Connecting the Dots: A Landscape Approach for Michigan CWD

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Michigan CWD

- First detected in free- ranging deer in May 2015
- Since detected in 5 counties in the Lower Peninsula
- Considered emergent within the bounds of our study area
- Where did it come from, and where could it be headed?



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Could these points be connected?



0 3 6 12 Miles

Landscape as a Driver for CWD

Some landscape features
promote/ restrict deer movement

Understanding how landscape features impact deer movement may inform the spread of the disease



Research Objective

Investigate the relative connectivity between points of CWD detection in Michigan, with respect to landscape features.

Following the Path of Least Resistance



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Modeling Resistance to Movement



Likelihood of Movement

- Least cost path (purple) represents a cost associated with movement between points
- Observed cost between CWD points is ranked against distribution of costs to sample points on the landscape
- Determines likelihood of travel between disease points



Path Directionality

- Individual sets of random paths developed around each CWD point
- Paths occurring between points are of equal cost, but rank differently
- Observed path rank is related only to random paths originating from the same point
- Difference in rank appear due to differences in landscape features surrounding each point



Ranking Results

Eastbound Westbound



Path Pairings

Ranking Results



Eastbound Westbound

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Ranking Results



Inferences

- If deer movement is driven by landscape features in MI:
 - Less costly for deer to move in easterly direction across landscape
 - Suggests that spread direction is likely opposite that of detection



Acknowledgements





MICHIGAN STATE UNIVERSITY











College of Agriculture and Natural Resources