



United States Department of the Interior

NATIONAL PARK SERVICE
Jewel Cave National Monument
11149 U.S. Highway 16
Custer, South Dakota 57730

IN REPLY REFER TO:

February 2nd, 2016

Memorandum

To: JECA Central Files

From: Dan Austin, Physical Science Technician

Subject: Jewel Cave Winter Bat Survey

On February 2nd 2016, the annual hibernating bat count was conducted at Jewel Cave. Dan Austin, Lydia Austin, Brad Phillips, and Mike Wiles participated in the count.

We conducted the survey following a protocol that has been used at Jewel Cave since 1992. Two search routes were surveyed: one extending from the Milk River gate to the cave entrance (Heavenly Route); the second extending from the Dungeon Room to Surveyor's Hall (Dungeon Route). Attached are copies of the maps used, with the specific search areas indicated.

We began the count at 8:30 a.m. and split into two groups. Each search group proceeded to the end of their assigned route, then counted back toward the entrance. The Dungeon Route group (Dan and Lydia) finished at 9:45 a.m., and the Heavenly Route group (Mike and Brad) finished at 10:30 a.m.

Corynorhinus (741), *Myotis* (616), *Eptesicus* (2), and *Perimyotis* (1) were found. When possible, the *Myotis* were identified to species. Each bat was counted, although numbers roosting in large clusters were estimated. Some bats may have been overlooked, particularly those that roost in small cracks, such as *M. ciliolabrum*. Temperature and relative humidity readings were taken in each numbered search area.

A total of 1360 bats were counted. There were 889 bats along the Dungeon Route (COTO=494; MYOT=393; EPFU=1; PESU=1) and 377 bats along the Heavenly Route (COTO=153; MYOT=223; EPFU=1). Overall, 77 fewer bats were counted this year than in 2014-2015. This is well within the natural variance established over the last 30+ years. The greatest number of bats in a search area was 385 *Myotis* in the Dungeon Room, and the largest cluster (44 *Corynorhinus*) was in the Trap Door Room and Catacombs area.

The temperature recorded just outside the cave entrance was 24°F, and the cave was inhaling. The teams also noted an abnormally large number of packrat droppings scattered throughout the cave. The Heavenly Route team noticed that the bats were more scattered than usual in Deep Canyon, and four were moving, which is normal.

cc: Bonnie Schwartz, JECA
JECA Interpretation
Joel Tigner

Mike Wiles, JECA
Brad Phillips, USFS
Greg Schroeder, WICA

SUMMARY OF BAT COUNT RECORDS FOR JEWEL CAVE, 1950's TO PRESENT

Pre-1992 Methodology:

YEAR	<i>C. townsendii</i>	<i>Myotis sp.</i>	<i>E. fuscus</i>	<i>P. subflavus</i>	TOTAL	Notes
Pre-1959					3500-4000	Reference in letter (anecdotal)
12/29/59 - 3/18/60	1137	0*			1137	1137 COTO banded*
12/22 - 12/30/60	544	0*			544	544 COTO banded*
12/28 - 12/29/61	291	0*			291	291 COTO banded*
1967/68	600	0*			604	
1969/70	1000	280			1280	
1986/87	728	545			1273	
1988/89	614	492			1106	
1989/90	831	445			1276	

New Methodology Established in 1992:

1992/93	1187	181			1368	
1993/94	791	389			1180	
1994/95	895	356			1251	
1995/96	721	432			1153	
1996/97	730	398	**		1128	
1997/98	593	479			1072	
1998/99	901	454			1355	
1999/00	853	466	2 ?		1321	
2000/01	708	435			1143	
2001/02	721	445	2		1168	
2002/03	1135	470			1605	
2003/04	886	457	2		1345	
2004/05	1060	493	1	1	1555	
2005/06	928	443	11		1382	
2006/07	750	595	6		1351	
2007/08	877	442			1319	
2008/09	921	460	4		1385	
2009/10	No count conducted this year				N/A	
2010/11	620	542	2		1164	
2011/12	527	497	1		1025	
2012/13	836	521	10		1367	
2013/14	604	453	5		1062	
2014/15	904	531	2		1437	
2015/16	741	616	2	1	1360	

* Banding records are held by National Biological Service, Patuxent Wildlife Research Center at the National Museum of Natural History in Washington DC. (They have the original banding cards).

* Total of 1,972 banded, 1959-61 including at least 4 *M. ciliolabrum* and an unknown # of *M. volans*.

** Deep Canyon was not counted in 1996/97

DUNGEON ROUTE COUNT, 2016

Survey Area	Temp	RH-%	Genus	Count	Clusters		Bats per cluster			Singles		
					# bats	in # clusters	Min	to	Max		avg/cluster	
Area #1	32.8	53%	COTO	250	232	in 22	2	to	38	14.2	18	
			MYOT	2							2	
			EPFU									
Area #2	37.7	62%	COTO	243	213	in 19	2	to	44	11.2	30	
			MYOT	0							0	
			EPFU									
Area #3	41.5	85%	COTO	0							0	
			MYOT	2							2	
			EPFU									
Area #4	42.4	86%	COTO	1							1	
			MYOT	1							1	
			EPFU									
Area #5	42.9	88%	COTO	0							0	
			MYOT	0							0	
			EPFU									
Area #6	44	93%	COTO	0							0	
			MYOT	385							N/A	
			EPFU									
Area #7	25.9	55%	COTO	0							0	
			MYOT	0							0	
			EPFU									
Lantern Room	25.6	56%	COTO	0							0	
			MYOT	3							3	
			EPFU	1							1	
TOTALS for route			COTO =	494	445	in 41	2	to	44	12.7	49	
			MYOT =	393							N/A	8
			EPFU =	1								1

1 *P. subflavus*

Average temp 36.6 degrees farenheit

Average RH: 72%

in clusters = total number of bats in clusters and total number of clusters (i.e., 41 in 5 means 41 bats in five clusters)

bats per cluster = size range of clusters

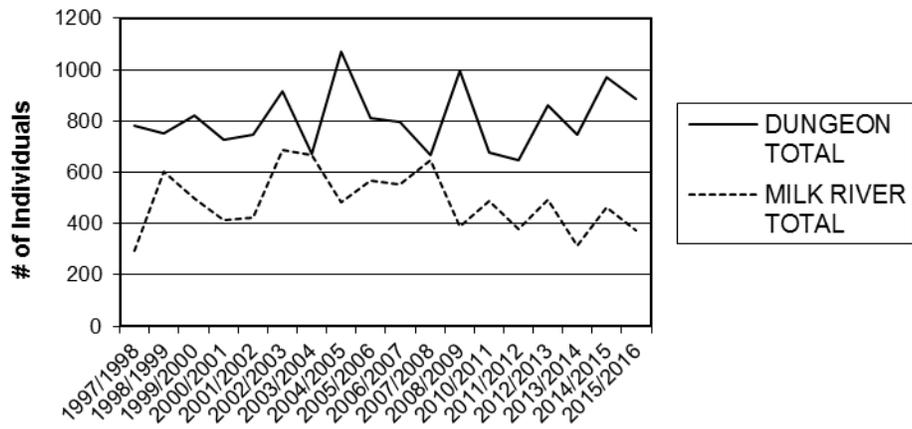
avg/cluster = average number of bats per cluster

singles = number of bats roosting singly

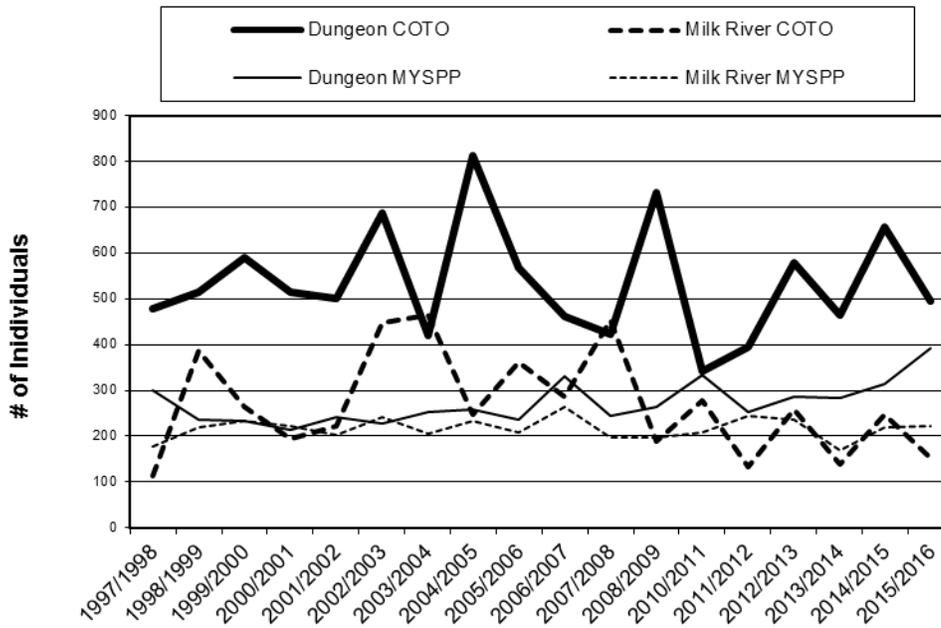
HEAVENLY ROUTE COUNT, 2016

Survey Area	Temp	RH-%	Genus	Count	Clusters		Bats per cluster			Singles
					# bats	in # clusters	Min	to	Max	
Area #8	31	52%	COTO	42	21	in 8	2	to 4	2.6	21
			MYOT	0						
			EPFU							
Area #9	35.5	51%	COTO	23	19	in 6	2	to 4	3.1	4
			MYOT	2						2
			EPFU							
Area #10	37.8	59%	COTO	12						12
			MYOT	0						
			EPFU							
Area #11	38.5	55%	COTO	58	49	in 9	2	to 8	5.4	9
			MYOT	1						
			EPFU							
Area #12	39.8	58%	COTO	6	2	in 1	2	to 2	2	4
			MYOT	2						2
			EPFU							
Area #13	41.4	55%	COTO	2						2
			MYOT	1						1
			EPFU							
Area #14	42.5	57%	COTO	2						2
			MYOT	2						2
			EPFU							
Area #15	44.7	53%	COTO	6	2	in 1	2	to 2	2	4
			MYOT	5						5
			EPFU							
Area #16	44.8	59%	COTO	0						
			MYOT	2						2
			EPFU							
Area #17	42.3	69%	COTO	0						
			MYOT	3						3
			EPFU							
Area #18	43	83%	COTO	0						
			MYOT	192	157	in 28	2	to 15	5.6	35
			EPFU							
Area #19	41.8	73%	COTO	0						
			MYOT	10						10
			EPFU	1						1
Area #20	42.8	75%	COTO	1						1
			MYOT	0						
			EPFU							
Area #21	44.8	75%	COTO	1						1
			MYOT	0						
			EPFU							

Bat Count Totals By Route

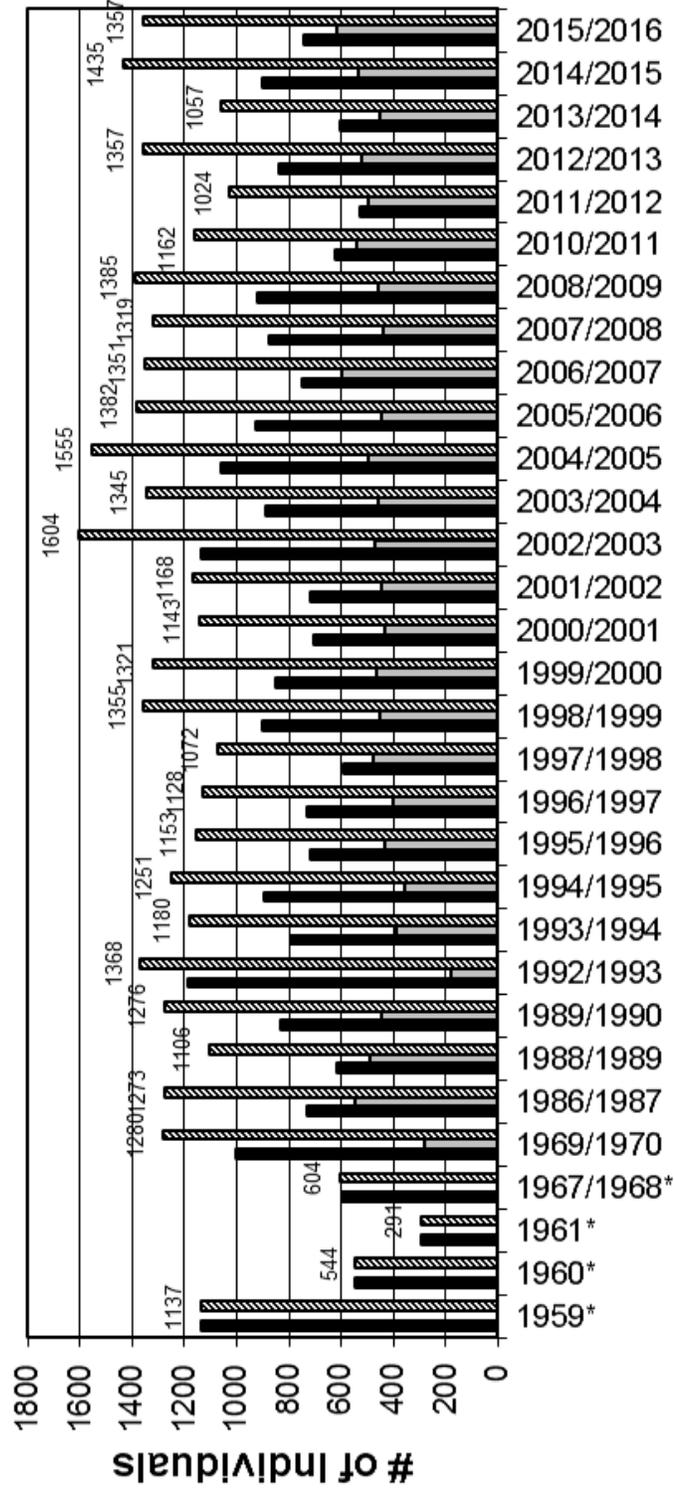


***Corynorhinus* and *Myotis* by Route**

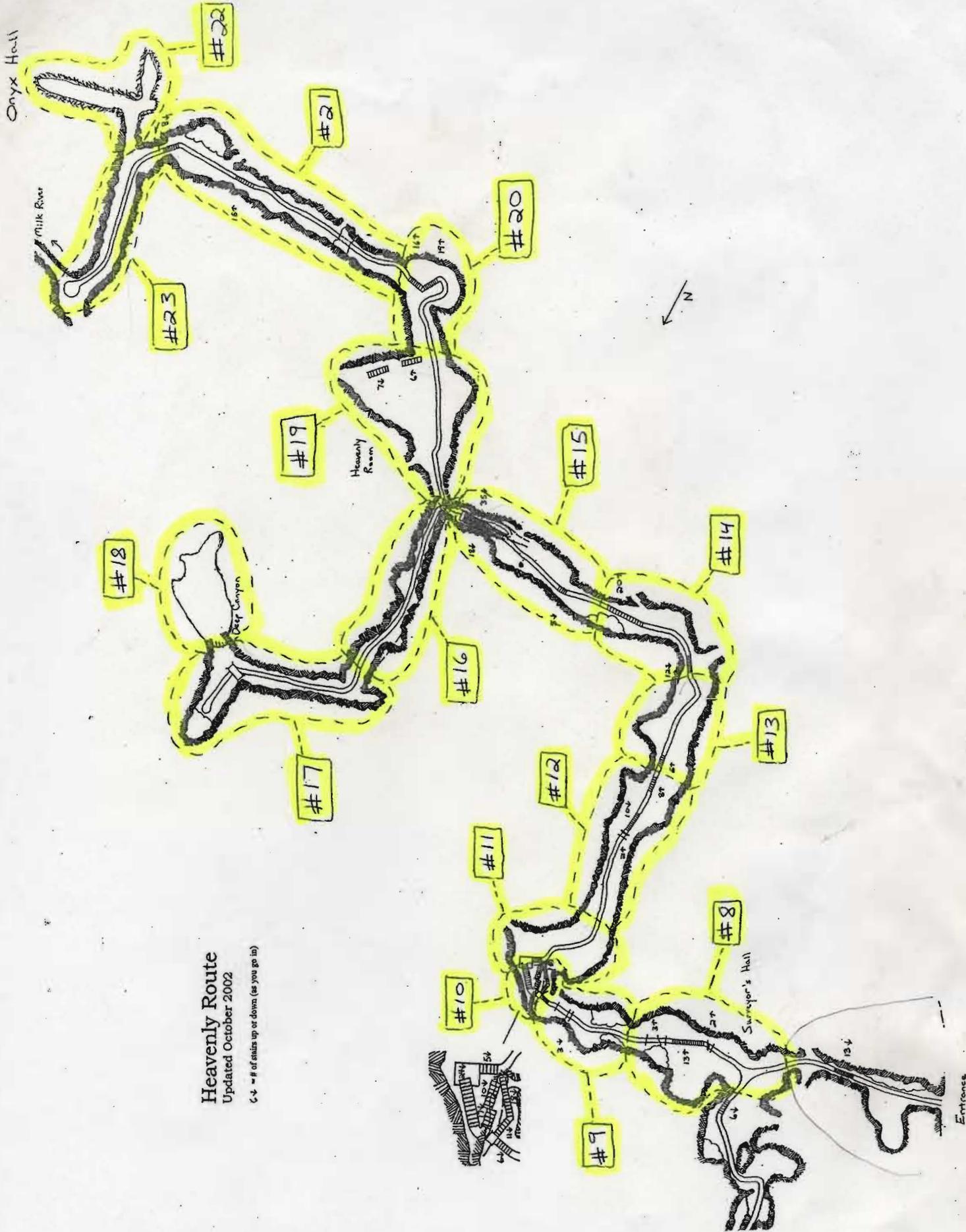


Jewel Cave Bat Count Results (1959-Present)

C. townsendii
 Myotis spp.
 Total



*Myotis numbers unknown 1959-1968



Heavenly Route
 Updated October 2002
 ♣ ♣ = # of stairs up or down (as you go in)



Dungeon Room

#6

Dungeon Route

Updated October 2002

6↓ = # of stairs up or down (as you go in)

#5

#4

Chert Room

Rock steps
3↑

#3

Fat Man's
Misc

#1

Catacombs

#2

Trap Door
1 step at bottom,
then 6↓

#7

Lantern

Entrance

