

Role of predators, winter weather, and habitat on white-tailed deer fawn survival in the south-central Upper Peninsula of Michigan

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Abstract – Project Graduate Students have begun to select their Graduate Committees as well as started developing project proposals. A literature review is currently being conducted as well as acquisition of equipment for the upcoming field season. A quad-fold brochure has been developed for public outreach and a project website is near completion. Scientific collector's permits and animal handling permits have been submitted. Deer trapping will begin in February.

Introduction:

Management of wildlife is based on an understanding, and in some cases, manipulation of factors that limit wildlife populations. Wildlife managers sometimes manipulate the effect of a limiting factor to allow a wildlife population to increase or decrease. White-tailed deer (*Odocoileus virginianus*) are an important wildlife species in North America providing many ecological, social and economic values. Most generally, factors that can limit deer numbers include food supply, winter cover, disease, predation, weather, and hunter harvest. Deer numbers change with changes in these limiting factors.

White-tailed deer provide food, sport, income, and viewing opportunities to millions of Americans throughout the United States and are among the most visible and ecologically–important wildlife species in North America. They occur throughout Michigan at various densities, based on geographical region and habitat type. Michigan spans about 600 km from north to south. The importance of factors that limit deer populations vary along this latitudinal gradient. For example, winter severity and winter food availability have less impact on deer numbers in Lower Michigan than in Upper Michigan.

Quantifying the relative role of factors potentially limiting white-tailed deer recruitment and how the importance of these factors varies across this latitudinal gradient is critical for understanding deer demography and ensuring effective management strategies. Considerable research has been conducted demonstrating the effects of winter severity on white-tailed deer condition and survival (Ozoga and Gysel 1972, Moen 1976, DelGiudice et al. 2002). In addition, the importance of food supply and cover, particularly during winter, has been documented (Moen 1976, Taillon et al. 2006). Finally, the role of predation on white-tailed deer survival has received considerable attention (e.g., Ballard et al. 2001). However, few studies have simultaneously addressed the roles of limiting factors on white-tailed deer.

Thus, the overall goal of this project is to assess baseline reproductive parameters and the magnitude of cause-specific mortality and survival of white-tailed deer fawns, particularly mortality due to predation, in relation to other possible limiting mortality agents along a latitudinal gradient in Michigan. We will simultaneously assess effects of predation and winter severity and indirectly evaluate the influence of habitat conditions on fawn recruitment. Considering results from Lower Michigan (Pusateri Burroughs et al. 2006) as the southern extent of this gradient, we propose three additional study sites from south to north across Upper Michigan. Because of logistical and financial constraints, we propose to conduct work sequentially across these study areas. The following objectives are specific to the southern Upper Michigan study area but applicable to other study areas with varying predator suites.

Objectives:

1. Estimate survival and cause-specific mortality of white-tailed deer fawns and does.
2. Estimate proportion of fawn mortality attributable to black bear, coyote, bobcat, and wolf predation.
3. Estimate number and age of fawns killed by a bear, coyote, bobcat, or wolf during summer.

4. Estimate white-tailed deer pregnancy and fecundity rates.
5. Estimate if familiarity of an area to each predator species affects the likelihood of fawn predation.
6. Estimate if minimum composite bear, coyote, bobcat, and wolf use of an area influences fawn predation rates.
7. Describe association between fawn birth site habitat characteristics and black bear, coyote, bobcat, or wolf habitat use.

Study Area:

This study will be conducted within the eastern portion of Deer Management Unit (DMU) 055 in Menominee County. The general area is bounded by Lake Michigan (east), U.S. Highway 2 (north), and U.S. Highway 41 (west) southward to the town of Stephenson. The study area will include portions of the Escanaba State Forest. The core study area will include a mix of forested and agricultural lands and is where capture efforts will occur. The overall study area will comprise a minimum convex polygon that includes the composite annual home ranges of telemetered animals. DMU 055 was selected initially because of the relatively low snowfall and generally low winter severity. In addition, deer in this area are largely non-migratory, making direct comparisons to southern Michigan (i.e., Pusateri Burroughs et al. 2006) easier. We will use aerial photos, GIS layers, bear harvest data, and knowledge of DNR biologists to aid in final study area selection.

Accomplishments:

Project staff has been preparing for the upcoming field season and has been conducting a literature review for the project. Recently hired Graduate Research Assistants (Jared Duquette and Nathan Svoboda) have begun to select a Graduate Committee at Mississippi State University as well as create outlines for their project proposals.

Field Season Preparation

Project staff has begun acquiring field equipment to begin white-tailed deer trapping in February. We have been working with Michigan Department of Natural Resources (MDNR) personnel to obtain the necessary items to begin the field season and have begun to develop field manuals, protocols and datasheets for the upcoming season. We have recently received an ultrasound machine to determine pregnancy and body condition and are currently developing a protocol and user's manual for this procedure. We have begun to develop several manuals, protocols and datasheets for the various procedures we will be implementing throughout the project. Also, we have been seeking field housing in Escanaba and have likely secured a house for the duration of the project.

Public Outreach

A few different outreach efforts have been developed for the project. We have worked with Karen Brasher, Mississippi State University Publications Editor and Web Designer to develop a quad-fold brochure for public distribution. This brochure contains the project background, objectives and techniques, contact information for project staff and information on how the public can become involved. We are also finalizing a project website that will be online by early-February.

Permits

A wildlife handling and use protocol was submitted to the Mississippi State University Animal Care and Use Committee (IACUC) and provisionally approved 17 December 2008. State of Michigan Scientific Collector's Permits, a Michigan State Land Use Permit and a permit to use agricultural products to trap deer was submitted to the state of Michigan in November. The Endangered Species Permit to allow project staff to work with wolves was submitted in January 2009.

Work to be completed (January – March):

Winter 2009

- Trapping and collaring of white-tailed deer does
- Trapping and collaring bobcats and coyotes
- Selection of Graduate Committees
- Development of project proposals
- Creation of protocols, manuals and datasheets for the following:
 - Capture/Trapping
 - Immobilization and Handling
 - Population Surveys (i.e. hair snares, camera, tracking and howl surveys
 - Telemetry (ground and aerial)
 - Ultrasound and Necropsy
 - Vegetation/Habitat data collection
 - Weather Station data collection
 - Vaginal Implant Transmitter Monitoring and Expulsion
 - Vaginal Implant Transmitter tag search
 - Data accuracy checks and data handling
- Creation of Conduct/Expectation Manual for seasonal staff
- Selection of Lead Technicians and field crews
- Write and submit press release

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