

Measurements, Body Condition, and Reproductive Status of bats Captured in Montana, northern Idaho, and western South Dakota

Montana Natural Heritage Program, Helena, Montana

Dan Bachen, Bryce Maxell, and Ellen Whittle

March 2017

The following tables and figures show the distribution of measurements, and age, sex, and status information collected from 3,201 bats representing 14 species captured between 1994 and 2016 across Montana, northern Idaho, and western South Dakota by biologists working with or for the Montana Natural Heritage Program, Montana Fish, Wildlife, and Parks, the U.S. Forest Service, and the Bureau of Land Management. We have compiled this information as a supplement to the Key to Idaho, Montana, and South Dakota Bats (Ormsbee 2005) to aid in identification of bats of the region, allow comparisons of species' morphologies, and help understand the timing of reproduction, parturition, and juvenile flight, as well as changes in body condition over the year. In many of the data tables and figures, we have combined measurements from both male and female animals and do not account for physical condition such as pregnancy or sexual status in order to simplify display of information for use in species determinations in association with the Ormsbee (2005) key.

Although common species such as the Little Brown Myotis (*Myotis lucifugus*) are well represented within these data summaries, other species have rarely been captured and have very few observations. Additionally, some measurements such as weight and forearm length have frequently been recorded, while others such as tragus length have been recorded less commonly. Due to the dearth of measurements for some species and features, we recommend that future studies record all measurements listed here. In particular tragus length should be measured on all Long-eared Myotis (*Myotis evotis*) captures, and thumb length should be recorded for all Western Small-footed Myotis (*Myotis ciliolabrum*) and California Myotis (*Myotis californicus*) captures.

Number of measurements recorded for each feature and species

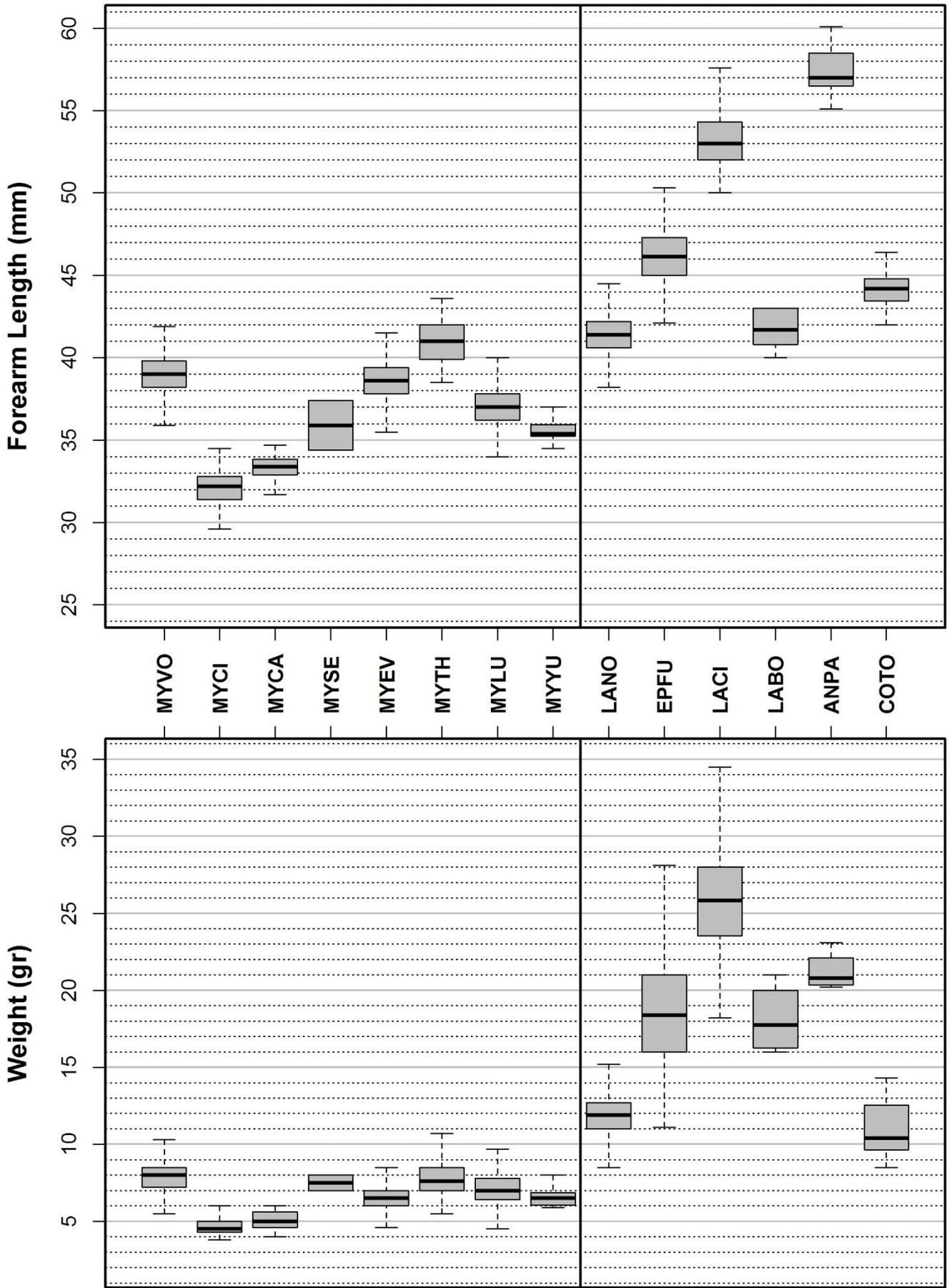
Species*	4-letter Code*	Total	Weight	Forearm	Ear	Tragus	Thumb	Foot
<i>Antrozous pallidus</i>	ANPA	7	4	5	3	0	0	0
<i>Lasiurus cinereus</i>	LACI	230	192	205	68	31	42	38
<i>Euderma maculatum</i>	EUMA	0	0	0	0	0	0	0
<i>Eptesicus fuscus</i>	EPFU	379	307	324	128	60	77	76
<i>Corynorhinus townsendii</i>	COTO	29	27	26	12	0	0	0
<i>Lasiurus borealis</i>	LABO	7	6	7	3	3	3	3
<i>Lasionycteris noctivagans</i>	LANO	410	334	363	3	39	54	54
<i>Myotis volans</i>	MYVO	294	257	285	138	31	55	124
<i>Myotis ciliolabrum</i>	MYCI	125	109	117	50	22	42	52
<i>Myotis californicus</i>	MYCA	38	29	38	23	1	1	12
<i>Myotis septentrionalis</i>	MYSE	3	3	3	3	3	3	3
<i>Myotis evotis</i>	MYEV	483	425	456	316	57	81	92
<i>Myotis thysanodes</i>	MYTH	22	13	21	20	2	7	5
<i>Myotis lucifugus</i>	MYLU	889	773	818	293	117	132	136
<i>Myotis yumanensis</i>	MYYU	21	20	21	16	7	4	11

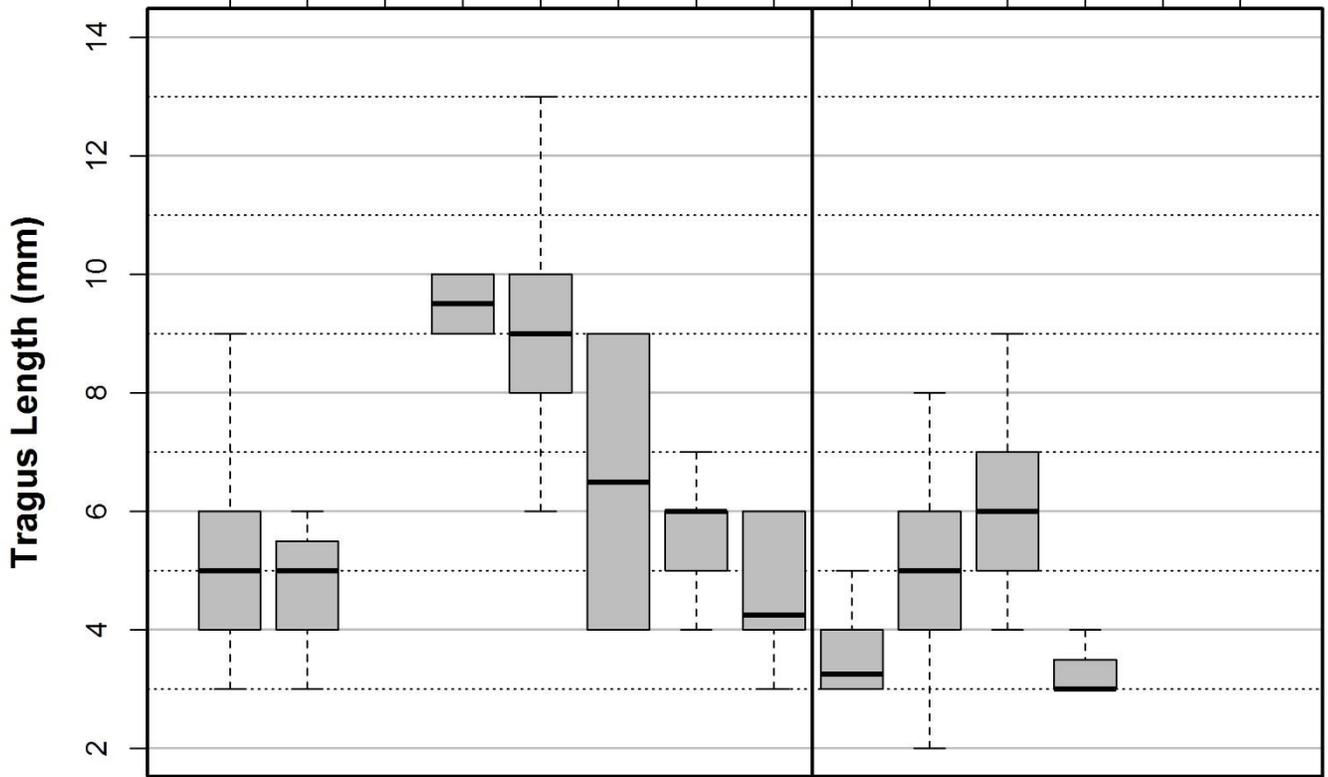
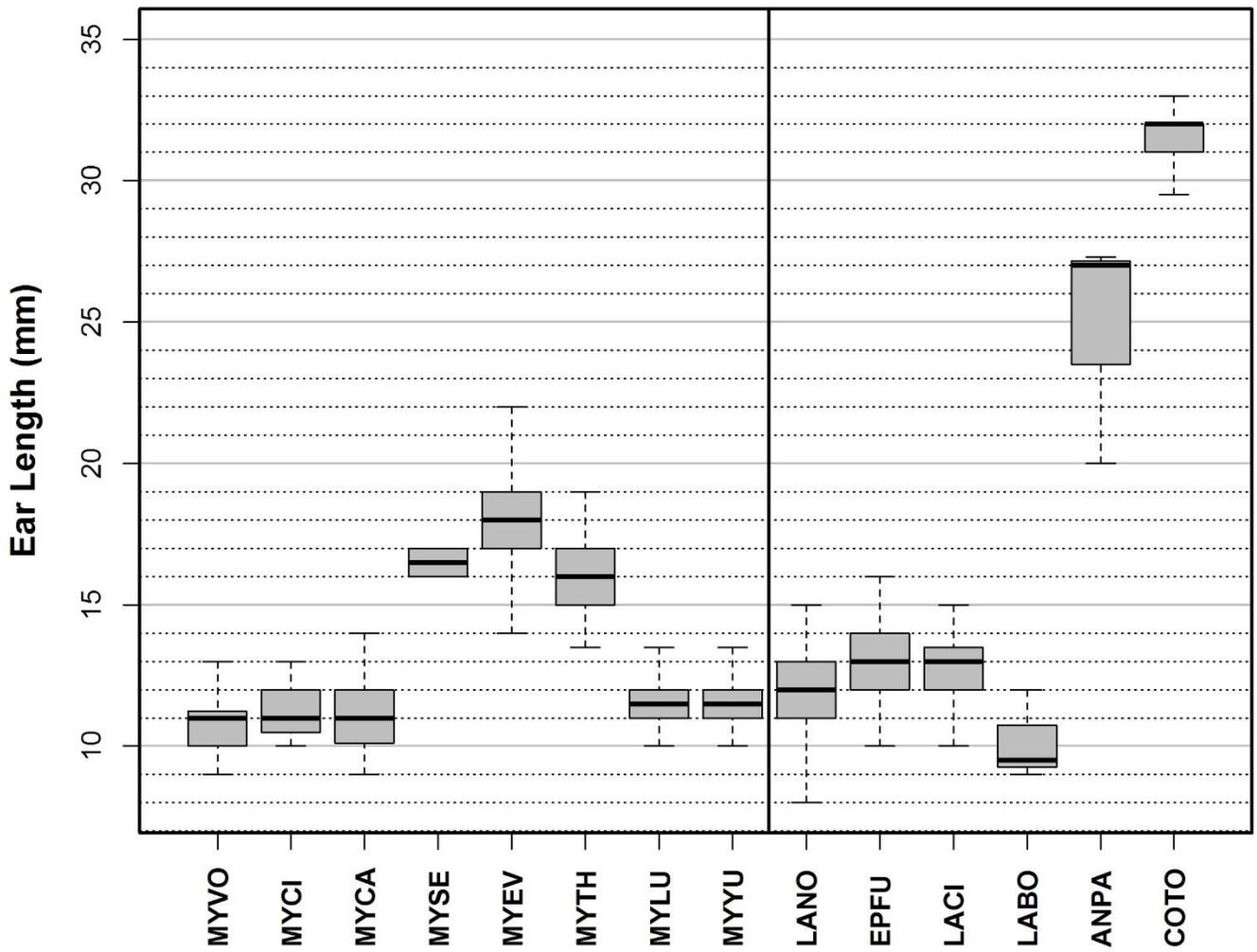
*Throughout this document 4-letter species codes are the first two letters of genus and species names.

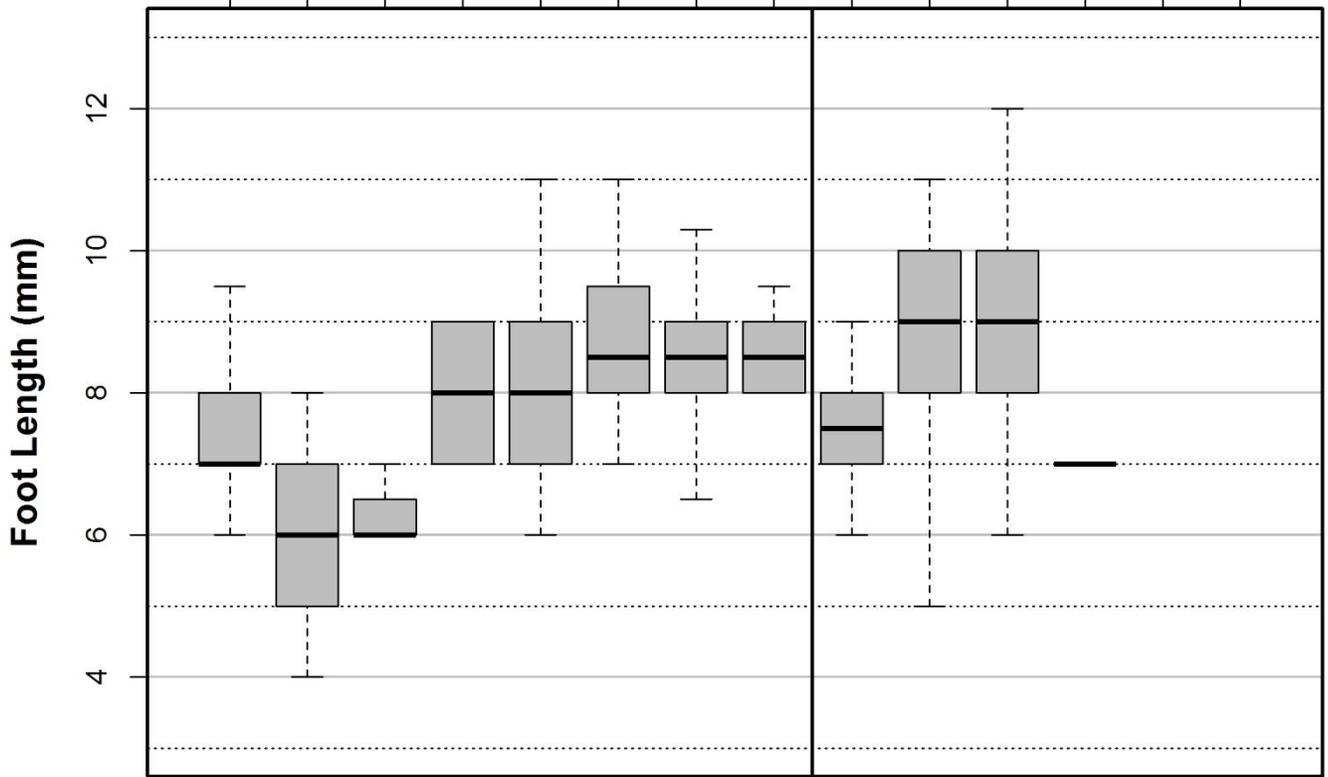
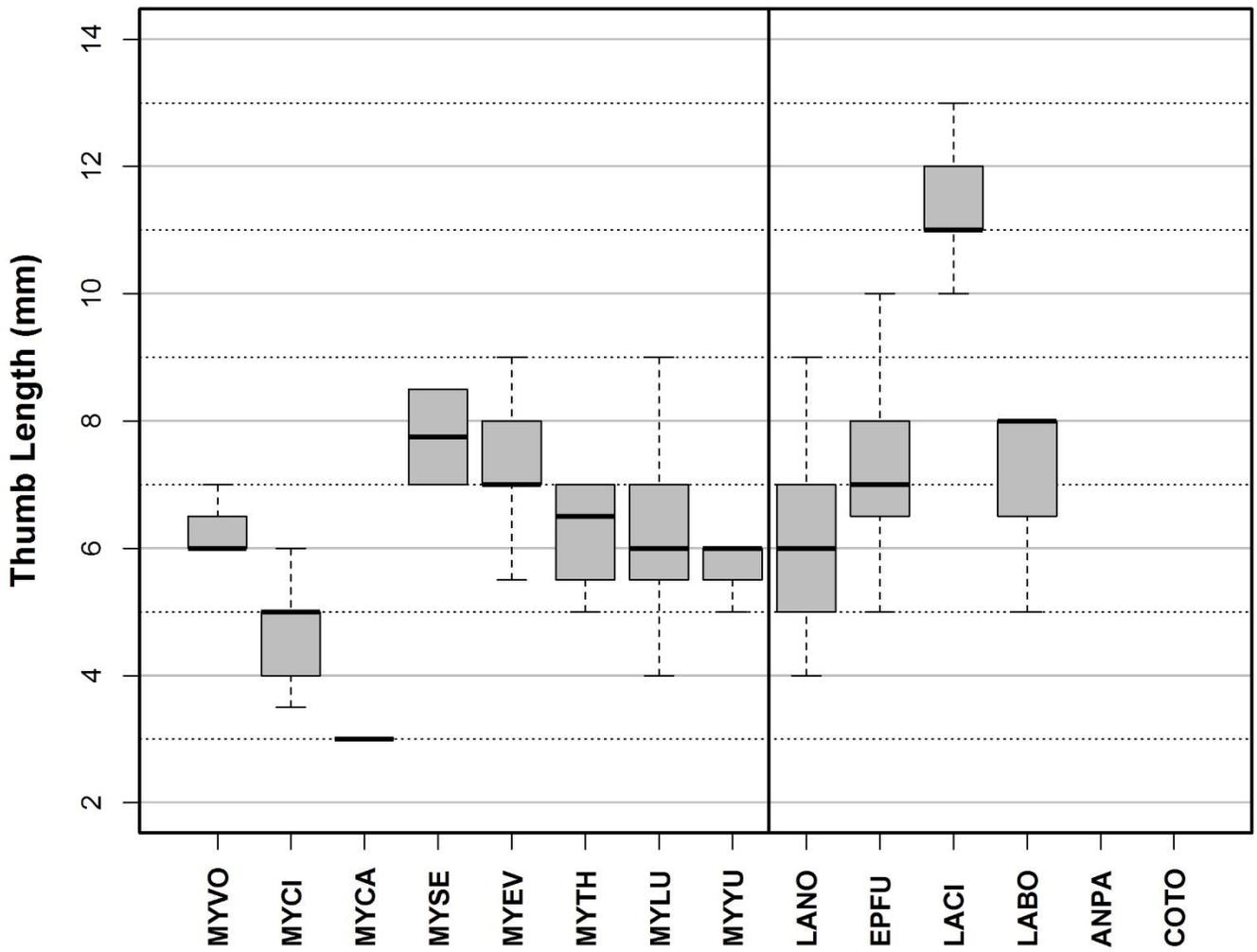
Measurements of adult bats from Montana, northern Idaho, and western South Dakota

The 5th to 95th quantiles are shown for each measurement with the mean in parentheses. See sample sizes in table above and box and whisker plots below for each measurement; * indicates too few measurements to display.

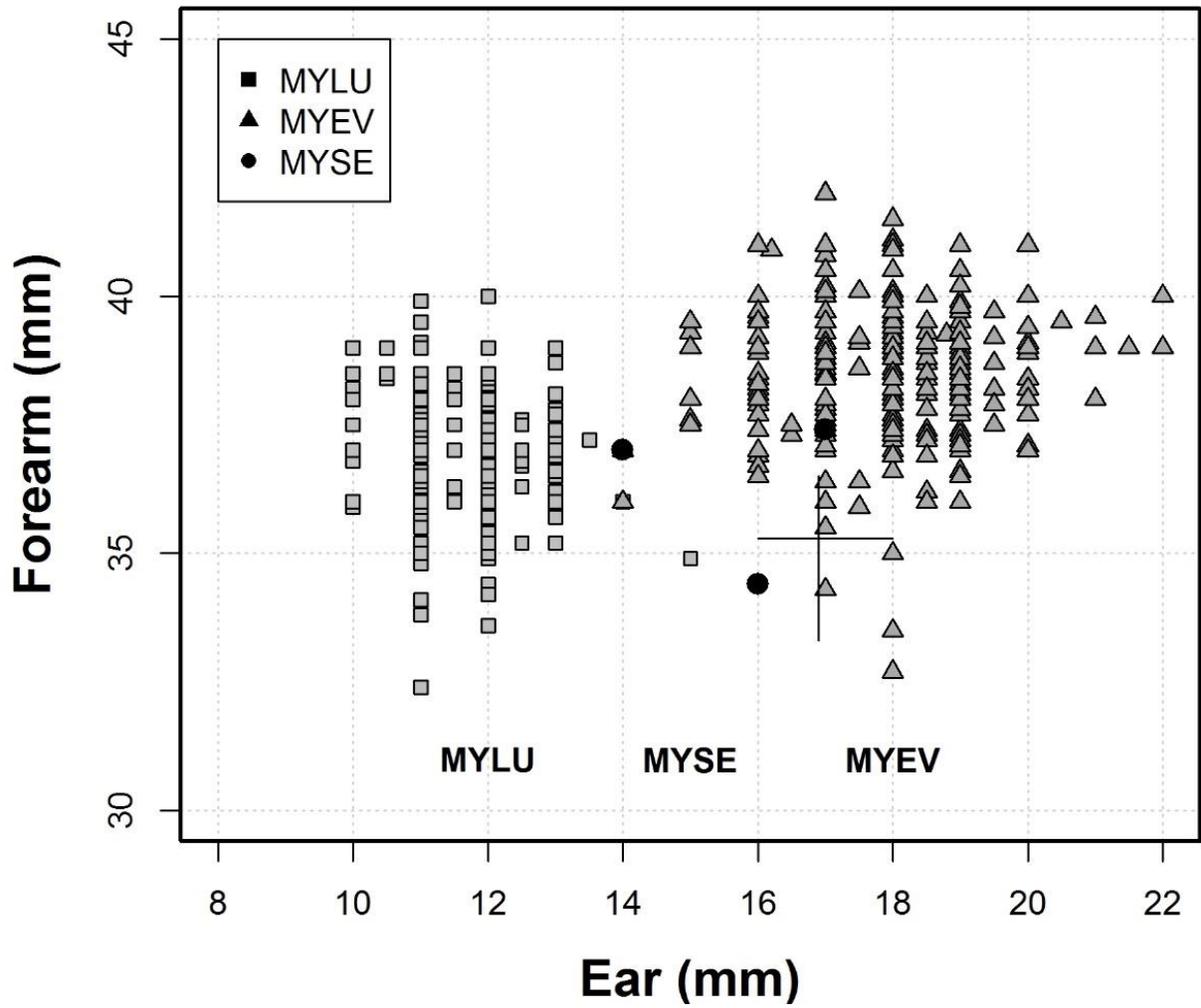
Species	Keeled Calcar	Forearm (mm)	Weight (g)	Ear (mm)	Tragus (mm)	Thumb (mm)	Foot (mm)	Other Key Identifying Features
Larger easily identified bats arranged from largest to smallest forearm lengths.								
LANO	N	39.5-43.5 (41.4)	9-14.5 (11.7)	9.6-14 (11.7)	3-6 (3.7)	4.7-7.3 (6)	5-9 (7.2)	Black pelage with more silver highlights in younger animals. Light color at base of small rounded black ears.
EPFU	Y	43.4-49 (46.1)	14-24.7 (18.8)	11-15 (13.1)	3-8 (5.2)	6-9 (7.4)	7-11 (9)	Doglike muzzle. Pelage light blond to dark brown.
LACI	Y	50.7-56.1 (53.2)	20.1-31.1 (25.4)	10.7-15 (12.9)	4-8 (6.1)	9-12 (10.9)	7-12 (9.6)	Grizzled dorsal fur contrasting with yellowish collar and white elbow patches. Small rounded ears.
LABO	Y	39.3-43 (41.2)	11.2-20.5 (16.2)	*	*	*	*	Reddish color with dark wing membranes. Small rounded ears, resembles small red LACI.
ANPA	N	55.4-59.8 (57.4)	20.2-22.8 (21.2)	*	*	*	*	Doglike muzzle with forward facing pig like nostrils having horseshoe shaped ridge. Large ears, pale in color, musky odor.
COTO	N	42.8-46.9 (44.4)	8.9-14 (10.8)	30.1-33.9 (31.8)	*	*	*	Very large ears joined on forehead. Two prominent lumps on nose.
EUMA	N	*	*	*	*	*	*	Large ears, distinct black pelage with 3 white patches.
Myotis Species: use calcar keel, forearm length, and then other key features listed. Brackets identify species pairs most difficult to distinguish or features difficult to distinguish.								
MYVO	Y	36.8-40.8 (38.9)	6.5-9.3 (7.9)	9-12.9 (10.9)	3-7 (4.8)	5-7 (6.2)	6-9 (7.3)	Fur on underside of wing extending to elbow. Usually dark chocolate in color.
MYCI	Y	30.1-33.9 (32.1)	4-5.7 (4.7)	10-13 (11.4)	3-6 (4.7)	4-6 (4.8)	5-8 (6)	Bare snout length 1.5 times distance between nostrils. Tail extends well beyond membrane. Light color with contrasting black mask.
MYCA	Y	31.9-34.5 (33.3)	4.3-6 (5.1)	9-13 (11.3)	*	*	5-6.8 (6)	Bare snout length same length as distance between nostrils. Tail barely extends beyond membrane.
MYSE	N	33.1-37.4 (35.0)	7-9 (8)	14-17 (15.7)	6-10 (8.3)	6.3-8.5 (7.25)	7-9 (8)	Ear 14-17mm in total length extends <5mm beyond tip of nose. Tragus long and slender. If caught collect guano or tissue sample for genetic verification.
MYEV	N	36.7-40.5 (38.6)	5.5-8.5 (6.7)	16-20 (18)	6.5-11 (8.8)	6-9 (7.2)	6.5-10 (8.2)	Ear >16mm extends beyond tip of nose > 5mm. Ear length variable. Fine hair may be present on edge of tail membrane, but is NOT a conspicuous fringe.
MYTH	N	38.8-43.6 (40.9)	6.1-10 (7.9)	14-19 (16.2)	*	5-7 (6.2)	7.2-10.7 (8.8)	Conspicuous fringe of stiff hairs extending from edge of tail membrane.
MYLU	N	35.1-39 (37)	5.5-10 (7.2)	10-13 (11.6)	4-7 (5.5)	5-8 (6.1)	6.5-10 (8.4)	Forearm > 36.5mm or forearm <36.5 AND characteristic frequency <44 kHz separates from MYYU, otherwise genetic confirmation needed.
MYYU	N	34.5-36.8 (35.6)	5.8-8 (6.5)	9.7-13.2 (11.5)	3.2-6 (4.6)	*	6.3-9.5 (8.3)	Forearm <36.5mm AND characteristic frequency >47 kHz separates from MYLU, otherwise genetic confirmation needed.





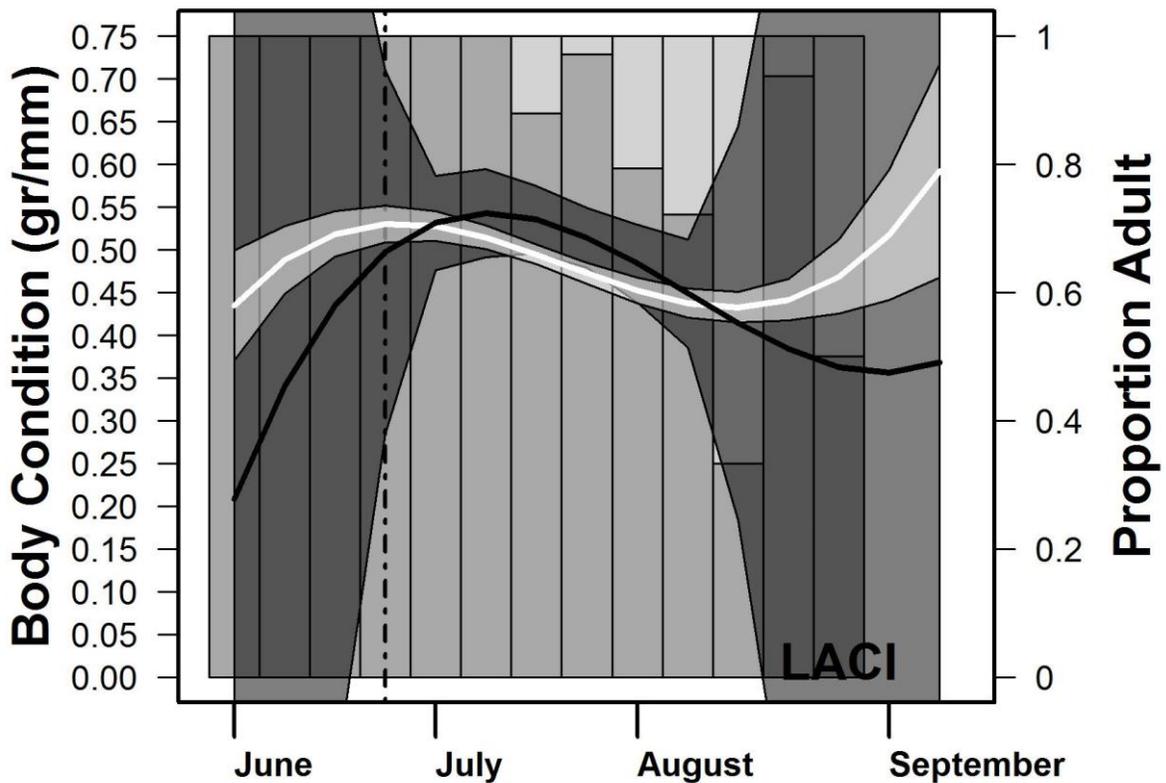
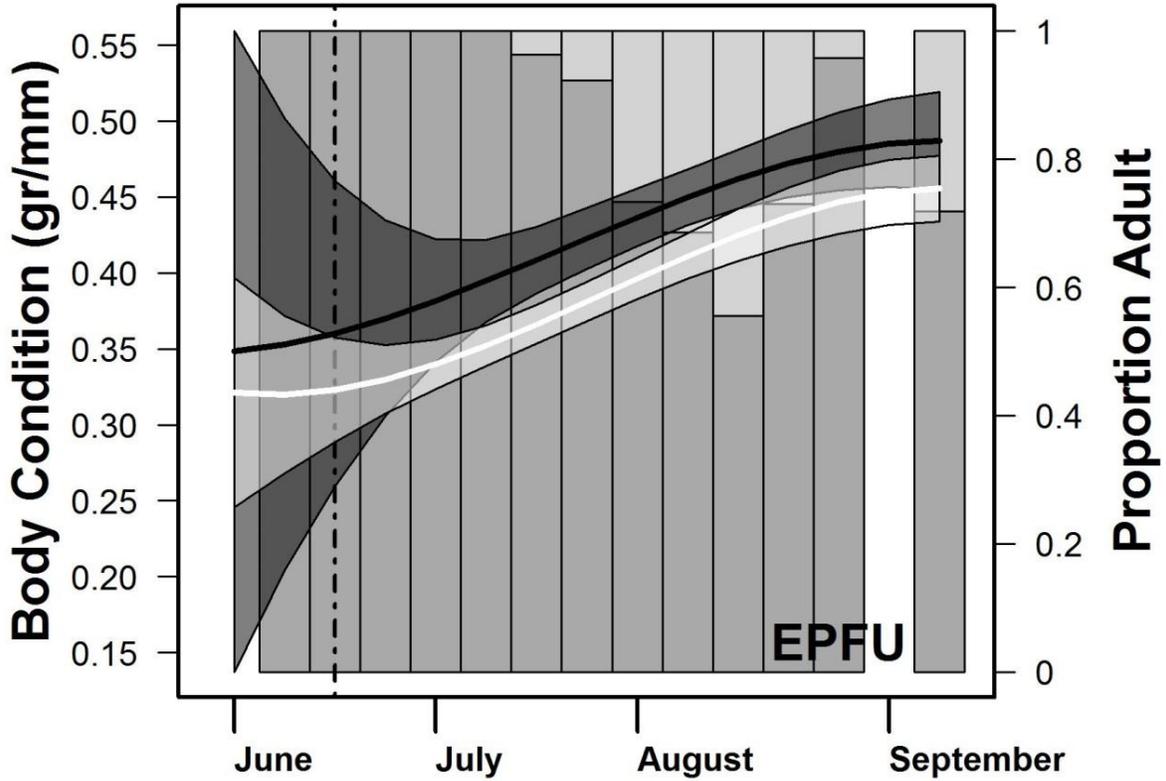


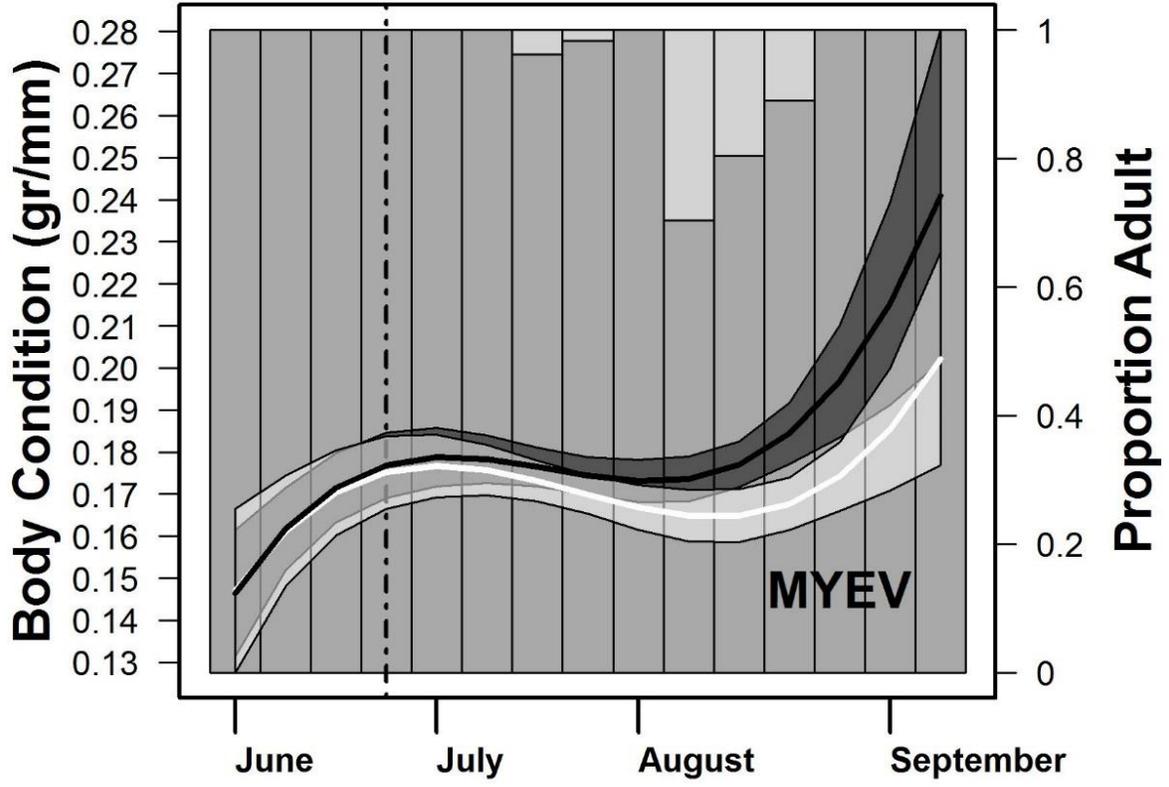
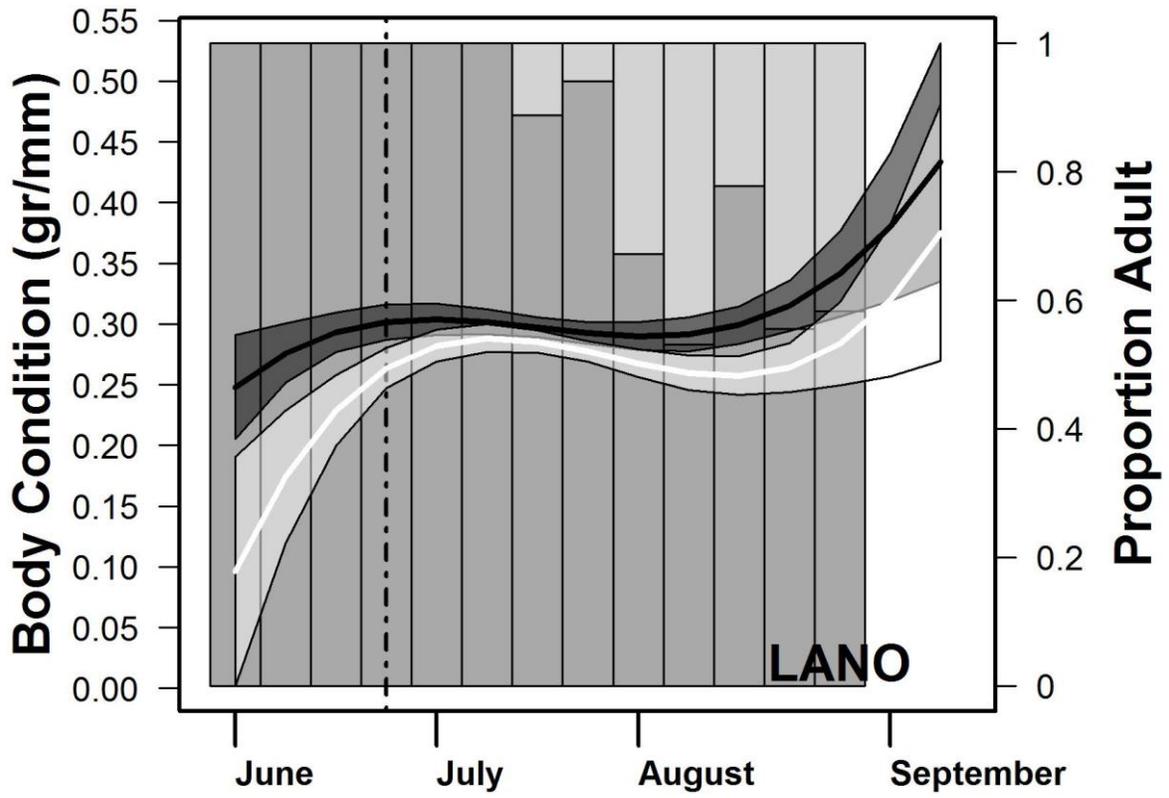
Overlap of forearm and ear length measurements for *M. evotis*, *M. lucifugus*, and *M. septentrionalis*

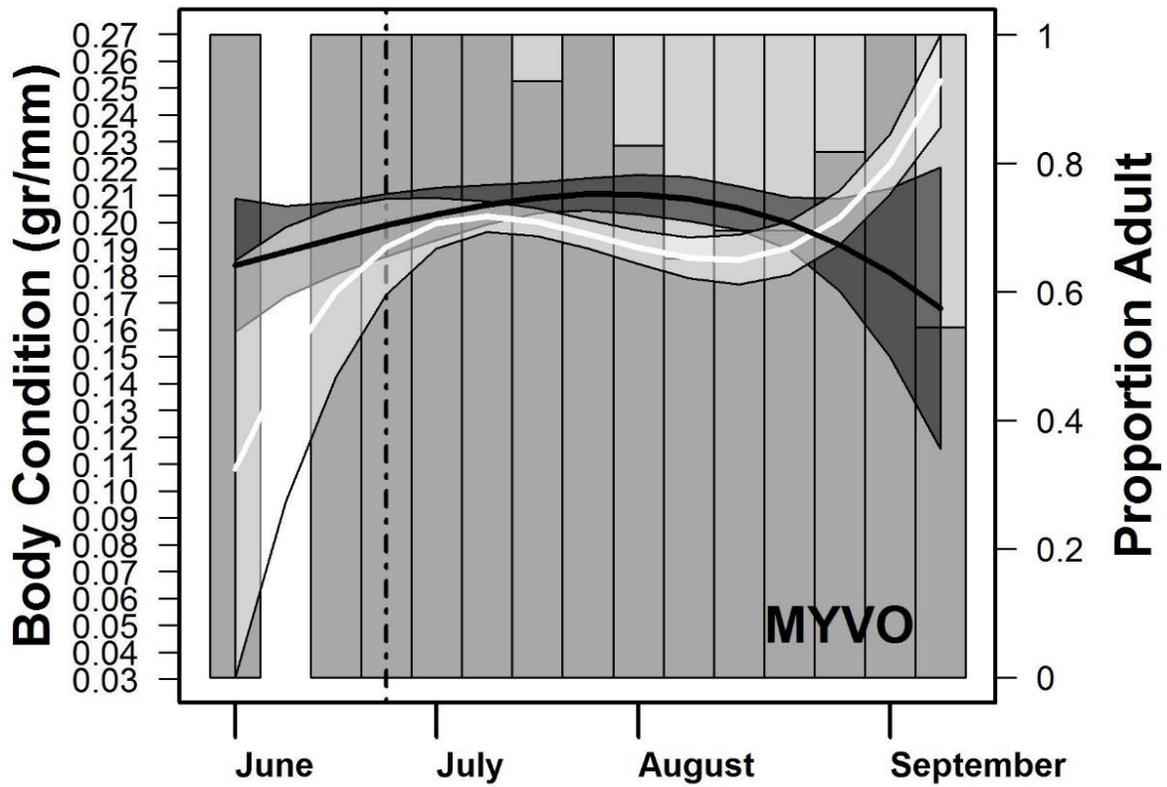
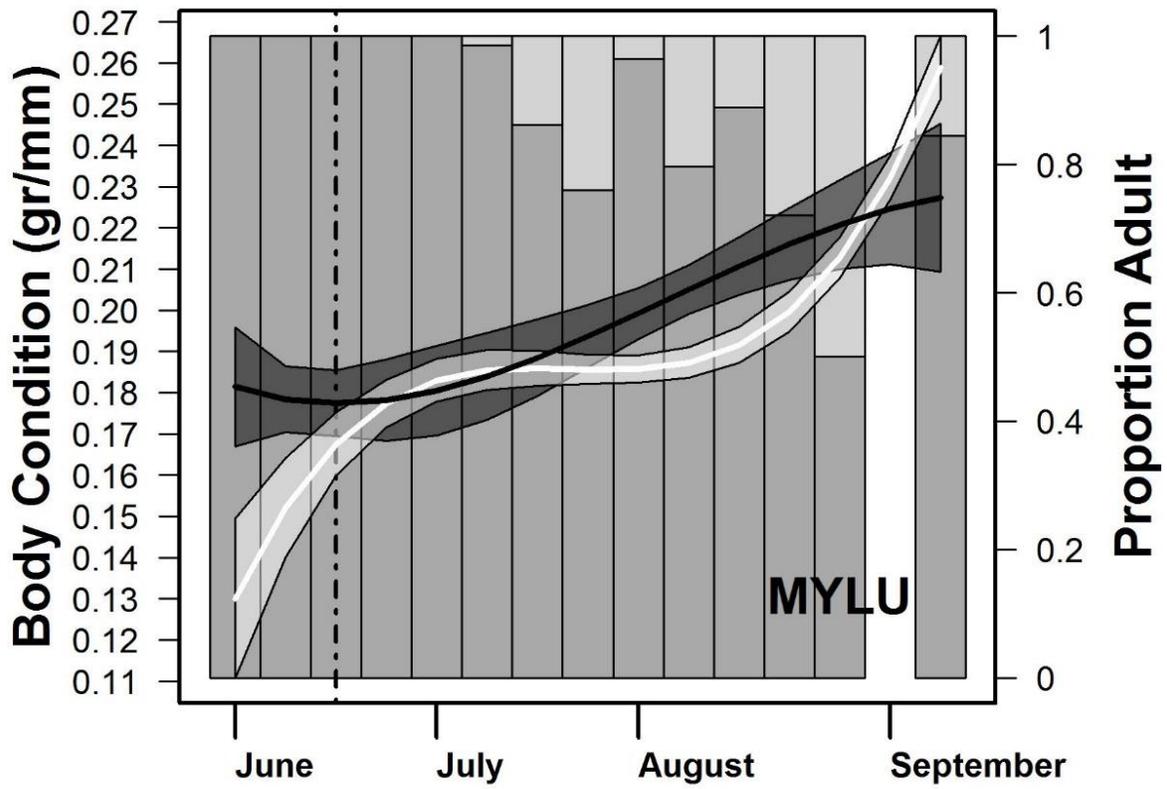


Body condition of selected adult and juvenile bats in Montana, northern Idaho, and western South Dakota

Body condition is represented by grams of body weight relative to length of forearm. Model fit for body conditions are shown as a black line for females and a white line for males with 95% confidence intervals as transparent polygons bounding the fit lines; models for each sex were fit independently. The stacked bar graphs behind each body condition plot show the proportion of adult (dark gray) and juvenile (light gray) bats captured across all years within each week. Dashed lines are the estimated beginning of the parturition period based on the earliest record of a flighted juvenile.

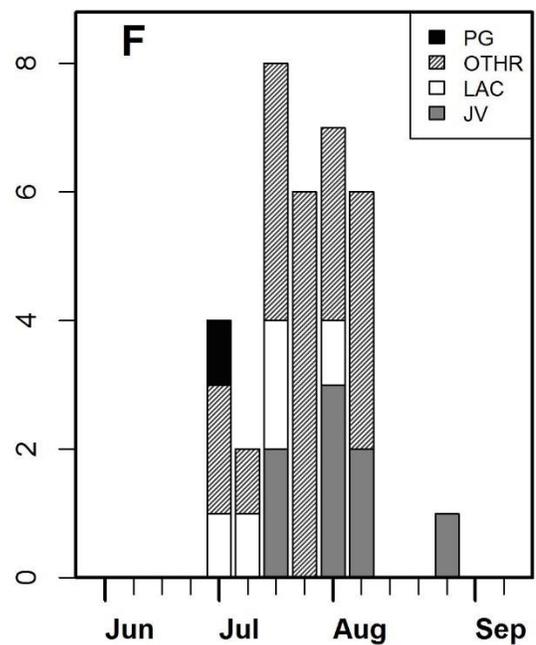
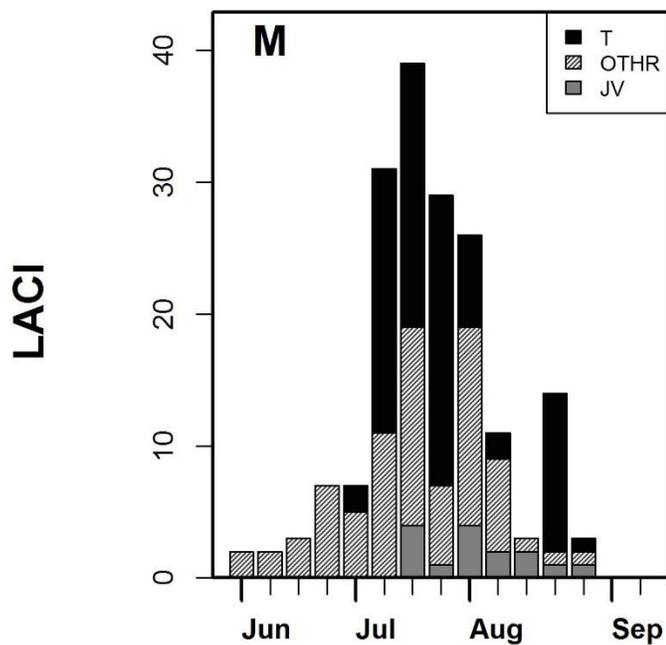
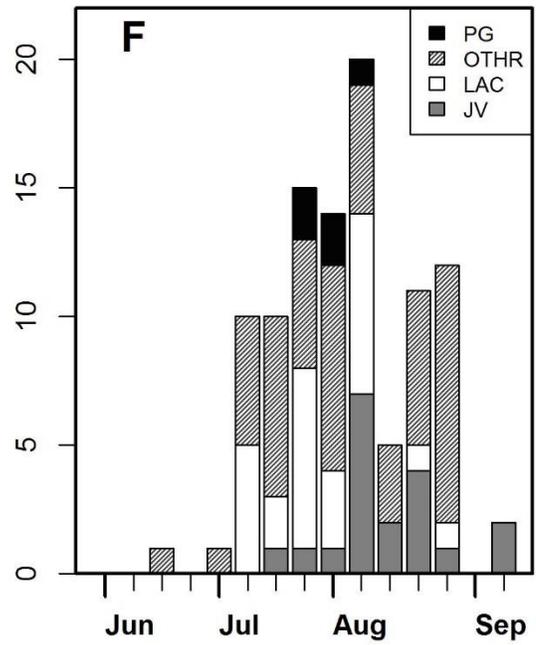
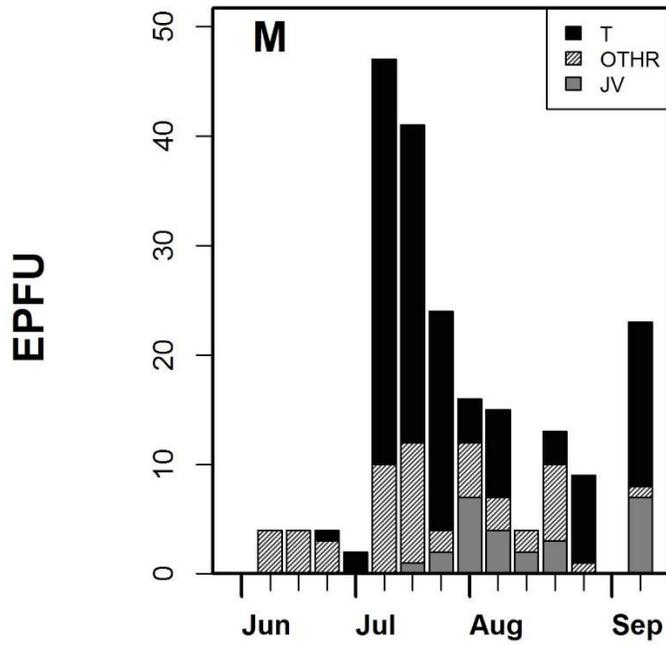




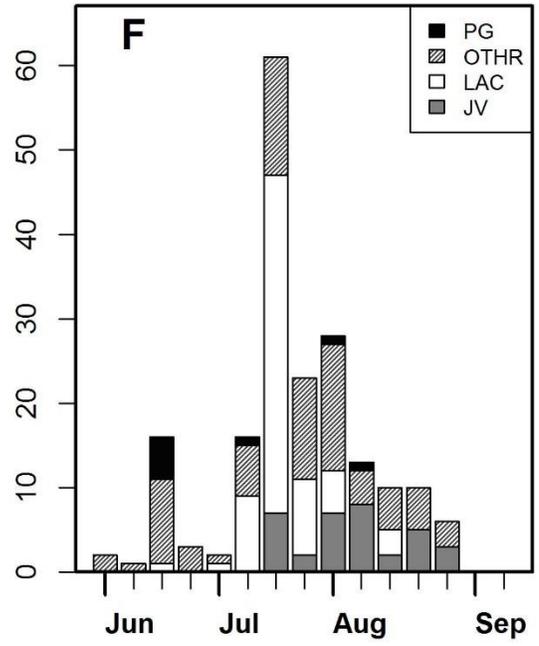
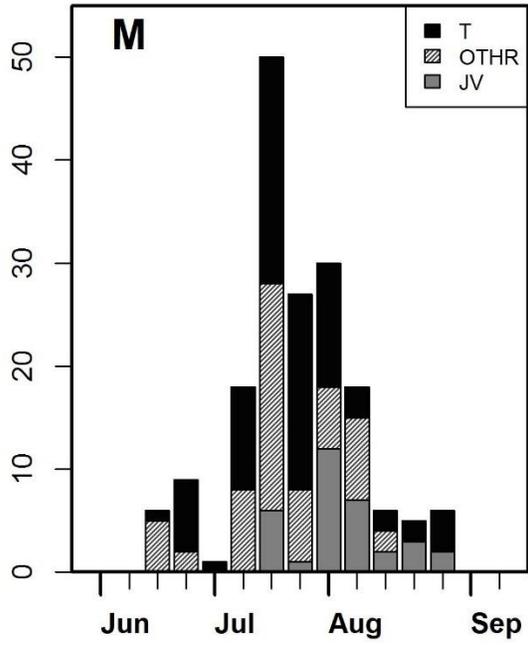


Temporal reproductive status of selected bats in Montana, northern Idaho, and western South Dakota

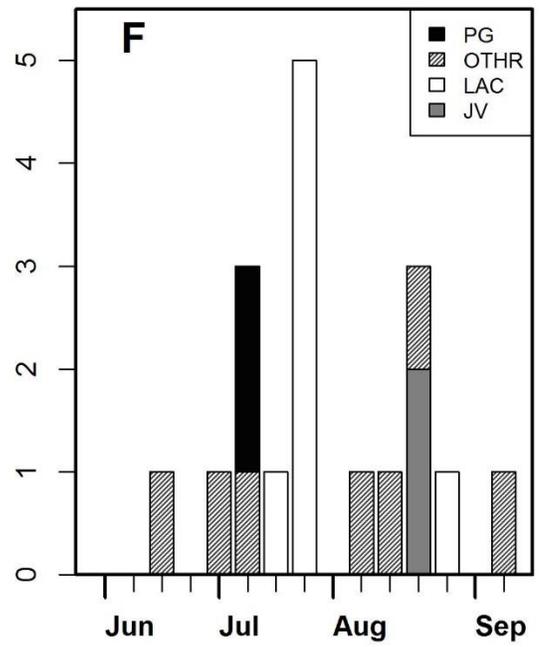
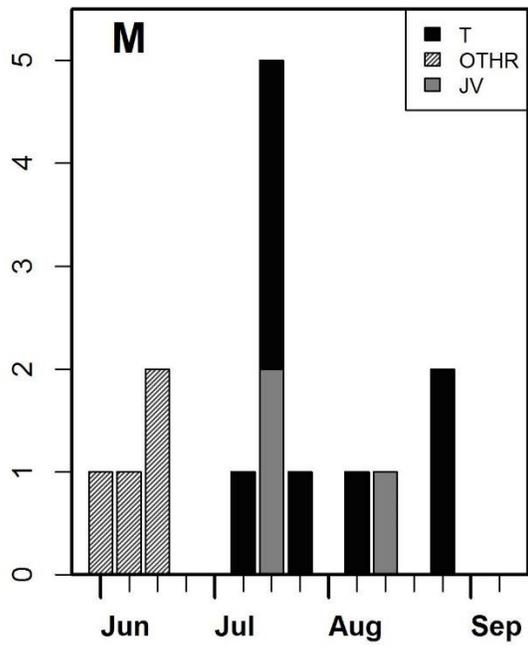
Weekly reproductive status of male and female bats. **Male (M):** T- Testicular , OTHR- Non-reproductive, JV- Juvenile. **Female (F):** PG- Pregnant, OTHR- non-reproductive or post-lactating, LAC- Lactating, JV- Juvenile



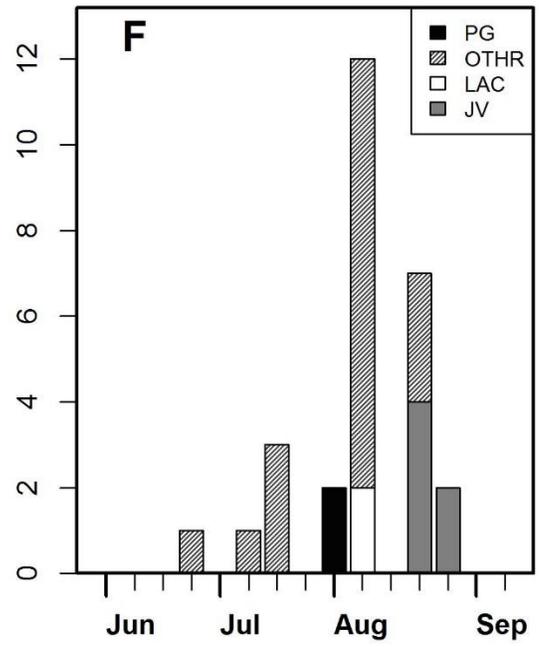
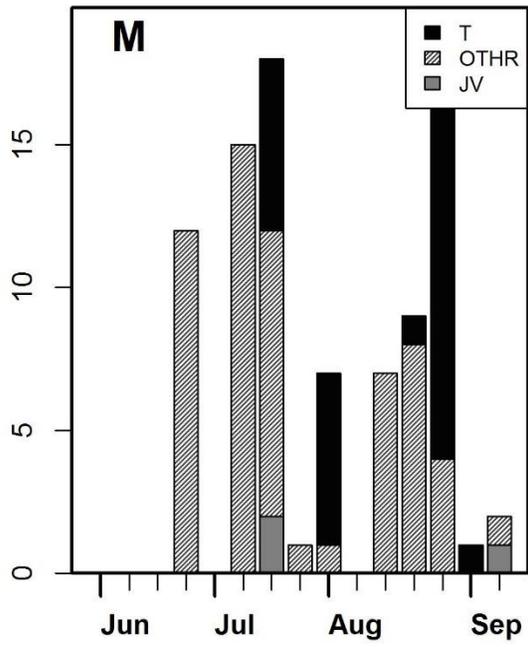
LANO



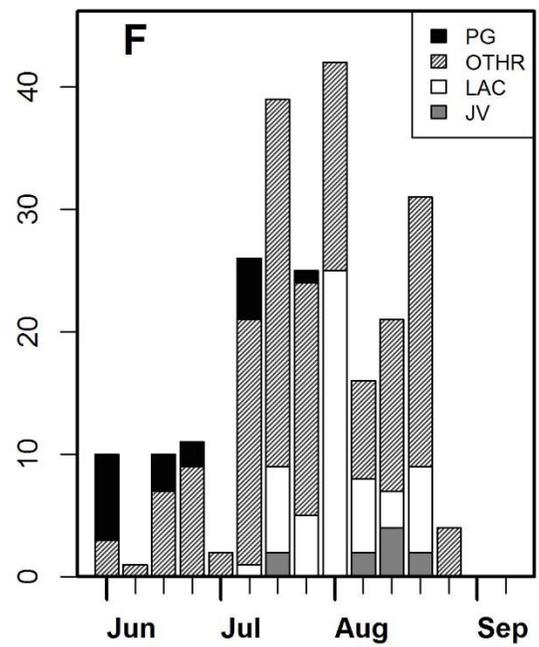
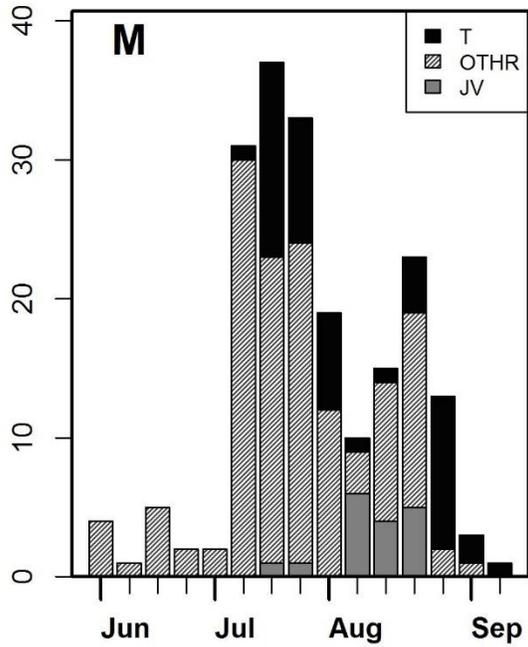
MYCA



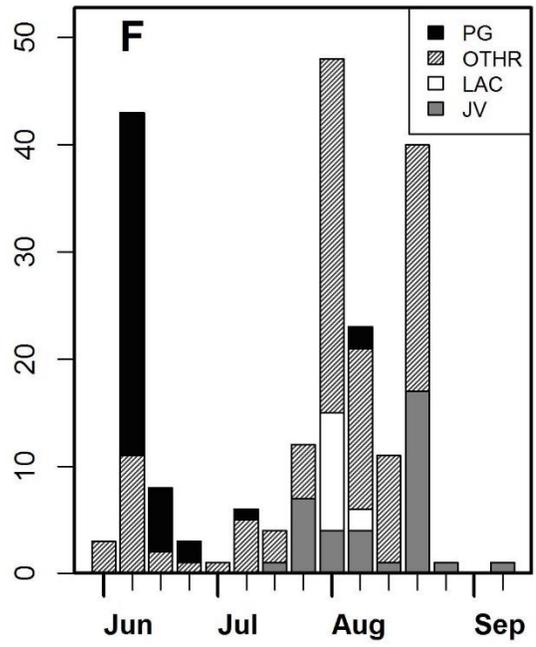
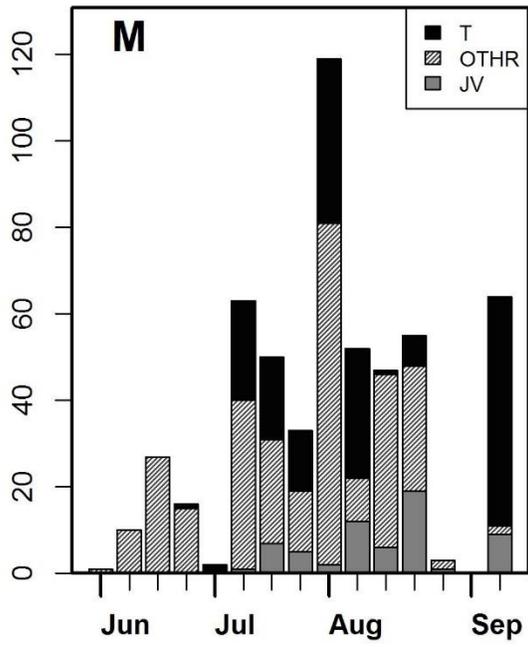
MYCI



MYEV



MYLU



MYVO

