



# Elk Feedgrounds & Infectious Disease

November 9<sup>th</sup> 2021

Today:

- Introductions
- Example – of what disease management can like look
- CWD
- **Break**
- Brucellosis
- Conclusion & Summary

# Who are we?

**Samantha Allen** MSc DVM PhD

State Wildlife Veterinarian (Wyoming, WGFD)

Adjunct Faculty – University of Wyoming,  
Department of Veterinary Sciences



**Hank Edwards** MSc

Supervisor - Wildlife Health Laboratory  
(WGFD)



# Veterinary Services?

Wildlife Health Laboratory &  
Thorne/Williams Wildlife Research Facility

Provide diagnostics, information,  
**education** & research on wildlife  
disease/immobilization

Bighorn sheep pneumonia, **CWD**,  
**brucellosis**, wildlife population  
health/disease status (e.g., WNV, RHDV2,  
etc.)

Things to think about:

## Elk Feedgrounds & Infectious Disease:

We are going to take on some big topics -

Tiny bit about disease management, CWD & brucellosis

Do not get bogged down in the semantics - you're not going to be disease experts after this

Infectious disease is complicated, and one of the most challenging aspects - management on elk feedgrounds

## Elk Feedgrounds & Infectious Disease:

- What we know
- What we don't know
- Questions to start asking yourselves about re. disease management

## What does that look like?

As you're listening today – start thinking about:

What – are we striving for: Prevention, Control, Eradication, Laissez-faire?

Who – are we managing: wildlife species, domestics, human?

Where – all elk feedgrounds, some?

When – how long (5 years, 15 years, 50 years)?



# Big Categories, defined? (Wobeser 2002)

**Prevention** (prevent introduction)

**Control** (implies that we are okay with some level of disease)

**Eradication**

**Laissez-faire**

“Why is it so difficult?”

Disease management & wildlife

“We do this for domestics all the time...”

Infectious disease is managed in domestic animals...but when it comes to wildlife:

1. Wildlife are not restrained (typically not fenced in)
2. Wildlife interact in an uncontrollable manner (with multiple other species)

“...anything else?”

3. Wildlife can be difficult to handle/high stress
4. Evaluation typically can take more time & money than in domestics
5. Long term public tolerance for management strategies (results can take time)
6. Huge groups (different needs for outcomes?)
7. Wildlife populations often cannot be quantified with useful accuracy
  - Difficult to assess health
  - Difficult to control disease

## “Useful Accuracy?”

Typically, decisions are being based on a lower level of knowledge:

Because population size & demographics are difficult to evaluate (but these are key parameters to evaluate transmission)

You need to be confident in your understanding of population dynamics & host-pathogen interactions (“lots to evaluate”)

It’s not that we can’t make decisions based on information we have, but we need to be aware that our outcomes might vary (a little less confident)

“yes/no, but...”

E.g., “Lots to evaluate”

Wildlife - populations size (endangered species), cultural/economic roles, distribution, demographics, contact with other wildlife/domestic animals, human contact, etc.

Pathogen - infect people, infect domestic animals, infect other wildlife, does it cause disease right away, how does it spread, can we identify it easily, is it treatable, do we have a vaccine?, prevalence, etc.

Environment - habitat look like (changes that have been made/could be made), resources, carrying capacity, etc.

Human management - how long can we do this, how much money do we have, who will be participating, will this be successful, history, etc.

## Disease management & Elk Feedgrounds

When an infectious disease arrives in a population - typically need to reduce transmission (botulism, bird feeders)

### **Concentrating animals and/or altering environmental factors**

- changes the distribution & abundance of animals

Providing a larger number of susceptible animals in an area over a certain period of time

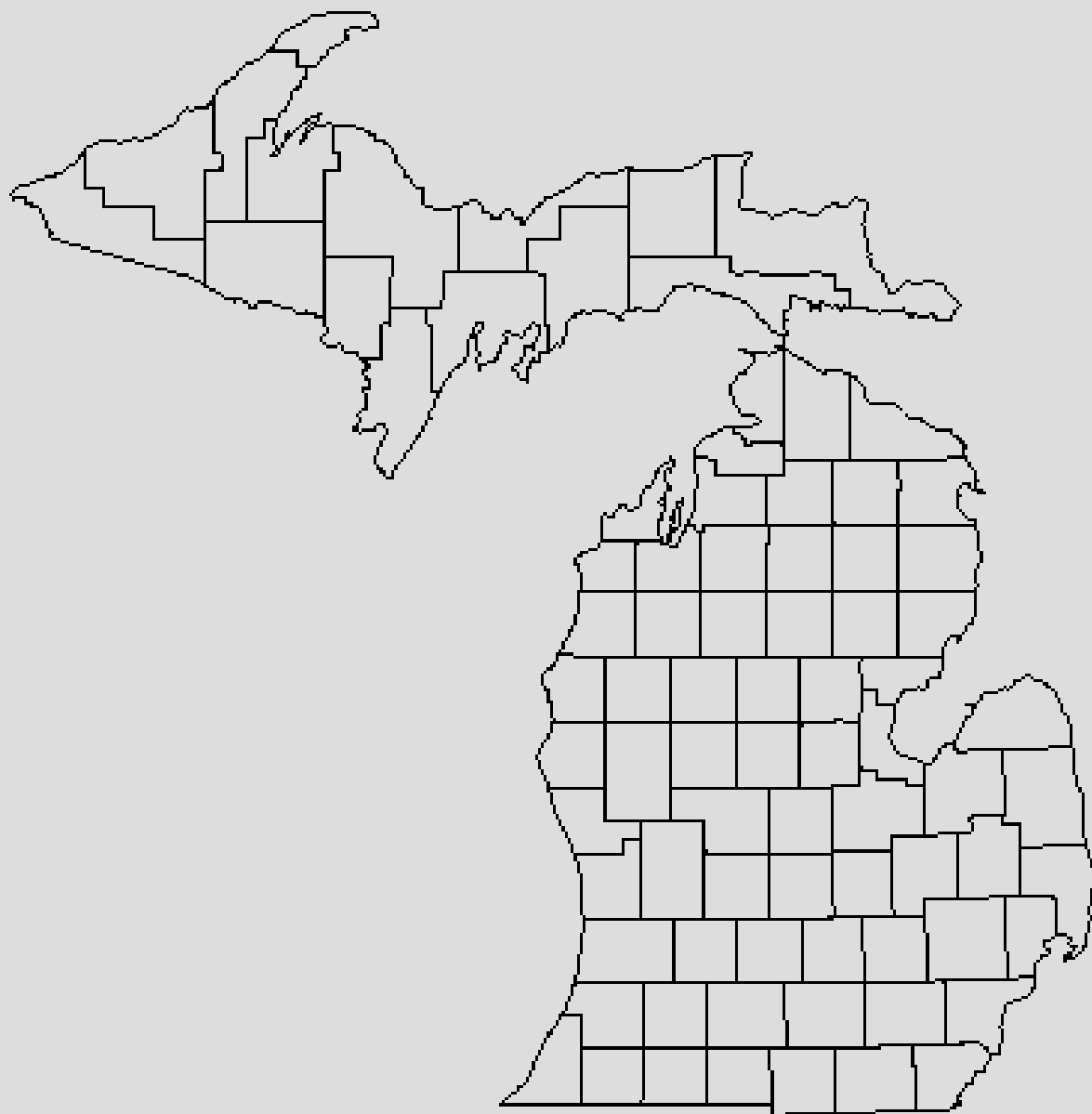
- lots of contact between susceptible animals means infectious pathogens can be transmitted **quickly**

**Example:**

**A disease management story from another state...**



**Bovine tuberculosis (bTB)  
in white-tailed deer, MI**



## “White nodules in the chest of a deer?”

bTB (bovine tuberculosis); *Mycobacterium bovis*  
(bacteria)

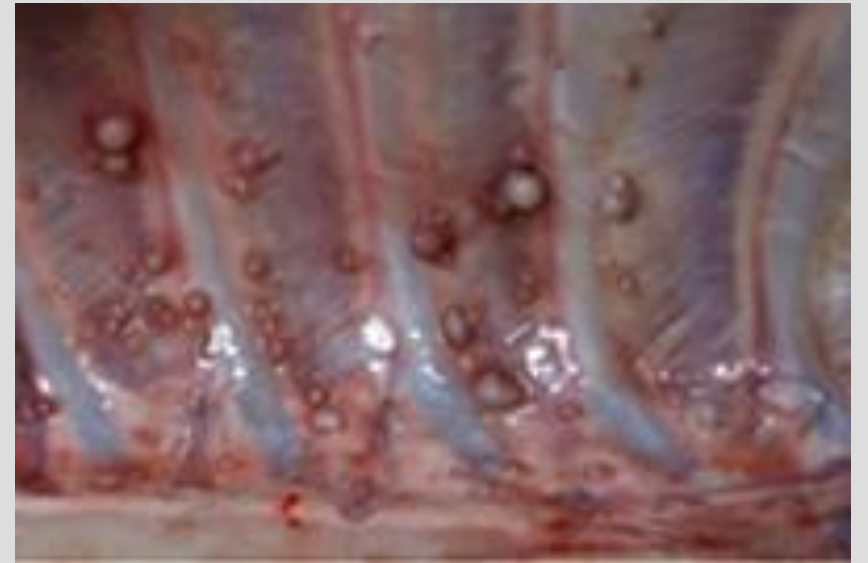
Domestic cattle are the original source - spills into white-tailed deer populations (then back and forth)

bTB has also spilled out to other wildlife (elk, black bear, coyotes, opossum, raccoon, red fox)

Can infect people

Chronic disease, takes time for clinical signs to present themselves

Found in white-tailed deer in Michigan (MI)



[https://www.michigan.gov/emergingdiseases/0,4579,7-186-76711\\_78153---,00.html](https://www.michigan.gov/emergingdiseases/0,4579,7-186-76711_78153---,00.html)

## General timeline:

**1974-1975:** the last known bTB-infected cattle herd was depopulated in MI, the following year a white-tailed deer (WTD) was harvested that was positive for bTB

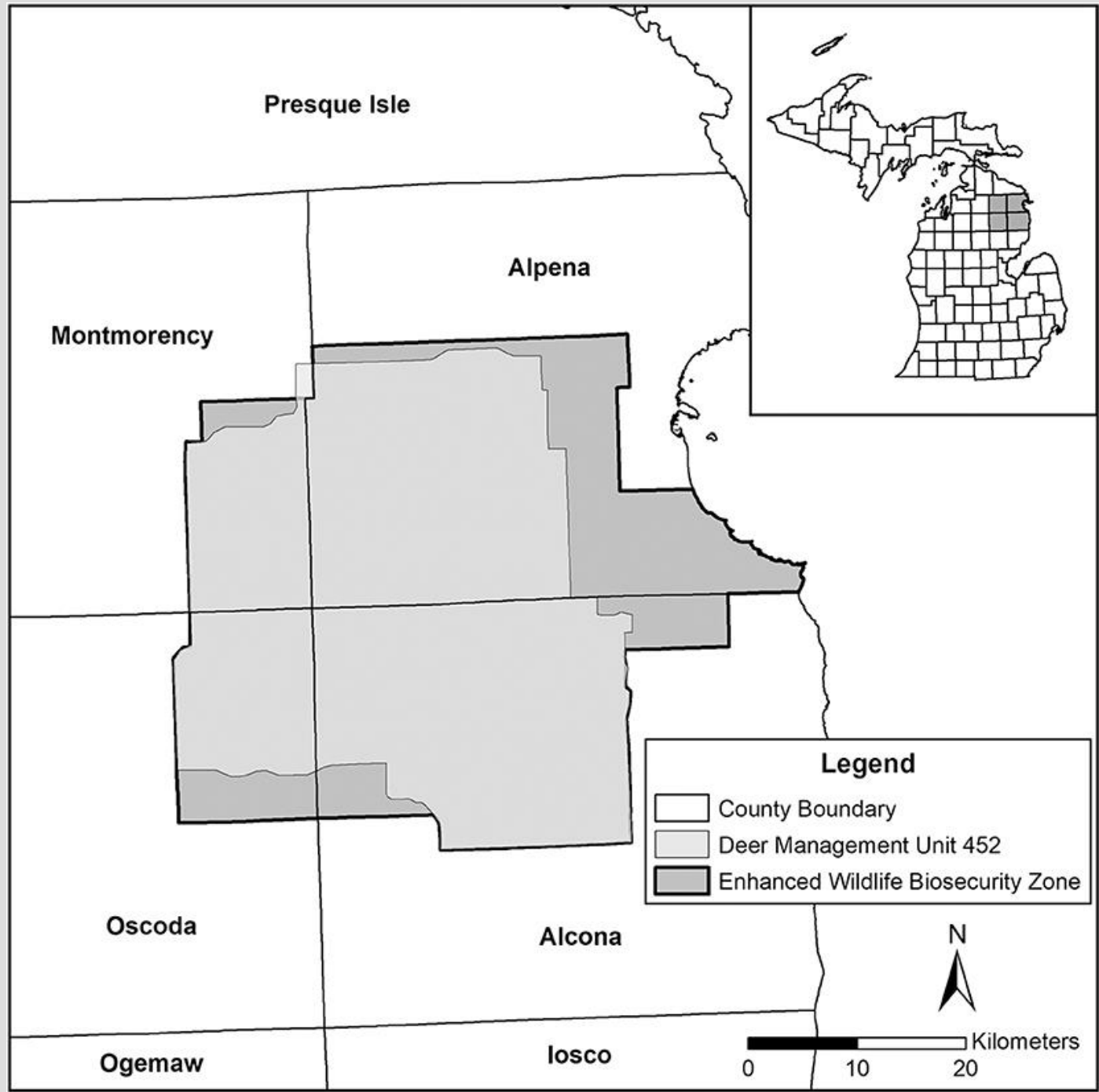
**1979:** MI acquires bTB “accredited-free” status (unknown extent in WTD)

**1994-1995:** a second WTD was harvested with bTB, more cases

**1996:** Ag, USDA, Resources, University, Health – manage bTB initiate the MI bTB eradication program

**1997:** bTB started to appear among cattle herds again (MI lost its bTB accredited-free status)

**1998:** Stakeholders are directed to develop a plan for MI WTD (governor)



## “What’s Contributing to this Challenge?”

The white-tailed deer densities where bTB occurred were at or beyond biological carrying capacity (19-23/km<sup>2</sup>)

High densities being maintained (“largely through supplemental feeding”)

Overall, problems are occurring in areas with:

- high cattle/deer population densities;
- artificial feeding; and/or,
- continuous interactions at the wildlife-livestock interface

Overall, WTD in this case are reservoirs for bTB – you are not going to eliminate bTB from cattle without eliminating it from WTD

# What We Know? What We Need to Know?

Wildlife - populations size (endangered species), cultural/economic roles, distribution, demographics, contact with other wildlife/domestic animals, human contact, etc.

Pathogen - infect people, infect domestic animals, infect other wildlife, does it cause disease right away, how does it spread, can we identify it easily, is it treatable, do we have a vaccine?, prevalence, etc.

Environment - habitat look like, resources, carrying capacity, etc.

Human Management - how long can we do this, how much money do we have, who will be participating, will this be successful, history/modelling in other herds, etc.

**Big overarching direction:**

**What are we striving for: Prevention, Control, Eradication,  
Laissez-faire?**



# Where Did Michigan Go?

## Eradication program of bTB from white-tailed deer in MI endemic areas (1998)

- deer feeding/baiting restriction/ban
- develop deer harvest quotas consistent with eradication goals (increase harvest)
- develop methods for eliminating contact between cattle and white-tailed deer (targeting areas of concern/risk)
- continue surveillance and determine actual prevalence and evaluate trends
- educate stakeholders on managing deer with the goal of eradicating bTB
- enlist a coordinator to implement the eradication strategy

REDUCTION OF WHITE-TAILED DEER CONCENTRATION & POPULATION (reduce transmission)

## Take Home Message(s) - Michigan

Once an infectious disease sets-up in a wildlife reservoir, it is very difficult to eradicate

This process took a while to figure out, they are still working on it (this is also one disease)

These programs are expensive, take a lot of people and time

## Take Home Message - Wyoming

Today/during this phase/beyond:

- What do we know
- What do we not know
- Think about those questions

# Chronic Wasting Disease (CWD)



**BREAK**

**10 minutes**

# Brucellosis



# Summary & Conclusion

# Summary & Conclusions

TON of information

What do we know? What do we not know?

Not trying to make you experts - trying to provide you with enough information to assist in the direction of disease management on the elk feedgrounds



# Elk Feedgrounds & Infectious Disease

Elk feedgrounds are a major wildlife disease challenge

Concentrating animals and/or altering environmental factors

Providing a larger number of susceptible hosts (animals) in an area, over a certain period of time

- lots of contact between susceptible animals means infectious pathogens can be transmitted quickly



## Summary of CWD & Elk Feedgrounds

- Impossible to eradicate once established & always fatal
- No treatments & no vaccines at this time
- Likely to decrease populations over the long-term
- Zoonotic disease?
- Elk feedgrounds become “hot spot” of CWD transmission from prion contamination
  - Transmission to deer, elk, and moose
  - Prion source likely to sustain elevated prevalence

## Summary of Brucellosis & Elk Feedgrounds

- Difficult to eradicate once established in a reservoir population
- Rarely fatal, but causes elk to abort
- No vaccines for elk available
- Currently, with feeding, no impact to elk populations over the long-term
- Within Designated Surveillance Area, economic/trade challenges for cattle producers
- Zoonotic disease
- Elk feedgrounds concentrate elk, which results in more transmission and sustained infected population

## Summary & Conclusions

Think about the challenges & questions (some ideas might not be feasible)

Will need work, collaboration, & communication

Next week: online zoom meeting, necrobacillosis

Amazing opportunity to tackle a complex disease process

What (are we striving for) :

Prevention, Control, Eradication, Laissez-faire?

Who (are we targeting) :

Wildlife species (elk, mule deer, etc.), domestic animals, humans?

Where :

All feedgrounds, 10 feedgrounds, the land around the feedgrounds?

When :

How long does it last: 15 years, 50 years?



Thank you & Questions?