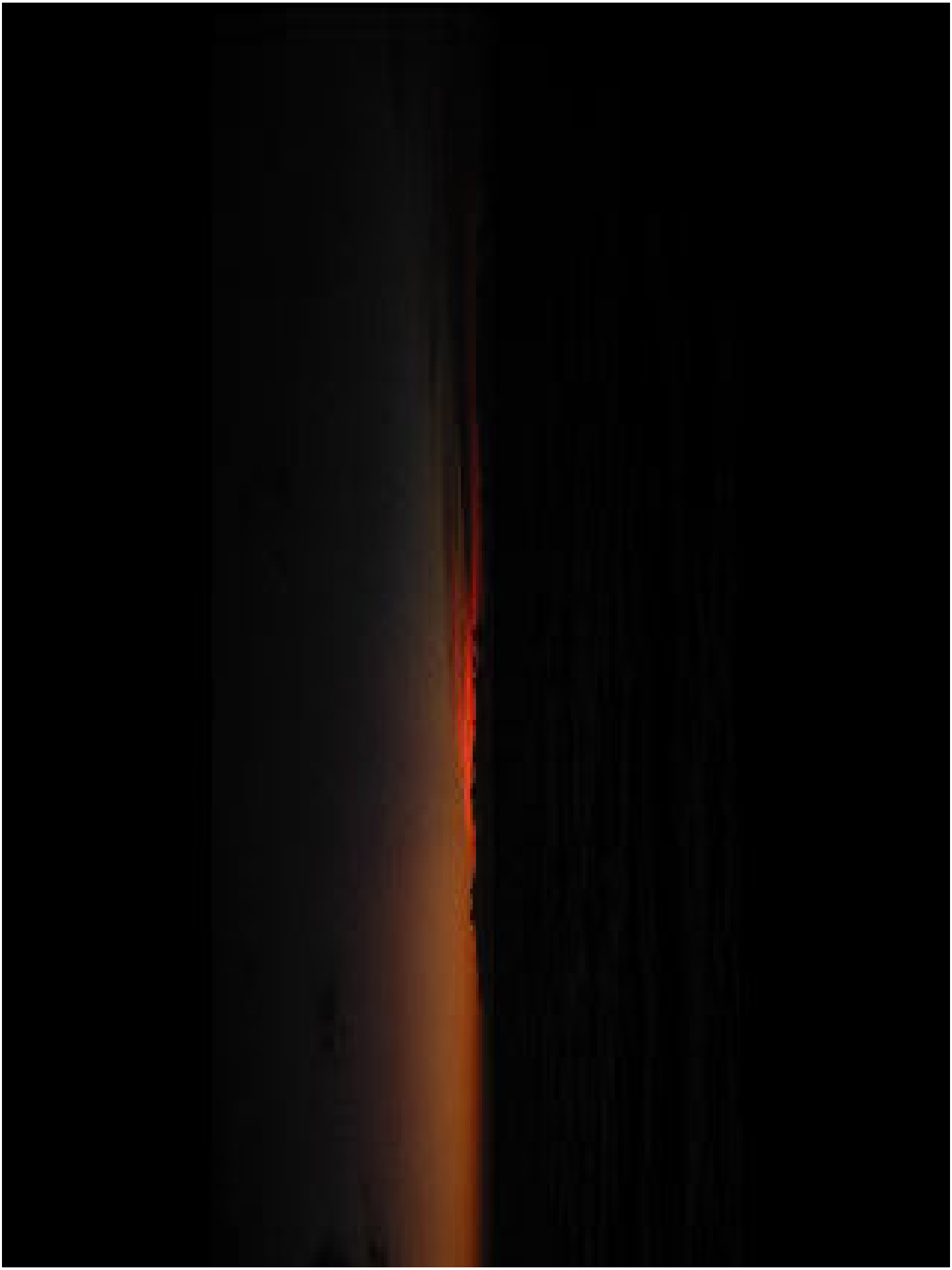


NC STATE UNIVERSITY

Emerging Diseases: A Continuing Experiment in Changing Natural Resources and Educating Public Opinion

Suzanne Kennedy-Stoskopf, DVM, PhD, DACZM

College of Veterinary Medicine

Department of Population Health and Pathobiology

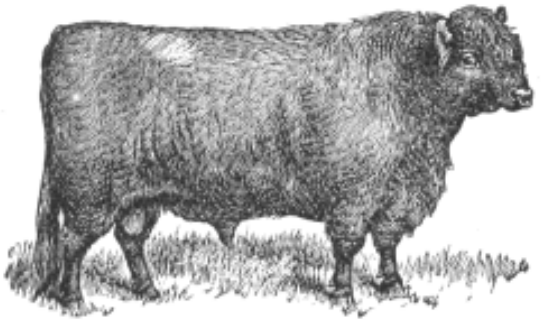
Canis lupus

Wildlife Science Center

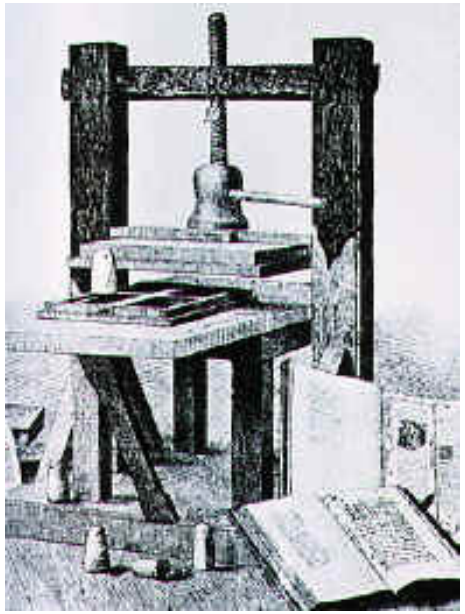
Canis lupus

- Extirpated from England, 1485-1509
- Pilgrims imposed bounties, 1630
- Virginia colonies, 1632
- North Carolina, 1748

Human-Wildlife-Livestock Interactions



Book Bindings



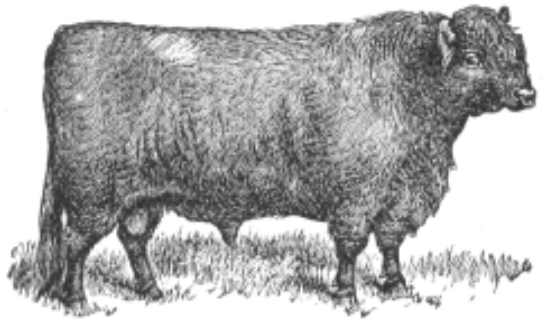
1501

1000 printing shops

35,000 titles

1 million copies

Human-Wildlife-Livestock Interactions



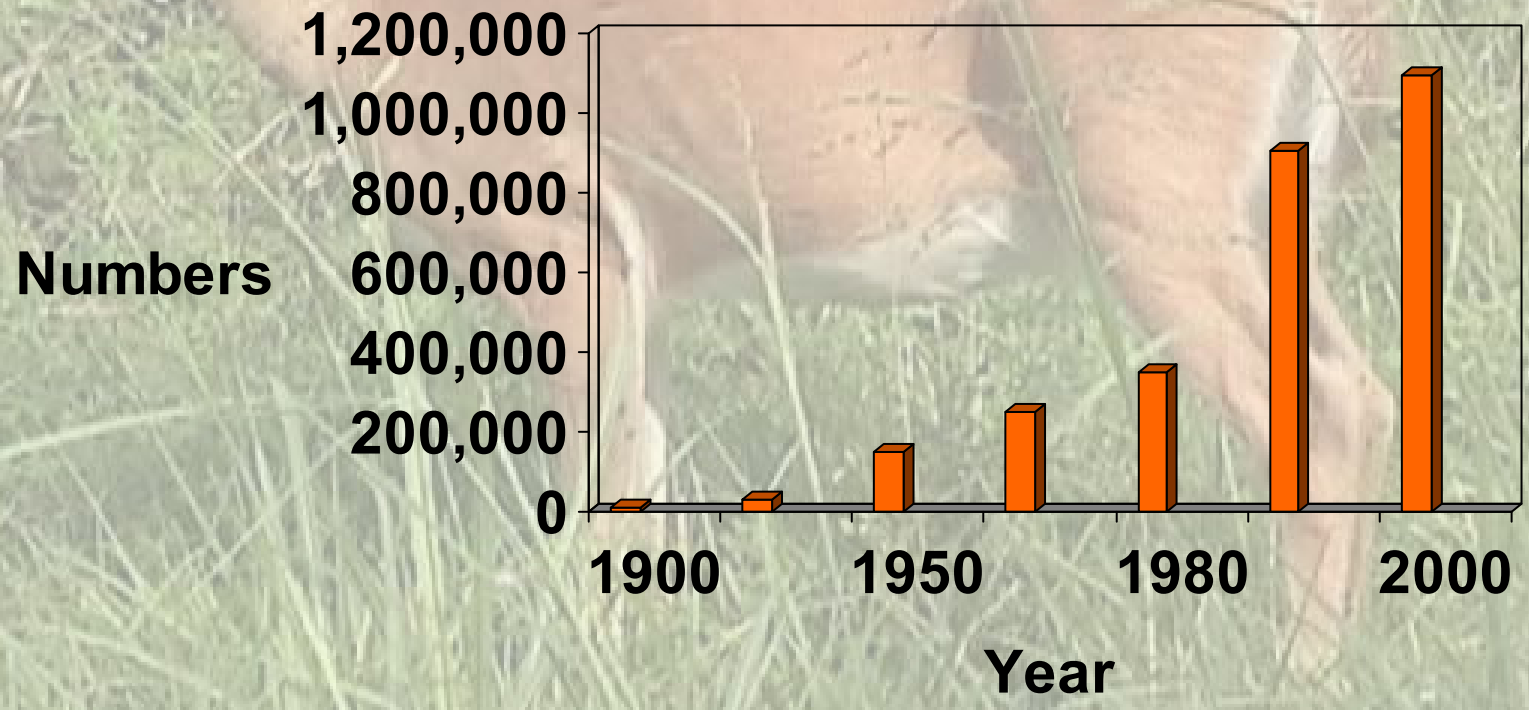
Wolves as Nuisance

- 1748 – Bounty on wolves
- 1784 – Fine for leaving deer carcass in the woods
- Early 1900's – Wolves essentially extirpated

Deer Populations

- 1500-1800: Lost 35-50% of population
- 1800-1865: Rebound
- 1865-1900: Exploitation
- 1890: 300,000 deer remaining

White-Tailed Deer Populations in North Carolina

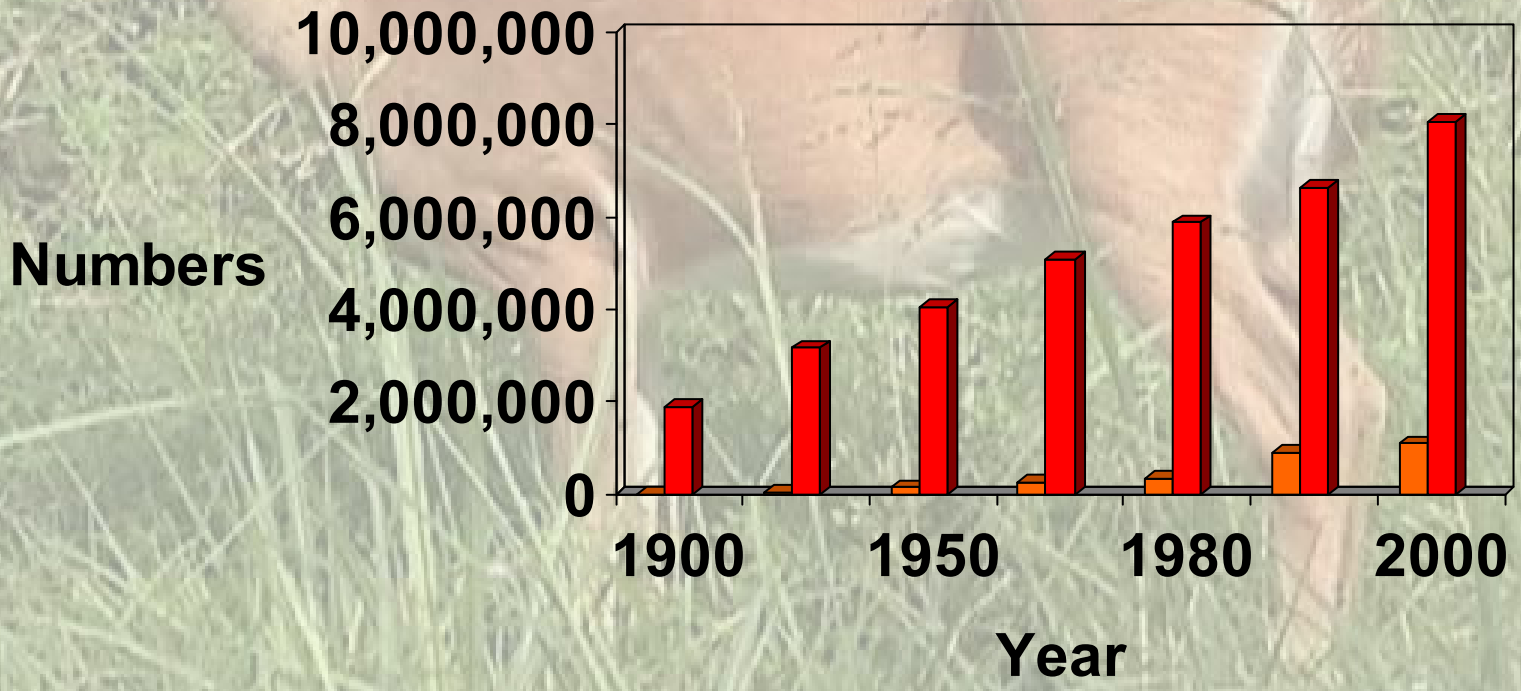


Increasing Deer Population

U.S. Fish and Wildlife

- US Forest Service purchased land
- Federal Aid in Wildlife Restoration Act of 1937
- NC restocked in 1945

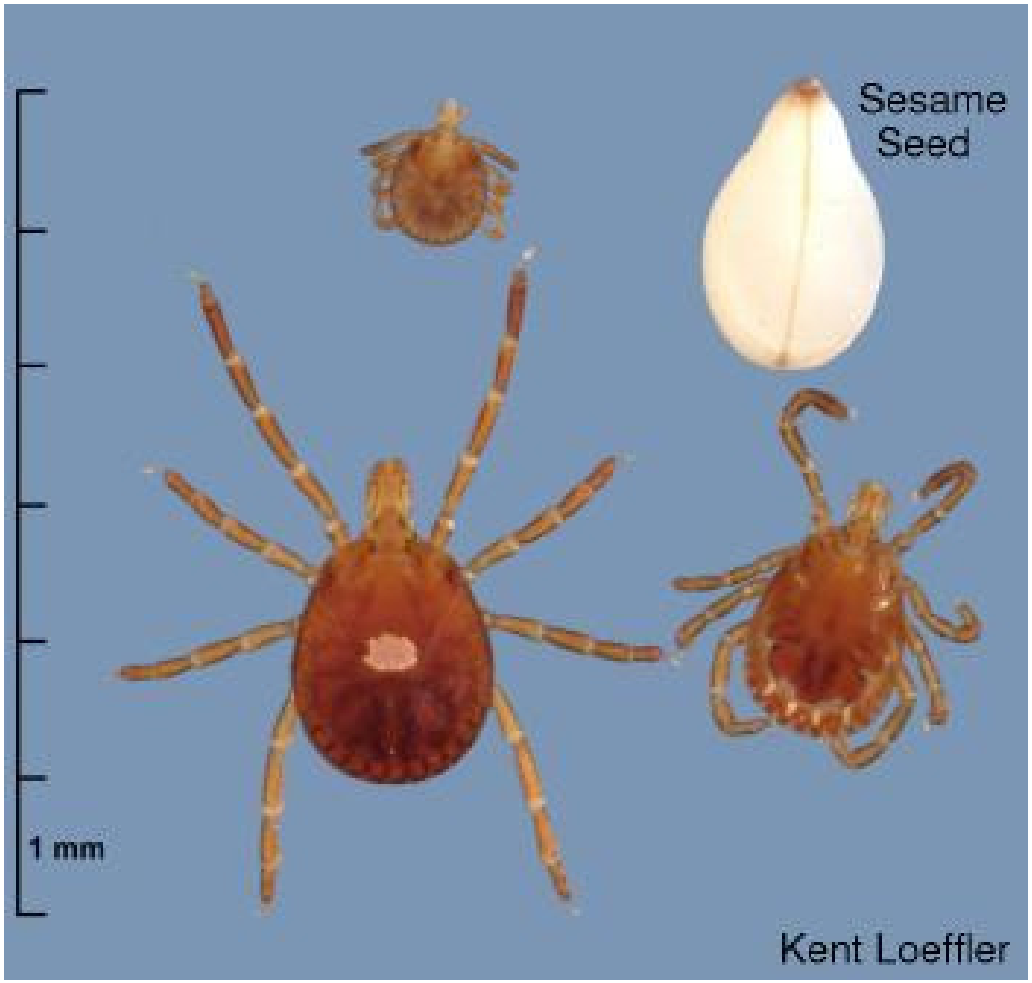
White-Tailed Deer and Human Populations in North Carolina



Human-Wildlife Interactions

Childs JE, Paddock CD. 2003.
Ann. Rev. Entomol. 48: 307-37.

Amblyomma americanum



Lone Star Tick Distribution

Tick Density

Amblyomma americanum

- Bite is highly irritating
- Increasing recognition as a vector
  - *Francisella tularensis*
  - *Ehrlichia chaffeensis* – HME – 1987
  - *Borrelia lonestari* – STARI ?

Lyme Disease in NC?

- *Borrelia burgdorferi*
- *Ixodes scapularis*
- Both vector and agent present
  - Ryan JR , et al. J Wildl Dis 36(1), 2000
- *B. burgdorferi* not isolated from humans
  - Kirkland KB, et al. Arch Internal Med 157, 1997

Dogs as a Sentinel for *Borrelia burgdorferi*

C6 ELISA (IDEXX 3DX)

Aug, 2001-Dec, 2003

987 Total Samples

RESULTS

983 C6 Peptide Neg.

4 C6 Peptide Positive

2 Lived In NE

2 Hunted In NE

Borrelia burgdorferi C6 ELISA

	Sample Number	**Seroreactivity** (%+)
North Carolina	987	0.4
Virginia	472	8.7
Maryland	167	14.4
Pennsylvania	40	25.0

Duncan A, Breitschwerdt E: Vector Borne and Zoonotic Dis, 2004

Borrelia lonestari

- Southern tick-associated rash illness (STARI)

Case History

- 9/6/2003 – multiple pruritic lesions
- 9/10/2003 – removed a tick from abdomen
- 9/19/2003 – rash noted; started doxycycline
- 9/26/2003 – headaches, lethargy, some neck rigidity, dry cough

Lab Results

- Negative for *Borrelia burgdorferi*
- Positive for Rocky Mountain Spotted Fever
  - African tick fever, 1997

INTRACELLULAR PATHOGENS RESEARCH LABORATORY

Bartonella?

- Gram negative, short, pleomorphic rods
- Fastidious
- Hemotropic and endotheliotropic
- Transmission
  - Vector-borne
  - Scratches and bites
- Numerous hosts

CAT SCRATCH DISEASE
(*Bartonella henselae*)

INOCULATION PAPULE **LYMPHADENOPATHY**

Bartonella henselae

- Seronegative
- PCR positive

POLYMICROBIAL INFECTIONS

- More frequent than currently recognized
- Diagnostic testing should address a spectrum of vector-borne pathogens
- Variations in typical disease manifestations may be due to co-infection
- Incomplete treatment responses - look for another pathogen or another disease

Ascendancy of *A. americanum*

Educating Public Opinion

Educating Public Opinion

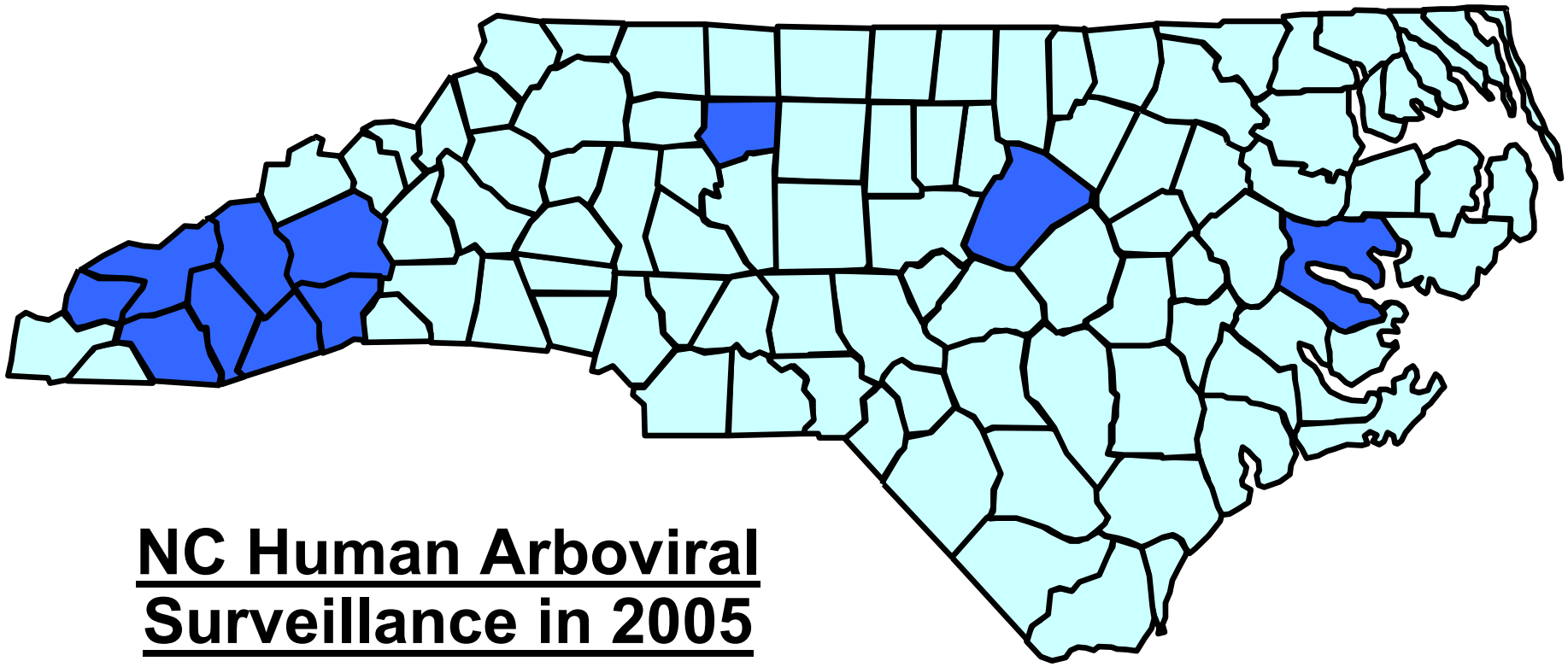
Educating Public Opinion

Public Health Education

- Tick and Mosquito Borne Illness Awareness Week – May 21-27, 2006
  - 625 cases RMSF in NC, 2005
  - End of April 2006, 225 cases RMSF

Public Health Education

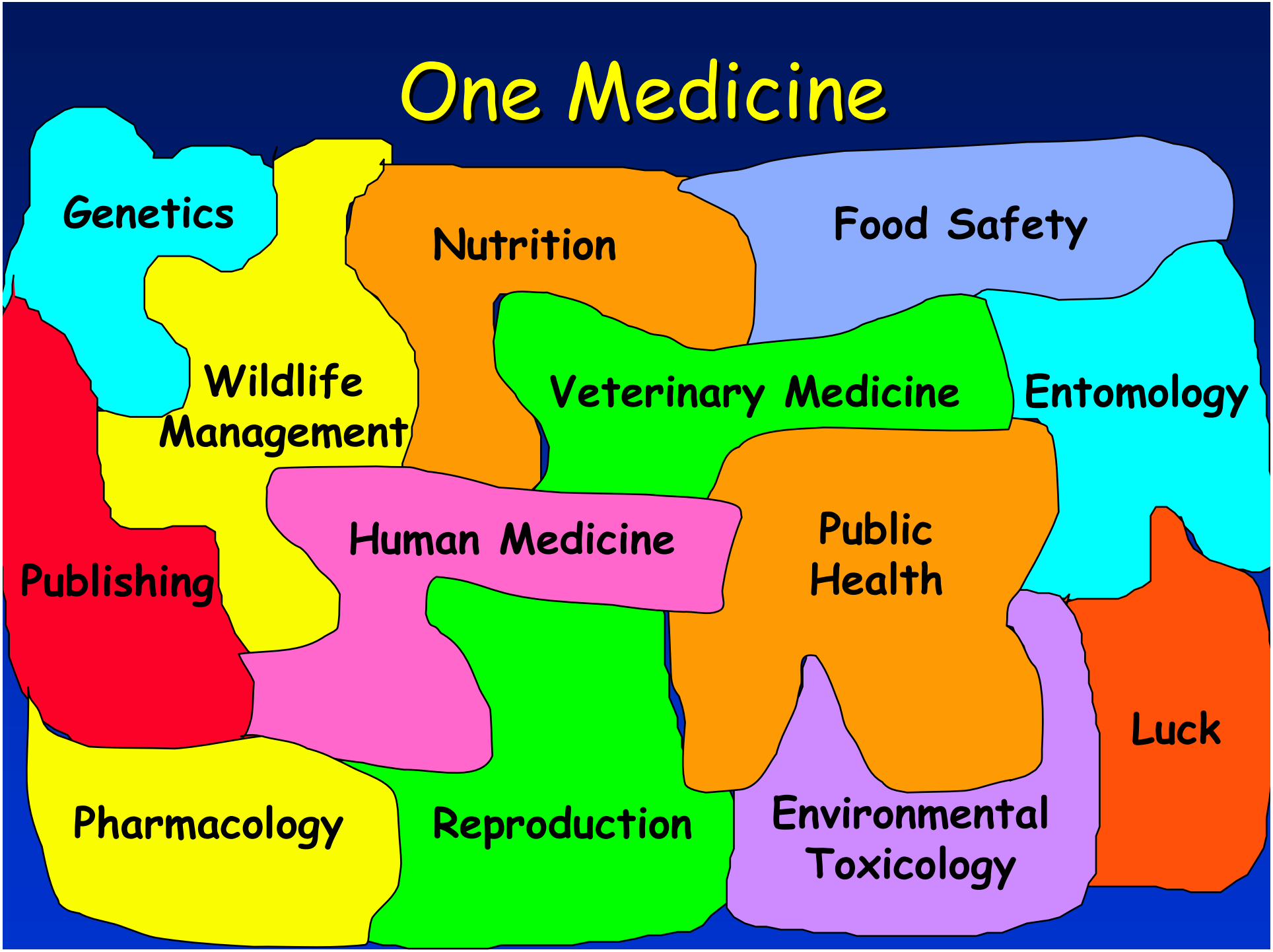
- Tick and Mosquito Borne Illness Awareness Week – May 21-27, 2006
  - LaCrosse Virus Encephalitis
  - 32 of 70 cases in 2005
  - 7 cases in 2000
  - 8 cases in 2006



NC Human Arboviral Surveillance in 2005

-LaCrosse Pos Human Cases

Aedes triseriatus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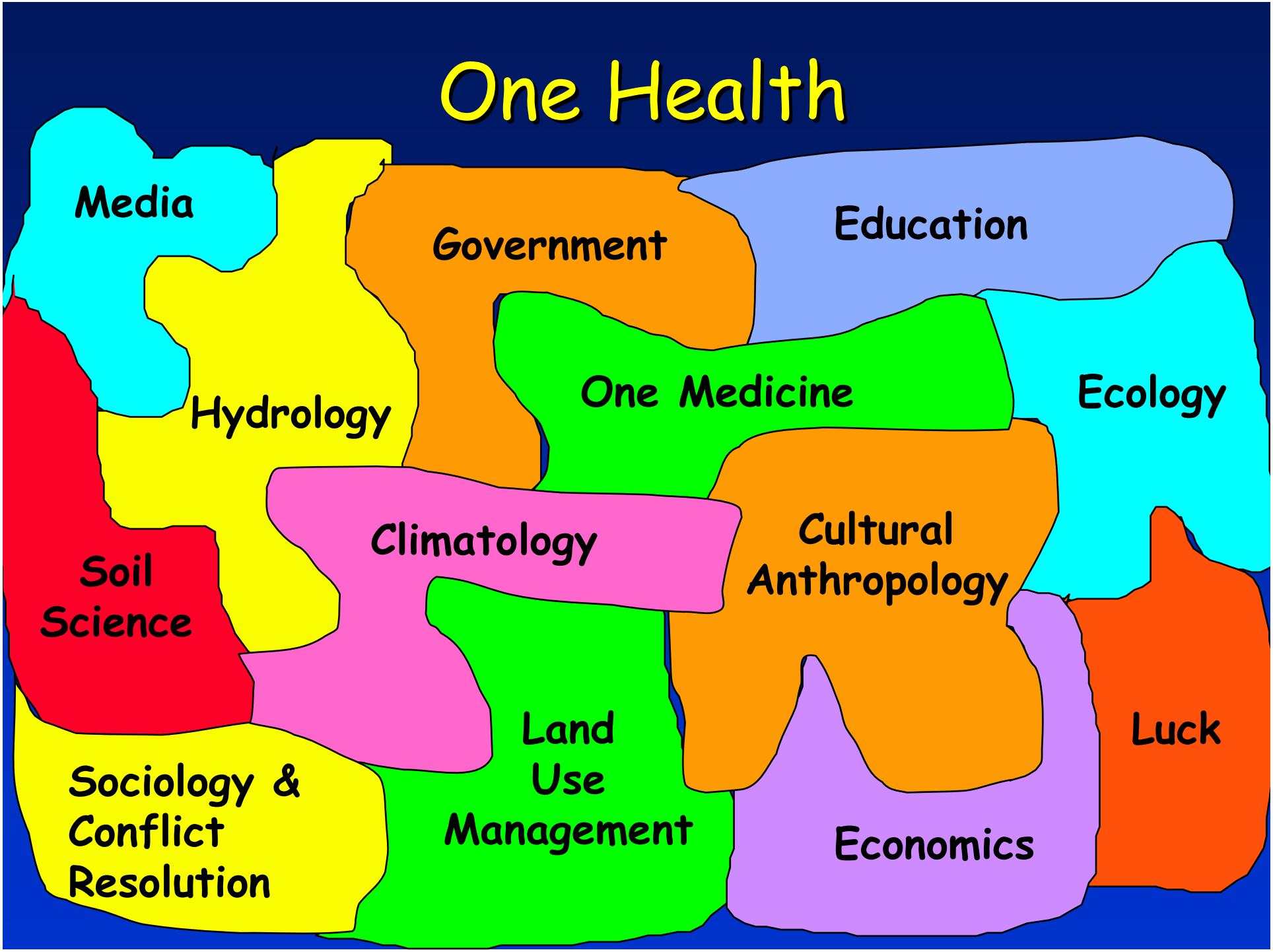
Luck
Pharmacology
Reproduction
Environmental Toxicology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Soil Science
Land Use Management
Luck
Sociology & Conflict Resolution
Economics

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