



## Identification of Shrew, Bat, and Rodent Species in the Greater Yellowstone Ecosystem

Dan Bachen Sr. Zoologist – May 3rd, 2023



# Identification philosophy

- Identification is hard! It is often difficult or impossible to identify observed animals to species with certainty
- Identify to the most exact taxonomic level possible
- Collect evidence if possible, particularly with challenging identifications
- Remain an objective observer
- Everyone makes mistakes, be open to debate and constructive criticism
- Record your observation data are valuable!

# Resources

## State Field Guides

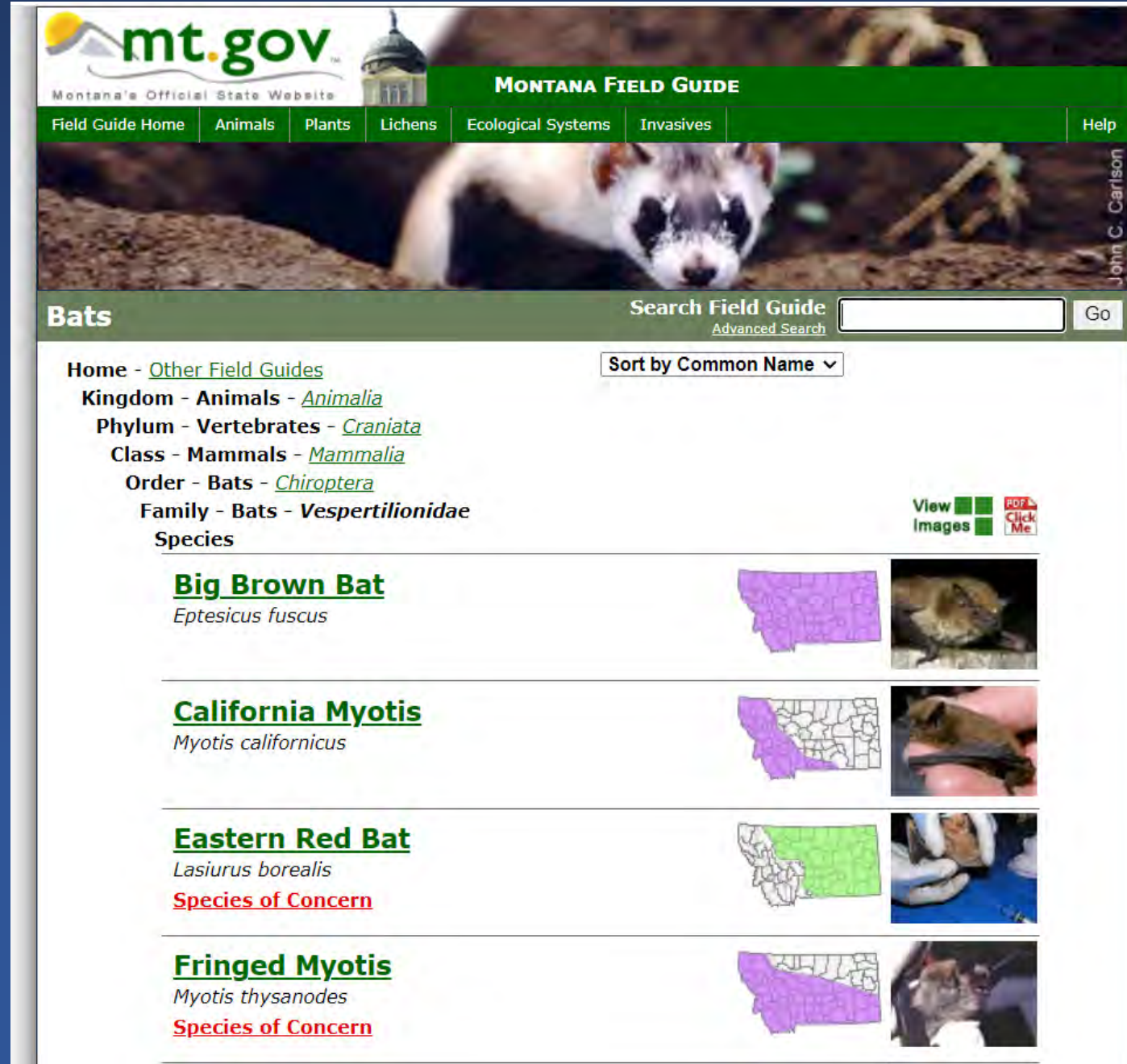
- Wyoming field Guide:  
<https://fieldguide.wyndd.org/>
- Montana Field Guide:  
<https://fieldguide.mt.gov/>
- Idaho Species Catalogue:  
<https://idfg.idaho.gov/species/>

## Identification Resources

- iNaturalist

## Books

- Mammals of Montana – Kerry Foresman



The screenshot displays the Montana Field Guide website. At the top, the 'mt.gov' logo is visible alongside the text 'Montana's Official State Website'. The main navigation bar includes links for 'Field Guide Home', 'Animals', 'Plants', 'Lichens', 'Ecological Systems', 'Invasives', and 'Help'. A large banner image of a bat is featured below the navigation bar. The page title is 'Bats'. A search bar with the text 'Search Field Guide' and a 'Go' button is present. Below the search bar, a breadcrumb trail shows the hierarchy: 'Home - Other Field Guides', 'Kingdom - Animals - Animalia', 'Phylum - Vertebrates - Craniata', 'Class - Mammals - Mammalia', 'Order - Bats - Chiroptera', and 'Family - Bats - Vespertilionidae'. A 'Sort by Common Name' dropdown menu is also visible. The main content area lists four bat species, each with a distribution map of Montana and a photograph: 'Big Brown Bat' (*Eptesicus fuscus*), 'California Myotis' (*Myotis californicus*), 'Eastern Red Bat' (*Lasiurus borealis*) marked as a 'Species of Concern', and 'Fringed Myotis' (*Myotis thysanodes*) also marked as a 'Species of Concern'. A 'View Images' link with a PDF icon is located to the right of the species list.



# How to see Small Mammals

- Research
  - Terrestrial Small Mammals - Trapping
  - Bats – roost searches, mist netting, acoustic recorders
- General Public
  - Direct observation
  - Trail cameras
  - Bat detectors
  - Dead animals
  - Owl pellets



# Types of Small Mammals in the GYE

Shrews – 8 species



Bats– 14 species



Rodents – 27 species





# Shrews (Eulipotyphla)

- Ubiquitous small mammals, common but rarely seen
- Invertebrate predators
- High metabolism very active during foraging
- Active year round
- Some species can echolocate

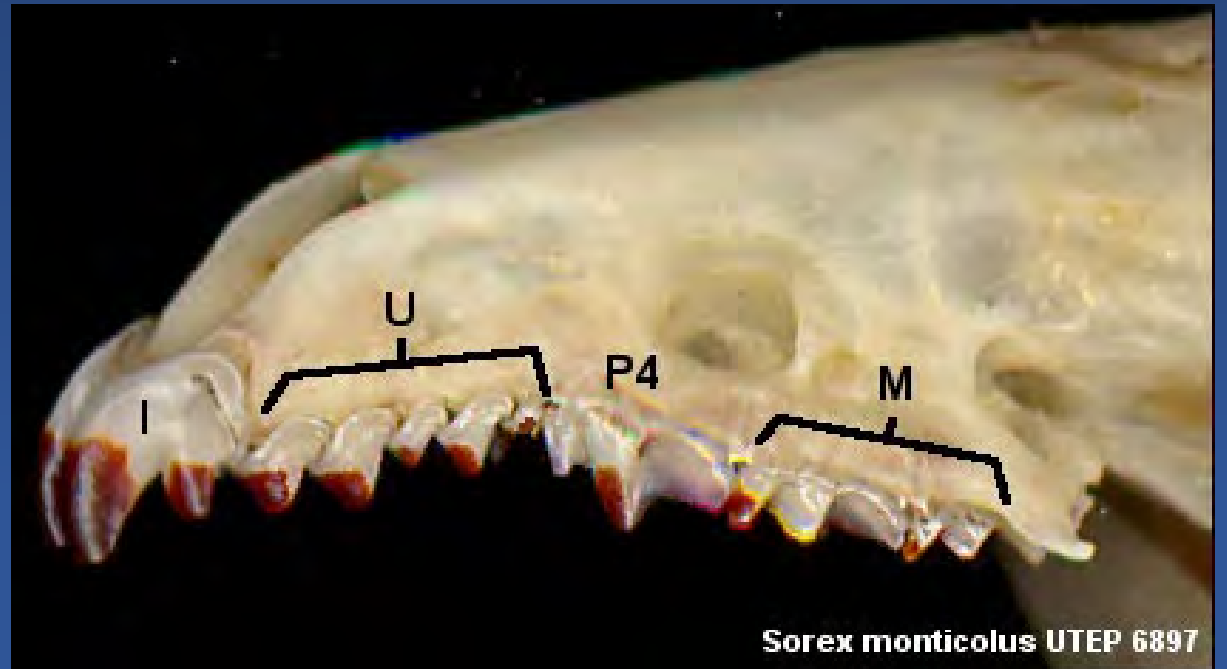
## Identification

- Long snout
- Small in size
- Lack true incisors
- Possible to confuse with rodents



# Shrew that are difficult to identify

- Identification requires detailed examination of tooth number, staining, foramen position
- Species
  - Masked Shrew (*Sorex cinereus*)
  - Montane Shrew (*S. obscurus*)
  - Vagrant Shrew (*S. vagrans*)
  - Hayden's Shrew (*S. haydeni*)
  - Dwarf Shrew (*S. nanus*)
  - Merriam's Shrew (*S. merriami*)
  - Preble's Shrew (*S. preblei*)



# Shrew that can be identified in the field

Western Water Shrew (*S. navigator*)

- Identification
  - "large"
  - Distinct bicolor pelage
  - Fringe of hair on toes
  - Associated with water





# Bats (Chiroptera)

- Among our most common species but difficult to closely observe
- Facing significant threats from wind energy development and White-Nose Syndrome
- Don't touch live animals! Slight rabies risk



# Bat Identification to Species

- 14 Species known from the GYE
- Some bats are among the most challenging mammals in Montana to identify
- Pelage/ field marks useful for most species except *Myotis* Bats
- *Myotis* require in-hand verification/ measurement
- Very few are identifiable with confidence on the wing
- Acoustic recordings of echolocation calls often used to identify species for research projects

# Big Brown Bat (*Eptesicus fuscus*)

- Field marks:
  - Dog like muzzle
- Roosts:
  - Structures
  - Rock outcrops
  - Trees
- Hibernacula
  - Caves/mines
  - Rock crevices





# Hoary Bat (*Lasiurus cinereus*)

- Field marks
  - Distinctive hoary pelage
  - White wrist and elbow patches
- Roosts:
  - Foliage
- Migratory
  - Unknown where they overwinter
- Almost all adults in MT are Male



# Spotted Bat (*Euderma maculatum*)

- Field Marks
  - Large ears
  - Black-and-white pelage
  - Audible call
- Roosts:
  - Cliffs/ rock outcrops
- Resident or migratory?
- Can travel > 60km between foraging and roosting sites



# Townsend's Big-eared Bat (*Corynorhinus townsendii*)

- Field Marks:
  - Large ears
  - “lumps” on rostrum
- Roosts:
  - Caves/ Mines
  - Buildings
- Associated with forests/brushy habitat





# Silver-haired Bat (*Lasionycteris noctivagans*)

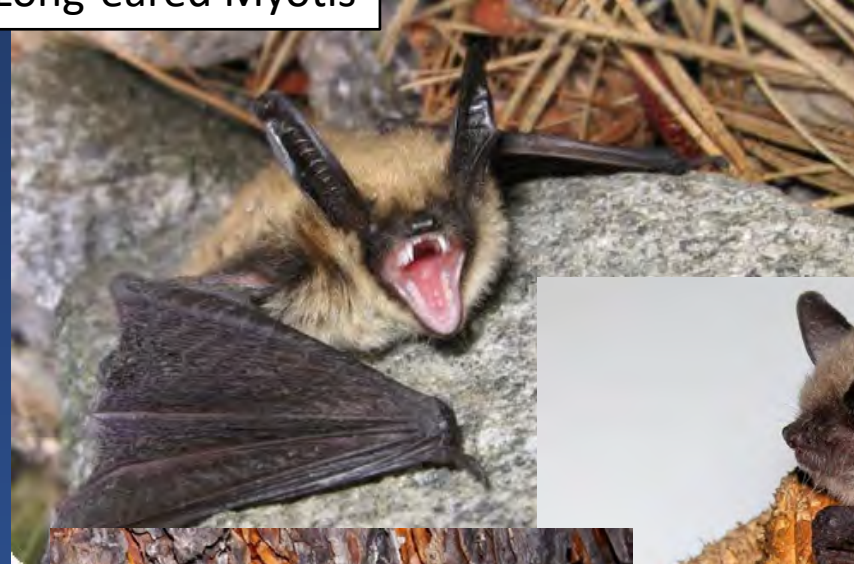
- Field marks:
  - Dark pelage with silver tips
  - Margin of ear light in color
- Roosts:
  - Trees
  - Structures
- Hibernacula:
  - ?
  - Rock outcrops in BC



# *Myotis* bats

- 7 species
- All very similar in size and appearance
- Identification often requires in-hand morphology, sometimes genetics
- Roosts are similar across species:
  - Man-made structures (buildings, bridges)
  - Caves/ mines
  - Rock outcrops
  - Trees

Long-eared Myotis



Little Brown Myotis



Yuma Myotis



Long-legged Myotis

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# Rodents (Rodentia)

- Most abundant and diverse group of mammals
- Ever-growing incisor teeth for gnawing
- Skulls can be confused with lagomorphs (rabbits and hares)
  - Rodents lack “fenestration”
  - Lagomorphs have 2 sets of incisors
- About 27 species in the GYE
  - Beavers (1)
  - Jumping Mice (2)
  - Old World Mice and Rats (2)
  - New-world Mice and Voles (10)
  - Pocket Gophers (2)
  - Porcupines (1)
  - Squirrels (9)





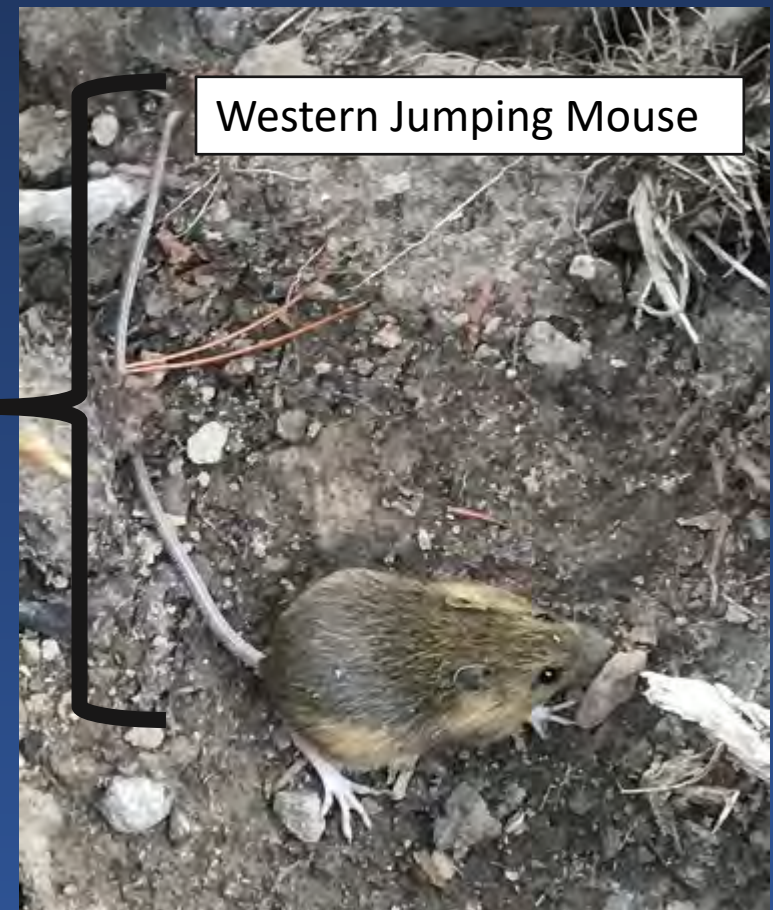
# Beaver (*Castor canadensis*)

- Largest rodent in North America
- Broad flat tail
- Evidence of presence
  - Dams and lodges
  - Gnawed shrubs and trees



# Jumping Mice (*Zapodidae*)

- Identification
  - Large hind feet
  - Long tail
  - Distinct tri-colored pelage
- 2 species:
  - Western Jumping Mouse (*Zapus princeps*) - common, tail not distinctly bicolored
  - Meadow (*Z. hudsonius*) may be present in eastern GYE, bicolored tail





# Old World Mice and Rats (*Muridae*, M)

- House Mouse (*Mus musculus*)
- Brown Rat (*Rattus norvegicus*)
- Identification
  - Scaled tail diagnostic for each species
  - Size and “gestalt” to separate
  - Associated with people





# New World Mice and Voles (*Cricetidae*)

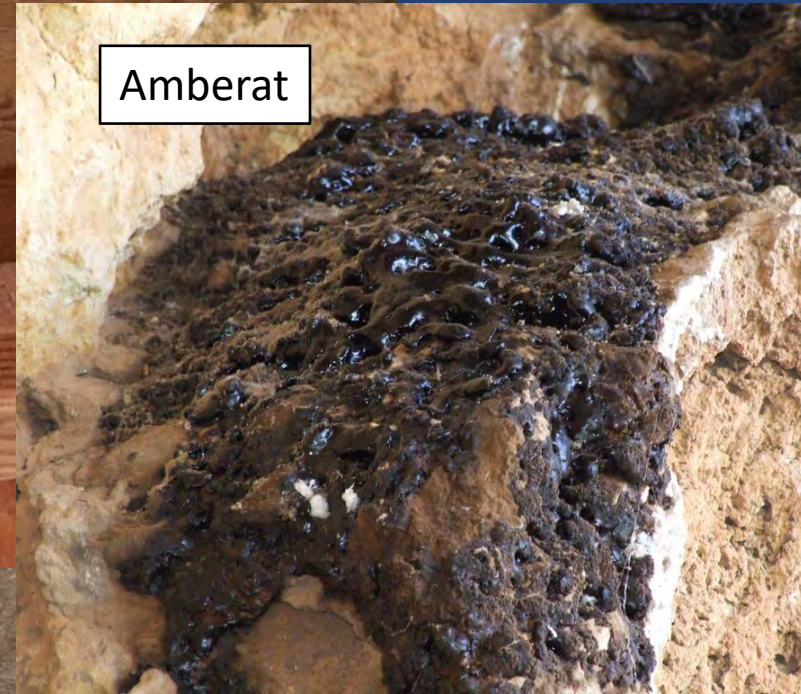
- Deer Mouse (*Peromyscus maniculatus* or *P. sonoriensis*)
  - Most common rodent in GYE
  - Found in most habitat types
  - Associated with buildings
- Identification
  - Bicolored tail
  - White underside and brown back and sides





# Bushy-tailed Woodrat (*Neotoma cinerea*)

- Bushy-tailed Woodrat (*Neotoma cinerea*)
  - “Pack Rat” or “trade rat”
  - Common in rocky areas or buildings
- Identification
  - Large in size
  - “Micky-mouse ears” and bushy tail
  - Amberat
  - Nests/ middens





# Microtus and Heather Voles

## Identification

- Subtle variation in pelage. Tail length may be diagnostic
- Meadow Vole (*M. pennsylvanicus*)
  - Dental characteristics
- Montane Vole (*M. montanus*)
  - Dental characteristics
- Long-tailed Vole (*Microtus longicaudus*)
  - Like other *Microtus* voles but tail >60% body length diagnostic
- Western Heather Vole (*Phenacomys intermedius*)
  - Dental characteristics





# Other Voles

- Sagebrush Vole (*Lemmiscus curtatus*)
  - Sagebrush associated species
  - Short tail diagnostic (<25% body length)
  - Superciliary ring
- Southern Red-backed vole (*Clethrionomys gapperi*)
  - Forest and willow shrublands
  - Larger ears
  - “Red Back”



# Aquatic Mice and Voles

- Muskrat (*Ondatra zibethicus*)
  - Ponds and creeks
  - Possible to confuse with Beaver
    - Pelage color on face
    - Narrow tail
- North American Water Vole (*Microtus richardsoni*)
  - Microtus vole 2x the size of other species
  - Aquatic habits and habitat



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# Pocket Gophers (Geomyidae)

- Northern Pocket Gopher (*Thomomys talpoides*)
  - Common but rarely observed
  - Identification
    - Large claws, short light colored tail
    - Eskers and tailings diagnostic
- Idaho Pocket Gopher (*T. idahoensis*)
  - Uncommon/periphery of GYE
  - Identification
    - Genetics
    - Smaller size
    - May have dark post-auricular patches

Northern Pocket Gopher



Eskers



Tailings



Idaho Pocket Gopher



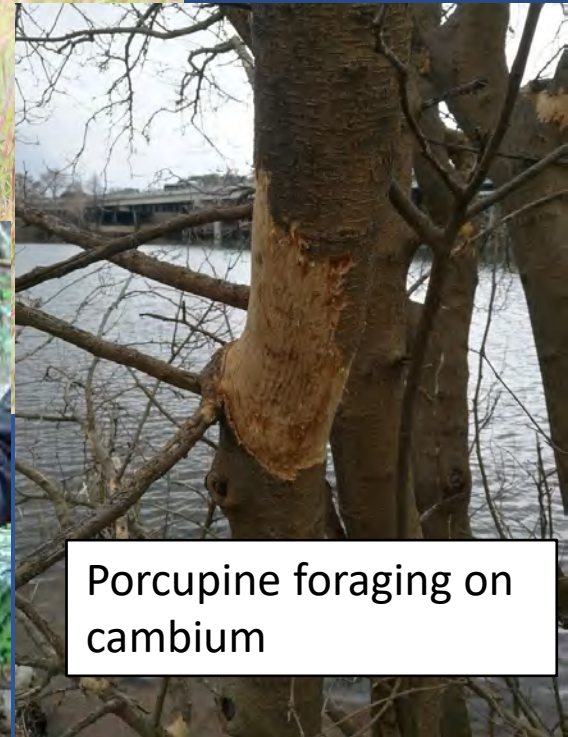


# Porcupine (*Erethizon dorsatum*)

- Identification
  - Large quilled rodent
- Forested areas, shrublands, grasslands with cover
- Chews diagnostic
  - Easy to confuse with other animals
  - Gnawing



Bear foraging  
on cambium



Porcupine foraging on  
cambium

# Chipmunks (*Neotamias*)

- Identification
  - Confused with Golden Mantled Ground Squirrel
  - Species difficult to ID with certainty
  - Color of chest and underside of tail
  - Habitat
  - Behavior
- Least Chipmunk (*Neotamias minimus*)
  - Relatively small and gray
  - Only species in shrublands/ areas without forests
- Yellow-pine Chipmunk (*N. amoenus*)
  - Yellowish chest and underside of tail
- Uinta Chipmunk (*N. umbrinus*)
  - Largest species

Least Chipmunk



Yellow-pine Chipmunk



Uinta Chipmunk





# Ground Squirrels

- Golden-mantled Ground Squirrel (*Callospermophilus lateralis*)
  - Stripes on side
  - Red/orange head with white eye-ring
  - Rocky habitats
- *Urocitellus* ground squirrels can be hard to identify!
- Uinta Ground Squirrel (*Urocitellus armatus*)
  - Gray head and reddish patch on nose
- Wyoming Ground Squirrel (*U. elegans*)
  - Less contrast than Uinta but significant overlap in pelage attributes

Golden-mantled Ground Squirrel



Uinta Ground Squirrel



Wyoming Ground Squirrel





# Tree Squirrels

- American Red Squirrel (*Tamiasciurus hudsonicus*)
  - Bushy tail, red pelage with light color on underside, eye ring
  - Distinct “chatter” call
  - Middens and cone pieces diagnostic
- Northern Flying Squirrel (*Glaucomys sabrinus*)
  - Patagium membranes for gliding
  - Nocturnal, difficult to see





# Yellow-Bellied Marmot (*Marmota flaviventris*)

- Large Rodent
- Characteristic whistle
- Rocky habitat or other protective cover
- Only Marmot species in GYE



# What to do with observations of small mammals?

- Observations of rare and common species can help research and management
  - If you're sure of ID submit to the state's Heritage program
    - MT: <https://mtnhp.org/>
    - WY: <http://www.uwyo.edu/wyndd/>
    - ID: <https://idfg.idaho.gov/species/observations>
  - Or submit to community science apps
    - iNaturalist: <https://www.inaturalist.org/>



# Meadow Jumping Mouse (*Zapus hudsonius*) Research Grade

Follow



**hydapse**  
4,850 observations

Observed: Jul 17, 2016 · 10:34 PM MDT  
Submitted: Jul 17, 2020 · 3:53 PM MDT



★ You faved this!

## Notes

Meadow Jumping Mouse (*Zapus hudsonius*)

## Activity



hydapse suggested an ID

Improving 2y



**Meadow Jumping Mouse**  
*Zapus hudsonius*

Compare



dbachen suggested an ID

2y



**Meadow Jumping Mouse**

## Community Taxon

**Meadow Jumping Mouse** (*Zapus hudsonius*)

Cumulative IDs: 2 of 2

0 2/3rds

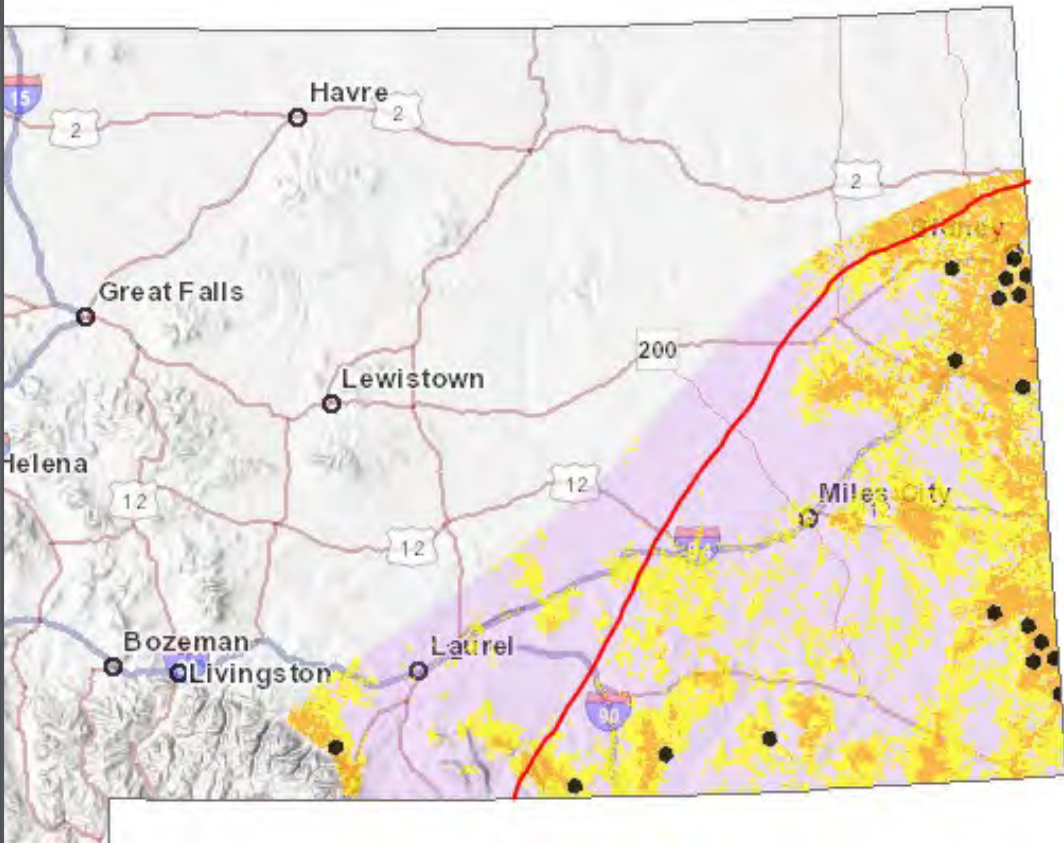
Agree

Compare

About

## Annotations

Attribute	Value	Agree	Disagree
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# Questions?

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