Chronic Wasting Disease in West Virginia: A Brief Assessment of Disease Management and Monitoring, “Now and Down the Road”
Jim Crum and Rich Rogers, WV DNR
Chronic Wasting Disease in West Virginia: A Brief Assessment of Disease Management, "Now and Down the Road"
Highest point 1,482 m (4,863 ft)
Lowest point 73 m (240 ft)

Annual Rainfall 152 cm (60 in) west of eastern continental divide and 76 cm (30 in) east of eastern continental divide

Deer Density Increase

[Graph showing the increase in WV deer population estimates from 1974 to 2017. The population estimate rises over the years, with notable peaks and troughs. The x-axis represents the years from 1974 to 2016, while the y-axis represents the population estimate in thousands. The graph indicates a general increase in deer population over the decades.]
Estimate deer pop 40 deer/ 259 ha (1 sq mi)

Little public land
WEST VIRGINIA CWD SURVEILLANCE

Formal Start in 2002

WVDA - Food safety concerns at meat processing facilities
WV DNR - Concern of negotiation with hunter for samples
WV DNR - Personnel limitations and efficiency
General CWD surveillance of free-ranging white-tailed deer is statewide and focused on road kill samples year round stratified by hunter harvest for each county (deer management unit).
Initial Case: CWD Agent Confirmed Sept. 2, 2005
2.5 yr Buck, Road-killed, Padded tail fat, Ribs and Pelvis not visible
CWD Agent Present Disease Not Apparent
WEST VIRGINIA CWD SURVEILLANCE

VERSUS

WEST VIRGINIA CWD MONITORING

ROAD KILL
“SICK DEER”

SHARP-SHOOTING

HUNTER HARVEST
OFFICIAL GAME CHECKING STATIONS

Record location of kill on 1 sq km grid
Plus Standard Information (Age, Sex, Physical Condition Indices)

Retropharyngeal lymph node
Note: 5 positives detected prior to hunter kill sampling.
Adaptive cluster sampling

Population dynamics information

(reproductive performance and chronology, age structure, physical condition, landowner cooperation)

Remove infected animals from landscape
CWD MANAGEMENT

• Transportation of Deer Carcasses
  – No dead deer or parts may be transported beyond the boundary of the CWD Containment Area except for:
    • Boned out meat
    • Quarters or portions of meat with no spinal column or head attached
    • Cleaned hide with no head attached
    • Cleaned skull plate
    • Antlers with no meat attached
    • Finished taxidermy mounts
CWD MANAGEMENT (con’t)

• Carcass Disposal Sites During Deer Season - Dumpsters

• Baiting Prohibition
  – It is illegal to bait or supplemental feed deer or other wildlife in the containment area
  – Song birds may be fed within 100 feet of an occupied dwelling
  – Statewide no baiting and feeding wildlife on public owned land prohibited Sept. 1 thru Dec. 31 and spring gobbler season.
CWD MANAGEMENT (con’t)

• Deer Population Management
  – Remove adequate numbers of antlerless deer to lower or maintain deer population to reduce disease transmission.
  – Manage for a younger deer population.
  – Remove infected deer from the population.
Adaptive Management/Research

Goal: Establish/Maintain long-term data

Goal: Improve efficiency/effectiveness

Challenges: Hunter Dimension

Challenges: Controls or Replicates
Hunter Kill Samples

AGE (Years)

0.5 1.5 2.5 3.5 4.5 5.5 6.5 7.5 8.5 9.5 10.5
2017 HUNTER HARVEST RESULTS

% CWD Positive

- M: 14%
- F: 12%

% CWD Positive by Age:

- 1.5: 11%, 10%
- 2.5: 13%, 16%
- 3.5: 17%
- 4.5: 25%
- 5.5: 13%

Legend:
- Buck
- Doe
49.07 Sq. miles not adequately sampled
12 Stations

184.07 Sq.miles not adequately sampled
6 Stations
49.07 Sq. miles not sampled
12 Stations

184.07 Sq. miles not sampled
6 Stations
Hampshire County Percent 1.5 Year Bucks

- Hampshire County Percent 1.5 Year Bucks

Bar chart showing the percentage of 1.5 year bucks in Hampshire County from 1974 to 2017.
Percent of deer (>1 year of age N=1,537) found to be infected with CWD abnormal prion (N=184) from Sept. 2005 through May 2017 in a 39 sq. mile area located in central Hampshire County, WV with an outer boundary one mile from locations of known CWD infected deer detected as of Dec. 2010 (lines represent 95% confidence limits)
HUNTERS’ ATTITUDES TOWARD CHRONIC WASTING DISEASE AND THE EFFECTS OF MANAGEMENT EFFORTS ON HUNTING PARTICIPATION IN HAMPSHIRE COUNTY, WEST VIRGINIA

Presented at the Northeast Fish and Wildlife Conference
April 16, 2012
Jim Crum, WVDNR
Randy Tucker, WVDNR
Chris Ryan, WVDNR
Mark Damian Duda, Responsive Management
OPINIONS ON SPECIFIC WV DNR ACTIONS
Percent who strongly or moderately agree with the following positive statements.

- The DNR is doing everything it can to manage CWD in Hampshire County: 80%
- The DNR’s CWD management efforts, such as the baiting and feeding ban and the carcass transportation restrictions, are based on the best available science: 73%
- The carcass transportation restrictions in Hampshire County will help prevent the spread of CWD: 64%
- Chronic Wasting Disease can be eradicated from the deer herd in West Virginia through management efforts: 53%
- Reducing the deer population in Hampshire County will help prevent the spread of CWD: 48%
- Banning baiting and feeding deer in Hampshire County will help prevent the spread of CWD: 47%
Percent who strongly or moderately agree with the following positive statement

The DNR’s CWD management efforts, such as the baiting and feeding ban and the carcass transportation restrictions, are based on the best available science
Percent who strongly or moderately agree with the following positive statement

The carcass transportation restrictions in Hampshire County will help prevent the spread of CWD

64%
Percent who strongly or moderately agree with the following positive statement:

Banning baiting and feeding deer in Hampshire County will help prevent the spread of CWD

47%
BEHAVIOR CHANGES CAUSED BY THE PRESENCE OF CWD
Closest Distance (miles) Willing to Hunt From CWD Positive Deer

- 10 Miles or less: 86%
- 5 Miles or Less: 77%
- 2 Miles or Less: 66%
- 1 Mile or Less: 64%
Percent who strongly or moderately agree with the following statement about likely behaviors

If Chronic Wasting Disease is found on the land or property I hunt, I will hunt antlerless deer less often in Hampshire County

43%
<table>
<thead>
<tr>
<th>YEAR</th>
<th>Area 2-mile buffer(sqmi)</th>
<th>Total Resident Hunter</th>
<th>Total Non-Resident Hunter</th>
<th>Estimated License Sales</th>
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<tbody>
<tr>
<td>2010</td>
<td>180</td>
<td>926</td>
<td>397</td>
<td>$76,841.56</td>
</tr>
<tr>
<td>2011</td>
<td>198</td>
<td>1016</td>
<td>435</td>
<td>$84,302.52</td>
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<tr>
<td>2012</td>
<td>230</td>
<td>1196</td>
<td>513</td>
<td>$99,298.11</td>
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<tr>
<td>2013</td>
<td>296</td>
<td>1562</td>
<td>669</td>
<td>$129,643.81</td>
</tr>
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</table>

**Assumptions:** County hunter estimate from Duda 2010 telephone survey of resident hunters >15 years of age, non-resident hunters as proportion of harvest and hunters evenly distributed per square mile.

Avg resident buys $35 sportsman and a $10 extra tag and only half of resident purchase license because of life time and landowner privelges, so avg. license buyer cost is $23.

Avg. non-resident buys Class E $119 and extra stamps avg. $140
If Chronic Wasting Disease is found on the land or property I hunt, I will hunt antlerless deer less often in Hampshire County.

If Chronic Wasting Disease spreads or increases, I will change my deer hunting habits and participation in Hampshire County.

I will stop hunting deer entirely in West Virginia if it is determined that Chronic Wasting Disease can infect humans.

If Chronic Wasting Disease increases so that one out of every two deer is infected in Hampshire County, I will hunt deer less...

I will stop hunting deer entirely in Hampshire County if it is determined that Chronic Wasting Disease can infect humans.

If Chronic Wasting Disease is found on the land or property I hunt, I will hunt antlerless deer less often in Hampshire County.
Percent who strongly or moderately agree with the following statement about likely behaviors

If Chronic Wasting Disease increases so that one out of every two deer is infected in Hampshire County, I will hunt deer less often in Hampshire County

64%
On a scale of 0-10 where 0 is not at all likely and 10 is extremely likely, the percentage who rated the likelihood that they would do the following if the DNR stopped testing deer harvested by hunters in Hampshire County

Intentionally harvest fewer deer in Hampshire County

27% Extremely likely

73% Not at all likely
On a scale of 0-10 where 0 is not at all likely and 10 is extremely likely, the percentage who rated the likelihood that they would do the following if the DNR stopped testing deer harvested by hunters in Hampshire County:

Continue to hunt deer in Hampshire County as usual

- Extremely likely: 85%
- Not at all likely: 15%
Some Conclusions

There is a “not in my backyard” impact

Providing testing for hunter harvested deer will keep some hunters from leaving area

The impact of CWD to hunter participation can increase if CWD prevalence, distribution and health concerns increase.

Carcass transport restrictions better received by hunters than feeding/baiting ban and population reduction. (impacts perception of success)
MISC. HUNTER BEHAVIOR
# ELS versus Deer Examined

<table>
<thead>
<tr>
<th></th>
<th>20-Nov</th>
<th>21-Nov</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>ELS Hampshire</td>
<td>625</td>
<td>303</td>
<td>928</td>
</tr>
<tr>
<td>ELS Upshur</td>
<td>589</td>
<td>286</td>
<td>875</td>
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<tr>
<td>ELS Mason</td>
<td>500</td>
<td>238</td>
<td>738</td>
</tr>
<tr>
<td>Hampshire Ck Station</td>
<td>448</td>
<td>167</td>
<td>615</td>
</tr>
<tr>
<td>Upshur Ck Station</td>
<td>456</td>
<td>280</td>
<td>736</td>
</tr>
<tr>
<td>Mason Ck Station</td>
<td>285</td>
<td>206</td>
<td>491</td>
</tr>
<tr>
<td>% Comp Hampshire</td>
<td>72%</td>
<td>55%</td>
<td>66%</td>
</tr>
<tr>
<td>% Comp Upshur</td>
<td>77%</td>
<td>98%</td>
<td>84%</td>
</tr>
<tr>
<td>% Comp Mason</td>
<td>57%</td>
<td>87%</td>
<td>67%</td>
</tr>
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</table>
Proportion of Hunters That Checked CWD Test Results
CLINICAL DEER

November 23, 2009, 2.5 yr old male (picture below) hunter harvest
“Disease Bridges”
Private Sector Ownership of Wildlife
Disease Risks:
Captive Cervids in WV
Disease Risks:
Captive Cervids in WV
Out-of-State Escapees Detected

Elvis: PA to Marshall Co. WV
Ohio to Calhoun Co. WV
REGIONAL COORDINATION

- Wildlife agencies from WV, VA, MD, and PA met in March 2006 to begin more intensive coordination efforts and communication on a regional level.
CONTRIBUTION OF BORDERING STATES TO NONRESIDENT DEER HUNTING PARTICIPATION IN WV

- 26.8%
- 21.5%
- 23.7%
- 13.8%
- 1.9%
2,824 deer harvested by 2,060 successful hunters in 2017 (911 deer by 669 non-resident hunters)
14,237 deer harvested by 9,929 successful hunters (3,490 deer by 2,490 non-resident hunters)
Environmental Sources of Prion Transmission in Mule Deer
Michael W. Miller,* Elizabeth S. Williams,† N. Thompson Hobbs,‡ and Lisa L. Wolfe*
Emerging Infectious Diseases • www.cdc.gov/eid • Vol. 10, No. 6, June 2004

800 sq.meter pen (8,540 sq.ft.) = 0.2 acres

Equivalent 3,200 deer per square mile

Decomposed Carcasses and even higher live deer density with 2/3 result

Other Considerations

Hunter Harvest high % Non-clinical
Internal organs and digestive tract lymph nodes left at kill site
WV CWD Positive Carcass Disposal Method

- Dumpster: 45%
- WVtrash: 4%
- WVprocessor: 3%
- WVhuntland: 34%
- OtherWVland: 1%
- OtherWVCo: 4%
- Unknown: 10%
Prior sampling (2002-2012) Bedford 1373, Blair 1648. (2012 Bedford 100, Blair 38)
Land Area Within 5 mile buffer of Detected CWD Positives (total 3976 Sq. Miles)

- Pennsylvania
- Maryland
- Virginia
- West Virginia

- 2000 total
- 1133 West Virginia
- 518 Virginia
- 325 Maryland
GENETICS IN WHITETAIL DEER:
IT’S ABOUT MORE THAN JUST LARGE ANTLERS

W. DAVID WALTER
USGS, PENNSYLVANIA COOPERATIVE FISH AND WILDLIFE RESEARCH UNIT
To this end, my colleagues and I initiated a study to see how chronic wasting disease could travel across a landscape after starting in an epicenter in West Virginia in 2005. We have collected tissue samples from hunters in the Mid-Atlantic region that includes Maryland, Pennsylvania, and Virginia.

FIGURE 1. Relative relatedness of deer based on three subpopulation clusters in the Mid-Atlantic region based on genetic markers for over 2,000 whitetail deer sampled. The epicenter of chronic wasting disease in the region is in West Virginia where it was first detected in 2005. It is indicated on the map with a plus (+) symbol.
Cost: Personnel and Testing (i.e. no supplies)
Conclusions (predictions)

- Interstate agency cooperation
- Hunter/public concern
- Captive cervid threat
- Cost to agencies
- Regulations imposed on hunters
- CWD distribution/prevalence
Material Presented Made Possible By:
Hard work by present and past WV DNR Wildlife Resources Section employees.
Acknowledgements

Southeastern Cooperative Wildlife Disease Study

USDA APHIS Veterinary Services

USFWS Federal Aid to Wildlife Restoration

Mark Damian Duda, Responsive Management
QUESTIONS?