

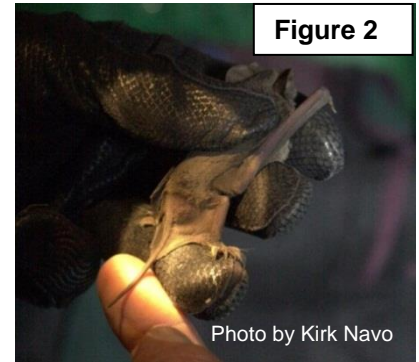
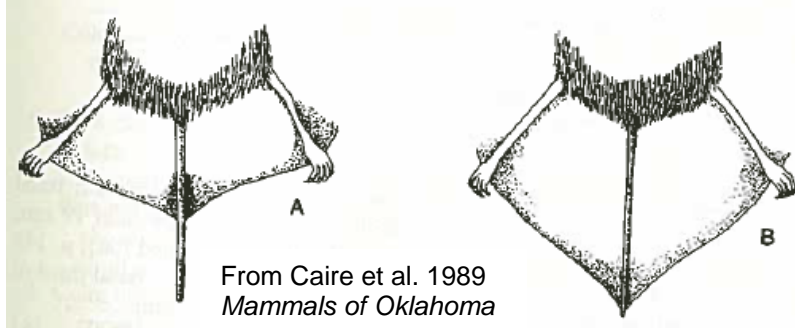
KEY TO THE BATS OF COLORADO

R. Schorr and K. Navo (revision July 2014)

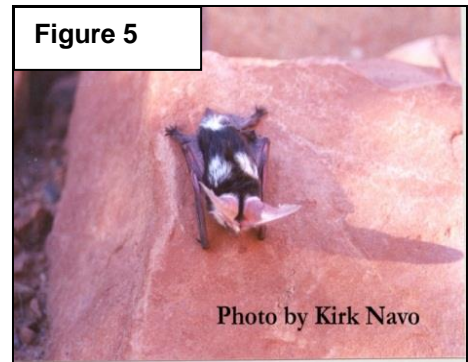
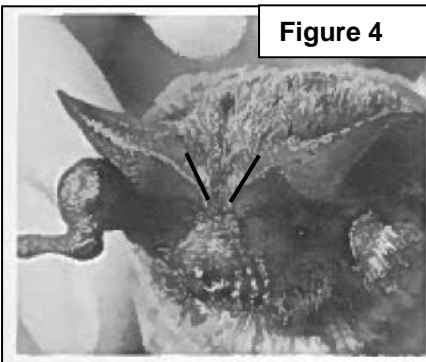
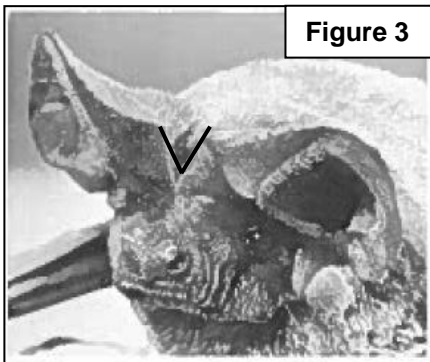
This purpose of this key is to provide a field key (without skeletal characters) that allows identification of bat species of Colorado. Please familiarize yourself with Figs 25-27. Forearm length (FA), hindfoot (HF), body mass (WT) based on specimens or texts. HF is measured from heel to tip of claw/nail. Figures 3, 4, and 24 from Barbour and Davis. 1969. *Bats of America*.

1. a. Tail extends "free" past tail membrane (free-tailed bats) [Fig 1A, Fig 2].....2
- b. Tail enclosed within tail membrane (uropatagium) [Fig 1B]3

Figure 1



2. a. Large bat, ears connect at mid-forehead, forearm > 55mm; (FA: 57-64mm; WT: 21-31g) [Fig 3]
Nyctinomops macrotis (big free-tailed bat)
- b. Smaller than *Nyctinomops*; ears do not connect, ammonia smell (FA: 33-48mm; WT: 8-12g) [Fig 4]
Tadarida brasiliensis (Mexican free-tailed bat/Brazilian free-tailed bat)



3. a. Bat has very long ears (> 30mm), extend well past nose when bent forward..... 4
- b. Bat ears < 30mm (warning: *Myotis evotis* and *M. thysanodes* have longer ears but < 30 mm) 7
4. a. Bat with large pinkish ears, 3 large white spots on back (FA: 47-53mm; WT: 13-20g) [Fig 5]
Euderma maculatum (spotted bat)
- b. Bat without large white spots on back 5
5. a. Eyes large and conspicuous; bumps or warts on face; rounded nostrils on long snout; pale color; forearm 46-63mm; ears do not connect at bases (FA: 48-60mm; WT: 14-17g) [Fig 6]
Antrozous pallidus (pallid bat)
- b. Bat without large eyes; ears connect at the base.....6

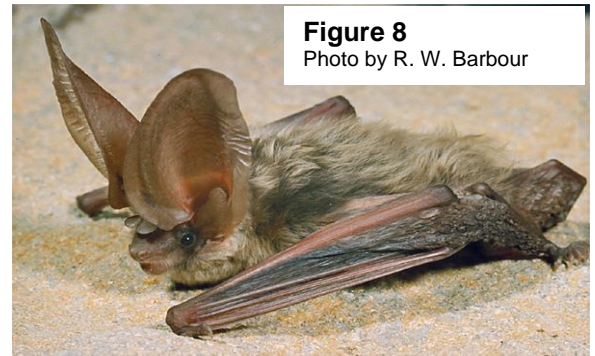
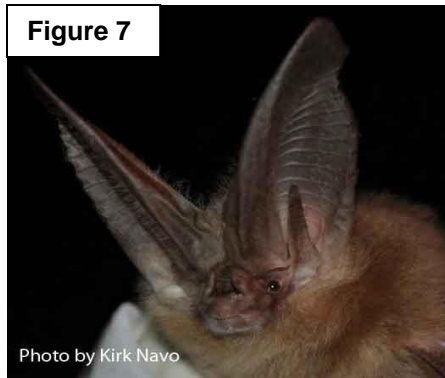


6. a. Lack of leaf-like structures extending from forehead; calcar not keeled (see Fig 14); weight 9-11g; forearm 41-46mm; (FA: 37-48mm; WT: 9-14g) [Fig 7]

Corynorhinus townsendii (Townsend's big-eared bat)

- b. Leaf-like structures that extend from forehead over face; light patch of fur at the base of each ear; dark shoulder patch usu. present; calcar keeled (see Fig 14); (FA: 43-49mm WT: 10-12g). *Only known from southwestern region of Colorado*. Documented based on vocalizations; no specimens have been collected [Fig 8]

Idionycteris phyllotis (Allen's big-eared bat/Allen's lappet-browed bat)



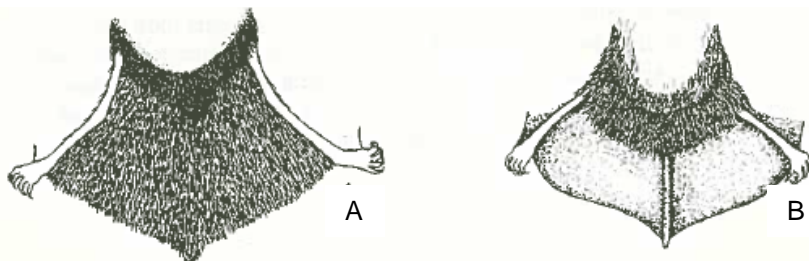
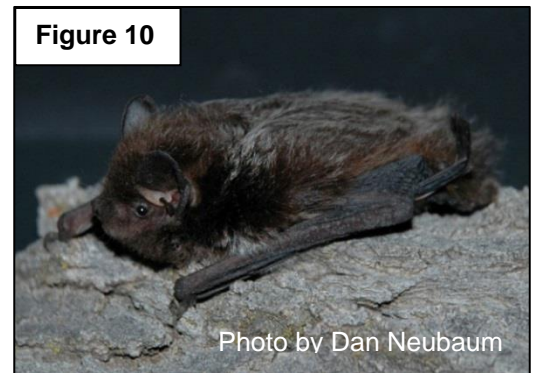
7. a. Tail membrane heavily furred [Figs 9A, 9B] 8

- b. Tail membrane not heavily furred 10

8. Bat has black hair with silver tips [Fig 10]; hair on tail membrane usually only extends a third of the length of the membrane [Fig 9B] (FA = 37-44mm; WT: 7-15g)

Lasionycteris noctivagans (silver-haired bat)

- b. Bat without black hair and hair extends to end of tail membrane [Fig 9A] 9



9. a. Large bat; salt & pepper color with light orange around face; rounded ears edged with black; (FA: 46-56mm; WT: 18-32g) [Fig 11] ***Lasiurus cinereus*** (hoary bat)

- b. Medium size bat; reddish color; long pointed wings; rounded ears, not edged with black. *Only known from eastern half of the state* (FA: 35-46mm; WT: 7-16g) [Fig 12] ***Lasiurus borealis*** (eastern red bat)



NOTE: If surveying in the southwestern region of Colorado be aware that one could encounter the western red bat (*Lasiurus blossevilli*) that has been documented in southeastern Utah. The western red bat is similar in appearance to eastern red bat, but the ranges do not overlap in Colorado.

MOUSE-EARED BATS

(usually short ears, without "tail", without well-furred uropatagium)

NOTE: For this group it is helpful to ensure you are identifying an adult bat because there may be overlap in size between large young bats and small adult bats. Prior to calcification, the finger bones of juvenile bats will be translucent when backlit and will not show the rounded, opaque calcified joints seen in adults [Figs 13A, 13B, see Fig 31 in Appendix].

- 10. a. Calcar keeled [Fig 14B] 11
- b. Calcar unkeeled [Fig 14A] 15
- 11. a. Bat very small [Fig 15]; black mask and ears [Fig 16]; 1st premolar miniscule; FA usu. ≤32mm; tragus <5mm, blunt and rounded at tip; 34 teeth; keeled calcar; weight usu. < 5g ; HF < 7mm; grayish to light brown/yellow color (FA: 26-35mm; WT: 4-6g)
Parastrellus hesperus (canyon bat, formerly western pipistrelle)
- b. Bat not very small, without black mask..... 12

Figure 13. From Nagorsen and Brigham 1993 *Mammals of British Columbia*

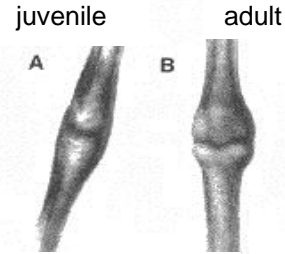


Figure 14 (from Caire et al. 1989 *Mammals of Oklahoma*)

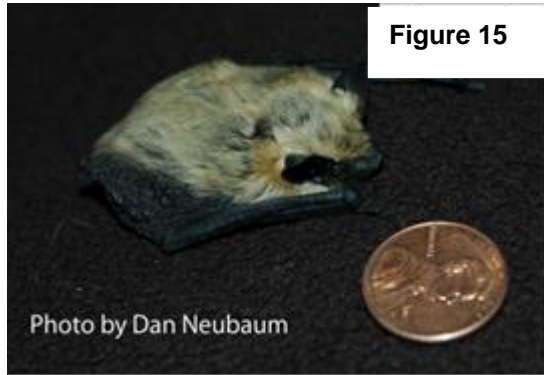
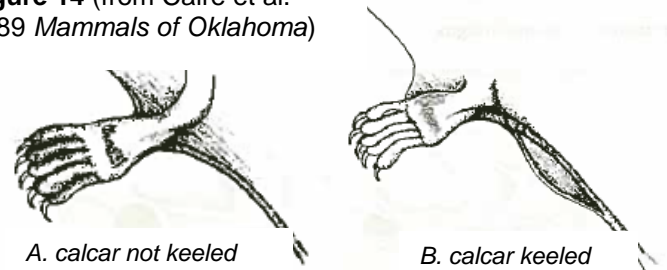


Figure 15

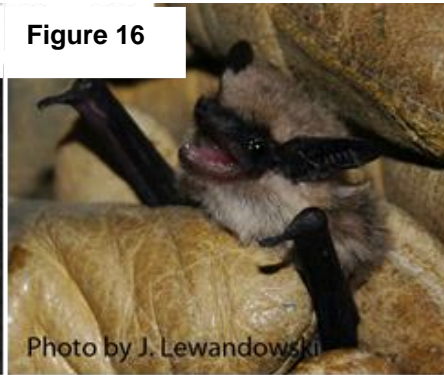


Figure 16

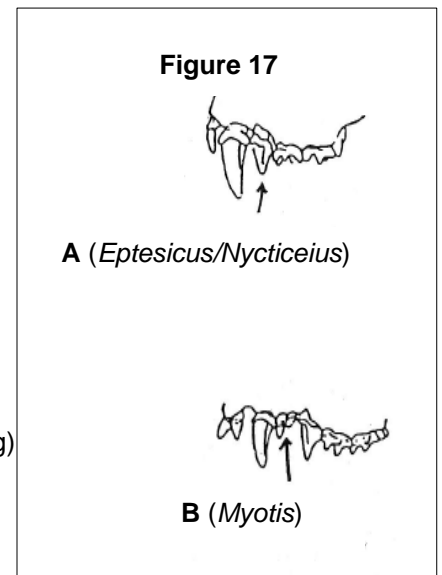


Figure 17

A (*Eptesicus/Nycticeius*)

B (*Myotis*)

- 12. a. Large bat, forearm ≥40mm; 1st tooth behind canine ≥ ½ height of canine [Fig 17A]; 2 upper incisors [Fig 18A]; 32 teeth, keeled calcar (FA: 36-57mm; WT: 12-20g)
Eptesicus fuscus (big brown bat)

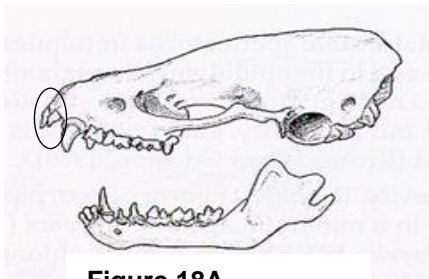


Figure 18A
Eptesicus fuscus

Figs 18A and 18B from www.discoverlife.org

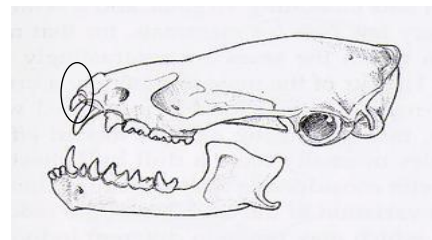


Figure 18B
Nycticeius humeralis

NOTE: If surveying in the southeastern area of Colorado be aware that one could encounter the evening bat that has been documented in southwestern Kansas. The evening bat is a medium-sized bat; FA: 34-38 mm; WT: 5-10g; 1 upper incisor [Fig 18B]; 34 teeth; presence of keel on calcar is variable; tragus short and blunt; hairs with black bases.

Nycticeius humeralis (evening bat)

- b. 1st tooth behind canine small; 2 small premolars [Fig 17B] 13

13. a. Heavy-bodied bat with short and rounded ears; fur on back extends onto tail membrane; (FA: 30-45mm; WT: 8-10g); heavily furred under wing from knee to the elbow (“hairy armpits”) [Fig 19]
Myotis volans (long-legged myotis/hairy-winged myotis)

b. Smaller bat with small ears, but not rounded; features not as above

14. a. Ears dark [Figs 20, 21]; foot very small (< 8mm); keeled calcar; skull does not rise abruptly above the rostrum; sometimes black mask noticeable [Fig 20]; (FA: 29-35; WT: 3.5-5.5g); the naked part of snout wide, about 1.5x as long as the width between the nostrils when viewed from above [Figs 20, 21, 22]

Myotis ciliolabrum (western small-footed myotis)

b. Ears lighter [Figs 20, 21]; small foot but can be >8mm; keeled calcar; skull rises abruptly above the rostrum; naked part of snout narrower, about as long as width between the nostrils [Figs 20, 21, 22]; found along western edge of Colorado; (FA: 29-36mm; WT: 3-5g)

Myotis californicus (California myotis)



Figure 19



Figure 20

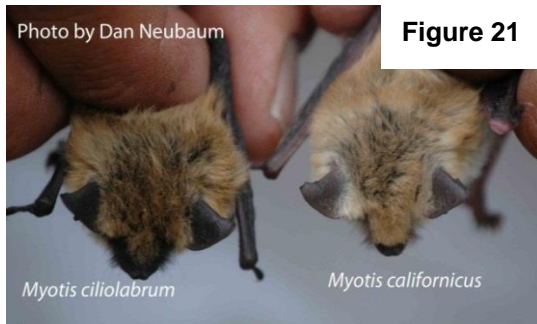


Figure 21

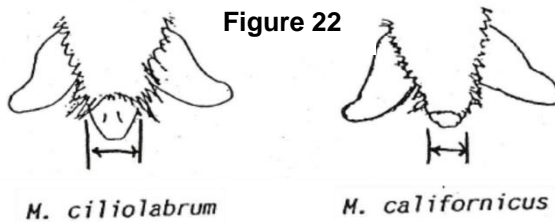


Figure 22

15. a. Ears large, ears >15mm 16
 b. Ears smaller, ears <15mm..... 17

16. a. Fringe of stiff hairs on trailing edge of uropatagium [Fig 23]; ears long 17-20mm; FA usually >40mm, (FA: 37-46mm; WT: 6-8g)

Myotis thysanodes (fringed myotis)

b. No fringe of stiff hairs on uropatagium, or if hairs are present they are fine and not stiff. Ears long and black (21-24mm) that extend well past nose when laid flat; dark black wing membranes; hair lead grey at base; (FA: 34-44mm; WT: 5-7g)

Myotis evotis (long-eared myotis)



Figure 23 (by Jared Hobbs/biodiversityatlas.org)

17. a. Large-bodied bat with WT >10g; HF > 10mm; FA > 41mm; bare patch between shoulders; fur short and coarse (**not yet documented in CO; likely to be found in the southeastern corner of the state**)

Myotis velifer (cave myotis)

b. Smaller bat with mass <10g 18

18. a. Very small (WT: 5-8g; FA: 30-35mm); tri-colored dorsal hairs (dark at tips and bases with light band between) [Fig 24]; 32 teeth; *found in eastern half of Colorado.*

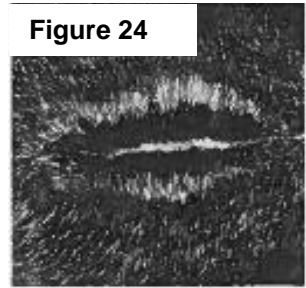
Perimyotis subflavus (tricolored bat, formerly eastern pipistrelle)

b. Not very small, or if small, features not as above..... 19

19. a. Small to medium sized bat (FA: 33-43mm, usu. 39-41mm; WT 4.5-9g, usu. >7g; fur long and glossy; underwing lightly furred to the elbow (mean WT = 7.6g)

Myotis lucifugus (little brown bat)

Figure 24



NOTE: Because there is much uncertainty as to the taxonomic status of the Arizona myotis (*Myotis occultus*) and its relationship to the little brown bat, we do not consider *M. occultus* a separate species in this key.

b. Smaller than above; hair short and pale (Front Range specimens darker); WT usu. < 7g; HF large for its size approx. 10 mm; (FA: 32-39mm; WT: 3.5-8g; mean WT = 6.1g)

Myotis yumanensis (Yuma myotis)

APPENDIX

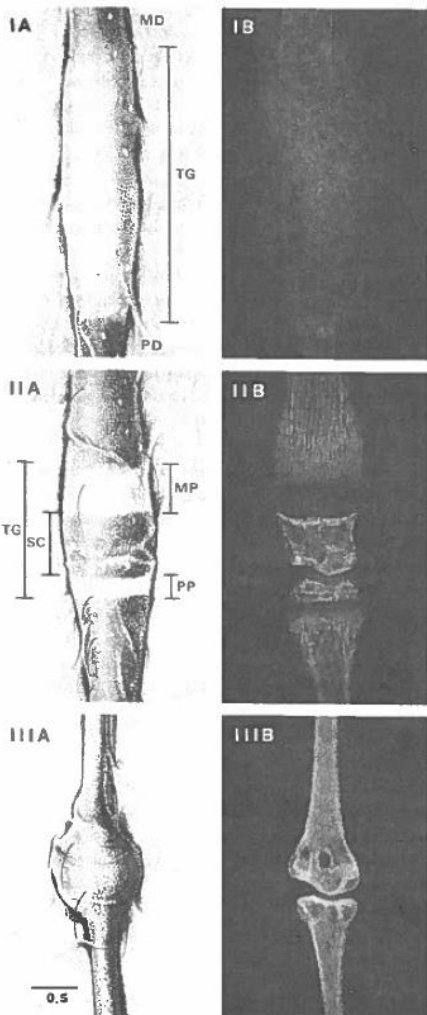


Figure 27 from Kunz and Anthony. 1982. *J. of Mammalogy*. Column A – transilluminated finger joints of *Myotis lucifugus*; Column B – Xrays of same joints; First Row (I) – neonate; Second Row (II) – juvenile; Third Row (III) – adult

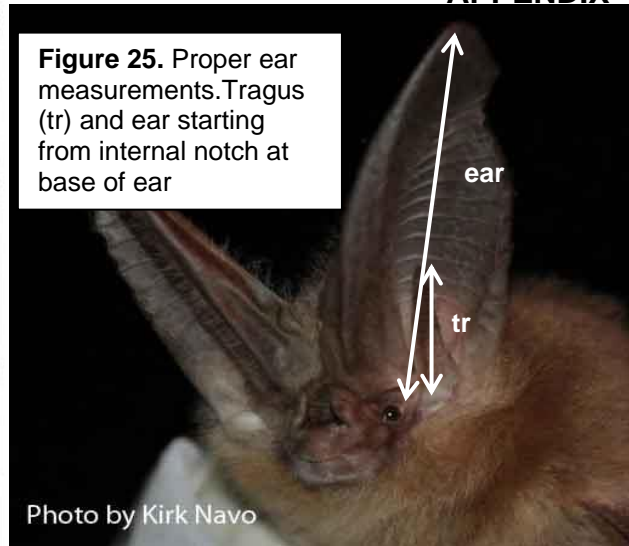


Figure 25. Proper ear measurements. Tragus (tr) and ear starting from internal notch at base of ear

Photo by Kirk Navo

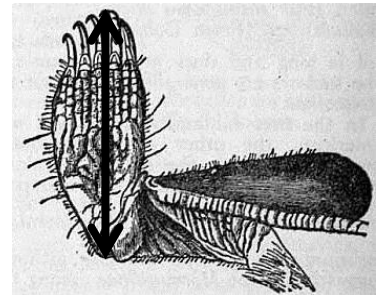


Figure 26. Proper measurement of bat hindfoot. From ankle to end of toenails (*Mystacops tuberculatus*). Image from Dobson 1876 *Proc. Zool. Soc.*

COLORADO SPECIES LIST

- | | |
|----------------------------------|---|
| <i>Antrozous pallidus</i> | pallid bat |
| <i>Corynorhinus townsendii</i> | Townsend's big-eared bat |
| <i>Eptesicus fuscus</i> | big brown bat |
| <i>Euderma maculatum</i> | spotted bat |
| <i>Idionycteris phyllotis</i> | Allen's big-eared bat/Allen's lappet-browed bat |
| <i>Lasionycteris noctivagans</i> | silver-haired bat |
| <i>Lasiurus blossevilli</i> * | western red bat |
| <i>Lasiurus borealis</i> | eastern red bat |
| <i>Lasiurus cinereus</i> | hoary bat |
| <i>Myotis californicus</i> | California myotis |
| <i>Myotis ciliolabrum</i> | western small-footed myotis |
| <i>Myotis evotis</i> | long-eared myotis |
| <i>Myotis lucifugus</i> | little brown bat |
| <i>Myotis thysanodes</i> | fringed myotis |
| <i>Myotis vellifer</i> * | cave myotis |
| <i>Myotis volans</i> | long-legged myotis/hairy-winged myotis |
| <i>Myotis yumanensis</i> | Yuma myotis |
| <i>Nycticeius humeralis</i> * | evening bat |
| <i>Nyctinomops macrotis</i> | big free-tailed bat |
| <i>Parastrellus hesperus</i> | canyon bat |
| <i>Perimyotis subflavus</i> | tricolored bat |
| <i>Tadarida brasiliensis</i> | Mexican free-tailed bat/Brazilian free-tailed bat |

*not documented in CO