Chronic Wasting Disease: A Saskatchewan Perspective

Iga Stasiak
Ministry of Environment
Ontario Federation of Anglers and Hunters
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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?

- Farmed elk imported to Lloydminster farm late 1980's
- Swift Current, 1998
- Regina, 1996

Map showing locations and years for CWD detection in Saskatchewan and neighboring states.
First detection in wild mule deer in 2000

June 2001

- Positive trace-out herds
- Criteria – length of time animals on premises, herd infection rate, herd density, clinical cases
- Risk Level:
  - High – CWD could be transferred to wild cervids without close contact with positive game farm cervids
  - Medium – CWD could be transferred with short term contact
  - Low – CWD could be transferred with extended close contact
High Priority Areas

- **2001**
  - Six locations around high risk positive game farms (~440 mi\(^2\))
  - **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 km\(^2\))
  - 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
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
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
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.

<table>
<thead>
<tr>
<th>YEAR</th>
<th>WTD</th>
<th>MD</th>
<th>ELK</th>
<th>TOTAL/YEAR</th>
<th>TEST POSITIVE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>IN</td>
<td>OUTSIDE</td>
<td>IN</td>
<td>OUTSIDE</td>
<td></td>
</tr>
<tr>
<td>1997</td>
<td>36</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>38</td>
</tr>
<tr>
<td>1998</td>
<td>18</td>
<td>0</td>
<td>91</td>
<td>2</td>
<td>111</td>
</tr>
<tr>
<td>1999</td>
<td>57</td>
<td>0</td>
<td>78</td>
<td>44</td>
<td>180</td>
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<tr>
<td>2000</td>
<td>726</td>
<td>0</td>
<td>185</td>
<td>88</td>
<td>1,000</td>
</tr>
<tr>
<td>2001</td>
<td>1,998</td>
<td>684</td>
<td>821</td>
<td>316</td>
<td>4,819</td>
</tr>
<tr>
<td>2002</td>
<td>1,957</td>
<td>911</td>
<td>1,857</td>
<td>161</td>
<td>5,054</td>
</tr>
<tr>
<td>2003</td>
<td>1,918</td>
<td>948</td>
<td>1,858</td>
<td>162</td>
<td>5,055</td>
</tr>
<tr>
<td>2004</td>
<td>1,357</td>
<td>0</td>
<td>5,251</td>
<td>0</td>
<td>6,648</td>
</tr>
<tr>
<td>2005</td>
<td>1,152</td>
<td>345</td>
<td>2,146</td>
<td>891</td>
<td>4,582</td>
</tr>
<tr>
<td>2006</td>
<td>1,445</td>
<td>415</td>
<td>1,807</td>
<td>859</td>
<td>4,677</td>
</tr>
<tr>
<td>2007</td>
<td>419</td>
<td>1,720</td>
<td>953</td>
<td>2,031</td>
<td>107</td>
</tr>
<tr>
<td>2008</td>
<td>2</td>
<td>2</td>
<td>4</td>
<td>1 MD / 1 UNKNOWN</td>
<td>2 ELK</td>
</tr>
<tr>
<td>TOTAL</td>
<td>5,750</td>
<td>9,150</td>
<td>12,702</td>
<td>8,674</td>
<td>1,082</td>
</tr>
</tbody>
</table>

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
CWD detected in 16 WMZ

- Rate of infection increasing
- Geographic spread expanding

“Chasing” the disease
Herd Reduction

- Targets not met

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

<table>
<thead>
<tr>
<th>Wildlife Management Zone (WMZ)</th>
<th>Species</th>
<th>Survey Period</th>
<th>Population Size ± CI</th>
<th>Density km² (mi²)</th>
<th>% Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>29</td>
<td>Mule Deer</td>
<td>Feb 2008</td>
<td>7171 ± 17.9%</td>
<td>1.32 (3.42)</td>
<td>- 43%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Feb 2009</td>
<td>4035 ± 13.5%</td>
<td>0.75 (1.93)</td>
<td></td>
</tr>
<tr>
<td>29</td>
<td>White-tailed Deer</td>
<td>Feb 2008</td>
<td>5818 ± 17.5%</td>
<td>1.07 (2.77)</td>
<td>- 7%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Feb 2009</td>
<td>5371 ± 16.0%</td>
<td>0.99 (2.57)</td>
<td></td>
</tr>
<tr>
<td>45</td>
<td>Mule Deer</td>
<td>No prior survey</td>
<td>N/a</td>
<td>N/a</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Feb 2009</td>
<td>3347 ± 20.4%</td>
<td>0.72 (1.87)</td>
<td></td>
</tr>
<tr>
<td>45</td>
<td>White-tailed Deer</td>
<td>No prior survey</td>
<td>N/a</td>
<td>N/a</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Feb 2009</td>
<td>3743 ± 16.5%</td>
<td>0.81 (2.09)</td>
<td></td>
</tr>
<tr>
<td>46</td>
<td>Mule Deer</td>
<td>Dec 2001</td>
<td>2930 ± 19.1%</td>
<td>1.09 (2.83)</td>
<td>+ 53%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Jan 2009</td>
<td>4697 ± 19%</td>
<td>1.67 (4.32)</td>
<td></td>
</tr>
<tr>
<td>46</td>
<td>White-tailed Deer</td>
<td>Dec 2001</td>
<td>2702 ± 14.7%</td>
<td>1.00 (2.60)</td>
<td>+ 84%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Jan 2009</td>
<td>5179 ± 19.1%</td>
<td>1.84 (4.76)</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Mule Deer</td>
<td>Mar 2007</td>
<td>10177 ± 19.0%</td>
<td>2.72 (7.04)</td>
<td>- 23%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Mar 2009</td>
<td>7952 ± 18.3%</td>
<td>2.08 (5.38)</td>
<td></td>
</tr>
<tr>
<td>14 E</td>
<td>White-tailed Deer</td>
<td>Jan 2005</td>
<td>5747 ± 9.7%</td>
<td>0.83 (2.15)</td>
<td>- 23%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Mar 2007</td>
<td>4662 ± 19.9%</td>
<td>0.67 (1.75)</td>
<td></td>
</tr>
</tbody>
</table>
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

Legend
CWD surveillance by WMZ
3-year prevalence in deer (2007-2009)
- 0%
- 0.1% - 0.5%
- 0.6% - 1%
- 1.1% - 2%
- 2.1% - 3.5%
White areas indicate zero samples
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’**
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)
Clinical Cases

Clinical Cases of CWD in Deer (WTD/MD)

Data: Trent Bollinger, Canadian Wildlife Health Cooperative

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

Trent Bollinger, CWHC
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?

Photo courtesy of the GNWT
Boreal Caribou

- Status: Threatened (Species at Risk Act)
Boreal Caribou

Prevalence > 15%
### Herd Estimates and Declines in the Canadian Arctic

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

*Values are approximate and may vary year to year. Additional information is available.*
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
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.
Artificial feeding of grain poses the highest relative risk for prion exposure and contamination.
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