

**Alaska Department of Fish and Game
State Wildlife Grant**

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Project Title: Estimating wolf populations in Southeast Alaska using noninvasive DNA sampling

Project Duration: July 1, 2009 – June 30, 2012

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

Report Due to HQ: September 1, 2010

PRINCIPAL INVESTIGATORS: Dr. David Person

WORK LOCATION: Prince of Wales Island and Ketchikan, Alaska

I. PROBLEM OR NEED THAT PROMPTED THIS RESEARCH

Wolves (*Canis lupus ligoni*) are an important component of the fauna of southeastern Alaska (Person et al 1996). They are obligatory predators of ungulates and are mostly dependent on Sitka black-tailed deer (*Odocoileus hemionus Sitkensis*). Habitat changes in Southeast Alaska from logging and road building will have long-term consequences for wolves and their prey. Concerns for the conservation of wolves prompted a petition from the Biodiversity Legal Foundation to list wolves in southeastern Alaska as threatened under the Endangered Species Act in 1994. In 1997, the U.S. Fish and Wildlife Service ruled that the petition was not warranted but acknowledged that concerns about future populations of deer and mortality of wolves were legitimate for some wolf population segments such as those on Prince of Wales Island. Consequently, the U. S. Forest Service included the wolf as a management indicator species within the Tongass National Forest (USFS 1997) and the Alaska Board of Game imposed a harvest guideline for wolves in game management unit 2 (GMU 2), which includes Prince of Wales Island. The harvest guideline specifies that harvest is limited to 30% of the autumn population of wolves in GMU 2 estimated by the Alaska Department of Fish and Game. Thus, monitoring wolf population in GMU 2 is important to both state and federal agencies. During the period when wolf research projects were ongoing in GMU 2, radio collared animals enabled researchers to locate 25-30% of the packs in the unit annually and count their numbers. Reasonable population estimates for the entire unit were extrapolated from those data. Active field research ended in 2004 and current estimates of wolf population are lacking. Clearly, a reliable and cost-effective method to estimate wolf numbers is needed to meet the obligations of monitoring a management indicator species and the requirements of the harvest guideline.

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

Wolves occupy the mainland and most of the islands south of Frederick Sound. They are genetically related to coastal wolves of British Columbia but differ from other inland wolves in Alaska and Canada (Weckworth et al. 2005). Moreover, the population living on Prince of Wales and immediately adjacent islands is isolated from other populations in the region (Weckworth et al. 2005). Person et al. (1996), Person (2001), Person and Russell (2008), and Person and Russell (2009) describe the biology and ecology of wolves in southeastern Alaska and identify the major factors influencing population growth. Conserving habitat for deer and regulating mortality from legal and illegal hunting and trapping are the essential elements for conserving wolf populations (Person et al. 1996, Person and Russell 2008). Those factors are particularly acute on Prince of Wales Island because extensive timber harvest is changing the long-term capacity of the landscape to support deer and roads enable hunters and trappers to harvest wolves over much of the area (Person 2001, Person and Russell 2008).

Over the last decade, DNA-based population estimators have been developed for several species of mammals (Kohn et al. 1999, Mills et al. 2000, Mowat and Strobeck 2000, Sloan et al. 2000, Creel et al. 2007). Samples of DNA can be obtained from feces and hair of target animals, individual animals identified from their DNA signatures, and those data used in robust mark-recapture analyses to estimate populations. The Alaska Department of Fish and Game currently uses DNA-based methods to assess brown bear (*Ursus arctos*) populations in some areas of southeastern Alaska (Flynn et al. 2007). Further, DNA techniques have been used successfully to estimate black bear (*U. americanus*) populations on Kuiu Island (Peacock 2004) and deer population in watersheds on Prince of Wales Island (Brinkman unpublished data).

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

We are conducting a pilot study to determine if DNA extracted from feces can be used to estimate wolf population in a portion of GMU 2. Our objective is to develop a sampling and processing protocol that can be used at large and small scales to estimate wolf population throughout Southeast Alaska. Our proximate goal is to devise a protocol that enables us to estimate wolf numbers in GMU 2 but we intend to generalize the protocol so that it can be used anywhere in the region.

Job/task 1: Collection of wolf scats

We began field work in autumn 2009, however, a medical issue involving a family member of the PI, Dave Person, caused the postponement of most field work until spring 2010. During May and June 2010, we surveyed 12 den sites that were used frequently by 5 different packs on central Prince of Wales Island. We also walked and drove transects within 4 sampling areas that we designated in our project plan proposal. We located very few (<25) wolf scats of which only 8 were sufficiently fresh for collection and preservation in alcohol. Wolf activity appears to be very low within the study area. Samples were preserved in 95% ethanol and were shipped to Dr. Hundertmark's genetics laboratory at the University of Alaska Fairbanks for DNA extraction and genotyping.

IV. MANAGEMENT IMPLICATIONS

This project is still in its initial phase and it is premature to suggest any management implications except that wolf population in GMU 2 may be low compared to previous years. If that is the case, the importance of this work increases.

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

JOB/ACTIVITY 1: Collection of wolf fecal samples

Accomplishments: We began field work in autumn 2009, however, a medical issue involving a family member of the PI, Dave Person, caused the postponement of most field work until spring 2010. During May and June 2010, we surveyed 12 den sites that were used frequently by 5 different packs on central Prince of Wales Island. We also walked and drove transects within 4 sampling areas that we designated in our project plan proposal. We located very few (<25) wolf scats of which only 8 were sufficiently fresh for collection and preservation in alcohol. Wolf activity appears to be very low within the study area.

JOB/ACTIVITY 2: DNA extraction and genotyping

Accomplishments: Samples collected in may and June were preserved in 95% ethanol and shipped to Dr. Hundertmark's genetics laboratory at the University of Alaska Fairbanks for DNA extraction and genotyping during summer 2010. Extraction and analysis were not done within the reporting period.

VI. PUBLICATIONS

None during this reporting period.

I. RECOMMENDATIONS FOR THIS PROJECT

We recommend that the project continue as planned with an extensive sampling period during autumn 2010. At that time, wolf population should be at an annual maximum and we should be able to locate fresh scats. However, population may be low relative to previous years and we may not obtain as many scats as planned.

Prepared by: Dr. David Person

Date: 8/24/2010