

The role of health in the use of human resources in urban coyotes (*Canis latrans*)



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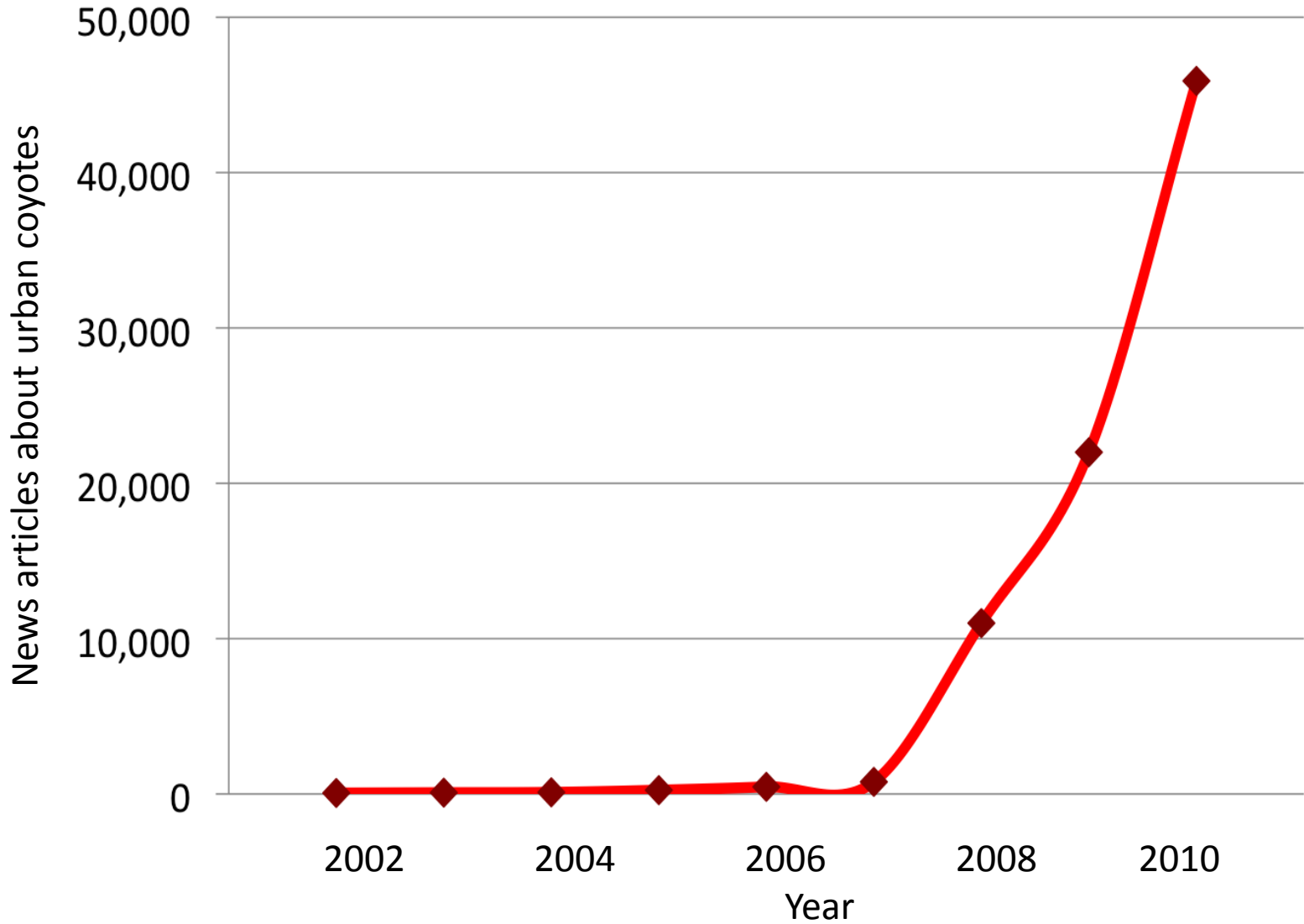
¹University of Alberta, ²Royal Alberta Museum

November 13, 2012

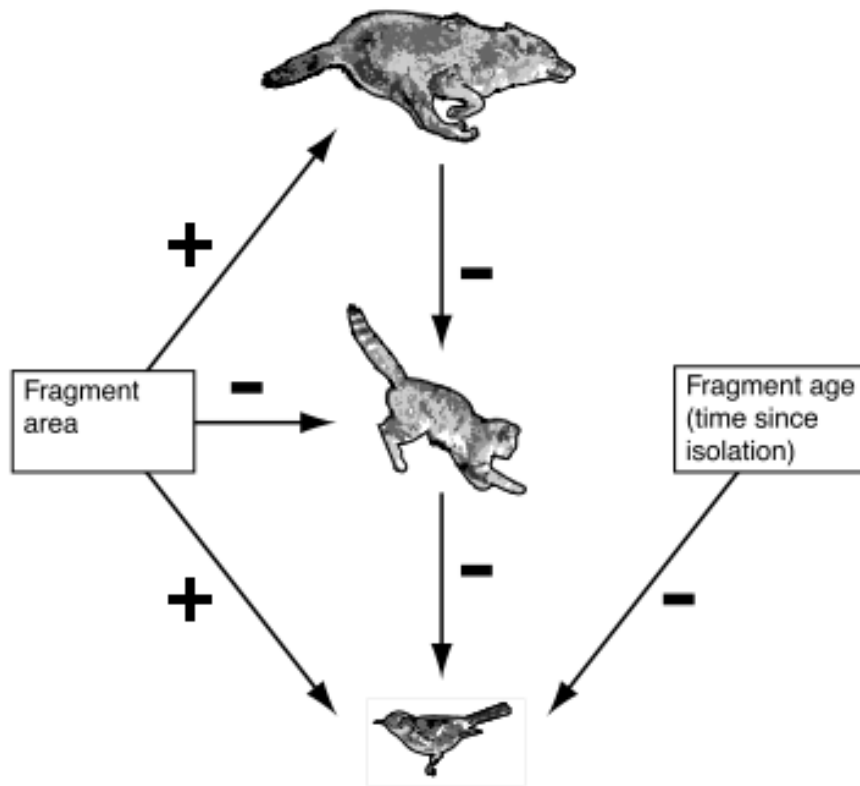
Human-coyote interactions are increasing



Human-coyote interactions are increasing



Coexisting with urban coyotes



Crooks and Soulé, 1999

Conflict behaviour



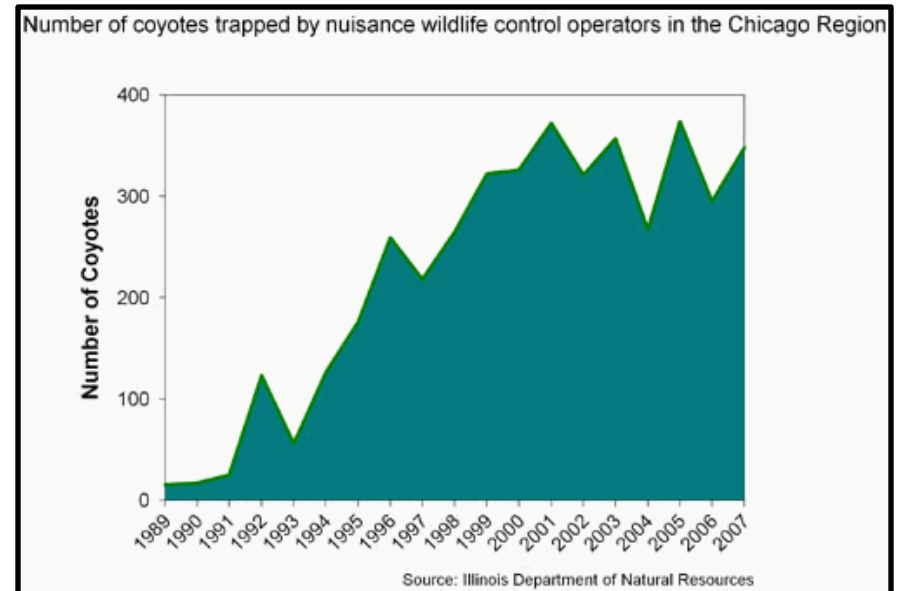
Variability in diet across cities (Gehrt, 2009)



Most are nocturnal (Kitchen, 2000)



Most prefer natural areas (Gehrt, 2009)



Why have reports increased?

Coexisting with urban coyotes

What promotes
conflict behavior?



Are certain individuals more prone to conflict?

What makes them different?

Are certain individuals more prone to conflict?

What makes them different?

Is there an interaction between urbanization and coyote behaviour?

Problem individuals?

Demographics – young, male



Experience - food conditioning



Problem individuals?

Demographics – young, male



Experience - food conditioning



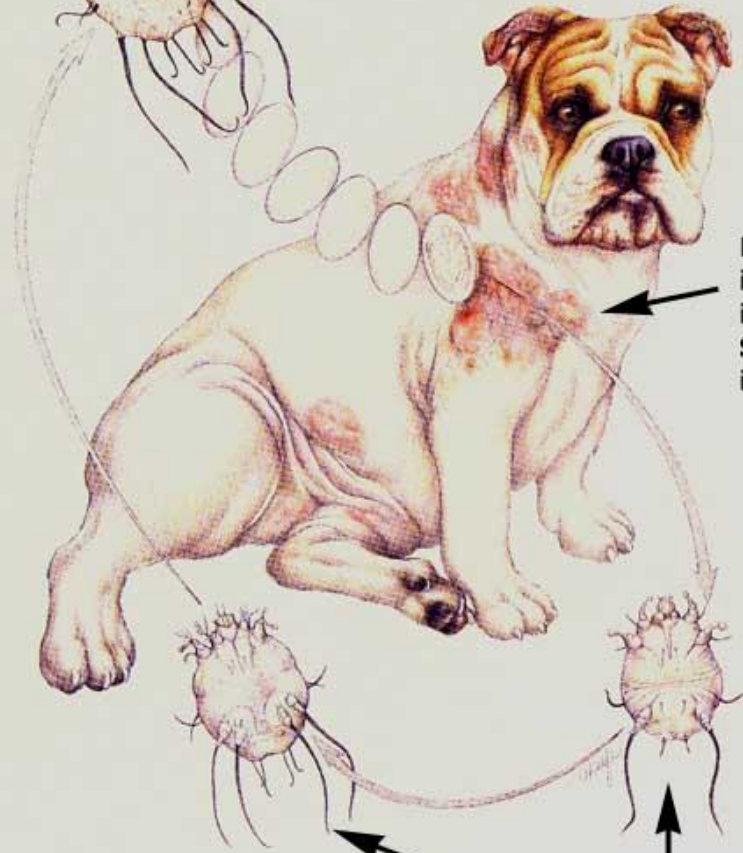
Individual state



Sarcoptes



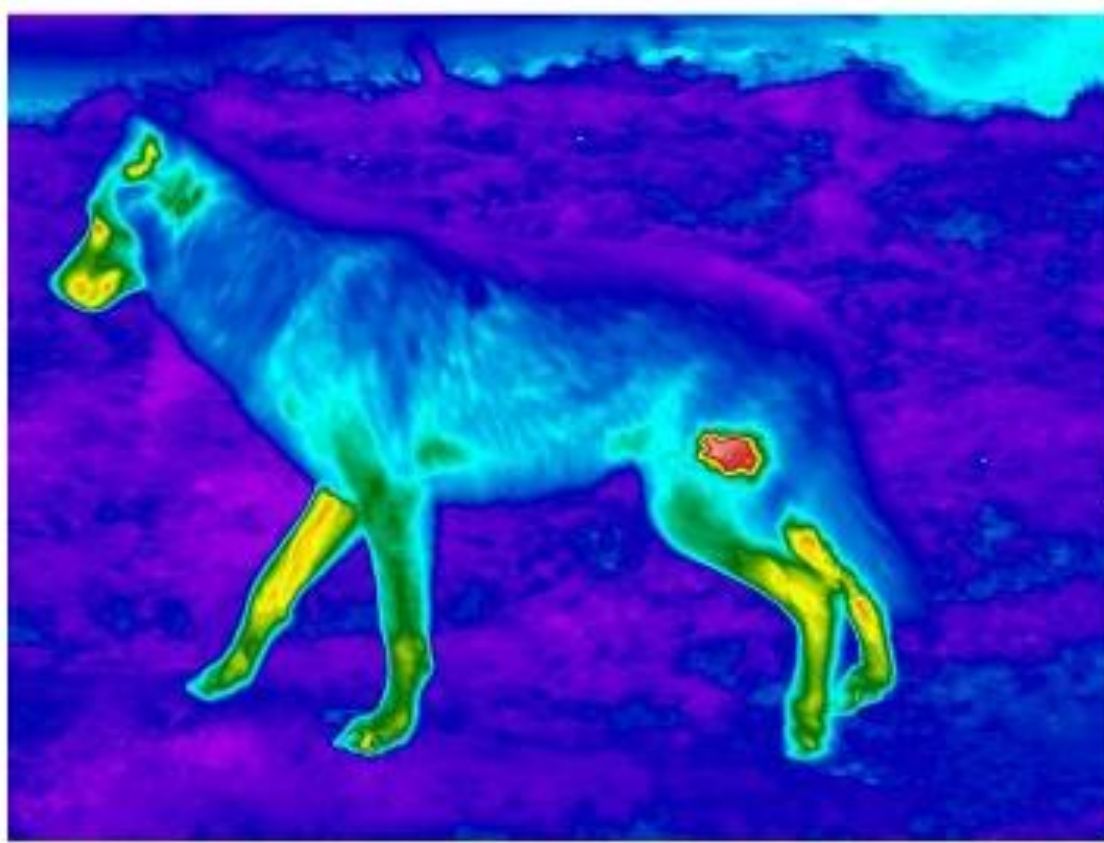
Female mites burrow into the skin and form tunnels. It is in these tunnels that the eggs are laid.



Mites cause an intense inflammatory reaction, itching and self-trauma. Secondary bacterial infections are common.

Larvae and nymphs grow in the tunnels.





USGS
 science for a changing world

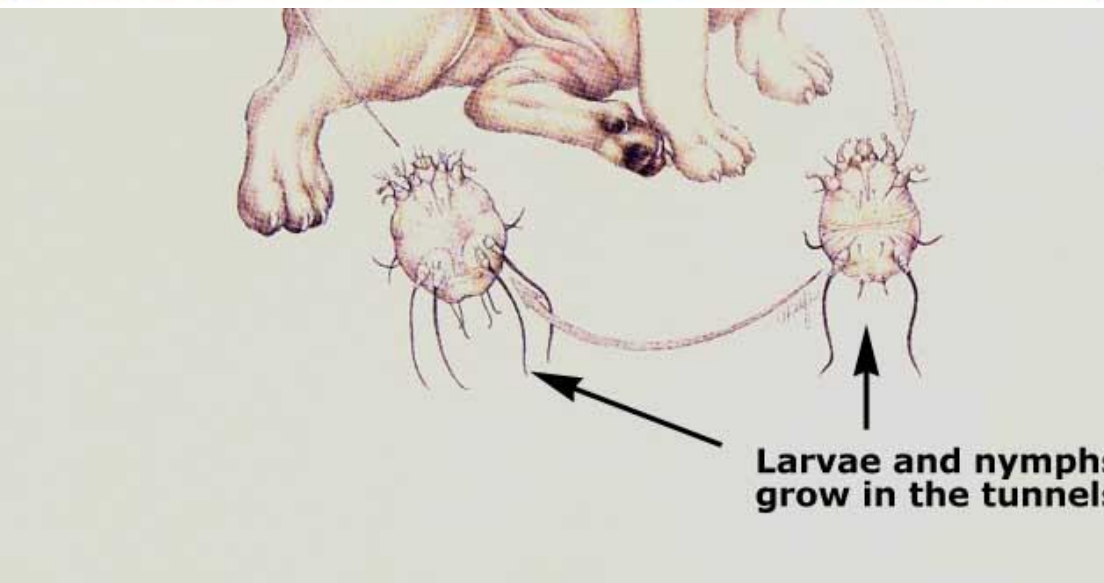
NATIONAL WILDLIFE SERVICE

40.0
 33.8
 27.5
 21.3
 15.1
 8.9
 2.6
 -3.8
 -10.0

Grizzly & Wolf
 Discovery Center

Grizzly & Wolf
 Discovery Center

A World of
 Wildlife and
 Educational Fun





23 coyotes
Padded leg hold traps
3 hour fix rates



23 coyotes
Padded leg hold traps
3 hour fix rates

12 healthy



11 mangy



23 coyotes
Padded leg hold traps
3 hour fix rates

12 healthy



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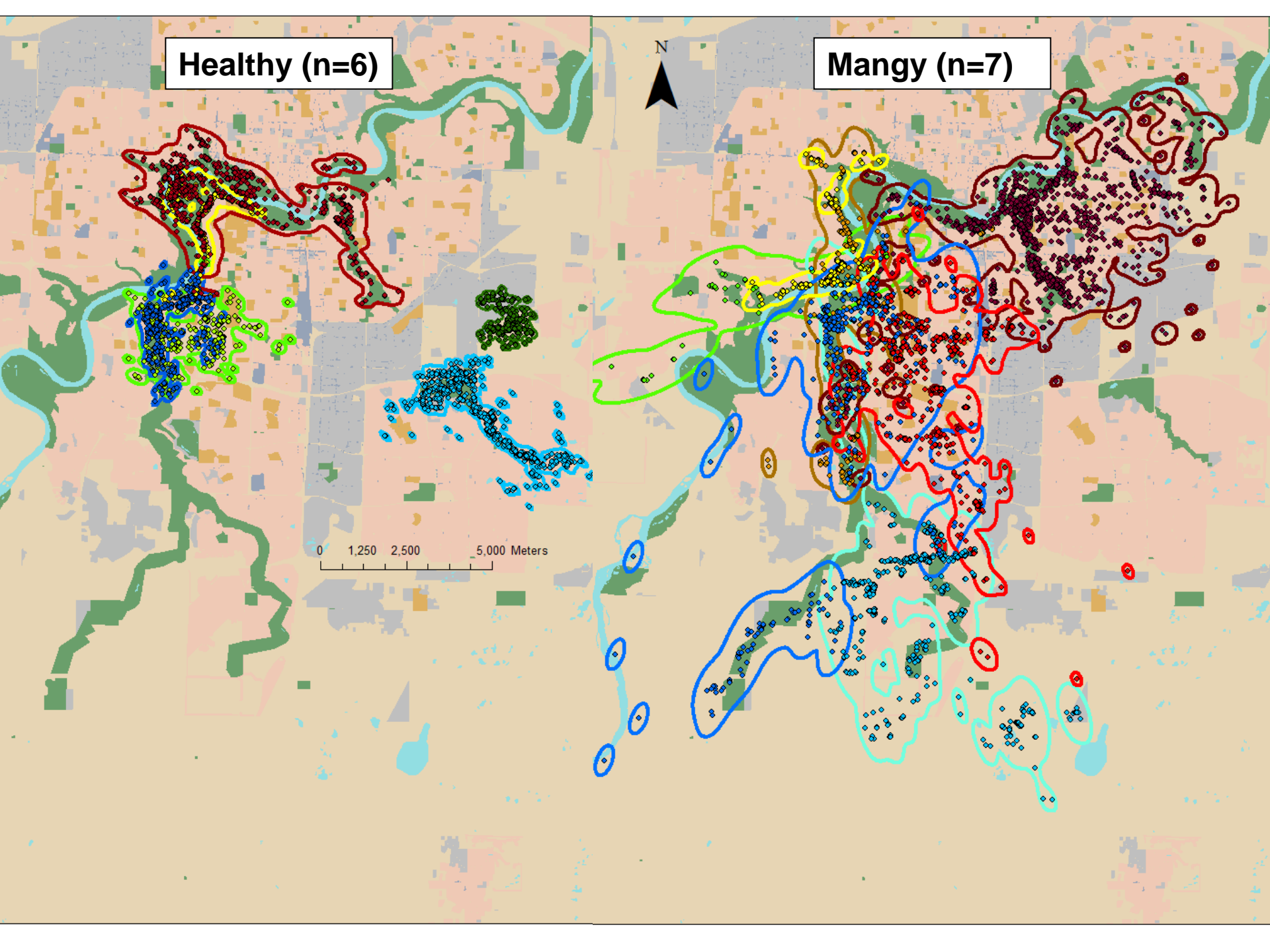


Hair loss and lesions



Healthy (n=6)

Mangy (n=7)



Healthy (n=6)

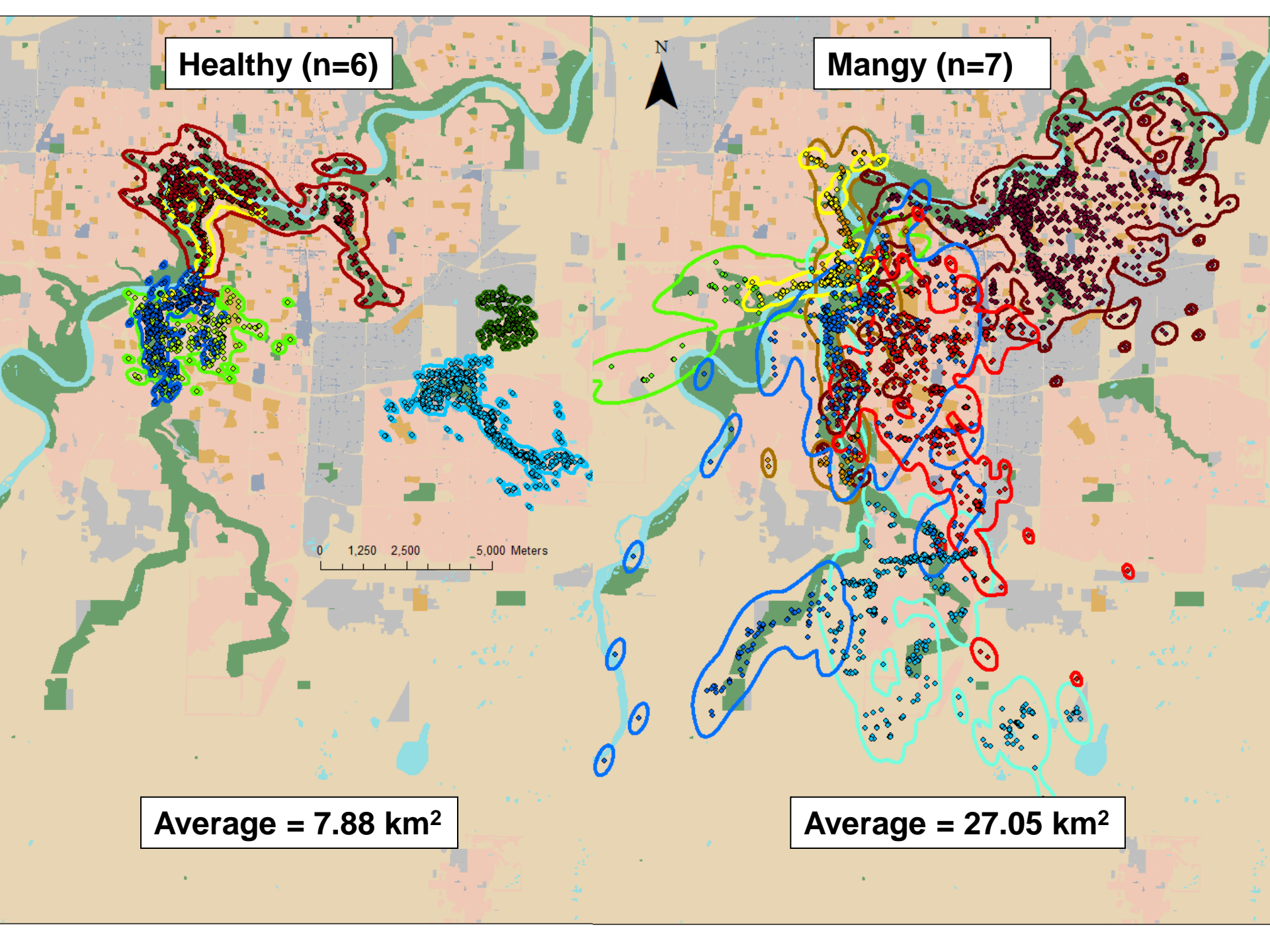
Mangy (n=7)



0 1,250 2,500 5,000 Meters

Average = 7.88 km²

Average = 27.05 km²

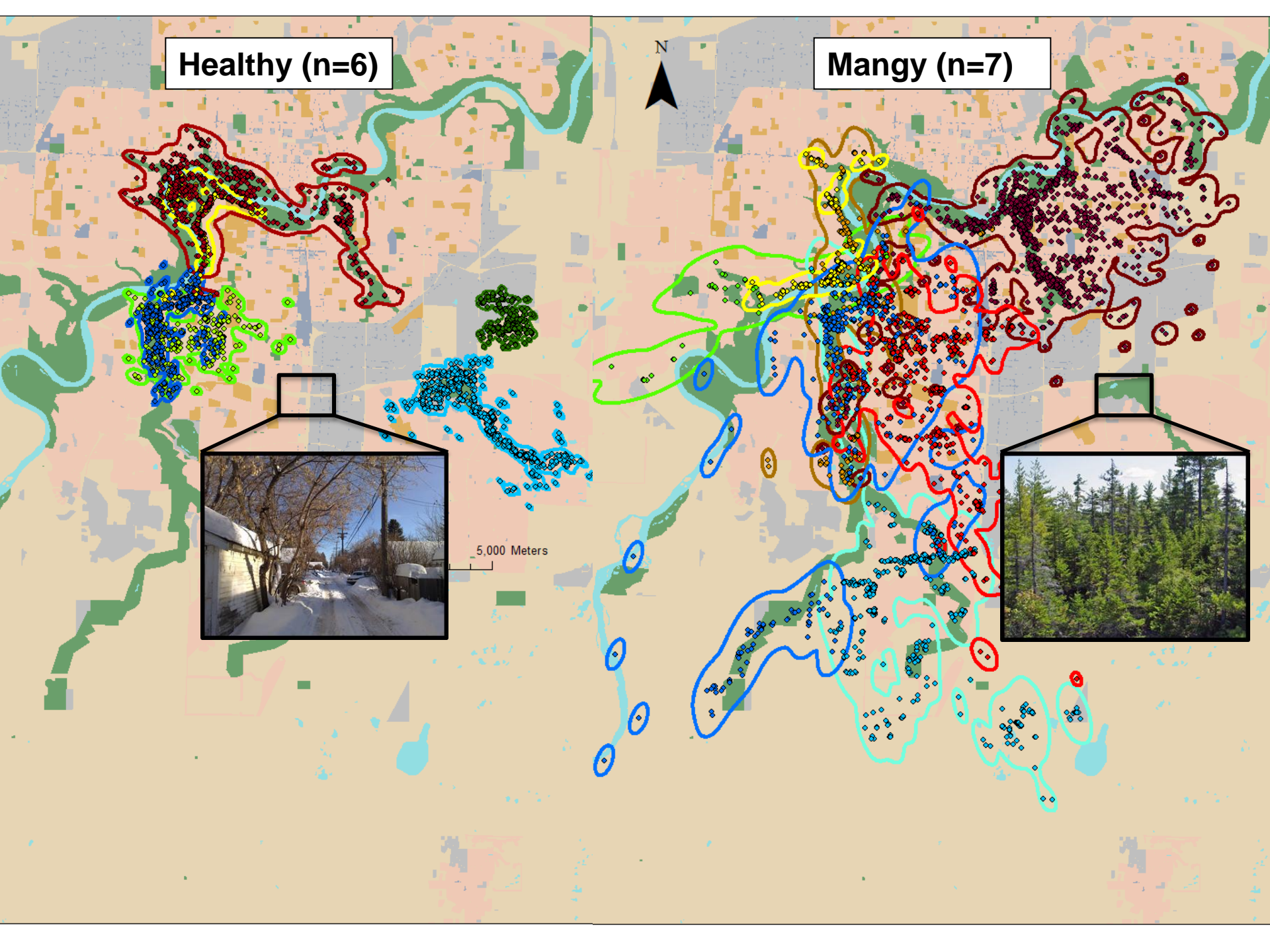


Healthy (n=6)

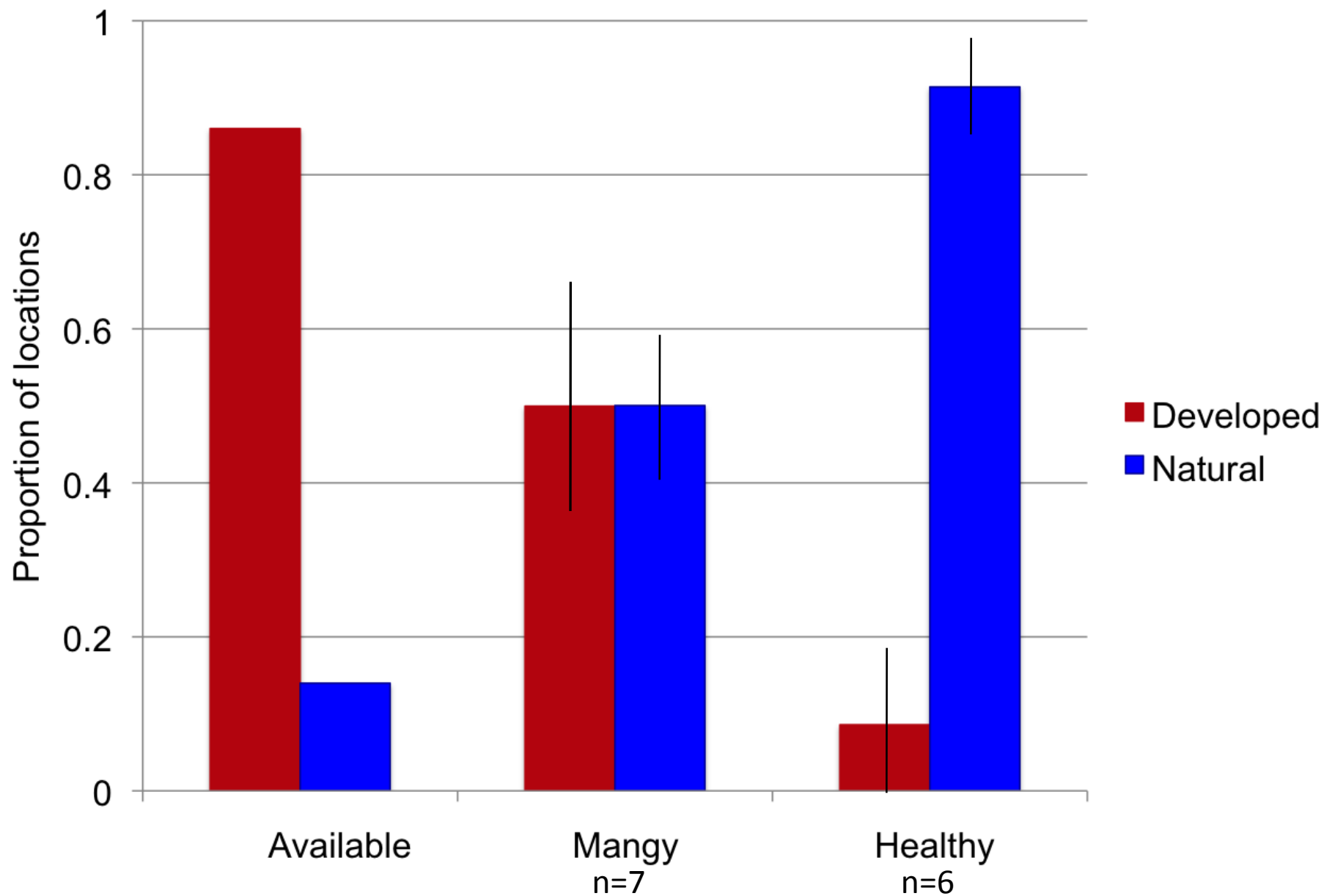
Mangy (n=7)



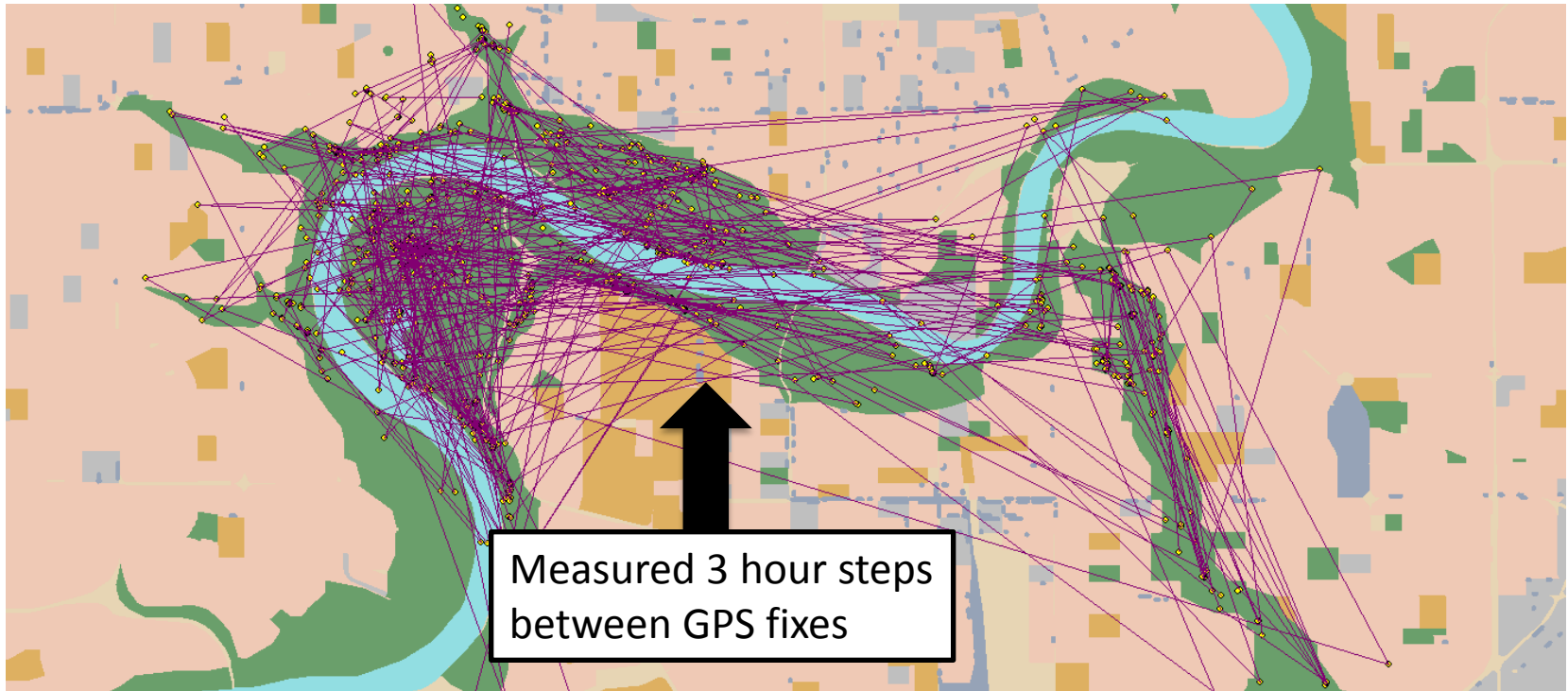
5,000 Meters



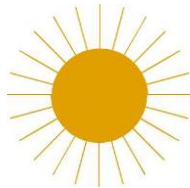
Coyotes in poor condition used more developed habitat



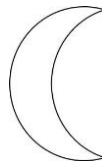
Activity patterns



± 1 hour



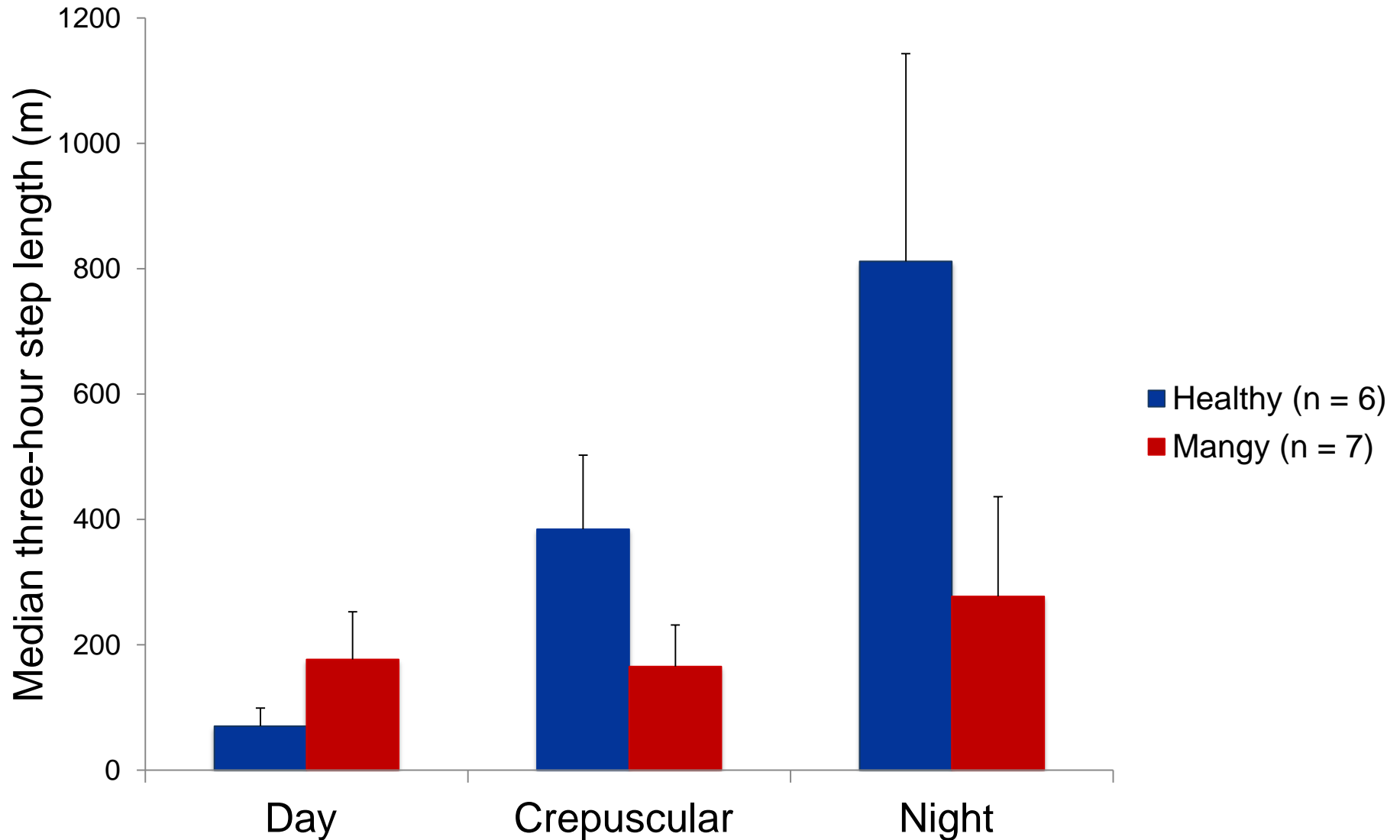
± 1 hour



GLMM

- Activity dependent on time?
 - Healthy and mangy
- Random effect for individual

Mangy coyotes were less nocturnal



Diet selection – Stable isotope analysis

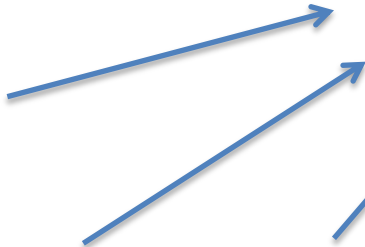


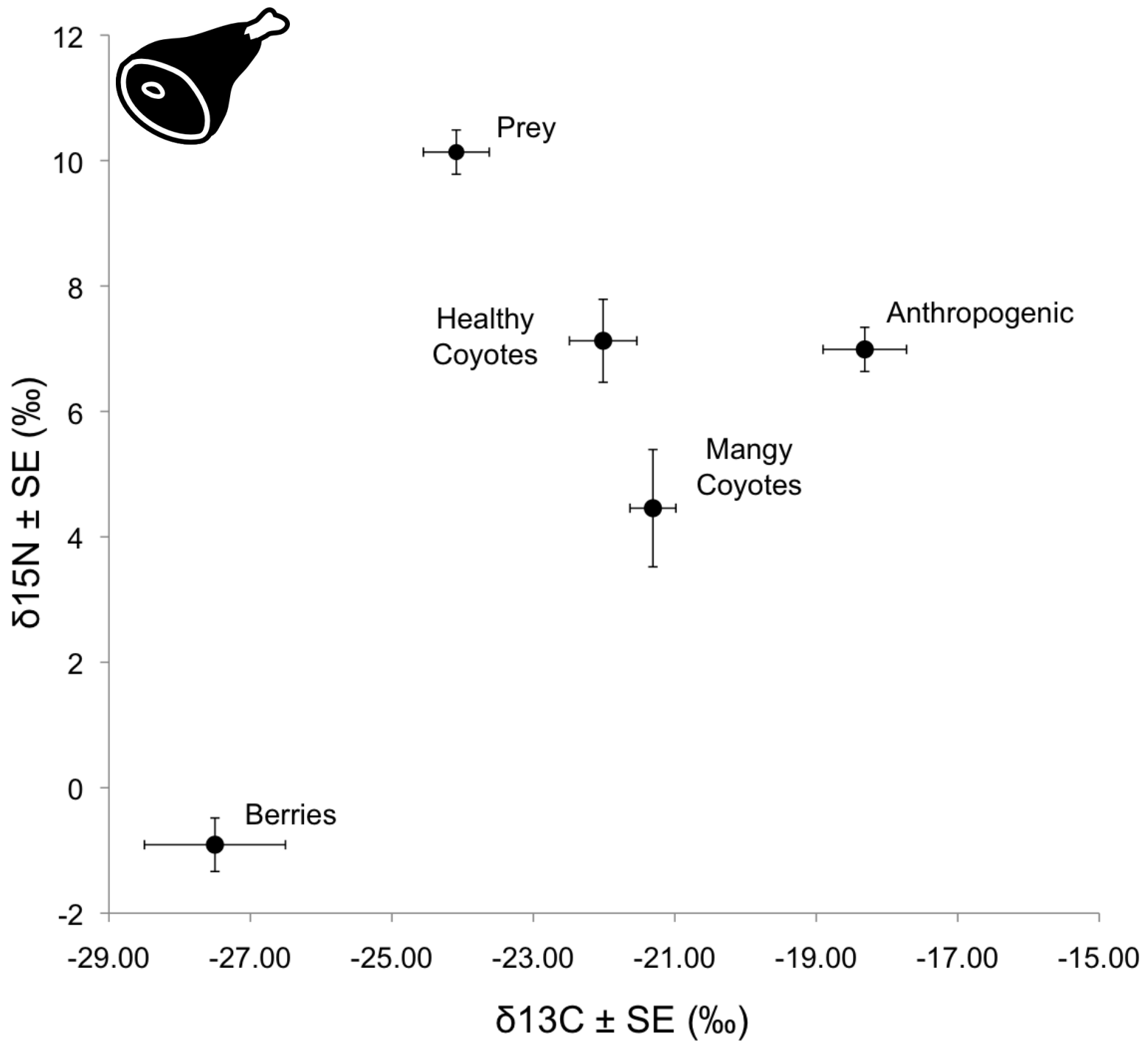
Diet selection – Stable isotope analysis

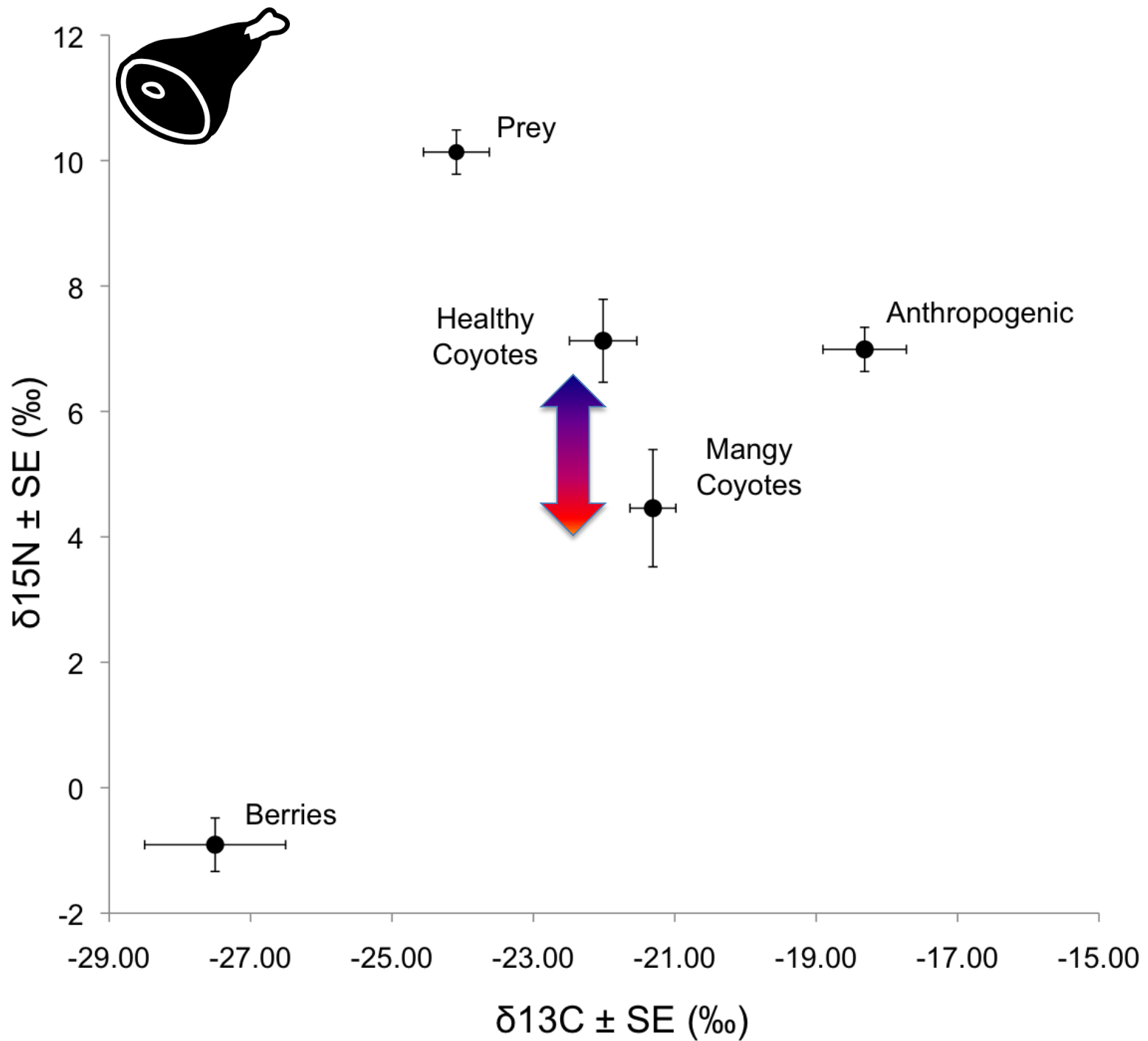


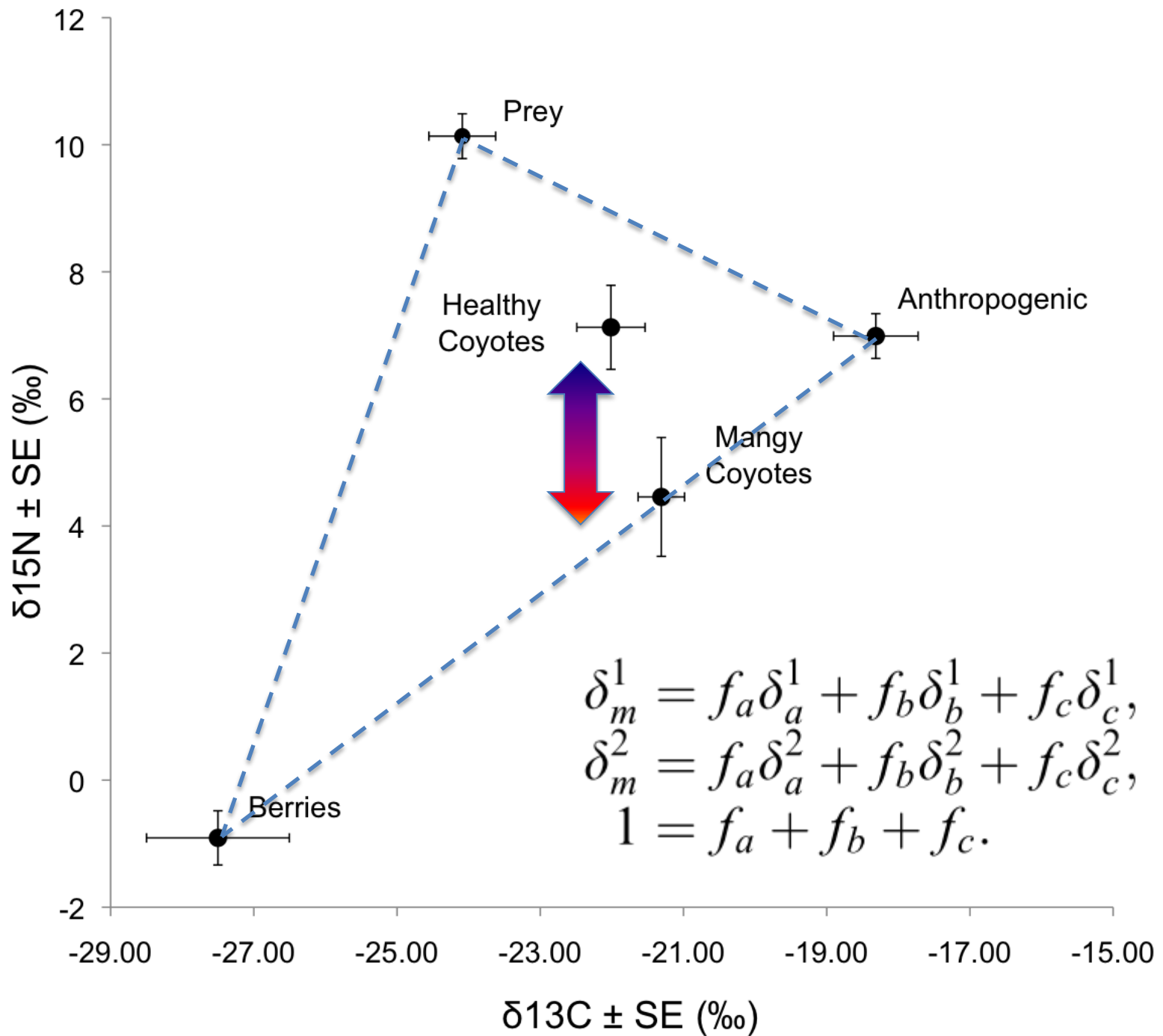
Collected coyote and prey hair samples

108 prey samples collected

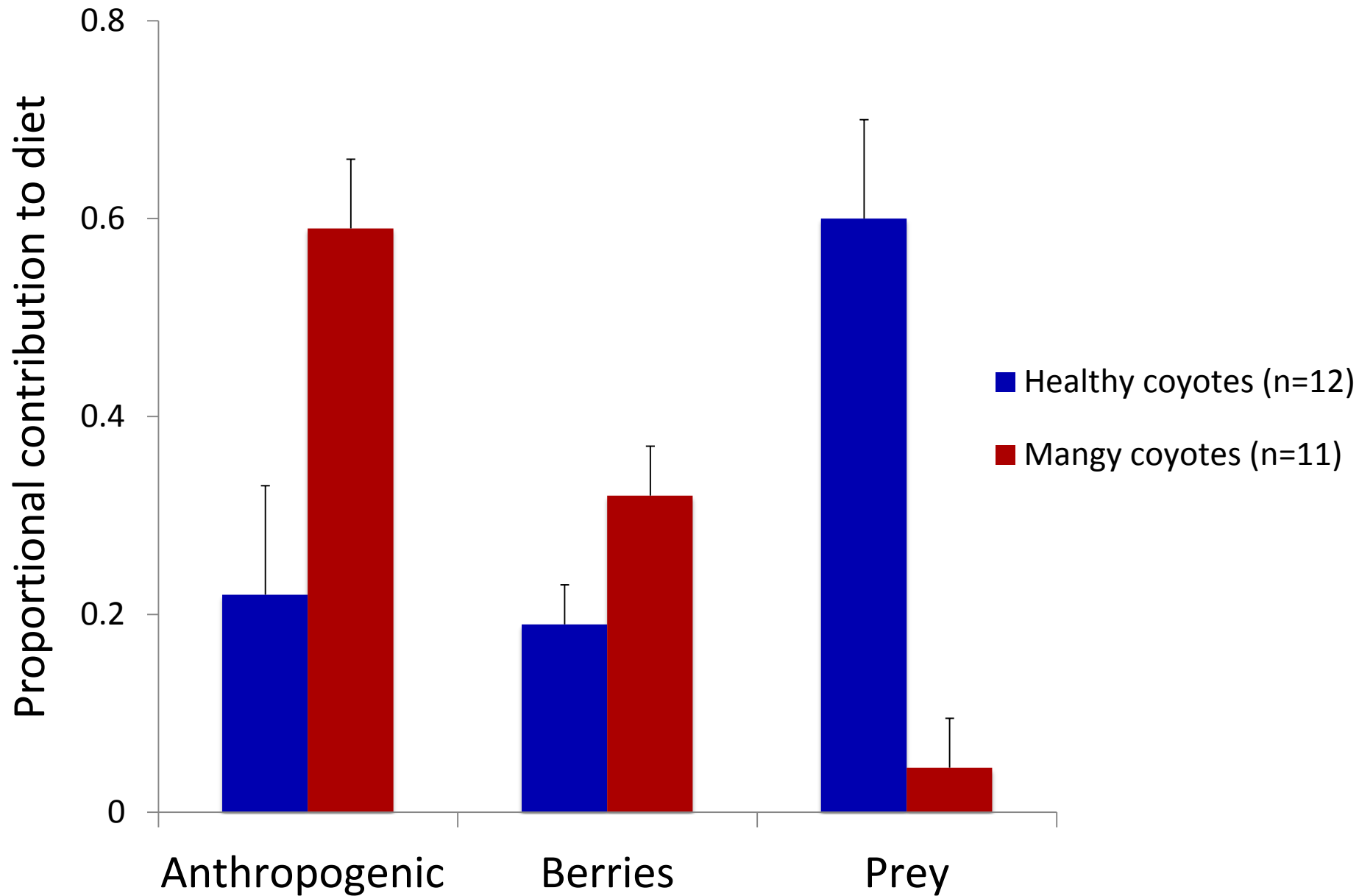









Mangy coyotes assimilated more human food and less prey



State dependent behaviour

- Coyotes with mange
 - Had larger home ranges
 - Used more developed area
 - Were less nocturnal
 - Ate more human food


State dependent behaviour

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- 
- More interactions with people

State dependent behaviour

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- Ate more human food



More
interactions
with people

Thermoregulation

Mobility

Transient status

Necessity and human resources

Compromised body condition

Necessity and human resources

Compromised body condition



Decreases availability of resources

Necessity and human resources

Compromised body condition



Decreases availability of resources



Increases necessity for obtainable food

Necessity and human resources

Compromised body condition



Decreases availability of resources



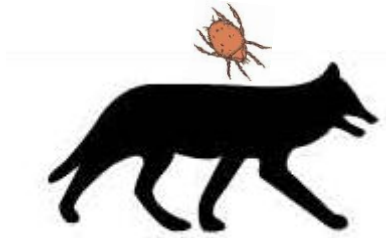
Increases necessity for obtainable food



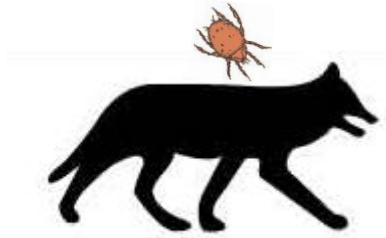
Less wary of people (Todd et al., 1981; Samuel et al., 2001)



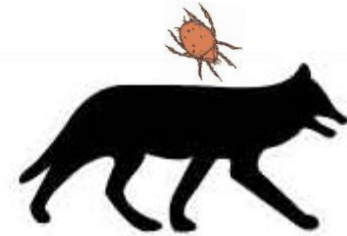
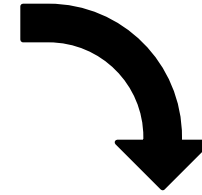
Marginal
individual



Marginal individual

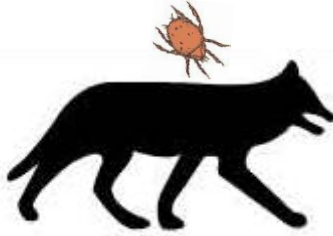


- ↓ Thermoregulation
- ↓ Agility or mobility
- ↓ Competitive ability

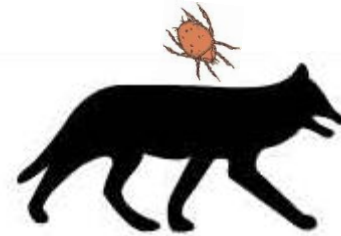
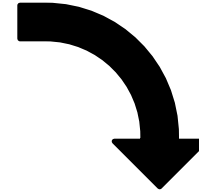


Behavioural change

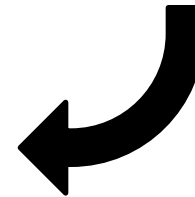
Marginal individual



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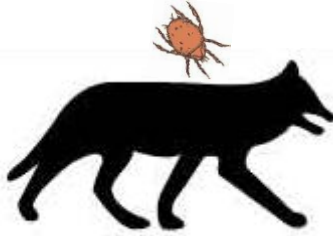
Behavioural change



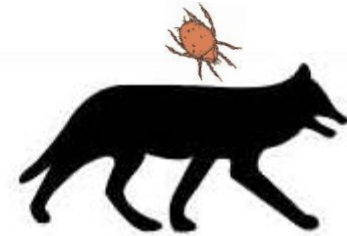
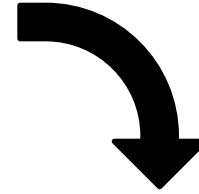
Consumes human food

- ↓ Foraging efficiency
- ↑ Exclusion from productive areas

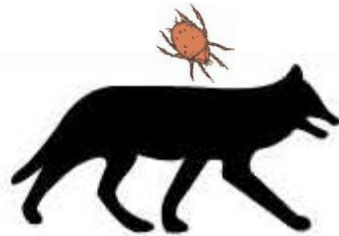
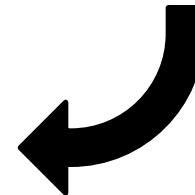
Marginal individual



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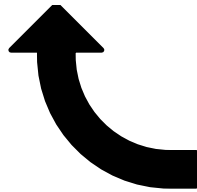


Behavioural change



Consumes human food

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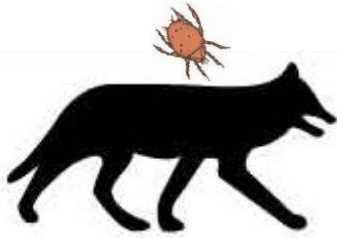


Human-modified habitat

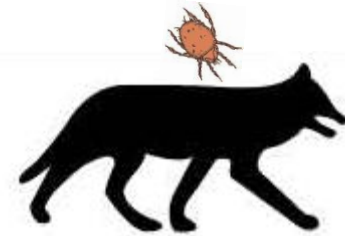
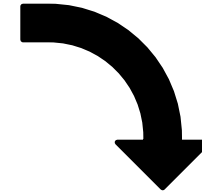
↑ Food conditioning

- ↑ Parasite exposure
- ↑ Risk of vehicle mortality
- ↑ Interactions with people

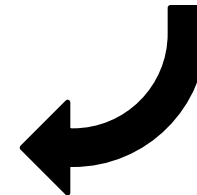
Marginal individual



- ↓ Thermoregulation
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Behavioural change

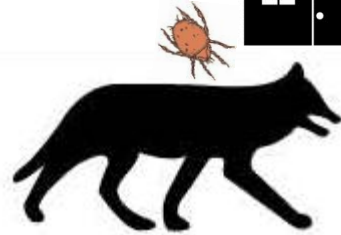
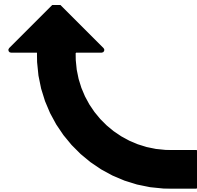


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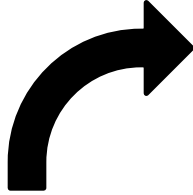


Consumes human food

- ↑ Food conditioning



Human-modified habitat

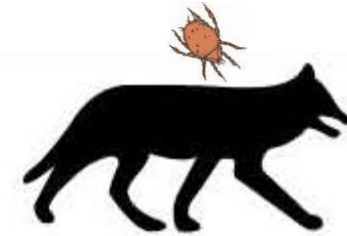
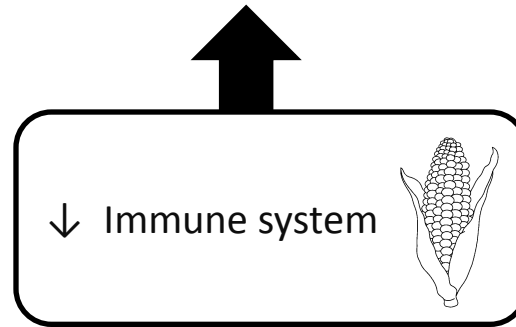
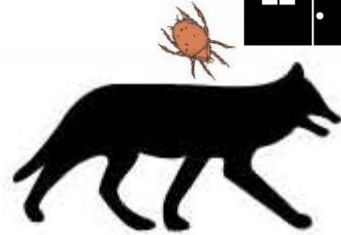


- ↑ Parasite exposure
- ↑ Risk of vehicle mortality
- ↑ Interactions with people

Marginal individual

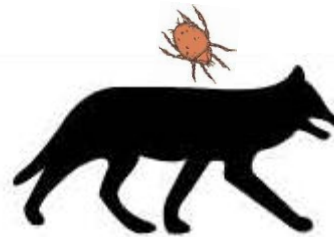
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Human-modified habitat



Behavioural change

↑ Food conditioning



Consumes human food

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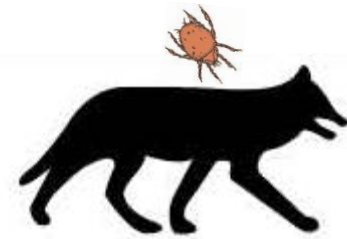
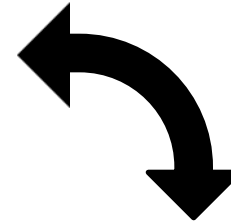
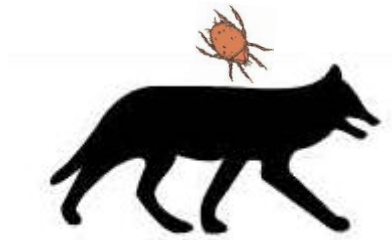
Ezenwa, 2004

Monello and Gompper, 2010

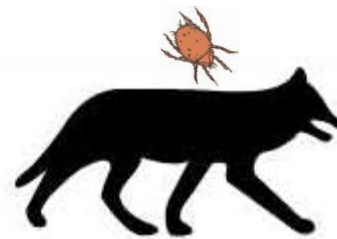
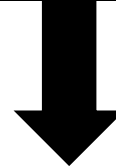
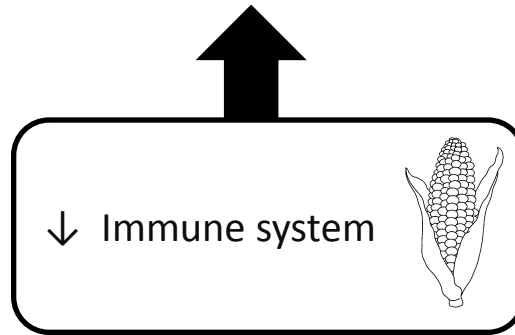
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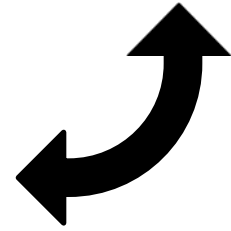
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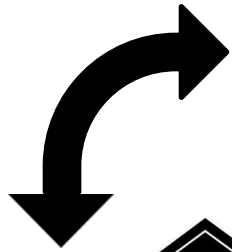
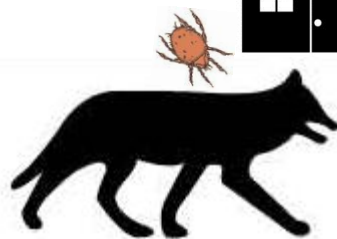


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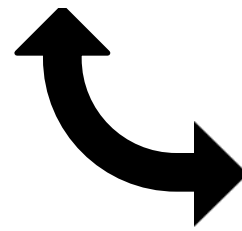


- ↓ Foraging efficiency
- ↑ Exclusion from productive areas

Human-modified habitat



- ↑ Food conditioning



Management applications

- Minimize features that retain marginal individuals
- Minimize aggregations of wildlife around large food sources
- Large scale trapping efforts may be ineffectual and counter-productive



Other contexts



Future directions

- Parasite transmission at compost piles



Future directions

- Parasite transmission at compost piles



Future directions

- Parasite transmission at compost piles



Thank You!



Bill Abercrombie
Mark Edwards
Alessandro Massolo
Dave Latham, Shelley Pruss, Darcy Visscher
City of Edmonton
SRD

Assistants
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Leonie Brown
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Adam Cembrowski
Forrest Gainer
Jesse Hill
Caitlin Mader
Steve Pasichnuk
Amelie Roberto-Charron
Tobias Tan
Amy Wisselink



