



## SURVEILLANCE AND MONITORING: METHODS OF DISEASE DETECTION

### CWD SURVEILLANCE

- A robust and **adaptable** surveillance strategy is essential for any CWD management to be at all effective.
- Surveillance should be designed to detect CWD as early as possible, when the proportion of the population infected is low and so is their contamination of the environment.
  - Incorporate known risk factors
- Surveillance datasets, if sample sizes are adequate, can be used to monitor changes in disease occurrences over time.

## CWD SURVEILLANCE

- Surveillance to detect diseases that are only present in a small percentage of a population, like CWD, is inevitably resource intensive.
  - Extremely large numbers of animals often need to be tested.
- Capacity to test for any disease is not unlimited, and depends on physical infrastructure, field and laboratory staffing, availability of tests, and cost.
  - Capacity is an issue nationwide.
  - As surveillance broadens, processing times lengthen, especially during peak testing periods.

## SAMPLE COLLECTION

- Mandatory sample collection may have limited use in areas with history of adequate surveillance or high prevalence.
  - Must be strategic with resources
  - Act in alignment with goals
  - Realize voluntary surveillance risks inadequate sampling
  - Mandatory collection useful for monitoring management impacts

## SURVEILLANCE SUMMARY

- Surveillance is *not* a substitute for management.
  - Surveillance is by nature retroactive.
  - Testing is a means to an end, not a long term strategy for preventing or controlling an outbreak.



DEER PROCESSING, CARCASS DISPOSAL &  
MOVEMENT

## DEER PROCESSING, CARCASS DISPOSAL, & CARCASS MOVEMENT

- Contamination risks in processing, movement, and disposal.
- No data on how carcasses are disposed of by hunters and processors in Michigan.
  - 46% of deer harvested in MI sent to commercial processors (2016)
- Current guidelines for transportation and disposal.

## RELEVANT RESEARCH

- Risks in carcass movement spreading disease beyond natural routes
  - Thought to be less CWD risk in carcass transport than live cervid
- Risks in carcass disposal
  - Environmental contamination
  - Recommended carcass disposal methods

## ADDITIONAL RISKS IN TAXIDERMISTRY & COMMERCIAL PROCESSING

- Taxidermy
  - Volume of older bucks
  - Contact with heads for mounting
- Commercial processing
  - Volume of potentially-infected materials in one location
  - New York surveillance results: only 50% of carcasses handled by processors were disposed of properly

## PROCESSING, CARCASS MOVEMENT & DISPOSAL: SUMMARY & CONSIDERATIONS

- No data on post-processing carcass disposal for hunters or processors
  - We do not know how 54% of Michigan deer hunters process deer
- Landfill considerations
  - Access and risks in transport
- In-state transportation restrictions to reduce risk of disease introduction to new areas
  - Restrictions may differentially impact hunters, taxidermists, and processors



## LIVE ANIMAL MOVEMENT

### HUMAN ASSISTED

- Both captive and wild cervids are moved for commerce (captives) or species recovery, translocation or rehabilitation (wild).
- Movement of infected live animals without symptoms is an efficient way to establish infections in new areas.
- Movement is the only confirmed activity linked to spreading disease to distant locations.
- No reliably sensitive live animal test for CWD
  - Currently available tests are limited
  - Not recommended for individual animal purposes

## MOVEMENT OPTIONS

- Prohibiting live cervid movement will likely control a significant risk of distributing CWD into previously uninfected areas.
- Prohibiting movement of captive cervids can affect the ability of deer farmers to do business.
- Prohibiting movement of wild cervids could affect translocation projects desirable to sportspeople (e.g. elk reintroduction into new areas) or limit deer rehabilitation
  - Evidence from other states indicate that more than three-quarters of rehabilitated fawns do not survive.



BIOSECURITY AND HANDLING

## INFECTIOUS PRIONS

- In CWD-infected cervids, infectious prions are present throughout the body and its fluids.
- Nervous system tissues (brain, spinal cord, nerves) and lymphatic tissues (lymph nodes, spleen) believed to have the highest infectivity.
- Infectious prions are present in blood, feces, saliva and urine.
  - Semen is not well understood

## INFECTIOUS PRIONS CONTINUED

- Tissues from infected cervids can contaminate the environment.
- Other species that eat infected cervid carcasses may transport prions and contaminate new areas.
- Captive cervid-derived products (e.g. urine, velvet) may be infectious if taken from infected animals, and could contaminate the environment.

## REGULATORY AUTHORITY

- Once harvested, wild cervids become the property of the hunter, who dictates how the remains are disposed.
- DNR can regulate the movement of wild cervid carcasses out of assumed CWD infected areas, perform outreach to teach proper disposal, and provide opportunity for safe disposal.
- MDARD has regulatory authority over disposal of dead livestock, including captive cervids, and biosecurity on livestock facilities.

## DISPOSAL

- Landfilling can contain CWD prions, and remain infectious.
- Only high-temperature incineration and alkaline digestion destroy prion infectivity. Treatments (e.g., some disinfectants, composting, controlled burns) can reduce, but not eliminate, infectivity.
  - Incinerator capacity and incineration costs for high-risk tissues could become prohibitive as the CWD-infected area expands.

## DISPOSAL AND MINIMIZING RISK

- Teaching hunters and providing opportunities for proper disposal may facilitate cooperation.
- Current testing protocols (shipment of cervid heads and carcasses of symptomatic cervids to the MDNR Wildlife Disease Lab for disposal) minimize opportunity for high risk tissues (e.g. brain) to be disposed of improperly.

## DISPOSAL AND MINIMIZING RISK CONTINUED

- Minimize risk may be eliminating the use of deer urine lures and velvet, although it is unclear how much.
  - Research has stated risk posed by natural deer urine lures to be “undeniable”, and other states (e.g. Arkansas, Maine, Virginia) have banned their use.
- Providing opportunity doesn’t guarantee compliance, and strict enforcement of movement restrictions is difficult.
- Regulating distribution and use of urine and velvet could affect the business of captive cervid producers.

