

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 –We captured 77 individual deer (61 female, 16 male) in 98 capture events from 16 February to 22 March 2009. Thirty-four pregnant females (27 adults, 7 yearlings) were collared and implanted with vaginal implant transmitters. Of the 77 deer captured, 33 were adults (32 female, 1 male), 10 were yearling females, and 34 were fawns (19 female, 15 male). Currently, 27 deer are being monitored. Nine mortalities of collared deer have occurred through 31 March. Graduate Research Assistants have selected Graduate Committees and are writing project proposals

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.

The 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 is being 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 includes portions of the Escanaba State Forest. The core study area includes a mix of forested and agricultural lands and is where capture efforts will occur. The study area will be determined by calculating a minimum convex polygon around the annual home ranges of does, which will be further refined by knowledge of predator space use. 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.

Accomplishments:

Trapping of white-tailed deer was the primary accomplishment for this quarter. Graduate Research Assistants have been preparing project research proposals as well as selecting Graduate Committees at Mississippi State University. Protocols, manuals and datasheets continue to be developed for various aspects of the project. Five seasonal Wildlife Technicians have been hired as well as 1 Research Associate. Currently, there are 3 volunteer summer positions available that will be filled by 4 May. A press release has been issued for the project and public outreach efforts continue.

Summary of Deer Capture and Monitoring

Trapping

- Trapping occurred from 4 February to 22 March 2009

Capture

- Total captures = 98
- Unique individuals captured = 77 (61 Females, 16 Males)
 - 33 Adults (32 Female, 1 Male)
 - 10 Female Yearlings

34 Fawns (19 Female, 15 Male)

- Recaptures = 21
 - 77 deer captured 1 time
 - 14 deer captured 2 times
 - 2 deer captured 3 times
 - 1 deer captured 4 times
- 34 Pregnant females collared and VIT tagged
 - 34 Collared females weighed and measured:
 - Mean weight = 54.1 kg (119 lbs.)
 - Mean body length = 146.0 cm (58.4 in)
 - Mean total length = 171.6 cm (68.6 in)
 - Mean chest girth = 90.9 cm (36.4 in)
 - Mean neck circumference = 34.0 cm (13.6 in)
- Currently 27 deer being monitored
- Mortalities = 9 deer

Telemetry

- Mortality of collared individuals is monitored 1-2 times weekly via aerial or ground monitoring
- Telemetry locations are collected 1-2 times weekly per individual via aerial telemetry

Work to be completed (April – June):

Trapping and radiocollaring

- Wolves, bobcats, and coyote trapping and subsequent radiocollaring will begin late April; Black bears will begin late May or early June
- Fawns will be captured using a thermal imaging camera, crew habitat searches, and VIT tag monitoring; captured fawns will then be radiocollared and released

Radiotelemetry

- Continue to monitor and collect habitat use data on collared does
- Monitor doe VIT tags as indication of fawn birth site
- Monitor radiocollared fawns to detect mortality and estimate survival
- Aerial flights will be conducted to retrieve predator GPS collar data and subsequent evaluation of potential predation sites will then be undertaken using trained dog

Habitat data collection

- Pertinent habitat data will be collected from surveys conducted at birth, predation, and random sites.

Organizational and logistical efforts

- Protocols, manuals, and datasheets will be created for the following:
 - Predator Capture/Trapping
 - Predator 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 tag search
 - Data accuracy checks and data handling
- Continue to refine project proposals

Literature Cited:

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Public Relations to Date

- Project meeting with area sportsmen groups:
 - U.P. Whitetails Association
 - U.P. Bear Houndsmen Association
 - Michigan Bear Hunters Association
 - U.P. Sportsmans Alliance
 - U.P. Trappers Association
- 2 Newspaper Articles: Daily Press (Escanaba, MI)
- 1 Newspaper Article: Mining Journal (Marquette, MI)
- Associated Press Article: numerous newspapers and webpages
- Television program “Discovering” with Buck Lavasseur
- “Trails & Tails Outdoors Radio Show” with Tim Kobasic
- Research study website is live on the internet and can be found at:
<http://fwrc.msstate.edu/carnivore/predatorprey/>
- Numerous volunteers have been scheduled to assist with field research activities (e.g. fawn capture)