LENGTH OF SEASONS
SEASON IMPACT AND LENGTH

2016 antlered/antlerless harvest by season

Antlered deer harvest by season
- Muzzleloaders: 5%
- Late Antlered: 12%
- Liberty: 2%
- Firearms: 55%

Antlerless deer harvest by season
- Muzzleloaders: 10%
- Late Antlerless: 1%
- Early Antlerless: 2%
- Liberty: 1%
- Firearms: 40%

Michigan Deer Harvest 2000-2016

<table>
<thead>
<tr>
<th>Year</th>
<th>Antlered</th>
<th>Antlerless</th>
<th>Total Harvest</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000</td>
<td>285,911</td>
<td>248,463</td>
<td>534,374</td>
</tr>
<tr>
<td>2001</td>
<td>235,271</td>
<td>222,718</td>
<td>457,989</td>
</tr>
<tr>
<td>2002</td>
<td>241,304</td>
<td>230,573</td>
<td>471,877</td>
</tr>
<tr>
<td>2003</td>
<td>254,473</td>
<td>240,772</td>
<td>495,245</td>
</tr>
<tr>
<td>2004</td>
<td>229,654</td>
<td>222,151</td>
<td>451,805</td>
</tr>
<tr>
<td>2005</td>
<td>218,057</td>
<td>195,554</td>
<td>413,611</td>
</tr>
<tr>
<td>2006</td>
<td>265,711</td>
<td>184,962</td>
<td>450,674</td>
</tr>
<tr>
<td>2007</td>
<td>267,429</td>
<td>209,166</td>
<td>476,595</td>
</tr>
<tr>
<td>2008</td>
<td>248,533</td>
<td>232,105</td>
<td>480,638</td>
</tr>
<tr>
<td>2009</td>
<td>215,120</td>
<td>220,916</td>
<td>436,036</td>
</tr>
<tr>
<td>2010</td>
<td>212,341</td>
<td>199,958</td>
<td>412,299</td>
</tr>
<tr>
<td>2011</td>
<td>212,791</td>
<td>203,930</td>
<td>416,721</td>
</tr>
<tr>
<td>2012</td>
<td>222,640</td>
<td>191,364</td>
<td>414,004</td>
</tr>
<tr>
<td>2013</td>
<td>203,057</td>
<td>175,737</td>
<td>378,794</td>
</tr>
<tr>
<td>2014</td>
<td>178,228</td>
<td>144,139</td>
<td>322,367</td>
</tr>
<tr>
<td>2015</td>
<td>191,608</td>
<td>137,073</td>
<td>328,681</td>
</tr>
<tr>
<td>2016</td>
<td>196,233</td>
<td>145,054</td>
<td>341,287</td>
</tr>
</tbody>
</table>
POTENTIAL SEASON CHANGES

Considering changes to Firearms season
• November 15

Corn Harvested

- Graphs showing buck harvest and bucks per hunter from 1986 to 2017.
- Graphs showing antlerless deer harvest and antlerless deer per hunter from 1995 to 2017.
POTENTIAL SEASON CHANGES CONT.

Options for adjustments to Muzzleloader/Independence Hunt

Number of deer harvested in each season of the 2016 Michigan deer hunting season.

<table>
<thead>
<tr>
<th>Season</th>
<th>Antlered</th>
<th>Antlerless</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Liberty</td>
<td>4,113</td>
<td>2,227</td>
<td>6,339</td>
</tr>
<tr>
<td>Early Antlerless</td>
<td>0</td>
<td>2,840</td>
<td>2,840</td>
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<tr>
<td>Independence</td>
<td>270</td>
<td>142</td>
<td>412</td>
</tr>
<tr>
<td>Archery</td>
<td>75,438</td>
<td>50,103</td>
<td>125,541</td>
</tr>
<tr>
<td>Firearms</td>
<td>107,329</td>
<td>57,513</td>
<td>164,843</td>
</tr>
<tr>
<td>Muzzleloader</td>
<td>9,083</td>
<td>14,195</td>
<td>23,278</td>
</tr>
<tr>
<td>Late Antlerless</td>
<td>0</td>
<td>18,035</td>
<td>18,035</td>
</tr>
<tr>
<td>Total</td>
<td>196,233</td>
<td>145,054</td>
<td>341,287</td>
</tr>
</tbody>
</table>

Graph showing the number of deer hunters over the years.
POTENTIAL SEASON CHANGES CONT. 2

Expanding equipment opportunity (IN)

Data supplied by Indiana Department of Natural Resources
Data from 8-day January CWD hunt indicates ~300 deer harvested across 14 open townships

• Translates to about ~0.6 deer per square mile

Approximately 74% of harvest was female

Approximately 84% of the harvest was antlerless (includes button bucks)
ANTLERLESS QUOTAS
DEER BIOLOGY AND MOVEMENT

Rural Southern Michigan
• Generally higher fawn survival relative to northern deer
• Dispersal distances longer in fragmented habitats vs contiguous habitats
• Migratory behavior/yarding behavior apparent, though less than northern deer
Urban Southern Michigan
• Tendency for smaller home ranges than rural counterparts
• Generally increased survival than rural counterparts
• Tendency for increased deer densities
DEER BIOLOGY AND MOVEMENT CONT. 2

Upper Peninsula Michigan
• Generally lower deer densities
• Increased volatility in year to year survival
• Increased migratory distances
RISK OF OVERHARVEST?

Understand the relationship between deer hunter effort and declining deer density*

• Accelerating effort for deer hunters likely hinders agency efforts to reduce overabundant deer populations
• Potential source of hunter perceptions of unrealistically reduced deer herds

* Van Deelen and Etter 2003
Understand the relationship between deer hunter effort and declining deer density*

• Accelerating effort for deer hunters likely hinders agency efforts to reduce overabundant deer populations

• Potential source of hunter perceptions of unrealistically reduced deer herds

* Van Deelen and Etter 2003
### Antlerless Harvest with Unlimited Licenses

<table>
<thead>
<tr>
<th>Year</th>
<th>DMU</th>
<th>Quota</th>
<th>Private licenses sold</th>
<th>Antlerless Harvest</th>
<th>Buck Harvest</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010</td>
<td>487</td>
<td>72,100</td>
<td>25,528</td>
<td>12,017</td>
<td>9,904</td>
</tr>
<tr>
<td>2011</td>
<td>487</td>
<td>72,100</td>
<td>25,685</td>
<td>13,735</td>
<td>13,519</td>
</tr>
<tr>
<td>2012</td>
<td>487</td>
<td>30,000</td>
<td>26,010</td>
<td>13,836</td>
<td>13,532</td>
</tr>
<tr>
<td>2013</td>
<td>487</td>
<td>30,000</td>
<td>25,875</td>
<td>14,825</td>
<td>15,357</td>
</tr>
<tr>
<td>2014</td>
<td>487</td>
<td>30,000</td>
<td>20,072</td>
<td>12,356</td>
<td>13,896</td>
</tr>
<tr>
<td>2015</td>
<td>487</td>
<td>30,000</td>
<td>18,432</td>
<td>11,505</td>
<td>15,264</td>
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<tr>
<td>2016</td>
<td>487</td>
<td>30,000</td>
<td>18,611</td>
<td>12,788</td>
<td>15,449</td>
</tr>
</tbody>
</table>
Adapted from Dr. Bronson Strickland, Mississippi State University

HOW MANY DOES TO REMOVE?

Doe harvest needed with growth rate of $\lambda=1.35$ (35% growth each year)

- No Removal
- 10% Removal
- 20% Removal
- 33% Removal

Adapted from Dr. Bronson Strickland, Mississippi State University
INCREASED HARVEST $\rightarrow$ REDUCED CWD?
# Historic Harvest in Affected Areas (Statewide Rank)

<table>
<thead>
<tr>
<th>Antlered</th>
<th>Montcalm</th>
<th>Mecosta</th>
<th>Newaygo</th>
<th>Kent</th>
<th>Ionia</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013</td>
<td>4642 (4)</td>
<td>4434 (6)</td>
<td>5102 (2)</td>
<td>4088 (8)</td>
<td>2901 (28)</td>
</tr>
<tr>
<td>2014</td>
<td>5258 (1)</td>
<td>3655 (8)</td>
<td>5029 (2)</td>
<td>4249 (4)</td>
<td>2512 (31)</td>
</tr>
<tr>
<td>2015</td>
<td>5710 (1)</td>
<td>4335 (5)</td>
<td>4545 (4)</td>
<td>3645 (13)</td>
<td>2894 (27)</td>
</tr>
<tr>
<td>2016</td>
<td>5486 (2)</td>
<td>4407 (5)</td>
<td>5800 (1)</td>
<td>4172 (7)</td>
<td>2718 (27)</td>
</tr>
<tr>
<td>2017</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Antlerless</th>
<th>Montcalm</th>
<th>Mecosta</th>
<th>Newaygo</th>
<th>Kent</th>
<th>Ionia</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013</td>
<td>4473 (2)</td>
<td>3466 (12)</td>
<td>4374 (4)</td>
<td>3732 (9)</td>
<td>2590 (28)</td>
</tr>
<tr>
<td>2014</td>
<td>4382 (1)</td>
<td>2929 (10)</td>
<td>2697 (14)</td>
<td>3200 (7)</td>
<td>2409 (24)</td>
</tr>
<tr>
<td>2015</td>
<td>4278 (1)</td>
<td>2400 (22)</td>
<td>2978 (10)</td>
<td>2852 (13)</td>
<td>2315 (24)</td>
</tr>
<tr>
<td>2016</td>
<td>4777 (1)</td>
<td>2693 (17)</td>
<td>3791 (4)</td>
<td>3693 (7)</td>
<td>2139 (31)</td>
</tr>
<tr>
<td>2017</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
AERIAL SURVEYS

Provides population estimate

Important in understanding localized distribution of deer in CWD areas
  • Can better inform management decisions and impacts
  • Tested this year with preliminary results pending

Survey routes established in Montcalm and parts of Kent/Mecosta
  • Results forthcoming (small sample size)
  • Increased effort planned for future years
ANTLER POINT RESTRICTIONS
Established in 2013 after survey supported implementation

Reevaluated in 2017 with sunset clause removed after survey showed 77% support

Analyzed by Boone and Crockett Quantitative Wildlife Center, Michigan State University

- Yearling buck harvest trends
- Antlerless harvest
- Hunter retention
Antler Point Restriction Research

Rebecca Cain, Dr. David Williams, Dr. William Porter

Boone and Crockett Quantitative Wildlife Center at Michigan State University
Research Question

How have harvest outcomes changed in the NW12 since APR implementation?

MDNR request for statistically rigorous answers

Harvest data gathered for NW12 counties

NW12 is an Experiment
  – it is possible to test hypotheses using harvest data
Trend Analysis
Trend Analysis Cont.
Research Findings

Data support the hypothesis that APR caused a decrease in harvest of 1.5 year old males

- The proportion of 1.5 year olds in the male harvest decreased leading to a greater proportion of the 2.5 and 3.5+ age classes in the male harvest
Data from the NW12 do not support the hypothesis that APRs caused an increase in antlerless harvest.

—Harvest data provide evidence for a change in antlerless trends in 2007 and suggest that the antlerless population has been increasing since 2007.
Data from the NW12 do not support the hypothesis that APRs caused an increase in hunter numbers where implemented

- Harvest survey data in the NW12 suggest a decline in hunter numbers
- This decline was similar to the rate of the decline in hunter numbers in surrounding 12 counties
Summary

**Question:** How have harvest outcomes changed in the NW12 after APR implemented?

**Method:** 2-Part Trend Analysis

<table>
<thead>
<tr>
<th>Hypothesis</th>
<th>Supported by Data?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Decreased harvest of male yearlings*</td>
<td>Yes</td>
</tr>
<tr>
<td>Increased antlerless harvest</td>
<td>No</td>
</tr>
<tr>
<td>Increased number of hunters</td>
<td>No</td>
</tr>
</tbody>
</table>

*Over the 4 years of APR management, numbers of 1.5 yr old males in the harvest decreased, 2.5 yr old males in the harvest were stable while numbers of 3.5+ yr old males in the harvest increased.
Thank you
## Harvest Data (as Presented in May 2017)

<table>
<thead>
<tr>
<th>Antlered Deer</th>
<th>2010-2012 Average</th>
<th>2013-2015 Average</th>
<th>Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>DMU 487</td>
<td>12,318</td>
<td>14,839</td>
<td>20.46%</td>
</tr>
<tr>
<td>Not Restricted</td>
<td>26,653</td>
<td>26,045</td>
<td>-2.28%</td>
</tr>
<tr>
<td>NW 12</td>
<td>25,380</td>
<td>21,203</td>
<td>-16.45%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Antlerless Deer</th>
<th>2010-2012 Average</th>
<th>2013-2015 Average</th>
<th>Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>DMU 487</td>
<td>13,196</td>
<td>12,895</td>
<td>-2.28%</td>
</tr>
<tr>
<td>Not Restricted</td>
<td>24,241</td>
<td>20,260</td>
<td>-16.42%</td>
</tr>
<tr>
<td>NW 12</td>
<td>18,870</td>
<td>21,312</td>
<td>12.94%</td>
</tr>
</tbody>
</table>
SPECIAL LICENSES/DISCOUNTS
DNR offered discounted licenses in 5-county TB affected area ($3.50)
  • Also dramatically expanded licenses and seasons

Initial response for increased antlerless harvest waned over time
  • 2002 lapsed hunter survey showed 28% hunt elsewhere while 26% felt
deer numbers were too low

Hunter harvest exceeded 50% antlerless deer in 1998-99
  • SAK showed decreasing deer populations

Hunter harvest now falls short of 50% antlerless deer
  • Trends showing increasing population

IMPACT OF PREVIOUSLY DISCOUNTED LICENSES
DISEASE CONTROL PERMITS

Original application for removal of deer in close contact with livestock in TB endemic area

Free permits issued in CWD areas since 2015

Impacts on population reduction?

Applicability over a large area
  • Impact on overall harvest?
  • Impact on license sales?
Of 1,089 Landowners in 2017:
- 25% purchased antlerless licenses
  (92% previously purchased in 2015 or 2016)
- 75% did not buy antlerless licenses
  (55% previously purchased in 2015 or 2016)
EXPIRED ANTLERLESS LICENSES (OH)

- **2006**
  - Harvest shifts back to **ANTLERLESS** deer 7-10 days earlier than it did in 2006
  - Notice in 2007 that the harvest composition remains dominated by antlerless deer for an additional 2 weeks!

- **2007**
  - Permit Expires!
  - Notice in 2007 how the harvest shifts back to antlerless deer ahead of the expiration date of the permit. Notice that in 2006 that the shift didn’t occur until the gun season opened.
  - Notice the height difference in the curves in 2007.
MICHIGAN HARVEST COMPOSITION (CHECK STATION DATA)

Proportion antlered/antlerless harvest by week

Archery Season Begins

Firearms Season Begins

% Antlered  % Antlerless
Michigan—historically ~4% of hunters report harvesting a second buck.

Indiana

- Transition from 2 bucks to 1 buck (2002)
- 2 bucks split by season
  - 1 archery
  - 1 firearms/muzzleloader
- Minimal impact on antlered harvest
- Unknown impact on antlerless harvest given other variables
Wisconsin (Earn-A-Buck)

- Adopted EAB in 2003 shortly after establishing CWD Eradication Zone
- Wisconsin Act 50 (2011) prohibited Earn-A-Buck from future implementation

Virginia (Earn A Second Buck)
BAITING AND FEEDING DEFINED

- Baiting and feeding defined
  - WCO 3.100 & MCL 324.40102
- Purposes for supplemental feeding and baiting
- Rules for baiting in Michigan
  - WCO 3.100
BAITING IN MICHIGAN

• Baiting popularity
  • Increased substantially since 1980s—71% approve of bait use
  • More common among bowhunters than firearm hunters
  • More common in the UP than in the rest of the state

• Hunter-reported reasons for baiting
  • 72% report it’s more exciting because they can watch more deer
  • 63% reported that they do it because they believe they have a better chance to harvest a deer over bait
BAITING IN MICHIGAN CONT.
Baiting and Hunter Harvest Levels

- Little evidence of impact on overall harvest
  - Negligible impact on overall harvest in MI, WI
  - Negative impact in SC across 7 years of data
  - Positive impact in Greenwich, CT for bowhunters in urban context for population control
- Once CWD established, research suggests that its spread may not be halted through hunter harvest
BAITING, FEEDING, AND CWD

• Risks associated with congregating wildlife
  • Probability of direct contact, contaminating food source, contaminating environment
• Hypothesis that disease immunity may be higher with supplemental feeding not supported
• Management practices aimed at increasing carrying capacity (e.g., feeding) cause diseases to persist and spread and are expected to do so in the case of CWD
HUNTER RESPONSE TO BAITING BANS

- Studies show support for baiting bans when herd health jeopardized
  - Support for management actions based on perceived effectiveness of those actions
  - Importance of public involvement in decision making
    - Wisconsin example
Changes in hunter behavior in response to baiting bans in NELP for bTB

- 50% of bowhunters and 31% of firearm hunters in the area reported hunting less because of the baiting ban, 22% stopped hunting in the area altogether.
- Survey of hunters who purchased antlerless licenses in 1998 but did not in 2001 after the ban was established, only 20% reported the ban contributed to their decision.
- Declines in antlerless harvest and firearm season participation in bTB area similar to statewide declines.
BAITING AND FEEDING MANAGEMENT OPTIONS

- Options discussed
  - Status quo
  - Working group recommendations
  - Single bite bait
  - Expand baiting ban
- Alternative methods of provisioning food or limits on food amounts do not eliminate risk
Baiting is popular and has economic value
Evidence suggests baiting increases disease risk through congregation of deer
Little evidence for baiting increasing overall hunter harvest
Bans may impact hunters differently due to geography or method of take
REDUCING DEER DENSITIES: ALTERNATIVES TO HUNTER HARVEST
In some areas (including Michigan), increasing localized deer harvest (and in effect reducing deer densities) has proven effective at maintaining low prevalence of CWD.

Simulated models have demonstrated that reducing prevalence of CWD can be achieved through harvesting specific sex and age classes of deer (selective harvest).
Recreational hunting alone typically is not effective at reducing and maintaining lower deer densities over time.

- Hunter satiation
- Hunter selection

Professionals continue to remove targeted sex and age classes of deer even as densities are substantially reduced.
In some areas (including Michigan), samples collected by culling have proven more effective than hunter harvested samples for detecting CWD positive deer.
PROS AND CONS

• Meeting harvest and sampling goals and objectives
  • Additional data collection
• Access
• Public and stakeholder acceptability
• Cost
THANK YOU