2021 Bovine Tuberculosis Surveillance

Natural Resources Commission Update

April 14, 2022
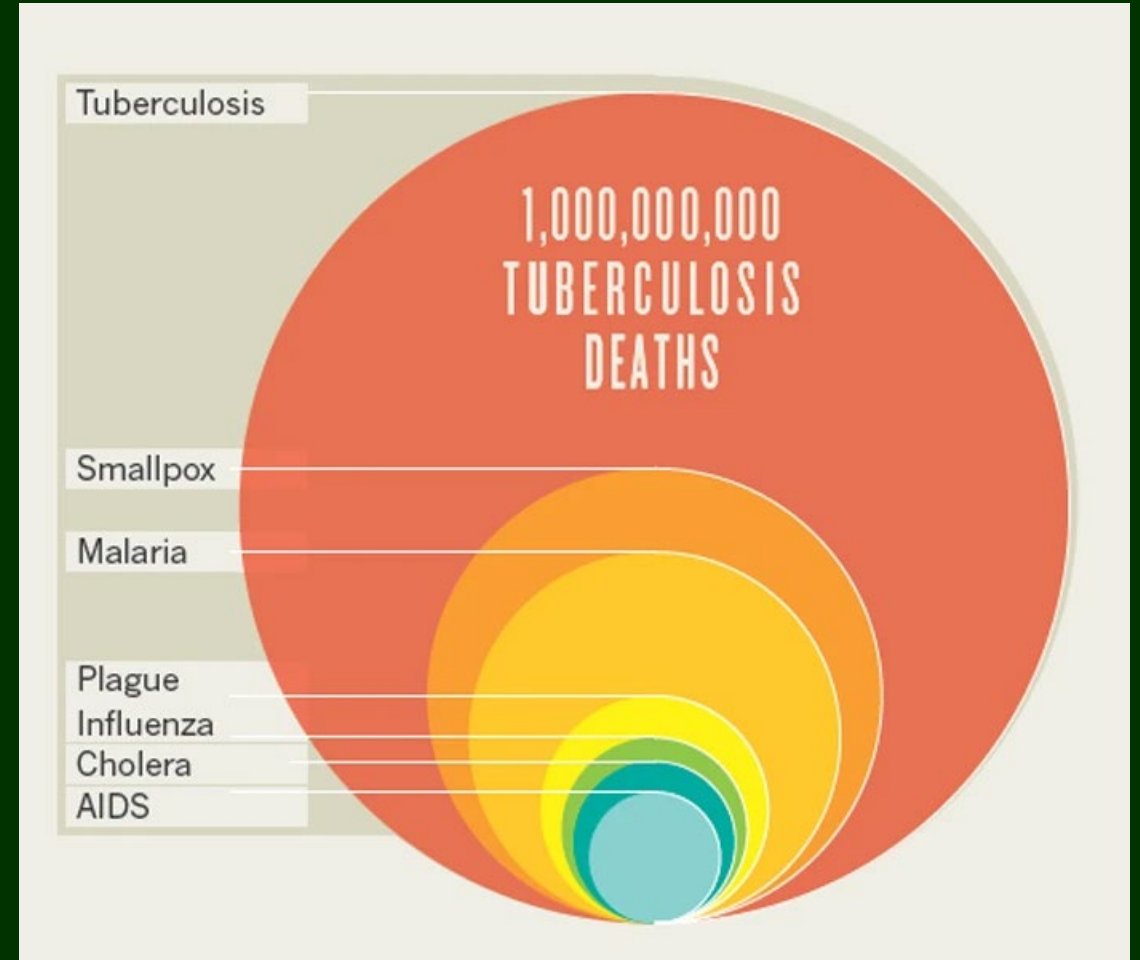
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Emily Sewell, Wildlife Health Specialist
MDNR

Nora Wineland, State Veterinarian
MDARD

Bovine Tuberculosis: One Health

Paulson, T. Epidemiology: A mortal foe. *Nature* **502,** S2–S3 (2013).
https://doi.org/10.1038/502S2a

Presentation Outline

- Shared goals of bTB surveillance
- Adaptive management
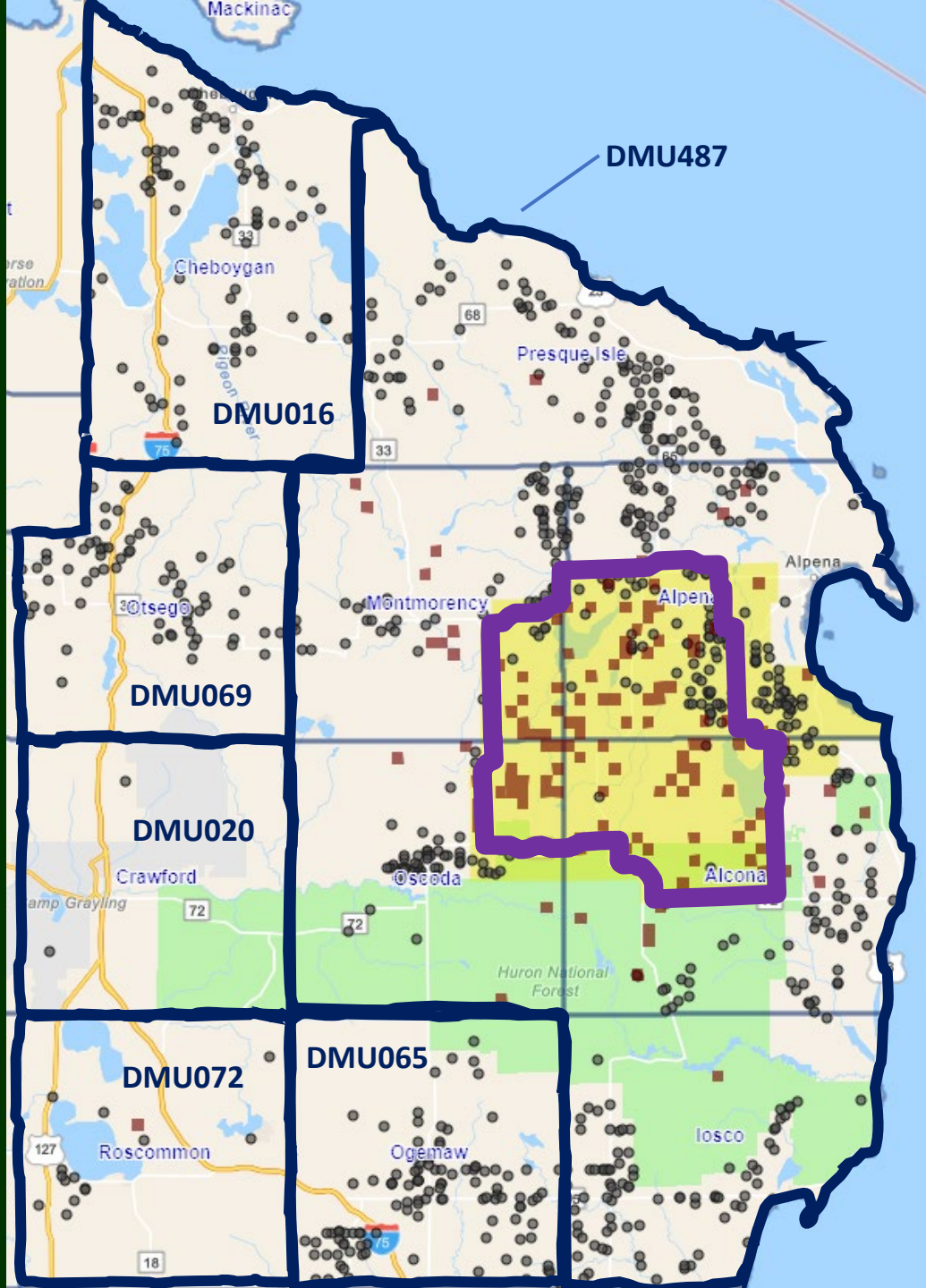- Sample collection
- What we learned (data analyses)
- Cattle update
- Future directions
- Questions

Map of
All Cattle
Herds in
Relation to
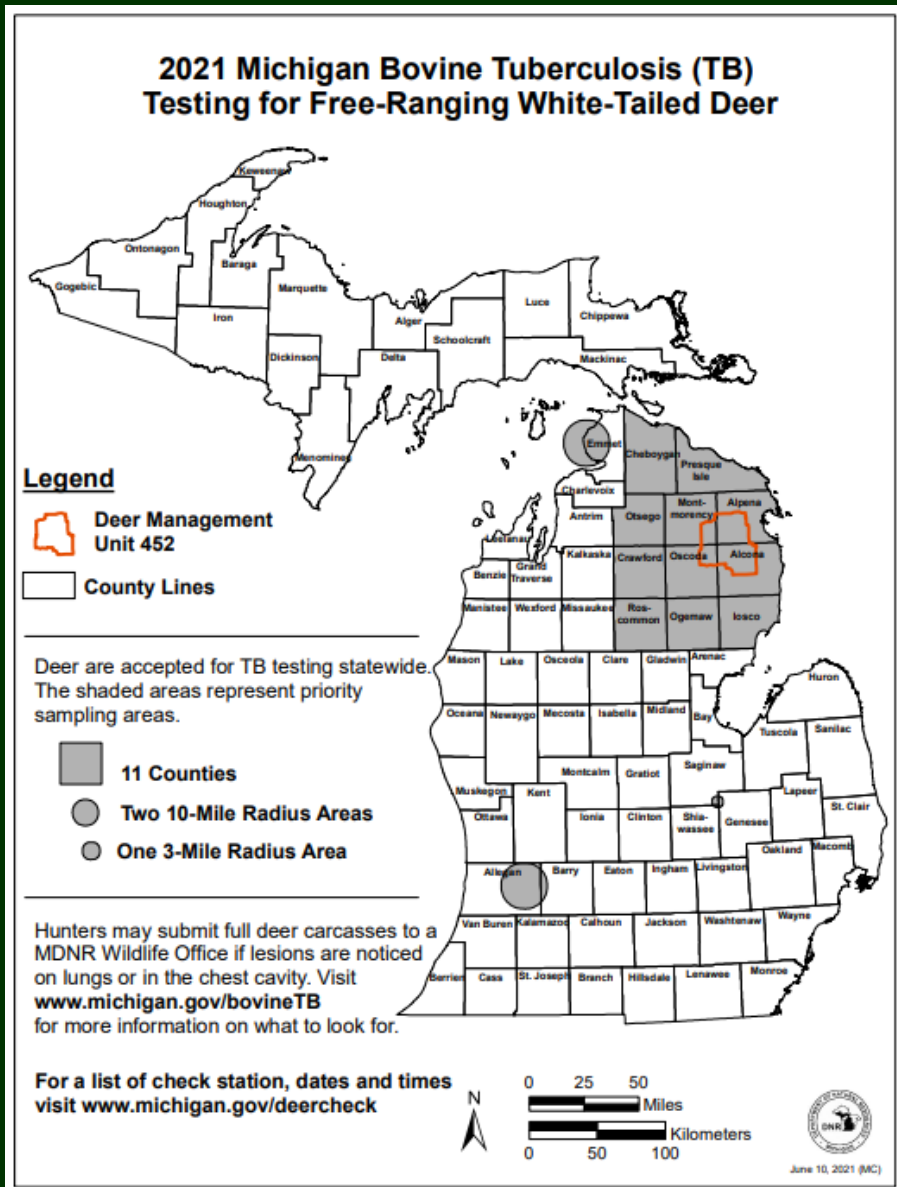DMU452

Shared Goals of Bovine TB (bTB) Surveillance

1 PREVENT

2 RESPOND

3 ELIMINATE

Sample
Collection

2021 Bovine TB Surveillance Efforts

2021 Michigan Bovine Tuberculosis (TB)
Testing for Free-Ranging White-Tailed Deer

Legend

Deer Management Unit 452

County Lines

Deer are accepted for TB testing statewide. The shaded areas represent priority sampling areas.

11 Counties

Two 10-Mile Radius Areas

One 3-Mile Radius Area

Hunters may submit full deer carcasses to a MDNR Wildlife Office if lesions are noticed on lungs or in the chest cavity. Visit www.michigan.gov/bovineTB for more information on what to look for.

For a list of check station, dates and times visit www.michigan.gov/deercheck

- Deer check stations

  o 24-hr. self-service drop boxes

- Permits

- Processors

- Communications

- Deer Head Collection Workgroup

2021 Bovine TB Surveillance Efforts
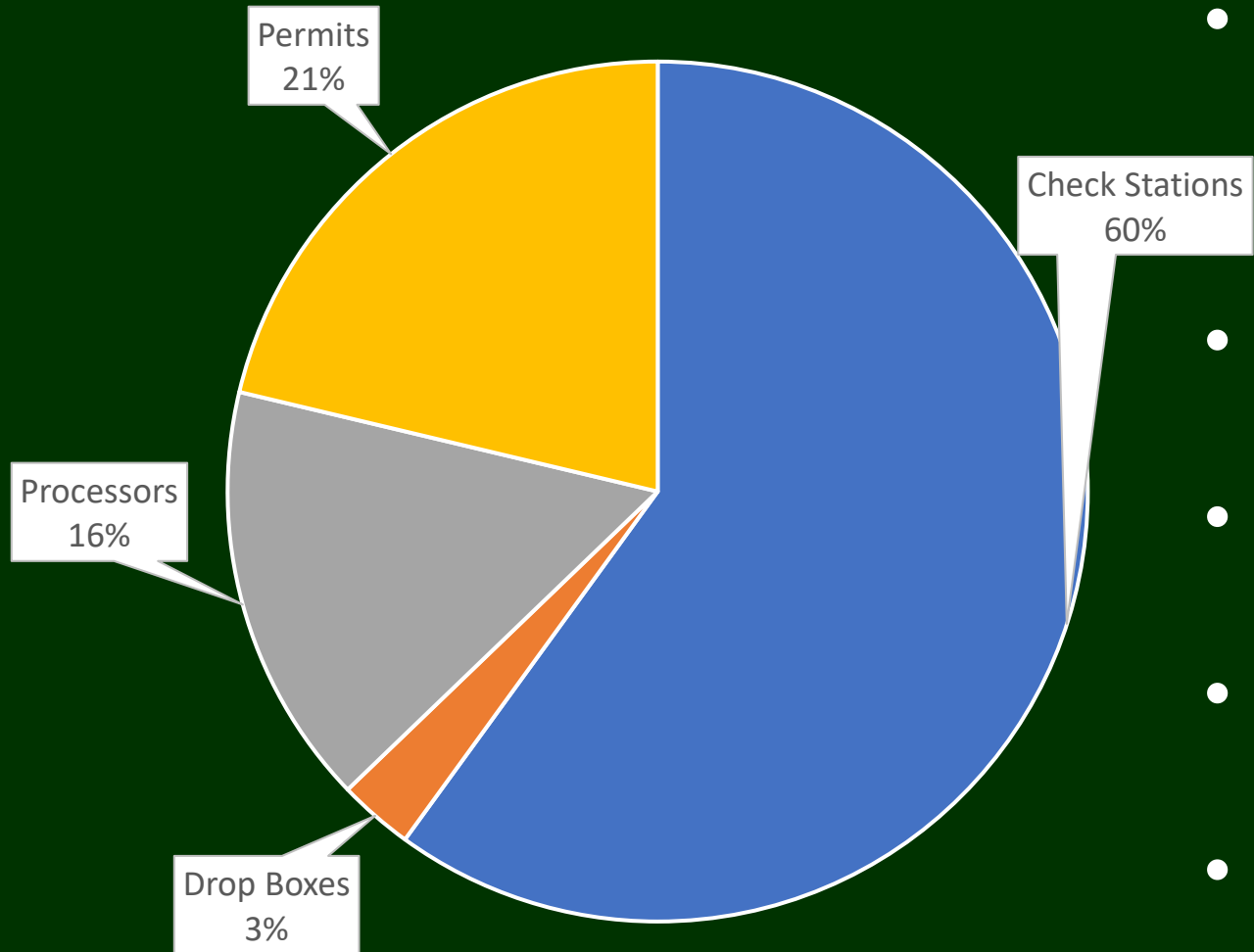
Submission Method for Deer Tested from TB Surveillance Counties (2021)

- Deer check stations
  - 24-hr. self-service drop boxes
- Permits
- Processors
- Communications
- Deer Head Collection Workgroup

Pie chart labels: Check Stations 60%, Permits 21%, Processors 16%, Drop Boxes 3%

What We Learned

Photo: M. Cosgrove, MDNR

White-tailed Deer bTB Surveillance

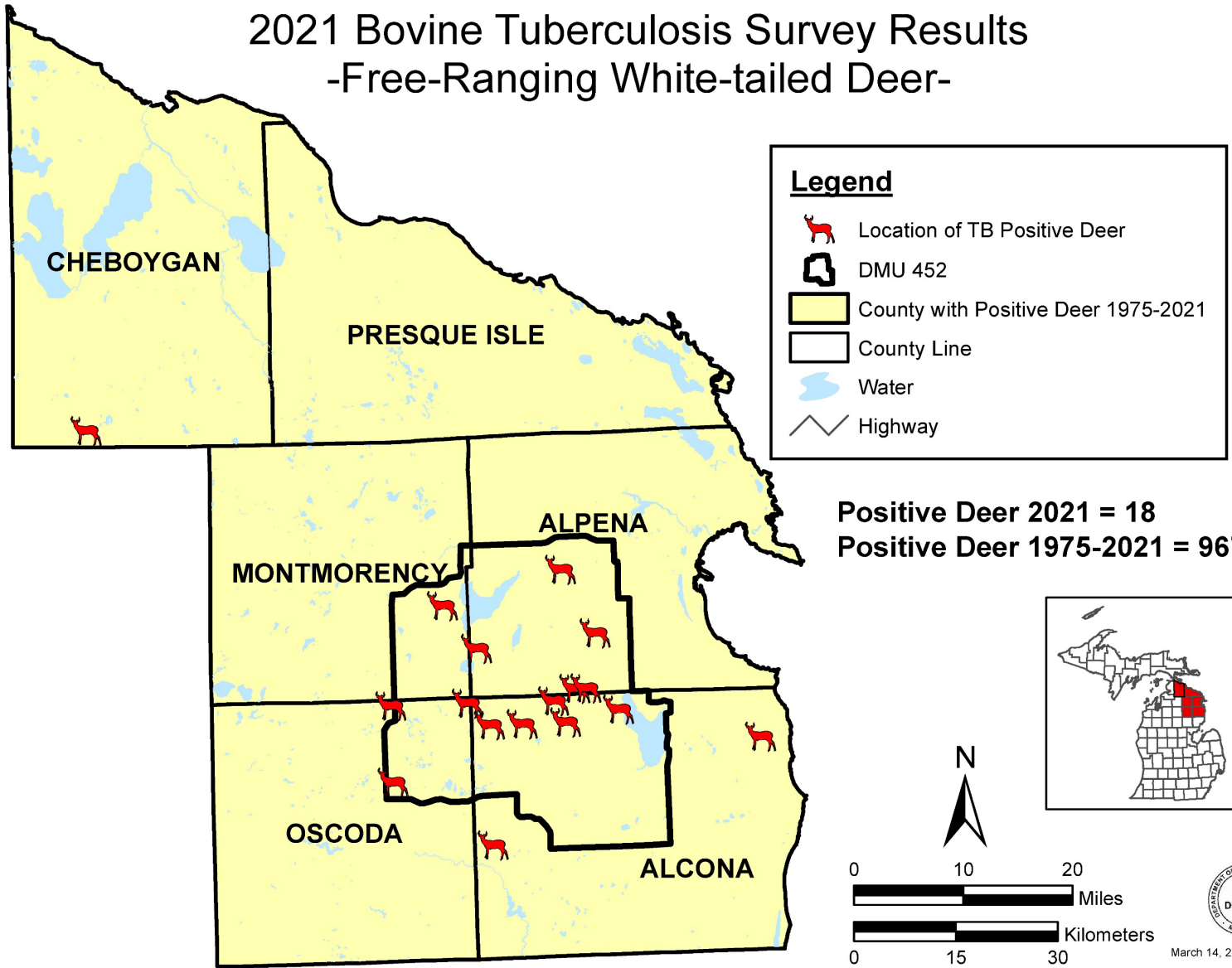| Year	Positive	Total Deer Tested
1975 & 1994	2	2
1995	18	403
1996	56	4,966
1997	73	3,720
1998	78	9,058
1999	58	19,497
2000	53	25,855
2001	61	24,278
2002	51	18,101
2003	32	17,306
2004	29	15,134
2005	16	7,365
2006	41	7,918
2007	27	8,316
2008	37	16,312
2009	31	5,723
2010	24	4,974
2011	17	6,026
2012	23	4,725
2013	21	5,903
2014	12	4,266
2015	34	8,461

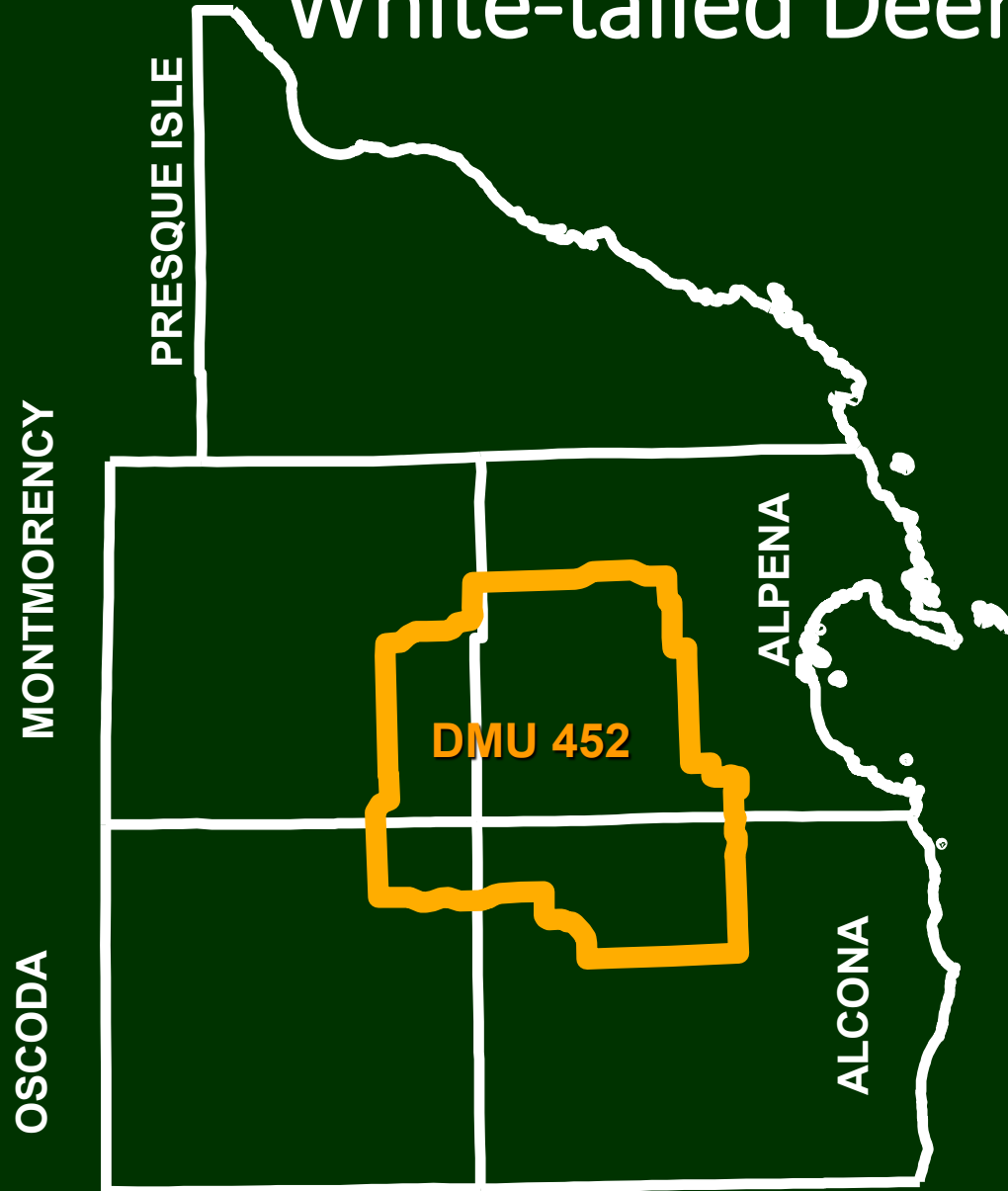| Year	Positive	Total Deer Tested
2016	29	12,031
2017	49	23,068
2018	26	35,620
2019	31	25,100
2020	20	7,460
2021	18	11,791
2022*	0	711
Grand Total	967	334,090

*testing for current year on-going

2021 Bovine Tuberculosis Survey Results
-Free-Ranging White-tailed Deer-

Legend

🦌 Location of TB Positive Deer

⬛ DMU 452

🟨 County with Positive Deer 1975-2021

⬜ County Line

🔵 Water

〜 Highway

Positive Deer 2021 = 18
Positive Deer 1975-2021 = 967

CHEBOYGAN

PRESQUE ISLE

ALPENA

MONTMORENCY

OSCODA

ALCONA

N

0   10   20   Miles

0   15   30   Kilometers

March 14, 2022 (MC)

Apparent bTB Prevalence in White-tailed Deer

| Year	DMU452	5-Co.Outside DMU452
1995	4.9%	(no testing)
1996	2.5%	0.2%
1997	4.7%	0.4%
1998	2.7%	0.3%
1999	2.4%	0.2%
2000	2.5%	0.4%
2001	2.3%*	0.5%
2002	2.6%	0.5%
2003	1.7%	0.2%
2004	1.7%	0.2%
2005	1.2%	0.1%
2006	2.3%	0.3%
2007	1.4%	0.2%
2008	1.9%	0.3%
2009	1.9%	0.4%
2010	1.8%	0.2%
2011	1.2%	0.1%
2012	1.7%	0.3%
2013	1.7%	0.2%
2014	1.0%	0.2%
2015	2.7%	0.3%
2016	2.0%	0.3%
2017	2.3%	0.6%
2018	2.1%	0.1%
2019	2.1%	0.4%
2020	2.1%	0.1%
2021	**1.4%**	**0.1%**
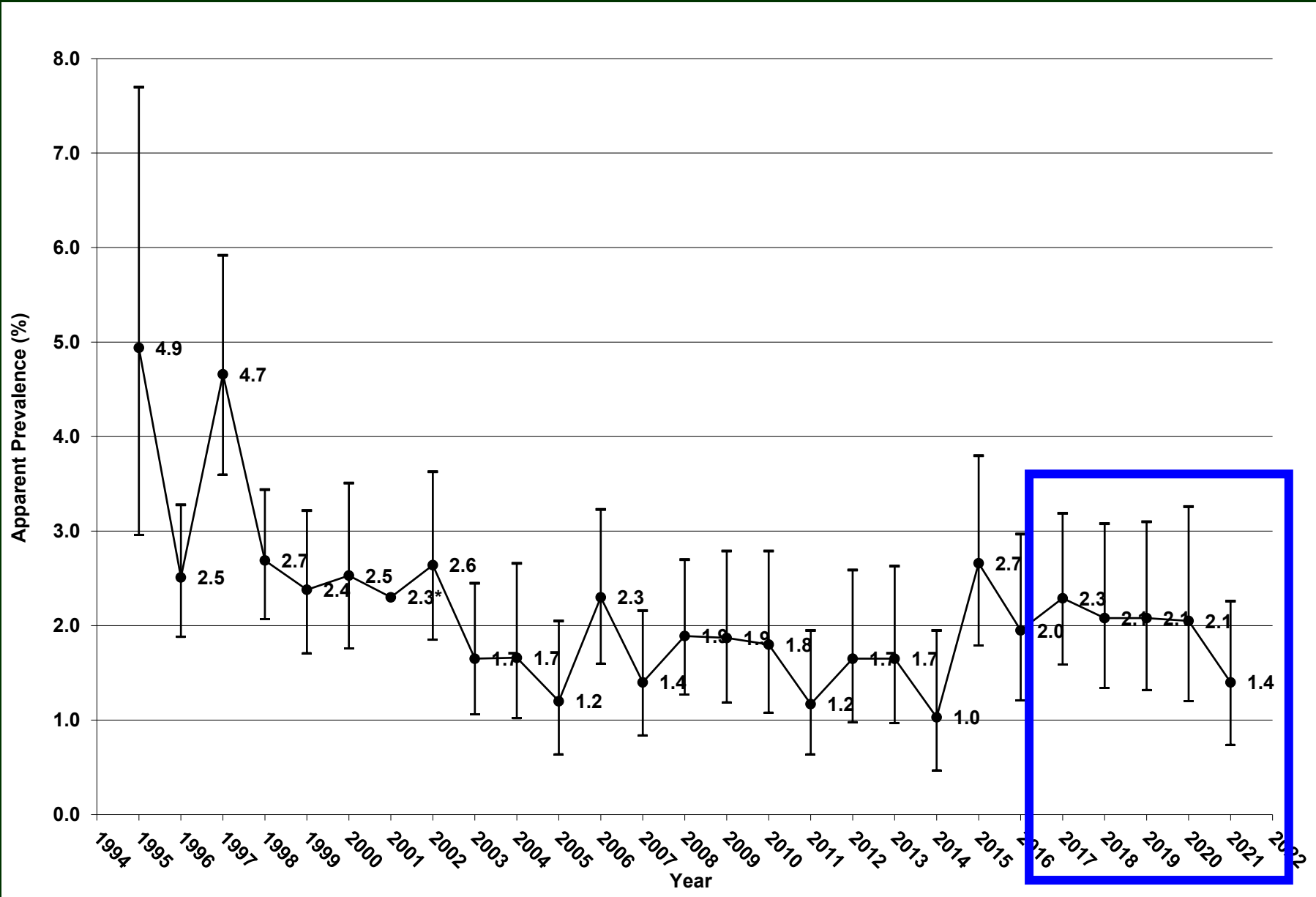
Cattle Update

Detecting and Responding to bTB Positive Cattle Herds

- Infected herds are detected through:
    - Annual surveillance testing
    - Movement testing

- Once detected:
    - Quarantine
    - Test-and-removal program
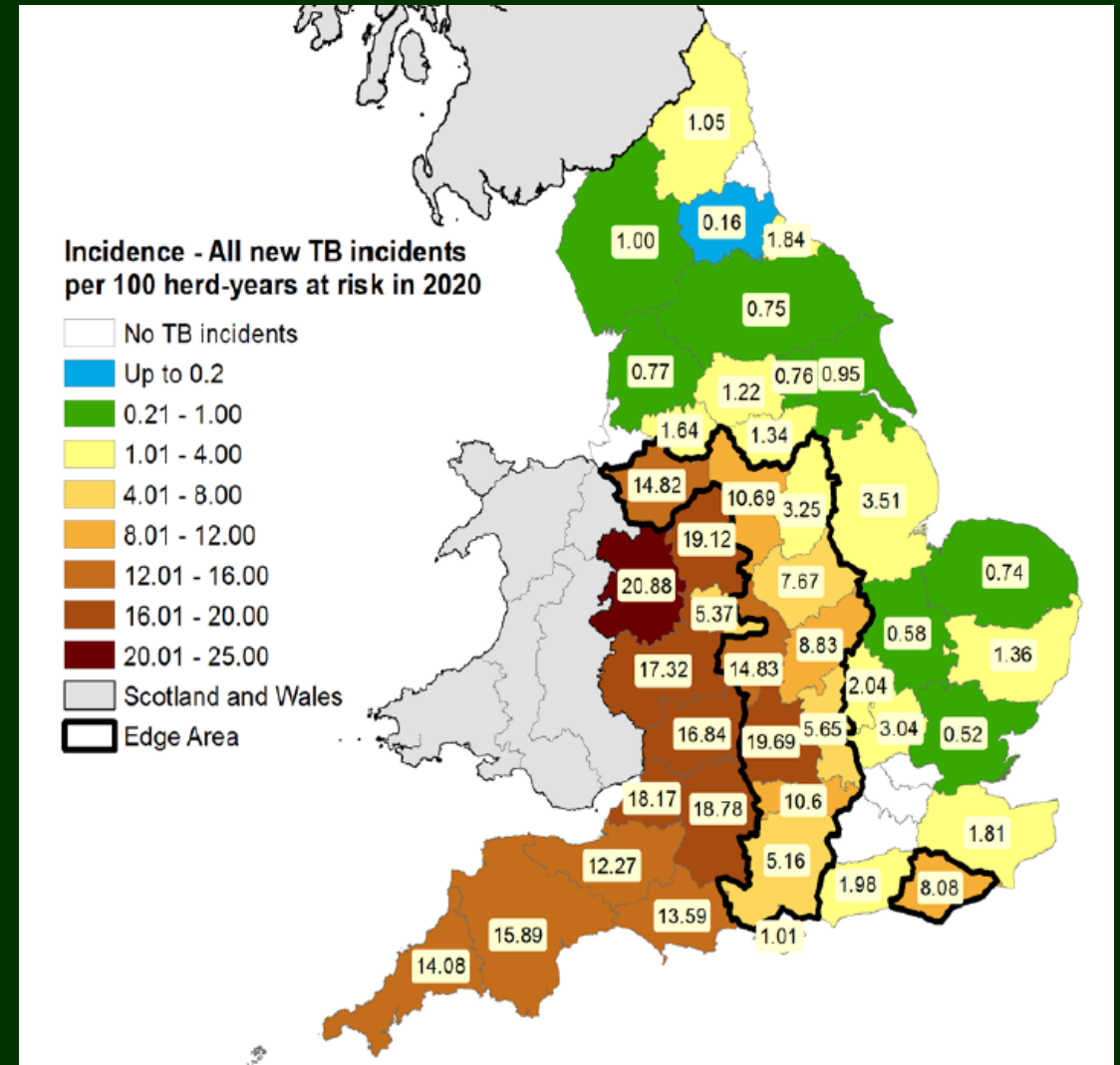   - Mandatory herd protection

Herd 81

Herd 82
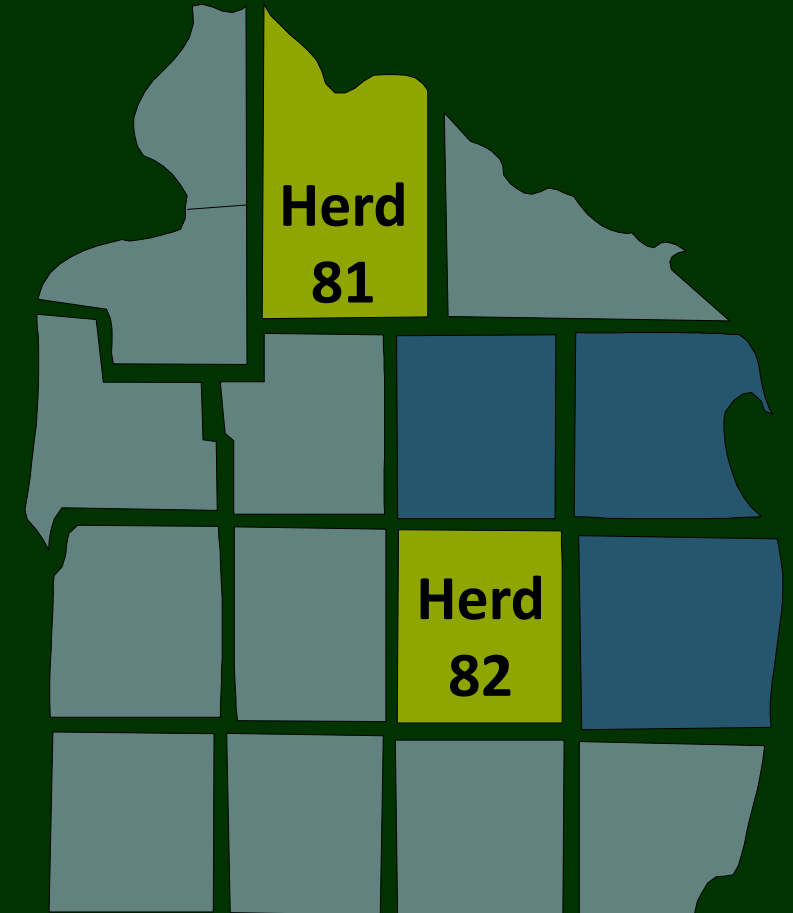
Current status of bTB positive cattle herds
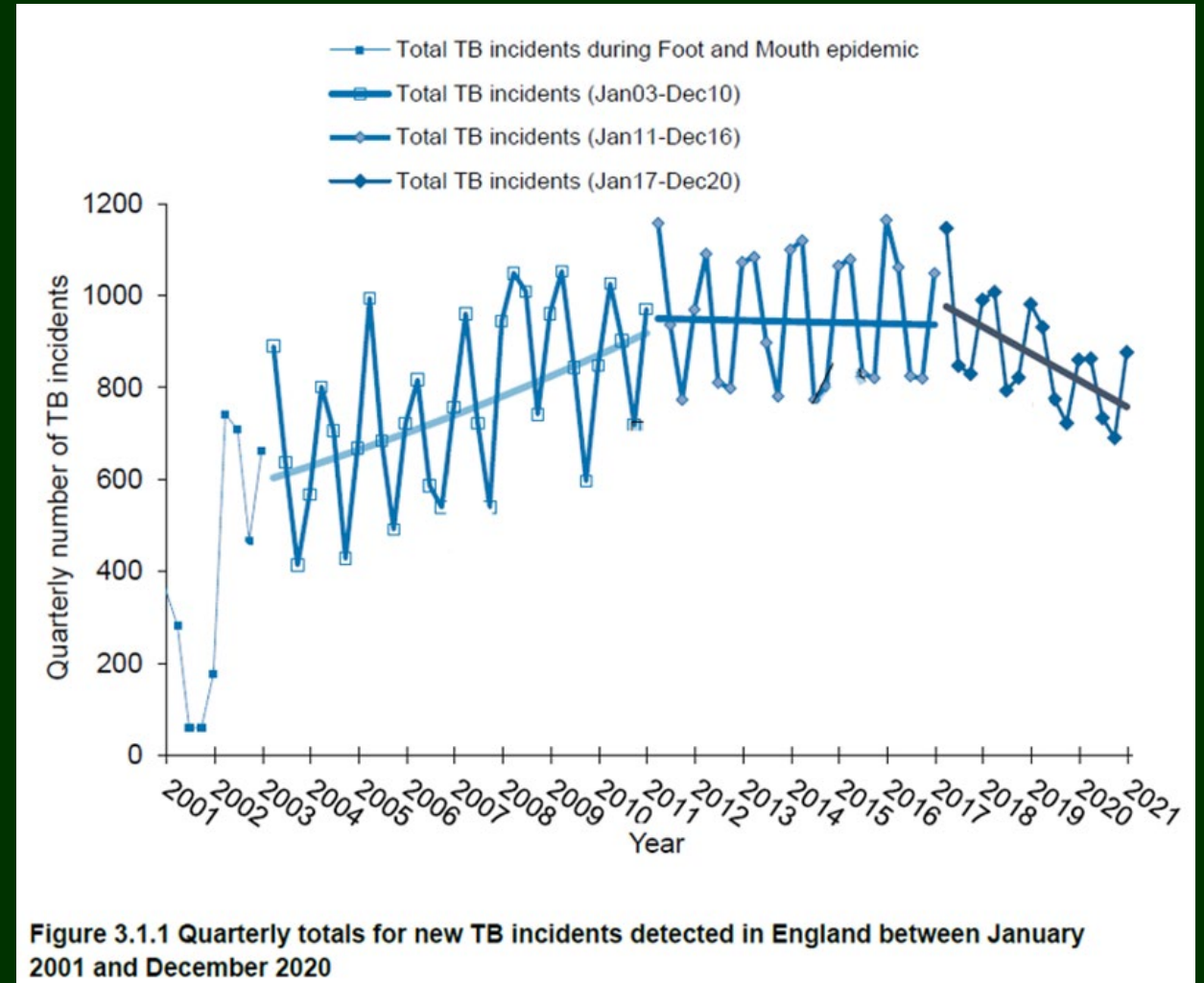
Future Directions

Great Britain As A Potential Model For Michigan

- Significant cattle industry
- Endemic TB in a populous wildlife species that are habituated to farms (European Badger)
- TB transmits from badgers to cattle
- Have been battling TB for many decades

Incidence - All new TB incidents per 100 herd-years at risk in 2020

- No TB incidents
- Up to 0.2
- 0.21 - 1.00
- 1.01 - 4.00
- 4.01 - 8.00
- 8.01 - 12.00
- 12.01 - 16.00
- 16.01 - 20.00
- 20.01 - 25.00
- Scotland and Wales
- Edge Area

Great Britain As A Potential Model For Michigan

- Made good progress up until 2002

- Efforts were relaxed due to other diseases – amount of TB exponentially increased

- Currently, finding <u>thousands</u> of TB-infected cattle herds each year

- TB is transmitting between livestock and wildlife **both ways**

Figure 3.1.1 Quarterly totals for new TB incidents detected in England between January 2001 and December 2020

Prevention and Wildlife Risk Mitigation

- For MDARD, the focus needs to be kept on protecting herds.

- <u>Main tools to reduce risk to herds</u>:
  - Feed cattle safely
  - Water cattle safely
  - Store feed safely
  - Remove habituated deer

- Encouraging producers to take advantage of and apply these tools.

Further Prevention Strategies in Wildlife

- bTB vaccine for deer
    - National Wildlife Research Center (USDA-APHIS Wildlife Services)
    - Ongoing field and lab trials – delivery method

New Surveillance Tools

- Force of Infection (FOI) model
  - bTB incidence (rate of new infections) in DMU 452 has been increasing since at least 2012 in both sexes
  - Geographic areas of highest transmission over time

TB Hazard, all ages, core outbreak area, 1996-2020

Bovine TB Surveillance Going Forward

- More efficient head collection – building partnerships

  o Processor program

  o Cooperation with groups, clubs, etc.

  o Continued coordination with MDARD

- Resume Herd & Hunter TB Connections meetings

  o Joint public engagement developed in 2018

Thank you!

Questions?

Special thanks to Dan O'Brien for sharing content from previous presentations