


Alaska Department of Fish and Game
Division of Wildlife Conservation

Region IV Research Update



Region IV 2021 Annual Meeting Team Ongoing projects Developing projects Products

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Region IV Research Team:

- Kassie Colson, WBII – Moose/furbearers
- Nick Demma, WBIII – Carnivores
- Dr. Kristin Denryter, WP II – Ungulate nutrition
 - Katie Anderson, WBI
- Christi Heun, WBI
- Meg Inokuma, Biometrician II
- Renae Sattler, WBIII – Caribou
- Volunteers: Bill Collins, Don Spalinger, Gary Gearhart, others
- Graduate students: Luke McDonald (PhD, USU); Amanda Zuelke (MSc, UAA)

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(Rapid) Region IV Research Overview:

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Dedicated "CIP" Projects:

Moose: 3+ projects on demography, nutrition, response to fire, and vehicle collisions

Caribou: 2 projects on demographic drivers, cause-specific mortality, and health

Wolves: abundance and demography

Grizzly bear: "2" projects on density; demographic and harvest rates

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Project: Demography and sources of mortality in GMU 17 moose

Kassie Colson, PI. 3/2018 – 11/2022

Purpose: to determine the cause of a probable population decline in order to improve the management of this resource

Objectives:

1. Document reproductive and nutrition related metrics for Unit 17 moose
2. Determine survivorship of calf, yearling, two-year-old, and adult moose, as well as likely sources of mortality
3. Investigate the spatial and temporal pattern in mortality amongst calf and adult moose, and how this relates to landscape predation risk



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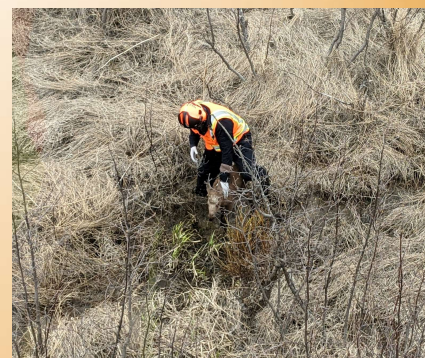
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Project: Demography and sources of mortality in GMU 17 moose

Kassie Colson, PI. 3/2018 – 11/2022

Status:

- Monitored 59 collared cows and 83 unmarked calves through 2019 parturition; some efforts derailed in 2020.
- Adult survival typical (88%); most mortality during calving season
- Strong adult fecundity (2018-2021)
 - 66% twinning rate
 - Calf weights exceptionally high (436 lbs at 10 months)
- Early age of first reproduction *and* twinning (2 yrs.)
 - Suggests excellent nutritional condition
- However, avg. just 13% calf survival to 1 year (range 3-27%)



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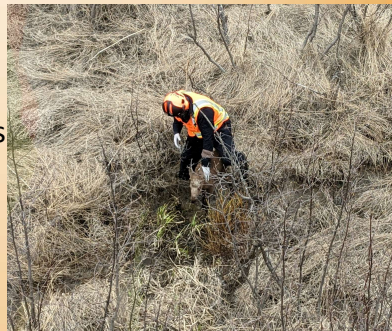
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Project: Demography and sources of mortality in GMU 17 moose

Kassie Colson, PI. 3/2018 – 11/2022

Status:

- Expanded the work in 2021 to radio-collar calves (n=49) to estimate cause-specific mortality through June 1
 - All known COD (n=23) were attributed to black or brown bears
 - Remains sent for disease screening; all brucellosis negative
- Preliminary results suggest population declining ($\lambda = 0.97$)
 - Consistent with other survey data during this time
- These and other analyses (e.g., resource selection) are being finalized for publication



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Project: Evaluation of the effects of fire on moose and forage quantity and quality in the southcentral Alaska area of Alphabet Hills

Kristin Denryter, PI. 2/2018 – 7/2022

Purpose: to research the impacts of fire on moose and their habitat in the Alphabet Hills prescribed burn areas in the Nelchina Basin, Alaska.

Objectives:

1. Quantify browse quality, quantity, and proportion removed in burned/unburned areas
2. Document body condition, productivity, twinning rates, and survival of collared moose that are using the burned/unburned areas
3. Monitor spatial habitat selection of moose in burned/unburned areas, the immediate response of moose to prescribed fire, and the moose colonization rate if it is ignited
4. Compare moose densities and composition between burned/unburned areas
5. Model the effects of fire on browse quality; moose nutrition, fitness, and movements; and demography
6. Evaluate the usefulness of prescribed fire for habitat enhancement in GMU 13



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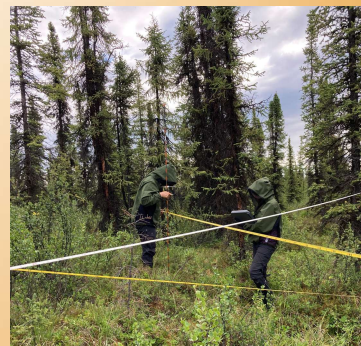
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Project: Evaluation of the effects of fire on moose and forage quantity and quality in the southcentral Alaska area of Alphabet Hills

Kristin Denryter, PI. 2/2018 – 7/2022

Status:

- Browse quality, quantity, and proportional removal within burned/unburned areas were sampled a total of six times during early-, mid-, and late- summer, and again in late-winter
- 60 GPS collars were deployed on bull and cow moose in the burned/unburned areas between Fall 2018 and Spring 2019
- Sample and data analyses are ongoing, including preliminary movement analyses of GPS data
- The prescribed fire was postponed until ??, so focus has been on previous burns
- Some results available in Katie Anderson’s thesis; others pending



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Project: Analysis and interpretation of ungulate dietary composition and forage nutritional quality in Alaska

Kristin Denryter, PI. 4/2018 – 1/2023

Purpose: to refine and provide appropriate nutritional analyses to researchers who are working to assess bottom-up factors regulating caribou and moose populations

Objectives:

1. Complete dietary composition analyses for previously collected samples from the Togiak, Goodnews, Nushagak, and Colville River moose populations
2. Determine forage nutritional quality for the diets determined in objective #1
3. Determine winter diets for Nelchina caribou wintering in the Tanana Hills from previously collected samples



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Project: Analysis and interpretation of ungulate dietary composition and forage nutritional quality in Alaska

Kristin Denryter, PI. 4/2018 – 1/2023

Status:

- Analyses of forage samples have been completed using traditional methods
- Currently testing DNA barcoding for determining diet composition; comparing to micro histological, fecal alkane-alcohol, and bite-count methods for moose and caribou
 - Barcoding continues to be problematic
 - Currently considering options for going forward and getting results disseminated



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Project: Density and demography of GMU 13 grizzly bears

Nick Demma, PI. 3/2019 – 7/2024

Purpose: To estimate density and vital rates to evaluate progress toward achieving the management objective of reducing bear abundance relative to the 1998 baseline

Objectives:

1. Estimate bear abundance and density
2. Estimate vital rates for multiple sex-age classes
3. Estimate population growth and annual harvest rates

Background:

- ADFG research estimated a ~40% reduction in abundance of independent bears (~4%/yr decline) during 1998-2011
- At this rate, abundance would be reduced $\geq 50\%$ by 2017 relative to 1998



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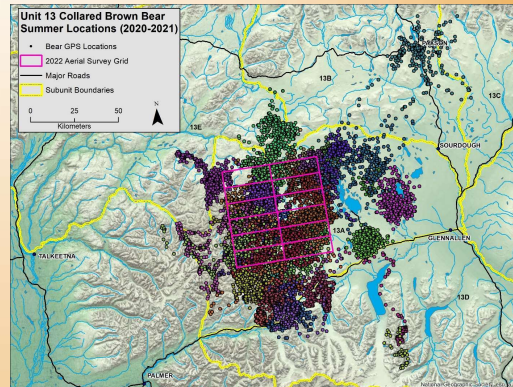


Project: Density and demography of GMU 13 grizzly bears

Nick Demma, PI. 3/2019 – 7/2024

Status:

- During 2019-2021, captured 56 and GPS-collared 52 bears, including 19-22 sows with young/yr
 - 26 alive, 9 dead, 17 unknown (e.g., shed collar)
- Location data, reproductive rates, COD data collection ongoing
- Final captures planned for spring 2022
- Currently refining design of spatial capture-mark-resight survey for May 2022



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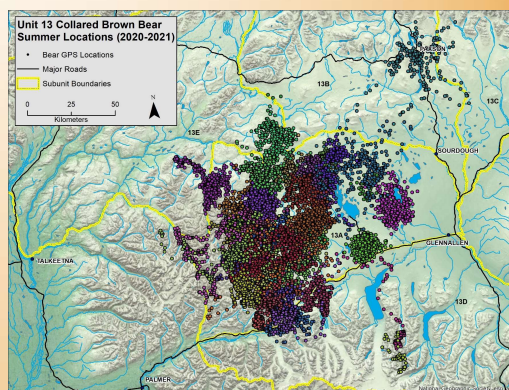
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Project: Density and demography of GMU 13 grizzly bears

Nick Demma, PI. 3/2019 – 7/2024

Status:

- University of Alaska Anchorage collaboration
 - Amanda Mumford (Zuelke) M.S. Student
 - Dr. Jeff Welker, Faculty Advisor
 - Thesis: *Investigating habitat usage, dietary composition, and behaviors of brown bears (Ursus arctos) in the Nelchina Basin*
- Preliminary movement and diet analyses (via stable isotopes) ongoing
- Several interim products already
- Will defend thesis in 2022



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Project: Assessment of Social and Environmental Factors Associated with MVCs

Luke McDonald, PhD student Utah State University; Jeff Stetz, PI. 7/2019 – 7/2022

Purpose: to improve our understanding of the social, behavioral, and environmental factors involved with moose-vehicle collisions (Phase II); Terry Messmer, major advisor

Objectives:

1. Determine how landscape factors are associated with MVCs
2. Identify important moose movement corridors and use areas to inform harvest management
3. Complete a human dimensions study to inform public awareness efforts
4. Estimate the rate of unreported MVCs



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Project: Assessment of Social and Environmental Factors Associated with MVCs

Luke McDonald, PhD student Utah State University; Jeff Stetz, PI. 7/2019 – 7/2022

Status:

- 60 adults GPS-collared beginning in 2016; nearly all collars retrieved by summer 2021
- ~100 MVCs investigated per season, including ~25% that were not reported
- Movement and site analyses nearly completed; human dimension surveys/focus groups also being analyzed currently
- Luke will defend dissertation in spring 2022



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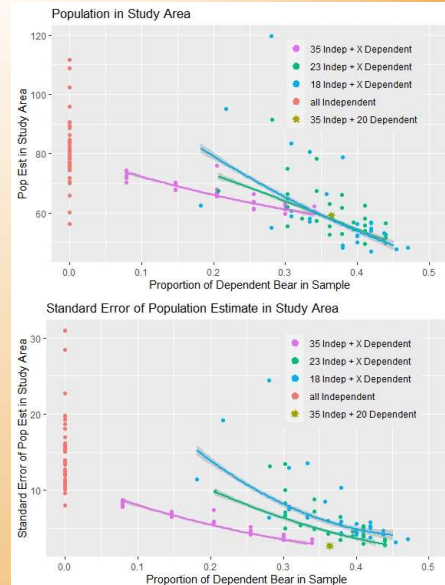
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Project: Biometrics support. Meg Inokuma

Purpose: Statistical support for project design, data analyses

Status:

1. Conduct annual population abundance estimates of big-game species, primarily caribou and moose
2. Unit 17 moose calf survival
3. Variation in Mulchatna caribou survival
4. Develop an integrated population model for Mulchatna caribou
5. Comparison of trend counts and GSPEs; small unit GSPE
6. 'power analyses' for Unit 13 grizzly bear project



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Project: Wolf Abundance and Demography in Unit 17

Nick Demma, PI. 03/2018-11/2022

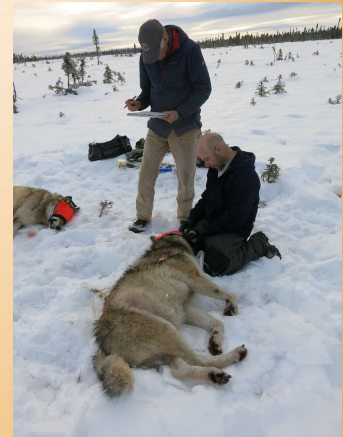
Purpose: To evaluate the effectiveness of the MCH IM program for reducing wolf density in the Mulchatna Wolf Control Area (WCA)

Objectives:

1. Determine annual abundance of wolves in the WCA
2. Document annual productivity, survival, and dispersal

Status:

- Deployed 28 GPS collars on wolves in 2017-2021 in/adjacent to the WCA
- Poor capture conditions and high loss rate of collars (e.g., ~50% have been harvested) has limited data collection dramatically



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Project: Wolf Abundance and Demography in Unit 17

Nick Demma, PI. 03/2018-11/2022

Status:

- Other questions include:
 - seasonal variation in movements, diet (stable isotopes)
 - age at first reproduction
 - den site selection
 - changes in pack space-use during wolf control activities
- Maintaining adequate sample of collared animals has been difficult for multiple reasons (e.g., weather, harvest)
- As such, we're pursuing new methods, including genetic sampling and spatial mark-recapture modeling



New Project: Estimating wolf pack and animal abundance in GMU16

Tim Peltier and Kassie Colson, Co-PIs. 3/2022 – 12/2023

Purpose: To evaluate new sampling and analytical methods to assess/monitor wolf populations

Objectives:

1. Estimate the abundance of individual wolves and number of packs
2. Contrast estimates/inferences to data collected from collared animals
3. Assess pros/cons of new methods for periodic and/or long-term monitoring



Status:

- *New study*; plan to deploy collars spring 2022 with genetic sampling beginning winter 2022
- Based on results, may employ similar methods in other populations



Project: ADFG Wildlife Nutrition Laboratory

Kristin Denryter, PI. 2021-2023

Purpose: to refine and provide appropriate nutritional analyses to researchers who are working to assess bottom-up factors regulating caribou and moose populations

- State-of-the-Art wildlife nutrition lab
 - Determine fiber, energy, and protein content of forages
- Captive animal facility
 - Digestion trials
 - Foraging studies with tame animals



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Project: ADFG Wildlife Nutrition Laboratory

Kristin Denryter, PI. 2021-2023

- Developing management tools
 - Foodscapes
 - Range assessments
 - Integrative carrying capacity models
- Calf rearing for field and controlled studies
- Longitudinal studies of nutrition and population productivity
- Developing partnerships and seeking external support
 - Currently refining proposals with ACCS and AITRC for mapping forage composition, quantity, and quality in GMU 13
 - Laying groundwork for estimating nutritional carrying capacity for large ungulates



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Project: Modeling density patterns of GMU 13 grizzly bears

Jeff Stetz, PI; Nick Demma, Co-PI. 5/2020 – 6/30/2023

Purpose: To use genetic sampling and spatial CMR modeling to explain/predict bear density; explore potential for long-term monitoring

Objectives:

1. Estimate bear density and model (i.e., explain) density patterns using newer, advanced methods
2. Contrast estimates/inferences from mark-resight and stable isotope models
3. Use detection data to explore study designs for long-term monitoring



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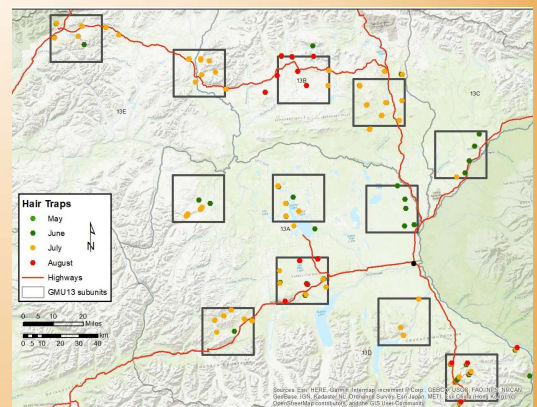
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Project: Modeling density patterns of GMU 13 grizzly bears

Jeff Stetz, PI; Nick Demma, Co-PI. 5/2020 – 6/30/2023

Status:

- Collaborative effort with Ahtna, Inc., AITRC, and ACFWRU
- Set 291 hair traps in 2020 for 606 hair samples; 281 traps in 2021 for 534 samples
- Collected samples from sealed and lived-captured/biopsied bears



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Project: Modeling density patterns of GMU 13 grizzly bears

Jeff Stetz, PI; Nick Demma, Co-PI. 5/2020 – 6/30/2023

Status:

- Preparing for a larger effort in 2022
- Talking with BLM and NPS (Denali, Wrangell-St. Elias)
- Sampling will correspond with mark-resight density estimate, allowing empirical comparison of inferences
- Resource selection modeling and space-use comparisons also planned



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Data Sharing Agreements: continue to develop new agreements and collaborations

- Genetic relationships of caribou Herds in the AK-YK region. Karen Mager (Southern Oregon State University), Mike Sutor (Environment Yukon)
- Unit 17 wolves' landscape use, diet, and predator-prey relationships. Jeff Welker (UAA)
- Genetic relationships/structure of Mulchatna caribou. Janna Willoughby (Auburn University)
- Additional agreements were renewed/maintained (e.g., ABoVE, MoveBank)



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- Peer-reviewed publications:
 - Human-Wildlife Interactions
 - Journal of Wildlife Management
 - Journal of Mammalogy
 - Science
 - Movement Ecology
 - PLoS ONE

The collage features several scientific publications:

- Ecological insights from three decades of animal movement tracking across a changing Arctic** (Journal of Wildlife Management, 2021)
- Effect of Harvest on a Brown Bear Population in Alaska** (Human-Wildlife Interactions, 2021)
- Characteristics of non-fatal attacks by black bears: conterminous United States 2000-2017** (Journal of Mammalogy, 2021)
- Behavioral modifications by a large-northern herbivore to mitigate warming conditions** (Movement Ecology, 2021)
- Phylogeography of moose in western North America** (Molecular Ecology, 2019)
- Temporal variation of moose-vehicle collisions in Alaska** (PLOS ONE, 2021)
- Estimating brown bear abundance and harvest rate on the southern Alaska Peninsula** (Wildlife Management, 2021)
- Movement Ecology** (Open Access journal)

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Select professional products

- Posters, newsletters:
 - The Wildlife Society
 - State and National Chapters
 - American Society of Mammalogists
 - International Association of Bear Research and Management

The collage features several scientific posters and newsletters:



- Habitat Selection and Dietary Composition of Brown Bears (Ursus arctos) in the Nelchina Basin of Alaska** (Journal of Wildlife Management, 2021)
- Seasonality of habitat selection, diet composition, and behavior of brown bears in the Nelchina Basin, Alaska** (Journal of Wildlife Management, 2021)
- Biological Research** (Newsletter)
- Wildlife Society News** (Newsletter)

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Education, Outreach, Professional Development, etc.:

- Presentations to Wildlife Wednesday, local TV, newspaper, and radio spots
- Assisting with MVC, MCH, and BOG I&E efforts
- Peer-reviewing and editing for multiple scientific journals
- Mentoring multiple graduate students and junior ADFG biologists
- Active with Alaska Chapter of TWS: conference planning, presentations
- Active with TWS's Nutritional Ecology Working Group
- Represent ADFG on WAFWA's Wildlife Movement and Migration Working Group
- Providing expertise and developing SOPs for UAS use by ADFG
- Provide training to ADFG staff on capture/handling techniques, advanced modeling methods, writing, etc.



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