



Eulipotyphla, Chiroptera, & Artiodactyla



Mammalogy 2019



Expectations for Today

- You will be expected to be able to:
 - Produce the common and scientific names of 38 species of Eulipotyphla, Chiroptera, and Artiodactyla when given samples (skeletons, skins, tracks, scat, etc.)
 - Describe some basic biological and ecological characteristics of those 38 species when given the name

Taxonomy



All Other Mammals



Xenarthra



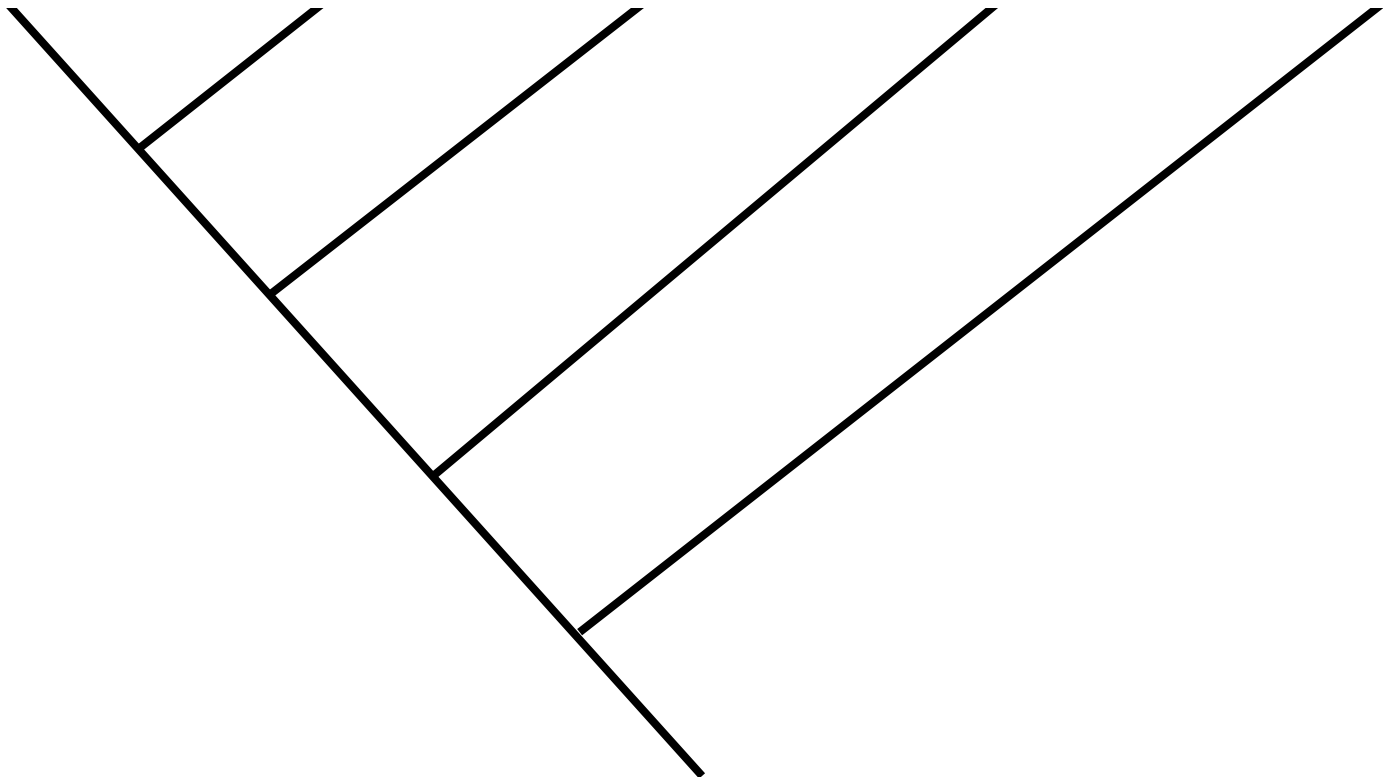
Afrotheria



Marsupiala



Monotremata



Taxonomy

Laurasiatheria



Rodentia



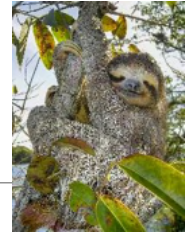
Primates



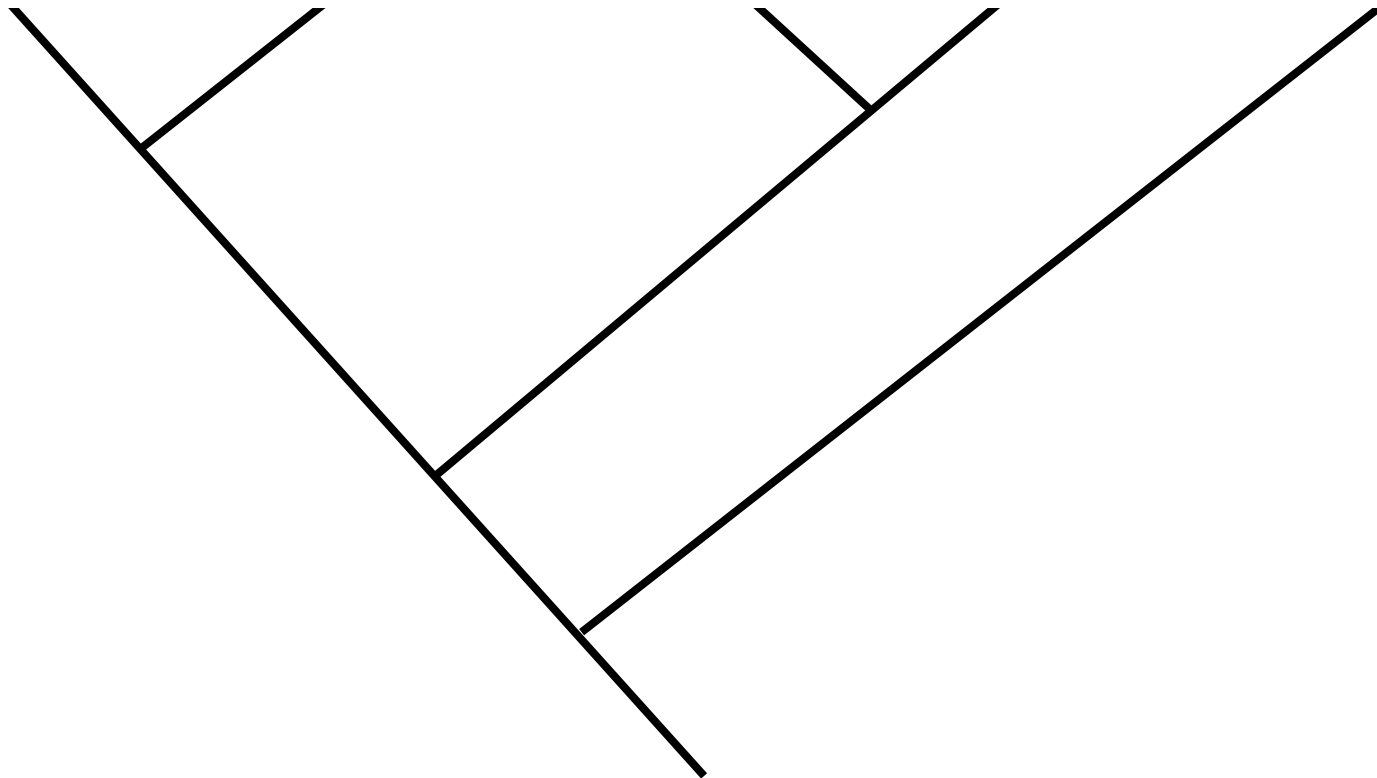
Artiodactyla



Eulipotyphla



Xenarthra



Laurasiatheria



Carnivora



Pholidota



Perissodactyla



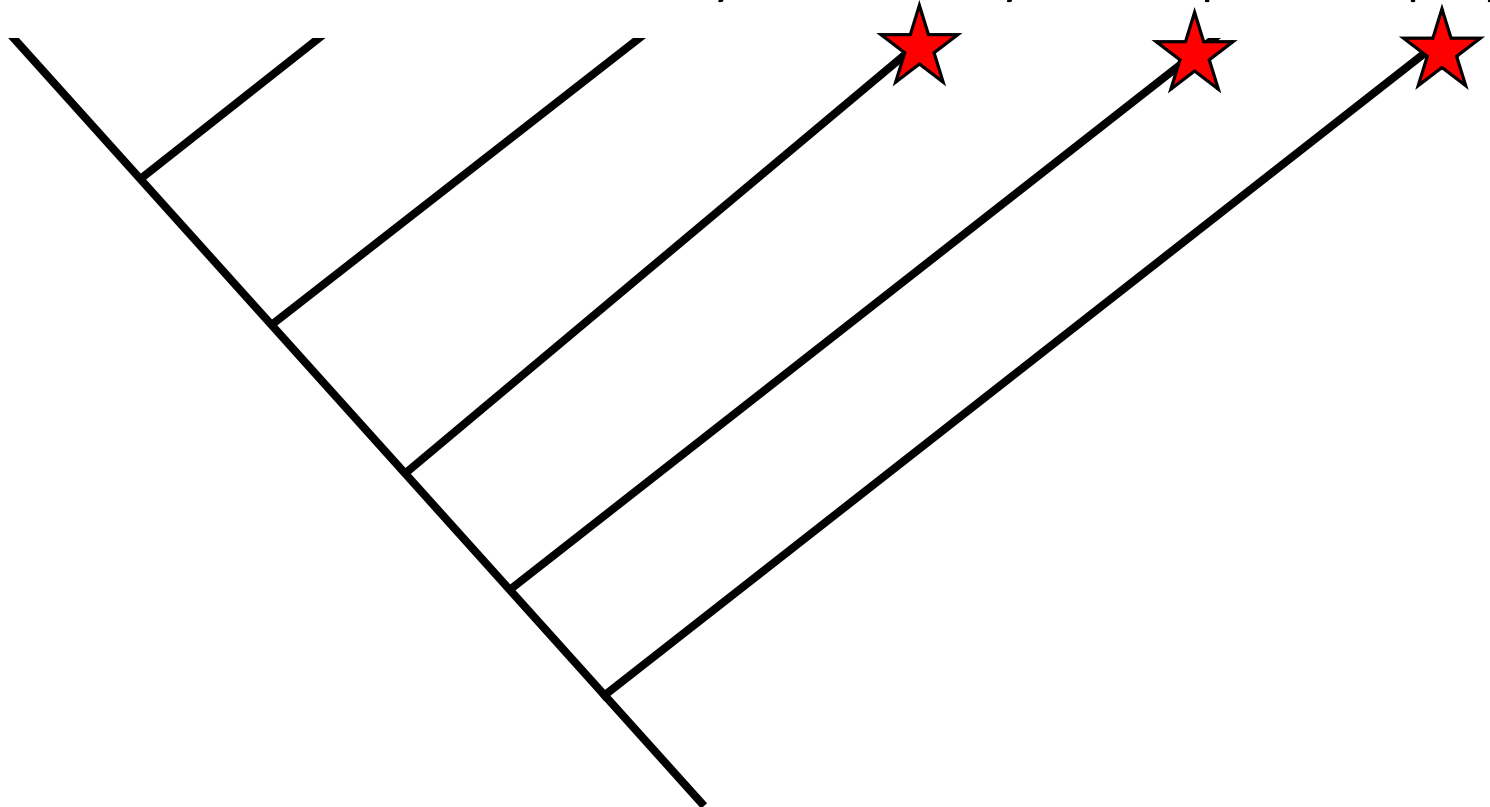
Artiodactyla



Chiroptera



Eulipotyphla



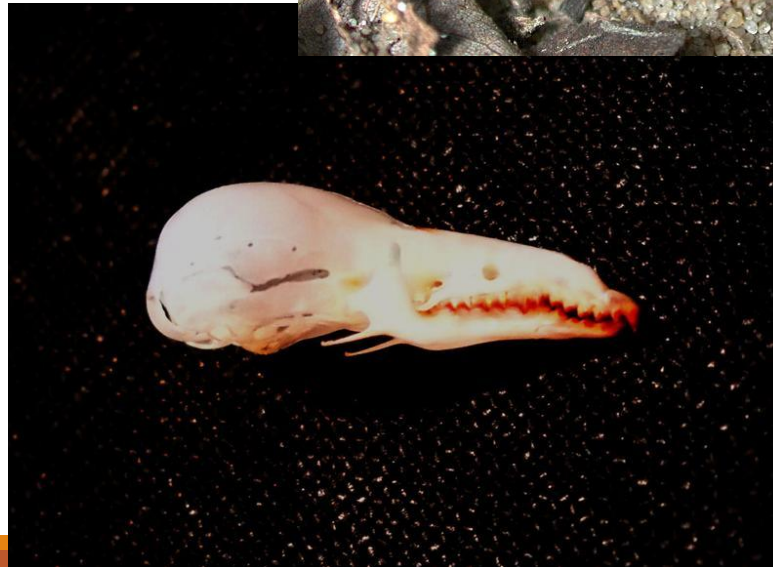
Order: Eulipotyphla



- Moles, hedgehogs, and shrews
- Eulipotyphla = “truly fat and blind”
- Primarily insectivorous
- Simplified hindgut, which lacks a caecum
- Primarily live fossorial lifestyle (subterranean)

Order: Eulipotyphla

- Typically 10 fingers + 10 toes
- Plantigrade foot posture
- Long pointed snouts
- Sharp teeth
- No auditory bullae



Scalopus aquaticus eastern mole



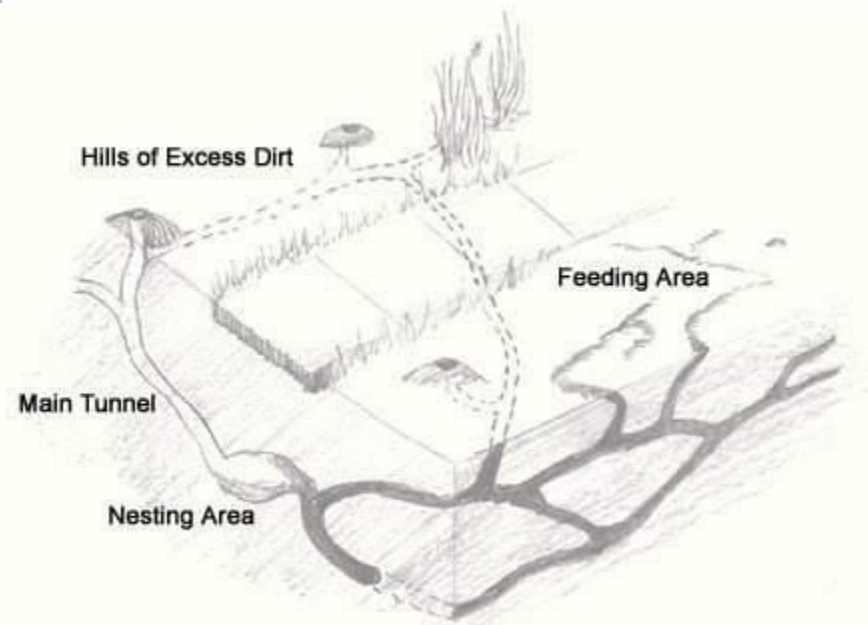
- Moles have web-like feet
- No external ears
- Forelimbs are rotated for digging
- Small eyes
- Active during both day and night
- Flattened skull
- Eat earthworms and insects
- Considered pests because of holes



Scalopus aquaticus eastern mole

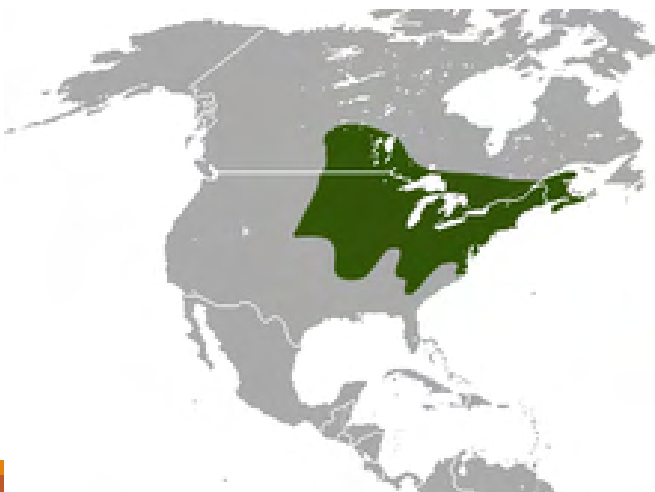


- Considered pests because of holes
- Tear up lawns and golf courses
- Weaken infrastructure of homes/buildings



Blarina brevicauda northern short-tailed shrew

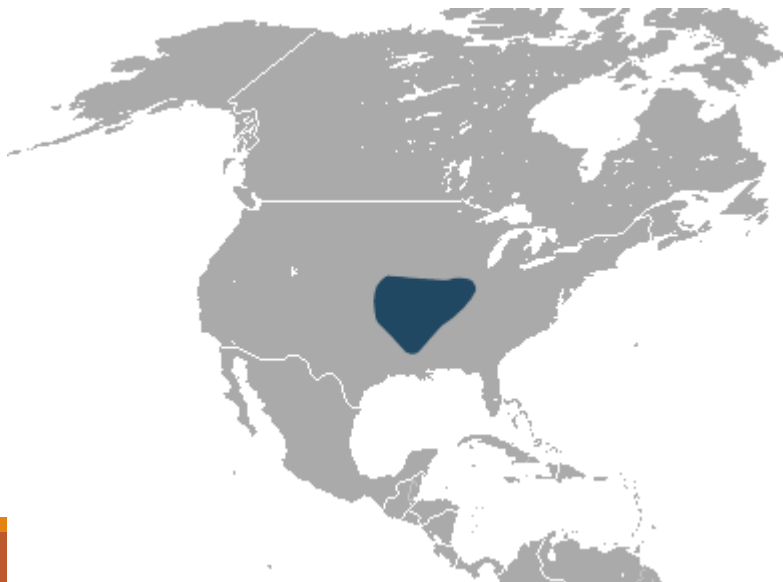
- All shrews do not have a zygomatic arch
- Insectivorous; semi-fossorial
- Venomous
- Echolocation



Blarina hylophaga

Elliot's short-tailed shrew

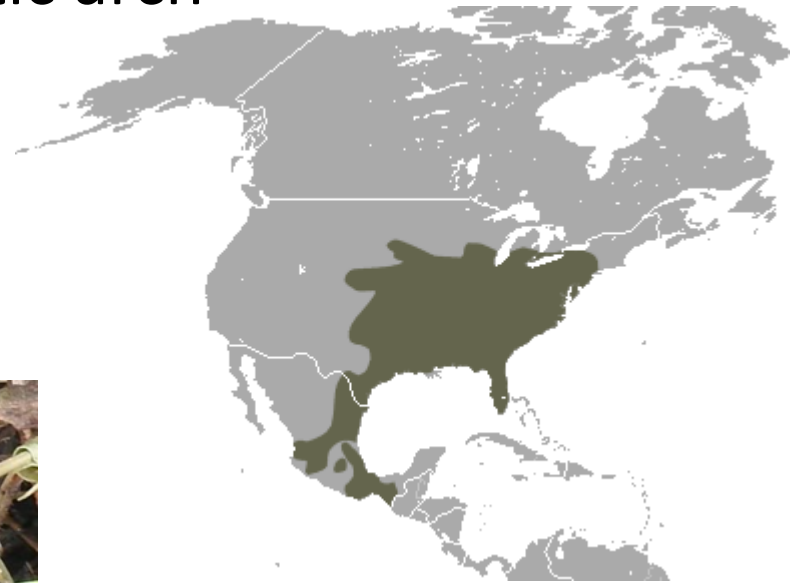
- All shrews do not have a zygomatic arch
- Prefers dense vegetation
- Smaller than the northern short-tailed shrew



Cryptotis parva

North American least shrew

- All shrews do not have a zygomatic arch
- Only 3" long
- Hoard food



Sorex cinereus masked shrew



- All shrews do not have a zygomatic arch
- Do well in disturbed habitats such as logging or burns
- Typically found in colder regions
- Largest range of North American shrews



Sorex merriami

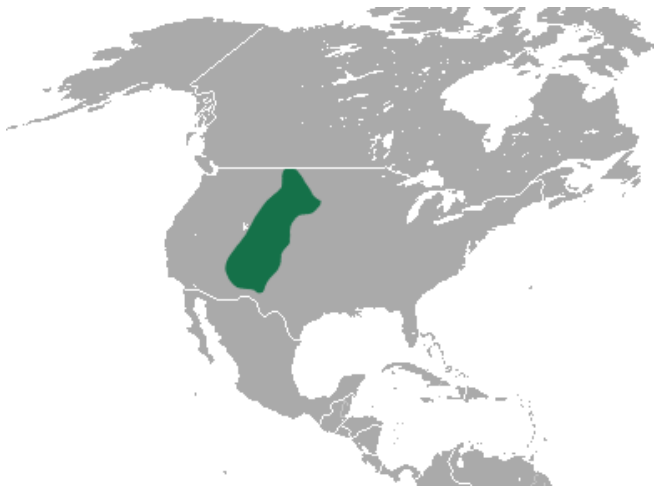
Merriam's shrew

- All shrews do not have a zygomatic arch
- Fur is light on bottom and dark on top during summer, but flips to dark on bottom and light on top during winter



Sorex nanus dwarf shrew

- All shrews do not have a zygomatic arch
- Have long tails



Order: Chiroptera Biology



- Chiroptera = “hand-wing”
- >220 extant species worldwide
- True flight (wings formed from the hand bones)
- Echolocation
- Hibernate by lowering body temperature and heart rate
- May be insectivorous, carnivorous, piscivorous, nectivorous, frugivorous, sanguivorous (all bats in North America are insectivores)
- Many are long-lived (>30yrs) and give birth to only 1-2 young each year

Order: Chiroptera Management

- White-nose syndrome
- Caught using harp traps
- Surveyed using acoustic recording devices



Tadarida brasiliensis

Brazilian free-tailed bat

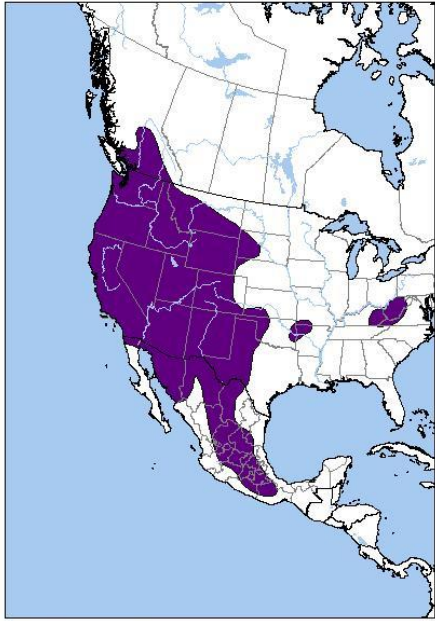
- Tail extends beyond the wing flaps (uropatagium)
- Have distinct curled incisors
- Young from individual colonies are typically born across 10 days



Corynorhinus townsendii

Townsend's big-eared bat

- Big ears and a lumpy nose
- Specialize in moths
- State bat of Virginia



Eptesicus fuscus

big brown bat

- Generalists that adapt well to humans
- Primarily eat beetles



Lasionycteris noctivagans silver-haired bat

- Migrates and hibernates
- Long flat skull
- Silver-tipped fur



Lasiurus borealis eastern red bat

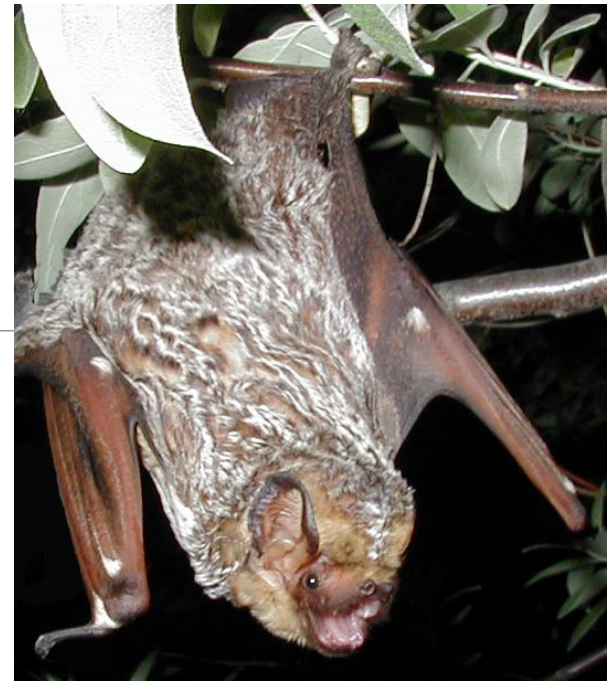


- Fur extends onto tail flap
- Sexually dimorphic coloration (male is more red)



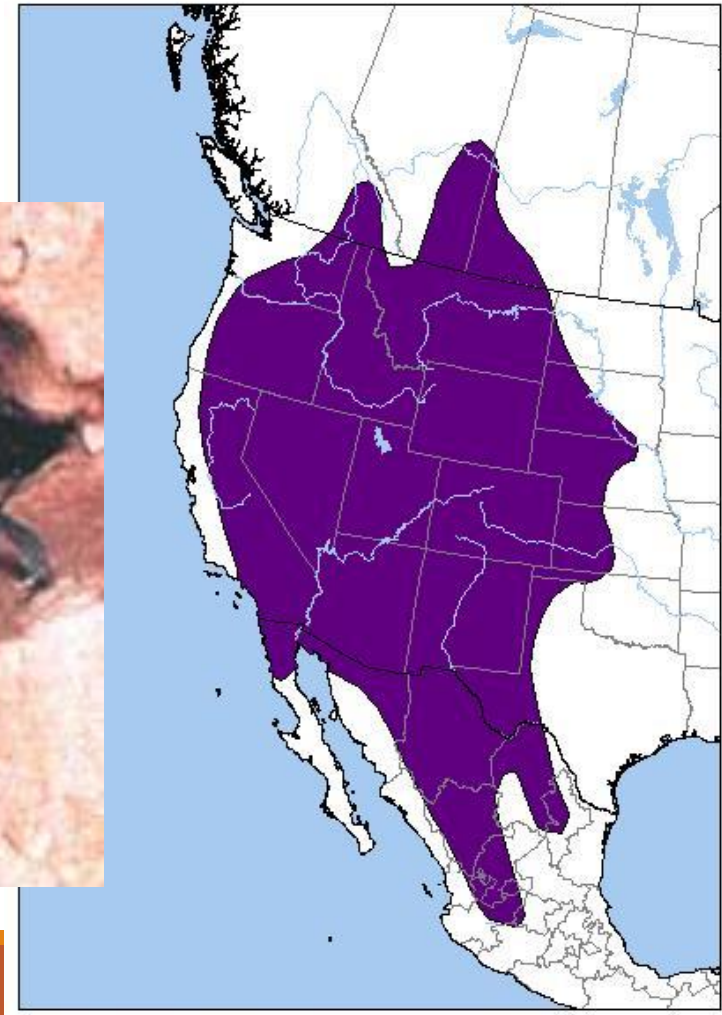
Lasiurus cinereus hoary bat

- Fur extends onto tail flap
- Silver-tipped fur
- Solitary
- Only land mammal endemic to Hawaii



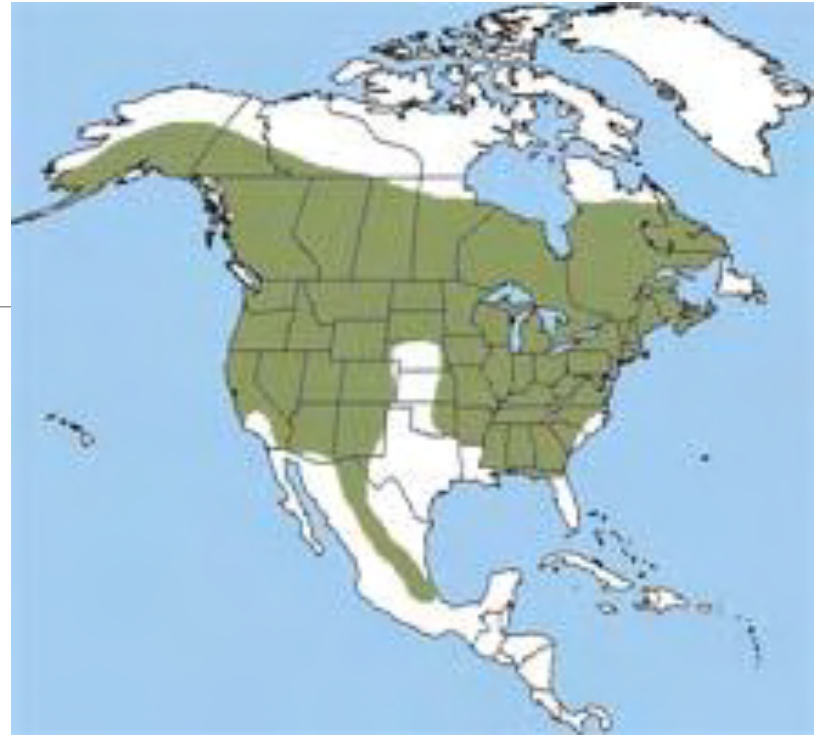
Myotis ciliolabrum western small-footed myotis

- Known for small feet



Myotis lucifugus little brown bat

- Promiscuous
- Depredated by owls
- Hibernates in caves
- Roost on cliffs/bridges
- Hairy toes



Myotis septentrionalis

northern myotis

- Has longer ears than other *Myotis* species
- Usually roost in trees or man-made structures



Myotis thysanodes fringed myotis

- Eat mostly beetles
- Prefers desert shrublands



Myotis volans long-legged myotis

- Longer than normal tibia
- Females are bigger than males



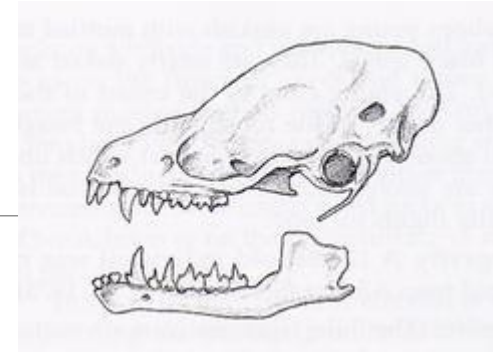
Nycticeius humeralis evening bat

- Migratory
- Form maternity colonies
- Roost inside hollow trees

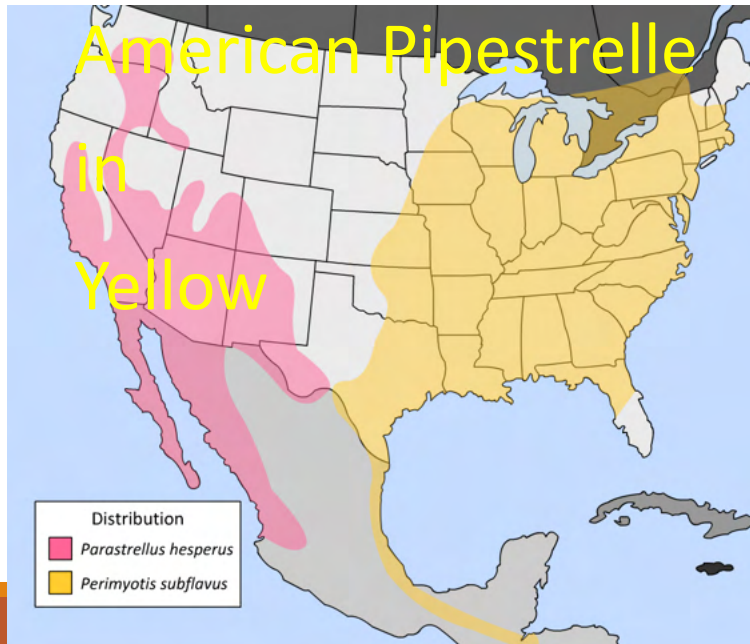


Perimyotis subflavus

American pipistrelle



- AKA tricolored bat
- body being yellowish
- Prefer habitats near open water



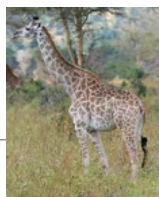
Artiodactyla



Cervidae



Bovidae



Giraffidae



Antilocapridae



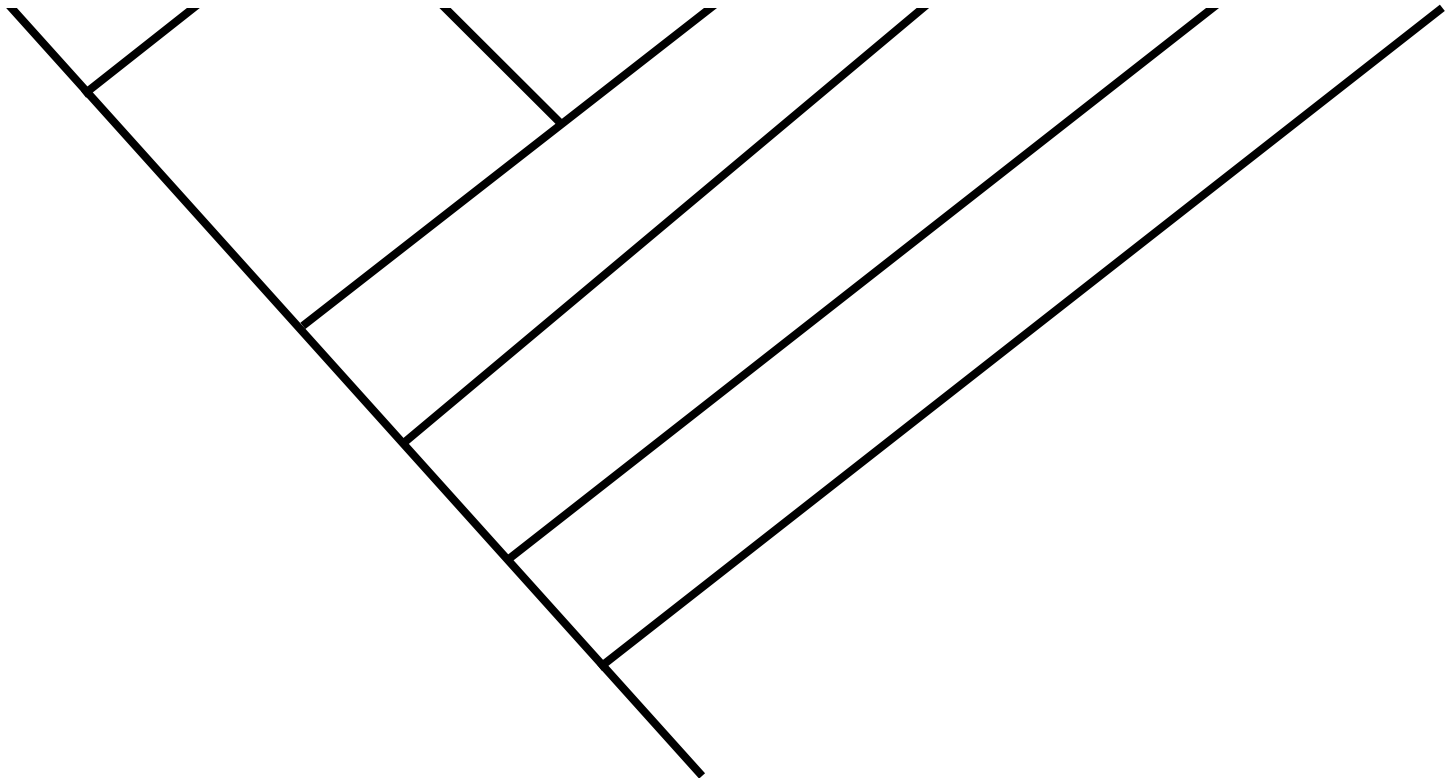
Cetacea



Suidae



Camilidae



Order: Artiodactyla

Lots of diversity:

- Clavicle (collarbone) is reduced or absent
- 2 or 4 toes (except hind feet of peccaries)
- Bunodont, brachyodont, selenodont, hypsodont teeth
- Simple stomachs to 4-chambered ruminating stomachs
- Ornamentation
- Artiodactyla = “even-toed”

Llama glama

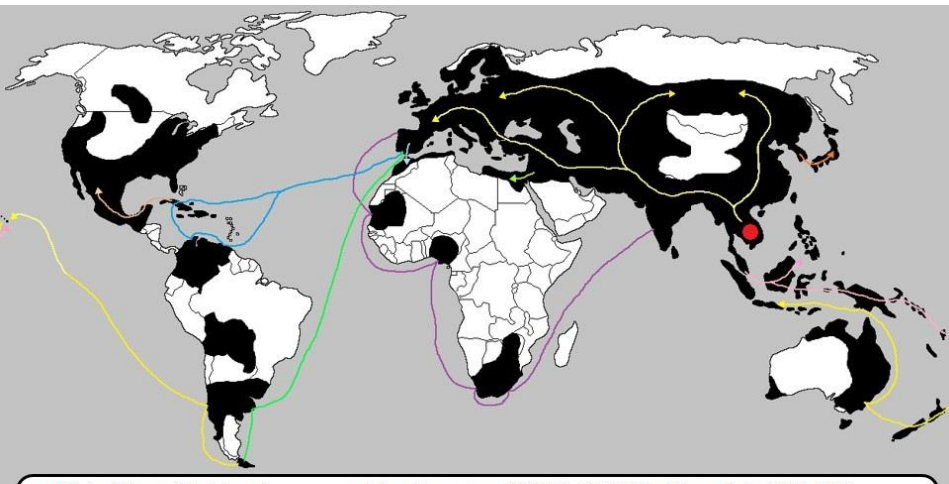
llama

- Live 15-25 years
- Originated in North America, but moved into South America during the Great American interchange
- Lots of breeds due to domestication



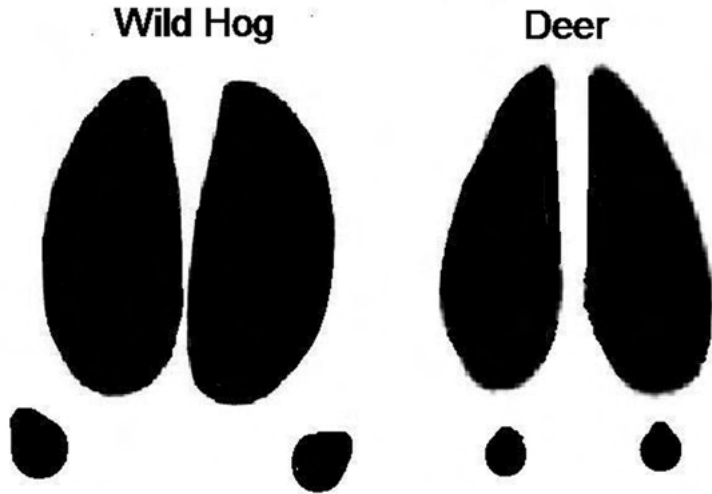
Sus scrofa wild boar

- Invasive in North America
- Have constantly growing canines (tusks)
- Dorsal hump stores fat
- Omnivorous
- Fur color variable in feral populations



Sus scrofa wild boar

- Known for rooting
- Tracks are very similar to whitetail deer



Sus scrofa wild boar



- Most states have no bag limits and very minimal weapon restrictions
- Snares and corral traps are common for removal on larger scales



Pecari tajacu collared peccary

- Similar in appearance to pigs
- Only have 3 hind foot toes
- Have special glands in rump for communicating
- Also called javelinas
- Threatened by invasive wild boar in
North America

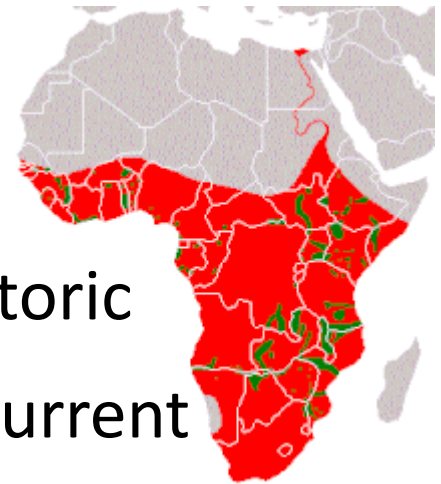


Hippopotamus amphibious common hippopotamus

- Closer related to whales and dolphins than other artiodactyls
- Heaviest terrestrial artiodactyl
- Prefer habitats with lots of water
- Highly aggressive

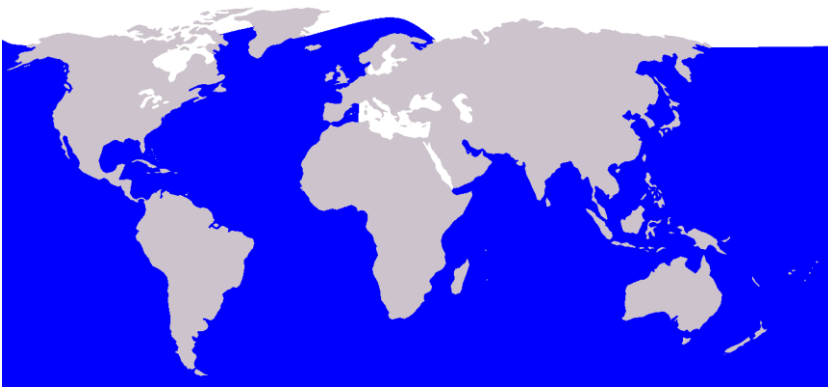


Red = historic
green = current



Megaptera noveangliae humpback whale

- Baleen teeth
- Migrate from the poles to tropics to breed
- Males battle for females



Megaptera noveangliae
humpback whale



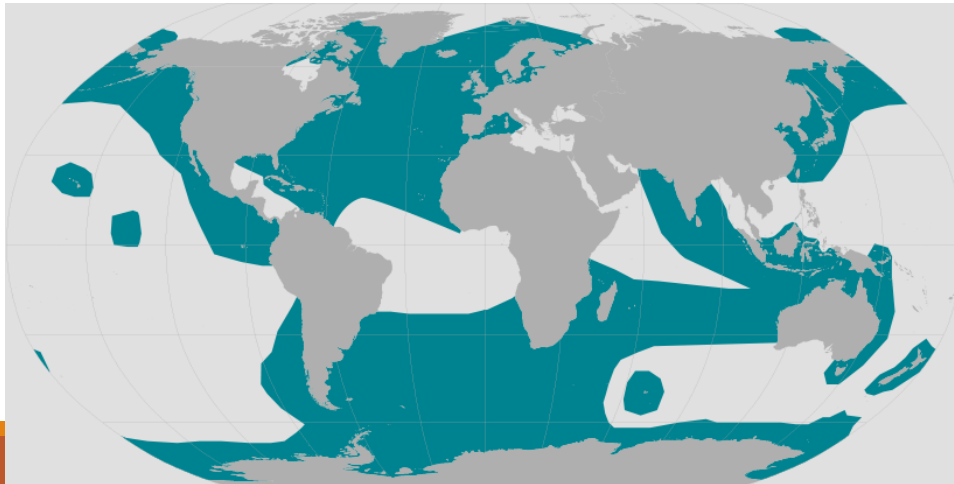
Physeter macrocephalus sperm whale

- Have homodont teeth
- Known to battle giant squids
- Have white fluid in cavity in head to help with echolocation



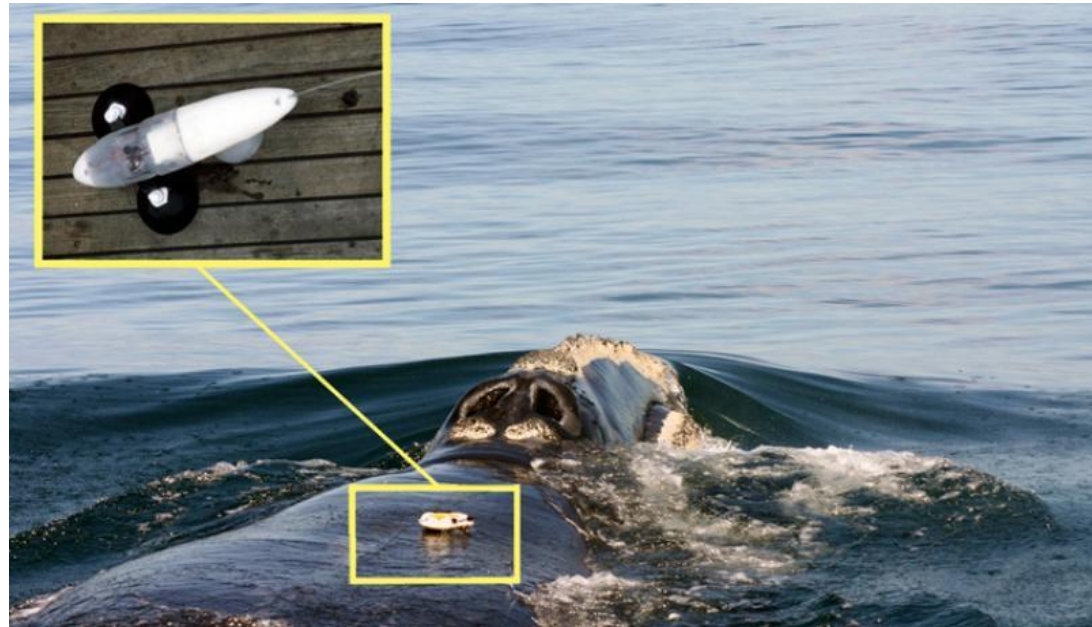
Orcinus orca killer whale

- Closer related to dolphins than other whales
- Hunt in packs
- Can be trained in captivity



Studying Whales

- We can track whales by attaching suction cup transmitters to them with modified harpoons (when the suction releases they float to the surface and can be reused)

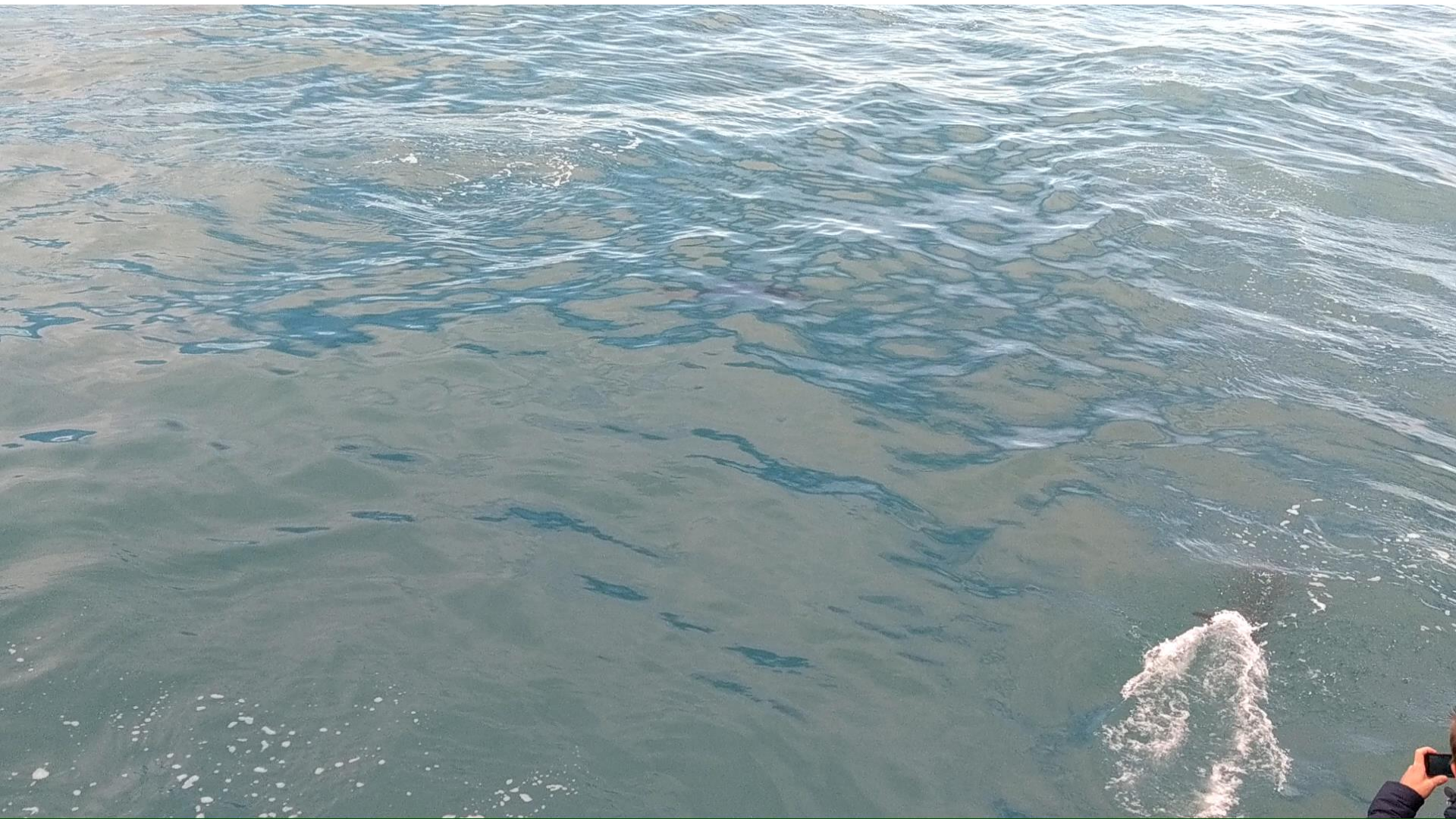


Lagenorhynchus obscurus dusky dolphin

- Concentrated in shallow water of Southern hemisphere
- Live in large groups called pods
- Piscivorous



Lagenorhynchus obscurus
dusky dolphin



Antilocapra Americana pronghorn

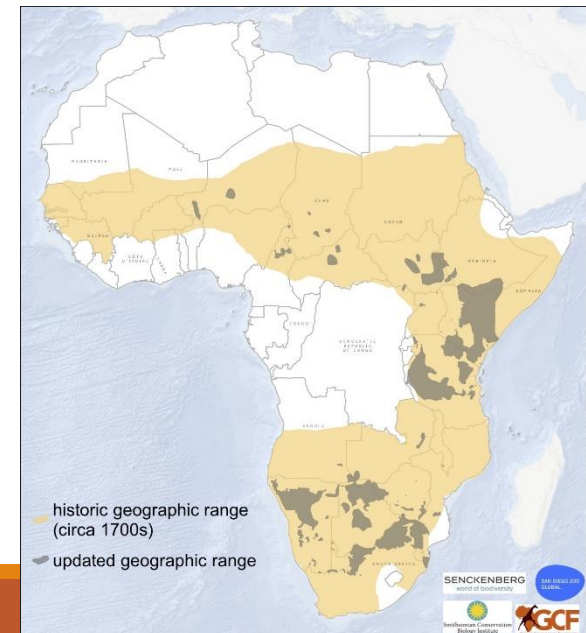
- AKA “speed goats”
- Fastest North American mammal
- Evolved speed to compete with now extinct American cheetah and American lions
- Males shed the outer layer of their horn sheath each year
- Migratory
- Site fidelity



Giraffa camelopardalis giraffe



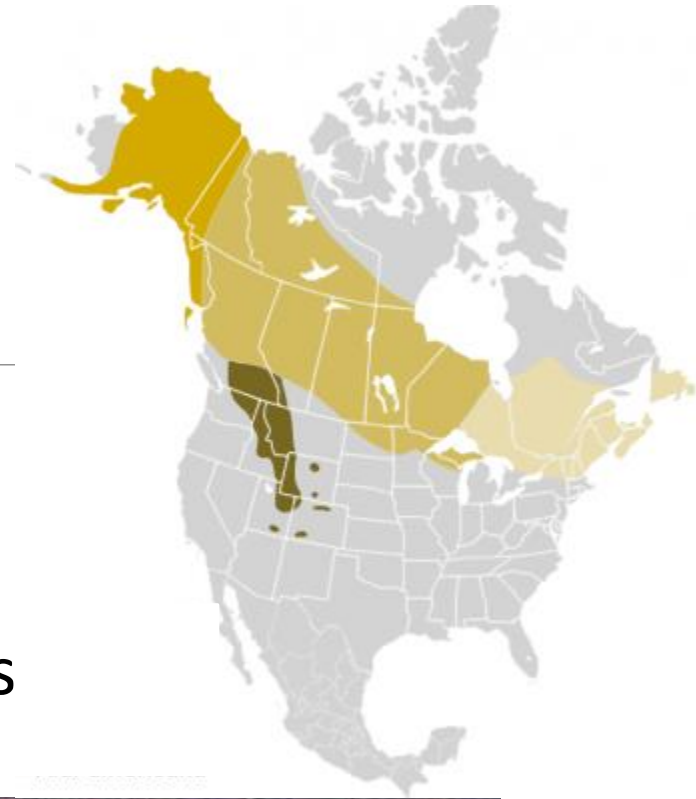
- Tallest living terrestrial mammal
- “horns” are ossicones
- Males use horns to fight for females by necking



Alces alces

moose

- Largest member of Cervidae (deer)
- Antlers are palmated
- Both males and females have beards



Alces alces moose

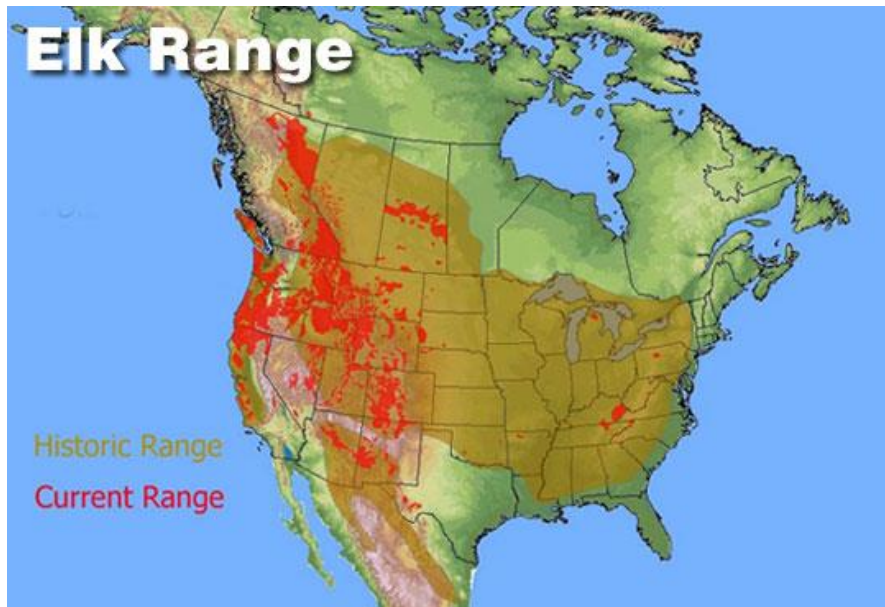


- Moose, elk, and deer have similar tracks and scat, but different sizes
- All three also rub antlers on trees, but at different scale
- Moose examples:



Cervus Canadensis elk / wapiti

- Known for their loud bugles during mating season
- Raised commercially for meat



Cervus Canadensis elk / wapiti



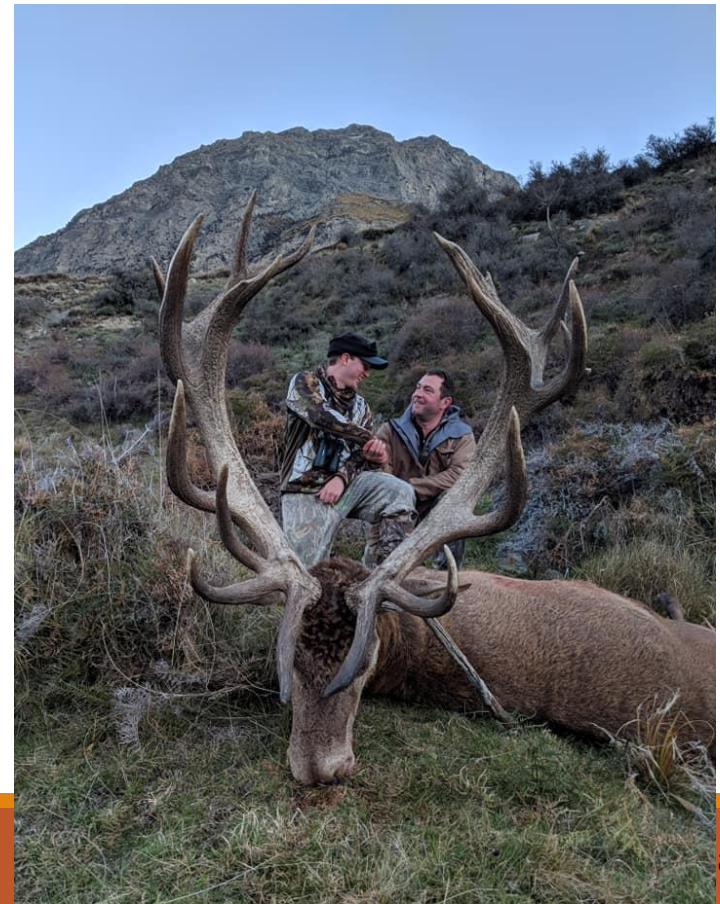
- Moose, elk, and deer have similar tracks and scat, but different sizes
- All three also rub antlers on trees, but at different scale
- Elk examples:



Cervus elaphus red deer



- Previously thought to be same species as elk
- Also bugle to obtain females, but known as the “roar”
- Females called “hinds”



Odocoileus hemionus mule deer



- Closely related to white-tailed deer
- Have rope-like tail
- Have larger ears
- Subspecies called black-tailed deer along Pacific Northwest coast



Odocoileus hemionus mule deer



- Moose, elk, and deer have similar tracks and scat, but different sizes
- All three also rub antlers on trees, but at different scale
- Mule deer examples:



5369911



Odocoileus virginianus white-tailed deer

- Closely related to mule deer
- Have smaller ears
- Have fan-like tail
- Flash tail to show predators they've already escaped
- Most common game species along entire east coast



Odocoileus virginianus white-tailed deer



- Moose, elk, and deer have similar tracks and scat, but different sizes
- All three also rub antlers on trees, but at different scale
- White-tailed deer examples:



Telling deer apart



**white-tailed
deer**



**black-tailed
deer**



mule deer



Sexual Dimorphism

Male Antlers

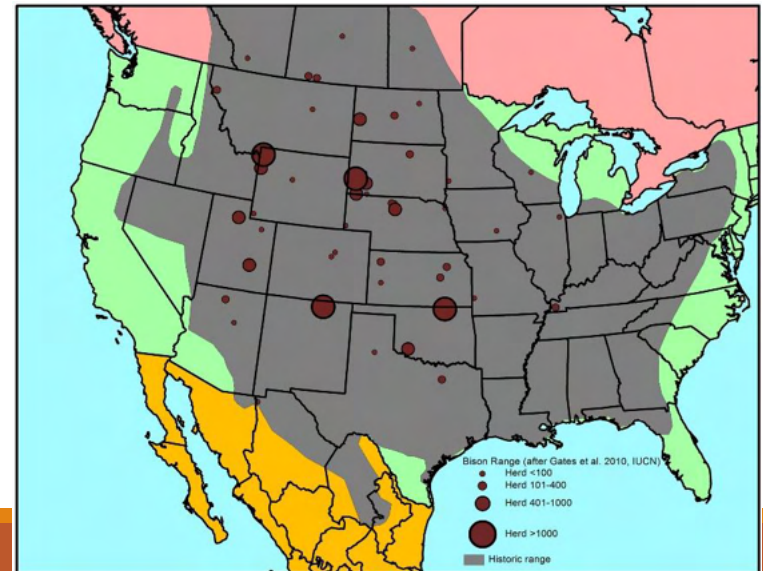
Annual antler growth cycle



Bison bison

American bison

- Were hunted heavily by American Indians and white settlers of the west
- Are not “buffalo”
- Can be crossbred with domestic cattle



Bison bison

American bison

- Buffalo wallow to rid themselves of parasites
- Scat is in big “paddies”



Oreamnos americanus mountain goat



- Have ruminant stomachs
- Have true horns
- Known for being sure-footed on ice and rocks
- Lives in alpine and sub-alpine areas especially mountains



Ovis canadensis bighorn sheep



- An icon of the American west
- Losing range due to humans as well as invasive audad sheep
- Can survive in many habitats
- Males fight for females by butting
- Scat similar to cervids



Evolutionary Benefits of Horns vs. Antlers

- Antlers grow anew annually, so they are a reliable indicator of health for a given year (but don't get large until they've survived a few years)
- Antlers will be small if they've been sick, didn't forage well, etc., so they might not have good genes
- Horns keep growing throughout life, so older animals have larger horns
- Horns will be larger the longer you live, which means more offspring with good genetics for long lives

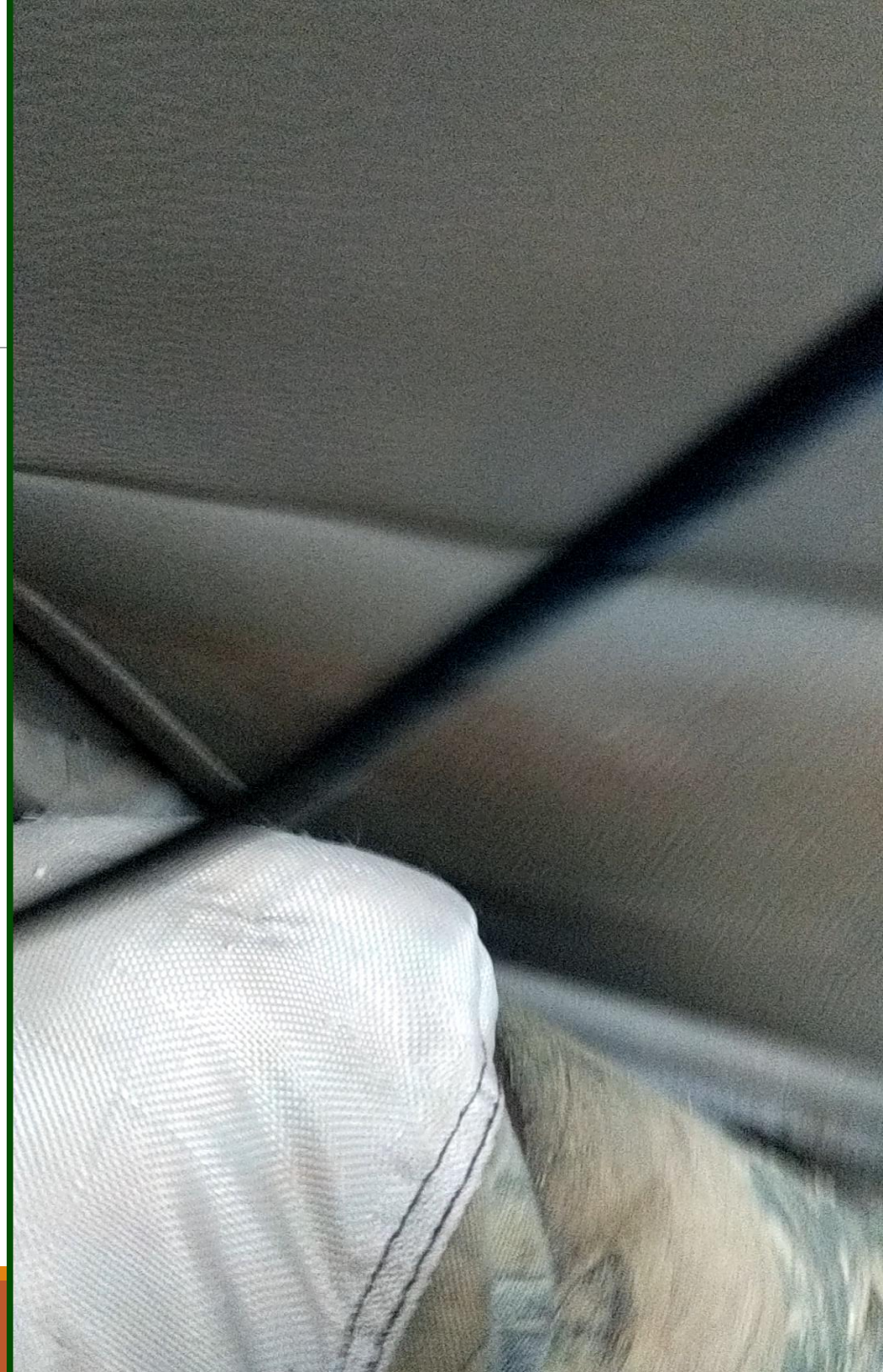
Trapping Artiodactyls



- Clover traps (are essentially large box traps) that catch deer/elk than can then be collared
- Darting is also common
- Drop nets and rocket nets can capture multiple deer simultaneously

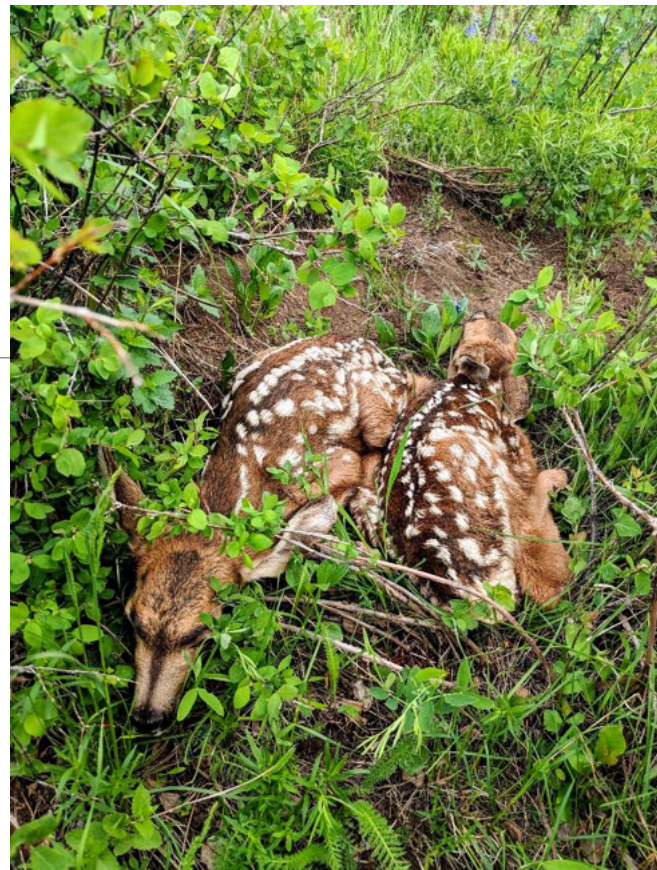


Trapping Artiodactyls



GPS Collars on Artiodactyls

- GPS collars let us track locations at intervals of our choosing
- Can be satellite linked or VHF (radio) transmitted



Specimens in the Lab

- *Blarina brevicauda*
 - (skull & skin)
- *Sorex cinereus*
 - (skull & skin)
- *Scalopus aquaticus*
 - (skeleton, skull, & skin)
- *Corynorhinus townsendii*
 - (skin)
- *Eptesicus fuscus*
 - (skin)
- *Lasiurus borealis*
 - (skin)
- *Myotis septentrionalis*
 - (skeleton & skin)
- *Sus scrofa*
 - (skeleton)
- *Antilocapra americana*
 - (skull & tracks)
- *Alces alces*
 - (skull)
- *Cervus canadensis*
 - (antler & tracks)
- *Odocoileus virginianus*
 - (skulls, scat, & tracks)
- *Bison bison*
 - (skull)
- *Ovis canadensis*
 - (horn)