Alaska Department of Fish and Game
Wildlife Restoration Grant

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PROJECT NO.: 1.75

PROJECT TITLE: Creating a server application and user manuals for browse plot data

PERIOD: 1 July 2014–30 June 2016

PRINCIPAL INVESTIGATORS: Thomas F. Paragi, Robert A. DeLong, and C. Tom Seaton

WORK LOCATION: Interior Alaska

I.   PROBLEM OR NEED THAT PROMPTED THIS RESEARCH

Monitoring nutritional condition of moose (*Alces americanus*) through population-level indicators such as twinning rate is important for detecting density-dependent negative feedback on productivity at higher densities (Boertje et al. 2007). Proportional offtake of current annual growth on browse species utilized by moose has been shown to be inversely correlated to twinning rate (Seaton et al. 2011), yet browse offtake is more time sensitive than twinning rate to short-term increases or decreases in moose density (Paragi et al. 2015). The technique of estimating browse offtake developed in Interior Alaska by Seaton (2002) is being used now in other regions of Alaska and by other agencies and is likely to be used further by managers and researchers in Region III. Better documentation of operational details is warranted for data handling and archive that will also enable meta-analysis of all surveys for broader ecological and management questions. An online utility would provide an easier batch process for new users, including those outside of ADF&G (with access restrictions).

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

During 2000-2013, Division of Wildlife Conservation (DWC) staff in Region III conducted 24 moose browse surveys in late winter (Paragi et al. 2008, Paragi and Seaton 2013). Survey data consisting of stem counts by browse plant species in plots and derived estimates of current annual production and removal by moose for estimating proportional removal (Seaton 2002). The steps for handling browse data are already automated. An Access database with an entry screen that matches the field form layout is used for storage. R software code can read the Access database, calculate parameters, and produce standard outputs in Excel for graphing various parameters (Paragi et al.

2008). However, presently each browse survey is a stand-alone project of Access and Excel files, GIS shapefiles, plot images, and other information. We envisioned an automated application for data input, calculations, and archive with associated user manuals similar to those developed for moose surveys (DeLong 2006, Kellie and DeLong 2006).

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

The task was to incorporate calculation functions of the original project into the DWC enterprise data management environment (WinfoNet) that provides staff with internal online access to applications and documents. Substantial work was completed within the fiscal year, but due to unforeseen delays, the project was not completed in its entirety. We first analyzed elements of the browse survey data structures and data management workflow in the existing Microsoft Access browse database. New data structures were implemented into the Microsoft SQL Server database environment within DWC. These SQL server data structures serve as the primary data store for browse survey data. Systems analysis and planning was completed for incorporating the data management workflow (data entry, data export, summary reports, data security models, etc.) into the WinfoNet Fusebox framework using existing state and DWC information technology standards. The R statistical server environment was migrated to a new server and supporting software was upgraded to accommodate the anticipated additional computational requirements associated with this project. Provisions were made to incorporate the R code currently used for statistical analysis of the browse survey data into the updated R statistical server environment. The MS Access data entry tool was redesigned to make the data structures consistent with corresponding data structures in MS SQL Server. The MS Access structures and forms serve as the primary data entry mechanism with provision for upload of those data into SQL server for statistical analysis and long term storage. Analytical results were designed to return to the WinfoNet user in the form of parameter display and downloadable results files. Some tools, such as the moose survey software, allow access for defined purposes (data upload, calculations, results download) by external parties that have permission limited to their data or geographic areas per the DWC administrator (R. DeLong). Similar security mechanisms were designed for the browse survey software to limit access to data and survey results on a survey by survey basis. We drafted a user manual to provide a concise source of sampling and data collection methods and document the data management and analysis procedures provided through the WinfoNet application. We will continue final development and testing of the WinfoNet tool with new data collected through spring 2017 before releasing the tool for general use.

IV. MANAGEMENT IMPLICATIONS

This online tool and the associated manuals will facilitate use of the Seaton (2002) browse technique by agency staff and external users and archive the information in a maintained server system.

V.   SUMMARY OF WORK COMPLETED ON JOBS IDENTIFIED IN ANNUAL PLAN FOR LAST SEGMENT PERIOD ONLY

Aside from brief prior discussions, all the work on this project occurred in this reporting segment.

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

None.

VII. PUBLICATIONS

Paragi, T.F., R.A. Delong, and C.T. Seaton. Browse survey operations manual and software user's guide (draft).

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VIII.   RESEARCH EVALUATION AND RECOMMENDATIONS

Now that the browse data are in a single SQL database, queries can be done to permit analyses on the full set of browse surveys conducted to date for several questions. Applications could include spatial validation of vegetative classifications, examination of twig metric relationships among different vegetation communities and moose densities, and sensitivity analysis of production and removal estimates using species mass-diameter relationships from different areas.

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