Apr 20th, 5:00 PM - 6:30 PM

Assessing the impacts of increasing wolf and grizzly bear populations on the habitat selection and foraging patterns of cougars: A multi-organizational collaborative project in the southern Greater Yellowstone Ecosystem (SGYE)

Jennifer A. Feltner
University of Montana, jennifer.feltner@umontana.edu

Assessing the impacts of increasing wolf and grizzly bear populations on the habitat selection and foraging patterns of cougars:

A multi-organizational collaborative project in the southern Greater Yellowstone Ecosystem (SGYE)

Jennifer Feltner[1], University of Montana, Wildlife Biology Program, 32 Campus Drive, Missoula MT 59812

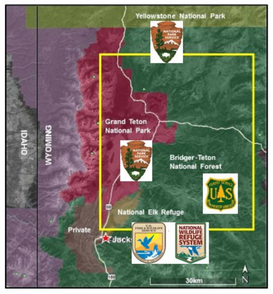
INTRODUCTION

Across North America and Europe, efforts are underway to restore and conserve populations of top carnivores such as wolves and grizzly bears. These recovering large carnivore populations are reviving long absent competitive interactions amongst species of the same guild, resulting in behavioral shifts by subordinates that can have population and community-level consequences. Despite an impressive body of work on community dynamics following large carnivore recovery, few studies have explored intraguild competition in depth. **Additional research efforts are needed to clarify responses of subordinate carnivores following large carnivore recovery and resultant impacts to prey populations.**

BACKGROUND

Following the reintroduction of wolves, and the recovery and expansion of grizzly bears, the GYE reclaimed its place as one of the last nearly intact ecosystems in North America. In the SGYE north of Jackson, Wyoming, management and monitoring of large carnivores and ungulates is complex. Multiple federal and state agencies, as well as non-profit organizations collect data and conduct research on these species. Separate datasets on the population dynamics, movements and food habits of wolves, cougars, and grizzly bears, as well as their primary prey, elk, from 2001 to the present exist. However, none of these single species datasets have been merged or examined comprehensively to date.

Study area & management



Also conducting research in the SGYE

Acknowledgments

I am grateful for all the support and guidance I have received from my advisor Dr. Scott Mills, Dr. Mark Elbroch and the rest of the TCP team (at Panthera and Craighead Beringia South), my collaborators at GTNP, NER, USFWS, USGS, and WFGD, my committee and other faculty in the Wildlife Biology Program at UM, the Mills Lab and my family and friends. Funding for my stipend and research comes from the NSF Graduate Fellowship Program, the University of Montana, North Carolina State University and the Wild Felid Management Association.

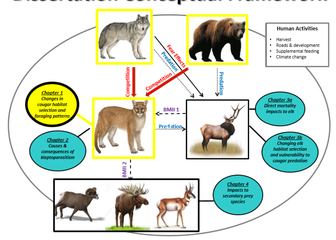
DISSERTATION GOALS

- Provide insights on some of the mechanisms by which recovering large carnivore populations (wolves and grizzly bears) impact subordinate carnivores (cougars) through competition.
- Evaluate potential consequences for subordinate carnivores and shared prey species

SPECIFIC STUDY OBJECTIVE

Investigate key factors driving cougar habitat selection and foraging patterns (i.e. where cougars kill prey), including risk of dominant competitor encounter, prey availability, human activities and other environmental factors (Chpt. 1)

Dissertation Conceptual Framework



FOCAL SPECIES, COMPETITORS & PREY

Cougar – Subordinate carnivore

- Solitary felid & obligate carnivore
- Exhibits plasticity in habitat use and prey selection
- Stalk and ambush predator

Potential wolf impacts

- Wolf pack social structure allows dominance
- Cougar shifts in prey and habitat selection have been documented
- Kitten mortality

Cougar Diet

- Elk, followed by mule deer are primary prey
- Bighorn sheep, pronghorn, and moose are secondary prey
- Beavers, porcupines, and coyotes also consumed

Potential grizzly bear impacts

- Large size advantage
- Food stealing (kleptoparasitism)

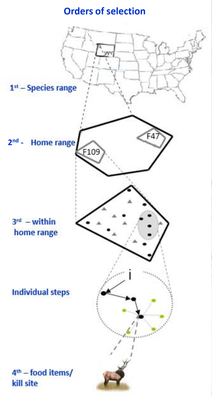
Elk (shared primary prey)

METHODS

I will estimate mixed-effects resource selection functions at three spatial scales following a use/availability design using location data from collared cougars, wolves, grizzly bears and elk and kill site data from cougars.

Environmental covariates

- Elevation (m)
- Slope (%)
- Aspect
- Ruggedness
- Landcover
- Human disturbance
- Distance to feedlots
- Ungulate forage availability
- Winter severity
- Year
- Season (winter/ summer)



DATA SUMMARY*

Species Data Summary 2001-2016

	Cougar	Wolf	Grizzly	Elk
No. VHF locations	7,817	4,920	2,298	4,177
No. VHF collared animals	73	86	138	127
No. GPS locations	155,506	177,973	227,677	2,401,844
No. GPS collared animals	28	55	78	256
Total locations	163,323	182,893	229,975	2,406,021
No. Kills	2,041			

*as of 4/12/2018; data is still being cleaned, processed and summarized

Example – location data visualization for cougars

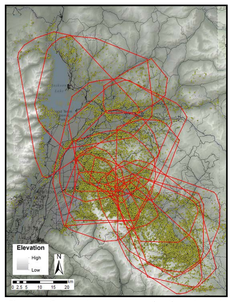


Figure – Cougar home ranges (red) and used locations (yellow) for adult cougars (>2 years old) monitored with GPS collars in the SGYE, Wyoming, USA from 2005-2016

COLLABORATION

This research project was initiated in early 2015, after I accepted an opportunity to develop a graduate project on cougar ecology and large mammal community dynamics in the SGYE with Panthera's Teton Cougar Project (TCP). I completed two years of fieldwork with TCP collecting population, predation and movement data on cougars. I also established relationships with representatives from the National Park Service, U.S. Fish and Wildlife Services, U.S. Geological Services and Wyoming Game and Fish Department, who as a group of scientists and wildlife managers collectively monitor and conduct research on wolves, grizzly bears, and elk in the SGYE. Following numerous meetings to discuss my research ideas and establish trust, I finalized collaborative and data sharing agreements with each agency. Collectively these organizations shared 16+ years of location data on the above-mentioned species. I regularly check in with my collaborators as I clean and analyze the data; they will all be offered the opportunity to co-author resulting publications. **This project rests on the hard work and support of many!**

SIGNIFICANCE

It is the highly collaborative nature of this project that sets it apart as an innovative approach to research: this project will expand on existing data collection and research programs carried out by several state and federal agencies and two nonprofits, bringing multiple collaborators and formerly disparate long-term datasets together in order to tackle challenging questions that have not been possible until now. This project will advance understanding of how intraguild competition shapes the behavior of cougars, highlighting potential fitness impacts to cougars and subsequent cougar behavioral shifts that could in turn cascade to impact cougar prey species. In an area where management of both carnivores and ungulates remains challenged by a lack of understanding in how shifting community dynamics impact individual species, this study will fill knowledge gaps and aide in the development of conservation and management strategies for both predator and prey species in the GYE, and in similar ecosystems in North America, Europe and Asia.

[1]Contact: jennifer.feltner@umontana.edu