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: AKW-B-R3-2020

PROJECT NUMBER: P36.0

PROJECT TITLE: Evaluation of intensive management programs in Alaska during harvest regulatory years 2003-2016

PERIOD OF PERFORMANCE: July 1, 2016 - June 30, 2021 (extended 2 years)

PERFORMANCE YEAR: July 1, 2019 - June 30, 2020

REPORT DUE DATE: Regional Supervisor 21 August; Federal Aid Coordinator 28 August 2020

PRINCIPAL INVESTIGATOR: Thomas F. Paragi

COOPERATORS: Adam Craig, Graham Frye, John Merickel, Jen Roach, John Skinner

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Authorities: 2 CFR 200.328
2 CFR 200.301
50 CFR 80.90

I. PROGRESS ON PROJECT OBJECTIVES DURING PERFORMANCE YEAR

OBJECTIVE 1: Describe time series of biological, environmental (e.g., weather, fire, habitat), and harvest parameters of prey and predators for each Intensive Management (IM) program using available data from when the first abundance estimates were reported in consistent presentation formats that incorporate estimates of variance when statistically-based sampling occurred.

ACCOMPLISHMENTS: Completed. To aid modeling efforts described below, data previously compiled at the scale of game management unit (GMU) was further summarized for moose survey boundaries in active IM areas and adjacent areas that did not have predator control. We also compiled predator take by method at the scale of active IM areas to understand the relative contribution of harvest and control. The latter was done to standardize comparisons because IM areas differed as to their proportion of a GMU and the size of the active predator control area often varied over time within the authorized boundary of IM areas.

OBJECTIVE (2): Where results from Objective 1 are sufficient, estimate trend in parameters (e.g., abundance, recruitment indexed from calves per cow) for those years available before and after implementation of IM for each IM program to discern whether trends changed in the intended or forecasted direction following implementation.

ACCOMPLISHMENTS: Completed. Merickel finished calculating abundance trend and plotting fall calf ratios or proportions for caribou and moose abundance in IM areas. Abundance trends were estimated within 3 time periods, the latter 2 unique to each IM area during Regulatory Years (RYs) 1983-2018: before 1994 IM law, after IM law but before active wolf control, and after active wolf control began under IM.

OBJECTIVE (3): Describe reported harvest of caribou and moose and reported take of black bears, brown bears, and wolves statewide by game management unit (GMU) as a context for interpreting caribou and moose harvest and trends statewide and the relative contribution from IM programs.

ACCOMPLISHMENTS: Completed. To prepare data for per capita calculations, we used multiple fields (name, license number, etc.) in each record to estimate unique hunters in a RY because 1 person might have >1 permit or may harvest >1 animal depending on species. Skinner performed SQL queries on hide sealing records for predators to discern method of take. Over much of the state in 2009 black bears went from hide sealing by a department agent to hunters self-reporting on a harvest ticket, so we queried both harvest and sealing records for 2009-2018 and used the greater tally for a hunter.

To aid spatial correspondence for our analyses, Roach used a geographic information system to estimate the proportion of polygons for coding the approximate reported location of game harvest (Uniform Coding Units) that fall within identified boundaries. Proportional UCU is multiplied by reported harvest in a UCU to approximate harvest within boundaries smaller than GMUs. These boundaries included active predator control areas, prescribed burns, moose survey areas, and national parks and wildlife refuges that sometimes have additional management constraints compared with other lands.

OBJECTIVE (4) Estimate caribou and moose hunting effort and kill per unit effort from GMUs along the road and ferry system to discern spatial shifts before and during IM programs and the effects of regulatory changes on harvest.

Skinner and Paragi conducted preliminary model selection for estimating harvest rate and days hunted before killing a moose as response metrics of hunter benefit. The modeling domain includes statewide harvest of moose by GMU (68 with reported harvest) during RYs 1983-2018 for temporal context of before and after predator control under IM that first began in 2003. We focused on moose because the species occurs in all 5 management regions, its population trends within GMU are often less dynamic and more precisely estimated than for caribou, and we judged harvest reporting to be more consistent than across caribou herds. In lieu of study designs that would permit establishing causation from treatments, we developed post hoc models of harvest that control for predator take, time after initiation of active wolf control (proxy for IM lag effect), and hunter access based on amount of rivers and roads/trails in grossly categorized

moose habitat (excluding barren ground, open water, tundra, etc.). To increase resolution of the time factor (RY), Paragi drafted a coding structure that is being reviewed by managers to characterize the plausible effect of regulations (hunting opportunity) on moose harvest.

II. SUMMARY OF WORK COMPLETED ON PROJECT TO DATE

Data compilation and exploratory analyses to understand data properties have been completed and posted on an internal server as a staff resource. Case study compilations of data trends were drafted for area biologist review. We updated a comparison of red meat inputs to Alaska from big game, Alaska-grown meat, and imported meat during 2000-2016 to provide context for contribution of the wild food supply.

To better understand spatial patterns in the moose harvest system, we divided moose harvest by human population among community groups across Alaska (U.S. Census data) to assess trends and inter-annual variation in per capita harvest during 1990-2018 for context on its contribution to wild food supply (Fall and Kostick 2018, ADF&G 2019). We also tested algorithms to generate annual maps of moose harvest during 1983-2018 from the perspective of communities (showing GMUs where harvest by a community occurred) or from the perspective of subunits (amount of harvest by community from a GMU). Neither approach can directly discern specific contribution of IM areas to moose harvest, but they illustrate dynamics at scales and perspectives that enable broader context of wild food supply for communities.

III. SIGNIFICANT DEVELOPMENT REPORTS AND/OR AMENDMENTS.

Because data compilation and exploratory analysis took longer than expected, we extended the harvest data analysis through RY 2018 (30 June 2019) and biological data analysis to include surveys through fall 2019.

Travel was greatly restricted due to Covid-19 related circumstances.

IV. PUBLICATIONS

None. Paragi gave 4 presentations of data summaries and preliminary analyses to staff (2 on video conference statewide, 1 each at Regions 3 and 4 staff meetings) for feedback and to identify additional research questions or data limitations.

V. RECOMMENDATIONS FOR THIS PROJECT

We extended the project a 2nd year to complete modeling of moose abundance response in IM areas and moose harvest statewide. We will complete evaluation of moose abundance and harvest within large prescribed burns.

We will begin model selection for response in moose abundance while controlling for moose harvest, predator removal, fire history (burns often improve forage, thus fitness), snow depth (deep snow reduces fitness), and lag time after beginning of predator control. In this post hoc approach we defined for each IM program ≥1 moose survey area (GeoSpatial Population

Estimator boundary) and identified ≥1 nearby GSPE area where several surveys occurred in the same approximate area, in most instances beginning prior to active predator control.

Both the harvest and abundance models for moose will be reviewed with staff to see if preliminary results are instructive or alternative approaches are feasible or warranted.

Preparation of the technical bulletin will continue along with staff consultation on outreach messages and presentation formats.

Prepared by: Thomas F. Paragi

Date: 20 August 2020

Literature cited

ADF&G. 2019. Estimated harvests of fish, wildlife, and wild plant resources by Alaska region and Census areas, 2017. Alaska Department of Fish and Game, Division of Subsistence.

Fall, J.A., and M.L. Kostick. 2018. Food security and wild resource harvests in Alaska. Alaska Department of Fish and Game, Division of Subsistence.

Paragi, T.F., S.C. Gerlach, and A.M. Meadow. 2010. Security of the red meat supply in Alaska. Agroborealis 41:36-37.