

2006 Annual Report

BLM Butte Field Office Bat Survey



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EXECUTIVE SUMMARY

Mist net and acoustic surveys were continued on Bureau of Land Management (BLM) holdings of the Butte Field Office (FO) in southwestern Montana from late July to early August 2006, the fourth and final year of the survey. Eight sites that were evaluated in 2005 were surveyed, prioritizing those sites with the highest scores: Lump Gulch, Indian Creek, Empire Creek, Virginia Creek, Lower Bigfoot Creek, Duck Creek, and Crow Creek. Moose Creek was visited on the first night and Indian Creek was surveyed for two nights because of high bat activity with no captures on the first night. The Big Hole National Battlefield was surveyed, but no bats were captured and only 4 were documented acoustically.

Overall bat activity was lower than in 2004, the most recent year during which more than a week of surveys was conducted. Fifteen individuals of 6 species were captured, with 8 individuals being captured at Lump Gulch. Nine species were identified by acoustic analysis, with *Myotis evotis* being identified at the greatest number of sites (8). Moose Creek, Lump Gulch, and Virginia Creek had the highest species diversity with 7 species documented.

Most notable of survey efforts in 2006 was the capture of two *M. septentrionalis*, one each at Lump Gulch and Duck Creek. Calls of this species were identified at 5 sites: Moose Creek, Lump Gulch, Indian Creek, Duck Creek, and Crow Creek. The evidence of the presence of this species outside of its current geographic range warrants further investigation.

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INTRODUCTION

Efforts to document bat species in the Bureau of Land Management (BLM) Butte Field Office (FO) were continued in 2006, the fourth and final year of surveys. Areas that were visited and scored in 2005 were surveyed in 2006, prioritizing the sites with the highest score and potential presence of bats.

METHODS

Mist Nets

Mist net surveys were conducted from 26 July—4 August 2006. Mist nets were set in locations considered to be suitable flyways for bats, such as open pools of water or clearings in stands of trees. Nets were set approximately 1 hour prior to sunset and run until at least midnight if no bat activity was detected. In times of high activity, nets were run until no activity was detected for 30 min. to 1 hr. Captured bats were weighed and standard measurements were taken. Not all measurements were taken for every lactating female to minimize stress. Bats were released after processing.

Acoustic Monitoring

Bat detectors were placed at each netting site to monitor bat activity in the area and record call sequences. No detectors were left out all night. Recorded calls were analyzed by entry into a discriminant function model that allows assignment to a species (references) group. Reference groups consisted of known calls from species that could be present in southwestern Montana. Output of the model also includes probabilities of assignment to each species group.

RESULTS

Study Sites

Big Hole National Battlefield (12 T 0293310 5057806; Elevation 6132 ft.). The river runs through the park and is associated with a narrow riparian area. Surrounding areas are open valleys and forest covered hills. Nets were set over the river and in a small meadow next to the river. No bats were captured at the Battlefield and only 4 species were documented with bat detectors (Table 2). A small number of passes were heard while mist netting was being conducted (<10) but activity in the area was generally low.

Mist net results:

<u>Species</u>	<u>No. of Males</u>	<u>No. of Females</u>
<i>No bats captured at this site.</i>	0	0

Species detected acoustically:

Lasionycteris noctivagans
Lasiurus cinereus
Myotis ciliolabrum
Myotis volans

Crow Creek (12T 0448048 5122216) —Riparian area surrounded by open range and agricultural land (4642 ft.). Site is at a fishing access/camping area where stream has moderate flow. Vertical rock faces and multiple snags are present in the area. Nets were set over the stream and in a small meadow adjacent to the stream (south).

Mist net results:

<u>Species</u>	<u>No. of Males</u>	<u>No. of Females</u>
<i>Lasiurus cinereus</i>	0	1

Species detected acoustically:

Lasionycteris noctivagans
Lasiurus cinereus
Myotis ciliolabrum
Myotis evotis
Myotis septentrionalis

Duck Creek Parcel 1 (12T 0468707 5146952) —Narrow riparian area in small plot of BLM land (4413 ft.). Multiple snags and rocky slopes in the area. Two to three miles are within a mile of the site. Nets were set over areas of slow-moving water.

Mist net results:

<u>Species</u>	<u>No. of Males</u>	<u>No. of Females</u>
<i>Myotis septentrionalis</i>	1	0

Species detected acoustically:

Lasionycteris noctivagans
Myotis ciliolabrum
Myotis evotis
Myotis lucifugus
Myotis septentrionalis
Myotis volans

Empire Creek (12T 0395272 5178989) —Narrow creeks run through grazed meadow near road (5472 ft.) with forest on both sides and steep rocky slopes nearby. Nets were set over the creek where trees created a flyway.

Mist net results:

<u>Species</u>	<u>No. of Males</u>	<u>No. of Females</u>
<i>No bats captured at this site.</i>	0	0

1 Species detected acoustically:2 *Corynorhinus townsendii*3 *Eptesicus fuscus*4 *Myotis evotis*5 *Myotis lucifugus*

6

7 **Indian Creek** (12T 0454317 5131143) —Creek runs from riparian area over road creating a
 8 small pool (4355 ft.). Mosaic of dry open area and trees in adjacent areas. Nets were set over
 9 the pool in the road.

10 Mist net results:

11	<u>Species</u>	<u>No. of Males</u>	<u>No. of Females</u>
12	<i>No bats captured at this site.</i>	0	0

13 Species detected acoustically:14 *Myotis ciliolabrum*15 *Myotis evotis*16 *Myotis lucifugus*17 *Myotis septentrionalis*18 *Myotis volans*

19

20 **Lower Bigfoot Creek** (12T 0412510 5106591) —Narrow riparian area where area is
 21 relatively heavily grazed (5258 ft.) causing pools in the creek where cattle cross; Outlying area
 22 predominately is dry, open rangeland. Nets were set in open camping area and over the creek at
 23 a cattle crossing.

24 Mist net results:

25	<u>Species</u>	<u>No. of Males</u>	<u>No. of Females</u>
26	<i>Myotis volans</i>	0	2

27

28

1 Species detected acoustically:2 *Lasionycteris noctivagans*3 *Lasiurus cinereus*4 *Myotis ciliolabrum*5 *Myotis evotis*6 *Myotis lucifugus*

7

8 **Lump Gulch** (12T 0419972 5148619) —Approximately 15 to 20 ft. pool at the downstream

9 end of a culvert running underneath road (4391 ft.). Riparian area is surrounded by rocky

10 outcrops and forest. Nets were set over pool.

11 Mist net results:

12	<u>Species</u>	<u>No. of Males</u>	<u>No. of Females</u>
13	<i>Eptesicus fuscus</i>	0	2
14	<i>Lasionycteris noctivagans</i>	0	1
15	<i>Lasiurus cinereus</i>	2	0
16	<i>Myotis lucifugus</i>	1	0
17	<i>Myotis septentrionalis</i>	0	1
18	<i>Myotis volans</i>	1	0
19			

20 Species detected acoustically:21 *Eptesicus fuscus*22 *Lasionycteris noctivagans*23 *Lasiurus cinereus*24 *Myotis ciliolabrum*25 *Myotis evotis*26 *Myotis lucifugus*27 *Myotis septentrionalis*

28

29

30 **Moose Creek** (12T 0369597 5066258) —Narrow, mesic, west-facing drainage, becoming

31 more open and xeric downstream (5831 ft.). Nets were set downstream of the parking lot over

32 pools in the creek.

1 Mist net results:

2	<u>Species</u>	<u>No. of Males</u>	<u>No. of Females</u>
3	<i>Lasiurus cinereus</i>	1	0
4	<i>Myotis volans</i>	0	1

6 Species detected acoustically:

7	<i>Corynorhinus townsendii</i>
8	<i>Lasionycteris noctivagans</i>
9	<i>Lasiurus cinereus</i>
10	<i>Myotis ciliolabrum</i>
11	<i>Myotis evotis</i>
12	<i>Myotis lucifugus</i>
13	<i>Myotis septentrionalis</i>
14	<i>Myotis yumanensis</i>

16 **Virginia Creek** (12T 0394331 5193915) —Creek with moderate flow in riparian area near
 17 road (4909 ft.). Creek is mostly covered by trees through BLM holding. Adjacent areas include
 18 steep, rocky slopes and abundant snags. Nets were in an open area next to the creek and in a
 19 clearing over a slow moving portion of the creek.

20 Mist net results:

21	<u>Species</u>	<u>No. of Males</u>	<u>No. of Females</u>
22	<i>Lasiurus cinereus</i>	0	1

23 Species detected acoustically:

24	<i>Eptesicus fuscus</i>
25	<i>Lasionycteris noctivagans</i>
26	<i>Lasiurus cinereus</i>
27	<i>Myotis ciliolabrum</i>
28	<i>Myotis evotis</i>
29	<i>Myotis lucifugus</i>
30	<i>Myotis volans</i>

Summary of Results

Mist Nets

Mist nets yielded lower capture success than previous years with only 15 bats of 6 species being captured in 9 nights (Table 1). *Lasiurus cinereus* was the most commonly captured bat (5) followed by *Myotis volans* (4). The remainder of captures was individuals of *Eptesicus fuscus*, *Lasionycteris noctivagans*, *M. lucifugus*, and *M. septentrionalis*. For the first year of the survey, more females (9) were captured than males (6). Probably most notable of the individuals captured in mist nets are the two *M. septentrionalis* captured at Lump Gulch and Duck Creek. One individuals of this species was captured in 2003 and only calls have been identified in 2004 and 2005.

Acoustic Monitoring

Nine species were documented with acoustic detectors. *Myotis evotis* was recorded at the greatest number of sites (8 of 8). *Myotis ciliolabrum*, *L. cinereus*, *L. noctivagans*, and *M. septentrionalis* were documented at 7, 6, 6, and 5 sites, respectively. The remaining species, *M. volans*, *E. fuscus*, and *M. yumanensis*, were documented at 3 or fewer sites. Sites where the highest species diversity was documented (7 species) were Moose Creek, Lump Gulch, and Virginia Creek. The model identified one call of *Corynorhinus townsendii* at Moose Creek and Empire Creek but, after visual verification, neither call was found to be identified correctly. With the exception of Empire Creek, sites where few captures were made presented high activity levels based on acoustic monitoring. Peterson detectors at Virginia Creek recorded an extremely high level of activity for *L. cinereus*. A similar situation occurred at Indian Creek where a moderate level of activity was heard on detectors but no bats were captured in mist nets.

Table 1. Number of each species caught at each mist net site during the July—August 2006 survey.

Net Site	Site Description	Elevation (ft)	Temp (°F)	Humidity (%)	Species (#m, #f) ¹	Total # Species (# Bats)
Big Hole National Battlefield	Narrow riparian area surrounded by open valleys and forest-covered hills	6132	-	-	NO BATS CAPTURED	
Crow Creek	Riparian area with adjacent vertical rock faces and sparse forest	4642	69	39	<i>Lasiurus cinereus</i> (1f)	1(1)
Duck Creek Parcel 1	Narrow riparian area with proximal rocky slopes and meadow	4413	66	43	<i>Myotis septentrionalis</i> (1m)	1(1)
Empire Creek	Creek runs through narrow meadow next to road	5472	66	23	NO BATS CAPTURED	
Indian Creek	Small pool where creek crosses road	4355	72	24	NO BATS CAPTURED	
Lower Bigfoot Creek	Very narrow riparian area with camping area and stream with cattle crossing	5258	75	30	<i>Myotis volans</i> (2f)	1(2)
Lump Gulch	Pool along side road created by culvert	4391	83	27	<i>Lasiurus cinereus</i> (2m) <i>Eptesicus fuscus</i> (2f) <i>Lasionycteris noctivagans</i> (1f) <i>Myotis lucifugus</i> (1m) <i>Myotis septentrionalis</i> (1f) <i>Myotis volans</i> (1m)	6(8)
Moose Creek	Narrow riparian area surrounded by rocky bluffs	5831	62	50	<i>Lasiurus cinereus</i> (1m) <i>Myotis volans</i> (1f)	2(2)
Virginia Creek	Stream with moderate flow in riparian area near road	4909	70	36	<i>Lasiurus cinereus</i> (1f)	1(1)

Table 2. Species identified at each site during the July—August 2006 survey.

Net Site	Date	Species Assignment	Call ID	Time	Probability of Identification ¹
Moose Creek	26 July	<i>Corynorhinus townsendii</i>	G7262139.29	21:39	0.85
		<i>Lasionycteris noctivagans</i>	G7262215.38	22:15	0.90
			G7262216.35	22:16	0.61
		<i>Lasiurus cinereus</i>	G7262139.27	21:39	0.83
			G7262139.29	21:39	0.79
			G7262139.55	21:39	0.81
			G7262140.34	21:39	0.76
			G7262149.33	21:49	0.66
		<i>Myotis ciliolabrum</i>	G7262138.31	21:38	0.70
			G7262142.42	21:42	0.45
			G7262144.34	21:44	0.48
			G7262145.47	21:45	0.65
			G7262146.12	21:46	0.99
			G7262146.28	21:46	0.47
		<i>Myotis evotis</i>	G7262151.32	21:51	0.99
			G7262152.00	21:52	0.99
		<i>Myotis lucifugus</i>	G7262153.48	21:53	0.52
		<i>Myotis septentrionalis</i>	G7262153.21	21:53	0.59
			G7262157.58	21:57	0.89
		<i>Myotis yumanensis</i>	G7262141.56	21:41	0.47

¹Average probability of assignment to species based on all pulses analyzed for each call sequence

Table 2. cont.

Net Site	Date	Species Assignment	Call ID	Time	Probability of Identification ¹
Big Hole National Battlefield	27 July	<i>Lasionycteris noctivagans</i>	G7272232.25	22:32	1.00
			G7272244.57	22:44	0.75
			G7272256.23	22:56	0.98
			G7272256.31	22:56	1.00
		<i>Lasiurus cinereus</i>	G7272151.49	21:51	0.99
		<i>Myotis ciliolabrum</i>	G7272316.31	23:16	0.52
		<i>Myotis volans</i>	G7272343.07	23:43	0.62
Lower Bigfoot Creek	28 July	<i>Lasionycteris noctivagans</i>	G7282145.46	21:45	0.98
			G7282218.19	22:18	1.00
		<i>Lasiurus cinereus</i>	G7282144.06	21:44	0.93
			G7290015.31	0:15	0.98
		<i>Myotis ciliolabrum</i>	G7290025.10	0:25	0.77
		<i>Myotis evotis</i>	G7282224.05	22:24	0.69
			G7282350.41	23:50	0.94
			G7290031.16	0:31	0.70
		<i>Myotis lucifugus</i>	G7282214.47	22:14	0.58
			G7282224.31	22:24	0.70
			G7282308.03	23:08	0.69
			G7282319.23	23:19	0.83

¹Average probability of assignment to species based on all pulses analyzed for each call sequence

Table 2. cont.

Net Site	Date	Species Assignment	Call ID	Time	Probability of Identification ¹
Lump Gulch	29 July	<i>Eptesicus fuscus</i>	G7292152.43	21:52	0.92
		<i>Lasionycteris noctivagans</i>	G7292145.56	21:45	0.73
			G7292155.25	21:55	0.79
		<i>Lasiurus cinereus</i>	G7292150.33	21:50	0.75
			G7292150.33	21:50	0.70
			G7292153.13	21:53	0.95
			G7292155.25	21:55	0.67
			G7292200.38	22:00	0.63
			G7292256.18	22:56	0.76
		<i>Myotis ciliolabrum</i>	G7292139.02	21:39	0.90
			G7292251.49	22:51	0.64
		<i>Myotis evotis</i>	G7292153.43	21:53	0.83
			G7292155.07	21:55	0.98
			G7292218.39	22:18	0.97
		<i>Myotis lucifugus</i>	G7292147.15	21:47	0.77
			G7292206.19	22:06	0.92
			G7292239.15	22:39	0.36
		<i>Myotis septentrionalis</i>	G7292134.12	21:34	0.64
			G7292138.22	21:38	0.61
			G7292143.19	21:43	0.61
			G7292146.18	21:46	0.60

¹Average probability of assignment to species based on all pulses analyzed for each call sequence

Table 2. cont.

Net Site	Date	Species Assignment	Call ID	Time	Probability of Identification ¹
Indian Creek	30 July	<i>Lasiurus cinereus</i>	G7302214.21	22:14	0.67
			G7302217.24	22:17	0.90
		<i>Myotis ciliolabrum</i>	G7302144.28	21:44	0.73
			G7302134.39	21:34	0.79
			G7302148.59	21:48	0.62
			G7302149.02	21:49	0.70
			G7302240.23	22:40	0.79
		<i>Myotis evotis</i>	G7302152.46	21:54	0.91
		<i>Myotis lucifugus</i>	G7302135.27	21:35	0.77
			G7302137.19	21:37	0.70
			G7302144.51	21:44	0.97
			G7302147.36	21:47	0.61
			G7302159.38	21:59	0.77
			G7302204.27	22:04	0.45
			G7302206.46	22:06	0.57
			G7302218.15	22:18	0.99
			G7302235.57	22:35	0.92
			G7302240.23	22:40	0.89
			G7302327.06	23:27	0.95
		<i>Myotis septentrionalis</i>	G7302210.13	22:10	0.70
			G7302241.18	22:41	0.72
		<i>Myotis volans</i>	G7302209.18	22:09	0.78
			G7302314.49	23:14	0.71

¹ Average probability of assignment to species based on all pulses analyzed for each call sequence

Table 2. cont.

Net Site	Date	Species Assignment	Call ID	Time	Probability of Identification ¹
Indian Creek	3 August	<i>Myotis ciliolabrum</i>	G8032133.26	21:33	0.51
			G8032141.30	21:41	0.90
		<i>Myotis evotis</i>	G8032146.47	21:46	0.71
		<i>Myotis lucifugus</i>	G8032133.11	21:33	0.77
		<i>Myotis septentrionalis</i>	G8032121.57	21:21	0.72
Empire Creek	31 July	<i>Corynorhinus townsendii</i>	G7312131.04	21:31	0.76
		<i>Eptesicus fuscus</i>	G7312320.41	23:20	0.73
		<i>Myotis evotis</i>	G7312211.41	22:11	0.78
		<i>Myotis lucifugus</i>	G7312254.17	22:54	0.70
Virginia Creek	1 August	<i>Eptesicus fuscus</i>	G8012325.09	23:25	0.97
		<i>Lasionycteris noctivagans</i>	G8012142.47	21:42	1.00
			G8012305.41	23:05	0.58
		<i>Lasiurus cinereus</i>	G8012250.09	22:50	0.44
		<i>Myotis ciliolabrum</i>	G8012201.49	22:01	0.58
			G8012212.04	22:12	0.56
			G8012237.10	22:37	0.59
		<i>Myotis evotis</i>	G8012245.34	22:45	0.86
		<i>Myotis lucifugus</i>	G8012143.36	21:43	0.79
			G8012146.15	21:46	0.61
			G8012157.08	21:57	0.66
			G8012200.11	22:00	0.81
		<i>Myotis volans</i>	G8012231.09	22:31	0.92

¹ Average probability of assignment to species based on all pulses analyzed for each call sequence

Table 2. cont.

Net Site	Date	Species Assignment	Call ID	Time	Probability of Identification ¹
Duck Creek Parcel 1	2 August	<i>Lasionycteris noctivagans</i>	G8022216.40	22:16	0.59
		<i>Myotis ciliolabrum</i>	G8022158.47	21:58	0.60
		<i>Myotis evotis</i>	G8022222.45	22:22	0.95
			G8022257.26	22:57	0.81
		<i>Myotis lucifugus</i>	G8022132.26	21:32	0.62
			G8022132.39	21:32	0.62
			G8022133.17	21:33	0.99
		<i>Myotis septentrionalis</i>	G8022140.45	21:40	0.85
Crow Creek	4 August	<i>Myotis volans</i>	G8022158.33	21:58	0.70
		<i>Lasionycteris noctivagans</i>	G8042140.25	21:40	0.80
		<i>Lasiurus cinereus</i>	G8042123.11	21:23	0.76
		<i>Myotis ciliolabrum</i>	G8042125.10	21:25	0.75
			G8042128.11	21:28	0.88
		<i>Myotis evotis</i>	G8042137.07	21:37	0.73
			G8042139.19	21:39	0.96
			G8042211.51	22:11	0.82
		<i>Myotis septentrionalis</i>	G8042126.23	21:26	0.79
			G8042128.45	21:28	0.94
			G8042129.38	21:29	0.80
			G8042148.47	21:48	0.84

¹Average probability of assignment to species based on all pulses analyzed for each call sequence

DISCUSSION

Of the sites surveyed in 2006, Lump Gulch was the most productive in both captures with mist nets and acoustic detections. Of the six species documented with mist nets, 5 were documented with bat detectors. *Myotis volans* was the only species captured but not detected acoustically. *Myotis ciliolabrum* and *M. evotis* were detected acoustically but no individuals were netted. This site seemed to be especially attractive to females (4 of 8 captures) as it was a low elevation site, provided plentiful water, and was in an area with rock outcrops and roost trees.

Seven species also were documented acoustically at both Virginia Creek and Moose Creek but capture success was much lower with only 1 to 2 individuals captured at these sites. The remaining sites yielded no less than three species based on acoustic analysis. Results of mist netting in this case are not a good indicator of bat activity. In some cases (e.g., Indian Creek, Virginia Creek, and Crow Creek), even the addition of acoustic analysis does not indicate fully the level of activity in the area. Recording of calls is highly dependent on the locations of flyways relative to detector locations and documented levels of activity were probably lower than actual at Indian, Virginia, and Crow Creeks.

The percentage of females likely was greater during 2006 (60%) compared to previous years because 5 of 8 sites were below 5000 ft. in elevation and appeared to have suitable habitat in close proximity. Also, because most of the area surrounding the survey sites is dry, females will seek out areas of easily accessible water.

1 Only one call of *M. yumanensis* was identified at Moose Creek, which is consistent with
2 previous surveys. However, the greatest number of *M. septentrionalis* calls (14) was identified
3 relative to the first three years of the survey. With the exception of calls identified at Moose
4 Creek (5831 ft.), all documentations of *M. septentrionalis* (acoustic and captures) occurred at
5 sites lower than 5000 ft. No materials for taking wing punches were available to make genetic
6 identification of the two captured individuals possible. Evidence of the presence of *M.*
7 *septentrionalis* presented by surveys in the BLM Butte FO warrants further investigation, and
8 possible reconsideration, of the current geographic range of this species.