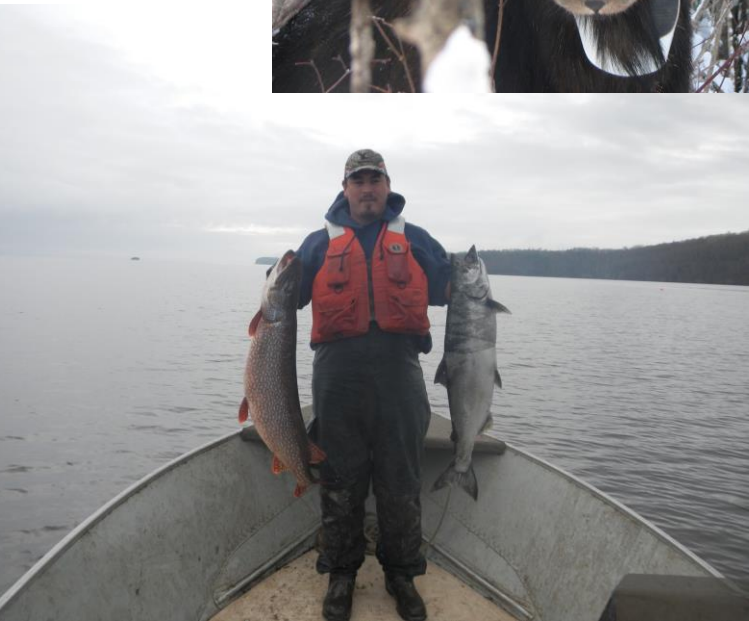


# Moose Health Research to serve Minnesota Tribal Communities

- Seth Moore, PhD
- Tiffany Wolf, DVM, PhD
- E.J. Isaac
- Yvette Ibrahim





# Ojibwe cultural perspective

- Seventh generation planning

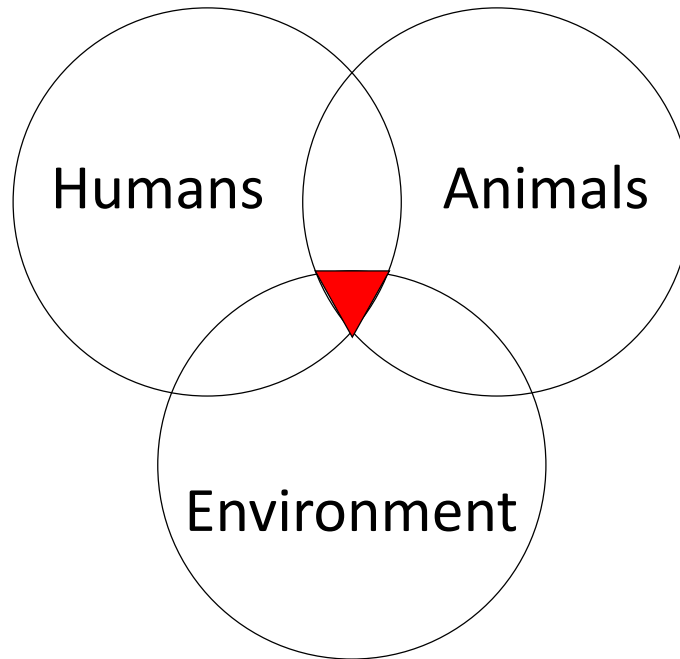
Great grand parent to great grand child

Actions taken now must not hurt those ahead

- Oneness of nature and humanity

Rights to hunt, fish, and gather, are also a right to non-toxic foods and waters

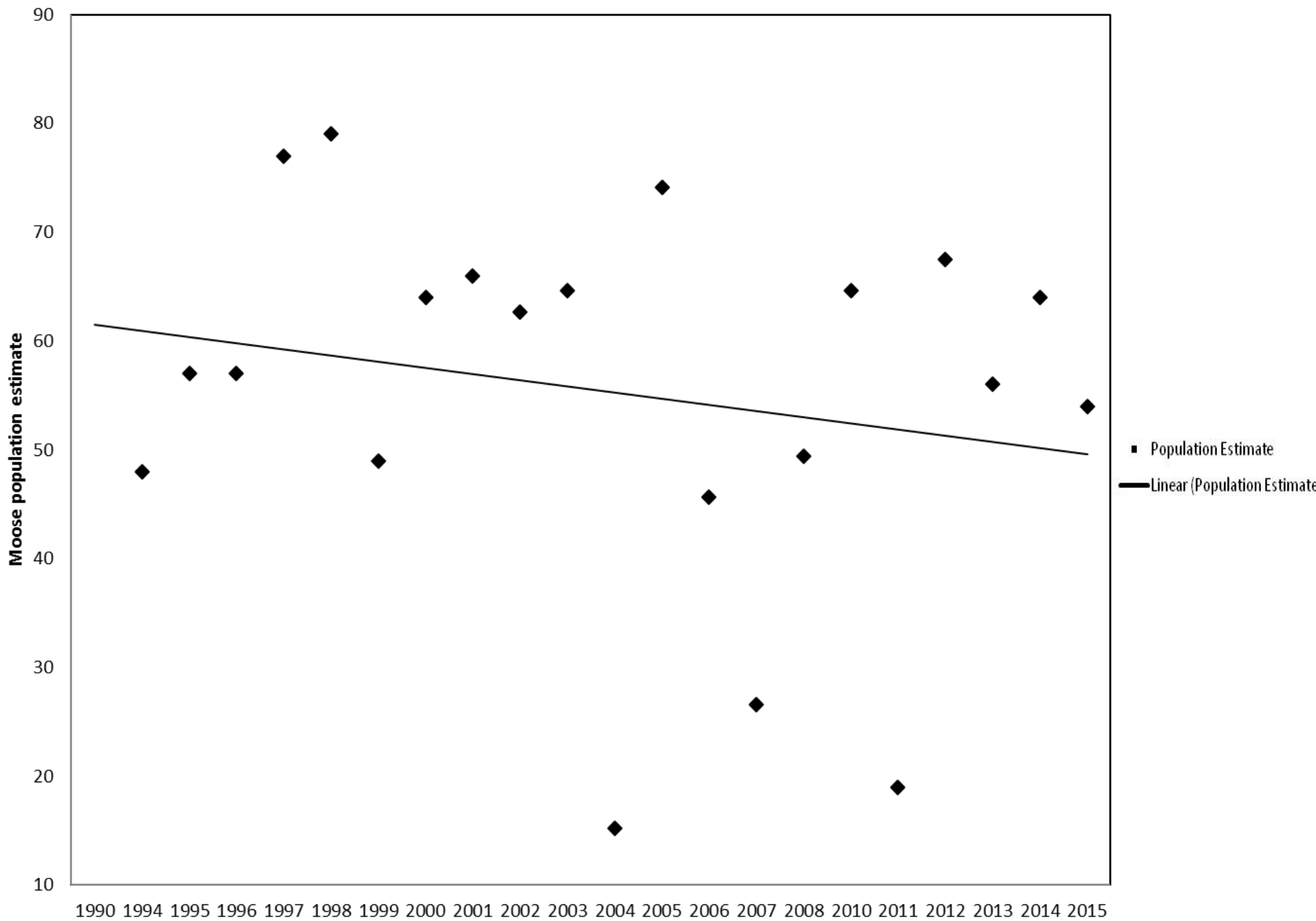
# Ecosystem Health



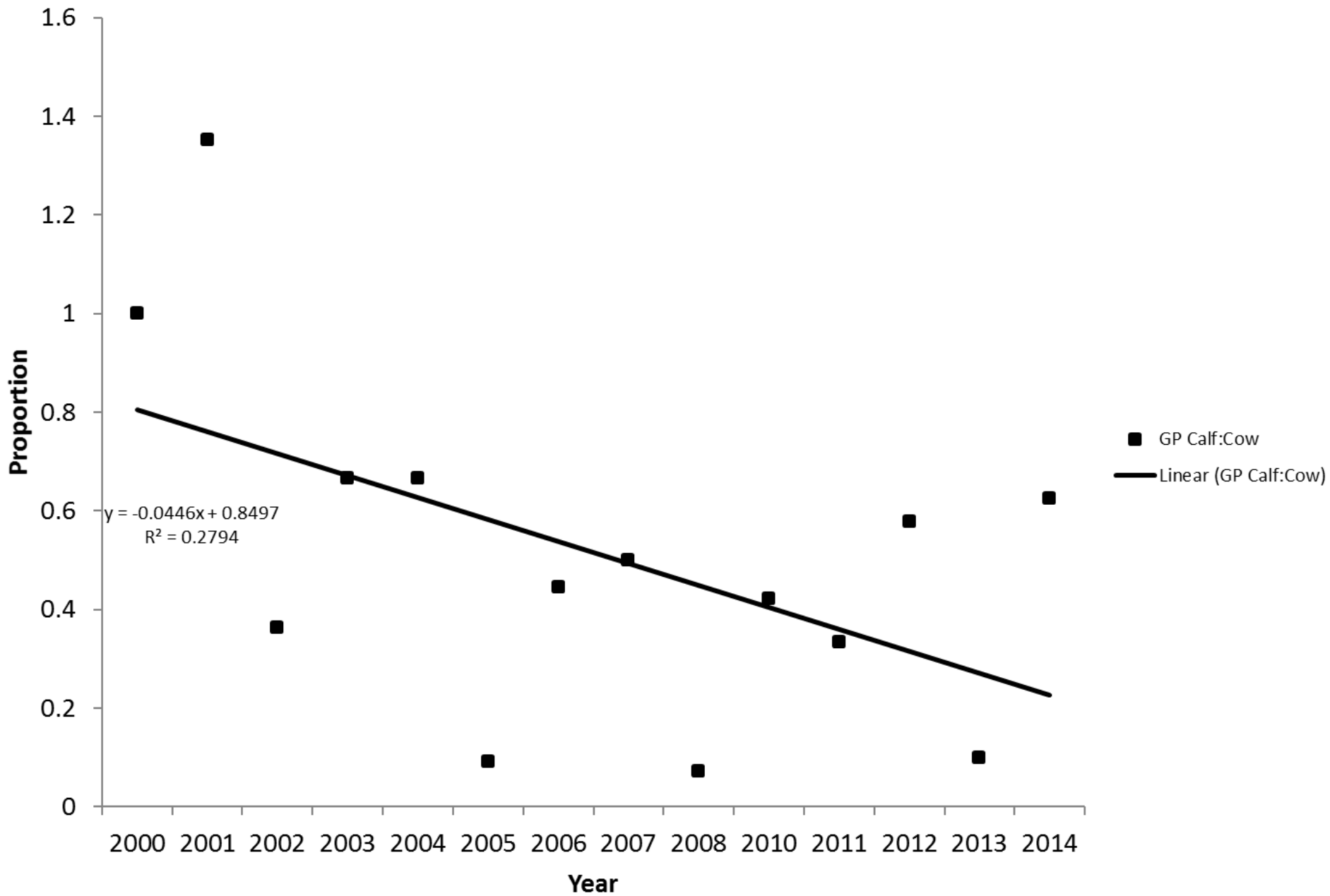
“Ecosystem Health recognizes the inherent interdependence of the health of humans, animals and ecosystems and explores the perspectives, theories and methodologies emerging at the interface between ecological and health sciences.”

- Wilcox, 2004

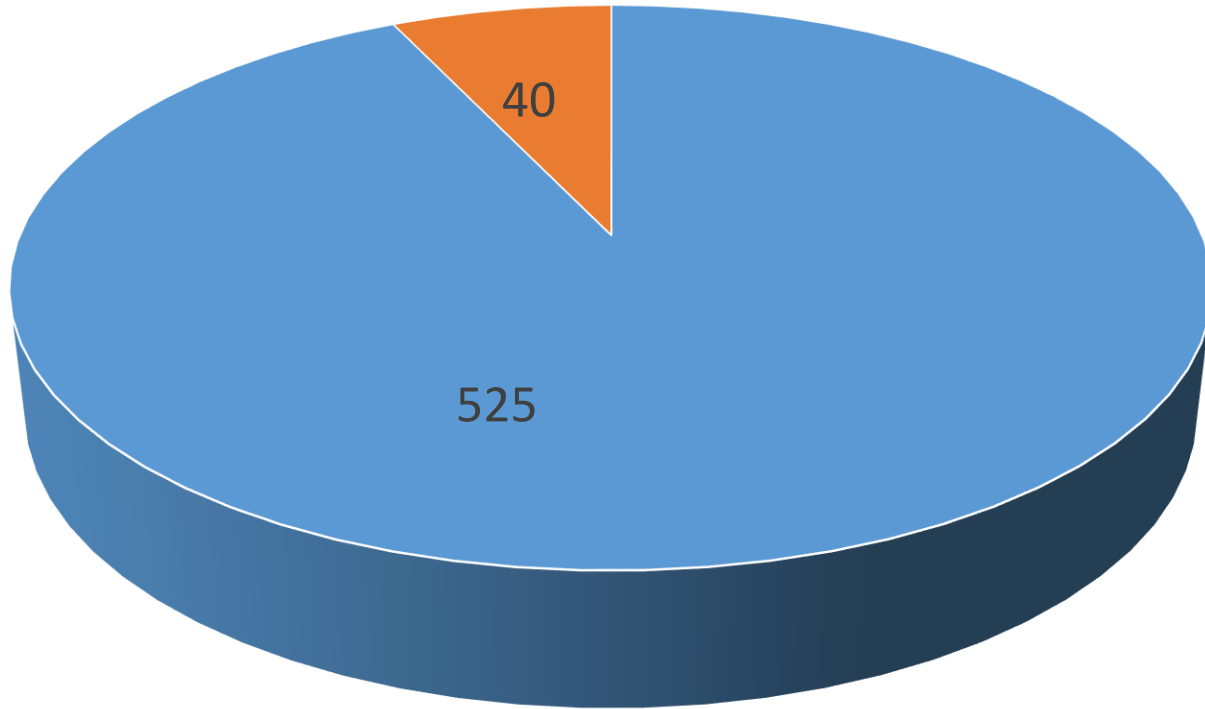
# Grand Portage Reservation Moose Population 1990-2015



# Grand Portage Reservation Calf: Cow ratios 2000-2014

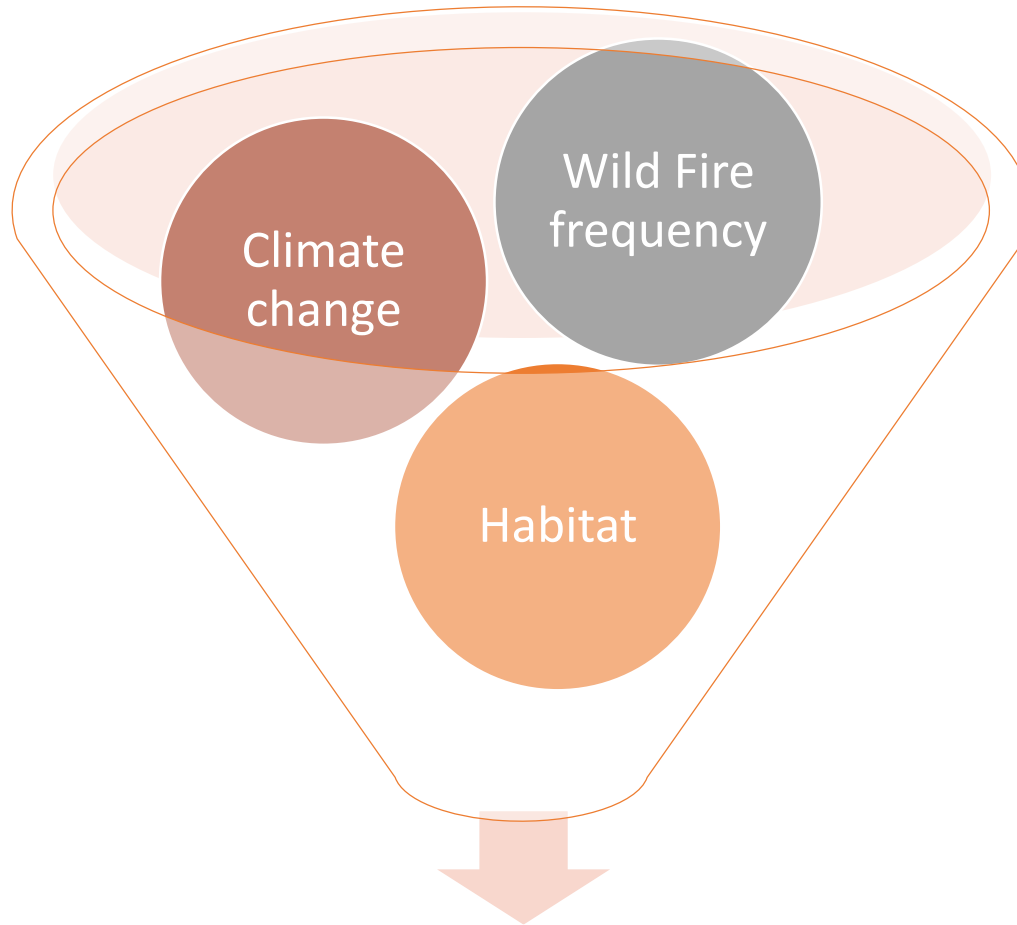


Subsistence Hunting and Natural Mortality of Adult  
Moose at a population of 3500 moose



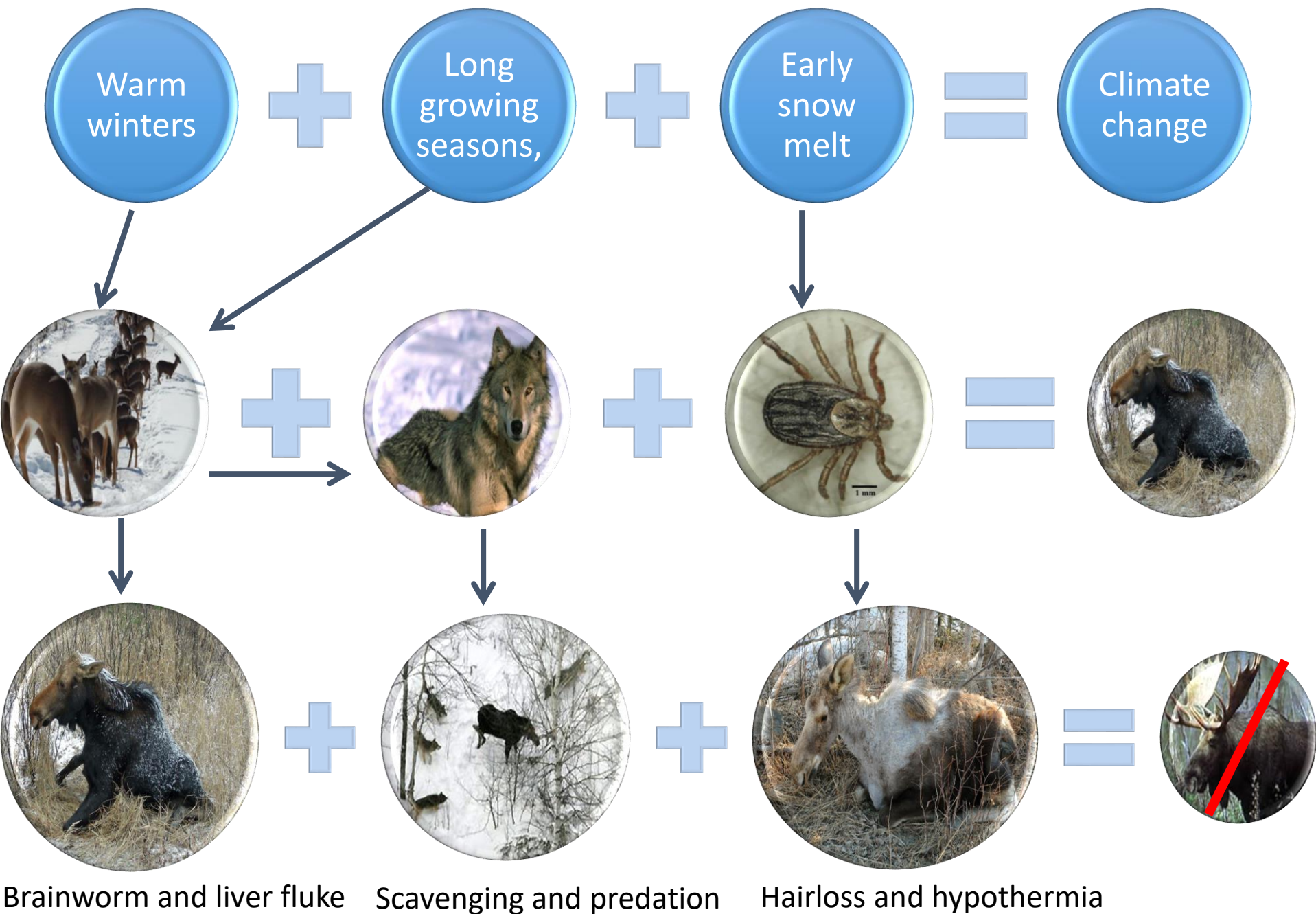
■ Natural Mortality

■ Subsistence Hunting



**Moose Population Decline**





Warm winters

Long growing seasons,

Early snow melt

Climate change



Brainworm and liver fluke

Scavenging and predation

Hairloss and hypothermia

# MN Tribal Moose Studies

## Moose

- 145 total moose captures
- 95 adult individuals
- 36 calves collared
- 33 adult mortalities
- 47 calf mortalities investigated
- 27 active adult collars
- 25 adult captures planned 2021

## Deer

- 63 whitetail deer collared
- 20 active collars

## Wolves

- 105 Wolf captures (avg.8.5/yr)
- Five packs
- Four donated to ISRO

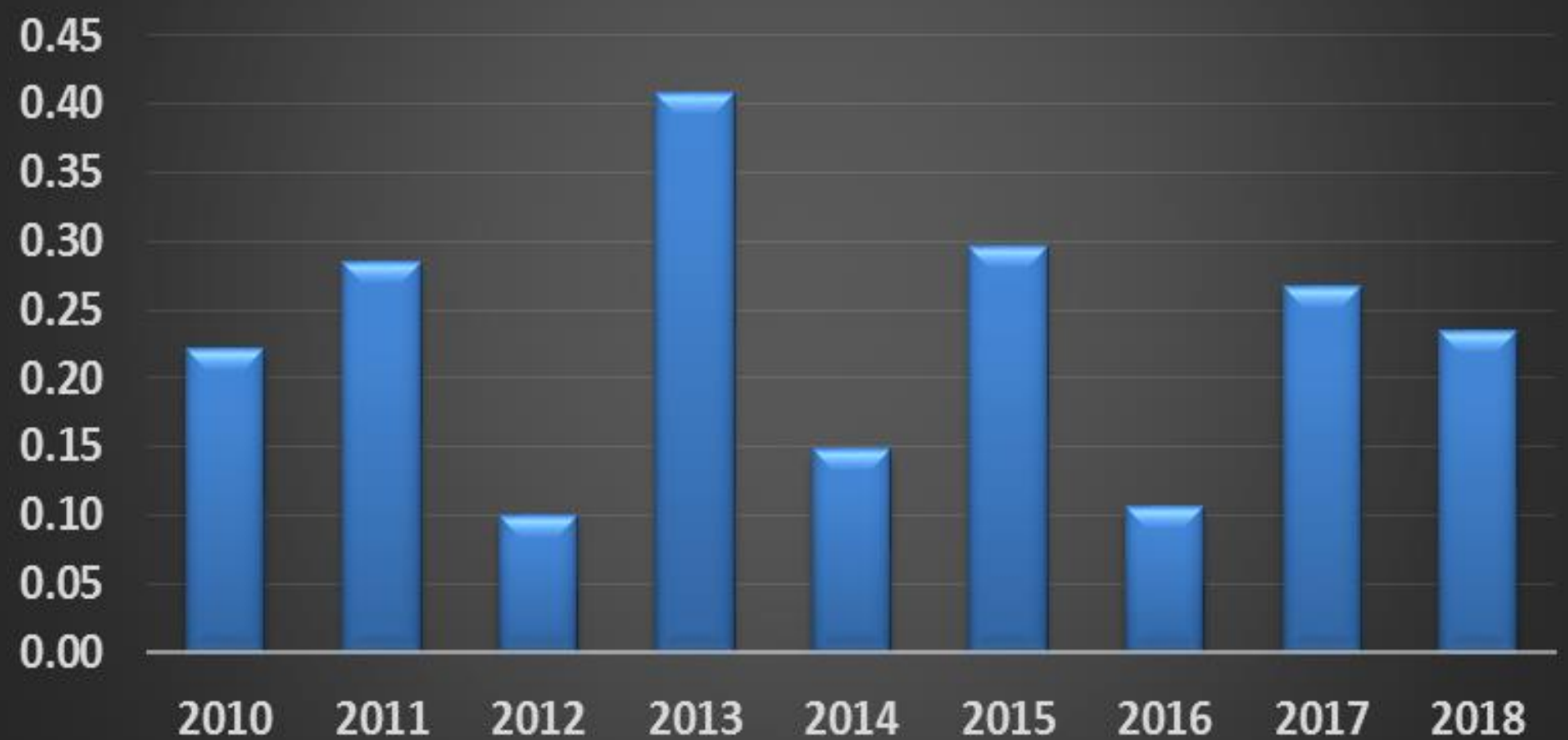
## Funding and infrastructure

- 100% grant funded
- \$3-5 million in wildlife research
- \$1.3M in agency infrastructure
- 5 FTE, 4 grad students, 4 post docs, 1 part-time UMN researcher
- 4 academic institutions (UMN, SUNY, MTU, Lakehead University)

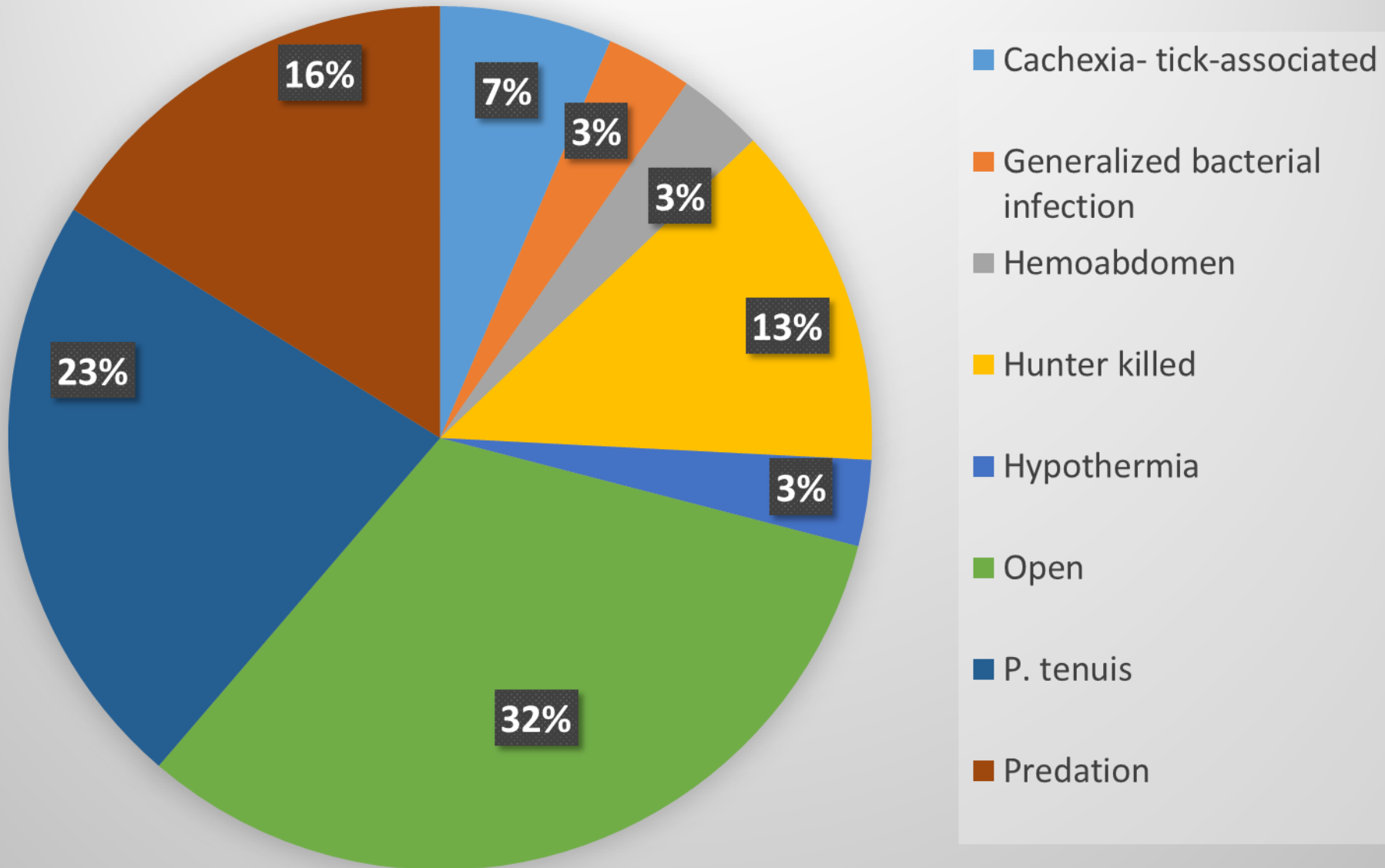
# Mortality Investigations



# Annual Collared Adult Moose Mortality Rate (n=95)



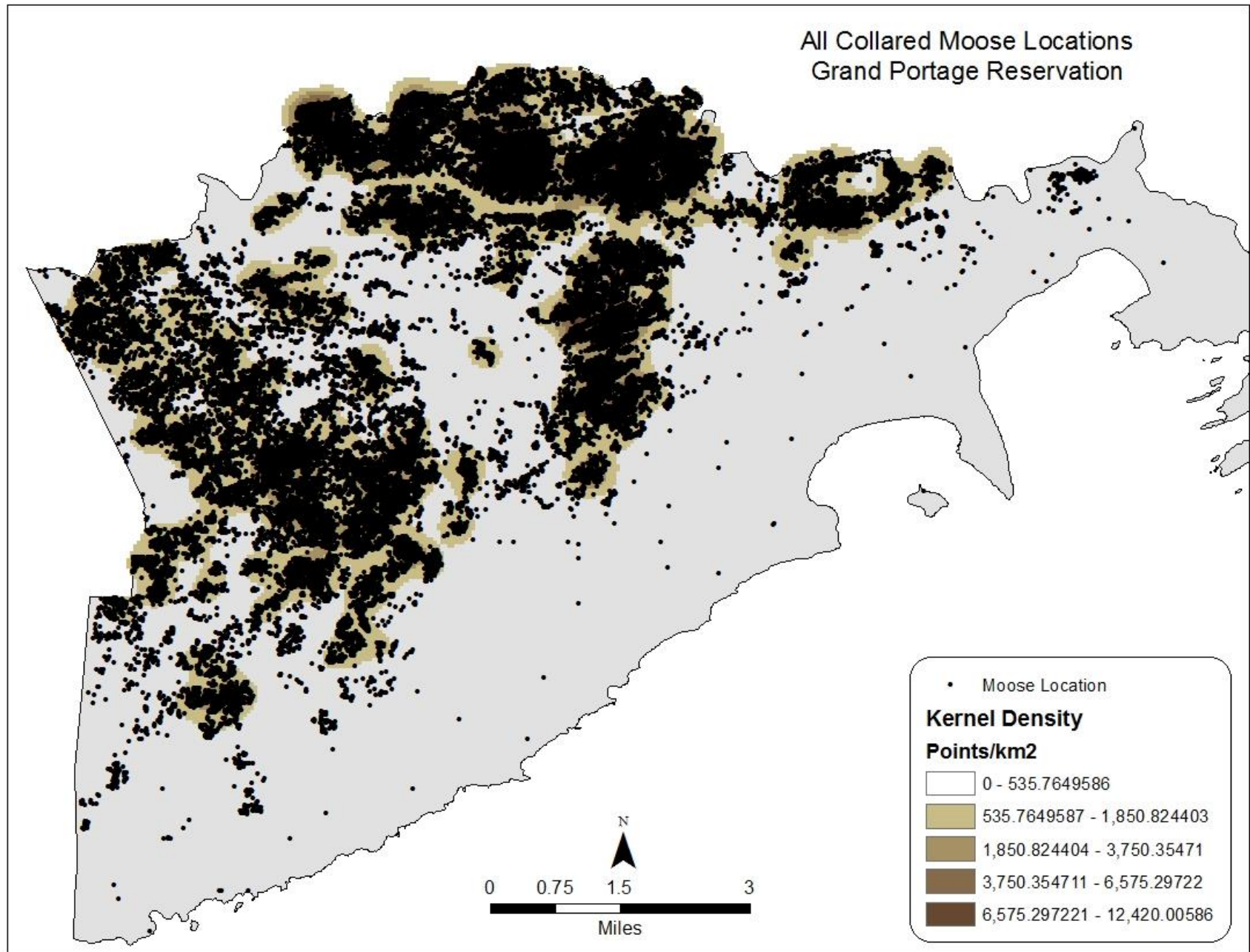
# Adult Moose Mortalities 2010-2018 (n=31)



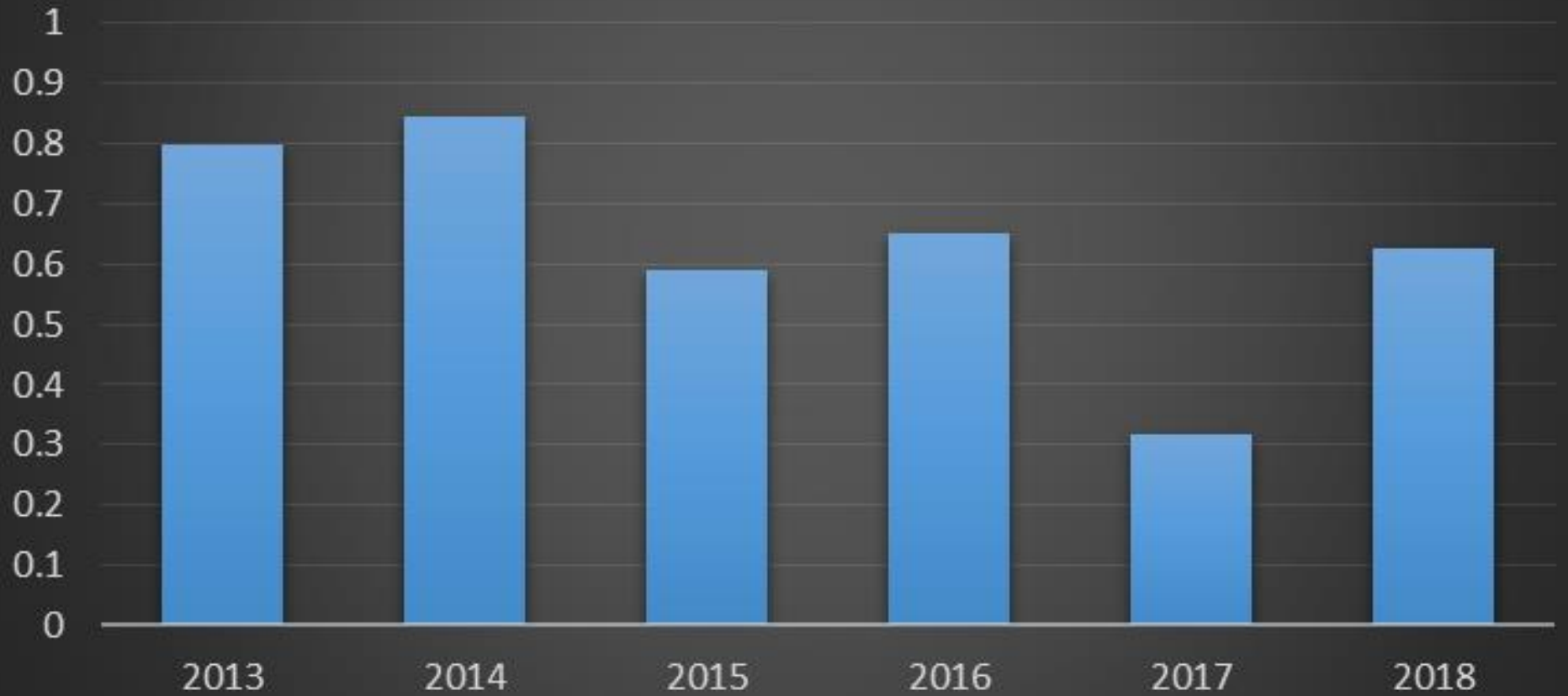
# Brainworm transmission



# Habitat use



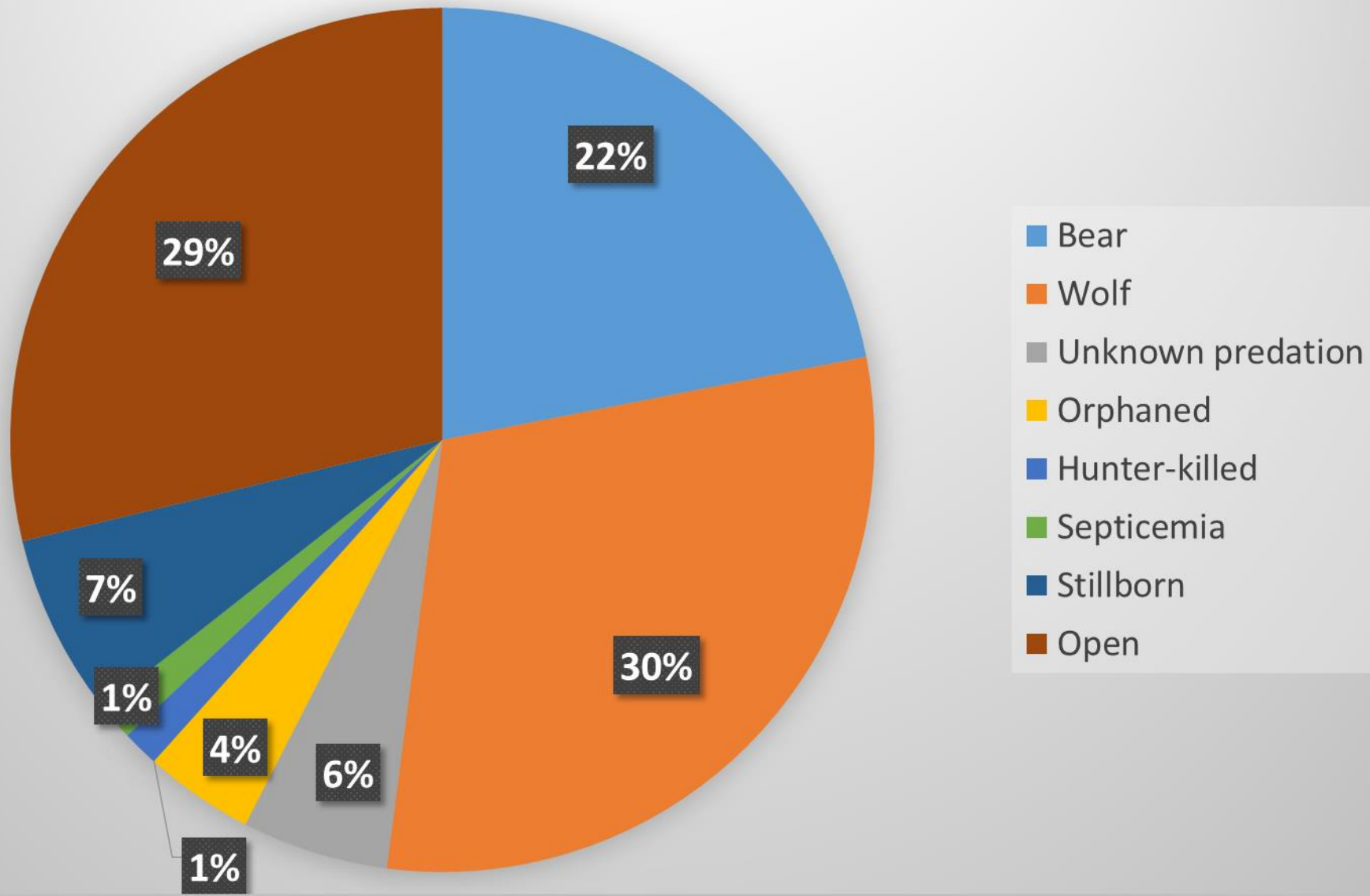
# Annual Moose Calf Mortality Rate 2013-2018





# Moose Calf Mortalities 2013-2018

(n=73)

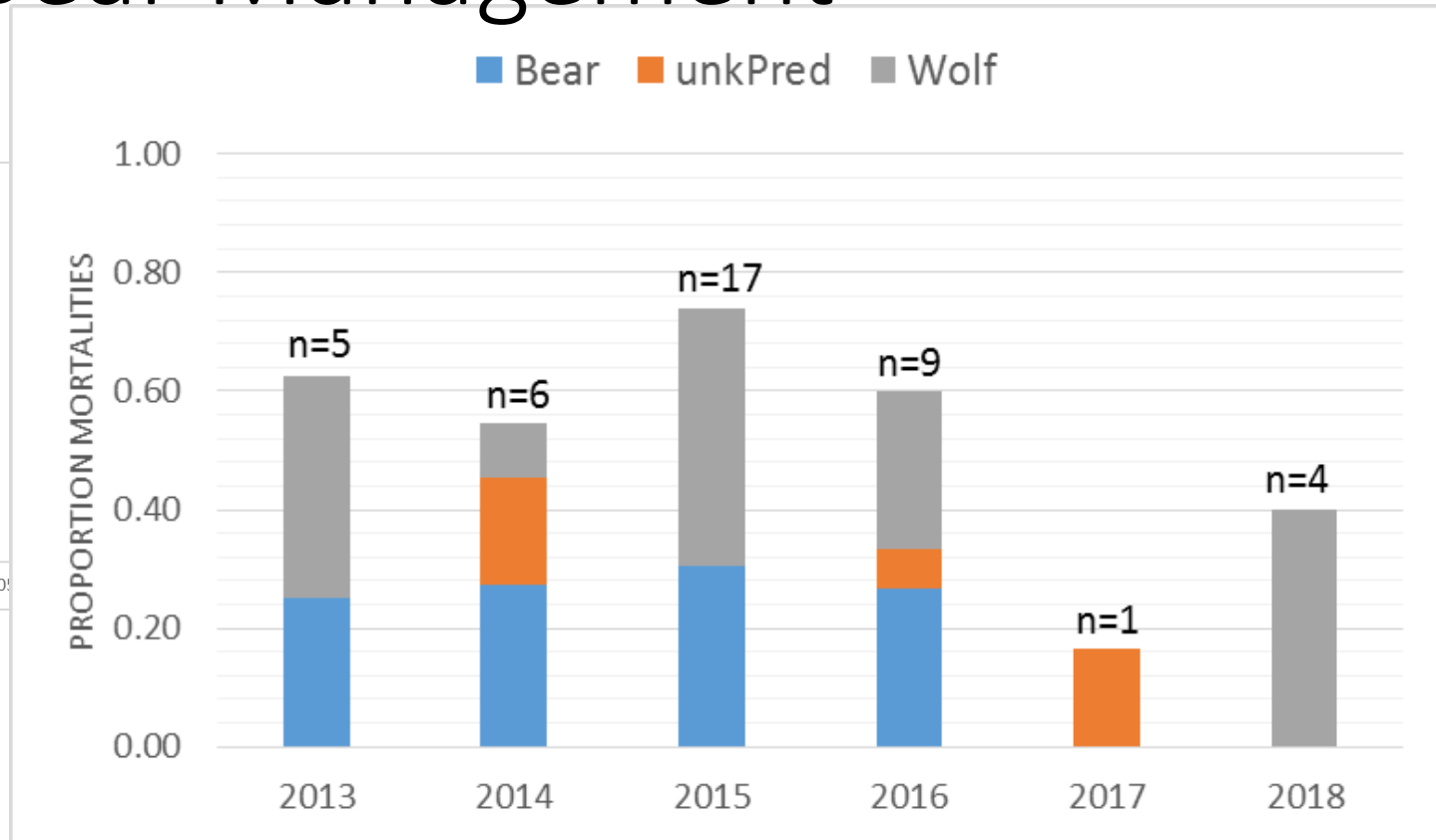


# Calf mortalities primarily a result of predation

- Next steps
  - Impacts of predator control
    - Sufficient to improve calf survival?



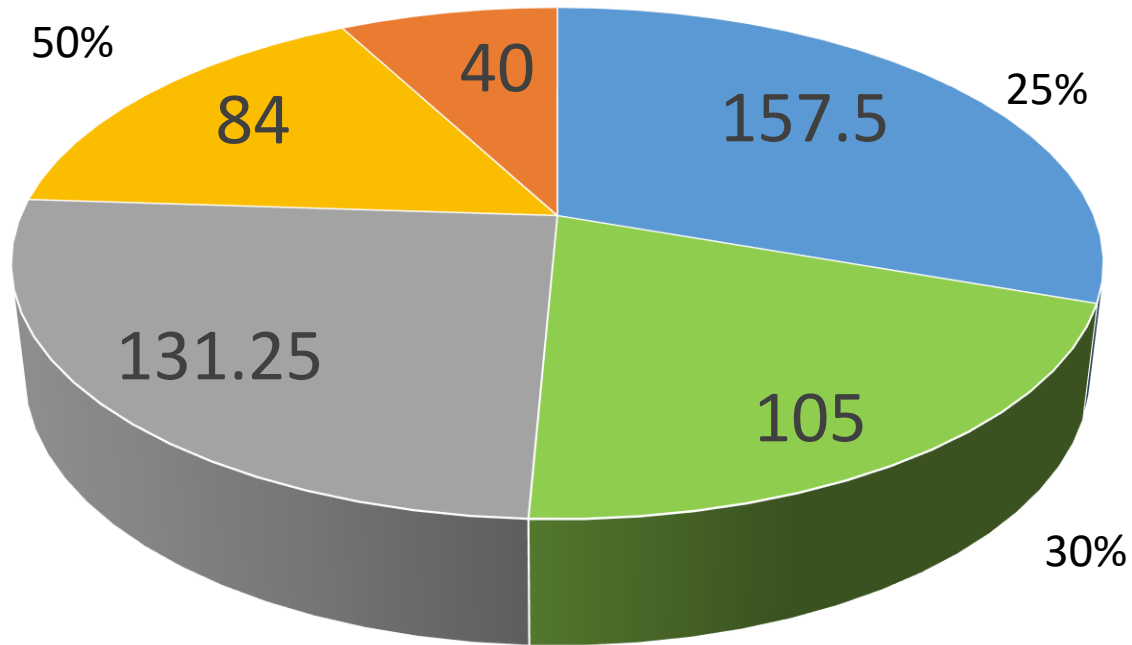
# Bear Management



16  
14  
12  
10  
8  
6  
4  
2  
0  
200

(hunting)

# Subsistence hunting mortality and other causes of mortality in a moose population of 3500



■ Brainworm

■ Winter Ticks

■ Other Health issues

■ Wolves

■ Subsistence Hunting

# Management to date

- New habitat creation
- Deer harvest increases
- Spring bear hunt

# Recommended management

- Significant habitat creation
- Reduce deer density (need 25% reduction in infection rate)
- Spring bear hunt/possible wolf management
- Wolf delisting – sovereignty issue