

Eastern Coyote (Coywolf) Ecology and Behavior

(Note: Please save questions until end of talk)



Eastern Coyote Research

Jonathan G. Way—www.EasternCoyoteResearch.com

My Books: ***Suburban Howls*** (~~\$ 25~~ 20)

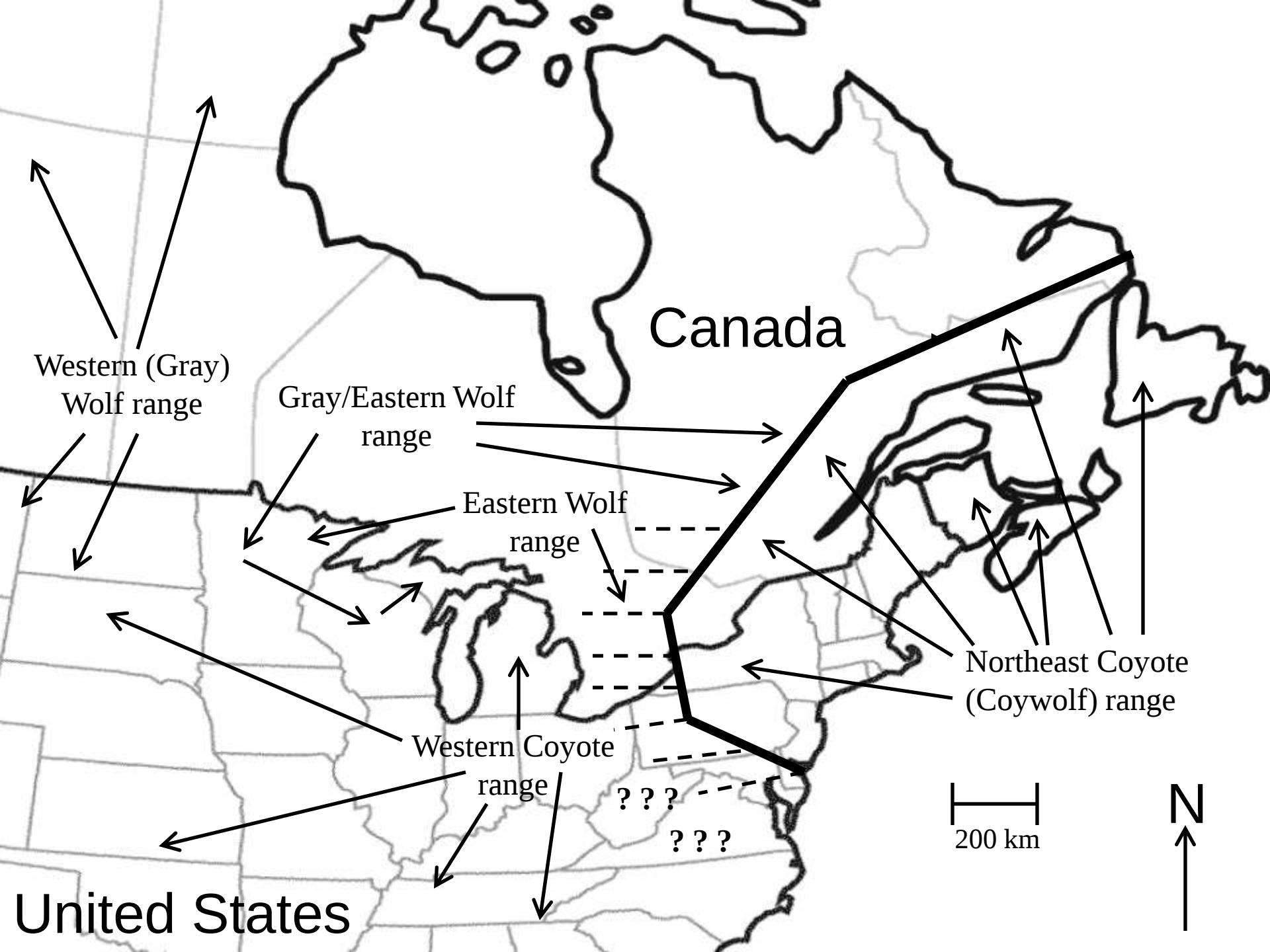
My Yellowstone Experience (\$20)

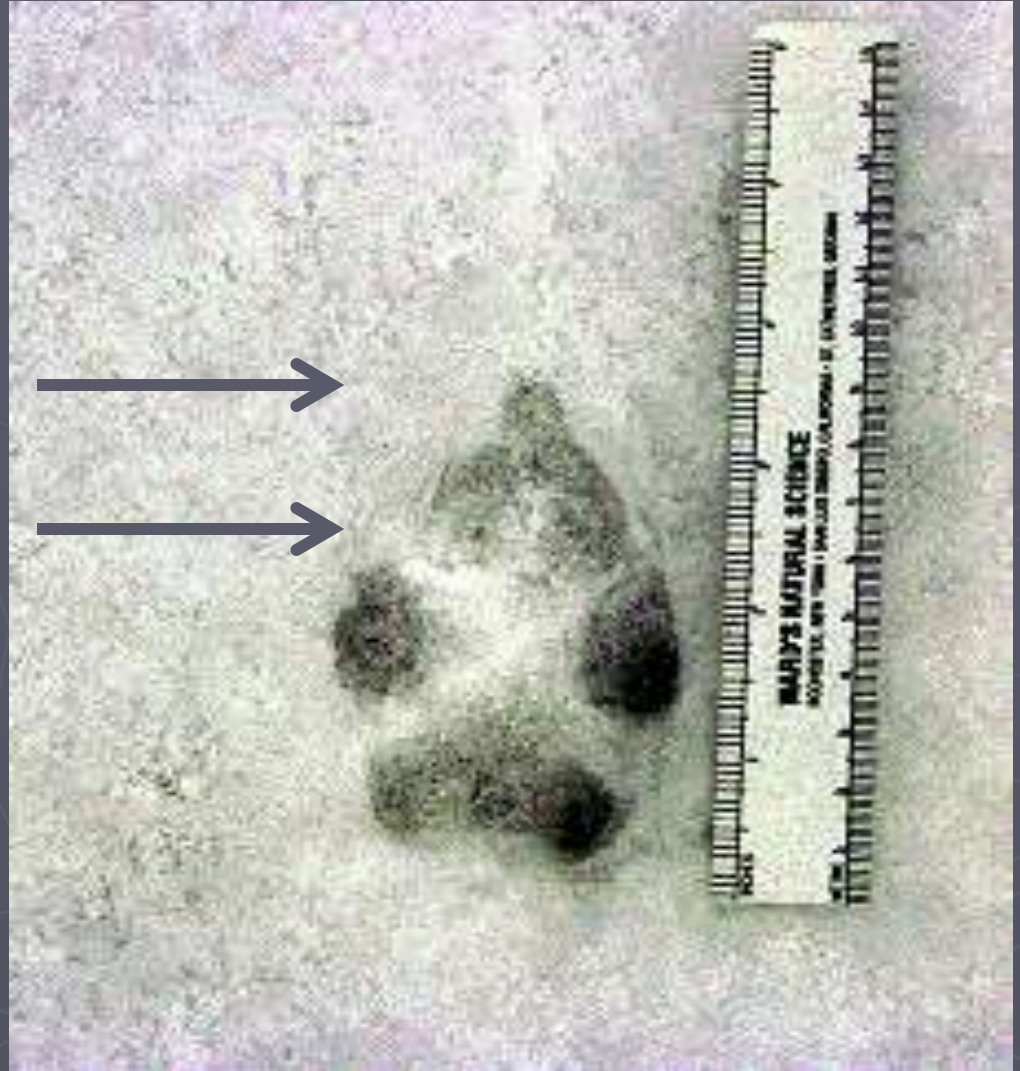
Introduction: The eastern coyote

Also called coywolf and northeastern coyote

1. Lives in all of Northeastern North America: from New Jersey and PA to Maine and New York and southern Ontario/Quebec
2. The biggest type of “coyote” – 30-45 lb on average
3. Track size is oval and from 3-3.5 inches long (see next slide)
4. Color ranges from blonde to darker black and brown
- usually tawny brown







Eastern coyote facts

- ▶ Feeds mostly on small and medium sized mammals; mostly similar to western coyotes
 - Opportunistic predators – fruit to meat
 - Mice, voles, rabbits, woodchucks, fawns
 - Larger mammals where available (adult deer)
 - ▶ Dangerous food items
- ▶ Habitat: Everywhere - wilderness to rural to urban
 - Prefers edge habitat
 - Suburban areas are actually good wildlife habitat
 - ▶ Provide cover, high prey numbers (edge habitat), less hunting
 - ▶ People need to realize that wildlife does well living among us
 - Lives in 49 of 50 U.S. states and everywhere except most of Long Island and some offshore islands.

Deer Fawns – A medium-sized food item



Are Coyotes Dangerous?

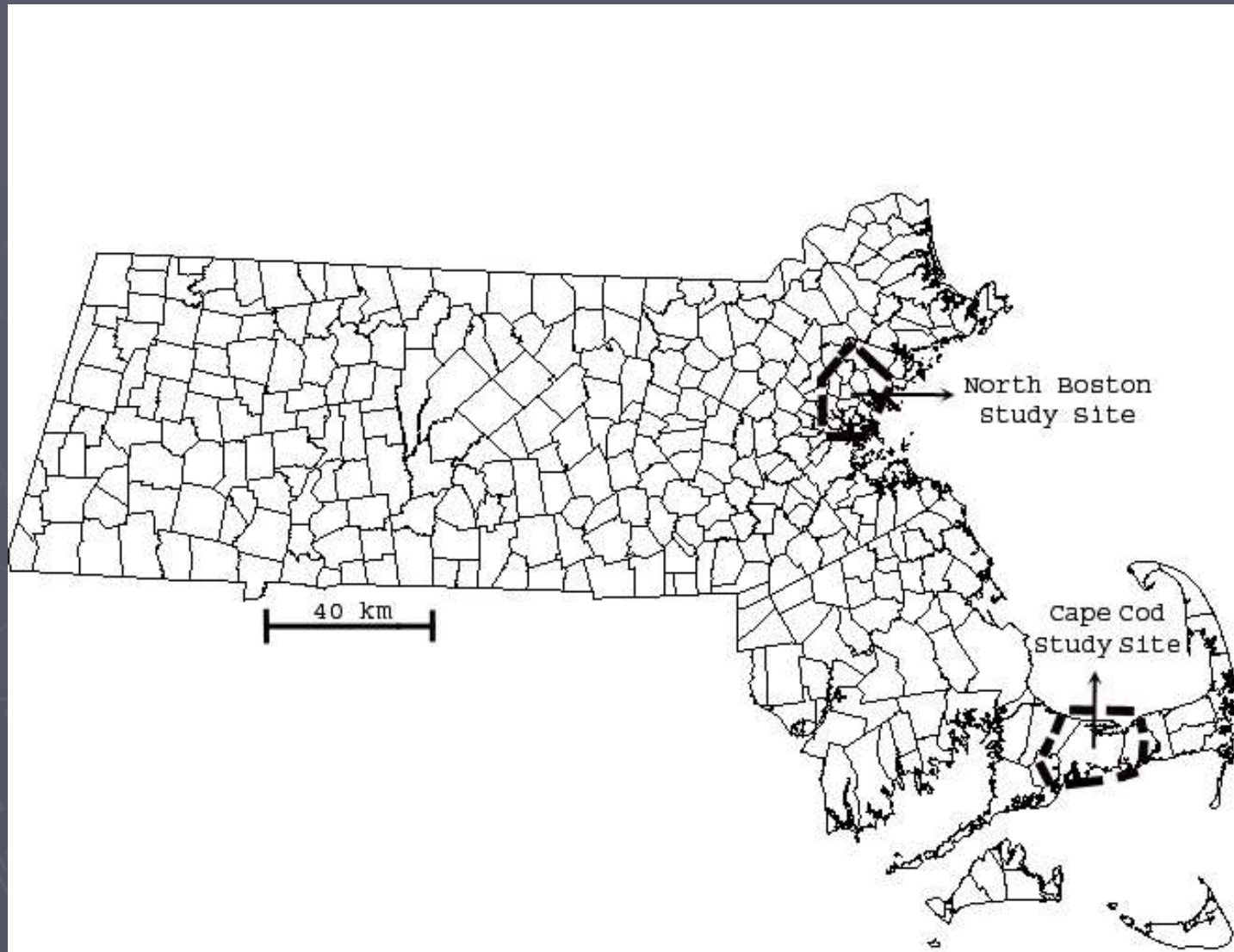
Keep it in Perspective: Coyotes vs. Dogs

- ▶ 4.7 million dog bites per year in U.S.
 - 800,000 need medical attention
 - 1,000 people per day go to ER
 - 15-20 people, on average, die per year
- ▶ ~3 coyote bites on people per year in N.A.
- ▶ 5 coyote bites in Massachusetts' history
 - Half (2-3) were rabid
 - 2 fatalities in recorded history in N.A. incl. Oct. 2009 in Nova Scotia (other in Cali in 1980s)
- ▶ Dog bite losses exceed \$1 billion per year
 - \$345 million paid by insurance

Fear the Dog (right), Not the Coyote!



Researching Coyote Ecology: Study Sites



From the Seashore to the Mountains



My Yellowstone Experience



www.MyYellowstoneExperience.org

My YELLOWSTONE *Experience*



A Photographic and Informative Journey
to a Week in the Great Park

by Jonathan G. Way

Photographs by Jonathan G. Way and Stephen M. Cifuni

Yellowstone National Park facts

- ▶ 2.2 million acres (about 40% size of MA)
 - Many different habitats ranging from desert to plains (sagebrush) to mountain
- ▶ Mostly in WY, but also MT and ID
- ▶ Created in 1872 as world's 1st National Park
- ▶ Surrounded by National Forests - in total, a huge area
- ▶ National Parks are generally characterized by:
 - No hunting of wildlife so they are habituated to roads and generally unafraid of people even though they are not fed by people.
 - A hands-off preservationist approach (versus the multiple use viewpoint of national forests)





Wildlife
Watching

Yellowstone National Park: Some things are similar to back east



coyote

Importance of research

- ▶ Radio-collaring aids in learning ecology and behavior of an animal whether it is a coyote, wolf, or anything
- ▶ Need Permits to capture, radio-tag, and release
- ▶ Study areas: national parks vs. non-protected areas

Wolf Collar

Most canid (wolf, coyote) packs being researched have at least one member collared so their movements and behavior can be studied



Hunting vs. Research

- ▶ Hunters in Massachusetts can legally kill **unlimited** numbers of coywolves for almost 6 full months (Oct – March) with a \$30 general license (No bag limits)
- ▶ Yet researchers like myself have to get multiple permits, often waiting months/years, to simply study these same creatures
- ▶ Mass Wildlife argues that this is one of the most protective states for “coyotes”
- ▶ Many people think “coyotes” are fully protected in MA
 - Not true



Legal Killing Methods for “coyotes” in MA (one of the most “protective” states)

► Legal killing methods in MA include:

- Hunting – gun or bow & arrow; now rifle
- Hounding – using dogs to chase, exhaust & shoot ‘coyotes’
- * **Baiting** – shooting them while feeding on food scraps
- “**House Hunting**” – shooting from your house in rural areas
- * **Night hunting** (usually over bait)
- Trap (box) then shoot in head to kill when trapped
- Predator call/injured animal call to lure in

► This is allowed for “recreational” purposes – i.e., to give hunters more “opportunity” – quoted from agency officials

► Science indicates predators are vital to maintaining ecosystem health



Coyote Research

Main technique: Radio-telemetry

- ▶ **Goal** = To capture, radio-tag, and release them in order to study their ecology such as movement and activity patterns, sociality, home range and territory sizes, and den and rendezvous site use
- ▶ This is what you need permits for – to trap and radio-collar study subjects
- ▶ Ancillary (secondary) objectives
 - Body measurements
 - Body weight
 - Pictures
 - Blood for DNA analysis ***

Radio-tracking

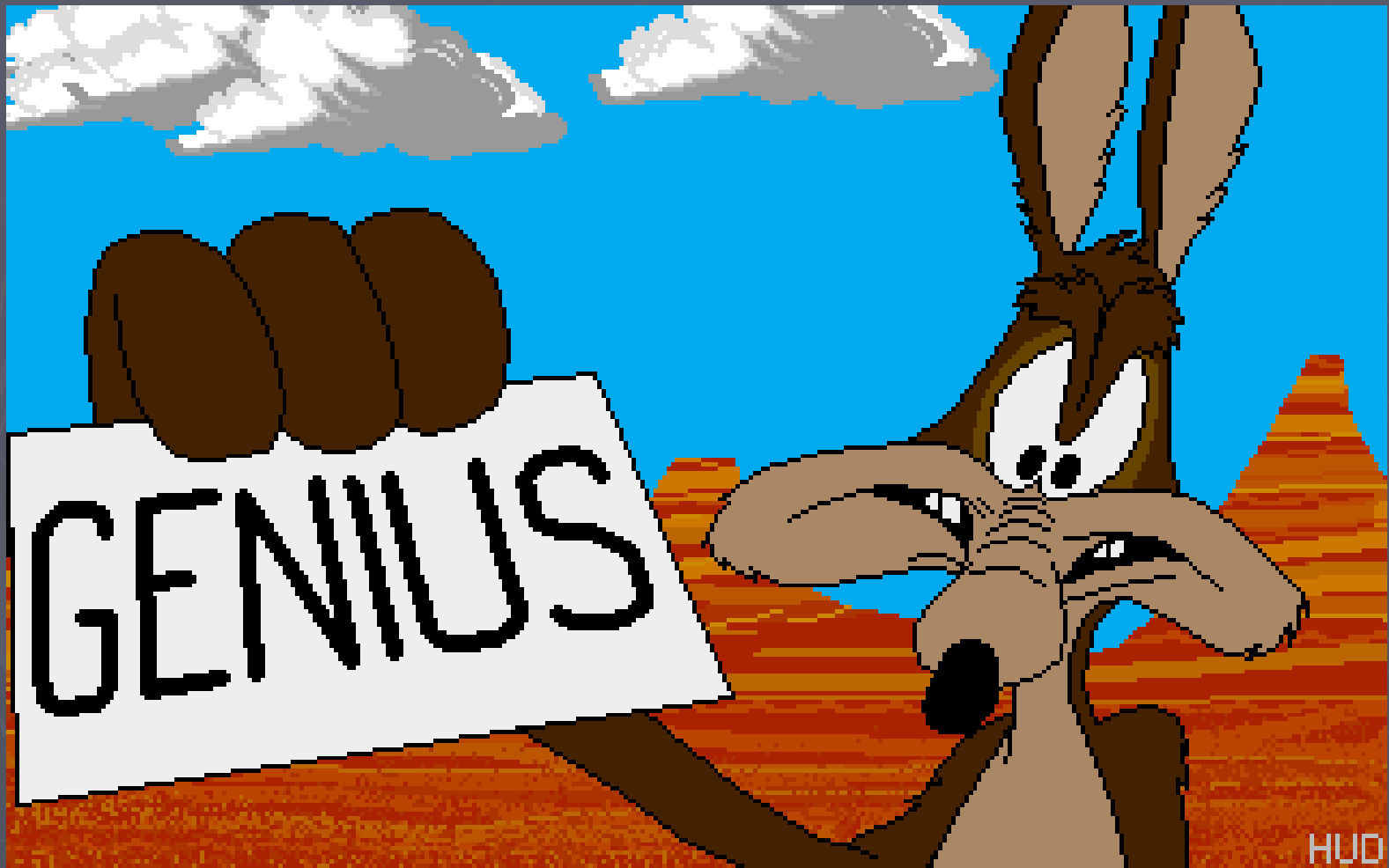
► Quote from my book:

- “It is absolutely amazing what you can discover with a radio-collared animal. A coyote transforms from an urban phantom to a potential 24/7 data bank.”



Capture Techniques: Box traps

A technique to capture eastern coyotes
(again, this is what you need permits for)



Results: Incidental catches



Coyotes captured using box traps



► Capture efficiency = **1.6% success rate**

- A very low number!!! Lots & lots of Effort
- But we have captured animals – & hence that's why I'm here!

Eastern Coyote/Coywolf Mystique

- ▶ All and all, I have had the fortune of seeing over 50 individuals over 5 dozen times (i.e., repeat captures) up-close & personal!
- ▶ I am repeatedly struck by their beauty and the look of wildness in their eyes, even knowing they live in the suburban wilds.



Waking Up

Transport back
to carrying
cage (or trap)



Coyotes/Coywolves love to travel!



Russian proverb: A wolf is kept fed by its feet

Adapted for coyotes: A **coyote** is kept fed by its feet **and its adaptability!**

Methods: Radio-tracking

Each collar has individual frequency



Radio-tracking – can be done on any animal from turtle to bear/moose

Directional
antenna



Radio-tracking

- ▶ Critical factor in elucidating (uncovering) the different facets of canid behavior recorded in the wild. Even in open landscapes coyotes are not always observable so the goal is to radio-collar at least one member from every pack under study.
- ▶ This enables us to collect data shown in the results section on Coyote/Coywolf Ecology.

6. Major Research Findings – Mostly applicable nationwide for coyotes



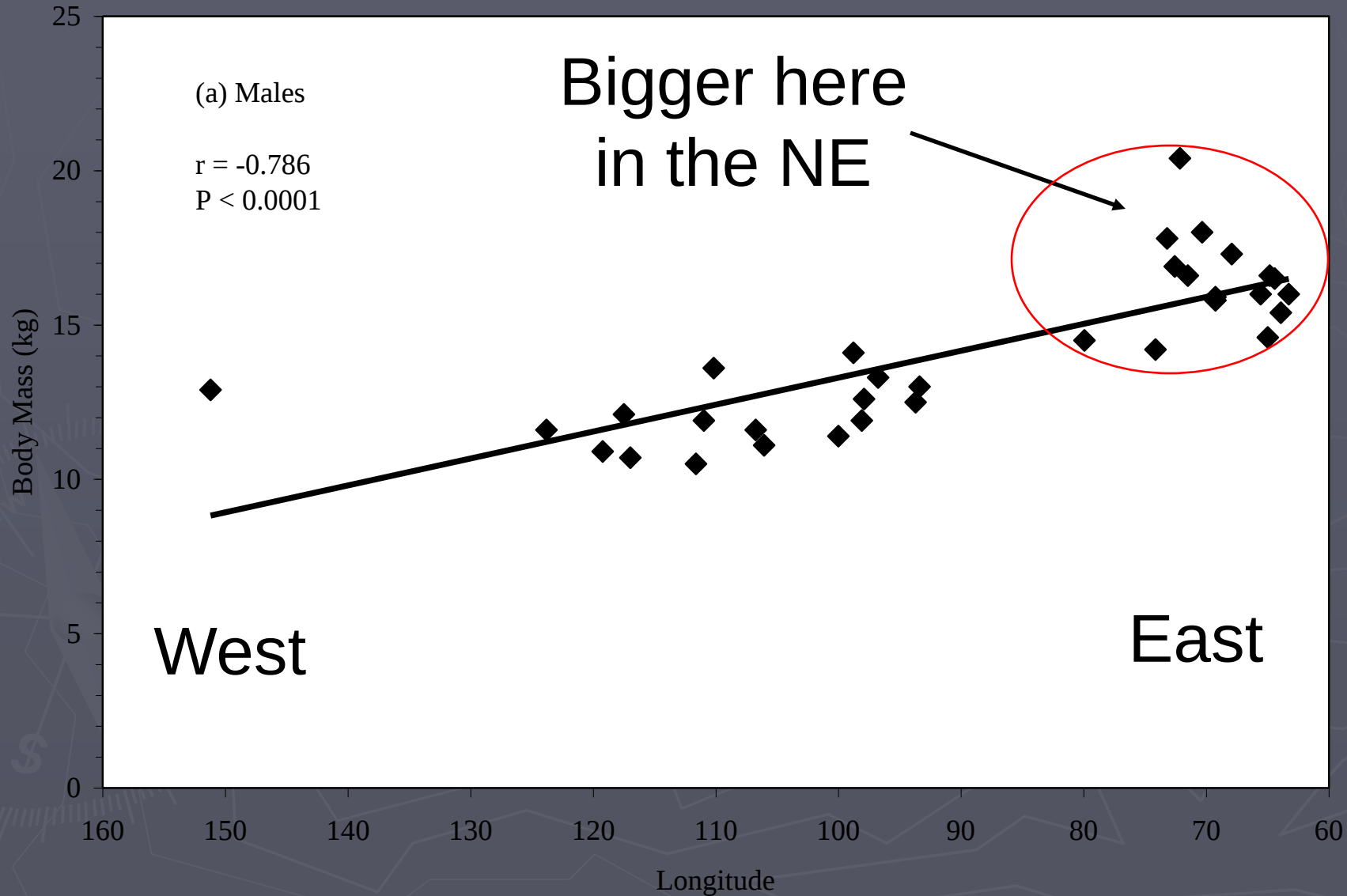
Results: 1. Taxonomy

A. Morphology

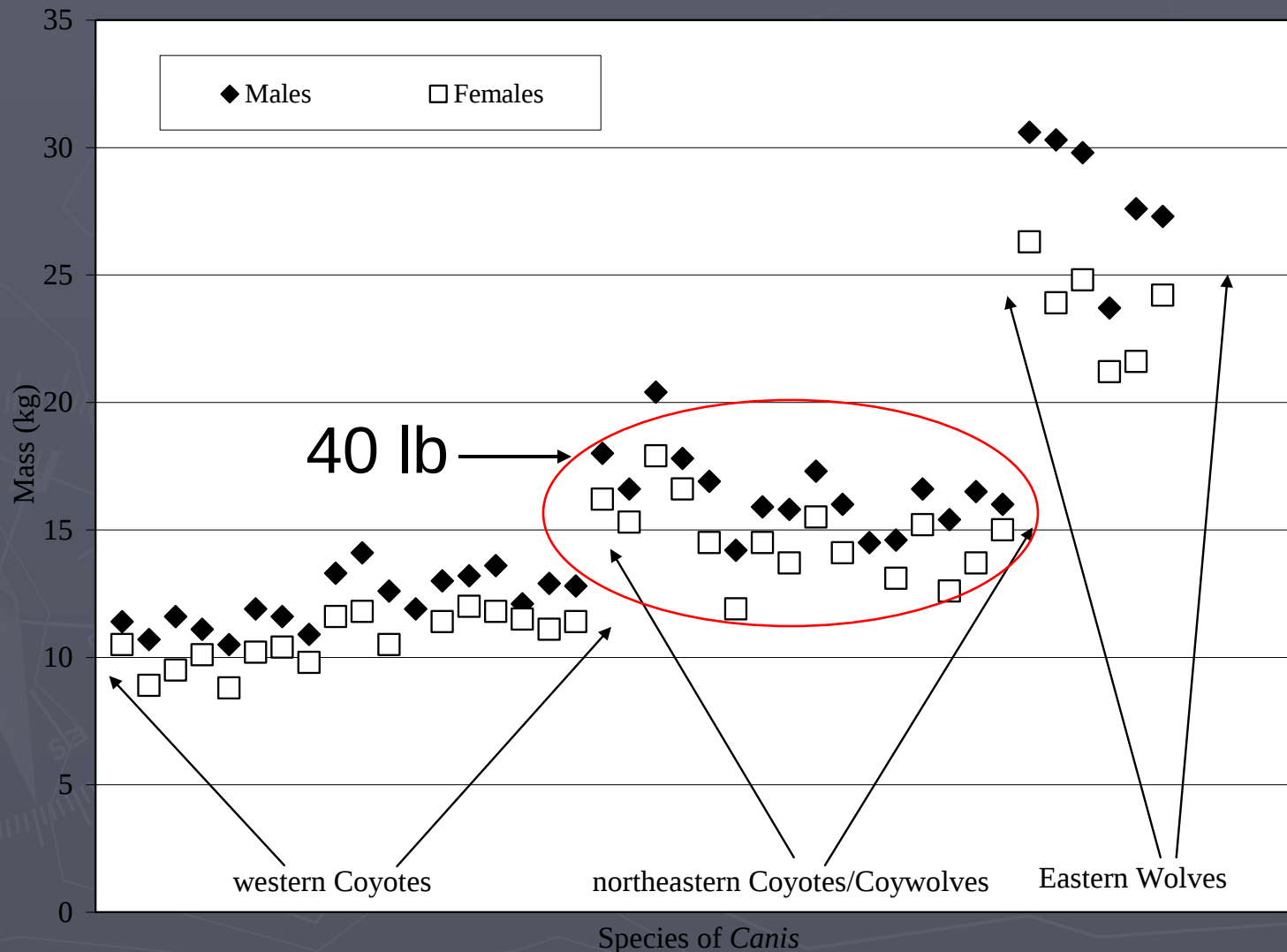
- ▶ Adults weighed
 - 13.6 - 25 kg
 - (27 - 55 lb)
 - Ave = 30-40 lbs
- ▶ Total Length
 - 122 - 152 cm
 - (4 - 5 ft +)
- ▶ Eastern Coyotes – Easily biggest form of “coyote”



1A. Body mass and longitude (W to E)



Coywolves: intermediate in size to western coyotes and eastern wolves

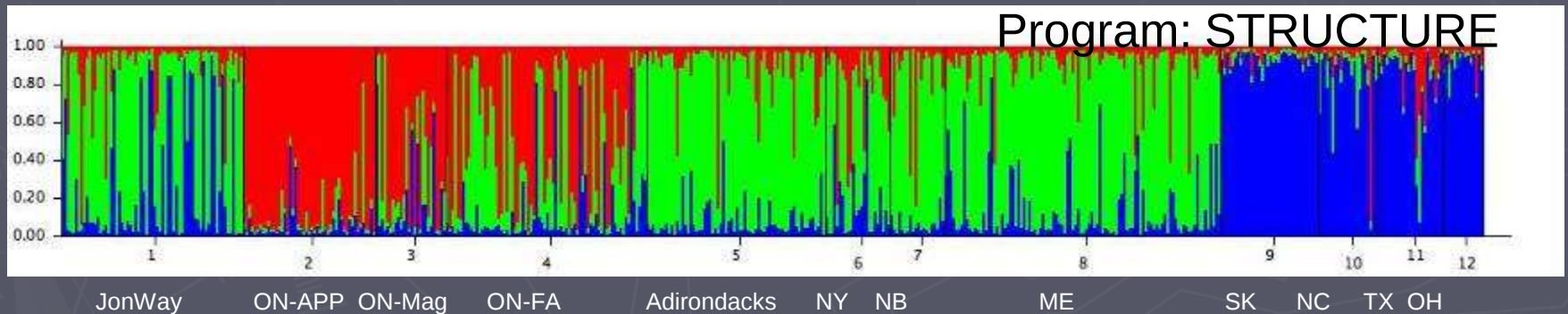


1A. A more massive appearance than coyotes



1B. Taxonomy: Genetics

- Eastern coyotes are a hybrid between western coyotes and eastern (red) wolves (**not gray wolf**)
- I believe they should more appropriately be called **Coywolves**, rather than “coyotes” in the NE: *Canis latrans x lycaon*



ON-APP = Ontario, Algonquin Provincial Park
ON-Mag = Ontario, Magnetawan
ON-FA = Ontario, Frontenac Axis
NY = New York
NB = New Brunswick
ME = Maine
SK = Saskatchewan
NC = North Carolina
TX = Texas
OH = Ohio

Red = Eastern/Red Wolf

**Green = Eastern
Coyote/Coywolf**

Blue = Western Coyote

1B. Important points

- ▶ Coywolves are hybrids with eastern/red wolves, not the larger grays that most people think of.
 - We probably never had larger gray wolves in the east – at least in southern New England in pure form.
 - Eastern/red wolves are more closely related to coyotes; not gray wolves
 - Hybridization happened ~1919 south of Algonquin Park, Ontario.
- ▶ Coywolf Genetics (mtDNA – maternally inherited):
 - Approx. 1/3 of mtDNA are of western coyotes
 - With another 1/3 of eastern wolf DNA
 - Over 1/3 is eastern specific gene; more closely related to coyotes but only found in eastern wolves & coywolves

Additional notes

- ▶ Recent research using Y chromosomes (paternally inherited) have also documented low levels of domestic dog and gray wolf introgression.
- ▶ However, the majority of the animal's makeup seems to be western coyote and eastern wolf with lower levels of dog and gray wolf DNA.
- ▶ It is unmistakable that this animal is the product of hybridization between closely related canid species.

Northeastern North America

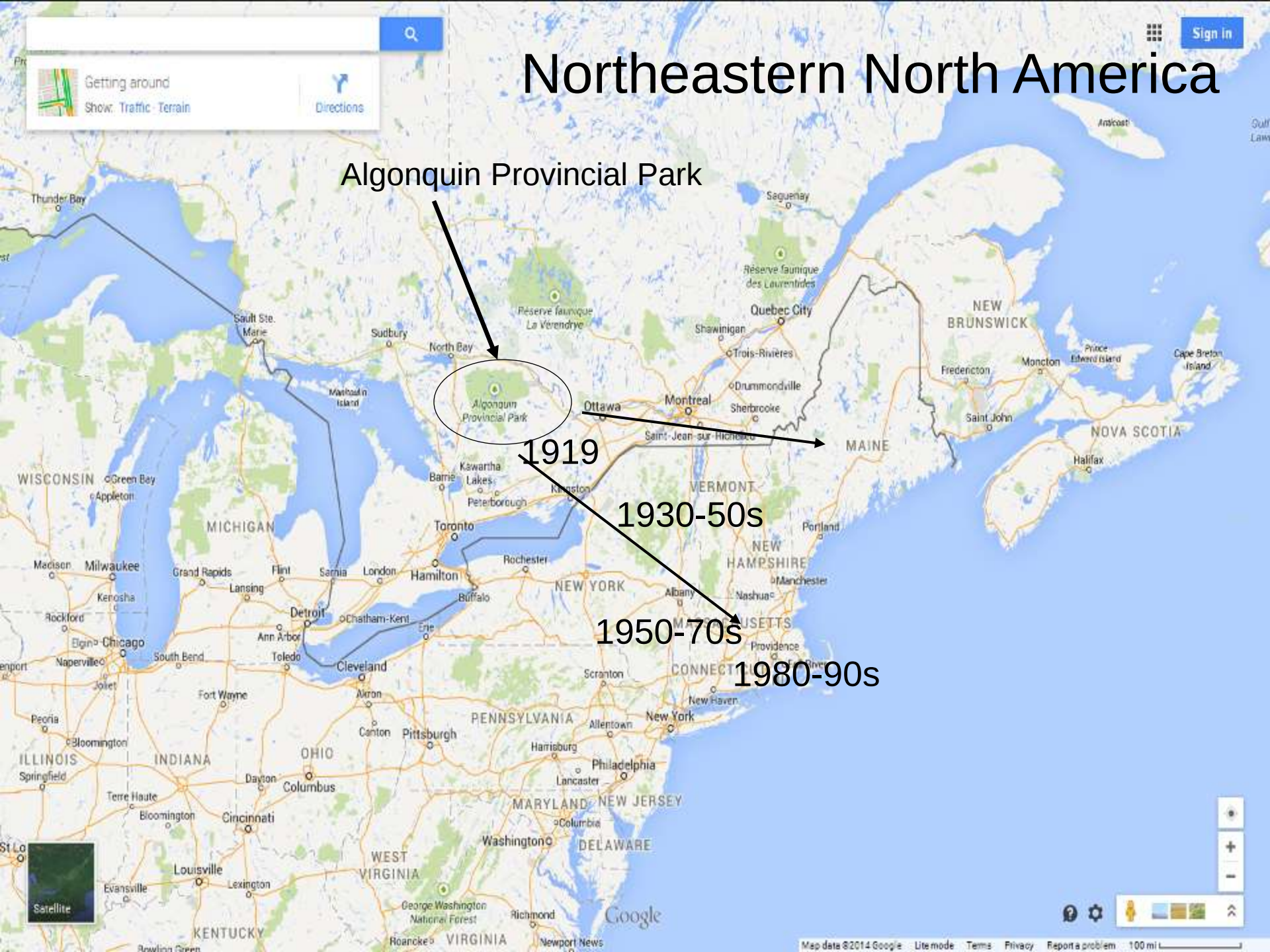
Algonquin Provincial Park

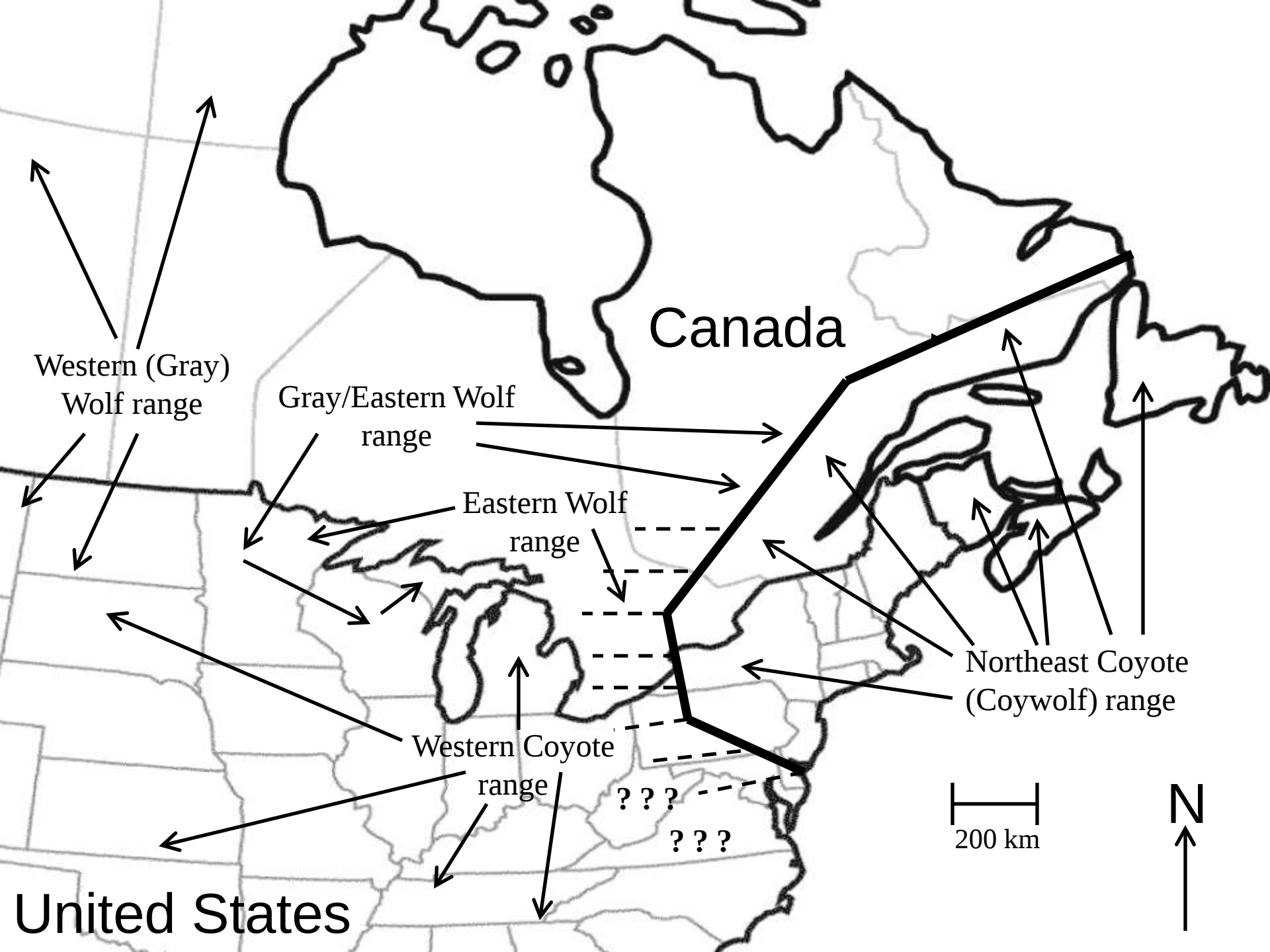
1919

1930-50s

1950-70s

1980-90s





1C. Taxonomy: 5 types of *Canis* in North America

-
- ▶ 1. Western coyotes
 - ▶ **2. Coywolves (eastern coyotes)**
 - ▶ 3. Eastern/Red wolves
 - Hybridizes with both coyotes and gray wolves
 - Conduit of hybridization in genus *Canis*
 - ▶ 4. Great Lakes wolves – MN, MI, WI
 - These are eastern/gray or gray/eastern hybrids
 - ▶ 5. Gray wolves – “western” wolves

Results of Coywolf ecology

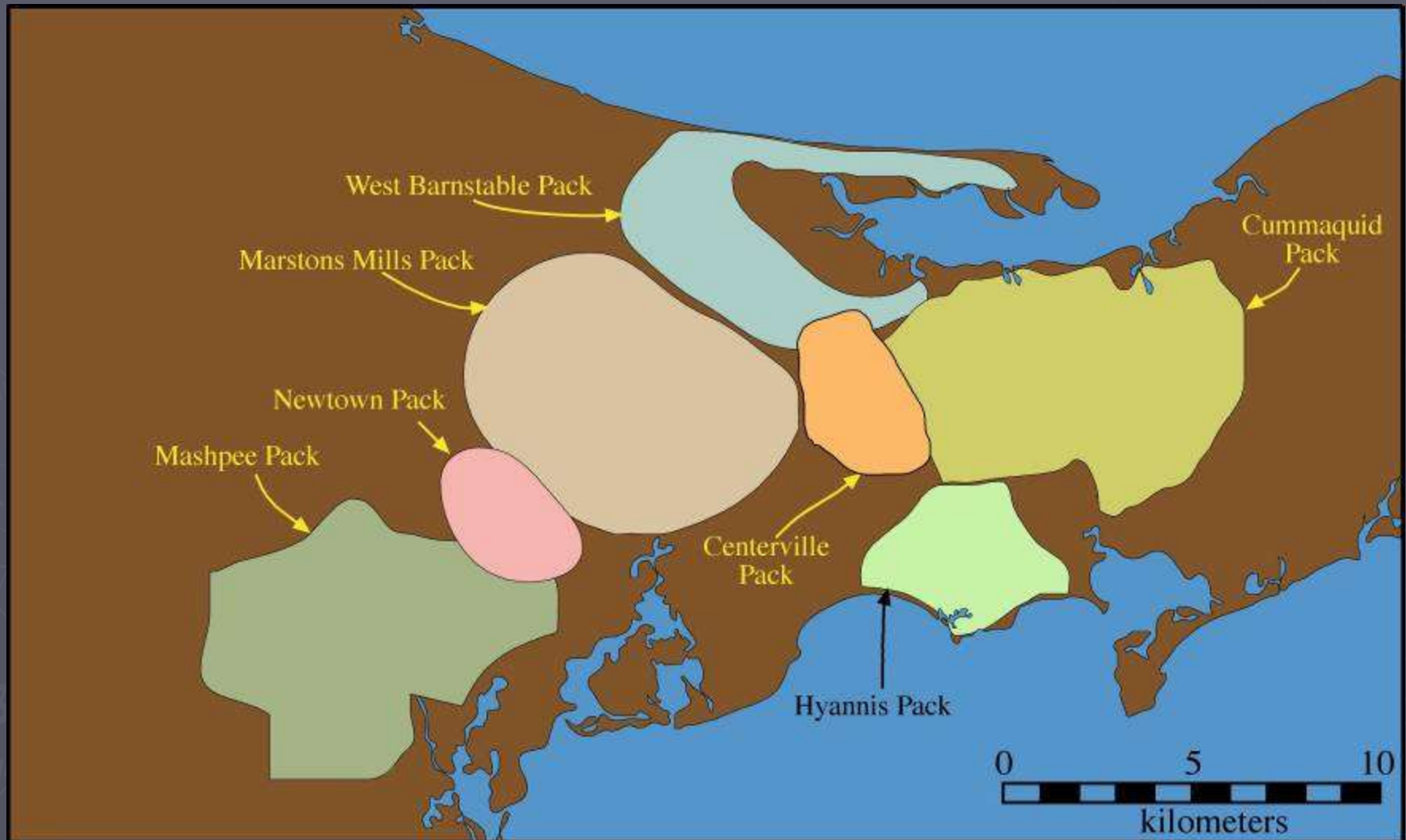
► 2. Space Use

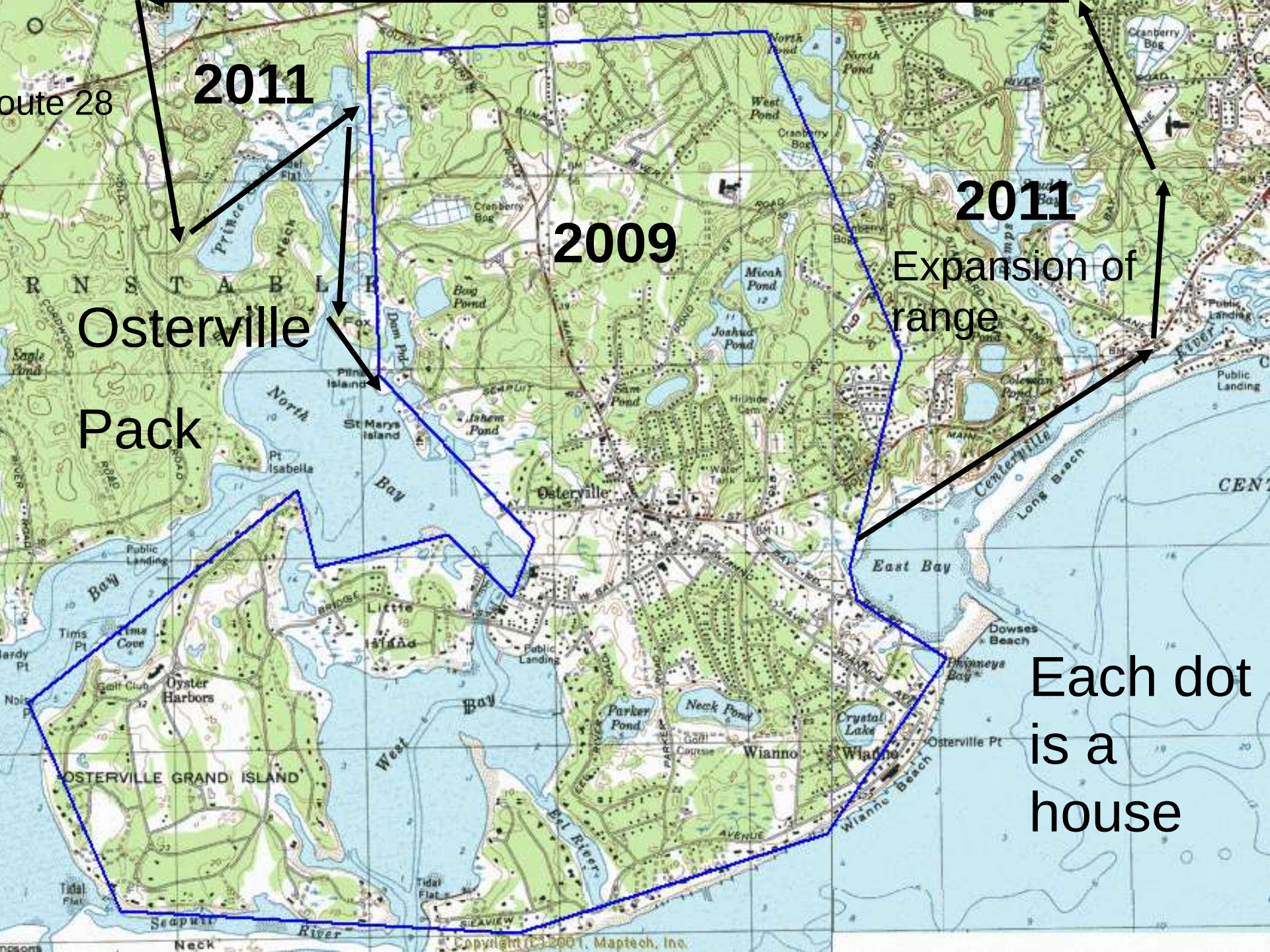
- Typically eastern coyote/coywolf packs maintain large territories or home ranges of $\sim 10 \text{ mi}^2$ ($\sim 30 \text{ km}^2$).
 - Home range – area that an animal uses
 - Territory – area that is guarded from others
 - Most of a canid's home range is a territory



2. Spatial Use

Territoriality – active defense





Route 28

2011

2009

2011

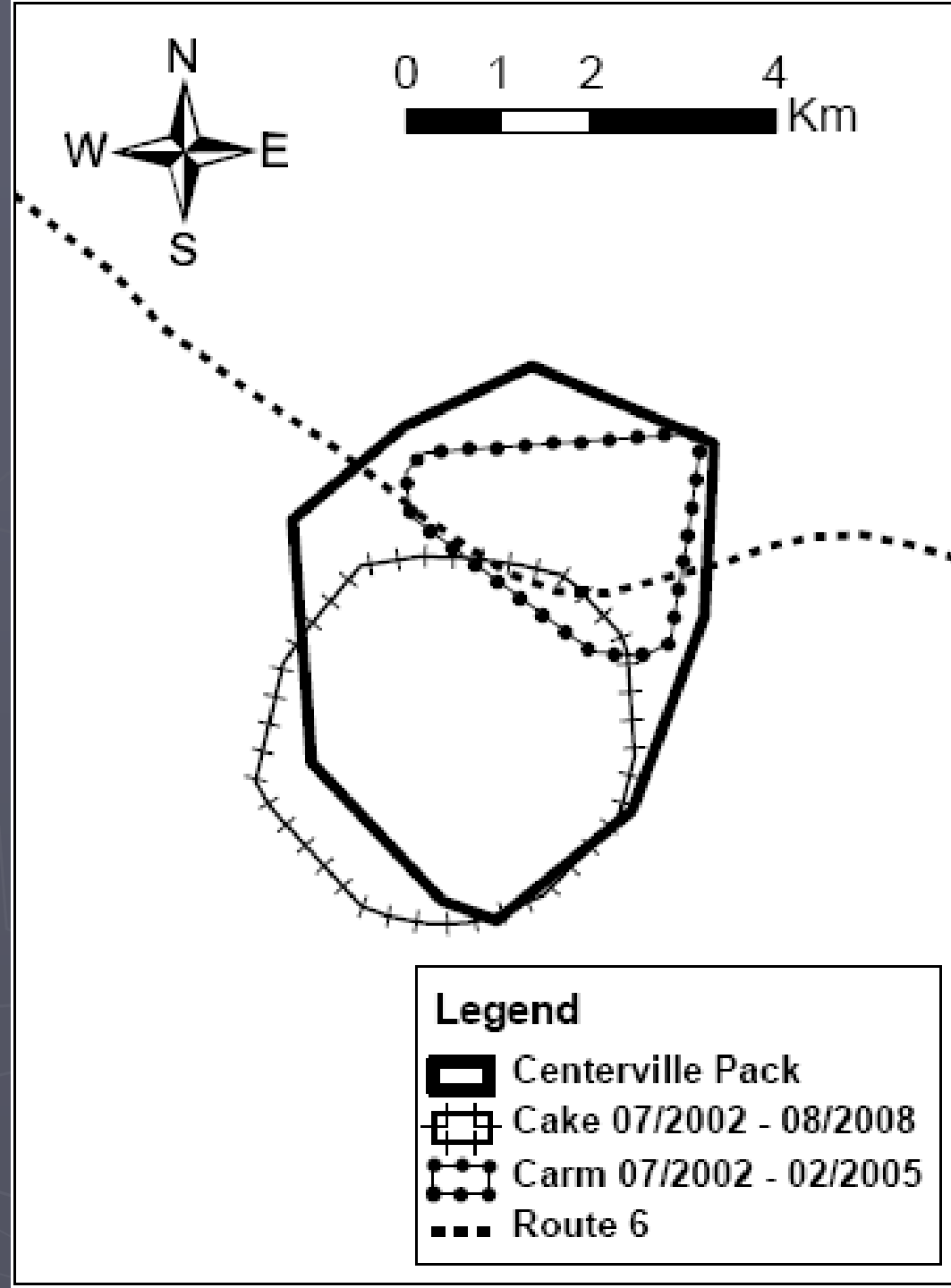
Osterville
Pack

Expansion of
range

Each dot
is a
house

Territory size
decrease
following death
of a breeding
male

- 2 packs
instead of 1 a
year later



2. Spatial use

Protecting Territory: Howling

- ▶ Group howling at summer rendezvous sites
- ▶ Winter howling of nomadic pack members
- ▶ What are functions of howling?
 - Answer soon

2. Spatial use: Howling

► What is the function of howling?

- Territorial advertisement – inter-pack communication
- Group rallying - captive coywolves good example
- Because they enjoy it! Why do humans sing?
- Finding each other (intra-pack communication), especially in the late summer with pups spread out as they get more active.
- NOT to scare humans or to howl at the moon



Results: Ecology

3. Social dynamics: Group or pack size

- ▶ Pack – At least 3 animals/canids living together on their territory
- ▶ 3 - 4 adult (full-size) coywolves per territory on average in winter after some of the pups leave (or die)
- ▶ Breeding male and female
- ▶ Resident associates or helpers
 - Usually last years' offspring
 - The new pups' older brothers and sisters

3. Coyote/Coywolf classification

- ▶ Breeding (alpha) residents – male and female
 - The parents
- ▶ Resident associates (betas, helpers) – offspring of pair. They delay dispersal to help form the pack.
 - Pack = parents + helpers + pups of year
- ▶ Juveniles - pups
- ▶ Transients –
disperse to new areas

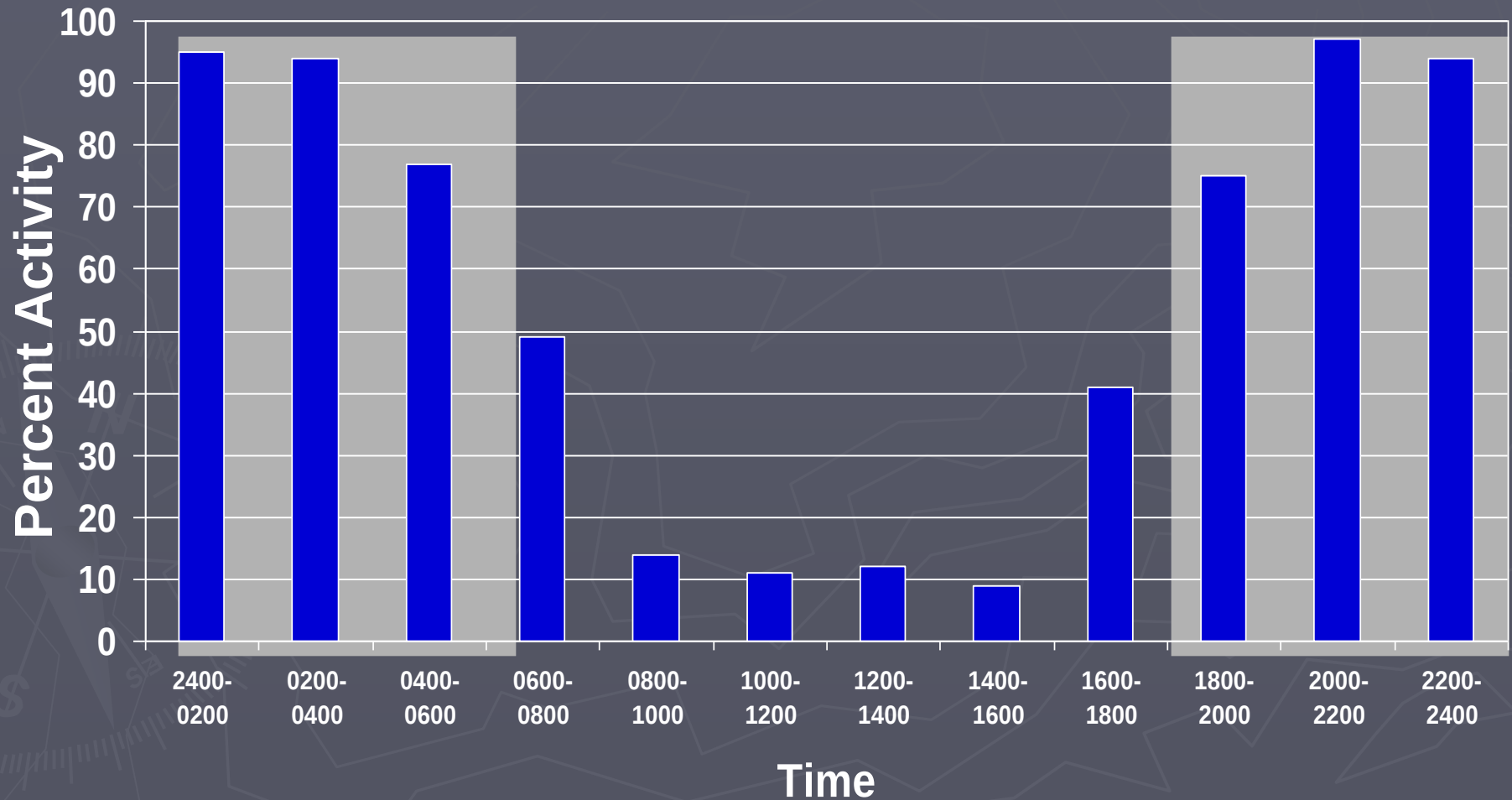


3. A typical pack



Results: Ecology

4. Activity Patterns



Chi-square, mostly active at night ($P < 0.001$)

Results: Ecology

5. Pup Rearing Behavior

- Coywolf females:
 - typically give birth in early April (mate late-January/early-February) in MA; as early as mid-March
 - most common den site is selected in woods under fallen tree or dug into side of hill
 - have 5 pups on average.

Pup Rearing:
5A. Denning Behavior

Coywolves give birth
in April in a wooded
area





5B. Pup Rearing Ecology in Mid-summer

- Coywolves abandon den sites in June
- Move to **rendezvous sites**
 - ▶ Above ground sites moved to when pups are ~10 weeks
 - Water
 - Cover – thick brush areas
 - Places to hunt
 - Open landscapes
 - ▶ Cranberry Bogs, Golf Courses, Swamps
 - ▶ Lots of sightings by the public
 - Pups Hunting – Puppy training centers
 - Pack Adults Returning to Feed Pups
 - Movements Predictable
 - Males are very good fathers
 - Interact with dogs



Sociality: Radio-collared 8-year-old, family-oriented father “Sill” tending & playing with pups



Field observations showed Sill spent considerably more time with his pups than his mate, and he tended them year-round!

6. Movement patterns & Dispersal

- ▶ Probably the aspect of coywolf biology that most impresses me!
- ▶ Coywolves travel 10-15 miles a night
 - Typically through altered landscapes
 - Power lines, cranberry bogs, dumps, RR tracks
 - Neighborhood roads, especially at night
 - Typical pack
 - ▶ 3-4 adults
 - ▶ 50 miles (75 km) of tracks per night in a territory
 - ▶ Why it seems like they are everywhere.

Micro-Corridors: hole in fence to steps which connect 2 cemeteries



© Lydia Rogers - Underpass

2007-12-13 11:00:31 AM M 1/3 40 28°F



Concord, MA

WWW.RECONYX.COM

6A. Resident Movement Patterns

Long distance movement – 32 km
in one night – Helper coywolf

|-----10 miles-----|



6A. A 16-hour movement of a Resident Breeding Coywolf



6b. Transient movement patterns

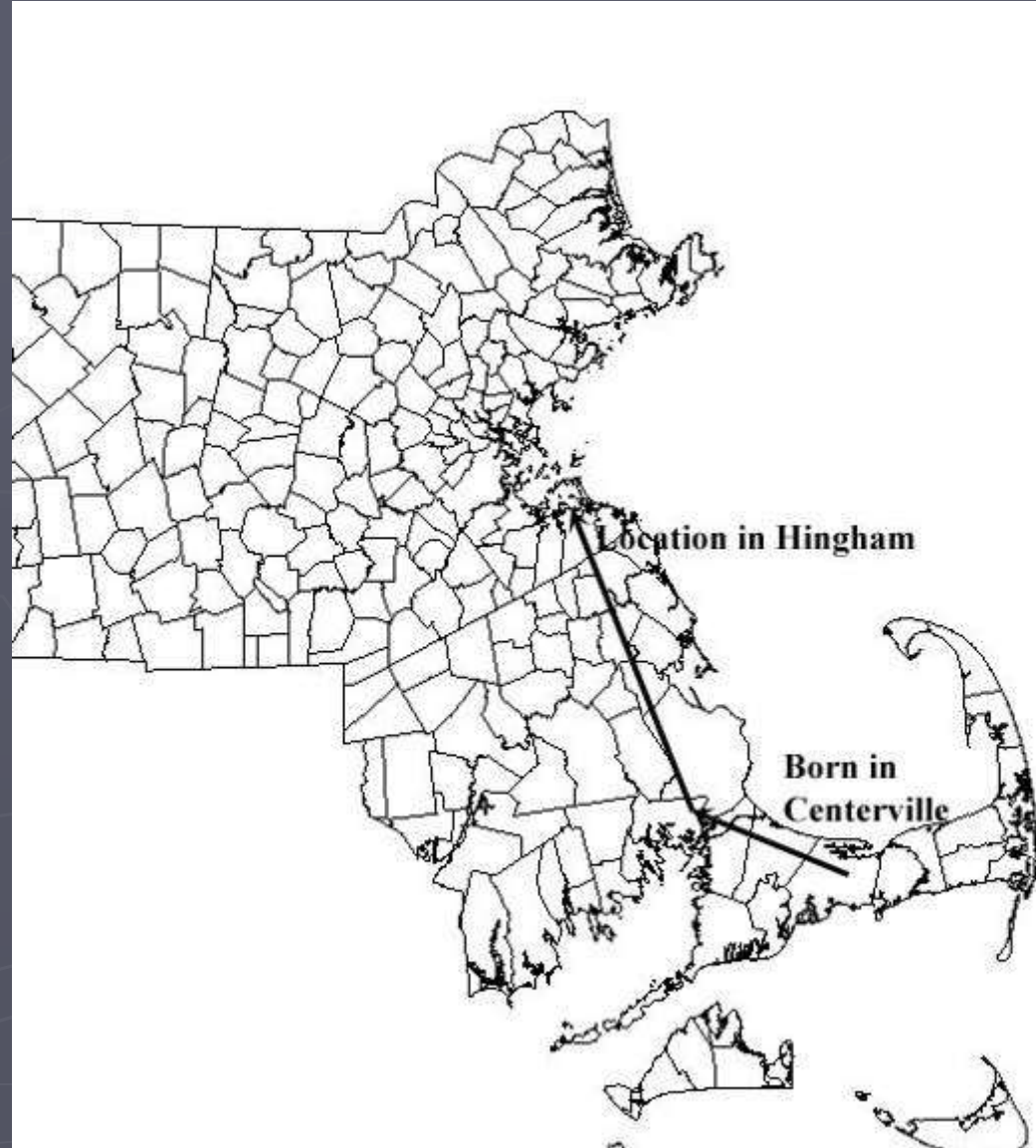
- One individual overlaid on resident pack territories
- No discernable center of activity – wondering
- Sometimes local like this or sometimes bee-line to new area





Coywolf "Walnut" leaving Cape Cod & traveling to Hingham, near Boston

50.7 miles!



Summary of Canid Actual Ecology

- ▶ Public perception
 - Overpopulation/Epidemic/Infestation of coywolves
 - “Too many ‘coyotes’.”
- ▶ In reality, population seems stable
 - Spatial avoidance and territorialism: Low densities
 - Saturation of available territory occurs quickly in a localized area.
- ▶ Population increase only possibly if:
 - (1) increased numbers of juveniles become transients
 - (2) resident groups/packs decrease territory sizes
 - (3) packs increase pack sizes
 - ▶ Usually occurs over a large geographic area
- ▶ What is more important?
 - More Coywolves in your town (local area) - unlikely
 - More Coywolves in Massachusetts – possible (see #1 above)

Overarching Conclusion

- ▶ We need more education to diverse audiences so the general public can understand the actual nature (& benefits) of carnivores.
- ▶ Coywolves are in neighborhoods to meet their ecological needs and could attack a person/child at any point of time if they collectively wanted to
- ▶ Despite the Oct. 2009 tragedy in Nova Scotia you are still (far) more likely to get injured/killed from:
 - Fatal dog attacks
 - fatal lightning strikes
 - murders
 - automobile deaths
 - cat bites
 - fatal bee stings
 - Falling trees

Website and Book



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