



TESTIMONY OF BROCK WAHL
NORTH DAKOTA BACKCOUNTRY HUNTERS AND ANGLERS
SENATE BILL 2137
HOUSE ENERGY AND NATURAL RESOURCE COMMITTEE
March 7, 2025

The North Dakota Chapter of Backcountry Hunters and Anglers recommends a **Do Not Pass** on Senate Bill 2137 of the 69th legislative assembly. This bill would strip authority from the North Dakota Game and Fish to implement their CWD Management Plan by prohibiting the Game and Fish from banning baiting practices. Just like the 2023 baiting bill (HB1151) we view this as ballot box biology.

While our chapter does not have a stance on baiting ethics, we do have a stance on legislation or ballot initiatives that seek to restrict or control the ability of the wildlife professionals to fulfill their statutory and constitutional duties. Duties that require them to manage for sustainable populations of wildlife for current and future generations, and as stated in Article XI, Section 27 of the North Dakota Constitution,

“Hunting, trapping, and fishing and the taking of game and fish are a valued part of our heritage and will be forever preserved for the people and managed by law and regulation for the public good.”

The public trust doctrine, supported by over a century of federal case law, makes it clear that all North Dakotans own the wildlife. This is codified in North Dakota Century code Section 20.1-03-03,

“The ownership of and title to all wildlife within this state is in the state for the purpose of regulating the enjoyment, use, possession, disposition, and conservation thereof, and for maintaining action for damages as herein provided.” and **“The state has a property interest in all protected wildlife. This interest supports a civil action for damages for the unlawful destruction of wildlife by willful or grossly negligent act or omission.”**

Our fellow North Dakotans at the Game and Fish act as our trustees and it is their responsibility to manage the public’s trust assets (the wildlife), for the benefit of the trust corpus and all beneficiaries, both alive and unborn. With that in mind, this is not a private property rights issue; this is about publicly owned wildlife, making this a public property rights issue. And the hunting practices of a single user group do not outweigh what is beneficial for the entire public resource or the beneficiaries. Allowing baiting practices to continue in the face of a contagious and 100% fatal disease is not responsible care of our wildlife assets. We believe it is not only responsible, but necessary for the department to ban baiting practices where chronic wasting disease is found.

This bill would effectively undo over 15 years of management by the North Dakota Game and Fish to slow the spread of CWD. Since the first CWD positive deer was found in 2009, the department has spent 6 million dollars on 500 hay yard projects for landowners, to help keep animals from congregating on silage piles, hay yards, and other alternative food sources.

There is no doubt that baiting practices contribute to the spread of chronic wasting disease. Infectious prions can be found in man placed mineral licks, in the soil around those mineral licks, on feeders, and in bait piles. Research efforts have repeatedly demonstrated horizontal and environmental transmission in animals that have prolonged and repeated contact with infectious materials. Research in Saskatchewan, Michigan, and Mississippi has found that man placed food sources represent by far, the largest aggregation of cervids and leads to the most focal contact with their environment. In other words, there is no activity that congregates deer more, putting them in direct contact with other deer and potentially contaminated environments, than artificial food sources. More than natural winter herding, natural food sources, bedding, and even breeding behaviors. Additionally, there are no examples of high prevalence rates of CWD within a deer herd not having negative impacts to that population. Some are less significant, others more severe and dramatic, but all impacts are negative. This is backed up by multiple population studies GPS collaring thousands of deer.

While we sympathize with the hunters this change affects, and we understand changing long held practices can be difficult, the resource must come first. With over half the states in the nation having banned baiting and feeding of wildlife, we are confident that North Dakota hunters will adapt and overcome to be successful in the field just like the other states. We understand that baiting bans alone will not stop CWD, that deer do naturally congregate, and some of those natural occurrences will never be a variable managers can control in wild animals. But we also believe it is disingenuous to suggest that hundreds of bait piles and feeders on the landscape, being replenished repeatedly throughout the year, does not directly exacerbate the spread of CWD.

While we were disappointed to see the Department's concessions over the 2023 baiting bill, we understand their desire to try and work with hunters as best they can. While the ND Game and Fish department cannot ban feeding, unless for purposes of hunting, we agree that banning baiting where CWD is found removes the incentive to feed and will also lead to a reduction in feeding. It is our stance that the department does have the legal authority to ban feeding, and we would support joining a majority of the states in the nation and implementing a feeding ban in the units that are under baiting restrictions.

This bill is not in the best interest of the deer held in public trust, or the North Dakota public hunters who are beneficiaries of that trust. The North Dakota Chapter of Backcountry Hunters and Anglers finds S.B. 2137 to be in direct violation of the North Dakota constitution, the North Dakota century code, the North American Model of Wildlife Conservation, the mission of the North Dakota Game and Fish, and a breach of the public trust doctrine.

We strongly oppose S.B. 2137

Board of Directors

North Dakota Chapter of Backcountry Hunters and Anglers

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Insight from Theodore Roosevelt

“Defenders of the short-sighted men who in their greed and selfishness will, if permitted, rob our country of half its charm by their reckless extermination of all useful and beautiful wild things, sometimes seek to champion them by saying the ‘the game belongs to the people.’ So, it does; and not merely to the people now alive, but to the unborn people. The ‘greatest good for the greatest number’ applies to the number within the womb of time, compared to which those now alive form but an insignificant fraction. Our duty to the whole, including the unborn generations, bids us restrain an unprincipled present-day minority from wasting the heritage of these unborn generations. The movement for the conservation of wild life and the larger movement for the conservation of all our natural resources are essentially democratic in spirit, purpose, and method.”



Wildlife is managed for all of the people of North Dakota, for the PUBLIC GOOD.

Article XI Section 27 of the North Dakota Constitution

Section 27. Hunting, trapping, and fishing and the taking of game and fish are a valued part of our heritage and will be forever preserved for the people and managed by law and regulation for the public good.

ND Century Code

20.1-01-03. Ownership and control of wildlife is in the state - Damages - Schedule of monetary values - Civil penalty. **The ownership of and title to all wildlife within this state is in the state for the purpose of regulating the enjoyment, use, possession, disposition, and conservation thereof, and for maintaining action for damages as herein provided.** Any person catching, killing, taking, trapping, or possessing any wildlife protected by law at any time or in any manner is deemed to have consented that the title thereto remains in this state for the purpose of regulating the taking, use, possession, and disposition thereof. The state, through the office of attorney general, may institute and maintain any action for damages against any person who unlawfully causes, or has caused within this state, the death, destruction, or injury of wildlife, except as may be authorized by law. **The state has a property interest in all protected wildlife.** This interest supports a civil action for damages for the unlawful destruction of wildlife by willful or grossly negligent act or omission.

ND Game and Fish Mission Statement

North Dakota Game and Fish Department
To protect, conserve and enhance fish and wildlife populations and their habitat for sustained public use.

What tools does the Game and Fish have?

- Baiting Bans
- Increased hunter harvest
- Sharpshooting/Culling
- Carcass transportation restrictions

In combating a contagious disease, what is the most effective tool?

ND Game and Fish Investments in fighting CWD and Winter Transmission

Biennium	License \$\$ Spent Landowner on depredation
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2009-11	\$1,068,000
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2011-13	\$851,000
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2013-15	\$253,000
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2015-17	\$276,935
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2017-19	\$689,339
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2019-21	\$471,910
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2021-23	\$699,528
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2023-25	\$1,761,269
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Total \$ \$6,070,981 = 498 Hay yard projects from 2009 – Fall 2024

Longitudinal Detection of Prion Shedding in Saliva and Urine by Chronic Wasting Disease-Infected Deer by Real-Time Quaking-Induced Conversion

Authors: [Davin M. Henderson](#), [Nathaniel D. Denkers](#), [Clare E. Hoover](#), [Nina Garbino](#), [Candace K. Mathiason](#), [Edward A. Hoover](#) | [AUTHORS INFO](#)

[& AFFILIATIONS](#)

Demonstrable prion shedding in saliva post infection

TABLE 3 Summary of IHC and RT-QuIC results for environmentally exposed CWD-exposed deer^a

Parameter	Value or description	
Animal no.	E-1	E-2
Sex	M	M
Genotype	C/S	G/G
No. of positive specimens/total no. of specimens tested		
Saliva		
0 mo p.i.	0/12	0/12
3 mo p.i.	1/12	3/12
6 mo p.i.	2/12	6/12
12 mo p.i.	2/12	12/12
15 mo p.i.	2/12	9/12

Environmentally exposed cohort (no artificial inoculation)

Animal no.	PO-1	PO2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10
Sex	M	M	M	M	F	M	F	M	F	F
Genotype	C/S	C/S	G/G	G/S	G/G	G/G	G/S	G/G	G/G	G/G
3 mo p.i.										
Saliva	0/8	0/8	0/8	0/8	0/8	0/8	1/8	0/8	0/8	0/8
Urine	0/8	NA	NA	0/8	NA	NA	0/8	NA	0/8	0/8
6 mo p.i.										
Saliva	0/8	0/8	NA	0/8	0/8	0/8	1/8	0/8	0/8	1/8
Urine	0/8	0/8	5/8	0/8	1/8	0/8	2/8	NA	0/8	1/8
9 mo p.i.										
Saliva	NA	0/8	2/8	NA	0/8	8/8	3/8	8/8	0/8	4/8
Urine	4/8	NA	NA	1/8	0/8	1/8	NA	NA	0/8	0/8
10 mo p.i.										
Saliva	0/8	1/8	1/8	4/8	NA	NA	4/8	5/8	NA	NA
Urine	1/8	NA	3/8	4/8	NA	0/8	NA	NA	NA	0/8
12 mo p.i.										
Saliva	0/8	0/8	5/8	3/8	0/8	1/8	0/8	5/8	1/8	3/8
Urine	7/8	NA	2/8	NA	0/8	NA	NA	NA	0/8	0/8

Orally inoculated cohort

Very low oral exposure to prions of brain or saliva origin can transmit chronic wasting disease

Nathaniel D. Denkers¹, Clare E. Hoover², Kristen A. Davenport³, Davin M. Henderson¹, Erin E. McNulty¹, Amy V. Nalls¹, Candace K. Mathiason¹, Edward A. Hoover^{1*}

**Large Doses or prolonged and repeated exposure to infect deer.
10 weeks of small doses was not enough to infect them.**

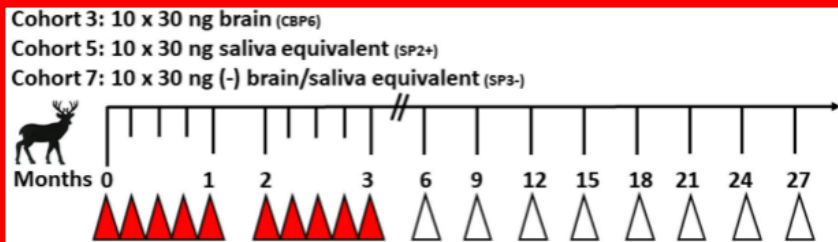
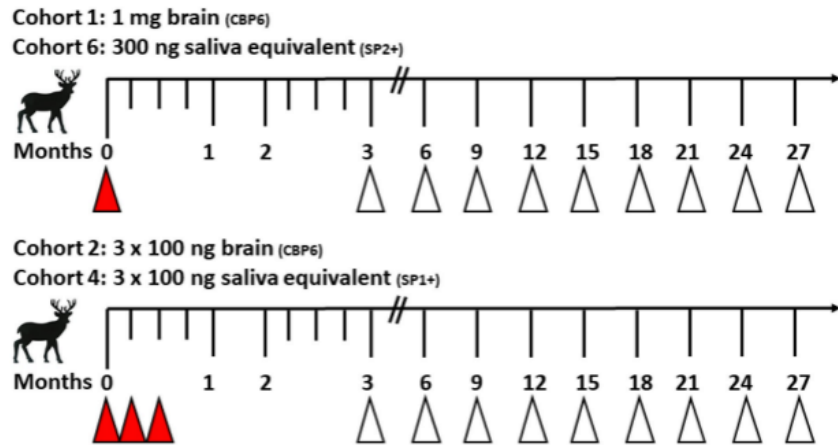
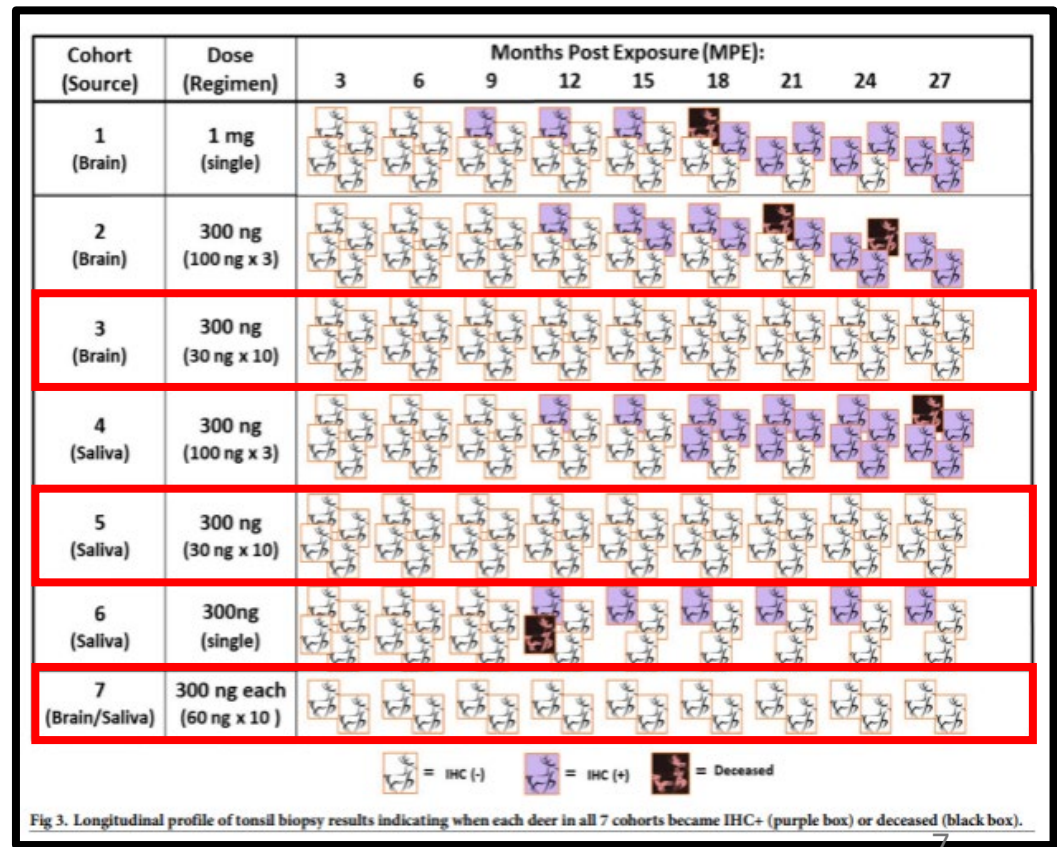


Fig 2. Experimental design of the current cohorts in this study. Solid triangles represent inoculation timepoints (0–12 weeks); open triangles represent longitudinal tissue biopsy collections to monitor for CWD (3–27 months).

10 week/Small dose cohorts 3,5,7 remained negative after 38-40 months of observation.



Infectious Prions in Pre-Clinical Deer and Transmission of Chronic Wasting Disease Solely by Environmental Exposure

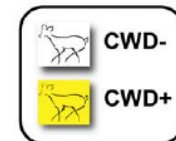
White-tailed Deer

Candace K. Mathiason¹, Sheila A. Hays¹, Jenny Powers², Jeanette Hayes-Klug¹, Julia Langenberg³, Sallie J. Dahmes⁴, David A. Osborn⁵, Karl V. Miller⁵, Robert J. Warren⁵, Gary L. Mason¹, Edward A. Hoover^{1*}

Table 1. CWD bioassay inoculation cohorts.

Animal cohort	n	Inoculum	Route of inoculation	Dosage (total volume)	No. of inoculations
1	3	Whole blood	IV	1 (225 ml)	1
2	3	Saliva	PO	10 ml/day for 5 days (50 ml)	5
3	3	Urine and Feces	PO	90 daily doses (85 ml+112.5 gr)	90
4	2	Environmental contact ^a	PO	19 mos. continuous exposure	Refreshed daily for 570 days (19 mos.)
5	4	Brain	PO	1 gr/day for 5 days (5 gr)	5

^aWater, feed buckets and bedding from CWD+ deer suites.
doi:10.1371/journal.pone.0005916.t001



Saliva (cohort 2). Each of the 3 deer in this cohort received saliva from pre-clinical CWD+ donors that were 6 to 13 months pi (Tables 1, 2). PrP^{CWD} was detected in tonsil of 1 of the 3 inoculated deer at 12 months pi, but not at earlier time points. By

19 months pi, study termination, a second animal was CWD+, by detection of PrP^{CWD} in brain and lymphoid tissue. The remaining deer was of necessity terminated at 16 months pi due to unmanageable aggressive behavior. This animal was CWD negative as determined by extensive western blot and IHC analysis (Figs. 1, 2).

Environmental exposure (cohort 4). The two animals in this cohort were exposed to daily introductions of feed buckets, water, and bedding removed from pens housing deer transitioning from pre-clinical to clinical phases of the disease (Table 1, 2). One of 2 exposed deer became tonsil biopsy PrP^{CWD}-positive at 15 months pi. At study termination, 19 months pi, both animals were CWD+ (Figs. 1, 2).

Cohort	T ^e 3 mo.	T ^e 6 mo.	T ^e 12 mo.	T ^e B ^f RLN ^g Terminal ^h	n+/ total n
Blood (cohort 1)	0/3	0/3	2/3	3/3	3/3
Saliva (cohort 2)	0/3	0/3	1/3	2/3	2/3
Urine/Feces (cohort 3)	0/3	0/3	0/3	0/3	0/3
Environment only (cohort 4)	0/2	0/2	0/2	2/2	2/2
Pos. control (cohort 5)	0/4	2/4	4/4	4/4	4/4

T^e=tonsil, B^f=Brain at obex, RLN^g=Retropharyngeal lymph node, ^h= euthanasia dependent upon clinical disease progression or space availability, X= animal euthanized for reason other than CWD.

Infectious Prions in Pre-Clinical Deer and Transmission of Chronic Wasting Disease Solely by Environmental Exposure (cont.)

White-tailed Deer
Replicate study

In summary, the results reported here reconfirm that blood and saliva are sources of infectious CWD prions, consistent with previous findings [27], and further support a mechanism for efficient CWD transmission in nature. We also show that infectious prions shed into the environment by CWD+ deer are sufficient to transmit the disease to naïve deer in the absence of direct animal-to-animal contact. These observations reinforce the exposure risk associated with body fluids, excreta, and all tissues from CWD+ cervids and suggest that similar dynamics may exist in other prion infections.

two years. The presence of infectious CWD prions in the environment therefore strongly suggests that natural prion infection occurs by routes additional to direct animal-to-animal contact. Based on the present and our previous findings [27], we speculate that saliva may harbor the greatest concentration of CWD prions available for horizontal transmission and environmental contamination, but recognize that other routes of excretion at lower concentration and greater volume still remain plausible.

Environmental sources of CWD infection

Previous studies have confirmed direct animal-to-animal contact—horizontal transmission—as an efficient mode for prion disease transmission [9,66]. Moreover, Miller and colleagues [9,67,68] have provided substantial evidence for environmental contamination as a source of CWD infection. Our bioassay study inocula doses (50 ml saliva/deer), while efficient in establishing the infectious nature of saliva, are likely unrealistic doses to be acquired in a natural setting. To emulate a more feasible natural environment-associated dose, while negating direct animal-to-animal contact, we exposed naïve deer to repeated exposures to fomites from the suites of CWD-infected deer. The study design was meant to mirror the daily habits and movements of a deer in its natural setting in which it may return to an area contaminated with small amounts of infectious prions over time. Here we provide the first report that under controlled indoor conditions CWD-naïve deer can acquire infection by exposure to fomites from the environment of CWD-infected deer, supporting the



Cohort	T ^o 3 mo.	T ^o 6 mo.	T ^o 12 mo.	T ^o B ¹ RLN ^o Terminal ^h	n/ total n
Blood IV/IP	0/6	0/6	4/6	6/6	6/6
Saliva PO	0/6	0/6	3/6	5/6	5/6
Urine/ Feces PO	0/5	0/5	0/5	0/5	0/5
Environ. only PO	0/2	0/2	0/2	2/2	2/2
Pos. control PO/IC	1/8	3/8	8/8	8/8	8/8

T^o=tonsil, B¹=Brain at obex, RLN^o=Retropharyngeal lymph node, ^h= euthanasia dependent upon clinical disease progression or space availability, X= animal euthanized for reason other than CWD.

Figure 4. Summary of naïve deer exposed to inoculum from CWD+ deer—combined with our previous published findings [27]. doi:10.1371/journal.pone.005916.g004

Prolonged and repeated exposure to infect deer

This is why bait piles are high risk.

Daily exposure = prolonged and repeated exposure

Environmental Sources of Prion Transmission in Mule Deer

Michael W. Miller,* Elizabeth S. Williams,† N. Thompson Hobbs,‡ and Lisa L. Wolfe*

NO animals were artificially inoculated.

No injections, no transfusions, no brain homogenate, no forced saliva intake. Prolonged eating and drinking out of the same containers that CWD+ elk did.

Materials and Methods

We conducted a replicated experiment to compare CWD transmission from three infection sources: naturally infected captive mule deer (one infected deer/paddock), carcasses from naturally infected captive mule deer that had decomposed in situ ≈1.8 years earlier (one carcass/paddock), or undisturbed paddock environments where infected mule deer had last resided 2.2 years earlier. Each exposure source was replicated in three separate paddocks; two clean paddocks served as unexposed controls. Control paddocks and paddocks where live infected deer were

Prolonged and repeated exposure to infect deer

This is why bait piles are high risk. Daily exposure = prolonged and repeated exposure

Table. Chronic wasting disease arising in mule deer exposed to environments contaminated by residual excreta, carcasses, or other infected deer

Replicate	Exposure source			Unexposed
	Infected deer	Infected carcass	Residual excreta	
1	1/4 ^a	0/3	1/3	0/2
2	0/2	2/4	0/3	0/2
3	1/4	1/5	0/3	NA ^b
Total	2/10	3/12	1/9	0/4

^aNumber positive/number exposed (not including infected source deer).

^bNot applicable; controls included only two replicate paddocks.

Chronic wasting disease model of genetic selection favoring prolonged survival in Rocky Mountain elk (*Cervus elaphus*)

A. L. WILLIAMS,^{1,†} T. J. KREEGER,^{2,3} AND B. A. SCHUMAKER¹

NO animals were artificially inoculated.

No injections, no transfusions, no brain homogenate, no forced saliva intake. Prolonged eating and drinking out of the same containers that CWD+ elk did.

CWD inoculation studies have been conducted there. The TWWRU has eight, 0.2-ha elk holding pens, all of which held CWD-infected elk previous to and during this study. Elk were rotated randomly among all eight pens annually to maximize PrP^{CWD} exposure, but were never intermingled with non-study, CWD-infected elk. Captive elk were fed alfalfa hay supplemented with a pelleted ration and provided water and a trace mineral block ad libitum. Husbandry, care, diagnostic techniques, and method of euthanasia

annually for PrP^{CWD} by rectal mucosa biopsy using ELISA (Spraker et al. 2009). During the analysis, 37 of 39 elk died, all of which were positive for CWD. Of those that had been examined for PrP^{CWD} by rectal mucosa biopsy,

all elk were 27 M/M₁₃₂ (69.2%), 11 M/L₁₃₂ (28.2%), and 1 L/L₁₃₂ (2.6%). The genotypes of the last surviving elk were M/L₁₃₂ (which died in 2012) and L/L₁₃₂. In 2014, the L/L₁₃₂ is still alive and has remained negative for PrP^{CWD} by rectal

Mineral licks as environmental reservoirs of chronic wasting disease prions

Ian H. Plummer¹, Chad J. Johnson², Alexandra R. Chesney³, Joel A. Pedersen^{4*}, Michael D. Samuel^{1*}

Detection at 9 of 11 sites sampled

Here, we test the hypothesis that mineral licks used by deer harbor CWD prions, thus serving as potential environmental reservoirs for these infectious agents. During 2012–2015 we collected soil and water samples from 11 mineral licks (10 man-made and one natural) frequented by free-ranging white-tailed deer in a large CWD enzootic zone west of Madison, Wisconsin, USA [6] (Fig 2). We adapted a 96-well microplate variant of PMCA that

likely due in part to co-extracted inhibitors of the PMCA reaction and incomplete extraction from soil particles. The detection of prions at 9 of 11 sites sampled, however, demonstrates widespread contamination of mineral licks in the CWD outbreak zone. The generally higher

At the mineral lick site with the highest detection of CWD prions in environmental samples (Site 6), we opportunistically sampled white-tailed deer fecal pellets. We detected CWD prions in six of the 10 fecal samples after three rounds of amplification by mb-PMCA. Of eight

Discussion

Our results demonstrate that CWD-infected white-tailed deer deposit prions at mineral licks they visit. Although the mechanism of prion deposition is unknown, we suspect deposition of saliva by infected deer during ingestion of soil and water at mineral licks has the highest potential to facilitate indirect transmission to susceptible deer. Saliva from white-tailed deer infected with CWD contains on the order of 1–5 infectious doses (ID_{50}) per 10 mL as quantified by real-time quaking-induced conversion, where an ID_{50} is the dose of CWD prions capable of infecting half of the transgenic mice expressing cervid prion protein [48]. Frequent visitation by infected cervids could allow mineral licks to become potential “hot spots” for indirect trans-

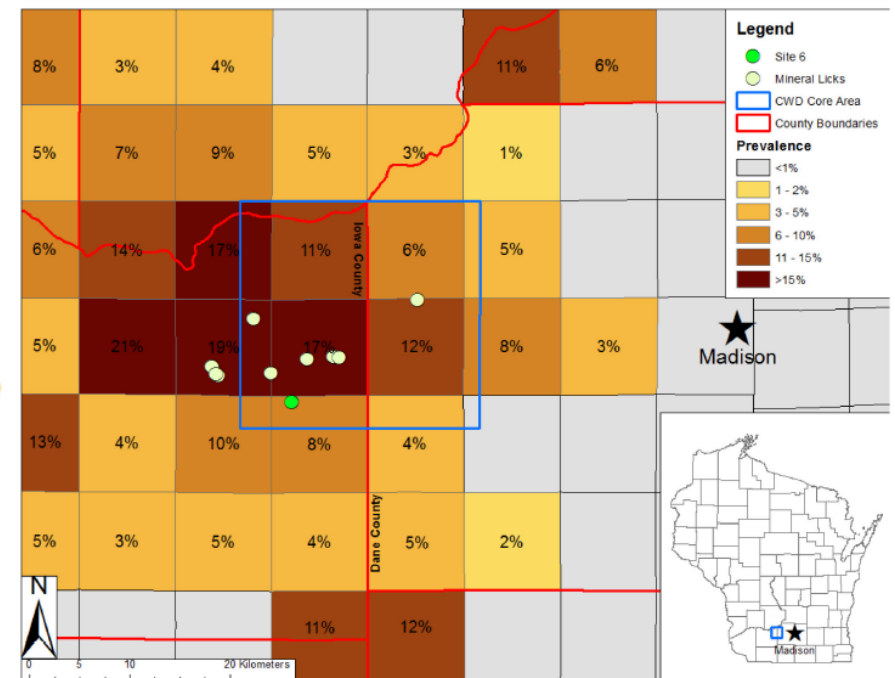


Fig 2. Mineral licks and chronic wasting disease prevalence. Locations of sampled mineral licks and prevalence of chronic wasting disease (CWD) in hunter-harvested white-tailed deer from 2010–2013 in south-central Wisconsin, USA. Squares are townships of 9.66 km per side. Inset shows state of Wisconsin, USA. Site 6 denotes the mineral lick with CWD-positive fecal samples.

CWD Sentinels: detecting environmental prion protein (ePrP) via surfaces for the early discovery of CWD

Marc D. Schwabenlander¹, Catalina Picasso-Risso¹, Gage Rowden¹, Qi Yuan², Erik Hildebrand³, Patrick Hagen³, Shannon L. Bartelt-Hunt⁴, Jason C. Bartz², Tiffany M. Wolf⁵, and Peter A. Larsen¹



INFECTIOUS PRIONS FOUND IN BAIT AND ON FEEDERS

<p>Site A</p> <ul style="list-style-type: none"> ~2% local prevalence 1/8 RT-QuIC+ swabs No ELISA+ deer culled near site 	<p>Wild Herd</p>
<p>Site B</p> <ul style="list-style-type: none"> ~2% local prevalence 6/12 RT-QuIC+ swabs 2 ELISA+ deer culled near site 	

Figure 1. A. Sentinel surfaces placed for one week in captive deer facilities and areas with wild deer feeders/baits. **B.** Sentinels collected/swabbed. **C.** Swabs tested via RT-QuIC for CWD.

Laboratory controls of clean/unused surfaces and feed/bait components were analyzed via RT-QuIC (negative controls). Some locations had additional samples collected (e.g., water tank swabs, feeder swabs, oral swabs). Locations had variable levels of CWD prevalence.

INTRODUCTION	METHODS	CONCLUSIONS
<p>Scientists are developing highly sensitive chronic wasting disease (CWD) detection methodologies that utilize non-tissue samples.</p> <p>Real-time quaking-induced conversion (RT-QuIC) is one such assay proven to be a more sensitive tool for CWD prion detection than current antibody-based methods (e.g., ELISA and IHC).</p> <p>Similar to environmental DNA (eDNA) detection methods in aquatic and terrestrial environments, we investigated a rapid method for extracting prions from swabs of environmental surfaces to detect CWD when paired with RT-QuIC.</p> <p>Laboratory investigation demonstrated that RT-QuIC detection of CWD prions recovered from surfaces (e.g., stainless steel, glass) via swabs was similar to the original CWD prion load applied to the surface.¹</p>	<p>Figure 1. A. Sentinel surfaces placed for one week in captive deer facilities and areas with wild deer feeders/baits. B. Sentinels collected/swabbed. C. Swabs tested via RT-QuIC for CWD.</p> <p>Laboratory controls of clean/unused surfaces and feed/bait components were analyzed via RT-QuIC (negative controls). Some locations had additional samples collected (e.g., water tank swabs, feeder swabs, oral swabs). Locations had variable levels of CWD prevalence.</p> <p>All data are being analyzed for detection performance (e.g., run time, sample dilution) and association between environmental sample detection and CWD prevalence.</p>	<ul style="list-style-type: none"> ePrP detection through non-invasive methods may be used for surveillance and discovery of CWD, informing management. Surface sentinel surveillance may be an applicable practice for other prion and prion-like diseases in settings such as meat processing facilities and hospitals. Environmental factors, such as feed type, may affect results.
RESULTS		
<p>Pen A</p> <ul style="list-style-type: none"> No historic IHC+ deer 2/16 RT-QuIC+ swabs 8% prevalence at depopulation <p>Pen B</p> <ul style="list-style-type: none"> Many historic IHC+ deer 19/34 RT-QuIC+ swabs 68% prevalence at depopulation 	<p>Site A</p> <ul style="list-style-type: none"> ~2% local prevalence 1/8 RT-QuIC+ swabs No ELISA+ deer culled near site <p>Site B</p> <ul style="list-style-type: none"> ~2% local prevalence 6/12 RT-QuIC+ swabs 2 ELISA+ deer culled near site 	<p>ACKNOWLEDGMENTS</p> <p>We thank the facility owners and regulatory bodies for access to the research locations, collection of sentinels, and providing official CWD testing results. Figures 1 and 2 and this poster were created with BioRender.com.</p>
AIM	DISCUSSION	LITERATURE CITED
<p>We deployed surfaces shown to effectively bind misfolded prions as environmental prion protein (ePrP) sentinels in food sources of captive and free-ranging herds.</p>	<ul style="list-style-type: none"> Data collection and analysis are still in progress for all locations. Captive facility swab results have generally aligned with location/pen prevalence. Wild herd sentinel swab results and CWD positive culled deer near bait sites have been less clearly aligned, likely due to seasonal local migration patterns in the wild herd, potential for infected deer visiting multiple sites, and culling processes. Research indicates that low levels of prions are excreted in saliva from CWD positive deer.² Therefore, even with promising prion recovery based on the seminal laboratory swabbing method development¹, it is likely in deer with early CWD infection, detection via sentinels may be limited. Additionally, deer may not test positive via IHC or ELISA on tissues but may be excreting prions in saliva at some level detectable via sentinel swabs. 	<ol style="list-style-type: none"> Yuan Q, Rowden G, Wolf TM, Schwabenlander MD, Larsen PA, Bartelt-Hunt SL, Bartz JC. Sensitive detection of chronic wasting disease prions recovered from environmentally relevant surfaces. <i>Environment International</i>, Volume 166, 2022. Henderson DM, Manca M, Haley NJ, Denkers ND, Nalls AV, Mathiason CK, et al. (2013) Rapid Antemortem Detection of CWD Prions in Deer Saliva. <i>PLoS ONE</i> 8(9): e74377.



FACTORS AFFECTING CHRONIC WASTING DISEASE PRION TRANSMISSION AMONG WHITE-TAILED DEER (*ODOCOILEUS VIRGINIANUS*) IN SOUTHERN MICHIGAN

2 year study

2021

10 bait sites
6 food plots

2022

10 different bait sites
9 food plots

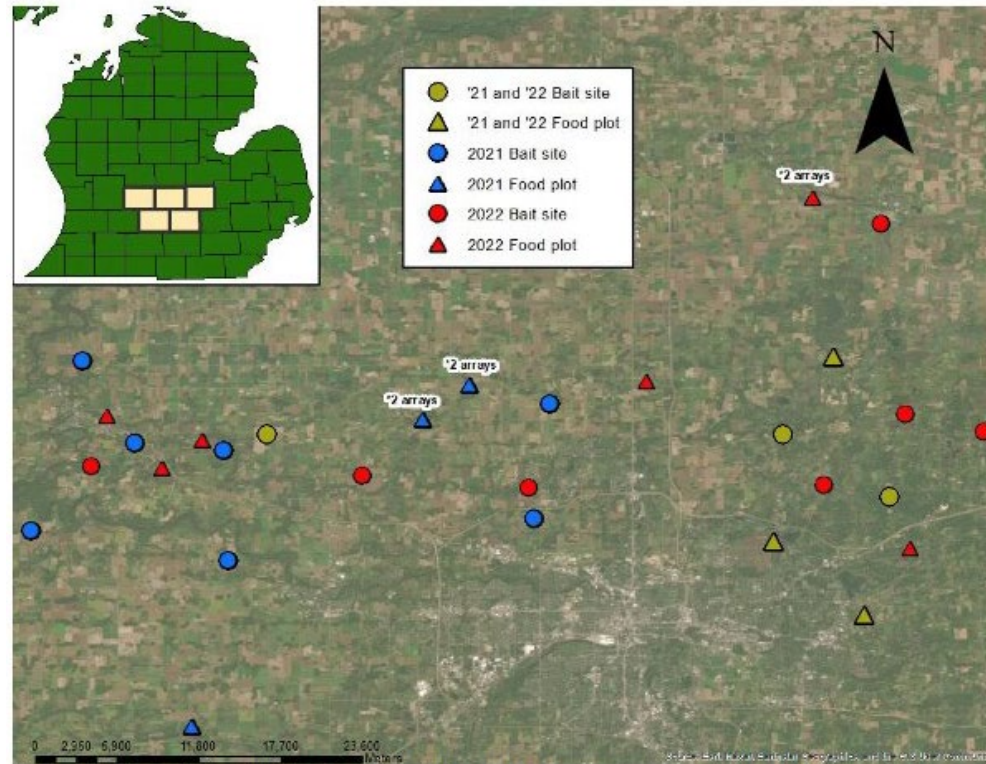


Figure 2.1 Locations of bait site and food plot camera arrays to record deer behaviors during winter (January through April) in Michigan, USA, 2021-22. Background is World Imagery layer updated in 2023 by Esri, Maxar, Earthstar Geographics and the GIS User Community.

FACTORS AFFECTING CHRONIC WASTING DISEASE PRION TRANSMISSION AMONG WHITE-TAILED DEER (ODOCOILEUS VIRGINIANUS) IN SOUTHERN MICHIGAN

Bait sites are consistently the highest incidence of direct and indirect (environmental) contact between deer

Table 2.3 Total number of direct, self, or environmental contacts exhibited by deer sex-age class by treatment during winter (January through April) in Michigan, USA, 2021-22. Note that multiple behavior types could occur within one 30-second segment.

Deer Sex-Age Group	Total deer observations by year		Contact Type by Year					
			Direct		Self		Environmental	
	2021	2022	2021	2022	2021	2022	2021	2022
Transects								
Adult Male	12	86	4	19	2	22	30	96
Adult Female	56	74	4	11	14	11	143	75
Male Fawn	24	57	6	11	7	16	65	67
Female Fawn	39	47	4	9	11	11	110	48
Total	131	264	18	50	34	60	348	286
Bait Sites								
Adult Male	201	298	132	92	26	59	646	874
Adult Female	61	355	54	172	15	92	161	967
Male Fawn	94	361	65	151	12	94	282	1,118
Female Fawn	36	225	27	120	8	67	106	631
Total	392	1,239	278	535	61	312	1,195	3,590
Food Plots								
Adult Male	57	48	22	3	5	3	143	97
Adult Female	42	74	28	8	4	5	118	154
Male Fawn	32	85	21	10	3	9	76	200
Female Fawn	11	67	2	6	0	5	22	129
Total	142	274	73	27	12	22	359	580

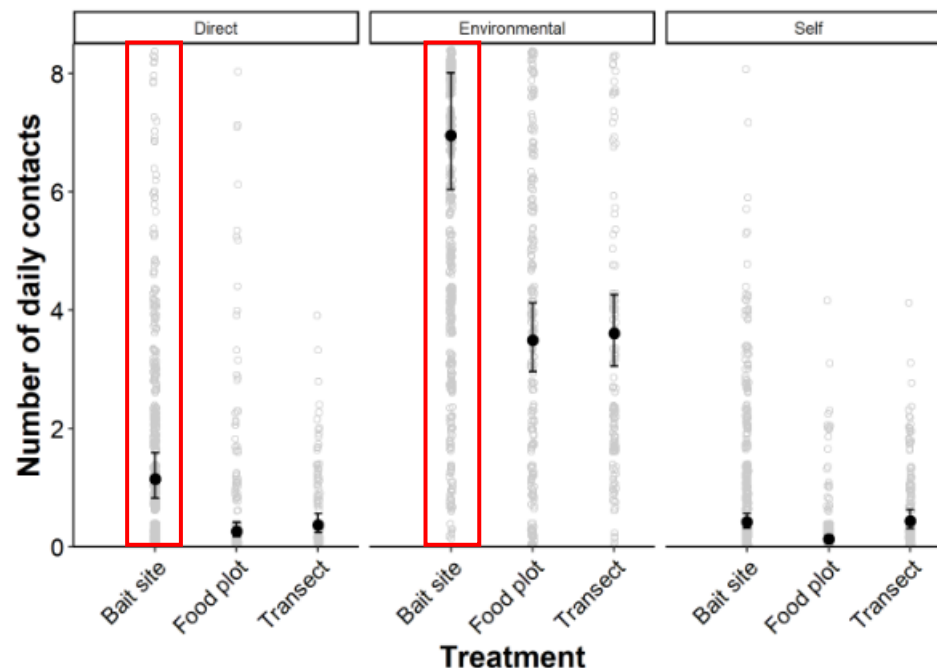




Figure 2.3 Average number of daily direct, environmental, and self-contacts among deer observed at bait sites, food plots, and transects during winter (January through April) in Michigan, USA, 2021-22. Light grey circles represent data points, and error bars represent 95% confidence intervals.

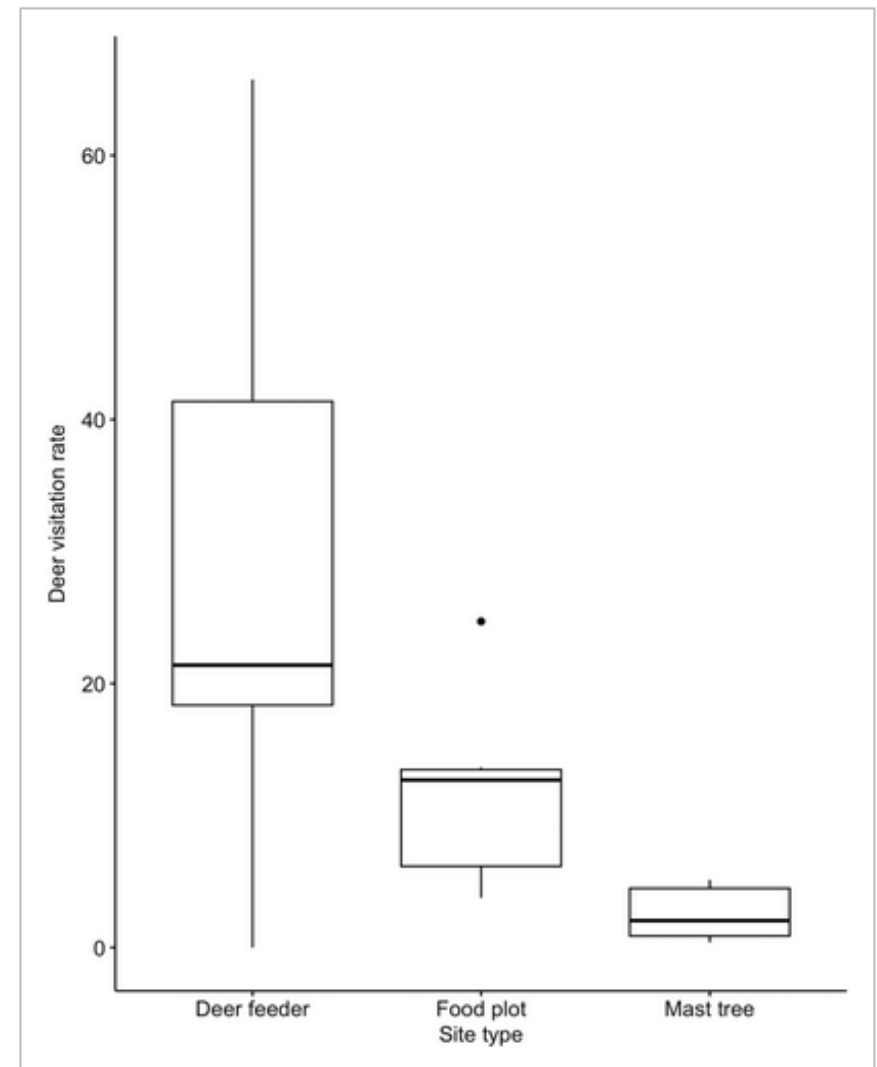
Chronic wasting disease prions on deer feeders and wildlife visitation to deer feeding areas

Miranda H. J. Huang  Steve Demarais, Marc D. Schwabenlander, Bronson K. Strickland, Kurt C. VerCauteren, William T. McKinley, Gage Rowden, Corina C. Valencia Tibbitts ... [See all authors](#) 

First published: 10 February 2025 | <https://doi.org/10.1002/jwmg.70000>

7 gravity feeders from September 2022 to March 2023 in a CWD zone in northern Mississippi

- All feeders had detectable levels of prions after 12 weeks.
- "We found that supplemental feeding increased the risk of exposure to CWD prions due to contamination of feeders, increased deer visitation, and increased deer-to-deer contact."
- "The relative risk comparison showed that almost three times more deer visited sample areas around feeders than equivalent areas within food plots. The more deer that frequent a small area, the greater the risk for CWD to spread through direct and indirect contact between those deer"
- **"...near-zero deer-to-deer contacts occurring at food plots"**



Use of environmental sites by mule deer: a proxy for relative risk of chronic wasting disease exposure and transmission

MARÍA FERNANDA MEJÍA-SALAZAR,^{1,†} CHERYL L. WALDNER,² YEEN TEN HWANG,^{1,3} AND TRENT K. BOLLINGER^{1,4}

July 2009 to December 2012

365 Deer GPS collared

Research sites: 17
 salt licks,
 29 waterholes
 26 rubs
 65 bed sites
 77 browse areas 33
 grain sources 70
 trails
 53 mortalities

370 cameras
 30,377 Pictures

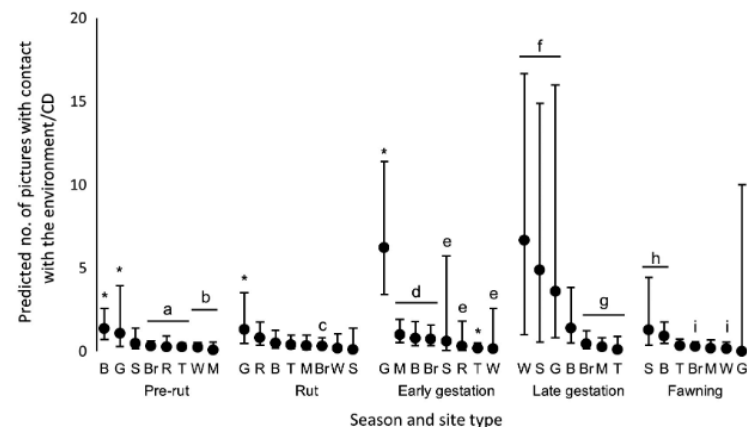
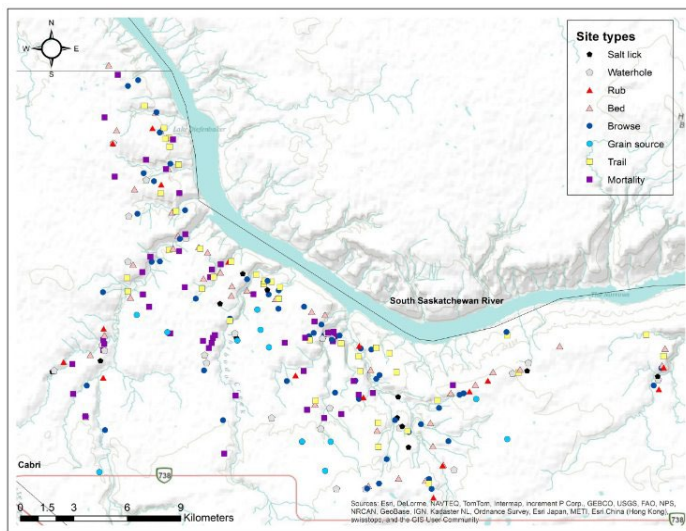


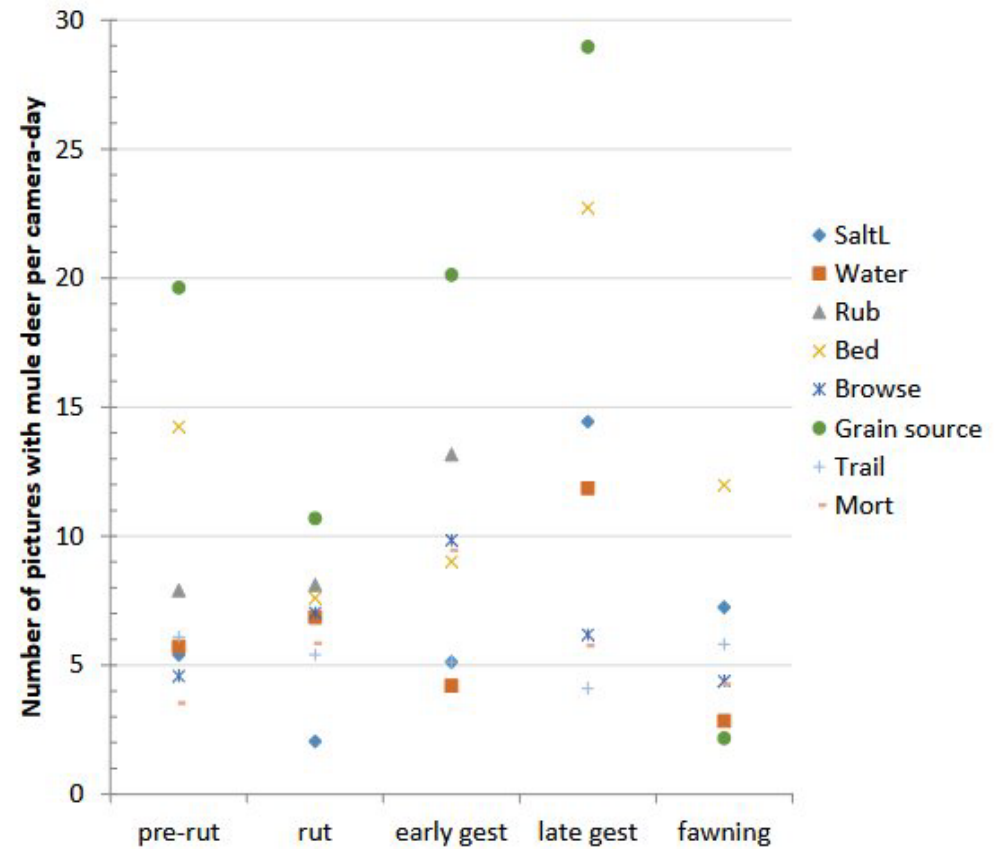
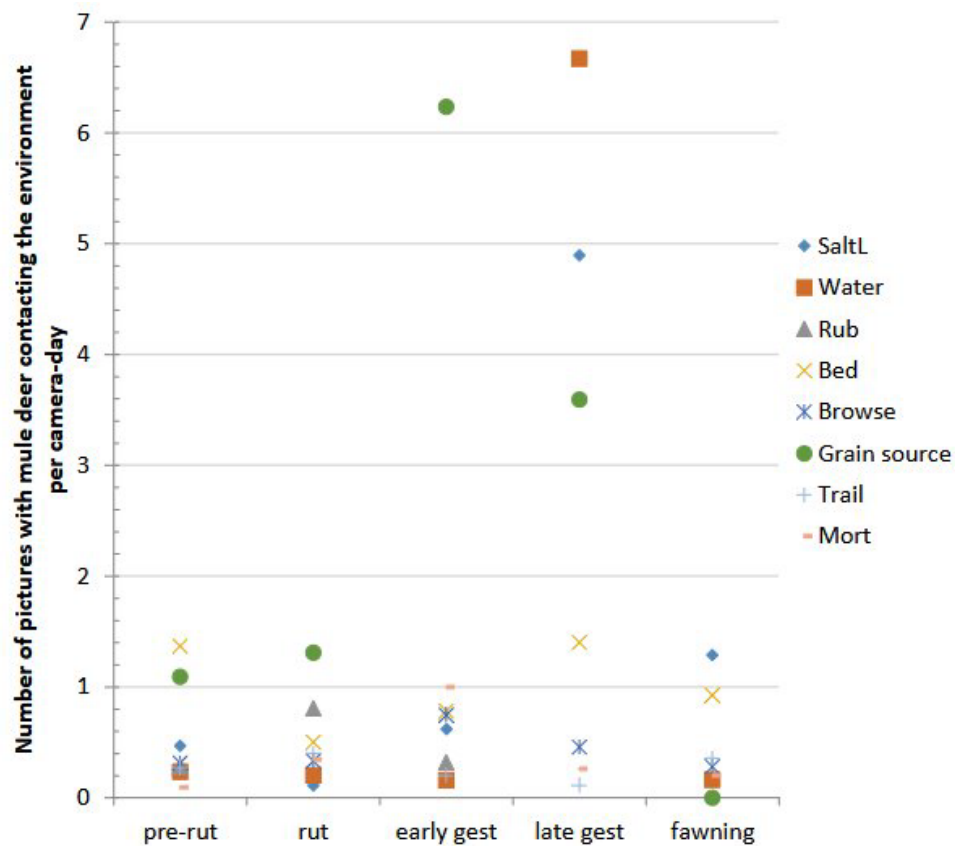
Fig. 4. Predicted number of pictures with mule deer contacting the environment per camera-day per station, by season and site type. Sites were B (beds), Br (browse areas), G (grain spills), M (mortalities), R (rubs), S (salt licks), T (trails), and W (waterholes). Rubs were not available in late gestation and fawning. Within each season, statistically significant pairwise comparisons are denoted with an * and lowercase letters. In pre-rut, B were significantly more visited than *a* and *b*, and G were more visited than *b*. In rut, G were more visited than *Br* (*c*). In early gestation, T were less visited than all *d*, and G were more visited than all *e*. In late gestation, *f* were more visited than *g*. In fawning, *h* were more visited than *i*. Bars are 95% confidence interval. Upper values of W and S in late gestation, and G in fawning, were manually set at a smaller value so the rest of the values could be read in the graph; real values are found in Data S1: Table S4.

- The greatest number of pictures with mule deer per camera-day occurred at grain sources across all seasons, except in fawning, when beds were the most visited sites
- During pre-rut and early gestation, mule deer visited grain sources at least twice as often as most other sites; beds and grain sources were the most intensively visited sites
- Alternative Food sources (AFS) are highest incident rate for direct and indirect contact with other deer and environmental sites (bait piles).
 - Even higher than natural winter herding and rutting behavior.

Social dynamics among mule deer and how they visit various environmental areas: implications for chronic wasting disease transmission - María Fernanda Mejía Salazar (PhD Thesis data)

2007-2012

365 Deer GPS collared

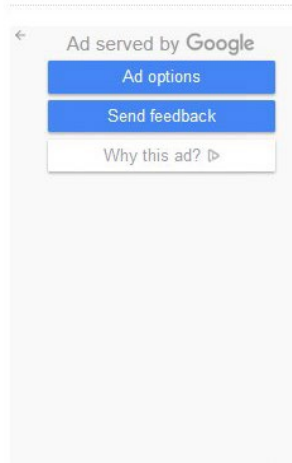


Former Utah Wildlife Board member among 7 charged in illegal hunting scheme

By Carter Williams, KSL.com | Posted - Aug. 23, 2024 at 7:03 p.m.



Utah Wildlife Board member Wade Heaton, left, speaks during a meeting on Jan. 4, 2022. Heaton, who resigned from the board last year, faces 11 charges tied to an illegal baiting scheme, according to court documents. (Utah Department of Natural Resources)



Most importantly to investigators, Heaton worked with his guides to lure the deer to specific locations using corn feed, court documents said. They even cut down tree limbs to improve the line of sight from deer blinds. Investigators frequently cited WhatsApp text messages from Heaton as evidence of his intentions.

"A reminder of our decision about feed ... We are going to keep the hunters as removed from it as possible," according to a text from Heaton in August 2021. "No feeding with a hunter in the truck. Keeping the feed out of sight of the public."



Two close-up shots of trophy mule deer bucks that were posted to Color Country Outfitter's Facebook page in 2023. Photos via Facebook

Baiting Mule Deer



Baiting Mule Deer



Winter Herding

We CAN stop this....



This is not the same...



We can't stop this...but they are obviously not the same.



As this...

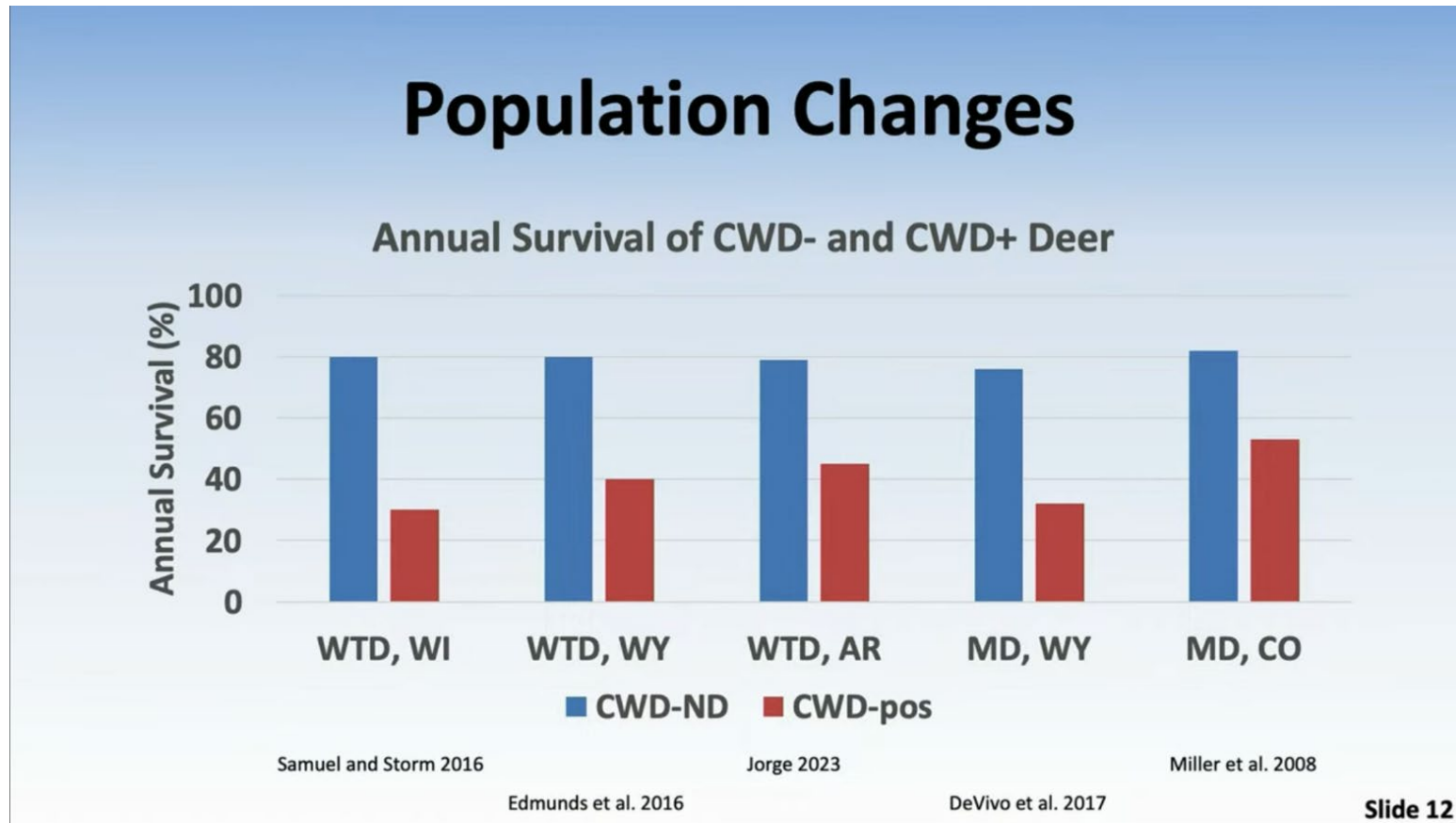


or this...



Population impacts

Negative impacts to populations at high prevalence.... **ALWAYS!**



Wyoming Outfitter gives up on Deer outfitting due to CWD



Riverton-area outfitter Ken Metzler in September 2022. (Mike Koshmrl/WyoFile)

"Based on hunter observation, landowner observation and [Game and Fish] personnel observation," Gregory said, "we're not seeing the deer that we used to."

Ken Metzler had a front-row seat to the crash. When [WyoFile first discussed CWD's impacts with the Riverton-area outfitter in late 2021](#), he estimated that his deer hunting operation had fallen off by 80%. Virtually every animal his paid hunters killed on leased agricultural hunting grounds – 98%, he estimated – tested positive for the disease.

Nearly three years later, Metzler reported that he's given up on his commercial deer hunting operation altogether.

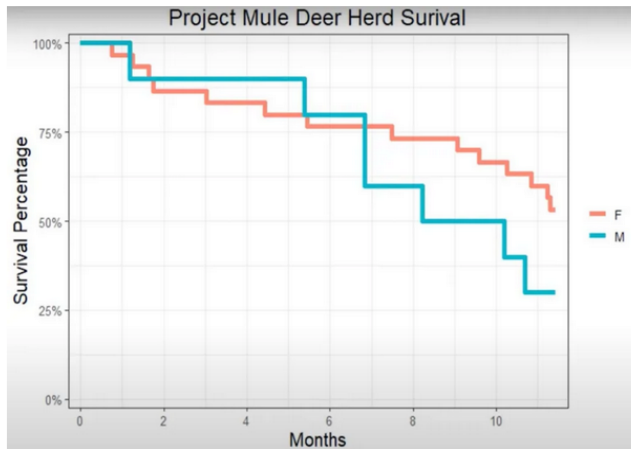
"We're pretty well shut down," he said. "I'm not booking any deer hunters. I can't promise something that isn't there."

The 67-year-old outfitter has witnessed the Project Herd cycle in the past, and he retains some hope that it'll bounce back.

"It's getting worse right now, but it'll turn around a little bit," Metzler said. "If it comes back, it comes back – but it's not looking too good right now, that's for sure."

Wyoming Outfitter gives up on Deer outfitting because of CWD cont...

Ahead of the data dump illuminating how CWD-infected deer are using the landscape differently, an eye-opening discovery has emerged. The collared deer are dying at horrendous rates that threaten to wipe out the herd. Typically, adult doe mule deer have about an 85% chance of surviving any given year. In the Project Herd, however, only half of the first cohort of 30 GPS-collared does lived through their first 12 months as a research deer. The bucks, more prone to CWD, fared worse. Three out of the 10 tracked males were still breathing after one year, but by the time WyoFile rendezvoused with Russell some 15 months into the study, 90% were dead. A single buck remained.



(Wyoming Game and Fish Department)

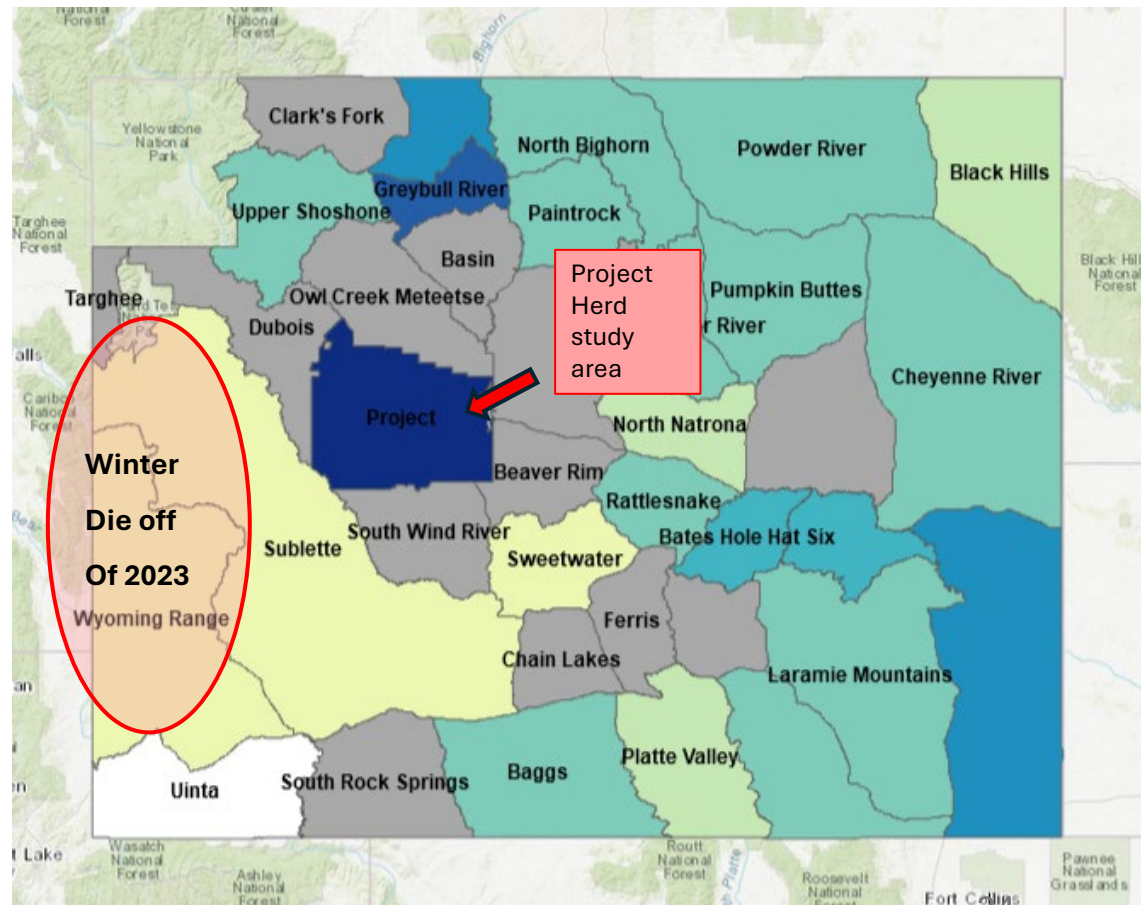
Unlike in [other portions of Wyoming](#), winter wasn't to blame. Humans weren't the direct cause, either. "We didn't have a single hunter harvest," Russell said.

At 15 months

9 out of 10 bucks dead

(Not a single hunter harvest of all collared deer)

2023 winter not the cause. Winter kill in a different region, 100 miles away on the other side of a mountain range



"In February of 2023, we deployed 40 GPS collars on adult male and females. In 2024, we deployed 42 GPS collars. This year, we deployed an additional 52 GPS collars. Despite the bad winter in 2023, we didn't see a significant difference in annual survival (365 days) between deer captured in 2023 and 2024; although, 2023 was slightly lower." - T. Russell

Arkansas Research – GPS Collared Deer

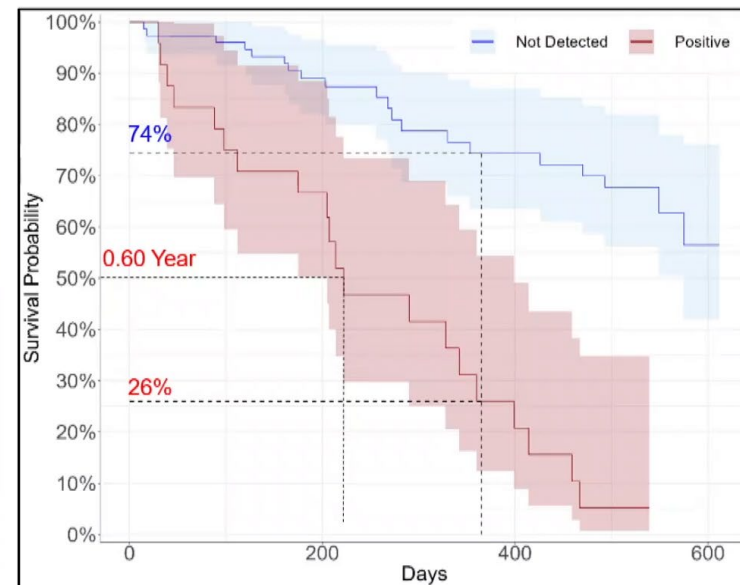
"34% of positive animals dying of no other cause other than late stage CWD."

-Dr. Jenn Ballard, Arkansas Veterinarian

Survival



CWD-Cause-Specific



At 1 year, positive animals are half as likely to be alive, with a 26% chance of survival.

By 500 days, ~5% chance of survival for positive animals vs negative animals at ~70%

CWD	Coyote	Bobcat	Bear	Harvest	CWD	Disease	Abnormal	Other
Positive	13%	7%	0%	24%	34%	4%	10%	7%
Not Detected	28%	10%	3%	28%	0%	10%	0%	21%

= 100%

= 100%



Arkansas end stage 2 yr old elk




Arkansas end stage doe



Arkansas end stage doe

Wisconsin's Preliminary results from 4-year study GPS collaring 1,089 deer

Led by Dr. Dan Storm – Fargo, ND native

 WISCONSIN DEPARTMENT OF NATURAL RESOURCES

infected and uninfected deer. Annual survival estimates are listed in the table below.

Annual Survival Probability

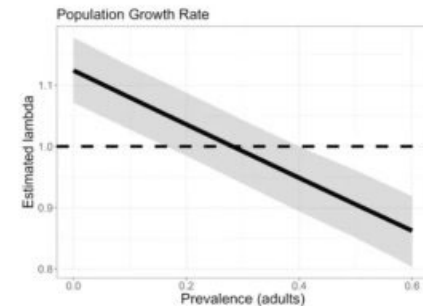
	Uninfected	CWD-Infected
Females	83%	41%
Males	69%	17%

These figures indicate that CWD is substantially reducing the annual survival probability of both male and female white-tailed deer. Reduced female survival lowers the growth rate of the population,

"...a preliminary summary showed end-stage wasting was the **leading cause of death (57%) of CWD-positive adult female deer.**"

Based on inputs from deer in the study, the model predicts that once CWD prevalence is 30% or higher in adult female deer – the key to deer recruitment – the disease is likely to lead to a population-level decline.

AGENDA ITEM 6.A, Daniel Storm/Deer Research Scientist Results - CWD and Deer Population Change

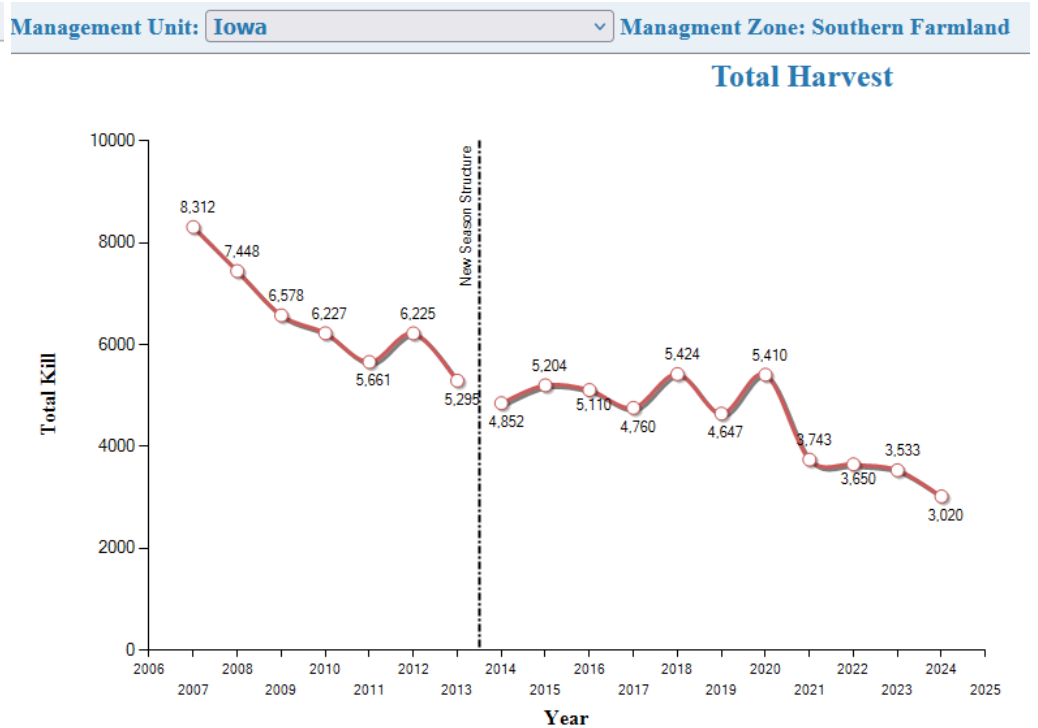
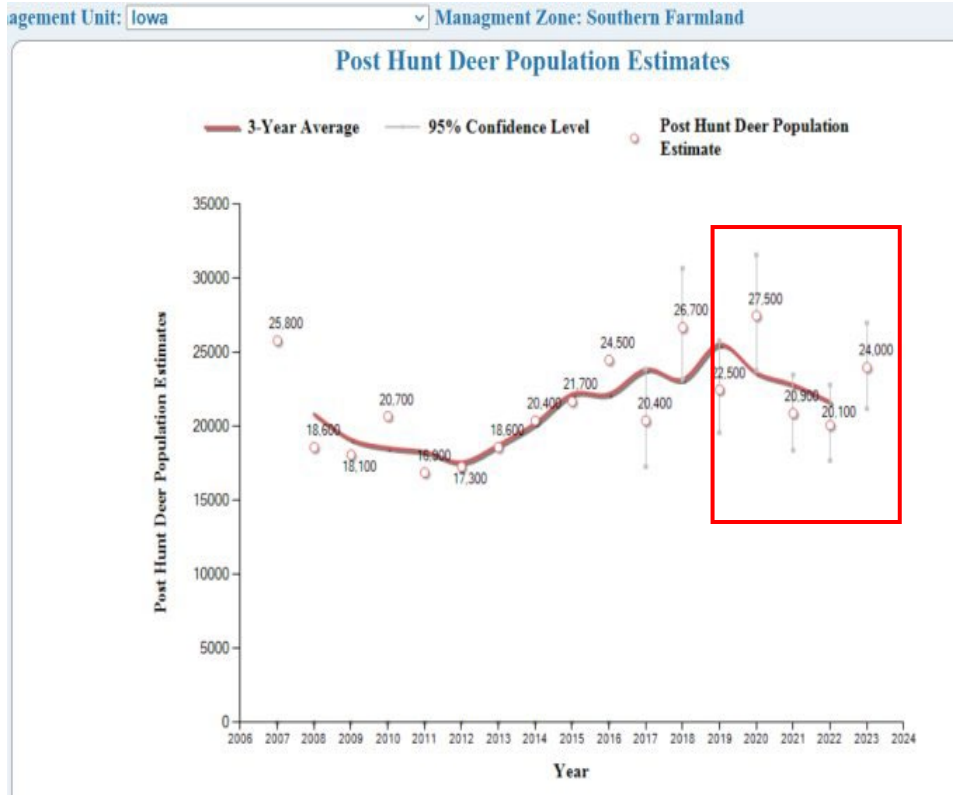


Slide #13

WISCONSIN DEPARTMENT OF NATURAL RESOURCES | DNR.WI.GOV

A graph shows the relationship between CWD prevalence and annual deer population change. The relationship was derived from data from the Southwest Wisconsin CWD, Deer and Predator Study. *Wisconsin Department Of Natural Resources*

Iowa County Wisconsin – Original outbreak zone (2000) Sustained high prevalence



Negative population impacts with sustained high prevalence (~30%) shown in Wisconsin's original outbreak area and most infected county.

- No bears or Wolves in Iowa County. No EHD outbreaks. No culling/sharps shooting since 2007.
- 2024 hunter harvest has **decreased by 19%** from 2022 and is **HALF** of what it was in 2011/2012 season.
- Yet, the population is still falling.
- Hunters and landowners seeing noticeable lowering of age structure and lower deer numbers in some areas of neighboring counties.

Wisconsin GPS Collar Research Project

- Doe
- Captured on 1/09/2017, 6 ½ years at capture
- CWD- at capture
- 165 lbs at capture, body condition score 5/10
- Recaptured on 2/04/2019
- CWD+ at recapture
- 164 lbs at capture, body condition score 7/10
- Died on 3/25/2019
- 90 lbs at death
- Lost 74lb, 45% body weight in 49 days
- 1.5 lbs per day
- CWD+ at death
- Lab necropsy
 - Severe emaciation, pneumonia



Wisconsin GPS Collar Research Project

- Doe
- Captured on 2/27/2017
- CWD+ at capture
- Est. 170 lbs at capture, body condition score 7/10
- Died on 5/29/2017
- Fell down hill
- 4 years of age at death
- 106 lbs at death
- Lab necropsy
 - Severe emaciation, pneumonia
 - Mummified fetus



Wisconsin GPS Collar Research Project

- Doe
- Collared 12/28/2017 ~3 ½ years of age
- CWD negative at capture
- 118 lbs at capture, body condition score of 0/10
- Died 02/14/2018
- CWD-positive at death
- Lab necropsy:
 - Severe emaciation
 - “The rumen contains a large amount of feed material...”
 - “Severe emaciation with adequate feed intake.”
- 78 lbs at death
- Loss of 40 lbs, ~33% body weight



- Doe
- Captured on 3/13/2017
- CWD+ at capture
- Died on 8/12/2017
- Carcass consumed

Wisconsin GPS Collar Research Project



Wisconsin GPS Collar Research Project

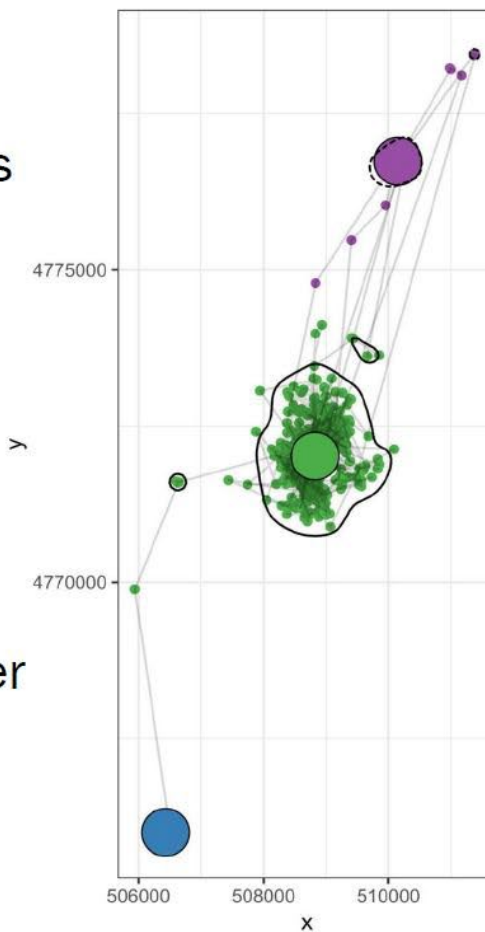
- Doe
- Collared 12/19/2019 as ~20 months old
- 129 lbs at capture, body condition score of 10/10
- CWD-negative at capture
- Died 7/06/2022
- 50 yards from house; Landowner saw “extremely skinny and sick looking” days prior to death
- 76 lbs at death
- 53 lb, 41% loss
- CWD-positive at death
- Lab necropsy:
 - Severe emaciation
 - Mild pneumonia



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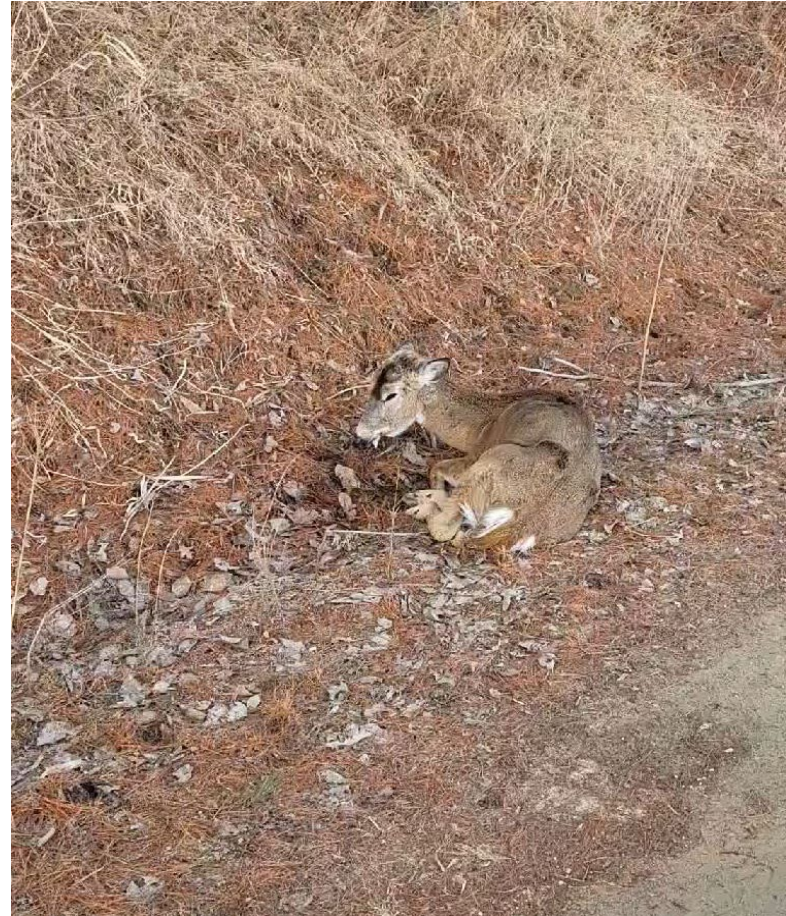
Wisconsin GPS Collar Research Project

- Born spring 2018
- Collared January 2020 as ~20 months old (20mo age class)
- CWD-positive at capture
- Died 9/29/2020
- Emaciated
- CWD-positive at death
- No necropsy as landowner did not want carcass removed










Wisconsin GPS Collar Research Project –
CWD positive doe



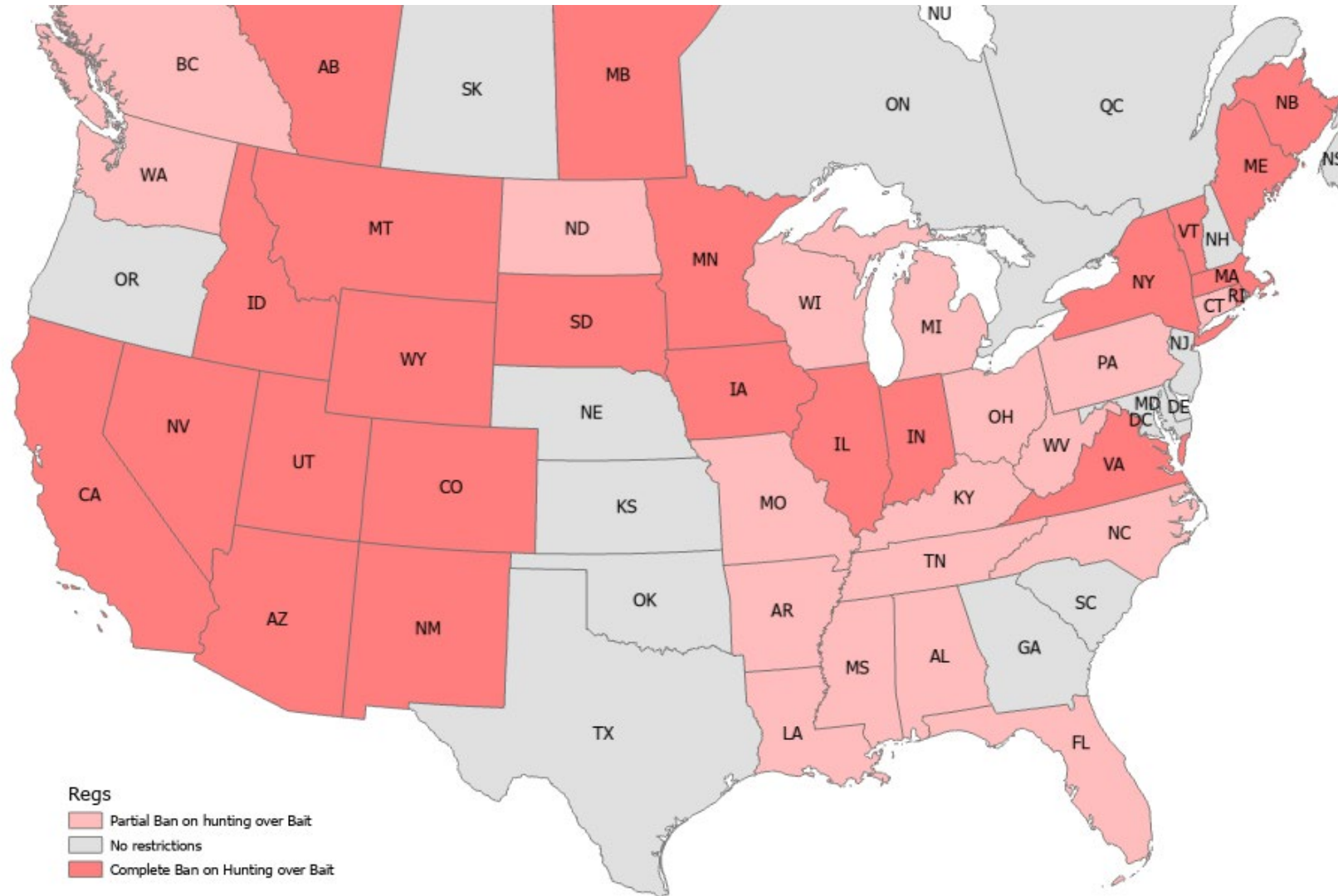
Hunter reported end stage white tailed deer

Top 5 States - Hunters Per Capita

1. Wyoming. 23.4% of its population is a licensed hunter. Or 136,205 total.  No hunting over bait
2. South Dakota. 22.7% of its population is a licensed hunter. 206,316 total.  No hunting over bait
3. Montana. 20.6% are licensed hunters. 231,339 total.  No hunting over bait
4. North Dakota. 19.3% are licensed hunters. 150,724 total.  Baiting bans in CWD Zones
5. Idaho. 15.6% are licensed hunters. 301,994 total.  No hunting over bait

38 states in the lower 48 have implemented baiting bans

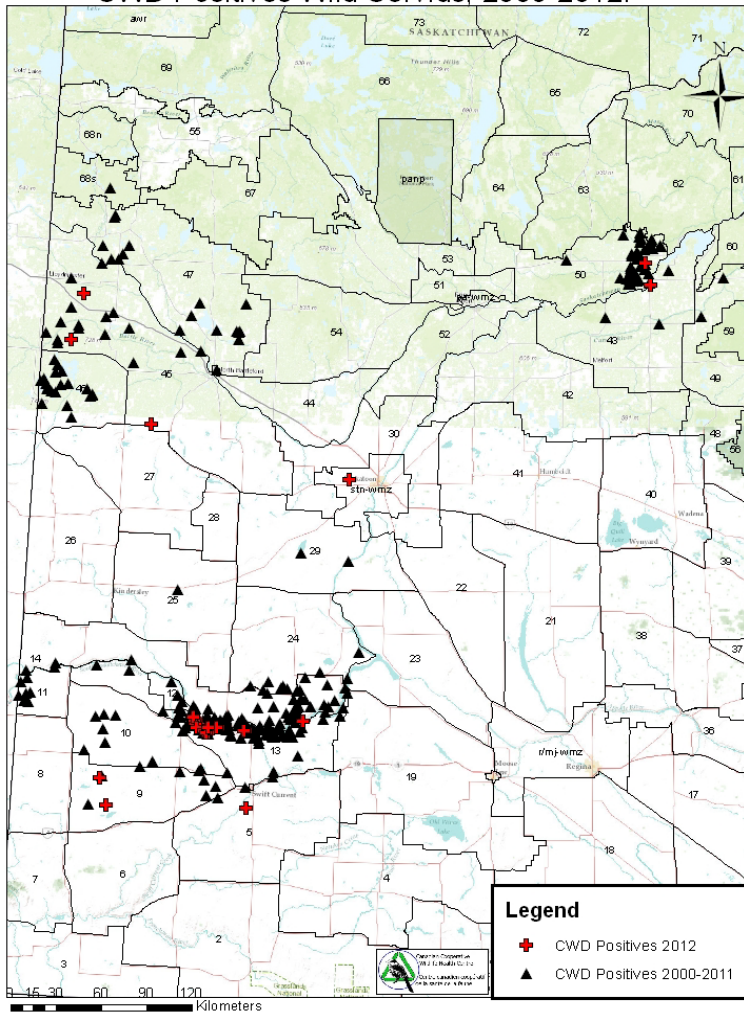
17 states have implemented partial bans due to CWD.



Saskatchewan vs North Dakota

Same number of years with disease

CWD Positives Wild Cervids, 2000-2012.



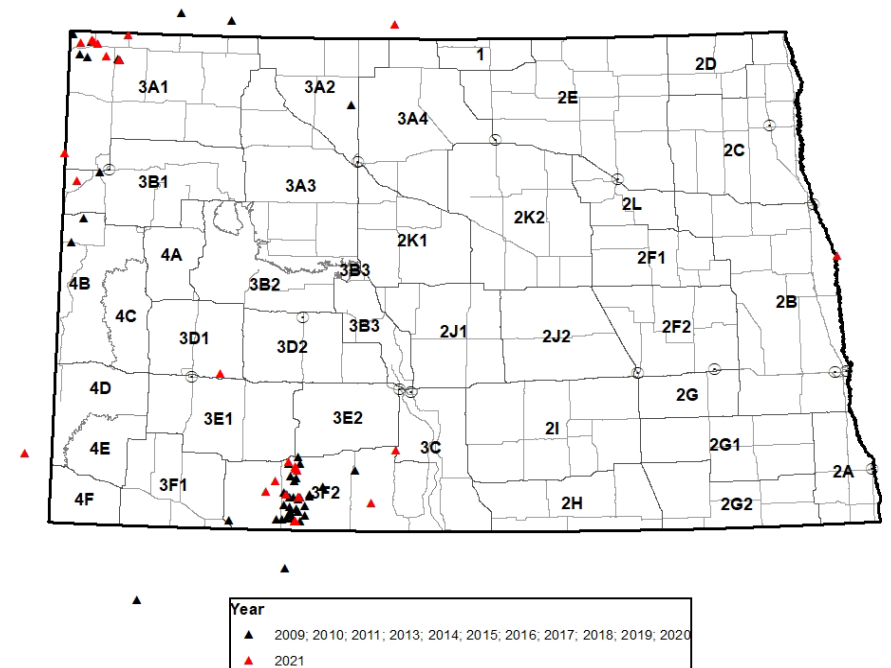
Saskatchewan – 2000-2012

Didn't do anything

TOTAL CWD positives = 397

Significantly more Geographic Spread with larger and denser hot spots

CWD Detections in North Dakota; 2009-2021



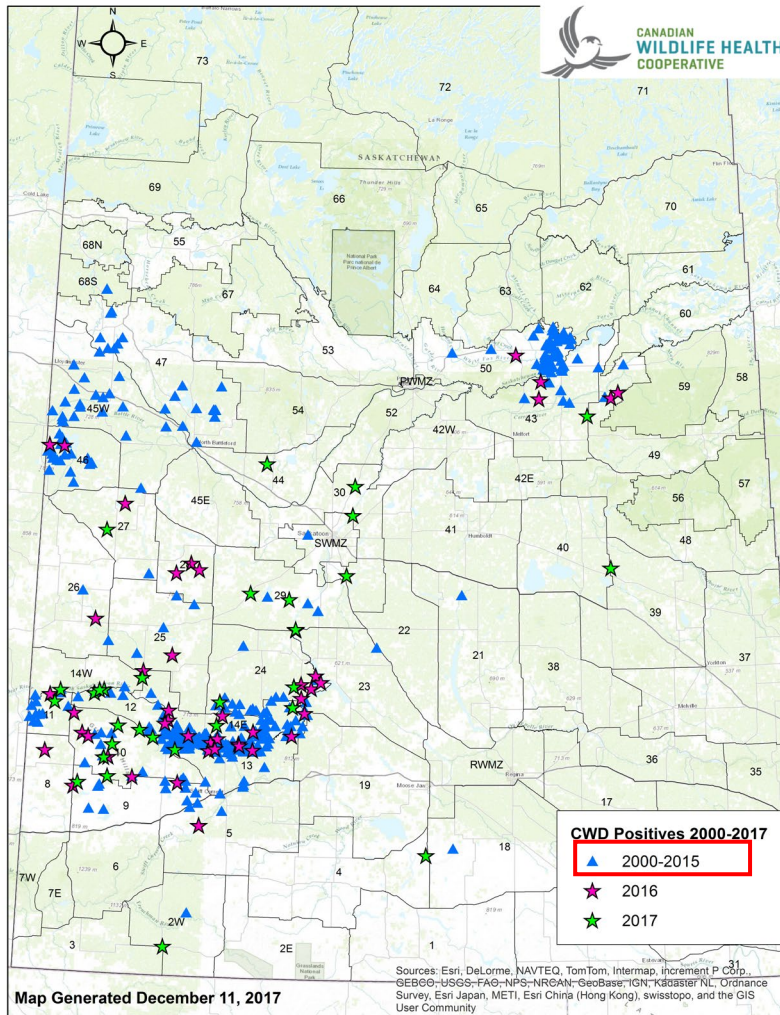
North Dakota – 2009-2021

Implemented baiting bans immediately and 6 million dollars spent on hay yard and silage fencing.

TOTAL CWD positives = 70

Saskatchewan vs North Dakota

Same number of years with disease



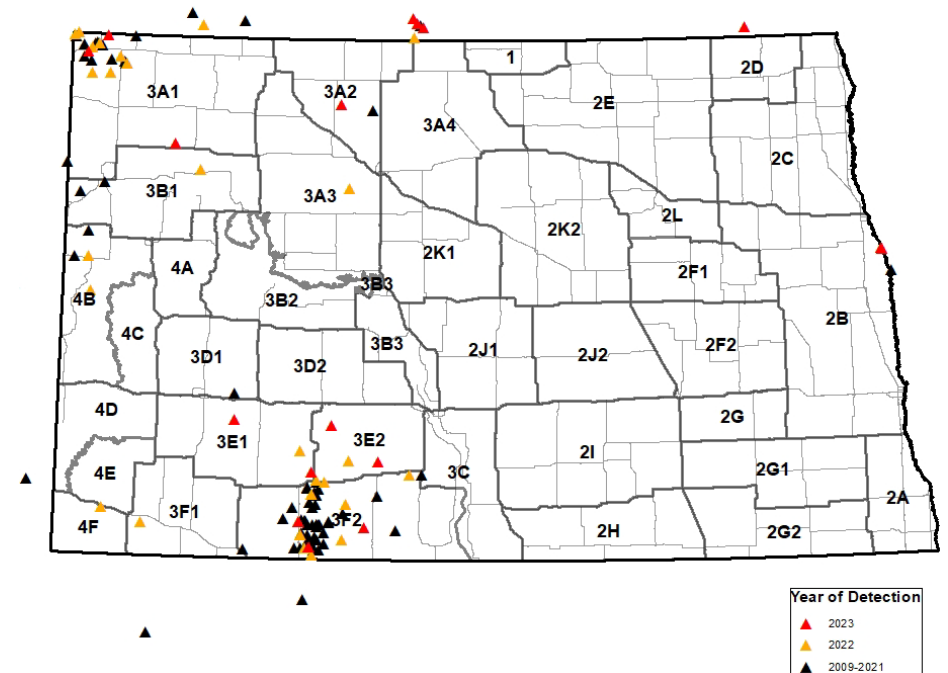
Saskatchewan – 2000-2015

Didn't do anything

TOTAL CWD positives = 458 even with multi-year gap in Surveillance funding (2010-2016)

145 miles of linear distance in Southern Saskatchewan outbreak

CWD Detections in North Dakota; 2009-2023



North Dakota – 2009-2023

Implemented baiting bans immediately and 6 million dollars spent on hay yard and silage fencing.

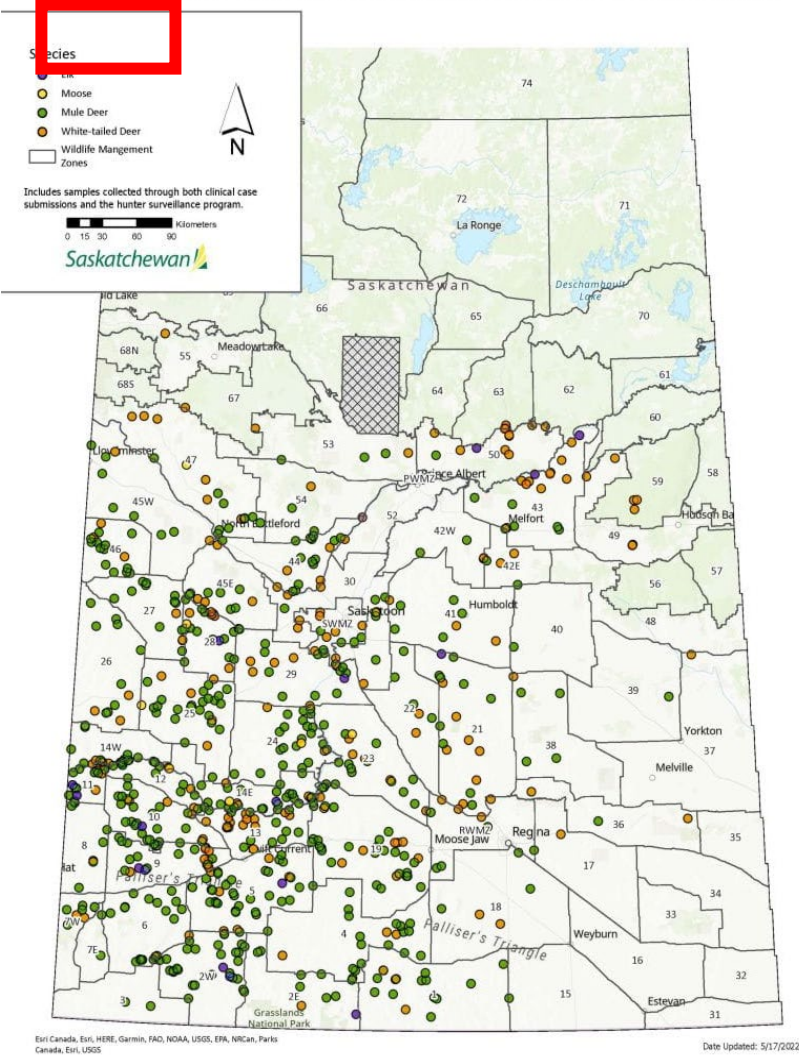
TOTAL CWD positives = 105

37 miles of linear distance in southern ND outbreak

Saskatchewan vs South Dakota

Just one year of Sask surveillance results

2021-22 CWD Surveillance Program Positive Test Results



Saskatchewan – 2000 – 2021 – 22 years with CWD

Baiting is legal and widely popular

22 yr TOTAL CWD positives = 2,599 even with 6-year gap in surveillance

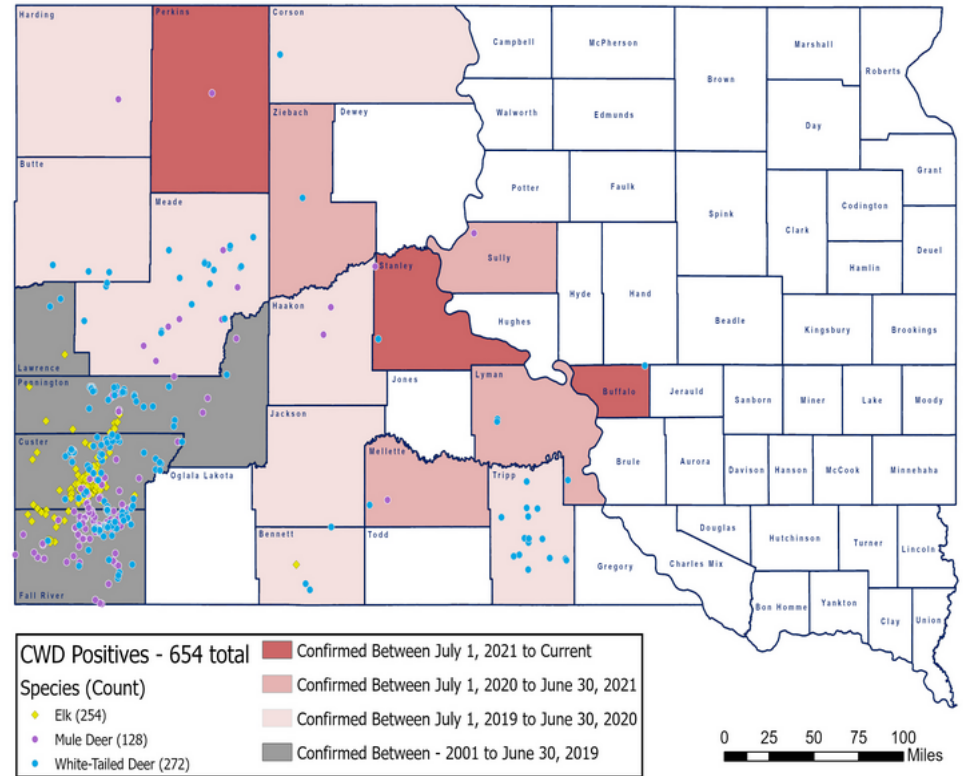
644 Positives just 2021/22 report

Geographic Spread over ~ 70 million acres (higher density across range)

All 21 years of SD surveillance results

Chronic Wasting Disease Positives in South Dakota

2001 - February 16, 2022



South Dakota – 2001 – 2021 – 21 years with CWD

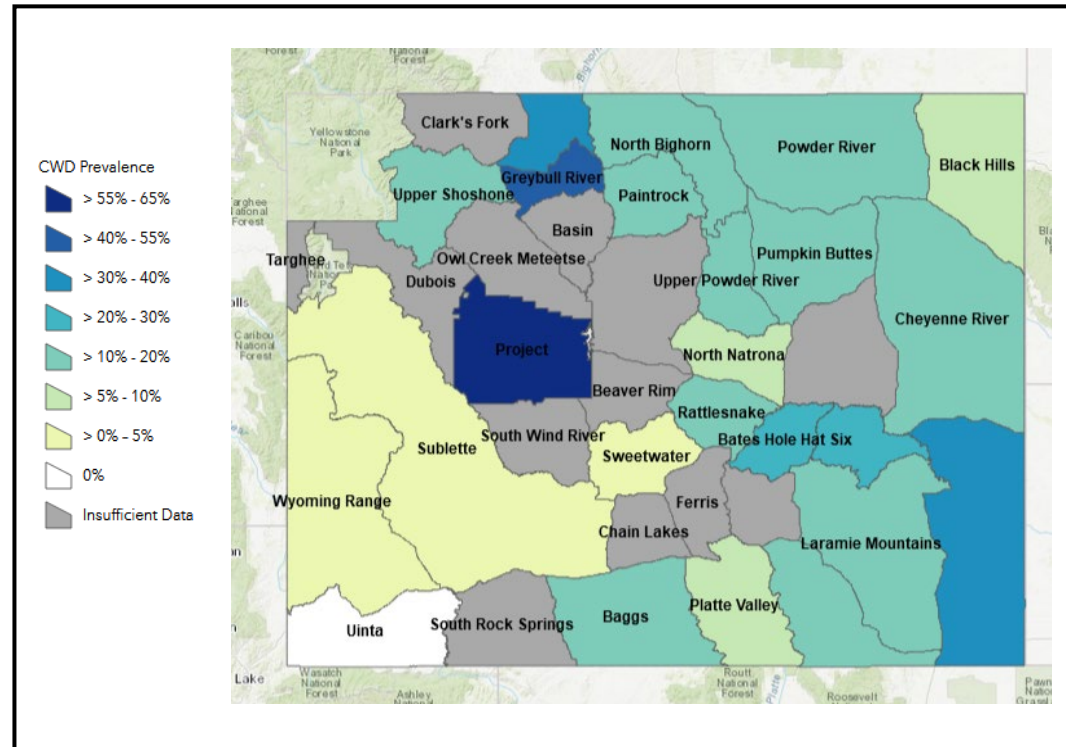
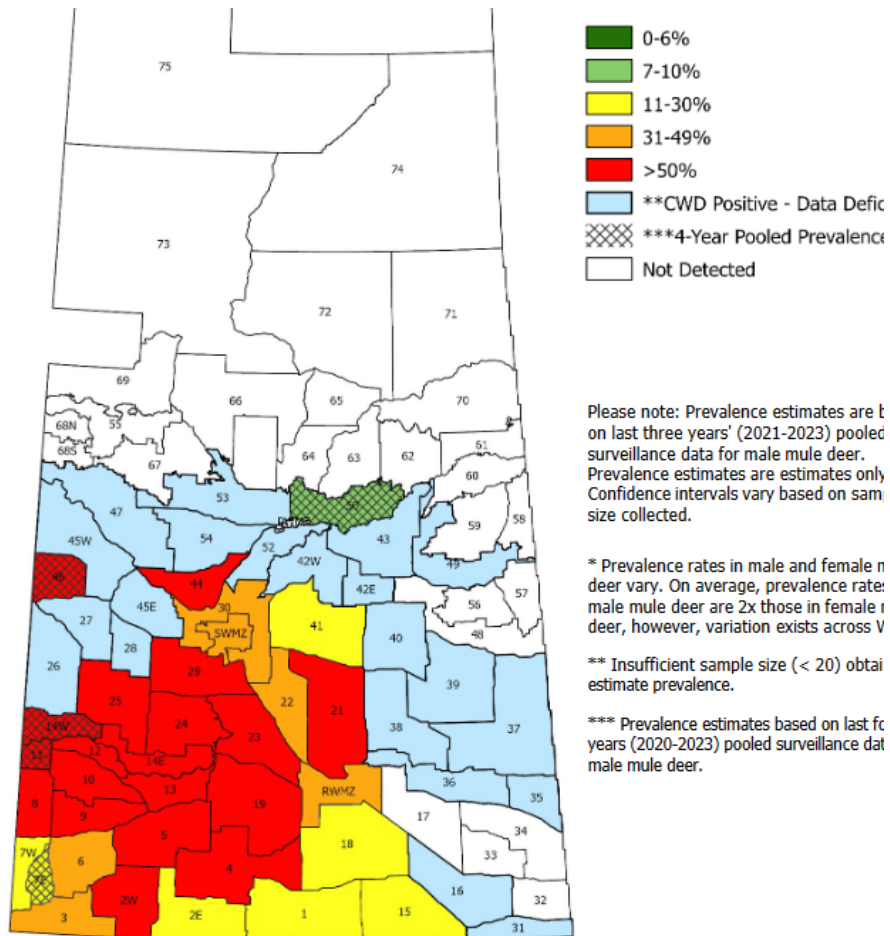
No Baiting (feeding is unregulated). Less feeding occurring because baiting is not engrained in the culture

**21 yr TOTAL CWD positives = 438 in wild deer
282 captive elk in Wind Cave NP**

54 Positives just in 2021/22 report

Confined to west half of the state ~ 23 million acres

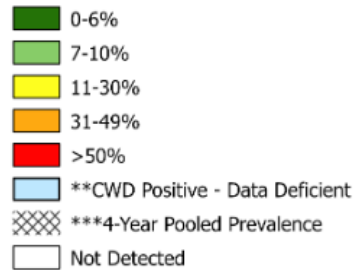
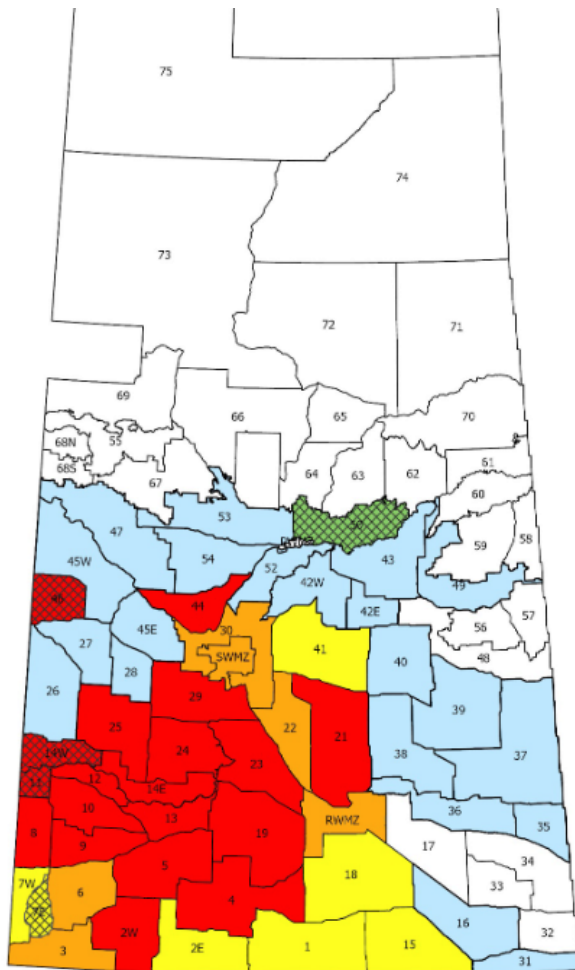
Saskatchewan vs Wyoming



- Recent Prevalence Estimates after **24 years**
- ~74.4 Million acres of geographic spread
- 18 units with over 75% prevalence
- Baiting is widely popular in SK

- Recent Prevalence Estimates after **39 years** with disease
- ~55.5 million acres of geographic spread
- 2 units over 55% prevalence
- Wyoming implemented NO CWD management efforts but baiting and feeding has never been allowed.

Saskatchewan vs Colorado Prevalence

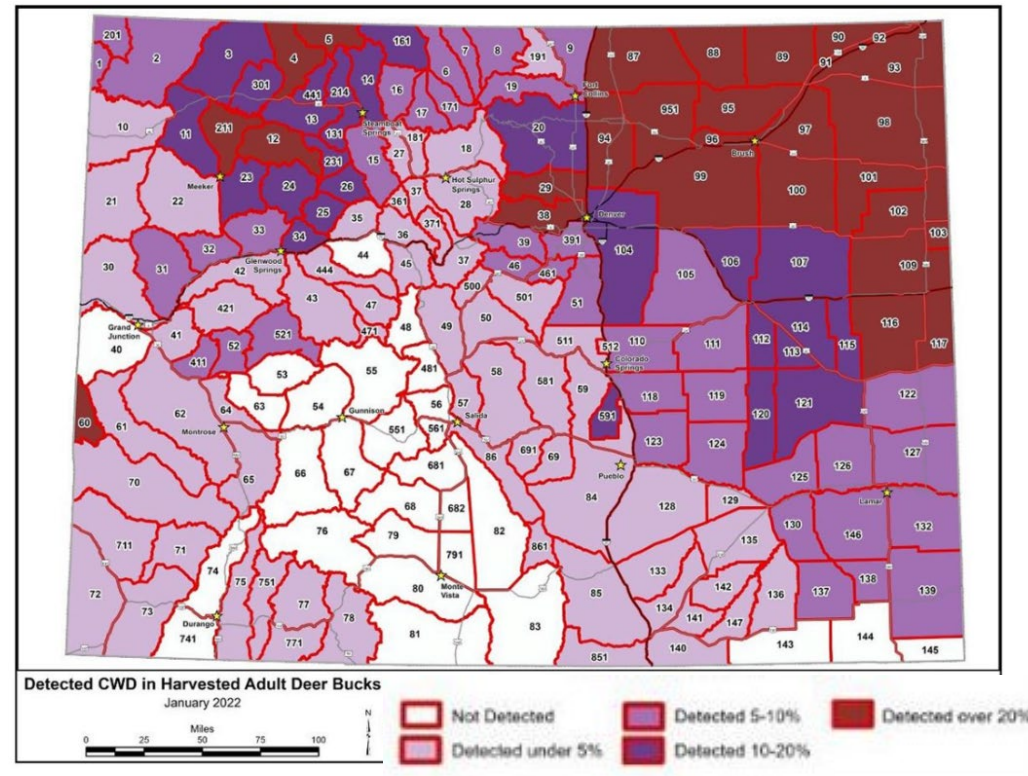


Please note: Prevalence estimates are based on last three years' (2021-2023) pooled surveillance data for male mule deer. Prevalence estimates are estimates only. Confidence intervals vary based on sample size collected.

* Prevalence rates in male and female mule deer vary. On average, prevalence rates in male mule deer are 2x those in female mule deer, however, variation exists across WMZs.

** Insufficient sample size (< 20) obtained to estimate prevalence.

*** Prevalence estimates based on last four years (2020-2023) pooled surveillance data for male mule deer.



Detected CWD in Harvested Adult Deer Bucks

January 2022



- **Recent Prevalence Estimates after 24 years**

- First detection in the wild – 2000
- Baiting has always been allowed

- ~74.4 Million acres of geographic spread

- **18 Units over 75% prevalence**

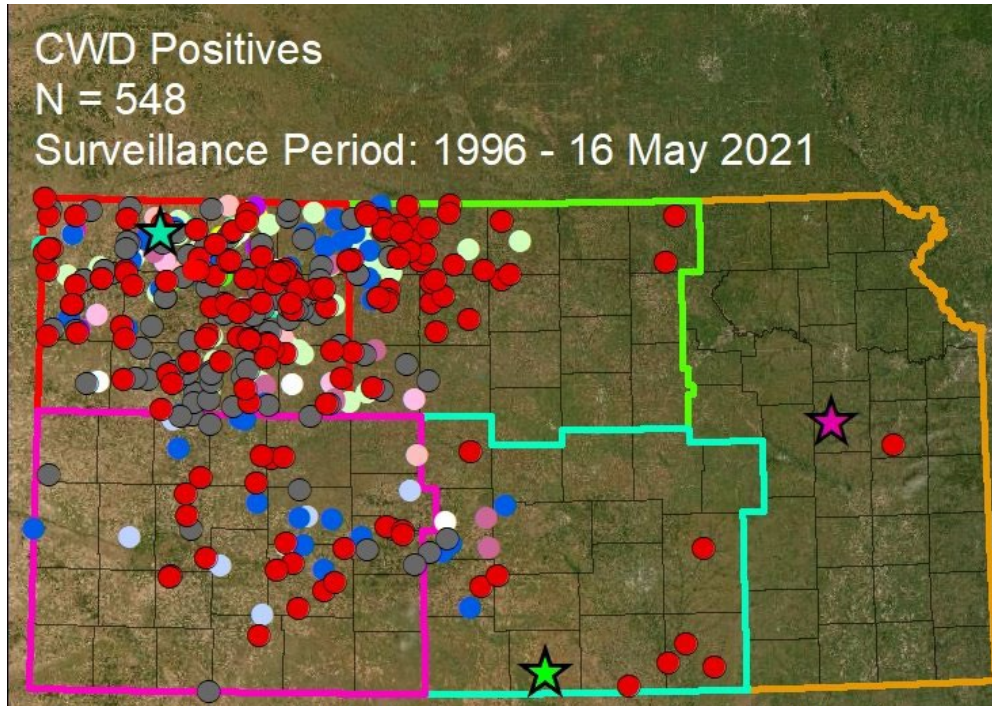
- **Recent Prevalence Estimates after 43 years with disease**

- First detection in the wild – 1981
- Baiting was never allowed

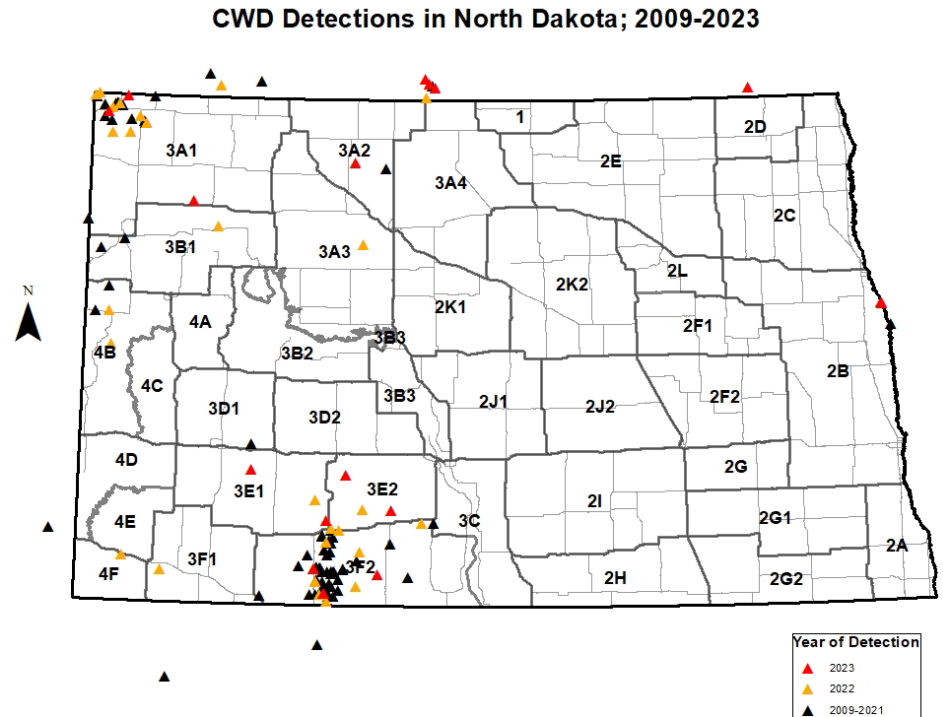
- ~56.5 million acres of geographic spread

- **NO UNITS over 30% prevalence**

Kansas (2005-2021) vs North Dakota (2009-2023)



- First detection in the wild- 2005
- Continues to allow baiting
- **16 years** with disease – **548 positives**



- First detection in the wild – 2009
- Baiting Bans in CWD units
- **14 years** with the disease – **105 Positives**

Kansas vs South Dakota

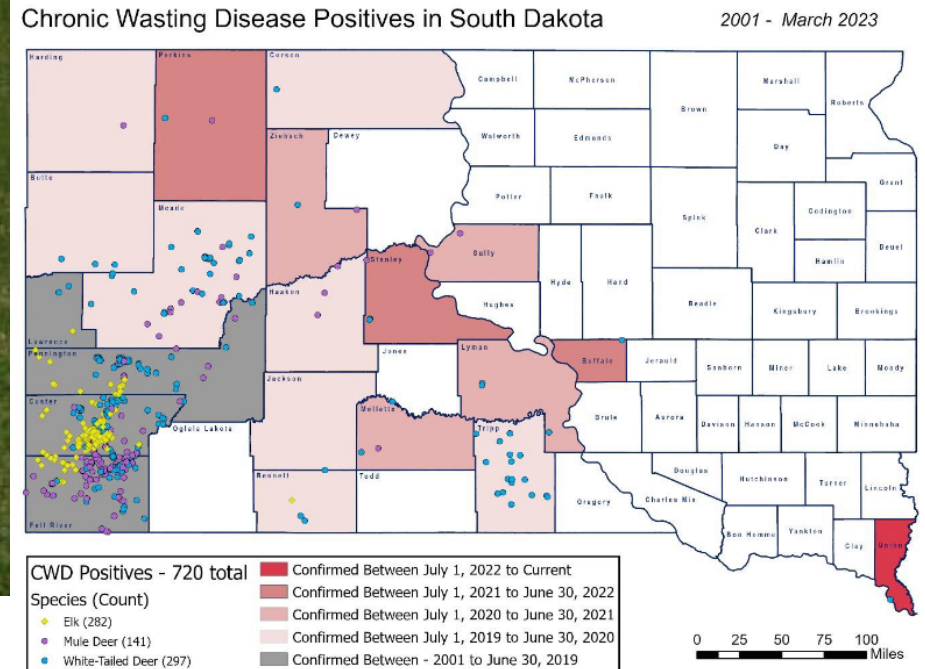
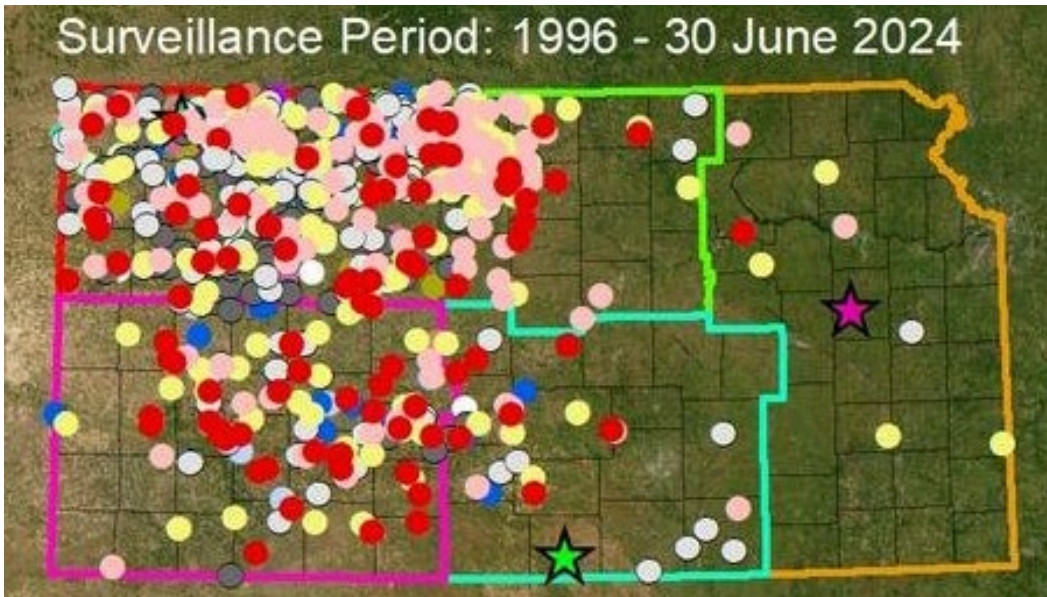
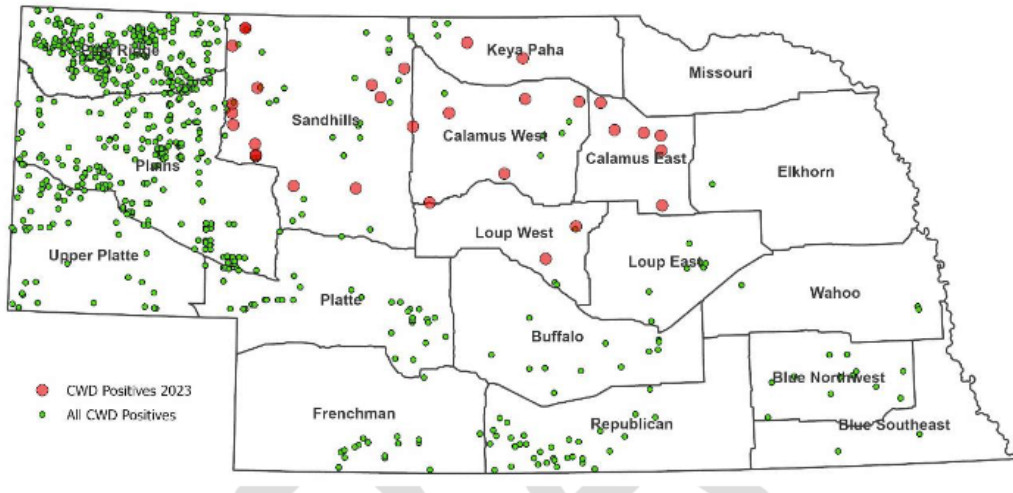


Figure 1. Locations of CWD infected free-ranging cervids in South Dakota, 2001-2023.

- First detection in the wild- 2005 (20 years with disease)
- Baiting is legal and widely popular
- **50% prevalence** in NW part of the state
- Finding sick deer is relatively common
- Kansas after 2024, now over **1,200 cases**

- First detection in the wild – 2001 (23 years with disease)
- Baiting is not legal
- **438 wild deer** and elk positives
- Single digit prevalence outside of Wind Cave NP
 - 282 captive elk positive in Wind Cave NP

Nebraska vs South Dakota



Chronic Wasting Disease Positives in South Dakota

2001 - March 2023

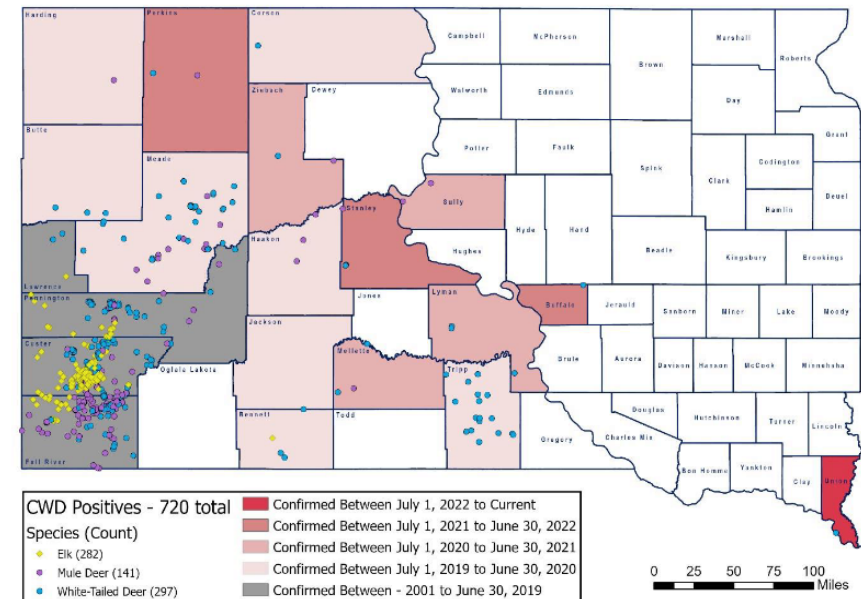


Figure 1. Locations of CWD infected free-ranging cervids in South Dakota, 2001-2023.

- **CWD first discovered in 2000**

- **Baiting allowed on Private Lands**

- **24 years with disease**
 - **1,269 positive wild deer**
 - **19 positive elk**

- **First detection in the wild – 2001**
- **No baiting**
- **23 years with the disease – 438 wild deer and elk positives**
 - **282 captive elk positive in Wind Cave NP**

Texas vs New Mexico

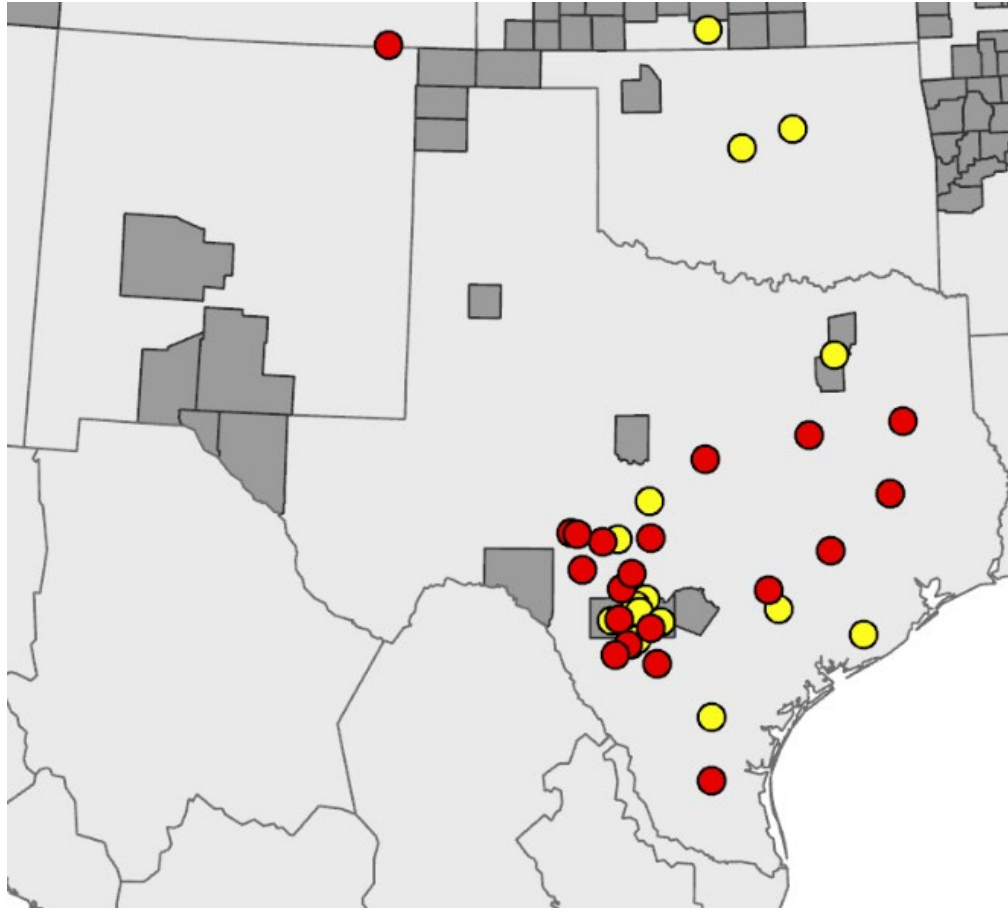
New Mexico – 2002 - 2023

First detected in 2002

No baiting

TOTAL CWD+ = 59

Confined to 3 counties



Texas – 2012-2024

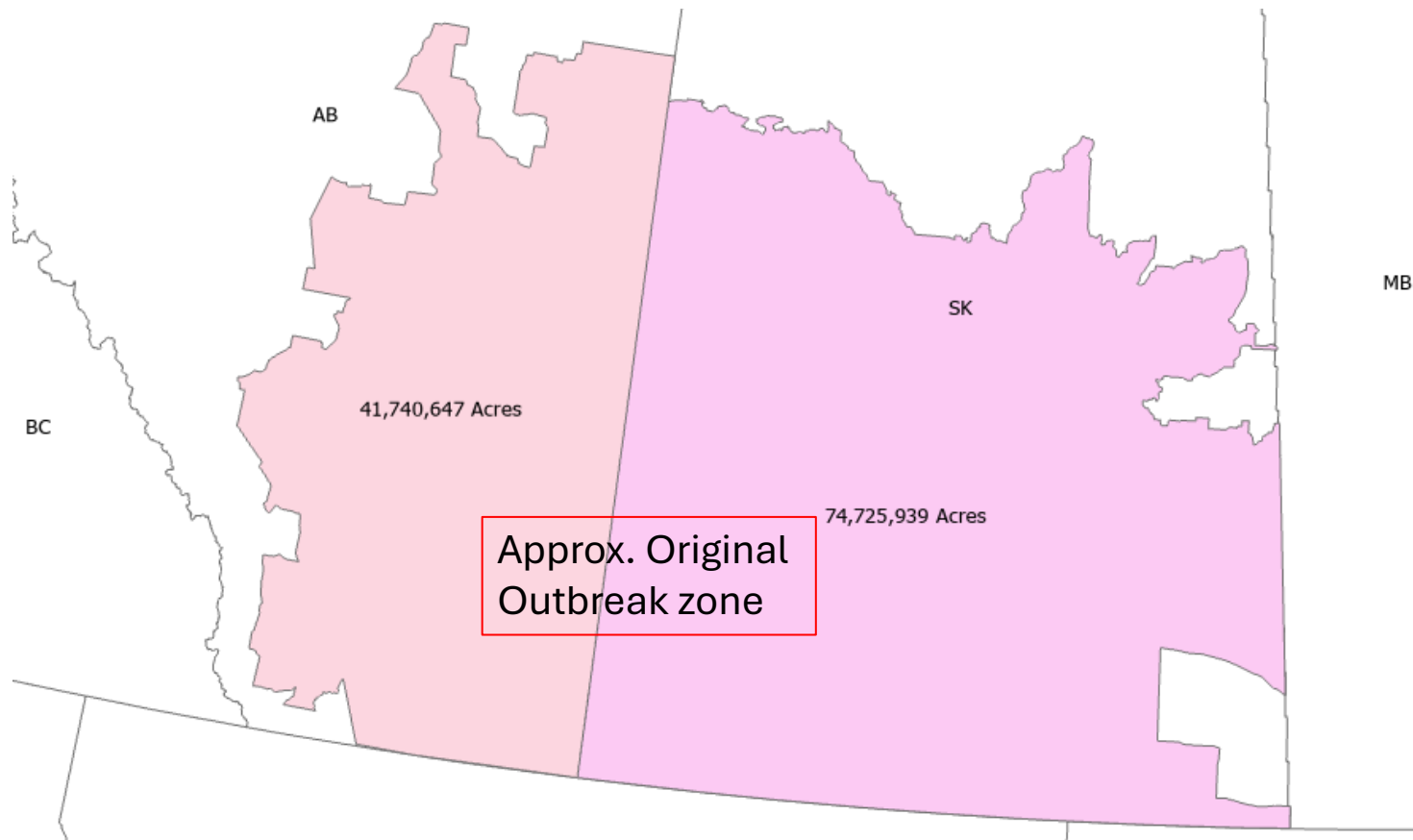
First detected in 2012

**TOTAL CWD positives =
1,019 as of November 2024**

**Texas has blurred the lines
with captive and wild deer.
Captive deer can still be
considered wild, and
thousands of captive deer are
"released" into the wild every
year in Texas.**

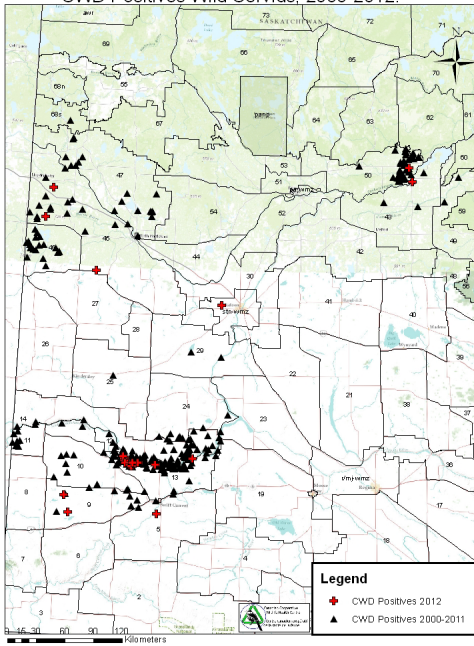
**Significantly more
Geographic Spread.**

Alberta vs Saskatchewan

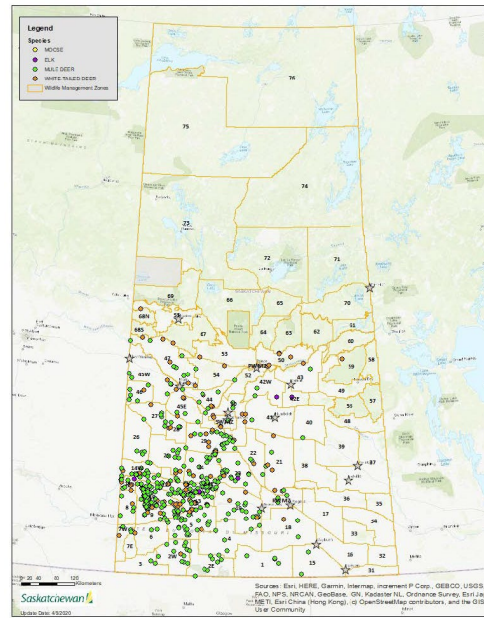


- ~33-million-acre difference in Geographic Spread.
- That's equal to 75% of the total surface area of North Dakota.
- Alberta's most infected areas are along the Saskatchewan border
- Landowner/outfitter anecdotal reports 60-70% population reduction

CWD Positives Wild Cervids, 2000-2012.

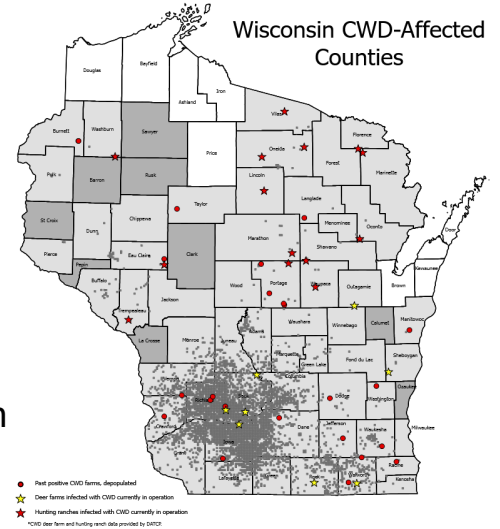


Chronic Wasting Disease 2019 Positive Test Results

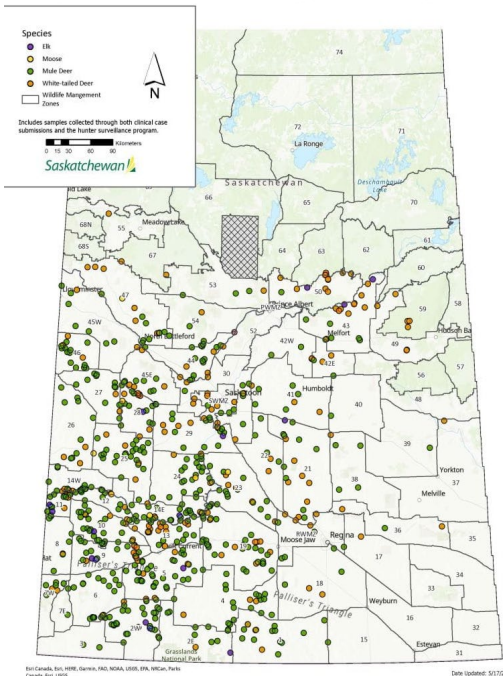


Sask and WI both found disease in 2000

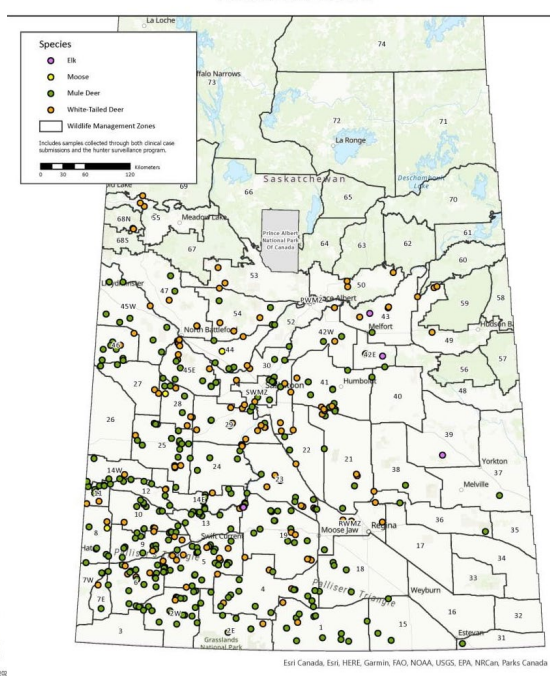
Cumulative CWD positives for Wisconsin 2000-2024



2021-22 CWD Surveillance Program Positive Test Results



2022-23 CWD Surveillance Program Positive Test Results



To scale comparison:
Wisconsin & Saskatchewan

