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Source: Journal of Raptor Research, 43(4) : 261-262
Published By: Raptor Research Foundation
URL: https://doi.org/10.3356/0892-1016-43.4.261

THE JOURNAL OF RAPTOR RESEARCH

A QUARTERLY PUBLICATION OF THE RAPTOR RESEARCH FOUNDATION, INC.

VOL. 43 DECEMBER 2009 NO. 4

J. Raptor Res. 43(4):261–262

THE AMERICAN KESTREL: FROM COMMON TO SCARCE?

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Peruse any popular book or booklet on North American birds of prey and you are apt to read the words ''widespread and numerous'' or ''most common'' in the introductory description of the American Kestrel (*Falco sparverius*). In his excellent reference book published in 1982, *The Falcons of the World*, Tom Cade made some calculations based on breeding densities to arrive at an estimate of more than 1.2 million pairs of kestrels breeding in North America. Now, 27 yr later, it would be interesting to know whether such an estimate would still be accurate.

In 2004 at the Raptor Research Foundation meeting in Bakersfield, I and a host of kestrel researchers presented a joint paper entitled ''Are American Kestrel Populations in a State of Decline in North America?'' This led to a number of reports received from other colleagues in North America who operated long-term nest-box programs for kestrels, several from the northeastern part of the continent. They had noticed disturbing declines in the numbers of nest boxes occupied by kestrel pairs. These observations matched my own in Montreal. Having offered a stable number of nest boxes to kestrels over the decades, my students and I have observed a significant decline in their use in recent years, i.e., from about 15 to 20 pairs down to 5 or 6 in the last two years. Interestingly, it was not the productivity that seemed to be suffering, but rather the number of breeding pairs.

On September 13, 2007, as part of a joint meeting of the Raptor Research Foundation and the Hawk Migration Association of North America held in Fogelsville, Pennsylvania, I officially opened a two-day symposium titled ''Are American Kestrels (*Falco sparverius*) in Decline?'' Having published over one hundred peer-reviewed papers on this tiny falcon and having bred in captivity somewhere between 2500 and 3000 American Kestrels over a period of almost four decades, I informed the packed room that ''Never in my lifetime would I have believed that I would even be asking such a question.''

The symposium essentially served to confirm our worst fears. In at least some regions in North America, the American Kestrel was becoming less common. In her 17-year study of kestrels in nest boxes in Massachusetts, Joanne Mason observed a significant decrease in occupancy from 2000 to 2007. Joshua Rusbuldt and his colleagues in eastern Pennsylvania noted that their nest-box use was down to a quarter of what once was. John Smallwood reported that his nest-box occupancy rate was down from a high of 59 pairs in 2002 to a low of 26 pairs in 2005, an annual decline of almost 25%!

Some presenters took a broader approach. Chris Farmer of Hawk Mountain Sanctuary teamed up with Jeff Smith of HawkWatch International to analyze migration counts of American Kestrels at 20 autumn hawkwatch sites thoughout North America from 1974 to 2004. In general, they concluded that ''Kestrel populations have undergone a long-term decline in northeastern North America and more recent declines in the midwestern and western regions of the continent'' (see this issue). Data collected by John Smallwood from eight kestrel nest-box programs from southern and eastern states, Saskatchewan and the Yukon, as well as Breeding Bird Surveys, suggest that North American populations of the American Kestrel have declined significantly from 1984 to 2007 (see this issue).

Not all kestrel populations seemed similarly afflicted. Karen Steenhof and her colleagues with the U.S. Geological Survey monitored kestrel nest boxes from 1986 to 2006 in southwestern Idaho (see this issue) and found an increasing occupancy rate over the 21-

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year period, along with a very healthy productivity and overall nesting success. Don and Carol McCartney of central Oregon informed me recently that half of their 95 nest boxes have been occupied in steady fashion over the last several years. It has long been known that American Kestrels thrive in our cities and towns and this is no better reflected than in the healthy population of at least 40 pairs in New York City monitored by Robert DeCandido and his colleagues.

That American Kestrels have definitely undergone a decline in some regions of North America seems hard to dispute. However, this raises two questions. First, will the slide in kestrel numbers continue to the point of endangerment or is it just a blip in history? Second, what is the cause of the decline?

I recalled a similar alarm being raised at a past Raptor Research Foundation meeting about decreasing counts of Sharp-shinned Hawks (*Accipiter striatus*) at migration lookouts in the northeast; today I do not hear any concerns raised about their populations. Migratory short-stopping by northern breeders has been suggested as the cause of the decline in sightings at lookouts (Viverette et al. 1996). Ironically, during the kestrel symposium, Allen Fish of the Golden Gate Observatory did report a decline in kestrel numbers in California but suggested a similar short-stopping scenario, based on detected increases in Oregon and Washington populations to the north.

There is no shortage of other interesting hypotheses for the cause of the decline, by no means mutually exclusive. Predation pressure from documented increases in Cooper's Hawks (*A. cooperii*) has played a role in local kestrel populations in Pennsylvania (Farmer et al. 2006). Several studies have indicated that wild kestrels can succumb to West Nile virus infections (see this issue). Certainly, competition with introduced cavity-nesters like European Starlings (*Sturnus vulgaris*) can play a role in keeping kestrels from using nest-boxes; doctoral student Lina Bardo has discarded as many as 80 starling eggs per day from our boxes. Like many birds of prey at the top of the food chain, American Kestrels are highly susceptible to the insidious effects of poisonous chemicals ranging from pesticides like DDT, industrial by-products like PCBs, and heavy metals like selenium (see this issue). Recent studies using captive kestrels have demonstrated significant effects of brominated flame-retardant chemicals on endocrine systems and reproductive performance (Fernie et al. 2008, 2009). Whether these chemicals are having an impact on wild kestrel populations is not yet known. While not likely a major cause of the population decline, the high frequency of strikes by aircraft at airports, i.e., American Kestrels represented 33.7% of 4545 reported raptor strikes in the U.S. (Dolbeer and Wright 2008) is cause for concern (see this issue). It is too early to speculate about the impact of widespread changes in habitats and/or invertebrate prey availability due to global warming or some other phenomenon, but research on these topics would be most useful. And what should be made of the finding presented at the symposium by Lawrence Fisher of Newtown, Connecticut, that showed that the average weight for 787 kestrels captured in spring migration in his state declined over a 20-year period?

This special issue of *The Journal of Raptor Research* focusing on the American Kestrel is most timely. We hope that it will serve to spark not only a lively debate on the future of this amazing little falcon, but to stimulate a plethora of research activities that will ascertain beyond any doubt whether the species is declining, the causes behind it, and most important, what we can do about it. One thing is for certain—American Kestrels can be easily bred in captivity for release programs. Let us hope that it does not come to that.

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