

Chronic Wasting Disease: A Saskatchewan Perspective

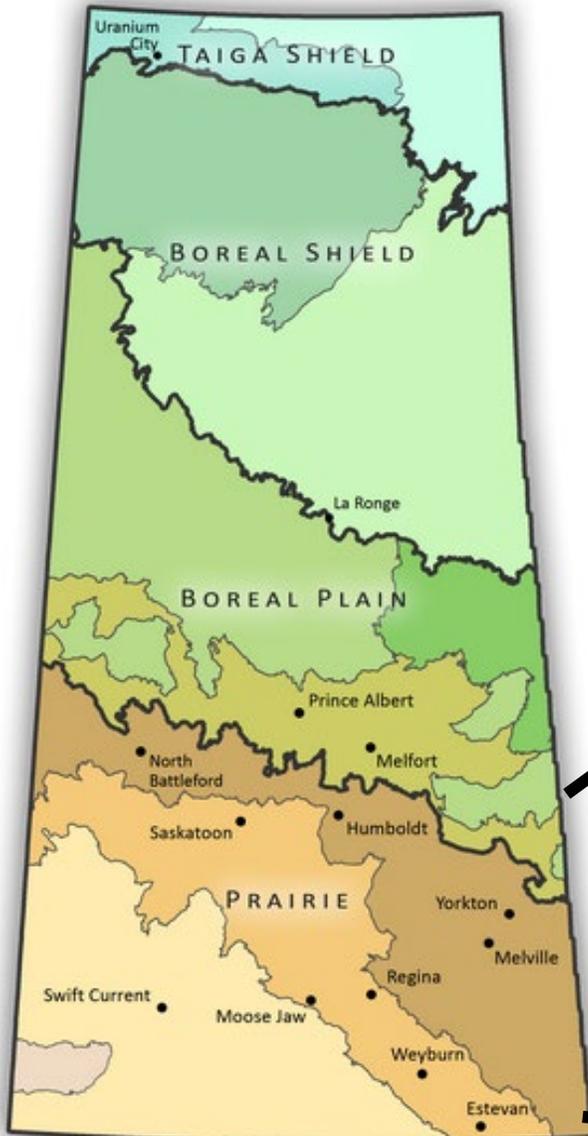
Iga Stasiak

Ministry of Environment

Ontario Federation of Anglers and Hunters

March 16, 2019

Saskatchewan Landscape



Hunting Culture



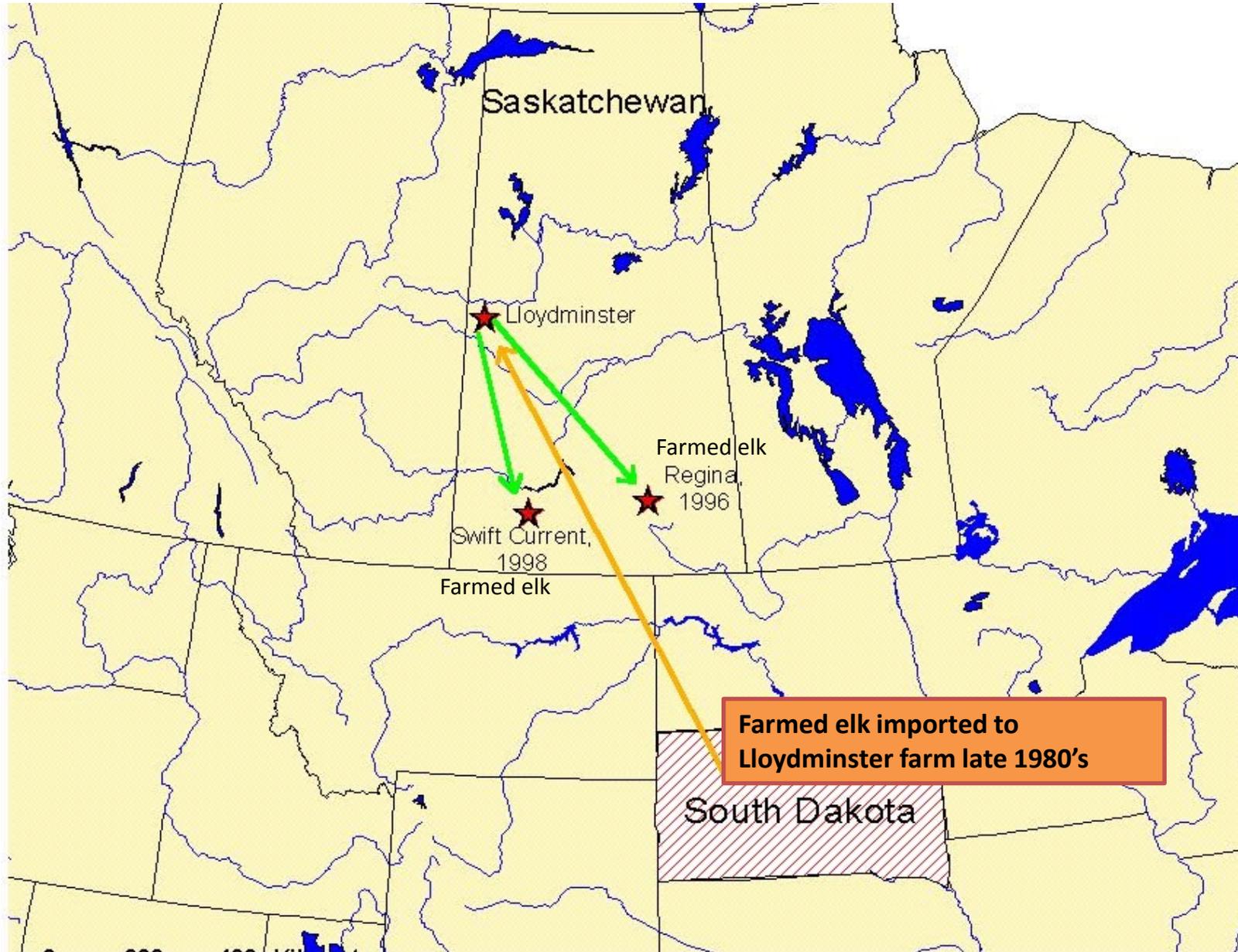
- World record white-tailed deer buck shot in 1993 (Hansen's buck)
- Made SK top outfitting tourism destination
- Baiting and feeding became common practice – increased success

Game Farming

- Game Farm industry established in Saskatchewan in 1987 to diversify the agricultural economy
- **“An expanding and internationally competitive game farm industry...that is in harmony with management of sustainable wildlife populations”**



When and where was CWD first detected in Saskatchewan?



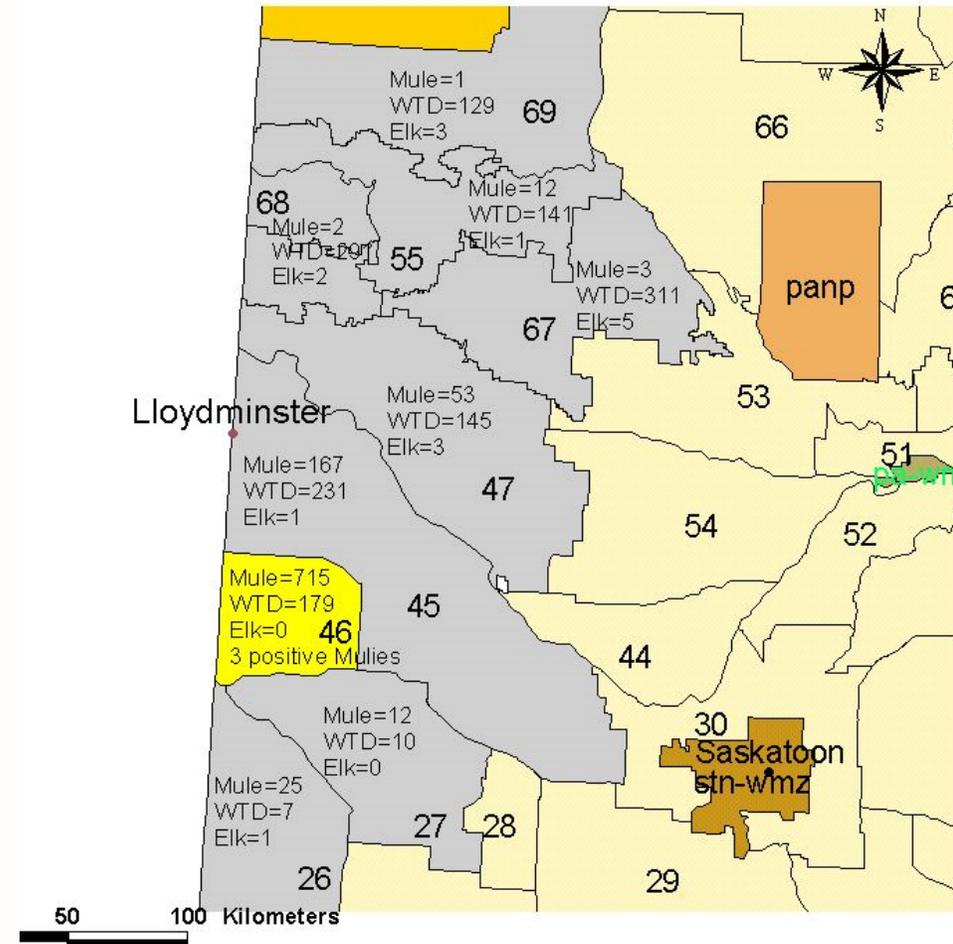
High Priority Areas

- 2001
 - Six locations around high risk positive game farms (~440 mi²)
 - **Goal: determine if CWD present**
 - Free CWD collection permits for antlerless deer only (2 per hunter)
 - Target: n=500
- 2002
 - Three High Priority Areas maintained (Hillmond, Paradise Hill, Mudie Lake) along Alberta border
 - Surveillance zone reduced to 6 km radius (113 km²)
 - Others eliminated as no wildlife cases found and now considered 'low risk.'

CWD Surveillance Program: The Early Years

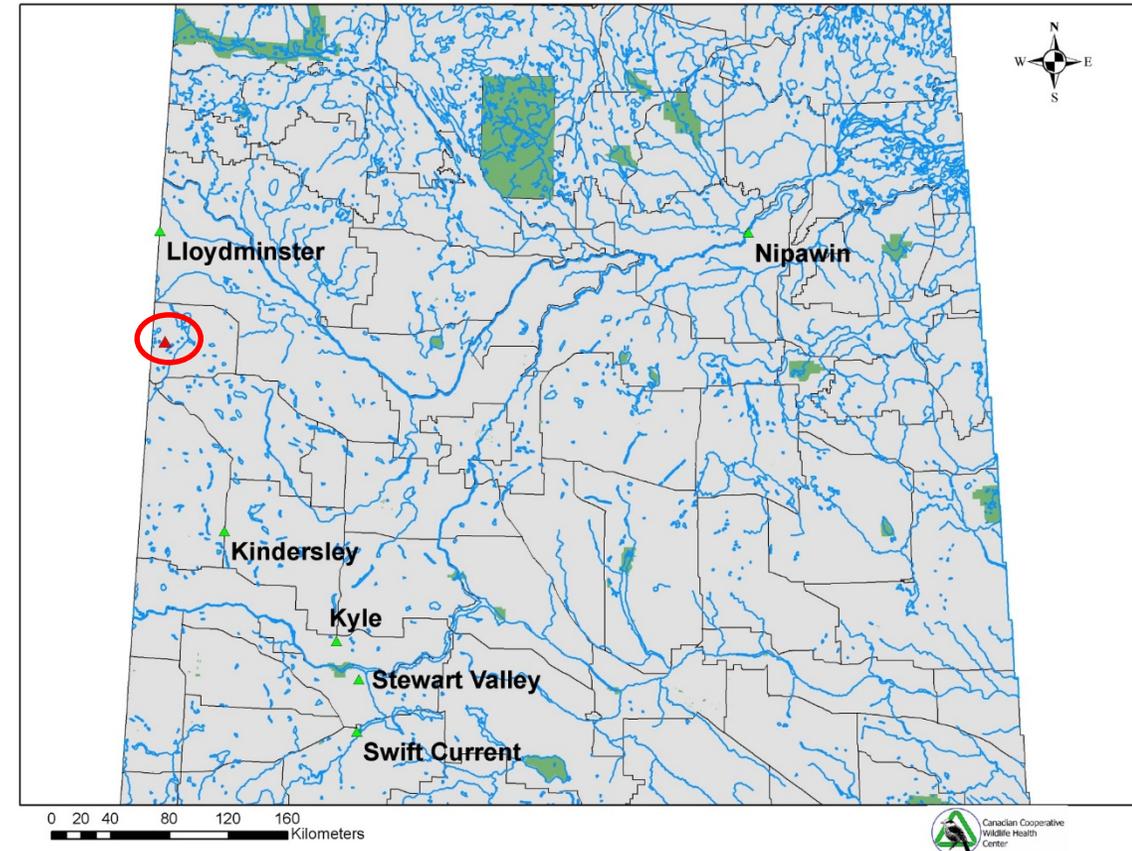
- Started testing in wild herds in 1997
- Voluntary free testing to hunters
- 1997-1999: 329 samples
- 2000: positive wild mule deer
- Primary goal:
 - Detect the distribution of disease

Number of Cervids Collected for CWD Assessment in Western Saskatchewan, 1997-2002.



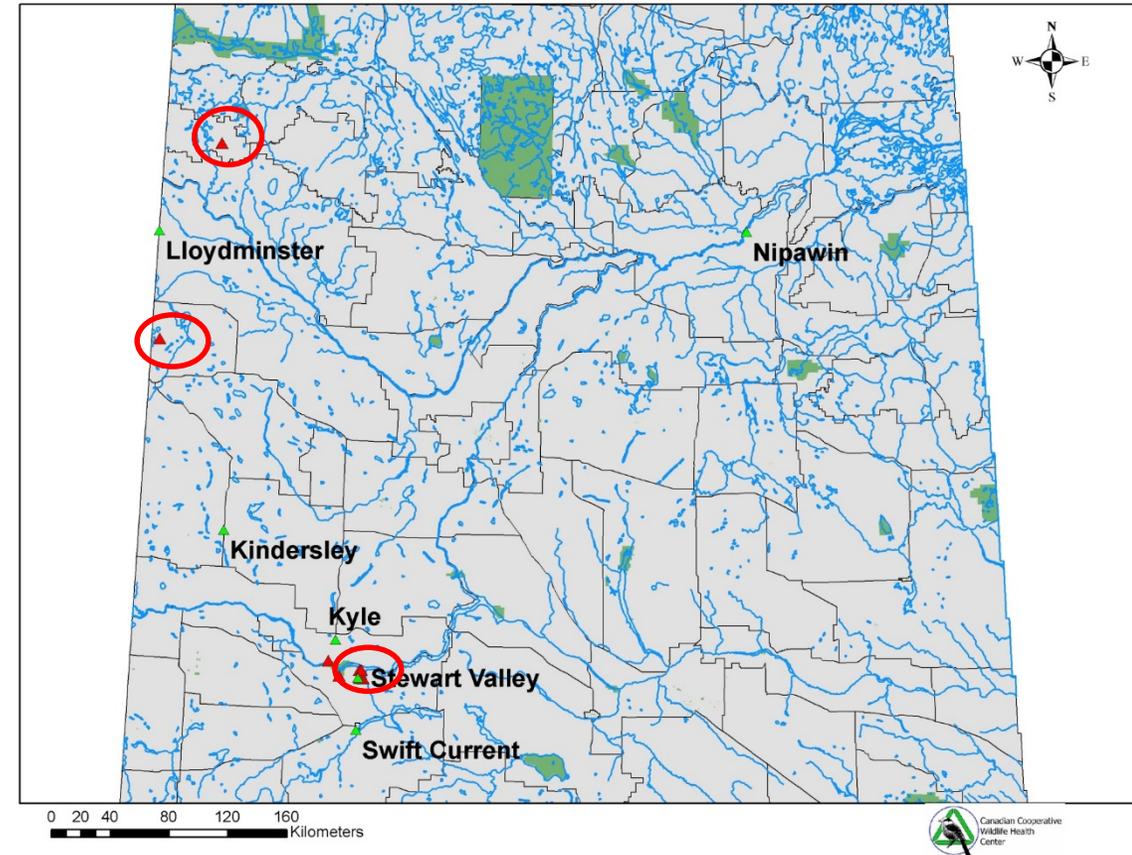
Herd Reduction Areas

- **Goal: Reduce herd (60%) to decrease transmission and eradicate disease**
- Targeted agency culling and increased hunting opportunities around CWD positive detections (~10 km²)
- Expanded to entire WMZ in 2007
- 2001
 - Manito Sandhills (HRA46)
 - All regular and special draw licenses cancelled
 - Control Permits: either sex license and antlerless license
 - 2 additional cases found in mule deer

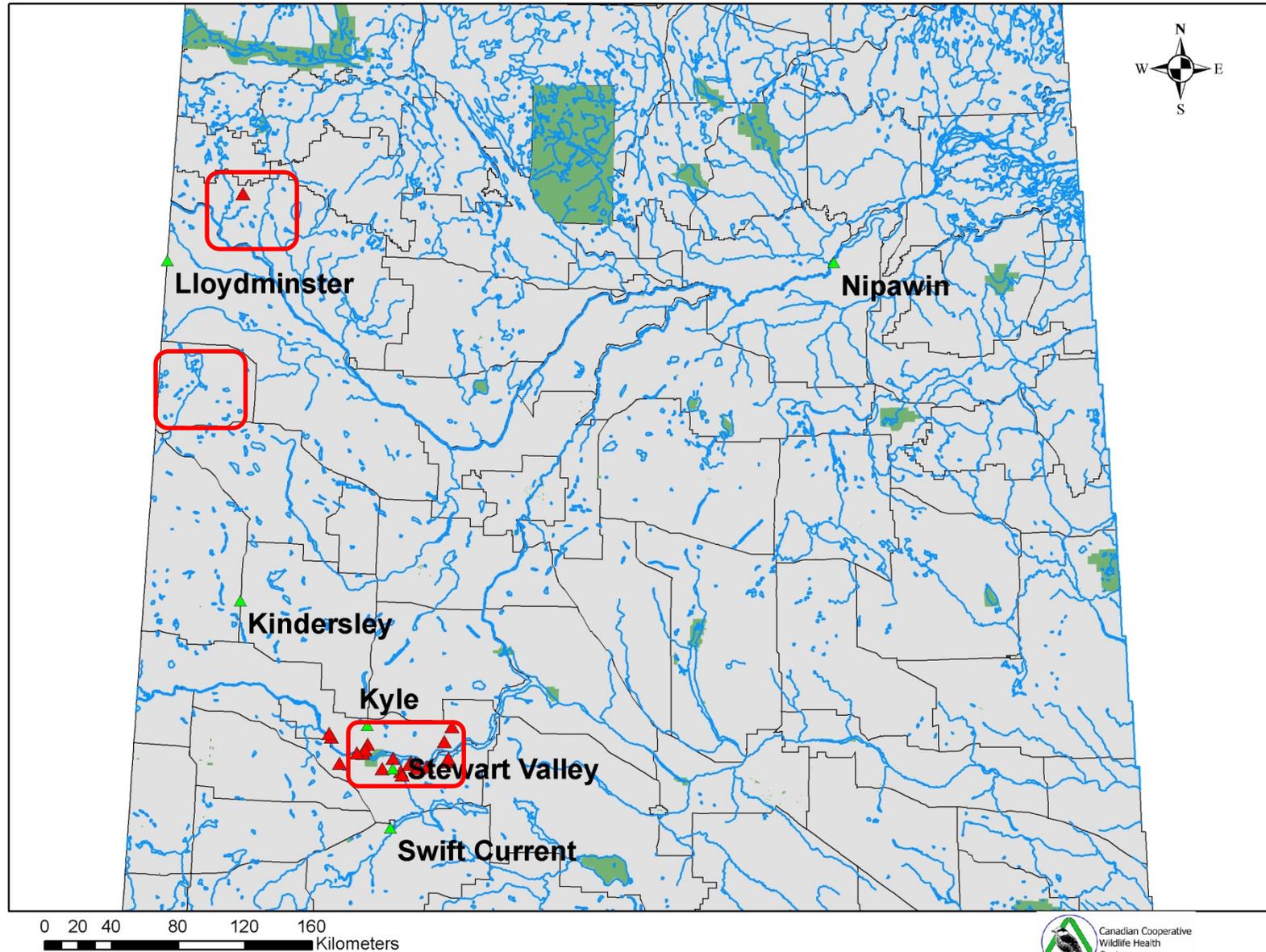


Herd Reduction Areas

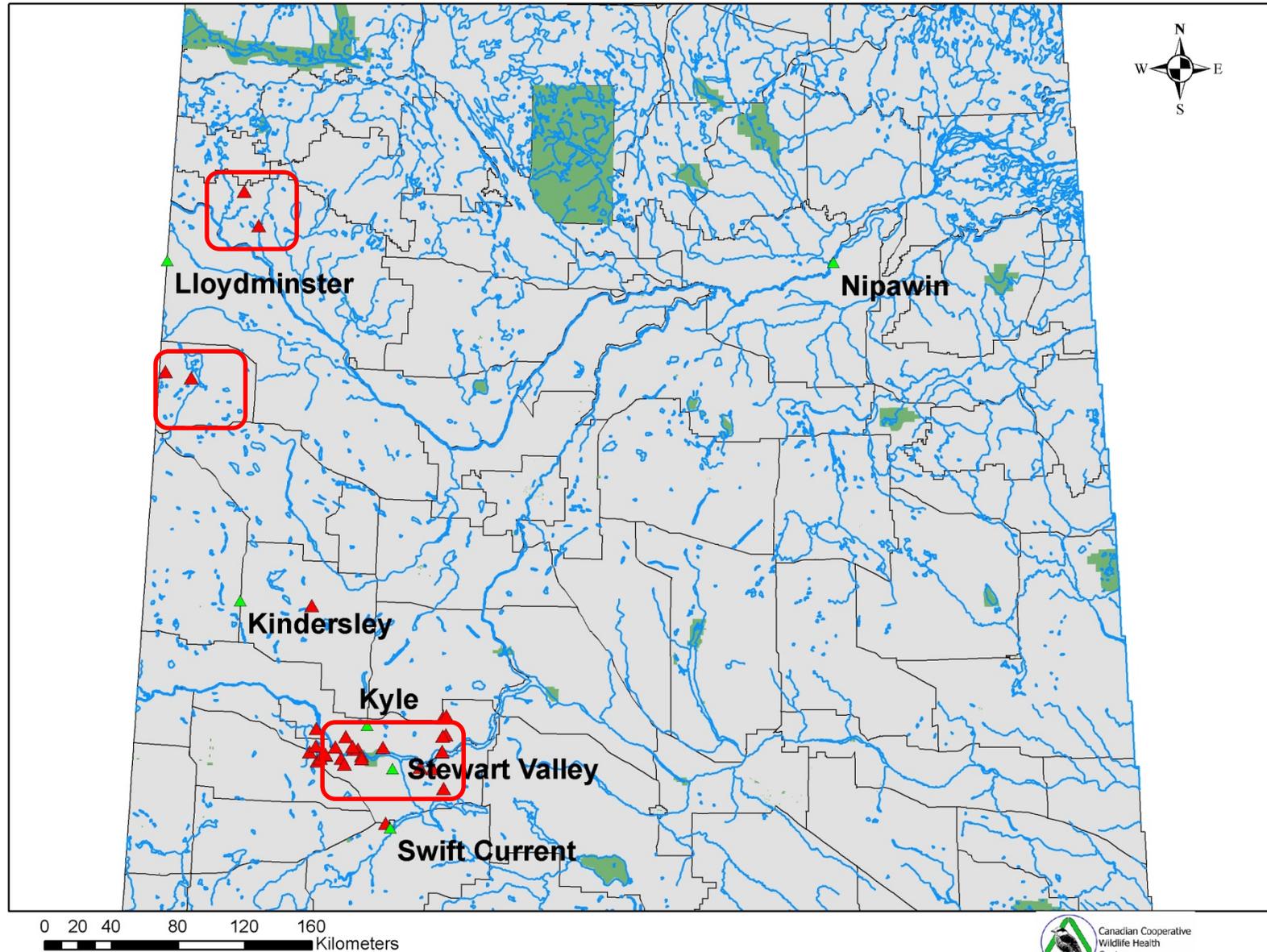
- 2002
 - CWD identified in mule deer in Saskatchewan Landing Area (WMZ14)
 - 6 km radius Herd Reduction Area established (HRA14)
- **Growing belief that CWD may be a “pocket” disease**



2003



2004



Lack of Stakeholder Buy In

- Opposition to herd reduction
 - Worried about killing ‘healthy’ deer and wiping out entire herd
 - Hunters report seeing less deer
- Hunters worried about herd ‘genetics’ – loss of big bucks
- Disease spreading outside of HRAs despite culling
- Questionable outcome
 - Hunters only shooting bucks – not achieving goal of herd reduction
- No long term plan

Earn A Buck

- Hunters submit 2 antlerless deer heads in exchange for an either sex license
- Incentive: Free buck license
- Free CWD hunting permit for antlerless deer

- 2004 – no limit on number of licenses
- 2005 – 2007 – unlimited antlerless or 3 points or less; **maximum of 2 bucks**; reduced fee for buck license (2007)
- 2008 – 2011 – **maximum of 1 buck**; no free hunting permits; have to purchase buck license

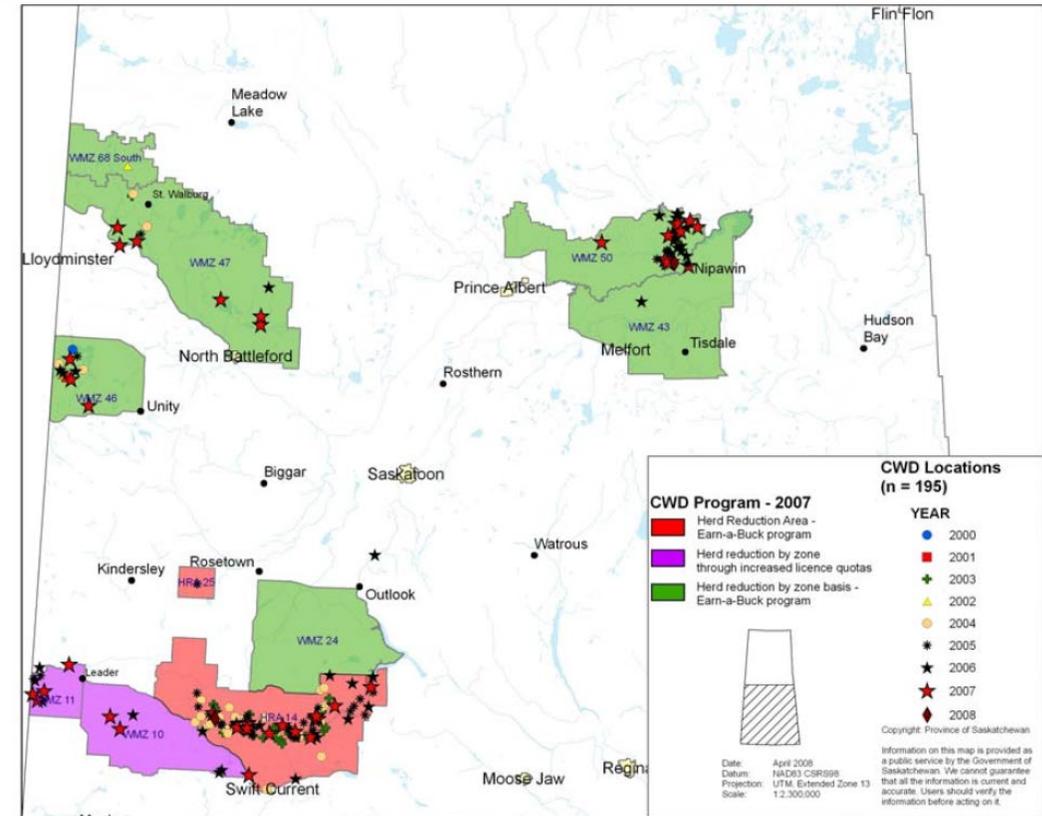


Figure 3. CWD distribution and spread in Saskatchewan: 2000-2008
(Saskatchewan Ministry of Environment)

Earn A Buck

- Earn-a-buck and incentive programs effective in encouraging hunters to submit head samples.

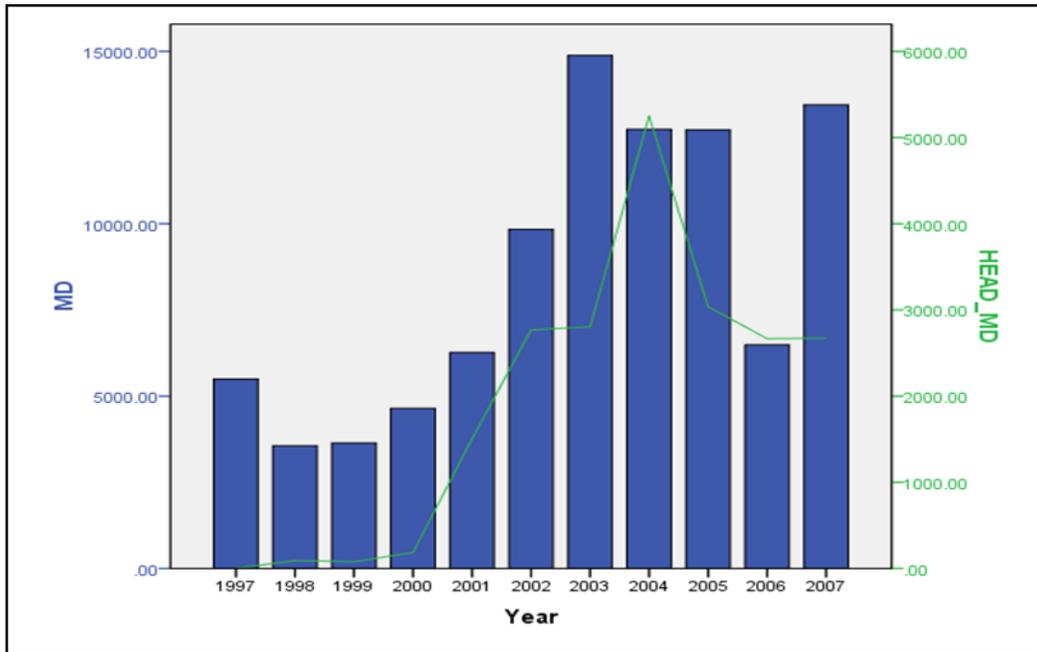


Figure 3. Head submission and estimated hunter harvest for mule deer (MD) from 1997-2007 in Saskatchewan.

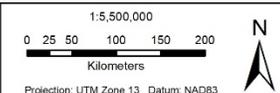
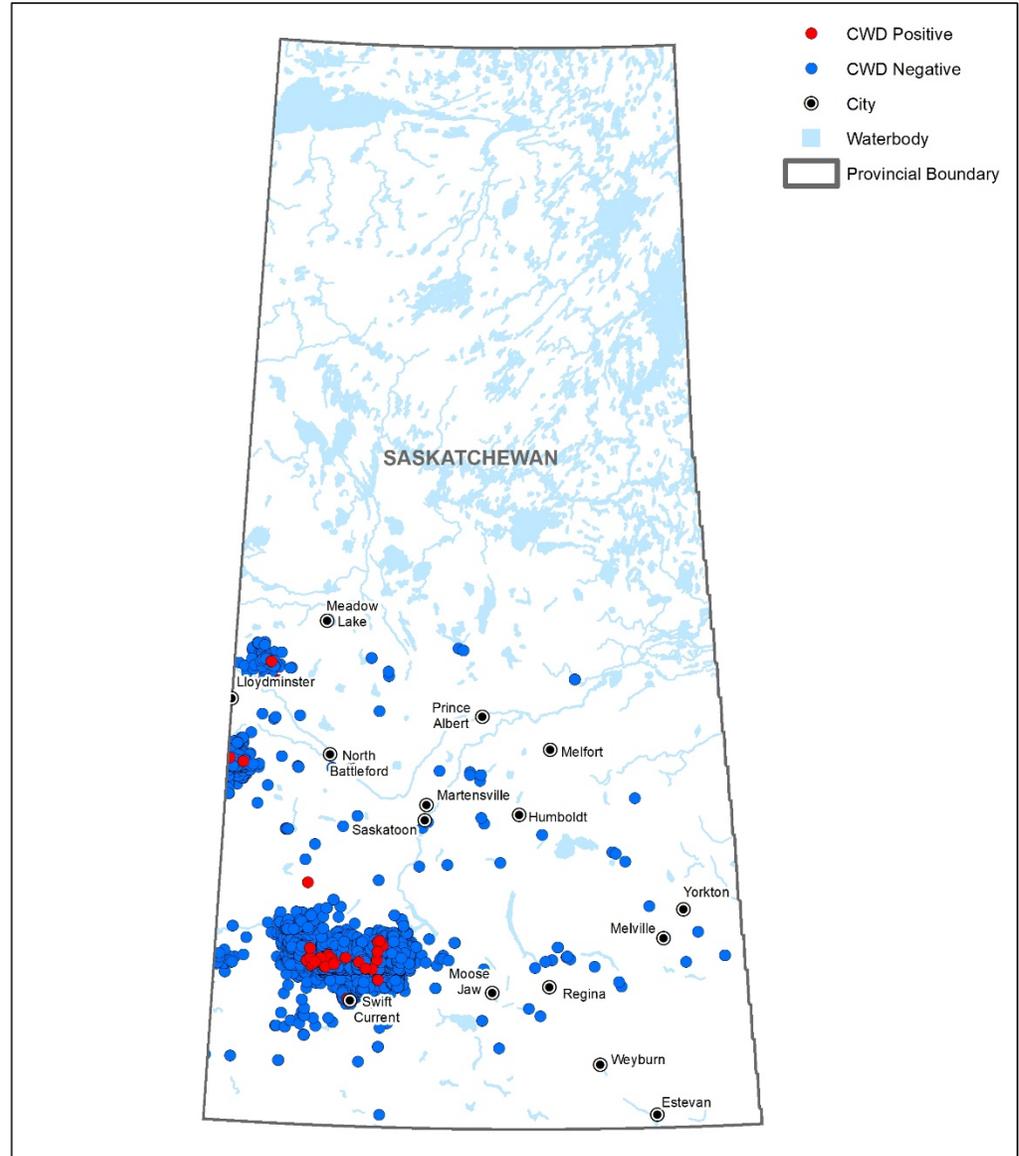
YEAR	WTD		MD		ELK	TOTAL/YEAR	TEST POSITIVE
	IN HRA'S	OUTSIDE HRA'S	IN HRA'S	OUTSIDE HRA'S			
1997	0	36	0	2	0	38	NONE
1998	0	18	0	91	2	111	NONE
1999	0	57	0	79	44	180	NONE
2000	0	726	0	185	89	1,000	1 MD
2001	1,000	1,998	684	821	316	4,819	1 MD
2002	168	1,957	911	1,857	161	5,054	8 MD / 2 WTD
2003	169	1,918	948	1,858	162	5,055	22 MD
2004	1,397	0	5,251	0	0	6,648	28 MD / 2 WTD
2005	1,152	345	2,146	891	48	4,582	27 MD / 10 WTD
2006	1,445	415	1,807	859	151	4,677	27 MD / 20 WTD
2007	419	1,720	953	2,031	107	5,230	30 MD / 15 WTD
2008			2		2	4	1 MD / 1 UNKNOWN 2 ELK
TOTAL	5,750	9,190	12,702	8,674	1,082	37,398	145 MD / 49 WTD 2 ELK

Figure 4. Summary of Saskatchewan's CWD control efforts: 1997-2008 (Saskatchewan Ministry of Environment)

Hunter Resistance

- Strong resistance from hunters
- Complaints of game wastage – slaughter of does just to “Earn a Buck”
- Landowners posting property because of deer being shot and abandoned on their land
- Rationale for program not clear– many only interested in increased hunting opportunity
- Did not comprehend negative effects of CWD
- Animosity between landowners and hunters and hunter who oppose program and those that participate
- Program shifting year to year – hunter fatigue

Chronic Wasting Disease Wildlife Test Results 2004

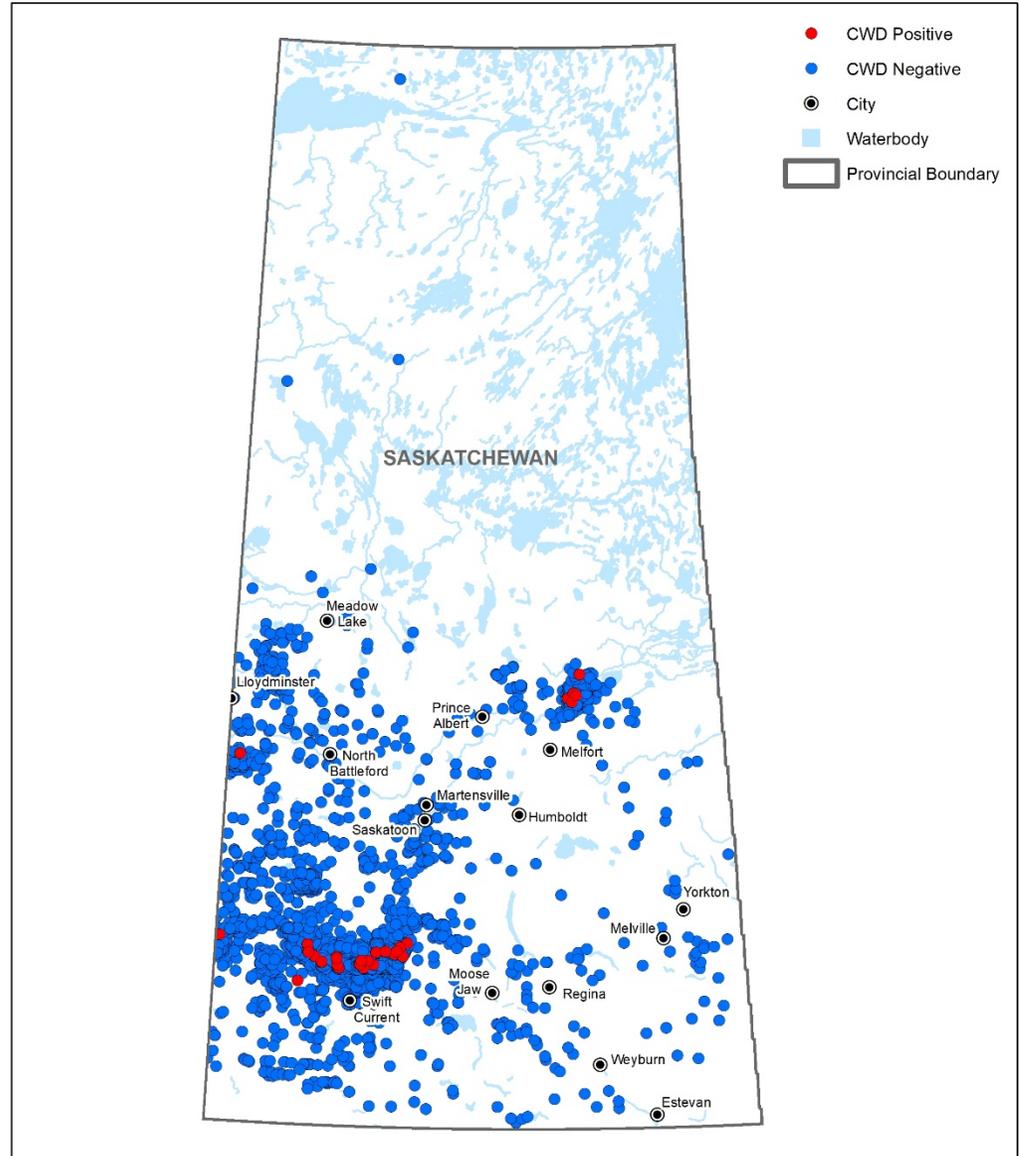


Data Source:
Chronic Wasting Disease sample locations - Canadian Wildlife Health Cooperative

Geomatics Services, Ministry of Agriculture

March 5, 2019

Chronic Wasting Disease Wildlife Test Results 2005



1:5,500,000
0 25 50 100 150 200
Kilometers

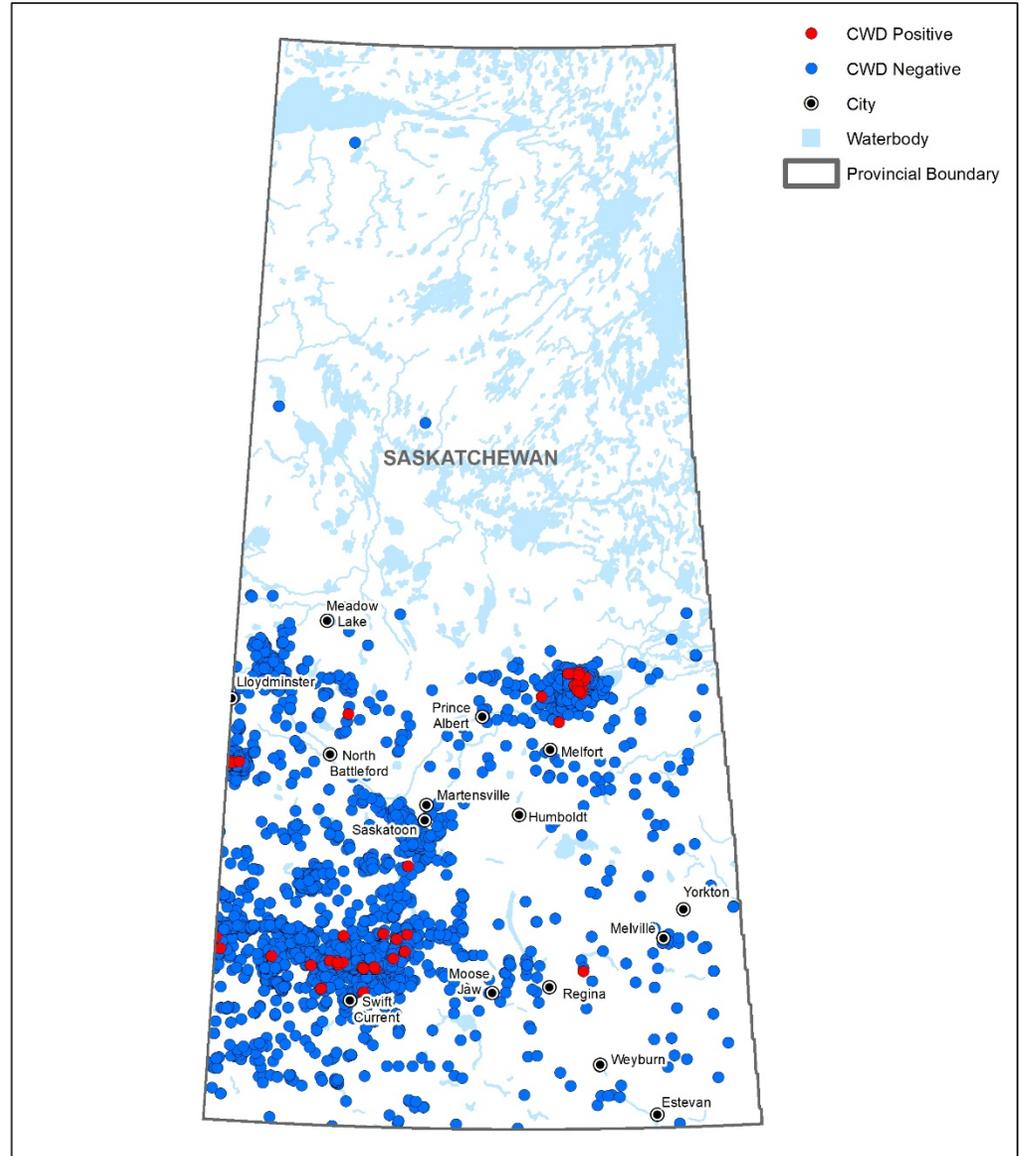


Data Source:
Chronic Wasting Disease sample locations - Canadian Wildlife Health Cooperative

Geomatics Services, Ministry of Agriculture

March 5, 2019

Chronic Wasting Disease Wildlife Test Results 2006

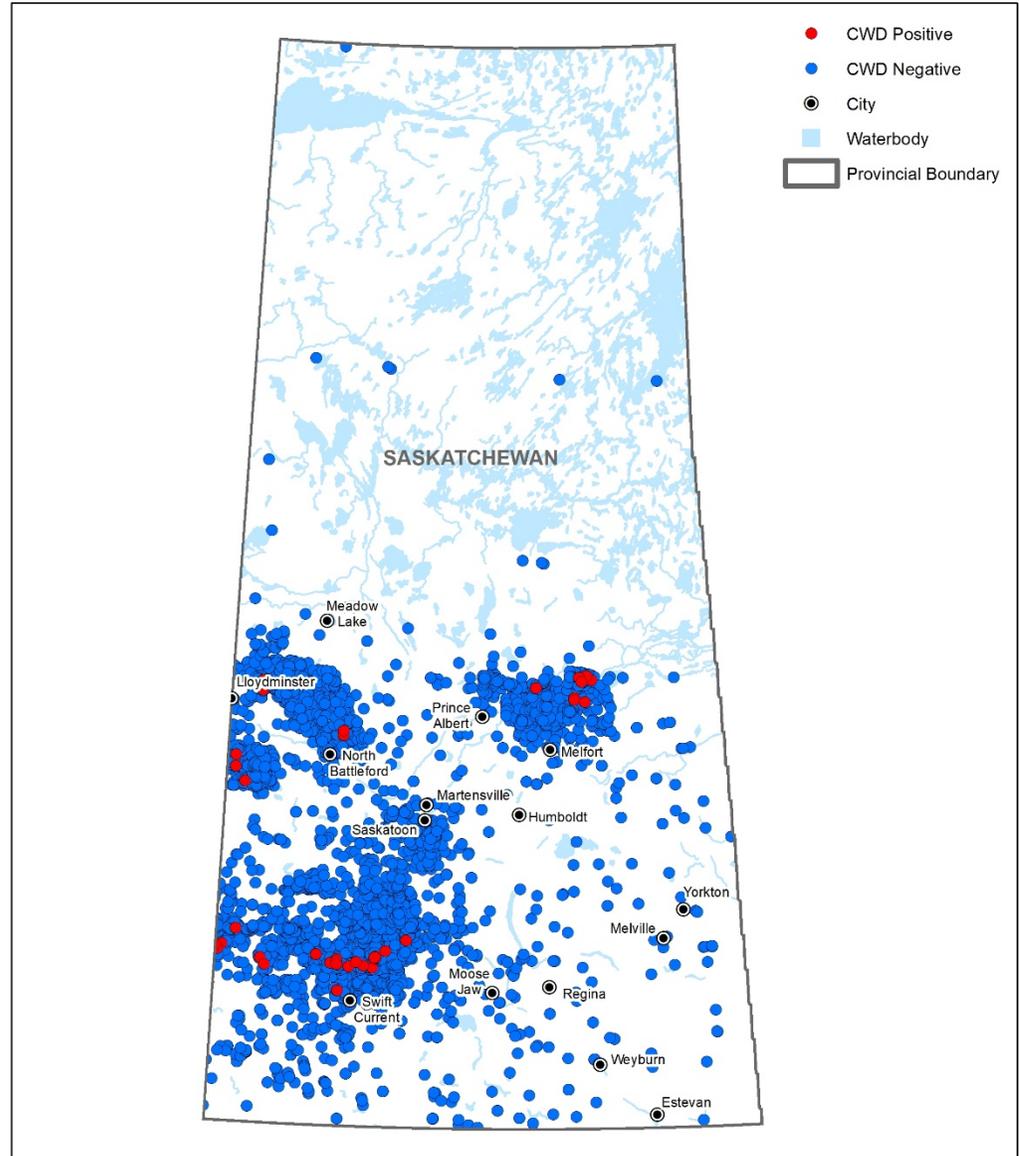


1:5,500,000
0 25 50 100 150 200
Kilometers
Projection: UTM Zone 13 Datum: NAD83



Data Source:
Chronic Wasting Disease sample locations - Canadian Wildlife Health Cooperative
Geomatics Services, Ministry of Agriculture March 5, 2019

Chronic Wasting Disease Wildlife Test Results 2007



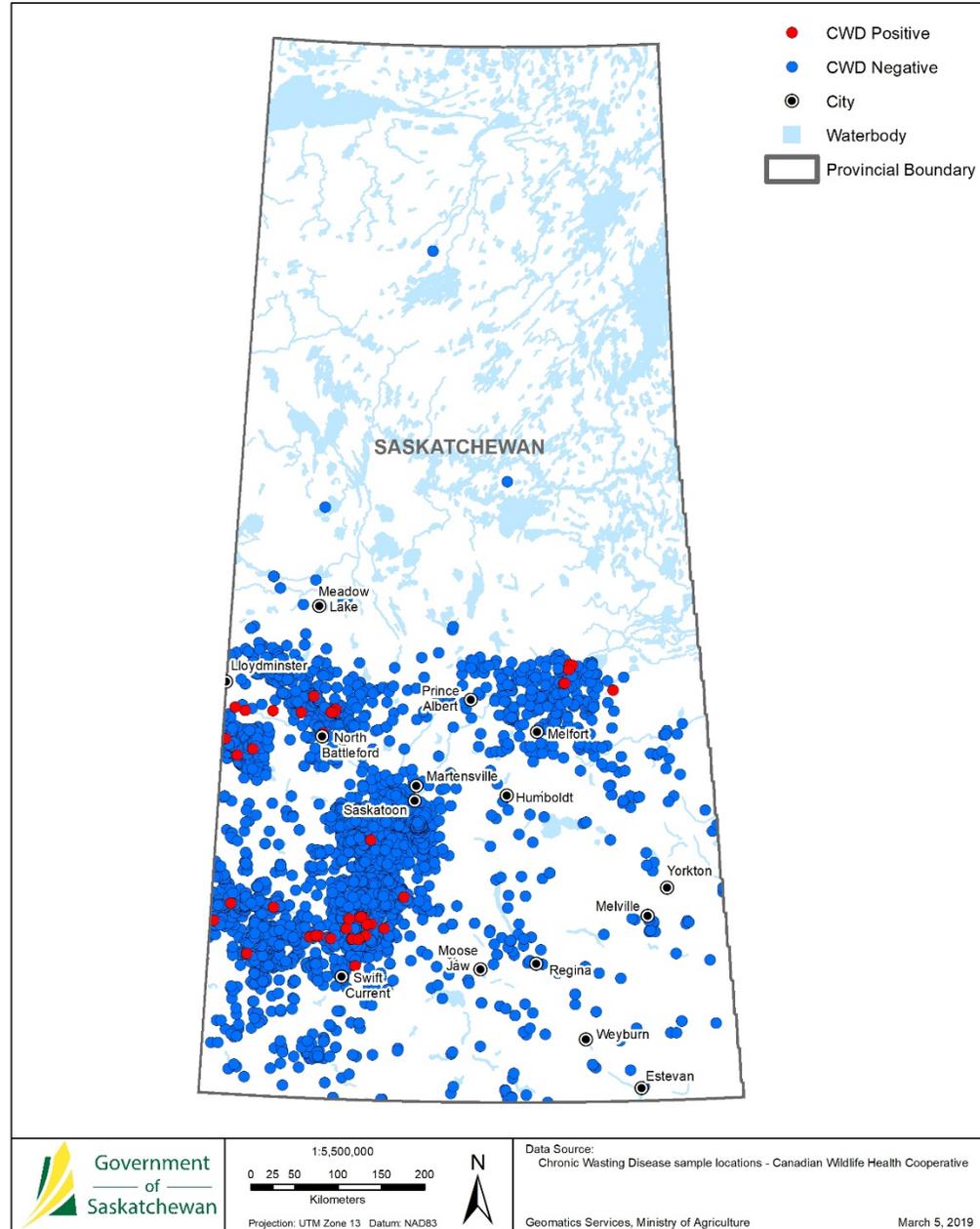
1:5,500,000
0 25 50 100 150 200
Kilometers
Projection: UTM Zone 13 Datum: NAD83



Data Source:
Chronic Wasting Disease sample locations - Canadian Wildlife Health Cooperative

Geomatics Services, Ministry of Agriculture March 5, 2019

Chronic Wasting Disease Wildlife Test Results 2008



CWD detected in 16 WMZ

- Rate of infection increasing
- Geographic spread expanding

“Chasing” the disease

Herd Reduction

- Targets not met

Aerial Survey Summary 2008-2009

Wildlife Management Zone (WMZ)	Species	Survey Period	Population Size ± CI	Density km ² (mi ²)	% Change
29	Mule Deer	Feb 2008	7171 ± 17.9%	1.32 (3.42)	- 43%
		Feb 2009	4035 ± 13.5%	0.75 (1.93)	
29	White-tailed Deer	Feb 2008	5818 ± 17.5%	1.07 (2.77)	- 7%
		Feb 2009	5371 ± 16.0%	0.99 (2.57)	
45	Mule Deer	No prior survey			N/a
		Feb 2009	3347 ± 20.4%	0.72 (1.87)	
45	White-tailed Deer	No prior survey			N/a
		Feb 2009	3743 ± 16.5%	0.81 (2.09)	
46	Mule Deer	Dec 2001	2930 ± 19.1%	1.09 (2.83)	+ 53 %
		Jan 2009	4697 ± 19%	1.67 (4.32)	
46	White-tailed Deer	Dec 2001	2702 ± 14.7%	1.00 (2.60)	+ 84 %
		Jan 2009	5179 ± 19.1%	1.84 (4.76)	
10	Mule Deer	Mar 2007	10177 ± 19.0%	2.72 (7.04)	- 23 %
		Mar 2009	7952 ± 18.3%	2.08 (5.38)	
14 E	White-tailed Deer	Jan 2005	5747 ± 9.7%	0.83 (2.15)	- 23 %
		Mar 2007	4662 ± 19.9%	0.67 (1.75)	

Figure 2. Aerial survey of mule and white-tailed deer population in CWD areas.

CWD Prevalence

- Continuing to increase
- Prevalence rate ~3% in some areas

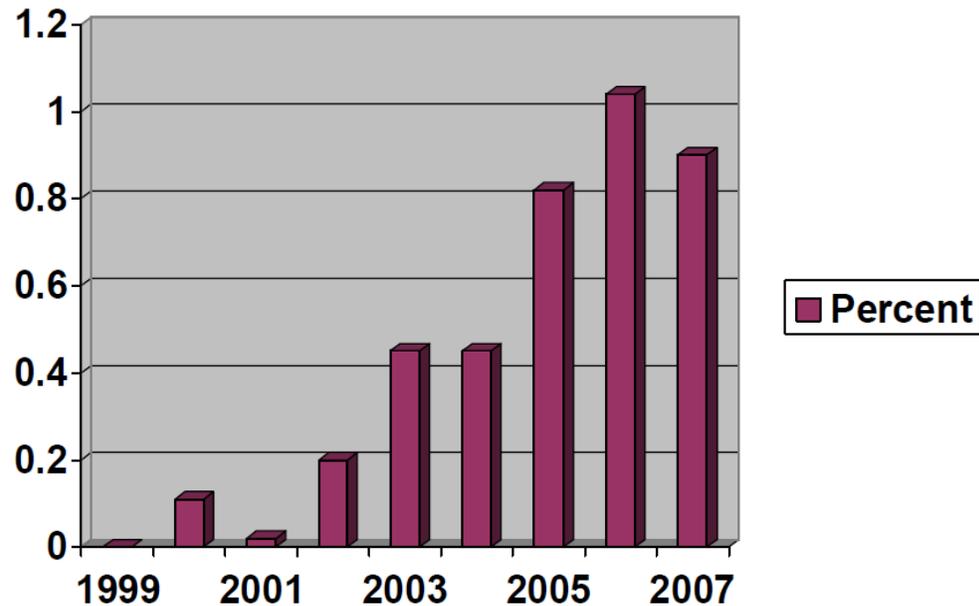
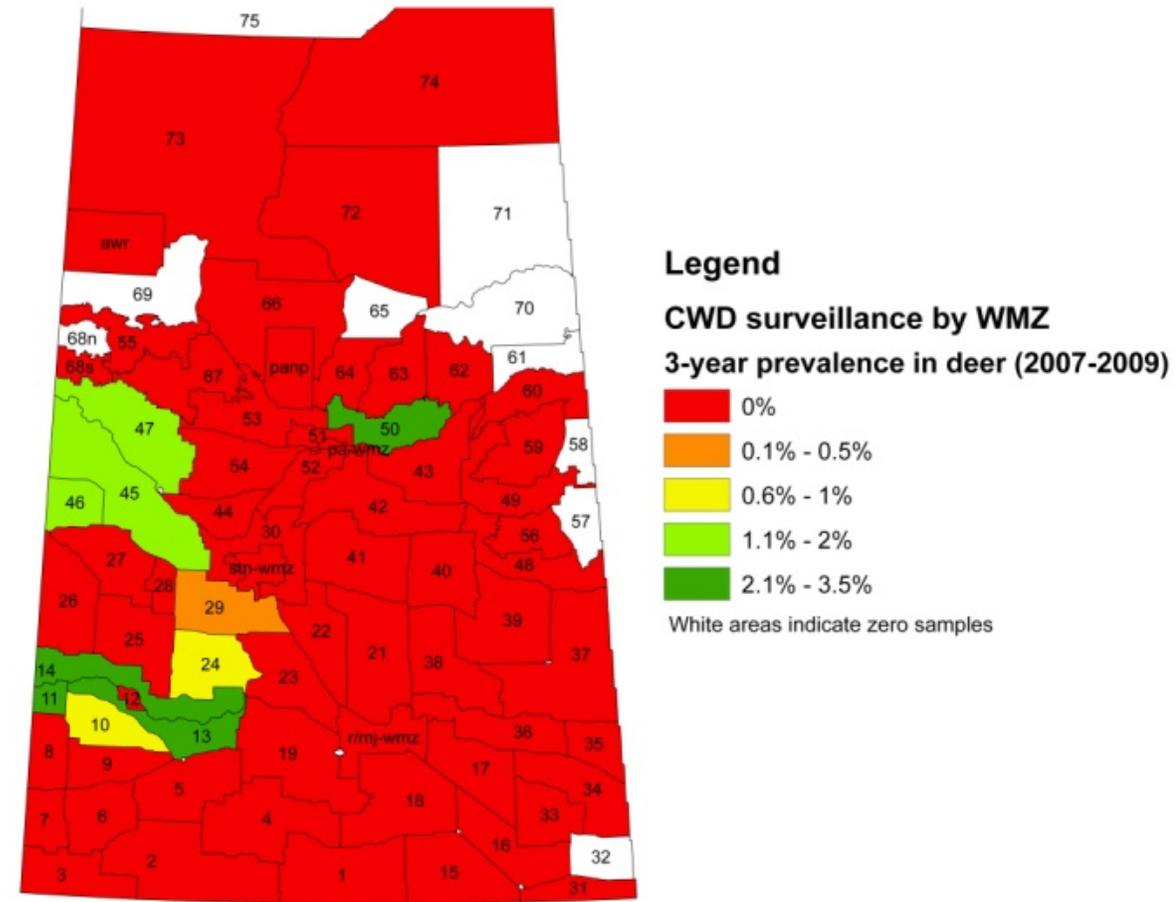
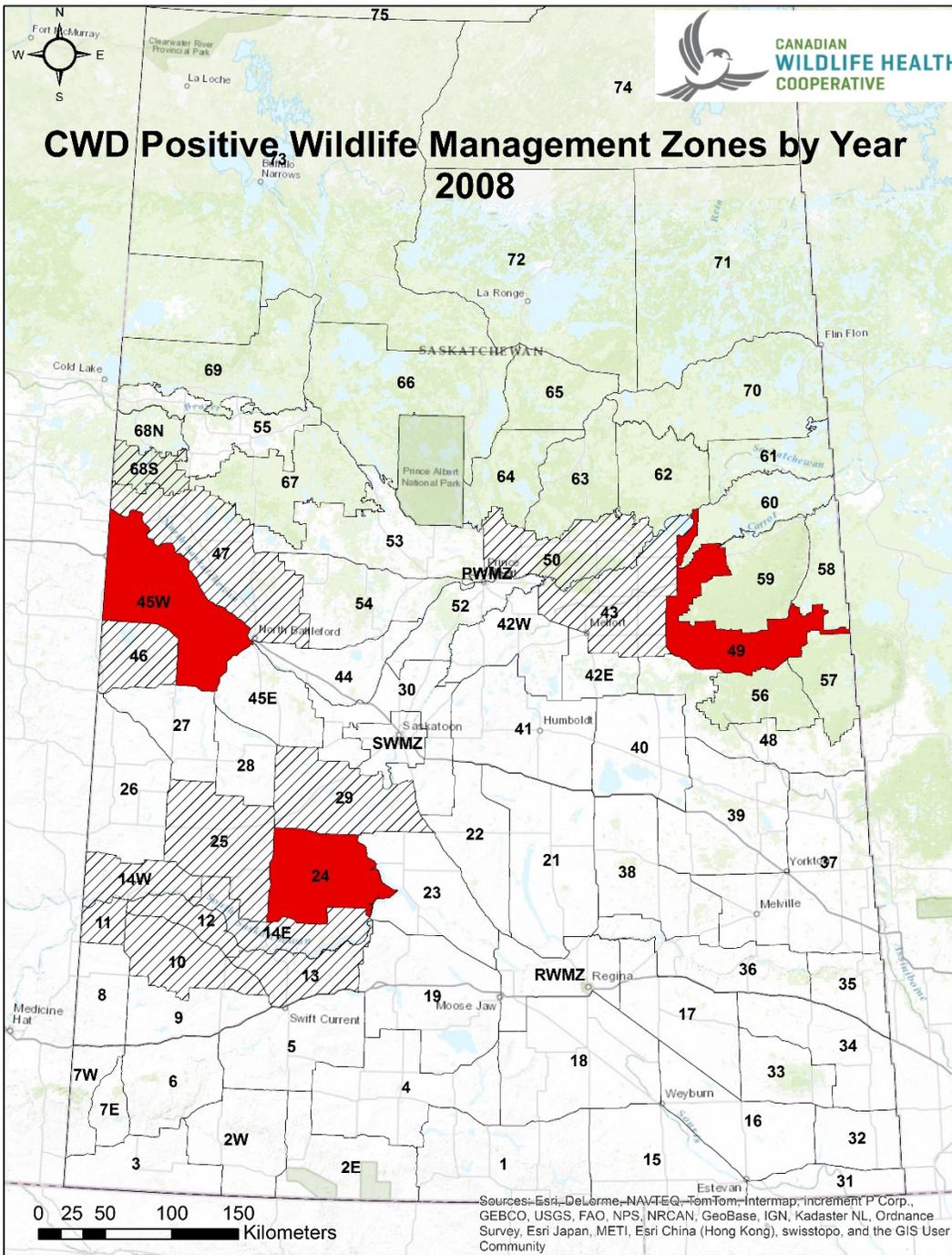


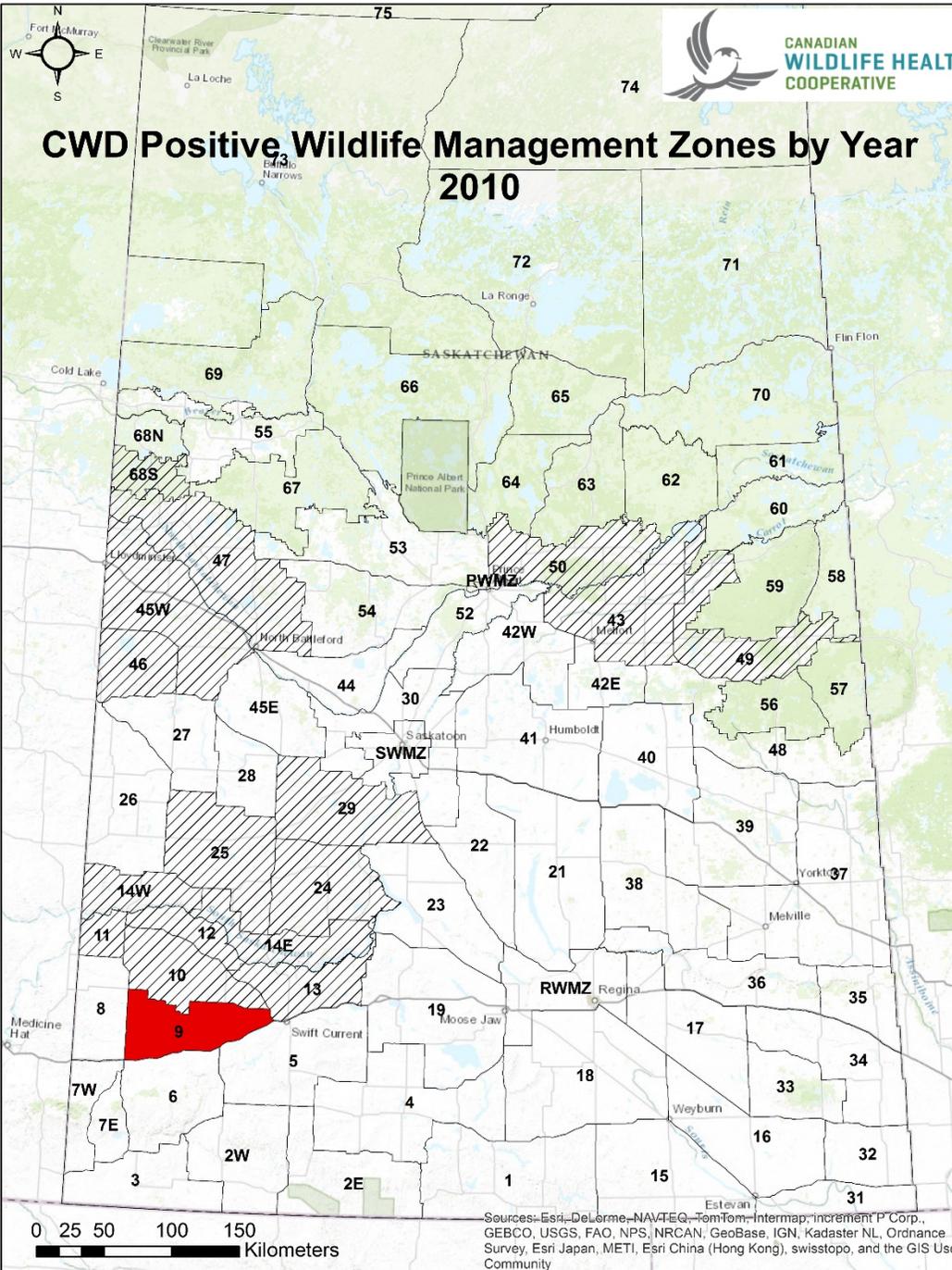
Figure 5. Proportion of sampled mule and white-tailed deer infected with CWD in Saskatchewan: 2000-2007



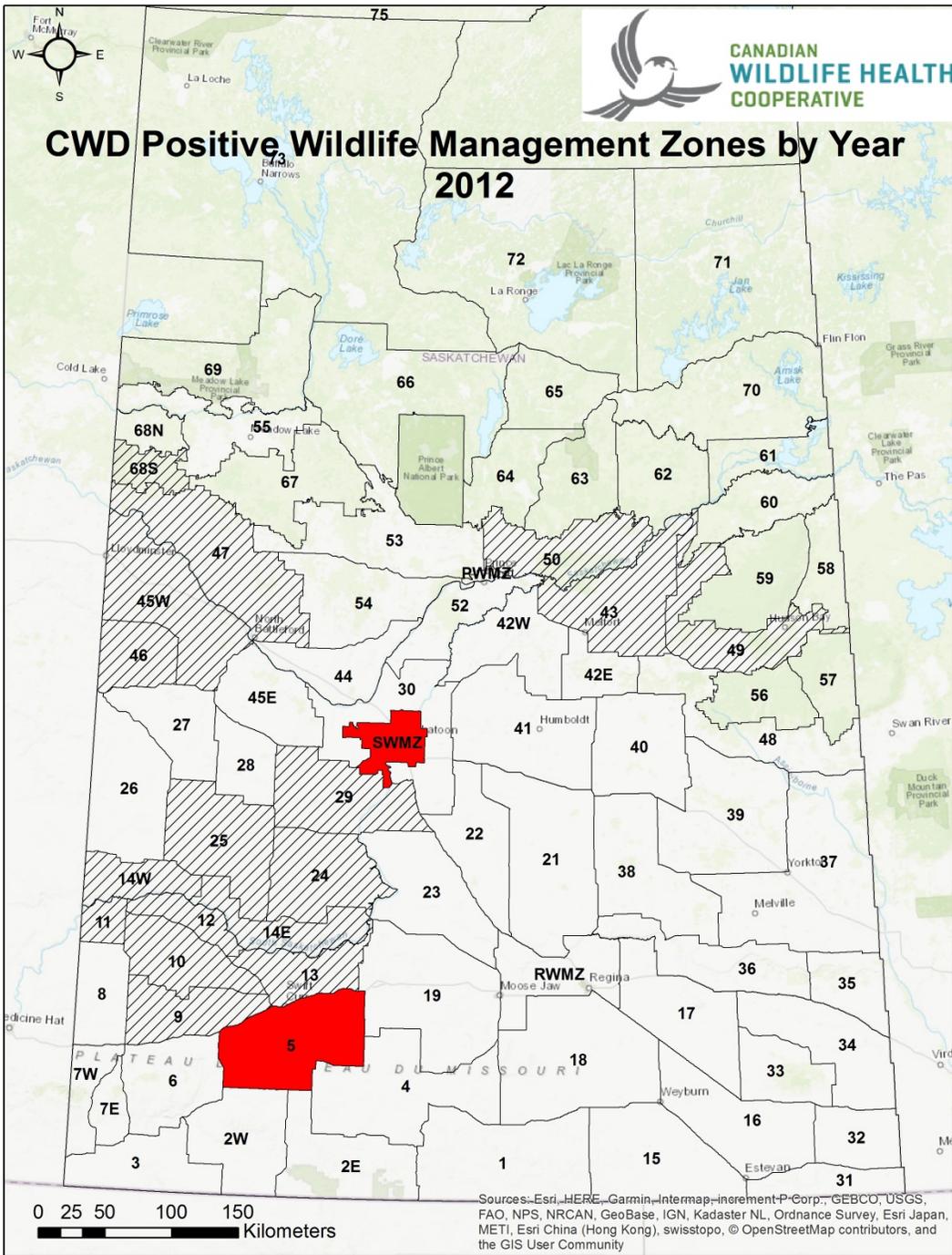
Shifting Goals

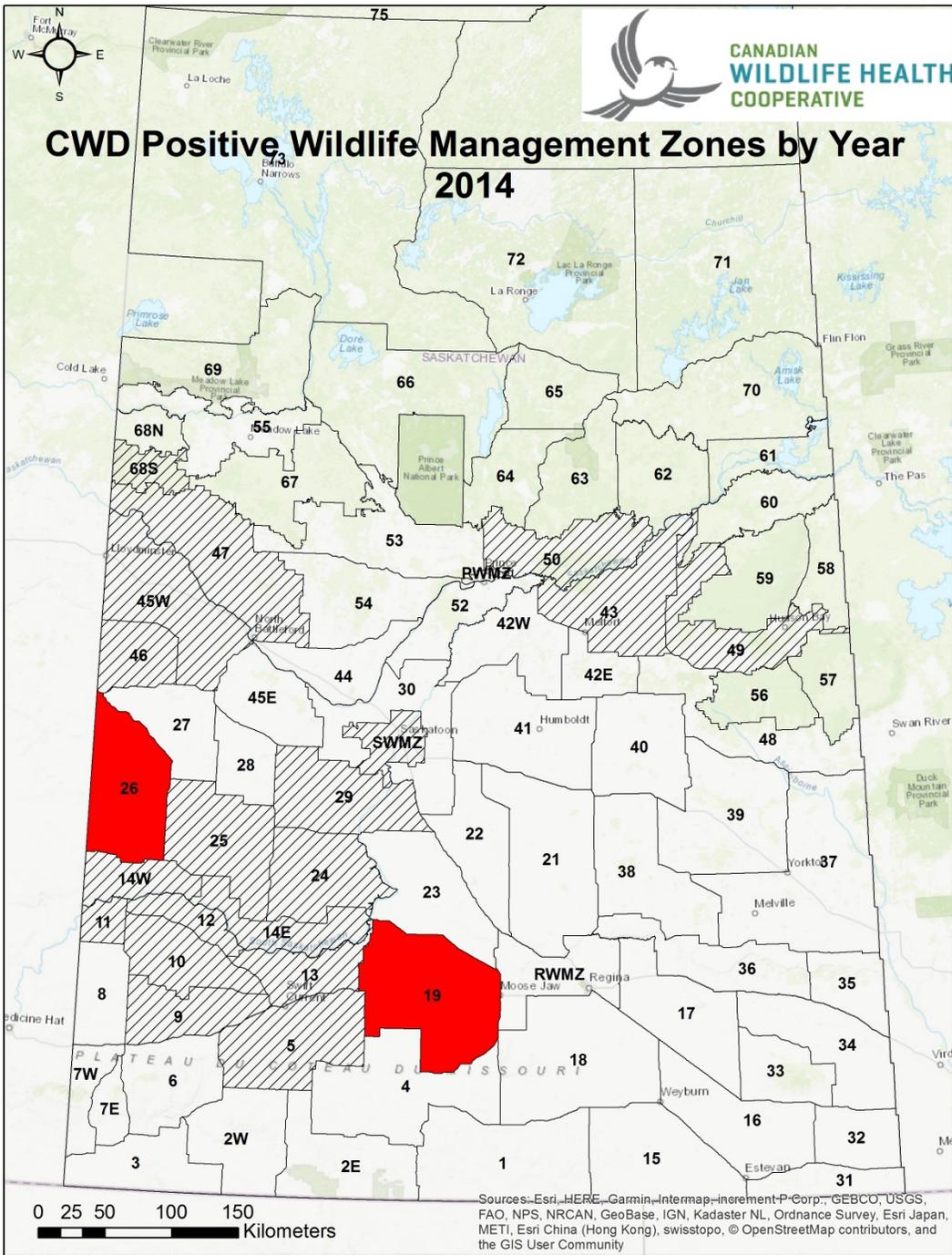
- **CWD eradication no longer considered a viable option**
- Primary Objectives
 - Determine geographic spread
 - Monitor disease prevalence
- Free permits no longer available in CWD zones
- All hunting through use of regular mule deer and WTD licenses
- Focus on keeping deer densities low - Earn a Buck in CWD positive zones
- **CWD will not ‘burn itself out’**

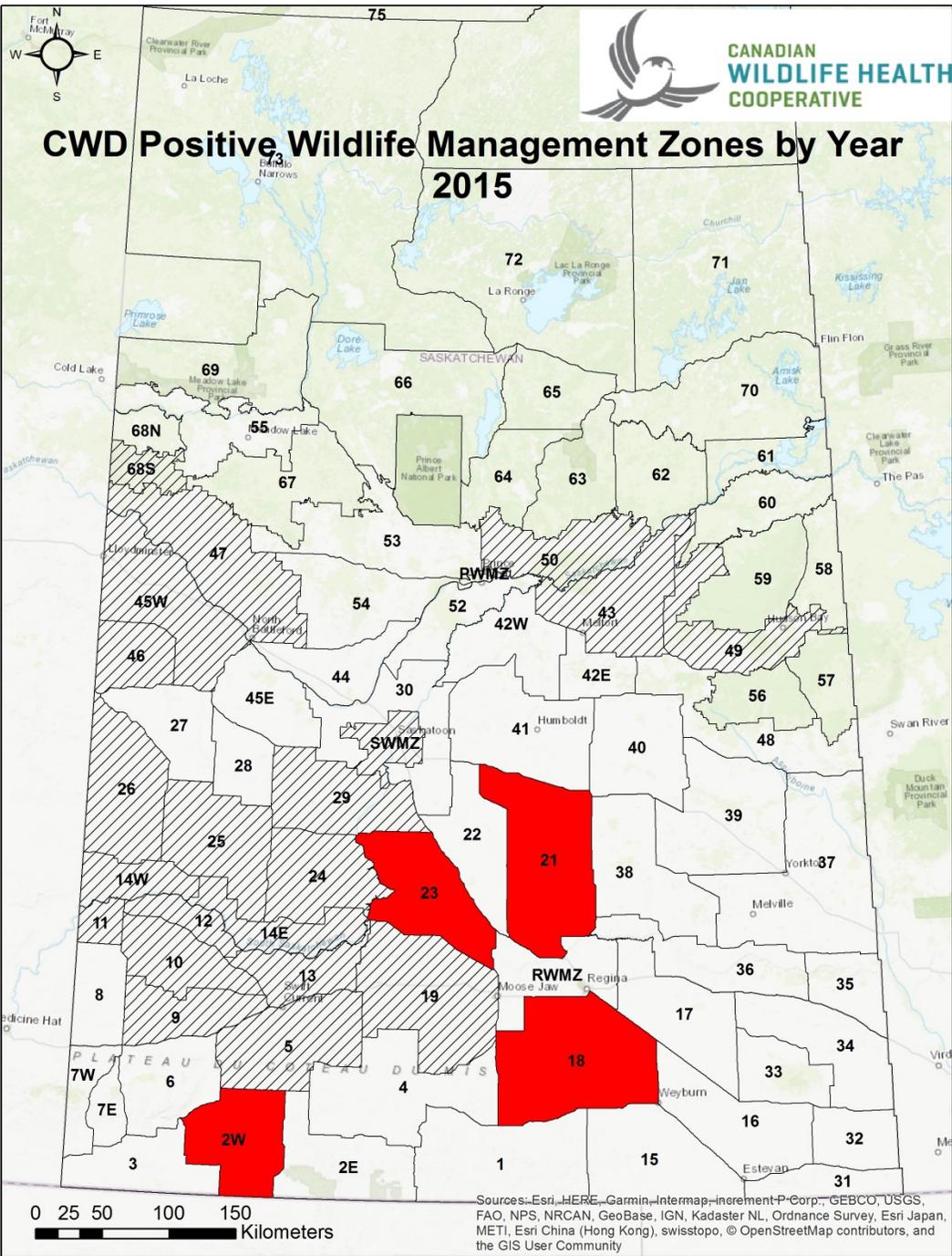


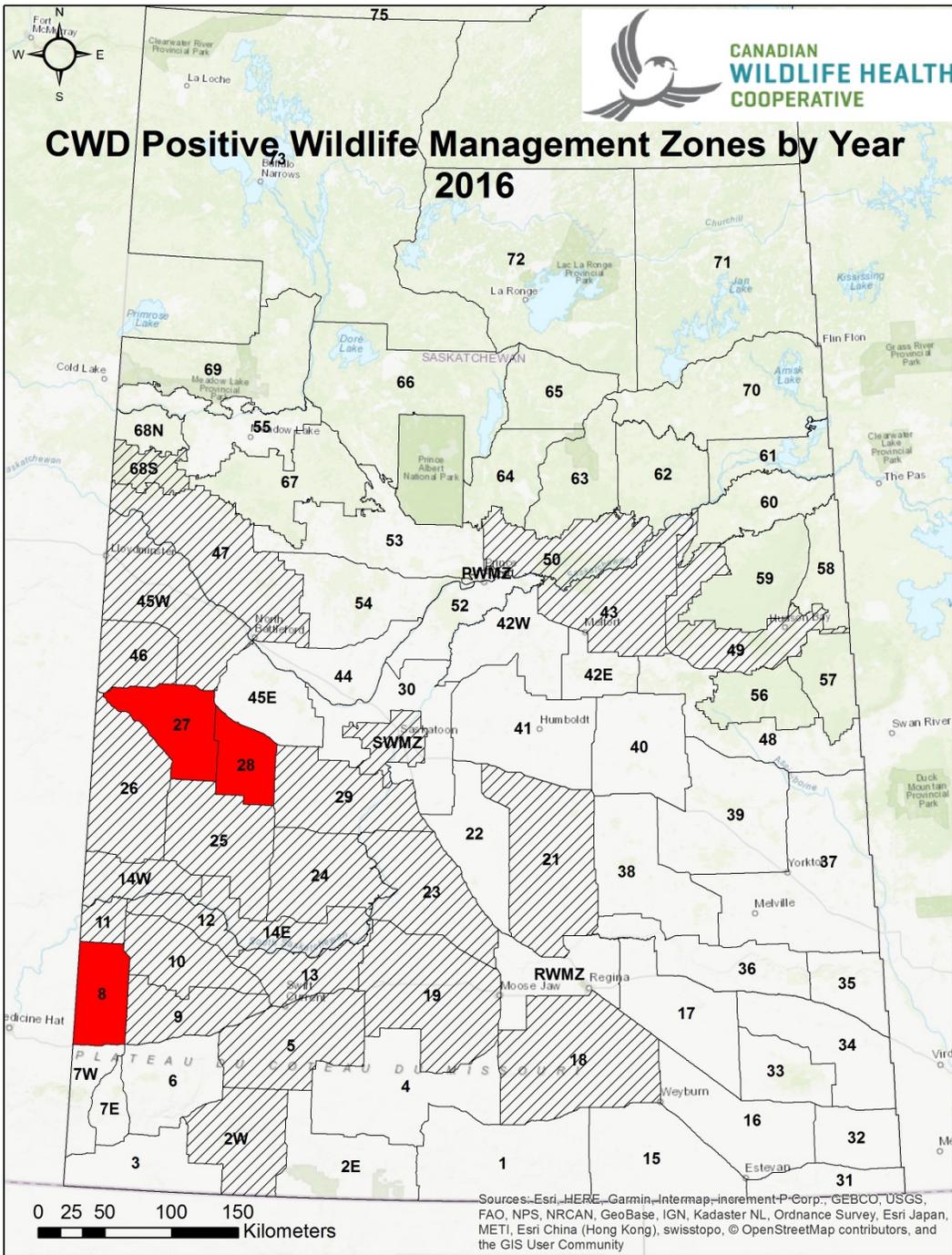


Sources: Esri, DeLorme, NAVTEQ, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, and the GIS User Community

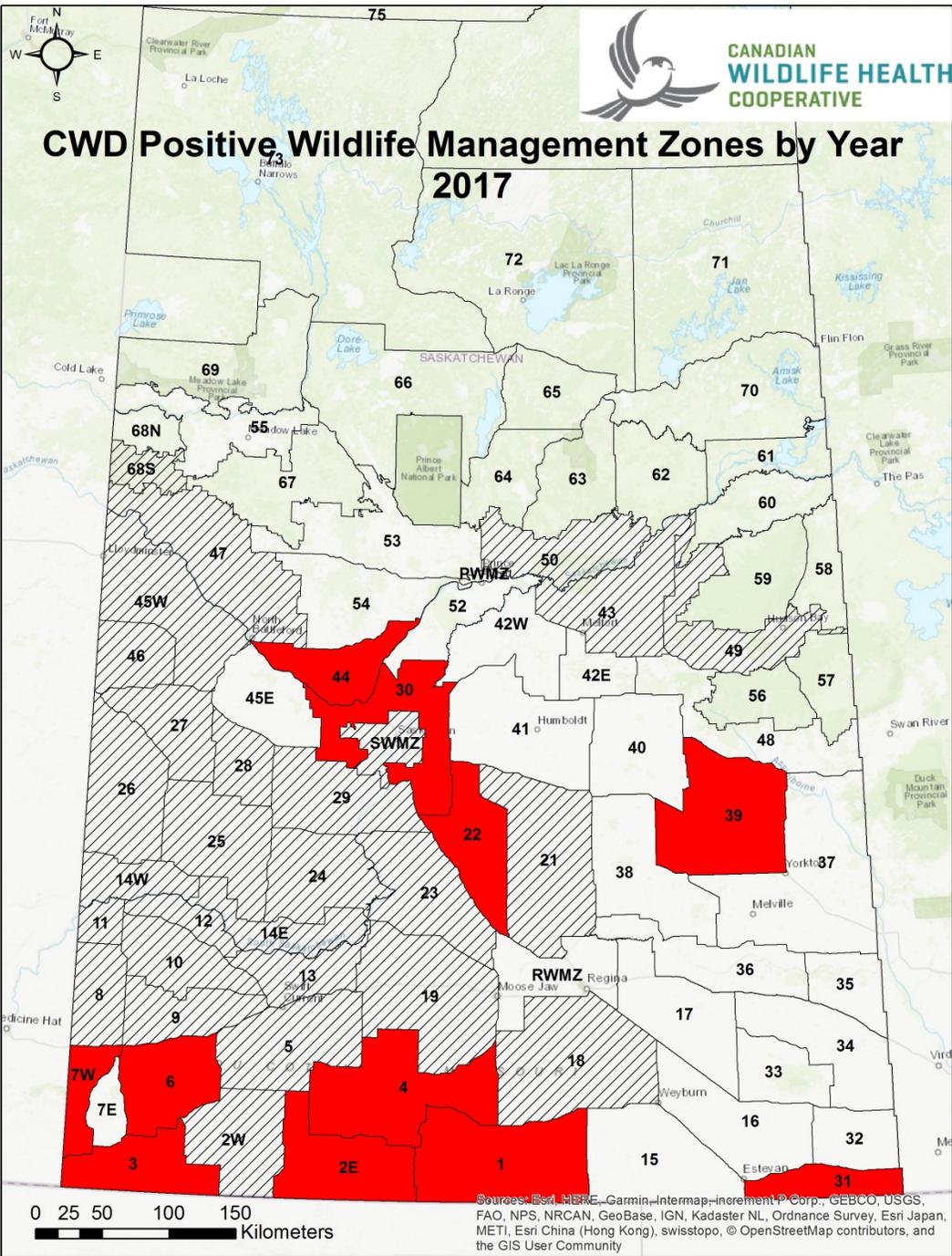


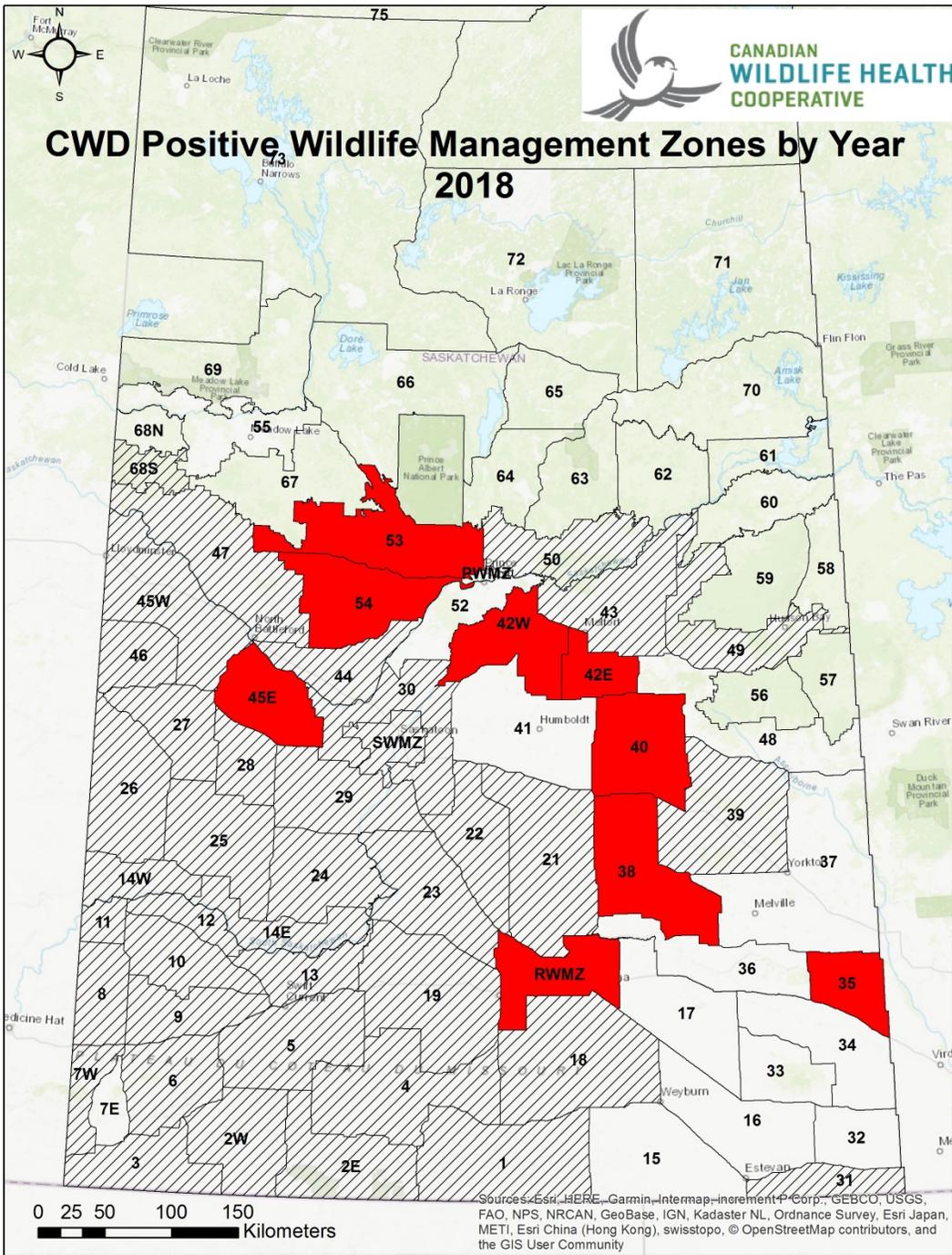






Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, © OpenStreetMap contributors, and the GIS User Community





2018

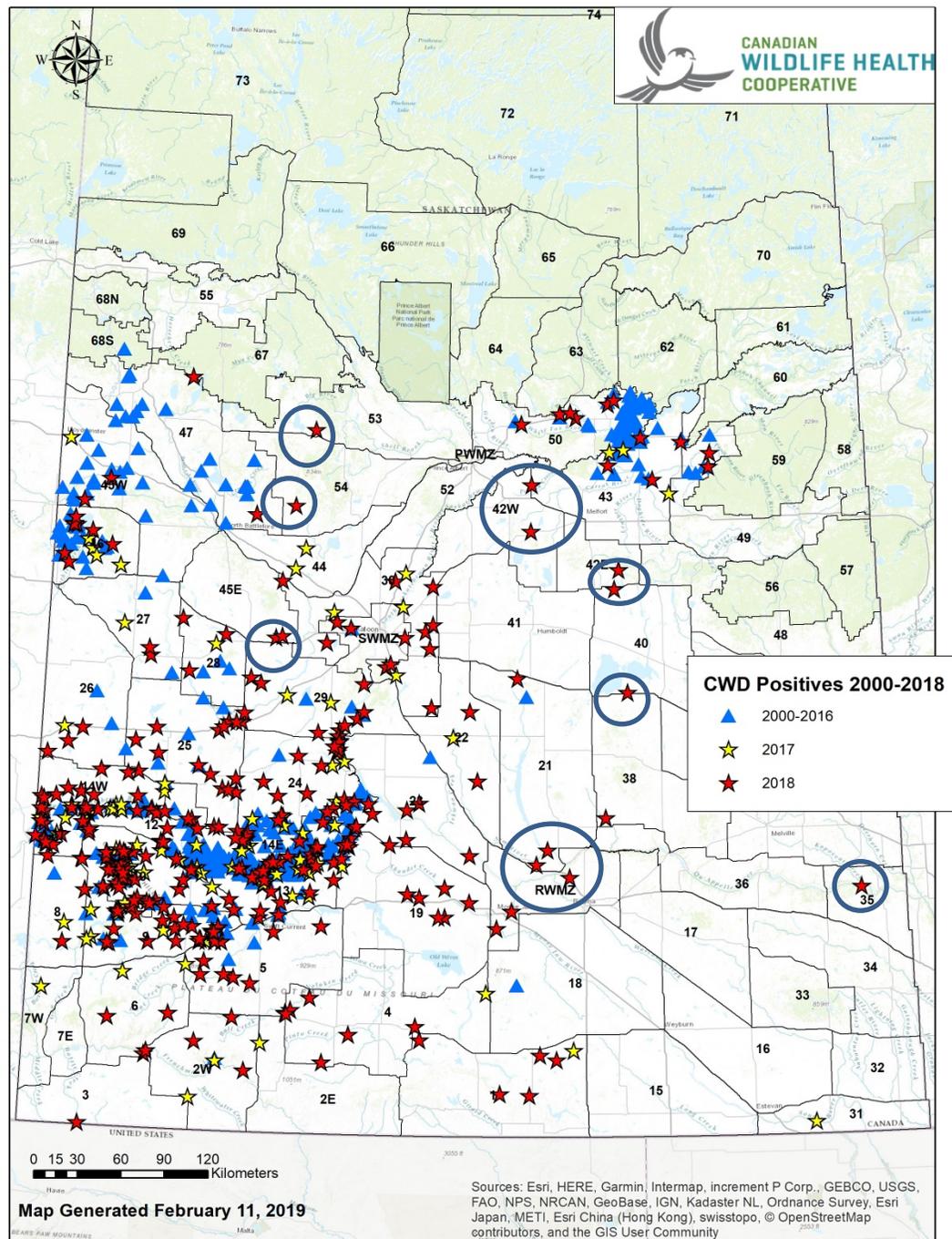
9 NEW WMZs: 35, 38, 40, 42E, 42W, RWMZ, 45E, 53, 54

Hunter samples collected: **2070**

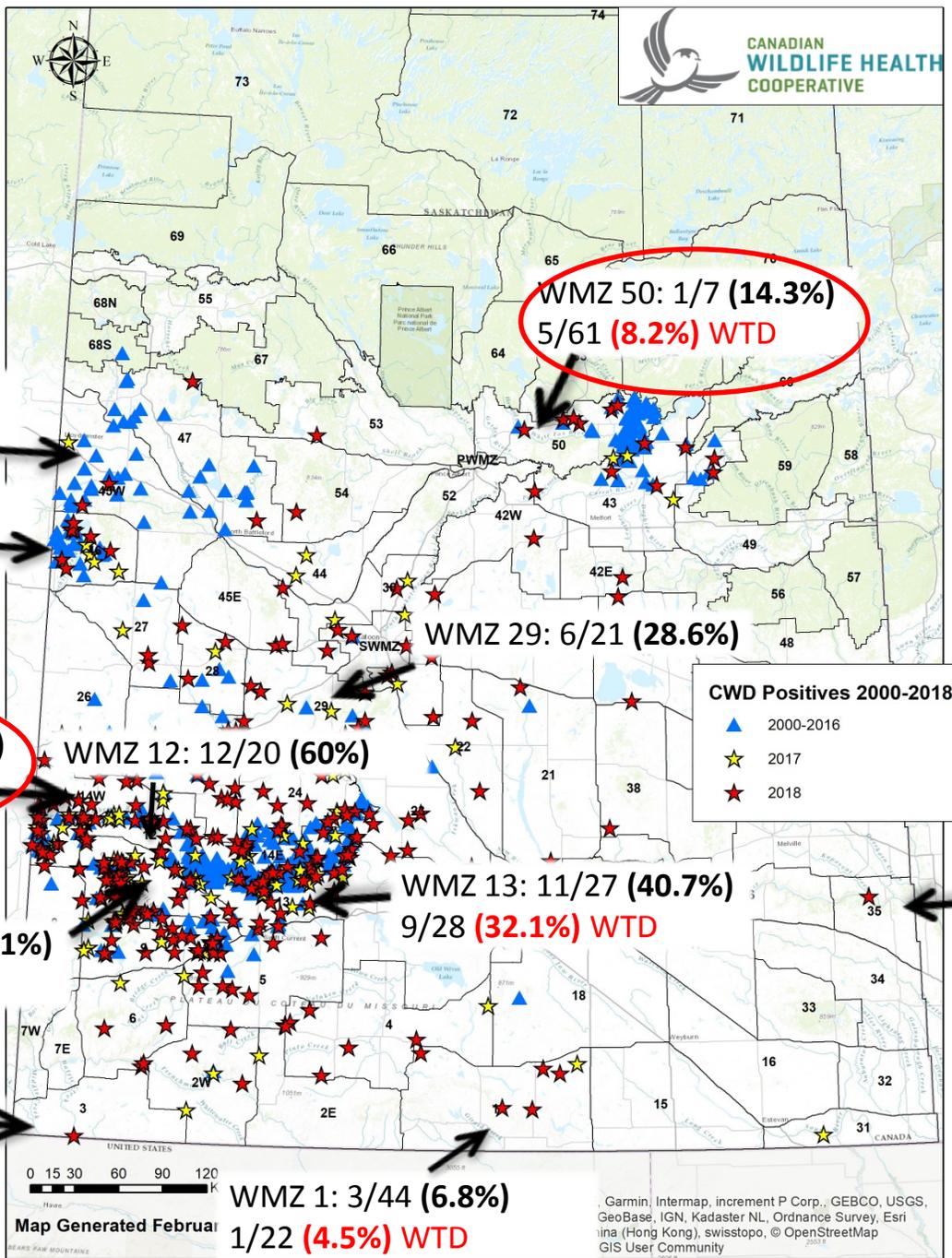
Clinical Cases: **198**

Number of positives: **349**

(3 elk, 2 moose, 270 mule deer, 74 WTD)



2018



WMZ 45: 3/13 (23.1%)
1/14 (7.1%) WTD

WMZ 46: 9/18 (50%)
1/3 (33.3%) WTD

WMZ 14: 26/55 (47.3%)
12/41 (29.3%) WTD

WMZ 10: 49/111 (44.1%)
3/14 (21.4%) WTD

WMZ 3: 3/19 (15.8%)

WMZ 50: 1/7 (14.3%)
5/61 (8.2%) WTD

WMZ 29: 6/21 (28.6%)

WMZ 12: 12/20 (60%)

WMZ 13: 11/27 (40.7%)
9/28 (32.1%) WTD

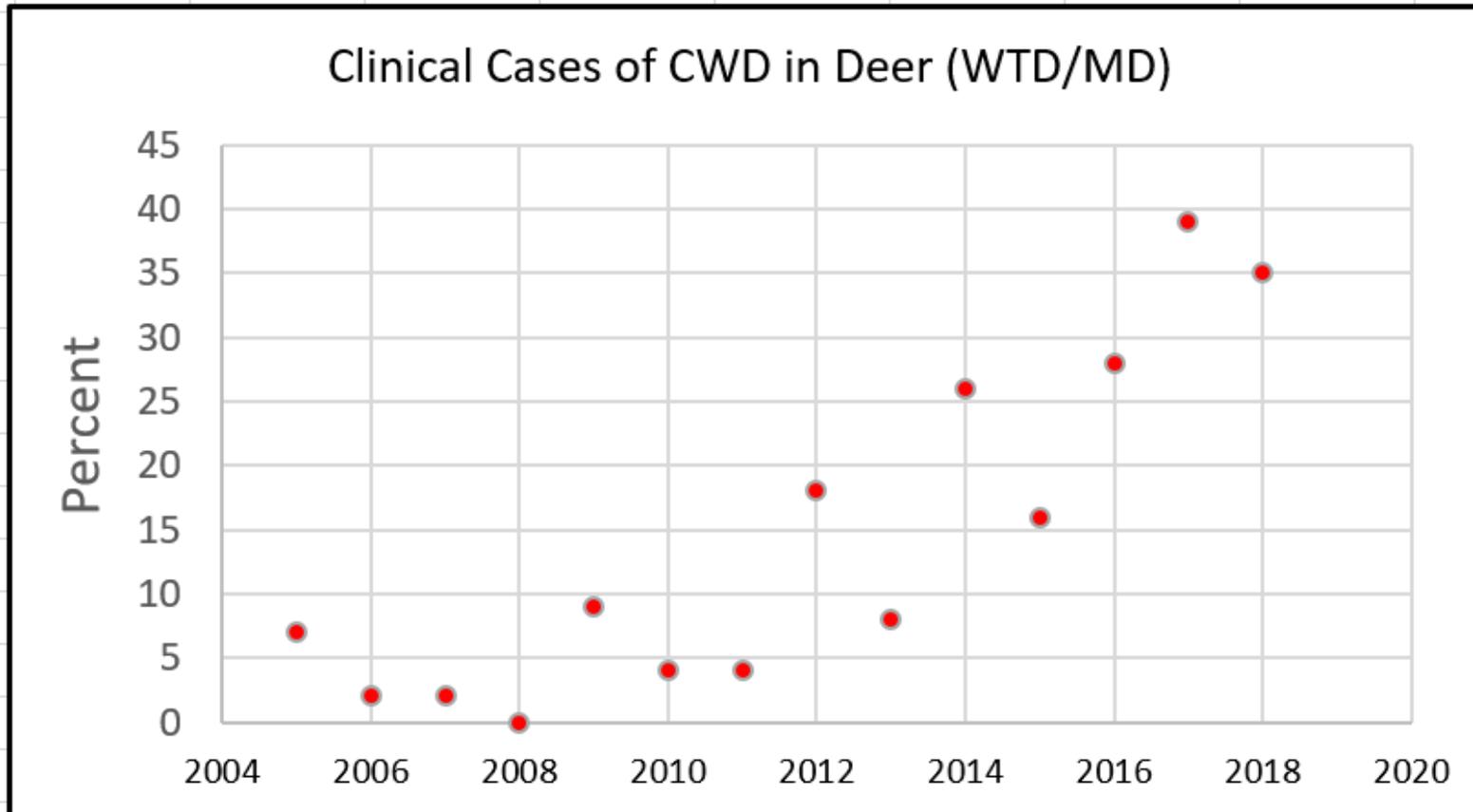
WMZ 35: 1/1 (100%)

WMZ 1: 3/44 (6.8%)
1/22 (4.5%) WTD

CWD Positives 2000-2018

- ▲ 2000-2016
- ★ 2017
- ★ 2018

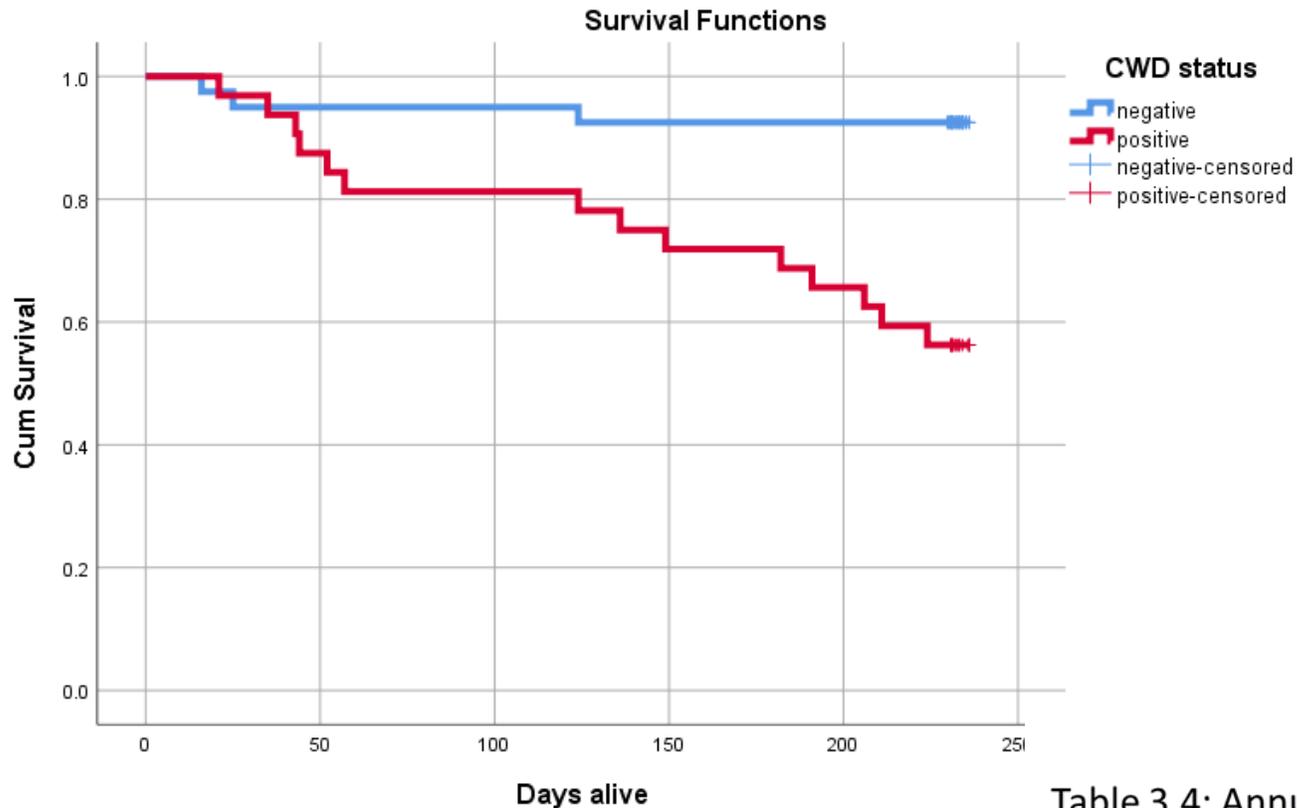
Clinical Cases



Canadian Wildlife Health
Cooperative

Data: Trent Bollinger, Canadian Wildlife
Health Cooperative

Survival



- 100 collared does
- 2 study areas along South Saskatchewan River
- CWD Prevalence: 39% (Antelope), 46% (Matador)
- Feb 2018 - Dec 2018

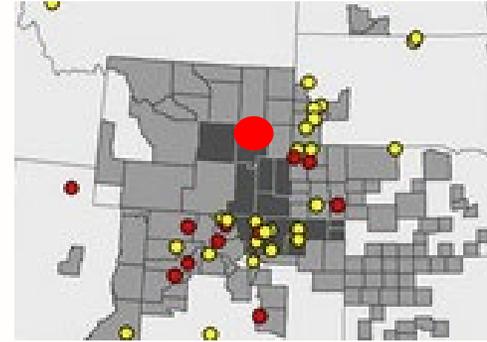
Table 3.4: Annual (Apr–Mar) survival rates (SE) of adult male and adult female radio-collared mule deer in southern Saskatchewan, 2006–2008.

Sex	2006	2007	2008
Female	0.76 (0.06)	0.72 (0.05)	0.86 (0.08)
Male	-	0.82 (0.05)	0.62 (0.07)

Trent Bollinger, CWHC

Chronic Wasting Disease Drives Population Decline of White-Tailed Deer

David R. Edmunds^{1na*}, Matthew J. Kauffman², Brant A. Schumaker¹, Frederick G. Lindzey^{2nb}, Walter E. Cook^{3nc}, Terry J. Kreeger^{4nd}, Ronald G. Grogan^{1ne}, Todd E. Cornish¹



Wyoming

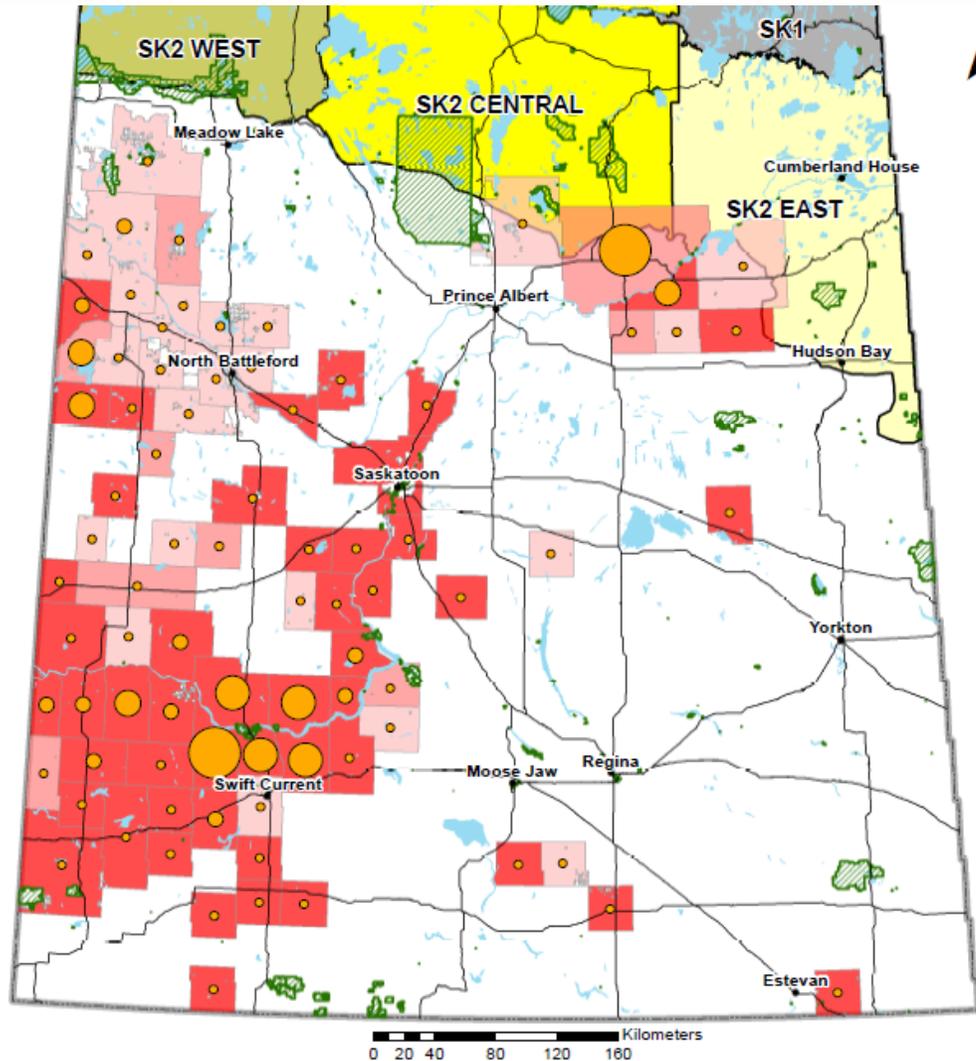
- Southeastern Wyoming (2003-2000)
- Prevalence 42% does, 29% bucks
- CWD positive deer 4.5X as likely to die as CWD negative deer
- 10.4% annual population decline

were 4.5 times more likely to die annually than CWD-negative deer while bucks were 1.7 times more likely to die than does. Population λ was 0.896 (0.859–0.980), which indicated a 10.4% annual decline. We show that a chronic disease that becomes endemic in wildlife populations has the potential to be population-limiting and the strong population-level effects of CWD suggest affected populations are not sustainable at high disease prevalence under current harvest levels.

What about caribou?



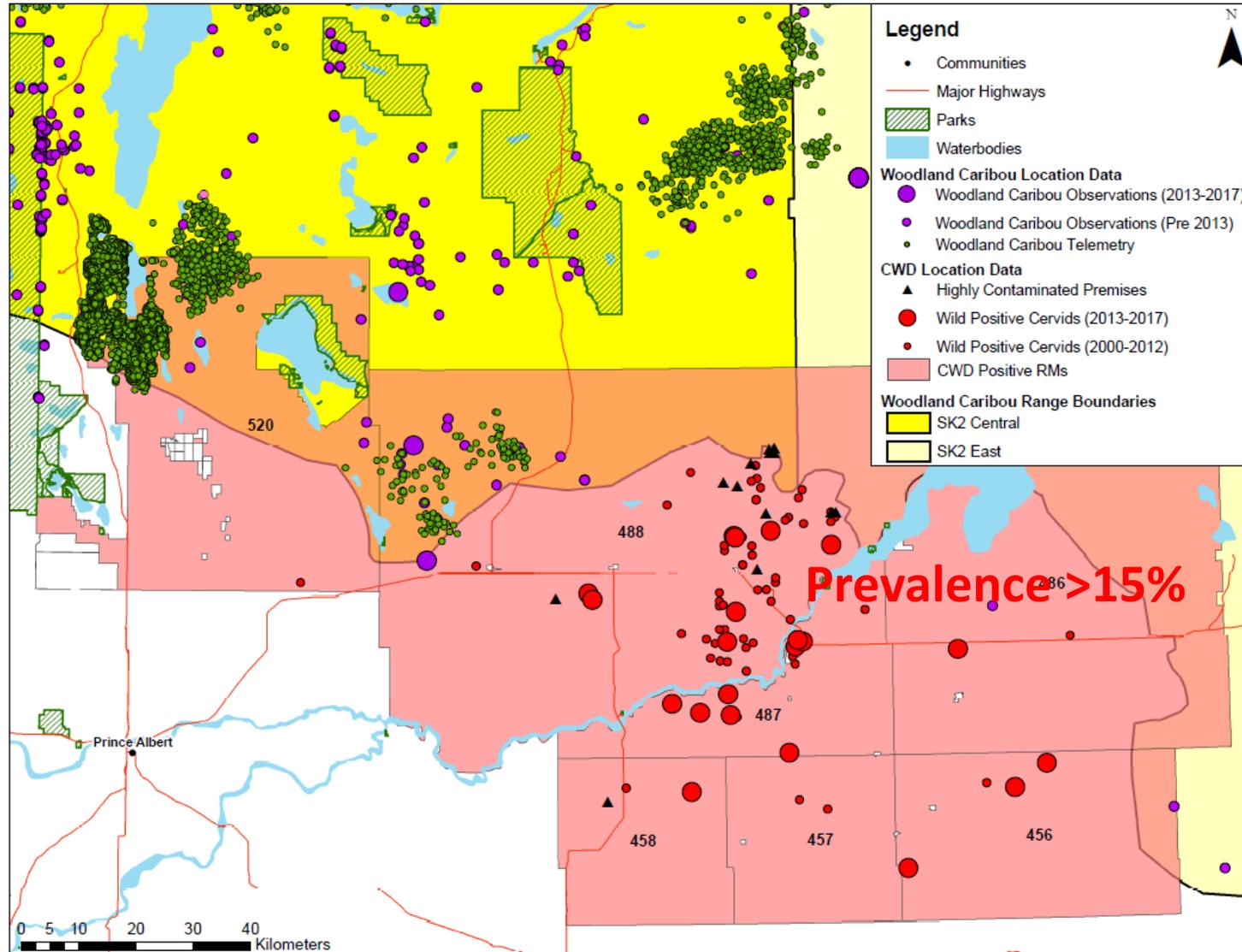
Boreal Caribou

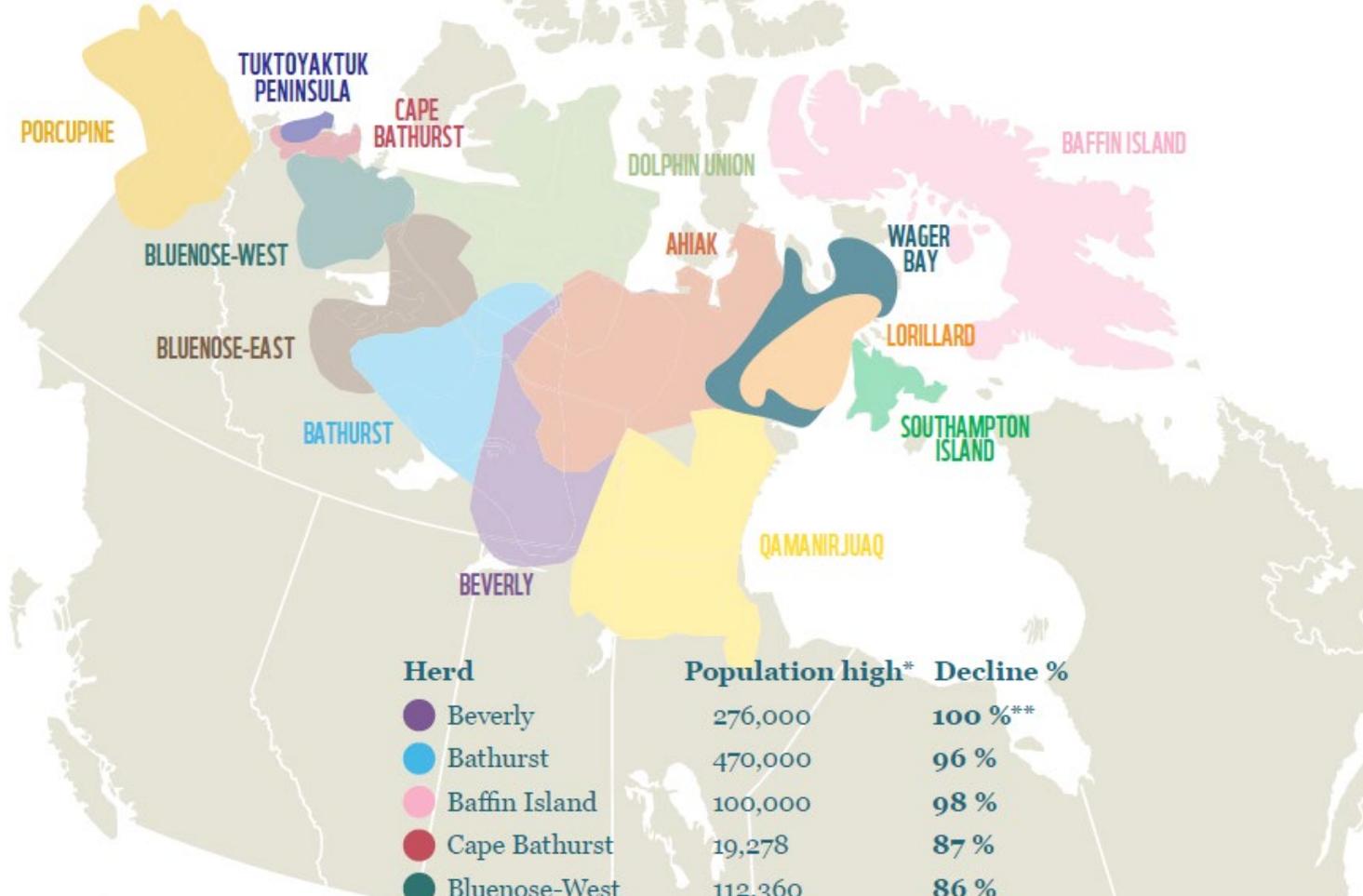


- Status: Threatened (Species at Risk Act)



Boreal Caribou





Herd	Population high*	Decline %
Beverly	276,000	100 %**
Bathurst	470,000	96 %
Baffin Island	100,000	98 %
Cape Bathurst	19,278	87 %
Bluenose-West	112,360	86 %
Bluenose-East	118,000	63 %
Ahiak	200,000	64 %
Qamanirjuaq	496,000	47 %
Dolphin Union	27,498	24 %
Porcupine	197,000	Increasing
Wager Bay	Unknown	Likely declining
Lorillard	Unknown	Likely declining
Southampton Island	12,297	Increasing
Tuktoyaktuk Peninsula	3,078	45%



HERD ESTIMATES AND DECLINES IN THE CANADIAN ARCTIC



*Various years. More information available.
 **Herd may have completely disappeared in recent years.

Hunter Perceptions

- Hunter survey (August 2010) –1,364 completed surveys (95% confidence level, margin of error = 3%):
 - 57% did not consider CWD as a human health risk
 - 82% will continue to hunt if CWD detected in their usual WMZ
 - 57% of SK hunters consider CWD a serious threat to deer population and hunting in SK

Hunter Perceptions Today

- Increased food safety concerns
- Demand for quick turnaround time on testing (financial strain)
- Some hunters choosing not to hunt in endemic areas (diminished future management options)
- Some hunters demanding refunds and reinstatement of draw pool status (loss of revenue for management programs)
- Some hunters viewing harvest of CWD negative animal as a right rather than an opportunity

P.A. food bank turns away wild game donations over disease concerns

Published Friday, February 22, 2019 4:23PM CST

Last Updated Friday, February 22, 2019 7:03PM CST

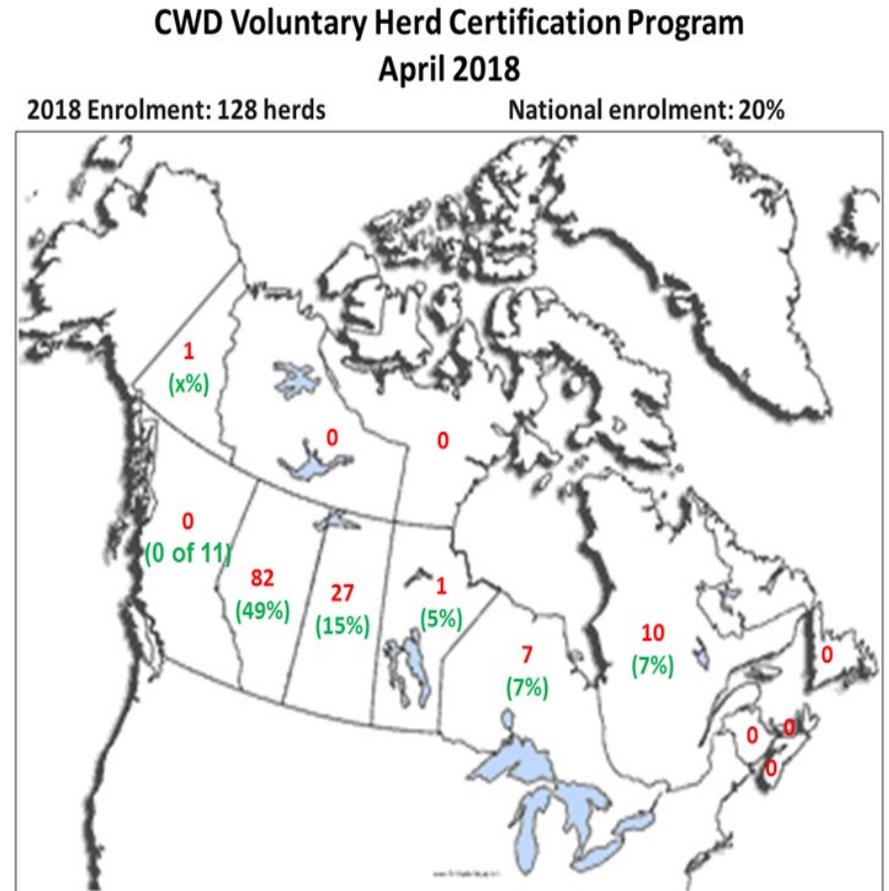


Saskatchewan Conservation officer Jaret Engele volunteers his time Tuesday morning with the delivery of wild game hamburger meat at the Saskatoon Food Bank, Dec. 1, 2015.

Challenges

Changes to CFIA CWD control program

- April 1, 2018
 - Response limited to herds enrolled in Voluntary Herd Certification Program (27/183, **15%**)
 - **No indemnification or depopulation**
 - 4 positive game farms in 2018 (3 elk, 1 deer)
 - Options: movement to slaughter, hunt farm
- Highly Contaminated Premises(33 in SK)
 - CFIA removed quarantine conditions to limit access by wild cervids (aka fencing)
- Poor Compliance
 - Escapes
 - Lack of annual physical inventories, failure to test
 - Lack of enforcement capacity



Attractants



Swath grazing. Lacombe Research and Development Center.



Elk feeding on hay bales. Alberta Fish and Wildlife.

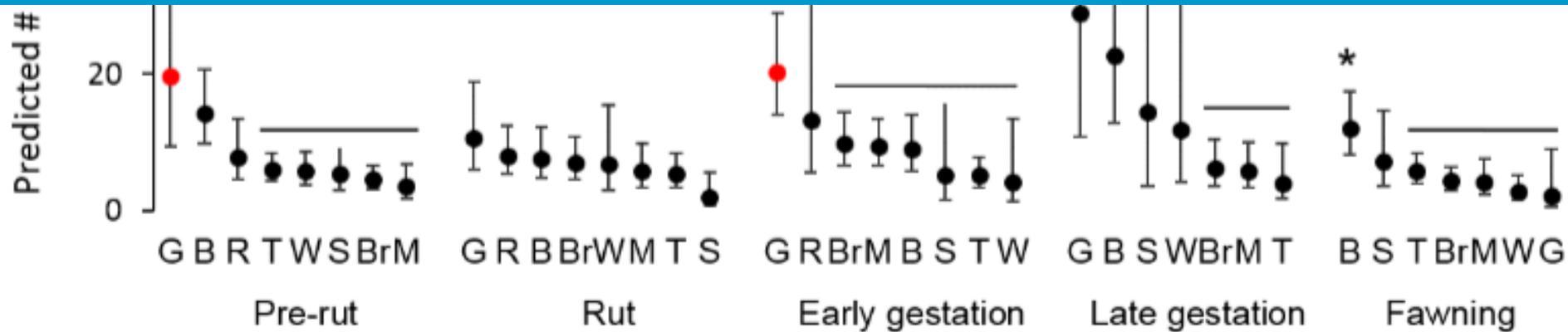


Deer over bait. Jeff Burleson.

Some sites are relatively more important than others.



Artificial feeding of grain poses the highest relative risk for prion exposure and contamination.



Published in: Mejía-Salazar MF, Waldner CL, Hwang YT, Bollinger TK, 2018. Ecosphere 9(1):e02055.



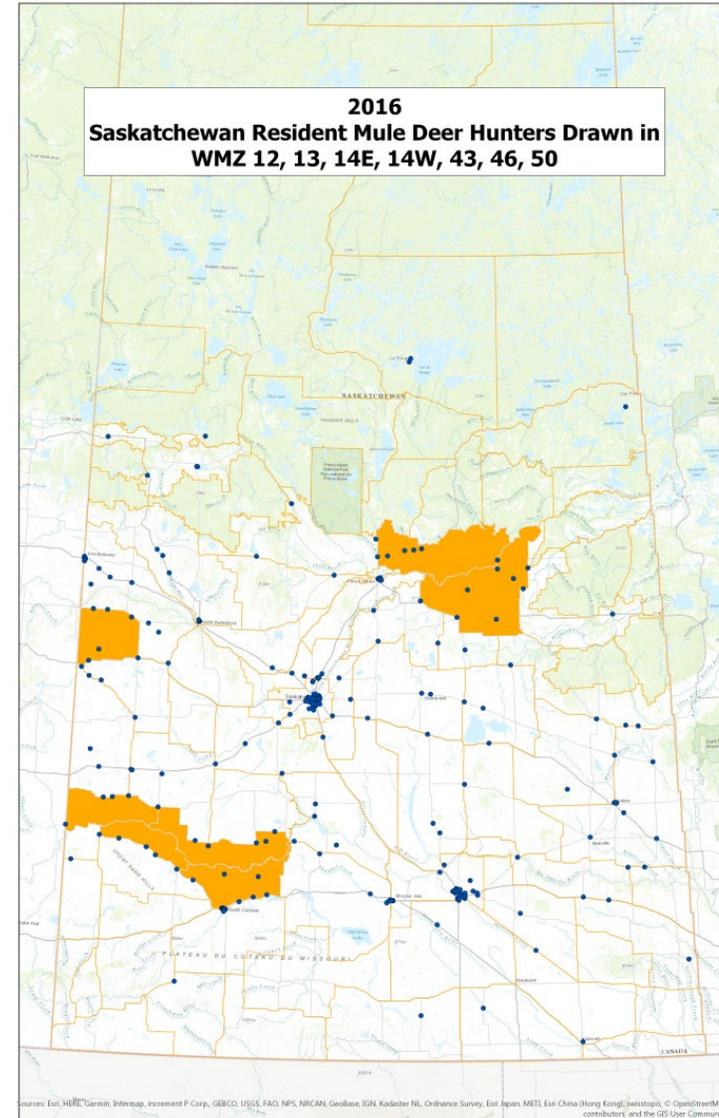
Photos courtesy of:
Dr. Trent Bollinger's research lab at
the Canadian Cooperative Wildlife Health Centre, U of S

- Conclusions: food sources important site for deer aggregation and focal contact with environment

Carcass Movement



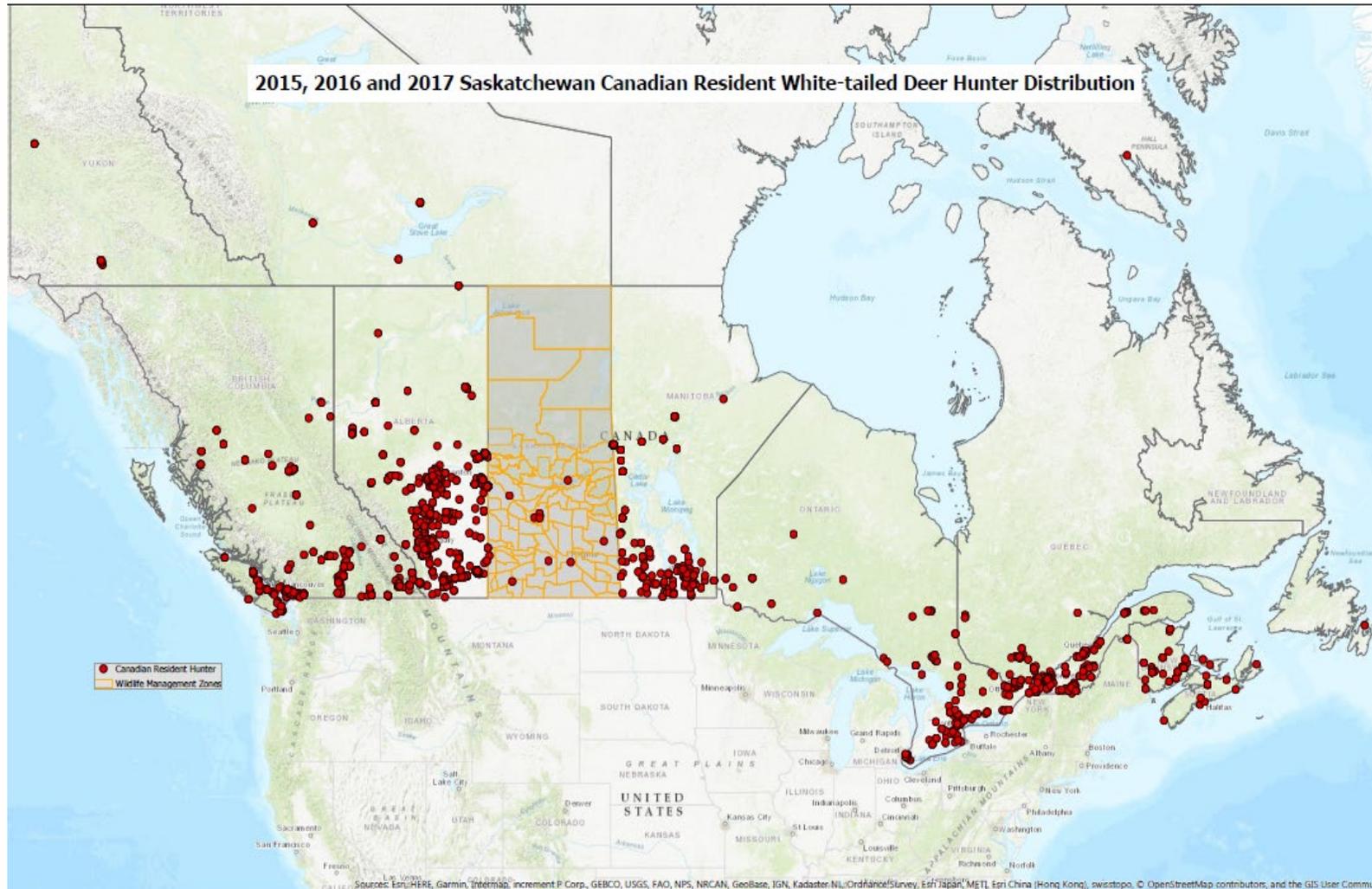
Hunters delivering deer carcass to a processor. Photo courtesy of KDFWR.



Carcass Disposal



Canadian Resident WTD Hunter Distribution



Ontario hunters (2018)

- Canadian Resident White-tail: **47**
- Guided White-tail: **30**
- SK Resident Archery Mule Deer: **1**
- SK Res WTD: **5**
- Antlerless WTD : **1**
- Wildlife habitat license: **510**

Where do we go from here?

- Shift towards management
- **Minimize transmission** to new areas and new species
- How?
 - Artificial points of concentration – baiting and feeding, agricultural practices (spilled grain, hay bales)
 - Carcass movement (intra-provincial, import, export)
 - Carcass disposal
 - Harvest management – extended seasons, increased buck harvest in endemic areas
 - Game farming – enforcement, fencing, moratorium on new licenses in high risk areas (ie. boreal caribou range)
 - Adaptive management – long-term, measurable and sustained approach, transparency with stakeholders

Long Term Outlook

- Continued geographic spread – across southern SK, neighboring jurisdictions
- Likely spread into the boreal forest, moose, caribou
- Impact on food security for First Nations
- Population impacts – localized decline, change in age/sex structure
- Declining interest in hunting, tourism in endemic areas

Lessons Learned

- Focus on prevention
- Early aggressive approach to first detection
- Long-term sustained management
- Early political and stakeholder support for action (prior to need)
- Coordinated response between wildlife and agricultural sector
- Transparency and open communication with stakeholders
- Well rationalized and outlined management actions – why?

“You’ll have to be aggressive; remove all sources and all potential movement. Cut wider and deeper than you ever think necessary. The deer will come back; but you’ll get one chance. If CWD gets established, you’ll have it for a very long time.”

Dr. Elizabeth S. Williams, 1996