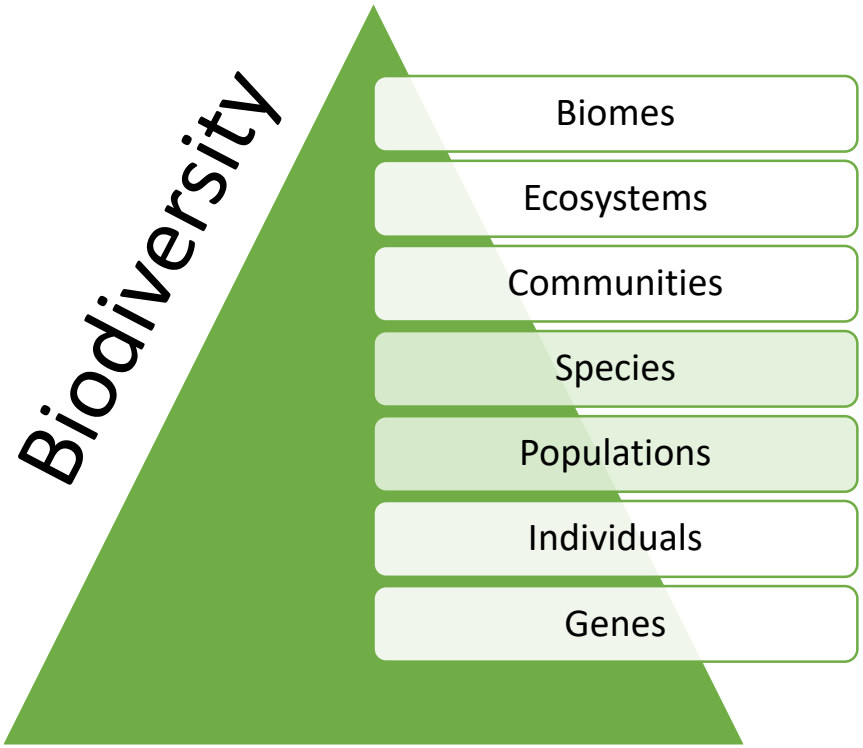
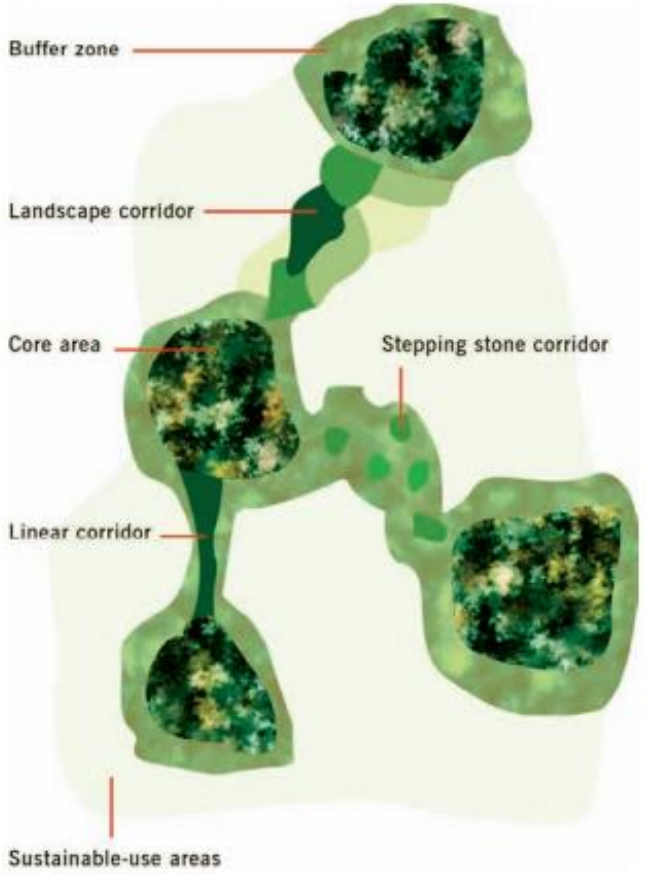
Municipalities & Biodiversity: Tools & Policies to Measure & Mitigate Biodiversity Loss

Colleen Cassady St. Clair

Department of Biological Sciences

Biological Organization of Biodiversity





Goal: Preserve biodiversity in urban areas by maintaining a network of natural areas that support ecological processes

Urban wildlife takes many forms

After McKinney 2002 *Bioscience*

Avoiders

Adapters

Exploiters

Studies of Urban Avoiders

- How do rodents, forest birds, and wolves perceive and cross roads?
- How do leash by-laws and mowing practices affect rodent and forest bird diversity in urban parks?
- How do temperate and tropical birds find and use habitat corridors in agricultural and urban landscapes?

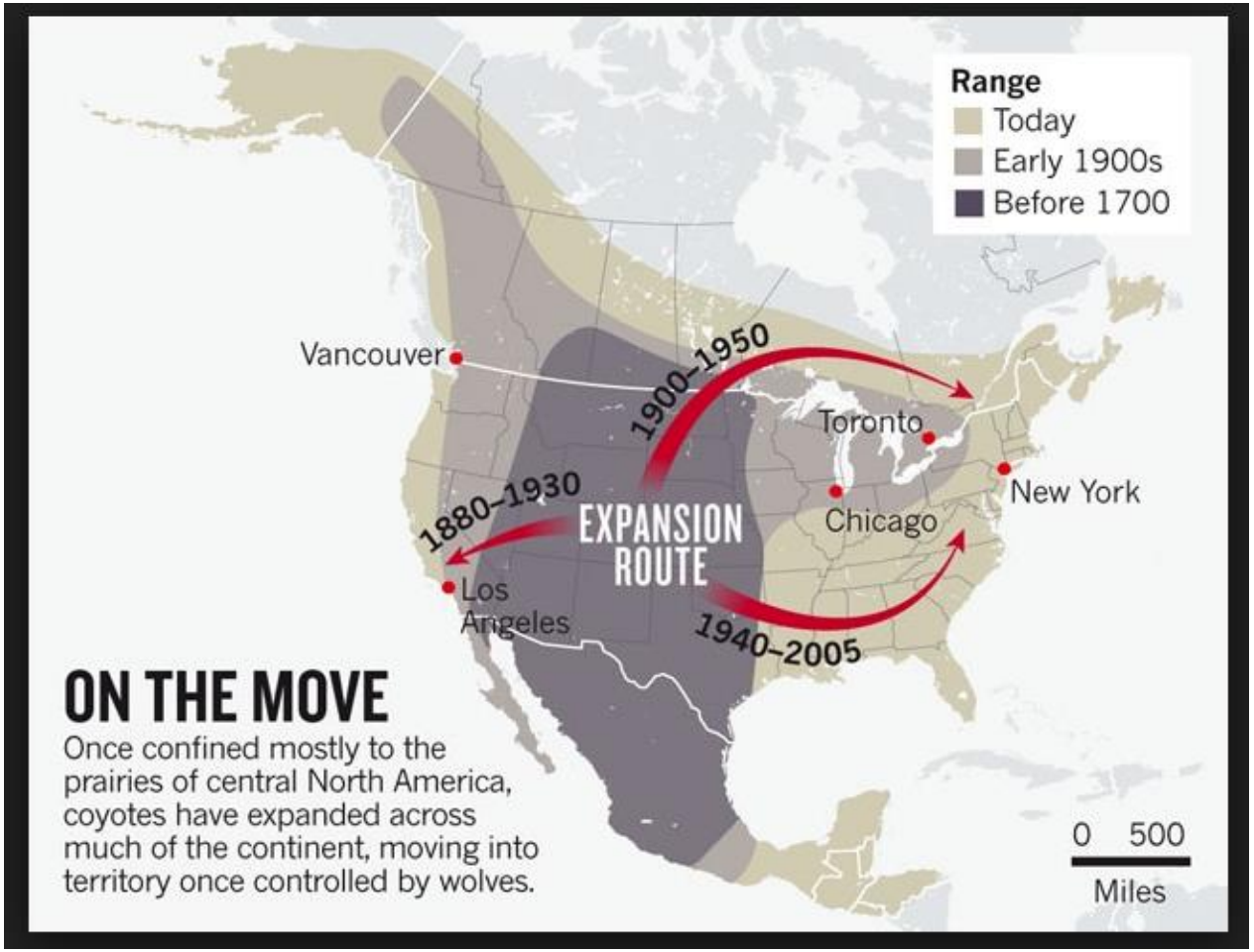
Studies of Urban Adapters

- Which landscape features support persistence of forest birds in urban areas?
- How do song characteristics of species vary with their abundance across a gradient of traffic noise?

- Can chickadees actually change song pitch in response to changing traffic noise? (Yes!)

Studies of adapters and exploiters in human-wildlife conflict

Coyote range has expanded; Urban coyotes occupy every city



Source: S. Gehrt, Illinois Coyote Project

THE EDMONTON URBAN COYOTE PROJECT

Urban Coyotes
Report a Sighting!
Coyote Ecology
Avoiding Conflict

The Project
About Us
Research
Outreach & Education
Get Involved!

Wildlife in the City
About Urban Wildlife
Photo Gallery
Frequently Asked Questions
Contact Us

The Project

The Edmonton Urban Coyote Project is a multi-faceted study on coyotes from in the lab of Dr. Colleen Cassady St. Clair at the University of Alberta. We are collecting information in three main areas: coyote movement and habitat selection, diet of coyotes, and the knowledge and perceptions of residents about coyotes.

Our goal

We wish to provide information that will promote positive interactions between people and wildlife while minimizing the need for lethal management of coyotes.

What we do

We use GPS collars to track coyotes and we analyze their scat to learn how they use and move through the urban landscape.

We need your help!

Another important source of information is you! If you encounter a coyote, please let us know by following the instructions provided under "report a sighting".

Edmonton has the most extensive stretch of urban parkland in North America, home to numerous species of urban wildlife including beavers, squirrels, foxes, coyotes and dozens of species of aquatic and terrestrial birds.

Two essential collaborators

Bill Abercrombie, CEO
Animal Damage Control

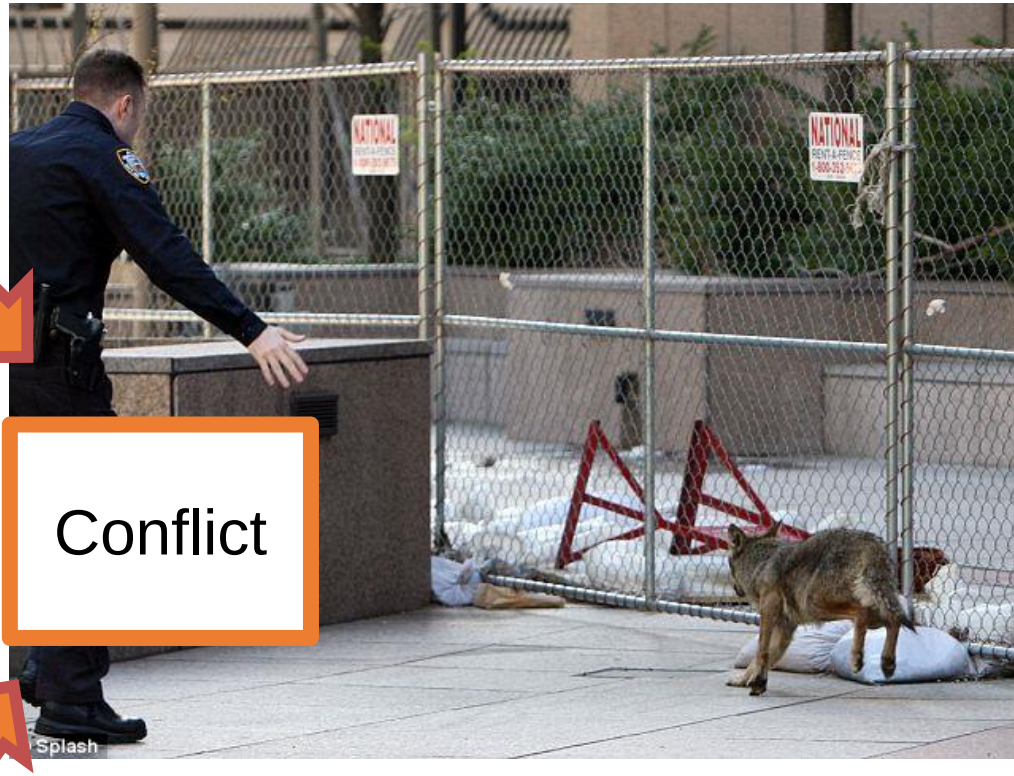
Maureen Murray, Ph.D. University of Alberta, 2015

Habitat Selection and Movement

Diet

Condition

Which contribute to conflict?



Conflict

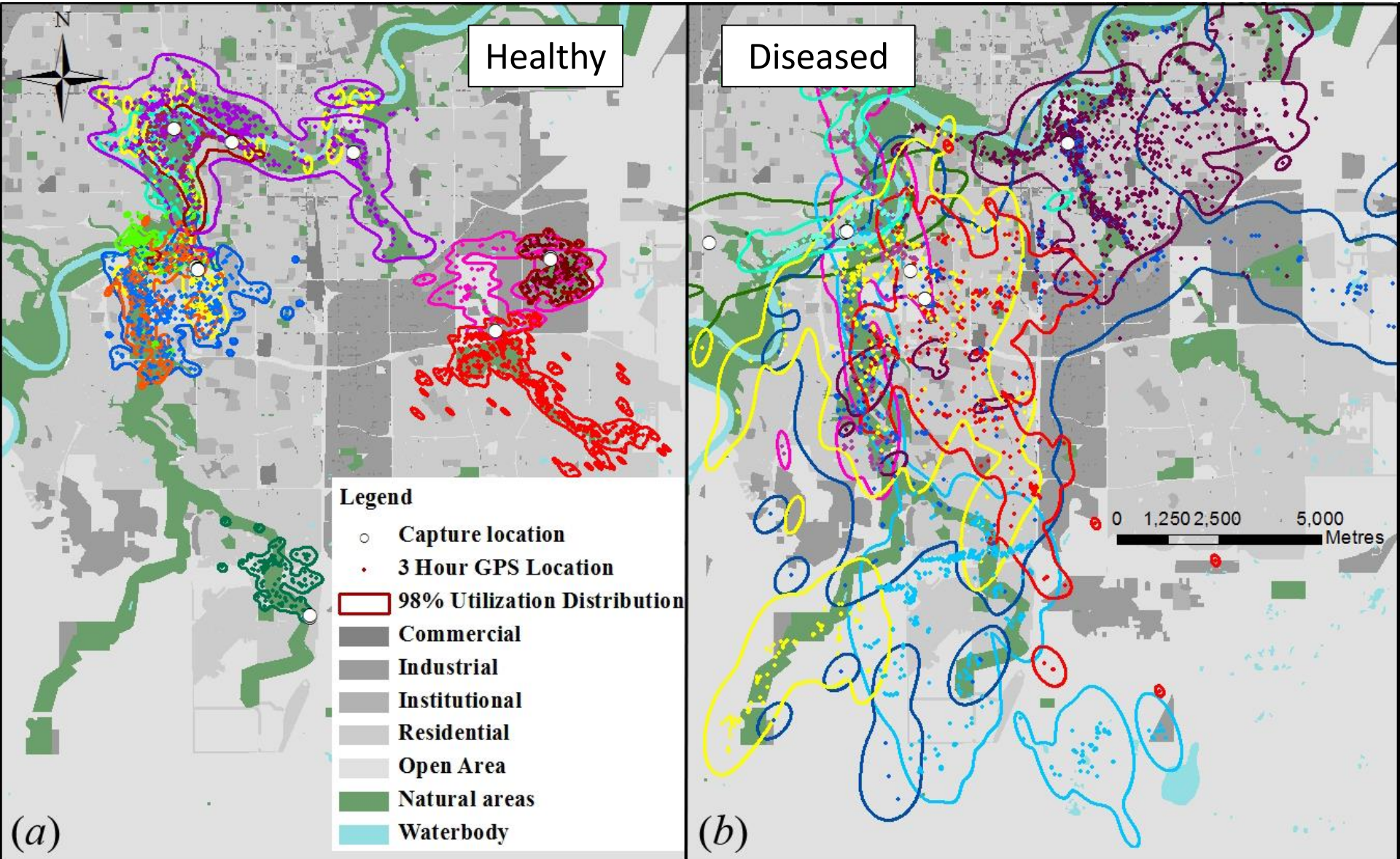
Can they be mitigated?

Some coyotes fitted with GPS collars had mange

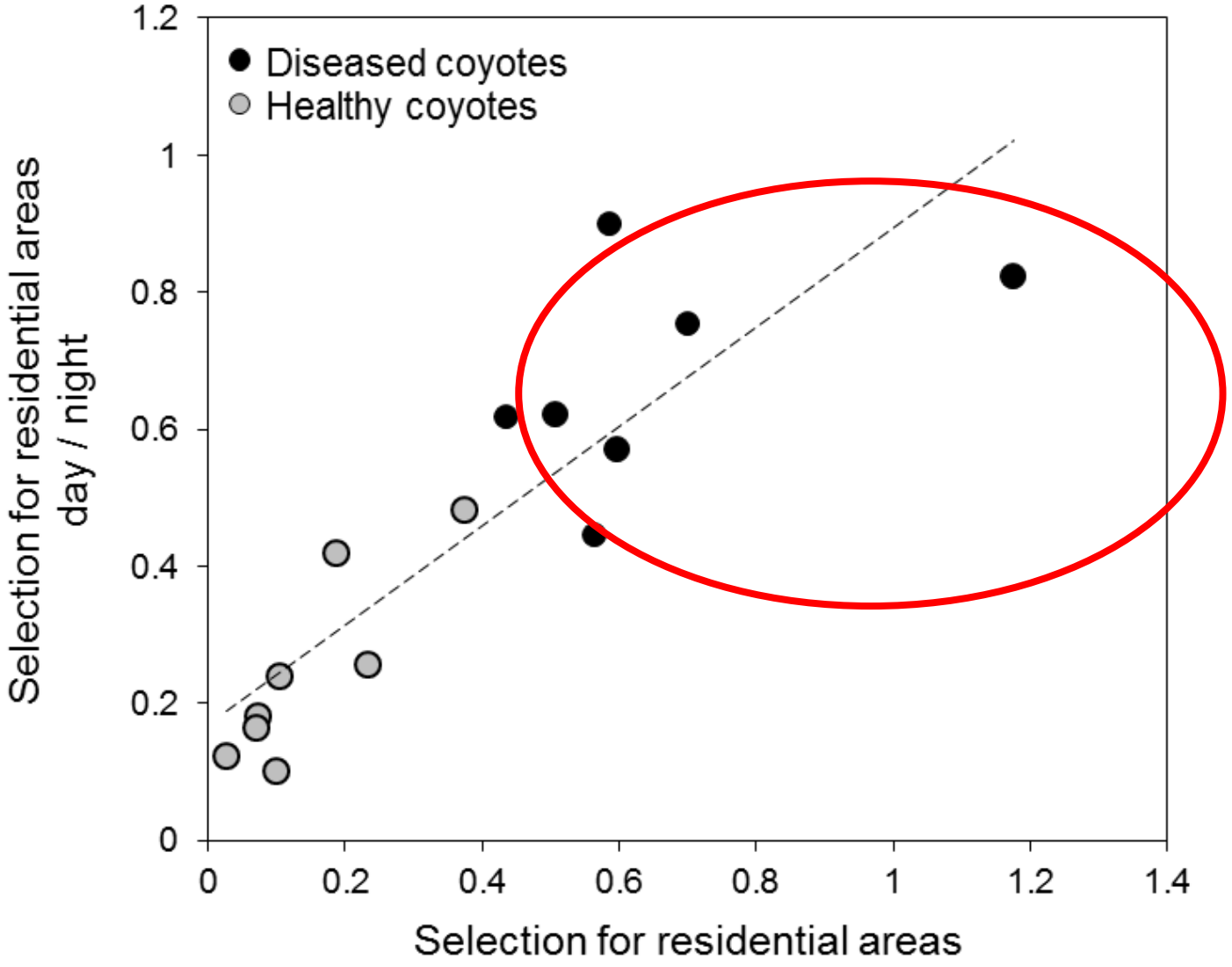
Scabies mite

Infected skin

Diseased coyote movement: home ranges were 10 larger and overlapped,



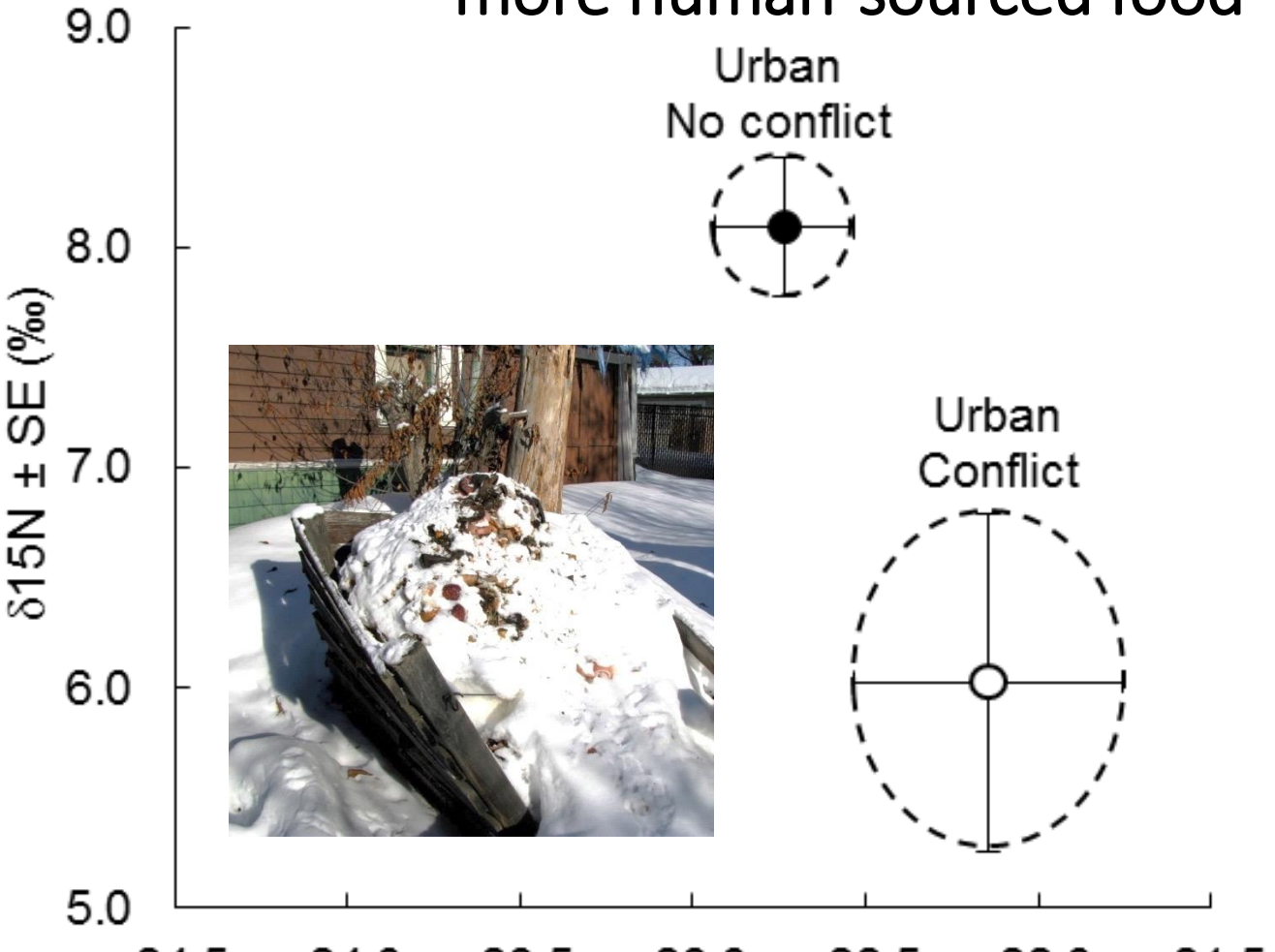
Diseased coyotes habitat selection: more use of residential areas during the day



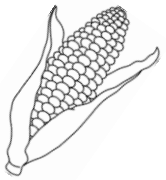
Murray *et al*. 2015
Proc Royal Society

Diet: Animals in conflict ate less protein and more human-sourced food

Protein / Meat

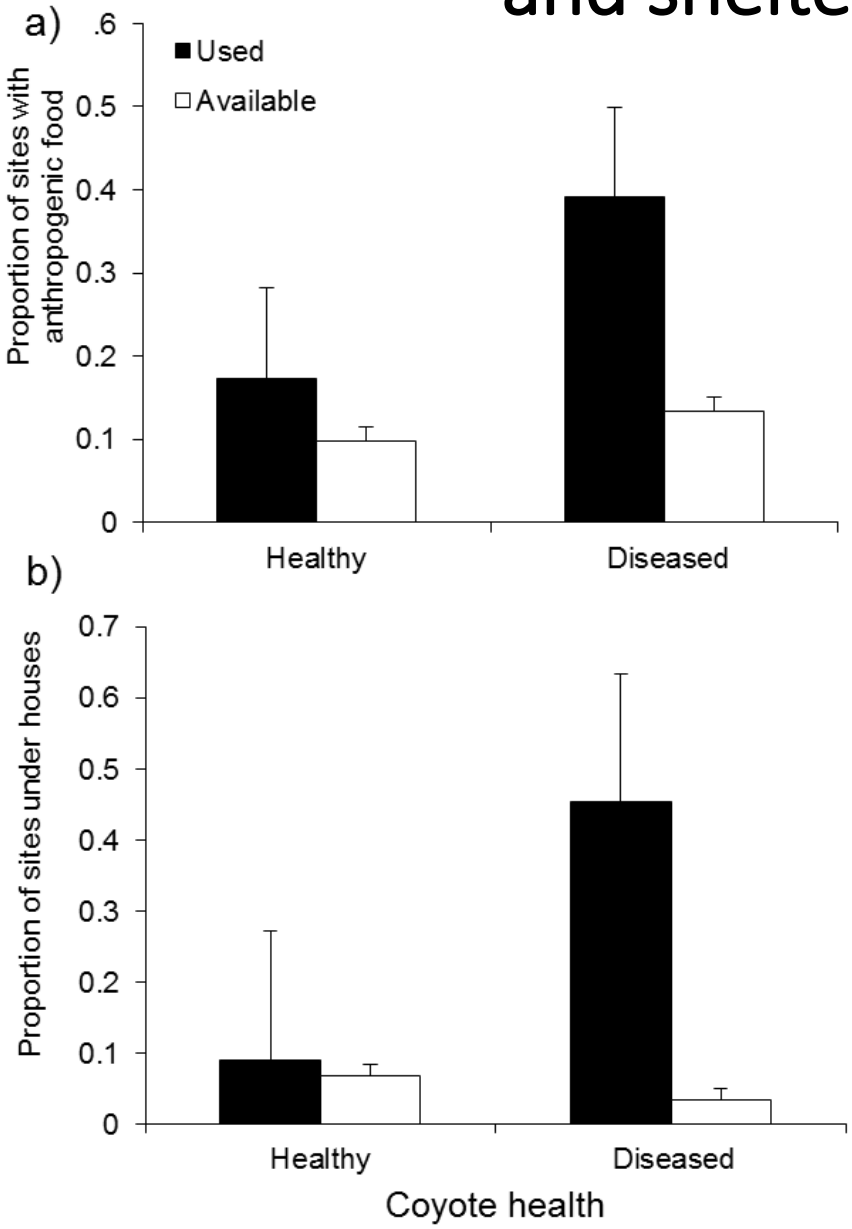


Processed food



Murray *et al*. 2015 *Ecography*

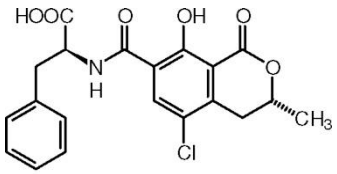
Mangy coyotes were more likely to seek human food and shelter near houses



Murray and St. Clair 2017 *J Wildlife Management*

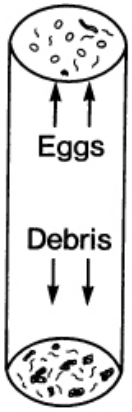
Condition: Does compost convey toxins and increase susceptibility to parasites?

Jesse Hill, UG student

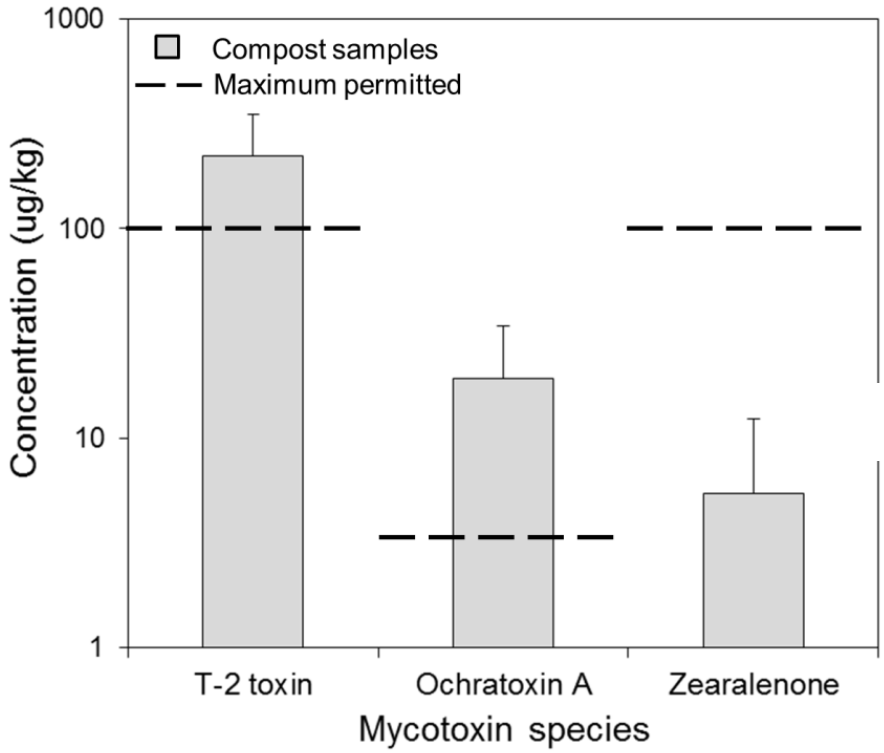


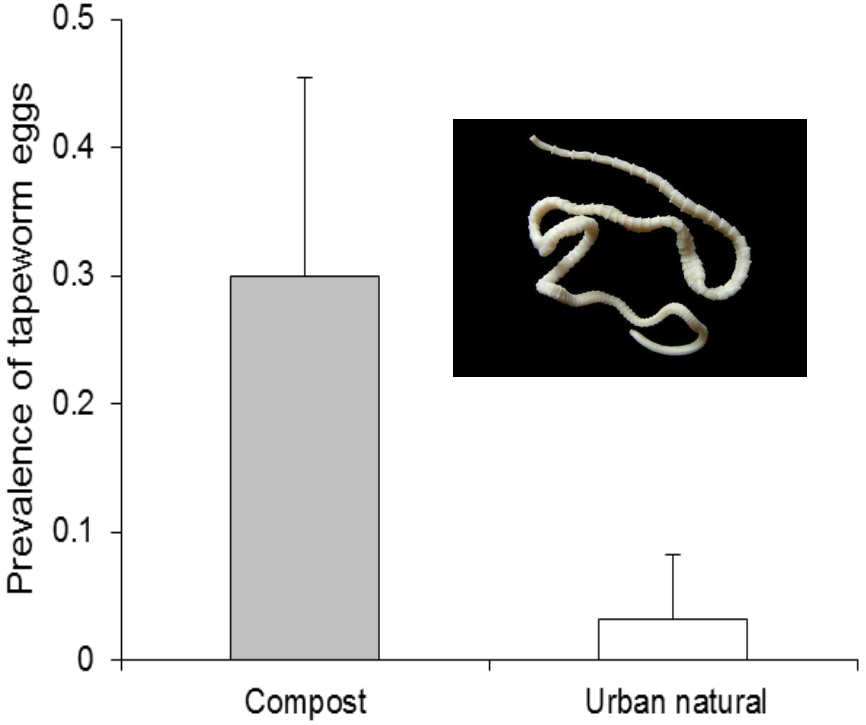
ochratoxin A

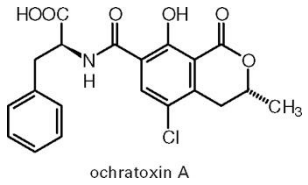
Peter Whyte, UG student



Yes, compost increases exposure to mycotoxins *and* parasites





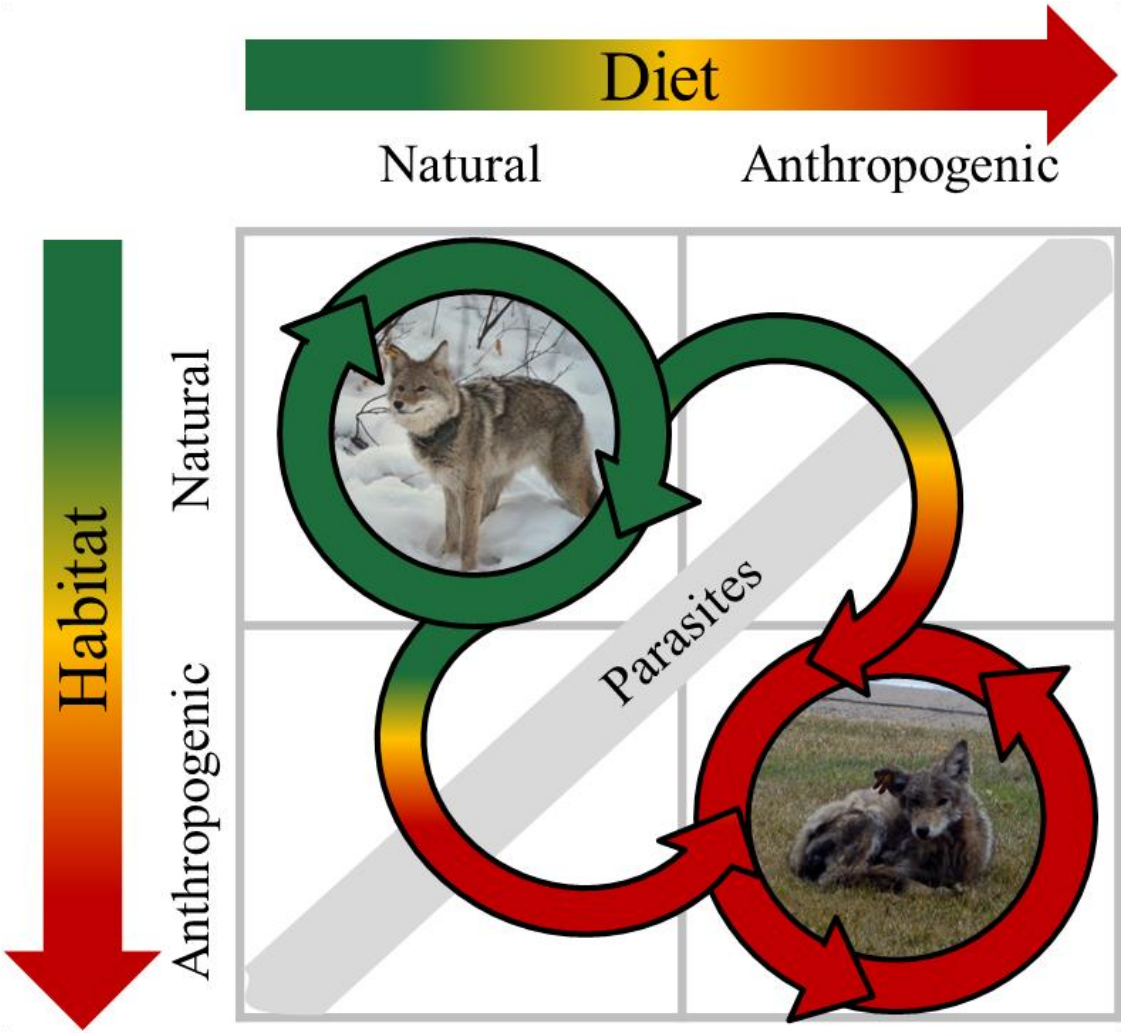


ochratoxin A

Murray *et al*. 2017 *Ecohealth*

A conceptual model for increasing coexistence with urban coyotes

- Prevent access to human-sourced food
- Prevent use of residential areas



Limits to public support for coexistence model

- Attacking coyote showed evidence of food conditioning, possibly disease

CBC | MENU

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British Columbia

Toddler left with nearly 150 stitches after coyote attack in Burnaby

'I saw the coyote on his head, chewing on his head,' boy's mom says

Cathy Kearney, Rhianna Schmunk · CBC News · Posted: May 17, 2018 6:34 AM PT | Last Updated: May 17

Three-year-old Ayden Ramm was attacked by the coyote on Tuesday. A plastic surgeon was called to administer more than 100 stitches, in order to minimize scarring. (Amanda Dycke)

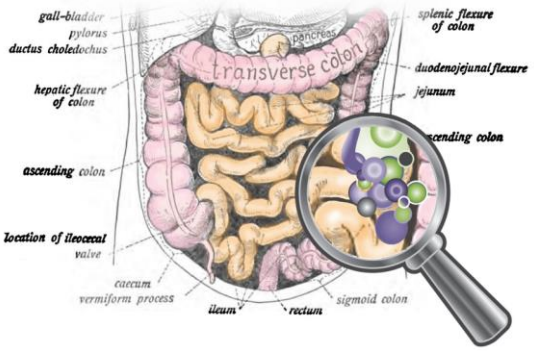
Amanda Dycke said she knew something bad had happened to her son when she heard the toddler scream on Tuesday.

She ran outside to find her three-year-old lying in the road, being attacked by a coyote.

"I saw the coyote on his head, chewing on his head," she said.

Dycke's son, Ayden Ramm, needed 148 stitches after the attack outside the family backyard in Burnaby, B.C.

What's Next?



Microbiome

Parasites

Wildlife Monitoring

Citizen Engagement

Management & Policy

A zoonotic tapeworm: *Echinococcus multilocularis*

2013-2019

- 15 human cases confirmed in Alberta

2019

- Mutant of European strain is widespread in Alberta wildlife (Massolo et al 2019 *New England J Medicine*)

2020

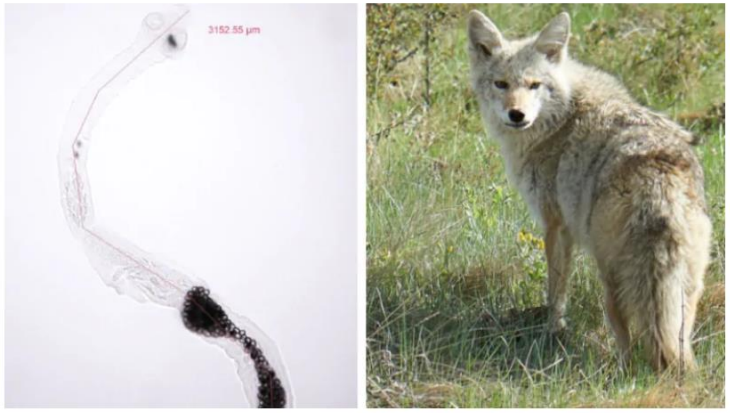
- 2 more cases suspected; testing expands
- Public concern growing

Calgary

Tapeworm in coyotes that can cause fatal tumours in people 'has spread all over Alberta'

'This European strain is known to be very virulent for people, and now is everywhere in wildlife'

CBC News · Posted: Jul 25, 2019 12:36 PM MT | Last Updated: July 25, 2019



A parasitic tapeworm called Echinococcus multilocularis is now very common in wildlife in Western Canada, scientists say. (Dr. Alejandra Santa/Submitted by Albert Lee)

https://www.cbc.ca/news/canada/calgary/tapeworm-echinococcus-multilocularis-alberta-klein-calgary-veterinarian-disease-coyotes-dogs-1.5224864

Edmonton

For this Alberta woman, the good news was she had contracted a rare, deadly parasite

Cancer surgery found latest case of infection linked to tapeworm rampant in Alberta wild canines

Ariel Fournier · CBC News · Posted: Jan 23, 2020 7:00 AM MT | Last Updated: January 23

Cassidy Armstrong discovered she had a 10-cm growth on her liver from a rare parasite that has emerged in Alberta. (Ariel Fournier/CBC)

Cassidy Armstrong went in for surgery last fall to remove what doctors thought was a tumour on her liver.

She had been diagnosed with a suspected rare cancer that, even with the surgery, would probably have left her with only a few years to live.

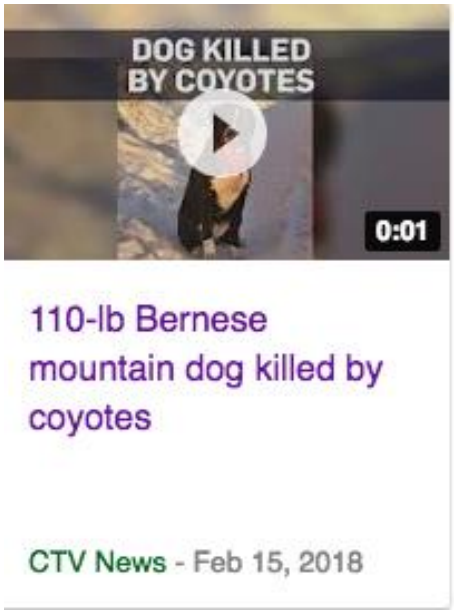
Instead, doctors found something even rarer: a grapefruit-sized mass caused by the eggs of a tapeworm.

https://www.cbc.ca/news/canada/edmonton/parasite-cassidy-armstrong-tapeworm-alberta-1.5436828

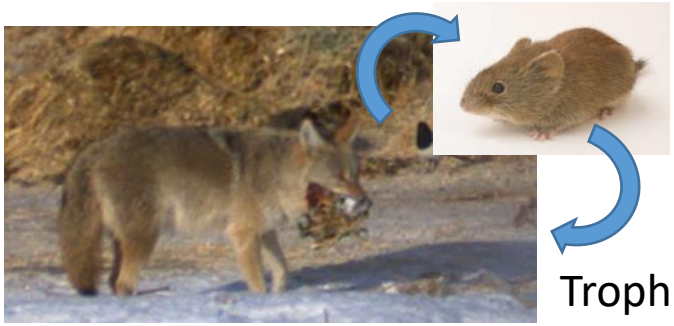
Parasite Study

With Lien Luong, Jackson Chambers, Deanna Steckler, Michael Stock, and Scott Sugden

More carnivorous?
More aggressive?
Bolder around people?



Diet and habitat selection → Increases susceptibility to particular parasites and disease → Human-Wildlife Conflict → Zoonotic disease



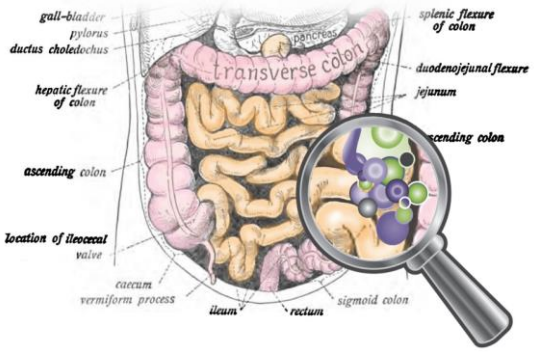
Trophic transmission

"Accidental" infection of gardeners, trappers, dog owners

Preliminary associations with diet

With
Deanna Stecker
Scott Sugden
Dana Sanderson,
Kyra Ford,
Arya Horon
Animals from Animal Damage Control and City of Edmonton

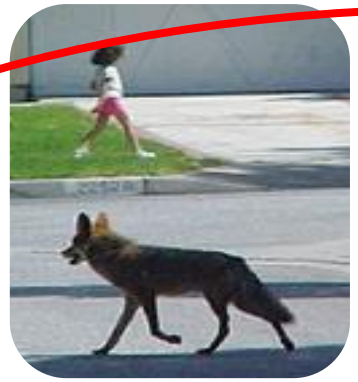
What Else?



Microbiome

Parasites

Wildlife Monitoring



Management & Policy

Citizen Engagement

August 23, 2018

City of Edmonton, U of A join world's largest urban wildlife monitoring network

City and university are first Canadian partners in U.S. study aimed at understanding how humans and animals interact in cities.

This coyote was captured in Edmonton's river valley by the Urban Wildlife Information Network. Researchers in Edmonton and 11 U.S. cities are using motion-triggered cameras to detect and study wildlife in urban natural areas. (Photo courtesy Colleen Cassady St. Clair and City of Edmonton)

By NEWS STAFF

Edmonton is the first Canadian city to join a U.S. study looking for ways for humans and wildlife to coexist more harmoniously in urban areas, thanks to a partnership between the city and the University of Alberta.

The Urban Wildlife Information Network (UWIN) is compiling and comparing data in several cities in the U.S. to better understand the ecology and behaviour of wildlife.

Management and Policy

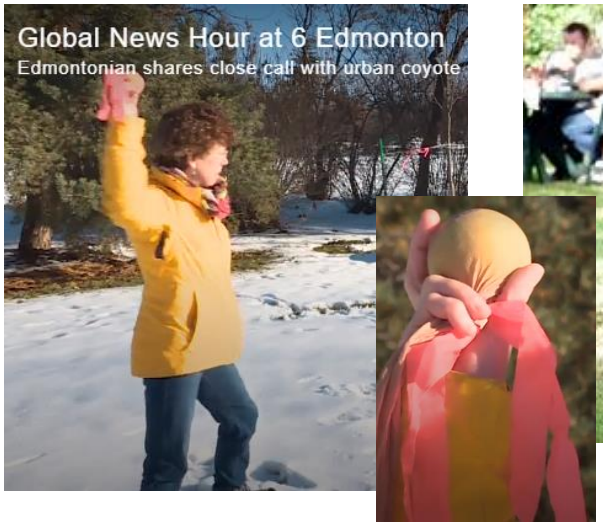
THE CITY OF Edmonton

Coyote Hazing **GUIDELINES**

How to Haze for Effective Reshaping of Coyote Behavior

THE HUMANE SOCIETY OF THE UNITED STATES

Goal: Seek out and scare coyotes when they are in residential areas during the day



Curiosity ~ Tolerance ~ Habi~~t~~ation ~ Food Conditioning ~ Conflict

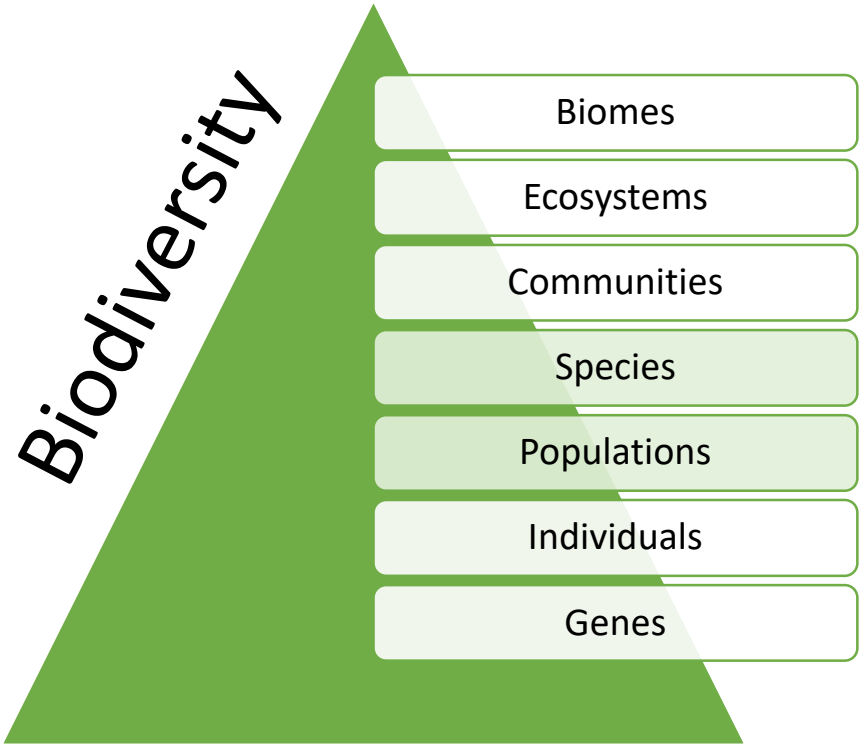
With Gabrielle Lajeunesse

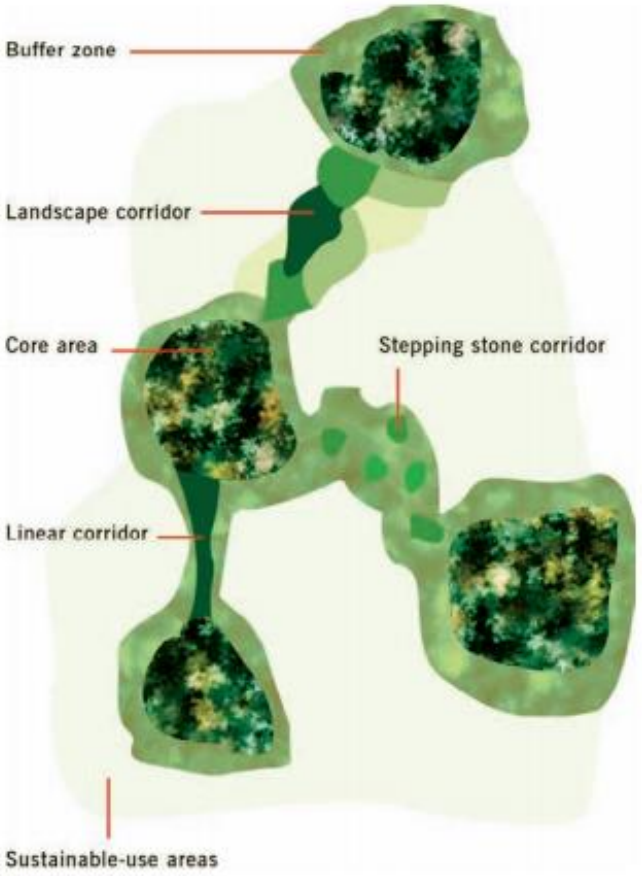
Coexistence with Urban Coyotes?

Avoiders **Adapters** **Exploiters**

Management Policy and Practice

More generally, urban biodiversity is… diverse!





Goal: Preserve biodiversity in urban areas by maintaining a network of natural areas that support ecological processes *within natural ranges of variation*

Thank You!

Collaborators

- Bill Abercrombie
- Mark Edwards
- Lien Luong
- Alessandro Massolo
- Maureen Murray
- Catherine Shier
- Lisa Stein
- Michael Stock
- Darcy Visscher

Current Students

- Gabrielle Lajeunesse
- Garret Tierney
- Deanna Steckler
- Cassie Stevenson
- Scott Sugden

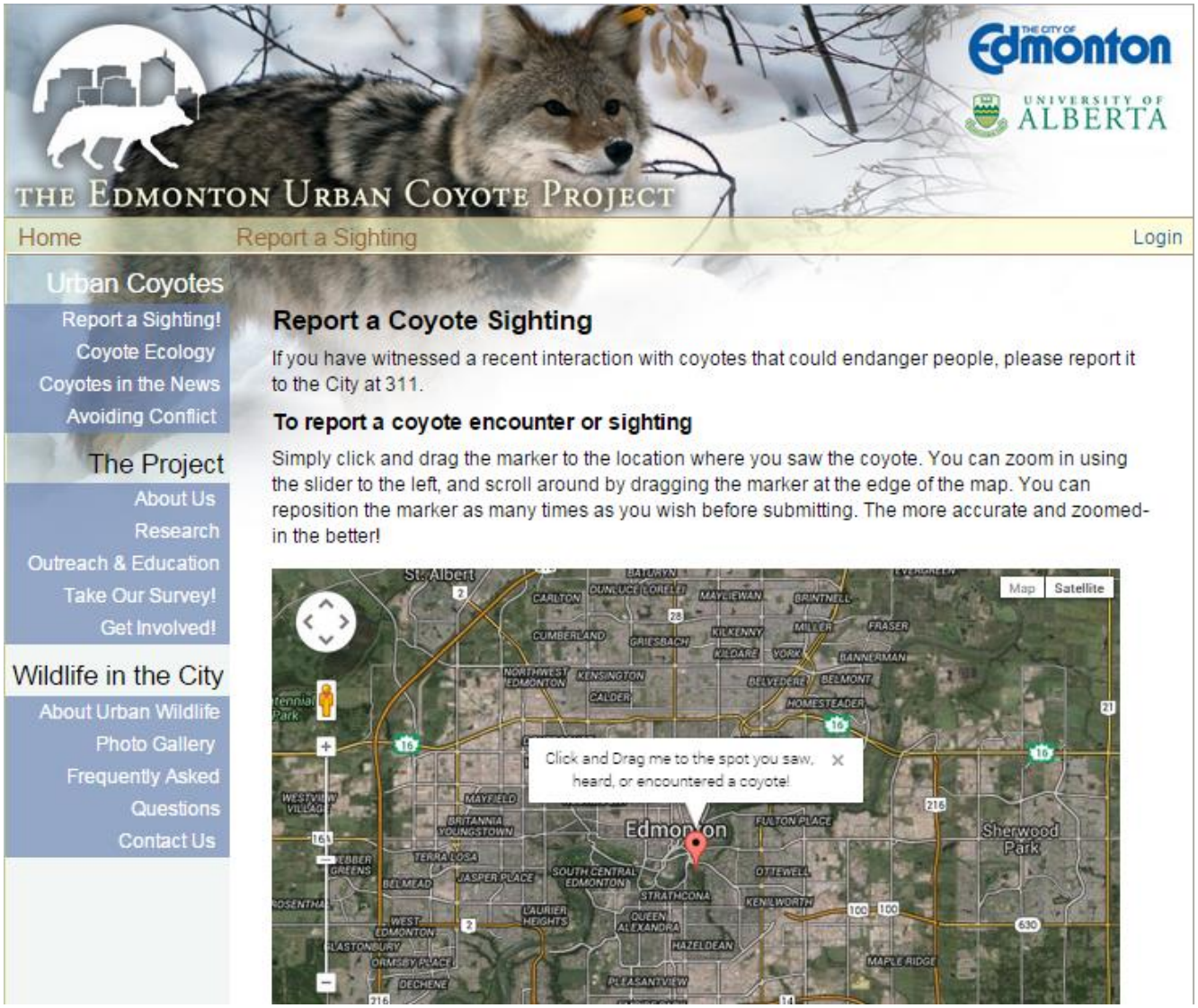
- Dozens of volunteers, research assistants, UG project students, and engaged citizens

cstclair@ualberta.ca

Summary of ways to foster coexistence with urban coyotes

Do these things	Especially in these contexts
Educate each other to eliminate accessible garbage, compost, fruit, bird seed, litter, and pets Conduct periodic clean ups of open areas	Near schools, playgrounds, and on-leash parks
Do not tolerate intentional feeding!	Wherever it is suspected or observed
Report sightings of bold coyotes	In residential areas, during the day
Treat bold coyotes very aggressively; control extreme animals Encourage personal responsibility and action to support safety of people and pets	In locations and contexts where there are vulnerable individuals

Report Coyote Sightings



Via 311

THE CITY OF Edmonton

City of St. Albert Cultivate Life

Report an issue

Alberta

Recorded information and reporting numbers

ABMI naturelynx