Effects of even-aged timber management on survivorship in Sitka black-tailed deer

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FEDERAL AID
FINAL RESEARCH PERFORMANCE REPORT

PROJECT TITLE: Effects of even-aged timber management on survivorship in Sitka black-tailed deer.

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COOPERATORS: NONE

GRANT AND SEGMENT NR.: W-24 5, W-27-1–W-27-4
PROJECT NR.: 14.16
SEGMENT PERIOD: 1 July 1996–30 June 2001

WORK LOCATION: Heceta Island
STATE: Alaska

I.   PROGRESS ON PROJECT OBJECTIVES

Our objectives were to determine how even-aged timber management influences survivorship in Sitka black-tailed deer (*Odocoileus hemionus sitkensis*) and interactions between deer and wolves (*Canis lupus ligoni*).

> JOB 1: Characterize habitat types available to deer in terms of forage composition, abundance, seasonal availability, and hiding cover.

> JOB 2: Examine seasonal and diurnal patterns of habitat use by radiocollared deer.

> JOB 3: Examine effects of habitat composition and type of landscape on survivorship of deer.

> JOB 4: Estimate risk of predation associated with habitat types as a function of vegetative structure and proximity to centers of activity of wolves.

SUMMARY OF WORK COMPLETED

> JOB 1: We sampled vegetation at 394 0.2 ha plots along 69 transects on Heceta island and used statistical clustering to identify 9 major habitat groupings or types that were likely relevant to deer:

1. Clearcut

2. Shrub-sapling forest

3. Pole-young timber forest

4. Open-canopy old-growth forest

5. Productive old-growth forest

6. Muskeg

7. Riparian

8. Road corridor

9. Alpine

Clearcuts were second-growth forest stands <30 years old and generally had large biomass of evergreen forbs (mean = 279 kg/ha) and shrubs (mean = 67 kg/ha). Shrub-sapling forests were second-growth stands 30-40 years old and had moderate abundance of forbs (mean = 90 kg/ha) and shrubs (mean = 45 kg/ha). Pole-young timber stands were second-growth forest >40 years old and had low abundance of forbs (mean = 11 kg/ha) and shrubs (mean = 2 kg/ha). Open-canopy old growth were forest stands with ≤20 mbf/acre basal area and had moderately dense understories of forbs (mean = 161 kg/ha) and shrubs (mean = 42 kg/ha). Productive old growth were forest stands with >20 mbf/acre and moderately dense understories of forbs (mean = 90 kg/acre) and shrubs (mean = 45 kg/acre). Muskegs were bog-like habitats below 560 m elevation and had moderate biomass of forbs (mean = 196 kg/acre) and few shrubs (mean = 22 kg/acre). Alpine habitats were all vegetated areas above 560 m elevation and moderate biomass of forbs (mean = 141 kg/acre) and very small biomass of shrubs (mean = 4.2 kg/acre). Clearly, biomass available to deer was highest in clearcuts, moderate in shrub-sapling, open-canopy old growth, productive old growth, muskeg, and alpine habitats, and very low in pole-young timber habitats. Forage biomass available to deer in winter was reduced to <50% of that in summer in all habitat types. Hiding cover for deer was greatest in clearcuts and shrub-sapling habitats and least in pole-young timber, muskeg, and alpine habitats. Riparian habitats were all habitats that bordered freshwater lakes and streams, and roads were the actual paved or graveled portion of the road right-of-way plus a 40m buffer on either side.

JOB 2: We captured a total of 115 deer between September 1996 and October 1999. Of those, 79 were successfully radiocollared, released, and monitored. Twelve deer died during capture or within 1 week of release, and 24 deer were released without collars because they were adult males (before we had expandable collars) or juveniles that were too small.

A total of 4,232 radio locations were obtained between September 1996 and June 2000. Average 95% adaptive kernel home ranges were 110 ha, 78 ha, and 23 ha for adult males, adult females, and all juveniles, respectively.

Analysis of habitat use by radiocollared deer indicated that deer generally selected riparian, muskeg, open canopy old growth, and road corridors. Deer avoided productive old-growth and shrub-sapling habitats. They also selected steep slopes, and westerly or easterly aspects. In winter deer selected for riparian and open-canopy old growth. Deer frequently used road corridors particularly at night.

JOB 3: Average annual survivorship for adult male deer was 57%, 61% for adult females, 86% for juvenile males, and 25% for juvenile females. Hunting by humans accounted for 72% of mortality of adult males, 26% of mortality of adult females, 0% of mortality of juvenile males, and 11% of the mortality of juvenile females. Predation by wolves accounted for 14% of the mortality of adult males, 33% of mortality of adult females, 100% of mortality of juvenile males, and 23% of mortality of juvenile females. Starvation or other natural causes accounted for 14% of mortality of adult males, 41% of mortality of adult females, 0% mortality of juvenile males and 67% of mortality of juvenile females.

Predation by wolves was positively correlated to the percent of muskeg habitat within home ranges of deer. Starvation was positively correlated to the percent of shrub-sapling and pole-young timber habitat within deer home ranges. For adult male deer, mortality from hunting was positively related to the density of roads within home ranges.

JOB 4: Nine wolves were captured, radiocollared, and released between September 1996 and October 1999. Six of those wolves dispersed from Heceta Island. One female disperser crossed Prince of Wales Island to the east and swam to the mainland. The swim across to the mainland from Prince of Wales Island was at least 8 km. All radiocollared wolves were eventually killed by trappers.

A single pack of 8 wolves occupied Heceta Island during the course of this study. The home range of that pack encompassed the entire island. Deer occupying habitats within the core activity areas of wolves were at higher risk of predation.

III. RECOMMENDATIONS

This project is completed and represents a portion of the Ph. D. dissertation of the principal author, Chris J. Farmer. A detailed final report is in the final stages of completion and will be available in November 2001. In addition, this study has resulted in at least 2 publications to be submitted to professional journals and a presentation at the annual Wildlife Society meeting in Reno in September 2001.

IV. ADDITIONAL FEDERAL AID FUNDED WORK NOT DESCRIBED ABOVE THAT WAS ACCOMPLISHED ON THIS PROJECT DURING THIS SEGMENT PERIOD: None.

V. FEDERAL AID TOTAL PROJECT COSTS

$ 213,000

V. PREPARED BY: **APPROVED BY:**

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                                                APPROVAL DATE: _____