

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

Grant Number: W-33-11

Project Number: 1.68

Project Title: Factors affecting moose forage quality and subsequent reproductive success.

Project Duration: 1 July 2009 to 30 June 2014

Report Due Date: 1 September 2013.

Partner:

PRINCIPAL INVESTIGATOR: William B. Collins

COOPERATORS:

WORK LOCATION: Matanuska Research Farm, Togiak Valley, Colville River, Nelchina Basin, Game Management Unit 15

I. PROGRESS ON PROJECT OBJECTIVES DURING LAST SEGMENT

OBJECTIVE 1: Nitrogen as a potentially limiting nutrient to moose. We have made steady progress in measuring digestible protein across a variety of moose ranges in Alaska. During this period, we completed the last forage collection of this project and we have analyzed all of the samples for nitrogen and most for tannins.

In summer 2013, we extended our sampling of forages in the Nushagak and Togiak drainages to determine the effects of insect defoliation on forage nitrogen and protein binding. Recent large scale defoliations of browse species in those areas have caused local citizens and biologists to become concerned about the effects of defoliation on moose nutrition. Given that our prior sampling of forage quality, 2009 through 2012, gives us a solid baseline for comparison, we concluded that with relatively little additional effort, we can assess the effect of current defoliation on forage quality. We are collaborating with Togiak National Wildlife Refuge biologists in this effort.

OBJECTIVE 2: Effects of climate and utilization on browse quality. We established a set of controlled experiments which will enable us to begin assessing the effects of soil temperature, soil fertility, soil moisture, and solar radiation on the productivity and quality of two important willow forages—an upland species, *Salix pulchra*, and a riparian species, *Salix alaxensis*. We cloned 128 plants of each species and subjected them to all 4 treatments for this period.

We analyzed these treatments for nitrogen, determining that soil fertility has the greatest effect on forage nitrogen, followed by solar radiation, followed by soil moisture. Given these results, we have begun determining availability of nitrogen in water and soils of different river systems where we have observed significant differences in forage nitrogen.

We still need to complete tannin analyses for forages in each of the treatments.

OBJECTIVE 3: Hormonal link between diet quality and reproductive performance. We completed analyses of the effects of nutrition on production of ghrelin, leptin, and corticosterone, which in turn, affect the production of progesterone and reproductive performance. We summarized the results and began preparing a manuscript for publication.

II. SUMMARY OF WORK COMPLETED ON JOBS IDENTIFIED IN ANNUAL PLAN THIS PERIOD

JOB/ACTIVITY 1: Moose forage nitrogen and protein binding

We completed the nitrogen analyses of forage samples from each of our study areas, and we are now working toward completion of the tannin analyses.

JOB/ACTIVITY 2: Diets by fecal alkane analysis

We continued preparation of a manuscript for publication regarding analysis of moose diets by the fecal alkane technique.

JOB/ACTIVITY 3: Climate/utilization effects—potted willows

Treatments have been maintained during the 2013 growing season without problems of root competition with other plants. We lost some plants in the high soil fertility treatment..

JOB/ACTIVITY 4: Hormonal link

We continued preparation of a manuscript.

JOB/ACTIVITY 5: Forage availability by remote sensing

Two manuscripts based on remote sensing of Nelchina and Placer Valley habitats have passed through peer review and one has been accepted for publication.

III. COSTS INCURRED DURING THIS SEGMENT

75% federal, 25% state.

IV. SIGNIFICANT DEVIATIONS AND/OR ADDITIONAL FEDERAL AID-FUNDED WORK NOT DESCRIBED ABOVE THAT WAS ACCOMPLISHED ON THIS PROJECT DURING THIS SEGMENT PERIOD

V. PUBLICATIONS

Walton, K., D. Spalinger, N. Harris, and W. Collins. In press. High Spatial Resolution Vegetation Mapping of Wildlife Habitat.

VI. RECOMMENDATIONS FOR THIS PROJECT

Continue as planned

Prepared by: William B. Collins

Date: 28 August 2013