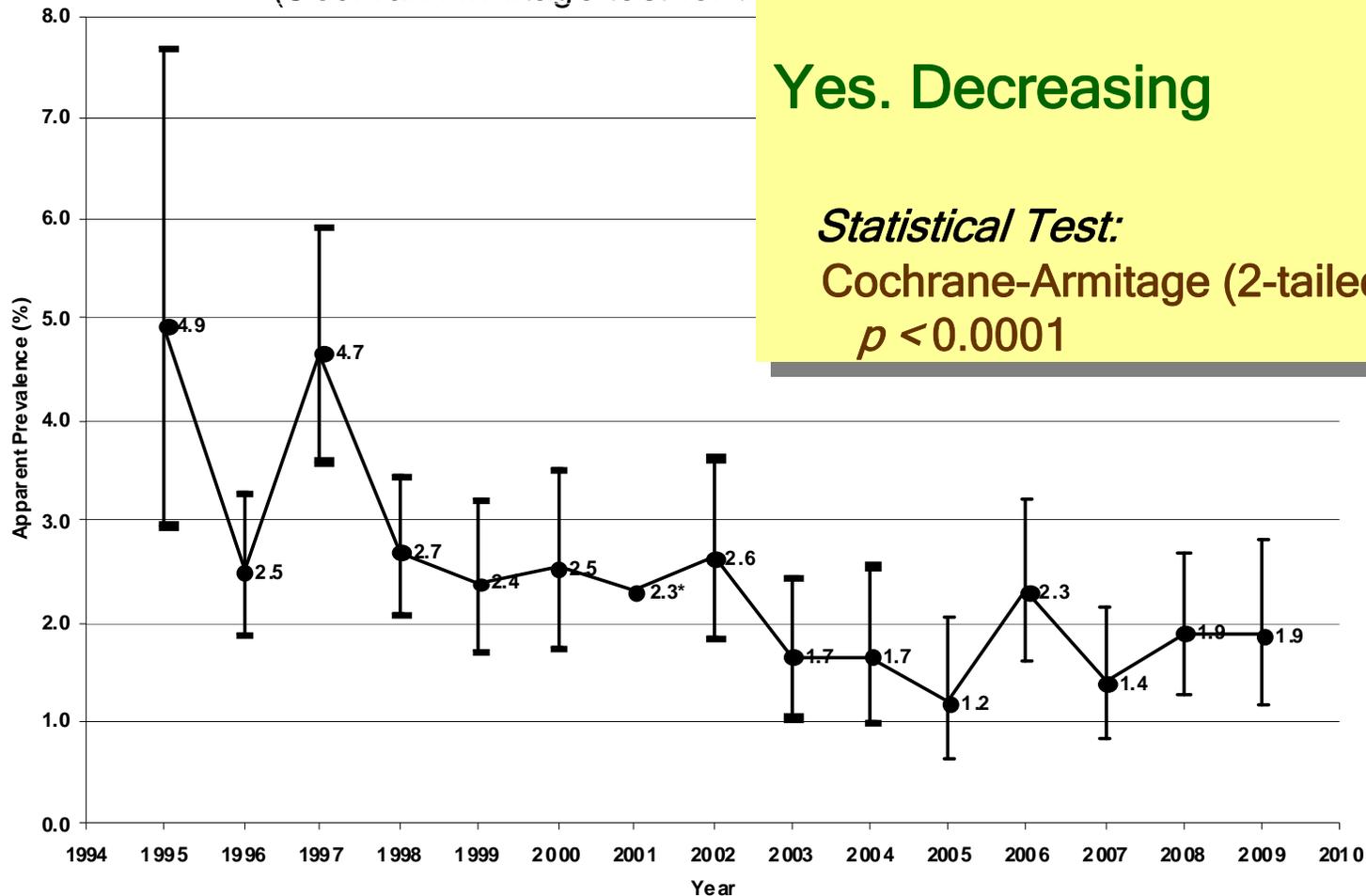
Year	Inside DMU452	5-County Outside DMU452
2009	1.9 %	0.4 %
2008	1.9 %	0.3 %
2007	1.4%	0.2%
2006	2.3%	0.3%
2005	1.2%	0.1%
2004	1.7%	0.2%
2003	1.7%	0.2%
2002	2.6%	0.5%
2001	2.3%*	0.5%
2000	2.5%	0.4%
1999	2.4%	0.2%
1998	2.7%	0.3%
1997	4.7%	0.4%
1996	2.5%	0.2%
1995	4.9%	(no testing)

* Extrapolated from head-only apparent prevalence; Mandatory head testing.

Adults

Apparent Prevalence of Bovine Tuberculosis in Adult White-tailed Deer, DMU 452,

(Cochran-Armitage test for trend)



* Extrapolated from head-only apparent prevalence: Mandatory testing.

Was there a significant trend in prevalence from 1995 - 2009 in DMU 452?

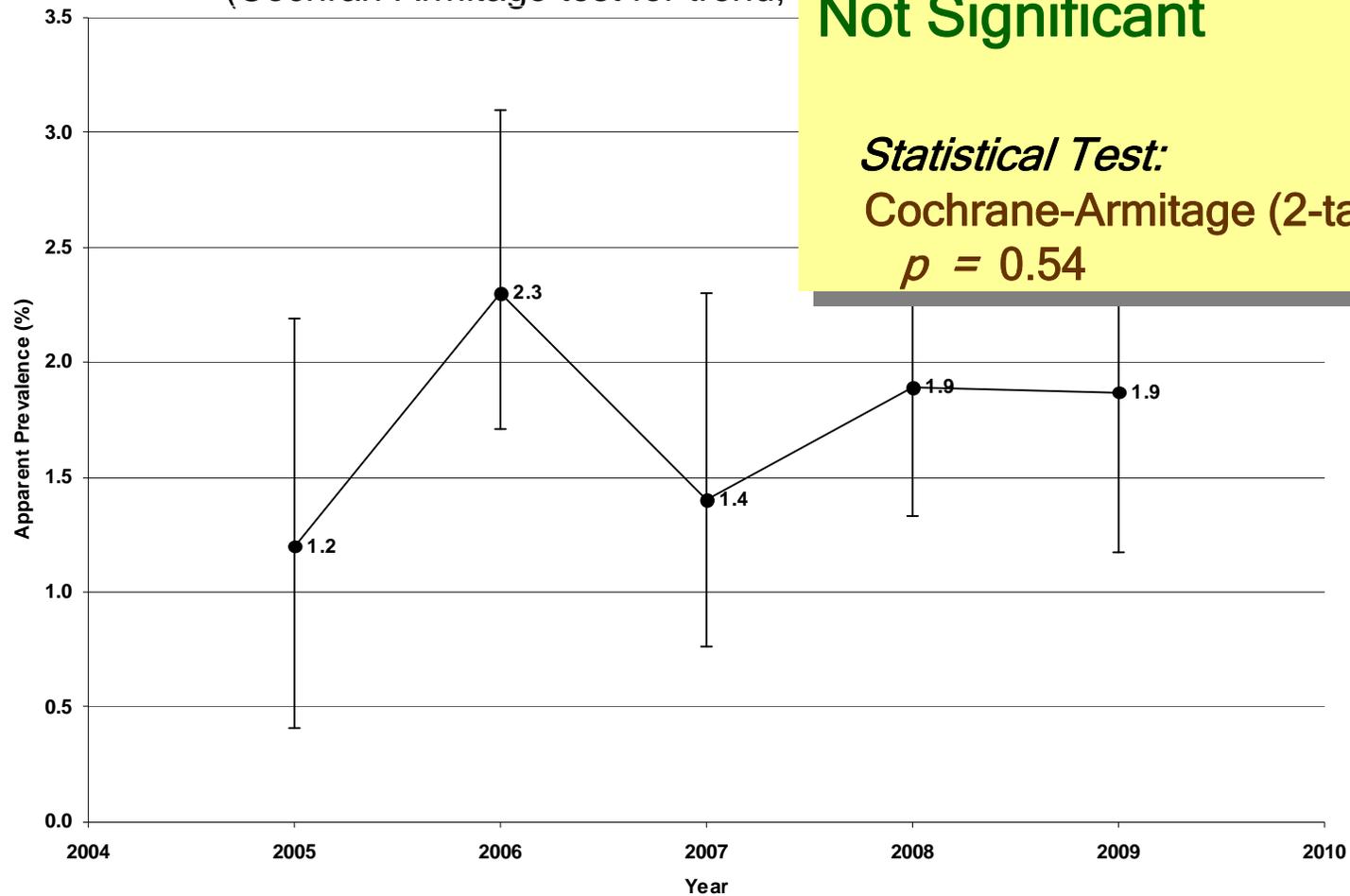
Yes. Decreasing

Statistical Test:
Cochrane-Armitage (2-tailed)
 $p < 0.0001$

Adults

Apparent Prevalence of Bovine Tuberculosis in Adult White-tailed Deer, DMU 452, 2005 - 2009

(Cochran-Armitage test for trend, $p = 0.54$)



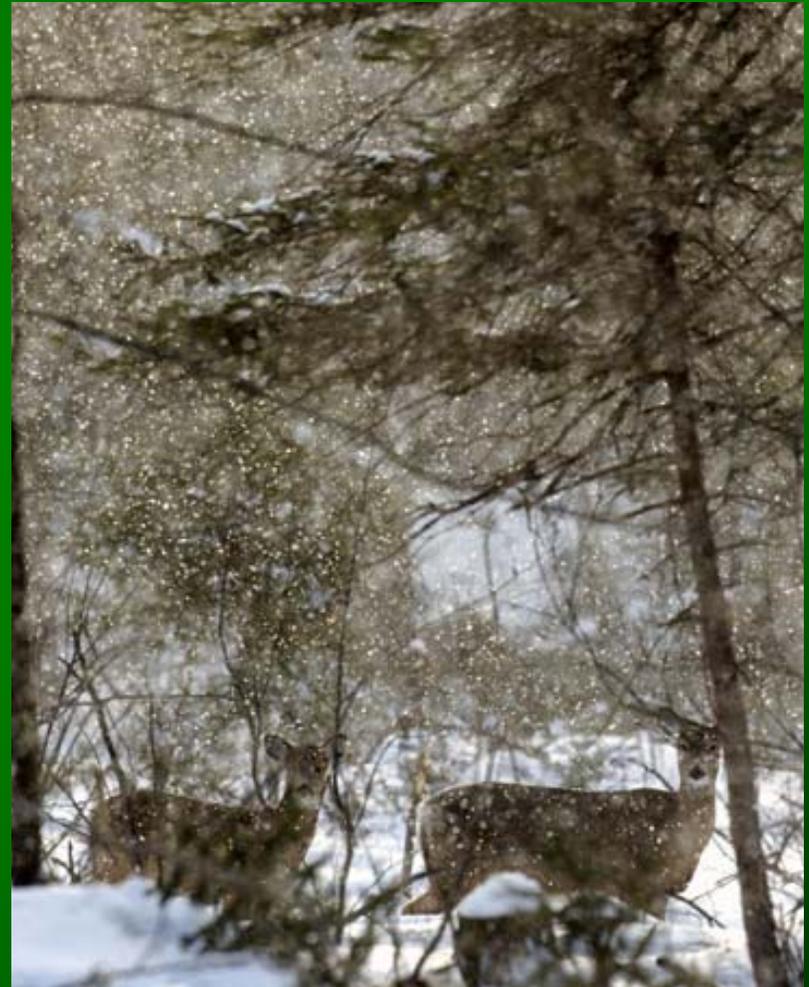
Was there a significant trend in prevalence from 2005 - 2009 in DMU 452?

Not Significant

Statistical Test:
Cochrane-Armitage (2-tailed)
 $p = 0.54$

DMU 452 Yearlings

Year	Tested	Positive	Apparent Prevalence (%)
1995	155	3	1.9
1996	862	11	1.3
1997	624	9	1.4
1998	952	15	1.6
1999	702	5	0.7
2000	491	3	0.6
2001	882	8	* 0.9
2002	588	8	1.4
2003	610	2	0.3
2004	459	0	0
2005	409	1	0.2
2006	638	8	1.3
2007	515	2	0.4
2008	474	3	0.6
2009	256	1	0.4

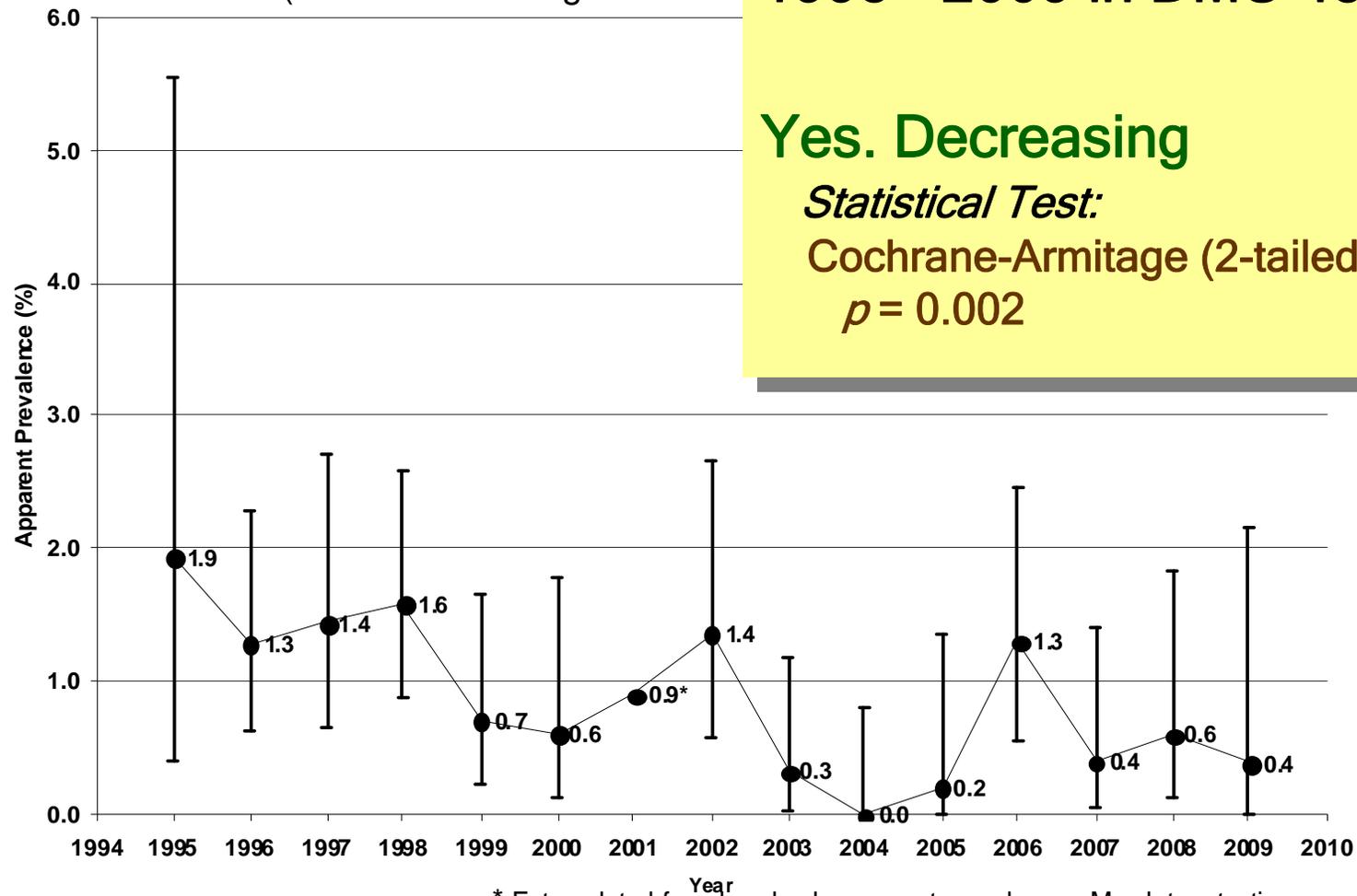


* 2001 Mandatory Testing

Yearlings

Apparent Prevalence of Bovine Tuberculosis in
Yearling White-tailed Deer, DMU 452

(Cochran-Armitage test for trend)



* Extrapolated from head-only apparent prevalence: Mandatory testing.

Was there a significant trend in prevalence from 1995 - 2009 in DMU 452?

Yes. Decreasing

Statistical Test:

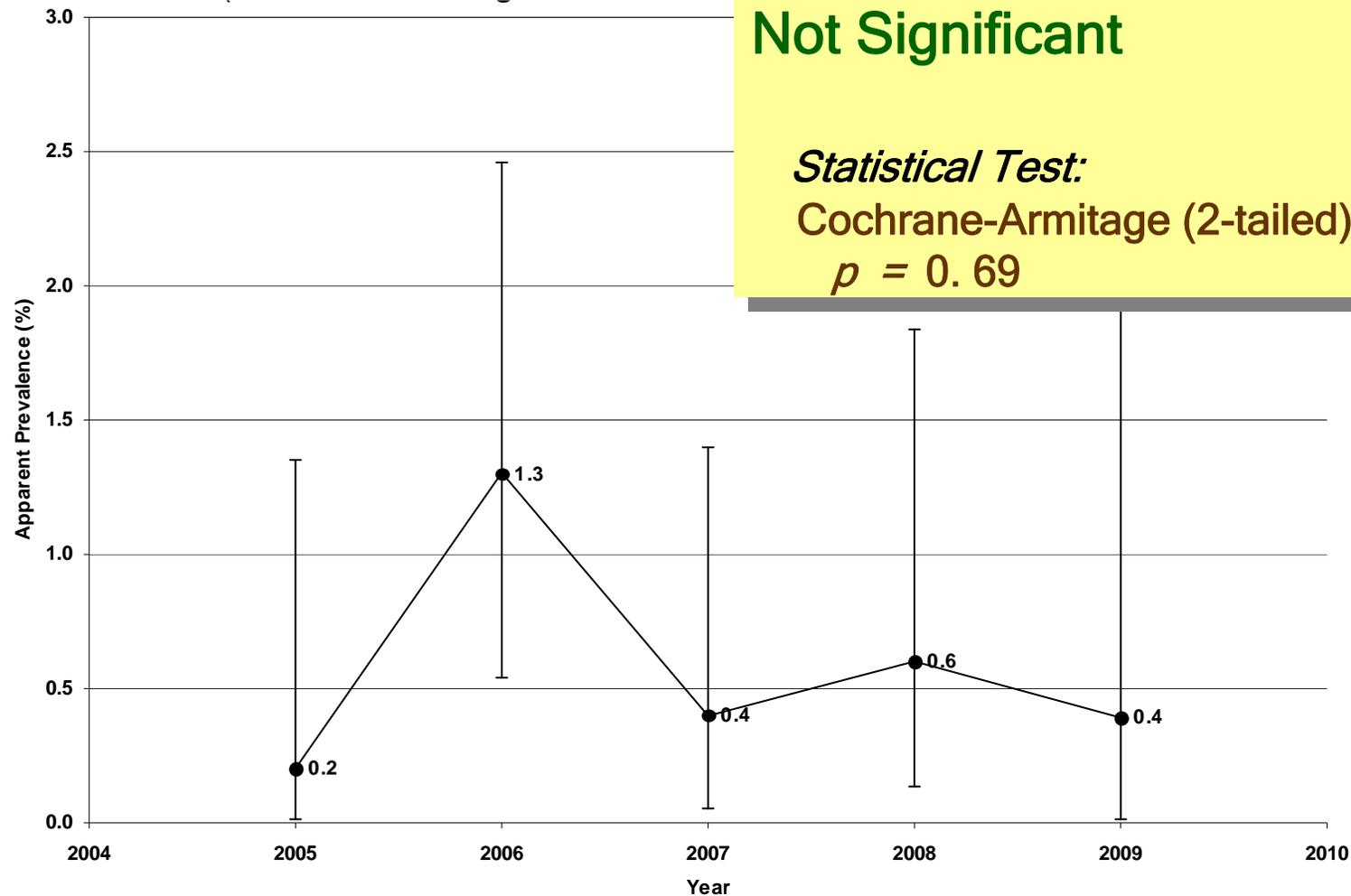
Cochrane-Armitage (2-tailed)

$p = 0.002$

Yearlings

Apparent Prevalence of Bovine Tuberculosis in
Yearling White-tailed Deer, DMU 452

(Cochran-Armitage test for trend)



Was there a significant trend in prevalence from 2005 - 2009 in DMU 452?

Not Significant

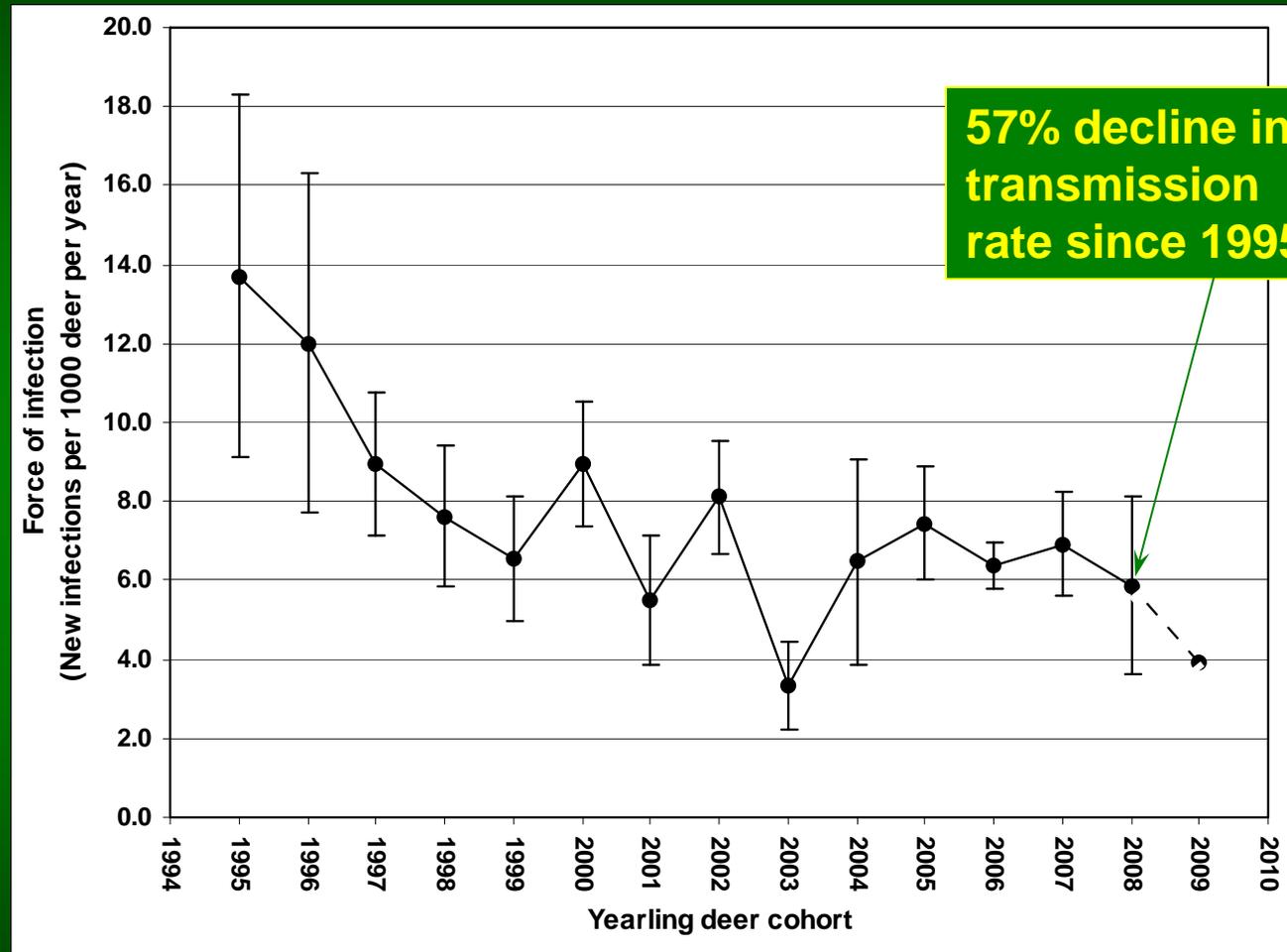
Statistical Test:
Cochrane-Armitage (2-tailed)
 $p = 0.69$

Disease transmission has declined significantly within DMU452

TB transmission

(New infections per 1000 deer per year)

TB transmission rate is still declining but not as rapidly as in the past!



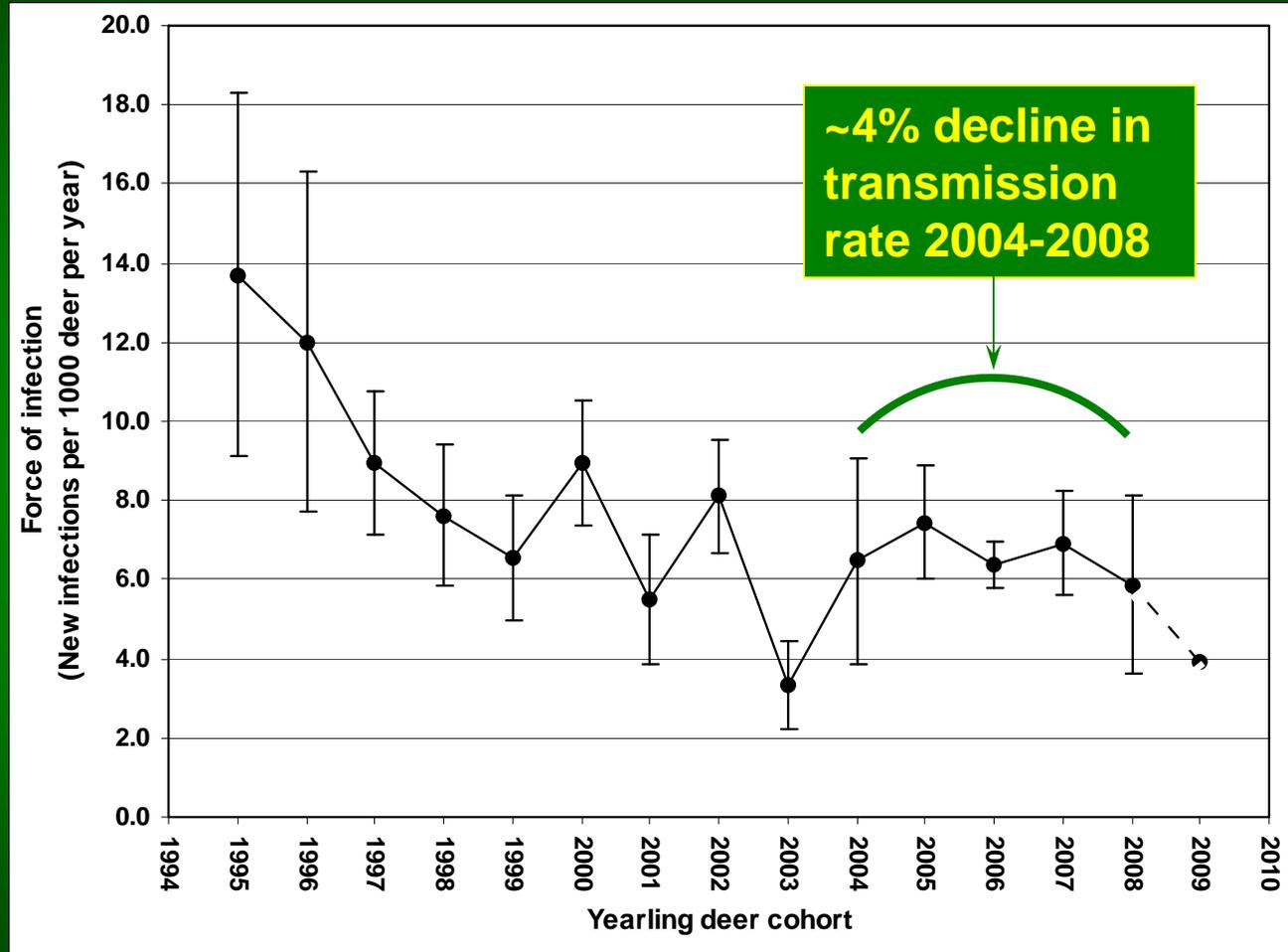
Note: The 2009 data are for yearlings only. Yearlings are at reduced risk of infection vs. older deer, so this point is not directly comparable to the other cohorts.

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TB transmission

(New infections per 1000 deer per year)

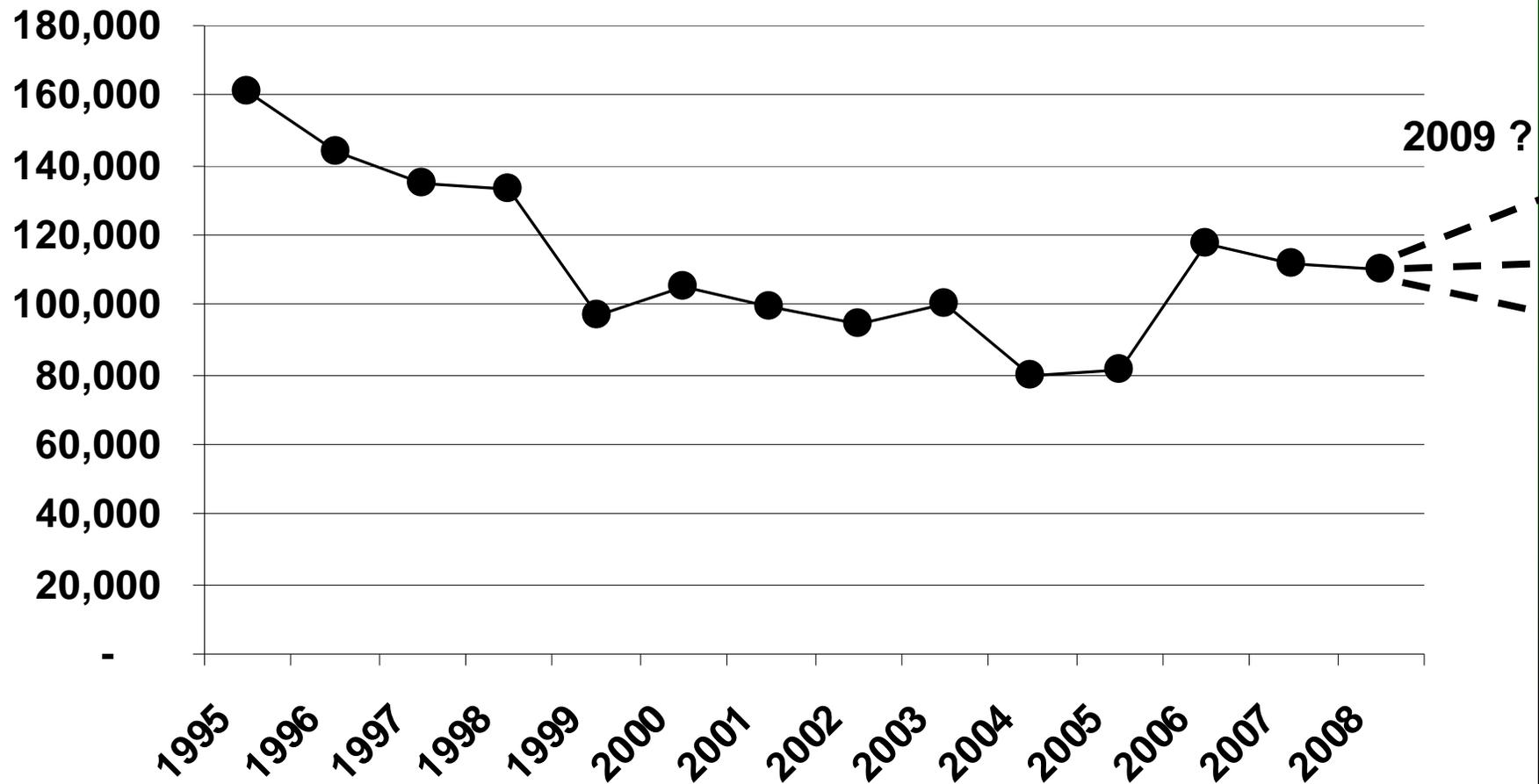
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Deer Population Estimates

1995-2008, 5-County Area



Baiting and Feeding Regulations

Legend

 **Baiting and Recreational Feeding Allowed**

No more than two (2) gallons per any one hunting site -or- per residence at any one time.
(the entire Upper Peninsula)

 **Supplemental Feeding Area**
By Permit Only.

 **Baiting and Feeding Ban Area**
(the entire Lower Peninsula)

 County Line

0 20 40 Miles

0 20 40 Kilometers

Rev.
08/26/2008
-MLS



Continued development of tools to help manage Bovine TB



Effective TB Vaccination



TB Blood Test



TB Disease Model



www.michigan.gov/bovinetb
www.michigan.gov/emergingdiseases
www.michigan.gov/dnr
www.michigan.gov/mda
