

THE STATUS OF BREEDING KESTRELS IN DELAWARE

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Abstract

The Delaware Breeding Bird Atlas and Audubon Christmas Count Data suggest declines in American kestrel (*Falco sparverius*) population from historic highs. The Delmarva Ornithological Society(DOS) conducted a preliminary kestrel survey in 2006 and a formal breeding survey from May to July 2007 to confirm kestrel status and to develop strategies for kestrel restoration. We used volunteer surveyors on the ground and web data contributed by DOS members to locate and describe kestrels sighted and to confirm breeding. Using GIS and land use categories, we compared the habitat of kestrel locations in winter and during the breeding season. We located only two kestrel nests, a sharp decrease from the high numbers of the 1980s. Kestrel numbers have dramatically decreased in the past twenty years and the reasons are not clear. However, changing land use and agricultural practices decrease prime kestrel habitats. Additionally, increasing woodlands favor Cooper's hawks (*Accipiter cooperii*) which have been found to prey on kestrels. DOS will continue the kestrel study through the upcoming Breeding Bird Atlas.

Keywords: American kestrel, *Falco sparverius*, decline, citizen science, survey, Delaware

The Delmarva Ornithological Society (DOS) is a volunteer membership organization founded in 1963, with a current roster of ca. 300 people. Historically, most activities occur within the State of Delaware. Due to its size and diversity, Delaware is good for ornithological research and good for birding, and DOS has a history of citizen science. Located in the mid-Atlantic, Delaware is small, about 90 miles in length, and has only three counties; New Castle, Kent, and Sussex. It has both piedmont and coastal plain, inland areas, the Delaware Bay, and Atlantic Ocean coastline. It is on a migratory flyway and has a temperate climate.

In June of 2005, DOS embarked on a study of the American kestrel (*Falco sparverius*) through a bequest to underwrite "restoration of the Sparrowhawk to the State of Delaware" (David Cutler, pers. comm.). Anticipating receiving funds in several years, DOS began to study the current status of *Falco sparverius*. If we determined the present population and breeding distribution, we could develop a strategy for kestrel restoration.

The American kestrel has a healthy history in Delaware. When *The Birds of Delaware* (Hess, et al 2000) was published, the kestrel appeared to be in decline, but the overall population was still robust, based on breeding records from 1983-94. In addition, the 1983-87 Breeding Bird Atlas (BBA) reported kestrels in 153 blocks out of 222 blocks surveyed. Allowing for missed observations and multiple kestrel pairs per block, the estimated state population size was 200 – 500 pairs, although the species had significant declines through 1991 (Hess et. al. 2000). Other studies also show a declining trend in kestrel populations. Audubon Christmas Bird Count (CBC) data from Delaware and the region show a steady decrease since the 1990s (see Figure 1). The Delaware Spring round up, a migration survey conducted since 1963 reflects the declining trend, with low counts since 1988 and very low numbers since 2000 (see Figure 2)(Janowski, pers.comm.).

METHODS

The DOS kestrel committee surveyed other States for kestrel research and restoration activities in 2006 and early 2007. Through the local listserv, DE-Birds, all DOS members and other local birders were encouraged to record any kestrel sightings to

the DOS website. Sighting data were augmented by rural residents visiting the DOS booth at the Delaware State Fair in July 06. A brochure soliciting input from interested parties was distributed, and the committee located all existing kestrel nesting boxes in the State, noted which were monitored, and recorded any breeding success.

Using the sightings between Summer 06 and Spring 07 as the pilot study, the DOS kestrel committee created a formal protocol based on a Texas research study (Schaefer and Rudolf, 2005). The 2007 breeding kestrel survey included survey volunteers following protocol as well as observations from all regional birders entering observations on our website. The original webpage was upgraded with a more detailed interactive webpage incorporating Google Earth and GIS coordinates to locate sightings and record specifics of kestrel activity. (http://www.dosbirds.org/kestrel/submit_sighting.php)

The state was divided into quads and then into 222 survey blocks. 55 Kestrel Volunteer Surveyors (KVS) were assigned to 184 blocks and given the protocol. KVS surveyed their blocks twice a month between May 1 and July 31, the determined safe

dates. They recorded the sex, habitat, and behavior of any kestrel seen, and any courtship or breeding activity was noted.

To determine the type of land used by kestrels in Delaware, we overlaid both winter and summer sightings with land use maps. Land use categories represented a simplified version of the 2002 vector land use commissioned by the State of Delaware. The categories were: Developed – High Intensity, Developed – Low Intensity, Agriculture, Forest, Wetlands, Water, Barren/Transitional (Homsey, pers. comm.).

RESULTS

In the mid-1990s, the DOS research committee placed four kestrel boxes on the back of highway signs along SR1, a new intrastate highway. One of these was successful, but over the decade of their use, a number were lost and others used by other birds (Lantz, pers. comm.). Other nest box placements throughout the State were minimal, with all located in New Castle County. Of these, only the boxes at Burrows Run Preserve were monitored regularly by the Delaware Nature Center, where no activity had been reported for about 5 years (White, pers.com.).

In the 2007 survey, KVS drove a total of 8835 miles and spent 597.08 hours in the field. A total of 33 kestrel sightings were documented. In addition 37 kestrel sighting reports were made to the website. The web sightings represented single birds, pairs, or multiple sightings of the same bird over a season. Kestrels were reported in all three Delaware counties and reported in 31 of the 184 grid blocks surveyed.

Only two confirmed nest locations were identified. One was in a nest box at Burrows Run Preserve, located in Northern Delaware in the piedmont. Three chicks were photographed in their nest box on 12 June. A second nest was discovered at the Dover Air Force Base with parents seen carrying food in the second week of June. Two kestrel family groups were documented in Sussex County, also in June. When the kestrel sighting reports were mapped, twelve sightings clusters were noted along with 8 single sighting reports; 7 in New Castle County, 3 in Kent County, and 2 in Sussex County. In the three month period of the survey 16 sightings were in May, 26 in June, and 18 in July.

We determined that the land use profiles for summer and winter sightings were nearly identical, with two thirds of all sightings on agricultural land. Even though sightings were often

in agricultural land, not all agricultural land had kestrels. There was a total absence of kestrel sighting reports from central and Northeastern Sussex County during the breeding season, yet those geographic regions had a strong winter presence of American kestrels.

DISCUSSION

The survey confirmed what had been suggested in the CBC and the Spring Round Up data. The number of breeding kestrels has declined precipitously; from 200 – 500 pairs in the 1980's to 2 confirmed nests in 2007. The reason for their demise is not clear.

Hawk Mountain research confirms predation from Cooper's hawks (*Accipiter cooperii*), which have increased in population in the last 20 years (Farmer, et. al. 2006). (Figure 3) However, predation may only be part of the answer. Cooper's hawks prefer woodlands and are adapted for maneuverability in dense cover (Curtis, et.al.2006). American kestrels inhabit open areas covered by short ground vegetation, hunting mainly from perches (Smallwood, et.al, 2002). Historic kestrel habitat in Delaware included pastures, orchards, or fallow fields, all with hedgerows. Many acres of agricultural land have been lost to

development, and in other locales agricultural practices conducive to kestrels have converted to wheat and soy production. Today, there are fewer snags as landowners cut down dead trees, removing both perches and potential cavities for nesting. In addition, developments that are now decades old and abandoned farm fields have increased woodlands; not conducive to kestrels but good habitat for Cooper's Hawks. Changing habitat as well as predation may be significant in the kestrel's decline.

Habitat loss on kestrel migration routes or toxicity, both factors that we are not able to study or quantify, may also contribute to their demise. Little is known regarding the historic population of kestrels in Delaware. Before the days of European settlement and agricultural development, when forests were the predominant land cover and there were monetary bounties for Cooper's hawks, how many American kestrels roamed our fields? It is possible that the high number of kestrels in the mid twentieth century is a historical anomaly? (Bildstein, pers.comm.)

Where does the kestrel working group go from here? With the Delaware BBA beginning in 2008, breeding kestrel data will be collected and reported as part of that effort. The breeding

survey of 2007 along with future BBA data will provide a clear picture of the present kestrel population in Delaware. Regional data may be gleaned from Maryland's just finished BBA and Pennsylvania's current efforts. Further data, including migratory pathways, winter habitat of Delaware's breeding birds, and evidence of toxicity are unavailable with our present methods.

Strategies for kestrel restoration need to be based on more confident reasons for their decline. In addition, we need to confirm preferences for winter residents and breeding kestrels. In the short term, more nest boxes will be put up in accordance with preferential location, direction, and habitat. Long term restoration may require improved open field habitat, hedgerows, and less removal of snags throughout Delaware. The kestrel working group will continue to monitor and assess the kestrel population in Delaware.

Figure 1. The decline of the American kestrel in Delaware from 1970 - 2007. (Audubon Christmas Bird Count(CBC))

Figure 2. The decline of the American kestrel in Delaware from 1969 - 2006 during migration (Janowski, Delaware Spring Round up, pers. comm.)

Figure 3. The rise in Cooper's hawk population in Delaware from 1970 - 2007. (Audubon CBC)

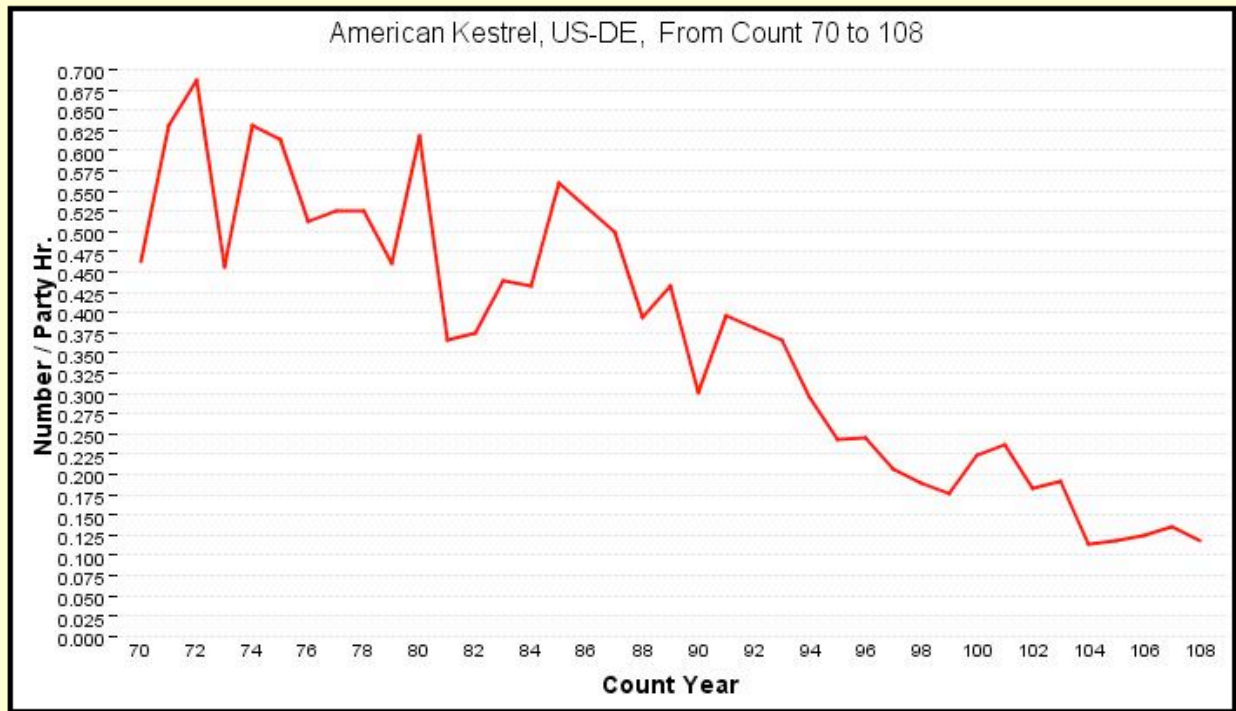


Figure 1.

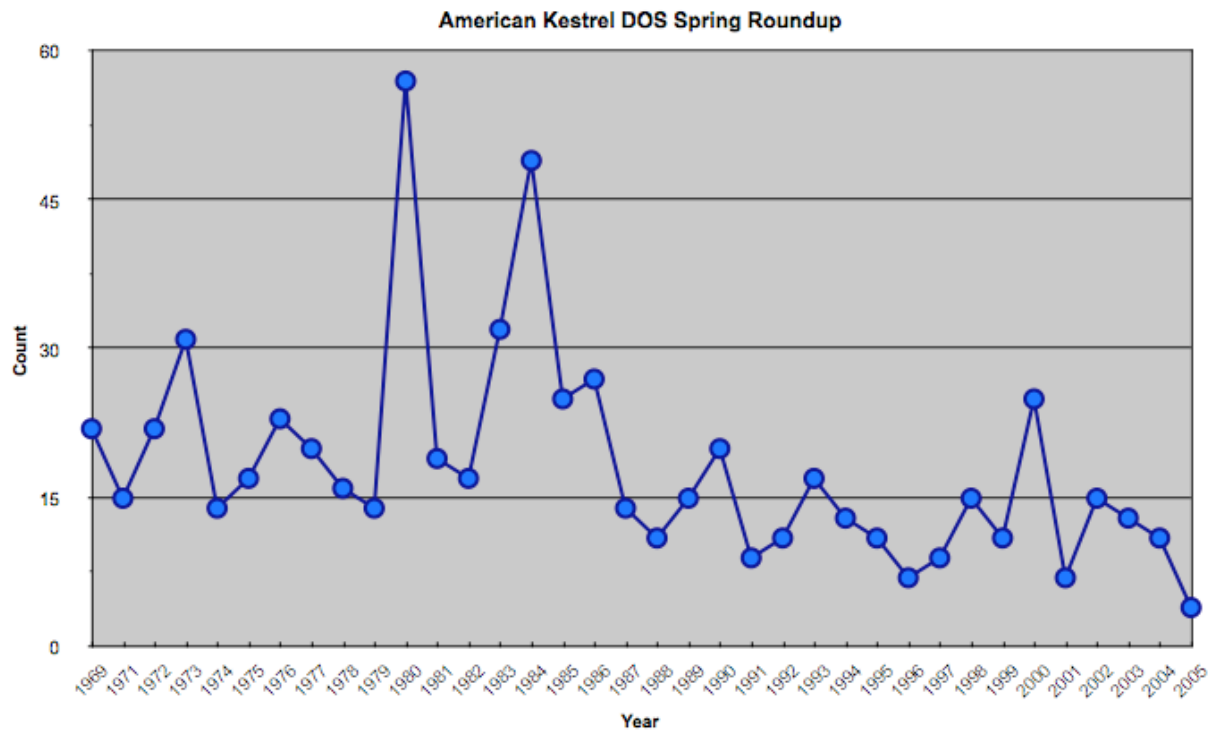


Figure 2.

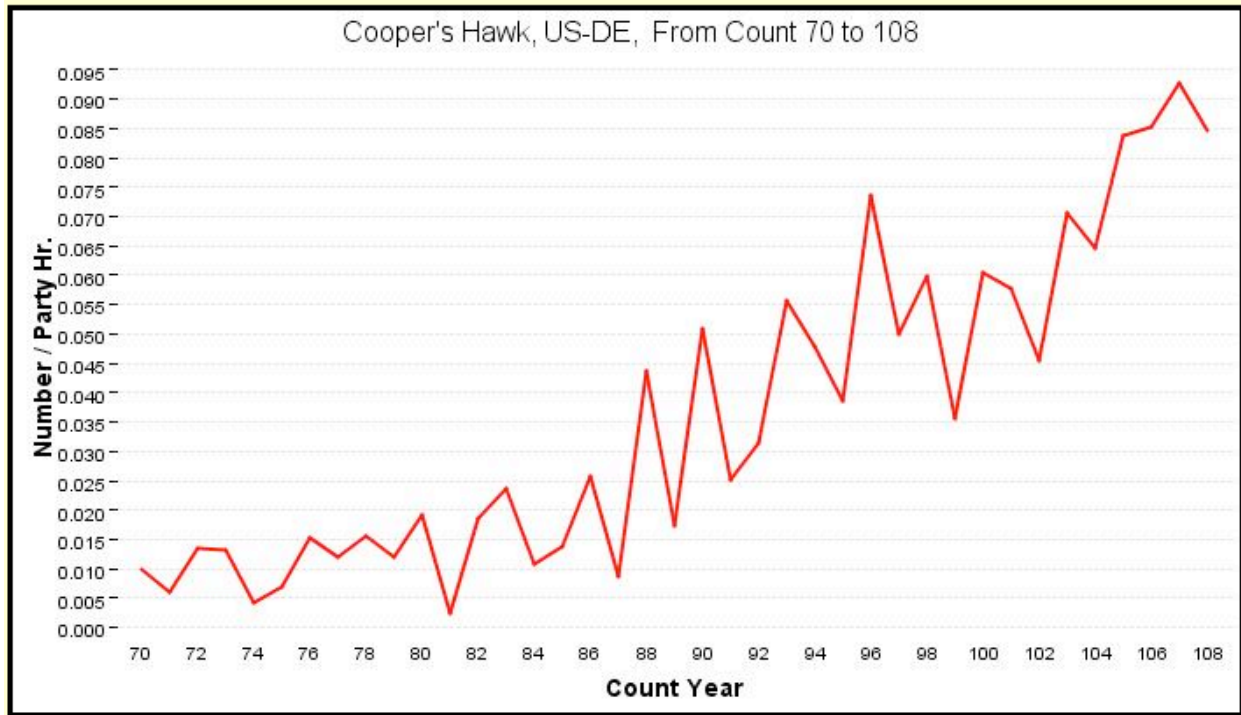


Figure 3.

Acknowledgements:

Keith Bildstein, Phd., Sarkis Acopian Director of Conservation Science, Hawk Mountain Sanctuary, personal communications; Anthony Gonzon, Project Coordinator of Delaware Breeding Bird Atlas, assistance in contributions to this paper; Andrew Homsey, webmaster of DOS; John Janowski, compiler of Spring Round-up; Bruce Lantz, chair of DOS research committee; Jim White, compiler of Delaware Christmas Counts and Associate Director of Delaware Nature Society

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