FEDERAL AID ANNUAL
RESEARCH PERFORMANCE REPORT

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

Alaska Department of Fish and Game
Wildlife Restoration Grant

GRANT NUMBER: W-33   **SEGMENT NUMBER:** 11

PROJECT NUMBER: 7.01

PROJECT TITLE: Develop and evaluate indices for assessing marten population status and trend in Interior Alaska

PROJECT DURATION: 1 July 2010–30 June 2014

REPORT DUE DATE: 1 September 2013

PARTNER: None

PRINCIPAL INVESTIGATORS: Craig L. Gardner, ADF&G; Co-investigator: Nathan J. Pamperin, ADF&G

COOPERATOR: Knut Kielland, University of Alaska Fairbanks

WORK LOCATION: Game Management Units 12, 19D, 20, 25B, and 25C

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I. **SUMMARY OF WORK COMPLETED THIS SEGMENT ON JOBS IDENTIFIED IN ANNUAL WORK PLAN**

OBJECTIVE 1: Determine the value of monitoring gender, young of year:adult female (YOY:AdF) ratios, diet and fecundity (pregnancy rate and blastocysts counts) of harvested marten to predict marten population status and composition for use by trappers to manage their traplines.

During FY11, FY12, and FY13, we necropsied 308, 1,183, and 802 marten carcasses, respectively. Five trappers from 4 areas contributed the FY11 sample; 17 trappers from 9 areas, the FY12 sample; and 11 trappers from 8 areas, the FY13 sample. For each carcass, we determined gender:age class (adult or young of year [YOY] based on skull characteristics); pregnancy by the presence of blastocysts in the uterine horns; and collected muscle, hair, and claw samples to determine seasonal diets using stable isotope analyses. We also extracted a lower fourth premolar from adult females for more exact age determination using cementum annuli. Stable isotope analyses were conducted by our cooperator Knut Kielland and associates at the University of Alaska Fairbanks. During FY12 we identified a reproductive failure that occurred across the Interior by examining the sex and age composition of the carcass sample. These data allowed us to quickly recommend to trappers how to proceed to best manage marten populations in their area

during the remainder of that trapping season and during FY13. Preliminary findings indicate that the best forecast variable for predicting a given year's marten abundance is pregnancy rate in the previous year. However, there can be disconnects between pregnancy and juvenile and overall marten numbers due to poor juvenile survival during spring and summer. The best in-season check appears to be percentage of adult males in the harvest. Since adult males are vulnerable to harvest throughout the season and juveniles are most vulnerable early on, early season harvest composition of ≥40% adult males will clearly indicate poor productivity and low marten numbers that year. We are conducting additional analyses to determine if there are multiple factors that can be used to develop a more accurate forecast of marten numbers in a given trapping season. We compared diet in marten between years, and found that during a year of low productivity (FY12) marten diets were dominated by squirrels when compared to more productive years (FY08 and FY10) when voles dominated the diet. Marten are dietary generalists but population declines have been documented following synchronous declines of rodents (Thompson and Colgan 1987, Flynn and Schumacher 2009). We will continue to evaluate diet for all sample areas over all of the sample years.

JOB/ACTIVITY 1A: <u>Literature review</u>.

Federal funds were used to cover salary when conducting literature reviews on a monthly basis. Literature searches were conducted for information on marten population dynamics, productivity, and food habits and on stable isotope analyses for mammals. Several publications were obtained through these searches which will be useful in interpreting the results of this study.

JOB/ACTIVITY 2: <u>Necropsy marten carcasses</u>.

Federal funds were used to pay salaries associated with collecting and necropsying marten carcasses. During FY13, 802 marten carcasses collected from 11 trappers in 8 areas in Interior Alaska were necropsied. Fewer samples were received from fewer trappers this year, because the number of trappers actively trapping marten declined due to low marten numbers. Overall, the YOY/AdF ratio was 2.1, pregnancy rate for ≥1-year-old females was 71.9%, the average number of blastocysts/pregnant female was 2.3, percent adult male in the harvest was 40.5%. The YOY/AdF ratios was below the recommended minimum of 3.0 YOY/Ad (Strickland and Douglas 1987); however, this ratio varied substantially across the Interior. In the western portion, the YOY:AdF ratio was 4.3 compared to the eastern and northern portions of 0.9 and 1.0, respectively. Further, pregnancy rates were higher in western Interior indicating the marten numbers will be higher next year.

JOB/ACTIVITY 3: <u>Age structure of harvest</u>.

A premolar from each harvested female ≥1-year-old was collected to determine age structure of the harvest. Federal funds were used to pay for salary associated with extracting and preparing teeth for aging. Tooth samples will be sent to Matson's Laboratory, LLC (Milltown, Montana) for aging. No federal funds were spent for aging this year. Instead, a larger sample will be sent next fiscal year to reduce costs because the lab offers a discount for processing larger samples.

JOB/ACTIVITY 4: <u>Stable isotope analyses</u>.

A muscle, claw, and hair sample from each harvested female ≥1-year-old was collected and used in stable isotope analyses to determine seasonal diets for FY12. Federal funds were used to pay for salary associated with this task and for the contracted work by the University of Alaska laboratory to conduct stable isotope analyses on samples from 156 adult female marten. Results are pending.

JOB/ACTIVITY 5E: <u>Data analysis and reporting</u>.

A paper on preliminary findings of this study was presented at the Alaska Chapter of *The Wildlife Society* meeting in April 2013 (abstract included in publications section). A report distributed to Interior area biologists and contributing trappers summarized the FY13 necropsy results. Salary associated with these tasks was funded by federal aid.

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

None.

III. PUBLICATIONS

Following is an abstract of a talk presented at the Alaska Chapter of *The Wildlife Society* meeting in April 2013.

Relationships between diet, fecundity, and population abundance and composition in American Marten in Interior Alaska

CRAIG L. GARDNER AND NATHAN J. PAMPERIN, Alaska Department of Fish and Game, 1300 College Road, Fairbanks, AK 99701-1551

Abstract: American marten (*Martes americana*) are the most valuable and harvested furbearer species in Interior Alaska. Marten abundance can vary greatly between years due to food availability, habitat changes, density dependent effects and overharvest. Mostly, due to expansive wilderness and relatively dispersed trapping patterns in the Interior, there are rarely any region wide management concerns. However, marten numbers can decline to low levels and depending on the fur market, the ability to forecast population trends becomes more important to managers and individual trappers. Little research has been conducted to identify indices to assess marten population status prior to, or during the trapping season. In Southeast Alaska, Flynn and Schumacher (2009) found that marten pregnancy rates were correlated with rodent abundance and there was a strong relationship between fecundity the previous year and current year numbers and mean age of harvested marten. We initiated a study to evaluate if monitoring gender, juvenile:adult female ratios, diet and fecundity (pregnancy rate and blastocysts counts) of harvested marten were useful in predicting marten population status and composition. During 2011 and 2012, we necropsied 308 and 1,183 marten carcasses from 4 and 11 areas, respectively across the Interior and evaluated pregnancy rates and juvenile:adult female ratios. Dietary data analyses are pending. These data were adequate to identify the status of marten populations across the Interior and be used by trappers to structure their

trapping efforts. We recommended trappers to cease their trapping efforts early during winter 2011–2012 and further reduce harvest this season (2012–2013).

Literature Cited:

FLYNN, R. W., AND T. V. SCHUMACHER. 2009. Temporal changes in population dynamics of American martens. Journal of Wildlife Management 73:1269–1281.

STRICKLAND, M. A., AND C. W. DOUGLAS. 1987. Marten. Pages 530–546 *in* M. Novak, J. A. Baker, M. E. Obard, and B. Malloch, editors. Wild Furbearer Management and Conservation in North America. Ontario Trappers Association, North Bay, Ontario, Canada.

THOMPSON, I. D., AND P. W. COLGAN. 1987. Numerical responses of martens to a food shortage in Northcentral Ontario. Journal Wildlife Management 51:824–835

IV.   RECOMMENDATIONS FOR THIS PROJECT

None.

PREPARED BY: Craig L. Gardner, ADF&G

DATE: 6 August 2013