FEDERAL AID ANNUAL RESEARCH PERFORMANCE REPORT

ALASKA DEPARTMENT OF FISH AND GAME
DIVISION OF WILDLIFE CONSERVATION
PO Box 115526
Juneau, AK 99811-5526

PROJECT TITLE: Habitat evaluation techniques for moose management in Interior Alaska

PRINCIPAL INVESTIGATORS: Thomas F. Paragi and Kalin A. Kellie

COOPERATORS: Terry Chapin, Jennifer Schmidt, Dana Thomas (University of Alaska Fairbanks); Rick McClure (National Resources Conservation Service); Jay Ver Hoef (National Marine Fisheries Service); and Matthew Sturm (U.S. Army, Cold Regions Research and Engineering Laboratory)

FEDERAL AID GRANT PROGRAM: Wildlife Restoration

GRANT AND SEGMENT NO. W-33-7

PROJECT NO. 5.20

WORK LOCATION: Interior Alaska (Region III)

STATE: Alaska

PERIOD: 1 July 2008–30 June 2009

I. PROGRESS ON PROJECT OBJECTIVES SINCE PROJECT INCEPTION

OBJECTIVE 1: Develop a spatial model of winter habitat occupancy by moose to quantify the area to which density estimates should be extrapolated when setting population objectives for intensive management.

In 2008 we downloaded the National Land Cover Database for Alaska to provide options for interim analysis until the LANDFIRE classification was completed. We reviewed scientific literature, discussed sampling design with biometricians and snow specialists, and acquired 580 snow depth measurements. We began assembling historic data on moose locations in winter that included GPS locations for individual moose. Data were obtained during recent late winter surveys in Units 19A and 21E (2000, 2001, and 2005) and winter telemetry in eastern Unit 19D (2001–2008). We also reviewed scientific literature on the construction of a spatial model of winter range use by moose. We continued to obtain literature on the job topic. During April 2008 we acquired snow depth data at several spatial scales (Job 1b) and examined options for modeling moose winter habitat after observations made during the moose survey in GMU 19A (Job 1c).

OBJECTIVE 2: Improve understanding of the relationship between proportional removal of browse production and moose twinning rate in the boreal forest of Interior Alaska to gauge the utility of browse removal as an alternative index to when nutritional condition of moose hinders productivity.

Various electronic files of moose survey data back to 1970 were compiled into a single spreadsheet for several game management units in the Interior as a starting point. We

coordinated with the facility manager at our regional office to obtain use of a heated storage room as an archive facility and set up shelving units and a map cabinet for organizing hard copies of data previously stored at various locations. We also began collaborating for mutual benefit with a UAF professor (Chapin) and post-doctoral student (Schmidt) who are forecasting the effect of climate change on ecosystem services (which requires reconstructing historic spatial trends), including provision of moose meat in the boreal forest. Initial archive efforts were focused on GMUs 25D, 21D, and 20A that represent low, moderate, and high moose density, respectively. We created an electronic archival database, and a temporary student employee began logging entries.

Galena staff conducted twinning surveys in Unit 24B during 27–31 May 2008.

OBJECTIVE 3: Create an archive of moose survey and harvest information to permit spatial analysis of population and harvest trends.

In 2008 we compiled electronic files of moose survey data, secured warm storage for an archive, and assisted a post-doctoral student (J. Schmidt) and temporary student employee with obtaining hard copies of moose data for adding to the electronic database.

OBJECTIVE 4: Write annual progress reports, a research interim technical report in FY10, and a final technical report. Give presentations at scientific forums, particularly in Alaska. Publish results in peer-reviewed journals for jobs where results have utility outside Region III.

Kellie wrote a memo describing preliminary results of the 2008 snow survey.

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

JOB/ACTIVITY 1A: Define the proportion of each game management unit in Region III that contains vegetated cover for year-round moose habitat, and define the proportion of each unit that contains browse-producing species for winter range.

Paragi downloaded the preliminary release of the LANDFIRE classification and began comparing correspondence with earlier classifications of land cover from the National Land Cover Database and the Ducks Unlimited classification for portions of Interior Alaska in selected units.

JOB/ACTIVITY 1B: Conduct sampling of snow accumulation at the landscape scale to predict snow depth.

McGrath area staff recorded snow depth at the start each month (Nov–Apr) at 8 snow stakes in Units 19A and 19D. We also worked with cooperators to download a calculated snow depth from the North American Regional Reanalysis (NARR; National Oceanic and Atmospheric Administration) on a 32 km × 32 km grid across Alaska from 1979–2008. Kellie transformed, georeferenced, and archived the data in a GIS raster format. Kellie prepared a memo evaluating the limitations of the NARR data for our purposes of modeling habitat use by moose and presented the results to staff during the regional meeting.

JOB/ACTIVITY 1C: Estimate winter habitat use by moose with respect to snow depth.

McGrath area staff provided GPS locations of moose observed during a Unit 21E population estimate in March.

JOB/ACTIVITY 1D: Construct a spatial model of winter range use by moose.

In 2009 we assembled a database of habitat characteristics at winter moose locations in eastern Unit 19D (2001–2008). These data will be analyzed in cooperation with a Division of Wildlife Conservation biometrician (B. Taras) and University of Alaska Fairbanks (UAF) faculty member (D. Thomas) for habitat selection changes with snow depth.

JOB/ACTIVITY 2A: Estimate browse production (kg/ha) and proportional removal.

We completed moose browse surveys in Units 19D and 20A (see also Objective 5) and facilitated UAF students with conducting a preliminary browse survey in the Fairbanks Management Area of Unit 20B. Paragi began analysis of biomass removal and drafting memos for individual surveys.

JOB/ACTIVITY 2B: Conduct moose twinning surveys in browse surveys areas.

The assistant area biologist for Galena conducted twinning surveys in Unit 24B on 30–31 May.

JOB/ACTIVITY 3A*:* Collate historic moose survey and harvest/sealing records for moose, bears, and wolves as attributes of an associated spatial extent for electronic storage, analysis, and display.

We continued to advise post-doctoral student J. Schmidt and Master's student C. Carroll on the application of long-term moose survey data. J. Schmidt continued archiving historic data on trend counts and population estimates for moose in Units 20A, 20D, and 25D and began comparison of moose data to fire history in Unit 20A.

JOB/ACTIVITY 4A*:* Write annual progress reports, a research interim technical report in fiscal year 2010, and a final technical report. Give presentations at scientific forums, particularly in Alaska. Publish results in peer-reviewed journals for jobs where results have utility outside Region III.

We wrote the annual progress report and prepared a budget request and annual work plan for fiscal year 2010.

JOB/ACTIVITY 5A: Conduct an experimental burn by aerial ignition of fine fuels in spring to evaluate the vegetative response in current annual growth.

Paragi did an aerial reconnaissance of potential burn sites in Unit 20A in September and assisted with writing a burn plan that was approved by the Alaska Department of Natural Resources, Division of Forestry (DOF) in May. We conducted a pretreatment browse survey in late March and early April (Job 2a), and Paragi visited the proposed burn areas in May with a DOF fire specialist. The burn prescription (weather conditions and fuel moisture) was met periodically during 15 May–15 June, but the burn did not occur because fire specialists or equipment were not available on some dates (competition with wildland fire suppression), military airspace was restricted other dates, and another prescribed burn of higher priority occurred.

III. ADDITIONAL FEDERAL AID-FUNDED WORK NOT DESCRIBED ABOVE THAT WAS ACCOMPLISHED ON THIS PROJECT DURING THIS SEGMENT PERIOD

Paragi organized a 1-day multi-agency workshop in January with a snow measurement specialist from the U.S. Army to discuss issues of sampling scale and frequency and demonstrate field techniques for measuring snow characteristics. Paragi assisted with a Division of Wildlife Conservation browse survey in Unit 26A in April and analyzed browse data collected in Unit 21D (2006) and Unit 20A (2007) as part of a cooperative project by a former employee whose graduate project had been terminated because of illness.

IV. PUBLICATIONS

None.

LITERATURE CITED:

Kellie, K.A., and R.A. DeLong. 2006. Geospatial survey operations manual. Alaska Department of Fish and Game. Fairbanks, Alaska, USA. <http://winfonet.alaska.gov/sandi/moose/surveys/documents/GSPEOperationsManual.pdf> Accessed 14 Aug 2009.

Paragi, T.F., C.T. Seaton, and K.A. Kellie. 2008. Identifying and evaluating techniques for wildlife habitat management in Interior Alaska: moose range assessment. Alaska Department of Fish and Game. Federal Aid in Wildlife Restoration. Final Research Technical Report. Grants W-33-4 through W-33-7. Project 5.10. Juneau, Alaska, USA. <http://www.wildlife.alaska.gov/pubs/techpubs/research_pdfs/hab-mgt08final.pdf> Accessed 14 Aug 2009.

Seaton, C. T. 2002. Winter foraging ecology of moose in the Tanana Flats and Alaska Range Foothills. Thesis, University of Alaska Fairbanks, USA. <http://www.birding.alaska.gov/pubs/techpubs/propubs/seaton_thesis.pdf> Accessed 14 Aug 2009.

V. RECOMMENDATIONS FOR THIS PROJECT

Objective 1 was conceived with the intention of delimiting winter range in Interior Alaska by vegetation types (presumed relationship to browse production) and snow depths useable by moose (i.e., not limited functionally by depth of snow). LANDFIRE contains 6 upland classification schemes that are consistent statewide with some type descriptions that include willows. However, accuracy validation of these classes has not yet occurred by the sponsoring agencies, and forage production estimates for summer or winter forage among these types are lacking. Thus, presently we can only use LANDFIRE to describe the amount of vegetated landscape in a designated area but not infer forage availability. Browse surveys have documented the highest production on tall shrub sites (Paragi et al. 2008, Appendix C), but these surveys included only sites that contain preferred forage species (Seaton 2002), thus would vastly overestimate production on all tall shrub sites on the landscape because many tall shrub classes contain little or no moose browse (e.g., dominated by dwarf birch or alder).

Our review of available snow depth data and existing models of snow depth, combined with our field research to measure the spatial correlation of snow depth at various scales, indicates that we presently lack the measurement resolution to predict snow depth accurately at a spatial scale useful for moose management in the Interior. Based on the preliminary correlations we found for snow depth at various spatial scales in our 2008 fieldwork, we recommended that prediction of snow depth for moose management be done at a coarse scale (e.g., GMU, subunit, or moose management area). Unfortunately, the spatial model we examined for snow depth based on composite weather (NARR) was inaccurate in the deep snow areas of Interior Alaska where snow is most likely to influence population trends of moose. We intend to make recommendations for monitoring snow in strategic areas of the Interior to better document winter conditions where they may affect population trends.

McGrath area staff noted that monthly flights to read snow stakes from aircraft were beneficial in providing opportunity to observe distribution of moose and other species important to management programs and in maintaining public contact in villages. They identified sites for up to 10 additional stakes with emphasis in Unit 21E in support of upcoming moose research and management projects in an area where snow is usually deep but few snow depths are measured. They also noted potential sites where local residents may be involved in collecting snow depth to augment information from snow stakes observed from aircraft.

Interim products from this research could benefit management decisions. First, the LANDFIRE classification can be used to compare extent of vegetated areas among units or portions of units where intensive management programs may be considered. Second, LANDFIRE may be useful in stratification of sample units for geospatial population estimator surveys (Kellie and DeLong 2006) and to estimate sightability correction factors where overhead cover influences the proportion of moose observed from aircraft (Project 1.66). Third, information on snow depth may allow interpretation of moose population trends in Unit 19D, where other researchers have documented calf survival over several winters of differing snow depth (Project 1.62; M. Keech, ADF&G, personal communication). Finally, imagery-based delineation of winter habitat will be evaluated for Unit 19D from vegetated cover types, McGrath average snow depth, and winter habitat selection by moose (telemetry data, 2001–2008). The habitat selection model will then be evaluated for application to a larger landscape using winter moose locations from Units 19A and 21E (GPS locations of unmarked animals during 2 Feb surveys in each subunit, 2000–2005). The modeling objectives are 1) to evaluate our ability to predict winter moose range at a landscape scale, and 2) to define the appropriate scale for modeling habitat selection in contrasting snow conditions (shallow and deep snow).

VI. APPENDICES

None.

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