A close-up, front-facing portrait of a lioness. The lioness has light brown, tawny fur with some darker patches around its eyes and on its face. Its eyes are a pale yellowish-green color, and it has long, white whiskers extending from its muzzle. The background is blurred, showing more of the lioness's body and some indistinct colors.

The comparative  
effects of large carnivores  
on the acquisition of  
carrion by scavengers

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Max Allen

Mark Elbroch - Chris Wilmers

Heiko Wittmer

# Scavenging

- Widespread Behavior
- Transfer of Energy
- Ecosystem Services





# Study Area

## Mendocino National Forest

- 3696 square km  
(18.2% of Slovenia)
- Black-tailed Deer Hunting
  - Effects of Mountain Lions  
(also called pumas or cougars)



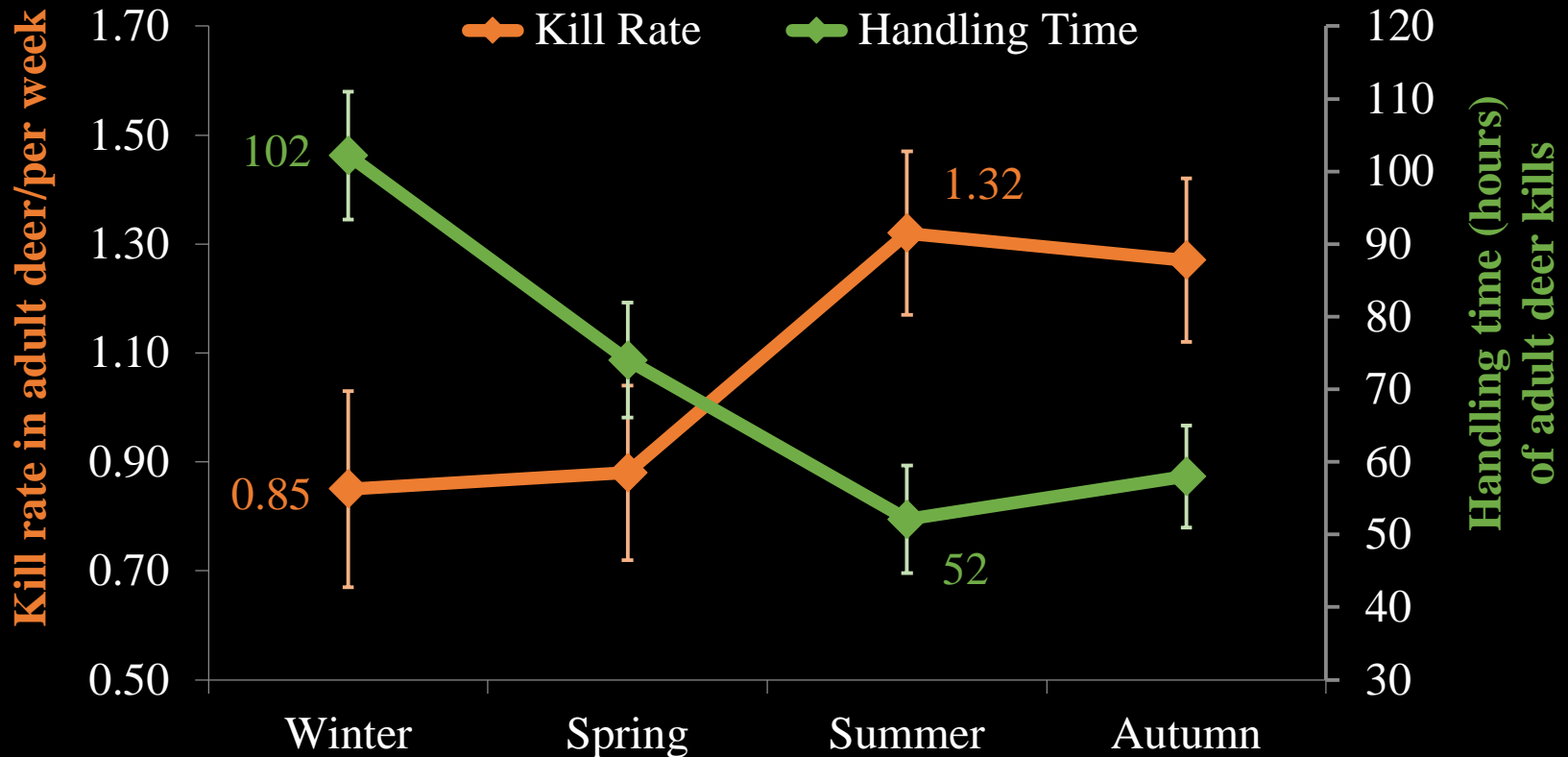
# Background (Ph.D. Research)

## GPS collars (598 GPS clusters, 352 kill sites)

- Deer = 98.6% of Prey Biomass
- High Kill Rates (1.39 animals/week)

## Seasonal patterns

- Kill Rate vs. Handling Time
- Inverse Pattern ( $R^2 = 0.98$ )





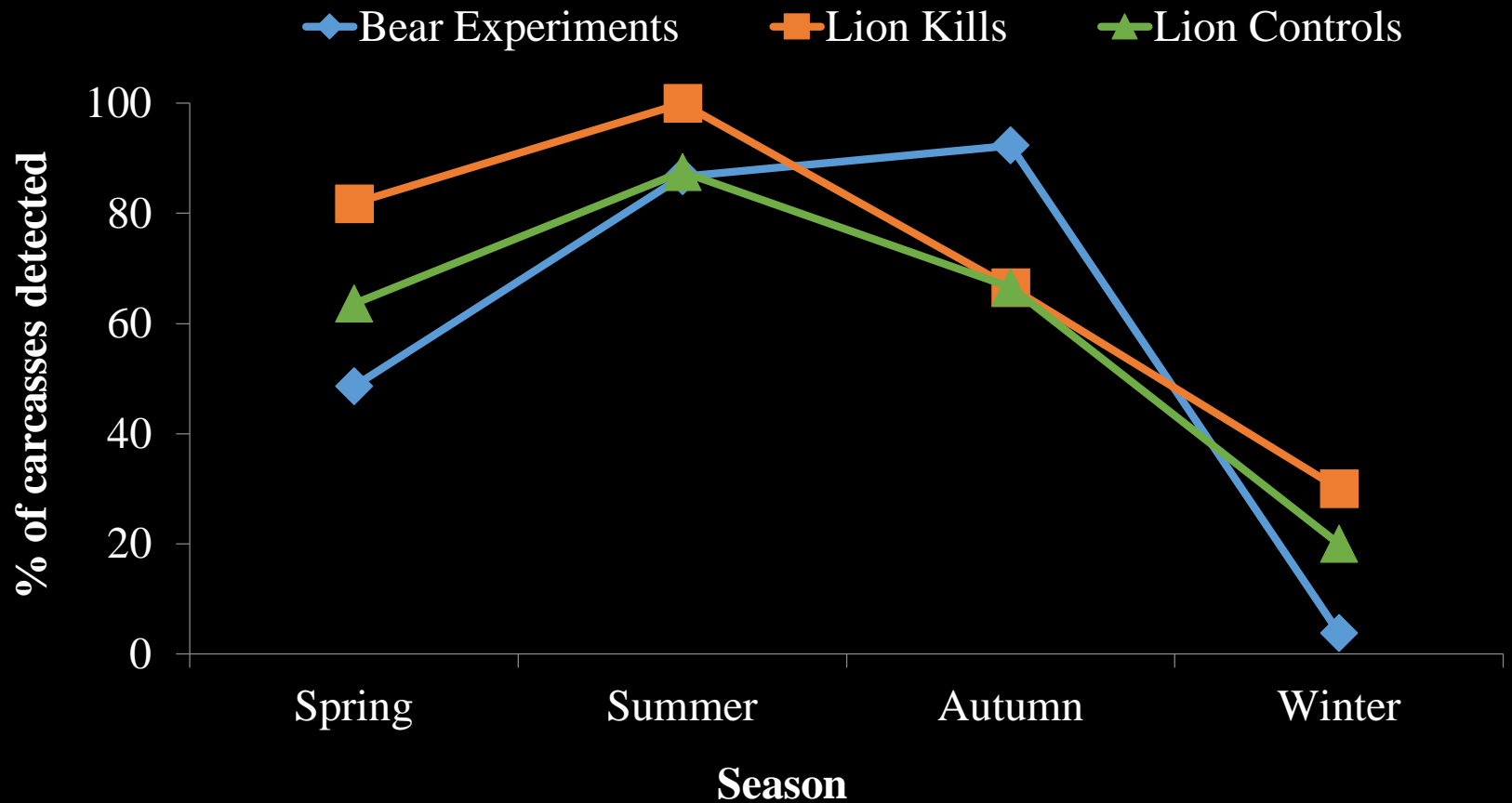
# Experimental Design

- 59 Active Mountain Lion Kills  
(compared to paired carcasses)
- 100 Experimental Bear Sites  
(Present vs. Not)
- Variables
  - Presence/Absence
  - Mean Feeding Bout Duration
  - **Total Feeding Time**



# Detection of Carcasses by Bears

- Seasonal Pattern
- Mean Detection = 48.5 hours





# Black Bear Effects on Mountain Lions

- After Bear Arrival
  - Abandoned 72.4% of kills
  - Fed once at 13.8% of kills
  - 106.5 minutes before vs. 16.8 after  
(Bear feeding time = 145.9 min)



# Scavenger Richness & Total Feeding Time

Effect Sizes (Cohen's D Score):

<0.20 = Small Effect   <0.50 = Medium Effect   <0.80 = Large Effect

Scavenger Variable	Lion Kill	Lion Control	Effect Size
Species Richness	3.07 Species (2.60-3.54 95% CI)	3.52 Species (3.13 - 3.90 95% CI)	-0.27
Total Feeding Time	165.7 min (124.1 - 207.3 95% CI)	246.3 min (187.3 - 305.3 95% CI)	-0.41

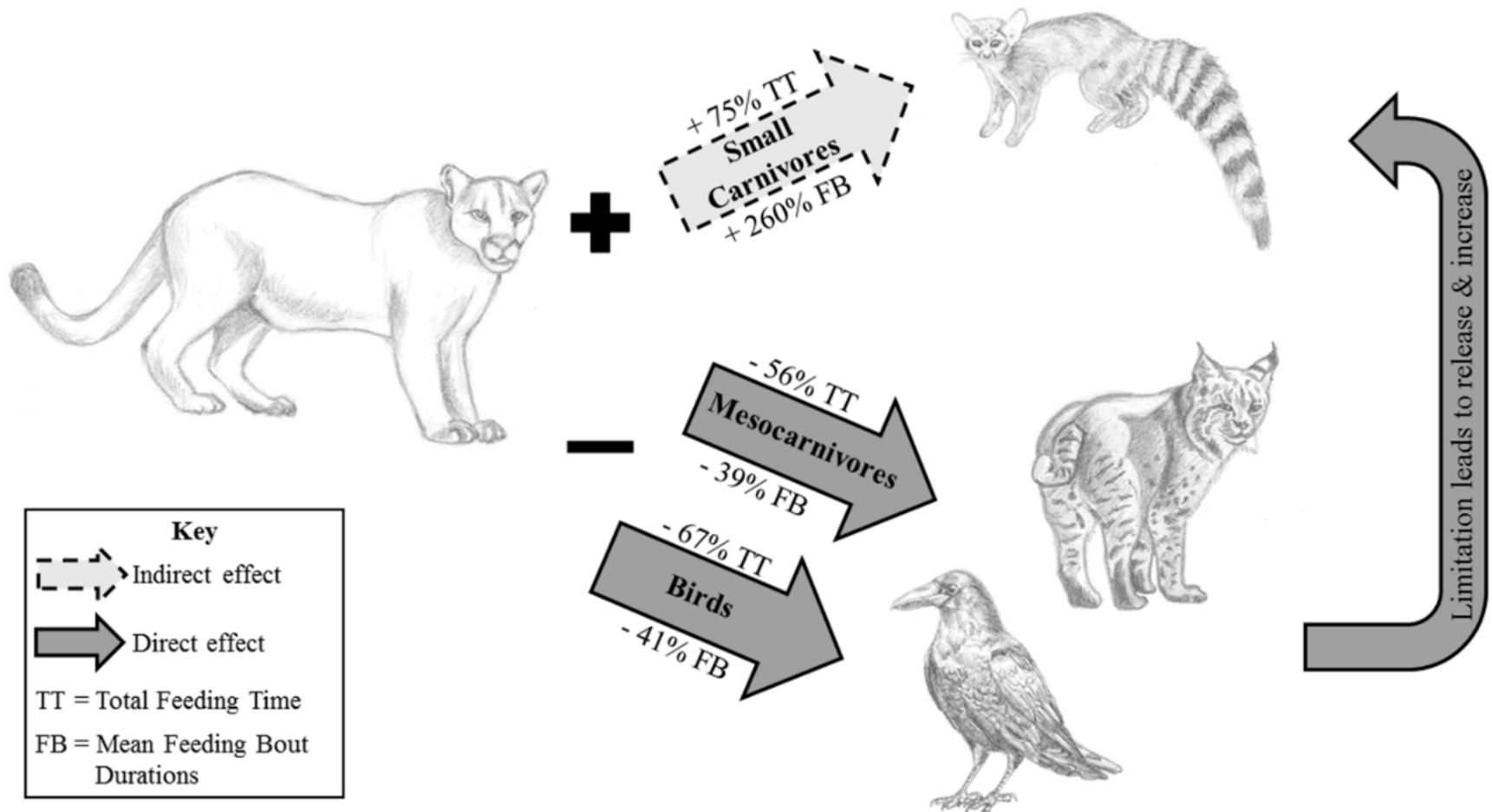
  

Scavenger Variable	Bear Present	Bear Absent	Effect Size
Species Richness	1.79 (1.30 - 2.28 95% CI)	3.09 (2.65 - 3.53 95% CI)	-0.87
Total Feeding Time	42.5 min (21.7 - 63.3 95% CI)	359.5 min (261.2 - 457.8 95% CI)	-1.20

# Mountain Lion Effects on Scavenger Classes

- Varied effects by class
- Promotes structuring

= Trophic Facilitation

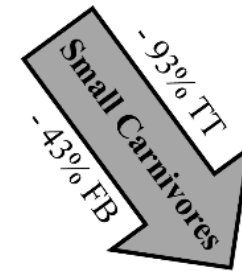
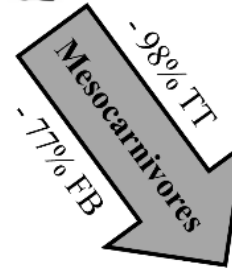
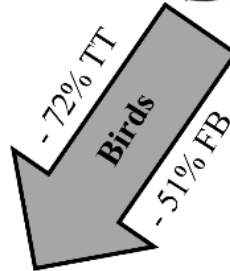
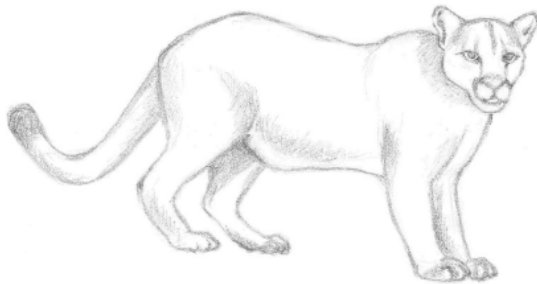
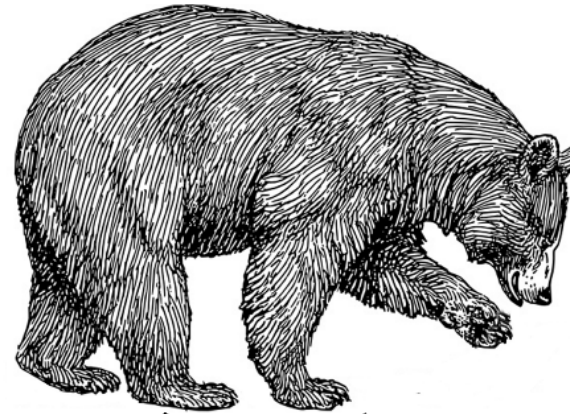
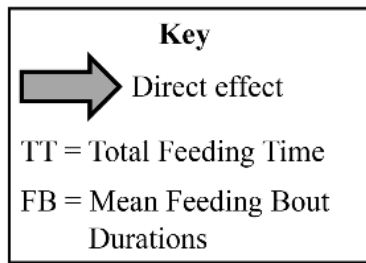


# Bear Effects on Scavenger Classes

- Negative Effects

- All Scavenger Classes
- All Variables

= Trophic Limitation







Thank  
You!