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A review of bird deaths on barbed-wire fences.—On 4 October 1988 we found a dead adult Eared Grebe (*Podiceps nigricollis*) on a 3-strand barbed-wire fence across a small ephemeral pond in Natrona County, Wyoming. A barb on the lowest wire (about 43 cm above the water) had entangled the bird's skin and undertail coverts. There were no external signs of other trauma. The water level in the pond fluctuates with irrigation returns, and the pond often is dry. Our observation prompted us to review published information on bird collisions with barbed-wire fences (Table 1). Bird injuries and deaths due to fencing have not been reported widely (e.g., Avery et al. 1980). There have been very few reports of bird collisions with fences over water, and we found no other report of an Eared Grebe death on barbed-wire fencing.

Stout (1967), Fitzner (1975), Knight et al. (1980) and Lockman et al. (1987) believed that fences and other man-made objects may be most hazardous for young-of-the-year, migrant, or nomadic birds. Stout and Cornwell (1976) reported that dabbling ducks seem more likely to be involved in collisions with fences and buildings than are diving ducks. Take off and landing, altitude gain, flight speed, and diurnal activity patterns may influence the likelihood of collision with man-made objects for different species (Siegfried 1972, Faanes 1987). We suspect that the hazards of barbed-wire fences over water are greatest for birds that move long distances across the water to take flight or for birds that fly close to the water after taking flight.

Bird collisions with fences probably comprise a very small portion of all non-hunting bird mortality (Stout and Cornwell 1976, Banks 1979, Avery et al. 1980, Jonkers and Smit 1984). An exception could be small populations of birds such as Whooping Cranes (*Grus canadensis,* see Anonymous 1989). However, birds entangled or seriously injured after fence collisions may die of exposure, starvation, drowning, or predation. Their bodies and those of birds killed on fences are likely to be removed quickly by scavengers. Therefore, the full impact of fence-related mortality would be difficult to assess.

We agree with Jonkers and Smit (1984) that preventing bird injuries and deaths on barbed-wire fences (and on other kinds of fences) is ethically important. Preventing bird deaths on fences has not been sufficiently considered for most locations that are managed for birds, or heavily used by them, or for projects with fencing alternatives. Fence construction and fence modification should be a standard consideration in reviewing land management practices or proposed projects. Cornwell and Hochbaum (1971) stated that wire fencing should not be built across water and that unneeded fences should be removed. We suggest that fences across ditches, streams, or rivers, in coves on lakes or ponds, in estuarine areas, or near tall vegetation may be exceptional hazards because they are less likely to be seen by birds attempting to take flight or to land. Hazardous fences should be marked to increase their visibility (Fitzner 1975), replaced by less dangerous fences, or removed, especially in areas used by shorebirds, waterfowl, or cranes. At a minimum, modifications of exceptionally hazardous fences can reduce bird injuries and deaths (Braun et al. 1978).

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TABLE 1
BIRD INJURIES AND DEATHS IN BARBED-WIRE FENCING

Bird species	Location	Reference	Remarks
Eared Grebe (*Podiceps nigricollis*)	Wyoming	This paper	Fence across pond
Great Skua (*Catharacta skua*)	Scotland	Morris (1984)	
Black-headed Gull (*Larus ridibundus*)	Scotland	Morris (1984)	Young birds
Gulls (Laridae)	Netherlands	Jonkers and Smit (1984)	
Sandhill Crane (*Grus canadensis*)	Idaho	Drewien (1973)	
	Idaho	Braun et al. (1978)	
	Oregon	Braun et al. (1978)	
Whooping Crane (*Grus americana*)	Idaho	Drewien (pers. comm.)	
	Colorado	Braun et al. (1978)	
	North Dakota	Anonymous (1984), Drewien (pers. comm.)	Injured, captured
	Western U.S.	Anonymous (1989)	Five of 24 hit fences
Trumpeter Swan (*Cygnus buccinator*)	Wyoming	Lockman et al. (1987), Lockman (pers. comm.)	Fences across creeks
	Western U.S.	Weaver and St. Ores (1974)	
Mute Swan (*Cygnus olor*)	England	Beer and Ogilvie (1972)	Barbed wire under water
Swans (Cygninae)	Netherlands	Jonkers and Smit (1984)	
Canada Goose (*Branta canadensis*)	Unspecified	Williams (1967)	
Geese (Anserinae)	Louisiana	Guillory (1973)	Personal communication
Northern Pintail (*Anas acuta*)	Manitoba	Cornwell and Hochbaum (1971)	Adult male
	Manitoba	Siegfried (1972)	Fence across pond
Cinnamon Teal (*A. cyanoptera*)	Colorado	Stroncek (1978)	Fence across pond(?)
Blue-winged Teal (*A. discors*)	North Dakota	Cornwell and Hochbaum (1971)	Adult male
	Unspecified	Cornwell and Hochbaum (1971)	Nesting female
Lesser Scaup (*Aythya affinis*)	Texas	Krueger and Whyte (1978)	Fence across pond
Ducks (Anatidae)	Louisiana	Guillory (1973)	Personal communication
	Netherlands	Jonkers and Smit (1984)	

TABLE 1
CONTINUED

Bird species	Location	Reference	Remarks
Gray Partridge (*Perdix perdix*)	Oregon	Griepentrog (1929)	
	England	Jenkins (1955)	
Great Blue Heron (*Ardea herodias*)	Colorado	Stroncek (1978)	
	Washington	Knight et al. (1980)	Fence across creek
Grey Heron (*A. cinerea*)	England	Mead et al. (1979)	Eight occurrences
"Blue Heron" (*A. cinerea*?)	England	Jonkers and Smit (1984)	
Least Bittern (*Ixobrychus exilis*)	Louisiana	Guillory (1973)	
Little Bittern (*Ixobrychus minutus*)	Zimbabwe	Irwin (1984)	
Stork (*Ciconia ciconia*)?	Netherlands	Jonkers and Smit (1984)	
Stiltwalkers (Recurvirostridae)	Netherlands	Jonkers and Smit (1984)	
Sora (*Porzana carolina*)	Washington	Knight et al. (1980)	
Clapper rail (*Rallus longirostrus*)	Virginia	Murray (1929)	
Black rail (*Laterallus jamaicensis*)	California	Arnold (1960)	Possible fence strike
American Coot (*Fulica americana*)	Wyoming	PR (pers. obs.)	Adult
Lapwing (*Vanellus vanellus*)	Netherlands	Jonkers and Smit (1984)	
Golden Eagle (*Aquila chrysaetos*)	South Dakota	Walker (1916)	
New Zealand Falcon (*Falco novaeseelandiae*)	New Zealand	Fox (1977)	Female, possible fence strike
Hen Harrier (*Circus cyaneus*)	Scotland	Morris (1984)	
European Kestrel (*Falco tinnunculus*)	Netherlands	Jonkers and Smit (1984)	
	Netherlands	Smit et al. (1987)	
Common Buzzard (*Buteo buteo*)	Netherlands	Jonkers and Smit (1984)	
Common Barn-Owl (*Tyto alba*)	Washington	Knight et al. (1980)	
Grass Owl (*T. capensis*)	Zimbabwe	Irwin and Lorber (1984)	

TABLE 1
CONTINUED

Bird species	Location	Reference	Remarks
Great Horned Owl (*Bubo virginanus*)	Pennsylvania	Edeburn (1973)	Adult male
	Missouri	McCarthy (1973)	
	Texas	Anderson (1977)	
	Montana	GTA (pers. obs.)	
	California	Emerson (1904)	
	Washington	Fitzner (1975)	
	Washington	Knight et al. (1980)	
Spotted Eagle Owl (*B. africanus*)	Zimbabwe	Irwin and Lorber (1984)	
Burrowing Owl (*Athene cunicularia*)	Nebraska	Lohoefener and Ely (1978)	Immature
	New Mexico	PR (pers. obs.)	Released
Short-Eared Owl (*Asio flammeus*)	Washington	Fitzner (1975)	
	Washington	Knight et al. (1980)	
	Scotland	Morris (1984)	
Marsh Owl (*A. capensis*)	Zimbabwe	Irwin and Lorber (1984)	
Great Gray Owl (*Strix nebulosa*)	Manitoba	Nero (1974)	Released, later died
Unspecified owls	Netherlands	Jonkers and Smit (1984)	
Unspecified raptors	England	Weir (1971)	
	Netherlands	Jonkers and Smit (1984)	
Sand Martin (*Riparia riparia*)	England	Mead (1979)	
Dipper (*Cinclus cinclus*)	England	Robson (1969)	Juvenile, fence across stream
American Robin (*Turdus migratorius*)	Oregon	Griepentrog (1929)	
Spotless Starling (*Sturnus unicolor*)	Netherlands	Jonkers and Smit (1984)	

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Deception in Canada Geese.—Deception in communication and manipulation of one individual by another are relatively new concepts in animal behavior. This note describes how a Canada Goose used the presence of other unrelated geese to obtain access to food. The observation was incidental to a study of Giant Canada Goose (*Branta canadensis maxima*) vocal and visual communication at the Milwaukee County Zoological Park, Milwaukee, Wisconsin. The zoo has a 0.5-ha lake near which I maintained a winter feeding site for my study geese. This site occasionally was used by geese of other subspecies, presumably migrants. Subspecies present 20 February 1982, when the deception observation occurred, were judged by medium size and light color and small size and very dark breast and back color to be Todd's Canada Goose (*B. c. interior*) and the Cackling Canada Goose (*B. c. minima*), respectively. Both subspecies were easily distinguished from my pinioned Giant Canada Geese.

Canada Goose intraspecific aggression has been described (Collias and Jahn, Auk 76:476–509, 1959; Klopman, Beh. 30:287–319, 1968), as has the normal social structure of the geese in winter (Raveling, J. Wildl. Manage. 33:304–318, 1969). Surviving family members normally remain together throughout the winter and often gain access to food via threats and group aggressive displays. Families are effectively closed, usually not tolerating unrelated geese closer than 2–3 m (Raveling, Beh. 37:291–317, 1970). Larger family groups generally displace smaller ones in gaining access to food. Single young of the year are subordinate to single adults which are subordinate to pairs; pairs with the most young are the most dominant (Raveling 1969). Lone geese, when approaching a group, almost invariably assume submissive postures, the beak just touching the breast feathers (Klopman 1968) and turn away.