the University of Saskatchewan Field Station property of Fairy Island, Emma Lake, Saskatchewan (53°30'N, 105°50'W).

From 94 females banded as adults on the nest between 1973 and 1982, 44 were recaptured on their nests on 93 occasions in subsequent years. Three birds were found dead in their nest boxes, including 786-38111, banded on 15 June 1974, recaptured in 1975, 1978, 1979, 1980, and 1981 and found freshly dead on 5 fresh eggs on 6 June 1982. Another female was shot 2 years after banding. From these data (Table 1), and by using the method described by Chapman and Robson (1960), we estimated a minimum annual survival rate of 57.8% (SD = 3.1). This estimate should be considered preliminary because the data do not meet the requirements outlined by Brownie et al. (1979) and annual banding and recapture efforts were unequal. Also, artificial nest structures were subjected to extensive damage by black bears (*Ursus americanus*) in some years. Nevertheless, our estimate of Common Goldeneye survival does provide additional information for this species. The annual survival rate for Minnesota goldeneyes was 63% (Moyle et al. 1964). The reported survival rates of other sea ducks (Mergini) include 55.3% for adult female Buffleheads (*Bucephala albeola*) banded in British Columbia (Erskine 1971:177) and 63.8% for adult female White-winged Scoters (*Melanitta fusca deglandi*) banded in Saskatchewan (Brown and Houston 1982). Adult survival rates for these 3 sea duck species are higher than for any of the North American dabbling ducks summarized by Bellrose (1980). These data are further evidence that sea ducks, like other species with deferred maturity, tend to have higher survival rates than species that mature at an earlier age.

We wish to thank R. B. Owen for his review of the manuscript.

LITERATURE CITED

BELLROSE, F. C. 1980. Ducks, geese, and swans of North America. Stackpole Books, Harrisburg, Pennsylvania.

BROWN, P. W., AND C. S. HOUSTON. 1982. Longevity and age of maturity of White-winged Scoters. J. Field Ornithol. 53:53–54.

BROWNIE, C., D. R. ANDERSON, K. P. BURNHAM, AND D. S. ROBSON. 1978. Statistical inference from band recovery data—A handbook. U.S. Fish Wildl. Serv. Res. Publ. No. 131.

CHAPMAN, D. G., AND D. S. ROBSON. 1960. The analysis of a catch curve. Biometrics 16: 354–368.

ERSKINE, A. J. 1971. Buffleheads. Can. Wildl. Serv. Manage. Ser. No. 4.

MOYLE, J. B. (ED.), F. B. LEE, R. L. JESSEN, N. J. ORDAL, R. I. BENSON, J. P. LINDMEIER, R. E. FARMES, AND M. M. NELSON. 1964. Ducks and land use in Minnesota. Minn. Dept. Conserv. Tech. Bull. 8.

PALMER, R. S. (ed.). 1976. Handbook of North American birds. Vol. 3. Yale Univ. Press, New Haven, Connecticut.

MAUREEN REVER DUWORS, *Department of Biology, University of Saskatchewan, Saskatoon, Saskatchewan, S7N 0W0;* C. STUART HOUSTON, *863 University Drive, Saskatoon, Saskatchewan S7N 0J8; and* PATRICK W. BROWN, *College of Forest Resources, University of Maine, Orono, Maine 04469.* Received 16 Nov. 1983; accepted 10 May 1984.

Longevity of the American Goldfinch.—Most passerine birds experience high mortality and therefore have short life expectancies (Lack 1954, Dorst 1974). As a result, few individuals of small temperate-zone songbird species, living under natural conditions, are known to reach ages in excess of 7 years (Kennard 1975), but in captivity may live for 15 years or more (Dorst 1974).

As part of a continuing study of the American Goldfinch (*Carduelis tristis*) at Guelph, Ontario (Middleton 1979), the nesting histories of 6 individually color-marked female birds have been recorded for three successive seasons, 2 for 4 successive seasons, and one for 5 successive seasons. These birds were of unknown age when first captured, and were at least 4 and 6 years old, respectively, when last encountered. Thus from our records, we had little reason to believe that free-living American Goldfinches reach ages in excess

TABLE 1. Distribution by age and sex of American Goldfinches recovered 5 or more years after banding. Data from the files of the Bird Banding Laboratory, Patuxent Wildlife Research Center, Laurel, Maryland, 1923–1979.

Years after banding t	Distribution by sex			Total in file Y_t	Estimated by regression $\hat{Y}_t$
	Male	Female	Unknown		
5	24	14	15	53	51.6
6	17	2	8	27	23.7
7	3	2	2	7	10.9
8	2	5	—	7	5.0
9	—	—	—	—	2.3
10	1	—	—	1	1.1
11	—	—	—	—	0.5
Totals	47	23	25	95	

of 6 years, a statistic fitting with that generally accepted for small songbirds (Kennard 1975). By contrast, one captive male American Goldfinch is known to have lived for a minimum of 11 years (Phillips 1968).

In an attempt to establish a reliable figure for survival of American Goldfinches in the Guelph population and those from other parts of North America, we analyzed data in the banding file of the U.S. Fish and Wildlife Service, Laurel, Maryland, through 1979. Data were extracted for all recoveries/recaptures made a minimum of 5 years after banding; we obtained 95 such records (Table 1). The appropriate equation for survival using the existing data is $Y_t = NS^t$ (see Andrewartha and Birch 1954, Schemnitz 1980), where Y is the number recovered, N is the number banded, S the annual survival rate, and t the number of years since banding. By transforming this equation to $\ln Y_t = \ln N + t \ln S$ (C. Faanes, pers. comm.), and performing a regression with Y_t as dependent and t as independent variable, the curve in Fig. 1 was obtained; the values of the estimate Y_t are given in Table 1, and the estimated survival rate S = 0.4591 (for males alone, S = 0.5069 and for males + unknown sex, S = 0.4539; for females, the result was not significant).

Four observations may be made. First, because males have a slightly higher survival than females, one would expect more males to be long-lived than females (Table 1). The disparity between the sexes may be enhanced by a skewed sex ratio favoring males in American Goldfinch populations (1.6/1, n = 6201, pooled data for both winter and summer populations). Second, the survival curve shows a gradual decline towards extinction around the 11th year. Thus adult mortality for the American Goldfinch is steady as predicted for birds by Lack (1954:94) and Ricklefs (1973:450). Third, the data suggest that longevity may vary for different populations. The survival rate of 46% above is higher than the 36% and 28% we have calculated for male and female American Goldfinches in Ontario and the 36% and 30% for each sex in Ohio (Middleton and Webb unpublished) and seems high by passerine standards. However, Bray et al. (1979) obtained a survival rate of 58.5% for adult male Yellow-headed Blackbirds (*Xanthocephalus xanthocephalus*), and previously published survival rates for passerines are probably underestimates (Botkin and Miller 1974). Of the 5 birds in the sample which were either banded (2 in Ontario) or recovered (3 in Nova Scotia, Quebec, and Ontario) in Canada, none was encountered beyond 6 years from banding. Such longevity fits with the data from our color-marked population at Guelph. By contrast, the 95 birds encountered 5 or more years from banding were generally from more southern localities (average latitude 40°41′N, average longitude 76°27′W: central Pennsylvania). These data support the suggestion that birds living in rigorous climates have shorter life spans than those in amenable climates (Welty 1982). Finally, some free-living American Goldfinches do live beyond 7 years, and the potential

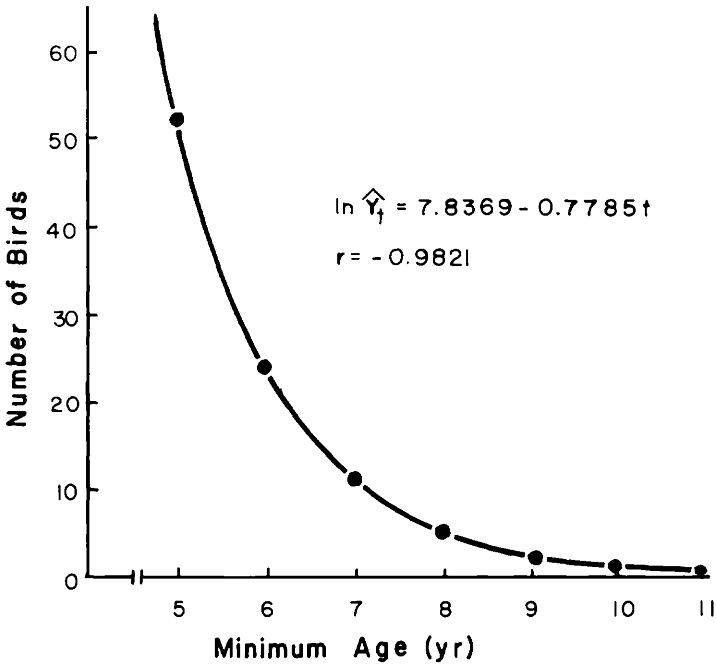

FIGURE 1. Survivorship curve for American Goldfinches known to be older than 5 years.

longevity for the American Goldfinch, as indicated by both banding and captive (Phillips 1968) data, appears to be in the region of 11 years.

We thank the Bird Banding Laboratory for providing us with data on American Goldfinches, and we acknowledge the work of all banders who have made this analysis possible. Ed Bailey, Craig Faanes, and Tom Nudds provided valuable criticisms of early drafts of the paper. The study was financially supported by NSERC grant #A6495 made to A. L. A. Middleton.

LITERATURE CITED

ANDREWARTHA, H. G., AND L. C. BIRCH. 1954. The distribution and abundance of animals. Univ. Chicago Press, Chicago and London.

BOTKIN, D. B., AND R. S. MILLER. 1974. Mortality rates and survival of birds. Am. Nat. 108:181–192.

BRAY, O. E., A. M. GAMMELL, AND D. R. ANDERSON. 1979. Survival of Yellow-headed Blackbirds banded in North Dakota. Bird-Banding 50:252–255.

DORST, J. 1974. The life of birds. Vol. 1. Columbia Univ. Press, New York.

KENNARD, J. H. 1975. Longevity records of North American birds. Bird-Banding 46: 55–73.

LACK, D. 1954. The natural regulation of animal numbers. Clarendon Press, Oxford.

MIDDLETON, A. L. A. 1979. Influence of age and habitat on reproduction by the American Goldfinch. Ecology 60:418–432.

PHILLIPS, R. S. 1968. Goldfinch attains age in excess of 11 years. Auk 85:499.

RICKLEFS, R. E. 1973. Ecology. Chiron Press Inc., Newton, Massachusetts.

SCHEMNITZ, S. D. (ed.). 1980. Wildlife management techniques manual. 4th ed. The Wildlife Society, Washington, D.C.

WELTY, J. C. 1982. The life of birds (3rd ed.). W. B. Saunders Co., Toronto.

ALEX L. A. MIDDLETON, *Department of Zoology, University of Guelph, Guelph, Ontario, N1G 2W1, Canada,* and PHILIP WEBB, *12 High Park Gardens, Toronto, Ontario, M6R 1S9, Canada.*
Received 10 July 1983; accepted 8 May 1984.

Dome Rebuilding by Clapper Rails.—In a typical Clapper Rail (*Rallus longirostris*) nest the eggs are held in a shallow bowl suspended above the ground by a column of marsh grass (*Spartina alterniflora*). A dome is woven from blades of living grass that extends over the nest, thus concealing the eggs. Although some have reported the dome use as camouflage from aerial predators (Johnson, 1973, Observations on the ecology and management of northern Clapper Rail, *Rallus longisostris crepitans* in Nassau County, New York, Ph.D. diss. Cornell Univ., Ithaca, New York) others suggest that it probably aids to contain the eggs within the nest during tidal inundation (Andrews, 1980, Nest-related behavior of the Clapper Rail (*Rallus longirostris*), Ph.D. diss., Rutgers Univ., New Brunswick, New Jersey).

I studied Clapper Rails at Corson's Inlet (near Ocean City, Cape May County, New Jersey) from May to July in 1977 and 1980. To test whether or not these rails would rebuild the dome, and to examine dependence of rebuilding upon nesting stage, I opened the woven dome above the nest cup and folded it back along the outside of the nest platform at each of 15 nests. Experimental manipulation was done at low tide and checked 24 h later for signs of rebuilding. All nests were located along natural creeks with a mean nest distance (creek side vegetation to nest) of 3.5 m (range: 1.8 to 6.0 m). Mean nest height (ground to nest cup rim) was 21.4 cm (range: 10 to 33 cm). All nests had similarly built domes. If 5 or more blades of grass were interwoven, the dome was considered rebuilt. Such manipulations were done during laying (those nests having 1–5 eggs), incubation or late laying (those nests having 8–12 eggs), and late incubation (first day an egg was pipped). Experiments were done on 5 nests for each of the 3 nesting stages.

Chi square analysis (df = 2, $\chi^2 = .50$, $P >. 05$) revealed that the stage of nesting did not influence dome rebuilding more than would be expected by chance. Eighty percent (12 of 15 nests) of the dome-manipulated nests were rebuilt within 24 h (those not rebuilt included; 2 early, and 1 during mid-incubation). Of 3 nests where the domes were not rebuilt, one nest was abandoned with no eggs found in the area of the nest, the second was lost to predation of all eggs by crows, and the third nest proceeded through normal hatching without egg loss and without a dome.—PAUL A. KOSTEN, *1217 New York Avenue, Cape May, New Jersey 08204.* Received 29 Apr. 1983; accepted 18 Apr. 1984.

Attacks on a Human by a Nesting American Kestrel.—Attacks by falconiformes on humans are generally uncommon and usually are in defense of nests or nesting territories (Brown 1976:130). However, it is not at all unusual for accipiters like the Northern Goshawk (*Accipiter gentilis*) and larger falcons such as the Peregrine (*Falco peregrinus*) to strike humans in defense of their nests (Craighead and Craighead 1956, Snyder 1974, Ratcliffe 1980:229). In this note I report attacks on a human intruder by a nesting female American Kestrel (*Falco sparverius*).

On 21 May 1982, I was checking a kestrel nest in Boone County, Missouri. The nest was 5 m high in a hollow beam at the end of a tool shed and contained 6 nestlings ranging in age from 2 days to 1 week. Initially both adult kestrels soared and hovered 10–20 m above while vocalizing incessantly. Suddenly the female stooped on me in a series of 12 successive dives, missing my head by centimeters. The last stoop culminated in the kestrel raking my scalp with her talons.

Her attacks occurred again on 27 May when I was struck 8 times, on 2 June when I banded the 6 nestlings and was struck 4 times, and on 14 June when I collected pellets from the nest. The intensity of her aggression was less during this last visit and I was struck only once.

In 1983, this female kestrel repeated her aggressive nest defense, striking me 13