





CHRONIC WASTING DISEASE

**“ONLY IMMEDIATE ACTION WILL AVOID
CATASTROPHIC OUTCOMES,”** *Geist et al. (2017)*



We Have A Big Problem

**It Will Not Solve Itself.
Untreated -- It Only Gets Worse.**

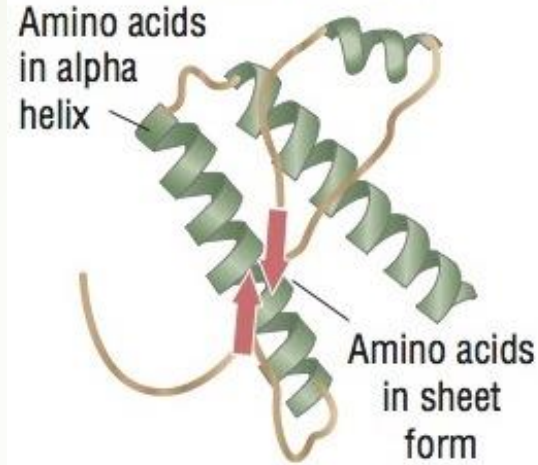


PrP = Protease Resistant Protein

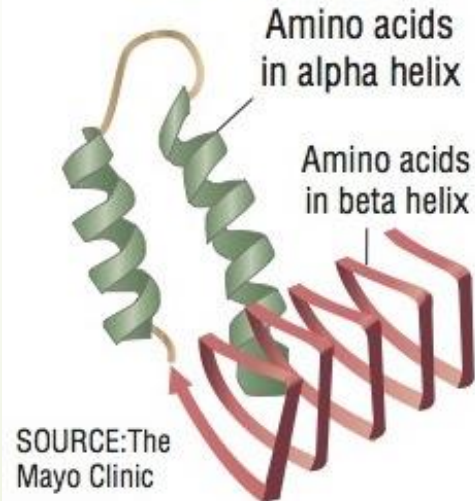
The culprit

Misfolded proteins called prions cause chronic wasting disease, a killer of deer and elk.

NORMAL PRION



DISEASED PRION



SOURCE: The Mayo Clinic

Arkansas Democrat-Gazette

Transmissible Spongiform Encephalopathy (TSE)

Misfolded Protein

Seeding - Replication

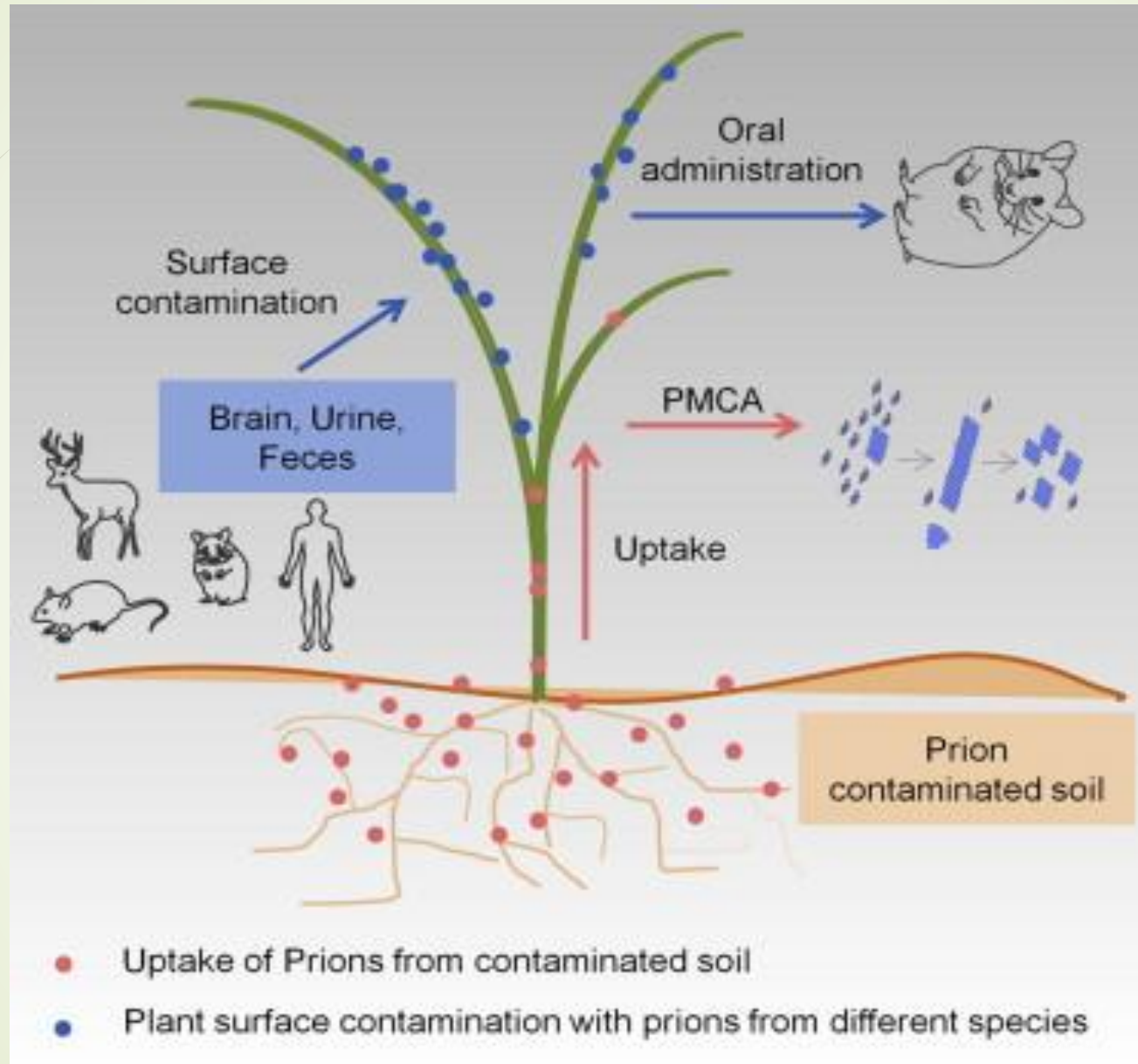
Characteristics of CWD

- **CWD is Always Fatal**
- **No Pharmaceutical Treatments Exist (No effective vaccine exists)**
- **CWD -- A New Disease Originating in the Early 1960's**

Deer Contract CWD Two Different Ways

- **Animal to Animal Transmission**
- **Environment to Animal Transition**

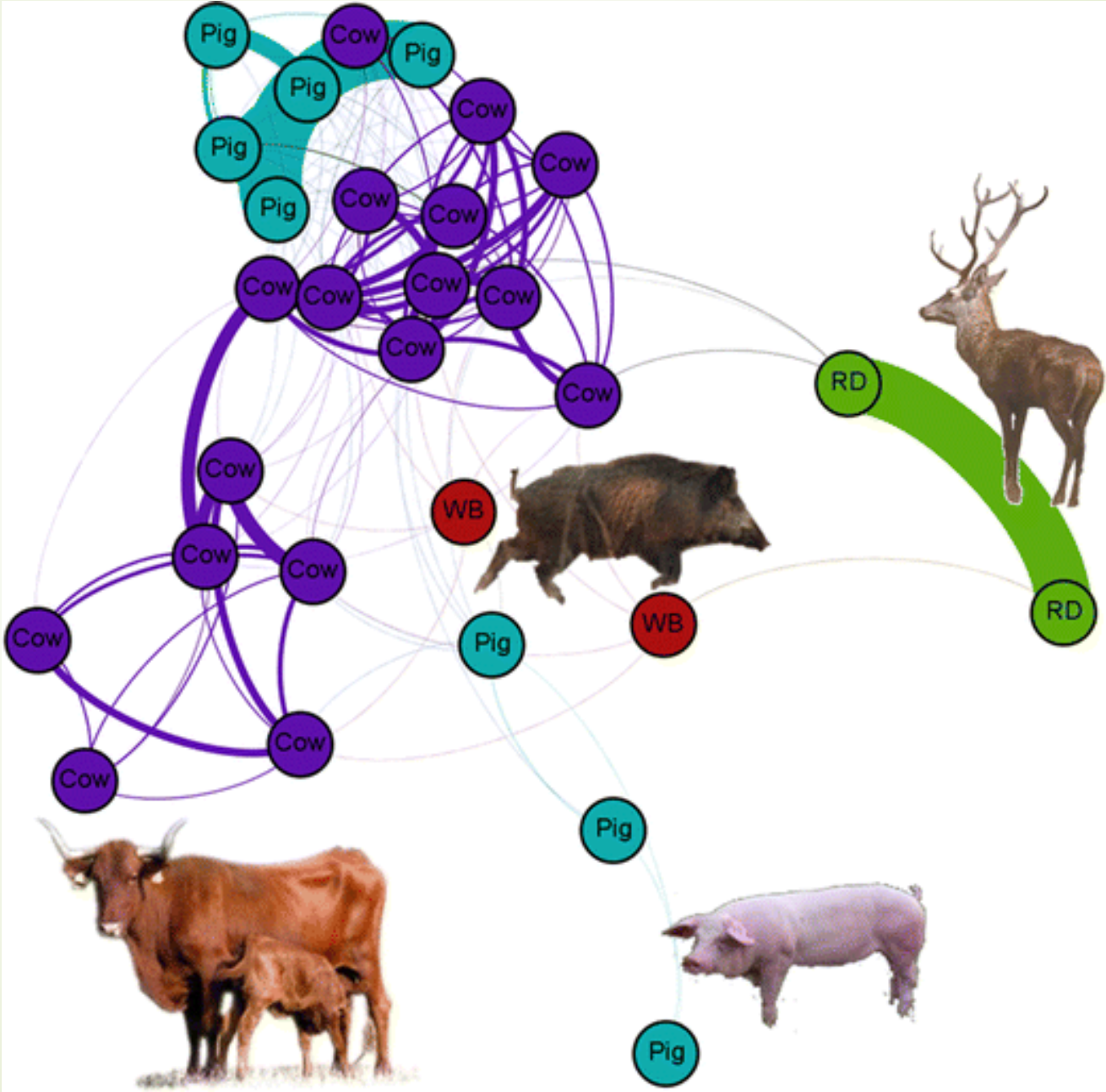
Plants Uptake Prions & Are Infectious



**Grass Plants Bind,
Retain, Uptake, and
Transport
Infectious Prions**

**Pritzkow et al.
2015**

SPECIES BARRIERS & WILDLIFE RESERVOIRS



“No Strong Evidence

- CWD is Always Fatal**
- No Pharmaceutical Treatments Exist (No effective vaccine exists)**
- CWD -- A New Disease Originating in the Early 1960's**

Deer Contract CWD Two Different Ways

- Animal to Animal Transmission**
- Environment to Animal Transition**

Infected Wild Deer, Bedford County - 2016

**SHAKERS
&
DROOLERS**





PRION DISEASES

HISTORY OF LEAPING SPECIES BARRIERS

Mad Cow, Mink, Cats, Rodents...

ENVIRONMENTAL CONTAMINATION
WILL ADD RISK

Other Prion Diseases

Other: Transmissible Spongiform Encephalopathies (TSE)

In humans:

Kuru

Fatal Familial insomnia

Creutzfeldt-Jakob Disease (CJD)

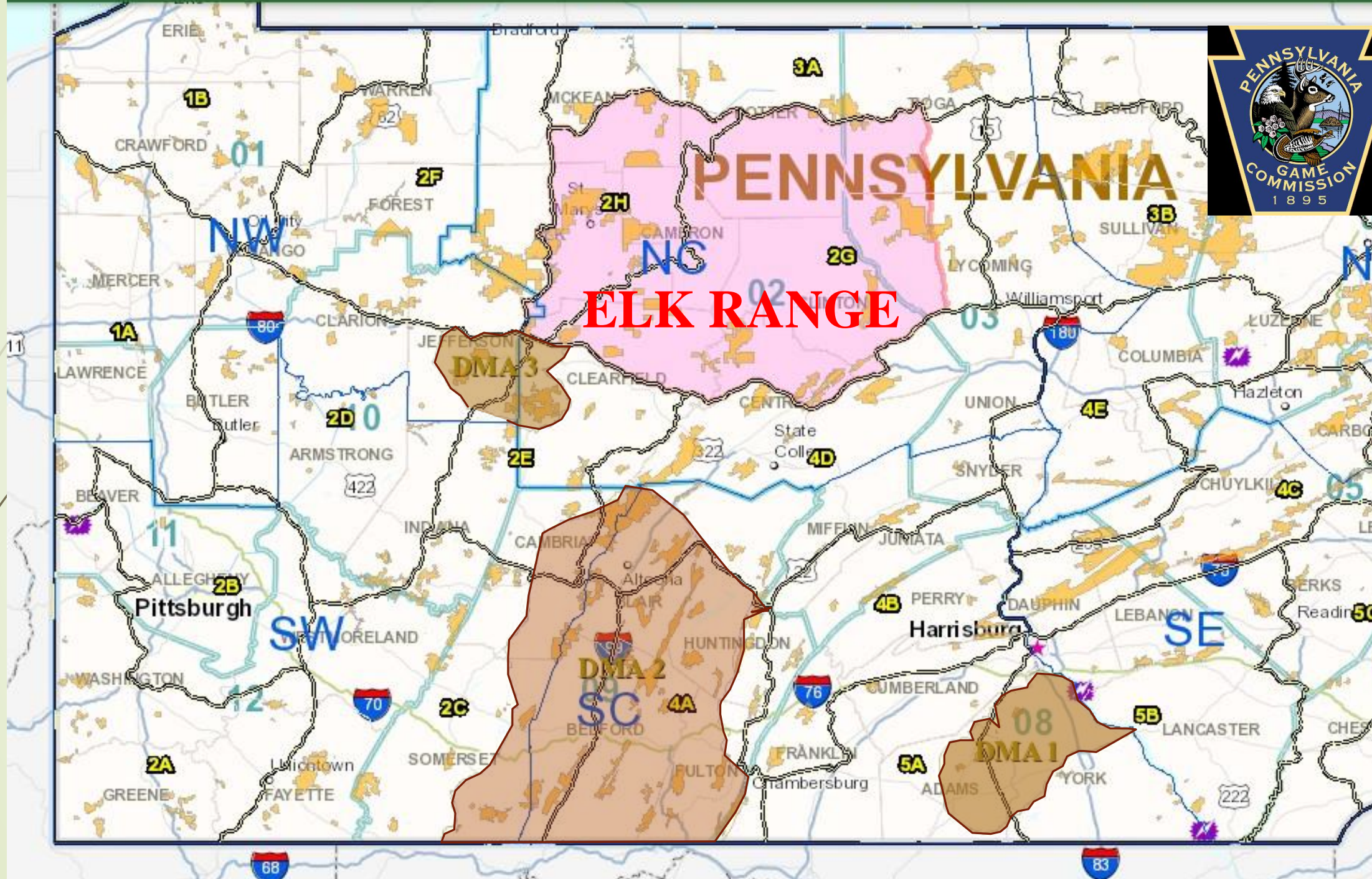
Gerstmann-Straussler-Scheinker Disease (GSS)

The largest TSE outbreaks though have occurred in domestic or captive animals:

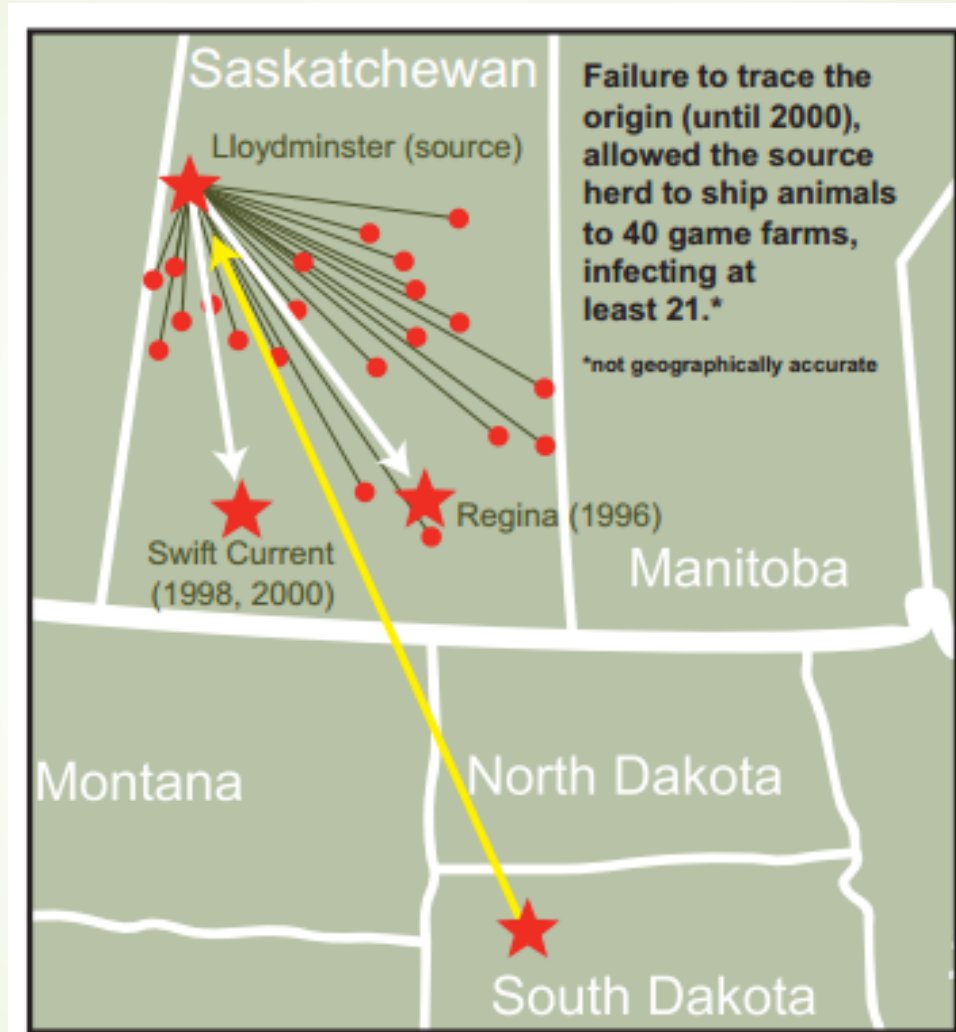
- **In cattle, Bovine Spongiform Encephalopathy (BSE)**
- **In sheep and goats, Scrapie**
- **In mink, Transmissible Mink Encephalopathy (TME)**

History of CWD

- **First Recognized As A Disease In 1967 In Captive Mule Deer At A Wildlife Research Facility In Fort Collins, CO.**
- **First Recognized As A TSE In 1978**
- **First Detected In Wild Elk In CO In 1981**
- **First Detected In Wild Mule Deer In CO In 1985**
- **First Positive Case In PA Discovered On A Fully Certified Captive Deer Farm In Adams County, 2012. Disease Management Area (DMA) 1 Was Created**
- **Two Months Later, Three Hunter-harvested Deer Tested Positive, Two From Blair County And One From Bedford County. DMA 2 Was Created**
- **In 2014, A Captive Deer On A Farm In Jefferson County Tested Positive. DMA 3 Was Created**
- **2017 - New Case Captive Cervid Facilities In Bedford, Franklin And Fulton Counties**
- **2017 – DMA 2 Will Be Expanded**



ALL CWD CANADA TRACED BACK TO MOVEMENT OF A SINGLE ELK

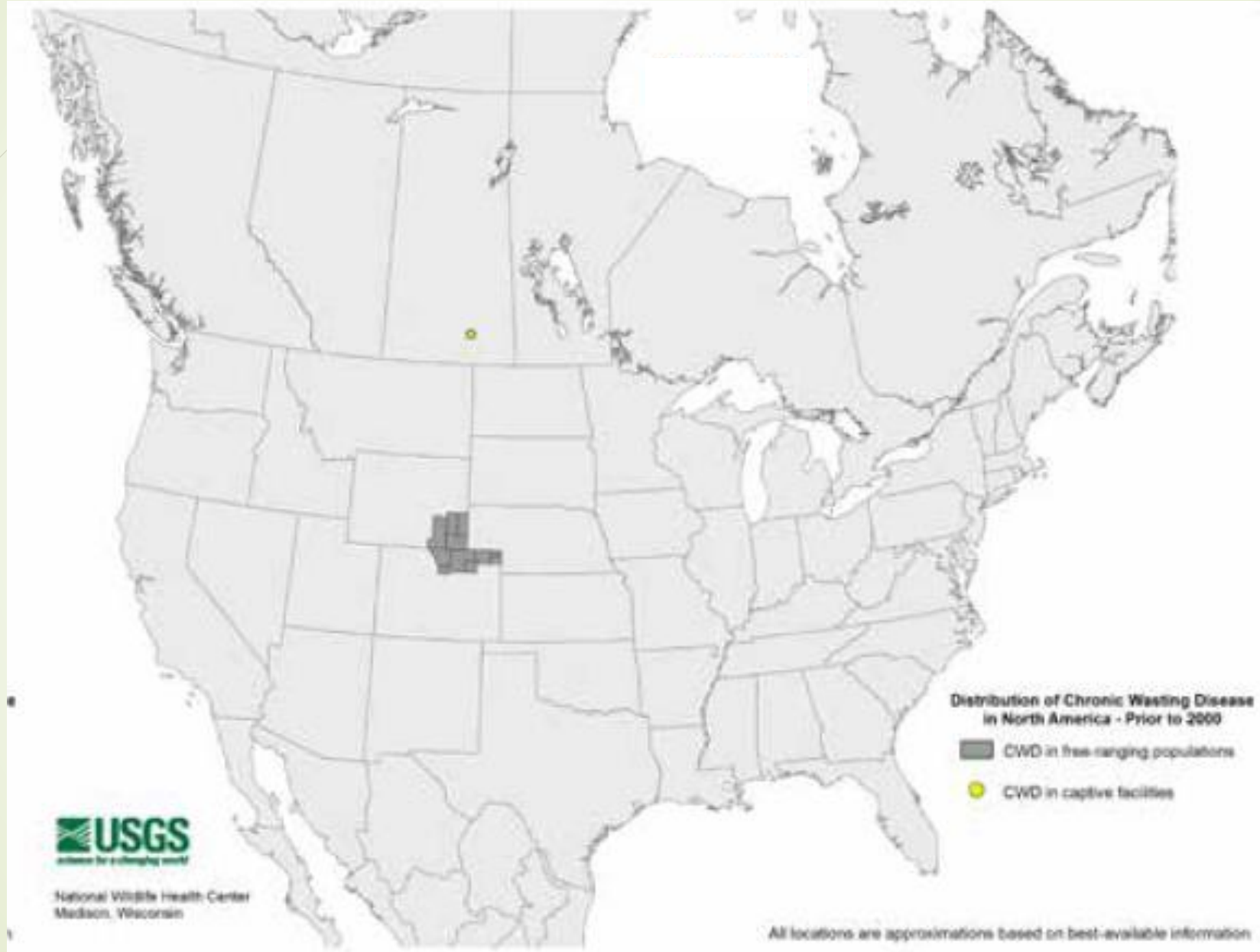


The Expert Scientific Panel traced Canada's CWD to game farm animals imported from South Dakota. It then spread to wildlife, including mule deer, white tailed deer, elk, and moose.

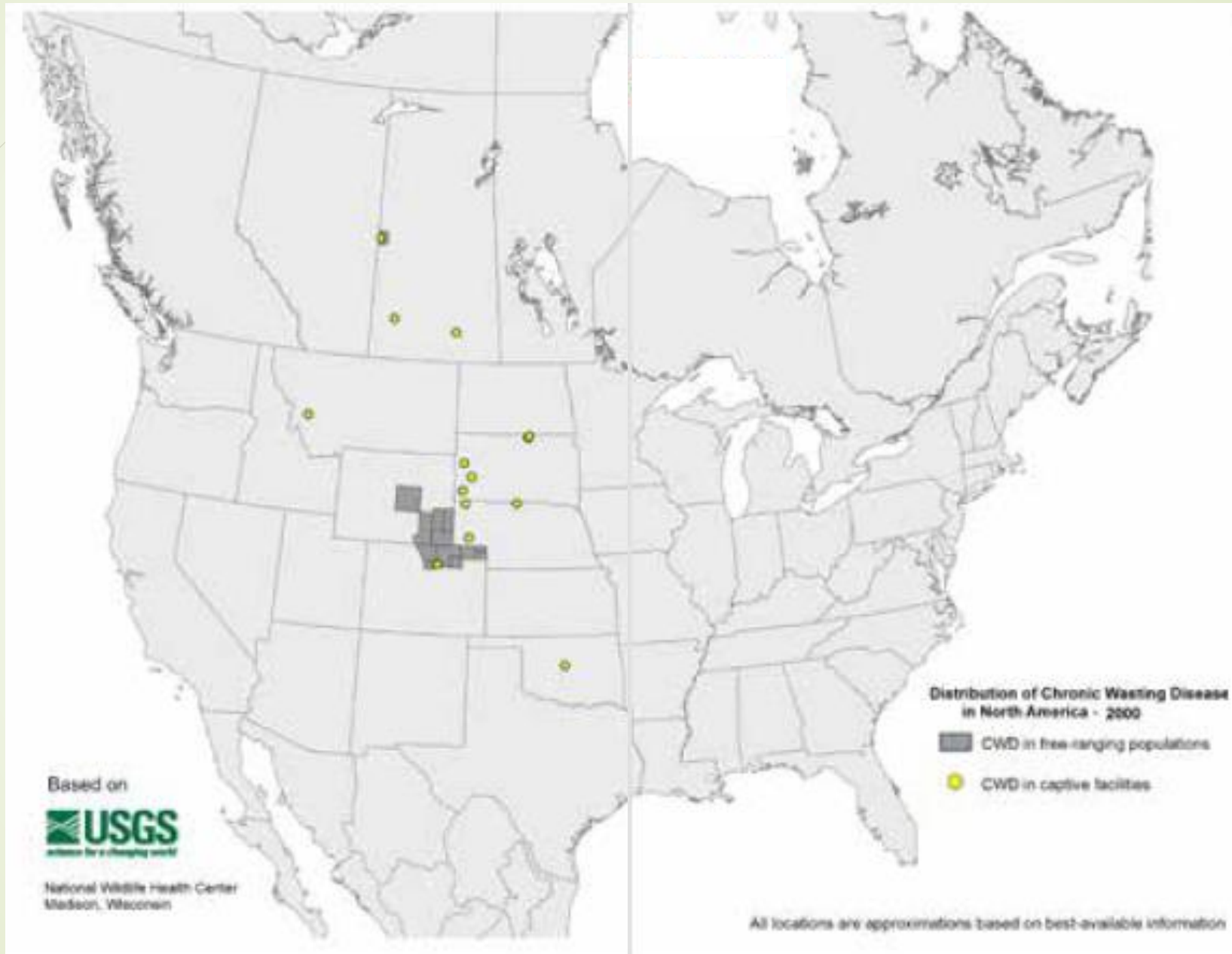
CWD MAP -- 1967



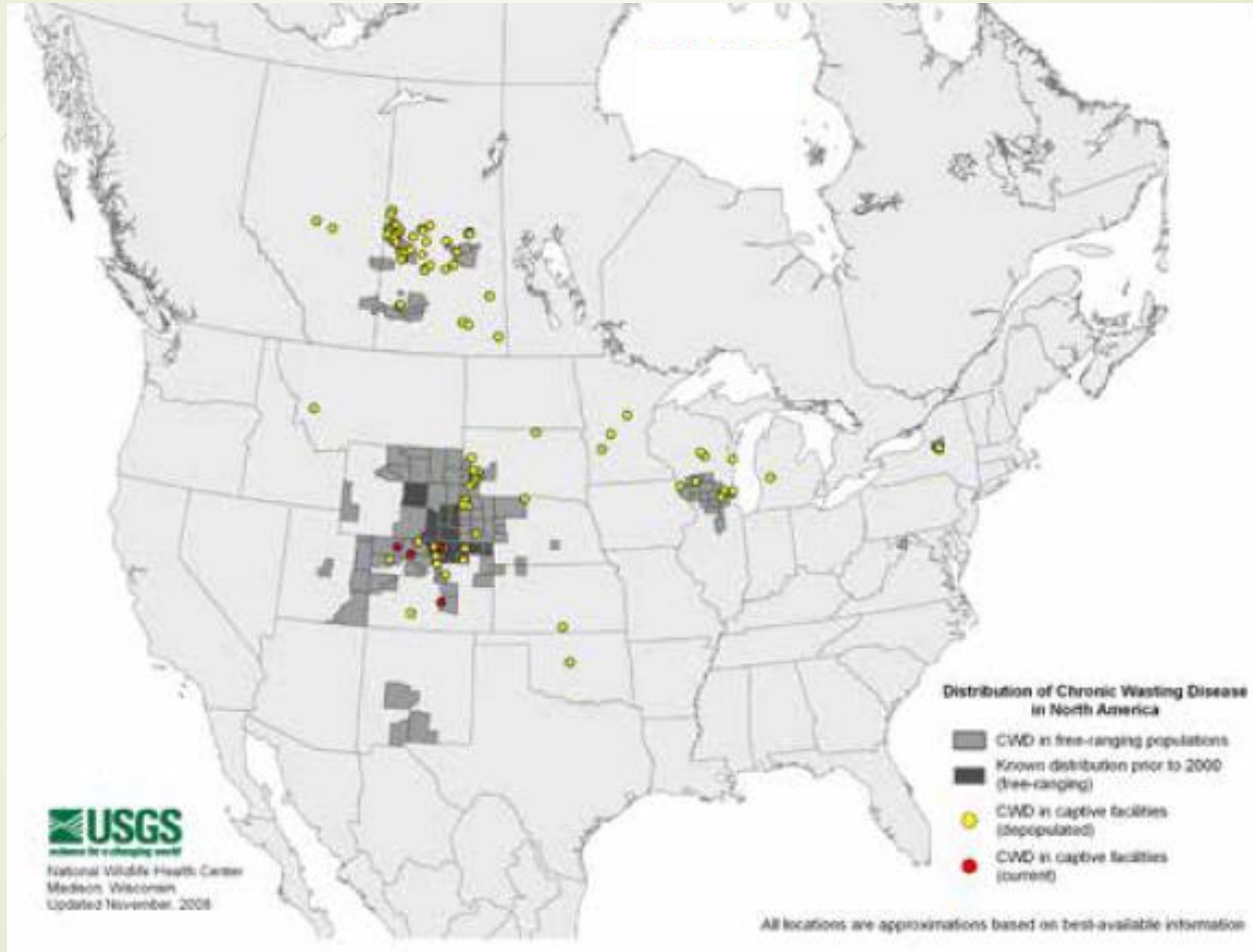
CWD MAP -- 1996



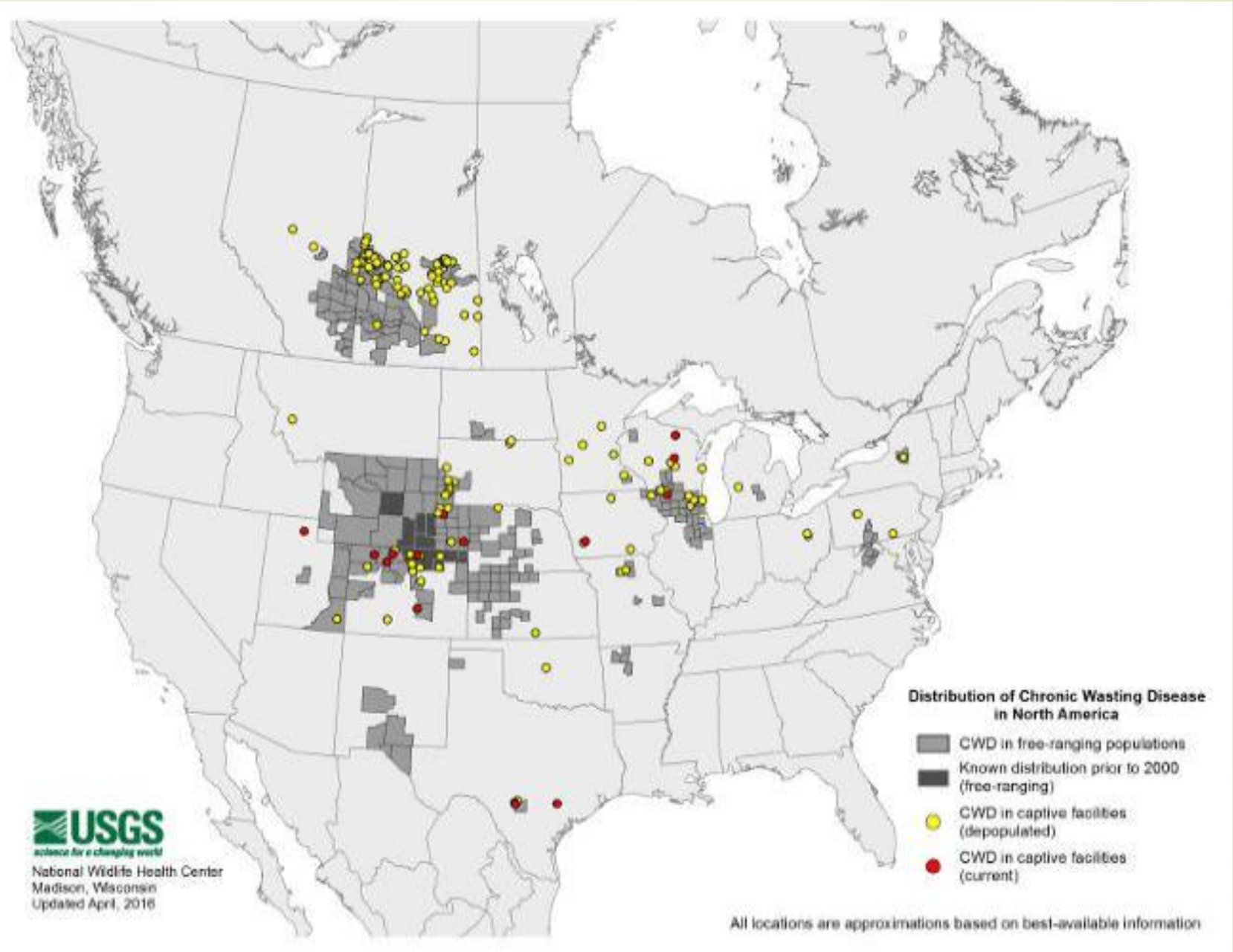
CWD MAP -- 2000



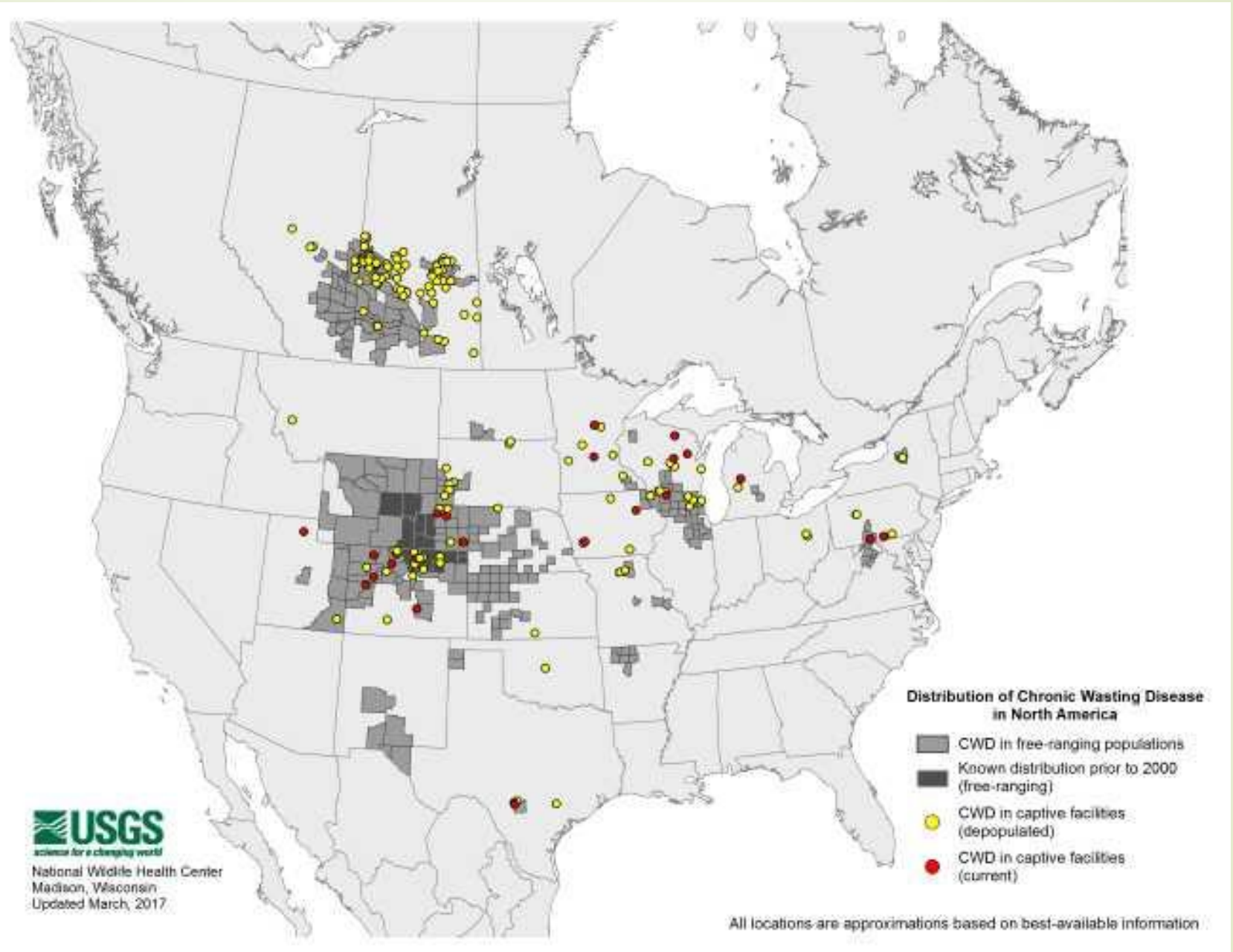
CWD MAP -- 2008



CWD MAP -- 2016



CWD MAP -- 2017



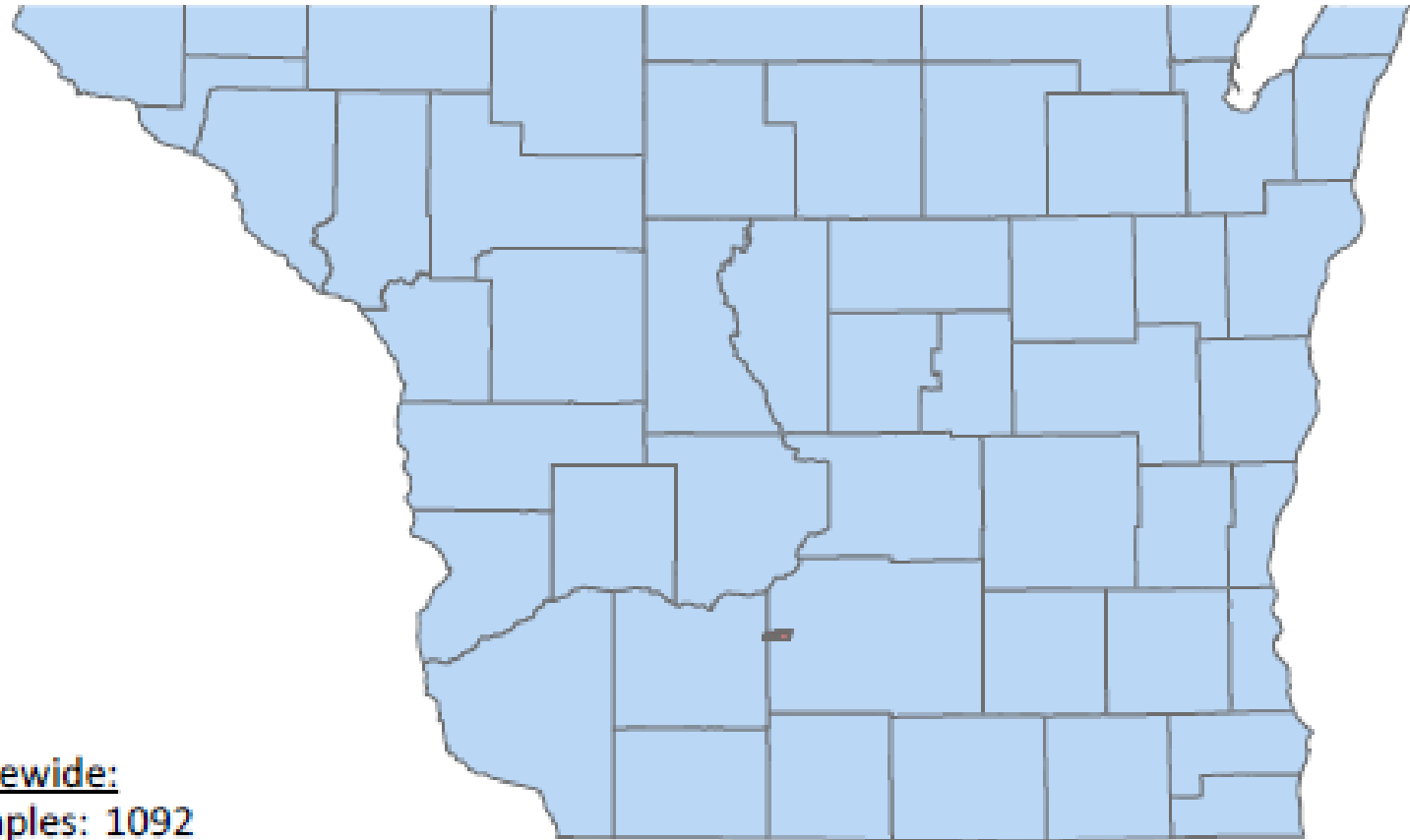


CWD RIDES IN THE BACK OF A TRUCK

- * TRANSPORTATION OF WILD DEER & ELK**
- * TRANSPORTATION OF WHOLE CARCASSES
(HIGH RISK PARTS)**

WISCONSIN

2001 Positive Samples



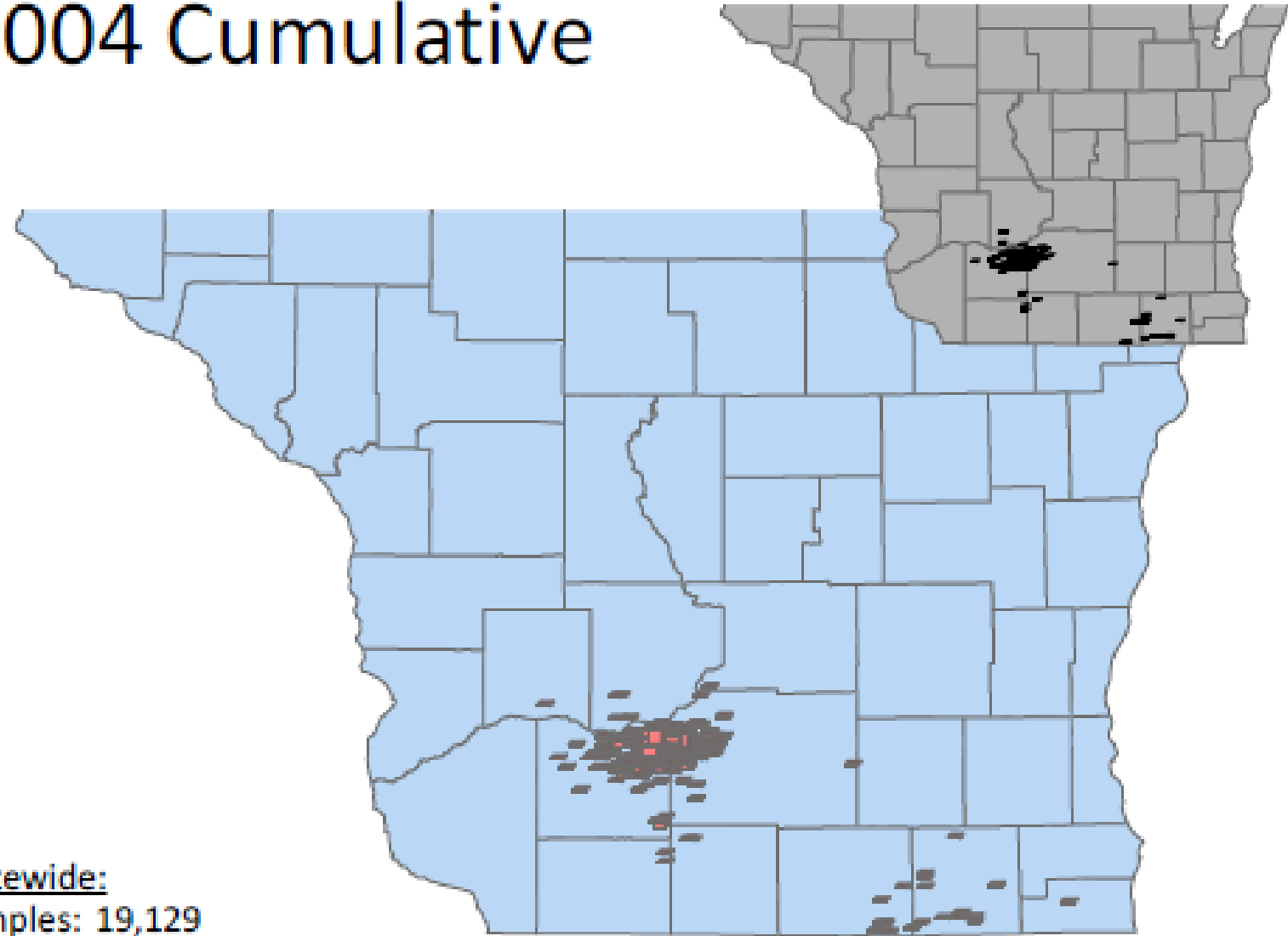
Statewide:
Samples: 1092
Positive: 3

Data: Wisconsin Department of Natural Resources

WISCONSIN

2004 Cumulative

2004 Positive Samples



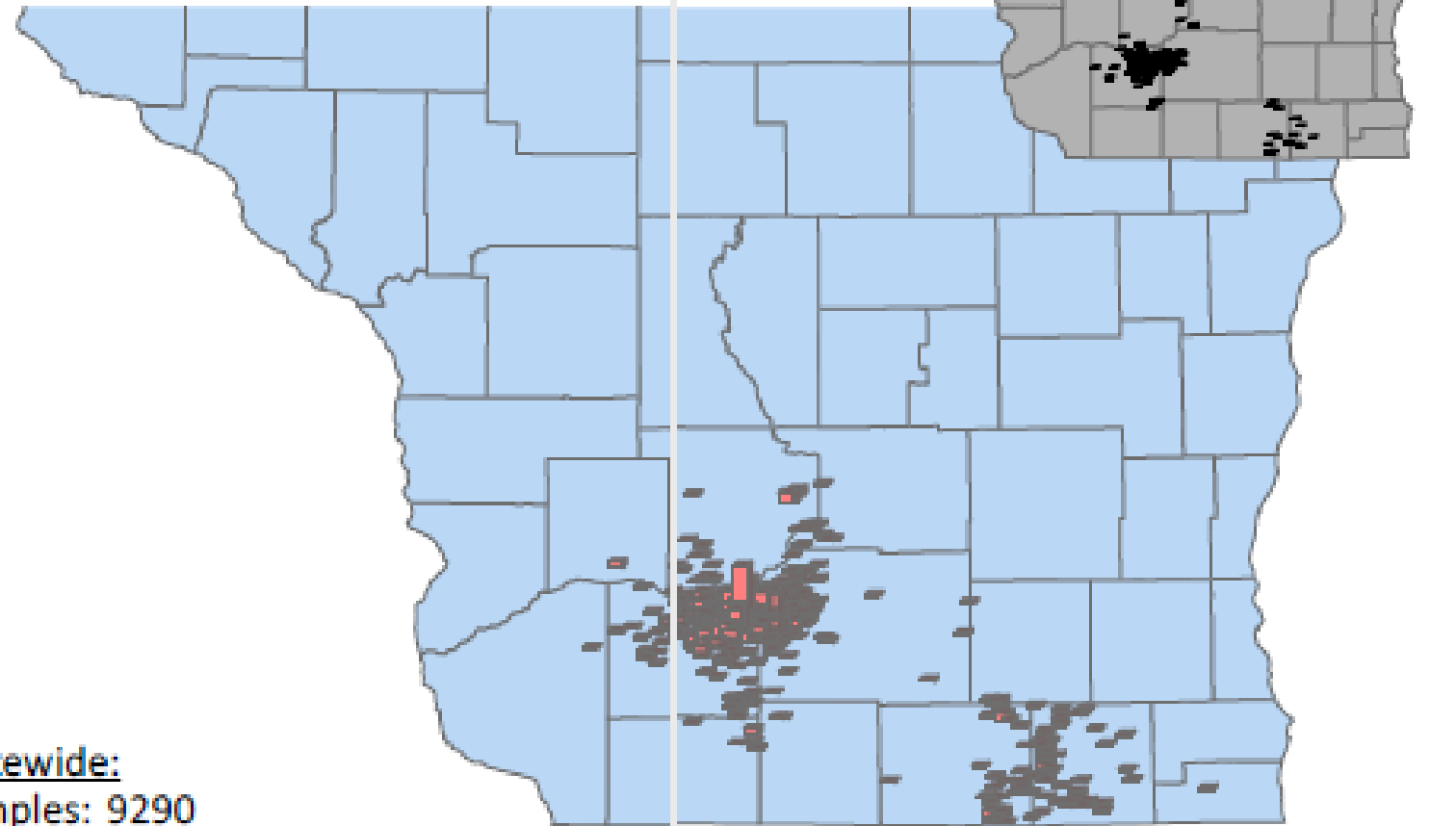
Statewide:
Samples: 19,129
Positive: 145

Data: Wisconsin Department of Natural Resources

WISCONSIN

2007 Cumulative

2007 Positive Samples



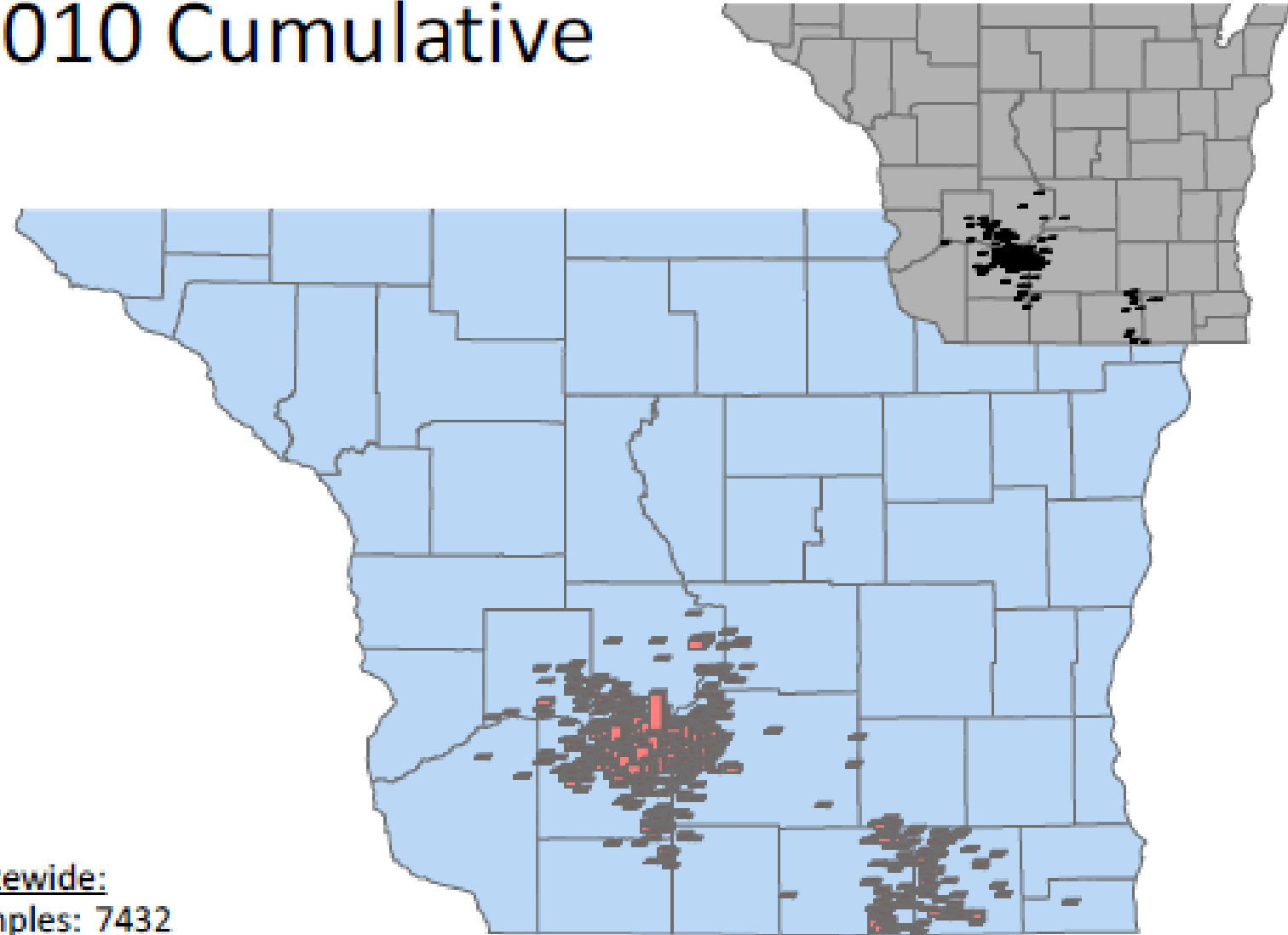
Statewide:
Samples: 9290
Positive: 135

Data: Wisconsin Department of Natural Resources

WISCONSIN

2010 Cumulative

2010 Positive Samples



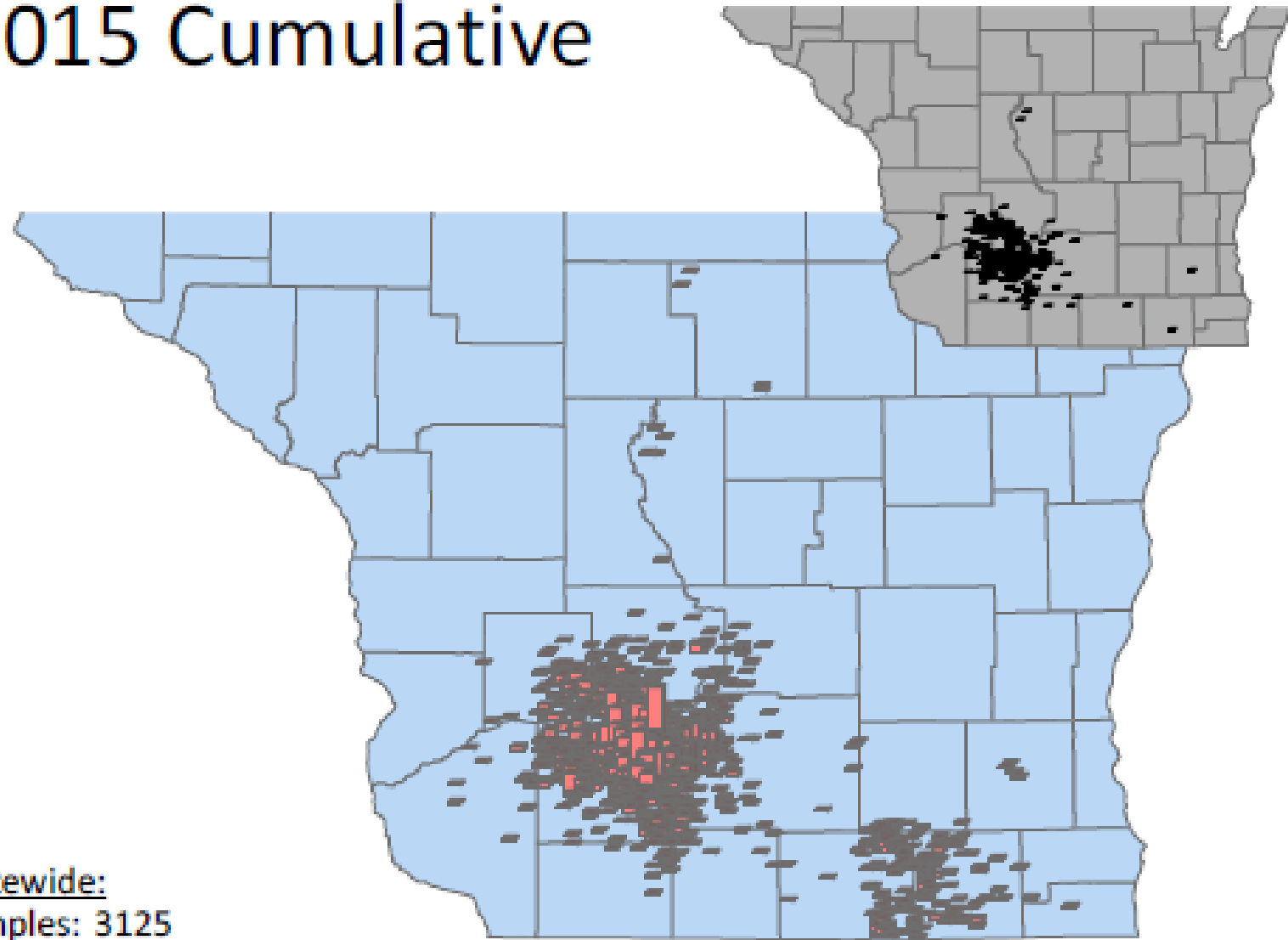
Statewide:
Samples: 7432
Positive: 219

Data: Wisconsin Department of Natural Resources

WISCONSIN

2015 Cumulative

2015 Positive Samples

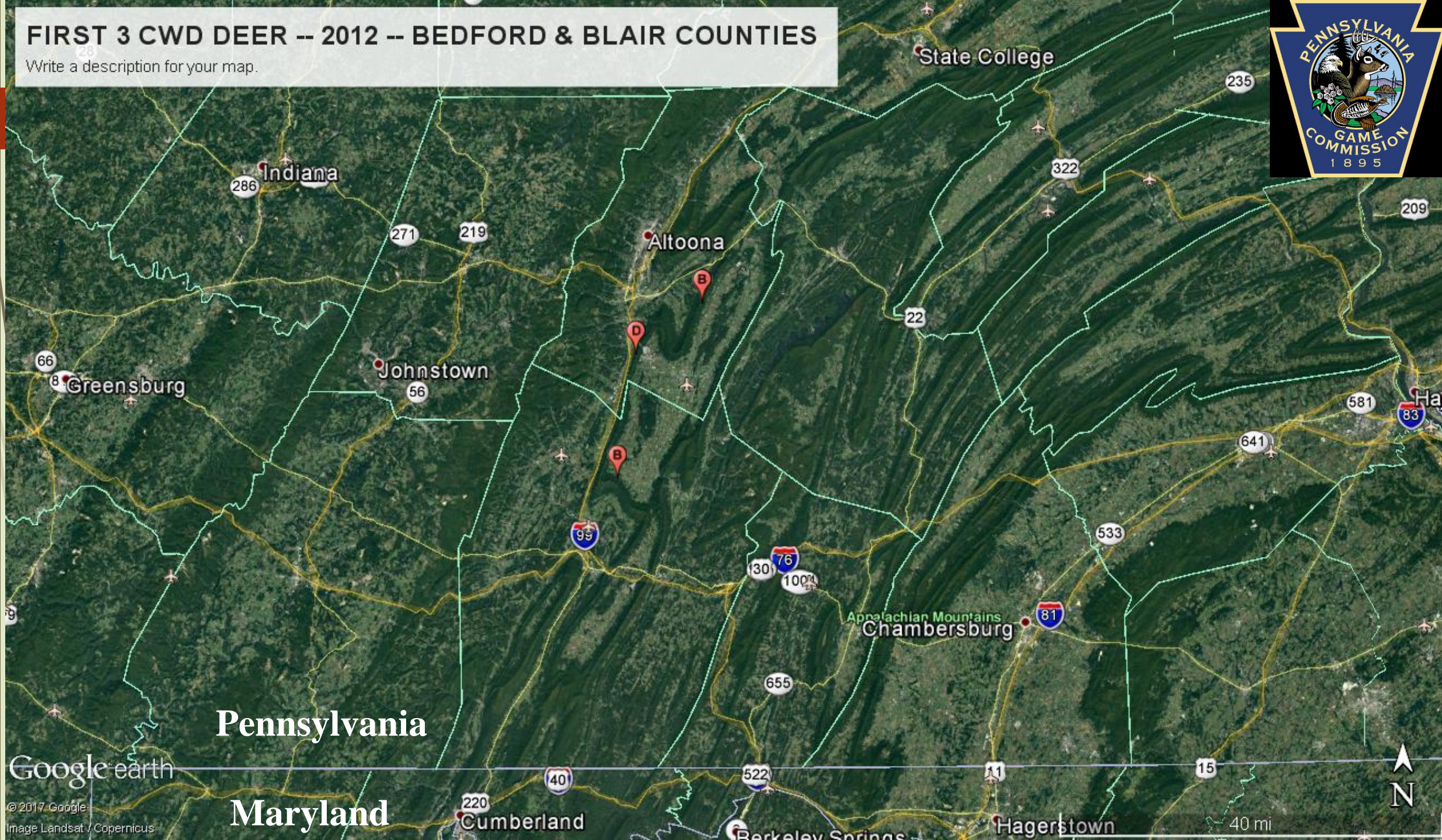


Statewide:
Samples: 3125
Positive: 295

Data: Wisconsin Department of Natural Resources

FIRST 3 CWD DEER -- 2012 -- BEDFORD & BLAIR COUNTIES

Write a description for your map.



Google earth

© 2017 Google
Image Landsat / Copernicus

Pennsylvania

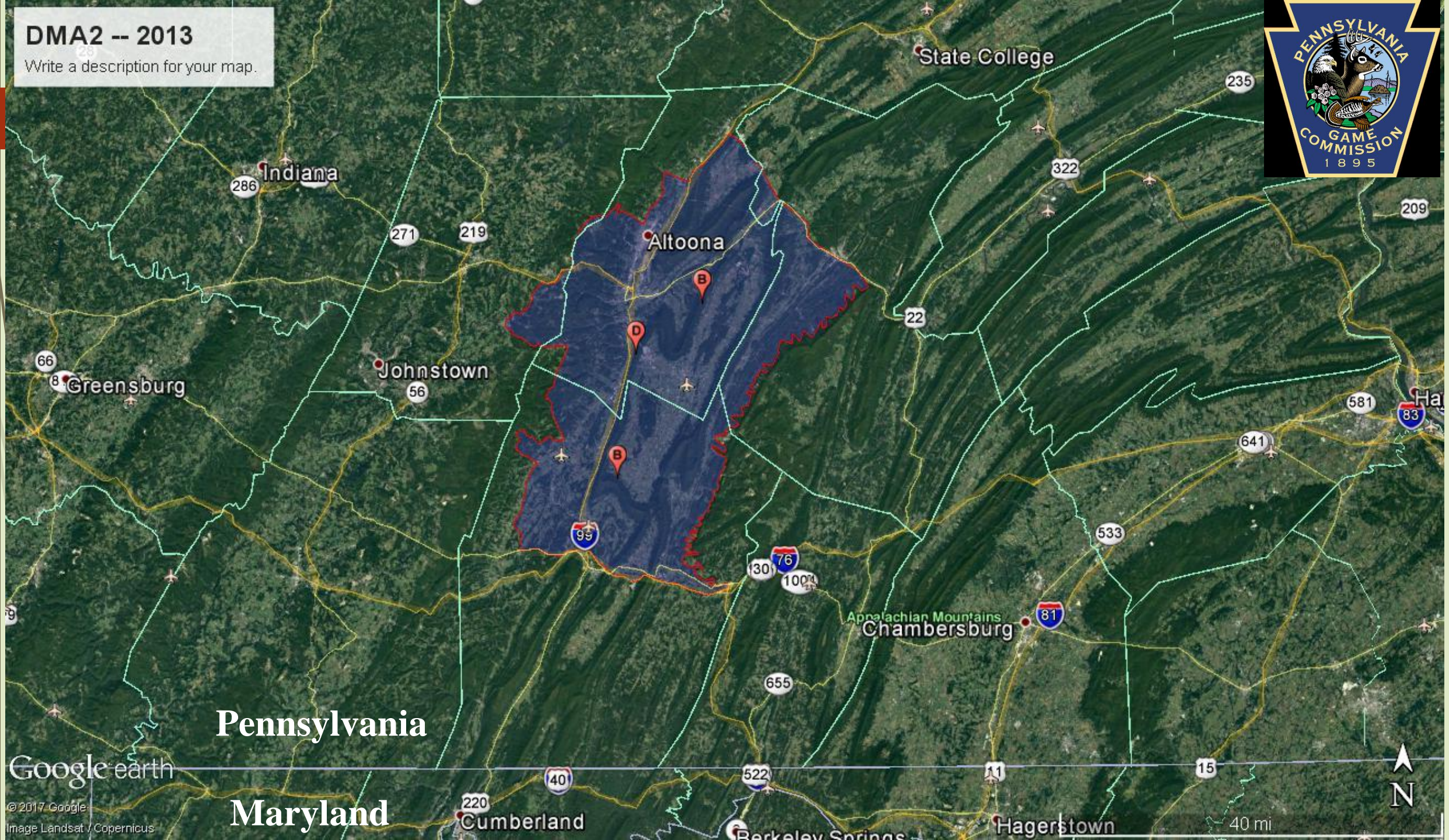
Maryland

40 mi



DMA2 -- 2013

Write a description for your map.



Google earth

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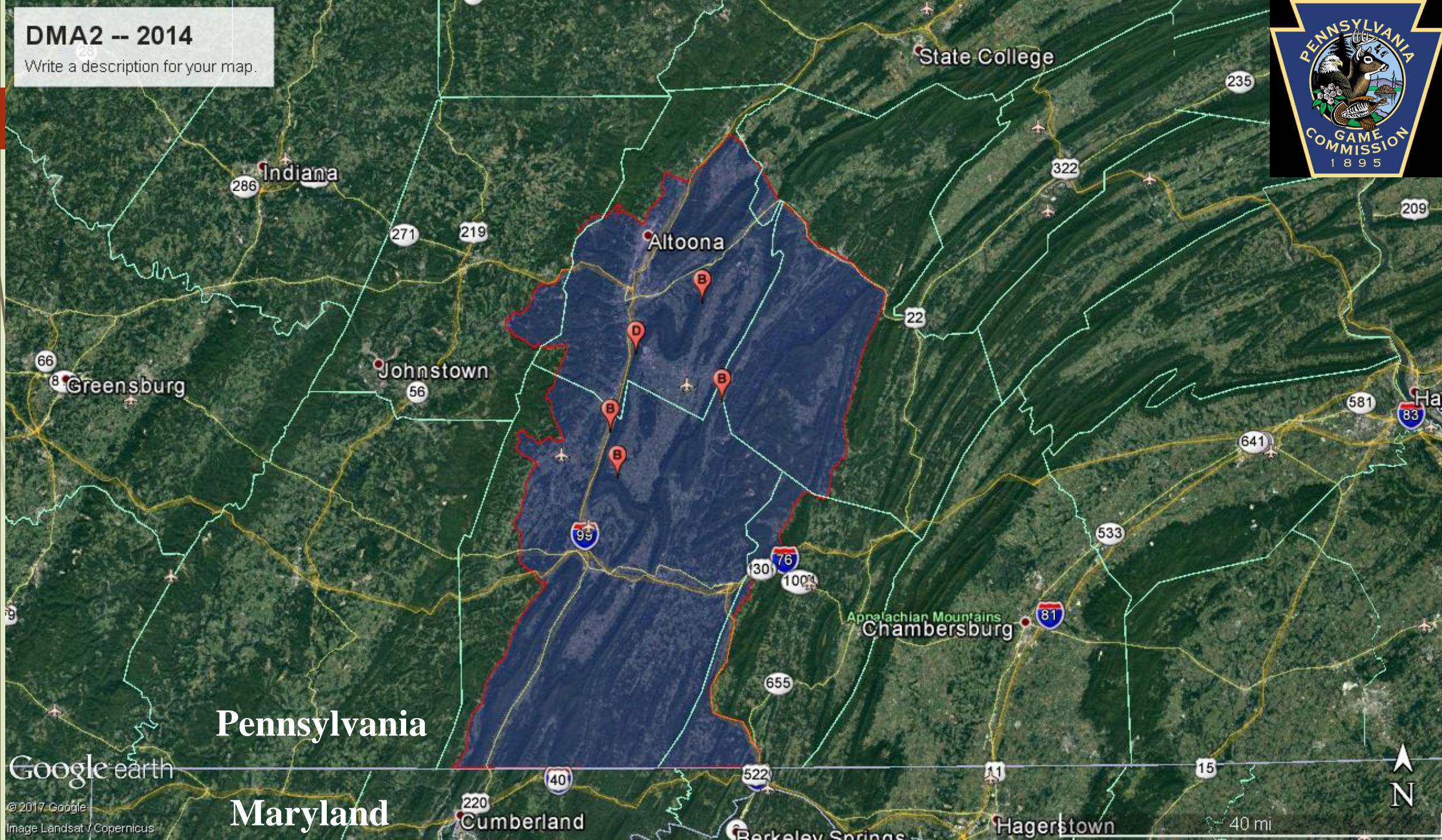
Pennsylvania

Maryland

40 mi

DMA2 -- 2014

Write a description for your map.



Google earth

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Pennsylvania

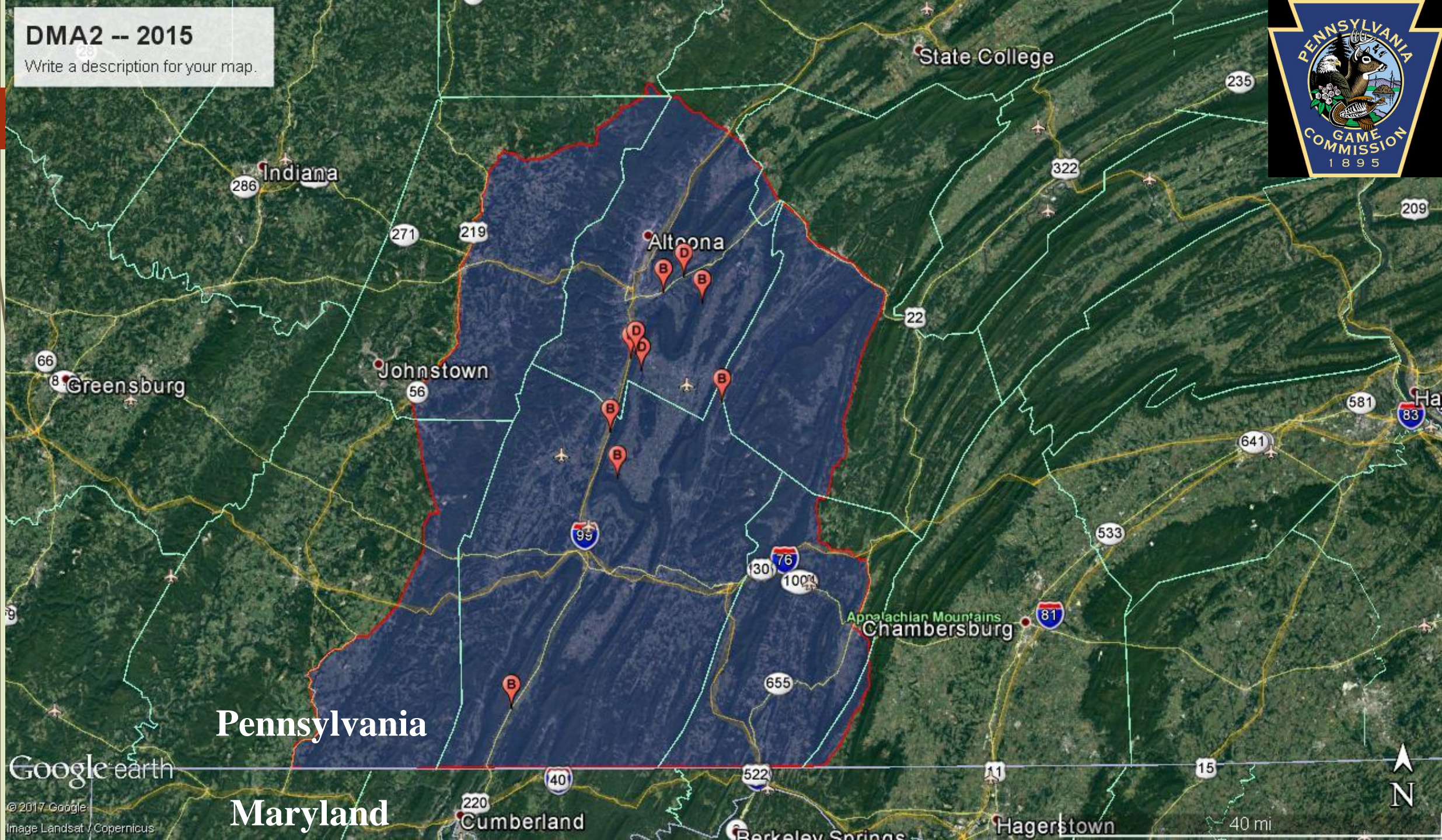
Maryland



40 mi

DMA2 -- 2015

Write a description for your map.



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Pennsylvania

Maryland

Cumberland

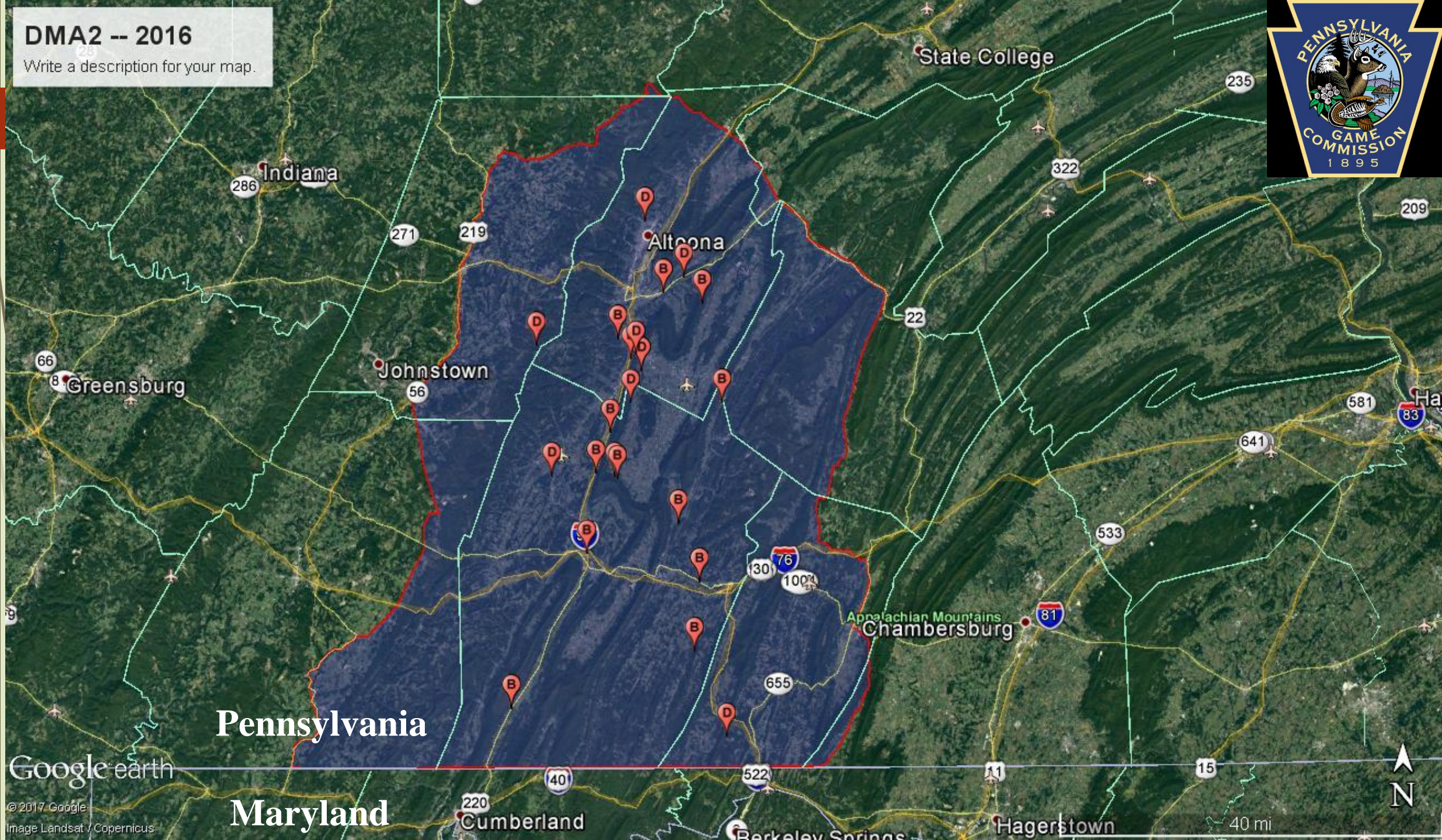
Berkeley Springs

Hagerstown

40 mi

DMA2 -- 2016

Write a description for your map.



Google earth

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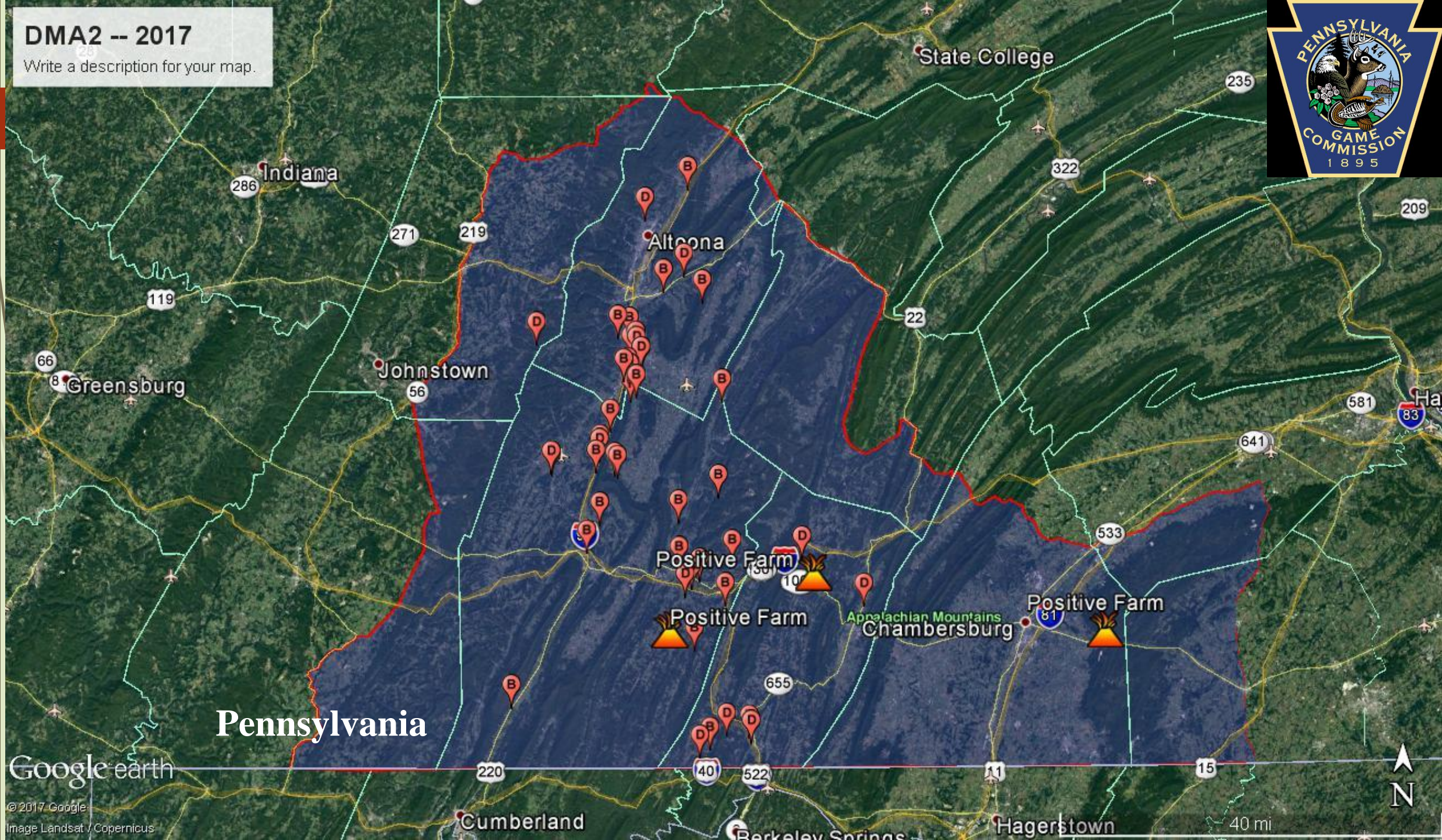
Pennsylvania

Maryland

40 mi

DMA2 -- 2017

Write a description for your map.



Google earth

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Pennsylvania

Cumberland

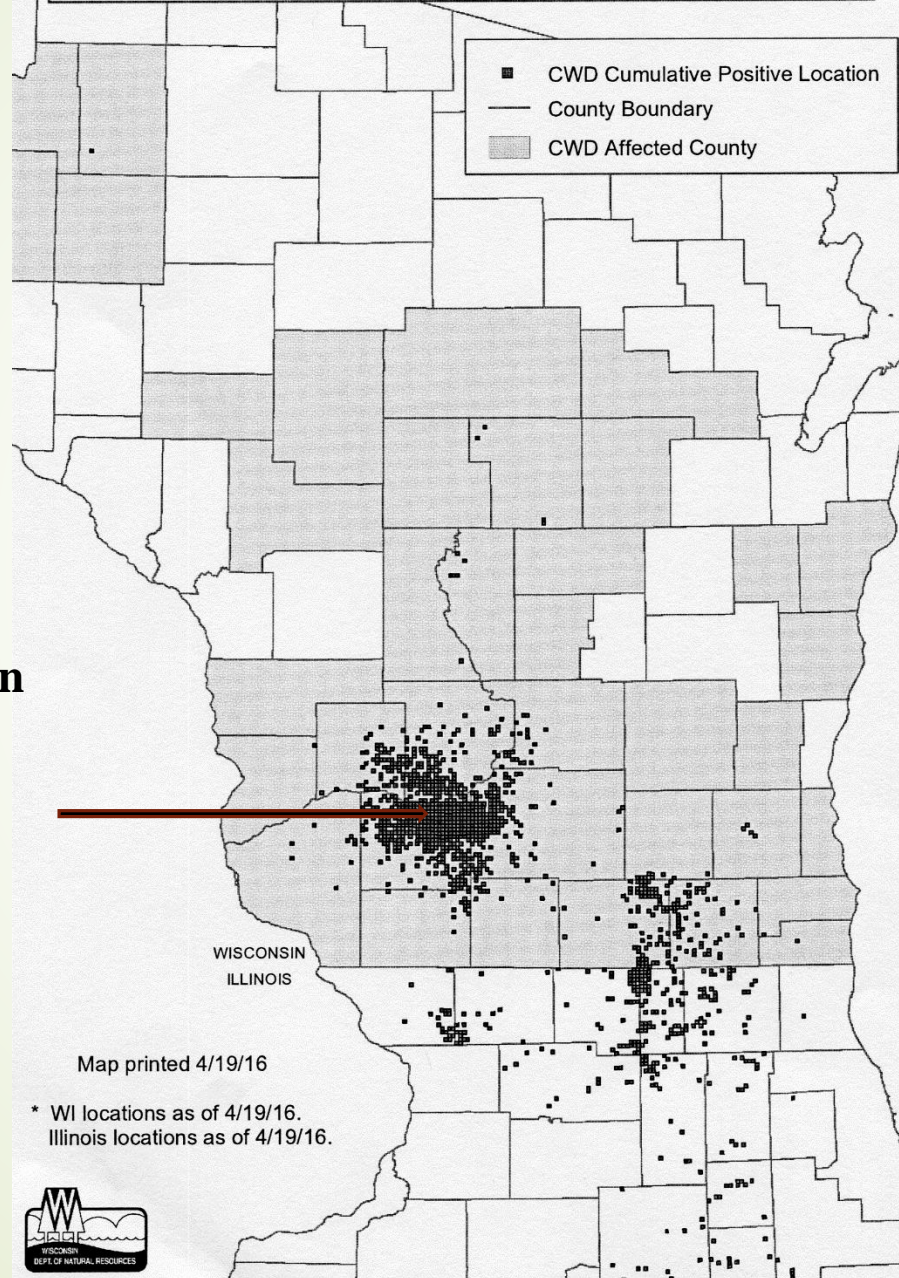
Berkeley Springs

Hagerstown

40 mi



Cumulative CWD Positive Locations of Wild Deer in Wisconsin and Illinois.

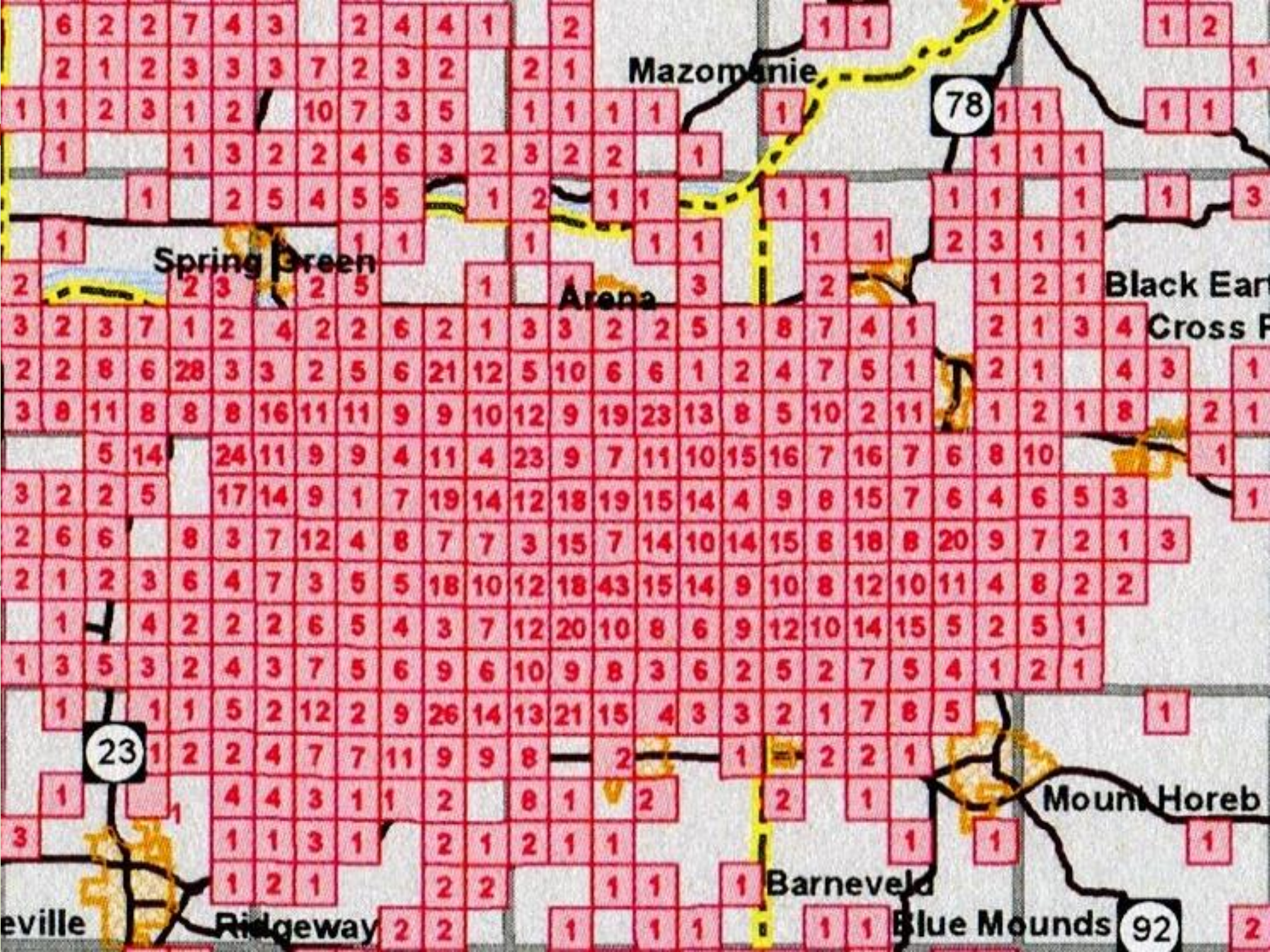


CWD Prevalence In Bucks At Center Now > 40%

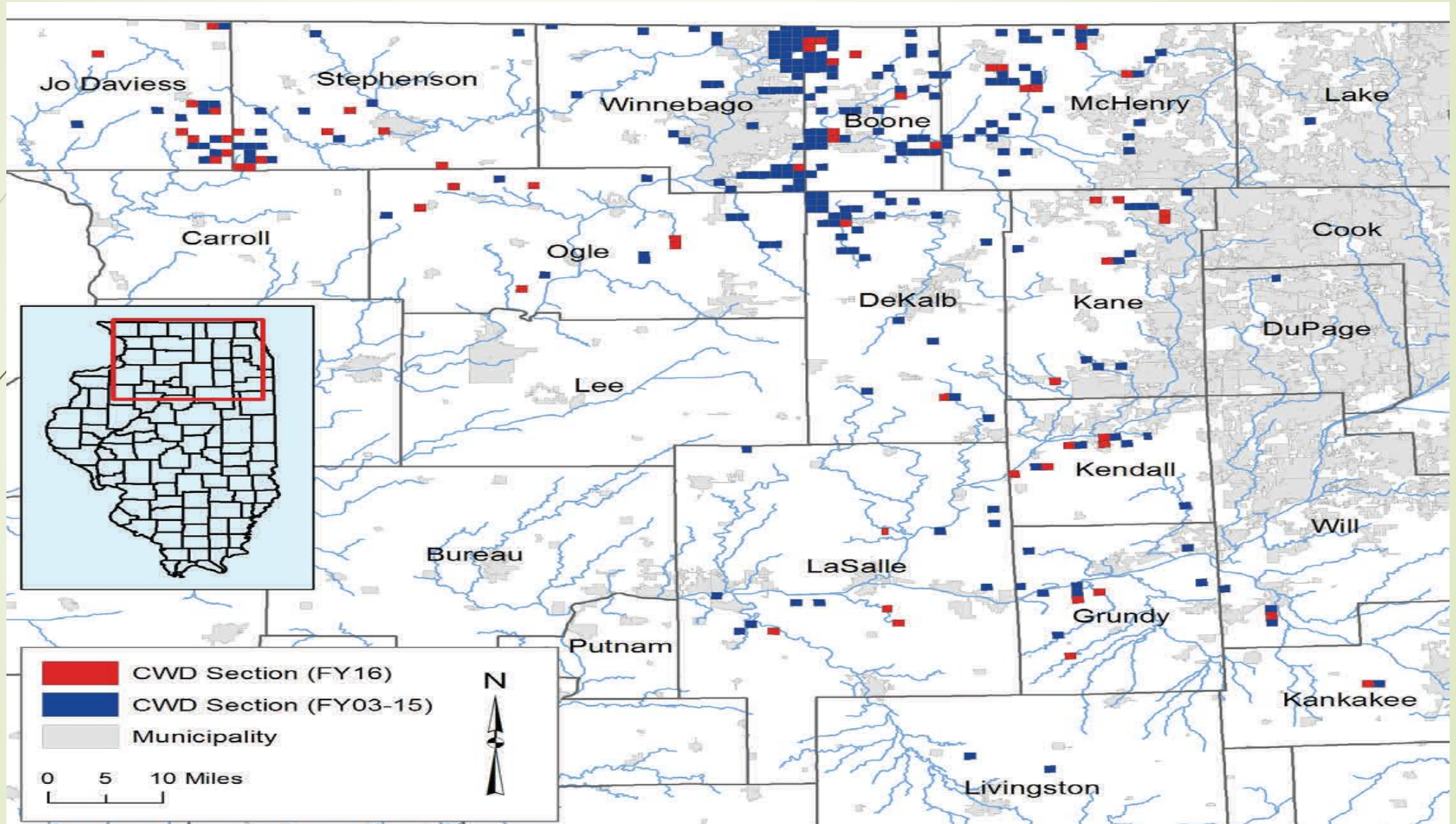
CWD = 9.4 % in Management Unit

Wisconsin & Illinois – First CWD Cases 2002

Illinois Prevalence Remains 1 %



Distribution of CWD in Illinois





ILLINOIS

HAS CONTROLLED PREVALENCE

**USING TARGETED
REMOVAL/SHARPSHOOTING**





The importance of localized culling in stabilizing chronic wasting disease prevalence in white-tailed deer populations

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Jan Novakofski^b

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^b Department of Animal Sciences, University of Illinois Urbana-Champaign, 1503 S. Maryland Drive, Urbana, IL 61801, USA

Systematic review of management strategies to control chronic wasting disease in wild deer populations in North America

- F. D. Uehlinger¹ Email author,
- A. C. Johnston¹,
- T. K. Bollinger² and
- C. L. Waldner¹

BMC Veterinary Research BMC series – open, inclusive and trusted 2016 12:173

DOI: [10.1186/s12917-016-0804-7](https://doi.org/10.1186/s12917-016-0804-7)

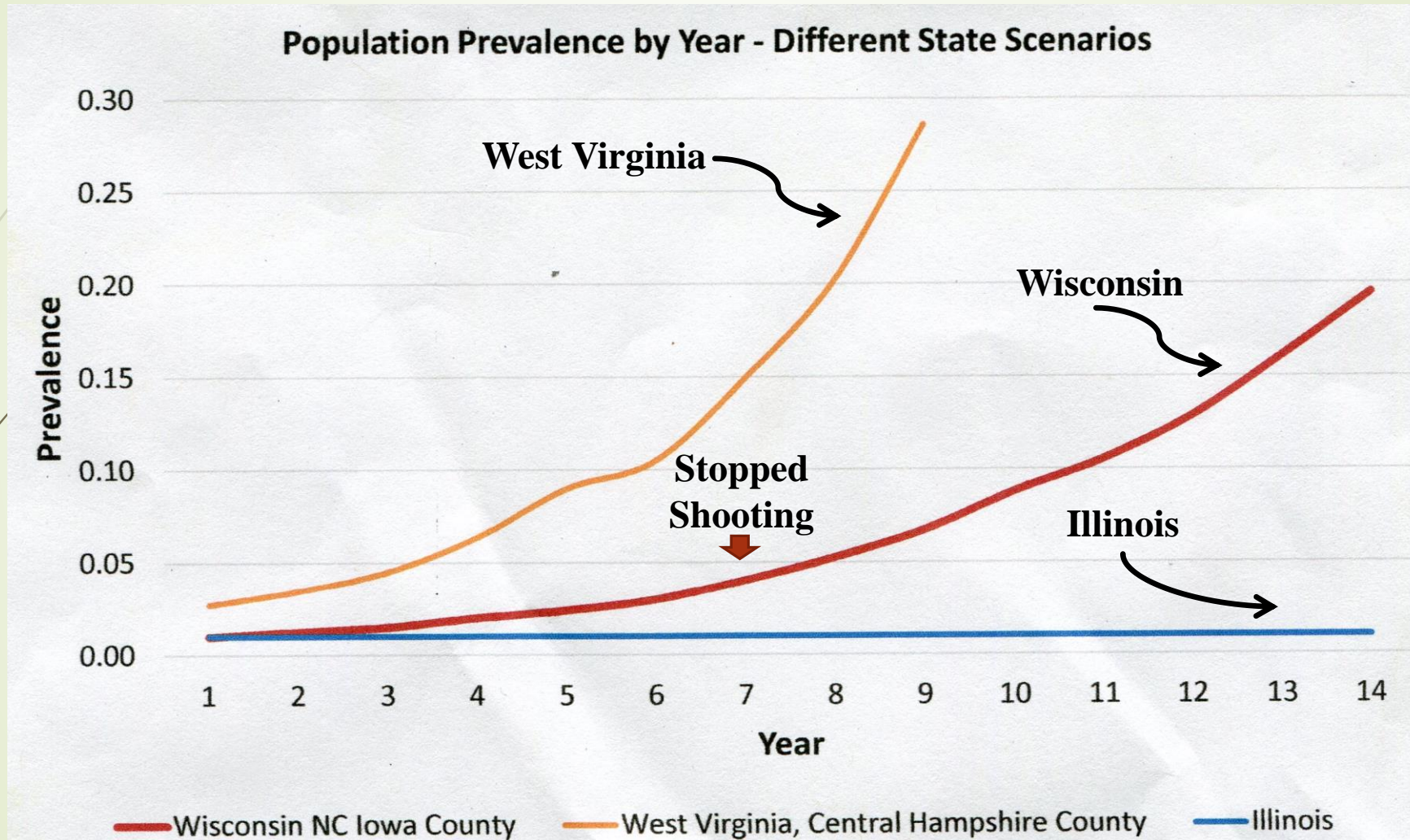


ILLINOIS

1. HAS CONTROLLED PREVALENCE
2. HAS NOT CONTROLLED DISEASE SPREAD

**PROPOSING
TRY TO CONTROL BOTH
PREVELANCE & SPREAD**

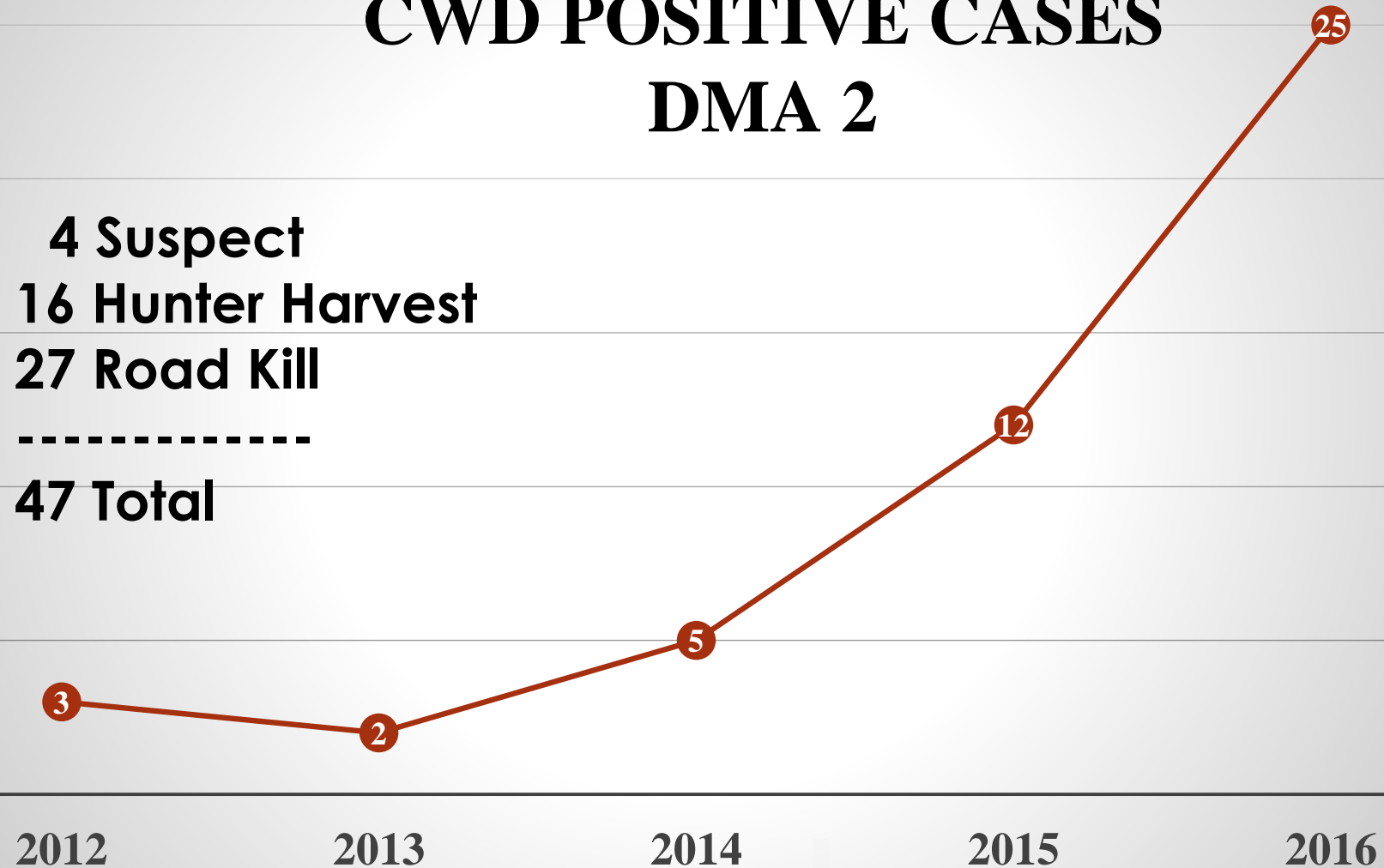
Untreated -- Exponential Growth Curve Is Typical of Chronic Wasting Disease Growth



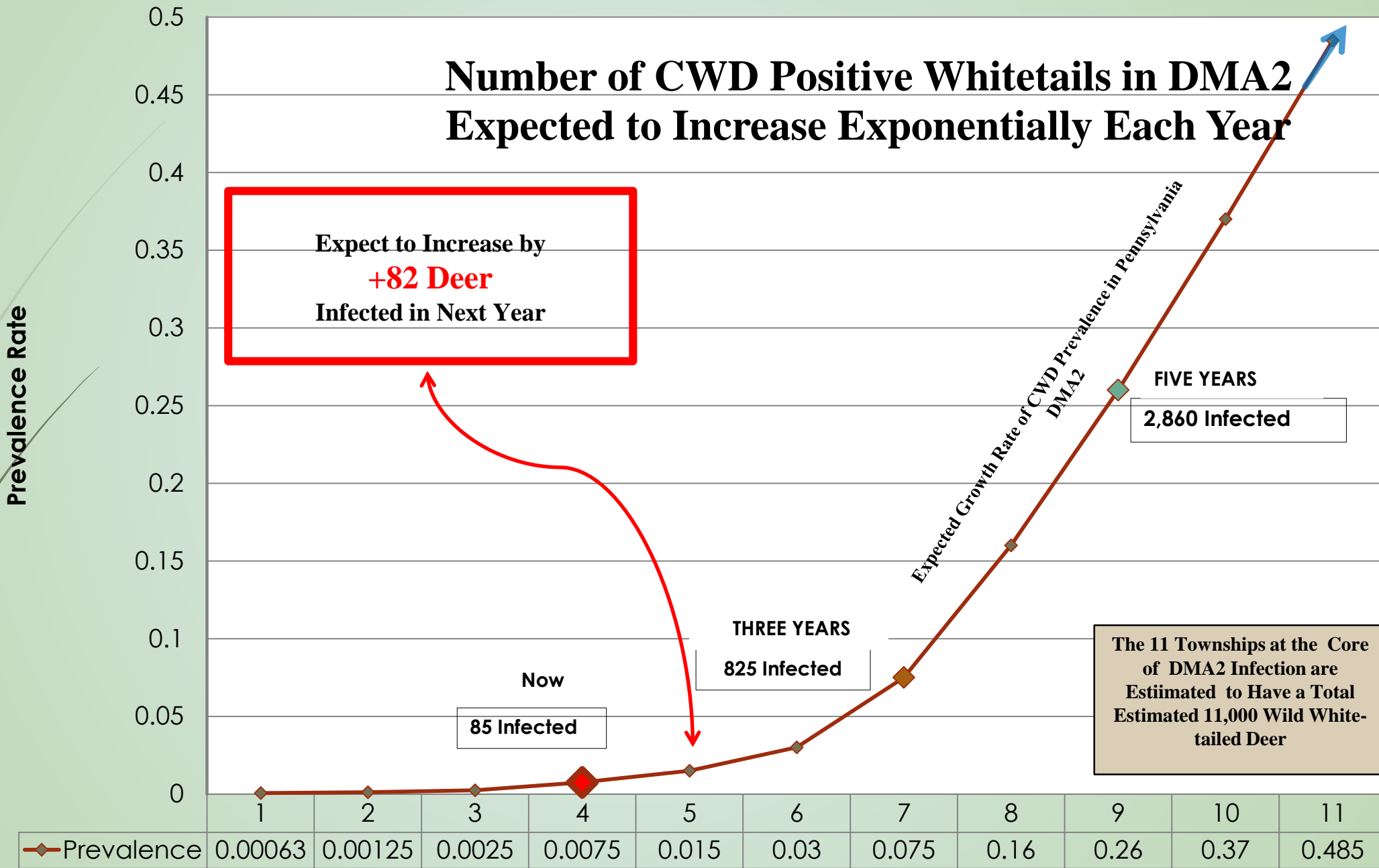
PENNSYLVANIA CWD POSITIVE CASES DMA 2

4 Suspect
16 Hunter Harvest
27 Road Kill

47 Total



Number of CWD Positive Whitetails in DMA2 Expected to Increase Exponentially Each Year

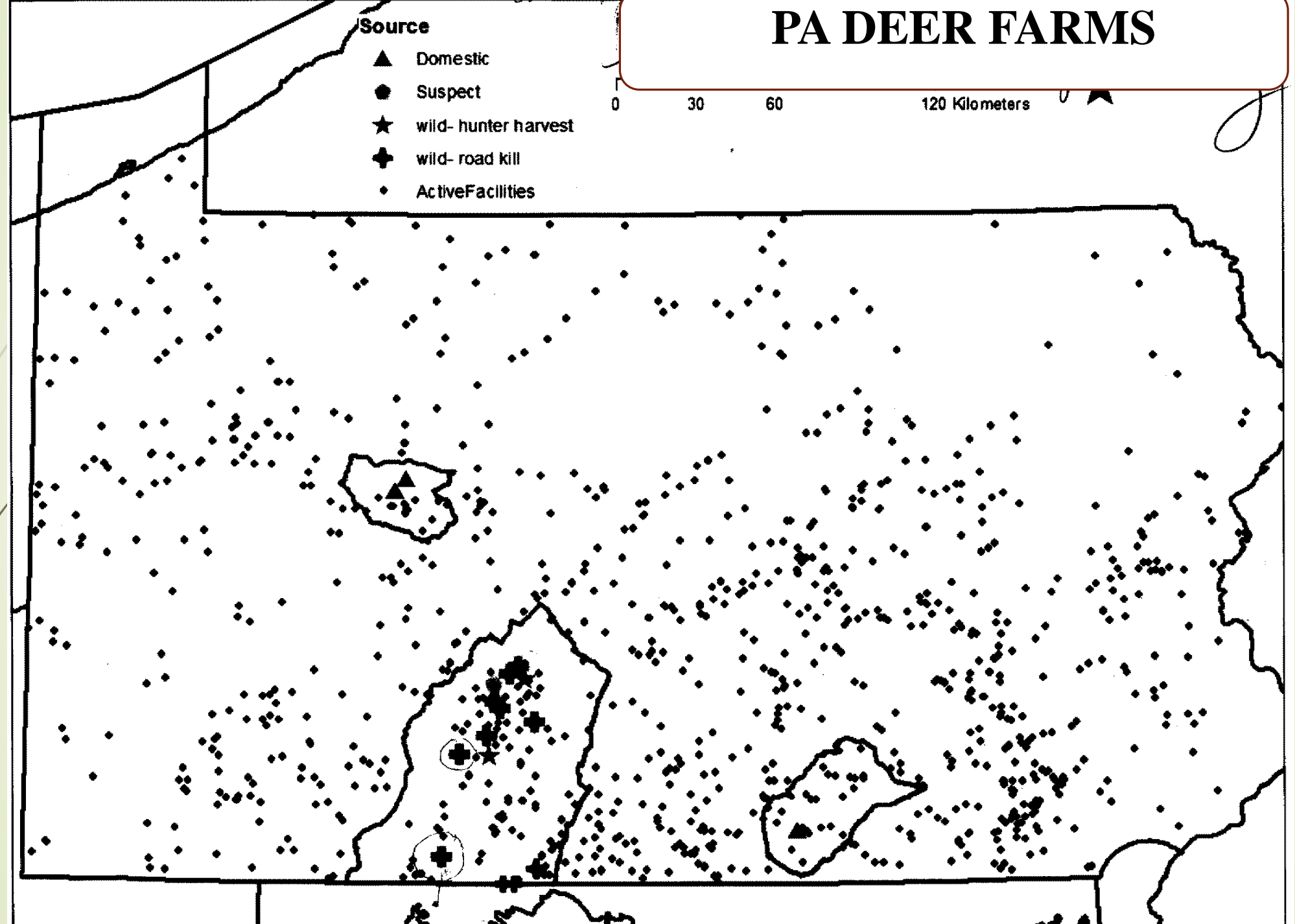


PA DEER FARMS

Source

- ▲ Domestic
- Suspect
- ★ wild- hunter harvest
- ✚ wild- road kill
- ActiveFacilities

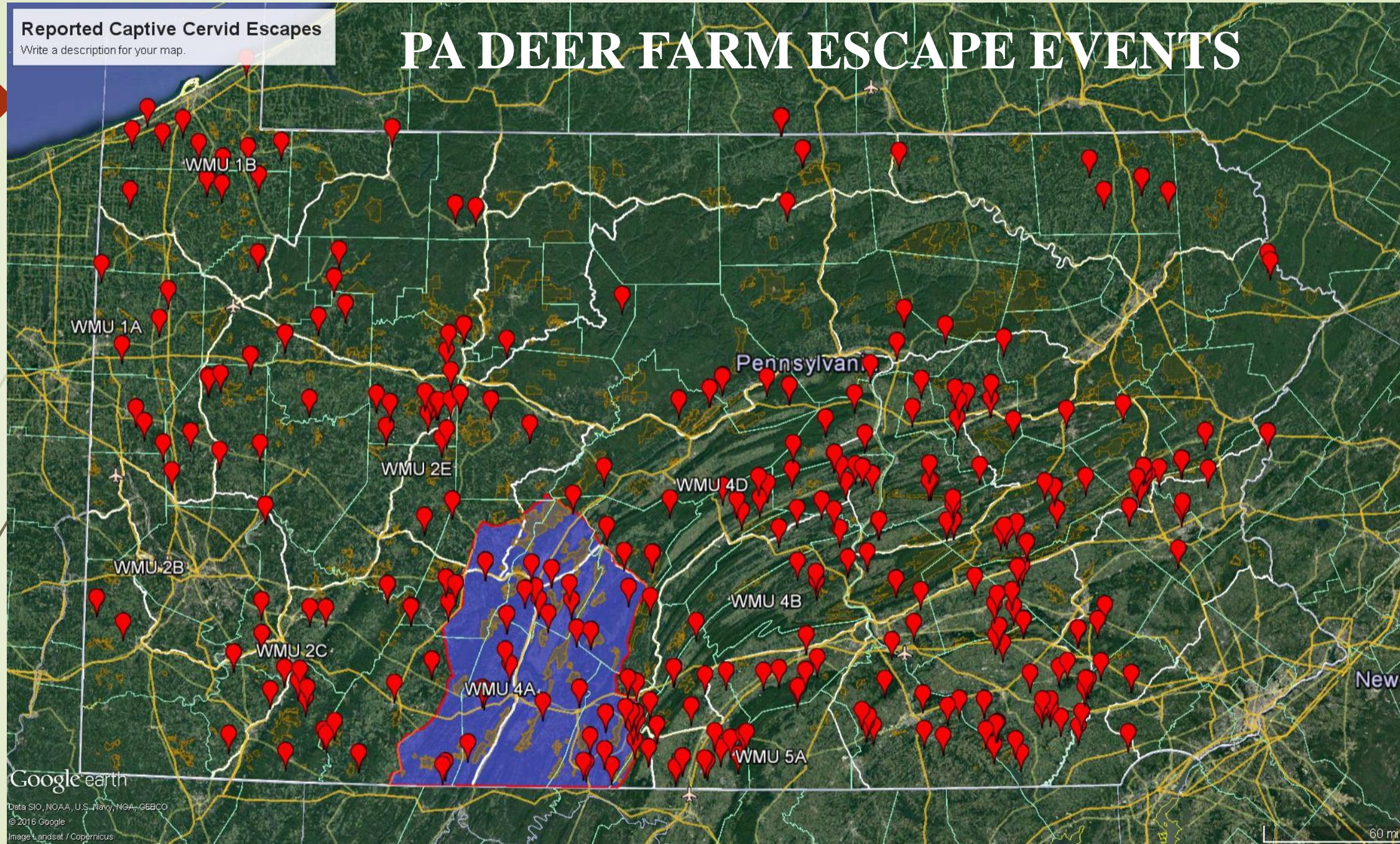
0 30 60 120 Kilometers



Reported Captive Cervid Escapes

Write a description for your map.

PA DEER FARM ESCAPE EVENTS



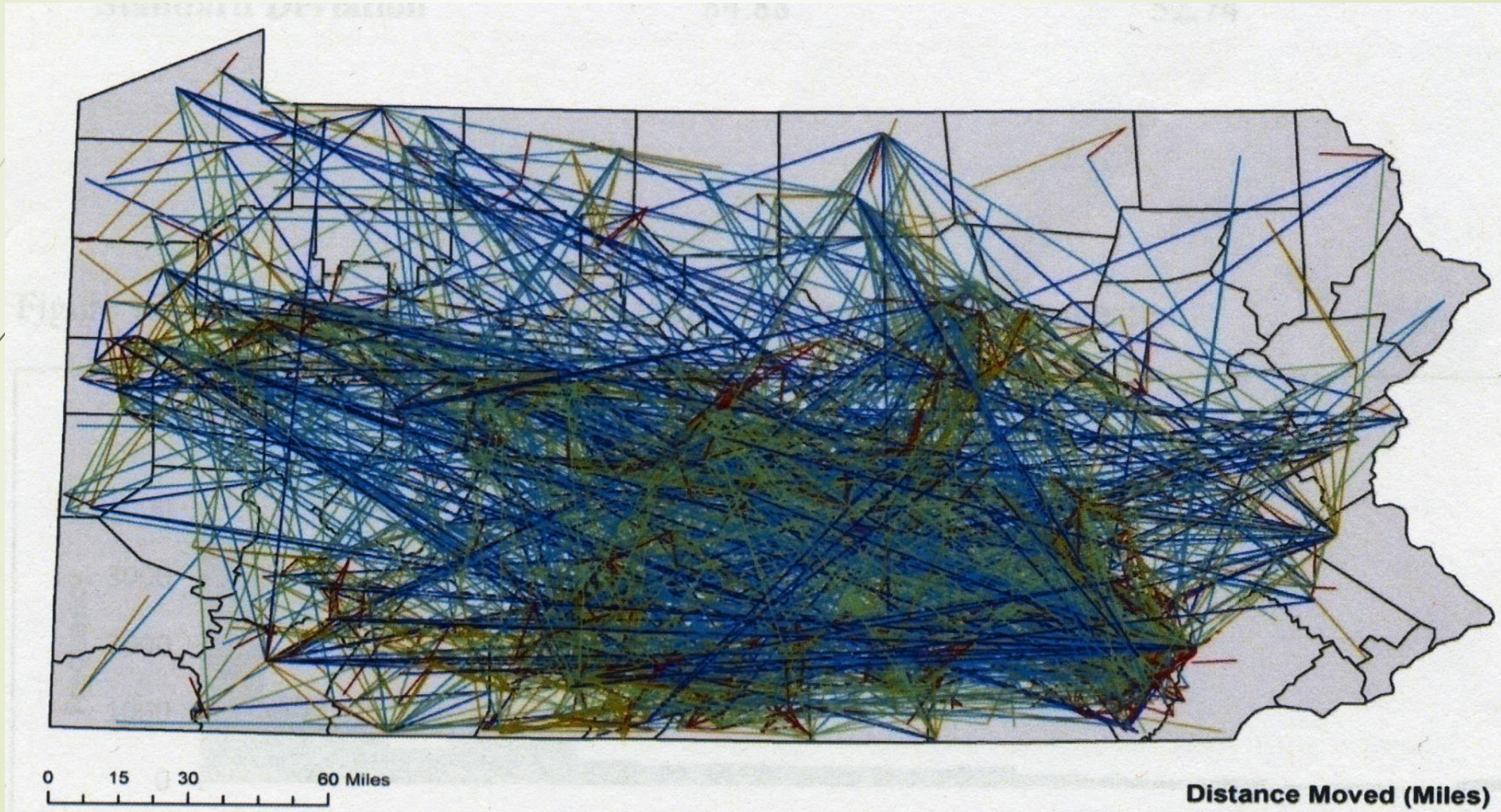
Google earth

Data SIO, NOAA, U.S. Navy, NGA, GEBCO
© 2018 Google
Image Landsat / Copernicus

60 mi

CAPTIVE DEER MOVEMENTS

M. Romain MS - 2012



OPTIONS AVAILABLE TO: CONTAIN...CONTROL...ERADICATE CWD

- ***BAN TRANSPORT OF HIGH RISK PARTS***
- ***BAN USE OF DEER URINE PRODUCTS***
 - ***BAN FEEDING & BAITING***
- ***IMPLEMENT TARGETED REMOVAL***



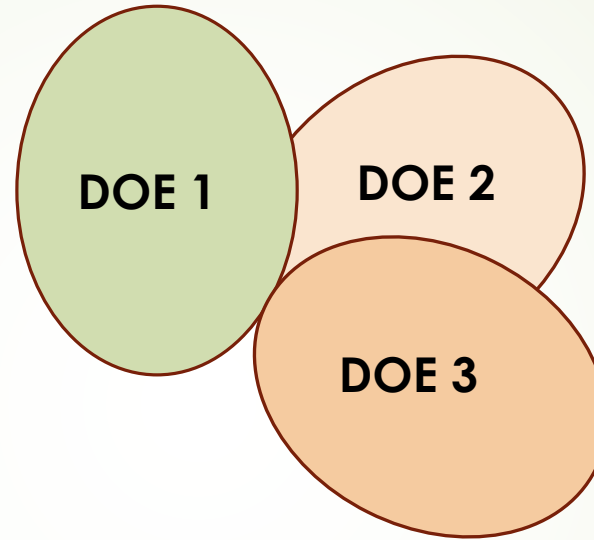
**TARGETED REMOVAL OF FAMILY
GROUPS**

**ONLY EFFECTIVE CONTROL
ALTERNATIVE**



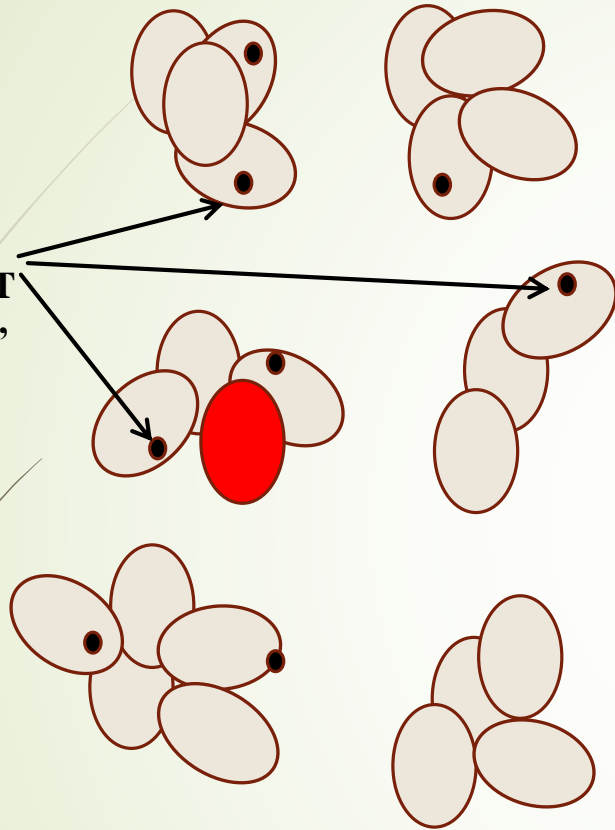
THE “ROSE PETAL THEORY”

White-tailed Deer Social Structure Affects Animal to Animal Contacts

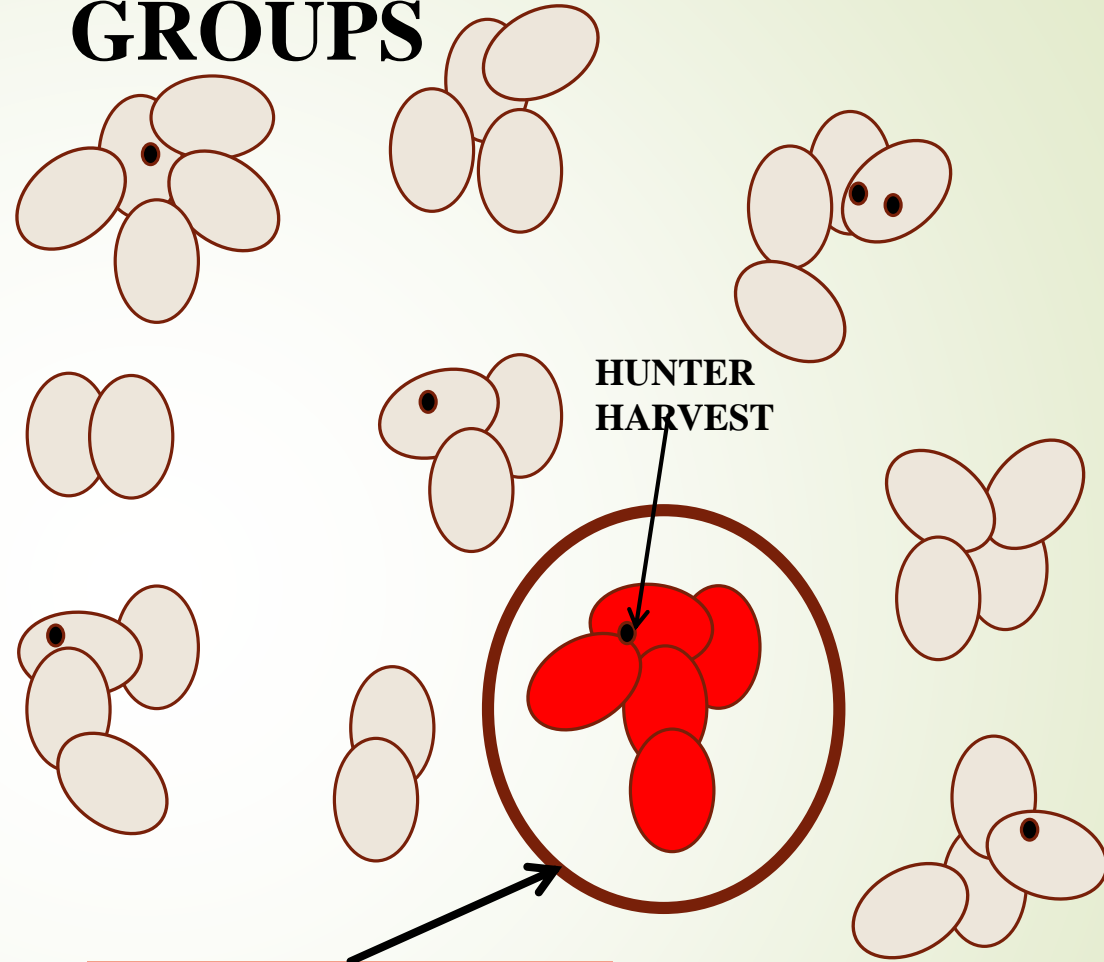


SYSTEMATICALLY LOCATE & TARGET INFECTED GROUPS

HUNTER
HARVEST
"Random"

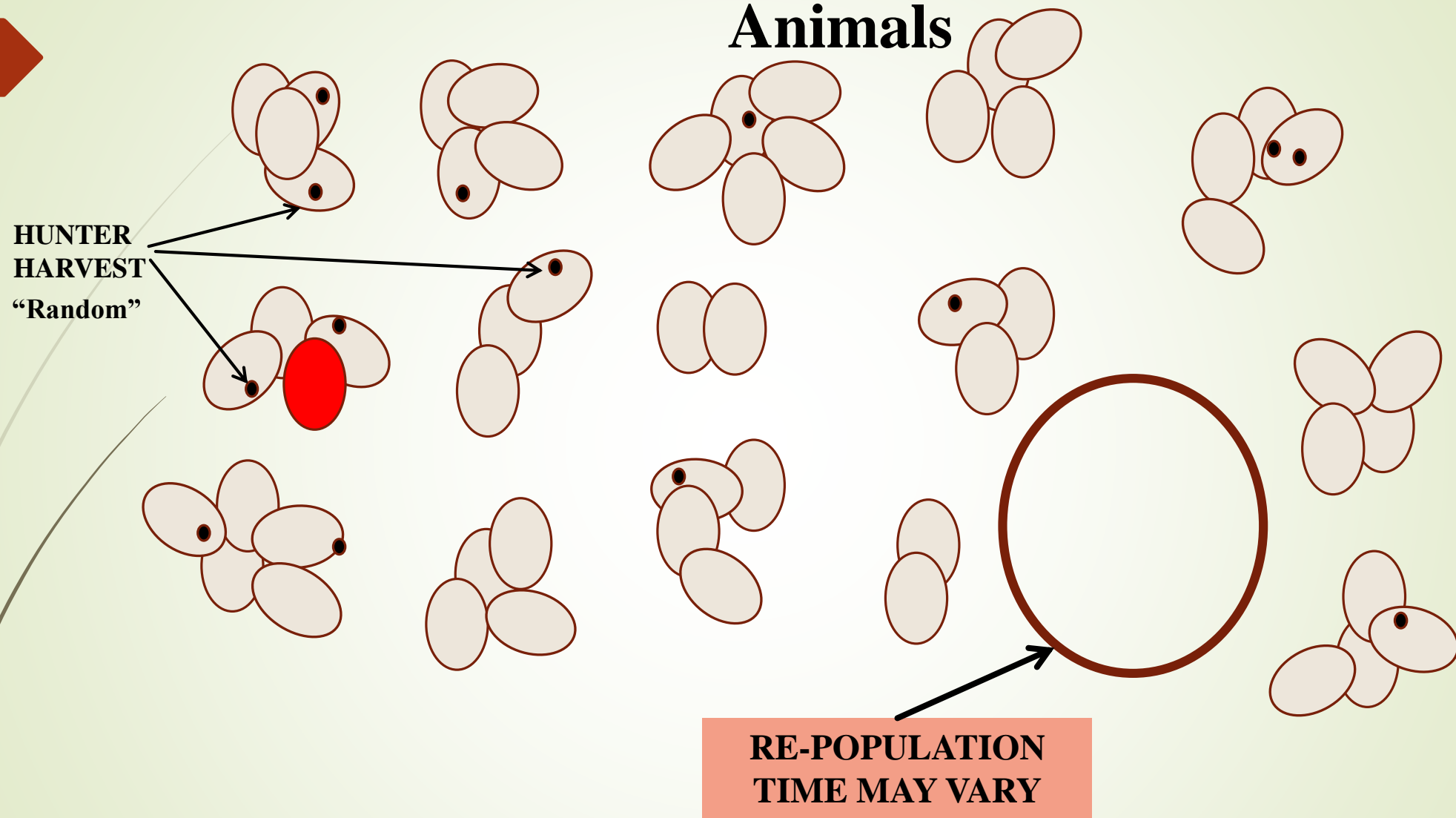


GROUPS



TARGET, BAIT &
REMOVE
FAMILY GROUPS

Selectively Remove to Increase Odds of Removing Infected





HUNTER HARVEST

IS

MORE OR LESS

HAPHAZARD

**NEVER PROVEN EFFECTIVE
FOR DISEASE CONTROL**





THE THREAT IS VERY REAL

THE SITUATION VERY DIRE

POTENTIAL OUTCOME =

CATASTROPHY

