Supplemental Information "Multiple Mortality Events in Bats: A Global Review", *Mammal Review* 2016, O'Shea, Cryan, Hayman, Plowright, Streicker.

We provide summaries of pertinent details regarding multiple mortality events of bats in a series of nine appendices. Appendix S10 lists all references cited in Appendices S1-S9. Events are given by region alphabetically, then chronologically within regions. The number of events entered into tallies are given in parentheses under the "Description" column. We attempted to be conservative in designating numbers of events. Unfortunately not all sources provide enough information to allow accurate judgments in each case. Generally we considered events extending over multiple years as one event per year, and events observed at more than one dispersed location as separate events. We considered events impacting more than one species of bat as separate events for each species, unless there was insufficient information on numbers per species. Events with insufficient information for each species were treated as single events. Scientific names follow Simmons (2005) in Wilson and Reeder's (2005) Mammal Species of the World, 3rd edition (http://www.vertebrates.si.edu/msw/mswcfapp/msw/index.cfm), with the exceptions of *Myotis escalerai (*Ibáñez *et al*. 2006), *Perimyotis subflavus*, and *Parastrellus hesperus* (Hoofer *et al*. 2006).

Appendix S9. Reports of multiple bat deaths due to unexplained causes.

Region and Species	**Date**	**Description**	**Location**	**Source**	**Case**
Australia					
Miniopterus schreibersii	1964, 1965	"Large numbers" of dead bats, especially juveniles. (2 events)	Lake Gillear Guano Cave, Victoria, Australia	Hamilton-Smith 1967	S9-1
Miniopterus schreibersii	1967	"A large number" of dead young (but less than 200). Author hypothesizes insecticides, or "natural causes related to population pressure". (1 event)	Three caves in Victoria and South Australia	Hamilton-Smith 1967	S9-2
Europe					
Miniopterus schreibersii	Ca. Apr 1982	About 500 found dead; DDT group residues found but not conclusive of mortality. Stress	Acqua Fitusa Cave, Sicily, Italy	Corrao *et al*. 1985	S9-3

		due to spring migration speculated as a factor. (1 event)			
Myotis myotis	Ca. Apr 1982	About 100 found dead; DDT group residues found but not conclusive of mortality. Stress due to spring migration speculated as a factor. (1 event)	Acqua Fitusa Cave, Sicily, Italy	Corrao *et al*. 1985	S9-4
Miniopterus schreibersii	July 1992	100 carcasses found, mostly juveniles. Pesticide mortality suspected but chemical analysis inconclusive. (1 event)	Unspecified location, Portugal	Roué & Némoz 2002	S9-5
Miniopterus schreibersii	May 2002	70 carcasses found in 5 local gardens along the river. Calculated that perhaps 2000 bats died in area. First speculated pesticide poisoning because of timing coinciding with applications, but then suggested perhaps event may be part of possible epizootic reported below and in Table S7. (1 event)	Charentes River, St. Savinien, Charente-Maritime, France	Jourde 2003	S9-6
Miniopterus schreibersii	Summer 2002	10 or more adult and young carcasses (up to 700) found at nine caves. Impaired reproduction also noted. Very few sampled for histological or microbiological analysis, and results not conclusive. Other species not affected. Similar events at two locations in northern Spain suggestive of	Multiple roosts in France	Roué & Némoz 2002	S9-7

		viral pneumonia perhaps due to filovirus (see Table S7). (9 events)			
Miniopterus schreibersii	Summer 2002	Multiple deaths reported at 6 locations in Portugal. Four carcasses submitted for laboratory analysis but results unremarkable. Similar events at two locations in northern Spain suggestive of viral pneumonia perhaps due to filovirus (see Table S7). (6 events)	Multiple roosts in Portugal	Roué & Némoz 2002	S9-8
Miniopterus schreibersii	Summer 2002	Multiple deaths (up to 1,400) reported at 11 roosts in southern Spain. Microbiological results on small sample unremarkable. Similar events at two locations in northern Spain suggestive of viral pneumonia perhaps due to filovirus (see Table S7). (11 events)	Multiple roosts in southern Spain	Roué & Némoz 2002, Quetglas *et al*. 2003, DeLucas 2007	S9-9
Islands					
Pteropus rayneri	1994	"In Kolokopisi Choiseul chief said within a week or so in 1994 the large colony 'thousands strong' fell down from the trees. Authors suggest invasive red ants may be involved. (1 event)	Choiseul, Solomon Islands	Bowen-Jones *et al*. 1997	S9-10

Pteronotus quadridens	Mar 2008	20 dead bats found, emaciated. (1 event)	Culebrones, Puerto Rico	U.S. Geological Survey 2015c	S9-11
North America					
Mormoops megalophylla	Jul-Aug 1954	Hundreds of thousands of dead bats, thought died in Jul or Aug but not discovered until November. (2 events)	Cueva de Diablo and Jesus Maria mine, Nuevo Leon, Mexico	Villa-R. 1955	S9-12
Myotis velifer	1958	Numerous mummified carcasses in cave "perhaps reaching several thousand". (1 event)	Valdina Farms Sinkhole, Medina County, Texas, USA	Raun 1960	S9-13
Tadarida brasiliensis	Late Jul 1962	Hundreds stricken, suspected to be due to cool weather conditions. Rabies not implicated. (1 event)	Tunnel, Kendall County, Texas, USA	Constantine 1967	S9-14
Tadarida brasiliensis	Late Jul 1962	Hundreds stricken, suspected to be due to cool weather conditions. Rabies not implicated. (1 event)	Frio Cave, Uvalde County, Texas, USA	Constantine 1967	S9-15
Tadarida brasiliensis	Dec 1963	Hundreds of thousands of dead and dying bats on the cave floor. (1 event)	Cave near Ciudad Mante, Tamaulipas, Mexico	Booth 1965	S9-16
Myotis grisescens, Myotis lucifugus, Perimyotis subflavus	1965	"Dozens of bats dead and dying" (over 100) in two caves. Author includes pesticide poisoning as possible explanation, but only limited pesticide data were provided. Clark (1981) suggested organochlorine poisoning during spring fat depletion as a possible cause. (2 events)	Missouri, USA	Davis 1965	S9-17

Tadarida brasiliensis	1968	Hillside outside cave "covered with dead or dying bats". Pesticide poisoning speculated as a factor. (1 event)	Cave southeast of Carbo, Sonora, Mexico	E. Studier, pers comm in Cockrum 1969, 1970	S9-18
Tadarida brasiliensis	1968	Dead bats found in local agricultural fields. "Negative for rabies". Colony in cave declined from 25 million bats in 1963 to 30,000 in 1969; not examined for diagnostic organochlorine pesticide residues; interpretation by Clark (1986) and Clark and Shore (2001) suggest an organophosphate such as methyl parathion (perhaps together with DDT) may have been responsible. (1 event)	Fields near Eagle Creek Cave, Arizona	Cockrum 1970, Reidinger & Cockrum 1978, Clark & Shore 2001	S9-19
Tadarida brasiliensis	Sep 1971	"Several thousand infant bats were found dead on the floor beneath the roost area". (1 event)	Carlsbad Caverns, New Mexico, USA	Altenbach *et al*. 1979	S9-20
Myotis lucifugus	Jun-Aug 2009	45 dead bats, undetermined. (1 event)	Hunterdon County, New Jersey, USA	U.S. Geological Survey 2015c	S9-21
Unidentified	Jul 2009	20 dead bats, undetermined. (1 event)	Ferry County, Washington, USA	U.S. Geological Survey 2015c	S9-22
Unidentified	13 Jun 2010	10 dead bats, undetermined. (1 event)	Montgomery County, Virginia	U.S. Geological Survey 2015c	S9-23
Myotis lucifugus	Jul 2010	20 dead bats, undetermined. (1 event)	Garrison Dam, North Dakota, USA	U.S. Geological Survey 2015c	S9-24

Myotis lucifugus	Jul 2010	80 dead bats, undetermined. (1 event)	Walla Walla County, Washington, USA	U.S. Geological Survey 2015c	S9-25
Myotis lucifugus	Jun-Jul 2008	10 dead bats, emaciation. (1 event)	Wisconsin Rapids, Wisconsin, USA	U.S. Geological Survey 2015c	S9-26
Myotis volans	Aug 2008	50 dead bats, emaciation. (1 event)	Lewis and Clark County, Montana, USA	U.S. Geological Survey 2015c	S9-27
Myotis lucifugus, Eptesicus fuscus	Jun-Jul 2009	190 dead bats, emaciation. (2 events)	Indiana, USA	U.S. Geological Survey 2015c	S9-28
Corynorhinus townsendii, Myotis evotis, Myotis ciliolabrum	Aug 2009	11 dead bats, emaciation. (1 event)	Hubbard Cave, Colorado, USA	U.S. Geological Survey 2015c	S9-29
Eptesicus fuscus	Jun 2010	25 dead bats, emaciation. (1 event)	Connecticut, USA	U.S. Geological Survey 2015c	S9-30
Nycticeius humeralis	Jun-Jul 2010	50 dead bats, emaciation, parasitism, external. (1 event)	Newport News County, Virginia, USA	U.S. Geological Survey 2015c	S9-31
Nycticeius humeralis	Jun-Jul 2013	20 bats dead, external parasites, emaciation. (1 event)	Fort Eustis, Virginia, USA	U.S. Geological Survey 2015c	S9-32
Myotis lucifugus	Aug 2013	11 dead bats, emaciated. (1 event)	Blue Earth County, Minnesota, USA	U.S. Geological Survey 2015c	S9-33
Tadarida brasiliensis	Feb 2011	55 dead bats, cause undetermined (1 event)	Tucson, Arizona, USA	U.S. Geological Survey 2015c	S9-34
Myotis yumanensis, Unidentified	Mar-May 2011	22 dead bats, cause undetermined (1 event)	Eddy County, New Mexico, USA	U.S. Geological Survey 2015c	S9-35

Nycticeius humeralis	Jun 2011	10 carcasses, emaciated, cause undetermined. (1 event)	Newport News, Virginia, USA	U.S. Geological Survey 2015c	S9-36
Myotis lucifugus, Myotis septentrionalis	Jun-Jul 2011	40 carcasses, cause undetermined. (1 event)	Bremer County, Iowa, USA	U.S. Geological Survey 2015c	S9-37
Myotis lucifugus	Jun-Jul 2011	37 carcasses, emaciated, cause undetermined. (1 event)	Paulding County, Ohio, USA	U.S. Geological Survey 2015c	S9-38
Myotis lucifugus, Parastrellus hesperus	Aug 2011	11 dead, cause undetermined. (1 event)	Donnelly, Idaho, USA	U.S. Geological Survey 2015c	S9-39
Unidentified bats	May 2012	30 decomposed carcasses, cause undetermined. (1 event)	Jefferson County, Indiana, USA	U.S. Geological Survey 2015c	S9-40
Myotis lucifugus	Jul 2013	18 dead bats, unknown causes. (1 event)	Snake River, Idaho, USA	U.S. Geological Survey 2015c	S9-41
Antrozous pallidus, Tadarida brasiliensis	Jun-Jul 2014	60 dead bats, emaciated. (2 events)	Tucson, Arizona, USA	U.S. Geological Survey 2015c	S9-42
Eptesicus fuscus	Jul-Aug 2014	70 dead bats, emaciation. (1 event)	Old Forestville Historic Village, Minnesota, USA	U.S. Geological Survey 2015c	S9-43
Nycticeius humeralis	Jul-Aug 2014	12 dead bats, emaciation. (1 event)	Fort Eustis, Virginia, USA	U.S. Geological Survey 2015c	S9-44
Myotis lucifugus	Feb 2015	Ca. 2,000 bats dead, bronchopneumonia, pulmonary	Pierce County, Wisconsin USA	U.S. Geological Survey 2015b	S9-45

		congestion, etiology unspecified (1 event)			