FEDERAL AID
ANNUAL PROGRESS REPORT

ALASKA DEPARTMENT OF FISH AND GAME
DIVISION OF WILDLIFE CONSERVATION
PO Box 115526
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Alaska Department of Fish and Game
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Project Title: Survivorship of Sitka black-tailed deer fawns in Southeast Alaska

Project Duration: July 1, 2008 – June 30, 2014

Report Period: July 1, 2009 – June 30, 2010

Report Due Date: September 1, 2010

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COOPERATORS: Kris Hundertmark and Sophie Gilbert (University of Alaska Fairbanks)

WORK LOCATION: Ketchikan, Alaska**.**

I. PROBLEM OR NEED THAT PROMPTED THIS RESEARCH

Sitka black-tailed deer (*Odocoileus hemionus sitkensis*), a relatively small subspecies of mule deer (*O. hemionus*), is the most important ungulate with respect to sport and subsistence hunting in Southeast Alaska. It is the most abundant ungulate in the region and it plays a major ecological role as a forest herbivore and as prey for Alexander Archipelago wolves (*Canis lupus ligoni*), black bears (*Ursus americanus*), and brown bears (*U. arctos*) (Klein 1965, Olson 1979, Wallmo 1981, Hanley 1984, Hanley 1993, Person et al. 1996, Kohira and Rexstad 1997, Person 2001). Although much is known about the ecology and energetics of Sitka black-tailed deer (Klein and Olson 1960, Klein 1965, Olson 1979, Wallmo 1981, Hanley 1984, Parker et al. 1999), little is known about reproduction and recruitment. Annual recruitment represents the fraction of a deer population that can be depleted by predators and hunters without causing a decline in population. Thus, it is an important measure of population resilience needed to evaluate the effects of habitat change, predation, and hunting on deer. There are few data concerning recruitment and sources of mortality of fawns for deer in Southeast Alaska.

II. REVIEW OF PRIOR RESEARCH AND STUDIES IN PROGRESS ON THE PROBLEM OR NEED

Estimates of fecundity derived from fetal counts have been made (Johnson 1987), however, net recruitment may be more a function of fawn survival than birth rate or fecundity (Bartmann et al. 1992). Previous telemetry studies have focused on home range, habitat use, and survivorship of adult and yearling deer (Schoen and Kirchhoff 1985, Yeo and Peek 1992, Farmer et al. 2006, Doerr et al. 2005). Nonetheless, few data are available concerning fawn survivorship and recruitment.

Sources and rates of fawn mortality and the influence of those sources on deer population dynamics likely are strongly linked to habitat quality or composition, and the proximity of the deer population to carrying capacity (*K*) (McCullough 1979, Bartmann et al. 1992, Person et al. 2001, Bowyer et al. 2005). Adult deer can store fat during summer and fall that may enable them to survive winters on relatively poor winter range (Parker et al. 1993). Fawns do not accumulate fat reserves as readily and are, therefore, likely to be more sensitive indicators of habitat quality and composition than adults. In a study of deer survivorship on Heceta Island in Southeast Alaska, shrub/sapling and seral stage second-growth habitat significantly increased the risk of malnutrition for fawns (Farmer et al. 2006). Both habitats result largely from clearcut logging (they may also originate from rare large windstorm events) (Alaback 1982, Kramer et al. 2001), and provide poor habitat for deer (Wallmo and Schoen 1980, Schoen et al. 1988, Hanley et al. 1989). Shrub/sapling habitat consists of coniferous regeneration 3-6 meters high about 20-40 years after logging. Understory vegetation consists mostly of older shrubs that persist in patches where gaps in the forest canopy occur. Interception of snow is poor making forage unavailable to deer in winters with snow. Seral forest occurs 35-40 years post logging and is characterized by a closed coniferous canopy and depauperate understory vegetation. Those conditions persist for the rest of the harvest rotation. That habitat is poor for deer throughout the year because forage is scarce. Nonetheless, shrub/sapling and younger seral forest stands that were pre-commercially thinned at 10-20 years post logging may have levels of forage biomass comparable to young clearcuts and unmanaged old growth forest (Farmer and Kirchhoff 2007). Those stands may provide abundant summer forage for deer under some conditions and enhance recruitment temporarily.

In addition to increasing risks of malnutrition, even-aged forest management may indirectly increase risk from predation. Preliminary data from a study of deer on Prince of Wales Island indicated that predation by black bears was the major source of mortality of neonates and deer <1 year old that were monitored in managed forest landscapes. Schwartz and Franzmann (1991) observed that young seral coniferous stands on the Kenai Peninsula of Alaska had significantly higher densities of black bears than older coniferous stands. Litter sizes of black bears were larger and age at first reproduction younger for sows in the younger seral forest. They also noted that predation by bears on moose calves was 4 times greater in younger forest habitat than in older forest. It follows that young regenerating coniferous stands in Southeast Alaska may promote high densities of black bears and increase risks of predation for fawns. Unfortunately, there are no data comparing densities and ecology of black bears in managed and unmanaged forests in Southeast Alaska.

Some predation of fawns may be compensatory rather than additive mortality. Neonate fawns that are nutritionally stressed and likely to die of disease or starvation may be more vulnerable to predation (Kunkel and Mech 1994). Additionally, some fawns killed by predators likely would not survive their first winter regardless of predation, and thus would not be recruited into the deer population. Mortality from all sources may be largely compensatory as an ungulate population exceeds maximum sustained yield and approaches *K* (McCullough 1979, McCullough 1987, Kie et al. 2003, Bowyer et al.

2005). Nonetheless, compensatory mortality may be significant even in ungulate populations well below *K*. For example, Farmer et al. (2006) reported that annual mortality rate from disease or malnutrition was 0.31 (SD = 0.11, N = 19) for fawns on Heceta Island. Heceta Island has few black bears but does have wolves. Wolf predation accounted for 10.0% (SD = 7%). In contrast, on Prince of Wales Island 55% (SD = 10%, N = 27) of fawns were killed by bears and wolves annually, whereas no fawns died from disease or malnutrition (ADFG unpublished data). Prince of Wales Island has abundant populations of both predators. Total annual mortality of fawns on Heceta (49%, SD = 12%) was not different than total mortality on Prince of Wales Island (65%, SD = 9%) (Z = 1.09, *P* = 0.274), however, the power to detect differences between studies was low. It is critically important to differentiate compensatory from additive mortality before attempting to interpret the effects of predation of fawns on deer population dynamics.

III. APPROACHES USED AND FINDINGS RELATED TO THE OBJECTIVES AND TO PROBLEM OR NEED

Objective 1: Evaluate fawn mortality as a result of malnutrition.

<u>Job/activity 1: Study site inspection, develop thesis proposal, ultrasound training, capture and monitoring of adult and fawn deer.</u>

We completed an initial visit and inspection of potential study sites during late January 2010.

The graduate student, Sophie Gilbert (University of Alaska Fairbanks) partially completed before we went into the field for deer capture in April 2010. She is expected to finish her proposal during FY2011.

Sophie Gilbert obtained ultrasound training from Colorado Division of Fish and Wildlife personnel during March 2010. She handled and scanned >60 deer during a 1-week period.

We captured 21 adult and yearling female deer during April-July 2010. All deer were captured by free-range darting using telemetered darts filled with a combination of Telazol and xylazine. Twelve does were fitted with vaginal implant transmitters and all we placed GPS radio collars on all does. Three animals died during capture, one of bloat during processing, one broke its leg running through a clearcut after darting, and another died of unknown causes 2 days after release. Ten VIT-fitted does gave birth before June 30. We radiocollared fawns from 9 of those does using the VIT to locate birth sites. We also captured neonate fawns opportunistically along roads. Using both methods ,we radiocollared 45 neonate fawns during May29–June 30.

Objective 2: Evaluate Habitat Selection

<u>Job/activity 2a: Monitor and tracking does and fawns.</u>

Adult and yearling does are being monitored for mortality and their GPS collars are programmed to release by July 15 2011. To date, no adults have died. Radio-collared fawns are tracked from the ground and by the end of this reporting period about 200 radio locations were obtained. Fifteen fawns died before June 30 2010, 13 were killed by black bears, 1 was underdeveloped at birth and died shortly thereafter, and 1 drowned in a stream. We will continue monitoring deer and initial data analyses will begin during the next reporting period.

Objective 3: Evaluate black bear predation on fawns is positively related to levels of bear activity or is spatially correlated with habitat composition and distribution.

Job/activity 3: Vegetation sampling and estimating deer and bear activity

We measured habitat and landscape variables associated with birth sites of 19 fawns located using VITs were evaluated, and locations of death for 12 fawns killed by bears. We did transects looking for scats and tracks of wolves and bears at each site to determine relative predator activity. We also deployed 15 arrays of remote temperature and light sensors that will measure depth and duration of snow pack.

IV. MANAGEMENT IMPLICATIONS

Nothing to report under this section. We have only part of one field season completed.

V. SUMMARY OF WORK COMPLETED ON JOBS FOR LAST SEGMENT PERIOD ONLY

JOB/ACTIVITY 1a: Develop thesis proposal and study site inspection with grad student, Ultrasound device training, Deer capture and radio collaring

See section 3, objective 1 above.

JOB/ACTIVITY 2a: Monitoring radio collared deer

See section 3, objective 2 above.

JOB/ACTIVITY3a: Vegetation sampling

See section 3, objective 3 above.

VI. PUBLICATIONS

None

I. RECOMMENDATIONS FOR THIS PROJECT

We are changing our capture schedule for adult and yearling does during FY2011 because preparturient deer did not respond well to fawn calls during April and early May. That made hunting them with dart guns difficult and time consuming. Alternatively, we plan on daring deer in January 2011 when they should still respond to fawn distress calls but they are also pregnant. In addition, earlier fetal development in January will make it easier to se multiple fawns during ultrasound scanning. During late term a large fetus often obscures the other fetus in the womb during the scan. The rest of our project tasks should be implemented as planned

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