# A Species Action Plan for the Southeastern American Kestrel
## *Falco sparverius paulus*

**Final Draft**
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## EXECUTIVE SUMMARY

The Florida Fish and Wildlife Conservation Commission (FWC) developed this plan in response to the determination that the southeastern American kestrel (*Falco sparverius paulus*) be listed as Threatened on the Florida Endangered and Threatened Species List. The goal of this plan is to improve the conservation status of the southeastern American kestrel so that the species can be removed from the Florida Endangered and Threatened Species List and will not again need to be listed. Biological objectives of this plan are to: 1) maintain a stable or increasing population trend in Florida within the next 10 years, 2) increase 1 or more subpopulations to greater than 1,000 mature individuals, and 3) increase current known area of occupancy on publicly owned lands to greater than 3,000 $km^2$ (1,158 $mi^2$).

To help meet these objectives, this plan designates 10 spatial units with similar habitat characteristics and land uses to facilitate development and implementation of Conservation Actions. These Kestrel Management Units (KMUs) will be the basis for setting regional targets for subpopulations and management actions in the future.

Habitat management actions needed to meet plan objectives include creation and implementation of Habitat Management Guidelines. These voluntary guidelines will provide detailed information on the habitat characteristics kestrels prefer and management strategies necessary to achieve them. Targets must also be set for needed habitat management, protection, and acquisition within KMUs. Voluntary Wildlife Conservation Measures (WCMs) for agricultural and silvicultural practices are needed to minimize negative impacts to kestrels on these lands, which provide potentially critical habitat.

Population management focuses on greatly expanding pilot efforts for kestrel nest box management into a Southeastern American Kestrel Monitoring Partnership (SAKMP). New monitoring actions include an assessment of southeastern American kestrel distribution in Florida using various data, including the Breeding Bird Atlas II project. Expanded sandhill bird community monitoring is also planned.

Research activities include creation of a habitat model for southeastern American kestrels to aid in developing habitat and population targets. Research on the population status, demographics, and reproductive health of kestrels on agricultural lands is also needed to assess any potential threats and the potential long-term value of such habitats to the species.

New state rule enforcement policies (like those implemented for gopher tortoises) are needed to clarify how southeastern American kestrels, their nest boxes, and nest cavities are protected by Florida Administrative Code (F.A.C.) rules. Rule enforcement policy should include flexibility needed to allow for effective management of kestrel habitat, efficient monitoring of kestrels, and reduced disincentives and liability associated with installing kestrel nest boxes. This plan recommends creation of new permitting guidelines that provide a standard approach to permitting and mitigation.

Finally, the FWC alone does not have the resources to implement all management, monitoring, research, and conservation actions of this plan. Education, outreach, and coordination with local,

state, and federal governments; non-governmental organizations; and private landowners will be necessary to fully implement this plan. The SAKMP will need a coordinator who will play a crucial role in FWC's partnering efforts and help achieve objectives of this plan. Outreach to existing habitat management working groups and coordination with local governments on county comprehensive plans are other important initiatives.

This plan details the actions necessary to improve the conservation status of the southeastern American kestrel. A summary of this plan will be included in the Imperiled Species Management Plan (ISMP), in satisfaction of the management plan requirements in Rule 68A-27, F.A.C., Rules Relating to Endangered and Threatened Species. The ISMP will address comprehensive management needs for 60 of Florida's imperiled species and will include an implementation plan; rule recommendations; permitting standards and exempt activities; anticipated economic, ecological, and social impacts; projected costs of implementation and identification of funding sources; and a revision schedule. The imperiled species management planning process relies heavily on stakeholder input and partner support. This level of involvement and support is also critical to the successful implementation of the ISMP. Any significant changes to this plan will be made with the continued involvement of stakeholders.

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## GLOSSARY OF TERMS AND ACRONYMS

Area of Occupancy: The area within its extent of occurrence (See Extent of Occurrence), which is occupied by a taxon, excluding cases of vagrancy. This reflects the fact that a taxon will not usually occur throughout the area of its extent of occurrence, which may contain unsuitable or unoccupied habitats (as defined by International Union for Conservation of Nature [IUCN]).

BBA2: Breeding Bird Atlas II Project, a statewide survey of all birds breeding in Florida conducted during 2013-2016. This survey will produce distribution maps of birds that are confirmed or likely to be nesting in the state. The Florida Ornithological Society leads this effort and volunteers collect the data. The first Breeding Bird Atlas for Florida was completed in 1991.

BRG: Biological review group, a group of taxa experts convened to assess the biological status of taxa using criteria specified in Rule 68A-27.001, Florida Administrative Code, 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 (Version 8.1).

BSR: Biological status review report, the summary of the biological review group's findings. It includes a Florida Fish and Wildlife Conservation Commission (FWC) staff recommendation on whether or not the species status meets listing criteria in Rule 68A-27-001, Florida Administrative Code. These criteria, based on IUCN criteria and IUCN guidelines, are used to help decide if a species should be added or removed from the Florida Endangered and Threatened List. In addition, FWC staff may provide within the report a biologically justified opinion that differs from the criteria-based finding.

Clutch: A group of eggs produced by a female in a single breeding attempt.

CPS: FWC's Office of Conservation Planning Services

Extent of Occurrence: The geographic area encompassing all observations of individuals of a species, including intervening areas of unoccupied habitat. Synonymous with range. See Also Area of Occupancy (as defined by IUCN).

F.A.C.: Florida Administrative Code.

Fire Suppression: Many natural Florida habitats such as sandhill require fire to maintain vegetation at a level that promotes a biologically diverse landscape. Fire-adapted landscapes that no longer experience or rarely experience natural or prescribed fires are considered fire suppressed.

Florida's State Wildlife Action Plan: This FWC document outlines a plan for partnering to conserve Florida's wildlife and wildlife habitats. It is part of a nationwide effort and grant program to conserve North American wildlife and is implemented in part by the FWC Florida Wildlife Legacy Initiative.

F.S.: Florida Statutes

FWC: The Florida Fish and Wildlife Conservation Commission, the state agency constitutionally mandated to protect and manage Florida's native fish and wildlife resources.

FWC Law Enforcement Manual: A manual which outlines the FWC enforcement policies and investigative procedures for imperiled species.

FWCLE: The Florida Fish and Wildlife Conservation Commission's Division of Law Enforcement.

HMGs: Habitat Management Guidelines. These voluntary habitat management practices are specifically designed to benefit southeastern American kestrels and grow/maintain their populations.

HSC: Habitat and Species Conservation, the species conservation and habitat management division of the FWC.

Incidental Take: Incidental Take (as defined in Rule 68A-27.001(5), F.A.C.). Any taking otherwise prohibited, if such taking is incidental to, and not the purpose of the carrying out of an otherwise lawful activity.

ISMP: Imperiled Species Management Plan

IUCN: International Union for Conservation of Nature, a professional global conservation network.

IUCN Red List (IUCN Red List of Threatened Species): An objective, global approach for evaluating the conservation status of plant and animal species, the goals of which are to: Identify and document those species most in need of conservation attention if global extinction rates are to be reduced; and provide a global index of the state of change of biodiversity.

KMUs: Kestrel Management Units. Units designated in this plan to provide a spatial framework for implementing management plan actions for southeastern American kestrels. KMUs are contiguous areas with similar habitats and land uses.

Prescribed Fire: Fires intentionally set by land managers to simulate natural fire and improve habitat for native wildlife.

SAKMP: The Southeastern American Kestrel Monitoring Partnership, a proposed partnership among FWC, other agencies, and the public to monitor southeastern American kestrel nest boxes in Florida. The partnership would expand pilot efforts for promoting and coordinating kestrel nest box monitoring in north-central Florida.

Subpopulation: Geographically or otherwise distinct groups in the population between which there is little exchange.

Subspecies: A biological classification that represents a race or variety of a species. For example, the southeastern American kestrel (*Falco sparverius paulus*) is a subspecies of the American kestrel (*Falco sparverius*).

Take: As defined in Rule 68A-27.001(4), F.A.C. To harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in such conduct.

Territory Fidelity: The degree to which an animal continues to use or return to the same territory.

WEAs: Wildlife and Environmental Areas. Areas purchased through the FWC Mitigation Park Program which are primarily managed to provide habitat for imperiled species.

WCMs: Wildlife Conservation Measures are voluntary, practical, cost-effective actions that agricultural and silvicultural producers can undertake to reduce negative impacts to state-listed species.

WCPR: Wildlife Conservation, Prioritization, and Recovery. A program administered by the FWC on FWC-managed areas to ensure that protected lands are managed for the highest benefit of wildlife.

WMAs: Wildlife Management Areas

# INTRODUCTION

This plan is for the southeastern American kestrel (*Falco sparverius paulus*) and was developed in response to the Florida Fish and Wildlife Conservation Commission (FWC) determination that the southeastern American kestrel be recommended for listing as Threatened on the Florida's Endangered and Threatened Species List. This plan was developed through the cooperative efforts of FWC staff and stakeholders. The FWC developed this plan per Rule 68A-27.0012, Florida Administrative Code (F.A.C.), which requires development of a management plan for all species going through the listing process.

## Biological Background

The southeastern American kestrel is 1 of 17 described subspecies of American kestrel in the western hemisphere (Smallwood and Bird 2002). The southeastern American kestrel is the only subspecies that is a non-migratory, permanent resident in Florida; however, the northern subspecies of American kestrel (*F. s. sparverius*) occurs in Florida as a migrant and winter visitor. Male southeastern American kestrels tend to have paler under parts with fewer markings than the *F. s. sparverius* subspecies (Collopy 1996, Smallwood and Bird 2002), but considerable plumage variation exists. Therefore, confident identification of southeastern American kestrels can only be made during the portion of the breeding season when migrants are not present (May through June).

### *Life History*

The southeastern American kestrel is closely associated with the southeastern sandhill ecosystem. The typical sandhill landscape consists of a widely spaced canopy of longleaf pine (*Pinus palustris*) or slash pine (*P. elliottii* var *densa*) with wiregrass (*Aristida stricta*) and forb dominated groundcover (Figure 1). This ecosystem provides both prey (e.g., insects) and nesting sites (e.g., tree cavities) for kestrels (Bohall-Wood and Collopy 1986, Hoffman and Collopy 1987, Collopy 1996). Southeastern American kestrels also use a variety of other natural communities in Florida including scrub, scrubby flatwoods, and dry prairie. Pastures, parks, golf courses, and orange groves are also used (Stys 1993), but no information is available about kestrel survivorship and reproductive success in these human-modified habitats.

Figure 1. Typical kestrel habitat. Photograph by Florida Natural Areas Inventory.

Southeastern American kestrels are secondary cavity nesters, meaning they depend on tree cavities excavated by woodpeckers or other natural tree cavities for nesting sites. Most natural nest cavities are in dead longleaf pine, sand pine (*P. clausa*), or various oak (*Quercus* spp.) trees. Nesting also can occur in live pines in

cavities originally excavated by red-cockaded woodpeckers (*Picoides borealis*) and subsequently enlarged by other woodpeckers (Gault et al. 2004). Kestrels have been recorded nesting in abandoned or occupied buildings, in manmade nest boxes (e.g., Smallwood and Collopy 2009), and in utility transmission towers (Beasley and Parrish 2009). Southeastern American kestrels have high territory fidelity (Bohall-Wood and Collopy 1986) and presumably maintain their territories throughout most of the year. Southeastern American kestrel territory size has not been measured, but it likely varies based on habitat quality, prey availability, and the presence of nesting cavities and perches. Studies of kestrels in suitable habitat elsewhere in North America suggest that kestrel densities can range from about 0.4 to 1.8 pairs per $km^2$ (Smallwood and Bird 2002), which is equivalent to territory sizes as large as 2.5 $km^2$ (0.9 $mi^2$) or as small as 0.6 $km^2$ (0.2 $mi^2$). Stys (1993) suggested 0.5 $km^2$ (0.19 $mi^2$) as an approximation for territory size for mitigation and conservation planning purposes. Territories that include areas of unsuitable plant communities (e.g., dense pinelands or other closed canopy forest) are probably much larger.

American kestrels hunt for food by searching the ground from elevated perches and hovering or soaring over open areas. Major prey items of the southeastern American kestrel are insects, lizards, and less frequently small rodents or birds (Bohall-Wood and Collopy 1986).

Courtship and pair bonding begins in early January (Bohall-Wood and Collopy 1986). From mid-March through May, 3 to 5 eggs per clutch are laid. Egg color varies from white to a yellowish or light reddish-brown, and is typically blotched or mottled with gray or brown (Smallwood and Bird 2002). Incubation lasts 29 to 31 days and young fledge in 28 to 30 days. Sexual maturity is reached when kestrels are 1 year old and life expectancy is estimated at 2 years and 9 months for kestrels that survive their first winter (Smallwood and Bird 2002).

*Description*

The smallest falcon in North America, American kestrels are distinguished in flight by long, pointed wings and deep, sometimes fluttering, wing-beats. Adult kestrels are sexually dimorphic; males have buffy underparts with variable spotting, blue-gray wings, a streaked rufous back, and a mostly solid rufous tail, whereas females have buffy underparts with heavy streaking and barred rufous wings, back, and tail (Figure 2). Both sexes have 2 vertical black stripes on each side of their head, 1 across the base of the beak (malar region), and 1 across the back of the head (auricular region). Female American kestrels are larger than male kestrels. Body mass in Florida, in summer, averages 100 g (3.5 oz) for males and 120 g (4.2 oz) for females.

Figure 2. Southeastern American kestrel appearance: perched male (left), male in flight (center), and female in flight (right). Photographs copyright by Alex Lamoreaux.

*Geographic Range and Distribution*

The southeastern American kestrel was once widely distributed throughout 7 southeastern states. Today, the subspecies occurs primarily in Florida and is patchily distributed elsewhere in the coastal plain of South Carolina and Georgia. Within Florida, the southeastern American kestrel was once distributed as far south as the rockland pine forests of Dade County (Holt and Sutton 1926), but now breeds no farther south than Highlands and Lee counties (Robertson and Woolfenden 1992, FWC 2003). The FWC's Biological Status Review (BSR) of the southeastern American kestrel identified 4 large clusters of kestrel occurrence or "subpopulations" based on recent distribution data (FWC 2003). These regional subpopulations of southeastern American kestrels (Figure 3) include: A) Western Panhandle, B) Brooksville Ridge and vicinity, C) Trail Ridge and vicinity, and D) Lake Wales Ridge and vicinity. The degree of isolation among these subpopulations is unknown, but given the subspecies' non-migratory status and its relatively short dispersal distances (Miller and Smallwood 1997), connectivity may be limited. Kestrels nest elsewhere in Florida (Figure 3), but their status and extent are poorly known.

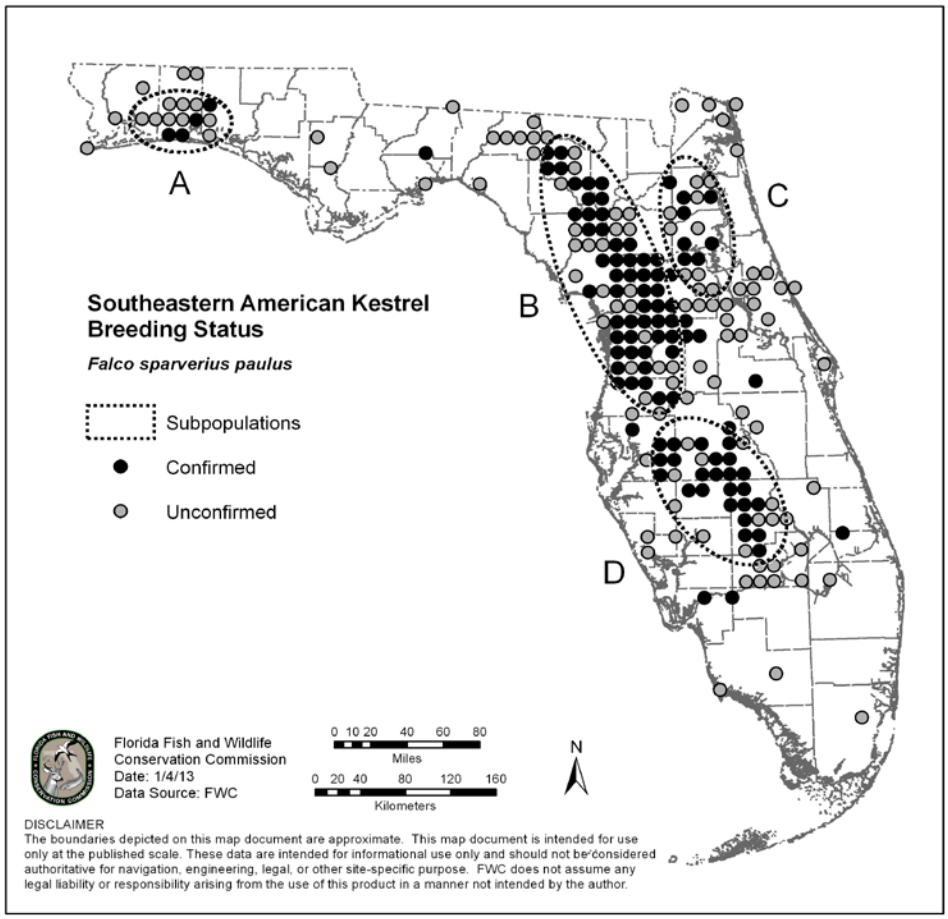


Figure 3. Distribution of the non-migratory southeastern American kestrel. The four largest regional subpopulations (approximated by dashed lines) are: A) Western Panhandle, B) Brooksville Ridge and vicinity, C) Trail Ridge and vicinity, D) Lake Wales Ridge and vicinity. Points represent 7.5-minute quadrangles where breeding activity was recorded as "Confirmed" (black dots) or "Probable" or "Possible" (gray dots) during Florida's Breeding Bird Atlas (FWC 2003).

**Conservation History**

The Florida Game and Fresh Water Fish Commission (predecessor to the FWC) listed the southeastern American kestrel as Threatened in 1975. The FWC species-ranking database initiated by Millsap et al. (1990) now assigns a biological score of 28 to the southeastern American kestrel (FWC, unpublished data), which ranks it 20$^{th}$ out of 297 bird species and higher than any other sandhill bird species, including the red-cockaded woodpecker. The subspecies is considered a priority species for conservation attention by Partners In Flight (Pashley et al. 2000) and other North American bird conservation initiatives. Recent data demonstrated a continuing decline in the populations of American kestrels throughout eastern North America, including the southeastern United States (Farmer and Smith 2009, Smallwood et al. 2009, Sauer et al. 2011).

In 1990, the FWC funded the University of Florida to study the southeastern American kestrel and the response of populations to large-scale nest box programs. Project leaders installed >380 kestrel nest boxes on public and private lands in north-central Florida. Within 3 years of installation, population densities increased more than 5-fold on experimental areas but remained unchanged on control areas (Smallwood and Collopy 2009). Biologists from the University of Florida, the University of Nevada–Reno, and the FWC have maintained and repaired or replaced >160 nest boxes in Levy and Marion counties during the last 2 decades (e.g., Miller and Smallwood 1997, Smallwood and Collopy 2009, Smallwood et al. 2009, Brown 2011). In 2009, the FWC initiated a pilot project to promote and coordinate nest box monitoring for southeastern American kestrels on public lands in north-central Florida. Staff is currently seeking funding in order to expand the program's scope into a statewide Southeastern American Kestrel Monitoring Partnership (SAKMP).

Two reports to the FWC (Wood et al. 1988, Stys 1993) provided recommendations for the protection of southeastern American kestrels, and included guidelines for evaluating habitat suitability and for protecting nesting and foraging sites. Although these reports provided a potential framework for permitting for the species, as of 2012, their recommendations have not been implemented. Action 18 proposes new permitting guidelines for this species.

**Threats and Recommended Listing Status**

*Threats*

Population declines of southeastern American kestrels in Florida have been largely attributed to clearing of older pine forests, conversion of sandhill and other upland habitats for agriculture and urban development, and the habitat changes that occur with fire suppression. These habitat changes lead to a lack of suitable nest sites (i.e., tree cavities) and a loss of suitable foraging habitat (i.e., open ground cover) for kestrels (Hoffman and Collopy 1988, Smallwood and Collopy 2009). In addition, habitat fragmentation may potentially have a negative effect on kestrels given that juvenile southeastern American kestrels have a median dispersal distance <5 km (<3 mi) (Miller and Smallwood 1997). However, southeastern American kestrel habitat relationships are poorly understood at both the plant community level and the landscape level; therefore, reasons for kestrel population decline are still unclear. It is likely that the effects of habitat loss, habitat fragmentation, and habitat degradation magnify each other. Recent bird surveys of restored sandhills throughout Florida (J. Rodgers, FWC, unpublished data; K. Miller,

FWC, unpublished data) indicate that southeastern American kestrels are either rare or absent at every location, with the possible exception of Eglin Air Force Base.

Threats to sandhill ecosystems identified by Florida's State Wildlife Action Plan (FWC 2005), including altered fire regime, habitat destruction or conversion, fragmentation of habitats, and the absence or scarcity of keystone species (i.e., cavity excavators), are likely to have a negative impact on southeastern American kestrels. Therefore, national and state-level conservation initiatives for protection and management of existing sandhill habitat will likely benefit the southeastern American kestrel to some degree.

Other threats to southeastern American kestrels include collisions with vehicles or stationary objects (Deem et al. 1998). Potential threats identified for American kestrels outside of Florida include West Nile Virus and exposure to various chemicals including agricultural pesticides and flame retardants (Smallwood and Bird 2002, Bird 2009). Recent studies have shown the species to be sensitive to endocrine disruptors, with exposure to flame retardants used in manufacturing consumer products (including polybrominated diphenyl ethers and hexabromocyclododecane) resulting in thinner eggshells and lower productivity (Fernie et al. 2009).

*Recommended Listing Status*

In 2010, the FWC directed staff to evaluate the status of all species listed as Threatened or Species of Special Concern that had not undergone a status review in the past decade. To address this charge for the southeastern American kestrel, staff conducted a literature review and solicited information from the public on the species' status. FWC convened a biological review group (BRG) of experts on the southeastern American kestrel to assess the biological status of the species using criteria specified in Rule 68A-27.001, F.A.C. This rule includes a requirement for BRGs to follow the Guidelines for Application of the International Union for Conservation of Nature (IUCN) Red List Criteria at Regional Levels (Version 3.0) and Guidelines for Using the IUCN Red List Categories and Criteria (Version 8.1). Biologists with FWC developed a draft BSR that included the BRG's assessment that the southeastern American kestrel met multiple criteria for listing as a Threatened Species. The FWC distributed the draft for peer review, and the reviewers' input was incorporated in a final southeastern American kestrel BSR.

The BRG found that the southeastern American kestrel met the following criteria for listing:

- Criterion B, Area of occupancy is less than 2,000 $km^2$ (1,250 mi) - The population is fragmented into fewer than 10 locations and populations continue to decline in number of individuals and habitat quality. Based on Breeding Bird Atlas records, recent statewide surveys in sandhills, and available data on estimated kestrel territory size, the BRG estimated the statewide kestrel population at 1,350 to 1,500 breeding pairs (see Criterion C below), which may be equivalent to an approximate area of occupancy of 1,350 to 1,875 $km^2$ (521 to 724 $mi^2$)

  Southeastern American kestrels in Florida appear to exist in 4 to 8 regional subpopulations. Most habitat patches are likely too small to support viable populations and are isolated from other habitat patches. The subspecies is non-migratory and demonstrates limited dispersal ability (Miller and Smallwood 1997).

- Criterion C, Population size is estimated at fewer than 10,000 mature individuals and an estimated continuing population decline is projected – There is a small population size of 2,700 to 3,000 mature individuals statewide with no subpopulation having greater than 1,000 mature individuals. Additionally, continuing declines in area of occupancy, habitat, and population size have been observed.

## CONSERVATION GOAL AND OBJECTIVES

### Goal

Conservation status of the southeastern American kestrel is maintained or improved so that the species can be removed from the Florida Endangered and Threatened Species List and will not again need to be listed.

### Objectives

I. Maintain a stable or increasing population trend in Florida within the next 10 years.

*Rationale*

To no longer meet Criterion C(2) in the southeastern American kestrel BSR, kestrels must no longer demonstrate an estimated decline of 10% or more over 10 years, which equates to 3 generations.

II. Increase 1 or more subpopulations to greater than 1,000 mature individuals.

*Rationale*

The BRG concluded that the population structure consisted of no subpopulations with >1000 mature individuals [C2.a.(i)]. Increasing at least one subpopulation to >1000 mature individuals would enhance long-term viability and ensure the taxa no longer triggers this subcriterion.

III. Increase known area of occupancy on public and private lands to greater than 3,000 $km^2$ (1,158 $mi^2$).

*Rationale*

The BRG concluded that the estimated area of occupancy for southeastern American kestrels must be >2,000 $km^2$ (>772 $mi^2$) to no longer meet Criterion B(2). This objective increases the estimated area of occupancy to at least 3,000 $km^2$ (1,158 $mi^2$) to allow for uncertainty in the size of kestrel home ranges when assessing total area. Increasing known area of occupancy would enhance long-term viability and ensure the species no longer triggers this subcriterion.

## CONSERVATION ACTIONS

The following sections describe the conservation actions that will make the greatest contribution toward achieving the conservation objectives. Actions are grouped by category (e.g., Habitat Conservation and Management, Population Management). The Conservation Action Table (Table 2) provides information on action priority, urgency, potential funding sources, likely effectiveness, identified partners, and leads for implementation.

A unifying principle of this plan is the need to increase both the size of regional subpopulations and connectivity among subpopulations (see Conservation Goal and Objectives). This plan designates spatial units for contiguous areas with similar habitats and land uses to facilitate development and implementation of conservation actions. The 10 proposed Kestrel Management Units (KMUs) in Figure 4 and Table 1 will facilitate setting and accomplishing management goals. See Action 6 and Appendix 1 for details on how KMUs were delineated.

Figure 4. Proposed southeastern American kestrel management units (KMUs), which are designed to provide a spatial framework for implementing management plan actions. KMUs include: 1) Panhandle, 2) Suwannee Pasture, 3) Brooksville Pasture, 4) Brooksville Ridge, 5) Hillsborough, 6) Lake Wales Ridge, 7) Southwest, 8) Trail Ridge, 9) Ocala National Forest, and 10) Northeast. Primary KMUs are areas with the greatest habitat potential, and they are the primary focus of this plan.

Table 1. Southeastern American kestrel management units (KMUs).

| **Kestrel management unit name and reference number** | **Brief geographic description** | **Dominant plant communities providing potential kestrel habitat** |
|---|---|---|
| Panhandle - 1 | Eglin Air Force Base and vicinity | Sandhill, clayhills |
| Suwannee Pasture - 2 | Florida-Georgia state line south to Suwannee-Santa Fe River watershed | Pastures |
| Brooksville Pasture - 3 | Primarily Gilchrist, western Alachua, eastern Levy, western Marion counties | Pastures and other agriculture, remnant sandhill |
| Brooksville Ridge - 4 | Primarily public lands along Brooksville Ridge | Sandhill |
| Hillsborough - 5 | Pasco, Hillsborough, and western Polk counties | Pastures, suburban, and other human-modified habitats |
| Lake Wales - 6 | Public and private lands along Lake Wales Ridge | Scrub, citrus |
| Southwest - 7 | Manatee and Hardee counties south to Lee County | Pastures and other agriculture |
| Ocala National Forest - 8 | Ocala National Forest | Sand pine scrub, some sandhill |
| Trail Ridge - 9 | Ridge west of St. John's River, including Camp Blanding and Gold Head Branch | Sandhill |
| Northeast - 10 | Jacksonville south to Volusia County | Pastures and other human-modified habitats |

**Habitat Conservation and Management**

Expanded habitat management with a focus on prescribed fire will be essential to conserving southeastern American kestrels. A current goal of FWC's Florida Wildlife Legacy Initiative is to increase the use of fire-related management in priority upland habitats by 100,000 ac (40,468 ha) by 2017. Habitat Management Guidelines (HMGs) for southeastern American kestrels will inform and help guide habitat management on public and private lands. The use of partnerships, additional funding opportunities and incentive programs, prescribed fire strike teams, and other mechanisms could increase the frequency and acreage of southeastern American kestrel habitat being actively managed within KMUs. Protecting habitat through conservation easements, acquisition, and other means also will be critical. Voluntary Wildlife Conservation Measures (WCMs) for agriculture and silviculture are needed to help minimize impacts to kestrels, their nests, and their habitat. Cattle ranches, horse farms, and other suitable, human-altered habitats can play an important role in conserving the species.

**Action 1** Develop and implement HMGs for southeastern American kestrels.

The HMGs will be voluntary, non-regulatory guidelines for public and private land managers interested in conducting management specifically to improve habitat for southeastern American kestrels. Within KMUs, managers should focus on achieving and maintaining these conditions within potential kestrel habitat. Some key elements of these guidelines are outlined below.

As discussed in the Biological Background, the southeastern American kestrel is associated with sandhills, although other natural communities are used. Kestrels require specific habitat conditions to successfully utilize a given area. An individual kestrel pair requires at least 0.5 $km^2$ (approximately 0.19 $mi^2$) of habitat that includes:

- Suitable cavity trees, nest boxes, or other man-made cavities
- Scattered perch sites
- An herbaceous ground cover dominated by forbs and grasses of low stature (primarily <25 cm [<10 in] tall) (Smallwood 1987)
- Widely spaced tree cover

Within sandhills, southeastern American kestrels are most likely to occupy sites that have ≥40% grass cover and ≤20% canopy closure (K. Miller, unpublished data). These habitat conditions can be achieved by applying prescribed fire when saplings, shrubs, and ground cover begin to increase in density and height. Additionally, these habitat conditions are consistent with those required by many wildlife species that inhabit the longleaf pine ecosystem. Literature suggests that sandhills in Florida should be burned every 1 to 3 years and scrub every 5 to 20 years, although there can be significant variation in fire frequency in scrub, depending on site-specific conditions (Florida Natural Areas Inventory 2010). Maintaining these habitats with fire promotes groundcover diversity and prevents encroachment of woody saplings. Mechanical treatments, such as shredding or mowing, can mimic the effect of fire and reduce understory, but when possible this should be done in combination with prescribed fire to achieve better long-term results (Weekley et. al 2008).

Managers of large public lands are encouraged to recognize high-intensity disturbance as an infrequent but valuable part of the landscape, given that wildfires provide high-quality breeding and foraging habitat for southeastern American kestrels and other cavity-nesting birds. The practice of post-fire salvage logging (i.e., removal of areas of standing dead trees) is discouraged, as large stands of snags provide habitat conditions that are important for southeastern American kestrels. When salvage cuts are conducted, retaining patches of dead trees with at least 5 to10 snags per acre will provide habitat for southeastern American kestrels. During the breeding season (March through June), managers should use caution when conducting land management activities around active kestrel nests.

Many public conservation lands are required to have a management plan approved by the Acquisition and Restoration Council or the agency's governing board. Specifically, Chapter 253.034(5), Florida Statute (F.S.) says, in part, all land management plans shall include an analysis of the property to determine if significant natural resources, including listed species, occur on the property. If significant natural resources occur, the plan shall contain management strategies to protect the resources. The Florida Forever Act (Chapter 259.105, F.S.) adds that all

state lands that have imperiled species habitat shall include, as a consideration in the management plan, restoration, enhancement, management, and repopulation of such habitats. For lands identified as having southeastern American kestrels or having the potential to support southeastern American kestrels (Appendix 2), the FWC should be consulted, and the lead management agency is encouraged to include the FWC as part of the management plan advisory group. The HMGs should be incorporated into management plans as appropriate (Action 1).

The FWC's Wildlife and Habitat Management section's Wildlife Conservation, Prioritization and Recovery (WCPR) program provides plans for species monitoring and management on lands in the Wildlife Management Area (WMA) system. This approach uses information from statewide models, in conjunction with input from species experts and people knowledgeable about the area, to create site-specific wildlife assessments for a number of focal species, including the southeastern American kestrel. Staff combines these assessments with management considerations to develop a wildlife management strategy for the area. As HMGs are developed, they should be incorporated into the WCPR program to provide up-to-date information on the management needs of southeastern American kestrels (Action 1).

The HMGs also can be incorporated into management performed on private lands (Action 1). The FWC's Office of Conservation Planning Services (CPS) interacts with private land managers to provide technical assistance on habitat management. The CPS also provides landowners with information on financial incentives for managing for wildlife (Action 22).

The HMGs will be developed so that recommendations do not conflict with any state or federal rules or permitting guidelines that may restrict certain activities.

**Action 2** Develop habitat management, protection, and acquisition targets for KMUs. Continue to refine habitat assessments within KMUs to assist in setting objectives.

This plan identifies KMUs for kestrel management and monitoring (Action 6) based on a coarse habitat assessment (Appendix 1). Within each KMU, kestrel habitat management targets will vary based on a number of factors, including the amount of land in public ownership, the natural community comprising kestrel habitat and the current condition of potential kestrel habitat. Habitat assessments need to be continually refined within KMUs as more information becomes available on southeastern American kestrel habitat associations. Assessments include identifying the amount and condition of potential nesting and foraging habitat, and identifying habitat restoration, management, and protection or acquisition needs and setting habitat targets within subpopulations. See Appendix 2 for a list of conservation lands in each KMU.

**Action 3** Focus land acquisition and protection efforts within KMUs that have a low percentage of land in public ownership.

For example, KMU 2 (Suwannee Pasture) and KMU 3 (Brooksville Pasture) have a low percentage of area in public ownership or under conservation easement. Land acquisition and other protections within these KMUs should focus on increasing the overall amount of kestrel habitat, improving connectivity between existing natural areas, or both.

**Action 4** Develop voluntary southeastern American kestrel WCMs for agricultural and silvicultural lands.

Approximately 65% of Florida is in some form of agricultural or silvicultural land use. Florida's fish and wildlife, including many state-listed species, occur on lands utilized for agriculture and silviculture. Agricultural lands may prove to be crucial habitat for southeastern American kestrels. The WCMs are voluntary measures designed to reduce negative impacts to state-listed species resulting from incompatible agricultural activities.

**Population Management**

Population management includes initiatives that set specific population targets for southeastern American kestrels or implement species-specific management actions. A central action in this section involves significant expansion of the SAKMP, which installs, maintains, and monitors kestrel nest boxes.

**Action 5** Identify and continue to refine spatial units appropriate for management and monitoring, including: 1) subpopulations and 2) KMUs.

Implementation will begin with the geographic designations proposed in this plan, with refinement as necessary subsequent to the plan's approval. Four large regional subpopulations are identified in Figure 3. Ten management units are proposed within those subpopulations (see KMUs in Figure 4, Table 1) to provide an initial spatial framework for monitoring and managing southeastern American kestrel populations. The KMUs will facilitate setting population and habitat targets for contiguous areas with similar habitats and land uses. These units were derived based on known areas of kestrel occurrence, the extent of potential kestrel habitat, physiographic boundaries including ecoregions and major rivers, and, to a lesser extent, political boundaries including counties and managed lands. Boundaries also were delineated to reflect significant differences in patterns of land ownership and stewardship. See Appendix 1 for attributes of each KMU.

Primary KMUs are areas with the greatest habitat potential, and they are the primary focus of this plan. Two regions with little or no sandhill or scrub habitat are identified as secondary KMUs. Although southeastern American kestrels seem to occur at relatively low densities in secondary KMUs, these units increase the total area of occupancy for the species.

It is important to note that many properties falling outside of identified KMUs have historical or current records of southeastern American kestrels. All of these areas are important to the conservation and recovery of the subspecies, and appropriate management activities for kestrels are encouraged wherever kestrels occur. However, primary KMUs represent the highest priority regions for setting objectives for habitat management, protection, acquisition, and southeastern American kestrel population size (Action 2).

Managers eventually may want to identify and further prioritize focal areas within KMUs for management. For example, focal areas could include: 1) areas supporting established populations on private lands that currently are not secured by long-term conservation agreements or 2) areas that could provide landscape linkages between other occupied lands if managed differently.

**Action 6** Establish southeastern American kestrel population targets for KMUs.

Population targets for KMUs will be developed by the FWC in coordination with partners using spatial mapping and analyses and the results of previous and ongoing research on kestrel habitat needs. Establishment of targets will become more feasible after the current kestrel distribution is known (Action 9) and after habitat modeling at the landscape level is improved (Action 11).

The BSR estimated the statewide population of southeastern American kestrels at 1,350 to 1,500 breeding pairs (J. Cox, Tall Timbers Research Station, and K. Miller, FWC, unpublished data) based on data from the first Breeding Bird Atlas (FWC 2003), recent FWC statewide surveys in sandhills (J. Rodgers and K. Miller, unpublished data), and data on estimated kestrel territory size (Stys 1993). Objective II of this plan specifies that at least 1 southeastern American kestrel subpopulation should support >1,000 mature individuals to meet the plan's conservation goal. As numbers for individual subpopulations are currently unknown, work done to meet this action will help identify which subpopulation has the best opportunity to meet the target of 1000 mature individuals.

**Action 7** Install, maintain, and monitor kestrel nest boxes on public and privately managed lands in peninsular Florida using expanded partnerships.

Nest-site limitation is believed to be a significant factor in the population declines of southeastern American kestrels; therefore, increasing nesting habitat opportunities will be a primary component of this plan. The addition of nest boxes has been shown experimentally to increase southeastern American kestrel populations at a regional level (Smallwood and Collopy 2009).

During 2009, FWC initiated a pilot project to promote and coordinate nest box monitoring for southeastern American kestrels on public lands in north-central Florida. Dozens of cooperators, including biologists and land managers from the FWC, the Florida Forest Service, the Florida Department of Environmental Protection, as well as private citizens, currently monitor >400 kestrel nest boxes primarily in six counties in north-central Florida. Kestrels occupy fewer than 150 of these nest boxes each year. Staff is currently seeking funding in order to expand the program's scope into a statewide Southeastern American Kestrel Monitoring Partnership (SAKMP).

Kestrel nest boxes should be installed in KMUs in areas with suitable kestrel habitat . Kestrel nest boxes can be purchased or constructed using readily available materials and mounted on trees, free-standing poles or utility poles (with permission) using standardized protocols supplied by the SAKMP. Existing nest box monitoring protocols from the SAKMP are recommended (Appendix 3). Protocols will be revised and expanded when feasible to capture more information about nesting success. Partners will include public and interested private land managers, and the FWC will strive to expand partnerships with utility companies that manage power line corridors.

**Action 8** Establish a coordinator to grow existing kestrel conservation efforts into a statewide SAKMP on public and private lands.

Currently, the FWC's kestrel nest box monitoring partnership is primarily limited to only 6 counties, yet it has already outgrown existing staff and resources. A year-round, dedicated coordinator will need to be secured if this program is to be effective throughout Florida and have a significant effect on achieving the objectives of this plan.

The coordinator would implement key components of this plan, including expanding and managing the SAKMP. Duties would include, but not be limited to, maintaining existing partnerships; making site visits to generate new partnerships; installing nest boxes; assisting with setting population targets; recruiting, training, and coordinating partners and volunteers in monitoring; conducting education and outreach; managing and analyzing annual monitoring data and distribution data; and developing new databases and tools to analyze kestrel distribution and habitat associations.

**Monitoring and Research**
These actions include monitoring initiatives that track progress towards meeting plan objectives and high-priority research necessary for effective conservation of this species.

**Action 9** Assess the current distribution of southeastern American kestrels throughout Florida.

Understanding the current distribution of southeastern American kestrels is a priority information need and will be accomplished through statewide and regional or local efforts. The Breeding Bird Atlas II (BBA2) project, coordinated by the Florida Ornithological Society, began generating distribution information at the statewide level in 2012. In addition to occurrence data collected and recorded at the scale of the United State Geological Survey 7.5-minute quad maps (ca. 163 $km^2$ [ca. 63 $mi^2$]), the BBA2 Technical Committee also will collect detailed distribution records for specific focal species. An interactive web-based registry for entering locations of breeding southeastern American kestrels may be developed cooperatively by the BBA2 and FWC to generate kestrel sightings from hundreds of volunteers throughout the state and facilitate collection and management of kestrel distribution data.

At the regional or local level, more intensive survey projects that focus on less-studied areas, including areas at the edge of the kestrel's current breeding range, will be encouraged. For example, counties along the Atlantic coast from Duval County south to Volusia County, and various counties in southwest Florida (e.g., Charlotte and Lee counties) are areas especially in need of updated distribution information.

**Action 10** Implement a comprehensive, multi-pronged, population monitoring program for southeastern American kestrels to measure progress towards meeting plan objectives.

To achieve the conservation goal, this plan recommends that Southeastern American kestrel populations be monitored with several approaches, including:

- Nest box monitoring
- Sandhill bird community monitoring
- Site-specific monitoring programs for the largest populations (e.g., Eglin Air Force Base, Ocala National Forest, and private lands in Levy and Marion counties)
- Other complementary monitoring activities as needed

The groundwork for nest-box monitoring will be established by the SAKMP (see Actions 7 and 8), but more intensive monitoring will be required in specific areas where information on population demographics is needed.

Sandhill bird communities will be monitored by expanding existing focal species monitoring programs on Wildlife Management Areas and other public lands as well as some private lands where monitoring partnerships are formed. The FWC currently has no effective point-count bird monitoring program in sandhills or other uplands. Existing methodologies (e.g., Miller and Martin 2011, Laurent et al. 2012) could be used to develop an effective monitoring program for kestrels and other species.

Large public lands known to support southeastern American kestrel populations, including Eglin Air Force Base (KMU 1) and Ocala National Forest (KMU 9), will require annual or periodic population assessments through occupancy estimation modeling (MacKenzie et al. 2006) or other appropriate techniques. Population estimates on these large public lands will provide key information to determine progress towards achievement of plan Objectives I and II.

Finally, valuable information about population status and trend also can be obtained by utilizing other monitoring approaches, some of which are ongoing programs. Complementary monitoring programs include, but are not limited to, the ongoing statewide Breeding Bird Survey, ongoing statewide monitoring of red-cockaded woodpecker cavity trees, and transect surveys for kestrels that could be conducted along linear features such as utility corridors.

**Action 11** Develop a new habitat model for southeastern American kestrels to aid in developing habitat and population targets and to identify optimal locations to focus management attention.

Existing habitat models for southeastern American kestrels have focused almost solely on determining the total amount of particular land cover classes, without consideration of local habitat conditions or landscape context. Southeastern American kestrel habitat use and distribution will be studied at various spatial scales to determine habitat associations and preferences at the plant community level (e.g., ground cover characteristics, number of perches, tree density, and basal area) and at the landscape level (e.g., landscape patch characteristics). Nest box datasets can be analyzed with a logistic regression approach to determine habitat and landscape characteristics that determine kestrel occupancy and nesting success. Comprehensive statewide occurrence and distribution data (Action 9) should be analyzed using “presence only” likelihood modeling to determine southeastern American kestrel habitat preferences at a landscape scale. Findings will be used to develop a current map of known, and predicted, southeastern American kestrel distribution. Dispersal distance data (Miller and Smallwood 1997) could be used to inform the model as to the likelihood of connectivity among habitat patches.

**Action 12** Conduct research to determine southeastern American kestrel carrying capacity and productivity in oak scrub, sand pine scrub, and other upland plant communities to further the understanding of the role of these natural communities and to refine HMGs (Action 1).

The Lake Wales Ridge (KMU 6) contains little sandhill, and kestrels in this KMU use scrub and other natural communities as well as human-modified landscapes. No information is available on

territory size, population density, or demographics of kestrels breeding on the Lake Wales Ridge. In addition, the Ocala National Forest (KMU 8) is dominated by scrub and sand pine forest, and research is needed on the impacts of current sand pine harvest-management practices on the availability of nest sites for kestrels.

**Action 13** Assess the population status, population demographics, and reproductive health of southeastern American kestrels in human-modified landscapes, particularly those dominated by agricultural land uses.

Recent surveys indicate that breeding habitat for southeastern American kestrels on public lands is limited and in need of further habitat restoration. In contrast, pasture-dominated landscapes are abundant in peninsular Florida, and these areas can serve as breeding habitat as long as nesting substrates such as nest boxes are provided. However, agricultural landscapes on private lands also may offer the potential for increased exposure to pesticides and other contaminants. Recent studies have shown American kestrels to be sensitive to endocrine disruptors, with exposure to flame retardants used in manufacturing consumer products (including polybrominated diphenyl ethers and hexabromocyclododecane) resulting in thinner eggshells and lower productivity (Fernie et al. 2009).

Information is needed on contaminant loads in southeastern American kestrels in Florida. Research should be conducted to determine the relative health of kestrel populations in sandhill-dominated landscapes and agriculture-dominated landscapes.

In addition, human-modified landscapes also offer increased proximity to motor vehicle traffic. Collision with motor vehicles was not a significant source of mortality for kestrels fledging from nest boxes installed along a highway in Iowa (Varland and Loughin 1993), but this risk has rarely been assessed and is usually unknown. Recent research in Idaho suggests that disturbance from noise along roadways can result in elevated corticosterone levels in American kestrels and reduced nesting success (Strasser and Heath 2011). Research is needed on the acceptable thresholds of noise and disturbance tolerable by southeastern American kestrels in agricultural-dominated landscapes in Florida, where many nest boxes are located.

Population demographics need to be compared to determine if productivity and survival are sustainable in human-dominated landscapes. Research findings in agricultural landscapes will be important in refining WCMs for agricultural over time (Action 4).

**Action 14** Identify common habitat needs as well as potential conflicts associated with managing other imperiled species in southeastern American kestrel habitat.

Habitat use of the southeastern American kestrel overlaps with several other imperiled or priority bird species, including the red-cockaded woodpecker, Florida scrub-jay (*Aphelocoma coerulescens*), and northern bobwhite (*Colinus virginianus*). Areas where strategies for birds and other taxa overlap should be identified to allow for stronger multi-species plans. In addition, habitat management strategies for some of these priority species may not be optimal for southeastern American kestrels. For example, the use of artificial cavity inserts for red-cockaded woodpeckers is not compatible with other excavating species, including the northern flicker

(*Colaptes auratus*) and pileated woodpecker (*Dryocopus pileatus*) (Blanc and Walters 2008). Southeastern American kestrels rely on these excavators to create and enlarge natural cavities, and artificial cavities may limit the activities of excavators. More research is needed on interspecific interactions between kestrels and other imperiled bird species to develop optimal management strategies where multiple high-priority species occur in the same area.

**Action 15** Identify potential barriers to movement and connectivity for southeastern American kestrel subpopulations.

The KMUs are small enough to include aggregations of southeastern American kestrels that are likely to be demographically connected, although this assumption has not been tested. Fragmentation of sandhill habitat may have a negative effect on breeding kestrels given the resident subspecies is non-migratory. In other regions, kestrels have been shown to prefer larger habitat patches and avoid smaller, more isolated patches (Smallwood et al. 2009). In a population with an abundance of newly installed nest boxes, southeastern American kestrels had a median natal dispersal distance <5 km (<3 mi) (Miller and Smallwood 1997). More study is needed on the frequency and magnitude of dispersal events across a variety of landscapes in Florida. Modeling current kestrel occurrence across Florida (Action 11) will help to identify potentially isolated populations.

**Action 16** Determine how extensively southeastern American kestrels use structures along major utility corridors for nesting.

Southeastern American kestrels are known to nest in the metal cross-pieces of high-voltage transmission line towers in the coastal plain of Georgia, where intact sandhills and high pine forests are sparse (Maney and Parrish 2007, Beasley and Parrish 2009; N. Klaus, Georgia Department of Natural Resources, personal communication). Although utility corridors are not known to provide significant nesting opportunities for kestrels in Florida, these areas should be surveyed and assessed for their current or potential use by nesting kestrels. Any nesting populations should be identified so cooperative agreements with utility companies (Action 29) can be established to manage these sites for kestrels.

## Rule and Permitting Intent

### *Protections*

Actions below are intended to ensure southeastern American kestrels, their eggs, young, and nests (including natural cavities and nest boxes) are protected. These protections are necessary to meet objectives of this plan and ensure the conservation of this species in Florida. Protections below are also intended to provide some flexibility for land management activities, FWC partners monitoring kestrels, utility companies, and landowners. This flexibility will allow for effective management and monitoring of southeastern American kestrels, and reduce disincentives or liability associated with installing kestrel nest boxes.

Southeastern American kestrels are protected in state rule under Rule 68A-27.003, F.A.C. Under this rule, it is unlawful to take, possess, or sell this species or its nests or eggs. The term “take” as defined in 68A-27.001(4) F.A.C. includes: harass, harm, pursue, hunt, shoot, wound, kill, trap,

capture, or collect…" Southeastern American kestrels are also protected under the Migratory Bird Treaty Act, 16 U.S.C. § 701-12. Under this Act, it is unlawful to pursue; hunt; take; capture; kill; or sell migratory birds, including their feathers, eggs, and nests.

**Action 17** Develop rule enforcement policies necessary for the conservation of the southeastern American kestrel.

State rules provide broad protection to southeastern American kestrels and other threatened species. However, it is often not clear to FWC biologists, FWC law enforcement, environmental consultants, developers, and others how such rules are intended to be enforced in specific situations. This creates problems when trying to determine what actions are and are not considered take and what actions do and do not require a permit. Developing rule enforcement policies for state-listed species can clarify how rules are intended to apply at a species-specific level. The FWC has successfully approved a rule enforcement policy for gopher tortoise.

Rule 68A-27.003(2) (a), F.A.C., states that Threatened species' "nests" and "eggs" are protected. However, it is not sufficiently clear whether inactive nest cavities (no young or eggs present) and nest trees are both protected under this rule. It is also unclear if there are situations in which kestrel nest cavities and nest boxes would not be protected under the rule. Rule enforcement policy should be revised to clarify these issues and provide flexibility for those managing habitat for kestrels and installing and monitoring nest boxes. These policies should be developed in close coordination with stakeholders.

Rule enforcement policy should specify what activities are exempt from some or all permitting requirements (in addition to general exemptions listed in 67A-27.007). These might include activities intended to improve habitat for southeastern American kestrels (e.g., prescribed burning) or actions required to protect human safety or the environment. Time of year and activity status of kestrel nest cavities and nest boxes should be considered when determining exemptions. Exemptions that allow removal of nest boxes outside the breeding season (July through February) could reduce current disincentives associated with installing kestrel nest boxes.

*Permitting Threshold*

The FWC rule enforcement policies, as discussed above, should address in more detail when an activity does or does not requires a permit. However, most language above addresses situations in which kestrels, their eggs, young, nest cavities, or nest boxes are directly impacted.

The possibility of requiring permits and mitigation should be investigated in cases where kestrels are taken through indirect impacts that cause harm or harassment as well as direct impacts (destruction of nest cavities or birds).

*Permitting Guidelines*

**Action 18** Create Permitting Guidelines for southeastern American kestrels.

*Intentional take permits.*—This section addresses permits issued for intentional take of southeastern American kestrels. Intentional take includes, but is not limited to, activities such as falconry, scientific collecting, research, and education.

*Falconry Permits*.—Falconry rules revised by the FWC are effective on 1 July 2013 and 1 January 2014. The rules specify that falconers can only take the migratory subspecies, American kestrel (*F. s. sparverius*), during a limited season. The rules also specify that intentional take of southeastern American kestrels (*F. s. paulus*) for falconry purposes will require an imperiled species intentional take permit in addition to a falconry permit; applicants for permits to take imperiled species must follow guidelines outlined in Rule 68-A-27.007(2)(a), F.A.C. No changes to current rules are proposed here.

*Scientific Collecting and Educational Possession Permits.*—Permits to take southeastern American kestrels for scientific or educational purposes should continue to be allowed when such permits improve our understanding and ability to conserve the species. Permits will likely be reviewed on a case-by-case basis using criteria outlined in 68A-27.007(2)(a), F.A.C. No changes to current rules are proposed here.

*Incidental take permits.*—This section deals with permits issued for incidental take of southeastern American kestrels, their young, eggs, nest cavities, and nest boxes. Incidental take occurs when planned, otherwise legal activities such as development occur in areas where listed species are present and will be impacted.

Incidental take permits are currently issued on a case-by-case basis. This plan proposes developing incidental take permitting guidelines that outline a standard process for addressing impacts.

Below is a proposed outline for southeastern American kestrel permitting guidelines. Some past FWC permitting guidelines have omitted important components necessary to ensure effective and efficient permitting statewide. This proposed outline is a recommendation only and will be superseded by permitting guidelines approved by the FWC subsequent to approval of this plan.

Permitting guidelines should include information on the following:

- How to determine when a permit is required: This section would provide information on southeastern American kestrel nest cavity and nest box definitions, rules, and enforcement policies. Enforcement policies need to outline how FWC's Division of Law Enforcement (FWC-LE) interprets and enforces rules protecting southeastern American kestrels. Without this information, it is often difficult for an applicant to determine under what circumstances a permit is required. This section would also include information on how site preparation activities for development (including infrastructure such as roads and utilities) are handled in the permitting process, and when permits are required up-front.

- Southeastern American kestrel survey protocol: This section would provide a survey protocol for finding southeastern American kestrels and their nest cavities. The protocol would cover surveys conducted prior to planned development activities. By providing a standard survey protocol, permit applicants and environmental consultants understand which required surveys are necessary to detect southeastern American kestrels and estimate their numbers or verify absence.
- Permits and mitigation: This section would provide information on permitting options available and mitigation options. Different permitting options may be provided, depending on the extent of direct or indirect impacts to southeastern American kestrels. Mitigation banking, conservation easements, and creation of a mitigation fund for kestrels could be considered. Mitigation is a crucial part of the permitting process and provides conservation benefits for the species. Mitigation helps achieve the objectives of this plan, and address threats such as loss of nesting sites and habitat.
- Permit review and issuance process: This section would outline how permits are applied for, reviewed, denied, issued, modified and revoked. A clear review and issuance process is crucial to meet statutory deadlines for reviewing and issuing permits.
- Guideline updates and modifications: This section would explain the process by which permitting guidelines can be edited in the future to improve their efficiency and conservation value and respond to concerns expressed by FWC's stakeholders and the public.

**Law Enforcement**

The FWC's Division of Law Enforcement, in conjunction with federal, state, and local partners, is responsible for enforcing Florida's wildlife laws. FWC's law enforcement officers are vital to the success of achieving the goals and objectives of this management plan because they ensure the enforcement of conservation laws that protect southeastern American kestrels and their nest cavities. Effective enforcement is also critical in ensuring an effective permitting process. This is because rules (and rule enforcement policies) define when developers and landowners are required to enter into the permitting process.

**Action 19** Develop law enforcement protocols for handling cases involving southeastern American kestrels, and incorporate these into the FWC Law Enforcement Manual.

For rules and regulations to be effective, it is important for FWC-LE to have specific direction on how rules are interpreted and enforced. Incorporating information on southeastern American kestrel rules, rule enforcement policies, and permitting guidelines into the FWC Law Enforcement Manual will help the FWC enforce rules in a consistent way.

**Action 20** Develop and implement an FWC-LE training module on southeastern American kestrels.

This module should include components to teach both trainees attending the law enforcement academy as well as officers at the regional level. The training module will be based on information provided for southeastern American kestrels in the FWC Law Enforcement Manual.

**Action 21** Focus additional specialized training for law enforcement officers who patrol areas included in southeastern American kestrel primary KMUs. Incorporate patrols into FWC work plans for these officers.

Regional FWCLE Commanders, in coordination with the Division of Habitat and Species Conservation (HSC), will organize specialized training in southeastern American kestrel biology, identification, rules, rule policy, and permitting for officers and investigators that patrol primary KMUs. Training will be conducted by FWCLE and HSC employees.

**Incentives and Influencing**

**Action 22** Promote existing incentives that encourage habitat protection and management on private lands harboring, or that have the potential to harbor, southeastern American kestrels.

The FWC currently utilizes several programs that promote conservation by providing technical and financial assistance to private landowners. The FWC informs private landowners of state and federal programs including: the Forest Stewardship Program, Wildlife Habitat Incentives Program, Wetlands Reserve Program, Environmental Quality Incentives Program, and the Partners for Fish and Wildlife Program. These programs are voluntary and some provide financial incentives, depending on annual appropriation, for wildlife conservation and habitat management on private lands. Florida also provides tax incentives including property tax exemptions for landowners that put a perpetual conservation easement on their land. This would allow any landowner interested in maintaining their current conservation or agricultural practices into the future to receive a break from property taxes for excluding additional development on their property.

When incentive programs are implemented on private lands containing kestrels or kestrel habitat, there is an increased conservation benefit to kestrels. The HMGs (Action 1) and WCMs (Action 4) should be provided to agencies that administer these incentive programs and to private landowners to further facilitate kestrel habitat management on private lands in Florida.

**Action 23** Develop new voluntary incentives that bring private rural and private residential lands into protected conservation status.

A program similar to the federal Safe Harbor Program may be considered. Safe Harbor Agreements are contracts that provide landowners with regulatory assurances. If the landowner implements land management activities that enhance the habitat resulting in additional usage by listed species, the agreement protects the landowner from additional land-use restrictions and provides FWC the opportunity to move individuals over the baseline level. The landowner cannot impact the base level amount of wildlife without a permit, but the agency agrees not to penalize the landowner if land use practices (e.g., certain agricultural practices) benefit the species by creating additional habitat or increasing the species population.

Conservation banking is another program available to private landowners interested in habitat conservation. Conservation banking for listed species is comparable to mitigation banking in that lands are permanently protected and can be used to offset adverse development related impacts

to wildlife resources, including habitats. Conservation banking is among many options that should be considered when creating mitigation options for kestrels (Action 18).

**Action 24** Inform local governments about rules and permitting guidelines for southeastern American kestrels.

Conduct workshops for local governments on new rules and permitting guidelines for southeastern American kestrels and other imperiled species.

**Action 25** Coordinate with local governments on county comprehensive growth management plans as they relate to conservation of southeastern American kestrels.

Chapter 163.3161, F.S. requires that county comprehensive growth management plans include a conservation element. The conservation element must include the identification of areas within the county that are locations of important fish, wildlife, or habitat resources, including state-listed species. This element must contain conservation principles, guidelines, and standards that restrict activities known to adversely affect the survival of these species. The FWC is identified as a state agency authorized to review county growth management plans and plan amendments to ensure important state fish, wildlife, and habitat resources are adequately considered. In addition, local government land development regulations require conditions for land and water uses that specify how such uses will be administered to be consistent with the conservation element of the county growth management plans. Therefore, interagency collaboration on the review and development of the conservation element of these plans is essential for ensuring that they consider wildlife habitat within the county. The FWC will assist counties in developing their land development regulations so these regulations better reflect the needs of southeastern American kestrels as identified in this plan.

**Education and Outreach**

Education and outreach to the public and private sector is critical in fostering awareness of kestrel habitat and reproductive needs. Gaining support from partners and stakeholders and encouraging implementation of conservation actions listed in this plan is critical to the long-term survival of the southeastern American kestrel.

**Action 26** Create and implement an outreach plan for southeastern American kestrels.

This plan will include creation and distribution of educational materials to members of the private and public sector including, but not limited to: homeowners, land managers, farmers and ranchers, utility companies, local governments, developers, and environmental consultants. All of these materials will also be incorporated into the FWC southeastern American kestrel website for public use and reference.

To be successful, educational materials need to be developed specific to the target audience. These materials should contain the following core messages:

- The southeastern American kestrel is a state-listed Threatened species protected by state and federal regulations.

- Declines in the quality and quantity of southeastern American kestrel habitat have been detrimental to kestrels in Florida.
- Habitat management and nest box installation have proved successful in increasing southeastern American kestrel subpopulations across the state.

**Action 27** Host workshops that provide an overview of southeastern American kestrel HMGs (Action 1), WCMs (Action 4), and other information on kestrel population management and monitoring.

Key stakeholders will be targeted, including public and private land managers, farmers, ranchers, and utility companies. Workshops facilitate an environment for open discussion and offer stakeholders technical assistance beyond what written materials can provide. Private landowners, wildlife managers, and utility companies have been identified as key stakeholders in the conservation of kestrel habitat and nest box installation and utilization. Successful implementation of this plan will require an investment in reaching out to these stakeholders specifically.

**Coordination with Other Entities**
Coordination with state and federal agencies, local governments, non-governmental organizations, private land managers, and utility companies will be vital to implementing this plan. Some actions are included below, and others are listed elsewhere in this plan where they are an essential part of implementing conservation actions.

**Action 28** Coordinate with existing scrub and sandhill working groups to develop and implement HMGs (Action 1) and expand nest box installation (Action 7) and monitoring (Action 10) on public and private lands.

Existing regional working groups already provide an effective platform for disseminating information to land managers on southeastern American kestrel conservation needs. Communication with these groups should help foster new partnerships. Opportunities for partnership between FWC and Georgia Department of Natural Resources staff in addressing kestrel management issues in northern Florida and southern Georgia will continue (K. Miller and N. Klaus, personal communication).

**Action 29** Work with interested utility companies to develop agreements that incentivize the installation, monitoring and management of additional kestrel nest boxes.

Utility companies own and maintain thousands of utility poles throughout the state, many of which are present in suitable kestrel habitat. Although kestrel nest boxes already have been installed on hundreds of poles, there is still much opportunity to expand this initiative through new partnerships. The permitting process (Action 18) for southeastern American kestrels should provide flexibility for utility companies to partner with the FWC. Maintenance or replacement of metal structures along major utility corridors used by nesting kestrels also will need to be addressed through agreements with utility companies.

## Table 2. Southeastern American Kestrel (*Falco sparverius paulus*) Conservation Action Table

***NOTE: An explanation of acronyms used is below the table.***

| Objective(s) Addressed | Team Assigned Priority Level | Action Item Number | Action Items | Conservation Action Category | Ongoing, Expanded or New Effort? | Authority | Man Power | Estimated Cost To Implement | Funding Source(s) | Lead for Implementation: FWC Program(s) and/or Section(s) | External partners | Likely Effectiveness | Feasibility | Urgent? |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1,2,3 | 1 | 1 | Develop and implement HMGs for southeastern American kestrels. | Habitat Conservation & Mgmt | NEW | YES | NO | TBD | Unknown | HSC | Public and private landowners interested in managing habitat specifically for kestrels | High | YES, but funding and partnerships will be necessary to achieve this. | YES - Kestrels need prescribed fire to maintain habitat and nest cavities/boxes. |
| 1,2,3 | 2 | 2 | Develop habitat management, protection, and acquisition targets for KMUs. Continue to refine habitat assessments within KMUs to assist in setting objectives. | Habitat Conservation & Mgmt | NEW | YES | YES | TBD | Unknown | HSC, FWRI | Universities, local governments, public and private landowners | Moderate | High | YES - Determining targets is important in measuring progress towards achieving the goal of the plan. |
| 1,2,3 | 1 | 3 | Focus land acquisition and protection efforts within KMUs that have a low percentage of land in public ownership. | Habitat Conservation & Mgmt | NEW | YES | NO | TBD | Unknown | HSC, FWRI | Local governments, private landowners | High | YES, but funding for land acquisition needed. | YES - Upland habitat is being rapidly developed in Florida. |
| 1,2,3 | 3 | 4 | Develop voluntary southeastern American kestrel WCMs for agricultural and silvicultural lands. | Habitat Conservation & Mgmt | ONGOING | YES | NO | TBD | Unknown | HSC | USDA, private landowners | Moderate | YES, but additional staff needed to implement this program. | YES - Kestrels use agricultural habitats which are more common now in the state than native upland habitat. |
| 1,2,3 | 2 | 5 | Identify and continue to refine spatial units for management and monitoring including: 1) subpopulations and 2) KMUs. | Population Mgmt | ONGOING | YES | YES | TBD | Unknown | HSC, FWRI | Universities, subject matter experts | High | High | YES - This framework of KMUs and priority focal areas will help prioritize where conservation actions are most important. |
| 1,2,3 | 2 | 6 | Establish southeastern American kestrel population targets for KMUs. | Population Mgmt | NEW | YES | YES | TBD | Unknown | FWRI | Subject matter experts | High | High | YES - Establishing population targets for management units will help measure progress towards the plan goal. |
| 1,2,3 | 1 | 7 | Install, maintain, and monitor kestrel nest boxes on public and privately managed lands in peninsular Florida using expanded partnerships. | Population Mgmt | ONGOING | YES | NO | TBD | Unknown | HSC, FWRI, OPAWV | Public and private landowners, NGOs, utility companies | High | High | YES - Installation of nest boxes will directly benefit kestrels; monitoring necessary to measure success toward achieving plan goal. |
| 1,2,3 | 1 | 8 | Establish a coordinator to grow existing kestrel conservation efforts into a statewide SAKMP on public and private lands. | Population Mgmt | NEW | YES | NO | TBD | Unknown | HSC, FWRI | TBD | High | High | YES - Nest box installation, monitoring, and maintenance cannot occur without creation of partnerships. Coordinator needed to recruit, train, and retain partners over the long-haul. |
| 1,2,3 | 2 | 9 | Assess the current distribution of southeastern American kestrels throughout Florida. | Monitoring & Research | ONGOING | YES | YES | TBD | Already Funded | HSC, FWRI | Public and private land managers, NGOs, interested birders | High | High | NO - Understanding distribution is important, but does not directly impact management activities, at least initially. |
| 1,2,3 | 1 | 10 | Implement a comprehensive, multi-pronged, population monitoring program for southeastern American kestrels to measure progress towards meeting plan objectives. | Monitoring & Research | EXPANDED | YES | YES | TBD | Unknown | HSC, FWRI | Public and private landowners, NGOs | High | High | YES - Monitoring will be critical to measuring progress towards achieving the plan goal. |
| 1,2,3 | 1 | 11 | Develop a new habitat model for southeastern American kestrels to aid in developing habitat and population targets and to identify optimal locations to focus management attention. | Monitoring & Research | NEW | YES | YES | TBD | Unknown | FWRI | Subject matter experts | High | High | YES - Habitat models will help to identify where conservation actions are most needed. |
| 1,2,3 | 1 | 12 | Conduct research to determine southeastern American kestrel carrying capacity and productivity in oak scrub, sand pine scrub, and other upland plant communities to further the understanding of the role of these natural communities and to refine HMGs (Action 1). | Monitoring & Research | NEW | YES | NO | TBD | Unknown | FWRI | Universities | High | High | YES - Research on oak scrub and sand pine scrub habitat will clarify the role of these habitats play in southeastern American kestrel conservation. |

## Table 2. Southeastern American Kestrel (*Falco sparverius paulus*) Conservation Action Table

| Objective(s) Addressed | Team Assigned Priority Level | Action Item Number | Action Items | Conservation Action Category | Ongoing, Expanded or New Effort? | Authority | Man Power | Estimated Cost To Implement | Funding Source(s) | Lead for Implementation: FWC Program(s) and/or Section(s) | External partners | Likely Effectiveness | Feasibility | Urgent? |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1,2,3 | 1 | 13 | Assess the population status, population demographics, and reproductive health of southeastern American kestrels in human-modified landscapes, particularly those dominated by agricultural land uses. | Monitoring & Research | NEW | YES | NO | TBD | Unknown | FWRI | Universities | High | High | YES - Research on southeastern American kestrel populations living in agricultural landscapes will clarify the role these habitats play in kestrel conservation and help refine agricultural BMPs. |
| 1,2,3 | 2 | 14 | Identify common habitat needs as well as potential conflicts associated with managing other imperiled species in southeastern American kestrel habitat. | Monitoring & Research | NEW | YES | NO | TBD | Unknown | FWRI | Universities | Moderate | Moderate | YES - Identifying potential conflicts in management strategies between southeastern American kestrels and other priority species could be helpful in assisting landowners in developing optimal strategies for managing multiple imperiled species. |
| 1,2,3 | 3 | 15 | Identify potential barriers to movement and connectivity for southeastern American kestrel subpopulations. | Monitoring & Research | NEW | YES | NO | TBD | Unknown | FWRI | Universities | Moderate | High | YES - Identifying potential barriers to connectivity will help identify where to preserve habitat connecting subpopulations. |
| 1,2,3 | 3 | 16 | Determine how extensively southeastern American kestrels use structures along major utility corridors for nesting. | Monitoring & Research | NEW | YES | NO | TBD | Unknown | FWRI | Universities | Moderate | Moderate | YES - Utility corridors may be important habitat for southeastern American kestrels. |
| 1,2,3 | 3 | 17 | Develop rule enforcement policies necessary for the conservation of the southeastern American kestrel. | Protections & Permitting | NEW | YES | YES | TBD | Unknown | HSC, LE, DLE | A wide variety of stakeholders that could be impacted by rule and permitting decisions | High | High | YES - Rules provide protections for kestrels and are also the basis for establishing when permits are and are not required. |
| 1,2,3 | 3 | 18 | Create Permitting Guidelines for southeastern American kestrels. | Protections & Permitting | NEW | YES | YES | TBD | Unknown | HSC, LE, DLE | Developers, conservation groups, Local governments, etc | High | YES, if effective mitigation strategies are developed, could contribute to protecting kestrels and their habitat. | YES - Habitat loss is a key threat to kestrels. If permitting process mitigates for loss of both kestrels and their habitat, it will address an important threat. |
| 1,2,3 | 3 | 19 | Develop law enforcement protocols for handling cases involving southeastern American kestrels, and incorporate these into the FWC Law Enforcement Manual. | Law Enforcement | NEW | YES | YES | TBD | Unknown | HSC, LE, DLE | TBD | High | High | YES - Enforcement of rules is essential to an effective permitting process. |
| 1,2,3 | 3 | 20 | Develop and implement an FWC-LE training module for southeastern American kestrels. | Law Enforcement | NEW | YES | YES | TBD | Unknown | HSC,LE, DLE | TBD | High | High | YES - Enforcement of rules is essential to an effective permitting process. |
| 1,2,3 | 3 | 21 | Focus additional specialized training for law enforcement officers who patrol areas in southeastern American kestrel primary KMUs. Incorporate patrols into FWC work plans for these officers. | Law Enforcement | NEW | YES | YES | TBD | Unknown | HSC, LE, DLE | TBD | High | High | YES - Enforcement of rules is essential to an effective permitting process. |
| 1,2,3 | 2 | 22 | Promote existing incentives that encourage habitat protection and management on private lands harboring, or that have the potential to harbor, southeastern American kestrels. | Incentives & Influencing | NEW | YES | YES | TBD | Unknown | HSC | Local governments, private landowners | High | High | YES - Promoting habitat management and protection on private lands will benefit kestrels. |
| 1,2,3 | 2 | 23 | Develop new voluntary incentives that bring private rural and private residential lands into protected conservation land status. | Incentives & Influencing | NEW | YES | YES | TBD | Unknown | HSC | Private landowners | High | High | YES- Protecting habitat for kestrels is essential for the conservation of the species. |
| 1,2,3 | 3 | 24 | Inform local governments about rules and permitting guidelines for southeastern American kestrels. | Incentives & Influencing | NEW | YES | NO | TBD | Unknown | HSC | Local governments | High | High | YES - Local government knowledge of rules and regulations will help protect kestrels in these areas. |
| 1,2,3 | 3 | 25 | Coordinate with local governments on county comprehensive growth management plans as they relate to conservation of southeastern American kestrels. | Incentives & Influencing | NEW | YES | NO | TBD | Unknown | HSC | Local Governments | High | High | YES - Working with local governments on county comprehensive plans could help conserve habitat for kestrels. |

## Table 2. Southeastern American Kestrel (*Falco sparverius paulus*) Conservation Action Table

| Objective(s) Addressed | Team Assigned Priority Level | Action Item Number | Action Items | Conservation Action Category | Ongoing, Expanded or New Effort? | Authority | Man Power | Estimated Cost To Implement | Funding Source(s) | Lead for Implementation: FWC Program(s) and/or Section(s) | External partners | Likely Effectiveness | Feasibility | Urgent? |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1,2,3 | 2 | 26 | Create and implement an outreach plan for southeastern American kestrels. | Education & Outreach | NEW | YES | YES | TBD | Unknown | HSC, OCR | All partners involved with kestrel conservation and management | High | High | YES - Outreach materials will need to be developed to implement many of the actions of this plan. |
| 1,2,3 | 3 | 27 | Host workshops that provide an overview of Kestrel HMGs (Action 1), WCMs (Action 4), and other information on kestrel population management and monitoring. | Education & Outreach | NEW | YES | NO | TBD | Unknown | HSC, OCR | Public and Private land managers, farmers, ranchers, utility companies | High | High | YES - Targeted workshops are an effective outreach tool for increasing awareness of kestrel management and monitoring initiatives. |
| 1,2,3 | 3 | 28 | Coordinate with existing scrub and sandhill working groups to develop and implement HMGs (Action 1) and expand nest box installation (Action 7) and monitoring (Action 10) on public and private lands. | Coordination with Other Entities | NEW | YES | YES | TBD | Unknown | HSC | Scrub and Sandhill Working Group members | High | High | YES - Coordination with existing scrub and sandhill working groups members has a high probability of raising awareness of actions necessary to conserve kestrels in scrub and sandhill habitats. |
| 1,2,3 | 3 | 29 | Work with interested utility companies to develop agreements that incentivize the installation and monitoring of additional kestrel nest boxes. | Coordination with Other Entities | EXPANDED | YES | NO | TBD | Unknown | HSC, LE | Utility companies | High | High | YES - Utility companies offer crucial nesting habitat for kestrels. |

**Acronyms used in this table:**

| | |
|---|---|
| BMP: | Best Management Practices |
| DLE: | The Florida Fish and Wildlife Conservation Commission's Division of Law Enforcement |
| FWC: | Florida Fish and Wildlife Conservation Commission |
| FWRI: | Fish and Wildlife Research Institute, the research branch of the Florida Fish and Wildlife Conservation Commission |
| HMG: | Habitat Management Guidelines |
| HSC: | Habitat and Species Conservation, a Division of the Florida Fish and Wildlife Conservation Commission |
| KMU: | Kestrel Management Unit |
| LE: | Law enforcement (all pertinent agencies) |
| NGO: | Non-governmental organization(s) |
| OCR: | Office of Community Relations, administered by the Florida Fish and Wildlife Conservation Commission |
| SAKMP: | Southeastern American Kestrel Monitoring Partnership |
| TBD: | To be determined |
| USDA: | United States Department of Agriculture |
| WCM: | Wildlife Conservation Measures |

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# APPENDICES

**Appendix 1. Total area of kestrel management units (KMUs) and percent area of important land cover features.**

| KMU | $Km^2$ | Sandhill & High Pine | Scrub | Agricultural | Managed[a] | Urban |
|---|---|---|---|---|---|---|
| 1-Panhandle | 6,540 | 26.9% | 0.4% | 15.2% | 43.9% | 8.3% |
| 2-Suwannee Pasture | 4,793 | 1.9% | 0.1% | 33.8% | 5.2% | 6.9% |
| 3-Brooksville Pasture | 5,513 | 3.0% | 0.5% | 31.1% | 11.2% | 11.2% |
| 4-Brooksville Ridge | 2,990 | 22.5% | 0.5% | 22.4% | 18.2% | 15.8% |
| 5-Hillsborough | 7,028 | 0.4% | 0.5% | 23.4% | 20.5% | 15.1% |
| 6-Lake Wales | 7,023 | 0.6% | 3.6% | 39.7% | 19.3% | 7.4% |
| 7-Southwest | 10,740 | 0.0% | 0.4% | 35.1% | 17.4% | 17.4% |
| 8-Trail Ridge | 2,922 | 9.7% | 0.8% | 8.3% | 23.3% | 12.6% |
| 9-Ocala NF | 1,551 | 14.1% | 61.8% | 0.4% | 99.8% | 2.3% |
| 10-Northeast | 7,311 | 0.7% | 0.5% | 10.3% | 18.2% | 13.8% |

[a]Land managed primarily for conservation purposes.

**Appendix 2. List of conservation areas with southeastern American kestrel habitat.** Conservation lands included have >50% of their land area within a kestrel management unit (KMU) and contain at least 0.5 $km^2$ of potential kestrel habitat. Kestrel habitat estimate includes sandhill, high pine, scrub, dry prairie, and open pasture lands.

| KMU | Conservation land with kestrel habitat ≥ 5 $km^2$ | Conservation land with kestrel habitat < 5 $km^2$ |
|---|---|---|
| 1-Panhandle | Eglin Air Force Base | Nokuse Plantation Conservation Easements |
| | Blackwater River State Forest | Yellow River Water Management Area |
| | | Harold Outlying Landing Field |
| | | Patterson Natural Area |
| | | Naval Air Station Whiting Field |
| | | Blackwater River State Park |
| 2-Suwannee Pasture | Twin Rivers State Forest | Suwannee Ridge Mitigation Park Wildlife and Environmental Area (WEA) |
| | Chinquapin Farm Conservation Easement | Little River Conservation Area |
| | Ichetucknee Springs State Park | River Rise Preserve State Park |
| | | Suwannee River State Park |
| | | Woods Ferry Conservation Area |
| | | O'leno State Park |
| | | Withlacoochee West Conservation Area |
| | | Holton Creek Conservation Area |
| | | Falmouth Spring Conservation Area |
| | | Fort Union Conservation Area |
| | | Upper Alapaha Conservation Area |
| | | Camp Branch Conservation Area |
| | | Charles Spring Conservation Area |
| | | Suwannee Valley Conservation Area |
| 3-Brooksville Pasture | Beville Ranch Conservation Easement | Lake Panasoffkee |
| | Indian Lake State Forest | Fort White Mitigation Park WEA |
| | Ross Prairie State Forest | Bell Ridge Longleaf Mitigation Park WEA |

| | | |
|---|---|---|
| | Half Moon WMA | Southwest Florida Water Management District/ Gum Slough Conservation Easement |
| | Potts Preserve | Flying Eagle Ranch |
| | | Fort Cooper State Park |
| | | Silver Springs Conservation Area |
| | | Wannee Conservation Area |
| | | Panasoffkee/Outlet Tract |
| | | Ichetucknee Conservation Area |
| 4-Brooksville Ridge | Subtropical Agricultural Research Station | Rainbow Springs State Park |
| | Annutteliga Hammock | Chinsegut WEA |
| | | Watermelon Pond Mitigation Park WEA |
| | | Perry Oldenburg Mitigation Park WEA |
| | | Janet Butterfield Brooks Preserve WEA |
| | | Halpata Tastanaki Preserve |
| | | Chassahowitzka WMA |
| 5-Hillsborough | Green Swamp Land Authority Land Protection Agreements | Al Bar Ranch |
| | Cone Ranch | Gator Creek Reserve |
| | Green Swamp | Little Manatee River Corridor |
| | Florida Department of Environmental Protection/Green Swamp Conservation Easements | Colt Creek State Park |
| | Alafia River Corridor | Lake Hancock |
| | Starkey Wilderness Preserve | Four Corners Conservation Easement |
| | Upper Hillsborough | Crooked Lake WEA |
| | Southwest Florida Water Management District/Green Swamp Conservation Easements | Lake Dan Preserve |
| | Cross Bar Ranch Wellfield | Circle B Bar Reserve |
| | Green Swamp/Bass Conservation Easement | Fish Hawk |
| | | Homeland |
| | | Conner Preserve |
| | | Balm Scrub |
| | | Morsani Conservation Easement |

| | | |
|---|---|---|
| | | Alderman's Ford Preserve |
| | | Little Manatee River State Park |
| | | Brooker Creek Buffer Preserve |
| | | Blackwater Creek Preserve |
| | | Triple Creek Nature Preserve |
| | | Osprey Unit |
| | | Balm-Boyette Scrub |
| | | Alafia River State Park |
| | | McIntosh/Zack |
| | | South Peace River |
| | | The Jahna Ranch Conservation Easement |
| 6-Lake Wales Ridge | Fisheating Creek/Lykes Brothers Conservation Easement | Disney Wilderness Preserve |
| | Avon Park Air Force Range | Paradise Run |
| | Lake Wales Ridge State Forest | Tiger Creek Preserve |
| | Fisheating Creek/Smoak Groves Conservation Easement | Lake Kissimmee State Park |
| | North of Lake Okeechobee Storage Reservoir | Nicodemus Slough Flowage Easement |
| | Hatchineha Ranch | Bass Ranch Conservation Easement |
| | Archbold Biological Station | Henscratch Conservation Easement |
| | Allen David Broussard Catfish Creek Preserve State Park | Crooked Lake West - Stuart Tract |
| | Lake Wales Ridge WEA | Platt Branch Mitigation Park WEA |
| | XL Ranch Conservation Easement | Highlands Hammock State Park |
| | Fisheating Creek WMA | SUMICA (Société Universelle Mining Industrie, Commerce et Agriculture) |
| | | Morgan Conservation Easement |
| | | North/Walk-in-Water Creek |
| 8-Trail Ridge | Camp Blanding Military Reservation | Bayard Conservation Area |
| | Jennings State Forest | Black Creek Ravines Conservation Area |
| | Ordway-Swisher Biological Station | |
| | Etoniah Creek State Forest | |

| | | |
|---|---|---|
| | Mike Roess Gold Head Branch State Park | |
| 9-Ocala NF | Ocala National Forest (Ocala WMA) | |

**Appendix 3. Southeastern American kestrel nest box monitoring protocol**
Prepared by Karl Miller, karl.miller@myfwc.com · (352)334-4215 · April 2011

- New nest boxes should be installed during the winter, no later than early February.
- Typical nesting chronology of Southeastern American Kestrels in north-central Florida:
    - Eggs laid mid-March – mid-April
    - Eggs hatch mid-April – mid-May
    - Young leave nest mid-May – mid-June
- Nesting chronology is similar in southern Florida, but you may adjust the timing of nest visits 1 week earlier if you wish.
- Please evict flying squirrels and gray squirrels and remove their nesting materials (typically Spanish moss and other plant material); leave screech owls and songbirds undisturbed.

**Recommended Protocol**

**Visit #1** – 1st or 2nd week of February
- Occasionally, kestrels will begin nesting in late February/early March so cleaning boxes as early as possible in February is advisable
- If necessary, repair old nest boxes and clean out debris if excessive
- *Optional:* Add coarse wood shavings (not saw dust)

**Visit #2** – 1st or 2nd week of April
- Count number of eggs in nest if present
- Record presence, sex, and behavior of adult kestrels in "Actions / Comments"
- *Optional*: If <5 eggs present, revisit box in 7 to 10 days to confirm completed clutch size

**Visit #3** – 1st or 2nd week of May
- Count number of eggs/chicks in nest
- Record presence, sex, and behavior of adult kestrels in "Actions / Comments"

**Visit #4 (*Optional*)** – 4th week of May or 1st week of June
- Count number of eggs/chicks in nest
- Record presence/absence of kestrel droppings and nest debris (successful nests will appear heavily "white washed" from droppings and have insect parts)
- Record presence, sex, and behavior of adult kestrels in "Actions / Comments"

**Visit #5 (*Optional*)** – 1st or 2nd week of July
- Count number of eggs/chicks in nest
- Record presence/absence of kestrel droppings and nest debris
- Record presence, sex, and behavior of adult kestrels in "Actions / Comments"

**Minimum Protocol**

Conduct Visit #1 and Visit #2 for all nest boxes; also conduct Visit #3 for any nest box that is not active during Visit #2. Examination of nest box contents during April and early May is critical; behavioral observations are not sufficient to confirm occupancy by kestrels.