How Long do Birds Live?

by Stanley A. Temple

By some popular accounts, birds live for a relatively long time. One often hears reference to spectacular records, such as captive parrots that survived through several generations of a human family or seabirds that lived so long that the metal bands placed on their legs actually wore out and dropped off. But, in the real world, these exceptional cases are clearly not the rule. Most birds do not live to spectacularly old ages, but the question remains: Just how long do different birds actually live? In this essay, I shall review what we know about longevity in birds and explain how ornithologists go about studying this aspect of avian life history.

We actually have very little information on the life spans of individual birds that have been known from birth to death, except those birds kept in captivity. These captive individuals have produced most of the longevity records for birds, and their long lives should come as no surprise. Protected from predators, harsh weather, food shortages, diseases and parasites, accidents, and other hazards, these pampered individuals have set the standards of avian longevity. For example, a Siberian Crane, named "Wolf," that was held at the International Crane Foundation in Baraboo, Wisconsin, lived to be at least 83 years old; he was no doubt actually several years older because he was apparently taken into captivity as an adult. My falconry trained Red-tailed Hawk, named "Argus," lived for 28 years, establishing the longevity record for his species. But even in the protected captive environment, there are no authenticated records of individual birds living a century, despite the popular allegations of centenarian parrots.

Birds in the wild, of course, face many hazards that end their lives far sooner than in captivity. In addition, very few wild birds are known and tracked as individuals from birth to death. Even in the age of sophisticated electronic techniques, such as radiotelemetry, ornithologists are rarely able to remain in contact with individual wild birds for more than a few months at a time. So, how do ornithologists study longevity in wild birds?

The most useful approach has been to estimate the annual survival rates of

birds and then project the potential lifespan that could be achieved by a bird in a population with that annual survival rate (Botkin and Miller 1974). Survival rates are measured as a percentage, and they indicate the proportion of individuals alive at the start of a year that are still alive 12 months later. An annual survival rate of 50% would, for example, imply that over the course of a year half of the birds in the population would survive (or conversely half would die).

Ornithologists determine survival rates in bird populations in several ways, most of which involve banding or in other ways marking birds so they are recognizable as individuals. One approach is to band or mark a large number of individuals in a concentrated local population, such as a seabird colony, in one year and return a year later to census the banded individuals. There will be fewer marked birds, and the proportion remaining will equal the annual survival rate, assuming that no birds left the area and all the missing birds, in fact, died. This is a fairly specialized approach that is generally carried out by ornithologists working on a specific local population. Only a few species have had their survival rates estimated by this method.

Another approach is to record the time from banding or marking until death of many individual birds banded or marked over many years. If a large enough number of birds are banded, various individuals will be found dead and reported at different times thereafter. A profile of the time from banding to death in the population will result, and it is possible to calculate the annual rate of survival from these observations. This is the approach that is used by the Bird Banding Laboratory of the U.S. Fish and Wildlife Service (Brownie et al. 1978), and it is this type of analysis that relies heavily on volunteers to report the date on which they found a dead banded bird. Joe Hickey's classic work on "Survival Studies of Banded Birds" (Hickey 1952) relied on this type of information to calculate survival rates.

Another technique that uses marked individuals has become popular since the advent of radiotelemetry, which allows ornithologists to know exactly when a bird carrying a miniature radio transmitter dies. After a number of birds have been fitted with radios and released, they will survive for differing lengths of time. The number of deaths over the cumulative amount of time radios were worn by all individuals can be used as a measure of survival. This is the approach, for example, that Temple and Wallace (1989) used to calculate the survival rates of Andean Condors in Peru. They radiotracked 33 adults condors over a cumulative period of 367 condor-months and recorded 2 deaths. This rate of deaths indicated that adult Andean Condors had annual survival rates of 94%, among the highest rates ever recorded for wild birds.

Similarly, Brittingham and Temple (1988) color-banded Black-capped Chickadees and recorded the time from banding until the last sighting of banded individuals visiting the bird feeders at Devil's Lake State Park and several other nearby locations. They found that the annual survival rate of chickadees that visited birdfeeders was 48%.

A final, less accurate and, hence, infrequently used technique for calculating survival rates involves the examination of age ratios in samples

of birds that were all killed over a brief period of time. The proportion of the birds in the sample that are adults (more than a year old) turns out to be equal to the annual survival rate for adults (if assumptions about the sample of dead birds being typical of the entire population are met). Records of mass bird kills at television towers, like those studied by Charles Kemper in Eau Claire, or examination of game birds taken by hunters during a brief hunting season (Hickey 1955) have been used this way.

These and other methods for estimating survival rates do not directly tell us about the average or maximum lifespan for a species. But they can be used to predict what the longevity for a particular species is likely to be. The average longevity in a population is simply the inverse of the average mortality rate. If a population has an annual survival rate of 60%, the mortality rate is 40%, and the average lifespan is 2.5 years (i.e., 1/0.40).

Maximum longevity is predicted in a different way. Assume that you start with a population of 1,000 birds, all born at the same time. When would the last member of this group die? If we again used a population of birds that has an average survival rate of 60%, the population in each successive year would be 60% of the size in the previous year. After one year, 600 of the 1,000 would be alive (i.e., 1,000 × 0.6), after two years 360, (i.e., 600 x 0.6), and so on. After 13 years only one bird would remain, so the predicted maximum longevity for a bird with an annual survival rate of 60% is 13 years.

There is clearly a big difference between the average lifespan of 2.5 years and the maximum lifespan of 13 years in this hypothetical bird population. The major conclusion is that few birds live to a great age; most die young.

To conclude on a personal note, in 1982 Margaret Brittingham and I banded 162 Black-capped Chickadees at the bird feeder at my house. We calculated that the average annual survival rate for those birds was 48%. Their average lifespan was, therefore, just under 2 years, and the projected maximum longevity was 9 years. In 1990, 2 chickadees banded in 1982 were still alive, but time is clearly running out for them. The last survivor of the class of 1982 should disappear this winter. In contrast, it is possible that one of the Andean Condors Mike Wallace and I marked in Peru may still be alive in the year 2050!

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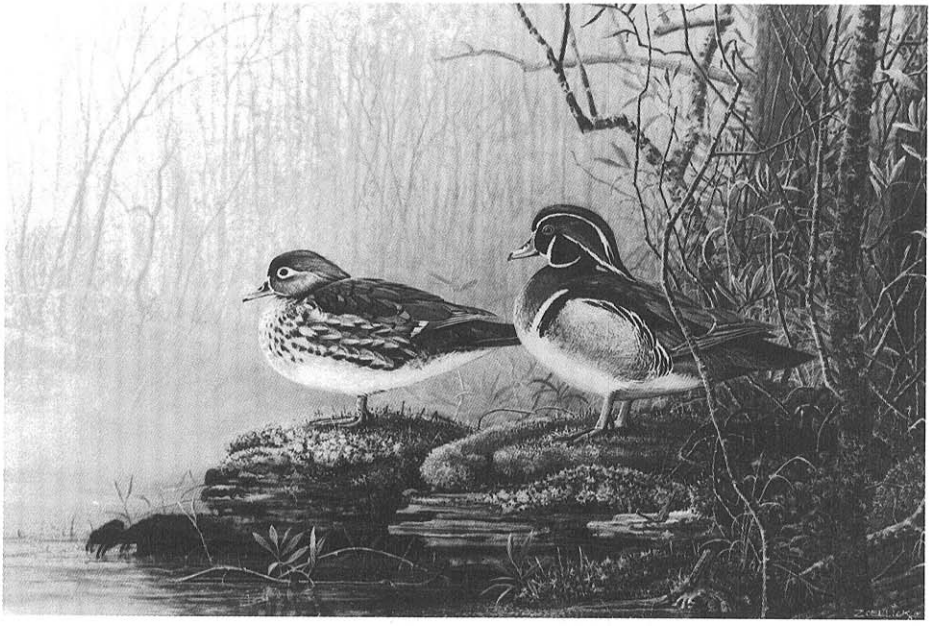

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