Southeastern American Kestrel Biological Status Review Report

March 31, 2011

FLORIDA FISH AND WILDLIFE CONSERVATION COMMISSION
620 South Meridian Street
Tallahassee, Florida 32399-1600

Biological Status Review
for the
Southeastern American Kestrel
(*Falco sparverius paulus*)
March 31, 2011

EXECUTIVE SUMMARY

The Florida Fish and Wildlife Conservation Commission (FWC) directed staff to evaluate all species listed as Threatened or Species of Special Concern as of November 8, 2010 that had not undergone a status review in the past decade. Public information on the status of the southeastern American kestrel was sought from September 17, 2010 to November 1, 2010. A three member Southeastern American Kestrel Biological Review Group (BRG) met on November 9th, 2010. Group members were Karl E. Miller (FWC lead), James Cox (Tall Timbers Research Station), and Nathan A. Klaus (Georgia Department of Natural Resources) (Appendix 1). In accordance with rule 68A-27.0012, Florida Administrative Code (F.A.C.), the BRG was charged with evaluating the biological status of the southeastern American kestrel using criteria included in definitions in 68A-27.001, F.A.C., and following the protocols in the *Guidelines for Application of the IUCN Red List Criteria at Regional Levels Version 3.0* and *Guidelines for Using the IUCN Red List Categories and Criteria (2004)*. Please visit http://myfwc.com/wildlifehabitats/imperiled/listing-action-petitions/ to view the listing process rule and the criteria found in the definitions.

In late 2010, staff developed the initial draft of this report which included BRG findings and a preliminary listing recommendation from staff. The draft was sent out for peer review and the reviewers' input has been incorporated to create this final report. The draft report, peer reviews, and information received from the public are available as supplemental materials at http://myfwc.com/wildlifehabitats/imperiled/biological-status/.

The BRG concluded in their biological assessment that the southeastern American kestrel met listing criteria. Based on a literature review and the BRG findings, FWC staff recommends listing the southeastern American kestrel as a Threatened species.

This work was supported by a Conserve Wildlife Tag grant from the Wildlife Foundation of Florida. FWC staff gratefully acknowledges the assistance of the biological review group members and peer reviewers. Staff would also like to thank Michelle Van Deventer, who served as a data compiler for the species and drafted part of an earlier version of this report.

BIOLOGICAL INFORMATION

Life History References – Bohall-Wood and Collopy (1986), Hoffman and Collopy (1988), Collopy (1996), Miller and Smallwood (1997), Smallwood and Smallwood (1998), Snyder (2001), Smallwood and Bird (2002), Florida Fish and Wildlife Conservation Commission (2003), Blanc and Walters (2007), Miller and Smallwood (2009), Smallwood and Collopy (2009), Parrish and Schneider (2010).

Taxonomic Classification – Two subspecies of American kestrel (*Falco sparverius*) occur in Florida: the nominate subspecies (*F. s. sparverius*), which occurs in Florida only as a migrant and winter resident; and the southeastern American kestrel (*F. s. paulus*), which is a non-migratory year-round resident in the state. The southeastern American kestrel is the only subspecies of kestrel that breeds in Florida.

Geographic Range and Distribution – American kestrels occur throughout most of the United States, with preferred habitat consisting of open fields, grasslands, savannahs, or other habitats that contain widely scattered trees or similar perches. The southeastern American kestrel (*F. s. paulus*) is a non-migratory subspecies closely tied to sandhills in the southeastern U.S. (Collopy 1996, Smallwood and Bird 2002, Florida Fish and Wildlife Conservation Commission 2005). Consequently, it has undergone a marked range contraction and population decline in recent decades. Once widely distributed throughout 7 southeastern states, the subspecies today occurs primarily in Florida and is patchily distributed elsewhere in the coastal plain of South Carolina, Georgia, and Louisiana. Within Florida, the southeastern American kestrel was once distributed as far south as Dade County (Holt and Sutton 1926) but now breeds no farther south than Highlands and Lee counties (Robertson and Woolfenden 1992, Florida Fish and Wildlife Conservation Commission 2003).

Southeastern American kestrels are slightly smaller than their northern counterparts (Layne and Smith 1992, Smallwood and Bird 2002) but cannot be reliably distinguished visually in the field. If a kestrel is seen in Florida from May through July, it is almost certainly a southeastern American kestrel because the northern subspecies is not present during this time.

Population Status and Trend – American kestrels throughout the eastern U.S. have been experiencing significant population declines since the mid-1980s (Bednarz et al. 1990, Bird 2009, Farmer and Smith 2009, Smallwood et al. 2009, Hinnebusch et al. 2010).

The southeastern American kestrel has experienced the greatest population declines. Estimates of population decline for *F. s. paulus* during the last half century range from 82% in north central Florida (Hoffman and Collopy 1988) to 95% for the Floridian physiographic region (Sauer et al. 2007).

Evidence points to substantial ongoing population declines for southeastern American kestrels in Florida within the past decade. During 1998-2007, nest box occupancy rates in a long-term study site in Levy and Marion counties (one of the two largest subpopulations in Florida) declined steadily from 68% to 33%, a decline of >51% (Smallwood et al. 2009). Nest box occupancy rates have been shown to track kestrel population size and trend in Florida and elsewhere (e.g., Smallwood and Collopy 2009, Smallwood et al. 2009). Conclusive data for kestrels elsewhere in Florida during the same timeframe are unavailable. For example, Breeding Bird Survey data for kestrels in Florida are considered "data deficient" (Sauer et al. 2007) within this narrow timeframe because of low sample sizes and annual variability. However, the quantity and quality of kestrel habitat throughout the state are declining (Kautz et al. 2007; K. Miller, *personal observation*) and expected to continue to decline. In addition, recent bird surveys in upland pine forests throughout Florida demonstrate that most sandhills on public lands are unsuitable for southeastern American kestrels (J. Rodgers, *unpublished data*; K. Miller, *unpublished data*).

The southeastern American kestrel is considered a Species of Greatest Conservation Need (SGCN) by the Florida Fish and Wildlife Conservation Commission (2005) and is one of only 3 sandhill SGCN that has both "Low" status and "Declining" trend.

Cox et al. (1994) created a comprehensive habitat distribution map for the southeastern American kestrel using occurrence records from the Florida Natural Areas Inventory and from Florida's Breeding Bird Atlas (Florida Fish and Wildlife Conservation Commission 2003). This habitat model estimated that conservation lands in the state could support three insecure breeding populations (each 50 – 200 individuals) and approximately 52 imperiled breeding populations (each <50 individuals). This yields an approximate total of 3,000 individuals. However, Cox et al. (1994) noted that they could not assess the suitability of ground cover using the FWC land-cover map and many of those areas actually may have been unsuitable for kestrels. Based on Breeding Bird Atlas records (Florida Fish and Wildlife Conservation Commission 2003), recent FWC statewide surveys in sandhills (J. Rodgers, *unpublished data*; K. Miller, *unpublished data*), and data on estimated kestrel territory size (Stys 1993), the statewide kestrel population was recently estimated at 1,350-1,500 breeding pairs (J. Cox and K. Miller, *unpublished data*).

An FWC-coordinated nest-box monitoring program in north central Florida was established during 2008, but kestrels have been slow to colonize and occupy new sites. Similarly, in Georgia, biologists have found kestrel populations are too small and too widely fragmented to rapidly expand into areas with new nest boxes (Breen and Parrish 1997; N. Klaus, *personal communication*; J. Parrish, *personal communication*).

Quantitative Analyses – We are not aware of a population viability analysis using demographic data for the southeastern American kestrel in Florida.

BIOLOGICAL STATUS ASSESSMENT

Threats – Population declines of southeastern American kestrels in Florida have been largely attributed to clearing of older pine forests and conversion of sandhill and other upland habitats for agriculture and urban development. Kestrels are secondary cavity nesters, and suitable nest sites can be a limiting factor for kestrel populations (e.g., Smallwood and Collopy 2009). Nest-site limitation occurs from the removal of longleaf pine snags (Hoffman and Collopy 1988, Gault et al. 2004) and from declines in the populations of woodpeckers that excavate most of the cavities subsequently used by kestrels, especially the northern flicker (*Colaptes auratus*) and red-cockaded woodpecker (*Picoides borealis*) (Gault et al. 2004, Blanc and Walters 2007). Nest-site competition with non-native species, particularly the European starling (*Sturnus vulgaris*), is a potential threat to southeastern American kestrels, although kestrels have been observed displacing starlings from nest sites (Parrish 2000, Bird 2009).

Nest boxes can provide suitable nesting habitat for kestrels. In many areas, southeastern American kestrels are partially dependent on these or other (Maney and Parrish 2007, Beasley and Parrish 2009) such artificial structures, and it is vital that they be retained. However, nest boxes placed along interstate highways may be avoided (N. Klaus, *personal communication*).

More research is needed in Florida on the impact of roadways on kestrel productivity and survival.

Habitat loss and fire suppression are the primary threats to kestrel foraging habitat in Florida. Inadequate resources for prescribed burning and the tendency of many land managers to prefer low-intensity cool-season burning (Cox and Widener 2008) are ongoing threats to kestrel populations.

In addition to a lack of natural nesting sites and loss of suitable foraging habitat, environmental contaminants pose a threat to the species. American kestrels, like other raptors, are vulnerable to pesticides and chemical pollutants such as DDT, PCBs, and heavy metals. Recent studies have shown the species to be sensitive to endocrine disruptors, with exposure to flame retardants resulting in thinner eggshells and lower productivity (Fernie et al. 2009). Other potential threats to American kestrel populations are the spread of West Nile Virus, increased predation pressure, and collisions with aircraft, vehicles or stationary objects (Deem et al. 1998, Smallwood and Bird 2002, Bird 2009).

Population Assessment – Please refer to the Biological Status Review Information Findings Table for the findings of the BRG. The southeastern American kestrel met 2 listing criteria, including Geographic Range (B) and Population Size and Trend (C).

Regional Assessment of Subpopulations – Please refer to the Biological Status Review Information Findings table for the regional assessment of the BRG. There was no change from the initial finding.

Southeastern American kestrel populations in neighboring states are tiny and highly fragmented, and there appears to be little to no opportunity for mixing of these subpopulations with those in Florida. In Georgia, the subspecies is restricted primarily to two military bases and utility line corridors (Breen and Parrish 1997); population estimates for Georgia range from approximately 300 breeding pairs (N. Klaus, *unpublished data*) to >600 breeding pairs (J. Parrish, *unpublished data*). The nearest known subpopulation in Georgia is >90 km north of the kestrel subpopulation in north central Florida (Schneider et al. 2010). The subspecies is non-migratory and demonstrates limited dispersal ability (Miller and Smallwood 1997).

LISTING RECOMMENDATION

Staff recommends listing the southeastern American kestrel as a Threatened species because the species met listing criteria as described in 68A-27.001, F.A.C. The southeastern American kestrel met two listing criteria, including Geographic Range (B) and Population Size and Trend (C).

SUMMARY OF THE INDEPENDENT REVIEWS

Comments were received from 2 reviewers: Dr. John Parrish (Georgia Southern University, retired) and Dr. Katie Sieving (University of Florida). Both reviewers concurred with the staff recommendation for listing. Appropriate editorial changes recommended by

reviewers were made to the report. No changes were made that affected the findings or staff recommendations.

Parrish agreed with the BRG's conclusions that southeastern American kestrel populations in Georgia are too small and too widely fragmented to expand into adjacent unoccupied habitats, but he also shared unpublished data suggesting that Georgia populations are somewhat larger than the BRG assumed. Staff concurred and added mention of these data in the revised report.

Sieving expressed concern that the BSR did not sufficiently illuminate the causes of population declines. However, determination of the causes of declines and recommended prescriptions for management were beyond the scope of the BSR. These will be addressed in FWC's subsequent management plan for the subspecies.

The full text of peer reviews is available at MyFWC.com.

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Biological Status Review Information
Findings

Species/taxon: Southeastern American Kestrel
Date: 11/09/10
Assessors: Karl Miller, Jim Cox, Nathan Klaus

Generation length: 2.5-3.0 yrs

Criterion/Listing Measure	Data/Information	Data Type*	Sub-Criterion Met?*	References
*Data types- Observed (O), Estimated (E), Inferred (I), Suspected (S), or Projected (P). Sub-Criterion Met – Yes (Y) or No (N).				
(A)Population Size Reduction, ANY of				
(a)1. An observed, estimated, inferred or suspected population size reduction of at least 50% over the last 10 years or 3 generations, whichever is longer, where the causes of the reduction are clearly reversible and understood and ceased[1]	No evidence that reduction has ceased.		N	
(a)2. An observed, estimated, inferred or suspected population size reduction of at least 30% over the last 10 years or 3 generations, whichever is longer, where the reduction or its causes may not have ceased or may not be understood or may not be reversible[1]	Conclusive data that kestrel numbers statewide have declined >50% in previous decades. Kestrel numbers statewide have continued to decline within last decade but data does not conclusively meet 30% threshold because of small sample sizes and incomplete coverage. Nest box occupancy rates in north central Florida (one of the two largest subpopulations in the state) declined >51% during 1998-2007 (from 68% to 33%).		N	Hoffman and Collopy (1988); Sauer et al. (2007); Smallwood et al. (2009); K. Miller, unpublished data.
(a)3. A population size reduction of at least 30% projected or suspected to be met within the next 10 years or 3 generations, whichever is longer (up to a maximum of 100 years) [1]	See A2 above.		N	
(a)4. An observed, estimated, inferred, projected or suspected population size reduction of at least 30% over any 10 year or 3 generation period, whichever is longer (up to a maximum of 100 years in the future), where the time period must include both the past and the future, and where the reduction or its causes may not have ceased or may not be understood or may not be reversible.[1]	See A2 above.		N	
[1] based on (and specifying) any of the following: (a) direct observation; (b) an index of abundance appropriate to the taxon; (c) a decline in area of occupancy, extent of occurrence and/or quality of habitat; (d) actual or potential levels of exploitation; (e) the effects of introduced taxa, hybridization, pathogens, pollutants, competitors or parasites.				
(B)Geographic Range, EITHER				
(b)1. Extent of occurrence < 20,000 km^2 (7,722 mi^2) OR			N	

(b)2. Area of occupancy < 2,000 km^2 (772 mi^2)	Based on Breeding Bird Atlas records, recent statewide surveys in sandhills, and data on estimated kestrel territory size, the statewide kestrel population is estimated at 1,350-1,500 breeding pairs, which is equivalent to an area of occupancy of 1,350-1,875 km^2.	O, E, I	Y	Stys (1993); Cox et al. (1994); Florida Fish & Wildlife Conservation Commission (2003); J. Rodgers, unpublished data; K. Miller, unpublished data; J. Cox, unpublished data; N. Klaus, unpublished data.
AND at least 2 of the following:				
a. Severely fragmented or exist in ≤ 10 locations	Exist in 4-8 regional subpopulations; fragmented; most habitat patches are too small to support viable populations and are isolated from other habitat patches. Subspecies known to have limited dispersal ability to re-colonize vacant habitats outside these areas.	O, E, I	Y	Cox et al. (1994); Miller and Smallwood (1997); Florida Fish & Wildlife Conservation Commission (2003); K. Miller, unpublished data; J. Cox, unpublished data; J. Parrish, personal communication.
b. Continuing decline, observed, inferred or projected in any of the following: (i) extent of occurrence; (ii) area of occupancy; (iii) area, extent, and/or quality of habitat; (iv) number of locations or subpopulations; (v) number of mature individuals	Continuing decline in several of these subcriteria (ii, iii, v); see A2 above and C1 below; extent of sandhill habitat declining at rapid rate throughout state; funding inadequate to restore habitat on public and private lands.	O, I, P	Y	Hoffman and Collopy (1988); D. Hardin (unpublished report 2004); Smallwood et al. (2009); K. Miller, unpublished data; Kautz et al. (2007); Florida Fish & Wildlife Conservation Commission 2060 report.
c. Extreme fluctuations in any of the following: (i) extent of occurrence; (ii) area of occupancy; (iii) number of locations or subpopulations; (iv) number of mature individuals			N	
(C)Population Size and Trend				
Population size estimate to number fewer than 10,000 mature individuals AND EITHER	Habitat model estimated potential for ca. 3,000 individuals on public lands during 1980s; however, habitat conditions were unsuitable in many of these areas. Recent surveys throughout Florida show kestrels absent, or very rare, on most sandhills in public ownership. The only large contiguous patches of private lands with long-term kestrel nest-box programs are in Marion/Levy/Alachua/Gilchrist/ southern Suwannee counties, supporting at least 175 active kestrel territories. Based on Breeding Bird Atlas records, recent statewide surveys in sandhills, and data on estimated kestrel territory size, the statewide kestrel population estimated at 1,350-1,500 breeding pairs or 2,700-3,000 mature individuals.	O, E, I	Y	Cox et al. (1994); Smallwood and Collopy (2009); J. Rodgers, unpublished data; K. Miller, unpublished data.

(c)1. An estimated continuing decline of at least 10% in 10 years or 3 generations, whichever is longer (up to a maximum of 100 years in the future) OR	No evidence that these declines have ceased. Nest box occupancy rates in a long-term study site in north central Florida declined >51% during 1998-2007 (from 68% to 33%). Extent of habitat expected to continue to decline and funding inadequate to restore existing habitat quickly over large scale. Kestrels have been slow to colonize new nest boxes in appropriate habitat throughout north central Florida.	P	N?	Cox et al. (1994); Miller and Smallwood (1997); Florida Fish & Wildlife Conservation Commission (2003); Smallwood et al. (2009); K. Miller, unpublished data; J. Cox, unpublished data; D. Hardin (unpublished report 2004); Kautz et al. (2007); Florida Fish & Wildlife Conservation Commission 2060 report.
(c)2. A continuing decline, observed, projected, or inferred in numbers of mature individuals AND at least one of the following:				
a. Population structure in the form of EITHER	See B2 above; only a few subpopulations >100 breeding pairs.	O, E, I	Y	See B2 and B2a above.
(i) No subpopulation estimated to contain more than 1000 mature individuals; OR				
(ii) All mature individuals are in one subpopulation			N	
b. Extreme fluctuations in number of mature individuals			N	
(D)Population Very Small or Restricted, EITHER				
(d)1. Population estimated to number fewer than 1,000 mature individuals; OR			N	
(d)2. Population with a very restricted area of occupancy (typically less than 20 km^2 [8 mi^2]) or number of locations (typically 5 or fewer) such that it is prone to the effects of human activities or stochastic events within a short time period in an uncertain future			N	
(E)Quantitative Analyses				
e1. Showing the probability of extinction in the wild is at least 10% within 100 years			N	

Initial Finding (Meets at least one of the criteria/sub-criteria OR Does not meet any of the criteria)	Reason (which criteria/sub-criteria are met)
Meets multiple criteria	B2a, bii, iii, v; C2ai
Is species/taxon endemic to Florida? (Y/N)	N
If Yes, your initial finding is your final finding. Copy the initial finding and reason to the final finding space below. If No, complete the regional assessment sheet and copy the final finding from that sheet to the space below.	

Final Finding (Meets at least one of the criteria/sub-criteria OR Does not meet any of the criteria/sub-criteria)	Reason (which criteria/sub-criteria are met)
Meets multiple criteria	B2a, bii, iii, v; C2ai

1	Biological Status Review Information Regional Assessment	Species/taxon: Southeastern American Kestrel
2		Date: 11/09/10
3		Assessors: Karl Miller, Jim Cox, and
4		Nathan Klaus
5		
6		
7		
8	Initial finding	Meets multiple criteria
9		
10	2a. Is the species/taxon a non-breeding visitor? (Y/N/DK). If 2a is YES, go to line 18. If 2a is NO or DO NOT KNOW, go to line 11.	No
11	2b. Does the Florida population experience any significant immigration of propagules capable of reproducing in Florida? (Y/N/DK). If 2b is YES, go to line 12. If 2b is NO or DO NOT KNOW, go to line 17.	No because (a) Subspecies is non-migratory and demonstrates limited dispersal, and b) nearest subpopulation in Georgia is 90 km away and extremely small)
12	2c. Is the immigration expected to decrease? (Y/N/DK). If 2c is YES or DO NOT KNOW, go to line 13. If 2c is NO go to line 16.	
13	2d. Is the regional population a sink? (Y/N/DK). If 2d is YES, go to line 14. If 2d is NO or DO NOT KNOW, go to line 15.	
14	If 2d is YES - Upgrade from initial finding (more imperiled)	
15	If 2d is NO or DO NOT KNOW - No change from initial finding	
16	If 2c is NO or DO NOT KNOW- Downgrade from initial finding (less imperiled)	
17	If 2b is NO or DO NOT KNOW - No change from initial finding	No change
18	2e. Are the conditions outside Florida deteriorating? (Y/N/DK). If 2e is YES or DO NOT KNOW, go to line 24. If 2e is NO go to line 19.	
19	2f. Are the conditions within Florida deteriorating? (Y/N/DK). If 2f is YES or DO NOT KNOW, go to line 23. If 2f is NO, go to line 20.	
20	2g. Can the breeding population rescue the Florida population should it decline? (Y/N/DK). If 2g is YES, go to line 21. If 2g is NO or DO NOT KNOW, go to line 22.	
21	If 2g is YES - Downgrade from initial finding (less imperiled)	
22	If 2g is NO or DO NOT KNOW - No change from initial finding	
23	If 2f is YES or DO NOT KNOW - No change from initial finding	
24	If 2e is YES or DO NOT KNOW - No change from initial finding	
25		
26	Final finding	Meets multiple criteria

APPENDIX 1. Brief biographies of the Southeastern American kestrel Biological Review Group members.

Karl E. Miller received his Ph.D. from the University of Florida and is currently the Upland Nongame Bird Leader for FWC's Fish and Wildlife Research Institute. Miller has more than 15 years experience implementing research and monitoring projects for imperiled birds and mammals in Florida, with more than 50 articles or book chapters published in scientific journals or popular magazines. Miller's expertise is focused on the population ecology and community ecology of raptors, woodpeckers, and songbirds.

James Cox received his M.S. degree from Florida State University. He is Director of the Vertebrate Ecology program at Tall Timbers Research Station in northwest Florida. Cox has more than 25 years experience conducting and supervising conservation research programs for upland birds, especially birds of the longleaf pine ecosystem. Cox was Bird Conservation Coordinator for the Florida Game and Fresh Water Fish Commission during the 1990s.

Nathan A. Klaus is a Senior Wildlife Biologist with Georgia's Department of Natural Resources, Nongame Conservation Section. Klaus supervises upland bird monitoring projects throughout Georgia, including a recovery program for the southeastern American kestrel. Klaus also supervises longleaf and grassland restoration efforts on state lands.

Appendix 2. Summary of letters and emails received during the solicitation of information from the public period of September 17, 2010 through November 1, 2010.

No information about this species was received during the public information request period.