**DISSERTATION\**

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| **10** | **Co-Advisor PhD Revive** | **06/13/25** |

* Dissertation = 3 big picture accomplishments
  + Don’t limit to easy/feasible
* ADCNR main objective: defensible method to set harvest numbers
  + Set of Qs for each agency related to concerns
    - Mostly the same Qs, especially within geographic regions
      * E.g., doe/buck ratio, age class
    - Shape methods / data / models used to produce outcomes
      * E.g., doe/buck = sensitive parameter in IBMs
* PhD project results / products:
  + “bouquet of tools”
  + Decision making framework
    - Based on publicly available data / commissioned studies / \_\_\_\_\_\_\_\_\_\_\_
  + Standardize the process (similar Qs for most state agencies)
* Set of Qs specific to ADCNR?
  + Limited by poor communication, however we will move forward with the idea that we are not limited by data sharing / availability from AL, and that ADCNR should come to us
    - Better decisions made by state agency = better assumptions, data, strategies
      * E.g., length / timing of harvest season
    - States with reported Qs / scenarios better than AL = product of agency collaboration with researchers (e.g., Missouri, Indiana, Minnesota)
      * Review annual deer population / management reports vs AL
    - Most deer population / harvest work and research funded by state agency
      * Focus of questions over time
  + Deer population management / research over time
    - 70s/80s: population increase
    - 80s/00s: ecology / physiology
    - 10s/20s: analytical methods/ technology
* What’s lacking? Replicable and reproducible methodology to address questions (Qs)
  + expertise in automated pipeline
  + technologies like cloud computing (e.g., shiny apps) increase accessibility
    - adaptive management iteration
  + this does not equal a black box
* Rule of 3: where any model can answer 2/3 of questions
  + Needs to be generalizable, accurate, precise, reproducible
  + Requires multiple methods / models to achieve state objectives
* Conceptual outline / synthesis paper (Chapter 1)
  + Appropriate steps for accomplishing questions / tools available
    - Whats been done, gaps, analytical improvements
      * Include perspective element
* Integration methods for citizen science data (Chapter 2/3)
  + Potential to sample (e.g., camera traps) around points
  + Processing may be difficult, complex, or even impossible
* Ani’s agent based / individual based models
  + Data is not limiting factor
  + ABM base = truth
    - Each aggregation of data = scenario

S1 - D:B = 5:1

S2 - D:B = 3/1

S3: Harvest Dates

S4: Harvest Length

* + Relative impact of scenarios
  + Participatory expert opinion from ADCNR
* Unlocking ABM from data restriction
  + Plug parameters ~ agency might want certain answers

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| **13** | **Chapter 1 Co-Advisor** | **07/06/2025** |

* Title: White-tailed deer population management in the 21st century
* Locally defensible population strategy
  + Shared concerns / challenges between agencies
    - Hunter satisfaction
    - QDMA – big antlers
    - Private – DMAP
    - Hunter participation
  + Framework to address all challenges and concerns
* North American Model of Conservation
* Change in focus / concern of agencies / researchers
  + 20th century = worries above population
    - Trend in slow increase vs
  + 21st century = disease (especially CWD) shaping population
* For different agencies:
  + What info is collected? Sources?
  + Structure of agency? ~ funding of agency?
  + What are Qs? (usually demographic)
* Data needed to informed analytical framework
  + Better framework = better management
* We are at a turning point for deer management
  + Technology = ability to more efficiently and cost effectively collect and process data
  + Diseases and influence on populations
    - Standardized decision making process is missing
* Proposed travel to meet with deer biologists
  + Goal: 10 states in SE/Midwest
  + Go with questions - “interacted with agency”
    - “want to better understand”
  + What’s currently happening?
  + Will help guide the base ABM ~ what we have + where to go
  + Possibility of AU workshop for participants
* Proposed start to Chapter 1 outline by Ani
  + Paragraph 1: Introduction to challenges to technology and tools to clear / standard direction
  + Paragraph 2: history of deer management
    - Urban deer population

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| **16** | **Chapter 1 Introduction** | **07/20/2025** |

* White-tailed deer population management in the 21st century (Chapter 1)
* Entirely different objectives in the 20th vs 21st century
  + 20th tied to population recover + harvest regulation / profit
  + 21st tied to disease + decline of hunter participation + public health + climate change
    - Decline in hunter participation ~ political, religious perception
      * Agency use of money (e.g., believe climate change is a hoax)
      * Health risk related to CWD
    - Climate change
      * Geographic distribution of WTD (moving north)
    - Disease
      * Lyme , CWD, EHD, brucellosis, etc.
    - Public health
      * SARS-COVID-2
  + caveat: 21st issues are result of deer population management in 20th century
    - + caveat:deer population management in the 21st century is primarily following same guidelines/ approaches used to manage deer in the 20th century
  + Interrelated challenges related to white-tailed deer population management
    - No major document outlines how influence other aspects + guides of 21st management
    - How do these change – regionally, temporally (decades)
      * Management approaches with new technologies, tools, and increased accessibility (cost, labor)
    - Is the current model of deer management at odds with 21st century challenges?
      * Management heavily influenced by issues in the 20th century
      * NA model conservation made deer profitable and public in effort to prevent extirpation + increase population

**A diagram of a problem

AI-generated content may be incorrect.**

* Deer population in the 20th century = entirely different objectives that the objectives in the 21st century
  + – e.g. tied to disease
    - Caveat – the issues were dealing with today are the result of deer populations and their management in the 20th century – why important to understand
  + Climate change in a main challenge in this century because deer are in northern climates where there were none
    - Public health and disease issues associated with this
* Money that goes into the population management (comes from deer hunter participation which has declines)
* Region specific issues with deer populations
  + E.g. michican where deer TB was an issue from things that happened in the 50s-70s
  + Have CWD emerging in various state s
* Issue with public practices
* Captive deer population
* All of the above are intererelated – cause and effect - snowball with several other aspects, issues
  + No major document that outlines how this has all influenced other aspects and how this guides deer management in the 21st century
* Deer = Hunters = Money = Management
  + Agencies may not want to know CWD presence if it’s going to lower hunter participation
    - Is model preventing from adequately addressing some of the modern challenges?
    - Do political views of the hunting population matter?
      * Climate change is major issue – those paying for deer management don’t believe in climate change = constituents that no longer want to pay money if state agency is spending money on phony research
        + Rule of tradition – legacy – grandfather to son to grandchild in traditions of hunting
    - Science denial / mistrust of government agencies = all time high
      * Hunters may be paying $ for
      * How to bridge the gap between the stakeholders and hunters? How does this differ between different states?
        + Dmap - Conflict between land owners on private land – how is this dealt with? How is this accounted for?
      * Wtd = everywhere
        + If agencies in west aren’t communications with SE..

How are challenges different? – e.g. multiple ungulate species co-occuring

* + - * Global NA conservation perspective in global lense
        + Critis
* Lime disease TB CWD EHD menigental worm – cannot keep it own of discussing challenges in 21st century
  + Challenges in 21st century – and how they change, regionally, temporally (decades), management approaches given new technologies and accessibility?
    - Diseases
    - Hunter participation
      * Harvest regulations = conflict with the science, government, etc. trust and participation
    - Public health
      * SARS COVID 2 and TB
    - Climate change
      * Changes distribution and presence of WTD – e.g. Alaska and bring new issues
* hunter surveys are also going to inform the models
* Challenges and Management in the 20st century
* How it is has changed in the 21st century
* Tools and Technology available today that didn’t exist before and how does that influence management
* Plugs in to interviews with agencies
  + What are they doing differently?
    - E.g. states using X technologies and how that helps, limits, etc. compared to other agencies
    - Not formal interviews – for letter –
      * We are very interested in these issues deer pop / cwd management
        + Interested in learning more about the perspective and real world experiences from managing those topics

Coming from 2 people with limited hunting experience – little management experience

Help guide focus

* + - * + Would be happy to do it zoom but would love to travel to you and informally discuss – approx. 2 hours
  + \*\* potentially lead to more formal conversation at deer conference later
    - * If driving – talk to WMA / DMAP / other people that manage deer
  + If want to publish – talk to Ally Mc. – IRB approval for structured survey for deer population managers
  + We want to understand so that we can be helped to prepare a group meeting in upcoming months – all participating will be invited – able to talk through these differences, successes, challenges as group
* Is the current model of deer management at odds with the 21st century cahllenges?
  + The way that we manage deer is heavily influences the way that deer are managed
    - NA conservation – big point is that it made wildlife public trust; big point two is that it made hunter participation profitable and legitimate/regulated
* 1. Report the history of WTD management in NA is first critical step before addressing anything else in chapter
  + History of deer management – what we do now and n 75 years will be drastically different
    - But we need to review the last century to guide the next – what can we learn? What were failures? Successes? Issues?
      * What’s at our disposal now?
        + Telemetry – 1 paragraph – when did they start – weight of collars – triangulation vs exact location – cost and how it has influenced accessibility (not just for the collars but also for the labor and resources and time that go intoit)
        + Camera traps
        + AI