Job-related mortality of wildlife workers in the United States, 1937–2000

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Abstract Wildlife biologists face a variety of job-related hazards that are unique to this profession, most of them involving the remote areas where work is performed and the unusual techniques used to study or manage wildlife. Information on biologists and others killed while conducting wildlife research or management was obtained from state and federal natural resources agencies, solicitations on wildlife-based internet discussion groups, and published obituaries. Ninety-one job-related deaths were documented from 1937 to 2000. Aviation accidents, drowning, car and truck accidents, and murder were the most common causes of death. Thirty-nine aviation accidents accounted for 66% of deaths, with aerodynamic stalls and power-line collisions being the most significant causes of accidents for which information was available. These safety threats should be taken into consideration during the design and planning of future research and management projects.

Key words aviation, history, mortality, safety, techniques

Early naturalists traveled through remote areas to study plants and animals and shared the risks that took the lives of settlers, soldiers, and others who made a living on the American frontier. The earliest American to die while in pursuit of scientific knowledge may have been John Lawson, surveyor general of the Carolinas and author of a book on the natural history of the region, who was burned to death by the Tuscarora Indian tribe in 1711. While encounters with hostile native Americans could occur, disease was a more dangerous threat to scientists and others in this period. Pioneer ornithologist Alexander Wilson died in 1813 after contracting dysentery while swimming a river to collect a bird; typhoid fever killed William Gambrel on an 1849 expedition through the Southwest (Evans 1993). Charles Linden died in 1888 as a result of long-term effects of exposure during an expedition to the Everglades (Anonymous 1888).

The methods used by early naturalists to obtain information and specimens were often dangerous. Francis J. Birtwell was strangled to death by a rope used as a safety line while collecting eggs from a bird nest, and John S. Cairns was killed by an accidental firearms discharge while on a trip in North Carolina (Anonymous 1895, Anonymous 1901). John K. Townsend and George F. Breninger died of arsenic poisoning acquired while preparing specimens for museum collections (Anonymous 1906, Evans 1993). Young naturalists such as Robert Shufeldt, age 15, and Worth H. Weller, age 18, often made significant contributions to science in these early years while facing the same dangers as their older peers. Shufeldt, who worked for the Natural History Museum of Marietta College, drowned while attempting to collect birds along the Ohio River in 1892 (Anonymous 1892, Hulbert 1892). Weller, author of several articles on herpetology, died after falling from a cliff while studying salamanders in North Carolina (Maslowski 1988).

Pioneering naturalists made many contributions to our knowledge of the flora and fauna of the

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United States, but wildlife biology was not recognized as a distinct science until the publication of Aldo Leopold's *Game Management* in 1933 and the formation of The Wildlife Society in 1937. Though the wildlife workers of today face some of the same risks as did the early naturalists, other dangers, such as aviation and motor vehicle accidents, have arisen. These factors have been discussed to a limited extent (Eckerlin 1990, King 1996, Brown 1999), but there has been no thorough review of mortalities in our field. My purpose was to recognize those who have lost their lives while working in wildlife research and management and to document significant safety hazards in this profession.

Methods

Information on job-related deaths of those involved in wildlife research and management was obtained using a variety of methods, including letters to state and federal conservation agencies, review of published obituaries, newspaper accounts, National Transportation Safety Board aircraft accident reports, and e-mails to wildlife and ecology internet discussion groups. Details on the deaths of all individuals were documented by at least one published account except for 13 deaths on which information was available only from a government agency.

Job-related mortality was defined as the death of a person employed as a wildlife biologist or technician while performing normal duties or

Table 1. Biologists, technicians, and others who died while performing wildlife research and management operations in the United States, 1937–2000. Full names are given when known.

Name	Organization	Date of death
Gower, William Carl	Michigan Dept. of Conservation	5 Feb 1945
Olsen, Orange A.	United States Forest Service	2 Mar 1945
Hinshaw, Maurice Layton	United States Fish and Wildlife Service	23 May 1947
Schneider, Paul Richard	United States Fish and Wildlife Service	22 May 1947
Kindler, L. P.	United States Fish and Wildlife Service	5 Dec 1948
Johnson, Clarence Stanley	United States Fish and Wildlife Service	24 Aug 1949
Lauridson, Donald G.	Colorado Game and Fish Dept.	23 May 1950
Engeling, Gus	Texas Parks and Wildlife Dept.	13 Dec 1951
Johnson, Donald Ernest	Nevada Division of Wildlife	11 Jul 1953
Meschkat, Ray Sterling	Nevada Division of Wildlife	11 Jul 1953
Fellows, Jr., Nathan Warren	Maine Dept. of Inland Fish & Game	27 Aug 1956
Gray, Ocie C.	New Mexico Dept. of Game and Fish	4 Jan 1960
Roberts, Austin	New Mexico Dept. of Game and Fish	4 Jan 1960
Cisney, Doyle E.	Alaska Dept. of Fish and Game	27 Oct 1961
Clawson, Sterling Gene	MS Dept. of Wildlife, Fisheries, & Parks	4 Aug 1962
Rouse, Ralph A.	Montana Dept. of Fish, Wildlife, & Parks	8 Mar 1962
Bohuslov, LeRoy Garvin	Alaska Dept. of Fish and Game	5 Mar 1964
Wohlfeil, Gary	Alaska Dept. of Fish and Game	5 Mar 1964
Shannon, Frederick Albert	Medical doctor in private practice	31 Aug 1965
Smith, J. Donald	United States Fish and Wildlife Service	12 May 1967
Uppgren, Robert A.	United States Fish and Wildlife Service	12 May 1967
Bratlie, Arthur E.	Alaska Dept. of Fish and Game	24 Jun 1968
Frank, John J.	Alaska Dept. of Fish and Game	24 Jun 1968
Martin, Paul	United States Fish and Wildlife Service	6 Aug 1969
Pierson, Douglas J.	Washington Dept. of Fish & Wildlife	6 Aug 1969
Northrup, Galen M.	Bureau of Land Management	14 Aug 1969
Erickson, James A.	Alaska Dept. of Fish and Game	27 Jul 1970
Fisher, Gerald L.	United States Fish and Wildlife Service	27 Jul 1970
LaFave, Neil	Wisconsin Dept. of Natural Resources	1971
McCall, Dewie Henson	North Carolina Wildlife Resources Comm.	5 Sep 1971
Cooper, William D.	National Park Service	19 May 1973
Ebersole, John	National Park Service	19 May 1973
Hansen, Charles Goodman	National Park Service	19 May 1973
Buntrock, Samuel B.	Idaho Dept. of Fish and Game	29 May 1974
Richardson, Gary L.	United States Forest Service	29 May 1974
Unknown	United States Forest Service	29 May 1974
Bergman, Robert D.	United States Fish and Wildlife Service	30 Sep 1974
Boughton, Leonard A.	United States Fish and Wildlife Service	30 Sep 1974
Haddock, J. Larry	United States Fish and Wildlife Service	30 Sep 1974
Cox, James Michael	United States Fish and Wildlife Service	23 Aug 1975
Graf, William	San Jose State University (Retired)	22 Sep 1975
Linderman, Spencer A.	Alaska Dept. of Fish and Game	10 Jul 1975
Southern, Judy	University of Missouri-Columbia	10 Feb 1975
Wilson, Terry G.	Missouri Dept. of Conservation	10 Feb 1975
Paur, Glenn Allen	University of North Dakota	16 May 1978
Koziol, Leonard	Nebraska Game and Parks Commission	30 Sep 2000 *
Schilling, Randall	Nebraska Game and Parks Commission	22 Jan 1979
Sinn, Jack	Nebraska Game and Parks Commission	22 Jan 1979
Pyle, Donald W.	Skidmore College	8 Jun 1979
Severson, Allen R.	Arizona Game and Fish Dept.	7 Feb 1980

(*Continued*)

* As a result of injuries incurred in a 22 Jan 1979 plane crash.

Table 1 (*continued*). Biologists, technicians, and others who died while performing wildlife research and management operations in the United States, 1937–2000. Full names are given when known.

Name	Organization	Date of death
Teague, Don	Arkansas Game and Fish Commission	7 Feb 1980
Swiderski, James L.	United States Forest Service	5 Aug 1980
Maness, Scott Jay	United States Fish and Wildlife Service	8 Jun 1981
Sauselein, Beau William	United States Fish and Wildlife Service	9 Jun 1981
Bowman, Garrett Bruce	FL Fish and Wildlife Conservation Comm.	28 May 1982
Schneider, Paul B.	University of California-Riverside	1983
Seegmiller, Rick F.	University of Arizona	6 Feb 1983
Schumacher, Lawrence H.	United States Fish and Wildlife Service	26 Sep 1984
Barcelona, Rich	United States Fish and Wildlife Service	8 Aug 1986
Bicket, James C.	Bureau of Land Management	6 Oct 1986
Cantu, John T.	United States Fish and Wildlife Service	29 Jan 1990
Norton, Karen L.	United States Fish and Wildlife Service	29 Jan 1990
Bevins, John	United States Fish and Wildlife Service	11 Oct 1990
Menkens, Jr., George E.	United States Fish and Wildlife Service	11 Oct 1990
Laing, Stephen	Utah Dept. of Wildlife	8 Jan 1991
Inberg, Kirk	Wyoming Game and Fish Dept.	16 Oct 1991
Roy, Kevin	Wyoming Game and Fish Dept.	16 Oct 1991
Felzien, Gregory S.	Hornocker Wildlife Research Institute	22 Feb 1992
Eberhardt, Lester Earl	Pacific Northwest Laboratory	3 Jun 1992
Fitzner, Richard E.	Pacific Northwest Laboratory	3 Jun 1992
Coury, Joni M.	Oregon State University	6 Aug 1992
Young, Stephen James	United States Fish and Wildlife Service	12 Nov 1992
Escobedo, Estevan	Arizona Game and Fish Dept.	4 Jan 1994
Chabot, Valerie	Alaska Dept. of Fish and Game	12 Jul 1994
Johnson, Craig S.	University of Tennessee	8 Oct 1994
Shull, Scott	University of Tennessee	8 Oct 1994
Stevens, Cliff	Oklahoma Dept. of Wildlife Conservation	6 Jul 1995
Moore, Joseph L.	National Biological Survey	13 Jul 1995
Martin, Steve	FL Fish and Wildlife Conservation Comm.	11 Jul 1996
Diamond, Seth J.	Intermountain Forest Industry Association	26 Jul 1996
Mabbutt, Darwin	U.S.D.A. Wildlife Services	10 Oct 1996
Kacyon, Randall H.	Alaska Dept. of Fish and Game	30 Nov 1996
Nove, Josh	United States Fish and Wildlife Service	3 Jul 1997
Hoover, Taryn	National Park Service	12 Sep 1997
Cornwall, Shane	U.S.D.A. Wildlife Services	14 Jan 1998
Callow, Mike	United States Fish and Wildlife Service	6 Nov 1998
Cheap, Kathleen	United States Fish and Wildlife Service	6 Nov 1998
Cox, Eric	University of Idaho	11 Jun 1999
Coyour, Grant Scott	Minnesota Dept. of Natural Resources	11 Jun 1999
Williams, Keith	Idaho Power and Light	16 Nov 2000
Gratson, Michael Walter	Idaho Fish and Game Dept.	28 Dec 2000

the death of any other person participating in wildlife research or management operations. Airplane and helicopter pilots were not included unless they were the sole occupant of the aircraft and were conducting wildlife work at the time of their death. Law-enforcement officers involved in wildlife research, habitat improvement, or wildlife feeding at the time of their death were included.

Results

Ninety-one people died while participating in wildlife research and management activities between 1937 and 2000 (Table 1). Among federal agencies, the United States Fish and Wildlife Service lost the most employees ($n = 24$), the United States Forest Service and National Park Service each lost 4, the Bureau of Land Management lost 2, and the Wildlife Services branch of the United States Department of Agriculture lost 2. The Alaska Fish and Game Department had the highest number of deaths ($n = 9$) among state agencies, followed by the Nebraska Game and Parks Commission ($n = 3$) (Table 1). Mortality occurred in 28 states, with the largest number of job-related deaths occurring in Alaska ($n = 22$), followed by Washington ($n = 8$); Utah and Florida ($n = 6$ each); Arizona and Wyoming ($n = 5$ each); Minnesota ($n = 5$); Idaho, Nebraska, and Nevada ($n = 3$ each); and 18 states reporting 1 or 2 deaths.

Aviation accidents involving both airplanes and helicopters accounted for 66% of documented fatalities. Twenty-seven percent of aviation deaths occurred in Alaska and accounted for 73% of the deaths in that state. Other common causes of death were drowning ($n = 10$), car and truck accidents ($n = 5$), and murder ($n = 4$) (Table 2).

Biologist mortality was associated with 31 airplane and 7 helicopter accidents. Most fatal flights were conducted for the purpose of wildlife or wildlife-habitat observation (50%) and radiotelemetry (26%) (Table 3). It was possible to determine the cause for 11 of 31 (36%) airplane accidents and all helicopter accidents. The majority of airplane

Table 2. Cause of death for wildlife workers in the United States, 1937–2000.

Cause of death	Decade of death							
	1937–1949	1950–1959	1960–1969	1970–1979	1980–1989	1990–1999	2000	Total
Airplane accidents	2	4	10	17	2	16	1	52
Drowning	2	0	0	2	1	5	0	10
Helicopter accident	0	0	2	0	2	3	1	8
Car or truck accident	0	0	1	0	1	3	0	5
Murder	0	1	0	2	1	0	0	4
Prescribed fire	0	0	0	0	3	0	0	3
Fall	0	0	0	1	0	1	0	2
Off-road vehicle accident	0	0	0	0	1	0	0	1
Tractor accident	1	0	0	0	0	0	0	1
Snakebite	0	0	1	0	0	0	0	1
Lightning	0	0	1	0	0	0	0	1
Avalanche	0	0	0	0	0	1	0	1
Disease (tularemia)	1	0	0	0	0	0	0	1
Exposure	0	0	0	1	0	0	0	1
Total	6	5	15	23	11	29	2	91

accidents for which the cause was known were the result of aerodynamic stalls (55%), power-line collisions (27%), and downdrafts (18%), while most helicopter accidents resulted from mechanical failure (29%) or power-line collisions (29%) (Table 3). Contractors piloted 17 of 28 (61%) fatal flights for which the pilot's employer was known, while 11 (39%) were flown by pilots employed by a state or federal agency.

Discussion

While every effort was made to identify biologists and others who lost their lives in wildlife research and management activities, the list compiled during the course of this study is probably incomplete. Several state and federal agencies failed to respond to repeated inquiries, though information on deaths of their employees was gained from other public sources. Additional biologists were not included, due to a lack of collaborating sources of essential details of the incidents in which they died. However, enough information was available to make inferences regarding the most significant fatal threats that biologists face while performing their duties. This study did not examine nonfatal injuries or illnesses, which are presumably much more common occurrences and therefore a greater daily risk to biologists. Activities that lead to such injuries may be greatly different from those resulting in death, and research into their cause is warranted. Diseases associated with wildlife, such as hantavirus, rabies, histoplasmosis, and West Nile Virus are also a danger to wildlife biologists, though only one death due to disease was confirmed (Fritz et al. 2002, Katz et al. 2002).

Aviation accidents accounted for 66% of all biologist mortalities and clearly are the riskiest activity in the wildlife profession. Flight in Alaska is especially dangerous, with a death rate among pilots about 91 times the rate for all United States workers and 5 times that of other

Table 3. Cause of fatal aviation accidents involving wildlife biologists in the United States, 1937–2000.

Flight purpose Accident cause	Airplane accidents	Helicopter accidents	Total
Unknown			
Unknown	5	0	5
Observation			
Unknown	8	0	8
Struck power-line	2	2	4
Aerodynamic stall	3	0	3
Downdraft	1	1	2
Mechanical failure	0	1	1
Struck tree	0	1	1
Radiotelemetry			
Unknown	3	0	3
Aerodynamic stall	2	0	2
Struck power-line	1	0	1
Loss of control in flight	1	0	1
Downdraft	1	0	1
Predator control			
Unknown	1	0	1
Aerodynamic stall	1	0	1
Mechanical failure	0	1	1
Wildlife feeding			
Unknown	1	0	1
Transportation			
Unknown	1	0	1
Search and rescue			
Flight into adverse weather	0	1	1
Total	31	7	38

pilots (Suarez 2000, Moran 2002). Low-level flight such as that used during radiotelemetry and aerial wildlife observation surveys poses special difficulties. The Federal Aviation Administration prohibits airplane operations at less than 153 m altitude in noncongested areas except in "sparsely populated areas" where flight at lower levels is allowed so long as the airplane does not come closer than 153 m to any person, vessel, vehicle, or structure (United States Government Printing Office 2003). In general such flights probably are no more dangerous than others conducted in similar light aircraft; in 1994 aerial observation, defined as the operation of an aircraft for the purpose of pipeline or power-line patrol, land and animal surveys, etc., but excluding traffic observation or sightseeing, accounted for 6.6% of all flying in the United States but only 0.7% of total accidents and 1.5% of fatal accidents in 1996 (Arendt 1997). Obstructions such as power lines and communications towers are difficult to see, and even experienced pilots are vulnerable to wire strikes (Wynbrandt 1996). Thorough review of current aeronautical charts for these hazards should be undertaken before any low-level flight, and mid-level reconnaissance flights may be advisable for pilots unfamiliar with an area.

Aerodynamic stalls can occur when a plane turns too quickly for the speed at which it is flying and loses the lift necessary to keep it in the air. Wildlife flights frequently are conducted at low speeds in order to enhance the ability of crew members to observe animals or locate radiotagged individuals. Frequent turns are often made during these flights to return to a particular site, increasing the chances of a stall from which the pilot cannot recover in time due to proximity to the ground. Ensuring that airplane weight-and-balance restrictions are strictly adhered to and using airplanes with stall warning systems that are tested prior to takeoff may reduce this threat. Surprisingly few safety training resources are available for pilots and observers of low-level wildlife flights, though several recent publications of the Airplane Owners and Pilots Association and the United States Department of the Interior's Office of Aircraft Services are recommended (Airplane Owners and Pilots Association Air Safety Foundation undated; United States Department of the Interior Office of Aircraft Services 1992, 1997; Wynbrandt 1996).

Biologists should check with their insurance agent to see whether their life insurance policy covers them in the case of accidental death in an airplane; some insurance policies, especially older ones, may not provide coverage when an accident does not occur in a scheduled airline flight. If your policy does not already cover aviation-related death, then you should strongly consider adding this coverage. However, as general aviation pilots have found, you may have to pay significantly higher premiums due to the perceived risk of this activity, and employers may want to consider providing additional compensation to workers carrying out aerial work (McClellan 2002).

While aviation accidents are the cause of the greatest mortality among wildlife workers, probably only a small percentage of biologists and technicians fly as part of their regular duties and most are probably at a greater risk from drowning or motor-vehicle accidents. Employees should participate in defensive driving and boating safety classes, often taught within their own agencies. Airboat operators should receive special training in the unique aspects of this type of vessel.

Natural resource professionals have been subject to an increasing number of threats and violence in recent years (Public Employees for Environmental Responsibility 2003), and murder was one of the more common causes of death in wildlife workers. However, 3 of the 4 biologists who were murdered were also part-time wildlife law-enforcement officers and were killed while exercising these responsibilities; the fourth was killed when he walked in upon a convenience-store robbery while on duty and was not a target of the crime. The number of state agencies in which biologists and technicians have law-enforcement authority is unknown, and whether or not wildlife workers can safely carry out such duties without the same amount of training as full-time enforcement officers receive deserves serious consideration by both workers and administrators.

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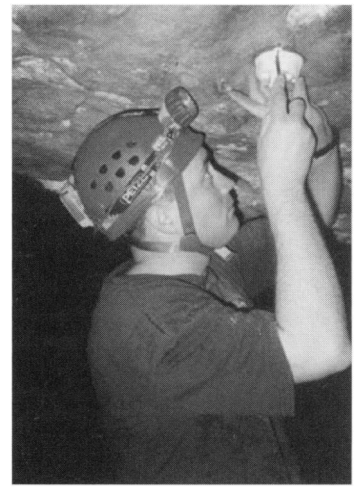

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